Updated 11/10/10

FEDERAL PROJECT

Effective November 10, 2010
Supersedes January 20, 2010

BIDDING INSTRUCTIONS

FOR ALL PROJECTS:

1. Use pen and ink to complete all paper Bids.
2. As a minimum, the following must be received prior to the time of Bid opening:

For a Paper Bid:

a) a copy of the Notice to Contractors, b) the completed Acknowledgement of Bid Amendments form, c) the completed Schedule of Items, d) two copies of the completed and signed Contract Offer, Agreement & Award form, e) a Bid Guaranty, (if required), and f) any other certifications or Bid requirements listed in the Bid Documents as due by Bid opening.

For an Electronic Bid:

a) a completed Bid using Expedite® software and submitted via the Bid Express™ web-based service, b) an electronic Bid Guaranty (if required) or a faxed copy of a Bid Bond (with original to be delivered within 72 hours), and c) any other Certifications or Bid requirements listed in the Bid Documents as due by Bid opening.

3. Include prices for all items in the Schedule of Items (excluding non-selected alternates).
4. Bid Guaranty acceptable forms are:
   a) a properly completed and signed Bid Bond on the Department's prescribed form (or on a form that does not contain any significant variations from the Department's form as determined by the Department) for 5% of the Bid Amount or
   b) an Official Bank Check, Cashier's Check, Certified Check, U.S. Postal Money Order or Negotiable Certificate of Deposit in the amount stated in the Notice to Contractors or
   c) an electronic bid bond submitted with an electronic bid.

5. If a paper Bid is to be sent, Federal Express overnight delivery is suggested as the package is delivered directly to the DOT Headquarters Building located at 16 Child Street in Augusta. Other means, such as U.S. Postal Service's Express Mail has proven not to be reliable.

IN ADDITION, FOR FEDERAL AID PROJECTS:

6. Complete the DBE Proposed Utilization form, and submit with your bid. If you are submitting your bid electronically, you must FAX the form to (207) 624-3431.

If you need further information regarding Bid preparation, call the DOT Contracts Section at (207) 624-3410.

For complete bidding requirements, refer to Section 102 of the Maine Department of Transportation, Standard Specifications, Revision of December 2002.

January 30, 2004
Supercedes February 11, 2003

NOTICE

The Maine Department of Transportation is attempting to improve the way Bid Amendments/Addendums are handled, and allow for an electronic downloading of bid packages from our website, while continuing to maintain a planholders list.

Prospective bidders, subcontractors or suppliers who wish to download a copy of the bid package and receive a courtesy notification of project specific bid amendments, must provide an email address to Diane Barnes or Mike Babb at the MDOT Contracts mailbox at: MDOT.contracts@maine.gov. Each bid package will require a separate request.

Additionally, interested parties will be responsible for reviewing and retrieving the Bid Amendments from our web site, and acknowledging receipt and incorporating those Bid Amendments in their bids using the Acknowledgement of Bid Amendment Form.

The downloading of bid packages from the MDOT website is not the same as providing an electronic bid to the Department. Electronic bids must be submitted via http://www.BIDX.com. For information on electronic bidding contact Larry Childs at Larry.Childs@maine.gov.

NOTICE

For security and other reasons, all Bid Packages which are mailed, shall be provided in double (one envelope inside the other) envelopes. The *Inner Envelope* shall have the following information provided on it:

Bid Enclosed - Do Not Open
PIN:
Town:
Date of Bid Opening:
Name of Contractor with mailing address and telephone number:

In Addition to the usual address information, the *Outer Envelope* should have written or typed on it:

Double Envelope: Bid Enclosed
PIN:
Town:
Date of Bid Opening:
Name of Contractor:
This should not be much of a change for those of you who use Federal Express or similar services.

Hand-carried Bids may be in one envelope as before, and should be marked with the following infrormation:

Bid Enclosed: Do Not Open
PIN:
Town:
Name of Contractor:

STATE OF MAINE DEPARTMENT OF TRANSPORTATION

Bid Guaranty-Bid Bond Form

KNOW ALL MEN BY THESE PRESENTS THAT_____

_____, of the City/Town of _____and State of_____

as Principal, and _____as Surety, a

Corporation duly organized under the laws of the State of_____and having a usual place of

Business in _____and hereby held and firmly bound unto the Treasurer of

the State of Maine in the sum of_____,for payment which Principal and Surety bind

themselves, their heirs, executers, administrators, successors and assigns, jointly and severally.

The condition of this obligation is that the Principal has submitted to the Maine Department of Transportation, hereafter Department, a certain bid, attached hereto and incorporated as a part herein, to enter into a written contract for the construction of _____

_____

_____and if the Department shall accept said bid and the Principal shall execute and deliver a contract in the form attached hereto (properly completed in accordance with said bid) and shall furnish bonds for this faithful performance of said contract, and for the payment of all persons performing labor or furnishing material in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be null and void; otherwise it shall remain in full force, and effect.

Signed and sealed this_____day of _____20_____

WITNESS:

_____

_____

_____

WITNESS

_____

_____

_____

PRINCIPAL:

By_____

By:_____

By:_____

SURETY:

By_____

By:_____

Name of Local Agency: _____

SAMPLE

NOTICE

Bidders:

Please use the attached “Request for Information” form when faxing questions and comments concerning specific Contracts that have been Advertised for Bid. Include additional numbered pages as required. Questions are to be faxed to the number listed in the Notice to Contractors. This is the only allowable mechanism for answering Project specific questions. Maine DOT will not be bound to any answers to Project specific questions received during the Bidding phase through other processes.

State of Maine
Department of Transportation

REQUEST FOR INFORMATION

Date _____ Time _____

Information Requested: **PIN: _____** **Town(s): _____**

_____

_____

_____

_____

_____

_____

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_____

Request by: _____ **Phone: (_____)_____**
Bid Date: _____ **Fax: (_____)_____**

Complete top portion of form and transmit to the number listed in the Notice to Contractors

RFI No: _____ **RFI received: _____**

Response:_____

_____

_____

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_____

_____

Response By:_____ Date: _____

NOTICE

Disadvantaged Business Enterprise Proposed Utilization

All Bidders must submit the Disadvantaged Business Enterprise Proposed Utilization form with their bid.

The Contractor's Disadvantaged Business Enterprise Proposed Utilization Plan form contains information that is required by U.S. DOT.

The Maine Department of Transportation's Contractor's Disadvantaged Business Enterprise Proposed Utilization Plan form must be used.

A copy of the new Contractor's Disadvantaged Business Enterprise Proposed Utilization Plan and instructions for completing it are attached.

Note: Questions about DBE firms, or to obtain a printed copy of the DBE Directory, contact The Office of Civil Rights at (207) 624-3066.

MDOTs DBE Directory of Certified firms can also be obtained at www.maine.gov/mdot/disadvantaged-business-enterprises/dbe-home.php

INSTRUCTIONS FOR PREPARING THE CONTRACTOR'S DISADVANTAGED BUSINESS ENTERPRISE UTILIZATION PLAN

The Contractor Shall:

1. Submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan with your bid on the Bid day.

2. Extend equal opportunity to MDOT certified DBE firms (as listed in MDOT's DBE Directory of Certified Businesses) in the selection and utilization of Subcontractors and Suppliers.

SPECIFIC INSTRUCTIONS FOR COMPLETING THE FORM:

Insert Contractor name, the name of the person(s) preparing the form, and that person(s) telephone, fax number and e-mail address.

Provide total Bid price, Federal Project Identification Number, and location of the Project work.

In the columns, name each subcontractor, DBE and non-DBE firm to be used, provide the Unit/Item cost of the work/product to be provided by the subcontractor, give a brief description and the dollar value of the work.

DBE GOAL NOTICE

Maine Department of Transportation
Disadvantaged Business Enterprise Program

Notice is hereby given that in accordance with US DOT regulation 49 CFR Part 26, the Maine Department of Transportation has established a DBE Program for disadvantaged business participation in the federal-aid construction program; MaineDOT contracts covered by the program include consulting, construction, supplies, manufacturing, and service contracts.

For FFY 2010 (October 1, 2009 through September 30, 2010), MaineDOT has established a DBE participation goal of 5.9% to be achieved through race/gender neutral means.

Interested parties may view MaineDOT's DBE goal setting methodology posted on this website. If you have questions regarding this goal you may contact the Maine Department of Transportation, Civil Rights Office by telephone at (207) 624-3042 or by e-mail at: theresa.savoy@maine.gov.

This DBE goal, at the request of Federal Highway Administration, has been recalculated and was resubmitted for approval on May 6, 2010. This goal remains in effect through September 30, 2012 unless otherwise determined by Federal Highway Administration.

____ **Original Submission** **Page ___ of ___**

____ **Revision # _____**

MaineDOT CONTRACTOR'S DBE/SUBCONTRACTOR UTILIZATION FORM

All Bidders must furnish this form with their bid on Bid Opening day

Contractor:_____ **Telephone:** _____ **Ext.** _____

Contact Person:_____ **Fax:** _____

E-mail: _____

BID PRICE: $_____ **BID DATE:** _____/_____/_____

FEDERAL PROJECT PIN # _____ **PROJECT LOCATION:** _____

TOTAL ANTICIPATED DBE _____ **% PARTICIPATION FOR THIS SUBMISSION**

WBE•	DBE•	Non DBE	Firm Name	Item Number & Description of Work	Quantity	Cost per Unit/Item	Actual $ Value
						Subcontractor Total ›	
						DBE Total >	

NOTE: THIS INFORMATION IS USED TO TRACK AND REPORT ANTICIPATED DBE PARTICIPATION IN ALL FEDERALLY FUNDED MAINE DOT CONTRACTS. THE ANTICIPATED DBE AMOUNT IS VOLUNTARY AND WILL NOT BECOME A PART OF THE CONTRACTUAL TERMS.

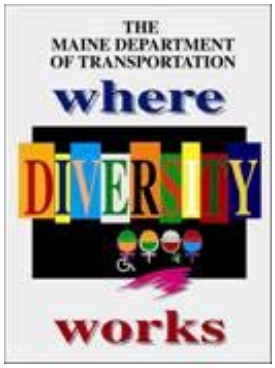
Equal Opportunity Use:

Form received: ___/___/___ Verified by: _____

cc: ☐ Contracts ☐ Other _____

For a complete list of certified firms and company designation (WBE/DBE) go to http://www.maine.gov/mdot

Rev. 7/10



Maine Department of Transportation Civil Rights Office

Directory of Certified Disadvantaged Business Enterprises

Listing can be found at:
www.maine.gov/mdot/disadvantagedbusiness-enterprises/dbe-home.php

For additional information and guidance contact: Civil Rights Office at (207) 624-3066

It is the responsibility of the Contractor to access the DBE Directory at this site in order to have the most current listings.

September 14, 2007

Vendor Registration

Prospective Bidders must register as a vendor with the Department of Administrative & Financial Services if the vendor is awarded a contract. Vendors will not be able to receive payment without first being registered. Vendors/Contractors will find information and register through the following link –
http://www.maine.gov/purchases/vendorinfo/vss.htm

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

PORTLAND
CUMBERLAND COUNTY

PROJECT NO. DTMA1G10006/TIGER
PIN 017820.00

PORTLAND INTERNATIONAL MARINE TERMINAL IMPROVEMENTS PROJECT

MAY 2011

PORTLAND INTERNATIONAL MARINE TERMINAL IMPROVEMENTS PROJECT

Portland, Cumberland County

PIN 017820.00

SECTION 1

Portland International Marine Terminal Improvement Project

Portland - Cumberland County

PIN 017820.00

TABLE OF CONTENTS

STATE OF MAINE DEPARTMENT OF TRANSPORTATION
NOTICE TO CONTRACTORS

Sealed Bids addressed to the Maine Department of Transportation, Augusta, Maine 04333 and endorsed on the wrapper **"Portland International Marine Terminal Improvements Project, City of Portland"** will be received from contractors at the Reception Desk, Maine DOT Building, Child Street, Augusta, Maine, until 11:00 o'clock A.M. (prevailing time) on **July 6, 2011** and at that time and place publicly opened and read. Bids will be accepted from all bidders. The lowest responsive bidder must have completed, or successfully complete, a Highway, Marine, Building, or project specific prequalification to be considered for the award of this contract. **We now accept electronic bids for those bid packages posted on the bidx.com website. Electronic bids do not have to be accompanied by paper bids. Please note: the Department will accept a facsimile of the bid bond; however, the original bid bond must then be received at the MDOT Contract Section within 72 hours of the bid opening. Until further notice, dual bids (one paper, one electronic) will be accepted, with the paper copy taking precedence.**

Description: Federal Project No. DTMA1G10006/TIGER, PIN 017820.00
Location: In Cumberland County, project is located on Commercial Street in Portland.

Outline of Work: The Work includes building demolition, construction of new pier space, construction of a new operations building, various site modifications to include paving, lighting and misc. electrical work, drainage improvements, fencing, maintenance of traffic and other incidental work outlined in the bid documents.

The basis of award will be Section 1 only.

For general information regarding Bidding and Contracting procedures, contact Scott Bickford at (207)624-3410. Our webpage at http://www.maine.gov/mdot/contractors/ contains a copy of the schedule of items, Plan Holders List, written portions of bid amendments (not drawings), and bid results. For Project-specific information fax all questions to **Project Manager Paul Pottle** at (207)624-3431. Questions received after 12:00 noon of Friday prior to bid date will not be answered. Bidders shall not contact any other Departmental staff for clarification of Contract provisions, and the Department will not be responsible for any interpretations so obtained. Hearing impaired persons may call the Telecommunication Device for the Deaf at 888-516-9364.

Plans, specifications and bid forms may be seen at the Maine DOT Building in Augusta, Maine, and at the Department of Transportation's Regional Office in Scarborough. They may be purchased from the Department between the hours of 8:00 a.m. to 4:30 p.m. by cash, credit card (Visa/Mastercard) or check payable to Treasurer, State of Maine sent to Maine Department of Transportation, Attn.: Mailroom, 16 State House Station, Augusta, Maine 04333-0016. They also may be purchased by telephone at (207)624-3536 between the hours of 8:00 a.m. to 4:30 p.m. Full size plans $71.00 (76.50 by mail) Half size plans 35.50 (38.75 by mail), Single Sheets $2, payment in advance, all non-refundable.

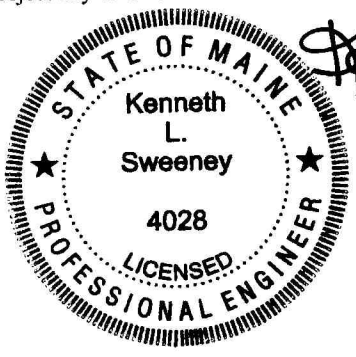
Each Bid must be made upon blank forms provided by the Department and must be accompanied by a bid bond at 5% of the bid amount or an official bank check, cashier's check, certified check, certificate of deposit, or United States postal money order in the amount of $130,000.00 payable to Treasurer, State of Maine as a Bid guarantee. A Contract Performance Surety Bond and a Contract Payment Surety Bond, each in the amount of 100 percent of the Contract price, will be required of the successful Bidder.

This Contract is subject to all applicable Federal Laws. This contract is subject to compliance with the Disadvantaged Business Enterprise program requirements as set forth by the Maine Department of Transportation.

All work shall be governed by "State of Maine, Department of Transportation, Standard Specifications, Revision of December 2002", price $10 [$13 by mail], and Standard Details, Revision of December 2002, price $20 [$25 by mail]. Standard Detail updates can be found at http://www.maine.gov/mdot/contractors/publications/ .

The right is hereby reserved to the Maine DOT to reject any or all bids.

Augusta, Maine
June 15, 2011



Kenneth L. Sweeny P.E.
CHIEF ENGINEER

Portland
PIN 017820.00
April 14, 2011
Supersedes August 3, 2004

SPECIAL PROVISION 102.7.3
ACKNOWLEDGMENT OF BID AMENDMENTS

With this form, the Bidder acknowledges its responsibility to check for all Amendments to the Bid Package. For each Project under Advertisement, Amendments are located at http://www.maine.gov/mdot/contractors/ . It is the responsibility of the Bidder to determine if there are Amendments to the Project, to download them, to incorporate them into their Bid Package, and to reference the Amendment number and the date on the form below. The Maine DOT will not post Bid Amendments any later than noon the day before Bid opening without individually notifying all the planholders.

Amendment Number	Date

The Contractor, for itself, its successors and assigns, hereby acknowledges that it has received all of the above referenced Amendments to the Bid Package.

CONTRACTOR

_____ _____
Date Signature of authorized representative

_____
(Name and Title Printed)

SCHEDULE OF ITEMS REVISED:

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
	SECTION 0001 PROJECT ITEMS					
0010	201.23 REMOVING SINGLE TREE TOP ONLY	14.000 EA				
0020	202.01 REMOVING STRUCTURES AND OBSTRUCTIONS	LUMP	LUMP			
0030	202.078 REMOVING ASBESTOS CONTAINING MATERIAL	LUMP	LUMP			
0040	202.08 REMOVING BUILDING NO.: IMT BLD.	LUMP	LUMP			
0050	202.08 REMOVING BUILDING NO.: PORT OFFICE TRAILER	LUMP	LUMP			
0060	202.08 REMOVING BUILDING NO.: TRUCK INSPECTION TRAILER	LUMP	LUMP			
0070	202.08 REMOVING BUILDING NO.: US CUSTOMS BLD.	LUMP	LUMP			
0080	202.1221 REMOVE ABANDONED CONCRETE FOUNDATION FOUNDATION	LUMP	LUMP			
0090	202.1241 REMOVING CONCRETE SLAB MAINTENANCE BLD.	LUMP	LUMP			
0100	202.15 REMOVING MANHOLE OR CATCH BASIN	14.000 EA				

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0110	202.203 PAVEMENT BUTT JOINTS	450.000 SY				
0120	202.2111 REMOVING, STORING, AND RESETTING OBJECTS	2.000 EA				
0130	202.4011 REMOVING EMBEDDED TIMBER PILE	5.000 EA				
0140	203.20 COMMON EXCAVATION	5450.000 CY				
0150	203.24 COMMON BORROW	50.000 CY				
0160	206.085 STRUCTURAL EARTH EXCAVATION - WATERFRONT	120.000 CY				
0170	304.104 AGGREGATE SUBBASE COURSE (PLAN QUANTITY)	8050.000 CY				
0180	403.207 HOT MIX ASPHALT 19.0 MM HMA	5450.000 T				
0190	403.208 HOT MIX ASPHALT 12.5 MM HMA SURFACE	3750.000 T				
0200	409.15 BITUMINOUS TACK COAT - APPLIED	1100.000 G				
0210	419.30 SAW CUTTING BITUMINOUS PAVEMENT	810.000 LF				

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0220	501.231 DYNAMIC LOADING TEST	3.000 EA				
0230	501.70 STEEL PIPE PILES, DELIVERED 16" DIA	3816.000 LF				
0240	501.701 STEEL PIPE PILES, IN PLACE 16" DIA.	3708.000 LF				
0250	501.90 PILE TIPS	36.000 EA				
0260	501.91 PILE SPLICES	9.000 EA				
0270	501.92 PILE DRIVING EQUIPMENT MOBILIZATION	LUMP	LUMP			
0280	502.235 STRUCTURAL CONCRETE, PIER PILE CAP & EDGE BEAM	140.000 CY				
0290	502.411 STRUCTURAL CONCRETE, PIER DECK SLAB	145.000 CY				
0300	502.45 STRUCTURAL CONCRETE APPROACH SLABS PIER APPROACH	65.000 CY				
0310	502.491 STRUCTURAL CONCRETE, PIER CURB	5.000 CY				
0320	502.601 STRUCTURAL CONCRETE, TRANSFORMER FOUNDATION	LUMP	LUMP			

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0330	502.602 STRUCTURAL CONCRETE, GENERATOR SLAB	LUMP	LUMP			
0340	502.603 STRUCTURAL CONCRETE, CONDENSER PAD	LUMP	LUMP			
0350	502.604 STRUCTURAL CONCRETE, MAINTENANCE BLD. SLAB	LUMP	LUMP			
0360	503.14 EPOXY-COATED REINFORCING STEEL, FABRICATED AND DELIVERED	72000.000 LB				
0370	503.15 EPOXY-COATED REINFORCING STEEL, PLACING	72000.000 LB				
0380	504.810 STRUCTURAL STEEL ERECTION FOR MODIFICATIONS	LUMP	LUMP			
0390	504.8210 STEEL REEFER UNIT FRAMES & INSTALLATION	LUMP	LUMP			
0400	506.9106 FUSION BONDED EPOXY COATING	LUMP	LUMP			
0410	514.06 CURING BOX FOR CONCRETE CYLINDERS	1.000 EA				
0420	515.20 PROTECTIVE COATING FOR CONCRETE SURFACES	780.000 SY				

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0430	520.240 EXPANSION DEVICE - PIER COMPRESSION SEAL	50.000 LF				
0440	526.301 TEMPORARY CONCRETE BARRIER TYPE I	LUMP	LUMP			
0450	528.08 STRUCTURAL TIMBER	LUMP	LUMP			
0460	535.631 PRESTRESSED STRUCTURAL CONCRETE DECK PLANKS	LUMP	LUMP			
0470	603.157 12 INCH PVC PIPE	935.000 LF				
0480	603.167 15 INCH POLYVINYLCHLORIDE (PVC) PIPE	285.000 LF				
0490	604.097 72 INCH CATCH BASIN TYPE B1-C	1.000 EA				
0500	604.11 CATCH BASIN TYPE C1	20.000 EA				
0510	604.15 MANHOLE	2.000 EA				
0520	604.154 72 INCH MANHOLE	1.000 EA				
0530	604.16 ALTERING CATCH BASIN TO MANHOLES	2.000 EA				

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0540	604.161 ALTERING CATCH BASIN	6.000 EA				
0550	604.18 ADJUSTING MANHOLE OR CATCH BASIN TO GRADE	8.000 EA				
0560	604.247 CATCH BASIN TYPE F5-C	1.000 EA				
0570	607.1601 TEMPORARY CHAIN LINK FENCE - 4'	400.000 LF				
0580	607.1701 TEMPORARY CHAIN LINK FENCE - 6' MOVEABLE	1680.000 LF				
0590	607.2301 TEMPORARY CHAIN LINK GATE	1.000 EA				
0600	607.25 REMOVE AND RESET CHAIN LINK FENCE	870.000 LF				
0610	607.2501 REMOVE CHAIN LINK FENCE	110.000 LF				
0620	607.490 CHAIN LINK GATE - 16 FT. SWING	1.000 EA				
0630	607.4911 MOTORIZED SLIDE GATE - 24 FT.	1.000 EA				
0640	607.4921 REMOVE GATE & MOTORS	4.000 EA				

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0650	607.493 REMOVE & RESET MOTORIZED SLIDING GATE - 14 FT.	1.000 EA				
0660	607.501 SPECIAL REMOVABLE GATE POST	LUMP	LUMP			
0670	607.502 SPECIAL SECURITY GATE POST	LUMP	LUMP			
0680	608.081 REINFORCED CONCRETE DRIVEWAYS WALKWAYS	110.000 SY				
0690	609.11 VERTICAL CURB TYPE 1	140.000 LF				
0700	609.12 VERTICAL CURB TYPE 1 - CIRCULAR	105.000 LF				
0710	609.237 TERMINAL CURB TYPE 1 - 7 FOOT	1.000 EA				
0720	609.2371 TERMINAL CURB TYPE 1- 7 FT - CIRCULAR	2.000 EA				
0730	609.30 PRECAST CONCRETE CURB FOR PIERS	50.000 LF				
0740	609.31 CURB TYPE 3	130.000 LF				
0750	615.07 LOAM	80.000 CY				

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0760	618.1301 SEEDING METHOD NUMBER 1 - PLAN QUANTITY	6.000 UN				
0770	619.1201 MULCH - PLAN QUANTITY	6.000 UN				
0780	621.126 SMALL DECIDUOUS TREES (6 FOOT - 8 FOOT) GROUP A	2.000 EA				
0790	621.5352 DECIDUOUS SHRUBS (18 INCH - 24 INCH) GROUP A	10.000 EA				
0800	621.80 ESTABLISHMENT PERIOD	LUMP	LUMP			
0810	621.901 LANDSCAPE BORDER & FOUNDATION FOR OFFICE BLD. EXTERIOR SIGN	LUMP	LUMP			
0820	621.951 BIKE RACK	LUMP	LUMP			
0830	627.901 PAVEMENT MARKINGS IN OFFICE PARKING LOT & DRIVEWAYS	LUMP	LUMP			
0840	639.18 FIELD OFFICE TYPE A	1.000 EA				
0850	652.35 CONSTRUCTION SIGNS	150.000 SF				

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0860	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP	LUMP			
0870	659.10 MOBILIZATION	LUMP	LUMP			
0880	801.15 6 INCH PVC SANITARY SEWER (SCHEDULE 40)	535.000 LF				
0890	803.173 SEWER MANHOLE - 4 FOOT DIAMETER	3.000 EA				
0900	810.4002 OFFICE BUILDING - VISITOR ENTRANCE SIGN	LUMP	LUMP			
0910	810.4003 OFFICE BUILDING - STOP SIGN	LUMP	LUMP			
0920	815.00 BUILDING ARCHITECTURAL	LUMP	LUMP			
0930	815.00 BUILDING ELECTRICAL	LUMP	LUMP			
0940	815.00 BUILDING MECHANICAL	LUMP	LUMP			
0950	815.00 BUILDING STRUCTURAL	LUMP	LUMP			
0960	822.320 6" PVC WATERMAIN	240.000 LF				

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0970	822.3212 4" PVC WATERMAIN	330.000 LF				
0980	823.3253 TAPPING SLEEVE & GATE VALVE WITH BOX	6.000 EA				
0990	823.33 6 INCH GATE VALVE WITH BOX	4.000 EA				
1000	823.335 4 INCH GATE VALVE W/ SERVICE BOX	3.000 EA				
1010	824.32 REMOVE/RESET HYDRANT	2.000 EA				
1020	827.37 NATURAL GAS DISTRIBUTION	LUMP	LUMP			
1030	832.071 CONTRACTOR ALLOWANCE BUILDING PERMIT, FEES & INSPECT.	LUMP	LUMP		50,000	.00
1040	832.071 CONTRACTOR ALLOWANCE CMP	LUMP	LUMP		40,000	.00
1050	832.071 CONTRACTOR ALLOWANCE FAIRPOINT	LUMP	LUMP		5,000	.00
1060	832.071 CONTRACTOR ALLOWANCE PWD	LUMP	LUMP		5,000	.00
1070	832.071 CONTRACTOR ALLOWANCE UNITIL	LUMP	LUMP		5,000	.00

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1080	910.42 ELECTRICAL - PIER FACILITY SITE - ELECTRICAL	LUMP	LUMP			
	SECTION 0001 TOTAL					.

SECTION 0002 BID ALT. 1

1090	890.011 PIER 12 FT. SECTION ADDITION	1.000 EA				
	SECTION 0002 TOTAL					.

SECTION 0003 BID ALT. 2

1100	528.601 STRUCTURAL TIMBER DECKING ADDITIONAL	LUMP	LUMP			
	SECTION 0003 TOTAL					.

SECTION 0004 BID ALT. 3

1110	627.902 PAVEMENT MARKINGS IN CONTAINER STORAGE LOT	LUMP	LUMP			
1120	627.903 PAVEMENT MARKINGS ON EXISTING CONCRETE PIER	LUMP	LUMP			
	SECTION 0004 TOTAL					.

SECTION 0005 BID ALT. 4

CONTRACT ID: 017820.00 PROJECT(S): DTMA1G10006 / TIGER

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1130	655.501 CATHODIC PROTECTION BY SACRIFICIAL ANODE	18.000 EA				
	SECTION 0005 TOTAL					.

SECTION 0006 BID ALT. 5

1140	841.50 RESET LARGE STEEL BOLLARD	LUMP	LUMP			
	SECTION 0006 TOTAL					.

SECTION 0007 BID ALT. 6

1150	810.4001 OFFICE BUILDING - EXTERIOR BUILDING SIGN	LUMP	LUMP			
	SECTION 0007 TOTAL					
	TOTAL BID ALL SECTIONS					

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street, Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and _____

_____

a corporation or other legal entity organized under the laws of the State of _____, with its principal place of business located at _____

_____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the **Contract, PIN No. 017820.00, for the Portland International Marine Terminal Improvements Project, in the City of Portland, County of Cumberland, Maine**. The Work includes building demolition, construction of new pier space, construction of a new operations building, various site modifications to include paving, lighting and misc. electrical work, drainage improvements, fencing, maintenance of traffic and other incidental work outlined in the bid documents.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **August 30, 2012.** Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the State of Maine Department of Transportation Standard Specifications, Revision of December 2002 and related Special Provisions.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is

Section 0001 $_____

Section 0002 $_____

Section 0003 $_____

Section 0004 $_____

Section 0005 $_____

Section 0006 $_____

Section 0007 $_____

Performance Bond and Payment Bond each being 100% of the amount awarded under this Contract. (see award amount in Section G below).

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in the Federal Contract Provisions Supplement, and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, Standard Specifications Revision of December 2002, Standard Details Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of: **PIN 17820.00 – Portland International Marine Terminal Improvements Project**, State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items".

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items", which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the Standard Specifications, Revision of December 2002, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work as stated in Section 107.2 of the Standard Specifications Revision of December 2002 and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan with their bid.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	_____
Date	(Signature of Legally Authorized Representative of the Contractor)
_____	_____
Witness	(Name and Title Printed)

G. Award.

Your offer is hereby accepted for (see checked boxes):

Section 0001 ❑
Section 0002 ❑
Section 0003 ❑
Section 0004 ❑
Section 0005 ❑
Section 0006 ❑
Section 0007 ❑

Contract Amount: _____

This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: David Bernhardt, Commissioner
_____	
Witness	

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street, Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and _____

_____

a corporation or other legal entity organized under the laws of the State of _____, with its principal place of business located at _____

_____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the **Contract, PIN No. 017820.00, for the Portland International Marine Terminal Improvements Project, in the City of Portland, County of Cumberland, Maine**. The Work includes building demolition, construction of new pier space, construction of a new operations building, various site modifications to include paving, lighting and misc. electrical work, drainage improvements, fencing, maintenance of traffic and other incidental work outlined in the bid documents.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **August 30, 2012.** Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the State of Maine Department of Transportation Standard Specifications, Revision of December 2002 and related Special Provisions.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is

Section 0001 $_____

Section 0002 $_____

Section 0003 $_____

Section 0004 $_____

Section 0005 $_____

Section 0006 $_____

Section 0007 $_____

Performance Bond and Payment Bond each being 100% of the amount awarded under this Contract. (see award amount in Section G below).

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in the Federal Contract Provisions Supplement, and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, Standard Specifications Revision of December 2002, Standard Details Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of: **PIN 17820.00 – Portland International Marine Terminal Improvements Project**, State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items".

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items", which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the Standard Specifications, Revision of December 2002, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work as stated in Section 107.2 of the Standard Specifications Revision of December 2002 and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan with their bid.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	_____
Date	(Signature of Legally Authorized Representative of the Contractor)
_____	_____
Witness	(Name and Title Printed)

G. Award.

Your offer is hereby accepted for (see checked boxes):

Section 0001 ❑
Section 0002 ❑
Section 0003 ❑
Section 0004 ❑
Section 0005 ❑
Section 0006 ❑
Section 0007 ❑

Contract Amount: _____

This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: David Bernhardt, Commissioner
_____	
Witness	

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and **(Name of the firm bidding the job)** a corporation or other legal entity organized under the laws of the State of Maine, with its principal place of business located at **(address of the firm bidding the job)**

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

SAMPLE

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, PIN No.**1224.00**, for the **Hot Mix Asphalt Overlay** in the town/city of **South Nowhere,** County of **Washington**, Maine. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **November 15, 2006.** Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the State of Maine Department of Transportation Standard Specifications, Revision of December 2002 and related Special Provisions.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is **(Place bid here in alphabetical form such as One Hundred and Two dollars and 10 cents)** **$ (repeat bid here in numerical terms, such as $102.10)** Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

SAMPLE

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in Appendix A to Division 100 of the Standard Specifications Revision of December 2002 (Federal Contract Provisions Supplement), and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan by 4:30pm on the day of bid opening to the Contracts Engineer.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	**(Sign Here)**
Date	(Signature of Legally Authorized Representative of the Contractor)
____(**Witness Sign Here)**__	**(Print Name Here)**
Witness	(Name and Title Printed)

SAMPLE

G. Award.

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: David Bernhardt, Commissioner

_____

(Witness)

BOND # ______________________

CONTRACT PERFORMANCE BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That ______________________________ ____________________ **in the State of** __________________________, as principal, and……………………………….., a corporation duly organized under the laws of the State of .... and having a usual place of business ...., as Surety, are held and firmly bound unto the Treasurer of the State of Maine in the sum of _______________________________________ **and 00/100 Dollars ($),** to be paid said Treasurer of the State of Maine or his successors in office, for which payment well and truly to be made, Principal and Surety bind themselves, their heirs, executors and administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Principal designated as Contractor in the Contract to construct Project Number ____________ in the Municipality of ______________________ promptly and faithfully performs the Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the State of Maine.

Signed and sealed this .... day of ...., 20….. .

WITNESSES:	SIGNATURES:
	CONTRACTOR:
Signature..	....….......................
Print Name Legibly	Print Name Legibly ...…….........................
	SURETY:
Signature	.....………...
Print Name Legibly	Print Name Legibly ....
SURETY ADDRESS:	NAME OF LOCAL AGENCY:
....	ADDRESS ....
....	..……………...
....	.......……………..
TELEPHONE..	.......……………..

SAMPLE

F. Offer.

The undersigned, having carefully examined the site of work, the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

PIN 1234.00 South Nowhere, Hot Mix Asphalt Overlay ,

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items".

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

SAMPLE

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items", which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the Standard Specifications, Revision of December 2002, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work as stated in Section 107.2 of the Standard Specifications Revision of 2002 and complete the Work within the time limits given in the Special Provisions of this Contract.

BOND # _____

CONTRACT PAYMENT BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That _____ _____ **in the State of** _____, as principal, and.....…..... a corporation duly organized under the laws of the State of ..... and having a usual place of business in .....……., as Surety, are held and firmly bound unto the Treasurer of the State of Maine for the use and benefit of claimants as herein below defined, in the sum of _____ **and 00/100 Dollars ($)** for the payment whereof Principal and Surety bind themselves, their heirs, executors and administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Principal designated as Contractor in the Contract to construct Project Number _____ in the Municipality of _____ promptly satisfies all claims and demands incurred for all labor and material, used or required by him in connection with the work contemplated by said Contract, and fully reimburses the obligee for all outlay and expense which the obligee may incur in making good any default of said Principal, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material or both, used or reasonably required for use in the performance of the contract.

Signed and sealed this ..... day of ...……......, 20 ... .

WITNESS:	SIGNATURES:
	CONTRACTOR:
Signature…….....	.....….....
Print Name Legibly .....……..	Print Name Legibly ….....
	SURETY:
Signature.....	...….....
Print Name Legibly	Print Name Legibly ….....
SURETY ADDRESS:	NAME OF LOCAL AGENCY:
...….....	ADDRESS ….....
.....	…….....
TELEPHONE	…….....

SAMPLE

General Decision Number: ME100045 06/03/2011 ME45

State: Maine

Construction Type: Building

County: Cumberland County in Maine.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Modification Number	Publication Date
0	04/29/2011
1	06/03/2011

* BRME0003-001 05/01/2011

	Rates	Fringes
BRICK POINTER/CAULKER/CLEANER	$ 28.51	17.14

CARP0118-015 10/01/2010

	Rates	Fringes
MILLWRIGHT (Industrial and Treatment Plants Only)	$ 23.32	16.80

CARP1996-009 10/01/2010

	Rates	Fringes
CARPENTER (Including Acoustical Ceiling Installation, Drywall Hanging, Form Work, Metal Stud Installation and Industrial Work)	$ 21.26	16.04

ELEC0567-013 09/01/2010

	Rates	Fringes
ELECTRICIAN	$ 27.83	13.88
Teledata System Installer (Including Installation of Alarms and HVAC Temperature Controls)	$ 21.82	12.80

ELEV0004-004 01/01/2011

	Rates	Fringes
ELEVATOR MECHANIC	$ 49.68	21.79

ENGI0004-023 12/01/2010

	Rates	Fringes

POWER EQUIPMENT OPERATOR:
Excavator.....$ 29.27 22.82

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* IRON0007-022 03/16/2011

	Rates	Fringes
IRONWORKER, REINFORCING AND STRUCTURAL	$ 20.87	19.37

LABO0327-007 06/01/2010

	Rates	Fringes
LABORER: Concrete Worker (Pour and Finish Concrete)	$ 16.62	14.35

PLUM0716-005 08/01/2010

	Rates	Fringes
PIPEFITTER (Including Industrial Work and HVAC Pipe Installation)	$ 24.75	13.21

SHEE0017-009 01/01/2010

	Rates	Fringes
SHEET METAL WORKER (HVAC Duct Work Only)	$ 23.38	18.11

SUME2011-029 03/23/2011

	Rates	Fringes
BRICKLAYER	$ 30.35	13.71
DRYWALL FINISHER/TAPER	$ 22.00	0.90
GLAZIER	$ 18.00	3.64
INSULATOR - BATT	$ 16.76	0.00
INSULATOR: Duct (Cold/Hot) and Pipe & Pipewrapper	$ 18.99	12.56
LABORER: Asphalt Raker	$ 15.66	2.79
LABORER: Demolition	$ 14.85	5.05
LABORER: Common or General, including brick mason tending and form stripping	$ 13.35	3.80
METAL BUILDING ERECTOR	$ 16.59	3.32
OPERATOR: Asphalt Paver	$ 14.25	1.78
OPERATOR: Backhoe	$ 18.58	2.91

OPERATOR: Crane.....$ 22.70 11.14

OPERATOR: Paver.....$ 16.25 6.59

PAINTER: Brush, Roller and Spray.....$ 14.73 2.95

PLUMBER, Includes HVAC System Installation and Excludes HVAC Pipe Installation.....$ 21.79 2.46

ROOFER, Including Metal Roofs....$ 16.76 3.00

SHEETMETAL WORKER, Excluding HVAC Duct Work.....$ 19.46 1.75

TRUCK DRIVER: Dump Truck.....$ 11.84 0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests

for summaries
of surveys, should be with the Wage and Hour Regional Office
for the area in
which the survey was conducted because those Regional Offices
have
responsibility for the Davis-Bacon survey program. If the
response from this
initial contact is not satisfactory, then the process described
in 2.) and
3.) should be followed.

With regard to any other matter not yet ripe for the formal
process
described here, initial contact should be with the Branch of
Construction
Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an
interested party
(those affected by the action) can request review and
reconsideration from
the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR
Part 7).
Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the
interested
party's position and by any information (wage payment data,
project
description, area practice material, etc.) that the requestor
considers
relevant to the issue.

3.) If the decision of the Administrator is not favorable, an
interested
party may appeal directly to the Administrative Review Board
(formerly the
Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

ROADWAY/SITE RELATED WORK

GENERAL DECISION: ME20100003 03/12/2010 ME3

Date: March 12, 2010
General Decision Number: ME20100003 03/12/2010

Superseded General Decision Number: ME20080003

State: Maine

Construction Type: Highway

Counties: Androscoggin and Cumberland Counties in Maine.

Highway Construction Projects Excluding Major Bridging (for example: bascule, suspension and spandrel arch bridges; those bridging waters presently navigating or to be navigable; and those involving marine construction in any degree); tunnels, building structures in rest area projects and railroad construction.

Modification Number	Publication Date
0	03/12/2010

* SUME2000-011 10/24/2000

	Rates	Fringes
CARPENTER	$ 11.30	1.95
ELECTRICIAN	$ 17.90	2.30
Laborers:		
Flaggers	$ 7.25	
Landscape	$ 7.99	.72
Unskilled	$ 8.69	1.08
Power equipment operators:		
Backhoes	$ 12.39	2.00
Bulldozers	$ 11.13	1.94
Excavators	$ 11.24	1.31
Loaders	$ 11.19	1.82
Rollers	$ 10.16	1.56
Truck drivers:		
Dump	$ 9.02	1.39
Two axle	$ 9.08	1.28

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses

(29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an

interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION

General Decision Number: ME100029 04/08/2011 ME29

State: Maine

Construction Type: Heavy

County: Cumberland County in Maine.

HEAVY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	04/08/2011

ELEC0567-005 09/01/2010

	Rates	Fringes
ELECTRICIAN (Including Industrial Work and Treatment Plants)	$ 27.83	13.88

LABO0327-005 06/10/2010

	Rates	Fringes
LABORER		
Concrete Worker	$ 16.62	14.35
Demolition	$ 16.87	14.35

SUME2011-013 03/16/2011

	Rates	Fringes
CARPENTER, Includes Form Work	$ 18.00	1.94
CEMENT MASON/CONCRETE FINISHER	$ 17.29	2.51
IRONWORKER, Reinforcing	$ 20.00	0.00
LABORER: Asphalt Raker	$ 16.93	1.91
LABORER: Common or General	$ 13.56	1.99
LABORER: Landscape	$ 15.00	0.58
LABORER: Pipelayer	$ 14.42	2.38
LABORER: Flagger	$ 12.43	0.95
LABORER: Wheelman	$ 18.74	2.86
OPERATOR: Asphalt Paver	$ 18.16	2.30
OPERATOR: Asphalt Roller	$ 15.70	1.62
OPERATOR: Backhoe	$ 22.22	6.48
OPERATOR: Bulldozer	$ 20.43	6.13
OPERATOR: Crane	$ 22.60	9.29

OPERATOR: Drill.....$ 17.09 3.79

OPERATOR: Excavator.....$ 19.88 5.06

OPERATOR: Loader.....$ 16.93 3.51

OPERATOR: Mechanic.....$ 24.35 6.66

OPERATOR: Roller.....$ 15.99 6.31

TRUCK DRIVER: Low Bed Truck.....$ 16.43 3.07

TRUCK DRIVER.....$ 14.67 2.04

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices

have
responsibility for the Davis-Bacon survey program. If the
response from this
initial contact is not satisfactory, then the process described
in 2.) and
3.) should be followed.

With regard to any other matter not yet ripe for the formal
process
described here, initial contact should be with the Branch of
Construction
Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an
interested party
(those affected by the action) can request review and
reconsideration from
the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR
Part 7).
Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the
interested
party's position and by any information (wage payment data,
project
description, area practice material, etc.) that the requestor
considers
relevant to the issue.

3.) If the decision of the Administrator is not favorable, an
interested
party may appeal directly to the Administrative Review Board
(formerly the
Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

PORTLAND INTERNATIONAL MARINE TERMINAL IMPROVEMENTS PROJECT

Portland, Cumberland County

PIN 017820.00

SECTION 2

Pin 17820.00
Portland
May 25, 2011

SPECIAL PROVISIONS
SECTION 101
Federal Funding Agency
(Federal Boilerplate Language)

The following is in addition to the requirements of Section 101

This contract has included in it Appendix A to Division 100 (also known as FHWA form 1273). The federal Funding Agency associated with this project is not FHWA but is the Maritime Administration (MARAD). Both agencies are part of the U.S. Department of Transportation and as such, MARAD has agreed to allow the FHWA language to be used to govern this work. References to FHWA should be changed to MARAD and any clarifications or interpretations will be done by MARAD and not FHWA.

SPECIAL PROVISIONS
SECTION 102
BIDDING

Notice to Contractor of Arrangement of Schedule of Bid Prices for Proposed Office Building and Site Electrical

The Contractor shall note that there is a substantial quantity of items proposed within this project for which there is no equivalent MaineDOT Pay Item counterpart. Also, and of particular noteworthiness, is the special arrangement of the schedule of bid prices for the proposed office building and site electrical. Pay Items for the office building and site electrical have been consolidated from their individual work elements into general categories for ease of reference. Note that electrical components are widespread throughout the site, and therefore the Contractor shall group the electrical components of the office building separately from the site electrical components.

The following CSI specifications listed in the tables below are for use by the Contractor to ensure that the proposed Schedule of Bid Prices for Office Building electrical items and site electrical items are included in the final proposed price accordingly. Note that not all of the Pay Items within a specification section may be included in the proposed office building tabulation.

Pay Item 815.00: Office Building-Architectural

03 35 43	Polished Concrete Finishing	08 71 00	Door Hardware
04 42 00	Exterior Stone Cladding	08 80 00	Glazing
05 58 13	Metal Column Covers	09 29 00	Gypsum Board
06 40 00	Architectural Woodwork	09 30 00	Tiling
07 21 00	Thermal Insulation	09 51 13	Acoustical Panel Ceilings
07 22 16	Nailboard Insulation	09 54 26	Wood Panel Ceilings
07 26 16	Below Grade Vapor Barrier	09 65 00	Resilient Flooring
07 27 13	Air Barriers	09 65 13	Resilient Bases and Accessories
07 41 13	Metal Roof Panels	09 68 00	Carpeting
07 42 13	Metal Wall Panels	09 91 23	Interior Painting
07 62 00	Sheetmetal Flashing and Trim	10 14 00	Signs
07 92 00	Joint Sealants	10 28 00	Toilet and Bath Accessories
08 11 13	Hollow Metal Doors and Frames	10 44 13	Fire Extinguisher Cabinets
08 14 16	Flush Wood Doors	10 44 16	Fire Extinguishers
08 31 13	Access Doors and Frames	10 95 00	Building Specialties
08 41 13	Aluminum Framed Entrances and Storefronts	11 31 00	Residential Appliances
08 51 13	Aluminum Windows		

Pay Item 815.00: Office Building-Mechanical

21 00 00	Fire Sprinklers	23 00 00	Mechanical
22 00 00	Plumbing		

Pay Item 815.00: Office Building-Structural

03 30 00	Cast In Place Concrete	06 12 00	Structural Insulated Panels
06 10 00	Rough Carpentry	31 20 00	Earthwork

Pay Item 815.00: Office Building-Electrical

The Office Building – Electrical Pay Item shall include the electrical elements within not only the footprint of the office building but also the area surrounding the office building up to 5 ft from the concrete foundation walls.

26 05 19	Low Voltage Electrical Power Conductors	26 32 13.16	Gas Engine Driven Generator Sets
26 05 26	Grounding and Bonding for Electrical Systems	26 36 23	Generator Transfer Switches
26 05 29	Supporting Devices	26 43 13	Transient Voltage Surge Suppression
26 05 33	Raceway and Boxes for Electrical Systems	26 51 00	Interior Lighting
26 05 53	Electrical Identification	26 52 00	Emergency Lighting
26 06 50.16	Lighting Fixture Schedule	26 56 00	Exterior Lighting
26 09 43	Lighting Controls	27 10 00	Structured Cabling System
26 24 16	Panelboards	28 13 00	Door Access Control System
26 27 26	Wiring Devices	28 23 00	Surveillance Systems
26 28 16	Enclosed Switches and Circuit Breakers	28 31 13	Fire Alarm and Smoke Detection System
26 29 13	Enclosed Motor Controllers		

Pay Item 910.42: Site-Electrical

The Site – Electrical Pay Item shall include the electrical elements throughout the entire site except for the region defined by the Office Building – Electrical.

26 00 00	General Electrical	26 24 16	Panelboards
26 05 19	Low Voltage Electrical Power Conductors	26 27 26	Wiring Devices
26 05 26	Grounding and Bonding for Electrical Systems	26 28 16	Enclosed Switches and Circuit Breakers
26 05 33	Raceway and Boxes for Electrical Systems	26 56 00	Exterior Lighting
26 05 53	Electrical Identification	27 10 00	Structured Cabling System
26 06 50.16	Lighting Fixture Schedule	28 23 00	Surveillance Systems
26 09 43	Lighting Controls	28 31 13	Fire Alarm and Smoke Detection System

SPECIAL PROVISIONS
SECTION 104
UTILITIES

MEETING

A pre-construction Utility Conference, as defined in Subsection 104.4.6 of the Standard Specifications is required.

GENERAL INFORMATION

These Special Provisions outline the arrangements that have been made by the Department for utility and/or railroad work to be undertaken in conjunction with this project. The following list identifies all known utilities or railroads having facilities presently located within the limits of this project or intending to install facilities during project construction.

Overview

Utility / Railroad	Aerial	Underground
Central Maine Power (Electrical)	X	X
Fairpoint (Communication)	X	X
Unitil (Gas)		X
City of Portland – Public Works Dept. (Sewer)		X
Portland Water District (Water)		X
Galaxy Integrated (Security) *		X

* Includes wireless technology

Temporary utility adjustments are not anticipated. If temporary relocation becomes necessary, sufficient time will need to be allowed prior to the construction for all required temporary relocation.

Utility working days are Monday through Friday, conditions permitting. Times are estimated on the basis of a single crew for each utility.

All utility crossings over driveways will provide not less than 18 feet vertical clearance over existing ground in cut or over finished grade in fill, during construction of this project.

Any times and dates mentioned are estimates only and are dependent upon favorable weather, working conditions, and freedom from emergencies. The Contractor shall have no claim against the Department if they are exceeded.

In all cases, the utilities shall be notified, by the Contractor, well in advance (three weeks) before work in any area is to commence.

Special note to Contractor and the Utilities: The Contractor shall plan and schedule his work in such a manner that the utilities that are located on this project will not be harmed, damaged or impacted in any way. The Contractor and Utility will coordinate and communicate their work plans in an effort not to interfere with each other's progress or the completion of the project.

Unless otherwise specified, any underground utility facilities shown on the project plans represent approximate locations gathered from available information. The Department cannot certify the level of accuracy of this data. Underground facilities indicated on the topographic sheets (plan views) have been collected from historical records and/or on-site designations provided by the respective utility companies. Underground facilities indicated on the cross-sections have been carried over from the plan view data and may also include further approximations of the elevations (depths) based upon straight-line interpolation from the nearest manholes, gate valves, or test pits.

The Portland Water District maintains a 20-ft wide easement from Commercial Street through the site's container storage facility and along the waterfront. Work within the easement must be coordinated with the Portland Water District since the water main will continue to be owned and operated by the PWD. Test pits to verify the water main's condition and location are incorporated into the project and shall be performed by the Contractor.

AERIAL

Central Maine Power Company has transmission lines and poles along Commercial Street which exist along the boundary of the project property. These wires do not appear to be issue given the project scope. No relocation or involvement of any kind is anticipated by the aerial utilities as part of the work but the contractor should inspect this location, prior to bid, and be aware of these lines when preparing their bid and using machines that are over legal heights. The contractor is urged to use caution around these lines. The Central Maine Power Company contact is: Gary Crabtree at 207-791-8025.

Fairpoint has a cable and fiber line which exist along the boundary of the project property. These wires do not appear to conflict with the scope of the project. Fairpoint contact is Steve Polyot at 207-990-5280.

SUBSURFACE

Central Maine Power Company has electrical lines which run throughout the scope of the project property. Lines extend from Commercial Street down to the waterfront and into the Maintenance Building (to remain); the Terminal Building (to be demolished), and to the RUBB Building (to remain). The Central Maine Power Company contact is: Gary Crabtree at 207-791-8025.

Fairpoint has a cable and fiber line which run throughout the scope of the project property. Lines extend from Commercial Street down to the waterfront and into the Maintenance Building (to remain); and the Terminal Building (to be demolished). Fairpoint contact is Steve Polyot at 207-990-5280.

Unitil has a gas line which extends from Commercial Street down to the Terminal Building (to be demolished); and overhead in the building canopy to the Maintenance Building (to remain). The Unitil contact is: Sam Murray at 207-541-2528.

City of Portland – Public Works Department has a sewer line which extends from Commercial street to the Terminal Building (to be demolished); and overhead in the building canopy to the Maintenance Building (to remain). City of Portland – Public Works Dept. contact is: Mike Farmer at 207-874-8845.

Portland Water District has a water main which extends from Commercial Street down to the waterfront within a 20-ft wide easement. One T-branch extends from this main to the Terminal Building (to be demolished). The contact for Portland Water District is Rico Spugnardi at 207-774-5961.

Galaxy Integrated has a wireless security system on site. The system is currently connected to the Port Office Building located along Commercial Street and is linked to several security cameras and card readers throughout the project site. The security system is also linked to the City of Portland's emergency call centers. The contact for Galaxy Integrated is Michael Finegan at 617-202-6388.

UTILITY SIGNING

Any utility working within the construction limits of this project shall ensure that the traveling public is adequately protected at all times. All work areas shall be signed, lighted, and traffic flaggers employed as determined by field conditions. All traffic controls shall be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, as issued by the Federal Highway Administration.

SAFE PRACTICES AROUND UTILITY FACILITIES

The Contractor shall be responsible for complying with M.R.S.A. Title35-A, Chapter 7-A Sections 751 - 761 Overhead High-Voltage Line Safety Act. Prior to commencing any work that may come within ten (10) feet of any aerial electrical line; the Contractor shall notify the aerial utilities as per section 757 of the above act. Any work around and below aerial utilities shall be done using OSHA standards.

DIG SAFE

The Contractor shall be responsible for determining the presence of underground utility facilities prior to commencing any excavation work and shall notify utilities of proposed excavation in accordance with M.R.S.A. Title 23 §3360-A, Maine "Dig Safe" System.

MAINTAINING UTILITY LOCATION MARKINGS

The Contractor will be responsible for maintaining the buried utility location markings following the initial locating by the appropriate utility or their designated representative.

THE CONTRACTOR SHALL PLAN AND CONDUCT HIS WORK ACCORDINGLY.

The following utilities are known to be located on this project:

Utility	Contact	Email	Phone Number
Central Maine Power	Gary Crabtree	gary.crabtree@cmpco.com	207-791-8025
Fairpoint	Steve Polyot	spolyot@fairpoint.com	207-990-5280
Unitil	Sam Murray	murray@unitil.com	207-541-2528
Portland Public Works Dept.	Mike Farmer	mfarmer@portlandmaine.gov	207-874-8845
Portland Water District	Rico Spugnardi	rspugnardi@pwd.org	207-774-5961
Galaxy Integrated	Michael Finegan	michaelf@galaxyintegrated.com	617-202-6388

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Portland
May 25, 2011

SPECIAL PROVISIONS
SECTION 104
GENERAL RIGHTS AND RESPONSIBILITIES

Coordination with Port Container Operator

The Portland International Marine Terminal (IMT) is an active container terminal with various container movements anticipated to occur on a weekly basis. Successful completion of the proposed project will require coordination between the Contractor and the Port Operator on a weekly basis via project meetings to be held on-site. At these meetings, the Contractor will be required to provide an update on the progress of the project and will make requests to work outside of the Primary Construction Zone, or to utilize the existing pier. In a similar manner, the Port Operator will provide a weekly vessel schedule to the Contractor and will advise when the existing pier is not available, or if the temporary fencing needs to be relocated along the eastern boundary of the Primary Construction Zone. It is believed that the general location of the proposed temporary fencing is positioned so that both port operations and construction activities can occur simultaneously without interruption or needing adjustments.

Container operations are typically routine: upon arrival of a vessel, the mobile harbor crane positions itself on the pier and will offload containers non-stop until the containers have been moved to their final position within the terminal. Containers are temporarily placed on the pier where large stacker cranes pick the containers and carry them to the Container Storage Area. Within twelve hours, the vessel is underway and waterfront activity subsides.

The Contractor is advised that while there is little available vacant space for Contractor storage outside of the terminal area, the inner Primary Construction Zone region will be solely designated for Contractor use. Within the terminal, the Contractor will have unlimited access to the 4+/- acres of construction area, including approximately 1.5 acres of Contractor Storage Area, as indicated on the Plans. This inner 5.5 +/- acres will be completely available to the Contractor upon commencement of the project.

EMERGENCY VEHICLE TRIPS:

There may be occasion during construction for access by emergency personnel and vehicles to the marine terminal area. Should this situation arise, the Contractor will suspend work immediately within the area to allow for safe and timely passage of emergency vehicles and personnel. The cost associated with this shall be considered incidental and no additional compensation will be made.

CONSTRUCTION SCHEDULE:

The Contractor will be required to submit a detailed written construction schedule.

This schedule will be monitored closely and shall be updated weekly during construction meetings. When the Contractor is prepared to commence work on site, in addition to the construction schedule, the Contractor shall provide on a regular basis a written day by day summary of construction activities that will occur for the upcoming three (3) week period. This summary will also highlight activities that will have an impact on the use of facilities in the construction and adjacent areas.

POLLUTION CONTROL:

All operations carried out by the contractor during the life of this contract shall comply with provisions and regulations for the control of air and noise pollution. The contractor shall make all applications and notices and comply with all appropriate provisions of the rules and regulations of Federal, State and Local Agencies.

The Contractor shall conduct his operations so as not to generate loud noises between the hours of 8:00 p.m. to 6:00 a.m., unless otherwise approved. Local requirements concerning noise may impose additional restrictions.

The contractor will also need to closely monitor debris and trash generated on site and ensure that it is properly contained and maintained. Trash must be removed regularly and as a minimum, at least weekly.

SPECIAL PROVISION
SECTION 104
GENERAL RIGHTS AND RESPONSIBILITIES
(Contractor's General Authority and Responsibilities)

104.3.6 Project Records Add the following:

Section 902 of the American Recovery and Reinvestment Act (ARRA) of 2009 requires that each contract awarded using ARRA funds must include a provision that provides the U.S. Comptroller General and his representatives with the authority to:

"(1) to examine any records of the contractor or any of its subcontractors, or any State or local agency administering such contract, that directly pertain to, and involve transactions relating to, the contract or subcontract; and

(2) to interview any officer or employee of the contractor or any of its subcontractors, or of any State or local government agency administering the contract, regarding such transactions."

Accordingly, the Comptroller General and his representatives shall have the authority and rights as provided under Section 902 of the ARRA with respect to this contract, which is funded with funds made available under the ARRA. Section 902 further states that nothing in this section shall be interpreted to limit or restrict in any way any existing authority of the Comptroller General.

Additionally, please be advised that Section 1515(a) of the ARRA provides as follows:

Section 1515(a) of the ARRA provides authority for any representatives of the Inspector General to examine any records or interview any employee or officers working on this contract. The contractor is advised that representatives of the inspector general have the authority to examine any record and interview any employee or officer of the contractor, its subcontractors or other firms working on this contract. Section 1515(b) further provides that nothing in this section shall be interpreted to limit or restrict in any way any existing authority of an inspector general.

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SPECIAL PROVISION
SECTION 104.4

Communications and Coordination
(Progress Meetings)

Progress meetings shall be held weekly in the Departments Field Office. A time shall be determined for the meetings, this time shall be agreeable to all parties; the Owner, the Contractor and the Port Authority. The current schedule will be discussed and updates will be given to all parties on what the next three weeks activities are and their potential impact on the site, the port traffic and adjacent facilities.

SPECIAL PROVISION
SECTION 104
GENERAL RIGHTS AND RESPONSIBILITIES
(Electronic Payroll Submission)
(Payment Tracking)

104.3.8.1 Electronic Payroll Submission The prime contractor and all subcontractors and lower-tier subcontractors will submit their certified payrolls electronically on this contract utilizing the Elation System web based reporting. There is no charge to the contracting community for the use of this service. The submission of paper payrolls will not be allowed or accepted. Additional information can be found at http://www.maine.gov/mdot/comprehensive-list-projects/project-information.php under the first "Notice".

104.3.8.2 Payment Tracking The prime contractor and all subcontractors and lower-tier subcontractors will track and confirm the delivery and receipt of all payments through the Elation System

SPECIAL PROVISIONS
SECTION 104

Earthwork

COMMON EXCAVATION FOR ESTIMATE				
COMMON EXCAVATION (FROM CROSS SECTIONS)			5,234	
GRUBBING IN FILL			5	
PAVEMENT SALVAGE IN FILL			183	
TOTAL COMMON EXCAVATION				5,422
FILL FOR BORROW CALCULATIONS				
COMMON FILL (FROM CROSS SECTIONS)			265	
GRUBBING IN FILL			5	
PAVEMENT SALVAGE IN FILL			183	
TOTAL FILL				453
AVAILABLE COMMON EXCAVATION FOR BORROW CALCULATIONS				
(1) TOTAL COMMON EXCAVATION				5,522
DEDUCTIONS:				
GRUBBING IN CUT			173	
GRUBBING IN FILL			5	
PAVEMENT SALVAGE (CUT & FILL)			183	
(2) TOTAL DEDUCTIONS				361
TOTAL AVAILABLE COMMON EXCAVATION (1) MINUS (2)				5,061
TOTAL AVAILABLE STRUCT. EXCAVATIONS (OFFICE BUILDING)				593
TOTAL AVAILABLE STRUCT. EXCAVATIONS (CB, DMH, SMH)				344
TOTAL AVAILABLE NON-ROCK EXCAVATION				5,998
COMPUTATION FOR COMMON BORROW FOR ESTIMATE				
(3)TOTAL FILL				453
TOTAL AVAIL. NON-ROCK EXCAV.	5,998	x.85=	5,098	
(4)TOTAL AVAILABLE EXCAVATION			=	5,098
SURPLUS MATERIAL (CY) = TOTAL FILL MINUS TOTAL AVAILABLE EXCAVATION				4,645

Town: Portland
PIN #: 17820.00
Date: 5/17/11

SPECIAL PROVISION
SECTION 105
General Scope of Work
(Environmental Requirements)

In-Water work consists of any activity conducted below the normal high water mark of a river, steam, brook, lake, pond or "Coastal Wetland" areas that are subject to tidal action during the highest tide level for the year which an activity is proposed as identified in the tide tables published by the National Ocean Service. http://www.oceanservice.noaa.gov/ For the full definition of "Coastal Wetlands", please refer to 38 MRSA 480-B(2)

I. In-Water Work shall not be allowed between the dates of 3/1 and 9/30.
(In-Water work is allowed from 10/1 to 2/28.)

II. In-Water work window applies to the following water body and the following activity:
1. Fore River – Pile driving

III. Special Conditions:
1.

IV. Approvals:
1. Temporary Soil Erosion and Water Pollution Control Plan

V. All activities are prohibited (including placement and removal of cofferdams unless otherwise permitted by Regulatory Agencies) below the normal high water mark if outside the prescribed in-water work window, except for the following:

1. Work within a cofferdam constructed according to MaineDOT's Standard Specifications and in adherence with the contractors approved "Soil Erosion and Water Pollution Control Plan".

VI. No work is allowed that completely blocks a river, stream, or brook without providing downstream flow. When working in Tidal streams flow needs to be provided in both directions

NOTE: Regulatory Review and Approval is required to modify the existing In-Water work window.

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SPECIAL PROVISIONS
SECTION 105
GENERAL SCOPE OF WORK

Construction Sequence and Summary of Project Requirements

The Contractor is advised that this project occurs within a secured/restricted facility as determined by Homeland Security, and contains security equipment for both the Terminal and City of Portland which must remain functional at all times. In addition, the on-going operations of the facility require that certain construction activities occur in a predefined sequence to ensure uninterrupted public utility services such as water, sewer, gas and electricity, and most importantly, uninterrupted site security via CCTV cameras throughout the site. For this reason, a construction sequence has been developed and is presented within the Plans to highlight the various aspects of the project. Variations to this construction sequence may be suggested by the Contractor, but will be subject to review and approval by the Owner.

A summary of the project requirements is summarized below:

Site Security:

- Contractor must maintain as operational the existing site security equipment at all times. This will require the establishment of electrical utilities and temporary systems prior to completion of the project. Electrical provisions will be required prior to demolition of buildings.
- CCTV systems and the City of Portland's emergency operator system must remain functional at all times. Again, electrical provisions will be required to maintain CCTV and emergency operator systems.
- Galaxy Integrated Technologies of Brighton, Massachusetts is the contractor responsible for servicing and monitoring the security system for the Portland IMT and the City of Portland. The Contractor shall coordinate with Galaxy at the onset of the project.

Maintenance Building

- Utilities at the Maintenance Building must remain functional throughout the project, but may be permitted short lapses of functionality (no more than four hours at a time) with scheduled notice to the Port Operator. For this reason, water, sewer, gas, electric, and communication lines must be re-established prior to demolition of the IMT Building. Minimize impact to the personnel in the Maintenance Building to the greatest extent possible.

Domestic/International Container Storage Areas – Port Operations Work Area

- Temporary fencing, which will define the Primary Construction Zone, must be placed within close proximity to the lines shown on the Plans, in order to provide ample working space for port operations. The location of the temporary fencing may be slightly shifted throughout the project as needed and on a short term scheduled basis, by either the Port Operator or the Contractor to accomplish specific task.

Pin 17820.00
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SPECIAL PROVISIONS
SECTION 105
GENERAL SCOPE OF WORK

Contractor Access to Restricted Areas

The Contractor is advised that the Container Storage Area is identified as a Marine Transportation Security Act (MTSA) 105 site defined by Homeland Security, and is essentially comprised of two separate container storage areas with different levels of restricted access. The first area is designated the International Container Storage Area, and comprises approximately 8 acres of the terminal site on the east side of the terminal. The second area is designated the Domestic Container Storage Area and comprises approximately 5 acres of the terminal site on the west side of the terminal.

Upon commencement of the project, the Contractor will establish the Primary Construction Zone within the middle 4 acres of the facility where the majority of the work will occur. The Primary Construction Zone will be defined by a series of temporary chain link fence segments erected by the Contractor, and will encompass the Contractor Staging Area immediately to the west of the pier in front of the RUBB Building. Once the Primary Construction Zone is established, the Contractor will not be allowed to breech the temporary fencing at will in order to work in the restricted zones. Work by the Contractor in the restricted zones, namely the Port Operation Areas, will be possible by the Contractor only on a scheduled basis and by employees with the proper security clearance, such as with TWIC Cards (Transportation Worker Identification Credential). Scheduling by the Contractor should be made on a weekly basis to ensure that access can be readily granted by the Port Operator. Similarly, the Port Operator will notify the Contractor on a weekly basis of scheduled vessel activity so that both container operations and construction work can occur simultaneously and without interruption.

The following activities will occur within the Port Operation Areas and therefore will require that the Contractor plan its efforts accordingly:

- Demolition of the U.S. Customs Building, concrete foundation, and trailer, and backfilling and patching the pavement;
- Removal of the 100-ft high mast light poles, backfilling, and patch paving the area;
- Access to the large steel site bollards; and
- Painting final pavement marking lines.

The Contractor will be required to obtain the proper Port Security clearance for its employees and subcontractors to the extent that these employees will be required to work outside of the Primary Construction Zone as indicated on the Plans. To ensure compliance with MTSA 105 at all times, the Contractor shall assume that all of its intended employees who will be working on the project will be required to have security clearance to be present within these otherwise restricted zones, and will maintain on its person at all times the Port Security badges it receives

from the Port Authority. Employees will be required to keep badges on their person at all times and will be required to return the temporary badges upon completion of the project or the completion of their portion of the work. Employees shall adhere to the restrictions placed on such temporary access, and will be required to acknowledge a basic understanding of these requirements upon completion of a 15-minute presentation by the port operator. While the presentation is routine in nature, the importance of site security at an international waterfront facility will be emphasized. Contact information for TWIC cards and Port Authority badges will be provide to the Contractor upon commencement of the project.

In addition to Port Security clearance, employees will be required to obtain City of Portland identification cards for the duration of the project. Similar to the Port Security cards, employees shall maintain possession of the identification cards at all times, and shall return the temporary cards upon completion of the project or the completion of their portion of the work.

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SPECIAL PROVISIONS
SECTION 105
GENERAL SCOPE OF WORK

Permits Required

The Contractor is required to obtain permits from the City of Portland for various construction activities identified throughout the project. Permits identified below shall be obtained and paid for by the Contractor under Pay Item 849.10106, Contractor Allowance for City Permits, Fees, and Special Inspections.

1. Building Demolition Permit
2. Building Construction Permit
3. Sign Permit
4. Flood Plan Permit

December 1, 2010
Supersedes April 1, 2010

SPECIAL PROVISION
SECTION 105
GENERAL SCOPE OF WORK
(Buy America Certification)

105.11 Federal Requirements Add the following as the third paragraph:

"Prior to payment by the Department, the Contractor shall provide a certification from the producer of steel or iron, or any product containing steel or iron as a component, stating that all steel or iron furnished or incorporated into the furnished product was manufactured in the United States in accordance with the requirements of the Buy America provisions of 23 CFR 635.410, as amended. Such certification shall also include (1) a statement that the iron or steel product or component was produced entirely within the United States, or (2) a statement that the iron or steel product or component was produced within the United States except for minimal quantities of foreign steel and iron valued at $ (actual value)."

SPECIAL PROVISION 105
GENERAL SCOPE OF WORK
Equal Opportunity and Civil Rights
(Disadvantaged Business Enterprises Program)

105.10.1.1 Disadvantaged Business Enterprises Program The Maine Department of Transportation (MaineDOT) has established a Disadvantaged Business Enterprise (DBE) program in accordance with regulations of the United States Department of Transportation (USDOT), 49 CFR Part 26. The MaineDOT receives federal financial assistance from USDOT, and as a condition of receiving this assistance, the Department has signed an assurance that it will comply with 49 CFR Part 26.The MaineDOT is responsible for determining the eligibility of and certifying DBE firms in Maine.

A DBE is defined as a for-profit business that is owned and controlled by one or more socially and economically disadvantaged person(s). For the purpose of this definition:

1. "Socially and economically disadvantaged person" means an individual who is a citizen or lawful permanent resident of the United States and who is Black, Hispanic, Native American, Asian, Female; or a member of another group or an individual found to be disadvantaged by the Small Business Administration pursuant to Section 3 of the Small Business Act.
2. "Owned and controlled" means a business which is:
    a. A sole proprietorship legitimately owned and controlled by an individual who is a disadvantaged person.
    b. A partnership or limited liability company in which at least 51% of the beneficial ownership interests legitimately are held by a disadvantaged person(s).
    c. A corporation or other entity in which at least 51% of the voting interest and 51% of the beneficial ownership interests legitimately are held by a disadvantaged person(s).

The disadvantaged group owner(s) or stockholder(s) must possess control over management, interest in capital, and interest in earnings commensurate with the percentage of ownership. If the disadvantaged group ownership interests are real, substantial and continuing and not created solely to meet the requirements of this program, a firm is considered a bona fide DBE.

105.10.1.2 Commercially Useful Function MaineDOT will count expenditures of a DBE contractor toward DBE goals only if the DBE is performing a commercially useful function on that contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. Credit will only be given when the DBE meets all conditions for a CUF. Credit for labor will be in accordance with the responsibilities outlined in the contract. To perform a commercially useful function, the DBE must also be responsible, with respect to materials and supplies used on the Contract, for negotiating price, determining quality and quantity, ordering the materials, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, MaineDOT will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and DBE credit claimed for its performance of the work, and other relevant factors.

Rented equipment used by the DBE must not be rented from the Prime Contractor on a job that the DBE is subcontracted with that Prime Contractor for regular course of business.

A current listing of certified DBEs that may wish to participate in the highway construction program and the scope of work for which they are certified can be found at http://www.maine.gov/mdot/disadvantaged-business-enterprises/pdf/directory.pdf. Credit will be given for the value described by a DBE performing as:

A. A prime contractor; 100% of actual value of work performed by own workforces.
B. An approved subcontractor; 100% of work performed by own workforces.
C. An owner-operator of construction equipment; 100% of expenditures committed.
D. A manufacturer; 100% of expenditures committed. The manufacturer must be a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor. Brokers and packagers shall not be regarded as manufacturers.
E. A regular dealer; 60% of expenditures committed. A regular dealer is defined as a firm that owns, operates, or maintains a store, warehouse or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public. For purposes of this provision a "Broker" is a DBE that has entered into a legally binding relationship to provide goods or services delivered or performed by a third party. Brokers and packagers shall not be regarded as regular dealers.
F. A bona fide service provider; 100% of reasonable fees or commissions. Eligible services include professional, technical, consultant, or managerial, services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for the performance of the contract. Eligible services also include agencies providing bonding and insurance specifically required for the performance of the contract.
G. A trucking, hauling or delivery operation. 100% of expenditures committed when trucks are owned, operated, licensed and insured by the DBE and used on the contract and, if applicable, includes the cost of the self supplied materials and supplies.100% of expenditures committed when the DBE leases trucks from another DBE firm including an owner-operator. 100% of reasonable fees or commissions the DBE receives as a result of a lease arrangement for trucks from a non-DBE, including an owner-operator.
H. Any combination of the above.

105.10.1.3 Race-neutral Goals The Maine DOT is required to set an annual goal (approved on a three year basis) for DBE participation in Federal-aid projects. In order to fulfill that goal, bidders are encouraged to utilize DBE businesses certified by the MaineDOT. MaineDOT seeks to meet the established DBE goal solely through race-neutral means. *Race-neutral* DBE participation occurs when a DBE is awarded a prime contract through customary competitive procurement procedures, is awarded a subcontract on a contract that does not carry a DBE contract goal, or wins a subcontract from a prime contractor that did not consider its DBE status in making the award. A DBE/subcontractor Utilization Proposed Form is required to be included in bid documents.

MaineDOT will analyze each project and create a Project Availability Target (PAT), based on a number of factors including project scope, available DBE firms, firms certified in particular project work, etc. Each bid will request that the contractor attempt to meet the PAT. This PAT is developed to assist contractors to better understand what the MaineDOT expectations are for a

specific project. The PAT is NOT a mandate but an assessment of what this particular project can bear for DBE participation. The Department anticipates that each contractor will make the best effort to reach or exceed this PAT for the project.

105.10.1.4 Race-conscious Project Goals If it is determined by the Department that the annual DBE goal will not be met through *race-neutral* means, the Department may implement *race-conscious contract goals* on some projects. Race-conscious contract goals are goals that are enforceable by the Department and require that the prime contractor use good faith effort to achieve the goal set by the Department for that particular project. If race conscious means are implemented on a project, the Prime must comply with the requirements of 49 CFR.

At the time of the bid opening, all Bidders shall submit with their bid a Disadvantaged Business Enterprise (DBE) Commitment Form provided by the Department. This form will list the DBE and non-DBE firms that are proposed to be used during the execution of the Work. The list shall show the name of the firm, the item/material/type of work involved and the dollar amount of work to be performed. The dollar total of each commitment shall be totaled and a percentage determined.

If the project goal is not met, acceptable documentation showing all good faith efforts made to obtain participation may be required in order to award the project. Failure to provide the required listing with the dollar participation total or acceptable documentation of good faith efforts to obtain DBE participation within 3 days after the bid opening date will be considered a lack of responsiveness on the part of the low bidder. Rejection of the low bid under these circumstances will require the low bidder to surrender the Proposal Guaranty to the Department. The submission and approval of the above forms does not constitute a formal subcontract.

If for any reason during the progress of the Work the Contractor finds that DBEs included on the list are unable to perform the proposed work, the Contractor, with written release by the committed DBE or approval of the Department, may substitute other DBE firms for those named on the list. If the Contractor is able to clearly document their inability to find qualified substitute firms to meet the project goal, the Contractor may request in writing approval to substitute the DBE with a non-DBE firm. If at any time during the life of the Contract it is determined that the Contractor is not fulfilling the goal or commitment(s) and is not making a good faith effort to fulfill the DBE requirement, the Department may withhold progress payments. If good faith effort is determined by the Department, failure to meet the DBE contract goal will not be a detriment to the bid award. Fulfillment of the goal percentage shall be determined by dividing the dollars committed to the DBEs by the actual contract dollars. These requirements are in addition to all other Equal Employment Opportunity requirements on Federal-aid contracts.

105.10.1.5 Certification of DBE attainment on Contracts The MaineDOT must certify that it has conducted post-award monitoring of all contracts to ensure that DBEs had done the work for which credit was claimed. The certification is for the purpose of ensuring accountability for monitoring which the regulation already requires. The MaineDOT will certify these contracts through review of CUF forms, Elations sub-contract payment tracking as well as occasional on-site reviews of projects and through the project's final closeout documentation provided by our Contracts Section.

105.10.1.6 Bidders' List Survey Pursuant to 49 CFR 26.11 the MaineDOT is required to "create and maintain" a bidders list and gather bidder information on our construction/consultant projects, Contractors will maintain information on all subcontract bids submitted by DBE and Non-DBE firms and provide that information to the Department. The Following information is required:

Firm Name
Firm Address
Firm status (DBE or non-DBE)
Age of firm (years)
And the annual gross receipts amount as indicated by defined brackets, i.e. $500,000 to $800,000, rather than requesting exact figures.

Not only is this information critical in determining the availability of DBE businesses relative to other businesses that do similar work, but the Federal Highway Administration requires that we obtain this information.

MaineDOT DBE Project Attainment Target (PAT)
for this Project is 1 %

The MaineDOT seeks to meet the specified annual Disadvantaged Business Enterprise (DBE) usage goal set out by 49 CFR 26.45 through the efforts of contractors seeking to employ qualified DBE subcontractors. We seek to meet this goal by race neutral means and do not, at this time, use contract specific requirements for each project. We do however, understand the capacity of Maine's DBE community and the unique characteristics a project may have that would differ from the broad annual goal.

Taking this into consideration, the MaineDOT will review each project and develop an anticipated attainment or Project Attainment Target (PAT) based on several factors that are project specific. Those factors include:

- Scope of Work
- DBE availability according to Specification Item
- Geographic location
- DBE capacity

This PAT is developed to assist contractors to better understand the DBE participation that the MaineDOT can reasonably expect for a specific project. The PAT is NOT a mandate but an assessment of the DBE opportunities that this project could meet or exceed. MaineDOT anticipates that each contractor will make the best effort to reach or exceed the PAT for this project.

SPECIAL PROVISION
SECTION 107
SCHEDULING OF WORK

Replace Section 107.4.2 with the following:

"107.4.2 Schedule of Work Required Within 21 Days of Contract Execution and before beginning any on-site activities, the Contractor shall provide the Department with its Schedule of Work. The Contractor shall plan the Work, including the activity of Subcontractors, vendors, and suppliers, such that all Work will be performed in Substantial Conformity with its Schedule of Work. The Schedule must include sufficient time for the Department to perform its functions as indicated in this Contract, including QA inspection and testing, approval of the Contractor's TCP, SEWPCP and QCP, and review of Working Drawings.

At a minimum, the Schedule of Work shall include a bar chart which shows the major Work activities, milestones, durations, and a timeline. Milestones to be included in the schedule include: (A) start of Work, (B) beginning and ending of planned Work suspensions, (C) Completion of Physical Work, and (D) Completion. If the Contractor Plans to Complete the Work before the specified Completion date, the Schedule shall so indicate.

Any restrictions that affect the Schedule of Work such as paving restrictions or In-Stream Work windows must be charted with the related activities to demonstrate that the Schedule of Work complies with the Contract.

The Department will review the Schedule of Work and provide comments to the Contractor within 20 days of receipt of the schedule. The Contractor will make the requested changes to the schedule and issue the finalized version to the Department."

SPECIAL PROVISION
SECTION 107
TIME
(Scheduling of Work – Projected Payment Schedule)

Description The Contractor shall also provide the Department with a Quarterly Projected Payment Schedule that estimates the value of the Work as scheduled, including requests for payment of Delivered Materials. The Projected Payment Schedule must be in accordance with the Contractor's Schedule of Work and prices submitted by the Contractor's Bid. The Contractor shall submit the Projected Payment Schedule as a condition of Award.

Pin 17820.00
Portland
May 25, 2011

SPECIAL PROVISION

SECTION 107
TIME
(Contract Time)

All work shall be completed by August 30, 2012, which is the specified completion date for this contract.

Pin 17820.00
Portland
May 25, 2011

SPECIAL PROVISION
SECTION 107.3
ALLOWABLE WORK TIMES
(Night Work)

The following is in addition to the requirements of Section 107.3.2

The Contractor is being made aware of the close proximity of the local residences. The Contractor shall conduct operations so as not to generate loud noises between the hours of 8:00 PM and 6:00 AM unless otherwise approved. Local requirements concerning noise may impose additional restrictions and must be complied with by the Contractor.

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SPECIAL PROVISIONS
SECTION 107.9
TIME
(Project Closeout)

The following is in addition to the requirements of Section 107.9.

The Contractor shall maintain, at the site, a set of Drawings, on which shall be recorded accurately as the work progresses, the actual dimensions and grades of all his work, indicating thereon all variations from the Contract Drawings. The record shall include the work of all Subcontractors. Record drawings shall be reviewed by the Resident, and the Contractor shall make all necessary changes according to the Resident's review.

Prior to final acceptance of the Work, all recorded data shall be transferred by the Contractor, to a complete set of reproducible record drawings, in ink, photolitho or electronic reproductions of the original of the Contract Drawings showing "As-Built" conditions.

SPECIAL PROVISION
SECTION 108
PAYMENT
(Asphalt Escalator)

108.4.1 Price Adjustment for Hot Mix Asphalt: For all contracts with hot mix asphalt in excess of 500 tons total, a price adjustment for performance graded binder will be made for the following pay items:

Item 403.206 Hot Mix Asphalt - 25 mm
Item 403.207 Hot Mix Asphalt - 19 mm
Item 403.2071 Hot Mix Asphalt - 19 mm (Polymer Modified)
Item 403.2072 Hot Mix Asphalt - 19 mm (Asphalt Rich Base)
Item 403.2073 Warm Mix Asphalt - 19 mm
Item 403.208 Hot Mix Asphalt - 12.5 mm
Item 403.2081 Hot Mix Asphalt - 12.5 mm (Polymer Modified)
Item 403.2083 Warm Mix Asphalt - 12.5 mm
Item 403.209 Hot Mix Asphalt - 9.5 mm (sidewalks, drives, & incidentals)
Item 403.210 Hot Mix Asphalt - 9.5 mm
Item 403.2101 Hot Mix Asphalt - 9.5 mm (Polymer Modified)
Item 403.2102 Hot Mix Asphalt - 9.5 mm (Asphalt Rich Base)
Item 403.2103 Warm Mix Asphalt - 9.5 mm
Item 403.211 Hot Mix Asphalt – Shim
Item 403.2111 Hot Mix Asphalt – Shim (Polymer Modified)
Item 403.2113 Warm Mix Asphalt - Shim
Item 403.212 Hot Mix Asphalt - 4.75 mm (Shim)
Item 403.2123 Warm Mix Asphalt - 4.75 mm (Shim)
Item 403.213 Hot Mix Asphalt - 12.5 mm (base and intermediate course)
Item 403.2131 Hot Mix Asphalt - 12.5 mm (base and intermediate course Polymer Modified)
Item 403.2132 Hot Mix Asphalt - 12.5 mm (Asphalt Rich Base and intermediate course)
Item 403.2133 Warm Mix Asphalt - 12.5 mm (base and intermediate course)
Item 403.214 Hot Mix Asphalt - 4.75 mm (Surface)
Item 403.2143 Warm Mix Asphalt - 4.75 mm (Surface)
Item 461.13 Maintenance Surface Treatment

Price adjustments will be based on the variance in costs for the performance graded binder component of hot mix asphalt. They will be determined as follows:

The quantity of hot mix asphalt for each pay item will be multiplied by the performance graded binder percentages given in the table below times the difference in price between the base price and the period price of asphalt cement. Adjustments will be made upward or downward, as prices increase or decrease.

Item 403.206: 4.8%

Item 403.207–5.2%	Item 403.2071–5.2%	Item 403.2072–5.8%	Item 403.2073–5.2%
Item 403.208–5.6%	Item 403.2081–5.6%		Item 403.2083–5.6%
Item 403.209–6.2%			
Item 403.210–6.2%	Item 403.2101–6.2%	Item 403.2102–6.8%	Item 403.2103–6.2%

Item 403.211–6.2%	Item 403.2111–6.2%		Item 403.2113–6.2%
Item 403.212–6.8%			Item 403.2123–6.8%
Item 403.213–5.6%	Item 403.2131–5.6%	Item 403.2132–6.2%	Item 403.2133–5.6%
Item 403.214–6.8%			Item 403.2143–6.8%
Item 461.13–6.4%			

Hot Mix Asphalt**:** The quantity of hot mix asphalt will be determined from the quantity shown on the progress estimate for each pay period.

Base Price: The base price of performance graded binder to be used is the price per standard ton current with the bid opening date. This price is determined by using the average New England Selling Price (Excluding the Connecticut market area), as listed in the Asphalt Weekly Monitor.

Period Price: The period price of performance graded binder will be determined by the Department by using the average New England Selling Price (Excluding the Connecticut market area), listed in the Asphalt Weekly Monitor current with the paving date. The maximum Period Price for paving after the adjusted Contract Completion Date will be the Period Price on the adjusted Contract Completion Date.

SPECIAL PROVISION
DIVISION 400
PAVEMENTS

SECTION 401 - HOT MIX ASPHALT PAVEMENT

401.01 Description The Contractor shall furnish and place one or more courses of Hot Mix Asphalt Pavement (HMA) on an approved base in accordance with the contract documents and in reasonably close conformity with the lines, grades, thickness, and typical cross sections shown on the plans or established by the Resident. The Department will accept this work under Quality Assurance provisions, in accordance with these specifications and the requirements of Section 106 – Quality, the provisions of AASHTO M 323 except where otherwise noted in sections 401 and 703 of these specifications, and the Maine DOT Policies and Procedures for HMA Sampling and Testing.

401.02 Materials Materials shall meet the requirements specified in Section 700 - Materials:

Asphalt Cement	702.01
Aggregates for HMA Pavement	703.07
HMA Mixture Composition	703.09

401.021 Recycled Asphalt Materials Recycled Asphalt Pavement (RAP) may be introduced into the mixture at percentages approved by the Department. If approved by the Department, the Contractor shall provide documentation stating the source, test results for average residual asphalt content, and stockpile gradations showing RAP materials have been sized to meet the maximum aggregate size requirements of each mix designation. The Department will obtain samples for verification and approval prior to its use.

For specification purposes, RAP will be categorized as follows:

Classified RAP – RAP consisting of processed millings from federal, state or municipal roadways that is free of materials not generally considered to be asphalt pavement. Millings from other sources that have been fractionated or otherwise processed so as to improve the consistency of the RAP may be considered Classified RAP if approved by the Department.

Unclassified RAP – RAP from unknown sources, from excavated or reclaimed pavements, millings from repaired areas or other sources.

In the event that RAP source or properties change, the Contractor shall notify the Department of the change and submit new documentation stating the new source or properties a minimum of 72 hours prior to the change to allow for obtaining new samples and approval.

401.03 Composition of Mixtures The Contractor shall compose the Hot Mix Asphalt Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), and mineral filler if required. HMA shall be designed and tested according to AASHTO R35 and the volumetric criteria in Table 1. The Contractor shall size, uniformly grade, and combine the aggregate fractions in proportions that provide a mixture meeting the grading requirements of the Job Mix Formula (JMF). The Contractor may use a maximum of 20 percent Classified RAP in any base, binder, surface, or shim course. For Unclassified RAP stockpiles no more than 15 percent shall be used. The Contractor may be allowed to use more than 20 percent Classified RAP, up to a maximum of 25 percent Classified RAP, in a base, binder, or shim course provided that PG 58-34 asphalt binder is used in the mixture. A PG 52-34 may be used when approved by the Department.

The Contractor shall submit for Department approval a JMF to the Central Laboratory in Bangor for each mixture to be supplied. The Department may approve 1 active design per nominal maximum size, per traffic level, per plant, plus a 9.5mm "fine" mix for shimming and where required, a non-RAP design for bridge decks. The Department shall then have 15 calendar days in which to process a new design before approval. The JMF shall establish a single percentage of aggregate passing each sieve size within the limits shown in section 703.09. The mixture shall be designed and produced, including all production tolerances, to comply with the allowable control points for the particular type of mixture as outlined in 703.09. The JMF shall state the original source, gradation, and percentage to be used of each portion of the aggregate including RAP when utilized, and mineral filler if required. It shall also state the proposed PGAB content, the name and location of the refiner, the supplier, the source of PGAB submitted for approval, the type of PGAB modification if applicable, and the location of the terminal if applicable.

In addition, the Contractor shall provide the following information with the proposed JMF:

Properly completed JMF indicating all mix properties (Gmm, VMA, VFB, etc.)
Stockpile Gradation Summary
Design Aggregate Structure Consensus Property Summary
Design Aggregate Structure Trial Blend Gradation Plots (0.45 power chart)
Trial Blend Test Results for at least three different asphalt contents
Design Aggregate Structure for at least three trial blends
Test results for the selected aggregate blend at a minimum of three binder contents
Specific Gravity and temperature/viscosity charts for the PGAB to be used
Recommended mixing and compaction temperatures from the PGAB supplier
Material Safety Data Sheets (MSDS) For PGAB
Asphalt Content vs. Air Voids trial blend curve
Test report for Contractor's Verification sample
Summary of RAP test results (if used), including count, average and standard deviation of binder content and gradation

At the time of JMF submittal, the Contractor shall identify and make available the stockpiles of all proposed aggregates at the plant site. There must be a minimum of 150 Mg [150 ton] for stone stockpiles, 75 Mg [75 ton] for sand stockpiles, and 50 Mg [50 ton] of blend sand before the Department will sample. The Department shall obtain samples for laboratory testing. The Contractor shall also make available to the Department the PGAB proposed for use in the mix in sufficient quantity to test the properties of the asphalt and to produce samples for testing of the mixture. Before the start of paving, the Contractor and the Department shall split a production sample for evaluation. The Contractor shall test its split of the sample and determine if the results meet the requirements of the Department's written policy for mix design verification (See Maine DOT Policies and Procedures for HMA Sampling and Testing available at the Central Laboratory in Bangor). If the results are found to be acceptable, the Contractor will forward their results to the Department's Lab, which will test the Department's split of the sample. The results of the two split samples will be compared and shared between the Department and the Contractor. If the Department finds the mixture acceptable, an approved JMF will be forwarded to the Contractor and paving may commence. The first day's production shall be monitored, and the approval may be withdrawn if the mixture exhibits undesirable characteristics such as checking, shoving or displacement. The Contractor shall be allowed to submit aim changes within 24 hours of receipt of the first Acceptance test result. Adjustments will be allowed of up to 2% on the percent passing the 2.36 mm sieve through the 0.075 mm and 3% on the percent passing the 4.75 mm or larger sieves. Adjustments will be allowed on the %PGAB of up to 0.2%. Adjustments will be allowed on GMM of up to 0.010.

The Contractor shall submit a new JMF for approval each time a change in material source or materials properties is proposed. The same approval process shall be followed. The cold feed percentage of any aggregate may be adjusted up to 10 percentage points from the amount listed on the JMF, however no aggregate listed on the JMF shall be eliminated. The cold feed percentage for RAP may be adjusted up to 5

percentage points from the amount listed on the JMF but shall not exceed the maximum allowable percentage for RAP for the specific application.

TABLE 1: VOLUMETRIC DESIGN CRITERIA

Design ESAL's (Millions)	Required Density (Percent of G_{mm})			Voids in the Mineral Aggregate (VMA)(Minimum Percent) Nominal Maximum Aggregate Size (mm)					Voids Filled with Binder (VFB) (Minimum %)	Fines/Eff. Binder Ratio
	$N_{initial}$	N_{design}	N_{max}	25	19	12.5	9.5	4.75		
<0.3	≤91.5	96.0	≤98.0	13.0	14.0	15.0	16.0	16.0	70-80	0.6-1.2**
0.3 to <3	≤90.5								65-80	
3 to <10	≤89.0								65-80*	
10 to <30										
≥ 30										

*For 9.5 mm nominal maximum aggregate size mixtures, the maximum VFB is 82.
*For 4.75 mm nominal maximum aggregate size mixtures, the maximum VFB is 84.
**For 4.75 mm nominal maximum aggregate size mixtures, the Fines/Effective Binder Ratio is 0.6-1.4.

401.04 Temperature Requirements After the JMF is established, the temperatures of the mixture shall conform to the following tolerances:

In the truck at the mixing plant – allowable range 135° to 163°C [275 to 325°F]
At the Paver – allowable range 135° to 163°C [275 to 325°F]

The JMF and the mix subsequently produced shall meet the requirements of Tables 1 and Section 703.07.

401.05 Performance Graded Asphalt Binder Unless otherwise noted in Special Provision 403 - Hot Mix Asphalt Pavement, the PGAB shall be 64-28, except that for mixtures containing greater than 20 percent but no more than 25 percent RAP the PGAB shall be PG 58-34 (or PG 52-34 when approved by the Department). The PGAB shall meet the applicable requirements of AASHTO M320 - Standard Specification for PGAB. The Contractor shall provide the Department with an approved copy of the Quality Control Plan for PGAB in accordance with AASHTO R 26 Certifying Suppliers of PGAB.
The Contractor shall request approval from the Department for a change in PGAB supplier or source by submitting documentation stating the new supplier or source a minimum of 24 hours prior to the change. In the event that the PGAB supplier or source is changed, the Contractor shall make efforts to minimize the occurrence of PGAB co-mingling.

401.06 Weather and Seasonal Limitations The State is divided into two paving zones as follows:

a. Zone 1 Areas north of US Route 2 from Gilead to Bangor and north of Route 9 from Bangor to Calais.
b. Zone 2 Areas south of Zone 1 including the US Route 2 and Route 9 boundaries.

The Contractor may place Hot Mix Asphalt Pavement for use other than a traveled way wearing course in either Zone between the dates of April 15th and November 15th, provided that the air temperature as determined by an approved thermometer (placed in the shade at the paving location) is 4°C [40°F] or higher and the area to be paved is not frozen. The Contractor may place Hot Mix Asphalt Pavement as traveled way wearing course in Zone 1 between the dates of May 1st and the Saturday following October 1st and in Zone 2 between the dates of April 15th and the Saturday following October 15th, provided the air temperature determined as above is 10°C [50°F] or higher. For the purposes of this Section, the traveled way includes truck lanes, ramps, approach roads and auxiliary lanes. The atmospheric temperature for all courses on bridge decks shall be 10°C [50°F] or higher.

Hot Mix Asphalt Pavement used for curb, driveways, sidewalks, islands, or other incidentals is not subject to seasonal limitations, except that conditions shall be satisfactory for proper handling and finishing of the mixture. All mixtures used for curb, driveways, sidewalks, islands, or other incidentals shall conform to section 401.04 - Temperature Requirements. Unless otherwise specified, the Contractor shall not place Hot Mix Asphalt Pavement on a wet or frozen surface and the air temperature shall be 4°C [40°F] or higher.

On all sections of overlay with wearing courses less than 25 mm [1 in] thick, the wearing course for the travelway and adjacent shoulders shall be placed between the dates of May 15th and the Saturday following September 15th.

On all sections of overlay with wearing courses less than 1 inch thick, the wearing course for the travelway and adjacent shoulders shall be placed between the dates of June 1st and the Saturday following September 1st if the work is to be performed, either by contract requirement, or Contractor option, during conditions defined as "night work".

401.07 Hot Mix Asphalt Plant

401.071 General Requirements HMA plants shall conform to AASHTO M156.

a. Truck Scales When the hot mix asphalt is to be weighed on scales meeting the requirements of Section 108 - Payment, the scales shall be inspected and sealed by the State Sealer as often as the Department deems necessary to verify their accuracy.

Plant scales shall be checked prior to the start of the paving season, and each time a plant is moved to a new location. Subsequent checks will be made as determined by the Resident. The Contractor will have at least ten 20 Kg [50 pound] masses for scale testing.

401.072 Automation of Batching Batch plants shall be automated for weighing, recycling, and monitoring the system. In the case of a malfunction of the printing system, the requirements of Section 401.074 c. of this specification will apply.

The batch plant shall accurately proportion the various materials in the proper order by weight. The entire batching and mixing cycle shall be continuous and shall not require any manual operations. The batch plant shall use auxiliary interlock circuits to trigger an audible alarm whenever an error exceeding the acceptable tolerance occurs. Along with the alarm, the printer shall print an asterisk on the delivery slip in the same row containing the out-of-tolerance weight. The automatic proportioning system shall be capable of consistently delivering material within the full range of batch sizes. When RAP is being used, the plant must be capable of automatically compensating for the moisture content of the RAP.

All plants shall be equipped with an approved digital recording device. The delivery slip load ticket shall contain information required under Section 108.1.3 - Provisions Relating to Certain Measurements, Mass and paragraphs a, b, and c of Section 401.073

401.073 Automatic Ticket Printer System on Automatic HMA Plant An approved automatic ticket printer system shall be used with all approved automatic HMA plants. The requirements for delivery slips for payment of materials measured by weight, as given in the following Sections, shall be waived: 108.1.3 a., 108.1.3 b., 108.1.3 c., and 108.1.3 d. The automatic printed ticket will be considered as the Weight Certificate.

The requirements of Section 108.1.3 f. - Delivery Slips, shall be met by the weigh slip or ticket, printed by the automatic system, which accompanies each truckload, except for the following changes:

a. The quantity information required shall be individual weights of each batch or total net weight of each truckload.
b. Signatures (legible initials acceptable) of Weighmaster (required only in the event of a malfunction as described in 401.074 c.).
c. The MDOT designation for the JMF.

401.074 Weight Checks on Automatic HMA Plant At least twice during each 5 days of production either of the following checks will be performed:

a. A loaded truck may be intercepted and weighed on a platform scale that has been sealed by the State Sealer of Weights and Measures within the past 12 months. Whenever the discrepancy in net weights is greater than 1.0%, but does not exceed 1.5%, the plant inspector will notify the producer to take corrective action; payment will still be governed by the printed ticket.

The producer will be allowed a period of two days to make any needed repairs to the plant and/or platform scales so that the discrepancy in net weights between the two is less than 1.0%. If the discrepancy exceeds 1.5%, the plant will be allowed to operate as long as payment is determined by truck platform scale net weight. Effective corrective action shall be taken within two working days.

b. Where platform scales are not readily available, a check will be made to verify the accuracy and sensitivity of each scale within the normal weighing range and to assure that the interlocking devices and automatic printer system are functioning properly.

c. In the event of a malfunction of the automatic printer system, production may be continued without the use of platform truck scales for a period not to exceed the next two working days, providing total weights of each batch are recorded on weight tickets and certified by a Licensed Public Weighmaster.

401.08 Hauling Equipment Trucks for hauling Hot Mix Asphalt Pavement shall have tight, clean, and smooth metal dump bodies, which have been thinly coated with a small amount of approved release agent to prevent the mixture from adhering to the bodies. Solvent based agents developed to strip asphalts from aggregates will not be allowed as release agents.

All truck dump bodies shall have a cover of canvas or other water repellent material capable of heat retention, which completely covers the mixture. The cover shall be securely fastened on the truck, unless unloading.

All truck bodies shall have an opening on both sides, which will accommodate a thermometer stem. The opening shall be located near the midpoint of the body, at least 300 mm [12 in] above the bed.

401.09 Pavers Pavers shall be self-contained, self-propelled units with an activated screed (heated if necessary) capable of placing courses of Hot Mix Asphalt Pavement in full lane widths specified in the contract on the main line, shoulder, or similar construction.

On projects with no price adjustment for smoothness, pavers shall be of sufficient class and size to place Hot Mix Asphalt Pavement over the full width of the mainline travel way with a 3 m [10 ft] minimum main screed with activated extensions.

The Contractor shall place Hot Mix Asphalt Pavement on the main line with a paver using an automatic grade and slope controlled screed, unless otherwise authorized by the Department. The controls shall automatically adjust the screed and increase or decrease the layer thickness to compensate for irregularities in the preceding course. The controls shall maintain the proper transverse slope and be readily adjustable so that transitions and superelevated curves can be properly paved. The controls shall operate from a fixed or moving reference such as a grade wire or ski type device (floating beam) with a minimum length of 10 m [30 ft], a non-contact grade control with a minimum span of 7.3 m [24 ft], except that a 12 m [40 ft] reference shall be used on Expressway projects.

The Contractor shall operate the paver in such a manner as to produce a visually uniform surface texture and a thickness within the requirements of Section 401.101 - Surface Tolerances. The paver shall have a receiving hopper with sufficient capacity for a uniform spreading operation and a distribution system to place the mixture uniformly, without segregation in front of the screed. The screed assembly shall produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Pavers with extendible screeds shall have auger extensions and tunnel extenders as per the manufacturer's recommendations, a copy of which shall be available if requested.

The Contractor shall have the paver at the project site sufficiently before the start of paving operations to be inspected and approved by the Department. The Contractor shall repair or replace any paver found worn or defective, either before or during placement, to the satisfaction of the Department. Pavers that produce an unevenly textured or non-uniform mat will be repaired or replaced before continuing to place HMA on MaineDOT projects.
On a daily basis, the Contractor shall perform nuclear density testing across the mat being placed, prior to being compacted by equipment., at 300 mm [12 in] intervals, If the density values vary by more than 2.0% from the mean, the Contractor shall make adjustments to the screed until the inconsistencies are remedied.

Failure to replace or repair defective placement equipment may result in a letter of suspension of work and notification of a quality control violation resulting in possible monetary penalties as governed by Section 106 - Quality

401.10 Rollers Rollers shall be static steel, pneumatic tire, or approved vibrator type. Rollers shall be in good mechanical condition, capable of starting and stopping smoothly, and be free from backlash when reversing direction. Rollers shall be equipped and operated in such a way as to prevent the picking up of hot mixed material by the roller surface. The use of rollers, which result in crushing of the aggregate or in displacement of the HMA will not be permitted. Any Hot Mix Asphalt Pavement that becomes loose, broken, contaminated, shows an excess or deficiency of Performance Graded Asphalt Binder, or is in any other way defective shall be removed and replaced at no additional cost with fresh Hot Mix Asphalt Pavement, which shall be immediately compacted to conform to the adjacent area.

The Contractor shall repair or replace any roller found to be worn or defective, either before or during placement, to the satisfaction of the Department. Rollers that produce grooved, unevenly textured or non-uniform mat will be repaired or replaced before continuing to place HMA on MaineDOT projects.

The type of rollers to be used and their relative position in the compaction sequence shall generally be the Contractor's option, provided specification densities are attained and with the following requirements:

a. On variable-depth courses, the first lift of pavement over gravel, reclaimed pavement, an irregular surface, or on bridges, at least one roller shall be 14.5 Mg [16 ton] pneumatic-tired. Unless otherwise allowed by the Resident, pneumatic-tired rollers shall be equipped with skirting to minimize the pickup of

HMA materials from the paved surface. When required by the Resident, the roller shall be ballasted to 18.1 Mg [20 ton].

b. Compaction with a vibratory or steel wheel roller shall precede pneumatic-tired rolling, unless otherwise authorized by the Department.

c. Vibratory rollers shall not be operated in the vibratory mode when checking or cracking of the mat occurs, or on bridge decks.

d. Any method, which results in cracking or checking of the mat, will be discontinued and corrective action taken.

The maximum operating speed for a steel wheel or pneumatic roller shall not exceed the manufacturer's recommendations, a copy of which shall be available if requested.

401.101 Surface Tolerances The Department will check surface tolerance utilizing the following methods :

a.) A 5 m [16 ft] straightedge or string line placed directly on the surface, parallel to the centerline of pavement.
b.) A 3 m [10 ft] straightedge or string line placed directly on the surface, transverse to the centerline of pavement.

The Contractor shall correct variations exceeding 6 mm [¼ in] by removing defective work and replacing it with new material as directed by the Department. The Contractor shall furnish a 10 foot straightedge for the Departments use.

401.11 Preparation of Existing Surface The Contractor shall thoroughly clean the surface upon which Hot Mix Asphalt Pavement is to be placed of all objectionable material. When the surface of the existing base or pavement is irregular, the Contractor shall bring it to uniform grade and cross section. All surfaces shall have a tack coat applied prior to placing any new HMA course. Tack coat shall conform to the requirements of Section 409 – Bituminous Tack Coat, Section 702 – Bituminous Material, and all applicable sections of the contract.

401.12 Hot Mix Asphalt Documentation The Contractor and the Department shall agree on the amount of Hot Mix Asphalt Pavement that has been placed each day.

401.13 Preparation of Aggregates The Contractor shall dry and heat the aggregates for the HMA to the required temperature. The Contractor shall properly adjust flames to avoid physical damage to the aggregate and to avoid depositing soot on the aggregate.

401.14 Mixing The Contractor shall combine the dried aggregate in the mixer in the amount of each fraction of aggregate required to meet the JMF. The Contractor shall measure the amount of PGAB and introduce it into the mixer in the amount specified by the JMF.

The Contractor shall produce the HMA at the temperature established by the JMF.

The Contractor shall dry the aggregate sufficiently so that the HMA will not flush, foam excessively, or displace excessively under the action of the rollers. The Contractor shall introduce the aggregate into the mixer at a temperature of not more than 14°C [25°F] above the temperature at which the viscosity of the PGAB being used is 0.150 Pa•s.

The Contractor shall store and introduce into the mixer the Performance Graded Asphalt Binder at a uniformly maintained temperature at which the viscosity of the PGAB is between 0.150 Pa•s and 0.300 Pa•s. The aggregate shall be coated completely and uniformly with a thorough distribution of the PGAB. The Contractor shall determine the wet mixing time for each plant and for each type of aggregate used.

401.15 Spreading and Finishing On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the Contractor shall spread, rake, and lute the HMA with hand tools to provide the required compacted thickness. Solvent based agents developed to strip asphalts from aggregates will not be allowed as release agents.

On roadways with adjoining lanes carrying traffic, the Contractor shall place each course over the full width of the traveled way section being paved that day, unless otherwise noted by the Department in Section 403 - Hot Bituminous Pavement.

401.16 Compaction Immediately after the Hot Mix Asphalt Pavement has been spread, struck off, and any surface irregularities adjusted, the Contractor shall thoroughly and uniformly compact the HMA by rolling.

The Contractor shall roll the surface when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking, or shoving. The Contractor shall prevent adhesion of the HMA to the rollers or vibrating compactors without the use of fuel oil or other petroleum based release agents. Solvents designed to strip asphalt binders from aggregates will not be permitted as release agents on equipment, tools, or pavement surfaces.
The Contractor shall immediately correct any displacement occurring as a result of the reversing of the direction of a roller or from other causes to the satisfaction of the Department. Any operation other than placement of variable depth shim course that results in breakdown of the aggregate shall be discontinued. Any new pavement that shows obvious cracking, checking, or displacement shall be removed and replaced for the full lane width as directed by the Resident at no cost to the Department.

Along forms, curbs, headers, walls, and other places not accessible to the rollers, the Contractor shall thoroughly compact the HMA with mechanical vibrating compactors. The Contractor shall only use hand tamping in areas inaccessible to all other compaction equipment. On depressed areas, the Contractor may use a trench roller or cleated compression strips under a roller to transmit compression to the depressed area.

Any HMA that becomes unacceptable due to cooling, cracking, checking, segregation or deformation as a result of an interruption in mix delivery shall be removed and replaced, with material that meets contract specifications at no cost to the Department.

401.17 Joints The Contractor shall construct wearing course transverse joints in such a manner that minimum tolerances shown in Section 401.101 - Surface Tolerances are met when measured with a straightedge.

The paver shall maintain a uniform head of HMA during transverse and longitudinal joint construction.

The HMA shall be free of segregation and meet temperature requirements outlined in section 401.04. Transverse joints of the wearing course shall be straight and neatly trimmed. The Contractor may form a vertical face exposing the full depth of the course by inserting a header, by breaking the bond with the underlying course, or by cutting back with hand tools. The Department may allow feathered or "lap" joints on lower base courses or when matching existing base type pavements.

Longitudinal joints shall be generally straight to the line of travel, and constructed in a manner that best ensure joint integrity. Methods or activities that prove detrimental to the construction of straight, sound longitudinal joints will be discontinued.

The Contractor shall apply a coating of emulsified asphalt immediately before paving all joints to the vertical face and 75 mm [3 in] of the adjacent portion of any pavement being overlaid except those formed by pavers operating in echelon. The Contractor shall use an approved spray apparatus designed for covering a narrow surface. The Department may approve application by a brush for small surfaces, or in the event of a malfunction of the spray apparatus, but for a period of not more than one working day.

Where pavement under this contract joins an existing pavement, or when the Department directs, the Contractor shall cut the existing pavement along a smooth line, producing a neat, even, vertical joint. The Department will not permit broken or raveled edges. The cost of all work necessary for the preparation of joints is incidental to related contract pay items.

401.18 Quality Control Method A, B & C The Contractor shall operate in accordance with the approved Quality Control Plan (QCP) to assure a product meeting the contract requirements. The QCP shall meet the requirements of Section 106.6 - Acceptance and this Section. The Contractor shall not begin paving operations until the Department approves the QCP in writing.

Prior to placing any mix, the Department and the Contractor shall hold a Pre-paving conference to discuss the paving schedule, source of mix, type and amount of equipment to be used, sequence of paving pattern, rate of mix supply, random sampling, project lots and sublots and traffic control. A copy of the QC random numbers to be used on the project shall be provided to The Resident. The Departments' random numbers for Acceptance testing shall be generated and on file with the Resident and the Project Manager. All field and plant supervisors including the responsible onsite paving supervisor shall attend this meeting.

The QCP shall address any items that affect the quality of the Hot Mix Asphalt Pavement including, but not limited to, the following:

a. JMF(s)
b. Hot mix asphalt plant details
c. Stockpile Management (to include provisions for a minimum 2 day stockpile)
d. Make and type of paver(s)
e. Make and type of rollers including weight, weight per inch of steel wheels, and average contact pressure for pneumatic tired rollers
f. Name of QCP Administrator, and certification number
g. Name of Process Control Technician(s) and certification number(s)
h. Name of Quality Control Technicians(s) and certification number(s)
i. Mixing & transportation including process for ensuring that truck bodies are clean and free of debris or contamination that could adversely affect the finished pavement
j. Testing Plan
k. Laydown operations including longitudinal joint construction, procedures for avoiding paving in inclement weather, type of release agent to be used on trucks tools and rollers, compaction of shoulders, tacking of all joints, methods to ensure that segregation is minimized, procedures to determine the maximum rolling and paving speeds based on best engineering practices as well as past experience in achieving the best possible smoothness of the pavement. Solvent based agents developed to strip asphalts from aggregates will not be allowed as release agents.
l. Examples of Quality Control forms including a daily plant report and a daily paving report

m. Silo management and details (can show storage for use on project of up to 36 hours)
n. Provisions for varying mix temperature due to extraordinary conditions.
o. Name and responsibilities of the Responsible onsite Paving Supervisor.
p. Method for calibration/verification of Density Gauge
q. A note that all testing will be done in accordance with AASHTO and the Maine DOT Policies and Procedures for HMA Sampling and Testing.
r. A detailed description of RAP processing, stockpiling and introduction into the plant as well as a note detailing conditions under which the percent of RAP will vary from that specified on the JMF.
s. A detailed procedure outlining when production will be halted due to QC or Acceptance testing results.
t. A plan to address the change in PGAB source or supplier and the potential co-mingling of differing PGAB's.
u. A procedure to take immediate possession of acceptance samples once released by MaineDOT and deliver said samples to the designated acceptance laboratory.

The QCP shall include the following technicians together with following minimum requirements:

a. QCP Administrator - A qualified individual shall administer the QCP. The QCP Administrator must be a full-time employee of or a consultant engaged by the Contractor or paving subcontractor. The QCP Administrator shall have full authority to institute any and all actions necessary for the successful operation of the QCP. The QCP Administrator (or its designee in the QCP Administrator's absence) shall be available to communicate with the Department at all times. The QCP Administrator shall be certified as a Quality Assurance Technologist certified by the New England Transportation Technician Certification Program (NETTCP).

b. Process Control Technician(s) (PCT) shall utilize test results and other quality control practices to assure the quality of aggregates and other mix components and control proportioning to meet the JMF(s). The PCT shall inspect all equipment used in mixing to assure it is operating properly and that mixing conforms to the mix design(s) and other Contract requirements. The QCP shall detail how these duties and responsibilities are to be accomplished and documented, and whether more than one PCT is required. The Plan shall include the criteria to be utilized by the PCT to correct or reject unsatisfactory materials. The PCT shall be certified as a Plant Technician by the NETTCP.

c. Quality Control Technician(s) (QCT) shall perform and utilize quality control tests at the job site to assure that delivered materials meet the requirements of the JMF(s). The QCT shall inspect all equipment utilized in transporting, laydown, and compacting to assure it is operating properly and that all laydown and compaction conform to the Contract requirements. The QCP shall detail how these duties and responsibilities are to be accomplished and documented, and whether more than one QCT is required. The QCP shall include the criteria utilized by the QCT to correct or reject unsatisfactory materials. The QCT shall be certified as a Paving Inspector by the NETTCP.

The QCP shall detail the coordination of the activities of the Plan Administrator, the PCT and the QCT. The Project Superintendent shall be named in the QCP, and the responsibilities for successful implementation of the QCP shall be outlined.

The Contractor shall sample, test, and evaluate Hot Mix Asphalt Pavement in accordance with the following minimum frequencies:

TABLE 2 : MINIMUM QUALITY CONTROL FREQUENCIES

Test or Action	Frequency	Test Method
Temperature of mix	6 per day at street and plant	-
Temperature of mat	4 per day	-
%TMD (Surface)	1 per 125 Mg [125 ton] (As noted in QC Plan)	ASTM D2950
%TMD (Base)	1 per 250 Mg [250 ton] (As noted in QC Plan)	AASHTO T269
Fines / Effective Binder	1 per 500 Mg [500 ton]	AASHTO T 312*
Gradation	1 per 500 Mg [500 ton]	AASHTO T30
PGAB content	1 per 500 Mg [500 ton]	AASHTO T164 or T308
Voids at N_{design}	1 per 500 Mg [500 ton]	AASHTO T 312*
Voids in Mineral Aggregate at N_{design}	1 per 500 Mg [500 ton]	AASHTO T 312*
Rice Specific Gravity	1 per 500 Mg [500 ton]	AASHTO T209
Coarse Aggregate Angularity	1 per 5000 Mg [5000 ton]	ASTM D5821
Flat and Elongated Particles	1 Per 5000 Mg [5000 ton]	ASTM D4791
Fine Aggregate Angularity	1 Per 5000 Mg [5000 ton]	AASHTO T304

*Method A and B only

The Contractor may utilize innovative equipment or techniques not addressed by the Contract documents to produce or monitor the production of the mix, subject to approval by the Department.

The Contractor shall submit all Hot Mix Asphalt Pavement plant test reports, inspection reports and updated pay factors in writing, signed by the appropriate technician and present them to the Department by 1:00 P.M. on the next working day, except when otherwise noted in the QCP due to local restrictions. The Contractor shall also retain splits of the previous 5 QC tests, with QC results enclosed for random selection and testing by The Department during QA inspections of the HMA production facility. Test results of splits that do not meet the Dispute Resolution Variance Limits in Table 10 shall trigger an investigation by the MDOT Independent Assurance Unit, and may result in that lab losing NETTCP certification and the ability to request a dispute [Section 401.223 - Process for Dispute Resolution (Methods A , B and C only)].

The Contractor shall make density test results, including randomly sampled densities, available to the Department onsite. Summaries of each day's results, including a daily paving report, shall be recorded and signed by the QCT and presented to the Department by 1:00 p.m. the next working day.

The Contractor shall have a testing lab at the plant site, equipped with all testing equipment necessary to complete the tests in Table 2. The Contractor shall locate an approved Gyratory Compactor at the plant testing lab or within 30 minutes of the plant site.

The Contractor shall fill all holes in the pavement resulting from cutting cores by the Contractor or the Department with a properly compacted, acceptable mixture no later than the following working day. Before filling, the Contractor shall carefully clean the holes and apply a coating of emulsified asphalt. On surface courses, cores shall not be cut except for Verification of the Nuclear Density Gauge, at a rate not to exceed 3 per day or 2 per 1000 Mg [1000 ton] placed.
The Contractor shall monitor plant production using running average of three control charts as specified in Section 106 - Quality. Control limits shall be as noted in Table 3 below. The UCL and LCL, shall not exceed the allowable control points for the particular type of mixture as outlined in Table 1 of section 703.09

TABLE 3: Control Limits

Property	UCL and LCL
Passing 4.75 mm and larger sieves	Target +/-4.0
Passing 2.36 mm sieve	Target +/-2.5
Passing .075 mm sieve	Target +/-1.2
PGAB Content*	Target +/-0.3
Voids in the Mineral Aggregate	LCL = LSL + 0.2
% Voids at N_{design}	JMF Target +/-1.3

*Based on AASHTO T 308

The Contractor shall cease paving operations whenever one of the following occurs on a lot in progress:

a. Method A: The Pay Factor for VMA, Voids @ N_d, Percent PGAB, composite gradation, VFB, fines to effective binder or density using all Acceptance or all Quality Control tests for the current lot is less than 0.85.
b. Method B: The Pay Factor for VMA, Voids @ N_d, Percent PGAB, composite gradation, VFB, fines to effective binder or density using all Acceptance or all Quality Control tests for the current lot is less than 0.90.
c. Method C: The Pay Factor for VMA, Voids @ N_d, Percent PGAB, percent passing the nominal maximum sieve, percent passing 2.36 mm sieve, percent passing 0.300 mm sieve, percent passing 0.075 mm sieve or density using all Acceptance or all available Quality Control tests for the current lot is less than 0.85.
d. The Coarse Aggregate Angularity or Fine Aggregate Angularity value falls below the requirements of Table 3: Aggregate Consensus Properties Criteria in Section 703.07 for the design traffic level.
e. Each of the first 2 control tests for a Method A or B lot fall outside the upper or lower limits for VMA, Voids @ Nd, or Percent PGAB; or under Method C, each of the first 2 control tests for the lot fall outside the upper or lower limits for the nominal maximum, 2.36 mm, 0.300 mm or 0.075 mm sieves, or percent PGAB.
f. The Flat and Elongated Particles value exceeds 10% by ASTM D4791.
g. There is any visible damage to the aggregate due to over-densification other than on variable depth shim courses.
h. The Contractor fails to follow the approved QCP.

The Contractor shall notify the Resident in writing as to the reason for shutdown, as well as the proposed corrective action, by the end of the work day. Failure to do so will be treated as a second incident under 106.4.6 QCP Non-compliance. The Department will consider corrective action acceptable if the pay factor for the failing property increases, based on samples already in transit, or a verification sample is tested and the property falls within the specification limits.

In cases where the corrective action can be accomplished immediately, such as batch weight or cold feed changes, the Contractor may elect to resume production once the corrective action is completed. Additional QC testing shall be performed to verify the effectiveness of the corrective action. Subsequent occurrences of shutdown for the same property in a Lot in progress will require paving operations to cease. Paving operations shall not resume until the Contactor and the Department determines that material meeting the Contract requirements will be produced. The Department may allow the Contractor to resume production based upon a passing QC sample, with a split of the sample being sent to the Department for verification testing. If the submitted verification sample test results fall outside the specification limits, the Contractor shall cease production until a verification sample is submitted to the Department has been tested by the Department and found to be within specification limits.

If the Contractor's control chart shows the process to be out of control (defined as a single point outside of the control limits on the running average of three chart) on any property listed in Table 3: Control Limits, the Contractor shall notify the Resident in writing of any proposed corrective action by 1:00 PM the next working day.

The Department retains the exclusive right, with the exception of the first day's production of a new JMF, to determine whether the resumption of production involves a significant change to the production process. If the Department so determines, then the current lot will be terminated, a pay factor established, and a new lot will begin.

401.19 Quality Control Method D For Items covered under Method D, the Contractor shall submit a modified QC Plan detailing, how the mix is to be placed, what equipment is to be used, and what HMA plant is to be used. All mix designs (JMF) shall be approved and verified by MDOT prior to use. Certified QC personnel shall not be required. The Contractor shall certify the mix and the test results for each item by a Certificate of Compliance.

401.20 Acceptance Method A, B & C These methods utilizes Quality Level Analysis and pay factor specifications.
For Hot Mix Asphalt Pavement designated for acceptance under Quality Assurance provisions, the Department will sample once per sublot on a statistically random basis, test, and evaluate in accordance with the following Acceptance Criteria:

TABLE 4: ACCEPTANCE CRITERIA

PROPERTIES	POINT OF SAMPLING	TEST METHOD
Gradation	Paver Hopper	AASHTO T30
PGAB Content	Paver Hopper	AASHTO T308
%TMD (Surface)	Mat behind all Rollers	AASHTO T269
%TMD (Base or Binder)	Mat behind all Rollers	AASHTO T269
Air Voids at N_d	Paver Hopper	AASHTO T 312
%VMA at N_d	Paver Hopper	AASHTO T 312
Fines to Effective Binder	Paver Hopper	AASHTO T 312
%VFB	Paver Hopper	AASHTO T 312

In the event the Department terminates a Lot prematurely but fails to obtain the required number of acceptance samples to calculate the volumetric property pay factor under the test method specified in the contract, the pay factor shall be calculated using the number of samples actually obtained from the contract. Should the number of acceptance samples taken total less than three, the resulting pay factor shall be 1.0 for volumetric properties. A minimum of three cores will be used for a density pay factor, if applicable, for quantities placed to date.

Should the Contractor request a termination of the Lot in progress prior to three acceptance samples being obtained, and the Department agrees to terminate the Lot, then the pay factor for mixture properties shall be 0.80. A minimum of three cores will be used to determine a density pay factor, if applicable, for quantities placed to date.

Lot Size For purposes of evaluating all acceptance test properties, a lot shall consist of the total quantity represented by each item listed under the lot size heading.

Sublot size - Refer to section 401.201, 401.202, and 401.203 for minimum size and number of sublots. The quantity represented by each sample will constitute a sublot.

If there is less than one-half of a sublot remaining at the end, then it shall be combined with the previous sublot. If there is more than one-half sublot remaining at the end, then it shall constitute the last sublot and shall be represented by test results. If it becomes apparent partway through a Lot that, due to an underrun, there will be insufficient mix quantity to obtain the minimum number of sublots needed, the Resident may adjust the size of the remaining sublots and select new sample locations based on the estimated quantity of material remaining in the Lot.

Acceptance Testing The Department will obtain samples of Hot Mix Asphalt Pavement in conformance with AASHTO T168 Sampling Bituminous Paving Mixtures, and the Maine DOT Policies and Procedures for HMA Sampling and Testing, which will then be transported by the Contractor to the designated MDOT Laboratory within 48 hours (except when otherwise noted in the project specific QCP due to local restrictions), as directed by MDOT in approved transport containers to be provided by the Department, unless otherwise directed by the Resident. Failure to deliver an acceptance sample to the designated acceptance laboratory will be considered the second incident under 106.4.6–QCP Non-Compliance.

The Department will take the sample randomly within each sublot. Target values shall be as specified in the JMF. The Department will use Table 5 for calculating pay factors for gradation, PGAB Content, Air Voids at N_{design}, VMA, Fines to Effective Binder and VFB. The Department will withhold reporting of the test results for the Acceptance sample until 7:00 AM, on the second working day of receipt of the sample, or after receipt of the Contractors results of the Acceptance sample split. Upon conclusion of each lot, where there is a minimum of four sublots, results shall be examined for statistical outliers, as stated in Section 106.7.2 - Statistical Outliers.

Isolated Areas During the course of inspection, should it appear that there is an isolated area that is not representative of the lot based on a lack of observed compactive effort, excessive segregation or any other questionable practice, that area may be isolated and tested separately. An area so isolated that has a calculated pay factor below 0.80, based on three random tests shall be removed and replaced at the expense of the Contractor for the full lane width and a length not to be less than 50 m [150 ft].

Pavement Density The Department will measure pavement density using core samples tested according to AASHTO T-166. The Department will randomly determine core locations. The Contractor shall cut 6 inch diameter cores at no additional cost to the Department by the end of the working day following the day the pavement is placed, and immediately give them to the Department. Cores for Acceptance testing shall be cut such that the nearest edge is never within 0.225 m (9 inches) of any joint. The cores will be placed in a transport container provided by the Department and transported by the Contractor to the designated MDOT Lab as directed by the Department. Pre-testing of the cores will not be allowed. At the time of sampling, the Contractor and the Department shall mutually determine if a core is damaged. If it is determined that the core(s) is damaged, the Contractor shall cut new core(s) at the same offset and within 1 m [3 ft] of the initial sample. At the time the core is cut, the Contractor and the Department will mutually determine if saw cutting of the core is needed, and will mark the core at the point where sawing is needed. The core may be saw cut by the Contractor in the Department's presence onsite, or in an MDOT Lab by The Department, without disturbing the layer being tested to remove lower layers of Hot Mix Asphalt Pavement, gravel, or RAP. No recuts are allowed at a test location after the core has been tested. Upon conclusion of each lot, density results shall be examined for statistical outliers as stated in Section 106.7.2.

On all sections of overlay with wearing courses designed to be 19 mm [3/4 in] or less in thickness, there shall be no pay adjustment for density otherwise noted in Section 403 - Hot Bituminous Pavement. For overlays designed to be 19 mm [3/4 in] or less in thickness, density shall be obtained by the same rolling train and methods as used on mainline travelway surface courses with a pay adjustments for density, unless otherwise directed by the Department.

There shall be no pay adjustment for density on shoulders unless otherwise noted in Section 403 - Hot Bituminous Pavement. Density for shoulders shall be obtained by the same rolling train and methods as used on mainline travelway, unless otherwise directed by the Department. Efforts to obtain optimum compaction will not be waived by the Department unless it is apparent during construction that local conditions make densification to this point detrimental to the finished pavement surface course.

401.201 Method A Lot Size will be the entire production per JMF for the project, or if so agreed at the Pre-paving Conference, equal lots of up to 4500 Mg [4500 tons], with unanticipated over-runs of up to 1500 Mg [1500 ton] rolled into the last lot. Sublot sizes shall be 750 Mg [750 ton] for mixture properties, 500 Mg [500 ton] for base or binder densities and 250 Mg [250 ton] for surface densities. The minimum number of sublots for mixture properties shall be 4, and the minimum number of sublots for density shall be five.

TABLE 5: METHOD A ACCEPTANCE LIMITS

Property	USL and LSL
Passing 4.75 mm and larger sieves	Target +/-7%
Passing 2.36 mm to 1.18 mm sieves	Target +/-4%
Passing 0.60 mm	Target +/-3%
Passing 0.30 mm to 0.075 mm sieve	Target +/-2%
PGAB Content	Target +/-0.4%
Air Voids	4.0% +/-1.5%
Fines to Effective Binder	0.6 to 1.2
Voids in the Mineral Aggregate	LSL Only from Table 1
Voids Filled with Binder	Table 1 values plus a 4% production tolerance for USL only
% TMD (In place density)	95.0% +/- 2.5%

**For 4.75 mm nominal maximum aggregate size mixtures, the Fines/Effective Binder Ratio is 0.6-1.4.

401.202 Method B Lot Size will be the entire production per JMF for the project and shall be divided into 3 equal sublots for Mixture Properties and 3 equal sublots for density.

TABLE 6: METHOD B ACCEPTANCE LIMITS

Property	USL and LSL
Percent Passing 4.75 mm and larger sieves	Target +/-7
Percent Passing 2.36 mm to 1.18 mm sieves	Target +/-5
Percent Passing 0.60 mm	Target +/-4
Percent Passing 0.30 mm to 0.075 mm sieve	Target +/-3
PGAB Content	Target +/-0.5
Air Voids	4.0% +/-2.0
Fines to Effective Binder	0.6 to 1.4
Voids in the Mineral Aggregate	LSL from Table 1
Voids Filled with Binder	Table1 plus a 4% production tolerance for USL.
% TMD (In-place Density)	95.0% +/- 2.5%

401.203 Testing Method C Lot Size will be the entire production per JMF for the project, or if so agreed at the Pre-paving Conference, equal lots of up to 4500 Mg [4500 tons], with unanticipated over-runs of up to 1500 Mg [1500 ton] rolled into the last lot. Sublot sizes shall be 750 Mg [750 ton] for mixture properties, 500 Mg [500 ton] for base or binder densities and 250 Mg [250 ton] for surface densities. The minimum number of sublots for mixture properties shall be 4, and the minimum number of sublots for density shall be five.

TABLE 7: METHOD C ACCEPTANCE LIMITS

Property	USL and LSL
Passing 4.75 mm and larger sieves	Target +/-7%
Passing 2.36 mm to 1.18 mm sieves	Target +/-5%
Passing 0.60 mm	Target +/-4%
Passing 0.30 mm to 0.075 mm sieve	Target +/-2%
PGAB Content	Target +/-0.4%
Air Voids	4.0% +/-1.5%
Fines to Effective Binder	0.6 to 1.2
Voids in the Mineral Aggregate	LSL Only from Table 1
Voids Filled with Binder	Table 1 values plus a 4% production tolerance for USL only
% TMD (In place density)	95.0% +/- 2.5%

**For 4.75 mm nominal maximum aggregate size mixtures, the Fines/Effective Binder Ratio is 0.6-1.4.

401.204 Testing Method D For hot mix asphalt items designated as Method D in Section 403 - Hot Bituminous Pavement, one sample will be taken from the paver hopper or the truck body per 250 Mg [250 ton] per pay item. The mix will be tested for gradation and PGAB content. Disputes will not be allowed. If the mix is within the tolerances listed in Table 8: Method D Acceptance Limits, the Department will pay the contract unit price. If the test results for each 250 Mg [250 ton] increment are outside these limits, the following deductions (Table 8b) shall apply to the HMA quantity represented by the test.

TABLE 8: METHOD D ACCEPTANCE LIMITS

Property	USL and LSL
Percent Passing 4.75 mm and larger sieves	Target +/-7
Percent Passing 2.36 mm to 1.18 mm sieves	Target +/-5
Percent Passing 0.60 mm	Target +/-4
Percent Passing 0.30 mm to 0.075 mm sieve	Target +/-3
PGAB Content	Target +/-0.5
% TMD (In-place Density)	95.0% +/- 2.5%

TABLE 8b Method "D" Price Adjustments

PGAB Content	-5%
2.36 mm sieve	-2%
0.30 mm sieve	-1%
0.075 mm sieve	-2%
Density	-10%*

*Only applies when called for in Section 403 - Hot Bituminous Pavement. Contractor shall cut two 150 mm [6 in] cores, which shall be tested for percent TMD per AASHTO T-269. If the average for the two tests falls below 92.5% the disincentive shall apply.

401.21 Method of Measurement The Department will measure Hot Mix Asphalt Pavement by the Mg [ton] in accordance with Section 108.1 - Measurement of Quantities for Payment.

401.22 Basis of Payment The Department will pay for the work, in place and accepted, in accordance with the applicable sections of this Section, for each type of HMA specified.

The Department will pay for the work specified in Section 401.11, for the HMA used, except that cleaning objectionable material from the pavement and furnishing and applying bituminous material to joints and contact surfaces is incidental.

Payment for this work under the appropriate pay items shall be full compensation for all labor, equipment, materials, and incidentals necessary to meet all related contract requirements, including design of the JMF, implementation of the QCP, obtaining core samples, transporting cores and samples, filling core holes, applying emulsified asphalt to joints, and providing testing facilities and equipment.
The Department will make a pay adjustment for quality as specified below.

401.221 Pay Adjustment The Department will sample, test, and evaluate Hot Mix Asphalt Pavement in accordance with Section 106 - Quality and Section 401.20 - Acceptance, of this Specification.

401.222 Pay Factor (PF) The Department will use the following criteria for pay adjustment using the pay adjustment factors under Section 106.7 - Quality Level Analysis:

Density If the pay factor for Density falls below 0.80 for Method A or C or 0.86 for Method B, all of the cores will be randomly re-cut by Sublot. A new pay factor will be calculated that combines all initial and retest results. If the resulting pay factor is below 0.80 for Method A or C or below 0.86 for Method B, the entire Lot shall be removed and replaced with material meeting the specifications at no additional cost to the Department, except that the Department may, when it appears that there is a distinct pattern of defective material, isolate any defective material by investigating each mix sample sublot and require removal of defective mix sample sublots only, leaving any acceptable material in place if it is found to be free of defective material. Pay factors equal to or greater than the reject level will be paid accordingly.

Gradation For HMA evaluated under Acceptance Method A or B, the Department will determine a composite pay factor (CPF) using applicable price adjustment factors “f“ from Table 9: Table of Gradation Composite “f” Factors, and Acceptance limits from Table 5: Method A Acceptance Limits, for Method A or Table 6: Method B Acceptance Limits, for Method B. The Department will not make price adjustments for gradation on Methods A and B, but will monitor them as shutdown criteria.

TABLE 9: TABLE OF GRADATION COMPOSITE " f " FACTORS (Methods A and B)

Constituent		"f" Factor			
		19 mm	12.5 mm	9.5 mm	4.75 mm
Gradation	25 mm	-	-	-	-
	19 mm	4	-	-	-
	12.5 mm		4	4	-
	9.50 mm				4
	2.36 mm	6	6	6	8
	1.18 mm				
	0.60 mm	2	2	2	2
	0.30 mm	2	2	2	2
	0.075 mm	6	6	6	8

For HMA evaluated under Acceptance Method C, the Department will determine a pay factor using acceptance limits from Table **7**: Method C Acceptance Limits.

VMA, Air Voids, VFB and Fines to Effective Binder The Department will determine a pay factor (PF) using the applicable Acceptance Limits.

The following variables will be used for pay adjustment:

PA = Pay Adjustment
Q = Quantity represented by PF in Mg [ton]
P = Contract price per Mg [ton]
PF = Pay Factor

Pay Adjustment Method A

The Department will use the following criteria for pay adjustment: density, Performance Graded Asphalt Binder content, voids @N_d, VMA, VFB, F/B_{eff}, and the screen sizes listed in Table 9 for the type of HMA represented in the JMF. If any single pay factor for PGAB Content, VMA, or Air Voids falls below 0.80, then the composite pay factor for PGAB Content, VMA, and Air Voids shall be 0.55.

Density: For mixes having a density requirement, the Department will determine a pay factor using Table 5: Method A Acceptance Limits:

PA = (density PF- 1.0)(Q)(P)x0.50

PGAB Content, VMA and Air Voids: The Department will determine a pay adjustment using Table 5: Method A Acceptance Limits as follows:

PA = (voids @ N_d PF- 1.0)(Q)(P)x0.20 + (VMA @ N_d PF- 1.0)(Q)(P)x0.20 + (PGAB PF- 1.0)(Q)(P)x0.10

VFB and Fines to Effective Binder The Department will determine a pay factor (PF) using Table 5: Method A Acceptance Limits. The Department will not make price adjustments for VFB or Fines to Effective Binder, but will monitor them as shutdown criteria.

Pay Adjustment Method B

The Department will use the following criteria for pay adjustment: density, Performance Graded Asphalt Binder content, voids @N_d, VMA, VFB, F/B_{eff}, and the screen sizes listed in Table 9 for the type of HMA represented in the JMF. If any single pay factor for PGAB Content, VMA, or Air Voids falls below 0.86, then the composite pay factor for PGAB Content, VMA, and Air Voids shall be 0.70.

Density: For mixes having a density requirement, the Department will determine a pay factor using Table 6: Method B Acceptance Limits:

PA = (density PF- 1.0)(Q)(P)x0.50

PGAB Content, VMA and Air Voids: The Department will determine a pay adjustment using Table 6: Method B Acceptance Limits as follows:

PA = (voids @ N_d PF- 1.0)(Q)(P)x0.20 + (VMA @ N_d PF- 1.0)(Q)(P)x0.20 + (PGAB PF-1.0)(Q)(P)x0.10

VFB and Fines to Effective Binder The Department will determine a pay factor (PF) using Table 6: Method B Acceptance Limits. The Department will not make price adjustments for VFB or Fines to Effective Binder, but will monitor them as shutdown criteria.

Pay Adjustment Method C

The Department will use density, Performance Graded Asphalt Binder content, and the percent passing the nominal maximum, 2.36 mm, 0.300 mm and 0.075 mm sieves for the type of HMA represented in the JMF. If the PGAB content falls below 0.80, then the PGAB pay factor shall be 0.55.

Density: For mixes having a density requirement, the Department will determine a pay factor using Table 7: Method C Acceptance Limits:

PA = (density PF- 1.0)(Q)(P)x0.50

PGAB Content and Gradation The Department will determine a pay factor using Table **7**: Method C Acceptance Limits. The Department will calculate the price adjustment for Mixture Properties as follows:

PA = (% Passing Nom. Max PF-1.0)(Q)(P)X0.05+(% passing 2.36 mm PF-1.0)(Q)(P)X0.05+(%passing 0.30 mm PF-1.0)(Q)(P)X0.05+(%passing 0.075 mm PF-1.0)(Q)(P)X0.10+(PGAB PF-1.0)(Q)(P)X0.25

VMA, Air Voids, VFB and Fines to Effective Binder The Department will determine a pay factor (PF) using Table 7: Method C Acceptance Limits. The Department will not make price adjustments for VMA, Air Voids, VFB or Fines to Effective Binder, but will monitor them as shutdown criteria.

Pay Adjustment Method D

The Department will use density, Performance Graded Asphalt Binder content, and the screen sizes listed in Table 8b for the type of HMA represented in the JMF. If test results do not meet the Table 8 requirements, deducts as shown in Table 8b shall be applied to the quantity of mix represented by the test.

401.223 Process for Dispute Resolution (Methods A B & C only)

a. Dispute Resolution sampling At the time of Hot-Mix Asphalt sampling, the Department will obtain a split sample of each Acceptance test random sample for possible dispute resolution testing. The Contractor shall also obtain a split sample of the HMA at this same time. If the Contractor wishes to retain the option of requesting dispute testing of the initial Acceptance sample, the Contractor will test their split of the

Acceptance sample and shall report their results to the Resident, with a copy to the QA Engineer at the Central Laboratory in Bangor by 7:00 AM, on the second working day from time of QA sampling, otherwise dispute resolution will not be initiated. The Department's dispute resolution split sample will be properly labeled and stored for a period of not more than two weeks, or until the sample is tested.

b. Disputing Acceptance results The Contractor may dispute the Department's Acceptance results and request (Methods A, B, & C) that the dispute resolution split sample be tested by notifying the Department's Resident and the QA Engineer at the Central Laboratory in Bangor in writing within two working days after receiving the results of the Acceptance test. The following shall be provided in the request:

- Acceptance sample reference number
- The specific test result(s) or property(ies) being disputed, and
- The complete, signed report of the Contractor's testing (In a lab certified by the NETTCP and MDOT) of their split of the Acceptance sample indicating that the variances in Table10: Dispute Resolution Variance Limits, for the specific test result(s) or property(ies) were exceeded.

c. Disputable items The Contractor may dispute any or all of the following Method A or B test results when the difference between the Department's value and the Contractor's value for that test equals or exceeds the corresponding allowable variation in Table 10: Dispute Resolution Variance Limits, PGAB content, G_{mb}, and G_{mm}. In addition, if the allowable variation for these tests is not met or exceeded, the Contractor may dispute either or both of the following material properties provided the difference between results for them equals or exceeds the corresponding allowable variation in Table 10: Voids at N_{design}, and VMA.
For Method C only: The results for PGAB content and the screen sizes used for pay adjustment may be disputed.

d. Outcome The value of any disputed result or property reported for the initial Acceptance sample shall stand if the value reported for the dispute resolution sample is not closer to the value the Contractor reported for their split sample than to the value reported for the initial Acceptance sample. If the value reported for the dispute resolution falls precisely half-way between the other two values the value reported for the dispute resolution will replace the original acceptance value. Otherwise, the value reported for the dispute resolution sample will replace the value reported for the initial Acceptance sample, and will be used to re-calculate any other affected results or properties.

TABLE 10: DISPUTE RESOLUTION VARIANCE LIMITS

PGAB Content	+/-0.4%
G_{mb}	+/-0.030
G_{mm}	+/-0.020
Voids @ N_d	+/-0.8%
VMA	+/-0.8%
Passing 4.75 mm and larger sieves	+/- 4.0%
Passing 2.36 mm to 0.60 mm sieves	+/- 3.0%
Passing 0.30 mm to 0.15	+/- 2.0 %
0.075 mm sieve	+/- 1.0%

SECTION 402 - PAVEMENT SMOOTHNESS

402.00 Smoothness Projects Projects to have their pavement smoothness analyzed in accordance with this Specification will be so noted in Special Provision 403 - Bituminous Box

402.01 Pavement Smoothness The final pavement surface shall be evaluated for smoothness using a Class I or Class II profiler as defined by ASTM E950 (94). Smoothness measurements will be expressed in terms of the International Roughness Index (IRI) as defined by the World Bank, in units of inches/mile.

402.02 Lot Size Lot size for smoothness will be 1000 lane-meters [3000 lane-feet]. A sublot will consist of 20 lane-meters [50 lane-feet]. Partial lots will be included in the previous lot if less than one-half the size of a normal lot. If equal to or greater than one-half the normal lot size, it will be tested as a separate lot.

402.03 Acceptance Testing The Department will conduct Acceptance testing following completion of the surface course. Sections to be excluded from testing include the following:

Bridge decks and joints (no smoothness measurements will be taken within 30 m [100 ft] of bridge joints)
Acceleration and deceleration lanes
Shoulders and ramps
Side streets and roads
Within 30 m [100 ft] of transverse joints at the beginning and end of the project
Within 30 m [100 ft] of railroad crossings
Urban areas with speed limits of 50 kph [30 mph] or lower

Each lot shall have 2 measurements made in each wheel path. The average of the 4 measurements will determine the smoothness for that lot.

The smoothness measurements will be statistically evaluated for pay factors as described in Subsection 106.7 - Quality Level Analysis, using the specification limits shown below.

ACCEPTANCE LIMITS

Level	USL
I	0.95 m/km [60 in/mile]
II	1.10 m/km [70 in/mile]
III	1.25 m/km [80 in/mile]

Computation of Smoothness Pay Adjustment:

PA = (PF-1.0)(Q)(P)
where:
Q = Quantity of surface course in the Lot (excluding shoulders, side streets, bridge decks, ramps, acceleration and deceleration lanes)
PF = smoothness pay factor for the Lot
P = Contract unit price for surface pavement
PA = pay adjustment

402.04 Unacceptable Work In the event that any Lot is found to have a pay factor less than 0.80, the Contractor shall take whatever remedial action is required to correct the pavement surface in that Lot at no additional expense to the Department. Such remedial action may include but is not limited to removal and replacement of the unacceptable pavement. In the event remedial action is necessary, the Contractor shall submit a written plan to the Resident outlining the scope of the remedial work. The Resident must approve this plan before the remedial work can begin. Following remedial work, the Lot shall be retested, and will be subject to the specification limits listed above. The resulting pay factor, if within the acceptable range, will be used in the final pay adjustment. The Contractor shall pay the cost of retesting the pavement following corrective action.

Localized surface tolerance defects will be subject to the provisions outlined in Section 401.101 Surface Tolerances.

Payment will be made under:

Pay Item	Pay Unit
402.10 Incentive/Disincentive - Pavement Smoothness	Lump Sum

SECTION 403 - HOT BITUMINOUS PAVEMENT

403.01 Description This work shall consist of constructing one or more courses of bituminous pavement on an approved base in accordance with these specifications, and in reasonably close conformity with the lines, grades, thickness and typical cross sections shown on the plans or established.

The bituminous pavement shall be composed of a mixture of aggregate, filler if required, and bituminous material.

403.02 General The materials and their use shall conform to the requirements of Section 401 - Hot Mix Asphalt Pavement.

403.03 Construction The construction requirements shall be as specified in Section 401 - Hot Mix Asphalt Pavement.
In addition, hot bituminous pavement placed on bridges shall also conform to the following requirements.

a. The mixture shall be composed of aggregate, PGAB and mineral filler but no recycled asphalt pavement and placed in courses as specified in the Special Provisions.

b. The bottom course shall be placed with an approved rubber mounted bituminous paver of such type and operated in such a manner that the membrane waterproofing will not be damaged in any way.

c. The top course shall not be placed until the bottom course has cooled sufficiently to provide stability.

d. The Contractor will not be required to cut sample cores from the compacted pavement on the bridge deck.

e. After the top course has been placed, the shoulder areas shall be sealed 1 meter [3 ft] wide with two applications of an emulsified bituminous sealer meeting the requirements of Section 702.12 - Emulsified Bituminous Sealing Compound. The first application shall be pre-mixed with fine, sharp sand, similar to mortar sand, as needed to fill all voids in the mix in the area being sealed. The second application may be applied without sand. The sealer shall be carried to the curb at the gutter line in sufficient quantity to leave a bead or fillet of material at the face of the curb. The area to be sealed shall be clean, dry and the surface shall be at ambient temperature.

f. The furnishing and applying of the required quantity of sealer for the bridge shoulder areas shall be incidental to placing the hot bituminous pavement.

g. The atmospheric temperature for all courses on bridge decks shall be 10°C [50°F] or higher.

403.04 Method of Measurement Hot bituminous pavement will be measured as specified in Section 401.21- Method of Measurement.

403.05 Basis of Payment The accepted quantities of hot bituminous pavement will be paid for at the contract unit price per Megagram [ton] for the bituminous mixtures, including bituminous material complete in place.

Method A, Method B, Method C and Method D shall be used for acceptance as specified in Section 401 - Hot Mix Asphalt Pavements. (See Complementary Notes, Section 403 - Hot Bituminous Pavement, for Method location).

Payment will be made under:

Pay Item		Pay Unit
403.102	Hot Mix Asphalt Pavement for Special Areas	MG [Ton]
403.206	Hot Mix Asphalt, 25 mm Nominal Maximum Size	MG [Ton]
403.207	Hot Mix Asphalt, 19.0 mm Nominal Maximum Size	MG [Ton]
403.2071	Hot Mix Asphalt , 19.0 mm Nominal Maximum Size	MG [Ton]
403.2072	Asphalt Rich Hot Mix Asphalt,19.0 mm Nominal Maximum Size (Asphalt Rich Base and Intermediate course)	MG [Ton]
403.208	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size	MG [Ton]
403.2081	Hot Mix Asphalt - 12.5 mm Nominal Maximum Size (PG 70-28)	MG [Ton]
403.209	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (sidewalks, drives, islands & incidentals)	MG [Ton]
403.210	Hot Mix Asphalt, 9.5 mm Nominal Maximum Size	MG [Ton]
403.2101	Hot Mix Asphalt - 9.5 mm Nominal Maximum Size (PG 70-28)	MG [Ton]
403.2102	Asphalt Rich Hot Mix Asphalt, 9.5 mm Nominal Maximum Size (Asphalt Rich Intermediate course)	MG [Ton]
403.211	Hot Mix Asphalt (shimming)	MG [Ton]
403.212	Hot Mix Asphalt, 4.75 mm Nominal Maximum Size	MG [Ton]
403.2131	Hot Mix Asphalt, 12.5 mm Nominal Maximum Size, (PG 70-28) (Base and Intermediate Base course)	MG [Ton]
403.2132	Asphalt Rich Hot Mix Asphalt, 12.5 mm Nominal Maximum Size (Base and Intermediate Base course)	MG [Ton]

SPECIAL PROVISION
SECTION 656
Temporary Soil Erosion and Water Pollution Control

The following is added to Section 656 regarding Project Specific Information and Requirements. All references to the Maine Department of Transportation Best Management Practices for Erosion and Sedimentation Control (a.k.a. Best Management Practices manual or BMP Manual) are a reference to the latest revision of said manual. The latest version is dated "February 2008" and is available at:

http://www.maine.gov/mdot/environmental-office-homepage/surface-water-resources.php

Procedures specified shall be according to the BMP Manual unless stated otherwise.

Project Specific Information and Requirements

The following information and requirements apply specifically to this Project. The temporary soil erosion and water pollution control measures associated with this work shall be addressed in the Soil Erosion and Water Pollution Control Plan (SEWPCP.)

1. Newly disturbed earth shall be mulched by the end of each workday. Mulch shall be maintained on a daily basis.

2. The SEWPCP shall describe the location and method of temporary erosion and sediment control for existing and proposed catch basins, outlet areas and culvert inlets and outlets.

3. **If water is flowing within the drainage system, the water shall be diverted to a stable area or conduit and work shall be conducted in the dry.** The Contractor's plan shall address when and where the diversions will be necessary.

4. Dust control items other than those under Standard Specification 637, if applicable, shall be included in the plan.

5. Permanent slope stabilization measures shall be applied within one week of the last soil disturbance. Temporary slope stabilization is required on a daily basis.

6. Permanent seeding shall be done in accordance with *Special Provision, Section 618, Seeding* unless the Contract states otherwise.

7. Culvert inlet and outlet protection shall be installed within 48 hours of culvert installation, or prior to a storm event, whichever is sooner.

SPECIAL PROVISION
SECTION 656
Temporary Soil Erosion and Water Pollution Control

8. Temporary winter stabilization must be used between November 1st and April 1st or outside of that time period if the ground is frozen or snow covered. Temporary winter stabilization involves, at a minimum, covering all disturbed soils and seeded ground that is not Acceptable Work with an approved method. If temporary winter stabilization practices are used then spring procedures for permanent stabilization shall also be described in the SEWPCP. Use of these methods for over-winter temporary erosion control will be incidental to the contract and be paid for as part of Pay Item 656.75.

9. Construction and demolition debris (including debris from wearing surface removal, saw cut slurry, dust, concrete debris, etc.) shall be contained and shall not be allowed to discharge to any resource. All construction and demolition debris shall be disposed of in accordance with *Standard Specifications, Section 202.03, Removing Existing Superstructure, Structural Concrete, Railings, Curbs, Sidewalks and Bridges*. Containment and disposal of construction and demolition debris shall be addressed in the Contractor's SEWPCP.

10. If a cofferdam sedimentation basin is used, it shall be located in an upland area where the water can settle and sink into the ground or be released slowly to the resource in a manner that will not cause erosion. The location of such a cofferdam sedimentation basin shall be addressed in the SEWPCP.

11. Prior to release to a natural resource, any impounded water that has been in contact with concrete placed during construction must have a pH between 7.0 and 8.5, must be within one pH unit of the background pH level of the resource and shall have a turbidity no greater than the receiving resource. This requirement is applicable to concrete that is placed or spilled (including leakage from forms) as well as indirect contact via tools or equipment. Water not meeting release criteria shall be addressed in the SEWPCP. Discharging impounded water to the stream must take place in a manner that does not disturb the stream bottom or cause erosion.

12. The Contractor shall be responsible for monitoring pH with a calibrated meter accurate to 0.1 units. A record of pH measurements shall be kept in the Environmental Coordinator's log (Section 656.4.4.)

May 19, 2011
Supersedes December 7, 2010

STANDARD DETAIL UPDATES

Standard Details and Standard Detail updates are available at:
http://www.maine.gov/mdot/contractor-consultant-information/ss_standard_details_updates.php

Detail #	Description	Revision Date
504(15)	Diaphragms	12/30/02
507(04)	Steel Bridge Railing	2/05/03
526(33)	Concrete Transition Barrier	8/18/03
645(06)	H-Beam Posts – Highway Signing	7/21/04
645(09)	Installation of Type II Signs	7/21/04
626(09)	Electrical Junction Box for Traffic Signals and Lighting	2/25/05
604(01)	Catch Basins	11/16/05
604(05)	Type “A” & “B” Catch Basin Tops	11/16/05
604(06)	Type “C” Catch Basin Tops	11/16/05
604(07)	Manhole Top “D”	11/16/05
604(09)	Catch Basin Type “E”	11/16/05
606(02)	Multiple Mailbox Support	11/16/05
606(07)	Reflectorized Beam Guardrail Delineator Details	11/16/05
609(06)	Vertical Bridge Curb	11/16/05
504(23)	Hand-Hold Details	12/08/05
609(03)	Curb Type 3	6/27/06
609(07)	Curb Type 1	6/27/06
535(01)	Precast Superstructure - Shear Key	10/12/06
535(02)	Precast Superstructure - Curb Key & Drip Notch	10/12/06
535(03)	Precast Superstructure - Shear Key	10/12/06

535(04)	Precast Superstructure - Shear Key	10/12/06
535(05)	Precast Superstructure - Post Tensioning	10/12/06
535(06)	Precast Superstructure - Sections	10/12/06
535(07)	Precast Superstructure - Precast Slab & Box	10/12/06
535(08)	Precast Superstructure - Sections	10/12/06
535(09)	Precast Superstructure - Sections	10/12/06
535(10)	Precast Superstructure - Sections	10/12/06
535(11)	Precast Superstructure - Sections	10/12/06
535(12)	Precast Superstructure - Sections	10/12/06
535(13)	Precast Superstructure - Sections	10/12/06
535(14)	Precast Superstructure - Stirrups	10/12/06
535(15)	Precast Superstructure - Plan	10/12/06
535(16)	Precast Superstructure - Reinforcing	10/12/06
535(17)	Precast Superstructure - Notes	10/12/06
801(01)	Drives on Sidewalk Sections	2/06/07
801(02)	Drives on Non-Sidewalk Sections	2/06/07
535(03)	Precast Superstructure - Shear Key	12/5/07
535(04)	Precast Superstructure - Shear Key	12/5/07
535(05)	Precast Superstructure - Post Tensioning	12/5/07
535(17)	Precast Superstructure - Notes	12/5/07
801(01)	Drives on Sidewalk Sections	1/04/08
801(02)	Drives on Non-Sidewalk Sections	1/04/08
203(03)	Backslope Rounding	1/29/08
535(02)	Precast Superstructure - Curb Key & Drip Notch	5/20/08

535(05)	Precast Superstructure - Post Tensioning	5/20/08
502(03)	Concrete Curb - Bituminous Wearing Surface	2/2/09
502(03)A	Concrete Curb - Concrete Wearing Surface	2/2/09
502(07)	Precast Concrete Deck Panels - Layout Plan	2/2/09
502(07)A	Precast Concrete Deck Panels - Layout Plan	2/2/09
502(08)	Precast Concrete Deck Panels - Panel Plan	2/2/09
502(09)	Precast Concrete Deck Panels - Blocking Detail	2/2/09
502(10)	Precast Concrete Deck Panels	2/2/09
502(11)	Precast Concrete Deck Panels	2/2/09
502(12)	Precast Concrete Deck Panels - Notes	2/2/09
502(12)A	Precast Concrete Deck Panels - Notes	2/2/09
526(06)	Permanent Concrete Barrier	2/2/09
526(08)	Permanent Concrete Barrier – Type IIIA	2/2/09
526(08)A	Permanent Concrete Barrier – Type IIIA	2/2/09
526(13)	Permanent Concrete Barrier – Type IIIB	2/2/09
526(14)	Permanent Concrete Barrier – Type IIIB	2/2/09
526(21)	Concrete Transition Barrier	2/2/09
526(39)	Texas Classic Rail – Between Window	2/2/09
526(40)	Texas Classic Rail – Through Window	2/2/09
526(41)	Texas Classic Rail – Through Post	2/2/09
526(42)	Texas Classic Rail – Through Nose	2/2/09
606(20)	Guardrail - Type 3 - Single Rail - Bridge Mounted	2/2/09
606(21)	Guardrail - Type 3 - Single Rail - Bridge Mounted	2/2/09
606(22)	Guardrail - Type 3 - Single Rail - Bridge Mounted	2/2/09

606(23)	Guardrail - Type 3 - Single Rail - Bridge Mounted	2/2/09
609(06)	Vertical Bridge Curb	2/2/09
609(08)	Precast Concrete Transition Curb	2/2/09
502(12)	Precast Concrete Desk Panels	9/09
504(22)	Diaphragm & Crossframe Notes	9/09
626(09)	Electrical Junction Box for Traffic Signals and Lighting	8/20/10
526(08)	Permanent Concrete Barrier	12/7/10
526(08)A	Permanent Concrete Barrier	12/7/10
504(15)	Diaphragms	5/19/11
507(09)	Steel Bridge Railing	5/19/11
507(09)A	Steel Bridge Railing	5/19/11
610(02)	Stone Scour Protection	5/19/11
610(03)	Stone Scour Protection	5/19/11
610(04)	Stone Scour Protection	5/19/11
620(05)	Geotextile Placement for Protection of Slopes Adjactent to Stream & Tidal Areas	5/19/11

SUPPLEMENTAL SPECIFICATION

(Corrections, Additions, & Revisions to Standard Specifications - Revision of December 2002)

SECTION 101
CONTRACT INTERPRETATION

101.2 Definitions

Closeout Documentation Replace the sentence "A letter stating the amount….. DBE goals." with "DBE Goal Attainment Verification Form"

Add "Environmental Information Hazardous waste assessments, dredge material test results, boring logs, geophysical studies, and other records and reports of the environmental conditions. For a related provision, see Section 104.3.14 - Interpretation and Interpolation."

Add "Fabrication Engineer The Department's representative responsible for Quality Assurance of pre-fabricated products that are produced off-site."

Geotechnical Information Replace with the following: "Boring logs, soil reports, geotechnical design reports, ground penetrating radar evaluations, seismic refraction studies, and other records of subsurface conditions. For a related provision, see Section 104.3.14 - Interpretation and Interpolation."

SECTION 102
DELIVERY OF BIDS

102.7.1 Location and Time Add the following sentence "As a minimum, the Bidder will submit a Bid Package consisting of the Notice to Contractors, the completed Acknowledgement of Bid Amendments form, the completed Schedule of Items, 2 copies of the completed Agreement, Offer, & Award form, a Bid Bond or Bid Guarantee, and any other Certifications or Bid Requirements listed in the Bid Book."

102.11.1 Non-curable Bid Defects Replace E. with "E. The unit price and bid amount is not provided or a lump sum price is not provided or is illegible as determined by the Department."

SECTION 103
AWARD AND CONTRACTING

103.3.1 Notice and Information Gathering Change the first paragraph to read as follows: "After Bid Opening and as a condition for Award of a Contract, the Department may require an Apparent Successful Bidder to demonstrate to the Department's satisfaction that the Bidder is responsible and qualified to perform the Work."

SECTION 104
GENERAL RIGHTS AND RESPONSIBILITIES

104.3.14 Interpretation and Interpolation In the first sentence, change "…and Geotechnical Information." to "…Environmental Information, and Geotechnical Information."
Delete the entire Section 104.5.9 and replace with the following:

SECTION 105
GENERAL SCOPE OF WORK

Delete the entire Section 105.6 and replace with the following:

105.6.1 Department Provided Services The Department will provide the Contractor with the description and coordinates of vertical and horizontal control points, set by the Department, within the Project Limits, for full construction Projects and other Projects where survey control is necessary. For Projects of 1,500 feet in length, or less: The Department will provide three points. For Projects between 1,500 and 5,000 feet in length: The Department will provide one set of two points at each end of the Project. For Projects in excess of 5,000 feet in length, the Department will provide one set of two points at each end of the Project, plus one additional set of two points for each mile of Project length. For non-full construction Projects and other Projects where survey control is not necessary, the Department will not set any control points and, therefore, will not provide description and coordinates of any control points. Upon request of the Contractor, the Department will provide the Department's survey data management software and Survey Manual to the Contractor, or its survey Subcontractor, for the exclusive use on the Department's Projects.

105.6.2 Contractor Provided Services Utilizing the survey information and points provided by the Department, described in Subsection 105.6.1, Department Provided Services, the Contractor shall provide all additional survey layout necessary to complete the Work. This may include, but not be limited to, reestablishing all points provided by the Department, establishing additional control points, running axis lines, providing layout and maintenance of all other lines, grades, or points, and survey quality control to ensure conformance with the Contract. The Contractor is also responsible for providing construction centerline, or close reference points, for all Utility Facilities relocations and adjustments as necessary to complete the Work. When the Work is to connect with existing Structures, the Contractor shall verify all dimensions before proceeding with the Work. The Contractor shall employ or retain competent engineering and/or surveying personnel to fulfill these responsibilities.

The Contractor must notify the Department of any errors or inconsistencies regarding the data and layout provided by the Department as provided by Section 104.3.3 - Duty to Notify Department If Ambiguities Discovered.

105.6.2.1 Survey Quality Control The Contractor is responsible for all construction survey quality control. Construction survey quality control is generally defined as, first, performing initial field survey layout of the Work and, second, performing an independent check of the initial layout using independent survey data to assure the accuracy of the initial layout; additional iterations of checks may be required if significant discrepancies are discovered in this process. Construction survey layout quality control also requires written documentation of the layout process such that the process can be followed and repeated, if necessary, by an independent survey crew.

105.6.3 Survey Quality Assurance It is the Department's prerogative to perform construction survey quality assurance. Construction survey quality assurance may, or may not, be performed by the Department. Construction survey quality assurance is generally defined as an independent check of the construction survey quality control. The construction survey

quality assurance process may involve physically checking the Contractor's construction survey layout using independent survey data, or may simply involve reviewing the construction survey quality control written documentation. If the Department elects to physically check the Contractor's survey layout, the Contractor's designated surveyor may be required to be present. The Department will provide a minimum notice of 48 hours to the Contractor, whenever possible, if the Contractor's designated surveyor's presence is required. Any errors discovered through the quality assurance process shall be corrected by the Contractor, at no additional cost to the Department.

105.6.4 Boundary Markers The Contractor shall preserve and protect from damage all monuments or other points that mark the boundaries of the Right-of-Way or abutting parcels that are outside the area that must be disturbed to perform the Work. The Contractor indemnifies and holds harmless the Department from all claims to reestablish the former location of all such monuments or points including claims arising from 14 MRSA § 7554-A. For a related provision, see Section 104.3.11 - Responsibility for Property of Others.

SECTION 106
QUALITY

106.4.3 Testing Change the first sentence in paragraph three from "…maintain records of all inspections and tests." to "…maintain original documentation of all inspections, tests, and calculations used to generate reports."

106.6 Acceptance Add the following to paragraph 1 of A: "This includes Sections 401 - Hot Mix Asphalt, 402 - Pavement Smoothness, and 502 - Structural Concrete - Method A - Air Content."

Add the following to the beginning of paragraph 3 of A: "For pay factors based on Quality Level Analysis, and"

106.7.1 Standard Deviation Method Add the following to F: "Note: In cases where the mean of the values is equal to either the USL or the LSL, then the PWL will be 50 regardless of the computed value of s."

Add the following to H: "Method C Hot Mix Asphalt: PF = [55 + (Quality Level *0.5)] * 0.01"

SECTION 107
TIME

107.3.1 General Add the following: "If a Holiday occurs on a Sunday, the following Monday shall be considered a Holiday. Sunday or Holiday work must be approved by the Department, except that the Contractor may work on Martin Luther King Day, President's Day, Patriot's Day, the Friday after Thanksgiving, and Columbus Day without the Department's approval."

107.7.2 Schedule of Liquidated Damages Replace the table of Liquidated Damages as follows:

From	Up to and	Amount of Liquidated

More Than	Including	Damages per Calendar Day
$0	$100,000	$225
$100,000	$250,000	$350
$250,000	$500,000	$475
$500,000	$1,000,000	$675
$1,000,000	$2,000,000	$900
$2,000,000	$4,000,000	$1,000
$4,000,000	and more	$2,100

SECTION 108
PAYMENT

Remove Section 108.4 and replace with the following:

"108.4 Payment for Materials Obtained and Stored Acting upon a request from the Contractor and accompanied by bills or receipted bills, the Department will pay for all or part of the value of acceptable, non-perishable Materials that are to be incorporated in the Work, including Materials that are to be incorporated into the Work, not delivered on the Work site, and stored at places acceptable to the Department. Examples of such Materials include steel piles, stone masonry, curbing, timber and lumber, metal Culverts, stone and sand, gravel, and other Materials. The Department will not make payment on living or perishable Materials until acceptably planted in their final locations.

If payment for Materials is made to the Contractor based on bills, only, then the Contractor must provide receipted bills to the Department for these Materials within 14 days of the date the Contractor receives payment for the Materials. Failure of the Contractor to provide receipted bills for these Materials within 14 days of the dated the Contractor receives payment will result in the paid amount being withheld from the subsequent progress payment, or payments, until such time the receipted bills are received by the Department.

Materials paid for by the Department are the property of the Department, but the risk of loss shall remain with the Contractor. Payment for Materials does not constitute Acceptance of the Material. If Materials for which the Department has paid are later found to be unacceptable, then the Department may withhold amounts reflecting such unacceptable Materials from payments otherwise due the Contractor.

In the event of Default, the Department may use or cause to be used all paid-for Materials in any manner that is in the best interest of the Department."

SECTION 109
CHANGES

109.1.1 Changes Permitted Add the following to the end of the paragraph: "There will be no adjustment to Contract Time due to an increase or decrease in quantities, compared to those estimated, except as addressed through Contract Modification(s)."

109.1.2 Substantial Changes to Major Items Add the following to the end of the paragraph: "Contract Time adjustments may be made for substantial changes to Major Items when the change affects the Critical Path, as determined by the Department"

109.4.4 Investigation / Adjustment Third sentence, delete the words "subsections (A) - (E)"

109.5.1 Definitions - Types of Delays

B. Compensable Delay Replace (1) with the following; "a weather related Uncontrollable Event of such an unusually severe nature that a Federal Emergency Disaster is declared. The Contractor will only be entitled to an Equitable Adjustment if the Project falls within the geographic boundaries prescribed under the disaster declaration."

109.7.2 Basis of Payment Replace with the following: "Adjustments will be established by mutual Agreement based upon Unit or Lump Sum Prices. These agreed Unit or Lump Sum prices will be full compensation and no additions or mark-ups are allowed. If Agreement cannot be reached, the Contractor shall accept payment on a Force Account basis as provided in Section 109.7.5 - Force Account Work, as full and complete compensation for all Work relating to the Equitable Adjustment."

109.7.3 Compensable Items Delete this Section entirely.

109.7.4 Non-Compensable Items Replace with the following: "The Contractor is not entitled to compensation or reimbursement for any of the following items:

A. Total profit or home office overhead in excess of 15%,
B. ……."

109.7.5 Force Account Work

C. Equipment
Paragraph 2, delete sentence 1 which starts; "Equipment leased…."

Paragraph 6, change sentence 2 from "The Contractor may furnish…" to read "If requested by the Department, the Contractor will produce cost data to assist the Department in the establishment of such rental rate, including all records that are relevant to the Actual Costs including rental Receipts, acquisition costs, financing documents, lease Agreements, and maintenance and operational cost records."
Add the following paragraph; "Equipment leased by the Contractor for Force Account Work and actually used on the Project will be paid for at the actual invoice amount plus 10% markup for administrative costs."

Add the following section;

"F. Subcontractor Work When accomplishing Force Account Work that utilizes Subcontractors, the Contractor will be allowed a maximum markup of 5% for profit and overhead on the Subcontractor's portion of the Force Account Work. If the Department does not accept the Subcontractor quote, then the Subcontractor work will be subject to the Force Account provisions with a 5% markup for profit & overhead.."

SECTION 110
INDEMNIFICATION, BONDING, AND INSURANCE

Delete the entire Section 110.2.3 and replace with the following:
110.2.3 Bonding for Landscape Establishment Period The Contractor shall provide a signed, valid, and enforceable Performance, Warranty, or Maintenance Bond complying with the Contract, to the Department at Final Acceptance.

The bond shall be in the full amount for all Pay Items for work pursuant to Sec 621, Landscape, payable to the "Treasurer - State of Maine," and on the Department's forms, on exact copies thereof, or on forms that do not contain any significant variations from the Department's forms as solely determined by the Department.

The Contractor shall pay all premiums and take all other actions necessary to keep said bond in effect for the duration of the Landscape Establishment Period described in Special Provision 621.0036 - Establishment Period. If the Surety becomes financially insolvent, ceases to be licensed or approved to do business in the State of Maine, or stops operating in the United States, the Contractor shall file new bonds complying with this Section within 10 Days of the date the Contractor is notified or becomes aware of such change.

All Bonds shall be procured from a company organized and operating in the United States, licensed or approved to do business in the State of Maine by the State of Maine Department of Business Regulation, Bureau of Insurance, and listed on the latest Federal Department of the Treasury listing for "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies."

By issuing a bond, the Surety agrees to be bound by all terms of the Contract, including those related to payment, time for performance, quality, warranties, and the Department's self-help remedy provided in Section 112.1 - Default to the same extent as if all terms of the Contract are contained in the bond(s).

Regarding claims related to any obligations covered by the bond, the Surety shall provide, within 60 Days of Receipt of written notice thereof, full payment of the entire claim or written notice of all bases upon which it is denying or contesting payment. Failure of the Surety to provide such notice within the 60-day period constitutes the Surety's waiver of any right to deny or contest payment and the Surety's acknowledgment that the claim is valid and undisputed.

SECTION 202
REMOVING STRUCTURES AND OBSTRUCTIONS

202.02 Removing Buildings Make the following change to the last sentence in the final paragraph, change "…Code of Maine Regulations 401." to "…Department of Environmental Protection Maine Solid Waste Management Rules, 06-096 CMR Ch. 401, Landfill Siting, Design and Operation."

SECTION 203
EXCAVATION AND EMBANKMENT

203.01 Description Under b. Rock Excavation; add the following sentence: "The use of perchlorate is not allowed in blasting operations."

Delete the entire Section 203.041 and replace with the following:
"203.041 Salvage of Existing Hot Mix Asphalt Pavement All existing hot mix asphalt pavement designated to be removed under this contract must be salvaged for utilization. Existing hot mix asphalt pavement material shall not be deposited in any waste area or be placed below subgrade in any embankment.

Methods of utilization may be any of the following:

1. Used as a replacement for untreated aggregate surface course on entrances provided the material contains no particles greater than 50 mm [2 in] in any dimension. Payment will be made under Pay Item 411.09, Untreated Aggregate Surface Course or 411.10, Untreated Aggregate Surface Course, Truck Measure. Material shall be placed, shaped, compacted and stabilized as directed by the Resident.

2. Stockpiled at commercial or approved sites for commercial or MaineDOT use.

3. Other approved methods proposed by the Contractor, and approved by the Resident which will assure proper use of the existing hot mix asphalt pavement.

The cost of salvaging hot mix asphalt material will be included for payment under the applicable pay item, with no additional allowances made, which will be full compensation for removing, temporarily stockpiling, and rehandling, if necessary, and utilizing the material in entrances or other approved uses, or stockpiling at an approved site as described above. The material will also be measured and paid for under the applicable Pay Item if it is reused for aggregate in entrances, or other approved uses."

SECTION 502
STRUCTURAL CONCRETE

502.05 Composition and Proportioning; TABLE #1; NOTE #2; third sentence; Change "…alcohol based saline sealer…" to "alcohol based silane sealer…". Add NOTE #6 to Class S Concrete.

502.0502 Quality Assurance Method A - Rejection by Resident Change the first sentence to read: "For an individual sublot with test results failing to meet the criteria in Table #1, or if the calculated pay factor for Air Content is less than 0.80……"

502.0503 Quality Assurance Method B - Rejection by Resident Change the first sentence to read: "For material represented by a verification test with test results failing to meet the criteria in Table #1, the Department will……"

502.0505 Resolution of Disputed Acceptance Test Results Combine the second and third sentence to read: "Circumstances may arise, however, where the Department may ……"
502.10 Forms and False work

D. Removal of Forms and False work 1., First paragraph; first, second, and third sentence; replace "forms" with "forms and false work"

502.11 Placing Concrete

G. Concrete Wearing Surface and Structural Slabs on Precast Superstructures Last paragraph; third sentence; replace "The temperature of the concrete shall not exceed 24° C [75° F} at the time of placement." with "The temperature of the concrete shall not exceed 24° C [75° F} at the time the concrete is placed in its final position."

502.15 Curing Concrete First paragraph; replace the first sentence with the following; "All concrete surfaces shall be kept wet with clean, fresh water for a curing period of at least 7 days after concrete placing, with the exception of vertical surfaces as provided for in Section 502.10 (D) - Removal of Forms and False work."

Second paragraph; delete the first two sentences.
Third paragraph; delete the entire paragraph which starts "When the ambient temperature…."
Fourth paragraph; delete "approved" to now read "…continuously wet for the entire curing period…"

Fifth paragraph; second sentence; change "…as soon as it is possible to do so without damaging the concrete surface." to "…as soon as possible."

Seventh paragraph; first sentence; change "…until the end of the curing period." to "…until the end of the curing period, except as provided for in Section 502.10(D) - Removal of Forms and False work."

502.19 Basis of Payment First paragraph, second sentence; add "pier nose armor" to the list of items included in the contract price for concrete.

SECTION 503
REINFORCING STEEL

503.06 Placing and Fastening Change the second paragraph, first sentence from: "All tack welding shall be done in accordance with Section 504, Structural Steel." to "All tack welding shall be done in accordance with AWS D1.4 Structural Welding Code - Reinforcing Steel."

SECTION 504
STRUCTURAL STEEL

504.09 Facilities for Inspection Add the follow as the last paragraph: "Failure to comply with the above requirements will be consider to be a denial to allow access to work by the Contractor. The Department will reject any work done when access for inspection is denied."

504.18 Plates for Fabricated Members Change the second paragraph, first sentence from: "…ASTM A 898/A 898 M…" to "…ASTM A 898/A 898 M or ASTM A 435/A 435 M as applicable and…"

504.31 Shop Assembly Add the following as the last sentence: "The minimum assembly length shall include bearing centerlines of at least two substructure units."

504.64 Non Destructive Testing-Ancillary Bridge Products and Support Structures Change the third paragraph, first sentence from "One hundred percent…" to "Twenty five percent…"

SECTION 535
PRECAST, PRESTRESSED CONCRETE SUPERSTRUCTURE

535.02 Materials Change "Steel Strand for Concrete Reinforcement" to "Steel Strand." Add the following to the beginning of the third paragraph; "Concrete shall be Class P conforming to the requirements in this section. 28 day compressive strength shall be as stated on the plans. Coarse aggregate…."

535.05 Inspection Facilities Add the follow as the last paragraph: "If the above requirements are not met, the Contractor shall be considered to be in violation of Standard Specification 104.2.5 – Right to Inspect Work. All work occurring during a violation of this specification will be rejected."

535.26 Lateral Post-Tensioning Replace the first paragraph; "A final tension…" with "Overstressing strands for setting losses cannot be accomplished for chuck to chuck lengths of 7.6 m [25 ft] and less. In such instances, refer to the Plans for all materials and methods. Otherwise, post-tensioning shall be in accordance with PCI standards and shall provide the anchorage force noted in the Plans. The applied jacking force shall be no less than 100% of the design jacking force."

SECTION 603
PIPE CULVERTS AND STORM DRAINS

603.0311 Corrugated Polyethylene Pipe for Option III Replace the Minimum Mandrel Diameter Table with the following:

Nominal Size US Customary (in)	Minimum Mandrel Diameter (in)	Nominal Size Metric (mm)	Minimum Mandrel Diameter (mm)
12	11.23	300	280.73
15	14.04	375	350.91
18	16.84	450	421.09
24	22.46	600	561.45
30	28.07	750	701.81
36	33.69	900	842.18
42	39.30	1050	982.54
48	44.92	1200	1122.90

SECTION 604
MANHOLES, INLETS, AND CATCH BASINS

604.02 Materials Add the following:

"Tops and Traps	712.07
Corrugated Metal Units	712.08
Catch Basin and Manhole Steps	712.09"

SECTION 605
UNDERDRAINS

605.05 Underdrain Outlets Make the following change:

In the first paragraph, second sentence, delete the words "metal pipe".

SECTION 606
GUARDRAIL

606.02 Materials Delete the entire paragraph which reads "The sole patented supplier of multiple mailbox…." and replace with "Acceptable multiple mailbox assemblies shall be listed on the Department's Approved Products List and shall be NCHRP 350 tested and approved."
Delete the entire paragraph which reads "Retroreflective beam guardrail delineators…." and replace with "Reflectorized sheeting for Guardrail Delineators shall meet the requirements of Section 719.01 - Reflective Sheeting. Delineators shall be fabricated from high-impact, ultraviolet and weather resistant thermoplastic.

606.09 Basis of Payment First paragraph; delete the second and third sentence in their entirety and replace with "Butterfly-type guardrail reflectorized delineators shall be mounted on all W-beam guardrail at an interval of every 10 posts [62.5 ft] on tangents sections and every 5 posts [31.25 ft] on curved sections as directed by the Resident. On divided highways, the delineators shall be yellow on the left hand side and silver/white on the right hand side. On two-way roadways, the delineators shall be silver/white on the right hand side. All delineators shall have retroreflective sheeting applied to only the traffic facing side. Reflectorized guardrail delineators will not be paid for directly, but will be considered incidental to the guardrail items."

SECTION 609
CURB

609.04 Bituminous Curb f., Delete the requirement "Color Natural (White)"

SECTION 610
STONE FILL, RIPRAP, STONE BLANKET, AND STONE DITCH PROTECTION

Add the following paragraph to Section 610.02:
"Materials shall meet the requirements of the following Sections of Special Provision 703:

Stone Fill	703.25
Plain and Hand Laid Riprap	703.26
Stone Blanket	703.27
Heavy Riprap	703.28
Definitions	703.32"

Add the following paragraph to Section 610.032.a.
"Stone fill and stone blanket shall be placed on the slope in a well-knit, compact and uniform layer. The surface stones shall be chinked with smaller stone from the same source."

Add the following paragraph to Section 610.032.b:
"Riprap shall be placed on the slope in a well-knit, compact and uniform layer. The surface stones shall be chinked with smaller stone from the same source."

Add the following to Section 610.032: "Section 610.032.d. The grading of riprap, stone fill, stone blanket and stone ditch protection shall be determined by the Resident by visual inspection of the load before it is dumped into place, or, if ordered by the Resident, by dumping individual loads on a flat surface and sorting and measuring the individual rocks contained in the load. A separate, reference pile of stone with the required gradation will be placed by the Contractor at a convenient location where the Resident can see and judge by eye the suitability of the rock being placed during the duration of the project. The Resident reserves the right to reject stone at the job site or stockpile, and in place. Stone rejected at the job site or in place shall be removed from the site at no additional cost to the Department."

SECTION 615
LOAM

615.02 Materials Make the following change:

Organic Content	Percent by Volume
Humus	"5% - 10%", as determined by Ignition Test

SECTION 618
SEEDING

618.01 Description Change the first sentence to read as follows: "This work shall consist of furnishing and applying seed ….." Also remove ",and cellulose fiber mulch" from 618.01(a).
618.03 Rates of Application In 618.03(a), remove the last sentence and replace with the following: "These rates shall apply to Seeding Method 2, 3, and Crown Vetch."

In 618.03(c) "1.8 kg [4 lb]/unit." to "1.95 kg [4 lb]/unit."

618.09 Construction Method In 618.09(a) 1, sentence two, replace "100 mm [4 in]" with "25 mm [1 in] (Method 1 areas) and 50 mm [2 in] (Method 2 areas)"

618.15 Temporary Seeding Change the Pay Unit from Unit to Kg [lb].

SECTION 620
GEOTEXTILES

620.03 Placement Section (c)

Title: Replace "Non-woven" in title with "Erosion Control".
First Paragraph: Replace first word "Non-woven" with "Woven monofilament".
Second Paragraph: Replace second word "Non-woven" with "Erosion Control".

620.07 Shipment, Storage, Protection and Repair of Fabric Section (a)

Replace the second sentence with the following: "Damaged geotextiles, as identified by the Resident, shall be repaired immediately."

620.09 Basis of Payment

Pay Item 620.58: Replace "Non-woven" with "Erosion Control"
Pay Item 620.59: Replace "Non-woven" with "Erosion Control"

SECTION 621
LANDSCAPING

621.0036 Establishment Period In paragraph 4 and 5, change "time of Final Acceptance" to "end of the period of establishment". In Paragraph 7, change "Final Acceptance date" to ""end of the period of establishment" and change "date of Final Acceptance" to "end of the period of establishment".

SECTION 626
HIGHWAY SIGNING

626.034 Concrete Foundations Add to the following to the end of the second paragraph: "Pre-cast and cast-in-place foundations shall be warranteed against leaning and corrosion for two years after the project is completed. If the lean is greater than 2 degrees from normal or the foundation is spalling within the first two years, the Contractor shall replace the foundation at no extra cost."

SECTION 627
PAVEMENT MARKINGS

627.10 Basis of Payment Add to the following to the end of the third paragraph: "If allowed by Special Provision, the Contractor may utilize Temporary Bi-Directional Yellow and White(As required) Delineators as temporary pavement marking lines and paid for at the contract lump sum price. Such payment will include as many applications as required and removal."

SECTION 637
DUST CONTROL

637.06 Basis of Payment Add the following after the second sentence of the third paragraph: "Failure by the Contractor to follow Standard Specification or Special Provision - Section 637 and/or the Contractor's own Soil Erosion and Pollution Control Plan concerning Dust Control and/or the Contractor's own Traffic Control Plan concerning Dust Control and/or visible evidence of excessive dust problems, as determined by the Resident, will result in a reduction in payment, computed by reducing the Lump Sum Total by 5% per occurrence per day. The Department's Resident or any other representative of the Department reserves the right to suspend the work at any time and request a meeting to discuss violations and remedies. The Department shall not be held responsible for any delay in the work due to any suspension under this item. Additional penalties may also be assessed in accordance with Special Provision 652 - Work Zone Traffic Control and Standard Specification 656 - Temporary Soil Erosion and Water Pollution Control."

SECTION 639
ENGINEERING FACILITIES

639.04 Field Offices Change the forth to last paragraph from: "The Contractor shall provide a fully functional desktop copier…" to "….desktop copier/scanner…"

Description Change "Floor Area" to "Floor Area (Outside Dimension)". Change Type B floor area from "15 (160)" to "20 (217)".

639.09 Telephone Paragraph 1 is amended as follows:
"The contractor shall provide **two** telephone lines and two telephones,…."

Add- "In addition the contractor will supply one computer broadband connection, modem lease and router. The router shall have wireless access and be 802.11n or 802.11g capable and wireless. The type of connection supplied will be contingent upon the availability of services (i.e. DSL or Cable Broadband). It shall be the contractor's option to provide dynamic or static IP addresses through the service. **The selected service will have a minimum downstream connection of 1.5 Mbps and 384 Kbps upstream.** The contractor shall be responsible for the installation charges and all reinstallation charges following suspended periods. Monthly service and maintenance charges shall be billed by the Internet Service Provider (ISP) directly to the contractor."

SECTION 652
MAINTENANCE OF TRAFFIC

652.2.3 Flashing Arrow Board Delete the existing 5 paragraphs and replace with the following: Flashing Arrow Panels (FAP) must be of a type that has been submitted to AASHTO's National Transportation Product Evaluation Program (NTPEP) for evaluation and placed on the Maine Department of Transportations' Approved Products List of Portable Changeable Message Signs & Flashing Arrow Panels.

FAP units shall meet requirements of the current Manual on Uniform Traffic Control Devices

(MUTCD) for Type "C" panels as described in Section 6F.56 - Temporary Traffic Control Devices. An FAP shall have matrix of a minimum of 15 low-glare, sealed beam, Par 46 elements capable of either flashing or sequential displays as well as the various operating modes as described in the MUTCD, Chapter 6-F. If an FAP consisting of a bulb matrix is used, each element should be recess-mounted or equipped with an upper hood of not less than 180 degrees. The color presented by the elements shall be yellow.

FAP elements shall be capable of at least a 50 percent dimming from full brilliance. Full brilliance should be used for daytime operation and the dimmed mode shall be used for nighttime operation. FAP shall be at least 2.4 M x 1.2 M [96" x 48"] and finished in non-reflective black. The FAP shall be interpretable for a distance not less than 1.6 km [1 mile].

Operating modes shall include, flashing arrow, sequential arrow, sequential chevron, flashing double arrow, and flashing caution. In the three arrow signals, the second light from the arrow point shall not operate.

The minimum element on-time shall be 50 percent for the flashing mode, with equal intervals of 25 percent for each sequential phase. The flashing rate shall be not less than 25 nor more than 40 flashes per minute. All on-board circuitry shall be solid state.

Primary power source shall be 12 volt solar with a battery back-up to provide continuous operation when failure of the primary power source occurs, up to 30 days with fully charged batteries. Batteries must be capable of being charged from an onboard 110 volt AC power source and the unit shall be equipped with a cable for this purpose.

Controller and battery compartments shall be enclosed in lockable, weather-tight boxes.
The FAP shall be mounted on a pneumatic-tired trailer or other suitable support for hauling to various locations, as directed. The minimum mounting height of an arrow panel should be 2.1 M [7 feet] from the roadway to the bottom of the panel.

The face of the trailer shall be delineated on a permanent basis by affixing retro-reflective material, known as conspicuity material, in a continuous line as seen by oncoming drivers.

A portable changeable message sign may be used to simulate an arrow panel display."

652.2.4 Other Devices Delete the last paragraph and add the following:
"652.2.5 Portable Changeable Message Sign Trailer mounted Portable Changeable Message Signs (PCMS) must be of a type that has been submitted to AASHTO's National Transportation Product Evaluation Program (NTPEP) for evaluation and placed on the Maine Department of Transportations' Approved Products List of Portable Changeable Message Signs & Flashing Arrow Panels. The PCMS unit shall meet or exceed the current specifications of the Manual on Uniform Traffic Control Devices (MUTCD), 6F.55.

The front face of the sign should be covered with a low-glare protective material. The color of the LED elements shall be amber on a black background. The PCMS should be visible from a distance of 0.8 km [0.5 mile] day and night and have a minimum 15º viewing angle. Characters must be legible from a distance of at least 200 M [650 feet].

The message panel should have adjustable display rates (minimum of 3 seconds per phase), so that the entire message can be read at least twice at the posted speed, the off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed. Each message shall consist of either one or two phases. A phase shall consist of up to eight characters per line. The unit must be capable of displaying at least three lines of text with eight characters per line. Each character shall be 457 mm [18"] high. Each character module shall use at least a five wide and seven high pixel matrix. The text of the messages shall not scroll or travel horizontally or vertically across the face of the sign.

Units shall automatically adjust their brightness under varying light conditions to maintain legibility.

The control system shall include a display screen upon which messages can be reviewed before being displayed on the message sign. The control system shall be capable of maintaining memory when power is unavailable. Message must be changeable with either a notebook computer or an on-board keypad. The controller shall have the capability to store a minimum of 200 user-defined and 200 pre-programmed messages. Controller and battery compartments shall be enclosed in lockable, weather-tight boxes.

PCMS units shall have the capability of being made programmable by means of wireless communications. PCMS units shall also be fully capable of having an on-board radar system installed if required for a particular application.

PCMS' primary power source shall be solar with a battery back-up to provide continuous operation when failure of the primary power source occurs. Batteries must be capable of being charged from a 110 volt AC power source. The unit must also be capable of being operated solely from a 110 volt AC power source and be equipped with a cable for this purpose.

The PCMS shall be mounted on a trailer in such a way that the bottom of the message sign panel shall be a minimum of 2.1 M [7 ft] above the roadway in urban areas and 1.5 M [5 ft] above the roadway in rural areas when it is in the operating mode. PCMS trailers should be of a heavy duty type with a 51 mm [2"] ball hitch and a minimum of four leveling jacks (at each corner). The sign shall be capable of being rotated 360° relative to the trailer. The face of the trailer shall be delineated on a permanent basis by affixing retro-reflective material, known as conspicuity material, in a continuous line as seen by oncoming drivers."

652.3.3 Submittal of Traffic Control Plan In item e. change "A list of all certified flaggers…" to "A list of all the Contractor's certified flaggers…"
Add the follow to the list of requirements: "k. The plan for unexpected nighttime work along with a list of emergency nighttime equipment available on-site."
In the last paragraph add the following as the second sentence: "The Department will review and provide comments to the Contractor within 14 days of receipt of the TCP." Add the following as the last sentence: "The creation and modification of the TCP will be considered incidental to the related 652 items."

652.3.5 Installation of Traffic Control Devices In the first paragraph, first sentence; change "Signs shall be erected…" to "Portable signs shall be erected.." In the third sentence; change

"Signs must be erected so that the sign face…" to "Post-mounted signs must also be erected so that the sign face…"

652.4 Flaggers Replace the first paragraph with the following; "The Contractor shall furnish flaggers as required by the TCP or as otherwise specified by the Resident. All flaggers must have successfully completed a flagger test approved by the Department and administered by a Department-approved Flagger-Certifier who is employing that flagger. All flaggers must carry an official certification card with them while flagging that has been issued by their employer. Flaggers shall wear safety apparel meeting ANSI 107-2004 Class 2 risk exposure that clearly identifies the wearer as a person, and is visible at a minimum distance of 300 m [1000 ft], and shall wear a hardhat with 360° retro-reflectivity. For nighttime conditions, Class 3 apparel, meeting ANSI 107-2004, shall be worn along with a hardhat with 360° retro-reflectivity. Retro-reflective or flashing SLOW/STOP paddles shall be used, and the flagger station shall be illuminated to assure visibility in accordance with 652.6.2."

Second paragraph, first sentence; change "…have sufficient distance to stop before entering the workspace." to "…have sufficient distance to stop at the intended stopping point." Third sentence; change "At a spot obstruction…" to "At a spot obstruction with adequate sight distance,…"

Fourth paragraph, delete and replace with "Flaggers shall be provided as a minimum, a 10 minute break, every 2 hours and a 30 minute or longer lunch period away from the work station. Flaggers may only receive 1 unpaid break per day; all other breaks must be paid. Sufficient certified flaggers shall be available onsite to provide for continuous flagging operations during break periods. Breaker flaggers will not be paid for separately, but shall be considered incidental to the appropriate pay item."

Add the following:
"652.5.1 Rumble Strip Crossing When lane shifts or lane closures require traffic to cross a permanent longitudinal rumble strip for 7 calendar days or less, the Contractor shall install warning signs that read "RUMBLE STRIP CROSSING" with a supplemental Motorcycle Plaque, (W8-15P).

When lane shifts or lane closures require traffic to cross a permanent longitudinal rumble strip for more than 7 calendar days, the Contractor shall pave in the rumble strips in the area that traffic will cross, unless otherwise directed by the Resident. Rumble strips shall be replaced prior to the end of the project, when it is no longer necessary to cross them."

652.6 Nightwork Delete this section entirely and replace with the following:
"652.6.1 Daylight Work Times Unless otherwise described in the Contract, the Contractor is allowed to commence work and end work daily according to the Sunrise/Sunset Table at: http://www.sunrisesunset.com/usa/Maine.asp . If the Project town is not listed, the closest town on the list will be used as agreed at the Preconstruction Meeting. Any work conducted before sunrise or after sunset will be considered Night Work.

652.6.2 Night Work When Night Work occurs (either scheduled or unscheduled), the Contractor shall provide and maintain lighting on all equipment and at all work stations.

The lighting facilities shall be capable of providing light of sufficient intensity to permit good workmanship, safety and proper inspection at all times. The lighting shall be cut off and arranged on stanchions at a height that will provide perimeter lighting for each piece of equipment and will not interfere with traffic, including commercial vehicles, approaching the work site from either direction.

The Contractor shall have available portable floodlights for special areas.

The Contractor shall utilize padding, shielding or other insulation of mechanical and electrical equipment, if necessary, to minimize noise, and shall provide sufficient fuel, spare lamps, generators, etc. to maintain lighting of the work site.

The Contractor shall submit, as a subset of the Traffic Control Plan, a lighting plan at the Preconstruction Conference, showing the type and location of lights to be used for night work. The Resident may require modifications be made to the lighting set up in actual field conditions.

Prior to beginning any Night Work, the Contractor shall furnish a light meter for the Residents use that is capable of measuring the range of light levels from 5 to 20 foot-candles.

Horizontal illumination, for activities on the ground, shall be measured with the photometer parallel to the road surface. For purposes of roadway lighting, the photometer is placed on the pavement. Vertical illumination, for overhead activities, shall be measured with the photometer perpendicular to the road surface. Measurements shall be taken at the height and location of the overhead activity.

Night Work lighting requirements:

Mobile Operations: For mobile-type operations, each piece of equipment (paver, roller, milling machine, etc) will carry indirect (i.e. balloon type) lights capable of producing at least 10 foot-candles of lighting around the work area of the equipment.

Fixed Operations: For fixed-type operations (flaggers, curb, bridge, pipes, etc.), direct (i.e. tower) lighting will be utilized capable of illuminating the work area with at least 10 foot-candles of light.

Hybrid Operations: For hybrid-type operations (guardrail, sweeping, Inslope excavation, etc.), either direct or indirect lighting may be utilized. The chosen lights must be capable of producing at least 10 foot-candles of light around the work area of the equipment
Inspection Operations: Areas required to be inspected by the Department will require a minimum of 5 foot-candles of lighting. This may be accomplished through direct or indirect means.

All workers shall wear safety apparel labeled as meeting the ANSI 107-2004 standard performance for Class 3 risk exposure.

The Contractor shall apply 2- inch wide retro-reflective tape, with alternating red and white segments, to outline the front back and sides of construction vehicles and equipment, to define

their shape and size to the extent practicable. Pickup trucks and personal vehicles are exempt from this requirement. The Contractor shall furnish approved signs reading "Construction Vehicle - Keep Back" to be used on trucks hauling to the project when such signs are deemed necessary by the Resident. The signs shall be a minimum of 30 inches by 60 inches, Black and Orange, ASTM D 4956 - Type VII, Type VIII, or Type IX (prismatic).

All vehicles used on the project, including pickup trucks and personal vehicles, shall be equipped with amber flashing lights, visible from both front and rear, or by means of single, approved type, revolving, flashing or strobe lights mounted so as to be visible 360º. The vehicle flashing system shall be in continuous operation while the vehicle is on any part of the project.

The Resident or any other representative of the Department reserves the right to suspend the work at any time and request a meeting to discuss violations and remedies. The Department shall not be held responsible for any delay in the work due to any suspension under this item. Failure to follow the approved Lighting Plan will result in a Traffic Control violation.

Payment for lighting, vehicle mounted signs and other costs accrued because of night work will not be made directly but will be considered incidental to the related contract items."

652.8.2 Other Items Replace the last paragraph with the following: "There will be no payment made under any 652 pay items after the expiration of the adjusted total contract time."

SECTION 653
POLYSTYRENE PLASTIC INSULATION

653.05 Placing Backfill In the second sentence; change "…shall be not less than 150 mm [6 in] loose measure." to "…shall be not less than 250 mm [10 in] loose measure." In the third sentence; change "…crawler type bulldozer of not more than 390 kg/m^2 [80 lb/ft^2] ground contact pressure…" to "…crawler type bulldozer of not more than 4875 kg/m^2 [2000 lb/ft^2] ground contact pressure…"

653.06 Compaction In the last sentence; change "…not more than 390 kg/m^2 [80 lb/ft^2] ground contact…" to "…not more than 4875 kg/m^2 [2000 lb/ft^2] ground contact…"

SECTION 656
TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL

656.5.1 If Pay Item 656.75 Provided Replace the second paragraph with the following: "Failure by the Contractor to follow Standard Specification or Special Provision - Section 656

and/or the Contractor's own Soil Erosion and Pollution Control Plan will result in a reduction in payment, computed by reducing the Lump Sum Total by 5% per occurrence per day. The Department's Resident or any other representative of the Department reserves the right to suspend the work at any time and request a meeting to discuss violations and remedies. The Department shall not be held responsible for any delay in the work due to any suspension under this item."

SECTION 701
STRUCTURAL CONCRETE RELATED MATERIALS

701.10 Fly Ash - Chemical Requirements Change all references from "ASTM C311" to "ASTM C114".

SECTION 703
AGGREGATES

703.05 Aggregate for Sand Leveling Change the percent passing the 9.5 mm [3/8 in] sieve from "85 – 10" to "85 – 100"

703.06 Aggregate for Base and Subbase Delete the first paragraph: "The material shall have…" and replace with "The material shall have a minimum degradation value of 15 as determined by Washington State DOT Test Method T113, Method of Test for Determination of Degradation Value (March 2002 version), except that the reported degradation value will be the result of testing a single specimen from that portion of a sample that passes the 12.5 mm [½ in] sieve and is retained on the 2.00 mm [No. 10] sieve, minus any reclaimed asphalt pavement used."

703.07 Aggregates for HMA Pavements Delete the forth paragraph: "The composite blend shall have…" and replace with "The composite blend, minus any reclaimed asphalt pavement used, shall have a Micro-Deval value of 18.0 or less as determined by AASHTO T 327. In the event the material exceeds the Micro Deval limit, a Washington Degradation test shall be performed. The material shall be acceptable if it has a value of 30 or more as determined by Washington State DOT Test Method T 113, Method of Test for Determination of Degradation Value (March 2002 version) except that the reported degradation value will be the result of testing a single composite specimen from that portion of the sample that passes the 12.5mm [1/2 inch] sieve and is retained on the 2.00mm [No 10] sieve, minus any reclaimed asphalt pavement used."

703.09 HMA Mixture Composition The coarse and fine aggregate shall meet the requirements of Section 703.07. The several aggregate fractions for mixtures shall be sized, graded, and combined in such proportions that the resulting composite blends will meet the grading requirements of the following table.

AGGREGATE GRADATION CONTROL POINTS

SIEVE SIZE	Nominal Maximum Aggregate Size---Control Points (Percent Passing)				
	TYPE 25 mm	TYPE 19 mm	TYPE 12.5 mm	TYPE 9.5 mm	TYPE 4.75 mm
	PERCENT BY WEIGHT PASSING - COMBINED AGGREGATE				
37.5 mm	100				
25 mm	90-100	100			
19 mm	-90	90-100	100		
12.5 mm		-90	90-100	100	100
9.5 mm		-	-90	90-100	95-100
4.75 mm		-	-	-90	80-100
2.36 mm	19-45	23-49	28-58	32-67	40 - 80
1.18 mm		-	-	-	-
600 µm		-	-	-	-
300 µm		-	-	-	-
75 µm	1-7	2-8	2-10	2-10	2-10

Gradation Classification---- The combined aggregate gradation shall be classified as coarse-graded when it passes below the Primary Control Sieve (PCS) control point as defined in the following table. All other gradations shall be classified as fine-graded.

GRADATION CLASSIFICATION

PCS Control Point for Mixture Nominal Maximum Aggregate Size (% passing)				
Nominal Maximum Aggregate Size	TYPE 25 mm	TYPE 19 mm	TYPE 12.5 mm	TYPE 9.5 mm
Primary Control Sieve	4.75 mm	4.75 mm	2.36 mm	2.36 mm
PCS Control Point (% passing)	40	47	39	47

If a Grading "D" mixture is allowed per Special Provision Section 403, it shall meet the following gradation and the aggregate requirements of Section 703.07.

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
½ inch	100
⅜ inch	93-100
No. 4	60-80
No. 8	46-65
No. 16	25-55
No. 30	16-40
No. 50	10-30
No. 100	6-22
No. 200	3.0-8.0

703.18 Common Borrow Replace the first paragraph with the following: "Common borrow shall consist of earth, suitable for embankment construction. It shall be free from frozen material, perishable rubbish, peat, and other unsuitable material including material currently or

previously contaminated by chemical, radiological, or biological agents unless the material is from a DOT project and authorized by DEP for use."

703.22 Underdrain Backfill Material Change the first paragraph from "…for Underdrain Type B…" to "…for Underdrain Type B and C…"

Replace subsections 703.25 through 703.28 with the following:
"703.25 Stone Fill Stones for stone fill shall consist of hard, sound, durable rock that will not disintegrate by exposure to water or weather. Stone for stone fill shall be angular and rough. Rounded, subrounded, or long thin stones will not be allowed. Stone for stone fill may be obtained from quarries or by screening oversized rock from earth borrow pits. The maximum allowable length to thickness ratio will be 3:1. The minimum stone size (10 lbs) shall have an average dimension of 5 inches. The maximum stone size (500 lbs) shall have a maximum dimension of approximately 36 inches. Larger stones may be used if approved by the Resident. Fifty percent of the stones by volume shall have an average dimension of 12 inches (200 lbs).

703.26 Plain and Hand Laid Riprap Stone for riprap shall consist of hard, sound durable rock that will not disintegrate by exposure to water or weather. Stone for riprap shall be angular and rough. Rounded, subrounded or long thin stones will not be allowed. The maximum allowable length to width ratio will be 3:1. Stone for riprap may be obtained from quarries or by screening oversized rock from earth borrow pits. The minimum stone size (10 lbs) shall have an average dimension of 5 inches. The maximum stone size (200 lbs) shall have an average dimension of approximately 12 inches. Larger stones may be used if approved by the Resident. Fifty percent of the stones by volume shall have an average dimension greater than 9 inches (50 lbs).

703.27 Stone Blanket Stones for stone blanket shall consist of sound durable rock that will not disintegrate by exposure to water or weather. Stone for stone blanket shall be angular and rough. Rounded or subrounded stones will not be allowed. Stones may be obtained from quarries or by screening oversized rock from earth borrow pits. The minimum stone size (300 lbs) shall have minimum dimension of 14 inches, and the maximum stone size (3000 lbs) shall have a maximum dimension of approximately 66 inches. Fifty percent of the stones by volume shall have average dimension greater than 24 inches (1000 lbs).

703.28 Heavy Riprap Stone for heavy riprap shall consist of hard, sound, durable rock that will not disintegrate by exposure to water or weather. Stone for heavy riprap shall be angular and rough. Rounded, subrounded, or thin, flat stones will not be allowed. The maximum allowable length to width ratio will be 3:1. Stone for heavy riprap may be obtained from quarries or by screening oversized rock from earth borrow pits. The minimum stone size (500 lbs) shall have minimum dimension of 15 inches, and at least fifty percent of the stones by volume shall have an average dimension greater than 24 inches (1000 lbs)."

Add the following paragraph:
"703.32 Definitions (ASTM D 2488, Table 1).
Angular: Particles have sharp edges and relatively plane sides with unpolished surfaces
Subrounded: Particles have nearly plane sides but have well-rounded corners and edges
Rounded: Particles have smoothly curved sides and no edges"

SECTION 706
NON-METALLIC PIPE

706.06 Corrugated Polyethylene Pipe for Underdrain, Option I and Option III Culvert Pipe Change the first sentence from "…300 mm diameters to 900 mm" to "…300 mm diameters to 1200 mm" Delete, in it's entirety, the last sentence which begins "This pipe and resins…" and replace with the following; "Manufacturers of corrugated polyethylene pipe must participate in, and maintain compliance with, AASHTO's National Transportation Product Evaluation Program (www.ntpep.org) which audits producers of plastic pipe. A certificate of compliance must be provided with each shipment."

SECTION 709
REINFORCING STEEL AND WELDED STEEL WIRE FABIC

709.03 Steel Strand Change the second paragraph from "…shall be 12mm [½ inch] AASHTO M203M/M203 (ASTM A416/A416M)…" to "…shall be 15.24 mm [0.600 inch] diameter AASHTO M203 (ASTM A416)…"

SECTION 710
FENCE AND GUARDRAIL

710.03 Chain Link Fabric Add the following sentence: "Chain Link fabric for PVC coated shall conform to the requirements of AASHTO M181, Type IV-Class B."

710.04 Metal Beam Rail Replace with the following: "Galvanized steel rail elements shall conform to the requirements of AASHTO M 180, Class A, Type II.

When corrosion resistant steel is specified, rail shall conform to AASHTO M 180, Class A, Type IV. Beams of corrosion resistant steel shall not be painted or galvanized. They shall be so handled and stored that the traffic face of these beams, used in a continuous run of guardrail, shall not show a distinctive color differential.

When metal beam rail is to be installed on a curve having a radius of curvature of 150 ft. or less, the beam sections shall be fabricated on an arc to the required radius and permanently stamped or embossed with the designated radius.

The engineer may take one piece of guardrail, a backup plate, and end or buffer section from each 200 pieces in a lot, or from each lot if less than 200 pieces are included therein for determination of compliance with specification requirements. If one piece fails to conform to the requirements of this specification, two other pieces shall be tested. If either of these pieces fails to conform to the requirements of this specification, the lot of material represented by these samples shall be rejected. A lot shall be considered that quantity of material offered for inspection at one time that bears the same heat and coating identification."

710.07 Guardrail Posts Section b. change "…AASHTO M183/M183M…" to "…AASHTO M 270M/M 270 Grade 250 (36)…"

SECTION 712
MISCELLANEOUS HIGHWAY MATERIALS

712.04 Stone Curbing and Edging Delete the existing and replace with the following: "Stone for curbing and edging shall be approved granite from acceptable sources. The stone shall be hard and durable, predominantly gray in color, free from seams that would be likely to impair its structural integrity, and of a smooth splitting character. Natural grain size and color variations characteristic of the source deposit will be permitted. Such natural variations may include bands or clusters of mineral crystallization provided they do not impair the structural integrity of the curb stone. The Contractor shall submit for approval the name of the quarry that is the proposed source of the granite for curb materials along with full scale color photos of the granite. Such submission shall be made sufficiently in advance of ordering so that the Resident may have an opportunity to judge the stone, both as to quality and appearance. Samples of curbing shall be submitted for approval only when requested by the Resident. The dimensions, shape, and other details shall be as shown on the plans."

712.06 Precast Concrete Units In the first paragraph, change "…ASTM C478M…" to "…AASHTO M199…" Delete the second paragraph and replace with the following; "Approved structural fibers may be used as a replacement of 6 x 6 #10 gauge welded wire fabric when used at an approved dosage rate for the construction of manhole and catch basin units. The material used shall be one of the products listed on the Maine Department of Transportation's Approved Product List of Structural Fiber Reinforcement." Delete the fifth paragraph and replace with the following; "The concrete mix design shall be approved by the Department. Concrete shall contain 6% air content, plus or minus 1½% tolerance when tested according to AASHTO T152. All concrete shall develop a minimum compressive strength of 28 MPa [4000 psi] in 28 days when tested according to AASHTO T22. The absorption of a specimen, when tested according to AASHTO T280, Test Method "A", shall not exceed nine percent of the dry mass."

Add the following:
"712.07 Tops, and Traps These metal units shall conform to the plan dimensions and to the following specification requirements for the designated materials.

Gray iron or ductile iron castings shall conform to the requirements of AASHTO M306 unless otherwise designated."

712.08 Corrugated Metal Units The units shall conform to plan dimensions and the metal to AASHTO M36/M36M. Bituminous coating, when specified, shall conform to AASHTO M190 Type A.

712.09 Catch Basin and Manhole Steps Steps for catch basins and for manholes shall conform to ASTM C478M [ASTM C478], Section 13 for either of the following material:

(a) Aluminum steps-ASTM B221M, [ASTM B211] Alloy 6061-T6 or 6005-T5.

(b) Reinforced plastic steps Steel reinforcing bar with injection molded plastic coating copolymer polypropylene. Polypropylene shall conform to ASTM D 4101.

712.23 Flashing Lights Flashing Lights shall be power operated or battery operated as specified.

(a) Power operated flashing lights shall consist of housing, adapters, lamps, sockets, reflectors, lens, hoods and other necessary equipment designed to give clearly visible signal indications within an angle of at least 45 degrees and from 3 to 90 m [10 to 300 ft] under all light and atmospheric conditions.

Two circuit flasher controllers with a two-circuit filter capable of providing alternate flashing operations at the rate of not less than 50 nor more than 60 flashes per minute shall be provided.

The lamps shall be 650 lumens, 120 volt traffic signal lamps with sockets constructed to properly focus and hold the lamp firmly in position.
The housing shall have a rotatable sun visor not less than 175 mm [7 in] in length designed to shield the lens.

Reflectors shall be of such design that light from a properly focused lamp will reflect the light rays parallel. Reflectors shall have a maximum diameter at the point of contact with the lens of approximately 200 mm [8 in].

The lens shall consist of a round one-piece convex amber material which, when mounted, shall have a visible diameter of approximately 200 mm [8 in]. They shall distribute light and not diffuse it. The distribution of the light shall be asymmetrical in a downward direction. The light distribution of the lens shall not be uniform, but shall consist of a small high intensity portion with narrow distribution for long distance throw and a larger low intensity portion with wide distribution for short distance throw. Lenses shall be marked to indicate the top and bottom of the lens.

(b) Battery operated flashing lights shall be self- illuminated by an electric lamp behind the lens. These lights shall also be externally illuminated by reflex-reflective elements built into the lens to enable it to be seen by reflex-reflection of the light from the headlights of oncoming traffic. The batteries must be entirely enclosed in a case. A locking device must secure the case. The light shall have a flash rate of not less than 50 nor more than 60 flashes per minute from minus 30 °C [minus 20 °F] to plus 65 °C [plus 150 °F]. The light shall have an on time of not less than 10 percent of the flash cycle. The light beam projected upon a surface perpendicular to the axis of the light beam shall produce a lighted rectangular projection whose minimum horizontal dimension shall be 5 degrees each side of the horizontal axis. The effective intensity shall not have an initial value greater than 15.0 candelas or drop below 4.0 candelas during the first 336 hours of continuous flashing. The illuminated lens shall appear to be uniformly bright over its entire illuminated surface when viewed from any point within an angle of 9 degrees each side of the vertical axis and 5 degrees each side of the horizontal axis. The lens shall not be less than 175 mm [7 in] in diameter including a reflex-reflector ring of 13 mm [½ in] minimum width around the periphery. The lens shall be yellow in color and have a minimum relative luminous transmittance of 0.440 with a luminance of 2854° Kelvin. The lens shall be one-piece construction. The lens material shall be plastic and meet the luminous transmission requirements of this specification. The case containing the

batteries and circuitry shall be constructed of a material capable of withstanding abuse equal to or greater than 1.21 mm thick steel [No. 18 U.S. Standard Gage Steel]. The housing and the lens frame, if of metal shall be properly cleaned, degreased and pretreated to promote adhesion. It shall be given one or more coats of enamel which, when dry shall completely obscure the metal. The enamel coating shall be of such quality that when the coated case is struck a light blow with a sharp tool, the paint will not chip or crack and if scratched with a knife will not powder. The case shall be so constructed and closed as to exclude moisture that would affect the proper operation of light. The case shall have a weep hole to allow the escape of moisture from condensation. Photoelectric controls, if provided, shall keep the light operating whenever the ambient light falls below 215 lx [20 foot candles]. Each light shall be plainly marked as to the manufacturer's name and model number.

If required by the Resident, certification as to conformance to these specifications shall be furnished based on results of tests made by an independent testing laboratory. All lights are subject to random inspection and testing. All necessary random samples shall be provided to the Resident upon request without cost to the Department. All such samples shall be returned to the Contractor upon completion of the tests.

712.32 Copper Tubing Copper tubing and fittings shall conform to the requirements of ASTM B88M Type A [ASTM B88, Type K] or better.

712.33 Non-metallic Pipe, Flexible Non-metallic pipe and pipe fittings shall be acceptable flexible pipe manufactured from virgin polyethylene polymer suitable for transmitting liquids intended for human or animal consumption.

712.34 Non-metallic Pipe, Rigid Non-metallic pipe shall be Schedule 40 polyvinylchloride (PVC) that meets the requirement of ASTM D1785. Fittings shall be of the same material.

712.341 Metallic Pipe Metallic pipe shall be ANSI, Standard B36.10, Schedule 40 steel pipe conforming to the requirements of ASTM A53 Types E or S, Grade B. End plates shall be steel conforming to ASTM A36/A36M.

Both the sleeve and end plates shall be hot dip galvanized. Pipe sleeve splices shall be welded splices with full penetration weld before galvanizing.

712.35 Epoxy Resin Epoxy resin for grouting or sealing shall consist of a mineral filled thixotropic, flexible epoxy resin having a pot life of approximately one hour at 10°C [50°F]. The grout shall be an approved product suitable for cementing steel dowels into the preformed holes of curb inlets and adjacent curbing. The sealant shall be an approved product, light gray in color and suitable for coating the surface.

712.36 Bituminous Curb The asphalt cement for bituminous curb shall be of the grade required for the wearing course, or shall be Viscosity Grade AC-20 meeting the current requirements of Subsection 702.01 Asphalt Cement. The aggregate shall conform to the requirements of Subsection 703.07. The coarse aggregate portion retained on the 2.36 mm [No. 8] sieve may be either crushed rock or crushed gravel.

The mineral constituents of the bituminous mixture shall be sized and graded and combined in a composite blend that will produce a stable durable curbing with an acceptable texture.

Bituminous material for curb shall meet the requirements of Section 403 - Hot Bituminous Pavement.

712.37 Precast Concrete Slab Portland cement concrete for precast slabs shall meet the requirements of Section 502 - Structural Concrete, Class A.

The slabs shall be precast to the dimension shown on the plans and cross section and in accordance with the Standard Detail plans for Concrete Sidewalk Slab. The surface shall be finished with a float finish in accordance with Subsection 502.14(c). Lift devices of sufficient strength to hold the slab while suspended from cables shall be cast into the top or back of the slab.

712.38 Stone Slab Stone slabs shall be of granite from an acceptable source, hard, durable, predominantly gray in color, free from seams which impair the structural integrity and be of smooth splitting character. Natural color variations characteristic of the deposit will be permitted. Exposed surfaces shall be free from drill holes or indications of drill holes. The granite slabs in any one section of backslope must be all the same finish.

The granite slabs shall be scabble dressed or sawed to an approximately true plane having no projections or depressions over 13 mm [½ in] under a 600 mm [2 ft] straightedge or over 25 mm [1 in] under a 1200 mm [4 ft] straightedge. The arris at the intersection of the top surface and exposed front face shall be pitched so that the arris line is uniform throughout the length of the installed slabs. The sides shall be square to the exposed face unless the slabs are to be set on a radius or other special condition which requires that the joints be cut to fit, but in any case shall be so finished that when the stones are placed side by side no space more than 20 mm [3/4 in] shall show in the joint for the full exposed height.

Liftpin holes in all sides will be allowed except on the exposed face.

SECTION 717
ROADSIDE IMPROVEMENT MATERIAL

717.03 C. Method #3 - Roadside Mixture #3 Change the seed proportions to the following:

Crown Vetch	25%
Perennial Lupine	25%
Red Clover	12.5%
Annual Rye	37.5%

717.05 Mulch Binder Change the third sentence to read as follows:

"Paper fiber mulch may be used as a binder at the rate of 2.3 kg/unit [5 lb/unit]."

SECTION 720
STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS

720.08 U-Channel Posts Change the first sentence from "…, U-Channel posts…" to "…, Rib Back U-Channel posts…"

SECTION 722
GEOTEXTILES

722.01 Stabilization/Reinforcement Geotextile Add the following to note #3; "The strengths specified in the columns labeled"<50%" and "≥ 50%" refer to the elongation at which the geotextile material was tested. For example; if a fabric is tested at 15% elongation then it must meet or exceed the minimum strength shown in the "<50%" column. Submittals must include the percent elongation at which the material was tested."

722.02 Drainage Geotextile Add the following to note #3; "The strengths specified in the columns labeled"<50%" and "≥ 50%" refer to the elongation at which the geotextile material was tested. For example; if a fabric is tested at 15% elongation then it must meet or exceed the minimum strength shown in the "<50%" column. Submittals must include the percent elongation at which the material was tested."

722.01 Erosion Control Geotextile Add the following note to Elongation in the Mechanical Property Table; "The strengths specified in the columns labeled"<50%" and "≥ 50%" refer to the elongation at which the geotextile material was tested. For example; if a fabric is tested at 15% elongation then it must meet or exceed the minimum strength shown in the "<50%" column. Submittals must include the percent elongation at which the material was tested."

APPENDIX A TO DIVISION 100

SECTION 1 - BIDDING PROVISIONS

A. Federally Required Certifications By signing and delivering a Bid, the Bidder certifies as provided in all certifications set forth in this Appendix A - Federal Contract Provisions Supplement including:

- Certification Regarding No Kickbacks to Procure Contract as provided on this page 1 below.
- Certification Regarding Non-collusion as provided on page 1 below.
- Certification Regarding Non-segregated Facilities as provided by FHWA Form 1273, section III set forth on page 21 below.
- "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion" as provided by FHWA Form 1273, section XI set forth on page 32 below.
- "Certification Regarding Use of Contract Funds for Lobbying" as provided by FHWA Form 1273, section XII set forth on page 35 below.

Unless otherwise provided below, the term "Bidder", for the purposes of these certifications, includes the Bidder, its principals, and the person(s) signing the Bid. Upon execution of the Contract, the Bidder (then called the Contractor) will again make all the certifications indicated in this paragraph above. Upon execution of the Contract, the Bidder (then called the Contractor) will again make all the certifications indicated in this paragraph above.

CERTIFICATION REGARDING NO KICKBACKS TO PROCURE CONTRACT Except expressly stated by the Bidder on sheets submitted with the Bid (if any), the Bidder hereby certifies, to the best of its knowledge and belief, that it has not:

(A) employed or retained for a commission, percentage, brokerage, contingent fee, or other consideration, any firm or person (other then a bona fide employee working solely for me) to solicit or secure this contract;

(B) agreed, as an express or implied condition for obtaining this contract, to employ or retain the services of any firm or person in connection with carrying out the contract, or;

C) paid, or agreed to pay, to any firm, organization, or person (other than a bona fide employee working solely for me) any fee, contribution, donation, or consideration of any kind for, or in connection with, procuring or carrying out the contract;

By signing and submitting a Bid, the Bidder acknowledges that this certification is to be furnished to the Maine Department of Transportation and the Federal Highway Administration, U.S. Department of Transportation in connection with this contract in anticipation of federal aid highway funds and is subject to applicable state and federal laws, both criminal and civil.

CERTIFICATION REGARDING NONCOLLUSION Under penalty of perjury as provided by federal law (28 U.S.C. §1746), the Bidder hereby certifies, to the best of its knowledge and belief, that:

the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with the Contract.

For a related provisions, see Section 102.7.2 (C) of the Standard Specifications - "Effects of Signing and Delivery of Bids" - "Certifications", Section 3 of this Appendix A entitled "Other Federal Requirements" including section XI - "Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion" and section XII. - "Certification Regarding Use of Contract Funds for Lobbying."

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B. Bid Rigging Hotline To report bid rigging activities call: **1-800-424-9071**

The U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

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SECTION 2 - FEDERAL EEO AND CIVIL RIGHTS REQUIREMENTS

Unless expressly otherwise provided in the Bid Documents, the provisions contained in this Section 2 of this "Federal Contract Provisions Supplement" are hereby incorporated into the Bid Documents and Contract.

A. Nondiscrimination & Civil Rights - Title VI The Contractor and its subcontractors shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the Department deems appropriate. The Contractor and subcontractors shall comply with Title VI of the Civil Rights Act of 1964, as amended, and with all State of Maine and other Federal Civil Rights laws.

For related provisions, see Subsection B - "Nondiscrimination and Affirmative Action - Executive Order 11246" of this Section 2 and Section 3 - Other Federal Requirements of this "Federal Contract Provisions Supplement" including section II - "Nondiscrimination" of the "Required Contract Provisions, Federal Aid Construction Contracts", FHWA-1273.

B. Nondiscrimination and Affirmative Action - Executive Order 11246 Pursuant to Executive Order 11246, which was issued by President Johnson in 1965 and amended in 1967 and 1978, this Contract provides as follows.

The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its efforts to achieve maximum results from its actions. The Contractor shall

document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

1. Ensure and maintain a working environment free of harassment, intimidations, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all forepersons, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

2. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its union have employment opportunities available, and to maintain a record of the organization's responses.

3. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

4. Provide immediate written notification to the Department's Civil Rights Office when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Design-Builder's efforts to meet its obligations.

5. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under B above.

6. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligation; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

7. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review

of these items with on-site supervisory personnel such as Superintendents, General Forepersons, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

8. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractor's and Subcontractors with whom the Contractor does or anticipates doing business.

9. Direct its recruitment efforts, both orally and written to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later that one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above describing the openings, screenings, procedures, and test to be used in the selection process.

10. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth, both on the site and in other areas of a Contractor's workforce.

11. Validate all tests and other selection requirements.

12. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

13. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

14. Ensure that all facilities and company activities are non segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

15. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction Contractor's and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.

16. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

C. Goals for Employment of Women and Minorities Per Executive Order 11246, craft tradesperson goals are 6.9% women and .5% minorities employed. However, goals may be adjusted upward at the mutual agreement of the Contractor and the Department. Calculation of these percentages shall not include On-the-Job Training Program trainees, and shall not include clerical or field clerk position employees.

For a more complete presentation of requirements for such Goals, see the federally required document "Goals for Employment of Females and Minorities" set forth in the next 6 pages below.

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Start of GOALS FOR EMPLOYMENT OF FEMALES AND MINORITIES
Federally Required Contract Document

§60-4.2 Solicitations

(d) The following notice shall be included in, and shall be part of, all solicitations for offers and bids on all Federal and federally assisted construction contracts or subcontracts in excess of $10,000 to be performed in geographical areas designated by the Director pursuant to §60-4.6 of this part (see 41 CFR 60-4.2(a)):

Notice of Requirement for Affirmative Action to Ensure Equal Opportunity (Executive Order 11246)

1. The Offeror's or bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

Goals for female participation in each trade 6.9%

Goals for minority participation for each trade
Maine
001 Bangor, ME 0.8%
Non-SMSA Counties (Aroostook, Hancock, Penobscot, Piscataquis, Waldo, Washington)

002 Portland-Lewiston, ME
SMSA Counties: 4243 Lewiston-Auburn, ME 0.5%
(Androscoggin)

6403 Portland, ME 0.6%
(Cumberland, Sagadahoc)

Non-SMSA Counties: 0.5%
(Franklin, Kennebec, Knox, Lincoln, Oxford, Somerset, York)

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non federally involved construction.

The contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be in violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor, employer identification number of the subcontractor, estimated dollar amount of the subcontract; estimated started and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this Notice, and in the Contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county and city, if any).

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department form 941;

   d. "Minority" includes:
      (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of the North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the contractor, is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors for Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a. through p. of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical areas where the work is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specific.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant, thereto.

6. In order for the non working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the

apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as expensive as the following:

   a. Ensure and maintain a working environment free of harassment, intimidation, coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, when possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

   b. Establish and maintain a current list of minority and female recruitment sources provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.

   c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment sources or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

   d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

   e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources complied under 7b above.

   f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific

review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment, efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing prior to the date for the acceptance of applications for apprenticeship or the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of

solicitation to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7 a through p.). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7 a through p. of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program and reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions take on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both make and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, specific minority group of women is underutilized.)

10. The Contractor shall not use the goals and timetables or affirmative action even through the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementation regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the

requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.6.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g. mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and location sat which the work was performed. Records be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

End of GOALS FOR EMPLOYMENT OF FEMALES AND MINORITIES
Federally Required Contract Document

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D. Disadvantaged Business Enterprise (DBE) Requirements The Department has established an annual Disadvantaged Business Enterprise goal to be achieved through race neutral means. This goal will adjusted periodically and will be provided by Supplemental Provision. The Contractor shall comply with all provisions of this section regarding DBE participation and the Department's latest version of the Disadvantaged Business Enterprise Program Manual, said Manual being incorporated herein by reference. In the case of conflict between this Contract and said Manual, this Contract shall control. The Department reserves the right to adjust DBE goals on a project-by-project basis by addendum.

Policy. It is the Department's policy that DBEs as defined in 23 CFR Part 26 and referenced in the Transportation Equity Act for 21st Century of 1998, as amended from the Surface Transportation Uniform Relocation Assistance Act of 1987, and the Intermeddle Surface Transportation Efficiency Act of 1991. The intent hereto remains to provide the maximum opportunity for DBEs to participate in the performance of contracts financed in whole or in part with federal funds.

The Department and its Contractors shall not discriminate on the basis of race, color, national origin, ancestry, sex, age, or disability in the award and performance of DOT assisted contracts.

Disadvantaged Business Enterprises are those so certified by the Maine Department of Transportation Civil Rights Office prior to bid opening date.

The Department has determined that elements of a good faith effort to meet the contract goal include but are not limited to the following:

1. Whether the Contractor advertised in general circulation, trade association, and minority/women's-focus media concerning the subcontracting opportunities;

2. Whether the Contractor provided written notice to a reasonable number of specific DBEs that their interest in the contract is being solicited;

3. Whether the Contractor followed up on initial solicitations of interest by contacting DBEs to determine with certainty whether the DBEs were interested;

4. Whether the Contractor selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the DBE goals;

5. Whether the Contractor provided interested DBEs with adequate information about the plans, specification and requirements of the contract;

6. Whether the Contractor negotiated in good faith with interested DBEs, not rejecting the DBE as unqualified without sound reasons based on a thorough investigation of their capabilities;

7. Whether the Contractor made efforts to assist interested DBEs with other appropriate technical/financial assistance required by the Department or Contractor;

8. Whether the Contractor effectively used the services of available minority/women's community organizations, minority/women's business assistance offices; and other organizations that provide assistance in the recruitment and placement of DBEs.

Substitutions of DBEs. The following may be acceptable reasons for Civil Rights Office approval of such a change order:

- The DBE defaults, voluntarily removes itself or is over-extended;
- The Department deletes portions of the work to by performed by the DBE.

It is not intended that the ability to negotiate a more advantageous contract with another certified DBE be considered a valid basis for such a change in DBE utilization once the DBE Bid Submission review has been passed. Any requests to alter the DBE commitment must be in writing and included with the change order.

Failure to carry out terms of this Standard Specification shall be treated as a violation of this contract and will result in contract sanctions which may include withholding of partial payments totaling the creditable dollars amount which would have been paid for said DBE participation, termination of this contract or other measures which may affect the ability of the Contractor to obtain Department contracts.

Copies of the Maine Department of Transportation's DBE Program may be obtained from:
Maine Department of Transportation
Civil Rights Office
#16 State House Station
Augusta, Maine 04333-0016
tel. (207) 624-3519

Quarterly Reporting Requirement. The Contractor must submit Semi-annual reports of actual dollars paid to Disadvantaged Business Enterprises (DBE's) on this Project to the MDOT Civil Rights Office by the end of the third week of April and October for the period covering the preceding six months considered Federal Fiscal Year periods. The reports will be submitted directly to the Civil Rights Office on the form provided in the latest version of the DBE Program Manual. Failure to submit the report by the deadline may result in a withholding of approval of partial payment estimates by the Department.

SECTION 3 - OTHER FEDERAL REQUIREMENTS

Unless expressly otherwise provided in the Bid Documents, the provisions contained in this Section 3 of this "Federal Contract Provisions Supplement" are hereby incorporated into the Bid Documents and Contract.

A. Buy America

If the cost of products purchased for permanent use in this project which are manufactured of steel, iron or the application of any coating to products of these materials exceeds 0.1 percent of the contract amount, or $2,500.00, whichever is greater, the products shall have been manufactured and the coating applied in the United States. The coating materials are not subject to this clause, only the application of the coating. In computing that amount, only the cost of the product and coating application cost will be included.

Ore, for the manufacture of steel or iron, may be from outside the United States; however, all other manufacturing processes of steel or iron must be in the United States to qualify as having been manufactured in the United States.

United States includes the 50 United States and any place subject to the jurisdiction thereof.

Products of steel include, but are not limited to, such products as structural steel, piles, guardrail, steel culverts, reinforcing steel, structural plate and steel supports for signs, luminaries and signals.

Products of iron include, but are not limited to, such products as cast iron grates.

Application of coatings include, but are not limited to, such applications as epoxy, galvanized and paint.

To assure compliance with this section, the Contractor shall submit a certification letter on its letterhead to the Department stating the following:

> "This is to certify that products made of steel, iron or the application of any coating to products of these materials whose costs are in excess of $2,500.00 or 0.1 percent of the original contract amount, whichever is greater, were manufactured and the coating, if one was required, was applied in the United States."

B. Materials

a. Convict Produced Materials References: 23 U.S.C. 114(b)(2), 23 CFR 635.417

Applicability: FHWA's prohibition against the use of convict material only applies to Federal-aid highways. Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if: 1) such materials have been produced by convicts who are on parole, supervised release, or probation from a prison; or 2) such material has been produced in a qualified prison facility, e.g., prison industry, with the amount produced during any 12-month period, for use in Federal-aid projects, not exceeding the amount produced, for such use, during the 12-month period ending July 1, 1987.

Materials obtained from prison facilities (e.g., prison industries) are subject to the same requirements for Federal-aid participation that are imposed upon materials acquired from other sources. Materials manufactured or produced by convict labor will be given no preferential treatment.

The preferred method of obtaining materials for a project is through normal contracting procedures which require the contractor to furnish all materials to be incorporated in the work. The contractor selects the source, public or private, from which the materials are to be obtained (23 CFR 635.407). Prison industries are prohibited from bidding on projects directly (23 CFR 635.112e), but may act as material supplier to construction contractors.

Prison materials may also be approved as State-furnished material. However, since public agencies may not bid in competition with private firms, direct acquisition of materials from a prison industry for use as State-furnished material is subject to a public interest finding with the Division Administrator's concurrence (23 CFR 635.407d). Selection of materials produced by convict labor as State-furnished materials for mandatory use should be cleared prior to the submittal of the Plans Specifications & Estimates (PS&E).

b. Patented/Proprietary Products References: 23 U.S.C. 112, 23 CFR 635.411

FHWA will not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

- the item is purchased or obtained through competitive bidding with equally suitable unpatented items,
- the STA certifies either that the proprietary or patented item is essential for synchronization with the existing highway facilities or that no equally suitable alternative exists, or
- the item is used for research or for a special type of construction on relatively short sections of road for experimental purposes. States should follow FHWA's procedures for "Construction Projects Incorporating Experimental Features" (expermnt.htm) for the submittal of work plans and evaluations.

The primary purpose of the policy is to have competition in selection of materials and allow for development of new materials and products. The policy further permits materials and products that are judged equal may be bid under generic specifications. If only patented or proprietary products are acceptable, they shall be bid as alternatives with all, or at least a

reasonable number of, acceptable materials or products listed; and the Division Administrator may approve a single source if it can be found that its utilization is in the public interest.

Trade names are generally the key to identifying patented or proprietary materials. Trade name examples include 3M, Corten, etc. Generally, products identified by their brand or trade name are not to be specified without an "or equal" phrase, and, if trade names are used, all, or at least a reasonable number of acceptable "equal" materials or products should be listed. The licensing of several suppliers to produce a product does not change the fact that it is a single product and should not be specified to the exclusion of other equally suitable products.

c. State Preference References: 23 U.S.C. 112, 23 CFR 635.409

Materials produced within Maine shall not be favored to the exclusion of comparable materials produced outside of Maine. State preference clauses give particular advantage to the designated source and thus restrict competition. Therefore, State preference provisions shall not be used on any Federal-aid construction projects.

This policy also applies to State preference actions against materials of foreign origin, except as otherwise permitted by Federal law. Thus, States cannot give preference to in-State material sources over foreign material sources. Under the Buy America provisions, the States are permitted to expand the Buy America restrictions provided that the STA is legally authorized under State law to impose more stringent requirements.

d. State Owned/Furnished/Designated Materials References: 23 U.S.C. 112, 23 CFR 635.407

Current FHWA policy requires that the contractor must furnish all materials to be incorporated in the work, and the contractor shall be permitted to select the sources from which the materials are to be obtained. Exceptions to this requirement may be made when there is a definite finding, by MDOT and concurred in by Federal Highway Administration’s (FHWA) Division Administrator, that it is in the public interest to require the contractor to use materials furnished by the MDOT or from sources designated by MDOT. The exception policy can best be understood by separating State-furnished materials into the categories of manufactured materials and local natural materials.

Manufactured Materials When the use of State-furnished manufactured materials is approved based on a public interest finding, such use must be made mandatory. The optional use of State-furnished manufactured materials is in violation of our policy prohibiting public agencies from competing with private firms. Manufactured materials to be furnished by MDOT must be acquired through competitive bidding, unless there is a public interest finding for another method, and concurred in by FHWA’s Division Administrator.

Local Natural Materials When MDOT owns or controls a local natural materials source such as a borrow pit or a stockpile of salvaged pavement material, etc., the materials may be designated for either optional or mandatory use; however, mandatory use will require a public interest finding (PIF) and FHWA’s Division Administrator's concurrence.

In order to permit prospective bidders to properly prepare their bids, the location, cost, and any conditions to be met for obtaining materials that are made available to the contractor shall be stated in the bidding documents.

Mandatory Disposal Sites Normally, the disposal site for surplus excavated materials is to be of the contractor's choosing; although, an optional site(s) may be shown in the contract provisions. A mandatory site shall be specified when there is a finding by MDOT, with the concurrence of the Division Administrator, that such placement is the most economical or that the environment would be substantially enhanced without excessive cost. Discussion of the mandatory use of a disposal site in the environmental document may serve as the basis for the public interest finding.

Summarizing FHWA policy for the mandatory use of borrow or disposal sites:

- mandatory use of either requires a public interest finding and FHWA's Division Administrator's concurrence,
- mandatory use of either may be based on environmental consideration where the environment will be substantially enhanced without excessive additional cost, and
- where the use is based on environmental considerations, the discussion in the environmental document may be used as the basis for the public interest finding.

Factors to justify a public interest finding should include such items as cost effectiveness, system integrity, and local shortages of material.

C. Standard FHWA Contract Provisions - FHWA 1273

Unless expressly otherwise provided in the Bid Documents, the following "Required Contract Provisions, Federal Aid Construction Contracts", FHWA-1273, are hereby incorporated into the Bid Documents and Contract.

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Start of FHWA 1273 REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS(As revised through March 10, 1994)

I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

   Section I, paragraph 2;
   Section IV, paragraphs 1, 2, 3, 4, and 7;
   Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. Selection of Labor: During the performance of this contract, the contractor shall not:

   a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

   b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION (Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
   a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

   b. The contractor will accept as his operating policy the following statement:
   "It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment,

upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. EEO Officer. The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy. All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

   a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

   b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

   c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

   d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

   e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment. When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

   a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. Personnel Actions. Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. Training and Promotion.

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision

for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

7. Unions. If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

   a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

   b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

   c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.

   d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment. The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. Records and Reports. The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. All such records must be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the MDOT and the Federal Highway Administration.

The Contractor will submit to the MDOT a report for the month of July, indicating the total hours worked by minority, women and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form PR-1391. If on-the-job training is being required by "Training Special Provision," the Contractor will be required to furnish Form FHWA-1409. The report is required for week ending July 15 and can be obtained from MDOT, is due by week ending August 20th. This report is to be furnished directly to MDOT - Civil Rights Office.

III. NONSEGREGATED FACILITIES (Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE (Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. General:

   a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the

provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. Classification:

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. Payment of Fringe Benefits:

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor

as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers. Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. Apprentices and Trainees (Programs of the U.S. DOT). Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. Withholding. The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. Overtime Requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4

and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. Violation. Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. Withholding for Unpaid Wages and Liquidated Damages. The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS (Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3). The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

   a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

   b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in

Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

   (1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

   (2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

   (3) that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the contractor shall:

   a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

   b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

   c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).

   a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor,

with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health

standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more that $10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (Applicable to all Federal-aid construction contracts and to all related subcontracts of $100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations

in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. Instructions for Certification - Primary Covered Transactions:
(Applicable to all Federal-aid contracts - 49 CFR 29)

   a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

   b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

   c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

   d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

   e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out

in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

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Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--
Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or

local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

****

2. Instructions for Certification - Lower Tier Covered Transactions: (Applicable to all subcontracts, purchase orders and other lower tier transactions of $25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

****

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--
Lower Tier Covered Transactions:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING
(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
   a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

   b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a

Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

End of FHWA 1273

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
AUGUSTA, MAINE

TECHNICAL SPECIFICATIONS
FOR:

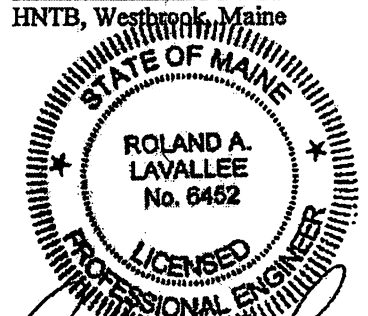
PORTLAND INTERNATIONAL MARINE TERMINAL IMPROVEMENTS

Portland, Maine

PROJECT PIN: 017820.00

March 25, 2011

CIVIL/STRUCTURAL-MARINE ENGINEER (Site & Pier)
HNTB, Westbrook, Maine

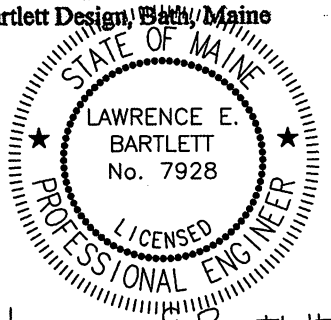


3/23/11
Rolland A. Lavallee, P.E., PLS — *Date*
Vice President, Director of Operations

ARCHITECT (Office Building)
Winton Scott Architects, Portland, Maine

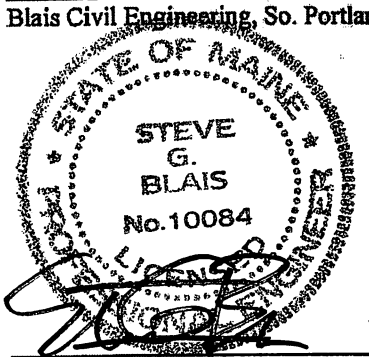
3/25/11
Winton Scott, NCARB — *Date*
President

ELECTRICAL ENGINEER (Office Building & Site)
Bartlett Design, Bath, Maine



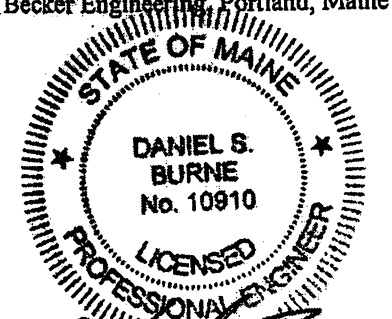
03/25/11
Lawrence Bartlett, P.E. — *Date*
President

CIVIL ENGINEER (Site)
Blais Civil Engineering, So. Portland, Maine



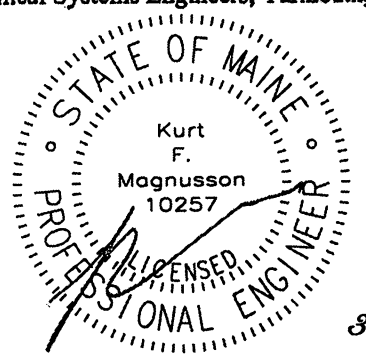
3/25/11
Steve Blais, P.E. — *Date*
President

STRUCTURAL ENGINEER (Office Building)
Becker Engineering, Portland, Maine



3/25/11
Daniel S. Burne, P.E. — *Date*
Associate

MECHANICAL ENGINEER (Office Building)
Mechanical Systems Engineers, Yarmouth, Maine



3/25/11
Kurt Magnusson, PE — *Date*
President

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
AUGUSTA, MAINE

TECHNICAL SPECIFICATIONS

FOR:

PORTLAND INTERNATIONAL MARINE TERMINAL IMPROVEMENTS

Portland, Maine

PROJECT PIN: 017820.00

March 25, 2011

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SECTION 01 10 10 – SUMMARY OF SPECIFICATIONS

All work and materials shall conform to the Contract Drawings and the State of Maine Department of Transportation Standard Specifications, Revision December 2002 (herein referred to as the Standard Specifications). Due to the inclusion of architectural components in this project, namely a proposed office building, the outline of these specifications follows the CSI format with references to the Standard Specifications where applicable. Where architectural, mechanical, or electrical specifications do not exist in the Standard Specifications, a specification has been created to address the construction element, which is then given a unique Pay Item number from the 800 series of the Standard Specifications.

Pay Items for the proposed office building shall be condensed into the four items shown below for simplicity in bidding. The Contractor shall note Special Provision 104 which identifies the various components to be included in each of the items.

- 815.00 Office Building – Architectural
- 815.00 Office Building – Mechanical
- 815.00 Office Building – Structural
- 815.00 Office Building – Electrical

Note also that the site electrical components of this project have also been combined into one Pay Item, as listed below:

- 910.42 Site – Electrical

Where conflicts exist between the specifications herein and the Standard Specifications, the Standard Specifications shall govern.

END OF SECTION

SECTION 02 41 00 – DEMOLITION

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 202 – REMOVING STRUCTURES AND OBSTRUCTIONS, with the following modifications:

MODIFICATIONS:

202.01 Description

Add the following paragraphs:

The work shall also include the removal and disposal of: the IMT Building; the U.S. Customs Building; the mobile office trailers; the raised concrete foundation; and the partial removal of the concrete retaining wall. Included in this work is removal and disposal of foundation components of the aforementioned elements to a depth of 3 feet below proposed grade and as shown on the Plans. IMT Building demolition shall also include removal and disposal of existing timber and steel foundation piles, steel and timber bracing, and concrete encasements as shown on the Plans.

This work shall also include removal and disposal of all asbestos containing materials (ACM) identified in the Asbestos Determination Report, in Appendix A, prior to the general demolition of the existing IMT Building and U.S. Customs Building. The work shall be performed by a licensed Asbestos Abatement Contractor.

This work shall also include removal and disposal of all lead-based paint containing materials. Exterior steel columns at the IMT Building and the U.S. Customs Building were tested and determined to contain lead-based paint. Other exterior steel components such as roof trusses were not tested. Interior steel columns at the IMT Building and the U.S. Customs Building were tested and determined not to contain lead-based paint.

This work shall also include submittal of Building Demolition Notification Forms (BDNFs) to the Maine DEP's Lead and Asbestos Prevention Program prior to the start of any demolition work. The Contractor shall submit copies of all Building Demolition Notification Forms to the Owner's Representative for the Authority's records.

The work shall also include the removal and disposal of concrete steps, concrete slabs, concrete planter boxes; and the Portland IMT sign (along Commercial Street).

This work shall also include removal and disposal of high-mast light poles and standard light poles located throughout the facility.

This work shall also include removal and disposal of a section of the concrete slab in the southwest corner of the Maintenance Building to facilitate the installation of sewer, water, gas, and electrical utilities.

There are a total of three flag poles along Commercial Street; one dedication plaque (mounted on a 4-ft diameter rock); and one large steel anchor. The work shall also include the removal and storage or resetting of these items as follows:

Removal and Storage: Two flag poles and one dedication plaque.

Removal and Reset: One flag pole and one large steel anchor.

The general sequence of demolition work is prescribed by the security and operational needs of the facility, which have been outlined in Section 105 of the Special Provisions and illustrated with a series of Construction Phasing drawings in the Plans.

202.02 Removing Buildings

The first paragraph is deleted and replaced with the following:

The contractor shall remove and dispose of all buildings as listed below:

IMT Building – a two-story steel structure with wood walls, industrial building constructed on a concrete slab. A concrete seawall divides the foundation elements into two sections, easterly and westerly. The westerly portion of the

structure is slab on grade with full depth footings while the easterly portion of the structure is an elevated concrete slab supported on timber and steel piles. The easterly portion is positioned over tidal waters. The structure was constructed in 1950's, and substantially modified in 1970. Exterior steel columns contain lead-based paint. Some areas of interior floors and/or ceilings contain asbestos-based materials. Minor modifications and renovations have occurred since 1995.

U.S. Customs Building – a two-story wood framed office structure. Foundation materials are slab on grade with full depth footings. Exterior steel columns contain lead-based paint. Some areas of interior floors and/or ceilings contain asbestos-based materials. The structure was constructed in 1970.

Port Office Trailer – a single story, pre-fabricated wood construction modular trailer complete with a trailer tongue and triple axles and tires. The trailer was manufactured on a steel frame which includes and is currently supported on the tires and blocks. Age is unknown.

Inspection Trailer – a single story, pre-fabricated wood construction modular trailer complete with a trailer tongue and dual axles and tires. The trailer was manufactured on a steel frame which includes and is currently supported on the tires and blocks. Age is unknown.

Concrete Foundation – a cast-in-place concrete foundation with rebar reinforcement, full depth footings and granular fill. The foundation was originally constructed in 1970 as a truck inspection building foundation.

The following is added to the second paragraph:

All ground cavities located within limits of pavement reconstruction or to be repaved shall be backfilled with granular borrow meeting the requirements of SECTION 31 20 00, Earthwork, and shall be compacted in accordance with the applicable embankment construction requirements unless otherwise noted on the Plans. All other cavities shall be backfilled with common borrow meeting the requirements of the Earthwork Section, and shall be compacted in accordance with the applicable embankment construction requirements unless otherwise noted on the plans

Add the following paragraphs:

The Contractor shall remove all utility service connections prior to demolition of the buildings. Existing sewer structures shall be pumped dry and shall be removed and legally disposed of by the Contractor. All water and sewer pipes shall be cut-off and sealed with a water and gas tight seal (plug or end cap) before such connections are covered by any fill material to the satisfaction of the Resident.

The Contractor shall obtain any and all permits or licenses necessary for the performance of the work and shall familiarize himself with and conform to all Federal, State, and local laws, regulations, or ordinances applicable to the work.

All steps; walks; slabs; piles; posts; decks, and associated debris shall be completely removed. The existing structural foundation walls, footings and the retaining wall (beneath the Terminal Building canopy) will be left in place beneath the backfill from a depth of 3 feet below proposed finish grade. All walls and footings will be demolished down to the determined depth prior to placing backfill material. Salvageable materials which may be of value to the Contractor have been identified on the Plans.

Perform the removal and storage or resetting of items as indicated with personnel skilled in the trades involved. Items to be stored or reset which are damaged by the Contractor shall be repaired or replaced with new undamaged items as approved by the Resident.

Completely remove and dispose of materials in an orderly and careful manner. Protect adjacent areas and buildings from damage during demolition operations. Limits of demolition are shown on the Plans.

All non-regulated materials shall become the property of the Contractor and shall be removed from the site prior to the completion of the Project. All debris and unusable material shall be removed to an approved and/or licensed building/construction demolition landfill. Under no circumstances shall any material or debris be disposed of by burying or burning on the premise nor shall the material or debris be burned at an off-premise-site. The Contractor shall provide the Resident with an affidavit stating the final location of all disposed material and that the material was disposed of in accordance with the Maine DEP's Solid Waste Regulations prior to the payment of Removing Building pay items.

All buildings and materials contained therein, except as noted above or otherwise as directed by the Resident shall become the property of the Contractor and shall be completely removed from the site. Ownership of the existing buildings reverts to Contractor upon issuance of the Notice to Proceed.

The Contractor shall provide and maintain all temporary barricades, signs or other safety measures necessary to complete the work while protecting the general public, patrons, vendor employees and Authority workers in the adjacent areas of the project site.

Paving and Slabs: Remove and dispose of concrete and asphaltic concrete paving and slabs as indicated. Provide neat sawcuts at limits of pavement removal.

The following Subsection is added:

202.023 Building Material Survey

The Port Authority conducted an Asbestos Containing Material (ACM) Determination Survey performed at the IMT Building and U.S. Customs Building in January 2011. All areas, except elevated inaccessible areas, concealed spaces and components internal to mechanical devices, have been tested for asbestos. Exterior columns of both buildings are known to contain lead-based paint. The Contractor shall assume components internal to the boiler and boiler appurtenances contain asbestos. The Contractor shall follow all requirements and recommendations as outlined in the ACM Determination Survey. The ACM Determination Survey is documented in Appendix A.

The exterior steel columns at both the IMT Building and the U.S. Customs Building contain lead-based paint, and as such should be removed by unbolting or cold-cutting whole and/or intact sections without actions creating dust and potential exposure hazards. If such components cannot be removed with burning, scraping, grinding, crushing, crumbling, sanding, or other actions creating dust and potential exposure, then requirements under OSHA 29 CFR 1926.62 should be followed for training, personal monitoring, and personal protection. Waste can be disposed of as demolition debris at an appropriate solid waste facility.

The following Subsection is added

202.025 Removing Universal Waste

Universal waste materials such as fluorescent tubes, ballasts, mercury thermometer and switches, etc., shall be carefully removed and legally disposed of in accordance with all Federal, State and local laws, regulations or ordinances.

The survey, tagging, removal and storage work shall be performed by persons trained in Universal Waste identification, handling and storage, transported by firms licensed to transport Universal Wastes, and disposed of by firms licensed to dispose of Universal Wastes.

Contractor shall submit copies of all documentation to the Resident, verifying that all universal waste materials have been appropriately managed and legally disposed of at an approved disposal location in conformance with all Federal, State and local regulations.

The following Subsection is added

202.027 Disposition of Material

Title to Materials: Except where specified in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from the project property. Items identified as “remove and store” or “remove and reset” are called-out in the Plans and shall remain the property of the Owner. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Resident of the Contractor's demolition and removal procedures, and authorization by the Resident to begin demolition. The Owner will not be responsible for the condition or loss of, or damage to, such property after Contract award. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

Reuse of Materials and Equipment: Remove and store materials and equipment indicated to be reused or relocated to prevent damage, and reinstall as the work progresses. Replace or restore to usable conditions, items indicated for reuse that are damaged during removal, storage or reinstallation.

Debris Disposal: Contractor is responsible for disposal of debris, rubbish, scrap and other non-salvageable materials resulting from removal operations with all applicable federal, state and local regulations. Storage of removed materials on the project site is prohibited. Contractor is responsible for the disposal of debris and materials to an approved upland disposal site.

202.031 Removing Existing Superstructure, Structural Concrete, Railings, Curbs, Sidewalks and Bridges

The following paragraphs are added:

Prior to starting any demolition work, the Contractor shall submit a demolition plan to the Resident for approval. No demolition will be permitted until an approved demolition plan has been submitted and accepted by the Resident. At a minimum, the demolition plan shall include methods to remove steel superstructures, concrete slabs, and salvageable items. Demolition method for removal of concrete slabs over the tidal water region shall be clearly described.

Concrete slabs shall be removed to the limits shown on the Plans. Concrete slabs over tidal waters shall be dry sawcut. Wet sawcutting of the deck will only be permitted if the Contractor can successfully demonstrate how concrete sawcutting slurry will be controlled and collected, such as with wet-vacs and partial-depth cutting (sawcutting up to 90% of the thickness of the slab). Pneumatic hammers, hoe rams, or any other method approved by the Resident may be used to remove the concrete.

Removal of the existing concrete curb on the concrete pier ramp shall be included in the demolition.

202.05 Removing Manholes or Catch Basins

Amend this Subsection by including the underground pump station along Commercial Street, which is to be removed and disposed of, and the ground cavity backfilled and compacted in accordance with Section 31 20 00, Earthwork.

202.07 Method of Measurement

The following paragraphs are added:

Removal and disposal of Asbestos Containing Materials from the IMT Building and U.S. Customs Building will be measured as one lump sum. Removing buildings will be measured as one lump sum per building and/or identified structure as shown on the Plans. Removal of lead-based paint steel elements will not be measured separately, but shall be included in the removal of the building. Removing Universal Waste Material will not be measured separately for payment, but shall be incidental to the Removing Building Item(s).

Removing Abandoned Concrete Foundation shall be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily remove and dispose of this element in accordance with the Plans and Specifications. The abandoned concrete foundation is specifically the retaining wall beneath the western edge of the IMT Building roof canopy.

Removing Concrete Slab in Maintenance Building shall be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily remove and dispose of this element in accordance with the Plans and Specifications. The amount of slab to be removed is approximately 15 ft by 15 ft at the southwest corner of the Maintenance Building.

Removing, Storing, and Resetting Objects shall be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Work shall include removing three flag poles; one dedication plaque; and one large steel anchor. From these removals, work shall also include: on-site storage of two of the three flag poles; on-site storage of the dedication plaque; resetting one flag pole; and resetting of the large steel anchor. Resetting the one flag pole and the large steel anchor shall be at the location shown on the Plans within the landscaped area adjacent to the proposed office building.

Removing Embedded Timber Pile by Extraction shall be measured by the unit, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

Removing Obstructions shall be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Work shall include the removal and disposal of the following: one Portland IMT sign (located along Commercial Street); 100-ft high-mast light poles; 35-ft light poles; and 18 concrete planter boxes. Removal of concrete foundations for the sign and light poles shall be to the limits shown on the Plans and shall be incidental to Removing Obstructions. Termination of the electrical connections to the sign and light poles shall be incidental to Removing Obstructions.

202.08 Basis of Payment

The first sentence of the fourth paragraph shall be amended to include the pump station along Commercial Street.

The following paragraphs are added:

Removing Asbestos Containing Materials will be paid for at the Contract lump sum price, which price shall be full compensation for the legal removal and disposal of all asbestos containing meeting materials, including all Appendix A requirements, and shall include all materials, labor, tools and equipment necessary to complete this work.

Removing Building will be paid for at the Contract lump sum price per building which price shall be full compensation for the legal removal and disposal of all building materials, including removal of reinforced concrete floor, walls and foundations (which includes partial removal of the concrete retaining wall) to a depth of 3' below proposed final grade, removal of steel elements including those with lead-based paint, removal of minor concrete elements such as stairs and ramps as shown on the Plans, termination of utilities including abandoning septic pump stations, and shall include all materials, labor, tools and equipment necessary to complete this work.

Removing Building: International Marine Terminal will include the above description as well as the select removal of the top of the concrete seawall at locations specified on the Plans for the installation of pier pile caps; removal of all timber and steel foundation piles at the cut-off elevation shown on the Plans; removal of steel and timber foundation framing and bracing members; removal of concrete encasements around piles; removal of the first row of precast concrete deck planks ("K" planks) from the existing pier and the cast-in-place concrete slab atop those planks; and selective removal of sheet metal wall panels and structural columns and diagonal framing members at Panel 16 for resetting at Panel 5.

Removing Concrete Slab in Maintenance Building will be paid for at the Contract lump sum price for the area to be removed, and shall be full compensation for the sawcutting, removal, and disposal of concrete slab included any steel reinforcement that is encountered.

Pavement Butt Joints: shall include removal of bituminous speed bump at existing truck driveway entrance.

Remove Embedded Timber Pile by Extraction shall be a contingency pay item in the event that timber piles exist in the proposed location of steel pipe piles. This work shall be paid by the unit Contract price for the full extraction of the timber pile without breakage. A total of five timber pile extractions have been assumed

Removing Obstructions shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Removal and disposal of light poles and foundations identified on the Plans shall include complete removal of the light poles, fixtures, conduit and wiring, and foundation elements (3 ft below final grade). The work also includes removal and disposal of the Portland IMT sign located along Commercial Street including the conduit and wiring, light bulbs, and foundation elements (3 ft below final grade). Underground conduit and wiring leading up to the foundation elements shall remain in place. This work shall also include removal and disposal of 18 concrete planter boxes located along the perimeter of the IMT Building.

Payment will be made under the following Pay Items:

Pay Item		Pay Unit
202.078	Removing Asbestos Containing Materials	Lump Sum
202.08	Removing Building - International Marine Terminal Building	Lump Sum
202.08	Removing Building - US Customs Building	Lump Sum
202.08	Removing Building - Port Office Trailer	Lump Sum
202.08	Removing Building - Truck Inspection Trailer	Lump Sum
202.1221	Removing Abandoned Concrete Foundation	Lump Sum

202.1241	Removing Concrete Slab in Maintenance Building	Lump Sum
202.203	Pavement Butt Joints	Square Yard
202.2111	Removing, Storing, and Resetting Objects	Lump Sum
202.4011	Removing Embedded Timber Pile by Extraction	Each
202.01	Removing Obstructions	Lump Sum

END OF SECTION

SECTION 03 21 16 – EPOXY COATED REINFORCING STEEL

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 503 – REINFORCING STEEL, with the following modifications:

MODIFICATIONS:

Section 503.01 Description

The following paragraph is added:

Epoxy coated reinforcing steel shall be installed in all structural marine components including pile caps, precast deck panels, pier deck slab, pier approach slab, precast curbs, and the tops of the steel pipe piles.

Epoxy coated reinforcing steel (welded wire fabric) shall be installed in the concrete walkways and tip-downs as shown on the Plans.

END OF SECTION

SECTION 03 30 00 – CAST IN PLACE CONCRETE

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

803.3000 Cast In Place Concrete

Add the following:

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:

1. The extent of cast in place concrete work is shown on drawings and includes (but not by way of limitation) formwork, reinforcing, cast in place concrete, accessories, finishing, and casting in of items specified under other Sections of the Specifications or furnished by Owner that are required to be built in with the concrete.

2. Cast-in-place concrete building foundation walls, footings, and slabs on grade.

3. Equipment support pads indicated on mechanical drawings to be installed by the Building Contractor.

4. Cast-in-place retaining walls, exterior slabs on grade, utility slabs, foundations, foundation posts (for light poles, fences, and gates), and pads, and other concrete shown on site drawings. See SECTION 32 16 20 for additional requirements of Concrete Walkways.

B. Work excluded: Marine concrete elements listed below are not included in this Section, but rather are included in the Sections indicated in parentheses:

1. Pier Deck Slab (see SECTION 03 31 29, Marine Concrete)
2. Pier Precast Deck Planks (see SECTION 03 41 00, Precast Structural Concrete)
3. Pier Deck Curb (cast in place) (see SECTION 03 31 29, Marine Concrete)
4. Pier Deck Curb (precast) (see SECTION 32 12 14, Precast Concrete Curbs)
5. Pier Pipe-Pile Fill (see SECTION 03 31 29, Marine Concrete)

1.03 RELATED WORK:

A. Polished Concrete Finishing: Division 03

B. Underslab Vapor Retarders/Wall Waterproofing: Division 07

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1. ACI “Manual of Concrete Practice”.

2. ACI 117 “Standard Specifications for Tolerances for Concrete Construction and Materials”.
3. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete."
4. ACI 212.3R "Chemical Admixtures for Concrete."
5. ACI 301 "Specifications for Structural Concrete for Buildings."
6. ACI 302.1R "Guide for Concrete Floor and Slab Construction."
7. ACI 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete."
8. ACI 304.2R "Placing Concrete by Pumping Methods."
9. ACI 306 R "Cold Weather Concreting."
10. ACI 308 “Standard Practice for Curing Concrete."
11. ACI 309R "Guide for Consolidation of Concrete."
12. ACI 315 "ACI Detailing Manual."
13. ACI 318 "Building Code Requirements for Reinforced Concrete."
14. ACI 347R "Guide to Formwork for Concrete."
15. Concrete Reinforcing Steel Institute, "Placing Reinforcing Bars."
16. AISC “Code of Standard Practice for Steel Buildings and Bridges.”
17. “Code of Federal Regulations, Part 1926” per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Materials and installed work may require testing and retesting, as directed by the Architect, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.05 SUBMITTALS:

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner’s Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 21 working days.

D. Incomplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

H. Electronic Submittals:

1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate

submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.

2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.

3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Adobe Acrobat Professional version 7.0 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.

4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.

5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

I. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Reinforcement certified mill reports covering chemical and physical properties and yield strength.

2. Patching products.

3. Non-shrink grout.

4. Curing compounds, where applicable.

5. Admixtures.

6. Expansion/Adhesive Anchors.

7. Aggregate

J. Shop Drawings:

1. Shop Drawing Preparation: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Reproduction of any portion of the Construction Documents for use as Shop drawings is prohibited. Shop drawings created from reproduced Construction Documents will be returned without review. Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315, showing bar schedules, stirrup and tie spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required at openings through concrete elements. Include supplemental reinforcing and bar supports necessary to support reinforcing steel at proper location within forms or slabs.
   a. Review of the shop drawings will be made for the size and arrangement of reinforcement. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.
   b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided all items listed prior. Incomplete submittals will not be reviewed.

K. Mix designs: Submit all laboratory test reports and materials for each mix design listed within. Prepare mixes by the field experience method and/or trial mixtures per the requirements of chapter 5 of ACI 318. Include the calculation of average strength and standard deviation. Proportioning by water cement ratio method will not be permitted.

L. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources and descriptions.

M. Curing Methods: Submit documentation of curing methods to be used for review. Account for anticipated project temperature ranges and conditions in curing methods.

N. Contraction/Construction Joints: Submit plan indicating proposed location of contraction and construction joints in walls and slabs.

O. Test Reports: Test reports shall be submitted to the Owner, Architect and Engineer within 48 hour after completion of each test. Test Reports shall include at a minimum ASR (Alkali-Silica Reaction) test results.

PART 2 PRODUCTS

2.01 FORM MATERIALS:

A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal framed plywood faced or other acceptable panel type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.

1. Use plywood complying with U.S. Product Standard PS 1 "B B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill oiled and edge sealed, with piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. Form Coatings: Provide commercial formulation form coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.02 REINFORCING MATERIALS:

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Welded Wire Fabric: ASTM A185, welded steel wire fabric. Provide welded wire fabric in flat sheet.

C. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use plastic, wire bar type supports or concrete block supports complying with CRSI recommendations, unless otherwise specified. Wood, clay brick and other unspecified devices are not acceptable.

1. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2. For exposed to view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2).

2.03 CONCRETE MATERIALS:

A. Single-Source Supplier: Ready-mix concrete shall be from one supplier unless specific written approval is received from the Structural Engineer.

B. Portland Cement: ASTM C 150, Type I or Type II, unless otherwise approved. Use one brand of cement throughout project, unless otherwise acceptable to Architect.

C. Normal Weight Aggregates: ASTM C 33. Provide from a single source for exposed concrete. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, or ochre which can cause stains on exposed concrete surfaces.

D. Light Weight Aggregates: ASTM C 330.

E. Water: Potable.

F. Air Entraining Admixture: ASTM C 260.

G. High Range Water Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G containing not more than 1% chloride ions.

H. Normal range water reducing admixture: ASTM C 494 Type A containing no calcium chloride.

I. Accelerating Admixture: ASTM C 494, Type C or E.

J. Blast Furnace Slag: ASTM C989

K. Fly Ash: ASTM C618, Class C or F

L. Calcium Chloride is not permitted.

2.04 RELATED MATERIALS:

A. Underslab Vapor Retarder: Provide vapor retarder over prepared sub base. Refer to architectural drawings, geotechnical report and/or division 7 specifications for additional requirements and vapor retarder location.

B. Non Shrink Cement based Grout: Provide grout consisting of pre-measured, prepackaged materials supplied by the manufacturer requiring only the addition of water. Manufacturer's instructions must be printed on the outside of each bag.

1. Non shrink: No shrinkage (0.0%) and a maximum 4.0% expansion when tested in accordance with ASTM C 827. No shrinkage (0.0%) and a maximum of 0.3% expansion in the hardened state when tested in accordance with CRD C 621.

2. Compressive strength: A minimum 28 day compressive strength of 5000 psi when tested in accordance with ASTM C 109.

3. Setting time: A minimum initial set time of 60 minutes when tested in accordance with ASTM C 191.

4. Composition: Shall not contain metallic particles or expansive cement.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M182, Class 2.

D. Moisture Retaining Cover: One of the following, complying with ANSI/ASTM C 171.

1. Waterproof paper.

2. Polyethylene film.

3. Polyethylene coated burlap.

E. Liquid Membrane Forming Curing Compound: Liquid type membrane forming curing compound complying with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Curing compound shall not impair bonding of any material, including floor finishes, to be applied directly to the concrete. Demonstrate the non impairment prior to use.

F. Preformed Expansion Joint Formers:

1. Bituminous Fiber Type, ASTM D 1751.

2. Felt Void, Poly Styrene Cap with removable top as manufactured by SUPERIOR.

G. Slab Joint Filler: Multi component polyurethane sealant (self leveling type).

2.05 PROPORTIONING AND DESIGN OF MIXES:

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 318. Use material, including all admixtures, proposed for use on the project. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Architect.

B. Submit written reports to Architect of each proposed mix for each class of concrete. Do not begin concrete production until mixes have been reviewed by Architect.

C. Proportion design mixes to provide concrete with the following properties:

1. Footings and foundation walls

a. Strength: 3,000 psi at 28 days.
b. Aggregate: 3/4"
c. W/C Ratio: 0.54 maximum
d. Entrained Air: 6% +/- 1.5%
e. Slump: 4" maximum

2. Interior Slabs on grade:
   a. Strength: 3,000 psi at 28 days
   b. Aggregate: 3/4" minimum, 1 1/2" maximum.
   c. W/C Ratio: 0.54 maximum
   d. Entrapped Air only (no entrainment), 2.5% +/- 1%
   e. Slump: 4" maximum

3. Exterior Slabs, Concrete Walkways and Tip-Downs, foundation posts (for light poles, fences, and gates), foundations for motors and key pads (for sliding gates) and all other exposed Site Concrete not specified elsewhere:
   a. Strength: 4,500 psi at 28 days
   b. Aggregate: 3/4"
   c. W/C Ratio: 0.45 maximum
   d. Entrained Air: 6% +/- 1.5%
   e. Slump: 4" maximum
   f. Corrosion Inhibitor: Calcium Nitrite at 5.0 gal/cy (only for exterior slabs and concrete walkways and tip-downs)

4. Add air entraining admixture at manufacturers prescribed rate to result in concrete at point of placement having the above noted air contents.

5. Additional slump may be achieved by the addition of a mid-range or high-range water reducing admixture. Maximum slump after the addition of admixture shall be 6 or 8 inches for mid-range or high range water reducing admixtures, respectively.

D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor, when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Structural Engineer before using in work.

1. Water may be added at the project only if the maximum specified slump and design mix maximum water/cement ratio is not exceeded.

2. Additional dosages of superplastisizer should be used when delays occur and required slump has not been maintained. A maximum of two additional dosages will be permitted per ACI 212.3R recommendations.

2.06 CONCRETE MIXING:

A. Job Site Mixing will not be permitted.

B. Ready Mix Concrete: Must comply with the requirements of ASTM C 94, and as herein specified. Provide batch ticket for each batch discharged and used in work, indicating project name, mix type, mix time and quantity.

1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required by Structural Engineer.

2. When the air temperature is between 85 degrees F. and 90 degrees F., reduce the mixing and delivery time from 1 1/2 hours to 75 minutes, and when the air temperature is above 90 degrees F., reduce the mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMS:

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Design, construct, erect, maintain, and remove forms for cast in place concrete work in compliance with ACI 347.

C. Design formwork to be readily removable without impact, shock or damage to cast in place concrete surfaces and adjacent materials.

D. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, dovetail slots, reglets, recesses, and the like to prevent swelling and for easy removal.

F. Provide temporary openings where interior area of formwork is inaccessible for clean out, for inspection before concrete placement and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

G. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

H. Form Ties: Factory fabricated, adjustable length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

1. Unless otherwise indicated, provide ties for concrete surfaces to be exposed to view in the final condition so portion remaining within concrete after removal is 1" (minimum) inside concrete.

2. Form ties shall not leave holes larger than 1" diameter in concrete surface. Repair holes left by form ties after removal of formwork.

I. Provision for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

J. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

1. Subgrade tolerance shall conform to a tolerance of +0/-1 1/2". Base tolerance (fine grading) for slabs shall conform to a tolerance of +0”/-3/4” in. Confirm compliance of above tolerances with surveyed measurements taken at 20 ft. intervals in each direction.

2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

3. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.

4. Place reinforcement to obtain specified coverage for concrete protection within tolerances of ACI 318. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

5. Install welded wire fabric in flat sheets in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.03 JOINTS:

A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Architect. Submit plan indicating proposed location of construction joints for review prior to beginning work.

1. Provide keyways at least 1 1/2" deep in construction joints in walls, and slabs; bulkheads reviewed by the Engineer, designed for this purpose may be used for slabs.

2. Roughened surfaces shall be used between walls and footings unless shown otherwise on the drawings. The footing surface shall be roughened to at least an amplitude of 1/4" for the width of the wall before placing the wall concrete.

3. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.

4. Joints in slabs on grade shall be located and detailed as indicated on the drawings. If saw cut joints are required, the early-entry dry-cut process shall be used. Refer to ACI 302, section 8.3.12.

3.04 INSTALLATION OF EMBEDDED ITEMS:

A. General: Set, securely anchor and build into work prior to concrete placement all anchorage devices and all other embedded items, including but not by limitation reinforcement, reinforcing dowels, embedded plates, anchor rods, anchor inserts, sleeves, load transfer plates, diamond dowels and shelf bulk heads required for other work that is attached to, bear upon, or supported by, cast in place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto. Notify other trades to permit installation of their work. Templates to be utilized for setting of anchorage devices shall be constructed in a manner to allow mechanical consolidation of concrete without disturbance. Embedments shall be placed in a timely fashion to permit the inspection of embedments prior to concrete placement. “Wet Setting” of embedded items into plastic concrete is strictly prohibited.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface.

C. Provide PVC sleeves where pipes and/or conduit pass through exterior concrete or slabs. Sleeves or penetrations shall not be placed through footings, piers, pedestals, drop caps, columns or pilasters unless specifically noted.

D. Tolerances: Tolerances for Anchor Bolts/Rods, other embedded items and bearing surfaces shall meet the requirement set forth in the latest edition of the American Institute of Steel Construction “Code of Standard Practice for Steel Buildings and Bridges,” and ACI 117. The more stringent criteria from these documents shall apply.

3.05 INSTALLATION OF GROUT

A. Place grout for base plates in accordance with manufacturer's recommendations.

B. Grout below setting plates as soon as practicable to facilitate erection of steel and prior to removal of temporary bracing and guys. If leveling bolts or shims are used for erection grout shall be installed prior to addition of any column load.

C. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials and allow to cure. For proprietary grout materials, comply with manufacturer's instructions.

3.06 PREPARATION OF FORM SURFACES:

A. Coat contact surfaces of forms with a form coating compound before reinforcement is placed.

B. Thin form coating compounds only with thinning agent of type, and in amount, and under conditions of form coating material manufacturer's directions. Do not allow excess form coating to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.07 CONCRETE PLACEMENT:

A. Pre-placement Review: Footing bottoms are subject to review by the Geotechnical Engineer. Reinforcement and all concrete preparation work shall be subject to review by the Structural Engineer. Verify that reinforcing, ducts, anchors, seats, plates and other items cast into concrete are placed and securely held. Notify Engineer/Project Special Inspector 48 hours prior to scheduled placement and obtain approval or waiver of review prior to placement. Be sure that all debris and foreign matter is removed from forms.

B. Concrete shall be placed in the presence of an approved testing agency.

C. General: Comply with ACI 304, and as herein specified.

1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.

2. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and in a manner which will assure that the required quality of the concrete is maintained.

3. Conveying equipment shall be approved and shall be of a size and design such that detectable setting of concrete shall not occur before adjacent concrete is placed. Conveying equipment shall be cleaned at the end of each operation or work day. Conveying equipment and operations shall conform to the following additional requirements:
   a. Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. An arrangement shall be used at the discharge end to prevent apparent segregation. Mortar shall not be allowed to adhere to the return length of the belt. Long runs shall be discharged into a hopper or through a baffle.
   b. Chutes shall be metal or metal lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long, and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.
   c. Pumping or pneumatic conveying equipment shall be of suitable kind with adequate pumping capacity. Pneumatic placement shall be controlled so that segregation is not apparent in the discharged concrete.
   d. Concrete shall not be conveyed through pipe made of aluminum alloy. Standby equipment shall be provided on the site.
   e. Tined rakes are prohibited as a means of conveying fiber reinforced concrete.

4. Do not use reinforcement as bases for runways for concrete conveying equipment or other construction loads.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 18 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment. Hand-spading, rodding or tamping as the sole means for the consolidation of concrete will only be permitted with special permission from the Engineer. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

2. Use vibrators designed to operate with vibratory equipment submerged in concrete, maintaining a speed of not less than 8000 impulses per minute and of sufficient amplitude to consolidate the concrete effectively. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine, generally at points 18 inches

maximum apart. Place vibrators to rapidly penetrate placed layer and at least 6 inches into the preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion maintain the duration of vibration for the time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix, generally from 5 to 15 seconds. A spare vibrator shall be kept on the job site during all concrete placing operation.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

1. Consolidate concrete using internal vibrators during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. Do not sprinkle water on plastic surface.

3. Maintain reinforcing in proper position during concrete placement operations.

4. Slab thicknesses indicated on the drawings are minimums. Provide sufficient concrete to account for structure deflection, subgrade fluctuations, and to obtain the specified slab elevation at the flatness and levelness indicated here within.

5. Finish: See “Monolithic Slab Finishes” in this specification for slab finish requirements.

F. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

1. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C), and not more than 80 degrees F (27degrees C) at point of placement.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators.

4. All temporary heat, form insulation, insulated blankets, coverings, hay or other equipment and materials necessary to protect the concrete work from physical damage caused by frost , freezing action, or low temperature shall be provided prior to start of placing operations.

5. When the air temperature has fallen to or is expected to fall below 40 degrees F, provide adequate means to maintain the temperature in the area where concrete is being placed between 50 and 70 degrees F.

G. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.

2. Cover reinforcing steel with water soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

3. Wet forms thoroughly before placing concrete.

4. Do not use retarding admixtures without the written acceptance by the Architect.

3.08 FINISH OF FORMED SURFACES:

A. Rough Form Finish: For formed concrete surfaces not exposed to view in the finish work or by other construction, unless otherwise indicated. This concrete surface shall have texture imparted by form facing material, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 in. in height rubbed down or chipped off.

B. Smooth Form Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp proofing, painting or other similar system. This as cast concrete surface shall be obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment. Combine one part Portland cement to 1 1/2 parts fine sand by volume and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that final color of dry grout will closely match adjacent surfaces.

1. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

D. Related Unformed Surfaces: At tops of walls and grade beams, horizontal offset surfaces occurring adjacent to formed surfaces, strike off, smooth and finish with a texture matching adjacent unformed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.09 FLOOR FLATNESS AND LEVELNESS

A. Floor flatness/levelness tolerances: Tolerances for various floor uses shall conform to the requirements set forth in ACI 117 and ACI 302 for “flat” floor profile, except as noted below at exposed concrete at corridors.

1. Minimum Test Area Flatness/Levelness: F_F35/F_L25, F_F45/F_L35 at corridors.

2. Minimum Local F Number: F_F25/F_L15, F_F30/F_L25 at corridors.

B. Levelness criteria shall be applied to slabs-on-grade only.

C. Contractor shall measure floor finish within 72 hours after slab finishing and provide corrective measures for finishes not within tolerance. Corrective procedures shall be reviewed by the Architect prior to implementation.

3.10 MONOLITHIC SLAB FINISHES:

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds, and as otherwise indicated.

1. After placing slabs, plane surface to a tolerance not exceeding 1/2 in. in 10 ft. when tested with a 10 ft. straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, and as otherwise indicated.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces indicated, including slab surfaces to be covered with carpet, resilient flooring, paint or other thin film finish coating system.

D. Non Slip Broom Finish: Apply non slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.

E. Slab finishes for floor coverings not indicated or exposed to view in the final condition shall be coordinated with the Architect prior to slab placement.

F. Slab Joints: Where indicated, sawn slab contraction joints shall be “soft cut”, immediately after concrete surface is firm enough not to be torn or damaged by the blade.

3.11 CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 308 as herein specified.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture retaining cover curing, by curing compound, and by combinations thereof, as herein specified unless noted otherwise. Curing shall commence as soon as concrete surfaces are sufficiently hard as to withstand surface damage. Slabs-on-grade shall be cured by "wet" curing methods unless otherwise noted; Slabs-on-grade to receive floor coverings with moisture sensitive adhesives shall be cured by means of a moisture retaining covering. Coordinate curing with flooring adhesive manufacturer and flooring installer. Submit curing methods to Architect for review and approval.

C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

D. Protection From Mechanical Injury: During the curing period and duration of construction, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials, or methods, by application of curing procedures, and by rain or running water. Self supporting structures shall not be loaded in such a way as to overstress the concrete.

3.12 REMOVAL OF FORMS:

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as joints, slabs and other structural elements, may not be removed in fewer than 14 days or until concrete has attained design minimum compressive strength at 28 days. Determine potential compressive strength of in place concrete by testing field cured specimens representative of concrete location or members.

C. Form facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and support.

3.13 REUSE OF FORMS:

A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and latency, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.14 MISCELLANEOUS CONCRETE ITEMS:

A. Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in place construction. Provide other miscellaneous concrete filling shown or required to complete work.

3.15 CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Architect.

1. Cut out honeycomb, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush coat the area to be patched with approved bonding agent. Place patching mortar after bonding compound has dried.

2. For exposed to view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, form tie holes, cracks, spalls, air bubbles, honeycomb, rock pockets, fins, and other projections on surface and stains and other discolorations that cannot be removed by cleaning.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. Testing Agency/Project Special Inspector shall verify reinforcement, including foundation reinforcement and slab reinforcement (WWF or reinforcing bar). Agent shall verify WWF or reinforcement has been chair/placed with proper clearances.

B. The Contractor shall employ an independent Testing Laboratory at his cost to inspect, sample and test the materials and the production of concrete and to submit test reports. Concrete testing shall be performed by technicians certified by the Maine Concrete Technician Certification Board and/or ACI Concrete Field Testing Technician Grade I.

C. Concrete shall be sampled and tested for quality control during placement. Quality control testing shall include the following, unless otherwise directed by the Architect.

D. See Submittals section for report requirements.

E. Sampling Fresh Concrete: ASTM C 172.

1. Slump: ASTM C143; One test for each set of compressive strength test specimens. Sample shall be taken from middle third of the load per ASTM C172. A slump test must be run prior to the incorporation of the CFP fibers per recommendations of ACI 544. A slump test must be run prior to and following the addition of a water reducer (superplasticizer) per recommendations of ACI 301.

2. Air Content: ASTM C231 "Pressure method for normal weight concrete. one test for each set of compressive strength specimens measured at point of discharge.

3. Concrete Temperature: Per ASTM C-1064; one test each time a set of compression test specimens are made.

4. Compression Test Specimen: ASTM C31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field cure test specimens are required.
   a. An insulated Cure Box for specimen curing shall be supplied by Testing Agency for initial curing as defined in ACI C31.
   b. Means of heating or cooling the Cure Box shall be provided by the Inspection Agency if required in order to maintain a temperature between 60 and 80 degrees F. Contractor shall provide an electrical source to the Testing Agency when required for temperature control.
   c. A maximum-minimum thermometer shall be provided in the Cure Box by the Testing Agency to record the temperature range of the Cure Box during specimen curing. The Testing Agency shall record the maximum/minimum temperature of the Cure Box when transferring the specimens to the laboratory.
   d. Test Specimens shall be moist cured.
   e. Refer to ACI C31 for additional requirements for Test Specimens.

5. Compressive Strength Tests: ASTM C39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 4,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, 1 specimen retained in reserve for later testing if required.

6. Pumped concrete shall be tested at point of discharge per ACI 301.

F. Additional Tests: The testing service will make additional tests of in place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods, as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT:

A. Measurement of cast-in-place concrete for the office building foundation will not be measured separately, but rather will be incidental to the Office Building – Structural pay item.

B. Measurement of cast-in-place concrete for the electrical light bases, fence posts, and thrust blocks will not be measured separately, but rather will be incidental to their respective items.

C. Measurement of cast-in-place concrete for the transformer foundation, generator slab, and condenser pad shall each be measured individually by the lump sum completed and installed to the lines and grades shown on the Plans.

D. Measurement of cast-in-place concrete for the Maintenance Building Slab shall be measured by the lump sum completed and installed to the lines and grades shown on the Plans. Installation of the concrete slab shall include installation of steel reinforcement in-kind, and installation of doweled bars into the existing slab to tie the new slab to the existing.

E. For measurement and payment of cast-in-place concrete for Concrete Walkways and Tip-Downs, see Subsection 608.06.

4.02 BASIS OF PAYMENT:

Payment for cast-in-place concrete for the office building foundation will not be paid for separately but shall be incidental to the Office Building – Structural pay item.

Payment for cast-in-place concrete for the light pole foundations, fence and gate posts, sign posts, motor and key pad foundations (for sliding gates), and thrust blocks will not be paid for separately but shall be incidental to their respective pay items.

Payment for cast-in-place concrete for the transformer foundation shall be paid for at the lump sum Contract price and shall include all excavation, forming, concrete, steel reinforcement, backfilling, compacting and leveling to the lines and grades shown on the Plans.

Payment for cast-in-place concrete for the Maintenance Building shall be paid for at the lump sum Contract price and shall include all excavation, forming, concrete, steel reinforcement, and leveling to the lines and grades shown on the Plans.

Payment for cast-in-place concrete for the generator slab and the condenser pad shall each be paid for at their respective lump sum Contract price, and shall include all excavation, forming, concrete, steel reinforcement, backfilling, compacting and leveling to the lines and grades shown on the Plans.

Pay Item		Pay Unit
502.601	Structural Concrete, Transformer Foundation	Lump Sum
502.602	Structural Concrete, Generator Slab	Lump Sum
502.603	Structural Concrete, Condenser Pad	Lump Sum
502.604	Structural Concrete, Maintenance Building Slab	Lump Sum
815.00	Office Building - Structural	Lump Sum

END OF SECTION

SECTION 03 31 29 – MARINE CONCRETE

All work and materials shall conform to the Contract Drawings and the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 502 – STRUCTURAL CONCRETE, with the following modifications:

MODIFICATIONS:

Section 502.01 Description

Add the following after the first paragraph:

This work shall consist of furnishing and placing Portland Cement Concrete for marine structures including fill for steel pipe piles, pile caps, deck slab, approach slab, and curbs, and incidental marine construction in accordance with these Specifications and in conformity with the lines, grades, and dimensions shown on the Plans.

Section 502.05 Composition and Proportioning

Modify Table 1 in accordance with the following:

Concrete Class LP shall include Note 3: inclusion of Calcium Nitrite.

Modify Table 1, Note 3, in accordance with the following:

Calcium Nitrite shall be added at a rate of 5.0 gallons per cubic yard.

Section 502.0501 Quality Control METHOD A, METHOD B, and Method C

The following paragraph is added:

Quality Control for marine concrete elements shall be based on Method A. Method A shall be used to for all marine concrete elements except for concrete fill for pipe piles.

Section 502.18 Method of Measurement

Add the following before the first paragraph:

Measurement of marine concrete for pier pile caps and edge beams; pier deck slab; pier approach slab; and pier curb; satisfactorily placed and accepted will be measured by the cubic yard, per their respective items, in accordance with the dimensions shown on the Plans or authorized changes in the Plans.

Fill for steel pipe piles will not be measured separately but shall in incidental to the installed steel pipe pile Pay Item, 501.7015.

Section 502.19 Basis of Payment

Add the following before the first paragraph:

Payment for saw cutting of pier deck slab and the placement of joint sealants shall be incidental to the Structural Concrete, Pier Deck Slab pay item.

Add the following Pay Items:

Pay Item		Pay Unit
502.235	Structural Concrete, Pier Pile Cap and Edge Beam	Cubic Yard
502.411	Structural Concrete, Pier Deck Slab	Cubic Yard
502.45	Structural Concrete, Pier Approach Slab	Cubic Yard
502.491	Structural Concrete, Pier Curb	Cubic Yard

END OF SECTION

SECTION 03 35 43 –POLISHED CONCRETE FINISHING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

803.3543 Polished Concrete Finishing

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY:

A. Section Includes:

1. Polished Concrete: Includes diamond grinding, honing and polishing with use of silicate sealer, hardener, and densifier floor finish, scavenger for unreacted silicate removal and non-film forming stain protection.

B. Related Sections: Division 03 Section "Cast In Place Concrete"

1.03 REFERENCE STANDARDS:

A. ASTM C642-06 Standard Test Method for Density, Absorption, and Voids in Hardened Concrete.

B. ASTM D5178-98/08 Standard Test Method for Mar Resistance of Organic Coatings

C. ASTM D2486-06 Standard Test Methods for Scrub Resistance of Wall Paints

D. ASTM D4060-07 Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abrasion: Modified.

E. ASTM G154-06 Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.

F. ASTM D4541-09 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

G. ASTM D236- 07 Standard Test Method for Volatile Content of Coatings

H. ASTM D2047-04 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.

I. Reflectivity according to use of Horiba IG-320 Gloss Checker.

J. ASTM C1378-04 (2009) Standard Test Method for Determination of Resistance to Staining

1.04 ADMINISTRATIVE REQUIREMENTS:

A. Schedule and hold a pre-installation meeting prior to project start.

1. To attend: Architect, Owners Representative, General Contractor, Concrete Contractor Vexcon Representative, and Certi-Shine Installer.

B. Complete and submit manufacturer’s project form work.

1. Vexcon “Project Conference and Job Survey”.

C. Schedule installation and review date for mock-up.

1.05 SUBMITTALS:

A. Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

B. Product Data: Provide data on all products, including information on compatibility of different products and limitations

C. Indicate installation procedures and interface required with adjacent construction

D. Provide Manufacturers Maintenance Instructions

E. Provide Installer certification and job experience

F. Test Data: Provide test reports and warranty

1.06 INFORMATIONAL SUBMITTALS:

A. Quality Assurance

1. Certificates
   a. Product certificates signed by the manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
   b. Current contractor’s certificate signed by the manufacturer declaring contractor as a certified and approved installer of the polishing system.

B. Qualifications:

1. Installer certified by Vexcon Chemicals and experienced in performing work of this section that has specialized in installation of work similar to that required for this project.

2. Installer trained and holding current certification for Certi-Shine Clear, Certi-Shine Clear FSR or Certi-Shine Micro-Stain FSR installation.

C. Pre-installation Meetings: Conduct a pre-installation meeting to verify project requirements, manufacturer's installation instructions, and manufacturer's warranty requirements.

1. Environmental requirements.

2. Curing of the concrete- method and period of time.

3. Scheduling and phasing of work.
   a. Large enough areas with no other trades

4. Coordinating with other work and personnel.

5. Protection of adjacent surfaces.

6. Surface preparation.

7. Repair of defects and defective work prior to installation.

8. Cleaning.

9. Application of liquid hardener, densifier.

10. Importance of un-reacted silicate rinse.

11. Installation of polished non-film forming floor finishes

12. Protection of finished surfaces after installation.

1.07 MOCK UP: Approved site mock-ups for all architectural concrete shall set the standard for the various architectural concrete features: flatness, levelness, formed finishes, and colors of the concrete. The materials and practices used to produce the mock-up panel, including placement, curing, and surface treatment applications shall be the same as the project installation.

A. Installation: Provide an 10' x 10' test area of polished floor as specified in Section 3.03

B. Mock-up Size: [100 ft2 (9.3 m2)] sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.

C. Mock-up will be used to evaluate concrete substrate preparation, material application, color selection, and shine.

D. When approved by the Architect, Mock-up will demonstrate minimum standard of quality required for proceeding with this work.

E. Approved Mock-up shall remain for comparison and quality control as part of the finished work.

1.08 DELIVERY, STORAGE, AND HANDLING:

A. Store material in dry, enclosed area protected from exposure to moisture & temperatures below 50° F.

B. Keep containers closed and upright to prevent leakage.

C. Dispense special concrete finish material from factory numbered and sealed containers.

D. Maintain record of lot numbers.

1.09 PROJECT CONDITIONS:

A. Protect concrete slabs from staining prior to application of concrete finish system.

B. Diaper hydraulic powered equipment.

C. Inspect lift tires daily for screws and nails- remove.

D. Place drop cloths under parked vehicles and all mechanical equipment.

E. Do not store structural steel or metal fabrications on slab.

F. Do not allow pipe-cutting machine on slab.

G. Sweep and Clean up spills daily

1.10 WARRANTY:

A. Certi-Shine Clear: Provide 20 year manufacturer's material warranty commencing at date of building substantial completion. Manufacturer shall warrant to the owner that polished surface will remain water repellent, dustproof, hardened and abrasion resistant.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Basis of Design: Subject to compliance with requirements provide Vexcon Chemicals system: Certi-Shine Clear FSR

1. Vexcon Chemicals, Inc.
   a. Contact: Jennifer Faller , Certi-Shine Brand Manager
      1-888-VEXCON-1; jfaller@vexcon.com;
      Fax 215-332-9997; 7240 State Rd Phila., PA 19135; www.vexcon.com
   b. Local certified Certi-Shine installer

B. Available Products: Subject to compliance with performance requirements, products that may be incorporated into the work must have 5 years of recognized polishing use on jobs of similar magnitude and be single source manufactured.

2.02 SYSTEM DESCRIPTION:

A. Polished Concrete: Includes Diamond Grinding, Honing and Polishing with use of silicate sealer, hardener, and densifier floor finish, scavenger for unreacted silicate removal and non-film forming stain protection.

B. Performance Data

1. ASTM C642 Absorbability: Reduction of 75% of Control
2. ASTM D5178 Balance Beam Mar Tester: Greater than 50% harder
3. ASTM D2486 Abrasive Scrub: 1200 Cycles
4. ASTM D4060 Modified Taber Abrasion 600 Rev: 0.37% treated vs. 0.68% untreated
5. ASTM G154: 5000 HR QUV: No fade, change or erosion
6. ASTM D4541 Bonding: Greater than 50 psi
7. ASTM D2369 Solids: 18% Min.
8. ASTM D2047 Coefficient of Friction Determinations by Case Consulting Laboratories:
   a. Certi-Shine Clear - average - 0.54
   b. Certi-Shine Finish Coat Ultra - average - 0.63
9. Reflectivity: Change in gloss to 30, 60 or 80 depending on Certi-Shine system, as measured using a gloss meter in accordance with Horiba IG-320 Gloss Checker.
10. ASTM C1378 Stain resistance: Food, Chemical, Oil and common stain resistance. See manufacturer's literature for list.

2.03 PRODUCTS/SYSTEMS:

A. Hardener, Penetrating Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.

1. Acceptable Material: Vexcon Chemicals, Inc., Certi-Shine Clear.

B. Unreacted Silicate Rinse: Liquid rinse solution, increases stain resistance.

1. Acceptable Material: Vexcon Chemicals, Inc., Certi-Shine Fixative.

C. Stain Repellent (non-film forming): Ready to use, food (oil and acid), hydraulic fluid and motor oil stain and water repellent, Silane and Silane polymer blend available in 3 formulations

1. Acceptable Material: Vexcon Chemicals, Inc., Certi-Shine Finish Coat Ultra
   a. Note: Product choice will depend on VOC regulations or preference
      1) Certi-Shine Finish Ultra Coat Water Base
      2) Certi-Shine Finish Coat Ultra AIM
      3) Certi-Shine Finish Coat Ultra

D. Silicate floor repair material: Liquid silicate material Silicate floor repair material: Liquid silicate material which fills and repairs concrete surface imperfections (optional).

1. Acceptable Material: Vexcon Chemicals Inc., Certi-Shine Fusion.

E. Cleaning Solution: Eco-friendly degreaser and cleaner, concentrate pH must be slightly alkaline.

1. Acceptable Material: Vexcon Chemicals, Inc., StarSeal EF Degreaser and Cleaner.

F. Finish Gloss Level Standard: Satin shine (Silver), equivalent to 60° film gloss of 30 when viewed at an angle

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Curing Methods: (refer back to section 03 30 00).

1. Disposable Blankets/Impervious Sheet Cure (preferred method) Wet exposed surfaces of concrete after completing finishing and then apply pre-wetted sheets with edges lapped 6 inches minimum and sealed & secured in such a manner as to prevent moisture from escaping from concrete laps or edges.
   a. UltraCure by McTech Group www.mctechgroup.com 1.866.913.8363

b. Conkure Blankets by Raven Industries website: ravenefd.com 800.635-345

2. Water base resin cure: Apply liquid curing compounds by spraying or rolling uniformly in a single coat on surfaces immediately following final finishing.
   a. Vexcon Chemicals Inc., Enviocure 100 Contact: Jennifer Faller 1.888.839.2661

B. Protection of the Architectural Concrete: Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and possible damage.

1. Protect wet cured or impervious sheet cured surfaces as follows
   a. Barricade concrete surfaces immediately after finishing
   b. Do not allow light traffic, except for curing purposes, on concrete surfaces until concrete has obtained 1800 psi (approx 3 days).
   c. Do not allow heavy traffic on concrete surface until concrete has obtained, by test, its design strength as noted on drawings but no sooner than 9 days after placement.
   d. Permit concrete to dry minimum of 2 additional days after curing is completed before removing barricades.

C. Site Verification of Concrete Conditions

1. Installer and manufacturer's representative will examine surfaces receiving concrete finish and polishing system.
   a. Verify that surfaces conform to product manufacturer's requirements for substrate conditions.
   b. Verify floor is free of curing membrane, bond-breaker, concrete laitance, and will absorb water per water absorbency test.

D. Concrete slab performance requirements

1. Verify that all the concrete complies with finishing requirements as specified in Cast In Place Section 03 30 00.

3.02 ARCHITECTURAL CONCRETE PREPARATION FOR POLISHING:

A. Complete surface preparation per manufacturers written instructions.

B. Sweep floor area, blow out corners and column footings.

C. Remove all other construction materials.

D. Initial grind should clean the concrete surface, removing all coatings, dirt, oil and laitance.

E. If grinding does not remove oil spots, treat oil spots with emulsifier and oil absorber materials. Detail scrub with high pH detergent.

1. Vexcon product: StarSeal EF Stripper

F. Double scrub floor with automatic scrubber capable minimum of 80 to 120 pounds of head pressure, equipped with black stripping pads. Use proper dilution of high pH detergent. Scrub floor once without squeegee or vacuum. On second pass, remove water solution.

G. Using automatic scrubber rinse surface removing all traces of soap residue.

H. Inspect the concrete surface.

I. Complete surface preparation per manufacturers written instructions.

J. Perform water absorbency test.

1. Repeat any steps as necessary to prepare for polishing.
   a. If water repels contact Vexcon directly

3.03 CONCRETE FINISH APPLICATION AND POLISHING:

A. Immediately following cleaning operation, grind, hone and install concrete polishing material(s) per manufacturer's installation instructions (OP 200AVexcon) polish until desired gloss is achieved.

B. Perform grinding, honing and polishing operations to the specified polish level.

1. Polishing Levels for Certi-Shine products
   a. Silver - Satin shine - Equivalent to 60° film gloss of 30 when viewed on an angle.

C. Grind concrete and reveal the specified appearance.

1. Appearance in accordance with the approved Mock-up.
   a. Sand finish- the concrete will show sand on 80%+ of the surface, less than 20% small aggregate.

3.04 PROTECTION:

A. Protect finished surfaces from damage and soiling and other construction activities.

B. Without damaging completed work, provide protective cover.

1. EZCover by McTech Group www.mctechgroup.com 1.866.913.8363

2. Ram Board by Ram Board www.ramboard.com 1.818.848-0400

3.05 MAINTENANCE:

A. Spills: When they occur, clean with neutral or preferably an alkaline cleaner, like StarSeal EF Degreaser & Cleaner making sure to scrub and rinse with clean water.

B. General Cleaning: Use a walk behind scrubber equipped with medium to soft nylon brushes. Clean on a daily basis with neutral or preferably an alkaline cleaner, like StarSeal EF Degreaser & Cleaner making sure to scrub and rinse with clean water.

C. Maintenance Cleaning: Perform when a more thorough cleaning is desired. This should be based on based on individual traffic areas or departments and the overall cleanliness of the facility.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Polished Concrete Finishing will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Polished Concrete Finishing shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Polished Concrete Finishing will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 03 39 00 –CONCRETE CURING

All work and materials shall conform to the Contract Drawings and the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 514 –CONCRETE CURING, with the following modifications:

MODIFICATIONS:

Section 514.01 Description

Add the following after the first paragraph:

This work shall consist of furnishing a Concrete Curing Box for concrete work throughout the duration of the project and in accordance with these Specifications.

END OF SECTION

SECTION 03 41 33 – PRECAST STRUCTURAL PRETENSIONED CONCRETE

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 535 – PRECAST, PRESTRESSED CONCRETE SUPERSTRUCTURE, with the following modifications:

MODIFICATIONS:

Section 535.13 Concrete

Revise the amount of Calcium Nitrite solution in Table 1 from 3 gallons per cubic yard to 5 gallons per cubic yard.:

Add the following paragraph:

Portland Cement concrete for precast structural pretensioned concrete deck planks shall be Class P (6,500 psi at 28 days) concrete in accordance with SECTION 03 31 29, MARINE CONCRETE. The mix design shall be approved by the Resident.

Minimum strength at transfer shall be 4,500 psi.

Section 535.29 Basis of Payment

Payment will be made under:

Pay Item	Pay Unit
535.631 Prestressed Structural Concrete Deck Planks	Lump Sum

END OF SECTION

SECTION 04 42 00 – EXTERIOR STONE CLADDING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

804.4200 Exterior Stone Cladding

Add the following:

PART 1- GENERAL

1.01 GENERAL CONDITIONS: The General Conditions, Supplementary General Conditions and all Sections of Division 1 shall apply to each and every contract and contractor, person or persons supplying material, labor or entering into the work directly or indirectly.

1.02 CODES: All work shall conform with the requirements of the local building codes. This Contractor shall verify compliance and where non compliance is noted it shall be reported immediately to the Architect. No work shall commence without this certification and no work should proceed unless it is in strict compliance with all applicable code requirements. See MaineDOT Division 100, General Conditions.

1.03 STANDARDS: All materials and work shall conform with the recommendations of the National Building Granite Quarry Association. All granite shall be obtained from quarries having adequate capacity and facility to meet the specified requirements. Cutting and finishing shall be done by a firm equipped to process the material promptly on order and in accordance with specifications.

1.04 SUBMITTALS:

A. Five prints of erection and shop fabrication drawings.

B. Shop drawings shall show all bedding, bonding, jointing and anchoring details and the dimension and setting number of each piece of granite. No final sizing or finishing shall be done until shop drawings for that part of the work has been approved.

1. Show location of inserts (for stone anchors and supports) which are to be built into concrete or unit masonry.

2. Show large scale details of decorative surfaces and inscriptions.

C. Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

1.05 SAMPLES: Submit to the Architect, one sample for approval of color, texture and surface finish. Sample shall be at least 12” x 12” in size and representative of the proposed finished product.

1.06 QUALITY ASSURANCE:

A. Upon receipt at the site, the granite shall be stacked on timber or platforms at least 4” above the ground and extreme care shall be taken to prevent staining during storage. If storage is to be for a prolonged period, polyethylene shall be placed between any wood and finished surfaces and shall be used also as an overall protective coating. Lewis holes shall be plugged during freezing weather to prevent the accumulation of water. Salt shall not be used for melting of ice formed in Lewis holes or on pieces or for any purpose involving its contact with the granite.

B. If any unit is damaged during handling or erection, it shall be inspected by the Architect to determine whether the unit can be repaired or rejected.

C. Reference Standards: Comply with National Building Granite Quarries Association, Inc. (NBGQA).

1. Granite: National Building Granite Quarries Association, Inc. (NBGQA).

D. Fabricator: Sub-subcontract fabrication of stone to a firm which has successfully fabricated stone similar to the quality specified for a period of not less than 5 years and is equipped to provide the quantity shown.

1.07 SCOPE: The Section includes all labor, materials, equipment and related services necessary for the fabrication, delivery and installation of the work shown on the drawings and/or specified herein, including but not limited to the following:

A. Fabrication, delivery and erection of all granite veneer panels, cornices, bases, etc. as shown on the drawings.

B. Mortars and sealants.

C. Anchors, cramps, dowels and other anchoring devices.

D. Incidental cutting and drilling.

E. Pointing of joints.

F. Cleaning and protecting the finished work.

1.08 RELATED WORK IN OTHER SECTIONS:

A. Rough Carpentry 06 10 00

1.09 INSTALL ONLY: Install following items, to be furnished under other Sections:

A. Anchors, inserts and other items furnished by other trades required to be built in with stone masonry.

1.10 FURNISH ONLY: Furnish and deliver, to jobsite unless otherwise indicated, the following items for installation under the Designated Sections or as otherwise noted.

A. Anchors, inserts, other accessory items for securing stone masonry to other construction and required to be built in with the other construction: SECTION 06 10 00 – ROUGH CARPENTRY

1.11 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Protect stone during storage and construction against moisture, soiling, staining and physical damage.

B. Handle stone to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of stone with wood or other rigid materials. Lift with wide belt type slings wherever possible; do not use wire rope or ropes containing tar or other substances which might cause staining. If required, use wood rollers and provide cushion at end of wood slides.

C. Store stone on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones. Protect stored stone from weather with waterproof, non-staining covers or enclosures, but allow air to circulate around stones.

D. Protect mortar materials and stonework accessories from weather, moisture and contamination with earth and other foreign materials.

1.12 JOB CONDITIONS:

A. Weather Protection, General: During all seasons protect partially completed stonework against weather when work is not in progress. Cover top of walls with strong waterproof, non-staining membrane extending at least 2 ft. down both sides of walls and anchor securely in place.

PART 2 - MATERIAL

2.01 GRANITE

A. All granite shall be of standard grade, free of cracks, seams or starts which may impair its structural integrity or function. Inherent variation characteristic of the quarry from which it is obtained is acceptable.

B. Granite must conform to ASTM C97, C170 and C99.

C. Granite shall be “Regal Gray” or approved equal with thermal finish. Thickness as indicated on Plans.

2.02 MORTAR AND GROUT MATERIALS:

A. Mortar for setting and pointing shall be: 1 part portland cement, 1 part plastic lime hydrate, and 3 parts clean, non-staining sand.

B. Calcium chloride or accelerator is not permitted.

C. Cement: Provide white cement as follows:

1. Portland Cement: ASTM C 150, except comply also with non-staining staining requirements of ASTM C 91 for not more than 0.13% soluble alkali. Furnish Type I, except Type III may be used for setting stonework in cold weather subject to approval by Architect.

2. Masonry cement: Not acceptable.

D. Hydrated Lime: ASTM C 207, Type S.

E. Sand: ASTM C 144, except graded with 100% passing the No. 16 sieve for 1/4" and narrower joints.

1. For white pointing mortar, provide natural white sand or ground stone meeting specified requirements.

2. For colored pointing mortar, provide marble, granite or other sound stone, meeting specified grading requirements for sand, as required to match Architect's sample.

F. Coloring Pigments: Limeproof, non-fading, mineral pigments as approved by Architect.

2.03 MIXES:

A. Mortar: Non-staining, cement/lime mortar, complying with ASTM C 270, Proportion Specification, using specified materials

1. Use Type S unless otherwise indicated.

2. Use specified mortar for grouting.

2.04 ANCHORS, CRAMPS & DOWELS:

A. All anchors, cramps, dowels and other anchoring devices shall be type 304 stainless steel by Hohmann & Barnard Inc. or suitable non-ferrous metal of the types and sizes shown on approved shop drawings.

B. Schedule of Anchoring devices by Hohmann & Barnard, Inc.

#	Name	Gauge
370	channel slots	12 gauge
St.2	storch anchors	12 gauge
366	strap anchors	12 gauge 1" wide length as required
365	strap anchors	12 gauge 1" wide length as required
402R	cramp anchor	14" 0 length as required
406	dowel	1/2" 0 length as required

2.05 FABRICATION:

A. General: Fabricate as shown and as detailed on final shop drawings and in compliance with recommendations of applicable stone association. Provide holes and sinkages cut or drilled for anchors, fasteners, supports and lifting devices, as shown and as necessary to secure stonework in place. Cut and back check as required for proper fit and clearance. Shape beds to fit supports.

B. Contiguous Work: Provide chases, reveals, reglets, openings and similar spaces and features as required for contiguous work. Coordinate with drawings and final shop drawings showing contiguous work.

C. Workmanship: Cut accurately to shape and dimensions shown on final shop drawings, maintaining fabrication tolerances of applicable stone associations.

1. Dress joints (bed and vertical) straight and at 90 degree angle to face, unless otherwise indicated.

2. Provide quirk-mitered corners, unless otherwise shown. Provide for cramp anchorage in top and bottom bed joints of corner units, unless otherwise shown.

D. Joint Widths: Cut to provide joint widths as indicated or, if not indicated, cut to allow for uniform 3/8" wide joints.

E. Thickness: Provide stone of thickness indicated. Saw cut back surfaces which will be concealed in finished work.

1. Allow not less than 1" clearance between back face of units and structure framing (or fireproofing, if any).

F. Reglets:

1. Flashing Reglets: Cut flashing reglets, 5/8" wide x 3/4" deep, unless otherwise indicated.

2. Gasket Reglets: Cut gasket reglets in edges of panels where gasketed joints are shown. Coordinate with profile of gaskets to be used in the work.

G. Moldings: Fabricate molded work to profiles indicated, with arises sharp and true and matched at joints between units.

H. Carvings: Carve and cut decorative surfaces and inscriptions in accordance with final shop drawings.

I. Saddles and Thresholds: Cut to profiles and dimensions shown.

PART 3 - EXECUTION

3.01 INSPECTION:

A. The installation of the granite shall be an indication of this contractor's acceptance of all subsurfaces and he will automatically assume the responsibility of any unacceptable finished work caused by subsurface conditions.

B. Condition of surfaces: Inspect foundations and back-up block wall to assure surface to support granite panel as follows.

1. To proper grades and elevations.

2. Dry and free of all dirt and other deleterious material.

3. All surfaces not properly prepared have been satisfactorily corrected.

C. Granite panels shall be verified to determine any flaws or imperfections upon receipt at the site.

3.02 PREPARATION:

A. Pieces shall be dry and clean of all dirt.

B. Anchors, cramps, dowels and other anchoring devices: remove all dirt, ice, loose rest and scale prior to installation.

C. Mortar shall be mixed in small batches using clean non-alkaline water until it is homogenous, stiff and plastic. After mixing the mortar shall not sit form more than two hours before being used.

3.03 ALLOWABLE TOLERANCES:

A. Maximum variation in the diversion of any piece shall be 1/4 of the specified bed and joint width.

B. Flatness Tolerances shall be determined from a 4 foot long straight edge in any direction. The maximum variation from true plane shall not exceed a/4 of specified joint width.

C. Variation from true plane to face surface shall not exceed 3/16" for thermal finish of moldings, washes and drips shall be constant in profile throughout their length in strict conformity with the details shown on approved shop drawings.

3.04 INSTALLATION:

A. General: Do not install cracked, broken or chipped granite exceeding ASTM allowances.

1. Granite pieces shall be bedded and jointed as shown on the approved shop drawings.
2. 3/8" for beds and joints of thermal finish granite. All mortar joints between stones should be thoroughly filled. The front 1/2" should be filled with pointing mortar after the setting bed has set. Tool a concave mortar joint.
3. Place an adequate number of lead pads or plastic buttons in the horizontal joint under heavy stones in order to sustain weight until mortar has set.
4. Prevent physical contact between back face of stone and concrete slabs and steel beams. Maximum variation of backs of granite shall be:

   1/4" on pieces up to modular 2" thick

   3/8" on pieces up to modular 2" to 3" thick

   1/2" on pieces up to modular 3" thick or more

   Sawn back shall be cleared of all rust stains and free of iron particles.
5. Dowel pins should not be embedded solidly when installed through a relieving angle at an expansion joint. Compressible materials should be installed at the base of the dowel pin holes to allow for thermal expansion of the granite.
6. Cavity wall should be kept clear of mortar droppings during construction.
7. Holes and sinkages for anchors, cramps and dowels shall be provided in accordance with approved shop drawings. Holes for other purposes shall be provided only when specifically shown on contract drawings. Fill all holes to prevent water traps.

B. Protection of the Work

1. Protect all cornices, ledges and offsets from mortar drippings or other damage during construction with wood covers and galvanized nails in mortar joints for support.
2. Remove misplaced mortar or grout immediately.
3. Do not permit wash from concrete floors or scaffolding to run down onto or behind walls.
4. Provide protection at all the corners and jambs from damage throughout the duration of construction.

C. Weather

1. Granite shall not be assembled when stone temperatures and surrounding air temperatures are below 50°F or above 95°F. Assembly of units below 50°F is permitted when the temperature of the stone units and the adhesive is raised by artificial heating to a temperature of 50°F. After the units have been joined, artificial heat should continue to be applied to the stone adjacent to the joint area to give the adhesive the curing temperature above 50°F. The contractor shall protect the granite from harm during the cold weather. No calcium chloride or accelerators may be permitted in mortar mix. If stone is set in cold weather construction follow recommendations of International Masonry Industry All Weather Council.
2. Adequately cover all work at the end of the work period during showers or storms and when so covered keep at least 50°F for at least 72 hours.
3. With wind velocities over 15 mph provide wind breaks.
4. Do not install granite pieces having a film of frost on its surface and do not build on any frozen work. Such work shall be required to be removed and rebuilt.

D. Setting

1. Each piece shall be carefully bedded in a full bed of mortar and tapped home with a rawhide mallet to a full and solid bearing.
2. Particular care shall be exercised to equalize bed and joint openings and eliminate the need for redressing of exposed surfaces. Exposed surfaces shall be kept free of mortar at all times.

3. Except at expansion joints shown on the approved shop drawings, all joints and beds shall be completely filled, then raked out to a depth of not less than 3/4", and every precaution shall be taken to prevent direct bearing contact between pieces.
4. Granite facing shall in no case be built up more than two courses above the backing and no piece having a greater bed width that the one below it shall be set until the lower course is backed up. Sills and other pieces subject to uneven pressure shall be bedded at their ends only.
5. Cavity Wall Construction: Where open space between back of stone units and back up or framing is shown, keep cavity open; do not fill with mortar or grout.
    1. Back parge stone wall units with non-staining cement mortar not more than 1/2" thick. Add specified moisture retardant additive to mortar mix in amount equal to not more than 3% of cement weight.
6. Grouted Construction: Where space between back of stone wall units and back up or framing is shown to be grouted, fill open space solidly with non-staining grout. Pour grout in lifts and rod to eliminate voids, allowing each pour to set enough to carry weight of next pour. Exercise care to prevent displacement of stone units during grouting operation.
7. Projecting Courses: Do not set until mortar in courses below has hardened sufficiently to prevent extrusion. Support projecting stone units until wall above is set.
8. Joints: Butter vertical joints for full width before setting and set units in full bed of mortar, unless otherwise indicated.
    a. Rake out joints 3/4" deep before mortar sets to allow for mortar pointing. Clean face of stone after raking. After mortar is set, wet raked joints thoroughly and force pointing mortar into joints. Tool to profile shown or, if not shown, tool slightly concave. Provide pointing mortar using specified materials to match Architect's sample.
    b. Rake out joints before mortar is set to allow for sealant pointing as shown. Refer to SECTION 07900 for backer rod and sealant.
    c. Where joints are shown to be set on shims without mortar, provide quantity of shims required to maintain uniform joint width and alignment of stone units. Sealing joints is specified under SECTION 07900.

E. Anchorage: All granite shall be anchored and/or doweled as shown on approved shop drawings and the anchors, dowels, etc. being inserted with non-expanding filler in holes provided in granite.

F. Pointing and Cleaning

a. Except where otherwise specified all joints and beds previously raked, shall be brushed clean and pointed with mortar to a flat cut joint. When thumb print hard, the joints shall be tooled with a round joiner having a diameter of 1/8" larger than the width of the joint.

b. All open beds and joints, such as under sills, shall be pointed for a depth of at least one inch.

c. At special locations where directed the joints and beds shall be pointed and finished as the setting progresses.

d. After being pointed, the granite work shall be carefully cleaned starting at the top, removing all dirt, excess mortar stains and other defacements.

e. Stainless steel wire brushes or wool may be used but the use of other wire brushes or of acid or other solutions which cause discoloration is expressly prohibited.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Exterior Stone Cladding will be measured by the lump sum and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Exterior Stone Cladding shall be full compensation for all labor, materials, incidentals, and

equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Exterior Stone Cladding will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Architectural	Lump Sum

END OF SECTION

SECTION 05 12 23 – STRUCTURAL STEEL FOR BUILDINGS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 504 – STRUCTURAL STEEL, with the following modifications:

MODIFICATIONS:

504.01 Description

The first paragraph is deleted and replaced with the following paragraph:

This work shall consist of detailing, fabricating, and erecting structural steel members and other ancillary steel components including the metal wall panels, flashing and trim for the structural support of the roof truss at Panel 5 at the remaining edge of the Maintenance Building. To the greatest extent possible, structural steel, metal wall panels, flashing, and trim shall be salvaged from Panel 16 at the western end of the Terminal Building prior to installation, and then installed at Panel 5. Structural steel material which may be salvaged includes steel columns, plates, tie-rods, wall panels, flashing, trim, and miscellaneous connections.

504.02 Materials

This Subsection is deleted and replaced with the following:

Structural steel for buildings shall conform to the requirements of ASTM A36.

High-strength steel bolts shall conform to the requirements of ASTM A325, Type 1.

504.645 Method of Measurement

The following paragraphs are added:

Structural Steel Erection for Modifications shall include all labor, equipment, and materials necessary to install reinforced concrete base, anchorage connection, temporary truss support, and miscellaneous materials to satisfactorily complete the modification work.

Removal and disposal of the timber deck boards is not included in this measurement but rather shall be incidental to the respective timber deck pay item.

Removal and storage of the existing steel material at Panel 16 of the IMT Building is not included in this measurement but rather shall be incidental to the Removing Building – International Marine Terminal Pay Item.

504.65 Basis of Payment

The second paragraph is deleted and replaced with the following:

Structural Steel Erection for Modifications will be paid for at the Contract lump sum price and shall include all labor, equipment, and materials to satisfactorily complete the modification work from the stored materials.

Payment will be made under the following Pay Item:

Pay Item		Pay Unit
504.810	Structural Steel Erection for Modifications	Lump Sum

END OF SECTION

SECTION 05 12 24 – MISCELLANEOUS STRUCTURAL STEEL

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 504 – STRUCTURAL STEEL, with the following modifications:

MODIFICATIONS:

504.01 Description

The first paragraph is deleted and replace with the following paragraph:

This work shall consist of detailing, fabricating, and erecting miscellaneous structural steel members and other ancillary steel components for the reefer plug unit support frames to be installed adjacent to the RUBB Building. Miscellaneous structural steel and connection hardware shall be hot dipped galvanized prior to installation. Touch up to the galvanized coating shall be applied upon completion of all welds and connections.

504.02 Materials

This Subsection is deleted and replaced with the following:

Structural steel for buildings shall conform to the requirements of ASTM A36.

High-strength steel bolts shall conform to the requirements of ASTM A325, Type 1.

504.649 Method of Measurement

The following paragraph is added:

Steel Reefer Unit Frames and Installation shall include all final bolted connections between the actual reefer units (currently stored in the adjacent RUBB Building) and the proposed fabricated steel frame, as well as the electrical hookups of the reefer units upon completion of the frame and reefer unit installation. The electrical conduit and wiring for the reefer units shall be measured separately under their respective pay items.

504.65 Basis of Payment

This Subsection is deleted and replaced with the following:

Steel Reefer Unit Frames and Installation will be paid for at a lump sum price for the respective contract items listed below, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

Payment will be made under the following Pay Item:

Pay Item	Pay Unit
504.8210 Steel Reefer Unit Frames and Installation	Lump Sum

END OF SECTION

SECTION 05 58 13 – METAL COLUMN COVERS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

805.5813 Metal Column Covers

Add the following:

PART 1-GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. This section includes Metal Column Covers as shown on drawings.

B. Related Sections include the following:

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Manufacturer's Literature and Data:

1. Product Data: Submit manufacturer's technical data and brochures for each type of column cover required.

B. Shop Drawings:

1. Shop drawings shall show dimensions, sizes, thickness, alloys, tempers, finishes, joining, attachments, and relationship of adjoining work.

C. Samples:

1. Samples shall include 5" x 7" piece of each type of metal and finish as specified.

D. Certification: Submit certificates from manufacturer of panels attesting that products comply with specified requirements including finish as specified.

E. Qualification Data:

1. Firms specified in "Quality Assurance" Article must demonstrate their capabilities and experience by including lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.04 QUALITY ASSURANCE

A. Manufacturer: Firm with manufacturing and delivery capacity required for the project, shall have successfully completed at least ten projects within the past five years, utilizing systems, materials and techniques as herein specified.

B. Fabricator must own and operate its own manufacturing facilities for all metal components. "Stick Built" or "Kit of Parts Systems" consisting of components from a variety of manufacturers will not be considered or accepted.

C. Manufacturer/Fabricator must own and operate its own Painting and Finishing facility to assure single source responsibility and quality control.

1.05 DELIVERY, STORAGE & HANDLING: All material shall be protected during fabrication, shipment, site storage and erection to prevent damage to the finished work from other trades. Store wall panels inside a well-ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Millenium Column Covers manufactured by Gordon Interior Specialties Division, Gordon, Inc., 5023 Hazel Jones Road, Bossier City, LA 71111, (800) 747-8954, Fax (800) 877-8746, www.gordoninteriors.com, sales@gordoninteriors.com.

B. The listed manufacturer shall not be construed as closing specifications to other prospective manufacturers, but rather as establishing a level of quality in a metal system.

2.02 MATERIALS

A. Metal Column Covers shall be a complete system. All secondary posts, anchors, clips and extrusions are to be provided as indicated per shop drawings. No exposed fasteners are allowed.

B. General: Provide metals free from surface blemishes where exposed to view in finished unit. Surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable. All metal shall be of the highest grade, commercial type.

C. Material shall be the following: Aluminum, 3003-H14, minimum .063" (14 Gauge) thickness [ASTM B 209 (ASTM B 209M)]

2.03 FABRICATION

A. Height of Column Covers shall be up to 10'-0" without horizontal joints.

B. Column Covers shall have either a butt joint, snap-in tee joint, horizontal reveal joint, or vertical reveal joint, as shown on the architectural drawings. All other details including base and ceiling details shall be fabricated in accordance with the architectural drawings.

C. Column Covers shall be manufactured true to geometry as shown on plan view of the architectural drawings with manufacturing tolerances.

1. Covers shall be fabricated with concealed return flanges, factory welded to covers at the vertical joints for structural strength. Each column cover shall be reinforced at the top and bottom with gussets.

2. Engagement clips shall be provided and factory attached to the column covers at specified intervals to allow for complete accessibility without tools or exposed fasteners. A clearance of ¾" is required at the top for installation.

3. In those cases where access is restricted to authorized personnel, a locking method at the top will be provided.

4. All covers shall be removable, demountable, and re-usable without exposed fasteners.

2.04 FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

C. Factory applied High Performance Powder Coat finish.

1. All Column Covers shall receive a micro-etched pretreatment prior to receiving an electrostatically applied High Performance Powder Coat finish.

2. All exposed surfaces must be coated. Finish shall be cured and oven baked to insure paint adhesion and uniform surface hardness.

3. Paint to be selected from standard colors (or approved custom color).

D. High Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited

chemicals; Chemical finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.

1. Fluoropolymer Coating System: Manufacturer's standard 2, 3, or 4 -coat thermo-cured system composed of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70% polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
2. Aluminum shall receive a factory applied and baked finish of 70% polyvinylidene fluoropolymer (PVDF) resin (Kynar or Hylar) OR If aluminum is to be field painted (Floated System), it should receive a factory-applied primer paint pre-treatment in Gordon Standard White (VX-132):
    a. Kynar is a registered trademark of ATOFINA.
    b. Hylar 5000 is a registered trademark of Ausimont Montedison Group.
3. Color & Gloss: To match metal siding color

E. Apply finish to exposed surfaces of Column Covers after fabrication.

PART 3-EXECUTION

3.01 INSTALLATION

A. Install Column Covers in accordance with manufacturer's written installation instructions and shop drawings.

B. Column Covers shall be erected plumb, level, square, true to line, securely anchored, and in proper alignment and relationship to work of other trades. Exterior joints are to be sealed by installer with backer rods and sealant.

C. Column Covers shall be inspected before installation to be free from dents, scratches, and other defects.

3.02 CLEANING

A. Removal of protective covering shall occur immediately after installation to prevent adhesive transfer.

B. Clean all surfaces following installation.

C. Maintenance per manufacturer's finish maintenance instructions.

3.03 PROTECTION

A. Protection of column covers from damage by other trades after installation to be provided by general contractor.

3.04 GENERAL RESPONSIBILITY

A. Variation from specification: Any variation from this specification resulting in additional cost to any other contractor or subcontractor on this project shall be the sole financial responsibility of the contractor for the work of this section.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Metal Column Covers will be measured by the lump sum and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Metal Column Covers shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Metal Column Covers will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Architectural	Lump Sum

END OF SECTION

SECTION 06 10 00 – ROUGH CARPENTRY

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

806.1000 Rough Carpentry

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, and without limiting the generality thereof furnish and install the following:

1. Wood framing, including joists, rafters, outriggers, scab-ons, headers, stringers, posts, studs, plates, truss bracing and similar members.
2. Wood grounds, nailers, blocking and sleepers.
3. Wood furring.
4. Wall sheathing and underlayment.
5. Miscellaneous carpentry as indicated or required and not specified under other Sections of the Specifications.
6. Fasteners and accessories as indicated and required for rough carpentry.
7. Treated wood as specified.

B. Related Work Specified Elsewhere:

1. Finish carpentry: Section 06 20 00.
2. Structural Insulated Panels: Section 06 12 00.
3. Gypsum wall sheathing: Division 9
4. Underlayments: Division 7
5. Furnishing and installing of doors and frames: Division 8.

1.03 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1. International Building Code, 2009 Edition – International Code Council
2. ANSI/AF&PA (American Forest & Paper Association) – NDS National Design Specification for Wood Construction – Latest Edition

3. AHA (American Hardboard Association) A135.4 – Basic Hardboard.
4. ALSC (American Lumber Standards Committee) – Softwood Lumber Standards.
5. ANSI A208.1 – Mat-Formed Wood Particleboard.
6. APA (American Plywood Association).
7. AWPA (American Wood Preservers Association) C1-All Timber Products – Preservative Treatment by Pressure Process.
8. AWPA (American Wood Preservers Association) C20-Structural Lumber Fire Retardant Treatment by Pressure Process.
9. NELMA (New England Lumber Manufacturer's Association).
10. NLGA (National Lumber Grades Authority)
11. NIST (National Institute of Standards and Technology, U. S. Department of Commerce [DOC])
12. NFPA (National Forest Products Association)
13. NFPA (National Fire Protection Association)
14. SPIB (Southern Pine Inspection Bureau).
15. WCLIB (West Coast Lumber Inspection Bureau).
16. WWPA (Western Wood Products Association).
17. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Lumber shall be supplied in accordance with the following agencies:
1. Lumber Grading Agency: Certified by NLGA for structural framing.
2. Sheathing Grading Agency: Certified by APA or ICBO approved certification agency. For non-APA rated plywood, provide ICC ES Evaluation report.
3. Grading stamp shall be on lumber and plywood.
4. Submit manufacturer's certificate certifying that products meet or exceed specified requirements.

C. Panelized/Prefabrication plant inspection: Prefabrication plant is subject to plant inspection completed by the Engineer-of-Record or an approved Third Party Inspection Agency. Inspections shall be performed at the Contractor's expense. Plant inspection does not relieve the Contractor of the obligation to perform work in accordance with the Construction Documents or from implementing their own shop and field quality control program.

1.04 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. Incomplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in sections Division 1have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

H. Electronic Submittals:

1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.

2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.

3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Adobe Acrobat Professional version 7.0 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.

4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.

5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

I. Panelized Construction Fabrication and Erection Drawings: If the contractor elects to use prefabricated wall, floor and/or roof panels, the panels shall meet or exceed the framing indicated in the construction documents, and applicable code requirements. Review by Engineer is for structural elements only; dimensional review is specifically excluded for this scope. Contractor remains solely responsible for proper fit-up of panels. Shop drawings shall include the following:

1. Framing layouts for all panel assemblies as required to completely describe panel construction.

2. Identification of all framing, sheathing and connection components

3. Sheathing Lap Details

4. Fastener patterns, spacing, length, diameter and finish for all prefabricated panels including framing and sheathing conditions.

5. Field fastening and construction details

6. Alternate framing connections that vary from design documents shall be submitted to the Engineer for approval prior to preparation of the shop drawings. Acceptance of alternate framing connections is subject to Engineer's review based on to project condition. Contractor is responsible to provide as-detailed conditions if alternate connections are not accepted.

J. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards). Product data shall include ICC/ICBO Evaluation Reports indicating conformance to standards specified here within.

1. Engineered Wood Products

2. Pressure Treated Lumber

3. Sheathing
4. Samples of Exposed to View Wood Members: Submit two samples, 6 inches long, illustrating wood grain, stain, and finish.
5. Hangers, Hardware and Accessories

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Protect materials from warping or other distortion by stacking to resist movement.

B. Follow manufacturer's recommendations for storage of Engineered Wood Products and connection hardware.

PART 2 - PRODUCTS

2.01 LUMBER MATERIALS

A. Lumber, General: Factory-mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.

B. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide seasoned lumber with 19% maximum moisture content at time of dressing.

C. For structural framing (4" and wider and from 2" to 4" thick), provide the following grade and species:

1. Spruce-Pine-Fir (SPF) #1/2 or better, NLGA Graded, unless noted otherwise on Structural Drawings,. Minimum Design Stresses:
   a. Fb: 875 psi
   b. Ft: 450 psi
   c. Fv: 135 psi
   d. $F_{c\perp}$: 425 psi
   e. Fc: 1,150 psi
   f. E: 1,400,000 psi
2. Pressure treated lumber: Southern Yellow Pine #2 or better. Minimum Design Stresses:
   a. Fb: 1,300 psi
   b. Ft: 775 psi
   c. Fv: 175 psi
   d. $F_{c\perp}$: 565 psi
   e. Fc: 1,650 psi
   f. E: 1,400,000 psi
3. See structural drawings for grades and bending stress at specific locations.

D. Miscellaneous Lumber: Provide wood for support or attachment of other work including cant strips, bucks, nails, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:

1. Moisture content: 19% maximum for lumber items not specified to receive wood preservative treatment.
2. Grade: Construction Grade light framing size lumber of any species or board size lumber as required. Provide construction grade boards (NELMA, NLGA or WCLB) or No.2 boards (SPIB, NLGA, NELMA, or WWPA).

2.02 SHEATHING LOCATIONS

A. Wall Sheathing: NIST/DOC PS-1 or PS-2 rated, Exposure 1, 1/2 inch thick, 48 x 96 inch sized sheets, square edges.

B. Wall Sheathing at Shear Walls: DOC PS-1 or PS-2 rated, Exposure 1, 48 x 96 inch sheets, square edges, unless noted otherwise.

C. Thicknesses indicated are nominal.

D. Sheathing shall be stamped with grading agency stamp

E. Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels where required per Code requirements. Paint as required by electrical code.

2.03 ENGINEERED WOOD PRODUCTS

A. General: Provide engineered wood products acceptable to authorities having jurisdiction and for which, current model code research or evaluation reports exist that evidence compliance with building code in effect for Project. Provide depths and widths as indicated.

1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2. Source and Species: Unless otherwise indicated, lumber sources in Engineered Wood Products shall be of single source and species.

3. Adhesives shall be exterior type, complying with ASTM D2559.

4. Substitutions: Substitutions of Engineered Wood Products other than those specified will be permitted only with written certification from the manufacturer that the substituted items "meets or exceeds" all properties of the specified product, including engineering, serviceability, aesthetic and durability characteristics. Substitutions shall not be made without written approval of the Architect and Engineer.

B. Laminated-Veneer Lumber (LVL): Lumber manufactured by laminating wood veneers in a continuous press using an exterior-type adhesive complying with ASTM D *2559* to produce members with grain of veneers parallel to their lengths and complying with the following requirements:

C. Boise Cascade F_b = 3080 psi, E = $2.0x10^6$

D. I-Level: F_b = 2600 psi, E = $1.9x10^6$

E. Parallel-Strand Lumber (PSL): Lumber manufactured by laying up wood strands using an exterior-type adhesive complying with ASTM D 2559, and cured under pressure to produce members with grain of strands parallel to their lengths and complying with the following requirements:

F. I-Level : Fc_{ll} = 2,900 psi, , F_b=2900 psi, E = 2.0 x 10^6

2.04 ACCESSORIES

A. Fasteners, Anchors, Connectors and Hardware:

1. Fasteners (for wood framing): Nail fasteners shall meet requirements of ASTM F1667. Unless noted otherwise, nails referenced on drawings are to be Common Nails with dimensions as follows:
   a. 6d: 2" long by 0.113" diameter shank with 0.266" diameter head
   b. 8d: 2 1/2" long by 0.131" diameter shank with 0.281" diameter head
   c. 10d: 3" long by 0.148" diameter shank with 0.312" diameter head
   d. 12d: 3 1/4" long by 0.148" diameter shank with 0.312" diameter head
   e. 16d: 3 1/2" long by 0.162" diameter shank with 0.344" diameter head
   f. 20d: 4" long by 0.192" diameter shank with 0.406" diameter head
   g. 30d: 4 1/2" long by 0.207" diameter shank with 0.438" diameter head

2. Anchor Bolts: ASTM A307 headed and SSTB Anchor Bolts by Simpson StrongTie, unless noted otherwise. "J" or "L" type anchor bolts shall not be substituted.

3. Screw fasteners (where indicated on drawings or required to install connection hardware):
   a. SD & SDS Screws by Simpson Strong Tie
   b. RSS Screws by GRK Fasteners, (800) 263-0463
   c. Timberlok Screws by Fasten Master.
   d. Wood Screws: ANSI/ASME Standard B18.6.1

4. Lag Screws: ANSI/ASME Standard B18.2.1. Provide lead hole per NDS Chapter 11.
5. Through Bolts: ANSI/ASME Standard B18.2.1:
   a. Holes for through bolts shall be a minimum of 1/32nd and a maximum of 1/16th larger than bolt diameter.
   b. A standard cut washer shall be provided between the wood and bolt head, and wood and nut, unless noted otherwise.

B. Structural Framing Connectors, Hardware or Joist Hangers: As indicated on the drawings or sized to suit framing conditions, manufactured by Simpson or approved alternate.

1. Unless noted, fill all nail holes to achieve manufacturer's maximum reaction rating.
2. Use nail diameter and length as specified by connector manufacturer. Substitutions of pneumatic nails or "joist hanger" (non standard length) nails shall not be made without written authorization of the Engineer.

C. Construction Adhesive: APA AFG-01, approved for use with type of construction panel indicated by both adhesive and panel manufacturer.

D. ALL ANCHORS, CONNECTORS AND FASTENERS IN CONTACT WITH PRESSURE TREATED LUMBER, AND/OR AT EXTERIOR EXPOSURE SHALL HAVE COATINGS AS FOLLOWS, UNLESS NOTED OTHERWISE:

1. Anchor Bolts/Bolts/Lag Bolts: Hot Dipped Galvanized, ASTM A123
2. Connection Hardware, unless otherwise noted: Simpson Strongtie Z-Max (G185 per ASTM A653) or Hot Dipped Galvanized (HDG, ASTM A123). Use hot dipped galvanized fasteners, ASTM A153 with these hangers.
3. Nails and Fasteners, unless otherwise noted: Hot Dipped Galvanized, ASTM A153. Use type 304 or 316 stainless steel fasteners with stainless hardware
4. Proprietary coatings used in conjunction with pressure treated fastener coatings will be permitted with written permission from the Architect and Engineer.

2.05 FACTORY WOOD TREATMENT

A. PRESSURE TREATED LUMBER (P. T.)

1. Wood Preservative (Pressure Treatment): AWPA Treatment, ACQ-C (amine formulated), ACQ-D or CA-B, ammonia free.
2. The use of ACZA and CCA treated lumber is strictly prohibited.
3. Retention:
   a. Above Ground Use: ACQ: 0.25 pcf, CA-B: 0.10 pcf
   b. Ground Contact Use: ACQ: 0.40 pcf, CA-B: 0.21 pcf.
4. See Section the "Fasteners, Anchors, Connectors and Hardware" portion of this specification for fastener, anchor and hardware requirements for use with pressure treated lumber.
5. Pressure treated lumber shall not contain ammonia unless authorized by the Architect and Engineer. Ammonia content shall be verified with the Pressure Treatment manufacturer.

PART 3 - EXECUTION

3.01 PREFABRICATED CONSTRUCTION REQUIREMENTS (PANELIZED CONSTRUCTION, CONSTRUCTED OFF-SITE)

A. Prefabrication shall not commence until shop drawings have been approved by the Engineer and Architect.

B. Panels shall meet or exceed the framing designed in the construction documents, and applicable code requirements.

C. Framing shall not be drilled, notched or cut for any reason without prior written approval from the Structural

Engineer (ie. passage of wiring, piping).

D. Quality Assurance Requirements:

1. Panelized/Prefabrication plant inspection: Prefabrication plant is subject to plant inspection completed by the Engineer-of-Record or an approved Third Party Inspection Agency prior to shipment to the jobsite. Inspections shall be performed at the Contractor's expense. Plant inspection does not relieve the Contractor of the obligation to perform work in accordance with the Construction Documents or from implementing their own shop and field quality control program.
2. Panel sheathing shall not be covered with air barrier (Typar, Tyvek, Construction Paper, etc) prior to shipment and until visual inspection by Engineer is complete.
3. Wall panels shall be constructed utilizing results of an as-built foundation survey to ensure that wall panels fit up correctly on foundation. Employ a Registered Land Surveyor to determine elevations and locations of concrete bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect and Structural Engineer. Do not proceed with erection until corrections have been made, or until compensating adjustments to prefabricated wood construction have been approved by Structural Engineer of Record. Additional surveys required to verify out-of-alignment work and/or corrective work shall be performed at the contractor's expense.
4. Fasteners into sheathing and framing shall not be overdriven. Head of fastener shall be flush with surface of member being fastened. Maximum indentation tolerance from flush shall be 1/16 inch.

E. Wall Framing Requirements:.

1. Wall panels shall be constructed to provide full bearing of panel bottom plate to supporting structure.
2. Construct wall panels to allow for field placement of top-most top plate to ensure overlapping of all joints

F. Sheathing Requirements:

1. All horizontal joints in plywood sheathing shall be blocked with full-depth blocking.
2. Attach adjacent panels together by overlapping sheathing a minimum of 1 ½" and fastening with approved fasteners specified.

3.02 FRAMING

A. Set members level and plumb, in correct position.

B. Unless noted otherwise, wall top plates shall be doubled. Install top plates with overlapping corners and at intersections with adjoining partitions. End joints in double top plates shall be offset at least 48 inches.

C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Place horizontal members, crown side up.

E. Construct load bearing framing members full length without splices.

F. Double members at openings over 24 inches wide and as indicated. Space short studs over and under opening to stud spacing.

G. Posts and columns shall be blocked at roof levels with framing matching or exceeding post dimensions down to supporting foundation.

H. Place sill gasket directly on cementitious foundation. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

I. Coordinate installation of structural insulated panels.

J. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

K. Coordinate curb installation with installation of decking and support of deck openings, and roofing vapor retardant.

L. Rough Carpentry Fastening Schedule: Unless otherwise indicated on the drawings, provide minimum nailing and fastening per IBC Table 2304.9.1.

3.03 SHEATHING

A. Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered.

B. Install telephone and electrical panel backboards with plywood sheathing material where required. Size as indicated, 6 inch larger than panel space required or per local Code requirements.

3.04 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Fasteners Driving Tolerance: Unless noted otherwise, fastener heads shall be driven flush with attached framing member or sheathing. Maximum indentation tolerance from flush shall be 1/16 inch.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Rough Carpentry will be measured by the lump sum and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Rough Carpentry shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Rough Carpentry will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

B. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Structural	Lump Sum

END OF SECTION

SECTION 06 12 00 – STRUCTURAL INSULATED PANELS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

806.1200 Structural Insulated Panels

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, and without limiting the generality thereof furnish and install the following:

1. Structural insulated panels consisting of oriented strand board (OSB) laminated with structural adhesives to a termite resistant EPS insulation core, a EPA registered treatment for mold, mildew, and termites, and SIP Manufacturer supplied connecting splines, sealants, and SIP screws

B. Related Work Specified Elsewhere:

1. Rough carpentry: Section 06 10 00.

2. Acoustical ceilings: Section 09 51 13

1.03 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1. International Building Code, 2009 Edition – International Code Council

2. ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

3. DOC PS2 – Performance Standard for Wood-based Structural-Use Panels.

4. ICC ES AC04 – Acceptance Criteria for Sandwich Panels.

5. ICC ES AC05 – Acceptance Criteria for Sandwich Panel Adhesives.

6. ICC ES AC12 – Acceptance Criteria for Foam Plastic Insulation.

7. ICC ES AC239 – Acceptance Criteria for Termite-Resistant Foam Plastics.

8. AWPA E1 - Standard Method for Laboratory Evaluation to Determine Resistance to Subterranean Termites.

9. AWPA E12- Standard Method of Determining Corrosion of Metal in Contact with Treated Wood.

10. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

11. EPA - Registered products listing.

12. “Code of Federal Regulations, Part 1926” per the Occupational Safety and Health Administration

(OSHA), Department of Labor (Latest Revision).

1.04 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. Incomplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in sections Division 1have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

1. Electronic Submittals:

2. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.

3. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.

4. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Adobe Acrobat Professional version 7.0 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.

5. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.

6. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

H. Product Data: Submit product data for specified products.

1. SIP Code Compliance: Provide ICC ES code report for SIP with evidence of compliance with code requirements as an alternate method of construction. Submit current compliance report number from ICC ES showing conformance to the International Building Code (IBC) and International Residential Code (IRC). Code report shall include compliance with ICC ES AC04 (Sandwich Panels) dated May 2006.

2. EPS Code Compliance: Provide ICC ES code report for EPS foam with evidence of compliance with code. Submit current compliance report numbers from ICC ES with conformance to the International Building Code (IBC) and International Residential Code (IRC). Code report shall include compliance with ICC ES AC12 (Foam Plastic) dated June 2006 and ICC ES AC239 (Termite-Resistance) dated June 2008.

3. Manufacturer's Instructions: SIP Manufacturer's Construction Manual and load design charts.

I. Shop Drawings: Submit shop drawings for SIPs showing layout, elevations, product components and accessories.

J. Quality Assurance Submittals: Submit the following:

1. Certificate: Product certificate showing compliance to Third Party Quality Control program of PFS Corp.

K. Fire Resistant Assemblies: PFS construction number for each fire-rated assembly

L. Warranty: Warranty documents specified herein.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Ordering: Comply with SIP manufacturer ordering instructions and lead time requirements to avoid construction delays.

B. Delivery: Deliver materials from SIP manufacturer with identification labels or markings intact.

C. Off-load SIPs from truck and handle using fork lift or other means to prevent damage to SIPs.

D. SIPs shall be fully supported in storage and prevented from contact with the ground. Stack SIPs on pallets or a minimum of three stickers for every 8 feet of SIP length.

E. SIPs shall be fully protected from weather. Protect against exposure to rain, water, dirt, mud, and other residue that may affect SIP performance. Cover stored SIPs with breathable protective wraps. SIPs shall be stored in a protected area.

PART 2 - PRODUCTS

2.01 MATERIALS

A. 6 ½" R-Control SIP with insulated I-Beam spline manufactured by Branch River Plastics, Inc., 15 Thurber Boulevard, Smithfield, RI 02917, rated for 79 psf at 12'-0" span and maintaining a deflection of L/240 or less.

B. SIPs consisting of the following:

1. UL certified EPS core with Perform Guard treatment, minimum of 0.95 pcf (15.2 kg/m^3) complying with ASTM C578 Type I and having ICC ES recognition of termite resistance. Insulation manufacturer shall provide Third Party UL certificate. ICC ES report shall be provided for recognition of termite resistance in compliance with ICC AC239.

2. OSB identified with APA or TECO performance mark with Exposure I durability rating and performance in accordance with DOC PS-2 span rating 24/16 or greater.

3. Adhesives shall be in conformance with ICC ES AC05 – Acceptance Criteria for Sandwich Panel Adhesives

4. FrameGuard treatment for mold, mildew, and termite resistance meeting the following requirements:
   a. Registered with EPA.
   b. Mold growth: 0 rating, tested to ASTM D3273 for 8 weeks at 77 degrees F and 100 percent relative humidity.
   c. Termite resistance: Minimum rating of 7.0, tested to AWPA E-1.
   d. Corrosion potential for metals in contact with treated wood: Maximum 2 mils per year, tested to

AWPA E12 for minimum of 60 days on aluminum 2024, carbon steel, hot-dip galvanized steel, and G90 galvanized steel.

e. Equivalent lateral resistance and tooth holding capacity as untreated wood.

2.02 ACCESSORIES

A. Splines: Insulated I-beam for use in joining SIPs shall be supplied by SIPs manufacturer.

B. Fasteners: corrosion resistant SIP screws compatible with SIP system shall be provided by the SIPs manufacturer.

1. Wood Screws for attachment to wood members

C. SIP Sealant: Shall be specifically designed for use with SIPs. Sealant must be compatible with all components of the SIP. Sealant shall be provided by the SIP manufacturer.

D. Dimensional Lumber: SPF, #2 or better, or engineered equivalent unless otherwise required by structural drawings.

E. Vapor Barrier SIP Tape: 40 mil thick, butyl adhesive suitable for indoor use, min. 6 inch wide for use on SIP joints as specified by designer. SIP Tape shall be supplied by the SIP manufacturer.

2.03 SOURCE QUALITY

A. Source Quality Assurance: Each SIP component required shall be supplied by SIP manufacturer and shall be obtained from selected SIP manufacturer or its approved supplier.

1. Each SIP shall be labeled indicating PFS Third Party certification.

2. Provide evidence of UL Third Party inspection and labeling of all insulation used in manufacture of SIPs.

3. SIP manufacturer shall provide Lamination, R-Value and mold/mildew/termite resistance warranty documents for building owner acceptance. Manufacturer standard forms will be submitted.

4. Provide SIPs with Foam-Control EPS with Perform Guard for termite resistance. Treatment shall be EPA registered with treatment efficacy substantiated by ICC ES report.

5. Provide SIPs with FrameGuard treatment for mold, mildew, and termite resistance. Treatment shall be EPA registered with treatment efficacy substantiated by independent research.

6. Dimensional Tolerance - shall comply with values listed in the manufacturer's Quality Control Manual.

B. Source Quality: Obtain SIPs from a single manufacturer.

2.04 FABRICATION

A. Sizes: SIPs shall be fabricated in accordance with approved Shop Drawings

B. Thermal Resistance, R-value

1. 6 1/2" (165 mm) thick SIP with R-value of 23 at 75^{o}F (24 at 40^{o}F)

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's ICC ES report, Load Design Charts, Construction Manual, Shop Drawings, and product data, including product technical bulletins, for installation.

B. Plans shall be reviewed by a qualified architect/engineer and shall be signed and/or sealed. Deviations from standard detail and load design values shall be calculated and signed and/or sealed by a qualified architect/engineer.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

1. Verify conditions of foundation/structural system/substrate and other conditions which affect installation of SIPs. Any adverse conditions shall be reported in writing. Do not proceed with installation until adverse

conditions are corrected.

3.03 INSTALLATION

A. SIP Installation:

1. SIP Supports: Provide level and square foundation/structural system/substrate that support wall and/or roof SIPs. For wall SIPs, hold sill plate back from edge of rim board 7/16" (11 mm) to allow full bearing of OSB skins. Provide 1 1/2" (38 mm) diameter access holes in plating to align with electrical wire chases in SIPs. Provide adequate bracing of SIPs during erection. Remove debris from plate area prior to SIP placement.

2. SIP Fastening: Connect SIPs by nails or staples as shown on drawings. Screws of equal strength may be substituted for nails and staples as specified by engineer. SIP sealant must be used together with each fastening techniques. Where SIP Screw Fasteners are used, provide a minimum of 1" (25.4 mm) penetration into support. Join SIPs using plates and splines. Secure attachment with nails, staples, or screws, and SIP sealant. Apply SIP sealant following SIP manufacturer recommendations.

3. SIP Tape: Provide SIP Tape at joints between SIP roof panels and at intersection of SIP roof and wall.

4. Vapor Retarders: Provide vapor retarders mandated by building code. Provide a vapor retarder, such as 6 mil (0.006") (0.15 mm) polyethylene on SIP applications which are connected using methods other than surface splines.

5. Thermal Barriers: Interior surfaces of SIPs shall be finished with a minimum 15-minute thermal barrier, such as 1/2" (13 mm) gypsum wallboard, nominal 1" (25 mm) wood paneling, or other approved materials. Apply code approved thermal barriers according to SIP manufacturer's recommendations.

6. Restrictions: Do not install SIPs directly on concrete. Do not put plumbing in SIPs without consulting SIP manufacturer. Do not overcut skins for field-cut openings and do not cut skins for electrical chases. SIPs shall be protected from exposure to solvents and their vapors that damage the EPS foam core.

7. Remove and replace insulated wall or roof SIPs which have become excessively wet or damaged before proceeding with installation of additional SIPs or other work.

3.04 PROTECTION

A. Protection: Protect installed product and finish surfaces from damage during construction.

1. Roof SIPs: Protect roof SIPs from weather by roofing materials to provide temporary protection at the end of the day or when rain or snow is imminent.

2. After installation, cover SIPs to prevent contact with water on each exposed SIP edges and faces.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Structural Insulated Panels will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Structural Insulated Panels shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Structural Insulated Panels will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Structural	Lump Sum

END OF SECTION

SECTION 06 15 19 – PIER TIMBERWORK

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 528 – STRUCTURAL TIMBER, with the following additions:

ADDITIONS:

Section 528.01 Structural Timber

Add the following:

PART 1 GENERAL

1.01 DESCRIPTION: This section applies to all necessary steps taken by the Contractor to comply with the pier timberwork requirements listed herein and in accordance with the drawings.

1.02 REFERENCES: The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

A. AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

AWPA C1 (2000)	All Timber Products – Preservative Treatment by Pressure Processes
AWPA C2 (2001)	Lumber, Timber, Bridge Ties, and Mine Ties – Preservative Treatment by Pressure Proc.
AWPA C18 (2003)	Standard for Pressure Treated Material in Marine Construction
AWPA M4 (2001)	Standard for the Care of Preservative-Treated Wood Products
AWPA M6 (1996)	Brands Used on Forest Products

1.03 DEFINITIONS:

A. Lumber: Dimensioned wood of any size which is standard dressed sawn cut S4S.

B. Timber: Lumber which has a minimum dimension of 5 inches in both width and thickness.

1.04 SUBMITTALS: Submit the following in accordance with Section 105.7, Working Drawings, of the State of Maine Department of Transportation Standard Specifications, Revision December 2002:

A. Preservative inspection test report

B. Delivery inspection list test report

C. MSDS and CIS Certificates

1.05 DELIVERY AND STORAGE: Untreated lumber material shall be open-stacked on skids at least 12 in. aboveground, in a manner that will prevent warping and allow shedding of water. Treated lumber material shall be close-stacked in a manner that will prevent long lumber from sagging or becoming crooked. Protect materials from weather. Handle treated lumber with ropes or chain slings without dropping, breaking outer fibers, bruising, or penetrating surface with tools. Do not use cant dogs, peaveys, hooks, or pike poles. Protect lumber and hardware from damage.

1.06 QUALITY ASSURANCE: All work specified herein shall conform to the following codes, specifications and standards, unless noted elsewhere:

A. Southern Pine Inspection Bureau (SPIB)

B. West Coast Lumber Inspection Bureau (WCLIB)

C. Western Wood Products Association (WWPA)

D. National Forest Products Association (NFPA)

E. American Society for Testing and Materials (ASTM)

F. State of Maine Building Code

G. American Institute of Timber Construction (AITC)

H. American Wood Preserver's Association (AWPA)

The Contractor shall submit for approval to the Owner and Engineer:

A. MSDS and CIS: Provide Material Safety Data Sheets (MSDS) and Consumer Information Sheets (CIS) associated with preservative treatment. Contractor shall comply with all safety precautions indicated on MSDS and CIS.

B. Preservative Inspection: Submit the inspection report of an independent inspection agency, for approval by the Resident, that offered products complying with applicable AWPA Standards. Identify treatment on each piece by the quality mark of an agency accredited by the Board of Review of the American Lumber Standard Committee.

C. Delivery Inspection List: Field inspect and submit a verification list of each treated timber member and each strapped bundle of treated lumber indicating the wording and lettering of the quality control markings, the species and the condition of the wood. Do not incorporated materials damaged in transport from plant to site. Inspect all preservative-treated lumber, visually to ensure there are no excessive residual materials or preservative deposits. Material shall be clean and dry or it will be rejected due to environmental concerns.

PART 2 PRODUCTS

2.01 MATERIALS

A. Lumber

1) Solid Sawn: Provide solid sawn lumber of stress rated No. 1 Southern Pine with a stress rating of 1200 psi or greater (flexural bending, Fb), and as graded by SPIB and with design values per NFPA National Design Specifications or equivalent. The association or independent inspection agency shall be certified by the Board of Review, American Lumber Standards Committee, to grade the species used. All lumber shall be new and standard dressed sawn (S4S) and as indicated by the nominal sizes on the plans.

B. Preservative Treatment: Fabricate timber before administering preservative treatment. Treated timber shall be branded by the producer in accordance with AWPA M6. Treat wood to be used in contact with salt water or salt water splash in accordance with AWPA C1, AWPA C2, AWPA C18, and AASHTO M-133 with water-borne preservative (CCA). Applications. Preservative retention shall be a minimum of 0.6 pcf. The Contractor shall be responsible for the quality of treated wood products.

C. Hardware: Bolts with necessary nuts and washers, nails, screws, spikes and other fasteners. All hardware fasteners shall be hot-dip galvanized steel conforming to the respective ASTM Standards and other requirements specified herein:

1) Machine bolts, eye bolts, nuts and screws shall conform to ASTM A 307.

2) Washers and steel brackets shall conform to ASTM A 36. Washers shall be round.

3) Galvanizing shall conform to ASTM A 123 and A 153 as applicable.

D. Sealing: A sealing compound for treatment of field cuts and drilled holes shall be two coats of copper naphthenate meeting AWPA Standard P8. All field cuts and drilled surfaces shall be treated with two coats of preservative containing copper napthanate solution (min. 2% metallic solution) per AWPA M4. Allow sufficient time after first treatment for preservative to soak-in and dry before second treatment is applied.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Decking: Replace decking in-kind. Unless otherwise indicated, lay lumber with heart side down and with 1/8 in. gap at joints. Provide pilot holes for spikes and fasten each deck member to the stringer with at least two spikes.

Provide spikes at least 4 in. longer than the thickness of the deck member. Place spikes at least 2-1/2 in. from edges of the deck member. Cut ends of lumber parallel to center line of stringer. Select lumber by thickness and lay so that adjacent members vary by less than 1/16 inch.

3.02 FIELD TREATMENT

A. Timberwork: Field treat cuts, bevels, notches, refacing and abrasions made in the field in treated timbers in accordance with AWPA M4, MSDS and CIS. Wood preservatives shall be applied according to applicable standards. Trim cuts and abrasions before field treatment. Paint depressions or openings around bolt holes, joints, or gaps including recesses formed by counter boring, with preservative treatment used for timber; and after bolt or screw is in place, fill with hot pitch or a bitumastic compound.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT:

A. Structural Timber will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in the Base Bid region shown on the Plans and in accordance with these Specifications. Base bid work includes approximately removal and disposal of the existing deck, and the purchase and installation of 650 sf of 1x4 decking and 60 sf of 3x8 decking; a region bounded by the seawall on the west and by a 25-ft length of chain link fence on the east, but which does not include removal of the chain link fence (see below).

B. Structural Timber Additional Decking will be measured by the lump sum, and shall include replacement of 1x4 and 3x8 decking material within the area identified on the Plans as Bid Alternate No. 2. Replacement shall include removal and disposal of existing decking, and the purchase and installation of new decking. The lump sum measurement shall also include removal and disposal of the remaining 25 ft of chain link fence atop the timber deck. The lump sum price shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work.

4.02 BASIS OF PAYMENT: Structural Timber will be paid for at the Contract lump sum price for the respective Contract items which shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

A. Payment will be made under the following Pay Item:

Pay Item		Pay Unit	
528.08	Structural Timber	Lump Sum	
528.601	Structural Timber Additional Decking	Lump Sum	(Bid Alternate No. 2)

END OF SECTION

SECTION 06 40 00 – ARCHITECTURAL WOODWORK

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

806.4000 Architectural Woodwork

Add the following:

PART 1 - GENERAL

1.01 GENERAL CONDITIONS The General Conditions, Supplementary General Conditions and all Sections of Division 1 shall apply to each and every contract and contractor, person or persons supplying material, labor or entering into the work directly or indirectly.

1.02 SCOPE This section includes all labor, materials, equipment and related services necessary for the fabrication, delivery and installation of the work shown on the drawings and or specified herein, including but not limited to the following:

A. Counters

B. Cabinets and Related Hardware

C. Adjustable and Fixed Shelving

D. Coat Pegs and Bench

E. Interior Running and Standing Trim

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Rough Carpentry	06 10 00
B. Flush Wood Doors	08 14 16
C. Interior Painting	09 91 23

1.04 STANDARDS: Except where otherwise noted, all millwork shall conform to, or exceed, the requirements of "Custom Grade" as established by "Quality Standards of the Architectural Woodworking Industry", as published by the American Woodworking Institute. Where conflicts occur between these standards and drawings or specifications, the more stringent requirements shall govern in each case.

1.05 SHOP DRAWINGS: Before fabrication of any millwork, the Contractor shall submit shop drawings for Architect's approval showing dimensions, hardware type and location, materials, details of assembly, relation to fixed construction of the building and any other items of millwork which relate to each other. No fabrication shall commence until shop drawings are approved.

1.06 QUALITY ASSURANCE:

A. General: It shall be the responsibility of the Millwork supplier to assure complete off site assembly of all items specified herein. All items should be ready for installation and should be planned for easy building entry. Where unit size prohibits easy entry, arrangements should be made with the Contractor so that there will be a minimum number of attachable sections for job reconnection.

B. Finish and Protection: All work should be fine sanded to remove all feather edges, glue smears, pencil and finger markings, and where necessary protected by a non staining paper.

C. Field Dimensions: It shall be the responsibility of the Millwork supplier to verify all dimensions in the field prior to fabrication. Any discrepancies which occur between field dimensions and delivered millwork shall be the responsibility of the Millwork supplier and shall be rectified at no cost to the General Contractor or the Owner.

1.07 PRODUCT HANDLING:

A. All Lumber: Shall be piled in a manner which ensures proper ventilation and drainage. It shall also be covered to protect it from the elements.

B. Millwork: Shall be protected against dampness during and after delivery. It shall be stored in well ventilated buildings and where not exposed to extreme changes in temperature and/or humidity.

PART 2 - PRODUCTS

2.01 WOOD TRIM

A. Birch Trim for Natural Finish shall be select White Birch, plain sawn, for transparent finish and shall be kiln dried to a moisture content not exceeding 12%.

2.03 INTERIOR ARCHITECTURAL WOODWORK

A. Plastic Laminate Countertops:

1. Grade: Premium, for all countertops.
2. Plastic Laminate Type: 0.050 in. thick; UL tested and labeled ratings of 25 for flame spread, 25 for fuel contributed and 100 for smoke developed when bonded to wood particle board.
3. Edging and Backsplashes: Solid Maple – clear finished unless otherwise indicated.
4. Core Material: Particle board for dry areas. Countertops with integral sinks shall have plywood core.
5. Sealant: Type as manufactured or recommended in writing by manufacturer of plastic laminate, color to match plastic laminate.
    a. Silicone Sealant: Mildew resistant type, formulated for pointing of tile, color to match the plastic laminate where feasible; or clear as directed by Architect.

B. Plastic Laminate Casework:

1. Grade: Custom.
2. Construction: Flush overlay or reveal overlay at Option of Installer.
3. Base Construction: Provide separate full ladder design subbase of Exterior Grade Plywood, high PVC molding channel around bottom of base, or snap in base with Exterior Grade Plywood and adjustable leveling legs, to protect against spilled or standing water on floor.
4. Hang Rails and Stiffeners: Provide 3/4" x 3" hardwood handrail top and bottom for wall cabinets, top of cabinet for base cabinets, sufficient stiffeners to support cabinets without backing material.
    a. Designs depending on cabinet backing for support will not be acceptable.
5. Back of Cabinets: 1/2" minimum particleboard.
6. Exposed Portions:
    a. Door and drawer fronts, end panels, divider panels at open cabinets and similar locations: High pressure plastic laminate on particleboard.
    b. Exposed edges: Self edged plastic laminate, same material as face.
    c. Adjustable Shelving: Edge banding at both edges to allow for reversing; and at ends where exposed to view in the finished work.
    d. PVC Edging: 3mm PVC edging, as specified for door and drawer edges will be acceptable in lieu of edging materials specified above.
7. Semi Exposed Surfaces, (Concealed when doors are closed): One of following at option of Installer:
    a. Plastic laminate.
    b. Transparent finish, on plywood (birch acceptable).
    c. Prefinished particleboard, edge banded.

C. Fixed Utility and Adjustable Shelving (non part of casework): Prefinished particleboard with edge banding.

1. Thickness: 1"

2. For adjustable shelving provide edge banding both edges to allow for reversing, and one on ends where exposed to view in the finished work.

2.04 FINISH FOR ARCHITECTURAL WOODWORK:

A. General: Finish architectural woodwork at shop or factory. Defer only final touch up, cleaning and polishing for time after delivery and installation.

B. Preparations for Finishing: Comply with AWI Quality Standards, Section 1500, for sanding, filling countersunk fasteners, back priming and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.

C. Transparent Finish: Provide transparent except where opaque finish is specifically indicated on Drawings or allowed in these Specifications.

1. General Finish Standard: AWI Finish System No. 3, Premium Grade, closed grain finish.

2. Final Finish: Sanding, followed by 2 coats of clean alkyd conversion varnish, rubbed to satin medium sheen.

2.05 CABINET HARDWARE AND ACCESSORY MATERIALS :

A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork, except for units which are specified as “door hardware” in other Sections of these Specifications.

1. Hardware Standards: Except as otherwise indicated, comply with ANSI A156.9 “American National Standard for Cabinet Hardware”, quality level - Type 2 (institutional), unless otherwise indicated.

B. Cabinet Hardware Schedule:

1. Shelf Supports, Plug-In Type: Hafele No. 282.11.761, nickel-plated, or equal.

2. Vertical Slotted Shelf Standards and Brackets: Spur.

3. Drawer Slides: Accuride No. C3732.

4. Door Hinges: Blum CLIP 120º Concealed Hinges.

5. Door and Drawer Pulls: Ives #38 B26D.

6. Metal Counter Brackets: A+M Hardware, 1/8” powder coated steel, 15” x 21”.

6. Desk Grommets: 2” ø black ABS.

C. Exposed Hardware Finish: Except where not available, provide exposed hardware with BHMA Code 626 satin chromium plate finish (US26D); where not available, provide either satin aluminum or satin stainless steel finish.

PART 3 - EXECUTION

3.01 PREPARATION

A. General: Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.

B. Pre-Installation Meeting: Meet at project site prior to delivery of architectural woodwork and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Include in meeting the Contractor; architect and other Owner Representatives (if any); installers of architectural woodwork, modular laminate casework, wet work such as plastering, other finishes, painting, mechanical work and electrical work; and firms or persons responsible for continued operation (whether temporary or permanent) of HVAC system as required to maintain temperature and humidity conditions. Proceed with woodwork installation only when everyone concerned agrees that required ambient conditions can be properly maintained.

3.02 INSTALLATION

A. Install work plumb, level, true and straight with no distortions. Shim as required using concealed shims.

B. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

C. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, strapping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.

D. Countertops and other plastic laminate: Anchor securely to base units and other support systems as indicated.

1. Seal joints at internal corners countertops and backsplashes or other construction with sealant matching color of plastic laminate.

2. Scribe countertops without backsplashes to wall; seal with silicone sealant matching color of plastic laminate; or clear if directed by Architect.

E. Casework: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

3.03 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION:

A. Repair damaged and defective woodwork wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.

B. Clean hardware, lubricate and make final adjustments for proper operation.

C. Clean woodwork on exposed and semi exposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.

D. Complete finishing work specified as work of this Section, to whatever extent not completed at shop or prior to installation of woodwork.

E. Protection: Installer of architectural woodwork shall advise Contractor of procedures required to protect architectural woodwork during remainder of construction period to ensure that work will be without damage or deterioration at time of acceptance.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Architectural Woodwork will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Architectural Woodwork shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Architectural Woodwork will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 07 21 00 – THERMAL AND ACOUSTIC INSULATION

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

807.2100 Thermal and Acoustic Insulation

Add the following:

PART 1 - GENERAL

1.01 GENERAL CONDITIONS: The General Conditions, Supplementary General Conditions and MaineDOT Division 100, General Conditions, shall apply to each and every contract and contractor, person or persons supplying material, labor or entering into the work directly or indirectly.

1.02 SUMMARY:

A. This Section includes the following:

1. Foam-plastic board insulation.
2. Foil-faced polyisocyanurate board insulation.
3. Damp-blown cellulosic insulation
4. Sprayed foam insulation.
5. Mineral fiber batt insulation.

B. Related Sections include the following:

1. Division 09 29 00, Gypsum Board, for insulation specified in that Section.

1.03 DEFINITIONS:

A. Mineral-Fiber Insulation: Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

1.04 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: For each type of product indicated.

B. Samples for Verification: Full-size units for each type of exposed insulation indicated.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.

D. Research/Evaluation Reports: For foam-plastic insulation.

1.05 QUALITY ASSURANCE:

A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify mate-rails with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.

2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site be-fore installation time.

3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.02 FOAM-PLASTIC BOARD INSULATION:

A. Rigid Insulation: Extruded-Polystyrene Board Insulation; ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:

1. Available Products:
   a. Foamular 250; Owens Corning.
   b. Styrofoam by Dow Chemical Co.
   c. Amofoam-CM by Tenneco Building Products

2. Type IV, 1.60 lb/cu. ft., unless otherwise indicated.

3. Application: Foundation insulation. Rigid insulation below concrete slab-on-grade.

2.03 FOIL-FACED POLISOCYANURATE BOARD INSULATION:

A. Rigid Insulation: Foil-faced Polyisocyanurate Board Insulation; ASTM C 1289, Type I, Class 1 or 2, with maximum flame-spread and smoke-development indexes of 75 and 450, respectively, based on tests performed on unfaced core o thickness up to 4” (101 mm):

1. Thickness: As indicated on drawings.

2. R value: 6/IN.

3. Provide manufacturer’s sealing tape at all joints

4. Available Products:
   a. Atlas Roofing Corporation
   b. Dow Chemical Co.
   c. Rmax, Inc.

5. Application: Exterior walls, under siding.

2.04 DAMP SPRAY-APPLIED CELLULOSIC INSULATION:

A. Self-Supported, Spray-Applied Cellulosic Insulation: ASTM C 739, chemically treated for flame-resistance, processing, and handling characteristics, sprayed-in-place to a density of 3.0 to 3.5 lbs per cubic foot.

1. Available Products:

a. Nu-Wool WallSeal Cellulose Insulation.
b. Cocoon2 Stabilized Borate Formula Insulation, product no. INS735.

2. Application: Exterior wall assembly insulation.

2.05 SPRAYED FOAM INSULATION

A. Sprayed Polyurethane Foam Sealant for Perimeter of Doors and Windows: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft. density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

1. Available Products:
a. Great Stuff Window & Door by Dow
b. Froth-Pak by Insta-Foam Products, Inc.
c. Pur-Fill 1G by Todol Products, Inc.
d. Handi-Seal Window and Door Sealant by Fomo Products, Inc.

2. Application: Perimeter wall air infiltration sealant.

2.06 MINERAL FIBER BATT INSULATION

A. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

2. Application: Sound proofing for shaft-walls.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.

1. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Clean substrates of substances harmful to insulation or of interfering with insulation attachment.

3.03 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

C. Extend insulation in thickness indicated to envelope entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.04 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

A. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

1. If not otherwise indicated, extend insulation to top of footing.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

C. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection course with joints butted. Set in adhesive according to insulation manufacturer's written instructions.

D. Protect top surface of horizontal insulation from damage during concrete work by applying protection course with joints butted. Delete paragraph and subparagraphs below if no cellular-glass insulation.

3.05 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

C. Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.

2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. Maintain 3-inch clearance of insulation around recessed lighting fixtures.

4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.

5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

D. Place loose-fill insulation into spaces indicated, by machine blowing, to comply with ASTM C 1015. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.

E. Apply foamed-in-place insulation, by spray or froth method to a uniform monolithic density without voids into miscellaneous voids and cavity spaces where shown.

3.06 PROTECTION:

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Thermal and Acoustic Insulation will measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Thermal and Acoustic Insulation shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Thermal and Acoustic Insulation will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 07 22 16 – NAILBOARD INSULATION

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

807.2216 Nailboard Insulation

Add the following:

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Rigid board type roof insulation for thermal protection as part of roofing assemblies.

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Wood roof blocking and nailers.

B. Section 06 12 00 - Structural Insulated Panels

1.03 REFERENCES

A. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Insulation Board.

B. ASTM E 119 - Standard Test Methods for Fire Tests of Building Constructions and Materials.

C. LTTR – Long Term Thermal Resistance, based on CAN/ULC S770 based on ASTM C1303.

D. UL 263 - Fire Tests of Building Construction and Materials.

E. UL 790 - Tests for Fire Resistance of Roof Covering Materials.

F. UL 1256 - Fire Test of Roof Deck Constructions.

G. ASTM E 2114-01 – Standard Terminology for Sustainability Relative to the Performance of Buildings

H. ASTM 2129 –01 – Standard Practice for Data Collection for Sustainability Assessment of Building Product

1.04 DEFINITIONS

A. HCFC FREE “Green” Polyiso Roof Board Insulation is defined as environmentally friendly, with Zero Global Warming, Zero Ozone Depletion (ODP) as in compliance with the US EPA requirements of January 1, 2003 requirement to eliminate production of HCFC 141b.

B. LTTR (Long Term Thermal Resistance) is defined as using techniques from ASTM C1303, CAN/ULC S770 predicting a foam’s R-Value that has been shown to be equivalent to the average performance of a permeably faced foam insulation product over 15 years. In Canada this method is used as the Design R-Value. This applies to ALL foam insulation products with blowing agents other than air, such as Polyiso, “Green” Polyiso, extruded polystyrene and polyurethane. The new method is based on consensus standards in the US and Canada. PIMA has reported this method as providing a better understanding of the thermal performance of foam.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Submit under provisions of Section 01 33 00 and 01 60 00.

B. Product Data:

1. Manufacturer´s specifications

C. Shop Drawings: Roof plan showing layout of boards, and fastening patterns, and ventilation and roof edge details.

D. Thermal Warranty: Submit sample warranty indicating conditions and limitations.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Show evidence of ability to manufacturer products specified with sufficient manufacturing facilities.

B. Regulatory Requirements:

1. American Society for Testing and Materials (ASTM).

2. Factory Mutual (FM).

3. Underwriters Laboratories Inc. (UL) Classification.

4. California State Insulation Quality Standards and Title 25 Foam Flammability Criteria.

5. IBC Sections on Foam Insulation.

6. Canadian Compliance: CAN/ULC, CGSB.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver insulation in packages labeled with material name, thermal value and product code.

B. When stored outdoors, stack insulation on pallets above ground or roof deck and cover with tarpaulin or other suitable waterproof coverings. Slit or remove manufacturer´s packaging before covering with waterproof covering.

1.08 PROJECT CONDITIONS

A. Comply with insurance underwriter´s requirements applicable for products of this Section.

B. Do not install insulation on roof deck when water of any type is present. Do not apply roofing materials when substrate is damp or wet.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Atlas Roofing Corporation, Atlanta, GA

2. Apache Products, Dallas, TX

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

C. Provide all insulating sheathing from a single manufacturer.

2.02 MATERIALS

A. ACFoam Nail Base: Closed-cell HCFC FREE “Green” polyisocyanurate foam board manufactured using blowing agent and bonded to 7/16 inch thick APA/TECO rated OSB on the top side and a fiber-reinforced felt facer on the bottom; for use with metal roofing, FM 1-90 wind rating; compressive strength - 20 psi.

B. Related Materials:

1. Fasteners: Factory Mutual approved.

2. Base Ply: As recommended by membrane manufacturer.

3. Fasteners: For Nail Base and Vented-R: Atlas Nail Base Fasteners.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine roof deck for suitability to receive insulation. Verify that substrate is dry, clean and free of foreign material that will damage insulation or impede installation.

B. Verify that roof drains, scuppers, roof curbs, nailers, equipment supports, vents and other roof accessories are secured properly and installed in conformance with Contract Drawings and submittals.

C. Verify that deck is structurally sound to support installers, materials and equipment without damaging or deforming work.

1. Start of installation indicates installer accepts conditions of existing deck surfaces.

3.02 APPLICATION / INSTALLATION

A. Install specified insulation using approved mechanical fasteners in accordance with manufacturer´s latest written instructions and as required by governing codes and Owner´s insurance carrier.

B. Install with end joints staggered to avoid having insulation joints coinciding with joints in deck. In multi-layer installations, stagger joints in top and bottom layers.

3.03 CLEANING / PROTECTION

A. Remove trash and construction debris from insulation surface prior to application of roofing membrane.

B. Do not leave installed insulation exposed to weather. Cover and waterproof with completed roof system immediately after installation.

1. Temporarily seal exposed insulation edges at the end of each day.

2. Remove and replace installed insulation that has become wet or damaged with new insulation.

C. Protect installed insulation and roof cover from traffic by use of protective covering materials during and after installation

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Nailboard Insulation will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Nailboard Insulation shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Nailboard Insulation will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 07 26 16 – BELOW GRADE VAPOR BARRIER

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

807.2616 Below Grade Vapor Barriers

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Vapor retarders under slabs-on-grade.

1.03 DEFINITIONS

A. Vapor Retarder: Material with a water vapor transmission rating of not over 0.04g per square foot per hour.

B. Vapor Barrier: Material with a water vapor transmission rating of not over 0.015g per square foot per hour.

1.04 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: For each type of product indicated.

B. Samples for Verification: 12 inch (300 mm) square units for each type of vapor retarder, vapor barrier, or air barrier indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.06 PROJECT CONDITIONS

A. Separate and recycle waste materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers and Products: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following products listed in Part 2 of this Section.

2.02 VAPOR RETARDERS FOR UNDER SLABS

A. Vapor Retarder for VCT and other moisture vapor sensitive flooring applications having the following qualities:

1. Minimum Permeance: ASTM E-96, not greater than 0.04 perms.
2. Tensile Strength: ASTM E154 or D638, Class B – over 30 lbs/in.
3. Puncture Resistance: ASTM E-154, Class C – over 475 grams.

4. Water Vapor Barrier: ASTM E-1745, meets or exceeds Class C.
5. Thickness of Barrier (Plastic) ACI 302.1R-96, not less than 10 mils.

B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Stego Wrap, 10 mil thick vapor retarder by Stego Industries LLC, (877) 464-7834.
2. Griffolyn Type-65 by Reef Industries.
3. Vapor Block 10 by Raven Industries.
4. MoistStop Ultra A by Fortifiber.
5. Sealtight Perminator 10 mil Underslab Vapor-Mat by W.R. Meadows, Inc.
6. Viper VaporCheck 10 by Insulation Solutions, Inc.

C. Vapor-Retarder Tape (for slabs): Stego Warp red polyethylene tape or tape as recommended by the manufacturer.

D. Double-Stick Edge Tape: Preformed 1-1/2" wide two sided adhesive. Available products include “Fab Tape” by Reef Industries.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

B. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Clean substrates of substances harmful to vapor retarders, including removing projections capable of puncturing vapor retarders, or of interfering with attachment.

3.03 INSTALLATION, GENERAL

A. Comply with manufacturer's written instructions applicable to products and application indicated.

B. Extend retarders in thickness indicated to envelop entire area to be covered. Cut and fit tightly around obstructions. Remove projections that interfere with placement.

3.04 INSTALLATION OF UNDER-SLAB VAPOR RETARDERS

A. Moisture vapor retarder system shall be installed at all interior floor slabs and as otherwise indicated in the drawings in strict accordance with the manufacturer's printed instructions and as follows:

1. Snap chalk line along inside perimeter of foundation walls at top of slab elevation.
2. Without wetting, clean a 3" wide band on the surface of the concrete below the chalk line at approximately mid-slab height. Remove dirt, residual form release, or other bond inhibiting surface contaminates. Grind smooth any surface projections within the band.
3. While removing the contact paper on the backside, firmly press 2" wide double-stick edge tape onto wall, parallel to the chalk line on the cleaned band at mid-slab elevation.
4. Remove contact paper on the face side.
5. Apply a 12" wide strip of vapor retarder covering only the bottom 1" of contact surface on the edge tape. Cut, fit, and seal corner details with vapor retarder seaming tape.
6. Align top edge of Iso-Strip isolation joint material to chalk line, and press material onto remaining 1" of exposed perimeter strip adhesive.

7. Roll out vapor retarder material, overlapping edge rolls and all seams by 3". Tape all seams with vapor retarder seaming tape.

8. All tears, punctures, etc. to be repaired and taped as required to maintain the watertight integrity of the vapor retarder system.

3.05 PROTECTION

A. Protect installed vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where vapor retarders are subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Below Grade Vapor Barrier will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Below Grade Vapor Barrier shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Below Grade Vapor Barrier will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 07 27 13 – AIR BARRIERS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

807.2713 Air Barriers

Add the following:

PART I - GENERAL

1.01 GENERAL CONDITIONS The General Conditions, Supplementary General Conditions and MaineDOT Division 100, General Conditions, shall apply to each and every contract and contractor, person or persons supplying material, labor or entering into the work directly or indirectly.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Air barrier and transition strips at the following locations.
    a. Air barrier at plywood sheathing substrate.
    b. Air barrier transition strips to adjacent and penetrating materials at all substrates.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 06 10 00 – ROUGH CARPENTRY for sheathing substrate for air and vapor barrier system.

1.03 DEFINITIONS

A. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall or soffit, including joints and junctions to abutting construction, to control air movement through the wall.

1.04 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of scaling substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air Barrier Assembly Air Leakage: Not to exceed 0.03 cfin/sq.ft. of surface area at 1.57 lbf/sq.ft., ASTM E283.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings:

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.

B. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside comers, terminations, and tie-ins with adjoining construction.

1. Include details of interfaces with other materials that form part of air barrier.

2. Include details of mockups.

C. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with air barrier; signed by product manufacturer.

D. Qualification Data: For Applicator.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers.

1.06 QUALITY ASSURANCE

A. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mockups: Before beginning installation of air barrier, build mockups of exterior wall assembly 150 sq. ft., incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate, surface preparation, crack and joint treatment, and scaling of gaps, terminations, and penetrations of air barrier membrane.

1. Coordinate construction of mockup to permit inspection by Contractor's independent testing agency of barrier before external insulation and cladding is installed.

2. Include junction with roofing membrane, building comer condition, and foundation wall intersection.

3. If the Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.

4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Pre-installation Conference: Conduct conference at Project site.

1. Include installers of other construction connecting to air barrier, such as roofing, waterproofing, architectural stone cladding , joint sealants, windows, glazed curtain walls, and door frames.

2. Review air barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures, sequence of installation, testing and inspecting procedures, and protection and repairs.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air barrier manufacturer.

B. Remove and replace liquid materials that cannot be applied within their stated shelf life. C. Store rolls according to manufacturer's written instructions. D. Protect stored materials from direct sunlight.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.01 AIR BARRIER

A. Modified Bituminous Sheet: 40-mil-thick, self-adhering sheet consisting of 36 mils of rubberized asphalt laminated to a 4-mil-thick, cross-laminated polyethylene film with release liner on adhesive side[and formulated for application with primer that complies with VOC limits of authorities having jurisdiction.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following
   a. Carlisle Coatings & Waterproofing; CCW-705.
   b. Grace, W. R. & Co.; Perm-A-Barrier.
   c. Henry Company; Blueskin SA.
   d. Meadows, W. R., Inc.; Sea]Tight Air-Shield.
   e. Rubber Polymer Corporation; Rub-R-Wall SA.

f. Tremco, Inc.; ExoAir 110.
g. Or approved equal.

2. Physical and Performance Properties:
   a. Membrane Air Permeance: Not to exceed 0.004 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. pressure difference; ASTM E 2178.
   b. Tensile Strength: 250 psi minimum; ASTM D 412, Die C, modified.
   c. Ultimate Elongation. 200 percent minimum; ASTM D 412, Die C, modified.
   d. Low-Temperature Flexibility: Pass at minus 20 deg F, ASTM D 1970.
   e. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement- AS'TM C 836.
   f. Puncture Resistance: 40 lbf minimum; ASTM E 154.
   g. Water Absorption: 0.15 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
   h. Vapor Permeance: 0.05 perms, ASTM E 96, Water Method.

B. Fluid-Applied, Vapor-Retarding Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   a. Elastomeric Modified Bituminous Membrane:
      1) Carlisle Coatings & Waterproofing; Barriseal.
      2) Henry Company; Air-Bloc 06.
      3) Meadows, W. R., In c.; Air-Shield LM.
      4) Tremco Incorporated; ExoAir.
   b. Synthetic Polymer Membrane:
      1) Grace, W. R. & Co.; Perm-A-Barrier Liquid.
      2) Polymer Corporation-, Rub-R-Wall Airtight.
2. Physical and Performance Proper-ties:
   a. Membrane Air Permeance: Not to exceed 0.004 cfm x sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
   b. Membrane Vapor Permeance: Not to exceed 0. 1 perm; ASTM E 96

2.02 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid waterborne or solvent-borne primer recommended for substrate by manufacturer of air barrier material.

C. Counterflashing Strip: Modified bituminous 40-mil-thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil-thick, cross-laminated polyethylene film with release liner backing.

D. Butyl Strip at Termination with EPDM or TPO Roofing Membrane: Vapor-retarding, 30- to 40-mil-thick, self adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive, with release liner backing.

E. Modified Bituminous Strip To Cover Cracks and Joints and Terminate Air Barrier to Compatible Roofing Membrane: Vapor-retarding, 40-mil-thick, smooth-surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- polyethylene film with release liner backing.

F. Termination Mastic: Cold fluid-applied elastomeric-liquid; trowel-grade.

G. Joint Reinforcing Strip: Air barrier manufacturer's glass-fiber-mesh tape.

H. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

I. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

J. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

K. Sprayed Polyurethane Foam Sealant to Fill Gaps at Penetrations and Openings: I - or 2 component, foamed -in -place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft. density; flame spread index of 25 or less according to MTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

L. Modified Bituminous Transition Strip to Seal Air Barrier Terminations with Glazing Systems: Vapor-retarding, 40-mil-thick, smooth-surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil-thick polyethylene film with release liner backing.

M. Preformed Silicone-Sealant Extrusion to Seal Air Barrier Terminations with Glazing Systems: Manufacturer's standard system consisting of cured low-modulus Silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100150 (low-modulus) silicone sealant for bonding extrusions to substrates.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following
    a. Dow Coming Corporation, 123 Silicone Seal.
    b. GE Silicone, UltraSpan US 1100.
    c. Pecora Corporation, Sil-Span. d. Tremco, Incorporated, Spectrem EZ Simple Seal. e. Or approved equal.

N. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use

O. Comply with Section 07 92 00 - JOINT SEALANTS.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.

2. Verify that concrete has cured and aged for minimum time period recommended by air barrier manufacturer.

3. Verify that concrete is visibly dry and -free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

4. Verify that masonry joints are flush and completely filled with mortar.

5. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 SURFACE PREPARATION

A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.

1. Install modified bituminous strips and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch

G. Bridge and cover isolation joints expansion joints and discontinuous deck-to-wall and deck-to-deck joints with overlapping modified bituminous strips.

H. At changes in substrate plane, apply sealant or termination mastic beads at sharp comers and edges to form a smooth transition from one plane to another.

1. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.03 INSTALLATION OF MODIFIED BITUMINOUS SHEETS

A. Install modified bituminous sheets according to air barrier manufacturer's written instructions and according to recommendations in ASTM D 6135.

1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous air barrier sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.

B. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.

1. Install modified bituminous strips centered over vertical inside comers. Install 3/4-inch fillets of termination mastic on horizontal inside corners.

C. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D 6135.

D. Apply primer to substrates at required rate and allow to dry: Limit priming to areas that will be covered by air barrier sheet in same day. Re-prime areas exposed for more than 24 hours.

1. Prime glass-fiber-surfaced gypsum. sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

E. Apply and firmly adhere modified bituminous sheets horizontally or vertically over area to receive air barrier sheets. Accurately align sheets and maintain a uniform 2-1/2-inchminimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure airtight installation.

1. Apply sheets in a shingled manner to shed water without interception by any exposed sheet edges.

2. Roll sheets firmly to enhance adhesion to substrate.

3. Apply termination mastic on any horizontal, field-cut or non-factory edges.

F. Apply continuous modified bituminous sheets over modified bituminous strips bridging substrate cracks, construction, and contraction joints.

G. Seal top of non-metallic through-wall flashings to air barrier sheet with an additional 6inch wide strip

H. Seal exposed edges of metallic sheets at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

I. Install air barrier sheets and auxiliary materials to form a sea] with adjacent construction and to maintain a continuous air barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

2. Install compatible strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over both substrates.

J. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings using accessory materials.

K. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply membrane specified below so that a minimum of 3 inches of coverage is achieved over both substrates. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than I inch of full contact.

1. Modified Bituminous Transition Strip: Roll firmly to enhance adhesion.

2. Elastomeric Flashing Sheet: Apply adhesive to wall, frame, and flashing sheet. Install flashing sheet and termination bars, fastened at 6 inches o.c. Apply lap sealant over exposed edges and on cavity side of flashing sheet.

3. Preformed Silicone-Sealant Extrusion: Set in full bed of silicone sealant applied to walls, frame, and membrane.

L. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air barrier membrane with foam sealant.

M. At end or each working day, seal top edge of membrane to substrate with termination mastic.

N. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

O. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air barrier sheet extending 6 inches beyond repaired areas in all directions.

P. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

Q. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components

3.04 INSTALLATION OF FLUID-APPLIED AIR BARRIER MEMBRANE

A. Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.

B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.

C. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Re-prime areas exposed for more than 24 hours.

1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

D. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in fall contact around protrusions such ~s masonry ties.

1. Vapor-Retarding Membrane Air Barrier: 60-mil dry film thickness.

E. Apply strip and transition strip a minimum of 1 inch onto cured air membrane or strip and transition strip over cured air membrane overlapping 3 inches onto each surface according to air barrier manufacturer's written instructions.

F. Do not cover air barrier until it has been tested and inspected by Owner's testing agency,

G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.05 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Continuous structural support of air barrier system has been provided.
3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings.
4. Site conditions for application temperature and dryness of substrates have been maintained.
5. Maximum exposure time of materials to UV deterioration has not been exceeded.
6. Surfaces have been primed.
7. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
8. Termination mastic has been applied on cut edges.
9. Air barrier has been firmly adhered to substrate.
10. Compatible materials have been used.
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.
13. All penetrations have been sealed.

C. Tests:

1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186.
2. Quantitative Air Leakage Testing: Testing not to exceed the test pressure differential, positive and negative, indicated in "Performance Requirements" Article for air barrier assembly air leakage according to ASTM E 283.

D. Remove and replace deficient air barrier components and retest as specified above.

3.06 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV- light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed to these conditions for more than 30 days.
2. Protect air barrier from contact with creosote, uncured coal-tar products, TPO, EPDM, flexible PVC membranes, and sealants not approved by air barrier manufacturer.

B. Clean spills, stains, and soiling from adjacent construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Air Barriers will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Air Barriers shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Air Barriers will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 07 41 13 – METAL ROOF PANELS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

807.4113 Metal Roof Panels

Add the following:

PART 1 - GENERAL

1.01 GENERAL CONDITIONS: The General Conditions, Supplementary General Conditions and MaineDOT Division 100, General Conditions, shall apply to each and every contract and contractor, person or persons supplying material, labor or entering into the work directly or indirectly.

1.02 SUMMARY:

A. This Section includes the following:

1. Factory-formed and field-assembled, standing-seam metal roof panels.

2. Metal soffit panels.

1.03 DEFINITIONS:

A. Metal Roof Panel Assembly: Metal roof panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete weathertight roofing system.

1.04 PERFORMANCE REQUIREMENTS:

A. General: Provide manufactured roof panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.

B. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift resistance class indicated.

1. Class: 1-60.

C. Thermal Movements: Provide metal roof panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: Include manufacturer's product specifications, standard details, certified product test results, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.

B. Shop Drawings: Show layouts of panels on roofs, details of edge conditions, joints, panel profiles, supports, anchorages, trim, flashings, underlayment, closures, and special details. Distinguish between factory- and field-assembled work.

C. Samples for Selection: Manufacturer's color charts or chips showing the full range of colors, textures, and patterns available for roof panels with factory-applied finishes.

D. Maintenance Data: For metal roof panels to include in maintenance manuals.

E. Warranties: Special warranties specified in this Section.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed metal roof panel projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver panels and other components so they will not be damaged or deformed. Package panels for protection against damage during transportation or handling.

B. Handling: Exercise care in unloading, storing, and erecting roof panels to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight and ventilated covering. Store panels to ensure dryness. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective covering on metal roof panels from exposure to sunlight and high humidity, except to extent necessary for period of metal roof panel installation.

1.08 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal roof panels to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, either establish opening dimensions and proceed with fabricating roof panels without field measurements or allow for trimming panel units. Coordinate roof construction to ensure actual locations of structural members and to ensure opening dimensions correspond to established dimensions.

1.09 COORDINATION

A. Coordinate metal panel roof assemblies with rain drainage work, flashing, trim, and construction of decks, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal roof panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures, including rupturing, cracking, or puncturing.
   b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

3. Warranty Requirements: Building is located in a marine environment. Warranty shall be equal to Manufacturer's standard form for buildings not located in a marine environment without limitations or exclusions.

C. Special Finish Warranty: Submit a written warranty, signed by manufacturer, covering failure of the factory-applied exterior finish on metal roof panels within the specified warranty period and agreeing to repair finish or replace roof panels that show evidence of finish deterioration. Deterioration of finish includes, but is not limited

to, color fade, chalking, cracking, peeling, and loss of film integrity.

1. Finish Warranty Period: 20 years from date of Substantial Completion.
2. Finish Warranty Requirements: Building is located in a marine environment. Warranty shall be equal to Manufacturer's standard form for buildings not located in a marine environment without limitations or exclusions

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers and Products: Subject to compliance with requirements, manufacturers offering metal panels that may be incorporated into the Work include, but are not limited to, the manufacturers listed in the following paragraphs of Part 2.

2.02 PANEL MATERIALS

A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
2. Surface: Smooth, flat finish.
3. Exposed Finishes: Apply the following coil coating, as specified or indicated on Drawings.
   a. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2605.

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.03 UNDERLAYMENT MATERIALS

A. Waterproof Underlayment: ASTM D 1970, 40 mils (1.0 mm) thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.

1. Available Products:
   a. Grace, W. R. & Co.; Grace Ice and Water Shield.

2.04 ROOF PANEL ASSEMBLIES

A. General: Provide factory-formed metal roof panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.

B. Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels, and snapping panels together.

1. Available Manufacturers:
   a. ARS Architectural Roofing & Siding: Snap Rib (16").

b. Berridge: Cee-Lock (16”).
c. BHP Steel Building Products USA, Inc.: Design Span (17”).
d. Centria: SDP (16”).
e. Fabral Metal Roofing and Siding: Slim Seam (16”).
f. Merchant & Even, Inc.: Zip Rib, No. 305 Series (15”)
g. McElroy Metal, Inc.: Medallian-Lok (16”).
h. Morin Corporation: SSL 15-1/2.

2. Material: Zinc-coated (galvanized) steel sheet, 24 gage thick.
   a. Exterior Finish: Fluoropolymer.
   b. Color: As selected by Architect from manufacturer’s full range.

3. Uplift Rating: UL 60.

2.05 METAL SOFFIT PANELS

A. General: Provide factory-formed metal soffit panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Metal Soffit Panels: Match profile and material of metal roof panels.

C. Flush-Profile Metal Soffit Panels: Solid panels formed with vertical panel edges and flat pan between panel edges; with flush joint between panels.

1. Available Manufacturers:
   a. ARS Architectural Roofing & Siding: F16FN, F18FN.
   b. Atas International, Inc.: DWF120 (12”).
   c. BHP Steel Building Products USA, Inc.: Prestige (R-0)-12.
   d. Centria: IW-10A. (12”).
   e. MBCI Metal Roof and Wall Systems: Artisan 1 Series, L-12.
   f. VicWest Steel: Select Series - 12.

2. Material: Zinc-coated (galvanized) steel sheet, 24 gage thick.
   a. Exterior Finish: Fluoropolymer.
   b. Color: As selected by Architect from manufacturer’s full range.

2.06 MISCELLANEOUS MATERIALS

A. General: Provide materials and accessories required for a complete roof panel assembly and as recommended by panel manufacturer, unless otherwise indicated.

B. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.

1. Use stainless-steel fasteners for exterior applications and galvanized steel fasteners for interior applications.

C. Accessories: Unless otherwise specified, provide components required for a complete roof panel assembly including trim, copings, fasciae, mullions, sills, corner units, ridge closures, clips, seam covers, battens, flashings, gutters, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of panels.

1. Closure Strips: Closed-cell, self-extinguishing, expanded, cellular, rubber or cross-linked, polyolefin-foam flexible closure strips. Cut or premold to match configuration of panels. Provide closure strips where indicated or necessary to ensure weathertight construction.

2. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

3. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use classifications required to seal joints in panel roofing and remain weathertight. Provide sealant recommended by panel manufacturer.

D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film

thickness per coat, unless otherwise indicated. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

E. Expansion-Joint Sealant: For hooked-type expansion joints that must be free to move, provide nonsetting, nonhardening, nonmigrating, heavy-bodied polyisobutylene sealant.

F. Snow Guards: Prefabricated, noncorrosive units designed to be installed without penetrating metal roof panels, and complete with predrilled holes, clamps, or hooks for anchoring.

1. Surface-Mounted, Plastic, Stop-Type Snow Guards: Clear polycarbonate stops designed for attachment to pan surface of metal roof panels using construction adhesive, silicone or polyurethane sealant, or adhesive tape.

2. Available Products:
   a. Berger Bros. Co.; CL Snow Guards.
   b. Polar Blox; Polar Blox.
   c. Sno-Gem, Inc.; SNO-GEM.
   d. Snojax Inc.; SNOJAX.

2.07 FABRICATION

A. General: Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate panel joints with captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will minimize noise from movements within panel assembly.

D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams.

3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal roof panel manufacturer.
   a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal roof panel manufacturer for application but not less than thickness of metal being secured.

2.08 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of work.

1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.

2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

B. Examine roughing-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of metal roof panels before metal roof panel installation.

C. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.

B. Install flashings and other sheet metal to comply with requirements specified in Division 7 Section “Sheet Metal Flashing and Trim.”

C. Coordinate metal panel roofing with rain drainage work; flashing; trim; and construction of decks, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

D. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer’s written recommendations.

1. Soffit Framing: Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

E. Promptly remove protective film, if any, from exposed surfaces of metal panels. Strip with care to avoid damage to finish.

3.03 UNDERLAYMENT INSTALLATION

A. Waterproof Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof sheathing under metal roof panels. Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply over entire roof in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

1. Roof to wall intersections for a distance from wall of 18 inches (460 mm).

B. Install flashings to cover underlayment to comply with requirements specified in Division 7 Section “Sheet Metal Flashing and Trim.”

3.04 PANEL INSTALLATION

A. General: Comply with panel manufacturer’s written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cutting exterior panels by torch is not permitted.

2. Install panels with concealed fasteners, unless otherwise indicated.

B. Fasteners:

1. Steel Roof Panels: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized steel fasteners for surfaces exposed to the interior.

C. Accessories: Install components required for a complete roof panel assembly including trim, copings, fasciae, ridge closures, clips, seam covers, battens, flashings, gutters, sealants, gaskets, fillers, closure strips, and similar items.

D. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized-asphalt underlayment to each metal surface, or by other permanent separation as recommended by manufacturers of dissimilar metals.

E. Coat back side of metal panels with bituminous coating where it will contact wood, ferrous metal, or cementitious construction.

F. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not otherwise indicated, types recommended by panel manufacturer.

1. Install weatherseal under ridge cap. Flash and seal panels at eave and rake with rubber, neoprene, or other closures to exclude weather.

2. Seal panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by panel manufacturer.

3. Prepare joints and apply sealants to comply with requirements of Division 7 Section “Joint Sealants.”

G. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.

1. Install clips to supports with self-tapping fasteners.

2. Install pressure plates at locations indicated in manufacturer’s written installation instructions.

3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.

H. Metal Soffit Panels: Provide metal soffit panels full width of soffits. Install panels perpendicular to support framing.

1. Flash and seal panels with weather closures where metal soffit panels meet walls and at perimeter of all openings.

I. Fascia Panels: Align bottom of panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

J. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.05 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer’s written installation instructions, and SMACNA’s “Architectural Sheet Metal Manual.” Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is

true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

C. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

D. Stop-Type Snow Guards: Attach snow guards to metal roof panels with adhesive, sealant, or adhesive tape, as recommended by manufacturer. Do not use fasteners that will penetrate metal roof panels.

1. Provide 4 rows of snow guards, at locations indicated on Drawings, spaced 24 inches apart, beginning 12 inches up from roof edge, with each snow guard centered between panel ribs.

3.06 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal roof panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.07 CLEANING AND PROTECTING

A. Damaged Units: Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

B. Cleaning: Remove temporary protective coverings and strippable films, if any, as soon as each panel is installed. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

3.08 WASTE MANAGEMENT

A. Collect offcuts and scrap and place in designated areas for recycling

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Metal Roof Panels will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Metal Roof Panels shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Metal Roof Panels will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 07 42 13 – METAL WALL PANELS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

807.4213 Metal Wall Panels

Add the following:

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Metal wall panels with concealed fasteners.

1.02 PERFORMANCE REQUIREMENTS

A. General: Provide manufactured wall panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: Include manufacturer's product specifications, standard details, certified product test results, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.

B. Shop Drawings: Show layouts of panels, details of corner conditions, joints, panel profiles, supports, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work.

C. Samples for Selection: Manufacturer's color charts or chips showing the full range of colors, textures, and patterns available for wall panels with factory-applied finishes.

D. Product Test Reports: Indicate compliance of manufactured wall panel assemblies and materials with performance and other requirements based on comprehensive testing of current products.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed metal wall panel projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver panels and other components so they will not be damaged or deformed. Package panels for protection against damage during transportation or handling.

B. Handling: Exercise care in unloading, storing, and erecting wall panels to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight and ventilated covering. Store panels to ensure dryness. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with

construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, either establish opening dimensions and proceed with fabricating wall panels without field measurements or allow for trimming panel units. Coordinate wall construction to ensure actual locations of structural members and to ensure opening dimensions correspond to established dimensions.

1.07 COORDINATION

A. Coordinate metal wall roof assemblies with rain drainage work, flashing, trim, and construction of substrate, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.08 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Finish Warranty: Submit a written warranty, signed by manufacturer, covering failure of the factory-applied exterior finish on metal wall panels within the specified warranty period and agreeing to repair finish or replace wall panels that show evidence of finish deterioration. Deterioration of finish includes, but is not limited to, color fade, chalking, cracking, peeling, and loss of film integrity.

C. Finish Warranty Period: 20 years from date of Substantial Completion.

1. Finish Warranty Requirements: Building is located in a marine environment. Warranty shall be equal to Manufacturer’s standard form for buildings not located in a marine environment without limitations or exclusion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers and Products: Subject to compliance with requirements, manufacturers offering metal panels that may be incorporated into the Work include, but are not limited to, the manufacturers listed in the following paragraphs of Part 2.

2.02 PANEL MATERIALS

A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

2. Surface: Smooth, flat finish.

3. Exposed Finishes: Apply the following coil coating, as specified or indicated on Drawings.
   a. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      1) Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2605.

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as

recommended in writing by metal roof panel manufacturer.

3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.03 UNDERLAYMENT MATERIALS

A. Felt Paper: ASTM D 226, Type I (No. 15), asphalt-saturated organic felts.

2.04 WALL PANEL ASSEMBLIES

A. General: Fabricate panel face sheets to the profile or configuration indicated; and of the material, finish, and thickness indicated. Design joints between panels to form weathertight seals.

B. Flush-Profile, Concealed-Fastener Metal Wall and Soffit Panels: Solid panels formed with vertical panel edges and flat pan between panel edges; with flush joint between panels.

1. Available Manufacturers:
   a. Berridge: FW-12.

2. Material: Zinc-coated (galvanized) steel sheet, 24 gage thick.
   a. Exterior Finish: Fluoropolymer.
   b. Color: As selected by Architect from manufacturer's full range.

2.05 MISCELLANEOUS MATERIALS

A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.

1. Use stainless-steel fasteners for exterior applications and galvanized steel fasteners for interior applications.

B. Accessories: Unless otherwise specified, provide components required for a complete wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, seam covers, flashings, louvers, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of panels.

1. Closure Strips: Closed-cell, self-extinguishing, expanded, cellular, rubber or cross-linked, polyolefin-foam flexible closure strips. Cut or premold to match configuration of panels. Provide closure strips where indicated or necessary to ensure weathertight construction.

2. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

3. Joint Sealant: One-part elastomeric polyurethane, polysulfide, or silicone-rubber sealant as recommended by panel manufacturer.

C. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat, unless otherwise indicated. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.06 SECONDARY FRAMING

A. Panel Supports and Anchorage: Provide girts, furring channels, angles, and other secondary framing members.

1. Girts: Z-shaped sections fabricated from 0.0598-inch- thick, shop-painted, roll-formed steel.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements indicated for conditions affecting performance of metal panel walls.

1. Panel Supports and Anchorage: Examine wall framing to verify that girts, angles, and other secondary structural panel support members and anchorage have been installed to meet requirements of panel manufacturer.

2. Do not proceed with wall panel installation until unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Felt Paper Application: Cover sheathing with felt as follows:

1. Cut back felt paper 1/2 inch on each side of break in supporting members at expansion- or control-joint locations.

2. Apply felt paper horizontally with 2-inch overlap and 6-inch end lap; fasten to sheathing with corrosion-resistant staples.

3. Apply felt paper to comply with manufacturer's written installation instructions.

4. Apply felt paper to cover vertical flashing with 4-inch overlap.

B. Coordinate metal wall panels with rain drainage work; flashing; trim; and construction of soffits, roofing, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

C. Promptly remove protective film, if any, from exposed surfaces of metal panels. Strip with care to avoid damage to finish.

D. Secondary Structural Supports: Install girts, angles, and other secondary structural panel support members and anchorage according to the Light Gage Structural Institute's "Guide Specifications," Section 07410, "Manufactured Roof and Wall Panels."

3.03 PANEL INSTALLATION

A. General: Comply with panel manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cutting exterior panels by torch is not permitted.

2. Install panels with concealed fasteners.

B. Accessories: Install components required for a complete wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, seam covers, flashings, louvers, sealants, gaskets, fillers, closure strips, and similar items.

C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not otherwise indicated, types recommended by panel manufacturer.

1. Install weatherseal to prevent air and moisture penetration. Flash and seal panels at ends and intersections with other materials with rubber, neoprene, or other closures to exclude weather.

2. Seal panel end laps with a bead of tape or sealant, full width of panel. Seal side joints where recommended by panel manufacturer.

3. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."

D. Wall Panels: Apply elastomeric sealant continuously between metal base channel (sill angle), and elsewhere as necessary for waterproofing. Handle and apply sealant and back-up according to sealant manufacturer's written instructions.

1. Align bottom of wall panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.

2. Install screw fasteners with power tools having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.

3. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

E. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating or by other permanent separation as recommended by manufacturers of dissimilar metals.

F. Coat back side of metal panels with bituminous coating where it will contact wood, ferrous metal, or cementitious construction.

G. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4 inch in 20 feet on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.04 CLEANING AND PROTECTING

A. Damaged Units: Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

B. Cleaning: Remove temporary protective coverings and strippable films, if any, as soon as each panel is installed. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

3.05 WASTE MANAGEMENT

A. Collect metal scraps and place in designated area for recycling.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Metal Wall Panels will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Metal Wall Panels shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Metal Wall Panels will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 07 62 00 – SHEETMETAL FLASHING AND TRIM

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

807.6200 Sheetmetal Flashing and Trim

Add the following:

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes sheet metal flashing and trim in the following categories:

1. Exposed trim, gravel stops, and fasciae.
2. Copings.
3. Metal flashing.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 4 Sections for through-wall flashing and other integral masonry flashings specified as part of masonry work.
2. Division 7 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
3. Division 7 Section "Joint Sealants" for elastomeric sealants.
4. Division 7 Roofing Sections for flashing and roofing accessories installed integral with roofing as part of roofing-system work.

1.02 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.

B. Fabricate and install flashings at roof edges to comply with recommendations of FM Loss Prevention Data Sheet 1-49 for the following wind zone:

1. Wind Zone 2: Wind pressures of 31 to 45 psf.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

C. Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.

1. 8-inch- square Samples of specified sheet materials to be exposed as finished surfaces.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.05 PROJECT CONDITIONS

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.01 METALS

A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

1. Surface: Smooth, flat.

2. Exposed Coil-Coated Finishes:
   a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

b. Provide finish color on both sides of sheet where shown.

2.02 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.

1. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

B. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

C. Mastic Sealant: As specified in Division 7 Section “Joint Sealants”.

D. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

E. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

F. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

G. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

2.03 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

1. Conform to referenced details of SMACNA's "Architectural Sheet Metal Manual" – 5th Edition.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

E. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of

corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

G. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Conceal fasteners and expansion provisions where possible.

I. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.

1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.04 SHEET METAL FABRICATIONS

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Metal Fasciae: Fabricate from the following material:

1. Aluminum: 0.032 inch thick.

2. Conform to drawings and applicable SMACNA details.

C. Copings: Fabricate from the following material:

1. Aluminum: 0.040 inch thick.

2. Conform to drawings and applicable SMACNA details.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactorily conditions have been corrected.

3.02 INSTALLATION

A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Roof-Edge Flashings: Secure metal flashings at roof edges according to FM Loss Prevention Data Sheet 1-49 for specified wind zone.

D. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

E. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply

with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.

F. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams.

G. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.

2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.

3.03 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Sheetmetal Flashing and Trim will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Sheetmetal Flashing and Trim shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Sheetmetal Flashing and Trim will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 07 91 13 – COMPRESSION SEALS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 520 – EXPANSION DEVICES NON-MODULAR, with the following modifications:

MODIFICATIONS:

Section 520.01 Description

The following paragraph is added:

This work shall consist of installing a compression seal (expansion device) between the proposed pier deck and the existing pier ramp along the eastern end of the proposed pier. Work shall include the forming of bond outs in the proposed pier deck and finishing of the termination points, as shown on the plans and in accordance with these specifications. At the termination points of the compression seal, the voids shall be finished with a non-sag silicone based sealant (gray in color).

Section 520.02 Material

This Subsection is deleted and replaced with the following::

This longitudinal compression seal material shall be D.S. Brown, J-Series J-150 or approved equivalent. The non-sag silicone based sealant shall be Dow Corning 888 or approved equal.

Section 520.06 Installation

The following paragraph is added:

The compression seal shall be installed in one continuous piece in strict accordance with the manufacturer's published recommendation. Field splicing of the compression seal will not be allowed.

Section 520.07 Method of Measurement

This Subsection is deleted and replaced with the following:

Expansion Device – Pier Compression Seal will be measured by the linear foot, complete, in-place, and accepted. The non-sag silicone based sealant will not be measured separately but shall be incidental to the pay item.

Section 520.08 Basis of Payment

This Subsection is deleted and replaced with the following:

The accepted quantity of Expansion Device – Pier Compression Seal will be paid for at the Contract unit price per linear foot which shall be full compensation for all labor, materials, and equipment for furnishing and installing the compression seal, including blocking the concrete out to receive the seal, priming the concrete, seal adhesive, non-sag sealant, and all other incidentals thereto.

Payment will be made under the following Pay Item:

Pay Item	Pay Unit
520.240 Expansion Device – Pier Compression Seal	Linear Foot

END OF SECTION

SECTION 07 92 00 – JOINT SEALANTS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

807.9200 Joint Sealants

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Latex joint sealants.

B. Related Sections:

1. Division 04 Section "Exterior Stone Cladding" for control and expansion joint fillers and gaskets.
2. Division 08 Section "Glazing" for glazing sealants.
3. Division 09 Section "Gypsum Board" for sealing perimeter joints.
4. Division 09 Section "Tiling" for sealing tile joints.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: For each joint-sealant product indicated.

B. Samples for Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

D. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

F. Warranties: Sample of special warranties.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

D. Preinstallation Conference: Conduct conference at Project site.

1.05 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.06 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.

2. Disintegration of joint substrates from natural causes exceeding design specifications.

3. Mechanical damage caused by individuals, tools, or other outside agents.

4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.

2. Sealant Primers for Nonporous Substrates: 250 g/L.

3. Sealant Primers for Porous Substrates: 775 g/L.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates,

provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.02 SILICONE JOINT SEALANTS

A. Sealant Type 1: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant; ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dow Corning Corporation; 790 (VOC 43); 756 SMS (VOC 87) for cold applications.
   b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
   c. Pecora Corporation; 890 (VOC na).
   d. Sika Corporation, Construction Products Division; SikaSil-C990.
   e. Tremco Incorporated; Spectrem 1 (VOC 1).

B. Sealant Type 2: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant; ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

1. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

2. Products: Subject to compliance with requirements, provide one of the following:
   a. Dow Corning Corporation; 756 SMS (VOC 87).
   b. GE Advanced Materials - Silicones; SilPruf LM SCS2700 (VOC 27).
   c. Pecora Corporation; 890NST (VOC 98).

C. Sealant Type 3: Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant; ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dow Corning Corporation; 790 (VOC 43).
   b. Pecora Corporation; 301 NS (VOC 50).
   c. Tremco Incorporated; Spectrem 800 (VOC 1).

D. Sealant Type 4: Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dow Corning Corporation; 786(VOC 33) (Food)
   b. GE Advanced Materials - Silicones; Sanitary SCS1700.
   c. Tremco Incorporated; Tremsil 200 Sanitary (VOC 1).

2.03 LATEX JOINT SEALANTS

A. Sealant Type 5: Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. BASF Building Systems; Sonolac (VOC 41).
   b. Bostik, Inc.; Chem-Calk 600.
   c. Pecora Corporation; AC-20 (VOC 31).
   d. Tremco Incorporated; Tremflex 834.

2.04 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.05 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
   a. Concrete.
   b. Masonry.
   c. Unglazed surfaces of ceramic tile.
   d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
   a. Metal.
   b. Glass.
   c. Porcelain enamel.
   d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
   a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:

1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.
3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

3.04 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with

cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.06 JOINT-SEALANT SCHEDULE

A. Exterior Isolation and Contraction Joints in Cast-in-place Concrete Slabs.

1. Silicone Joint Sealant: Sealant Type 3.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Exterior Control, Expansion, and Soft Joints in Masonry and Between Masonry and Adjacent Work.

1. Silicone Joint Sealant: Sealant Type 1.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Exterior Control, Expansion, and Soft Joints Between Masonry and Metal Door Frames, Windows, Storefronts and Curtain Walls.

1. Silicone Joint Sealant: Sealant Type 1.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Exterior Control, Expansion, and Soft Joints in Stone Work and Between Stone and Adjacent Work.

1. Silicone Joint Sealant: Sealant Type 2.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Under Exterior Door Thresholds.

1. Silicone Joint Sealant: Sealant Type 1.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Exterior Joints for Which No Other Sealant Type is Indicated.

1. Silicone Joint Sealant: Sealant Type 1.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

G. Interior Isolation and Contraction Joints in Cast-In-Place Concrete Slabs.

1. Silicone Joint Sealant: Sealant Type 3.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

H. Concealed Interior Perimeter Joints of Exterior Openings.

1. Silicone Joint Sealant: Sealant Type 1.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

I. Exposed Interior Perimeter Joints of Exterior Openings.

1. Silicone Joint Sealant: Sealant Type 1.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

J. Perimeter Joints Between Interior Wall Surfaces and Frames of Interior Doors Windows and Elevator Entrances.

1. Latex Joint Sealant: Sealant Type 5.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

K. Vertical Joints on Exposed Surfaces of Walls and Partitions.

1. Latex Joint Sealant: Sealant Type 5.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

L. Joints between Plumbing Fixtures and Walls and Floors and Between Countertops and Walls.

1. Silicone Joint Sealant: Sealant Type 4.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

M. Interior Joints for Which No Other Sealant is Indicated.

1. Latex Joint Sealant: Sealant Type 5.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Joint Sealants will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Joint Sealants shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Joint Sealants will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 08 11 13 – HOLLOW METAL DOORS AND FRAMES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

808.1113 Hollow Metal Doors and Frames

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Standard hollow metal frames.

B. Related Sections:

1. Division 08 Section "Door Hardware" for door hardware for hollow metal frames.
2. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal frames.

1.03 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.04 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. General: Submittals for Sections 081113, 081416 and 087100 shall be made concurrently.

B. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes.

C. Shop Drawings: Include the following:

1. Elevations of each door frame design.
2. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
3. Locations of reinforcement and preparations for hardware.
4. Details of each different wall opening condition.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.

D. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.05 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

C. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.

D. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

E. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.

1. Notify Architect of details or specifications not conforming to code.

F. Preinstallation Conference: Conduct conference at Project site.

1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.

2. Review tie-in to air barrier system.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.08 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Standard Steel Frames:
   a. Ceco Door Products; a United Dominion Company.
   b. Curries Company.
   c. de La Fontaine, Industries.
   d. Steelcraft; a division of Ingersoll-Rand.

2.02 MATERIALS

A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed

applications.

C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.

1. Wipe Coat Galvanneal materials will not be considered acceptable.

E. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

G. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

H. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.03 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.

1. Fabricate frames with mitered or coped corners.

2. Fabricate frames as face welded unless otherwise indicated.

3. Frames for Level 2 Steel Doors: 0.053-inch- thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet, unless metallic-coated sheet is indicated.

1. Fabricate frames with mitered or coped corners.

2. Fabricate frames as knocked down unless otherwise indicated.

3. Frames for Wood Doors: 0.053-inch- thick steel sheet.

4. Frames for Borrowed Lights: 0.053-inch- thick steel sheet.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.04 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.05 STOPS AND MOLDINGS

A. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.

B. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.06 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- wide steel.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.07 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. Jamb Anchors: Provide number and spacing of anchors as follows:
   a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      1) Two anchors per jamb up to 60 inches high.
      2) Three anchors per jamb from 60 to 90 inches high.
      3) Four anchors per jamb from 90 to 120 inches high.
      4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
   b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      1) Three anchors per jamb up to 60 inches high.
      2) Four anchors per jamb from 60 to 90 inches high.
      3) Five anchors per jamb from 90 to 96 inches high.
      4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
   c. Compression Type: Not allowed.
   d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame.

Space anchors not more than 26 inches o.c.

7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

2. Reinforce frames to receive nontemplated, mortised and surface-mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

F. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

4. Provide loose stops and moldings on inside of hollow metal work.

5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.08 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

D. At exterior walls and masonry walls, coat inside of frame profile with bituminous coating to a thickness of 1/16 inch.

3.03 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
   a. At fire-protection-rated openings, install frames according to NFPA 80.
   b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
   c. Install frames with removable glazing stops located on secure side of opening.
   d. Install door silencers in frames before grouting.
   e. Remove temporary braces necessary for installation only after frames have been properly
   f. set and secured.
   g. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
   a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
8. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.04 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Hollow Metal Doors and Frames will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Hollow Metal Doors and Frames shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Hollow Metal Doors and Frames will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 08 14 16 – FLUSH WOOD DOORS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

808.1416 Flush Wood Doors

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.
4. Factory glazing of wood doors.

B. Related Sections:

1. Division 08 Section "Glazing" for glass view panels in flush wood doors.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. General: Submittals for Sections 08 11 13, 08 14 16 and 08 71 00 shall be made concurrently.

B. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

C. Maine State Housing Authority Green Standards Submittals:

1. Product Data for adhesives and composite wood products, documentation indicating that product contains no urea formaldehyde.

D. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire-protection ratings for fire-rated doors.

E. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.

F. Warranty: Sample of special warranty.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors from single manufacturer.

B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 and UL 10C.

1. Include all requirements as part of the door construction per Category “A” guidelines.”

D. Preinstallation Conference: Conduct conference at Project site.

1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.07 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
   b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flush Wood Doors:
   a. Algoma Hardwoods Inc.
   b. Eggers Industries; Architectural Door Division.
   c. Marshfield Door Systems, Inc.: Signature Series.
   d. Mohawk Flush Doors, Inc.
   e. VT Industries Inc.

2.02 DOOR CONSTRUCTION, GENERAL

A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

B. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

C. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-2.

2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting

hardware.

D. Structural-Composite-Lumber-Core Doors:

1. Structural Composite Lumber: WDMA I.S.10.
   a. Screw Withdrawal, Face: 700 lbf.
   b. Screw Withdrawal, Edge: 400 lbf.
2. Provide doors with structural-composite-lumber cores instead of particleboard cores for the following doors:
   a. Doors indicated to receive exit devices.
   b. Doors where oversized glass lites exceed more than 40 percent of the door surface area.
   c. Doors where louvers exceed more than 40 percent of the door surface area.

E. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.

1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.

F. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.03 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade A faces.
2. Species: White Maple
3. Cut: Plain sliced.
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Pair and Set Match: Provide for doors hung in same opening.
7. Exposed Vertical Edges: Same species as faces.
8. Core: Particleboard except where structural composite lumber is required.
9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.
10. Adhesives: Type I per WDMA TM-6.

2.04 LOUVERS AND LIGHT FRAMES

A. Wood Louvers: Door manufacturer's standard solid-wood louvers unless otherwise indicated.

1. Wood Species: Same species as door faces.

B. Metal Louvers:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Air Louvers Inc.
   b. Anemostat; a Mestek company.
   c. Hiawatha Incorporated.

d. L & L Louvers, Inc.
e. LL Building Products, Inc.; a division of GAF Materials Corporation.
f. Louvers & Dampers, Inc.; a Mestek company.
g. McGill Architectural Products.

2. Blade Type: Vision-proof, inverted V.

3. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

C. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Air Louvers Inc.
b. Anemostat; a Mestek company.
c. Hiawatha Incorporated.
d. L & L Louvers, Inc.
e. LL Building Products, Inc.; a division of GAF Materials Corporation.
f. Louvers & Dampers, Inc.; a Mestek company.
g. McGill Architectural Products.

2. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

D. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows unless otherwise indicated.

1. Wood Species: Same species as door faces.

2. Profile: Flush, square shape.

3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

E. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.

2.05 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

C. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.

2. Louvers: Factory install louvers in prepared openings.

D. Factory Glazing: Provide glazing for all doors. Provide glass as specified in Division 08 Section “Glazing.” Install fire-rated glass as required by the glazing manufacturer.

2.06 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory.

C. Transparent Finish:

1. Grade: Premium.

2. Finish: WDMA TR-4 conversion varnish or TR-6 catalyzed polyurethane.

3. Staining: None required.

4. Effect: Open-grain finish.

5. Sheen: Satin.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.

2. Reject doors with defects.

B. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.03 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Flush Wood Doors will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Flush Wood Doors shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Flush Wood Doors will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 08 31 13 – ACCESS DOORS AND FRAMES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

808.3113 Access Doors and Frames

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Access doors and frames for walls and ceilings.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.

C. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain access doors and frames through one source from a single manufacturer.

B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for vertical access doors and frames.

2. ASTM E 119 or UL 263 for horizontal access doors and frames.

C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.05 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.01 STEEL MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

1. ASTM A 123/A 123M, for galvanizing steel and iron products.

2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Steel Sheet: Uncoated cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."

2. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.

2.02 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Acudor Products, Inc.
2. Babcock-Davis; A Cierra Products Co.
3. Bar-Co, Inc. Div.; Alfab, Inc.
4. Dur-Red Products.
5. J. L. Industries, Inc.
6. Karp Associates, Inc.
7. Larsen's Manufacturing Company.
8. Milcor Inc.
9. Nystrom, Inc.
10. Williams Bros. Corporation of America (The).

B. Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.

1. Locations: Wall and ceiling surfaces.
2. Door: Minimum 0.060-inch- thick sheet metal, set flush with exposed face flange of frame.
3. Frame: Minimum 0.060-inch- thick sheet metal with 1-inch- wide, surface-mounted trim.
4. Hinges: Continuous piano.
5. Latch: Cam latch operated by screwdriver with interior release.

C. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Fabricated from steel [stainless-steel] sheet.

1. Locations: Wall and ceiling surfaces.
2. Fire-Resistance Rating: Not less than that of adjacent construction.
3. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
4. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch.
5. Frame: Minimum 0.060-inch- thick sheet metal with 1-inch- wide, surface-mounted trim.
6. Hinges: Continuous piano.
7. Automatic Closer: Spring type.
8. Latch: Self-latching device operated by flush key with interior release.

2.03 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.

2. Provide mounting holes in frames for attachment of units to metal or wood framing.

3. Provide mounting holes in frame for attachment of masonry anchors. Furnish adjustable metal masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.02 ADJUSTING AND CLEANING

A. Adjust doors and hardware after installation for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

3.03 SCHEDULE

A. Ceilings: 24 by 24 inch door, unless noted otherwise.

B. Walls: 12 by 12 inch door, unless noted otherwise.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Access Doors and Frames will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Access Doors and Frames shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Access Doors and Frames will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 08 41 13 – ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

808.4113 Aluminum Framed Entrances and Storefronts

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Exterior storefront framing.

2. Exterior manual-swing entrance doors and door-frame units.

1.03 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.04 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.

2. Dimensional tolerances of building frame and other adjacent construction.

3. Failure includes the following:
   a. Deflection exceeding specified limits.
   b. Thermal stresses transferring to building structure.
   c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
   d. Noise or vibration created by wind and by thermal and structural movements.
   e. Loosening or weakening of fasteners, attachments, and other components.
   f. Sealant failure.
   g. Failure of operating units.

B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings..

2. Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
   a. Component Importance Factor is 1.5.

D. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is smaller.

E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.

F. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..

G. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..

1. Maximum Water Leakage: No uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior and water that cannot damage adjacent materials or finishes.

H. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
   a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
   b. Low Exterior Ambient-Air Temperature: 0 deg F.

2. Interior Ambient-Air Temperature: 75 deg F.

I. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 53 when tested according to AAMA 1503.

J. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.40 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.

2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. Other Action Submittals:

1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

E. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of aluminum-framed systems.

2. Include design calculations.

F. Seismic Qualification Certificates: For aluminum-framed systems, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

H. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

I. Warranties: Sample of special warranties.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.

C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

D. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

E. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

F. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.

1. Doors: Provide doors as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:
   a. Clear Width: 32 inches (815 mm) with door 90 degrees open.
   b. Maneuvering Clearances: Refer to Code for various side and approach clearances.
   c. Double-Leaf Doorways: Provide at least one leaf that meets the clear width and maneuvering clearances.
   d. Two Doors in Series: Provide a distance of four feet plus the width of any door swinging into the space between hinged or pivoted doors.

2. Notify Architect of details or specifications not conforming to code.

G. Preinstallation Conference: Conduct conference at Project site.

1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
2. Review structural loading limitations.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review use of Rivnuts for hardware.
5. Review sill flashing details and components.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including, but not limited to, excessive deflection.
   b. Noise or vibration caused by thermal movements.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   d. Water leakage through fixed glazing and framing areas.
   e. Failure of operating components.
2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide indicated products by one of the following:

1. EFCO Corporation.
2. Kawneer North America; an Alcoa company.
3. United States Aluminum.
4. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
5. YKK AP America Inc.

B. Products:

1. Exterior Aluminum-Framed Storefronts Standard of Design:
   a. Kawneer: FA-SET S.S.G (Thermal).
2. Doors and Entrances:
   a. Kawneer: 350 Heavy Wall.

2.02 MATERIALS

A. Recycled Content of Aluminum Products: Provide products with average recycled content of aluminum products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25

percent.

B. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

C. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.03 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Front.
4. Exterior Jambs and Head Framing: Provide manufacturer’s standard extruded aluminum continuous flat filler for use at jambs and head framing. This extrusion provides the necessary profile for sealing with the building air barrier system. Channel type jamb components will not be acceptable.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system, fabricated from stainless steel.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

F. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

G. Subsills for Exterior Storefronts: Manufacturer’s standard thermally broken extruded aluminum sill flashing, color to match framing.

2.04 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.05 ENTRANCE DOOR SYSTEMS

A. Heavy-Duty Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-7/8 to 2-inch overall thickness, with minimum 0.188-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

2. Door Design: Medium stile; 3-1/2-inch nominal width.
   a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane.

3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

B. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

2.06 ENTRANCE DOOR HARDWARE

A. General: Provide entrance door hardware and entrance door hardware sets indicated in "Entrance Door Hardware Sets" Article for each entrance door to comply with requirements in this Section.

1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products or products equivalent in function and comparable in quality to named products.

2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

3. Opening-Force Requirements:
   a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbfto set the door in motion and not more than 15 lbf to open the door to its minimum required width.
   b. Accessible Interior Doors: Not more than 5 lbf to fully open door.

B. Butt Hinges: BHMA A156.1, Grade 1, radius corner.

1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while entrance door is closed.

2. Exterior Hinges: Stainless steel, with stainless-steel pin.

3. Quantities:
   a. For doors up to 87 inches high, provide 3 hinges per leaf.
   b. For doors more than 87 and up to 120 inches high, provide 4 hinges per leaf.

C. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.

D. Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.

E. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

F. Additional Hardware: As specified in Division 8 Section "Door Hardware."

2.07 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

1. Provide interior sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

2.08 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.

2. Accurately fitted joints with ends coped or mitered.

3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.

4. Physical and thermal isolation of glazing from framing members.

5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

6. Provisions for field replacement of glazing from exterior.

7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Storefront Framing: Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.

2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.

2. At exterior doors, provide weather sweeps applied to door bottoms.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.09 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

2.10 HARDWARE FINISHES

A. Standard: BHMA A156.18, as indicated in door hardware sets.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide the following finishes:

1. Butts and Hinges: 26D
2. Weatherstripping Aluminum
3. Threshold Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

F. Install glazing as specified in Division 08 Section "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

3.03 ERECTION TOLERANCES

A. Install aluminum-framed systems to comply with the following maximum erection tolerances:

1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.

2. Alignment:
   a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
   b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.04 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Aluminum Framed Entrances and Storefronts will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Aluminum Framed Entrances and Storefronts shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Aluminum Framed Entrances and Storefronts will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 08 51 13 – ALUMINUM WINDOWS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

808.5113 Aluminum Windows

Add the following:

PART 1 - GENERAL

1.01 GENERAL CONDITIONS: The General Conditions and Supplementary General Conditions, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, shall apply to each and every contract and contractor, person or persons supplying material, labor or entering into the work, directly or indirectly.

1.02 SCOPE: This Section includes all labor, materials, equipment and related services necessary for the fabrication and delivery to the job site of the items shown on the drawings and/or specified herein, including but not limited to the following:

A. Aluminum windows.

1. Include factory glazing of window units.
2. Screens at operable units.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Glass and Glazing 08 80 00

1.04 LABORATORY TESTING AND PERFORMANCE REQUIREMENTS

A. Test Units

1. Air, water, and structural test unit shall conform to requirements set forth in AAMA/NWWDA 101/I.S.2 – 97 and manufacturer's standard locking/operating hardware and insulated glazing configuration.
2. Thermal test unit sizes shall be 48" (1219 mm) x 72" (1828 mm). Unit shall consist of a fixed over project-out window.

B. Test Procedures and Performances

1. The air, water, and structural tests shall conform to AAMA/NWWDA 101/I.S.2 - 97 requirements for the window type referenced in 1.01.B. In addition, the following specific performance requirements shall be met.
2. Air Infiltration Test
   a. With ventilators closed and locked, test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf (299 Pa).
   b. Air infiltration shall not exceed .10 cfm/SF (.50 l/s•m²) of unit.
3. Water Resistance Test
   a. With ventilators closed and locked, test unit in accordance with ASTM E 331/ASTM E 547 at a static air pressure difference of 10.0 psf (479 Pa).
   b. There shall be no uncontrolled water leakage.
4. Uniform Load Structural Test
   a. With ventilators closed and locked, test unit in accordance with ASTM E 330 at a static air pressure difference of 97.5 psf (4668 Pa), both positive and negative.
   b. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanisms, nor any other damage that would cause the window to be inoperable.

5. Forced Entry Resistance
   a. Windows shall be tested in accordance to ASTM F 588 or AAMA 1302.5 and meet the requirements of performance level 10.
6. Condensation Resistance Test (CRF)
   a. With ventilators closed and locked, test unit in accordance with AAMA 1503.1.
   b. Condensation Resistance Factor (CRF) shall not be less than 46 (frame) and 42 (glass) when glazed with 1" (25 mm) insulated – 1/4" (6 mm) clear, 1/2" (12 mm) air, 1/4" (6 mm) clear glass.
7. Thermal Transmittance Test (Conductive U-Value)
   a. With ventilators closed and locked, test unit in accordance with AAMA 1503.1.
   b. Conductive thermal transmittance (U-Value) shall not be more than 0.59 BTU/hr•ft^2•°F (3.35 W/m^2•k) when glazed with 1" (25 mm) insulated – 1/4" (6 mm) clear, 1/2" (12 mm) air, 1/4" (6 mm) clear glass.

C. Project Wind Loads

1. The system shall be designed to withstand the following loads normal to the plane of the wall:
   a. Positive pressure of +24 psf at non-corner zones.
   b. Negative pressure of -26 psf at non-corner zones.
   c. Negative pressure of +31 psf at corner zones.

1.05 QUALITY ASSURANCE

A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in 1.4.

B. Test reports shall be accompanied by the window manufacturer's letter of certification, stating the tested window meets or exceeds the air, water, and structural testing criteria for the appropriate AAMA/NWWDA 101/I.S.2 – 97 window type.

1.06 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Contractor shall submit shop drawings; finish samples, test reports, and warranties.

1. Samples of materials as may be requested without cost to owner, i.e., metal, glass, fasteners, anchors, frame sections, mullion section, corner section, etc.

1.07 WARRANTIES

A. Total Window System

1. The responsible contractor shall assume full responsibility and warrant for one year the satisfactorily performance of the total window installation which includes that of the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water, and structural adequacy as called for in the specifications and approved shop drawings.

2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at his expense during the warranty period.

PART 2 - PRODUCTS

2.01 WINDOWS

A. Basis of design is Kawneer 8225 TL projected window w/ 2 1/4" frame depth. Provide units from one of the following manufacturers:

1. Kawneer
2. Efco
3. Peerless

2.02 MATERIALS

A. Aluminum

1. Extruded aluminum shall be 6063-T6 alloy and tempered.

B. Hardware

1. Locking handles shall be cam type and manufactured from a white bronze alloy with a US25D brushed finish.

2. Operating hardware shall be 4-bar stainless steel arms or equal.

C. Weather-Strip

1. All weather-strip shall be Santoprene® or equal.

D. Thermal Barrier

1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.

2. No thermal short circuits shall occur between the exterior and interior.

3. Barrier material shall be poured-in-place, two-part polyurethane. A nonstructural thermal barrier is unacceptable.

E. Glass

1. Insulated glass shall be 1” (25 mm) as manufactured by EFCO consisting of ¼” exterior, ½” air spacer, and ¼” interior.

2.03 FABRICATION

A. General

1. All aluminum frame and vent extrusions shall have a minimum wall thickness of .125” (3 mm).

2. Mechanical fasteners, welded components, and hardware items shall not bridge thermal barriers. Thermal barriers shall align at all frame and vent corners.

3. Depth of frame shall not be less than 2 7/16” (61 mm).

B. Frame

1. Frame components shall be mortise and tenon. Other means of mechanically fastening, i.e., screws shall not be permitted.

2. Appearance of frame shall replicate a putty-glazed steel frame.

C. Ventilator

1. All vent extrusions shall be tubular.

2. Each corner shall be mitered, reinforced with an extruded corner key, hydraulically crimped, and "cold welded" with epoxy adhesive.

3. Each vent shall have one exterior row of weather stripping installed in specifically designed dovetail grooves in the extrusion and one interior row of drive-in glazing gasket that also forms the interior seals. The exterior gasket will be omitted at the vent bottom rail for project-out vents allowing pressure air to pressure equalize the void between the vent and frame.

4. Appearance of vent frame shall replicate putty-glazed steel vents.

D. Screens

1. Screen frames shall be extruded.

2. Screen mounting holes in the window frame shall be factory drilled.

3. Screen mesh shall be aluminum or fiberglass.

E. Glazing

1. Vents
   a. Units shall be inside glazed with a snap-in aluminum glazing bead and Santoprene drive-in wedge against the interior of the glass. The exterior face of the glass shall be set against preshimmed butyl tape.

2. Fixed Lites
   a. The exterior face of the glass shall be set against preshimmed butyl tape. The interior face of the glass shall be set against a dense neoprene drive-in wedge.

F. Finish

1. Organic
   a. Finish all exposed areas of aluminum windows and components with performance paint system. Color shall be selected by architect from full range of manufacturer's full line of standard and premium colors.

AA Description	Description	AAMA Guide Spec.
AA-M12-C42-R1X	70% PVDF Ultrapon™	2605-98

PART 3 - EXECUTION

3.01 INSPECTION

A. Job Conditions

1. Verify that openings are dimensionally within allowable tolerances, plumb, level, clean, provide a solid anchoring surface, and are in accordance with approved shop drawings.

3.02 INSTALLATION

A. Use only skilled tradesmen with work done in accordance with approved shop drawings and specifications.

B. Plumb and align window faces in a single plane for each wall plane, and erect windows and materials square and true. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

C. Adjust windows for proper operation after installation.

D. Furnish and apply sealants to provide a weather tight installation at all joints and intersections and at opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.

3.03 ANCHORAGE

A. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

3.04 PROTECTION AND CLEANING

A. After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, etc. Protection from this point shall be the responsibility of the general contractor.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Aluminum Windows will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Aluminum Windows shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Aluminum Windows will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 08 71 00 – DOOR HARDWARE

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

808.7100 Door Hardware

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Commercial door hardware for the following:

a. Swinging doors.

2. Power door operators.

B. Related Sections include the following:

1. Division 08 Section "Hollow Metal Frames" for door silencers provided as part of hollow-metal frames.

2. Division 08 Section "Flush Wood Doors" for integral intumescent seals provided as part of fire-rated labeled assemblies.

3. Division 28 Section “Door Entry Access Control System” for electric strikes provided as part of the building security system.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. General: Submittals for Sections 081113, 081416 and 087100 shall be made concurrently.

B. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

C. Samples for Verification: Submit minimum 2-by-4-inch plate Samples of each type of finish required, except primed finish.

D. Product Certificates: For electrified door hardware, signed by product manufacturer.

1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for locks, latches and closers.

F. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

G. Warranty: Special warranty specified in this Section.

H. Other Action Submittals:

1. Door Hardware Sets: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door

hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

a. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
b. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
c. Content: Include the following information:
    1) Identification number, location, hand, fire rating, and material of each door and frame.
    2) Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.
    3) Complete designations of every item required for each door or opening including name and manufacturer.
    4) Fastenings and other pertinent information.
    5) Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    6) Explanation of abbreviations, symbols, and codes contained in schedule.
    7) Mounting locations for door hardware.
    8) Door and frame sizes and materials.
    9) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
        a) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
    10) List of related door devices specified in other Sections for each door and frame.
d. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in Project construction schedule. Submit the final door hardware sets after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.

2. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

1. Electrified Door Hardware Consultant Qualifications: A qualified Architectural Hardware Consultant who is experienced in providing consulting services for electrified door hardware installations.

C. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

D. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.

1. Door Hardware: Provide hardware as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:
   a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
   b. Door Closers: Comply with the following maximum opening-force requirements indicated:
      1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
      2) Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
      3) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
   c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
2. NFPA 101: Comply with the following for means of egress doors:
   a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
   b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf for not more than 3 seconds.
   c. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
   d. Thresholds: Not more than 1/2 inch high.
3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

E. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.

F. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.

G. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

H. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." In addition to Owner, Construction Manager, Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for key control system.
4. Address for delivery of keys.

I. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to electrified door hardware including, but not limited to, the following:

1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.

2. Review sequence of operation for each type of electrified door hardware.

3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Review required testing, inspecting, and certifying procedures.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to access control system.

C. Existing Openings: Where new hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.

1.07 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including excessive deflection, cracking, or breakage.
   b. Faulty operation of operators and door hardware.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: One year from date of Substantial Completion, except as follows:
   a. Exit Devices: Two years from date of Substantial Completion.
   b. Manual Closers: 10 years from date of Substantial Completion.

1.08 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.01 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in Part 3 "Door Hardware Sets" Article.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.

2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Sets" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware

type required for the purpose of establishing minimum requirements.

C. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.02 HINGES, GENERAL

A. Quantity: Provide the following, unless otherwise indicated:

1. Two Hinges: For doors with heights up to 60 inches.
2. Three Hinges: For doors with heights 61 to 90 inches.
3. Four Hinges: For doors with heights 91 to 120 inches.
4. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

C. Hinge Weight: Unless otherwise indicated, provide the following:

1. Entrance Doors: Heavy-weight hinges.
2. Doors with Closers: Antifriction-bearing hinges.
3. Interior Doors: Antifriction-bearing hinges and standard-weight hinges as indicated.

D. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Exterior Hinges: Stainless steel, with stainless-steel pin.
2. Interior Hinges: Steel, with steel pin.
3. Hinges for Fire-Rated Assemblies: Steel, with steel pin.

E. Hinge Options: Where indicated in door hardware sets or on Drawings:

1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors and outswinging corridor doors with locks.
2. Corners: Square.

F. Electrified Functions for Hinges: Comply with the following:

1. Power Transfer: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle.
2. Available Products:
   a. Hagar: ETW 4-1/2 x 4-1/2.
   b. McKinney: TA2714-CC4.
   c. Stanley: CEFBB-179.

G. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors and wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.03 HINGES

A. Butts and Hinges: BHMA A156.1.

B. Template Hinge Dimensions: BHMA A156.7.

C. Available Manufacturers:

1. Hager Companies (HAG).
2. McKinney Products Company; an ASSA ABLOY Group company (MCK).
3. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

D. The following is a guide for hinge size and type required for this project.

Door Type	Manufacturer	Interior:	Exterior
1-3/8" Doors	Stanley	F179-3 1/2"	*not applicable*
up to 3'-0" wide	Hager	1279-3 1/2"	*not applicable*
	McKinney	T2714-3 1/2"	*not applicable*
1-3/4" Doors	Stanley	FBB179-4 1/2"	FBB191-4 1/2"
up to 3'-0" wide	Hager	BB1279-4 1/2"	BB1191-4 1/2"
	McKinney	TA-TB2714-4 1/2"	TA-TB2314-4 1/2"
1-3/4" Doors	Stanley	FBB168-4 1/2"	FBB199-4 1/2"
over 3'-0" wide	Hager	BB1168-4 1/2"	BB1199-4 1/2"
	McKinney	T4A-T4B3786-4 1/2"	T4A-T4B3386-4 1/2"
2-1/4" Doors	Stanley	*not applicable*	FBB199-5"
	Hager	*not applicable*	BB1199-5"
	McKinney	*not applicable*	T4A-T4B3386-5"

2.04 LOCKS AND LATCHES, GENERAL

A. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.

B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

C. Electrified Locking Devices: BHMA A156.25.

D. Lock Trim:

1. Levers: Cast.
2. Escutcheons (Roses): Forged.
3. Dummy Trim: Match lever lock trim and escutcheons.

E. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch latchbolt throw.
2. Mortise Locks: Minimum 3/4-inch latchbolt throw.
3. Deadbolts: Minimum 1-inch bolt throw.

F. Rabbeted Meeting Doors: Provide special rabbeted front and strike on locksets for rabbeted meeting stiles.

G. Backset: 2-3/4 inches, unless otherwise indicated.

H. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:

1. Strikes for Bored Locks and Latches: BHMA A156.2.
2. Strikes for Mortise Locks and Latches: BHMA A156.13.
3. Strikes for Interconnected Locks and Latches: BHMA A156.12.
4. Strikes for Auxiliary Deadlocks: BHMA A156.5.
5. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
6. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
7. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.

2.05 MORTISED LOCKS AND LATCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mechanical Locks and Latches:
   a. Best Lock Corporation (BLC).
   b. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).
   c. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
   d. Schlage Lock Company; an Ingersoll-Rand Company (SCH).

B. Mortise Locks: Stamped steel case with steel or brass parts; BHMA Grade 1; Series 1000.

1. Provide one of the following manufacturers and designs:
   a. Best H Series
   b. Corbin/Russwin ML2000 Series
   c. Sargent 8200 Series
   d. Schlage L9000 Series

C. Lock Trim: Comply with the following:

1. Lockset Designs: Provide the lockset design designated below or, if sets are provided by another manufacturer, provide designs that match those designated:
   a. Best, 14 design
   b. Corbin/Russwin, Newport design
   c. Sargent, LNL design
   d. Schlage, 06A design

D. Lock Functions: Lock functions as indicated in the hardware schedule shall be as follows:

Function	Sargent	Schlage	Corbin/Russwin:	Best
A (utility)	04	80	57	EW
B (office)	05	50	51	E
C (passage)	15	10	10	N
D (classroom)	37	70	55	J
E (entrance)	16	60	42	F
F (privacy)	65	40	30	LF

2.06 DOOR BOLTS

A. Bolt Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Half-Round Surface Bolts: Minimum 7/8-inch throw.
2. Interlocking Surface Bolts: Minimum 15/16-inch throw.
3. Fire-Rated Surface Bolts: Minimum 1-inch throw; listed and labeled for fire-rated doors.
4. Dutch-Door Bolts: Minimum 3/4-inch throw.
5. Mortise Flush Bolts: Minimum 3/4-inch throw.

B. Dustproof Strikes: BHMA A156.16, Grade 1.

C. Manual Flush Bolts: BHMA A156.16, Grade 1; designed for mortising into door edge.

1. Available Manufacturers:
   a. Door Controls International (DCI).
   b. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
   c. Rockwood.

2. Available Products for Wood Doors:
   a. Door Controls: 790.
   b. Glynn-Johnson: FB6W.
   c. Rockwood: 557.

2.07 EXIT DEVICES

A. Note: NEC requires exit devices on electrical room doors where gear is rated over 1200 amps. City of Portland requires exit devices on all electrical room doors regardless of rating.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Precision Hardware, Inc. (PH).

2. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).

3. Von Duprin; an Ingersoll-Rand Company (VD).

C. Products: All exit devices for this project shall be one of the following:

1. Precision Olympian Series

2. The 80 Series exit device by Sargent & Co.

3. 98 Series by Von Duprin Division

D. Exit Devices: BHMA A156.3, Grade 1.

E. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.

F. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

G. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

H. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

I. Removable Mullions: BHMA A156.3.

J. Outside Trim: Pull with cylinder; material and finish to match locksets, unless otherwise indicated.

K. Top and Bottom Strikes: Where vertical rod exit devices are indicated for interior doors, provide standard surface-mounted top strike and flush or recessed bottom strike.

L. The following functions shall be required where specified:

Function	Von Duprin	Sargent:	Precision
A	CD99NL-OP	16-8804	1103CD x 1123-38
B	CD99EO	16-8810	1101CD x 1123-38
C	99L	8813ET	1108 x 39L x 1123-38
D	99L-BE	8815ET	1108A x 39L x 1123-38
E	99EO-F	12-8810	FL-1101 x 1123-38
F	99L-F	12-8813ET	FL-1108 x 39L x 1123-38
G	99L-F-BE	12-8815ET	FL-1108A x 39L x 1123-38
H	CD9927EO	16-8710	1201CD x 1123-38
I	9927L	8713ET	1208 x 39L x 1123-38
J	9927L-BE	8715ET	1208A x 39L x 1123-38
K	CD9927EO x LBR	16-PP/PR8710	1201CD x 1123-38 x LBR
L	9927L x LBR	PP/PR8713ET	1208 x 39L x 1123-38 x LBR
M	9927L-BE x LBR	PP/PR8715ET	1208A x 39L x 1123-38 xLBR
N	9927EO-F	12-8710	FL-1201 x 1123-38
O	9927L-F	12-8713ET	FL-1208 x 39L x 1123-38
P	9927L-F-BE	12-8715ET	FL-1208A x 39L x 1123-38
Q	9927EO-F x LBR	12-PP/PR8710	FL-1201 x 1123-38 x LBR
R	9927L-F x LBR	12-PP/PR8713ET	FL-1208x39L x 1123-38xLBR
S	9927-L-F-BE x LBR	12-PP/PR8715ET	FL-1208Ax39Lx1123-38 x LBR

2.08 LOCK CYLINDERS

A. Standard Lock Cylinders: BHMA A156.5, Grade 1.

B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Six.

2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

3. Bored-Lock Type: Cylinders with tailpieces to suit locks.

C. Construction Keying: Comply with the following:

1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cylinders: Same manufacturer as for locks and latches.

2.09 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference, and as follows:

1. Master Key System: Cylinders are operated by a change key and a master key.

2. Keyed Alike: Key all cylinders to same change key.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
   a. Notation: Information to be furnished by Owner.

2. Quantity: In addition to one extra key blank for each lock, provide the following:
   a. Cylinder Change Keys: Three.
   b. Master Keys: Eight.

2.10 KEY CONTROL SYSTEM

A. Key Control Cabinet: BHMA A156.5, Grade 1; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

1. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

B. Cross-Index System: Multiple-index system for recording key information. Include three receipt forms for each key-holding hook. Set up by key control manufacturer.

1. Available Manufacturers:
   a. Key Control Systems, Inc. (KCS).
   b. Telkee, Inc.; a division of Sunroc Corporation (SUN).

C. Key Lock Boxes (Knox Box): Designed for storage of (4) four keys.

1. Available Manufacturers:
   a. ABLOY Security, Inc.; an ASSA ABLOY Group company (ABL).
   b. Knox Company (KNX).
   c. Supra Products (SUP).
   d. Provide item approved by the Portland Fire Department.

2.11 OPERATING TRIM

A. Standard: BHMA A156.6.

B. Materials: Fabricate from stainless steel, unless otherwise indicated.

C. Available Manufacturers:

1. Burns Manufacturing Incorporated (BM).

2. Don-Jo Mfg., Inc. (DJO).

3. Hager Companies (HAG).

4. IVES Hardware; an Ingersoll-Rand Company (IVS).

5. Rockwood Manufacturing Company (RM).

D. Door Pulls, 1 inch diameter.

1. Size: ADA compliant, unless indicated otherwise, provide 10 inches center to center, with 3 1/2 inch projection and 2 1/2 inch clearance.

2. Available Products:
   a. Hager Companies, H4J.
   b. IVES Hardware; an Ingersoll-Rand Company; 8103EZ.
   c. Equivalent by Rockwood Manufacturing Co.

E. Push Bars, 1 inch diameter.

2.12 CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Surface-Mounted Closers:
   a. LCN Closers; an Ingersoll-Rand Company (LCN).
   b. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).

C. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Comply with the following maximum opening-force requirements:
   a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
   b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

D. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.

E. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. LCN:
   a. Exterior: 4040 Series
   b. Interior: 4040 Series

2. Sargent:
   a. Exterior: 281
   b. Interior: 281

2.13 PROTECTIVE TRIM UNITS

A. Size: 1-1/2 inches less than door width on push side and 1/2 inch less than door width on pull side, by height specified in door hardware sets.

B. Fasteners: Manufacturer's standard machine or self-tapping screws.

C. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from the following material:

1. Material: 0.050-inch- thick stainless steel.

2. Available Manufacturers:
   a. Burns Manufacturing Incorporated (BM).
   b. Don-Jo Mfg., Inc. (DJO).
   c. Hager Companies (HAG).
   d. IVES Hardware; an Ingersoll-Rand Company (IVS).
   e. Rockwood Manufacturing Company (RM).

D. Fabricate protection plates as follows:

1. Push Plates: 16" high by 8" wide.

2. Kick Plates: 10" high by 1-1/2" less than door width for single doors and 1" less than door width for pairs of doors. Kick plates shall be applied to push side of all doors where noted.

2.14 STOPS AND HOLDERS

A. Stops and Bumpers: BHMA A156.16, Grade 1.

1. Provide wall stops for doors unless floor or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.

2. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.

B. Wall Stops: Wall type bumpers with concealed type flange shall be used where ever possible.

1. Available Products:
   a. Ives - 407 1/2
   b. Door Controls - 3211T
   c. Rockwood - 409

C. Floor Stops: Where wall type bumpers cannot be used, provide dome type, floor mounted stops of the proper height as follows:

1. Available Products:
   a. Ives - 436, 438
   b. Door Controls - 3310X, 3320X
   c. Rockwood - 440, 442

D. Exterior doors striking masonry and doors specified to have door stops and holders, shall have cast bronze wall or floor type door stops with hook or staple type holders to selectively hold doors in open position. The following will be acceptable:

1. Available Products:
   a. Ives - 445, 446
   b. Door Controls - 3237X, 3347X
   c. Rockwood - 473, 477

E. Door Catches: Provide surface-mounted roller catch where indicated. Ives No. 338 or approved substitute.

F. Roller Bumper: Provide curved roller bumper with 2-3/4 inch projection with brushed chrome finish; No. GJRB3 by Robert Brooke and Associates, Hager 273W, or approved substitute.

G. Silencers for Wood Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum 5/8 by 3/4 inch; fabricated for drilled-in application to frame.

H. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch; fabricated for drilled-in application to frame.

2.15 DOOR GASKETING

A. Standard: BHMA A156.22.

B. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

C. Weatherstripping:

1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. Basis-of-Design Product, No. A626A by National Guard Products or approved substitute.

2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed. Basis-of-Design Product, No. 600A by National Guard Products or approved substitute.

3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed. Basis-of-Design Product, No. 95WH by National Guard Products or approved substitute.

D. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.

1. Provide smoke-labeled gasketing on fire-rated doors and on smoke-labeled doors. Basis-of-Design Product, No. 5050 by National Guard Products or approved substitute.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

2.16 THRESHOLDS

A. Standard: BHMA A156.21.

B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch high.

D. Manufacturers:

1. Provide No. 896 with door bottom sweep No. 95WH by National Guard Products or approved substitute.

2.17 MISCELLANEOUS DOOR HARDWARE

A. One-Way Viewers: Provide No. 698 by Ives or approved substitute.

2.18 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.

2. Steel Machine or Wood Screws: For the following fire-rated applications:
   a. Mortise hinges to doors.
   b. Strike plates to frames.
   c. Closers to doors and frames.

3. Steel Through Bolts: For the following fire-rated applications unless door blocking is provided:
   a. Surface hinges to doors.
   b. Closers to doors and frames.
   c. Surface-mounted exit devices.

4. Spacers or Sex Bolts: For through bolting of hollow-metal doors.

5. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.19 FINISHES

A. Standard: BHMA A156.18, as indicated in door hardware sets.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide the following finishes:

1.	Butts and Hinges:	26D
2.	Locks & Lock Trim:	26D
3.	Exit Devices:	26D
4.	Door Controls - Closers:	Sprayed Aluminum
5.	Door Stops	26D
6.	Weatherstripping	Aluminum
7.	Threshold	Aluminum
8.	Kickplates	26D
9.	Pulls	26D

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 Series.

1. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.

B. Wood Doors: Comply with DHI A115-W Series.

3.03 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

E. Strikes for Vertical Rod Exit Devices: Where vertical rod exit devices are used at interior doors, bottom strikes at

floor are to be installed so that the top of the strike is flush with the adjacent flooring material.

3.04 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.

2. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.05 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.06 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

3.07 DOOR HARDWARE SETS

A. The hardware sets listed below indicate the items of hardware required for each opening. It is the bidder's responsibility to accurately furnish the proper quantities, items, sizes, weights and functions as required by the plans and specifications. If an opening has, through error, been omitted from the following hardware sets, it shall be the bidder's responsibility to supply hardware of equivalent quality and quantity, as that which is specified for a comparable opening.

HW1 ALUMINUM VESTIBULE DOORS
Doors 107.1 123.1

Each leaf to have:
- Closer
- Push / Push Plate
- Hinges
- Kickplate

HW2 EXTERIOR ALUMINUM SECURE ENTRANCE
Doors 107.2, 111.1, 115.1, 115.2, 123.2

Each to have:
- Hinges
- Mortise Lockset
- Heavy Duty Electric Strike (Folger Adams)
- Closer
- Kickplate
- Weather-stripping
- Threshold
- Silencers

Card reader and request to exit sensor, door position switch by Security System Subcontractor, Galaxy Integrated Technologies.

Note: omit threshold and weather-striping at door 115.1.

HW3 INTERIOR SECURE OFFICE / MEETING ROOM DOORS
Doors 101.1, 102.1, 103.1, 104.1, 105.1, 106.1, 108.1, 117.1, 117.2, 121.1, 122.1, 124.1, 125.1,

Each to have:
Hinges
Mortise Lockset
Heavy Duty Electric Strike (Folger Adams)
Closer
Kickplate
Silencers
Card reader, request to exit sensor, door position switch by Security System Subcontractor, Galaxy Integrated Technologies.

HW4 SECURE STORAGE/UTILITY DOORS
Doors 110.1, 118.1, 119.1, 120.1

Each to have:
Hinges
Mortise Lockset (Storeroom Function)
Stop
Silencers

Note: Door 120.1 – Provide closer, weather-striping, and threshold
Door 110.1 – Provide flush bolt at inactive leaf.

HW5 INTERIOR PRIVACY DOORS
Doors 112.1, 113.1, 114.1,

Each to have:
Hinges
Mortise Lockset (Privacy Function)
Stop

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Door Hardware will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Door Hardware shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Door Hardware will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 08 80 00 – GLAZING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

808.8000 Glazing

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Doors.

B. Related Sections:

1. Division 08 Section "Flush Wood Doors" for wood doors to be factory glazed.

1.03 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit.

1.04 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: For each glass product and glazing material indicated.

B. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

C. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Product Certificates: For glass and glazing products, from manufacturer.

1.06 QUALITY ASSURANCE

A. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA's "Glazing Manual."

D. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

E. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F, and the fire-resistance rating in minutes.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

PART 2 - PRODUCTS

2.01 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

2.02 GLASS PRODUCTS

A. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2. For uncoated glass, comply with requirements for Condition A.

2.03 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

1. EPDM complying with ASTM C 864.

2. Silicone complying with ASTM C 1115.

3. Thermoplastic polyolefin rubber complying with ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned EPDM, silicone, or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.04 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D.

4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Dow Corning Corporation; 790.
   b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
   c. May National Associates, Inc.; Bondaflex Sil 290.
   d. Pecora Corporation; 890.
   e. Sika Corporation, Construction Products Division; SikaSil-C990.
   f. Tremco Incorporated; Spectrem 1.

C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.05 GLAZING TAPES

A. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.

2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.06 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.07 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.08 MONOLITHIC-GLASS TYPES

A. Tempered Glass: Clear fully tempered float glass.

1. Thickness: 6.0 mm.

2. Provide safety glazing labeling.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep systems.

3. Minimum required face and edge clearances.

4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.03 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.04 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.05 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Glazing will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Glazing shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Glazing will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 09 29 00 – GYPSUM BOARD

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

809.2900 Gypsum Board

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Interior gypsum board.

B. Related Sections include the following:

1. Division 06 Section "Rough Carpentry" for wood framing and furring that supports gypsum board.
2. Division 06 Section "Sheathing" for sheathing.
3. Division 07 Section "Thermal Insulation" for insulation and vapor retarders installed in assemblies that incorporate gypsum board.
4. Division 09 painting Sections for primers applied to gypsum board surfaces.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: For each type of product indicated.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

1.04 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.05 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.01 PANELS, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

B. Regional Materials: Gypsum panel products shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

2.02 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. American Gypsum Co.
   b. BPB America Inc.
   c. G-P Gypsum.
   d. Lafarge North America Inc.
   e. National Gypsum Company.
   f. PABCO Gypsum.
   g. Temple.
   h. USG Corporation.

B. Regular Type:

1. Thickness: 1/2 inch.
2. Long Edges: Tapered.

C. Type X:

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

2.03 SPECIALTY GYPSUM BOARD

A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Georgia-Pacific Gypsum LLC; DensArmour Plus.
2. Core: 5/8 inch, Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10.

2.04 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material:
   a. Galvanized or aluminum-coated steel sheet or rolled zinc.

b. Plastic where abutting exterior metal doors and windows.

2. Shapes:
   a. Cornerbead.
   b. LC-Bead: J-shaped; exposed long flange receives joint compound.
   c. L-Bead: L-shaped; exposed long flange receives joint compound.
   d. Expansion (control) joint.

2.05 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.

2. Mold-Resistant Gypsum Wallboard: 10-by-10 glass mesh.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.

2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping or drying-type, all-purpose compound.
   a. Use setting-type taping with mold-resistant gypsum wallboard.

3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.

4. Finish Coat: For third coat, use drying-type, all-purpose compound.

5. Skim Coat: Not required.

2.06 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

D. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Pecora Corporation; AC-20 FTR or AIS-919.
   b. USG Corporation; SHEETROCK Acoustical Sealant.

2. Provide sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

F. Vapor Retarder: As specified in Division 07 Section "Thermal Insulation."

G. Firestopping: As specified in Division 07 Section “Penetration Firestopping.”

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.

2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Fire-Resistance-Rated Gypsum Board Assemblies: Provide firestop system at the top of fire-resistance-rated gypsum board assemblies. Provide firestop system around any structural penetration of wall assembly.

L. Smoke-Rated Gypsum Board Assemblies: Provide a tight, taped joint at the top of smoke-rated assemblies and around any penetrations to assemblies at both side of the assembly. The use of acoustical sealant will be acceptable to fill gaps up to 3/8 inch wide.

3.03 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Regular Type: As indicated on Drawings.
2. Type X: Where required for fire-resistance-rated assembly.
3. Moisture- and Mold-Resistant Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels as follows:
   a. Vertically (parallel to framing) for metal framing.
   b. Horizontally (perpendicular to framing) for wood framing.
   c. Stagger abutting end joints not less than one framing member in alternate courses of panels.
   d. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.04 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings or according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners, unless otherwise indicated.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use where indicated.

3.05 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.

2. Level 2: Where indicated on Drawings.

3. Level 3: Where indicated on Drawings.

4. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
   a. Primer and its application to surfaces are specified in other Division 09 Sections.

5. Level 5: Not required.

3.06 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

1. Complete the following in areas to receive gypsum board ceilings:
   a. Installation, insulation, and leak and pressure testing of water piping systems.
   b. Installation of air-duct systems.
   c. Installation of air devices.
   d. Installation of mechanical system control-air tubing.
   e. Installation of ceiling support framing.
   f. Installation of Penetration Firestopping.

3.07 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Gypsum Board will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Gypsum Board shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Gypsum Board will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Structural	Lump Sum

END OF SECTION

SECTION 09 30 00 –TILING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

809.3000 Tiling

Add the following:

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Through body porcelain tile.

2. Metal edging transition strips for recessed areas.

1.02 RELATED WORK

A. See Division 09 Section 096800 for Carpeting.

B. See Division 09 Section 096500 for Resilient Flooring

1.03 DEFINITIONS

A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

B. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.04 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the values indicated as determined by testing identical products per ASTM C 1028.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: For each type of tile, mortar, grout, and other products specified.

B. Shop Drawings: For the following:

1. Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Tile Samples for Selection: Manufacturer's color charts consisting of actual tiles or sections of tiles showing the full range of colors, textures, and patterns available for each type and composition of tile indicated. Include Samples of accessories involving color selection.

D. Grout Samples for Selection: Manufacturer's color charts consisting of actual sections of grout showing the full range of colors available for each type of grout indicated.

E. Samples of Accessories: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent

quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Management and Coordination."

1. Review details and components for thick-set tile, waterproofing, and crack suppression at control joints.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

1.09 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers and Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the following paragraphs of Part 2.

2.02 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.

2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. As selected by Architect from manufacturer's full range.

D. Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

E. Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless another mounting method is indicated.

1. Where tile is indicated for installation in swimming pools, on exteriors, or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for these kinds of installations and has a record of successful in-service performance.

2.03 TILE PRODUCTS

A. Ceramic Mosaic Tile (CT-1): Provide factory-mounted flat tile complying with the following requirements:

1. Composition: Porcelain.
2. Field Tile Module Size: 2in. x 2 in. (4.9 cm x 4.9 cm).
3. Base Tile Module Size: 2 in. x 2 in. Surface Bullnose.
4. Nominal Thickness: 1/4 inch (7.5 mm).
5. Face: Unglazed.
6. Static Coefficient of Friction: Level Surfaces, minimum 0.6.
7. Product: Provide the following:
   a. “Keystones” series unglazed mosaics by Daltice.

2.04 WATERPROOFING FOR THIN-SET TILE INSTALLATIONS

A. General: Provide products that comply with ANSI A118.10 and the descriptions in this Article.

B. Latex-Rubber Waterproofing: Manufacturer's standard factory-packaged, job-mixed, proprietary, 2-part formulation consisting of liquid-latex rubber and powder for trowel application and glass-fiber-fabric reinforcing.

1. Product: Laticrete 9235 Waterproof Membrane; Laticrete International, Inc.

C. Urethane Waterproofing and Tile-Setting Adhesive: Manufacturer's standard proprietary product consisting of 1-part liquid-applied urethane in a consistency suitable for trowel application and intended for use as both waterproofing and tile-setting adhesive in a 2-step process.

1. Product: Hydroment Ultra-Set Advanced; Bostik.

2.05 SETTING MATERIALS

A. Latex-Portland Cement Mortar: ANSI A118.4, composed as follows:

1. Prepackaged dry-mortar mix combined with acrylic resin liquid-latex additive.
   a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

B. Organic Adhesive: ANSI A136.1, Type I.

2.06 GROUTING MATERIALS

A. Polymer-Modified Tile Grout: ANSI A118.7, color as indicated.

1. Polymer Type: Acrylic resin in liquid-latex form for addition to prepackaged dry-grout mix.
   a. Unsanded grout mixture for joints 1/8 inch (3.2 mm) and narrower.
   b. Sanded grout mixture for joints 1/8 inch (3.2 mm) and wider.

2.07 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard sanded acrylic caulking containing a mildew-cide or antimicrobial protection.

1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

C. Products: Available products include the following:

1. Keracaulk™ S by Mapei
2. CeramaSeal by Bostik Findley

2.08 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

C. Crack Suppression for Thin Set Tile:

1. Sheet or trowelable membrane designed to bridge small cracks for tile setting applications. Provide one of the following products:
   a. Laticrete 9235 Waterproof & Anti-Fracture Membrane
   b. Nobleseal CIS
   c. Hydroment Ultra-Set
   d. Mapei PRP M19

D. Metal Edging:

1. Stainless steel edging to be embedded in tile setting bed:
   a. Product: Schluter SCHIENE – E, 3/8 in. (10 mm), #E 100

2.09 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.

B. Do not proceed with installation until unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

B. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill minor cracks.

C. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.

1. Use self-leveling underlayments or trowelable leveling and patching compounds to fill cracks, holes, and depressions.

2. Remove protrusions, bumps, and ridges by sanding or grinding.

D. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

E. Cracks and Control Joints for Thin-Set Tile:

1. Install crack suppression materials a minimum of 12 inches wide over construction and control joints. Install in accordance with manufacturer’s instructions.

3.03 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.

C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Lay out tile wainscots to next full tile beyond dimensions indicated.

G. Grout tile to comply with the requirements of the following tile installation standards:

1. For ceramic tile grouts (sand-portland cement, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.

H. Joint Sealants: Install sealant in floor tile joint directly above control joints and crack suppression material. Install sealant in tile joint at perimeter edges of floor tile and tile base or dissimilar base materials.

3.04 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with waterproofing manufacturer's written instructions to produce a waterproof membrane of uniform thickness bonded securely to substrate.

B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.05 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Ceramic Tile Floor Installation Schedule, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.

B. Joint Widths: Install tile on floors with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
2. Porcelain Tile: 1/8 inch (3.2 mm).
3. Paver Tile: 1/4 inch (6.35 mm).

C. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.

1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.

3.06 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion.

1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with carpet pad or other heavy covering during construction period to prevent staining, damage, and wear.
2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.

D. Before final inspection, rinse neutral cleaner from tile surfaces.

3.07 CERAMIC TILE FLOOR INSTALLATION SCHEDULE

A. Ceramic Tile Floor Installation: Where interior floor installations of this designation are indicated, comply with the following:

1. Tile Type: Porcelain paver tile.
2. Installation Method: TCA F113 (thin-set mortar bonded to concrete subfloor).
3. Setting Bed and Grout: ANSI A118.1 with the following mortar and grout:
   a. Latex-portland cement mortar bond coat.
   b. Sanded polymer-modified tile grout.
   c. Grout color: Black

3.08 WASTE MANAGEMENT

A. Separate waste in accordance with the Waste Management Plan and place in designated areas in the following categories for recycling:

1. Half tiles and larger: Set aside for reuse by Owner.
2. Broken tile, cutoffs smaller than 1/2 tile, and excess mortar and grout: Crush for use as mosaic, sub-base, or fill.
3. Separate metal waste and place in designated area for recycling.
4. Separate cardboard waste and place in designated area for recycling.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Tiling will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Tiling shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Tiling will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 09 51 13 – ACOUSTICAL PANEL CEILINGS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

809.5113 Acoustical Panel Ceilings

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Acoustical ceiling panels.
2. Exposed grid suspension system.
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

B. Related Sections:

1. Section 09 29 00 - Gypsum Board
2. Divisions 23 - HVAC
3. Division 26 - Electrical Work

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
7. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
8. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
9. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
10. ASTM E 1264 Classification for Acoustical Ceiling Products.
11. ASTM E 1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.

12. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

13. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.

B. ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"

C. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components

D. International Code Council-Evaluation Services - Evaluation Report, ESR-1308, Fire- and Nonfire-Resistance-Rated Suspended Ceiling Framing Systems

E. ASCE 7 Standard - American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

F. CISCA 0-2 - Ceilings and Interior Systems Construction Association Recommendations for Direct-Hung Acoustical Tile and Lay-In Panel Ceilings, Seismic Zones 0-2

1. 04 SYSTEM DESCRIPTION

A. Seismic Loads: Design and size components to withstand seismic loads in accordance with the International Building Code, Section 1621 for Category C.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications SECTION 105.7, Working Drawings.

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

C. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.

D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

E. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.06 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

B. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.

a. Flame Spread: 25 or less

b. Smoke Developed: 50 or less

2. Fire Resistance Ratings: As indicated by reference to design designations in UL Fire Resistance Directory, for types of assemblies in which acoustical ceilings function as a fire protective membrane and tested per ASTM E 119.

a. Protect lighting fixtures and air ducts to comply with requirements indicated for rated assembly.

C. Seismic Performance: Provide acoustical ceiling system that has been evaluated by an independent party and found to be compliant with the 2003 International Building Code, Seismic Category C.

1. Tested per International Code Council - Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components as evidenced by International Code Council Evaluation Report, ESR-1308.

D. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.08 PROJECT CONDITIONS

A. Space Enclosure:

All ceiling products and suspension systems must be installed and maintained in accordance with Armstrong written installation instructions for that product in effect at the time of installation and best industry practice. Prior to installation, the ceiling product must be kept clean and dry, in an environment that is between 32oF (0o C) and 120oF (49o C) and not subject to Abnormal Conditions. Abnormal conditions include exposure to chemical fumes, vibrations, moisture from conditions such as building leaks or condensation, excessive humidity, or excessive dirt or dust buildup.

HumiGuard Plus Ceilings: Installation of the products shall be carried out where the temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning. All wet work (plastering, concrete, etc) must be complete and dry. The ceilings must be maintained to avoid excessive dirt or dust buildup that would provide a medium for microbial growth on ceiling panels. Microbial protection does not extend beyond the treated surface as received from the factory, and does not protect other materials that contact the treated surface such as supported insulation materials.

HumiGuard Max Ceilings: HumiGuard Max's sag performance warranty extends to installations where the ceiling product is exposed to chemical fumes, extreme temperatures up to 120°F (49° C) (including steam up to 275°F (135° C)) and 100% RH, including standing water applications so long as the product is installed with either SS Prelude Plus, AL Prelude Plus or Prelude Plus XL Fire Guard suspension systems. For swimming pools, install only with AL Prelude Plus suspension system. For outdoor soffits, canopies, and parking garages install with Prelude XL for Exterior Applications (wind uplift should be considered). The ceilings must be maintained to avoid excessive dirt or dust buildup that would provide a medium for microbial growth on ceiling panels. Microbial protection does not extend beyond the treated surface as received from the factory, and does not protect other materials that contact the treated surface such as supported insulation materials.

1.09 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:

1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.

2. Grid System: Rusting and manufacturer's defects

3. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.

B. Warranty Period Humiguard:

4. Acoustical panels: Ten (10) years from date of substantial completion.

5. Grid: Ten (10) years from date of substantial completion.
6. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.10 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2-PRODUCTS

2.01 MANUFACTURERS

A. Ceiling Panels:

1. Armstrong World Industries, Inc.

2.02 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type ACT-1: Optima

1. Surface Texture: Fine
2. Composition: Fiberglass
3. Color: White
4. Size: 24in x 24in x 1in
5. Edge Profile: Square Tegular for interface with Interlude XL 9/16" Dimensional Tee.
6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, 0.95.
7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, Not Applicable
8. Articulation Class (AC): ASTM E 1111; Classified with UL label on product carton 190.
9. Emissions Testing: Section 01350 Protocol, < 13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"
10. Flame Spread: ASTM E 1264; Class A (UL)
11. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.90.
12. Dimensional Stability: HumiGuard Plus - Temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning. All wet work (plastering, concrete, etc) must be complete and dry.
13. Antimicrobial Protection: Inherent - Resists the growth of mold/mildew and bacterial growth.
14. Acceptable Product: Optima Open Plan, 3251 as manufactured by Armstrong World Industries.

2.03 SUSPENSION SYSTEMS

A. Components: Main beams and cross tees In accordance with the International Building Code, Section 1621 for Category C as described in ESR-1308.

1. Structural Classification: ASTM C 635, (Intermediate Duty) (Heavy Duty).

2. Color: Aluminum.

3. Represented Systems: Interlude XL 9/16" Dimensional Tee System as manufactured by Armstrong World Industries.

B. Attachment Devices: In accordance with the International Building Code, Section 1621 for Category C.

C. Wire for Hangers and Ties: In accordance with the International Building Code, Section 1621.

D. Wall Moldings: In accordance with the International Building Code, Section 1621 for Category C or method as described in ESR-1308.

E. Accessories:

4. BERC2 - 2 inch Beam End Retaining Clip, 0.034 inch thick, hot-dipped galvanized cold-rolled steel per ASTM A568 - used to join main beam or cross tee to wall molding.

2.04 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type ACT-2:

1. Surface Texture: Medium

2. Composition: Mineral Fiber

3. Color: White

4. Size: 24in X 24in X 5/8in

5. Edge Profile: Square Lay-In for interface with AL Prelude Plus XL 15/16" Exposed Tee.

6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, 0.55.

7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, 38

8. Emissions Testing: Section 01350 Protocol, < 13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"

9. Flame Spread: ASTM E 1264; Fire Resistive

10. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.82.

11. Dimensional Stability: HumiGuard Max - Temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning.

12. Antimicrobial Protection: Inherent - Resists the growth of mold/mildew and bacterial growth.

13. Acceptable Product: Fine Fissured Ceramaguard, 607 as manufactured by Armstrong World Industries.

2.05 SUSPENSION SYSTEMS

A. Components: Main beams and cross tees In accordance with the International Building Code, Section 1621 for Category C as described in ESR-1308.

1. Structural Classification: ASTM C 635, (Intermediate Duty) (Heavy Duty).

2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.

3. Represented Systems: AL Prelude Plus XL 15/16" Exposed Tee System as manufactured by Armstrong World Industries.

B. Attachment Devices: In accordance with the International Building Code, Section 1621 for Category C.

C. Wire for Hangers and Ties: In accordance with the International Building Code, Section 1621.

D. Wall Moldings: In accordance with the International Building Code, Section 1621 for Category C or method as described in ESR-1308.

E. Accessories:

4. BERC2 - 2 inch Beam End Retaining Clip, 0.034 inch thick, hot-dipped galvanized cold-rolled steel per ASTM A568 - used to join main beam or cross tee to wall molding.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

3.02 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.03 INSTALLATION (Category C)

A. Install suspension system and panels in accordance with the International Building Code, Section 1621, except as noted in Section 4.4.3.2 of ESR-1308, and with the authorities having jurisdiction.

B. ESR-1308, Section 4.4.3.2, Seismic Design Category C Installation:

Terminal ends of the runners are secured by attaching the BERC-2 clip to the wall molding and attaching the runners to the BERC-2 clip. The runners have zero clearance at the perimeter on two adjacent walls and with 3/8-inch (9.5 mm) clearance on the opposite walls. The clip is attached to the wall molding by sliding the locking lances over the hem of the vertical leg of the wall molding. BERC-2 clips installed in this manner are an acceptable means of preventing runners from spreading, in lieu of spacer bars required in CISCA 0-2, which is referenced in ASCE 7, Section 9.6.2.6.2.1, which is referenced in IBC Section 1621. Except for the use of the BERC-2 clip as noted above, installation of the ceiling system must be as prescribed by the applicable code. Maximum ceiling weight permitted is 1.20 pounds per square foot (5.86 kg/m2). This construction is equivalent to that required by CISCA 0-2, which is referenced in ASCE-7, Section 9.2.6.2.1, and which is referenced in IBC Section 1621.

C. The presence of a hanger wire within 3 inches of an expansion relief joint as called for in ASTM C 636 shall be required in addition to the requirements of the International Building Code, Section 1621.2.5 and with the authorities having jurisdiction.

1. Only applies when using (Prelude XL Fire Guard 15/16") (Prelude Plus XL Fire Guard 15/16") (Suprafine XL Fire Guard 9/16") Exposed Tee Systems.

D. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

E. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.04 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Acoustical Panel Ceilings will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the

Plans and Specifications.

4.02 BASIS OF PAYMENT: Acoustical Panel Ceilings Hardware shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Acoustical Panel Ceilings will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

B. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 09 54 26 – WOOD PANEL CEILINGS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

809.5426 Wood Panel Ceilings

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Wood veneer ceiling planks.
2. Concealed grid suspension system.
3. Wire hangers, fasteners, main runners, wall angle moldings and accessories.
4. Acoustical backing

B. Related Sections:

1. Section 09 51 13 - Acoustical Ceilings
2. Section 09 29 00 - Gypsum Board
3. Divisions 23 - HVAC
4. Division 26 Sections - Electrical Work

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
2. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot- Dip Process.
3. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
4. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
5. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
6. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
7. ASTM E 1264 Classification for Acoustical Ceiling Products.

B. CISCA Seismic Zones (0-2) (3-4) Ceilings and Interior Systems Construction Association Guidelines for Seismic Restraint for Direct Hung Suspended Ceiling Assemblies

1.04 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: Submit manufacturer's technical data for each type of ceiling unit and suspension system required.

B. Installation Instructions: Submit manufacturer's installation instructions as referenced in Part 3, Installation.

C. Samples: Minimum 3-1/2 inch or 5-1/2 inch samples of specified panel; 8 inch long samples of exposed wall molding and suspension system, including main runner.

D. Shop Drawings: Layout and details of ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.

E. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.

F. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.05 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide ceiling panel units and grid components by a single manufacturer.

B. Fire Performance Characteristics: Identify ceiling components with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
    a. Flame Spread: 25 or less
    b. Smoke Developed: 50 or less

2. HPVA (Hardwood Plywood and Veneer Association) certification and audit program per ASTM E-84 tunnel test.

C. Woodworking Standards: Manufacturer must comply with specified provisions of Architectural Woodworking Institute quality standards.

D. Linear Wood, as with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern, or possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

E. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store ceiling components in a dry interior location in their cartons prior to installation to avoid damage. Store cartons in a flat, horizontal position. The protectors between the panels should not be removed until installation.

B. Do not store in unconditioned spaces with humidity greater than 55 percent or lower than 25 percent relative humidity and temperatures lower than 50 degrees F or greater than 86 degrees F. Panels must not be exposed to extreme temperatures, for example, close to a heating source or near a window with direct sunlight.

C. Handle ceiling units carefully to avoid chipped edges or damage to units in any way.

1.07 PROJECT CONDITIONS

A. Wood veneer ceiling materials should be permitted to reach room temperature and have a stabilized moisture content for a minimum of 72 hours before installation.

B. The wood veneer panels should not be installed in spaces where the temperature or humidity conditions vary greatly from the temperatures and conditions that will be normal in the occupied space.

C. As interior finish products, the wood veneer panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

1.08 WARRANTY

A. Wood Veneer Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:

1. Ceiling Panels: Defects in materials or factory workmanship.

2. Grid System: Rusting and manufacturing defects.

B. Warranty Period:

1. Wood veneer panels: One (1) year from date of installation.

2. Grid: Ten years from date of installation.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.09 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Ceiling Units: Furnish quantity of full-size units equal to 5.0 percent of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Ceiling Panels:

1. Armstrong World Industries, Inc.

B. Suspension Systems:

2. Armstrong World Industries, Inc.

2.02 WOOD VENEER CEILING UNITS

A. Ceiling Panels Type AP-1:

1. Surface Texture: Smooth

2. Composition: Wood

3. Finish: Manufacturer's standard natural veneer - Natural Variations

4. Species: Natural Variations Maple

5. Size: 96in x 3-3/4in x 3/4in

6. Reveal: 3/4 inch black fleece reveal

7. Edge Banding and Trim: To match face veneer

8. Noise Reduction Coefficient (NRC): ASTM C 423
   a. Nominal 4-1/2" Module - 0.50; 0.65 with optional acoustical backing
   b. Nominal 6" Module - 0.40; 0.50 with optional acoustical backing

9. Flame Spread: ASTM E 1264; Class A.

10. Dimensional Stability: Standard

11. Acceptable Product: WoodWorks Linear, 6440W1, as manufactured by Armstrong World Industries.

B. Accessories:

1. Item #5374: #20 Wood Biscuits, for joining and aligning planks end-to-end.

2. Item #6093: 1/2 inch acoustical backing.

2.03 SUSPENSION SYSTEMS

A. Components: All linear carriers shall be commercial quality hot dipped galvanized steel as per ASTM A 653. Linear carriers are double-web steel construction with 15/16 inch type concealed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Linear carriers shall have rotary stitching.

1. Structural Classification: ASTM C 635, Heavy Duty.

2. Color: Black, unless noted otherwise.

3. Clips: Integral, factory-applied, spring steel clips on linear carriers in sufficient number to receive 8 foot linear wood (nominal 4 inch) (nominal 6 inch) planks.

4. Acceptable Product: HD Linear Carrier as manufactured by Armstrong World Industries, Inc.

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Accessories/Edge Moldings and Trim:

1. Linear Splices, Item #5372, for splicing planks together end-to-end

2. RC2 Clip: Radius clip for creating faceted grid applications

3. Wall Molding:
   a. Angle Molding, Item #7805BL - 1-1/2 inch x 1-1/2 inch, Tech Black
   b. Shadow Molding, Item #7823BL - 2 inch x 1-1/4 inch x 3/4 inch, Tech Black

PART 3 – EXECUTION

3.01 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out.

B. Proper designs for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

3.02 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

3.03 INSTALLATION

A. Install suspension system and panels in compliance with ASTM C636; CISCA Seismic Guidelines; approved construction drawings; with the authorities having jurisdiction; and in accordance with the manufacturer's installation instructions, WoodWorks Linear Installation Instructions, LA-297076.

B. Suspend linear carriers from overhead construction with hanger wires spaced 4 feet on center along the length of the linear carrier. Install hanger wires plumb and straight. Install linear carriers 24 inches on center (or less).

C. Install wall moldings at intersection of suspended ceiling and vertical surfaces.

D. Follow the instructions found in "WoodWorks Linear Installation Instructions", LA-297076, for border treatment of the WoodWorks Linear planks.

3.04 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of ceilings panels, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Wood Panel Ceilings will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Wood Panel Ceilings shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Wood Panel Ceilings will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 09 65 00 – RESILIENT FLOORING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

809.6500 Resilient Flooring

Add the following:

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Static dissipating vinyl composition floor tile.

1.02 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For flooring installed on walkway surfaces, provide products with the values indicated as determined by testing identical products per ASTM C 1028.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: For each type of product specified.

B. Samples for Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors and patterns available for each type of product indicated.

1. For resilient accessories, manufacturer's standard-size samples, but not less than 12 inches long, of each resilient accessory color and pattern specified.

2. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

C. Product Certificates: Signed by manufacturers of resilient products certifying that each product furnished complies with requirements.

D. Maintenance Data: For resilient flooring to include in the maintenance manuals specified in Division 1.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor covering manufacturer for installation techniques required.

B. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.

2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F.

C. Store tiles on flat surfaces. Do not stake boxes of tiles over 5 high.

D. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.06 PROJECT CONDITIONS

A. Maintain a temperature of not less than 70 deg F or more than 95 deg F in spaces to receive products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After postinstallation period, maintain a temperature of not less than 55 deg F or more than 95 deg F.

B. Do not install products until they are at the same temperature as the space where they are to be installed.

C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.

D. Install products and accessories after other finishing operations, including painting, have been completed.

E. Where demountable partitions and other items are indicated for installation on top of resilient tile flooring, install tile before these items are installed.

F. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test as well as acceptable pH range.

1.07 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Furnish not less than one box of each type, color, pattern, class, wearing surface, and size of resilient tile flooring installed.

2. Furnish not less than 10 linear feet for each type, color, pattern, and size of resilient accessory installed.

3. Deliver extra materials to Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the following paragraphs of Part 2.

2.02 RESILIENT TILE

A. Vinyl Composition Tile: Where this designation is indicated, provide static dissipating vinyl composition floor tile complying with ASTM F 1066 and the following:

1. Products: As follows:
   a. Armstrong World Industries: Excelon

2. Color and Pattern: As selected by Architect from manufacturer’s full range of colors and as indicated on the drawings.

3. Class: Class 2 (through-pattern tile).

4. Static Coefficient of Friction: Level Surfaces, minimum 0.6.

5. Thickness: 1/8 inch.

6. Size: 12 by 12 inches.

7. Application: Server Room

2.03 RESILIENT ACCESSORIES

A. Vinyl Accessory Molding: Where this designation is indicated, provide vinyl accessory molding complying with the following:

1. Available Products: As follows:
   a. Johnsonite.

2. Color: As selected by Architect from manufacturer's full range of colors produced for vinyl accessory molding complying with requirements indicated.

3. Transition Strip between VCT and Carpet: CE-XX-A by Johnsonite or approved substitute.

2.04 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   a. VCT Adhesives: 50 g/L.
   b. Cove Base Adhesives: 50 g/L.

C. Urethane Waterproofing and Tile-Setting Adhesive: Manufacturer's standard proprietary product consisting of 1-part liquid-applied urethane in a consistency suitable for trowel application and intended for use as both waterproofing and tile-setting adhesive in a 2-step process.

1. Product: Hydroment Ultra-Set; Bostik.

2. For use with slip-resistant VCT only.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other manufacturer's requirements. Verify that substrates and conditions are satisfactorily for resilient product installation and comply with requirements specified.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond.

2. Verify that adhesion and dryness characteristics have been determined as required in Division 7 Section “Vapor Retarders, Vapor Barriers, and Air Barriers” and meet flooring manufacturer’s recommendations.

3. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving resilient flooring.

4. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. For wood subfloors, verify the following:

1. Underlayment over subfloor complies with requirements specified in Division 6 Section "Rough Carpentry."

2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond, show through surface, or stain flooring.

D. Do not proceed with installation until unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Use stair-tread-nose filler, according to resilient tread manufacturer's written instructions, to fill nosing substrates that do not conform to tread contours.

D. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

E. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactorily conditions have been corrected.

3.03 TILE INSTALLATION

A. General: Comply with tile manufacturer's written installation instructions.

B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half of a tile at perimeter.

1. Lay tiles square with room axis, unless otherwise indicated.

C. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles in basket-weave pattern with grain direction alternating in adjacent tiles.

D. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

E. Extend tiles into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, nonstaining marking device.

G. Install tiles on covers for telephone and electrical ducts, and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on covers. Tightly adhere edges to perimeter of floor around covers and to covers.

H. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to comply with tile manufacturer's written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.

1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Hand roll tiles according to tile manufacturer's written instructions.

J. Provide waterproofing to set tiles where slip-resistant VCT is indicated on the drawings.

3.04 RESILIENT ACCESSORY INSTALLATION

A. General: Install resilient accessories according to manufacturer's written installation instructions.

B. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, locker bases, and other permanent fixtures in rooms and areas where base is required.

1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
3. Do not stretch base during installation.
4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
5. Form outside corners on job from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
6. Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

C. Place resilient accessories so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.
1. Locate reducer strips or transition strips to line up centered under doors, unless noted otherwise.

D. Apply resilient products to stairs as indicated and according to manufacturer's written installation instructions with epoxy adhesive and nose filler.

3.05 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing resilient products:
1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
2. Sweep or vacuum floor thoroughly.
3. Do not wash floor until after time period recommended by flooring manufacturer.
4. Damp-mop floor to remove marks and soil.

B. Clean floor surfaces as soon as possible after installation. Clean products according to manufacturer's written recommendations.
1. After cleaning, apply polish to floor surfaces to provide protective floor finish according to flooring manufacturer's written recommendations. Apply stain resistant sealer under polish as recommended by manufacturer at all areas to receive VCT. Coordinate with Owner's maintenance program.
2. Protect flooring with covers from time of installation to time of polish application per manufacturer’s written instructions.

3.06 WASTE MANAGEMENT

1. Separate waste in accordance with the Waste Management Plan and place in designated areas.

B. Close and seal tightly all partly used adhesive containers and store protected in well-ventilated, fire-safe area at moderate temperatures.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Resilient Flooring will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Resilient Flooring shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Resilient Flooring will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See

Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 09 65 13 – RESILIENT BASE AND ACCESSORIES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

809.6513 Resilient Base and Accessories

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Resilient base.

2. Resilient molding accessories.

B. Related Sections:

1. Division 09 Section "Resilient Sheet Flooring" for resilient sheet floor coverings.

2. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: For each type of product indicated.

B. Maine State Housing Authority Green Standards Submittals:

1. Product Data for adhesives, including printed statement of VOC content.

C. Samples for Selection: For each type of product indicated.

D. Product Schedule: For resilient products.

1.04 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.06 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.

2. During installation.

3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

1.07 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.01 RESILIENT BASE

A. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Armstrong World Industries, Inc.
   b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
   c. Endura Rubber Flooring; Division of Burke Industries, Inc.
   d. Flexco, Inc.
   e. Johnsonite.
   f. Musson, R. C. Rubber Co.
   g. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
   h. Roppe Corporation, USA.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TP (rubber, thermoplastic).

2. Manufacturing Method: Group I (solid, homogeneous).

3. Style: Cove (base with toe).

C. Minimum Thickness: 0.125 inch.

D. Height: 4 inches.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed.

G. Inside Corners: Job formed.

H. Finish: Satin.

I. Colors and Patterns: As selected by Architect from full range of industry colors.

2.02 RESILIENT MOLDING ACCESSORY

A. Resilient Molding Accessory:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Johnsonite.

B. Material: Vinyl.

C. Profile and Dimensions:

1. Transition Strip between VCT and Carpet/Ceramic Tile: CE-XX-A by Johnsonite or approved substitute.

2. Transition Strip between Sheet Flooring and VCT: CD-XX-C by Johnsonite or approved substitute.

3. Reducer Strip between Concrete and VCT: RRS-XX-C by Johnsonite or approved substitute.
4. Reducer Strip between Concrete and Carpet: EG-XX-L by Johnsonite or approved substitute.

D. Colors and Patterns: As selected by Architect from full range of industry colors.

2.03 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   a. Cove Base Adhesives: Not more than 50 g/L.
   b. Rubber Floor Adhesives: Not more than 60 g/L.

C. Epoxy Adhesives: Two-part epoxy compound recommended by resilient tread manufacturer to adhere rubber treads and risers to substrates.

1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   a. Rubber Floor Adhesives: 60 g/L.

D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

E. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.03 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible.

3.04 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.

2. Tightly adhere to substrates throughout length of each piece.

3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.05 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.

2. Sweep and vacuum surfaces thoroughly.

3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.

1. Apply two coats.

E. Cover resilient products until Substantial Completion.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Resilient Base and Accessories will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Resilient Base and Accessories shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Resilient Base and Accessories will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 09 68 00 – CARPETING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

809.6800 Carpeting

Add the following:

PART 1 - GENERAL

1.01 GENERAL CONDITIONS The General Conditions, Supplementary General Conditions and MaineDOT Division 100, General Conditions, shall apply to each and every contract and contractor, person or persons supplying material, labor or entering into the work directly or indirectly.

1.02 SCOPE This section includes all labor, materials, equipment and related services necessary for the fabrication, delivery and installation of the work shown on the drawings and or specified herein, including but not limited to the following:

A. Carpet Tile as scheduled.

B. Carpet adhesives, seaming, anchorage edge treatment and other accessories.

1.03 ALTERNATES: Refer to MaineDOT Division 100, General Conditions to determine extent, if any, work of this Section will be affected by Alternates, Unit Prices or Allowances.

1.04 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Prior to installation submit to the Architect two copies of the manufacturer's current recommendations for installation of the materials specified.

B. Also prior to installation, submit to the Architect a sketch showing location of all seams proposed to be made in the carpeting.

C. Prior to ordering carpet submit a full range of samples for color selection.

D. Laboratory test reports as required.

1.05 QUALITY ASSURANCE

A. For cutting, laying and trimming of carpeting, use only thoroughly trained and experienced carpet installers who are completely familiar with the materials specified, the manufacturer's recommended methods of installation, and the requirements of this work.

B. The manufacturer's recommended methods of installation shall be the basis for acceptance or rejection of methods of installation used in this work.

PART 2 - PRODUCTS

2.01 CARPET TYPE 1 (MODULAR TILE):

A. Product: "Harmony H308V" by Blue Ridge Carpet Mills as selected by Architect.

B. Carpet Specifications:

Construction.....	Multi-Level Loop Pattern
Yarn.....	100% Envirolon XP Type 6,6.
Dye Method	Solution Dyed
Soil/Stain Protection ……...	Blue Shield Soil and Stain Protector

Primary Backing	Woven Polypropylene
Secondary Backing	EnviroFlex Performance Engineered Backing w/40% Recycled Content
Tufted Yarn Weight	20 Oz. per Sq. Yd.
Finished Pile Thickness	.127 Inch Approx.
Stitches per Inch	10
Machine Guage	1/12”
Density Factor	5,669
CRI Traffic Rating	Severe
Traffic Class	Extra Heavy Commercial Class III
Adhesive	BR200 Enviroflex Modular carpet adhesive
Edge Ravel Guarantee	Useful Life
Delamination Guarantee	Useful Life
Run Resistance Warranty	Useful Life
Wear Warranty	10 Year
Recycling Program……	Qualifies for the Blueridge BlueCycle Reclamation Program

2.02 CARPET TYPE 2 (MODULAR TILE):

A. Product: “Clean Step - Stripe” 24”x24” Tile by Blue Ridge Carpet Mills as selected by Architect.

B. Carpet Specifications:

Construction.....	Tufted Multi-Level
Yarn.....	100% High Abrasive Nylon
Dye Method	Solution Dyed
Secondary Backing	EnviroFlex Performance Engineered Backing w/40% Recycled Content
Yarn Weight	36 Oz.
Total Weight…….	160 Oz Per Sq. Yd.
Flooring Radiant Panel Test	ASTM E-648 – Class 1
Smoke Density……..	NFPA 258- Passes
Capret Tile Size	24”x24”
Adhesive	BR200 Enviroflex Modular carpet adhesive
Recycling Program……	Qualifies for the Blueridge BlueCycle Reclamation Program

2.03 ACCESSORIES

A. General: Installation materials shall conform with the quality, function, and substance of the products listed below. Architect will be the sole judge of the quality of materials to be used on the project.

B. Edging: No. 12-1812 universal molding by Roberts Consolidated Industries, Inc., or approved equal. Color of vinyl insert shall be as selected by Architect.

C. Installation Adhesive: Provide adhesive recommended by carpet manufacturer for adequate adhesion and water resistance at each application, but which will allow removal of carpet/cushion with minimum damage to

carpeting materials and substrate, and which complies with requirements for overall flammability rating (if any) for carpeting installation.

D. Seaming Cement: Hot melt seaming adhesive of type recommended by the carpet manufacturer for taping seams and buttering cut edges of carpet backing (and bottom of face pile) at seams, to form secure seams and eliminate pile loss at seams.

E. Concrete Sealer: 35% solution of 42° Baume sodium silicate and a non-acid penetrating agent, compatible with adhesive.

F. Floor Filler: Levelastic or equal.

PART 3 - EXECUTION

3.01 PRE-INSTALLATION REQUIREMENTS: Installer must examine substrates and conditions which carpeting is to be installed and notify Contractor in writing of conditions detrimental to proper completion of the work. Do not proceed with installation of carpeting until unsatisfactorily conditions have been corrected in a manner acceptable to Installer and carpet manufacturer.

3.02 CARPET Shall be direct cement installation. Adhesive shall be non-toxic, waterproof and latex base formulated particularly for installing carpet and approved or recommended by the carpet manufacturer. This Contractor shall coordinate and verify with General Contractor to insure compatibility of floor topping and curing compound materials with adhesive employed.

3.03 INSTALLATION

A. General:

1. Comply with manufacturer's instructions and recommendations. Place seams in directions indicated, and as accepted on shop drawings, if any. Maintain direction of pattern and texture, including lay of pile. Do not seam weft to warp, except as specifically indicated for a direction change.

2. Extend carpet under open bottomed and raised bottom obstructions, and under removable flanges of obstructions. Extend carpet into closets and alcoves of rooms indicated for such spaces. Extend carpet under movable furniture and equipment, unless otherwise indicated.

3. Provide cutouts as indicated for removable access devices in substrate. Bind edges as neatly as possible and secure both sides of cuts to the substrate. Use double faced tape on carpet cutouts which must be lifted from substrate to gain access to devices, unless otherwise indicated. Cut only 3 sides where feasible to provide carpet flap in lieu of fully removable cutout.

4. Install carpet edge guard at locations where edge of carpet is exposed to traffic, except where another device, such as expansion joint cover system or threshold, is indicated with integral carpet binder bar or edge guard. Anchor edge guard to substrate.

5. Doors: Where seams relate to doors, center seams under door thickness. Do not place carpet seams in traffic direction in doorways.

6. Expansion Joints: Provide special carpeting treatment as indicated at expansion joints in substrate or, if none is indicate, install carpeting with provisions to accommodate movement without damaging carpet installation.

B. Glue-Down Installation:

1. Treat concrete surfaces with sealer specified. Remove excess sealer promptly. Existing floors shall be clean, wax free and sound.

2. Install a test sample to demonstrate effectiveness of adhesive. With Owner's personnel present, remove sample, demonstrating procedure to minimize damage to carpet. Apply primer to entire substrate where necessary for adequate bond of carpet.

3. Fit sections of carpet into each room or space prior to application of adhesive. Trim off mill edges unless carpet has been pre-trimmed. Maintain straight seams, true with lines of building.

4. Apply seaming cement on cut edges of carpet at seams, without being in evidence on face of carpet but securing base of pile at cut.

5. Apply adhesive uniformly to substrate in accordance with manufacturer's instructions. Butt carpet edges tightly together to form seams without gaps. Roll lightly to eliminate air pockets and ensure uniform total area bond of carpet to substrate. Remove adhesive (if any appears) promptly from face of installed carpet.

6. Coordinate with installation of base materials. Unless otherwise indicated or instructed by Architect, apply glue-down carpet before installation of resilient or wood base materials.

3.04 CLEANING, PROTECTION, FOLLOW-UP SERVICE

A. Remove debris from installation, carefully sorting pieces to be saved from scraps to be disposed of.

B. Vacuum carpet with a commercial machine, with rotating agitator or beater in nozzle. Remove spots and replace carpet where spots cannot be removed.

C. Advise Contractor of areas which should be protected during remainder of construction period, so that carpet will be in undamaged and unsoiled condition at time of acceptance. Recommend type of non-staining cover material that should be used for protective cover.

D. Follow-up Service: Return to installation at mutually agreeable time(s), within 6 months following substantial completion of Project (or portion thereof), unless otherwise directed or approved by Owner.

3.05 EXTRA STOCK: Upon completion of the work, and as a condition of its acceptance, deliver to the Owner 5% overage of tiles for each color and pattern of carpeting installed in this work for the Owner's future use in patching

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Carpeting will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Carpeting shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Carpeting will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 09 91 23 – INTERIOR PAINTING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

809.9123 Interior Painting

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete.
2. Wood.
3. Gypsum board.
4. Cotton or canvas insulation covering.

B. This Section includes exposed interior items and surfaces with low VOC coatings complying with ME DEP regulations.

C. Related Sections include the following:

1. Division 06 Sections for shop priming carpentry with primers specified in this Section.
2. Division 08 Sections for factory priming windows and doors with primers specified in this Section.
3. Division 09 painting Sections for special-use coatings.
4. Division 09 Section "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product List: For each product indicated, include the following:

1. Product data.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
3. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
4. Include printed statement of VOC content for each product.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.

3. Label each coat of each Sample.

4. Label each Sample for location and application area.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced Applicator who has completed painting system applications similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers, primers and undercoat materials for each coating system from the same manufacturer as the finish coats.

C. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of general wall paint system specified in Part 3.
   a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft..
   b. Other Items: Architect will designate items or areas required.

2. Apply benchmark samples after permanent lighting and other environmental services have been activated.

3. Final approval of color selections will be based on benchmark samples.
   a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.06 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.07 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. Benjamin Moore & Co

2. Sherwin Williams

3. Pratt & Lambert

2.02 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.

2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.

3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.

4. Floor Coatings: VOC not more than 100 g/L.

5. Shellacs, Clear: VOC not more than 730 g/L.

6. Shellacs, Pigmented: VOC not more than 550 g/L.

7. Flat Topcoat Paints: VOC content of not more than 50 g/L.

8. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.

9. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.

10. Floor Coatings: VOC not more than 100 g/L.

11. Shellacs, Clear: VOC not more than 730 g/L.

12. Shellacs, Pigmented: VOC not more than 550 g/L.

13. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.

14. Dry-Fog Coatings: VOC content of not more than 400 g/L.

15. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.

16. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.

C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

2. Restricted Components: Paints and coatings shall not contain any of the following:
   a. Acrolein.
   b. Acrylonitrile.
   c. Antimony.
   d. Benzene.
   e. Butyl benzyl phthalate.
   f. Cadmium.
   g. Di (2-ethylhexyl) phthalate.
   h. Di-n-butyl phthalate.
   i. Di-n-octyl phthalate.
   j. 1,2-dichlorobenzene.
   k. Diethyl phthalate.

l. Dimethyl phthalate.
m. Ethylbenzene.
n. Formaldehyde.
o. Hexavalent chromium.
p. Isophorone.
q. Lead.
r. Mercury.
s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.
w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

D. Colors: Provide color selections made by the Architect. Allow for up to 10 different color selections.

2.03 PRIMERS/SEALERS

A. Low-VOC Latex Primer/Sealer:

1. Moore: Pristine Eco Spec Interior Latex Primer Sealer, No. 231

B. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

2.04 METAL PRIMERS

A. Rust-Inhibitive Primer (Water Based):

1. Moore: IMC Acrylic Metal Primer M04. (51 g/L)

2.05 LATEX PAINTS

A. Low-VOC Latex (Flat):

1. Moore: Pristine Eco Spec Interior Latex Flat, No. 219.

B. Low-VOC Latex (Low Luster):

1. Moore: Pristine Eco Spec Interior Latex Eggshell, No. 223

C. Low-VOC Latex (Semigloss):

1. Moore: Pristine Acrylic Semi-Gloss, No. 214

2.06 HIGH PERFORMANCE EPOXY PAINTS

A. Waterborne Epoxy Finish:

1. Moore: Moorcraft Super Spec Acrylic Epoxy Coating No. 256.

2.07 FLOOR COATINGS

A. Latex Floor and Porch Paint (Low-Luster):

1. Moore Latex Floor & Patio Enamel 122.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.

2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactorily conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints. Uniformly abrade galvanized surfaces with a palm sander and 60 grit aluminum oxide so surface is free of oil and surface contaminants.

H. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

I. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.03 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Apply an additional coat of primer on metal surfaces that have been shop primed.

B. Tinting: Tint primer of colors such as reds, yellows, and oranges with a gray basecoat system designed to help provide color coverage.

1. Do not tint prime or base coat for multi-colored finishes.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces. When using colors such as red, yellow or orange, an extra coat of finish may be necessary. Notify Architect when additional coats do not fix the problem.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:

1. Mechanical, Plumbing and Fire Protection Work:
   a. Uninsulated metal piping.
   b. Uninsulated plastic piping.
   c. Pipe hangers and supports.
   d. Tanks that do not have factory-applied final finishes.
   e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
   f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
   g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
2. Electrical Work:
   a. Switchgear.
   b. Panelboards.
   c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.04 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.05 INTERIOR PAINTING SCHEDULE

A. VOC Compliance, General: Provide the manufacturers' formulations for the products specified below that comply with the VOC requirements for the State of Maine Department of Environmental Protection in paragraph 2.2 of this Section.

B. Concrete Substrates, Traffic Surfaces:

1. Latex Floor Coating System:
   a. Prime Coat: Latex floor and porch paint (low gloss).
   b. Intermediate Coat: Latex floor and porch paint (low gloss).

c. Topcoat: Latex floor and porch paint (low gloss).

2. High-Performance Epoxy System:
   a. Prime Coat: Latex block filler.
   b. Intermediate Coat: High-performance architectural latex matching topcoat.
   c. Topcoat: High-performance architectural latex (semigloss).

C. Steel Substrates: Including, but not limited to steel doors and frames, steel stairs (including risers and stringers), handrails and guardrails, lintel plates and angles, wood door glass lite kits and astragals, access panels (both sides), metal fabrications; see Division 05 Section "Metal Fabrications", and miscellaneous metal items.

1. Low-VOC Latex Over DTM Primer System:
   a. Prime Coat: DTM anticorrosive metal primer.
   b. Intermediate Coat: Low-VOC latex paint matching topcoat.
   c. Topcoat: Low-VOC latex semi-gloss paint.

D. Galvanized-Metal Substrates:

1. Low-VOC Latex Over DTM Primer System:
   a. Prime Coat: DTM anticorrosive metal primer.
   b. Intermediate Coat: Low-VOC latex paint matching topcoat.
   c. Topcoat: Low-VOC latex semi-gloss paint.

E. Dressed Lumber Substrates: Including architectural woodwork.

1. Low-VOC Latex System:
   a. Prime Coat: Interior latex-based wood primer.
   b. Intermediate Coat: Low-VOC latex paint matching topcoat.
   c. Topcoat: Low-VOC latex (semigloss) paint.

F. MDF Substrates: Including window sills by architectural woodwork.

1. Alkyd Based Primer/Sealer System:
   a. Prime Coat: Zinsser “Cover Stain” #3501 White.
   b. Intermediate and Top Coat: By others.

G. Gypsum Board Substrates:

1. Low-VOC Latex System:
   a. Prime Coat: Low-VOC latex primer/sealer.
   b. Intermediate Coat: Low-VOC latex paint matching topcoat.
   c. Topcoat: Low-VOC latex (flat for ceilings) (eggshell for walls) paint.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Interior Painting will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Interior Painting shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Interior Painting will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 09 97 13 – STEEL COATINGS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 506 – PAINTING STRUCTURAL STEEL, with the following additions:

ADDITIONS:

Section 506.01 Steel Coating System

Add the following:

PART 1 GENERAL

1.01 DESCRIPTION: This section includes materials, shop application, field repair, and testing of fusion bonded epoxy (FBE) coatings for steel pipe piles.

1.02 REFERENCES: The publications listed below form a part of this specification to the extent referenced. References shall be made to the latest edition of said standards unless otherwise called for. The publications are referred to within the text by the basic designation only.

A. AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C213	Standard for Fusion-Bonded Epoxy for Interior and Exterior Of Steel Water Pipelines

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM A972/A972M	Standard Specification for Fusion Bonded Epoxy-Coated Pipe Piles

C. AMERICAN WELDING SOCIETY (AWS)

AWS TSS: 1985	Thermal Spraying Practice, Theory, and Application

D. STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC-AB3	Newly Manufactured or Re-Manufactured Steel Abrasives.
SSPC-PA1	Shop, Field, and Maintenance Painting
SSPC-SP1	Solvent Cleaning
SSPC-SP10	Near-White Blast Cleaning

1.03 SUBMITTALS: Submit the following in accordance with Section 105.7, Working Drawings, of the State of Maine Department of Transportation Standard Specifications, Revision December 2002:

A. Fusion Bonded Epoxy Coating Data. Submit the following components as part of this submittal package:

1) Product Data: Manufacturer's product data for fusion bonded coating, including generic description, complete technical data, material certificates, surface preparation, and application instructions.

2) Color Samples: Submit manufacturer’s color samples showing full range of standard colors.

3) Manufacturer’s Quality Assurance: Submit manufacturer’s certification that coatings comply with specified requirements and are suitable for intended application.

4) Warranty: Submit the manufacturer’s standard warranty.

5) Applicator’s Quality Assurance: Submit list of a minimum of five completed projects of similar size and complexity to this Work. Include for each project:

(a) Project name and location.

(b) Name of owner.

(c) Name of contractor.

(d) Name of coating manufacturer.

(e) Approximately area of coatings applied.

(f) Date of completion

PART 2 MATERIALS

2.01 COATING MATERIALS

A. Fusion Bonded Epoxy Coating – Shop Applied:

1) Fusion Bonded Epoxy Coating shall be Scotchkote 6233 Fusion Bonded Epoxy Coating as manufactured by 3M Company, or an approved equal. Any product submitted as an "approved equal" must have a Repair Coating counterpart which satisfies the Coating Materials requirement.

B. Fusion Bonded Epoxy Repair Coating – Field Applied:

1) Fusion Bonded Epoxy Coating shall be Scotchkote, Liquid Epoxy Coating as manufactured by 3M Company, or an approved equal, and compatible with the primary shop-applied coating system noted above and with similar color.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

A. Surfaces to be coated shall be prepared in accordance with ASTM A972, except as modified herein.

B. All oil, grease, and other contaminants shall be removed by SSPC SP1 (steam or solvent cleaning) prior to blasting. Remove all sharp edges, burrs, weld splatter, and gouges.

C. Surfaces to be coated shall be blast cleaned by SSPC SP10 (near white metal).

1) Blasting material shall be a Class 1, steel abrasive angular metallic grit meeting the requirements of SSPC-AB3. Silica sand, shot, or spherical shaped abrasives shall not be permitted.

2) The grit used for blasting shall be of proper gradation to create a profile of 2 to 4 mills. The metal shall be cleaned after blasting with clean, dry compressed air. Use of rags to remove residual dust after sandblasting shall not be permitted.

3.02 APPLICATION

A. Coatings shall be applied in conformance with ASTM A972.

B. Minimum air temperature shall be 65 degrees F. Surface temperature of steel shall be 60 degrees to 95 degrees F and, in any event, be 5 degrees F higher than the dew point. Humidity shall be 85 percent maximum.

C. Surface of substrate shall be dry and free from dust, dirt, oil, grease or other contaminants. Coating and cure facility shall be maintained free of airborne dust and dirt until coatings are completely cured

D. All coating material shall be force cured in a calibrated oven capable of maintaining curing temperatures per the coating manufacturer's specification.

E. All coatings shall be applied by a qualified applicator in accordance with the latest requirements of the manufacturer.

F. Dry film thickness shall be 18 mils, which shall be achieved by no less than two coatings performed over a period of time that allows for sufficient drying of the previous coating.

G. All coatings shall provide a satisfactorily film with a smooth and even surface. Each coasting application shall be applied evenly and free of sags, holidays, bridging and with no evidence of poor workmanship. Finished surfaces shall be free from defects and blemishes.

H. All shop coated items may be subjected to field inspection and testing to verify the dry film thickness and absence of holidays. Those items not meeting the criteria of this specification will be subject to rejection.

3.03 FIELD REPAIRS

A. Field repairs to the polyester coating shall be done according to the manufacturer's recommendations.

B. Areas left uncoated for welding shall be field coated following the manufacturer's recommendations.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Fusion Bonded Epoxy Coating will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Fusion Bonded Epoxy Coating will be paid for at the contract lump sum price for the respective contract items which shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
506.9106 Fusion Bonded Epoxy Coating	Lump Sum

END OF SECTION

SECTION 09 97 23 – CONCRETE AND MASONRY COATINGS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 515 – PROTECTIVE COATINGS FOR CONCRETE SURFACE, with the following modifications:

MODIFICATIONS:

Section 515.01 Description

This section is deleted and replaced with the following:

The work shall include the surface preparation and application of a protective sealant on concrete surfaces to protect new cast-in-place concrete and precast concrete structural elements in the marine environment, as well as new concrete walkways. The sealant shall be applied to the new pier deck components, specifically the following: top of the concrete overlay, bottom of precast concrete panels, sides and bottom of pile caps, and sides and tops of concrete curbs. The sealant shall also be applied to the top of the new concrete walkways along the office building.

Section 515.02 Materials

This section is deleted and replaced with the following:

The penetrating concrete sealant shall be Saltguard WB by Consolideck / ProSoCo; a penetrating water and salt barrier comprised of a VOC compliant silane/siloxane water repellent and chloride screen, or an approved equal.

Section 515.04 Application

This section is deleted and replaced with the following:

The penetrating concrete sealant shall be applied in one coat in strict accordance with manufacturer's recommendations.

Section 515.06 Basis of Payment

This section is deleted and replaced with the following:

Protective Coating for Concrete Surfaces will be paid at the Contract unit price per square yard which price shall be full compensation for all labor, materials, equipment, and incidentals required for furnishing and applying the penetrating sealant as shown on the Plans and in accordance with these Specifications..Surface preparation and protection of surfaces not designated for treatment will not be measured separately for payment, but shall be incidental to the Protective Coating for Concrete Surfaces.

Pay Item	Pay Unit
515.20 Protective Coating for Concrete Surfaces	Square Yard

END OF SECTION

SECTION 10 14 00 – SIGNS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

810.1400 Signs

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. This Section includes the following types of signs:

1. Panel signs as shown and as listed herein.

2. Custom exterior building signs as shown on the drawings

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 01 Section "Temporary Facilities and Controls" for temporary project identification signs.

2. Divisions 22 and 23 Sections for labels, tags, and nameplates for mechanical equipment.

3. Division 26 Sections for labels, tags, and nameplates for electrical equipment.

4. Division 26 Section "Interior Lighting Fixtures" for illuminated exit signs.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: For each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.

B. Shop Drawings: Show fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components.

1. Provide message list for each sign required, including large-scale details of wording and lettering layout.

2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.

C. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.

1. Samples for selection of color, pattern, and texture:
   a. Cast Acrylic Sheet and Plastic Laminate: Manufacturer's color charts consisting of actual sections of material including the full range of colors available for each material required.

1.04 QUALITY ASSURANCE

A. Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the Work.

B. Single-Source Responsibility: For each separate sign type required, obtain signs from one source of a single manufacturer.

C. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as

adopted by authorities having jurisdiction.

1. Interior Code Signage: Provide signage as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:
   a. Illuminated Exit Signs: Refer to Division 26.
   b. Elevator Signs: Refer to Division 14.
   c. Stairway Identification:
   d. Signs for Accessible Spaces:
      1) Accessible entrances when not all are accessible (inaccessible entrances shall have directional signage to indicate the route to the nearest accessible entrance.
      2) Accessible toilet and bathing facilities when not all are accessible.
2. Notify Architect of details or specifications not conforming to code.

D. Design Concept: The Drawings indicate sizes, profiles, and dimensional requirements of signs and are based on the specific types and models indicated. Sign units by other manufacturers may be considered provided deviations in dimensions and profiles do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.

1.05 PROJECT CONDITIONS

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Manufacturers of Panel Signs:
   a. Welch Architectural Signage.
   b. Mohawk Sign Systems.

2.02 MATERIALS

A. Cast Acrylic Sheet: Provide cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thicknesses indicated, with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 deg F, and of the following general types:

1. Opaque Sheet: Where sheet material is indicated as "opaque," provide colored opaque acrylic sheet in colors and finishes as selected from the manufacturer's standards.

B. Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background colors, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are nonfading for the application intended.

2.03 PANEL SIGNS

A. Substrate: Fabricate signs from 1/8 inch thick matte clear acrylic with edges mechanically and smoothly finished to eliminate cut marks. Background color to be subsurface.

1. Background Color: As selected by the Architect from manufacturer’s standard colors.
   a. Provide additional backer sheet, projecting ¼ in. beyond face panel at all sides.
   b. Contrasting color as selected by the Architect.
2. Edge Condition: Beveled.
3. Corner Condition: Rounded to 3/8 inch radius.
4. Size: 6 by 6 inch, unless noted otherwise.

B. Copy: Helvetica.

C. Letterform: route copy into face of substrate 1/32 inch deep. Chemically weld (inlay) computer precision cut tactile copy into routed letter openings so that tactile copy is embedded in substrate and remains at least 1/32" above surface of substrate.

1. Height: 5/8 inch minimum letter height.

D. Braille: Use engrave process for all Braille areas. Engrave Braille dots into surface of clear material.

E. Symbols of Accessibility:

1. Accessible elements: Provide international symbol of accessibility.
   a. Provide male and female symbols as required for toilets.

F. Provide characters complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille.

2.04 CUSTOM EXTERIOR SIGNS (OFFICE BUILDING EXTERIOR SIGN)

A. Substrate: Fabricate sign with aluminum components with natural brushed satin finish. Dimensions and profiles are shown on the drawings.

B. Copy: Helvetica – 3/8-inch thick flat cut aluminum stud mounted, with natural brushed satin finish.

C. Graphics: Art files provided by Owner – 3/8-inch thick flat cut aluminum, with natural brushed satin finish.

2.05 FINISHES

A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Architect from the manufacturer's standards.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.

1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

2. Locate signs in accordance with approved shop drawings and ADA requirements.

B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:

1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.

3.02 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

3.03 PANEL SIGN SCHEDULE

A.

Types:	Sizes:	Quantity:
HC Accessible Symbols	Provide 4" x 4"	3
Exit	Provide 6" x 6"	one for each exit
Room Identification	Provide 6" x 6"	one for each room

B. Account for an informational sign at room. Rooms with more than one entrance door shall have a sign at each door. Final room names and numbers will be verified during the submittal.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Signs for the interior space of the office building will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

Signs along the exterior of the building including the Entrance Building Sign, the Exterior Visitor Sign, and the Stop Sign, will be measured individually by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete each individual the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Signs for the interior space of the office building shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Signs for the interior space of the office building will not be paid for separately but rather will be considered incidental to the Office Building – Architectural Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

Signs along the exterior of the building including the entrance sign, stop sign, and visitor sign, shall be included in their respective lump sum price listed below, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

Stop Sign and Visitor Entrance Sign shall include full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Purchase and installation of the signs, excavation for foundation posts, concrete, and backfill, shall be included in their respective lump sum pay items.

The Exterior Building Sign shall comprise Bid Alternate No. 6 and shall include full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Purchase and installation of the sign (including the vertical HSS steel post supports) and making electrical connections shall be included in the lump sum price. The Landscape Border and Foundation work surrounding the Exterior Building Sign, namely the excavations, foundation posts and backfill, shall not be included in the Exterior Building Sign pay item, but rather will comprise a separate pay item, Pay Item 621.90. The electrical wiring and conduit leading up to the exterior entrance sign shall not be included in the lump sum price, but rather shall be included in the respective electrical pay items.

A. Payment will be made under the following Pay Item:

Pay Item		Pay Unit
810.4001	Office Building – Exterior Building Sign	Lump Sum (Bid Alternate No. 6)
810.4002	Office Building – Visitor Entrance Sign	Lump Sum
810.4003	Office Building – Stop Sign	Lump Sum
815.00	Office Building – Architectural	Lump Sum

END OF SECTION

SECTION 10 28 00 – TOILET ACCESSORIES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

810.2800 Toilet Accessories

Add the following:

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Toilet and bath accessories.

1.02 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

B. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet and Bath Accessory Schedule and room designations indicated on Drawings in product schedule.

D. Maintenance Data: For accessories to include in maintenance manuals specified in Division 1. Provide lists of replacement parts and service recommendations.

1.03 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.04 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.

1. Minimum Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering accessories that may be incorporated into the Work include, but are not limited to, the following:

1. Toilet Accessories:
   a. American Specialties, Inc.
   b. Bobrick Washroom Equipment, Inc.
   c. Bradley Corporation.

d. Gamco (General Accessory Manufacturing Company)

B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Toilet and Bath Accessory Schedule at the end of Part 3.

2.02 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.

B. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch (0.9-mm) minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.

C. Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180).

D. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.

E. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.

F. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.

G. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

H. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.03 FABRICATION

A. General: One, maximum 1-1/2-inch- (38-mm-) diameter, unobtrusive stamped manufacturer logo, as approved by Architect, is permitted on exposed face of accessories. On interior surface not exposed to view or back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

B. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

C. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

D. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.

1. Provide galvanized steel backing sheet, not less than 0.034 inch (0.85 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.

E. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:

1. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

2. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

F. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.

C. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

3.02 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.03 TOILET AND BATH ACCESSORY SCHEDULE

A. Combination Towel Dispenser/Waste Receptacle: PT/WR-1 & PT/WR-2 Where this designation is indicated, provide stainless-steel combination unit complying with the following:

1. Products: Available products include the following:
   a. PT/WR-1 Similar to No. B-38032 by Bobrick.
   b. PT/WR-2 Similar to No B-380349 by Bobrick

2. Semi Recessed and surface Type with Single Flush Door: Designed for nominal 4-inch (100-mm) wall depth with continuous, seamless wall flange; towel dispenser in unit's upper compartment designed to dispense minimum of 600 C-fold or 800 multifold paper towels; waste receptacle in unit's lower portion and with minimum 6.3-gal. (12-L) capacity, reusable, vinyl liner; and compartment double-panel door with continuous hinge and tumbler locksets.

B. Toilet Tissue Dispenser: TP Where this designation is indicated, provide toilet tissue dispenser complying with the following:

1. Products: Available products include the following:
   a. Bobrick No. B-2888.

2. Type: Roll-in-reserve dispenser with hinged front secured with tumbler lockset.

3. Mounting: Surface mounted with concealed anchorage.

4. Material: Stainless steel.

5. Operation: Noncontrol delivery with mfr's standard spindle.

6. Capacity: Designed for 4-1/2- or 5-inch- (114- or 127-mm-) diameter-core tissue rolls.

C. Soap Dispenser: SD-1 Where this designation is indicated, provide soap dispenser complying with the following:

1. Products: Available products include the following:
   a. Bobrick No. B-2112.

2. Liquid Soap Dispenser, Horizontal-Tank Type: Surface-mounted type, minimum 40-oz. (1182.9-mL) capacity tank with stainless-steel piston, springs, and internal parts designed to dispense soap in measured quantity by pump action; and stainless-steel cover with unbreakable window-type refill indicator.
   a. Soap Valve: Designed for dispensing soap in liquid form.

D. Grab Bars: GB36 ; GB42 Where this designation is indicated, provide stainless-steel grab bar complying with

the following:

1. Products: Available products include the following:
   a. Bobrick No. B-5806 Series.
2. Stainless-Steel Nominal Thickness: Minimum 0.05 inch (1.3 mm).
3. Mounting: Concealed with manufacturer's standard flanges and anchors.
4. Gripping Surfaces: Manufacturer's standard slip-resistant texture.
5. Outside Diameter: 1-1/4 inches (32 mm) for medium-duty applications.

E. Sanitary Napkin Disposal Unit: SND Where this designation is indicated, provide stainless-steel sanitary napkin disposal unit complying with the following:

1. Products: Available products include the following:
   a. Bobrick No. B-254.
2. Surface-Mounted Type: With seamless exposed walls; self-closing top cover; locking bottom panel with stainless-steel, continuous hinge; and removable, reusable receptacle.

F. Mirror Unit: M24X36 Where this designation is indicated, provide mirror unit complying with the following:

1. Products: Available products include the following:
   a. Bobrick No. B-165 2436.
2. Stainless-Steel, Channel-Framed Mirror: Fabricate frame from stainless-steel channels in manufacturer's standard satin or bright finish with square corners mitered to hairline joints and mechanically interlocked.

G. Robe Hook:

1. Products: Available products include the following:
   a. Similar to No. B-7671 by Bobrick.
2. Single-Prong Unit: Stainless-steel, single-prong robe hook with rectangular wall bracket and backplate for concealed mounting.

H. Towel Bar: TB30 Where this designation is indicated, provide 30” long Stainless Steel towel bar complying with the following:

1. Products: 5800SF by Franklin Brass
2. Outside Diameter: 1 inch

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Toilet Accessories will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Toilet Accessories shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Toilet Accessories will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 10 44 13 – FIRE EXTINGUISHER CABINETS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

810.4413 Fire Extinguisher Cabinets

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Fire protection cabinets for the following:
   a. Portable fire extinguishers.

B. Related Sections:

1. Division 10 Section "Fire Extinguishers."

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.

1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

2. Show location of knockouts for hose valves.

B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

D. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.04 QUALITY ASSURANCE

A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

1.05 COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate size of fire protection cabinets to ensure that type and capacity of fire hoses, hose valves, and hose racks indicated are accommodated.

C. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

B. Stainless-Steel Sheet: ASTM A 666, Type 304.

C. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.02 FIRE PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

B. Basis of Design Product: Potter-Roemer FRC-7060-DV, Recessed, Stainless Steel

C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following.

1. J.L. Industries: Cosmopolitan Series .
2. Larsen's: Architectural Series.
3. Potter-Roemer: Alta Series.

D. Cabinet Construction: Fire rated.

E. Cabinet Material: Stainless steel.

1. Shelf: Enameled steel.

F. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.

1. Rolled-Edge Trim: 2-1/2-inch backbend depth.

G. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim. Provide where indicated on the drawings.

H. Cabinet Trim Material: Stainless-steel sheet.

I. Door Material: Stainless-steel sheet.

J. Door Style: Fully glazed panel with frame.

K. Door Glazing: Clear tempered glass, 3 mm.

L. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide projecting door pull and friction latch.
2. Provide manufacturer's standard hinge permitting door to open 180 degrees.

M. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:
   a. Interior of cabinet and door.
2. Stainless Steel: No. 4.

2.03 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.

2. Provide factory-drilled mounting holes.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.

2. Fabricate door frames of one-piece construction with edges flanged.

3. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.04 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.05 STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.06 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.

2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine roughing-in for hose and cabinets to verify actual locations of piping connections before cabinet installation.

B. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.

C. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 PREPARATION

A. Prepare recesses for semirecessed fire protection cabinets as required by type and size of cabinet and trim style.

3.03 INSTALLATION

A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights indicated below:

1. Fire Protection Cabinets: 54 inches above finished floor to top of cabinet.

B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semirecessed fire protection cabinets.

3.04 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Fire Extinguisher Cabinets will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Fire Extinguisher Cabinets shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Fire Extinguisher Cabinets will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 10 44 16 – FIRE EXTINGUISHERS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

810.4416 Fire Extinguishers

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Sections:

1. Division 10 Section "Fire Extinguisher Cabinets."

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

C. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

D. Warranty: Sample of special warranty.

1.04 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FMG.

1.05 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.06 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Failure of hydrostatic test according to NFPA 10.
   b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Amerex Corporation.
   b. Ansul Incorporated; Tyco International Ltd.
   c. Badger Fire Protection; a Kidde company.
   d. Buckeye Fire Equipment Company.
   e. J. L. Industries, Inc.; a division of Activar Construction Products Group.
   f. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
   g. Larsen's Manufacturing Company.
   h. Potter Roemer LLC.
2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 3-A : 40-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.02 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Amerex Corporation.
   b. Ansul Incorporated; Tyco International Ltd.
   c. Badger Fire Protection; a Kidde company.
   d. Buckeye Fire Equipment Company.
   e. Fire End & Croker Corporation.
   f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
   g. Larsen's Manufacturing Company.
   h. Potter Roemer LLC.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Fire Extinguishers will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Fire Extinguishers shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Fire Extinguishers will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 10 95 00 – BUILDING SPECIALTIES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

810.9500 Building Specialties

Add the following:

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Knox Box.

1.02 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, pro-files, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

PART 2 - PRODUCTS

2.01 KNOX BOX

A. Where indicated on the drawings, provide Series 3200, surface-mounted key box by Knox Box.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

3.02 ADJUSTING AND CLEANING

A. Adjust specialties for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

3.03 CLEANING

A. Clean surfaces prior to inspection. Replace damaged or defective items.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Building Specialties will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Building Specialties shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Building Specialties will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 11 31 00 – RESIDENTIAL APPLIANCES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

811.3100 Residential Appliances

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Cooking appliances.

2. Refrigeration appliances.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, dimensions, furnished accessories, and finishes for each appliance.

B. Product Schedule: For appliances. Use same designations indicated on Drawings.

C. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

D. Warranties: Sample of special warranties.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.

B. Regulatory Requirements: Comply with the following:

1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

1.05 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.

B. Refrigerator/Freezer, Sealed System: Limited warranty including parts and labor for first year and parts thereafter for on-site service on the product.

1. Warranty Period for Sealed Refrigeration System: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 REFRIGERATOR/FREEZER

A. Type 1. Basis-of-Design Product: General Electric Profile Series 12.0 cu. Ft. Top Freezer Refrigerator Model# GTR12HAX Color: White

B. Type 2. Basis-of-Design Product: Kenmore 3.3 cu. Ft. Compact Refrigerator Model# 93382

2.02 MICROWAVE OVEN

A. Basis-of-Design Product: General Electric Profile Series 1.0 Cu. Ft. Countertop Microwave Oven. Model #PEM31SM. Finish: Stainless Steel. Provide Hanging Kit #JXA019K at undercab locations shown on drawings.

2.03 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactorily conditions have been corrected.

3.02 INSTALLATION, GENERAL

A. General: Comply with manufacturer's written instructions.

B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.

C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

D. Utilities: See Divisions 22 and 26 for plumbing and electrical requirements.

3.03 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.

2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.

3. Operational Test: After installation, start units to confirm proper operation.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.

C. An appliance will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.04 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Residential Appliances will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Residential Appliances shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Residential Appliances will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Architectural	Lump Sum

END OF SECTION

SECTION 21 00 00 – FIRE SPRINKLERS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

821.0000 Fire Sprinklers

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

General Provisions of Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to work specified in this Section.

1.03 DEFINITIONS

A. Reviewed equal: Shall mean that the Engineer, not the contractor, shall make final determination whether materials are an equal to that which is specified.

B. Equal: Shall mean essentially the same as that product specified, but a model of a different manufacturer.

C. Concealed: Shall mean in walls, in chases, above ceilings, within enclosed cabinets, otherwise enclosed.

D. Exposed: Shall mean in finished spaces, in closets, under counters, behind and/or under equipment and/or otherwise visible.

E. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

F. Others: Shall mean provided by sections other than this section. If not purposely assumed by another section, shall be provided by the General Contractor.

G. Materials: Shall mean any product used in the construction, including but not limited to: fixtures, equipment, piping and supplies.

H. Piping: Shall mean pipe, fittings, hangers and valves.

I. Provide: Shall mean the furnishing and installing of materials.

J. Substitution: Shall mean materials of significantly different physical, structural or electrical requirements, performance, dimensions, function, maintenance, quality or cost, than that specified.

1.04 DESCRIPTION OF WORK

A. Work Included: Provide all design services, construction documents, labor, transportation, equipment, permits, materials, tools, inspections, incidentals, tests and perform all operations in connection with the installation of a complete new Hydraulically Designed Sprinkler System in all areas of the buildings with a wet pipe system in the heated areas and a Dry Type system in the attic and unheated areas. Comply with requirements of all Authorities Having Jurisdiction. Include aesthetic considerations into the design. Coordinate with interfacing trades. Submit equipment and components for review. Prepare Shop and Record Drawings and Owner's Manuals. Assure quality of workmanship. Provide guarantees and warranties.

1. Automatic Sprinkler System shall meet the standards of the most recent edition of the National Fire Protection Association's (NFPA) NFPA 13 Standard for the Installation of Sprinkler Systems.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Shop Drawings:

1. Within 30 working days after the General Contractor has received a fully executed contract, prepare and submit Plans / Shop Drawings in accordance with the requirements of NFPA and obtain the Engineer's approval and Owner's Insurance Underwriter approval before proceeding with the fabrication and work.

2. Drawings shall include, but not be limited to:
   a. Name of Owner and Occupant
   b. Name and address of Contractor.
   c. Physical Location
   d. Plan view of system
   e. Full height cross section or schematic diagram including ceiling construction and spray obstructions.
   f. Locations of all partitions, with fire partitions noted.
   g. Occupancy class for each area and minimum density of water application.
   h. Locations of concealed spaces
   i. Plan showing location and size of city water main, where private main attaches, all valves, distance and elevation between main and riser.
   j. Recent hydrant test showing both static and residual pressures, and date and time taken. List any significant known daily or seasonal pressure fluctuations and the cause.
   k. Make, model and nominal K factor of sprinkler heads.
   l. Control valves, check valves, drain pipes and test connections.
   m. Fire department connections
   n. Details showing riser piping configurations.
   o. Pipe sizes.
   p. Switches and supervisory devices.
   q. Interface with Fire Control Panel.

3. To obtain an electronic copy of the building plan and sections, contact the Engineer. Specify required CAD format when requesting the files.

4. Procedure
   a. As soon as possible after award of Contract, before any material or equipment is purchased, this Contractor shall submit to the Engineer no less than ten (10) copies for approval. Shop drawings shall be properly identified and shall describe in detail the material and equipment shall be provided, including all dimensional data, performance data, curves, computer selection print-outs, etc.

   b. Corrections or comments made on the submittals do not relieve the contractor from compliance with requirements of the specification. Shop drawing review is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades and performing his work in a safe and satisfactorily manner.
   c. All related items shall be submitted as a package.

4. Submit data on the following items:
   a. Piping, fittings and couplings.
   b. Alarm valves and trim.
   c. Backflow preventer.
   d. Valves and supervisory devices.
   e. Sprinkler heads and escutcheon plates.
   f. Supports, hangers and accessories.
   g. Fire Department Connections.
   h. Any other significant item valued over $100.00

5. Submit to the Owner's Insurance Underwriter sufficient copies for approval to allow one copy to be incorporated into each Owner's Manual in addition to the required As-Built Plans

1.06 HYDRAULIC DESIGN DATA

A. Water Density and Square Foot Requirements: Provide per NFPA.

B. Codes and Requirements:

1. Comply with the standards of most recent edition of the National Fire Protection Association.

2. Comply with the BOCA International Building Code, all Maine State laws as well as local codes and ordinances.

3. Comply with the requirements of the State Fire Marshals Office, Local Fire Chief, Owners Insurance Underwriter, Local Water District and other Authorities Having Jurisdiction

1.07 GUARANTEE

This Contractor shall guarantee all materials and workmanship furnished by him or his sub-contractors to be free from all defects for a period of no less than one (1) year from date of final acceptance of completed system and shall make good, repair or replace any defective work which may develop within that time at his own expense and without expense to the Owner.

1.08 MAINTENANCE MANUAL

On completion of this portion of the work, and as a condition of its acceptance, submit for review two copies of a manual describing the system. Prepare manuals in durable 3-ring binders approximately 8.1/2" by 11" in size with at least the following:

A. Project name on the spine and front cover, and identification on the front cover stating the project name, general nature of the manual, and name, address and telephone number of the General and Sprinkler Contractors.

B. Neatly typewritten index.

C. Complete instructions regarding operation and maintenance of all equipment involved.

D. Complete nomenclature of all frequently replaceable parts and supplies, their part numbers, and name, address and telephone number of the vendor.

E. Copy of all guarantees and warranties issued, and dates of expiration.

F. Shop drawings and equipment/fixtures manufacturer's catalog pages.

PART 2 – PRODUCTS

All products shall be new and must be either Factory Mutual (FM) or Underwriters' Laboratory (U.L.) listed or both.

2.01 MANUFACTURERS

A. Equipment: Grinnell, Standard, Viking, Central Sprinkler Corp., Reliable, or equal.

B. Heads: Viking, or equal.

C. Flow Switch and Supervisory Device: Potter Electric Signal Company or equal.

D. Backflow preventer: Ames or equal.

2.02 MATERIALS

A. Piping:

1. Outside Building, Underground: Is the responsibility of the General Contractor and shall comply with NFPA.

2. Inside building: Shall be schedule 40 black steel, standard weight welded, threaded or Victaulic fittings for sizes 2-1/2" and under. Install flanged fitting and flanges at valves and where required. Threadable light wall pipe (schedule 10) shall be permitted only for sizes 3" and over.

3. Where permitted by code and based on the construction the contractor may substitute CPVC sprinkler system piping in lieu of the above for the sprinkler system. Install according to manufacturer's requirements and restrictions. Piping and fittings, shall be Harvel Blazemaster CPVC fire sprinkler piping or approved equal. Piping shall be installed only by a factory trained and certified installer. Where piping is exposed or where manufacturers requirements cannot be met, piping shall be the same as above.

B. Sprinkler Heads:

1. Temperature Classification:
   a. Finished area shall be ordinary temperature rating.
   b. Mechanical/Boiler Room shall be Intermediate temperature rating 175° F to 225° .
2. All shall be Quick Response type head.
3. All heads shall be glass bulb type .
4. Type:
   a. Generally shall be white, concealed pendant.
   b. Concealed spaces shall be the type best suited for the configuration of the individual space.
   c. Any minor unheated spaces shall be dry type.
5. Provide and install a spare head case per NFPA requirements. The case shall contain not less than 12 heads total, no less than two of each style of heads and one wrench for each style of head. Locate case in the sprinkler room near the check valve assemblies.

C. Provide sprinkler guards on any exposed heads.

D. Hangers: Provide per NFPA. Provide seismic protection unless specifically exempt by the Authority Having Jurisdiction. Hang from building structure, not piping of other trades.

E. Sleeves:

1. Pipes Through Floors: Form with Schedule 40 (galvanized) steel pipe and extend 1" above surrounding floor.
2. Pipes Through Interior Fire-rated or Sound-rated Partitions: Form with steel pipe or 16 gauge galvanized steel.
3. Pipes through Exterior Building Walls, Concrete Walls or Footing: Form with Schedule 40 (galvanized) steel pipe.
4. Size: The minimum sleeve diameter shall be either 2 pipe sizes or 2" in diameter larger than the outside diameter of the pipe.
5. Fire caulk all penetrations through floors and fire rated partitions.

F. Valves:

1. Riser Control Valve: OS&Y cast iron construction.
2. Sectionalizing Valves: OS&Y cast iron body.
3. Drain and Test Valves: Bronze body, gate type or ball type, capable of being padlocked in either open or closed position.

G. Provide all miscellaneous items required for a complete system, such as: paint, signs, valve tags, pipe markers, chains and locks, relief valves, and water additives.

2.03 COMPONENTS

A. Fire Department Connection (Verify with local Fire Department). 4" Fire Department connection with, caps with chains and wall plate with "Auto Sprinkler". Thread Pattern shall match that of the local Fire Department equipment; also 4" UL listed check valve with automatic ball drip piped to drain. Bronze finish.

B. Flow Switch for Wet Systems: Model # VSR-F vane type water flow alarm switch with an adjustable retard setting from 10 seconds to 90 seconds having two sets of DPDT contacts for reporting to the building fire alarm system.

C. Electric Supervisory Switch: All valves shall have a Model # OSYSU-2 electric supervisory device with 2 sets of DPDT contacts to report to the building fire alarm system.

D. Backflow preventer: Double check, testable, replaceable seats.

E. Provide all shut-off valves with tamper switches. Lock or chain open valves with break-away padlocks.

F. Water pressure gauge: Provide one before the valve on each inspectors test connection. Range applicable to fire protection application.

PART 3 – EXECUTION

3.01 PREBID EXAMINATION AND INVESTIGATION

A. Visit the site and become acquainted with the conditions.

B. Study all Drawings and Specifications for all related and interfacing trades. No claim will be recognized for extra compensation due to failure to become familiarized with the conditions and extent of the proposed work as indicated within.

C. Ascertain all Authorities Having Jurisdiction, and consult where needed.

3.02 OBTAINING DRAWINGS AND SPECIFICATIONS

A. Obtain a FULL set of drawings and specifications as soon as is practical.

3.03 SPECIFIC INSTALLATION REQUIREMENTS

A. For reasons of aesthetics and vandalism, all piping in finished areas shall be run concealed. Run above ceilings if available or inside walls. Coordinate with G.C. for hard soffits only where neither is possible.

B. For aesthetic reasons, locate sprinkler heads neatly and symmetrically, relative to the walls, ceiling grid, diffusers and light fixtures. Center heads in tiles in suspended ceilings.

C. All piping shall be run as high as practicable. Pitch piping slightly to allow the system to be drained.

D. System drains shall be valved and piped to discharge. No valve shall be provided ahead of the electric alarm devices.

F. All sprinkler work shall avoid proposed locations of, and installation clearances for, lighting, ducts, piping, framing and equipment.

3.04 COORDINATION

A. Coordinate work with that of other trades. Coordinate early for locations of mains. Ductwork, mechanical equipment, electrical panels and large gravity piping will be given priority over sprinkler piping, unless all effected parties agree otherwise. No compensation will be given for neglect to comply with the above and no claim will be recognized for sprinkler piping, heads and miscellaneous appurtenances which must be modified, removed and reinstalled or relocated, due to conflicts with other work which is or will be installed per the Contract Documents.

B. Contact Electrical Contractor and assure that all requirements for power and fire alarm system have been met.

3.05 TESTS

A. The entire installation shall be tested with water in accordance with all NFPA requirements, all requirements of the local Fire Department and local Water District; and the Owner's Insurance Underwriter; this includes the testing of all alarms.

B. All tests shall be witnessed by the Owner's representative and local Fire Chief's representative. Submit copies of all test certificates, properly signed, to the Engineer.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Fire Sprinklers will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Fire Sprinklers shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Fire Sprinklers will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Mechanical	Lump Sum

END OF SECTION

SECTION 22 00 00 – PLUMBING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

822.0000 Plumbing

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings, Addenda, General Provisions of Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to work specified in this Section.

1.02 DEFINITIONS

A. ADA: Designed to meet the requirements of the Americans with Disabilities Act.

B. Concealed: Shall mean in walls, in chases, above ceilings, within enclosed cabinets, otherwise enclosed.

C. Equal: Shall mean essentially the same as that product specified, but a model of a different manufacturer

D. Exposed: Shall mean in finished spaces, in closets, under counters, behind and/or under equipment and/or otherwise visible.

E. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

F. Materials: Shall mean any product used in the construction, including but not limited to: fixtures, equipment, piping and supplies.

G. Others: Shall mean provided by sections other than this section. If not purposely assumed by another section, shall be provided by the General Contractor.

H. Piping: Shall mean pipe, fittings, hangers and valves.

I. Provide: Shall mean the furnishing and installing of materials.

J. Reviewed equal: Shall mean that the Architect or a designated Consultant, not the contractor, shall make final determination whether materials are an equal to that which is specified.

K. Substitution: Shall mean materials of significantly different physical, structural or electrical requirements, performance, dimensions, function, maintenance, quality or durability, than that specified.

1.03 ALTERNATES

There are no alternates that apply to this section of the project.

1.04 DESCRIPTION OF WORK

A. Work Included

1. Furnish all labor, materials, equipment, transportation, and perform all operations required to install complete plumbing systems in the building, in accordance with these specifications and applicable drawings.

2. Provide the following:
   a. Sanitary, waste and vent systems.
   b. Domestic hot and cold water system.

c. Fuel gas system
d. Pipe, valve and fittings
e. Water specialties
f. Drainage specialties
g. Plumbing fixtures and accessories
h. Insulation
i. Installation and/or connections to fixtures/equipment provided by others.

3. Specifications and accompanying drawings do not indicate every detail of pipe, valves, fittings, hangers, fixtures and equipment necessary for complete installation; but are provided to show general arrangement and extent of work to be performed.

4. Before submitting proposal, This Contractor shall be familiar with all conditions. Failure to do so does not relieve This Contractor of responsibility regarding satisfactorily installation of the system.

1.05 PERMITS

A. This Contractor shall be responsible for providing and filing all Plans, Specifications and other documents, pay all requisite fees and secure all permits, inspections and approvals necessary for the legal installation and operation of the systems and/or equipment furnished under this Section of the Specifications.

B. The Contractor shall frame under glass/ clear plastic all permits, secured by him, adjacent to the respective system and/or equipment and required to be displayed by Code, law or ordinance. Those permits secured but not required to be displayed shall be laminated in plastic and included in the Owner's maintenance manual.

1.06 CODES AND ORDINANCES

A. All work performed under this Section of the Specifications shall be done in accordance with applicable Federal Laws, Maine State Laws, Uniform Plumbing Code, Subsurface Wastewater Disposal Rules, and local plumbing codes and ordinances. The following standards are also to be followed when applicable:

ADA	Americans With Disabilities Act
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
BOCA	Building Officials & Code Administrators International, Inc.
NFPA	National Fire Protection Association (a.k.a. NFC, National Fire code)
NEMA	National Electrical Manufacturer's Association
OSHA	Occupational Safety and Health Act
UL	Underwriter's Laboratories

B. If an obsolete code section or standard is specified, the latest replacement issue of each Code or standard for the application, in effect at the time of bidding, shall be used. Code requirements are the minimum quality and/or performance acceptable. Where the Specifications and/or Drawings indicate more stringent requirements, these requirements shall govern.

1.07 QUALITY ASSURANCE

A. Use sufficient qualified workmen and competent supervisors in execution of this portion of the work to ensure proper and adequate installation of the system throughout. Work performed shall conform to manufacturers recommendations, good standard practice and industry standards.

B. Any work deemed unacceptable by the Engineer, Architect or Clerk of the Works shall be redone correctly, at no additional cost to the owner.

1.08 ELECTRONIC DRAWINGS AND FILE SHARING

Plans and specifications may be made available in electronic format on request. Contact the Owner's Representative who will forward the request to the Engineer for action. Plans may be provided in either Adobe (.pdf) or CAD (.dwg or .dxf) formats and will be compressed using WinZip (.zip format). Recipient is responsible to obtain the necessary software to open the files. Note: CAD drawings will be made available to successful bidders only after a contract is awarded.

CAD drawings are produced with AutoCAD 2006 and may be provided in either the 2000 or 2004 file formats. Upon request for CAD files a release form will be provided which must be signed and returned to the Engineer prior to transmission of electronic files. Physical mailing address, telephone numbers and e-mail address for this office are indicated on each drawing. A signed release will not be required for Adobe based files.

All contract documents are copyrighted material. No portion of materials may be reproduced or duplicated except as indicated in the release form. Where release forms are not required (Adobe based files), materials may be printed for use by the intended recipient only and may not be reproduced or copied in any other manner unless written permission is obtained.

1.09 MATERIALS AND SUBSTITUTIONS

All materials and equipment shall be new and of the latest design of respective manufacturers. All materials and equipment of the same classification shall be the product of the same manufacturer, unless specified otherwise.

A. Any proposal for substitution of Plumbing equipment shall be made in writing PRIOR TO OPENING OF BIDS, see Division 1. Submit full details for consideration and obtain written approval of the Architect. The phrase "or reviewed equal" shall be intended to mean that the Architect, not the contractor, shall make final determination whether or not substitute materials are an equal to that which is specified. The contractor shall be responsible to certify within his submittals that any equipment to be considered as an "reviewed equal" meets or exceeds the requirements of this specification in all aspects and will physically fit within the space provided and still provide adequate space adjacent to the equipment for service. If requested by the Architect the contractor shall provide said certification in the form of scale drawings before review will be made. Architect will not be responsible to provide drawings for substituted materials unless the substitution is agreed upon prior to opening of bids. Architect's decision on acceptability of substitute materials shall be final.

B. Approval by Architect for such substitution shall not relieve the Plumbing Contractor from responsibility for a satisfactorily installation and shall not affect his guarantee covering all parts of work

C. Any material or equipment submitted for approval which are arranged differently or is/are of different physical size from that shown or specified shall be accompanied by shop drawings indicating different arrangements of size and method of making the various connections to equipment. Final results will be compatible with system as designed.

D. Materials and equipment determined as an "reviewed equal" and /or substitutions must meet the same construction standards, capacities, code compliances, etc. as the equipment (i.e. manufacturer, model, etc.) specified.

E. Any additional cost resulting from the substitution of equipment shall be paid by this Contractor.

1.10 PLANS AND SPECIFICATIONS FOR SUPPLIERS

This Contractor shall provide his Suppliers, and any related subcontractors, with a copy of the specification pages, and letter sized photocopies of equipment details and schedules, that pertain to the item to be supplied.

1.11 SHOP DRAWINGS & SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. As soon as possible after award of Contract (but not longer than 21 calendar days), before any material or equipment is purchased, Plumbing Contractor shall submit to the Architect no less than ten (10) copies of shop drawings for approval. If shop drawings are not submitted within the allotted time frame all substitutions included the late shop drawings will be invalid and the equipment specified must be provided. Any costs resulting from delays in the project schedule due to failure to submit shop drawings related to this section in a timely manner shall be the responsibility of the Plumbing Contractor.

B. Each item shall be properly identified, preferably by fixture/equipment tag number (such as WC-3), and shall describe in detail the material and equipment to be provided, including all dimensional data, performance data, pump curves, computer selection print-outs, etc. Capacities indicated are minimums. Equipment submitted with capacities below specified parameters will be refused.

C. Corrections or comments made on the shop drawings do not relieve the contractor from compliance with requirements of the drawings and specifications. Shop drawing review is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades and performing his work in a safe and satisfactorily manner.

D. Should any materials or products be purchased and/or installed without prior review and comment the contractor shall be required to remove or replace those products and/or materials if directed by the Architect at his own expense. If the materials are not removed (or replaced) or if the project is delayed as a result the Architect reserves the right to order the withholding of payment until the situation is resolved in a manner satisfactorily to the Architect.

E. Plumbing shop drawings shall be separate from Mechanical shop drawings. All submittals shall have a clear area on the front no less than 4inches x 3inches to be reserved exclusively for the Engineers' shop drawing stamp or they will be refused for re-submittal.

F. It is desirable for shop drawings to be submitted electronically, including all documentation outlined in paragraph "A" above. Hard copies of shop drawings must be original documents or good quality photocopies of original documents (photocopies of color samples are not acceptable). Faxed copies of submittal sheets will be refused.

G. Review must be obtained on all items specified in Section 2 Products or shown on the drawing, and any significant items implied or otherwise required but not specified.

H. Format

1. Related items shall be stapled or Bound together as a package. The number of copies of each package shall be as listed above. Examples of packages of related items include:
    a. Hangers and Supports
    b. Identification
    c. Insulation
    d. Valves
    e. Piping
    f. Plumbing Fixtures with accessories
    g. Drainage Specialties
    h. Water Specialties

2. If due to circumstances beyond his control, the contractor is unable to include all the related items in the submitted package, he shall insert in its place a plain sheet of paper with a notation stating that the item will be submitted separately.

1.12 PRODUCT HANDLING

Use all means necessary to protect materials before, during and after installation, and to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

1.13 AS-BUILT DRAWINGS

Keep in good condition at the job, apart from all other prints used in actual construction, one complete set of all blueprints furnished for this job. On this special set of blueprints, record *completely and accurately* all differences between the work as actually installed and the design as shown on the drawings. These record prints must be kept up to date by recording all changes within one week of the time that the changes are authorized. At the completion of the work, this set of drawings shall be delivered to the Architect for the Owner electronically in the form of CAD drawings. If a complete record of changes is not made and electronic CAD drawings not provided by the Plumbing

Contractor, a record shall be made by the Engineers, and *the cost of the record shall be paid by the Plumbing Contractor*. Copies of the plumbing CAD drawings may be made available electronically to the Contractor if desired. Drawings shall be dated accordingly and clearly identified as "AS-BUILT". Contact the Architect directly or the Engineer via e-mail at mechsyst@maine.rr.com. Specify required CAD format when requesting the files. CAD drawings were generated using AutoCAD 2006 and utilize both paper space and model space with external references to various other drawings. Files will be compressed and will require "WinZip" (http://www.winzip.com) for extraction. A release form will be provided which must be signed and returned to the Engineer prior to transfer of files.

1.14 MAINTENANCE MANUAL

On completion of this portion of the work, and as a condition of its acceptance, submit for review two copies of a manual describing the system. Plumbing equipment manuals shall be separate from mechanical manuals. All manuals shall be original copies, not photocopies, or they will be refused for resubmittal. Prepare manuals in durable 3-ring binders approximately 8.1/2" by 11" in size with at least the following:

A. Project name on the spine and front cover, and identification on the front cover stating the project name, general nature of the manual, and name, address and telephone number of the General and Plumbing Contractors.

B. Neatly typewritten index.

C. Complete instructions regarding operation and maintenance of all equipment involved.

D. Complete nomenclature of all frequently replaceable parts and supplies, their part numbers, and name, address and telephone number of the vendor.

E. Copy of all guarantees and warranties issued, and dates of expiration.

F. Shop drawings and equipment/fixtures manufacturer's catalog pages. Clearly indicate the precise item included in this installation and delete, cross out or otherwise clearly indicate, all manufacturers' data with which this installation is not concerned.

1.15 OBJECTIONABLE NOISE AND VIBRATION

All equipment shall operate without objectionable noise and vibration. Should objectionable noise or vibration be transmitted to any occupied part of the building by apparatus, piping or ducts, as determined by the Architect, the necessary changes eliminating the noise or vibration shall be made by this Contractor at no extra cost to the Owner.

1.16 GUARANTEE

This Contractor shall guarantee all materials and workmanship furnished by him or his sub-contractors to be free from all defects for a period of no less than one (1) year from date of final acceptance of completed system and shall make good, repair or replace any defective work which may develop within that time at his own expense and without expense to the Owner. Any additional costs required to extend manufacturer's guarantee and warranty for the period specified, shall be included in Contractor's base bid.

1.17 DEVIATIONS, DISCREPANCIES AND OMISSIONS

A. The drawings are intended to indicate only diagrammatically the intent, extent, general character and approximate locations of plumbing work. Work indicated, but having details obviously omitted, shall be furnished complete to perform the functions intended without additional cost to the Owner. This shall include but not limited to:

1. All items that are required to meet all applicable codes and referenced standards.

2. Piping for cold and hot water supply, drain, vent, gas, etc to each plumbing fixture/equipment shown on the drawings or scheduled as required.

3. Shut-off valves on lines feeding individual fixtures without integral stops.

4. Minor single phase electrical or control wiring between plumbing provided items that require it, unless indicated on the Division 16 Electrical Drawings.

5. Plumbing related items indicated on the drawings of other trades.

6. Items indicated on one plumbing drawing but not shown on a corresponding drawing.

7. Items implied on the plumbing drawings but not shown.

8. All plumbing related items clearly shown in dark print on the Plumbing drawings but not included in the specification (See paragraph 2.01), unless it is noted as being provided by the owner or other contractor or unless other sections assume the responsibility.

B. The drawings and specifications are complimentary to each other and what is called for in one, shall be as binding as if called for by both. In the event of conflicting information on the drawings, or in the specifications, or between drawings and specifications, or between trades, that which is better, best or most stringent shall govern.

1.18 WORKPLACE SAFETY

The Trade Contractor alone shall be responsible for the safety, efficiency and adequacy of his plant, appliances and methods, and for any damage, which may result from their failure of their improper construction, maintenance, or operation.

1.19 CHANGE ORDERS

A. No change shall be made from the work, equipment, or materials under this section except as directed in writing by the Owner's Representative.

B. All requests for change in contract price and scope shall be accompanied by a breakdown list of materials with unit and extended prices and labor hours with unit and extended price, plus markups that have been applied.

1.20 REQUESTS FOR INFORMATION

Requests for Information (RFI) or other correspondences which are submitted electronically must be in an open format, meaning files must not be locked and comments may be added without altering the original content, or have interactive fields intended specifically for commenting. Locked files will not be accepted.

PART 2 - PRODUCTS

2.01 GENERAL

A. Unless otherwise indicated, the materials to be furnished under this contract shall be new and the standard products of manufacturers regularly engaged in the production of such equipment, and shall be the manufacturer's latest standard design that complies with the specification requirements.

B. All materials and equipment of the same classification shall be the product of the same manufacturer, unless specified otherwise. An entire product line may be rejected if one or more of the products submitted are not an equal to that specified.

C. All products shall be manufactured within the United States, unless specified otherwise, and supplied locally (within the State) wherever possible. It is preferable to obtain materials that are manufactured within 500 miles of the work site when practical.

D. Unspecified items shall be by the same manufacturer and level of quality and as similar items specified when possible. Whenever items have no similarity to those specified in this section, provide the equivalent item as specified in other Division 15 Sections. When no similarity exists in other sections, the Contractor shall submit for review an appropriate commercial/institutional quality item, complete to perform the functions intended, using his best discretion. The Architect or a designated Consultant, not the contractor, shall make final determination whether materials are of suitable quality and perform the functions intended.

2.02 MOTORS AND ELECTRICAL WORK

A. Provide and erect all motors, temperature controls, limit switches as specified.

B. Power supply to switches, fused switches, outlets, motor starters, to line terminals of equipment, and all related wiring and fuses to properly connect and operate all electrical equipment specified shall be furnished and installed under Division 16, "ELECTRICAL" (Electrical Contractor). Coordinate all wiring between Mechanical/Plumbing and Electrical to provide a complete and operating system.

2.03 PAINTING

Painting shall be provided for all steel/iron equipment supports, steel/iron fuel piping, exposed flanges, fittings and valves within boiler rooms, basements and outside and where specified elsewhere within this section. Painting shall consist of no less than two (2) coats of rust inhibiting paint, Rust'O'leum or reviewed equal. Paint shall be capable of withstanding temperatures of up to 250°F. Colors shall be as follows:

Fuel Gas Piping outside	Match exterior finish or per gas supplier requirements.

2.04 HANGERS AND SUPPORTS

A. General

1. All hangers and supports shall be especially manufactured for that purpose and shall be the pattern, design and capacity required for the location of use.
2. Piping specified herein shall not be supported from piping of other trades.
3. All steel hangers shall be factory painted.
4. Hangers shall be heavy-duty steel adjustable clevis type, plain for steel, cast iron and plastic pipe, and copper plated for piping in direct contact with copper tubing (i.e. copper hot water piping) shall be equal to Carpenter & Paterson Inc., Fig. 100 (Fig. 100CT copper plated).
5. Hangers shall go outside of insulation for domestic water piping. Each hanger shall be furnished with metal shield.
6. Exposed vertical risers ¾ inch and smaller shall be supported at 6 foot intervals between floor and ceiling with split ring type hangers; copper plated for piping in direct contact with copper tubing equal to Carpenter & Paterson Inc. ALL PIPING DROPS TO FIXTURES SHALL BE ANCHORED SOLID TO WALL WITH A STEEL SUPPORT BRACKET WITH ADJUSTABLE CLIP, ESPECIALLY PIPING TO FLUSH VALVES
7. Piping suspended from walls and partitions shall be supported by steel support bracket with adjustable clips equal to Carpenter & Paterson Inc. All attachments to bar joists shall be from top chord.

B. Hanger Rods & Attachments

1. Hanger rods shall be galvanized all thread rod. Rod size shall be as follows:

Pipe Size	Rod Size
3/8” to 2”	3/8”
2.1/2” to 3.1/2”	1/2"
4” to 5”	5/8”
6”	3/4"

2. All nuts for hanger rods and hangers to be galvanized steel.
3. Provide lag points with rod couplings for fastening to wood, toggle bolts in concrete blocks and compound anchor shields and bolts in poured concrete.
4. Provide toggle bolts with rod couplings for fastening in the pre-cast concrete plank decks.
5. Provide and install angle iron supports for pipe hangers in locations as required. Angle iron supports shall be adequate size for span and piping or equipment.
6. Hot and cold water piping at each fixture shall be securely fastened in wall with split ring type hanger fastened to studs within wall.

2.05 SEISMIC RESTRAINT

All seismic restraints shall be in accordance with the International Building Code.

A. Piping Suspended by Hangers

Piping suspended by individual hangers 12 inches or less in length, need not be braced. The following piping shall be braced:

1. Fuel Oil or Fuel Gas, 1 inch and larger
   a. Brazed or Soldered Joints - Transverse bracing every 20 feet and longitudinal every 40 feet.
   b. Threaded or Mechanical Joints - Transverse bracing every 10 feet and longitudinal every 20 feet.

B. Piping Risers

1. All vertical pipe risers shall be laterally supported with a riser clamp at each floor.
2. No-hub joints shall be braced or stabilized between floors.

C. Equipment

1. All floor/pad mounted equipment including: water heaters, above ground water storage tanks, pneumatic pressure tanks, expansion tanks and boilers shall be anchored to the floor.
2. Suspended equipment shall be cross braced in all directions.

2.06 IDENTIFICATION

A. Tag each new pump /equipment, and switch with 2½ inches x ¾ inch rectangular engraved nameplates with white letters on black, #2060-20 by Seton Name Plate Corp. or reviewed equals. Nameplates shall be mechanically fastened to equipment (adhesives are not acceptable). Embossed labels are not acceptable.

B. Identify all new water and drain piping with "Set Mark" snap-around pipe markers by Seton Name Plate Corporation or reviewed equal. Markers shall include both identification and arrows indicating direction of flow. Markers shall be placed on pipe segments 5 feet and longer, and spaced no less than 10 feet apart. Heating hot water piping shall be labeled differently from Domestic hot water piping. On parallel runs of piping, plumbing markers shall be grouped together, and grouped with heating markers whenever practical.

Legend	Background/Letter Color
"Cold Water"	Green/ white letters
"Domestic 120°F Water"	Yellow/ black letters
"Domestic 140°F Water"	Yellow/ black letters
"Propane"	Yellow/ black letters
"Plumbing Vent"	Green/ white letters
"Sanitary Drain"	Green/ white letters

C. Tag all new valves with Seton #M4506 1½ inch square brass tags and #6 bead chains, stamped with the following identification: "CW", "HW", "HWR" or "140HW". Tag shall be consecutively numbered. DO NOT DUPLICATE EXISTING VALVE IDENTIFICATION NUMBERS. Fixture stops, control valves or valves adjacent to equipment, the use of which is obvious, are not to be tagged.

D. Provide valve charts identifying valve number, valve identification and service (i.e. Apt. 203, HW). Mount charts in Boiler Room and Mechanical Room in 8½ inch x 10 inch and 8½ inch x 11 inch self-closing aluminum frame with plastic windows. Provide additional copies for maintenance manuals.

2.07 INSULATION

A. Domestic Water Piping

1. Insulate all above grade Cold, Hot and Recirculating Water Piping with fiberglass heavy density sectional pipe insulation system, with minimum of 7 lb. density and 450^{o} temperature rating having a factory applied vapor barrier with butt and longitudinal adhesive.
   a. Concealed Piping.

      Insulation shall have standard paper all service jacket (ASJ).
   b. Exposed Piping.

      Shall be Owens Corning Evolution SSL II paper free ASJ with tough, wrinkle resistant, easy-to-clean jacket. Or reviewed equal.
2. Insulations Thickness
   a. Cold Water – ½" minimum.
   b. Hot and Recirculating – 1" minimum
3. Shields of 28 gauge metal approximately 8 inches long and forming an arc of approximately 120 degrees to fit the insulation shall be provided at each hanger for all Domestic Water piping. (Note: this is done on cold water lines to prevent points of condensation that may promote mold growth, and on hot and recirculating water lines to minimize rate of cooling between uses, as well as to prevent unintentional overheating of the building in the warmer months.) Shields to be provided by this Contractor. Hangers shall be provided large enough to be outside the covering.
4. Insulate any below grade hot water piping runouts with ½" Armaflex closed cell piping insulation.

B. Fittings

1. All fittings and valves shall be covered with a one piece PVC insulated fitting cover secured.
2. The ends of insulation on exposed pipes at valves, flanges, unions, etc., shall be finished neatly with covering to match jacket and secure with mastic.
3. Valves, flanges and unions on hot water piping shall not be insulated.

C. Installation

All insulation work shall be executed by skilled insulation workmen regularly in the trade.

D. Covering

Wherever insulation is exposed in occupied or potentially wet areas, it shall be carefully and neatly covered with a white PVC plastic covering material. Covering shall be applied in no less than 4 foot lengths with shingle joints. Longitudinal joints shall be on the top or back sides so as to be out of sight and sealed with adhesive materials provided with the jacketing. Material shall be butted to finish walls or Insulation. Jacketing material shall be Zeston pre-cut, pre-curled 0.030 thickness. Or reviewed equal.

2.08 VALVES

A. General

1. Valves shall be provided as shown and as required to make the installation and its apparatus complete in operation; locate to permit easy operation, replacement and repair.
2. All valves must be so constructed that they may be repacked under pressure while open.
3. Valves shall have name and/or trademark of manufacturer as well as working pressure stamped or cast on valve body.
4. Valves shall comply with Manufacturer's Standards Society (MSS) specifications and be so listed.

B. Types and Manufacturers

All valves shall be of one manufacturer and by one of the manufacturers listed. The following list is provided as a means of identifying the quality and type required.

1. Gate Valves 3 inches in size and smaller

   Shall have bronze bodies, rising stem, solid wedge, union bonnet, rated for 150# WSP, 300# WOG:

	Soldered Ends	Screwed Ends
Milwaukee	1169	1151
Stockham	B-124	B-120
NIBCO	S-134	T-134
Hammond	IB648	IB629

2. Globe Valves 2 inches in size and smaller

   Shall have bronze bodies, union bonnet, renewable composition disc for service intended, rated for 150# WSP, 300# WOG:

	Soldered Ends	Screwed Ends
Milwaukee	1590-T	590-T
Stockham	B-24-T	B-22-T
NIBCO	S-235-Y	T-235-Y
Hammond	IB423	IB413T

3. Angle valves

   Same general description and manufacturers as globe valves above, only outlet at 90 degree angle from inlet.

4. Ball valves 1¼ inches in size and smaller

   Shall have bronze bodies, Type 316 stainless steel stems and balls, reinforced Teflon seats and seals, blowout proof stems and adjustable stem gland. Shall be equipped with suitable packing for service intended. Ports shall be "full port". Rated for 400# WOG and 350^{o}F:

	Soldered Ends	Screwed Ends
Milwaukee	BA-350S	BA-300S
Apollo	82-200	82-100
Watts	B-6081	B-6080
NIBCO	------	------
Hammond	8614	8604

5. Ball valves 1½ inches in size and larger

   Shall have bronze bodies, Type 316 stainless steel stems and balls, reinforced Teflon seats and seals, blowout proof stems and adjustable stem gland. Shall be equipped with suitable packing for service intended. Ports shall be "conventional port". Rated for 400# WOG and 350^{o}F:

	Soldered Ends	Screwed Ends
Apollo	70-200	70-300
Watts	B-6000-SS	B-6001-SS
NIBCO	S-585-66	T-585-66
Hammond	8514	8503

6. Check Valves 2 inches in size and smaller

Shall be horizontal swing type with bronze body, Teflon disc. Rated for 125# WSP, 200# WOG:

	Soldered Ends	Screwed Ends
Milwaukee	1509-T	509-T
Stockham	B-310-T	B-320-T
NIBCO	S-413-Y	T-413-Y
Hammond	IB945	IB904

7. Spring loaded check valves 2" and smaller:

   Bronze body, bronze trim, stainless steel spring, stainless steel center guide pin, Class 125, Teflon seat unless only bronze available.

	Solder or Screwed Ends
ConBraCo	61 series
Grinnell	3600SJ
Mueller	203BP
Nibco	S480Y
Val-Matic	S1400 series.

8. Drain Valves

   Shall be conventional ball valves and provided with hose nipples and threaded metal cap on chain. Watts B-6001-CC or reviewed equal.

9. Balancing Valves

   Shall be Watts CSB-61-S. For ¾" pipe, initially set dial at 30. For ½" pipe initially set dial at 60. Or reviewed equal.

2.09 DOMESTIC WATER PIPING

A. Well system piping

1. Well system piping by Well Contactor. Connect to system at tank inside building.

B. Interior

1. All exposed hot and cold water piping above finish floor (not buried) shall be hard-drawn type "L" copper tube with cast or wrought fittings and made up with Silvabrite 100 lead-free solder.
2. All concealed hot and cold water piping above finish floor (not buried) shall be either Flowguard Gold CPVC pipe and fittings or copper as specified above. PEX may not be substituted.
3. All buried water and trap primer piping shall be AquaPEX or type "K" soft copper tubing. No joints below slab.
4. All exposed, uninsulated water piping in finished areas shall be chromium plated I.P.S. copper or red brass pipe or tubing and fittings. Valves shall also be chrome plated brass or bronze. Any chrome trim with wrench marks shall be removed and new trim installed.
5. Type of tubing shall be stamped or printed on each length by Manufacturer.

2.10 PIPE EXPANSION FITTINGS AND LOOPS

A. Provide expansion loops on hot water supply (120 degrees and above) and recirculating return lines where shown and on any straight pipe lengths over 100 feet that occur as a result of relocating piping to meet field conditions. Loop shall be 2 feet by 4 feet offset, and located near center of length. Anchors shall be bolted collars held by angular braces in direction of piping near opposite ends of the pipe. Provide guides on each expansion joint.

2.11 SANITARY WASTE AND VENT PIPING

A. Sanitary and Waste Piping

All piping and fittings shall be PVC Schedule 40 polyvinyl chloride plastic, as per ASTM-A-2665 or latest standard. Solvent as per ASTM-D-2564.

B. Plumbing Vent Piping,

All piping and fittings shall be PVC Schedule 40 polyvinyl chloride plastic, as per ASTM-A-2665 or latest standard. Solvent as per ASTM-D-2564. Exposed vent piping above roof shall be black PVC or CPVC for appearance and solar heat dissipation of frost.

2.12 FUEL GAS PIPING

A. Coordinate with General Contractor and contact the Gas Supplier and for installation of gas meter/entrance. Provide a second regulator after the entrance if the one supplied by the Gas Company is not adjustable within the range required of the gas using equipment.

B. Piping after the entrance shall be Schedule 40 black steel pipe, ASTM 120 with 150# fittings.
   a. Piping 2" and less in diameter shall be screwed pattern malleable iron fittings, shall meet ASTM A-47, ASA B16.3. Pipe joint compound shall be used on all threaded joints.
   b. Piping shall use welded fittings if over 2" in diameter, or if pressure in excess of 14" W.C.

C. Provide dirt leg, gas cock and union at each boiler. Provide gas cock and flex connect with union at any gas clothes dryer.

D. Installation shall meet the requirements of the gas supplier and NFPA 54.

2.13 PIPE SLEEVES AND ESCUTCHEONS

A. Sleeves

1. Contractor shall set sleeves for all piping penetrating walls and floors. Sleeves through masonry shall be steel pipe sleeves two sizes larger than pipe. Piping passing through walls other than masonry shall be provided with # 24 gauge galvanized steel tubes with wired or hemmed edges.

2. Sleeves set in concrete floors shall finish flush with underside, but extend minimum of 1 inch above finish floor. Weld clips to sleeves for support in concrete pre-cast planks of a size that will be covered by concrete topping. Sleeves set in partitions shall finish flush with each side.

3. Space between sleeves and pipes shall be sealed to make smoke and water tight with 3M Brand Fire Barrier Caulk CP25 or Putty 303.

4. Masonry sleeves shall be Schedule 40 steel pipe.

5. This Contractor has the option to use the Pro-set system on lieu of the above.

B. Exterior Sleeves

Where piping passes through exterior walls, provide and install a complete pipe sleeve/hydrostatic wall closure system.

1. Wall sleeve shall be schedule 40 steel pipe, two pipe sizes larger than carrier pipe. Sleeve shall be the same length as the thickness of the wall served.

2. The hydrostatic closure device shall consist of identical interlocking links of solid synthetic rubber compounded to resist ozone, water, chemicals and extreme temperature variations. Each link shall be connected by corrosion resistant bolts and nuts to form a belt that is to fit snugly around the pipe. Under each bolt and nut there shall be a metal pressure plate so that when each nut is tightened the rubber links will expand between the pipe and sleeve to form a continuous, air tight and water tight seal.

3. Units to be Link-Seal system Model LS wall seal by Thunderline Corp. or reviewed equal.

C. Escutcheons

Where piping passes through finish walls, floors, ceilings and partitions, provide and set two piece nickel plated steel floor and ceiling plates.

2.14 PLUMBING FIXTURES

A. IM-1 Ice maker Water Box

1. Appliance supplied by Owner.

2. LSP Products Group model OB-504 metal ice maker box with ¼" Comp valve. Mount just above counter height.

3. Provide 18-24" long, 1/4" Braided S.S. Flex connector.

B. LV-1 Lavatory, Wall – ADA

1. AMERICAN STANDARD 955.000 Murro Universal Design wall hung lavatory, for concealed arm support, 4" center holes, vitreous china, rear overflow, self draining deck, color "white". 0059.020 shroud/Knee Contact Guard, vitreous china. Or reviewed equal.

2. Moen model 8416, commercial brass, single 6" lever handle centerset lavatory faucet, 4" centers, ceramic control components, chrome, meets ADA. Or reviewed equal.

3. McGuire chrome plated grid drain, P-trap, chrome plated angle supplies, wheel stops, wrought escutcheons. Or reviewed equal. Must fit inside shroud/knee guard.

4. Provide floor mounted concealed arms wall carrier.

C. MB-1 Mop Basin

1. The mop basin shall be Fiat MSB-2424, molded stone or reviewed equal. The molding shall be done in matched metal dies under heat and pressure resulting in a one-piece homogeneous product. Size of unit shall be 24"x24"x10" high.

The drain body shall be cast brass, chrome plated, complete with cast brass lock nut and gaskets. A combination dome strainer and lint basket made from #302, 16 gauge stainless steel attached with tamper proof screws shall be included. The drain body shall provide for a lead caulked joint to be 3" I.P.S.

Provide the following accessories:

a. Stainless steel wall guard, MSG-2424
b. Service faucet with vacuum breaker; integral stops and wall brace plate #830-AA.
c. 30" Hose with ¾" coupling at one end; Plate #832-AA.
d. Mop Hanger, stainless steel, 24" long with (3) holders, Plate #889-CC.
e. Silicone sealant #833-AA.
f. Vinyl bumper guard #-77-AA.

D. SH-1 Shower, Right Hand – ADA

1. Enclosure shall be Comfort Designs prepackaged model 38381_.5, gel-coated fiberglass, Right hand unit, open top, 1/2" threshold, outside dimensions 38" x 39" x 78-1/4", ½" tri-cell honeycomb wall construction, textured floor, molded soap ledges, smooth tile pattern, color white, 3 year warranty. Optional Max-Guard antibacterial protection finish. Accessories: fold-up frameless HDP seat, stainless steel grab bars, semi-permanent dam, no-caulk brass drain with stainless steel strainer, stainless steel curtain rod, heavy duty shower rings, Impact heavy duty weighted washable shower curtain. Or reviewed equal.

2. Controls shall be Moen model 8346 metal commercial hand shower system with single handle Posi-temp pressure balanced valve with trim, integral stops, single function hand shower with slide bar, chrome, 69" flexible hose assembly, integral vacuum breaker. Install slide bar with A750 secure mount anchor. Or reviewed equal.

E. SK-1 Sink, Single Bowl, Kitchen - ADA

1. Elkay LRAD-2522-65-3 single bowl stainless steel sink, 21" x 16" x 6-1/2" bowl, 18 gauge, type 302 SS, self-rim, satin finish, sound guard undercoating, 3 hole drilling, **rear drain**. LK-35 Standard strainer. Or reviewed equal.

2. Moen model 8241 commercial lever handle kitchen faucet, cast brass body, two handle, heavy duty ceramic disk cartridges, 9-1/2" reach spout, vandal resistant aerator, chrome, meets ADA, 5 year warranty. Or reviewed equal.

3. McGuire Prowrap insulated 1-1/2" P-trap and supply covers, chrome plated angle supplies, wheel stops, wrought escutcheons. Or reviewed equal. Provide drain tailpiece with dishwasher drain connection where required.

F. SK-2 Sink, Single Bowl, Bar - ADA

1. Elkay LRAD-1517-65-3 single bowl stainless steel sink, 12" x 12" x 6-1/2" bowl, 18 gauge, type 302 SS, self-rim, satin finish, sound guard undercoating, 3 hole drilling, **rear drain**. LK-35 Standard strainer. Or reviewed equal.

2. Moen model 8241 commercial lever handle kitchen faucet, cast brass body, two handle, heavy duty ceramic disk cartridges, 9-1/2" reach spout, vandal resistant aerator, chrome, meets ADA, 5 year warranty. Or reviewed equal.

3. McGuire Prowrap insulated 1-1/2" P-trap and supply covers, chrome plated angle supplies, wheel stops, wrought escutcheons. Or reviewed equal. Provide drain tailpiece with dishwasher drain connection where required.

G. UR-1 Urinal, Wall

1. AMERICAN STANDARD 6590.005 Washbrook, 0.5 GPF, 3/4" top spud, siphon jet, 2" threaded outlet, water saver, white, vitreous china, wall mounted. Or reviewed equal by Kohler Manufacturing Company, Crane, Universal-Rundle, Toto or Eljer.

2. Sloan Royal 186-0.5-SG, chrome, quiet exposed flush valve with check angle stop, Saniguard lever handle, and wall flange. Sweat solder adapter kit. Or reviewed equal.

3. Provide adjustable floor mounted carrier as specified under Plumbing Specialties, Drainage.

H. WC-1 Water Closet, Floor - ADA

1. AMERICAN STANDARD 2386.012 elongated "Cadet 3 right height toilet with Flush Right system, 1.6 GPF, white, vitreous china, floor mounted, close coupled tank, bolt caps, rim 16.1/2" above finished floor. Or reviewed equal.

2. Church 295C white, elongated, commercial duty, solid plastic open front seat with, stainless check hinges and posts. Or reviewed

3. McGuire Chrome plated wheel handle stop supply.

I. WC-2 Water Closet, Floor – ADA

1. Same as WC-1 except flush handle on right hand side, alternate tank configuration.

2.15 EQUIPMENT OR PLUMBING FIXTURES BY OTHERS

Any equipment and fixtures by other sections will be provided and set in place by those sections. This contractor will connect gas, domestic hot water, waste and vent as required.

2.16 PLUMBING SPECIALTIES, DRAINAGE

A. Carriers

1. Wall hung fixtures including urinals and wall lavatories, shall be supported with adjustable floor mounted carriers to fit building conditions, piping system, and fixtures specified. Each carrier shall be provided with a wall finishing frame. All carriers shall be secured to the floor with tie down lugs.

2. Carriers shall be as manufactured by Zurn, Smith, Josam or Wade.

B. Traps

1. Traps of material and design as approved by the State and shall be furnished and installed at all fixtures and appliances. Trap each fixture separately, keeping all trap screws below water line; vent each trap. Make

offsets in vent piping with 45-degree angle fittings when possible. Pitch horizontal vents toward waste lines, group vents and take through roof as shown. All traps, at fixtures and appliances shall be provided with accessible clean outs.

2. All traps under sinks and lavatories, and all piping and fittings shall be chrome-plated.

C. Cleanouts

Provide cleanouts for soil and waste where shown on the drawings and as required by code.

1. Floor Cleanouts (FCO)

All floor cleanouts in concrete or tile shall be flush with finish floor.

a. Type "1", Round, finished areas

Zurn ZB-1400-BP-K, polished bronze top, bronze plug, anchor flange.

b. Type "2", Round, Carpeted areas

Zurn ZB-1400-BP-K-CM, polished bronze top, bronze plug, anchor flange and carpet marker.

2. Wall Cleanouts

All wall cleanouts shall be Zurn Z-1445 cleanout tee with threaded plug. Polished nickel bronze cover, Zurn ZANB-1462 or reviewed equal by Smith, Josam or Wade.

3. Flashing

Flash each above grade floor clean out with Chloraloy® 240 thermoplastic elastomeric sheet membrane for concealed waterproofing, or other approved flashing material, extending 24" beyond perimeter of clean out and lock into clamping collar.

D. Floor Drains (FD)

1. All floor drains above grade shall be complete and each provided with flashing flange, flange device, and 24"x24", Chloraloy® 240 thermoplastic elastomeric sheet membrane for concealed waterproofing, or other approved flashing material, lock into drain clamping collar.

2. Traps for floor drains shall be deep seal traps. Those without trap seal primers shall be topped-off with 12 oz. of mineral oil to retard evaporation. Those in poorly heated areas, such as loading docks and penthouses, shall be filled with an undiluted non-toxic, non-corrosive antifreeze effective to at lease -20 deg F.

a. Type "1" General, Round
Cast iron body, flashing collar, polished bronze, 6" adjustable strainer head, inside caulk, trap primer connection. Zurn ZB-415-6B-P or equal by Josam, Wade or Smith.

b. Type "2" Indirect Waste
Open PVC hub raised ½" to 1" above floor with PVC P-trap, and PVC trap primer connection.

c. Type "3" Indirect Waste
Cast iron body, flashing collar, sediment bucket, polished bronze, 5" adjustable recessed grate, inside caulk. Zurn ZB-415-5I-Y or equal by Josam, Wade or Smith.

2.17 PLUMBING SPECIALTIES, WATER

A. Trap Primer (TP)

1. Type "1", Above Floor

Furnish and install self-adjusting automatic trap primers equal to Model PR-500 as manufactured by Precision Plumbing Products Inc. Provide DU distribution unit where indicated. Or reviewed equal. NOTE: As the trap primer may be on a line larger than 1/2", flow through type trap primers smaller than the pipe size are not acceptable.

B. Hose Bibs (HB)

1. Type "1" Exterior Hose Bib

Zurn Z-1321 exposed Ecolotrol "Anti-Siphon" automatic draining, non-freeze wall hydrant, integral backflow preventer, all bronze interior parts, operating key. Or reviewed equal.

C. Shock Absorbers (SA)

Shock protection shall be provided where shown on drawings and at all quick closing devices. Devices shall be stainless steel shell, welded expansion bellows surrounded by on-toxic mineral oil or gas, pressurized compression chamber charged and factory sealed, all, in-line design, threaded nipple and PDI reviewed. Sized to meet the conditions.

1. Type "1", 'A' P.D.I. units

Zurn Z-1700, #100. Or reviewed equal.

2. Type "2", 'B' P.D.I. units

Zurn Z-1700, #200. Or reviewed equal.

D. Thermometer (T)

Units to be dial type, 4.1/2" with 30^{o} to 180^{o} range; Trerice Universal angle or reviewed equal.

E. Pressure Gauge (P.G.)

Furnish and install pressure gauges with gauge cocks on piping where shown on drawings. The dial range shall be such that the normal pressure shall be approximately mid-way of dial. Gauges shall be Trerice No. 600 or equivalent by Weiss or Nurnburg, 4.1/2" dial size, cast aluminum case, with brass "T" handle cocks and No. 872 bronze pressure snubbers on water units.

F. Vacuum Relief Valve

Watts Model N36 or reviewed equal.

G. Backflow Preventers (BFP)

Provide and install all necessary components to provide protection against potentially hazardous backflow or back siphonage and the contamination of the potable water system at the required GPM demand. Unit shall be UL, USC, ASSE, 1APMD and AWWA approved.

1. Type "1", Entrance

Watts 007M2QT-S double check backflow preventer, 2", quarter turn full port ball valves, strainer, 6 psi fall-off at 75 GPM. Or reviewed equal.

2. Type "2", Mechanical Equipment

Watts #9DM2 double check with atmospheric port, or reviewed equal.

H. Mixing Valves (MV)

1. Type "1" Master Mixer

Leonard model TM-28 thermostatic mixing valve, inlet size 3/4", outlet size ¾" capacity 10 GPM @ 10 psi differential pressure for exposed piping, Dura-trol solid bi-metal thermostat scale hot to cold, rough bronze, check stops, set at 120^{o}F. Or reviewed equal.

I. Expansion Tank

Watts Model DET-12-M1. Potable water expansion tank, 1.8 gallon acceptance, precharged to 40 psi. Or reviewed equal.

J. Braided Stainless Steel Water Connectors

EPDM tubing jacketed by type 304 stainless steel braid, stainless ferrule, brass nuts. By Zurn or reviewed equal.

K. Dielectric Unions

Series 3000 as manufactured by Watts or reviewed equal.

L. Pressure Reducing Valve (PRV-1)

Watts Model U5B-GG Standard capacity Water pressure reducing valve with integral stainless steel strainer, pressure gauge. Set at 70 psi. Or reviewed equal.

2.18 ACCESS DOORS AND PANELS

A. Furnish General Contractor with access doors/ panels for all locations where service access is required behind walls, above sheetrock and masonry ceilings, and below floors for equipment, piping, valves, and specialties furnished under this Division.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that plumbing may be installed in strict accordance with all pertinent codes and regulations and the reviewed Shop Drawings.

B. Discrepancies

1. In the event of discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.

3.02 COORDINATION WITH OTHER TRADES

A. Establish and resolve areas of conflict and congestion, especially those indicated on the drawings. Priority to be given to HVAC equipment and large ductwork, then gravity piping, then small ductwork, then piping based on descending order of size. Special consideration given to allow access to valves, dampers etc. .

B. Failure to coordinate will result in this contractor removing and relocating his piping at no additional expense to the owner.

3.03 INSTALLATION OF PIPING AND EQUIPMENT

A. General

1. Install all piping promptly, making pipe generally level and plumb, free from traps, and in a manner to conserve space for other work.

2. Provide uniform pitch of at least ¼ inch per foot for all horizontal waste and soil piping 3” or less. For piping 4” and above, slope at 1/8” minimum per foot

3. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions; promptly remove all defective material from the jobs site.

4. Install pipes to clear all beams and obstructions. Do not cut into or reduce the size of load carrying members without the approval of the Architect.

5. Plumbing vents
   a. Back vent all plumbing fixtures.
   b. Pitch all vents at 1/32” per foot minimum toward waste lines for proper drainage to prevent unintended traps.
   c. Install vent piping with each bend 45 degrees minimum from the horizontal, wherever structural conditions will permit.
   d. Group plumbing vents and take through roof as shown.
   e. Increase vents 3” and smaller one size before going thru roof. Make size transition a minimum of 12” below the surface of flat roofs and 72” (or as structure permits) below sloped roofs.
   f. Terminate 18” to 24” above roof.
   g. If installing in locations other than as shown on the drawings, line up with other plumbing vents for a neat appearance.

h. Do not install plumbing vents within 10 feet of an operable window or door or within 25 feet of a ventilation air intake.

6. All risers and off-sets shall be substantially supported.

7. Pipe hangers shall be placed on center as follows:

MATERIAL	HORIZONTAL	VERTICAL
Cast-iron	At joints not to exceed 10 ft	15' or at each story whichever is less, and stacks at the base
Copper 1-1/4" & less	6'	6'
1-1/2"	6'	10'
2" & up	10’	10'
PVC, DWV	4’	4'
Steel	10’	10'

8. Arrange all piping to maintain required grade and pitch to lines to prevent vibration. Expansion loops to anchors shall be provided where shown on drawings.

9. Make all changes in pipe size with reducing fittings.

10. All low points in water piping shall be drained with ½” gate valve with hose nipple and metal cap.

11. No piping shall be installed in such a manner to permit back-siphonage or flow of any liquid in water piping under any conditions.

12. No water piping shall be installed outside of building or in an exterior wall unless adequate provisions are made to protect such pipe from freezing.

13. All piping and drain openings left unattended will be capped, plugged or securely covered to prevent accidental entry of foreign matter. Roof drains in use will be provided with domes.

B. Joints and Connections

1. Smoothly ream all cut pipe; cut all threads straight and true; apply best quality Teflon tape to all male pipe threads but not to inside the fittings; use graphite on all clean out plugs. DO NOT use Teflon tape on gas piping.

2. Smoothly ream all cut P.V.C. pipe. Clean and use solvent for fitting connection and in strict accordance with the manufacturer’s recommendations.

3. Make all joints in copper water tube with solder applied in strict accordance with the manufacturer’s recommendations.

C. Coordinate with the General Contractor to depress the finished floor where indicated on drawings. Install floor drains at low points of surface areas to be drained. Adjust grates of drains 1/32" below finished floor, unless otherwise indicated. Finished floor shall be depressed according to the following drainage area radii:

1. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.

2. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.

3. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.

3.04 STERILIZATION AND FLUSHING OF PIPES

A. After preliminary purging of the system, chlorinate the new potable water system in accordance with the current recommendations of the American Water Works Association, and in accordance with all pertinent codes and regulations. Chlorinate only when the building is unoccupied.

B. Upon completion of the sterilization, thoroughly flush the entire potable water system.

C. After sterilization and flushing are complete, a sample shall be collected from the end of the longest main, or at any other location selected by the Architect, and a water analysis test provided. The test must prove the water acceptable or additional disinfecting of system performed. A copy of the test report shall be submitted to the Architect.

3.05 CLOSING IN UNINSPECTED WORK

A. Do not cover up or enclose work until it has been properly and completely inspected and approved.

B. Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required and after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Architect and at no additional cost to the Owner.

3.06 TESTING OF PIPING

Tests shall be applied to the plumbing installation as required by codes and where as directed by the Architect, and in all cases before work is covered by earth fill or pipe covering.

A. Sanitary piping shall be tested when all underground work is complete (before covering) and again, after all piping is installed, but before it is further closed in. Sanitary systems shall be securely stopped, except at the highest point, and the entire system filled with water to the point of overflow for 24 hours. All leaks shall be repaired. Cracked pipes and fitting shall be removed and replaced. No doping of soil pipe or fittings will be allowed. Plan testing around expected weather and temperature conditions or provide protection so that pipes do not freeze.

B. New domestic water piping shall be filled and subjected to a hydrostatic pressure test of 150 psi for 8 hours with no leaks. If leaks are detected they shall be repaired and the test repeated until tight. NOTE: Testing with compressed air only is NOT ACCEPTABLE.

C. Testing of Fuel Gas piping shall conform to NFPA 54. Testing of natural gas piping shall also conform to the requirements of the gas supplier.

3.07 CLEANING

A. Prior to acceptance of the buildings, thoroughly clean all exposed portions of the this installation, removing all labels and all traces of foreign substance, using only a cleaning solution approved by the manufacturer of the plumbing item, being careful to avoid all damage to finished surfaces. Additional attention may be required to thoroughly clean any used, re-used or owner provided fixtures.

B. Clean out all strainers and aerators and adjust or replace washers, cartridges, etc

3.08 INSTRUCTIONS

On completion of the job, this Contractor shall provide a competent technician to thoroughly instruct the Owner's Representative in the care and operation of the system. The time of instruction shall be arranged with the Owner.

3.09 RECYCLING

Discarded materials, both new and removed, shall be recycled whenever practical through metal salvage dealers (piping, etc.), paper salvage (cardboard shipping containers, etc.), wood products, etc. The Plumbing Contractor shall retain the salvage value of discarded materials and may use this value to offset his project bid price if so desired. Toxic materials such as adhesives, coolants, etc. SHALL be disposed of in a manner acceptable to the State of Maine Department of Environmental Protection.

3.10 HAZARDOUS MATERIALS

Mercury or any other material deemed by the Federal Environmental Protection Agency or the State Department of Environmental Protection to be hazardous shall not be used in any components of the plumbing systems.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Plumbing will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Plumbing shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Plumbing will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Mechanical	Lump Sum

END OF SECTION

SECTION 23 00 00 – MECHANICAL

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

823.1000 Mechanical

Add the following:

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

General Provisions of Contract, including General and Supplementary Conditions and MaineDOT Division 100, General Conditions, apply to work specified in this Section.

1.02 ALTERNATES

There are no alternates that apply to this section of the project.

1.03 DEFINITIONS

ATC Automatic Temperature Control

EC Electrical Contractor (Division 26)

GC General Contractor

HC Heating (mechanical) Contractor

PC Plumbing Contractor

1.04 DESCRIPTION OF WORK

A. Work Included

1. Furnish all labor, materials, equipment, transportation and perform all operations required to install a complete heating, ventilating, heat recovery and air conditioning system in the building, in accordance with these specifications and applicable drawings.
2. All temperatures are expressed in degrees Fahrenheit.
3. Perform demolition and removal as required.
4. Work to be performed shall include, but is not limited to, the following:
   a. Provide and install forced hot water heating and ventilating system in building areas indicated on drawings.
   b. Provide and install forced air heat recovery system in building areas indicated on drawings.
   c. Provide and install direct expansion heat pump system in building areas indicated on drawings.
   e. Pipe, valve and fittings
   f. Hot water specialties
   g. Circulating pumps and boiler work
   h. Radiation
   i. Air handling units
   j. Unit heaters and cabinet unit heaters
   k. Insulation
   l. Fans
   m. Sheetmetal
   n. Automatic Temperature Control (ATC)
   o. Tests and balance

5. Specifications and accompanying drawings do not indicate every detail of pipe, valves, fittings, hangers, ductwork and equipment necessary for complete installation; but are provided to show general arrangement and extent of work to be performed.
6. Before submitting proposal, Mechanical Contractor shall be familiar with all conditions. Failure to do so does not relieve Mechanical Contractor of responsibility regarding satisfactorily installation of the system.
7. Mechanical contractor shall be responsible for rigging to hoist his own (and his sub-contractors') materials and equipment into place.
8. Mechanical contractor and his sub-contractors shall be responsible for start-up of all equipment provided under this section.

B. Related Work Described Elsewhere

1. Excavation and backfill.
2. Cutting and patching.
3. Firestopping between building construction and ductwork.
4. Electrical conduit and wiring, except as noted below.
5. Framing of openings.
6. Setting of sleeves in masonry work (sleeves provided by Mechanical Contractor)
7. Door louvers
8. All finish work

C. Mechanical Electrical Work

1. Provide and erect all motors, temperature controls, limit switches as specified.
2. Power supply to switches, fused switches, outlets, motor starters, to line terminals of equipment, and all related wiring and fuses to properly connect and operate all electrical equipment specified shall be furnished and installed under Division 26, "ELECTRICAL". Division 26 shall not mount electrical equipment to indoor mechanical equipment without the consent of Division 23. Division 26 shall not drill wiring holes in equipment casings but shall make use of factory wiring knockouts when present. Coordinate all wiring between Mechanical and Electrical to provide a complete and operating system.
3. All wiring provided under this section shall be in accordance with the latest rules and regulations of the National Fire Underwriters, National Electric code, State of Maine Oil Burner Code, and Local Codes Division 26. Install all wiring under the supervision of the Division 26. Any wiring that is not installed according to these standards, and which does not match wiring installed by Division 26 in type, quality and appearance shall be corrected by Division 26 at the expense of this section.
4. Automatic Temperature Control (ATC) Systems

   Electric wiring shall be furnished and installed by ATC Contractor under supervision of Division 26. Any wiring that is not installed according to these standards, and which does not match wiring installed by Division 26 in type, quality and appearance shall be corrected by Division 26 at the expense of this section.

   Low voltage control wiring must be plenum rated and adequately supported with no sags or "droops". Low voltage wiring need not be installed in conduit unless required by local code.
5. Boilers

   Division 26 shall provide a separate circuit breaker for each boiler and wire to line terminals on unit. Mechanical contractor shall provide all other wiring, including control and safety circuits, low water cut-off and fusible switches.
6. Automatic Temperature Control (ATC) Panels

   Division 26 shall provide a dedicated 120 volt, 15 amp circuit breaker for each temperature control panel. Wring from circuit breaker to temperature control panels will be provided and installed by the ATC

Contractor. Division 26 shall also provide a duplex convenience receptacle on a separate circuit within 2 feet of panel.

7. Circulating Pumps

   Division 26 shall provide and wire disconnect switches for each pump then wire to pumps.

8. Unit Heaters
   a. Cabinet Type: Division 26 shall wire to disconnect switch provided with unit.
   b. Propeller type: Division 26 shall provide and wire service switch with overload protection.

9. Air Handling Units

   Division 26 shall provide and wire disconnect switches then wire to line terminals on each unit. Interlock wiring with fans and other Air Handling units shall be provided by ATC Contractor.

10. Outdoor (compressor/condenser) Units

    Division 26 shall provide and wire disconnect switches then wire to line terminals on each unit. Interlock wiring with fans and other Air Handling units shall be provided by ATC Contractor.

11. Heat Recovery Unit

    Division 26 shall provide and wire disconnect switches then wire to line terminals on each unit. Interlock wiring with air handling units shall be provided by ATC Contractor.

12. Heating System Low Temperature Sensor

    ATC Contractor shall install aquastat and flow switch in hot water supply in Mechanical Room and outdoor air sensor. Division 26 shall wire to alarm, if supplied, or as indicated under that Division.

13. Convenience Receptacles

    Division 26 is requested to provide and install duplex convenience receptacles within 8 feet of each outdoor unit and within 2 feet of each ATC panel.

    Division 26 is requested to provide and install adequate lighting at each air handling unit, boiler and heat recovery unit so as to facilitate easy servicing of equipment without the need of portable drop lighting. Light fixtures should be installed in such a manner as to avoid shadows resulting from ductwork or other obstructions larger than 6 inches (such as piping).

14. All motors 1/3 HP and smaller shall be wired for 120 volt, 1 phase, 60 hz; motors 1/2 hp and larger shall be wired for 208 volt, 3 phase, 60 hz, unless specifically shown otherwise. All three phase motors shall be premium efficiency.

1.05 PERMITS

A. This Contractor shall be responsible for providing and filing all Plans, Specifications and other documents, pay all requisite fees and secure all permits, inspections and approvals necessary for the legal installation and operation of the systems and/or equipment furnished under this Section of the Specifications.

B. The Contractor shall frame under glass/ clear plastic all permits, secured by him, adjacent to the respective system and/or equipment and required to be displayed by Code, law or ordinance. Those permits secured but not required to be displayed shall be laminated in plastic and included in the Owner's maintenance manual.

1.06 CODES, ORDINANCES AND PERMITS

A. All work performed under this Section of the Specifications shall be done in accordance with applicable National, State and local Codes, Laws and Ordinances. The following abbreviations are used for reference to standards which are to be followed:

AABC	Associated Air Balance Council
ADA	Americans With Disabilities Act
AMCA	Air Movement & Control Association
ANSI	American National Standards Institute
ARI	Air Conditioning and Refrigeration Institute

ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BOCA	Building Officials and Code Administrators
NEC	National Electrical Code
NFPA	National Fire Protection Association
NEMA	National Electrical Manufacturer's Association
OSHA	Occupational Safety and Health Act
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
UL	Underwriter's Laboratories

B. The latest issue of each Code in effect at the time of bidding shall be used. Code requirements are the minimum quality and/or performance acceptable. Where the Specifications and/or Drawings indicate more stringent requirements, these requirements shall govern.

1.07 QUALITY ASSURANCE

A. Mechanical Contractor shall have prior experience with at least two projects of this nature, size and scope and be capable of producing references indicating as such.

B. Use sufficient qualified workpersons and competent supervisors in execution of this portion of the work to ensure proper and adequate installation of systems throughout. Technical training and certification of workpersons installing the systems specified, by the systems manufacturer, shall be mandatory prior to commencement of work. Documentation of such certification shall be made available to the Architect upon request within 5 business days.

C. Work performed shall conform with all Local and State Rules and Regulations, as well as those of the International Building Code and National Fire Protection Association (N.F.P.A.).

D. Piping design shall conform to ANSI, ASME B31.9 and AWS D10.9 codes.

1.08 MATERIALS AND SUBSTITUTIONS

All materials and equipment shall be new and of the latest design of respective manufacturers. All materials and equipment of the same classification shall be the product of the same manufacturer, unless specified otherwise.

A. Any proposal for substitution of Mechanical equipment, materials or vendors shall be made in writing PRIOR TO OPENING OF BIDS. Submit full details for consideration and obtain written approval of the Architect. The phrase "or approved equal" shall be defined to mean that the Architect, not the contractor, shall make final determination whether or not substitute materials are an equal to that which is specified. The contractor shall be responsible to certify within his submittals that any equipment to be considered as an "approved equal" meets or exceeds the requirements of this specification in all aspects and will physically fit within the space provided and still provide adequate space adjacent to the equipment for service. If requested by the Architect the contractor shall provide said certification in the form of scale drawings before review will be made. Architect will not be responsible to provide drawings for substituted materials unless the substitution is agreed upon prior to opening of bids. Architect's decision on acceptability of substitute materials shall be final.

B. Approval by Architect for such substitution shall not relieve Mechanical Contractor from responsibility for a satisfactorily installation and shall not affect his guarantee covering all parts of work

C. Any material or equipment submitted for approval which are arranged differently or is/are of different physical size from that shown or specified shall be accompanied by shop drawings indicating different arrangements of size and method of making the various connections to equipment. Any material or equipment that requires different piping, ductwork or installation methods differing from the design must be supplied from the manufacturer with a full set of plans indicating pipe, duct and equipment sizes, as well as full engineering calculations. Final results shall be compatible with the system as designed. Should it be necessary for the Architect or Engineer to provide new designs to accommodate substitutes, the contractor or manufacturer of the substituted equipment will be required to pay design fees.

D. Materials and equipment determined as an "approved equal" and/or substitutions must meet the same construction standards, capacities, code compliances, etc. as the equipment (i.e. Manufacturer, model, etc.) specified.

E. Any additional cost(s) to other trades resulting from the substitution of equipment, regardless of acceptance by the Architect or Engineer, shall be paid by this Contractor. Additional costs may include, but not be limited to, electrical and/or structural alterations from the contract documents. Contractor shall be solely responsible to verify that substitutes will fit within the designated spaces provide while permitting adequate clearances for servicing of equipment as required by the manufacturers. Contractor shall, upon request from the Architect or Engineer of record, provide such verification of ample space and clearances in the form of shop drawings or any other manner requested.

1.09 PLANS AND SPECIFICATIONS

Mechanical Contractor shall provide his sub-contractors with a copy of the ENTIRE portion of Part 1 of this specification, portions of this specification and copies of drawings which pertain to the equipment to be supplied at no cost to the sub-contractor. Provide ATC Contractor with entire set of Electrical plans and specifications. Provide Testing and Balancing sub-contractor with copies of shop drawings indicating coil gpm's, air handling unit air volumes, etc. Failure to do so may result in the Architect providing the required materials at the Contractor's expense.

Sketches pertaining to changes and amendments during construction (ASI's, RFI's and RFP's for example) shall be contract form documents issued by the Architect and/or Engineer for use during construction and it shall be the Architect's and/or Engineer's discretion to provide sketches or full size drawings. Requests for documentation other than what is provided (full size revised drawings for instance) and deemed suitable for the particular situation shall be paid for by the contractor making the request. The cost(s) shall include, but not limited to, drafting time and reproduction costs.

1.10 ELECTRONIC DRAWINGS AND FILE SHARING

Plans and specifications may be made available in electronic format on request. Plans may be provided in either Adobe (.pdf) or CAD (.dwg or .dxf) formats and will be compressed using WinZip (.zip format). Recipient is responsible to obtain the necessary software to open the files. Note: CAD (.dwg and .dxf) files will be made available to successful bidders only after a contract is awarded.

CAD drawings are produced with AutoCAD and may be provided in the 2004 or 2010 file format. Upon request for CAD files a release form will be provided which must be signed and returned to the Engineer prior to transmission of electronic files. Physical mailing address and telephone numbers for this office are indicated on each drawing. A signed release will not be required for Adobe based files.

All contract documents are copyrighted material. No portion of materials may be reproduced or duplicated except as indicated in the release form. Where release forms are not required (Adobe based files), materials may be printed for use by the intended recipient only and may not be reproduced or copied in any other manner or for any purpose other than for use pertaining to the construction of this project unless written permission is obtained.

1.11 SHOP DRAWINGS & SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. As soon as possible after award of contract (*but not longer than 21 calendar days*), before any material or equipment is purchased, Mechanical Contractor shall submit shop drawings for review. Unless prior arrangements are made with the Architect all shop drawings must be submitted to the General Contractor who in turn will forward them to the Architect. The quantity of copies shall be as outlined in MaineDOT Standard Specifications Section 105.7, Working Drawings. If shop drawings are rejected or returned for re-submittal, Mechanical Contractor shall provide said re-submittals within 14 calendar days of receipt of original submittals with engineer's comments. If original or re-submitted shop drawings are not submitted within the allotted time frames indicated all substitutions included in the late shop drawings will be invalid and the equipment primarily specified must be provided. Any costs resulting from delays in the project schedule due to failure to submit shop drawings related to this section in a timely manner shall be the responsibility of the Mechanical Contractor. Mechanical Contractor's and vendor's name, address, telephone & fax numbers and e-mail addresses shall be

provided with every shop drawing submission. Capacities indicated are minimums. Equipment submitted with capacities below specified parameters will be refused.

B. Shop drawings shall be properly identified and shall describe in detail the material and equipment to be provided, including all dimensional data, performance data clearly indicated, fan curves, pump curves, computer selection print-outs, etc. Capacities indicated are minimums. Equipment submitted with capacities below specified parameters will be refused.

C. Corrections or comments made on the shop drawings do not relieve the contractor from compliance with requirements of the drawings and specifications. Shop drawing review is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades and performing his work in a safe and satisfactorily manner.

D. Should any materials or products be purchased and/or installed without prior review and comment the contractor shall be required to remove or replace those products and/or materials, if directed by the Architect, at his expense. If the materials are not removed (or replaced) or if the project is delayed as a result of the contractor's actions, the Architect reserves the right to order the withholding of payment until the situation is resolved in a manner satisfactorily to the Architect.

E. Electronic submission of shop drawings is encouraged. Electronic files must be accessible and in an open format, meaning files must not be locked and comments may be added without altering the original content, or have interactive fields intended specifically for commenting. Locked files will not be reviewed. Hard copies of shop drawings must be original documents or good quality photocopies of original documents (photocopies of color samples are not acceptable). Faxed copies of submittal sheets will be refused unless prior arrangements are made.

F. Mechanical shop drawings shall be separate from Plumbing shop drawings. Submittals not separated from plumbing shop drawings will be refused for re-submittal.

G. Review must be obtained on the following items:

1. Ductwork and Accessories
    a. Registers, diffusers, and grilles
    b. Duct access doors
    c. Volume control dampers (manual and automatic)
    d. Duct sealant
    e. Side takeoff fittings
    f. Flexible duct
    g. Backdraft dampers
    h. Manual dampers
    i. Louvers and brick vents - provide color chips (photocopies not acceptable) – provide samples if substituting
    j. Filters
    k. Vents from gas heating appliances

2. Mechanical Equipment (sound data must be provided with all interior motorized equipment).
    a. Full warrantee information must be included with all submittals.
    b. Air handling units and accessories - provide curves for fan wheels submitted and computer selection printouts.
    c. Outdoor units and accessories
    d. Boiler unit and accessories
    e. Cabinet unit heaters - provide color chips (photocopies not acceptable)
    f. Domestic hot water storage heater and accessories
    g. Equipment identification tags
    h. Heat recovery unit and accessories - provide computer selection printouts.
    i. Horizontal unit heaters
    j. Pumps and accessories - provide full pump curves and computer selection printouts.

3. Piping and Accessories
   a. Pipe, valves, unions and flanges
   b. Air scoop
   c. Air vents (automatic and manual)
   d. Backflow preventer
   e. Balancing valves with read-out gauge and pressure tappings. Provide a schedule clearly indicating every valve, its location, GPM, size and pressure drop.
   f. Expansion tank and accessories
   g Exterior piping support system.
   h. Flow control valves
   i. Flow meters
   j. Pipe and valve markers
   k. Pipe hose assemblies.
   l. Pipe hangers and insulated pipe supports
   m. Pressure gauges and thermometers
   n. Pressure reducing valves
   o. Relief valves

4. Terminal Units
   a. Convectors
   b. Hot water heating coils - provide computer selection printouts.

5. Insulation
   a. Duct
   b. Equipment
   c. Pipe
   d. Pipe fittings
   e. Smoke pipe

6. Automatic Temperature Control (ATC) System

1.12 PRODUCT HANDLING

A. Protection

Use all means necessary to protect heating, ventilating and air conditioning materials before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

1.13 AS-BUILT DRAWINGS

in good condition at the job, apart from all other prints used in actual construction, one complete set of all blueprints furnished for this job. On this special set of blueprints, record *completely and accurately* all differences between the work as actually installed and the design as shown on the drawings. These record prints must be kept up to date by recording all changes within one week of the time that the changes are authorized. At the completion of the work, this set of drawings shall be delivered to the Architect for the Owner electronically in the form of CAD drawings. If a complete record of changes is not made and electronic CAD drawings not provided by the Mechanical Contractor, a record shall be made by the Engineers, and *the cost of the record shall be the responsibility of the Mechanical Contractor*. Copies of the mechanical CAD drawings (minus professional engineering stamps) may be made available at no cost to the Mechanical Contractor of record if desired. Drawings shall be dated accordingly and clearly identified as "AS-BUILT". See par. 1.10, "ELECTRONIC DRAWINGS AND FILE SHARING" for additional information.

1.14 MAINTENANCE MANUAL

A. On completion of this portion of the work, and as a condition of its acceptance, submit for approval two copies of a manual describing the system. Mechanical equipment manuals shall be separate from plumbing manuals. All manuals shall be original copies, not photocopies or they will be refused for re-submittal. Prepare manuals in durable 3-ring binders approximately 8½ inches by 11 inches in size with at least the following:

1. Identification on the front cover and spine stating general nature of the manual.
2. Neatly typewritten index.
3. Complete instructions regarding operation and maintenance of all equipment involved.
4. Complete nomenclature of all replaceable parts, their part numbers, current cost, and name, address and telephone number of nearest vendor of parts.
5. Copy of all guarantees and warranties issued.
6. Where contents of manuals including manufacturer's catalog pages, clearly indicate the precise item included in this installation and delete, or otherwise clearly indicate, all manufacturers' data with which this installation is not concerned.

B. In addition to above, provide two (2) separate offset style binders properly identified, each containing a copy of all reviewed shop drawings and catalog cuts. (NOTE: May be incorporated in Maintenance Manuals, if binders are of adequate size.)

1.15 OBJECTIONABLE NOISE AND VIBRATION

Mechanical equipment shall operate without objectionable noise and vibration. Should objectionable noise or vibration be transmitted to any occupied part of the building by apparatus, piping or ducts, as determined by the Architect, the necessary changes eliminating the noise or vibration shall be made by this Mechanical Contractor at no extra cost to the Owner.

1.16 GUARANTEE

This Contractor shall guarantee all materials and workmanship furnished by him or his sub-contractors to be free from all defects for a period of no less than one (1) year from date of final acceptance of completed system and shall make good, repair or replace any defective work which may develop within that time at his own expense and without expense to the Owner. Any additional costs required to extend manufacturer's guarantee and warranty for the period specified, shall be included in Contractor's base bid.

1.17 DEVIATIONS AND DISCREPANCIES

A. The drawings are intended to indicate only diagrammatically the extent, general character and approximate locations of mechanical work. Work indicated, but having minor details obviously omitted, shall be furnished complete to perform the functions intended without additional cost to the Owner. Follow the architectural, structural, plumbing and electrical drawings so that work under this section is properly installed and coordinated with other Sections.

B. The drawings and specifications are complimentary to each other and what is called for in one, shall be as binding as if called for by both. In the event of conflicting information on the mechanical drawings, or between drawings and specifications, or between trades, that which is better, best or most stringent shall govern.

C. Questions to the Architect or Engineers are encouraged, however any answers and/or advice is non-binding unless incorporated into the contract documents in the form of addenda, change order, etc. Inquires requiring an answer prior to opening of bids should be made at least 4 days prior to when bids are due to allow time for a clarifying addendum to be issued.

D. Any conflicts arising from duplication of equipment specified in different portions of the specifications shall be brought to the attention of the Architect prior to submitting bids. Failure to do so does not relieve the Contractor from responsibility of providing said materials and equipment and a credit will be taken for the duplicated item(s).

E. Should unforeseen job conditions require re-arrangement of piping and/or ductwork resulting in deviation from the intent of the contract documents or potentially compromising the integrity of the mechanical systems, the Architect shall be notified immediately prior to commencement of work. Failure to do so will result in the contractor being responsible to correct any work installed that is contrary to the contract documents at his own expense.

1.18 CHANGE ORDERS

A. No change shall be made from the work, equipment, or materials under this section except as directed in writing by Engineer.

B. All requests for change in contract price and scope shall be accompanied by a breakdown list of materials with unit and extended prices and labor hours with unit and extended price, plus markups that have been applied.

1.19 COORDINATION

A. Contractor shall be responsible to coordinate his work with that of other trades to adjust to field conditions prior to commencing work. It is also this contractor's responsibility to coordinate locations of his own piping and ductwork to ensure the two do not conflict. If a reasonable solution cannot be achieved without compromising the integrity of the intended design or would result in additional cost the Architect must be notified immediately prior to commencement of work. Failure to do so does not relieve the Contractor from providing and installing the systems to the satisfaction of the Architect at no additional cost.

B. Contractor shall be responsible to review job conditions and identify conflicts and/or obstructions to ductwork and piping prior to fabrication. If conflicts and/or obstructions are noted the Architect must be notified immediately prior to commencement of work. The cost of any fabrication work performed without confirmation and notification of conflicts and/or obstructions shall be the responsibility of the contractor.

1.20 REQUESTS FOR INFORMATION

Requests for Information (RFI) or other correspondences which are submitted electronically must be in an open format, meaning files must not be locked and comments may be added without altering the original content, or have interactive fields intended specifically for commenting. Locked files will not be accepted.

Requests for design criteria of the mechanical systems must be submitted in the form of an RFI and shall include the purpose for the request.

1.21 WORKPLACE SAFETY

Mechanical contractor shall be responsible for the safety of his workpeople.

PART 2 - PRODUCTS

2.01 PIPING

A. General

Provide and erect in accordance with best practice of trade all hot water supply and return, refrigerant and condensate drain piping shown on the plans and as required to complete intended installation. Contractor shall make offsets as shown or required to place all piping in proper position to avoid other work, and to allow application of insulation and finish painting.

B. Pipe Materials:

1. Hot water Schedule 40 standard weight black steel, ASTM 120
2. Cold water, drains from relief Type "L" hard drawn copper tubing valves and automatic vents.
3. Condensate drains Schedule 40 PVC
4. Refrigerant Type "L" hard drawn copper tubing.

C. Pipe Fittings:

1. Screwed 125# cast iron screwed pattern ASTM A126, ASA B16.1
2. Unions 250 malleable iron, brass to iron seats (threaded), brass for sweat joints.

3. Flanges 150# forged steel slip-on ASTM A234
4. Sweat Cast bronze or wrought copper made up with 95-5 solder
5. Connections to equipment: 2inches and smaller - screwed or sweat unions. 2½ inches and larger – flanged
6. Refrigerant Cast bronze or wrought copper, long radius elbows, made up with Sil-Fos silver solder.
7. Dielectric fitting Steel or copper pipe to ASTM A-53, zinc electroplated body with non-corrosive thermoplastic lining, thread connections. Victaulic Style 47-TT or approved equal.

D. Steel piping shall have screwed connections. All threads on piping must be full length and clean-cut with inside edges reamed smooth to the full inside bore.

E. The Mechanical Contractor may, at his option, use type "L" hard drawn copper tube in lieu of steel. His option of steel or copper MUST be stipulated in his bid and thereafter no deviation will be acceptable. If copper is to be used, the piping system shall be 100% copper with no mixture from copper to steel.

F. Use dielectric fittings when connecting dissimilar metals.

2.02 VALVES

A. General

1. Valves shall be provided as shown and as required to make the installation and its apparatus complete in operation, locate to permit easy operation, replacement and repair. All pressures specified are steam working pressure.
2. All valves must be so constructed that they may be repacked under pressure while open.
3. Globe valves shall be installed in all lines where regulation is required.
4. Check valves shall be installed in all lines where flow may reverse from intended direction.
5. Except for above or as otherwise noted on drawings, ball valves shall be installed in all water supply and return lines and on all drain lines.
6. All valves to comply with federal specifications and be so listed.
7. Butterfly valves shall not be used.

B. Types and Manufacturers

All valves shall be of one manufacturer and by one of the manufacturers listed. The following list is provided as a means of identifying the quality and type required.

1. Gate Valves 2 inches in size and smaller shall have bronze bodies, rising stem, solid wedge, union bonnet, rated for 150# WSP, 300# WOG:

	Soldered Ends	Screwed Ends
Milwaukee	1169	1151
Stockham	B-124	B-120
NIBCO	S-134	T-134
Hammond	IB648	IB629

2. Globe Valves 2 inches in size and smaller shall have bronze bodies, union bonnet, renewable composition disc for service intended, rated for 150# WSP, 300# WOG:

	Soldered Ends	Screwed Ends
Milwaukee	1590-T	590-T
Stockham	B-24-T	B-22-T
NIBCO	S-235-Y	T-235-Y
Hammond	IB423	IB413T

3. Plug type Globe valves 2 inches in size and smaller shall have bronze bodies, union bonnet, stainless steel plug type disc and seat. Rated for 150# WSP, 300# WOG:

	Soldered Ends	Screwed Ends
Milwaukee	591-A	
NIBCO	T-256-AP	

4. Ball valves 1¼ inches in size and smaller shall have bronze bodies, brass stems and chrome plated brass balls, reinforced Teflon seats an seals, blow-out proof stems and adjustable stem gland. Shall be equipped with suitable packing for service intended. Ports shall be "full port". Rated for 400# WOG and 350°F:

	Soldered Ends	Screwed Ends
Milwaukee	BA-350	BA-300
Apollo	82-200	82-100
Watts	B-6081	B-6080
NIBCO	------	------
Hammond	8614	8604

5. Ball valves 1½ and 2 inches in size shall have bronze bodies, two piece, standard port, brass stems and chrome plated brass balls, reinforced Teflon seats an seals, blow-out proof stems and adjustable stem gland. Shall be equipped with suitable packing for service intended. Rated for 400# Bar non-shock cold working pressure.

	Soldered Ends	Screwed Ends
Apollo	70-200	70-300
Watts	B-6000	B-6001
NIBCO	S-580-66	T-580-66
Hammond	8513	8503

6. Check Valves 2 inches in size and smaller shall be horizontal swing type with bronze body, Teflon disc. Rated for 125# WSP, 200# WOG:

	Soldered Ends	Screwed Ends
Milwaukee	1509-T	509-T
Stockham	B-310-T	B-320-T
NIBCO	S-413-Y	T-413-Y
Hammond	IB945	IB904

2.03 INTERIOR HANGERS AND SUPPORTS

A. General

1. All interior hangers and supports shall be specially manufactured for that purpose and shall be the pattern, design and capacity required for the location of use.

2. Piping specified shall not be supported from piping of other trades.

3. Hangers shall be steel, adjustable clevis type; plain for steel pipe and copper plated for copper tubing. Carpenter & Paterson, Inc., Fig. 100 (Fig. 100 CT copper plated) or approved equal. Hangers on hot water and drain piping shall be sized for the piping only (not including insulation). Hangers on cold water piping, and where specifically indicated on drawings, shall be sized to include the insulation and include thermal hanger shields (insulated pipe supports).

4. Thermal hanger shields shall be Carpenter & Paterson, Inc., Fig. 265P or approved equal.

5. Exposed vertical risers ¾ inch and smaller shall be supported at the mid-point between floor and ceiling with split ring type hangers; copper plated for copper tubing. Carpenter & Paterson, Inc., Fig. 81 (Fig. 81 CT copper plated) or approved equal.

6. Attachments to wide flange steel members shall be adjustable beam clamp, Carpenter & Paterson, Inc., Fig. 82 or approved equal.

7. Piping suspended from walls, trench walls and partitions shall be supported by steel support bracket. Carpenter & Paterson, Inc., Fig. 69 or approved equal.

B. Hanger Rods

1. Hanger rods shall be galvanized all thread rod. Rod size shall be as follows:

Pipe Size	Rod Size
½" to 2"	3/8"
2½" to 3½"	1/2"

2. Provide toggle bolts for fastening to concrete blocks and compound anchor shields for bolts for fastening to poured concrete.
3. Provide lag points with rod couplings or side beam connectors with drive screws for fastening to wood.
4. All nuts for hanger rod to be stainless steel.

C. Supports

Provide and install angle iron supports for pipe hangers as required. Angle iron supports shall be adequate size for span and piping or equipment load.

2.04 PIPE SLEEVES AND ESCUTCHEONS

A. Interior Sleeves

1. Mechanical Contractor shall set sleeves for all piping penetrating interior concrete and masonry walls. Sleeves shall be schedule 40 steel pipe, two sizes larger than the carrying pipe. Pipes passing through walls of frame construction need not be provided with sleeves.
2. Spaces between sleeves and pipes shall be sealed fire and smoke tight. Spaces between pipes and fire rated walls in frame construction shall also be sealed fire and smoke tight. Sealant material shall be 3M brand fire barrier caulk CP25 or putty 303, Ciba-Geigy CS240 Firestop Sealant, or approved equal and shall be U.L. listed.
3. General Contractor shall be required to seal spaces between sleeves and wall construction.

B. Exterior Sleeves

Where piping passes through exterior walls, provide and install a complete pipe sleeve/hydrostatic wall closure system as shown on drawings.

1. Wall sleeve shall be schedule 40 steel pipe, two pipe sizes larger than carrier pipe. Sleeve shall be the same length as the thickness of the wall served.
2. The hydrostatic closure device shall consist of identical interlocking links of solid synthetic rubber compounded to resist ozone, water, chemicals and extreme temperature variations. Each link shall be connected by corrosion resistant bolts and nuts to form a belt which is to fit snugly around the pipe. Under each bolt and nut there shall be a metal pressure plate so that when each nut is tightened the rubber links will expand between the pipe and sleeve to form a continuous, air tight and water tight seal.
3. Units to be Link-Seal system Model LS wall seal by Thunderline Corp. or approved equal.

C. Escutcheons

Where uninsulated piping passes through finish walls, floors, ceilings and partitions, provide and set two piece nickel plated steel floor and ceiling plates. Provide deep type floor plates as required for projecting sleeves. Piping through walls with insulation shall not require escutcheons.

2.05 ANCHORS

Anchors shall be provided and installed as detailed and shown on the drawings, or as required to control expansion.

2.06 REFRIGERANT SPECIALTIES

A. Sight glass and moisture indicator shall be provided in the liquid line at the evaporator coil and at each compressor-condenser unit.

B. Externally equalized expansion valve shall be installed on each liquid connection to the evaporator coil(s) if not provided by the evaporator manufacturer. Valve size shall be as verified with unit manufacturer based on actual length of piping, quantity of fittings and difference of elevation. Valve shall be manufactured by ALCO or Sporlan and installed in accordance with manufacturer's instructions.

C. A complete charge of R-410A shall be provided for the system.

D. The liquid line shall be provided with removable core type filter-dryer and refrigerant valves as shown on the drawings. Units to be provided with ¼ inch male pipe plug in flange plate for installation of charging valve. Units to be Sporlan or approved equal.

E. Suction and liquid refrigerant piping shall be provided and installed. The refrigerant piping shall be run in an approved manner providing traps where necessary to maintain the proper gas velocities and to keep the system free of oil.

2.07 HOT WATER AND CHILLED WATER SPECIALTIES

A. Automatic (Preset) Balancing Valves

1. All convectors, cabinet unit heaters, unit heaters, coils and elsewhere as indicated, shall be provided on the return line from each unit with a balancing type valve equipped with readout taps to facilitate the connecting of a differential pressure meter. Valve body shall include a ball valve, flow control cartridge assembly, two (2) pressure/temperature plugs and inlet union. Valve bodies shall be line size.

2. Design
   a. The GPM for the automatic flow control valves shall be factory set and shall automatically limit the rate of flow to within 5% of the specified amount.
   b. For ½ inch to 2 inch sizes the flow cartridge shall be removable from the Y body housing without the use of special tools to provide access for regulator changeout, inspection and cleaning without breaking the main piping (Access shall be similar to that provided for removal of a Y-strainer screen).
   c. True operating ranges of 2 - 32 psid or 5 - 60 psid are required. The design flow should be achieved at the minimum psi differential. A 50% safety factor applied to the lower operating range is not acceptable.
   d. Each valve shall have two PIT ports.
   e. All automatic flow control devices shall be supplied by a single source and certified flow tests, witnessed by a professional engineer, shall be available.
   f. Provide factory product warranty of not less than five (5) years and free first year cartridge exchange.

3. Construction
   a. Internal wear surfaces of the valve cartridge shall be electroless nickel or stainless steel.
   b. Internal flow cartridge body shall have machined threads so the spring free height may be compensated for without the use of fixed shims. A crimped sheet metal design is not acceptable.
   c. Internal flow cartridge shall be permanently marked with the GPM and spring range.
   d. All valves shall be factory leak tested at 100 psi air under water.

4. Minimum ratings
   a. ½ inch through 2 inch pipe size: 400 PSIG at 250DF

5. Flow Verification
   a. Where indicated on the plans, the differential pressure across the Automatic Flow Control Valve shall be measured for flow verification and to determine the amount of system over heading or under pumping.
   b. Flow shall be verified by measuring the differential pressure across the coil served or the wide open temperature control valve and calculating the flow using the coil or valve Cv.

6. Test Kit

   A differential pressure test kit shall be supplied to verify flow and measure overheading. The kit shall consist of a 4½ inch diaphragm gauge equipped with ten foot hoses and P/T adapters all housed in a vinyl case. Calibration shall be 0-35 PSID for 2-32 PSI spring range or 0 - 65 PSID for 5-60 PSI range.

7. Installation
   a. Install automatic flow control valves on the return lines of coils and terminal heating units as indicated on the plans. Balancing valve on supply side is not acceptable.
   b. The standard ports and handles shall clear 1 inch thick insulation. Handle and port extensions are required for over 1 inch thick insulation.
   c. Do not install balancing valves so that two or more are piped in series.
8. Units shall be Flow Design "AutoFlow" or approved equal.
   a. Model ACM for ½ inch and ¾ inch sizes.
   b. Model AC for 1 inch to 2 inch sizes.

B. Strainers

1. All convectors, cabinet unit heaters, unit heaters and coils shall be provided on the supply line to each unit with a strainer equipped with ports to facilitate the connecting of a pressure gauge or thermometer and a hose end drain. Valve body shall include a ball valve and shall be line size.

2 Construction
   a. 20 mesh stainless steel strainer, removable without breaking the main piping.
   b. Ball valve shall have Teflon packing, brass packing nut, blowout-proof stem, large diameter plated ball and a handle with vinyl grip.
   c. An integral union shall be provided on the discharge end of the strainer and shall incorporate an EPDM O-ring and tailpiece. Unions shall be available in both male & female threaded and sweat configurations.
   d. Units shall be rated for 400 psig at 250^{o}F.

3. Strainers shall be mounted upstream of ATC control valves (see typical piping diagrams on drawings).

4. Units shall be by Flow Design or approved equal.
   a. Model YCM for ½ inch and ¾ inch sizes.
   b. Model YC for 1 inch to 2 inch sizes.

C. Radiator Valves

All radiation shall be provided with ball valve for 125 psig at 250^{o}F. as specified under valves. Provide a gate valve when installed within radiation covers.

D. Drains

Each downfeed radiator, convector, cabinet unit heater, unit heater, coil and unit ventilator shall be provided with a drain valve between the shut-off valves and heating equipment at the lowest point in the piping. All low points in piping mains shall be provided with drain valves. Drain valves shall be ball valves as specified under VALVES with hose connections and metal caps.

E. Air Vents

1. Air vents shall be installed at the equipment, all high points in the piping as indicated on the plans or as may be required.

2. Automatic air vents shall be Taco 409 brass vent with ¾ inch I.D. flexible tube drain. Units by Anderson, Armstrong (No. 1-AV) or Sarco will also be considered. Pet cocks shall be installed with each unit and the drains from the vents shall be run as indicated on the plans. An air chamber shall be installed at each air vent on piping 2 inches and larger piping. Do not use on glycol systems, use manual vents only.

3. Manual air vents shall consist of air chamber with a Dole No. 14A Coin Valve with copper tube extension. Install valve in accessible location.

4. By-pass type vents shall be installed where shown and as detailed on the drawings. By-pass valves shall be plug-type globe as specified under VALVES.

F. Expansion Tank

Furnish and install vertical pressurized replaceable bladder type water expansion tank pre-charged to 12 psi as shown on the drawings. Tank shall be constructed of steel for 125 psi working pressure and have the necessary

tappings for water connections and charging valve. Tank shall be Taco HTX series. Units by Bell & Gossett or Wood will be considered. Capacities shall be as shown on drawings.

G. Backflow Preventer

Backflow preventer shall be furnished under division 21 00 00, "PLUMBING".

H. Water Pressure Reducing Valve

Furnish and install a pressure reducing valve with brass body construction and built-in strainer in the cold water piping connected to hot water heating system as shown on the drawings. The valve shall be adjustable and be No. 335, as manufactured by Taco. Units by Bell & Gossett and Watts will be considered. Provide pressure relief valve with operating pressure 100% over system pressure, but not exceeding 100 psi.

I. Flow Measuring Stations

1. Provide and install a flow metering stations in the combined discharge of pumps P-2 & P-3 as indicated on drawings.
2. Units shall have sweat connections.
3. Units shall be DZR brass and shall include test ports for attachment of a flow measuring device. Maximum working pressure shall be 600 psig at a maximum temperature of 250^{o}F. for sweat application.
4. Units shall be line size.
5. Units shall be FlowSet model UA by Flow Design, Inc. or approved equal.

J. Flow Control Valve

Furnish and install flow control valve with line size cast iron body and threaded ends. Working parts shall be easily removable for inspection and cleaning without removing valve body from the pipeline. Taco Model "Flo-Chek" or approved equal by Bell & Gossett.

K. Air Scoop

Furnish and install in-line air scoop; Taco product No. 433. Equivalent devices by Bell & Gossett will be considered.

L. Piping Hose Assemblies

1. Contractor may, if desired, provide and install pipe hose assemblies on all duct heating coils rather than pipe directly to each coil with metallic piping. Units shall be line size and not more than 24 inches in length.
2. Units shall be flame retardant and non-toxic with an EPDM core and braided stainless steel outer covering. Units shall have a minimum working pressure of 400 psig at 230^{o}F with a burst pressure of not less than 1600 psig.
3. End connections shall be swivel type, brass (ground joint union) with standard ips threads.
4. Hoses must meet ANSI 2.5, NFPA 255, UL 723, UBC 42-1, ASTM E84-75 and ASTM E84-80 codes and standards. Flame spread rating = 25, fuel contribution = 0, smoke = 50.
5. Units shall be by Flow Design, Inc. or approved equal.

M. Pressure Gauges

Furnish and install pressure gauges with gauge cocks on piping where shown on drawings. Tubing to pressure gauges shall be of sufficient length to extend beyond pipe insulation and still leave enough space to easily operate the gauge cock. The dial range shall be such that the normal pressure shall be approximately midway of the dial. Gauges shall be Weiss Series 4CTS with 4½ inch dial size, stainless steel or cast aluminum case, with brass "T" handle cocks. Provide steam siphons on steam pressure gauges and bronze pressure snubbers on water pressure gauges. Units by Ashcroft, Nurnburg & Trerice will be considered.

Pressure range: Water Systems 0-60 psi

N. Thermometers

Furnish and install where indicated on the drawings and in Part 3 - EXECUTION, analog dial type thermometers with stainless steel case, 4½ or 5 inch dial size, bimetal, universal angle type. No other style will be accepted. Thermometers shall be Weiss 5VBM series. Units by Ashcroft, Nurnburg & Trerice will be considered. Provide and install thermometer wells on supply and return branch piping to duct reheat coils (when present) and two thermometers in boxes for the Owner's use.

Temperature Range: Heating System… 30°F. - 240°F.

2.08 DOMESTIC HOT WATER STORAGE TANK AND HEATER

A. Storage Water Heater

Furnish and install hot water storage tank and heater complete with all accessories as shown on drawings.

B. Tank

Tank shall have size and capacity indicated on drawings, installed in a vertical position, constructed of 316L stainless steel and withstand a working pressure of not less than 150 psi. Tanks shall be provided with a heating element, aquastat control tapping, cold water inlet and drain, hot water outlet and T&P relief valve. Storage tank shall be incorporate a 2 inch polyurethane foam insulation. Outer jacket shall be heavy duty rigid plastic. The entire unit shall carry a manufacturer's lifetime warranty. All connections shall be standard I.P.S. threads.

C. Unit to be Triangle Tube Smart Series or approved equal.

2.09 CIRCULATING PUMPS

A. Circulating Pumps P-2 and P-3

1. Furnish and install hot water circulating pumps of the type, size and capacity shown on drawings. Pumps shall be Wilo Stratos or approved equal.

2. Pumps shall be Wet rotor, glandless inline circulating pumps and shall include electronic variable speed control to operate at constant/variable differential pressure control without external sensors.

3. Materials and Construction
   a. Circulating pumps shall be constructed with Cast-Iron bodies with factory applied Catephoresic coating.
   b. Shafts shall be constructed of high quality stainless steel. Motor bearings shall be metal impregnated carbon sleeve bearing type. Impellers will be constructed of a high strength, glass filled polypropylene engineered composite.

4. Pumps shall include the following features:
   a. Integrated synchronous motors using ECM technology with permanent magnetic rotors, sensorless control electronics and single phase electronic converters.
   b. Infra-red (IR) interface for wireless communication and an infra-red monitor.
   c. Integrated overload motor protection.
   d. Fault contact "FC" terminals shall be included in the terminal box and are to be potentially free, normally closed contacts that open on the event of a failure.
   e. Interface (IF) modules shall be included, installed in the terminal box. Modules shall permit BMS communication via LONworks, 0 – 10 volt DC control of speed or head setpoint, external minimum speed, external off, dual pump communication and pump operation status.
   f. Internal programming to regulate pump on/off operation based on outdoor temperature.
   g. Internal programming to regulate pump speed in response to changes in system pressure.
   h. Internal programming to provide lead/lag operation for pumps P-2 and P-3. Provide interface wiring between pumps.

5. Pumps shall have a terminal box with NPT electrical connections and a secure, gasketed cover, Class 2 protection level. Include on the face of the terminal box cover a single adjustment button, front readable graphical pump display, field adjustable for horizontal or vertical positioning of the terminal box. The display shall indicate:
   a. Operation status
   b. Control mode

c. Differential pressure or speed/setpoint
d. Fault and warning signals

6. Pumps shall have a coded terminal strip indicating common/neutral/ground within the terminal box for field connections for single phase 230 volt, 60 Hz power.

7. Electrical
   a. Motor shall be a minimum of class H winding insulation as defined by UL 778.
   b. Voltage variances shall be less than +/- 10% from rated voltage with pump under load conditions. Maximum amperage not to be exceeded is indicated on the pump nameplate. Electrical power to the pump is confirmed when the face of the graphic display is lit.

8. Startup and adjustment

   Manufacturer shall provide a factory authorized mechanic to provide startup services for the pumps. Startup shall include (but not be limited to):
   a. Setup of lead / lag control between pumps.
   b. Adjustment of required pressure settings.
   c. Verification that the ATC system is able to communicate with the pumps for start/stop and alarming features as required by the ATC system.

B. Circulating Pumps P-1 and P-4

1. Furnish and install hot water circulating pumps of the type, size and capacity shown on drawings. Wilo Top S or approved equal.

2. Pumps shall be a maintenance free, self venting, system lubricated type specifically designed for quiet operation with a horizontal motor mounted directly to the pump volute.

3. Pump volute shall be constructed of cast iron, rated at 145 PSI working pressure. Temperature range for shall be from 14^{o} to 230^{o}F, based on maximum ambient temperatures of 104^{o}F.

4. Impeller shall be constructed of engineered composite polypropylene. Shaft shall be made of hardened stainless steel and sleeve bearings made of metal impregnated carbon. Rotor can and rotor cladding shall be constructed of high quality stainless steel. Water lubricated sleeve bearings to be constricted of metal impregnated carbon. Pump shall not incorporate the use of couplings or mechanical seals of any kind.

5. The integral motor shall be non-overloading at any point of the curve, include thermal overload protection and rated for continuous duty operating on 120 volt, 1 phase, 60 hertz alternating current.

6. Pumps shall be a manually selectable, two speed design regardless of voltage.

7. Pumps shall be UL and ULC approved.

2.10 BOILER BURNER UNIT

A. Furnish and install, where shown on the drawings, a wall mounted natural gas fired condensing boiler unit of capacity scheduled on sheet M5. Unit shall be completely assembled, modulating, sealed combustion, high efficiency with a stainless steel, fire tube heat exchanger.

B. General

1. Installation shall be according to manufacturer's installation instructions and all work shall be completed in a neat and workmanship like manner.

2. The boiler shall operate at a minimum Annual Fuel Utilization Efficiency of 95% and shall comply with the energy efficiency requirements of ASHRAE 90.1, latest edition and the minimum efficiency requirements of ASHRAE 103, latest edition.

3. The boiler AFUE efficiency shall be verified through a third party testing agency under the guidance of the Hydronics Institute Division of AHRI and listed in the AHRI Certification Directory.

4. The boiler shall be capable of full modulation, with a turn down of 4 to 1

5. The boiler shall be manufactured by an ISO 9001 registered company and shall bear the ASME "H" stamp according to Section IV of the ASME Boiler and Pressure Vessel Code. The stainless steel heat exchanger shall be hydrostatically pressure tested at the factory in accordance with ASME requirements. The maximum allowable working pressure shall be 30 psig water as listed on the rating plate. The heat exchanger shall be registered with the National Board and contain a registry number on the rating plate.
6. Boiler shall be ITS / ETL certified and listed to ANSI Z21.13/CSA 4.9 test standards for US and Canada.
7. Boiler shall meet or exceed the SCAQMD (South Coast Air Quality Management District of California) Low NOx emission requirement for 14 NG/J.
8. Boiler shall meet Department of Energy guidelines for Energy Star energy efficiency.

C. Construction

1. 439 stainless steel, fire tube heat exchanger of welded construction and shall not contain any banding materials, bolts, gaskets or O-rings in the construction.
2. Combustion chamber shall be sealed and located at the top of the heat exchanger which should be of a counterflow design and vertical to assure that sediment and any potential lime that may form will fall to the bottom away from the tube sheet.
3. Flue ways shall be of a vertical design that allows condensate to "wash down" the flue surface preventing potential combustion residue from adhering to the flue ways.
4. Boiler shall be supplied with a gas valve designed with negative pressure regulation.
5. The gas valve on the boiler shall operate with an inlet gas pressure of a minimum 5" w.c to a maximum of 13" w.c and shall be independent of the type of gas (natural or propane). If the inlet gas pressure exceeds the maximum allowable 13" w.c. a 100% lock-up type gas pressure regulator, properly sized, must be installed in the gas supply piping and adjust as to prevent an inlet gas pressure in excess of 13" w.c.
6. The burner shall be a premix combustion type system, made with a burner head constructed of stainless material and able to provide a wide range of modulating firing rates.
7. Boiler shall be equipped with a variable speed blower system to precisely control the fuel/air mixture to provide modulating boiler firing rates for maximum efficiency.
8. Boiler shall be constructed with a heavy gauge steel jacket assembly, primed and pre-painted on both sides.
9. Boiler control shall have an electronic display for boiler set-up, boiler status and boiler diagnostics.

D. Controls and Trim

All electrical components shall be of the highest quality manufacture and bear a UL or UL recognized label. Supply voltage shall be 120 volt / 60 hertz / single phase

Boiler shall be furnished with controls and boiler trim that provides:

1. High limit temperature control of 200^{o}F
2. Operating temperature limit of 60^{o}F to 194^{o}F
3. Pressure gauge dial that is clearly marked and easy to read.
4. ASME certified pressure relief valve, set to relieve at 30 psig.
5. Flue gas, outlet water temperature and return water temperature sensors
6. Low water protection
7. Built-in freeze protection
8. Outdoor sensor to provide Outdoor Reset Control
9. Domestic priority with ability to reset the boiler operating temperature
10. Allows a 0-10 VDC input signal to allow external BMS control

11. Venting and Combustion Air

E. Warranty

1. The boiler heat exchanger shall carry a ten (10) year limited warranty.

2. The parts used in the assembly of the boiler shall carry a one (1) year warranty.

F. Unit shall be a Triangle Tube Prestige SOLO 175 or approved equal.

2.11 GAS VENT SYSTEM

A. Furnish and install as indicated on drawings, a schedule 40 PVC gas vent system complete with all required supports, braces, stiffeners, hangers and wall flashing devices on the outside.

B. Shop drawings shall include a drawing showing a profile of the entire assembled system with all components and dimensions clearly indicated.

C. Wall thimbles for the vent system shall be provided by the Mechanical Contractor and set by the General Contractor.

D. Vent system shall be installed in strict accordance with the boiler manufacturer's venting instructions and must comply with all applicable NFPA 54, ANSI Z223.1 and local codes and ordinances.

2.12 CONVECTORS

A. Convectors of the size and types listed on the drawings shall be provided and installed. They shall have removable front panels. Backs and end enclosures of the cabinets shall be constructed of not less than 20 gauge steel. Fronts and tops shall be of not less than 18 gauge steel, if less than 48 inches long and 16 gauge if 48 inches or longer. Elements shall consist of round seamless copper tubes, non-ferrous fins securely fastened to the tubing, taps at each end for venting on up-feed units and drains on down-feed units, with ratings as shown on the drawings. Cabinets shall have baked enamel finish in color to be selected by Architect. Provide not less than two (2) color chip cards with submittals (photocopies not acceptable). Ratings shown on the drawings based on 130^{o}F. average water temperature with a 20^{o}F. temperature drop as indicated on the drawings.

B. The following types are based on Sterling to establish a standard:

1. Surface mount, wall hung, flat top with front outlet grille and bottom inlet; Type W-A.

2. Units shall be firmly fastened to the walls.

C. Units by Dun-Ham Bush, Rittling, Trane Co. and Vulcan will be considered.

2.13 DUCT HEATING COILS

A. General

Furnish and install where indicated a duct mounted water heating coil, size and capacity as indicated on drawings. Coil shall be serpentine, 1 or 2 rows, with same end piping connections.

B. Tube and Fins

Tubes shall be round, seamless copper tubing brazed into intruder header tube holes using copper brazing alloys, tested at 315 lbs and guaranteed for 250 psig working pressure. Tubes shall be staggered in the direction of air flow. Fins shall be rippled aluminum with full drawn collars to provide a continuous surface cover over the entire tube. The use of internal restrictive devices to obtain turbulent flow will not be allowed since they prevent complete drainage of the coil.

C. Casing

Casing shall be constructed of continuous galvanized steel with 3/8 inch diameter bolt holes for flange mounting at 6 inch centers. Coil side plates shall also be of continuous galvanized steel of reinforced flange type construction for greater strength.

D. Coil shall be Trane Type T. Units by Carrier, McQuay, USA Coil or York will be considered.

2.14 CABINET UNIT HEATERS

A. Cabinet unit heaters shall be provided and installed where shown and fastened securely. The units shall be mounted as indicated on the drawings and shall include multi-blade centrifugal fans with quiet operating three (3) speed high efficiency direct drive motor, insulated casing, coils of copper tubes with aluminum fins, tamper proof access door to motor control switch. Capacities indicated on drawings to be based on 140°F. inlet water with a minimum 20°F. drop.

B. All units shall be provided with 3 speed fan switch and unit mounted disconnect switch with thermal overload protection, all factory installed and wired.

C. Cabinets shall be 18-gauge steel with exposed corners and edges rounded, easily removed access panels. Finish shall be factory applied baked enamel in color as selected by Architect on visible surfaces of enclosure or cabinet. Provide two (2) color chip cards with submittals (photocopies not acceptable).

D. Cabinet insulation shall be 2 inch thick dual density bonded glass fiber. Exposed side shall be high density erosion proof material suitable for use in airstreams up to 4500 FPM.

E. Coils shall be evenly spaced aluminum fins mechanically bonded to copper tubes, designed for 200 psi and 220 degrees F.

F. Provide two (2) sets of 1 inch *pleated media* throwaway type filters for each unit as specified under paragraph 2.20, "FILTERS". One set to be provided WITH each unit from the manufacturer to be used during construction and the other set installed when project is completed.

G. The following units are based on Trane Models in order to establish a standard. Approved equals by American Air Filter or McQuay will be considered.

1. Vertical surface units shall be Trane Cabinet Unit Heater Type FFMB inverted vertical cabinet or approved equal with remote heavy duty line voltage electric thermostat and strap-on aquastat provided by Temperature Control Contractor as indicated.

H. Shut-off valve, balancing valve, drain valve with metal cap and air vent shall be provided on each unit.

2.15 HORIZONTAL UNIT HEATERS

A. Furnish and install hot water type horizontal propeller unit heaters as shown. Motors shall be totally enclosed and provided with overload protection and factory wired service disconnect switch.

B. Units shall have coils with copper tubes and aluminum fins. Supply connections shall be in at the rear bottom and return out the rear top.

C. Provide double directional louvers on each horizontal unit and controls indicated in "AUTOMATIC TEMPERATURE CONTROL".

D. Shut-off valve, balancing valve and drain with metal cap shall be provided with each unit.

E. Units shall be manufactured by Trane Co. Units by American Air Filter or McQuay will be considered.

2.16 OUTDOOR UNIT OU-1 & ASSOCIATED AIR HANDLING UNITS

A. General

Provide and install a variable capacity, split system, heat pump air conditioning and heating system as indicated on drawing. Systems shall be a variable refrigerant flow zoning system providing simultaneous heating and cooling. The installing contractor must be certified by the equipment manufacturer to properly install the system as specified and be able to provide evidence of certification if requested.

The systems and equipment described herein are based on a Mitsubishi City-Multi VRFZ system split system heat pump consisting of PUHY outdoor (Compressor/Condenser) unit, PEFY indoor air handlers and M-NET DDC (Direct Digital Controls). The PUHY outdoor Compressor/Condenser unit shall be a vertical discharge, 208 volt, three phase unit. Daikin, LG or Sanyo equipment meeting the features and performance requirements of this equipment will be considered. If a substitution of Daikin, LG or Sanyo is made by the contractor it should be at no additional cost. Mitsubishi is a two-pipe system, Daikin, LG and Sanyo are three-pipe systems and it will be the responsibility of the contractor to submit revised refrigerant piping plans for review. It will also be the responsibility of the contractor to include any additional control or power wiring that is required in addition

to the specified Mitsubishi equipment. See par. 108, "MATERIALS AND SUBSTITUTIONS" for additional information and requirements for substitution.

Units shall be listed by Electrical Laboratories (ETL) and bear the ETL label. All wiring shall be in accordance with the National Electrical Code (N.E.C.). Units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

A full charge of R-410A for the condensing units only shall be provided in the condensing units.

Provide a full diagrammatic drawing of the heat pump systems shown all components (including equipment tags), refrigerant piping (including lengths and sizes) and control wiring with the shop drawings.

B. Warranty

All units shall be covered by the manufacturer's limited warranty for a period of not less than one (1) year from date of installation. In addition the compressors shall have a manufacturer's limited warranty for a period of six (6) years from date of installation.

If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer. This warranty shall not include labor.

C. Outdoor (Compressor/Condenser) Unit

1. The outdoor units shall be intended specifically for use with other system components. The PUHY outdoor unit shall be equipped with multiple circuit boards that interface to the M-NET controls system and shall perform all functions necessary for operation. The outdoor unit shall have a powder coated finish. The outdoor unit shall be completely factory assembled, piped and wired. If the outdoor unit consists of multiple devices, all devices shall be factory wired and piped to single point power and piping connections. Each unit shall be run tested at the factory.
   a. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of outdoor rated capacity.
   b. Outdoor unit shall have a sound rating no higher than 63 dB(A).
   c. All refrigerant lines (suction and liquid) shall be insulated.
   d. Outdoor unit shall have an accumulator with refrigerant level sensors and controls.
   e. Outdoor unit shall have a high pressure safety switch, over-current protection and DC bus protection.
   f. Outdoor unit shall have the ability to operate with a maximum height difference of 164 feet and have total refrigerant tubing length of 984 to 1,312 feet. The greatest length is not to exceed 492 feet between outdoor unit and the indoor units without the need for line size changes or traps.
   g. Outdoor unit shall be capable of operating in heating down to -4°F ambient temperature without additional low ambient controls.
   h. Outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.

2. Unit Cabinet

   Casings shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.

3. Fans
   a. Outdoor unit #1 shall be furnished with two direct drive, variable speed propeller type fans.
   b. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.
   c. All fan motors shall be mounted for quiet operation.
   d. All fans shall be provided with a raised guard to prevent contact with moving parts.
   e. The outdoor unit shall have vertical discharge airflow.

4. Refrigerant

   R410A refrigerant shall be required for all outdoor unit systems.

5. Coils
   a. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
   b. The coil fins shall have a factory applied corrosion resistant blue-fin finish.
   c. The coil shall be protected with an integral metal guard.
   d. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.
   e. The outdoor coil shall include 4 circuits with two position valves for each circuit, except for the last stage.

6. Compressors:
   a. Outdoor units shall be equipped with one inverter driven scroll hermetic compressor and one scroll hermetic compressor.
   b. Crankcase heaters shall be factory mounted on the compressors.
   c. Outdoor unit compressors shall have an inverter to modulate capacity. The capacity shall be completely variable down to 16% of rated capacity.
   d. Compressors shall be equipped with an internal thermal overload.
   e. Compressor shall be mounted to avoid the transmission of vibration.

7. Electrical
   a. The outdoor unit electrical power shall be 460 volts, 3-phase, 60 hertz.
   b. The outdoor unit shall be capable of satisfactorily operation within voltage limits of 200-208 volts.
   c. The outdoor units shall be controlled by integral microprocessors.
   d. The control circuit between the air handling units the outdoor units shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

D. Air Handling Units

1. Units shall be model PEFY-P__NMAU-E (Medium Static), high-performance ceiling concealed ducted indoor fan coil for mounting above the ceiling with a 2-position, field adjustable return and a fixed horizontal discharge supply and shall have a modulating linear expansion device. The PDFY shall be used with the R2-Series outdoor unit and BC Controller or S-Series outdoor unit. The PDFY shall support individual control using M-NET DDC controllers and shall feature external static pressure settings up 0.40 in. WG, 208/230 Volts, single phase.

2. Units shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. Units shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

3. Cabinet
   a. Cabinets shall be ceiling-concealed, ducted.
   b. Cabinet panels shall have provisions for a field installed filters on the intake.

4. Fan
   a. The indoor unit fan shall be an assembly with one or two Sirocco fan(s) direct driven by a single motor.
   b. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
   c. The indoor unit shall have a ducted air outlet system and ducted return air system.

5. Filter

   Return air shall be filtered by a factory-supplied polypropylene honeycomb filter set in a unit mounted filter frame at the air intake. Provide two (2) sets of filters for each unit, one set to be provided WITH each unit from the manufacturer to be used during construction and the other set installed when project is completed.

6. Coil
   a. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
   b. The tubing shall have inner grooves for high efficiency heat exchange.
   c. All tube joints shall be brazed with phos-copper or silver alloy.

d. The coils shall be pressure tested at the factory.
e. A condensate pan and drain shall be provided under the coil.
f. The unit shall include a condensate lift mechanism that will be able to raise drain water 33 inches above the condensate pan.
g. Both refrigerant lines to the PDFY indoor units shall be insulated.

7. Electrical
   a. Unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
   b. System shall be capable of satisfactorily operation within voltage limits of 187-228 volts (208V/60Hz).

E. Heat Recovery Ventilator

Heat pump system and heat recovery unit must be of the same manufacturer. See par. 2.18, "HEAT RECOVERY UNIT" for details and requirements.

F. Controls

Units shall use controls provided by the manufacturer to perform functions necessary to operate the system. Room thermostats shall be the simple MA controllers, all corrected to the AG150 master controller located in Kitchenette. The mechanical contractor shall employ the services of an Automatic Temperature Control contractor to install and program the controls. See 2.23, "AUTOMATIC TEMPERATURE CONTROLS". Provide to controls contractor all controls that are to be provided by the Variable Refrigerant Flow manufacturer.

2.17 OUTDOOR UNIT OU-2 & AIR HANDLING UNIT 14

A. Provide and install a variable capacity, split system, heat pump air conditioning and heating system as indicated on drawing. System shall be a variable refrigerant flow zoning system providing simultaneous heating and cooling. The installing contractor must be certified by the equipment manufacturer to properly install the system as specified and be able to provide evidence of certification if requested.

The systems and equipment described herein are based on a Mitsubishi City-Multi VRFZ system split system heat pump consisting of an MUZ-FE__NA outdoor (Compressor/Condenser) unit, MSZ-FE__NA indoor air handler and M-NET DDC (Direct Digital Controls). The outdoor Compressor/Condenser unit shall be a horizontal discharge, 208 volt, single phase unit. Daikin, LG or Sanyo equipment meeting the features and performance requirements of this equipment will be considered. If a substitution of Daikin, LG or Sanyo is made by the contractor it should be at no additional cost. It will be the responsibility of the contractor to submit revised refrigerant piping plans for review. It will also be the responsibility of the contractor to include any additional control or power wiring that is required in addition to the specified Mitsubishi equipment. See par. 108, "MATERIALS AND SUBSTITUTIONS" for additional information and requirements for substitution.

Units shall be listed by Electrical Laboratories (ETL) and bear the ETL label. All wiring shall be in accordance with the National Electrical Code (N.E.C.). Units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

A full charge of R-410A for the condensing unit only shall be provided in the condensing units.

Provide a full diagrammatic drawing of the heat pump systems shown all components (including equipment tags), refrigerant piping (including lengths and sizes) and control wiring with the shop drawings.

Provide a base heater for the outdoor unit.

B. Electrical

System electrical power shall be 208/230 volts, 1-phase, 60 hertz. System shall be capable of satisfactorily operation within voltage limits of 187-228 volts (208V/60Hz).

C. Controls

Units shall use PAR-21MAA & MAC-397-IFE wired controllers provided by the manufacturer to perform functions necessary to operate the system. The mechanical contractor shall employ the services of an Automatic Temperature Control contractor to install and program the controls. See 2.23, "AUTOMATIC

TEMPERATURE CONTROL". Provide to controls contractor all controls that are to be provided by the Variable Refrigerant Flow manufacturer.

D. Warranty

Not less than 5 years on parts and defects and not less than 7 years on the compressor.

2.18 HEAT RECOVERY UNIT

A. Unit shall be Lossnay model LHG-F470RX3-E heat recovery unit or approved equal. Unit shall be a product of the same manufacturer of the main heat pump system (OU-1 and associated air handlers), support individual control using the same control system as the central air conditioning system and shall feature external static pressure settings up 0.80 in. WG, 208/230 Volts, single phase. Equipment not manufactured by the same manufacturer of the main heat pump system will not be accepted.

B. Unit shall contain be fully self contained with minimal cross (<1% overall) contamination between leaving and entering air streams. Units shall include internal fan, filter section and controls as indicated. The indoor unit fan shall be an assembly with one or two Sirocco fan(s) direct driven by a single motor. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.

C. Unit shall be factory assembled, wired and run tested.

D. Filter:

Filter shall be a washable fiber type supplied with the unit by the unit manufacturer.

E. Performance:

Temperature recovery efficiency shall be from 74 to 69% depending on fan speed. Heating enthalpy heat recovery shall be from 67 to 62% depending on fan speed. Sound level shall not exceed 41 dB(A).

F. Controls

Units shall use controls provided by the manufacturer to interface with the primary heat pump system and perform functions necessary to operate the system. See par. 2.23, "AUTOMATIC TEMPERATURE CONTROL".

2.19 SHEETMETAL

A. General

The work under this section includes all the required sheetmetal and duct work, extensions for grilles, manual dampers, automatic counterbalanced (backdraft) dampers, deflectors, duct lining, setting of control dampers, grilles, registers, diffusers, flexible connections and louvers, as shown on the drawings or required to make the installation complete in accordance with the intent of the drawings and specifications.

B. Ducts

1. The size of ducts marked on the drawings will be adhered to as closely as possible. The right is reserved to vary duct sizes to accommodate structural conditions during the progress of the work without additional cost to the Owners. The duct layout is schematic to indicate size and general arrangement only. All ducts shall be arranged to adjust to "field conditions". The Sheet Metal Contractor shall coordinate his work with Division 26 and other trades.

2. Medium and low pressure ducts shall be constructed of galvanized steel in accordance with the following table of duct sizes OR the latest SMACNA HVAC Duct Construction Standards for Metal and Flexible Duct unless otherwise shown on drawings.

Low pressure ducts:

Dimensions of Longest Side (inches)	Minimum Sheet Metal Gauge
Up thru 12	26
13 --> 30	24
31 --> 42	22

43 --> 60	20
61 --> inf.	18

Medium pressure ducts with air velocities greater than 1,200 FPM:

Dimensions of Longest Side (inches)	Minimum Sheet Metal Gauge
Up thru 10	26
11 --> 12	24
13 --> 18	22
19 --> 22	20
23 --> 30	18
30 B> Inf.	16

3. Methods of fabrication and installation shall be in strict accordance with guidelines set forth in the latest SMACNA Guide and Data Book for Low and Medium Pressure Duct Construction unless otherwise shown on drawings. Cross break all ducts with largest dimension being 18 inches and larger. Beaded ducts are not acceptable except for ductwork less than 18 inches in either direction.

4. All dampers and deflectors shall be a minimum of #22 gauge and stiffened as required. Splitter dampers shall not be acceptable.

5. All joints in ducts shall be made air tight, and all branches and turns shall be made with long radius elbows and fittings. Long radius elbows are defined as having a centerline radius of 12 times the width of the duct. If long radius elbows are not used, elbows 18 inches wide and larger shall be provided with fixed double wall airfoil turning vanes designed to reduce the resistance of the elbow to the equivalent of a long radius elbow with a throat radius of not less than duct width. Square elbows less than 18 inches wide shall be provided with single wall turning vanes. Square elbows with outside corners cut at 45^{o} or rounded are not acceptable.

6. All ducts shall be installed with necessary offsets, changes in cross sections, risers, and drops which may be required. They shall be constructed with approved joints and be supported in an approved manner.

7. Round ductwork shall be constructed in accordance with the latest SMACNA HVAC Duct Construction Standards for round and oval duct construction. Ductwork larger than 8 inches in diameter shall employ spiral seams. All turns shall be made with smooth (not segmented), long radius elbows and fittings. All seams shall be type RL-5, grooved seam pipe lock or better. *Lap seams are not permissible*. Gauge thicknesses shall be as outlined in SMACNA for galvanized steel round duct gauge selections for maximum 2 inches w.g. static pressure. Ductwork shall be supported with full wrap-around band and single hanger strap as indicated in Figure 4-4 of the 1985 edition of the SMACNA HVAC Duct Construction Standards handbook.

8. Furnish and install flexible connections on air handlers. Connections shall be made from Ventglas neoprene coated glass fabric as furnished by Ventfabrics, Inc., or approved equal.

9. Every precaution shall be taken to keep interior of duct system free from dirt and rubbish and to protect all ducts and equipment during construction. At completion, this Mechanical Contractor shall thoroughly clean all equipment to the satisfaction of the Architect.

10. Spaces between ducts and wall construction shall be caulked to make smoke and water tight with 3M brand fire barrier caulk CP25 or putty 303, Ciba-Geigy CS240 Firestop Sealant or approved equal.

11. Testing, Balancing and Leak Testing... See Part 3, EXECUTION

12. Requirements set forth in applicable codes (see part one) shall supersede SMACNA standards.

C. Diffusers, Grilles and Registers

1. Grilles and/or registers shall be installed at all air supply, return and exhaust openings as shown. All units to be aluminum, except as noted, and provided with baked enamel finish to match color of grille or register and countersunk screw holes. Mounting screws shall be oval head type with head painted to match finish. Unless stated otherwise, the following list is based on model numbers of Anemostat to establish a standard

of quality (if substituting, certified sound criteria shall be included with submittals indicating CFM and NC levels of each register and grille). Krueger and Price only will also be considered for review.

a. Supply Registers: Double deflection; X2HO with opposed blade damper and 3/4 inch front blade spacing; front blades set horizontal.
b. Supply Grilles: Double deflection; X2H, ¾ inch blade spacing; front blades set horizontal.
c. Exhaust Registers: X3HOD with opposed blade damper and 3/4 inch, 45° front blade spacing, front blades set horizontal.
d. Filtered Return Grilles (lay-in): X3HD-81L filter grilles with hinged core, 3/4 inch front blade spacing, front blades set horizontal. Provide filters with grilles as outlined in paragraph 2.20, "FILTERS".
e. Filtered Return Grilles: Anemostat X3HD-81 filter grilles with hinged core, 3/4 inch front blade spacing, front blades set horizontal. Provide filters with grilles as outlined in paragraph 2.20, "FILTERS".

All lay-in registers and grilles shall be supported directly to building structure with no less than two (2) safety chains located at opposing corners.

2. Diffusers shall be installed at all air supply openings as shown. All units to be aluminum, except as noted, and provided with white baked enamel finish. The following list is based on model numbers of Anemostat to establish a standard of quality (if substituting, certified sound criteria shall be included with submittals indicating CFM and NC levels of each diffuser). Krueger and Price only will also be considered for review.
   a. Square face, steel construction, 4 way discharge with circular duct connection, adjustable core assembly, white finish. Model EPL-A for gypsum ceilings or 24 inch x 24 inch lay-in application for suspended tile ceilings. Provide straightening grid for units in lay-in ceilings and combination butterfly damper and straightening grid for units in gypsum ceilings. Straightening grids to be factory mounted.
   b. Linear slot type, extruded aluminum construction with steel clips, adjustable pattern, baked enamel white finish throughout. Series SLAD with frame for mounting in gypsum board surfaces. Support to structure.

All lay-in diffusers shall be supported to building structure with no less than two (2) safety chains located at opposing corners.

D. Louvers

1. All exterior louvers shall be extruded aluminum construction with interior bird screens and anodized finish in color to be selected by Architect. Provide not less than 2 original color chip cards with submittals for review (photocopies not acceptable). Frames and blades shall have not less than 55% minimum free area and no less than 0.081 inches thick. The following list is based on model numbers of Ruskin to establish a standard of quality; approved equal units by American Air Warming and Arrow are acceptable.

2. All louvers shall be stationary blade type. Units to be 4 inches deep with certified rating of zero water penetration at free area velocity of 873 FPM based on tests in accordance with AMCA Standard 500. Units 48 inches and less in width shall be Model ELF375DX. Units greater than 48 inches in width shall have drainable blades, Model ELF375DXH.

3. Frames of all louvers to be box type for mounting in masonry. Provide factory mounting flanges on head and side jambs with extended sill for units mounted in frame walls.

4. Louvers in doors shall be provided as a part of the door by the General Contractor.

E. Duct Sleeves

Provide aluminum duct sleeves through outside wall at all locations as shown on drawings.

F. Sealing of Ducts

All interior ductwork shall be sealed with low VOC water based duct mastic, either "MP" (Multi-Purpose), Hardcast "Iron-grip 601", Polymer Adhesive "Airseal #11", or United Duct Seal (United McGill Corp.) water base, latex or acrylic type sealant. All transverse joints to be continuously sealed. Note that, except as noted, oil or solvent based sealants are specifically prohibited for use on this project. Duct tape, in any form or material, is also prohibited.

For exterior applications, "Uni-Weather" (United McGill Corp.) neoprene based sealant shall be used. No other sealants may be used.

All seams and joints in shop and field fabricated ductwork shall be sealed by applying one layer of sealant, then immediately spanning the joint with a single layer of 3" wide open weave fiberglass tape. Sufficient additional sealant shall then be applied to completely imbed the cloth. All sealants shall be UL rated at no more than flame spread of 5 and smoke developed of 0. At contractor's option Hardcast 1602 sealant tape may be used in lap joints and flat seams.

G. Duct Access Doors

Hinged insulated access doors with seals shall be provided in ducts where indicated on drawings, or as required. Units shall be provided at each manual damper, motor operated damper, duct coil (both sides), duct mounted temperature control device and fire damper unless accessible through grilles and as shown on drawings. Units to be Ruskin Model ADH-22 for rectangular duct and Model ADR for round duct or approved equal by Elmdor.

H. Motor Operated Dampers

Motor operated control dampers mounted in ductwork shall be provided by ATC Contractor, but installed by this Contractor. Contractor shall seal dampers to ductwork to provide a completely waterproof and airtight seal between damper frames and ductwork.

I. Manual Dampers

1. See Part 3, EXECUTION for installation notes.
2. Manual dampers with smallest dimension 5 inches or less shall be shop fabricated, single 22 gauge blade, 3/8 inch rod, provided with position indicator and locking quadrant.
3. Manual dampers with smallest dimension larger than 5 inches but smaller than 11 inches shall be single blade steel, 16 gauge construction, provided with position indicator and locking quadrant. Unit shall be Ruskin Type MD35 or approved equal.
4. Manual dampers with smallest dimension larger than 11 inches shall be opposed blade steel, 16 gauge construction, linkage concealed in frame, provided with position indicator and locking quadrant. Unit shall be Ruskin Type MD35 or approved equal.
5. Dampers to be installed in aluminum ductwork shall be fabricated of aluminum or isolated from ductwork with rubber grommets between the damper and the duct to prevent oxidation between dissimilar metals.
6. Provide hand quadrants for all manual dampers, Ventline Model 560 or approved equal.

J. Backdraft Dampers

Provide and install automatic counterbalanced backdraft dampers where indicated on the drawings. Unit frames shall be channel type, constructed of 0.090 inch extruded aluminum. Blades shall be 0.025 inch formed aluminum with extruded vinyl edge seals. Unit shall employ aluminum blade linkage concealed in the frame and adjustable zinc plated counterbalance bar on blades (except on top blade). Units shall be capable of being mounted in any position, Ruskin Model CBD2 or approved equal. Contractor shall seal dampers to ductwork to provide a completely waterproof and airtight seal between damper frames and ductwork.

K. Flexible Duct

Provide and install insulated flexible duct where shown on drawings. Ducts 20 inches in diameter and smaller shall be a double lamination of polyester encapsulating a steel wire helix forming an air-tight inner core. The core shall be wrapped in a blanket of fiberglass insulation (R 4.2) and sheathed in a rugged and durable reinforced metallized polyester jacket. Duct shall be class 1, U.L. 181 compliant and rated for not less than 2 inches w.g. positive working pressure. Duct internal diameter shall be same size as diffuser served. Atco UPC 030 or approved equal.

L. Side Takeoff Fittings (for flexible duct)

Provide and install, at all flexible duct branches to diffusers (where shown), a bellmouth side takeoff fitting with manual damper. Fittings shall be pre-manufactured with bell end shall have a 1½ inch radius and employ a self-

adhesive gasket seal and be pre-drilled for attachment screws. Dampers shall be heavy duty with bearings and hand quadrants. Fittings shall be anchored to ductwork with *not less than* three (3) screws. Final diameter shall be same size as diffuser served. Units shall be no thinner than 22 gauge, G-90 galvanized steel. Buckley Bellmouth HD-BM, HD-BMD or approved equal by Flexmaster or United Enertech.

M. Turning Vanes

1. Provide and install at all square duct elbows 18 inches and larger, and where shown on drawings, fixed double wall airfoil type turning vanes. Turning vanes shall be constructed as outlined in the latest SMACNA HVAC Duct Construction Standards guidebook, Figure 2-3.

2. Provide and install at all square duct elbows less than 18 inches in width, and where shown on drawings, fixed single wall turning vanes. Turning vanes shall be constructed as outlined in the latest SMACNA HVAC Duct Construction Standards guidebook, Figure 2-3.

2.20 FILTERS

All filtered return grilles and cabinet unit heaters shall be provided with a minimum of three (3) sets of filters with pleated media. One set to be used during construction (and replaced by the Mechanical Contractor during construction if required as determined by the Clerk of the Works and/or the Mechanical Engineer). Second set to be installed a minimum of one (1) day and a maximum of three (3) days prior to testing and balancing and/or final inspection. The third set shall be turned over to the Owner in their original unopened shipping boxes for their future use.

Filters shall be Farr 30/30, Air Guard DP-40 or approved equal; 1 inch thick

2.21 EQUIPMENT IDENTIFICATION

Tag each boiler, fan, circulating pump, air handler, outdoor unit, heat recovery unit, unit heater, cabinet unit heater and switch with rectangular engraved nameplates with white letters on black, Brady Corp., Seton Name Plate Corp. or approved equals. Nameplates shall be mechanically fastened to equipment (adhesives are not acceptable). Embossed labels are not acceptable.

On ducted air handling units, outdoor units and heat recovery unit, nameplates shall be 4 inches by 1½ inches, Setonply Style No. M1774. On all other units nameplates shall be 2½ inches by 3/4 inch, Setonply Style No. M1771.

Identify all heating hot water supply and return, refrigerant and drain piping with "Set Mark" full snap-around pipe markers by Seton Name Plate Corporation or approved equal by Brady Corp. Markers shall include both identification and direction of flow. Use yellow background with black letters for hot water supply and return, green background with black letters for refrigerant piping and green background with white letters for drain piping. Markers shall be no less than 10 feet apart except in mechanical room where they shall be not less than 20 feet apart. Identification shall read “Heating Water Supply”, “Heating Water Return”, “Drain”, “Refrigerant Suction” and “Refrigerant Liquid” as applicable. Domestic hot and cold water piping shall be labeled differently from heating water piping.

Tag all valves (if not tagged by valve manufacturer) with 1½ inch round brass tags and #6 bead chains, Seton #M4506. Tag shall be consecutively numbered. Provide a valve chart identifying valve number, valve identification and service. Mount chart in mechanical room in 8½ inch x 10 inch and 8½ inch x 11 inch self-closing aluminum frame with plastic windows.

2.22 INSULATION AND CONDENSATE PROTECTION

A. General

1. Insulation shall be provided for all hot water supply and return piping, all refrigerant piping, outside air intakes, supply ducts, exhaust and relief ducts and other insulation where shown on drawings.

2. All insulation products shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less per ASTM E 84, UL 723 and NFPA 255.

B. Hot Water Supply & Return Piping

1. All hot water supply and return piping shall be insulated with heavy density fiberglass pipe insulation with 850°F. temperature rating and factory applied self sealing ASJ jacket. Cut insulation to include pipe hangers. Maximum "k" factor of 0.23 at 75°F. mean temperature difference per ASTM C 518. Owens Corning SSL II, Johns Manville Micro-Lok HP or approved equal.

Insulation thickness for hot water shall be as follows:

Pipe Size	Insulation Thickness
½" – 1½ "	1½"
2" - 8"	2"

Insulation thickness for hot water run-outs in partitions shall be as follows:

Pipe Size	Insulation Thickness
½" - 1"	½"

2. All fittings shall be wrapped with fiberglass insulation and covered with a one piece PVC insulated fitting cover secured with flare type stainless steel staples.

3. The ends of insulation on exposed pipes at valves, flanges, unions, etc., shall be finished net with covering to match jacket and secured with mastic.

4. Valves, flanges and unions for hot water application shall not be insulated. All valves for cold water application shall be insulated.

C. Refrigerant Piping

1. All refrigerant piping (not pre-insulated by equipment manufacturer) shall be insulated with 2 inch flexible, closed cell elastomeric thermal insulation. Material shall be 25/50 rated (flame spread rating of 25 or less and smoke developed rating of 50 or less) when tested in accordance with ASTM E84, latest revision.

2. Exterior piping and fittings shall have the insulation covered with ultraviolet resistant vinyl outdoor PVC jacket, JohnsManville Zeston 300 or approved equal.

3. Materials shall have a maximum thermal conductivity of 0.27 Btu-in./h-ft2-°F at a 75°F mean temperature when tested in accordance with ASTM C177 or ASTM C 518, latest revisions.

4. Materials shall have a maximum water vapor transmission of 0.08 perminches when tested in accordance with ASTM E 96, Procedure A, latest revision.

5. Adhesive shall be the insulation manufacturer's recommended contact adhesive: Armaflex 520, Armaflex 520 BLV.

6. Insulation finish shall be the insulation manufacturer's recommended finish: WB Armaflex Finish.

7. Accessories such as adhesives, mastics and cements shall have the same properties as listed above and shall not detract from any of the system ratings as specified above.

D. Duct and Equipment Insulation

1. Duct insulation shall be a ¾ pound density, all-service fiberglass duct wrap with factory applied foil faced FRK vapor barrier facing meeting the requirements of ASTM C 1136, Type II. Insulation material shall meet the requirements of NFPA 90A, NFPA 90B, ASTM C 1290 and ASTM C 553. Operating temperature range shall be from 40°F. to 250°F. Maximum "k" factor of 0.30 at 75°F. mean temperature difference. Owens Corning Type 75, Johns Manville Microlite XG or approved equal.

2. Insulate the following ducts with 1½ inches installed thickness fiberglass duct wrap:
   a. Air handling unit supply air ducts
   b. Heat recovery unit supply air ducts.

3. Insulate the following ducts with 3 inches installed thickness fiberglass duct wrap:
   a. Heat recovery unit outside air intake and exhaust ducts from louvers to unit connections.

4. Material to carry U. L. label. All laps to be sealed and held in place with adhesive and flare staples. All lap joints to be folded under before stapling so no raw insulation will be showing. On the bottom of ducts 24 inches or wider, mechanical fasteners shall be provided approximately 12 inches O.C.

E. Condensate Protection

Solder or weld bottom and sides of ducts connected to outdoors to prevent water leaks from rain and snow. Seal duct wrap and liner to minimize condensation.

F. Installation

All insulation work shall be executed by skilled insulation workmen regularly employed in the trade.

2.23 AUTOMATIC TEMPERATURE CONTROL (ATC)

A. General

1. Furnish and install a complete system of electric/electronic temperature controls.
2. The control system shall be installed by either of the following vendors (listed alphabetically):

a. T.A.C.
Maine Controls
400 Presumpscot Street
Portland, Maine 04103
(207) 774-0220

b. Honeywell, Inc.
501 County Road
Westbrook, Maine 04092
(207) 775-3501

c. Johnson Controls
39 Salem Street
P.O. Box 840
Lynnfield, MA 01940
1-800-288-1028, ext. 4478

d. Siemens Building Technologies
66 Mussey Rd.
Scarborough, Me. 04074
(207) 885-4110

3. ATC Contractor must be capable of installing and servicing the control system in its entirety. Sub contracting of parts or partial sections of the ATC system is not permitted. Exception: Sub contracting of ATC wiring is permissible but the ATC contractor shall be ultimately responsible and liable for proper installation as outlined in Divisions 23 and 26 of this specification.
4. The control systems shall be provided either the equipment manufacturers. Control valves and motorized dampers shall be provided by the ATC contractor. Controls shall be installed by trained control mechanics, regularly employed by the approved vendors, in installation and calibration of ATC equipment. No other vendor will be accepted.
5. Shop drawings of entire control system shall be submitted for approval before work is started.
6. Provide ATC technician to test the complete ATC systems sequences for specified cycles of operation with the Testing and Balancing Contractor.
7. ATC Contractor must, at the end of the warranty period, furnish the Owner with all access codes and passwords assigned to the ATC control systems. ATC Contractor shall also instruct the Owner in the use of all digital control software and provide a backup copy of the final software package to the Owner on CD.

B. Scope

Control system shall consist of all area thermostats, air stream thermostats, valves, dampers, damper operators, relays, transformers, labor, 7day program clocks and other accessory equipment, and a complete system of wiring to fulfill intent of ATC specification. Control shall be provided for, but not limited to the following:

1. Heat pump systems
2. Heat recovery system
3. Direct radiation
4. Cabinet and horizontal unit heaters
6. Boiler controls
7. Control of circulating Pumps.

C. Incidental Work by Others

1. The following incidental work shall be furnished by the designated contractor under the supervision of the Control Contractor.
   a. Mechanical Contractor shall:
      (1) Install automatic valves and separable wells that are specified to be supplied by the Control Contractor.
      (2) Furnish and install all necessary valved pressure taps, water, drain and overflow connections and piping.
   b. Sheet Metal Contractor shall:
      (1) Install all automatic dampers.
      (2) Provide necessary blank-off plates required to install dampers that are smaller than duct size.
      (3) Assemble multiple section dampers with required interconnecting linkages and extend required number of shafts through duct for external mounting of damper motors.
      (4) Provide access doors or other approved means of access through ducts for service to control equipment.
   c. The General Contractor shall:
      (1) Provide all necessary cutting, patching and painting.
      (2) Provide access doors or other approved means of access through ceilings and walls for service to control equipment.
   d. Division 26 shall:
      (1) Wire power to all motor operated dampers.
      (2) Provide circuit breaker(s) for circuits to temperature control panels. Wiring from circuit breaker to temperature control panels will be provided and installed by the ATC Contractor.

D. Electric Wiring

1. All low voltage and data wiring for installation of temperature controls shall be by ATC Contractor, except as noted. Power wiring for equipment shall be by Division 26, "ELECTRICAL". See Part 1, Paragraph 1.03, sub-paragraph C, 'MECHANICAL ELECTRICAL WORK" for specific requirements. Exception: Power wiring from circuit breaker to temperature control panel(s) will be provided and installed by the ATC Contractor.
2. Temperature Control Contractor shall be responsible for coordinating installation of his wiring conduits with Division 26, "ELECTRICAL".

E. Submittal Brochure

The following shall be submitted for approval:

1. Control drawings with detailed wiring diagrams, including bill of material and description of operation for all systems.
2. Panel layouts and name plate lists for all local and central panels.
3. Valve and damper schedules showing size, configuration, capacity and location of all equipment.
4. Product data for all control system components.

F. Instruction and Adjustment

Upon completion of the project, the Temperature Control Contractor shall:

1. Adjust for use by Owner, all thermostats, controllers, valves, damper operators, and relays provided under this section.
2. Furnish two (2) instruction manuals covering function and operation of control systems for use of the Owner's operating personnel. A competent technician shall be provided for instruction purposes.

G. Guarantee

Control system shall be guaranteed to be free from original defects in both material and workmanship for a period of not less than one (1) year of normal use and service. This guarantee shall become effective starting the date Architect agrees Owner has begun to receive beneficial use of the system.

H. Hazardous Materials

Mercury, or any other material deemed hazardous by the Federal Environmental Protection Agency or the State of Maine Department of Environmental Protection, shall not be used in any components of the ATC system.

I. Thermostats

1. Direct Radiation: Thermostats shall be electric/electronic, single temperature thermostats.
2. Air handling unit thermostats: These thermostats shall be provided with the air handling units. See par. 2.16, " OUTDOOR UNIT OU-1 & ASSOCIATED AIR HANDLING UNITS" and par. 2.17, "OUTDOOR UNIT OU-2 & ASSOCIATED AIR HANDLING UNIT".
3. Heat recovery unit: Control hardware to be provided with the unit. See par. 2.18, "HEAT RECOVERY UNIT".
4. Unit heater thermostats shall be line voltage, heavy duty all metal type and provided with concealed adjustment.
5. Cabinet unit heater thermostats shall be of the heavy duty all metal type and provided with concealed adjustment and clear plastic tamper-proof covers.
6. Thermostats shall be mounted according to ADA requirements (http://www.access-board.gov/adaag/html/adaag.htm#4.27).

J. Low Temperature Safety Thermostat

Electric low temperature warning thermostats shall have 20 ft. low point sensitive elements (not averaging type) installed to cover the entire duct area. These thermostats shall be two position manual reset type. Freeze-Stats shall be provided and wired to shut down the supply fan.

K. Automatic Control Valves

All automatic control valves shall be either two position or fully proportioning with modulating plug or V-port inner guides, unless otherwise specified. The valves shall be quiet in operation and fail safe in either normally open or normally closed position in the event of control air failure. All valves shall be capable of operating in sequence when required by the sequence of operation. All control valves shall be sized by the control manufacturer and guaranteed to meet the heating and cooling loads as specified. All control valves shall be suitable for the pressure conditions and shall close against the differential pressure involved. Valve operators shall be of the molded synthetic rubber diaphragm type. Body pressure rating and connection type (screwed or flanged) shall conform to pipe schedule in this specification.

L. Miscellaneous Devices

Provide all the necessary relays, transformers, etc. to make a complete and operable system.

M. Dampers

1. Control dampers shall have 16 gauge galvanized frames not less than 2 inches in width with airfoil blades not less than 14 gauge galvanized steel, and shall be adequately braced to form a rigid assembly. No dampers shall have blades more than 6 inches wide. Dampers shall be painted with one coat of lacquer. Dampers shall be two position or proportioning as required by specific application, opposed blade type with linkage concealed within the frame. Oilite bronze bearings shall be provided at the ends of damper blades. ALL DAMPERS SHALL BE MOUNTED WITH BLADES ORIENTED HORIZONTALLY.
2. Damper operators shall be provided with bracket arrangement for location outside of air stream wherever possible. All damper motors shall be sufficient size to operate dampers, including slow opening and fast closing.
3. Dampers shall be provided with flexible metal edge and jamb seals and neoprene blade edge seals for tight closure. Leakage shall be certified to be no more than 2.0 CFM per square foot at 1 inch w.g. on units 24 inches wide and larger, 3.0 CFM per square foot at 1 inch w.g. on units less than 24 inches wide.
4. Control dampers furnished by the ATC Contractor shall include motor operated dampers installed in exhaust air and outdoor air intake ducts.
5. Dampers shall be Ruskin Model CD60, Air Balance, Arrow Model, or approved equal.

N. Description of Operation

1. System shall be hot water with water supplied from the boiler at a maximum of 140^{o}F, with minimum 20^{o}F drop through the heating system.
2. Reset Water Control

   ATC Contractor shall program the reset water controls through the boiler controls. ATC Contractor shall install the hardware provided with the boiler, including outdoor temperature sensor, supply water temperature sensors, etc. The control shall maintain the water temperature to the system by modulating the boiler output. The water temperature shall be reset to provide 140^{o}F water at 20^{o}F outdoors to 90^{o}F water at 65^{o}F outdoors. As the outside temperature drops, the supply water temperature shall be decreased. On a rise in outdoor air temperature, the temperature of the water shall be decreased. When the outdoor temperature is above 65^{o}F. the boiler shall go cold unless there is a demand for domestic hot water.
3. Domestic Hot Water Control

   Program the boiler to go into the domestic hot water over-ride and deliver 180^{o}F. water to the domestic hot water storage heater on a call for heat from the immersion aquastat in the storage tank. See control sequence for pump P4. During this period no hot water shall be delivered to the heating system (pump P1).
4. Control of Circulating pumps

   a. The main heat pump system shall take the lead in heating the building. When the outdoor temperature drops to a point where the heat pump can no longer satisfy the heating demands or should become inoperative, the heat pump controls shall energize pumps P1, P2 and P3.

   b. Pump P1
   Pump serves as an injection pump to the main heating system and shall cycle on call for heat from the main heating system based on the reset water schedule.

   c. Pumps P2 and P3
   Pumps shall be provided with internal outdoor air control and lead/lag control. ATC Contractor shall provide and install interface wiring between pumps. Program pumps for lead/lag operation and pump on/off operation based on outdoor air temperature. Active pumps shall run continuously when outdoor temperature is below 62^{o}F. and off above 65^{o}F. (adjustable), provided they are energized by the main heat pump system. Pressure sensors in the pumps shall modulate pump speed in response to system pressure. As zone valves in the system close, the pumps shall reduce speed.

d. Pump P4
Provide an immersion aquastat in domestic water storage heater to activate pump to pump boiler water directly to the heat exchanger coil. Pump shall also be interlocked with boiler to instruct the boiler to go into the internal domestic hot water over-ride sequence when the pump is energized. Aquastat shall have adjustable setpoints. Pump control shall have a high limit (off) of 140°F. and a low limit (on) of 120°F.

e. See par. 2.09, 'CIRCULATING PUMPS" for additional information.

5. Direct radiation controlled by a single dual temperature thermostat. On a call for heat the zone valve shall open.

6. Unit Heaters
   a. Horizontal Type: Unit to be controlled by heavy duty line voltage thermostat and trap-on aquastat by ATC Contractor.
   b. Cabinet Unit Heaters: Units to be supplied with single temperature thermostats furnished and installed by ATC Contractor. Provide each unit with strap-on aquastat.
   c. On a call for heat the zone valve shall open and when the aquastat senses a water temperature of at least 90°F. the unit fan shall be permitted to start.

7. Outdoor (compressor/condenser) Unit 1 and Air Handling Units No. 1 thru No. 13.
   a. Reference par. 2.16, "OUTDOOR UNIT OU-1 AND ASSOCIATED AIR HANDLING UNITS" for components to be provided.
   b. ATC Contractor shall be certified by the equipment manufacturer to install and program the controls for the system.
   c. ATC Contractor shall install the controls that are provided with the system.
   d. Air handling units shall cycle in response to their own electronic thermostats.
   e. Air handler fans shall cycle on demand for cooling or heating and signal the outdoor unit to activate.
   f. When the outdoor unit is no longer capable of providing the scheduled heat output the boiler, pumps P1, P2 and P3 shall be signaled to activate.
   g. Program the system for day/night operation per the Owner's schedule. There shall be no cooling permitted during unoccupied periods.

8. Outdoor (compressor/condenser) Unit 2 and Air Handling Unit 14.
   a. Reference par. 2.17, "OUTDOOR UNIT OU-2 AND AIR HANDLING UNIT 14" for components to be provided.
   b. ATC Contractor shall be certified by the equipment manufacturer to install and program the controls for the system.
   c. ATC Contractor shall install the controls that are provided with the system.
   d. Air handling unit and outdoor unit shall cycle to provide heating or cooling in response to their own electronic thermostats.

9. Heat Recovery Ventilator

   Heat recovery ventilator controls shall be interfaced with the controls for the main heat pump system. During occupied periods the unit shall operate continuously, summer and winter. When the unit operates, normally closed motorized dampers on the outdoor air intake and exhaust ducts shall open. Unit shall be of the same manufacturer of the heat pump system and interface with the heat pump system controls. See par. 2.18, "HEAT RECOVERY UNIT" for details and requirements.

10. Duct Heating Coils
    a. Heat Recovery Unit
       1. Duct heating coil located in the supply air (discharge) ductwork from the heat recovery ventilator shall be controlled from a discharge sensor in the ductwork. Provide a set point mounted adjacent to the heat recovery ventilator.
       2. Provide a modulating control valve on the hot water supply to coil. Initially set discharge temperature at 72°F. Valve shall modulate to maintain setpoint.

3. Provide a freeze protection sensing element across the entire face of coil. Should discharge temperature fall below 40°F. the fan shall be stopped and the motorized dampers in the ducts shall close.

b. Air Handling Units

1. Air Handling Units shall have factory-mounted return air (space temperature) sensors. The space temperature shall be displayed on the space sensor.

2. The hot water valve shall be energized by a 12VDC signal from the Heat Pump Controls System. The valves will be modulated to maintain a 90 deg. discharge temperature (adjustable through the BMS). Control of the valve position and discharge air temperature will require a separate communication to the BMS (not part of the Heat Pump Controls System).

O. Low Temperature/Flow and Boiler Failure Alarms

1. Provide an immersion aquastat (normally open) with separable well in the heating hot water supply from the boiler. Also, provide a flow switch in the hot water supply line. The aquastat is to close an alarm circuit should the water temperature from the boilers drop below the reset water temperature setpoint (adjustable). The flow switch will also close this alarm circuit should the circulating pumps fail.

2. These alarm circuits shall signal alarms in the building security system by Division 26 (if present).

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all work is complete to the point where this installation may properly commence.

2. Verify that Mechanical systems may be installed in strict accordance with all pertinent codes and regulations and the approved shop drawings.

B. Discrepancies

1. In the event of discrepancy, immediately notify Architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 INSTALLATION OF PIPING AND EQUIPMENT

A. General

1. All water piping shall be installed within building insulation.

2. Size and general arrangements as well as methods of connecting all piping, valves, and equipment shall be as indicated, or to meet requirements for complete installation.

3. All piping shall be erected to provide for easy and noiseless passage of hot water and refrigerant under all working conditions. Inverted eccentric reducing fittings shall be used whenever water pipes reduce in size in the direction of flow. Tee fittings with reduction in the main direction of flow (run) are not acceptable.

5. All hot water mains shall be run level or pitch slightly upward so that no air pockets are formed in piping. Mains shall be set at elevations so runouts feeding heating equipment shall have no pockets where air can collect or automatic vents shall be provided.

6. Where preset balancing valves are used, it is critical that there not be two valves installed in series anywhere throughout the piping system.

7. Provide drains with hose threads and metal caps at all low points in the water piping system.

8. In erection of hot water piping, care must be taken to make allowance for expansion and contraction; piping shall be anchored as necessary to control expansion.

9. Runouts to hot water radiation anc coils shall be size indicated on plans and shall come off the main downward (downfeed units) or off the side (upfeed units) with no less than three (3) 90 degree elbows provided on runout from main to drop or rise to radiation to absorb movement.
10. Install brass fittings at all points of dissimilar piping connections.
11. Install a sufficient number of unions or flanges to facilitate assembly and disassembly of piping and removal of equipment.
12. Install all piping promptly, capping or plugging all open ends and making pipe generally level and plumb, free from traps, and in a manner to conserve space for other work.
13. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions; promptly remove all defective materials from the job site.
14. Install pipes to clear all beams and obstructions; do not cut into or reduce the size of load carrying members without the approval of the Architect.
15. All risers and offsets shall be substantially supported.
16. Make all changes in pipe size with approved reducing fittings.
17. All low points in water piping shall be provided with an accessible plug tee or drain valve.
18. All high points in water piping shall be provided with an accessible automatic vent.
19. Maximum spacing of hangers for steel piping shall be as follows:

Pipe Size	Spacing
½", ¾" & 1"	6'-0"
1¼" & 1½"	8'-0"
2" & 3"	10'-0"

20. Maximum spacing of hangers for copper piping shall be as follows:

Pipe Size	Spacing
½", ¾" & 1"	6'-0"
1¼" & 1½"	6'-0"
2" & 3"	10'-0"

21. Whenever possible valves shall be installed with the operating stems in the upright position, however when conditions dictate it is acceptable to position valves 90^{o} to either side of vertical. Valves shall not be installed with the stems in the downward position.
22. Do not substitute one style of valve indicated on drawings for another unless authorized by the Architect. Example: If a gate valve is shown use ONLY a gate valve or if a ball valve is shown use ONLY a ball valve.

B. Joints and Connections

1. Smoothly ream all cut pipe; cut all threads straight and true; apply best quality Teflon tape to all male pipe threads but not to inside of fittings; use graphite on all plugs.
2. Make all joints in copper tube (water and drains) with 95-5 tin-antimony solder applied in strict accordance with the manufacturer's recommendations.
3. All joints in refrigerant tubing shall be brazed.

C. Thermometers

Install thermometers where indicated on drawings and on supply and return branch piping at all duct hot water heating coils and two (2) thermometers with storage cases for the Owner's use.

3.03 PIPING TEST AND ADJUST

A. During the installation, all hot water supply and return piping shall be tested with water to a pressure of not more than 125 psi and held for a period of not less than four (4) hours. Isolate boilers and any other piping or devices

not designed for this pressure. Any leaks shall be repaired and another test applied to the piping. All piping shall be tested before it is insulated or otherwise concealed. Contractor shall be required to certify in writing that piping has been tested and conforms to these requirements.

B. Before operating the water system, all piping shall be flushed out to remove oil and foreign materials. This shall be accomplished by circulating a solution of heavy duty detergent by use of Mechanical Contractor supplied pump.

C. After the installation is complete and ready for operation, the system shall be tested under normal operating conditions in the presence of the Architect and demonstrated that the system functions as designed.

D. It shall be demonstrated that all parts of heating system have a free and noiseless circulation of water and that all parts are tight. It shall also be demonstrated that all units are functioning properly and that control system operates correctly.

E. Should any defects in operation develop during the test periods, the Mechanical Contractor will proceed to correct defects immediately. Additional tests will be conducted after correction.

3.04 INSTALLATION OF DUCTWORK AND EQUIPMENT

A. General

1. Size and general arrangements as well as methods of connecting all diffusers, registers, grilles, duct coils and equipment shall be as indicated, or to meet requirements for complete installation.

2. Construction standards and sheet metal gauges shall be as outlined in the latest edition of the SMACNA HVAC Duct Construction Standards handbook for metal and flexible ducts unless specifically indicated otherwise.

3. Manual Dampers
   a. Manual dampers may be shop-fabricated on units 5 inches in height and less. All dampers larger than 5 inches MUST be pre-fabricated as previously outlined in this specification.
   b. All manual dampers located within 10 feet of a fan outlet shall have the blades oriented perpendicular to the fan shaft.
   c. Provide duct access door as large as possible up to 12 inches x 12 inches at each manual damper larger than 5 inches.

B. Protection and Cleaning

1. All open ends of ductwork which is to be unattended for 4 hours or more shall be temporarily protected with plastic sheeting and duct tape (or similar method) to reduce the collection of construction dust and debris.

2. Prior to testing and balancing and at the end of the construction, clean the interiors of all supply and return air ductwork before changing filters in air handling equipment. Careful coordination must be maintained between the time of testing and balancing and final delivery to avoid re-accumulation of dust and debris within the duct systems which will require additional cleaning by the Mechanical Contractor.

3.05 TESTING, ADJUSTING AND BALANCING (TAB)

A. General

1. TAB contractor shall be a subcontractor to the Mechanical Contractor.

2. TAB contractor shall perform functional performance test of all Division 15 equipment and entire ATC system for specified operation and control sequences.

3. The mechanical contractor shall startup all Division 23 equipment as required by the equipment specifications. Mechanical contractor shall verify that systems are complete and operable before TAB commencing work. Ensure the following conditions:
   a. Systems are started and operating in a safe and normal condition.
   b. Temperature control systems are installed complete and operable.
   c. Proper thermal overload protection is in place for electrical equipment.
   d. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   e. Duct systems are clean of debris.

f. Fans are rotating correctly.
g. Volume dampers are in place and open.
h. Air coil fins are cleaned and combed.
i. Access doors are closed and duct end caps are in place.
j. Air outlets are installed and connected.
k. Duct system leakage is minimized.
l. Hydronic systems are flushed, filled, and vented.
m. Pumps are rotating correctly.

4. TAB Contractor shall submit field reports to General Contractor. Report defects and deficiencies noted during performance of services which prevent system testing and balance.

5. TAB contractor shall submit all verification and functional performance checklists/results, signed by indicated personnel, organized by system and sub-system.

6. TAB contractor shall submit other reports described below.

B. Work Included

1. Test, adjust and balance all air and water systems, including components to conform to air and water flow rates shown on drawings.

2. Test complete automatic temperature control sequences for specified operations described under AUTOMATIC TEMPERATURE CONTROLS.

3. Complete and submit balance report. Report shall be submitted with information noted on one side of sheet only (i.e., backside of sheet shall be blank.).

4. Testing of air and water systems will be done by the same agency.

5. Mechanical Contractor SHALL PROVIDE copies of shop drawings indicating coil gpm's, air handling unit air volumes, etc. to the Testing and Balancing contractor at no cost to the contractor.

6. Careful coordination must be maintained between the time of testing and balancing and final delivery to avoid re-accumulation of dust and debris within the duct systems which will require additional cleaning by the Mechanical Contractor.

C. Quality of Compliance

1. Qualification: TAB Contractor must be independent test and balancing agency.

2. AABC Compliance: Comply with AABC Manual MN-1 "AABC National Standards" as applicable to mechanical and hydronic distribution systems and/or Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).

3. Industry Standards: Comply with ASHRAE recommendations for measurements, instruments and testing and balancing.

4. Coordination: Work together with Automatic Temperature Control Contractor to adjust set points of various devices to balance system(s) and test ATC sequences of operation. Temperature Control Contractor shall be responsible for balancing return air, exhaust (relief) air and outdoor air dampers on Air Handling Units in order to achieve proper mixed air temperatures.

5. ASHRAE Guideline 1-1996, "The HVAC Commissioning Process".

D. Execution of TAB Work

1. TAB Contractor shall visit job site and determine that control devices, test devices and valves are correctly installed and ready for balancing.

2. Examine each air and hydronic distribution system to see that it is free from obstructions. Determine that all dampers, registers and valves are in a set or full open position; that moving equipment is lubricated, and that required filters are clean and functioning. Request that Installing Contractor perform any adjustments necessary for proper functioning of the system.

3. TAB Contractor shall use test instruments that have been calibrated within a time period recommended by the manufacturer, and have been checked for accuracy prior to start of testing, adjusting and balancing activity.
4. Verify that all equipment performs as specified. Adjust variable type drives, volume dampers, control dampers, balancing valves and control valves as required by TAB work.
5. Test pressure profile of systems by traverse as required.
6. Adjust each register, diffuser terminal unit and damper to handle and roperly distribute design airflow within 5% of specified quantities. Mark all setpoints.
7. Take readings of all balancing valves and verify that each device is providing the design fluid flow within 5% of the specified quantities.
8. Adjust air discharge patterns of all supply air diffusers, registers and grilles for optimal air diffusion.
9. Document results of all testing on approved TAB report formats and submit 3 copies for approval and record within 15 days of completion of TAB work. Include a warranty period of 90 days, during which time the Architect/Engineer may request a re-check or re-adjustment of any part of the work.
10. Reports shall be compiled on a spreadsheet such as Excel, Quattro-Pro, Lotus, etc. and shall clearly indicate the following *minimum* information:
    a. Air (Rated and Actual)
        1) System/unit name
        2) HP, BHP, voltage, amperage and fan rpm
        3) Static pressures; suction, discharge and total
        4) Total system flow rate
        5) Individual terminal flow rates (Terminal readings must show location, make, model and size of register, grille or diffuser).
        6) Provide a static pressure profile of all AHU's components in the two extreme operating modes; minimum outdoor air and economizer cycle.
        7) Filter status report
    b. Water
        1) Pump full flow and no-flow suction and discharge pressures.
        2) Rated and actual amperage, voltage and total discharge head (TDH).
        3) Calibrated balancing device readings will indicate location, size, setting, differential pressure and rated and actual gpm.

Reports to have a minimum of color or must be compatible with monochrome printers. Reports must be submitted to the Architect electronically in addition to hard copies.

E. Drawings

Drawings in CAD format may be made available to the TAB Contractor after the contract for this work is awarded. Contact the Owner's Representative who will forward the request to the Engineer for action. Indicate CAD format required and a return email address. See par. 1.10, "ELECTRONIC DRAWINGS AND FILE SHARING" for additional information.

F. Acceptable TAB Contractors (listed alphabetically)

1. Central Air Balance
2. Maine Air Balance
3. Tab-Tech International
4. Tekon-Technical Consultants

5. Yankee Balancing

3.06 CLOSING IN UNINSPECTED WORK

A. Do not cover up or enclose work until it has been properly and completely inspected and approved.

B. Should any work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required. After it has been inspected completely and approved, make all repairs and replacements with materials necessary for approval by the Architect and at no additional cost to the Owner.

C. Notify the Architect or Engineer of record not less than 2 days prior to covering work requiring inspection to permit time for scheduling.

3.07 TEMPORARY HEATING

A. Mechanical Contractor shall install the new heating system and related equipment as soon as those portions of the building are ready and the work can be performed.

B. Mechanical Contractor will be required to permanently connect as many units as possible for temporary heat.

C. At the conclusion of the temporary heating period, the complete system shall be thoroughly cleaned.

D. General Contractor will be required to assume full responsibility for the care and operation of the new equipment during its temporary use and to return the equipment to the Mechanical Contractor in perfect order, normal wear and tear excepted.

E. Water, fuel and electric power required to operate the heating system for temporary heat shall be provided by the General Contractor.

3.08 CLEANING

Prior to acceptance of the buildings, thoroughly clean all exposed portions of the Heating, Ventilating and Air Conditioning installation, including the removal all labels and all traces of foreign substance. Prior to testing and balancing vacuum and clean inside of all convectors, finned radiators (spackle droppings), unit ventilators, air handling units, VAV units, fans and cabinet unit heaters. Clean the interiors of ductwork as outlined in 3.04, "INSTALLATION OF DUCTWORK AND EQUIPMENT"; paragraph "B", "Protection and Cleaning".

3.09 INSTRUCTIONS

On completion of the job, the Mechanical Contractor shall provide a competent technician to thoroughly instruct the Owner's Representative in the care and operation of the system. The total period of instruction shall not exceed twenty-four (24) hours. (Temperature control system instruction shall be in addition to this instruction period). The time of instruction shall be arranged with the Owner.

3.10 RECYCLING

Discarded materials, both new and removed, shall be recycled whenever practical through metal salvage dealers (ductwork, piping, etc.), paper salvage (cardboard shipping containers, etc.), wood & plastic products, etc. The Mechanical Contractor shall retain the salvage value of discarded materials and may use this value to offset his project bid price if so desired. Toxic materials such as adhesives, coolants, refrigerants, etc. SHALL be disposed of in a manner acceptable to the State of Maine Department of Environmental Protection.

3.11 REFRIGERANT PIPING

Refrigerant piping shall be installed and tested in accordance to the conditions set forth herein and as required by the manufacturer of the refrigeration equipment by personnel with not less than 5 years experience in the installation of refrigerant piping.

The installation shall be inspected and certified by the manufacturer of the refrigeration equipment prior to charging with refrigerant.

Refrigerant piping shall be run in a approved manner, providing traps where necessary to maintain gas velocities to return oil to the compressor and to keep systems free of oil slugs at the compressor. Fittings shall be long radius and soldered with Sil-Fos or silver solder. The inside of all refrigerant piping shall be thoroughly cleaned using Virginia Solvent #10 or approved equal; followed by a wiping of compressor oil and then wiped dry with a clean, dry cloth.

All refrigerant piping shall then be tested with nitrogen and all joints tapped with a rubber mallet to make sure they are tight. A soap solution shall then be applied to each joint. High side test shall be a minimum of 250 psi while the low side test shall be tested to a minimum of 100 psi. Any equipment that may be damaged by these pressures shall be removed. After pressure test, a freon test shall be applied using Halide torch. The interior of the piping system shall be thoroughly cleaned of all oil, dirt and foreign matter then evacuated and dehydrated. All copper tubing shall be supported by copper coated clevis type hangers, see Paragraph 2.03; "HANGERS AND SUPPORTS". The hangers on the suction piping shall be sized to include the insulation and metal shields 12 inches long shall be placed between hangers and insulation.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Mechanical will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Mechanical shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Mechanical will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building - Mechanical	Lump Sum

END OF SECTION

SECTION 26 00 00 – GENERAL ELECTRICAL REQUIREMENTS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.0000 General Electrical Requirements

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Furnish all materials, labor, tools, transportation, incidentals, and appurtenances to complete in every detail and leave in working order all items of work called for herein or shown on the accompanying drawings, including work related to:
1. Replacement of existing service/distribution equipment.
2. Electrical distribution including new circuit breaker panelboards, and associated feeders.
3. Electrical branch circuits, including wiring and devices.
4. Interior lighting including luminaires, lamps, wiring and controls.
5. Exterior lighting including luminaires and wiring and controls.
6. Raceways and boxes for fire alarm system provided under Division 28.
7. Raceways and boxes for cable television system wiring provided under Division 27.
8. Raceways and boxes for voice/data network system provided under Division 27.
9. Raceways and conductors for Owner furnished door access control system.
10. Raceways and conductors for Owner furnished surveillance system.

B. Include any minor items of work necessary to provide a complete and fully operative electrical system.

C. The Contractor for this work is referred to Bidding Requirements, General Conditions, Special Conditions, Temporary Services and other pertinent Sections of these Specifications. These sections describe work that is a part of this Contract as contained in Division 01. The following General Provisions amplify and supplement these Sections of Specifications. In cases of conflicting requirements, the stipulations set forth in Division 01 supersede and must be satisfied by the Contractor.

1.02 SEQUENCE OF CONSTRUCTION:

A. The Contractor shall refer to the 100 series Specification Sections for a detailed breakdown of the sequence of construction. In summary, the following electrical tasks must be completed prior to the demolition of the existing Marine Terminal Building:
1. Provide all electrical service/distribution equipment modifications at the Rubb Building.
2. Provide a new *CMP* electrical service for the new electrical service/distribution equipment in the Rubb Building from the existing *CMP* transformer located just west of the Rubb Building.
3. Provide a new 120 VAC connection for a voice/data network rack to be provided under Division 27 in the Rubb Building.
4. Provide conduit and wire at the Rubb Building for new Owner furnished surveillance cameras.
5. Provide a new 120 VAC connection for a voice/data network rack to be provided under Division 27 in the Maintenance Building.
6. Provide conduit and wire at the Maintenance Building for new Owner furnished surveillance cameras.
7. Provide a new 120 VAC connection for the relocation of the existing broadcast canopy antenna from the Marine Terminal Building to the Maintenance Building (canopy antenna to be relocated under Division 27). Also provide all necessary conduit and boxes to facilitate the relocation.

B. The existing electrical service to the trailer shall not be disconnected and removed until the new office building is fully operational.

1.03 RELATED SECTIONS:

A. 26 05 26 – Grounding

B. 26 05 33 – Raceway and Boxes for Electrical Systems

1.04 REFERENCES:

A. ANSI/NFPA 70 - National Electrical Code.

B. ANSI/NFPA 101 - Life Safety Code.

C. OSHA 1910 - Occupational Safety and Health Act.

D. ADA - Americans with Disabilities Act.

1.05 GENERAL REQUIREMENTS:

A. Contractor shall read the entire specifications covering other branches of work. He is responsible for coordination of his work with work performed by other trades.

B. Consult all Contract drawings which may affect the location of any equipment or apparatus furnished under this work and make minor adjustments in location as necessary to secure coordination. Contractor shall consult architectural reflected ceiling plans for exact locations of ceiling mounted lighting fixtures. Contractor shall consult architectural interior elevations for mounting heights of wiring devices. Contractor shall consult architectural exterior elevations for mounting heights of wall mounted exterior lighting fixtures.

C. System layout is schematic and exact locations shall be determined by structural and other conditions. This shall not be construed to mean that the design of the system may be arbitrarily changed. The equipment layout is to fit into the building as constructed and to coordinate with equipment included under other Divisions of work.

D. Contractor shall contact the Owner's Representative immediately if he notices any discrepancies or omissions in either the drawings or the specifications, or if there are any questions regarding the meaning or intent thereof.

E. Submit all changes, other than minor adjustments, to the Architect for approval before proceeding with the work.

1.06 SUBMITTALS:

A. Submit under provisions of the following and in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings..

B. Submittal shall include complete Specifications, including type of materials, electrical characteristics, capacities, performance and power requirements to determine compliance with Contract Documents. All data submitted shall be complete and shall apply only to this specific project. All extraneous material shall be deleted or marked out. Items to be supplied shall be specifically indicated using a method that will be visible after photocopying.

C. Regardless of any information included in the submittal submitted for review, the requirements of the Drawings and Specifications shall not be superseded in any way by the review. Review by the Architect-Engineer does not relieve responsibility for submittal errors or from meeting the requirements of the Contract Documents.

D. It is intended that Submittal data be complete and accurate at the first submission. If the Submittal is returned marked "Resubmit" only one additional submission will be permitted.

E. Submit related Submittal at one time. SUBMIT ALL ITEMS IN A SPECIFICATION SECTION AT THE SAME TIME. Incomplete submittal will be held until a complete submittal is accumulated or may be rejected without further review and returned to the applicable parties. Include a copy of the Specification Paragraphs pertaining to the items submitted.

F. If proposed equipment deviates from the Specifications or Drawings, indicate in writing on Company letterhead those differences and provide sufficient data to justify acceptance. FAILURE TO INDICATE DEVIATIONS OR SUBSTITUTIONS IMPLIES FULL COMPLIANCE WITH DRAWINGS AND SPECIFICATIONS.

G. The term "by others" or similar wording shall not be used on Submittal. Submittal shall state by whom related items of work are to be provided. Where not indicated, it is implied that the work or item is provided under this Section.

H. Shop Drawings: Provide shop drawings as required by the individual Specification Sections. Submit shop drawings indicating physical size and arrangement, (plans and elevations) construction details, provisions for conduits, access requirements for installation and maintenance, finishes, and materials used in fabrication for all equipment. Supplement shop drawings with wiring diagrams for all systems with wiring connections for multiple components.

I. Submittals shall be made as paper copies. Submittals transmitted only by electronic email shall not be accepted.

1.07 REGULATORY REQUIREMENTS:

A. Complete installation shall conform with all applicable Federal, State and Local laws, Codes and Ordinances, included but not limited to latest approved editions of the following:
1. State Building Codes.
2. Specific Construction Safety Requirements, State Industrial Commission.
3. National Electrical Code - NFPA 70.
4. National Fire Code - NFPA 72.
5. Life Safety Code - NFPA 101.
6. Occupational Safety and Health Act (OSHA) of 1971 and all amendments thereto.
7. ADA - Handicap Accessibility Requirements.

B. Nothing contained in the drawings and specifications shall be construed to conflict with these laws, codes and ordinances, and they are thereby included in these specifications. All work shall comply with the 2011 edition of NFPA 70, The National Electrical Code. It shall be the Contractor’s responsibility to assure that electrical work is in full compliance with the NEC.

C. The Contractor shall visit the site to become familiar with all existing conditions affecting this work. No claim will be recognized for extra compensation due to failure of contractor to familiarize himself/herself with the conditions and extent of proposed work.

D. Obtain and pay for all necessary permits. Request inspections from authority having jurisdiction.

1.08 RECORD DRAWINGS:

A. Record any changes in location of concealed boxes, equipment items, receptacle and device outlets, lighting fixtures, fire alarm devices, underground utility service conduits, and similar construction items on a set of prints and deliver them to the Owner’s Representative upon completion of the work.

B. Record location and depth of exterior work carefully for future reference.

1.09 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Provide a Complete Instruction and Maintenance Manual: Prepare in the form of an instructional manual for use by Owner's personnel. Provide one (1) draft copy and two (2) final copies.
1. Format:
a. Size: 8-1/2" x 11", 20 lb. minimum weight white paper for typed pages, either manufacturer's printed data, or neatly typewritten.
b. Drawings: Provide reinforced punched binder tab, bind in with text. Fold larger drawings to size of text pages. Clear plastic "binding tape" (not "Scotch" tape) applied to edge of sheet and then punched is acceptable.
c. Single-sheet product literature and contractor-prepared pages: Provide reinforced punched binder tab. Clear plastic "binding tape" (not "Scotch" tape) applied to edge of page and then punched is acceptable.

d. Provide indexed tabs and flyleaf for each separate product, or each piece of operating equipment. Include typed description of product, and major component parts of equipment.

e. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS".

f. Binders:

1) Commercial quality three-ring binders with durable and cleanable plastic covers, 1" minimum, 2" maximum ring size.

2) When multiple binders are used, collate the data into related consistent groupings and provide a spine label that includes the volume number and contents of the binder.

B. Provide content as listed in separate Sections of Division 26 of these specifications.

1.10 PROJECT/SITE CONDITIONS:

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.

B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.

1.11 COORDINATION WITH WORK PROVIDED UNDER DIVISIONS 22 AND 23:

A. Electrical work for mechanical systems equipment furnished under Divisions 22 and 23 shall be coordinated with these respective Divisions.

B. Power wiring and connections shall be provided under Division 26 for all Division 22 and 23 equipment, including:

1. Branch circuit power wiring.
2. Local disconnect switches for 208-volt single and three phase equipment items (except where an integral means of disconnect is specified to supplied with the equipment item by the manufacturer).
3. Motor starters for 208-volt single and three phase equipment items (except where an integral starter is specified to supplied with the equipment item by the manufacturer or where a variable speed drive is provided under Division 23).
4. SPST Manual motor starter switch for 120-volt motors.

C. Work provided under Divisions 22 and 23 shall include:

1. Motors.
2. Motor speed controller switches.
3. Low-voltage automatic temperature controls and associated wiring.
4. Variable speed drives for motors.

D. In general, motors will be furnished and installed under other Divisions of work as a factory-installed item. Unless they are factory installed on equipment units supplied under other Divisions, all safety switches and motor starters shall be furnished and installed by the Electrical Contractor. Coordinate prior to submission of bid.

1. Electrical Contractor shall obtain all wiring diagrams necessary to connect and control equipment requiring electrical energy.

1.12 COORDINATION WITH WORK PROVIDED UNDER OTHER DIVISIONS:

A. Division 27 - Telecommunications:

1. Voice/Data Network System (wiring, outlets, equipment racks provided under Division 27; switches, servers provided by owner)
   a. Provide 120-volt power requirements for all voice/data racks.
   b. Provide conduit and boxes for voice/data network systems wiring.

B. Division 28 – Alarms:

1. Fire Alarm System (equipment and wiring provided under Division 28)
   a. Provide 120-volt power requirements for the fire alarm equipment control panels.

b. Provide conduit and boxes for interior fire alarm system wiring.

2. Door Access Control System (equipment and wiring terminations provided by owner).
   a. Provide 120-volt power requirements for the door access control system.
   b. Provide conduit, boxes, and wiring for door access control system devices.
3. Surveillance System (cameras and wiring terminations provided by owner; wiring provided under Division 27)
   a. Provide conduit and boxes for surveillance camera wiring.

1.13 UTILITY SERVICE WORK:

A. Electrical Service Modifications:
   1. Work associated with the new electrical services shall be coordinated with:
      a. *Central Maine Power Company*
   2. Marine Terminal Building Electrical Service:
      a. Arrange with *CMP* to disconnect and remove the existing pad mounted service transformer that presently serves the Marine Terminal Building that is to be demolished.
   3. Rubb Building Electrical Service:
      a. Provide a new underground secondary 277/480 volt service from the existing *CMP* pad mounted service transformer that is located west of the Rubb Building.
      b. Arrange with *CMP* for connections to the existing transformer and for service metering.
      c. Provide new service grounding.
   4. Office Building Electrical Service:
      a. Arrange with *CMP* to provide a new underground primary service to be extended from an existing utility pole at Commercial Street to a new *CMP* pad mounted service transformer to be located west of the Office Building. Arrange with *CMP* to modify the existing utility pole as required.
      b. Provide a new underground secondary 120/208 volt service from a new *CMP* pad mounted service transformer that is located west of the Office Building.
      c. Arrange with *CMP* for connections to the new transformer and for service metering.
      d. Provide new service grounding.
   5. Office Trailer:
      a. Following the completion of the construction of the Office Building, Arrange with *CMP* to disconnect and remover the existing overhead secondary service to the Office Trailer.

B. Telephone Service Modifications:
   1. Work associated with the new telephone services shall be coordinated with:
      a. *FairPoint*
   2. Marine Terminal Building Telephone Service:
      a. Arrange with *FairPoint* to disconnect and remove the existing telephone service that presently extends from an existing manhole to the Marine Terminal Building that is to be demolished.
      b. Provide a new underground conduit duct bank between the existing telephone manhole and the maintenance Building.
      c. Arrange with *FairPoint* to extend a new telephone service from the existing manhole to a new service demarcation point in the Maintenance Building.
   3. Office Building Electrical Service:
      a. Arrange with *FairPoint* to provide a new underground telephone service to be extended from an existing utility pole at Commercial Street to a service demarcation point in the new Office Building. Arrange with *Fairpoint* to modify the existing utility pole as required.
   4. Office Trailer:
      a. Following the completion of the construction of the Office Building, Arrange with *FairPoint* to disconnect and remover the existing overhead telephone service to the Office Trailer.

C. Cable Television Service Modifications:
   1. Work associated with the new telephone services shall be coordinated with:
      a. *Time-Warner*
   2. Office Building Electrical Service:
      a. Arrange with *Time-Warner* to provide a new underground cable television service to be extended from an existing utility pole at Commercial Street to a service demarcation point in the new Office Building. Arrange with *Time-Warner* to modify the existing utility pole as required.

D. Work Provided Under Division 26:
   1. Conduit.
   2. Secondary electrical wiring.
   3. Electrical service metering.

E. Work Provided by the General Contractor Under Other Divisions:
   1. Excavation and backfill.
   2. Service transformer concrete foundation pad.
   3. Concrete encasement of primary electrical service conduits.

1.14 FIRESTOPPING:

A. Firestopping around electrical cable, conduit and/or boxes and firestopping within boxes shall be as specified under Section 26 05 33 to maintain fire ratings at walls, floors and ceilings. The Contractor shall coordinate penetrations of rated surfaces with the architectural drawings and specifications to assure that the proper fire rating is achieved.

1.15 TEMPORARY POWER AND LIGHTING:

A. The Contractor shall be responsible for provision of temporary electrical power and lighting as required to facilitate construction work.
   1. Temporary electrical power shall be obtained from the existing electrical distribution system. The Contractor shall make all necessary provisions for the connection of a temporary power service.
   2. The Contractor shall provide temporary electrical power distribution as required to facilitate construction activities including:
      a. Wire/conduit
      b. Over-current protection
      c. Receptacle outlets
      d. Motor disconnect means
      e. Grounding
   3. The Contractor shall provide temporary lighting as required to facilitate construction activities.
   4. All temporary electrical power and lighting shall be completely removed prior to substantial completion of the project.

1.16 SUBSTANTIAL AND FINAL COMPLETION:

A. Refer to General Conditions and Supplementary Conditions.

B. Substantial Completion shall not be considered unless all systems are tested and verified for adherence with Contract Documents and any work remaining is less than one percent of the total Contract Value of this Section.
   1. Record Drawings, Operation and Maintenance Manuals, Acceptance Demonstrations, Owner personnel training, spare parts or extra materials required, test reports, warranties and certifications of installation inspections shall be submitted and accepted prior to Substantial Completion.

C. Final Completion shall be when all work under this Section is completed as defined by the Contract Documents and accepted by the Architect-Engineer.

D. When Architect-Engineer determines Work is complete, close out submittals will be considered.

PART 2 – PRODUCTS:

2.01 MATERIALS:

A. Furnish new and undeteriorated materials and of a quality not less than what is specified.

B. The selection of materials and equipment to be furnished shall be governed by the following:
1. Where single trade name, brand of manufacturer or material is listed in the specification, the exact equipment listed shall be used in the bid.
2. Where more than one name is listed, Contractor may select any one of the several brands specified.
3. Where trade name, brand of manufacturer of equipment or material is listed in the specification followed by the word "or approved equal," the Contractor may substitute product of equal quality from another manufacturer for consideration by the Engineer.

C. Conduit shall be as specified under Section 26 05 33.

PART 3 – EXECUTION:

3.01 PROTECTION AND CLEANING:

A. Protect all electrical work and products against damage during construction and pay the cost of repair or replacement of electrical products made necessary by failure to provide suitable safeguards or protection.

B. After all work has been inspected and approved, thoroughly clean all equipment, provided under this work.

C. Repair all dents and scratches in factory prime or finish coated on all electrical equipment.

3.02 CUTTING AND PATCHING:

A. Cut and patch as required to install new work. Patching shall match existing surfaces in kind and finish.

B. Obtain prior approval from the Engineer before cutting any structural members.

3.03 DEMOLITION:

A. Disconnect and remove all existing electrical, lighting, alarm system, door access control system, and surveillance system components in the existing Marine Terminal Building that is to be demolished.

B. Disconnect and remove all existing electrical, lighting, alarm system, door access control system, and surveillance system components in the existing Customs Building that is to be demolished.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations. Where existing electrical circuits that are required to remain active are interrupted by new construction, provide wiring and splice boxes as required to maintain circuit continuity. Provide blank covers for abandoned outlet boxes that are not removed.

D. The Contractor shall remove and dispose of all electrical equipment that contains hazardous substances according to the requirements of the State of Maine Department of Environmental Protection and the Federal Environmental Protection Agency. Such materials shall include, but are not necessarily limited to PCPs, PCBs, mercury and lead paint. The Contractor shall pay all costs associated with the transportation to and the disposal of such items at sites that are recognized and licensed by the State and Federal authorities.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: General Electrical components will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: General Electrical components shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and

Specifications. Payment will be made for the sum total of each type of underground or exposed conduit, secondary service wiring, and secondary service metering actually furnished, installed and accepted at the contract price. this price shall include the cost of furnishing and installing the conduit, pull wire, conduit fittings, groundings, bondings, wiring conductors, service meters, and all materials labor, equipment and incidentals necessary to complete the work. General Electrical will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 05 19 – LOW VOLTAGE POWER CONDUCTORS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.0519 Low Voltage Power Conductors

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Building wire and cable.

B. Metal clad cable

C. Wiring connectors and connections.

1.02 RELATED SECTIONS:

A. Section 26 05 33 – Raceway and Boxes for Electrical Systems.

1.03 REFERENCES:

A. ANSI/NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS:

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc.

1.05 PROJECT CONDITIONS:

A. Verify that field measurements are as shown on Drawings.

B. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.

C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

PART 2 – PRODUCTS:

2.01 BUILDING WIRE AND CABLE:

A. Wiring Manufacturers:
1. *Triangle PWC.*
2. Substitutions: Or Approved Equal.

B. Description: Single Conductor insulated wire.

C. Conductor: Copper only.

D. Insulation Voltage Rating: 600 volts.

E. Insulation Type: THW or XHHW.

F. Insulation Color: Color of all service, feeder, branch, motor control, and signaling circuit conductors shall be green for grounding conductors, and white for neutrals. The color of the ungrounded conductors in different voltage systems shall be as follows:
1. 120/208 volt, 3-phase
a) Phase A – Black

b) Phase B – Red
c) Phase C – Blue

2. 277/480 volt, 3-phase
a) Phase A – Brown
b) Phase B – Orange
c) Phase C - Yellow

2.02 METAL CLAD CABLE:

A. Manufacturers:
1. *Triangle PWC.*
2. Substitutions: Or Approved Equal.

B. Description: ANSI/NFPA 70, Type MC.

C. Conductor: Copper only.

D. Insulation Voltage Rating: 600 volts.

E. Insulation Temperature Rating: 60 degrees C.

F. Insulation Material: Thermoplastic.

G. Armor material: Steel or aluminum.

H. Armor Design: Interlocked metal tape.

I. Jacket: None.

2.03 MANUFACTURERS - WIRING CONNECTORS:

A. Connector manufacturers:
1. Burndy
2. 3M
3. Ideal
4. Thomas and Betts

B. Description: Compression set or twist-on type with integral molded insulation and internal metallic compression ring or spiral screw-on connecting device.

PART 3 – EXECUTION:

3.01 PREPARATION:

A. Completely and thoroughly swab raceway before installing wire.

3.02 WIRING METHODS:

A. Concealed Interior Locations: Type MC cable.

B. Exposed Interior Locations: Building wire in conduit as specified in Section 26 05 33.

C. Panelboard Feeders: Building wire in conduit as specified in Section 26 05 33.

D. Exterior Locations: Building wire in conduit as specified in Section 26 05 33.

3.03 INSTALLATIONS:

A. Install products in accordance with manufacturers' instructions.

B. Use solid conductor for feeders and branch circuits 10 AWG and smaller.

C. Use stranded conductors for control circuits.

D. Use conductor not smaller than 12 AWG for power and lighting circuits.

E. Use conductor not smaller than 16 AWG for control circuits.

F. Use 10 AWG conductors for 20 ampere, 120-volt branch circuits longer than 75 feet.

G. Pull all conductors into raceway at same time.

H. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

I. Protect exposed cable from damage.

J. Support cables above accessible ceiling, using spring metal clips or cable ties to support cables from structure. Do not rest cable on ceiling panels. Support Type MC cable at spacing as identified in NFPA 70.

K. Group cables together neatly and secure as bundles where practical. Route cables parallel and/or perpendicular to building framing members or adjacent walls.

L. Neatly train and lace wiring inside boxes, equipment, and panelboards.

M. Clean connector surfaces before installing lugs and connectors.

N. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

O. Terminate aluminum conductors with tin-plated aluminum-bodied compression connectors only. Fill with anti-oxidant compound before installing conductor.

P. Use suitable reducing connectors or mechanical connector adapters for connecting aluminum conductors to copper conductors.

Q. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

R. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

3.04 FIELD QUALITY CONTROL:

A. Inspect wire and cable for physical damage and proper connection.

B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

C. Verify continuity of each branch circuit conductor.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Low Voltage Power Conductors will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Low Voltage Power Conductors shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all secondary wiring actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the electrical feeder and branch circuit conductors, labor, equipment and incidentals necessary to complete the work. Low Voltage Power Conductors will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 05 26 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.0526 Grounding & Bonding for Electrical Systems

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Service ground system.

B. Feeder and branch circuit wiring grounding.

C. Electrical equipment and raceway grounding and bonding.

D. Telecommunications system grounding.

1.02 RELATED SECTIONS:

A. Section 26 05 19 – Low-Voltage Electrical Power Conductors.

1.03 REFERENCES:

A. NFPA 70 - National Electrical Code.

1.04 REGULATORY REQUIREMENTS:

A. Conform to requirements of NFPA 70.

1.05 SERVICE GROUND SYSTEM DESCRIPTION:

A. The Contractor shall provide a new service ground to meet all requirements in Article 250 of NFPA 70. Provide grounding service conductors and fittings as may be necessary for code conformance.

1.06 FEEDER AND BRANCH CIRCUIT GROUNDING DESCRIPTION:

A. All feeders and branch circuits shall include a separate insulated (green) grounding conductor.

1.07 TELECOMMUNICATIONS SYSTEM GROUNDING DESCRIPTION:

A. The telecommunications service termination board shall include a separate ground conductor connected to the main service ground system.

B. All network racks shall include a separate ground conductor connected to the system ground at the telecommunications service termination board.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Feeder and Branch Circuit Ground Conductors: Insulated conductors per Section 26 05 19.

B. Service Ground Conductor: Bare copper stranded wire, sized per NFPA 70, Article 250.

PART 3 – EXECUTION:

3.01 INSTALLATION:

A. Confirm that the existing service ground is connected to service ground electrodes as well as to the water service entrance pipe (attach ground ahead of water meter).

B. Install all ground system components in conformance with Article 250 of NFPA 70.

C. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

D. Measure ground resistance from the existing system neutral connection at the service entrance to confirm that resistance does not exceed 10 ohms. Take corrective actions as may be required, including the provision of additional grounding electrodes, to achieve a maximum resistance to ground of 10 ohms

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Grounding and Bonding for Electrical Systems will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Grounding and Bonding for Electrical Systems shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of grounding actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the grounding electrodes, grounding conductors, fittings, labor, equipment and incidentals necessary to complete the work. Grounding and Bonding for Electrical Systems will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 05 29 – SUPPORTING DEVICES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.0529 Supporting Devices

Add the following:

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Conduit and equipment supports.

B. Telecommunications cable supports.

C. Fastening hardware.

1.02 QUALITY ASSURANCE:

A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 - PRODUCTS

2.01 SUPPORT CHANNELS:

A. Support Channel: Galvanized or painted steel.

2.02 TELECOMMUNICATIONS CABLE J-HOOKS:

A. Manufacturers:
1. *Panduit*.
2. *Caddy*
3. *Chatsworth*
4. Substitutions: Or Approved Equal.

B. Where telecommunications cables are routed above accessible ceilings, provide cable support J-hooks. J-Hooks shall be sized to correctly support the number of cables which pass through them. Under no circumstances shall cable quantity exceed 50 in any given support. Fill capacity shall be as required by code for conduit. That is to say that every J-Hook shall have a maximum of 40 percent fill capacity. Install additional supports as required.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion anchors or beam clamps.

B. Anchors and Fasteners:
1. Concrete Surfaces: Use expansion anchors.
2. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.
3. Wood Elements: Use wood screws.

C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.

D. Do not use powder-actuated anchors.

E. Install surface-mounted cabinets and panelboards with minimum of four anchors.

F. Bridge studs top and bottom with horizontal members to support flush-mounted cabinets and panelboards in stud walls.

G. Install telecommunications J-hooks to support network and video cables above accessible ceilings only.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Supporting Devices will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls.

4.02 BASIS OF PAYMENT: Supporting Devices shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of support devices actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the conduit and box supports, wiring J-hooks, labor, equipment and incidentals necessary to complete the work. Supporting Devices will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum

END OF SECTION

SECTION 26 05 33 – RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.0533 Raceway and Boxes for Electrical Systems

Add the following:

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Rigid metal conduit and fittings.

B. Electrical metallic tubing and fittings.

C. Flexible metal conduit and fittings.

D. Liquid-tight flexible metal conduit and fittings.

E. Non-metallic conduit and fittings.

F. Fire stopping.

G. Sealing of conduit penetrations through walls.

H. Wall and ceiling outlet boxes.

I. Interior pull and junction boxes.

J. Exterior in-grade wiring boxes

1.02 COORDINATION OF WORK PROVIDED UNDER OTHER SPECIFICATION DIVISIONS:

A. The Contractor shall coordinate requirements for conduit and boxes associated with the following:
1. Telecommunications – Section 27 10 00
2. Fire Alarm System – Section 28 31 13
3. Door Access Controls – Section 28 13 00

1.03 RELATED SECTIONS:

A. Section 26 27 26 - Wiring Devices

B. Section 27 10 00 – Structured Cabling System

C. Section 28 31 23 - Fire Alarm System.

1.04 REFERENCES:

A. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated.

B. ANSI C80.3 - Electrical Metallic Tubing, Zinc-Coated.

C. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.

D. NEMA TC-2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

E. NEMA TC-3 - PVC Fittings for use with Rigid PVC Conduit and Tubing.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: Provide dimensions, knockout sizes and locations, materials, fabrication details, finishes, and accessories, for junction and pull boxes greater than 36 sq. in size.

1.06 PROJECT RECORD DRAWINGS:

A. Submit documents under provisions of Section 26 00 00.

B. Record actual locations of underground conduits.

1.07 PROJECT CONDITIONS:

A. Verify field measurements are as shown on Drawings.

B. Electrical boxes are shown in approximate locations unless dimensioned. Install at location required for box to serve intended purpose. Include installation within 10 feet of location shown.

PART 2 - PRODUCTS

2.01 RIGID METAL CONDUIT AND FITTINGS:

A. Rigid Steel Conduit: ANSI C80.1.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; threaded type, material to match conduit.

2.02 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS:

A. EMT: ANSI C80.3. galvanized tubing.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel compression type.

2.03 FLEXIBLE METAL CONDUIT AND FITTINGS:

A. Conduit: steel.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1.

2.04 PLASTIC CONDUIT AND FITTINGS:

A. Conduit: NEMA TC-2 Schedule 40 PVC.

B. Fittings and Conduit Bodies: NEMA TC-3.

2.05 LIQUID-TIGHT FLEXIBLE CONDUIT AND FITTINGS:

A. Conduit: Flexible metal conduit with PVC jacket.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1.

2.06 CONDUIT SUPPORTS:

A. Conduit Clamps, Straps, and Supports: Steel or malleable iron.

2.07 FIRE STOP:

A. Fire stopping materials shall be NRTL listed to UL 1479 (ASTM E814). Installation methods shall conform to a UL fire stopping system. Submit specifications and installation drawings for the type of material to be used. Fire stopping materials shall be as manufactured by *3M, International Protective Coatings Corp., Specified Technologies, Inc., Carborundum Company, RayChem, Nelson Fire Stop* or approved equal.

2.08 OUTLET BOXES:

A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel.
1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include ½ inch male fixture studs where required.

B. Cast Boxes: NEMA FB 1, Type FD. Provide gasketed cover by box manufacturer. Provide threaded hubs.

2.09 INTERIOR PULL AND JUNCTION BOXES:

A. Sheet Metal Boxes: NEMA OS1, galvanized steel.

2.10 EXTERIOR IN-GRADE WIRING BOXES

A. Provide exterior, in-grade pre-cast concrete wiring boxes for telecommunications wiring as detailed on the drawings.

PART 3 - EXECUTION

3.01 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT:

A. Size conduit for conductor type installed, 3/4-inch minimum.

B. Arrange conduit to maintain headroom and present a neat appearance.

C. Route conduit parallel and perpendicular to walls, ceiling joists, and adjacent piping. In spaces where exposed ceiling joists exist, route conduit at ceiling deck between joists where possible. Group conduits together where multiple conduits are installed along corridors. Do not drill through joists without prior permission from Architect.

D. Maintain minimum 6-inch clearance between conduit and heat sources such as flues, steam pipes and heating appliances.

E. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.

F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.

G. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.

H. Support conduit at spacing not to exceed limits stipulated in NFPA 70.

3.02 CONDUIT INSTALLATION:

A. Cut conduit square using a saw or a pipecutter; de-burr cut ends.

B. Bring conduit to the shoulder of fittings and couplings and fasten securely.

C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations.

D. Install no more than the equivalent of three 90-degree bends between boxes.

E. Use conduit bodies to make sharp changes in direction, as around beams.

F. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 1-inch size.

G. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.

H. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.

I. Provide No. 12 AWG insulated conductor or suitable nylon pull rope in empty conduit, except sleeves and nipples.

J. Install expansion joints where conduit crosses building expansion joints.

K. Where conduit penetrates walls or floors, seal opening around conduit. Use UL listed foamed silicone elastomer compound for fire rated walls.

L. Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack with pitch pocket.

M. Do not install conduits within the poured-in-place floor slabs above grade.

N. Where conduit(s) pass(es) from refrigerated or cooled atmosphere to warmer areas where condensation of water vapor may occur within raceways, conduit bodies sealed with "Duct Seal" type compound shall be provided after conductors are installed.

O. Flexible conduit shall not exceed three (3) feet in length.

P. Install top of underground conduit 30 inches (min.) below finished grade.

Q. Slope underground conduit away from building.

R. Use rigid galvanized steel conduit sweeps for underground elbows in conduit sizes 2 inch and larger.

3.03 CONDUIT INSTALLATION SCHEDULE:

A. Underground Installations: PVC Schedule 40.

B. Exposed Outdoor Locations: Rigid steel conduit.

C. Concealed Interior Locations: Electrical metallic tubing.

D. Exposed Interior Locations: Electrical metallic tubing.

E. Interior Motor Connections: Flexible metal conduit.

F. Exterior Motor Connections: Liquid-tight flexible conduit.

3.04 FIRE STOP INSTALLATION:

A. Provide fire stop for all cables and conduits and conduit sleeves that pass through fire-rated partitions, ceilings and/or floors.

3.05 BOX INSTALLATION:

A. Install electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

B. Install electrical boxes to maintain headroom and to present neat mechanical appearance.

C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

D. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

E. Install boxes to preserve fire resistance rating of partitions and other elements.

F. Align adjacent wall-mounted outlet boxes for fire alarm devices, switches, receptacle outlets, intercom call stations, telecommunications outlets, thermostats, and similar devices with each other.

G. Use flush mounting outlet boxes in finished areas.

H. Do not install flush mounting boxes back-to-back in walls; provide minimum 6-inch separation. Provide minimum 24 inches separation in acoustic rated walls.

I. Where two (2) or more single-gang boxes are to be installed side-by-side, mount boxes a stud-width apart.

J. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

K. Use stamped steel bridges to fasten flush mounting outlet box between studs.

L. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

M. Use adjustable steel channel fasteners for hung ceiling outlet box.

N. Do not fasten boxes to ceiling support wires.

O. Support boxes independently of conduit.

P. Use gang boxes where more than one device is mounted together. Do not use sectional box.

Q. Use gang box with plaster ring for single device outlets.

R. Use cast outlet box in exterior locations and wet locations.

S. Install knockout closure in unused box openings.

T. Obtain approval from Architect for exact locations of floor boxes prior to installation.

U. Coordinate installation of exterior, in-grade wiring boxes with final grade elevations as indicated on the civil site plans.

3.06 INTERFACE WITH OTHER PRODUCTS:

A. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

B. Position outlet boxes to locate luminaires as shown on Architectural Reflected Ceiling Plans.

3.07 ADJUSTING:

A. Adjust flush-mounting outlets to make front flush with finished wall material.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Raceway and Boxes for Electrical Systems will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Raceway and Boxes for Electrical Systems shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

Payment will be made for the sum total of each type of exterior underground or exposed conduit actually furnished, installed and accepted at the contract price per linear foot. This price shall include the cost of: furnishing and installing the conduit; pull wire, fittings, groundings and bondings; test cleaning interiors of conduits and all materials, labor, equipment and incidentals necessary to complete the work.

Payment will be made for the sum total of each exterior in-grade wiring box furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the boxes, covers, labor, equipment and incidentals necessary to complete the work.

Payment will be made for the sum total of all interior raceways actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the conduits, boxes, fire stop, fittings, labor, equipment and incidentals necessary to complete the work.

Raceway and Boxes for Electrical Systems will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 05 53 – ELECTRICAL IDENTIFICATIONS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.0553 Electrical Identifications

Add the following:

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Nameplates and tape labels.

B. Panelboard directories.

C. Underground marker tape.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Nameplates: Engraved three-layer laminated plastic, black letters on a white background.

B. Underground Warning Tape: 6" wide plastic tape, colored red with suitable legend describing buried electrical lines: Model UT27737-6 as manufactured by *Emedco*, or equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Degrease and clean surfaces to receive nameplates.

B. Install nameplates parallel to equipment lines.

C. Secure nameplates to equipment fronts using screws, rivets, or adhesive. Secure nameplate to inside face of recessed panelboard doors in finished locations.

D. Install underground warning tapes at all buried lines 6" below finished grade.

3.02 NAMEPLATE ENGRAVING SCHEDULE:

A. Provide nameplates to identify all electrical distribution and control equipment, and loads served. Letter Height: ¼ inch.

B. Mount panelboard nameplates on inside of trim cover.

3.03 PANELBOARD DIRECTORIES:

A. Provide a typed directory of panel circuit load descriptions for all panelboards. Mount directory to inside of panel cover.

B. Identify each branch circuit according to load served and room(s) where loads exist.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Electrical Identifications will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the

region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Electrical Identifications shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all electrical identification actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing name plates, tape labels, panelboard directories, underground warning tape, labor, equipment and incidentals necessary to complete the work. Electrical Identifications will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 06 50.16 – LIGHTING FIXTURE SCHEDULE

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

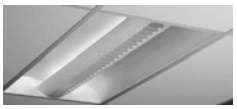
826.0650 Lighting Fixture Schedule

Add the following:

PART 1 - INTERIOR LIGHTING FIXTURE SCHEDULE

Lamp numbers refer to *Osram Sylvania* designations. Also approved are equal lamps manufactured by *General Electric*, and *Philips*. All fixtures are 120 volt, unless specifically noted otherwise.

NOTE: All fluorescent ballasts shall be low harmonic type (≤ 10%).



Dimensions: Length = 49" Width = 24" Recess Height = 5 3/4"

Type: **A1**

Description: Recessed 2 x 4 direct/indirect troffer with perforated diffuser and a white perforated center radial louver. Fixture shall have flush frame for grid ceilings and electronic, low harmonic ballast. Provide separate switching control of two outside lamps from center lamp.

Lamps: (3) FO28/835/XP/SS/ECO

Manufacturers: *Focal Point Lighting* # FLU24-B-3T8-S-120-G-RLP-L835-WH
Metalux # 2RDI-332RP/TBW-120V-TEB82
Lithonia # 2AV G 3 32 SBL 120 GEB10IS

No Picture

Dimensions: Width/Length = 24" Recess Height = 5"

Type: **A2**

Description: Similar to Type A1 except 2 x 2 size, different lamping and no separate switching control of two outside lamps from center lamp.

Lamps: (3) F017/835/ECO

Manufacturers: *Focal Point Lighting* # FLU22-B-3T8-S-120-G-RLP-L835-WH
Metalux # 2RDI-317RP/TBW-120V-TEB81
Lithonia # 2AV G 3 17 SBL 120 GEB10IS

Dimensions: Width = 24" Length = 24" Recess Height = 4 3/8"

Type: **A3**

Description: Recessed 2 x 2 static fluorescent troffer with flush frame for suspended grid ceilings, acrylic prismatic diffuser, and electronic, low harmonic ballast.

Lamps: (3) F017/835/ECO

Manufacturers: *Columbia* # 4PS24-317G-FSA12-3EB8LH120
Metalux # 2GC8-317A-120-TEB81
Lithonia # 2SP G B 3 17 A12 120 GEB10IS

Dimensions: Aperture = 5 3/4" Diameter = 7" Recess Height = 6 1/8"

Type: **B1**
Description: Recessed open down-light with semi-specular aluminum reflector. Provide electronic, non-dimming ballast.
Lamps: (2) CF26DD/E/835
Manufacturers: *Prescolite* # CFR626EB-ST372A-SS
Portfolio # C6226E-6251-LI
Intense Lighting # IFH6-226E-1C602-PR

Dimensions: Aperture = 5 3/4" Diameter = 7" Recess Height = 11 3/8"

Type: **B2**
Description: Recess down-light with regressed prismatic lens. Install fixtures within shower enclosures within bathrooms as shown on plans. Provide electronic non-dimming ballast. Luminaire shall be UL listed for wet locations.
Lamps: (1) CF26DD/E/835
Manufacturers: *Prescolite* # CFQ626EB-STF602-SS-PL-WT
Portfolio # C6026E-6081-LI-1-WF
Intense Lighting # IFVC6-26-E-W

Dimensions: Diameter = 7 3/8" Recess Height = 6 13/16"

Type: **B3**
Description: Recessed down-light with 8" (nom.) diameter cone with parabolic cross-blade louver. Provide electronic, dimming ballast.
Lamps: (2) CF26DD/E/835
Manufacturers: *Prescolite* # CFCB826QHEBDM-STCB8ACL-SS
Portfolio # C7226-2D-7281LI-5
Lithonia # AFZ-2/26DTT-84A-120-DMHL

Dimensions: Diameter = 13 7/8" Height = 4-1/8"

Type: **C1**
Description: Circular surface ceiling fixture with white acrylic diffuser and white fixture housing. Provide electronic, non-dimming ballast.
Lamps: (2) CF13DD/835
Manufacturers: *Shaper* # 226-CFL/2/13-120V-MW
American Scientific Lighting # HSA/26/EB-120V
Lithonia # FMLR11 2 13 DTT-120

Dimensions: Length = 13 1/4" Height = 5 1/4" Projection = 5 1/8"

Type: **E1**
Description**:** Wall mounted emergency light with self contained sealed nickel cadmium battery with ten year rated life. Battery shall be rated to operate fixture lamps for 90 minutes upon loss of normal power. Mount bottom of fixture at 7' - 0" AFF. Fixture housing shall be white.
Lamps**:** (2) By Manufacturer
Manufacturer**:** *Dual Lite* # LZ35-12V
Sure-Lites # CC-7/WH
Lithonia # ELM1272 H1212

Dimensions: Width = 6 3/4" Height = 4 7/16" Length = 4' – 0"

Type: **J1**
Description: Surface ceiling mount wraparound light with acrylic prismatic lens. Provide electronic non-dimming ballast.
Lamps: (2) FO28/835/XP/SS/ECO
Manufacturers: *Columbia Lighting* # PT4-232-E120
Metalux # CR-232A-120V-TEB81
Lithonia # CS-2-32-120-GEB10

Dimensions: Width = 2 11/16" Length = 48" Height = 3 5/8"

Type: **J2**
Description**:** Surface ceiling mounted bare lamp strip fixture. Provide electronic non-dimming ballast.
Lamps**:** (1) FO28/835/XP/SS/ECO
Manufacturer**:** *Metalux* # SN-132-277V-TEB81
Columbia # CH4-132-EB8LH277
Lithonia # S 1 32 277 GEB10

Dimensions: Width = 9" Height = 2.6" Length = 12' – 0"

Type: **N1**
Description: Direct/indirect pendant mounted luminaire with adjustable aircraft cable hangers and center semi-specular radial parabolic louver. Provide electronic, low harmonic 0-10 volt dimming ballast. Luminaire finish shall be white. Provide an overall continuous length of 12 feet.
Lamps: (6) FO32/835/XP/ECO
Manufacturers: *Finelite #* S12-ID-WCB-12'-2T8-SC-91W-OPEN-120-AC-CE
Litecontrol # P-ID-59-2-12-T8-PBCWM/O-TCWM- LPD/DIO -120-ECSS
Peerless Lighting # 10RCM4-2-32-WHR-SBL-12'-R8-120- ADZT

Dimensions: Diameter = 18.1”

Type: **R1**
Description: Pendant hung luminaire to match fixture Type B3. Luminaire shall have hand-blown satin opal glass diffuser. Luminaire finish shall be satin nickel. Provide electronic non-dimming ballast. Suspend luminaire with adjustable cables to height as directed by Architect.
Lamps: (2) CF26DD/E/835
Manufacturers: *Beta Calco* # 68 9801/SN/1/HR
Shaper Lighting # 494-22-CFL/4/26-120V-SN
Scott Architectural Lighting # S2310-4C26E-BN

Dimensions: Diameter = 11 1/2” Luminaire Height = 9 5/8”

Type: **R2**
Description: Suspended luminaire with white fixture housing. Provide electronic 0-10 volt dimming ballast. Suspend luminaire with adjustable cables to height as directed by Architect.
Lamps: (2) CF26DD/E/835
Manufacturers: *Prescolite #* CFP1026-782 EB-DM-CC
Portfolio # C192261D26-CC9250-LI
Gotham Lighting # CF11-2/26DTT-8AR-120-DIMMING-CC

Dimensions: Length = 21 1/4” Width = 5” Depth = 1 1/8”

Type: **U1**
Description: Surface under cabinet task light luminaire with acrylic lens. Provide electronic non-dimming ballast.
Lamps: (1) F13T5/WW
Manufacturers: *Columbia* # UCS21-113-PH120
Alkco # SFHP113
Lithonia # UC 21 120

Dimensions: Length = 13” Height = 9” Projection = 1 7/8”

Type: **X1**
Description**:** Wall mounted thermoplastic exit sign with red letters and white housing. Fixture shall include LED lamps. Fixture shall include an integral battery rated to operate fixture for 90 minutes upon loss of normal power. Provide directional arrows as indicated on the drawings.
Lamps**:** By Manufacturer
Manufacturer**:** *Dual Lite* # LX-U-R-W-E
Sure-Lites # CCX-7-1-70-R-WH
Lithonia # LQM S W 1 R 120/277 EL N

PART 2 - EXTERIOR LIGHTING FIXTURE SCHEDULE

Lamp numbers refer to *Osram Sylvania* designations. Also approved are equal lamps manufactured by *General Electric*, and *Philips*. All fixtures are 480 volt, unless specifically noted otherwise.

Type: S1

Description: 60-foot high mast lighting pole with motorized lowering assembly and three luminaires. One luminaire shall utilize a 400 watt high pressure sodium lamp, while the remaining two luminaires shall utilize 1000 watt metal halide lamps. The two metal halide luminaires shall be wired to operate off one circuit, and the single high pressure sodium luminaire shall be wired to operate off a separate circuit.

Luminiares:

High last luminaires with die cast aluminum housing with polyester powder paint. The bracket arm clamp shall attach to a 2 inch nominal schedule 40 pipe and allow for ±3° adjustment for leveling the luminaire. A stainless steel lamp clamp lined with woven glass cloth shall be attached to the reflector housing assembly for standard HID lamps. The fixture shall pass a vibration fatigue test per ANSI standards for Roadway Lighting Equipment – Luminaire Vibration.

The ballast shall be copper wound with power factor 90%, and shall have a published ballast factor of 1 to ensure full output of the lamp. All ballast components shall be completely removable as a unitized quick disconnect assembly for maintenance. A terminal block shall be provided to simplify wiring and provide positive electrical connections. A protected starter shall sense an inoperative or missing HPS map and automatically shut down to prevent runaway operation, shortened life, and damage to secondary ballast windings. The ballast shall be UL listed for 40°C ambient conditions.

The optical assembly shall consist of highly specular enhanced aluminum panels hermetically sealed between a spun aluminum cover, an open ventilated borosilicate glass piece. The exposed smooth glass inner surface shall be continuously cleaned by the chimney effect of flow through air and subject to no permanent deterioration. The lamp shall be operated in the vertical position for maximum life and lumen maintenance. There shall be no glass bottom enclosure to scatter light above the horizon, to collect dirt or to reduce luminaire efficiency. The luminaire dirt depreciation shall be less than 5% (LDD 0.95). The luminaire optics shall conform to the Illuminating Engineering Society of North America Type V, full cut-off distribution classification.

Poles with Lowering Devices:

The lowering device and pole shall be manufactured and tested as an integral system and shall be provided and warranted by one manufacturer. The complete high mast system, consisting of pole, lowering device, and specified luminaires shall be subjected to full-scale load testing to determine actual loading for the high mast system with 5:1 safety factor.

The pole shall be round tapered steel, 60-feet in height. The pole dimensions shall be capable of supporting the specified lowering device and luminaire assembly in a wind load of 100 mph with a 1.3 gust factor, shall not be less than 13 inches in diameter at the base and 4.95 inches at the top. The pole shaft shall conform to ASTM A595 Grade A or A572 Grade 55 with a consistent linear taper of 0.14 in/ft. Poles shall include a hot dipped galvanized finish. Provide a handhole and grounding provisions with a full two-piece base cover fabricated from galvanized steel. All structural hardware shall be galvanized high strength carbon steel. Non-structural hardware shall be stainless steel. Anchor bolts shall conform to ASTM F1554 Grade 55 and shall be provided with two hex nuts and two flat washers. Bolts shall have an “L” bend on one end and shall be galvanized a minimum of 12 inches on the threaded end. Provide 4 anchor bolts per pole with a 1 3/4-inch diameter and a 17 1/2-inch bolt circle. Provide an anchor bolt base plate that is 18 1/2-inches square.

The lowering device shall consist of three main sub-assemblies: head-frame, lowering box and winch/motor assembly. All lowering device material shall be of corrosive resistant nature, including stainless steel, aluminum, or galvanized steel.

The lowering device head-frame shall consist of fabricated stainless steel channel. All fasteners used for additional covers or other items shall be stainless steel. The head frame shall incorporate four hoist cable

sheaves of high strength nylon rated fro 1400 lbs each. Each sheave shall be a minimum four inch diameter and the cable groove shall be formed with a circular cross-section to match the cable diameter. The sheaves shall have oil impregnated, pressed-in, sintered bronze bushings. Wire rope cables that operate over the sheaves shall be 7 x 19 construction aircraft cable, 3/16 inch diameter stainless steel. The cables shall meet MIL Spec W83420C and federal Specification RR-W-410d. The head-frame shall incorporate power cord pulleys providing a minimum of 7-inch bending radius for the main power cord. The design shall prevent the main power cord from riding up the sides of the rollers and shall incorporate keeper bars on each end to secure the cord. The stainless steel wire rope hoist cables and main power cord shall be factory pre-strung in the head-frame assembly.

The lowering device shall include two one-piece high strength cast aluminum latch plates on the head-frame assembly. Each latch plate shall be designed to hold the entire weight of the lowering box and luminaires. All cam surfaces of the latch plate shall be shielded from environmental conditions such as icing. The latch plates shall support the luminaire box assembly in a top-latched position, unloading the hoist cables, transition assembly and winch when the device is not in operation.

The lowering box assembly shall be fabricated of #12 gauge stainless steel. The assembly shall include the appropriate number of luminaire mounting arm brackets fabricated from 2 inch aluminum pipe of sufficient strength to support the specified luminaire. The mounting arms shall bolt to the lowering box with stainless steel hardware. A wiring enclosure shall be provided of formed aluminum with a removable cover. The entire assembly shall be weatherproof. The enclosure shall include a weatherproof inlet for testing of the luminaires and lamps at ground level. The enclosure shall include a factory pre-wired terminal block, the appropriate number of 16/2 Type ST cords for luminaires and appropriately sized main power cord. The power cord shall be securely attached to the ring using cable clamps that grip the outer jacket of the cord. The luminaire mounting arms shall be factory installed to the lowering box assembly and the luminaire power cords pre-wired and pulled through the mounting arms. Two stainless steel latch pins shall be provided on the lowering box. Each latch pin shall be capable of individually supporting the entire weight of the luminaires and lowering box assembly. Each latch pin shall be capable of individual operation. Indicator flags shall distinguish the latching and unlatching position, which shall be visible from ground level. The latching or unlatching sequence shall impart no more than one (1) G of force to any component of the system including luminaires and lamps.

The lowering system self-centering system shall consist of roller contact, spring loaded, stainless steel arms with non-marking rollers designed to protect the pole, luminaires, and lamps from damage during raising and lowering of the luminaire ring assembly. The centering system shall keep the lowering box assembly concentric to the pole during the raising and lowering operation. The centering arms shall be designed to prevent jamming of the system on the pole during raising and lowering operation. The springs shall be contained in a sealed sleeve.

The lowering system transition assembly shall be designed to prevent misalignment of the two hoist cables. The wire rope cables shall be attached to the transition assembly with properly sized wire rope thimbles and factory swaged fittings. The attachment shall prevent the wire rope cable from untwisting under load. The transition plate shall be fabricated of steel with a zinc-plated finish including yellow chromate dip.

The lowering system portable winch/motor assembly shall have an ultimate strength of five (5) times the lifted load. The assembly shall consist of aluminum frame construction. The motor and winch shall be mounted to the aluminum frame and include handles for transport. The frame shall include provisions to lock the assembly to the pole hand hole during raising and lowering operations. The winch shall include a 51:1 worm gear reduction. The drum shall be supported on both ends and the winch shall include a cable keeper designed to aid the correct spooling of the winch cable. The winch drum shall be factory pre-wound with minimum 3/16 inch diameter stainless steel high strength 7 x 19 construction aircraft cable. The drive motor assembly shall include a minimum 7-amp heavy duty reversing type electric motor with a stalled torque at least twice that required to operate the lowering device. The motor shall drive the winch through a torque limiter coupling to limit the driving force on the hoist and winch cables. The torque limiter shall be factory pre-st. The drive motor assembly shall have a 20-foot cord with drum switch for remote operation. The drive motor assembly shall be supplied with a step-down transformer to provide 120V to the motor. The drive motor described herein shall be portable and shall interface with the pole hand-hole to operate the lowering device.

The lowering assembly shall include circuit breakers sized for the correct voltage and phasing supplied for the luminaire loads. An aluminum or zinc plated steel cover shall be supplied for the circuit breakers. A pigtail cord and plug shall be provided from each circuit breaker. The cord and plug shall match the main power cord of the lowering system.

Lamps: (2) M1000/U
(1) LU400/ECO

Manufacturer: *Holophane* # HMAO-C10MH-48-S-9-FD2-F2 *(two luminaires)*
Holophane # HMAO-400HP-48-S-9-FD2-F2 *(one luminaire)*
Holophane # 10-2-3-HMS-(2)1M/(1)4H-K-060-NS-1-LR *(lowering device)*
Holophane # PLMS60100HGAB-H060AH01 *(pole)*

Type: S2

Description: Identical to Type S1 lighting pole except luminaires to be equipped with 180-dgree shields.

Lamps: (2) M1000/U
(1) LU400/ECO

Manufacturer: *Holophane* # HMAO-C10MH-48-S-9-FD2-F2-SD-395-180 *(two luminaires)*
Holophane # HMAO-400HP-48-S-9-FD2-F2-SD-395-180 *(one luminaire)*
Holophane # 10-2-3-HMS-(2)1M/(1)4H-K-060-NS-1-LR *(lowering device)*
Holophane # PLMS60100HGAB-H060AH01 *(pole)*

Type: S3

Description: 20-foot pole with a single area light with optics that conform to the Illuminating Engineering Society of North America full cut-off distribution classification. The luminaire shall include a die cast aluminum housing with a polyester powder coat paint finish (grey). All external hardware shall be corrosion resistant. The optical assembly shall include an internal reflector and a flat, tempered glass lens. The luminaire shall be UL listed for wet locations.

The pole shall be tapered steel with a polyester powder coat paint finish (grey) to match the luminaire. The pole shall be rated to withstand 90 mph wind with a gust factor of 1.3.

Lamps: LU150/55/MED

Manufacturer: *Holophane* # G250HP48LWF

Type: S3A

Description: Identical to type S3 except rated 120 volts.

Lamps: LU150/55/MED

Manufacturer: *Holophane* # G250HP12LWF

Type: S4 **Luminaire Dimensions: Height = 9.66" Diameter = 5.22"**

Description: Adjustable ground mounted accent flood light with die cast aluminum housing and integral electronic ballast. Luminaire shall have 360 degree rotation and 105 degree tilt. Luminaire shall be equipped with wide horizontal optical distribution and top shielding hood. Luminaire finish color shall be black. Install luminaire as detailed on the drawings. Luminaire shall be UL listed for wet locations. Luminaire voltage shall be 120 volts.

Lamps: MC39T6/U/G12/830PB

Manufacturer: *Architectural Area Lighting # ON-39R111EB-40-BLK-NLN-NAH-NTE*
Cooper Invue # PHH-39-MH-120-EB-HWF-G1B-BK-VA3001

Type: S5 **Dimensions: Height = 5.75" Length = 12.5" Projection = 7.5"**
Description: Exterior surface wall mounted luminaire with full cutoff medium throw lighting distribution optics. Luminaire shall include clear flat bottom glass lens. Luminaire finish shall be dark bronze. Luminaire shall be UL listed for wet locations. Coordinate exact mounting height with Architect prior to rough-in.
Lamps: (1) CF42DT/E/IN/830/ECO
Manufacturer: *Lithonia # WSTM-42TRT-MD-120*
Lumux # UD200/PL42/120/B
Guth # SND-121-F42-PL-1

Type: S6 **Dimensions: Height = 10" Length/Width = 19"**
Description: Surface ceiling mounted luminaire with flush, flat bottom diffuser. Luminaire shall have an aluminum housing with a black painted finish. Luminaire shall be 120 volts. Luminaire shall be UL listed for damp locations.
Lamps: (1) MP150/U/MED
Manufacturer: *Hubbell # NK2-CM-P15-H5-F-Q-BL*
Cooper Lighting# MHCL-150-120V-C73-BLK
Lithonia # KACM-150M-FP-120-DBL

Type: FL1 Not used.

Type: FL2
Description: 35-foot pole with four pole-top floodlights and a 36-inch high exposed concrete base. The floodlights shall include a die cast aluminum housings with spun aluminum reflectors. All external hardware shall be corrosion resistant. Floodlights shall be supplied with a threaded, water tight cord connector with 90°C rated conductors. Floodlight mounting slip fitter for a 2-3/8" diameter tenon. The luminaire shall be UL listed for wet locations. Luminaires shall be equipped with top and side shields.

The pole shall be round tapered steel, 35-feet in height. The pole dimensions shall be capable of supporting the specified luminaires and bracket assembly in a wind load of 100 mph with a 1.3 gust factor, shall not be less than 11 inches in diameter at the base and 4.00 inches at the top. The pole shaft shall conform to ASTM A595 Grade A or A572 Grade 55 with a consistent linear taper of 0.14 in/ft. Poles shall include a hot dipped galvanized finish. Provide a handhole and grounding provisions with a full two-piece base cover fabricated from galvanized steel. All structural hardware shall be galvanized high strength carbon steel. Non-structural hardware shall be stainless steel. Anchor bolts shall conform to ASTM F1554 Grade 55 and shall be provided with two hex nuts and two flat washers. Bolts shall have an "L" bend on one end and shall be galvanized a minimum of 12 inches on the threaded end..
Lamps: (3) M400/PS/U
Manufacturer: *Holophane # PF-40LPH-MT-L-N-1-G-A-D (luminaire)*
Holphane # RTS3595B-P6-ND-HG-2 (pole)
Holophane # BKT-24-P (pole bracket)

Type: FL3
Description: Luminaires identical to those specified for Type FL2. Assembly shall be wall mounted with a wall bracket mount to accommodate two floodlights.
Lamps: (2) M400/PS/U
Manufacturer: *Holophane* # PF-40LPH-MT-L-N-1-G-A-D (luminaire)
Holophane # BKT-1-P (wall bracket)

Type: FL4

Description: Identical to type FL1 except to be provided with a pole-top bracket mount to accommodate three floodlights.

Lamps: (3) M400/PS/U

Manufacturer: *Holophane* # PF-40LPH-MT-L-N-1-G-A-D (luminaire)
Holophane # BKT-20-P (pole bracket)
Holophane # RTS359B-P6-ND-HG-2 (pole)

826.0651 Measurement and Payment

Add the following:

METHOD OF MEASUREMENT: Lighting Fixtures will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

BASIS OF PAYMENT: Lighting Fixtures shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of lighting fixtures actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing lighting fixtures, lamps, labor, equipment and incidentals necessary to complete the work. Lighting Fixtures will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

Payment for lighting fixtures will be made under the respective lighting Pay Items as identified below:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 09 43 –LIGHTING CONTROLS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.0943 Low Voltage Power Conductors

Add the following:

PART 1 - GENERAL:

1.01 SECTION INCLUDES:

A. This extent of lighting control system work is indicated by drawings and by the requirements of this section. It is the intent of this section to provide an integrated, energy saving lighting control system for interior lighting including occupancy sensors. Also included are lighting controls for exterior lighting including a digital, programmable lighting control panel.

1.02 REGULATORY REQUIREMENTS:

A. National Fire Protection Association (NFPA): NFPA 70 – National Electrical Code

B. Underwriters Laboratories Incorporated (UL):

1. UL 916 - Energy Management Equipment

2. UL 508 – Industrial Control Panels

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: For control panels, low-voltage switches and plates, occupancy sensors, and conductors and cables.

B. Shop Drawings: Detail assemblies of standard components, custom assembled for specific application on this Project.

1. Outline Drawings: Indicate dimensions, weights, arrangement of components, and clearance and access requirements.

2. Block Diagram: Show interconnections between components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices to be used. Describe characteristics of network and other data communication lines.

3. Wiring Diagrams: Power, signal, and control wiring. Coordinate nomenclature and presentation with a block diagram.

C. Coordination Drawings: Submit evidence that lighting controls are compatible with connected control devices and systems specified in other Sections.

1. Show interconnecting signal and control wiring and interfacing devices that prove compatibility of inputs and outputs.

2. For networked controls, list network protocols and provide statements from manufacturers that input and output devices meet interoperability requirements of the network protocol.

D. Programming Documentation:

1. Program instruction manuals.

2. Device address list.

E. Field quality-control test reports.

F. Software licenses and upgrades required by and installed for operation and programming of digital and analog devices.

G. Operation and Maintenance Data: For lighting controls to include in emergency, operation, and maintenance manuals.

H. Warranty: Special warranty specified in this Section.

1.04 QUALITY ASSURANCE:

A. Source Limitations: Obtain lighting system components through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with 47 CFR, Subparts A and B, for Class A digital devices.

D. Comply with NFPA 70.

1.05 PROJECT RECORD DRAWINGS:

A. Submit documents under provisions of Section 26 00 00.

B. Record actual locations and devices.

1.06 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Provide written operating and maintenance instructions as specified in Section 26 00 00. Include product data and operation/maintenance information for all system components

B. The Owner may assign personnel to participate with the Contractor during installation. Without delaying work, familiarize the Owner's personnel with the installation, equipment, and maintenance.

C. During tests and adjustments, permit the Owner's personnel to observe. When feasible, explain the significance of each test.

D. Provide sufficient training to personnel selected by the Owner on operation and basic maintenance of all systems and equipment.

E. Employ manufacturer's field representative to demonstrate system operation to designated Owner personnel.

F. Conduct walking tour of project and briefly describe function, operation, and maintenance of each component.

G. Use submitted operation and maintenance manual as reference during demonstration and training.

H. Provide the owner with a training program designed to make all users familiar with the operation of the Lighting Control System.

1.07 WARRANTY:

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of lighting controls that fail in materials or workmanship or from transient voltage surges within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Failure of program input/output to execute switching or dimming commands.
   b. Failure of modular relays to operate under manual or program commands.
   c. Damage of electronic components due to transient voltage surges.

2. Warranty Period: Two years from date of Substantial Completion.

3. Extended Warranty Period Failure Due to Transient Voltage Surges: Eight years.

4. Extended Warranty Period for Electrically Held Relays: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS:

2.01 MANUFACTURERS:

A. Lighting systems equipment shown on the Drawings and specified herein is based on equipment as manufactured by *Hubbell Building Automation*.

2.02 NETWORK LIGHTING CONTROL SYSTEM:

A. Network Data Line: The distributed intelligent lighting control network shall consist of intelligent lighting control devices consisting of but not limited to relays, touch tablet graphic user interfaces, controllers, enclosures, switch stations, photo sensors, occupancy sensors, and miscellaneous components linked together via a single data line that uses the Echelon/LonTalk™ protocol for communications.

B. The distributed intelligent lighting control network shall facilitate data transmission between the distributed intelligent lighting control systems devices over a twisted pair of wires at 78K baud. Network communication shall use the LonWorks communication protocol to transmit/receive and negotiate messaging between networked devices.

C. Network wiring shall be unshielded, twisted pair data communication wire with insulation ratings as required by local codes. The network shall support free topology wiring allowing loop, star, bus or any mixed combination of connection topologies between devices.

D. Wiring distances shall be up to 1500 feet for free topology, 8000 feet for linear bus terminated topology.

E. Communication over the network shall allow any switch input from any device to be linked to any relay output or group of relay outputs in the lighting control system for complete, unrestricted control.

F. Network Technology: The distributed intelligent lighting control network shall consist of intelligent devices such as lighting control panels, switch stations, photo sensors and motion sensors that communicate with each other using the ANSI/EIA/CEA 709.1 protocol over one or more communications channels.

G. Peer-to-Peer (P2P): The distributed intelligent lighting control network shall consist of true peer-to-peer network. In order to eliminate the potential of a single point of failure there shall be no master controller or node required for system operation. All nodes shall be capable of communicating with each other without the need of these types of devices. Systems which utilize master controllers or master/slave networking concepts shall not be acceptable.

H. Network Topology: The lighting control system specified herein shall utilize a 2-wire topology free polarity insensitive powered network. Devices connected to the network shall be capable of doing so without regard for network topology or wiring polarity. Systems, which require the contractor to follow any kind of networking topology or to pay attention o the wiring polarity, are not acceptable.

I. Network Capacities: Up to 32,000 individual distributed intelligent (NODES) shall be capable of being connected together within a single network.

J. Programming: The distributed intelligent lighting control systems hall be capable of being programmed from any point or points anywhere on the system network. Systems that require a single point of system access are not acceptable. The lighting control network must remain completely functional during this process. Lighting control systems that must be taken “OFF LINE’ for programming are not acceptable. All programming changes shall take effect immediately as they are programmed.

K. System Updates and Upgrades: All device installed upon the distributed intelligent lighting control system network shall be capable of having their programs updated and/or upgraded over the network systems which require hardware or memory chips to be replaced to perform upgrades are not acceptable. Software and firmware upgrades shall be made available free of charge for the life of the system.

L. Lighting Control Panels

1. Where shown on the drawings, the Contractor shall furnish and install lighting control panels of the quantities, sizes, and types shown on the drawings and/or specified herein.

2. Lighting panels shall contain relays, and other devices of the sizes and quantities indicated on the drawings and specified herein.

3. Hardware Features:
   a. Controller Backbox: Each lighting control panel shall be provided with a factory furnished, UL listed NEMA 1 enclosure designed for wall mounting. Backbox must be capable of being shipped ahead of controller chassis insert to allow for rough-in of all electrical connections prior to receipt of the controller chassis insert.
   b. Controller Finish: Each lighting control panel shall be of welded construction primed and painted with a powder coat finish. Unpainted or galvanized enclosures are not acceptable.
   c. Controller Chassis Insert: Each lighting control panel shall be provided with a factory or field installable controller chassis insert. Controller chassis insert shall contain all controller electronics, power supplies, relays, and other required components. Controller chassis inserts shall arrive at the project site completely pre-wired and requiring only the connection of lighting circuits and network cable. Systems that require field assembly of controllers or chassis inserts are not acceptable.
   d. High-Voltage/Low-Voltage Separation: Each programmable lighting controller shall be provided with a mechanical barrier that separates all high-voltage components and wiring from all low-voltage components and wiring. An additional barrier shall be installed within the high-voltage section that shall provide isolation between normal and emergency circuits where required.
   e. Controller Covers: Each programmable lighting controller shall be provided with a dead front screw-held hinged locking cover that is designed for either surface or flush mounting.

4. Electrical:
   a. Controller Power Supply: Each programmable lighting controller shall be provided with a single triple-rated, UL listed Class 2 transformer capable of either being connected to 120/277 or 347 VAC primary (+ or -20% VAC, 50 to 60 Hz).
   b. Connections: All connections shall be made to clearly and permanently labeled termination points.

5. Lighting Control Panel Electronics:
   a. Controller Module: Each lighting panel shall be provided with a LonWorks controller module that shall provide for all of the lighting panels controller functions, these functions shall include but not be limited to real time clock, LonWorks network interface, scheduling, relay control, monitoring, status and diagnostic information.
   b. I/O Controller: I/O (input/output) cards shall be provided to expand the controller capability from 8 to 48 relay outputs in groups of 8.I/O controller cards shall be completely self-configuring and shall not require settings of any kind in order to be configured for use within the lighting control panel.
   c. Capacity: Each controller shall be capable of controlled 1 to 48 individual lighting control relays. Controllers shall be available in three sizes: 16, 32 and 48 relay outputs. Relay must be capable of being individually added to or removed from the lighting controller for the purpose of service or expansion of the controllers capabilities.
   d. Diagnostic Aids: Each lighting control panel shall be provided with a status LED to indicate current operational status. Each relay output shall have an LED pilot to indicate the current status of all controlled relay outputs.
   e. Data Protection and Storage: All programmed data shall be stored in nonvolatile flash memory that shall protect all stored programming data from loss during a power outage for a minimum period of 20 years without power of any type.

f. Power Failure and Power-Up Options: Each lighting control panel shall be provided with circuitry that shall automatically shut down the controller whenever the incoming power fails. When power is returned to the controlled, one of the following power-up modes will be implemented (user selectable) for each controlled relay output in the system.
g. No Action: Upon restoration of incoming control power, the lighting control panel electronics shall be restarted and resume normal operations, and all circuits will be maintained in the condition they were last in.
h. Forced ON: Controller will force selected relay output(s) to the ON state after power-up.
i. Forced OFF: Controller will force selected relay output(s) to the OFF state after power-up.

6. Blink Alert: Program feature not required.

7. Real-Time Clock: Each lighting control panel shall have its own Real-Time Clock, which shall be used to perform all time-controlled functions. Real-Time Clock functions shall include time of day, day of week, date and automatic daylight savings and leap year adjustments. Time clock shall be protected against loss of time during a power outage for a period of up to 60 days without power of any type. Systems, which utilize a single central time clock, are not acceptable.

8. Astronomical Clock: Each lighting control panel shall contain an astronomical time clock that shall calculate sunrise and sunset times based on the geographical positioning information provided during the programming of the system. Sunrise and sunset times may be used as activation times for any system timer. In addition to sunrise and sunset time activation, the control shall be capable of programming activation time for the system time for before and after these times based on an offset of 1 to 999 minutes either before or after the calculated sunrise or sunset event.

9. Time-of-Day Scheduling: Each programmable lighting control panel shall be provided with a minimum of 99 scheduled events for use in developing time-of-day automated schedules. Each schedule shall have the ability to turn any relay or group of relays ON or OFF or activate a preset lighting scene and the scheduled time. Schedules shall be day-of-week selectable and may be programmed to activate on any combination of days of the week (Sunday through Saturday), on all days, or to activate on a specific date only ("Holiday Schedule"). Each non-holiday scheduled event shall be capable of being programmed either to halt operation on holidays or to ignore holidays and continue normal operations on holidays.

10. Manual Relay Overrides: Lighting control panel relays shall be provided with 2 means of manual override.

11. Mechanical Manual Override: Each relay shall be provided with a manual override switch. It shall be possible to change the state of each relay without the need for the controller electronics or any other part of the system to be operational or powered. Lighting control panels that require power to be applied in order to change or maintain the state of relays are not acceptable.

12. Push Button Override: In addition to but not in lieu of the mechanical manual override each relay output shall be supplied with an ON and OFF manual override push-button with LED pilot that shall allow the system user to view the current status and/or manually override any relay output to the ON or OFF state.

13. True Relay Status Feedback: Each lighting control panel shall be provided with circuitry that shall monitor the actual current status of each relay.

14. Staggered Relay Activation: Lighting control panels shall be designed to stagger relays ON and OFF to limit the impact of switching multiple lighting loads ON or OFF at the same time.

M. 20 Amp Relays

1. Electrical Contractor shall provide and install quantities of mechanically latching lighting control relays as indicated on the drawings and schedules as specified herein. Electrically held or non-mechanically latching relays shall not be considered.

2. Lighting control relays shall be individually UL and CUL listed and shall bear labels indicating compliance. Lighting control relays shall be tested to UL Standard 508 for both safety and endurances and bare labels signifying compliance.

3. Lighting control relays shall be designed and tested to have a minimum cycle life of 30,000 ON/OFF cycles @ FULL LOAD switching into any and all loads that the relay is rated to control. Manufacturer shall provide test data certifying compliance to this section.

4. Lighting control relays shall be specifically designed for control of 480 VAC single phase lighting loads including but not limited to incandescent, low-voltage, neon, cold cathode, LED, fluorescent and HID lighting sources at a full 20.

5. Lighting control relays shall be designed with a mechanical latching mechanism that shall hold the relay in its last activated state indefinitely, with no change of state during an interruption of power.

6. Lighting control relay shall contain an electrical means of monitoring the current status of the relay contacts electronically isolated, but mechanically linked to the main contacts for the purpose of true status monitoring and pilot light activation.

7. Each lighting control relay shall include a mechanical means of turning the relay ON or OFF without the need for electrical power of any kind.

8. Each lighting control relay shall include a mechanical visual indicator showing the current status of relay itself.

N. Touch Tablet Graphic User Interface

1. The Electrical Contractor shall provide LX Touch Tablet Graphic User Interface(s) as shown on drawings and described herein.

2. The LX Touch Tablet Graphic User Interface shall consist of a microprocessor-based lighting control station specifically designed for the control of lighting control systems.

3. To provide for clarity of operation a high resolution graphic liquid crystal display with wide viewing angle and an electroluminescent backlight shall be used to display system information in both alphanumeric and graphical format.

4. All programming shall be accomplished through the use of a graphical user interface.

5. The LX Touch Tablet Graphic User Interface shall provide the system user access to the following system features:
   a. Current status of any device on the systems network.
   b. Time and date information and programming.
   c. Astro-clock and daylight saving time adjustments.
   d. Scheduling
   e. Manual overrides.
   f. System programming.
   g. System diagnostics.

6. All programming information stored in the LX Touch Tablet Graphic User Interface shall be stored in nonvolatile flash memory preventing loss of stored information in the event of a power failure up to 20 years.

7. The LX Touch Tablet Graphic User Interface shall be capable of being to the lighting control system at any point on the network. One or multiple LX Touch Table Graphic User Interface shall be capable of being connected to the system at any time.

8. The LX Touch Tablet Graphic User Interface shall contain no special programming causing it to become a required part of the lighting control system it is being utilized with. The lighting control system shall provide full-functionality with or without this device attached to the system.

O. Lx Networked Switch Stations

1. The Electrical Contractor shall provide and install networked switch station of the types and quantities shown on the drawings and specified herein.

2. Network switch stations shall be injection molded and designed to mount in a standard single-gang junction box with standard Decora switch plate opening.

3. Networked switch stations shall be available in three colors: white, almond, and gray.

4. Networked switch stations shall be 2-button standard configurations.

5. Labeling and switch identification shall be accomplished through the use of hot-stamped labels, permanently attached to the switch face itself. Silk-screened or painted labeling shall not be acceptable.

   a. Button 1: 'ON'

   b. Button 2: 'OFF'

6. Each networked switch station shall be provided with both pilot and non-pilot version of buttons, which can be selected by the Contractor at the time of installation or change at any time throughout the life of the system. Switch stations, which require switches to be ordered with, or without pilots and are not field-modifiable shall not be considered.

7. Network switch stations shall connect to the self-powered topology free network via a single pair of wires. Network switch stations requiring more than two wires or requiring that the Installing Contractor install them with a stick topology or maintain correct polarity are unacceptable.

8. Buttons on LX networked switch stations shall be programmed to perform the following functions:

LIGHTING CONTROL PANEL RELAY SCHEDULE			
Lighting Control Panel	Relay Number	Lights Controlled	Ltg. Ckt. Numbers Controlled
LC1	1,3 (2 pole)	Security Yard Lights	SPP-2 #10,12
LC1	2,4 (2 pole)	Yard Lights	SPP-2 # 1,3
LC1	5,7 (2 pole)	Yard Lights	SPP-2 # 5,7
LC1	6,8 (2 pole)	Yard Lights	SPP-2 # 2,4
LC1	9,11 (2 pole)	Yard Lights	SPP-2 # 6,8
LC1	10,12 (2 pole)	Yard Lights	SPP-2 # 9,11
LC1	13,15 (2 pole)	Pier Lights	SPP-2 # 13,15
LC1	14,16 (2 pole)	Pier Lights	SPP-2 # 14,16
LC1	17,19 (2 pole)	Pier Lights	SPP-2 # 18,20
LC1	18, 20 (2 pole)	Spare	
LC1	21,23 (2 pole)	Spare	
LC1	22 (1 pole)	Spare	
LC1	24 (1 pole)	Spare	
LC2	1, 3 (2 pole)	Existing Yard Lights	Existing Yard Ltg. Pnl. (RUBB Bldg.)
LC2	2,4 (2 pole)	Spare	
LC2	5, 6 (2 pole)	Spare	
LC2	7, 8 (2 pole)	Spare	

2.03 OCCUPANCY SENSORS:

A. Ceiling mounted passive-infrared sensors shall be *Hubbell* model OMNIIR.

1. Sensor shall use a micro-processor for motion signal analysis and internal self-adjustment. Sensor shall adapt automatically to changing room conditions. Sensor micro-processor shall monitor PIR background levels and automatically make corresponding adjustments. Sensor shall recognize any motion detected within 15 seconds of turning off the lighting as a false off. Sensor shall recognize as a false on, the failure to detect motion 6 seconds after motion is detected initially.
   a. Test Setting: 8 second timeout.
   b. Timer Adjustability: 8 to 40 minutes (factory set at 15 minutes).
   c. Sensitivity: Adjustable from 0 to 100%.
   d. Indicator Light: LED.
   e. Detection Field: 360 degrees.
   f. Coverage: 450 square feet.
   g. Voltage: 24 volts DC.

B. Ceiling mounted dual technology sensors shall be *Hubbell* model OMNIDT2000.

1. Sensor shall use a micro-processor for motion signal analysis and internal self-adjustment. Sensor shall adapt automatically to changing room conditions. Sensor micro-processor shall monitor PIR background levels as well as utilize Doppler shift technology with a micro-processor for motion signal analysis and automatically make corresponding adjustments. Sensor shall recognize any motion detected within 15 seconds of turning off the lighting as a false off. Sensor shall recognize as a false on, the failure to detect motion 6 seconds after motion is detected initially.
   a. Test Setting: 8 second timeout.
   b. Timer Adjustability: 8 to 30 minutes (factory set at 15 minutes).
   c. Sensitivity: Adjustable from 0 to 100%.
   d. Indicator Light: LED.
   e. Detection Field: 360 degrees.
   f. Coverage: 2000 square feet.
   g. Voltage: 24 volts DC.

C. Occupancy sensor power packs shall be *Hubbell* model UVPP.

1. Power packs shall include an integral transformer and relay designed for switching 20-ampere loads. Power packs shall be capable of being installed within a standard 4-inch square electrical box.
   a. Input Voltage: 100-277VAC
   b. Output Rating: 24VDC, 150 mA

2.04 CONDUCTORS AND CABLES:

A. Classes 2 Control Cables: Multi-conductor cable with copper conductors not smaller than No.18 AWG.

PART 3 - EXECUTION:

3.01 WIRING INSTALLATION:

A. Wire exterior lighting circuits through relays in the relay control panels as indicated in the Lighting Control Panel Schedule included in this specification.

B. Comply with NECA 1.

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and non-power-limited conductors according to conductor manufacturer's written instructions.

D. Install field-mounting transient voltage suppressors for lighting control devices in Category A locations that do not have integral line-voltage surge protection.

E. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

F. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in terminal cabinets, equipment enclosures, and in junction, pull, and outlet boxes.

G. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

3.02 OCCUPANCY SENSOR INSTALLATION:

A. Provide ceiling mounted dual technology occupancy sensors in the following spaces within the Office Building:

1. Conference 117
2. Public Lobby/Hallway 116
3. Secure hallway 106

B. Provide ceiling mounted passive infrared type occupancy sensors for all other sensors not listed in paragraphs A.

3.03 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to provide full commissioning services including the inspection, testing, field-assembled components adjustments and system start-up. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Test for circuit continuity.
2. Verify that the control panel features are operational.
3. Check operation of local override controls.
4. Test system diagnostics by simulating improper operation of several components selected by Architect.

3.04 ADJUSTING

A. Occupancy Adjustments: When requested within 2 months of date of Substantial Completion, provide on-site assistance in adjusting sensors and to assist Owner's personnel in making program changes to suit actual occupied conditions.

3.05 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting controls. Refer to Division 01 Section "Demonstration and Training."

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Lighting Controls will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Lighting Controls shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

Payment will be made for the sum total of the entire exterior lighting control system as actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the lighting control panel, labor, equipment and incidentals necessary to complete the work.

Payment will be made for the sum total of the entire interior lighting control system as actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing occupancy sensors,

labor, equipment and incidentals necessary to complete the work.

Lighting Controls will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 24 16 – PANELBOARDS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.2416 Panelboards

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Service/distribution Panelboard.

B. Branch Circuit Panelboards.

1.02 REFERENCES:

A. NECA (National Electrical Contractors Association) "Standard of Installation."

B. NEMA AB 1 - Molded Case Circuit Breakers.

C. NEMA PB 1 - Panelboards.

D. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards rated 600 Volts or Less.

E. NEMA PB 1.2 - Application Guide for Ground-fault Protective Devices for Equipment.

F. NFPA 70 - National Electrical Code.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Submit shop drawings for equipment and component devices under provisions of Section 26 00 00.

B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, and branch circuit breaker quantities and sizes.

C. Operating and Maintenance Manuals: Provide for panelboards.

1.04 SPARE PARTS:

A. Panelboard Cover Keys: Furnish 4 each to Owner.

PART 2 – PRODUCTS:

2.01 PANELBOARDS:

A. Acceptable Manufacturers.
1. *Square D.*
2. *Cutler-Hammer*.
3. *General Electric.*
4. *Siemens.*
5. Substitutions: None Permitted.

B. Description
1. Panelboards: NEMA PB1; Circuit breaker type with bolt-on circuit breakers.
2. Enclosures: NEMA PB 1; Type 1.
3. Cabinet Sizes:
   a. Branch Circuit Panelboards: 5 ¾ inches deep; 20 inches wide.

b. Service/distribution Panelboard: 6 ½ inches deep; 26 inches wide.

4. Provide cabinet fronts with concealed trim clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

5. Provide copper buses for all panels and load centers. Branch circuits panels shall be rated as scheduled within specification section 26 06 20.16. Service/distribution panel shall be rated as indicated on the single-line diagram in the contract drawings.

6. Minimum Integrated Short Circuit Ratings:
   a. Distribution Panelboards: 65,000 AIC at 480 volts.
   b. Branch Circuit Panelboards: 35,000 AIC at 120/240 volts.

7. Molded Case Circuit Breakers: NEMA AB 1; thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits.

8. Provide circuit breaker accessory trip units and auxiliary contacts as indicated.

C. Panelboard Schedule:

VOLTS: 120/208 AMPS 225 MAIN: MLO **PANEL: E1 SECTION 1**
MOUNT: SURFACE PHASE: 3 WIRES: 4 LOCATION: KITCHENETTE 111

BREAKER A	BREAKER P	DESCRIPTION	CKT VA	TYPE	CKT NO.	LOAD A	LOAD B	LOAD C	CKT NO.	TYPE	CKT VA	DESCRIPTION	BREAKER P	BREAKER A
20	1	LIGHTS	1075	L	1	1575			2	O	500	TELEPHONE EQUIPMENT	1	20
20	2	P-3	125	M	3		525		4	R	400	TELECOM RECEPT	1	20
20	2	P-3	125	M	5			625	6	O	500	DATA NETWORK RACK	1	20
20	1	SPARE	500	S	7	1000			8	O	500	FIRE ALARM PANEL	1	20
20	1	P-1 / P-4	336	M	9		836		10	O	500	DOOR ACCESS PANEL	1	20
20	1	B-1	600	M	11			1600	12	O	1000	ELEC DOOR LOCKS	1	20
20	1	HRU-1	500	M	13	1500			14	O	1000	ELEC DOOR LOCKS	1	20
20	2	OU-2	1248	M	15		2248		16	O	1000	ELEC DOOR LOCKS	1	20
20	2	OU-2	1248	M	17			2248	18	O	1000	ELEC DOOR LOCKS	1	20
20	2	P-2	125	M	19	1125			20	O	1000	ELEC DOOR LOCKS	1	20
20	2	P-2	125	M	21		1793		22	M	1668	AH SYSTEM	2	20
20	1	SPARE	500	S	23			2168	24	M	1668	AH SYSTEM	2	20
100	3	PANEL E1 SECTION 2	8600		25	9200			26	H	600	CUH1/CUH2/CUH3/UH1	1	20
100	3	PANEL E1 SECTION 2	6400		27		6900		28	S	500	SPARE	1	20
100	3	PANEL E1 SECTION 2	7000		29			7500	30	S	500	SPARE	1	20
		PHASE TOTALS				14400	12302	14141						

CONNECTED VOLT-AMPERES= 40843
CONNECTED AMPERES= 113
DEMAND VOLT-AMPERES= 21259
DEMAND AMPERES= 59

	CIRCUIT TYPE CODES	DEMAND FACTOR
L	LIGHTS	1.0
M	MOTORS	0.5
R	RECEPTACLES	0.5
H	HEAT	1.0
O	OTHER	0.5
S	SPARE	0.5

VOLTS: 120/208 AMPS 225 MAIN: MLO **PANEL: E1 SECTION 2**
MOUNT: SURFACE PHASE: 3 WIRES: 4 LOCATION: KITCHENETTE 111

BREAKER A	BREAKER P	DESCRIPTION	CKT VA	TYPE	CKT NO.	LOAD A	LOAD B	LOAD C	CKT NO.	TYPE	CKT VA	DESCRIPTION	BREAKER P	BREAKER A
20	1	RECEPTACLES	1200	R	31	2400			32	R	1200	RECEPTACLES	1	20
20	1	RECEPTACLES	1000	R	33		2200		34	R	1200	RECEPTACLES	1	20
20	1	RECEPTACLES	1200	R	35			2000	36	R	800	RECEPTACLES	1	20
20	1	RECEPTACLES	1200	R	37	2700			38	R	1500	REFRIGERATOR	1	20
20	1	RECEPTACLES	800	R	39		1200		40	R	400	KITCHENETTE RECEPTS	1	20
20	1	RECEPTACLES	1200	R	41			2000	42	R	800	RECEPTACLES	1	20
20	1	RECEPTACLES	1000	R	43	1500			44	S	500	SPARE	1	20
20	1	SPARE	500	S	45		1000		46	S	500	SPARE	1	20
20	1	SPARE	500	S	47			1000	48	S	500	SPARE	1	20
20	1	SPARE	500	S	49	1000			50	S	500	SPARE	1	20
20	1	SPARE	500	S	51		1000		52	S	500	SPARE	1	20
20	1	SPARE	500	S	53			1000	54	S	500	SPARE	1	20
20	1	SPARE	500	S	55	1000			56	S	500	SPARE	1	20
20	1	SPARE	500	S	57		1000		58	S	500	SPARE	1	20
20	1	SPARE	500	S	59			1000	60	S	500	SPARE	1	20
		PHASE TOTALS				8600	6400	7000						

CONNECTED VOLT-AMPERES= 22000
CONNECTED AMPERES= 61
DEMAND VOLT-AMPERES= 11000
DEMAND AMPERES= 31

	CIRCUIT TYPE CODES	DEMAND FACTOR
L	LIGHTS	1.0
M	MOTORS	0.5
R	RECEPTACLES	0.5
H	HEAT	1.0
O	OTHER	0.5
S	SPARE	0.5

VOLTS: 120/208 AMPS 100 MAIN: MLO **PANEL: P1**
MOUNT: SURFACE PHASE: 3 WIRES: 4 LOCATION: ELECTRICAL 119

BREAKER A	BREAKER P	DESCRIPTION	CKT VA	TYPE	CKT NO.	LOAD A	LOAD B	LOAD C	CKT NO.	TYPE	CKT VA	DESCRIPTION	BREAKER P	BREAKER A
20	1	LIGHTS	933	L	1	1629			2	L	696	LIGHTS	1	20
20	1	RECEPTACLES	1200	R	3		2400		4	R	1200	RECEPTACLES	1	20
20	1	RECEPTACLES	1000	R	5			1800	6	R	800	RECEPTACLES	1	20
20	1	MOTORIZED SCREEN	1000	O	7	2200			8	R	1200	RECEPTACLES	1	20
20	1	RECEPTACLES	1200	R	9		2400		10	R	1200	RECEPTACLES	1	20
20	1	RECEPTACLES	600	R	11			1800	12	R	1200	RECEPTACLES	1	20
20	1	REFRIGERATOR	1500	R	13	2700			14	R	1200	RECEPTACLES	1	20
20	1	PARKING LOT LIGHT	190	L	15		1390		16	R	1200	RECEPTACLES	1	20
20	1	SPARE	500	S	17			1000	18	S	500	SPARE	1	20
20	1	SPARE	500	S	19	1000			20	S	500	SPARE	1	20
20	1	SPARE	500	S	21		1000		22	S	500	SPARE	1	20
20	1	SPARE	500	S	23			1000	24	S	500	SPARE	1	20
		PHASE TOTALS				7529	7190	5600						

CONNECTED VOLT-AMPERES= 20319
CONNECTED AMPERES= 56
DEMAND VOLT-AMPERES= 11069
DEMAND AMPERES= 31

	CIRCUIT TYPE CODES	DEMAND FACTOR
L	LIGHTS	1.0
M	MOTORS	0.5
R	RECEPTACLES	0.5
H	HEAT	1.0
O	OTHER	0.5
S	SPARE	0.5

PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide panelboards as indicated on the Contract Drawings.

B. Install panelboards plumb and flush with wall finishes, in conformance with NEMA PB 1.1.

C. Height: 6 feet to top of panelboard.

D. Clearance: 3 feet front clearance, floor to ceiling with no foreign pipes, ducts, or other system equipment.

E. Provide filler plates for unused spaces.

F. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

3.02 FIELD QUALITY CONTROL:

A. Measure state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the phase loads within 20 percent. Take care to maintain proper phasing for multi-wire branch circuits.

B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Panelboards will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Panelboards shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all panelboards actually furnished, installed, and accepted at the contract price. This price shall include the cost of: furnishing and installing panelboards, labor, equipment, and incidentals necessary to complete the work. Panelboards will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 27 26 – WIRING DEVICES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.2726 Wiring Devices

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Wall switches.

B. Receptacles.

C. Device plates.

1.02 RELATED SECTIONS:

A. Section 26 05 33 – Raceway and Boxes for Electrical Systems.

B. Section 26 09 43 – Lighting Controls.

1.03 REFERENCES:

A. NEMA WD 1 - General Purpose Wiring Devices.

B. NEMA WD 6 - Wiring Device Configurations.

1.04 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Submit under provisions of Division 01 and Section 26 00 00.

B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations for all wiring devices.

1.05 REGULATORY REQUIREMENTS:

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 – PRODUCTS:

2.01 WIRING DEVICES:

A. *Leviton* model numbers are listed below to establish configuration and type. Equal devices by other manufacturers listed herein will be accepted.
1. *Hubbell*
2. *Pass & Seymour*
3. *Bryant*
4. Substitutions: None permitted.

B. Wall Switches
1. Description: style NEMA WD 1, heavy-duty, AC only general-use switch.
2. Device Body: White plastic with "*Decora*" series.
3. Voltage Rating: 120-277 volts, AC.
4. Current Rating: 20 amperes.

5. Model Number: *Leviton* 5621-2-W (SPST).
6. Model Number: *Leviton* 5623-2-W (3-way)

C. Boiler Cut-Off Switches
1. Description: Heavy-duty, AC only, double pole single throw snap switch.
2. Device Body: Red plastic with toggle handle.
3. Voltage Rating: 120-277 volts AC.
4. Current Rating: 20 amperes.
5. Model Number: *Leviton* 1122-2R

D. General Use Receptacles
1. Description: NEMA WD 1; heavy-duty type, 125-volt grounded duplex receptacle.
2. Device Body: Thermoplastic, "*Decora*" series.
3. Configuration: NEMA 5-20.
4. Model number: *Leviton* 16352-W.

E. Receptacles Connected to Surge-Suppression Panelboards
1. Description: NEMA WD 1; heavy-duty type, 125-volt grounded duplex receptacle.
2. Device Body: Thermoplastic, "*Decora*" series.
3. Configuration: NEMA 5-20.
4. Model number: *Leviton* 16352-GY.

F. Ground Fault Receptacles
1. Description: UL 498, 544, 943; 125 volt, ground fault interrupt type duplex receptacle with TEST and RESET.
2. Device Body: Thermoplastic, *"Decora"* series.
3. Configuration: NEMA 5-20.
4. Model Number: *Leviton* 8899-W.

G. Wall Plates
1. Decorative Cover Plate: "*Decora*" series.
a. Standard Devices: White color.
b. Boiler Cut-Off Switches: Red color, engraved: "EMERGENCY."

PART 3 – EXECUTION:

3.01 EXAMINATION:

A. Verify outlet boxes are installed at proper height.

B. Verify wall openings are neatly cut and will be completely covered by wall plates.

C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.02 PREPARATION:

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean debris from outlet boxes.

3.03 WIRING DEVICE INSTALLATION:

A. Install products in accordance with manufacturer's instructions.

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install receptacles with grounding pole on top.

E. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

F. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

G. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas.

H. Provide ground fault GFCI receptacles where receptacles are located within six (6) feet of a sink.

3.04 INTERFACE WITH OTHER PRODUCTS:

A. Install wall switches 48 inches above finished floor.

B. Install convenience receptacles 18 inches above floor, or as noted on the Drawings.

3.05 FIELD QUALITY CONTROL:

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

3.06 ADJUSTING:

A. Adjust devices and wall plates to be flush and level.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Wiring Devices will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Wiring Devices shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all wiring devices actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the switches, receptacle outlets, plates, labor, equipment and incidentals necessary to complete the work. Wiring Devices will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 28 16 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.2816 Enclosed Switches and Circuit Breakers

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Service and General Disconnect Switches.

B. Fuses.

1.02 REFERENCES:

A. NEMA KS 1 - Enclosed Switches.

B. ANSI/NFPA 70 - National Electrical Code.

1.03 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Include outline drawings with dimensions, and equipment ratings for voltage, capacity, horsepower, and short circuit.

PART 2 – PRODUCTS:

2.01 SERVICE AND GENERAL DISCONNECT SWITCHES

A. Acceptable manufacturers:
1. *Square D*.
2. *General Electric*.
3. *Siemens*
4. Substitutions: None permitted

B. Non-fusible General Disconnect Switch Assemblies: NEMA KS 1; Type HD; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front with switch in ON position. Handle lockable in OFF position.

C. Enclosures: NEMA KS 1; Type 1. For indoor locations; Type 3R for outdoor locations.

PART 3 – EXECUTION:

3.01 INSTALLATION:

A. Provide unfused disconnect switches for general motors, except where packaged equipment is supplied by the manufacturer with integral means of disconnect.

B. Mount disconnect switch handle 60 inches (maximum) above adjacent working surface, with not less than 36 inches clearance in front of switch (floor to ceiling).

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Enclosed Switches and Circuit Breakers will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to

5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Enclosed Switches and Circuit Breakers shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all enclosed switches and circuit breakers actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the enclosed switches, labor, equipment and incidentals necessary to complete the work. Enclosed Switches and Circuit Breakers will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 26 29 13 – ENCLOSED MOTOR CONTROLLERS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.0519 Low Voltage Power Conductors

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Manual motor starters.

B. Combination motor starters.

1.02 RELATED SECTIONS:

A. Section 26 00 00 – General Electrical Requirements.

1.03 REFERENCES

A. ANSI/NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

B. NEMA AB 1 - Molded Case Circuit Breakers.

C. NEMA ICS 1 - Industrial Control Devices, Controllers, and Assemblies.

1.04 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Submit shop drawings and product data under provisions of Division 01 and Section 26 00 00.

B. Provide product data on motor starters and combination motor starters, relays, pilot devices, and switching and overcurrent protective devices.

1.05 OPERATION AND MAINTENANCE DATA:

A. Submit operation and maintenance data under provisions of Division 01 and Section 26 00 00.

B. Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

PART 2 – PRODUCTS:

2.01 MOTOR STARTERS:

A. Acceptable Manufacturers

1. *Cerus Industrial*

2. Substitutions: Or approved equal.

B. Manual Motor Starters:

1. Single-Phase Motor Starter Control: The single-phase motor starter shall consist of a manually operated quick-make toggle mechanism lockable in the "Off" position which shall also function as the starter disconnect. Additionally, the starter shall provide thermal overload protection, run status pilot light and fault pilot light. The starter must include the capability to operate in both manual and automatic control modes. In automatic mode, the starter shall have the capability to integrate with a building automation system by provided terminals for fun input, run status output and fault output. All control terminals shall be integrated in the starter. At a minimum, each

single-phase starter shall include an interposing run relay and current sensing status output relay. Single-phase motor starter shall be in a surface mount enclosure.

2. Approved Manufacturer: *Cerus Industrial*, Model BAS-1P, or approved equal.

C. Combination Motor Starters

1. Motor Starter shall be enclosed in a Type 1 or Type 4 UL rated enclosure. Type 1 enclosure shall include pre-cut holes for conduits with removable plugs.

2. Motor Starter shall be rated for NEMA class B motors for AC-3 switching and AC-4 switching. Starter shall be sized to equivalent NEMA rating for AC-3 switching.

3. Controls and annunciation shall include Hand- OFF- Auto keypad with 20 mm snap dome actuation. Keypad shall be water tight and liquid tight. LED indication shall include Hand, Off, Auto, Run and Overload. Overload reset shall be available by holding Hand and Off for five seconds.

4. Control inputs shall include: Auto Wet input, Auto Dry input, Permissive Auto input, Damper Status Input and Override Input. Automatic control inputs shall be capable of accepting a transistorized input without the need for interposing relays. Wet control inputs shall accept AC or DC inputs from 10 to 138VACor DC.

5. Damper control shall be built into the starter to provide 24VAC or 120VAC damper control and monitoring.

6. Override input shall disable the starter from operating in either Hand or Auto mode.

7. Protective Functions-
   a. Electronic Overload shall provide phase failure and phase loss protection, stall, and class 1 - 30 selectable overload protection. Phase failure protection shall initiate when phase loss is greater than 70% for 3 seconds or phase unbalance is greater than 50% for more than 5 seconds.
   b. Cycling fault protection shall be integral to the starter. Cycling fault shall be enabled whenever the starter is cycled more than 1000 times in a one hour period. This feature shall be selectable to be disabled. Cycling fault shall cause overload LED to blink rapidly.

8. Motor Starters shall be equipped with an integral Motor Circuit that is UL listed 508. The breaker and shall carry a UL 508F rating (up to 100A frame size) which provides for coordinated short circuit rating for use with the motor contactor and provides an interrupting rating for the breaker and contactor combination.

9. Approved Manufacturer: *Cerus Industrial*, Model BAS, or approved equal.

PART 3 – EXECUTION:

3.01 INSTALLATION:

A. Install motor control equipment in accordance with manufacturer's instructions.

B. Provide motor controllers at equipment as specified under Section 26 00 00.

C. Motor Data: Provide neatly typed label inside each motor starter enclosure door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.

D. Mount combination type motor starters locally to equipment being served, with top at 60 inches (maximum) above adjacent floor, with not less than 36 inches clearance in front of starter (floor to ceiling).

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Enclosed Motor Controllers will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not

only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls.

4.02 BASIS OF PAYMENT: Enclosed Motor Controllers shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all motor starters actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the motor starters, labor, equipment and incidentals necessary to complete the work. Enclosed Motor Controllers will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum

END OF SECTION

SECTION 26 32 13.16 – GAS ENGINE DRIVEN GENERATOR SET

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.3216 Gas Engine Driven Generator Set

Add the following:

PART 1 – GENERAL:

1.01 SCOPE*:*

A. Provide complete factory assembled natural gas-fired generator set equipment with digital (microprocessor-based) electronic controls.

B. Provide factory test, startup by a supplier authorized by the manufacturer, and on-site testing of the system.

C. The generator set manufacturer shall warrant all equipment provided under this section, whether or not is manufactured by the generator set manufacturer, so that there is one source for warranty and product service. Technicians specifically trained and certified by the manufacturer to support the product and employed by the generator set supplier shall service the generator sets.

1.02 CODES AND STANDARDS*:*

A. The generator set installation and on-site testing shall conform to the requirements of the following codes and standards, as applicable. The generator set shall include necessary features to meet the requirements of these standards.
1. CSA 282, 1989 Emergency Electrical Power Supply for Buildings
2. IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
3. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
4. NFPA99 – Essential Electrical Systems for Health Care Facilities
5. NFPA110 – Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1prototype tests required by this standard shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement.

B. The generator set and supplied accessories shall meet the requirements of the following standards:
1. NEMA MG1-1998 part 32. Alternator shall comply with the requirements of this standard.
2. UL142 – Sub-base Tanks
3. UL1236 – Battery Chargers
4. UL2200. The generator set shall be listed to UL2200 or submit to an independent third party certification process to verify compliance as installed.

C. The control system for the generator set shall comply with the following requirements.
1. CSA C22.2, No. 14 – M91 Industrial Control Equipment.
2. EN50082-2, Electromagnetic Compatibility – Generic Immunity Requirements, Part 2: Industrial.
3. EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
4. FCC Part 15, Subpart B.
5. IEC8528 part 4. Control Systems for Generator Sets
6. IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions.
7. UL508. The entire control system of the generator set shall be UL508 listed and labeled.
8. UL1236 –Battery Chargers.

D. The generator set manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

1.03 ACCEPTABLE MANUFACTURERS:

A. Only approved bidders shall supply equipment provided under this contract. Equipment specifications for this project are based on microprocessor-based generator sets manufactured by *Cummins Power Generation*. Equipment by the following other supplier that meets the requirement of this specification is acceptable. Proposals must include a line by line compliance statement based on this specification.
1. *Kohler*
2. Substitutions: None permitted

PART 2 – PRODUCTS:

2.01 GENERATOR SET:

A. Model: The generator shall be *Cummins* Series GGLB, or approved equal.

B. Ratings
1. The generator set shall operate at 1800 rpm and at a voltage of: 208/120 Volts AC, three phase, 4-wire, 60 hertz.
2. The generator set shall be rated at 85 kW, 106.25 kVA at 0.8 PF, standby rating, based on site conditions of: Altitude 499 ft. (152 meters), ambient temperatures up to 77 degrees F (25 degrees C).
3. The generator set rating shall be based on emergency/standby service.

C. Performance
1. Voltage regulation shall be plus or minus 0.5 percent for any constant load between no load and rated load for both parallel and non-parallel applications. Random voltage variation with any steady load from no load to full load shall not exceed plus or minus 0.5 percent.
2. Frequency regulation shall be isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed plus or minus 0.25%.
3. The engine-generator set shall be capable of single step load pick up of 100% nameplate kW and power factor, less applicable derating factors, with the engine-generator set at operating temperature.
4. Motor starting capability shall be a minimum of 313 kVA. The generator set shall be capable of sustaining a minimum of 90% of rated no load voltage with the specified kVA load at near zero power factor applied to the generator set.
5. The alternator shall produce a clean AC voltage waveform, with not more than 5% total harmonic distortion at full linear load, when measured from line to neutral, and with not more than 3% in any single harmonic. Telephone influence factor shall be less than 40.

D. Construction
1. The engine-generator set shall be mounted on a heavy-duty steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails
2. All switches, lamps, and meters in the control system shall be oil-tight and dust-tight, and the enclosure door shall be gasketed. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts.

E. Connections
1. The generator set load connections shall be composed of silver or tin plated copper bus bars, drilled to accept mechanical or compression terminations of the number and type as shown on the drawings. Sufficient lug space shall be provided for use with cables of the number and size as shown on the drawings.
2. Power connections to auxiliary devices shall be made at the devices, with required protection located at a wall-mounted common distribution panel.

3. Generator set control interfaces to other system components shall be made on a common, permanently labeled terminal block assembly.

2.02 ENGINE AND ENGINE EQUIPMENT:

A. The engine shall be natural gas fueled, radiator and fan cooled. Minimum displacement shall be 412.5 cubic inches, with 10 cylinders. The horsepower rating of the engine at its minimum tolerance level shall be sufficient to drive the alternator and all connected accessories. Engine accessories and features shall include:

B. Complete engine fuel system, including all pressure regulators, strainers, and control valves. The fuel system shall be plumbed to the generator set skid for ease of site connections to the generator set. For dual fuel systems, changeover from primary to secondary fuel shall be automatic.

C. An electronic governor system shall provide automatic isochronous frequency regulation. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate and excitation as appropriate to the state of the generator set. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various isochronous or parallel states.

D. Skid-mounted radiator and cooling system rated for full load operation in 104 degrees F (40 degrees C) ambient as measured at the generator air inlet, based on 0.5 in H_2O external static head. Radiator shall be sized based on a core temperature that is 20F higher than the rated operation temperature, or prototype tested to verify cooling performance of the engine/radiator/fan operation in a controlled environment. Radiator shall be provided with a duct adapter flange. The equipment manufacturer shall fill the cooling system with a 50/50-ethylene glycol/water mixture. Rotating parts shall be guarded against accidental contact.

E. Electric starter(s) capable of three complete cranking cycles without overheating.

F. Positive displacement, mechanical, full pressure, lubrication oil pump.

G. Full flow lubrication oil filters with replaceable spin-on canister elements and dipstick oil level indicator.

H. Replaceable dry element air cleaner with restriction indicator.

I. Flexible fuel lines.

J. Engine mounted battery charging alternator, 40-ampere minimum, and solid-state voltage regulator.

K. Coolant heater
1. Engine mounted, thermostatically controlled, coolant heater(s) for each engine. Heater voltage shall be as shown on the project drawings. The coolant heater shall be UL499 listed and labeled.
2. The coolant heater shall be installed on the engine with high temperature silicone hose connections. Steel tubing shall be used for connections into the engine coolant system wherever the length of pipe run exceeds 12 inches. The coolant heater installation shall be specifically designed to provide proper venting of the system. The coolant heaters shall be installed using quick disconnect couplers to isolate the heater for replacement of the heater element. The quick disconnect/automatic sealing couplers shall allow the heater element to be replaced without draining the engine cooling system or significant coolant loss.
3. The coolant heater shall be provided with a 24VDC thermostat, installed at the engine thermostat housing. An AC power connection box shall be provided for a single AC power connection to the coolant heater system.
4. The coolant heater(s) shall be sized as recommended by the engine manufacturer to warm the engine to a minimum of 100F (40C) in a 40F ambient, in compliance with NFPA110 requirements, or the temperature required for starting and load pickup requirements of this specification.

L. Provide vibration isolators, spring/pad type or as recommended by the manufacturer, quantity as recommended by the generator set manufacturer. Isolators shall include seismic restraints if required by site location.

M. Starting and Control Batteries shall be calcium/lead antimony type, 24 volt DC, sized as recommended by the engine manufacturer, complete with battery cables and connectors.

N. Provide exhaust silencer(s) for each engine of size and type as recommended by the generator set manufacturer and approved by the engine manufacturer. The mufflers shall be critical grade. Exhaust system shall be installed according to the engine manufacturer's recommendations and applicable codes and standards.

O. Provide a minimum 12 amp battery charger for each generator set battery bank. Generator sets incorporating two battery banks shall be provided with two chargers connected together and operating in parallel, with alarm output(s) connected in parallel. The charger(s) shall include the following capabilities:
1. Chargers shall be UL 1236-BBHH listed and CSA or CUL certified for use in emergency applications.
2. The charger shall be compliant with UL991 requirements for vibration resistance.
3. The charger shall comply with the requirements of EN61000-4-5 for voltage surge resistance; EN50082-2 for immunity; EN61000-4-2 for ESD; EN61000-4-3 for radiated immunity; ANSI/IEEE C62.41 category B and IN61000-4-4 for electrically fast transient; EN61000-4-6 for conducted emissions; and FCC Part 15 Class A for radiated emissions.
4. The charger shall be capable of charging a fully discharged battery without damage to the charger. It shall be capable of returning a fully discharged battery to fully charged condition within 24 hours. The charger shall be UL-labeled with the maximum battery amp-hour rating that can be recharged within 24 hours.
5. The charger shall incorporate a 4-state charging algorithm, to provide trickle charge rate to restore fully discharged batteries, a bulk charge rate to provide fastest possible recharge after normal discharge, an absorption state to return the battery to 100 percent of charge, and a float stage to maintain a fully charge battery and supply battery loads when the generator set is not operating. In addition, the charger shall include an equalization timer. Charge rates shall be temperature compensated based on the temperature directly sensed at the battery.
6. The DC output voltage regulation shall be within plus or minus 1%. The DC output ripple current shall not exceed 1 amp at rated output current level.
7. The charger shall include the following features:
   a. two line alphanumeric display with programming keys to allow display of DC output ammeter and voltmeters (5% accuracy or better), display alarm messages, and perform programming;
   b. LED indicating lamp(s) to indicating normal charging condition (green), equalize charge state (amber), and fault condition (red);
   c. AC input overcurrent, over voltage, and undervoltage protection;
   d. DC output overcurrent protection;
   e. Alarm output relay
   f. Corrosion resistant aluminum enclosure

2.03 AC GENERATOR:

A. The AC generator shall be; synchronous, four pole, 2/3 pitch, revolving field, drip-proof construction, single prelubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system. Actual temperature rise measured by resistance method at full load shall not exceed 150 degrees Centigrade.

B. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.

C. A permanent magnet generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds.

D. The sub-transient reactance of the alternator shall not exceed 15 percent, based on the standby rating of the generator set.

E. The alternator shall be capable of operation with reverse kVAR of 0.15 per unit.

2.04 GENERATOR SET CONTROL*:*

A. *The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set, and remote monitoring and control as described in this specification.*

B. The control shall be mounted on the generator set, or may be mounted in a free-standing panel next to the generator set if adequate space and accessibility is available. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.

C. The generator set mounted control shall include the following features and functions:
1. Control Switches
a. Mode Select Switch. The mode select switch shall initiate the following control modes. When in the RUN or MANUAL position the generator set shall start, and accelerate to rated speed and voltage as directed by the operator. A separate push-button to initiate starting is acceptable. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.
b. EMERGENCY STOP switch. Switch shall be Red "mushroom-head" push-button. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.
c. RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.
d. PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed, or after the switch is depressed a second time.
2. Generator Set AC Output Metering. The generator set shall be provided with a metering set including the following features and functions:
a. Digital metering set, 1% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be available in line-to-line and line-to-neutral voltages, and shall display all three-phase voltages (line to neutral or line to line) simultaneously.
b. Analog voltmeter, ammeter, frequency meter, power factor meter, and kilowatt (KW) meter. Voltmeter and ammeter shall display all three phases. Meter scales shall be color coded in the following fashion: green shall indicate normal operating condition, amber shall indicate operation in ranges that indicate potential failure, and red shall indicate failure impending. Metering accuracy shall be within 1% at rated output. Both analog and digital metering are required.
c. The control system shall monitor the total load on the generator set, and maintain data logs of total operating hours at specific load levels ranging from 0 to 110% of rated load, in 10% increments. The control shall display hours of operation at less than 30% load and total hours of operation at more than 90% of rated load.
d. The control system shall log total number of operating hours, total kWH, and total control on hours, as well as total values since reset.

D. Generator Set Alarm and Status Display. The generator set control shall include LED alarm and status indication lamps. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. Functions indicated by the lamps shall include:
1. The control shall include five configurable alarm-indicating lamps. The lamps shall be field adjustable for any status, warning, or shutdown function monitored by the genset. They shall also be configurable for color, and control action (status, warning, or shutdown).
2. The control shall include green lamps to indicate that the generator set is running at rated frequency and voltage, and that a remote start signal has been received at the generator set. The

running signal shall be based on actual sensed voltage and frequency on the output terminals of the generator set.

3. The control shall include a flashing red lamp to indicate that the control is not in automatic state, and red common shutdown lamp.
4. The control shall include an amber common warning indication lamp.
5. The generator set control shall indicate the existence of the warning and shutdown conditions on the control panel. All conditions indicated below for warning shall be field-configurable for shutdown. Conditions required to be annunciated shall include:
   a. low oil pressure (warning)
   b. low oil pressure (shutdown)
   c. oil pressure sender failure (warning)
   d. low coolant temperature (warning)
   e. high coolant temperature (warning)
   f. high coolant temperature (shutdown)
   g. high oil temperature (warning)
   h. engine temperature sender failure (warning)
   i. low coolant level (warning)
   j. fail to crank (shutdown)
   k. fail to start/overcrank (shutdown)
   l. overspeed (shutdown)
   m. low DC voltage (warning)
   n. high DC voltage (warning)
   o. weak battery (warning)
   p. low fuel-daytank (warning)
   q. high AC voltage (shutdown)
   r. low AC voltage (shutdown)
   s. under frequency (shutdown)
   t. over current (warning)
   u. over current (shutdown)
   v. short circuit (shutdown)
   w. over load (warning)
   x. emergency stop (shutdown)
   y. (4) configurable conditions
6. Provisions shall be made for indication of four customer-specified alarm or shutdown conditions. Labeling of the customer-specified alarm or shutdown conditions shall be of the same type and quality as the above-specified conditions. The non-automatic indicating lamp shall be red, and shall flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

E. Engine Status Monitoring.
1. The following information shall be available from a digital status panel on the generator set control :
   a. engine oil pressure (psi or kPA)
   b. engine coolant temperature (degrees F or C)
   c. engine oil temperature (degrees F or C)
   d. engine speed (rpm)
   e. number of hours of operation (hours)
   f. number of start attempts
   g. battery voltage (DC volts)
2. The control system shall also incorporate a data logging and display provision to allow logging of the last 10 warning or shutdown indications on the generator set, as well as total time of operation at various loads, as a percent of the standby rating of the generator set.

F. Engine Control Functions.

1. The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15-second rest period between cranking periods.
2. The control system shall include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.
3. The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting.
4. The control system shall include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.
5. The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.

G. Alternator Control Functions:
1. The generator set shall include a full wave rectified automatic digital voltage regulation system that is matched and prototype tested by the engine manufacturer with the governing system provided. It shall be immune from misoperation due to load-induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with three-phase line to neutral RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque-matching characteristic, which shall reduce output voltage in proportion to frequency below an adjustable frequency threshold. Torque matching characteristic shall be adjustable for roll-off frequency and rate, and be capable of being curve-matched to the engine torque curve with adjustments in the field. The voltage regulator shall include adjustments for gain, damping, and frequency roll-off. Adjustments shall be broad range, and made via digital raise-lower switches, with an alphanumeric LED readout to indicate setting level. Rotary potentiometers for system adjustments are not acceptable.
2. Controls shall be provided to monitor the output current of the generator set and initiate an alarm (over current warning) when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445. The protection for this function shall be 3rd party certified to very performance.
3. Controls shall be provided to individually monitor all three phases of the output current for short circuit conditions. The control/protection system shall monitor the current level and voltage. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445. The protection for this function shall be 3rd party certified to very performance.
4. Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition (over load) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.
5. An line to neutral sensing AC over/under voltage monitoring system that responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds.
6. The generator set control shall include a 120VAC-control heater.

H. Other Control Functions
1. The generator set shall be provided with a network communication module to allow LonMark compliant communication with the generator set control by remote devices. The control shall

communicate all engine and alternator data, and allow starting and stopping of the generator set via the network in both test and emergency modes.

2. A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 25VDC or more than 32 VDC. During engine cranking (starter engaged), the low voltage limit shall be disabled, and DC voltage shall be monitored as load is applied to the battery, to detect impending battery failure or deteriorated battery condition.

I. Control Interfaces for Remote Monitoring:

1. The control system shall provide four programmable output relays. These relay outputs shall be configurable for any alarm, shutdown, or status condition monitored by the control. The relays shall be configured to indicate: (1) generator set operating at rated voltage and frequency, (2) common warning, (3) common shutdown, (4) load shed command.
2. A fused 10 amp switched 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit whenever the generator set is running.
3. A fused 10 amp 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit at all times from the engine starting/control batteries.
4. The control shall be provided with a direct serial communication link for the LonWorks communication network interface as described elsewhere in this specification and shown on the drawings.

2.05 OTHER EQUIPMENT TO BE PROVIDED WITH THE GENERATOR SET:

A. The generator set shall be provided with a mounted main line circuit breaker, sized to carry the rated output current of the generator set. The circuit breaker shall incorporate an electronic trip unit that operates to protect the alternator under all overcurrent conditions, or a thermal-magnetic trip with other overcurrent protection devices that positively protect the alternator under overcurrent conditions. The supplier shall submit time overcurrent characteristic curves and thermal damage curve for the alternator, demonstrating the effectiveness of the protection provided.

B. Outdoor Weather-Protective Sound Attenuated Enclosure

1. The generator set shall be provided with an outdoor enclosure, with the entire package listed under UL2200. The package shall comply with the requirements of the National Electrical Code for all wiring materials and component spacing. The total assembly of generator set, enclosure, and sub-base fuel tank (when used) shall be designed to be lifted into place using spreader bars. Housing shall provide ample airflow for generator set operation at rated load in an ambient temperature of 100F. The housing shall have hinged access doors as required to maintain easy access for all operating and service functions. All doors shall be lockable, and include retainers to hold the door open during service. Enclosure roof shall be cambered to prevent rainwater accumulation. Openings shall be screened to limit access of rodents into the enclosure. All electrical power and control interconnections shall be made within the perimeter of the enclosure.
2. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturer's standard color using a two step electro-coating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted. The painting process shall result in a coating that meets the following requirements:
   a. Primer thickness, 0.5-2.0 mils. Top coat thickness, 0.8-1.2 mils.
   b. Gloss, per ASTM D523-89, 80% plus or minus 5%. Gloss retention after one year shall exceed 50%.
   c. Crosshatch adhesion, per ASTM D3359-93, 4B-5B.
   d. Impact resistance, per ASTM D2794-93, 120-160 inch-pounds.
   e. Salt Spray, per ASTM B117-90, 1000+ hours.
   f. Humidity, per ASTM D2247-92, 1000+ hours.
   g. Water Soak, per ASTM D2247-92, 1000+ hours.
3. Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation or service work.
4. Enclosure shall be constructed of minimum 12 gauge steel for framework and aluminum panels. All hardware and hinges shall be stainless steel.

5. A factory-mounted exhaust silencer shall be installed inside the enclosure. The exhaust shall exit the enclosure through a rain collar and terminate with a rain cap. Exhaust connections to the generator set shall be through seamless flexible connections.
6. The enclosure shall include the following maintenance provisions:
   a. Flexible coolant and lubricating oil drain lines, that extend to the exterior of the enclosure, with internal drain valves
   b. External radiator fill provision.
7. Provide an external emergency stop switch that is protected from accidental actuation.
   a. Inlet ducts shall include rain hoods.
8. Maximum Sound levels shall be:
   a. 63 Hz: 77.6 dB(A)
   b. 125 Hz: 87.6 dB(A)
   c. 250 Hz: 88.3 dB(A)
   d. 500 Hz: 87.3 dB(A)
   e. 1000 Hz: 85.1 dB(A)
   f. 2000 Hz: 83.0 dB(A)
   g. 4000 Hz: 78.8 dB(A)
   h. 8000 Hz: 74.4 dB(A)
   i. Overall Sound Power Level: 93.9 dB(A)

PART 3 – EXECUTION:

3.01 SEQUENCE OF OPERATION:

A. Generator set shall start on receipt of a start signal from remote equipment. The start signal shall be via hardwired connection to the generator set control.

B. The generator set shall complete a time delay start period as programmed into the control.

C. The generator set control shall initiate the starting sequence for the generator set. The starting sequence shall include the following functions:
   1. The control system shall verify that the engine is rotating when the starter is signaled to operate. If the engine does not rotate after two attempts, the control system shall shut down and lock out the generator set, and indicate “fail to crank” shutdown.
   2. The engine shall fire and accelerate as quickly as practical to start disconnect speed. If the engine does not start, it shall complete a cycle cranking process as described elsewhere in this specification. If the engine has not started by the completion of the cycle cranking sequence, it shall be shut down and locked out, and the control system shall indicate “fail to start”.
   3. The engine shall accelerate to rated speed and the alternator to rated voltage. Excitation shall be disabled until the engine has exceeded programmed idle speed, and regulated to prevent over voltage conditions and oscillation as the engine accelerates and the alternator builds to rated voltage.

D. On reaching rated speed and voltage, the generator set shall operate as dictated by the control system in isochronous, synchronize, load share, load demand, or load govern state.

E. When all start signals have been removed from the generator set, it shall complete a time delay stop sequence. The duration of the time delay stop period shall be adjustable by the operator.

F. On completion of the time delay stop period, the generator set control shall switch off the excitation system and shall shut down.
   1. Any start signal received after the time stop sequence has begun shall immediately terminate the stopping sequence and return the generator set to isochronous operation.

3.02 SUBMITTALS:

A. Within 10 days after award of contract, provide six sets of the following information for review:
   1. Manufacturer’s product literature and performance data, sufficient to verify compliance to specification requirements.

2. A paragraph by paragraph specification compliance statement, describing the differences between the specified and the proposed equipment.
3. Manufacturer's certification of prototype testing.
4. Manufacturer's published warranty documents.
5. Shop drawings showing plan and elevation views with certified overall dimensions, as well as wiring interconnection details.
6. Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent point-to-point manner.
7. Manufacturer's installation instructions.

3.03 FACTORY TESTING:

A. The generator set supplier shall perform a complete operational test on the generator set prior to shipping from the factory. A certified test report shall be provided. Equipment supplied shall be fully tested at the factory for function and performance.

B. Generator set factory tests on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup, and function of safety shutdowns.

3.04 INSTALLATION:

A. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.

B. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.

C. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer’s instructions and seismic requirements of the site.

D. Equipment shall be initially started and operated by representatives of the manufacturer.

E. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to final testing of the system.

3.05 ON-SITE ACCEPTANCE TEST:

A. The complete installation shall be tested for compliance with the specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests.

B. Installation acceptance tests to be conducted on-site shall include a "cold start" test, a two hour full load test, and a one step rated load pickup test in accordance with NFPA 110. Provide a resistive load bank and make temporary connections for full load test, if necessary.

C. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service, and observing proper operation of the system for at least 2 hours. Coordinate timing and obtain approval for start of test with site personnel.

3.06 TRAINING:

A. *The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. The training program shall be not less than 4 hours in duration and the class size shall be limited to 5 persons. Training date shall be coordinated with the facility owner.*

3.07 SERVICE AND SUPPORT:

A. The manufacturer of the generator set shall maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.

B. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

C. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

3.08 WARRANTY:

A. The generator set and associated equipment shall be warranted for a period of not less than 5 years from the date of commissioning against defects in materials and workmanship.

B. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, etc.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Gas Engine Driven Generator Sets will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls.

4.02 BASIS OF PAYMENT: Gas Engine Driven Generator Sets shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all work associated with the generator system actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the generator, generator enclosure, battery charger, output circuit breaker, coolant heater, all associated wiring, labor, equipment and incidentals necessary to complete the work. Gas Engine Driven Generator Sets will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum

END OF SECTION

SECTION 26 36 23 – GENERATOR TRANSFER SWITCHES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.3623 Generator Transfer Switches

Add the following:

PART 1 – GENERAL:

1.01 SYSTEM DESCRIPTION:

A. Provide automatic transfer switches for control of the generator as specified under Section 16915.

1.02 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. The submittal shall include prototype test certification and specification sheets showing all standard and optional accessories to be supplied, schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number, each required interconnection between the generator set and the transfer switch if it is included elsewhere in these specifications.

1.03 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Provide written operating and maintenance instructions as specified in Section 16010. Include product data and operation/maintenance information for all system components.

B. Provide sufficient training to personnel selected by the Owner on operation and basic maintenance of all systems and equipment.

C. Employ manufacturer's field representative to demonstrate system operation to designated Owner personnel

1.04 FACTORY TESTING:

A. To assure that the equipment has been designed and built to the highest reliability and quality standards, the manufacturer and/or local representative shall be responsible for design prototype tests, and final production tests.

1. Design Prototype Tests: Components of the emergency system such as the engine/generator set, transfer switch, and accessories shall not be subjected to prototype tests since the tests are potentially damaging. Rather, similar design prototypes and pre-production models, which will not be sold, shall have been used for prototype tests.
2. Final Production Tests: Each transfer switch shall be tested under load with all guards in place. Tests shall include:
   a. The complete transfer switch shall be tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency, and time delay settings are in compliance with the specification requirements.
   b. The complete transfer switch shall be subjected to a dielectric strength test per NEMA Standard ICS 1-109.05.
   c. The control panel shall meet or exceed the voltage surge withstand capability in accordance with ANSI C37.90a-2978 and the impulse withstand voltage test in accordance with NEMA Standard ICS 1-109.

1.05 WARRANTY & MAINTENANCE:

A. The transfer switch shall be guaranteed against defective material and workmanship in accordance with the manufacturer's published warranty for one year from date of start-up. Optional warranties shall be available upon request.

B. The transfer switch manufacturer and its distributor shall maintain a 24-hour parts and service organization. This organization shall be regularly engaged in a maintenance contract program to perform preventive maintenance and service on equipment similar to that specified. A service agreement shall be available and shall include system operation under simulated operating conditions, adjustment to the generator, transfer switch, and switchgear controls as required, and certification in the owner's maintenance log of repairs made and proper functioning of all systems.

1.06 COMPLIANCE WITH CODES AND STANDARDS:

A. The ATS shall conform to the requirements of:
1. UL 1008--Standard for Automatic Transfer Switches.
2. NFPA 70--National Electrical Code, including use in emergency and standby systems in accordance with Articles 517, 700.
3. NFPA 99--Essential Electrical Systems for Health Care Facilities.
4. NFPA 110--Standard for Emergency and Standby Power Systems.
5. IEEE Standard 446--Recommended Practice for Emergency and Standby Power Systems (Orange Book).
6. IEEE Standard 241--Recommended Practice for Electric Power Systems in Commercial Buildings (Gray Book).
7. NEMA Standard ICS 2-447 Automatic Transfer Switches.

1.07 ELECTRICAL REQUIREMENTS:

A. Transfer switches not intended for continuous duty or repetitive load transfer switching are not acceptable.

B. Transfer switches shall be rated in amperes for total system transfer including control of motors, electric-discharge lamps, electric heating, and tungsten-filament lamp load. Switches rated 400 amperes and below shall be suitable for 100% tungsten-filament lamp load. Switches rated above 400 amperes shall be suitable for 30% tungsten-filament load.

C. The automatic transfer switches shall be rated to withstand the rms symmetrical short circuit current available at the automatic transfer switch terminals, with the type of overcurrent protection shown on the plans.

PART 2 – PRODUCTS:

2.01 AUTOMATIC TRANSFER SWITCHES:

A. Acceptable Manufacturers:
1. *Cummins.*
2. *Onan.*
3. *Kohler.*
4. Substitutions: Or Approved Equal.

B. Transfer switches shall have the following characteristics:
1. Current rating as indicated on Drawings
2. 3-Pole, solid neutral, or 2-Pole solid neutral, as indicated on Drawings
3. 120/208 Volt-60Hz
4. The ATS shall be furnished in a NEMA 1 enclosure.
5. The switch shall be a 600-volt class.
6. The withstand and closing ratings with current-limiting circuit breaker protective device shall be 100,000 Amps.

C. All main contacts shall be of silver composition. The main contacts shall be protected by arcing contacts in sizes 400 amperes and above. The main contacts shall be of the blow-on configuration and of segmented construction in ratings 600 amperes and above.

D. All contacts, coils, springs, and control elements shall be conveniently removable from the front of the transfer switch without major disassembly or disconnection of power conductors.

E. The contact transfer time shall not exceed one-sixth of a second.

F. All moveable parts of the operating mechanism shall remain in positive mechanical contact with the main contacts during the transfer operation without the use of separate mechanical interlocks.

G. All contacts, coils, springs, and control elements shall be conveniently removable from the front of the transfer switch without major disassembly or disconnection of power conductors.

H. The neutral conductor shall be solidly connected as shown on the plans, a neutral conductor terminal plate with fully rated AL-CU pressure connectors shall be provided.

I. Transfer switches shall be provided with NEMA 1 surface mount enclosures with locking covers.

2.02 TRANSFER SWITCH CONTROL SYSTEM:

A. The control module shall direct the operation of the transfer switch. The module's sensing and logic circuitry must use a solid-state design for maximum reliability and minimum maintenance. The control module shall have a polarized disconnect plug to enable it to be disconnected from the transfer mechanism for routine maintenance.

B. All printed circuit boards for the control module must be conformal coated on both sides for environmental protection.

C. The control module must be mounted separately from the transfer mechanism unit for safety and ease of maintenance. Interfacing relays shall be industrial control grade plug-in type with dust cover.

D. The control module shall include lamps to indicate normal or emergency source switch position and normal and emergency source availability. These lamps shall be visible when the enclosure door is closed. The control module must be upgradable with the following options:
1. Switch position auxiliary contacts.

PART 3 – EXECUTION:

3.01 INSTALLATION:

A. Install transfer switch in full conformance with manufacturer’s requirements and recommendations.

B. Site Tests: The manufacturer’s local representative shall perform an installation check, start-up, and building load test. The engineer, regular operators, and the maintenance staff shall be notified of the time and date of the site test.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Generator Transfer Switches will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls.

4.02 BASIS OF PAYMENT: Generator Transfer Switches shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all work associated with the generator transfer switch system actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the transfer switch, all associated wiring, labor, equipment and incidentals necessary to complete the work.. Generator Transfer Switches will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum

END OF SECTION

SECTION 26 42 15 – CATHODIC PROTECTION BY SACRIFICIAL ANODES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 655 – Electrical Work, with the following modifications:

MODIFICATIONS:

Section 655.501 Cathodic Protection by Sacrificial Anodes

Add the following:

PART 1 GENERAL

1.01 DESCRIPTION: This section applies to all necessary steps taken by the Contractor to comply with the cathodic protection requirements listed herein and in accordance with the drawings. Contractor shall be qualified in the field of cathodic protection with a successful track record of at least five years.

1.02 REFERENCES: The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

A. ASTM INTERNATIONAL (ASTM)
ASTM A 36 (1992) Carbon Structural Steel
ASTM A 307 (2004) Carbon Steel Bolts and Studs
ASTM A 563 (2007) Carbons and Alloy Steel Nuts
ASTM F 436 (2010) HardenedSteel Washers

B. AMERICAN WELDING SOCIETY (AWS)
AWS D3.6M (1999) Specifications for Underwater Welding

C. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2005) National Electrical Code

1.03 RELATED REQUIREMENTS: The Cathodic Protection System installation shall conform to the applicable rules of NFPA 70 and all applicable Federal, State, and local codes. The Cathodic Protection System shall be constructed in accordance with the design requirements set forth in the referenced NACE International and ASTM documents. All materials shall be installed and used in accordance with the recommendations of the manufacturer and safety procedures.

A. Materials: All materials shall conform to the requirements set forth herein or as designated on the drawings, unless otherwise specified. All materials must be new, free from defects and shall be of the best commercial quality for the purpose specified. All necessary items and accessories not shown on the Drawings or specified herein, but which are required to fully carry out the specified intent of the work, shall be furnished without additional cost to the Government.

1.04 SUBMITTALS: Submit the following in accordance with Section 105.7, Working Drawings, of the State of Maine Department of Transportation Standard Specifications, Revision December 2002:

A. Anode Data. Submit the following components as part of this submittal package:

1) Product Data: Manufacturer's data, catalog cuts, and other descriptive data shall be submitted for approval, which shall include the following:

(a) Anode dimensions and weight, including core details, illustrated in a shop drawing
(b) Anode chemical composition

PART 2 PRODUCTS

2.01 ANODES FOR STEEL PIPE PILES: This project utilizes Type III Aluminum anodes. Aluminum anodes shall not contain any mercury. The location of the anodes is illustrated in the Plans.

A. Anode Dimensions and Weight

Anode Weight: 34 lbs (min.) to 60 lbs (max.)
Anode Length: 3 ft (max.)
Anode Width: 4 in. (max., either direction)

B. Anode Chemical Composition

1) The aluminum alloy shall have the following composition (% by weight)

Zinc	2.80% to 3.50%
Indium	0.01% to 0.02%
Silicon	0.08% to 0.20% (max)
Aluminum	Remainder

2) Test efficiency of the aluminum alloy in seawater shall not be less than 85% on a 100% efficiency of 1150 ampere-hours per pound. The aluminum alloy shall have an open circuit potential in seawater of not less than -1.15 volts versus a copper-copper sulfate reference electrode.

C. Anode Core

1) The anodes shall have a continuous 1/4-inch flat-bar core with 90 degree bends as shown on the plans. The core member shall be dimensioned to allow a minimum stand-off from the pile 3 in. after its installation. The steel shall comply with ASTM A 36

2) The core of the anode shall be located in the center of the anode casting along the anode longitudinal axis.

3) To facilitate proper bonding of the aluminum alloy to the steel core during casting, the surface of the steel shall be prepared by a dry blast cleaning process. Rust discoloration and/or visible surface contamination shall not be permitted. Surface preparation shall be SSPC SP6 (commercial blast) or better.

D. Anode Surface Irregularities

1) Shrinkage depressions on the anode surface shall not exceed 10 percent of the nominal height of the anode as measured from the uppermost corner to the bottom of the depression.

2) Not more than 1 percent of the total surface of the anode casting shall be contaminated with nonmetallic inclusions visible to the naked eye.

3) The straightness of the anode shall not deviate more than 2 percent of the anode nominal length from the longitudinal axis of the anode.

4) Within the aluminum section transverse cracks of unlimited length and depth are permitted if width does not exceed 5 mm and there are not more than 10 cracks per anode. Small dense cracks shall be considered one crack and cracks of 0.5 mm width or less shall be ignored. Longitudinal cracks are not permitted in any length except in the final "topping-up" metal at shrinkage depressions.

2.02 STEEL HARDWARE

A. Threaded Rod: Shall be ASTM A307, course thread

B. Nuts: Shall be ASTM A563, to match threaded rod

C. Washers: Shall be ASTM F 436.

PART 3 EXECUTION

3.01 INSTALLATION: Unless otherwise indicated, all materials shall be installed in accordance with the manufacturer's recommendations, safety procedures and as directed by the Resident. Installation shall conform to NFPA 70.

A. Anode Connections

1) The anodes shall be installed vertically via bolted connections, at the depths and locations indicated on the drawing set. The threaded studs shall be welded to the flange of the pile per AWS D3.6M.

2) The area on each pile where the anode is to be welded shall be cleaned to bare metal just prior to welding the anode. The weld for each anode shall be capable of fully supporting the anode weight.

3) The anode shall be maintained free of oils, chemicals, paint, petroleum products and other foreign chemicals or coatings. All coatings, wrapping and protective shipping material shall be removed from the anode prior to installation.

4) The State may perform a visual underwater inspection of the anode installations. A written report will be submitted indicating which anodes were inspected and the approval of the workmanship. Unacceptable workmanship shall be reworked to the approval of the Resident at no additional cost to the Government before final payment shall be made.

B. Anode Attachment

1) Anodes shall be attached to the piles via bolted connections. A system of double-nutted connections shall be used to attach the anodes to the piles.

3.02 FIELD QUALITY CONTROL: Field tests shall be witnessed by the Resident. Advise the Resident five days prior to performing each field test.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Cathodic Protection by Sacrificial Anodes will be measured by the unit, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Measurement shall include furnishing and installing the anodes including the threaded rod connection and all hardware. Base bid includes 18 anodes.

4.02 BASIS OF PAYMENT: Cathodic Protection by Sacrificial Anodes will be paid for at the Contract unit price for the respective Contract items which shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications

If Bid Alternative No. 1, Pier 12-ft Section Addition, is awarded, then two additional anodes will be purchased at the Contract unit price for each unit of Bid Alternative No. 1 awarded.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit	
655.501 Cathodic Protection by Sacrificial Anodes	EA	(Bid Alternate No. 4)

END OF SECTION

SECTION 26 43 13 – TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.4313 Transient Voltage Surge Suppression

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. These specifications describe the electrical and mechanical requirements for a high energy surge protective device (abbreviated TVSS in this specification and on all drawings). The specified system shall provide effective high energy surge current diversion, sine wave tracking for electrical line noise filtering and be suitable for application in ANSI/IEEE C62.41 Category A, B, and C environments, as tested by ANSI/IEEE C62.11, C62.45 and MIL-STD-220A. The system shall be connected in parallel with the MAIN CIRCUIT BREAKER; no series connected elements shall be used which limit load current or kVA capability.

1.02 STANDARDS:

A. The specified system shall be designed, manufactured, tested and installed in compliance with the following codes and standards:
1. Canadian Underwriters Laboratory (CUL)
2. American National Standards Institute and Institute of Electrical and electronic Engineers (ANSI/IEEE C62.11, C62.41, and C62.45)
3. Federal Information Processing Standards Publication 94 (FIP PUB 94)
4. National Electrical Manufacturer Association (NEMA LS-1 1992)
5. National Fire Protection Association (NFPA 20, 70, 75, and 780)
6. Underwriters Laboratories (UL 1449, UL 1283) (Second Edition)
7. MIL-STD-220A
8. International Standards Organization (ISO) Company certified ISO 9001 for manufacturing, design and service.

B. The TVSS unit shall be UL-listed under UL 1449 Standard for Transient Voltage Surge Suppressions and the surge ratings shall be permanently affixed to the TVSS.

1.03 SYSTEM DESCRIPTION:

A. The TVSS shall be constructed using multiple surge current diversion arrays of metal oxide varistors (MOV). No gas tubes, silicon avalanche diodes or selenium plates/rectifiers shall be used. The status of each array shall be continuously monitored and a green LED shall be illuminated if the array is in full working order.

1.04 ELECTRICAL REQUIREMENTS:

A. Nominal system operating voltage shall be 120/208VAC, Split Configuration, Three Phase, 4-Wire plus ground.

B. Maximum Continuous Operating Voltage (MCOV): The TVSS maximum continuous operating voltage shall be 115% of the nominal system operating voltage to ensure the ability of the system to withstand temporary RMS overvoltage (swell) conditions.

C. Operating Frequency: The operating frequency range of the system shall be at least 47 to 63 Hertz.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Equipment Manual: The manufacturer shall furnish an installation manual with installation, start up, trouble-shooting guide and operating instructions for the specified system.

B. Drawings: Electrical and mechanical drawings shall be provided by the manufacturer which show unit dimensions, weights, component and connection locations, mounting provisions, connection details and wiring diagram.

C. UL 1449 Ratings: Documentation of specified system's UL 1449 Listing and clamping voltage ratings of all protection modes shall be included as required product data submittal information.

1.06 OPERATION AND MAINTENANCE DATA:

A. Maintenance Data: Include spare parts data listing; source and current prices of replacement parts and supplies and recommended maintenance procedures and intervals.

1.07 REGULATORY REQUIREMENTS:

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 – PRODUCTS:

2.01 ENCLOSURE:

A. The unit case shall be a NEMA 12 metal enclosure.

2.02 CONNECTIONS:

A. The unit shall be designed to be installed using wire leads cut as short as possible.

2.03 PERFORMANCE STANDARDS:

A. Transient Voltage Surge Suppression (TVSS)
1. Manufacturer: *Cutler-Hammer/Eaton* Visor Series, or approved equal.
2. Compliance: TVSS units and all components shall be designed, manufactured and tested in accordance with the latest applicable UL-listed standards (UL 1449, 2nd Edition), UL 1283 and CSA certified per CSA 22.2.
3. Operating Voltage: 120/208Y.
4. Maximum Continuous Operating Voltage: 115% nominal operating voltage
5. Description: The suppression system shall incorporate a hybrid designed MOV surge suppressor for the service entrance and other distribution level. The system shall not utilize silicon avalanche diodes, air gaps or other components that may crowbar the system voltage leading to system upset. The device shall have directly connected suppression elements between line-neutral (L-N), line-ground (L-G), and neutral-ground (N-G).
6. Maximum UL 1449 SVR: 800V (L-N, L-G, N-G) and 1800V (L-L).
7. ANSI/IEEE Cat.C3 Let-Through Voltage: 960V or less (L-N).
8. ANSI/IEEE Cat B3 Let-Through Voltage: 165V or less (L-N).
9. TVSS Design:
   a. Balanced Suppression Platform: The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum performance. The surge suppression platform must provide equal impedance paths to each matched MOV. Designs incorporating TVSS modules shall not be acceptable.
   b. Electrical Noise Filter: Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be 50 dB at 100 kHz using the MIL-STD-220A insertion loss test method. The unit shall be complimentary listed to UL 1283. Products not able to demonstrate noise attenuation of 50 dB @ 100 kHz shall be rejected.
   c. Extended Range Filter: The Surge Protective Device shall have a High Frequency Extended Range Tracking filter in each Line to Neutral mode with compliance w UL 1283. The filter shall have published high frequency attenuation rating in the attenuation frequencies.
      (1) Attenuation Frequency 50kHz 100kHz 150kHz 1MHz 10MHz 100MHz

(2)	Insertion Loss (ratio)	40	316	316	89	200	79
(3)	Insertion Loss (dB)	32	50	50	39	46	38

d. Internal Connections: No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be hardwired with connections utilizing low impedance conductors and compression fittings.

e. Minimum Repetitive Surge Current Capability as per ANSI/IEEE C62.41 and ANSI/IEEE 62.45: 1992 suppression filter system must be repetitive surge tested in every mode utilizing a 1.2 x 50µsec, 20kV open circuit voltage, 8 x 20µsec, 10kA short circuit current Category C3 bi-wave at one minute interval without suffering either performance degradation or more than 10% deviation of clamping voltage at a specified surge current.

(1) Service Entrance: 12000 impulses per mode.

10. Minimum Total Surge Current (compliant to ANSI/IEEE C62.41 and NEMA LS1):
    a. 250 kA per phase
    b. 125 kA per mode
    c. Surge Withstand Capability ANSI/IEEE C3 Wave (10kA) -12,000.
11. Installation:
    a. The TVSS shall be installed immediately beside the main service panelboard.
    b. The suppressor shall be connected on load side of main disconnect device, as close as possible to the phase conductors and ground/neutral bar.
    c. The Contractor shall provide a 30-amp circuit breaker disconnect. The disconnect shall be installed within the main service panel.
12. Accessories:
    a. Push-to-test feature to verify operational integrity.
    b. Transient counter to be incremented on every sure event.

PART 3 – EXECUTION:

3.01 INSTALLATION:

A. The installing Contractor shall connect the TVSS in parallel to the power source main circuit breaker, keeping conductors as short and straight as practically possible. The Contractor shall twist the TVSS input conductors together to reduce input conductor impedance. The unit shall be close-nippled to the panel and be supplied by a 30-Amp circuit breaker. The Contractor shall follow the TVSS manufacturer's recommended installation practices and comply with all applicable codes.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Transient Voltage Surge Suppression will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls.

4.02 BASIS OF PAYMENT: Transient Voltage Surge Suppression shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of the TVSS system arrangement actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the TVSS unit, connection to the main service panel, labor, equipment and incidentals necessary to complete the work. Transient Voltage Surge Suppression will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum

END OF SECTION

SECTION 26 51 00 – INTERIOR LIGHTING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.5100 Interior Lighting

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Interior lighting fixtures, lamps, and ballasts.

B. Lighting fixture supports.

1.02 REFERENCES:

A. Section 26 05 50.16 – Lighting Fixture Schedule

1.03 DEFINITIONS:

A. BF: Ballast factor.

B. CRI: Color-rendering index.

C. CU: Coefficient of utilization.

D. LER: Luminaire efficacy rating.

E. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.04 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
1. Physical description of lighting fixture including dimensions.
2. Ballast.
3. Energy-efficiency data.

B. Operation and Maintenance Data: For lighting equipment.

C. Warranties: Special warranties specified in this Section.

1.05 QUALITY ASSURANCE:

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.06 COORDINATION:

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.07 WARRANTY:

A. Special Warranty for Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.
1. Warranty Period for Electronic Ballasts: Five years from date of Substantial Completion.

1.08 EXTRA MATERIALS:

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Lamps: 10 of each type and rating installed.

PART 2 – PRODUCTS:

2.01 MANUFACTURERS:

A. Luminaires:
1. Provide products as specified in Interior Lighting Fixture Schedule.

B. Electronic Fluorescent Ballasts for fluorescent and compact fluorescent lamps
1. *Sylvania*
2. *Advance*
3. *Universal*
4. *Lutron*
5. *General Electric*
6. Substitutions: None Permitted

C. Lamps:
1. *Osram Sylvania*
2. *General Electric*
3. *Philips*
4. Substitutions: None Permitted.

2.02 STANDARD NON-DIMMING BALLASTS FOR LINEAR FLUORESCENT LAMPS:

A. Electronic Ballasts: Comply with ANSI C82.11; programmed-start type, unless otherwise indicated, and designed for type and quantity of lamps served. Ballasts shall be designed for full light output.

B. T8 Fluorescent Lamps
1. Starting Method: Programmed Start
2. Ballast Factor: 0.88 (minimum)
3. Circuit Type: Series
4. Lamp Frequency: > 40 kHz
5. Lamp CCF: < 1.6
6. Starting Temperature: 60 F
7. Input Frequency: 60 Hz
8. Total Harmonic Distortion (THD): <10%
9. Power Factor: >98%
10. Voltage: Universal 120-277 volts

2.03 BALLASTS FOR COMPACT FLUORESCENT LAMPS:

A. Description: Electronic programmed rapid-start type, complying with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:
1. Starting Method: Programmed Rapid-Start (quad and triple-tube lamps); Instant Start (PL lamps)
2. Ballast Factor: 0.96 (minimum)
3. Circuit Type: Series (quad and triple-tube lamps); Parallel (PL lamps)
4. Lamp Frequency: > 40 kHz
5. Lamp CCF: < 1.7
6. Starting Temperature: 5 F (-20 C)
7. Input Frequency: 60 Hz
8. Total Harmonic Distortion (THD): <10%
9. Power Factor: >97%
10. Voltage: Universal 120-277 volts

2.04 FLUORESCENT AND COMPACT FLUORESCENT LAMPS:

A. Low-Mercury Lamps: Comply with EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.

B. 17-Watt, T8 Fluorescent Lamps:
1. Base: Medium Bi-Pin
2. Initial Lumens: 1375 (minimum)
3. Mean Lumens: 1305 (minimum)
4. CCT: 3500K
5. CRI: 85 (minimum)
6. Life: 24000 hours (3 hours/start)

C. 28-Watt, T8 Fluorescent Lamps:
1. Base: Medium Bi-Pin
2. Initial Lumens: 3100 (minimum)
3. Mean Lumens: 2945 (minimum)
4. CCT: 3000K
5. CRI: 85 (minimum)
6. Life: 24000 hours (3 hours/start)

D. 26-Watt, T4 Quad Tube Lamps:
1. Base: 4-pin, GX24q-3
2. Initial Lumens: 1800
3. Mean Lumens: 1548
4. CCT: 2700K
5. CRI: 82
6. Life: 12000 hours (3 hours/start)

E. 36-Watt, PL Lamps:
1. Base: 2G11
2. Initial Lumens: 2900
3. Mean Lumens: 2494
4. CCT: 3500K
5. CRI: 82
6. Life: 12000 hours (3 hours/start)

F. 42-Watt, T4 Triple Tube Lamps:
1. Base: 4-pin, GX24q-4
2. Initial Lumens: 3200
3. Mean Lumens: 2752
4. CCT: 3500K
5. CRI: 82
6. Life: 12000 hours (3 hours/start)

2.05 LIGHTING FIXTURE SUPPORT COMPONENTS:

A. Comply with Section 26 05 29 "Supporting Devices" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gauge.

PART 3 – EXECUTION:

3.01 INSTALLATION:

A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

B. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Do not use grid as a sole support element.

1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches from lighting fixture corners.
2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.
4. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

C. Suspended Lighting Fixture Support:
1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.

D. Aim adjustable accent lighting fixtures as directed by the Engineer.

E. Install fixtures in full conformance with manufacturers' instructions.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Interior Lighting will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls.

4.02 BASIS OF PAYMENT: Interior Lighting shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all interior lighting actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the lighting fixtures, lamps, labor, equipment and incidentals necessary to complete the work. Interior Lighting will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum

END OF SECTION

SECTION 26 52 00 – EMERGENCY LIGHTING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.5200 Emergency Lighting

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Emergency battery units.

B. Emergency exit signs.

1.02 REFERENCES:

A. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.

B. NEMA WD1 - General Purpose Wiring Devices.

C. UL 924 Emergency Lighting and Power Equipment.

1.03 REGULATORY REQUIREMENTS:

A. Conform to NFPA 101 and UL 924 for materials and installation methods.

1.04 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Submit product data under provisions of Division 1.

B. Provide product data on emergency lighting units, exit signs, and emergency fluorescent lamp power supply units.

PART 2 – PRODUCTS:

2.01 EMERGENCY EXIT SIGNS:

A. Manufacturers:

1. As included in the Lighting Fixture Schedule in Section 26 06 50.16.

B. Emergency Exit Signs: Exit signs shall be UL 924 listed. Signs shall be thin profile, and shall be equipped with an integral dual voltage (120/277) input transformer. Sign housings shall be edge-lighted with red LED lamps on a clear face panel.

2.02 EMERGENCY BATTERY UNITS:

A. Manufacturers: As included in the Lighting Fixture Schedule in Section 26 06 50.16.

B. Emergency Battery Units: Emergency battery units shall be UL 924 listed. Battery unit shall include an integral battery, battery charger and transfer switch to allow for operation for 90 minutes upon loss of normal power. Housings shall be injection-molded, color-stable, high impact polycarbonate with a white finish. Fixtures shall be provided for either 120-volt or 277-volt input (field selectable). Emergency battery units shall include the following features:

1. Battery: Sealed lead calcium type, 250

2. Battery Voltage: 6-volts

3. Charging System: Charger with low voltage disconnect, AC lockout, brownout protection, AC indicator lamp and test switch

4. Full recharge Time: 24 hours (maximum)

5. Mounting Method: Wall mount with hard-wire connection to recessed electrical box

6. Lamp Heads: Dual PAR36, 9-watt

7. Power Consumption: 14.4 watts (maximum)

PART 3 – EXECUTION:

3.01 INSTALLATION:

A. Connect Exit Signs to the closest emergency lighting circuit that serves adjacent egress lighting luminaires. Exit Signs shall be connected ahead of any local switching for continuous operation. Connect Emergency Battery Units to the lighting circuit that serves the local lighting luminaires within the room in which they are located. Emergency Battery Units shall be connected ahead of any local switching for continuous operation.

B. Install all Exit Signs and Emergency Battery Units in conformance with the manufacturer's instructions. Install Exit Signs and Emergency battery Units plumb and level.

C. Where located at exit doors, install Exit Signs immediately above exit door head frame. Where glass transoms are included, Exit Signs shall be installed above transom head frame. Where ceiling heights do not allow sufficient space for installation of Exit Signs immediately above door frames, consult Architect in the field for mounting location.

D. Exit Signs that are indicated to be wall mounted apart from exit doors, and wall mounted Emergency Battery Units shall be installed so that the bottom of fixtures is 8'-0" AFF. Where ceiling heights do not allow for an 8'-0" mounting height, consult Architect in field for mounting location. In no case shall Exit Sign, nor Emergency Battery Units be installed at a height lower than 7'-0" AFF to the bottom of fixtures.

E. Aim directional Emergency Battery Unit lighting heads as directed in the field after installation.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Emergency Lighting will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls.

4.02 BASIS OF PAYMENT: Emergency Lighting shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all emergency lights actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing emergency lights, exit signs, labor, equipment and incidentals necessary to complete the work. Emergency Lighting will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum

END OF SECTION

SECTION 26 56 00 – EXTERIOR LIGHTING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

826.5600 Exterior Lighting

Add the following:

PART 1 – GENERAL:

1.01 SUMMARY:

A. This Section includes the following:
1. Exterior luminaires with lamps and ballasts.
2. Exterior Lighting Poles
3. Concrete Foundation Bases for Exterior Lighting Poles
4. Photocell controls.

B. Related Sections include the following:
1. Section 26 06 50.16 - Lighting Fixture Schedule.
2. Section 26 09 43 – Network Lighting Controls

1.02 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Product Data: For each luminaire and lighting pole, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
2. Details of attaching luminaires and accessories.
3. Details of installation and construction.
4. Luminaire materials.
5. Ballasts, including energy-efficiency data.
6. Lamps, including life, output, and energy-efficiency data.
7. Materials, dimensions, and finishes of poles.
8. Details for pole lowering devices.

1.03 QUALITY ASSURANCE:

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with IEEE C2, "National Electrical Safety Code."

C. Comply with NFPA 70.

1.04 WARRANTY:

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.

B. Warranty Period for Luminaires: one year from date of Substantial Completion.

C. Warranty Period for Lamps: Replace lamps and fuses that fail within 1 month from date of Substantial Completion.

1.05 EXTRA MATERIALS:

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Lamps: 12 of each type and rating installed.

PART 2 – PRODUCTS:

2.01 MANUFACTURERS:

A. In Lighting Fixture Schedule in Section 26 06 50.16 provide products as specified.

2.02 LUMINAIRES, GENERAL REQUIREMENTS:

A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.

B. Metal Parts: Free of burrs and sharp corners and edges.

C. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

D. Exposed Hardware Material: Stainless steel.

E. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

2.03 BALLASTS FOR HIGH INTENSITY DISCHARGE LAMPS:

A. Metal Halide Ballasts: Pulse start core and coil magnetic ballasts.
1. Power Factor: 90 percent, minimum
2. Starting Temperature: -20 F
3. Insulation Class: H

2.04 LAMPS:

A. Manufacturers
1. *Phillips*
2. Substitutions: None Permitted

B. HID Lamps:
1. Metal Halide
a. Type: Pulse Start, clear
b. Watts: As indicated in the Lighting Fixture Schedule

2.05 PHOTOCELLS:

A. Manufacturers
1. *Tork* Model 2101/73866.
2. Substitutions: Or Approved Equal.

B. Description: Photocell control UL listed for wet locations with STSP contact. Photocell shall be provided with bracket for wall mounting.
1. Voltage: 120 VAC
2. Operating Range: ON-1-5FC; OFF-3-15FC

PART 3 – EXECUTION:

3.01 LUMINAIRE INSTALLATION:

A. Install lamps in each luminaire.

B. Fasten luminaire to indicated structural supports.

C. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

3.02 LIGHTING CONTROL INSTALLATION:

A. Install photocell on north face of building at height as directed by the Engineer. Wire photocell to Network Lighting Control Panel LC1 as specified under section 26 09 43.

3.03 GROUNDING:

A. Ground metal luminaires according to Section 26 05 26 "Grounding".

3.04 FIELD QUALITY CONTROL:

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Exterior Lighting will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Exterior Lighting shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Exterior Lighting will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 27 00 00 – GENERAL COMMUNICATIONS REQUIREMENTS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

827.0000 General Communications Requirements

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Furnish all materials, labor, tools, transportation, incidentals, and appurtenances to complete in every detail and leave in working order all items of work called for herein or shown on the accompanying drawings, including work related to:
1. Cable television system, including outlets and wiring.
2. Voice/data network system including wiring, equipment racks, outlets and wiring.

B. Include any minor items of work necessary to provide a complete and fully operative electrical system.

C. The Contractor for this work is referred to Bidding Requirements, General Conditions, Special Conditions, Temporary Services and other pertinent Sections of these Specifications.

1.02 RELATED SECTIONS:

A. Section 26 05 26 – Grounding.

B. Section 26 05 33 – Raceway and Boxes for Electrical Systems.

C. Section 28 13 00 – Door Access Control System.

D. Section 28 31 13 – Fire Alarm System.

1.03 REFERENCES:

A. ANSI/NFPA 70 - National Electrical Code.

B. OSHA 1910 - Occupational Safety and Health Act.

1.04 GENERAL REQUIREMENTS:

A. Contractor shall read the entire specifications covering other branches of work. He is responsible for coordination of his work with work performed by other trades.

B. Consult all Contract drawings which may affect the location of any equipment or apparatus furnished under this work and make minor adjustments in location as necessary to secure coordination. Contractor shall consult architectural interior elevations for mounting heights of telecommunications outlets and clocks.

C. System layout is schematic and exact locations shall be determined by structural and other conditions. This shall not be construed to mean that the design of the system may be arbitrarily changed. The equipment layout is to fit into the building as constructed and to coordinate with equipment included under other Divisions of work.

D. Contractor shall contact the Owner's Representative immediately if he notices any discrepancies or omissions in either the drawings or the specifications, or if there are any questions regarding the meaning or intent thereof.

E. Submit all changes, other than minor adjustments, to the Architect for approval before proceeding with the work.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Submit under provisions of the following:

B. Submittal shall include complete Specifications, including type of materials, electrical characteristics, capacities, performance and power requirements to determine compliance with Contract Documents. All data submitted shall be complete and shall apply only to this specific project. All extraneous material shall be deleted or marked out. Items to be supplied shall be specifically indicated using a method that will be visible after photocopying.

C. Regardless of any information included in the submittal submitted for review, the requirements of the Drawings and Specifications shall not be superseded in any way by the review. Review by the Architect-Engineer does not relieve responsibility for submittal errors or from meeting the requirements of the Contract Documents.

D. It is intended that Submittal data be complete and accurate at the first submission. If the Submittal is returned marked "Resubmit" only one additional submission will be permitted.

E. Submit related Submittal at one time. SUBMIT ALL ITEMS IN A SPECIFICATION SECTION AT THE SAME TIME. Incomplete submittal will be held until a complete submittal is accumulated or may be rejected without further review and returned to the applicable parties. Include a copy of the Specification Paragraphs pertaining to the items submitted.

F. If proposed equipment deviates from the Specifications or Drawings, indicate in writing on Company letterhead those differences and provide sufficient data to justify acceptance. FAILURE TO INDICATE DEVIATIONS OR SUBSTITUTIONS IMPLIES FULL COMPLIANCE WITH DRAWINGS AND SPECIFICATIONS.

G. The term "by others" or similar wording shall not be used on Submittal. Submittal shall state by whom related items of work are to be provided. Where not indicated, it is implied that the work or item is provided under this Section.

H. Shop Drawings: Provide shop drawings as required by the individual Specification Sections. Submit shop drawings indicating physical size and arrangement, (plans and elevations) construction details, provisions for conduits, access requirements for installation and maintenance, finishes, and materials used in fabrication for all equipment. Supplement shop drawings with wiring diagrams for all systems with wiring connections for multiple components.

I. Submittals shall be made as paper copies. Submittals transmitted only by electronic email shall not be accepted.

1.06 REGULATORY REQUIREMENTS:

A. Complete installation shall conform with all applicable Federal, State and Local laws, Codes and Ordinances, included but not limited to latest approved editions of the following:
1. State Building Codes.
2. Specific Construction Safety Requirements, State Industrial Commission.
3. National Electrical Code - NFPA 70.
4. Occupational Safety and Health Act (OSHA) of 1971 and all amendments thereto.

B. Nothing contained in the drawings and specifications shall be construed to conflict with these laws, codes and ordinances, and they are thereby included in these specifications. All work shall comply with the 2008 edition of NFPA 70, The National Electrical Code. It shall be the Contractor’s responsibility to assure that electrical work is in full compliance with the NEC.

C. The Contractor shall visit the site to become familiar with all existing conditions affecting this work. No claim will be recognized for extra compensation due to failure of contractor to familiarize himself/herself with the conditions and extent of proposed work.

D. Obtain and pay for all necessary permits. Request inspections from authority having jurisdiction.

1.07 RECORD DRAWINGS:

A. Record any changes in location of equipment items, telecommunications outlets, and similar construction items on a set of prints and deliver them to the Owner's Representative upon completion of the work.

1.08 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Provide a Complete Instruction and Maintenance Manual: Prepare in the form of an instructional manual for use by Owner's personnel. Provide one (1) draft copy and two (2) final copies.
   1. Format:
      a. Size: 8-1/2" x 11", 20 lb. minimum weight white paper for typed pages, either manufacturer's printed data, or neatly typewritten.
      b. Drawings: Provide reinforced punched binder tab, bind in with text. Fold larger drawings to size of text pages. Clear plastic "binding tape" (not "Scotch" tape) applied to edge of sheet and then punched is acceptable.
      c. Single-sheet product literature and contractor-prepared pages: Provide reinforced punched binder tab. Clear plastic "binding tape" (not "Scotch" tape) applied to edge of page and then punched is acceptable.
      d. Provide indexed tabs and flyleaf for each separate product, or each piece of operating equipment. Include typed description of product, and major component parts of equipment.
      e. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS".
      f. Binders:
         1) Commercial quality three-ring binders with durable and cleanable plastic covers, 1" minimum, 2" maximum ring size.
         2) When multiple binders are used, collate the data into related consistent groupings and provide a spine label that includes the volume number and contents of the binder.

B. Provide content as listed in separate Sections of Division 27 of these specifications.

1.09 PROJECT/SITE CONDITIONS:

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.

B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.

1.10 COORDINATION WITH WORK PROVIDED UNDER DIVISION 26:

A. Telecommunications work shall be coordinated with associated work being provided under Division 26. Work provided under Division 26 shall include the following:
   1. Raceway and boxes for wiring.
   2. Wiring support means.
   3. 120-volt power circuits.

1.11 COORDINATION WITH WORK PROVIDED UNDER OTHER DIVISIONS:

A. Division 28 – Alarms: Provide communications wiring and connections to the fire alarm control panel as specified under Section 28 31 13.

B. Division 28 – Door Access Control: Provide communications wiring and connections to the door access control system as specified under Section 28 13 00.

1.12 COORDINATION WITH OWNER FURNISHED ITEMS:

A. Provide structured cable wiring and connections to owner furnished network switches.

1.13 SUBSTANTIAL AND FINAL COMPLETION:

A. Refer to General Conditions and Supplementary Conditions.

B. Substantial Completion shall not be considered unless all systems are tested and verified for adherence with Contract Documents and any work remaining is less than one percent of the total Contract Value of this Section.
   1. Record Drawings, Operation and Maintenance Manuals, Acceptance Demonstrations, Owner personnel training, spare parts or extra materials required, test reports, warranties and certifications of installation inspections shall be submitted and accepted prior to Substantial Completion.

C. Final Completion shall be when all work under this Section is completed as defined by the Contract Documents and accepted by the Architect-Engineer.

D. When Architect-Engineer determines Work is complete, close out submittals will be considered.

PART 2 – PRODUCTS:

2.01 MATERIALS:

A. Furnish new and undeteriorated materials and of a quality not less than what is specified.

B. The selection of materials and equipment to be furnished shall be governed by the following:
   1. Where single trade name, brand of manufacturer or material is listed in the specification, the exact equipment listed shall be used in the bid.
   2. Where more than one name is listed, Contractor may select any one of the several brands specified.
   3. Where trade name, brand of manufacturer of equipment or material is listed in the specification followed by the word "or approved equal," the Contractor may substitute product of equal quality from another manufacturer for consideration by the Engineer.

C. Conduit shall be as specified under Section 26 05 33.

PART 3 – EXECUTION:

3.04 PROTECTION AND CLEANING:

A. Protect all telecommunications work and products against damage during construction and pay the cost of repair or replacement of telecommunications products made necessary by failure to provide suitable safeguards or protection. After all work has been inspected and approved, thoroughly clean all equipment, provided under this work.

PART 4 – MEASUREMENT AND PAYMENT -

NONE REQUIRED FOR THIS SECTION

END OF SECTION

SECTION 27 10 00 – STRUCTURED CABLING SYSTEM

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

827.1000 Structured Cabling System

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. This section of the specification includes the furnishing, installation, connection and testing of a complete Structured Cabling System (SCS). The SCS is defined as all required equipment and cabling including hardware, termination blocks, cross connect wire, patch panels, patch cords, telecommunication outlets, UTP fiber optic cable, and video cable installed and configured to provide a computer data, voice and video connectivity from each data, voice or video device to the network file server or voice network/switch designated as the service point of the local area network. Provide all equipment required to form a complete, operative, and coordinated system as shown on the drawings and specified herein. Components of the SCS shall include, but are not limited to, the following:
   1. Optical fiber cable.
   2. Optical fiber connectors.
   3. Optical fiber patch panels
   4. Telecommunications data network racks.
   5. Network patch panels.
   6. Telecommunications data network outlet jacks.
   7. Intra-building telecommunications cable.
   8. Network patch cords.
   9. Video cable.

1.02 RELATED SECTIONS:

A. Section 27 00 00 – General Communications Requirements.

B. Section 26 05 26 – Grounding.

C. Section 26 05 29 – Supporting Devices.

D. Section 26 05 33 – Raceway and Boxes for Electrical Systems.

1.03 REFERENCES:

A. ANSI/TIA/EIA 568A - Electronic Industries Association Telecommunications Industry Association - Commercial Building Telecommunications Wiring Standards.

B. ANSI/TIA/EIA 568-A1 - Propagation Delay and Delay Skew specifications.

C. ANSI/TIA/EIA 569 - Commercial Building Standard for Telecommunications Pathways and Spaces.

D. ANSI/TIA/EIA TSB-67 - Transmission Performance Specifications for Field Testing of Unshielded. Twisted Pair Cabling Systems, October 1995.

E. ANSI/TIA/EIA TSB-72 - Centralized Optical Fiber Cabling Guidelines, October 1995.

F. ANSI/TIA/EIA TSB-75 - Additional Horizontal Cabling Practices for Open Offices.

G. ANSI/TIA/EIA 607 - Grounding and Bonding Requirements for Telecommunications in Commercial Buildings.

H. ANSI/TIA/EIA 606 - Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.

I. Institute of Electrical and Electronics Engineers (IEEE)

1.04 QUALIFICATIONS:

A. Installer: Company specializing in the installation of telecommunications systems, including installation and certification of "Category 5e" cabling and optical fiber cable. Company shall have five (5) years (minimum) documented experience on completed projects. All work shall be performed and supervised by telecommunications technicians who are qualified to install voice, data and image cabling systems and to perform related tests. The telecommunications technicians employed shall be fully trained and qualified by the manufacturer of the test equipment for the installation. Evidence that the Contractor is a current certified installer of the manufacturer must be provided in writing prior to commencing work.

B. System: The cabling system shall conform to the current of industry standard ANSI/TIA/EIA 568A. Certification shall be provided that the system will support applications for which it is designed including Category 5e intra-building telecommunications cable performance.

1.05 QUALITY ASSURANCE:

A. Contractor Quality Assurance:
1. Provision of all manufactured components, installation, wiring, and testing shall be the responsibility of a single contractor.
2. Maintain the same person in charge of work throughout installation.
3. Supply and install any incidental equipment needed in order to result in a complete and operable system.
4. Verify correctness of parts lists and equipment model numbers and conformance of each component with manufacturer's specifications.
5. Unless otherwise specified, supply only new equipment, parts and material, and operate only as required for testing as part of installation procedure.

B. Manufacturer Quality Control for Telecommunications Data Network Systems
1. All systems components and products specified shall be supplied by a single manufacturer, with the exception data racks and other hardware that is not defined as part of the channel test configuration by TIA/EIA TSB67, Transmission Performance Specifications for Field Testing of unshielded Twisted-Pair Cabling Systems and shall be as specified herein. Unless the words "Or Approved Equal" are included, only the manufacturers listed will be considered.
2. Each system is to be fully tested upon completion of installation in accordance with PART 3 - EXECUTION of this specification.

1.06 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Submit shop drawings and product data under provisions of Section 27 00 00.

B. Submit for review prior to the submission of any Submittal, an itemized list of manufacturers of material and equipment and of Subcontractors proposed to be used under this Section. Include a Schedule of anticipated submittal and anticipated lead times after release of reviewed Submittal.

C. Provide a Submittal Index, with column headings, that clearly identifies the information requested herein, for each and every item submitted. Each and every specification sheet submitted shall include a page number in the lower outside corner of the sheet, double sided specification sheets shall be identified by two (2) separate page numbers. The Submittal Index Column Headings shall identify the following minimum information: Submittal *Page Number(s)* of specification sheet(s) for each item, *Description* of each item, *Manufacturer's* Name for each item, Manufacturer's *Model Number* for each item, *Quantity* of each item being provided.
1. Any submittal which does not include a submittal index that provides a minimum of the information requested herein shall be rejected without further review and returned to the applicable parties.

D. Equipment shall be of proper size for its allotted space. Equipment may be disassembled as required, where it does not invalidate the manufacturers' warranty, so that it can be installed through available window, door, or louver openings.

E. Indicate clearly all equipment, components or assemblies that are not Nationally Recognized Testing Laboratory (NRTL) listed or labeled. Failure to indicate otherwise implies NRTL listing or labeling. Products found not to be NRTL listed or labeled where such listing or labeling is available shall be replaced.

F. Product Data: Submit catalog data sheets or other published materials showing appearances, electrical ratings characteristics and connection requirements, performance characteristics, dimensions, weights, installation methods, and space requirements of equipment and their accessories, as listed below and required by the individual paragraphs:
1. Identification Methods
2. Grounding and Bonding
3. Test Report Formats
4. Test Equipment
5. Test Procedures

1.07 TRAINING:

A. Give detailed instructions, prior to the Substantial Completion of the work, to the responsible personnel designated by the Owner in the operation and maintenance of all work installed under this Section. A letter with two copies containing the name of the person or persons to whom the instructions were given and the dates of the instruction period shall be submitted to the Architect-Engineer at the completion of the project.

1.08 PROJECT RECORD DOCUMENTS:

A. Submit record documents under provisions of Section 27 00 00.

B. Accurately record location of telecommunications outlets.

1.09 PROJECT CONDITIONS:

A. Verify that field measurements are as shown on Drawings.

B. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions. Include wire and cable lengths within 10 feet of length shown for all local data outlets.

C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

D. PRIOR TO BEGINNING ANY WORK the Contractor shall coordinate the proposed layout of each IDF Closet and the MDF room as well as intended wiring layouts to confirm maximum allowable wiring drop distances as specified herein.

1.10 OPERATION AND MAINTENANCE DATA:

A. Submit data under provisions of Section 27 00 00 and Division 01.

B. Provide name, address and telephone number of the manufacturer's representative and Service Company for all items supplied so that the source of replacement parts and service can be readily obtained.
1. Include copies of manufacturer's and Installer's warranties and maintenance contracts and performance bonds properly executed and signed by an authorized representative.

C. Include copies of all test reports and certifications.

PART 2 – PRODUCTS:

2.01 UNSHIELDED TWISTED PAIR (UTP) CABLING SYSTEM:

A. Approved Manufacturers:
1. *Belden*

2. *CommScope*
3. *Berk-Tek*
4. *General Cable*
5. *Mohawk*
6. Substitutions: Or Approved Equal.

B. UTP Pin/pair Termination Assignment: The UTP cabling systems shall have TIA/EIA T568B pin/pair termination assignment. All conductors provided shall be properly and consistently terminated at both ends throughout the entire systems.

C. Horizontal Cable -Voice & Data:
1. Voice Cable shall be TIA/EIA Category 5e Unshielded Twisted Pair (UTP) cable, as specified.
2. Electrical Characteristics for 24 AWG Extended Frequency Category 5e cable:
   a. DC Resistance (max) 8.9
   b. DC Resistance Unbalanced (max) 3.0
   c. Input Impedance, 1.0 to 100 MHz =100 +/- 15, 100 to 350MHz = 100 +/- 22
   d. Characteristics Impedance, 1 to 350 MHz = 100 +/- 15%
   e. ACR @ 100KHz, db (min) of 21
   f. PS-ACR @ 100MHz, db (min) of 19
   g. Delay Skew (max) ns/100m is 25
   h. Nominal Velocity of Propagation (NVP), % speed of Light, 70

3. Electrical Characteristics:

Frequency	Max. Atten. Db/100m	ELFEXT bd (min)	PS-ELFEXT bd (min)	PS-NEXT bd (min)	NEXT bd (min)	SLR db (min)	Return Loss db (min)
772kHz	1.8	66	63	70	72	-	-
1MHz	2.0	64	61	68	70	24.5	20.0
4MHz	4.1	52	49	59	61	24.5	23.0
8MHz	5.8	46	43	54	56	24.5	24.5
10MHz	6.5	44	41	53	55	24.5	25
16MHz	8.2	40	37	50	52	24.5	25.0
20MHz	9.3	38	35	48	50	24.5	25.0
25MHz	10.4	36	33	47	49	24.0	24.3
31.25MHz	11.7	34	31	45	47	23.5	23.6
62.5MHz	17.0	28	25	41	43	22.0	21.5
100MHz	22.0	24	21	38	40	21.0	20.1
155MHz	28.1	20	17	35	37	20.1	18.8
200MHz	32.4	18	15	33	35	19.5	18.0
300MHz	41.0	14	11	31	33	18.6	16.8
350MHz	44.9	13	10	30	32	18.3	16.3

4. Compliance of 24 AWG Extended Frequency Category 5e cable:
   a. ISO/IEC 11801
   b. ANSI/TIA/EIA 586-5 (Category 5E)
   c. ANSI/ICEAA S-90-661 (Category 5X-100)
   d. NEWA WC 63.1 (Category 5)
   e. UL Listed Type MPR/CMR
   f. (UL) CMG
5. Plenum rated cable - CMP rated jacket for Plenum applications.

D. Backbone Cable-Voice (Category 5e)
1. TIA/EIA Category 5e Unshielded Twisted Pair (UTP)
   a. Able shall meet or exceed all current specifications for Category 5e cable per EIA/TIA, 24AWG, 25-pair cable.
   b. Backbone cable shall match-up all pairs (4-pairs from each work area outlet) to the MDF.
   c. Riser rated cable – CMR rated jacket for Riser applications.

E. Patch Panels
1. Patch panels shall be EIA nineteen inch (518mm), rack mounted, TIA/EIA Category 5e, UL Category 5e type patch panels with integral printed circuit board, color-coded, high density, IDC type terminations and 8 position modular jacks. Keyed jacks are not allowed. Jacks shall be able to withstand at least a minimum of 2000 mating cycles without any transmission degradation.

2.02 110 WIRING BLOCKS/CROSS CONNECTOR BLOCKS:

A. Cross Connector Blocks Manufacturers:
1. *Ortronics* model OR-30600150/OR-110ABC6050
2. Substitutions: or approved equal

B. Description: 200-pair 19” x 7” rack mount panel with 110 wiring blocks. Provide termination kit and termination labels.

2.03 OPTICAL FIBER CABLE SYSTEM:

A. Approved Manufacturers:
1. *Belden*
2. *CommScope*
3. *Berk-Tek*
4. *Siecor*
5. *Optical Cable Corp.*
6. Substitutions: Or Approved Equal.

B. Fiber Optic Backbone Cable
1. Multimode fiber optic cable: Cable shall be NRTL certified to TIA/EIA 492CAAA, 492AAAA EIA/TIA 568B Series standard, TSB72 and ANSI X3T9.5 fiber optic specifications, 62.5/125 micron, 1300 nm, graded video, dual window 6 pair (12 strand) tight buffer, multimode distribution cable.
   a. Riser-rated multi-mode cable - OFNR jacket, distribution cable for Riser applications.
   b. The maximum attenuation measured at 23 degrees C. shall be 3.75 dB/km @ 850 nm and 1.5 dB/km @ 1300 nm. The minimum bandwidth shall be 160 MHZ @ 850 nm and 500 MHZ @ 1300 nm.
2. Modular Connectors and Couplers
   a. Fiber optic modular connectors/couplings shall be NRTL listed and TIA/EIA compliant, type "SC" terminations. Connectors and couplings shall be able to withstand at least a minimum of 2000 mating cycles without any transmission degradation. Maximum optical loss budget shall not exceed .75 dB per termination and 1.5 dB per mated pair.
   b. The connectors and couplings shall be compatible with the installed fiber optics: multi mode 62.5/125 micron optics.
   c. Fiber optic connectors shall be terminated by the following methods:
      1) Hot Melt

2) Heat Cured Epoxy
3) Ultra Violet Cured Epoxy
4) Anaerobic
5) Mechanical Splice with Index Matching Gel

d. Fiber optic connectors and couplers shall be provided by a single Manufacturer.
e. Multimode connectors shall be beige in color.

3. Fiber Optic Patch Panels
   a. Patch panels shall be capable of terminating 12 pair (24 strands) of a fiber optic cable.
   b. Patch panels shall be rack mounted 1.75 inch (44mm) high EIA nineteen inch (518mm) wide, rack mounted, drawer type with integral cable management, patch panels pre-loaded with duplex SC couplings.
4. Fiber Optic Patch Cables
   a. Provide NRTL certified EIA/TIA 492AAAA, EIA/TIA 568B Series standard performance tested patch cables as required for a complete operational system. Patch cables shall be factory pre-connectorized, two strand, "SC" type connectors, tight buffer. Patch cables connectors shall be provided by the same manufacturers as the fiber optic connectors and couplings.
   b. Patch cables shall match the fiber optic system installed, multimode 62.5/125 micron.
   c. One strand of the patch cable shall have a distinguishing mark throughout its entire length to simplify the distinction between Transmitting (Tx) and Receiving (Rx) at the patching area. Color coded factory marked (Tx-Rx) connectors are preferred.
5. Fiber Optic Cable Management
   a. Each equipment rack shall have horizontal and vertical cable management panels and brackets.

C. Horizontal cable management shall be EIA nineteen inch (482mm) rack mounted 1.75 inch (44mm) high drawer panel with integral cable management and shall be provided for each fiber optic patch panel. This cable management drawer panel is for the fiber optic patch cables and is separate from the fiber optic patch panel drawer.

2.04 VIDEO CABLE SYSTEM:

A. Approved Manufacturers:
1. *Belden*
2. *CommScope*
3. *General Cable*
4. Substitutions: Or Approved Equal.

B. The video cable shall be coaxial copper-clad center conductor, foam polyethylene dielectric, quad-shield aluminum-Mylar-aluminum foil type, aluminum braid shield and non-contaminating polyvinyl chloride jacket. Cable shall have 75 ohm impedance with 80 dB shielding. No discontinuity shall exist within 54-216 MHZ and 470-890 MHZ bands. Cable shall be used as follows:
1. Hardline backbone cable shall be equivalent to *CommScope* QR 540 Hardline Coax Cable.
   a. The trunk/backbone cable shall be home run directly to video head end location. If field amplification is required to increase dB levels, the amplification hardware must be installed in applicable IDFs or MDFs.

b. Backbone cable shall meet or exceed the following nominal attenuation and shall not exceed 1000 feet from head end:

5mhz	.13db/100’
30mhz	.34db/100’
50mhz	.43db/100’
108mhz	.63db/100’
220mhz	.93db/100’
400mhz	1.26db/100’
750mhz	1.80db/100’
865mhz	1.90db/100’
1000mhz	2.10db/100’

2. Drop Cable shall be equivalent to *CommScope* RG-6/U, utilize quad-shielding
   a. Plenum-Rated Cable: #2227K CMP rated jacket for Plenum applications.
   b. Drop cable shall meet or exceed the following nominal attenuation specifications and shall not exceed 100 feet to tap on A/V Distribution Trunk/Backbone cable:

1mhz	.21db/100’
10mhz	.65db/100’
50mhz	1.46db/100’
100mhz	2.04 db/100’
200mhz	2.98db/100’
400mhz	4.46db/100’
700mhz	5.89db/100’
900mhz	7.47db/100’
1000mhz	8.02db/100’

3. Underground service cable shall be equivalent to *CommScope* RG-11.

C. Video Cable Connectors
   1. Connector type shall be compatible with cable type.
   2. Connector types:
      a. "F" connector - 75 ohm with hexagonal 3/4 inch compression termination.
      b. BNC" connector - 75 ohm with hexagonal 3/4 inch compression termination.

D. Video Cabling Splitting Devices
   1. Cable tap/splitting devices shall be used in the system as required to meet specified signal strength at each jack location. These units shall utilize a die cast housing and RF shielding exceeding local cable company requirements (minimum -80dB) and be equipped with flanges to permit mounting on any flat surface and shall meet FCC specifications on radiation.

2. Passive Splitters shall have a rated frequency range of 5-1000 Hz and shall be equivalent to Blonder Tongue XRS series.
3. Two-way splitters shall have a maximum splitting loss of 3.8 dB. Four-way splitters shall have a maximum splitting loss of 8.4 dB. Directional couplers shall be available in nominal tap loss values of 8, 12, and 16 dB and the return loss of any terminal shall be 18 dB or higher.
4. Terminating Resistor: Terminating resistors with 75 ohm impedance shall be installed at unused ports and feeder line ends. Terminating resistors shall be designed to cover the frequency range from 5 MHZ to 890 MHZ with minimum return loss of 25 dB at UHF and 30 dB across the VHF band.
5. Directional Coupler Tap, Flush Mounted: Directional coupler type taps shall be provided as required for signal distribution. The taps shall be fully shielded and in compliance with FCC rules pertaining to radiation. The taps shall be available in isolation values of 3, 8, 12, 16, 20, and 24 dB. Frequency response through any port shall be from 5 MHZ to 890 MHZ.
6. The directional coupler taps shall provide a single RF outlet with a type "F" connector. A through match shall be 18 dB minimum and back match shall be in excess of 14 dB. Any combination of taps shall provide a minimum isolation between tap ports of 30 dB. Through connection to the tap shall be made by standard type "F" fittings. The tap shall be housed in a rugged cast aluminum case and shall be above first floor lay-in ceilings.
7. Directional Coupler Multi-Tap, Surface Mounted: Eight-way directional couple-type taps shall be provided as required for signal distribution. The taps shall be fully shielded and in compliance with FCC rules pertaining to radiation. All connections to the unit shall be by standard type "F" connectors. The taps shall be available in isolation value of 20 dB.
8. The frequency response shall be from 12 MHZ to 890 MHZ and the return loss at any port shall be no less than 14 dB. Isolation between any two tap outlets shall be no less than 30 dB from 5 MHZ to 400 MHZ and no less than 15 dB from 470 MHZ to 806 MHZ.
9. The tap shall be housed in a rugged cast aluminum housing provided with flanges to permit mounting on any flat surface.

2.05 VIDEO OUTLET BOXES:

A. Outlet Boxes: Sheet metal as specified in Section 26 05 33.

2.06 VIDEO OUTLETS:

A. Manufacturers:
1. *Leviton* model Quickport Series
2. *AMP*
3. *Hubbell*
4. Substitutions: Or Approved Equal.

B. Recessed Single Outlet Wall Type: “F” style threaded coaxial cable connector suitable for back wiring and mounting in a standard electrical box. Jack shall include a plastic ivory faceplate and mounting lugs.

C. Outlet Combined With Network Jacks: “F” style threaded coaxial cable connector to be included in multi-gang faceplate as specified under Section 27 10 00.

2.07 TELECOMMUNICATIONS DATA NETWORK RACKS:

A. Description: EIA/TIA 19-inch wide telecommunications rack, enclosure and accessories. Provide a complete assembly for mounting all telecommunications equipment within enclosures.

B. Floor Rack Manufacturers (Maintenance Building):
1. *Chatsworth* – F-Series Treaframe #F-D-1-A-1-1-2-C-C-2-1
2. Substitutions: Or Approved equal

C. Floor Rack Description: Enclosed rack with hinged front door.
1. Height: 80 in.
2. Width: 23.6 in.
3. Depth: 35.3 in.
4. Rail Style: Square punched

5. Front Door: Single, perforated metal
6. Rear Door: Single, perforated metal
7. Door Latches: Two-point cam latches with lock
8. Color: Black
9. Top Panel: 4 network cable openings
10. Side Panels: Solid, 1-each

D. Wall Rack Manufacturers (Office Building and RUBB Building):
1. *Chatsworth* –#12325-722
2. Substitutions: Or Approved equal

E. Wall Rack Description: Enclosed rack with hinged front door.
1. Height: 24.5 in.
2. Width: 19 in.
3. Depth: 18 in.
4. Front Door: Single, plexiglass
5. Color: Black
6. Top/Bottom Panels: Vented
7. Side Panels: Solid, 1-each

2.08 SURGE PROTECTED POWER STRIP:

A. Manufacturers:
1. *Wiremold*
2. *Sentrex*
3. *TrippLite*
4. *S.L. Weber*
5. Substitutions: Or approved equal

B. Surge protected power strip shall be rack mount type.

C. Surge protected power strip with six NEMA 5-15R outlets 15 amp capacity, 120 volts, UL 1449 listed, maximum surge current of 33,000 amps, clamping voltage of 260 volts, maximum 5 picosecond response time, resettable overload circuit breaker, surge suppression warning light, surge protection for line to neutral, line to ground, neutral to ground, EMI/RFI filters. One required for each load up to 1200 watts (total of individual equipment loads).

2.09 RACK MOUNTED UPS (Maintenance Building):

A. Manufacturers:
1. *APC* Model SUA1000RM2U.
2. Substitutions: Or approved equal.

B. Description: Rack mounted uninterruptible power supply unit rated to operate 670 watts for 8.8 minutes or 335 watts for 29.9 minutes.
1. Output Capacity: 670 watts/1000 VA.
2. Nominal Output Voltage: 120 volts.
3. Output Connections: (6) NEMA 5-15R.
4. Input Voltage: 120 volts.
5. Input Connections: NEMA 5-15P (8 foot cord).
6. Battery Type: Maintenance-free sealed lead acid.
7. Battery Recharge Time: 3 hours.

2.10 FLOOR MOUNTED UPS (Office Building):

A. Manufacturers:
1. *APC* Model SUA1000RM2U.
2. Substitutions: Or approved equal.

B. Description: Floor mounted uninterruptible power supply unit rated to operate 330 watts for 10.
1. Output Capacity: 330 watts/550 VA.

2. Nominal Output Voltage: 120 volts.
3. Output Connections: (4) NEMA 5-15R (battery).
4. Input Voltage: 120 volts.
5. Input Connections: NEMA 5-15P (6 foot cord).
6. Battery Type: Maintenance-free sealed lead acid.
7. Battery Recharge Time: 24 hours.

2.11 TELECOMMUNICATIONS DATA NETWORK OUTLET JACKS:

A. Manufacturers:
1. *Leviton* "Quickport" Series
2. *AMP*
3. *Hubbell*
4. *Ortronics*
5. *Panduit*
6. Substitutions: Or approved equal.

B. Each Outlet shall consist of the following:
1. Single gang or dual gang face plate shall be thermoplastic (nylon) with number of voice, data, video and sound jacks as indicated in the Specifications and Drawings.
2. Electrical Subcontractor shall provide 4" square backboxes for all Single gang and Dual gang outlet face plates. Provide single gang and dual gang plaster rings for the specified Single gang and Dual gang outlet face plates.
3. Refer to Electrical drawings for placement of Work Area Outlets.
4. Outlets:
a. Data Outlet - shall consist of two (2) white color modular Category 5e RJ-45 8-position connectors mounted on single gang faceplate, with the capabilities listed below. Provide blanks for faceplate
1) Two (2) RJ45 connectors shall be used for data and cabled to relevant IDF/MDF patch panel with two (2) 4-pair Category 5e unshielded twisted pair cables.
b. Video Outlet – shall consist of a single video "F" style connector mounted on a single-gang faceplate.

2.11 BONDING AND GROUNDING JUMPER CABLE:

A. Manufacturer: Provide products meeting the requirements of the Drawings and Specifications from one of the following manufacturers:
1. *Belden* (No. 8669)

B. Jumper cable shall be hollow braided, 60 amp capacity, copper.

C. Provide equal conduct of as described in "B" above for aluminum equipment.

D. Jumpers shall have compression or exothermic type terminals on both ends of cables. Terminals shall be compatible with jumper cable material and equipment material in order to not have any degenerative reaction.

2.12 EQUIPMENT/CABLE IDENTIFICATION

A. All equipment and cabling shall be properly identified by means of clear and concise labels. All identification shall meet or exceed the minimum requirements of EIA/TIA568A, 606 and BICSI standards.

B. Permanently label, using pre-printed labels, all cables and terminations. Handwritten or embossed type labels are specifically prohibited
1. Label all equipment racks, panels and cross connect blocks uniquely.
2. Label patch panels and cross connect blocks numerically, top-to-bottom.
3. Label cable segments by designated incoming cable.

C. Labels
1. Provide color-coded labels with CODED identifiers as follows:

a. Conduits and other pathways shall be labeled at all end points including equipment rooms, telecommunications closets, pull boxes and the like. Provide adhesive labels on the conduit with at least one label within each space that the conduit passes through. Labels shall be attached by means of the label adhesive and color-coded pressure-sensitive tape wrapped around conduit at least one and one half times.
b. Cables shall have double lapped adhesive labels at all end points including Work Area Outlets, telecommunication closets and equipment rooms. Cables shall also have factory imprinted manufacturer's name, part number and the NRTL certified UL EIA/TIA category rating designation at a minimum of two foot (610mm) intervals along the entire length of the cable.
c. Termination hardware shall have adhesive labels on both the front and rear (if accessible) of the hardware.
d. Insert Labels shall be provided in each Work Area Outlet patch panel termination hardware (top of jack) cross connect blocks (edge of block) and the like.
e. Outlet boxes, junction boxes and the like shall have adhesive labels attached on the inside and located where visible from the outlet opening.
f. Grounding and bonding system shall have engraved labels at each ground bar and backbone grounding cable as it passes through each room. Each bonding jumper shall have heat shrink labels at all end points.

2. Labels shall be constructed of approved material in order to meet the legibility, defacement, adhesion (adhesive labels only), and exposure requirements of UL 969. All labels shall be mounted horizontally in order to be read from left to right.
a. Adhesive Labels shall be constructed of color-coded paper with a clear polyester over laminate, Brady USA, Inc. PermaShield, RayChem TMS or approved equal. Adhesive material used shall be approved for material being attached to, typeface shall be medium density, Helvetica, 1/8 inch (3mm) high black characters unless indicated otherwise.
b. Heat-Shrink Labels shall be constructed of color-coded flame retardant, heat shrinkable polyolefin, Brady USA, Inc, RayChem TMS or approved equal. Typeface shall be medium density, Helvetica 1/8 inch (3mm) high black characters unless indicated otherwise.
c. Insert Labels shall be constructed of color-coded paper inserted behind clear plastic label holder. Work Area Outlets shall have white color labels inserted behind a flush mounted (recessed) plastic window. Patch panels and cross connect block may have continuous clear plastic insertion strips label holders with label strips. Label strips shall have distinct markings to indicate where one jack or cross connect ends and the adjacent one starts. Typeface shall be medium density, Helvetica 1/8 inch (3mm) high black characters unless indicated otherwise.
d. Each Network Interface Outlet shall have each of its eight-position modular jacks provided with a color-coded, embossed modular ICON. The telephone jack icon shall be red and shall have either the word "VOICE" or a telephone logo. The data jack icon shall be blue and shall have either the word "DATA" or a computer logo. The Network Interface Outlet jack provided shall also be able to have additional ICON types such as but not limited to "LAN1 " or "LAN2" and the like available for use. Coordinate with the Owner through the Architect-Engineer, the specific icon's required for this project.
e. Handwritten or embossed labels are not allowed.

2.13 CABLE SUPPORTS

A. Wiring cable supports shall be as specified under Section 26 05 29.

2.14 PATCH CORDS

A. Patch cords shall match the characteristics of UTP cable and shall be in lengths as required. Provide terminations at each cable end.
1. Test each cord according to the requirements listed under paragraph 3.04.
2. Provide one patch cord for each switch service cable.

PART 3 – EXECUTION:

3.01 EXAMINATION:

A. Verify that surfaces are ready to receive work.

B. Verify that field measurements are as shown on Drawings.

C. Beginning of installation means installer accepts existing conditions.

3.02 TELECOMMUNICATIONS DATA NETWORK OUTLET JACKS:

A. Install and connect data outlet jacks in boxes at locations indicated on Drawings.

B. Install outlet jacks in accordance with manufacturer's instructions.

3.03 TELECOMMUNICATIONS DATA NETWORK WIRING:

A. Provide continuous, unspliced, UTP horizontal drop cable from data/voice outlets to owner-furnished network switches located above the first floor ceiling. Also provide continuous, unspliced UTP cables from the owner-furnished network switches to wiring patch panels in equipment racks.

B. Optical fiber cable and intra-building telecommunications cable shall be handled, installed, and supported in conformance with manufacturer's recommendation and EIA/TIA 569. During the laying of cable, the Contractor shall take care not to over stress the cable. After cables are installed, the Contractor shall make sure that all parts of the cable are supported properly and are stress-free at both ends and throughput their length.

C. The Contractor shall insure that the installed bending radius of optical fiber cable and intra-building telecommunications conforms to the manufacturer's requirements. At no location shall a cable's static or dynamic bending radius be exceeded.

D. Conceal intra-building telecommunications cable, above accessible ceilings or in walls. All telecommunications cables shall be run in conduit.

E. Do not make splices in optical fiber cable or intra-building telecommunications cable.

F. All 4 pairs of each unshielded twisted pair (UTP) intra-building telecommunications cable shall be terminated on a single port. The splitting of cable pairs between different jacks is not permitted.

G. Terminating intra-building telecommunications cable pairs (Category 5e) shall have a maximum of 13mm (0.5 inches) of cable untwisted before termination.

3.04 CABLE TESTING:

A. Sub-contract with a independent testing company to test and certify all intra-building telecommunications cabling to identify pair reversal, crossed pairs, opens and shorts. Testing shall comply with ANSI/TIA/EIA 568A, TSB67. Perform test using a network analyzer, Microtest Penta scanner, or approved equal. Test results shall be documented, corrections implemented and re-testing conducted and documented. In addition, documentation shall be presented to show the length of the cable between outlet jack and the telecommunications rack. Submit written test results for review and acceptance.

B. Attenuation testing for optical fiber cable shall be performed after the fiber is installed. Provide documentation of test results.

3.05 VIDEO CABLE OUTLETS:

A. Provide video outlet boxes and jacks as shown on Drawings.

B. Provide recessed (flush) mounted video outlet boxes in all finished areas.

C. Do not install recessed video outlet boxes back-to-back in walls; provide minimum 6-inch separation. Provide minimum 24 inches separation in acoustic rated and fire rated walls.

D. Secure recessed video outlet boxes to interior wall and partition studs. Accurately position to allow for surface finish thickness.

E. Install video outlet boxes at height indicated on Drawings.

F. Adjust video outlet jacks and wall plates to be flush and level.

3.06 VIDEO CABLE WIRING:

A. Route interior cable concealed in partitions above ceilings.

B. Provide video cables continuous from outlet jacks to cable taps and service point. Do not make splices of video cables.

C. Support video cables with telecommunications supporting devices as specified under Section 26 05 29.

3.07 GROUNDING

A. Each equipment rack shall be connected to the telecommunications ground as specified in Section 26 05 26 and in accordance with applicable code requirements as per EIA/TIA 607. Communication bonding and grounding shall be in accordance with the NEC® and NFPA. Horizontal cables shall be grounded in compliance with ANSI/NFPA 70 and local requirements and practices. Horizontal equipment includes cross connect frames, patch panels and racks, active telecommunication equipment and test apparatus and equipment. Provide a Telecommunications Bonding Backbone utilizing a #6-AWG or larger bonding conductor that provides direct bonding between equipment rooms and telecommunications closets. This is part of the grounding and bonding infrastructure (part of the telecommunications pathways and spaces in the building structure), and is independent of equipment or cable. All data equipment shall be properly grounded in the Telecommunications Rooms per manufacturers requirements.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Structured Cabling System will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Structured Cabling System shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of the entire structured cable system as actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the optical fiber cable, optical fiber connectors, optical fiber patch panels, telecommunications racks, network patch panels, network outlets, intra-building telecommunications cable, network patch cords, video cable, video outlets, labor, equipment and incidentals necessary to complete the work.. Structured Cabling System will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 28 00 00 – GENERAL ELECTRONIC SAFETY AND SECURITY REQUIREMENTS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

828.0000 General Electronic Safety and Security Requirements

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. Provide wiring to facilitate the installation of door access control equipment and surveillance cameras being provided under a separate contract by the owner with others.

B. Provide a complete fire alarm system including all materials, labor, tools, transportation, incidentals, and appurtenances to complete in every detail and leave in working order all items of work called for herein or shown on the accompanying drawings.

C. The Contractor for this work is referred to Bidding Requirements, General Conditions, Special Conditions, Temporary Services and other pertinent Sections of these Specifications.

1.02 RELATED SECTIONS:

A. Section 26 05 33 – Raceway and Boxes for Electrical Systems.

B. Section 27 10 00 – Structured Cabling System.

C. Section 28 13 00 – Door Access Control System.

D. Section 28 23 00 – Surveillance System

E. Section 28 31 13 – Fire Alarm System.

1.03 REFERENCES:

A. ANSI/NFPA 70 - National Electrical Code.

B. ANSI/NFPA 72 - National Fire Code.

C. ANSI/NFPA 101 - Life Safety Code.

D. OSHA 1910 - Occupational Safety and Health Act.

E. ADA - Americans with Disabilities Act.

1.04 GENERAL REQUIREMENTS:

A. Contractor shall read the entire specifications covering other branches of work. He is responsible for coordination of his work with work performed by other trades.

B. Consult all Contract drawings which may affect the location of any equipment or apparatus furnished under this work and make minor adjustments in location as necessary to secure coordination. Contractor shall consult architectural interior elevations for mounting heights of fire alarm devices.

C. System layout is schematic and exact locations shall be determined by structural and other conditions. This shall not be construed to mean that the design of the system may be arbitrarily changed. The equipment layout is to fit into the building as constructed and to coordinate with equipment included under other Divisions of work.

D. Contractor shall contact the Owner's Representative immediately if he notices any discrepancies or omissions in either the drawings or the specifications, or if there are any questions regarding the meaning or intent thereof.

E. Submit all changes, other than minor adjustments, to the Architect for approval before proceeding with the work.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Submit under provisions of the following.

B. Submittal shall include complete Specifications, including type of materials, electrical characteristics, capacities, performance and power requirements to determine compliance with Contract Documents. All data submitted shall be complete and shall apply only to this specific project. All extraneous material shall be deleted or marked out. Items to be supplied shall be specifically indicated using a method that will be visible after photocopying.

C. Regardless of any information included in the submittal submitted for review, the requirements of the Drawings and Specifications shall not be superseded in any way by the review. Review by the Architect-Engineer does not relieve responsibility for submittal errors or from meeting the requirements of the Contract Documents.

D. It is intended that Submittal data be complete and accurate at the first submission. If the Submittal is returned marked "Resubmit" only one additional submission will be permitted.

E. Submit related Submittal at one time. SUBMIT ALL ITEMS IN A SPECIFICATION SECTION AT THE SAME TIME. Incomplete submittal will be held until a complete submittal is accumulated or may be rejected without further review and returned to the applicable parties. Include a copy of the Specification Paragraphs pertaining to the items submitted.

F. If proposed equipment deviates from the Specifications or Drawings, indicate in writing on Company letterhead those differences and provide sufficient data to justify acceptance. FAILURE TO INDICATE DEVIATIONS OR SUBSTITUTIONS IMPLIES FULL COMPLIANCE WITH DRAWINGS AND SPECIFICATIONS.

G. The term "by others" or similar wording shall not be used on Submittal. Submittal shall state by whom related items of work are to be provided. Where not indicated, it is implied that the work or item is provided under this Section.

H. Shop Drawings: Provide shop drawings as required by the individual Specification Sections. Submit shop drawings indicating physical size and arrangement, (plans and elevations) construction details, provisions for conduits, access requirements for installation and maintenance, finishes, and materials used in fabrication for all equipment. Supplement shop drawings with wiring diagrams for all systems with wiring connections for multiple components.

I. Submittals shall be made as paper copies. Submittals transmitted only by electronic email shall not be accepted.

1.06 REGULATORY REQUIREMENTS:

A. Complete installation shall conform with all applicable Federal, State and Local laws, Codes and Ordinances, included but not limited to latest approved editions of the following:
1. State Building Codes.
2. Specific Construction Safety Requirements, State Industrial Commission.
3. National Electrical Code - NFPA 70.
4. National Fire Code - NFPA 72.
5. Life Safety Code - NFPA 101.
6. Occupational Safety and Health Act (OSHA) of 1971 and all amendments thereto.
7. ADA - Handicap Accessibility Requirements.

B. Nothing contained in the drawings and specifications shall be construed to conflict with these laws, codes and ordinances, and they are thereby included in these specifications. All work shall comply with the 2011 edition of NFPA 70, The National Electrical Code, and with the 2010 edition of NFPA 72, The National Fire Alarm Code. It shall be the Contractor's responsibility to assure that all work is in full compliance with applicable codes.

C. The Contractor shall visit the site to become familiar with all existing conditions affecting this work. No claim will be recognized for extra compensation due to failure of contractor to familiarize himself/herself with the conditions and extent of proposed work.

D. Obtain and pay for all necessary permits. Request inspections from authority having jurisdiction.

1.07 RECORD DRAWINGS:

A. Record any changes in location of equipment items, system devices, and similar construction items on a set of prints and deliver them to the Owner's Representative upon completion of the work.

1.08 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Provide a Complete Instruction and Maintenance Manual: Prepare in the form of an instructional manual for use by Owner's personnel. Provide one (1) draft copy and two (2) final copies.
   1. Format:
      a. Size: 8-1/2" x 11", 20 lb. minimum weight white paper for typed pages, either manufacturer's printed data, or neatly typewritten.
      b. Drawings: Provide reinforced punched binder tab, bind in with text. Fold larger drawings to size of text pages. Clear plastic "binding tape" (not "Scotch" tape) applied to edge of sheet and then punched is acceptable.
      c. Single-sheet product literature and contractor-prepared pages: Provide reinforced punched binder tab. Clear plastic "binding tape" (not "Scotch" tape) applied to edge of page and then punched is acceptable.
      d. Provide indexed tabs and flyleaf for each separate product, or each piece of operating equipment. Include typed description of product, and major component parts of equipment.
      e. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS".
      f. Binders:
         1) Commercial quality three-ring binders with durable and cleanable plastic covers, 1" minimum, 2" maximum ring size.
         2) When multiple binders are used, collate the data into related consistent groupings and provide a spine label that includes the volume number and contents of the binder.

B. Provide content as listed in separate Sections of Division 28 of these specifications.

1.09 PROJECT/SITE CONDITIONS:

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.

B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.

1.10 COORDINATION WITH WORK PROVIDED UNDER DIVISION 26:

A. Work shall be coordinated with associated work being provided under Division 26. Work provided under Division 26 shall include the following:
   1. Raceway and Boxes for wiring.
   2. 120-volt power circuits.

1.11 COORDINATION WITH WORK PROVIDED UNDER OTHER DIVISIONS:

A. Division 27 - Telecommunications: Provide telephone wiring and connections to the fire alarm control panel as specified under Section 27 10 00.

1.12 SUBSTANTIAL AND FINAL COMPLETION

A. Refer to General Conditions and Supplementary Conditions.

B. Substantial Completion shall not be considered unless all systems are tested and verified for adherence with Contract Documents and any work remaining is less than one percent of the total Contract Value of this Section.
   1. Record Drawings, Operation and Maintenance Manuals, Acceptance Demonstrations, Owner personnel training, spare parts or extra materials required, test reports, warranties and certifications of installation inspections shall be submitted and accepted prior to Substantial Completion.

C. Final Completion shall be when all work under this Section is completed as defined by the Contract Documents and accepted by the Architect-Engineer.

D. When Architect-Engineer determines Work is complete, close out submittals will be considered.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Furnish new and undeteriorated materials and of a quality not less than what is specified.

B. The selection of materials and equipment to be furnished shall be governed by the following:
   1. Where single trade name, brand of manufacturer or material is listed in the specification, the exact equipment listed shall be used in the bid.
   2. Where more than one name is listed, Contractor may select any one of the several brands specified.
   3. Where trade name, brand of manufacturer of equipment or material is listed in the specification followed by the word “or approved equal,” the Contractor may substitute product of equal quality from another manufacturer for consideration by the Engineer.

C. Conduit shall be as specified under Section 26 05 33.

PART 3 – EXECUTION:

3.01 PROTECTION AND CLEANING:

A. Protect all electrical work and products against damage during construction and pay the cost of repair or replacement of electrical products made necessary by failure to provide suitable safeguards or protection.

B. After all work has been inspected and approved, thoroughly clean all equipment, provided under this work.

PART 4 – MEASUREMENT AND PAYMENT –

NONE REQUIRED FOR THIS SECTION

END OF SECTION

SECTION 28 13 00 – DOOR ACCESS CONTROL SYSTEMS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

828.1300 Door Access Control Systems

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. The Owner will contract separately with others to provide a complete, fully distributed, solid state IP network system consisting of a network controller with web based user interface, network connection cards for device termination, door access card readers, request-to-exit devices, door position switches, and door release control station.

B. Contractor shall provide wiring for all system components.

1.02 WORK PROVIDED UNDER OTHER DIVISIONS:

A. Power circuits, including 120VAC outlets and wiring, shall be provided under Division 26.

B. Raceway and boxes shall be provided under Division 26.

1.03 RELATED SECTIONS:

A. Section 26 05 33 – Raceway and Boxes.

B. Section 26 05 19 - Building Wire and Cable.

C. Section 27 10 00 – Structured Cabling System.

1.04 REFERENCES:

A. National Fire Protection Association (NFPA): NFPA 70 - National Electrical Code.

B. Underwriters Laboratories Incorporated (UL):

1.05 REGULATORY REQUIREMENTS:

A. Comply with requirements of NFPA 70.

B. Comply with applicable UL Standards.

1.06 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Submit product data for system wiring under provisions of Section 28 00 00.

1.07 PROJECT RECORD DRAWINGS

A. Submit documents under provisions of Section 28 00 00.

B. Record actual locations and devices, and routing of access control wiring.

1.08 COORDINATION:

A. The Contractor shall be responsible for coordinating all wiring methods with the Owner's system supplier/installer prior to installation.

PART 2 - PRODUCTS

2.01 SYSTEM WIRING:

A. Low voltage cable shall consist of 4C/#22 and 4C/#18 cables.

PART 3 – EXECUTION:

3.01 EXAMINATION:

A. Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.

B. Report in writing to Architect prevailing conditions that will adversely affect satisfactorily execution of the Work of this Section. Do not proceed with Work until unsatisfactorily conditions have been corrected.

C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost.

3.02 INSTALLATION:

A. Install system according to Owner's system supplier/installer's instructions.

B. Splices, Taps, and Terminations: Make splices, taps, and terminations on numbered terminal strips in junction, pull and outlet boxes, terminal cabinets, and equipment enclosures.

C. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so media are identified and coordinated with system wiring diagrams.

D. Extend low voltage system cables from the location of the control equipment in the Office Building Security Office 105 to serve card readers, door locks, electric hinges, door position switches, and request-to-exit devices at each door as indicated on the plans. Consult Owner's system supplier/installer for exact locations of system components. Leave six feet of slack cable at each end for terminations by Owner's system supplier/installer.

3.03 FIELD QUALITY CONTROL:

A. Inspection: test all conductors for proper continuity.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Door Access Control Systems will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

4.02 BASIS OF PAYMENT: Door Access Control Systems shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Payment will be made for the sum total of all door access wiring actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the wiring, labor, equipment and incidentals necessary to complete the work. Specifications. Door Access Control Systems will not be paid for separately but rather will be considered incidental to the Pay Item listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Item. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum

END OF SECTION

SECTION 28 23 00 – SURVEILLANCE SYSTEM

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

828.2300 Low Voltage Power Conductors

Add the following:

PART 1 – GENERAL:

1.01 SECTION INCLUDES:

A. The Owner will contract separately with others to provide a complete, fully distributed, solid state IP surveillance system consisting of a cameras with web based user interface.

B. Contractor shall provide wiring for all system components.

1.02 WORK PROVIDED UNDER OTHER DIVISIONS:

A. Raceway and boxes shall be provided under Division 26.

1.03 RELATED SECTIONS:

A. Section 26 05 33 – Raceway and Boxes.

B. Section 26 05 19 - Building Wire and Cable.

C. Section 27 10 00 – Structured Cabling System.

1.04 REFERENCES:

A. National Fire Protection Association (NFPA): NFPA 70 - National Electrical Code.

B. Underwriters Laboratories Incorporated (UL):

1.05 REGULATORY REQUIREMENTS:

A. Comply with requirements of NFPA 70.

B. Comply with applicable UL Standards.

1.06 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. Submit product data for system wiring under provisions of Section 28 00 00.

1.07 PROJECT RECORD DRAWINGS

A. Submit documents under provisions of Section 28 00 00.

B. Record actual locations and devices, and routing of camera wiring.

1.08 COORDINATION:

A. The Contractor shall be responsible for coordinating all wiring methods with the Owner's system supplier/installer prior to installation. The Owner's system/supplier is Galaxy Integrated Technologies Inc., Brighton, MA 617-202-6388, Representative: Mike Finegan.

PART 2 - PRODUCTS

2.01 SYSTEM WIRING:

A. Voice Cable shall be TIA/EIA Category 6 Unshielded Twisted Pair (UTP) cable, as specified.

B. Electrical Characteristics for 24 AWG Extended Frequency Category 6 cable:
   a. DC Resistance (max) 8.9
   b. DC Resistance Unbalanced (max) 3.0
   c. Input Impedance, 1.0 to 100 MHz =100 +/- 15, 100 to 350MHz = 100 +/- 22
   d. Characteristics Impedance, 1 to 350 MHz = 100 +/- 15%
   e. ACR @ 100KHz, db (min) of 21
   f. PS-ACR @ 100MHz, db (min) of 19
   g. Delay Skew (max) ns/100m is 25
   h. Nominal Velocity of Propagation (NVP), % speed of Light, 70

C. Electrical Characteristics:

Frequency	Max. Atten. Db/100m	ELFEXT bd (min)	PS-ELFEXT bd (min)	PS-NEXT bd (min)	NEXT bd (min)	SLR db (min)	Return Loss db (min)
772kHz	1.8	66	63	70	72	-	-
1MHz	2.0	64	61	68	70	24.5	20.0
4MHz	4.1	52	49	59	61	24.5	23.0
8MHz	5.8	46	43	54	56	24.5	24.5
10MHz	6.5	44	41	53	55	24.5	25
16MHz	8.2	40	37	50	52	24.5	25.0
20MHz	9.3	38	35	48	50	24.5	25.0
25MHz	10.4	36	33	47	49	24.0	24.3
31.25MHz	11.7	34	31	45	47	23.5	23.6
62.5MHz	17.0	28	25	41	43	22.0	21.5
100MHz	22.0	24	21	38	40	21.0	20.1
155MHz	28.1	20	17	35	37	20.1	18.8
200MHz	32.4	18	15	33	35	19.5	18.0
300MHz	41.0	14	11	31	33	18.6	16.8
350MHz	44.9	13	10	30	32	18.3	16.3

D. Compliance of 24 AWG Extended Frequency Category 6 cable:
   a. ISO/IEC 11801
   b. ANSI/TIA/EIA 586-5 (Category 5E)
   c. ANSI/ICEAA S-90-661 (Category 5X-100)
   d. NEWA WC 63.1 (Category 5)
   e. UL Listed Type MPR/CMR
   f. (UL) CMG

E. Plenum rated cable - CMP rated jacket for Plenum applications.

PART 3 – EXECUTION:

3.01 EXAMINATION:

A. Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.

B. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost.

3.02 INSTALLATION:

A. Install system according to Owner's system supplier/installer's instructions.

B. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so media are identified and coordinated with system wiring diagrams.

C. Extend CAT 6 cables from the location of each camera to the closest network equipment rack. Consult Owner's system supplier/installer for exact locations of cameras. Leave six feet of slack cable at each end for terminations by Owner's system supplier/installer.

3.03 FIELD QUALITY CONTROL:

A. Inspection: test all conductors for proper continuity.

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Surveillance System will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Surveillance System shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all surveillance system wiring actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the wiring, labor, equipment and incidentals necessary to complete the work. Surveillance System will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 28 31 13 – FIRE DETECTION AND ALARM SYSTEM

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

828.3113 Fire Detection and Alarm Systems

Add the following:

PART 1 - GENERAL

1.01 RELATED SECTIONS

A. Section 13800 - Building Automation and Control.

B. Section 13900 (21 00 00) - Fire Suppression.

C. Section (27 15 00) - (Fire Alarm Communications Horizontal Cabling).

1.02 DESCRIPTION:

A. The system shall conform to all requirements listed in the City of Portland Standard for Signaling Systems for the Protection of Life and Property 2010 Edition. The Contractor shall be responsible for assuring that all operational features of the fire alarm system meet the City's listed standards.

B. The Contractor shall be responsible for obtaining and paying for the City of Portland Fire Alarm Permit.

C. This section of the specification includes the furnishing, installation, connection and testing of the microprocessor controlled, intelligent reporting fire alarm equipment required to form complete, operative, coordinated systems for the existing Maintenance Building, and the new Office Building. They shall include, but not be limited to, alarm initiating devices, alarm notification appliances, Fire Alarm Control Panels (FACP), auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.

D. The fire alarm systems shall comply with requirements of NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The systems shall be electrically supervised and monitor the integrity of all conductors.

E. The fire alarm systems shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.

F. The FACPs and peripheral devices shall be manufactured 100% by a single U.S. manufacturer (or division thereof).

G. The systems and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

H. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final checkout and to ensure the systems integrity.

1.03 SCOPE:

A. A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance to the project specifications and drawings at the existing Maintenance Building, and at the new Office Building.

B. Basic Performance:

1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B) Signaling Line Circuits (SLC).

2. Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D) as part of an addressable device connected by the SLC Circuit.

3. Notification Appliance Circuits (NAC) shall be wired Class A (NFPA Style Z) as part of an addressable device connected by the SLC Circuit.
4. On Style 6 or 7 (Class A) configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
5. Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.
6. NAC speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke zone which ever is greater.
7. NAC speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system.

1.04. BASIC SYSTEM FUNCTIONAL OPERATION

A. When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

1. The system alarm LED on the system display shall flash at the respective control panel.
2. A local piezo electric signal in the respective control panel shall sound.
3. A backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises, at the respective control panel.
4. All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

1.05 SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. General:

1. Submit product data for Fire Detection and Alarm Sytems under provisions of Section 28 00 00.
2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
3. Show annunciator layout, configurations, and terminations.

C. Manuals:

1. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.
2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

D. Software Modifications:

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.

2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site.

E. Certifications:

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.06 WARANTY:

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

1.07 POST CONTRACT MAINTENANCE:

A. Complete maintenance and repair service for the fire alarm system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of five (5) years after expiration of the guaranty.

1.08 POST CONTRACT EXPANSIONS:

A. The contractor shall have the ability to provide parts and labor to expand the system specified, if so requested, for a period of five (5) years from the date of acceptance.

B. As part of the submittal, include a quotation for all parts and material, and all installation and test labor as needed to increase the number of intelligent or addressable devices by ten percent (10%). This quotation shall include intelligent smoke detectors, intelligent heat detectors, addressable manual stations, addressable monitor modules and addressable modules equal in number to one tenth of the number required to meet this specification (list actual quantity of each type).

C. The quotation shall include installation, test labor, and labor to reprogram the systems for this 10% expansion. If additional FACP hardware is required, include the material and labor necessary to install this hardware.

D. Do not include cost of conduit or wire or the cost to install conduit or wire except for labor to make final connections at the FACPs and at each intelligent addressable device. Do not include the cost of conventional peripherals or the cost of initiating devices or notification appliances connected to the addressable monitor/control modules.

1.09 APPLICABLE STANDARDS AND SPECIFICATIONS:

A. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.

1. NFPA 13 Sprinkler Systems

2. NFPA 70 National Electrical Code

3. NFPA 72 National Fire Alarm Code

4. NFPA 101 Life Safety Code

B. Underwriters Laboratories Inc. (UL) - USA:

1. No. 268 Smoke Detectors for Fire Protective Signaling Systems

2. No. 864 Control Units for Fire Protective Signaling Systems
3. No. 268A Smoke Detectors for Duct Applications
4. No. 521 Heat Detectors for Fire Protective Signaling Systems
5. No. 464 Audible Signaling Appliances
6. No. 38 Manually Actuated Signaling Boxes
7. No. 346 Waterflow Indicators for Fire Protective Signaling Systems
8. No. 1076 Control Units for Burglar Alarm Proprietary Protective Signaling Systems
9. No. 1971 Visual Notification Appliances

C. Local and State Building Codes.

D. All requirements of the Authority Having Jurisdiction (AHJ).

1.10 APPROVALS:

A. The system shall have proper listing and/or approval from the following nationally recognized agencies:

1. UL Underwriters Laboratories Inc

B. The fire alarm control panel shall meet UL Standard 864 (Control Units) and UL Standard 1076 (Proprietary Burglar Alarm Systems).

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIAL, GENERAL:

A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code.

B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.

C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.02 CONDUIT AND WIRE:

A. Conduit:

1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
2. All wiring within the Maintenance Building, where there are no suspended ceilings, and in the Rubb Building, shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
3. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-55.
4. Wiring for 24 volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
6. Conduit shall be 3/4-inch (19.1 mm) minimum.

B. Wire:

1. All fire alarm system wiring shall be new.
2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).
5. Wiring used for the multiplex communication circuit (SLC) shall be twisted and unshielded and support a minimum wiring distance of 12,500 feet. The design of the system shall permit use of IDC and NAC wiring in the same conduit with the SLC communication circuit.
6. All field wiring shall be electrically supervised for open circuit and ground fault.
7. The fire alarm control panel shall be capable of t-tapping Class B (NFPA Style 4) Signaling Line Circuits (SLCs). Systems that do not allow or have restrictions in, for example, the amount of t-taps, length of t-taps etc., are not acceptable.

C. Terminal Boxes, Junction Boxes and Cabinets: All boxes and cabinets shall be UL listed for their use and purpose.

D. Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

E. The fire alarm control panels shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinets shall be grounded securely to either a cold water pipe or grounding rod.

2.03 MAIN FIRE ALARM CONTROL PANELS

A. Main FACPs shall be a *Notifier* Model NFS-320, or approved equal, and shall contain a microprocessor based Central Processing Unit (CPU) and power supply in an economical space saving single board design. The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, printer, annunciators, and other system controlled devices.

B. Operator Control:

1. Acknowledge Switch:
   a. Activation of the control panel acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the LCD display to the next alarm or trouble condition.
   b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
2. Alarm Silence Switch: Activation of the alarm silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition after an alarm condition. The selection of notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.
3. Alarm Activate (Drill) Switch: The Alarm Activate switch shall activate all notification appliance circuits. The drill function shall latch until the panel is silenced or reset.

4. System Reset Switch: Activation of the System Reset switch shall cause all electronically-latched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition.

5. Lamp Test: The Lamp Test switch shall activate all local system LEDs, light each segment of the liquid crystal display and display the panel software revision for service personal.

C. System Capacity and General Operation

1. The control panel or each network node shall provide, or be capable of 318 intelligent/addressable devices.

2. The control panel or each network node shall include Form-C alarm, trouble, supervisory, and security relays rated at a minimum of 2.0 amps @ 30 VDC.

3. It shall also include four Class B (NFPA Style Y) or Class A (NFPA Style Z) programmable Notification Appliance Circuits.

4. The Notification Appliance Circuits shall be programmable to Syncronize with System Sensor, *Gentex* and *Wheelock* Notification Appliances.

5. The system shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display (LCD), individual color coded system status LEDs, and an alphanumeric keypad with easy touch rubber keys for the field programming and control of the fire alarm system.

6. The system shall be programmable, configurable, and expandable in the field without the need for special tools, PROM programmers or PC based programmers. It shall not require replacement of memory ICs to facilitate programming changes.

7. The system shall allow the programming of any input to activate any output or group of outputs. Systems that have limited programming (such as general alarm), have complicated programming (such as a diode matrix), or require a laptop personal computer are not considered suitable substitutes.

8. The FACPs shall support up to 20 logic equations, including "and," "or," and "not," or time delay equations to be used for advanced programming. Logic equations shall require the use of a PC with a software utility designed for programming.

9. The FACPs or each network node shall provide the following features:

   a. Drift compensation to extend detector accuracy over life. Drift compensation shall also include a smoothing feature, allowing transient noise signals to be filtered out.

   b. Detector sensitivity test, meeting requirements of NFPA 72, Chapter 7.

   c. Maintenance alert, with two levels (maintenance alert/maintenance urgent), to warn of excessive smoke detector dirt or dust accumulation.

   d. Nine sensitivity levels for alarm, selected by detector. The alarm level range shall be .5 to 2.35 percent per foot for photoelectric detectors and 0.5 to 2.5 percent per foot for ionization detectors. The system shall also support sensitive advanced detection laser detectors with an alarm level range of .03 percent per foot to 1.0 percent per foot. The system shall also include up to nine levels of Pre-alarm, selected by detector, to indicate impending alarms to maintenance personnel.

   e. The ability to display or print system reports.

   f. Alarm verification, with counters and a trouble indication to alert maintenance personnel when a detector enters verification 20 times.

   g. PAS pre-signal, meeting NFPA 72 3-8.3 requirements.

   h. Rapid manual station reporting (under 3 seconds) and shall meet NFPA 72 Chapter 1 requirements for activation of notification circuits within 10 seconds of initiating device activation.

   i. Periodic detector test, conducted automatically by the software.

   j. Self-optimizing pre-alarm for advanced fire warning, which allows each detector to learn its particular environment and set its pre-alarm level to just above normal peaks.

k. Cross zoning with the capability of counting: two detectors in alarm, two software zones in alarm, or one smoke detector and one thermal detector.

l. Walk test, with a check for two detectors set to same address.

m. Control-by-time for non-fire operations, with holiday schedules.

n. Day/night automatic adjustment of detector sensitivity.

10. The FACPs shall be capable of coding main panel node notification circuits in March Time (120 PPM), Temporal (NFPA 72 A-2-2.2.2), and California Code. Panel notification circuits (NAC 1,2,3 and 4) shall also support Two-Stage operation, Canadian Dual Stage (3 minutes) and Canadian Dual Stage (5 minutes). Two stage operation shall allow 20 Pulses Per Minute (PPM) on alarm and 120 PPM after 5 minutes or when a second device activates. Canadian Dual stage is the same as Two-Stage except will only switch to second stage by activation of Drill Switch 3 or 5 minute timer. The panel shall also provide a coding option that will synchronize specific strobe lights designed to accept a specific "sync pulse."

11. Network Communication: The FACPs shall be capable of communicating on a Local Area Network (LAN), a firmware package that utilizes a peer-to-peer, inherently regenerative communication format and protocol.

D. Central Microprocessor

1. The microprocessor shall be a state-of-the-art, high speed, 16-bit RISC device and it shall communicate with, monitor and control all external interfaces. It shall include an EPROM for system program storage, Flash memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.

2. The microprocessor shall contain and execute all control-by-event programs for specific action to be taken if an alarm condition is detected by the system. Control-by-event equations shall be held in non-volatile programmable memory, and shall not be lost even if system primary and secondary power failure occurs.

3. The microprocessor shall also provide a real-time clock for time annotation of system displays, printer, and history file. The time-of-day and date shall not be lost if system primary and secondary power supplies fail. The real time clock may also be used to control non-fire functions at programmed time-of-day, day-of-week, and day-of-year.

4. A special program check function shall be provided to detect common operator errors.

5. An auto-program (self-learn) function shall be provided to quickly install initial functions and make the system operational.

6. For flexibility and to ensure program validity, an optional Windows(TM) based program utility shall be available. This program shall be used to off-line program the system with batch upload/download, and have the ability to upgrade the manufacturers (FLASH) system code changes. This program shall also have a verification utility, which scans the program files, identifying possible errors. It shall also have the ability to compare old program files to new ones, identifying differences in the two files to allow complete testing of any system operating changes. This shall be in incompliance with the NFPA 72 requirements for testing after system modification.

E. System Display

1. The system shall support an 80 character display. The display shall include an 80-character backlit alphanumeric Liquid Crystal Display (LCD) and a full PC style QWERTY keypad.

2. The display shall provide all the controls and indicators used by the system operator:

a. The 80-character display shall include the following operator control switches: ACKNOWLEDGE, ALARM SILENCE, ALARM ACTIVATE (drill), SYSTEM RESET, and LAMP TEST.

3. The display shall annunciate status information and custom alphanumeric labels for all intelligent detectors, addressable modules, internal panel circuits, and software zones.

4. The display shall also provide Light-Emitting Diodes.

a. The 80-character display shall provide 12 Light-Emitting-Diodes (LEDs) that indicate the status of the following system parameters: AC POWER, FIRE ALARM, PREALARM WARNING, SECURITY ALARM, SUPERVISORY SIGNAL, SYSTEM TROUBLE, DISABLED POINTS, ALARM SILENCED, Controls Active, Pre-Discharge, Discharge and Abort.

5. The display shall provide a QWERTY type keypad

a. The 80-character display keypad shall be an easy to use QWERTY type keypad, similar to a PC keyboard. This shall be part of the standard system and have the capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.

6. The system shall support the display of battery charging current and voltage on the 80-character LCD display.

F. Signaling Line Circuits (SLC)

1. Each FACP or FACP network node shall support one SLC. Each SLC interface shall provide power to and communicate with up to 159 intelligent detectors (ionization, photoelectric or thermal) and 159 intelligent modules (monitor or control) for a loop capacity of 318 devices. SLC shall be capable of NFPA 72 Style 4, Style 6, or Style 7 (Class A or B) wiring.

2. CPU shall receive analog information from all intelligent detectors to be processed to determine whether normal, alarm, prealarm, or trouble conditions exist for each detector. The software shall automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information shall also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.

G. Serial Interfaces

1. The system shall include two serial EIA-232 interfaces. Each interface shall be a means of connecting UL Listed Information Technology Equipment (ITE) peripherals.

a. One EIA-232 interface shall be used to connect an UL-Listed 40 or 80 column printer. Printers that are not UL-Listed are not considered acceptable substitutes.

b. One EIA-232 interface shall be used to connect an UL-Listed 40 or 80 column printer. Printers that are not UL-Listed are not considered acceptable substitutes.

c. One EIA-232 interface shall be used to connect a UL-listed CRT terminal. This interface shall include special protocol methods that allow off-site monitoring of the FACP over standard dial-up phone lines. This ancillary capability shall allow remote readout of all status information, including analog values, and shall not interfere with or degrade FACP operations when used. It shall allow remote FACP Acknowledge, Reset, or Signal Silence in this mode. It shall also allow adjustment of detector sensitivity and readout of the history file.

d. The system shall include an EIA-485 port for the serial connection of optional annunciators and remote LCD displays.

e. The EIA-485 interface may be used for network connection to a proprietary-receiving unit.

H. Enclosures:

1. The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.

2. The back box and door shall be constructed of 0.060 steel with provisions for electrical conduit connections into the sides and top.

3. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators. For convenience, the door may be site configured for either right or left hand hinging.

I. Power Supply:

1. A high tech off-line switching power supply shall be available for the fire alarm control panel or network node and provide 6.0 amps of available power for the control panel and peripheral devices.
2. Provisions will be made to allow the audio-visual power to be increased as required by adding modular expansion audio-visual power supplies.
3. Positive-Temperature-Coefficient (PTC) thermistors, circuit breakers, or other over-current protection shall be provided on all power outputs. The power supply shall provide an integral battery charger for use with batteries up to 55 AH or may be used with an external battery and charger system. Battery arrangement may be configured in the field.
4. The power supply shall continuously monitor all field wires for earth ground conditions, and shall have the following LED indicators:
    a. Ground Fault LED
    b. AC Power Fail LED
    c. NAC on LED (4)
5. The main power supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.
6. The main power supply shall provide a battery charger using dual-rate charging techniques for fast battery recharge and be capable of charging batteries up to 200 AH.
7. All circuits shall be power-limited, per UL864 requirements.

J. Auxiliary Field Power Supply - Addressable

1. The auxiliary addressable power supply is a remote 24 VDC power supply used to power Notification Devices and field devices that require regulated 24VDC power. The power supply shall also include and charge backup batteries.
2. The addressable power supply for the fire alarm system shall provide up a minimum of 6.0 amps of 24 volt DC regulated power for Notification Appliance Circuit (NAC) power or 5 amps of 24 volt DC general power. The power supply shall have an additional .5 amp of 24 VDC auxiliary power for use within the same cabinet as the power supply. It shall include an integral charger designed to charge 7.0 - 25.0 amp hour batteries.
3. The addressable power supply shall provide four individually addressable Notification Appliance Circuits that may be configured as two Class "A" and two Class "B" or four Class "B" only circuits. All circuits shall be power-limited per UL 864 requirements.
4. The addressable power supply shall provide built-in synchronization for certain Notification Appliances on each circuit without the need for additional synchronization modules. The power supply's output circuits shall be individually selected for synchronization. A single addressable power supply shall be capable of supporting both synchronized and non-synchronized Notification Devices at the same time.
5. The addressable power supply shall operate on 120 or 240 VAC, 50/60 Hz.
6. The interface to the power supply from the Fire Alarm Control Panel (FACP) shall be via the Signaling Line Circuit (SLC) or other multiplexed means Power supplies that do not use an intelligent interface are not suitable substitutes. The required wiring from the FACP to the addressable power supply shall be a single unshielded twisted pair wire. Data on the SLC shall be transmitted between 24 VDC, 5 VDC and 0 VDC at approximately 3.33k baud.
7. The addressable power supply shall supervise for battery charging failure, AC power loss, power brownout, battery failure, NAC loss, and optional ground fault detection. In the event of a trouble condition, the addressable power supply shall report the incident and the applicable address to the FACP via the SLC.
8. The addressable power supply shall have an AC Power Loss Delay option. If this option is utilized and the addressable power supply experiences an AC power loss, reporting of the incident to the FACP will be delayed. A delay time of eight or sixteen hours shall be Dip-switch selected.

9. The addressable power supply shall have an option for Canadian Trouble Reporting and this option shall be Dip-switch selectable.
10. The addressable power supply mounts in either the FACP backbox or it's own dedicated surface mounted backbox with cover.
11. Each of the power supply's four output circuits shall be DIP-switch selected for Notification Appliance Circuit or General Purpose 24 VDC power. Any output circuit shall be able to provide up to 2.5 amps of 24 VDC power.
12. The addressable power supply's output circuits shall be individually supervised when they are selected to be either a Notification Appliance Circuit when wired Class "A" or by the use of and end-of-line resistor. When the power supply's output circuit is selected as General 24VDC power, the circuit shall be individually supervised when an end-of-line relay is used.
13. When selected for Notification Appliance Circuits, the output circuits shall be individually DIP-switch selectable for Steady, March Time, Dual Stage or Temporal.
14. When selected as a Notification Appliance Circuit, the output circuits of the addressable power supply shall have the option to be coded by the use of a universal zone coder.
15. The addressable power supply shall interface and synchronize with other power supplies of the same type. The required wiring to interface multiple addressable power supplies shall be a single unshielded, twisted pair wire.
16. An individual or multiple interfaced addressable power supplies shall have the option to use an external charger for battery charging. Interfaced power supplies shall have the option to share backup battery power.

K. Field Charging Power Supply (FCPS). The FCPS is a device designed for use as either a remote 24 volt power supply or used to power Notification Appliances.

1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24 volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries and to support 60 hour standby.
2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two style Y) shall be available for connection to the Notification devices.
3. The FCPS shall include an attractive surface mount backbox.
4. The Field Charging Power Supply shall include the ability to delay the AC fail delay per NFPA requirements.
5. The FCPS include power limited circuitry, per 1995 UL standards.

L. Specific System Operations

1. Smoke Detector Sensitivity Adjust: A means shall be provided for adjusting the sensitivity of any or all addressable intelligent detectors in the system from the system keypad. Sensitivity range shall be within the allowed UL window and have a minimum of 9 levels.
2. Alarm Verification: Each of the intelligent addressable smoke detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification delay shall be programmable from 5 to 30 seconds and each detector shall be able to be selected for verification. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.
3. Point Disable: Any addressable device or conventional circuit in the system may be enabled or disabled through the system keypad.
4. Point Read: The system shall be able to display or print the following point status diagnostic functions:
   a. Device status
   b. Device type
   c. Custom device label

d. View analog detector values
e. Device zone assignments
f. All program parameters

5. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system status.

6. System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 800 events. Up to 200 events shall be dedicated to alarm and the remaining events are general purpose. Systems that do not have dedicated alarm storage, where events are overridden by non-alarm type events, are not suitable substitutes. Each of these activations will be stored and time and date stamped with the actual time of the activation. The contents of the history buffer may be manually reviewed, one event at a time, or printed in its entirety. The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable substitutes.

7. Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent detector and shall analyze the detector responses over a period of time. If any intelligent detector in the system responds with a reading that is above or below normal limits, then the system will enter the trouble mode, and the particular detector will be annunciated on the system display, and printed on the optional printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.

8. Pre-Alarm Function: The system shall provide two levels of pre-alarm warning to give advance notice of a possible fire situation. Both pre-alarm levels shall be fully field adjustable. The first level shall give an audible indication at the panel. The second level shall give an audible indication and may also activate control relays. The system shall also have the ability to activate local detector sounder bases at the pre-alarm level, to assist in avoiding nuisance alarms.

9. Software Zones: The FACP shall provide 100 software zones, 10 additional special function zones, 10 releasing zones, and 20 logic zones.

10. The fire alarm control panels shall include a walk test feature. It shall include the ability to test initiating device circuits and notification appliance circuits from the field without returning to the panel to reset the system. Operation shall be as follows:

    a. Alarming an initiating device shall activate programmed outputs, which are selected to participate in walk test, for 3 seconds.

    b. Introducing a trouble into the initiating device shall activate the programmed outputs for 8 seconds.

    c. All devices tested in walk test shall be recorded in the history buffer.

11. Waterflow Operation: An alarm from a waterflow detection device shall activate the appropriate alarm message on the main panel display, turn on all programmed notification appliance circuits and shall not be affected by the signal silence switch.

12. Supervisory Operation: An alarm from a supervisory device shall cause the appropriate indication on the system display, light a common supervisory LED, but will not cause the system to enter the trouble mode.

13. Signal Silence Operation: The FACP shall have the ability to program each output circuit (notification, relay, speaker etc) to deactivate upon depression of the signal silence switch.

14. Non-Alarm Input Operation: Any addressable initiating device in the system may be used as a non-alarm input to monitor normally open contact type devices. Non-alarm functions are a lower priority than fire alarm initiating devices.

15. Combo Zone: A special type code shall be available to allow waterflow and supervisory devices to share a common addressable module. Waterflow devices shall be wired in parallel, supervisory devices in series.

2.04 SYSTEM COMPONENTS:

A. Programmable Electronic Sounders:

1. Electronic sounders shall operate on 24 VDC nominal.
2. Electronic sounders shall be field programmable without the use of special tools, at a sound level of at least 90 dBA measured at 10 feet from the device.
3. Shall be flush or surface mounted as shown on plans.

B. Strobe lights shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:

1. The maximum pulse duration shall be 2/10 of one second.
2. Strobe intensity shall meet the requirements of UL 1971.
3. The flash rate shall meet the requirements of UL 1971.

C. Waterflow Indicator:

1. Waterflow Switches shall be an integral, mechanical, non-coded, non-accumulative retard type.
2. Waterflow Switches shall have an alarm transmission delay time which is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds.
3. All waterflow switches shall come from a single manufacturer and series.
4. Waterflow switches shall be provided and connected under this section but installed by the mechanical contractor.
5. Where possible, locate waterflow switches a minimum of one (1) foot from a fitting which changes the direction of the flow and a minimum of three (3) feet from a valve.

D. Sprinkler and Standpipe Valve Supervisory Switches:

1. Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
2. PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.
3. The switch shall be mounted so as not to interfere with the normal operation of the valve and adjusted to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
4. The supervisory switch shall be contained in a weatherproof aluminum housing, which shall provide a 3/4 inch (19 mm) conduit entrance and incorporate the necessary facilities for attachment to the valves.
5. The switch housing shall be finished in red baked enamel.
6. The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
7. Valve supervisory switches shall be provided and connected under this section and installed by mechanical contractor.
    a. This unit shall provide for each zone: alarm indications, using a red alarm an yellow trouble long-life LEDs and control switches for the control of fire alarm control panel functions. The annunciator will also have an ON-LINE LED, local piezo electric signal, local acknowledge/lamp test switch, and custom slide-in zone/function identification labels.
    b. Switches shall be available for remote annunciation and control of output points in the system, system acknowledge, telephone zone select, speaker select, global signal silence, and global system reset within the confines of all applicable standards.

E. Alphanumeric LCD Type Annunciator:

1. The alphanumeric display annunciator shall be a supervised, remotely located back-lit LCD display containing a minimum of eighty (80) characters for alarm annunciation in clear English text.
2. The LCD annunciator shall display all alarm and trouble conditions in the system.
3. An audible indication of alarm shall be integral to the alphanumeric display.
4. The display shall be UL listed for fire alarm application.
5. It shall be possible to connect up to 32 LCD displays and be capable of wiring distances up to 6,000 feet from the control panel.
6. The annunciator shall connect to a separate, dedicated "terminal mode" EIA-485 interface. This is a two-wire loop connection and shall be capable of distances to 6,000 feet. Each terminal mode LCD display shall mimic the main control panel.
7. The system shall allow a minimum of 32 terminal mode LCD annunciators. Up to 10 LCD annunciators shall be capable of the following system functions: Acknowledge, Signal Silence and Reset, which shall be protected from unauthorized use by a keyswitch or password.
8. The LED annunciator shall offer an interface to a graphic style annunciator and provide each of the features listed above.

F. All interfaces and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL standard 864.

G. Universal Digital Alarm Communicator Transmitter (UDACT). The UDACT is an interface for communicating digital information between a fire alarm control panel and an UL-Listed central station.

1. The UDACT shall be compact in size, mounting in a standard module position of the fire alarm control cabinet. Optionally, the UDACT shall have the ability for remote mounting, up to 6,000 feet from the fire alarm control panel. The wire connections between the UDACT and the control panel shall be supervised with one pair for power and one pair for multiplexed communication of overall system status. Systems that utilize relay contact closures are not acceptable.
2. The UDACT shall include connections for dual telephone lines (with voltage detect), per UL/NFPA/FCC requirements. It shall include the ability for split reporting of panel events up to three different telephone numbers.
3. The UDACT shall be completely field programmable from a built-in keypad and 4 character red, seven segment display.
4. The UDACT shall be capable of transmitting events in at least 15 different formats. This ensures compatibility with existing and future transmission formats.
5. Communication shall include vital system status such as:
    a. Independent Zone (Alarm, trouble, non-alarm, supervisory)
    b. Independent Addressable Device Status
    c. AC (Mains) Power Loss
    d. Low Battery and Earth Fault
    e. System Off Normal
    f. 12 and 24 Hour Test Signal
    g. Abnormal Test Signal (per UL requirements)
    h. EIA-485 Communications Failure
    i. Phone Line Failure
6. The UDACT shall support independent zone/point reporting when used in the Contact ID format. In this format the UDACT shall support transmission of up to 2,040 points. This enables the central station to have exact details concerning the origin of the fire or response emergency.

H. Field Wiring Terminal Blocks: For ease of service all panel I/O wiring terminal blocks shall be removable, plug-in types and have sufficient capacity for #18 to #12 AWG wire. Terminal blocks that are permanently fixed are not acceptable.

2.05 SYSTEM COMPONENTS - ADDRESSABLE DEVICES

A. Addressable Devices - General

1. Addressable devices shall use simple to install and maintain decade, decimal address switches. Devices shall be capable of being set to an address in a range of 001 to 159.
2. Addressable devices, which use a binary-coded address setting method, such as a DIP-switch, are not an allowable substitute.
3. Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the fire alarm control panel Signaling Line Circuits.
4. Addressable smoke and thermal detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash green under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady red illumination by the control panel, indicating that an alarm condition has been detected. If required, the LED flash shall have the ability to be removed from the system program. An output connection shall also be provided in the base to connect an external remote alarm LED.
5. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. The panel on a time-of-day basis shall automatically adjust sensitivity.
6. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
7. The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. Bases shall include a sounder base with a built-in (local) sounder rated at 85 DBA minimum, a relay base and an isolator base designed for Style 7 applications.
8. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
9. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).
10. Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values. The FACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the FACP program and allowing the system operator to view the current analog value of each detector.
11. Addressable devices shall store an internal identifying code that the control panel shall use to identify the type of device.
12. A magnetic test switch shall be provided to test detectors and modules. Detectors shall report an indication of an analog value reaching 100% of the alarm threshold.
13. Addressable modules shall mount in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box. An optional surface mount Lexan enclosure shall be available.

B. Addressable Manual Fire Alarm Box (manual station)

1. *Notifier* model FST-851R, or approved equal. Addressable manual fire alarm boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.

2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.

3. Manual fire alarm boxes shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.

C. Intelligent Photoelectric Smoke Detector: *Notifier* model FSP-851, or approved equal. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

D. Intelligent Thermal Detectors: *Notifier* model FST-851R, or approved equal. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.

E. Addressable Dry Contact Monitor Module:

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLCs.

2. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

3. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch (70 mm) x 1-1/4 inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include Style D or an LED.

F. Two Wire Detector Monitor Module:

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).

2. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

G. Addressable Control Module:

1. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances.

2. The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation.

3. Audio/visual power shall be provided by a separate supervised power circuit from the main fire alarm control panel or from a supervised UL listed remote power supply.

4. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

H. Addressable Relay Module: Addressable Relay Modules shall be available for HVAC control and other building functions. The relay shall be form C and rated for a minimum of 2.0 Amps resistive or 1.0 Amps inductive. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.

I. Isolator Module:

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.

2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.

3. The isolator module shall not require address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.

4. The isolator module shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

2.06 BATTERIES:

A. The battery shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 5 minutes of alarm upon a normal AC power failure.

B. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks for refilling, spills, and leakage shall not be required.

C. If necessary to meet standby requirements, external battery and charger systems may be used.

2.01 MUNICIPAL FIRE ALARM MASTER BOX:

A. Provide radio operated municipal fire alarm master transmittal box as directed by the City Fire Department to match the City's standard.

2.02 FIRE ALARM DOCUMENTS AND SIGNAGE:

A. Provide a lockable fire alarm records cabinet next to the fire alarm control panel, keyed alike with the control panel. Label the cabinet "FIRE ALRM DOCUMENTS" A record of System Installation (#14 of the Fire Alarm Emergency Communication System Record of Completion) shall be laminated and affixed to the inside of the cabinet.

B. Provide a laminated sign to be affixed to the outside of the door of the main electrical room where the fire alarm control panel is located reading: "FIRE ALARM CONTROL PANEL".

PART 3 – EXECUTION

3.01 INSTALLATION:

A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

D. Manual fire alarm boxes shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 inches (1067 mm), nor more than 48 inches (122 mm) above the finished floor.

3.02 TEST:

A. The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72, Chapter 7.

B. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

C. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.

D. Verify activation of all waterflow switches.

E. Open initiating device circuits and verify that the trouble signal actuates.

F. Open and short signaling line circuits and verify that the trouble signal actuates.

G. Open and short notification appliance circuits and verify that trouble signal actuates.

H. Ground all circuits and verify response of trouble signals.

I. Check presence and audibility of tone at all alarm notification devices.

J. Check installation, supervision, and operation of all intelligent smoke detectors using the walk test.

K. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

L. When the system is equipped with optional features, the manufacturer's manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

M. When the system is equipped with a Voice Evacuation Control panel, the manufacturer's manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying voice messages.

3.03 FINAL INSPECTION:

A. At the final inspection, a factory-trained representative of the manufacturer of the major equipment shall demonstrate that the system functions properly in every respect.

3.04 INSTRUCTION:

A. Instruction shall be provided as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

B. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

PART 4 – MEASUREMENT AND PAYMENT:

4.01 METHOD OF MEASUREMENT: Fire Detection and Alarm Systems will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The Office Building-Electrical Pay Item shall include the electrical elements within not only the footprint of the office building, but also the area surrounding the office building up to 5 ft from the concrete foundation walls. The Site-Electrical Pay Item shall include the electrical elements throughout the site except for the region defined by the Office Building-Electrical Pay Item.

4.02 BASIS OF PAYMENT: Fire Detection and Alarm Systems shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Payment will be made for the sum total of all work associated with the fire detection and alarm systems actually furnished, installed and accepted at the contract price. This price shall include the cost of: furnishing and installing the fire alarm control panels, initiation devices, notification appliances, radio communication boxes, all associated wiring, fittings, labor, equipment and incidentals necessary to complete the work. Fire Detection and Alarm Systems will not be paid for separately but rather will be considered incidental to the Pay Items listed below. See Special Provision 102 for a list of other construction elements to be included in the Pay Items.

A. Payment will be made under the following Pay Items:

Pay Item	Pay Unit
815.00 Office Building – Electrical	Lump Sum
910.42 Site – Electrical	Lump Sum

END OF SECTION

SECTION 31 13 13 – SELECTIVE TREE REMOVAL

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 201 – CLEARING RIGHT-OF-WAY, with the following modifications:

MODIFICATIONS:

Section 201.01 Description

The following paragraph is added:

Tree removal occurs along Commercial Street and within the container storage area at the western end of the terminal building.

END OF SECTION

SECTION 31 20 00 – EARTHWORK

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 203 – EXCAVATION AND EMBANKMENT, and SECTION 206 – STRUCTURAL EXCAVATION, with the following modifications:

MODIFICATIONS to SECTION 203 – EXCAVATION AND EMBANKMENT:

203.02 Materials

Add the following paragraphs:

A. Compacted Granular Fill (CGF) shall consist of clean, mineral, aggregate sand and gravel material free of organic material, loam, trash, snow, ice, frozen soil, or other deleterious material well graded within the following limits:

Sieve Size (ASTM D422)	Percent Passing by Weight
6 in.	100
No. 4	30 – 80
No. 40	10 – 50
No. 200	0 – 8

CGF shall be used below foundations, slabs, sidewalks, exterior slabs, and at other locations shown on the Drawings only when accepted by the Engineer.

MaineDOT Type D Subbase Aggregate (Section 703.06b, Type D) is an acceptable substitute for CGF as specified above.

B. Screened/Crushed Gravel Base shall be in accordance with the requirements of MaineDOT Standard Specification, Highways and Bridges; Section 703.06a, Type A. Screened/Crushed Gravel Base shall be used at the locations shown on the Drawings.

C. Sand/Gravel Subbase shall be in accordance with the requirements of MaineDOT Standard Specification, Highways and Bridges; Section 703.06b, Type D. Sand/Gravel Subbase shall be used at the locations shown on the Drawings.

D. Recycled Bituminous Pavement Base shall meet the requirements of MaineDOT Standard Specification, Highways and Bridges; Section 703.06b, Type D. Recycled Bituminous Pavement Base may be used in place of Sand/Gravel Subbase at the locations shown on the Drawings with approval from the Engineer.

E. Common Fill shall consist of mineral sandy soil free from organic matter, loam, plastic, metal, wood, snow, ice, frozen soil, or deleterious materials.

1. Common Fill shall not contain particles larger than 6 inches in maximum dimension and shall have a maximum of 80 percent passing the No. 40 sieve and a maximum of 30 percent passing the No. 200 sieve. It shall possess physical properties such that it can be readily spread and compacted to the specified densities in a reasonable length of time. The material shall not contain materials subject to decay, decomposition, or dissolution.

2. On-site soils reused as Common Fill shall meet the requirements above and shall be free of organic material, loam, trash, snow, ice, frozen soil, clay, peat or other deleterious material including but not limited to wood, glass, brick, concrete, rubble, asphalt, steel, and wire. This fill shall possess physical properties such that it can be readily spread and compacted to the specified densities. The material shall not contain materials subject to decay, decomposition, or dissolution. The Contractor shall mechanically screen on site soils to remove debris, cobbles and boulders prior to reuse

F. 3/4-inch Crushed Stone shall be in accordance with the requirements of MaineDOT Standard Specification, Highways and Bridges, Section 703.12. 3/4-inch Crushed Stone shall be used as indicated on the Drawings. 3/4-inch Crushed Stone shall be angular and washed to remove fine grained soils prior to use on the Project.

G. Demolished building material (ABC Material): Brick and concrete demolition material (ABC Material) shall be used only as Common Fill, Subbase Gravel, or CGF. The ABC material shall not be used as Base Material.

The ABC Material must be:

1. Relatively free of wood, organic matter, debris, steel or other material that could adversely impact its placement or performance as compacted fill. If the materials contain rebar (metal reinforcing), all rebar should be removed and should be recycled or disposed of in an approved solid waste management facility.

2. Placed in relatively uniform thickness lifts, and spread in a manner that limits segregation of the larger and smaller sized particles, and results in a uniform fill mass.

3. Confirmed to be compatible with plantings, utilities, overlying fill and other features in the fill area.

4. Sampled prior to use and as judged necessary by the Engineer during production to confirm that the gradation requirements are being achieved.

5. Crushed and reused within a reasonable time.

203.04 General

Add the following paragraphs:

Any temporary earth support required will not be measured separately for payment, but shall be incidental to the Excavation items.

All excavations shall be accomplished in accordance with the applicable OSHA Standards. The Engineer reserves the right to request the Contractor to prepare an excavation plan. This plan shall include, but not necessarily be limited to, the limit and depth of excavation, side slope, shoring, trench box and utility support.

203.10 Embankment Construction – General

Add the following paragraphs:

DEFINITIONS

A. Engineer: Authorized representatives of the Owner. For the scope of work covered under this Section, this term will include HNTB Corporation and its subconsultants.

B. Geotechnical Consultant: Authorized representative of the Owner. For the scope of work covered under this Section, this term will include Haley & Aldrich, Inc.

EXAMINATION

A. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

B. Verify structural ability of unsupported walls to support loads imposed by fill.

C. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

PREPARATION

A. All earthworks shall be conducted in accordance with the requirements of this Section.

B. Ensure that erosion controls are in place and properly functioning prior to any earthwork in accordance with Section 31 25 13, Erosion Controls.

C. Topsoil Excavation:

1. Excavate topsoil from all areas to be further excavated, raised in grade, relandscaped, or regraded, without mixing with foreign materials for use in finish grading.

2. Stockpile on Site in area approved by the Resident and protect from erosion.

3. Remove excess topsoil not intended for reuse, from site.

D. Ground Surface Preparation: Remove vegetation, debris, unsatisfactorily soil materials, obstructions, and deleterious materials from ground surface prior to placement of materials. Placement of materials on top of prepared subgrade for all sub-structures, slabs, and paved areas shall not be conducted until subgrade in that area

has been inspected by the Geotechnical Consultant. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

E. Locate and mark any and all existing underground and aboveground utilities before beginning any earthwork. Notify Dig Safe at 1-888-344-7233 not less than three working days before performing Work.

F. Remove and properly dispose of any pavement, structures, fences, debris, etc. scheduled for removal. Save and store any material scheduled for re-use.

G. Identify required lines, levels, contours, and datum locations.

H. Notify utility company to remove and relocate utilities.

I. Maintain and protect above and below grade utilities indicated to remain.

J. Protect plant life, lawns, rock outcroppings, and other features remaining as portion of final landscaping.

K. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

L. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

M. Below-Grade Utilities and Obstructions

1. The Contractor is advised that the in-situ fill soils may contain cobbles, boulders, and man-made structures. These items will not be considered obstructions and shall be removed as needed at no additional cost to the Owner.

2. For work specified in this Section, cobbles and boulders within the naturally deposited soils will nt be considered obstructions.

3. Refer to the Drawings for locations of utilities to remain, to be located, or to be removed.

SUBMITTALS: Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

A. General

1. The Contractor shall forward submittals to the Engineer a minimum of 2 weeks prior to any planned work related to the Contractor's submittals.

2. The time periods for submittals are the minimum required by the Engineer to review, comment, and respond to the Contractor. The Engineer may require resubmission or resubmissions for various reasons. The Contractor is responsible for scheduling specified submittals and resubmittals so as to prevent delays in the work.

3. The Contractor's submittals shall be reviewed without comment by the Engineer prior to conducting any work.

4. Review of the Contractor's submittals by the Engineer does not relieve the Contractor of the responsibility for the adequacy, safety, and performance of the Work.

B. Backfill Materials and Equipment

1. Proposed types and sources of all off site fill materials including topsoil. For each type of soil to be utilized as fill or backfill the Contractor shall deliver a 50-lb. bag sample from each borrow source or supplier to the Engineer for review and laboratory testing. Do not import any material to site unless the material has been accepted by the Engineer. With each sample provide the following documentation:

a. Location of the borrow source site.

b. Present and past usage of the source site and material.

c. All previously existing reports associated with an assessment of the source site as relates to the presence of oil or hazardous materials.

2. Submit additional material samples every 2,500 cubic yards throughout the course of the Work, if requested by the Engineer, to evaluate the consistency of the source or process at no additional cost to the Owner.

3. Details of compaction equipment proposed for use in compacting fill and backfill materials. The Details shall include descriptions, product literature, specifications and ratings.

FIELD QUALITY CONTROL

A. Comply with MaineDOT Division 100, General Conditions.

B. Comply with MaineDOT General and Supplementary Conditions.

C. Testing and Field Observations:

1. The Owner may retain an independent testing and inspection firm and/or a Geotechnical Consultant to perform on-site observation and testing during the various phases of construction. The scope of services will be determined by the Owner and the independent testing and inspection firm and/or the Geotechnical Consultant and will be provided to the Contractor. The Owner reserves the right to modify or waive the services of the independent testing and inspection firm and/or the Geo-technical Consultant. The services of a Geotechnical Consultant/Inspection and testing firm may include, buy not necessarily be limited to, the following:

a. Observation during excavation and dewatering of building and controlled fill areas.

b. Observation during backfilling and compacting operations within that area defined as building area or controlled fill area and other areas as appropriate.

c. Laboratory testing and analysis of fill materials as specified herein and proposed by the Contractor for incorporation into the Work.

d. Observation of construction and performance of water content, gradation and compaction tests at a frequency and locations that he shall select. The results of these tests will be submitted to the Owner, Engineer, and Contractor on a timely basis so that action can be taken to remedy indicated deficiencies. During the course of construction, the Geotechnical Consultant will advise the Owner in writing if at any time in his opinion the Work hereunder is of unacceptable quality. Failure of Geotechnical Consultant to give notice, shall not excuse the Contractor from latent defects discovered in their work.

2. The Contractor shall make provisions for allowing observations and testing of contractor's Work by the independent testing and inspection firm and/or the Geotechnical Consultant. The Contractor shall assist the testing agency as required and shall deliver samples of all materials required to the testing agency at the Contractor's expense.

3. The presence of the independent testing and inspection firm and/or the Geotechnical Consultant does not include supervision or direction of the actual work of the Contractor, his employees or agents. Neither the presence of the independent testing and inspection firm and /or the Geotechnical Consultant, nor any observations and testing performed by them, nor failure to give notice of defects shall excuse the Contractor from defects discovered in their work.

4. Costs related to retesting due to unacceptable qualities of work and failures discovered by testing shall be paid for by the Contractor at no additional expense to Owner.

D. Contractor shall employ an independent testing agency to perform all proposed material gradation and field compaction tests.

E. The Contractor shall work with the Geotechnical Consultant and independent testing agency to allow the necessary subgrade inspection and in-site density testing.

F. Proof roll compacted fill surfaces under slabs-on-grade, pavers, and paving.

G. Request visual inspection of subgrades and bearing surfaces by Geotechnical Consultant before installing subsequent work.

H. Slope sides of excavations to comply with OSHA regulations and local codes. Shore and brace where sloping is not possible.

EXCAVATION

A. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

B. When excavating through roots, perform work by hand and cut roots with sharp axe.

C. Underpin adjacent structures and utilities which may be damaged by excavation work.

D. Excavate subsoil to accommodate building foundations, slabs-on-grade paving, site structures, and construction operations.

E. Do not excavate within the Zone of Influence of new or existing foundations or utilities. The Zone of Influence (ZOI) is the zone beneath a structure defined by imaginary lines extending outward 1 ft laterally beyond the bottom edge of the structure and down on a one horizontal to one vertical (1H:1V) slope to the top of the suitable natural inorganic bearing soils. Soils located within the ZOI provide foundation support for the structure.

F. Grade top perimeter of excavation to prevent surface water from draining into excavation.

G Trim excavation. Remove loose matter.

H. Remove lumped subsoil, boulders, and rock up to 1/3cu yd measured by volume.

I. Notify Engineer of unexpected subsurface conditions.

J. Correct areas over excavated with CGF.

K. Stockpile subsoil intended for reuse on Site in area approved by the Engineer and protect from erosion.

L. Remove and legally dispose of excess and unsuitable material and groundwater from site. No groundwater shall be discharged into open bodies of water, wetlands, storm drains, or sewer drains without required permits.

M. Remove excess subsoil not intended for reuse, from site, at no additional cost to the Owner.

N. Repair or replace items indicated to remain damaged by excavation.

O. Prepare subgrade for lawn areas 4” below finished grade.

P. All excavations and backfilling for structures, utilities and site improvements shall be performed in-the-dry. Dewatering, if required, shall be conducted by the Contractor at no additional cost to the Owner.

Q. Soil Subgrade Preparation – General

1. Care shall be taken to avoid disturbance to subgrades. The Contractor shall be solely responsible for stabilization of exposed soil subgrade surfaces.

2. The Contractor shall consider implementation of methods for protection of approved subgrade surfaces, including but not limited to placement of a layer of crushed stone or a lean concrete mud-mat.

3. Make final 2 ft of excavation into natural bearing soils using smooth-bladed equipment or by hand to limit disturbance. Loose, disturbed soil shall be removed by hand shovel.

4. Subgrades consisting of cohesive soils shall not be “backbladed” or compacted to prepare a smooth surface.

5. Subgrades consisting of saturated soils shall not be recompacted to avoid disturbance.

6. Movement of construction equipment directly over exposed final subgrades, except for compaction equipment, shall not be permitted.

7. The exposed subgrade will be inspected in the field by the Geotechnical Consultant to observe the strength and bearing capacity of the soils. Disturbed or soft or unstable soils, as judged by the Geotechnical Consultant, shall be excavated and replaced with lean concrete, CGF, or other acceptable materials at no additional cost to the Owner.

8. Temporary drainage trenches or other dewatering facilities shall not be permitted to extend below the bearing level near footings.

9. Prevent soil subgrades from freezing and frost. Soil subgrades that freeze prior to concrete or backfill placement shall be thawed and recompacted, or removed and replaced with non-frozen backfill, lean concrete or other acceptable material as directed by the Engineer.

10. Disturbance of prepared soil subgrades from construction traffic is the sole responsibility of the Contractor. Areas that have been disturbed shall be repaired in accordance with the requirements of this Section, as judged by the Geotechnical Consultant, at no additional cost to the Owner.

R. Building Footings.

1. For all footings, remove all unsuitable materials, including topsoil, organic soils, debris, disturbed soil and other compressible materials, as judged by the Geotechnical Consultant, from within the ZOI of footings down to the top of inorganic suitable bearing soils in a manner that minimizes disturbance to the bearing surface.

2. Following excavation to the acceptable bearing stratum as judged by the Geotechnical Consultant, exposed granular soil surfaces shall be proof-compacted with vibratory compaction equipment until deemed acceptable by the Geotechnical Consultant.

3. Place and compact a minimum 2-ft thick layer of Compacted Granular Fill (CGF) or other approved structural fill in engineered lifts within the ZOI from the prepared subgrade elevation to the design footing bearing elevation. Refer to foundation detail in the Drawings showing the details of CGR placement beneath footings.

5. Soil surfaces below completed foundations and slabs shall be protected against freezing, before and after foundation construction. Footings constructed during freezing weather shall be either backfilled to a depth of 5 feet or protected with insulating blankets or other means to prevent subgrade soil surfaces from freezing.

S. Building Slabs-on-Grade and Sidewalks

1. Over-excavate all topsoil, organic soils, debris and disturbed soil within the ZOI of building slabs. Any utility abandoned in-place below the slab-on-grade shall be entirely backfilled with lean concrete or other grout material approved by the Engineer.

2. Proof-compact granular soil surfaces beneath building slabs-on-grade and sidewalks with a self-propelled vibratory compaction equipment, as recommended by the Geotechnical Consultant, to achieve an acceptable subgrade.

T. Pavement Areas

1. Strip and stockpile or remove or remove from site existing bituminous concrete.

2. Over-excavate all topsoil, debris and organic soils within the limits of the access roads and parking areas. Exposed subgrades shall be inspected in the field by the Geotechnical Consultant prior to fill placement. Over-excavation may be necessary to remove weak, disturbed or otherwise unacceptable soils.

3. Proof-compact surface exposed granular soil with a self-propelled vibratory roller, until deemed acceptable by the Geotechnical Consultant.

4. Remove stones greater than 5 inches measured in any dimension from subgrade to a 12-inch depth. Fill depressions with suitable fill as require. See Fill Schedule of this Section.

5. When areas become impervious due to concentrations of fines, lightly scarify and recompact. In severe cases, remove such material and replace with suitable soil as directed.

FILLING, BACKFILLING AND GRADING

A. Fill areas to contours and elevations with unfrozen materials.

B. Backfill excavations as promptly as work permits but not before completion of the following:

1. Acceptance of construction below finish grade, including but not limited to application of waterproofing, and perimeter insulation.
2. Removal of concrete formwork.
3. Removal of trash and debris.
4. Removal of shoring, bracing, and backfilling of the remaining voids with satisfactorily materials. Cut off temporary sheet piling driven below bottom of structures and remove in a manner to prevent settlement of the structure or utilities or leave in place if required.
5. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

C. Use care in backfilling utility trenches to avoid damage or displacement of the utilities.

D. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

E. Place fill material in continuous layers and compact each lift in accordance with the requirements of the Fill Schedule in this Section.

F. Employ placement method that does not disturb or damage other work.

G. Maintain optimum moisture content of backfill materials to attain required compaction density.

H. Do not backfill against unsupported foundation walls.

I. Backfill concrete structures only after the concrete has developed adequate strength. Do not allow heavy machinery within 5 feet of structures during backfilling and compacting.

J. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

K. Slope grade away from building minimum 5 percent slope for minimum distance of 10 ft, unless noted otherwise.

L. Make gradual grade changes. Blend slope into level areas.

M. Remove surplus backfill materials from site.

N. Repair or replace items indicated to remain damaged by excavation or filling, at no additional cost to the Owner.

O. Settlement or erosion that occurs prior to acceptance of the Work shall be repaired, and re-graded to the required elevations and slopes at no additional cost to the Owner.

TRENCHING

A. Remove lumped subsoil, boulders, and rock up of 1/6 cubic yard, measured by volume.

B. Do not advance open trench more than 200 feet ahead of installed pipe unless approved by the Engineer.

C. Remove water or materials that interfere with Work.

D. Excavate bottom of trenches maximum 2 feet wider than outside diameter of pipe.

E. Excavate trenches to lines depths indicated on Drawings with sufficient width to enable installation and inspection of the utility.

F. Owner reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

G. Use laser-beam instrument with qualified operator to establish lines and grades.

H. Provide uniform and continuous bearing and support for bedding material and utilities.

I. Do not excavate within the ZOI of existing or new substructures or utilities.

J. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Engineer until suitable material is encountered. Notify Engineer, and request instructions.

K. Cut out soft areas of subgrade not capable of compaction in place. Backfill with GCF and compact to density equal to or greater than requirements for subsequent backfill material.

L. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

M. Correct over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.

N. Remove excess subsoil not intended for reuse, from site.

O. Stockpile excavated material in area designated on site in accordance with this Section.

SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation to comply with OSHA regulations and local codes.

C. Design sheeting and shoring to be removed at completion of excavation work.

D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

DEWATERING

A. Perform all work in the dry.

B. Dewater soils and excavations as necessary to adequately compact, excavate, and work existing soils.

C. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding areas.

D. Do not allow water to accumulate in excavations. Provide and maintain pumps and dewatering system components necessary to convey water away from excavations.

E. Convey water removed from excavations adequately to prevent soil erosion.

F. Do not use trench excavations as temporary drainage ditches.

TOLERANCES

A. Comply with MaineDOT Division 100, General and Supplementary Conditions.

B. Moisture content of fill material as it is being placed shall be within two percent of the optimum moisture content of the material as determined by ASTM D1557 modified.

C. Top Surface of Backfilling around Building Areas: Plus or minus 1 inch from required elevations.

D. Top Surface under Paved Areas and Pavers: Plus or minus 1 inch from required elevations.

E. Top Surface of Landscaped and Lawn Areas: Plus or minus 0.10 feet from required elevations.

F. CGF under Slabs:

1. Maximum Variation From Flat Surface: 1/2 inch measured with 10 foot straight edge.

2. Maximum Variation From Elevation: 3/8 inch.

G. Footing Excavations:

1. Maximum Variation From Elevation: 0.10 feet.

STOCKPILING

A. Stockpile materials on site at locations approved by Engineer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Prevent intermixing of soil types or contamination.

E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

F. Unsuitable materials delivered to the Site and materials that become unsuitable during the course of the project shall be stockpiled in a manner to prevent erosion and spreading of this material until it is removed and disposed of off-Site.

STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

203.12 Construction of Earth Embankment with Moisture and Density Control

This Subsection is deleted in its entirety and replaced with the following:

FILL SCHEDULE

A. All fill shall be placed in accordance with the requirements of this Section.

B. The degree of compaction is expressed as a percentage of the maximum dry density at optimum moisture content as determined by ASTM Test D1557, Method C.

C. All footings shall bear on a minimum 2 ft thick layer of Compacted Granular Fill (CGF). Refer to the foundation detail in Drawings showing the CGF placement beneath footings and slabs.

D. Fill shall be placed in layers between 6 and 12 inches in thickness depending upon size and type of compaction equipment such that the desired density is achieved throughout the lift thickness.

E. Fill shall be placed at the approximate optimum moisture content.

F. Below Foundations and within 12 inches of Floor Slabs:

1. Fill Type: CGF.

2. CGF shall be placed in horizontal lifts and be compacted. Lift thickness should be such that desired density is achieved throughout the lift thickness.

3. In confined areas, CGF shall be compacted to the same standard except that the maximum particle size should be reduced to 3 inches and loose layer thickness should be reduced to 6 inches, and compaction performed by hand-guided equipment to the same percentage of compaction.

4. Compaction: 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557 or 100 percent if crushed stone is used as determined by ASTM C-29.

5. Where fill is required below footing grade, the zone of 95 percent compaction shall extend within the ZOI of foundations.

6. If compaction requirements of CGF are difficult to meet due to space constraints or other limitations, use of flowable fill for foundation backfill should be considered as recommended by the Geotechnical Consultant, at no additional cost to the Owner.

G. Entrances and Approaching Sidewalks

1. Fill Type: CGF

2. CGF shall be placed in horizontal lifts and be compacted. Lift thickness should be such that desired density is achieved throughout the lift thickness.
3. For slab/sidewalk entrances: CGF shall be placed to a depth of 4.0 feet below the top of slab/sidewalk. This thickness of CGF should extend horizontally from the building outward to the entire width of the entrance slabs/sidewalks.
4. CGF below entrance slab/sidewalks, including those supported on frost walls, shall have a gradual transition up to the bottom of the sidewalk and pavement subbase at a 1V to 3H slope or flatter.
5. Compaction: 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557.

H. Foundation Backfill (interior and exterior, outside of ZOI of footings):
1. Fill Type: Common Fill (except within 12 inches of floor slabs).
2. Common Fill shall be placed in horizontal lifts and be compacted. Lift thickness should be such that desired density is achieved throughout the lift thickness.
3. Compaction: 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557.

I. Driveway and Parking Area Subgrade:
1. Fill Type: Common Fill.
2. Compaction: 92 percent of maximum dry density up to 3 ft below finished grade, and 95 percent of maximum dry density in the upper 3 ft, as determined in accordance with ASTM Test Designation D1557.

J. Fill Under Lawn and Landscaped Areas:
1. Fill Type: Common Fill.
2. Compaction: 90 percent of maximum dry density as determined in accordance with D1557.

K. Trench Bedding and Backfill
1. Storm drainage pipe and sanitary sewer pipe bedding:
   a. Pipe Bedding: 3/4" Crushed Stone compacted to 100 percent if crushed stone is used as determined by ASTM C-29.
   b. Fill Above Bedding:
      1) Under Paving and Sidewalks: Common Fill similar to the trench sidewalls compacted to 92 percent of maximum dry density, as determined in accordance with ASTM Test Designation D1557, up to 3 ft below finished grade. 95 percent of maximum dry density in the upper 3 ft.
      2) In lawn and landscaped areas: Common Fill compacted to 90% of maximum dry density as determined in accordance with ASTM Test Designation D1557.
2. Water distribution pipe, electric, telephone, and cable utilities:
   a. Pipe Bedding: Sand.
   b. Fill Above Bedding:
      1) Under Paving and Sidewalks: Common Fill similar to trench compacted to a dry density of at least 92 percent of maximum dry density, as determined in accordance with ASTM Test Designation D1557, up to 3 ft below finished grade. 95 percent of maximum dry density in the upper 3 ft.
      2) In lawn and landscaped areas: Common Fill compacted to 90% of maximum dry density as determined in accordance with ASTM Test Designation D1557.

3. Footing Drains and Underdrains:

   a. Pipe Bedding: 3/4" Crushed Stone compacted to 100 percent if crushed stone is used as determined by ASTM C-29.

4. Fill to Correct Over-excavation:

   a. Fill Type: CGF flush to required elevation, compact uniformly to 95% percent of maximum density as determined in accordance with ASTM Test Designation D1557.

L. Base and Subbase Courses

1. Refer to Section 32 11 23 – Aggregate Base Courses for base and subbase requirements.

MODIFICATIONS to SECTION 206 – STRUCTURAL EXCAVATION:

206.04 Method of Measurement

The following paragraph is added:

Earthwork associated with the waterfront construction of the pier caps, edge beams, and approach slabs (behind the seawall) shall be measured by the cubic yard and shall include all labor, materials, incidentals, and equipment for excavation, backfilling, structural excavation, and materials, necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

Earthwork associated with the construction of the office building shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The limit of earthwork associated with the office building shall include the material not only within the footprint of the office building but also the area surrounding the office building up to 5 ft from the perimeter of the concrete foundation walls.

206.05 Basis of Payment

The following paragraph is added:

Earthwork associated with the waterfront construction of the pier caps, edge beams, and approach slabs (behind the seawall) shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Earthwork for the waterfront construction will be paid for by the cubic yard and will be paid under the Structural Earth Excavation - Waterfront Pay Item.

Earthwork associated with the construction of the office building shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Earthwork for the office building will not be paid for separately but rather will be considered incidental to the Office Building - Structural Pay. See Special Provision 102 for a list of other construction elements to be included in the Pay Item.

A. Payment will be made under the following Pay Item:

Pay Item		Pay Unit
206.085	Structural Earth Excavation - Waterfront	Cubic Yard
815.00	Office Building - Structural	Lump Sum

END OF SECTION

SECTION 31 25 13 – EROSION CONTROL

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 656 – TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL, with the following modifications:

MODIFICATIONS:

656.01 Description

This work shall also include implementation of the requirements set forth by the City of Portland in its Site Plan permit and references made therein.

END OF SECTION

SECTION 31 62 17 – DRIVEN STEEL PIPE PILES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 501 – FOUNDATION PILES, with the following modifications:

MODIFICATIONS:

501.01 Description

Add the following paragraph:

The work also includes the following:

1. Pre-augering of the piles in Pile Row "N" to no shallower than El. -10 ft as shown on the Plans. At a minimum, pre-augering must be performed for Pile Row "N" to the elevation shown on the Plans.
2. Spudding of the piles in Pile Row "M" to no shallower than El. -10 ft as shown on the Plans.
3. Other measures needed to advance the piles through the existing riprap present at pile locations in Pile Rows "K" and "L". Pre-augering, spudding, or other measures may be necessary to advance the piles in Pile Rows "K" and "L". Any excavations or removals shall be limited to an area of disturbance of 8 ft x 8 ft per pile.
4. Filling pipe piles with Class S concrete, and adding steel rebar cage at the top of the piles.
5. Conducting a location survey of existing timber piles and the existing seawall prior to the installation of piles as described herein and as shown on the Plans.

501.015 Submittals

This Subsection is added and shall include the following:

The Contractor shall provide the submittals listed below in accordance with Section 105.70 of the MaineDOT Standard Specification. Specific components of the submittals are listed in the referenced MaineDOT SECTION 501.

1. Pile Driving and Dynamic Load Test Equipment
    a. Manufacturer's literature, including technical and performance literature for pile driving hammer(s), cushions, hoses, and other equipment for the piles.
    b. Details of equipment and procedures for pre-augering of the piles in Row "N" as described herein.
    c. Details of equipment and procedures for spudding and any other method proposed for achieving pile advancement through existing riprap present at pile locations in Row "M" (e.g. pre-excavation).
    d. Qualifications and experience of the Contractor's Professional Engineer performing the PDA testing and CAPWAP analyses.
    e. Description of dynamic testing equipment and procedures.
2. Wave Equation (WEAP) Analyses
    a. Qualifications and experience of the Contractor's Professional Engineer performing the WEAP analyses.
    b. The Contractor shall propose driving criteria (blow count) as the minimum number of hammer blows for each inch of the final 6 inches of pile penetration in the bearing stratum. The proposed criteria shall be submitted to Resident, Engineer, and/or Geotechnical Consultant for review and acceptance. Piles shall not be installed prior to acceptance by the Resident, Engineer, and/or Geotechnical Consultant.
    c. Results of WEAP analyses performed and stamped by a licensed Professional Engineer in the State of Maine, which demonstrate that the equipment, cushions and cap are capable of obtaining the minimum required ultimate capacity in accordance with the IBC Code without damage to the pile due to driving stresses. The WEAP analyses shall model bearing conditions in soil and the anticipated pile lengths across the site as shown on the Plans. The submittal shall also include any additional applicable assumptions used in the analyses.

3. PDA and CAPWAP Results
    a. The Contractor shall provide complete reports of PDA measurements/analyses and CAPWAP analyses performed during the indicator pile test program by the Contractor's Engineer. In this report, the Contractor shall propose the final driving criteria (number of hammer blows per inch over the last 6 inches of pile advancement) based on the results of the PDA and CAPWAP analyses. The final driving criteria will likely be different than the criteria developed from the WEAP evaluation.

501.02 Materials

This Subsection is deleted and replaced with the following:

Steel pipe pile materials shall conform to the requirements of ASTM A252, Grade 3 Modified, Fy=50 ksi or greater. Pipe material shall be furnished either seamless or comprised of straight electric-resistance welds. Spiral-welded pipe will not be acceptable.

Conical pile tips shall conform to the requirements of ASTM A148 Grade 90/60.

Pipe pile splice backup ring material shall be any steel listed in AWS Structural Steel Welding Code D1.1, Table 3.1 with the exception of 100 ksi minimum yield strength steels.

Concrete fill for steel pipe piles shall be Class S and shall meet the requirements of SECTION 03 31 29 – MARINE CONCRETE.

Reinforcing steel for steel pipe piles shall meet the requirements of Section 503, Reinforcing Steel. Epoxy Coated and Grade 60.

Steel pipe pile material shall be coated with a Fusion Bonded Epoxy Coating as specified in SECTION 09 97 13 – STEEL COATINGS. The limit of fusion bonded epoxy coating applied to the steel pipe piles shall be from the top of the pile cut off elevation to a depth of 10 feet below the mudline, but in no instance shall it be less than 15 ft from the top of the pile (due to change in elevation of the two inboard rows of piles).

501.03 Equipment for Driving Piles

The last sentence of the fourth paragraph is amended as follows:

Also, the Contractor shall provide the Resident with a chart, calibrated within the 90 days prior to use of the actual hammer performance, equating bounce chamber pressure to either equivalent energy or stroke for the closed-end diesel hammer to be used.

The last sentence of the fifth paragraph is amended as follows:

In addition, the Contractor shall provide the Resident with a chart, calibrated within the 90 days prior to use, of the actual hammer performance.

501.04 Driving Procedures and Tolerances

The first sentence of the fifth paragraph is deleted and replaced with the following:

Jetting – Jetting shall not be allowed.

The last sentence of the seventh paragraph is deleted and replaced with the following:

The use of spuds, which are driven and removed to make a hole for inserting a pile, shall be permitted in Pile Rows "K", "L", and "M", as necessary. Spudding shall be performed for piles in Pile Row "M" to El. -10 ft. The use of other methods for achieving pile advancement through existing riprap shall not be allowed until information regarding equipment/procedures have been submitted and reviewed by the Engineer in accordance with Section 501.015.

The following paragraphs are added for heaved piles:

1. Immediately after a pile is driven, the Contractor shall establish a reference point and its elevation on the pile for the purpose of checking uplift (heave) of the pile tip as additional piles are driven.
2. After all piles within the radius of uplift have been driven, the Contractor shall determine the elevation of the reference point on the pile. If uplift of 1/4 –inch or more has occurred, the pile shall be redriven to its original

elevation, and deeper if necessary, to the specified final driving resistance. After redriving each pile, the Contractor shall re-establish the elevation of the reference point. Redriving shall be repeated as often as necessary until the uplift on any pile is less than 1/4 –inch.

3. The radius of uplift shall be initially assumed to be 30 ft. This radius may be expanded or contracted by the Geotechnical Consultant based on actual field measurements and is defined as the maximum distance between piles such that pile driving causes uplift of 1/4 –inch or more in the affected pile.

The following paragraph is added:

A turbidity curtain and debris boom shall be installed beneath the pier at the location shown on the Plans prior to commencement of any pile driving operations.

The following paragraph is added:

Prior to installation of piles, a pile layout survey shall be conducted to determine which pile stubs from the existing terminal building pile foundation may need to be extracted in order to facilitate pile driving of the new steel pipe piles. Interference between the proposed pile and the existing pile stub(s) shall necessitate pile extraction when the proposed pile cannot be properly driven, whether in its prescribed location or within the location allowed by the following tolerances:

a. Longitudinally along the longitudinal axis of the pile cap: 6 inches
b. Transversely across the width of the pile cap: 2 inches

The following paragraph is added:

Prior to installation of piles, a survey of the existing seawall shall be completed in order to establish a base line location, elevation, and plumbness along the seawall at 20-ft intervals and up to 40 ft away from the first and last pile bent shown on the Plans. The seawall shall be monitored via survey control upon completion of each pile bent (four piles), or as requested by the Resident. A maximum of nine surveys shall be completed during pile installation as part of the work.

The following paragraph is added:

Pile driving shall be limited to the hours of 7:00 AM to 7:00 PM. Preparation for and clean-up of pile driving activities shall be limited to the hours of 6:00AM to 8:00 PM in accordance with the City of Portland's Code of Ordinances (Rev 12-15-10), Chapter 14, Section 14-320.3 Performance Standards.

501.07 Driven Pile Capacity, Pile Testing, and Acceptance

The following paragraph is added:

Dynamic pile load tests (initial drive and restrike) shall be conducted in the presence of the Geotechnical Consultant.

501.09 Splicing Piles

The following paragraph is added:

If pile splices are proposed along the length of the pile in order to achieve the prescribed pile length shown on the Plans, then the pile splices shall be located a minimum of 12 ft below the mudline elevation.

501.11 Method of Measurement

The last paragraph of Subsection "C. Piles in Place," is amended as follows:

No separate measurement will be made for reinforcing steel, excavation, drilling, pre-augering, spudding or other method to advance piles through riprap, cleaning of drilled holes, dewatering or cleaning of pipe piles, drilling fluids, sealing materials, concrete, required casing, and other items required to complete the work. These items shall be incidental to the Steel Pipe Pile In Place pay item.

No separate measurement will be made for pile splices which occur within the estimated length of the pile. Pile splices will only be measured for payment when said splices are required to achieve a pile length greater than the estimated pile length shown on the Plans.

No separate measurement will be made for removal of riprap encountered during the pile installation work, if such removal is deemed necessary to advance the pile. Removal of riprap shall be incidental to the Steel Pipe Pile In Place pay item.

No separate measurement will be made for installation, maintenance, and removal of temporary turbidity curtains and debris booms. These items shall be incidental to the Steel Pipe Pile In Place pay item.

No separate measurement will be made for surveys required to locate existing timber piles, layout the proposed piles or to monitor the existing seawall during pile installation. Surveys shall be incidental to the Steel Pipe Pile In Place pay item.

501.12 Basis of Payment

The sixth paragraph is amended as follows:

Wave equation analyses submittals and any subsequent wave equation analyses re-submittal, required to demonstrate the appropriateness of the driving system, will be incidental to the Pile Driving Equipment Mobilization pay item.

Conical pile tips shall be paid for separately under Pay Item 501.90.

Fusion bonded epoxy coating shall be paid for separately and shall be considered incidental to Pay Item 506.9106, Fusion Bonded Epoxy Coating.

Pile splices which occur within the estimated pile length shown on the Plans will not be paid for separately, but shall be incidental to the Steel Pipe Pile In Place pay item.

Anodes will be paid for separately under Pay Item 655.501, Cathodic Protection by Sacrificial Anodes.

Pile extraction(s) of existing timber piles, if necessary, will be paid for separately under Pay Item 202.40, Remove Embedded Timber Pile by Extraction.

Payment will be made under the following Pay Item:

Pay Item		Pay Unit
501.70	Steel Pipe Pile (16” dia.), Delivered	LF
501.701	Steel Pipe Pile (16” dia.), In Place	LF

END OF SECTION

SECTION 32 01 20 – SAW CUTTING PAVEMENT

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 419 – SAWING AND SEALING JOINTS IN BITUMINOUS PAVEMENT, with the following modifications:

MODIFICATIONS:

419.01 Description

Add the following paragraph:

This work consists of sawing bituminous concrete pavement as shown on the Plans, as specified herein or as approved by the Resident.

419.02 General

Add the following paragraphs:

The bituminous concrete pavement to be sawed shall be accurately marked before cutting. The marking shall be in accordance with the locations as shown on the Plans or as approved by the Resident. Cutting shall be with an approved power driven saw with an abrasive blade.

Unless otherwise noted or directed, the sawcut shall be vertical, a minimum of 3/8 inch wide, and extend to the depth as shown on the Plans.

Residue or debris from the sawing operation shall be removed immediately and legally disposed of by the Contractor.

419.03 Method of Measurement

Add the following paragraph:

Sawing Bituminous Pavement will be measured by the linear foot of pavement actually cut and accepted. No additional payment will be made for variations in the pavement thickness.

419.04 Basis of Payment

Add the following paragraph:

Sawing Bituminous Pavement will be paid for at the Contract unit price per linear foot which shall be full compensation for all materials, tools, equipment labor, and all incidentals necessary for the completion of the work to the satisfaction of the Resident. The disposal of sawcut residue shall be incidental to this item.

Payment will be made under:

Pay Item		Pay Unit
419.30	Saw Cutting Bituminous Pavement	Linear Foot

END OF SECTION

SECTION 32 11 23 – AGGREGATE BASE COURSES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 304 – AGGREGATE BASE AND SUBBASE COURSES, and SECTION 700 – MATERIALS, with the following modifications:

MODIFICATIONS:

304.02 Aggregate

This Subsection is amended by the addition of the following:

Aggregate base course crushed, regardless of depth, shall be made up of aggregate, Type A, as described in Subsection 703.06 of the MaineDOT Standard Specifications.

Aggregate subbase course gravel, regardless of depth, shall be made up of aggregate, Type D, as described in Subsection 703.06 of the MaineDOT Standard Specifications.

304.03 Placing

The first paragraph of this Subsection is deleted and is replaced with the following:

The maximum compacted thickness of any aggregate subbase or aggregate base course layer shall not exceed eight inches.

304.04 Shaping, Compacting, and Stabilizing

The first sentence of the first paragraph of this Subsection is deleted and is replaced with the following sentences:

Within the container storage area and the truck entrance driveway (limits shown on the Plans), compact each aggregate layer until a density of not less than 98% of the maximum density has been achieved for the full width and depth of the layer. Within the passenger vehicle parking lot adjacent to the proposed port office building (limits shown on the Plans), compact each aggregate layer until a density of not less than 95% of the maximum density has been achieved for the full width and depth of the layer.

The second sentence of the first paragraph of this Subsection is deleted and is replaced with the following sentence:

The maximum density shall be determined in accordance with ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort, with self-propelled vibratory compaction equipment.

703.06 Aggregate for Base or Subbase

The last paragraph of this Subsection is deleted and replaced with the following:

Aggregate subbase shall not contain particles of rock which will not pass the 4-inch square mesh sieve.

END OF SECTION

SECTION 32 12 13 – TACK COATS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 409 – BITUMINOUS TACK COAT, with the following modifications:

MODIFICATIONS:

409.02 Bituminous Material

This Subsection is deleted in its entirety and replaced with the following:

Tack Coat shall conform to the Specifications for Emulsified Asphalt RS-1, of the AASHTO Designation M-140.

409.05 Equipment

Add the following text:

Add "or as determined by the Resident", after the words "gal/yd^2]" in the fourth line of the second paragraph of this Subsection.

409.06 Preparation of Surface

Add the following paragraph:

All existing pavement and shoulder areas on which bituminous pavement mixtures are to be placed shall receive a tack coat. The surface area where the tack coat is to be applied shall be dry and cleaned of all dirt, sand, and loose material. Cleaning shall be accomplished by use of revolving brooms or mechanical sweepers. Undesirable material not removed by the above means shall be cleaned by hand-brooming or scraping, or a combination of both. Small areas otherwise inaccessible may be broomed with hand brooms. The tack coat shall be applied only when the existing surface is dry.

409.08 Method of Measurement

Add the following paragraphs:

Measurement will be based on delivery slips made out in duplicate by the Contractor and signed by the Resident, or his representative, at the point of delivery. One of these slips shall be retained by the Resident and one by the Contractor. Delivery slips shall be furnished by the Contractor and shall provide space for identifying the vehicle and driver, for stating the volume of material, the source of the material, the date, and the Resident or his representative's signature.

Material included in the delivery slips and not used or rejected shall be deducted from the amount being measured for payment. Each day's delivery slips shall be reconciled by the Contractor and the Resident within 24-hours.

Cleaning of the surface area where tack coat is to be applied shall be incidental to Item 409.15, Bituminous Tack Coat, Applied.

END OF SECTION

SECTION 32 12 16 – FLEXIBLE ASPHALT PAVING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 403 – HOT BITUMINOUS PAVEMENT, and SECTION 401 – HOT MIX ASPHALT PAVEMENT, with the following modifications:

MODIFICATIONS to SECTION 403 HOT BITUMINOUS PAVEMENT:

403.03 Construction

Add the following tables after the first paragraph:

TABLE 1
35 inch – Full Depth Pavement Reconstruction in Container Stoarge Area

Description of Course	Gradation Design	Item Number	Bituminous Content % of Mix	Total Thickness	Number of Layers	Complementary Notes
Surface	12.5 mm	403.208	NA	1-1/2 in.	1	1, 2, 3
Surface	12.5 mm	403.208	NA	1-1/2 in.	1	1, 2, 3
Base	19.0 mm	403.207	NA	3 in.	1	1, 2
Base	19.0 mm	403.207	NA	3 in.	1	1, 2

TABLE 2
30 inch – Full Depth Pavement Reconstruction in Container Stoarge Area and Truck Entrance

Description of Course	Gradation Design	Item Number	Bituminous Content % of Mix	Total Thickness	Number of Layers	Complementary Notes
Surface	12.5 mm	403.208	NA	1-1/2 in.	1	1, 2, 3
Surface	12.5 mm	403.208	NA	1-1/2 in.	1	1, 2, 3
Base	19.0 mm	403.207	NA	3 in.	1	1, 2
Base	19.0 mm	403.207	NA	3 in.	1	1, 2

TABLE 3
18 inch – Full Depth Pavement Reconstruction in Passenger Vehicle Parking Lot, and
3 inch – Partial Depth Pavement Patch

Description of Course	Gradation Design	Item Number	Bituminous Content % of Mix	Total Thickness	Number of Layers	Complementary Notes
Surface	12.5 mm	403.208	NA	1-1/2 in.	1	1, 2, 3, 4
Surface	12.5 mm	403.208	NA	1-1/2 in.	1	1, 2, 4

Complementary Notes:

1. The bituminous binder material for this mixture shall be PG 64-28.
2. Section 106.6, Acceptance, (2) Method C.
3. Joints shall conform to Subsection 401.17, below.
4. 3-inch Partial Depth Pavement Patch occurs at Reefer Plug area, U.S. Customs Building, and Concrete Foundation.

403.035 Composition of Mixture

This Subsection is added and shall include the following:

The Contractor shall submit a current MaineDOT approved job mix formula to the Resident at least 30 days prior to the placement of bituminous pavement. Submission shall include a description of where the submitted mix is currently in use on a MaineDOT Project. Bituminous pavement shall not be placed until after the job mix formula is approved by the Resident

MODIFICATIONS to SECTION 401 HOT MIX ASPHALT PAVEMENT:

401.06 Weather and Seasonal Limitations

This Subsection is deleted in its entirety and replaced with the following:

The Contractor shall not place hot mix asphalt on a wet or frozen surface and the air temperature shall be 45ºF or higher.

401.17 Joints

Add the following sentence:

All cold joints with temperatures less than 120°F shall be sealed as specified herein.

The fourth paragraph is amended as follows:

The words "emulsified asphalt" are deleted and replaced with "joint sealant, conforming to Federal Specification SS-S-1401C".

The following sentence is added after the last paragraph:

The Contractor shall submit to the Resident a manufacturer's certification for the joint sealant (SS-S-1401C).

401.204 Opening to Loads

This Subsection is added and shall include the following:

No vehicular traffic , equipment, or construction loads shall be permitted on newly completed pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. The newly paved area may be opened to loads after the internal temperature of the pavement has cooled to 120°F. The Resident will test the internal temperature of the pavement and shall be the sole judge as to the opening to loads. The period of time before opening to loads may be extended at the discretion of the Resident. Loads shall not be permitted until the internal temperature of the pavement has cooled to 120°F.

401.205 Additional Lifts of Pavement

This Subsection is added and shall include the following:

No additional lifts of pavement shall be permitted on a newly completed pavement layer until the material has cooled sufficiently and adequate stability has been attained to prevent mat distortion or loss of fines. No subsequent lift of pavement shall be placed until the internal temperature of the previously placed pavement layer has cooled to 120^{o}F. The Resident will test the internal temperature of the previously placed pavement layer and shall be the sole judge as to whether a subsequent lift of pavement can be placed. No loads will be permitted on the compacted pavement layer until the internal temperature has cooled to 120^{o}F.

END OF SECTION

SECTION 32 16 14 – PRECAST CONCRETE CURBS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 609 – CURB, with the following modifications:

MODIFICATIONS:

609.01 Description

This Subsection is deleted and replaced with the following:

Provide labor, materials, equipment, and services necessary for proper and complete installation of precast concrete curb and related items as indicated on the Plans and as specified herein. Precast concrete curb is required on portions of the existing concrete pier; along the edge of one existing ramp; and along the edge of the proposed pier section.

609.02 Materials

The following paragraph is added:

Concrete shall contain 5.0 gallons per cubic yard of calcium nitrite corrosion inhibitor. Steel reinforcement shall be epoxy coated. Fasteners shall be ASTM A307 or A325 with hot dipped galvanized coating.

609.03 Portland Cement Concrete Curb, Terminal Sections and Transition Sections

This Subsection is deleted and replaced with the following:

a) Installation: Precast concrete curb shall be placed in sections at the areas illustrated in the Plans. A neoprene pad shall be installed between the contact points of the curb and the support below. For concrete curb continuously supported by the concrete deck, the neoprene pad shall extend the full length of the contact area. Neoprene pad shall conform to Subsection 713.03.

b) Joints: Joints between precast elements shall be as shown on the plans. Joints shall be thoroughly wetted with clean water and filled with mortar.

c) Connection: Precast concrete curb shall be fastened using threaded steel hardware and mechanical inserts placed in the side of the supporting member. Cast-in inserts shall be Hilti HCI-WF or approved equal. Threaded fasteners shall be hot dipped galvanized, ASTM A307 or A325 rods or bolts, respectively, hand-tightened. Coat threaded portion of the fasteners with a never-seize lubricant prior to installation.

d) Finish: Recessed holes in the sides of concrete curbs for fasteners shall be plugged or capped to provide a weather-tight seal (such as a plastic insert cap with a bead of silicone caulking. The top and side concrete surfaces of the curb shall be coated with a protective coating in accordance with SECTION 09 97 23, Concrete and Masonry Coatings.

609.09 Method of Measurement

This Subsection is deleted and replaced with the following:

Curb will be measured by the linear foot along the front face of the curb, complete, in place, and accepted. All materials including neoprene pads, fasteners, mechanical anchors, drilling, and filler material will not be measured separately but shall be incidental to the Precast Concrete Curb pay item.

609.10 Method of Payment

This Subsection is deleted and replaced with the following:

The accepted quantities of precast concrete curb will be paid for at the contract unit price per linear foot. There will be no separate payment for cement, reinforcement, corrosion inhibitor, neoprene pads, mechanical anchors, drilling for and setting mechanical anchors, and filler material; these will be considered included in the work of the curb. Concrete coating will be paid for under Pay Item 515.202, Clear Protective Coating for Concrete Surfaces.

Payment will be made under the following Pay Item:

Pay Item	Pay Unit
609.30 Precast Concrete Curb for Pier	LF

END OF SECTION

SECTION 32 16 15 –GRANITE AND BITUMINOUS CURBS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 609 – CURB, with the following modifications:

MODIFICATIONS:

609.01 Description

This Subsection is deleted and replaced with the following:

Provide labor, materials, equipment, and services necessary for proper and complete installation of all granite curb and related items as indicated on the Plans and as specified herein. The type of granite curb to be used shall be:

1. MaineDOT Type 1 – Stone curbing of quarried granite stone

Provide labor, materials, equipment, and services necessary for proper and complete installation of bituminous curb and related items as indicated on the Plans and as specified herein. The type of bituminous curb to be used shall be:

2. MaineDOT Type 3 – Bituminous curbing

609.03 Vertical Stone Curb, Terminal Section and Transition Sections

The first paragraph is deleted and replaced with the following:

a) Installation: The curb stone shall be set on a compacted foundation so that the front top arris line conforms to the lines and grades required. Set curbing in 18-inch wide trench, with trench bottoms at 6 inches below bottom of curb. Set the curb with vertical face plumb and curb top parallel to adjacent surface. The foundation shall be prepared in advance of setting the stone by grading the proper elevation and shaping to conform as closely as possible to the shape of the bottom of the stone. The required spacing between stones shall be assured by the use of an approved spacing device to provide an open joint between stones of at least 1/4-inch and no greater than 1/2-inch.

END OF SECTION

SECTION 32 16 20 – CONCRETE WALKWAYS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 608 – SIDEWALKS, with the following modifications:

MODIFICATIONS:

608.01 Description

This Subsection is deleted and replaced with the following:

Provide labor, materials, equipment, and services necessary for proper and complete installation of all concrete walkways and tip-downs as indicated on the Plans and as specified herein. Concrete walkways and tip-downs are located along the proposed truck entrance and between the proposed office building and the proposed parking lot.

The term, "sidewalk," as stated in SECTION 608 of the MaineDOT Standard Specifications shall be revised to "walkway," as stated herein and described on the Plans.

608.02 Materials

The second paragraph is deleted and replaced with the following:

Portland cement concrete for walkways and tip-downs shall be 4,500 psi and shall meet the requirements of SECTION 03 30 00, Cast In Place Concrete.

608.06 Basis of Payment

This Subsection is deleted and replaced with the following:

The accepted quantities of Reinforced Concrete Walkways will be paid for at the contract unit price per square yard for portland cement concrete walkway.

All work associated with installing Reinforced Concrete Walkways and tip-downs including: excavating of existing ground; expansion joint filler material; epoxy coated steel reinforcement; base and subbase course material, compaction, necessary incidentals, and final surfacing will not be paid for separately but the cost thereof shall be included in the cost of the Reinforced Concrete Walkways pay item.

Concrete coating of walkways and tip-downs will not be paid for under Reinforced Concrete Walkways, but shall be incidental to Protective Coating for Concrete Surfaces, Pay Item 515.205.

Granite curb for walkways and tip-downs shall be incidental to the Granite Curb Pay Item, 609.11 and 609.12.

Payment will be made under:

Pay Item	Pay Unit
608.081 Reinforced Concrete Walkways	Square Yard

END OF SECTION

SECTION 32 17 23 – PAVEMENT MARKINGS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 627 – PAVING MARKINGS, with the following modifications:

MODIFICATIONS:

Section 627.01 Description

The following paragraph is added:

This work shall specifically include pavement markings within the office building parking lot; the crosswalk in front of the primary truck entrance along Commercial Street; and all facility markings within the container storage area. Also included are the pile bent markings atop the proposed portion of the pier. Markings to be made on portions of the existing concrete ramps leading up to the pier shall be considered part of Bid Alternate No. 3.

Section 627.02 Materials

This Subsection is deleted and replaced with the following:

Pavement marking paint shall be 100% acrylic, low VOC, fast drying, white, yellow, and blue waterborne traffic paint. The paint shall be formulated and processed specifically for service as a binder for beads, in such a manner as to produce maximum adhesion, refraction, and reflection. Any capillary action of the paint shall not be such as to cause complete coverage of the beads. The binder shall be 100% acrylic, as determined by infrared analysis according to ASTM D2621. VOC levels shall comply with ASTM D3960. Lead percentage shall comply with ASTM D3335. The paint shall be rated as non-combustible.

Section 627.09 Method of Measurement

The following paragraphs are added:

The Pavement Markings in Office Parking Lot and Driveways shall be measured by the lump sum, and shall include the white stall striping, blue striping with handicap symbols, the crosswalk, and the white stop line at the parking lot exit.

The Pavement Markings in Container Storage Lot shall be measured by the lump sum, and shall include all white and yellow paint marks as shown on the Plans.

The Pavement Markings on Existing Concrete Pier shall be measured by the lump sum, and shall include all yellow paint marks as shown on the Plans.

Section 627.10 Basis of Payment

The following paragraphs are added:

The accepted quantity of Pavement Markings in Office Parking Lot and Driveways will be paid for at the Contract lump sum price, and shall include the white stall striping, blue striping with handicap symbols, the crosswalk, the white stop line at the parking lot and truck driveway exits, and the white crosswalk across the truck driveway.

Pavement markings within the container storage lot, on the proposed pier, and on the existing concrete pier ramps will comprise Bid Alternate No. 3 as defined below.

Payment will be made under the following Pay Item:

Pay Item		Pay Unit	
627.901	Pavement Markings in Office Parking Lot and Driveways	Lump Sum	
627.902	Pavement Markings in Container Storage Lot	Lump Sum	(Bid Alt. No. 3)
627.903	Pavement Markings on Existing Concrete Pier	Lump Sum	(Bid Alt. No. 3)

END OF SECTION

SECTION 32 31 00 – FENCES AND GATES

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 607 – FENCES, with the following modifications:

MODIFICATIONS:

607.01 Description

Add the following paragraph:

The work shall also include the installation of new fence posts with concrete foundations for the resetting of the existing 8-ft tall security chain link fence as shown on the Plans.

The work shall also include temporary fencing used during the duration of the project. Temporary fencing will consist of two types: 1) A 6-ft tall moveable chain link fence with individual panels; and 2) A 4-ft tall chain link fence with three-strand barbed wire mounted on a concrete jersey barrier.

Temporary fence 6-ft tall shall be used throughout the site: at the pier; at the contractor staging area; and within the facility, as indicated on the Plans to form the boundary of the Primary Construction Zone. Temporary fence 4-ft tall with concrete barrier will be placed along Commercial Street.

607.02 Materials

Replace the fifth paragraph with the following:

Concrete for anchoring metal posts shall meet the requirements of Section 03 30 00, Cast In Place Concrete.

607.03 General

Add the following paragraph:

Gate posts for the 24-ft sliding cantilever gate shall be 4" O.D. round Schedule 40 with the exception of the removable post which is indicated on the Plans.

Metal fence posts sizes shall be in accordance with MaineDOT Standard Details for fence posts.

607.05 Chain Link Fence

Add the following sentences to the outlined section as indicated:

b. Gates: The 24-ft sliding cantilever gate system shall be manufactured by Tymetal Corp or an owner approved equivalent.

e. Barbed Wire: All permanent and temporary fencing and gates shall be equipped with 3 strands of barbed wire with the exception of the 6-ft temporary movable panels. In the event that barbed wire cannot be salvaged from fence called out to be removed and reset, the contractor will provide new barbed wire at no additional cost.

607.06 Method of Measurement

Add the following paragraphs:

b. Gates: The 24-ft sliding cantilever gate system shall be manufactured by Tymetal Corp or an owner approved equivalent.

Metal fence posts with concrete foundations installed for resetting the 8-ft tall security chain link fence shall not be measured separately but rather shall be incidental to the Remove and Reset Chain Link Fence pay item.

Measurement for the Special Removable Gate Post shall include all labor, equipment, and materials necessary to completely fabricate and install the gate post in accordance with the Plans and Specifications. The work shall include all excavation, concrete, steel reinforcement, steel pipe, bracket assemblies, caps, lifting eye hooks, and painted lettering.

Measurement for the Special Security Gate Post shall include all labor, equipment, and materials necessary to completely fabricate and install the fence post in accordance with the Plans and Specifications. The work shall include all excavation, concrete, steel reinforcement, miscellaneous steel and mounting brackets (for security camera), steel pipe, and caps.

607.07 Basis of Payment

Add the following two paragraphs:

Concrete Jersey barriers used in conjunction with the 4-ft tall chain link fence for temporary fencing will be paid for under Pay Item 526.301, Temporary Concrete Barrier, Type 1.

Special Removable Gate Post shall be paid by the lump sum Contract price complete in place. Payment will be full compensation for furnishing and assembling all materials, for excavating and backfilling holes, and for all incidentals necessary to complete the work.

Special Security Gate Post shall be paid by the lump sum Contract price complete in place. Payment will be full compensation for furnishing and assembling all materials, for excavating and backfilling holes, for miscellaneous steel plates and mounting devices for security camera, for electrical handhole, and for all incidentals necessary to complete the work.

Payment will be made under the following Pay Items:

Pay Item		Pay Unit
607.1601	Temporary Chain Link Fence - 4 ft	Linear Foot
607.1701	Temporary Chain Link Fence - 6 ft Movable	Linear Foot
607.2301	Temporary Chain Link Fence Gate	Each
607.25	Remove and Reset Chain Link Fence	Linear Foot
607.2501	Remove Chain Link Fence	Linear Foot
607.490	Chain Link Gate – 16-ft Swing	Each
607.4911	Motorized Slide Gate 24 ft	Each
607.4921	Remove Gate and Motors	Each
607.493	Remove and Reset Motorized Slide Gate 14 ft	Each
607.501	Special Removable Gate Post	Lump Sum
607.502	Special Security Gate Post	Lump Sum

SECTION 32 33 00 – SITE BOLLARDS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

Section 832.3300 Description

The following paragraph is added:

The work shall consist of installing nine owner-supplied large steel site bollards as shown in the Plans at the reefer unit location adjacent to the RUBB Building. The site bollards are currently located adjacent to the Maintenance Building along the inboard side of the seawall.

Section 832.3320 Method of Measurement

The following paragraph is added:

Resetting Large Steel Site Bollard shall be measured by the lump sum, and shall include all excavation, setting, and backfilling of the site bollards in the location shown on the Plans.

Section 832.3330 Basis of Payment

The following paragraph is added:

Resetting Large Steel Site Bollard shall be paid for by the lump sum at the Contract price. Payment shall include all hauling, excavation, setting, and backfilling of the site bollards. Resetting Large Steel Site Bollards shall comprise Bid Alternate No. 5.

Payment will be made under the following Pay Items:

Pay Item		Pay Unit
841.50	Resetting Large Steel Site Bollard	Lump Sum (Bid Alternate No. 5)

END OF SECTION

SECTION 32 91 19 – LOAM

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 615 – LOAM, with the following modifications:

MODIFICATIONS:

Section 615.01 Description

The following paragraph is added:

Loam is required as part of the landscaping along Commercial Street in areas adjacent to the proposed office building and proposed passenger vehicle parking area.

END OF SECTION

SECTION 32 92 19 – SEEDING AND MULCHING

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 618 – SEEDING, and SECTION 619 – Mulching, with the following modifications:

MODIFICATIONS to SECTION 618, SEEDING:

Section 618.01 Description

The following paragraph is added:

Seeding is required as part of the landscaping along Commercial Street in areas adjacent to the proposed office building and proposed passenger vehicle parking area.

MODIFICATIONS to SECTION 619, MULCHING:

Section 619.01 Description

The following paragraph is added:

Mulching is required as part of the landscaping along Commercial Street in areas adjacent to the proposed office building and proposed passenger vehicle parking area.

END OF SECTION

SECTION 32 93 00 – LANDSCAPE ESTABLISHMENT

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 621 – LANDSCAPING, with the following modifications:

MODIFICATIONS:

621.01 Description

Add the following paragraphs:

This work includes planting trees and shrubs along the street frontage immediately in front of and alongside the proposed office building, in the approximate locations shown on the Plans, and as directed by the Resident. Table 1 below indicates the type of trees and shrubs to be used in the landscape design:

This work also includes the establishment of a raised stone wall bedding area for the Office Building Exterior Sign along the frontage of Commercial Street as shown on the Plans. The work shall include all labor, materials, and equipment to adequately complete the stone wall, foundation elements to support the sign, electrical connections for lighting, lighting materials, and bedding materials. Plants within the landscaped border area are not included as these will be placed by others after construction.

This work shall also include purchase and installation of a standard bike rack in accordance with the City of Portland's Standard Bike Rack for a minimum of two bikes to be installed on a concrete surface.

For exterior signs within the landscaped areas around the office building, including the Exterior Building Sign, the Visitor Entrance Sign, and the Stop Sign, see SECTION 10 14 00.

621.0037 Method of Measurement

Add the following paragraphs:

Landscaped Border and Foundation for Office Building Exterior Sign will be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. The work shall include completion of the stone wall, foundation elements to support the sign, electrical connections for lighting, and bedding materials. All excavation and backfilling shall be incidental to the relevant earthwork pay items.

Bike Rack shall be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

Resetting of the large steel anchor shall not be measured as part of Landscaping Establishment, but rather shall be incidental to the Removing, Storing, and Resetting Objects Pay Item, 202.211.

Concrete Walkways and Tip-Downs; Granite Curbs; and Exterior Signs shall not be measured as part of Landscaping Establishment, but rather shall be incidental to the Removing, Storing, and Resetting Objects Pay Item, 202.211.

621.0038 Basis of Payment

Add the following table:

TABLE 1
Shrubs and Plants Quantities Listing

Description of Shrub or Plant	Pay Item Number	Unit	Species Qnty	Item Qnty
Deciduous Tree, 6ft to 8ft Tall, Class A	621.126	EA	2	2
Shrub, 2ft Tall	621.5352	EA	10	10
Establishment Period – Two Year	621.80	LS		1

Add the following Pay Item:

Payment will be made under the following Pay Items:

Pay Item		Pay Unit
621.126	Deciduous Tree, 6 ft to 8 ft Tall, Class A	Each
621.5352	Shrub, 2 ft Tall	Each
621.80	Establishment Period – Two Years	Lump Sum
621.901	Landscape Border and Foundation for Office Building Exterior Sign	Lump Sum
621.951	Bike Rack	Lump Sum

END OF SECTION

SECTION 33 11 00 –WATER UTILITY DISTRIBUTION

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

833.1100 Water Utility Distribution

Add the following:

PART 1 GENERAL

1.01 SUMMARY

A. Description of Work: Provide labor, materials, equipment, and services necessary for proper and complete installation of the water distribution system as indicated on the drawings and as herein specified including the following items:

1. Pipe, fittings, and appurtenances for site water line including domestic water line, and fire water line.
2. Anchors.
3. Thrust restraints.
4. Valves and valve boxes.
5. Positive displacement meters.
6. Underground pipe markers.
7. Bedding and cover materials.
8. Disinfecting and testing the system.
9. Required accessories.
10. Connection to existing water system.

B. The Contractor shall attain all permits and pay all fees associated with connection to the existing utilities and inspections by the City of Portland and the Portland Water District.

C. Related Sections:

1. Section 31 20 00 – Earthworks
2. Section 31 25 13 – Erosion Control

1.02 REFERENCES

A. Portland Water District latest Standards and Specifications.

1.03 SUBMITTALS

A. Submittals shall be prepared and submitted in accordance with MaineDOT Standard Specifications Section 105.7, Working Drawings.

B. Product Data: Submit manufacturer's technical product data on all material to be furnished showing dimensions, joints, and other details.

C. Submit Product Data to the Portland Water District and the Engineer. Approval from the Engineer is required prior to ordering materials.

D. Supply the Owner with all testing submittal requirements of the Portland Water District.

1.04 CLOSEOUT SUBMITTALS

A. Comply with the requirements of MaineDOT Division 100, General Conditions.

B. Project Record Documents (As-Built Drawings):

1. Accurately record actual constructed locations and depth of piping mains, stubs, valves, connections, thrust restraints, and appurtenances. Submit scaled drawings to the Engineer.

2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 QUALITY ASSURANCE

A. Comply with the requirements of MaineDOT Division 100, General Conditions.

B. Documents affecting Work of this Section include, but are not necessarily limited to; the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda, and all Sections of Division 1 are hereby made a part of this Section.

C. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.

D. All Work shall comply with the requirements of the Maine Department of Environmental Protection, the Cumberland County Soil and Water Conservation District Standards, and U.S. Environmental Protection Agency NPDES Permit requirements, to minimize adverse environmental impacts. Reference is made to the Erosion and Sedimentation Control Report and Plan included in the Plan set for this project. Strict adherence to the Specifications and Plans is required in order to prevent adverse downstream impacts

E. All Work shall comply with the conditions of the Maine DEP stormwater permit by rule and the Maine General Construction Permit.

F. Perform all Work in accordance with the Portland Water District waterline/water system standards and specifications.

G. Installation will be observed by the Resident and the Portland Water District.

H. The Contractor shall bear all cost associated with correcting any Work that does not meet the requirements of this Section or any damages to property outside the limits of Work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with the requirements of MaineDOT Division 100, General Conditions.

B. Deliver and store valves in shipping containers with labeling in place.

C. Any damage to pipe and fitting coatings shall be repaired or replaced as directed by the Engineer.

D. Pipe, and all water system appurtenances that are damaged or disturbed through any cause prior to acceptance of the work shall be repaired, realigned or replaced as required by the Engineer.

PART 2 PRODUCTS

2.01 WATER PIPING

A. All water service materials shall be in conformance with the Portland Water District latest Standards and Specifications.

B. The 4-inch and 6-inch water services shall be as listed below.

C. PVC Water Pipe:

1. For all water main installations that are less than 4" I.D. (4" and larger use ductile iron), the District will require use of 2" I.D. PVC plastic water pipe meeting the following: Under special site conditions the District does require the use of C-900 PVC in sizes larger than 4".

2. Pipe Specifications (2"):

a. Diameter:
   1) The I.D. shall be a minimum of 2"
   2) The O.D. shall be a maximum of 2.38"
   3) The minimum wall thickness shall be 0.113"

b. Pressure Rating
   1) The minimum working pressure rating shall be 200 PSI (SDR-21).
   2) The pipe shall conform to standard ASTM 2241.

c. Pipe Length
   1) The pipe shall be provided in 20' lengths. Shorter lengths may be allowed and/or field cut following manufacturer's recommended procedures.

d. Gaskets
   1) The gasket or O-Ring material shall be rubber meeting ASTM F 477 and of the "permanent use" type.

3. Fittings:
   a. Standard AWWA C900 fittings are not available in the 2" I.D. and therefore "steel pipe" class fittings, or Certa-Lok Yelomine couplings and fittings meeting ASTM D 3139 shall be used.
   b. The normal nomenclature for "steel fittings" is Schedule 40 or Schedule 80, with the respective pressure ratings of 280 PSI and 400 PSI. Both of these fitting classes are acceptable for use.

4. Service Connections:
   a. All service connections shall be made with tapping saddles* per Portland Water District specifications or by use of tees meeting the above noted fitting specifications.

5. Installation:
   a. Follow manufacturer's instructions.
   b. An eight gauge bare copper wire shall be fastened to the buried PVC pipe to facilitate electronic pipe locating. The wire shall be fastened at two locations per length and not at any joint.

6. The District requires 200 PSI (SDR-14) PVC pipe for other sizes such as 4”, 6”, 8”, and 12”. Pipe shall conform to AWWA C900.:

7. Approved Manufactures are:
   a. J-M Manufacturing – Blue Brute
   b. Certainteed – Yelomine
   c. Victaulic – Aquamine
   d. IPEX – Blue Brute

D. Pipe Joint Restrainer.

1. Use in conjunction with mechanical joint fittings.

2. The joint restraint ring and its wedging components shall be made of ductile iron conforming to ASTM A536-80.

3. Dimensions of the restrainer must allow use with standard M.J. bell conforming to AWWA C111 and AWWA C153.

4. Restrainer must restrain up to 350 psi of working pressure in 3” to 16” sizes and 250 psi of working pressure in 18” to 48” sizes with a 2:1 safety factor.

5. Torque limiting twist off nuts shall be used to ensure proper actuation of the restraining wedges (used on a, b, and c below), from the Approved Manufacturers:
   a. Sigma Super Lug
   b. Ford Uni Flange Series 1400
   c. Ebba Mega Lug
   d. Romac Grip Ring
   e. Star Grip Series 300
   f. Romac Romagrip

g. MJ Field Lok Gasket

E. Restrained Joint Gasket: .

1. All accepted restrained joint gaskets in the Portland Water District distribution system shall be rated in accordance with the performance requirements of ANSI/AWWA C111/A21.11.

2. Required Applications:
   a. any hydrant branch or service with a distance greater than 18 ft shall have an approved restrained joint gasket in the bell ends.
   b. Where a casing is required, all joints within the casing shall have an approved restrained joint gasket unless restrained joint pipe is used.
   c. At any time as required by a PWD Engineer.
   d. Any live service tap where there is a joint between the connection and the end of the service.

3. Approved Manufacturers:
   a. American Fast-Grip Gasket – American Pipe
   b. Field Lok 350 Gasket – US Pipe

2.02 FIRE HYDRANT

A. Barrel length(s) shall be:
   a. 6 ft. cover, 6-1/2 ft. bury; or
   b. 5-1/2 ft. cover, 6 ft. bury, or
   c. 5 ft. cover, 5'-6" bury

B. Bolts:
   a. all buried mechanical joint bolts and nuts (T-head, etc.) shall be Cor-Ten or equal;
   b. all buried flange joint bolts shall be stainless steel (Type 304) or silicone bronze.

C. Flow Indicator Collars: PWD personnel shall install flow indicator collars on all new hydrants.

D. Field Test of Installed Hydrant.

1. Hydrant flow shall completely stop with no more than 200 ft. lb. of torque applied to the operating nut.

2. Failure to shut completely at no more than 200 ft. lb. of torque will be cause for rejection of that hydrant.

2.03 RESILIENT SEATED GATE VALVE

A. Valve shall meet the latest revision of the AWWA C-509 Standard.

B. Valve shall have a smooth unobstructed water way which shall be a minimum diameter of the valve.

C. Valve ends to be specified and shall be furnished with Cor-ten (or equal) bolts and nuts.

D. Valve shall be rated for zero leak rate at 200 psi differential working pressure and have a 400 psi hydrostatic test for structural integrity.

E. Sealing - Valve shall have a minimum of 2 "O" rings situated such that the "O" rings above the thrust collar can be replaced with the valve under pressure and in the open position.

F. Stem – Valve stem shall:

1. Open right with a stem nut made of grade D, E manganese bronze;

2. Be non-rising

3. Be designed with a thrust collar integrally cast to the stem;

4. Be designed with two (2) thrust washers, placed one above and one below the stem thrust collar;

5. Be constructed of grade D, E manganese bronze;

6. Be such that the thrust washers are made of a synthetic polymer with physical properties required.

G. Valve Body: The body, including the stuffing box and the bonnet, shall be constructed of cast iron or ductile iron, meeting the latest revision of AWWA C153.

H. Valve Wedge:

1. Shall be constructed of ductile iron (less guiding mechanism);
2. Shall be fully encapsulated and permanently bonded with a resilient elastomer;
3. Shall be constructed such to allow the flushing of any interior exposed surface during operations.

I. Coatings:

1. The internal and external valve body, including the stuffing box, bonnet, and interior of the wedge shall be fusion bonded epoxy coated with 8 mils DFT;
2. The interior shall meet the latest version of AWWA C550;
3. Shall be holiday free, interior and exterior, per testing method described in AWWA C550, Section 5.1.

J. Operating Nut:

1. Shall be 2-inch square ductile iron;
   a. With a countersunk hold down nut (made of 316 stainless steel or silicone bronze). This applies to stems that are tapered; or
   b. With a stainless steel pin inserted thru the stem. This applies to stems of full diameter.

K. Bolts:

1. The seal plate and bonnet bolts shall be stainless steel (Type 316 or Type 304);

L. Valves 12" nominal diameter and smaller shall be directly operated by the nut on the valve stem and mounted vertically. Number of turns to open or close shall closely match the formula: (3 x D) + 2. For example, a 12" valve should open or close with approximately (3 x 12) + 2 = 38 turns of the operating nut.

M. Valves larger than 12" nominal diameter shall be designed to be installed horizontally and shall have bevel gear operators driven by the operating nut. Valves 14" - 24" nominal diameter shall have 4:1 bevel gear operators. Valves with 30" - 36" nominal diameters shall have 6:1 bevel gear operators and valves with 42" - 48" nominal diameters shall have 8:1 bevel gear operators. Number of turns to open or close shall closely match the formula: ((3 x D) + 2) times the bevel gear ratio. For example, a 24" valve should open or close with approximately ((3 x 24) + 2) x 4 = 296 turns of the operating nut.

N. General Provisions:

1. Vendor shall identify any and all exceptions to the specifications.
2. Vendor shall provide standard brochures for item quoted.
3. Vendor may be required to supply a valve for inspection and determination of coating process.

O. Approved Resilient Seated Gate Valves:

1. USP
2. AFC Series 2500
3. Mueller A-2360/61
4. Clow Series F6100

2.04 SERVICE BOX AND ROD

A. Reference is made to the Standard Details.

B. Service Box – Approved Manufacturers: Laroche, Clow Canada, and Bibby

1. Shall be 1.0” Schedule 40 steel pipe with top having 1.0” NPT pipe threads for screw-on cover or coupling.
2. Shall be Erie style with 6ft slide-type riser.
3. Any extension of a service box requires a threaded merchant coupling with no set screw.

C. Service Box Cover – Approved Manufacturers: Laroche, Clow Canada, QWP, and Bibby

1. Shall be Quincy type (heavy duty) cover that screws on Service Box (1.1 above).
2. Shall be tapped with a 1" rope thread with a solid brass plug with pentagon operating head.

D. Service Box Foot Piece – Approved Manufacturers: Laroche

1. The standard foot piece shall be heavy duty (Ford style or equal) cast iron design.
2. The large, heavy-duty foot piece shall have an arch that will fit over 2" ball-valve curb stops.

E. Service Rod – Approved Manufacturers: North American Manufacture

1. Shall have a self aligning design.
   a. 36" length for all services.
   b. 24" length for air valves.
2. Shall be round and constructed of stainless steel (304) with an epoxy coating (minimum 4 mil DFT).
3. Shall have a yoke design that is an integral part of the rod.
4. The curb-stop attachment pin shall be a brass cotter pin.
5. The rod "wrench-flat" shall have a minimum thickness of 1/4" tapered to 1/16" and width of 5/8" or 1/2".
6. Diameter
   a. 1/2", 3/4" and 1" services use 1/2" diameter.
   b. 1 1/2" and 2" services use 5/8" diameter.

2.05 SERVICE SADDLES

A. The following is for use with Ductile Iron Pipe.

1. The service saddle shall have the "larger sized" body, the same as associated with the "service repair" saddle, which shall have a minimum diameter of 6 in. and multiple "O" ring type sealing.
2. The saddle body shall be constructed of epoxy coated ductile iron.
3. The sealing gasket(s) shall be either Buna-N rubber or SBR rubber (ASTM D2000).
4. Service saddles shall be installed with all 1 1/2" and 2" corporation stops (cc only).
5. Approved Manufacturers:

Size	Tap	Saddle
2" - 2-1/4"	3/4", 1" cc	Smith-Blair 315, Ford FC 202
4" - 12" D.I.	3/4"-1-1/2" cc	Smith Blair 331
4" - 12" D.I.	2" cc	Smith-Blair 313
16"	3/4"-2" cc	Smith-Blair 313
20" - 36"	3/4"-2"cc	Smith-Blair 366

B. The following is for use with PVC Pipe.

1. Stainless steel straps will be used on saddles on C900 PVC Pipe.
2. Approved Manufacturers

Size	Tap	Saddle
2" - 2-1/4"	3/4", 1" cc	Smith-Blair 315, Ford FC 202
4"-12"		Smith-Blair 265

C. The following is for use with HDPE Pipe.

1. Spring washers are required for service saddles on HDPE Pipe.
2. Approved Manufacturers

Size	Tap	Saddle
4"-12"		Smith-Blair 265

2.06 TAPPING SLEEVES

A. For sizes 16” and larger tapping sleeve shall be fabricated steel:

1. Body and flange A36.
2. Coating – Fusion bonded epoxy coating with minimum D.F.T. of 5 mils, inside and out.
3. Bolts, Nuts Stainless Steel (Type 304).
4. Gaskets - SBR.
5. Flange – AWWA Class D plate flange with ANSI 150# drilling, proper recessing for tapping vavles.
6. Sleeves shall be provided with 3/4" F.I.P.T. test port and plug.

B. Approved Manufacturers (4” – 12”):

1. AFC.
2. Mueller Co..
3. U.S. Pipe.
4. Tyler / Union.
5. Powerseal Model 3490 and 3490MJ (Fabricated Steel).

C. Approved Manufacturers (16” and larger):

1. Romac FTS 420.
2. Ford FTSC.
3. Smith Blair 622.
4. JCM 412.
5. Powerseal Model 3490 and 3490MJ (up to 24”).
6. JCM 415 or approved equal (for RCCP pipe only)

2.07 VALVE BOXES

A. Reference is made to the Standard Details.

B. The valve box bottom section shall be slide-type with bell-type base with bottom lip. Manufacturer: North American Manufacture.

C. The valve box top section shall be slide-type, 36 inches long (minimum). No top flange and no "bead" or bottom flange. Manufacturer: North American Manufacture.

D. The valve box cover shall be a 2" drop-type cover to fit the 7-1/4" opening of the top section. Manufacturer: Bibby St-Croix (no substitute).

E. The valve box intermediate (mid) section shall be slide-type with a minimum 3" belled bottom. Base section No. 645 may be used as an alternate. Manufacturer: North American Manufacture.

F. Material shall be cast iron or ductile iron free from defects.

G. Interior and exterior of all components shall be bituminous coated with a minimum of 4 mils D.F.T.

2.08 UNDERGROUND PIPE MARKERS

A. Warning Tape: 3-inch-wide detectable tape with foil aluminum core. Tape shall be bright and have a warning message including the words "WATER LINE BELOW ".

2.09 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 20 00.

B. Cover: As specified in Section 31 20 00.

2.10 DISINFECTION CHEMICALS

A. Chemicals: According to Portland Water District Standards and Specifications.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.

3.02 PREPARATION

A. Inspect both ends of the Pipe. Defected or damaged pipe shall not be installed and shall be removed from the Site.

B. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

C. Remove scale and dirt on inside and outside before assembly.

D. Prepare pipe connections to equipment with flanges or unions.

3.03 BEDDING

A. Excavate pipe trench in accordance with Section 31 20 00 for Work of this Section.

B. Form and place concrete for pipe thrust restraints at changes of pipe direction according to the Drawing layout and details. Place concrete to permit full access to pipe and pipe accessories.

C. Place bedding material at trench bottom in accordance with Section 31 20 00.

D. Backfill around sides and top of pipe in accordance with Section 31 20 00.

E. Place any required fill material in accordance with Section 31 20 00.

3.04 INSTALLATION - PIPE

A. Begin installing pipe as soon as bedding below pipe is complete.

B. All installations shall follow manufacturer's recommended procedures unless otherwise specified in this section or by the Engineer.

C. Maintain a minimum 10 foot clear separation between water mains and sewer utilities.

D. Group domestic piping with fire line piping whenever practical.

E. Route pipe in straight lines in sections shown straight on the Drawings.

F. Plug ends of the pipe except when connecting the next length of pipe.

G. Do not lay pipe in water or when trench conditions or weather are unsuitable for such work.

H. For installations into the Maintenance Building, cut penetrations through the concrete retaining wall and the Maintenance Building concrete foundation wall.

I. Install pipe to allow for expansion and contraction without stressing pipe or joints.

J. Install access fittings to permit disinfection of water system.

K. Establish elevations of buried piping with not less than 4.5 ft of cover.

L. Install warning tape continuous over top of pipe overlapping a minimum of 3 feet at ribbon ends. Tape shall be a minimum 1.0 ft below finished grade and a minimum of 1.0 ft above top of pipe.

M. Backfill trench accordance with Section 31 20 00.

N. Make final connections to building components, both new and existing, including fire sprinkler systems and bring system on-line.

3.05 INSTALLATION - VALVES

A. All installations shall follow manufacturer's recommended procedures unless otherwise specified in this section or by the Engineer.

B. Set valves on solid-bearing, compacted soil.

C. Center and plumb valve box over valve. Set box cover flush with finished grade.

D. Provide blow off assemblies in accordance with the Portland Water District Standards and Specifications.

3.06 FIELD QUALITY CONTROL

A. Field quality control shall be performed in accordance with the MaineDOT Standard Specifications.

B. Conduct pipe tests before joints are covered, and after thrust blocks have sufficiently hardened. Use only potable water.

C. Perform pressure test on domestic site water distribution system in accordance with the Portland Water District Standards.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retested.

E. The Contractor shall bear all cost associated with correcting any Work that does not meet the requirements of this Section including retesting expenses.

3.07 DISINFECTION

A. Perform disinfection only after the water system has passed all required pressure tests.

B. Flush and disinfect system in accordance with Portland Water District Standards and with AWWA C651-86 "Standard for Disinfecting Water Mains."

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT:

Pipe shall be measured complete and fully installed by the linear foot. Thrust blocks, pipe bends, and insulation shall not be measured separately but rather shall be incidental to the corresponding pipe Pay Item. Penetrations through the concrete cutoff retaining wall (beneath the edge of the maintenance building canopy) and the concrete foundation wall of the Maintenance Building shall not be measured separately but rather shall be incidental to the corresponding pipe Pay Item. Excavation, backfilling, and compacting shall also be included in the corresponding pipe Pay Item.

Gate valves with boxes and tapping shall be measured complete and fully installed by the unit.

Removing and resetting the two existing fire hydrants shall be measured by the unit, and shall include all excavation, backfilling, connections, and tests of the complete system.

4.02 BASIS OF PAYMENT:

The accepted quantities of PVC water pipe will be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications, and will be paid for at the Contract unit price per linear foot, which payment will be compensation for furnishing and installing all necessary fittings, thrust blocks, and insulation. Penetrations through the concrete cutoff retaining wall (beneath the edge of the maintenance building canopy) and through the concrete foundation wall of the Maintenance Building shall not be paid for separately but rather shall be incidental to the corresponding pipe Pay Item. Excavation, backfilling, and compacting shall also be included in the corresponding pipe Pay Item.

The accepted quantities of Gate Valves with Box will be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications, and will be paid for at the Contract unit price.

Removing and resetting the fire hydrants shall be paid at the Contract unit price.

Payment will be made under the following Pay Item:

Pay Item		Pay Unit
822.3212	Water Pipe, 4-inch, PVC	Linear Foot
822.320	Water Pipe, 6-inch, PVC	Linear Foot
823.335	Gate Valve, 4-inch, with Service Box	Each
823.33	Gate Valve , 6-inch, with Service Box	Each
823.3253	Tapping Sleeve, Valve, and Service Box	Each
824.32	Remove and Reset Hydrant	Each

END OF SECTION

SECTION 33 31 00 – SANITARY SEWER SYSTEM

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

Section 833.3100 Sanitary Sewer System

Add the following:

PART 1 GENERAL

1.01 DESCRIPTION: This section applies to all necessary steps taken by the Contractor to comply with the sanitary sewer system requirements listed herein and in accordance with the drawings. Contractor shall completely install the sanitary sewer system as illustrated on the Plans and as specified herein including the following items:

A. Entire sanitary sewer system from outside to within 5 ft of the proposed office building to the connection with the existing sewer system, including sanitary manholes, gravity sewer lines, and services to proposed buildings.

B. Sanitary sewage pipe.

C. Underground pipe markers.

D. Manholes.

E. Bedding and cover materials

F. The Contractor shall pay all fees associated with connection to the existing utilities and inspections by the City and the local sewer district.

G. Termination of port office trailer service.

1.02 REFERENCES: The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

A. ASTM INTERNATIONAL (ASTM)
ASTM A 48
ASTM D 3034
ASTM D 1784
ASTM D 3033
ASTM D 3212
ASTM D 1149
ASTM D 449
ASTM F 477
ASTM B 221
ASTM C32-69
ASTM C139

B. AASHTO
AASHTO M294-97
AASHTO MP7-97

C. MAINE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS (MDOT)
MDOT Section 704.01
MDOT Section 704.03
MDOT Section 705.02

1.03 SUBMITTALS: Submit the following items for approval in accordance with Section 105.7, Working Drawings, of the

State of Maine Department of Transportation Standard Specifications, Revision December 2002:

A. Sanitary Pipe Data. Submit the following components as part of this submittal package:

1) Pipe material, accessories, and appurtenances

2) Manufacturer's Installation Instructions. Indicate special procedures required to install the products specified.

3) Manufacturer's Certificates. Certify products meet or exceed specified requirements.

B. Sanitary Sewer System Shop Drawings. Submit product literature and shop drawings for:

1) Precast concrete structures (manholes)

2) Cast iron frames and covers for structures.

C. Closeout Project Record Documents. Accurately record actual locations of pipe runs, connections, manholes, cleanouts, stubs, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.04 QUALITY ASSURANCE

A. Comply with MaineDOT Standard Specification.

B. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.

C. All Work shall comply with the requirements of the Maine Department of Environmental Protection standards, the Cumberland County Soil & Conservation District Standards, U.S. Environmental Protection Agency NPDES, and City of Portland, Maine Permit requirements, to minimize adverse environmental impacts. Reference is made to the Erosion and Sedimentation Control Report and Plan included in the Plan set for this project. Strict adherence to the Specifications and Plans is required in order to prevent adverse downstream impacts.

D. Work shall be accomplished in accordance with regulations of local, county and state agencies and national or utility company standards as they apply.

E. The Contractor shall bear all cost associated with correcting any Work that does not meet the requirements of this Section or any damages to property outside the limits of Work.

1.05 PRE-INSTALLATION MEETINGS

A. Comply with Section 01 31 00 – Project Management and Coordination: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.06 FIELD MEASUREMENTS

C. Verify field measurements and elevations are as indicated.

1.07 COORDINATION

D. Comply with the requirements of MaineDOT Division 100, General Conditions.

E. Coordinate the Work with termination of sanitary sewer connections outside building, trenching and new connection to existing subsurface wastewater system.

PART 2 PRODUCTS

2.01 SANITARY SEWER PIPE.

A. Pipe shall conform to ASTM D 3034 for sizes 4"– 15". PVC resin compound shall conform to ASTM D 1784 and rubber gaskets shall conform to ASTM D 3212 and F 477. Standard laying lengths shall be 13 ft. The pipe shall be colored green.

B. Pipe shall be joined with the bell-and-spigot joint meeting AASHTO M252, AASHTO M294-97 OR MP7-97. The joint shall be watertight. Gaskets shall be made of polyisoprene meeting the requirements of ASTM F477 with the addition that the gaskets shall not have any visible cracking when tested according to ASTM D1149 after 72 hour exposure in 50 PPHM ozone at 104° Fahrenheit. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

C. PVC gravity sewer fitting shall meet all requirements and intent of the National Standards ASTM D3034 for materials and ASTM D-3212 for joints.

D. Plastic Pipe: ASTM D3034 or ASTMD3033, strength requirement SDR35, Type PSM, Poly (Vinyl Chloride) (PVC) material; inside nominal diameter of inches, bell and spigot style rubber ring sealed gasket joint.

1) Fittings: PVC

2) Joints: ASTM D3212 push-on joints, ASTM F477 elastometric gaskets.

E. Fittings:

1) ANSI A21.10, 250 psi rated.

2) Furnish fittings of same type and class of materials as pipe.

F. Joints

1) Push-on with single rubber gasket, ANSI, A21.11, pressure rating equal to that of the pipe.

2.02 UNDERGROUND PIPE MARKERS

A. Warning Tape: Tape shall be 3 ft wide detectable tape with foil aluminum core. Tape shall be bright and have a warning message including the words “SANITARY SEWER BELOW.”

2.03 MISCELLANEOUS

A. Flexible Adaptors:

1) Neoprene sleeve with stainless steel bands equal to those manufactured by Fernco, Calder Couplings

B. Manhole Seals:

1) Segmented neoprene seal with stainless steel bolts equal to “Link-Seal” as manufactured by Thunderline Corporation.

C. Insulation:

1) Sytrofoam SM by Dow Chemical Co. or approved equal. Sheet size shall be 2 ft by 4 ft by 2 inches thick.

2.04 SANITARY MANHOLES

A. Precast Concrete Structures: ASTM C478, MDOT Section 712.06. Structures and top pieces shall provide H-20 load bearing capacity. Two (2) Butyl rubber gaskets shall be installed at all joints between manhole sections.

B. Structure walls: 5 in. thick for precast up to 10 ft. depth; 8 in. thick for precast below that depth.

C. Cast Iron Frames, Grates, and Covers: ASTMA48, Class 35, MDOT Section 712.07. Covers shall have the word “Sewer” cast thereon.

1) Sanitary Manholes: Standard Solid Cover – 24 in. round opening; M248S, (heavy-duty) manufactured by Ethridge Foundary Co., Portland, ME or approved equivalent.

D. Waterproofing: All sewer manholes shall be waterproofed with two coats of bituminous sealer applied to the exterior of the manhole by the manufacturer. Waterproofing shall comply with ASTM D449, Type A.

E. Manhole Steps: Steps shall be Polypropylene Plastic with steel reinforcement or aluminum conforming to ASTM B221, alloy 6061-T6, a minimum of 14” wide and cast into the sections.

F. Brick: ASTM C32-69, Grade MS, except Grade SS for drainage manhole inverts; MDOT Section 704.01.

G. Concrete Block: ASTM C-139; MDOT Section 704.03.

H. Mortar: One part Portland Cement, Type IIA, two parts mortar sand, and clean water as required: MDOT Section 705.02.

PART 3 EXECUTION

3.01 EXAMINATION: Verify existing conditions before starting work. Verify trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on the drawings.

3.02 PREPARATION:

A. Notify "Dig-Safe" (1-888-334-7233) at least 3 days prior to beginning any excavation work, in accordance with Maine State Law.

B. Contact local utility companies, before beginning work.

C. Check for conflict with underground utilities or structures. Notify the Architect/Engineer immediately of any and all discrepancies before proceeding with the work.

D. Fully coordinate with utility companies to insure timely work by others to avoid construction delays.

E. Hand trim excavations to required elevations. Correct over excavation with Structural Fill as specified in Section 31 20 00.

F. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.03 BEDDING

A. Excavate pipe trench in accordance with Section 31 20 00 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

D. Bedding Material: as specified in Section 31 20 00.

E. Soil Backfill from Above Pipe to Finish Grade: as specified in Section 31 20 00.

3.04 INSTALLATION – PIPE

A. Excavate in locations and to depths indicated on the drawings to install drain lines.

B. Install pipe, fittings, and accessories in accordance with the manufacturer's recommendations.

C. Place pipe on minimum 6 inch deep bed of bedding material as specified.

D. Lay pipe to inverts noted on drawings in straight lines and constant slopes.

E. For installations into the Maintenance Building, cut penetrations through the concrete retaining wall and the Maintenance Building concrete foundation wall.

F. Install aggregate at sides and over top of pipe.

1) Install top cover to minimum compacted thickness of 12 inches, compact to 95 percent.

2) The remainder of the trench shall be backfilled as specified in Section 31 20 00.

G. Refer to Section 31 20 00 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

H. Connect to existing subsurface wastewater system.

I. Make final connections to building components, both new and existing, and bring system on-line.

3.05 INSTALLATION – SANITARY SEWER MANHOLES

A. Form bottom of excavation clean and smooth to correct elevation.

B. Place 12-inch layer of 3/4-inch crushed stone and compact to 95 percent.

C. Set base section establishing elevations and pipe inverts for inlets and outlets as indicated on Plans.

D. Mount lid and frame in grout, secured to top cone section to elevation indicated.

3.06 FIELD QUALITY CONTROL

A. Comply with MaineDOT Standard Specifications.

3.07 PIPE TESTING

A. General: Test all pipes after backfilling. Install all service leads on main line before testing. Perform tests in presence of Engineer or authorized representative of the Sewer District or Public Works Department.

B. Gravity Sewer-Leakage Tests: Use low-pressure air test as follows:

1) Plug ends of section to be tested.

2) Supply air slowly to the pipe to be tested until the air pressure inside the pipe is 4.0 psi greater than the average back-pressure of any groundwater submerging the pipe.

3) Disconnect air supply and allow a minimum of two minutes for stabilization of pressure.

4) Following stabilization period, measure drop in pressure over a 6-minute test period.

5) Acceptable Drop: No more than 1.0 psi.

6) Repair and retest: Repair all pipes not passing tests using materials and methods approved by the Engineer, and retest.

3.08 SANITARY MANHOLE TESTING

A. General: Use either exfiltration test for all manholes. Perform tests before constructing invert.

B. No allowance will be made for absorption during the 8-hour test period. No allowance will be made for leakage at test plug.

C. Retest unacceptable manholes following repairs until acceptable leakage rate is attained.

D. Instant Exfiltration Test.

1) Prior to backfilling excavation, plug pipes into and out of manholes and liftholes and fill with water.

2) Inspect manhole surface, pipe joints, and lift holes. If there are no visible leaks, manholes may be considered watertight.

E. 8-Hour Exfiltration Test:

1) Plug pipes into and out of manhole and secure plugs.

2) Lower groundwater table (GWT) to below manhole. Maintain GWT at this level throughout test.

3) Provide means of determining GWT level at any time throughout test.

4) Fill manhole with water to top of cone.

5) Allow a period of time for absorption (determined by Contractor).

6) Determine volume of leakage in a 9-hour minimum test period and calculate rate.

7) Determine volume of leakage in a 9-hour minimum test period and calculate rate.

8) Acceptable Leakage Rate: Not more than 1 gallon per vertical foot per 24 hours.

F. Manhole Repairs

1) Determine causes of all leaks and repair them. Perform earthwork required if manhole has been backfilled,

2) Perform repairs using methods and material approved by the Engineer. Remove and replace or reconstruct manhole if necessary. Remove and replace defective sections if required by Engineer.

3.09 PROTECTION OF FINISHED WORK

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

1) Take care not to damage or displace installed pipe and joints during construction of pipe supports, backfilling, testing, and other operations.

2) Repair or replace pipe that is damaged or displaced from construction operations.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT:

Sanitary Sewer Pipe shall be measured complete and fully installed by the linear foot. Thrust blocks, pipe bends, and insulation shall not be measured separately but rather shall be incidental to the corresponding pipe Pay Item. Penetrations through the concrete cutoff retaining wall (beneath the edge of the maintenance building canopy) and the concrete foundation wall of the Maintenance Building shall not be measured separately but rather shall be incidental to the corresponding pipe Pay Item. Excavation, backfilling, and compacting shall also be included in the corresponding pipe Pay Item.

Precast Sewer Manholes shall be measured complete and fully installed by each unit. All excavation and backfill shall be incidental to the pay item.

4.02 BASIS OF PAYMENT:

The accepted quantities of PVC sanitary sewer pipe will be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications, and will be paid for at the Contract unit price per linear foot, which payment will be compensation for furnishing and installing all necessary fittings, thrust blocks, and insulation. Penetrations through the concrete cutoff retaining wall (beneath the edge of the maintenance building canopy) and through the concrete foundation wall of the Maintenance Building shall not be paid for separately but rather shall be incidental to the corresponding pipe Pay Item. Excavation, backfilling, and compacting shall also be included in the corresponding pipe Pay Item.

The accepted quantities of Precast Sewer Manholes will be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications, and will be paid for at the Contract unit price.

Payment will be made under the following Pay Item:

Pay Item		Pay Unit
801.15	Sanitary Sewer Pipe, 6-inch PVC	Linear Foot
803.173	Sanitary Sewer Manhole, 4-ft Diameter, Precast	Each

END OF SECTION

SECTION 33 41 10 – STORM DRAINAGE PIPE CULVERTS AND STORM DRAINS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 603 – PIPE CULVERTS AND STORM DRAINS, with the following modifications:

MODIFICATIONS:

Section 603.01 Description

This Subsection is deleted and replaced with the following:

Provide all labor, materials, equipment, and services necessary for proper and complete installation of the storm drainage system as indicated on the Plans and as herein specified including the following items:

1. Storm drainage piping.
2. Drainage swales.
3. Tree Filter Inlet
4. Cleanouts.
5. Bedding and cover materials.
6. Underdrains.
7. Footing Drains.
8. Roof drains.
9. Related appurtenances.

Section 603.015 References

This Subsection is added with the following:

AASHTO

ASTM

Section 603.025 Submittals

This Subsection is added and shall include the following:

Contractor shall submit for approval the following items in accordance with Section 105.7, Working Drawings, of the State of Maine Department of Transportation Standard Specifications, Revision December 2002:

1. Product Data: Submit data indicating pipe, pipe accessories, and appurtenances.
2. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
3. Project Record Documents: Provide an accurate record of actual location of pipe runs, connections, cleanouts, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

Section 603.031 General

This Subsection is deleted and replaced with the following:

STORM DRAINAGE PIPING

Polyethylene Pipe (HDPE): High density polyethylene pipe conforming to AASHTO M294-97, Type S and/or AASHTO M252, Type S and/or AASHTO MP7-97. Pipe shall be smooth bore. Type "C" pipe shall be perforated on top with 5/8" holes at 30°, 2 ft. on center.

Pipe shall be joined with the bell-and-spigot joint meeting AASHTO M252, AASHTO M294-97 OR MP7-97. The joint shall be silt tight and nonrated watertight. Gaskets shall be made of polyisoprene meeting the requirements of ASTM F477 with the addition that the gaskets shall not have any visible cracking when tested according to ASTM D1149 after 72 hour exposure in 50 PPHM ozone at 104° Fahrenheit. Gaskets shall be installed by the pipe

manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

Pipe and fitting material shall be high-density polyethylene meeting ASTM D3350 minimum cell classification 324420C for 4" through 10" diameters or 335420C for 12" through 60" diameters.

UNDERDRAIN AND FOOTING DRAIN PIPING

Pipe: Perforated PVC Schedule 40 (ASTM D1785) or approved equivalent. Sizes as shown on Drawings.

Drainage Filter Fabric: Non woven, continuous filament fibers of polypropylene; Amoco 4551 or approved equivalent.

ACCESSORIES

Mortar: One part Portland Cement, Type IIA, two parts mortar sand, and clean water as required: MDOT Section 705.02.

UNDERGROUND PIPE MARKERS

Warning Tape: 3" wide detectable tape with foil aluminum core. Tape shall be bright and have a warning message including the words "Storm Sewer".

BEDDING AND COVER MATERIALS

Per Section 31 20 00 – Earthwork.

Section 603.032 Excavation

The Subsection is amended to include the following:

PREPARATION

Notify "Dig-Safe" (1-888-334-7233) at least 3 days prior to beginning any excavation work, in accordance with Maine State Law.

Contact local utility companies, before beginning work, at least five days in advance. The Portland Water District has requested access to inspect the existing water lines when test pits are dug or when tee-branches are installed.

Check for conflict with underground utilities or structures. Notify the Architect/Engineer immediately or all discrepancies before proceeding with the work.

Fully coordinate with utility companies to insure timely work by others to avoid construction delays.

Hand trim excavations to required elevations. Correct over excavation with Structural Fill as specified in Section 31 20 00.

Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

Section 603.04 Bedding

The Subsection is amended to include the following:

BEDDING

Hand trim excavation for accurate placement of pipe to elevations indicated.

Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth.

Maintain optimum moisture content of bedding material to attain required compaction density.

Section 603.05 Laying Culvert

The Subsection is deleted and replaced with the following:

INSTALLATION - PIPE

Excavate in locations and to depths indicated on the drawings to install drain lines.

Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.

Place pipe on minimum 6 inch deep bed of bedding material as specified.

Lay pipe to inverts noted on drawings in straight lines and constant slopes.

Install bedding material at sides and over top of pipe. Install top cover to minimum compacted thickness of 12 inches, compact to 95 percent.

The remainder of the trench shall be backfilled according to Section 31 20 00 – Fill Schedule.

Refer to Section 31 20 00 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

Connect to roof drain and foundation drain outlet from building.

Connect underdrain systems shown on the drawings.

After all site work is completed, including spreading of topsoil and seeding, clean silt, stones and debris from all structures and lines.

Section 603.055 Creating Swales

The Subsection is added and includes the following:

DRAINAGE SWALES

Drainage swales shall be excavated and shaped to the lines and grades shown on the Drawings. Suitable material excavated from the ditches and ponds may be used to construct berms, or as site fill for subgrade, as specified in Section 31 20 00.

Swales and ponds shall be lined with rip-rap, jute matting, sod, or loamed and seeded, as indicated on the plans and/or as specified in Section 31 25 13 – Erosion Control.

Swales shall be constructed and maintained as described in the Erosion Control and Sediment Report and as shown and detailed in the Plan Set.

Stormwater Treatment Structures shall be constructed as indicated on the plans. Refer to appropriate details for installation instructions.

Section 603.12 Basis of Payment

The Subsection is amended to include the following:

The accepted quantities of pipe for culverts and storm drain pipes will be paid for at the Contract unit price per linear foot, for the types and sizes specified, complete in place. The Contractor shall pay all fees associated with connection to the existing utilities and inspections by the City of Portland. Any fees associated with the work shall be incidental to the pay item.

Payment will be made under the following Pay Item:

Pay Item		Pay Unit
603.157	Stormwater Pipe, 12 Inch, PVC	LF
603.167	Stormwater Pipe, 15 Inch, PVC	LF

END OF SECTION

SECTION 33 41 20 – STORM DRAINAGE MANHOLES, INLETS, AND CATCH BASINS

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, SECTION 604 – MANHOLES, INLETS,

MODIFICATIONS:

Section 604.01 Description

This section is deleted and replaced with the following:

Provide all labor, materials, equipment, and services necessary for proper and complete installation or retrofit of the storm drainage manholes, inlets, and catch basins as indicated on the Plans and as herein specified including the digging of test pits as shown on the Plans. The work also includes all fees associated with connection to the existing utilities, tests, and inspections.

Section 603.015 References

This Subsection is added with the following:

AASHTO

ASTM

Section 604.025 Submittals

This Subsection is added and shall include the following:

Contractor shall submit for approval the following items in accordance with Section 105.7, Working Drawings, of the State of Maine Department of Transportation Standard Specifications, Revision December 2002:

1. Shop Drawings: Submit product specification literature and/or shop drawings for:
   a. Precast concrete structures (manholes, catch basins, and area drains).
   b. Cast iron frames, grates, and covers for structures.
2. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
3. Project Record Documents: Provide an accurate record of actual location of catch basins. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

Section 604.03 Construction Requirements

This Subsection is amended by inclusion of the following:

CATCH BASINS, DRAINAGE MANHOLES, FIELD INLETS, AND TREE FILTER INLET

Precast Concrete Structures: ASTM C478, MDOT Section 712.06. Structures and top pieces shall provide H-20 load bearing capacity. Butyl rubber gaskets shall be installed at all joints between manhole sections. The top cone section shall be of an offset shape.

Brick: ASTM C32-69, Grade MS, except Grade SS for drainage manhole inverts; MDOT Section 704.01.

Concrete Block: ASTM C-139; MDOT Section 704.03.

Structure walls: 5 in. thick for precast up to 10 ft. depth; 8 in. thick for precast below that depth.

Grout: Specified in Section 03 30 00.

Cast Iron Frames, Grates, and Covers: ASTMA48, Class 35, MDOT Section 712.07.

1. Grates in paved areas shall be "bicycle safe".
2. Covers shall have the word "Storm" cast thereon.
3. All components shall be H-20 rated.

4. All frames, grates and covers shall have two coats of coal tar pitch varnish applied after sandblasting to provide a smooth, tough, non-brittle, non-scaling finish. Repair damage to coatings to the satisfaction of the Engineer.
5. Drain Manholes: Standard Solid Cover – 24 in. round opening; E245S, manufactured by Etheridge Foundry Co., except M248S (heavy-duty) in paved areas or approved equivalent.
6. Catch Basin: Standard 24 in. round opening; SA 248 M or SA 246 M where cover requirements dictate use of shorter frame.
7. Field Inlet: E245G, Round frame and grate by Etheridge Foundry Co.

Section 604.035 Construction Requirements

This Subsection is added and includes the following:

PREPARATION

Notify "Dig-Safe" (1-888-334-7233) at least 3 days prior to beginning any excavation work, in accordance with Maine State Law.

Contact local utility companies, before beginning work, at least five days in advance. The Portland Water District has requested access to inspect the existing water lines when test pits are dug or when tee-branches are installed.

Check for conflict with underground utilities or structures. Dig test pits at the locations shown on the Plans. Test pits located along the water line parallel adjacent to the concrete half-wall (inboard of the pier) shall determine the location of the water line prior to installation of the drainage structure. Notify the Architect/Engineer immediately or all discrepancies before proceeding with the work.

Fully coordinate with utility companies to insure timely work by others to avoid construction delays.

Hand trim excavations to required elevations. Correct over excavation with Structural Fill as specified in Section 31 20 00. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

INSTALLATION - CATCH BASINS, DRAINAGE, MANHOLES, FIELD INLETS, AND TREE FILTER INLET.

Establish elevations and pipe inverts for inlets and outlets as indicated on Drawings.

Construct all catch basins, manholes, field inlets and other structures to lines, grades and dimensions shown on Drawings.

Inverts for drainage manholes shall be built to the crown of the pipe for sizes up to eighteen (18) inches, and to the spring line for larger pipes.

Cut inlet or outlet pipes flush with inside wall unless otherwise indicated. Set metal or polypropylene fittings, including rings and frames, in full mortar beds.

604.05 Method of Measurement

Add the following:

Test pits will not be measured separately but shall be incidental to the respective pay items.

604.06 Basis of Payment

Add the following paragraphs:

Test pits will not be measured separately for payment but shall be incidental to the respective pay items.

Payment will be made under the following Pay Items:

Pay Item		Pay Unit
604.097	Catch Basin, 6 ft Diameter, Type C1	Each
604.154	Manhole, 6 ft Diameter	Each

END OF SECTION

SECTION 33 51 00 – NATURAL GAS DISTRIBUTION

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

833.5100 Natural Gas Distribution

Add the following:

All natural gas piping, installation, materials, and work shall conform to the requirements of Unitil Corporation. Contractor shall coordinate all work through Unitil at 866-933-3821, including shut off of existing service, removal of existing meters and equipment, demolition and dismantling of salvaged components, cutting penetrations through existing concrete retaining wall and Maintenance Building concrete foundation wall, and installation of new piping and service meters to the buildings.

835.5101 Method of Measurement

Add the following paragraph:

Natural Gas Distribution shall be measured by the lump sum, and shall include all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Work will include all install coordination with Unitil to ensure the demolition, removals, dismantling, and installation of gas service is properly conducted throughout the project, and that final gas service installation is provided at the buildings. Penetrations through the concrete cutoff retaining wall (beneath the edge of the maintenance building canopy) and through the concrete foundation wall of the Maintenance Building shall be included in this work. Excavation, backfilling, and compacting shall also be included in this work.

835.5102 Basis of Payment

Add the following paragraph:

Natural Gas Distribution will be paid for at the Contract lump sum price and will be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications. Penetrations through the concrete cutoff retaining wall (beneath the edge of the maintenance building canopy) and through the concrete foundation wall of the Maintenance Building shall not be paid for separately but rather shall be incidental to the Pay Item. Excavation, backfilling, and compacting shall also be included in the corresponding Pay Item.

Payment will be made under the following Pay Items:

Pay Item		Pay Unit
827.37	Natural Gas Distribution	Lump Sum

SECTION 35 35 10 –PIER AND APPROACH SLAB (BID ALTERNATE)

All work and materials shall conform to the Contract Drawings and the provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, with the following additions:

ADDITIONS:

Subsection 890.011 Pier and Approach Slab (Bid Alternate No. 1)

Add the following:

PART 1 GENERAL

1.01 DESCRIPTION: This section applies to all necessary steps to construct an additional twelve (12) feet of pier and approach slab as shown on the plans and in accordance with these specifications.

1.02 REFERENCES: The requirements of the specifications listed below are incorporated into this specification by reference in their entirety.

A. 02 41 00 DEMOLITION

B. 03 21 00 REINFORCING STEEL

C. 03 31 29 MARINE CONCRETE

D. 03 41 33 PRECAST STRUCTURAL PRETENSIONED CONCRETE

E. 09 97 13 STEEL COATINGS

F. 09 97 23 CONCRETE AND MASONRY COATINGS

G. 26 42 14 CATHODIC PROTECTION SYSTEM

H. 31 20 00 EARTHWORK

I. 31 62 17 DRIVEN STEEL PIPE PILES

PART 2 PRODUCTS

2.01 QUANTITIES: Each Pier Addition Bid Alternate shall consist of the following quantities, pay items are shown for reference to the appropriate specification. Quantities shown below are approximate and provided for reference only.

A. 202.081 Removing Building International Marine Terminal Building (selective removal of top of seawall)

B. 206.085 Structural Earth Excavation – Waterfront (earth removal for pier cap and approach slab)

C. 501.7005 Steel Pipe Piles (16” diameter, 0.5” wall), delivered – 412 LF

D. 501.7105 Steel Pipe Piles (16” diameter, 0.5” wall), in place – 424 LF

E. 501.90 Pile Tips – 4 EA

F. 502.451 Structural Concrete, Approach Slab – 6 CY

G. 502.235 Structural Concrete, Pier Pile Cap – 16 CY

H. 502.411 Structural Concrete, Pier Deck Slab – 17 CY

I. 515.20 Protective Coating for Concrete Surfaces – 96 SY

J. 535.63 Precast Structural Concrete, Planks – 13 EA

PART 3 EXECUTION

3.01 CONSTRUCTION:

A. All materials and workmanship shall be in accordance with the appropriate specification.

B. The termination curb and associated details shown on the plans shall be moved to the last pile cap constructed.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT: Each Pier 12-ft Section Addition will be measured as a unit, and shall include all materials and work required to construct one additional pile bent, deck surface, and approach slab as shown on the Plans.

4.02 BASIS OF PAYMENT: Pier 12-ft Section Addition will be paid for at the Contract unit price which shall be full compensation for all labor, materials, incidentals, and equipment necessary to satisfactorily complete the work in accordance with the Plans and Specifications.

Note that Cathodic Protection by Sacrificial Anodes (2 EA), will not be included in Bid Alternate No. 1. If Bid Alternate No. 1 and Bid Alternate No. 4, Cathodic Protection by Sacrificial Anodes, are both awarded, then additional anodes will be purchased at the Contract unit priced.

A. Payment will be made under the following Pay Item:

Pay Item	Pay Unit
890.011 Pier 12-ft Section Addition	EA (Bid Alternate No. 1)

END OF SECTION

SECTION 49 10 10 – MISCELLANEOUS CONSTRUCTION ELEMENTS

All work and materials shall conform to the Contract Drawings and the following provisions of the State of Maine Department of Transportation Standard Specifications, Revision December 2002, and additions and/or modifications to the Sections listed below :

SECTION 639 – ENGINEERING FACILITIES
SECTION 652 – CONSTRUCTION REQUIREMENTS
SECTION 659 – MOBILIZATION, with the following modifications:

MODIFICATIONS:

659.01 Description

Add the following paragraph:

This work shall also include the obtainment of special security clearance through the City of Portland for a minimum of six personnel, two of which shall include the Contractor's foreman and/or supervisors. The security clearance will enable Contractor personnel to work within the restricted areas of the container terminal (outside the limits of the temporary security fence, also known as the Primary Construction Zone) at times when such work is required. At a minimum, security clearance will require a background check on individuals. Contact the City of Portland at the Port Ocean Terminal at (207) 232-6590 for security badges.

ADDITIONS:

849.10101 Description

Add the following paragraphs:

Miscellaneous Construction shall include allowances for cost of Central Maine Power, Unitil, Portland Water District (PWD), and Fairpoint to provide utility connections and other miscellaneous work throughout the facility. Allowance is also made for the City of Portland Permits, Fees, and Inspections. The allowances are shown in the Schedule of Bid Prices.

849.10104 Basis of Payment

Add the following paragraphs:

Contractor Allowances will be paid for at the Contract unit price for the respective contract items. Allowances shall be cost incurred by the Contractor for work or materials which was accomplished by others to satisfy or procure the pay item. Contractor Allowance for City Building Permits, Fees, and Inspections shall also include testing of Office Building and Site Systems not already covered by the pay items for specifications sections listed in Special Provision 102.

Payment will be made under the following Pay Item:

Pay Item		Pay Unit
832.071	Contractor Allowance for CMP (Electrical Utility)	ALLOW
832.071	Contractor Allowance for Unitil (Gas Utility)	ALLOW
832.071	Contractor Allowance for Fairpoint (Telecommunications Utility)	ALLOW
832.071	Contractor Allowance for PWD (Water Utility)	ALLOW
832.071	Contractor Allowance for City Building Permits, Fees, and Inspections	ALLOW

END OF SECTION

APPENDIX A

Asbestos Containing Materials Report

Abatement Professionals

590 County Road, Suite 2, Westbrook ME 04092 Tel (207) 773-1276 * Fax (207) 772-1203

Renovation/Demolition Impact Survey
Bulk Sampling Services

Prepared For:

Craig R. Morin, P.E.
Project Manager
HNTB Corporation
340 County Road, Suite 6-C
Westbrook, Maine 04092

Project Location:
Portland International Marine Terminal
Commercial Street
Portland, Maine

From:

Robert Rickett
President
Abatement Professionals Corp
590 County Rd Suite #2
Westbrook, Maine 04092

January 14, 2011

Abatement Professionals

590 County Road, Suite 2, Westbrook ME 04092 Tel (207) 773-1276 * Fax (207) 772-1203

January 9, 2011

Craig R. Morin, P.E.
Project Manager
HNTB Corporation
340 County Road, Suite 6-C
Westbrook, Maine 04092

Dear Mr. Morin:

Abatement Professionals Corp was retained by HNTB Corp to perform an impact demolition survey of the Portland International Marine Terminal; Commercial Street in Portland, Also included in this survey was the former customs building on this site.

A site visit was conducted on December 20, 2010 for the purposes of collecting suspect samples of these 2 buildings, Robert Rickett, Maine D.E.P. inspector number AI-0144, conducted this site inspection.

A total of thirty five (35) Samples were collected and sent to EMSL in New Jersey where they were analyzed by Polarized Light Microscopy (PLM) (EPA test method #600/M4-82-020) for asbestos content due to laying materials such as mastic adhesives etc a total of 61 samples ended up being the final count.

All samples locations were marked with a bulk sample number, pictures collected of the materials and logged into our system.

Sample numbers range from B-1-A to B-12-C, there is no sample B-6 (when I visited the site I had preprinted labels before my arrival on site, the wall systems because of the volume required that I collect 5 samples of this material and I had to use the labels for B-6 to finish carrying out my samples of B-5)

The following samples came back as containing greater than 1% asbestos:

- B-2-A Mastic Adhesive
- B-3-A Floor tile
- B-4-A Floor tile
- B-8-A Floor tile
- B-10-A Floor tile

Main Terminal Building material Inventory:

- Sample B-2-A consist of mastic adhesive under the flooring materials there is 14 Stair Risers and 35 S/F of plywood underlayment on the mid landing which is located under the negative 9x9 Black floor tiles.
- Sample B-3-A consist of 250 S/F of 12 x 12 tan colored floor tile located on the second floor level on a walkway that overlooks the main lobby.
- Sample B-4-A consist of 20 S/F of a tan colored 12x12 Floor tile located on the second floor level at the top landing of the second stairwell.
- Not sampled by assumed to be positive for asbestos are a few expansion gaskets on the main hot Air system within the terminal building. These gaskets are approx 25 feet in the air and I didn't have anything to allow me to collect samples, but historically these materials are always positive for asbestos and need to be treated as such.
    - There are approx 148 Light Fixtures that contain either Mercury Vapor light tubes and metal halide light tubes, the total count of tubes in each device ranges from 2-4 4 foot light tubes and the metal halide lights each contain 1 tube. These light tubes need to be removed, properly packaged and disposed of in accordance with the Maine DEP waste standards.
    - There is also approx 20 wall mounted thermostats that could have mercury tubes located in them, that need to be removed, checked and properly disposed of.
    - All exit and emergency lighting needs to any battery packs and light tubes removed for proper disposal.
    - All light tubes need to have the light ballast checked for possible PCB ballast. (if a ballast has written on it, that "NO PCB's" exist then they can be disposed of as a light metal, if the ballast don't have a label on them, then these ballast need to be collected and disposed of as PCB containing materials.

Customs Building Material Inventory:

- Sample B-8-A consist of approx 275 S/F of 12 x 12 floor tiles which are located on the first floor level of this building behind the service counter.
- Sample B-10-A consist of approx 80 S/F of red 9x9 floor tile in the mechanical room on the first floor level of this building.
    - This building also has approx 18 interior light fixtures and 19 exterior light fixtures that all have either mercury vapor light tubes or metal Halide bulbs, which need to be removed and properly disposed of.
    - All light tubes need to have the light ballast checked for possible PCB ballast. (if a ballast has written on it, that "NO PCB's" exist then they can be disposed of as a light metal, if the ballast don't have a label on them, then these ballast need to be collected and disposed of as PCB containing materials.

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Lead based paint was tested in 4 different locations and those are labeled as L-1 to L-4.

- Of the 4 locations tested for Lead L-4 showed a positive result, which was on the front of the building on the exterior.
  - Lead based paints for this project is an OSHA concern, workers handling these materials should have had the 2 hour OSHA awareness training for handling these materials, all steel should be "Cold Cut" and no open torches cutting should be allowed.

Cost considerations to perform the removal and disposal of the above listed materials should be figured at $10,000.00-$12,500.00, Abatement Pros could perform this service for you and your client, so that when the other demo contractors come on site there would be no Asbestos or Universal waste to be concerned with.

The State of Maine Department of Environmental Protection (DEP) considers a material to be an "asbestos containing material" when it is analyzed by PLM and found to contain greater than 1% asbestos

If you have any further questions or need additional information please feel free to contact me at (207)-773-1276.

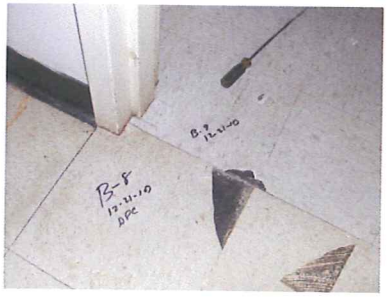
Sincerely,

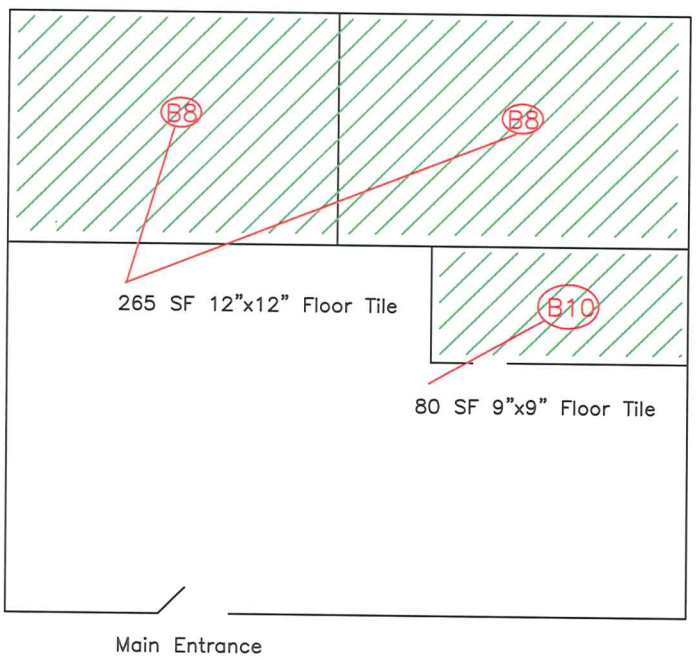
Robert Rickett
President

Enclosures

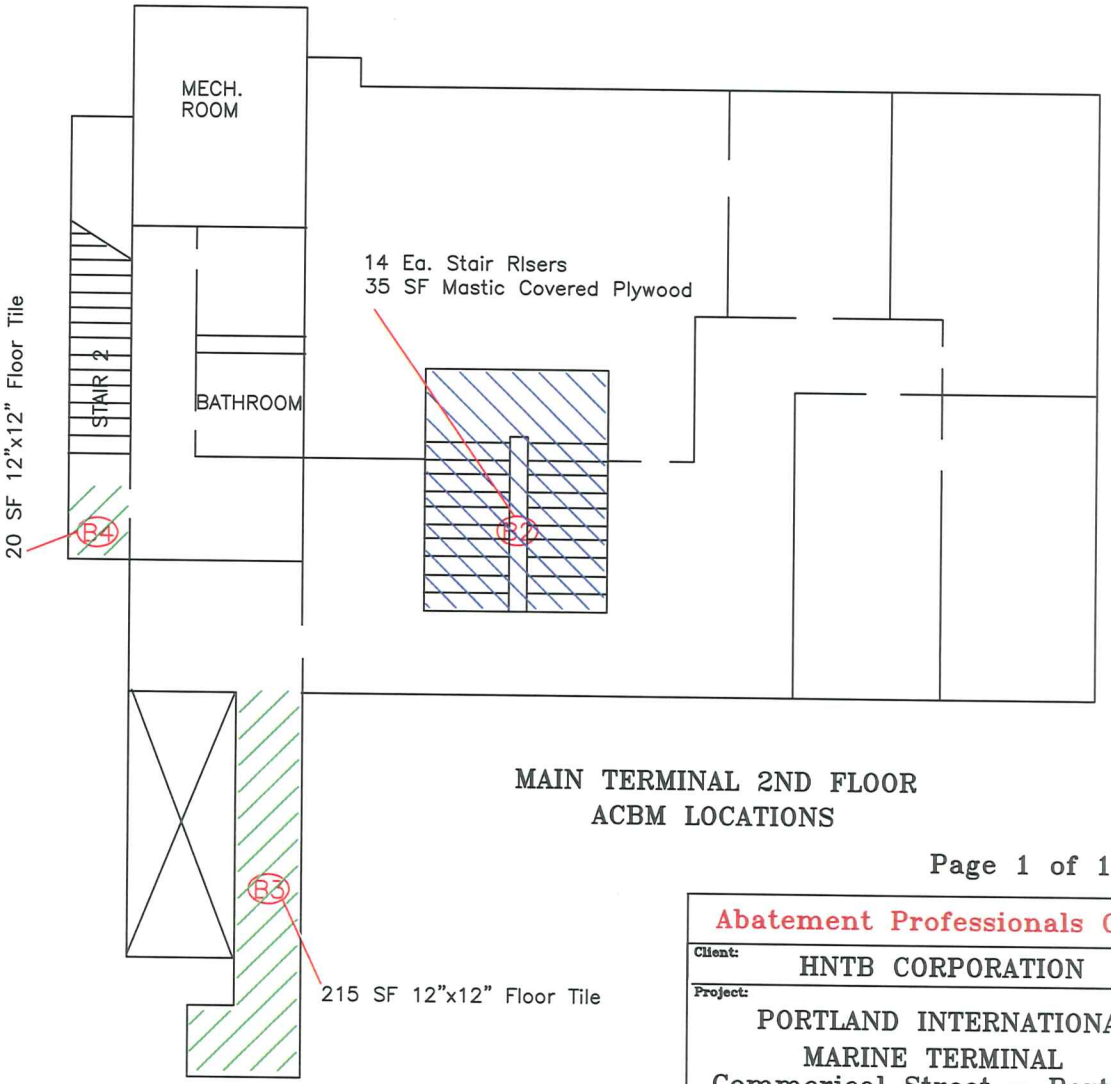
Abatement Professionals

590 County Road, Suite 2, Westbrook ME 04092 Tel (207) 773-1276 * Fax (207) 772-1203





CUSTOMS BLD. 1ST FLOOR
ACBM LOCATIONS



MAIN TERMINAL 2ND FLOOR
ACBM LOCATIONS

B# Sample # / Approx. Location

Vinyl Asbestos Floor Tile

Asbestos Containing Mastic

Abatement Professionals Corp.

Client: HNTB CORPORATION

Project: PORTLAND INTERNATIONAL MARINE TERMINAL
Commerical Street – Portland

Date:	Drawn:	Scale:	Apr:	File:
1/14/11	BMH	N/A		PIMT1.dwg

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Email: westmontasblab@EMSL.com

Attn: **Robert W Rickett**
Abatement Professionals Corp.
590 County Road
Westbrook, ME 04092

Fax: (207) 772-1203 Phone: (207) 773-1276
Project: **APC-10-440/PORTLAND INTERNATIONAL MARINE**

Customer ID: ABAT52
Customer PO: 140
Received: 12/23/10 10:30 AM
EMSL Order: 041029614

EMSL Proj:
Analysis Date: 1/6/2011

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos			Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**		**% Non-Fibrous**	**% Type**
B-1-A-Floor Tile *041029614-0001*		Gray Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**
B-1-A-Mastic *041029614-0001A*		Brown Non-Fibrous Heterogeneous	30%	Cellulose	70% Non-fibrous (other)	**None Detected**
B-1-B-Floor Tile *041029614-0002*		Gray Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**
B-1-B-Mastic *041029614-0002A*		Brown Non-Fibrous Heterogeneous	35%	Cellulose	65% Non-fibrous (other)	**None Detected**
B-1-C-Floor Tile *041029614-0003*		Gray Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
B-1-C-Mastic *041029614-0003A*		Yellow Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**
B-2-A-Floor Tile *041029614-0004*		Black Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**

Initial report from 01/06/2011 16:18:54

Analyst(s)

Gregory Mortka (27)
Leslie McCluskey (23)

Stephen Siegel, CIH, Laboratory Manager
or other approved signatory

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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B-2-A-Mastic *041029614-0004A*		Yellow Non-Fibrous Homogeneous		98% Non-fibrous (other)	**2% Chrysotile**
B-2-B-Floor Tile *041029614-0005*		Black Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B-2-B-Mastic *041029614-0005A*					**Stop Positive (Not Analyzed)**
B-2-C-Floor Tile *041029614-0006*		Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
B-2-C-Mastic *041029614-0006A*					**Stop Positive (Not Analyzed)**
B-3-A-Floor Tile *041029614-0007*		White/Grayish Non-Fibrous Heterogeneous		97% Non-fibrous (other)	**3% Chrysotile**
B-3-A-Mastic *041029614-0007A*		Black Non-Fibrous Homogeneous	3% Cellulose	97% Non-fibrous (other)	**None Detected**

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Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
B-3-B-Floor Tile *041029614-0008*					**Stop Positive (Not Analyzed)**
B-3-B-Mastic *041029614-0008A*		Black Non-Fibrous Homogeneous	2% Cellulose	98% Non-fibrous (other)	**None Detected**
B-3-C-Floor Tile *041029614-0009*					**Stop Positive (Not Analyzed)**
B-3-C-Mastic *041029614-0009A*		Black Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B-4-A-Floor Tile *041029614-0010*		Tan Non-Fibrous Heterogeneous		98% Non-fibrous (other)	**2% Chrysotile**
B-4-A-Mastic *041029614-0010A*		Black Non-Fibrous Homogeneous	5% Cellulose	95% Non-fibrous (other)	**None Detected**
B-4-B-Floor Tile *041029614-0011*					**Stop Positive (Not Analyzed)**

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Sample	Description	Appearance	Non-Asbestos %	Fibrous	Non-Asbestos %	Non-Fibrous	Asbestos % Type
B-4-B-Mastic *041029614-0011A*		Black Non-Fibrous Homogeneous	8%	Cellulose	92%	Non-fibrous (other)	**None Detected**
B-4-C-Floor Tile *041029614-0012*							**Stop Positive (Not Analyzed)**
B-4-C-Mastic *041029614-0012A*		Black Non-Fibrous Heterogeneous			100%	Non-fibrous (other)	**None Detected**
B-5-A-Drywall *041029614-0013*		Brown/Gray Fibrous Heterogeneous	20% 4%	Cellulose Glass	76%	Non-fibrous (other)	**None Detected**
B-5-A-Joint Compound *041029614-0013A*		White Non-Fibrous Homogeneous			100%	Non-fibrous (other)	**None Detected**
B-5-B-Drywall *041029614-0014*		Brown/Gray Fibrous Heterogeneous	45% 3%	Cellulose Glass	52%	Non-fibrous (other)	**None Detected**
B-5-B-Joint Compound *041029614-0014A*		White Non-Fibrous Homogeneous			100%	Non-fibrous (other)	**None Detected**

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Sample	Description	Appearance	Non-Asbestos %	Fibrous	Non-Asbestos %	Non-Fibrous	Asbestos % Type
B-5-C-Drywall *041029614-0015*		Brown/Gray Fibrous Heterogeneous	30%	Cellulose	66%	Non-fibrous (other)	None Detected
			4%	Glass			
B-5-C-Joint Compound *041029614-0015A*		White Non-Fibrous Homogeneous			100%	Non-fibrous (other)	None Detected
B-5-D-Drywall *041029614-0016*		Brown/Gray Fibrous Heterogeneous	30%	Cellulose	67%	Non-fibrous (other)	None Detected
			3%	Glass			
B-5-D-Joint Compound *041029614-0016A*		White Non-Fibrous Homogeneous			100%	Non-fibrous (other)	None Detected
B-5-E-Drywall *041029614-0017*		Brown/Gray Fibrous Heterogeneous	30%	Cellulose	70%	Non-fibrous (other)	None Detected
B-5-E-Joint Compound *041029614-0017A*		White Non-Fibrous Homogeneous			100%	Non-fibrous (other)	None Detected
B-7-A *041029614-0018*		Gray Fibrous Heterogeneous	90%	Min. Wool	10%	Non-fibrous (other)	None Detected

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			Non-Asbestos			Asbestos
Sample	**Description**	**Appearance**	**%**	**Fibrous**	**% Non-Fibrous**	**% Type**
B-7-B *041029614-0019*		Gray Fibrous Heterogeneous	90%	Min. Wool	10% Non-fibrous (other)	**None Detected**
B-7-C *041029614-0020*		Gray Fibrous Heterogeneous	75% 15%	Min. Wool Cellulose	10% Non-fibrous (other)	**None Detected**
B-8-A-Floor Tile *041029614-0021*		Gray Non-Fibrous Homogeneous			98% Non-fibrous (other)	**2% Chrysotile**
B-8-A-Mastic *041029614-0021A*		Black Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**
B-8-B-Floor Tile *041029614-0022*						**Stop Positive (Not Analyzed)**
B-8-B-Mastic *041029614-0022A*		Black Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**
B-8-C-Floor Tile *041029614-0023*						**Stop Positive (Not Analyzed)**

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Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
B-8-C-Mastic *041029614-0023A*		Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
B-9-A-Floor Tile *041029614-0024*		White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
B-9-A-Mastic *041029614-0024A*		Black Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B-9-B-Floor Tile *041029614-0025*		White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
B-9-B-Mastic *041029614-0025A*		Black Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B-9-C-Floor Tile *041029614-0026*		White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B-9-C-Mastic *041029614-0026A*					**Insufficient Material**

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EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone: (800) 220-3675 Fax: (856) 786-5974 Email: westmontasblab@EMSL.com

Attn: **Robert W Rickett**
Abatement Professionals Corp.
590 County Road
Westbrook, ME 04092

Fax: (207) 772-1203 Phone: (207) 773-1276
Project: **APC-10-440/PORTLAND INTERNATIONAL MARINE**

Customer ID: ABAT52
Customer PO: 140
Received: 12/23/10 10:30 AM
EMSL Order: 041029614

EMSL Proj:
Analysis Date: 1/6/2011

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos %	Fibrous	Non-Asbestos %	Non-Fibrous	Asbestos %	Type
B-10-A-Floor Tile *041029614-0027*		Red Fibrous Homogeneous			95%	Non-fibrous (other)	**5%**	**Chrysotile**
B-10-A-Mastic *041029614-0027A*		Black Non-Fibrous Heterogeneous			100%	Non-fibrous (other)	**None Detected**	
B-10-B-Floor Tile *041029614-0028*							**Stop Positive (Not Analyzed)**	
B-10-B-Mastic *041029614-0028A*		Brown Non-Fibrous Heterogeneous			100%	Non-fibrous (other)	**None Detected**	
B-10-C-Floor Tile *041029614-0029*							**Stop Positive (Not Analyzed)**	
B-10-C-Mastic *041029614-0029A*		Black Non-Fibrous Homogeneous			100%	Non-fibrous (other)	**None Detected**	
B-11-A *041029614-0030*		Gray Fibrous Heterogeneous	25% 5%	Min. Wool Cellulose	70%	Non-fibrous (other)	**None Detected**	

Initial report from 01/06/2011 16:18:54

Analyst(s)

Gregory Mortka (27)
Leslie McCluskey (23)

Stephen Siegel, CIH, Laboratory Manager
or other approved signatory

EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the federal government. The test results contained within this report meet the requirements of NELAC unless otherwise specified. Samples received in good condition unless otherwise noted.
Samples analyzed by EMSL Analytical, Inc. 200 Route 130 North, Cinnaminson NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036

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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos			Asbestos
Sample	Description	Appearance	% Fibrous		% Non-Fibrous	% Type
B-11-B *041029614-0031*		Gray Fibrous Heterogeneous	25% Min. Wool 5% Cellulose		70% Non-fibrous (other)	None Detected
B-11-C *041029614-0032*		Gray Non-Fibrous Heterogeneous	30% Min. Wool 5% Cellulose		65% Non-fibrous (other)	None Detected
B-12-A *041029614-0033*		Cream Non-Fibrous Heterogeneous	25% Cellulose 5% Glass		70% Non-fibrous (other)	None Detected
B-12-B *041029614-0034*		Cream Fibrous Heterogeneous	25% Cellulose 5% Glass		70% Non-fibrous (other)	None Detected
B-12-C *041029614-0035*		White Non-Fibrous Heterogeneous	30% Cellulose 5% Glass		65% Non-fibrous (other)	None Detected

ME CERT # BA-0122 (GM)/BA-0123(LM)

Initial report from 01/06/2011 16:18:54

Analyst(s)

Gregory Mortka (27)
Leslie McCluskey (23)

Stephen Siegel, CIH, Laboratory Manager
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. 200 Route 130 North, Cinnaminson NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036

THIS IS THE LAST PAGE OF THE REPORT.

041029614

Abatement Professionals

041029614

590 County Road, Suite 2, Westbrook ME 04092 Tel (207) 773-1276 * Fax (207) 772-1203

EMSL Analytical, Inc
Revised 07/07/99

CHAIN OF CUSTODY **ASBESTOS**

EMSL Rep: **Paul Nyfield**

Third Party Billing requires written authorization from third party

Your Company Name: **Abatement Professionals Corp**
590 County Rd Suite #2
Westbrook, Maine 04092

EMSL- Bill to: **ABAT52**

Fax Results: Robert **Rickett**
Telephone #: **207-773-1276**

E-mail Results:
rrickett@abatementpros.com

Project APC-10-440
Name/Number: Portland International Marine

Purchase Order # **140**

MATRIX				TURNAROUND			
☐ Air	☐ Soil	☐ Micro-Vac		☐ 3 Hrs	☐ 6 Hrs	☐ 12 Hrs *	☐ 1 Day
X Bulk	☐ Drinking Water			☐ 2 Days	☐ 3 Days	☐ 4 Days	☐ 5 Days
☐ Wipe	☐ Waste Water			6-10 Days			

Please call ahead to schedule TEM AIR, 3 hours, 6 hours. There is a premium charge for 3 hour TAT; call 1-800-220-3675 for price prior to sending samples
You will be asked to sign an authorization form for this service
* 12 Hours must arrive by 11:00am Mon-Fri. Please refer to Price Quote

PCM- AIR
☐ NIOSH 7400 (A) Issue 2: August 1994
☐ OSHA w/TWA
☐ Other:

PLM-Bulk
X EPA 600/R-93/116-Test Till Positive
[] EPA Point Count 400
☐ NY Stratified Point Count
☐ PLM NOB (Gravimetric) NYS 198.1
☐ NIOSH 9002
☐ EMSL Standard Addition

SEM Air or Bulk
☐ Qualitative
☐ Quantitative

TEM-AIR
☐ AHERA 40 CFR, Part 763 Subpart E
☐ NIOSH 7402 Issue 2
☐ EPA Level II

TEM-Bulk
☐ Drop Mount (Qualitative)
☐ Chatfield SOP-1988-02
☐ TEM NOB (Gravimetric) NY 198.4
☐ EMSL Standard Addition

PLM Soil
☐ EPA Protocol Qualitative
☐ EPA Protocol Quantitative
☐ EMSL MSD 9000 Method fibers/gram

TEM-WATER
☐ EPA 100.1
☐ EPA 100.2
☐ NYS 198.2

TEM Micro Vac/wipe
☐ ASTM D 5755-95
☐ Wipe Qualitative

XRD
☐ Asbestos
☐ Silica NIOSH 7500

OTHER
☐

Client Sample # (s) B-1-A- B- - B-13-C Total Sample #: 35

Relinquished: [signature] Date: 12-21-10 Time: 9:00 AM

Received: _____ Date: _____ Time: _____

Relinquished: _____ Date: _____ Time: _____

Received: DMB PM-1030A Date: 12-23-10 Time: _____

SAMPLES ACCEPTED FOR ANALYSIS BY: [illegible]
10 DEC 23 AM 11:51

1

State of Maine
Department of Environmental Protection

LICENSE

Abatement Professionals Corp.

Asbestos Abatement Contractor
(Full)

License Number: CF-0012 Expiration Date: 06/30/2011

999

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

June 15, 2010

Attn.: Robert Rickett, President
Abatement Professionals Corp.
590 County Road, Suite 2
Westbrook, Maine 04092

Dear Mr. Rickett:

This letter is in reference to your renewal application for licensure as an **Asbestos Abatement Contractor (Full).**

This office has received and completed the review of your application and finds it to be in accordance with the requirements of Maine Asbestos Management Regulations Chapter 425, effective May 29, 2004.

Your application has been approved and your firm is licensed to provide asbestos contractor service(s) as described on the enclosed certificate.

Your renewal license number remains at **CF-0012** which is in effect for one year and will expire on June 30, 2011. A renewal application should be filed not less than thirty (30) days prior to expiration of this licensure. Thank you for your continued service to the people of the State of Maine.

If you have any questions please call me at (207) 287-7751.

Sincerely,

Sandra J. Moody

Sandra J. Moody, Environmental Technician
Division of Solid Waste Management
Bureau of Remediation and Waste Management

Enclosure

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04679-2094
(207) 764-0477 FAX: (207) 760-3143

web site: www.maine.gov/dep

State of Maine
Department of Environmental Protection

LICENSE

Abatement Professionals Corp.

Asbestos Consultant
(Full)

License Number: SF-0028 Expiration Date: 06/30/2011

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STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

June 15, 2010

Attn.: Robert Rickett, President
Abatement Professionals Corp.
590 County Road, Suite 2
Westbrook, Maine 04092

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web site: www.maine.gov/dep

APPENDIX B

Permits

BOARD OF HARBOR COMMISSIONERS
PORT OF PORTLAND
PERMIT-A

TO BE POSTED IN A CONSPICUOUS PLACE AT THE CONSTRUCTION SITE

To.....Maine Department of Transportation, 16 State House Station, Augusta, ME 04333.....
The undersigned, Board of Harbor Commissioners for the Harbor of Portland, has carefully considered your application, Dated the 7th day of December 2010, for a permit authorizing
.....the construction and maintenance of approximately 5,000 s.f. of industrial pier space and other improvements to the Portland International Marine Terminal;.....
Having given public notice of this pending application, as required by law, and therein designated the 13th day Of January, 2011 at 5:00 o'clock in the afternoon prevailing time as the time when they would meet At the Portland City Hall to examine this issue and here all interested parties, and having met at the time and place mentioned and examined the location of this proposed construction project.....
And having heard all interested parties, the Board of Harbor Commissioners for the Port of Portland hereby issues this permit which authorizes you to proceed under all applicable local and federal regulations hereinafter stated, and to maintain within the limits mentioned in the permit application. .....

In addition, the construction project described above must be surrounded by a containment boom unless the Board of Harbor Commissioners for the Port of Portland has waived this requirement in writing, either as part of the above-listed conditions, or in a separate statement.

This permit is limited authorization, which contains a stated set of conditions with which the permit holder must comply. If a contractor performs the work for you, both you and the contractor are responsible for assuring that the work is done in conformance with the conditions and limitations of this authorization. Please be sure that the person who will be performing the work has read and understands these conditions.

Performing any work not specifically authorized by this permit, or that fails to comply with its conditions, may subject your to the enforcement provisions of Harbor Commission regulations. If any change in plans or construction methods is found necessary, please contact the Harbor Commission immediately to discuss modifications to your authorization. Any change must be approved by the Harbor Commission before it is undertaken.

Nothing in this permit shall be construed to justify or authorize any invasion to the private rights of others. Moreover, nothing in this permit shall limit or modify the authority of the Board of Harbor Commissioners for the Harbor of Portland with its applicable statute. Attested copies will be submitted to the U. S. Army Corps of Engineers, the Department of Environmental protection, the City of Portland, and the City of South Portland.

In Witness Whereof, the members of the Board of Harbor Commissioners for the Harbor of Portland hereunto set their hands and affix their corporate seal on this 13th day of January 2011.

The work authorized to this permit must be completed on or before the 13th day of January 2012.

.....

.....

.....

.....

.....

Board of Harbor Commissioners for the Port of Portland

BOARD OF HARBOR COMMISSIONERS
PORT OF PORTLAND, MAINE

Application for a Marine Construction Permit

DECISION

Date of public hearing:
January 13, 2011

Name and address of applicant:
Maine Department of Transportation
16 State House Station
Augusta, ME 04333-0016

Location of project for which permit is requested:
Portland International Marine Terminal
468 Commercial Street
Portland, ME 04101

Description of project:
The construction and maintenance of approximately 5,000 s.f. of industrial pier space and other improvements to the Portland International Marine Terminal;

For the Record:

Names and addresses of witnesses (proponents, opponents and others):
Craig Morin
Stephen Weatherhead

Exhibits admitted (e.g. renderings, reports, etc.):
Marine Construction permit application packet prepared by Stephen Weatherhead, Winton Scott Architects

Summary of testimony presented:
Outlined proposed project and answered questions from the Board

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Findings of Fact and Conclusions of Law:

1) Waiver of 25ft rule as defined in Rule 16.2(b):

The Board of Harbor Commissioners may grant a waiver of the 25 foot rule if it finds that it would be unfair, inappropriate or unnecessary to apply the rule in a particular situation.

Granted ____ Not Granted ____

Reason:

Factors to be considered by the Board:

a. Whether the particular marine structure or obstruction under consideration, even if allowed to be constructed or placed within 25 feet of a sideline, will permit a channel that will adequately allow the passage of vessels;

b. Whether existing marine structures or obstructions make it impossible for a channel wide enough to allow the passage of vessels to exist, regardless of the placement or construction of the marine structure under consideration;

c. The intended use of the marine structure of obstruction;

d. Whether granting a waiver would significantly reduce an abutting property owner's use of that abutting property, including but not limited to the owner's ability in the future to attach a marine structure to that abutting property;

e. Any boundary lines between properties that extend into the harbor as described in deeds, maps or plans; and

f. Any other factor the Board believes is relevant to whether a waiver should be granted in a particular case.

2) The marine structure or obstruction will not substantially or unreasonably interfere with navigation, including its impact on convenient channels for the passage of vessels.

Satisfied X Not Satisfied ____

Reason:

3) The marine structure or obstruction will not injure the rights of others.

Satisfied X Not Satisfied ____

Reason:

Nothing in record to indicate otherwise

4) The marine structure or obstruction will not threaten public safety.

Satisfied X Not Satisfied ____

Reason:

Nothing in record to indicate otherwise

Conclusion: (check one)

X Option 1: The Board finds that the standards described above have been satisfied and therefore GRANTS the permit.

___ Option 2: The Board finds that while the standards described above have been satisfied, certain additional conditions must be imposed to minimize adverse effects on navigation and/or public safety, and therefore GRANTS the permit SUBJECT TO THE FOLLOWING CONDITIONS:

___ Option 3: The Board finds that the standards described have NOT all been satisfied and therefore DENIES the permit.

Dated:

Tom Dobbins
Chair, Board of Harbor Commissioners

Environmental Summary Sheet

Pin: 17820.00 **Date Submitted: 6/2/11**
Town: Portland
CPD Team Leader: J Nichols
NEPA Complete: CE issued by MARAD

☒ **Section 106**
SHPO Concurrence
Special Conditions:

☒ **Section 4(f) and 6(f)**
Section 4(f)
Review Complete
Section 6(f)
Not Applicable

☒ **Maine Department of Inland Fisheries and Wildlife Essential Habitat**

Not Applicable **Timing Window: Not Applicable**

☒ **Section 7**
Not Applicable
Species of Concern:

Comments/References: Not Applicable

☒ **Maine Department of Conservation/Public Lands, Submerged Land Lease**
Not Applicable

☒ **Maine Land Use Regulation Commission**
Not Applicable

**Applicable Standards and Permits are included with the contract*

☒ **Maine Department of Environmental Protection**
Permit by Rule (PBR)

**Applicable Standards and Permits are included with the contract*

☒ **Army Corps of Engineers, Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.**
Category 2

**Applicable Standards and Permits are included with the contract*

☒ **Coast Guard**
Not Applicable
**Applicable Standards and Permits are included with the contract*

☒ **Special Provisions Required**

Special Provision 105-Timing of Work Restriction	N/A☐	Applicable☒
Special Provision 656-Erosion Control Plan	N/A☐	Applicable☒
Special Provision 203-Dredge Spec	N/A☐	Applicable☐
General Note for Hazardous Waste	N/A☐	Applicable☒
OR		
Special Provision 203-Hazardous Waste	N/A☐	Applicable☒
Special Provision 105.9	N/A☐	Applicable☐

**All permits and approvals based on plans/scope as of: 6/1/11*

DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP)

PERMIT BY RULE NOTIFICATION FORM

(For use with DEP Regulation, Chapter 305)

■ **MDOT PIN: No pin**

Name of Applicant: State of Maine Department of Transportation **Name of Contact:** Josh Nichols
Mailing Address: 16 Station State House **Town/City:** Augusta **State:** Me. **Zip Code:** 04330-0016
Daytime Telephone #: **Name of Wetland, Water Body or Stream:** Fore River
Detailed Directions to Site: Project is located between Commercial Street and the Fore River, adjacent to the Casco Bay Bridge. (International Marine Terminal)

Town/City: Portland **Map #:** N/A **Lot #:** N/A **County:** Cumberland

Description of Project: Project scope is to expand the existing pier at the International Marine Terminal on driven piles. The project will be performed in accordance with erosion control measures conforming with the latest versions of the *State of Maine Department of Transportation Standard Specifications for Highways and Bridges* and the *Department of Transportation's Best Management Practices for Erosion and Sediment Control.*

Part of a larger project? ☐**Yes** ☒**No**

(**CHECK ONE**) This project... ☒ does ☐ does not ...involve work below mean low water.

I am filing notice of my intent to carry out work which meets the requirements for Permit By Rule (PBR) under DEP Regulation, Chapter 305. I have a copy of PBR Sections checked below. I have read and will comply with all of the standards.

☐Sec. (2) Soil Disturbance	☐Sec. (8) Shoreline stabilization	☐Sec. (14) Piers, Wharves & Pilings
☐Sec. (3) Intake Pipes	☐Sec. (9) Utility Crossing	☐Sec. (15) Public Boat Ramps
☐Sec. (4) Replacement of Structures	☐Sec. (10) Stream Crossing	☐Sec. (16) Coastal Sand Dune Projects
☐Sec. (5) REPEALED	☒Sec. (11) State Transport. Facilities	☐Sec. (17) Transfers/Permit Extension
☐Sec. (6) Movement of Rocks or Vegetation	☐Sec. (12) Restoration of Natural Areas	☐Sec. (18) Maintenance Dredging
☐Sec. (7) Outfall Pipes	☐Sec. (13) F&W Creation/Enhance/Water Quality Improvement	

I authorize staff of the Departments of Environmental Protection, Inland Fisheries & Wildlife, and Marine Resources to access the project site for the purpose of determining compliance with the rules. I also understand that ***this permit is not valid until approved by the Department or 14 days after receipt by the Department, whichever is less.***

I have attached all of the following required submittals. **NOTIFICATION FORMS CANNOT BE ACCEPTED WITHOUT THE NECESSARY ATTACHMENTS:**

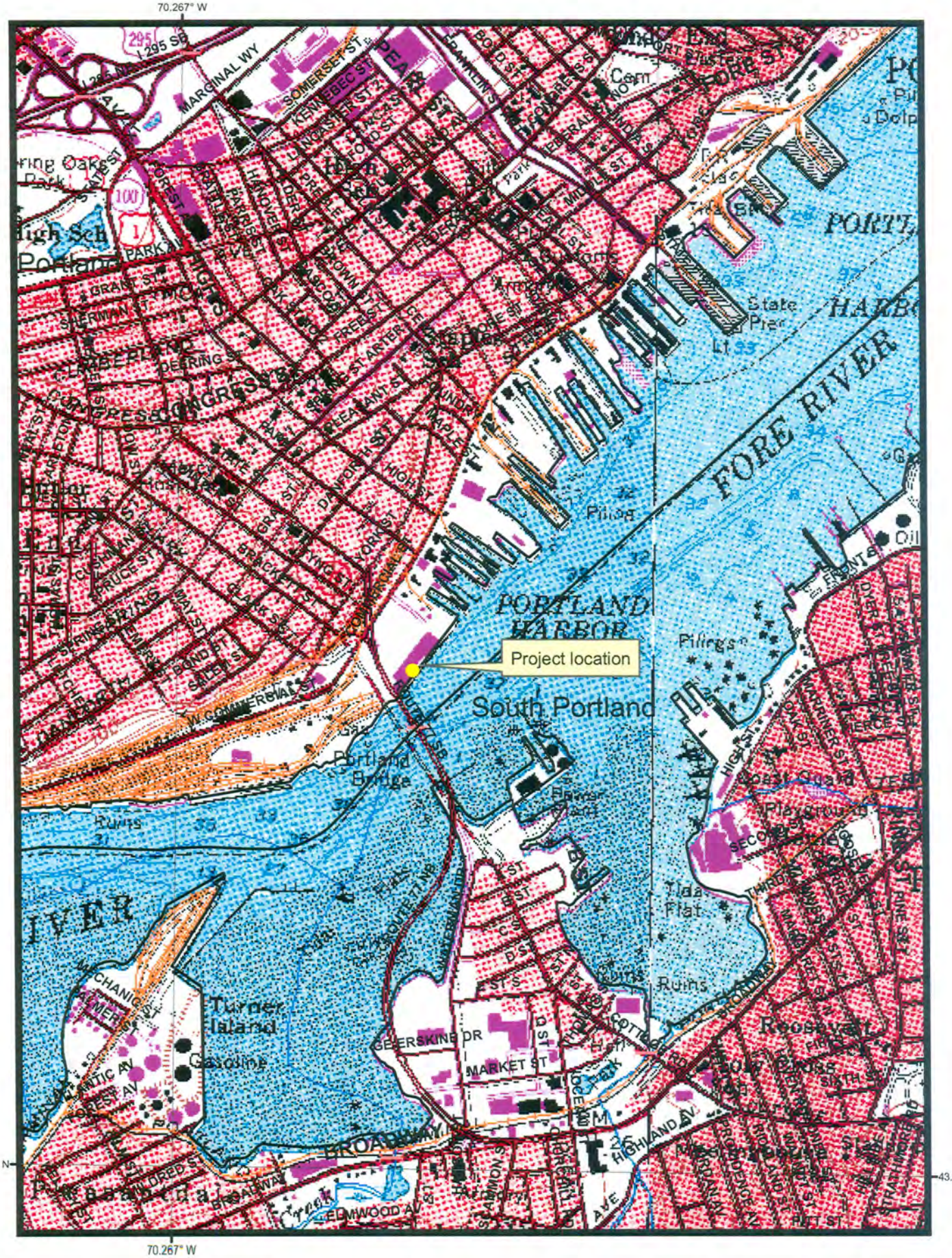
- **A $55 (non-refundable) payment shall be done by internal billing.**
- ***Attach* a U.S.G.S. topo map or Maine Atlas & Gazetteer map with the project site clearly marked.**
- ❑ ***Attach* photographs showing existing site conditions (unless not required under standards).**

Signature of Applicant: Judy C. Gates **Date:** 6/22/10
Judy Gates, MaineDOT Env Office Director

Keep the bottom copy as a record of permit. Send the form with attachments via certified mail to the Maine Dept. of Environmental Protection **at the appropriate regional office listed below**. The DEP will send a copy to the Town Office as evidence of the DEP's receipt of notification. No further authorization by DEP will be issued after receipt of notice. Permits are valid for two years. **Work carried out in violation of any standard is subject to enforcement action.**

AUGUSTA DEP STATE HOUSE STATION 17 AUGUSTA, ME 04333-0017 (207)287-2111 PORTLAND DEP 312 CANCO ROAD PORTLAND, ME 04103 (207)822-6300 BANGOR DEP 106 HOGAN ROAD BANGOR, ME 04401 (207)941-4570 PRESQUE ISLE DEP 1235 CENTRAL DRIVE PRESQUE ISLE, ME 04769 (207)764-0477

OFFICE USE ONLY		Ck.#	Staff		Staff	
PBR #	FP		Date	Acc. Date	Def. Date	After Photos



0 295 590 1,180 1,770 2,360 Feet

Portland

International Marine Terminal

-70.34035 44.90954

Coordinates in North American Datum 1983 (Decimal Degrees)

Chapter 305: PERMIT BY RULE Section 11
State Transportation Facilities

1. Introduction. A "permit by rule" or "PBR", when approved by the Department of Environmental Protection (DEP), is an approval for an activity that requires a permit under the Natural Resources Protection Act (NRPA). Only those activities described in this chapter may proceed under the PBR process. A PBR activity will not significantly affect the environment if carried out in accordance with this chapter, and generally has less of an impact on the environment than an activity requiring an individual permit. A PBR satisfies the Natural Resources Protection Act (NRPA) permit requirement and Water Quality Certification requirement.

If a proposed activity is not described in this chapter, or will not be conducted in accordance with the standards of this chapter, the applicant must obtain an individual permit prior to beginning the activity.

A. Location of activity. The location of an activity may affect whether an activity qualifies for PBR, and whether review by the Department of Inland Fisheries and Wildlife is required.

(1) Type of resource. For some types of activities, the availability of a PBR is affected by the type of natural resource in or adjacent to which the activity is proposed. For example, an applicant proposing an activity consisting of "Movement of rocks or vegetation" may receive a PBR only if the activity will take place in a great pond, river, stream or brook. Limitations concerning the location of activities are addressed in the "Applicability" provision in each section of this chapter.

(2) Essential habitat. Essential habitats include areas critical to the survival of threatened and endangered species such as the bald eagle, least tern, roseate tern, and piping plover. If the activity is located in essential habitat, such as near an eagle nesting site, a PBR is only available if the applicant obtains written approval from the Department of Inland Fisheries and Wildlife (IF&W). This approval from IF&W must be submitted to the DEP with the PBR notification form, and the applicant must follow any conditions stated in the IF&W approval.

NOTE: Maps showing areas of essential habitat are available from the Department of Inland Fisheries and Wildlife regional headquarters, municipal offices, the Land Use Regulation Commission (for unorganized territories) and DEP regional offices. If the activity is located in essential habitat, IF&W must be contacted to request and obtain a "certification of review and approval".

B. Notification. The applicant must file notice of the activity with the DEP prior to beginning work on the activity. The notification must be on a form provided by the DEP and must include any submissions required in this chapter. The applicant must keep a copy to serve as the permit.

The notification form must be sent to the DEP by certified mail (return receipt requested), or hand delivered to the DEP and date stamped by the department.

C. Effective period

(1) Beginning of period. The PBR becomes effective 14 calendar days after the DEP receives the notification form, unless the DEP approves or denies the PBR prior to that date. If the DEP does not speak with or write to the applicant within this 14 day period regarding the PBR notification, the applicant may proceed to carry out the activity.

There are three exceptions regarding the effective date of an approved PBR:

(a) Activities listed in Section 10 (Stream crossings) occurring in association with forest management are exempt from the 14 day waiting period.

(b) Activities listed in Section 2 (Soil disturbance) and Section 10 (Stream crossings) performed or supervised by individuals currently certified in erosion control practices by the DEP are exempt from the 14 day waiting period. To be certified in erosion control practices, an individual must successfully complete all course requirements of the Voluntary Contractor Certification Program administered by the DEP's Nonpoint Source Training and Resource Center.

(c) Activities that are part of a larger project requiring a permit under the Site Location of Development or the Storm Water Management Acts may not proceed until any required permit under those laws is obtained.

NOTE: Activities that are part of a larger project may require other permits from the DEP also. These other laws may prohibit the start of construction of any part of the project unless a permit under that law is obtained. In these cases, while not a violation of this rule, starting work on a PBR approved activity would be a violation of those other applicable laws.

(2) End of period. The PBR is generally effective for 2 years from the date of approval, except that a PBR for "Replacement of structures" under Section 4 is effective for 3 years.

NOTE: Activities that qualify under this chapter may need to meet other local, state and federal requirements. Examples -- (1) If an activity extends below the low water line of a lake, coastal wetland or international boundary water, the applicant should contact the Bureau of Parks and Lands (287-3061) concerning possible lease or easement requirements, or (2) If an activity will involve work below the mean high water line in navigable waters of the United States, the applicant should contact the Army Corps of Engineers (623-8367).

D. Discretionary authority. Notwithstanding compliance with the PBR applicability requirements and standards set forth in this chapter, the DEP may require an individual permit application to be filed in any case where credible evidence indicates that the activity:

(1) May violate the standards of the NRPA (38 M.R.S.A. Section 480-D);

(2) Could lead to significant environmental impacts, including cumulative impacts; or

(3) Could adversely impact a resource of special concern.

If an individual permit is required pursuant to this subsection, the DEP shall notify the applicant in writing within the 14 calendar day waiting period described in sub-section (C) above. When the DEP notifies an applicant than an individual permit is required, no work may be conducted unless and until the individual permit is obtained.

E. Violations. A violation of law occurs when a person, or his or her agent, performs or causes to be performed any activity subject to the NRPA without first obtaining a permit from the DEP, or acts contrary to the provisions of a permit. The person, his or her agent, or both, may be held responsible for the violation. Commonly, the "person" is the landowner, and the "agent" is the contractor carrying out the activity. A violation occurs when:

(1) An activity occurs that is not allowed under PBR, whether or not a PBR notification form has been filed with and/or approved by the DEP;

(2) An activity occurs that is allowed under PBR, but a PBR for the activity has not become effective prior to the beginning of the activity; or

(3) An activity occurs that is allowed under PBR and a PBR for the activity is in effect, but the standards specified in this chapter are not met.

See the "applicability" provision under each activity for rules concerning what activities are allowed under PBR. A PBR is only valid for the person listed on the notification form, or for his or her agent.

Each day that a violation occurs or continues is considered a separate offense. Violations are subject to criminal penalties and civil penalties of not less than $100 nor more than $10,000 for each day of that violation (38 M.R.S.A. Section 349).

NOTE: A local Code Enforcement Officer (CEO) may take enforcement action for a violation of the Natural Resources Protection Act if he or she is authorized to represent a municipality in District Court, and he or she has been certified as familiar with court procedures, 30-A M.R.S.A. Section 4452(7).

Chapter 305 Section 11

State transportation facilities

A. Applicability

(1) This section applies to the maintenance, repair, reconstruction, rehabilitation, replacement or minor construction of a State Transportation Facility carried out by, or under the authority of, the Maine Department of Transportation or the Maine Turnpike Authority, including any testing or preconstruction engineering, and associated technical support services.

(2) This section does not apply to an activity within a coastal sand dune system.

NOTE: The construction of a transportation facility other than roads and associated facilities may be subject to the Storm Water Management Law, 38 M.R.S.A. Section 420-D.

B. Standards

(1) Photographs of the area to be altered by the activity must be taken before work on the site begins. The photographs must be kept on file and be made available at the request of the DEP.

(2) The activity must be reviewed by the Department of Inland Fisheries and Wildlife, the Department of Marine Resources, the Atlantic Salmon Authority, and the DEP's Division of Environmental Assessment prior to the notification being filed with the DEP. The activity must be performed according to any recommendations from these authorities.

(3) The activity must be performed in accordance with erosion control measures conforming with the State of Maine Department of Transportation Standard Specifications for Highways and Bridges Revision of April 1995 and with the Department of Transportation's Best Management Practices for Erosion and Sediment Control, September 1997.

NOTE: Guidance on the use of erosion control best management practices can be obtained from the on site Construction Manager.

(4) Alignment changes may not exceed a distance of 200 feet between the old and new center lines in any natural resource.

(5) The activity may not alter more than 300 feet of shoreline (both shores added together) within a mile stretch of any river, stream or brook, including any bridge width or length of culvert.

(6) The activity may not alter more than 150 feet of shoreline (both shores added together) within a mile stretch of any outstanding river segment identified in 38 M.R.S.A. 480-P, including any bridge width or length of culvert.

(7) The activity must minimize wetland intrusion. The activity is exempt from the provisions of Chapter 310, the Wetland Protection Rules, if the activity alters less than 15,000 square feet of natural resources per mile of roadway (centerline measurement) provided that the following impacts are not exceeded within the 15,000 square foot area:

(a) 1,000 square feet of coastal wetland consisting of salt tolerant vegetation or shellfish habitat; or

(b) 5,000 square feet of coastal wetland not containing salt tolerant vegetation or shellfish habitat; or

(c) 1,000 square feet of a great pond.

All other activities must be performed in compliance with all sections of Chapter 310, the Wetland Protection Rules, except 310.2(C), 5(A), 9(1), 9(B) and 9(C).

(8) The activity may not permanently block any fish passage in any watercourse containing fish. The applicant must improve passage beyond what restriction may already exist unless the Department of Inland Fisheries and Wildlife, the Department of Marine Resources, the Atlantic Salmon Authority and the DEP's Division of Environmental Assessment concur that the improvement is not necessary.

(9) Rocks may not be removed from below the normal high water line of any coastal wetland, freshwater wetland, great pond, river, stream or brook except to the minimum extent necessary for completion of work within the limits of construction.

(10) If work is performed in a river, stream or brook that is less than three feet deep at the time and location of the activity, with the exception of culvert installation, the applicant must divert flow away from the activity while work is in progress.

(a) Diversion may be accomplished by the use of stable, inert material. No more than two thirds (2/3) of stream width may be diverted at one time.

(b) Any material used to divert water flow must be completely removed upon completion of the activity, and the stream bottom must be restored to its original condition.

(c) A pump may be operated, where necessary, for a temporary diversion. The pump outlet must be located and operated such that erosion or the discharge of sediment to the water is prevented.

NOTE: Guidance on the appropriate location of a diversion and materials which should be used for a stream diversion can be obtained from the on site Construction Manager.

(11) Wheeled or tracked equipment may not operate in the water. Equipment operating on the shore may reach into the water with a bucket or similar extension. Equipment may cross streams on rock, gravel or ledge bottom.

(12) All wheeled or tracked equipment that must travel or work in a vegetated wetland area must travel and work on mats or platforms.

(13) Any debris or excavated material must be stockpiled either outside the wetland or on mats or platforms. Hay bales or silt fence must be used, where necessary, to prevent sedimentation. Any debris generated during the activity must be prevented from washing downstream and must be removed from the wetland or water body. Disposal of debris must be in conformance

with the Maine Hazardous Waste, Septage and Solid Waste Management Act, 38 M.R.S.A. Section 1301 et seq.

(14) Work below the normal high water line of a great pond, river, stream or brook must be done at low water except for emergency work or work agreed to by the resource agencies listed in paragraph 2 above. Measures, such as a silt boom or staked fencing, must be employed to reduce and isolate turbidity.

(15) Perimeter controls must be installed before the work starts. Disturbance of natural resources beyond the construction limits shown on the plans is not allowed under this rule.

NOTE: Guidance on the location of construction limits can be obtained from the on site Construction Manager.

(16) The use of untreated lumber is preferred. Lumber pressure treated with chromated copper arsenate (CCA) may be used, provided it is cured on dry land in a manner that exposes all surfaces to the air for a period of at least 21 days prior to construction. Wood treated with creosote or pentachlorophenol may not be used where it will contact water.

(17) A temporary road for equipment access must be constructed of crushed stone, blasted ledge, or similar materials that will not cause sedimentation or restrict fish passage. Such roads must be completely removed at the completion of the activity. In addition, any such temporary roads which are in rivers, streams or brooks, must allow for a passage of stormwater flows associated with a 10-year storm.

(18) Soil may not be disturbed during any period when soils are saturated due to rain or snow melt, except as necessary to protect work in progress or as required for bridge maintenance activities. Areas where soils are saturated (i.e. water drips from the soil when squeezed by hand, or the soil is capable of being rolled into a rod 1/8th inch in diameter that does not crumble) must be immediately mulched if they are disturbed.

(19) Disturbed soil must be protected within one week from the time it was last actively worked, and prior to any storm event, using temporary or permanent measures such as the placement of riprap, sod, mulch, erosion control blankets, or other comparable measures.

(20) Hay bale or straw mulch, where used, must be applied at a rate of at least one bale per 500 square feet (1 to 2 tons per acre).

(21) If mulch is likely to be moved because of steep slopes or wind exposure, it must be anchored with netting, peg and twine, binder or other suitable method and must be maintained until a catch of vegetation is established over the entire disturbed area.

(22) In addition to the placement of riprap, sod, erosion control blankets or mulch, additional steps must be taken where necessary to prevent sedimentation of the water Evidence of sedimentation includes visible sheet, rill or gully erosion, discoloration of water by suspended particles and/or slumping of banks. Silt fences, staked hay bales and other sedimentation control measures, where planned for, must be in place prior to the commencement of an activity, but must also be installed whenever necessary to prevent erosion and sedimentation.

NOTE: Guidance on the location and proper installation of erosion control measures can be obtained from the on site Construction Manager.

(23) Temporary erosion control measures must be maintained and inspected weekly until the site is permanently stabilized with vegetation or other permanent control measures. Erosion control measures must also be inspected immediately prior to and following storms.

(24) Permanent erosion control measures protecting all disturbed areas must be implemented within 30 days from the time the areas were last actively worked, or for fall and winter activities by the following June 15, except where precluded by the type of activity (e.g. riprap, road surfaces, etc.). The permanent erosion control measures must be maintained.

(25) The applicant shall immediately take appropriate measures to prevent erosion or sedimentation from occurring or to correct any existing problems, regardless of the time of year.

(26) Non-native species may not be planted in restored areas.

(27) Disposal of debris must be in conformance with Maine Hazardous Waste, Septage and Solid Waste Management Act, 38 M.R.S.A. Sections 1301 et seq.

(28) Disturbance of vegetation must be avoided, if possible. Where vegetation is disturbed outside of the area covered by any road or structure construction, it must be reestablished immediately upon completion of the activity and must be maintained.

(29) A vegetated area at least 25 feet wide must be established and maintained between any new stormwater outfall structure and the high water line of any open water body. A velocity reducing structure must be constructed at the outlet of the stormwater outfall that will create sheet flow of stormwater, and prevent erosion of soil within the vegetated buffer. If the 25 foot vegetated buffer is not practicable, the applicant must explain the reason for a lesser setback in writing. Approval from the DEP must be in writing and any recommendations must be incorporated into the activity.

C. Definitions. The following terms, as used in this chapter, have the following meanings, unless the context indicates otherwise:

(1) Diversion. A rerouting of a river, stream or brook to a location outside of its established channel.

(2) Fill. a. (verb) To put into or upon, supply to, or allow to enter a water body or wetland any earth, rock, gravel, sand, silt, clay, peat, or debris; b. (noun) Material, other than structures, placed in or immediately adjacent to a wetland or water body.

(3) Floodplain wetlands. Freshwater wetlands that are inundated with flood water during a 100-year flood event based on flood insurance maps produced by the Federal Emergency Agency or other site specific information.

(4) Riprap. Rocks that are fit into place, usually without mortar, on a slope as defined in the State of Maine, Department of Transportation, Standard Specifications for Highway and Bridges, revision of April 1995.

DEPARTMENT OF THE ARMY

NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO ATTENTION OF

MAINE PROGRAMMATIC GENERAL PERMIT (PGP)
AUTHORIZATION LETTER AND SCREENING SUMMARY

OFFICE OF ENVIRONMENTAL SERVICES
MAINE DEPT. OF TRANSPORTATION
16 STATE HOUSE STATION
AUGUSTA, MAINE 04333

CORPS PERMIT # NAE-2010-01287
CORPS PGP ID# 10-210
STATE ID# PBR

DESCRIPTION OF WORK:

Rehabilitate and expand the existing International Marine Terminal in the Fore River (Portland Harbor) at Portland, Maine. Work will consist of demolishing an existing building, driving new steel pipe piles beneath the footprint of the former building to support a new concrete deck, and in-filling two open areas totaling 5,600 s.f. with new steel pipe pile supported concrete deck. This work is shown on the attached plans entitled "ME DOT – PORTLAND, INTERNATIONAL MARINE TERMINAL RECONSTRUCTION, PORTLAND, MAINE" in five sheets undated. DOT PIN: None

LAT/LONG COORDINATES : 43.6470122° N 70.2576743° W USGS QUAD: PORTLAND WEST, ME

I. CORPS DETERMINATION:

Based on our review of the information you provided, we have determined that your project will have only minimal individual and cumulative impacts on waters and wetlands of the United States. **Your work is therefore authorized by the U.S. Army Corps of Engineers under the enclosed Federal Permit, the Maine Programmatic General Permit (PGP).** Accordingly, other than possibly performing a compliance inspection (condition 23 of the permit) at some later date, we do not plan to take any further action on this project.

You must perform the activity authorized herein in compliance with all the terms and conditions of the PGP [including any attached Additional Conditions and any conditions placed on the State 401 Water Quality Certification including any required mitigation]. Please review the enclosed PGP carefully, including the PGP conditions beginning on page 7, to familiarize yourself with its contents. You are responsible for complying with all of the PGP requirements; therefore you should be certain that whoever does the work fully understands all of the conditions. You may wish to discuss the conditions of this authorization with your contractor to ensure the contractor can accomplish the work in a manner that conforms to all requirements.

If you change the plans or construction methods for work within our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

Condition 38 of the PGP (page 15) provides one year for completion of work that has commenced or is under contract to commence prior to the expiration of the PGP on October 11, 2010. You will need to apply for reauthorization for any work within Corps jurisdiction that is not completed by October 11, 2011.

This authorization presumes the work shown on your plans noted above is in waters of the U.S. Should you desire to appeal our jurisdiction, please submit a request for an approved jurisdictional determination in writing to the undersigned.

No work may be started unless and until all other required local, State and Federal licenses and permits have been obtained. **This includes but is not limited to a Flood Hazard Development Permit issued by the town if necessary.**

II. STATE ACTIONS: PENDING [X], ISSUED[ ], DENIED [ ] DATE

APPLICATION TYPE: PBR: X, TIER 1:, TIER 2:, TIER 3:, LURC:, DMR LEASE:, NA:

III. FEDERAL ACTIONS:

JOINT PROCESSING MEETING: 7/1/10 LEVEL OF REVIEW: CATEGORY 1: CATEGORY 2: X

AUTHORITY (Based on a review of plans and/or State/Federal applications): SEC 10 X, 404, 10/404, 103

EXCLUSIONS: The exclusionary criteria identified in the general permit do not apply to this project.

FEDERAL RESOURCE AGENCY OBJECTIONS: EPA NO, USF&WS NO, NMFS NO

If you have any questions on this matter, please contact my staff at 207-623-8367 at our Manchester, Maine Project Office. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://per2.nwp.usace.army.mil/survey.html

Jay L. Clement

JAY L. CLEMENT
SENIOR PROJECT MANAGER
MAINE PROJECT OFFICE

7-15-2011

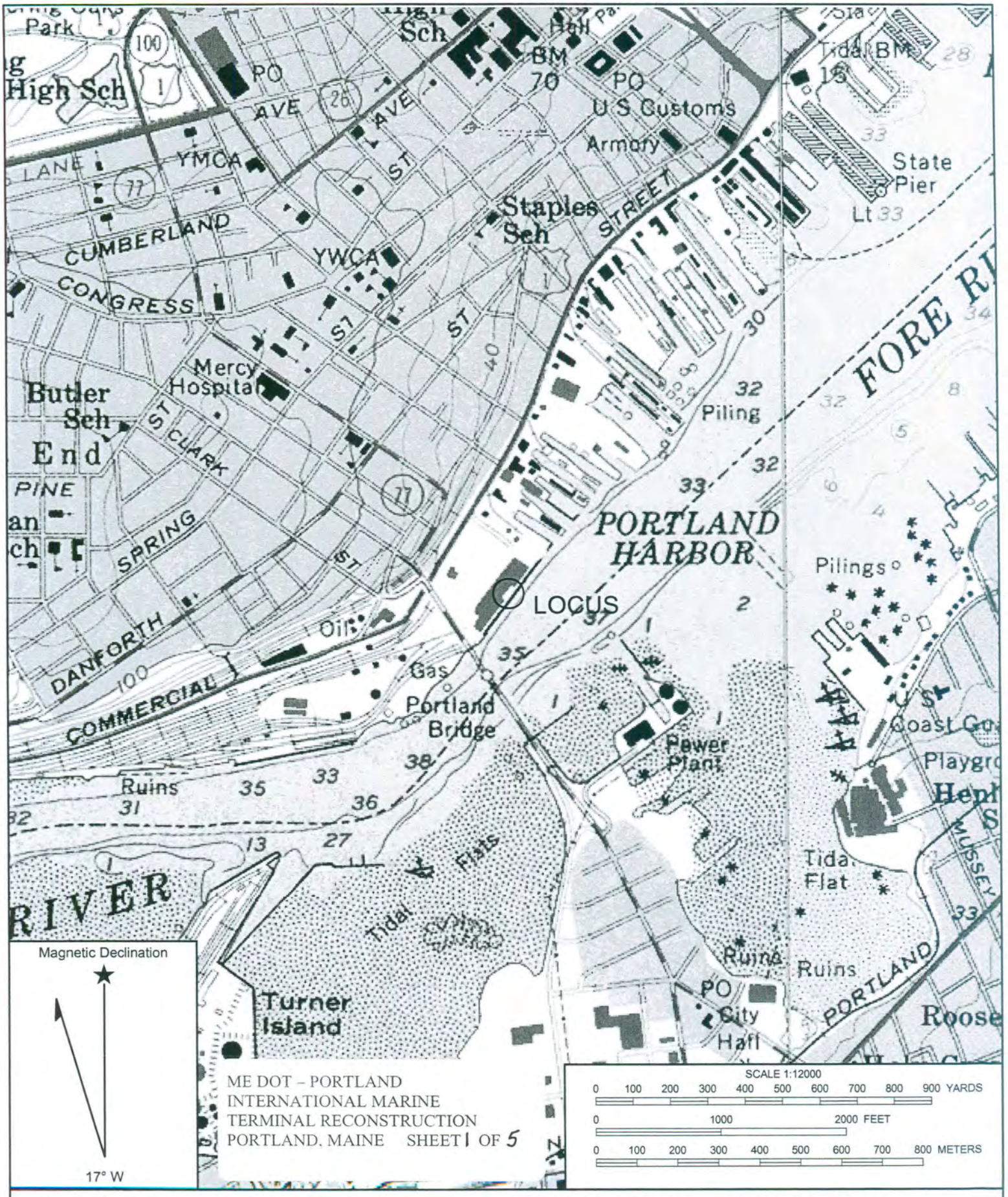
FRANK J. DEL GIUDICE DATE
CHIEF, PERMITS & ENFORCEMENT BRANCH
REGULATORY DIVISION

US Army Corps
of Engineers ®
New England District

PLEASE NOTE THE FOLLOWING GENERAL CONDITIONS FOR
DEPARTMENT OF THE ARMY
PROGRAMMATIC GENERAL PERMIT
NO. NAE-2010-01287

1. The permittee shall assure that a copy of this permit is at the work site whenever work is being performed and that all personnel performing work at the site of the work authorized by this permit are fully aware of the terms and conditions of the permit. This permit, including its drawings and any appendices and other attachments, shall be made a part of any and all contracts and sub-contracts for work which affects areas of Corps of Engineers' jurisdiction at the site of the work authorized by this permit. This shall be done by including the entire permit in the specifications for the work. If the permit is issued after construction specifications but before receipt of bids or quotes, the entire permit shall be included as an addendum to the specifications. The term "entire permit" includes permit amendments. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions of the entire permit, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps of Engineers jurisdiction.

2. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.



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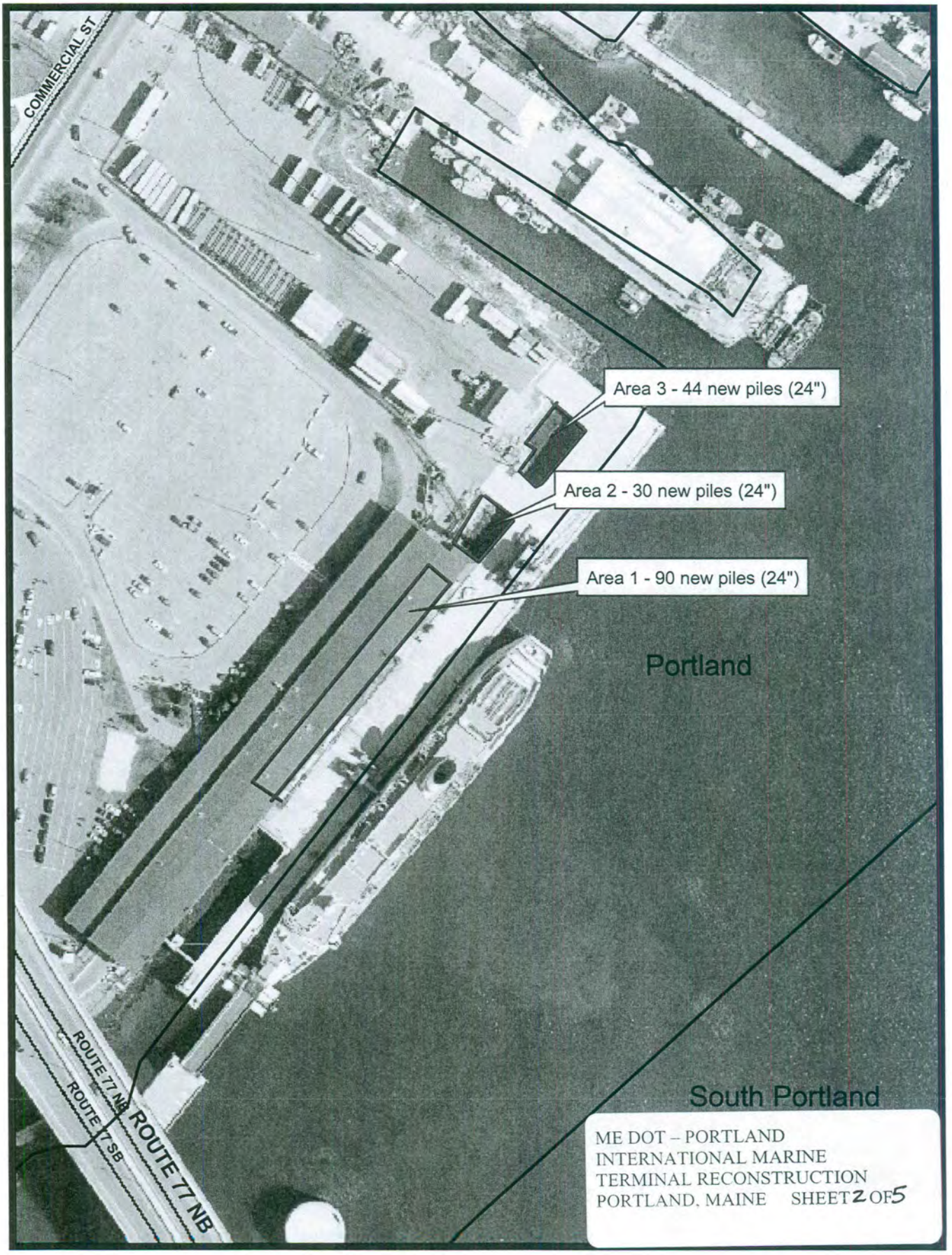


0 35 70 140 210 280 Feet

Portland
no pin

International Marine Terminal

-70.34035 44.90954

Coordinates in North American Datum 1983 (Decimal Degrees)

4

7772

ITEM NO. _____ DESCRIPTION _____ SH. NO. 690

Preliminary Estimated Quantity _____

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

INTERNATIONAL MARINE TERMINAL - NO PIN

1 OF 3

PORTLAND, MAINE - GEN. SITE ARRANGEMENT

NTS - JUNE 2010

= IMPACT AREA

CONTAINER YARD

(MEAN HIGH WATER IS AT SEAWALL)

N

MATCH LINE A

EDGE OF ROOF

WAREHOUSE (TO REMAIN)

TERM. BLDG. (TO BE REMOVED)

SEAWALL (TYP)

CONC Bridge

MLLW

OPEN

AREA #1
IMPACT = 282 +/- S.F. (90 PILES)

PIER DECK

TRANS BRIDGE (TO REMAIN)

FORE RIVER

ME DOT – PORTLAND
INTERNATIONAL MARINE
TERMINAL RECONSTRUCTION
PORTLAND, MAINE SHEET 3 OF 5

08

7/72

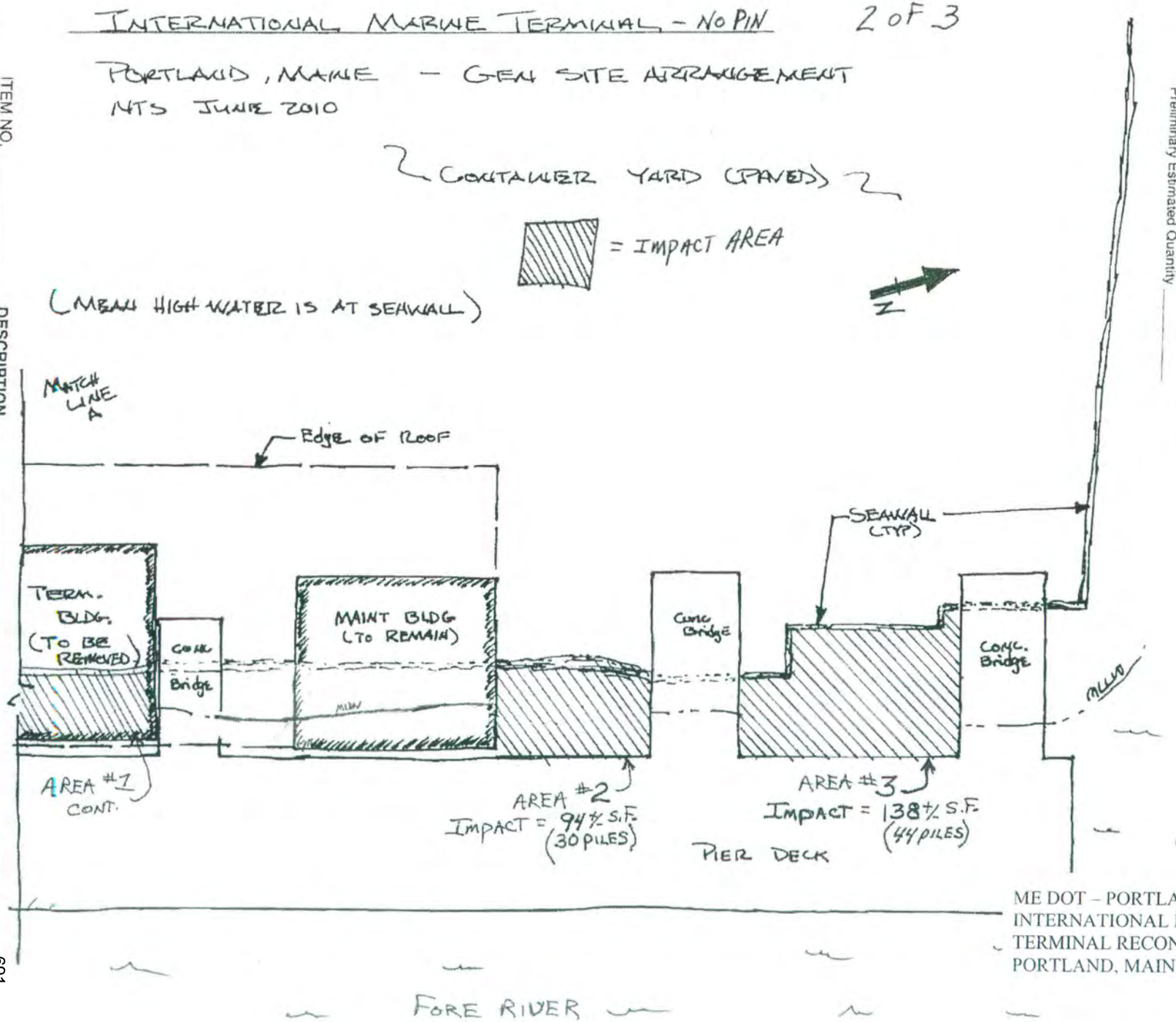
ITEM NO. _____ DESCRIPTION _____ SH. NO. 691

INTERNATIONAL MARINE TERMINAL - NO PIN

2 OF 3

PORTLAND, MAINE – GEN SITE ARRANGEMENT

NTS JUNE 2010



Preliminary Estimated Quantity _____

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

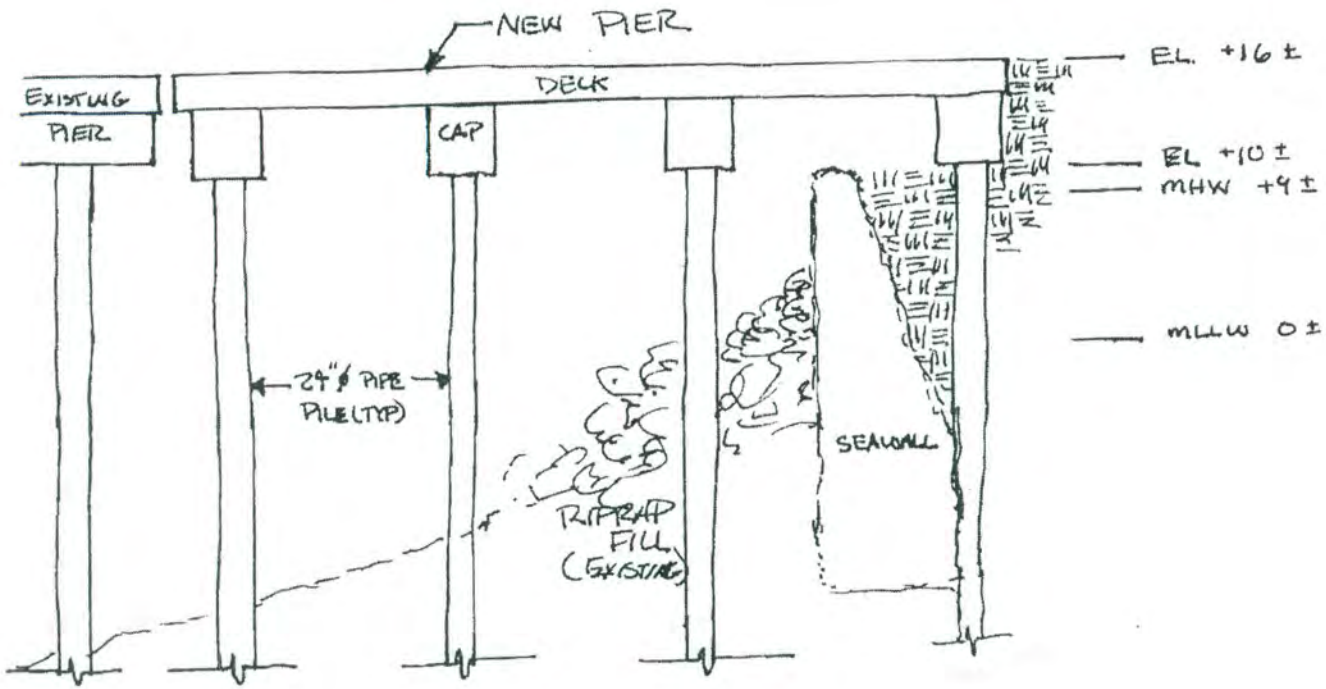
ME DOT – PORTLAND
INTERNATIONAL MARINE
TERMINAL RECONSTRUCTION
PORTLAND, MAINE SHEET 4 OF 5

9

INTERNATIONAL MARINE TERMINAL

PORTLAND, MAINE

3 of 3



TYPICAL SECTION - NEW DECK

NTS

NOTE: WORKS SAME FOR AREA 1 & 2, ADD ADDITIONAL 4 PILE BENT AT AREA 3.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

Preliminary Estimated Quantity

ITEM NO. DESCRIPTION SH. NO.

7/72

692

(10)

ME DOT – PORTLAND
INTERNATIONAL MARINE
TERMINAL RECONSTRUCTION
PORTLAND, MAINE SHEET 5 OF 5

Applicant: General Public, State of Maine

Effective Date: October 12, 2010
Expiration Date: October 12, 2015

DEPARTMENT OF THE ARMY
GENERAL PERMIT
STATE OF MAINE

The New England District of the U.S. Army Corps of Engineers (Corps) hereby issues this General Permit (GP) for activities in waters of the United States (U.S.) that have no more than minimal individual, secondary, and cumulative adverse effects on the aquatic environment in waters of the U.S. within the boundaries of and off the coast of the State of Maine.

I. GENERAL CRITERIA

In order for activities to qualify for this GP, they must meet the GP's terms and eligibility criteria (Pages 1 – 4), general conditions (GC) (Pages 5 – 18), and Appendix A - Definition of Categories.

Under this GP, projects may qualify for the following:

- Category 1: Category 1 Notification Form required.
  (Submittal of the Category 1 Notification Form at Appendix B to the Corps is required.
- Category 2: Application required.
  (Submittal of an application to the Corps is required and written approval from the Corps must be received.

If your project is ineligible for Category 1, it may qualify for Category 2 or an Individual Permit and you must submit an application (see Page 3). The thresholds for Categories 1 and 2 are defined in Appendix A. This GP does not affect the Corps Individual Permit review process or activities exempt from Corps regulation.

II. ACTIVITIES COVERED:

- Work and structures that are located in, under or over any navigable water of the U.S.[1] that affect the course, location, condition, or capacity of such waters; or the excavating from or depositing of material in such waters. The Corps regulates this under Section 10 of the Rivers and Harbors Act of 1899);
- The discharge of dredged or fill material into waters of the U.S[2]. The Corps regulates this under Section 404 of the Clean Water Act (CWA).[3]
- The transportation of dredged material for the purpose of disposal in the ocean. The Corps regulates this under Section 103 of the Marine Protection, Research and Sanctuaries Act.

[1] Defined at 33 CFR 329 and Appendix A, Page 4.
[2] Defined at 33 CFR 328
[3] When there is a regulated discharge of dredged or fill material into waters of the U.S., the Corps will also consider secondary impacts, which are defined at Appendix A, Endnote/Definition 2.

III. PROCEDURES:

1. State Approvals

Applicants are responsible for applying for and obtaining any of the required state or local approvals (see GC 1, Page 5). Federal and state jurisdictions may differ in some instances. State permits may be required for specific projects regardless of the general permit category.

In order for authorizations under this GP to be valid, when any of the following state approvals or statutorily-required reviews is also required, the approvals must be obtained prior to the commencement of work in Corps jurisdiction.

- Maine Department of Environmental Protection (DEP): Natural Resources Protection Act (NRPA) permit, including permit-by-rule and general permit authorizations; Site Location of Development Act permit; and Maine Waterway Development and Conservation Act permit.
- Maine Department of Conservation: Land Use Regulation Commission (LURC) permit.
- Maine Department of Marine Resources: Aquaculture Leases.
- Maine Department of Conservation, Bureau of Parks and Lands, Submerged Lands: Lease

NOTE: This GP may authorize projects that are not regulated by the State of Maine (e.g., seasonal floats or moorings).

2. Corps Authorizations

a. <u>Category 1 (Submission of Category 1 Notification Form required)</u>

Eligibility Criteria

Activities in Maine that:

- Are subject to Corps jurisdiction (see GC 2, Page 5),
- Meet the terms and eligibility criteria of this GP (Pages 1 - 4),
- Meet all GCs of this GP (Pages 5 – 18), and
- Meet the definition of Category 1 in Appendix A - Definition of Categories,

may proceed without application to the Corps provided:

- The Category 1 Notification Form (Appendix B) is submitted to the Corps before starting the work authorized by this GP.

Consultation with the Corps and/or outside experts may be necessary to ensure compliance with this GP's general conditions (starting on Page 5) and related federal laws such as the National Historic Preservation Act, the Endangered Species Act (ESA), and the Wild and Scenic Rivers Act. For example, experts on historic resources may include the agencies and tribes referenced in GC 8, while experts on endangered species include the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). Project proponents are encouraged to contact the Corps with Category 1 eligibility questions.

Work that is not regulated by the State of Maine, but is subject to Corps jurisdiction, is eligible for Category 1 authorization under this GP. The Maine DEP and LURC have waived WQC for projects authorized under Categories 1 and 2 of this GP. The state has concurred with the determination that projects authorized under Categories 1 and 2 of this GP are consistent with the enforceable policies of the Maine CZM Program.

b. Category 2 (Application to and written approval from the Corps required)

Eligibility Criteria
Activities in Maine that:

- Are subject to Corps jurisdiction (see GC 2, Page 5),
- Meet the terms of this GP (Pages 1 - 4),
- Meet all GCs of this GP (Pages 5 - 18),
- Meet the definition of Category 2 in Appendix A - Definition of Categories,

require an application to and written approval from the Corps. The Corps will coordinate review of Category 2 activities with federal and state agencies, as appropriate. To be eligible and subsequently authorized, an activity must result in no more than minimal impacts to the aquatic environment as determined by the Corps based on comments from the review team and the criteria listed above. This may require project modifications involving avoidance, minimization or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal. Compensatory mitigation for waterway/wetland impacts may take the form of wetland preservation, restoration, enhancement, creation, and/or "in-lieu fee" for inclusion into the Natural Resources Mitigation Fund. See www.nae.usace.army.mil/reg, "Mitigation" and then "Maine" for more information.

Work that is not regulated by the State of Maine, but is subject to Corps jurisdiction, is eligible for Category 2 authorization under this GP. The Maine DEP and LURC have waived WQC for projects authorized under Categories 1 and 2 of this GP. The state has concurred with the determination that projects authorized under Categories 1 and 2 of this GP are consistent with the enforceable policies of the Maine CZM Program.

3. Applying for a Permit

All applicants for Category 2 projects must:

a. Apply directly to the Corps using the state application form or the Corps application form (ENG Form 4345[1]), and apply directly to the state (DEP, LURC, BPL or DMR) as applicable using the appropriate state form, if the work is regulated by the Corps and the state.

b. Apply directly to the Corps using the Corps application form (ENG Form 4345[1]) if the work is regulated by the Corps but not the state (DEP, LURC, BPL or DMR).

c. Provide application information (see "Information Typically Required" in Appendix C) to help ensure the application is complete and to speed project review.

d. Submit a copy of their application materials to the Maine Historic Preservation Commission (MHPC) and the five Indian tribes listed at Appendix D, at the same time, or before, they apply to the state (DEP or LURC) or the Corps, to be reviewed for the presence of historic, archaeological or tribal resources in the permit area that the proposed work may affect. Submittals to the DEP or Corps shall include information to indicate that this has been done (a copy of the applicant's cover letter to MHPC and tribes or a copy of the MHPC and tribal response letters is acceptable).

[1] Located at www.nae.usace.army.mil/reg under "Forms."

4. Review Procedures

The Corps will coordinate review of all Category 2 activities with federal and state agencies, as appropriate, to ensure that the work will result in no more than a minimal impact to the aquatic environment. Applicants are responsible for applying for the appropriate state and local approvals listed on Page 2.

Emergency Procedures: 33 CFR 325.2(e)4 states that an "emergency" is a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures." The Corps will work with all applicable agencies to expedite authorization according to established procedures in emergency situations.

Individual Permit Procedures: Proponents of work that does not meet the terms and general conditions of this GP must submit the Corps application form and the appropriate application materials to the Corps at the earliest possible date in order to expedite the Individual Permit review process. General information and application forms can be obtained at our website or by calling us (see Appendix D). Individual WQC and CZM consistency concurrence are required when applicable from the State of Maine before Corps permit issuance. The Corps encourages applicants to concurrently apply for a Corps Individual Permit and state permits.

5. Approval Process

Applicants for Category 2 activities may not proceed with work in Corps jurisdiction until written authorization is received from the Corps. If the Corps determines that the Category 2 activity is eligible for the GP, the Corps will send an authorization letter directly to the applicant. The Corps will attempt to issue a written eligibility determination within the state's review period. If the Corps determines that the activity is not eligible under the GP or that additional information is required, the Corps will notify the applicant in writing and send a copy to the DEP or LURC. Applicants are responsible for obtaining all applicable approvals listed on Page 2 from the appropriate state and local agencies before commencing work in Corps jurisdiction.

V. GENERAL PERMIT CONDITIONS:

The following conditions apply to activities authorized under this Maine GP, unless otherwise specified, including all Category 1 (notification required) and Category 2 (application required) activities:

1. Other Permits. Authorization under this GP does not obviate the need to obtain other federal, state, or local authorizations required by law. This includes, but is not limited to, the project proponent obtaining a Flood Hazard Development Permit issued by the town, if necessary. Inquiries may be directed to the municipality or to the Maine Floodplain Management Coordinator at (207) 287-8063. See www.maine.gov/spo/flood.

2. Federal Jurisdictional Boundaries.
(a) Applicability of this GP shall be evaluated with reference to federal jurisdictional boundaries. Applicants are responsible for ensuring that the boundaries used satisfy the federal criteria defined at 33 CFR 328 "Waters of the U.S." and 33 CFR 329 "Navigable Waters of the U.S."
Note: Waters of the U.S. include the subcategories "navigable waters of the U.S." and "wetlands."
(b) For Category 1 projects, proponents are not required to delineate the waters of the U.S. that they plan to impact, but must approximate the square footage of impacts in order to determine the review category (1 or 2 or Individual Permit). For projects filling <15,000 SF of waters of the U.S. that do not qualify for Category 1 (e.g., vernal pool, secondary or endangered species impacts, etc.) and therefore require an application to the Corps, and for those filling ≥15,000 SF, applicants shall delineate all waters of the U.S. that will be filled (direct impacts) in accordance with the Corps of Engineers Wetlands Delineation Manual and the most recent regional supplements (see Appendix E). In addition, applicants shall approximately identify all waters of the U.S. on the property and known waters adjacent to the property in order for the Corps to evaluate secondary impacts. The waters of the U.S. shall be clearly shown on the project plans submitted with the application. This includes all waters of the U.S. in areas under DEP or LURC jurisdiction regardless of whether they're shown on LURC zoning maps.
(c) On a case-by-case basis, the Corps may modify/refine the above delineation and identification requirements for waters of the U.S.

3. Minimal Direct, Secondary and Cumulative Impacts.
(a) Projects authorized by this GP shall have no more than minimal direct, secondary and cumulative adverse environmental impacts. Category 2 applicants should provide information on secondary and cumulative impacts as stated in Appendix C. Compensatory mitigation may be required to offset unavoidable impacts (see GC 16) and to ensure that they are no more than minimal. Compensatory mitigation requirements will be determined on a case-by-case basis.
(b) Secondary impacts to waterway and/or wetland areas, (e.g., areas drained, flooded, cleared, excavated or fragmented) shall be added to the total fill area when determining whether the project qualifies for Category 1 or 2. Direct, secondary and cumulative impacts are defined at Appendix A, Endnote 2.
(c) Site clearing, grading and construction activities in the upland habitat surrounding vernal pools ("Vernal Pool Management Areas") are secondary impacts. See GC 28 for avoidance and minimization requirements and recommendations.

4. Discretionary Authority. Notwithstanding compliance with the terms and conditions of this permit, the Corps retains discretionary authority to require Category 2 or Individual Permit review based on concerns for the aquatic environment or for any other factor of the public interest [33 CFR

320.4(a)]. This authority is invoked on a case-by-case basis whenever the Corps determines that the potential consequences of the proposal warrant a higher level of review based on the concerns stated above. This authority may be invoked for projects that may contribute to cumulative environmental impacts that are more than minimal or if there is a special resource or concern associated with a particular project that is not already covered by the remaining conditions of the GP and that warrants greater review. Whenever the Corps notifies an applicant that an Individual Permit may be required, the project is not authorized under this GP and no work may be conducted until an Individual Permit is obtained or until the Corps notifies the applicant that further review has demonstrated that the work may proceed under this GP.

5. Single and Complete Projects.
(a) This GP shall not be used to piecemeal work and shall be applied to single and complete projects[1]. When determining the review category in Appendix A (Category 1 or 2) for a single and complete project, proponents must include any permanent historic fill placed since October 1995 that is associated with that project and all currently proposed temporary and permanent impact areas.
(b) A single and complete project must have independent utility[1].
(c) Unless the Corps determines the activity has independent utility[1]:

i. This GP shall not be used for any activity that is part of an overall project for which an Individual Permit is required,

ii. All components of a single project and/or all planned phases of a multi-phased project (e.g., subdivisions should include all work such as roads, utilities, and lot development) shall be treated together as constituting one single and complete project[1].

(d) For linear projects, such as power lines or pipelines with multiple crossings, the single and complete project[1] is all crossings of a single water of the U.S. (i.e., single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly-shaped wetland or lake, etc., are not separate waterbodies and crossings of such features cannot be considered separately. If any crossing requires a Category 2 activity, then the entire linear project shall be reviewed as one project under Category 2.

6. Permit On-Site. For Category 2 projects, the permittee shall ensure that a copy of this GP and the accompanying authorization letter are at the work site (and the project office) authorized by this GP whenever work is being performed, and that all personnel with operation control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit authorization shall be made a part of any and all contracts and sub-contracts for work that affects areas of Corps jurisdiction at the site of the work authorized by this GP. This shall be achieved by including the entire permit authorization in the specifications for work. The term "entire permit authorization" means this GP and the authorization letter (including its drawings, plans, appendices and other attachments) and also includes permit modifications. If the authorization letter is issued after the construction specifications, but before receipt of bids or quotes, the entire permit authorization shall be included as an addendum to the specifications. If the authorization letter is issued after receipt of bids or quotes, the entire permit authorization shall be included in the contract or sub-contract. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire GP authorization, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

[1] Single and Complete Project and Independent Utility are defined at Appendix E.

7. St. John/St. Croix Rivers. Work within the Saint John and Saint Croix River basins that requires approval of the International Joint Commission is not eligible for Category 1 and an application to the Corps is required if any temporary or permanent use, obstruction or diversion of international boundary waters could affect the natural flow or levels of waters on the Canadian side of the line; or if any construction or maintenance of remedial works, protective works, dams, or other obstructions in waters downstream from boundary waters could raise the natural level of water on the Canadian side of the boundary.

8. Historic Properties. No activity otherwise authorized by this GP shall result in effects (as that term is defined at 36 C.F.R. § 800.16(i)) on properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties, unless and until the Corps or another federal agency has satisfied the consultation requirements of Section 106 of the National Historic Preservation Act. Work is not eligible for Category 1 and an application to the Corps is required if the activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. Work is eligible for Category 1 if a no effect or no adverse effect determination has been made for that work by another federal action agency in its Section 106 consultation with the Maine Historic Preservation Commission (MHCP) and the five federally recognized Indian tribes listed at Appendix D. Information on the location and existence of known historic resources can be obtained from the MHPC, the National Register of Historic Places, and the five tribes listed in Appendix D. Historic properties include those that are eligible for inclusion, but not necessarily listed on the National Register. If the permittee, either prior to construction or during construction of the work authorized herein, encounters a previously unidentified archaeological or other cultural resource within the area subject to Corps jurisdiction that might be eligible for listing in the National Register of Historic Places, he/she shall stop work and immediately notify the Corps and the MHPC and/or applicable tribe(s).

9. National Lands. None of the following work is eligible as a Category 1 project**:**
(a) Activities that impinge upon the value of any National Wildlife Refuge, National Forest, National Marine Sanctuary, National Park or any other area administered by the National Park Service, U.S. Fish and Wildlife Service (USFWS) or U.S. Forest Service.
(b) Work on Corps properties and Corps-controlled easements. Contact the Corps, Real Estate Division (978) 318-8585 to initiate reviews about both Corps holdings and permit requirements.
(c) Any proposed temporary or permanent modification or use of a federal project (including but not limited to a levee, dike, floodwall, channel, sea wall, bulkhead, jetty, wharf, pier, or other work built but not necessarily owned by the United States), which would obstruct or impair the usefulness of the federal project in any manner, and/or would involve changes to the authorized federal project's scope, purpose, and/or functioning that go beyond minor modifications required for normal operation and maintenance (requires review and approval by the Corps pursuant to 33 USC 408). Federal projects in Maine as of October 2010 are shown at Appendix F. This map may not be inclusive of all projects.

10. Endangered Species.
(a) No activity may be authorized under Category 1 of this GP which:
i. "May affect" a threatened or endangered species, a species proposed for listing as threatened or endangered, or designated or proposed critical habitat (all herein referred to as "listed species or habitat") as identified under the federal Endangered Species Act (ESA) (unless specified in a programmatic agreement with NMFS or USFWS),

ii. Results in a "take" of any federally-listed threatened or endangered species of fish or wildlife, or

iii. Results in any other violation of Section 9 of the ESA protecting threatened or endangered species of plants.

(b) Work in Inland Waters and Wetlands[1] and the non-tidal portions of Navigable Waters[2] (e.g., the Penobscot River, Kennebec River) is not eligible for Category 1 if:

i. The project action area occurs within a watershed occupied by listed Atlantic salmon or shortnose sturgeon. Project proponents must check the site in Footnote 3 below.

ii. In areas outside these watersheds contact the USFWS (see Appendix D, Page 1 for contact information) to check for the presence of other listed species.

(c) Work in the tidal portions of Navigable Waters may be eligible for Category 1. Reference Appendix A, II. Navigable Waters, Pages 4 – 9, and the other terms and general conditions (GC 11 is particularly relevant) of this GP to determine Category 1 eligibility. Project proponents must contact the USFWS (see Appendix D, Page 1 for contact information) to ensure that work in all tidal portions of Navigable Waters[2] is not in critical habitat or areas occupied by listed species other than Atlantic salmon or shortnose sturgeon.

(d) Although some work is excluded from Category 1 as stated in (b) and (c) above, work may qualify for Category 1 if a no effect determination has been made for that work by a federal action agency such as the Corps.

(e) Proponents must submit an application to the Corps if any of the activities in 10(a)-10(c) that do not qualify for Category 1 may occur and provide information on federally-listed species or habitat to allow the Corps to conduct any required consultation under Section 7 of the ESA.

(f) The Corps review may consider species listed as endangered and threatened pursuant to Maine state law.

11. Essential Fish Habitat. Any work in the following rivers and streams, including all tributaries to the extent that they are currently or were historically accessible for salmon migration, shall not be authorized under Category 1 of the GP and must be screened for potential impacts to EFH (see Appendix E for more information).

Androscoggin River	Aroostook River	Boyden River	Dennys River
Ducktrap River	East Machias River	Hobart Stream	Kennebec River
Machias River	Narraguagus River	Orland River	Passagassawaukeag River
Patten Stream	Penobscot River	Pleasant River	Presumpscot River
Saco River	Sheepscot River	St. Croix River	Tunk Stream
			Union River

The above does not apply to the following activities which may qualify for Category 1 work:

- Exploratory drilling and borings for bridges.
- Moorings (see Appendix A, Page 6 for Category 1 thresholds and requirements)
- Structures and floats (see Appendix A, Page 7 for Category 1 thresholds and requirements)
- Other activities specified in a programmatic agreement with NMFS.

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[1] See Appendix A, Page 1 for definition.

[2] See Appendix A, Page 4 for definition.

[3] For areas considered occupied by listed Atlantic salmon and/or shortnose sturgeon in Inland Waters and Wetlands, and in Navigable Waters, see: www.nero.noaa.gov/prot_res/altsalmon/dpsmaps.html. Tidal portions of navigable waters occupied by listed Atlantic salmon are more specifically described as those waters from the Kennebec River to its mouth at Merrymeeting Bay, northeast to the Dennys River, including the Androscoggin River upstream to the Brunswick Dam, and other streams northeast of this line to the limit of their tidal reaches.

12. Wild and Scenic Rivers. Any activity that occurs in the designated main stem of, within 0.25 mile up or downstream of the designated main stem of, or in tributaries within .25 miles of the designated main stem of a National Wild and Scenic River, or in "bordering and contiguous wetlands" (see Appendix A, Endnote 1) that are adjacent to the designated main stem of a National Wild and Scenic River, or that has the potential to alter flows within a river within the National Wild and Scenic River System, is not eligible for Category 1 regardless of size of the impacts. This condition applies to both designated Wild and Scenic Rivers and rivers officially designated by Congress as study rivers for possible inclusion while such rivers are in an official study status. National Wild and Scenic Rivers System segments for Maine as of October 2010 include: Allagash River beginning at Telos Dam continuing to Allagash checkpoint at Eliza Hole Rapids, approximately 3 miles upstream of the confluence with the St. John River (length = 92 miles).

13. Federal Navigation Project. Any structure or work that extends closer to the horizontal limits of any Corps Federal Navigation Project (see Appendix F) than a distance of three times the project's authorized depth shall be subject to removal at the owner's expense prior to any future Corps dredging or the performance of periodic hydrographic surveys. This is applicable to Category 1 and 2. Reference Appendix A, Page 6 (Moorings) and Page 7 (Structure and Floats).

14. Navigation.
(a) There shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein and no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized herein.
(b) The permittee understands and agrees that, if future U.S. operations require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

15. Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following: (a) damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; (b) damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest; (c) damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit; (d) design or construction deficiencies associated with the permitted work; (e) damage claims associated with any future modification, suspension, or revocation of this permit.

16. Avoidance, Minimization and Compensatory Mitigation.
Discharges of dredged or fill material into waters of the U.S., including wetlands, shall be avoided and minimized to the maximum extent practicable through consideration of alternatives. The Corps may require compensatory mitigation of unavoidable direct and secondary impacts associated with Category 2 projects on a case-by-case basis (see Appendix E).

17. Heavy Equipment in Wetlands. Operating heavy equipment other than fixed equipment (drill rigs, fixed cranes, etc.) within wetlands shall be minimized, and such equipment shall not be stored, maintained or repaired in wetlands, to the maximum extent practicable. Where construction requires heavy equipment operation in wetlands, the equipment shall either have low ground pressure

(typically <3 psi), or it shall be placed on swamp/construction/timber mats (herein referred to as "construction mats" and defined at Appendix A, Endnote 4) that are adequate to support the equipment in such a way as to minimize disturbance of wetland soil and vegetation. Construction mats are to be placed in the wetland from the upland or from equipment positioned on swamp mats if working within a wetland. Dragging construction mats into position is prohibited. Other support structures that are capable of safely supporting equipment may be used with written Corps authorization (Category 2 authorization or Individual Permit). Similarly, the permittee may request written authorization from the Corps to waive use of mats during frozen, dry or other conditions. An adequate supply of spill containment equipment shall be maintained on site.

18. Temporary Fill.
Temporary fill that qualifies for Category 1 (e.g., <15,000 SF of combined temporary and permanent fill associated with the single and complete project) or is authorized in writing under Category 2, shall adhere to the following:
(a) All temporary fill shall be stabilized to prevent its eroding into portions of waters of the U.S., including wetlands, where it is not authorized.
(b) Unconfined temporary fill authorized for discharge into waters of the U.S., including wetlands, shall consist of material that minimizes impacts to water quality (e.g. sandbags, clean gravel, stone, aggregate, etc.).
(c) Temporary fill authorized for discharge into wetlands should be placed on geotextile fabric or other material (e.g., straw) laid on the pre-construction wetland grade where practicable to minimize impacts.
(d) Temporary fill shall be removed as soon as it is no longer needed, disposed of at an upland site, and suitably contained to prevent subsequent erosion into waters of the U.S, including wetlands.
To qualify for Category 1, temporary fill placed during the:

i. Growing season must be removed before the beginning of the next growing season.

ii. Non-growing season may remain throughout the following growing season, but must be removed before the beginning of the next growing season.

(e) Waters of the U.S., including wetlands, where temporary fill was discharged shall be restored (see GC 19).
(f) Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must be placed in a manner that will not be eroded by expected high flows (see GC 21).
(g) Construction mats and corduroy roads (see GC 17 above) are considered as temporary fill when they are removed immediately upon work completion. The area must be restored (see GC 19).

19. Work Site Restoration.
(a) Wetland areas where permanent disturbance is not authorized shall be restored to their original condition and elevation, which under no circumstances shall be higher than the pre-construction elevation. Original condition means careful protection and/or removal of existing soil and vegetation, and replacement back to the original location such that the original soil layering and vegetation schemes are approximately the same, unless otherwise authorized.
(b) Upon completion of construction, all disturbed wetland areas (the disturbance of these areas must be authorized) shall be properly stabilized. Any seed mix shall contain only plant species native to New England and shall not contain any species listed in the "Invasive and Other Unacceptable Plant Species" Appendix in the "New England District Compensatory Mitigation Guidance" (see Appendix E, Paragraph 6). This list may be updated periodically.
(c) In areas of authorized temporary disturbance, if trees are cut they shall be cut at ground level and

not uprooted in order to prevent disruption to the wetland soil structure and to allow stump sprouts to revegetate the work area, unless otherwise authorized.

20. Bank Stabilization.
(a) Projects involving construction or reconstruction/maintenance of bank stabilization structures within Corps jurisdiction shall be designed to minimize environmental effects, effects to neighboring properties, scour, etc. to the maximum extent practicable.
(b) Project proponents must design and construct bank stabilization projects using this sequential minimization process: avoidance of aquatic resource impacts, diversion of overland flow, vegetative stabilization, stone-sloped surfaces, and walls/bulkheads. Vertical walls/bulkheads shall only be used in situations where reflected wave energy can be tolerated. Refer to Appendix E for design guidance.
(c) Inland Water bank stabilization activities necessary for erosion prevention must meet all of the following criteria: **(i)** No material is placed in excess of the minimum needed for erosion protection; **(ii)** The activity is no more than 500 feet in length along the bank; **(iii)** The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark; **(iv)** Structures angled steeper than 1H:1V and any material other than angular or subangular stone or fiber roll revetments require at least a Category 2 review. **(v)** The activity does not involve discharges of dredged or fill material into special aquatic sites; **(vi)** No material is of the type, or is placed in any location, or in any manner, to impair surface water flow into or out of any water of the U.S.; **(vii)** No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and, **(viii)** The activity is not a stream channelization activity.
(d) Navigable Water bank stabilization activites are provided at Appendix A, Page 4.

21. Sedimentation and Erosion Control.
(a) Adequate sedimentation and erosion control management measures, practices and devices, such as phased construction, installation of sediment control barriers (i.e. silt fence, vegetated filter strips, geotextile silt fences, erosion control mixes, hay bales or other devices) downhill of all exposed areas, retention of existing vegetated buffers, application of temporary mulching during construction, and permanent seeding and stabilization shall be installed and properly maintained to reduce erosion and retain sediment on-site during and after construction. They shall be capable of preventing erosion, of collecting sediment, suspended and floating materials, and of filtering fine sediment.
(b) Temporary sediment control barriers shall be removed upon completion of work, but not until all disturbed areas are permanently stabilized. The sediment collected by these sediment barriers shall be removed and placed at an upland location and stabilized to prevent its later erosion into a waterway or wetland.
(c) All exposed soil and other fills shall be permanently stabilized at the earliest practicable date (see GC 19).

22. Stream Work and Crossings[1].

Notes:

(a) GC 22(a) and (b) apply to Inland Waters and Wetlands (see Appendix A, Page 1 for definition) and Navigable Waters (see Appendix A, Page 4 for definition). GC 22(c)-(l) only apply to Inland Waters and Wetlands that are streams. All new and replacement crossings in Navigable Waters require an application to the Corps and at least a Category 2 review.

(b) In-stream work in a watershed occupied by listed Atlantic salmon or shortnose sturgeon [see GC 10(b)] and some stream work such as crossings on EFH waters (see GC 11) is not eligible for Category 1.

(c) "High-Quality Stream Segments" are shown at www.maine.gov/dep/gis/datamaps and may be useful in evaluating impacts to fisheries. GIS shape files are under "Other Google Earth Interactive Maps" and PDFs by county are under "DEP GIS Maps." See Appendix E, 8(b) for more information.

Conditions:

(a) All permanent crossings of rivers, streams, brooks, etc. (hereon referred to as "streams") shall be suitably culverted, bridged, or otherwise designed to **i)** withstand and to prevent the restriction of high flows to qualify for Category 1, and **ii)** not obstruct the movement of or not substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, beyond the actual duration of construction unless the activity's primary purpose is to impound water to qualify for Category 1 or 2. (NOTE: Areas of fill and/or cofferdams must be included in total waterway/wetlands impacts to determine applicability of this GP).

(b) Any work that temporarily or permanently impacts upstream or downstream flood conditions, or permanently impacts wetlands in excess of Category 1 thresholds, must be reviewed at least under Category 2. See the documents referenced in Appendix E, 8(c) and (d) for guidance.

(c) New Stream Crossings. For new stream crossings to qualify for Category 1:

i. Must ensure compliance with GC 22(a) and GC 22(b) above.

ii. Shall be designed and constructed in accordance with the Corps General Stream Crossing Standards provided on Page 14 and the stream simulation document listed at Appendix E, 8(a).

(d) Replacement Stream Crossings. For replacement stream crossings to qualify for Category 1:

i. Must ensure compliance with GC 22(a) and GC 22(b) above.

ii. Shall be designed and constructed in accordance with the Corps General Stream Crossing Standards provided on Page 14 and the stream simulation document listed at Appendix E, 8(a).

(e) Culvert Extensions. Culvert extensions on culverts that do not meet the Corps General Stream Crossing Standards do not qualify for Category 1 and require an application to the Corps at least as a Category 2 project.

(f) Temporary Stream Crossings.

Note: The General Stream Crossing Standards don't apply to temporary stream crossings.

i. Temporary stream crossings or cofferdams shall be used for equipment access across streams [see Appendix E, 8(e)]. Note: Areas of fill and/or cofferdams must be included in total waterway/wetlands impacts to determine the review category in Appendix A.

ii. Temporary stream crossings shall be removed within 180 days to qualify for Category 1.

iii. Temporary stream crossings that are not spans[2] (typically culverts) must be designed in accordance with 1-6 below to qualify for Category 1. Category 2 applications should include information demonstrating 2-6 below:

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[1] This condition does not apply to non-tidal drainage systems and irrigation ditches excavated on dry land.

[2] For the purposes of this GP, spans are bridges, three-sided box culverts, open-bottom culverts or arches that span the stream with footings landward of bankfull width.

1. Installed and removed during the low flow period specified in GC 22(l) below.

2. Placed on geotextile fabric or other material where practicable to ensure restoration to the original grade. Soil may not be used to construct or stabilize these structures and rock must be large enough to allow for easy removal without disrupting the streambed.

3. Designed and maintained to withstand and pass high flows. Water height should be no higher than the top of the culvert's inlet. A minimum culvert diameter of two feet is required to pass debris. Culverts must be aligned to prevent bank erosion or streambed scour.

4. Equipped with energy dissipating devices installed downstream if necessary to prevent scour.

5. Designed and maintained to prevent soil from entering the waterbody.

6. Removed upon the completion of work. Impacts to the streambed or banks requires restoration to their original condition using stream simulation methods[1].

(g) Slip Lining. Work using slip lining (retrofitting an existing culvert by inserting a smaller diameter pipe), invert lining, or resulting in decreased diameter, do not qualify for Category 1, either as new work or maintenance activities.

(h) Work in Flowing Waters. To qualify for Category 1, no unconfined fill [see GC 18(b)] or excavation in flowing waters is allowed. To accomplish this:

i. Bank stabilization work below ordinary high water (OHW) shall utilize erosion controls such as inflatable cofferdams, jersey barrier, silt screen, turbidity curtain, etc. where practicable to prevent sediment input to the stream and to minimize turbidity and sedimentation impacts for sensitive life stages. Bank stabilization above OHW must utilize erosion controls.

ii. Management techniques such as temporary flume pipes, culverts, cofferdams, etc. must be used to maintain normal flows within the stream boundary's confines, or water diversions may be used immediately up and downstream of the work footprint (see Appendix A, Endnote 6) or work must be performed in the dry under no flow conditions, or under very low flow conditions following the practices in GC 22(a).

(i) Minimization. In order to make the Category 2 review process more efficient and result in a faster decision, new and replacement stream crossings should be designed using the least intrusive and environmentally damaging method following this sequential minimization process: 1) spans with no stream impacts, 2) spans with stream impacts, and 3) embedded culverts with stream simulation or low-slope design.

(j) Maintenance Requirements. The permittee shall maintain the work authorized herein in good condition and in conformance with the terms and general conditions of this permit to facilitate aquatic life passage as stated in GC 22(a). Culverts that develop "hanging" inlets or outlets, result in bed washout, or a stream that doesn't match the characteristics of the substrate in the natural stream channel such as mobility, slope, stability confinement will require maintenance or repair to comply with this GC. This does not apply to GC 22(f) above.

(k) Maintenance and Replacement Information. An existing stream crossing must be authorized and in compliance with all conditions of its authorization(s) to qualify for maintenance not subject to regulation. See Appendix A, Endnote 7. A non-serviceable crossing is not eligible for maintenance and is therefore considered as a replacement crossing [see 22(d)].

(l) Work Window. For projects that otherwise meet the terms of Category 1, in-stream construction work shall be conducted during the low flow period July 15 - October 1 in any year. Projects that are not to be conducted during that time period are ineligible for Category 1 and shall be screened pursuant to Category 2, regardless of the waterway and wetland fill and/or impact area.

(See next page for Corps General Stream Crossing Standards.)

[1] Design and construction shall be in accordance with the stream simulation document listed at Appendix E, 8(a).

Corps General Stream Crossing Standards (required for Category 1, recommended for Category 2):

(a) Culverts must be embedded:

- ≥ 2 feet for box culverts and other culverts with smooth internal walls,
- ≥ 1 foot for corrugated pipe arches
- ≥ 1 foot and at least 25 percent for corrugated round pipe culverts

(b) For new crossings, spans[1] are required to avoid or cause minimal disruption to the streambed and to meet the requirements of General Condition 22(a) and 22(b). Footings and abutments must be landward of 1.2 times bankfull width. To the greatest extent practicable, work in the stream shall be minimized, and design and construction shall allow the streambed's natural structure and integrity to remain intact. Any fill or excavation of the streambed below bankfull width other than footings, support pilings, or work specified in 22(h)ii requires Category 2 review and, unless demonstrated otherwise, stream simulation[2] to establish substrate and banks in the span structure and work area as specified in (d) and (e) below.

(c) For replacement crossings, spans[1] are required to meet the requirements of General Condition 22(a) and 22(b). Footings and abutments shall be landward of 1.2 times bankfull width. Unless demonstrated otherwise, stream simulation[2] is required to establish substrate and banks in the span structure and work area as specified in (d) and (e) below.

(d) Crossings must have a natural bottom substrate within the structure matching the characteristics of the substrate in the natural stream channel and the banks (mobility, slope, stability, confinement, grain and rock size)[2] at the time of construction and over time as the structure has had the opportunity to pass significant flood events. To allow terrestrial passage for wildlife and prevent undermining the footings, crossings shall have a bank on both sides of the stream matching the horizontal profile of the existing stream and banks[2].

(e) Crossings must be designed and constructed[2] with appropriate bed forms and streambed characteristics so that water depths and velocities are comparable to those found in the natural channel at a variety of flows. In order to provide appropriate water depths and velocities at a variety of flows and especially low flows, it is usually necessary to reconstruct the streambed or preserve the natural channel within the structure. Otherwise, the width of the structure needed to accommodate higher flows will create conditions that are too shallow at low flows. The grain and rock size, and arrangement of streambed materials within the structure should be in accordance with (d) above. Flows could go subsurface within the structure if only large material is used without smaller material filling the voids.

23. Wetland Crossings.

(a) All temporary and permanent crossings of wetlands shall be suitably culverted, bridged, or otherwise designed to: **i)** Withstand and prevent the restriction of high flows, **ii)** Not obstruct the movement of or not substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the wetland, including those species that normally migrate through the area, beyond the actual duration of construction unless the activity's primary purpose is to impound water. See Appendix E for the Maine DEP's crossing standards.

(b) To qualify for Category 1, new and replacement wetland crossings that are permanent shall be culverted, spanned or bridged in such a manner as to preserve hydraulic and ecological connectivity, at its present level, between the wetlands on either side of the road. To meet this requirement, we

[1] For the purposes of this GP, spans are bridges, three-sided box culverts, open-bottom culverts or arches that span the stream with footings landward of bankfull width.

[2] Design and construction shall be in accordance with the stream simulation document listed at Appendix E, 8(a).

recommend that culverts, spans or bridges be placed at least every 50 feet with an opening at least 2 feet high and 3 feet wide at ground level where practicable. Closed bottom culverts shall be embedded at least 6 inches with a natural bottom.
(c) In the case of non-compliance, the permittee shall take necessary measures to correct wetland damage due to lack of hydraulic and ecological connectivity.
(d) Any work that results in flooding, results in impacts to wetlands on either side of the wetland crossing in excess of Category 1 thresholds, or impacts wetland drainage from the upgradient side of the wetland crossing does not qualify for Category 1.

24. Discharge of Pollutants.
(a) All activities involving any discharge of pollutants into waters of the U.S., including wetlands, authorized under this GP shall be consistent with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the Clean Water Act (CWA) (33 USC 1251), and applicable state and local laws. If applicable water quality standards, limitations, etc., are revised or modified during the term of this GP, the authorized work shall be modified to conform with these standards within six months of the effective date of such revision or modification, or within a longer period of time deemed reasonable by the Corps in consultation with the EPA. Issuance of a LURC or DEP NRPA permit confirms that state water quality standards are met.
(b) All projects authorized by this GP shall be designed, constructed and operated to minimize or eliminate the discharge of pollutants.
(c) All activities involving any discharge of pollutants into waters of the U.S., including wetlands, authorized under this GP must comply with Section 402 [33 U.S.C. 1342] of the CWA and the requirements of the National Pollutant Discharge Elimination System (40 CFR 122).

25. Spawning, Breeding and Migratory Areas. Activities and impacts such as excavations, discharges of dredged or fill material, and/or suspended sediment producing activities, in fish migratory areas, fish and shellfish spawning or nursery areas, or amphibian and migratory bird breeding areas, during spawning or breeding seasons shall be avoided and minimized to the maximum extent practicable.

26. Storage of Seasonal Structures. Coastal structures, such as pier sections and floats, that are removed from the waterway for a portion of the year (often referred to as seasonal structures) shall be stored in an upland location located above mean high water (MHW) and not in tidal wetlands or mudflats. These seasonal structures may be stored on the fixed, pile-supported portion of the structure that is seaward of MHW. This is intended to prevent structures from being stored on the marsh substrate, mudflats, or the substrate seaward of MHW. Seasonal storage of structures in navigable waters, e.g., in a protected cove on a mooring, requires Corps and local harbormaster approval.

27. Environmental Functions and Values. The permittee shall make every reasonable effort to carry out the construction or operation of the work authorized herein in a manner that maintains as much as is practicable, and minimize any adverse impacts on existing fish, wildlife, and natural environmental functions and values.

28. Protection of Vernal Pools (VPs).
(a) Impacts to VP Management Areas[1] for all VPs on, and known VPs surrounding, the project site shall be minimized to the maximum extent practicable.
(b) The following management practices must be followed for all work within the VP Management Area (750' of a VP's edge) of all VPs in order to qualify for Category 1 when there is fill placed in a water of the U.S., including wetlands:

- **i.** Similar to the DEP's Significant Wildlife Habitat regulations[2]:
  1. No disturbance within the VP Depression or VP Envelope (area within 100 feet of the VP Depression's edge)[3];
  2. Maintain a minimum of 75% of the Critical Terrestrial Habitat (area within 100-750 feet of the VP Depression's edge) as unfragmented forest with at least a partly-closed canopy of overstory trees to provide shade, deep litter and woody debris[3];
  3. Maintain or restore forest corridors connecting wetlands and significant vernal pools;
  4. Minimize forest floor disturbance; and
  5. Maintain native understory vegetation and downed woody debris.
- **ii.** Cape Cod style-curbing or no curbing options shall be used on new roads to facilitate amphibian passage[2].

(c) For work not complying with the requirements in (b) above, applicants shall submit an application to the Corps for at least Category 2 review with information on directional buffers in accordance with the VP Directional Buffer Guidance document[2]. Conservation of the unimpacted area within the VP Management Area will often be required.
(d) GC 2 requires applicants to delineate or approximately identify on the project plans all waters of the U.S., which include vernal pools. Appendix A, Page 1 lists VP Category 1 thresholds.

29. Invasive Species.
(a) The introduction, spread, or the increased risk of invasion of invasive plant or animal species on the project site, into new or disturbed areas, or areas adjacent to the project site caused by the site work is prohibited (see Appendix E, Paragraph 6).
(b) Unless otherwise directed by the Corps, all applications for Category 2 inland projects and Category 2 coastal fill projects proposing fill in Corps jurisdiction shall include an Invasive Species Control Plan (ISCP) (see Appendix E, Paragraph 6).

30. Cranberry Development Projects. For cranberry development projects authorized under the GP, the following conditions apply:
(a) If a cranberry bog is abandoned for any reason, the area must be allowed to revert to natural wetlands unless an Individual Permit is obtained from the Corps allowing the discharge of fill for an alternate use.

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[1] The Corps VP Management Area, which includes the VP and a750' radius from the VP's edge, is defined at Appendix A, Endnote 5.
[2] Appendix E, 10(a)-(d) provides links to the state's Significant Wildlife Habitat regulations and references that provide impact minimization measures to reference when designing projects.
[3] The no disturbance requirement in the VP envelope [see (b)(i)(1)], and (b)(i)(2), do not apply to temporary impacts associated with construction mats in previously disturbed areas of existing utility project (e.g., transmission lines, gas pipelines) or linear transportation project (e.g., roads, highways, railways, trails, airport runways and taxiways) right-of-ways provided there is a Vegetation Management Plan that avoids, minimizes and mitigates impacts to aquatic resources.

(b) No stream diversion shall be allowed under Category 1 of this GP.
(c) No impoundments of intermittent or perennial streams shall be allowed under Category 1 and an application to the Corps is required for at least Category 2 review.
(d) The project shall be designed and constructed to not cause flood damage on adjacent properties.

31. Inspections. The permittee shall allow the Corps to make periodic inspections at any time deemed necessary in order to ensure that the work is being or has been performed in accordance with the terms and conditions of this GP. The Corps may also require post-construction engineering drawings for completed work or post-dredging survey drawings for any dredging work.
To facilitate these inspections, the permittee shall complete and return to the Corps:

- For Category 1 projects, the Category 1 Notification Form (Appendix B).
- For Category 2 projects, the 1) Work-Start Notification Form and 2) Compliance Certification Form whenever either is provided with a Category 2 authorization letter.

32. Maintenance.
(a) The permittee shall maintain the work authorized herein in good condition and in conformance with the terms and general conditions of this permit.
(b) This does not include maintenance of dredging projects. Each maintenance dredging event exceeding the Category 1 thresholds (see Appendix A, Page 6) requires a new written Corps authorization unless an unexpired, written Corps authorization specifies that the permittee may "dredge and maintain" an area for a particular time period. Category 1 or 2 maintenance dredging includes only those areas and depths previously authorized and dredged.
(c) Some maintenance activities may not be subject to regulation under Section 404 in accordance with 33 CFR 323.4(a)(2) (see Appendix A, Endnote 7).

33. Property Rights. This PGP does not convey any property rights, either in real estate or material, or any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of Federal, State, or local laws or regulations.

34. Transfer of GP Verifications. When the structures or work authorized by this GP are still in existence at the time the property is transferred, the terms and conditions of this GP, including any special conditions, will continue to be binding on the entity or individual who received the GP verification, as well as the new owner(s) of the property. The permittee may transfer responsibilities and obligations under the GP verification to the new owner by submitting a letter to the Corps (see Appendix D for address) to validate the transfer. A copy of the GP verification must be attached to the letter and the letter must contain the following statement and signature: "When the structures or work authorized by this GP are still in existence at the time the property is transferred, the terms and conditions of this GP, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this GP and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

35. Modification, Suspension, and Revocation. This GP or any work authorized under Category 1 or 2 may be either modified, suspended, or revoked, in whole or in part, pursuant to the policies and procedures of 33 CFR 325.7. Any such action shall not be the basis for any claim for damages against the United States.

36. Restoration Directive. The permittee, upon receipt of a notice of revocation of authorization under this GP, shall restore the wetland or waterway to its former condition without expense to the United States and as directed by the Secretary of the Army or his authorized representative. If the permittee fails

to comply with such a directive, the Secretary or his designee may restore the wetland or waterway to its former condition, by contract or otherwise, and recover the cost from the permittee.

37. Special Conditions. The Corps may independently, or at the request of the Federal resource agencies, impose other special conditions on a project authorized pursuant to this GP that are determined necessary to minimize adverse navigational and/or environmental effects or based on any other factor of the public interest. Failure to comply with all conditions of the authorization, including special conditions, constitutes a permit violation and may subject the permittee to criminal, civil, or administrative penalties and/or an ordered restoration.

38. False or Incomplete Information. If the Corps makes a determination regarding the eligibility of a project under this GP and subsequently discovers that it has relied on false, incomplete, or inaccurate information provided by the permittee, the GP authorization shall not be valid and the U.S. government may institute appropriate legal proceedings.

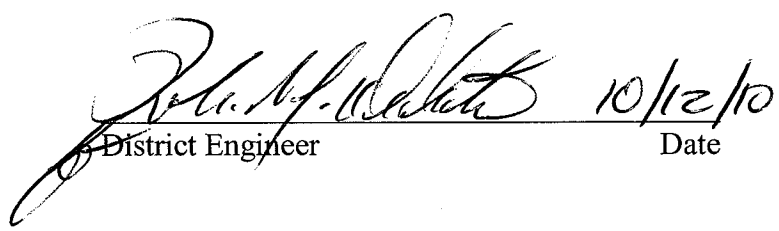
39. Abandonment. If the permittee decides to abandon the activity authorized under this GP, unless such abandonment is merely the transfer of property to a third party, he/she may be required to restore the area to the satisfaction of the Corps.

40. Enforcement Cases. This GP does not apply to any existing or proposed activity in Corps jurisdiction associated with an on-going Corps or EPA enforcement action, until such time as the enforcement action is resolved or the Corps and/or EPA as appropriate determines that the activity may proceed independently without compromising the enforcement action.

41. Duration of Authorization. This GP expires on October 11, 2015. Activities authorized under this GP that have commenced (i.e., are under construction) or are under contract to commence before this GP expires will have until October 11, 2016 to complete the activity under the terms and conditions of the current GP.

42. Previously Authorized Activities.
(a) Projects that have received authorization (Category 1 or 2) from the Corps and that were completed under the previous PGPs, nationwide permits, regional general permits or letters of permission, shall remain authorized.
(b) Activities authorized pursuant to 33 CFR Part 330.3 ("Activities occurring before certain dates") are not affected by this GP.
(c) Any work not commenced nor completed that was authorized in a written letter from the Corps under the PGP in effect between October 11, 2005 and October 11, 2010 remains authorized subject to the terms and general conditions of this GP along with any special conditions in the authorizing written letter.

43. NEPA Compliance. The Maine PGP was authorized in full compliance with Council for Environmental Quality ("CEQ") NEPA regulations. The Corps has determined that individual permit actions taken under the terms and conditions of the PGP are not a major federal action significantly affecting the quality of the human environment.



10/12/10

District Engineer Date

APPENDIX A: DEFINITION OF CATEGORIES

A. INLAND WATERS AND WETLANDS	**Inland Waters and Wetlands:** Waters that are regulated under Section 404 of the Clean Water Act, including rivers, streams, lakes, ponds and wetlands, and excluding Section 10 Navigable Waters of the U.S. The jurisdictional limits are the ordinary high water (OHW) mark in the absence of adjacent wetlands, beyond the OHW mark to the limit of adjacent wetlands when adjacent wetlands are present, and the wetland limit when only wetlands are present. For the purposes of this GP, fill placed in the area between the mean high water (MHW) and the high tide line (HTL), and in the bordering and contiguous wetlands[1] to tidal waters are reviewed in the Navigable Waters section. (See II. Navigable Waters on page 4 below.)	
	Projects not meeting Category 1 require an application for review as a Category 2 or Individual Permit project. All Category 1 and 2 projects must comply with all of this GP's applicable terms (Pages 1 – 4) and general conditions (Pages 5–18).	
ACTIVITY	**CATEGORY 1**	**CATEGORY 2**
(a) NEW FILL/ EXCAVATION DISCHARGES (You must reference (b) – (e) below for other thresholds that may be relevant to your project.)	**1.** <15,000 square feet (SF) (in LURC or DEP territories) of inland waterway and/or wetland fill and associated secondary impacts[2] (e.g., areas drained, flooded, fragmented, mechanically cleared or excavated). Fill area includes all temporary and permanent fill, and regulated discharges associated with excavation. Construction mats are considered as fill. [See General Condition (GC) 18(g).] Provided: • Historic fill + proposed impact area <15,000 SF and subdivision fill complies with GC 5, Single and Complete Projects. • No work in special aquatic sites (SAS)[4] other than wetlands. **2.** Construction mats[4] of any area necessary to conduct activities that were previously authorized, authorized under Category 1, or not subject to regulation (see Endnote 7). Authorized construction mats must be in place for <3 months, removed immediately upon work completion, and the wetlands must be restored (see GC 19). **3.** For work in Vernal Pool (VP) Management Areas (includes VPs)[5]: • See GC 2 and Appendix C for VP delineation requirements. • See GC 28 to determine if work qualifies for Category 1 or 2. • See Appendix E, Page 3 for VP documents providing mitigation guidance.	**1.** ≥15,000 square feet (SF) (in LURC or DEP territories) to <3 acres of inland waterway and/or wetland fill and associated secondary impacts (e.g., areas drained, flooded, fragmented, or excavated). Fill area includes all temporary and permanent fill, and regulated discharges associated with excavation. Mechanical clearing without grubbing or other soil disturbance >3 acres as a secondary impact may still be eligible for Category 2 at the discretion of the Corps. **2.** Specific activities with impacts of any area ≥15,000 SF required to affect the containment, stabilization, or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority. Wetlands must be restored in place. **3.** Temporary structures, work, and discharges (including construction mats[4]) ≥15,000 SF necessary for construction activities or access fills or dewatering of construction sites, provided that the associated primary activity is authorized by the Corps, authorized under Category 1, or not subject to Corps regulation. GCs 16 -19 are particularly relevant. See GC 2 and Appendix C for wetland delineation requirements.

ACTIVITY	CATEGORY 1	CATEGORY 2
(b) BANK STABILIZATION PROJECTS	**1.** Inland bank stabilization <500 FT long and <1 CY of fill per linear foot below OHW, provided: • ≤1 cubic yard of fill per linear foot placed along the bank waterward of ordinary high water. • Work complies with the GCs (GC 20 in particular), including: o No structures angled steeper than 1H:1V allowed. Only rough-faced stone or fiber roll revetments allowed. o No in-stream work involving fill or excavation in flowing waters (see GC 22(h)). • In-stream work limited to Jul 15 - Oct 1 [see GC 22 (l)]. • No work in vernal pools[5] or SAS[3]. • GC 10 Endangered Species and GC 11 Essential Fish Habitat are particularly relevant.	**1.** Inland bank stabilization ≥500 FT long and/or ≥1 CY of fill per linear foot, or any amount with fill in wetlands.
(c) RIVER/ STREAM/ BROOK WORK & CROSSINGS *and* WETLAND CROSSINGS	**1.** River, stream and brook work and crossings: • Must comply with GC 22 in particular, including: o No slip lining [see GC 22 (g)]. o No in-stream work involving fill or excavation in flowing waters [see GC 22(h)]. o In-stream work limited to Jul 15 - Oct 1 [see GC 22 (l)]. • No work in riffles and pools[3]. • No stream relocations. • No dams or dikes[6]. • Work in areas designated as Atlantic salmon critical habitat or occupied by listed Atlantic salmon, or any other area occupied by a listed species is not eligible for Category 1 (see GC 10). • No work in EFH streams except for the activities stated in GC 11. **2.** Wetland crossings must comply with the particularly relevant GC 23.	**1.** Work not qualifying for Category 1.

ACTIVITY	CATEGORY 1	CATEGORY 2
(d) REPAIR, REPLACEMENT, & MAINTENANCE OF AUTHORIZED FILLS	**1.** Repair or maintenance of existing, currently serviceable, authorized fills with no expansion or change in use: • Conditions of the original authorization apply • Minor deviations in fill design allowed.[7] • The repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events is authorized, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage.	**2.** Replacement of non-serviceable fills, or repair/maintenance of serviceable fill, with expansion <3 acres, or with a change in use.
(e) MISCELL-ANEOUS	**1.** Activities required for the containment and cleanup of oil and hazardous substances that are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300) provided that the work is done in accordance with the Spill Control and Countermeasure Plan required by 40 CFR 112.3 and any existing state contingency plan and provided that the Regional Response Team (if one exists in the area) concurs with the proposed containment and cleanup action. SAS[3] must typically be restored in place at the same elevation. **2.** Scientific measurement devices whose purpose is to measure and record scientific data, such as staff gages, water recording devices, water quality testing and improvement devices, and similar structures. This excludes any biological sampling devices. Structures may not restrict movement of aquatic organisms. **3.** Survey activities, such as core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, exploratory trenching, soil surveys, sampling, and historic resources surveys (but not recovery). Exploratory trenches must be restored in accordance with GC 19. The construction of temporary pads is authorized provided the discharge doesn't exceed 25 CY. This doesn't authorize permanent structures or the drilling and the discharge of excavated material from test wells for oil and gas exploration (the plugging of such wells is authorized). **4.** Any work not commenced nor completed that was authorized in a written letter from the Corps under the PGP in effect between October 11, 2005 and October 11, 2010. The terms and general conditions of this GP apply along with any special conditions in the written authorization.	**1.** Aquatic habitat restoration, establishment, and enhancement of wetlands and riparian areas and the restoration and enhancement of streams and other open waters with impacts of any area ≥15,000 SF, provided those activities result in net increase in overall aquatic resource functions and services.[8] **2.** Projects where an EIS is required by the Corps are not eligible for Category 2.

II. NAVIGABLE WATERS	**Navigable Waters of the United States**: Waters that are subject to the ebb and flow of the tide and/or the tidal and non-tidal portions of the Federally designated navigable waters (the Penobscot River, Kennebec River, and Lake Umbagog) (Section 10 Rivers and Harbors Act of 1899). The jurisdictional limits are the mean high water (MHW) line in tidal waters and the ordinary high water (OHW) mark in non-tidal portions of the federally designated navigable rivers. For the purposes of this GP, fill placed in the area between the mean high water (MHW) and the high tide line (HTL), and in the bordering and contiguous wetlands[1] to tidal waters are also reviewed in this Navigable Waters section.	
	Projects not meeting Category 1 require an application for review as a Category 2 or Individual Permit project. All Category 1 and 2 projects must comply with all of this GP's applicable terms (Pages 1 - 4) and general conditions (Pages 5 - 18).	
ACTIVITY	**CATEGORY 1**	**CATEGORY 2**
(a) **FILL**	**1.** Discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the U.S., including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided the U.S. Coast Guard authorizes such discharges as part of the bridge permit or appropriate approval. Causeways and approach fills are not included in this category and require Category 2 or Individual Permit authorization. **2.** Bank stabilization projects <200 linear feet: • ≤1 cubic yard of fill per linear foot placed along the bank waterward of high tide line. No fill or equipment will occur in SAS[3]. • Work conducted in the intertidal zone must be conducted in-the-dry during low water, or between Nov. 8 – Apr. 9. • No structures angled steeper than 1H:1V and only rough-faced stone or fiber roll revetments allowed. • No driving of piles or sheeting. **3.** For 1 and 2 above: • Project proponents must contact the USFWS for work on coastal beaches to ensure no impacts to piping plovers, roseate terns or their habitat [see GC 10(b)ii].	**1.** <1 acre temporary or permanent fill, excavation and/or secondary impacts (e.g., areas drained, flooded, fragmented or mechanically cleared). Fill area includes all temporary and permanent waterway fills, provided: • Temporary or permanent fill in eelgrass[14] <1000 SF. • Permanent fill in SAS (excluding eelgrass[14]) <4300 SF.
(b) STREAM WORK & CROSSINGS, *and* WETLAND CROSSINGS	**1.** No new fill for crossings allowed.	**1.** New crossings or replacement crossings that do not fit the (c) Repair and Maintenance activity below.

ACTIVITY	CATEGORY 1	CATEGORY 2
(c) REPAIR AND MAINTENANCE WORK	**1.** Repair, replacement in-kind, or maintenance[7] of existing, currently serviceable[7], authorized structures or fills: • Conditions of the original authorization apply. • No substantial expansion or change in use. • Must be rebuilt in same footprint, however minor deviations in structure design allowed[7]. • The repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events is authorized, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. Minor deviations for work involving piles shall adhere to one of the 4 methods in a - d below: **a.** Piles installed in-the-dry during low water or in-water between Nov. 8th - Apr. 9th, or **b.** Must be drilled and pinned to ledge, or **c.** Vibratory hammers used to install any size and quantity of wood, concrete or steel piles, or **d.** Impact hammers limited to one hammer and <50 piles installed/day with the following: wood piles of any size, concrete piles ≤18-inches diameter, steel piles <12-inches diameter if the hammer is ≤3000 lbs and a wood cushion is used between the hammer and steel pile, and • For b – d above: o In-water noise levels shall not exceed >187dB SEL re 1µPa or 206dB peak re 1µPa at a distance >10m from the pile being installed., and o In-water noise levels >155dB peak re 1µPa shall not exceed 12 consecutive hours on any given day and a 12 hour recovery period (i.e., in-water noise below 155dB peak re 1µPa) must be provided between work days. • For a – d above: o Work is not eligible for Category 1 if conducted in tidal portions of the Penobscot river upstream of a line extending from Turner point in Castine to Moose Point (formerly squaw point) on Cape Jellison in Stockton Springs or in tidal portions of the Kennebec or Androscoggin Rivers upstream of a line extending from Doubling point in Arrowsic to Hospital Point in West Bath.	**1.** Replacement of non-serviceable structures and fills or repair/maintenance of serviceable structures or fills, with fill, replacement or expansion <1 acre, or with a change in use.

ACTIVITY	CATEGORY 1	CATEGORY 2
(d) DREDGING AND ASSOCIATED DISPOSAL	**1.** Maintenance dredging[10] for navigational purposes <1,000 CY with upland disposal. Includes return water from upland contained disposal area, provided: • Proper siltation controls are used. • Dredging & disposal operation limited to Nov. 8 – Apr. 9. • No impact to SAS[3]. • No dredging in intertidal areas. • No dredging in areas considered occupied by listed Atlantic salmon [see GC 10(b)(ii)]. • For dredging in waters outside of Atlantic salmon critical habitat, applicants must contact NMFS (Appendix D) to ensure no impacts to listed species such as shortnose sturgeon. • Project proponents must contact the USFWS for work on coastal beaches to ensure no impacts to piping plovers, roseate terns or their habitat [see GC 10(c)].	**1.** Maintenance dredging[10] ≥1,000 CY, new dredging <25,000 CY, or projects not meeting Category 1. Includes return water from upland contained disposal areas. Disposal includes: • Upland. • Beach nourishment (above mean high water) of any area provided dredging's primary purpose is navigation or sand is from an upland source. • Open water & confined aquatic disposal, if Corps finds the material suitable. **2.** Beach nourishment associated with dredging when the primary purpose is not navigation requires at least a Category 2 review. **3.** Maintenance or new dredging[10] and/or disposal in or affecting a SAS[3] requires an Individual Permit. See II(a) above for dredge disposal in wetlands or waters.
(e) MOORINGS	**1.** Private, non-commercial, non-rental, single-boat moorings, provided: • Authorized by the local harbormaster/town. • Not associated with any boating facility.[11] • Boat or mooring not located in a Federal Navigation Project[12] other than a Federal Anchorage[12]. Moorings in Federal Anchorage not associated with a boating facility[11] and are not for rent. • No interference with navigation. • No new moorings located in SAS[3]. Prior to installation of moorings, a site-specific eelgrass survey should be conducted to document that eelgrass is not present. • When existing, authorized moorings in SAS[3] are going to be replaced, they shall be replaced with elastic mooring systems that prevent mooring chains from resting or dragging on the bottom substrate at all tides and helical anchors, or equivalent SAS protection systems where practicable. **2.** Minor relocation of previously authorized moorings and moored floats, provided: • Authorized by the local harbormaster/town. • Not located in SAS[3] • No interference with navigation. • Cannot be relocated into a Federal Navigation Project[12] other than a Federal Anchorage[12]	**1.** Moorings associated with a boating facility[11]. An eelgrass[14] survey may be required. **2.** Moorings that don't meet the terms in Category 1 and don't require an Individual Permit. This includes private moorings with no harbormaster or means of local approval. **3.** Moorings located such that they, and/or vessels docked or moored at them, are within the buffer zone of the horizontal limits[13] of a Federal Channel[12]. (See Appendix F.) The buffer zone is equal to 3 times the authorized depth of that channel. **4.** An IP is required for moorings within the horizontal limits[11], or with moored vessels that extend, into the horizontal limits of a Federal Navigation Project[12], except those in Federal Anchorages[12]. For 1-4 above, siting of new individual moorings in SAS[3], including eelgrass[14], should be avoided to the maximum extent practicable. If SAS[3] cannot be avoided, plans should show elastic mooring systems that prevent mooring chains from resting or dragging on the bottom substrate at all tides and helical anchors, or equivalent SAS protection systems, where practicable.

ACTIVITY	CATEGORY 1	CATEGORY 2
(f) STRUCTURES AND FLOATS	**1.** Reconfiguration of existing, authorized structures or floats. Provided: **a**. Piles shall adhere to one of the 4 methods in (i) –(iv) below: **i.** Piles installed in-the-dry during low water or in-water between Nov. 8th - Apr. 9th, or **ii.** Must be drilled and pinned to ledge, or **iii.** Vibratory hammers used to install any size and quantity of wood, concrete or steel piles, or **iv.** Impact hammers limited to one hammer and <50 piles installed/day with the following: wood piles of any size, concrete piles ≤18-inches diameter, steel piles <12-inches diameter if the hammer is ≤3000 lbs and a wood cushion is used between the hammer and steel pile. **b**. For (ii) – (iv) above: **i.** In-water noise levels shall not exceed >187dB SEL re 1µPa or 206dB peak re 1µPa at a distance >10m from the pile being installed-, and **ii.** In-water noise levels >155dB peak re 1µPa shall not exceed 12 consecutive hours on any given day and a 12 hour recovery period (i.e., in-water noise below 155dB peak re 1µPa) must be provided between work days. **c.** For (i) –(iv) above: **i.** Work is not eligible for Category 1 if conducted in tidal portions of the Penobscot river upstream of a line extending from Turner point in Castine to Moose Point (formerly squaw point) on Cape Jellison in Stockton Springs or in tidal portions of the Kennebec or Androscoggin Rivers upstream of a line extending from Doubling point in Arrowsic to Hospital Point in West Bath.	**1.** Private structures or floats, including floatways/skidways, built to access waterway (seasonal and permanent) **2.** Expansions to existing boating facilities[11]. For 1 & 2 above, compliance with the following design standards is not required but recommended: • Pile-supported structures <400 SF, with attached floats totaling ≤200 SF. • Bottom anchored floats ≤200 SF. • Structures are ≤4' wide and have at least a 1:1 height:width ratio[11]. • Floats supported a minimum of 18" above the substrate during all tides. • Structures & floats not located within 25' of any eelgrass[8]. • Moored vessels not positioned over SAS[4]. • No structure located within 25' of the riparian property boundary without written approval from the abutter(s). • No structure extends across >25% of the waterway width at mean low water. • Not located within the buffer zone of the horizontal limits[13] of a Corps Federal Navigation Project (FNP) (App. F). The buffer zone is equal to three times the authorized depth of that FNP. **3.** An Individual Permit is required for structures or floats, including floatways/skidways, located such that they and/or vessels docked or moored at them are within the horizontal limits[13] of a Corps Federal Navigation Project[12] (see App. F). **4.** An Individual Permit is required for structures & floats associated with a new or previously unauthorized boating facility[11].

ACTIVITY	CATEGORY 1	CATEGORY 2
(g) MISCELL-ANEOUS	**1.** Temporary buoys, markers, floats, etc. for recreational use during specific events, provided they are removed within 30 days after use is discontinued. **2.** The placement of aids to navigation and regulatory markers which are approved by and installed in accordance with the requirements of the U.S. Coast Guard. (See 33 CFR 66, Chapter I, subchapter C)." **3.** Activities required for the containment and cleanup of oil and hazardous substances that are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300) provided that the work is done in accordance with the Spill Control and Countermeasure Plan required by 40 CFR 112.3 and any existing state contingency plan and provided that the Regional Response Team (if one exists in the area) concurs with the proposed containment and cleanup action. SAS[3] must typically be restored in place at the same elevation. **4.** Fish and wildlife harvesting, enhancement, and attraction devices and activities such as pound nets, crab traps, crab dredging, eel pots, lobster traps, and clam and oyster digging, and small fish attraction devices such as open water fish concentrators (sea kites, etc.). This does not authorize artificial reefs or impoundments and semi-impoundments of waters of the U.S. for the culture or holding of motile species such as lobster, or the use of covered oyster trays or clam racks. No activity that results in a hazard to navigation. Note: A Category 1 Notification Form is not required for these devices and activities. **5.** Scientific measurement devices whose purpose is to measure and record scientific data, such as staff gages, water recording devices, water quality testing and improvement devices, and similar structures. Structures may not restrict movement of aquatic organisms. No activity results in a hazard to navigation. **6.** Survey activities such as exploratory drilling, surveying and sampling activities, excluding any biological sampling devices. Does not include oil and gas exploration and fill for roads or construction pads. No activity results in a hazard to navigation. Applicants must contact NMFS to ensure no impacts to listed species.	**1.** Structures or work in or affecting tidal or navigable waters, that are not defined under any of the previous headings listed above. Includes, but is not limited to, utility lines, aerial transmission lines, pipelines, outfalls, boat ramps, floatways/skidways, bridges, tunnels and horizontal directional drilling activities seaward of the mean high water line. **2.** Shellfish/finfish (other than Atlantic salmon), or other aquaculture facilities with no more than minimal individual and cumulative impacts to environmental resources or navigation. –Aquaculture guidelines are provided at: www.maine.gov/dmr/aquaculture/index.htm. **3.** Specific activities with impacts of any area required to affect the containment, stabilization, or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority. Wetlands must typically be restored in place at the same elevation to qualify. **4.** Aquatic habitat restoration, establishment and enhancement provided those activities are proactive and result in net increases in aquatic resource functions and services.[8] **5.** Projects where an EIS is required by the Corps are not eligible for Category 2.

ACTIVITY	CATEGORY 1	CATEGORY 2
(g) MISCELL-ANEOUS (continued)	**7.** Shellfish seeding (brushing the flats[9]) projects. **8.** Marine railway work not eligible for maintenance[7] (i.e. not currently serviceable[7] or in non-compliance) may be replaced "in-kind" with minor deviations[7] provided: • Work is in the intertidal zone • No fill expansion below high tide line. • Work conducted in-the-dry during low water or in-water between Nov. 8 – Apr. 9. **9.** Test plots <100 SF for the planting of wetland species native to the area. No grading, no structures, no plant growing devices and no interference with navigation, which require at least Category 2 review. **10.** Any work not commenced nor completed that was authorized in a written letter from the Corps under the PGP in effect between October 11, 2005 and October 11, 2010. The terms and general conditions of this GP apply along with any special conditions in the written authorization	

Endnotes/Definitions

[1] **Bordering and Contiguous Wetlands:** A bordering wetland is immediately next to its adjacent waterbody and may lie at, or below, the ordinary high water mark (mean high water in navigable waters) of that waterbody and is directly influenced by its hydrologic regime. Contiguous wetlands extend landward from their adjacent waterbody to a point where a natural or manmade discontinuity exists. Contiguous wetlands include bordering wetlands as well as wetlands that are situated immediately above the ordinary highwater mark and above the normal hydrologic influence of their adjacent waterbody. Note, with respect to the federally designated navigable rivers, the wetlands bordering and contiguous to the tidally influenced portions of those rivers are reviewed under "II. Navigable Waters."

[2] **Direct, Secondary, and Cumulative Impacts/Effects:**

Direct Impacts: The immediate loss of aquatic ecosystem within the footprint of the fill.

Secondary Impacts: These are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final section 404 action is taken by permitting authorities. Some examples of secondary effects on an aquatic ecosystem are a) fluctuating water levels in all impoundment and downstream associated with the operation of a dam, b) septic tank leaching and surface runoff from residential or commercial developments on fill, and c) leachate and runoff from a sanitary landfill located in waters of the U.S. Put another way, secondary effects are those impacts outside the footprint of the fill that arise from and are associated with the discharge of dredged or fill material, including the operation of an activity or facility associated with the discharge. Examples may include habitat fragmentation; interruption of travel corridors for wildlife (for example, for amphibians that migrate to and from seasonal or vernal pools used as breeding habitat); hydrologic regime changes; and impacts from operation and maintenance activities for constructed facilities; such as noise/lighting, storm water runoff, and road kill of wetland dependent wildlife. Using the directions contained in the guidelines, we consider the circumstances of a proposed discharge and the project of which it is a part to evaluate the scope, extent, severity, and permanence of direct, secondary, and cumulative adverse effects upon the aquatic ecosystem.

Cumulative Impacts: The extent of past, present, and foreseeable developments in the area may be an important consideration in evaluating the significance of a particular project's impacts. Although the impacts associated with a particular discharge may be minor, the cumulative effect of numerous similar discharges can result in a large impact. Cumulative impacts should be estimated only to the extent that they are reasonable and practical.

[3] **Special Aquatic Sites:** Includes wetlands and saltmarsh, mudflats, riffles and pools, and vegetated shallows (predominantly comprised of eelgrass in Maine).

[4] **Construction Mats:** Constructions, swamp and timber mats (herein referred to as "construction mats") are generic terms used to describe structures that distribute equipment weight to prevent wetland damage while facilitating passage and providing work platforms for workers and equipment. They are comprised of sheets or mats made from a variety of materials in various sizes. A timber mat consists of large timbers bolted or cabled together. Corduroy roads, which are not considered to be construction mats, are cut trees and/or saplings with the crowns and branches removed, and the trunks lined up next to one another. Corduroy roads are typically installed as permanent structures. Like construction mats, they are considered as fill whether they're installed temporarily or permanently.

[5] **Vernal Pools:** A vernal pool, also referred to as a seasonal forest pool, is a temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet or outlet and no viable populations of predatory fish. A vernal pool may provide the primary breeding habitat for wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystoma maculatum*), blue-spotted salamanders (*Ambystoma laterale*), and fairy shrimp (*Eubranchipus* sp.), as well as valuable habitat for other plants and wildlife, including several rare, threatened, and endangered species. A vernal pool intentionally created for the purposes of compensatory mitigation is included in this definition. For the purposes of this GP, the presence of any of the following species in any life stage in any abundance level/quantity would designate the waterbody as a vernal pool: fairy shrimp, blue spotted salamanders, spotted salamanders or wood frogs. The Corps may determine during a Category 2 review that a waterbody should not be regulated as a VP based on available evidence. For the purposes of this GP*, the VP Management Areas are the: Vernal Pool Depression (includes the vernal pool depression up to the spring or fall high water mark, and includes any vegetation growing within the depression), Vernal Pool Envelope (area within 100 FT of the VP Depression's edge) and Critical Terrestrial Habitat (area within 100-750 FT of the Vernal Pool Depression's edge). [*Note: Critical Terrestrial Habitat is defined as 100 -750 FT on page 243 of the document "Science and Conservation of Vernal Pools in Northeastern North America," Calhoun and deMaynadier, 2008, which is referenced in Appendix E, page 3, Paragraph 10(b).

[6] **Water Diversions:** Water diversions are activities such as bypass pumping or water withdrawals. Temporary flume pipes, culverts or cofferdams where normal flows are maintained within the stream boundary's confines aren't water diversions. "Normal flows" are defined as no change in flow from pre-project conditions.

[7] **Maintenance: a)** In accordance with 33 CFR 323.4(a)(2), any discharge of dredged or fill material that may result from any of the following activities is not prohibited by or otherwise subject to regulation under Section 404 of the CWA: "Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design." Otherwise, the following work is regulated and subject to the Category 1 or 2 thresholds in Appendix A above: The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3 – "Activities occurring before certain dates," provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. **b)** Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, or current construction codes or safety standards that are necessary to make repair, rehabilitation, or replacement are authorized. **c)** Currently serviceable means useable as is or with some maintenance, but not so degraded as to essentially require reconstruction. **d)** No seaward expansion for bulkheads or any other fill activity is considered Category 1 maintenance. **e)** Only structures or fills that were previously authorized and are in compliance with the terms and condition of the original authorization can be maintained as a non-regulated activity under 33 CFR 323.4(a)(2), or in accordance with the Category 1 or 2 thresholds in Appendix A. **f)** The state's maintenance provisions may differ from the Corps and may require reporting and written authorization from the state. **g)** Contact the Corps to determine whether stream crossing replacements require a written application to the Corps for at least a Category 2 review.

[8] **Aquatic Habitat Restoration, Establishment and Enhancement:** The Corps will decide if a project qualifies and must determine in consultation with federal and state agencies that the net effects are beneficial. The Corps may refer to Nationwide Permit 27 published in the 3/12/07 Federal Register. Activities authorized here may include, but are not limited to: the removal of accumulated sediments; the installation, removal, and maintenance of small water control structures, dikes, and berms; the installation of current deflectors; the enhancement, restoration, or establishment of riffle and pool stream structure; the placement

of in-stream habitat structures; modifications of the stream bed and/or banks to restore or establish stream meanders; the backfilling of artificial channels and drainage ditches; the removal of existing drainage structures; the construction of small nesting islands in inland waters**;** the construction of open water areas; the construction of native shellfish species habitat over unvegetated bottom for the purpose of habitat protection or restoration in tidal waters; shellfish seeding; activities needed to reestablish vegetation, including plowing or discing for seed bed preparation and the planting of appropriate wetland species; mechanized land clearing to remove non-native invasive, exotic, or nuisance vegetation; and other related activities. Only native plant species should be planted at the site.

[9] **Brushing the Flats:** The placement of tree boughs, wooden lath structure, or small-mesh fencing on mudflats to enhance recruitment of soft-shell clams (*Mya arenaria*).

[10] **Maintenance Dredging:** This includes only those areas and depths previously authorized by the Corps and dredged.

[11] **Boating Facilities:** Facilities that provide for a fee, rent, or sell mooring space, such as marinas, yacht clubs, boat clubs, boat yards, town facilities, dockominiums, etc.

[12] **Federal Navigation Projects (FNPs):** FNPs are comprised of Federal Channels and Federal Anchorages. See Appendix F for their location and contact the Corps for more information. "Horizontal Limits" is the outer edge of an FNP. "Buffer Zone" is equal to three times the authorized depth of that channel.

[13] **Horizontal Limits:** The outer edge of a Federal Navigation Project (FNP). See Appendix F and contact the Corps for information on FNP's.

[14] **Eelgrass (Zostera marina):** A type of rooted aquatic vegetation that exists in intertidal and shallow subtidal areas known as vegetated shallows. See www.nero.noaa.gov/hcd/ for eelgrass survey guidance.

[15] **Structures:** The height of structures shall at all points be equal to or exceed the width of the deck. For the purpose of this definition, height shall be measured from the marsh substrate to the bottom of the longitudinal support beam.

APPENDIX C

Geotechnical Report

GEOTECHNICAL DATA REPORT
PORTLAND INTERNATIONAL MARINE TERMINAL IMPROVEMENTS
PORTLAND, MAINE
PIN: 17820.00

by

Haley & Aldrich, Inc.
Portland, Maine

for

HNTB Corporation
Westbrook, Maine

File No. 37272-000
7 January 2011

HALEY & ALDRICH

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7 January 2011
File No. 37272-000

HNTB Corporation
340 County Road, Suite 6-C
Westbrook, Maine 04092

Attention: Mr. Craig R. Morin, P.E.

Subject: Geotechnical Data Report
Portland International Marine Terminal Improvements
Portland, Maine
PIN: 17820.00

Ladies and Gentlemen:

This report presents the results of the subsurface explorations and laboratory testing program conducted in support of the subject project. This work was undertaken by Haley & Aldrich, Inc. (Haley & Aldrich) at your request in accordance with our proposal dated 30 July 2010 and our Agreement dated 6 October 2010.

ELEVATION DATUM

Elevations referenced herein are in feet and reference the National Geodetic Vertical Datum of 1929 (NGVD 29). Site specific tidal data (i.e. mean low water, MLW, and mean lower low water, MLLW) has been provided by HNTB, and relate to NGVD 29 datum as follows:

El. 0 MHW = El. +4.95 NGVD 29
El. 0 MLW = El. -4.23 NGVD 29
El. 0 MLLW = El. -4.52 NGVD 29

EXISTING SITE CONDITIONS

The project site (referred to hereinafter as the "site," shown in Figure 1) is located on a portion of a 13.5-acre parcel in Portland, Maine. The site is bounded by Commercial Street to the northwest, the Fore River to the southeast, and the Casco Bay Bridge to the west, as shown in Figure 2.

The southeastern portion of the parcel is currently occupied by a pier and several buildings formerly used by the City of Portland for loading and unloading of passengers and vehicles for the Scotia Prince ferry to Nova Scotia, Canada. The remaining area of the site is paved and used as a container storage/shipping facility. The ground surface is relatively flat across the site, ranging from El. 12 near Commercial Street to El. 15 on the existing pier. There is a low area around El. 11 near a 4-ft high retaining wall located northwest of the pier and buildings.

PROPOSED SITE DEVELOPMENT

The project consists of improvements and additions to the International Marine Terminal (IMT). As described in a Request for Proposal (RFP) prepared by Maine Department of Transportation (MaineDOT), project elements include:

- Demolish and remove approximately 36,000 sq. ft. (sf) of existing terminal building and ancillary structures,
- Design and construction of approximately 1,000 sf of pier space,
- Strengthen soils as needed in the approximate 4 acre container storage area,
- Remove existing office trailers and construct a new 3,400 sf office building, and
- Maintain operations at IMT during design and construction of improvements.

Based on our review of proposed grading as shown on the 30% drawings prepared by HNTB, we understand that in general fill will be required in order to reach the proposed design grades, with a maximum fill height of about 4 ft in front of the existing retaining wall. Minor excavation (to frost depth) is anticipated for construction of the proposed building footings.

REGIONAL GEOLOGY

A review of the surficial geology map for the area indicates that the site and vicinity along Commercial Street is underlain by artificial fill identified as variable mixtures of surficial sediments, rock fragments and artificial material which was placed to create land for waterfront uses.

Explorations at the site indicate the fill is underlain by silt, sand and clay deposits of the Presumpscot Formation, sand and gravel ice contact deposits, and dense glacial till. Bedrock at the site and vicinity is mapped as the Spring Point Formation, part of the Casco Bay Group, identified as an Ordovician-aged greenish-gray phyllite, some light-gray granofels and zones of metavolcanics.

SUBSURFACE EXPLORATION PROGRAM

Recent Testing Borings

Haley & Aldrich performed a geotechnical subsurface exploration program in support of the subject project. The program consisted of the following:

- One boring for the proposed building;
- Two borings for the proposed raise-in-grade in the existing parking area;
- Six borings for pavement design in the new storage container areas;
- Two borings in the area of existing container storage;
- One boring at the proposed pier infill area.

The test boring locations were laid out in the field by Haley & Aldrich by taping distances from existing site features. The "as-drilled" test boring locations were surveyed by James D. Nadeau, LLC and are shown on Figure 2, Site and Subsurface Exploration Location Plan. Ground surface elevations were

estimated based on the topographic information shown on existing conditions plan by James D. Nadeau, LLC.

All test borings were drilled by Maine Test Borings of Brewer, Maine during the period 15 through 18 November 2010. Test borings were drilled with a Mobile Drill B-53 truck-mounted drill rig.

Soil samples obtained in test borings were typically collected continuously through the fill, then at standard, 5-ft intervals through natural soil, by driving a 1-3/8-in. ID split-spoon sampler with a 140-lb hammer dropped from a height of 30 in., as indicated on the test boring logs. The number of hammer blows required to advance the sampler through each 6-in. interval was recorded and is provided on the test boring logs. The Standard Penetration Test (SPT) N-value is defined as the total number of blows required to advance the sampler through the middle 12 in. of the 24-in. sampling interval.

In-situ vane shear tests were attempted in the marine clay deposits encountered in several test borings. However we were unable to advance the vane in the desired sampling depths due to the presence of sand/silt layers at the attempted test locations.

Relatively undisturbed samples of marine clay were obtained in select test borings by advancing a 3-in. OD thin-wall Shelby Tube into the clay using a piston sampler. The samples were obtained so that we could conduct laboratory tests to assess the compressibility characteristics of the deposit, if needed.

All test borings were monitored in the field by Haley & Aldrich personnel. All soil samples were collected and preserved in glass jars and the samples that were not submitted for laboratory testing are available for review upon request. The soil samples are being stored at the Haley & Aldrich laboratory facility in Portland, Maine.

The boreholes were backfilled using drill cuttings. Cold patch was used to replace the bituminous pavement for test borings drilled in paved areas.

Logs showing the soil and groundwater conditions encountered in the test borings are presented in Appendix A. Additional details of our subsurface explorations are presented below.

Building Borings

One test boring (HA10-1) was drilled within the building footprint. The test boring was drilled to a depth of 27 ft below ground surface (BGS) using HW-size (4 in. ID) steel casing.

Raise In Grade Borings

Two test borings (HA10-5 and HA10-9) were drilled within the limits of proposed storage container area where up to 4 ft of new fill will be placed. The test borings were drilled through potentially compressible soils to depths ranging from 26 to 44 ft BGS using HW-size (4 in. ID) or NW-size (3 in. ID) steel casing.

New Storage Container Area

A total of six shallow test borings (HA10-2 through HA10-4, HA10-6 through HA10-8) were drilled within the proposed container storage area. Test borings were drilled to depths ranging from 11 to 13 ft BGS using solid-stem augers.

Existing Storage Container Area

A total of two shallow test borings (HA10-11 and HA10-12) were drilled within the existing container storage area to identify the pavement section in this area that is reportedly performing well. Test borings were drilled to depths ranging from 3 to 5 ft BGS using solid-stem augers.

Pier Boring

One test boring (HA10-10) was drilled within the proposed pier space. The test boring was drilled from the existing pier deck, through compressible soils to a depth of 85 ft BGS using HW-size (4 in. ID) and NW-size (3 in. ID) steel casing. The boring was terminated 16 ft into glacial till.

Historic Test Borings

Numerous previous explorations have been conducted at and near the site in association with development of the site, pier and adjacent Fore River Bridge replacement. The locations of the explorations that we determined to be useful to the current site development are shown on Figure 2, Site and Subsurface Exploration Location Plan and logs are included in Appendix B.

Proposed Renovations International Ferry Terminal, 1992 – Four test borings, designated B101 through B104, were performed for the proposed 1992 renovations by Maine Test Borings, Inc. of Brewer, Maine during the period between 22 July and 3 August 1992. Drilling was performed from the existing pier using 3 in. diameter casing and a truck-mounted rotary drilling rig. These borings were monitored by Haley & Aldrich personnel.

Proposed Fore River Bridge Replacement, 1988 and 1989 – A series of explorations were drilled in 1988 and 1989 by Maine Test Borings, Inc. for the proposed bridge replacement. Eight of the explorations (B553, B555, B556, B557, B558, B559, B568 and B569) were at or near the IMT site and logs included in Appendix B. These borings were monitored by Haley & Aldrich personnel.

Proposed Cargo Pier, 1987 – One of the test borings (B-9) for the proposed cargo pier was conducted near the proposed building for the current IMT project. The test boring was drilled from 1 to 2 October 1987 by Maine Test Borings, Inc. A piezometer, consisting of a standpipe connected to a perforated pipe, was installed in the borehole to obtain information on groundwater levels at the site. Piezometer installation details and a summary of measured water levels are presented in Appendix B. These borings were monitored by Haley & Aldrich personnel.

Portland International Ferry Terminal, 1969 – Test borings at the ferry terminal site consisted of seven 2-½ in. diameter cased borings, designated B1 through B7, drilled during the period of 16 October to 26 November 1969 by Northeast Soil Services of Brewer, Maine.

SUBSURFACE CONDITIONS

Soil/Bedrock Conditions

Generally, the subsurface explorations encountered the following geologic units, presented in order of increasing depth below existing ground surface:

- Bituminous Pavement
- Fill
- Harbor Bottom Deposit
- Marine Deposit (Clay)
- Marine Deposit (Sand)
- Ice Contact Deposit
- Glacial Till

A brief description of each geologic unit is provided below based on recent explorations. Refer to Table I for a summary of the test borings and Appendix A for test boring logs.

Bituminous Pavement

Bituminous pavement was encountered in all of the test borings except HA10-10. The thickness ranged from 0.2 to 0.4 ft.

Fill

Man-placed fill was encountered in all of the test borings. The fill was variable, consisting of well graded SAND with gravel (SW) to silty SAND (SM) to ORGANIC SILT (OL/OH). Rip rap was encountered in boring HA10-10. Brick fragments, wood fragments, ash, coal, cobbles, and boulders were encountered at several locations. The thickness of the fill encountered at these locations varied from approximately 3.5 to 15 ft. The fill soils were generally very loose to very dense with SPT N-values ranging from 2 to in excess of 50 blows per foot (bpf).

Harbor Bottom Deposit

A harbor bottom deposit was encountered directly beneath the fill in three of the deeper test borings closest to the existing seawall (HA10-5, HA10-9 and HA10-10). The layer ranged in thickness from 11.5 to 14 ft. The deposit consisted of gray silty SAND (SM), sandy SILT (ML), ORGANIC SILT (OL/OH), or CLAY (CL). It typically contained shell and wood fragments. The soils were generally loose to very loose, or soft to very soft, with SPT N-values ranging from weight of rods (WOR) to 7 bpf.

Marine Deposit (Clay)

Marine clay deposits were encountered in four of the explorations (HA10-4, HA10-6, HA10-9 and HA10-10). The material typically consisted of gray to olive-brown, lean CLAY (CL) with varying amounts of fine sand, or sandy SILT (ML). The encountered thickness of the deposit ranged from about 8 to 14 ft. The marine clay deposits were generally very soft to stiff with SPT N-values ranging from weight of hammer (WOH) to 10 bpf.

Marine Deposit (Sand)

Marine sand deposits were encountered in five test borings (HA10-1, HA10-2, HA10-5, HA10-9 and HA10-10). The material typically consisted of gray to brown, poorly graded SAND (SP), well graded SAND (SW), or clayey SAND (SC). The deposit occasionally contained varying amounts of gravel. The deposit was fully penetrated in only one boring (HA10-10) where the encountered thickness was 32 ft. The marine sand deposits were generally loose to dense with SPT N-values ranging from 2 to 49 bpf.

Ice Contact Deposit

Ice contact deposit soils were encountered in HA10-10, which was the only boring that fully penetrated the overlying marine deposits. The material consisted of gray, well graded SAND with gravel (SW). A cobble was noted within the deposit. The encountered thickness of the deposit was 14 ft. These soils were found to be medium dense with SPT N-values ranging from 10 to 24 bpf.

Glacial Till

Glacial till soils were encountered in HA10-10, which was the only boring that fully penetrated the overlying marine and ice contact deposits. The material consisted of gray to brown, poorly graded SAND with gravel (SP). The material was poorly to well bonded. The deposit was not fully penetrated in any of the recent explorations. Test boring HA10-10 extended 16 ft into glacial till without penetrating the layer. In historic explorations the deposit was up to 93 ft thick. These soils were found to be very dense with SPT N-values in excess of 50 bpf.

Bedrock

Bedrock was not encountered in any of the recent explorations, which were drilled to depths up to 85 ft BGS. Bedrock was cored in one of the historic explorations (for the Fore River Bridge; B569-89) at a depth of 136 ft. Another historic boring, B568-88, extended to a depth of 200 ft without encountering bedrock.

Groundwater Conditions

Groundwater levels were not typically observed in the borings due to drilling methods. However a piezometer was installed in one historic boring near Commercial Street (B-9) in 1987. The water level readings taken indicate that water levels at the site fluctuate with tide levels in Portland Harbor. The

water elevation in this piezometer ranged from El. 0.8 to El. 3.6. The piezometer data is included in Appendix B (note that the 1987 data in the appendix references the MLW datum).

Groundwater levels can be expected to fluctuate, subject to seasonal variation, local soil conditions, topography and precipitation. Water levels encountered during construction may differ from those summarized above.

LABORATORY SOIL TESTING

A limited laboratory testing program was conducted to assist in soil classification and for determination of engineering properties and reuse potential of the in-situ soils. The testing program included two grain size analyses (sieve only) in the vicinity of the proposed building, three Atterberg Limits tests, and one consolidation test. All laboratory testing was conducted in accordance with appropriate ASTM test procedures by Geotesting Express of Boxborough, Massachusetts. The laboratory test reports are presented in Appendix C. A summary of laboratory test results is provided below.

Test Boring No.	Sample Designation	Sample Depth	Stratum	Percent Passing No. 200 Sieve
HA10-1	S1A	0.5 to 1.5 ft	Fill	20.3
HA10-1	S2	2.5 to 4.5 ft	Fill	17.6

Test Boring No.	Sample Designation	Sample Depth	Stratum	Natural Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
HA10-5	U1 (upper)	14.5 to 16.5 ft	Marine	33	38	18	20
HA10-5	U1 (lower)	14.5 to 16.5 ft	Marine	21	NP	NP	NP
HA10-9	U1	35 to 37 ft	Marine	29	30	17	13

[1]- NP = non-plastic

Recommendations regarding reuse potential will be provided under separate cover.

CLOSURE

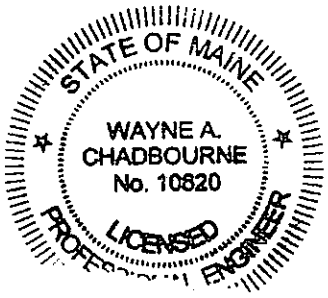
It is our intention that this report be distributed to the project team for use during design development. This report should also be included in the contract document package for use by prospective contractors to provide baseline information on subsurface conditions in preparation of their bids. We are currently in the process of completing our engineering evaluations for this project and will provide geotechnical design recommendations under separate cover.

We appreciate the opportunity to provide geotechnical engineering services on this project. Please do not hesitate to call if you have any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.

Erin F. Wood

Erin F. Wood, P.E.
Senior Engineer



Wayne A. Chadbourne, P.E.
Vice President

Enclosures:

- Table I – Summary of Subsurface Explorations
- Figure 1 – Project Locus
- Figure 2 – Site and Subsurface Exploration Location Plan
- Appendix A – Recent Test Boring Logs
- Appendix B – Historic Test Boring Logs
- Appendix C – Laboratory Test Reports

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REFERENCES

1. Boone, Gary M., Hussey, Arthur M. and Philip H. Osberg (1985), Bedrock Geologic Map of Maine, Maine Geological Survey, Department of Conservation, Augusta, Maine.

2. Hussey, Arthur M. (2003), Bedrock Geology, Portland West Quadrangle, Maine, Maine Geological Survey, Department of Conservation, Augusta, Maine, Open File No. 03-94.

3. Thompson, Woodrow B. and Robert G. Marvinney (2008), Surficial Geology, Portland West Quadrangle, Maine, Maine Geological Survey, Department of Conservation, Augusta, Maine, Open File Report No. 08-16.

4. HNTB Corporation, "Portland International Marine Terminal Improvements, Pin: 17820.00," 30% Submission, dated 23 November 2010.

5. Haley & Aldrich data report entitled "Pavement Evaluation, International Marine Terminal, Portland, Maine," dated February 2002, prepared for Maguire Group, Inc., Providence, Rhode Island.

6. Haley & Aldrich report entitled "Pavement Evaluation, International Marine Terminal Cargo Yard, Portland, Maine," dated 10 September 1997, prepared for TAMS Consultants, Inc., Boston, Massachusetts.

7. Haley & Aldrich report entitled "Geotechnical Data, Fixed Span approaches, Abutments, Beach Street Ramp, and Dolphins, Portland/South Portland Bridge, Portland, Maine," dated 28 December 1993, prepared for T.Y. Lin International, Falmouth, Maine.

8. Haley & Aldrich report entitled "Subsurface and Foundation Investigation for Proposed Renovations to International Ferry Terminal, Portland, Maine," dated 25 August 1992, prepared for TEC Associates, South Portland, Maine.

9. Haley & Aldrich report entitled "Proposed Cargo Pier, Portland, Maine," dated 8 January 1988, prepared for Childs Engineering Corporation, Medford, Massachusetts.

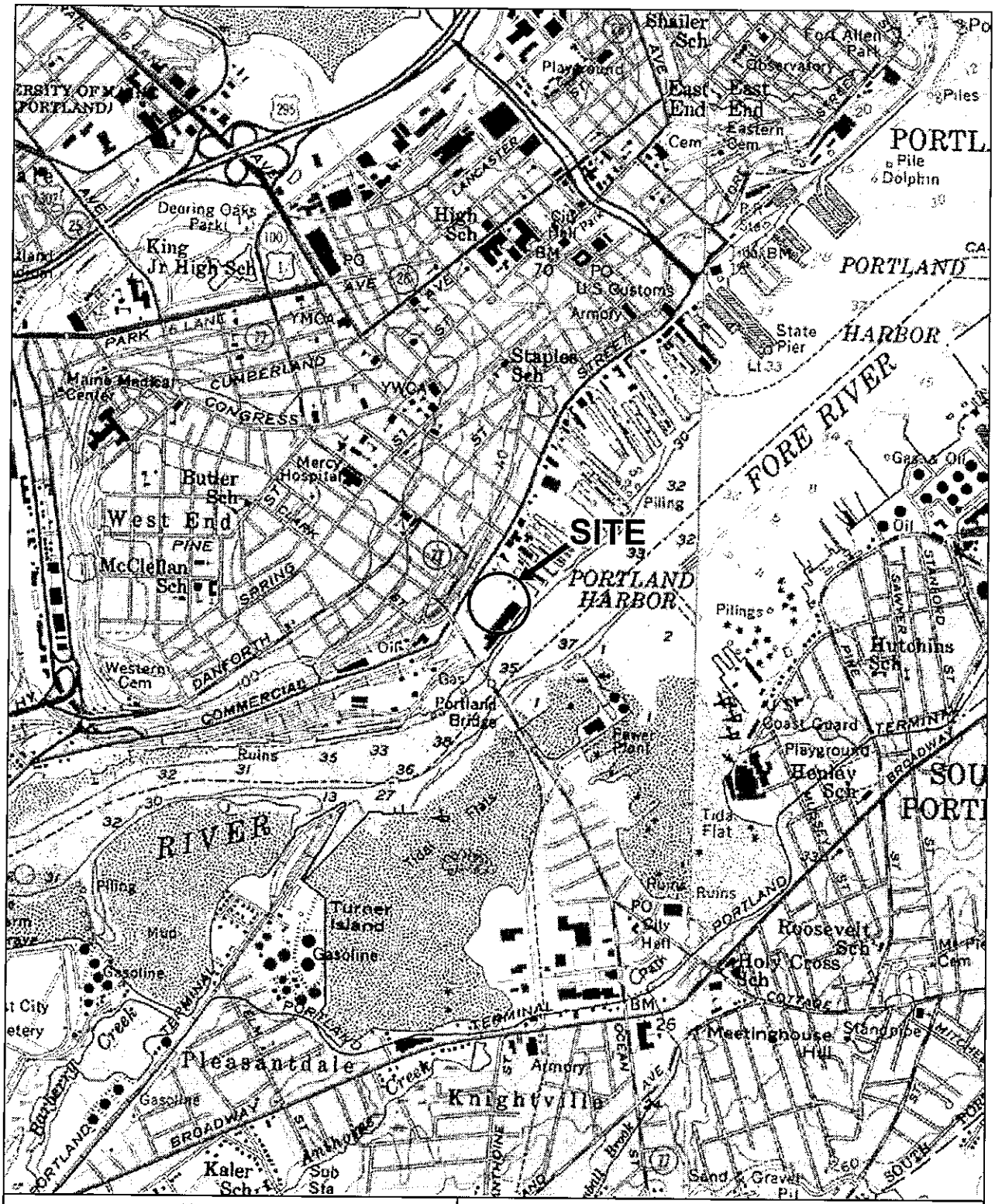
TABLE I
Summary of Subsurface Explorations
Portland International Marine Terminal Improvements
Portland, Maine

Haley & Aldrich File No.: 37272-000

Test Boring No.[1]	Ground Surface Elevation[3]	Approximate Strata Thickness[4] (ft)						Approximate Elevation of Bottom of Exploration
		Fill	Harbor Bottom Deposit	Marine Deposit		Ice Contact	Glacial Till	
				Clay	Sand			
HA10-1	11.5	15.0	NE	NE	> 12	--	--	-15.5
HA10-2	11.0	7.0	NE	NE	> 4	--	--	0.0
HA10-3	11.5	> 10.5	--	--	--	--	--	1.0
HA10-4	11.0	10.0	NE	> 0.5	--	--	--	0.5
HA10-5	11.5	12.5	11.5	NE	> 2	--	--	-14.5
HA10-6	11.0	6.5	NE	> 6	--	--	--	-1.5
HA10-7	10.5	> 10.5	--	--	--	--	--	0.0
HA10-8	10.5	> 10.5	--	--	--	--	--	0.0
HA10-9	11.5	13.0	14.0	14.0	> 3	--	--	-32.5
HA10-10	-3.5	3.5	11.5	3.5	36.5	14.0	> 16.3	-88.8
HA10-11	12.5	> 3	--	--	--	--	--	9.5
HA10-12	13.5	> 4.5	--	--	--	--	--	9.0

Notes:
[1] Test boring locations are shown on Figure 2, Site and Subsurface Exploration Location Plan.
[2] As-drilled locations of test borings were determined by James D. Nadeau, LLC.
[3] Ground surface elevations at test boring locations were estimated by Haley & Aldrich based on ground surface contours shown on existing conditions plan by James D. Nadeau, LLC. and reference NGVD 29.
[4] "NE" indicates stratum was not encountered in test boring.
[5] "--" indicates test boring was not advanced deep enough to determine the presence of stratum.

COMPLETED BY:	MLS
CHECKED BY:	EFW
REVIEWED BY:	WAC



SITE COORDINATES:43°38'52"N 70°15'29"W

N
W
E
S

U.S.G.S. QUADRANGLE: PORTLAND WEST, ME

HALEY & ALDRICH

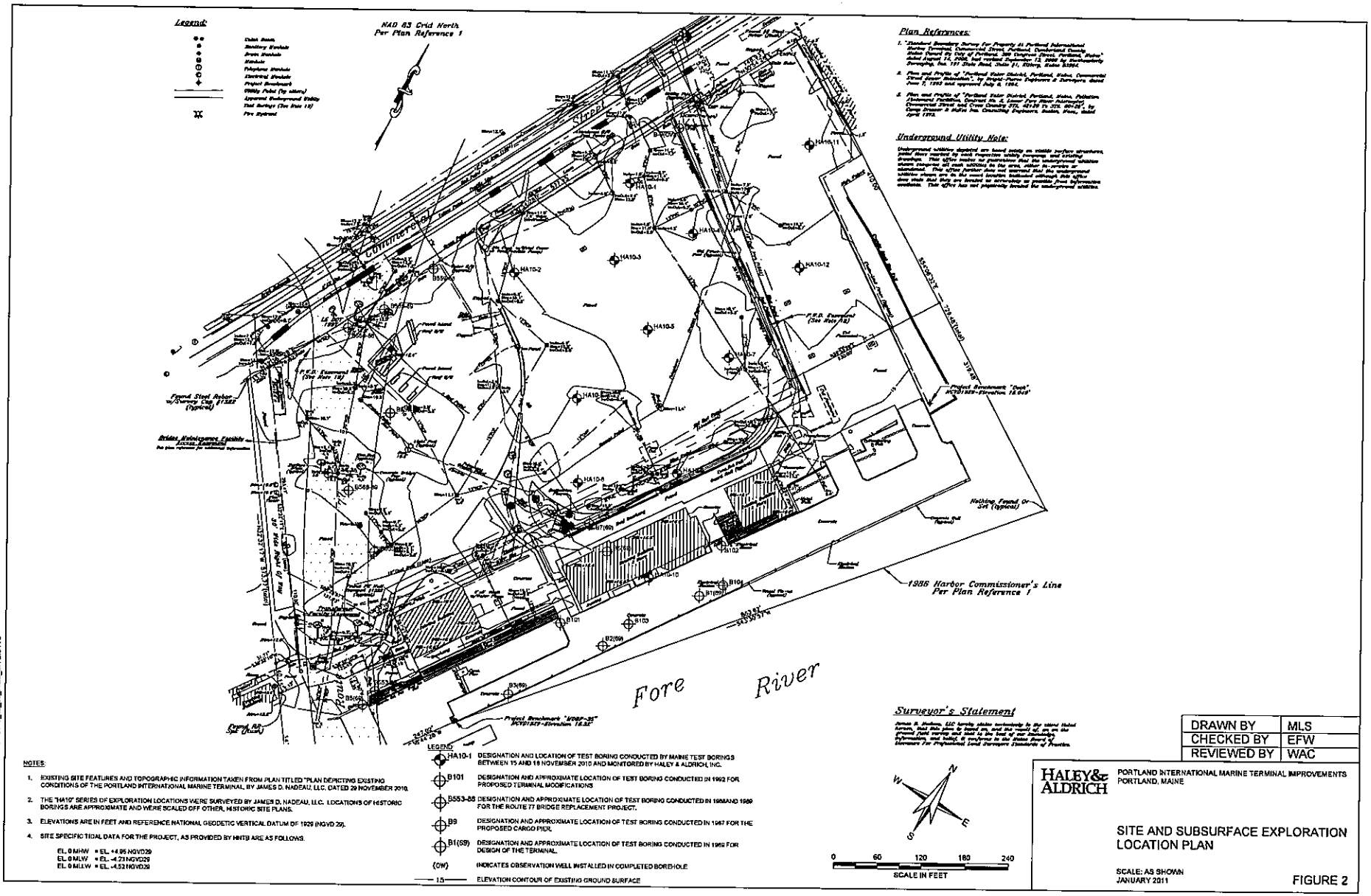
PORTLAND INTERNATIONAL MARINE TERMINAL IMPROVEMENTS
PORTLAND, MAINE

PROJECT LOCUS

SCALE: 1:24,000
DECEMBER 2010

FIGURE 1

37272-000 1.PDF



DRAWN BY	MLS
CHECKED BY	EFW
REVIEWED BY	WAC

HALEY & ALDRICH

PORTLAND INTERNATIONAL MARINE TERMINAL IMPROVEMENTS
PORTLAND, MAINE

SITE AND SUBSURFACE EXPLORATION LOCATION PLAN

SCALE: AS SHOWN
JANUARY 2011

FIGURE 2

G:\PROJECTS\337272 - IMT\000\FIGURES\2010_12_06_FIG2_SITE.DWG

APPENDIX A

Recent Test Boring Logs

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA10-1

Project: Portland International Marine Terminal Improvements, Portland, Maine
Client: HNTB Corporation
Contractor: Maine Test Borings

File No. 37272-000
Sheet No. 1 of 2
Start 15 November 2010
Finish 15 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 11.5 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	4.0	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	16	30	-	Casing: SSA to 5', HSA to 15.0', HW to 25.0'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test: Dilatancy	Field Test: Toughness	Field Test: Plasticity	Field Test: Strength
0				11.3		-BITUMINOUS CONCRETE-										
	7 9 10 14	S1 18	0.5 2.5	0.2	SM	Medium dense, brown, silty SAND (SM), mps 0.75 in., no odor, moist -BASE/SUBBASE-	3	3	5	33	36	20				
				10.0												
				1.5	SW	Medium dense, dark brown, well graded SAND with gravel (SW), mps 0.75 in., no odor, moist, contains brick and wood fragments		20	5	15	55	5				
	12 11 7 8	S2 18	2.5 4.5	9.0 2.5	SM	Medium dense, brown, silty SAND (SM), mps 1.25 in., no odor, moist -FILL-	4	6	8	30	34	18				
5	5 6 6 9	S3 11	4.5 6.5		SW-SM	Medium dense, brown, well graded SAND with silt and gravel (SW-SM), mps 0.3 in., no odor, moist, rust-staining around schist gravel		15	5	10	60	10				
	7 9 8 10	S4 13	6.5 8.5		SW-SM	Medium dense, brown, well graded SAND with silt and gravel (SW-SM), mps 1.3 in., no odor, moist, rust-staining around schist gravel		25	10	15	40	10				
	5 3 13 25	S5 7	8.5 10.5		SM	Medium dense, brown, silty SAND with gravel (SM), mps 0.75 in., no odor, wet -FILL-		30	5	25	25	15				
10	6 2 7 5	S6A 4	10.5 12.5		SW	Loose, brown, well graded SAND with gravel (SM), mps 1.5 in., no odor, wet		25	10	20	40	5				
						Note: Advance roller bit through boulder from 12.5 to 13.0 ft.										
	14 22 23 23	S6B 11	13.0 15.0		SW	Dense, gray, well graded SAND with gravel (SW), mps 1.0 in., no odor, saturated, brick fragments in coarse sand -FILL-		15	5	15	60	5				
15	6 5 5 8	S7 13	15.0 17.0	-3.5 15.0	SP	Loose, gray, poorly graded SAND (SP), mps 0.3 in., no odor, wet		10	5	5	75	5				
				-4.5 16.0	SP-SW	Loose, brown, well graded SAND (SW), trace gravel, mps 0.2 in., no odor, wet		10	10	30	50					
	9 8 10 13	S8 8	17.0 19.0		SP	Medium dense, brown, poorly graded SAND with silt (SP), mps 2.0 mm, no odor, wet, thin (1 cm) layer of clay in the top of the spoon, thin (1.5 in.) layer of rust-stained sand at approximately 18.0 ft -MARINE DEPOSIT- (Sand)				15	75	10				
20																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
11/15/10	1445	0	pulled	27.0	4.5

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 27.0
Rock Cored (ft) --
Samples 11S
Boring No. HA10-1

Field Tests: Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-J807-1R-FOR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY& ALDRICH

TEST BORING REPORT

Boring No. HA10-1
File No. 37272-000
Sheet No. 2 of 2

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	7 11 15 16	S9 11	20.0 22.0		SP	Medium dense, brown, poorly graded SAND (SP), mps 2.0 mm, no odor, wet, thin (0.75 in.) layer of rust-stained sand at bottom of spoon -MARINE DEPOSIT- (Sand)				25	75					
25	7 8 9 10	S10 11	25.0 27.0		SP	Medium dense, brown, poorly graded SAND (SP), mps 2.0 mm, no odor, wet				25	75					
				-15.5 27.0		Bottom of Exploration 27.0 ft										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA10-1

H&A-TEST BORING-07-1 H:\A-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA10-2

Project Portland International Marine Terminal Improvements, Portland, Maine
Client HNTB Corporation
Contractor Maine Test Borings

File No. 37272-000
Sheet No. 1 of 1
Start 18 November 2010
Finish 18 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 11.0 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 9.0'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				10.8 / 0.2		-BITUMINOUS CONCRETE-										
						Note: Cobble at 0.5 ft.										
	10 10 8 6	S1 15	1.0 3.0		SW	Medium dense, dark brown to brown at 2.0 ft, well graded SAND with gravel (SW), mps 0.75 in., no odor, dry to moist		25	15	15	45					
						-BASE/SUBBASE-										
	6 5 4 3	S2 18	3.0 5.0	7.9 / 3.1	SP	Loose, brown, poorly graded SAND (SP), mps 0.42 mm, no odor, moist, frequent 0.5 in. thick horizontal layers of black sand				20	80					
5	2 1 3 2	S3 22	5.0 7.0		SP	Loose, brown, poorly graded SAND (SP), mps 0.3 in., no odor, moist, dark brown layers from 5.0 to 5.5 ft		5		20	75					
						-FILL-										
	2 1 2 2	S4 22	7.0 9.0	4.0 / 7.0	SW	Very loose, brown, well graded SAND (SW), mps 4.0 mm, no odor, wet			15	25	60					
						-MARINE DEPOSIT- (Sand)										
10	1 1 1 2	S5 21	9.0 11.0		SW	Very loose, brown, well graded SAND (SW), mps 1.0 in., no odor, wet		5	15	30	50					
				0.0 / 11.0		Bottom of Exploration 11.0 ft										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 11.0
Rock Cored (ft) --
Samples 5S
Boring No. HA10-2

Field Tests: **Dilatancy:** R - Rapid S - Slow N - None **Plasticity:** N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High **Dry Strength:** N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HA-TEST BORING-07-1 HA-UB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA10-3

Project Portland International Marine Terminal Improvements, Portland, Maine
Client HNTB Corporation
Contractor Maine Test Borings

File No. 37272-000
Sheet No. 1 of 1
Start 18 November 2010
Finish 18 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 11.5 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 8.5'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				11.3 / 0.2	SW	-BITUMINOUS CONCRETE-										
	12 24 50/0"	S1 14	0.5 1.8	10.5 / 1.0	SP	Very dense, brown, well graded SAND with gravel (SW), mps 0.75 in., no odor, dry to moist -BASE/SUBBASE- Dense, black, poorly graded SAND with gravel (SP), mps 1.3 in., no odor, dry to moist, brick and coal fragments		25	10	15	50					
	8 14 9 11	S2 8	2.5 4.5		SP	Note: Augered through boulder from approximately 1.8 to 2.5 ft. Medium dense, black, poorly graded SAND with gravel (SP), mps 1.0 in., no odor, dry to moist, 0.5 in. ash layer, brick and coal fragments		15	10	10	60	5				
5	5 5 4 6	S3 16	4.5 6.5		SW	Loose, dark brown to black, well graded SAND with gravel (SW), mps 1.0 in., no odor, dry, contains ash and coal		15	10	10	65					
	3 2 3 3	S4 4	6.5 8.5		SP	Loose, dark brown to black, poorly graded SAND with gravel (SP), mps 0.3 in., no odor, dry -FILL-		20	15	25	40					
10	1 1 2 4	S5 5	8.5 10.5		SP	Very loose, black, poorly graded SAND with gravel (SP), mps 0.7 in., no odor, moist to wet		15	10	10	65					
				1.0 / 10.5		Bottom of Exploration 10.5 ft		20	10	10	60					

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 10.5
Rock Cored (ft) --
Samples 5S
Boring No. HA10-3

Field Tests: Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA10-4

Project: Portland International Marine Terminal Improvements, Portland, Maine
Client: HNTB Corporation
Contractor: Maine Test Borings

File No. 37272-000
Sheet No. 1 of 1
Start 18 November 2010
Finish 18 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 11.0 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 8.5'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				10.7		-BITUMINOUS CONCRETE-										
	14 21 16 19	S1 19	0.5 2.5	0.3 10.0	SW	Dense, brown, well graded SAND with gravel (SW), mps 2.0 in., no odor, dry to damp		25	15	15	45					
				1.0	SP	-BASE/SUBBASE- Dense, black, poorly graded SAND with gravel (SP), mps 2.0 in., no odor, dry to moist, contains coal		30	5	10	55					
	12 16 12 12	S2 17	2.5 4.5		SW	Medium dense, brown to dark brown, well graded SAND with silt and gravel (SW), mps 1.0 in., no odor, moist, contains coal and large wood fragments -FILL-		15	10	15	50	10				
5	7 6 5 5	S3 5	4.5 6.5		SW	Medium dense, dark brown, well graded SAND with silt and gravel (SW), mps 0.8 in., no odor, moist, contains wood fragments		15	10	10	55	10				
	5 7 4 4	S4 7	6.5 8.5		SW	Medium dense, brown, well graded SAND with gravel (SW), mps 1.0 in., no odor, moist		25	15	10	50					
	1 1 2 2	S5 24	8.5 10.5		SM	Very loose, brown, silty SAND (SM), mps 0.5 in., no odor, saturated		5		10	70	15				
10				1.0 10.0	CL	Soft, brown, sandy CLAY (CL), mps 0.47 mm, no odor, saturated					30	70				
				0.5 10.5		-MARINE DEPOSIT- (Clay)										
						Bottom of Exploration 10.5 ft										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 10.5
Rock Cored (ft) --
Samples 5S
Boring No. HA10-4

Field Tests: **Dilatancy:** R - Rapid S - Slow N - None **Plasticity:** N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High **Dry Strength:** N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA10-5

Project: Portland International Marine Terminal Improvements, Portland, Maine
Client: HNTB Corporation
Contractor: Maine Test Borings

File No. 37272-000
Sheet No. 1 of 2
Start 15 November 2010
Finish 16 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 11.5 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	4.0	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	16	30	-	Casing: SSA to 8.5,' HW to 24.0'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				11.3		-BITUMINOUS CONCRETE-										
	14 24 14 13	S1 14	0.5 2.5	0.2 10.0	SW	Dense, brown, well graded SAND with gravel (SW), mps 2.0 in., no odor, moist		20	10	15	55					
				1.5	SW	-BASE/SUBBASE-		25	20	15	40					
	9 6 12 15	S2 18	2.5 4.5	8.5	SW	Dense, dark brown to black, well graded SAND with gravel (SW), mps 1.75 in., no odor, moist, contains ash and brick fragments and coal										
				3.0 7.5	SP	Medium dense, dark brown to black, well graded SAND with gravel (SW), mps 1.75 in., no odor, moist, contains ash and brick fragments and coal					85	15				
				4.0 7.0	SW	Medium dense, dark brown, silty SAND (SP), mps 0.42 mm, no odor, moist		30	15	15	40					
5	4 6 6 5	S3 14	4.5 6.5	4.5	SP	Medium dense, brown, well graded SAND with gravel (SW), mps 1.5 in., no odor, moist					100					
						Medium dense, light brown, poorly graded SAND (SP), mps 0.42 mm, no odor, moist										
				5.0		-FILL-										
	4 5 5 4	S4 24	6.5 8.5	6.5	SM	Loose, light brown, silty SAND (SM), mps 0.42 mm, no odor, moist					75	25				
	1 3 4 4	S5 10	8.5 10.5		SM	Loose, light brown, silty SAND (SM), mps 0.42 mm, no odor, wet				10	75	15				
10				1.5 10.0	SP	Loose, brown, poorly graded SAND (SP), mps 4.75 mm, no odor, wet			10	60	30					
	1 3 3 2	S6 7	10.5 12.5	1.0 10.5	SP	Loose, brown, poorly graded SAND (SP), mps 0.75 in., no odor, wet		10		65	25					
						-FILL-										
	2 1 2 2	S7 24	12.5 14.5	-1.0 12.5	CL	Soft, gray, lean CLAY (CL), mps 0.075 mm, no odor, wet						100				
15		U1 18.5	14.5 16.5			U1 (14.5-16.5 ft) Recovery = 18.5 in.										
						Note: Unable to advance vane through soil from 16.5 to 17.5 ft.										
	2 1 WOH 2	S8 24	17.0 19.0		OL/ OH	Very soft, gray, ORGANIC SILT with sand (OL/OH), mps 4.0 mm, strong organic odor, wet, shell and wood fragments			5	5	30	60				
						-HARBOR BOTTOM DEPOSIT-										
	WOH WOH	S9 24	19.0 21.0		SC/ OL/OH	Very loose, gray, clayey SAND and ORGANIC SILT (SC/OL/OH), mps 1.0 in., organic odor, wet, contains shell and wood fragments and fibrous		5	5	10	55	35				
20																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 26.0
Rock Cored (ft) --
Samples 10S, 1U
Boring No. HA10-5

Field Tests: Dilatancy: R - Rapid S - Slow N - None; Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High; Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT1000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA10-5
File No. 37272-000
Sheet No. 2 of 2

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	WOH 3					organics, some seams of medium to coarse sand -HARBOR BOTTOM DEPOSIT-										
	12 11 12 14	S10 24	24.0 26.0	-12.5 24.0	SC	Medium dense, light brown, clayey SAND (SC), mps 4.0 mm, slight organic odor, wet, contains red-brown to dark brown layers of iron staining -MARINE DEPOSIT- (Sand)				5	60	35				
25				-14.5 26.0		Bottom of Exploration 26.0 ft										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA10-5

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT0000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA10-6

Project Portland International Marine Terminal Improvements, Portland, Maine
Client HNTB Corporation
Contractor Maine Test Borings

File No. 37272-000
Sheet No. 1 of 1
Start 18 November 2010
Finish 18 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 11.0 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 10.5'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel %	Sand % Coarse	Sand % Fine	Sand % Medium	Sand % Fine	% Fines	Field Test: Dilatancy	Toughness	Plasticity	Strength
0				10.7		-BITUMINOUS CONCRETE-										
	10 16 14 14	S1 17	0.5 2.5	0.3 10.2	SW	Medium dense, brown, well graded SAND with gravel (SW), mps 0.75 in., no odor, dry		20	15	15	50					
				0.8	SW	-BASE/SUBBASE-		15	10	15	60					
	14 13 15 10	S2 18	2.5 4.5	8.5 2.5	SW	Medium dense, brown to black, well graded SAND with gravel (SW), mps 0.75 in., no odor, dry, contains brick fragments, ash and wood Medium dense, brown, well graded SAND with gravel (SW), mps 1.3 in., no odor, dry		20	15	15	45	5				
						-FILL-										
5	4 3 3 3	S3 24	4.5 6.5	6.0 5.0	SW SP	Loose, brown, well graded SAND with gravel (SW), mps 1.0 in., no odor, dry Loose, light brown, poorly graded SAND (SP), mps 0.42 mm, no odor, moist, 1.4 in. layers of iron staining		20	15	15	50					
				4.9 6.1						5	95					
	1 1 1 2	S4 23	6.5 8.5	4.5 6.5	CL CL	Medium stiff, gray, sandy lean CLAY (CL), mps 0.42 mm, no odor, moist, iron staining Very soft, olive-brown, lean CLAY (CL), with fine sand layers, organics, mps 0.42 mm, no odor, wet, mottled					30	70				
						-MARINE DEPOSIT-										
	1 2 2 2	S5 24	8.5 10.5		CL	(Clay) Soft, olive-brown, lean CLAY (CL), with fine sand layers, mps 0.42 mm, no odor, wet					30	70				
10																
	2 2 1 1	S6 23	10.5 12.5		CL/ SP	Soft, olive-brown, lean CLAY (CL), alternating with loose, brown, poorly graded SAND (SP), mps 0.42 mm, no odor, wet, gray clay in bottom of sampler					50	50				
				-1.5 12.5		-Bottom of Exploration 12.5 ft										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 12.5
Rock Cored (ft) --
Samples 6S
Boring No. HA10-6

Field Tests: Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA10-7

Project: Portland International Marine Terminal Improvements, Portland, Maine
Client: HNTB Corporation
Contractor: Maine Test Borings

File No. 37272-000
Sheet No. 1 of 1
Start 18 November 2010
Finish 18 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 10.5 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 8.5'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions; GEOLOGIC INTERPRETATION)	Gravel %	Sand %	Fines %	Field Test
				10.1		-BITUMINOUS CONCRETE-				
	17 20 17 13	S1 16	0.5 2.5	0.4 9.5 1.0	SW SW	Dense, brown, well graded SAND with gravel (SW), mps 1.5 in., no odor, dry -BASE/SUBBASE- Dense, black, well graded SAND with gravel (SW), mps 0.5 in., no odor, moist, contains coal and ash	25	60	15	
	11 12 9 5	S2 16	2.5 4.5		SP	Medium dense, dark brown, poorly graded SAND with silt and gravel (SP), mps 0.2 in., no odor, moist, contains ash and trace bricks	15	75	10	
5	2 2 3 8	S3 17	4.5 6.5		SM	Loose, dark brown, silty SAND with gravel (SM), mps 1.3 in., no odor, wet -FILL-	20	70	10	
	10 6 2 9	S4 10	6.5 8.5	4.0 6.5	OL/ OH	Medium stiff, dark brown, ORGANIC SILT (OL/OH), contains abundant brick fragments, mps 1.0 in., no odor, wet		10	90	
	1 1 2 2	S5 24	8.5 10.5	1.6 8.9	OL/ OH	Very soft, dark brown, ORGANIC SILT (OL/OH), contains abundant brick fragments, mps 1.0 in., no odor, wet		10	90	
10				0.0 10.5	SP	Very loose, brown, poorly graded SAND (SP), mps 4.0 mm, no odor, wet -FILL- Bottom of Exploration 10.5 ft	5	95		

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 10.5
Rock Cored (ft) --
Samples 5S
Boring No. HA10-7

Field Tests: Dilatancy: R - Rapid S - Slow N - None; Toughness: L - Low M - Medium H - High; Plasticity: N - Nonplastic L - Low M - Medium H - High; Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-05-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT1000F\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA10-8

Project: Portland International Marine Terminal Improvements, Portland, Maine
Client: HNTB Corporation
Contractor: Maine Test Borings

File No. 37272-000
Sheet No. 1 of 1
Start 18 November 2010
Finish 18 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 10.5 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 8.5'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				10.3												
				0.2	SW	-BITUMINOUS CONCRETE-										
	9	S1	0.5	9.5		Medium dense, brown, well graded SAND with gravel (SW), mps 0.75 in.,		25	15	15	45					
	11	21	2.5	1.0	SP	no odor, moist		20	10	10	60					
	11					-BASE/SUBBASE-										
	19					Medium dense, brown to black, poorly graded SAND with gravel (SP), mps 0.4 in., no odor, moist, contains coal, brick fragments and glass shards										
				8.0												
	13	S2	2.5	2.5	SW	Medium dense, brown, well graded SAND with gravel (SW), mps 1.0 in., no		15	20	15	50					
	15	15	4.5			odor, moist, trace brick fragments and ash										
	13															
	9															
5	5	S3	4.5		SW	Dense, brown, well graded SAND with silt and gravel (SW), mps 1.5 in., no		20	15	15	40	10				
	23	21	6.5			odor, moist, some ash layers										
	17															
	15															
	20	S4	6.5		SW	Medium dense, brown, well graded SAND with gravel (SW), mps 0.75 in.,		30	15	10	45					
	15	12	8.5			no odor, moist										
	9															
	10					-FILL-										
	4	S5	8.5		SW	Loose, brown, well graded SAND with gravel (SW), mps 1.0 in., no odor,		20	15	15	50					
	2	4	10.5			moist to wet, gravel in tip of sampler, split spoon tip is wet										
10	2															
	3															
				0.0												
				10.5		Bottom of Exploration 10.5 ft										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID: O - Open End Rod; T - Thin Wall Tube; U - Undisturbed Sample; S - Split Spoon Sample

Well Diagram: Riser Pipe; Screen; Filter Sand; Cuttings; Grout; Concrete; Bentonite Seal

Summary

Overburden (ft)	10.5
Rock Cored (ft)	--
Samples	5S
Boring No.	HA10-8

Field Tests: Dilatancy: R - Rapid S - Slow N - None; Toughness: L - Low M - Medium H - High; Plasticity: N - Nonplastic L - Low M - Medium H - High; Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-05-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IM\1000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA10-9

Project: Portland International Marine Terminal Improvements, Portland, Maine
Client: HNTB Corporation
Contractor: Maine Test Borings

File No. 37272-000
Sheet No. 1 of 2
Start 16 November 2010
Finish 16 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 11.5 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	3.0	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	16	30	-	Casing: SSA to 10', NW to 42.0'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				11.2		-BITUMINOUS CONCRETE-										
	10 15 14 12	S1 9	0.5 2.5	0.3	SW	Medium dense, brown, well graded SAND with gravel (SW), mps 1.3 in., no odor, moist		35	5	20	40					
				10.0		-BASE/SUBBASE-										
				1.5	SW	Medium dense, black, well graded SAND with gravel (SW), mps 1.3 in., no odor, moist, brick fragments in tip, coal and brick fragments		20	5	10	65					
	6 4 5 12	S2 8	2.5 4.5		SW	Loose, brown, well graded SAND with gravel (SW), mps 1.3 in., no odor, moist, abundant brick fragments		20	15	25	40					
5	1 2 50/1"	S3 4	4.5 5.5		SW	Very dense, brown, well graded SAND with gravel (SW), mps 1.3 in., no odor, moist, abundant brick fragments		20	15	25	40					
	4 5 3 3	S4 16	6.5 8.5		SW	Loose, brown, well graded SAND with gravel (SW), mps 1.0 in., no odor, moist, abundant brick fragments, 2 in. dark brown fill in tip of spoon		20	15	25	35	5				
	2 1 1 14	S5 5	8.5 10.5		SW	Very loose, brown, well graded SAND (SW), mps 0.75 in., no odor, wet		15	10	25	50					
10						-FILL-										
						Note: Roller coned through cobble from 10.5 to 11.0 ft.										
	8 5 2 1	S6 7	11.0 13.0		SW	Loose, brown, well graded SAND (SW), mps 0.5 in., no odor, wet, contains abundant brick fragments		10	25	15	50					
				-1.5												
	2 1 1 1	S7 14	13.0 15.0	13.0	CL	Very soft, gray, sandy CLAY (CL), mps 0.42 mm, organic odor, wet, contains shell fragments				35	65					
						-HARBOR BOTTOM DEPOSIT-										
15	WOH 1 6 4	S8 15	15.0 17.0		OL/OH/ CL	Note: Attempted vane shear test at 15.0 ft, unable to push to full depth of test.				15	85					
				-4.5 16.0	SP	Very soft, gray, ORGANIC SILT with clay and sand (OL/OH/CL), mps 0.42 mm, organic odor, wet, contains shell fragments			10	40	45	5				
	4 2 3 5	S9 18	17.0 19.0		SM	Loose, gray, poorly graded SAND (SP), mps 4.0 mm, organic odor, wet, contains brick and shell fragments Loose, gray, silty SAND (SM), mps 4.0 mm, strong organic odor, wet		5	5	15	55	20				
						-HARBOR BOTTOM DEPOSIT-										
				-7.5												
	2 1	S10 14	19.0 21.0	19.0	SM/ ML	Very loose, gray, silty SAND (SM) to sandy SILT with organics (ML), mps 4.0 mm, strong organic odor, wet, contains shell and wood fragments					55	45				
20																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 44.0
Rock Cored (ft) --
Samples 14S, 1U

Boring No. HA10-9

Field Tests: Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-IR-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\0005FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA10-9
File No. 37272-000
Sheet No. 2 of 2

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	2 2					-HARBOR BOTTOM DEPOSIT-										
25	2 1 2 2	S11 9	24.0 26.0		ML	Soft, gray, sandy SILT with organics (ML), mps 0.42 mm, contains shell fragments, mps 0.075 mm, organic odor, wet					35	65				
				-15.5 27.0												
30	WOH WOH WOH 2	S12 24	29.0 31.0		CL	Very soft, gray, lean CLAY (CL), mps 0.075 mm, no odor, wet, black streaks of organics -MARINE DEPOSIT- (Clay) Note: Attempted vane shear test at 33.0 ft, vane would not advance due to probable sand seam.						100				
35		U1 16	35.0 37.0			U1 (35.0-37.0 ft)										
				-28.0 39.5	CL	Note: Attempted vane shear test at 39.5 ft, unable to advance through soils. Soft, gray, lean CLAY with sand (CL), mps 0.42 mm, no odor, wet, frequent gray, fine sand seams. Brown, fine sand seam in bottom 2 in. of spoon.					25	75				
40	1 2 2 6	S13 24	39.5 41.5													
				-29.5 41.0	SC	-MARINE DEPOSIT- (Clay) Medium dense, brown, clayey SAND (SC), mps 0.42 mm, thin (0.1 in.) horizontal layers of iron staining in the sand					65	35				
	3 10 16 18	S14 20	42.0 44.0			-MARINE DEPOSIT- (Sand)										
				-32.5 44.0		Bottom of Exploration 44.0 ft										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA10-9

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-05-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA10-10

Project: Portland International Marine Terminal Improvements, Portland, Maine
Client: HNTB Corporation
Contractor: Maine Test Borings

File No. 37272-000
Sheet No. 1 of 4
Start 16 November 2010
Finish 18 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation -3.5 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW/NW	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	4.0/3.0	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	16	30	-	Casing: HW 4" to 20', NW 3" to 70'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0						Note: Test boring drilled from deck level (approx. El. 15.5). Depth from deck level to mudline approx. 19 ft.										
						Note: Advance casing through rip rap/mud to 3.5 ft.										
						-RIP RAP- -FILL-										
				-7.0												
	WOH WOH WOH WOH	S1 10	3.5 5.5	3.5	OL/ OH	Very soft, dark gray to black, sandy ORGANIC SILT with sand (OL/OH), mps 0.3 in., strong organic odor, wet, contains brick fragments, contains wood and shell fragments					20	80				
5																
	WOR WOR WOR WOH	S2 0	5.5 7.5			No Recovery										
10																
	WOR I 1 WOH	S3 24	10.0 12.0		OL/OH	Very soft, gray, sandy ORGANIC SILT (OL/OH), 0.42 in., strong organic odor, wet					30	70				
						-HARBOR BOTTOM DEPOSIT-										
15				-18.5												
	5 10 13 16	S4 14	15.0 17.0	15.0	SP	Medium dense, gray, poorly graded SAND (SP), mps 4.0 mm, no odor, wet					20	80				
						-MARINE DEPOSIT- (Sand)										
20																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID: O - Open End Rod; T - Thin Wall Tube; U - Undisturbed Sample; S - Split Spoon Sample

Well Diagram: Riser Pipe; Screen; Filter Sand; Cuttings; Grout; Concrete; Bentonite Seal

Summary

Overburden (ft)	85.3
Rock Cored (ft)	--
Samples	16S
Boring No.	HA10-10

Field Tests: Dilatancy: R - Rapid S - Slow N - None; Plasticity: N - Nonplastic L - Low M - Medium H - High; Toughness: L - Low M - Medium H - High; Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-05-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA10-10
File No. 37272-000
Sheet No. 2 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	10 9 6 4	S5 14	20.0 22.0	-24.5 21.0	SP	Medium dense, gray, poorly graded SAND with silt (SP), mps 4.0 mm, no odor, wet			5	15	70	10				
					ML	Stiff, gray, sandy SILT (ML), mps 0.42 mm, organic odor					35	65				
						-MARINE DEPOSIT- (Sand)										
25	2 WOH WOH 1	S6 24	25.0 27.0	-29.0 25.5	ML	Very soft, gray, sandy SILT (ML), mps 2.0 mm, organic odor, wet, contains shell fragments				5	35	60				
					CL	Very soft, gray, lean CLAY (CL), with frequent seams of very fine sand					25	75				
						-MARINE DEPOSIT- (Clay)										
				-32.5 29.0												
30	8 7 12 17	S7 14	30.0 32.0	-34.0 30.5	SM	Medium dense, gray, silty SAND (SM), mps 0.42 mm, organic odor, wet, black organic staining					85	15				
					SC	Medium dense, olive-brown, clayey SAND (SC), mps 2.0 mm, no odor, wet				5	65	30				
						-MARINE DEPOSIT- (Sand)										
35	10 14 8 19	S8 13	35.0 37.0		SP	Medium dense, light brown grading to rusty-brown, poorly graded SAND (SP), mps 2.0 mm, no odor, wet				25	75					
40	7 11 14 12	S9 21	40.0 42.0		SM	Medium dense, brown, silty SAND (SM), mps 2.0 mm, no odor, wet, occasional clayey sand layers, occasional iron staining				5	65	30				
						Note: Drill action indicates gravel in sand at 42.0 ft.										
				-47.5 44.0		Note: Drill action indicates cobbles at 44.0 ft.										
45	40 25 24 19	S10 10	45.0 47.0		SW	Dense, brown grading to gray at 46 ft, well graded SAND with gravel (SW), mps 1.3 in., no odor, wet		25	15	20	45					
						-MARINE DEPOSIT- (Sand)										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA10-10

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-05-03-06.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\0005FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA10-10
File No. 37272-000
Sheet No. 3 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test: Dilatancy	Field Test: Toughness	Field Test: Plasticity	Field Test: Strength
50	13 11 11 20	S11 10	50.0 52.0		SP	Medium dense, gray, poorly graded SAND (SP), mps 1.0 in., no odor, wet -MARINE DEPOSIT- (Sand)		5	10	25	55	5				
55	40 11 6 5	S12 8	55.0 57.0	-58.5 55.0	SW	Medium dense, gray, well graded SAND with gravel (SW), mps 1.3 in., no odor, wet Note: Casing pushed on cobble at 55.5 ft. -ICE CONTACT DEPOSIT-		35	20	20	20	5				
60	5 5 5 6	NR 0	60.0 62.0			Note: No recovery. Sand and gravel in casing.										
65	11 11 13 17	S13 8	65.0 67.0		SW	Medium dense, gray, well graded SAND with gravel (SW), mps 0.75 in., no odor, wet		15	35	30	20					
70	67 100/4"	S14 8	70.0 70.8	-72.5 69.0	SP	Very dense, gray, poorly graded SAND with gravel (SP), mps 0.75 in., well bonded, no odor, wet -GLACIAL TILL-		20	10	10	55	5				
75	106/2"	S15 2	75.0 75.2		SP	Very dense, gray, poorly graded SAND with gravel (SP), mps 0.75 in., no odor, wet Note: 0.5 ft of sand in casing at 75.0 ft.		20	5	10	65					

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA10-10

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-05-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\0808\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA10-10
File No. 37272-000
Sheet No. 4 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
80	100/3"	S16 3	80.0 80.2		SP	Very dense, blue-gray to gray, poorly graded SAND with silt and gravel (SP), mps 1.0 in., well bonded, no odor, wet		20	5	10	55	10				
						-GLACIAL TILL-										
85	120/4"	S17 2	85.0 85.3	-88.8 85.3	SP	Very dense, brown, poorly graded SAND with gravel (SP), mps 0.3 in., poorly bonded, no odor, wet Note: 4.5 in. sand in casing at 85.0 ft.		25	5	10	60					
						Bottom of Exploration 85.3 ft										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA10-10

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-05-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IM1100\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA10-11

Project Portland International Marine Terminal Improvements, Portland, Maine
Client HNTB Corporation
Contractor Maine Test Borings

File No. 37272-000
Sheet No. 1 of 1
Start 18 November 2010
Finish 18 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 12.5 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 1.0'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				12.3		-BITUMINOUS CONCRETE-										
				0.2	SW	Augered through cobble at 0.5 ft		20	10	15	55					
				11.5												
	11	S1	1.0	1.0	SW	Dense, brown, well graded SAND with gravel (SW)		10	5	75	10					
	30	22	3.0	11.0	SP	Very dense, white, poorly graded SAND (SP)		20	10	15	50	5				
	30			1.5		-BASE/SUBBASE-										
	15					Very dense, dark brown, well graded SAND with gravel (SW), contains brick fragments, ash, mps 2.0 in., no odor, dry										
				9.5												
				3.0		-FILL-										
						Bottom of Exploration 3.0 ft										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft) 3.0
Rock Cored (ft) --
Samples 1S

Boring No. HA10-11

Field Tests: Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IM\1000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

HALEY & ALDRICH — TEST BORING REPORT

Boring No. HA10-12

Project: Portland International Marine Terminal Improvements, Portland, Maine
Client: HNTB Corporation
Contractor: Maine Test Borings

File No. 37272-000
Sheet No. 1 of 1
Start 18 November 2010
Finish 18 November 2010
Driller R. Leonard
H&A Rep. M. Foley
Elevation 13.5 (approx.)
Datum NGVD 29
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	SSA	S	-	Rig Make & Model: Mobile Drill B53
Inside Diameter (in.)	-	1.375	-	Bit Type: Roller Bit
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: SSA to 0.5'
				Hoist/Hammer: Winch / Safety Hammer
				PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				13.2		-BITUMINOUS CONCRETE-										
	13	S1	0.5	0.3	SW	Dense, brown, well graded SAND with gravel (SW), mps 1.0 in., no odor,		20	15	15	50					
	30	17	2.5	12.5		damp										
	14			1.0	SP	Dense, dark brown to black, poorly graded SAND with gravel (SP), mps 1.5		15	5	10	70					
	18					in., no odor, moist										
				11.0		-BASE/SUBBASE-										
	17	S2	2.5	2.5	SM	Medium dense, dark brown, silty SAND with gravel (SM), mps 1.5 in., no		20	5	10	45	20				
	11	13	4.5			odor, moist, contains ash, decomposed wood and brick fragments										
	18					-FILL-										
	12															
				9.0												
				4.5		Bottom of Exploration 4.5 ft										

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 4.5
Rock Cored (ft) --
Samples 2S
Boring No. HA10-12

Field Tests: **Dilatancy:** R - Rapid S - Slow N - None **Plasticity:** N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High **Dry Strength:** N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-1R-POR-06-03-08.GLB HA-TB+CORE+WELL-07-1.GDT G:\PROJECTS\37272 - IMT\000\FIELD\37272-000_HA10-1_HA10-12.GPJ 15 Mar 11

APPENDIX B

Historic Test Boring Logs

Proposed Renovations International Ferry Terminal
1992

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. **B101**

PROJECT PROPOSED RENOVATIONS INTERNATIONAL FERRY TERMINAL, PORTLAND, MAINE
CLIENT TEC ASSOCIATES
CONTRACTOR MAINE TEST BORINGS, INC.

FILE NO. 80349-00
SHEET NO. 1 OF 3
LOCATION SEE PLAN

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	NW	SS	-
INSIDE DIAMETER (IN)	3.0	1 3/8	-
HAMMER WEIGHT (LB)	300	140	-
HAMMER FALL (IN)	24	30	-

DRILLING EQUIPMENT & PROCEDURES
RIG TYPE MOBILE B53 TRUCK RIG
BIT TYPE ROLLER BIT
DRILL MUD NONE
OTHER HNU BACKGROUND = 0.0
PPMS

ELEVATION 0.6
DATUM MLW
START 28 July 1992
FINISH 29 July 1992
DRILLER D. MCKEEN
H & A REP C. KARAM

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
0	10	6 9 12	S1 4"	0.0 1.5		Medium dense brown coarse to fine sandy GRAVEL with wood fragments HNU = 0.0 ppm -FILL-
	27				-2.4	
	34				3.0	
	9					
	4					
5	2	1 WOH WOH	S2 16"	5.0 6.5		Very soft dark gray fine sandy SILT, with shell fragments and organics HNU reading 15 ppm (peak) above background
	3					
	8					
	4					
10	5	1 WOH WOH	S3 10"	10.0 11.5		Very loose gray silty fine SAND, with organics and shells HNU peak = 17 ppm -HARBOR BOTTOM DEPOSIT-
	9					
	7					
	7					
15	15	WOH WOH WOH	S4 16"	15.0 16.5		Very loose gray silty fine SAND to fine sandy SILT, with organics and shells HNU = 13 ppm
	14					
	13					
	15					
	15					
20	22	1 1 1	S5 16"	20.0 21.5		Very loose gray silty fine SAND, with organics and shells HNU = 6 ppm
	17				-21.4	
	19				22.0	
	20					
25	19					

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT.) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION
O OPEN END ROD
T THIN WALL TUBE
U UNDISTURBED SAMPLE
S SPLIT SPOON

SUMMARY

OVERBURDEN (LIN FT)	91.5
ROCK CORED (LIN FT)	0.0
SAMPLES	19S

BORING NO. **B101**

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. B101
FILE NO. 80349-00
SHEET NO. 2 OF 3

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
25	29	WOH WOH WOH	S6 12"	25.0 26.5		Soft to medium stiff gray silty CLAY with occasional fine sand seams and black streaks HNU = 0.0 ppm -MARINE CLAY-
	23					
	25					
	23					
	24					
30	34	WOH WOH 1	S7 NR	30.0 31.5		No Recovery Gray silty CLAY -MARINE CLAY-
	30					
	33					
	40				-32.4 33.0	
	44					
35	48	4 10 9	S8 12"	35.0 36.5		Medium dense brown fine SAND, occasional silt seams -MARINE SAND-
	37					
	44					
	47					
	56					
40	49	6 8 10	S9 1"	40.0 41.5		Medium dense olive brown silty fine SAND, little clay
	51					
	81					
	97				-42.4 43.0	
	54					
45	65	4 5 9	S10 8"	45.0 46.5		Medium dense gray silty fine SAND -MARINE SAND-
	57					
	48					
	45					
	40					
50	42	5 5 6	S11 10"	50.0 51.5		Medium dense gray medium to fine SAND
	38					
	30					
	35					
	33					
55	42	1 1 1	S12 18"	55.0 56.5		Very loose gray silty fine SAND, occasinal silt and clay seams
	39					
	38					
	40					
	41					
60						

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. B101
FILE NO. 80349-00
SHEET NO. 3 OF 3

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
60	49	6 8 10	S13 14"	60.0 61.5		Medium dense gray medium to fine SAND, trace coarse sand -MARINE SAND-
	48					
	54					
	64					
	62					
65	68	4 5 5	S14 10"	65.0 66.5		Medium dense gray coarse to fine SAND
	64					
	60					
	65					
	60					
70	77	8 14 5	S15 6"	70.0 71.5	-69.4 70.0	Medium dense gray gravelly coarse to fine SAND, poorly bonded -ICE CONTACT DEPOSIT-
	85					
	80					
	79					
	72					
75	83	21 8 4	S16 12"	75.0 76.5		Medium dense gray gravelly medium to fine SAND, little coarse sand and silt, (bonded - not tightly)
	83					
	86					
	135				-77.4 78.0	Encountered cobbles from 78.0 to 80.0 ft.
	217					
80	154	66 90 91	S17 12"	80.0 81.5		Very dense gray gravelly coarse to fine SAND (well bonded), little silt *Washed ahead with roller cone from 80.0 to 90.0 ft. -GLACIAL TILL-
	112					
	106					
	139					
	286					
85	107	68 30 41	S18 4"	85.0 86.5		Very dense gray coarse to fine sandy GRAVEL
	163					
	142					
	163					
	306					
90		200/.2	S19 0"	90.0 91.5		No Recovery (wash = gravel)
					-90.9 91.5	Bottom of Exploration at 91.5 ft. No Refusal

BORING NO. B101

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. B102

PROJECT PROPOSED RENOVATIONS INTERNATIONAL FERRY TERMINAL, PORTLAND, MAINE
CLIENT TEC ASSOCIATES
CONTRACTOR MAINE TEST BORINGS, INC.

FILE NO. 80349-00
SHEET NO. 1 OF 3
LOCATION SEE PLAN

ITEM	CASING	DRIVE SAMPLER	CORE BARREL	DRILLING EQUIPMENT & PROCEDURES
TYPE	NW	SS	-	RIG TYPE MOBILE B53 TRUCK RIG
INSIDE DIAMETER (IN)	3.0	1 3/8	-	BIT TYPE ROLLER BIT
HAMMER WEIGHT (LB)	300	140	-	DRILL MUD NONE
HAMMER FALL (IN)	24	30	-	OTHER FV = 2 IN. X 7 IN.
				FIELD VANE SHEAR

ELEVATION -0.8
DATUM MLW
START 22 July 1992
FINISH 23 July 1992
DRILLER D. MCKEEN
H & A REP C. KARAM

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
0						
	2	2	S1	0.0	-1.3	Very loose brown gravelly coarse to fine SAND
		1	12"	1.5	0.5	-FILL-
	1	1				Very loose black to dark gray fine sandy SILT, with organics
	WOH					
	1					
	WOH	W	S2	4.0		No Recovery
5		O	NR	5.5		
	WOH	H				-HARBOR BOTTOM DEPOSIT-
	4					
	15				-7.8	
	17				7.0	
	6	1	S3	9.0		Loose gray silty medium to fine SAND
10		3	12"	10.5		-HARBOR BOTTOM DEPOSIT-
	9	3				
	14					
	15					
	8					
	7	3	S4	14.0		Medium dense gray coarse to fine SAND, with trace shell fragments
15		4	18"	15.5		
	11	6				
	17					
	21					
	25					
	12	1	S5	19.0		Very loose gray silty fine SAND, with organics
20		1	10"	20.5		
	13	1				
	17					
	18					
	22				-23.8	
					23.0	
	25	W	S6	24.0		Soft to medium stiff gray silty CLAY with shell fragments
25		O	18"	25.5		

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT.) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O	OPEN END ROD
T	THIN WALL TUBE
U	UNDISTURBED SAMPLE
S	SPLIT SPOON

SUMMARY

OVERBURDEN (LIN FT)	79.8
ROCK CORED (LIN FT)	0.0
SAMPLES	17S

BORING NO. B102

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. B102
FILE NO. 80349-00
SHEET NO. 2 OF 3

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
25	19	H				-MARINE CLAY-
	21					
	22					
	22					
	40	W	S7	29.0		Stiff gray silty CLAY
30		0	18"	30.5		
	34	H				FV#1, 30.5 to 31.1 ft. Undrained Shear Strength (Su) = 1.48 ksf
	37					FV#2, 30.1 to 31.7 ft. Undrained Shear Strength (Su) = 1.67 ksf
	43				-32.8	
	54				32.0	
	40	7	S8	34.0		Medium dense brown silty fine SAND
35		5	12"	35.5		
	34	8				
	37					
	43					
	51					
	41	7	S9	39.0		Dense brown silty medium to fine SAND
40		15	10"	40.5		
	48	15				-MARINE SAND-
	57					
	110					
	51					
	28	10	S10	44.0		Medium dense rusty brown silty medium to fine SAND
45		8	12"	45.5		
	30	10				
	34					
	32					
	39					
	24	6	S11	49.0		Loose brown silty fine SAND
50		5	8"	50.5		
	22	3				
	27					
	33				-52.8	
	30				52.0	
	29	6	S12	54.0		Medium dense gray silty fine SAND
55		5	10"	55.5		
	26	6				-MARINE SAND-
	25					
	34					
	30					
	29	4	S13	59.0		Medium dense gray silty medium to fine SAND
60		5	12"	60.5		

BORING NO. B102

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. B102
FILE NO. 80349-00
SHEET NO. 3 OF 3

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
60						
	31	5				
	32					
	37					
	32					
	29	1	S14	64.0		
65		1	12"	65.5	-65.8	Very loose gray silty fine SAND, with clayey silt seams
	39	1			65.0	
	45					-ICE CONTACT DEPOSIT-
	42					
	40					
	53	20	S15	69.0		
70		50	6"	70.5		Very dense gray gravelly medium to fine SAND, little silt (bonded and gravel is rough and angular)
	70	40				
	79					
	61					
	71				-74.8	
	40	15	S16	74.0	74.0	Very dense gray gravelly medium to fine SAND, little silt (well bonded)
75		30	8"	75.5		-GLACIAL TILL-
	91	100				
	131					
	234					NOTE: Washed ahead of casing with roller bit from 78.0 to 79.0 ft.
						Very dense brown gravelly medium to fine SAND, little silt, trace coarse sand (well bonded)
		92	S17	79.0	-80.6	
		100/.3		79.8	79.8	Split spoon refusal at 79.8 ft.
		50/0				Bottom of Exploration at 79.8 ft.

BORING NO. B102

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. **B103**

PROJECT PROPOSED RENOVATIONS INTERNATIONAL FERRY TERMINAL, PORTLAND, MAINE
CLIENT TEC ASSOCIATES
CONTRACTOR MAINE TEST BORINGS, INC.

FILE NO. 80349-00
SHEET NO. 1 OF 1
LOCATION SEE PLAN

ITEM	CASING	DRIVE SAMPLER	CORE BARREL	DRILLING EQUIPMENT & PROCEDURES
TYPE	NW	SS	-	RIG TYPE MOBILE B53 TRUCK RIG
INSIDE DIAMETER (IN)	3.0	1 3/8	-	BIT TYPE ROLLER BIT
HAMMER WEIGHT (LB)	300	140	-	DRILL MUD NONE
HAMMER FALL (IN)	24	30	-	OTHER HNU BACKGROUND = 0.0 PPMS

ELEVATION -15.2
DATUM MLW
START 30 July 1992
FINISH 30 July 1992
DRILLER C. KARAM
H & A REP D. MCKEEN

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
0	WOC	W	S1	0.0		Very soft black fine sandy SILT, with organics
	WOC	0	18"	1.5		HNU reading above background = 7.0 ppm
	WOC	R				
	WOC					-HARBOR BOTTOM DEPOSIT-
	WOC					
5	WOC	WOR	S2	5.0		Very soft black fine sandy SILT, with organics
	WOC	WOR	6"	6.5	-21.2	HNU = 5 ppm
	9	2			6.0	Very loose black silty fine SAND, with organics
	7					HNU = 5 ppm
	8					
	30				-24.2	
10	25	8	S3	10.0	9.0	Dense dark gray silty medium to fine SAND, with organics
	38	16	10"	11.5		HNU = 0.0 ppm
	47	18				-HARBOR BOTTOM DEPOSIT-
	54					
	17					
15					-30.2	
					15.0	Bottom of Exploration at 15.0 ft.
						No Refusal
						Casing broke off
						Moved boring 1 ft. North and continued at 15 ft. See boring B103A.

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT.) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O OPEN END ROD
T THIN WALL TUBE
U UNDISTURBED SAMPLE
S SPLIT SPOON

SUMMARY

OVERBURDEN (LIN FT)	15.0
ROCK CORED (LIN FT)	0.0
SAMPLES	3S

BORING NO. **B103**

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. **B103A**

PROJECT PROPOSED RENOVATIONS INTERNATIONAL FERRY TERMINAL, PORTLAND, MAINE
CLIENT TEC ASSOCIATES
CONTRACTOR MAINE TEST BORINGS, INC.

FILE NO. 80349-00
SHEET NO. 1 OF 3
LOCATION SEE PLAN

ITEM	CASING	DRIVE SAMPLER	CORE BARREL	DRILLING EQUIPMENT & PROCEDURES
TYPE	NW	SS	-	RIG TYPE MOBILE B53 TRUCK RIG
INSIDE DIAMETER (IN)	3.0	1 3/8	-	BIT TYPE ROLLER BIT
HAMMER WEIGHT (LB)	300	140	-	DRILL MUD NONE
HAMMER FALL (IN)	24	30	-	OTHER

ELEVATION -15.2
DATUM MLW
START 30 July 1992
FINISH 3 August 1992
DRILLER D. MCKEEN
H & A REP C. KARAM

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
0						No samples taken from 0-15.0 ft. See Boring B103 for soil descriptions.
5						
10						
15	19	3	S1	15.0	-30.2	
		2	4"	16.5	15.0	Loose gray silty fine SAND, with organics and shell fragments
	18	3				-HARBOR BOTTOM DEPOSIT-
	23				-32.2	
	21				17.0	
	22					
20	26		S2	20.0		Medium dense olive brown silty fine SAND
	28		8"	21.5		-MARINE SAND-
	31					
	34					
25	42					

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT.) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O OPEN END ROD
T THIN WALL TUBE
U UNDISTURBED SAMPLE
S SPLIT SPOON

SUMMARY

OVERBURDEN (LIN FT)	75.4
ROCK CORED (LIN FT)	0.0
SAMPLES	16S

BORING NO. **B103A**

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. B103A
FILE NO. 80349-00
SHEET NO. 2 OF 3

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
25	16	9 12 15	S3 12"	25.0 26.5		Medium dense brown fine SAND, trace silt
	30					
	32					
	40					
	45				-44.2 29.0	
30	22	3 5 6	S4	30.0 31.5		Medium dense gray medium to fine SAND, trace silt
	23					
	26					
	20					
	25					
35	26	6 5 7	S5 12"	35.0 36.5		Medium dense gray medium to fine SAND, trace coarse sand and silt -MARINE SAND-
	26					
	32					
	45					
	50					
40	24	4 5 8	S6 12"	40.0 41.5		Medium dense gray coarse to fine SAND, trace fine gravel
	29					
	44					
	49					
	45					
45	29	13 4 5	S7 10"	45.0 46.5		Loose gray medium to fine SAND, trace coarse sand
	38				-62.2 47.0	
	60					
	64					
	61					
50	56	10 7 7	S8 12"	50.0 51.5		Medium dense gray medium to fine SAND, little gravel and silt (slightly bonded) -ICE CONTACT DEPOSIT-
	53					
	66					
	100				-68.2 53.0	
	126					
55	83	25 27 44	S9 12"	55.0 56.5		Very dense gray gravelly medium to fine SAND, little sand and silt (well bonded) -GLACIAL TILL-
	112					
	223					
	280					
	425					
60						

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. B103A
FILE NO. 80349-00
SHEET NO. 3 OF 3

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
60						
	148	69	S10	60.0		Very dense gray gravelly fine SAND, trace silt
		250/.4	6"	60.9		(well bonded)
	225					Washed ahead of casing from 60.0 to 70.0 ft.
	270					
	376					
	158/.4					-GLACIAL TILL-
65						
		184	S11	65.0		Used drilling mud from 65.0 to 70.0 ft.
		104/.1	6"	65.6		Very dense gray gravelly medium to fine SAND,
						little silt and coarse sand
						NOTE: Drilled ahead of casing using drilling
						mud from 65.0 to 75.4 ft.
70						
		165	S12	70.0		Very dense gray gravelly fine SAND, little
		100/.1	4"	70.6		silt
						(well bonded)
						-GLACIAL TILL-
75						
		200/.4	S13	75.0	-90.6	Very dense gray silty medium to fine SAND
			2"	75.4	75.4	(well bonded)
						Bottom of Exploration at 75.4 ft.
						No Refusal

BORING NO. B103A

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. **B104**

PROJECT PROPOSED RENOVATIONS INTERNATIONAL FERRY TERMINAL, PORTLAND, MAINE
CLIENT TEC ASSOCIATES
CONTRACTOR MAINE TEST BORINGS, INC.

FILE NO. 80349-00
SHEET NO. 1 OF 3
LOCATION SEE PLAN

ITEM	CASING	DRIVE SAMPLER	CORE BARREL	DRILLING EQUIPMENT & PROCEDURES
TYPE	NW	SS	-	RIG TYPE MOBILE B53 TRUCK RIG
INSIDE DIAMETER (IN)	3.0	1 3/8	-	BIT TYPE ROLLER BIT
HAMMER WEIGHT (LB)	300	140	-	DRILL MUD NONE
HAMMER FALL (IN)	24	30	-	OTHER

ELEVATION -17.7
DATUM MLW
START 23 July 1992
FINISH 28 July 1992
DRILLER D. MCKEEN
H & A REP C. KARAM

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
0	WOC	W	S1	0.0		Very soft black organic SILT
	WOC	0		1.5		
	43	R				NOTE: Wood in wash from 2.0 to 3.0 ft.
	12					
	3					
5	9					-HARBOR BOTTOM DEPOSIT-
	5					
	WOC	2	S2	7.5		Loose black silty medium to fine SAND, little organics
	6	2	6"	9.0	-26.7	
	15	5			9.0	
10	18					
	13					
	WOC					
	4	1	S3	12.8		Loose gray silty fine SAND, trace shell fragments
	8	1	10"	14.3	-31.7	
15	9	3			14.0	
	10					-MARINE SAND-
	22	2	S4	17.0		Loose olive brown to gray silty fine SAND with frequent silt seams
	22	2	14"	18.5		
	26	3				
20	31					
	31					
	29	4	S5	22.0		Brown silty fine SAND, little clay
	27	4	1"	23.5		
	29	4				
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT.) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O OPEN END ROD
T THIN WALL TUBE
U UNDISTURBED SAMPLE
S SPLIT SPOON

SUMMARY

OVERBURDEN (LIN FT)	83.0
ROCK CORED (LIN FT)	0.0
SAMPLES	17S

BORING NO. **B104**

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. B104
FILE NO. 80349-00
SHEET NO. 2 OF 3

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
25						
	30					
	35					
	24	3 6 6	S6 12"	27.0 28.5		Medium dense brown silty fine SAND
	27					
	33					
30	29					NOTE: Probable silt and clay seams at 30 ft. based on observations of wash water.
	32					
	44	8 5 4	S7 18"	32.0 33.5		Loose gray silty fine SAND
	21					-MARINE SAND-
	27					
35	32					
	38					
	35	2 4 5	S8 14"	37.0 38.5		Loose gray silty fine SAND, little medium sand
	32					
	41					
40	46					
	41					
	37	2 1 2	S9 12"	42.0 43.5		Loose gray silty fine SAND with occasional silt seams
	30					
	38					
45	57				-62.7 45.0	
	51					
	54	10 1 6	S10 8"	47.0 48.5		Loose gray gravelly medium to fine SAND, little silt (slightly bonded gravel is rounded) -ICE CONTACT DEPOSIT-
	50					
	66					
50	64					
	87					
	64	18 19 20	S11 6"	52.0 53.5		Dense gray gravelly coarse to fine SAND, little silt (well bonded angular rough gravel)
	90					
	99					
55	105				-73.7 56.0	
	248					NOTE: Washed ahead before driving casing from 57.0 to 82.0 ft.
	75	124 69 103	S12 12"	57.0 58.5		Very dense gray gravelly coarse to fine SAND, little silt (well bonded)
	75					-GLACIAL TILL-
60	115					

BORING NO. B104

HALEY & ALDRICH, INC.
SCARBOROUGH, MAINE

TEST BORING REPORT

BORING NO. B104
FILE NO. 80349-00
SHEET NO. 3 OF 3

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	ELEV./ DEPTH (FT)	VISUAL DESCRIPTION AND REMARKS
60	143					
	137					
	82	87	S13	62.0		Very dense gray medium to fine sandy GRAVEL, trace silt
		91	8"	63.5		(very well bonded, rough angular gravel)
	87	101				
	135					
65	138					
	239					
	61	330/.4	S14	67.0		Very dense gray coarse to fine sandy GRAVEL
			4"	67.4		
	49					
	141					
70	406					
	200	154	S15	71.5		NOTE: Drilled ahead of casing from 71.0 to 71.5 ft.
	80	200/.2	2"	72.2		71.5 to 72.0 ft.; wash sample
						72.0 to 72.2 ft.; Very dense gray/olive brown gravelly medium to fine SAND, little sand and silt
	78					-GLACIAL TILL-
	127					
75	312					
	458					
	181	200/.3	S16	77.0		Very dense gray sandy GRAVEL
			1"	77.3		
	92					
	88					
80	241					
	465					
		246	S17	82.0		Very dense gray medium to fine SAND
		300	10"	83.0	-100.7	
					83.0	Bottom of Exploration at 83.0 ft.
						No Refusal

BORING NO. B104

Proposed Fore River Bridge Replacement
1988 and 1989

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B553-88

PROJECT: PROPOSED FORE RIVER BRIDGE REPLACEMENT, PORTLAND/SOUTH PORTLAND, MAINE
CLIENT: T.Y. LIN INTERNATIONAL, FALMOUTH, MAINE
CONTRACTOR: MAINE TEST BORINGS, INC., BREWER, MAINE

FILE NO. 08946-00
SHEET NO. 1 OF 4
LOCATION:

ELEVATION: +14.70
DATUM: NGVD
START: 7 SEPT.1988
FINISH: 8 SEPT.1988
DRILLER: D. McKEEN
H&A REP: S. PARKER

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	NW	SS	-
INSIDE DIAMETER (IN)	30	1 3/8	-
HAMMER WEIGHT (LB)	300	140	-
HAMMER FALL (IN)	16	30	-

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: TRUCK RIG
BIT TYPE: ROLLER BIT
DRILL MUD: -
OTHER: SAFETY HAMMER, AUGER TO 5.0 FT

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		7 11 16	S1 9"	0.0 1.5	0.2	-PAVEMENT- Medium dense, brown with reddish mottling, silty fine SAND, little medium sand, little gravel, trace coarse sand -FILL-
5	WOH	4 WOH WOH	S2 8"	5.0 6.5		Very loose, brown to dark brown, silty fine SAND, trace coarse to medium sand, trace gravel
10	5 15 19 18 3	WOR 1 9	S3 2"	10.0 11.5		Loose, dark brown silty fine SAND, some clay, little medium sand, trace coarse sand, trace gravel, trace wood fragments
15	1 10 20 18 8	1 1 3	S4 2"	15.0 16.5		Loose, light brown silty fine SAND, some clay, trace medium sand
20	20 22 10 12 14	6 9 6	S5 6"	20.0 21.5	22.0	Medium dense, light brown silty fine SAND and GRAVEL, some clay, little medium sand, rootlets -MARINE CLAY-
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
9-8-88	0730	-	100	101.5	14.5
9-8-88	1230	-	-	-	12.0

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT): 120.5
ROCK CORED (LIN FT): -
SAMPLES: S25

BORING NO. B553-88

HALEY & ALDRICH, INC., PORTLAND, MAINE
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

TEST BORING REPORT

BORING NO. B553-88
FILE NO. 08946-00
SHEET NO. 2 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	17	1	S6	25.0		Very soft, gray silty CLAY, trace fine sand
	16	1	11"	26.5		
	15					-MARINE CLAY-
	17					
	17					
30	24	1	S7	30.0		Very soft, gray silty CLAY, trace fine sand, trace shells
	19	1	16"	31.5		
	20					
	20					
	20					
35	26	WOH	S8	35.0		Very soft, gray silty CLAY, trace fine sand, pebble
	23		18"	36.5		
	25					
	22					
	22					
40	20	WOH	S9	40.0		Very soft, gray silty CLAY, trace fine sand
	27	WOH	18"	41.5		
	26	WOH				
	26					
	27					
45	27	1	S10	45.0		Very soft, gray silty CLAY, trace fine sand
	33	1	18"	46.5		
	30	1				
	32					
	31					
50	36	1	S11	50.0		Very soft, gray silty CLAY, some fine sand, becoming brittle
	38	WOH	18"	51.5		
	48	WOH				
	69				53.0	
	66					
55	53	11	S12	55.0		55.0 - 55.3, Stiff, light gray silty CLAY 55.3 -55.7, Dense, light brown with red partings, silty fine SAND, trace medium sand
	53	13	8"	56.5		
	85	18				
	111					
	109					

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B553-88 FILE NO. 08946-00 SHEET NO. 3 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	100	7	S13	60.0		Dense, light brown to red fine SAND, trace medium sand, trace silt
	102	18 24	8"	61.5		
	102				62.5	
	99					
	108					
65	74	5	S14	65.0		Medium dense, gray fine SAND, trace silt
	111	12 15	7"	66.5		
	98					
	65					-MARINE SAND-
	67					
70	65	3	S15	70.0		Medium dense, gray fine SAND, trace silt
	75	8 12	11"	71.5		
	80					
	105					
	86					
75	50	3	S16	75.0		Medium dense, gray fine SAND, trace medium sand, trace silt
	80	7 10	9"	76.5		
	83					
	84					
	82					
80	72	2	S17	80.0		Loose, gray silty fine SAND, layer of sandy clay from 81.0 - 81.2 ft.
	75	2 2	18"	81.5		
	106					
	116					
	109					
85	71	8	S18	85.0		Medium dense, gray silty fine SAND, trace clay
	71	9 10	3"	86.5		
	94					
	98					
	105					
90	81	8	S19	90.0		Medium dense, gray silty fine SAND, little medium sand, trace coarse sand
	86	15 13	12"	91.5		
	119					
	135					
	123					

HALEY & ALDRICH, INC., PORTLAND, MAINE
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

TEST BORING REPORT

BORING NO. B553-88
FILE NO. 08946-00
SHEET NO. 4 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	81	7	S20	95.0		Medium dense, gray fine SAND, little medium sand, trace silt
	93	8 8	9"	96.5		
	125					
	136					-MARINE SAND-
	140					
100	142	6	S21	100.0		Medium dense, gray medium to fine SAND, trace silt
	137	8 9	12"	101.5		
	145					
	170					
	167					
105	152	6	S22	105.0	105.2	Medium dense, gray silty fine SAND
	174	7 8	9"	106.5		Medium dense, gray silty medium to fine SAND, little coarse sand, little coarse angular gravel
	213					
	235					
	283					
110	172	9	S23	110.0		Loose, gray silty fine SAND, little coarse to medium sand, little gravel
	170	4 WOH	18"	111.5		
	213					
	243					
	440					
115	275	59	S24	115.0	115.0	Very dense, gray to olive-green, silty coarse to fine SAND, some clay, some dark gray to white subrounded to angular GRAVEL
	270	82 153	12"	116.5		
	700					-GLACIAL TILL-
	710					
		41	S25	119.0		Very dense, gray to olive-green, silty coarse to fine SAND, some clay, some dark gray to white subrounded to angular GRAVEL
120		39 42		120.5	120.5	
						No Refusal Bottom of Exploration at 120.5 ft.

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B555-88

PROJECT: PROPOSED FORE RIVER BRIDGE REPLACEMENT, PORTLAND/SOUTH PORTLAND, MAINE
CLIENT: T.Y. LIN INTERNATIONAL, FALMOUTH, MAINE
CONTRACTOR: MAINE TEST BORINGS, INC., BREWER, MAINE

FILE NO. 08946-00
SHEET NO. 1 OF 5
LOCATION:

ELEVATION: +9.97
DATUM: NGVD
START: 17 AUG. 1988
FINISH: 25 AUG. 1988
DRILLER: D. McKEEN
H&A REP: S. CALKIN

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	NW	SS	BX
INSIDE DIAMETER (IN)	3	1 3/8	1 1/2
HAMMER WEIGHT (LB)	300	140	-
HAMMER FALL (IN)	16	30	-

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: TRUCK RIG
BIT TYPE: ROLLER CONE
DRILL MUD: -
OTHER: PROBE AUGER TO 5.0 FT.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
					0.3	Bituminous concrete -PAVEMENT-
		26	S1	0.5		Very dense, brown to black, coarse to fine SAND, little coarse
		32	17"	2.0		to fine gravel
		28				
5	20	11	S2	5.0		Medium dense, brown coarse to fine SAND, little coarse to fine
		11	16"	6.5		GRAVEL
	24	11				
	31					-FILL-
	23					
	13					
10	8	6	S3	10.0		Medium dense, brown silty coarse to fine SAND, little coarse to
		15	5"	11.5		fine gravel
	22	15				
	8					
	8					
	7					
15	6	2	S4	15.0		Loose to very loose, dark gray to black silty coarse to fine
		2	12"	16.5		SAND, little clay, trace fine gravel, some organics
	8	2				
	8					
	10				18.0	
	10					
20	16	6	S5	20.0		Stiff, olive-brown to gray mottled silty CLAY, little fine
		6	8"	21.5		sand, trace fine gravel, some organics
	13	4				
	14					-MARINE CLAY-
	17					
	24					
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
	-	-	-	-	-

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT): 146.5
ROCK CORED (LIN FT): -
SAMPLES: 30S

BORING NO. B555-88

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B555-88 FILE NO. 08946-00 SHEET NO. 2 OF 5

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	19	3	S6	25.0		Stiff, olive-brown to gray silty CLAY, little fine sand, some organics
		7	13"	26.5		
	16	7				
	15					
	14					-MARINE CLAY-
	15					
30	27	WOH	S7	30.0		Medium stiff, gray mottled silty CLAY, trace fine sand, some organics
	21	1	18"	31.5		
	23	6				
	24					
	25					
35	28	WOH	S8	35.0		Medium stiff, gray to black silty CLAY, trace fine sand, some organics, layers silty fine sand
	25	2	17"	36.5		
	25	4				
	24					
	27					
40	43	6	S9	40.0	40.2	Dense, light-brown to rusty-brown silty coarse to fine SAND, frequent gray silty clay pockets
	50	18	-	41.5		
	69	23				
	53					
	99					
45	52	35	S10	45.0		Very dense, light brown silty coarse to fine SAND
	51	43	14"	46.5		
	66	55				
	73					-MARINE SAND-
	94					
50	64	24	S11	50.0		Very dense, light brown silty coarse to fine SAND
	59	28	11"	51.5		
	79	32				
	117					
	98					
55	58	22	S12	55.0		Very dense, light brown silty coarse to fine SAND
	88	21	17"	56.5		
	90	34				
	57					
	61					
60						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B555-88 FILE NO. 08946-00 SHEET NO. 3 OF 5

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	69	11	S13	60.0		Medium dense, gray, silty medium to fine SAND
		14	12"	61.5		
	65	12				
	82				62.3	
	73					
	80					
65	90	3	S14	65.0		NO RECOVERY
		5	NR	66.5		
	72	5				
	75					
	85					-MARINE SAND-
	92					
70	50	6	S15	70.0		NO RECOVERY
		10	NR	71.5		
	98	13				
	103					
	115					
	161				74.2	
75	174	17	S16	75.0		Very dense, gray, silty coarse to fine SAND, little fine gravel
		29	2"	76.5		
	196	25				
	197					
	172					
	175					
80	122	4	S17	80.0		Dense, gray, silty coarse to fine SAND, little coarse to fine gravel
		12	8"	81.5		
	153	35				
	136					
	132					-GLACIAL TILL-
	141					
85	110	6	S18	85.0		NO RECOVERY
		12	NR	86.5		
	147	20				
	146					
	148					
	139					
90	118	5	S19	90.0		NO RECOVERY
		6	NR	91.5		
	111	15				
	106					
	120					
	127					

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B555-88 FILE NO. 08946-00 SHEET NO. 4 OF 5

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	135	19	S20	95.0		Dense, gray silty coarse to fine SAND, little coarse to fine gravel
		16	4"	96.5		
	128	20				
	120					
	129					
	134					
100	116	WOR	S21	100.0		Medium dense, gray coarse to fine SAND, little coarse to fine gravel
	99	4	12"	101.5		
	124	13				
	139					
	129					
105	92	14	S22	105.0		NO RECOVERY
	107	21	NR	106.5		
	117	43				
	126					-GLACIAL TILL-
	142					
110	132	38	S23	110.5		NO RECOVERY
	117	15	NR	112.0		
	134	24				
	149					
	162					
115	156	14	S24	115.0		Dense, gray silty medium to fine SAND
	164	21	18"	116.5		
	168	27				
	173					
	192					
120	117	6	S25	120.0		Medium dense, gray silty coarse to fine SAND, trace fine gravel
	94	14	9"	121.5		
	93	13				
	130					
	159					
125	146	29	S26	125.0		Very dense, gray silty coarse to fine SAND, little fine gravel
	136	38	10"	126.5		
	154	59				
	177					
	159					
130						

HALEY & ALDRICH, INC., PORTLAND, MAINE
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

TEST BORING REPORT

BORING NO. B555-88
FILE NO. 08946-00
SHEET NO. 5 OF 5

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	146	13	S27	130.0		Very dense, gray silty coarse to fine SAND, little coarse to fine gravel and clay, grading to very dense, brown medium to fine SAND
	137	26 76	14"	131.5		
	239					
	316					
	155	86 150/0.2'	S28 9"	133.8 134.5		Very dense, gray silty medium to fine SAND, trace fine gravel
135	276					
	453					Probable cobble at 136.1 ft.
	145					
	209					
	348					
140	76	69	S29	140.0		Very dense, gray silty medium to fine SAND
	318	195/.3	8"	141.5		
	692					
	973					
	3000					
145						
		41	S30	145.0		Very dense, gray silty medium to fine SAND, layer gray coarse to fine SAND
		93	14"	146.5	146.1	
		125			146.5	Very dense, brown silty coarse to fine SAND, little fine gravel
						NW refusal in dense till at 145.0 ft. Bottom of Exploration at 146.5 ft.

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B556-88

PROJECT: PROPOSED FORE RIVER BRIDGE REPLACEMENT, PORTLAND/SOUTH PORTLAND, MAINE
CLIENT: T.Y. LIN INTERNATIONAL, FALMOUTH, MAINE
CONTRACTOR: MAINE TEST BORINGS, INC., BREWER, MAINE

FILE NO. 08946-00
SHEET NO. 1 OF 5
LOCATION:

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	NW	SS	-
INSIDE DIAMETER (IN)	3.0	1 3/8	-
HAMMER WEIGHT (LB)	300	140	-
HAMMER FALL (IN)	16	30	-

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: TRUCK RIG
BIT TYPE: ROLLER BIT
DRILL MUD: AT 70 FT.
OTHER: AUGER TO 5 FT.

ELEVATION: +10.00
DATUM: NGVD
START: 15 SEP. 1988
FINISH: 20 SEP. 1988
DRILLER: D. McKEEN
H&A REP: S. PARKER

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		10 10 9	S1 10"	0 1.5	0.2	Pavement Medium dense, light to dark brown fine SAND, some gravel, trace medium sand and silt, trace brick fragments -FILL-
5	10 10	2 3 3	S2 18"	5 6.5		Loose, brown silty fine SAND, little coarse to medium sand and gravel, trace brick
	12 14 11					
10	6 17	5 3 5	S3 8"	10 11.5		Loose, light brown to gray mottled silty fine SAND, little gravel, medium sand, and clay
	16 9 9					
15	7 3	3 2 1	S4 18"	15 16.5	15.5	Loose, brown silty fine SAND, little coarse sand Soft, light gray silty CLAY, trace fine sand
	2 3 3					-MARINE CLAY-
20	8 8	WOH WOH WOH	S5 18"	20 21.5		Very soft, gray silty CLAY, trace fine sand
	9 11 11					
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
9-15-88	-	-	9.5	9.5	9.5

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT): 141.5
ROCK CORED (LIN FT): -
SAMPLES: 28S

BORING NO. B556-88

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B556-88 FILE NO. 08946-00 SHEET NO. 2 OF 5

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	10	1	S6	25		Very soft, gray silty CLAY
	12	WOH WOH	18"	26.5		
	14					-MARINE CLAY-
	17					
	16					
30	15	1	S7	30		Very soft, gray silty CLAY, trace medium to fine sand, layer brown fine SAND, trace silt, and layer brown silty CLAY
	24	WOH 3	18"	31.5	31.3	
	37					
	63					
	67					
35	53	22	S8	35		Very dense, light brown fine SAND, little clay, trace silt, partings gray fine SAND
	83	29 35	13"	36.5		
	77					
	62					
	59					
40	69	29	S9	40		Very dense, light brown fine SAND, some gravel, little medium sand, trace coarse sand and silt
	81	33 44	12"	41.5		
	60					
	65					
	61					
45	47	8	S10	45		Dense, light brown fine SAND, trace gravel, coarse to medium sand and clay
	55	13 18	2"	46.5		
	67					
	68					
	62					
50	39	5	S11	50		Medium dense, light brown fine SAND, little medium sand, trace silt
	47	9 13	3"	51.5		
	63					
	70					-MARINE SAND-
	93					
55	34	7	S12	55		Medium dense, light brown fine SAND, trace medium sand and sil
	53	10 14	6"	56.5		
	65					
	80					
	106					
60						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B556-88 FILE NO. 08946-00 SHEET NO. 3 OF 5

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	56	15	S13	60	60.6	Dense, brown to red-brown medium to fine SAND, some gravel
	66	22 21	9"	61.5		Dense, light gray medium to fine SAND
	79					
	73					
	59					
65	53	11	S14	65		Dense, light gray fine SAND, trace coarse to medium sand and silt
	55	11 19	3"	66.5		
	80					
	89					
	89					
70	75	8	S15	70		Medium dense, gray to white GRAVEL and gray coarse to fine SAND, trace silt, grading to gray fine SAND, little medium sand, trace silt
	90	9 9	12"	71.5		
	103					
	107					
	108					
75	78	9	S16	75		Medium dense, gray medium to fine SAND, trace coarse sand and silt
	95	8 9	14"	76.5		
	101					
	95					
	88					
80	76	3	S17	80		Medium dense, gray fine SAND, little gravel and medium sand, trace coarse sand and silt
	89	5 8	13"	81.5		
	101					
	99					-MARINE SAND-
	106					
85	94	6	S18	85		Medium dense, gray coarse to fine SAND, trace fine gravel and silt
	100	5 8	14"	86.5		
	96					
	97					
	100					
90	103	4	S19	90		Medium dense gray coarse to fine SAND, little fine gravel
	107	7 5	13"	91.5		
	101					
	111					
	106					
95						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B556-88 FILE NO. 08946-00 SHEET NO. 4 OF 5

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	97	5	S20	95		Medium dense, gray coarse to fine SAND, trace fine gravel
	95	9 10	15"	96.5		
	109					-MARINE SAND-
	122					
	132				99	
100	130	8	S21	100		Dense, gray fine SAND, trace gravel and medium sand, occasional cobbles
	160	34 15	18"	101.5		
	179					
	256					
	225					
105	190	20	S22	105		Dense, gray medium to fine SAND, some gravel, little coarse sand, trace silt
	182	21 24	12"	106.5		
	183					
	210					-GLACIAL-TILL-
	179					
110	153	9	S23	110		Medium dense, gray medium to fine SAND, trace silt
	166	7 16	11"	111.5		
	165					
	155					
	167					
115	154	8	S24	115		Dense, gray fine SAND, little medium sand, trace silt, trace gravel
	187	16 25	14"	116.5		
	183					
	248					
	240					
120	110	21	S25	120		Very dense, gray silty coarse to fine SAND, some clay, with layer (120-120.9 ft.) of brown and red-brown stratified mediu to fine SAND, trace coarse sand
	191	41 31	12"	121.5		
	189					
	163					
	180					
125	212	21				NO RECOVERY
	209	17 15				
	210					
	207					
	193					
130						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B556-88 FILE NO. 08946-00 SHEET NO. 5 OF 5

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	197	13	S26	130		Dense, gray coarse to fine SAND, little silt, trace gravel and clay
		17	13"	131.5		
	202	20				
	195					
	171					
	174					
135						
	243	21	S27	135		Very dense, gray medium to fine SAND, stratified with clayey SILT lenses
		39	13"	136.5		
	198	48				
	273					
	305					
	248					
140						
		46	S28	140		Very dense, gray, silty coarse to fine SAND, some fine gravel
		58	15"	141.5		
		65			141.5	
						No Refusal Bottom of Exploration at 141.5 ft.
145						
150						
155						
160						
165						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B557-88

PROJECT: PROPOSED FORE RIVER BRIDGE REPLACEMENT, PORTLAND/SOUTH PORTLAND, MAINE
CLIENT: T.Y. LIN INTERNATIONAL, FALMOUTH, MAINE
CONTRACTOR: MAINE TEST BORINGS, INC., BREWER, MAINE

FILE NO. 08946-00
SHEET NO. 1 OF 4
LOCATION:

ELEVATION: +10.40
DATUM: NGVD
START: 1 SEPT. 1988
FINISH: 6 SEPT. 1988
DRILLER: D. McKEEN
H&A REP: S. PARKER

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	NW	SS	-
INSIDE DIAMETER (IN)	30	1 3/8	-
HAMMER WEIGHT (LB)	300	140	-
HAMMER FALL (IN)	16	30	-

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: TRUCK RIG
BIT TYPE: ROLLER BIT
DRILL MUD: -
OTHER: AUGER TO 5.0 FT.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		16	S1	0.5	0.2	Bituminous Concrete -PAVEMENT-
		16	8"	2.0		Dense, light brown to black silty fine SAND, little medium sand, trace rock fragments, trace black cinders
		17				
5	14	4	S2	5.0		Loose, brown to red-brown coarse to fine SAND, little gravel, trace silt
	25	5	12"	6.5		
	18					-FILL-
	7					
	4					
10	16	8	S3	10.0		Medium dense, dark brown coarse to fine SAND, little gravel and silt
	25	10	4"	11.5		
	29	13				
	31					
	12				14.0	
15	4	1	S4	15.0		Very loose, gray silty CLAY, little fine sand, trace gravel
	2	1	6"	16.5		
	2	1				-MARINE CLAY-
	4					
	4					
20	5	WOH	S5	20.0		Very loose, gray silty CLAY, trace fine sand
	6	1	18"	21.5		
	19	1			22.5	
	21					
25	45					

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
9-2-88	0630	-	55	56.5	10.5
9-7-88	0600	-	130	131.5	19.5

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT): 131.5
ROCK CORED (LIN FT): -
SAMPLES: 26S

BORING NO. B557-88

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B557-88 FILE NO. 08946-00 SHEET NO. 2 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	32	9	S6	25.0		Medium dense, gray and red-brown layered fine SAND, trace silt
	42	13 16	11"	26.5		
	37					
	47					
	56					
30	30	7	S7	30.0		Dense, light brown medium to fine SAND, trace gravel and silt
	42	10 20	9"	31.5		-MARINE SAND-
	44					
	51					
	68					
35	34					Probable cobble at 35.0 ft.
	24	5	S8	36.0		Medium dense, light brown fine SAND, trace medium sand and silt
	40	9 13	11"	37.5		
	32					
	41					
40	8	10	S9	40.0		Dense, brown fine SAND, little gravel, trace coarse to medium sand and silt
	55	10 25	9"	41.5		
	64					
	63					
	143					
45	44	13	S10	45.0		Medium dense, brown medium to fine SAND, little gravel and coarse sand, trace silt
	59	7 7	7"	46.5		
	75					
	110					
	92					
50	28	5	S11	50.0		Medium dense, brown medium to fine SAND, trace gravel, coarse sand and silt
	72	8 15	8"	51.5		
	137					
	270					Probable cobble near 53.0 ft.
	212					
55	97	15	S12	55.0		Dense, brown medium to fine SAND and GRAVEL, little coarse sand, trace silt
	80	20 19	9"	56.5		
	99					
	145					
	158					
60						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B557-88 FILE NO. 08946-00 SHEET NO. 3 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	144	48	S13	60		Very dense, brown coarse to fine SAND and GRAVEL, little silt
	125	40 27	9"	61.5		
	137					
	126					
	75					
65	62	9	S14	65		Dense, brown coarse to fine SAND, some gravel, little silt
	82	28 18	8"	66.5		
	89					
	91					
	74					
70	68	7	S15	70		Dense, brown medium to fine SAND, little gravel and coarse sand, trace silt
	78	16 22	11"	71.5		
	91					
	83					-MARINE SAND-
	80					
75	89	5	S16	75		Medium dense, brown medium to fine SAND, little gravel, trace coarse sand and silt
	102	6 11	6"	76.5		
	103					
	101					
	86					
80	87	8	S17	80		Medium dense, brown to white, medium to fine SAND, some coarse sand, little gravel, trace silt
	85	9 9	5"	81.5		
	103					
	103					
	95					
85	80	7	S18	85		Medium dense, brown medium to fine SAND, little gravel and coarse sand, trace silt
	90	8 11	8"	86.5		
	130					
	111					
	101					
90	88	7	S19	90		Medium dense, brown medium to fine SAND, little gravel and coarse sand, trace silt
	89	7 9	8"	91.5		
	91					
	107					
	100					
95						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B557-88 FILE NO. 08946-00 SHEET NO. 4 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	84	2	S20	95		Medium dense, brown medium to fine SAND, little coarse sand,
		4	7"	96.5		layer brown fine SAND, little silt
	84	11				
	81					
	103					
	99					
100	105	8	S21	100		Medium dense, brown coarse to medium SAND, little fine gravel,
		12	6"	101.5		little fine sand, trace silt
	111	13				
	112					
	110					-MARINE SAND-
	100					
105	98	4	S22	105		Medium dense, brown medium to fine SAND, little gravel and
		5	14"	106.5		coarse sand
	121	9				
	125					
	131					
	143					
110	112	2	S23	110		Dense, brown medium to fine SAND, trace fine gravel, coarse
		9	14	111.5		sand and silt
	138	22				
	147					
	187					
	132				114	
115	130	8	S24	115		Medium dense, gray coarse to medium SAND, some coarse to fine
		6	9"	116.5		gravel, little fine sand, trace silt
	133	6				
	141					
	131					-GLACIAL TILL-
	125					
120	130	10	S25	120		Medium dense, gray coarse to fine SAND, little gravel, trace
		6	12"	121.5		silt
	116	10				
	164					
	199					
	247					
125	155	8	S26	125		NO RECOVERY
		29	NR	126.5		
	179	39				
	314					
	430					
	667					
130		36				Very dense, gray medium to fine SAND, little coarse sand, trac
		68	S26	130		silt
		108	13"	131.5	131.5	Bottom of Exploration at 131.5, No Refusal

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B558-88

PROJECT: PROPOSED FORE RIVER BRIDGE REPLACEMENT, PORTLAND/SOUTH PORTLAND, MAINE
CLIENT: T.Y. LIN INTERNATIONAL, FALMOUTH, MAINE
CONTRACTOR: MAINE TEST BORINGS, INC., BREWER, MAINE

FILE NO. 08946-00
SHEET NO. 1 OF 4
LOCATION:

ELEVATION: +12.33
DATUM: NGVD
START: 30 AUG. 1988
FINISH: 31 AUG. 1988
DRILLER: D. McKEEN
H&A REP: S. PARKER

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	NW	SS	-
INSIDE DIAMETER (IN)	3.0	1 3/8	-
HAMMER WEIGHT (LB)	300	140	-
HAMMER FALL (IN)	16	30	-

DRILLING EQUIPMENT & PROCEDURES
RIG TYPE: TRUCK RIG
BIT TYPE: ROLLER BIT
DRILL MUD: AT 75 FT.
OTHER: AUGER TO 5 FT.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		10	S1	0.5	0.2	Pavement
		11	18"	2.0		Medium dense, black fine SAND, little silt, trace coarse to medium sand, cinders, wood
		11				-FILL-
5	19	6	S2	5		Medium dense, dark brown coarse to fine SAND, trace fine gravel, trace silt
	21	11	18"	6.5		
	28	7				
	36					
	17					
10	6	3	S3	10		Very loose, brown coarse to fine SAND, some fine gravel, and silt
	9	1	6"	11.5		
	21	2				
	42				13	
	63					
15	84	100/4"	S4	15		NO RECOVERY probable cobble at 15 ft.
	172		NR	16.5		
	167					
	126					
	172					
20	55	16	S5	20		Dense, brown coarse to fine SAND, little fine gravel, trace silt and clay
	71	17	8"	21.5		
	92	16				
	264					-MARINE SAND-
	127					
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
8-31-88	0630	-	40	41.5	9.4
9-1-88	0630	-	105	106.5	20.8

SAMPLE IDENTIFICATION
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY
OVERBURDEN (LIN FT): 121.5
ROCK CORED (LIN FT): -
SAMPLES: 24S
BORING NO. B558-88

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B558-88 FILE NO. 08946-00 SHEET NO. 2 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	46	18	S6	25		Dense, dark brown silty fine SAND, trace medium sand and gravel, pyrite throughout sample
	81	16 13	3"	26.5		
	105					
	75					
	86					
30	67	23	S7	30		Dense, brown coarse to fine SAND and GRAVEL, trace clayey silt
	76	20 14	6"	31.5		
	75					
	61					
	94					
35	31	11	S8	35		Medium dense, brown coarse to fine SAND and fine GRAVEL
	72	9 14	6"	36.5		
	60					
	34					-MARINE SAND-
	84					
40	30	5	S9	40		Medium dense, brown medium to fine SAND, trace gravel, coarse sand, and silt
	65	5 10	4"	41.5		
	85					
	81					
	110					
45	62	14	S10	45		Dense, brown to white coarse GRAVEL and red-brown silty coarse to fine SAND
	93	17 17	5"	46.5		
	100					
	96					
	86					
50	53	8	S11	50		Dense, brown silty medium to fine SAND, some coarse sand, little gravel
	77	15 17	8"	51.5		
	121					
	102					
	87					
55	50	11	S12	55		Dense, brown silty medium to fine SAND and brown to white coarse GRAVEL, mica
	72	16 23	8"	56.5		
	64					
	73					
	95					
60						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B558-88 FILE NO. 08946-00 SHEET NO. 3 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	66	18	S13	60		Dense, dark gray to white coarse GRAVEL and brown to black silty coarse to fine SAND
	86	14 16	6"	61.5		
	107					
	83					
	56					
65	75	28	S14	65		Very dense, brown silty medium to fine SAND, little coarse sand, trace gravel
	92	30 27	9"	66.5		
	80					
	85					-MARINE SAND-
	96					
70	57	14	S15	70		Dense, light brown medium to fine SAND, trace gravel, coarse sand, and silt
	93	17 21	10"	71.5		
	151					
	170					
	293					
75	98	17	S16	75		Dense, brown to reddish brown medium to fine SAND, some to trace silt, trace coarse sand and gravel
	21	36 54	12"	76.5		
	273					
	171					
	135					
80	58	8	S17	80		Medium dense, brown to red coarse to fine SAND, some gravel, trace silt
	73	12 16	9"	81.5		
	100					
	143					
	116					
85	73	5	S18	85		Medium dense, brown to red-brown fine SAND, some to trace gravel, trace coarse to medium sand, and silt, at 86 ft. light
	73	8 9	14"	86.5	86.5	gray fine SAND, trace coarse sand and silt
	97					
	105					
	96					
90	80	5		90		NO RECOVERY
	75	8 14	NR	91.5		
	100					
	110					
	111					
95						

HALEY & ALDRICH, INC., PORTLAND, MAINE
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

TEST BORING REPORT

BORING NO. B558-88
FILE NO. 08946-00
SHEET NO. 4 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	74	9	S19	95		Medium dense, light gray to white to black, medium SAND, trace
		10	18"	96.5	96	coarse to fine sand
	105	16				
	122					Medium dense, light gray silty fine SAND
	134					-GLACIAL TILL-
	135					
100	104	10	S20	100		Medium dense, light gray to white to black medium to fine sand,
		13	14"	101.5		trace gravel, coarse sand and silt
	110	16				
	129					
	152					
	178					
105	127	33	S21	105		Dense, light gray silty fine SAND, little gravel and coarse to
		20	10"	106.5		medium sand
	132	18				
	181					
	205					
	201					
110	152	16	S22	110		Very dense, light gray to white to black medium SAND, trace
		25	11"	111.5		fine sand
	214	35				
	289					
	481					
	130					
115	339	32	S23	115		Very dense, light gray silty fine SAND, trace coarse sand
		49	14"	116.5		
	613	84				
	450					
	495					
	442					
120		50	S24	120		Very dense, light gray medium to fine SAND, trace gravel,
		91	--	121.5		coarse sand and silt
		115			121.5	
						No Refusal
						Bottom of Exploration at 121.5 ft.
125						
130						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B559-88

PROJECT: PROPOSED FORE RIVER BRIDGE REPLACEMENT, PORTLAND/SOUTH PORTLAND, MAINE
CLIENT: T.Y. LIN INTERNATIONAL, FALMOUTH, MAINE
CONTRACTOR: MAINE TEST BORINGS, INC., BREWER, MAINE

FILE NO. 08946-00
SHEET NO. 1 OF 4
LOCATION:

ELEVATION: +12.43
DATUM: NGVD
START: 25 AUG. 1988
FINISH: 30 AUG. 1988
DRILLER: D. McKEEN
H&A REP: S. CALKIN

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	NW	SS	-
INSIDE DIAMETER (IN)	3	1 3/8	-
HAMMER WEIGHT (LB)	300	140	-
HAMMER FALL (IN)	16	30	-

DRILLING EQUIPMENT & PROCEDURES
RIG TYPE: TRUCK RIG
BIT TYPE: ROLLER BIT
DRILL MUD: -
OTHER: AUGER TO 5 FT.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		8	S1	0.2	0.2	Pavement
		15	12"	1.7		Dense, brown medium to fine GRAVEL, little coarse to fine sand
		19				
5						
	1	WOH	S2	5		Very loose, brown coarse to fine SAND, little medium to fine gravel
	2	WOH	3"	6.5		
	16	1				-FILL-
	21					
	18					
10						
	9	8	S3	10		Probable cobble at 10 ft.
	28	8	NR	11.5		
	77	5				
	39				13.1	
	32					
15						
	13	10	S4	15		Dense, brown coarse to fine SAND and GRAVEL
	40	14	4"	16.5		
	60	16				-MARINE SAND-
	60					
	58					
20						
	18	38	S5	20		Dense, dark gray to black, silty medium to fine SAND, trace medium to fine gravel and coarse sand, pyrite
	45	11	3"	21.5		
	84	19				
	97					
	71					
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
8-26-88	0600	12	65	65	15.5
8-30-88	1215	-	-	115.8	9.5

SAMPLE IDENTIFICATION
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY
OVERBURDEN (LIN FT): 115.8
ROCK CORED (LIN FT): -
SAMPLES: 24S
BORING NO. B559-88

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B559-88 FILE NO. 08946-00 SHEET NO. 2 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	41	21	S6	25		NO RECOVERY
		19	NR	26.5		
	29	22				
	32					
	67					
	44					
30	20	11	S7	30		Medium dense, brown coarse to fine SAND and GRAVEL, little silt, pyrite
		13	15"	31.5		
	68	8				
	48					
	55					-MARINE-SAND-
	59					
35	27	7	S8	35		Dense, brown coarse to fine SAND and GRAVEL, little silt, pyrite
		8	9"	36.5		
	33	35				
	48					
	41					
	38					
40	18	7	S9	40		Same
		9	9"	41.5		
	25	25				
	45					
	35					
	40					
45	16	8	S10	45		Medium dense, brown coarse to fine SAND, little coarse to fine gravel, trace silt
		7	-	46.5		
	36	28				
	44					
	27					
	25					
50	15	10	S11	50		Medium dense, brown coarse to fine SAND, little coarse to fine gravel, trace silt, pyrite
		10	-	51.5		
	58	41				
	41					
	29					
	47					
55	39	13	S12	55		Very dense, brown silty coarse to fine SAND, little coarse to fine gravel, trace clay
		62	18"	56.5		
	125	37				
	136					
	135					
	119					
60						

HALEY & ALDRICH, INC., PORTLAND, MAINE
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

TEST BORING REPORT

BORING NO. B559-88
FILE NO. 08946-00
SHEET NO. 3 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	46	19	S13	60		Very dense, brown silty coarse to fine SAND, little coarse to
	92	27 25	16"	61.5		fine gravel, trace clay
	78					
	102					
65	65					
	50	10	S14	65		Medium dense, brown coarse to fine SAND and GRAVEL, little silt
	55	13 14	13"	66.5		
	58					
	68					
70	68					
	40	10	S15	70		Medium dense, light brown coarse to fine SAND and GRAVEL, trace
	54	8 15	14"	71.5		silt, pyrite
	57					
	87					
75	74					
	62	11	S16	75		Dense, brown coarse to fine SAND and GRAVEL, little silt
	85	18 29	12"	76.5		
	86					
	88					-MARINE SAND-
	87					
80	45	11	S17	80		Dense, brown coarse to fine SAND, little fine gravel, trace
	55	20 20	11"	81.5		silt
	83					
	108					
	133					Dense, brown coarse to fine SAND, little fine gravel, trace
85	85	12	S18	85	85.3	silt
	62	12 21	12"	86.5		Dense, gray silty coarse to fine SAND, little coarse to fine
	63					gravel
	69					
	95					-GLACIAL TILL-
90	64	10	S19	90		Dense, gray silty medium to fine SAND, trace coarse to fine
	82	16 22	11"	91.5		gravel
	126					
	136					
	130					
95						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B559-88 FILE NO. 08946-00 SHEET NO. 4 OF 4

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	66	9	S20	95		Dense, gray silty medium to fine SAND, little coarse to fine gravel
		14	14"	96.5		
	95	18				
	112					
	130					
	187					
100	126	19	S21	100		Very dense, gray coarse to fine SAND, trace coarse to fine gravel
		42	15"	101.5		
	155	49				
	306					-GLACIAL TILL-
	402					
	467					
105	79/6"	19	S22	105		Very dense, gray silty medium to fine SAND, trace fine gravel and coarse sand
	75/6"	45	18"	106.5		
	173	129				
	500					Boulders encountered between 106.4 and 109 ft.
	388					
	233					
110	130	17	S23	110		Very dense, gray fine SAND, trace medium sand, gray silty fine SAND lense
		29	12"	111.5		
	510	92				
	650/3"					
	132/9"					
	251					
	310/1"					
115	369/11"					
		34	S24	115		Very dense, gray fine SAND, trace medium sand
		172/4"	12"	~~116.5~~	115.8	
				115.8		No Refusal Bottom of Exploration at 115.8 ft.
120						
125						
130						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B568

PROJECT: PROPOSED FORE RIVER BRIDGE REPLACEMENT, PORTLAND/SOUTH PORTLAND, MAINE
CLIENT: T.Y. LIN INTERNATIONAL, FALMOUTH, MAINE
CONTRACTOR: MAINE TEST BORINGS, INC., BREWER, MAINE

FILE NO. 08946-00
SHEET NO. 1 OF 6
LOCATION: SEE PLAN

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	HW/NW	SS	--
INSIDE DIAMETER (IN)	4	1 3/8	--
HAMMER WEIGHT (LB)	300	140	--
HAMMER FALL (IN)	24	30	--

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: MOBILE B53
BIT TYPE: ROLLER BIT
DRILL MUD:
OTHER: AUGER TO 5.0 FT.

ELEVATION: 10.27
DATUM: NGVD
START: 18 OCT 1989
FINISH: 25 OCT 1989
DRILLER: J. RUDNICKI
H&A REP: D. BOIS

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		17 15 11	S1 (8")	0.5 2.0	0.2	-PAVEMENT- Top 3 in. - Dense, brown medium to fine SAND, trace coarse to fine gravel Bottom 5 in. - Dense, black fine SAND, little medium sand, trace silt, trace fine gravel, with black ash/cinders
5	17	8 5 4	S2 (3")	5.0 6.5		Loose, brown, medium to fine SAND, trace silt, trace coarse to fine gravel, with few wood and brick particles
	17 16 11 14					-FILL-
10	8 12 9	5 4 4	S3 (8")	10.0 11.5		Loose, dark gray medium to fine SAND, trace silt, trace coarse to fine gravel, trace brick particles (Top 2 in. same as S2)
	7 7				13.0	
15	15 14	1 2 1	S4 (15")	15.0 16.5		Top 7 in. - Soft, gray fine sandy SILT interlayered with silty CLAY, little fine sand with few partings of silty fine sand Bottom 8 in. -Soft, black silty CLAY, little fine sand NOTE: Strong organic/decay odor
	24 34 33					-MARINE CLAY-
20	33 28 30	3 2 2	S5 (18")	20.0 21.5		Soft, gray silty CLAY, (trace fine sand 20.0-20.9 ft.), few clamshell fragments at 20.9 ft.
	31 28					
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
10-19-89	0646	--	65.0	66.5	8.5
10-24-89	0630	--	155.0	155.0	9.1

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT): 200.5
ROCK CORED (LIN FT): --
SAMPLES: 39S

BORING NO. B568

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B568 FILE NO. 08946-00 SHEET NO. 2 OF 6

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	37	1	S6 (16")	25.0		Soft, gray silty CLAY, trace silt
	33	1 2		26.5		
	32					
	29					
	39					
30	30	1	S7 (8")	30.0		Very soft, gray silty CLAY, trace fine sand with few layers of silty fine sand
	37	1		31.5		
	44					-MARINE CLAY-
	60				32.7	
	91					
35	86	26	S8 (12")	35.0		Very dense, light brown silty fine SAND, trace clay, trace fine gravel with few layers of silty clay
	71	39 34		36.5		
	80					
	115					
	142					
40	63	14	S9 (18")	40.0		Dense, brown medium to fine SAND, trace silt with few layers of clayey silt
	127	18 27		41.5		
	218					
	52					
	63					
45	54	5	S10 (18")	45.0		45.0-45.5 Brown medium to fine SAND, with few silty clay layers 45.5-46.0 Olive silty CLAY, with few fine sand layers 46.0-46.5 Tan fine sandy SILT, trace fine gravel
	50	12 15		46.5		
	43					
	50					
	67					
50	63	14	S11 (14")	50.0		50.0-51.0 Dense, brown medium to fine SAND, few silty clay layers 51.0-51.5 Olive-gray silty CLAY, little fine sand, trace fine gravel
	54	23 21		51.5		
	64					
	74					
	86					
55	50	6	S12 (12")	55.0		Medium dense, brown medium to fine SAND, trace silt, 1/8 in. clay layer at 55.0 ft.
	53	9 12		56.5		
	79					
	75					-ABLATION TILL-
	79					
60					60.0	

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B568 FILE NO. 08946-00 SHEET NO. 3 OF 6

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	53	5	S13	60.0		Medium dense, gray medium to fine SAND, ~~trace silt~~
	58	6 8	(4")	61.5		
	73					-MARINE SAND-
	84					
	88					
65	66	3	S14	65.0		Loose, gray medium to fine SAND, trace silt
	53	3 5	(11")	66.5		
	59					
	83					
	110					
70	88	8	S15	70.0		Medium dense, gray SAND Top 3 in. - Silty fine SAND Bottom 2 in. - Medium SAND, little fine sand
	91	6 6	(5")	71.5		
	93					
	124					
	147					
75	106	8	S16	75.0		Medium dense, gray fine GRAVEL, (wash sample)
	124	10 11	(1")	76.5		
	157					
	155					
	153					
80	125	7	S17	80.0		Medium dense, gray medium SAND, little fine sand
	134	8 13	(4")	81.5		
	139					
	156					
	200					
85	144	5	S18	85.0		Medium dense, fine GRAVEL (wash sample)
	129	4 7	(3")	86.5		
	163					
	204					
	235					
90	123	6	S19	90.0		Medium dense, gray fine GRAVEL, trace medium to fine sand
	111	6 7	(3")	91.5		
	108					
	112					
	125					
95						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B568 FILE NO. 08946-00 SHEET NO. 4 OF 6

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	56	13	S20	95.0		Top 2 in. - Fine gravel
	63	10	(5")	96.5		Bottom 3 in. - Medium dense, gray medium to fine SAND, little coarse sand to fine gravel, trace silt
	82	11				
	105					
	132					
100	98	24	S21	100.0		Dense, gray medium to fine SAND, little coarse sand, trace silt
	101	22	(6")	101.5		Top 2 in. - Coarse to fine gravel in wash
	132	21				
	146					
	175					
105	120	27	S22	105.0		Very dense, gray medium to fine SAND, trace silt
	133	31	(8")	106.5		
	165	42				-MARINE SAND-
	200				107.5	Encountered cobbles at 107.5 ft.
	179					
110	136	17	S23	110.0		-GLACIAL TILL-
	150	20	(6")	111.5		Very dense, gray medium to fine SAND, trace silt, trace coarse sand to fine gravel
	172	36				
	189					
	204					
115	169	13	S24	115.0		Medium dense, gray medium to fine SAND, little coarse sand to fine gravel
	192	13	(3")	116.5		
	220	15				
	238					
	256					
120	171	15	S25	120.0		Dense, gray fine GRAVEL, trace coarse sand (Wash sample)
	158	18	(2")	121.5		Encountered cobbles at 121.0 ft.
	183	15				
	217					NOTE: Washed ahead of casing from 120.0-200.5 ft. in 5.0 ft. intervals
	275					
125	126	22	S26	125.0		Very dense, gray silty fine SAND, trace medium sand
	138	34	(10")	126.5		Encountered cobbles at 126.0 ft.
	218	33				
	235					
	258					
130						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B568 FILE NO. 08946-00 SHEET NO. 5 OF 6

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	168		NR	130.2 131.7		No Recovery
	183					
	271					
	245					
	322					
135	197	16				
	203	6 5	S27 (2")	135.2 136.7		Medium dense, gray coarse to fine gravel (wash sample)
	267					
	339					
	476					
140		10				
	196	8	S28	140.0		Top 4 in. - Medium dense, gray coarse to medium SAND, little fine gravel, trace fine sand
	187	8 7	- (7")	- 142.0		Bottom 3 in. - Medium dense, gray silty fine SAND
	254					
	310					
	612					
145		23				
	273	42	S29	145.0		Very dense, gray medium to fine SAND, little coarse sand, little silt, fine gravel
	443	60	(12")	146.5		
	800					-GLACIAL TILL-
	893					
	510	37 82	S30 (12")	148.9 149.9		Very dense, gray gravelly coarse to fine SAND, little silt
150	317					
	400					
	572					
	403					
	541					
155	337					NOTE: Roller bit through cobbles at 155.0 ft.
	383	56 100/.4	S31 (10")	155.8 156.7		Very dense, gray silty fine SAND
	491					
	696					NOTE: Medium to fine sand in wash 155.0-160.0 ft.
	389					
160	330	61 117	S32 (10")	160.0 161.0		Very dense, gray medium to fine SAND, trace coarse sand, trace silt, trace gravel
	436					
	440					
	425					
	701					
165						

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B568 FILE NO. 08946-00 SHEET NO. 6 OF 6

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	339	113	S33	165.3		Very dense, gray medium to fine SAND, little silt, trace coarse sand
	292	100/.3	(20")	166.1		
	308					
	326					-GLACIAL TILL-
	366					
170	336	66 96	S34 (10")	170.0 171.0		Same as S33
	325					
	416					
	850					
	815					
175	200	118 100/.3	S35 (9")	175.0 175.8		Very dense, gray medium to fine SAND, little coarse sand, little silt, little gravel
	334					
	482					
	415					
	720					
180	138	67 150/.4	S36 (10")	180.0 180.9		Very dense, gray silty fine SAND with few layers of clayey silt
	130					
	199					
	193					
	333					
185	191	178	S37 (6")	185.0 185.5		Very dense, medium to coarse SAND, little coarse to fine gravel, trace silty fine sand, trace clay Boulder encountered at 186.0 ft., casing does not advance beyond 186.4 ft.
190		115 100/.2	S38 (6")	190.0 190.7		Very dense, gray medium to coarse SAND, little fine gravel, little silty fine sand, trace clay .
195		58 189/.3	S39 (5")	195.0 195.8		Very dense, gray silty medium to fine SAND, little coarse sand to fine gravel, trace coarse gravel, trace clay -GLACIAL TILL-
200						Bottom of Exploration at 200.5 ft. No Refusal

HALEY & ALDRICH, INC., PORTLAND, MAINE
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

TEST BORING REPORT

BORING NO. B569-89

PROJECT: PROPOSED FORE RIVER BRIDGE REPLACEMENT, PORTLAND-SOUTH PORTLAND, MAINE
CLIENT: T.Y. LIN INTERNATIONAL, FALMOUTH, MAINE
CONTRACTOR: MAINE TEST BORINGS, BREWER, MAINE

FILE NO. 08946-00
SHEET NO. 1 OF 6
LOCATION: SEE PLAN

ITEM	CASING	DRIVE SAMPLER	CORE BARREL	DRILLING EQUIPMENT & PROCEDURES
TYPE	HW/NW	SS	NX	RIG TYPE: MOBILE B53
INSIDE DIAMETER (IN)	4/3	1 3/8	2 3/8	BIT TYPE: ROLLER BIT
HAMMER WEIGHT (LB)	300	140	--	DRILL MUD:
HAMMER FALL (IN)	16	30	--	OTHER: AUGER TO 5.0 FT.

ELEVATION: 12.8
DATUM: NGVD
START: 12 OCT 1989
FINISH: 17 OCT 1989
DRILLER: J. RUDNICKI
H&A REP: J. WIECK

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		21 12 8	S1 (11")	0.5 2.0	0.3	Bituminous concrete -PAVEMENT-
						Medium dense, dark brown, fine SAND, little coarse to medium sand, trace silt, gravel, particles coal, wood
5	23	10 10 13	S2 (10")	5.0 6.5		Medium dense, brown, medium to fine SAND, little gravel, trace coarse sand, silt
	41					
	36					
	40					
	30					
10	14	8 7 7 4	S3 - (7")	10.0 - 12.0		Medium dense, brown SAND, little gravel, silt, trace metal particles
	29					
	27					-FILL-
	82				13.0	
	76					
15	39	20 16 17 17	S4 - (15")	15.0 - 17.0		Dense, brown SAND, little gravel, trace silt, poorly bonded
	60					
	75					
	167					
	119					
20	79	64 22 20 22	S5 - (12")	20.0 - 22.0		Dense, brown, gravelly SAND, trace silt
	108					
	125					
	126					-ABLATION TILL-
	98					
25	38					

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER
10-12-89	1723	--	52.0	52.0	12.8
10-13-89	1412	--	100.0	100.0	14.3

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT): 137.4
ROCK CORED (LIN FT): 5.0
SAMPLES: 27S, 1C

BORING NO. B569-89

HALEY & ALDRICH, INC., PORTLAND, MAINE
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

TEST BORING REPORT

BORING NO. 8569-89
FILE NO. 08946-00
SHEET NO. 2 OF 6

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	39	16 14 14 15	S6 - (13")	25.5 - 27.5		Dense, brown, medium to fine SAND, little gravel, trace coarse sand, SILT
	48					
	55					
	97					
30	47	17 15 19 25	S7 - (13")	30.0 - 32.0		Dense, brown SAND, little gravel, trace silt
	52					
	105					
	120					
	114					
35	60	15 18 19 21	S8 - (11")	35.7 - 37.7		Dense, brown, gravelly SAND, little silt
	89					
	82					
	90					
	61					
40	62	12 17 16 14	S9 - (10")	40.0 - 42.0		Similar to S8
	74					
	112					
	157					-ABLATION TILL-
	171					
45	77	14 11 12 14	S10 - (7")	45.5 - 47.5		Medium dense, brown sandy GRAVEL, trace silt
	89					
	89					
	81					
	73					
50	70	7 24 15 13	S11 - (7")	50.0 - 52.0		Similar to S10 except dense
	71					
	76					
	155					
	86					
55	69	9 12 15 22	S12 - (11")	55.0 - 57.0		Medium dense, brown, medium to fine SAND, little gravel, silt, trace coarse sand
	85					
	108					
	88					
	100					
60	68					

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B569-89 FILE NO. 08946-00 SHEET NO. 3 OF 6

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	69	16 16 15 14	S13 - (11")	60.0 - 62.0		Dense, brown SAND, little gravel, silt
	74					
	83					
	94					
65	69	12 10 12 14	S14 - (8")	65.0 - 67.0		Medium dense, brown, medium to fine SAND, little gravel, trace coarse sand, silt
	68					
	89					
	116					
	137					
70	91	13 17 17 21	S15 - (11")	70.0 - 72.0		Dense, light brown, fine SAND, little coarse to medium sand, trace fine gravel
	96					
	112					
	139					-ABLATION TILL-
	150					
75	132	15 20 19 18	S16 - (14")	75.0 - 77.0		Dense, brown, medium to fine SAND, little gravel, trace coarse sand, silt
	129					
	127					
	132					
	144					
80	126	11 15 15 19	S17 - (12")	80.0 - 82.0		Dense, brown, medium to fine SAND, trace fine gravel, coarse sand, silt, with occasional brown, fine sand, trace silt seams
	119					
	136					
	146					*Last 1.0 in. brown, fine SAND, trace silt See sample S17B
	159				84.0	
85	139	12 13 9 14	S18 - (12")	85.0 - 87.0		Medium dense, gray, medium to fine SAND, trace fine gravel, coarse sand, silt, with occasional gray, silty fine sand seams
	147					
	191					
	202					-MARINE SAND-
	210					
90	143	6 8 15 17	S19 - (12")	90.0 - 92.0		Medium dense, gray fine SAND, trace coarse sand
	145					
	207					
	206					
	237					
95	157					

HALEY & ALDRICH, INC., PORTLAND, MAINE
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

TEST BORING REPORT

BORING NO. B569-89
FILE NO. 08946-00
SHEET NO. 4 OF 6

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	155	9 20 15 15	S20 - (12")	95.0 - 97.0		Dense, gray, medium to fine SAND, trace gravel, coarse sand interbedded with gray, fine SAND
	232					
	231					-MARINE SAND-
	256					
100	125	17 11 13 17	S21 - (14")	100.0 - 102.0		NOTE: Advanced roller bit ahead of casing from 95.0-100.0 ft. Advanced roller bit into probable cobbles at 97.3 ft.
	142					Medium dense, gray, medium to fine SAND, little coarse sand and gravel, little silt
	191					
	202					
	248					
105	145	18 19 29 28	S22 - (18")	105.0 - 107.0	105.0	
	179					Dense, gray, medium to fine SAND, little coarse sand and gravel, trace silt
	217					
	250					
	315					NOTE: Advanced roller bit ahead of casing from 100.0-105.0 ft. and 105.0-110.0 ft.
110	163	45 72 100	S23 (18")	110.0 111.5		Very dense, gray, fine SAND, little silt, trace medium sand, trace gravel
	199					
	222					
	330					
	330					
115	235	25 50 100	S24 (14")	115.0 116.5		Very dense, gray, medium to fine SAND, trace silt, trace fine gravel
	335					
	388					
	510					
	885					
120	177	101 100	S25/(10")	120/121.0		Very dense, gray, fine SAND, some silt, layer of brown-gray medium to fine SAND, trace coarse sand
	222					
	282					NOTE: Advanced roller bit ahead of casing from 120.0-125.0 ft. and from 125.0-130.0 ft.
	268					
	277					
125	440	100/0				-GLACIAL TILL-
	221					
	189					
	245					
	330					
130	270					

HALEY & ALDRICH, INC., PORTLAND, MAINE Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B569-89 FILE NO. 08946-00 SHEET NO. 5 OF 6

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	312	222	S26 (6")	130.2 130.7		Very dense, gray, fine SAND, little silt
	310					
	398					
	450					-GLACIAL TILL-
135	561					
	600/0.4	57 100/3	S27 (10")	135.4 136.3		Very dense, gray, silty fine SAND
						Probable Weathered Bedrock Surface at 136.3 ft. Roller cone to 137.4 ft. Begin NX Rock Core at 137.4 ft. (See Core Boring Report)
140						
145						
150						
155						
160						
165						

HALEY & ALDRICH, INC., PORTLAND, MAINE
Consulting Geotechnical Engineers,
Geologists and Hydrogeologists

CORE BORING REPORT

BORING NO. B569
FILE NO. 08946-00
SHEET NO. 6 OF 6

DEPTH (FT)	DRILLING RATE MIN./FT.	CORE NO. DEPTH(FT)	RECOVERY/RQD IN.	RECOVERY/RQD %	WEATHERING	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
							136.3 ft. of overburden (See Test Boring Report) Roller cone from 136.4-137.4 ft. Begin NX Rockcore at 137.4 ft.
135							
						136.4	Probable bedrock surface at 136.4 ft.
		137.4	60	100			Hard, fresh, dark green-gray, porphyritic METAVOLCANICS, with a chloritized amorphous groundmass, and medium grained plagioclase phenocrysts; primary joint set is close, undulating, rough and stepped, tight to slightly open, and moderately to steeply dipping; zone from 139.4-139.8 ft. of very closely spaced joints of the primary set; primary joint set is controlled by very closely spaced fracture cleavage; one joint at 140.4 ft. is planar, rough, tight and moderately dipping, this joint strikes perpendicular to the general strike of the primary set; one undulating, rough, slightly open, low angle joint at 141.6 ft.; secondary mineralization includes pervasive thin quartz veins and stringers and stringers of calcareous material, and trace amounts of pyrite; joints contain a very thin veneer of dark gray silty weathering product
140		C1			Fr.		
		142.4	47	78			-SPRING POINT FORMATION-
145							Bottom of Exploration at 142.4 ft.
150							
155							
160							
165							

Proposed Cargo Pier
1987

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Haley & Aldrich, Inc.

SHEET 1 OF 3
HOLE NO. B-9

DRILLER: Darrel McKeen	PROJECT NAME: Proposed Cargo Pier	LINE & STATION:
M.T.B. JOB NUMBER: 87-213	LOCATION: Portland, Maine	OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT. AFTER ____ HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 10/1/87 DATE FIN. 10/2/87
SURFACE ELEV.
GROUND WATER ELEV.

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24*	DEPTH	STRATUM DESCRIPTION
Auger	1D	2"	18"		1.5	4	10	14			
"											
"											
"											
"											
19	2D	2"	18"		6.5	4	4	5			Brown gravelly silty sand
13											
15											
31											
65										10.5	
14	3D	2"	12"		11.0	25	60				Brown gravelly silty sand w/cobbles and boulders
23											
35										13.0	
14											
23	4D	2"	24"		17.0	4	6	8	12		Brown fine to medium sand w/trace of coarse sand trace of silt trace of gravel
35											
47											
34										20.0	
14											
26	5D	2"	24"		22.0	7	7	9	9		
38											
46											
66											
28											
36	6D	2"	24"		27.0	12	15	18	19		
55											
57											
61											
23											
30	7D	2"	24"		32.0	9	14	14	9		Brown fine to coarse sand w/trace of silt w/trace gravel
50											
76											
71											
27											
41	8D	2"	24"		37.0	9	12	16	25		
65											
79											
144										40.0	

SAMPLES
D = Split Spoon
C = 2" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY:
[X] Driller - Visually
[ ] Soil Technican - Visually
[ ] Laboratory Tests

REMARKS:
* Changes made by Haley & Aldrich

HOLE NO. B-9

MTB-14

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT Haley & Aldrich, Inc.	SHEET 2 OF 3 HOLE NO. B-9
DRILLER Darrel McKeen	PROJECT NAME Proposed Cargo Pier	LINE & STATION
M.T.B. JOB NUMBER 87-213	LOCATION Portland, Maine	OFFSET
GROUND WATER OBSERVATIONS AT ____ FT. AFTER ____ HOURS AT ____ FT. AFTER ____ HOURS	TYPE: CASING NW, SAMPLER SS, CORE BARREL ____ SIZE I.D.: CASING 3", SAMPLER 1 3/8", CORE BARREL ____ HAMMER WT.: CASING 300, SAMPLER 140 HAMMER FALL: CASING 16", SAMPLER 30"	DATE START 10/1/87 DATE FIN. 10/2/87 SURFACE ELEV. ____ GROUND WATER ELEV. ____

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24*	DEPTH	STRATUM DESCRIPTION
47											
51	9D	2"	24"		42.0	19	19	18	15		
67											
67											
74											
38											
62	10D	2"	24"		47.0	6	12	14	17		
104											
120											
113											Brown fine to coarse sand w/trace of silt w/ trace of gravel w/trace of cobbles
45											
55	11D	2"	24"		52.0	12	12	15	16		
75											
80											
82											
45											
74	12D	2"	24"		57.0	7	17	15	15		
91											
90											
90										60.0	
83											
85	13D	2"	24"		62.0	10	12	12	15		
90											
95											
100											
71											
71	14D	2"	24"		67.0	37	18	12	10		
69											
77											
96											Brown gravelly sand, trace silt*
72											
73	15D	2"	24"		72.0	11	15	15	16		
82											
91											
83											
65											
100	16D	2"	24"		77.0	10	15	20	18	77.0	
185											
144											Brown fine sand w/trace of silt
160											

SAMPLES
D = Splite Spoon
C = 2" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY:
[X] Driller - Visually
[ ] Soil Technican - Visually
[ ] Laboratory Tests

REMARKS:
* Changes made by Haley & Aldrich

HOLE NO. B-9

MTB-14

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: Haley & Aldrich, Inc.

SHEET 3 OF 3
HOLE NO. B-9

DRILLER: Darrel McKeen

PROJECT NAME: Proposed Cargo Pier

LINE & STATION:

M.T.B. JOB NUMBER: 87-213

LOCATION: Portland, Maine

OFFSET:

GROUND WATER OBSERVATIONS
AT ____ FT. AFTER ____ HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 10/1/87 DATE FIN 10/2/87
SURFACE ELEV.
GROUND WATER ELEV.

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE O.D.	SAMPLE PEN.	SAMPLE REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
112	17D	2"	18"		81.9	23	50	80		81.5	Brown fine sand w/trace of silt
275										82.0	Gray fine sand w/trace of silt
797										85.0	Gray gravelly sand w/trace of silt

Bottom of Boring @ 85.0'
Installed Well

SAMPLES
D = Splite Spoon
C = 2" Shelby Tube
U = 3½" Shelby Tube

SOIL CLASSIFIED BY:
[X] Driller - Visually
[ ] Soil Technican - Visually
[ ] Laboratory Tests

REMARKS:

HOLE NO. B-9

MTB-14

Piezometer Installed in B9

HALEY & ALDRICH, INC.
CONSULTING SOIL ENGINEERS

PIEZOMETER INSTALLATION REPORT

PROJECT: PROPOSED CARGO PIER
LOCATION: PORTLAND, MAINE
CLIENT: CHILDS ENGINEERING CORPORATION
CONTRACTOR: MAINE TEST BORINGS, INC.
DRILLER: D. MCKEEN INSPECTOR: M. THOMPSON
INSTALLATION DATE: 2 OCTOBER 1987

FILE NO. 8872
WELL NO. B9-PZ
BORING NO. B9
LOCATION SEE PLAN
SHEET 1 OF 1

SURVEY DATUM MLW

GROUND ELEVATION 15.8

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

-FILL-

13 Ft. -GLACIAL RIVER BOTTOM DEPOSITS-

82 Ft. -GLACIAL TILL-

Bottom of Boring at 85 Ft.

~~ELEVATION OR~~ STICKUP ABOVE~~/BELOW~~ GROUND SURFACE OF CASING ~~OR ROAD-WAY BOX~~	3.4 Ft.
~~ELEVATION OR~~ STICKUP ABOVE~~/BELOW~~ GROUND SURFACE OF RISER PIPE.	3.3 Ft.
THICKNESS OF SURFACE SEAL	1.0 Ft.
TYPE OF SURFACE SEAL	BENTONITE
[INDICATE ALL SEALS SHOWING DEPTH, THICKNESS AND TYPE]	
TYPE OF CASING	STEEL PIPE
INSIDE DIAMETER OF CASING	3 In.
~~ELEVATION~~/DEPTH OF BOTTOM OF CASING	3.6 Ft.
INSIDE DIAMETER OF RISER PIPE	0.75 In.
TYPE OF BACKFILL AROUND RISER	FILTER SAND
DIAMETER OF BOREHOLE	3 In.
~~ELEVATION~~/DEPTH OF BOTTOM OF RISER	15.0 Ft.
TYPE OF POINT OR MANUFACTURER	SLOTTED PVC
SCREEN GAUGE OR SIZE OF OPENINGS	0.010 In.
DIAMETER OF WELLPOINT	0.75 In.
TYPE OF BACKFILL AROUND POINT	FILTER SAND
~~ELEVATION~~/DEPTH OF BOTTOM OF POINT	20.0 Ft.
~~ELEVATION~~/DEPTH OF BOTTOM OF BOREHOLE	85.0 Ft.

[FIGURES REFER TO: EL. ____ DEPTH X]

[7.0 Ft. LENGTH OF CASING L_3] [18.3 Ft. LENGTH OF RISER PIPE (L_1)] + [5.0 Ft. LENGTH OF POINT (L_2)] = [23.0 Ft. PAY LENGTH]

H&A FORM 59 SEP.72

HALEY & ALDRICH, INC.
Portland, Maine

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: B9-PZ

GROUND SURFACE ELEVATION 15.8

FILE NO. 8872
PAGE NO. 1 OF 2

DATE	TIME	ELAPSED TIME (DAYS)	DEPTH OF WATER FROM GROUND SURFACE (FT.)	ELEVATION OF WATER IN PIEZOMETER	ELEVATION OF WATER IN HARBOR	REMARKS	READ BY
10-7-87	1030	5	8.8	7.0	10.6	HIGH TIDE	MTT
10-12-87	1200	10	9.9	5.9	4.8		MTT
10-13-87	1020	11	10.2	5.6	1.5	LOW TIDE	MTT
10-19-87	0930	17	9.0	6.8	8.4		MDB
10-19-87	1630	17	10.3	5.5	1.3		MTT
10-20-87	1006	18	9.1	6.7	8.7	HIGH TIDE	MDB
10-20-87	1610	18	10.2	5.6	0.4	LOW TIDE	MTT
10-23-87	1205	21	8.8	7.0	9.5	HIGH TIDE	MTT
NOTE:	ALL TIMES AFTER 24 OCTOBER 1987 ARE IN EASTERN STANDARD TIME						
10-28-87	1015	26	9.8	6.0	1.1		JEN
10-28-87	1520	26	8.6	7.2	10.1	HIGH TIDE	SRD
11-9-87	1400	38	8.9	6.9	8.4		MTT
11-12-87	0955	41	8.0	7.8	2.6		JEN
11-16-87	0940	45	9.5	6.3	4.7		MTT
11-23-87	0820	52	10.0	5.8	4.3		MTT
11-23-87	1007	52	9.3	6.5	9.0		MTT
11-23-87	1145	52	8.9	6.9	10.5	HIGH TIDE	MTT
11-23-87	1330	52	8.6	7.2	8.8		MTT
11-23-87	1510	52	9.4	6.4	4.3		MTT
11-23-87	1647	52	10.1	5.7	0.3		MTT
11-23-87	1840	52	10.8	5.0	-1.3	LOW TIDE	MDB
11-24-87	0632	53	10.7	5.1	0	LOW TIDE	MDB
11-24-87	0823	53	10.2	5.6	2.5		MTT
11-24-87	0940	53	9.8	6.0	5.8		MTT
11-24-87	1128	53	9.0	6.8	9.2		SRD
11-24-87	1250	53	8.6	7.2	11.0	HIGH TIDE	SRD
11-24-87	1435	53	8.6	7.2	9.6		SRD
11-24-87	1600	52	9.2	6.6	4.8		MTT
11-24-87	1740	53	10.4	5.4	-0.2		MDB

H&A FORM JAN. 79 59A

HALEY & ALDRICH, INC.
Portland, Maine

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: B9-PZ

GROUND SURFACE ELEVATION 15.8

FILE NO. 8872
PAGE NO. 2 OF 2

DATE	TIME	ELAPSED TIME (DAYS)	DEPTH OF WATER FROM GROUND SURFACE (FT.)	ELEVATION OF WATER IN PIEZOMETER	ELEVATION OF WATER IN HARBOR	REMARKS	READ BY
11-24-87	1933	53	10.7	5.1	-1.1	LOW TIDE	MDB

H&A FORM JAN. 79 59A

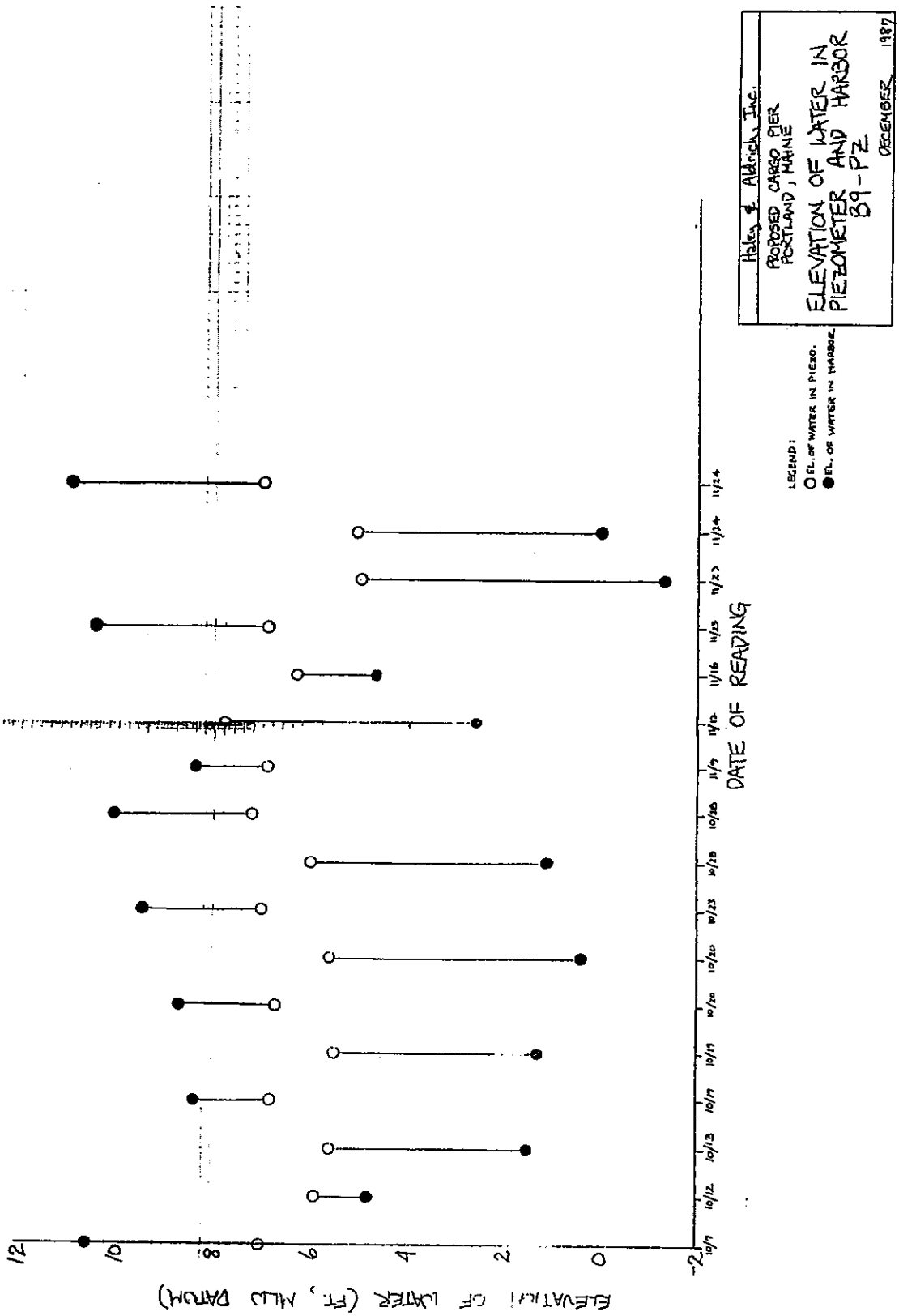

Haley & Aldrich, Inc.
PROPOSED CARGO PIER
PORTLAND, MAINE
ELEVATION OF WATER IN
PIEZOMETER AND HARBOR
89-PZ
DECEMBER 1987
LEGEND:
EL. OF WATER IN PIEZO.
EL. OF WATER IN HARBOR
DATE OF READING
ELEVATION OF WATER (FT., MLLW DATUM)
12
10
8
6
4
2
0
-2
10/1
10/12
10/13
10/17
10/19
10/20
10/23
10/26
10/30
11/9
11/12
11/16
11/25
11/27
11/34
11/24

FIGURE D3

Water Levels Measured
on 23 and 24 November 1987

FILE NO. 8872

HALEY & ALDRICH, INC.
PORTLAND, MAINE

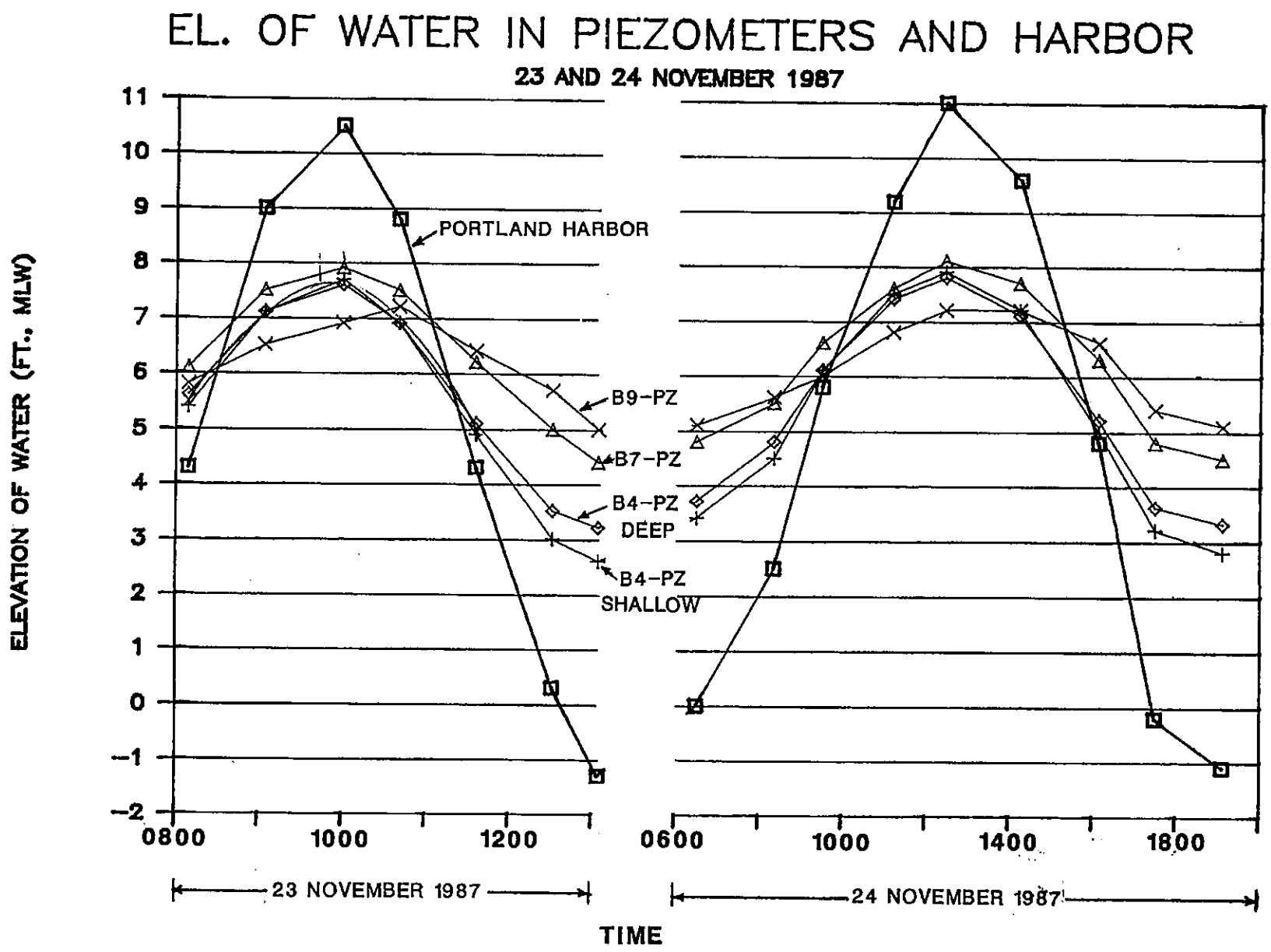
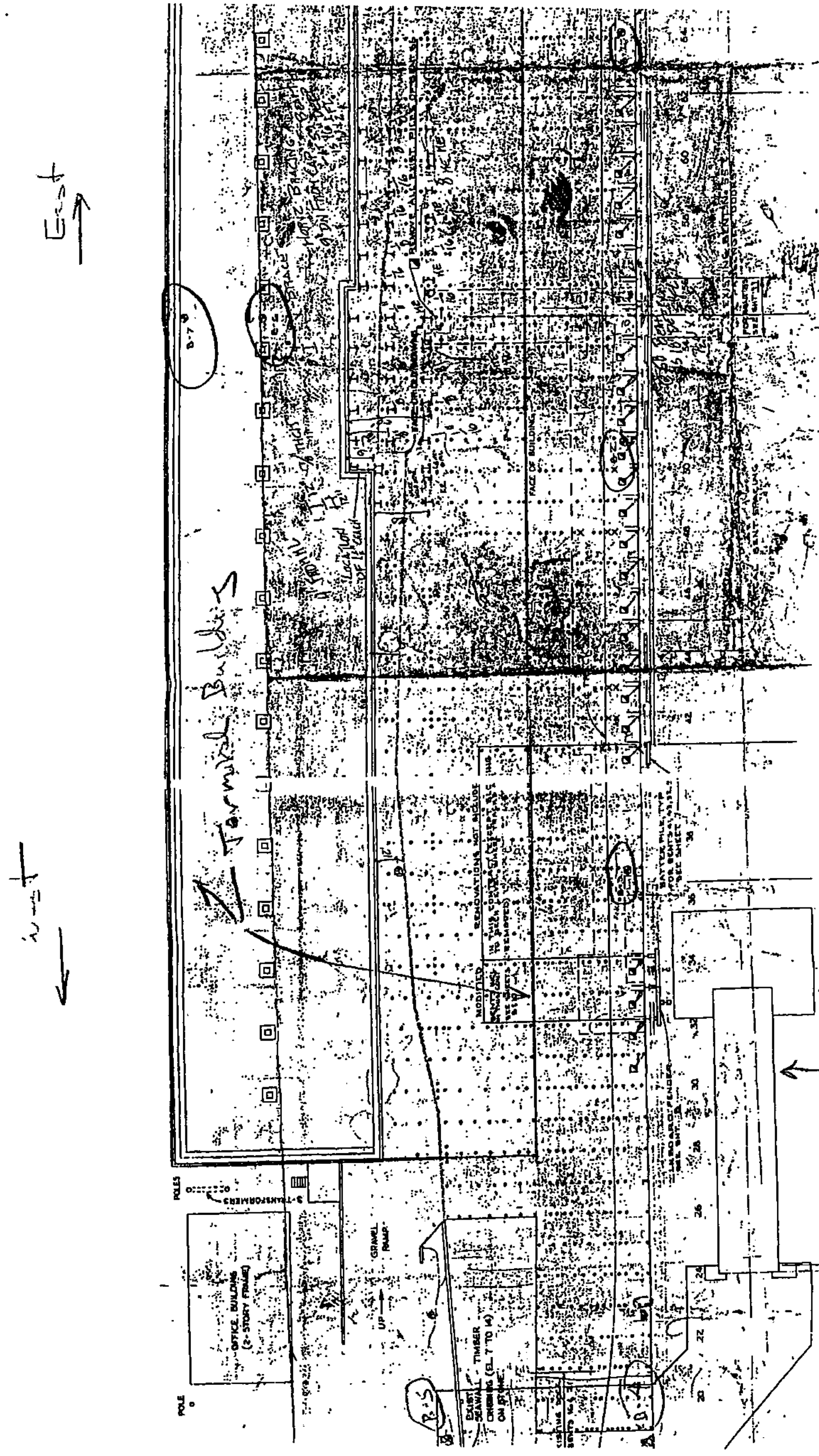


FIGURE D4

Portland International Ferry Terminal
1969


OFFICE BUILDING (2-STORY FRAME)
GRAVEL RAMP
POLE
POLES
TRANSFORMERS
FACE OF BUILDING
East
West

Northeast Oil Services

BORING LOG

Job # 760 13-1

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 1 OF: 3

BORING No. 1 DATUM: U.S.C.S. BORING INSPECTOR: DATE 10-21-69

STRATIFICATION ELEVATION MLW = 0.0	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER
								CASING 300 # AVG. FALL 16 ins.
								SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS
								CASING SIZE 24"
-19	0'0"	Top of ground						SPOON 2" O D 1 3/8" I D.
		Black silty sand, coal,	0	12"				
		ashes, organics, etc.	0	"				
		LOOSE (?)	2	"				
	5'6"		2	"				
			4	"				
			4	"	3	6"	1D	
			2	"	3	7"		
			7	"				
	9'0"		-	"				
		Gray silty sand w/trace	10	"				
		of coal	9	"	4	6"	2D	
	6'0"	LOOSE--FIRM (?)	8	"	5	6"		
			12	"				
			9	"				
	15'0"		8	"				
		Brown very silty sand	8	"	3	6"	3D	
			5	"	4	6"		
		LOOSE	20	"				
			27	"				
			24	"				
	15'0"		13	"	4	6"	D	Missed sample
			11	"	3	6"		
			10	"				
			-	"				
	25'0"		-	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ⌶ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 6

over

Northeast Soil Services

BORING LOG

13-2

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 2 OF 3

BORING No. 1 DATUM: U.S.G.S. BORING INSPECTOR: DATE 10-21-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	REMARKS
								HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
	25'0"	Continued						
		Brown very silty sand	12	12"	3/4	6"/6"	D	Missed sample.
			18	"	6	6"		
		LOOSE	21	"				
			18	"				
	30'0"		17	"				
		Gray very silty sand	2	"	3/4	6"/6"	4D	
			3	"	7	6"		
		LOOSE—FIRM	3	"				
			6	"				
			17	"				
			6	"	4/5	6"/6"	1W	Missed D sample took W sample
			8	"	5	6"		
			10	"				
			12	"				
			12	"				
			1	"	4/6	6"/6"	2W	Missed D sample took W sample
			1	"	6	6"		
			9	"				
			11	"				
			12	"				
	46'0"		2	"	7/10	6"/6"	3D	
		Gray gravely silty sand	2	"	10	6"		
		FIRM TO COMPACT (?)	4	"				
			49	"				
	50'0"		80	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 7

BORING LOG

Job # 760

LOCATION Portland, Me. STRUCTURE Ferry Terminal SHEET No. 3 OF 3

BORING No. 1 DATUM U.S.G.S. BORING INSPECTOR DATE 10-21-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	HAMMER / REMARKS
								HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
	50'0"	Continued						CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
		Gray gravely silty sand	16	12"			3W	Wash sample
		FIRM TO COMPACT (?)	90	"				
		150+	117	"				
			160	"				
			140	"				
			34	"			4W	Wash sample
			61	"				
			80	"				
	59'0"		175	"				
		Refusal						

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 8

over

Northeast Soil Services 13-4

BORING LOG

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 1 OF: 3

BORING No. 2 DATUM: U.S.G.S. BORING INSPECTOR: DATE 10-16-69

HAMMER CASING 300 # AVG. FALL 16 ins.

SAMPLER 140 # AVG. FALL 30 ins.

CASING SIZE 2½"

SPOON 2" O.D. 1 3/8" I.D.

ELEVATION	DEPTH	STRATIFICATION	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	REMARKS
-13	0'0"		Top of ground						
		1½'	Black silty sand	WOH	12"				
	1'6"			WOH	"				
			Gray silty sand & shells,	WOH	"				
		4'	Organic	WOH	"				
		6'	LOOSE	WOH	"				
				1	"	2/3	6"/6"	1D	
				2	"	4	6"		
	8'0"			5	"				
			Gray silty sand w/traces	9	"				
			of gray silty clay	16	"				
				1	"	3/2	6"/6"	2D	
		4'	LOOSE TO VERY LOOSE	5	"	2	6"		
		8½'		9	"				
				6	"				
				6	"				
	16'0"			3	"	1/1	6"/6"	3D	
			Brown silty sand w/trace	9	"	1	6"		
			of gravel	7	"				
		4'	VERY LOOSE TO LOOSE-FIRM	6	"				
		7½'		5	"				
				19	"	2/3	6"/6"	4D	
				21	"	3	6"		
	23'0"			29	"				
		4'	Gray silty sand	25	"				
	25'0"	21½'	LOOSE-FIRM	23	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 9

825

Northeast Soil Services

BORING LOG

Job # 760

13-5

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 2 OF: 3

BORING No. 2 DATUM: U.S.C.S. BORING INSPECTOR: DATE 10-16-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	HAMMER / REMARKS
								HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS: CASING SIZE 2½" SPOON 2" O.D. 1 3/8" I.D.
	25'0"	Continued						
		Gray silty sand	11	22"	3 5	0" 6"	D	Missed sample
		LOOSE-FIRM	15	"	5	6"		
			31	"				
			33	"				
			30	"				
			19	"	3 4	0" 6"	SD	
			21	"	5	6"		
			17	"				
			29	"				
			27	"				
			28	"	2 3	0" 6"	D	Missed sample
			24	"	5	6"		
			26	"				
			24	"				
			24	"				
			15	"	3	0" 6"	D	Missed sample
			22	"	5	6"		
			28	"				
	44'0"		30	"				
		Gray gravelly silty sand	36	"				Sand flowing into casing
		LOOSE-FIRM (?)	34	"				unable to get sample
			40	"				
			34	"				
			43	"				
	50'0"		43	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 10

over

Northeast Soil Services

13-6

BORING LOG

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 3 Of 3

BORING No. 2 DATUM: U.S.G.S. BORING INSPECTOR: DATE 10-16-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	HAMMER / REMARKS
								HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS CASING SIZE 2½"
	50'0"	Continued						SPOON 2" O.D. 1 3/8" I.D.
		Gray gravely silty sand	21	12"				Sand flowing into casing
		LOOSE-FIRM (?)	24	"				unable to get sample
			32	"				
			50	"				
	55'0"		75	"				
		Refusal						

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 11

827

Northeast Soil Services

BORING LOG

13-7

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 1 OF: 4

BORING No. 3 DATUM: U.S.G.S. BORING INSPECTOR: DATE 10-28-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins. REMARKS
-22+	0'0"	Top of ground						CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
		Black organic silty sand & shells		12"				Blows—Weight of casing from 0' to 11'
				"				
				"				
				"				
				"				
				"	–	6"	D	Missed sample Weight of 1 Man
				"	–	5"		
				"				
				"				
				"				
				"				
				"	0	5"	ID	
	12'0"			"	2	5"		
		Gray silty sand		"	1	6"		
		FIRM	6	"				
			6	"				
			2	"				
			0	"	0	5"	D	Missed sample
			4	"	0	6"		
	18'0"		17	"				
		Brown silty sand	23	"				
		FIRM	40	"				
		BECOMING LOOSE	3	"	2	5"	ID	
			14	"	3	6"		
			17	"				
			21	"				
	25'0"		21	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3 , 102.4 & 102.5

2A - Steel H Piles - 12

over 828

Northeast Soil Services

BORING LOG

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 2 OF: 4

BORING No. 3 DATUM: U.S.G.S. BORING INSPECTOR: DATE 10-28-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D
	25'0"	Continued						
		Brown silty sand	0	1.4"	2 3	6" 6"	D	Missed sample
		FIRM	3	"	6	6"	W	took wash sample
		BECOMING LOOSE	7	"				
			18	"				
	30'0"		20	"				
		Grey silty sand	16	"	7 3	5" 6"	D	
		FIRM BECOMING	28	"	8	6"		
		LOOSE-FIRM	28	"				
			31	"				
			30	"				
			16	"	4 2	6" 6"	D	Missed sample
			19	"	4	6"	W	
			28	"				
			28	"				
			28	"				
			14	"	3 4	6" 6"	D	Missed sample
			25	"	5	6"	W	
			24	"				
			25	"				
			30	"				
			29	"	4 4	5" 6"	D	Missed sample
			26	"	4		W	
			0	"				
			35	"				
	50'0"		36	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ⌅ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 13

Northeast Soil Services

13-9

BORING LOG

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 3 OF: 4

BORING No. 3 DATUM: U.S.G.S. BORING INSPECTOR: DATE 10-28-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS: CASING SIZE 21" SPOON 2" O. D. 1 3/8" I. D.
	50'0"	Continued						
		Gray silty sand	61	12"	3	6"	D	Missed sample
	52'0"	FIRM BECOMING LOOSE-FIRM	58	"	4	6"	SW	
		Gray gravely silty sand	60	"				
		VERY COMPACT	60	"				
			63	"				
			142	"			SW	
			480	"				
			230	"				
			240	"				
			261	"				
			193	"			SW	
			260	"				
			128	"				
			130	"				
			221	"				
			170	"				
			70	"				
			130	"				
			293	"				
			420	"				
			170	"	50	6"	SW	
			534	"				
			48	"				
			400	"				
	75'0"		430	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

24 - Steel H Piles - 14

•660

Northeast Soil Services

13-10

BORING LOG

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 4 OF: 4

BORING No. 3 DATUM: U.S.G.S. BORING INSPECTOR: DATE 10-28-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER 300 # AVG. FALL 16 ins.
								CASING
								SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS
								CASING SIZE 2½"
	75'0"	Continued						SPOON 2" O. D. 1 3/8" I. D.
		Gray gravely silty sand	134	12"	120	6"	S1	
		VERY COMPACT	117	"				
	77'0"							
		Brown gravely silty sand	300	"				
		VERY COMPACT BECOMING	300	"				
		FIRM	300	"				
			270	"	14	5"	S2	
			4'0	"				
			1.8	"				
			119	"				
			111	"				
					6	6"	D	Missed sample
					8	6"		
					7	5"	SW	
		run carbide down from						
		86'6" to 92'6"						
	92'6"							
		Bottom of exploration						

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ⌅ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 15

Northeast Soil Services

BORING LOG

13-11

Job# 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal

BORING No. 4 DATUM: U.S.G.S. BORING INSPECTOR: SHEET No. 1 OF 3

DATE 11-24-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
+18±	0'0"	Top of ground						HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins. REMARKS: CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
		Black silty sand	0	12"				
	2'0"		0	"				
		Gray silty sand w/trace of shells VERY LOOSE	0	"				
			0	"				
			0	"				
			0	"	0	6"	1D	
			1	"	1	6"		
	8'0"		2	"				
		Gray silty clay VERY SOFT (?)	3	"				
			2	"				
			1	"	–	0"	2D	Pushed by 1000# Hydraulic
			4	"	–	6"		" " "
			6	"				
			8	"				
			8	"				
			6	"	–	0"	3D	Weight of 1 Man
	17'0"		9	"	–	6"		" "
		Gray silty sand w/gray silty clay VERY LOOSE BECOMING FIRM	11	"				
			13	"				
			14	"				
			12	"	1	6"	4D	
			24	"	1	6"		
			24	"				
			30	"				
	25'0"		36	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 16

Northeast Soil Services

BORING LOG

13-12

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 2 OF: 3

BORING No. 4 DATUM: U.S.G.S. BORING INSPECTOR: DATE: 11-24-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS: CASING SIZE 2½" SPOON 2" O.D. 1 3/8" I.D.
	25'0"	Continued						
	25'6"	Gray silty sand cont.	22	12"	8 11	6"	SD	
		Brown silty sand	27	"	19	6"		
		LOOSE-FIRM	30	"				
			30	"				
			33	"				
			22	"	2 5	6" 6"	D	Missed sample
	32'0"		27	"	6	6"		
		Gray silty sand	33	"				
		FIRM BECOMING COMPACT	32	"				
		WITH DEPTH	29	"				
			24	"	4	6" 6"	SD	
			24	"	9	6"		
			37	"				
			41	"				
			39	"				
			56	"	5	6" 5"	D	Missed sample
			30	"	9	6"		
			56	"				
			60	"				
			73	"				
			33	"	16	6"	D	Missed sample
			42	"	15	6"		
			43	"				
			28	"				
	50'0"		95	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ⌯ Ground Water Surface

102.3, 102.4, & 102.5

2A - Steel H Piles - 17

Northeast Soil Services

BORING LOG

Job # 760 13-13

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 3 OF: 3

BORING No. 4 DATUM: U.S.G.S. BORING INSPECTOR: DATE: 11-24-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins. REMARKS: CASING SIZE 2½" SPOON 2" O.D. 1 3/8" I.D
	50'0"	Continued						
		Gray silty sand	22	12"	12 50	6" 6"	7D	
		FIRM BECOMING COMPACT	43	"				
		WITH DEPTH	57	"				
			76	"				
			80	"				
			60	"	8 9	6" 6"	1W	
			83	"	10	6"		
			80	"				
			26	"	5			
			70	"				
			35	"	13 47	6" 6"	2W	Missed D sample
			68	"				
			77	"				
			95	"				
			90	"				
			120	"	17 30	6" 6"	3W	Missed sample
			140	"	26	6"		
			93	"				
			124	"				
			144	"				
			350	"	15 16	6" 6"	8D	
			345	"	25	6"		
			472	"				
			530	"				
	75'0"	Bottom of exploration	442	"			4W	

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 18

ave834

Northeast Soil Services

BORING LOG

Job # 760 13-14

LOCATION Portland, Me. STRUCTURE Ferry Terminal SHEET No. 1 OF 3

BORING No. 5 DATUM U.S.G.S. BORING INSPECTOR DATE 11-26-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	HAMMER / REMARKS
								HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS: CASING SIZE 2½" SPOON 2" O.D. 1 3/8" I.D.
+16±	0'0"	Top of ground						
		Sand, & coal ashes, organic, etc. VERY LOOSE (?)	10	12"				
			9	"				
			7	"				
			5	"				
			-	"				
			-	"	1	6"	1D	
			7	"	1	6"		
			10	"				
	9'0"		10	"				
		Brown gravely silty sand Fill	9	"	2	0"	2D	
			9	"	5	6"		
		VERY LOOSE TO FIRM	19	"	5	6"		
			17	"				
			20	"				
			13	"				
			6	"	1	9"	3D	
			6	"	1	6"		
			18	"				
			42	"				
			50	"				
			10	"	20	0"	4D	
			34	"	50	6"		
	23'0"		17	"	17	0"		
		Gray sandy silt	15	"				
	25'0"	VERY LOOSE	4	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 19

ew835

Northeast Soil Services

BORING LOG

13-15

Job # 760

LOCATION Portland, Me. STRUCTURE Ferry Terminal SHEET No. 2 OF 3

BORING No. 5 DATUM U.S.G.S. BORING INSPECTOR _____ DATE 11-26-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
	25'0"	Continued						HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins. REMARKS CASING SIZE 2½" SPOON 2" O.D. 1 3/8" I.D.
		Gray sandy silt	24	12"	1	6"	5D	
	27'0"	VERY LOOSE	14	"	1	6"		
		Gray silty clay w/black	16	"				
		streaks and sand layers	[illegible]	"				
		SOFT (?)	[illegible]	"				
			40	"	1	6"	6D	
			21	"	1	6"		
			28	"				
			38	"				
			30	"				
			40	"	—	6"	7D	Pushed by 1500# Hydraulic
			40	"	—	6"		" " "
			26	"				
			28	"				
			30	"				
			48	"	—	6"	8D	Pushed by 2000# Hydraulic
			48	"	—	6"		" " "
			38	"				
			36	"				
			[illegible]	"				
			50	"	—	6"	9D	Pushed by 2000# Hydraulic
			50	"	—	5"		" " "
			48	"				
			47	"				
	50'0"		40	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ∓ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 20

Northeast Soil Services

BORING LOG

Job # 760 13-16

LOCATION Portland, Me. STRUCTURE Ferry Terminal SHEET No. 3 Of. 3

BORING No. 5 DATUM U.S.G.S. BORING INSPECTOR DATE 11-26-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	REMARKS
	50'0"	Continued						HAMMER 300 # AVG. FALL 16 ins. CASING
		Grey silty clay w/black streaks & sand layers SOFT(?)			-	0"		SAMPLER 140 # AVG. FALL 30 ins.
	57'2"				-	6"	10D	Pushed by 2000# Hycraulic
					-	6"		" " "
		Bottom of exploration						CASING SIZE 2½"
								SPOON 2" O. D. 1 3/8" I. D.

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 21

ev-837

Northeast Soil Services

BORING LOG

Job # 760

13-17

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 1 OF 4

BORING No. 6 DATUM: U.S.G.S. BORING INSPECTOR: DATE 11-18-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS: CASING SIZE 2½" SPOON 2" O.D. 1 3/8" I.D.
+3+	0'0"	Top of ground						
	1'0"	Boulders	12	12"				
		Gray silty sand	10	"				
			9	"				
	4'0"		7	"				
		Black silty sand w/traces of shells VERY LOOSE TO LOOSE	4	"				
			2	"	1 1	6" 6"	D	Missed sample
			3	"	2	6"		
			4	"				
			4	"				
			5	"				
			6	"	4 4	6" 6"	1D	
			11	"	3	6"		
			10	"				
			10	"				
			11	"				
			18	"	1 1	6" 6"	2D	
			10	"	1	6"		
			11	"				
			13	"				
			23	"				
			28	"	0 3	5" 6"	3D	
			24	"	2	6"		
			25	"				
			23	"				
	25'0"		22	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 22

838

Northeast Soil Services

BORING LOG

13-18

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 2 OF: 4

BORING No. 6 DATUM: U.S.G.S. BORING INSPECTOR: DATE 11-18-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS: CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
	25'0"	Continued						
		Gray silty clay	35	12"	1 3	0" 6"	4D	
		MEDIUM CONSISTENCY	30	"	3	0"		
			26	"				
			24	"				
			20	"				
			28	"	–	12"	1C	Pushed by Hydraulic 2500#
	35'0"		23	"	–	12"		Pushed by Hydraulic 2500#
		Brown silty sand	60	"				
		COMPACT	72	"				
			82	"				
			56	"	10 12	6" 6"	5D	
			70	"	16	6"		
			52	"				
			62	"				
			54	"				
			60	"	10 16	6" 6"	6D	
			80	"	19	6"		
			83	"				
			79	"				
			70	"				
			60	"	9 1	6" 0"	7D	
			70	"				
			45	"				
			50	"				
	50'0"		47	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 23

839

Northeast Soil Services

BORING LOG

13-19

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal

BORING No. 6 DATUM: U.S.C.&.S. SHEET No. 3 OF 4

BORING INSPECTOR: DATE 11-18-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	REMARKS
	50'0"	Continued						HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins. CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
		Brown silty sand w/some	62	12"	5 11	5" 6"	SD	
		gray silty clay	56	"	7	6"		
		FIRM	72	"				
			72	"				
			72	"				
			52	"	4 4	6" 6"	D	Missed sample
			57	"	6	6"		
			60	"				
			60	"				
			74	"				
			65	"	9 16	6" 6"	D	Missed sample
			80	"	8	6"		
			85	"				
			85	"				
			80	"				
			77	"	4 6	6" 6"	D	Missed sample
	67'0"		80	"	9	6"	W	
		Gray gravely silty sand	70	"				
		FIRM BECOMING COMPACT	80	"				
			95	"				
			85	"	11 12	6" 6"	SD	
			70	"	5	6"		
			75	"				
			80	"				
	75'0"		120	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 24

Northeast Soil Services

BORING LOG

Job # 760 13-20

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 4 OF 4

BORING No. 6 DATUM: U.S.G.S. BORING INSPECTOR: DATE 11-18-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	HAMMER / REMARKS
	75'0"	Continued						CASING SIZE 2½"
		Gray gravely silty sand	136	12"	10 10	6"	10D	SPOON 2" O.D. 1 3/8" I.D.
		FIRM BECOMING COMPACT	400	"	21	6"		CASING 300 # AVG. FALL 16 ins.
	13'6"		550	6"				SAMPLER 140 # AVG. FALL 30 ins.
		washed ahead with carbide						
		from 77'5" to 80'0"						
	80'6"				75	6"	11D	
		Bottom of exploration						

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 25

Northeast Soil Services

BORING LOG

Job # 760 13-21

LOCATION: Portland, Me.

STRUCTURE: Ferry Terminal

SHEET No. 1 OF 6

BORING No. 7 DATUM: U.S.G.S.

BORING INSPECTOR: DATE 11-10-69

HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.

CASING SIZE: 2½"

SPOON 2" O. D. 1 3/8" I. D.

STRATIFICATION: ELEVATION	DEPTH		DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING: BLOWS	CASING: PENETRATION	SAMPLER OR SPOON: BLOWS	SAMPLER OR SPOON: PENETRATION	SAMPLE NO.*	REMARKS
+15	0'0"		Top of ground						
			Gravel, brick & cobbles	8	12"				
			LOOSE	85	"				
				168	"				
				24	"				
				18	"				
		15'0"		14	"	6 6	6" 6"	1D	
				15	"	5	6"		
				17	"				
				11	"				
				[illegible]	"				
				12	"	2 6	6" 6"	2D	
				24	"	8	6"		
				24	"				
				30	"				
	15'0"			17	"				
			Black silty sand & stones	9	"	4 1	6" 6"	D	Missed sample
		5'0"	VERY LOOSE	12	"	1	6"		
				9	"				
				13	"				
	20'0"			16	"				
			Gray sandy silt	[illegible]	"	1 1	6" 6"	3D	
			VERY LOOSE	[illegible]	"	1	6"		
		5'0"		[illegible]	"				
				[illegible]	"				
	25'0"			12	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ≡ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 26

Northeast Soil Services

BORING LOG

13-22

Job # 760

LOCATION: Portland, Me. STRUCTURE Ferry Terminal SHEET No. 2 OF. 6

BORING No. 7 DATUM: U.S.G.S. BORING INSPECTOR: DATE 11-10-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	HAMMER / REMARKS
								HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
								REMARKS: CASING SIZE 2½" SPOON 2" O.D. 1 3/8" I.D.
	22'0"	Continued						
		Gray sandy silt	20	22"	1	6"	4D	
		VERY LOOSE	20	"	1	6"		
			20	"				
			23	"				
			10	"				
			30	"	-	6"	5D	Pushed by one man
	32'0"		26	"	-	6"		" "
		Gray silty clay w/black	24	"				
		streaks	24	"				
		VERY SOFT	19	"				
			25	"	-	6"	6D	Pushed by one man
			20	"	-	6"		" "
			30	"				
			28	"				
			25	"				
			60	"		12"	C	Mixed C tube
	42'0"		34	"	-	12"		Pushed by hydraulic 1500#
		Brown silty sand	56	"				2 x 7 Vane test 42/30 50+
		FIRM	59	"				
			42	"				
			35	"	5C	5"	7D	
				"		6"		
			59	"				
			96	"				
	50'0"		84	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 27

over

Northeast Soil Services

BORING LOG

13-23

Job # 760

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal

BORING No. 7 DATUM: U.S.G.S. BORING INSPECTOR: SHEET No. 3 OF 6

DATE 11-10-59

HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.

CASING SIZE 2½" SPOON 2" O.D. 1 3/8" I.D.

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	REMARKS
	50'3"	Continued						
		Brown silty sand	35	12"	7 10	6" 6"	SD	
		FILL	44	"	9	6"		
			68	"				
			74	"				
			74	"				
			36	"	4	6"	D	Missed sample
			37	"	5	6"		
			41	"				
			40	"				
			58	"				
			60	"	16	9"	SD	
			53	"	10	6"		
			59	"				
			61	"				
			63	"				
			80	"	2 2	5" 7"	D	Missed sample
			72	"	7	6"	1W	
			84	"				
			86	"				
			95	"				
			90	"	2	6" 4½"	2W	Missed D sample
			82	"	9	6"		
			112	"				
			94	"				
	75'6"		85	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ = Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 28

844

Northeast Soil Services

BORING LOG

Job # 760 13-24

LOCATION: Portland, Me.

STRUCTURE: Ferry Terminal SHEET No. 4 OF 6

BORING No. 7 DATUM: U.S.C.S.

BORING INSPECTOR: DATE 11-10-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	REMARKS
								HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.
	75'0"	Continued						CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.
		Gray silty sand	93	12"	[illegible]	5" 5"	3W	Missed D sample
		FIRM	70	"	3	6"		
			80	"				
			85	"				
			78	"				
			70	"	1 9	6" 6"	4W	Missed D sample
			68	"	7	6"		
			97	"				
			107	"				
			103	"				
	86'0"		100	"	7 18	6" 6"	5W	Missed D sample
		Gray gravely silty sand	100	"	19	6"		
		COMPACT	110	"				
			115	"				
			140	"				
			148	"	20 21	6" 6"	10D	
			250	"	26	6"		
			254	"				
			550	"				
			457	"				
	96'0"		385	"	35	6"	6W	Missed D sample
		Brownish gray gravely silty sand	562	"				
		VERY COMPACT	110	"				
	103'0"		[illegible]	"				

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 29

ev845

Northeast Soil Services

BORING LOG

Job # 760 13-25

LOCATION: Portland, Me. STRUCTURE: Ferry Terminal SHEET No. 5 OF 6

BORING No. 7 DATUM: U.S.C.S. BORING INSPECTOR: DATE 11-10-69

HAMMER: CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.

REMARKS: CASING SIZE 2½" SPOON 2" O.D. 1 3/8" I.D.

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO.*	REMARKS
	100'0"	Continued						
		Brownish gray gravely	500	12"	85	6"	11D	
		silty sand	280	"				
		VERY COMPACT	273	"				
			170	"				
			225	"			7W	
			670	"				
			375	"				
			310	"				
			1180	"				
			790	"			8W	
			410	"				
	112'0"		310	"	22 22	6" 6"	12D	
		Gray gravely silty sand	430	"	12	6"		
		VERY COMPACT	580	"				
			484	"				
		washed ahead with carbide		"	50 50	6" 1"	D	Missed sample
		from 115' to 119'6"		"				
				"				
				"				
		washed ahead with carbide		"				
		from 119'6" to 135'		"		48"	1R	Recovery 26" or 54%
				"				
				"				
				"				
	125'0"			"			12W	

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ = Ground Water Surface

102.3, 102.4 & 102.5

2A - Steel H Piles - 30

Northeast Soil Services

BORING LOG

Job # 760 13-26

LOCATION Portland, Me. STRUCTURE Ferry Terminal SHEET No. 6 OF 6

BORING No. 7 DATUM U.S.G.S. BORING INSPECTOR DATE 11-10-69

STRATIFICATION ELEVATION	STRATIFICATION DEPTH	DESCRIPTION OF MATERIALS (TYPE, COLOR & CONSISTENCY)	CASING BLOWS	CASING PENETRATION	SAMPLER OR SPOON BLOWS	SAMPLER OR SPOON PENETRATION	SAMPLE NO. *	REMARKS
	125'0"	Continued						
		Gray gravely silty sand		12"				
		VERY COMPACT		"				
				"				
				"				
				"			13W	
				"				
				"				
				"				
				"	50	6"	D	Missed sample
	135'0"			"	04	2"		
		Refusal						

HAMMER CASING 300 # AVG. FALL 16 ins. SAMPLER 140 # AVG. FALL 30 ins.

CASING SIZE 2½" SPOON 2" O. D. 1 3/8" I. D.

* Designate dry samples by D. Wash samples by W. 3½" undisturbed tube samples by U. Rock cores by R. 2" tube samples by C. ▽ Ground Water Surface

102.3, 102.4 & 102.5

24 - Steel H Piles - 31

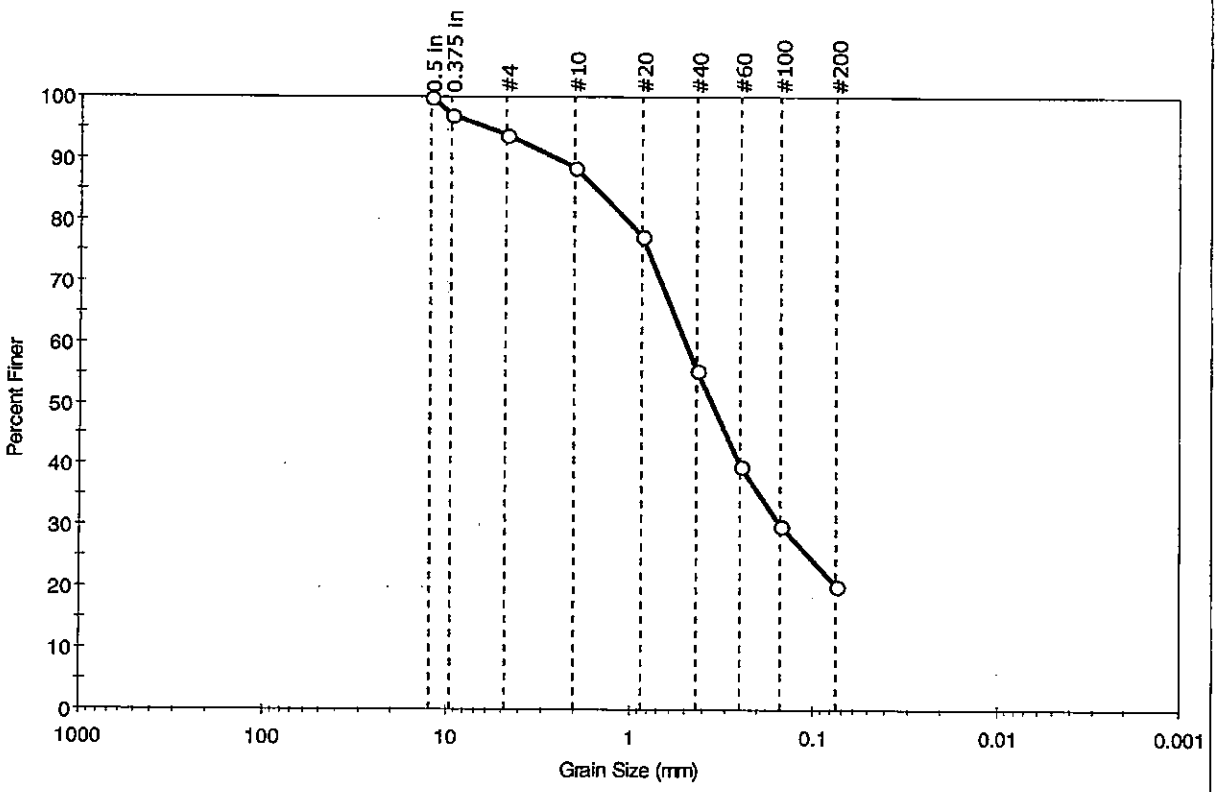
APPENDIX C

Laboratory Test Reports

GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.				
Project:	International Marine Terminal Improvements				
Location:	Portland. ME			Project No:	GTX-10419
Boring ID:	HA10-1	Sample Type:	jar	Tested By:	jbr
Sample ID:	S1A	Test Date:	11/30/10	Checked By:	jdt
Depth :	0.5-1.5 ft	Test Id:	199463		
Test Comment:	---				
Sample Description:	Moist, dark brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel	%Sand	%Silt & Clay Size
–	6.2	73.5	20.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	97		
#4	4.75	94		
#10	2.00	89		
#20	0.85	77		
#40	0.42	56		
#60	0.25	40		
#100	0.15	30		
#200	0.075	20		

Coefficients

D_{85} =1.5257 mm	D_{30} =0.1485 mm
D_{60} =0.4898 mm	D_{15} =N/A
D_{50} =0.3520 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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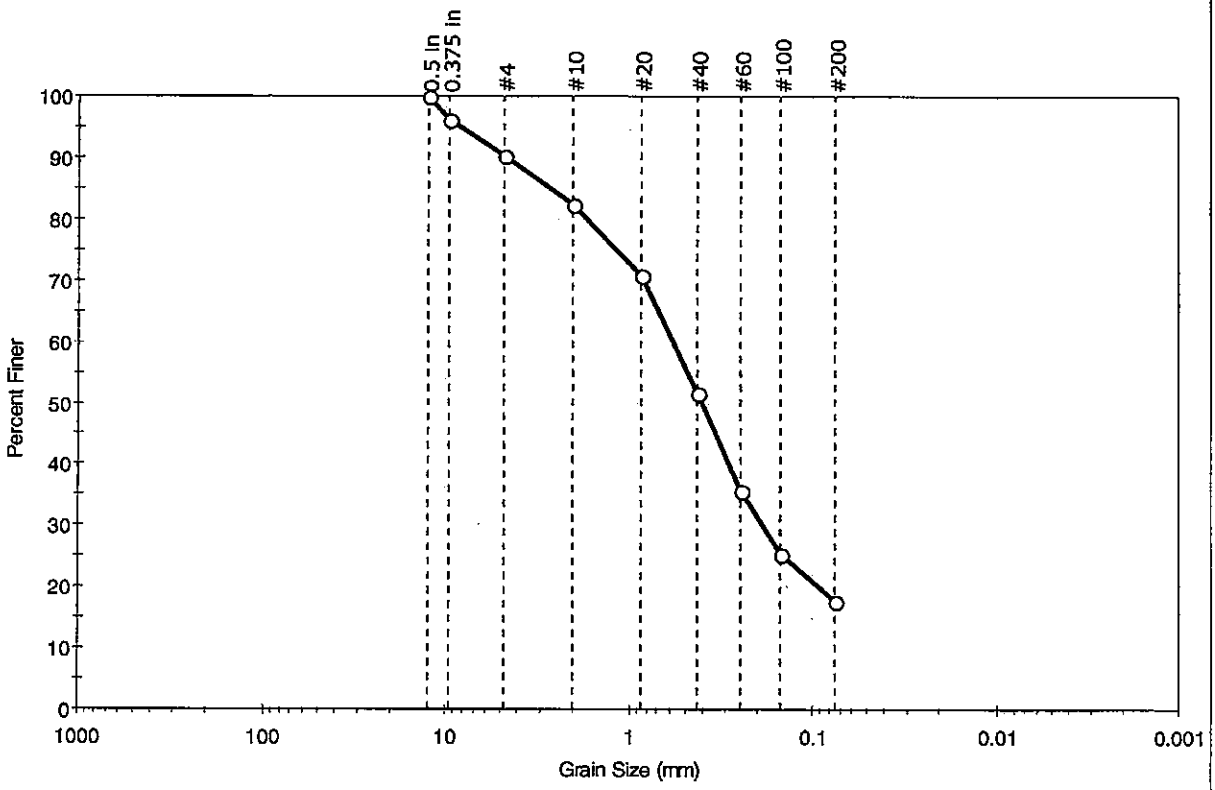
GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.				
Project:	International Marine Terminal Improvements				
Location:	Portland. ME			Project No:	GTX-10419
Boring ID:	HA10-1	Sample Type:	jar	Tested By:	jbr
Sample ID:	S2	Test Date:	11/30/10	Checked By:	jdt
Depth :	2.5-4.5 ft	Test Id:	199464		
Test Comment:	---				
Sample Description:	Moist, dark brownish gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



%Cobble	%Gravel	%Sand	%Silt & Clay Size
—	9.7	72.7	17.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	96		
#4	4.75	90		
#10	2.00	82		
#20	0.85	71		
#40	0.42	52		
#60	0.25	36		
#100	0.15	25		
#200	0.075	18		

Coefficients

D_{85} = 2.6857 mm D_{30} = 0.1880 mm
D_{60} = 0.5741 mm D_{15} = N/A
D_{50} = 0.4013 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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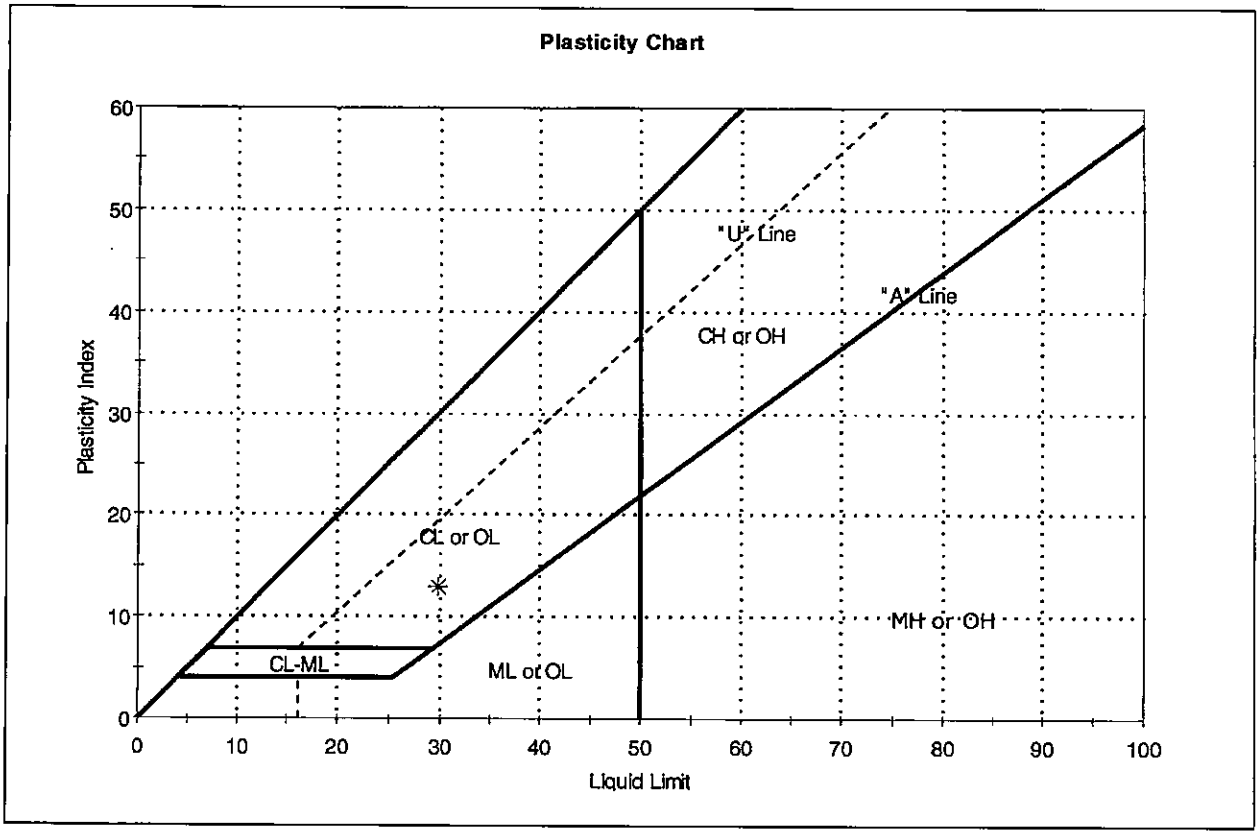
GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.				
Project:	International Marine Terminal Improvements				
Location:	Portland. ME			Project No:	GTX-10419
Boring ID:	HA10-9	Sample Type:	jar	Tested By:	cam
Sample ID:	U1	Test Date:	12/02/10	Checked By:	jdt
Depth :	35-37 ft	Test Id:	199466		
Test Comment:	---				
Sample Description:	Moist, dark olive gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	U1	HA10-9	35-37 ft	29	30	17	13	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

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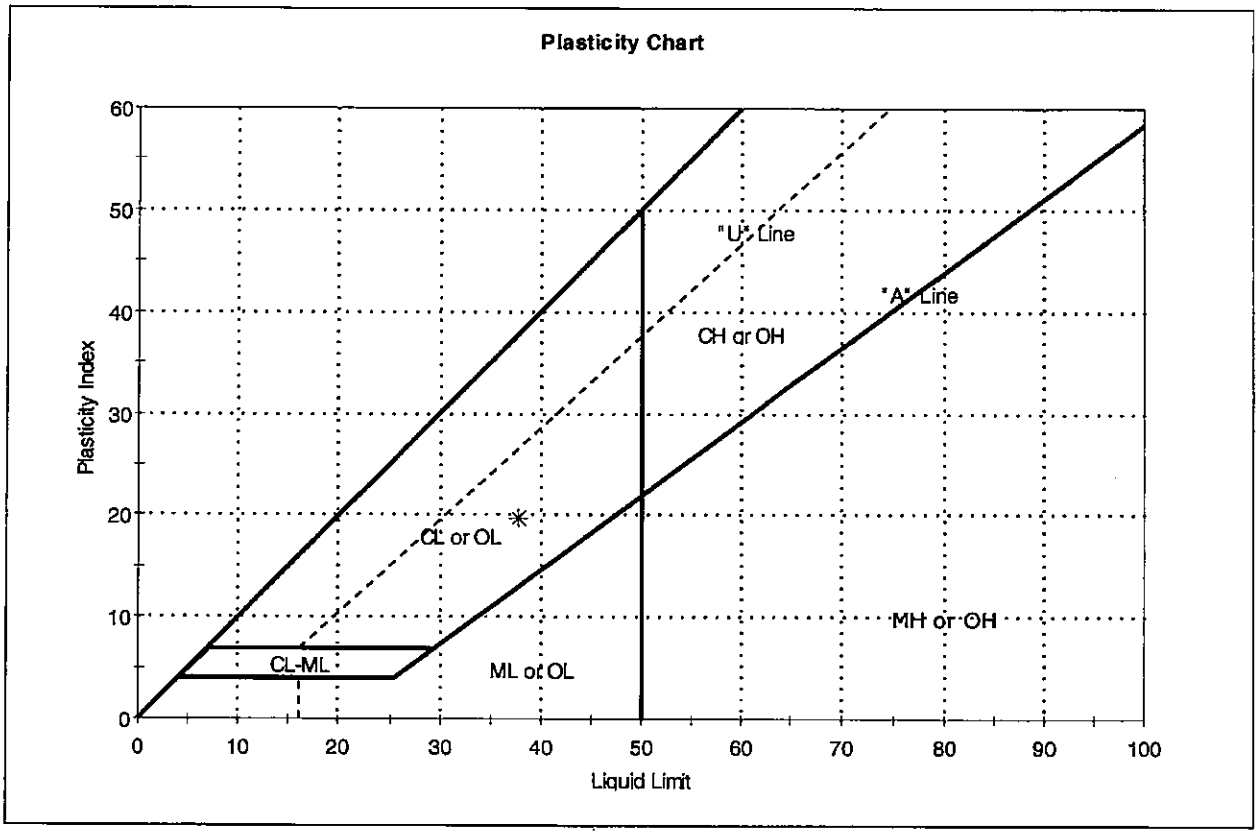
GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.				
Project:	International Marine Terminal Improvements				
Location:	Portland. ME			Project No:	GTX-10419
Boring ID:	HA10-5	Sample Type:	tube	Tested By:	cam
Sample ID:	U1 (0-2 in of recovery)	Test Date:	12/03/10	Checked By:	jdt
Depth :	14.5-16.5 ft	Test Id:	199753		
Test Comment:	---				
Sample Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	U1 (0-2 in of recovery)	HA10-5	14.5-16.5 ft	33	38	18	20	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

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GeoTesting EXPRESS

Client:	Haley & Aldrich, Inc.				
Project:	International Marine Terminal Improvements				
Location:	Portland. ME			Project No:	GTX-10419
Boring ID:	HA10-5	Sample Type:	tube	Tested By:	cam
Sample ID:	U1 (2-22 in of recovery)	Test Date:	12/03/10	Checked By:	jdt
Depth :	14.5-16.5 ft	Test Id:	199754		
Test Comment:	---				
Sample Description:	Moist, dark olive gray silty sand				
Sample Comment:	Sample contains shell fragments and organics				

Atterberg Limits - ASTM D 4318-05

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	U1 (2-22 in of recovery)	HA10-5	14.5-16.5 ft	21	n/a	n/a	n/a	n/a	

Dry Strength: LOW

Dilentancy: RAPID

Toughness: n/a

The sample was determined to be Non-Plastic

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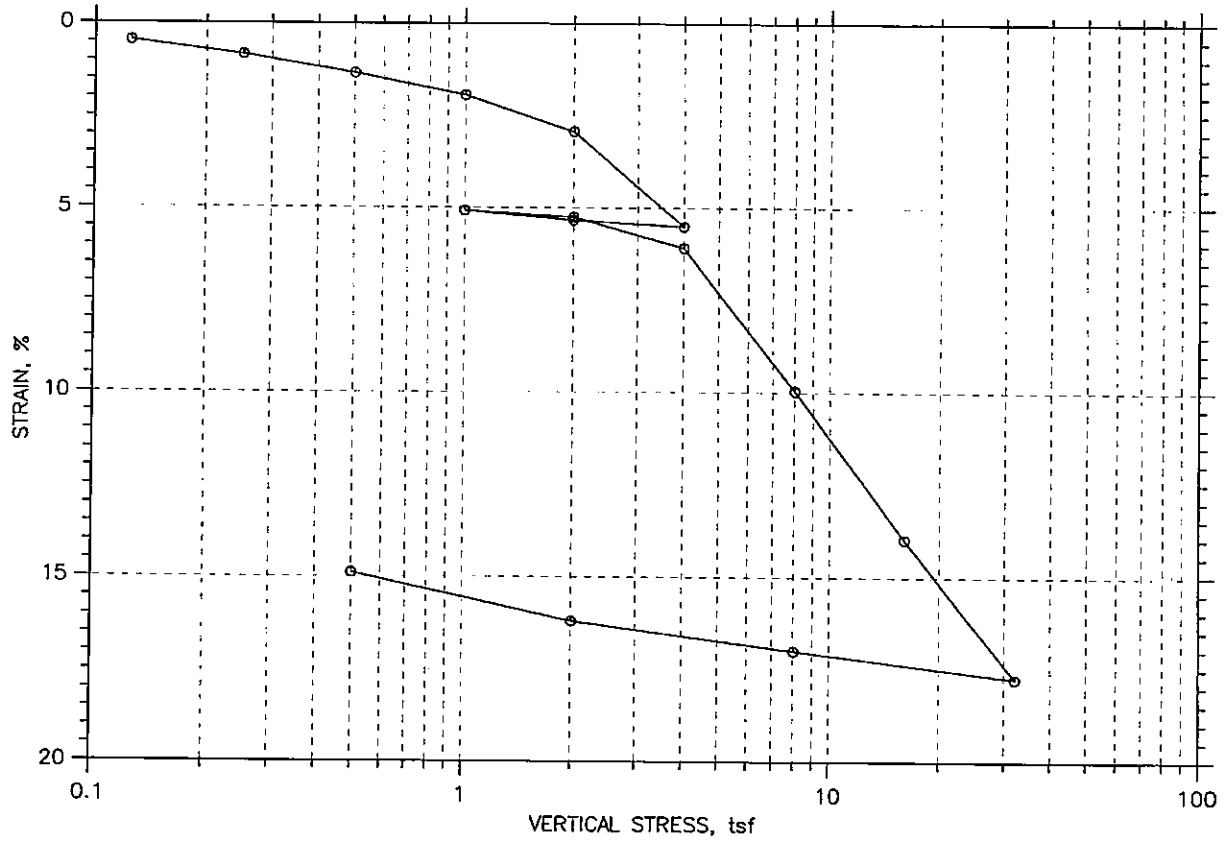
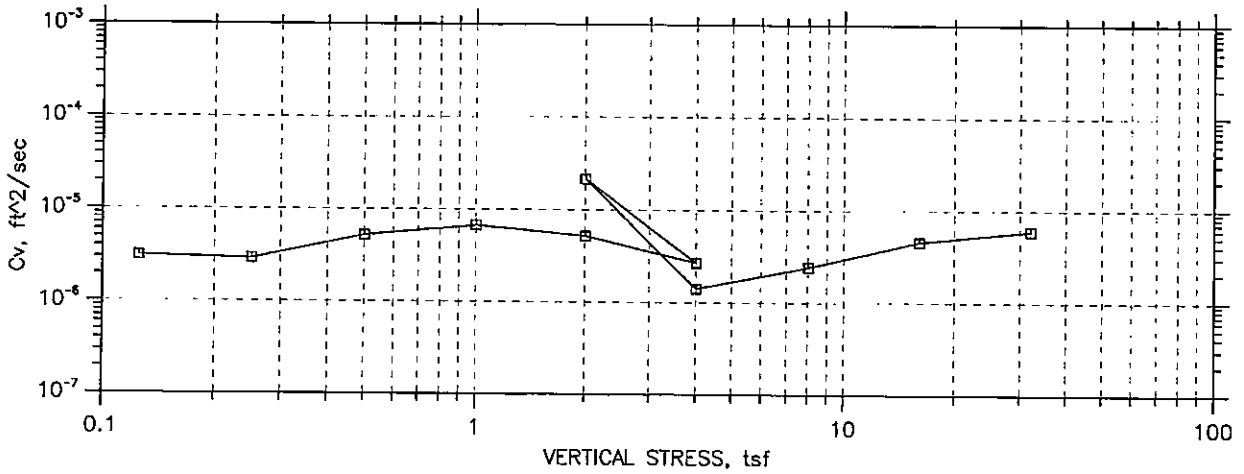
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

CONSOLIDATION TEST DATA

SUMMARY REPORT





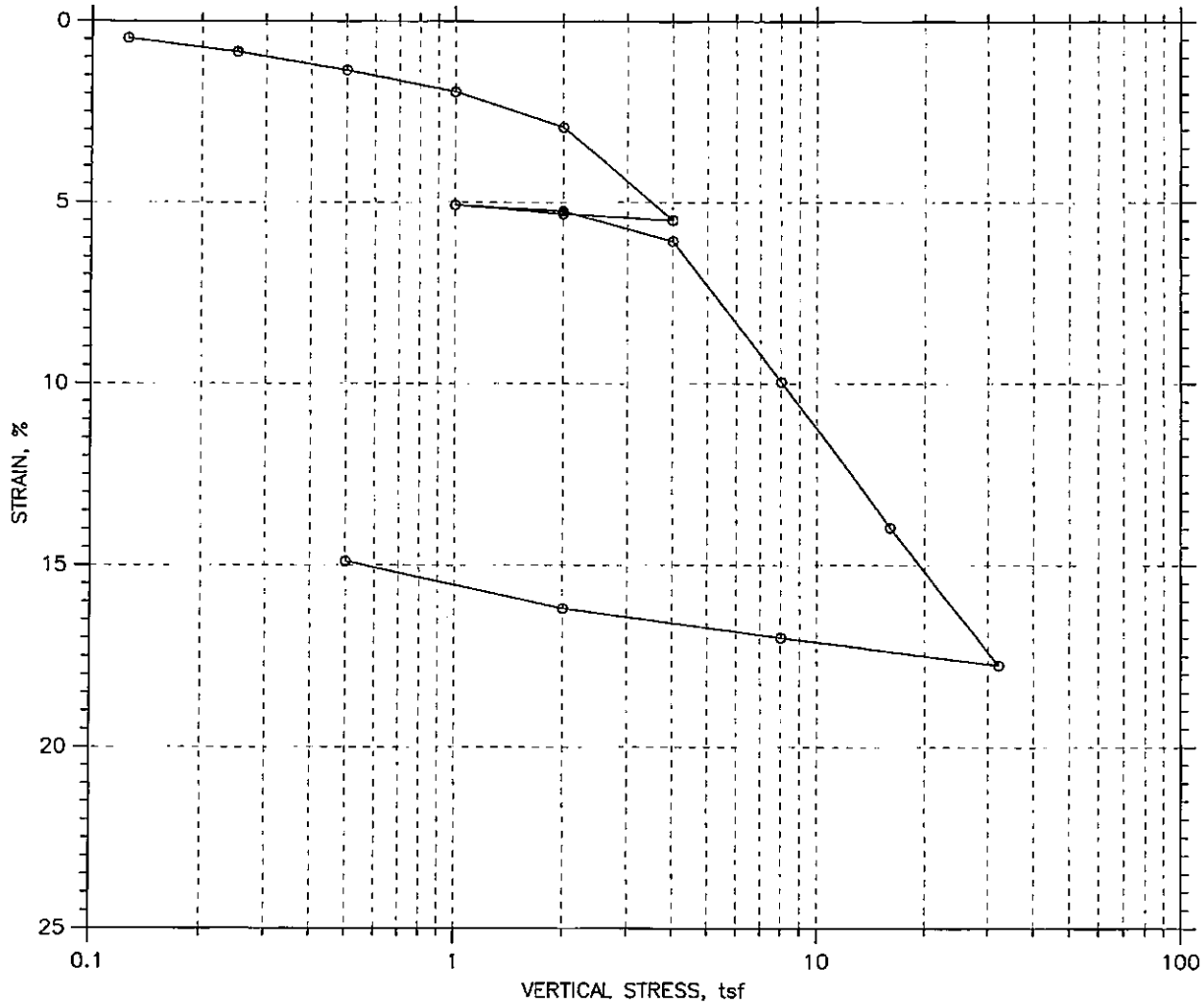
GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

Tue, 07-DEC-2010 11:31:58

ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test
Overburden Pressure: ---				Water Content, %	30.10	20.29
Preconsolidation Pressure: ---				Dry Unit Weight, pcf	94.67	111.3
Compression Index: ---				Saturation, %	99.88	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	0.84	0.57
LL: 30	PL: 17	PI: 13	GS: 2.79			

GeoTesting EXPRESS

Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
Boring No.: HA-10-9	Tested By: md	Checked By: jdt
Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
Test No.: C-1	Sample Type: tube	Elevation: ---
Description: Moist, dark olive gray		
Remarks: System Y		

ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

CONSOLIDATION TEST DATA

Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
Boring No.: HA-10-9	Tested By: md	Checked By: jdt
Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
Test No.: C-1	Sample Type: tube	Elevation: ---

Soil Description: Moist, dark olive gray
Remarks: System Y

Estimated Specific Gravity: 2.79	Liquid Limit: 30	Initial Height: 1.00 in
Initial Void Ratio: 0.84	Plastic Limit: 17	Specimen Diameter: 2.50 in
Final Void Ratio: 0.57	Plasticity Index: 13	

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	6110	RING		7614
Wt. Container + Wet Soil, gm	208.3	267.94	255.98	155.35
Wt. Container + Dry Soil, gm	159.71	231.23	231.23	130.54
Wt. Container, gm	8.42	109.24	109.24	8.27
Wt. Dry Soil, gm	151.29	121.99	121.99	122.27
Water Content, %	32.12	30.10	20.29	20.29
Void Ratio	---	0.84	0.57	---
Degree of Saturation, %	---	99.88	100.00	---
Dry Unit Weight, pcf	---	94.672	111.28	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

CONSOLIDATION TEST DATA

Project: International Marine
Boring No.: HA-10-9
Sample No.: U1
Test No.: C-1

Location: Portland, ME
Tested By: md
Test Date: 12/01/10
Sample Type: tube

Project No.: GTX-10419
Checked By: jdt
Depth: 35-37 ft
Elevation: ---

Soil Description: Moist, dark olive gray
Remarks: System Y

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting Sq.Rt. min	T50 Fitting Log min	Coefficient of Consolidation Sq.Rt. ft^2/sec	Coefficient of Consolidation Log ft^2/sec	Coefficient of Consolidation Ave. ft^2/sec
1	0.125	0.004744	0.833	0.47	1.9	0.0	3.06e-006	0.00e+000	3.06e-006
2	0.25	0.008533	0.826	0.85	1.8	2.2	3.20e-006	2.58e-006	2.86e-006
3	0.5	0.01354	0.817	1.35	1.1	1.1	5.03e-006	5.18e-006	5.10e-006
4	1	0.0195	0.806	1.95	0.8	0.0	6.57e-006	0.00e+000	6.57e-006
5	2	0.02939	0.787	2.94	1.1	0.0	5.07e-006	0.00e+000	5.07e-006
6	4	0.05511	0.740	5.51	1.8	2.2	2.88e-006	2.43e-006	2.63e-006
7	2	0.05338	0.743	5.34	0.1	0.0	7.39e-005	0.00e+000	7.39e-005
8	1	0.05086	0.748	5.09	0.2	0.0	2.73e-005	0.00e+000	2.73e-005
9	2	0.05261	0.745	5.26	0.2	0.0	2.08e-005	0.00e+000	2.08e-005
10	4	0.06091	0.729	6.09	3.7	0.0	1.38e-006	0.00e+000	1.38e-006
11	8	0.09983	0.658	9.98	1.8	2.2	2.68e-006	2.15e-006	2.39e-006
12	16	0.14	0.584	14.00	0.9	1.1	4.96e-006	4.12e-006	4.50e-006
13	32	0.1778	0.514	17.78	0.7	0.0	5.88e-006	0.00e+000	5.88e-006
14	8	0.1703	0.528	17.03	0.0	0.0	1.84e-004	0.00e+000	1.84e-004
15	2	0.1622	0.543	16.22	0.6	0.0	7.16e-006	0.00e+000	7.16e-006
16	0.5	0.1493	0.567	14.93	3.6	3.9	1.13e-006	1.06e-006	1.09e-006

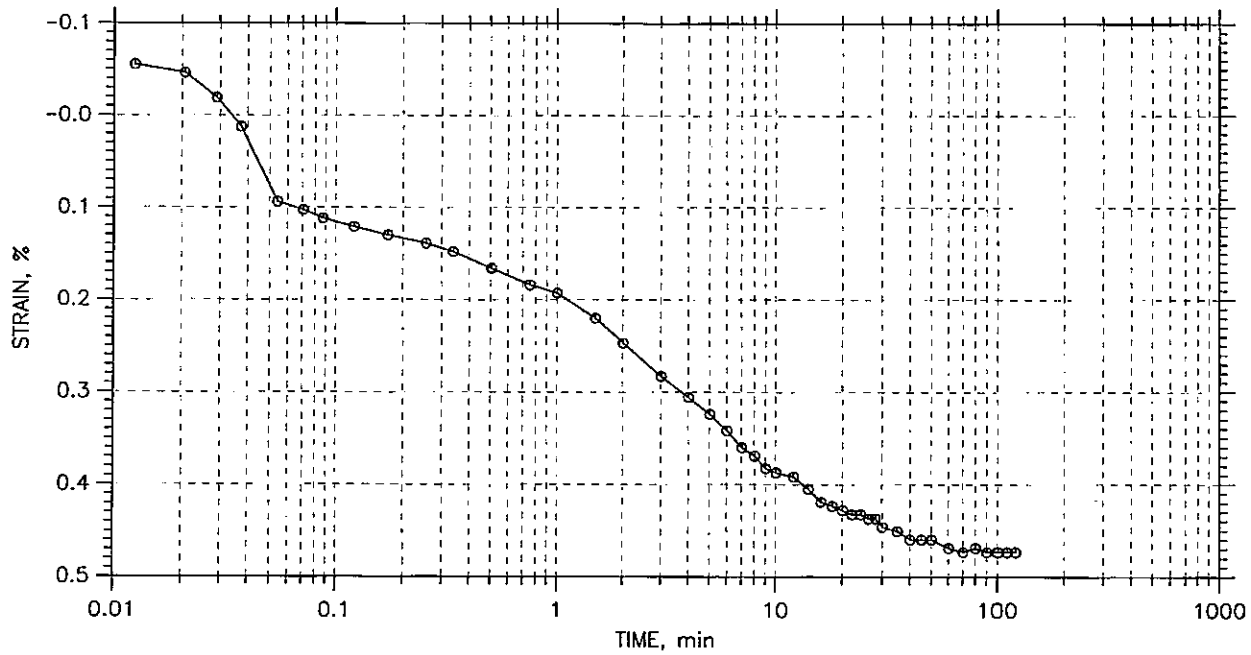
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

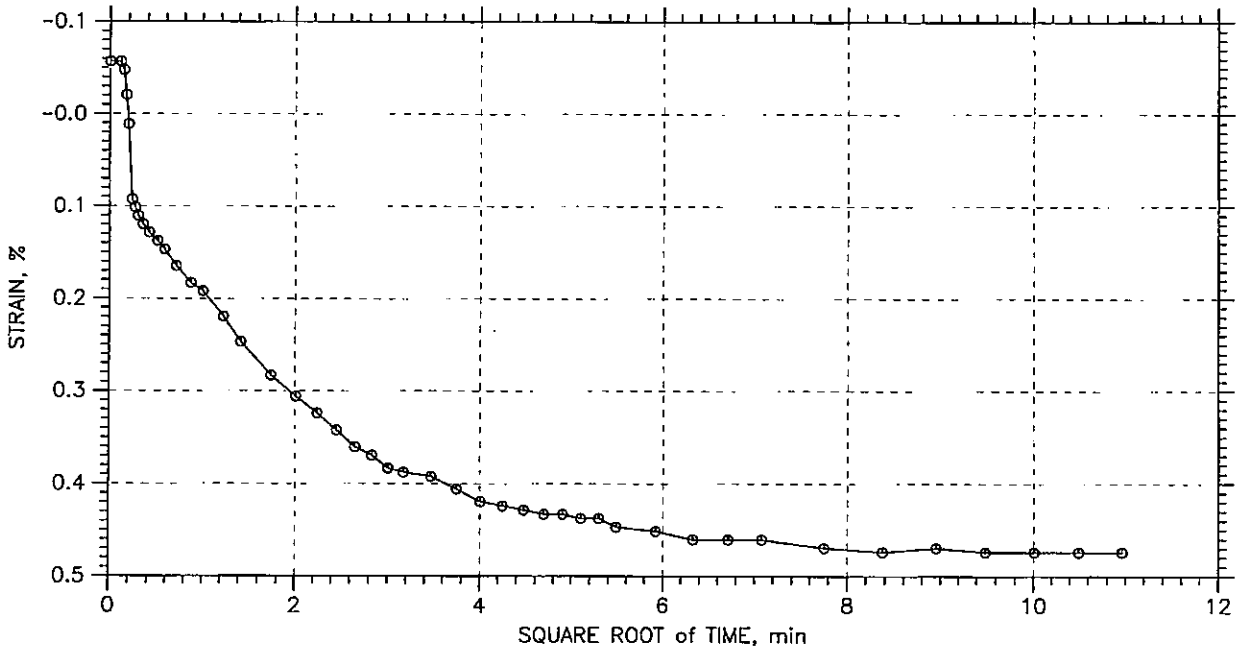
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 16

Stress: 0.125 tsf





GeoTesting EXPRESS

Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
Boring No.: HA-10-9	Tested By: md	Checked By: jdt
Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
Test No.: C-1	Sample Type: tube	Elevation: ---
Description: Moist, dark olive gray		
Remarks: System Y		

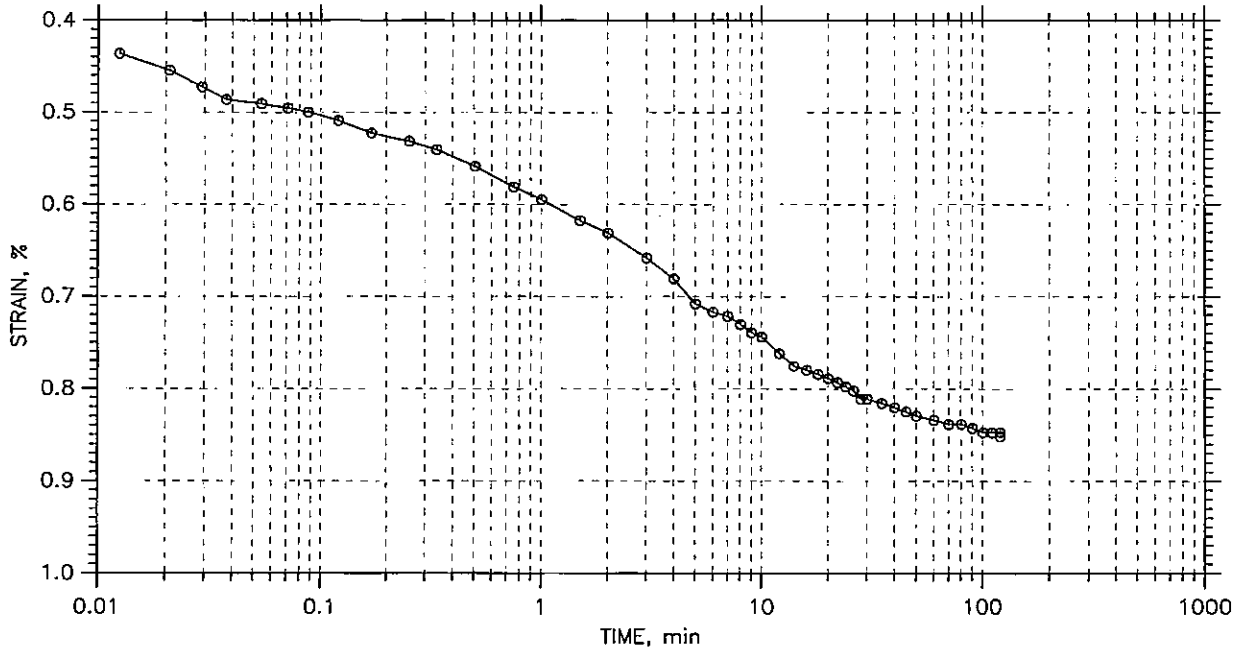
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

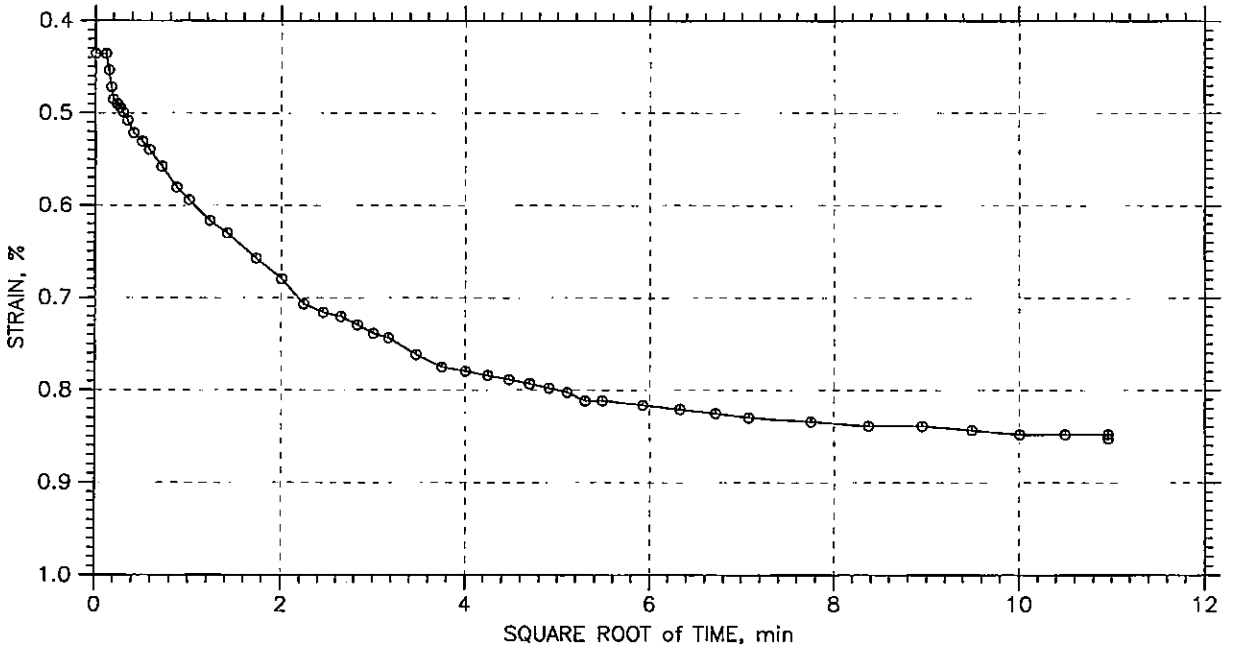
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 16

Stress: 0.25 tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

Tue, 07-DEC-2010 11:31:59

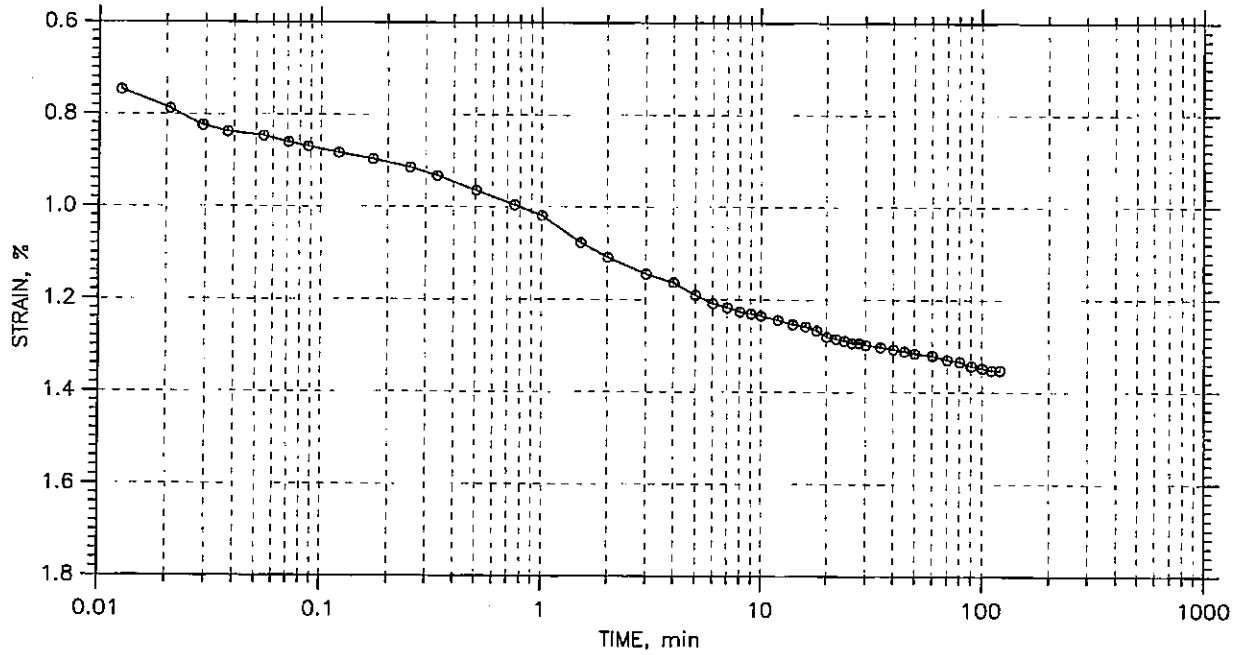
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

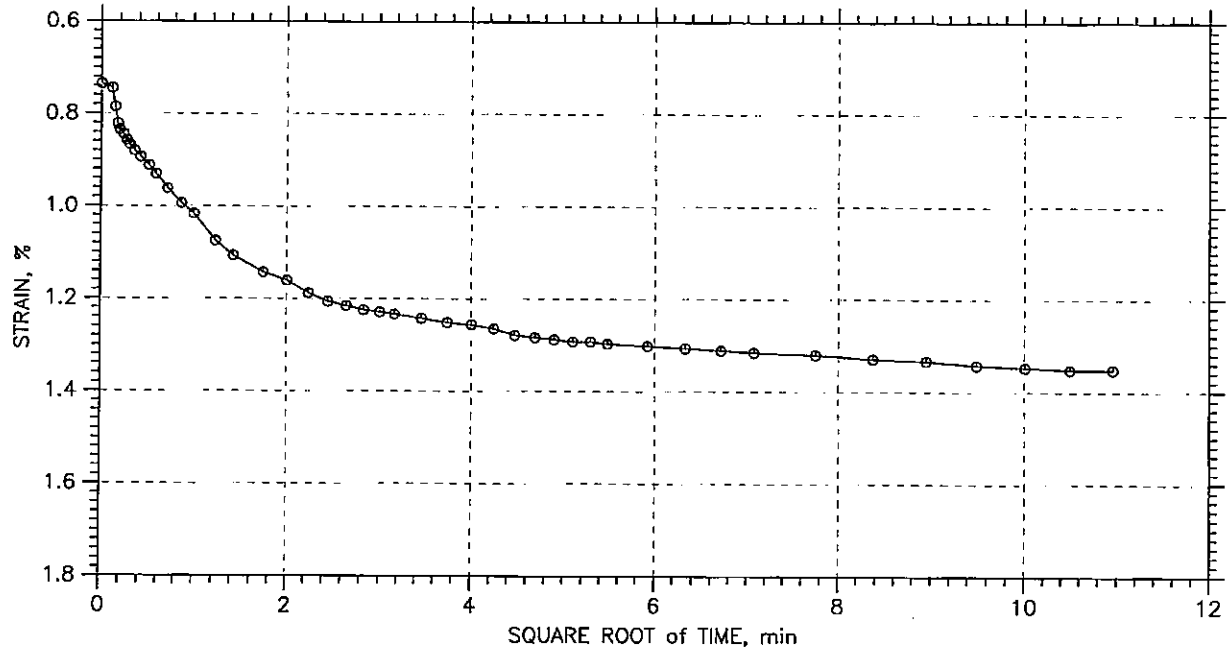
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 16

Stress: 0.5 tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

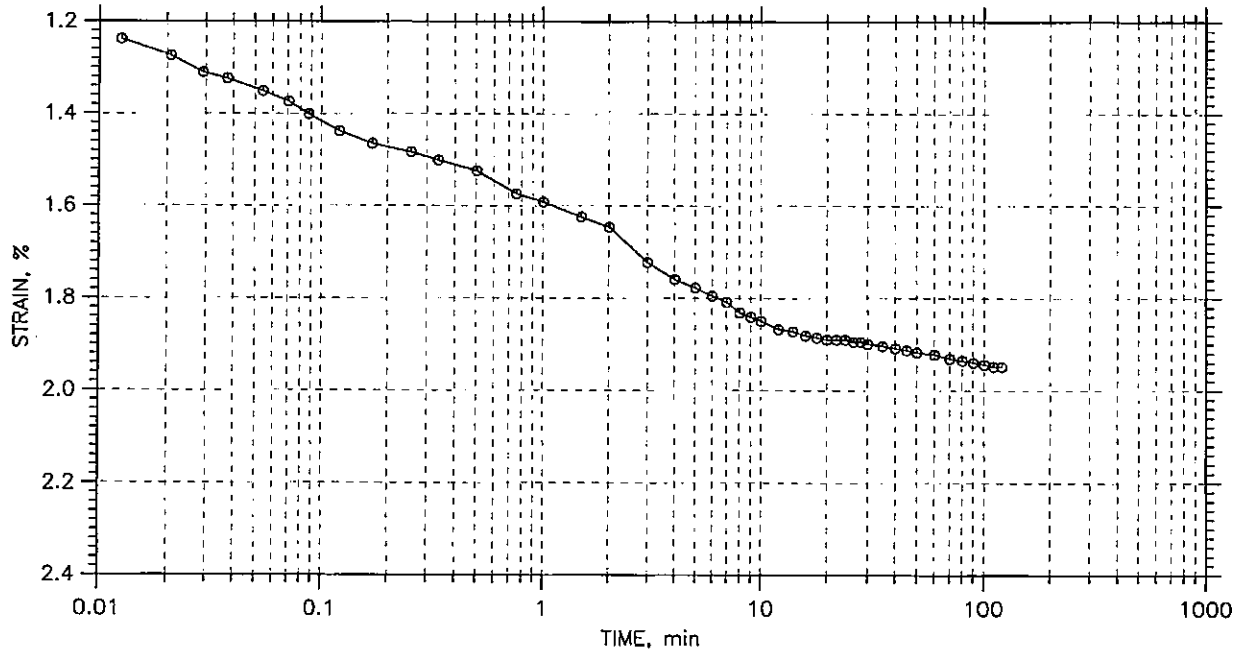
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

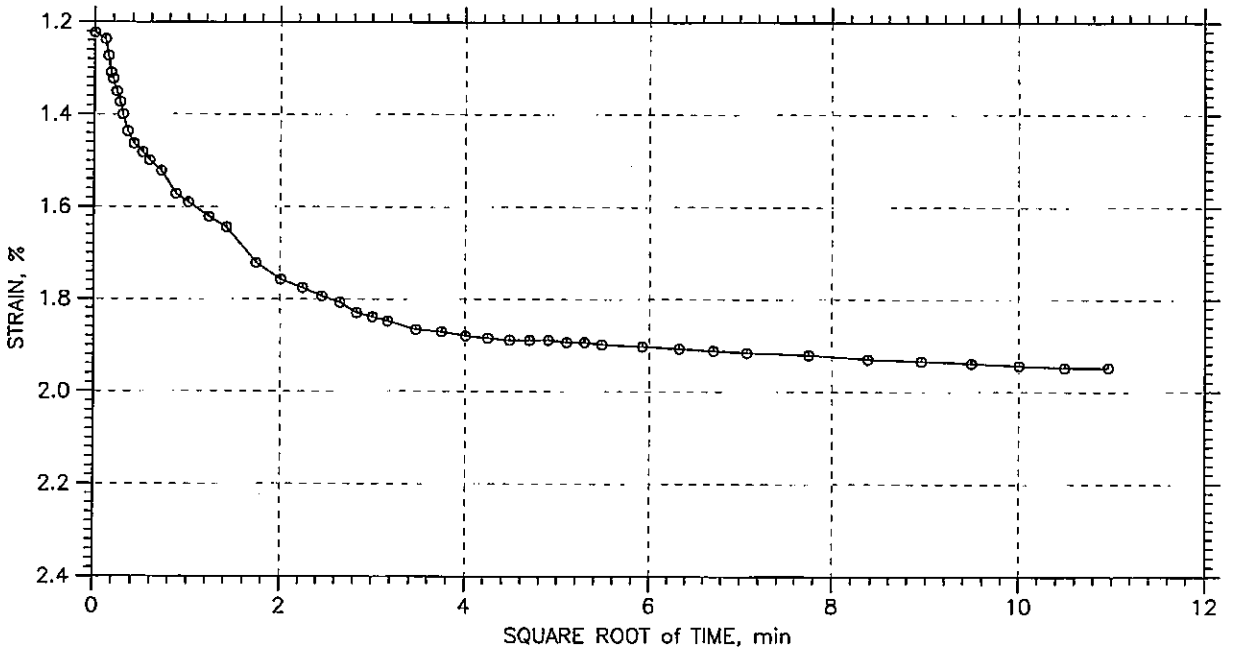
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 16

Stress: 1. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

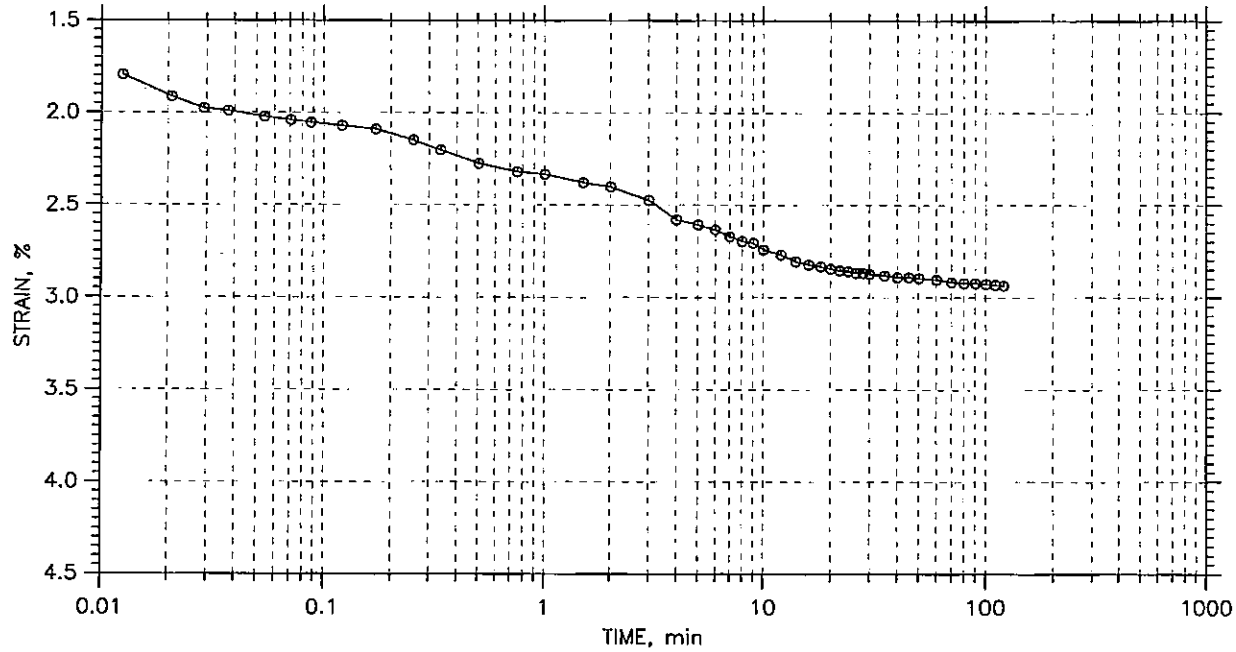
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

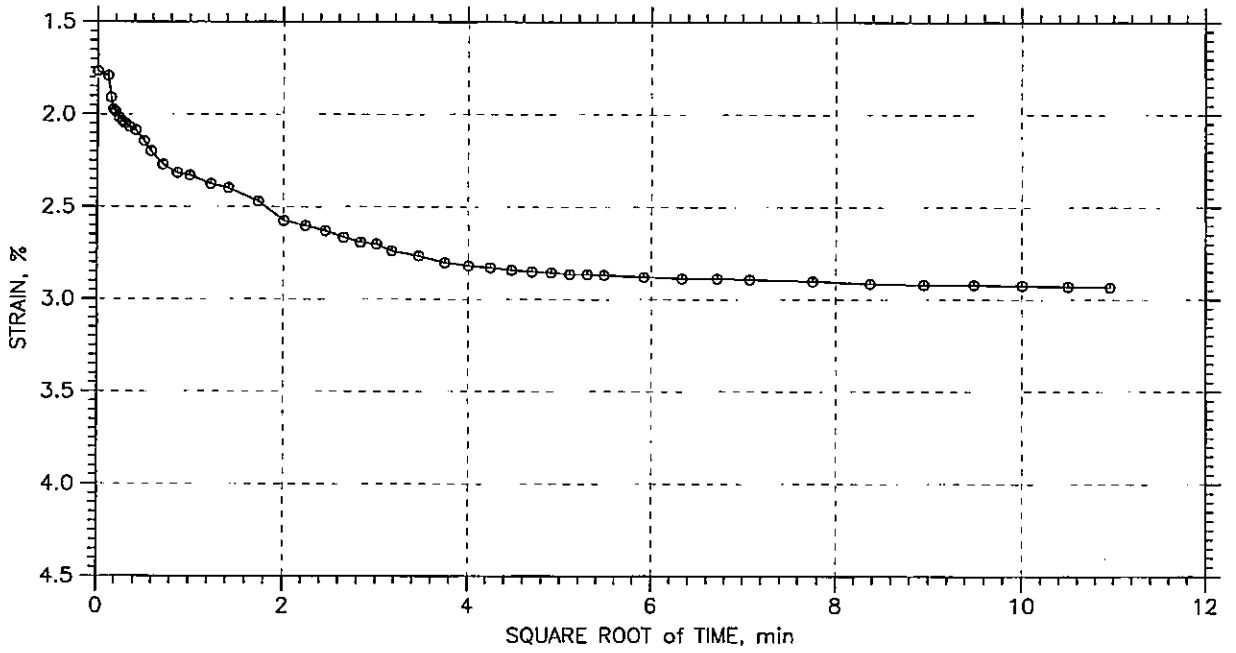
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 16

Stress: 2. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

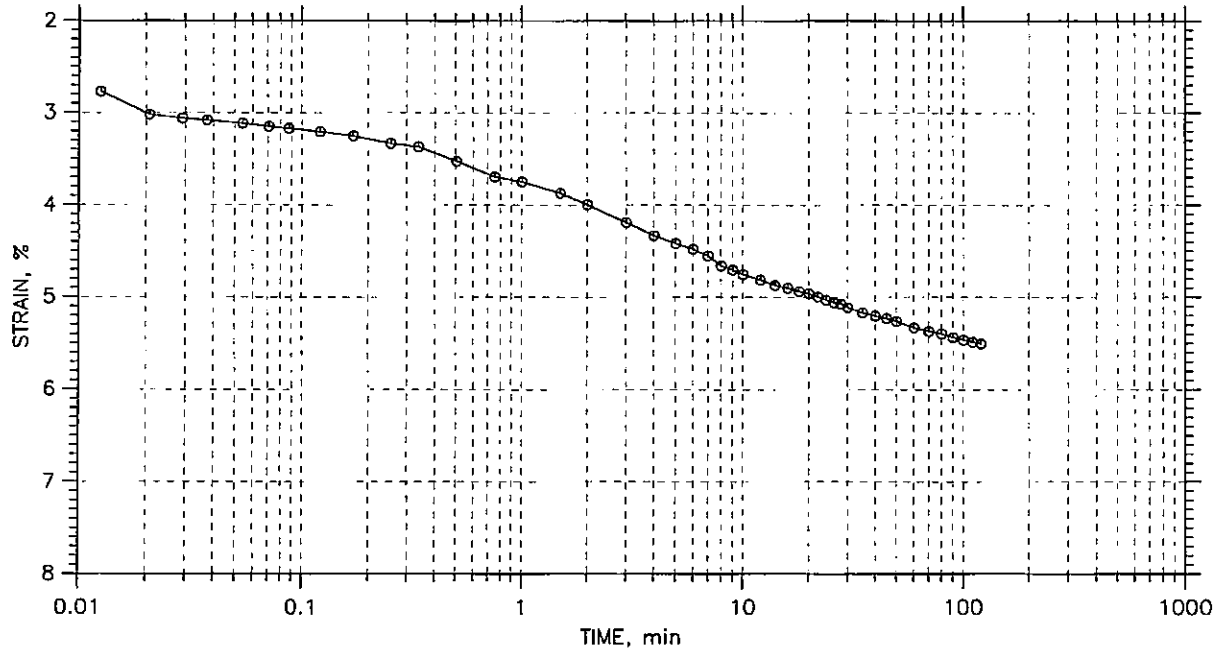
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

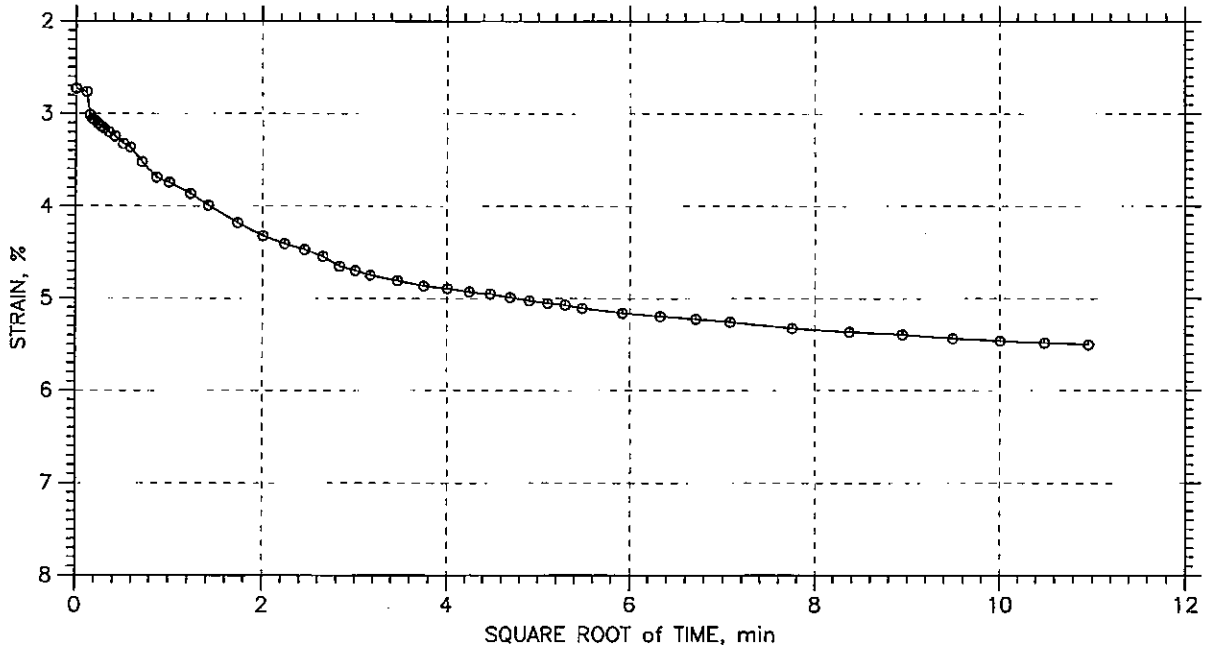
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 16

Stress: 4. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

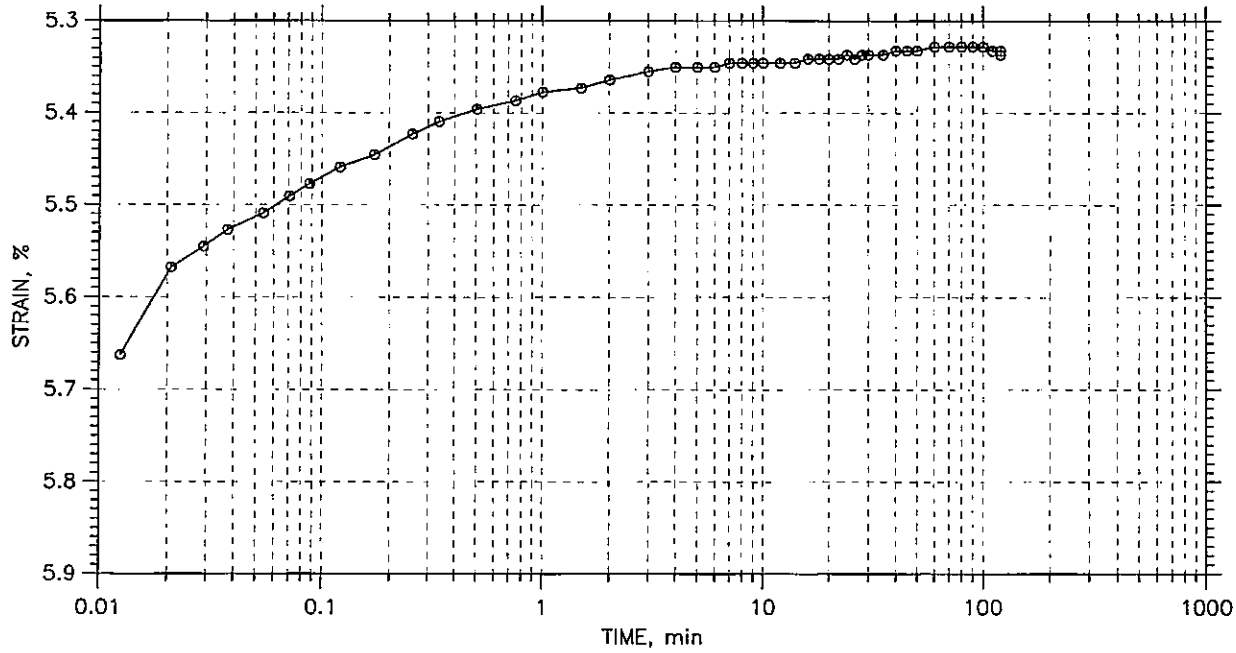
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

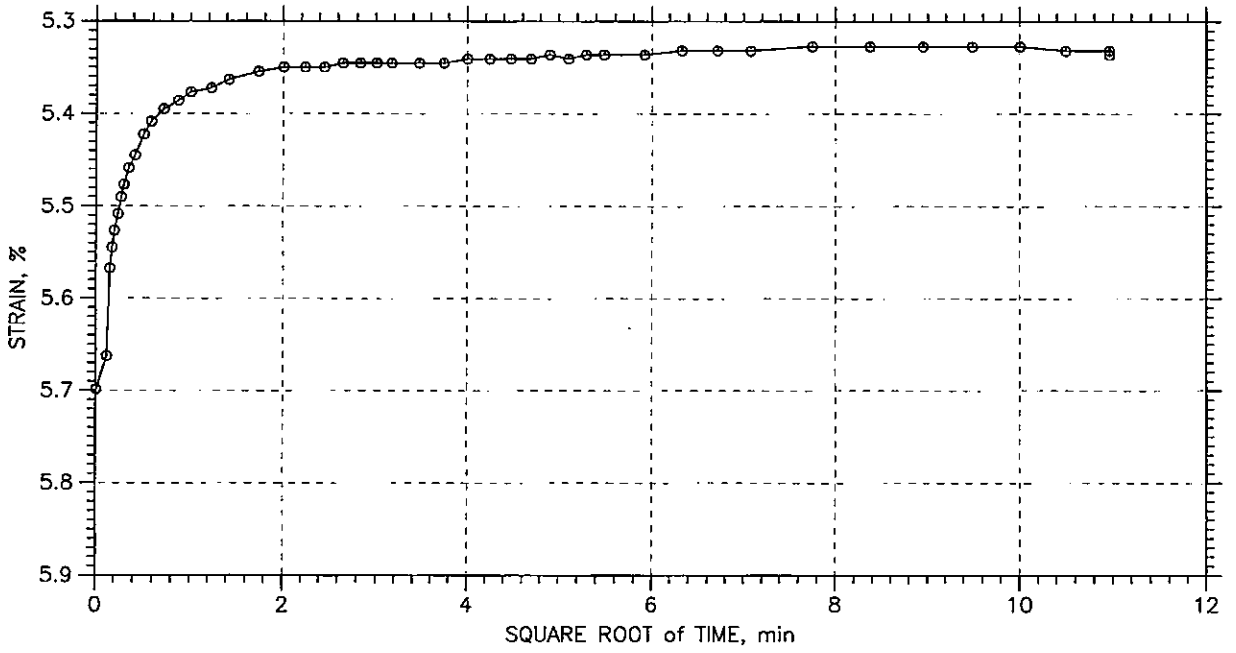
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 16

Stress: 2. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

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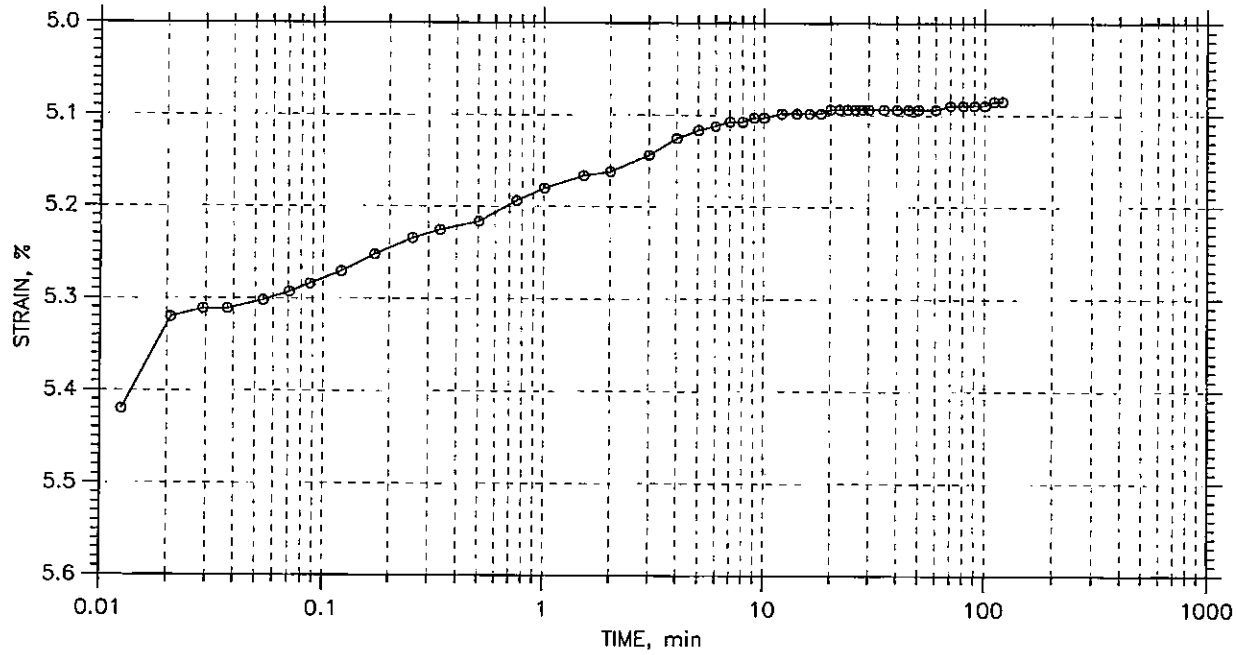
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

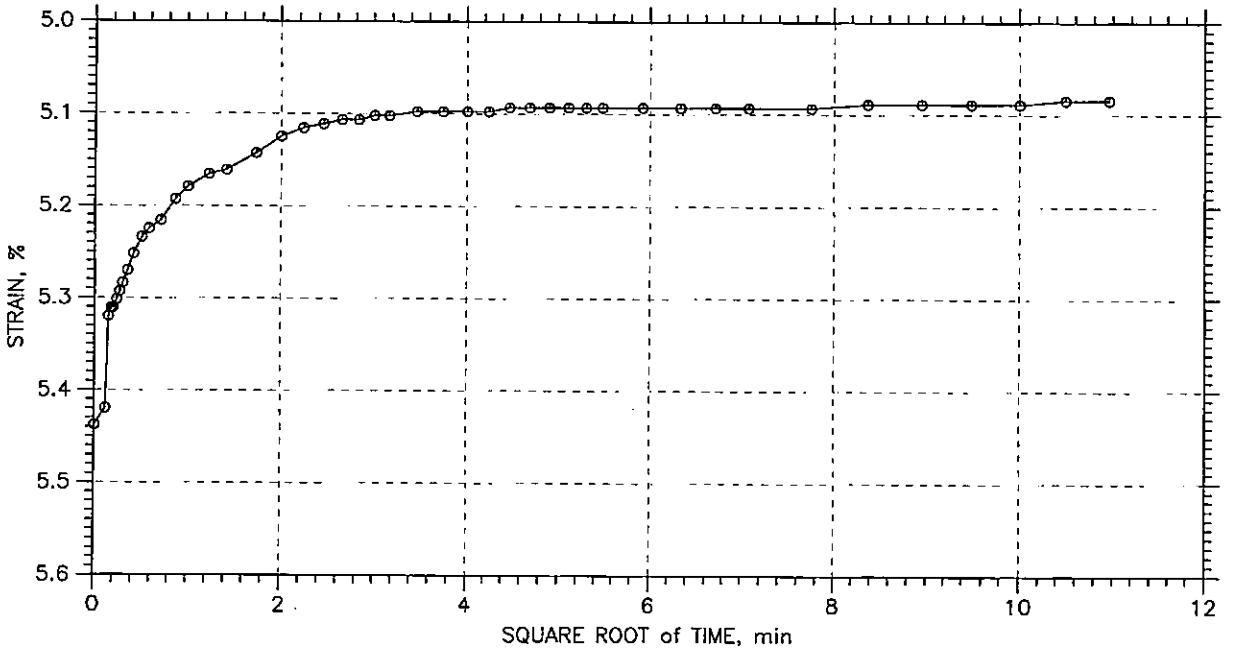
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 16

Stress: 1. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

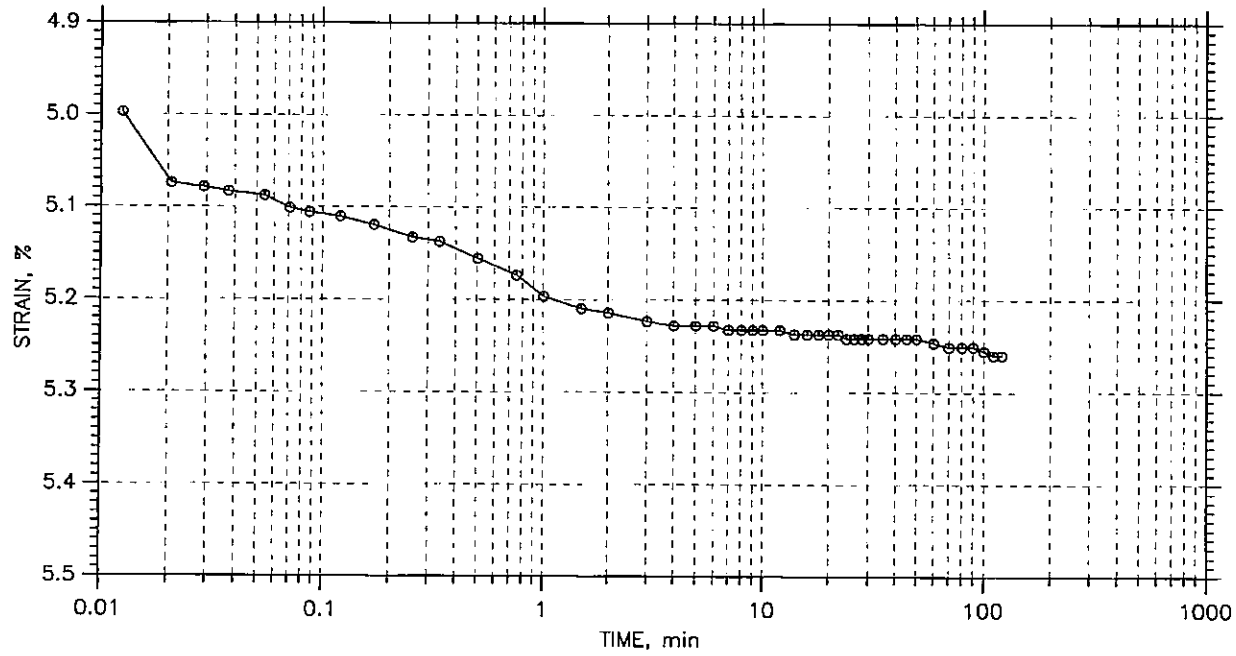
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

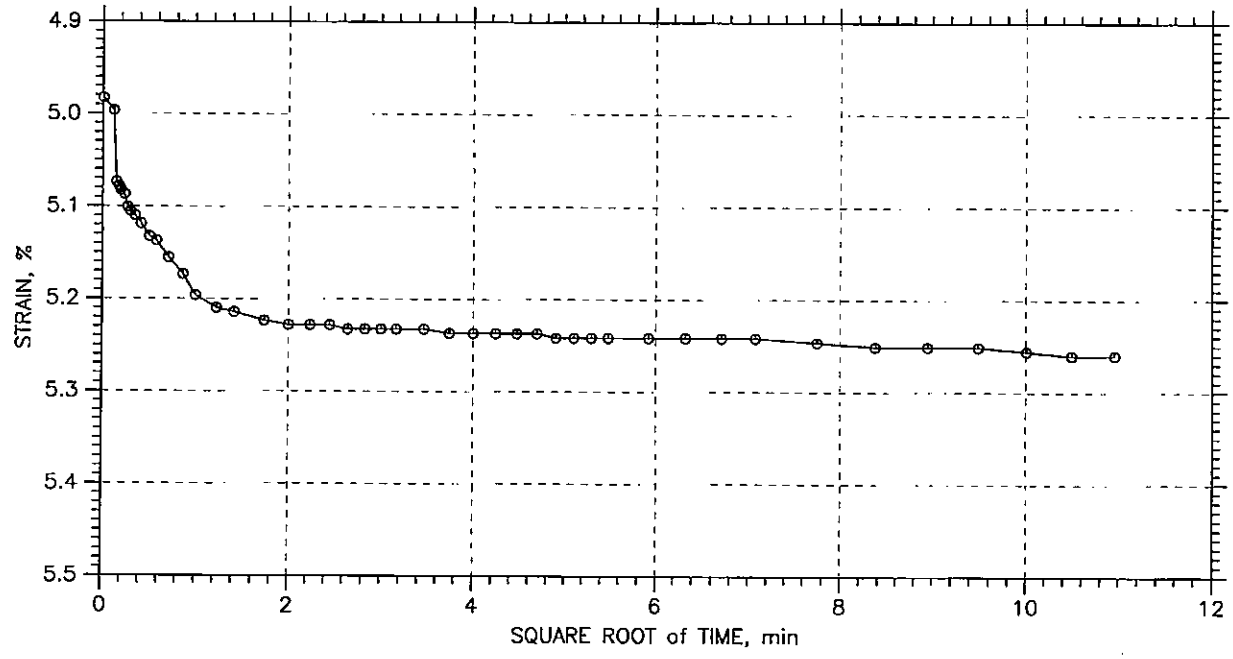
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 16

Stress: 2. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

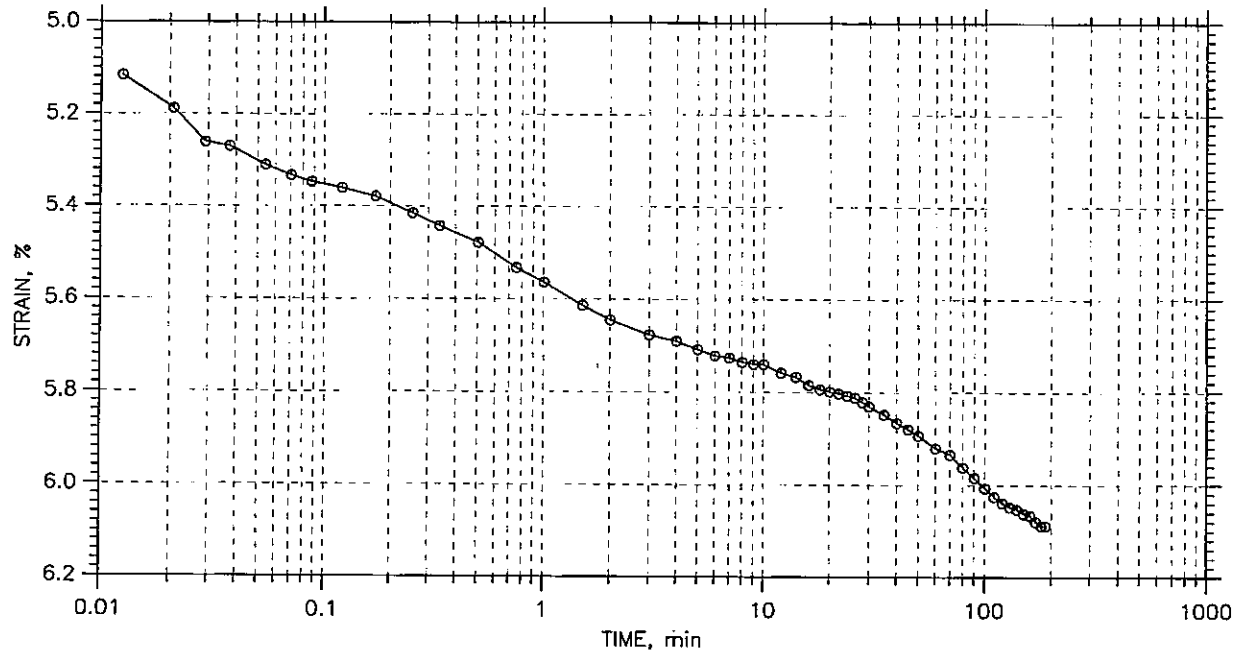
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

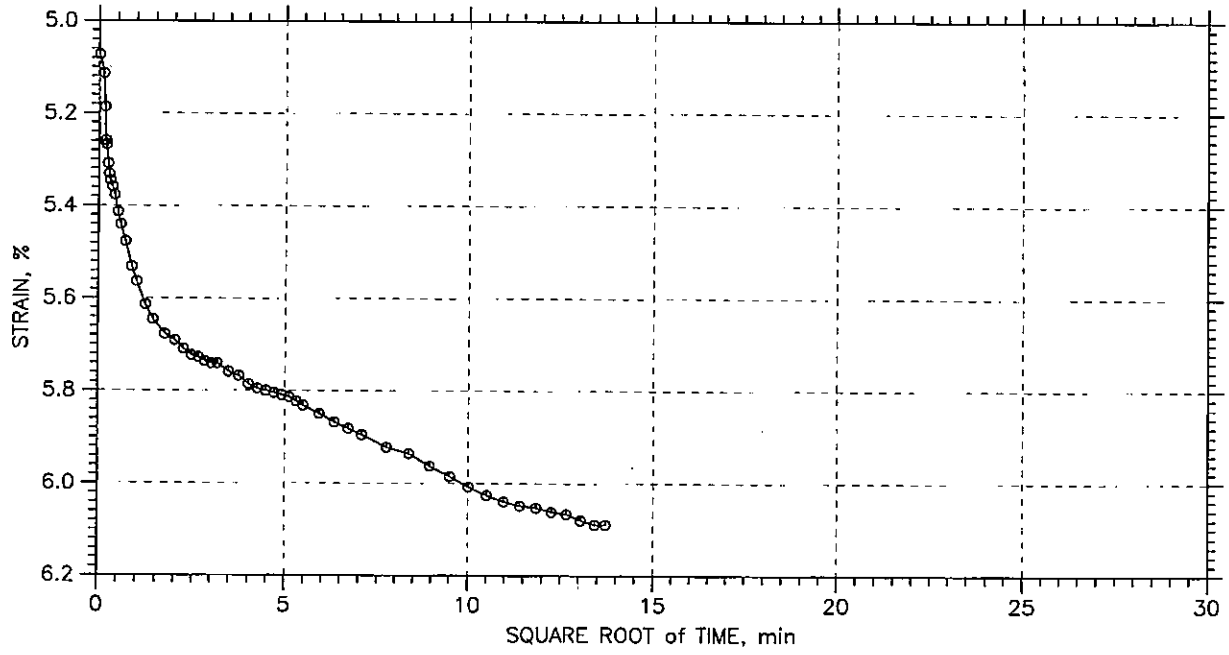
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 16

Stress: 4. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

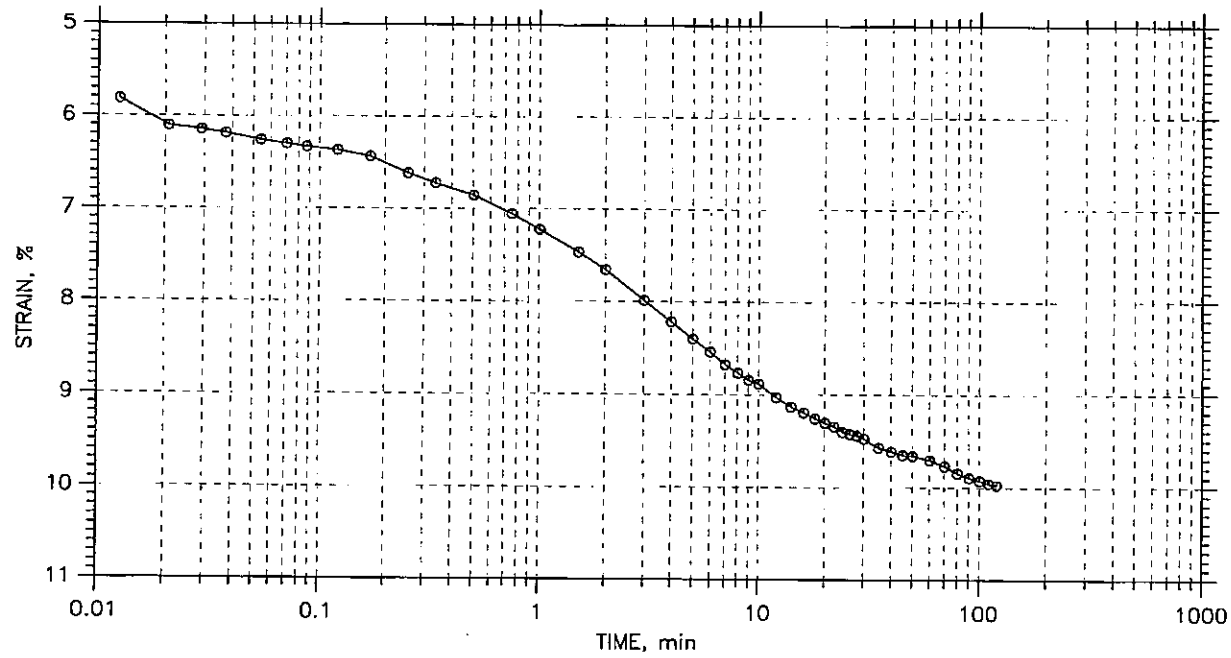
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

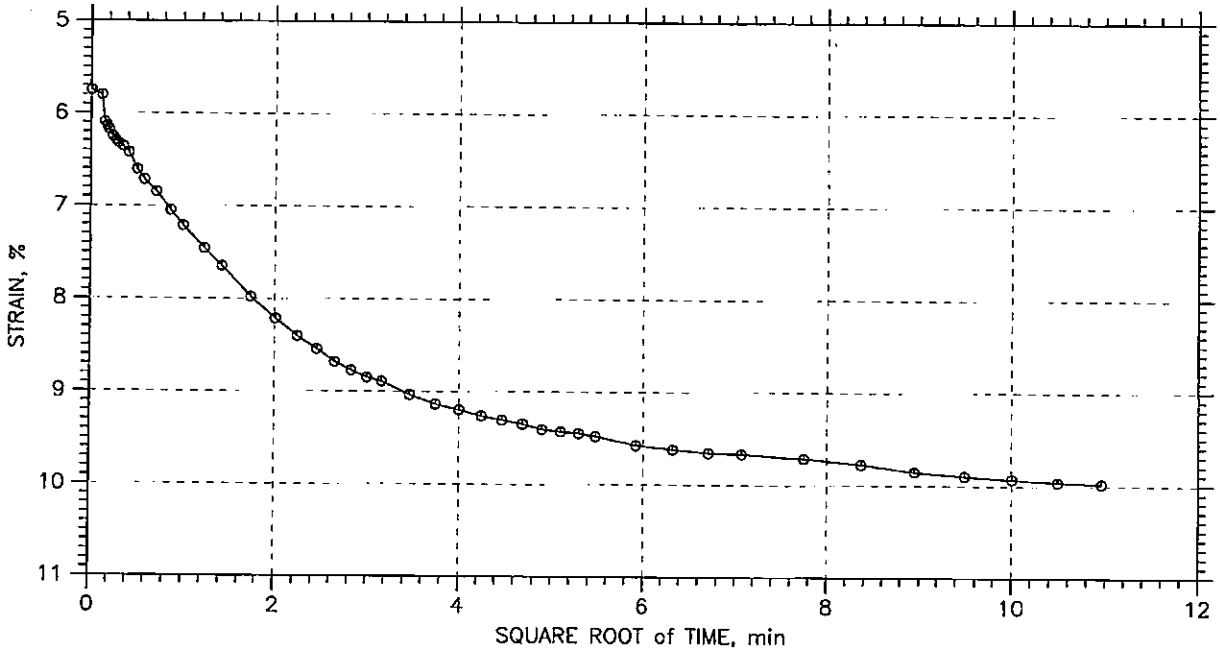
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 16

Stress: 8. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

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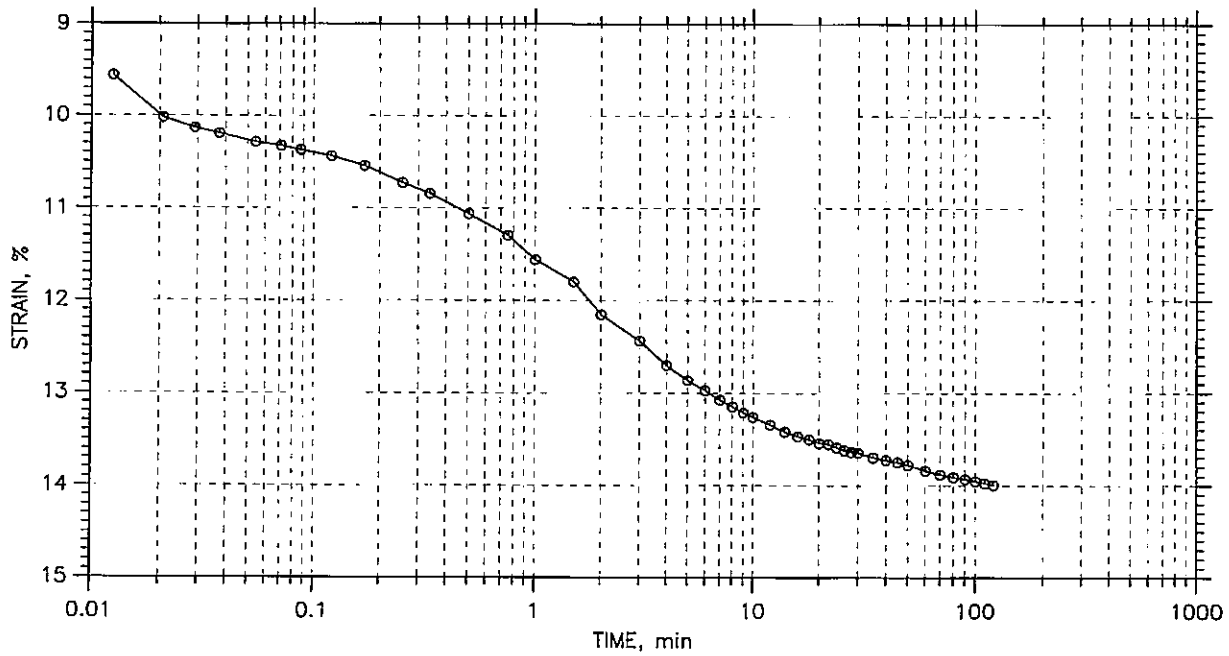
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

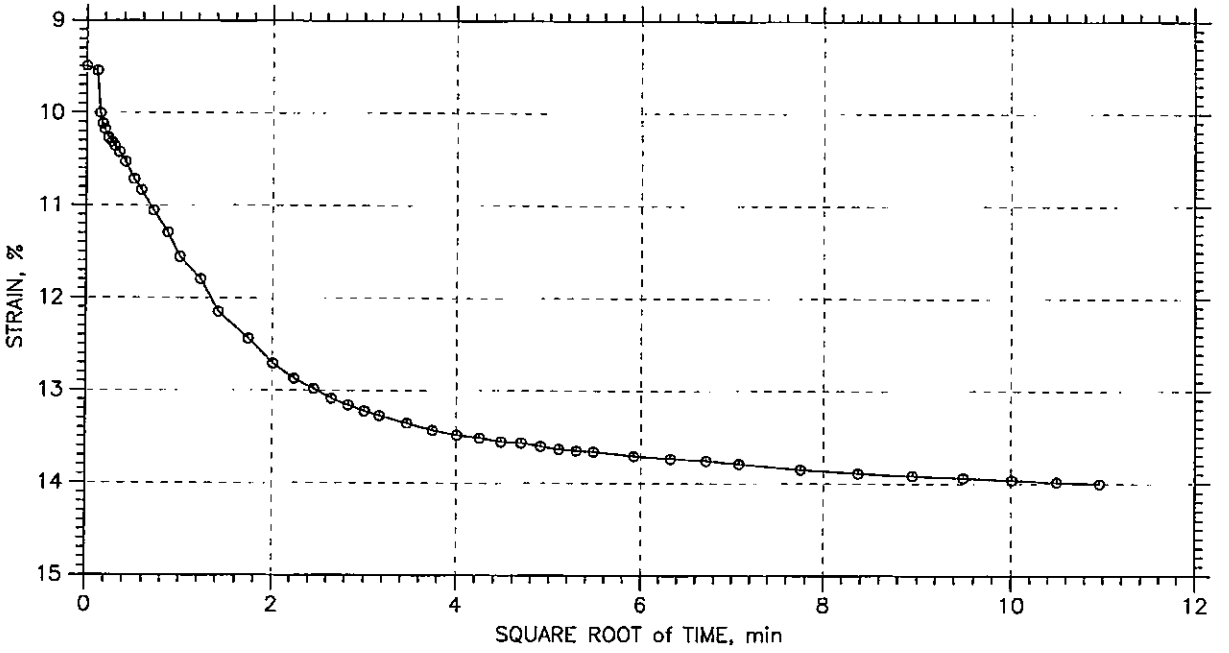
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 16

Stress: 16. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

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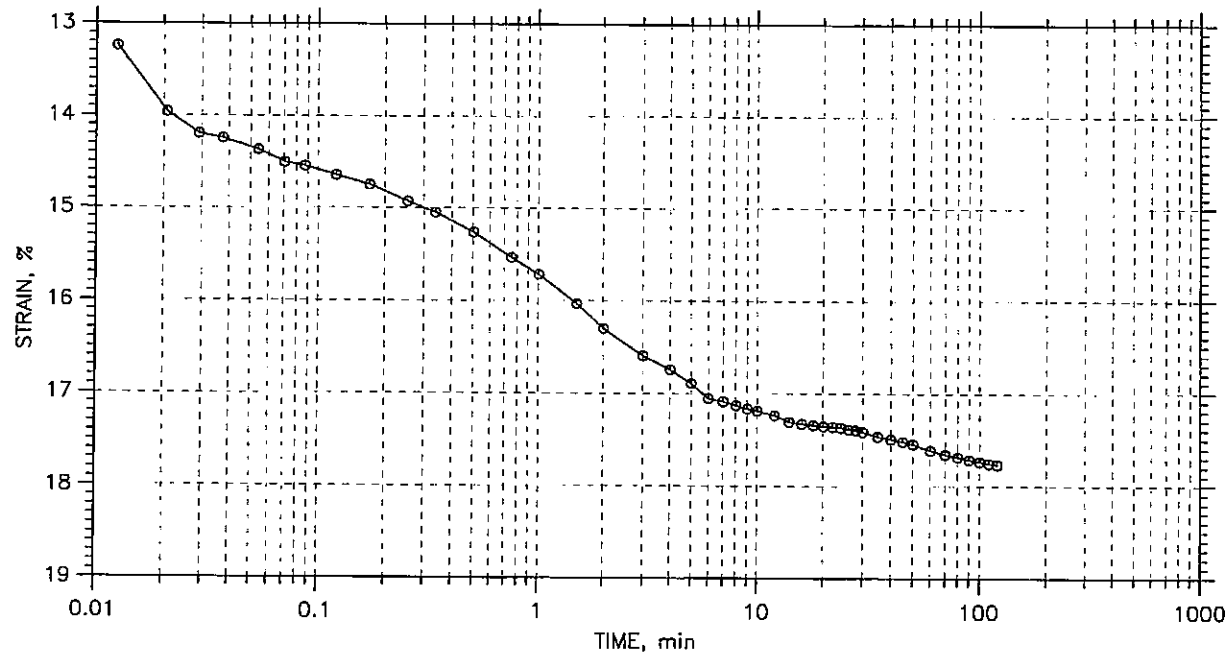
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

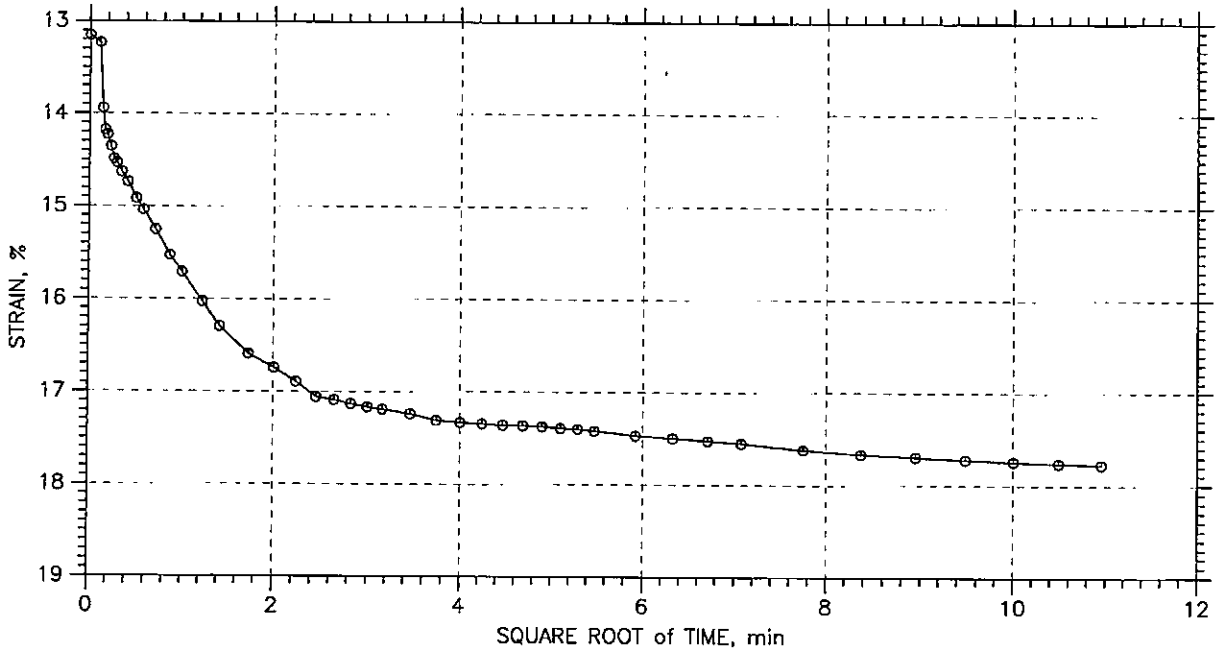
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 16

Stress: 32. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

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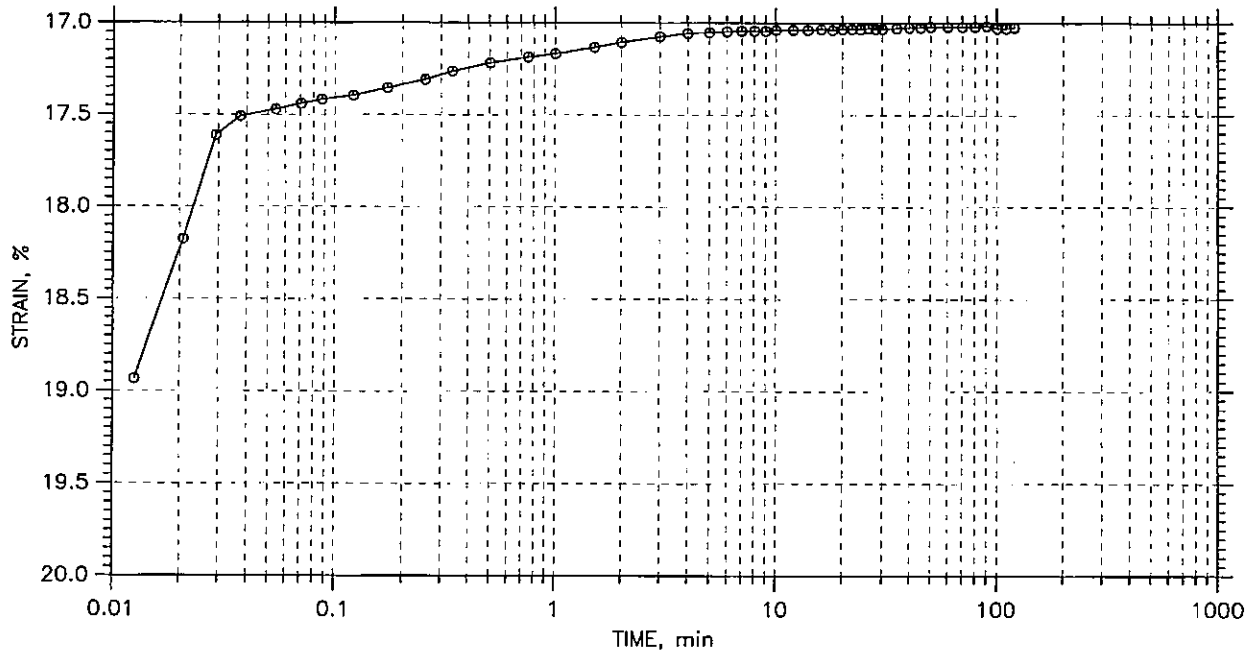
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

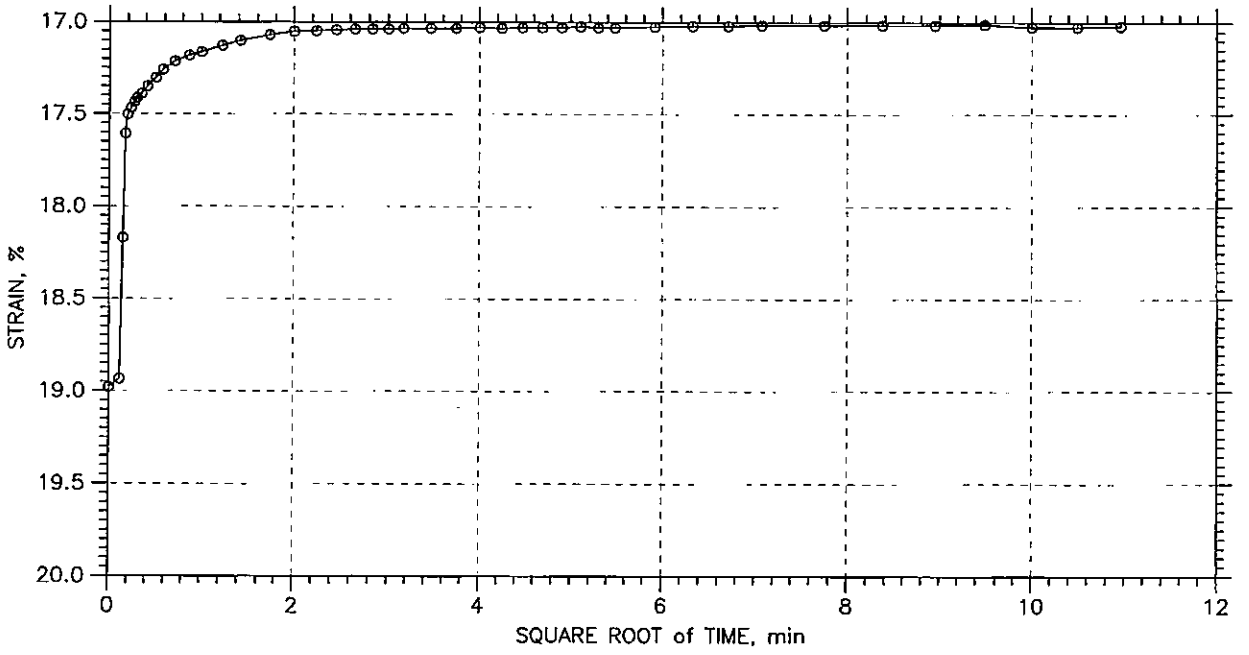
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 16

Stress: 8. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

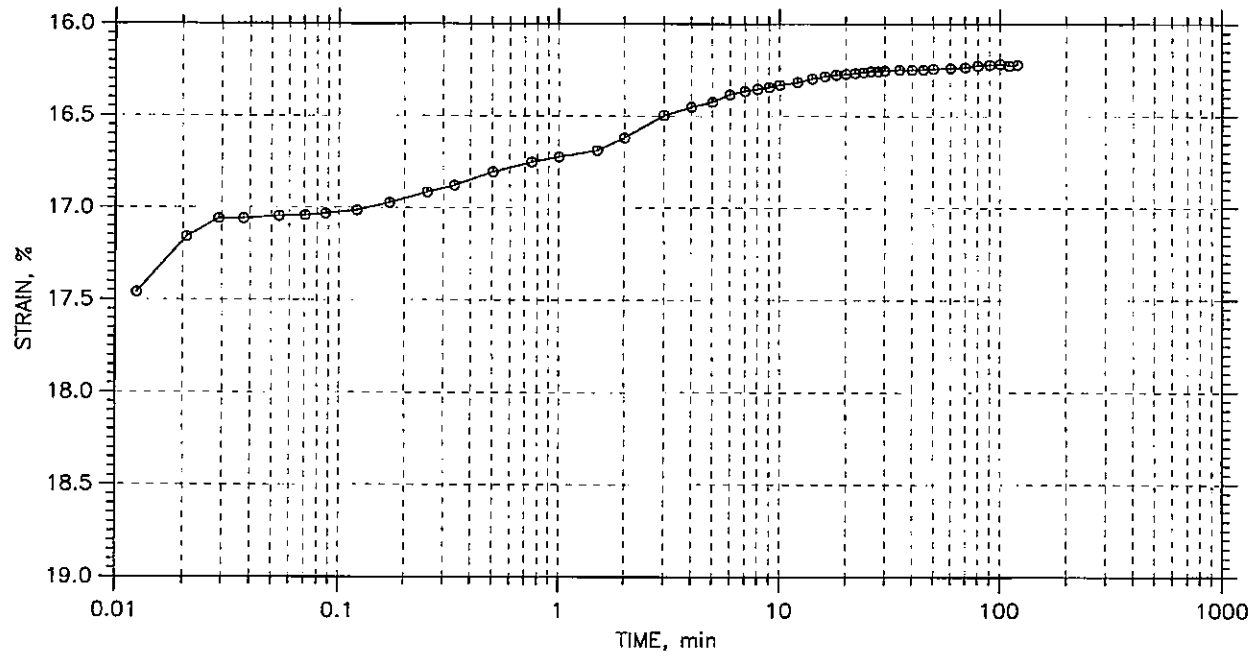
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

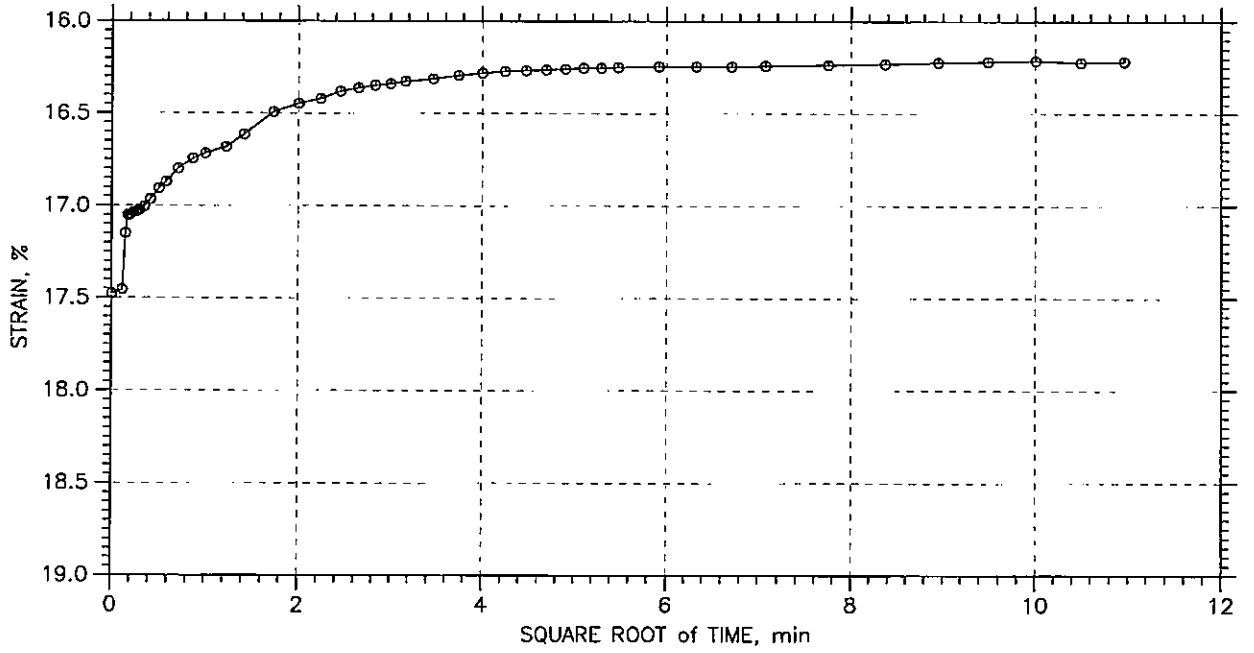
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 16

Stress: 2. tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

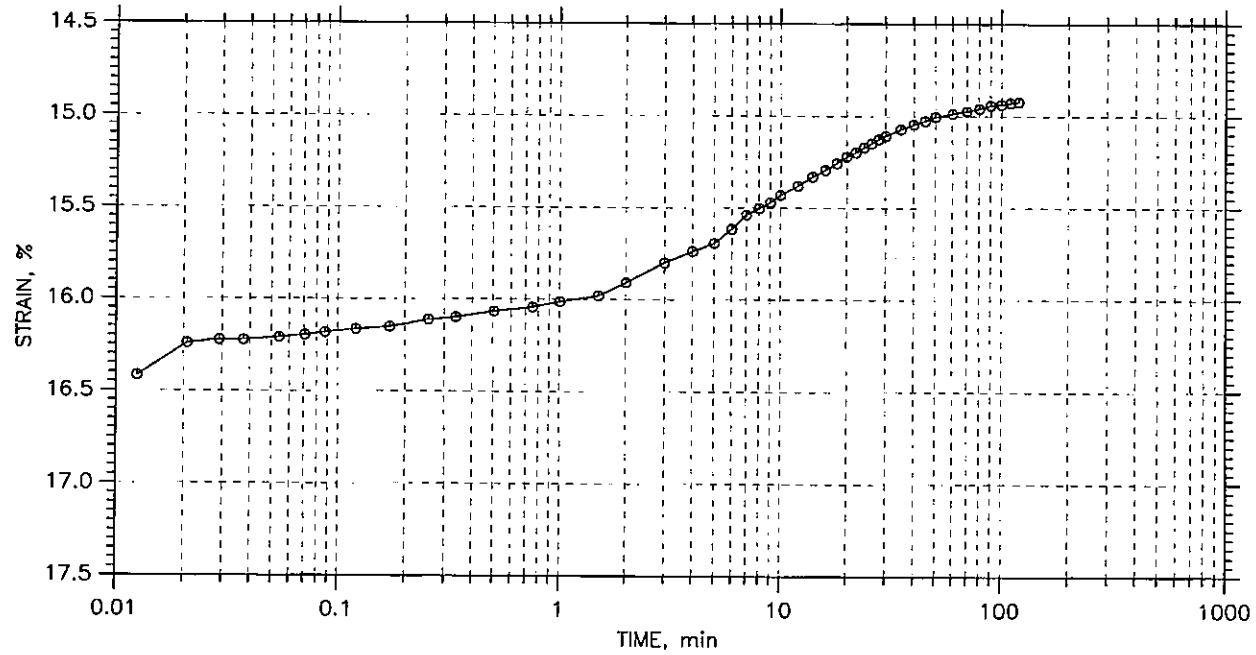
ONE-DIMENSIONAL CONSOLIDATION by ASTM D 2435-04 - Method B

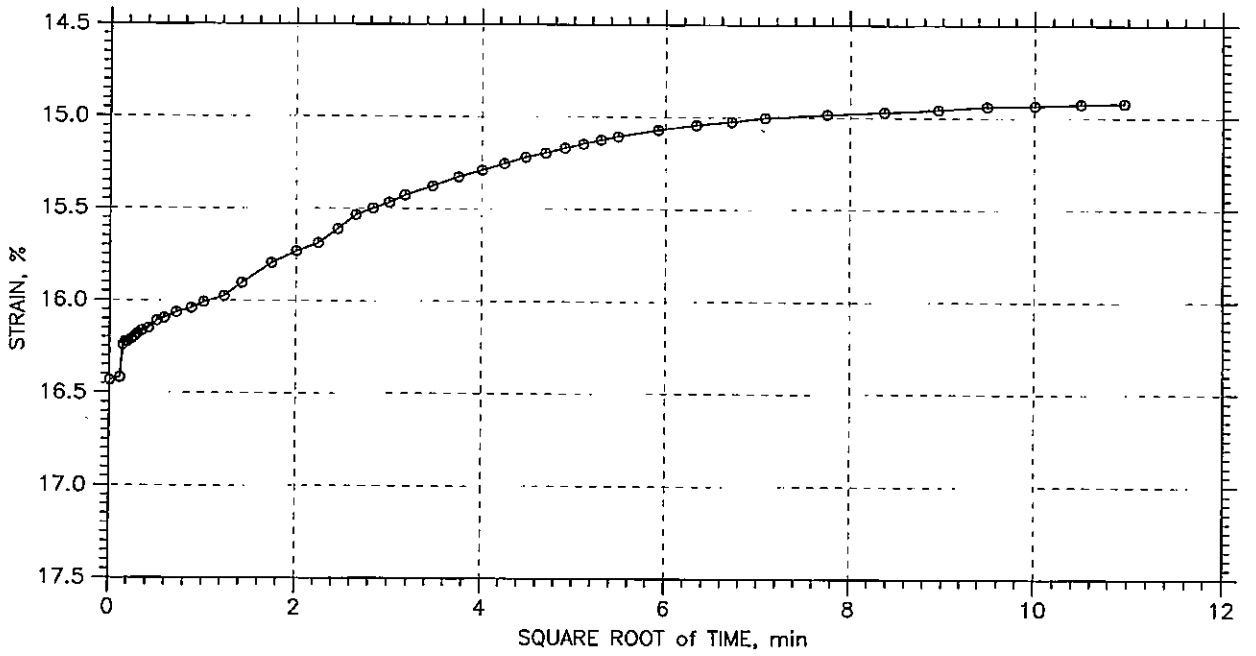
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 16

Stress: 0.5 tsf





GeoTesting EXPRESS	Project: International Marine	Location: Portland, ME	Project No.: GTX-10419
	Boring No.: HA-10-9	Tested By: md	Checked By: jdt
	Sample No.: U1	Test Date: 12/01/10	Depth: 35-37 ft
	Test No.: C-1	Sample Type: tube	Elevation: ---
	Description: Moist, dark olive gray		
	Remarks: System Y		

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