

Jean Fraser - Planner
City of Portland
Planning & Urban Development Department
389 Congress Street
Portland, ME 04101

January 17, 2014

Subject: Munjoy Heights
 Final Level III Site Plan – Conditions of Approval
 Comment Response Letter

On behalf of Redfern Munjoy, LLC we are pleased to address the conditions of approval that *pertain* to Acorn Engineering from the City of Portland, including:

- Email from Tom Errico to Jean Fraser dated December 11, 2013.
- Email from Captain Chris Pirone, dated December 4th, 2013
- Memorandum from Woodard & Curran's December 6th, 2013. The following comments are listed in the numerical order of the November 20, 2013 memorandum prepared by Woodard & Curran and the associated December 4, 2013 response letter from Acorn Engineering. Previous questions and comments that have been adequately addressed are not included for brevity.

To facilitate the review comments are provided below in italics followed by Acorn Engineering, Inc.'s response.

Tom Errico's – Email

Comment 3 and 5

Response: On Sheet C-10, the driveway entrance radii was eliminated from the plans and standard tip-down curbing is provided.

Captain Chris Pirone's – Email

Response: The proposed driveway width was designed to be a minimum of 20 ft wide and to have the ability to withstand the weight of the Fire Department vehicles and outriggers for the entire 20 ft area of the driveway.

The geotechnical engineer has reviewed the proposed construction of the driveway (Concrete Brick Paver Detail) and recommended the minimum amount of aggregate material to support H-20 wheel loading. Please refer to the attached email from Bill Peterlein, P.E. Acorn Engineering's Concrete Brick Paver Detail exceeds the minimum aggregate depths specified.

Woodard & Curran – Peer Review Memo

- 1) a), b) & c) (i.)(ii.)(iii.) – Comments adequately addressed.
- 2) a), b) & c) – Comments adequately addressed.
- d) Sheet C-30: The access/diversion structure labeled CB-1 has two outlets, a 12” pipe and a 24” pipe. The 24” pipe connects to the Isolator Row, whereas the 12” pipe appears to connect to an adjacent standard chamber. Please clarify the intent of 12” pipe, along with the invert elevation. Because the Isolator Row is intended to remove sediment and debris from the stormwater flow, we would not anticipate that the 12” pipe invert elevation would be set the same as the 24” pipe invert elevation. If the 12” pipe is acting as a high-flow outlet, we would anticipate that the invert elevation of this pipe would be set higher than the 24” pipe.

Response – The 12” pipe is acting as a high-flow outlet for CB 1 and CB 2. This has been clarified within the Drainage Control Structure Schedule on Sheet C-30.

- 3) Comment adequately addressed relative to the Underdrained Subsurface Sand Filter. The plans contain additional details on two underdrained soil filters / rain gardens. It appears these systems were designed without an impermeable liner. We request review and comment on these systems by the project’s geotechnical engineer.

Response – The following response is from Bill Peterlein, P.E. – Summit Geoengineering Services, Inc. in an email.

“I recommend that an impermeable liner be installed in the rain gardens up to at least 6 inches above the channel protection volume elevation. This measure will address the concerns of both #3 and #17 from a geotechnical perspective.”

The email is included as an attachment. The Rain Garden Detail was revised to include an impermeable liner wrapping the bottom and sides extending to 6” above the channel protection volume. Refer to Sheet C-42.

- 4) Comment adequately addressed. We recommend requiring a Stormwater Drainage System Maintenance Agreement as a condition of approval.

Response – Please refer to the attached Stormwater Drainage System Maintenance Agreement.

- 5) a), b), c), d) – Comments adequately addressed.
- 6) Comment adequately addressed.
- 7) Comment adequately addressed.
- 8) Comment adequately addressed.
- 9) We recommend a condition of approval stating that the Applicant shall submit final plans to the Portland Water District for review and approval, with documentation of PWD’s approval forwarded to the City Planning Office.

Response – Acorn Engineering submitted the final plans to the Portland Water District for review and approval on January 8th, 2014. We are awaiting a formal response.

- 10) *Comment adequately addressed.*
 11) *Comment adequately addressed.*
 12) *The Applicant's response letter states that "All proposed trees within a 5' proximity of the sewer pipe will be planted at a depth no greater than 3' deep. Permeable landscape fabric will be used to create a root barrier around the sewer pipes". This requirement should be reflected on the Landscaping and Civil plans.*

Response – Note 5 was added to the Storm Drain, Sewer and Water Typical Trench Section on Sheet C-45 stating:

5. All proposed trees within 5' proximity of the sewer pipe shall be planted at a depth no greater than 3' deep. Permeable landscape fabric shall create a root barrier around the sewer pipes. Contractor shall coordinate with the landscape drawings."

- 13) *Comment mostly addressed; note that Unit #20 is missing a sewer service connection on sheet C-20.*

Response – A sewer service was added to Unit #20 on Sheet C-20. Thank-you.

- 14) *Comment adequately addressed.*
 15) *Comment adequately addressed.*
 16) *Comment adequately addressed.*
 17) *The details provided for the underdrained soil filters (rain gardens) on C-42 do not provide sufficient detail at the edges of the system, where the in-slope meets the driveway/walkway pavers. The in-slope should be designed with measures to avoid erosion and under-mining of the adjacent pavers. As noted in Comment #3, the soil filters are not currently designed with an impermeable liner below the underdrain. The project geotechnical engineer should review the design to ensure that the introduction of surface water to the subsurface soils will not create geotechnical concerns.*

Response – Additional edge information was provided for the Rain Garden Detail on Sheet C-42. The detail specifies concrete paver edge restraints, clarifies the size of the shoulder, and provides for river stones at points of concentrated flow to mitigate the potential for erosion and under-mining of the concrete pavers. Sideslopes not protected with river stone shall be stabilized with loam, seed and erosion control blanket.

The following response is from Bill Peterlein, P.E. – Summit Geoengineering Services, Inc. in an email.

"I recommend that an impermeable liner be installed in the rain gardens up to at least 6 inches above the channel protection volume elevation. This measure will address the concerns of both #3 and #17 from a geotechnical perspective."

- 18) *The Applicant has noted that a revised C-30 drawing will be provided to address the previous review comment; we will review upon receiving the revised C-30 plan.*

Response – Sheet C-30 was revised to include sloped granite curb, along the driveway entrance, to redirect the stormwater away from the Rando property and towards the proposed rain gardens and USSF.

19) *In general we agree with the Applicant's proposal to provide "weep holes" at the base of the wall in lieu of a direct connection to the combined sewer in East Cove Street. The Applicant should include details and notes on the plans for the weep hole outlets to ensure that they are properly stabilized and that they do not direct concentrated flow onto adjoining properties. Per discussions with City DPS, the Applicant should design the retaining wall drainage system and weep holes to allow for a future connection to a hard-piped system if issues arise from groundwater flow. Additional notes and design details should be submitted for review and approval.*

Response – The following response is from Bill Peterlein, P.E. – Summit Geoengineering Services, Inc. in an email.

"The following minor revisions were made to Sheet 3 of the SGS retaining wall drawings.

1) The crushed stone at the base of the wall is extended up to the ground surface in front of the wall to provide erosion protection. The concept is that the water flow out of the weep pipe, into the stone, and then percolates into the subgrade soil. This potential infusion of water into the stone base will not affect the integrity of the retaining wall.

2) A secondary underdrain is shown at the base of the crushed stone column behind the wall. This underdrain would be capped at its ends. If there is a problem with weep water flowing onto the adjacent property, the weep pipe outlets can be capped and the end of the secondary underdrain connected to the combined Sewer in East Cove Street.

A revised plan set is attached."

Acorn Engineering revised Sheet C-30 to include the following Note 5.

"5. The retaining wall drainage system includes a secondary underdrain system for future connection to a hard piped system. Should issues arise from groundwater flow through the weep holes on to downgradient properties, the weep pipe outlets would be capped and the secondary underdrain would outlet to a future connection within East Cove Street. Refer to the Stormwater Inspection & Maintenance Plan for additional information."

The only change from Bill Peterlein's email is that the future connection would not be to a combined sewer but to a separated system. The location of the secondary underdrain outlet was also noted on Sheet C-30. Both Sheet C-30 and the Stormwater Inspection & Maintenance Plan are included as Exhibits within the Condominium Declaration. Refer to the attached Stormwater Inspection & Maintenance Plan for additional information.

20) *Comment adequately addressed.*

- 21) *Comment adequately addressed.*
- 22) *Comment adequately addressed.*
- 23) *On Sheet C-32 & C-33 the Applicant has noted that Summit Engineering Services in coordination with Structural Integrity Consulting Engineers, Inc., shall provide the retaining wall design, global stability analysis, and the design of the temporary soil restraint measures, as required. We recommend a condition of approval stating that the retaining wall designs be completed and submitted to the City as part of the Building Permit process prior to construction, and that it be stamped by a professional engineer.*

Response – The retaining wall design drawings, soil restraint measures and global stability analysis were each stamped by each respective professional engineer, and were submitted to the City as part of the Building Permit.

- 24) *Comment adequately addressed.*
- 25) *Comment adequately addressed.*
- 26) *Comment adequately addressed.*

Acorn Engineering submitted the Maine Construction General Permit – Notice of Intent Application on December 24th, 2013 and received no comments within the 14-day window for comments. Therefore the permit is approved.

Please let me know if you have any additional questions or comments.

Sincerely,



William H. Savage, P.E.
Project Manager
Acorn Engineering, Inc.

Attachment:

1. Stormwater Maintenance Agreement
2. Email from Bill Peterlein dated January 8th, 2014
3. Revised Summit Geoengineering Services Plan Set with changes clouded on Sheet 3.
4. Revised Acorn Engineering – Stormwater Inspection & Maintenance Plan dated January 16th, 2014.
5. Acorn Engineering – Civil Engineering Plans
 - i. C-10
 - ii. C-20
 - iii. C-30
 - iv. C-40
 - v. C-42
 - vi. C-45

**STORMWATER DRAINAGE SYSTEM
MAINTENANCE AGREEMENT**

IN CONSIDERATION OF the site plan and subdivision approval granted by the Planning Board of the City of Portland to a Grading, Drainage & Erosion Control Plan submitted by Redfern Munjoy, LLC, prepared by Acorn Engineering, Inc, PO Box 3372 Portland, Maine 04104, Issued for Construction, dated _____, _____ recorded in the Cumberland County Registry of Deeds in Plan Book ____, Page ____ (the “Plan”) and pursuant to a condition thereof, Redfern Munjoy, LLC, a Maine limited liability company with a principal place of business in Portland, Maine, and having a mailing address of P.O. Box 8816, Portland, Maine 04104, the owner of the subject premises, does hereby agree, for itself, its successors and assigns (the “Owner”), as follows:

Maintenance Agreement

That it, its successors and assigns, will, at its own cost and expense and at all times in perpetuity, maintain in good repair and in proper working order the underdrained subsurface sand filter BMP system, rain gardens, storm drain pipes, underdrain pipes, catch basins, (hereinafter referred to collectively referred to as the “stormwater system”), as shown on the Plan and in strict compliance with the approved Stormwater Report prepared for the Owner by Acorn Engineering, Inc. and Chapter 32 of the Portland City Code.

Owner of the subject premises further agrees, at its own cost, to keep a Stormwater Maintenance Log. Such log shall be made available for inspection by the City of Portland upon reasonable notice and request.

Said agreement is for the benefit of the said City of Portland and all persons in lawful possession of said premises and abutters thereto; further, that the said City of Portland or said persons in lawful possession may enforce this Agreement by an action at law or in equity in any court of competent jurisdiction; further, that after giving the Owner written notice and a stated time to perform, the said City of Portland, by its authorized agents or representatives, may, but is not obligated to, enter upon said premises to maintain, repair, or replace said stormwater system in the event of any failure or neglect thereof, the cost and expense thereof to be reimbursed in full to the said City of

Portland by the Owner upon written demand. Any funds owed to the City under this paragraph shall be secured by a lien on the property.

This Agreement shall not confer upon the City of Portland or any other person the right to utilize said stormwater system for public use or for the development of any other property, and the Owner shall bear no financial responsibility by virtue of this Agreement for enlarging the capacity of said system for any reason whatsoever.

This Agreement shall also not be construed to allow any change or deviation from the requirements of the subdivision and/or site plan most recently and formally approved by the Planning Board of the City of Portland.

This agreement shall bind the undersigned only so long as it retains any interest in said premises, and shall run with the land and be binding upon the Owner's successors and assigns as their interests may from time to time appear.

The Owner agrees to provide a copy of this Agreement to any successor or assign and to forward to the City an Addendum signed by any successor or assign in which the successor or assign states that the successor or assign has read the Agreement, agrees to all its terms and conditions and the successor or assign will obtain and forward to the City's Department of Public Services and Department of Planning and Urban Development a similar Addendum from any other successor or assign.

For the purpose of this agreement and release "Owner" is any person or entity who is a successor or assign and has a legal interest in part, or all, of the real estate and any building. The real estate shown by chart, block and lot number in the records on file in the City Assessor's office shall constitute "the property" that may be entered by the City and liened if the City is not paid all of its costs and charges following the mailing of a written demand for payment to the owner pursuant to the process and with the same force and effect as that established by 36 M.R.S.A. §§ 942 and 943 for real estate tax liens.

Any written notices or demands required by the agreement shall be complete on the date the notice is attached to one or more doors providing entry to any buildings or residential units and mailed by certified mail, return receipt requested or ordinary mail or both to the owner of record as shown on the tax roles on file in the City Assessor's Office.

If the property has more than one owner on the tax rolls, service shall be complete by mailing it to only the first listed owner. The failure to receive any written notice required by this agreement shall not prevent the City from entering the property and performing maintenance or repairs on the stormwater system, or any component thereof, or liening it or create a cause of action against the City.

Dated at Portland, Maine this _____ day of January, 2014.

Redfern Munjoy, LLC

Jonathan Culley, Manager

STATE OF MAINE
CUMBERLAND, ss.

Date: _____

Personally appeared the above-named Jonathan Culley, Manager of Redfern Munjoy, LLC, and acknowledged the foregoing instrument to be his free act and deed in his said capacity.

Before me,

Notary Public/Attorney at Law

Print name: _____

William Savage

From: Bill Peterlein <bpeterlein@summitgeoeng.com>
Sent: Wednesday, January 08, 2014 11:23 AM
To: William Savage
Cc: Jonathan Culley; Mike Barton; Aaron Jones; Ryan Senatore
Subject: Re issued Response
Attachments: Bill Peterlein.vcf; 13067-2 WALL PLAN SET.PDF

Will & Team – please find my responses to comments #3, #17, and #19 below.

#3 and #17: I recommend that an impermeable liner be installed in the rain gardens up to at least 6 inches above the channel protection volume elevation. This measure will address the concerns of both #3 and #17 from a geotechnical perspective.

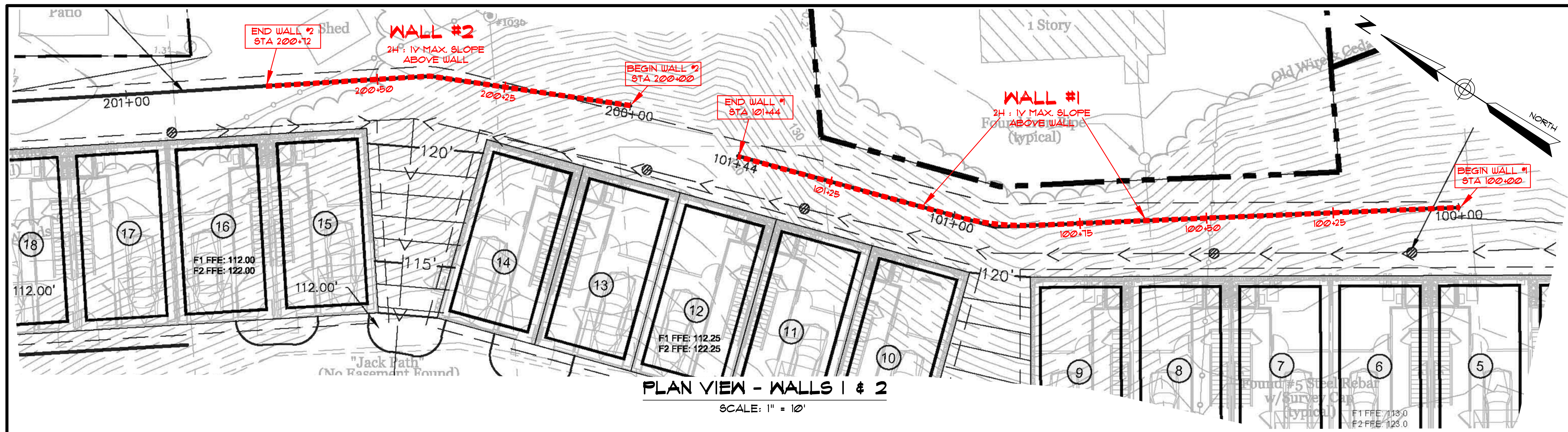
#19: The following minor revisions were made to Sheet 3 of the SGS retaining wall drawings.

1) The crushed stone at the base of the wall is extended up to the ground surface in front of the wall to provide erosion protection. The concept is that the water flow out of the weep pipe, into the stone, and then percolates into the subgrade soil. This potential infusion of water into the stone base will not affect the integrity of the retaining wall.

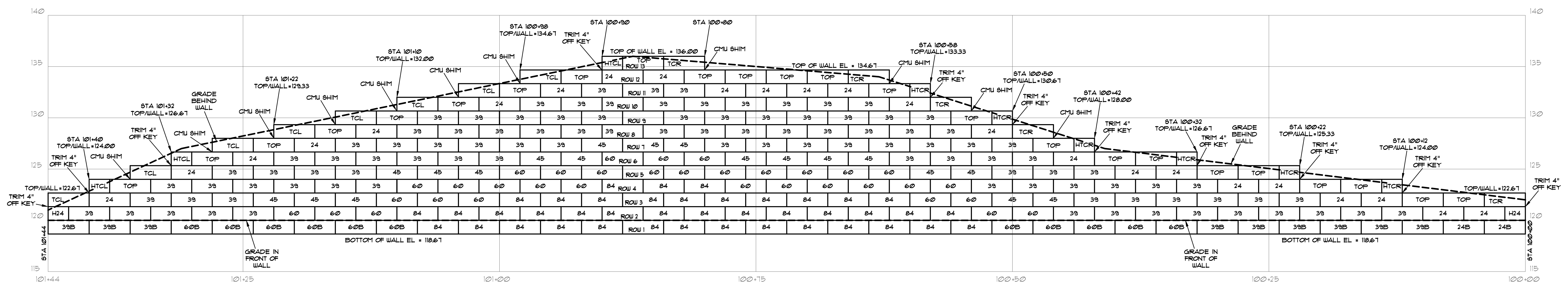
2) A secondary underdrain is shown at the base of the crushed stone column behind the wall. This underdrain would be capped at its ends. If there is a problem with weep water flowing onto the adjacent property, the weep pipe outlets can be capped and the end of the secondary underdrain connected to the combined Sewer in East Cove Street.

A revised plan set is attached.

Bill Peterlein, P.E.
President & Principal Engineer
Summit Geoengineering Services, Inc.
P.O. Box 7216, Lewiston, Maine 04243
145 Lisbon St, Suite 601, Lewiston, Maine 04240
(207) 576-3313

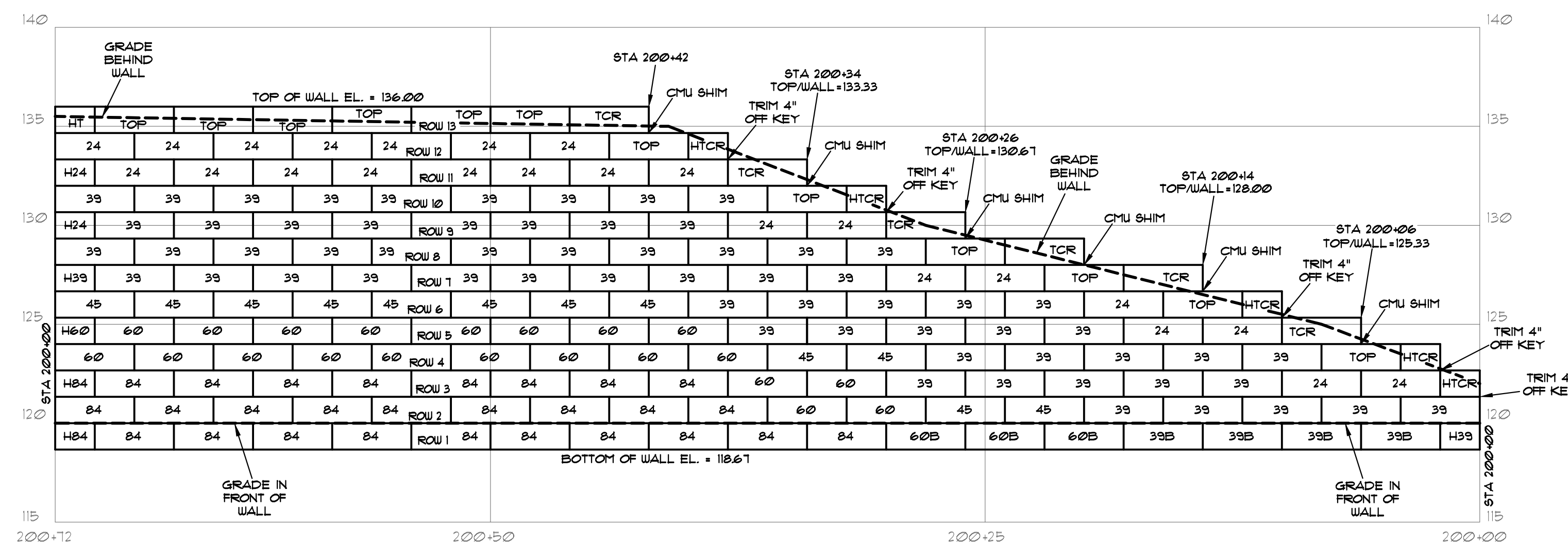


PLAN VIEW - WALLS 1 & 2
SCALE: 1" = 10'



PROFILE - WALL #1
SCALE: 1" = 5'

WALL 1 - BLOCK COUNT		
SYMBOL	BLOCK TYPE	QUANTITY
TOP	TOP	24
TCL	TOP LEFT	8
TCR	TOP RIGHT	5
HTCL	HALF TOP LEFT	3
HTCR	HALF TOP RIGHT	6
24	24" FULL BLOCK	24
H24	24" HALF BLOCK	2
39	39" FULL BLOCK	105
45	45" FULL BLOCK	19
60	60" FULL BLOCK	34
84	84" FULL BLOCK	41
24B	24" BASE BLOCK	2
39B	39" BASE BLOCK	9
60B	60" BASE BLOCK	11
TOTAL = 1,533 sq. ft.		



PROFILE - WALL #2
SCALE: 1" = 5'

WALL 2 - BLOCK COUNT		
SYMBOL	BLOCK TYPE	QUANTITY
TOP	TOP	12
HT	HALF TOP	1
TCR	TOP RIGHT	6
HTCR	HALF TOP RIGHT	5
24	24" FULL BLOCK	24
H24	24" HALF BLOCK	2
39	39" FULL BLOCK	63
H39	39" HALF BLOCK	2
45	45" FULL BLOCK	12
60	60" FULL BLOCK	21
H60	60" HALF BLOCK	1
84	84" FULL BLOCK	27
H84	84" HALF BLOCK	2
39B	39" BASE BLOCK	4
60B	60" BASE BLOCK	3
TOTAL = 952 sq. ft.		

SHEET TITLE: **RECON BLOCK-WALLS 1 & 2**
PLAN & PROFILE

PROJECT: **MUNJOY HEIGHTS**
 CLIENT: **REDFERN MUNJOY, LLC**
 P.O. BOX 8816 - FORTLAND, ME 04104

SCALE: AS NOTED
 DATE: DECEMBER 5, 2013
 CHECKED BY: UMP

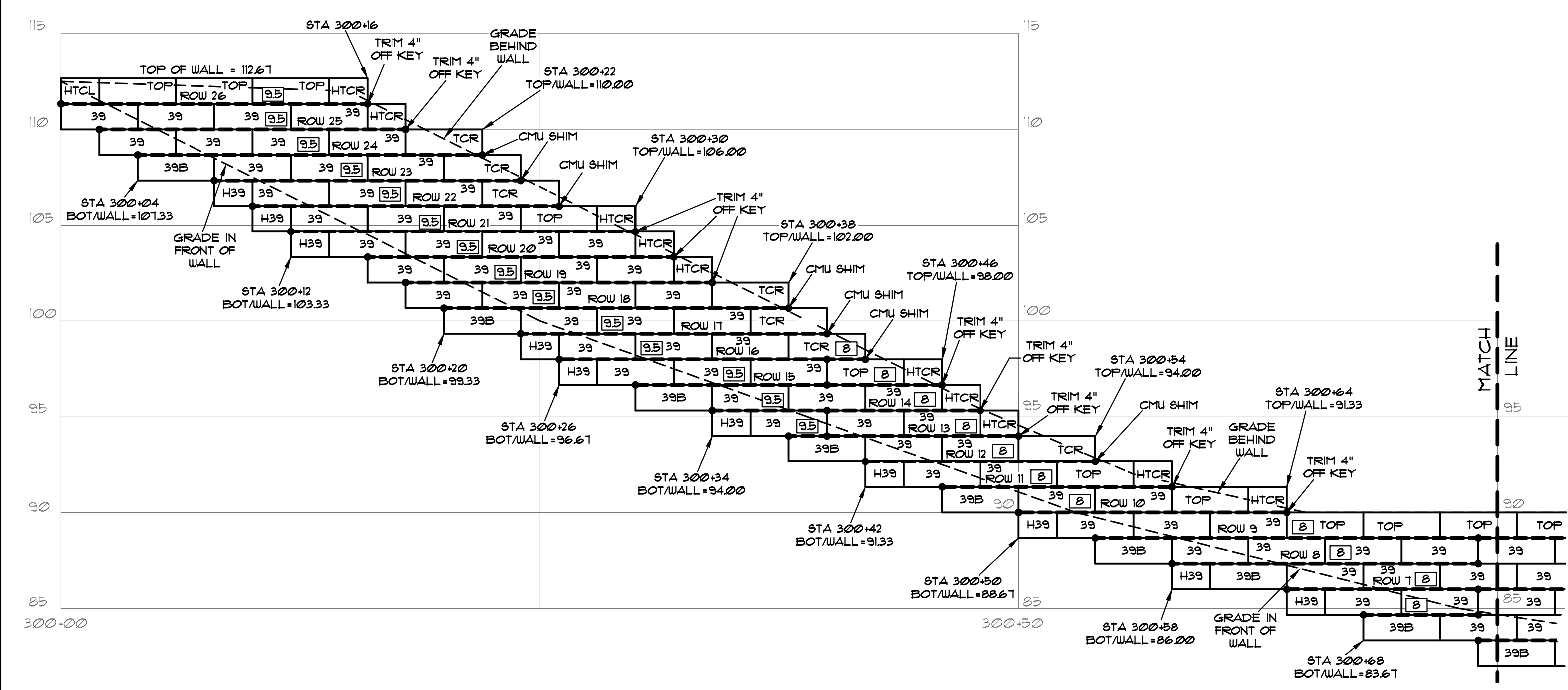
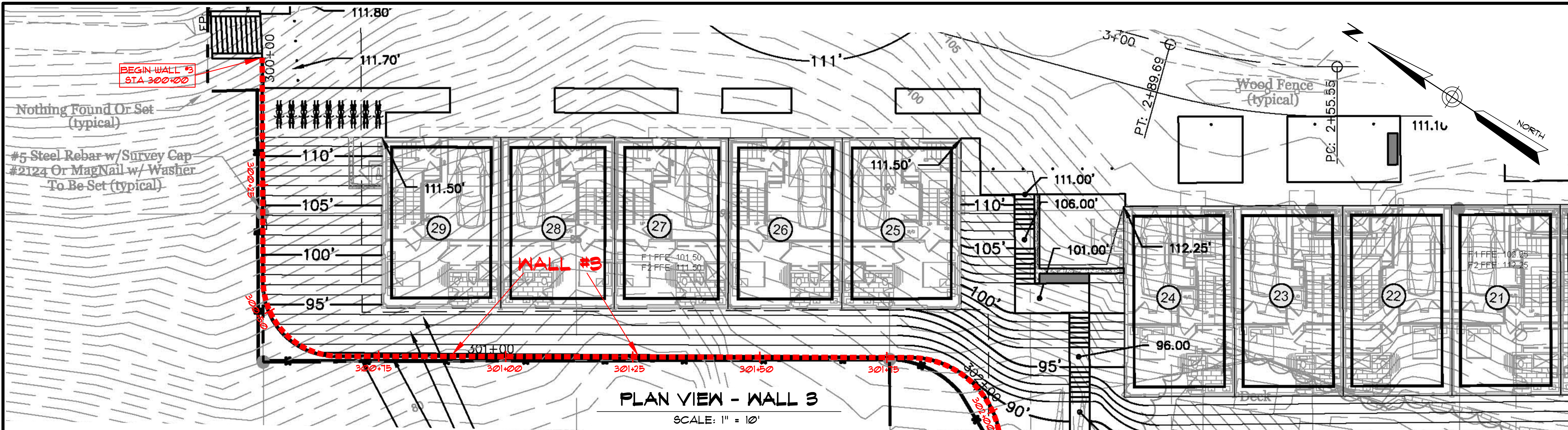
NO. 1
 REVISION
 CHANGES PER SUPPLIER REVIEW
 DATE: 12-16-13

145 LISBON ST. - SUITE 601
 LEWISTON, ME 04240
 Tel: (207) 576-3313
 www.summitgeogroup.com

SUMMIT
 GEOTECHNICAL SERVICES

WILLIAM M. PETERLIN
 REGISTERED PROFESSIONAL ENGINEER

JOB NO. - 130672
 SHEET



WALL 3 - BLOCK COUNT

SYMBOL	BLOCK TYPE	QUANTITY
TOP	TOP	44
TCR	TOP RIGHT	7
HT	HALF TOP	1
HTCL	HALF TOP LEFT	1
HTCR	HALF TOP RIGHT	10
39	39" FULL BLOCK	219
H39	39" HALF BLOCK	16
39B	39" BASE BLOCK	38
TOTAL =		1,111 sq. ft.

GEOGRID QUANTITIES

LENGTH (ft.)	WIDTH (ft.)	AREA (ft ²)
8	116	928
8.5	130	1,105
9	230	2,070
9.5	198	1,881
10	60	600
11	56	616
12	42	504
TOTAL =		1,104 sq. yd.

ALL GEOGRID SHALL BE MIRAFI 5xT



RECON BLOCK-WALL #3
PLAN & PROFILE

MUNJOY HEIGHTS

PROJECT: 145 LISBON ST. - SUITE 601 LEWISTON, ME 04240
Tel: (207) 576-3313 www.summitgeogeng.com

CLIENT: REDFERN MUNJOY, LLC
P.O. BOX 806 - FORTLAND, ME 04104

SCALE: AS NOTED
DATE: DECEMBER 5, 2013
DRAWN BY: KRF
CHECKED BY: UMP

NO. 1
CHANGES PER SUPPLIER REVIEW
REVISION
DATE 12-16-13

SUMMIT
ENGINEERING SERVICES

WILLIAM A. PETERLEIN
REGISTERED PROFESSIONAL ENGINEER

JOB NO. - 13061
SHEET **2**

GENERAL NOTES

- 1) WALL LAYOUT IS BASED UPON A SET OF PLANS ENTITLED "MUNJOY HEIGHTS", DATED DECEMBER 16, 2013, PREPARED BY ACORN ENGINEERING.
- 2) THE CONTRACTOR IS RESPONSIBLE TO LAYOUT THE LOCATION OF THE FACE OF THE BOTTOM BLOCK COURSE AND THE WALL ALIGNMENT.
- 3) THE DESIGN OF THE WALLS ARE SPECIFIC TO THIS SITE AND SHOULD NOT BE USED ON OTHER SITES. DESIGNS ARE BASED ON INTIMATE KNOWLEDGE OF THE PROJECT BY S.G.S. AS A MEMBER OF THE DESIGN TEAM AND A GEOTECHNICAL INVESTIGATION BY S.G.S.
- 4) SOIL INFORMATION WAS OBTAINED FROM A GEOTECHNICAL INVESTIGATION PERFORMED BY S.G.S.
- 5) THE FOLLOWING ASSUMPTIONS WERE USED IN THE DESIGN -
 - A) SLOPE OF GROUND AT BASE AND TOP OF WALL = 2H : 1V MAXIMUM
 - B) LIVE LOAD SURCHARGE = 100 psf (MSE) & 150 psf (GRAVITY)
 - C) DEAD LOAD SURCHARGE = 500 psf (MSE, TO ACCOUNT FOR FOUNDATIONS)
 - D) SOIL PROPERTIES - GRAVITY WALL
FOUNDATION - EXISTING FILL OR GLACIAL TILL, $u_w = 135$ pcf, $\phi = 33^\circ$
RETAINED - RETAINING WALL BACKFILL (NOTE 22), $u_w = 125$ pcf, $\phi = 32^\circ$
 - E) SOIL PROPERTIES - MSE WALL
FOUNDATION - GRANULAR FILL OVER GLACIAL TILL, $u_w = 130$ pcf, $\phi = 30^\circ$
REINFORCED & RETAINED - RETAINING WALL BACKFILL (NOTE 22), $u_w = 128$ pcf, $\phi = 32^\circ$
 - F) SEISMIC DESIGN COEFFICIENT = 0.08
 - G) MAXIMUM CONTACT PRESSURE BENEATH WALL IS LESS THAN 4000 psf
 - H) GROUNDWATER BELOW BASE OF WALL
 - I) GEOGRID COVERAGE RATIO = 100%

THE CONTRACTOR SHALL COORDINATE INSTALLATION OF THE GRAVITY WALL AND MSE WALLS WITH THE INSTALLATION SOLDIER FILE AND LAGGING WALL AND C.I.P. CONCRETE WALLS WHERE THESE WALL SYSTEMS INTERSECT.

FOUNDATION NOTES

- 6) FOUNDATION EXCAVATION SHALL EXTEND TO UNDISTURBED NATURAL DEPOSITS. ALL EXISTING TOPSOIL, LOOSE MATERIAL, FILL, ORGANIC SOIL, AND OTHER SOFT OR UNSTABLE FOUNDATION SOILS SHALL BE REMOVED FROM THE AREA TO BE OCCUPIED BY THE WALL AND REPLACED WITH CRUSHED STONE OR COMPACTED RETAINING WALL BACKFILL. REMOVE UNSUITABLE FOUNDATION SOILS TO THE LATERAL LIMITS EXTENDING BEYOND THE WALL A DISTANCE EQUAL TO THE DEPTH OF FILL REQUIRED BELOW THE WALL PLUS (1) ONE FOOT. SOFT, WET AND OTHERWISE UNSUITABLE SOIL SHOULD BE BROUGHT TO THE ATTENTION OF SUMMIT GEOENGINEERING SERVICES.
- 7) UPON COMPLETION OF THE EXCAVATION THE NATURAL SUBGRADE SHALL BE COMPACTED BY A MINIMUM OF 4 PASSES USING A VIBRATORY COMPACTOR.
- 8) INSTALL AND COMPACT $\frac{3}{4}$ " CRUSHED STONE FOR BLOCK WALL LEVELING PAD AS SHOWN ON THE WALL CROSS SECTION. EXTEND LEVELING PAD ONE FOOT HORIZONTALLY IN ALL DIRECTIONS BEYOND LIMITS OF PRECAST BLOCK WALL.

WALL INSTALLATION

- 9) A GLOBAL STABILITY ANALYSIS FOR WALL #3 HAS BEEN PERFORMED BY S.G.S. THE STABILITY ANALYSIS IS SPECIFIC TO THE RECON MSE WALL SYSTEM. IF AN ALTERNATIVE WALL SYSTEM IS USED, A NEW GLOBAL STABILITY ANALYSIS SHOULD BE PERFORMED USING THE SPECIFIC PROPERTIES OF THE SELECTED WALL SYSTEM.
- 10) A COMPLETE SET OF APPROVED CONSTRUCTION DRAWINGS AND CONTRACT SPECIFICATIONS SHALL BE ON SITE AT ALL TIMES DURING CONSTRUCTION OF THE MSE AND GRAVITY RETAINING WALL SYSTEMS. THE CONTRACTOR IS RESPONSIBLE TO FOLLOW THE SPECIFICATIONS AND THESE DRAWINGS.
- 11) INSTALL BASE COURSE OF BLOCKS ON PREPARED FOUNDATION LEVELING PAD. ENSURE THAT BASE COURSE IS LEVEL SIDE TO SIDE AND LUMB. ADJUST BLOCKS AS REQUIRED TO PROVIDE A STRAIGHT AND LEVEL BASE COURSE.
- 12) INSTALL $\frac{3}{4}$ " CRUSHED STONE AND RETAINING WALL BACKFILL SOIL BEHIND THE WALL AS INDICATED ON THESE DRAWINGS.
- 13) SLEEP AND CLEAN OFF BLOCK WALL, AND INSTALL NEXT COURSE OF BLOCKS. SHIMS MAY BE REQUIRED TO FLUMB BLOCK. SHIMS SHALL BE APPROVED BY THE WALL SUPPLIERS AND SUMMIT GEOENGINEERING SERVICES (S.G.S). SHIMS SHALL CONSIST OF A HIGH COMPRESSIVE STRENGTH, SLIP RESISTANT MATERIAL $\frac{1}{4}$ " MAXIMUM THICKNESS BY 4" DEEP BY 8" WIDE MINIMUM.
- 14) THE FOLLOWING TOLERANCES ARE RECOMMENDED:
VERTICAL CONTROL - 1/2" OVER (1/3" MAX.)
HORIZONTAL CONTROL - SAME AS VERTICAL
ROTATION FROM THE PLAN BATTER - +2 DEGREES, -0 DEGREES
BULGING - 1" OVER 10' DISTANCE
- 15) GEOGRIDS SHALL BE INSTALLED AT THE LENGTHS, ELEVATIONS AND LOCATIONS SHOWN ON THE DRAWINGS HEREIN. CHANGES TO GEOGRID LAYOUT ARE NOT PERMISSIBLE WITHOUT THE EXPRESS WRITTEN CONSENT OF S.G.S.
- 16) GEOGRID SHALL BE ROLLED OUT PERPENDICULAR TO THE FACING UNITS. INSTALL GEOGRID IN FULL LENGTH PIECES. PULL GEOGRID TIGHT AND SECURE TO HOLD TENSION ON GEOGRID. INSTALL DRAINAGE AND BACKFILL MATERIAL ON GRID TAKING PRECAUTIONS TO KEEP GEOGRID TIGHT.
- 17) TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE GEOGRID REINFORCEMENT. A MINIMUM BACKFILL COVER OF 6" IS REQUIRED FOR OPERATION OF TRACKED VEHICLES OVER THE GEOGRID REINFORCEMENT. TURNING OF TRACKED VEHICLES SHOULD BE KEPT TO A MINIMUM TO PREVENT TRACKS FROM DISPLACING THE FILL AND/OR GEOGRID REINFORCEMENT. RUBBER-TIRED VEHICLES MAY PASS OVER THE GEOGRID REINFORCEMENT AT SPEEDS LESS THAN 10 MPH. SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.
- 18) A MINIMUM OF 3" OF REINFORCED BACKFILL SHALL BE PLACED BETWEEN OVERLAPPING LAYERS OF GEOGRID REINFORCEMENT.
- 19) RETAINING WALL BACKFILL SHALL BE PLACED FROM THE BACK OF THE WALL FACE TOWARD THE ENDS OF THE GEOGRID TO PROMOTE PROPER TENSIONING.
- 20) RETAINING WALL BACKFILL SHALL BE PLACED AND COMPACTED TO A MINIMUM OF 95% OF ITS MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557. THE OWNER SHALL HIRE A TESTING AGENCY TO PERFORM FIELD DENSITY TESTS AT A MINIMUM FREQUENCY OF 1 TEST PER EVERY OTHER LIFT (32') PER 50'. THE MAXIMUM LIFT THICKNESS SHALL BE LIMITED TO 16". ONLY LIGHTWEIGHT EQUIPMENT SHALL BE ALLOWED WITHIN 5' OF THE BACK FACE OF THE GRAVITY & MSE STRUCTURES.
- 21) AT THE END OF EACH WORKDAY, BACKFILL SURFACE SHALL BE GRADED AWAY FROM THE WALL FACE A MINIMUM OF 2% SLOPE. THE BACKFILL SURFACE SHALL BE COMPACTED WITH A 9000TH DRUM ROLLER TO MINIMIZE PONDING OF WATER AND SATURATION OF THE BACKFILL. A TEMPORARY SOIL BERM SHALL BE CONSTRUCTED NEAR THE CREST OF THE MSE STRUCTURE TO PREVENT SURFACE WATER RUNOFF FROM OVERTOPPING THE MSE STRUCTURE.

MATERIAL SPECIFICATIONS

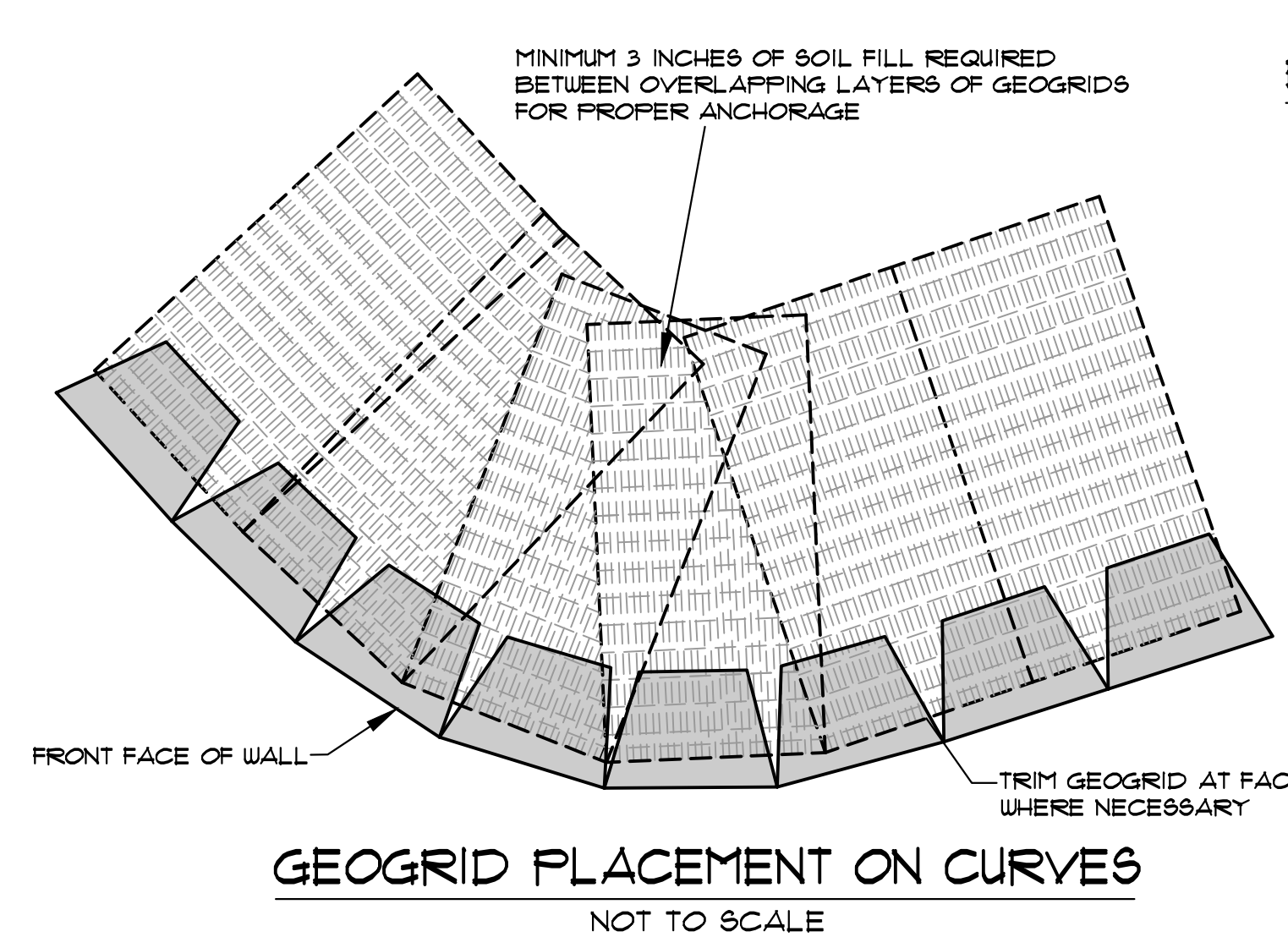
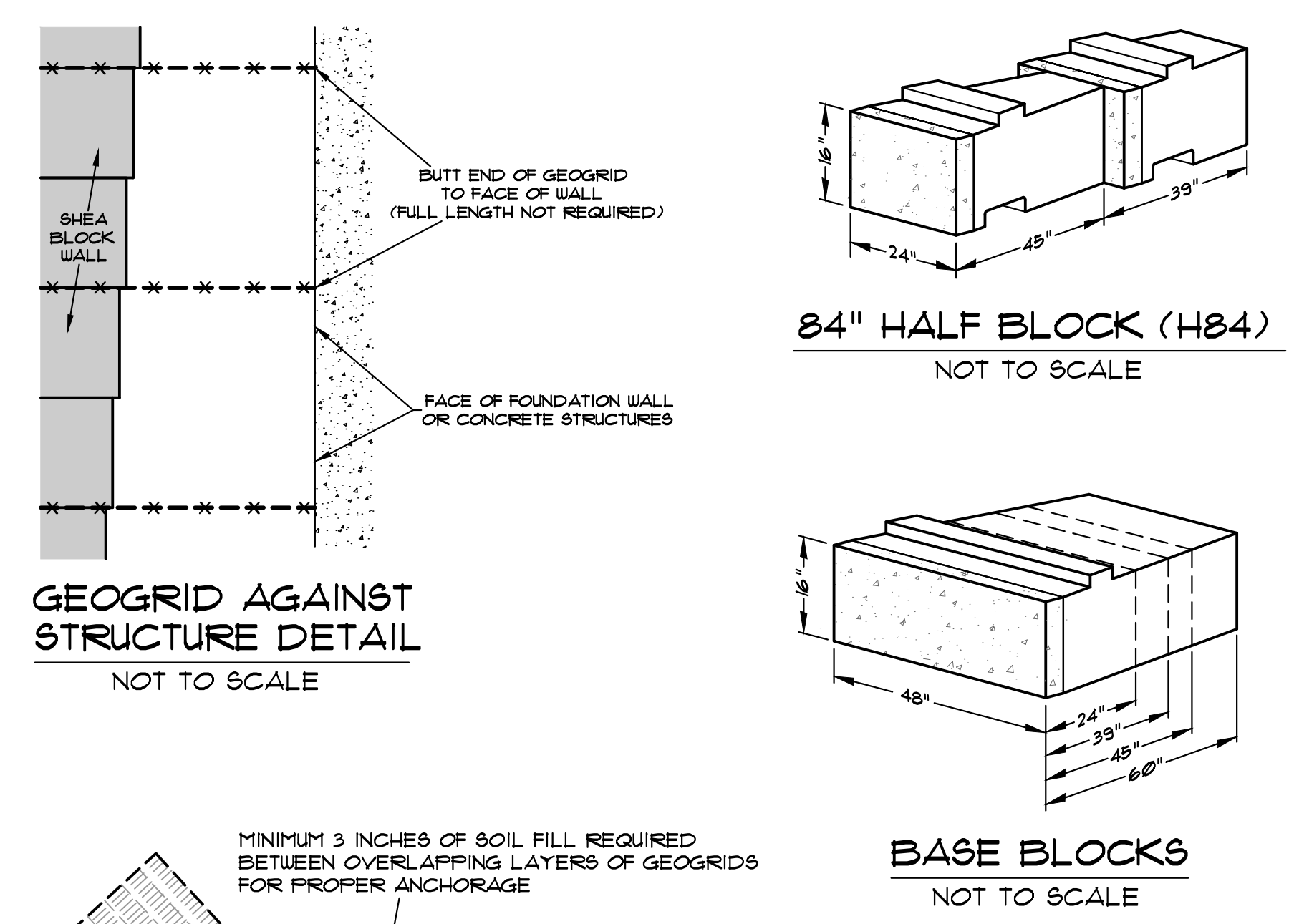
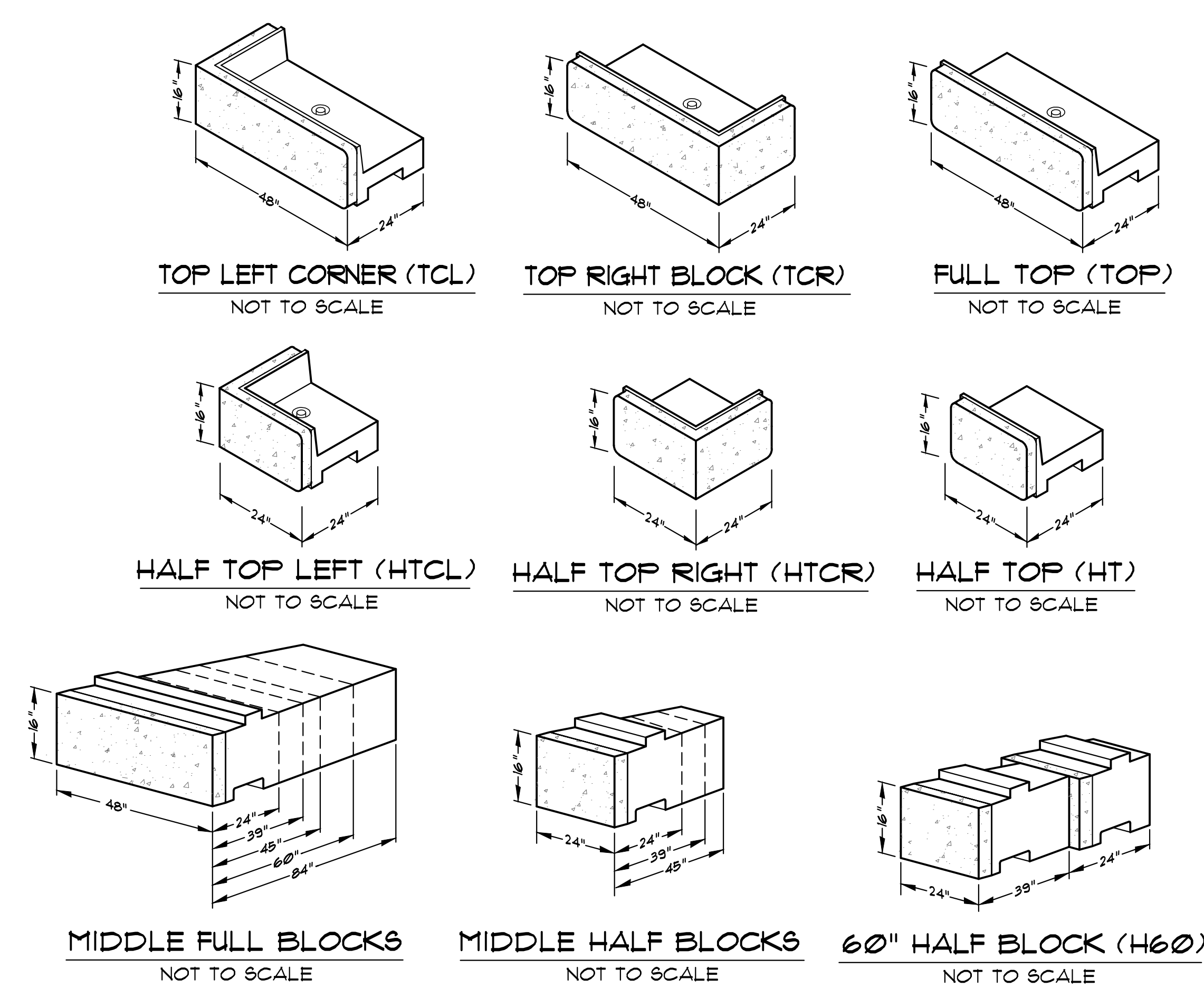
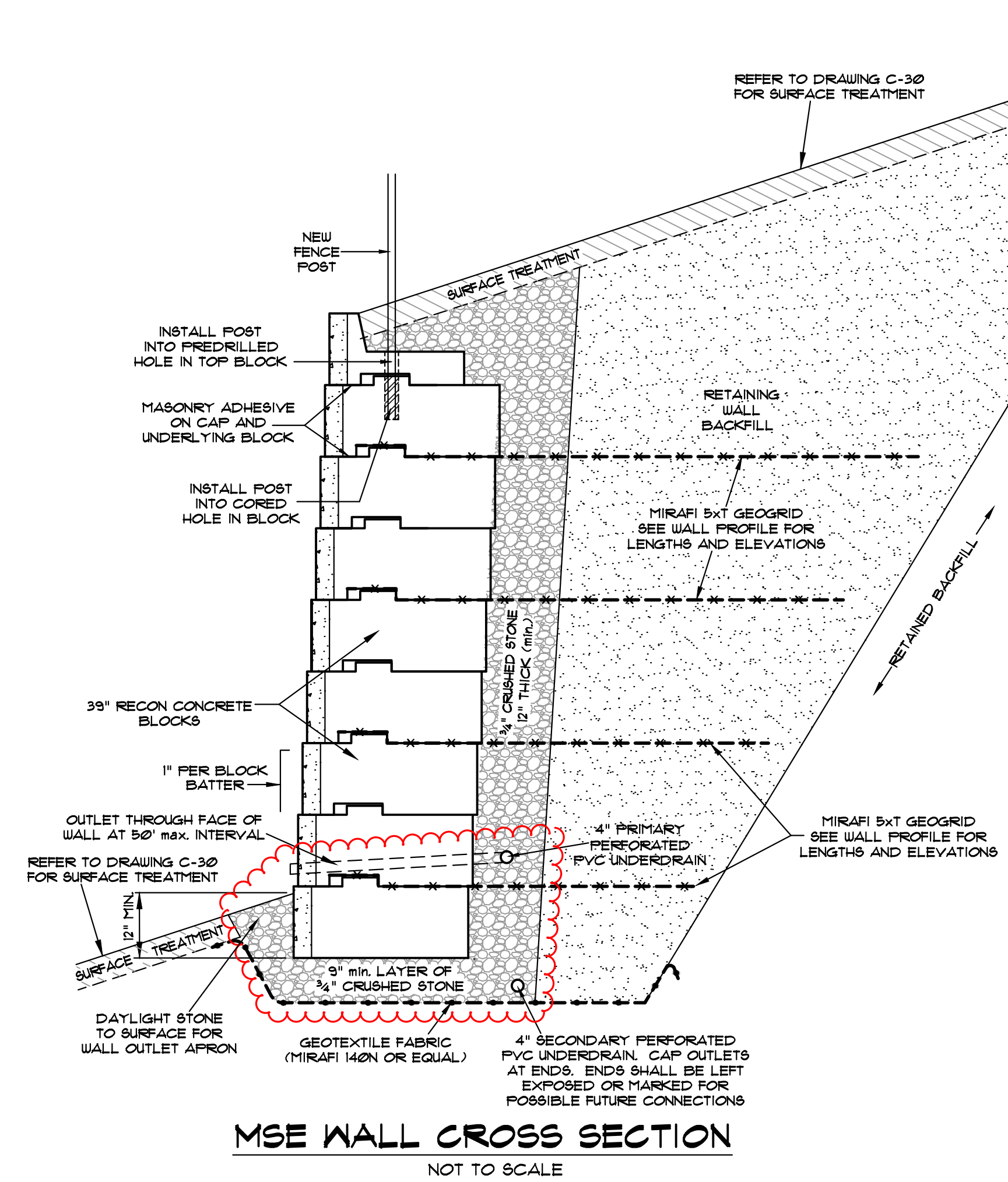
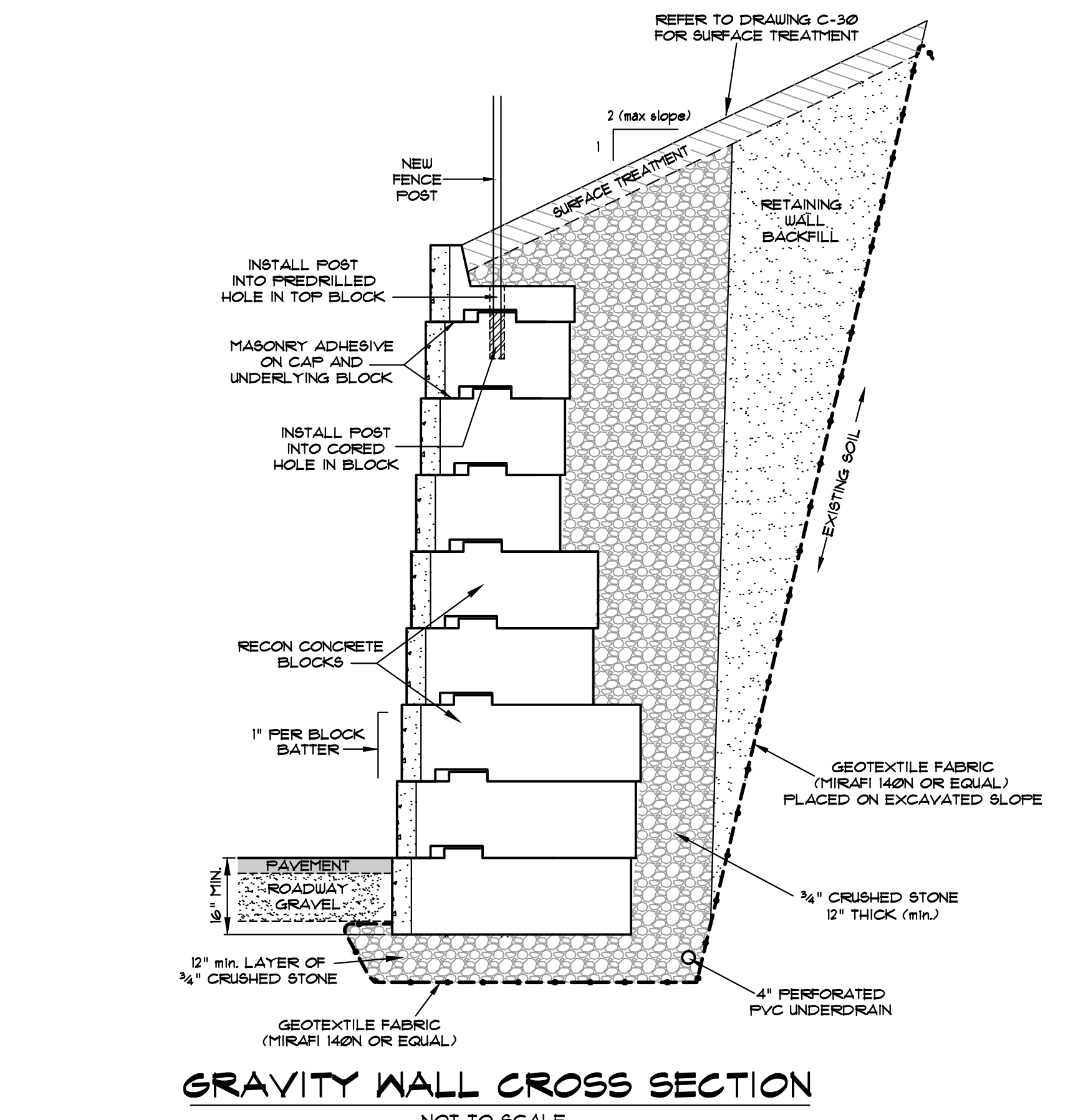
- 22) $\frac{3}{4}$ " CRUSHED STONE SHALL BE CLEAN ANGULAR CRUSHED STONE MEETING THE FOLLOWING GRADATION AS DETERMINED IN ACCORDANCE WITH ASTM D422.

SIEVE SIZE	PERCENT PASSING
1"	100
$\frac{1}{2}$ "	90 - 100
$\frac{3}{8}$ "	20 - 55
No. 4	0 - 10
No. 8	0 - 5
- 23) RETAINING WALL BACKFILL SHALL BE A FREE DRAINING, WELL GRADED GRANULAR MATERIAL MEETING THE GRADATION REQUIREMENTS OF MDOT 103.20 GRAVEL BORROW.

SIEVE SIZE	PERCENT PASSING
3"	100
$\frac{1}{2}$ "	10 - 10
No. 40	0 - 20
No. 200	0 - 10
- 24) RETAINING WALL BACKFILL SHALL BE PLACED IN A MAXIMUM OF 16" LIFTS AND COMPACTED TO 95% IN ACCORDANCE WITH AASHTO T99. THE MAXIMUM PARTICLE SIZE SHALL BE LIMITED TO 4".
- 25) BLOCKS SHALL BE RECON PRECAST CONCRETE BLOCKS AS INDICATED ON THE PROFILE, MANUFACTURED BY SHEA CONCRETE PRODUCTS, AMESBURY, MA.
- 26) GEOGRID SHALL BE 5xT MANUFACTURED BY TENCATE.
- 27) GEOTEXTILE SHALL BE MIRAFI 140N OR EQUIVALENT.

CONSTRUCTION CONTROL

- 28) IT IS THE RESPONSIBILITY OF THE CONTRACTOR OR THEIR REPRESENTATIVE TO ENSURE THAT CONSTRUCTION OF THE WALL AND MATERIALS USED IN THE CONSTRUCTION OF THE WALL ARE IN ACCORDANCE WITH THESE SPECIFICATIONS AND/OR THE CONTRACT SPECIFICATIONS WHICH EVER ARE MORE STRINGENT.
- 29) SHEA CONCRETE AND ITS ENGINEER ACCEPTS NO RESPONSIBILITY NOR LIABILITY IN THE DETERMINATION OF THE ADEQUACY OF SITE MATERIALS AND/OR PROCEDURES.
- 30) PRIOR TO THE START OF CONSTRUCTION THE CONTRACTOR SHALL VERIFY THAT ALL ELEVATIONS AND ASSUMED SITE CONDITIONS SHOWN ON THESE DRAWINGS ARE ACCURATE TO THE GIVEN SITE CONDITIONS. ANY DISCREPANCY SHALL BE BROUGHT TO THE ATTENTION OF S.G.S. PRIOR TO START OF CONSTRUCTION.



DATE

REVISION

NO. 1 ADD SECONDARY UNDERDRAIN ON WALL 3

CONSTRUCTION NOTES & DETAILS

DRAWN BY: KRF
CHECKED BY: WJMP

SCALE: AS NOTED
DATE: DECEMBER 9, 2013

MUNJOY HEIGHTS

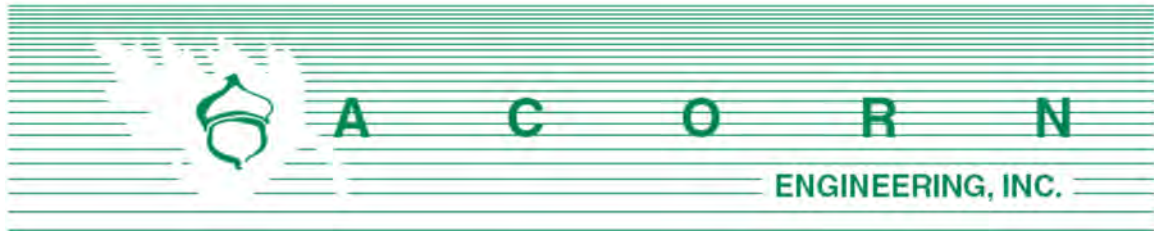
RED FERN MUNJOY, LLC
P.O. BOX 8816 - PORTLAND, ME 04104

PROJECT: 145 LIBBON ST. - SUITE 601
LEWISTON, ME 04240
Tel: (207) 516-5313
www.summitgeoring.com

SUMMIT
GEOENGINEERING SERVICES

WILLIAM PETERLIN
30213
REGISTERED PROFESSIONAL ENGINEER

JOB NO. - 130612
SHEET 3



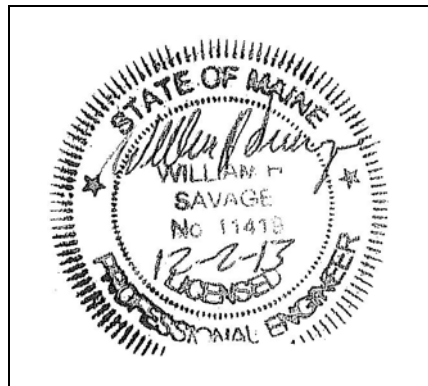
POST CONSTRUCTION - STORMWATER INSPECTION & MAINTENANCE PLAN

Prepared For:

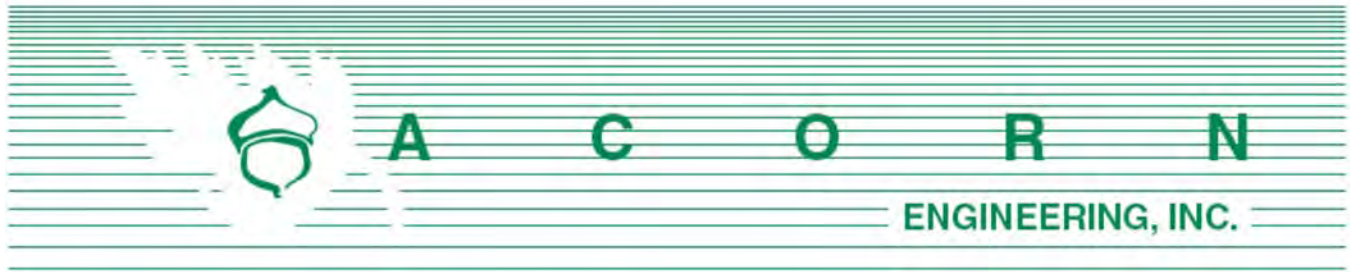
**Redfern Munjoy, LLC
Munjoy Heights
79 Walnut Street
Portland, Maine 04101**

Prepared By:

**Acorn Engineering, Inc.
PO Box 3372
Portland, Maine 04104**



**November 2013
Revised: 1/16/14**



RESPONSIBLE PARTY

The owner, Redfern Munjoy, LLC, and or their successor shall be responsible for contracting with a qualified stormwater professional to implement the Inspection and Maintenance Plan. The qualified stormwater professional shall maintain a stormwater log (report) summarizing inspections, maintenance, and corrective action taken. The Qualified Stormwater Professional shall annually submit the Stormwater Log to the Department of Public Services prior to June 30th.

The following is an example of a qualified stormwater professional that the homeowners association may contract through.

Organization: Will Savage, PE
Acorn Engineering, Inc
Portland, Maine

Phone: (207) 775-2655

Qualifications:

- Maine Professional Engineering License #11419
- Maine DEP - Certified in Maintenance & Inspection of Stormwater BMP's Cert #14
- Certified Erosion, Sediment and Storm Water Inspector (CESSWI) Cert #0293
- Certified Professional in Erosion and Sediment Control (CPESC) Cert. #4620

The inspection and maintenance criteria is based upon the Maine DEP - Stormwater Management for Maine, Volume III: BMPs Technical Design Manual. Refer to the Grading and Drainage Plan for the location of the BMPs

PURPOSE

This Inspection and Maintenance Plan has been individually tailored to this parcel's stormwater infrastructure, site characteristics, and their respective opportunities and limitations related to reducing the pollutant load on the receiving watershed. The maintenance of a parcel's impervious surfaces and stormwater infrastructure is critical to extending the long term performance and effectiveness of Best Management Practices (BMPs). The Inspection and Maintenance Plan represents the parcel's minimum activities to meet the permit requirements. The parcel shall still be subject to any applicable Civil Site Plans, Permit Applications, Erosion and Sedimentation Control Plans Reports, Stormwater Management Plans, Inspection and Maintenance Manuals, and all Municipal, State, and Federal rules.

OPERATION AND MAINTENANCE ACTIVITY

Underdrained Subsurface Sand Filter (USSF):

The maintenance of the underdrained subsurface sand filter shall be in accordance with the following activities identified below and the most recent version of the Maine DEP Volume III BMPs Technical Design Manual Chapter 7.3 Underdrained Subsurface Sand Filter.

- The system should be inspected after every major storm in the first few months to ensure proper function. Thereafter, the filter should be inspected at least once every six months to ensure that it is draining within 24 hours to 36 hours.
- Inspect Outlet Control Structures (OCS) to ensure they are in good working order and that the orifice and trash racks are unobstructed from trash and debris.
- Inspect and maintain the StormTech Isolator Row in accordance with the attached proprietary Operation and Maintenance Plan.

Sweeping:

Annual sweeping of the driveway and parking areas following the snow melt for accumulated winter sand, if necessary. Appropriately dispose of all collected material.

Storm Drains:

The storm drain shall be annually inspected for the presence of accumulated sediment or debris. Any sediment shall be removed as required.

- The equipment shall meet the following minimum specifications; power jet and water source for washing down the storm drain, vacuum attachment for catch basin cleaning, and a liquid handling method to dewater the material.
- Inspect and legally dispose of accumulated sediment and debris within the storm drains between basins. Liquids must be decanted on-site and returned to the catch basin.

Catch Basins:

Catch basins shall be inspected to confirm the structure is operating properly.

- Inspect the presence of accumulated sediment or debris any sediment shall be removed. The equipment shall meet the following minimum specifications; power jet and water source for washing down the storm drain, vacuum attachment for catch basin cleaning, and a liquid handling method to dewater the material.
- Sediment shall be removed when accumulation is within 6 inches of the outfall pipe invert. Legally dispose of accumulated sediment and debris from the bottom of the basin, inlet grates, and inflow channels to the basin.
- If the basin outlet is designed with a hood to trap floatable materials (e.g. Snout), check to ensure watertight seal is working.
- Appropriately dispose of all collected material.

Rain Garden (Bioretention Cell):

The maintenance of the rain garden shall be in accordance with the following activities identified below and the most recent version of the Maine DEP Volume III BMPs Technical Design Manual Chapter 7.2 Underdrained Bioretention Cell BMP.

- The soil filter shall be inspected to ensure the filter area is draining within a 48-hour period and no less than a 24-hour period.
- Soil filter replacement shall occur when water ponds on the surface of the bed for periods greater than 72 hours. The top several inches of the filter shall be replaced with fresh material. Removed material shall be disposed in an acceptable manner.
- Soil filter modification shall occur if the filter bed is draining in less than 24 hours. The top six inches of the filter shall be replaced with six inches of loam, per the most recent Maine DEP specification.
- The filter area shall not be fertilized unless it is absolutely necessary.
- Harvesting and pruning of excessive growth shall be done occasionally. Weeding to control unwanted or invasive plants may be necessary.
- Inspect the overflow outlet to ensure they are in good working order and unobstructed from trash and debris.

Landscaped, Vegetated and Areas Adjacent to Retaining Walls:

Inspect all landscaped and or vegetated slopes and embankments on an annual basis. Vegetated areas with bare areas or sparse growth (<90% coverage) shall be revegetated. Mulch shall be applied to landscaped areas, as necessary. Dead or decaying landscaping (ground cover, shrubs, trees etc.) shall be replanted in accordance with the approved Landscape Plan by Soren Deniord Design Studios.

If signs of rill erosion or scour are present within areas tributary to the retaining walls, or stormwater flow is observed flowing over the wall, Acorn Engineering should be immediately contacted to perform an inspection and/or to contact the appropriate professional. Should concerns arise from the downhill abutters related to groundwater flow from the retaining wall weep hole outlets, Acorn Engineering should be contacted to perform a site inspection and to meet with the concerned abutter. Periodic inspections of the retaining walls shall be performed, under separate contract, by a Professional Geotechnical Engineer.

INSPECTION AND MAINTENANCE TABLE

Inspection and Maintenance Frequency	Spring or Yearly	Summer	Fall	As Necessary
Underdrained Subsurface Sand Filter	X		X	X
Sweeping	X			X
Storm Drains		X		X
Catch Basins		X		X
Rain Garden	X	X		X
Landscaped/Vegetated/Wall Areas	X			X

**Save Valuable Land and
Protect Water Resources**



Isolator[®] Row O&M Manual
StormTech[®] Chamber System for Stormwater Management

1.0 The Isolator[®] Row

1.1 INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.



Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

1.2 THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

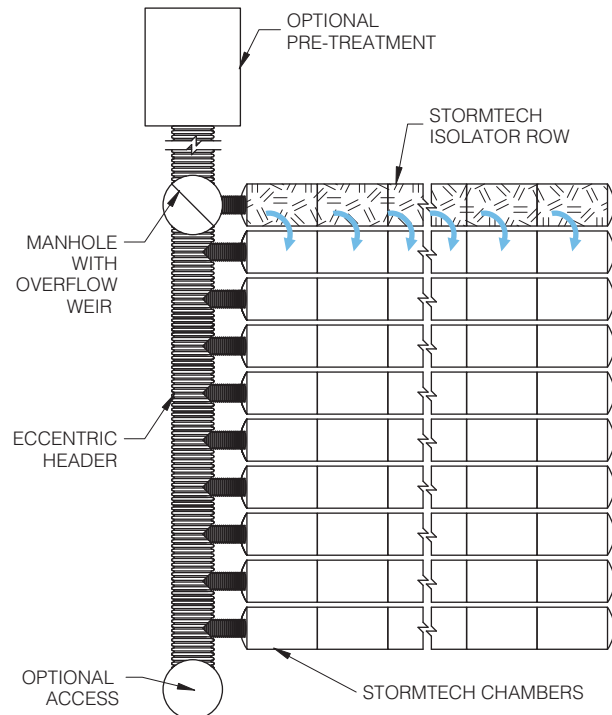
Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

The Isolator Row is typically designed to capture the “first flush” and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.

StormTech Isolator Row with Overflow Spillway (not to scale)



2.0 Isolator Row Inspection/Maintenance

2.1 INSPECTION

The frequency of Inspection and Maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

2.2 MAINTENANCE

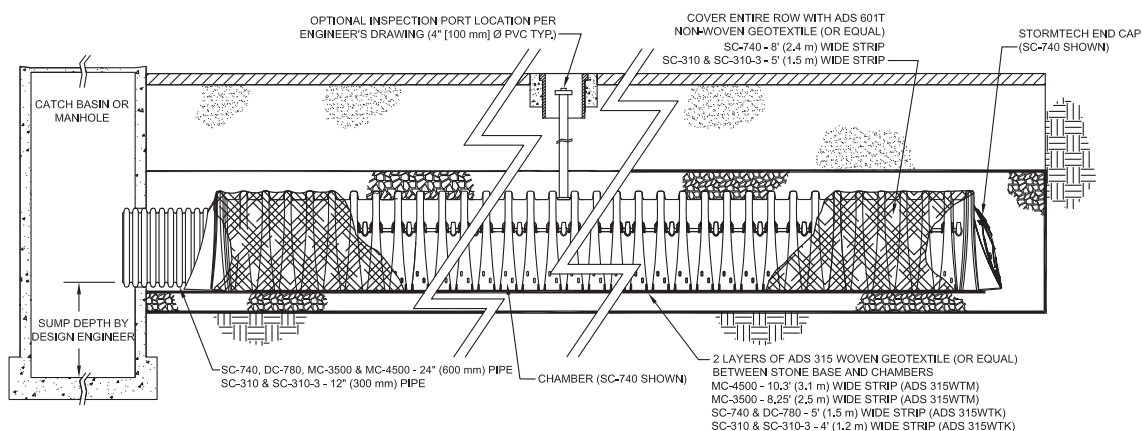
The Isolator Row was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.



Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products.)

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

StormTech Isolator Row (not to scale)



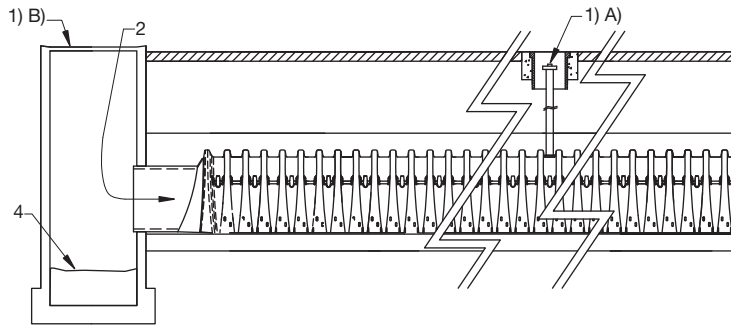
NOTE: NON-WOVEN FABRIC IS ONLY REQUIRED OVER THE INLET PIPE CONNECTION INTO THE END CAP FOR DC-780, MC-3500 AND MC-4500 CHAMBER MODELS AND IS NOT REQUIRED OVER THE ENTIRE ISOLATOR ROW.

3.0 Isolator Row Step By Step Maintenance Procedures

Step 1) Inspect Isolator Row for sediment

- A) Inspection ports (if present)
 - i. Remove lid from floor box frame
 - ii. Remove cap from inspection riser
 - iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.
 - iv. If sediment is at, or above, 3 inch depth proceed to Step 2. If not proceed to step 3.
- B) All Isolator Rows
 - i. Remove cover from manhole at upstream end of Isolator Row
 - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
 1. Mirrors on poles or cameras may be used to avoid a confined space entry
 2. Follow OSHA regulations for confined space entry if entering manhole
 - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches) proceed to Step 2. If not proceed to Step 3.

StormTech Isolator Row (not to scale)



Step 2) Clean out Isolator Row using the JetVac process

- A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

Step 3) Replace all caps, lids and covers, record observations and actions

Step 4) Inspect & clean catch basins and manholes upstream of the StormTech system

Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1) - (2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/01	6.3 ft.	none		New installation. Fixed point is CI frame at grade	djm
9/24/01		6.2	0.1 ft.	Some grit felt	sm
6/20/03		5.8	0.5 ft.	Mucky feel, debris visible in manhole and in Isolator row, maintenance due	rv
7/7/03	6.3 ft.		0	System jetted and vacuumed	djm



70 Inwood Road, Suite 3 | Rocky Hill | Connecticut | 06067
 860.529.8188 | 888.892.2694 | fax 866.328.8401 | www.stormtech.com

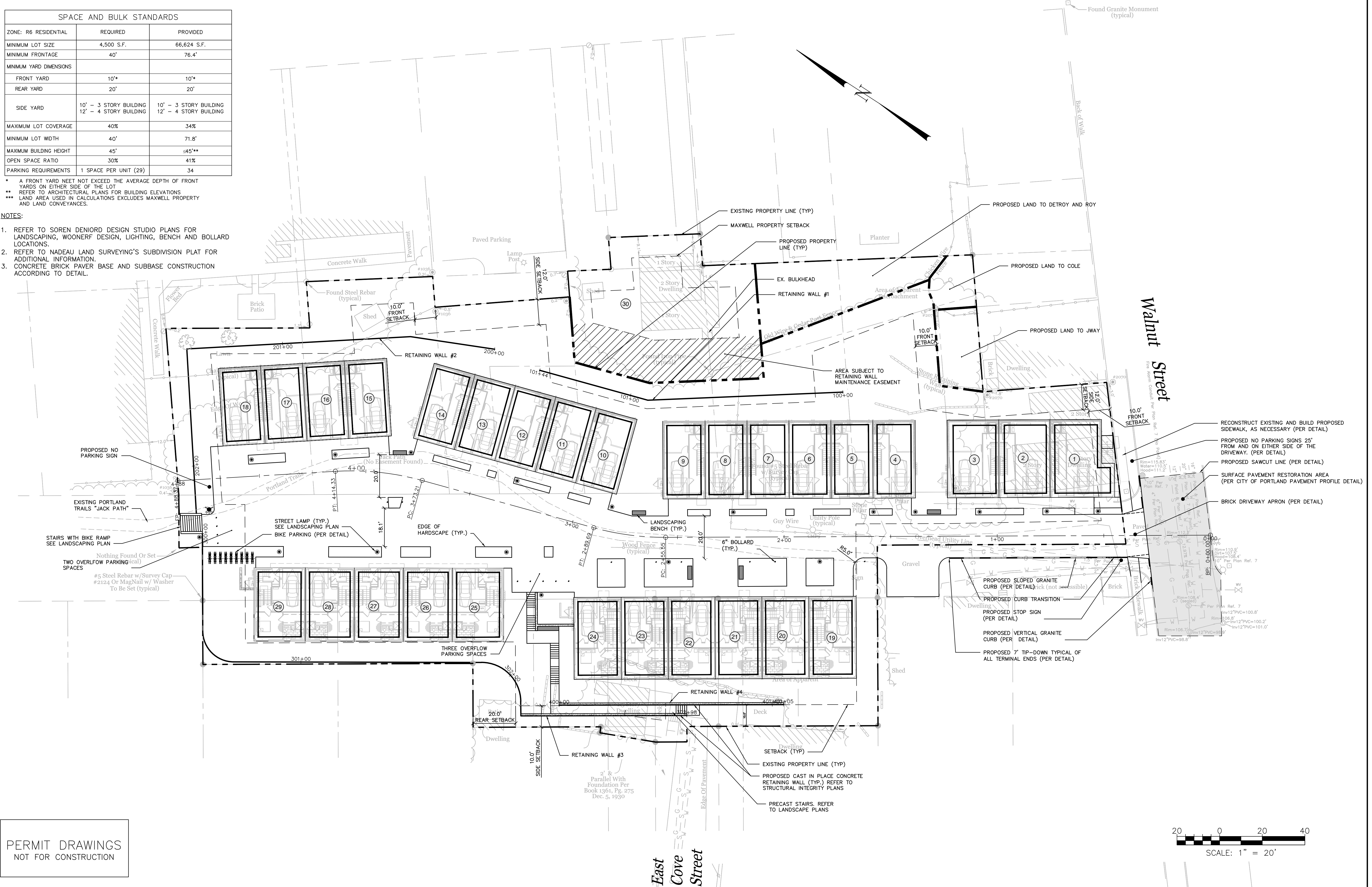
ADS "Terms and Conditions of Sale" are available on the ADS website, www.ads-pipe.com
 Advanced Drainage Systems, the ADS logo, and the green stripe are registered trademarks of Advanced Drainage Systems.
 Stormtech® and the Isolator® Row are registered trademarks of StormTech, Inc.
 Green Building Council Member logo is a registered trademark of the U.S. Green Building Council.

SPACE AND BULK STANDARDS		
ZONE: R6 RESIDENTIAL	REQUIRED	PROVIDED
MINIMUM LOT SIZE	4,500 S.F.	66,624 S.F.
MINIMUM FRONTAGE	40'	76.4'
MINIMUM YARD DIMENSIONS		
FRONT YARD	10'	10'
REAR YARD	20'	20'
SIDE YARD		
	10' - 3 STORY BUILDING 12' - 4 STORY BUILDING	10' - 3 STORY BUILDING 12' - 4 STORY BUILDING
MAXIMUM LOT COVERAGE	40%	34%
MINIMUM LOT WIDTH	40'	71.8'
MAXIMUM BUILDING HEIGHT	45'	<45'*
OPEN SPACE RATIO	30%	41%
PARKING REQUIREMENTS	1 SPACE PER UNIT (29)	34

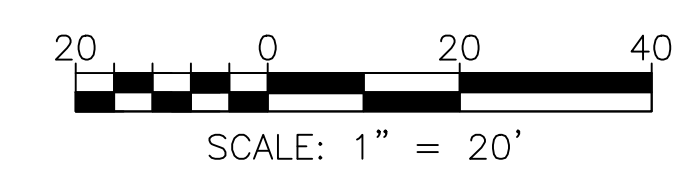
* A FRONT YARD NEET NOT EXCEED THE AVERAGE DEPTH OF FRONT YARDS ON EITHER SIDE OF THE LOT
 ** REFER TO ARCHITECTURAL PLANS FOR BUILDING ELEVATIONS
 *** LAND AREA USED IN CALCULATIONS EXCLUDES MAXWELL PROPERTY AND LAND CONVEYANCES.

NOTES:

1. REFER TO SOREN DENIORD DESIGN STUDIO PLANS FOR LANDSCAPING, WOONERF DESIGN, LIGHTING, BENCH AND BOLLARD LOCATIONS.
2. REFER TO NADEAU LAND SURVEYING'S SUBDIVISION PLAT FOR ADDITIONAL INFORMATION.
3. CONCRETE BRICK PAVR BASE AND SUBBASE CONSTRUCTION ACCORDING TO DETAIL.



PERMIT DRAWINGS
NOT FOR CONSTRUCTION



ISSUED FOR	DATE	BY
CITY SUBMISSION	9/23/13	WHS
WORKSHOP #2	11/12/13	WHS
FINAL SUBMISSION	12/2/13	WHS
MAINE DEP MCGP	12/16/13	WHS
CONDITIONS APPROVAL	1/7/14	WHS

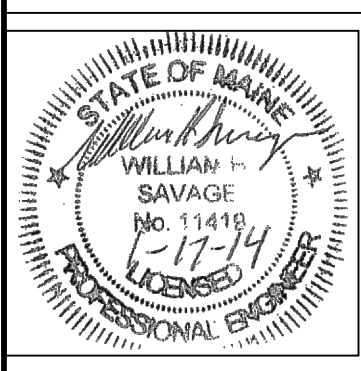
REVISION	REV. DATE	REV. BY
STAFF COMMENTS	12/6/13	WHS

DRAWING NAME: **SITE LAYOUT PLAN**
 PROJECT NAME: **MUNJOY HEIGHTS**
 CLIENT: **REDFERN MUNJOY, LLC.**
 P.O. BOX 8816, PORTLAND, MAINE 04104

A C O R N
ENGINEERING, INC.

1047
P.O. BOX 3372 PORTLAND, MAINE 04104
(207) 775-2655

FILE: 1047_CIVIL
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 JN: 1047
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 DRAWN BY: ZRJ
 CHECKED BY: WHS

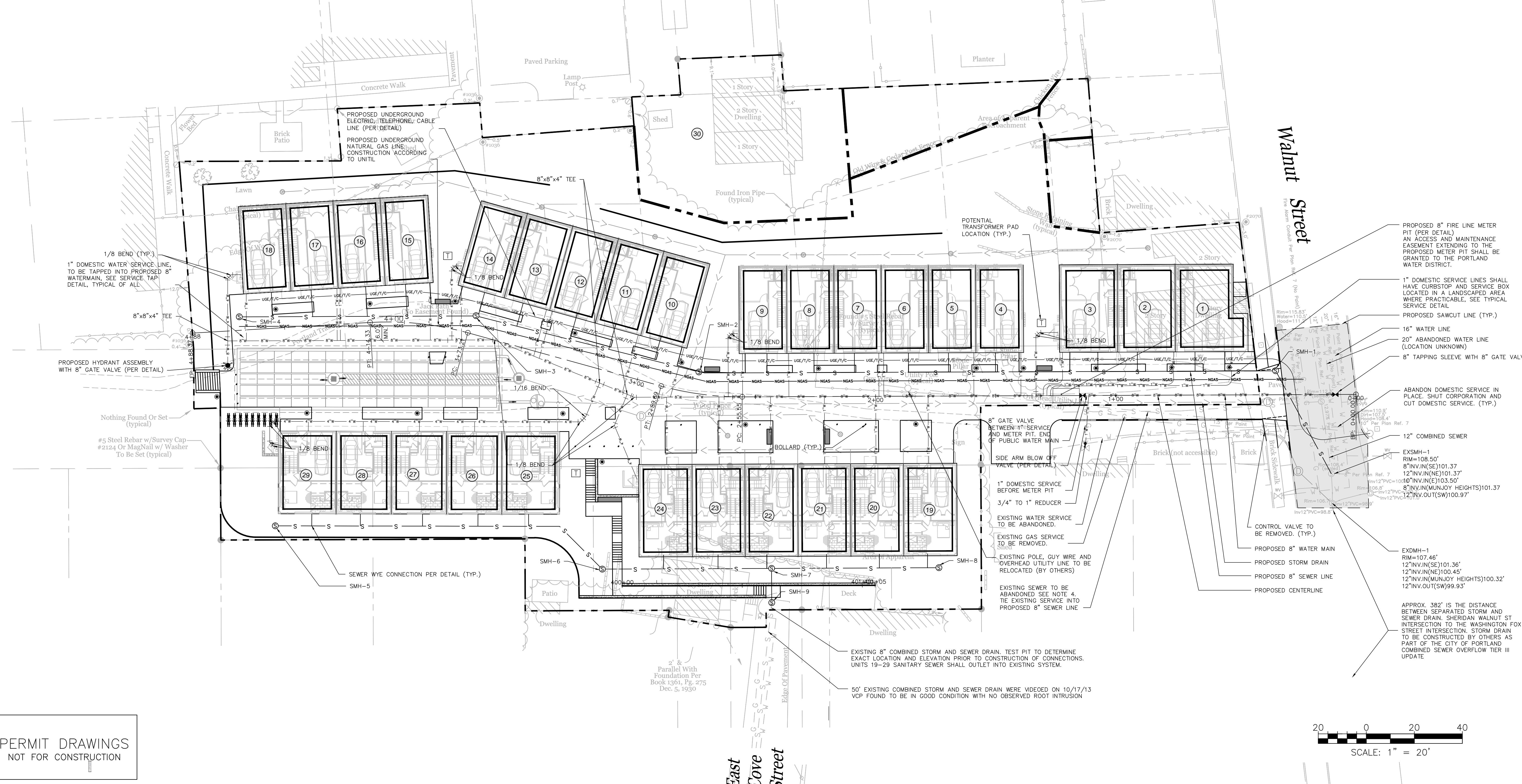


DRAWING NO.
C-10

- NOTES:
- UTILITY NOTES WITHIN WALNUT STREET FROM PLAN TITLED SHERIDAN STREET SANITARY SEWER AND STREET RECONSTRUCTION BY WOODARD & CURRAN CONSULTING ENGINEERS, SHEET 5, STAMPED AS-BUILTS 6-20-89.
 - COORDINATE ALL UTILITY ENTRY POINTS WITH ARCHITECTURAL PLANS PRIOR TO START OF CONSTRUCTION.
 - THE CONDOMINIUM ASSOCIATION DOCUMENTS SHALL PROVIDE A HYDRANT MAINTENANCE AGREEMENT IN ACCORDANCE WITH CITY OF PORTLAND TECHNICAL MANUAL SECTION 3.2.3 REVISED 6/17/11.
 - PLUGGING OF ABANDONED SEWER LATERALS SHALL BE IN ACCORDANCE WITH CITY OF PORTLAND TECHNICAL MANUAL SECTION 2.6.11 REVISED 6/7/11.
 - POTENTIAL TRANSFORMER PAD LOCATIONS ARE APPROXIMATE PENDING CONFIRMATION BY CENTRAL MAINE POWER COMPANY AND FUTURE REVIEW/APPROVAL BY THE CITY.
 - IF NECESSARY, ELECTRIC AND TELEPHONE PULL BOXES LOCATIONS TO BE DETERMINED BY THE CENTRAL MAINE POWER AND VERIZON PRIOR TO CONSTRUCTION. CONTRACTOR TO COORDINATE.
 - CONTRACTOR TO COORDINATE THE RELOCATION OF THE EXISTING GUY WIRE AND UTILITY POLE WITH CENTRAL MAINE POWER COMPANY.
 - MAINTAIN MINIMUM 10' HORIZONTAL SEPARATION BETWEEN SANITARY SEWER AND WATERMAIN. DEFLECT WATER MAIN JOINT UP TO 3' TO MAINTAIN ALIGNMENT. THE CONTRACTOR MAY REDUCE THE HORIZONTAL SEPARATION TO 5', PROVIDED THE INSTALLATION MEETS THE PORTLAND WATER DISTRICT SPECIFICATION AND PROCEDURES SECTION 1: GENERAL INFORMATION, D. 2. CONTRACTOR SHALL OBTAIN APPROVAL IN WRITING FROM THE PORTLAND WATER DISTRICT PRIOR TO ANY WATER AND SEWER LINE CONSTRUCTION.
 - THE EXACT LOCATION OF THE INDIVIDUAL GAS AND UGE/T/C LOCATIONS SHALL BE PROVIDED BY WRIGHT-RYAN TO THE RESPONSIBLE CONTRACTOR.

SEWER STRUCTURE SCHEDULE				
STRUCTURE	SIZE	RIM	INV. IN	INV. OUT
EXSMH-1	EXIST.	108.50'	8" INV. IN (SE) 101.37' 12" INV. IN (NE) 101.37' 10" INV. IN (E) 103.50' 8" INV. IN (MUNJOY HEIGHTS) 101.37'	12" INV. OUT (SW) 100.97'
SMH-1	4'	113.35'	102.52'	102.42'
SMH-2	4'	112.23'	105.00'	104.90'
SMH-3	4'	111.75'	105.71'	105.61'
SMH-4	4'	112.41'	-	106.08'
SMH-5	4'	93.00'	-	87.50'
SMH-6	4'	90.00'	84.50'	84.40'
SMH-7*	4'	91.50'	8"/83.04' 8"/83.04'	TBD
SMH-8	4'	91.50'	-	84.40'
SMH-9**	4'	TBD/85.75'	TBD	TBD

* IF THE DROP IS GREATER THAN 2 FEET BETWEEN THE INVERT IN & OUT, BASED UPON THE DATA RECEIVED FROM THE TEST PIT, THEN A DROP MANHOLE SHALL BE REQUIRED. PROVIDE TEST PIT INFORMATION TO THE ENGINEER FOR VERIFICATION.
 ** INVERTS IN & OUT TO BE DETERMINED BASED UPON TEST PIT DATA.



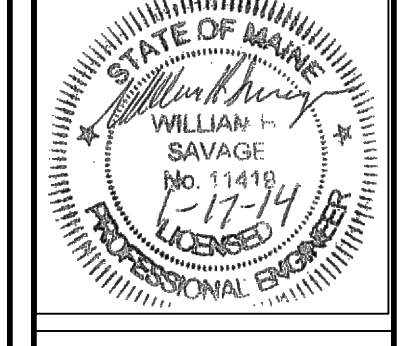
ISSUED FOR	DATE	BY
CITY SUBMISSION	9/23/13	WHS
WORKSHOP #2	11/12/13	WHS
FINAL SUBMISSION	12/22/13	WHS
MAINE DEP MCGP	12/16/13	WHS
CONDITIONS APPROVAL	1/7/14	WHS

REVISION	REV. DATE	BY
STAFF COMMENTS	12/2/13	WHS

DRAWING NAME: **UTILITY PLAN**
 PROJECT NAME: **MUNJOY HEIGHTS**
 CLIENT: **REDFERN MUNJOY, LLC.**
 P.O. BOX 8816, PORTLAND, MAINE 04104

ACORN ENGINEERING, INC.
 2207 775-2655
 P.O. BOX 33201 PORTLAND, ME 04104

FILE: 1047_CIVIL
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 DRAWN BY: ZRJ
 CHECKED BY: WHS



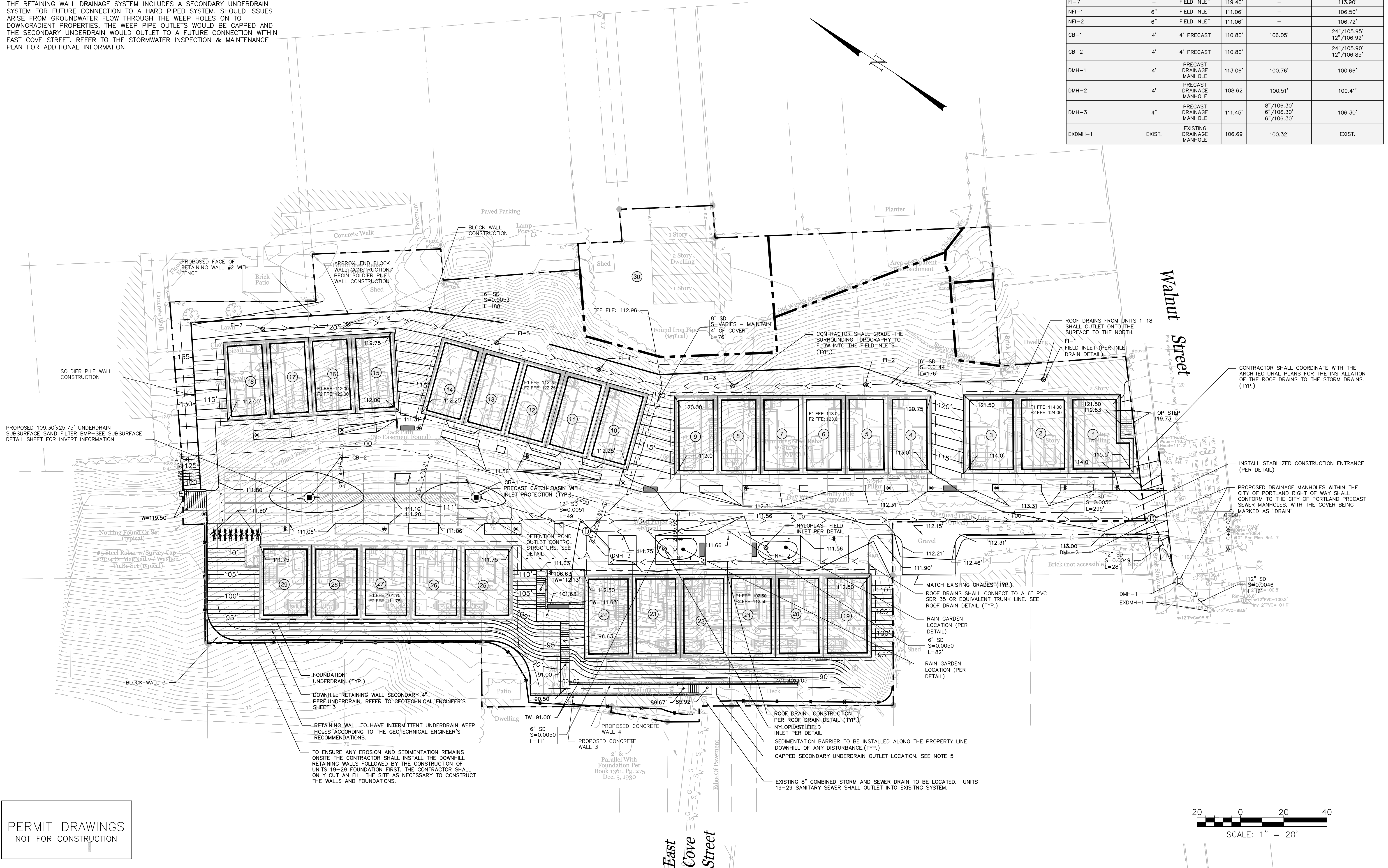
DRAWING NO. **C-20**

PERMIT DRAWINGS
 NOT FOR CONSTRUCTION



- NOTE:
- ALL DISTURBED AND PROPOSED SLOPES NOT COVERED WITH MULCH AND GREATER THAN 3:1 SHALL BE STABILIZED WITH 4" OF LOAM SEED AND EROSION CONTROL BLANKETS SC150BN BY NORTH AMERICAN GREEN OR APPROVED EQUAL.
 - ALL DISTURBED AND PROPOSED SLOPES TO BE COVERED WITH MULCH AND GREATER THAN 3:1 SHALL BE TEMPORARILY STABILIZED WITH EROSION CONTROL BLANKETS SC150BN BY NORTH AMERICAN GREEN OR APPROVED EQUAL.
 - THE UNDERDRAIN ASSOCIATED WITH THE UPHILL RETAINING WALLS AND FOUNDATION UNDERDRAIN FOR UNITS 1-18 SHALL OUTLET DOWNSTREAM OF THE UNDERDRAINED SUBSURFACE SAND FILTER'S OUTLET CONTROL STRUCTURE.
 - ALL STORM DRAIN PIPES SHALL CONFORM TO CITY OF PORTLAND TECHNICAL MANUAL SECTION 2.5.2
 - THE RETAINING WALL DRAINAGE SYSTEM INCLUDES A SECONDARY UNDERDRAIN SYSTEM FOR FUTURE CONNECTION TO A HARD PIPED SYSTEM. SHOULD ISSUES ARISE FROM GROUNDWATER FLOW THROUGH THE WEEP HOLES ON TO DOWNGRADIENT PROPERTIES, THE WEEP PIPE OUTLETS WOULD BE CAPPED AND THE SECONDARY UNDERDRAIN WOULD OUTLET TO A FUTURE CONNECTION WITHIN EAST COVE STREET. REFER TO THE STORMWATER INSPECTION & MAINTENANCE PLAN FOR ADDITIONAL INFORMATION.

DRAINAGE STRUCTURE SCHEDULE					
STRUCTURE	SIZE	TYPE	RIM	INV. IN	INV. OUT
FI-1	-	FIELD INLET	121.00'	-	115.50'
FI-2	-	FIELD INLET	120.40'	114.90'	114.90'
FI-3	-	FIELD INLET	120.40'	114.30'	114.30'
FI-4	-	FIELD INLET	121.90'	113.16'	113.16'
FI-5	-	FIELD INLET	121.90'	113.32'	113.32'
FI-6	-	FIELD INLET	119.40'	113.70'	113.70'
FI-7	-	FIELD INLET	119.40'	-	113.90'
NFI-1	6"	FIELD INLET	111.06'	-	106.50'
NFI-2	6"	FIELD INLET	111.06'	-	106.72'
CB-1	4'	4' PRECAST	110.80'	106.05'	24"/105.95' 12"/106.92'
CB-2	4'	4' PRECAST	110.80'	-	24"/105.90' 12"/106.85'
DMH-1	4'	PRECAST DRAINAGE MANHOLE	113.06'	100.76'	100.66'
DMH-2	4'	PRECAST DRAINAGE MANHOLE	108.62	100.51'	100.41'
DMH-3	4'	PRECAST DRAINAGE MANHOLE	111.45'	8"/106.30' 6"/106.30'	106.30'
EXDMH-1	EXIST.	EXISTING DRAINAGE MANHOLE	106.69	100.32'	EXIST.



ISSUED FOR	DATE	BY
CITY SUBMISSION	9/23/13	WHS
WORKSHOP #2	11/12/13	WHS
FINAL SUBMISSION	12/22/13	WHS
MAINE DEP MCGP	12/16/13	WHS
CONDITIONS APPROVAL	1/7/14	WHS

REVISION	DATE	BY
STAFF COMMENTS	12/27/13	WHS

DRAWING NAME: **GRADING, DRAINAGE & EROSION CONTROL PLAN**

PROJECT NAME: **MUNJOY HEIGHTS**

CLIENT: **REDFERN MUNJOY, LLC.**
P.O. BOX 8816, PORTLAND, MAINE 04104

A C O R N

ENGINEERING, INC.

P.O. BOX 3332, PORTLAND, MAINE 04104
(207) 775-2685

FILE: 1047_CIVIL

DATE: 11/05/13

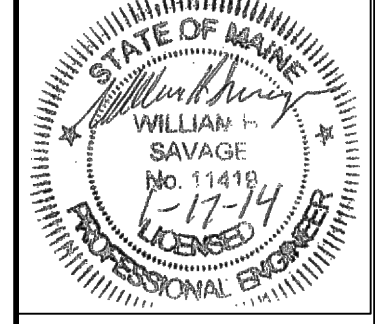
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DESIGN BY: WHS

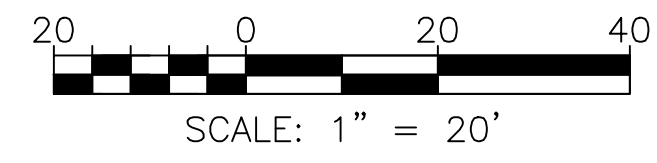
DRAWN BY: ZRJ

CHECKED BY: WHS

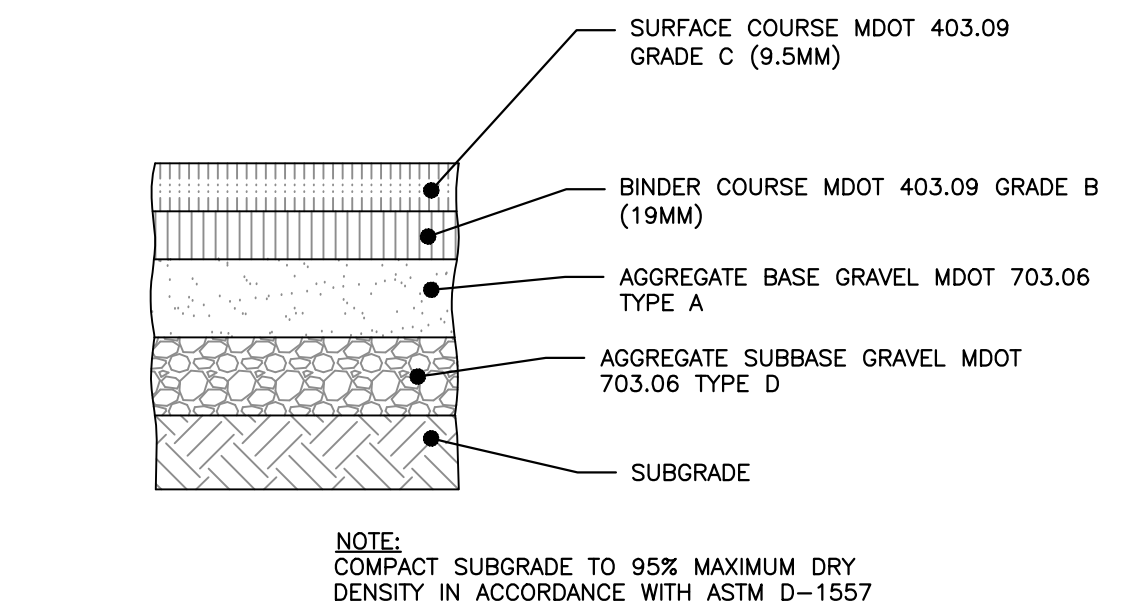
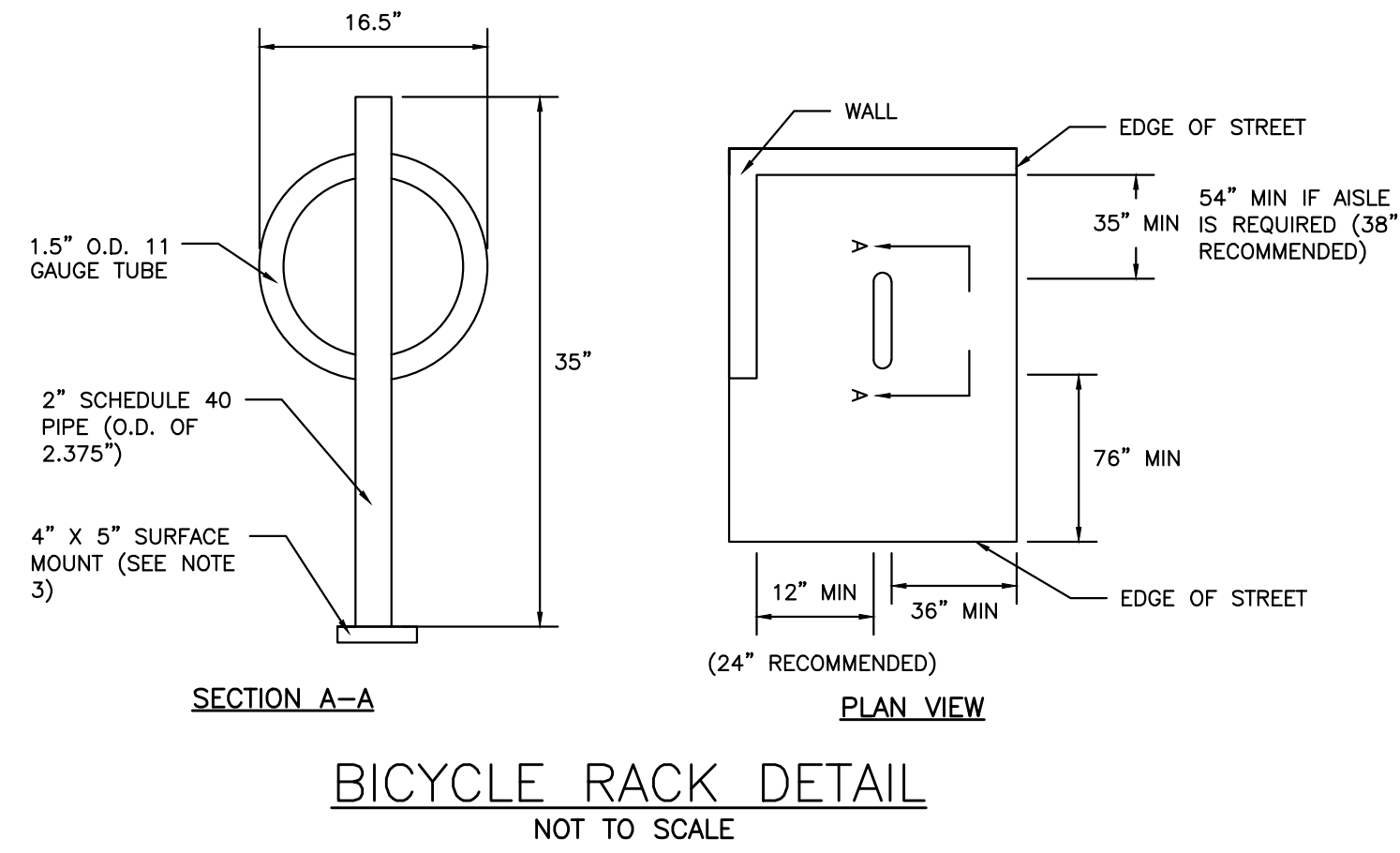


DRAWING NO. **C-30**

PERMIT DRAWINGS
NOT FOR CONSTRUCTION



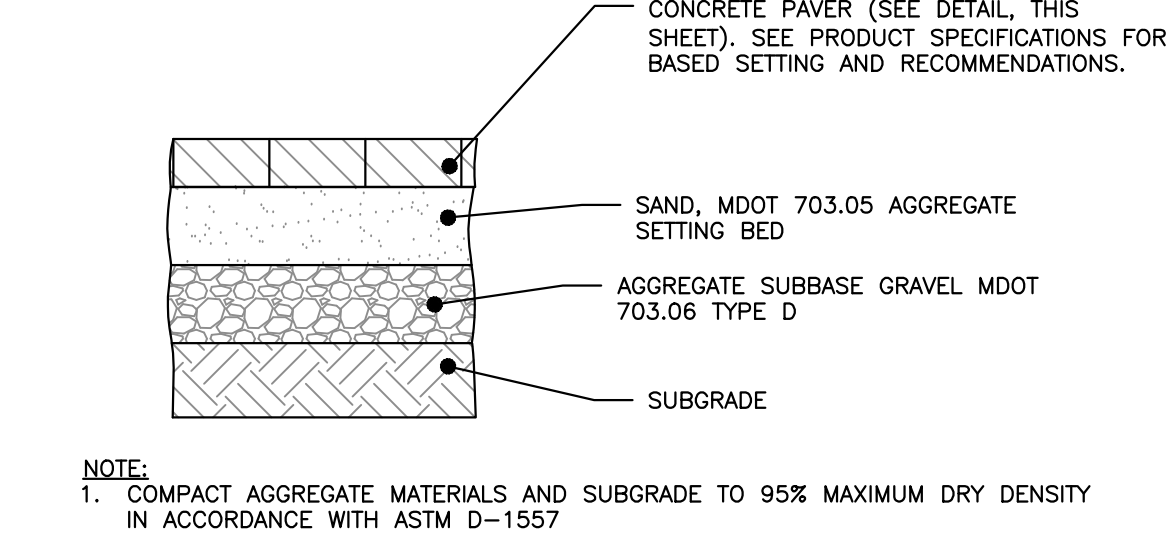
- NOTES:**
- 1) BICYCLE RACK SHALL HAVE CAPACITY FOR TWO BICYCLES.
 - 2) BICYCLE RACK PARTS SHALL BE OF UNIFORM COLOR AND SHALL BE FINISHED IN ACCORDANCE WITH PRODUCT SPECIFICATION.
 - 3) BICYCLE RACK SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S MOST RECENT INSTALLATION RECOMMENDATIONS, AND SHALL BE INSTALLED WITH A SURFACE MOUNT UNLESS OTHERWISE APPROVED BY ENGINEER.
 - 4) BICYCLE RACK SHALL BE "DERO BIKE HITCH", AS MANUFACTURED BY DERO BIKE RACKS.
 - 5) MINIMUM OFFSETS SHOWN. MANUFACTURER'S RECOMMENDED OFFSETS SHALL BE ENFORCED WHERE POSSIBLE.
 - 6) MINIMUM DISTANCE BETWEEN BICYCLE RACKS SHALL BE 24". RECOMMENDED DISTANCE BETWEEN BICYCLE RACKS SHALL BE 38".
 - 7) ALL OFFSETS ARE FROM OUTSIDE EDGES OF ITEMS.



NOTE:
1. COMPACT SUBGRADE TO 95% MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-1557

THICKNESS OF LAYERS	
STANDARD	LAYERS
2"	SURFACE COURSE MDOT 403.09 GRADE C (12.5mm)
3"	BINDER COURSE MDOT 403.09 GRADE B (19mm)
6"	AGGREGATE BASE GRAVEL MDOT 703.06 TYPE B
18"	AGGREGATE SUBBASE GRAVEL MDOT 703.06 TYPE D

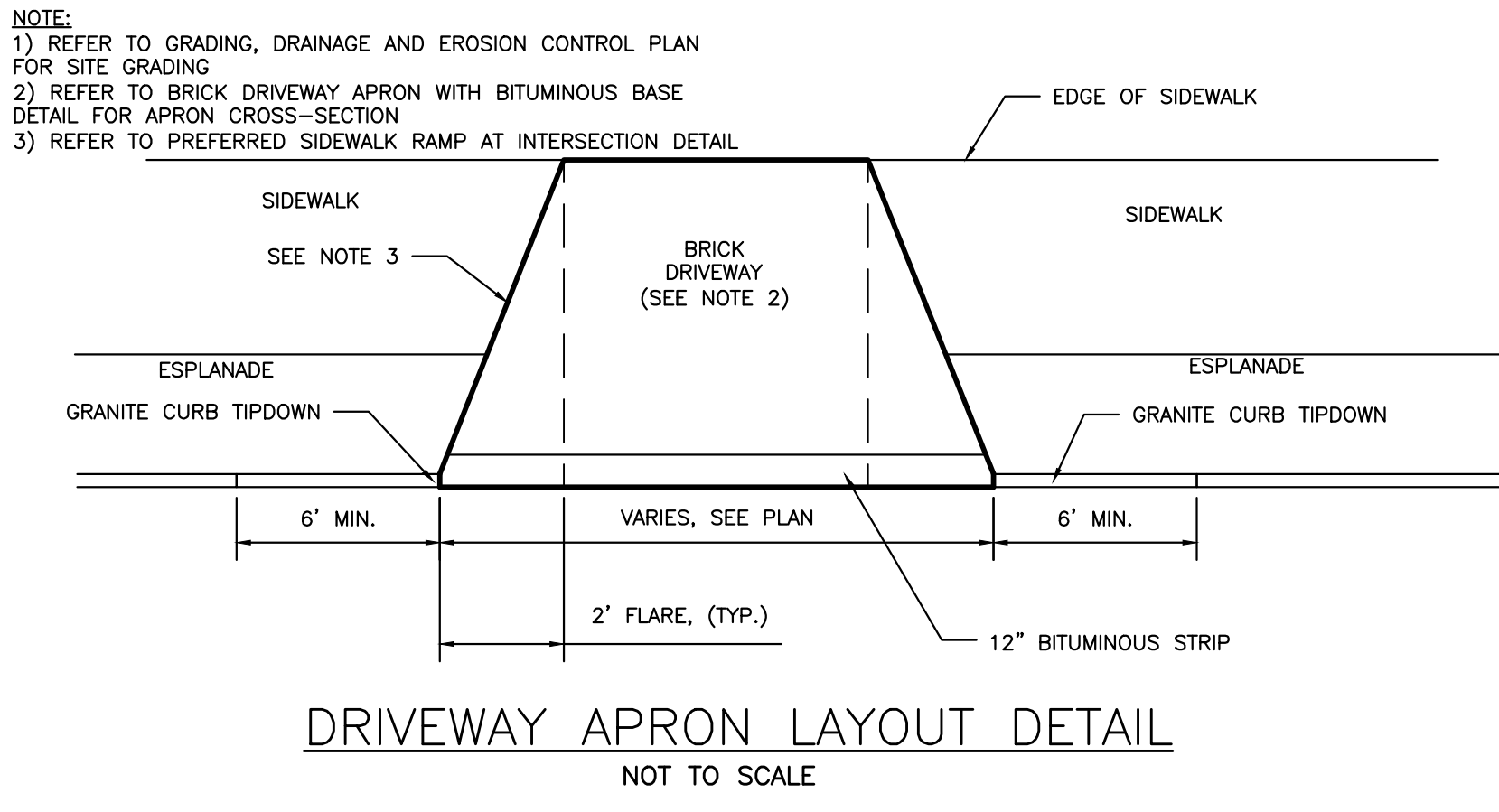
CITY OF PORTLAND ARTERIAL BITUMINOUS PAVEMENT PROFILE
NOT TO SCALE



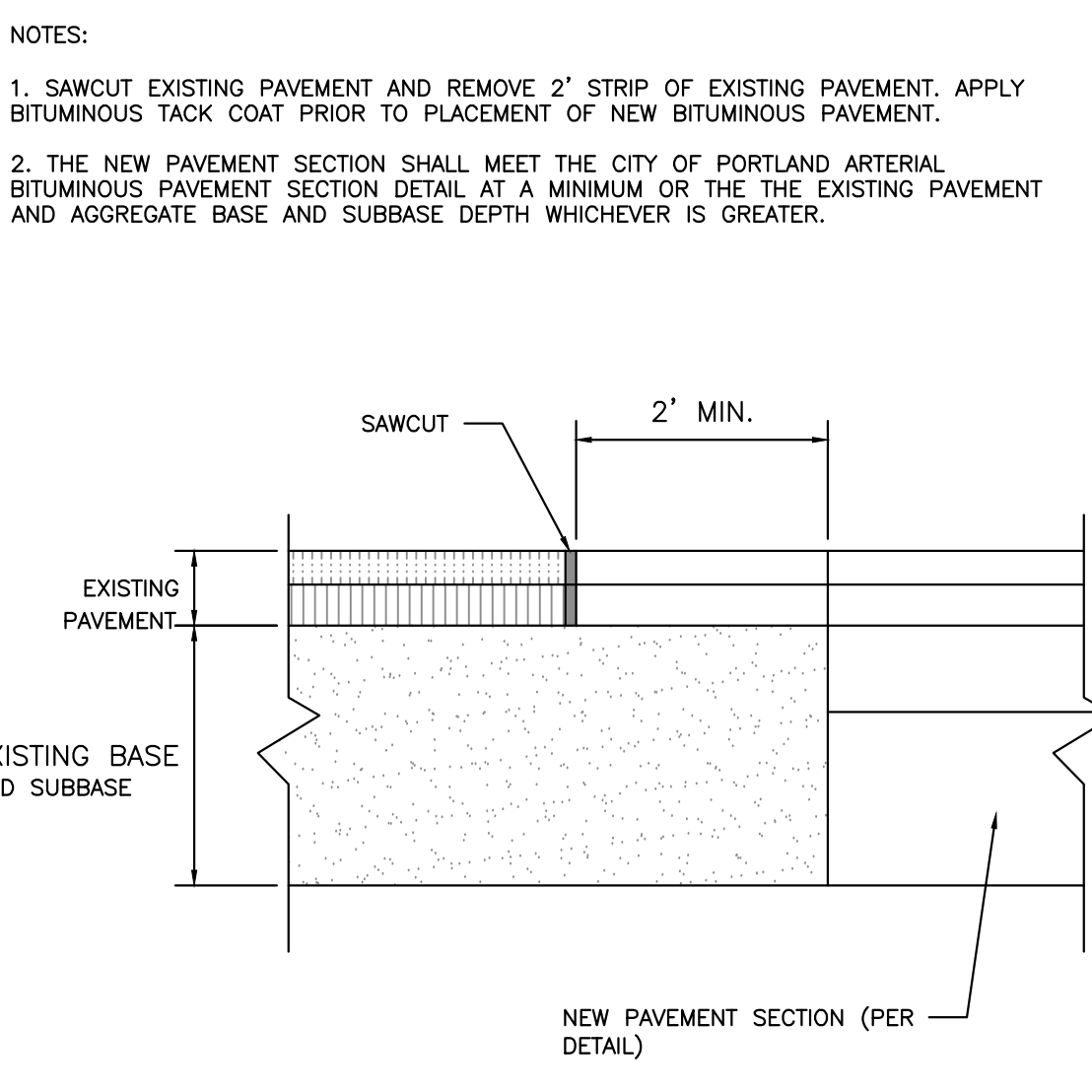
NOTE:
1. COMPACT AGGREGATE MATERIALS AND SUBGRADE TO 95% MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-1557

THICKNESS OF LAYERS	
STANDARD	LAYERS
2-3/4"	CONCRETE PAVER (DEPTH TBD BASED UPON THE MANUFACTURER)
4"	AGGREGATE BASE SAND MDOT 703.05
15"	AGGREGATE SUBBASE GRAVEL MDOT 703.06 TYPE D

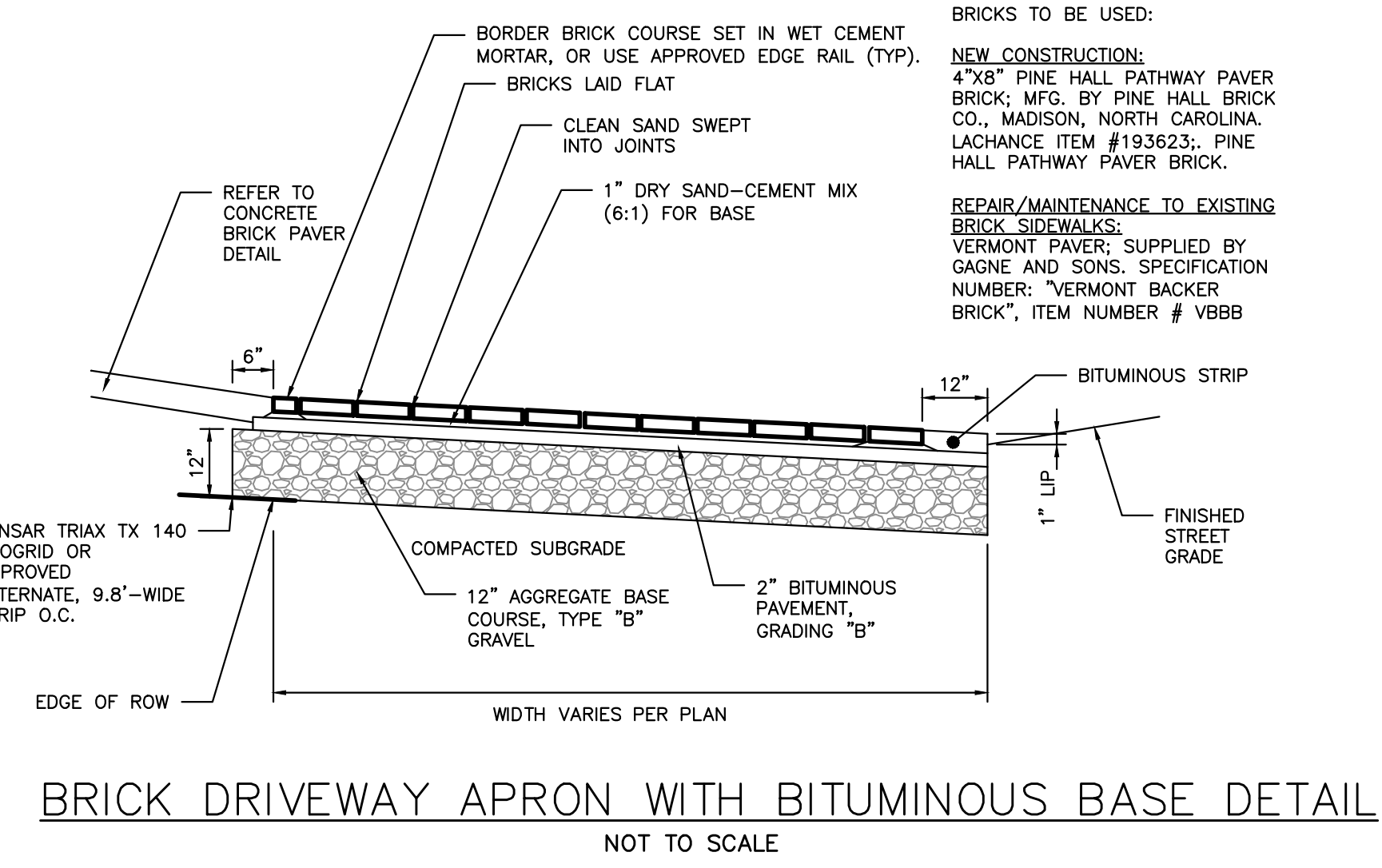
CONCRETE BRICK PAVER PROFILE
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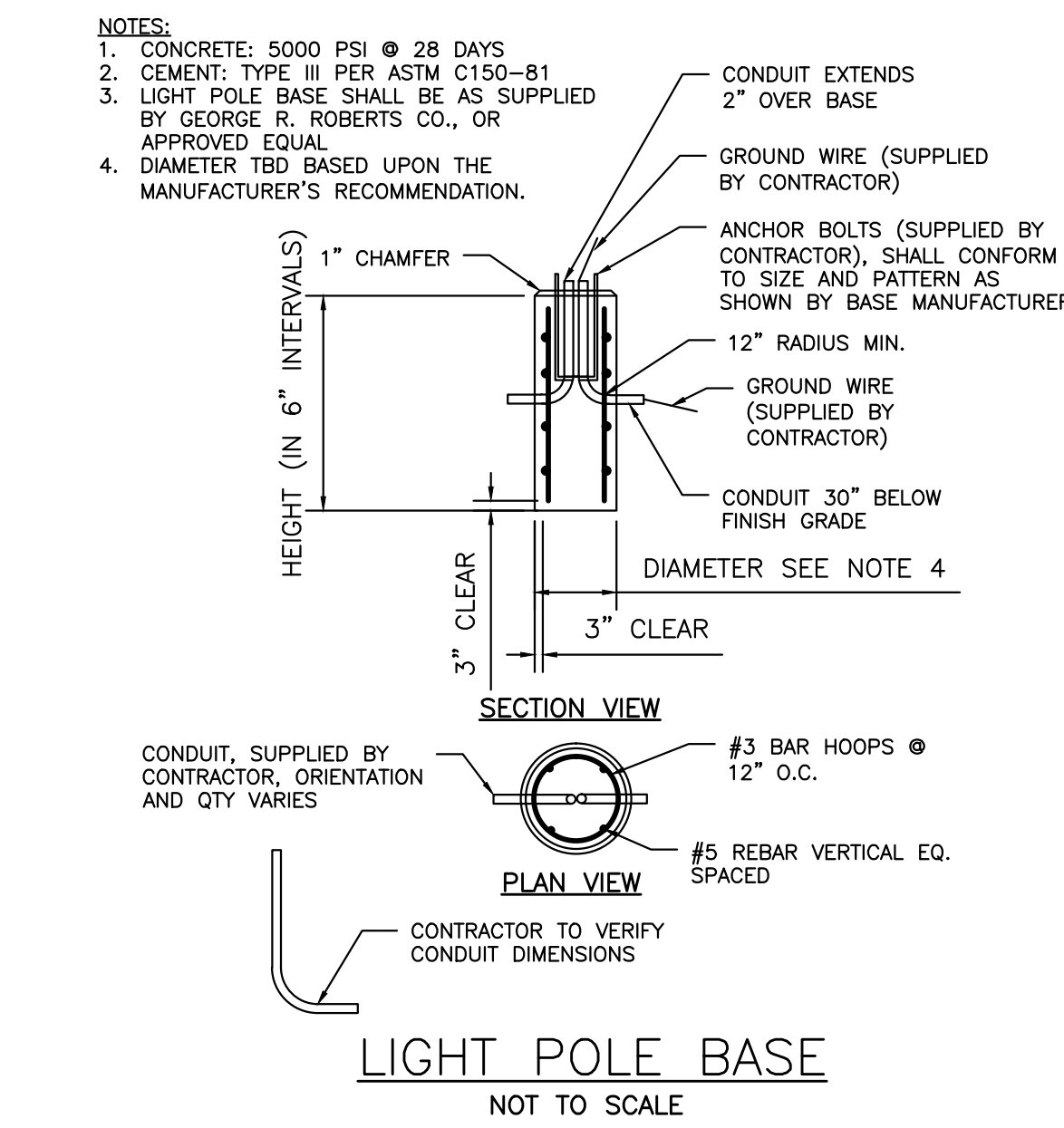
DRIVEWAY APRON LAYOUT DETAIL
NOT TO SCALE



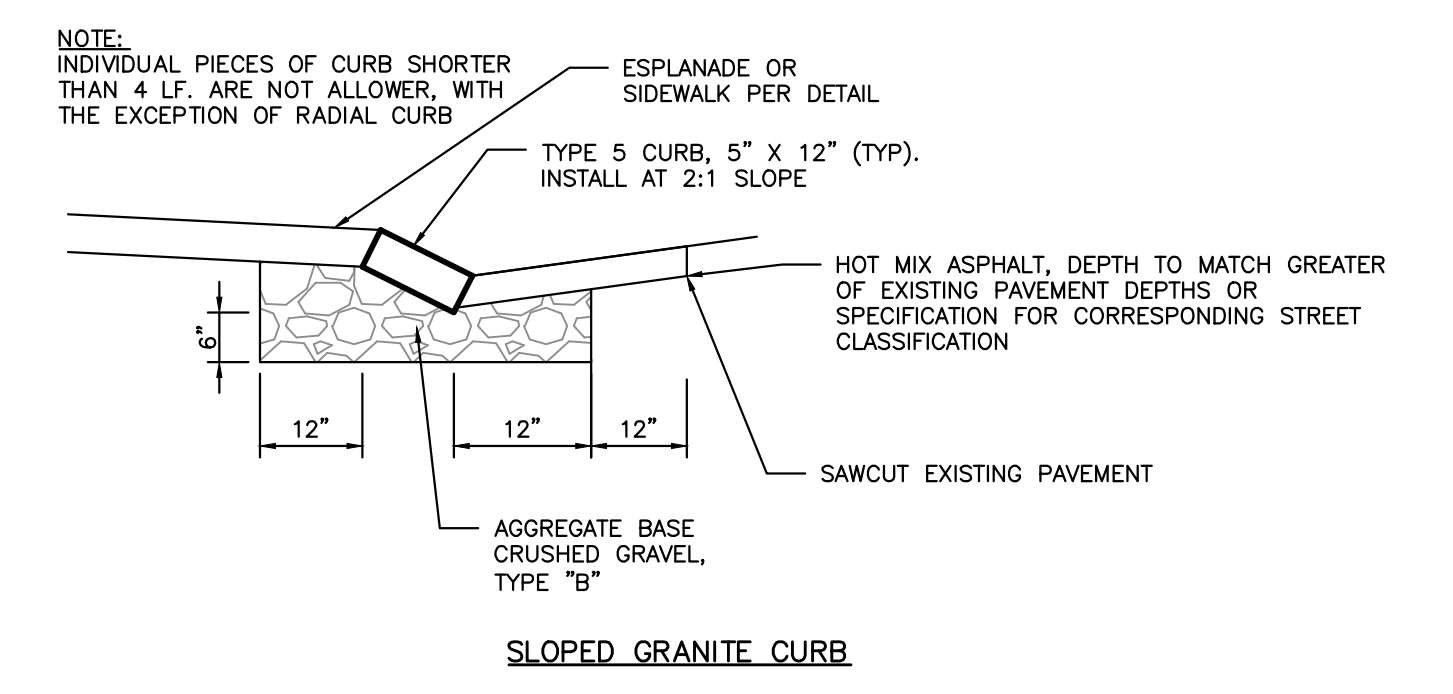
PAVEMENT SAWCUT DETAIL
NOT TO SCALE



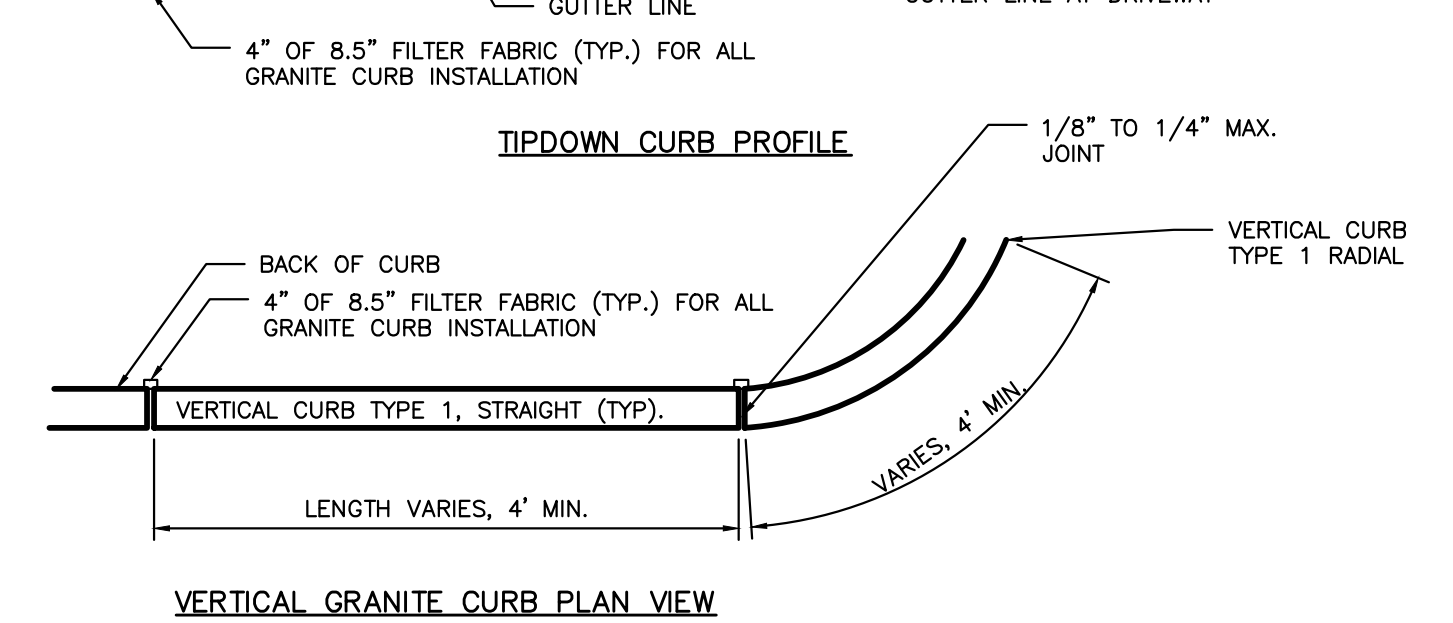
BRICK DRIVEWAY APRON WITH BITUMINOUS BASE DETAIL
NOT TO SCALE



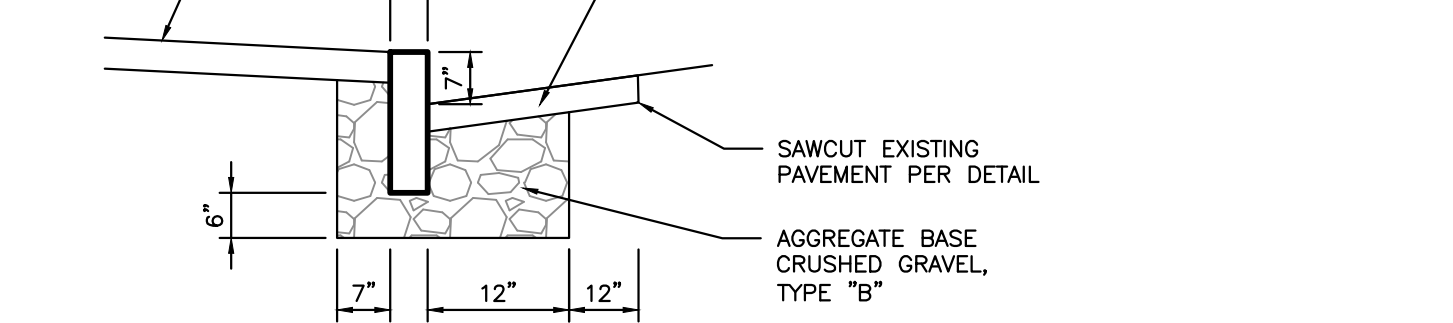
LIGHT POLE BASE
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SLOPED GRANITE CURB



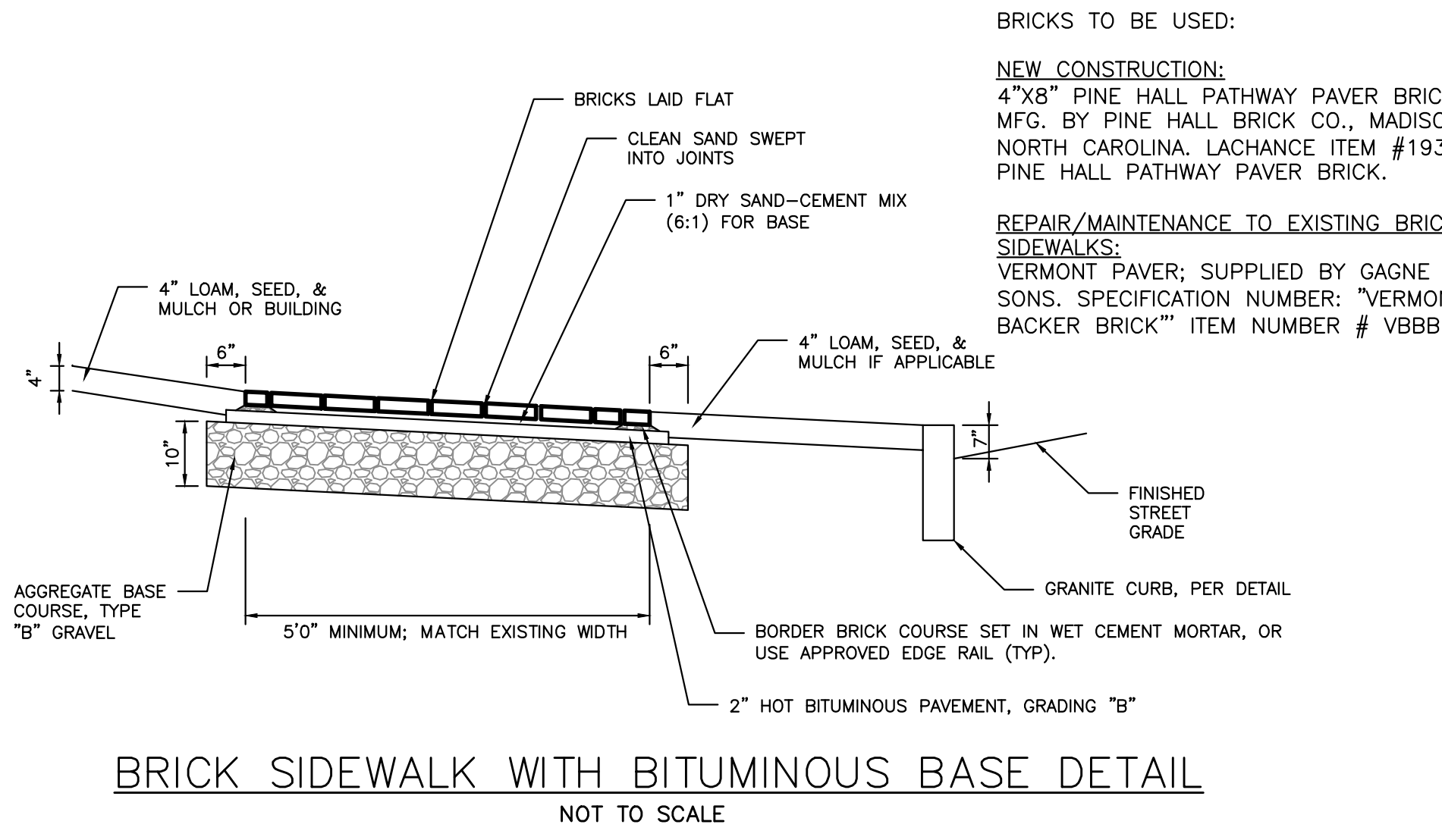
TIPDOWN CURB PROFILE



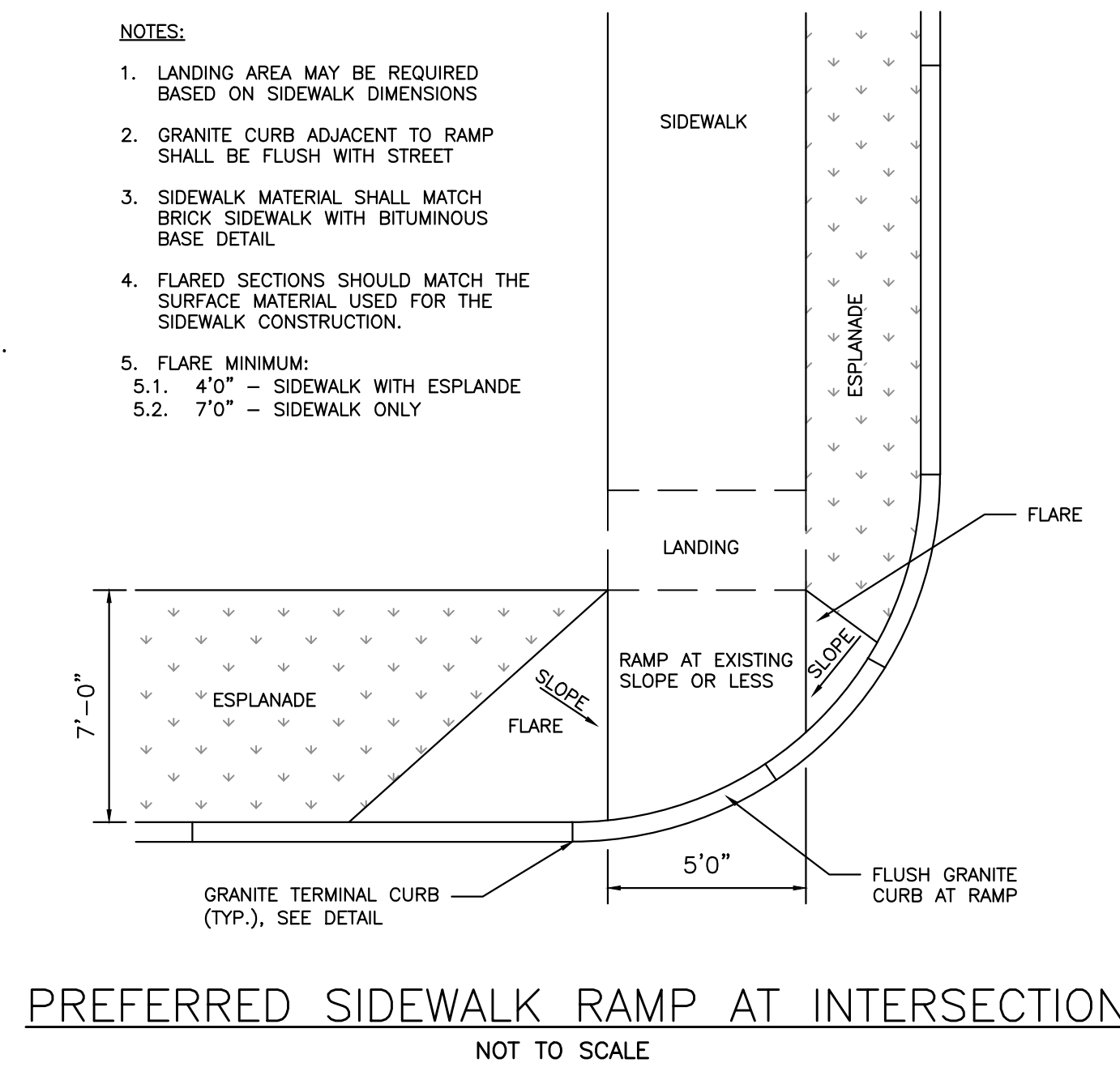
VERTICAL GRANITE CURB PLAN VIEW



VERTICAL GRANITE CURB CROSS SECTION
VERTICAL GRANITE CURB INSTALLATION IN EXISTING STREETS DETAIL
NOT TO SCALE



BRICK SIDEWALK WITH BITUMINOUS BASE DETAIL
NOT TO SCALE



PREFERRED SIDEWALK RAMP AT INTERSECTION
NOT TO SCALE

PERMIT DRAWINGS
NOT FOR CONSTRUCTION

ISSUED FOR	BY DATE
WORKSHOP #2	WHS 11/12/13
FINAL SUBMISSION	WHS 12/22/13
MAINE DEP MCGP	WHS 12/16/13
REVISION	REV DATE
REV. STANDARD DETAIL	WHS 12/22/13
STAFF COMMENTS	WHS 12/16/13

DRAWING NAME: **SITE DETAILS**

PROJECT NAME: **MUNJOY HEIGHTS**

CLIENT: **REDFERN MUNJOY, LLC.**
P.O. BOX 8816, PORTLAND, MAINE 04104

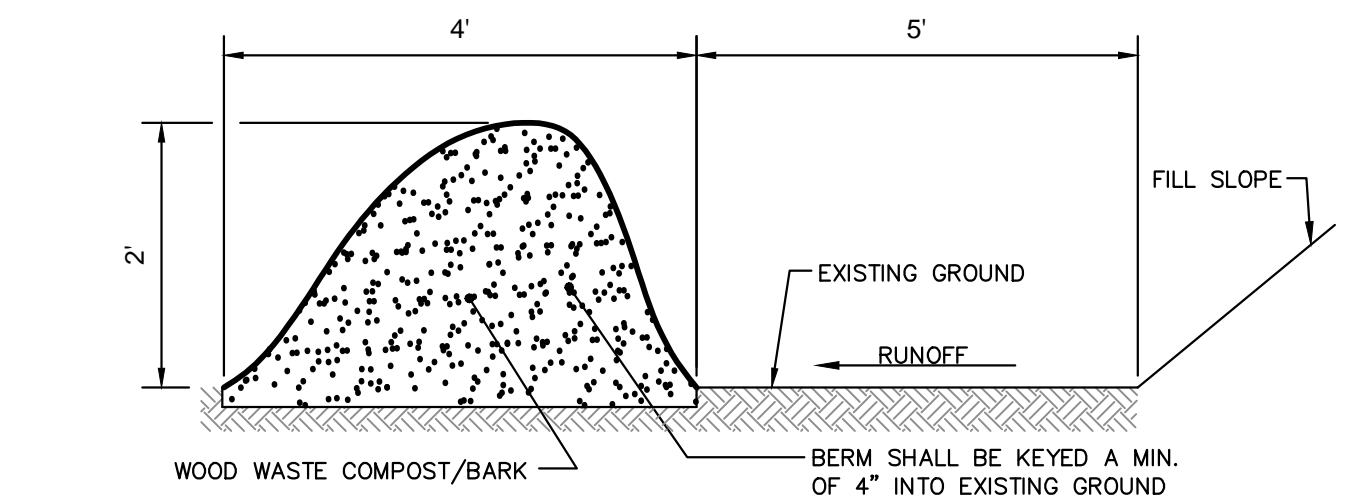
ACORN ENGINEERING, INC.
3372 PORTLAND, MAINE 04104
(207) 775-2655

FILE: 047_details 1-17-14.dwg
DATE: 7/11/13
JN: 302-001
SCALE: NTS
DESIGN BY: WHS
DRAWN BY: ZRJ
CHECKED BY: WHS

DRAWING NO. **C-40**

NOTES:

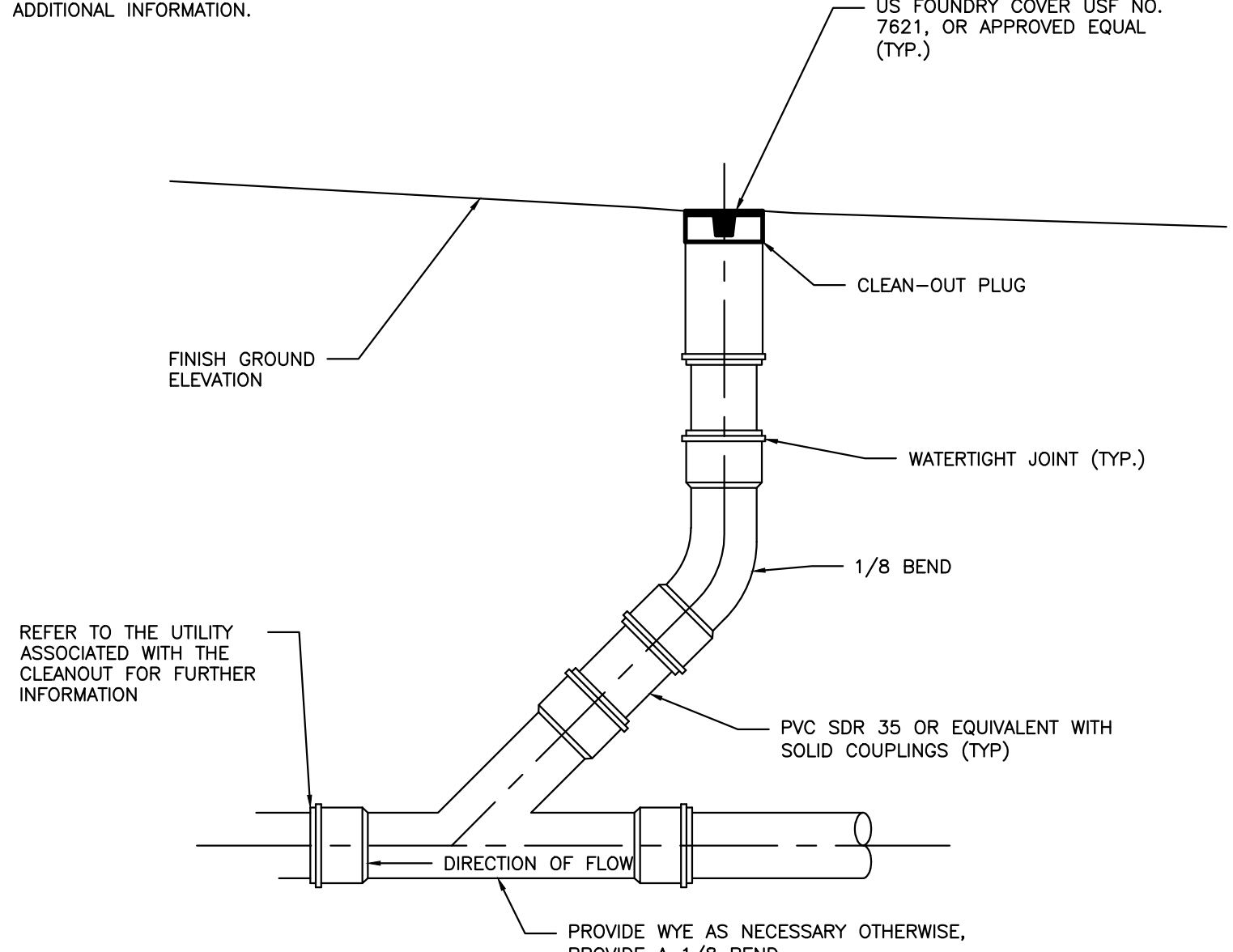
- THE EROSION CONTROL MIX SHALL CONFORM TO THE FOLLOWING STANDARDS AND IN ACCORDANCE WITH THE MAINE DEP'S EROSION AND SEDIMENT CONTROL BMP'S SECTION B-1:
 - THE ORGANIC PORTIONS SHALL BE FIBROUS AND ELONGATED TO ALLOW FOR THE INTERLOCKING OF MATERIAL.
 - pH - 5.0 - 8.0.
 - PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 6" SCREEN AND A MINIMUM OF 70% TO A MAXIMUM 85% PASSING A 0.75" (3/4") SCREEN.
 - THE ORGANIC MATTER CONTENT SHALL BE BETWEEN 80 AND 100% DRY WEIGHT BASIS.
 - NO STONES LARGER THAN 4" IN DIAMETER.
 - LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
- THE BERM SHOULD BE PLACED, UNCOMPACTED, ALONG A RELATIVELY LEVEL CONTOUR, WHEN NECESSARY THE BERM MAY BE PLACED PERPENDICULAR TO THE SLOPE ALONG THE PROPERTY LINE TO CONTAIN THE SEDIMENT PROVIDED A BERM IS LOCATED AT THE BASE OF THE SLOPE.
- THE BERM MAY BE USED IN LIEU OF SILTATION FENCE, AT THE TOE OF SHALLOW SLOPES, ON FROZEN GROUND, LEDGE OUT CROPS, VERY ROOTED FORESTED AREA OR AT THE EDGE OF GRAVEL PARKING AREAS.
- BERMS SHALL REMAIN IN PLACE UNTIL UPSTREAM AREA IS STABILIZED OR 90% CATCH OF VEGETATION IS ATTAINED. BERMS SHALL BE REMOVED OFFSITE OR BY SPREADING SUCH THAT NATIVE EARTH CAN BE SEEN BELOW.



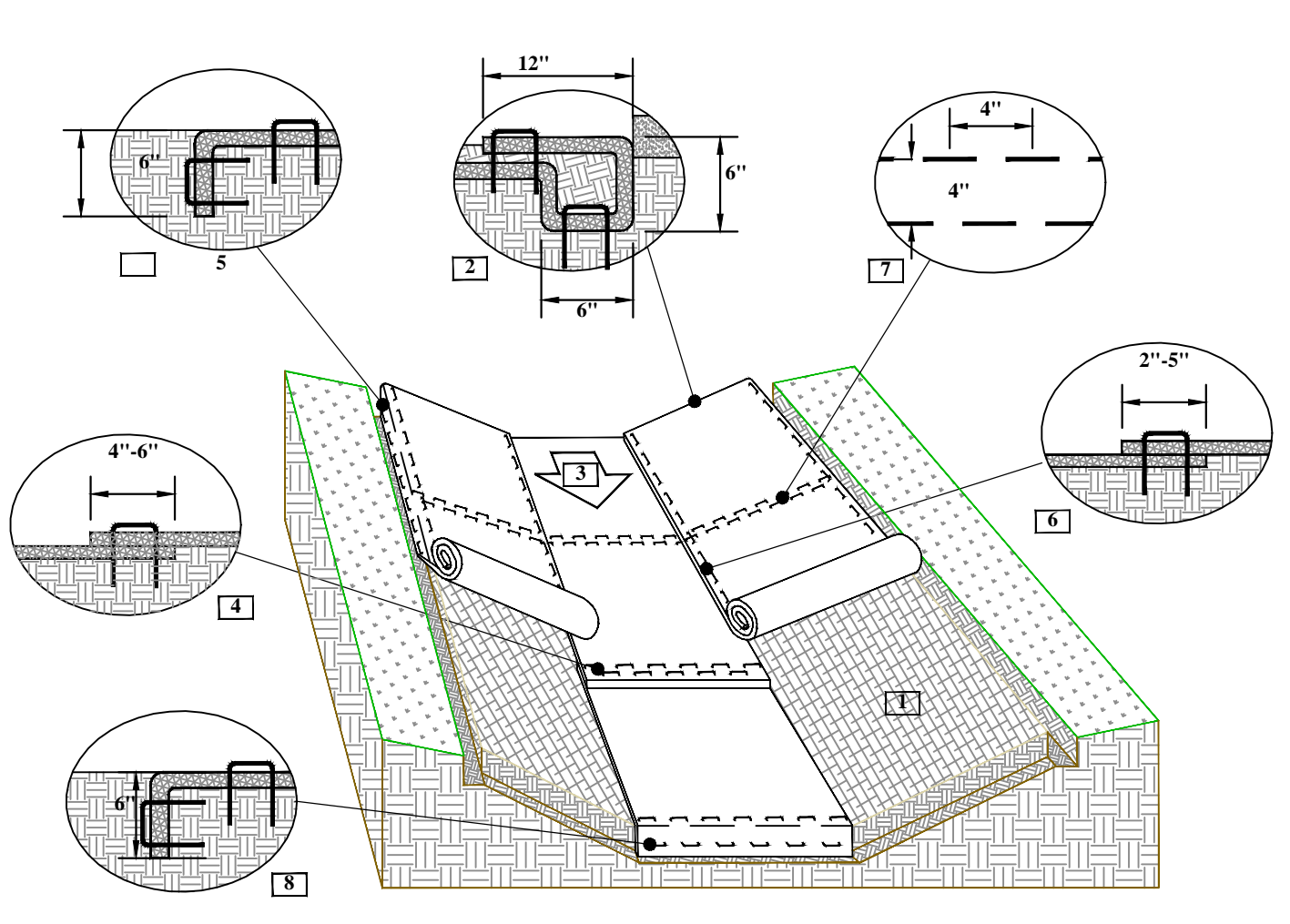
EROSION CONTROL MIX BERM DETAIL
NOT TO SCALE

NOTES:

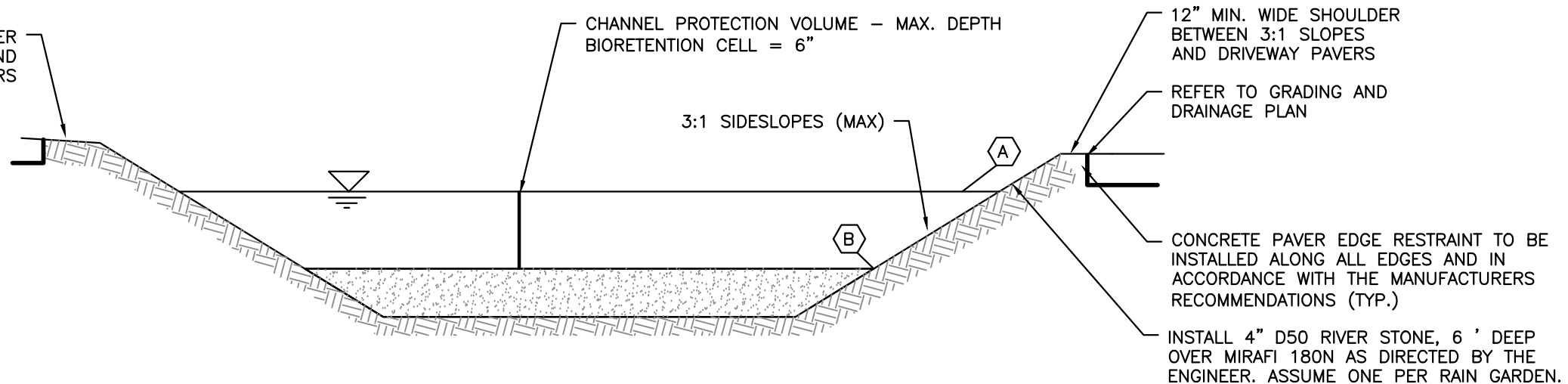
- REFER TO THE REFER TO THE GRADING & DRAINAGE PLANS AND UTILITY PLANS FOR ADDITIONAL INFORMATION.



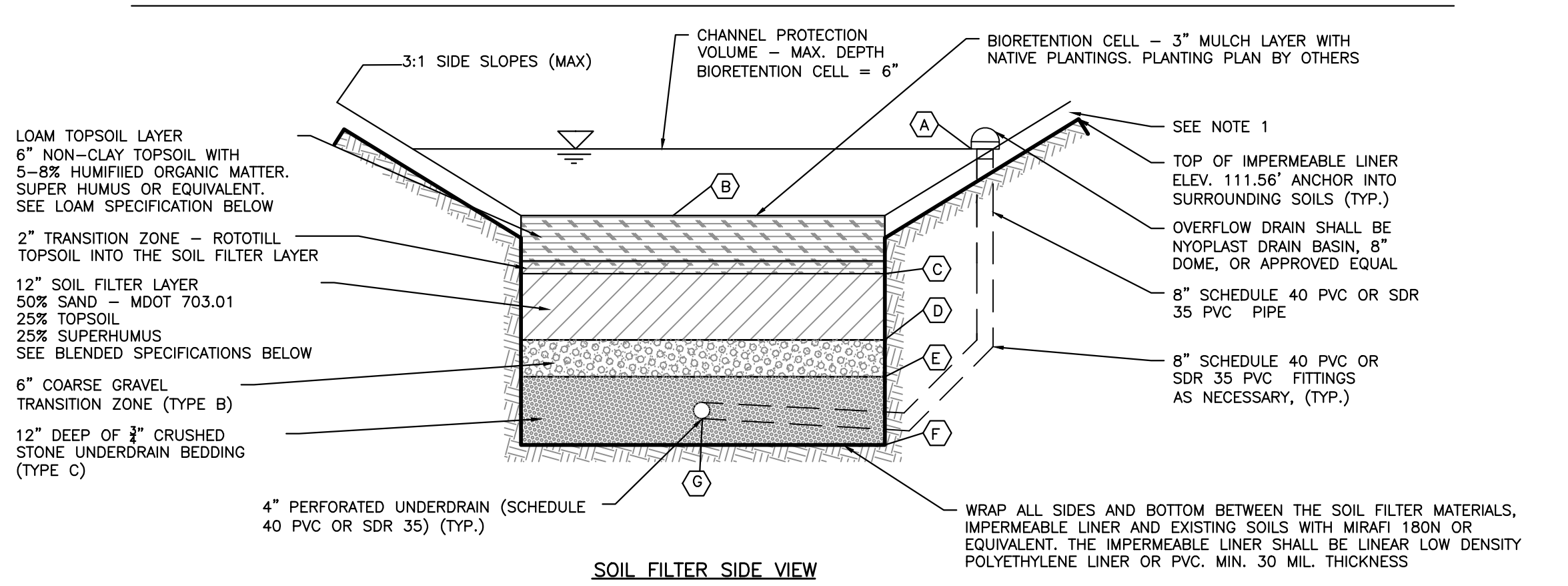
CLEANOUT DETAIL
NOT TO SCALE



EROSION CONTROL BLANKET CHANNEL INSTALLATION
NOT TO SCALE



SOIL FILTER CROSS SECTION



SOIL FILTER SIDE VIEW

- NOTES:**
- THE SIDESLOPES SHALL BE STABILIZED WITH A MIN. OF 4" LOAM, EROSION CONTROL BLANKETS SC150BN BY NORTH AMERICAN GREEN OR APPROVED EQUAL AND A CONSERVATION SEED MIX.
 - LIGHT COMPACTION SOIL FILTER AND PIPE BEDDING MATERIAL. (90 TO 92% STANDARD PROCTOR). TESTING SHALL BE PERFORMED BY A QUALIFIED MATERIAL TESTING FIRM.
 - THE SOIL FILTER MEDIA SHALL NOT BE CONSTRUCTED UNTIL THE AREA DRAINING TO THE BASIN HAS BEEN PERMANENTLY STABILIZED.
 - A LANDSCAPE DESIGNER OR ARCHITECT SHALL SELECT THE APPROPRIATE PLANTS FOR THE BIORETENTION CELL FOR THE SITE CONDITIONS. PLANTING PLAN BY OTHERS.
 - MINIMUM UNDERDRAIN SLOPE 0.0025.
 - TESTING: SIEVE ANALYSIS INCLUDING HYDROMETER TESTING FOR CLAY CONTENT FOR EACH LAYER SHALL BE PERFORMED BY A QUALIFIED SOIL TESTING LABORATORY AND SUBMITTED TO THE PROJECT ENGINEER FOR APPROVAL 2 WEEKS PRIOR TO CONSTRUCTION. ALL TESTING AND SUBMITTALS SHALL BE IN ACCORDANCE WITH THE MOST RECENT VERSION OF THE MAINE DEP - TECHNICAL DESIGN MANUAL SECTION 7.2.5 TESTING AND SUBMITTALS.
 - ACORN ENGINEERING, INC., RECOMMENDS THE SOIL FILTER LAYER BE SUPPLIED BY JONES ASSOCIATES, INC., AUBURN, ME.

SCHEDULE		BIOCCELL
(A)	PROPOSED OVERFLOW RIM	111.06
(B)	TOP OF LOAM TOPSOIL LAYER	110.56
(C)	TOP OF SOIL FILTER	109.89
(D)	TOP OF GRAVEL	107.89
(E)	TOP OF STONE	107.39
(F)	BOTTOM OF STONE	106.39
(G)	UNDERDRAIN INVERT	106.72

SOIL FILTER BED - TRANSITION ZONE (TYPE B)		
SIEVE SIZE	% PASSING BY WEIGHT	
1"	90-100	
1/2"	75-100	
#4	50-100	
#20	15-80	
#50	0-15	
#200	0-5	

SOIL FILTER BED - UNDERDRAIN BEDDING (TYPE C)		
SIEVE SIZE	% PASSING BY WEIGHT	
1"	100	
3/4"	90-100	
3/8"	0-75	
#4	0-25	
#10	0-5	

6" LOAM TOPSOIL LAYER SPECIFICATION

SIEVE SIZE	% PASSING BY WEIGHT
#4	75-95
#10	60-90
#40	35-85
#200	20-70

1. CLAY FRACTION <10% PASSING THE #200 SIEVE.*

2. LOAM SHALL BE LOOSE AND FRIABLE AND SHALL BE FREE FROM ADMIXTURE OF SUBSOIL, REFUSE, LARGE STONES, CLOUDS OR ROOTS OR RHIZOMES OR "WITCH GRASS" OR OTHER UNDESIRABLE GRASSES.

*10% CLAY PASSING THE #200 SIEVE ALLOWED PER EMAIL FROM MARIANNE HUBERT - MDEP TO WILL SAVAGE DATED 9/20/13

SOIL FILTER BED - SUPERHUMUS OR EQUIV. SPECIFICATION

SIEVE SIZE	% PASSING BY WEIGHT
1"	100
#200	0-5

MINIMAL CLAY CONTENT, NO MORE THAN 3-5% PASSING #200 SIEVE

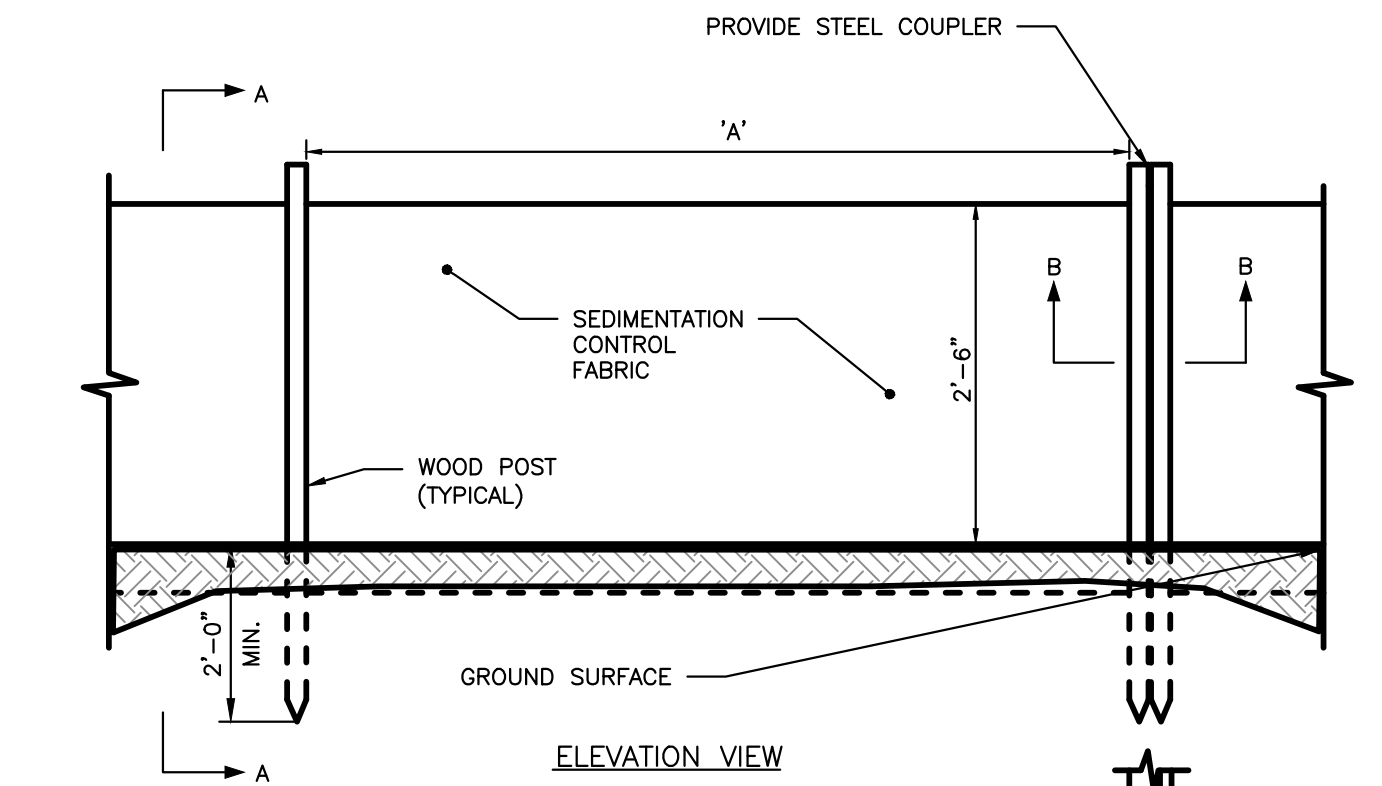
12" SOIL FILTER BED - BLENDED SAND, LOAM, SUPERHUMUS SIEVE ANALYSIS

SIEVE SIZE	% PASSING BY WEIGHT
#10	85-100
#20	70-100
#60	15-40
#200	8-15

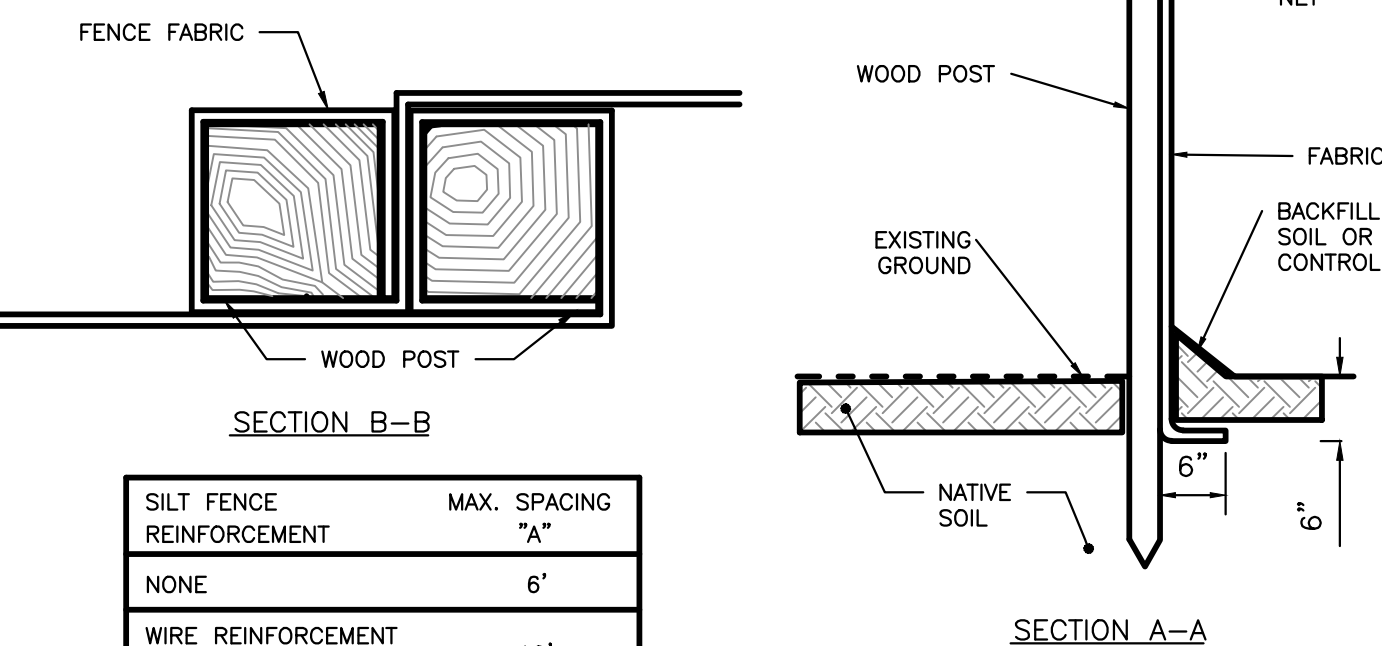
1. CLAY FRACTION <2% PASSING THE #200 SIEVE.

2. SUPERHUMUS OR EQUIVALENT

RAIN GARDEN OR BIORETENTION CELL DETAIL
NOT TO SCALE

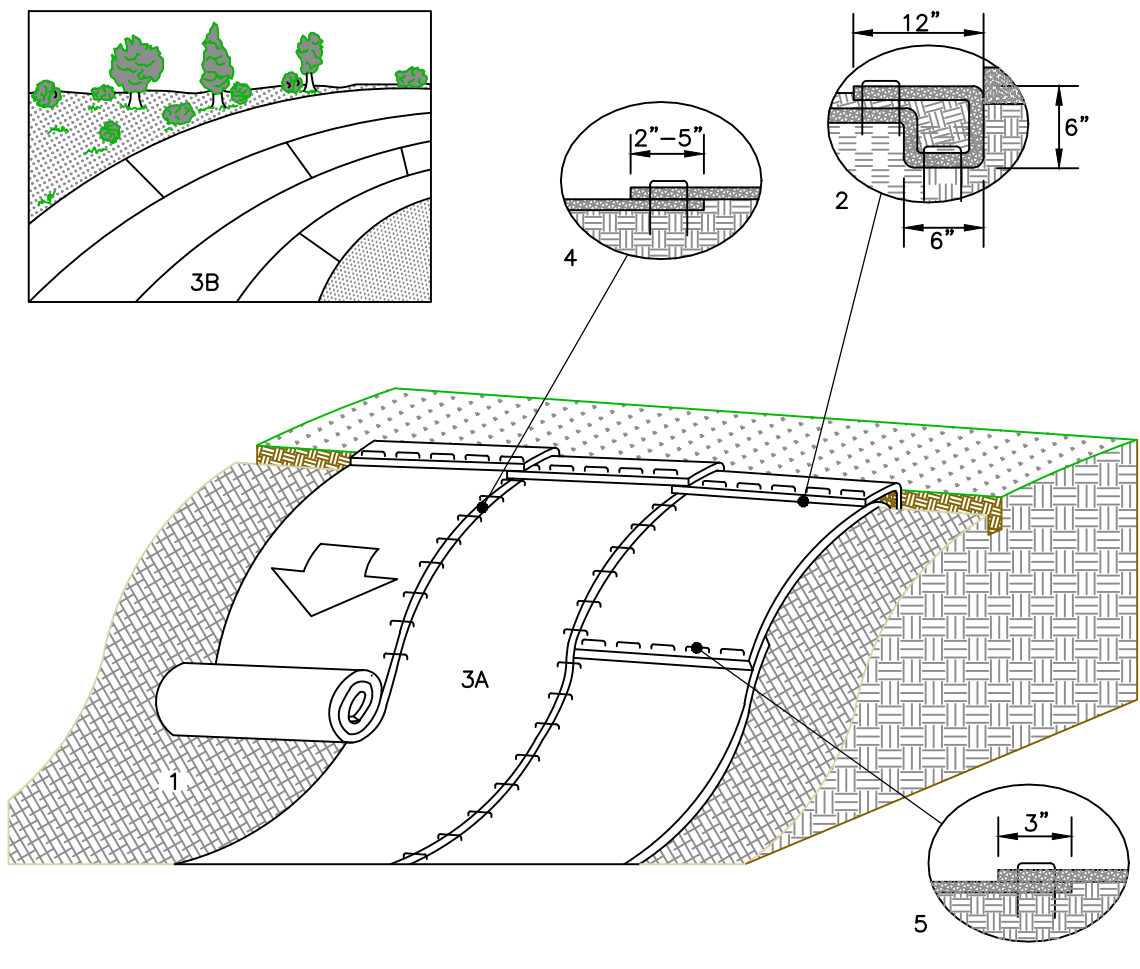


SILTATION FENCE DETAIL
NOT TO SCALE



SILT FENCE REINFORCEMENT	MAX. SPACING
NONE	6'
WIRE REINFORCEMENT	10'
14 GAUGE, 6" MESH	

- CONSTRUCTION OBSERVATION:**
- CONSTRUCTION OBSERVATION SHALL BE PROVIDED FOR EACH PHASE OF CONSTRUCTION BY ACORN ENGINEERING. THE CONTRACTOR OR OWNERS REPRESENTATIVE SHALL NOTIFY ACORN ENGINEERING A MINIMUM 48 HOURS OR 2 BUSINESS DAY WHICH EVER IS GREATER PRIOR TO ANY OF THE PHASES OF CONSTRUCTION LISTED BELOW SO THAT THE FOLLOWING SITE VISITS MAY BE SCHEDULED.
- ONE SITE VISIT AFTER PRELIMINARY CONSTRUCTION OF THE BIORETENTION CELL GRADES;
 - ONE SITE VISIT DURING THE INSTALLATION OF THE IMPERVIOUS LINER.
 - ONE SITE VISIT AFTER THE UNDER DRAIN PIPES ARE INSTALLED BUT NOT BACKFILLED.
 - ONE SITE VISIT DURING THE CONSTRUCTION OF THE SOIL FILTER LAYER.
 - ONE SITE VISIT DURING THE CONSTRUCTION OF THE TOPSOIL LAYER.
 - ONE SITE VISIT DURING THE FLOODING OF THE BIORETENTION CELL, IF REQUIRED.



EROSION CONTROL BLANKET SLOPE INSTALLATION
NOT TO SCALE

CHANNEL INSTALLATION DETAIL

- PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL BLANKET (ECB), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
- BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE ECB IN A 6" (15CM) DEEP X 6" (15CM) WIDE TRENCH WITH APPROXIMATELY 12" (30CM) OF ECB EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. USE SHOREMAX MAT AT THE CHANNEL/CULVERT OUTLET AS SUPPLEMENTAL SCOUR PROTECTION AS NEEDED. ANCHOR THE ECB WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO THE COMPACTED SOIL AND FOLD THE REMAINING 12" (30CM) PORTION OF ECB BACK OVER THE SEED AND COMPACTED SOIL. SECURE ECB OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE ECB.
- ROLL CENTER ECB IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. ECB WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL ECB MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE.
- PLACE CONSECUTIVE ECB END-OVER-END (SHINGLE STYLE) WITH A 4"-6" OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER TO SECURE ECB. THE TOP LAYER SHALL GO OVER THE DOWNSTREAM LAYER.
- FULL LENGTH EDGE OF ECB AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30CM) APART IN A 6" (15CM) DEEP X 6" (15CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
- ADJACENT ECB MUST BE OVERLAPPED APPROXIMATELY 2"-5" (5-12.5CM) (DEPENDING ON ECB TYPE) AND STAPLED.
- IN HIGH FLOW CHANNEL APPLICATIONS A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT (9 - 12M) INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10CM) APART AND 4" (10CM) ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
- THE TERMINAL END OF THE ECB MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30CM) APART IN A 6" (15CM) DEEP X 6" (15CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

PERMIT DRAWINGS
NOT FOR CONSTRUCTION

ISSUED FOR	BY
WORKSHOP #2	WHS
FINAL SUBMISSION	WHS
MAINE DEP MCGP	WHS

REVISION	REV. DATE
REV. STANDARD DETAIL	12/2/13
STAFF COMMENTS	12/16/13

DRAWING NAME: **DRAINAGE DETAILS - 2**

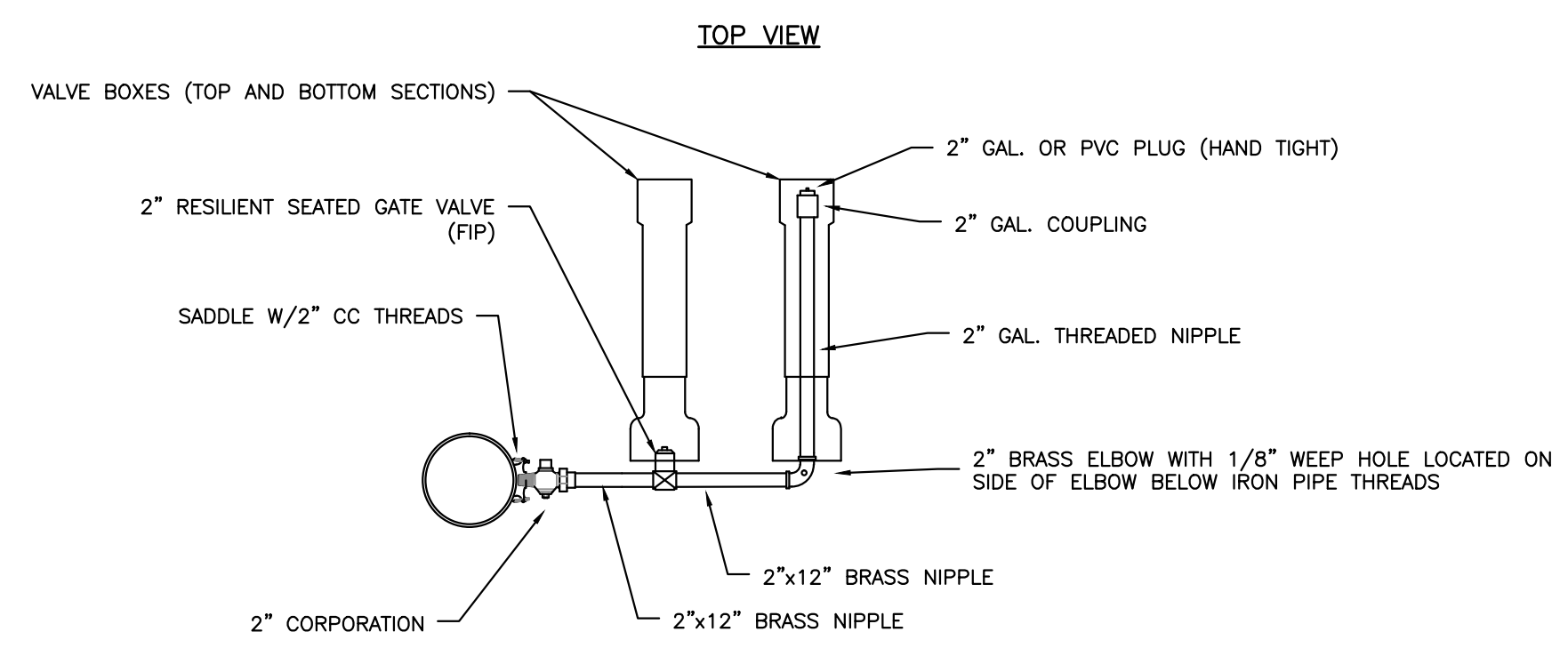
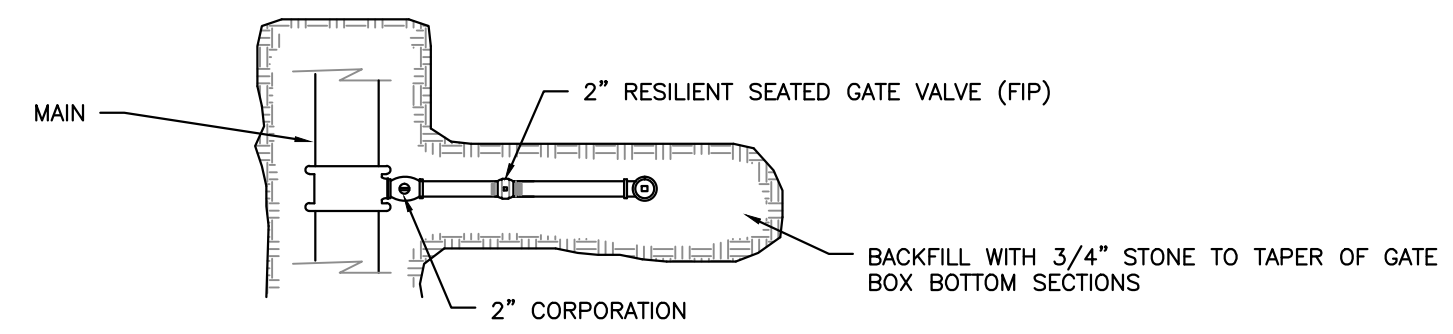
PROJECT NAME: **MUNJOY HEIGHTS**

CLIENT: **REDFERN MUNJOY, LLC.**
P.O. BOX 8816, PORTLAND, MAINE 04104

ACORN ENGINEERING, INC.
1000 WASHINGTON ST., SUITE 200, PORTLAND, MAINE 04104
P.O. BOX 3372, PORTLAND, MAINE 04104
(207) 775-2655

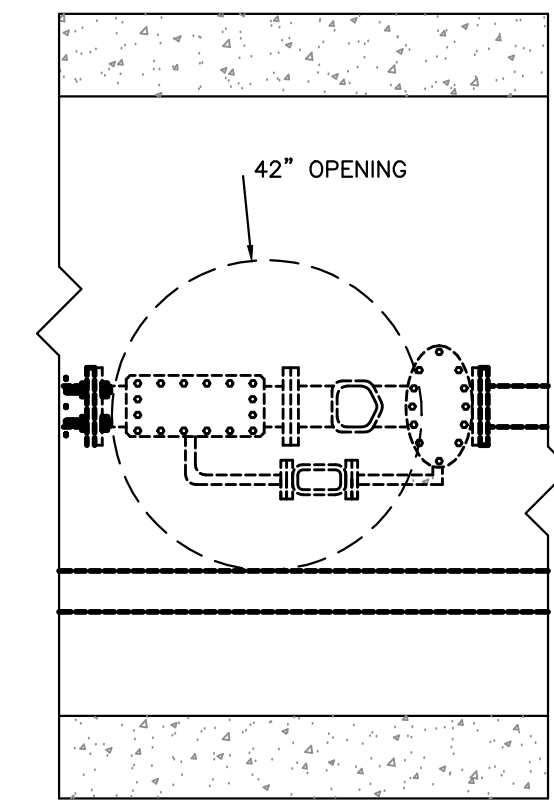
STATE OF MAINE
WILLIAM H. SAVAGE
No. 11416
1-17-14
LICENSED PROFESSIONAL ENGINEER

DRAWING NO. **C-42**

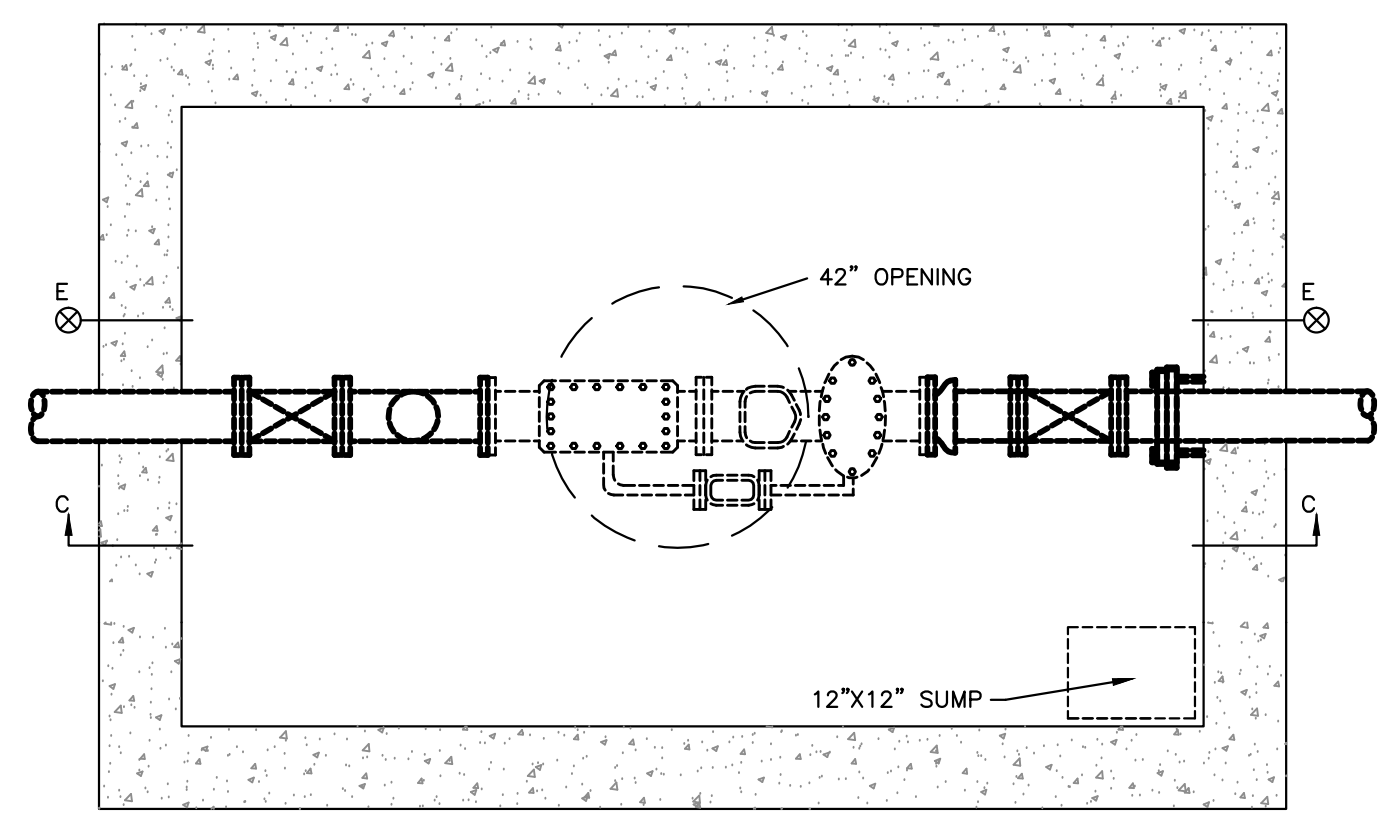


SIDE-ARM BLOW-OFF 4" & LARGER MAINS

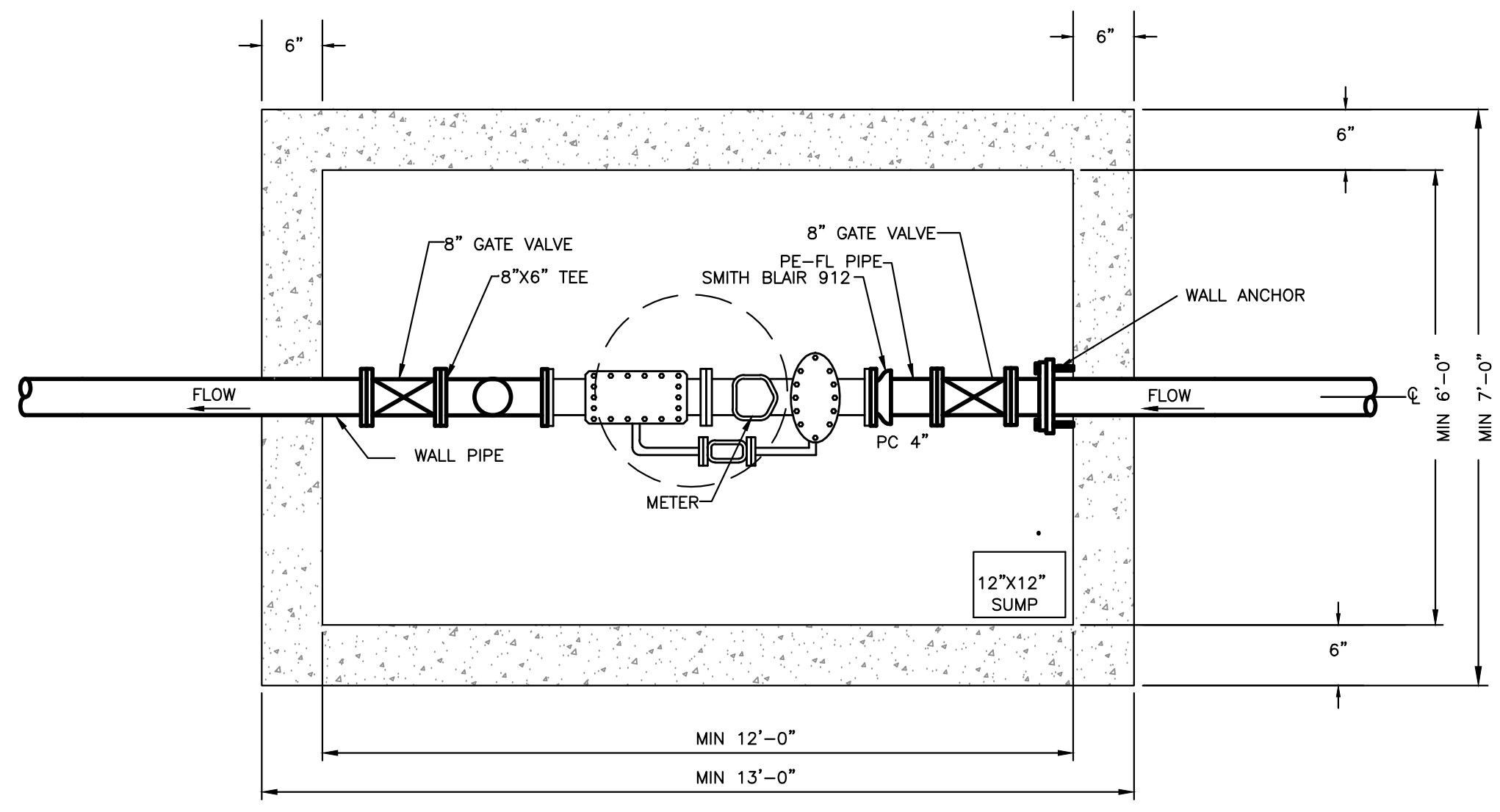
- NOTES:
- SHOP DRAWING SUBMITTAL REQUIRED TO THE ENGINEER.
 - ALL JOINTS TO BE WATERTIGHT WITH USE OF TWO (2) STRIPS OF CONSEAL.
 - COVER AND STRUCTURE LOADING SHALL BE FOR H2O.
 - STRUCTURAL DESIGN OF THE VAULT TO BE APPLICABLE FOR THE ANTICIPATED LOADING AND A MIN. OF H2O LOADING.
 - WATER METER SHALL BE "OMNI F" METER AS MANUFACTURED BY SENSUS. WATER METER SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. FINAL METER SIZE TO BE DETERMINED BY A MECHANICAL ENGINEER, WRIGHT-RYAN TO COORDINATE. FOR BIDDING PURPOSES AN 8" METER SHALL BE ASSUMED.
 - PRE-CAST CONCRETE METER PIT AND APPURTENANCES SHALL BE AS MANUFACTURED BY GEORGE R. ROBERTS CO., OR APPROVED EQUAL.
 - 5,000 PSI @ 28 DAYS.
 - CEMENT SHALL BE TYPE III PER ASTM C150-81.
 - SHALL BE CONSTRUCTED IN ACCORDANCE WITH PORTLAND WATER DISTRICT STANDARDS.
 - 12" HOLES SHALL BE CONSTRUCTED FOR 8" PIPE.
 - THE PORTLAND WATER DISTRICT HAS REQUESTED THAT NO METER BYPASS PIPING BE ALLOWED AT THIS SITE. FINAL DIMENSIONS OF THE PRE-CAST CONCRETE METER PIT TO BE DETERMINED WITH AN APPROVED SHOP DRAWING SUBMITTAL.



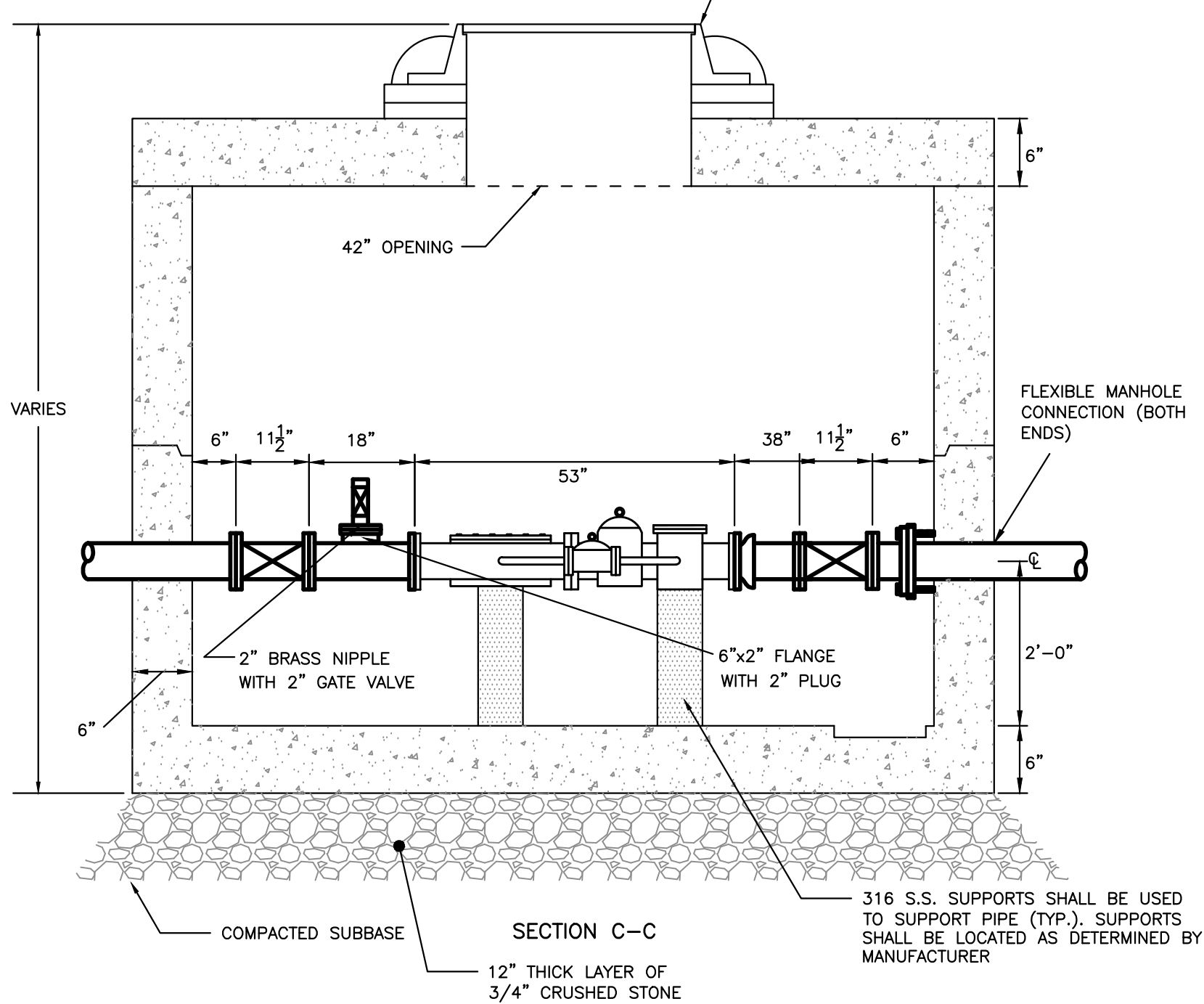
PLAN - TRAFFIC-RATED COVER



PLAN

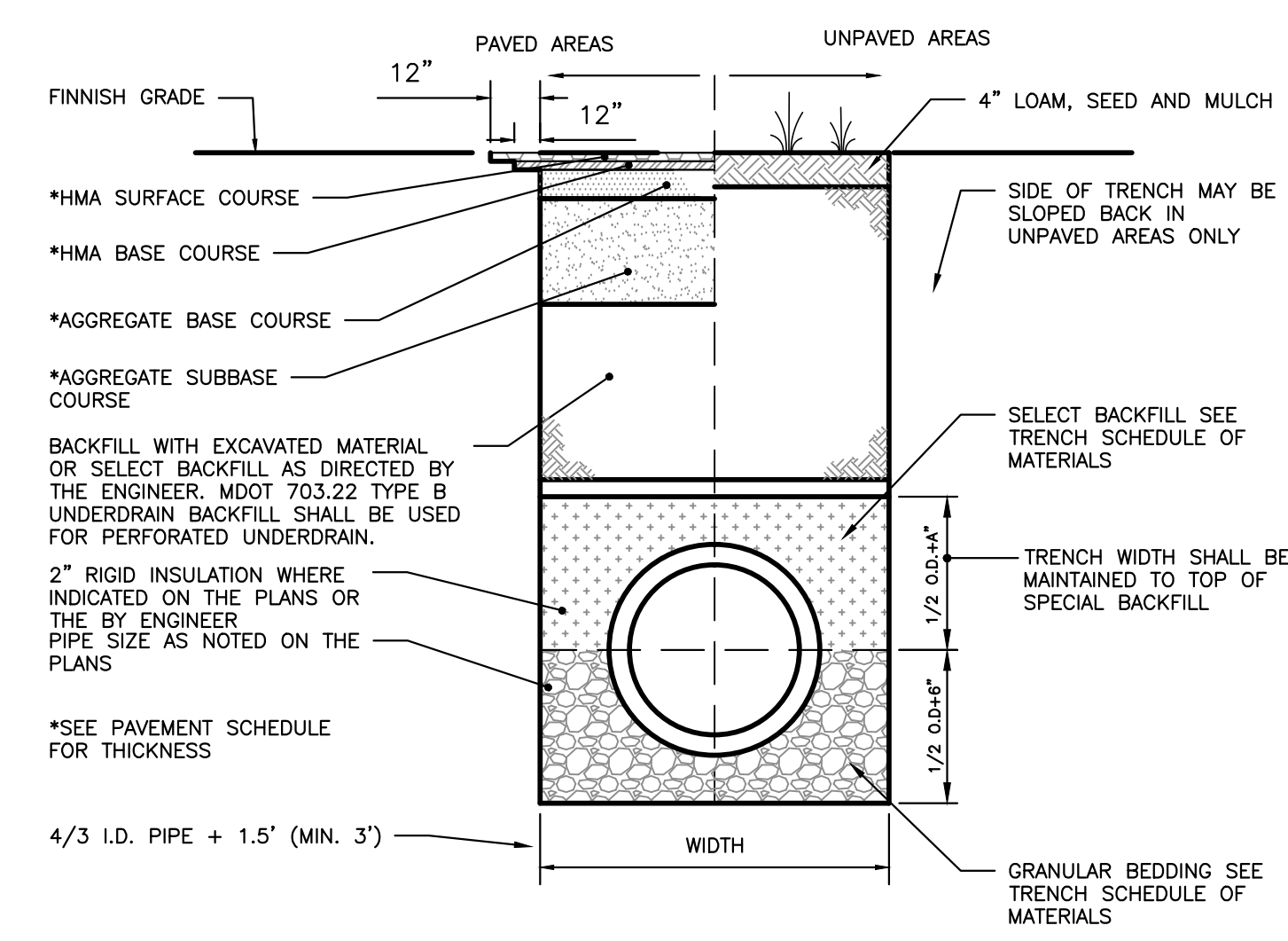


SECTION E-E



SECTION C-C

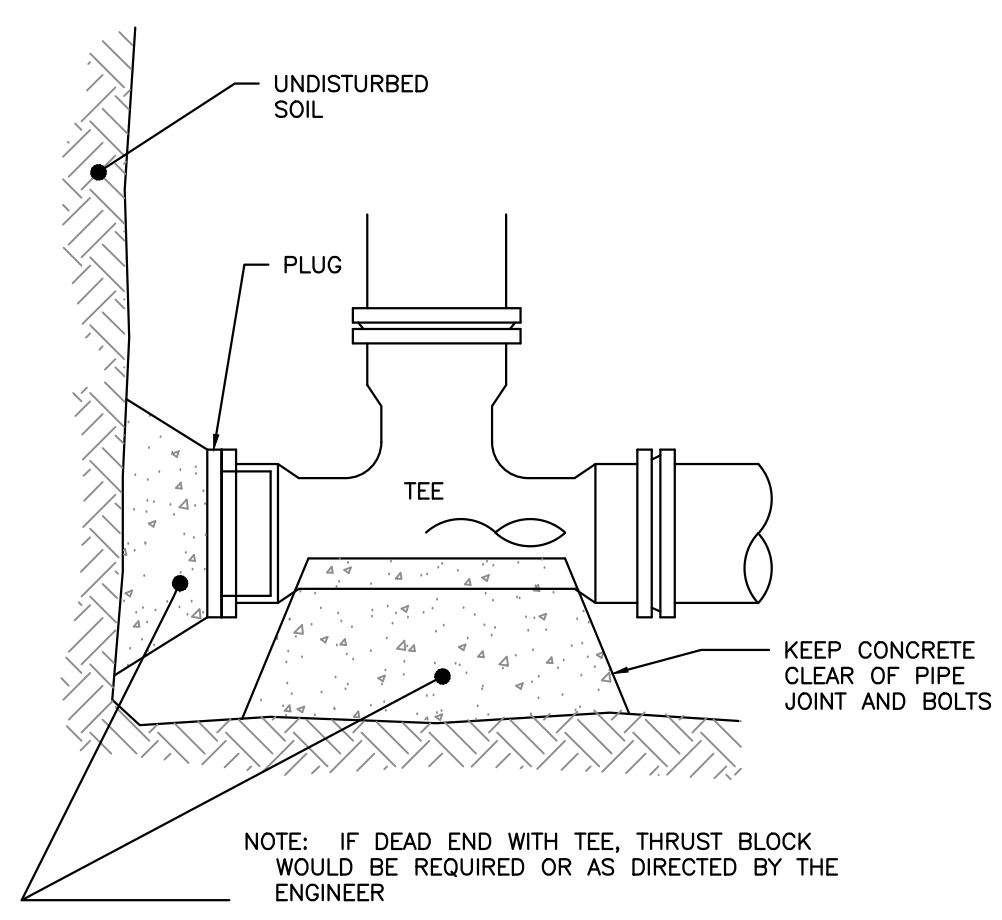
8-IN FIRE LINE METER DETAIL
NOT TO SCALE



SCHEDULE OF MATERIALS		
TYPE OF PIPE	GRANULAR BEDDING	SELECT BACKFILL
CMP	MDOT 703.22 TYPE B UD BACKFILL	MDOT 703.22 TYPE B UD BACKFILL
DUCTILE IRON RCP	MDOT 703.22 TYPE C 3/4" CRUSHED STONE	MDOT 703.22 TYPE B UD BACKFILL
PVC/HOPE	MDOT 703.22 TYPE C 3/4" CRUSHED STONE	MDOT 703.22 TYPE B UD BACKFILL
CMP	MDOT 703.22 TYPE C 3/4" CRUSHED STONE	MDOT 703.22 TYPE C 3/4" CRUSHED STONE

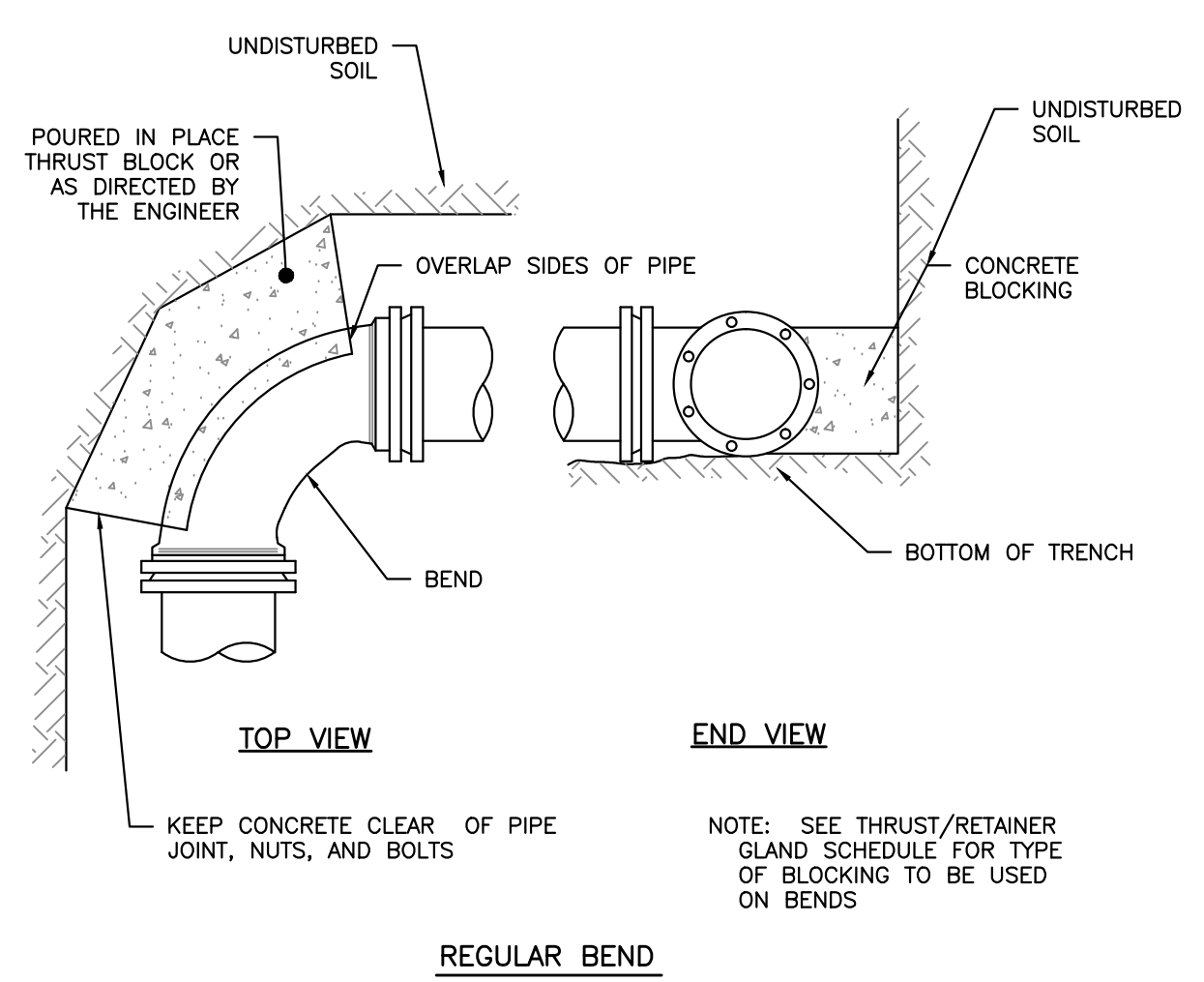
- NOTE:
- BRACING AND SHEETING OR OTHER TRENCH PROTECTION TO BE PROVIDED TO MEET APPLICABLE STATE AND O.S.H.A. SAFETY STANDARDS. ALL SUCH TRENCH PROTECTION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
 - STORM DRAIN COVER BETWEEN 2' AND 3' SHALL INCLUDE 4" OF RIGID INSULATION. COVER BETWEEN 3' AND 4' SHALL INCLUDE 2" RIGID INSULATION.
 - INSTALL WARNING TAPE DIRECTLY ABOVE UTILITIES AT THE TOP OF SUBGRADE.
 - MINIMUM COVER
 - 2'-0" - STORM DRAIN
 - 5'-6" - WATER
 - 5'-0" - SEWER
 - ALL PROPOSED TREES WITHIN 5' PROXIMITY OF THE SEWER PIPE SHALL BE PLANTED AT A DEPTH NO GREATER THAN 3' DEEP. PERMEABLE LANDSCAPE FABRIC SHALL CREATE A ROOT BARRIER AROUND THE SEWER PIPES. CONTRACTOR SHALL COORDINATE WITH THE LANDSCAPE DRAWINGS.

STORM DRAIN, SEWER AND WATER TYPICAL TRENCH SECTION
NOT TO SCALE



END SECTION

THRUST SCHEDULE BEARING SURFACE REQUIRED FOR WATER PIPES (VALUES IN SF)					
PIPE SIZE	1/32 BEND	1/16 BEND	1/8 BEND	1/4 BEND	TEES/CAPS
8"	2.0	3.0	6.0	10.0	16.0



TOP VIEW

END VIEW

REGULAR BEND

THRUST BLOCKING
NOT TO SCALE

PERMIT DRAWINGS
NOT FOR CONSTRUCTION

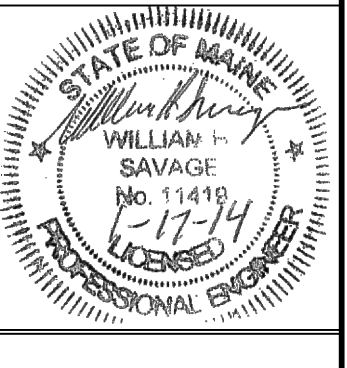
ISSUED FOR	BY	DATE
WORKSHOP #2	WHS	11/12/13
FINAL SUBMISSION	WHS	12/2/13
MAINE DEP MCGP	WHS	12/16/13

REVISION	REV.	DATE
REV. STANDARD DETAIL	WHS	12/4/13
STAFF COMMENTS	WHS	12/6/13

DRAWING NAME: PORTLAND WATER DISTRICT DETAILS - 2
PROJECT NAME: MUNJOY HEIGHTS
CLIENT: REDFERN MUNJOY, LLC.
P.O. BOX 8816, PORTLAND, MAINE 04104

ACORN ENGINEERING, INC.
1200 S. MAIN ST. SUITE 200
PORTLAND, MAINE 04104
P.O. BOX 3372 PORTLAND, MAINE 04104
(207) 775-2655

FILE#47_details 1-17-14.dwg
DATE: 7/11/13
JN: 302-001
SCALE: NTS
DESIGN BY: WHS
DRAWN BY: ZRJ
CHECKED BY: WHS



DRAWING NO.
C-45