354-A-16 2002-0089

19 Rice Street

Warehouse / office Bld.

Gringolet Assoc.

on Spreadsheet

CITY OF PORTLAND, MAINE
DEVELOPMENT REVIEW APPLICATION
PLANNING DEPARTMENT PROCESSING FORM
Planning Copy

2002-0089
Application I. D. Number

04/01/2002
Application Date

Gringolet Associates
Applicant

45 Bridgton Road, Westbrook, ME 04092
Applicant's Mailing Address

Warehouse/Office Building
Project Name/Description

Consultant/Agent

19 - 19 Rice Street, Portland, Maine
Address of Proposed Site

Applicant Ph: (207) 797-6066 Agent Fax:
Applicant or Agent Daytime Telephone, Fax

354 A006001
Assessor's Reference: Chart-Block-Lot

Proposed Development (check all that apply): ☑ New Building ☐ Building Addition ☐ Change Of Use ☐ Residential ☐ Office ☐ Retail
☐ Manufacturing ☑ Warehouse/Distribution ☐ Parking Lot ☐ Other (specify)

8,616 sq. ft. | Acreage of Site | IM
Proposed Building square Feet or # of Units | Zoning

Check Review Required:

☑ Site Plan (major/minor) ☐ Subdivision # of lots ☐ PAD Review ☐ 14-403 Streets Review
☐ Flood Hazard ☐ Shoreland ☐ HistoricPreservation ☐ DEP Local Certification
☐ Zoning Conditional Use (ZBA/PB) ☐ Zoning Variance ☐ Other

Fees Paid: Site Plan $400.00 Subdivision Engineer Review Date 04/02/2002

Planning Approval Status:

Reviewer

☐ **Approved** ☐ **Approved w/Conditions** See Attached ☐ **Denied**

Approval Date Approval Expiration Extension to ☐ Additional Sheets Attached

☐ OK to Issue Building Permit
signature date

Performance Guarantee ☐ **Required*** ☐ **Not Required**

* No building permit may be issued until a performance guarantee has been submitted as indicated below

☐ Performance Guarantee Accepted
date amount expiration date

☐ Inspection Fee Paid
date amount

☐ Building Permit Issue
date

☐ Performance Guarantee Reduced
date remaining balance signature

☐ Temporary Certificate of Occupancy
date ☐ Conditions (See Attached) expiration date

☐ Final Inspection
date signature

☐ Certificate Of Occupancy
date

☐ Performance Guarantee Released
date signature

Defect Guarantee Submitted
submitted date amount expiration date

Released
date signature

CITY OF PORTLAND, MAINE
DEVELOPMENT REVIEW APPLICATION
PLANNING DEPARTMENT PROCESSING FORM
Planning Copy

2003-0149
Application I. D. Number

07/22/2003
Application Date

Thirsty Turf Irrigation
Applicant

1 Industrial Way, Portland, ME 04103
Applicant's Mailing Address

Warehouse Building
Project Name/Description

Consultant/Agent

19 - 19 Rice St R, Portland, Maine
Address of Proposed Site

Applicant Ph: (207) 797-3461 Agent Fax:
Applicant or Agent Daytime Telephone, Fax

354 A006001
Assessor's Reference: Chart-Block-Lot

Proposed Development (check all that apply): ☐ New Building ☐ Building Addition ☐ Change Of Use ☐ Residential ☐ Office ☐ Retail
☐ Manufacturing ☑ Warehouse/Distribution ☐ Parking Lot ☐ Other (specify)

6,000 s.f.
Proposed Building square Feet or # of Units

Acreage of Site

IM
Zoning

Check Review Required:

☑ Site Plan (major/minor)
☐ Subdivision # of lots
☐ PAD Review
☐ 14-403 Streets Review
☐ Flood Hazard
☐ Shoreland
☐ HistoricPreservation
☐ DEP Local Certification
☐ Zoning Conditional Use (ZBA/PB)
☐ Zoning Variance
☐ Other

Fees Paid: Site Plan $400.00 Subdivision Engineer Review Date 07/23/2003

Planning Approval Status:

Reviewer

☐ **Approved**
☐ **Approved w/Conditions** See Attached
☐ **Denied**

Approval Date Approval Expiration Extension to ☐ Additional Sheets Attached

☐ OK to Issue Building Permit
signature date

Performance Guarantee ☐ **Required*** ☐ **Not Required**

* No building permit may be issued until a performance guarantee has been submitted as indicated below

☐ Performance Guarantee Accepted	date	amount	expiration date
☐ Inspection Fee Paid	date	amount	
☐ Building Permit Issue	date		
☐ Performance Guarantee Reduced	date	remaining balance	signature
☐ Temporary Certificate of Occupancy	date	☐ Conditions (See Attached)	expiration date
☐ Final Inspection	date	signature	
☐ Certificate Of Occupancy	date		
☐ Performance Guarantee Released	date	signature	
☐ Defect Guarantee Submitted	submitted date	amount	expiration date
☐ Defect Guarantee Released	date	signature	

City of Portland Site Plan Application

If you or the property owner owe real estate taxes, personal property taxes or user charges on any property within the City of Portland, payment arrangements must be made before permit applications can be received by the Inspections Dept.

Address of Construction: Rice Street (19 Rice ST Rear)		Zone: IM
Total Square Footage of Proposed Structure: 6,000 Sq.Ft.	Square Footage of Lot: 75,180 Sq.Ft.	
Tax Assessor's Chart, Block & Lot — Chart# 354, Block# A, Lot# 6	Property owner, mailing address: Thirsty Turf Irrigation, 1 Industrial Way, Portland, ME 04103	Telephone: 797-3461
Consultant/Agent, mailing address, phone & contact person: DeLuca-Hoffman, Associates, 778 Main Street, South Portland, ME 04106	Applicant name, mailing address & telephone: Thirsty Turf Irrigation, 1 Industrial Way, Portland, ME 04103	Project name: Warehouse Building

Proposed Development (check all that apply) ___New Building ___Building Addition ___Change of Use
___Residential ___Office ___Retail ___Manufacturing _X_Warehouse/Distribution ___Parking lot
___Subdivision, amount of lots____ $25.00 per lot $_____
___Site Location of Development $3,000, except for residential lots which are then $200 per lot_____
___Traffic Movement $1,000 ___Stormwater Quality $250.00 ___Other_____
___After the fact review - Major project $1,500.00 ___After the fact review - Minor project $1,200.00

Major Development _____ $500.00 Minor Development _X_ $400.00
Plan Amendments: ___Board review $200.00 ___Staff review $100.00

Who billing will be sent to:	Thirsty Turf Irrigation		
Mailing address:	1 Industrial Way		
State and Zip:	Portland, ME 04103	Contact person: Josh Doucette	Phone: 797-3461

Submittals shall include (9) separate folded packets of the following:

a. copy of application
b. cover letter stating the nature of the project
c. site plan containing the information found in the attached sample plans check list

Amendment to Plans: Amendment applications should include 6 separate packets of the above (a, b, and c)

ALL PLANS MUST BE FOLDED NEATLY AND IN PACKET FORM

Section 14-522 of the Zoning Ordinance outlines the process, copies are available at the counter at .50 per page (8.5 x11) you may also visit the web site: ci.portland.me.us chapter 14

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature of applicant: Steph Turf	Date: July 22, 2003

This application is for site review ONLY, a building Permit application and associated fees will be required prior to construction.

NORTHEAST CIVIL SOLUTIONS, INC.

153 U.S. Route 1
Scarborough, Maine 04074
(800) 882-2227/ (207) 883-1000
FAX: (207) 883-1001
ncs@maine.rr.com

LETTER OF TRANSMITTAL

TO: JAY REYNOLDS, DEVELOPMENT REVIEW COORDINATOR CITY OF PORTLAND 389 CONGRESS STREET PORTLAND, ME 04101	DATE: 3-10-06 JOB NO.: FROM: GREG BOULETTE
RE: THIRSTY TURF IRRIGATION	

PLEASE BE ADVISED THAT WE ARE ENCLOSING THE FOLLOWING:

NO.	COPIES	DESCRIPTION
1	1	Copy of NRPA Application
1	1	Copy of Plan

Notes:
Jay,
I met with you and Fred on the site last fall and we discussed this proposal. I am sending you a copy as required by the MDEP. If you should have any questions please call.
Thanks
Greg Boulette

Copy to file

Signed

SURVEYING ENGINEERING LAND PLANNING
Northeast Civil Solutions
INCORPORATED
153 U.S. Route 1
Scarborough
Maine 04074
tel
207.883.1000
800.882.2227
fax
207.883.1001

March 2, 2006

Maine Department of Environmental Protection
Attn: Bill Bullard
312 Canco Road
Portland, Maine 04074

RE: Thirsty Turf Irrigation, JD Builders, 21 Rice Street, Portland

Dear Bill,

On behalf of JD Builders, we are pleased to submit two (2) copies of the Individual NRPA Permit Application for the development adjacent to the unnamed stream. The project consists of filling of the embankment to allow for additional parking in the rear of the building. As you will recall, we discussed the after-the-fact status of this project and the fact that most of not all of the fill will actually be removed from the bank and the bank stabilized with erosion control mesh, loamed and seeded as well as the additional plantings of trees as shown on the plan.

The revegetation and erosion control plan has previously been verbally approved. We are submitting this application for the additional parking in the rear of the building as it is disturbance and the placement of crushed stone within 25 feet of the top of the bank associated with the stream. The client also proposed to install a guardrail at the top of the embankment to further protect the stream and associated slopes as requested in the pre-application meeting. The following numbered comments correspond with the numbered requirements in the Additional Attachments for Individual NRPA Permits section within the NRPA Application booklet:

1. **Functional Assessment**
   N/A

2. **Compensation**
   The attached plan shows how the applicant proposes to mitigate the work that has previously been done without a permit. The top of the slope will be rounded out to create more of a moderate slope rather than a steep drop off from the top of bank. The crushed stone now in place actually dissipates the runoff and slows it to deter from further erosion.

Additionally, haybales will be staked along the top of the bank until the vegetation and trees have stabilized the embankment. A wearing course or final paving will be added which will allow the runoff that currently drains past the catch basin to enter the basin and be transported to the subsurface detention facility on the site. This will mitigate the major area of erosion where the runoff was creating a large rill in the embankment. The crushed stone also help to stabilize this area.

The applicant has already taken steps to mitigate the issue by installing silt fence to stop the silts from entering the stream. The trees shown on the plan have also been ordered and will be planted this spring along with the installation of the erosion control mesh and the planting of grass in accordance with the attached erosion and sedimentation narrative. The crushed stone parking area that has been installed will serve two purposes, one to stabilize the top of the bank and second to serve as overflow parking for the client. The original proposal had sufficient parking but due to the applicants business growing, the need for additional parking for work trucks and equipment has been met. Again, the applicant does propose a guardrail to further protect the embankment from any trucks or debris mistakenly going over the bank. The entrance to the site also has a gate to keep the general public from entering the site and throwing garbage over the banking and into the stream.

The following attachments are included with this proposal in accordance with the requirement for an Individual Permit Application.

Attachment 1 This letter will serve as the activity description.

Attachment 2 Alternative Analysis Report.

Attachment 3 A Site Location Map.

Attachment 4 Color photographs of the embankment.

Attachment 5 Overhead and profile views of the embankment and surrounding areas can be seen on the plans.

Attachment 6 Overhead and profile views of the embankment can be seen on the plans.

Attachment 7 The Construction Plan has been previously submitted and verbally approved. This plan is one in the same with the erosion plan and compensation plan.

Attachment 8 The Erosion Control Plan and narrative is attached.

Attachment 9 A Site condition report is not applicable as this is an after the fact application. Although, the site is currently stable and erosion has been brought to a minimum with the placement of the crushed stone. The addition of erosion mesh, loam and seed and tree plantings will mitigate the remaining issues.

Attachment 10 The Notice of Intent to file has been published in a news paper as well as sent to the abutters via certified mail.

Attachment 11 A copy of this application has been sent to the Maine Historic Preservation Commission as well as the City of Portland.

We are hopeful that we have provided you with all of the pertinent information so that the permit for the additional crushed stone parking may be granted. We believe it is in the best interest of all parties to leave the crushed stone as placed so no further disturbance is created adjacent to the stream. Thank you

Sincerely,

Northeast Civil Solutions

Gregory Boulette
Project Engineer

APPLICATION FOR A NATURAL RESOURCES PROTECTION ACT PERMIT

→PLEASE TYPE OR PRINT IN *BLACK INK ONLY* →SEE DETACHABLE INSTRUCTIONS

1. Name of Applicant:	JD Building, LLC	4. Name of Agent: (if applicable)	Gregory Boulette c/o Northeast Civil Solutions, Inc.
2. Applicant's Mailing Address:	21 Rice Street, Unit 1 Portland, Maine 04103	5. Agent's Mailing Address:	153 U.S. Route One Scarborough, Maine 04074
3. Applicant's Daytime Phone #:	(207) 797-3461	6. Agent's Daytime Phone #:	(207) 807-0892

7. Location of Project: (Nearest Road, Street, Rt.#)	Rice Street	8. Town:	Portland	9. County:	Cumberland

10. Type of Resource: (Check all that apply)	X River, stream or brook ❑ Great Pond ❑ Coastal Wetland ❑ Freshwater Wetland ❑ Wetland Special Significance ❑ Significant Wildlife Habitat ❑ Fragile Mountain	11. Name of Resource:	Unnamed tributary to Presumpscot River
		12. Amount of Impact (Sq.Ft.):	Fill: 11,435 S.F Dredging/Veg Removal/Other: Vegetation Removal and Fill.

13. Type of Freshwater Wetland: (Check all that apply)	X Forested ❑ Scrub Shrub ❑ Emergent ❑ Wet Meadow ❑ Peatland ❑ Open Water ❑ Other_____	*FOR FRESHWATER WETLANDS:* *Tier 1*	*Tier 2/3*
		❑ 0 - 4,999 sq. ft. ❑ 5,000 – 9,999 sq. ft. ❑ 10,000 – 14,999 sq. ft.	❑ 15,000 – 19,999 sq. ft. ❑ 20,000 – 43,560 sq. ft. ❑ > 43,560 sq. ft.

14. Brief Project Description:	Thirsty Turf Irrigation is seeking an after the fact NRPA permit for clearing and filling that occurred along the steep slope adjacent to the stream on site as well as the crushed stone parking area behind the building.

15. Size of Lot or Parcel:	75,180 X square feet, or ❑ acres						
16. Title, Right or Interest:	X own ❑ lease ❑ purchase option ❑ written agreement						
17. Deed Reference Numbers:	Book#: 19745 Page: 280	18. Map and Lot Numbers:	Map #: 354	Lot #: A			
19. DEP Staff Previously Contacted:	Bill Bullard, Chris Redman, Fred Gallant	20. Part of a larger project:	❑ Yes X No	After-the-Fact:	X Yes ❑ No		
21. Resubmission of Application?	❑ Yes→ X No	If yes, previous application #		Previous project manager:			
22. Written Notice of Violation?	X Yes → ❑ No	If yes, name of DEP enforcement staff involved:	Fred Gallant	23. Previous Wetland Alteration:	❑ Yes X No		
24. Detailed Directions to the Project Site:	From Portland: Take Route 302 (Forest Avenue) West to Riverside Industrial Parkway to right onto Rice Street.						

25. TIER 1	TIER 2/3 AND INDIVIDUAL PERMITS	
❑ Fee ❑ Topographic Map ❑ Documentation of Title, Right or Interest ❑ Plan or Drawing (8 1/2" x 11") ❑ Photos of Area ❑ Statement of Avoidance & Minimization ❑ Statement/Copy of cover letter to Maine Historic Preservation Commission ❑ Copy to municipality	x Fee x Topographic Map x Documentation of Title, Right, Interest x Photos of Area x Plan or Drawing (8 1/2" x 11") x Copy of Public Notice N/A Professional Certification/Delineation X Erosion Control Plan	X Alternatives Analysis, if required X Description of Avoidance & Minimization X Compensation Plan (if required) N/A Description of Previously Mined Peatland (if required) X Statement/Copy of cover letter to Maine Historic Preservation Commission X Construction Plan, if required X Copy to municipality

26. FEES, Amount Enclosed:	

FOR DEP USE	L- ATS# Total FEES CK# Date Rec'd
FOR CORPS USE	App#: Office Code: Date Rec'd: Date Completed:

SIGNATURE PAGE: *This page MUST be submitted along with the form on the previous page.*

By signing below the applicant (or authorized agent), certifies that he or she has:

X Completed all of the public notice requirements.

X Read and understood the following:

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting navigable waters of the United States, the discharge of dredged or fill material into waters of the Untied States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor a permit be issued.

CORPS SIGNATORY REQUIREMENT

USC Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry shall be fined not more than $10,000 or imprisoned not more than five years or both. I authorize the Corps to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein.

DEP SIGNATORY REQUIREMENT

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

"I hereby authorize the person named below to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application."

SIGNATURE OF APPLICANT, *if agent involved* — DATE 3/10/06

"Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in the application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant."

SIGNATURE OF AGENT/APPLICANT — DATE 3/10/06

NOTE: Any changes in activity plans must be submitted to the DEP and the Corps in writing and must be approved by both agencies prior to implementation. Failure to do so may result in enforcement action and/or the removal of the unapproved changes to the activity.

Greg Boulette

From: Gallant, Fred C [Fred.C.Gallant@maine.gov]
Sent: Tuesday, August 30, 2005 8:43 AM
To: 'Greg Boulette'
Cc: 'thirstyturf@aol.com'
Subject: RE:

Greg and Josh,

No I was not aware that an ATF full NRPA application was in the works. That changes things considerably.

Lets do this, I'll return the PBR all together with the understanding that a full NRPA permit is in the works. I will accept a restoration plan w/o a permit application that shows the entire area being revegetated, including the area with the stone.

I need to accept a restoration plan before I can have you (Josh) do anything out there, you want to get things moving along and I want the slope stabilized before winter. Let us start there, we can keep the restoration and any permit separate.

If the full Permit is approved then the rocks can stay at the top and be used as parking, if the application is denied, withdrawn or not submitted then the Department will hold you (Josh) to the restoration plan. Sound fair?

What do you both think?

Fred

-----Original Message-----
From: Greg Boulette [mailto:greg.boulette@northeastcivilsolutions.com]
Sent: Tuesday, August 30, 2005 7:18 AM
To: fred.c.gallant@maine.gov
Cc: thirstyturf@aol.com
Subject:

Fred,
I spoke with Josh and he said you were looking for a revised plan. What revision are you looking for? Where you aware that we were going to submit a full NRPA to allow the stone parking area? I have completed the application for the NRPA and the plan essentially remains unchanged. Do you need a plan for the PBR showing the stone being removed and revegetated? My thought on this is if the NRPA is approved than it would be a waste of Josh's time and money to remove the stone and revegetate just to replace the stone at a later date. Please let me know how you feel on this situation.
Thank you
Greg

Doc#: 67073 Bk:19748 Ps: 280

WARRANTY DEED
MAINE STATUTORY SHORT FORM

RICE STREET REALTY, LLC, a Maine limited liability company, with a mailing address of 55 Hardy Road, Falmouth, Maine, 04105, for consideration paid, grants to J.D. BUILDING, L.L.C., a Maine limited liability company with a mailing address of 125 Bridgton Road, Westbrook, Maine, 04092, with **WARRANTY COVENANTS**, the following described real estate:

MAINE REAL ESTATE TAX PAID

A certain lot of parcel of land, with any buildings thereon, situated in the City of Portland, County of Cumberland and State of Maine, easterly of but not adjacent to Riverside Industrial Parkway and westerly of but not adjacent to land of the Portland Terminal Company and being all of Lot C on a plan entitled "Composite Plan Riverside Industrial Park," dated April, 1975, and recorded in the Cumberland County Registry of Deeds in Plan Book 108, Page 6, being further bounded and described as follows:

Beginning at an iron set in the ground at the southwesterly corner of land conveyed by Greater Portland Building Fund, Inc. to Maine National Bank, as Trustee under Declaration of Trust entitled Riverside Building Co., by deed dated August 25, 1971, and recorded in said Registry of Deeds in Book 3187, Page 664, said iron being on the easterly line of land conveyed by Greater Portland Building Fund to Anna Belle Aggar by deed dated December 28, 1973, and recorded in said Registry of Deeds in Book 3499, Page 293; thence running South 18° 38' West by said Aggar land, 354.77 feet to the northwesterly line of land conveyed by ADC Building Fund Incorporated to Davis-Greene Co., by deed dated December 18,1962 and recorded in said Registry of Deeds in Book 2723, Page 182; thence running North 68° 40' 30" East by said Davis-Greene Co. land 552.40 feet to the southeasterly line of land conveyed by Greater Portland Building Fund Inc. to Maine National Bank, as Trustee under Declaration of Trust entitled Riverside Building Co. as aforesaid; thence running North 71° 22' West by land conveyed to Maine National Bank, as Trustee under Declaration of Trust entitled Riverside Building Co. as aforesaid, 423.42 feet to an iron set in the ground in the easterly line of said Aggar land and the point of beginning.

ALSO hereby conveying a forty (40) foot easement, which is appurtenant to and benefits the above-described

Doc#: 67073 Bk:19748 Pg: 281

premises, to pass and repass on foot and with vehicles at any and all times and to construct, lay and relay, repair, maintain, remove and replace utility pipes, mains and poles and wires upon, under and over said forty (40) foot wide strip, together with all necessary fixtures and appurtenances, said forty (40) foot wide strip being bounded and describe as follows:

Beginning at an iron set at the northwesterly corner of land conveyed to Theodore H. Brodie and Glenn A. Brodie as Trustees by deed of Riverside Building Co. dated December 13, 1976, and recorded in said Registry of Deeds in Book 3952, Page 105 (hereinafter referred to as "Brodie land"); thence South 18° 38' West by the westerly boundary of said Brodie land two hundred fifty (250) feet to another iron; thence South 71° 22' East by the above-described premises forty (40) feet to another iron; thence running North 18° 38' East two hundred fifty (250) feet to another iron; thence running North 71° 22' West forty (40) feet to the point of beginning.

Said forty (40) foot right of way and said Brodie land are shown on a plan made for Theodore H. Brodie by H. I. and E. C. Jordan dated November 17, 1976.

Being the same premises conveyed to Rice Street Realty, LLC by Quitclaim Deed of Gringolet Associates, dated August 20, 2002, recorded in the Cumberland County Registry of Deeds at Book 17980, Page 32.

IN WITNESS WHEREOF, Rice Street Realty, LLC, has caused this instrument to be signed by Robert J. Gaudreau, its Member, thereunto duly authorized, this 14 day of July, 2003.

RICE STREET REALTY, LLC

WITNESS

BY: _____
Robert J. Gaudreau,
Its: ~~Member~~ MANAGER PTG

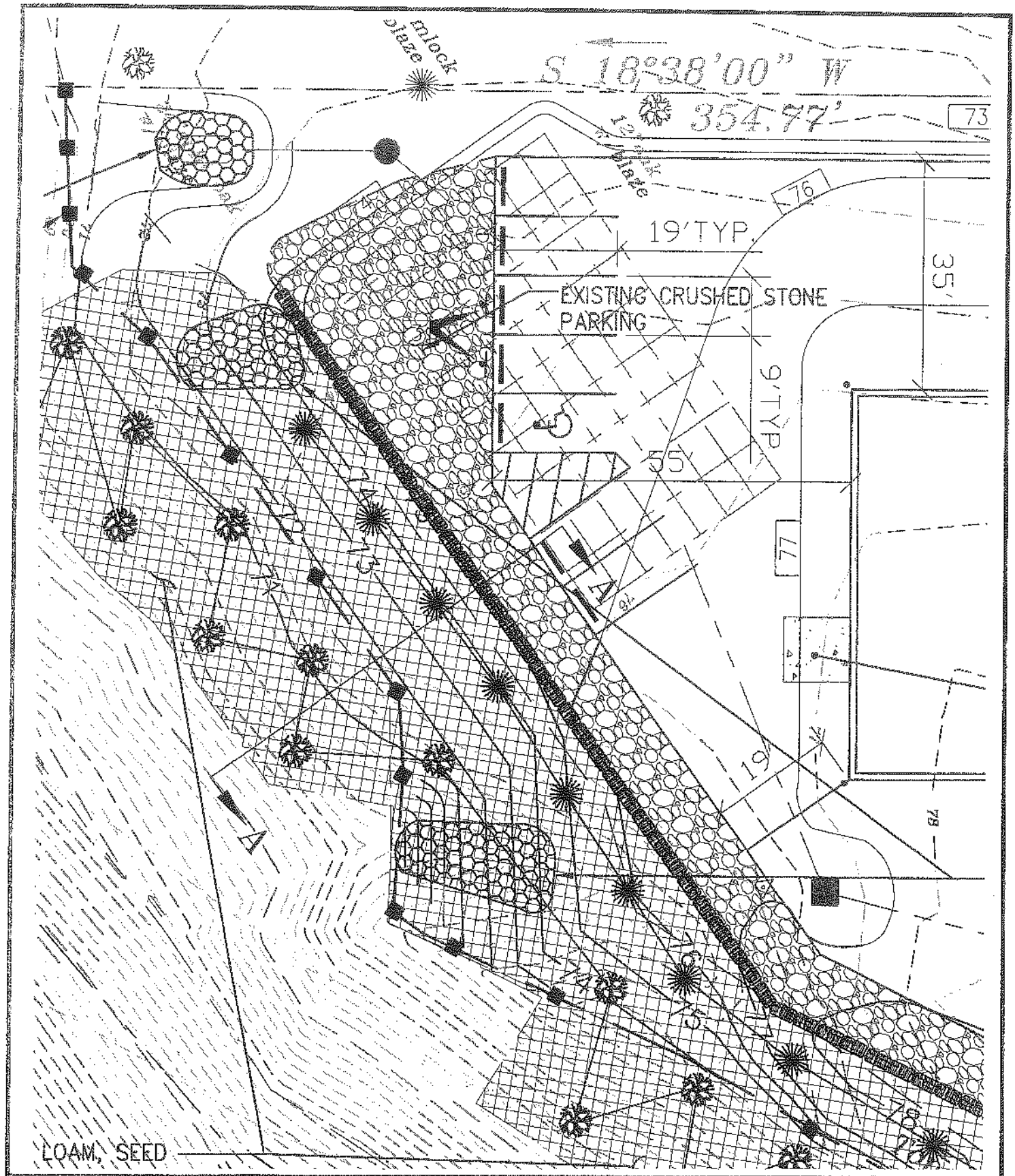
STATE OF MAINE
Cumberland, ss.

July 14th, 2003

The personally appeared, the above-named Robert J. Gaudreau, in his capacity as Member of Rice Street Realty, LLC and acknowledged the forgoing instrument to be his/her free act and deed and the free act and deed of said corporation.

Before me, _____
Jeffrey W. Jones, Attorney-at-Law

Received
Recorded Register of Deeds
Jul 15,2003 10:09:58A
Cumberland County
John B. O'Brien



ACAD FILE: 7-20-05	SCALE: 1" = 20'	DATE: AUGUST 31, 2005

Drawing Name:
EROSION CONTROL & VEGETATION PLAN

Client:
THIRSTY TURF IRRIGATION
21 RICE STREET, PORTLAND, MAINE 04103

Prepared For:
JD BUILDING, LLC.
21 RICE STREET, PORTLAND, MAINE 04103

SURVEYING ENGINEERING LAND PLANNING
Northeast Civil Solutions
INCORPORATED
153 US ROUTE 1, SCARBOROUGH, MAINE 04074
tel 207.883.1000 800.882.2227
fax 207.883.1001
e-mail ncs@maine.rr.com

Attachment 1

See Cover Letter

Attachment 2

Alternatives Analysis Report

Statement of Avoidance or Minimization

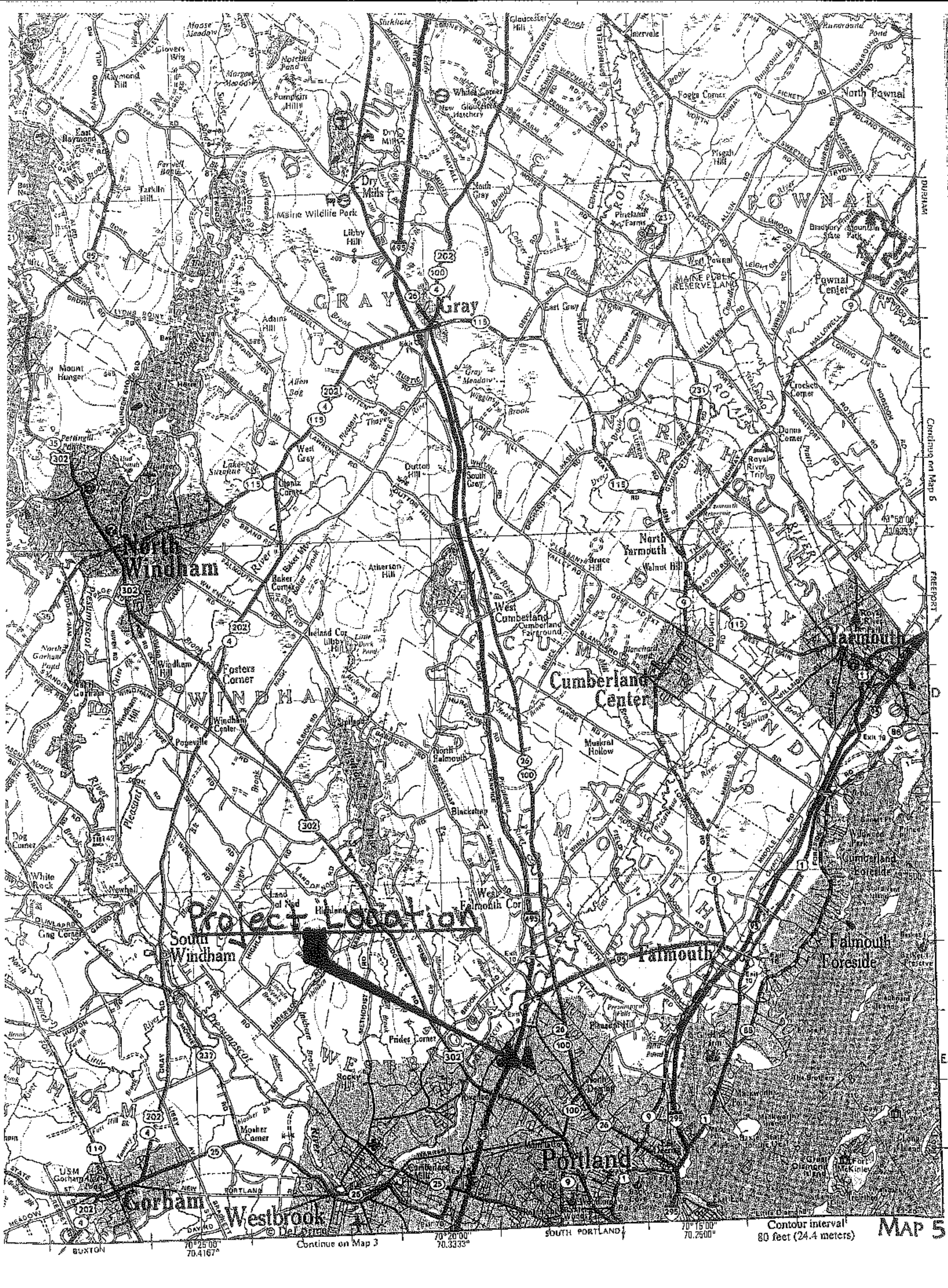
In the original layout of the project site careful attention was paid to the deep ravine that transects the site when designing the parking areas and drives. The proposed site had many constraints due to its size, location and proximity to a large ravine and train track. Due to these constraints the developer had no choice but to place the building and subsequent parking where it is now located. At this time the applicant has outgrown his space and the requirement of additional parking is needed. The area shown on the plans was the only location on the site where additional parking could be installed. The crushed stone parking not only serves as the needed additional parking area but also stabilizes the top of the bank.

Alternatives Analysis

As stated above, due to the small size of the site and the surrounding constraints there was no better alternative for the site layout. Perhaps a smaller building and less parking would have been prudent but then the building would not have met the needs of the current owner. As such, we believe that there is no alternative design warranted for this project. A 25' setback was originally held from the top of the bank associated with the stream with erosion control measures placed to prohibit any pollutants to enter into the resource. Since the original approvals the applicant business has grown and the need for additional parking was met by placing the crushed stone where it is now located on the site. After inspection of the site there was no better alternative or location for the parking to be installed. With the proposed mitigation we believe the additional crushed stone parking will not create any adverse impact to the stream at the bottom of the steep ravine.

Attachment 3

Site Location Map


Project Location
North Windham
Windham
Gray
South Windham
Cumberland Center
North Yarmouth
Yarmouth
Pownal
North Pownal
Falmouth
Falmouth Foreside
Portland
Westbrook
Gorham
West Cumberland
West Gray
South Gray
North Falmouth
West Falmouth Cor
Windham Center
Windham Hill
Fosters Corner
Prides Corner
Mosher Corner
Highland Lake
Land of Nod
Maine Wildlife Park
Dry Mills
Cumberland Fairground
Muskrat Hollow
Blackstrap
Popeville
Gorham
Continue on Map 3
Continue on Map 6
Contour interval 80 feet (24.4 meters)
70°25'00" 70.4167°
70°20'00" 70.3333°
70°15'00" 70.2500°
SOUTH PORTLAND
BUXTON
FREEPORT
DURHAM
© DeLorme
MAP 5

Attachment 4

Color Photographs

Attachment 5

See attached plan

Attachment 6

See attached plan

Attachment 7

See attached plan

Attachment 8

See attached plan and Narrative

INTRODUCTION

The purpose of this report is to identify the erosion and sedimentation control measures for the clearing and filling that has taken place along the ravine and adjacent stream at Thirsty Turf irrigation located at 21 Rice Street in Portland, Maine. Erosion and Sedimentation control measures are typically used to discourage sedimentation runoff during construction operations. In this specific case the construction has occurred and we will be proposing a rehabilitation plan. During the rehabilitation process these temporary and permanent erosion control measures will be implemented. The measures in this report include temporary non-structural and structural measures, permanent non-structural and structural measures and maintenance of measures.

PROJECT DESCRIPTION

The project site has previously been developed with a 6,000 S.F. office/warehouse space. Stormwater management infrastructure was constructed and erosion control devices were in place at time of construction. Since final construction was finished subsequent clearing and filling has taken place along the ravine adjacent to a stream that transects the site. The purpose of this proposal is to create a rehabilitation plan for the steep slopes including minor grading and seeding as well as the addition of trees on the slope to help with long term stability of the area.

EXISTING SITE CONDITIONS

The project Site is presently developed with a 6,000 S.F. office/warehouse building with associated parking, circulation drives and stormwater management infrastructure. The main area of concern is the steep slope and ravine adjacent to the stream. The slope has been cleared and fill has been placed along the streambed. The slope has since seen multiple rain events and due to the lack of vegetation and the collection of stormwater into concentrated areas rills have formed causing erosion and silt to enter into the stream.

SOILS

Soils information taken from the Cumberland County SCS Soil Maps indicates that the soils along the ravine to be Scantic (Sn) with a hydrologic soil group of "D". These soils have since been stripped of their vegetation and fill has been placed upon the virgin ground causing increased risk of erosion to occur.

PRECONSTRUCTION MEETING

Prior to any further disturbance to the ravine a meeting was held at the site between Thirsty Turf Irrigation, Inc., The City of Portland, The Maine Department of Environmental Protection and Northeast Civil Solutions. In that meeting we discussed what had occurred and the best way to go about remedying the issue. After discussions we came to a conclusion that the best way to fix the problem was to file an after the fact Permit-By-Rule Application form for the construction of the parking areas and the building. Under separate cover we are to propose a rehabilitation plan for the steep slope. It was decided that the top of the banking would need to be scraped to allow for a more gradual slope leading into the steep side slopes of the ravine. Also discussed was an erosion control plan to assure that no further erosion of soil would occur into the stream. Attached is a plan that we have developed to regrade the steep slopes as well as revegetate the slopes so no further erosion will occur.

EROSION CONTROL SEDIMENTATION CONTROL PRACTICES

STRUCTURAL MEASURES

Silt Fence: Silt Fence will be used to surround the existing wetlands and the downhill side of all construction activities. Silt fences will be installed upgradient of the wetlands and stream area, in unstabilized drainage ways and in additional areas where dictated by field conditions.

Riprap: Materials for aprons were selected to attenuate the erosive forces of stormwater runoff. Riprap armament is proposed for discharge outlet aprons as well as in problem areas where rills have formed due to concentrated flow from the parking area.

Haybale Barriers: Haybale barriers will be staked across the upland edge of the regraded downslope to slow runoff prior to it sheeting across the newly graded and seeded ravine slopes. Jute mat will also be placed on the slopes so as to hold the soil and seed in place to allow the seed to germinate and form a good root system, which will deter further erosion.

NONSTRUCTURAL MEASURES

Permanent grass and legume cover shall be used on all areas of exposed soils not scheduled for other finishes. A minimum of four inches of loam shall be used in al areas to be permanently seeded. Temporary seeding shall not be substituted for permanent seeding.

Limestone and fertilizers shall be applied according to D.E.P recommendations due to the proximity to the stream on –site. If the D.E.P does not recommend any applications than fertilizer can be applied at a rate of 18.4 pounds per 1,000 SF using 10-20-20 (N-P205-K20) or equivalent. Agricultural limestone (equivalent to 50% calcium plus magnesium oxide) shall be applied at a rate of 138 pounds per 1,000 SF. Limestone and fertilizer shall be worked into the soil to a depth of four inches with a disk, spring tooth harrow, or other suitable equipment. The final harrowing or discing operation shall be on the general contour and continue until a reasonably fine, uniform, seedbed is prepared. All but clay soils, silty soils, or coarse sands shall be rolled to firm the seedbeds, whenever feasible. All stones two inches or larger in any dimension, debris such as wire, cable, tree roots, pieces of concrete, trash, clods, lumps and all other unsuitable materials shall be removed. If traffic has left the soil compacted, the area must be tilled and firmed as above. The following seed mixture and seeding rates shall be used for all permanent seeded areas.

PERMANENT SEED MIXTURE

Seed Mixture	Lbs/Acre	Lbs/1000 Sf
Creeping Red Fescue	20	0.46
Tall Fescue	20	0.46
Redtop	2	0.05
Total	42	0.97

Note: Inoculate all legume seeds, and use four times the recommended rate of inoculant when hydroseeding

Seed shall be uniformly applied by hand, cyclone, drill or cultipacker-type seeder, or hydroseeder (slurry including seed and fertilizer). Normal depth shall be from ¼ to ½ inch. Hydroseedings, which are mulched, may be left on the soil surface.

Where feasible, the seedbeds shall be firmed following seeding operations using either a roller of lightweight drag, except where either a cultipacker-type seeder or hydroseeder is used. Seeding operations shall be on the contour. Seeding rates must be increased ten percent when hydroseeding. Spring or fall seedings will be used whenever possible, in accordance with the following schedule:

Spring Seeding	April 1 to May 20
Fall Seeding	August 1 to September 1

Permanent seeding shall be done within 14 days of final grading, but in no case later than September 1, (45 days prior to the first killing frost, which is typically 10/10), of the construction year. All seeded areas that do not have an adequate catch of grass shall be reseeded as needed to guarantee a good quality vegetative cover. Mulching and mulch anchoring shall occur immediately after seeding.

All disturbed area not reseeded prior to September 1 shall be stabilized for the winter with temporary seed and hydraulically-applied mulch and binder, or with a geotextile fabric, prior to October 1.

Dormant seeding may be used after the first killing frost (October 10) and before snowfall. If seeding cannot be done within the seeding dates, mulch shall be used to protect the site to delay seeding until the next recommended seeding period. Midsummer seeding should be avoided, but is allowable, provided that the seeded area is supplied with sufficient water from daily watering and rain.

One of the following methods will be used to perform a dormant seeding:

A) Prepare the seedbeds, add the required amounts of lime and fertilizer, then mulch and anchor. After the first killing frost and before snowfall, broadcast or hydroseed the selected seed mixture.

B) When soil conditions permit, between the first killing frost and before snowfall, prepare the seedbeds, lime and fertilize, apply the selected seed mixture, and mulch and anchor.

Dormant seedings shall use double the regular seeding rates. Dormant seedings shall be well anchored on slopes, ditch bases and areas of concentrates water flows. The dormant seeding shall be inspected and reseeded as needed in the spring, and remulched in areas where cover is less than 75%, or in bare spots larger than one square foot.

MAINTENANCE

Maintenance functions are extremely important on this site due to the potential impact to the wetlands and streambed should erosion be permitted. All erosion and sedimentary control structures and other measures shall be inspected weekly and after every rainfall event. Any signs of damage shall be repaired/replaced immediately. In addition, recurring problem areas shall be inspected more frequently. **Additional measures may be required if those proposed on the plan are not sufficient. Problem areas shall receive riprap, as necessary to control erosion. Culvert outfalls that do not possess aprons shall be inspected weekly.** Riprap shall be placed at the outfall if erosion occurs.

Silt Fences: Silt fences shall be inspected weekly and after each storm event. Sediment deposits should be removed after each storm event. If there are any signs of erosion or sedimentation occurring below the fences, those areas requiring repair shall be attended to immediately and silt fencing installed below the damaged area. Silt fencing shall be removed by the contractor when the area draining to the silt fence has been permanently stabilized. The remaining sediment deposits shall be raked to conform to the existing grade, prepared and seeded.

Hay Bale Barriers: Hay bale barriers shall also be inspected weekly and after each storm event. Sediment deposits shall be removed when deposit height reaches approximately one-half the height of the hay bale barrier. The hay bale barriers shall remain in place until the areas surrounding the bales have stable, mature, final vegetation.

Permanent Grassed Areas: Permanent grassed areas shall be maintained by liming according to DEP recommendation, or at a minimum, every five years, using a rate of 100 lbs per 1,000 SF. Fertilizer shall be in accordance with DEP recommendation, or broadcast biannually at a rate of 7.5 lbs per 1,000 SF, 10-10-10. All seeded areas shall be reseeded as needed in order to maintain an adequate vegetative cover.

Removal of Temporary Measures: The contractor shall remove all temporary erosion and sedimentation control measures after all surfaces have been finished and all vegetative cover has matured and stabilized.

The owner shall be responsible for the implementation and maintenance of all the erosion and sedimentation control devices.

Attachment 9

See cover letter

Attachment 10

Notice of Intent to File

PUBLIC NOTICE:
NOTICE OF INTENT TO FILE

Please take notice that

J.D. Building, LLC
(Name, Address and Phone of Applicant)
21 Rice Street, Unit 1Portland, Maine 04103
(207) 797-3461

is intending to file a Natural Resources Protection Act permit application with the Maine Department of Environmental Protection pursuant to the provisions of 38 M.R.S.A. §§ 480-A through 480-Z on or about **March 6, 2006**
(anticipated filing date)

The application is for

A small crushed stone parking area at the rear of the building for overflow parking of business vehicles as well as a small amount of fill adjacent to the stream.
(description of the activity)

at the following location:

21 Rice Street
(activity location)

A request for a public hearing or a request that the Board of Environmental assume jurisdiction over this application must be received by the Department, in writing, no later than 20 days after the application is found by the Department to be complete and is accepted for processing. A public hearing may or may not be held at the discretion of the Commissioner or Board of Environmental Protection. Public comment on the application will be accepted throughout the processing of the application.

For Federally licensed, permitted, or funded activities in the Coastal Zone, review of this application shall also constitute the State's consistency review in accordance with the Maine Coastal Program pursuant to Section 307 of the federal Coastal Zone Management Act, 16 U.S.C. §1456. (Delete if not applicable.)

The application will be filed for public inspection at the Department of Environmental Protection's office in (*Portland, Augusta or Bangor*)(circle one) during normal working hours. A copy of the application may also be seen at the municipal offices in

Portland, Maine.
(town)

Written public comments may be sent to the Department of Environmental Protection, Bureau of Land and Water Quality, 17 State House Station, Augusta, Maine 04333-0017 or the appropriate regional office.

INFORMATION CONCERNING THE FILING OF PUBLIC NOTICE

The DEP Rules, Chapter 2, require an applicant to provide public notice for all NRPA projects except Tier 1 and modifications. In the notice, the applicant must describe the proposed activity and where it is located. The specific requirements using the Notice of Intent to File form are outlined below:

1. **Newspaper**

   You must publish the Notice of Intent to File in a newspaper circulated in the area where the activity is located. The notice must appear in the newspaper within 30 days prior to the filing of the application with the Department.

2. **Abutting Property Owners**

   You must send a copy of the Notice of Intent to File by certified mail to the owners of the property abutting the activity. Their names and addresses can be obtained from the town tax maps or local officials. They must receive notice within 30 days prior to the filing of the application with the Department.

   In addition, Maine Public Law 761, enacted in 2000, requires that a public notice must be sent to the local water company, municipality, or water district if your activity is in the watershed of a public water supply.

   List below the names and addresses of the owners of abutting property. (Submit an additional sheet if necessary)

NAME	ADDRESS
SEE ATTACHED SHEET	

3. **Municipal Office**

   You must send a copy of the Notice of Intent to File and a **duplicate of the entire application** to the Municipal Office.

4. **Water Company/District**

   If a water company, municipality, or water district as a source of water supply uses the river, stream, or brook, you must also, at the time of filing the application, forward a copy of the application to the water company, municipality, or water district by certified mail.

NOTE: The applicant shall use the Notice of Intent to File form on the next page or one containing identical information to notify abutters, municipal officials, and local newspapers.

330A/C/2 354A/A/5
JOSEPH STEPHEN COMPANY
461 RIVERSIDE IND PKWY
PORTLAND ME 04103

354/A/4
STONE COAST PROPERTIES
LLC
P.O.BOX 4152
PORTLAND ME 04101

354A/A/1
PORTLAND WATER DISTRICT
225 DOUGLASS STREET
P.O. BOX 3553
PORTLAND, ME 04104-3553

Abutters

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

OFFICIAL USE

7002 0460 0003 0914 0716

Postage	$ .39
Certified Fee	2.40
Return Receipt Fee (Endorsement Required)	1.85
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	4.64

Postmark Here

354A/A/1

Sent To: PORTLAND WATER DISTRICT
Street, Apt. No. or PO Box No.: 225 DOUGLASS STREET P.O. BOX 3553
City, State, ZIP: PORTLAND, ME 04104-3553

PS Form 3800, January 2001 — See Reverse for Instructions

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

OFFICIAL USE

7002 0460 0003 0914 0709

Postage	$ .39
Certified Fee	2.40
Return Receipt Fee (Endorsement Required)	1.85
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 4.64

Postmark Here

354/A/4

Sent To: STONE COAST PROPERTIES LLC
Street, Apt. No. or PO Box No.: P.O.BOX 4152
City, State, ZIP: PORTLAND ME 04101

PS Form 3800

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com®

OFFICIAL USE

7005 1160 0002 7595 0490

Postage	$ .39
Certified Fee	2.40
Return Receipt Fee (Endorsement Required)	1.85
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	4.64

Postmark Here

330A/C/2 354A/A/5

Sent To: JOSEPH STEPHEN COMPANY
Street, Apt. No. or PO Box No.: 461 RIVERSIDE IND PKWY
City, State, ZIP: PORTLAND ME 04103

See Reverse for Instructions

PUBLIC NOTICE

PUBLIC NOTICE:
NOTICE OF
INTENT TO FILE

Please take notice that J.D. Building, LLC, 21 Rice Street, Unit 1Portland, Maine 04103 (207) 797-3461 is intending to file a Natural Resources Protection Act permit application with the Maine Department of Environmental Protection pursuant to the provisions of 38 M.R.S.A. §§ 480-A through 480-Z on or about March 6, 2006
The application is for
A small crushed stone parking area at the rear of the building for overflow parking of business vehicles as well as a small amount of fill adjacent to the stream.
at the following location: 21 Rice Street
A request for a public hearing or a request that the Board of Environmental assume jurisdiction over this application must be received by the Department, in writing, no later than 20 days after the application is found by the Department to be complete and is accepted for processing. A public hearing may or may not be held at the discretion of the Commissioner or Board of Environmental Protection. Public comment on the application will be accepted throughout the processing of the application.

For Federally licensed, permitted, or funded activities in the Coastal Zone, review of this application shall also constitute the State's consistency review in accordance with the Maine Coastal Program pursuant to Section 307 of the federal Coastal Zone Management Act, 16 U.S.C. §1456. (Delete if not applicable.)

The application will be filed for public inspection at the Department of Environmental Protection's office in (Portland, Augusta or Bangor)(circle one) during normal working hours. A copy of the application may also be seen at the municipal offices in Portland, Maine.

Written public comments may be sent to the Department of Environmental Protection, Bureau of Land and Water Quality, 17 State House Station, Augusta, Maine 04333-0017 or the appropriate regional office.

2251461

Attachment 11

Letter to MHPC

TRANSPORTATION ENGINEERING LAND PLANNING
Northeast Civil Solutions
INCORPORATED

153 U.S. Route 1
Scarborough
Maine 04074

tel
207.883.1000
800.882.2227

fax
207.883.1001

March 2, 2006

Maine Historic Preservation Commission
Attn: Earle Shettleworth
65 State House Station
Augusta, Maine 04333-00065

RE: Thirsty Turf Irrigation, JD Builders, 21 Rice Street, Portland

Dear Earle,

On behalf of JD Builders and in accordance with the Maine Department of Environmental Protection, we are pleased to submit a copy of the Individual NRPA Permit Application for the development adjacent to the unnamed stream. The project consists of filling of the embankment to allow for additional parking in the rear of the building. As you will recall, we discussed the after-the-fact status of this project and the fact that most of not all of the fill will actually be removed from the bank and the bank stabilized with erosion control mesh, loamed and seeded as well as the additional plantings of trees as shown on the plan.

The revegetation and erosion control plan has previously been verbally approved. We are submitting this application for the additional parking in the rear of the building, as it is disturbance and the placement of crushed stone within 25 feet of the top of the bank associated with the stream. The client also proposed to install a guardrail at the top of the embankment to further protect the stream and associated slopes as requested in the pre-application meeting. Please review the application and respond with any questions or comments you may have on the project. Thank you.

Sincerely,

Northeast Civil Solutions

Gregory Boulette
Project Engineer

DeLuca-Hoffman Associates, Inc.
Consulting Engineers
778 Main Street, Suite 8
South Portland, Maine 04106

(207) 775-1121
Fax (207) 879-0896

LETTER OF TRANSMITTAL

DATE	JOB NO.
September 26, 2003	2189.01
ATTENTION: Kandi Talbot	
RE: Thirsty Turf Irrigation	

TO: City of Portland Planning
4th Floor City Hall
Portland, Maine 04101

We are sending you ☐ Attached ☐ Under separate cover via ____ the following items:

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change Order ☐ ____

COPIES	DATE	NO.	DESCRIPTION
1			updated Deed information

THESE ARE TRANSMITTED as checked below:

☐ For Approval ☐ Approved as Submitted ☐ Resubmit ____ Copies for Approval
☐ For Your Use ☐ Approved as noted ☐ Submit ____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return ____ corrected prints
☐ For review and comment ☐ ____
☐ FOR BIDS DUE ____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS: Kandi,

Just to let you know, seven sets of Final approval plans for the Thirsty Turf project were sent to Planning a day or so ago. They may have been sent to Jay Reynolds. In addition, I am providing the attached deed for the property showing that J.D. Building, LLC actually purchased the property. Josh Doucette is the owner of both Thirsty Turf and J.D. Building LLC. We offer this for your records. The project is scheduled to begin construction soon, so they should be contacting Jay Reynolds and posting their performance guarantees soon also.

Thanks for your assistance on this project.

COPY TO:

SIGNED: _____

If enclosures are not as noted, kindly notify us at once.

Doc#: 67073 Bk:19748 Pg: 280

WARRANTY DEED
MAINE STATUTORY SHORT FORM

RICE STREET REALTY, LLC, a Maine limited liability company, with a mailing address of 55 Hardy Road, Falmouth, Maine, 04105, for consideration paid, grants to **J.D. BUILDING, L.L.C.**, a Maine limited liability company with a mailing address of 125 Bridgton Road, Westbrook, Maine, 04092, with **WARRANTY COVENANTS**, the following described real estate:

A certain lot of parcel of land, with any buildings thereon, situated in the City of Portland, County of Cumberland and State of Maine, easterly of but not adjacent to Riverside Industrial Parkway and westerly of but not adjacent to land of the Portland Terminal Company and being all of Lot C on a plan entitled "Composite Plan Riverside Industrial Park," dated April, 1975, and recorded in the Cumberland County Registry of Deeds in Plan Book 108, Page 6, being further bounded and described as follows:

Beginning at an iron set in the ground at the southwesterly corner of land conveyed by Greater Portland Building Fund, Inc. to Maine National Bank, as Trustee under Declaration of Trust entitled Riverside Building Co., by deed dated August 25, 1971, and recorded in said Registry of Deeds in Book 3187, Page 664, said iron being on the easterly line of land conveyed by Greater Portland Building Fund to Anna Belle Aggar by deed dated December 28, 1973, and recorded in said Registry of Deeds in Book 3498, Page 293; thence running south 18° 38' West by said Aggar land, 354.77 feet to the northwesterly line of land conveyed by ADC Building Fund Incorporated to Davis-Greene Co., by deed dated December 18,1962 and recorded in said Registry of Deeds in Book 2723, Page 182; thence running North 68° 40' 30" East by said Davis-Greene Co. land 552.40 feet to the southeasterly line of land conveyed by Greater Portland Building Fund Inc. to Maine National Bank, as Trustee under Declaration of Trust entitled Riverside Building Co. as aforesaid; thence running North 71° 22' West by land conveyed to Maine National Bank, as Trustee under Declaration of Trust entitled Riverside Building Co. as aforesaid, 423.42 feet to an iron set in the ground in the easterly line of said Aggar land and the point of beginning.

ALSO hereby conveying a forty (40) foot easement, which is appurtenant to and benefits the above-described

MAINE REAL ESTATE TAX PAID

Doc#: 67073 Bk:19768 Pg: 281

premises, to pass and repass on foot and with vehicles at any and all times and to construct, lay and relay, repair, maintain, remove and replace utility pipes, mains and poles and wires upon, under and over said forty (40) foot wide strip, together with all necessary fixtures and appurtenances, said forty (40) foot wide strip being bounded and describe as follows:

Beginning at an iron set at the northwesterly corner of land conveyed to Theodore H. Brodie and Glenn A. Brodie as Trustees by deed of Riverside Building Co. dated December 13, 1976, and recorded in said Registry of Deeds in Book 3952, Page 105 (hereinafter referred to as "Brodie land"); thence South 18° 38' West by the westerly boundary of said Brodie land two hundred fifty (250) feet to another iron; thence South 71° 22' East by the above-described premises forty (40) feet to another iron; thence running North 18° 38' East two hundred fifty (250) feet to another iron; thence running North 71° 22' West forty (40) feet to the point of beginning.

Said forty (40) foot right of way and said Brodie land are shown on a plan made for Theodore H. Brodie by H. I. and E. C. Jordan dated November 17, 1976.

Being the same premises conveyed to Rice Street Realty, LLC by Quitclaim Deed of Gringolet Associates, dated August 20, 2002, recorded in the Cumberland County Registry of Deeds at Book 17960, Page 32.

IN WITNESS WHEREOF, Rice Street Realty, LLC, has caused this instrument to be signed by Robert J. Gaudreau, its Member, thereunto duly authorized, this 14 day of July, 2003.

WITNESS

RICE STREET REALTY, LLC

BY: Robert J. Gaudreau,
Its: ~~Member~~ MANAGER RTG

STATE OF MAINE
Cumberland, ss.

July 14th, 2003

The personally appeared, the above-named Robert J. Gaudreau, in his capacity as Member of Rice Street Realty, LLC and acknowledged the forgoing instrument to be his/her free act and deed and the free act and deed of said corporation.

Before me,
Jeffrey W. Jones, Attorney-at-Law

Received
Recorded Register of Deeds
Jul 15,2003 10:09:56A
Cumberland County
John B. O Brien

THIRSTY-TURF

IRRIGATION

July 18, 2003

To whom it may concern,

Thirsty-Turf Irrigation authorizes DeLuca-Hoffman Associates, Inc. to submit a site plan application to the City of Portland on its behalf.

Sincerely,

Joshua G. Doucette
President

1 Industrial Way - #4 Portland, ME 04103 • Tel: 207-797-3461 1-877-797-3461
email: thirstyturf@aol.com

City of Portland

Application for Minor Site Plan Review

Warehouse/Office at Rice Street
Off Riverside Industrial Parkway

Prepared for:

Thirsty Turf Irrigation
1 Industrial Way
Portland, Maine 04103

Prepared by:

DeLuca-Hoffman Associates, Inc.
778 Main Street, Suite 8
South Portland, Maine 04106
(207) 775-1121
dhai@delucahoffman.com

June 2003

CITY OF PORTLAND, MAINE
SITE PLAN CHECKLIST

If a provision is not applicable, put "NA"

Section 1. Development Description

1.0 A. Narrative
1. Objectives and details
2. Total land area
3. Total floor area

1.1 B. Easements/Right-of-Way Statement
1. Location of existing
2. Location of proposed

C. Natural Resources

1.2 1. NRPA setbacks

1.3 D. Subsurface Conditions
1. USDA Medium Intensity Soils Statement
2. National Wetland Inventory Statement

1.4 E. Infrastructure
1. Sewer Availability
2. Water Availability
3. Right of Way

1.5 F. Construction Plan
1. Outline of construction sequence
2. Dates

1.6 G. Figures, Plates and Drawings

Section 2. Title, Right or Interest (copy of document)

Section 3. Financial Capacity

Att.3.1 A. Estimated costs

B. Financing

Att.3.2 1. Letter of commitment to fund

2. Self-financing

Att.3.3 a. Annual report

Att.3.4 b. Bank statement

Section 4. Technical Ability (description)

4.0 A. Prior experience (statement)

Att.4.1 B. Personnel (documents)

____ **Section 5. Unusual Natural Areas, Wildlife and Fisheries and Archaeological Sites**

Section 6. Review Criteria for Site Plan Approval

Section 7. Solid Waste

7.0 A. Narrative

7.1 B. Solid wastes during construction

7.2 C. Solid wastes during operation of development

Att.7.1 D. Computations

Section 8. Surface Drainage and Runoff

8.0 A. Introduction

8.1 1. Existing conditions

8.2 2. Proposed conditions

8.3 3. Stormwater runoff analysis

8.4 4. Conclusion

B. Maps

Sec.1.6,Fig.1 1. DeLorme location map with site boundaries
Sec.1.6,Fig.3 2. SCS soils map with site boundaries
Sec.1.6,Fig.5 3. NWI map with site boundaries
Sec.1.6,Fig.4 4. Aquifer map with site boundaries
Sec.1,Plate1 C. Predevelopment drainage plan
Sec.1,Plate2 D. Postdevelopment drainage plan

E. Runoff analysis (predevelopment and postdevelopment)

Att.8.1 1. Curve number computations
Att.8.1 2. Time of concentration calculations
Att.8.1 3. Travel time calculations
Att.8.1 4. Peak discharge calculations
Att.8.1 5. Reservoir routing calculations

Section 9. Temporary and Permanent Erosion and Sediment Control

Section 10. Landscape Plan

SECTION 1

DEVELOPMENT DESCRIPTION

1.0 Overview

Thirsty Turf Irrigation is proposing to develop a one-story 6,000 square foot warehouse/office building on the existing 75,180 square foot lot identified on Tax Map 354 as Block 6, Lot A off of Rice Street. An 8-space parking lot is also proposed as part of this development. The development site was previously reviewed and granted site plan approval for a 9,200 square foot building proposed by the current owner, Gringolet Associates. The owner has abandoned their development proposal and has entered into an agreement to sell the property to Thirsty Turf Irrigation pending Site Plan approval.

1.1 Existing and Proposed Easements/Rights-of-Way

As part of the development, a 24-foot access drive is proposed in the existing 40-foot right-of-way leading onto the existing lot. Also, DeLuca-Hoffman Associates, Inc. proposes to run a culvert under the 24-foot access drive that will require a one-time easement from the abutting property owner. The location of this easement is shown on Sheet 4 of the attached plan set.

1.2 Natural Resources

There is an embankment with a stream in the valley on the southern portion of the existing lot. As part of the Natural Resources Protection Act, any structures within the proposed development must be set back 25 feet from the top of the stream embankment. This requirement has been accounted for in the layout plan.

1.3 Subsurface Conditions

According to the Medium Intensity Soil Survey for Cumberland County, the development site consists of the following soil(s):

Sn – Scantic silt loam

Scantic soils are normally indicative of wet areas. However, in this case the majority of the site sits high atop a plateau where the soils appear more granular. Wet soils are primarily confined to the lower elevations of the nearby ravine. According to the National Wetland Inventory (NWI) for Portland (North), Maine, there are no wetlands delineated in the development vicinity. Please see Figures 1 and 2 attached showing the soils and wetland areas with respect to the development location.

1.4 Infrastructure

The proposed development will include the following infrastructure modifications, as shown on Sheet 3 of the attached plan set:

- Installation of new water/sewer line utilities off the existing 12" sewer and 12" water on Rice Street.

- Construction of new, 24-foot access road from Rice Street through the existing 40-foot right-of-way onto the existing lot.

- An underground electric service will serve the property. If necessary due to CMP requirements, the service will be installed in a PVC conduit in accordance with CMP standards.

- The gas line in Rice Street will not be tapped for the building at this time.

1.5 Construction Plan

Table 1.1 - The proposed schedule developed for this project is as follows:		
Item	**Site Work**	**Buildings**
Local Site Plan	June 2003	June 2003
Start Construction	July 2003	July 2003
Building Construction	N/A	July 2003
Complete Site Work	September 2003	-
Complete Building	-	November 2003
Building Occupancy	N/A	November 2003

1.6 Figures, Plates and Drawings

Figure	Description
1	DeLorme Location Map
2	USGS Location Map
3	USDA Medium Intensity Soils Map
4	MGS Sand and Gravel Aquifer Map
5	National Wetland Inventory Map
6	Zoning Map
7	Tax Assessor's Map

Plates	Description
1	Predevelopment Watershed Plan
2	Postdevelopment Watershed Plan

Plan Sheets	Description
1	Cover Sheet, General Notes and Legend
2	Existing Conditions Plan
3	Site Layout and Utilities Plan
4	Grading, Drainage and Erosion Control Plan
5	Site Details
6	Utility, Erosion Control & Storm Drain Details
7	Erosion Control Notes

SECTION 2

TITLE, RIGHT AND INTEREST

2.0 Overview

Gringolet Associates owns the lot proposed for the development. Thirsty Turf Irrigation currently has an option agreement to purchase the property upon receipt of Site Plan approval. Please see attached supporting documents.

CONTRACT FOR THE SALE OF COMMERCIAL REAL ESTATE

RECEIVED from Thirsty Turf Irrigation, Incorporated, or its assigns, whose mailing address is One Industrial Way, Portland, Maine 04103 (hereinafter called "Purchaser"), this 18th day of March, 2003 the sum of Five Thousand Dollars ($5,000) as earnest money deposit toward purchase of real estate owned by Gringolet Associates (hereinafter called "Seller"), located at 19 Rice Street in the City of Portland, County of Cumberland, State of Maine, described as follows: A 1.73± acre of undeveloped land together with the building approvals that Seller has received from the City of Portland and being more fully described on the City of Portland Tax Assessor's Map 354, Lot A, Block 6, (hereinafter referred to as the "Property"), upon the terms and conditions indicated below.

1. PURCHASE PRICE: The total Purchase Price is One Hundred Ten Thousand Dollars ($110,000), with payment to be made as follows:

The earnest money deposit shall be applied to the purchase price with the balance due at closing in cash or certified funds.

2. EARNEST MONEY/ACCEPTANCE: NAI The Dunham Group ("Escrow Agent") shall hold the earnest money and act as escrow agent until closing. The earnest money deposit will be held in a _X_ non-interest bearing account/___ interest bearing account. If the deposit is held in an interest-bearing account, said interest will accrue to the Purchaser, except in the event of a default by Purchaser. This offer shall be valid until Friday, ~~March 21, 2003~~ March 28, 200 at 5:00 PM. In the event of Seller's non-acceptance of this offer, the earnest money shall be returned promptly to Purchaser.

3. TITLE: That a deed, conveying the premises in fee simple with good and marketable title in accordance with standards of title adopted by the Maine Bar Association shall be delivered to purchaser and this transaction shall be closed and Purchaser shall pay the Purchase Price as provided herein and execute all necessary papers for the completion of the purchase on or before May 20, 2003 or within 10 days of receipt of final approvals pursuant to paragraph #16, whichever occurs last. If Seller is unable to convey title to the premises in accordance with the provisions of this paragraph, then Seller shall have a reasonable time period, not to exceed 30 days from the time Seller receives written notice of the defect, unless otherwise agreed to by both parties, to remedy the title, after which time, if such defect is not corrected so that there is marketable title, Purchaser may within seven (7) days thereafter, at Purchaser's option, withdraw said earnest money and neither party shall have any further obligation hereunder. Seller hereby agrees to make a good-faith effort to cure any title defect during such period.

4. DEED: That the property shall be conveyed by a quit claim deed with covenant, and shall be free and clear of all encumbrances except covenants, conditions, easements and restrictions of record and usual public utilities servicing the premises and shall be subject to applicable land use and building laws and regulations.

5. POSSESSION/OCCUPANCY: Possession/occupancy of premises shall be given to Purchaser immediately at closing unless otherwise agreed by both parties in writing.

6. RISK OF LOSS: Until transfer of title, the risk of loss or damage to said premises by fire or otherwise is assumed by Seller unless otherwise agreed in writing. Said premises shall at closing be in substantially the same condition as at present, excepting reasonable use and wear.

7. PRORATIONS: The following items shall be prorated as of the date of closing:

a. Real Estate Taxes based on the municipality's current tax year. Seller is responsible for any unpaid taxes for prior years.
b. Purchaser and Seller shall each pay one-half of the transfer tax as required by the laws of the State of Maine.

8. INSPECTIONS: Purchaser is advised to seek information from professionals regarding any specific issue of concern. The Selling Agent and Listing Agent make no warranties regarding the condition, permitted use or value of Seller's real or personal property. This contract is subject to the following inspections, with the results being satisfactory to Purchaser:

TYPE OF INSPECTION	YES	NO	RESULTS REPORTED
a. Building Inspection	____	X	within____ days
b. Feasibility Study	____	X	within____ days
c. Sewage Disposal	____	X	within____ days
d. Water Quality	____	X	within____ days
e. Radon Air Quality	____	X	within____ days
f. Radon Water Quality	____	X	within____ days
g. Asbestos	____	X	within____ days
h. Lead Paint	____	X	within____ days
i. ADA	____	X	within____ days
j. Wetlands	X	____	within 60 days
k. Environmental Scan	X	____	within 60 days

The use of days is intended to mean from the Effective Date of the Contract. All inspections will be done by inspectors chosen and paid for by Purchaser. If the result of any inspection or other condition specified herein is unsatisfactory to Purchaser, Purchaser may declare the Contract null and void by notifying Seller in writing within the specified number of days set forth above, and said earnest money shall be returned to Purchaser. If Purchaser does not notify Seller that an inspection is unsatisfactory within the time period set forth above, this contingency is waived by Purchaser. In the absence of inspection(s) mentioned above, Purchaser is relying completely upon Purchaser's own opinion as to the condition of the premises.

9. FINANCING. Purchaser's obligation to close hereunder is contingent upon Purchaser's obtaining within forty-five (45) days from the effective date of this contract a written commitment (the "Commitment") from a lender for a mortgage loan of not less than seventy percent (70%) of the purchase price at an initial interest rate not to exceed seven percent (7%) per annum and amortized over a period of not less than fifteen (15) years. Purchaser acknowledges that a breach of this good faith obligation to seek and accept financing on the above-described terms shall be a breach of this Contract.

In the event that Purchaser is unable to obtain the Commitment and Purchaser notifies Seller within seven (7) days from the effective date of this contract, then Seller shall return the earnest money to Purchaser and this contract shall terminate and neither party shall be under any further obligation hereunder. If Purchaser does not notify Seller that he has failed to obtain the Commitment within the time limit set forth above, then Purchaser shall be and is deemed to have satisfied and/or waived this financing contingency.

10. DEFAULT: If Purchaser fails to perform any of the terms of this Contract, Seller shall have the option of either retaining the earnest money as full and complete liquidated damages or employing all available legal and equitable remedies. Should Seller elect to retain the earnest money, this Contract shall terminate and neither party shall be under any further obligation hereunder. In the event of default by either party, the Escrow Agent shall not return the earnest money to Purchaser or Seller without written releases from both parties. If a dispute arises between Purchaser and Seller as to the existence of a default hereunder and said dispute is not resolved by the parties within thirty (30) days, Escrow Agent shall file an action in interpleader and deposit the earnest money in the court to resolve said dispute. Purchaser and

Seller, jointly and severally, shall indemnify Escrow Agent for all costs, losses, expenses, and damages, including reasonable attorneys' fees, incurred by Escrow Agent in connection with said dispute.

11. MEDIATION: Any dispute or claim arising out of or relating to this Contract or the premises addressed in this Contract shall be submitted to a mediation in accordance with the Maine Residential Real Estate Mediation Rules of the American Arbitration Association. This clause shall survive the closing of this transaction.

12. PRIOR STATEMENTS: This Contract sets forth the entire agreement between the parties, and there are no other representations, agreements or understandings with respect to the subject matter of this Contract. This Contract shall be construed according to the laws of the State of Maine.

13. HEIRS/ASSIGNS: This Contract shall extend to and be obligatory upon heirs, personal representatives, successors, and assigns of the respective parties.

14. COUNTERPARTS: This Contract may be signed on any number of identical counterparts, including telefax copies, with the same binding effect as if all of the signatures were on one instrument.

15. EFFECTIVE DATE: This Contract is a binding contract when signed by both Seller and Purchaser and when that fact has been communicated to all parties or to their agents. Time is of the essence of this Contract.

16. ADDITIONAL TERMS AND CONDITIONS: Subject to Buyer obtaining necessary government approvals for the construction of a 6,000± SF building, said building to be able to be subdivided into 3 units for lease.

17. FACSIMILE COPIES: All parties to this contract agree to accept facsimile copies of this document and any signatures thereto as originals.

A COPY OF THIS CONTRACT IS TO BE RECEIVED BY ALL PARTIES AND, BY SIGNATURE, RECEIPT OF A COPY IS HEREBY ACKNOWLEDGED. IF NOT FULLY UNDERSTOOD, CONSULT AN ATTORNEY.

Seller acknowledges that the laws of the State of Maine provide that every buyer of real property located in Maine must withhold a withholding tax equal to 2-1/2% of the consideration unless Seller furnishes to Purchaser a certificate by the Seller stating, under penalty of perjury, that Seller is a resident of Maine or the transfer is otherwise exempt from withholding.

THIRSTY TURF IRRIGATION, INCORPORATED
OR ITS ASSIGNS, PURCHASER

Signature

11-3664393
Social Security # or Tax I.D. #

President
Name/Title, there unto duly authorized

Seller accepts Purchaser's offer and agrees to deliver the premises at the price and upon the terms and conditions set forth above and agrees to pay the Brokers the commission for services according to the terms of the listing agreement or if there is no listing agreement, the sum of $_____, or _____ percent (___%) of the Purchase Price. In the event the earnest money is forfeited by Purchaser, it shall be evenly distributed between (1) Brokers and (2) Seller; provided, however, that the Brokers' portion shall not exceed the full amount of the commission specified.

Signed this 26 day of March, 2003.

GRINGOLET ASSOCIATES
Seller

Signature

01-0495797
Social Security # or Tax I.D. #

ROBERT J GAUDREAU PRES
Name/Title, there unto duly authorized

NAI The Dunham Group
Escrow Agent

Signature

P. Gregory Hastings II Broker
Name/Title

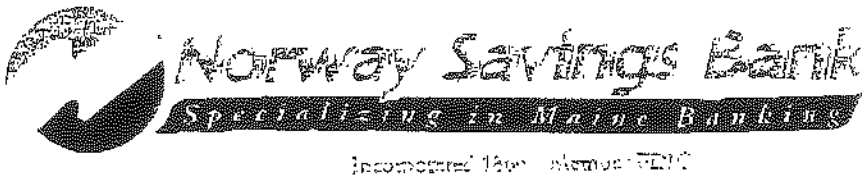
EFFECTIVE DATE OF CONTRACT: March 26, 2003.

SECTION 3

FINANCIAL CAPACITY

3.0 Overview

Thirsty Turf Irrigation is financing the proposed development. A copy of the agreement and estimate for the proposed development accompanies this report.



Incorporated 1869 Member FDIC
www.norwaysavingsbank.com

April 23, 2003

Mr. Joshua G. Doucette
Thirsty-Turf Irrigation, Inc.
1 Industrial Way
Portland, ME 04103

Re: Commercial Application Dated April 9, 2003

Dear Josh:

This letter, when properly signed and accepted, will constitute an agreement between Norway Savings Bank (the "Bank") which agrees to lend, and Thirsty-Turf Irrigation, Inc. (the "Borrower") which agrees to borrow in accordance with the following terms and conditions:

Borrower:	Thirsty-Turf Irrigation, Inc.
Loan Amount:	Facility A - $463,500.00 Lot Purchase/Construction Line of Credit Facility B - $283,250.00 Maximum Permanent Commercial Mortgage Facility C - $62,000.00 Maximum Equipment Term Loan
Purpose:	Facility A - Finance Land Acquisition and Construction Costs Facility B - Permanent Commercial Real Estate Mortgage Facility C - Refinance and Consolidate Certain Existing Term Debt
Guarantors:	Unlimited Personal Guarantee of Mr. Joshua G. Doucette
Repayment Terms:	Facility A - Interest billed monthly for one year. Facility B - Principal and interest billed monthly based on a twenty-year amortization schedule. Facility C - Principal and interest billed monthly based on an amortization schedule not to exceed three years.
Maturity:	Facility A - One Year from Date of Initial Loan Closing Facility B - Twenty Years Facility C - Three Years

Interest Rate:

Facility A - Wall Street Journal Prime, as it may vary, plus 1.0%.

Facility B – *Option 1*: Wall Street Journal Prime, as it may vary, plus 1.0%; **however**, the interest rate shall neither fall below 5.25% nor rise above 8.50% during the initial five years. Thereafter, Wall Street Journal Prime, as it may vary, plus 1.0%.

Facility B - *Option 2*: 7.0% fixed for initial five years; thereafter, Wall Street Journal Prime, as it may vary, plus 1.0%.

Facility C - *Option 1*: Wall Street Journal Prime, as it may vary, plus 1.0%; **however**, the interest rate shall neither fall below 5.25% nor rise above 7.50%.

Facility C - *Option 2*: 6.5% fixed for three years.

SBA Fees:

$4,635.00 Debenture Fee may be included within debenture amount
$1,417.00 Pass-through Underwriting Fee paid to the SBA.
$6,052.00 Total Underwriting Fees due at closing.

FEA
J.O.

+$2,500. Legal Fees related to SBA only.

Prepayment Penalty:

Facility B - The Borrower may, **without penalty**, remit accelerated principal payments or satisfy the entire loan in cash resulting from the sale of the underlying collateral; **however**, the following prepayment penalties are due the Bank if this facility is refinanced by another financial institution during the initial six years: 5% of the outstanding principal balance during the first year, 4% during the second, 3% during the third, 2% during the fourth, and 1% during the fifth and sixth years.

Facility C - The Borrower may, **without penalty**, remit accelerated principal payments or satisfy the entire loan in cash resulting from the sale of the underlying collateral; **however**, the following prepayment penalties are due the Bank if this facility is refinanced by another financial institution: 3% of the outstanding principal balance during the first year, 2% during the second and 1% during the third.

Collateral:

All credit facilities shall be cross-collateralized and cross-defaulted.

Facility A - Valid first mortgage on real estate described on the City of Portland's Tax Assessor's Map 354 as Lot A, Block 6 located within the Portland Industrial Park, a first assignment of leases and rents emanating therefrom, and a first security interest in all fixtures related thereto **and** a valid second mortgage on a certain investment property owned by the Guarantor's spouse, Nadia Doucette. This second mortgage shall be released immediately upon satisfactory completion of the construction project contemplated herein and the subsequent reduction of the Bank's first mortgage balance to a maximum fifty-five percent loan-to-value ratio by virtue of the SBA's subordinated second mortgage.

Facility B – Valid first mortgage on real estate described on the City of Portland's Tax Assessor's Map 354, Lot A, Block 6 located within the Portland Industrial Park, a first assignment of leases and rents emanating therefrom, and a first security interest in all fixtures related thereto.

Facility C – Valid first security interest and/or lien in all business assets.

Insurance:

The Borrower will provide casualty and hazard insurance coverage on the proposed collateral in a form acceptable to the Bank.

Legal & Costs:

All legal and loan documentation shall be satisfactory in all respects to the Bank, Coastal Enterprises, Inc., the SBA, and its counsel. Whether or not these loans close, the Borrower and/or Guarantor shall be responsible for all reasonable expenses incurred by the Bank, Coastal Enterprises, Inc., and the SBA in connection with preparing to close the proposed loans.

Deposit Relationship:

The rate and terms of this commitment are in express reliance on your maintenance of a comprehensive deposit relationship with the Bank.

Financial Statements:

Borrower and Guarantor will provide the Bank with CPA-prepared income tax returns, financial statements, and any other necessary financial information in a form and frequency satisfactory to the Bank.

Other Conditions: **Closing the subject loans are contingent upon the Bank's receipt of a written agreement from Coastal Enterprises, Inc. and the SBA to underwrite an SBA 504 Program loan. Further, Borrower and Guarantor agree to fulfill any additional conditions precedent to closing imposed by those agencies including, but not limited to, the Borrower occupying two-thirds of the total building area upon project completion and at the final closing.**

Facility A - The Bank shall engage an independent construction monitor to verify the construction cost estimates are sufficient to complete the proposed project including a reasonable contingency factor. The construction monitor shall also analyze actual construction progress relative to project budget, line disbursements, and proposed draw schedule. All disbursements shall be subject to the approval of the construction monitor and the Bank at their sole discretion.

Engage appraiser prior to receiving CEI/SBA 504 approval. TSA

Facility A and B – *Prior to the initial closing*, the Bank shall engage an independent appraiser to conduct an "*as complete*" commercial real estate appraisal. Facility A shall not, at anytime, exceed either ninety percent (90%) of the total project cost or "*as complete*" appraised value, **whichever is less**. Facility B shall not exceed, at anytime, either fifty-five percent (55%) of the total project cost or "*as complete*" appraised value, **whichever is less**.

Facility A and B – *Prior to the initial closing*, Borrower shall complete and submit an Environmental Questionnaire to determine if any further environmental investigation is warranted at Bank's sole discretion.

Facility A and B - *Prior to initial closing*, the Borrower shall provide to the Bank a mortgagee's Title Insurance Policy, with the Survey Exception deleted, satisfactory to the Bank in all respects.

Facility C – *Prior to closing*, Borrower will submit a detailed line-item equipment and vehicle list referencing make, VIN where applicable, model or serial number, year made, purchase price, and net book value satisfactory to Bank in all respects.

Other terms and conditions as may be deemed necessary by the Bank, Coastal Enterprises, Inc., the SBA, and its legal counsel.

Borrower acknowledges that this commitment letter represents and constitutes the entire understanding and agreement between the Borrower and the Bank with respect to any agreement to lend money, extend credit, forbear from collection of a debt or make any other accommodation for the repayment of a debt. The Borrower acknowledges that there are no verbal agreements.

This commitment assumes that all information provided to date by the Borrower is accurate. It shall be a condition for closing this loan that the financial condition of the Borrower be satisfactory to the Bank. The Bank reserves the right to terminate this commitment and not close the loan in the event: 1) of an adverse change, as determined by the Bank, in the financial condition of the Borrower prior to closing; 2) any information provided to Bank which proves to be inaccurate; or 3) a case or proceeding is commenced by or against the Borrower under any bankruptcy or insolvency law.

If the terms of this commitment letter are acceptable to you, please sign as indicated and return to me. **This commitment must be signed and returned to the Bank by Friday, May 2, 2003.** This commitment will expire on June 30, 2003 if Facility A is not closed by that date. TSA

Sincerely,

Tad Atwell
Vice President

SEEN AND ACKNOWLEDGED: Thirsty-Turf Irrigation, Inc.

By: Joshua G. Doucette
Its: President

5/6/03
Date

Joshua G. Doucette, Personal Guarantor

5/6/03
Date

Nadia Doucette, Grantor

5-6-03
Date

SECTION 4

TECHNICAL ABILITY

4.0 Overview

The applicant has contracted the site development design and environmental permitting work to DeLuca-Hoffman Associates, Inc., a civil engineering firm located in South Portland, Maine. DeLuca-Hoffman Associates, Inc. was founded in 1986 and has provided engineering services to private, industrial, commercial, municipal and governmental clients for the past 17 years. Qualification materials for DeLuca-Hoffman Associates, Inc. can be provided upon request.

SECTION 5

UNUSUAL NATURAL AREAS, WILDLIFE AND FISHERIES HABITATS OR ARCHAEOLOGICAL SITES

5.0 Overview

The respective agencies have been contacted in regards to the location of the proposed development for unusual areas, wildlife and fisheries habitats, and archaeological sites. It was determined by these agencies that there are no concerns in the development vicinity for any of these criteria.

SECTION 6

REVIEW CRITERIA

City of Portland, Maine Standards
Requirements for Site Approval

6.1 Provisions for traffic and pedestrian circulation both on and off the site

Access to the site from Rice Street will not aggravate or create a significant hazard to the safety of intersections in the project vicinity. Providing a drive exit onto Rice Street is not anticipated to create any significant impact to the intersection of Rice Street and Riverside Industrial Parkway due to the street being a dead end street.

6.2 Construction of new structures and parking requirements

The proposed new structure has a total floor area of 6,000 square feet and under Article II of the Zoning Ordinance, off-street parking is not required. The parking supplied is based on foreseeable demand for the proposed site.

6.3 Impact of bulk, location or height of proposed buildings and structures on the neighbors

The proposed building and structures will have no adverse effects on abutting landowners. The building has been set back from the property lines as per Article III of the Portland Code.

6.4 Impact on value of neighboring property due to proposed buildings

The proposed building should not affect the values of abutting structures. The proposed new building will be constructed in a zone designated for industrial use.

6.5 Effect of proposed project on public utilities

The proposed project will not adversely affect the public utilities of the City of Portland.

6.6 On-site landscaping to provide a buffer with neighboring uses

The proposed development is 50 feet from the nearest building. Vegetated screening will be provided between all adjacent buildings and the proposed development.

6.7 The site plan minimizes to the extent feasible, any disturbance or destruction of significant vegetation

The proposed project site plan minimizes the disturbance of existing vegetation as shown on page 4 of the plan set.

6.8 Site plan does not create any significant soil or drainage problems

See page 4 of the plan set.

6.9 Provision of appropriate exterior lighting

The planned additional exterior lighting will not be hazardous to motorists traveling on adjacent streets due to the setback of the development from Rice Street and Riverside Industrial Parkway. The lighting is adequate for users of the site and will not spill over or glare onto abutting properties.

6.10 The development will not create fire or other safety hazards and provides adequate access to the site and to the buildings on the site for emergency vehicles

A twenty-four foot ingress/egress access drive is proposed for the development, which will provide adequate access to the site for emergency vehicles.

6.11 The proposed development is designed so as to be consistent with off-premises infrastructure, existing or planned by the City of Portland

The development does not interfere with any existing or proposed city infrastructure.

6.12 Pertaining to industrial development

N/A

6.13 Pertaining to development in R-P Zone

N/A

6.14 Pertaining to planned unit developments

N/A

6.15 Pertaining to multi-family developments

N/A

6.16 Pertaining to development in B-3 Zone

N/A

6.17 The applicant has submitted all information required by this article and the development complies with all applicable provisions of this Code

The application compiled addresses all provisions noted in this code to the best of our knowledge.

6.18 **Proximity to any landmark, historic district or historic landscape district**

The proposed structure is not within 100' of any landmark, historic district or historic landscape district to the best of our knowledge.

6.19 **Pertaining to view corridors**

N/A

6.20 **No adverse effect on existing natural resources**

No adverse effect on existing natural resources is anticipated from the proposed development. Stormwater runoff from paved areas is treated by use of Casco traps in catch basins and an underground stormwater storage system.

6.21 **Pertaining to discharge to a significant groundwater aquifer**

According to the Portland west quadrangle map of the Maine Geological Survey, there is no significant aquifer in the vicinity of the project location.

6.22 **Pertaining to signs**

No signs are anticipated for the proposed project. No ingress/egress driveways are within 30 feet of an intersection.

6.23 **Pertaining to denial of sign under Section 14-369.5**

N/A

6.24 **Pertaining to major or minor businesses**

N/A

6.25 **Pertaining to development in industrial zones**

Landscaping has been provided to screen /enhance and buffer the property from all adjacent properties. The development has preserved the existing landscape to the greatest extent possible as shown on Sheet 4 of the plan set.

6.26 **Pertaining to development in B-5 and B-5b zones**

N/A

SECTION 7

SOLID WASTE

7.0 Overview

This section provides the estimates, the use of recycling, the transport and disposal of solid waste, which will be generated by the construction and operation of the proposed development.

7.1 Solid wastes generated during construction of the site work

The solid wastes generated during construction consist of tree clearing and stump removal.

The contractor will be permitted to dispose of trees and limbs by chipping with the biomass hauled to a biomass burner or use of the material as erosion control mix. Many of the trees are suitable for sale as saw logs. The contractor will be provided the following options for stump disposal:

- On-site chipping – to be used for erosion control mix or landscape mulch.
- Transport to Riverside Transfer Station in Portland, Maine or another licensed facility.

7.2 Solid wastes generated from the operation of the Development

Please refer to the attachment on the following page. Cardboard from packaging will be compressed and privately hauled off. A dumpster will be provided for miscellaneous office wastes and will be hauled off by a private contractor. The development is expected to generate less than 10 cubic yards of solid waste per week.

Computations of Types and Volumes of Solid Wastes for Development Project

Solid Wastes Computations and Disposal

• Type	Wood waste from clearing		
• Basis of Quality Computations	Assume 400cy of stump/acre		
• Site Work Construction	Area to be cleared	Volume @ 400cy/acre	
	0.8 acres	320 c.y.	

SECTION 8

SURFACE DRAINAGE AND RUNOFF

8.0 Introduction

The following stormwater runoff analysis has been prepared for Thirsty Turf Irrigation for the construction of warehouse/office facilities off of Rice Street.

8.1 Existing Conditions

The 1.73-acre triangular-shaped site is located off of Rice Street in Portland, Maine and consists of undeveloped woodlands. The site abuts natural drainageways to the north and south. A ravine on the south side is approximately 18 feet deep compared to the relatively flat development area in the middle of the site. Approximately half of the stormwater runoff flows via overland flow to the stream that runs along the southern border of the project site.

The remainder of the stormwater runoff flows via overland flow to the tributary swale to the north and eventually ties into the same stream that runs from east to west along the southern border of the project site.

Based on the USDA medium intensity soil survey for Cumberland County, surficial soils across the site consist of Scantic Silt loam. These soils tend to be poorly drained. These soils appear to actually be confined to the lower ravine areas. More well drained soils appear within the development area.

Based on the National Wetlands Inventory for Portland, Maine (north) region, there are no mapped wetlands shown in this area. Soils and wetland maps are included as Figures 2 and 3 in this section of the application. During the previous development proposal period, DeLuca-Hoffman Associates, Inc. walked the site with Doug Burdick of the Maine Department of Environmental Protection. Mr. Burdick identified the ravines as containing wetland resources and a stream.

8.2 Proposed Conditions

The proposed project consists of constructing a twenty-four-foot access drive in the existing forty-foot Public Right Of Way, a 6,000 square foot warehouse/office facility and an 8-space parking lot that will result in approximately 0.67 acres of new impervious surface. Approximately 10.5 percent of the new impervious surface will sheet flow off into adjacent wooded area. The runoff from the remainder of the site will be collected in the proposed storm drain system that will discharge to an underground stormwater storage system. The storage system will discharge to a level spreader to be located on the property, and will discharge via sheet flow into a existing vegetated buffer prior to discharging to the stream to the south of the project site. The proposed outlet will consist of a 12" ADS N-12 pipe with a 12"x6" reducer at the inlet. This provides effectively a 6" culvert outlet as the control for the underground storage system.

8.3 Stormwater Runoff Analysis

The SCS medium intensity survey for Cumberland County was used to delineate surficial soil conditions for onsite areas. The soils with the site were classified as hydrologic soil group D.

Hydrological analysis for the predevelopment and postdevelopment conditions have been conducted based on the methodology outlined in the Soil Conservation Service (SCS) Technical Release 20 (TR-20). The HydroCAD computer program has been used in this analysis.

The design storms used for this analysis were the 2, 10, and 25-year frequencies. Total 24-hour rainfall amounts for these storm events are 3.0, 4.7 and 5.5 inches, respectively. The rainfall distribution for this location is a Type III storm.

Land use cover, delineation of watershed subcatchments, hydraulic flow paths and hydrologic soil types were obtained using the flowing data sources:

1. Portland, WEST USGS 7.5 Minute Quadrangle
2. Sheet 75 of the SCS Medium Intensity Soil Survey for Cumberland County
3. On-site topographic survey with 1-foot contour intervals prepared by Stephen Martin, In. of Gorham, Maine.
4. Field reconnaissance by DeLuca-Hoffman, Associates, Inc.

Details of these calculations can be found in Attachment 8.1 following this section.

8.4 Conclusion

Runoff rates from the site have been analyzed for the existing and proposed conditions. Runoff rates would increase at the point of interest due to the proposed development without stormwater management. A storm drain collection and storage system have been designed to reduce postdevelopment runoff to below the 2, 10 and 25-year predevelopment rates. A summary of the existing and proposed peak runoff rates is provided in Table 8.1 below.

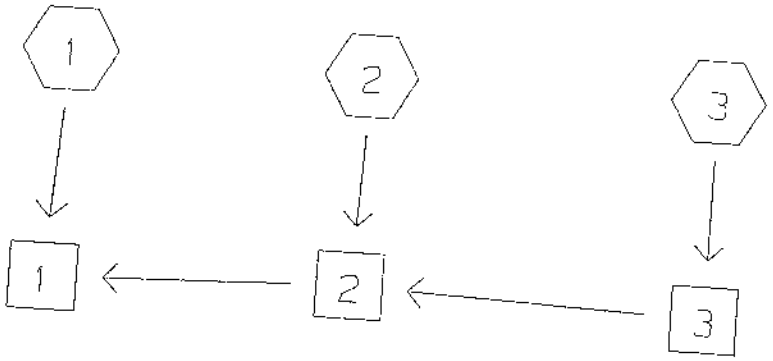
Table 8.1
Summary of Peak Flows (CFS)

	2 year storm	10 year storm	25 year storm
Existing	2.57	5.67	7.22
Proposed	2.31	4.93	6.25

Attachment 8.1

Runoff Analysis (Pre and Postdevelopment)

WATERSHED ROUTING ==========



SUBCATCHMENT REACH POND LINK

SUBCATCHMENT 1	=	
SUBCATCHMENT 2	=	-> REACH 1
SUBCATCHMENT 3	=	-> REACH 2
REACH 1	=	-> REACH 3
REACH 2	=	->
REACH 3	=	-> REACH 1
		-> REACH 2

SUBCATCHMENT 1

PEAK= 1.06 CFS @ 12.11 HRS, VOLUME= .09 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'	Segment ID:AB	8.7
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps	Segment ID:	.1
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs	Segment ID:	.9
Total Length= 605 ft	Total Tc=	9.7

SUBCATCHMENT 2

PEAK= .58 CFS @ 12.18 HRS, VOLUME= .06 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=70' P2=3 in s=.0169 '/'	Segment ID:	8.1
TR-55 SHEET FLOW Grass: Short n=.15 L=80' P2=3 in s=.0471 '/'	Segment ID:	6.0
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=85' s=.2113 '/' V=3.22 fps	Segment ID:	.4
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=170' Capacity=1548.3 cfs	Segment ID:	.2
Total Length= 405 ft	Total Tc=	14.7

DeLUCA-HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS

778 MAIN STREET
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SOUTH PORTLAND, MAINE 04106
TEL. 207 775 1121
FAX 207 879 0896

- ROADWAY DESIGN
- ENVIRONMENTAL ENGINEERING
- TRAFFIC STUDIES AND MANAGEMENT
- PERMITTING
- AIRPORT ENGINEERING
- SITE PLANNING
- CONSTRUCTION ADMINISTRATION

July 22, 2003

Ms. Sarah Hopkins, Development Review Coordinator
City of Portland Planning Authority
389 Congress Street
Portland, Maine 04101

Subject: Application for Minor Site Plan Review
Rice Street
Applicant – Thirsty Turf Irrigation

Dear Sarah:

DeLuca-Hoffman Associates, Inc. has prepared a submission package for a Minor Site Plan Review on behalf of Thirsty Turf Irrigation. The proposed project will be located on a 75,180 s.f. parcel (Tax Map 354 Block A Lot 6) off Rice Street. The project site is located in the Industrial zone; thus the proposal qualifies for a Minor Site Plan Review. A minor site plan approval was previously granted for the property to Gringolet Associates. That project was not constructed and Gringolet will transfer the property to the current applicant, Thirsty Turf Irrigation. Location and resource maps have been provided previously in the original application materials. Copies of these maps are again provided following this letter. Thirsty Turf Irrigation proposes to construct an approximately 6,000 SF building and construct perimeter paved and gravel areas. The building will be a single-story structure.

The site will be accessed off Rice Street via an existing 40' access easement. The utility services to the building will come from Rice Street and are considered adequate for the modest water, sewer and power needs of the site.

Stormwater runoff will be collected and temporarily stored in a subsurface system. Runoff from the paved areas and building will primarily sheet flow to collection inlets and be routed through a series of StormTech stormwater storage chambers. The chambers will reduce postdevelopment stormwater discharges to at or below predevelopment rates.

Erosion and sediment control measures will be necessary for the project site. The project will include building construction and disturbance for paved or gravel surfaces. Best management practices including siltation barriers, erosion control blankets and a permanent gravel surface should minimize erosion potential and sediment transport.

The site's lighting will primarily consist of wall-pack units. The project location is such that no spillover or glare from the existing lighting appears to be a problem.

Landscaping will be minimal, since the project is located in an industrial area and is also located on a site sheltered by mature trees all around it. Where necessary, the owner will provide grass cover to stabilize non-gravel or non-paved surfaces.

The following statements are provided in accordance with Section 14-525 (c):

(1) The proposed use will be for office space and warehouse storage. The proposed building size is approximately 6,000 SF.

(2) The project parcel size is 75,180 s.f.

(3) A 40' wide access easement across an adjoining property provides access to the site. No other easements or burdens are to be placed on the project site.

(4) The project will generate a small amount of construction debris that will be disposed of at the Riverside Street disposal facility. After completion, the building operations are expected to generate only a small amount of solid waste that will be disposed of in an onsite dumpster that will be emptied on a weekly basis by an area trash hauler.

(5) Public water, sewer, and power, all of which are currently servicing or are available to the site from Rice Street, will serve the project site. No capacity issues currently exist on the property for water or power. The use of the building for office and warehouse space by Thirsty Turf Irrigation will not result in excess wastewater flow to the system. Previous ability to serve letters from the Portland Water District and Public Works support the availability of adequate water and sewer capacities to serve the site. The building will have only simple restroom facilities and will not require significant water or sewer service capacity.

(6) The project will maintain the existing drainage patterns that currently exist on site. Runoff from the site ultimately discharges towards a natural drainage swale that ultimately discharges to the Presumpscot River.

(7) Erosion control measures including a silt barrier and erosion control blanket over topsoiled surfaces will be provided. The project includes constructing a new building and paved and gravel surfaces. The work is anticipated to begin and be completed by the end of this year.

(8) The project is subject to a Minor Site Plan review by the Portland Planning Authority and a Building Permit by the Code Enforcement Office. The building may require review by the State Fire Marshal. Thirsty Turf Irrigation or its building contractor will be handling the Fire Marshal review separately, if necessary.

(9) Thirsty Turf Irrigation has provided evidence of financial capacity from Norway Savings. It is apparent the applicant has sufficient capacity to undertake the project.

(10) A copy of the purchase and sale agreement is contained in the application package supporting right, title or interest of the property.

(11) The site contains no unusual natural areas, wildlife or fisheries habitats or archaeological sites.

(12) DeLuca-Hoffman Associates, Inc. can provide CADD.DXF files to the department upon final approval of the plan.

(13) The proposed project will generate only a modest amount of recyclable materials. Paper and cardboard will be collected and containerized for removal by area paper and cardboard recyclers such as W. M. Goodman & Sons. This material will likely be collected inside the building in plastic containers supplied by the collection vendors. The materials will be collected on a regular basis and removed from the site by a selected vendor.

We trust these statements and the supporting application plans and materials satisfy the City's requirements and we look forward to your review and approval of the project. The applicant is seeking a site plan approval for the building and would appreciate the staff's effort to expedite the review and approval. Please contact this office with any staff questions and concerns.

Sincerely,

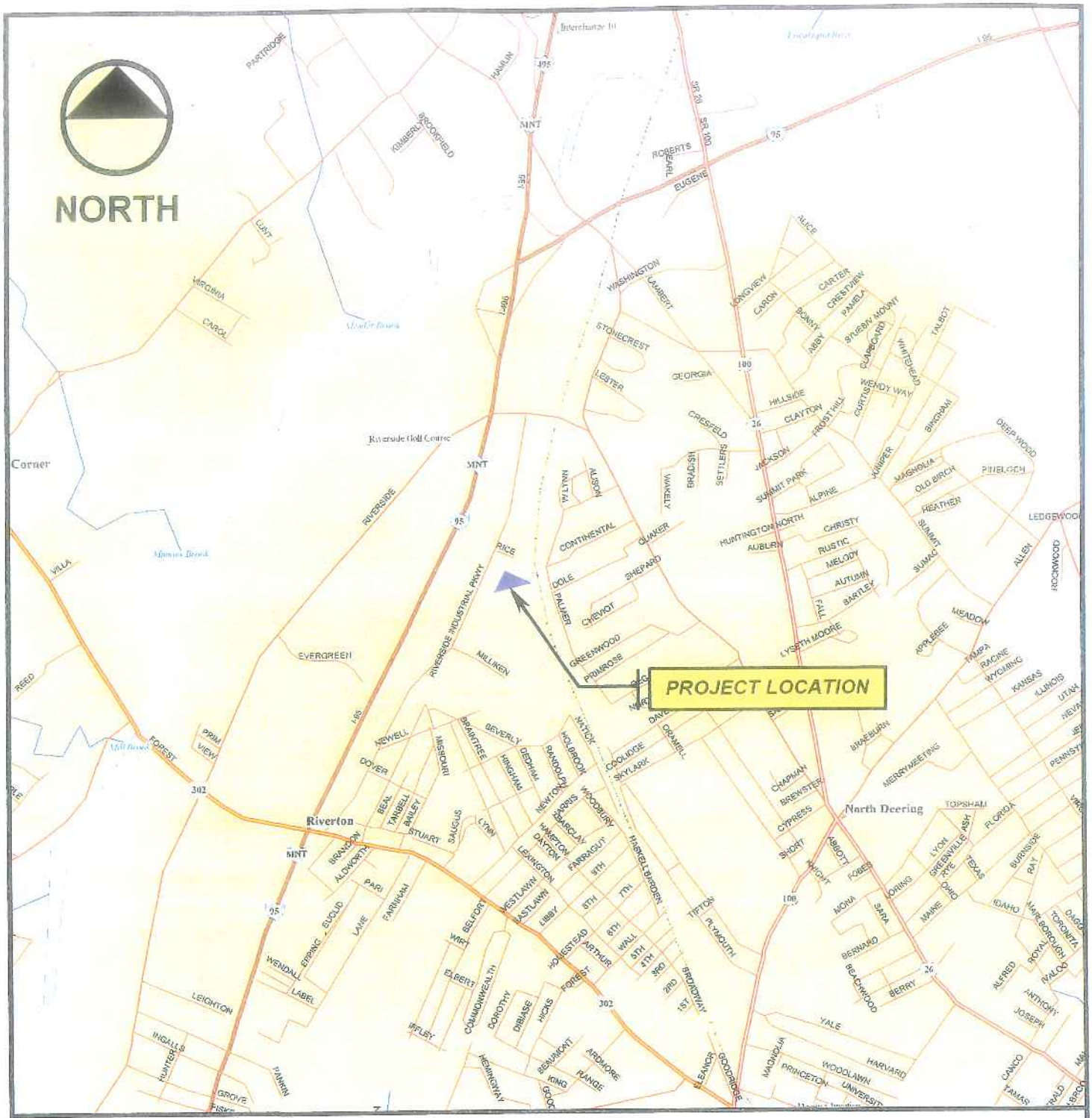
DeLUCA-HOFFMAN ASSOCIATES, INC.

Stephen R. Bushey, PE
Senior Engineer

SRB/sq/JN2189.01/Hopkins7-22-03

Enclosures

c: Josh Doucette, Thirsty Turf Irrigation



DeLORME LOCATION MAP

Rice Street Building – Portland, Maine

SOURCE: DeLORME MAP EXPERT; **DATED:** 1993

DeLUCA-HOFFMAN ASSOCIATES, INC.
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778 MAIN STREET, SUITE 8
SOUTH PORTLAND, MAINE 04106
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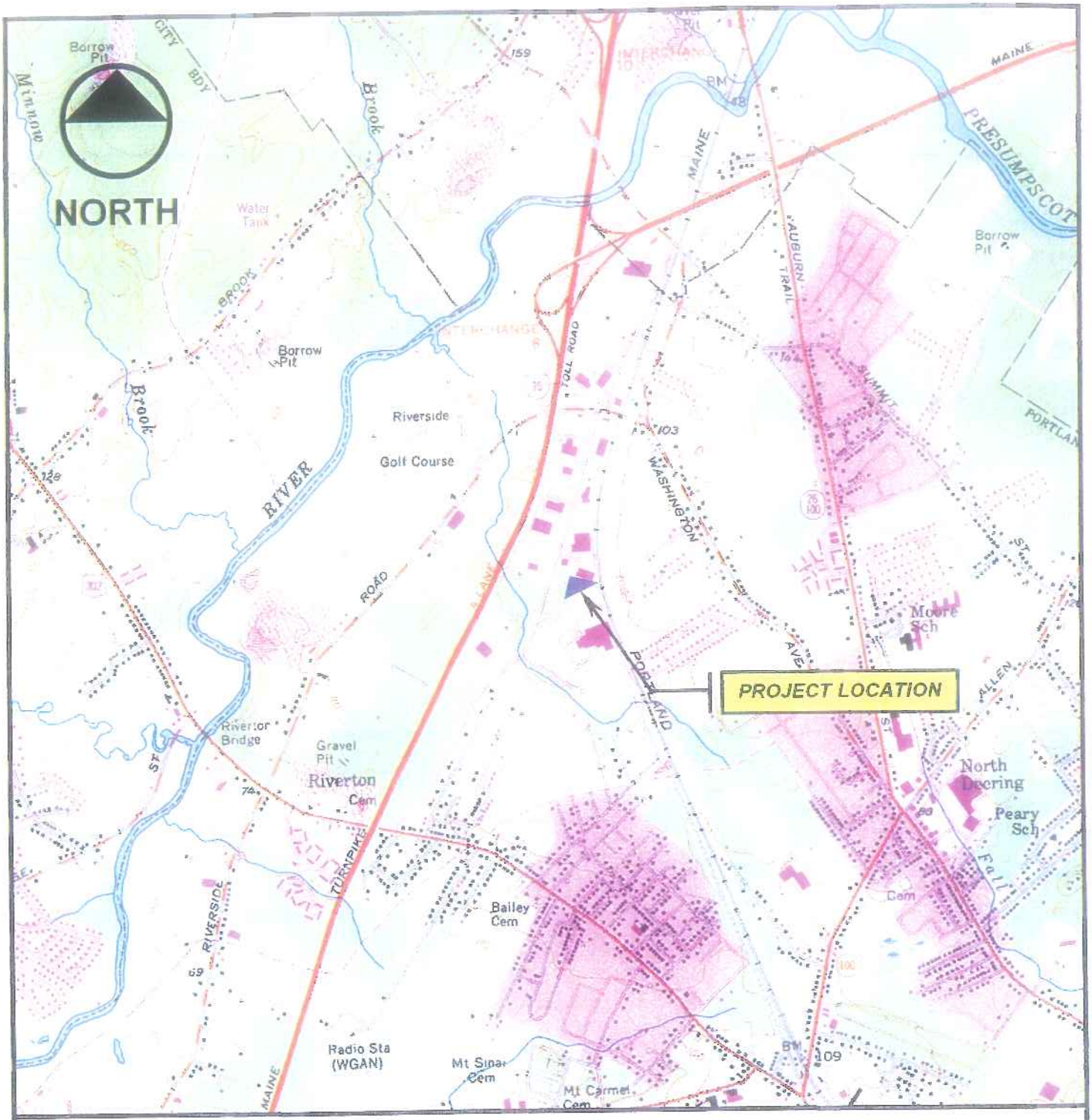
DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 2000'+-	1
CHECKED	SRB	JOB NO.	2213	



USGS TOPOGRAPHIC MAP

Rice Street Building – Portland, Maine

SOURCE: TOPOSCOUT; Coastal Maine CD-ROM, USGS Portland West Quadrangle, 7.5 Minute Series (Topographic)

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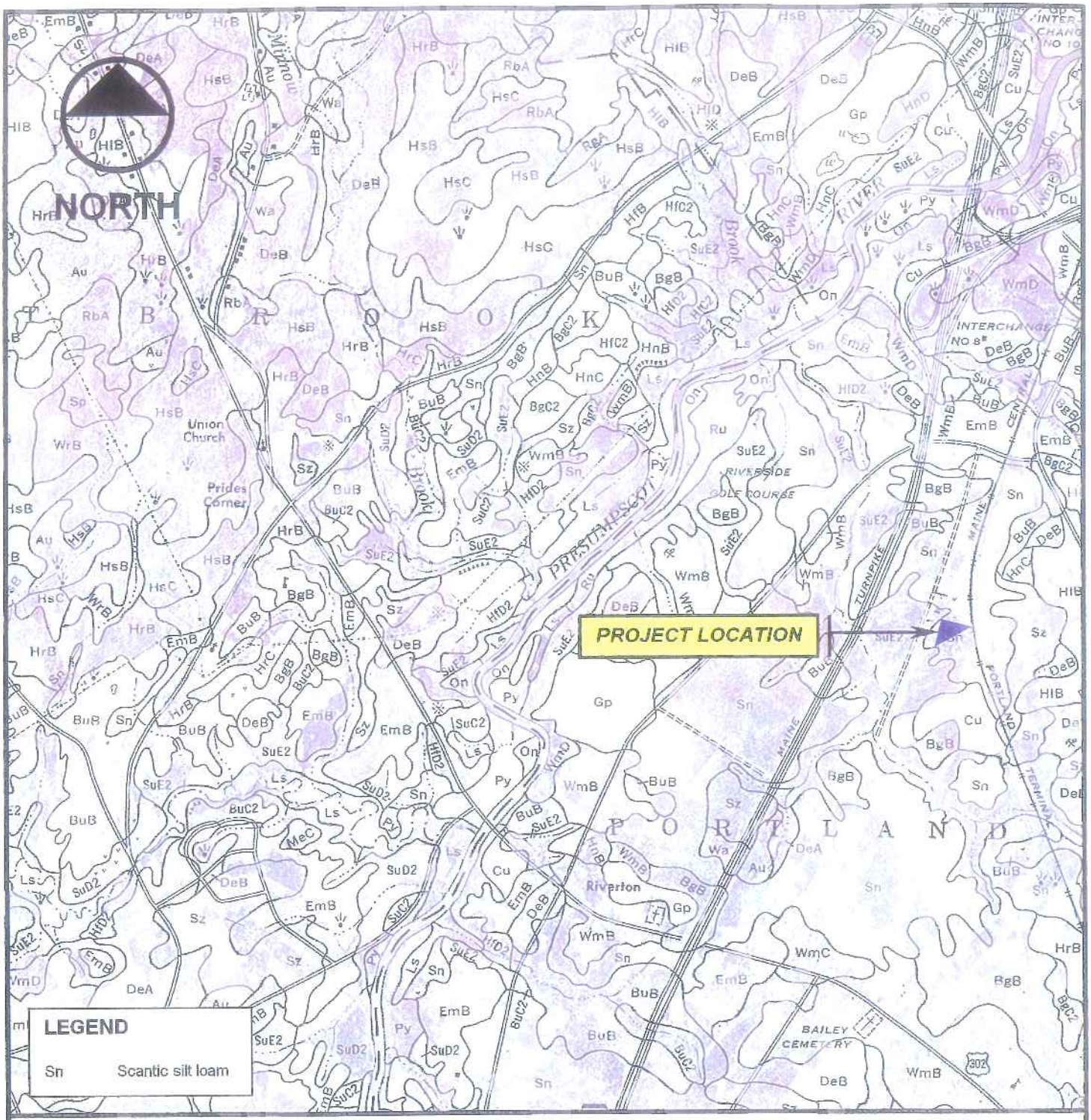
DESIGNED	TD	DATE	OCT. 2001
DRAWN	JDL	SCALE	1" = 2000'+-
CHECKED	SRB	JOB NO.	2213

FIGURE 2



USDA SOILS MAP

Rice Street Building – Portland, Maine

SOURCE: SOIL SURVEY, Cumberland County, Maine; **SHEET NUMBER:** 75

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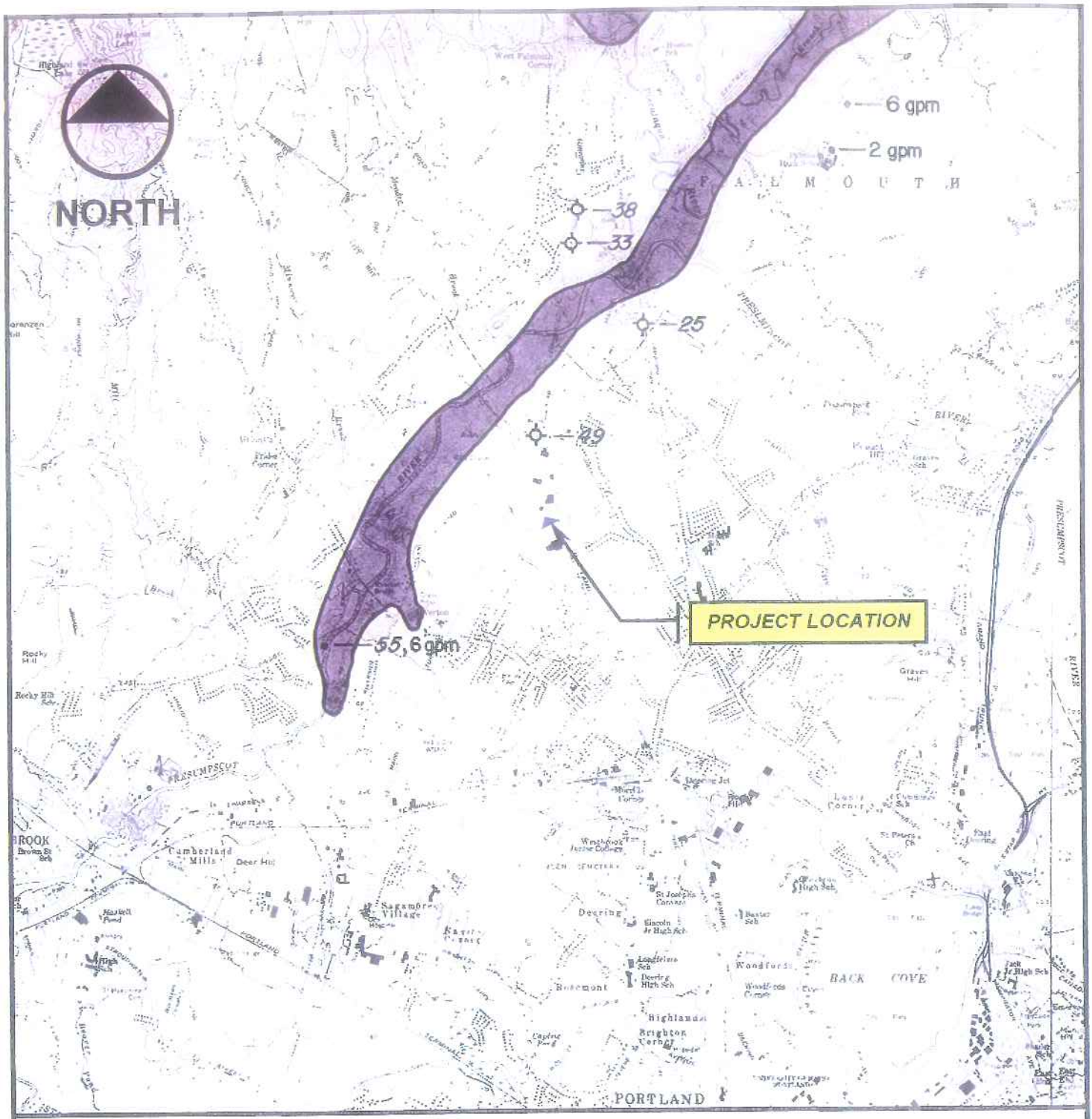
DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 4167'+-	3
CHECKED	SRB	JOB NO.	2213	



MGS SAND AND GRAVEL AQUIFER MAP

Rice Street Building – Portland, Maine

SOURCE: SAND AND GRAVEL AQUIFERS, CUMBERLAND AND YORK COUNTIES, MAINE; **MAP NUMBER:** 5; **OPEN-FILE NO.** 79-6; **DATED:** 1979

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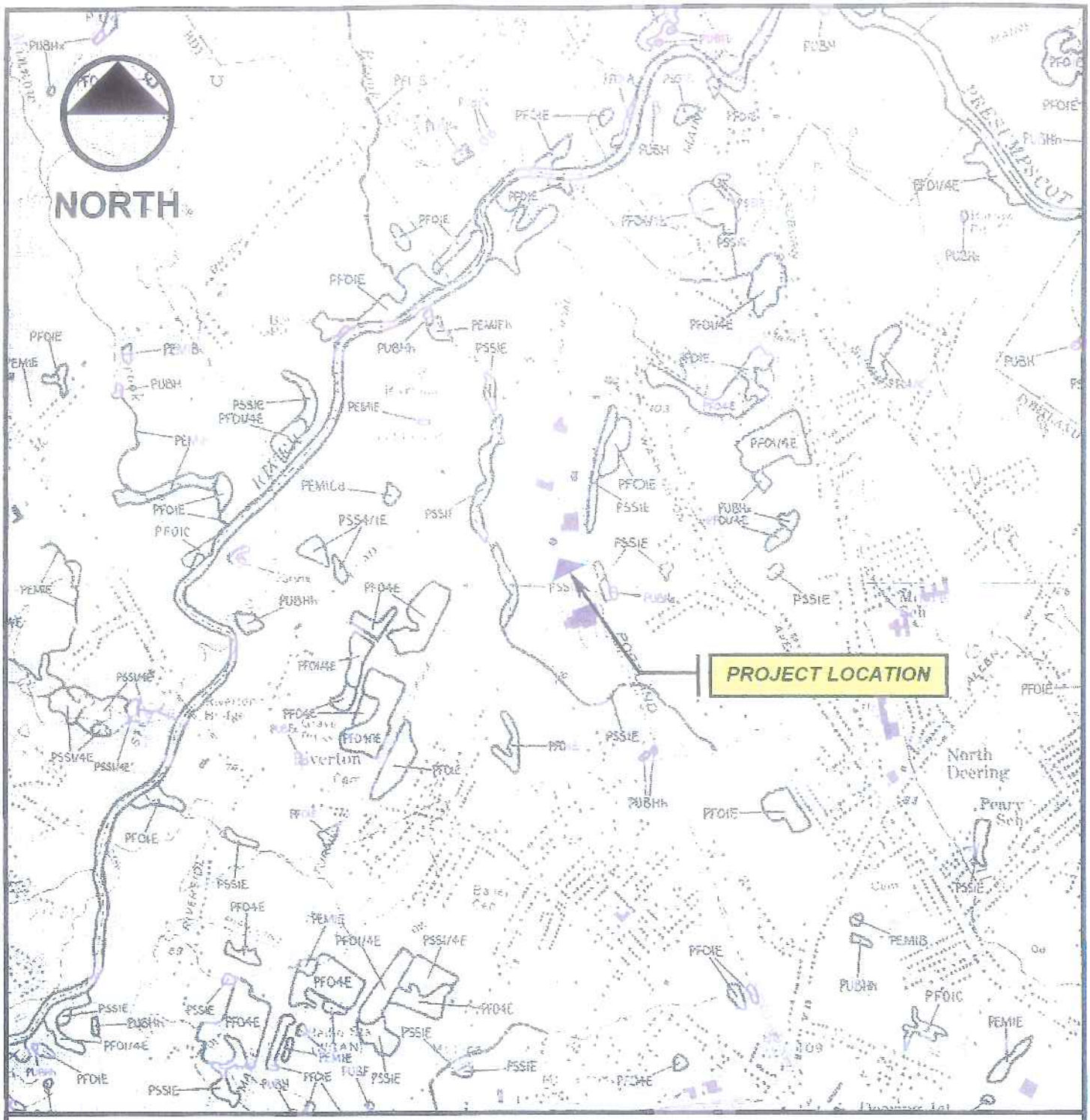
DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 4167'+-	4
CHECKED	SRB	JOB NO.	2213	



NATIONAL WETLANDS INVENTORY MAP

Rice Street Building – Portland, Maine

SOURCE: NATIONAL WETLANDS INVENTORY, PORTLAND WEST QUADRANGLE; **DATED:** 1992

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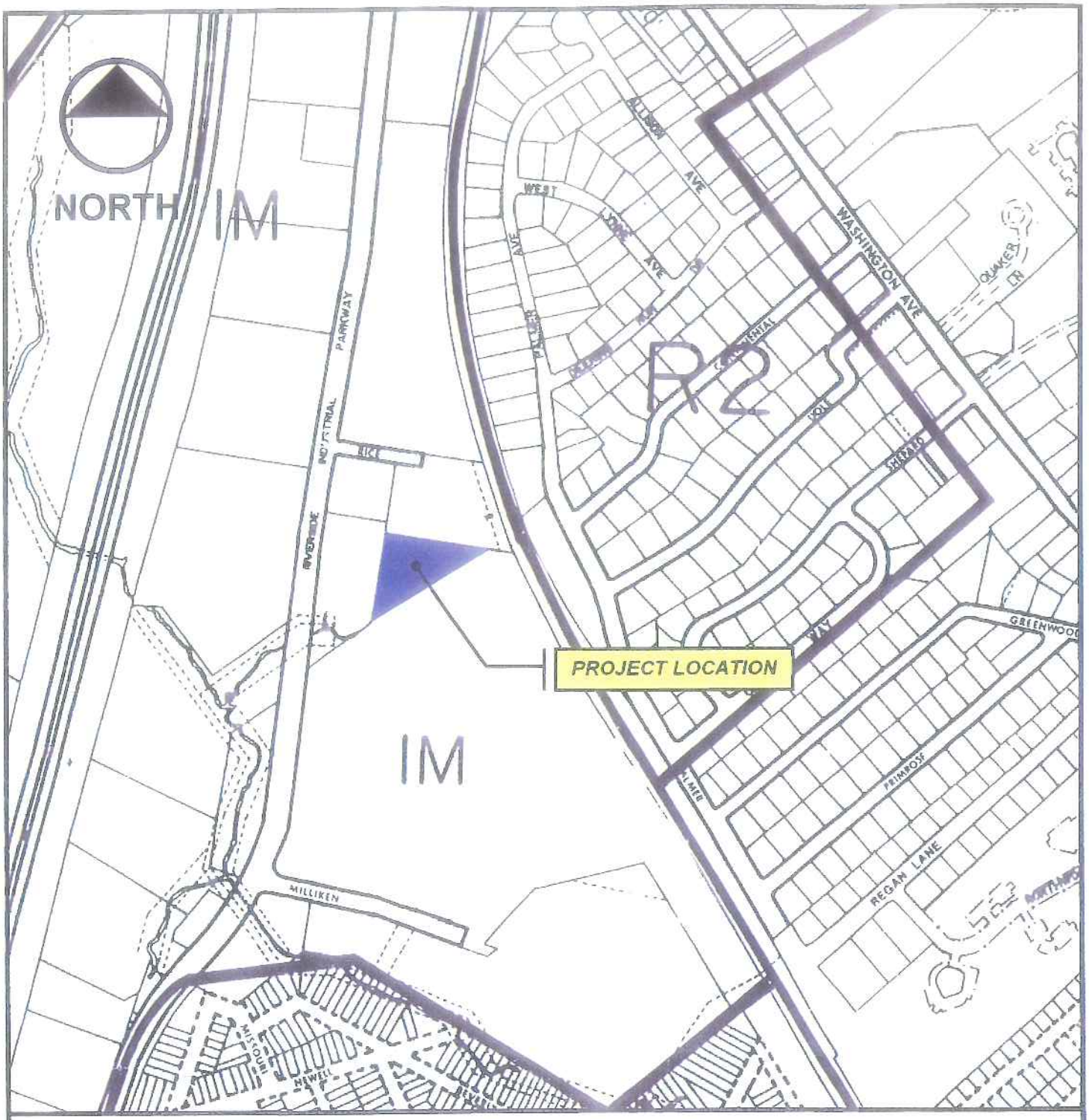
DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 2000'+-	5
CHECKED	SRB	JOB NO.	2213	



ZONING

Rice Street Building – Portland, Maine

SOURCE: CITY OF PORTLAND ZONING MAP

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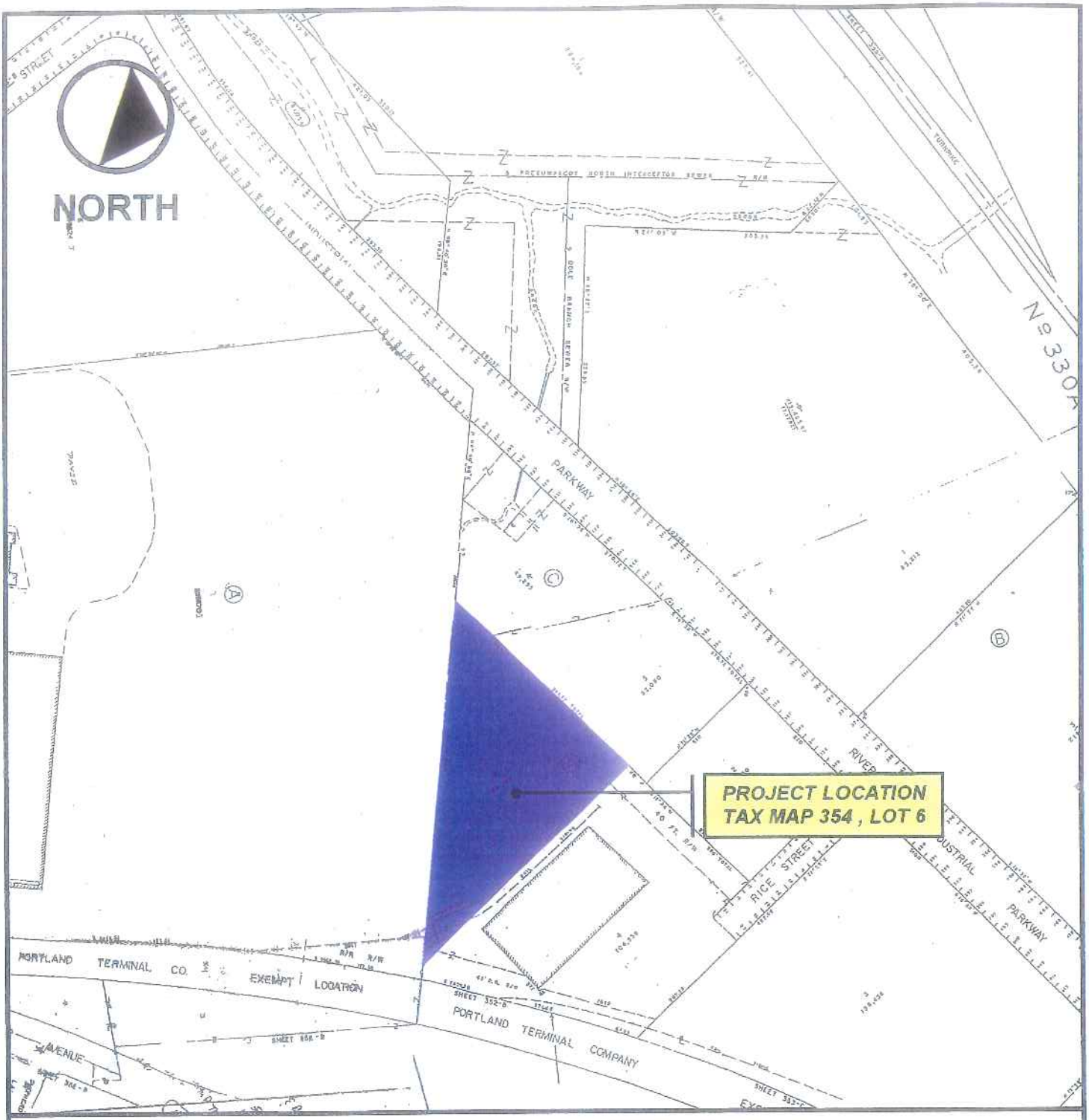
DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	N.T.S.	6
CHECKED	SRB	JOB NO.	2213	



PROPERTY TAX MAP

Rice Street Building – Portland, Maine

SOURCE: CITY OF PORTLAND ASSESSOR'S PLAN; **REVISED:** 3-78

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DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 2000'+-	7
CHECKED	SRB	JOB NO.	2213	

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September 3, 2003

Ms. Kandi Talbot
Portland Planning Department
Portland City Hall
389 Congress Street
Portland, ME 04101

Subject: Thirsty Turf Irrigation
Response to Comments From Jim Seymour

Dear Kandi:

We have received Jim Seymour's comments on the proposed Thirsty Turf Irrigation Site plan off Rice Street and offer the following responses.

Response to Comment 1A. DeLuca-Hoffman Associates, Inc. has revised the proposed grading to provide additional ground cover over the top of the underground storage system. The revised grading plan accompanies this letter.

Response to Comment 2A. The Site plan has been revised to eliminate the parking space thus providing for approximately 15' of clear space between the dumpster pad and the striped parking space.

Response to Comment 3A. The Utilities layout has been revised and the proposed water service reduced from a 6" main to a 1 ½" domestic service main. The proposed building does not require a sprinkler therefore the larger main size is not warranted. A note has been added to the plan to require the service main and sewer service installation to be completed in accordance with the Portland Water District and Portland Public Works standards.

Response to Comment 4A. On behalf of the applicant, DeLuca-Hoffman Associates, Inc. requests consideration to provide a paved apron around the proposed catch basin as well as a 3' sump and casco trap in the structure to avoid the additional expense of paving the entire yard area. We propose to pave an apron within 5 ft. of the catch basin inlet to provide stability to the ground surface around the structure. The remaining yard area will be constructed with a MDOT Type A gravel surface.

We trust these responses satisfy the concerns of the City's reviewing staff. We will also be forwarding to you a copy of a signed temporary grading and access easement from the abutting landowner to allow the grading work on the east side of the property.

If you have any further comments please call this office.

Sincerely,

DeLuca-Hoffman Associates, Inc.

Stephen Bushey, P.E.
Senior Engineer

SRB/ked/JN2189.01/Talbot09-03-03

Attachment

c: Josh Doucette, Thirsty Turf Irrigation

SUBCATCHMENT 3

PEAK= 1.01 CFS @ 12.11 HRS, VOLUME= .09 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	
Grass: Short n=.15 L=110' P2=3 in s=.0356 '/'		8.7
RECT/VEE/TRAP CHANNEL	Segment ID:	
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374'		
s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		1.4
RECT/VEE/TRAP CHANNEL	Segment ID:	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		0.0
RECT/VEE/TRAP CHANNEL	Segment ID:	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=115' Capacity=1548.3 cfs		.1
Total Length= 350 ft	Total Tc=	10.2

REACH 1

Not described

Qin = 2.53 CFS @ 12.13 HRS, VOLUME= .24 AF
Qout= 2.53 CFS @ 12.13 HRS, VOLUME= .24 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 1.52 CFS @ 12.15 HRS, VOLUME= .14 AF
Qout= 1.47 CFS @ 12.15 HRS, VOLUME= .14 AF, ATTEN= 3%, LAG= .3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .03 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

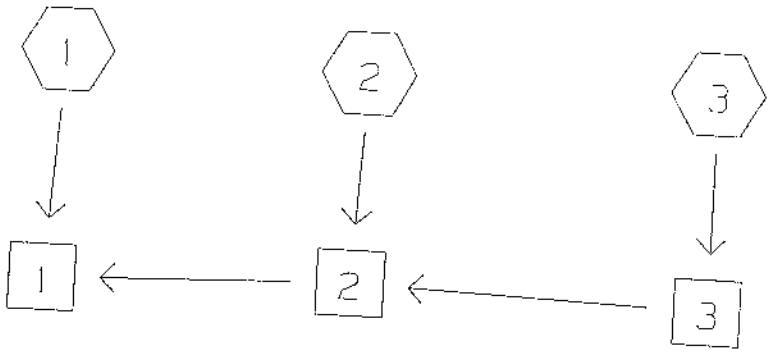
Qin = 1.01 CFS @ 12.11 HRS, VOLUME= .09 AF
Qout= .95 CFS @ 12.14 HRS, VOLUME= .09 AF, ATTEN= 6%, LAG= 1.5 MIN

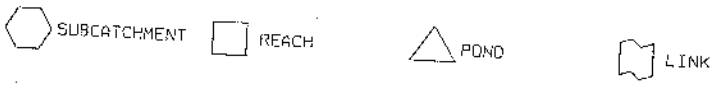
DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .02 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

WATERSHED ROUTING ==========





SUBCATCHMENT 1	=	-> REACH 1
SUBCATCHMENT 2	=	-> REACH 2
SUBCATCHMENT 3	=	-> REACH 3
REACH 1	=	->
REACH 2	=	-> REACH 1
REACH 3	=	-> REACH 2

SUBCATCHMENT 1

PEAK= 2.42 CFS @ 12.10 HRS, VOLUME= .20 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'	Segment ID:AB	8.7
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps	Segment ID:	.1
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs	Segment ID:	.9
	Total Length= 605 ft Total Tc=	9.7

SUBCATCHMENT 2

PEAK= 1.32 CFS @ 12.17 HRS, VOLUME= .13 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=70' P2=3 in s=.0169 '/'	Segment ID:	8.1
TR-55 SHEET FLOW Grass: Short n=.15 L=80' P2=3 in s=.0471 '/'	Segment ID:	6.0
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=85' s=.2113 '/' V=3.22 fps	Segment ID:	.4
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=170' Capacity=1548.3 cfs	Segment ID:	.2
	Total Length= 405 ft Total Tc=	14.7

SUBCATCHMENT 3

PEAK= 2.07 CFS @ 12.10 HRS, VOLUME= .18 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	8.7
Grass: Short n=.15 L=110' P2=3 in s=.0356 '/'		
RECT/VEE/TRAP CHANNEL	Segment ID:	1.4
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374'		
s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=115' Capacity=1548.3 cfs		
	Total Length= 350 ft Total Tc=	10.2

REACH 1

Not described

Qin = 5.60 CFS @ 12.12 HRS, VOLUME= .51 AF
Qout= 5.60 CFS @ 12.12 HRS, VOLUME= .51 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 3.27 CFS @ 12.14 HRS, VOLUME= .30 AF
Qout= 3.23 CFS @ 12.14 HRS, VOLUME= .30 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .07 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

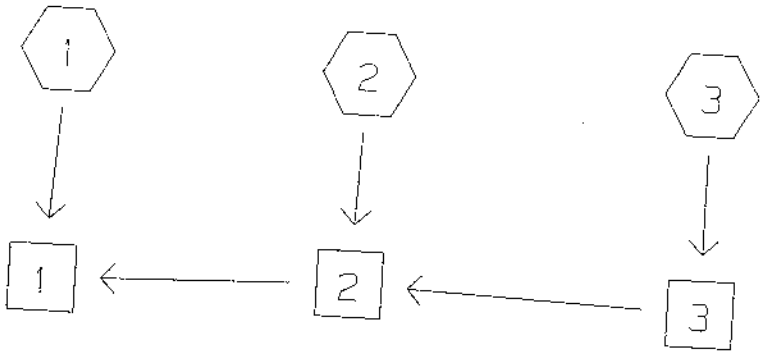
Qin = 2.07 CFS @ 12.10 HRS, VOLUME= .18 AF
Qout= 1.96 CFS @ 12.13 HRS, VOLUME= .18 AF, ATTEN= 5%, LAG= 1.4 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .04 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

WATERSHED ROUTING



SUBCATCHMENT REACH POND LINK

SUBCATCHMENT 1	=	
SUBCATCHMENT 2	=	-> REACH 1
SUBCATCHMENT 3	=	-> REACH 2
REACH 1	=	-> REACH 3
REACH 2	=	->
REACH 3	=	-> REACH 1
		-> REACH 2

SUBCATCHMENT 1

PEAK= 3.11 CFS @ 12.10 HRS, VOLUME= .26 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'	Segment ID:AB	8.7
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps	Segment ID:	.1
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs	Segment ID:	.9
	Total Length= 605 ft Total Tc=	9.7

SUBCATCHMENT 2

PEAK= 1.69 CFS @ 12.16 HRS, VOLUME= .17 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=70' P2=3 in s=.0169 '/'	Segment ID:	8.1
TR-55 SHEET FLOW Grass: Short n=.15 L=80' P2=3 in s=.0471 '/'	Segment ID:	6.0
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=85' s=.2113 '/' V=3.22 fps	Segment ID:	.4
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=170' Capacity=1548.3 cfs	Segment ID:	.2
	Total Length= 405 ft Total Tc=	14.7

SUBCATCHMENT 3

PEAK= 2.58 CFS @ 12.10 HRS, VOLUME= .22 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	
Grass: Short n=.15 L=110' P2=3 in s=.0356 '/'		8.7
RECT/VEE/TRAP CHANNEL	Segment ID:	
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374' s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		1.4
RECT/VEE/TRAP CHANNEL	Segment ID:	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		0.0
RECT/VEE/TRAP CHANNEL	Segment ID:	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=115' Capacity=1548.3 cfs		.1
Total Length= 350 ft	Total Tc=	10.2

REACH 1

Not described

Qin = 7.13 CFS @ 12.12 HRS, VOLUME= .65 AF
Qout= 7.13 CFS @ 12.12 HRS, VOLUME= .65 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 4.14 CFS @ 12.14 HRS, VOLUME= .39 AF
Qout= 4.08 CFS @ 12.14 HRS, VOLUME= .39 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .08 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

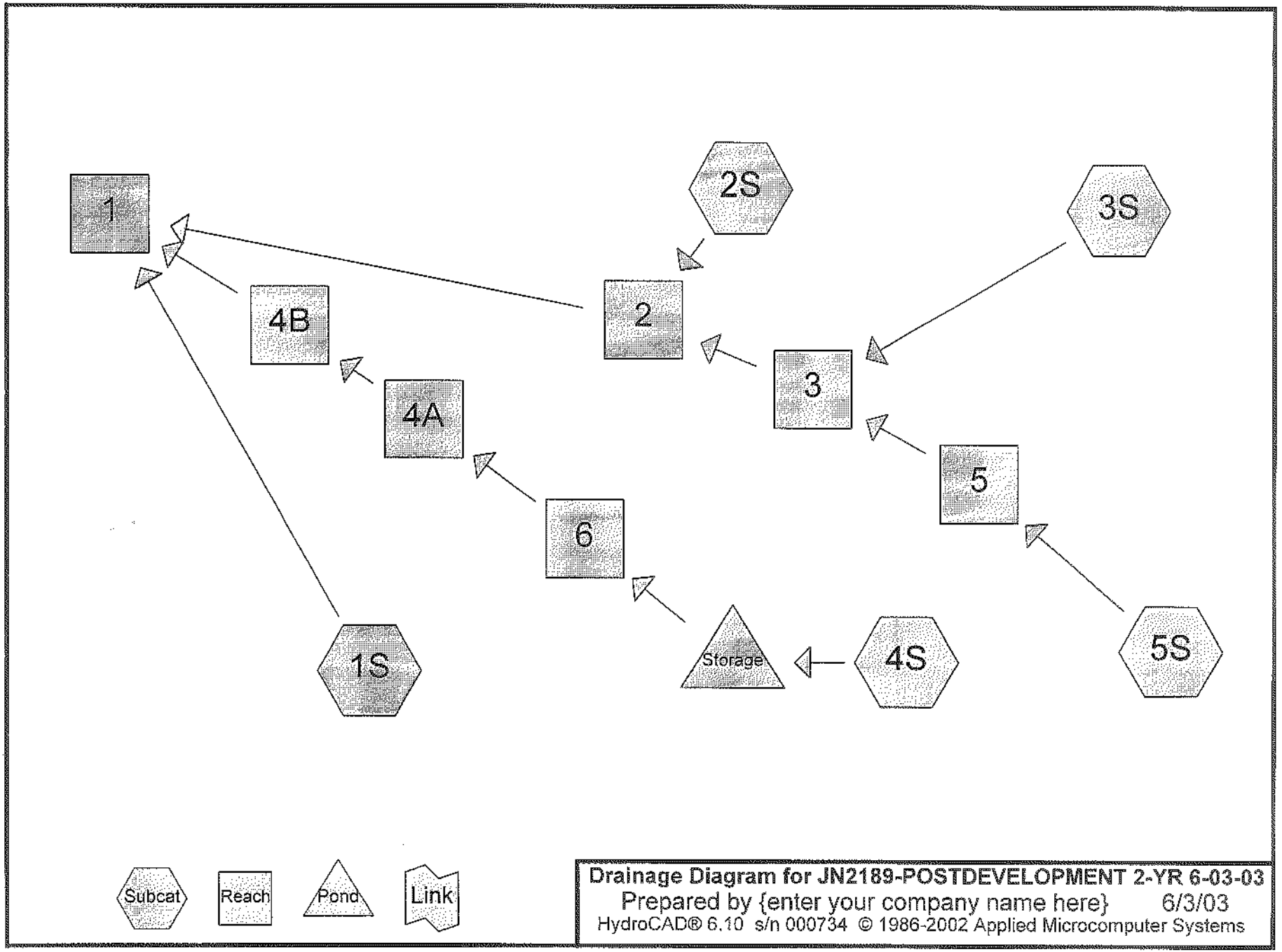
REACH 3

Qin = 2.58 CFS @ 12.10 HRS, VOLUME= .22 AF
Qout= 2.45 CFS @ 12.13 HRS, VOLUME= .22 AF, ATTEN= 5%, LAG= 1.4 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .05 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS



Drainage Diagram for JN2189-POSTDEVELOPMENT 2-YR 6-03-03

Prepared by {enter your company name here} 6/3/03

Time span=0.00-25.00 hrs, dt=0.10 hrs, 251 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=3.00"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Southern Stream Bank Runoff Area=1.080 ac Runoff Depth=1.07"
Length=655' Tc=8.8 min CN=77 Runoff= 1.13 cfs 0.096 af

Subcatchment 2S: Western Stream Bank Runoff Area=0.400 ac Runoff Depth=1.07"
Length=170' Tc=3.8 min CN=77 Runoff= 0.48 cfs 0.036 af

Subcatchment 3S: West of Driveway Runoff Area=0.220 ac Runoff Depth=1.25"
Length=350' Tc=8.8 min CN=80 Runoff= 0.27 cfs 0.023 af

Subcatchment 4S: Building & Lot Runoff Area=0.620 ac Runoff Depth=2.16"
Length=245' Tc=8.4 min CN=92 Runoff= 1.31 cfs 0.112 af

Subcatchment 5S: Lot north of Site Runoff Area=0.210 ac Runoff Depth=1.74"
Length=160' Tc=6.6 min CN=87 Runoff= 0.36 cfs 0.030 af

Reach 1: Point of Interest Inflow= 2.31 cfs 0.296 af
Outflow= 2.31 cfs 0.296 af

Reach 2: Channel to POI Peak Depth= 0.06' Max Vel= 1.3 fps Inflow= 0.81 cfs 0.089 af
n=0.050 L=45.0' S=0.0667 '/' Capacity=1,628.01 cfs Outflow= 0.80 cfs 0.089 af

Reach 3: Channel to Reach 2 Peak Depth= 0.07' Max Vel= 0.9 fps Inflow= 0.63 cfs 0.053 af
n=0.050 L=200.0' S=0.0300 '/' Capacity=1,092.10 cfs Outflow= 0.57 cfs 0.053 af

Reach 4A: Level Spreader Peak Depth= 0.15' Max Vel= 0.4 fps Inflow= 0.67 cfs 0.111 af
n=0.800 L=40.0' S=0.5850 '/' Capacity=5.09 cfs Outflow= 0.67 cfs 0.111 af

Reach 4B: Flow Stream from Chamber Peak Depth= 0.10' Max Vel= 0.6 fps Inflow= 0.67 cfs 0.111 af
n=0.050 L=120.0' S=0.0100 '/' Capacity=630.53 cfs Outflow= 0.66 cfs 0.111 af

Reach 5: Culvert Discharge to Reach 3 Peak Depth= 0.06' Max Vel= 1.2 fps Inflow= 0.36 cfs 0.030 af
n=0.050 L=90.0' S=0.0667 '/' Capacity=314.45 cfs Outflow= 0.36 cfs 0.030 af

Reach 6: Pond Outlet Manhole Discharge Peak Depth= 0.37' Max Vel= 2.5 fps Inflow= 0.67 cfs 0.111 af
D=12.0" n=0.011 L=20.0' S=0.0030 '/' Capacity=2.31 cfs Outflow= 0.67 cfs 0.111 af

Pond Storage: Underground Storage Peak Storage= 1,012 cf @ 71.53' Inflow= 1.31 cfs 0.112 af
Primary= 0.67 cfs 0.111 af Outflow= 0.67 cfs 0.111 af

Total Runoff Area = 2.530 ac Runoff Volume = 0.297 af Average Runoff Depth = 1.41"

Subcatchment 1S: Southern Stream Bank

Runoff = 1.13 cfs @ 12.10 hrs, Volume= 0.096 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
1.000	77	WOODS GOOD
0.080	80	>75% Grass cover, Good, HSG D
1.080	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0391	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	30	0.6333	5.6		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
1.0	525	0.0204	9.0	900.57	**Trap/Vee/Rect Channel Flow, Flow in Stream from** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
8.8	655	Total			

Subcatchment 2S: Western Stream Bank

Runoff = 0.48 cfs @ 12.02 hrs, Volume= 0.036 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.400	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	70	0.1286	0.3		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	20	0.6900	5.8		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.1	80	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
3.8	170	Total			

Subcatchment 3S: West of Driveway

Runoff = 0.27 cfs @ 12.10 hrs, Volume= 0.023 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.180	77	WOODS GOOD
0.040	93	Paved roads w/open ditches, HSG D
0.220	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	110	0.0400	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.4	110	0.0073	4.9	1,482.54	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 10.0 '/' n= 0.050
0.0	15	0.4667	43.1	4,307.47	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
0.1	115	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
8.8	350	Total			

Subcatchment 4S: Building & Lot

Runoff = 1.31 cfs @ 12.08 hrs, Volume= 0.112 af, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.140	98	Roof
0.430	91	Gravel Lot, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.620	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	60	0.0200	1.2		**Sheet Flow, Roof Run off** Smooth surfaces n= 0.011 P2= 3.00"
7.1	45	0.0200	0.1		**Sheet Flow, Sheet Flow on Gravel** n= 0.215 P2= 3.00"
0.3	82	0.0100	5.4	4.21	**Circular Channel (pipe), 12" SD from CB1 to CB2** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0
0.2	58	0.0100	5.4	4.21	**Circular Channel (pipe), !2" SD from CB2 to Cham** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0
8.4	245	Total			

Subcatchment 5S: Lot north of Site

Runoff = 0.36 cfs @ 12.05 hrs, Volume= 0.030 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.100	77	WOODS GOOD
0.030	91	Gravel roads, HSG D
0.020	93	Paved roads w/open ditches, HSG D
0.060	98	Paved parking & roofs
0.210	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	80	0.0440	0.2		**Sheet Flow, Edge of Building to Swale** Grass: Short n= 0.150 P2= 3.00"
0.3	40	0.0750	1.9		**Shallow Concentrated Flow, Ditch at end of RR T** Short Grass Pasture Kv= 7.0 fps
0.1	40	0.0250	9.8	12.07	**Circular Channel (pipe), Culvert under Driveway** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0
6.6	160	Total			

Reach 1: Point of Interest

Inflow Area = 2.530 ac, Inflow Depth = 1.40"
Inflow = 2.31 cfs @ 12.13 hrs, Volume= 0.296 af
Outflow = 2.31 cfs @ 12.13 hrs, Volume= 0.296 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Reach 2: Channel to POI

Inflow Area = 0.830 ac, Inflow Depth = 1.29"
Inflow = 0.81 cfs @ 12.18 hrs, Volume= 0.089 af
Outflow = 0.80 cfs @ 12.18 hrs, Volume= 0.089 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.3 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.06'
Capacity at bank full= 1,628.01 cfs
Inlet Invert= 61.00', Outlet Invert= 58.00'
10.00' x 5.00' deep channel, n= 0.050 Length= 45.0' Slope= 0.0667 '/'
Side Slope Z-value= 2.0 '/'

Reach 3: Channel to Reach 2

Inflow Area = 0.430 ac, Inflow Depth = 1.49"
Inflow = 0.63 cfs @ 12.10 hrs, Volume= 0.053 af
Outflow = 0.57 cfs @ 12.21 hrs, Volume= 0.053 af, Atten= 10%, Lag= 7.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.9 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 4.8 min

Peak Depth= 0.07'
Capacity at bank full= 1,092.10 cfs
Inlet Invert= 67.00', Outlet Invert= 61.00'
10.00' x 5.00' deep channel, n= 0.050 Length= 200.0' Slope= 0.0300 '/'
Side Slope Z-value= 2.0 '/'

Reach 4A: Level Spreader

Inflow Area = 0.620 ac, Inflow Depth = 2.14"
Inflow = 0.67 cfs @ 12.30 hrs, Volume= 0.111 af
Outflow = 0.67 cfs @ 12.35 hrs, Volume= 0.111 af, Atten= 0%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.4 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.1 fps, Avg. Travel Time= 5.3 min

Peak Depth= 0.15'
Capacity at bank full= 5.09 cfs
Inlet Invert= 70.40', Outlet Invert= 47.00'
12.00' x 0.50' deep channel, n= 0.800 Length= 40.0' Slope= 0.5850 '/'

Reach 4B: Flow Stream from Chambers

Inflow Area = 0.620 ac, Inflow Depth = 2.14"
Inflow = 0.67 cfs @ 12.35 hrs, Volume= 0.111 af
Outflow = 0.66 cfs @ 12.45 hrs, Volume= 0.111 af, Atten= 1%, Lag= 6.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.6 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 4.9 min

Peak Depth= 0.10'
Capacity at bank full= 630.53 cfs
Inlet Invert= 47.00', Outlet Invert= 45.80'
10.00' x 5.00' deep channel, n= 0.050 Length= 120.0' Slope= 0.0100 '/'
Side Slope Z-value= 2.0 '/'

Reach 5: Culvert Discharge to Reach 3

Inflow Area = 0.210 ac, Inflow Depth = 1.74"
Inflow = 0.36 cfs @ 12.05 hrs, Volume= 0.030 af
Outflow = 0.36 cfs @ 12.10 hrs, Volume= 0.030 af, Atten= 2%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.2 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 2.3 min

Peak Depth= 0.06'
Capacity at bank full= 314.45 cfs
Inlet Invert= 73.00', Outlet Invert= 67.00'
5.00' x 2.50' deep channel, n= 0.050 Length= 90.0' Slope= 0.0667 '/'
Side Slope Z-value= 3.0 '/'

Reach 6: Pond Outlet Manhole Discharge

Inflow Area = 0.620 ac, Inflow Depth = 2.14"
Inflow = 0.67 cfs @ 12.29 hrs, Volume= 0.111 af
Outflow = 0.67 cfs @ 12.30 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.37'
Capacity at bank full= 2.31 cfs
Inlet Invert= 70.56', Outlet Invert= 70.50'
12.0" Diameter Pipe n= 0.011 Length= 20.0' Slope= 0.0030 '/'

Pond Storage: Underground Storage

Inflow Area = 0.620 ac, Inflow Depth = 2.16"
Inflow = 1.31 cfs @ 12.08 hrs, Volume= 0.112 af
Outflow = 0.67 cfs @ 12.29 hrs, Volume= 0.111 af, Atten= 49%, Lag= 12.6 min
Primary = 0.67 cfs @ 12.29 hrs, Volume= 0.111 af

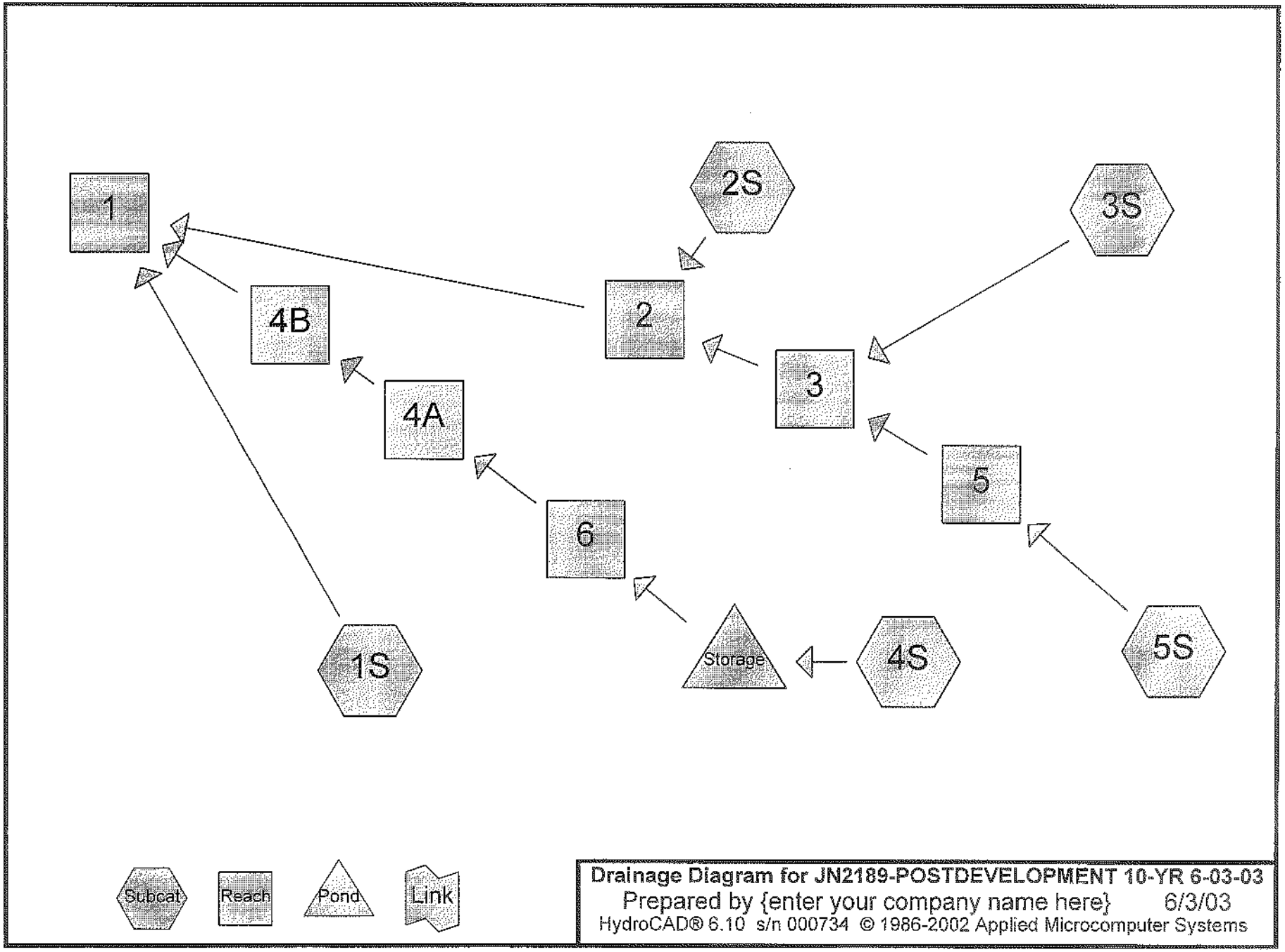
Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Peak Elev= 71.53' Storage= 1,012 cf
Plug-Flow detention time= 32.9 min calculated for 0.110 af (99% of inflow)

Elevation (feet)	Cum.Store (cubic-feet)
70.71	0
71.21	426
71.71	1,330
72.21	2,220
72.71	3,036
73.21	3,759
73.71	4,293
74.21	4,719

Primary OutFlow Max=0.67 cfs @ 12.29 hrs HW=71.53' (Free Discharge)
↑—**1=Culvert** (Controls 0.67 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	70.71'	**6.0" x 10.0' long Culvert** Ke= 0.500 Outlet Invert= 70.66' S= 0.0050 '/' n= 0.011 Cc= 0.900



Drainage Diagram for JN2189-POSTDEVELOPMENT 10-YR 6-03-03

Prepared by {enter your company name here} 6/3/03

Subcatchment 1S: Southern Stream Bank

Runoff = 2.57 cfs @ 12.09 hrs, Volume= 0.214 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.000	77	WOODS GOOD
0.080	80	>75% Grass cover, Good, HSG D
1.080	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0391	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	30	0.6333	5.6		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
1.0	525	0.0204	9.0	900.57	**Trap/Vee/Rect Channel Flow, Flow in Stream from** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
8.8	655	Total			

Subcatchment 2S: Western Stream Bank

Runoff = 1.10 cfs @ 12.01 hrs, Volume= 0.079 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.400	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	70	0.1286	0.3		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	20	0.6900	5.8		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.1	80	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
3.8	170	Total			

Subcatchment 3S: West of Driveway

Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.048 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.180	77	WOODS GOOD
0.040	93	Paved roads w/open ditches, HSG D
0.220	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	110	0.0400	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.4	110	0.0073	4.9	1,482.54	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 10.0 '/' n= 0.050
0.0	15	0.4667	43.1	4,307.47	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
0.1	115	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
8.8	350	Total			

Subcatchment 4S: Building & Lot

Runoff = 2.24 cfs @ 12.08 hrs, Volume= 0.196 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.140	98	Roof
0.430	91	Gravel Lot, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.620	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	60	0.0200	1.2		**Sheet Flow, Roof Run off** Smooth surfaces n= 0.011 P2= 3.00"
7.1	45	0.0200	0.1		**Sheet Flow, Sheet Flow on Gravel** n= 0.215 P2= 3.00"
0.3	82	0.0100	5.4	4.21	**Circular Channel (pipe), 12" SD from CB1 to CB2** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0
0.2	58	0.0100	5.4	4.21	**Circular Channel (pipe), !2" SD from CB2 to Cham** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0
8.4	245	Total			

Subcatchment 5S: Lot north of Site

Runoff = 0.69 cfs @ 12.05 hrs, Volume= 0.057 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.100	77	WOODS GOOD
0.030	91	Gravel roads, HSG D
0.020	93	Paved roads w/open ditches, HSG D
0.060	98	Paved parking & roofs
0.210	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	80	0.0440	0.2		**Sheet Flow, Edge of Building to Swale** Grass: Short n= 0.150 P2= 3.00"
0.3	40	0.0750	1.9		**Shallow Concentrated Flow, Ditch at end of RR T** Short Grass Pasture Kv= 7.0 fps
0.1	40	0.0250	9.8	12.07	**Circular Channel (pipe), Culvert under Driveway** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0
6.6	160	Total			

Reach 1: Point of Interest

Inflow Area = 2.530 ac, Inflow Depth = 2.81"
Inflow = 4.93 cfs @ 12.10 hrs, Volume= 0.593 af
Outflow = 4.93 cfs @ 12.10 hrs, Volume= 0.593 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Reach 2: Channel to POI

Inflow Area = 0.830 ac, Inflow Depth = 2.67"
Inflow = 1.77 cfs @ 12.05 hrs, Volume= 0.185 af
Outflow = 1.73 cfs @ 12.09 hrs, Volume= 0.185 af, Atten= 2%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.7 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.10'
Capacity at bank full= 1,628.01 cfs
Inlet Invert= 61.00', Outlet Invert= 58.00'
10.00' x 5.00' deep channel, n= 0.050 Length= 45.0' Slope= 0.0667 '/'
Side Slope Z-value= 2.0 '/'

Reach 3: Channel to Reach 2

Inflow Area = 0.430 ac, Inflow Depth = 2.95"
Inflow = 1.25 cfs @ 12.09 hrs, Volume= 0.106 af
Outflow = 1.11 cfs @ 12.18 hrs, Volume= 0.106 af, Atten= 11%, Lag= 5.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.1 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 4.7 min

Peak Depth= 0.10'
Capacity at bank full= 1,092.10 cfs
Inlet Invert= 67.00', Outlet Invert= 61.00'
10.00' x 5.00' deep channel, n= 0.050 Length= 200.0' Slope= 0.0300 '/'
Side Slope Z-value= 2.0 '/'

Reach 4A: Level Spreader

Inflow Area = 0.620 ac, Inflow Depth = 3.78"
Inflow = 0.98 cfs @ 12.34 hrs, Volume= 0.195 af
Outflow = 0.98 cfs @ 12.38 hrs, Volume= 0.195 af, Atten= 0%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.4 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 4.4 min

Peak Depth= 0.18'
Capacity at bank full= 5.09 cfs
Inlet Invert= 70.40', Outlet Invert= 47.00'
12.00' x 0.50' deep channel, n= 0.800 Length= 40.0' Slope= 0.5850 '/'

Reach 4B: Flow Stream from Chambers

Inflow Area = 0.620 ac, Inflow Depth = 3.77"
Inflow = 0.98 cfs @ 12.38 hrs, Volume= 0.195 af
Outflow = 0.97 cfs @ 12.46 hrs, Volume= 0.195 af, Atten= 1%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.7 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 4.7 min

Peak Depth= 0.13'
Capacity at bank full= 630.53 cfs
Inlet Invert= 47.00', Outlet Invert= 45.80'
10.00' x 5.00' deep channel, n= 0.050 Length= 120.0' Slope= 0.0100 '/'
Side Slope Z-value= 2.0 '/'

Reach 5: Culvert Discharge to Reach 3

Inflow Area = 0.210 ac, Inflow Depth = 3.29"
Inflow = 0.69 cfs @ 12.05 hrs, Volume= 0.057 af
Outflow = 0.67 cfs @ 12.09 hrs, Volume= 0.057 af, Atten= 3%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.5 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 2.2 min

Peak Depth= 0.09'
Capacity at bank full= 314.45 cfs
Inlet Invert= 73.00', Outlet Invert= 67.00'
5.00' x 2.50' deep channel, n= 0.050 Length= 90.0' Slope= 0.0667 '/'
Side Slope Z-value= 3.0 '/'

Reach 6: Pond Outlet Manhole Discharge

Inflow Area = 0.620 ac, Inflow Depth = 3.78"
Inflow = 0.98 cfs @ 12.33 hrs, Volume= 0.195 af
Outflow = 0.98 cfs @ 12.34 hrs, Volume= 0.195 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.8 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.2 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.45'
Capacity at bank full= 2.31 cfs
Inlet Invert= 70.56', Outlet Invert= 70.50'
12.0" Diameter Pipe n= 0.011 Length= 20.0' Slope= 0.0030 '/'

Pond Storage: Underground Storage

Inflow Area = 0.620 ac, Inflow Depth = 3.80"
Inflow = 2.24 cfs @ 12.08 hrs, Volume= 0.196 af
Outflow = 0.98 cfs @ 12.33 hrs, Volume= 0.195 af, Atten= 56%, Lag= 15.2 min
Primary = 0.98 cfs @ 12.33 hrs, Volume= 0.195 af

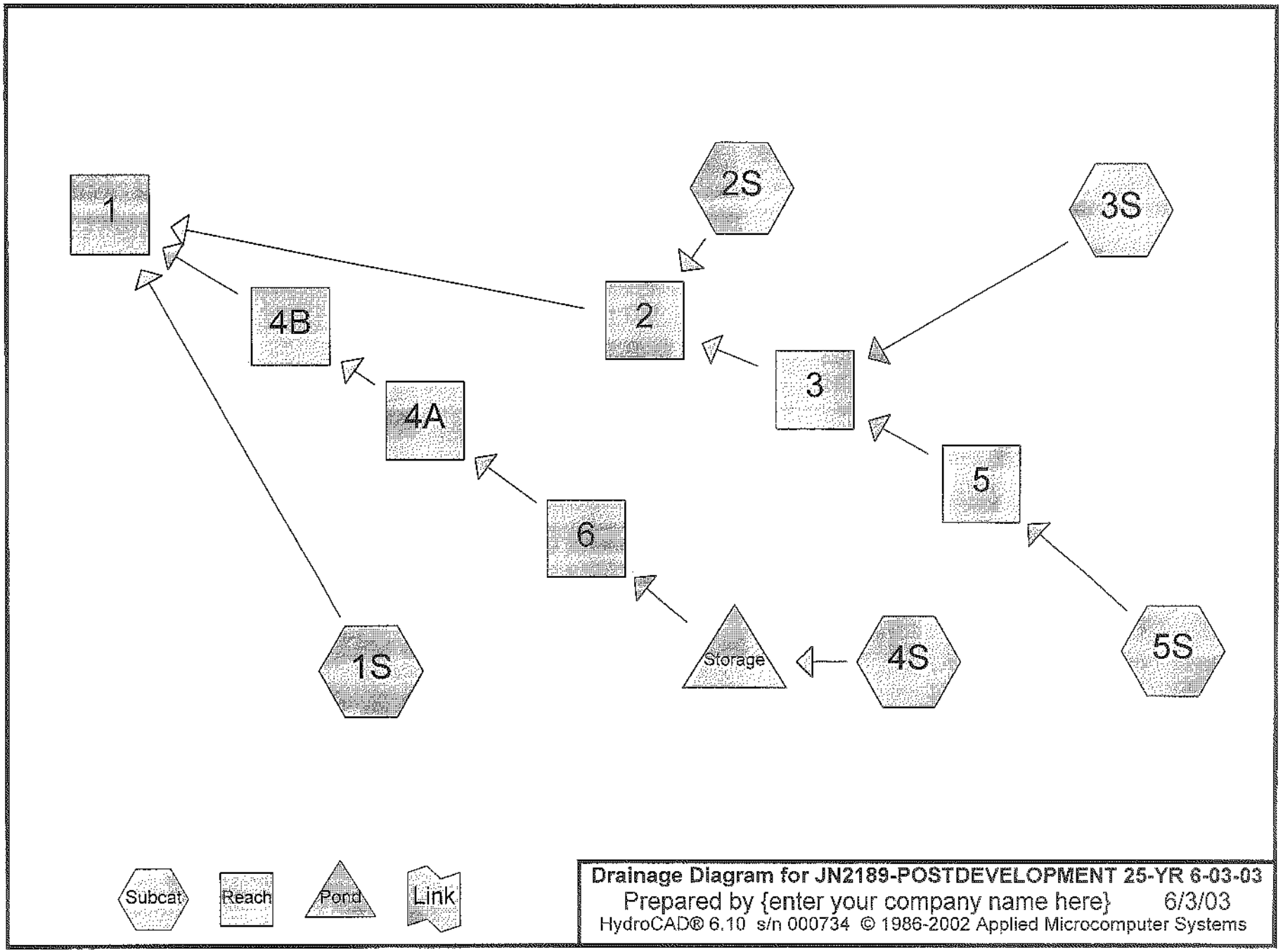
Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Peak Elev= 72.03' Storage= 1,905 cf
Plug-Flow detention time= 30.9 min calculated for 0.194 af (99% of inflow)

Elevation (feet)	Cum.Store (cubic-feet)
70.71	0
71.21	426
71.71	1,330
72.21	2,220
72.71	3,036
73.21	3,759
73.71	4,293
74.21	4,719

Primary OutFlow Max=0.98 cfs @ 12.33 hrs HW=72.03' (Free Discharge)
↑—**1=Culvert** (Controls 0.98 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	70.71'	**6.0" x 10.0' long Culvert** Ke= 0.500 Outlet Invert= 70.66' S= 0.0050 '/' n= 0.011 Cc= 0.900



Drainage Diagram for JN2189-POSTDEVELOPMENT 25-YR 6-03-03
Prepared by {enter your company name here} 6/3/03

Subcatchment 1S: Southern Stream Bank

Runoff = 3.30 cfs @ 12.09 hrs, Volume= 0.274 af, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
1.000	77	WOODS GOOD
0.080	80	>75% Grass cover, Good, HSG D
1.080	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0391	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	30	0.6333	5.6		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
1.0	525	0.0204	9.0	900.57	**Trap/Vee/Rect Channel Flow, Flow in Stream from** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
8.8	655	Total			

Subcatchment 2S: Western Stream Bank

Runoff = 1.42 cfs @ 12.01 hrs, Volume= 0.102 af, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.400	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	70	0.1286	0.3		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	20	0.6900	5.8		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.1	80	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
3.8	170	Total			

Subcatchment 3S: West of Driveway

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.061 af, Depth= 3.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.180	77	WOODS GOOD
0.040	93	Paved roads w/open ditches, HSG D
0.220	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	110	0.0400	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.4	110	0.0073	4.9	1,482.54	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 10.0 '/' n= 0.050
0.0	15	0.4667	43.1	4,307.47	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
0.1	115	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
8.8	350	Total			

Subcatchment 4S: Building & Lot

Runoff = 2.67 cfs @ 12.08 hrs, Volume= 0.237 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.140	98	Roof
0.430	91	Gravel Lot, HSG D
0.050	80	>75% Grass cover, Good, HSG D
0.620	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	60	0.0200	1.2		**Sheet Flow, Roof Run off** Smooth surfaces n= 0.011 P2= 3.00"
7.1	45	0.0200	0.1		**Sheet Flow, Sheet Flow on Gravel** n= 0.215 P2= 3.00"
0.3	82	0.0100	5.4	4.21	**Circular Channel (pipe), 12" SD from CB1 to CB2** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0
0.2	58	0.0100	5.4	4.21	**Circular Channel (pipe), !2" SD from CB2 to Cham** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0
8.4	245	Total			

Subcatchment 5S: Lot north of Site

Runoff = 0.84 cfs @ 12.04 hrs, Volume= 0.071 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.100	77	WOODS GOOD
0.030	91	Gravel roads, HSG D
0.020	93	Paved roads w/open ditches, HSG D
0.060	98	Paved parking & roofs
0.210	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	80	0.0440	0.2		**Sheet Flow, Edge of Building to Swale** Grass: Short n= 0.150 P2= 3.00"
0.3	40	0.0750	1.9		**Shallow Concentrated Flow, Ditch at end of RR T** Short Grass Pasture Kv= 7.0 fps
0.1	40	0.0250	9.8	12.07	**Circular Channel (pipe), Culvert under Driveway** Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0
6.6	160	Total			

Reach 1: Point of Interest

Inflow Area = 2.530 ac, Inflow Depth = 3.52"
Inflow = 6.25 cfs @ 12.10 hrs, Volume= 0.743 af
Outflow = 6.25 cfs @ 12.10 hrs, Volume= 0.743 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Reach 2: Channel to POI

Inflow Area = 0.830 ac, Inflow Depth = 3.37"
Inflow = 2.39 cfs @ 12.05 hrs, Volume= 0.233 af
Outflow = 2.25 cfs @ 12.07 hrs, Volume= 0.234 af, Atten= 6%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.9 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.12'
Capacity at bank full= 1,628.01 cfs
Inlet Invert= 61.00', Outlet Invert= 58.00'
10.00' x 5.00' deep channel, n= 0.050 Length= 45.0' Slope= 0.0667 '/'
Side Slope Z-value= 2.0 '/'

Reach 3: Channel to Reach 2

Inflow Area = 0.430 ac, Inflow Depth = 3.68"
Inflow = 1.55 cfs @ 12.09 hrs, Volume= 0.132 af
Outflow = 1.38 cfs @ 12.17 hrs, Volume= 0.132 af, Atten= 11%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.2 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 4.7 min

Peak Depth= 0.12'
Capacity at bank full= 1,092.10 cfs
Inlet Invert= 67.00', Outlet Invert= 61.00'
10.00' x 5.00' deep channel, n= 0.050 Length= 200.0' Slope= 0.0300 '/'
Side Slope Z-value= 2.0 '/'

Reach 4A: Level Spreader

Inflow Area = 0.620 ac, Inflow Depth = 4.56"
Inflow = 1.10 cfs @ 12.35 hrs, Volume= 0.235 af
Outflow = 1.09 cfs @ 12.40 hrs, Volume= 0.235 af, Atten= 0%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.5 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 4.1 min

Peak Depth= 0.20'
Capacity at bank full= 5.09 cfs
Inlet Invert= 70.40', Outlet Invert= 47.00'
12.00' x 0.50' deep channel, n= 0.800 Length= 40.0' Slope= 0.5850 '/'

Reach 4B: Flow Stream from Chambers

Inflow Area = 0.620 ac, Inflow Depth = 4.55"
Inflow = 1.09 cfs @ 12.40 hrs, Volume= 0.235 af
Outflow = 1.09 cfs @ 12.47 hrs, Volume= 0.235 af, Atten= 0%, Lag= 4.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.8 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 4.7 min

Peak Depth= 0.14'
Capacity at bank full= 630.53 cfs
Inlet Invert= 47.00', Outlet Invert= 45.80'
10.00' x 5.00' deep channel, n= 0.050 Length= 120.0' Slope= 0.0100 '/'
Side Slope Z-value= 2.0 '/'

Reach 5: Culvert Discharge to Reach 3

Inflow Area = 0.210 ac, Inflow Depth = 4.04"
Inflow = 0.84 cfs @ 12.04 hrs, Volume= 0.071 af
Outflow = 0.82 cfs @ 12.08 hrs, Volume= 0.071 af, Atten= 3%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 2.2 min

Peak Depth= 0.10'
Capacity at bank full= 314.45 cfs
Inlet Invert= 73.00', Outlet Invert= 67.00'
5.00' x 2.50' deep channel, n= 0.050 Length= 90.0' Slope= 0.0667 '/'
Side Slope Z-value= 3.0 '/'

Reach 6: Pond Outlet Manhole Discharge

Inflow Area = 0.620 ac, Inflow Depth = 4.56"
Inflow = 1.10 cfs @ 12.35 hrs, Volume= 0.235 af
Outflow = 1.10 cfs @ 12.35 hrs, Volume= 0.235 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.9 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.49'
Capacity at bank full= 2.31 cfs
Inlet Invert= 70.56', Outlet Invert= 70.50'
12.0" Diameter Pipe n= 0.011 Length= 20.0' Slope= 0.0030 '/'

Pond Storage: Underground Storage

Inflow Area = 0.620 ac, Inflow Depth = 4.58"
Inflow = 2.67 cfs @ 12.08 hrs, Volume= 0.237 af
Outflow = 1.10 cfs @ 12.35 hrs, Volume= 0.235 af, Atten= 59%, Lag= 16.1 min
Primary = 1.10 cfs @ 12.35 hrs, Volume= 0.235 af

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Peak Elev= 72.31' Storage= 2,380 cf
Plug-Flow detention time= 31.3 min calculated for 0.235 af (100% of inflow)

Elevation (feet)	Cum.Store (cubic-feet)
70.71	0
71.21	426
71.71	1,330
72.21	2,220
72.71	3,036
73.21	3,759
73.71	4,293
74.21	4,719

Primary OutFlow Max=1.09 cfs @ 12.35 hrs HW=72.30' (Free Discharge)
↑—**1=Culvert** (Controls 1.09 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	70.71'	**6.0" x 10.0' long Culvert** Ke= 0.500 Outlet Invert= 70.66' S= 0.0050 '/' n= 0.011 Cc= 0.900

SECTION 9

TEMPORARY AND PERMANENT EROSION AND SEDIMENTATION CONTROL

9.0 Overview

See attached plan set Sheet 4 Grading, Drainage and Erosion Control Plan, and Sheet 3, Site Layout and Utilities Plan, for location of temporary and permanent erosion and sediment control measures.

SECTION 10

LANDSCAPE PLAN

10.0 Overview

The current site consists of primarily wooded areas. It is the intention of the owner to maintain the wooded environment around the proposed building.

To attain this goal, the owner or owner's representative will be working with the site contractor to minimize impact to the surrounding woods.

In areas where impact to the existing vegetation cannot be avoided, replacement trees and bushes that complement the existing surroundings will be planted.

Sebago Technics
Engineering Expertise You Can Build On

03P149

TO: **Kandi Talbot – Planner**

FROM: **Jim Seymour – Development Review Coordinator, Sebago Technics, Inc.**

RE: **Minor Site Plan Review: Thirsty Turf Irrigation – 19 Rice Street, Portland**

DATE: **August 12, 2003**

Sebago Technics has reviewed the Minor Site Plan application and supporting documentation for the proposed 6,000 square-foot warehouse to be located at 19 Rice Street in the City of Portland. We respectfully offer the following comments in outline format:

1. **Stormwater Management**

   A. It appears that there is not sufficient cover over the StormTech underground detention system. The invert of the proposed system is 70.71 feet. Adding 30 inches (2.5 feet) for the chamber profile, and 6 inches (0.5 foot) of stone over the chambers, brings the top of the system to an elevation of 73.71 feet. The minimum cover recommended by StormTech for its underground detention system is 18 inches (1.5 feet), which brings the minimum ground surface elevation over the system to 75.21 feet. According to the grading plan (Sheet 4), you have proposed the ground surface elevation over the system to range from approximately 74.2 to 76.8 feet. The grading in this vicinity should be revised in order to provide adequate cover over the system. This will help mitigate the possibility of pipe deflection, due to the fact that parking is proposed over the system.

   B. Overall, the stormwater modeling generally adheres to acceptable industry standards and, as such, meets the requirements of the Ordinance.

2. **Road Access/Circulation**

   A. The drawings indicate that a 15 foot wide access lane will be designed on the north side of the building and will be gated. The opposite end of the building has an opening of 18 feet, but it narrows to 8 feet from the parking space to the corner of the proposed dumpster pad. Either the pad or parking space should be moved to allow for more aisle space.

3. **Utilities**

A. The water and sewer services cross at approximately 30 feet north of the northwest corner of the proposed structure. The depth of cover for the water service is recommended to be 5.5 feet. As such, the top of pipe will be approximately 71.5 feet in this location. As shown, the sewer will cross over the water service. Therefore, we recommend encasing the sewer in concrete for a distance of 10 feet on both sides of the crossing, in accordance with generally accepted engineering practice.

4. **Grading & Erosion Controls**

A. The applicant proposed a gravel storage/parking lot at the building rear that should be paved. Given the proximity to the storm drain, sediment transport to the underground system could be problematic.

Overall, the development appears to be approvable, assuming that the design is revised in accordance with the two minor comments noted above. Please contact our office if you have any questions.

BGY/bgy:jc

Department of Planning & Development
Lee D. Urban, Director

CITY OF PORTLAND

Division Directors
Mark B. Adelson
Housing & Neighborhood Services

Alexander Q. Jaegerman, AICP
Planning

John N. Lufkin
Economic Development

February 13, 2003

Mr. Stephen Bushey, P.E.
De-Luca Hoffman Associates, Inc
778 Main Street
Suite 8
South Portland, ME 04106

RE: 19 Rice Street Development

CBL: 354 A006001

Dear Mr. Bushey:

On February 13, 2003, the Portland Planning Authority granted minor site plan approval for the construction of a warehouse/office building with associated site improvements in the vicinity of 19 Rice Street.

Where submission drawings are available in electronic form, the applicant shall submit any available electronic CADD.DXF files with seven sets of final plans.

The approval is based on the submitted site plan. If you need to make any modifications to the approved site plan, you must submit a revised site plan for staff review and approval.

Please note the following provisions and requirements for all site plan approvals:

1. The site plan approval will be deemed to have expired unless work in the development has commenced within one (1) year of the approval or within a time period agreed upon in writing by the City and the applicant. A one-year extension may be granted by this department if requested by the applicant in writing prior to the expiration date of the site plan.

2. A performance guarantee in a form acceptable to the City of Portland and an inspection fee equal to 2.0% of the performance guarantee will have to be posted before beginning any site construction or issuance of a building permit.

3. A defect guarantee, consisting of 10% of the performance guarantee, must be posted before the performance guarantee will be released.

389 Congress Street • Portland, Maine 04101 • (207) 874-8721 • FAX 756-8258 • TTY 874-8936

DeLUCA-HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS

75 MAIN STREET
SUITE 2
SOUTH PORTLAND, MAINE 04106
TEL: 207 775 1121
FAX 207 879 0896

- ROADWAY DESIGN
- ENVIRONMENTAL ENGINEERING
- TRAFFIC SITE DESIGN AND MANAGEMENT
- PERMITTING
- AIRPORT ENGINEERING
- SITE PLANNING
- CONSTRUCTION ADMINISTRATION

February 4, 2003

Mr. Jonathan Spence, Planner
Portland Planning Department
4th Floor
389 Congress Street
Portland, Maine 04101

RE: 19 Rice Street Development
Applicant: Gringolet Associates
Response to Engineering Peer Review Comments

Dear Jonathan:

DeLuca-Hoffman Associates, Inc. has reviewed the comments from Jim Seymour on the Rice Street project and offers the following responses in order of comments contained in the December 31, 2002 letter.

Comment 1 – Stormwater Management

The drainage appears to be handled by two different watershed areas. The main area collects both building and parking area runoff and detains in a proposed pond located at the southwesterly end of the site at the top of a large embankment. The revised plans have reworked the grading and drainage outlets to address our earlier design questions. Our only remaining concern with the pond is that it has shown an eight-inch culvert for a main outlet. This is acceptable, but is a small culvert that may be prone to leaf/debris clogging and, given the sensitive area due to slopes and soil conditions, we encourage a maintenance plan for the pond that discusses routine maintenance and inspections. This plan should be attached for review prior to construction starting.

Since the abutters adjacent to the pond were not willing to cooperate with a drainage easement for the rights to drain across their lot, the pond outlet location was required to be altered. A similar condition exists on the opposite side of the site next to the old railroad tracks. The grading and drainage improvements are actually on the abutter's lot (Theodore H. Brodie, et al. TRS). I agree that the improvements are benefiting everyone, but have permission or rights been obtained to work on this property? Since this application is old, rights may have been provided before but need to be checked again.

The applicants (in their letter dated December 12th) have stated that they meet the stormwater quantity rates in all storms but the 2 year. Our review determined that the applicant may have "double counted" one reach (Reach 3). It appears that it was counted in Watershed 2 as Channel Flow and as Reach 3. This mistake, when corrected, will likely help the applicant come

in compliance with the 2 year storm values. Therefore we request the applicant check the calculation, but see no problem with the design. The revised calculation for the 2 year pre-developed shall be submitted for the City's file prior to construction, or as deemed appropriate by staff.

Response:

We have reviewed the drainage computations and have rerun the calculations based on the correction suggested by Mr. Seymour, as well as data entry corrections identified by us. We find that the revised computations slightly revise the flows at the point of analysis; however, the overall conclusions remain the same. As shown in the following table, the postdevelopment 2-year discharge still is slightly over the predevelopment rate. It is our opinion, however, that this small increase is insignificant and we thereby request approval for the system as designed.

Summary of Discharges (cfs)		
Storm	**Predevelopment**	**Postdevelopment**
2 Year	2.53	2.65
10 Year	5.60	5.15
25 Year	7.13	6.41

The revised computations are attached to this letter.

Comment 2 – Road Access/Circulation:

The width of the shoulder on the driveway access at the first culvert crossing shall be delineated on the plan. It appears that a steep slope of 1 to 1 will be required. A short run of guardrail may be needed on the western side of the road at this location due to the lack of shoulder and slope starting the edge of pavement.

Response:

DeLuca-Hoffman Associates, Inc. has added 50 LF of timber guiderail along the entrance driveway.

Comment 3 – Utilities:

No updated utility plans were submitted for our review, but it appears that no significant changes have been made. We noted previously that there was a utility conflict between the sewer and the culvert that should be checked to assure that the conflict has been addressed.

Response:

The utility conflict had been corrected previously. No further revisions have been proposed for the utility plan.

Comment 4 – Grading & Erosion Controls:

The grading along the southeast corner of the structure needs more detail grading. The current plan shows a contour at elevation 79 crossing the building corner. Since the finish floor is also 79, this may be a problem. I would recommend tying the grading of elevation 79 just off the building corner and, with the swale or ditch proposed, the runoff should be conveyed away from the building.

The small retaining wall proposed at the end of the parking lot shows an incorrect spot grade on the southeast end of the wall. We believe that the spot grade is off by 1 foot and may be just a labeling error. Please have the engineer show or confirm the final grading at this location.

All silt fencing shall be kept on the applicant's property. Some fencing is shown over the property line and on the land of Joseph Stephen Co.

Response:

DeLuca-Hoffman Associates, Inc. has revised the grading at the corner of the building and corrected the spot grade along the retaining wall adjacent to the pavement area. We have also revised the silt fence location to be entirely on the applicant's property. A copy of a Temporary Grading Rights agreement is also attached to this submission. The Temporary Grading Rights agreement has been signed by the neighboring property owner to allow the grading and culvert installation along the southeast side of the driveway.

We trust that these responses adequately address these final issues and that a final approval of the project will be forthcoming shortly. We appreciate your patience and time on this project.

Sincerely,

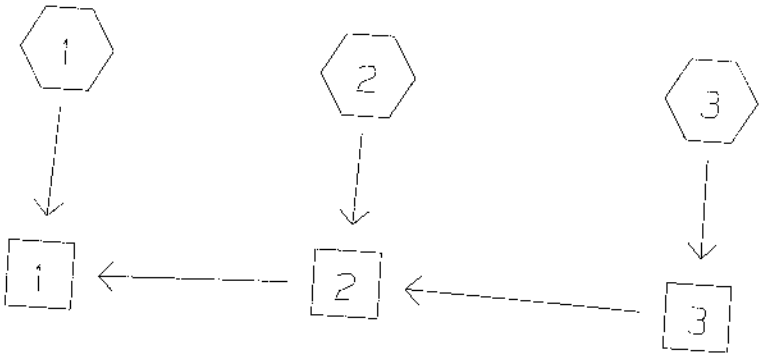
DeLUCA-HOFFMAN ASSOCIATES, INC.

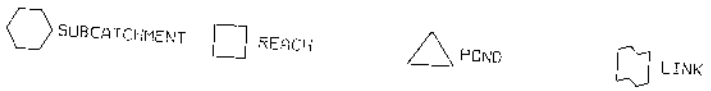
Stephen Bushey, PE
Senior Engineer

SRB/sq/JN2189/Spence2-3-03

Attachments

WATERSHED ROUTING ==========





SUBCATCHMENT 1	=	
SUBCATCHMENT 2	=	-> REACH 1
SUBCATCHMENT 3	=	-> REACH 2
REACH 1	=	-> REACH 3
REACH 2	=	->
REACH 3	=	-> REACH 1
		-> REACH 2

SUBCATCHMENT 1

PEAK= 1.06 CFS @ 12.11 HRS, VOLUME= .09 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW		
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'	Segment ID:AB	8.7
SHALLOW CONCENTRATED/UPLAND FLOW		
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps	Segment ID:	.1
RECT/VEE/TRAP CHANNEL		
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'	Segment ID:	
s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs		.9
Total Length= 605 ft	Total Tc=	9.7

SUBCATCHMENT 2

PEAK= .58 CFS @ 12.18 HRS, VOLUME= .06 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW		
Grass: Short n=.15 L=70' P2=3 in s=.0169 '/'	Segment ID:	8.1
TR-55 SHEET FLOW		
Grass: Short n=.15 L=80' P2=3 in s=.0471 '/'	Segment ID:	6.0
SHALLOW CONCENTRATED/UPLAND FLOW		
Short Grass Pasture Kv=7 L=85' s=.2113 '/' V=3.22 fps	Segment ID:	.4
RECT/VEE/TRAP CHANNEL		
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'	Segment ID:	
s=.0603 '/' n=.05 V=15.48 fps L=170' Capacity=1548.3 cfs		.2
Total Length= 405 ft	Total Tc=	14.7

SUBCATCHMENT 3

PEAK= 1.01 CFS @ 12.11 HRS, VOLUME= .09 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	8.7
Grass: Short n=.15 L=110' P2=3 in s=.0356 '/'		
RECT/VEE/TRAP CHANNEL	Segment ID:	1.4
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374'		
s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=115' Capacity=1548.3 cfs		
	Total Length= 350 ft Total Tc=	10.2

REACH 1

Not described

Qin = 2.53 CFS @ 12.13 HRS, VOLUME= .24 AF
Qout= 2.53 CFS @ 12.13 HRS, VOLUME= .24 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 1.52 CFS @ 12.15 HRS, VOLUME= .14 AF
Qout= 1.47 CFS @ 12.15 HRS, VOLUME= .14 AF, ATTEN= 3%, LAG= .3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .03 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

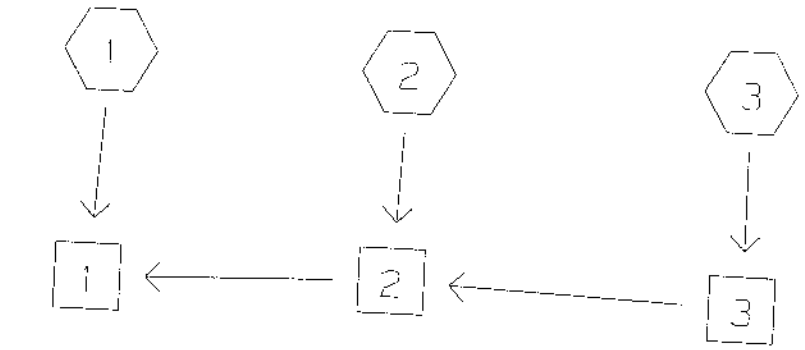
Qin = 1.01 CFS @ 12.11 HRS, VOLUME= .09 AF
Qout= .95 CFS @ 12.14 HRS, VOLUME= .09 AF, ATTEN= 6%, LAG= 1.5 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .02 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

WATERSHED ROUTING



SUBCATCHMENT REACH POND LINK

SUBCATCHMENT 1	=	-> REACH 1
SUBCATCHMENT 2	=	-> REACH 2
SUBCATCHMENT 3	=	-> REACH 3
REACH 1	=	->
REACH 2	=	-> REACH 1
REACH 3	=	-> REACH 2

SUBCATCHMENT 1

PEAK= 2.42 CFS @ 12.10 HRS, VOLUME= .20 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:AB**	
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'		8.7
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps		.1
RECT/VEE/TRAP CHANNEL	**Segment ID:**	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs		.9
	Total Length= 605 ft	Total Tc= 9.7

SUBCATCHMENT 2

PEAK= 1.32 CFS @ 12.17 HRS, VOLUME= .13 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	
Grass: Short n=.15 L=70' P2=3 in s=.0169 '/'		8.1
TR-55 SHEET FLOW	**Segment ID:**	
Grass: Short n=.15 L=80' P2=3 in s=.0471 '/'		6.0
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	
Short Grass Pasture Kv=7 L=85' s=.2113 '/' V=3.22 fps		.4
RECT/VEE/TRAP CHANNEL	**Segment ID:**	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=170' Capacity=1548.3 cfs		.2
	Total Length= 405 ft	Total Tc= 14.7

SUBCATCHMENT 3

PEAK= 2.07 CFS @ 12.10 HRS, VOLUME= .18 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	8.7
Grass: Short n=.15 L=110' P2=3 in s=.0356 '/'		
RECT/VEE/TRAP CHANNEL	Segment ID:	1.4
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374' s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=115' Capacity=1548.3 cfs		
	Total Length= 350 ft Total Tc=	10.2

REACH 1

Not described

Qin = 5.60 CFS @ 12.12 HRS, VOLUME= .51 AF
Qout= 5.60 CFS @ 12.12 HRS, VOLUME= .51 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 3.27 CFS @ 12.14 HRS, VOLUME= .30 AF
Qout= 3.23 CFS @ 12.14 HRS, VOLUME= .30 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .07 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

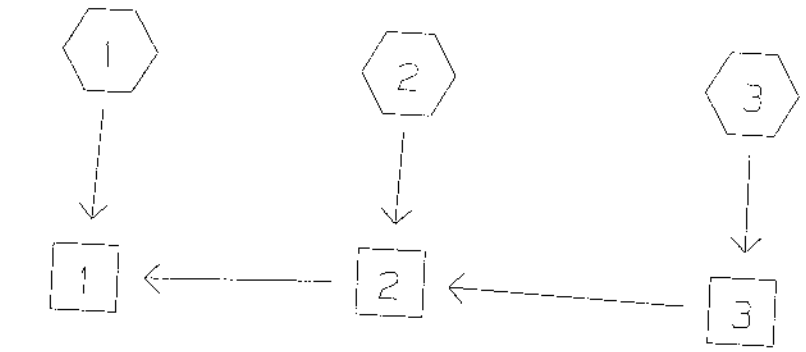
Qin = 2.07 CFS @ 12.10 HRS, VOLUME= .18 AF
Qout= 1.96 CFS @ 12.13 HRS, VOLUME= .18 AF, ATTEN= 5%, LAG= 1.4 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .04 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

WATERSHED ROUTING ==========



SUBCATCHMENT 1	=	
SUBCATCHMENT 2	=	-> REACH 1
SUBCATCHMENT 3	=	-> REACH 2
REACH 1	=	-> REACH 3
REACH 2	=	->
REACH 3	=	-> REACH 1
		-> REACH 2

SUBCATCHMENT 1

PEAK= 3.11 CFS @ 12.10 HRS, VOLUME= .26 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'	Segment ID:AB	8.7
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps	Segment ID:	.1
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs	Segment ID:	.9
	Total Length= 605 ft	Total Tc= 9.7

SUBCATCHMENT 2

PEAK= 1.69 CFS @ 12.16 HRS, VOLUME= .17 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=70' P2=3 in s=.0169 '/'	Segment ID:	8.1
TR-55 SHEET FLOW Grass: Short n=.15 L=80' P2=3 in s=.0471 '/'	Segment ID:	6.0
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=85' s=.2113 '/' V=3.22 fps	Segment ID:	.4
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=170' Capacity=1548.3 cfs	Segment ID:	.2
	Total Length= 405 ft	Total Tc= 14.7

SUBCATCHMENT 3

PEAK= 2.58 CFS @ 12.10 HRS, VOLUME= .22 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=110' P2=3 in s=.0356 '/'	Segment ID:	8.7
RECT/VEE/TRAP CHANNEL W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374' s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs	Segment ID:	1.4
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs	Segment ID:	0.0
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=115' Capacity=1548.3 cfs	Segment ID:	.1
	Total Length= 350 ft Total Tc=	10.2

REACH 1

Not described

Qin = 7.13 CFS @ 12.12 HRS, VOLUME= .65 AF
Qout= 7.13 CFS @ 12.12 HRS, VOLUME= .63 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 4.14 CFS @ 12.14 HRS, VOLUME= .39 AF
Qout= 4.08 CFS @ 12.14 HRS, VOLUME= .39 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .08 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

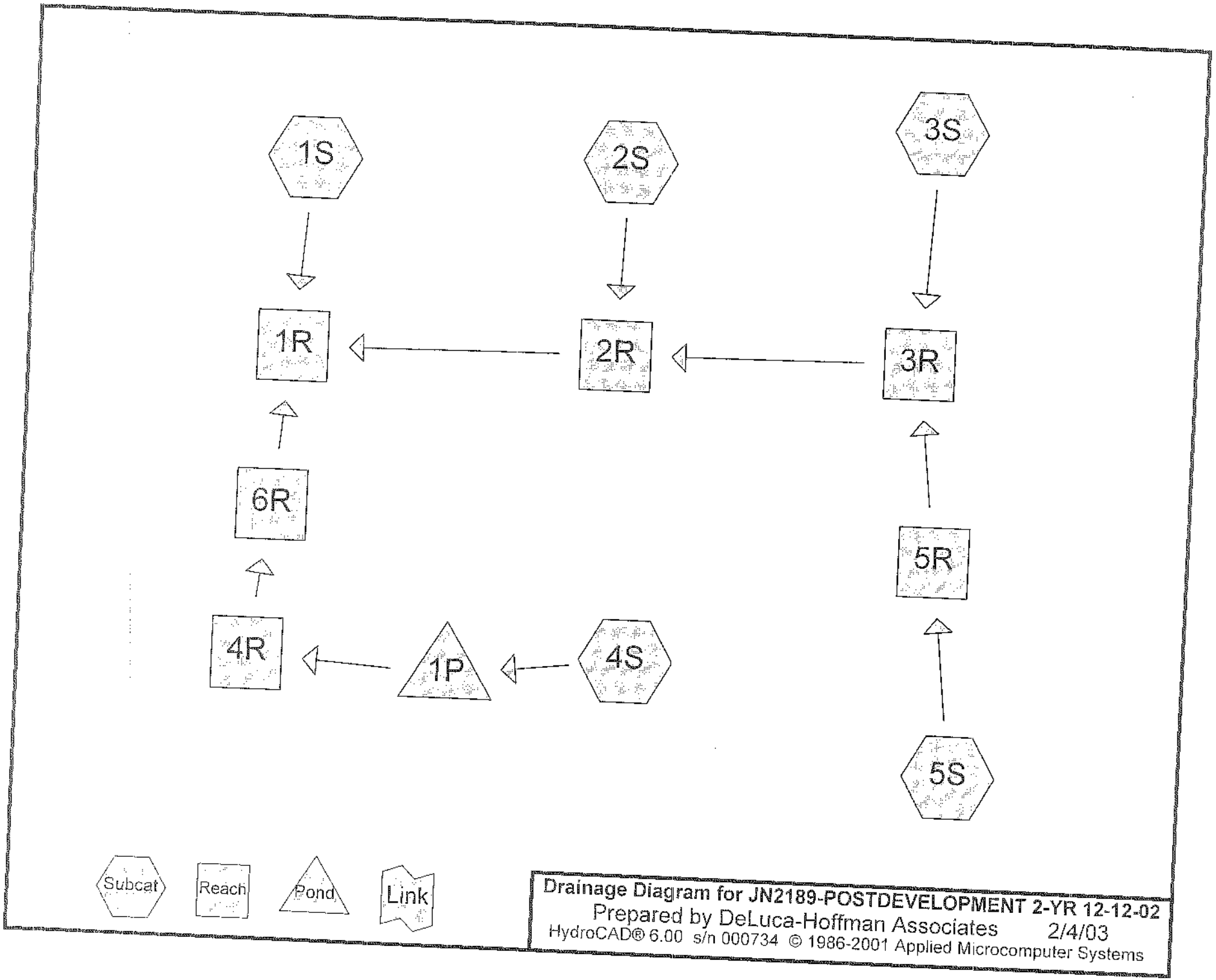
REACH 3

Qin = 2.58 CFS @ 12.10 HRS, VOLUME= .22 AF
Qout= 2.45 CFS @ 12.13 HRS, VOLUME= .22 AF, ATTEN= 5%, LAG= 1.4 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .05 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS



Drainage Diagram for JN2189-POSTDEVELOPMENT 2-YR 12-12-02
Prepared by DeLuca-Hoffman Associates 2/4/03

Time span=0.00-25.00 hrs, dt=0.10 hrs, 251 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=3.00"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S:
Tc=9.7 min CN=77 Area=0.900 ac Runoff= 0.93 cfs 0.080 af

Subcatchment 2S:
Tc=3.8 min CN=77 Area=0.310 ac Runoff= 0.37 cfs 0.028 af

Subcatchment 3S:
Tc=7.5 min CN=77 Area=0.260 ac Runoff= 0.27 cfs 0.023 af

Subcatchment 4S:
Tc=5.0 min CN=97 Area=0.610 ac Runoff= 1.65 cfs 0.135 af

Subcatchment 5S:
Tc=8.7 min CN=88 Area=0.350 ac Runoff= 0.64 cfs 0.053 af

Reach 1R:
Inflow= 2.65 cfs 0.320 af
Outflow= 2.65 cfs 0.320 af

Reach 2R:
Length= 45.0' Max Vel= 1.3 fps Capacity= 1,547.33 cfs Inflow= 1.01 cfs 0.104 af
Outflow= 1.00 cfs 0.104 af

Reach 3R:
Length= 200.0' Max Vel= 1.3 fps Capacity= 1,546.33 cfs Inflow= 0.89 cfs 0.076 af
Outflow= 0.81 cfs 0.076 af

Reach 4R:
Length= 55.0' Max Vel= 1.5 fps Capacity= 133.78 cfs Inflow= 0.85 cfs 0.135 af
Outflow= 0.84 cfs 0.135 af

Reach 5R:
Length= 85.0' Max Vel= 2.0 fps Capacity= 521.90 cfs Inflow= 0.64 cfs 0.053 af
Outflow= 0.62 cfs 0.053 af

Reach 6R: (new node)
Length= 130.0' Max Vel= 0.9 fps Capacity= 900.23 cfs Inflow= 0.84 cfs 0.135 af
Outflow= 0.83 cfs 0.135 af

Pond 1P: POND 1
Peak Storage= 589 cf Inflow= 1.65 cfs 0.135 af
Primary= 0.85 cfs 0.135 af Outflow= 0.85 cfs 0.135 af

Runoff Area = 2.430 ac Volume = 0.319 af Average Depth = 1.58"

Subcatchment 1S:

Runoff = 0.93 cfs @ 12.11 hrs, Volume= 0.080 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.880	77	WOODS GOOD
0.020	91	GRAVEL
0.900	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	115	0.0391	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	30	0.6333	5.6		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.9	460	0.0204	9.0	900.57	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
9.7	605	Total			

Subcatchment 2S:

Runoff = 0.37 cfs @ 12.02 hrs, Volume= 0.028 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.310	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	70	0.1286	0.3		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	20	0.6900	5.8		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.1	80	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
3.8	170	Total			

Subcatchment 3S:

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.023 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.260	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	90	0.0400	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.4	110	0.0073	4.9	1,482.54	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 10.0 '/' n= 0.050
0.0	15	0.4667	43.1	4,307.47	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
0.1	115	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
7.5	330	Total			

Subcatchment 4S:

Runoff = 1.65 cfs @ 12.02 hrs, Volume= 0.135 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.040	80	OPEN SPACE
0.570	98	IMPERVIOUS
0.610	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Segment ID:**

Subcatchment 5S:

Runoff = 0.64 cfs @ 12.09 hrs, Volume= 0.053 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.140	77	WOODS GOOD
0.090	91	GRAVEL
0.120	98	IMPERVIOUS
0.350	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0310	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.2	30	0.1030	2.2		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
8.7	130	Total			

Reach 1R:

Inflow = 2.65 cfs @ 12.14 hrs, Volume= 0.320 af
Outflow = 2.65 cfs @ 12.14 hrs, Volume= 0.320 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Reach 2R:

Inflow = 1.01 cfs @ 12.16 hrs, Volume= 0.104 af
Outflow = 1.00 cfs @ 12.17 hrs, Volume= 0.104 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.3 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.8 min

Peak Depth= 0.07'
Capacity at bank full= 1,547.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 45.0' Slope= 0.0602 '/'
Side Slope Z-value= 2.0 '/'

Reach 3R:

Inflow = 0.89 cfs @ 12.10 hrs, Volume= 0.076 af
Outflow = 0.81 cfs @ 12.18 hrs, Volume= 0.076 af, Atten= 10%, Lag= 5.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.3 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 3.4 min

Peak Depth= 0.07'
Capacity at bank full= 1,548.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 200.0' Slope= 0.0603 '/'
Side Slope Z-value= 2.0 '/'

Reach 4R:

Inflow = 0.85 cfs @ 12.20 hrs, Volume= 0.135 af
Outflow = 0.84 cfs @ 12.22 hrs, Volume= 0.135 af, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.5 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 1.6 min

Peak Depth= 0.03'
Capacity at bank full= 133.78 cfs
20.00' x 0.50' deep channel, n= 0.050 Length= 55.0' Slope= 0.3333 '/'
Side Slope Z-value= 20.0 '/'

Reach 5R:

Inflow	=	0.64 cfs @	12.09 hrs, Volume=	0.053 af
Outflow	=	0.62 cfs @	12.11 hrs, Volume=	0.053 af, Atten= 2%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.0 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 1.3 min

Peak Depth= 0.06'
Capacity at bank full= 521.90 cfs
5.00' x 2.50' deep channel, n= 0.050 Length= 85.0' Slope= 0.1836 '/'
Side Slope Z-value= 3.0 '/'

Reach 6R: (new node)

Inflow	=	0.84 cfs @	12.22 hrs, Volume=	0.135 af
Outflow	=	0.83 cfs @	12.30 hrs, Volume=	0.135 af, Atten= 1%, Lag= 4.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.9 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 3.7 min

Peak Depth= 0.09'
Capacity at bank full= 900.23 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 130.0' Slope= 0.0204 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: POND 1

Inflow	=	1.65 cfs @	12.02 hrs, Volume=	0.135 af
Outflow	=	0.85 cfs @	12.20 hrs, Volume=	0.135 af, Atten= 49%, Lag= 11.0 min
Primary	=	0.85 cfs @	12.20 hrs, Volume=	0.135 af

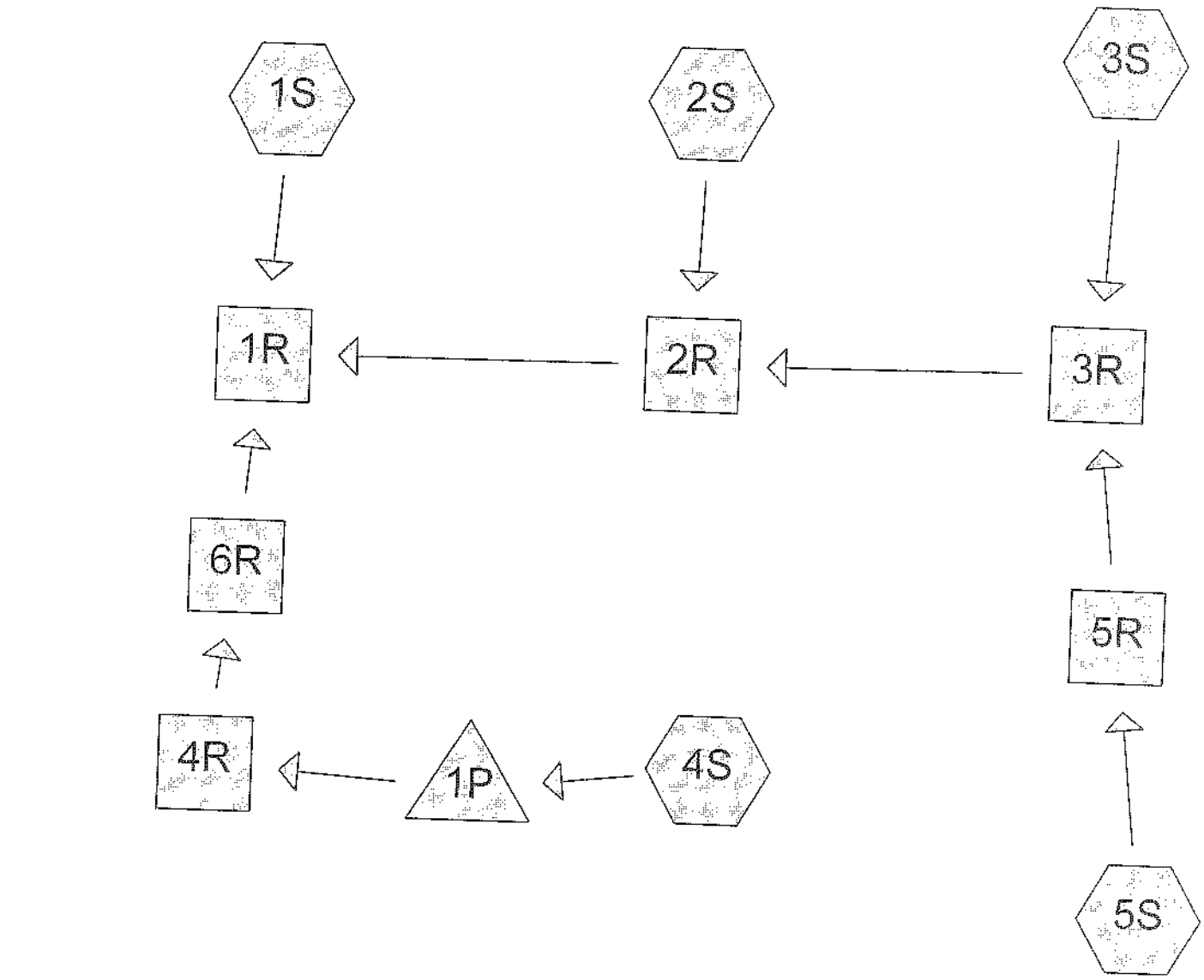
Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Peak Elev= 72.40' Storage= 589 cf
Plug-Flow detention time= 3.5 min calculated for 0.135 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	1,266	0	0
73.00	1,663	1,465	1,465
74.00	2,096	1,880	3,344
74.50	2,309	1,101	4,445

Primary OutFlow (Free Discharge)
↑—1=Orifice/Grate

#	Routing	Invert	Outlet Devices
1	Primary	71.40'	**6.0" Vert. Orifice/Grate** C= 0.620



Subcat Reach Pond Link

Drainage Diagram for JN2189-POSTDEVELOPMENT 10-YR 12-12-02

Prepared by DeLuca-Hoffman Associates 2/4/03

Time span=0.00-25.00 hrs, dt=0.10 hrs, 251 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=4.70"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S:
Tc=9.7 min CN=77 Area=0.900 ac Runoff= 2.12 cfs 0.178 af

Subcatchment 2S:
Tc=3.8 min CN=77 Area=0.310 ac Runoff= 0.86 cfs 0.061 af

Subcatchment 3S:
Tc=7.5 min CN=77 Area=0.260 ac Runoff= 0.62 cfs 0.051 af

Subcatchment 4S:
Tc=5.0 min CN=97 Area=0.610 ac Runoff= 2.63 cfs 0.221 af

Subcatchment 5S:
Tc=8.7 min CN=88 Area=0.350 ac Runoff= 1.16 cfs 0.099 af

Reach 1R:
Inflow= 5.15 cfs 0.611 af
Outflow= 5.15 cfs 0.611 af

Reach 2R:
Inflow= 2.11 cfs 0.211 af
Length= 45.0' Max Vel= 1.7 fps Capacity= 1,547.33 cfs Outflow= 2.08 cfs 0.212 af

Reach 3R:
Inflow= 1.75 cfs 0.150 af
Length= 200.0' Max Vel= 1.6 fps Capacity= 1,548.33 cfs Outflow= 1.59 cfs 0.150 af

Reach 4R:
Inflow= 1.12 cfs 0.221 af
Length= 55.0' Max Vel= 1.7 fps Capacity= 133.78 cfs Outflow= 1.11 cfs 0.221 af

Reach 5R:
Inflow= 1.16 cfs 0.099 af
Length= 85.0' Max Vel= 2.5 fps Capacity= 521.90 cfs Outflow= 1.14 cfs 0.099 af

Reach 6R: (new node)
Inflow= 1.11 cfs 0.221 af
Length= 130.0' Max Vel= 1.0 fps Capacity= 900.23 cfs Outflow= 1.11 cfs 0.221 af

Pond 1P: POND 1
Peak Storage= 1,418 cf Inflow= 2.63 cfs 0.221 af
Primary= 1.12 cfs 0.221 af Outflow= 1.12 cfs 0.221 af

Runoff Area = 2.430 ac Volume = 0.611 af Average Depth = 3.02"

Subcatchment 1S:

Runoff = 2.12 cfs @ 12.10 hrs, Volume= 0.178 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.880	77	WOODS GOOD
0.020	91	GRAVEL
0.900	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	115	0.0391	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	30	0.6333	5.6		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.9	460	0.0204	9.0	900.57	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
9.7	605	Total			

Subcatchment 2S:

Runoff = 0.86 cfs @ 12.01 hrs, Volume= 0.061 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.310	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	70	0.1286	0.3		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	20	0.6900	5.8		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.1	80	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
3.8	170	Total			

Subcatchment 3S:

Runoff = 0.62 cfs @ 12.08 hrs, Volume= 0.051 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.260	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	90	0.0400	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.4	110	0.0073	4.9	1,482.54	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 10.0 '/' n= 0.050
0.0	15	0.4667	43.1	4,307.47	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
0.1	115	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
7.5	330	Total			

Subcatchment 4S:

Runoff = 2.63 cfs @ 12.02 hrs, Volume= 0.221 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.040	80	OPEN SPACE
0.570	98	IMPERVIOUS
0.610	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Segment ID:**

Subcatchment 5S:

Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.099 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.140	77	WOODS GOOD
0.090	91	GRAVEL
0.120	98	IMPERVIOUS
0.350	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0310	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.2	30	0.1030	2.2		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
8.7	130	Total			

Reach 1R:

Inflow = 5.15 cfs @ 12.12 hrs, Volume= 0.611 af
Outflow = 5.15 cfs @ 12.12 hrs, Volume= 0.611 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Reach 2R:

Inflow = 2.11 cfs @ 12.10 hrs, Volume= 0.211 af
Outflow = 2.08 cfs @ 12.12 hrs, Volume= 0.212 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.7 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.12'
Capacity at bank full= 1,547.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 45.0' Slope= 0.0602 '/'
Side Slope Z-value= 2.0 '/'

Reach 3R:

Inflow = 1.75 cfs @ 12.09 hrs, Volume= 0.150 af
Outflow = 1.59 cfs @ 12.15 hrs, Volume= 0.150 af, Atten= 9%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 3.4 min

Peak Depth= 0.10'
Capacity at bank full= 1,548.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 200.0' Slope= 0.0603 '/'
Side Slope Z-value= 2.0 '/'

Reach 4R:

Inflow = 1.12 cfs @ 12.24 hrs, Volume= 0.221 af
Outflow = 1.11 cfs @ 12.26 hrs, Volume= 0.221 af, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.7 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 1.4 min

Peak Depth= 0.03'
Capacity at bank full= 133.78 cfs
20.00' x 0.50' deep channel, n= 0.050 Length= 55.0' Slope= 0.3333 '/'
Side Slope Z-value= 20.0 '/'

Reach 5R:

Inflow	=	1.16 cfs @	12.09 hrs, Volume=	0.099 af
Outflow	=	1.14 cfs @	12.10 hrs, Volume=	0.099 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.5 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 1.3 min

Peak Depth= 0.09'
Capacity at bank full= 521.90 cfs
5.00' x 2.50' deep channel, n= 0.050 Length= 85.0' Slope= 0.1836 '/'
Side Slope Z-value= 3.0 '/'

Reach 6R: (new node)

Inflow	=	1.11 cfs @	12.26 hrs, Volume=	0.221 af
Outflow	=	1.11 cfs @	12.33 hrs, Volume=	0.221 af, Atten= 0%, Lag= 4.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.0 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 3.7 min

Peak Depth= 0.11'
Capacity at bank full= 900.23 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 130.0' Slope= 0.0204 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: POND 1

Inflow	=	2.63 cfs @	12.02 hrs, Volume=	0.221 af
Outflow	=	1.12 cfs @	12.24 hrs, Volume=	0.221 af, Atten= 57%, Lag= 13.5 min
Primary	=	1.12 cfs @	12.24 hrs, Volume=	0.221 af

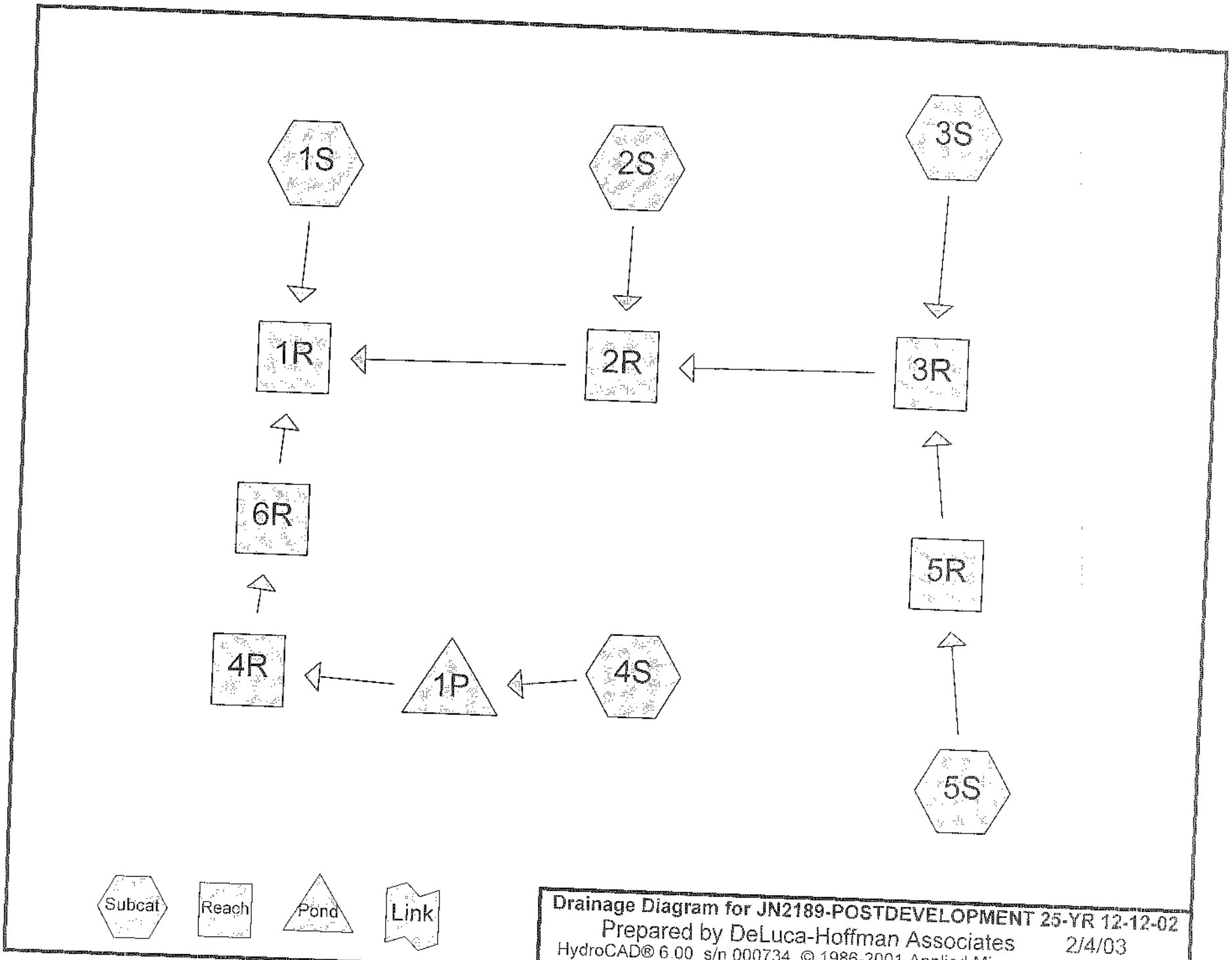
Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Peak Elev= 72.97' Storage= 1,418 cf
Plug-Flow detention time= 6.8 min calculated for 0.220 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	1,266	0	0
73.00	1,663	1,465	1,465
74.00	2,096	1,880	3,344
74.50	2,309	1,101	4,445

Primary OutFlow (Free Discharge)
↑—1=Orifice/Grate

#	Routing	Invert	Outlet Devices
1	Primary	71.40'	**6.0" Vert. Orifice/Grate** C= 0.620



Drainage Diagram for JN2189-POSTDEVELOPMENT 25-YR 12-12-02
Prepared by DeLuca-Hoffman Associates 2/4/03

Time span=0.00-25.00 hrs, dt=0.10 hrs, 251 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=5.50"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Tc=9.7 min CN=77 Area=0.900 ac Runoff= 2.72 cfs 0.228 af

Subcatchment 2S: Tc=3.8 min CN=77 Area=0.310 ac Runoff= 1.10 cfs 0.079 af

Subcatchment 3S: Tc=7.5 min CN=77 Area=0.260 ac Runoff= 0.79 cfs 0.066 af

Subcatchment 4S: Tc=5.0 min CN=97 Area=0.610 ac Runoff= 3.08 cfs 0.262 af

Subcatchment 5S: Tc=8.7 min CN=88 Area=0.350 ac Runoff= 1.41 cfs 0.121 af

Reach 1R: Inflow= 6.41 cfs 0.756 af
Outflow= 6.41 cfs 0.756 af

Reach 2R: Length= 45.0' Max Vel= 1.9 fps Capacity= 1,547.33 cfs Inflow= 2.69 cfs 0.266 af
Outflow= 2.65 cfs 0.266 af

Reach 3R: Length= 200.0' Max Vel= 1.8 fps Capacity= 1,548.33 cfs Inflow= 2.17 cfs 0.187 af
Outflow= 2.00 cfs 0.187 af

Reach 4R: Length= 55.0' Max Vel= 1.7 fps Capacity= 133.78 cfs Inflow= 1.22 cfs 0.262 af
Outflow= 1.21 cfs 0.262 af

Reach 5R: Length= 85.0' Max Vel= 2.6 fps Capacity= 521.90 cfs Inflow= 1.41 cfs 0.121 af
Outflow= 1.38 cfs 0.121 af

Reach 6R: (new node) Length= 130.0' Max Vel= 1.0 fps Capacity= 900.23 cfs Inflow= 1.21 cfs 0.262 af
Outflow= 1.21 cfs 0.262 af

Pond 1P: POND 1 Peak Storage= 1,836 cf Inflow= 3.08 cfs 0.262 af
Primary= 1.22 cfs 0.262 af Outflow= 1.22 cfs 0.262 af

Runoff Area = 2.430 ac Volume = 0.756 af Average Depth = 3.73"

Subcatchment 1S:

Runoff = 2.72 cfs @ 12.10 hrs, Volume= 0.228 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.880	77	WOODS GOOD
0.020	91	GRAVEL
0.900	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	115	0.0391	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	30	0.6333	5.6		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.9	460	0.0204	9.0	900.57	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
9.7	605	Total			

Subcatchment 2S:

Runoff = 1.10 cfs @ 12.01 hrs, Volume= 0.079 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.310	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	70	0.1286	0.3		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	20	0.6900	5.8		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.1	80	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
3.8	170	Total			

Subcatchment 3S:

Runoff = 0.79 cfs @ 12.08 hrs, Volume= 0.066 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.260	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	90	0.0400	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.4	110	0.0073	4.9	1,482.54	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 10.0 '/' n= 0.050
0.0	15	0.4667	43.1	4,307.47	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
0.1	115	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
7.5	330	Total			

Subcatchment 4S:

Runoff = 3.08 cfs @ 12.02 hrs, Volume= 0.262 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.040	80	OPEN SPACE
0.570	98	IMPERVIOUS
0.610	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Segment ID:**

Subcatchment 5S:

Runoff = 1.41 cfs @ 12.09 hrs, Volume= 0.121 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.140	77	WOODS GOOD
0.090	91	GRAVEL
0.120	98	IMPERVIOUS
0.350	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0310	0.2		**Sheet Flow, Segment ID:**
					Grass: Short n= 0.150 P2= 3.00"
0.2	30	0.1030	2.2		**Shallow Concentrated Flow, Segment ID:**
					Short Grass Pasture Kv= 7.0 fps
8.7	130	Total			

Reach 1R:

Inflow = 6.41 cfs @ 12.11 hrs, Volume= 0.756 af
Outflow = 6.41 cfs @ 12.11 hrs, Volume= 0.756 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Reach 2R:

Inflow = 2.69 cfs @ 12.09 hrs, Volume= 0.266 af
Outflow = 2.65 cfs @ 12.10 hrs, Volume= 0.266 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.9 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.14'
Capacity at bank full= 1,547.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 45.0' Slope= 0.0602 '/'
Side Slope Z-value= 2.0 '/'

Reach 3R:

Inflow = 2.17 cfs @ 12.09 hrs, Volume= 0.187 af
Outflow = 2.00 cfs @ 12.14 hrs, Volume= 0.187 af, Atten= 8%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 3.3 min

Peak Depth= 0.12'
Capacity at bank full= 1,548.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 200.0' Slope= 0.0603 '/'
Side Slope Z-value= 2.0 '/'

Reach 4R:

Inflow = 1.22 cfs @ 12.26 hrs, Volume= 0.262 af
Outflow = 1.21 cfs @ 12.29 hrs, Volume= 0.262 af, Atten= 0%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.7 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 1.4 min

Peak Depth= 0.03'
Capacity at bank full= 133.78 cfs
20.00' x 0.50' deep channel, n= 0.050 Length= 55.0' Slope= 0.3333 '/'
Side Slope Z-value= 20.0 '/'

Reach 5R:

Inflow	=	1.41 cfs @	12.09 hrs, Volume=	0.121 af
Outflow	=	1.38 cfs @	12.10 hrs, Volume=	0.121 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.6 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 1.3 min

Peak Depth= 0.10'
Capacity at bank full= 521.90 cfs
5.00' x 2.50' deep channel, n= 0.050 Length= 85.0' Slope= 0.1836 '/'
Side Slope Z-value= 3.0 '/'

Reach 6R: (new node)

Inflow	=	1.21 cfs @	12.29 hrs, Volume=	0.262 af
Outflow	=	1.21 cfs @	12.35 hrs, Volume=	0.262 af, Atten= 0%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.0 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 3.6 min

Peak Depth= 0.12'
Capacity at bank full= 900.23 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 130.0' Slope= 0.0204 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: POND 1

Inflow	=	3.08 cfs @	12.02 hrs, Volume=	0.262 af
Outflow	=	1.22 cfs @	12.26 hrs, Volume=	0.262 af, Atten= 61%, Lag= 14.7 min
Primary	=	1.22 cfs @	12.26 hrs, Volume=	0.262 af

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Peak Elev= 73.20' Storage= 1,836 cf
Plug-Flow detention time= 8.3 min calculated for 0.261 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

DeLUCA-HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS

778 MAIN STREET
SUITE 8
SOUTH PORTLAND, MAINE 04106
TEL. 207 775 1121
FAX 207 879 0896

- ROADWAY DESIGN
- ENVIRONMENTAL ENGINEERING
- TRAFFIC STUDIES AND MANAGEMENT
- PERMITTING
- AIRPORT ENGINEERING
- SITE PLANNING
- CONSTRUCTION ADMINISTRATION

FAX COVER SHEET

February 6, 2003

This transmission consists of ___pages including this cover sheet.

Deliver To:	Company/Firm:	Phone Number:	Fax Number:
Jonathan Spence	**Portland Planning Dept**		

Our fax number is: (207) 879-0896

From: **Steve Bushey**

Subject:

Rice Street Development-Gringolet Associates

Message:
Jonathan,

The attached Temporary Grading Rights easement has been obtained from the adjacent landowner to allow the completion of grading work and the culvert installation under the proposed driveway. I trust that this is sufficient for approval.

If you do not receive all pages, please call (207) 775-1121.

TEMPORARY GRADING RIGHTS

I, [illegible], an authorized representative of [illegible] being the owners for the property located at Tax Map 354, Block A, Lot Number 4 of the City of Portland, by request and give to Gringolet Associates, and their Contractor, the temporary right to enter upon land outside of and adjoining the northwesterly boundary line of said property, for purposes necessary to complete drainage and grading improvements to the said adjoining land (to include any necessary excavating, placing of fill material, loaming, seeding, paving and other necessary incidental work) to conform to the adjacent site development within the limits as shown on a Plan Set titled "Warehouse/Office at Rice Street off riverside Industrial Parkway" prepared by DeLuca-Hoffman Associates, Inc. These grading rights are more fully identified on the attached Figure SK-1.

The Contractor shall be responsible for all surface restoration or any damages to land or structures.

Owner (or Agent for Owner)

Table 36.1 (Continued)

3

Hydrologic Group D

Soil Name	K factor (10" - 20")	Permissible Velocity Feet per second		Inflow Rate cfs/1000 ft. (Where water table exists)
		Bare	Vegetated	
Abram	-----	2.0	3.5	----
Aurelie	.17	2.0	3.5	.10
Beaches	.05	2.5	4.5	1.00
Benson	.17	2.0	3.5	----
Biddeford	.32	1.5	3.0	.05
Burnham	.28	1.5	3.0	.10
Easton	.37	1.5	3.0	.10
Gouldsboro	.37	1.5	3.0	.05
Lamoine	.49	1.5	3.0	.05
Lyme(Leicester)	.32	1.5	3.0	.10
Medomak (Saco)	.49	1.5	3.0	.05
Monarda	.28	2.0	3.5	.10
Peacham (Whitman)	.28	2.0	3.5	.10
Scantic	.49	1.5	3.5	.05
Schoodic	.17	2.0	3.5	----
Searsport (Scarboro)	.17	2.5	4.5	.15
Washburn	.24	2.0	3.5	.10
Whately	.28	2.0	3.5	.05

Hydrologic Group B/D

(Atherton)	.28	2.0	3.5	.15

Hydrologic Group C/D

Creasy	.28	1.5	3.0	----
Halsey	.24	2.0	3.5	.15
Lyman (Hollis)	.32	2.0	3.5	----
Mapleton, Stony	.20	2.0	3.5	1.00
Monson	.24	2.0	3.5	----
Swanton	.32	1.5	3.0	.05
Thorndike	.20	2.0	3.5	1.00

Mesic soil names appear in parenthesis

Miscellaneous land types are not assigned to a hydrologic group because of the variability of the soil material.

Organic soils and those soils mapped above an elevation of 2300 feet (cryic soils) do not appear on this list as they will require special considerations.

DeLUCA-HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS

778 MAIN STREET
SUITE 8
SOUTH PORTLAND, MAINE 04106
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- ENVIRONMENTAL ENGINEERING
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- SITE PLANNING
- CONSTRUCTION ADMINISTRATION

December 12, 2002

Mr. Jonathan Spence
Portland Planning Department
4TH Floor
389 Congress Street
Portland, Maine 04101

Subject: Warehouse/Office Building off Rice Street
Revisions to Site Plan and Grading Plans

Dear Mr. Spence:

On behalf of Gringolet Associates, DeLuca-Hoffman Associates, Inc is providing revised plans for their proposed development off Rice Street in Portland. As you will recall this project has previously been reviewed by the Planning Authority staff and generally has been found to be acceptable for approval. One condition of approval was that a drainage easement was necessary from the abutting landowner for the discharge of stormwater runoff across their property. Gringolet Associates has not been able to secure the drainage easement; therefore we have revised the detention pond design to keep the basin discharge on the applicant's property. We have also revised the plan to maintain a 25' setback from the top of the bank for the majority of the soils disturbances associated with the construction. This revision is in response to recent Natural Resources Protection Act rules changes. As a result, DeLuca-Hoffman Associates, Inc. has made the following changes to the proposed warehouse/office site off of Rice Street.

1. The outfall from pond 1 was moved from the abutting property to the applicant's property with a rip rap apron and level lip spreader constructed at the new outfall. The level lip spreader should be 12 feet in length and a minimum of 8 feet in width. The level spreader shall be constructed on undisturbed soils where possible. If fill is used, it shall be constructed to a material compaction of 95%. The receiving area below the level should not be disturbed. All disturbed areas shall be stabilized with erosion control netting installed in accordance with manufacturer's recommendations. The attached Figure A is a level lip spreader detail in accordance with the BMP manual. The level lip spreader reduces the twenty-five year storm velocity to 1.04 fps, which is well below the acceptable discharge velocity of 3.5 fps for Scantic soils.

2. The new outfall is at elevation 71, which is slightly higher than the original design. An adjustment has been made to the F.F.E. of the proposed building. The proposed building F.F.E. has been raised from elevation 78 to elevation 79. A modular block retaining wall is now proposed off the edge of pavement to compensate for the difference in elevation from the pavement to the basin.

3. The pavement limits have been reduced to create space for the detention basin outside of the 25' NRPA setback. As a result 3 parking spaces have been shifted to adjacent the building.

4. The grading has been modified to keep the limits of disturbance outside of the 25' NRPA setback.

Ten copies of the revised Site layout and Grading plans are provided with this package for your review and technical engineering review. Please advise this office if additional copies are required. Revised computer stormwater modeling computations have also been prepared and accompany this submittal. We trust that you will find the latest revisions reasonable and that the proposed development continues to satisfy the City's requirements.

If you have any questions please don't hesitate to call me at 775-1121.

Sincerely,

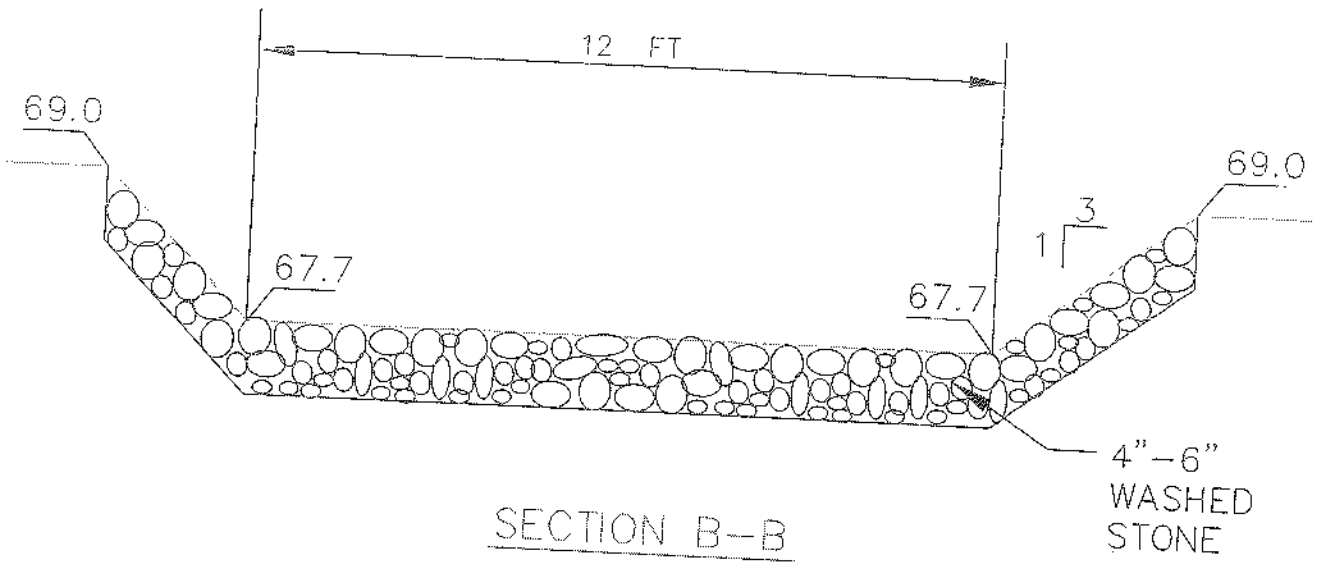
DeLUCA-HOFFMAN ASSOCIATES, INC.

Stephen Bushey, PE
Senior Engineer

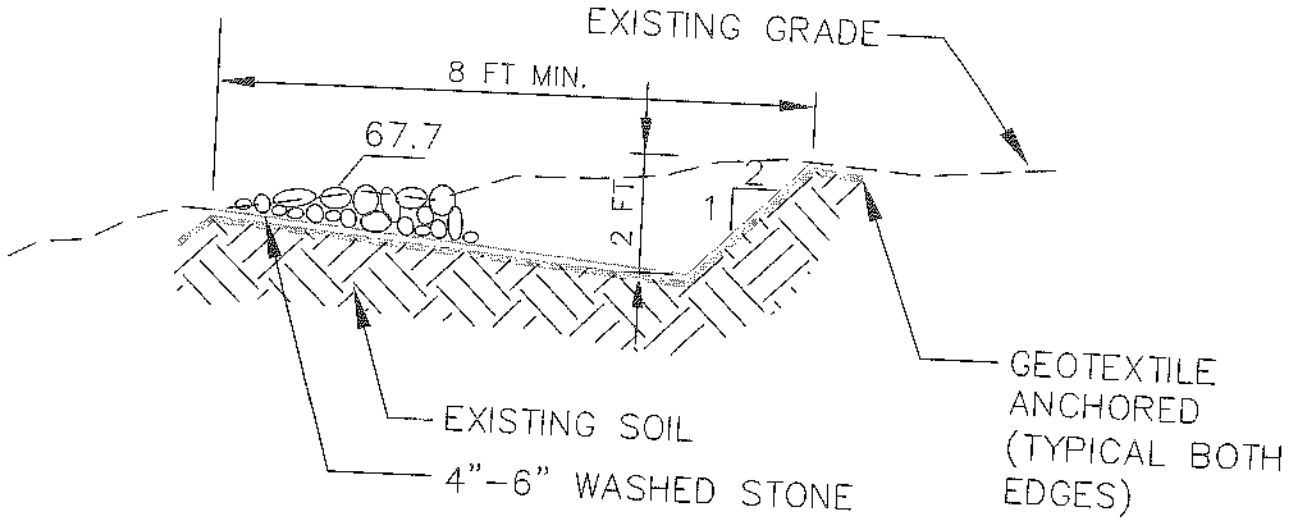
SB/ked/JN2189/Spence12-12-01

Enclosures – Revised plans

c: Bob Gaudreau, Gringolet Associates



SECTION B–B



SECTION A–A

LEVEL LIP SPREADER

N.T.S.

WAREHOUSE/OFFICE BLDG OFF
RICE STREET

LEVEL LIP SPREADER DETAIL

DeLuca-Hoffman Associates, Inc.
778 MAIN STREET, SUITE 8
SOUTH PORTLAND, ME 04106
(207) 775-1121
WWW.DELUCAHOFFMAN.COM

DRAWN:	TDD	DATE:	DEC 2002	FIGURE
DESIGNED:	TDD	SCALE:	NTS	A
CHECKED:	SRB	JOB NO.	2189	
FILE NAME:	2189			

SECTION 8

SURFACE DRAINAGE AND RUNOFF-REVISED DECEMBER 2002

8.0 Introduction

The following stormwater runoff analysis has been prepared for Gringolet Associates for the construction of warehouse/office facilities off of Rice Street.

8.1 Existing Conditions

The 1.73-acre triangular-shaped site is located off of Rice Street in Portland, Maine and consists of undeveloped woodlands. The site abuts natural drainageways to the north and south. A ravine on the south side is approximately 18 feet deep compared to the relatively flat development area in the middle of the site. Approximately half of the stormwater runoff flows via overland to the stream that runs along the southern border of the project site.

The remainder of the stormwater runoff flows via overland flow to the tributary swale to the north and eventually ties into the stream that runs from east to west along the southern border of the project site.

Based on the USDA medium intensity soil survey for Cumberland County, surficial soils across the site consist of Scantic Silt loam. These soils tend to be poorly drained. These soils appear to actually be confined to the lower ravine areas. More well drained soils appear within the development area.

Based on the National Wetlands Inventory for Portland, Maine (north) region, there are no mapped wetlands shown in this area. Soils and wetland maps are included as Figure 2 and 3 in this section of the application. The applicant has walked the site with Doug Burdick of the Maine Department of Environmental Protection. Mr. Burdick identified the ravines as containing wetland resources and a stream.

8.2 Proposed Conditions

The proposed project consists of constructing a twenty-four-foot access drive in the existing forty-foot Public Right Of Way, a 9,200 square foot warehouse/office facility and 11-space parking lot that will result in approximately 0.67 acres of new impervious surface. Approximately 10.5 percent of the new impervious surface will sheet flow off into adjacent wooded area. The runoff from the remainder of the site will be collected in the proposed storm drain system that will discharge to a detention basin. The grading of the detention basin has been modified to fall outside of the MeDEP required 25' setback, the detention basin will discharge to a level spreader, now located on the applicant's property, and will discharge via sheet flow into a existing vegetated buffer prior to discharging to the stream to the south of the project site. The proposed outlet will consist of an 8" ADS N-12 pipe with an 8"x6" reducer at the inlet. This provides effectively a 6" culvert inlet.

8.3 Stormwater Runoff Analysis

The SCS medium intensity survey for Cumberland County was used to delineate surficial soil conditions for onsite areas. The soils with the site were classified as hydrologic soil group D.

Hydrological analysis for the pre-development and post development conditions have been conducted based on the methodology outlined in the Soil Conservation Service (SCS) Technical Release 20 (TR-20). The HydroCAD computer program has been used in this analysis.

The design storms used for this analysis were the 2, 10, and 25-year frequencies. Total 24-hour rainfall amounts for these storm events are 3.0, 4.7 and 5.5 inches, respectively. The rainfall distribution for this location is a Type III storm.

Land use cover, delineation of watershed subcatchments, hydraulic flow paths and hydrologic soil types were obtained using the flowing data sources:

1. Portland, WEST USGS 7.5 Minute Quadrangle
2. Sheet 75 of the SCS Medium Intensity Soil Survey for Cumberland County
3. On-site topographic survey with 1-foot contour intervals prepared by Stephen Martin, In. of Gorham, Maine.
4. Field reconnaissance by DeLuca-Hoffman, Associates, Inc.

Details of these calculations can be found in Attachment 8.1 following this report.

8.4 Conclusion

Runoff rates from the site have been analyzed for the existing and proposed conditions. Runoff rates would increase at the point of interest due to the proposed development without stormwater management. A storm drain system and a detention basin have been designed to reduce postdevelopment runoff to below the 10 and 25-year predevelopment rates. The 2-year postdevelopment runoff rate is slightly higher than the predevelopment rate however this small increase is considered insignificant. A summary of the existing and proposed peak runoff rates is provided in Table 8.1 below.

Table 8.1
Summary of Peak Flows (CFS)

	2 year storm	10 year storm	25 year storm
Existing	2.57	5.67	7.22
Proposed	2.68	5.18	6.44

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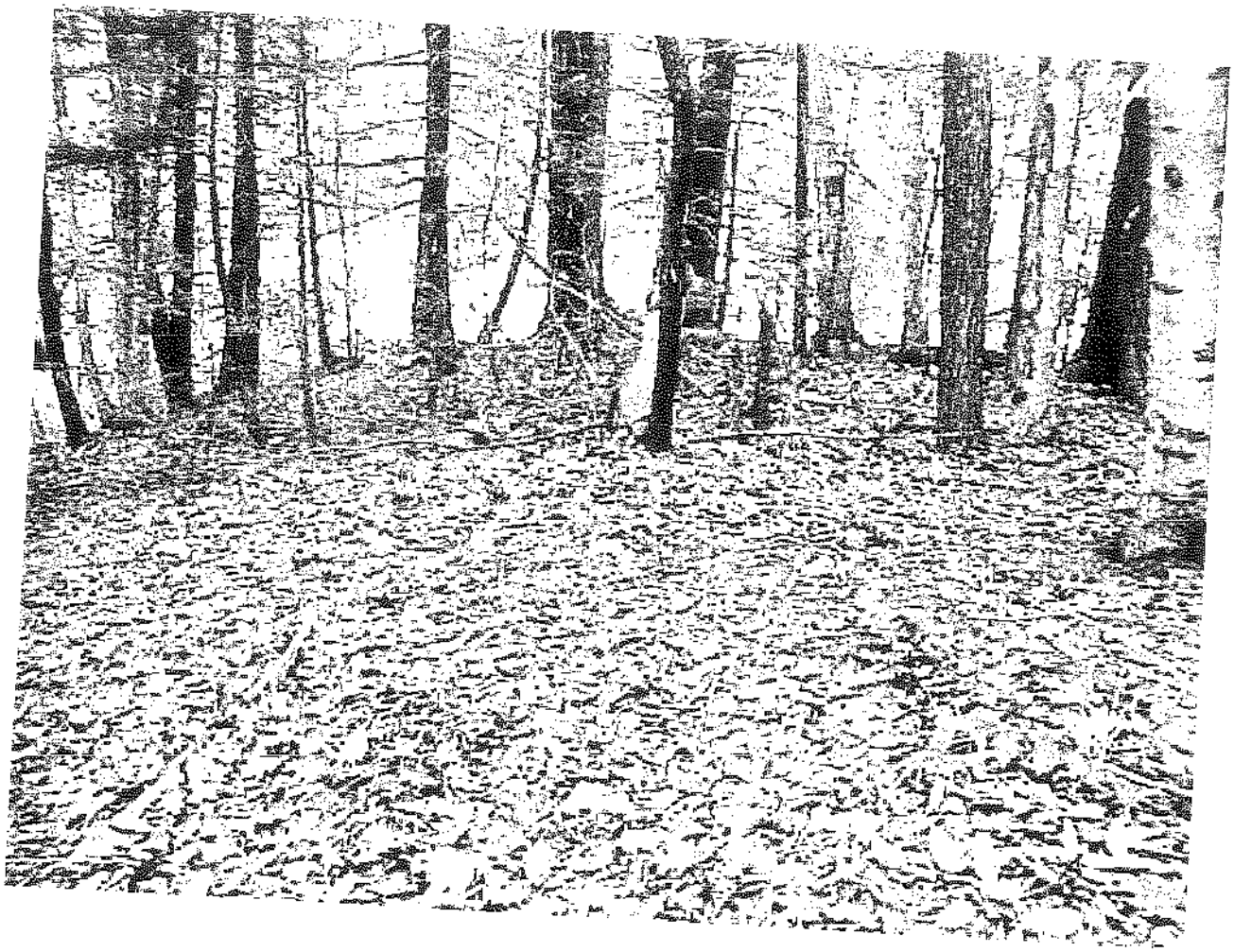
DATE: 12-11-02



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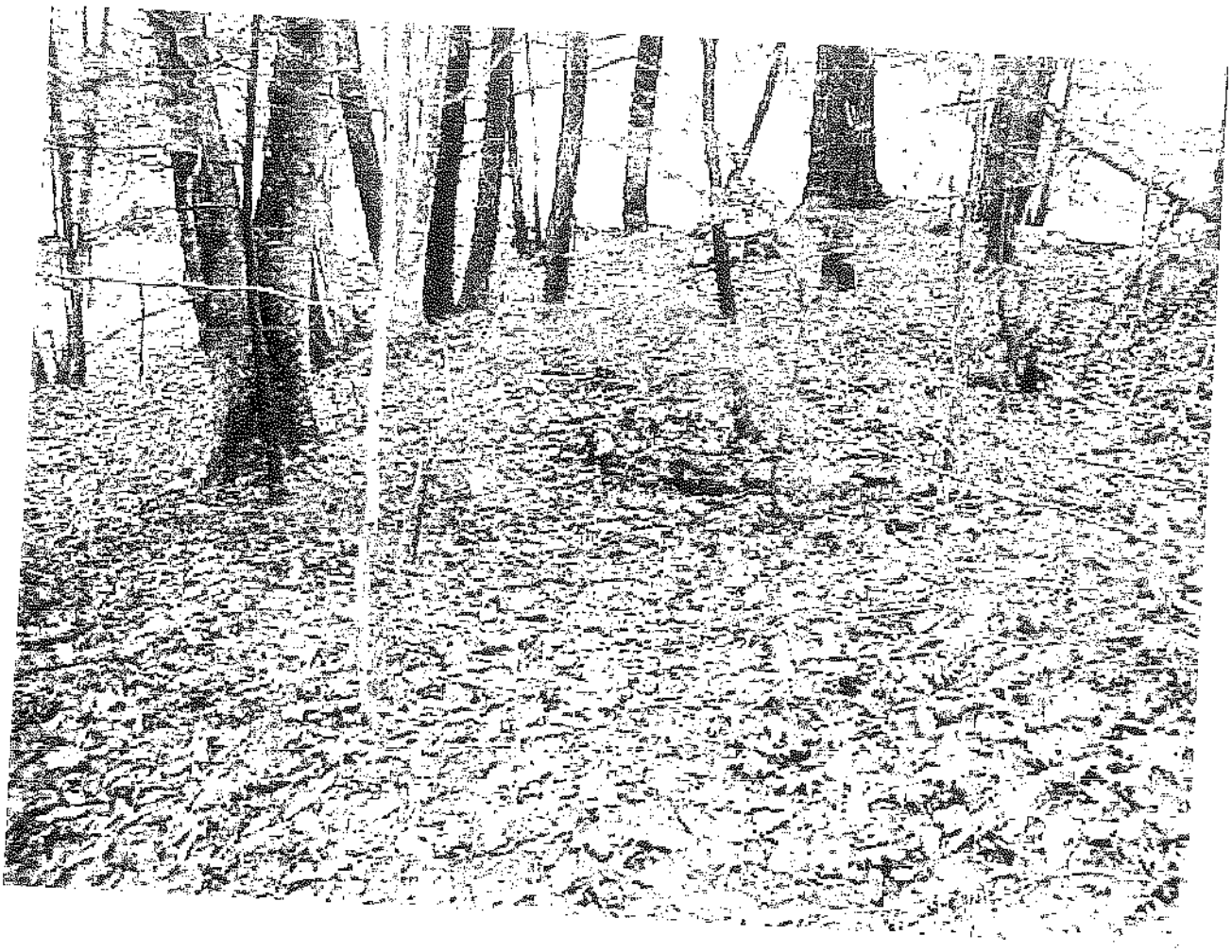
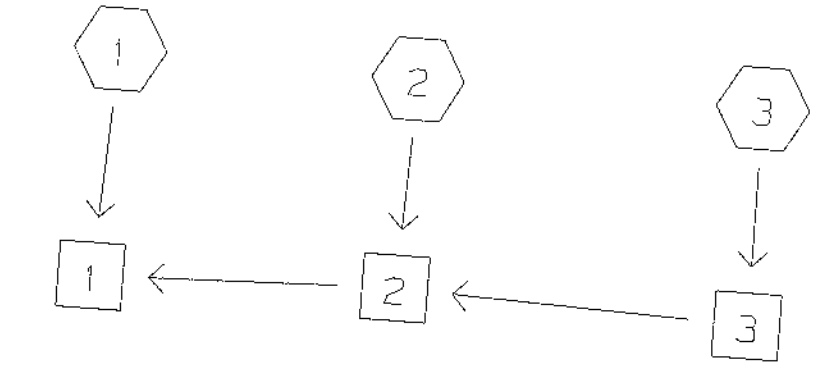
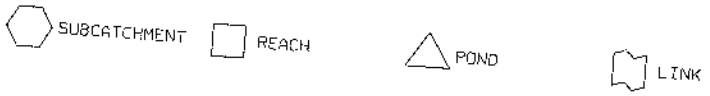


WATERSHED ROUTING





RUNOFF BY SCS TR-20 METHOD: TYPE III 24-HOUR RAINFALL= 3.00 IN, SCS U.H.

RUNOFF SPAN = 0-25 HRS, dt= .10 HRS, 251 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--	WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
1	1.03	9.7	98%77 2%91	77	-	1.06	12.11	.09
2	.65	14.6	100%77	77	-	.58	12.18	.06
3	.75	8.9	72%77 12%91 16%98	82	-	1.03	12.10	.09

REACH ROUTING BY STOR-IND+TRANS METHOD

REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)		n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
1	-	-	-	-	-	-	-	-			
2	-	10.0	5.0	.50	.50	.050	45	.0603	0.0	0.0	2.57 N
3	-	10.0	5.0	.50	.50	.050	200	.0603	4.3	.2	1.52
									4.3	.8	.98

POND ROUTING BY STOR-IND METHOD

POND NO.	START ELEV. (FT)	FLOOD ELEV. (FT)	PEAK ELEV. (FT)	PEAK STORAGE (AF)	PEAK FLOW Qin (CFS)	PEAK FLOW Qout (CFS)	PEAK FLOW Qpri (CFS)	PEAK FLOW Qsec (CFS)	---Qout--- ATTEN. (%)	---Qout--- LAG (MIN)

SUBCATCHMENT 1

PEAK= 1.06 CFS @ 12.11 HRS, VOLUME= .09 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW		
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'	**Segment ID:AB**	8.7
SHALLOW CONCENTRATED/UPLAND FLOW		
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps	**Segment ID:**	.1
RECT/VEE/TRAP CHANNEL		
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs	**Segment ID:**	.9
Total Length= 605 ft	Total Tc=	9.7

SUBCATCHMENT 2

PEAK= .58 CFS @ 12.18 HRS, VOLUME= .06 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW		
Grass: Short n=.15 L=65' P2=3 in s=.0169 '/'	**Segment ID:**	7.7
TR-55 SHEET FLOW		
Grass: Short n=.15 L=85' P2=3 in s=.0471 '/'	**Segment ID:**	6.3
SHALLOW CONCENTRATED/UPLAND FLOW		
Short Grass Pasture Kv=7 L=80' s=.2113 '/' V=3.22 fps	**Segment ID:**	.4
RECT/VEE/TRAP CHANNEL		
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=160' Capacity=1548.3 cfs	**Segment ID:**	.2
Total Length= 390 ft	Total Tc=	14.6

SUBCATCHMENT 3

PEAK= 1.03 CFS @ 12.10 HRS, VOLUME= .09 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=90' P2=3 in s=.0356 '/'	Segment ID:	7.4
RECT/VEE/TRAP CHANNEL W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374' s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs	Segment ID:	1.4
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs	Segment ID:	0.0
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=120' Capacity=1548.3 cfs	Segment ID:	.1
	Total Length= 335 ft Total Tc=	8.9

REACH 1

Not described

Qin = 2.57 CFS @ 12.13 HRS, VOLUME= .24 AF
Qout= 2.57 CFS @ 12.13 HRS, VOLUME= .24 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 1.54 CFS @ 12.14 HRS, VOLUME= .14 AF
Qout= 1.52 CFS @ 12.14 HRS, VOLUME= .14 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .03 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

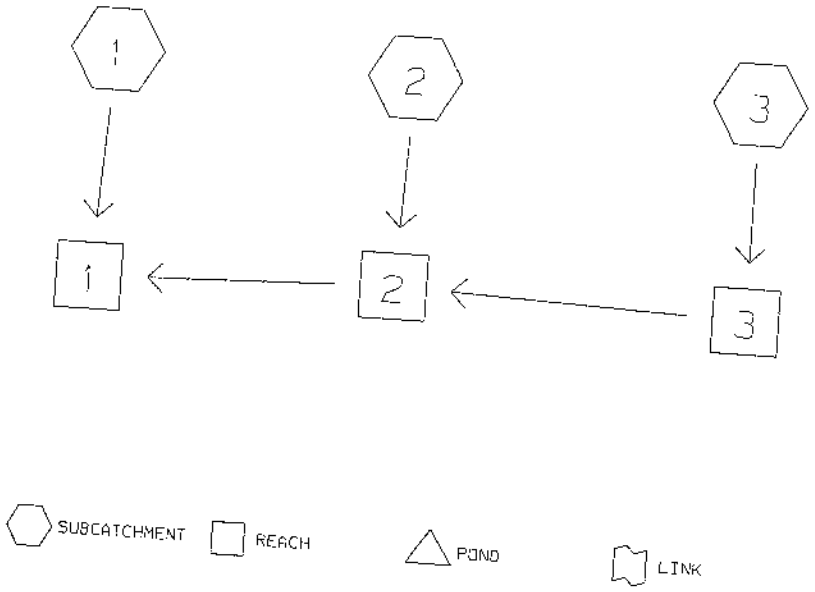
Qin = 1.03 CFS @ 12.10 HRS, VOLUME= .09 AF
Qout= .98 CFS @ 12.12 HRS, VOLUME= .09 AF, ATTEN= 4%, LAG= 1.3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .02 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

WATERSHED ROUTING ==========



RUNOFF BY SCS TR-20 METHOD: TYPE III 24-HOUR RAINFALL= 4.70 IN, SCS U.H.

RUNOFF SPAN = 0-25 HRS, dt= .10 HRS, 251 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--	WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
1	1.03	9.7	98%77 2%91	77	-	2.42	12.10	.20
2	.65	14.6	100%77	77	-	1.32	12.17	.13
3	.75	8.9	72%77 12%91 16%98	82	-	2.11	12.09	.18

REACH ROUTING BY STOR-IND+TRANS METHOD

REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)		n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
1	-	-	-	-	-	-	-	-			
2	-	10.0	5.0	.50	.50	.050	45	.0603	0.0	0.0	5.67 N
3	-	10.0	5.0	.50	.50	.050	200	.0603	4.3	.2	3.27
									4.3	.8	2.02

POND ROUTING BY STOR-IND METHOD

POND NO.	START ELEV. (FT)	FLOOD ELEV. (FT)	PEAK ELEV. (FT)	PEAK STORAGE (AF)	PEAK FLOW Qin (CFS)	PEAK FLOW Qout (CFS)	PEAK FLOW Qpri (CFS)	PEAK FLOW Qsec (CFS)	---Qout--- ATTEN. (%)	---Qout--- LAG (MIN)

SUBCATCHMENT 1

PEAK= 2.42 CFS @ 12.10 HRS, VOLUME= .20 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'	Segment ID:AB	8.7
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps	Segment ID:	.1
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs	Segment ID:	.9
Total Length= 605 ft	Total Tc=	9.7

SUBCATCHMENT 2

PEAK= 1.32 CFS @ 12.17 HRS, VOLUME= .13 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW Grass: Short n=.15 L=65' P2=3 in s=.0169 '/'	Segment ID:	7.7
TR-55 SHEET FLOW Grass: Short n=.15 L=85' P2=3 in s=.0471 '/'	Segment ID:	6.3
SHALLOW CONCENTRATED/UPLAND FLOW Short Grass Pasture Kv=7 L=80' s=.2113 '/' V=3.22 fps	Segment ID:	.4
RECT/VEE/TRAP CHANNEL W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=160' Capacity=1548.3 cfs	Segment ID:	.2
Total Length= 390 ft	Total Tc=	14.6

SUBCATCHMENT 3

PEAK= 2.11 CFS @ 12.09 HRS, VOLUME= .18 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	
Grass: Short n=.15 L=90' P2=3 in s=.0356 '/'		7.4
RECT/VEE/TRAP CHANNEL	Segment ID:	
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374' s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		1.4
RECT/VEE/TRAP CHANNEL	Segment ID:	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		0.0
RECT/VEE/TRAP CHANNEL	Segment ID:	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=120' Capacity=1548.3 cfs		.1
	Total Length= 335 ft Total Tc=	8.9

REACH 1

Not described

Qin = 5.67 CFS @ 12.12 HRS, VOLUME= .51 AF
Qout= 5.67 CFS @ 12.12 HRS, VOLUME= .51 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 3.31 CFS @ 12.13 HRS, VOLUME= .30 AF
Qout= 3.27 CFS @ 12.13 HRS, VOLUME= .30 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .07 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

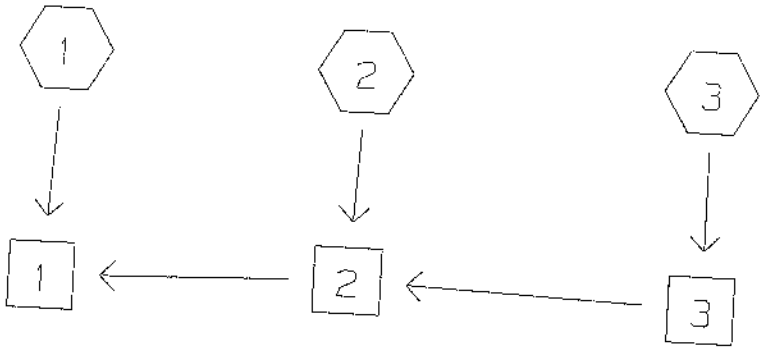
Qin = 2.11 CFS @ 12.09 HRS, VOLUME= .18 AF
Qout= 2.02 CFS @ 12.11 HRS, VOLUME= .18 AF, ATTEN= 4%, LAG= 1.3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .04 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

WATERSHED ROUTING



SUBCATCHMENT 1	=	
SUBCATCHMENT 2	=	-> REACH 1
SUBCATCHMENT 3	=	-> REACH 2
REACH 1	=	-> REACH 3
REACH 2	=	->
REACH 3	=	-> REACH 1
		-> REACH 2

RUNOFF BY SCS TR-20 METHOD: TYPE III 24-HOUR RAINFALL= 5.50 IN, SCS U.H.

RUNOFF SPAN = 0-25 HRS, dt= .10 HRS, 251 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--	WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
1	1.03	9.7	98%77 2%91	77	-	3.11	12.10	.26
2	.65	14.6	100%77	77	-	1.69	12.16	.17
3	.75	8.9	72%77 12%91 16%98	82	-	2.63	12.09	.22

REACH ROUTING BY STOR-IND+TRANS METHOD

REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)		n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
1	-	-	-	-	-	-	-	-	0.0	0.0	7.22 N
2	-	10.0	5.0	.50	.50	.050	45	.0603	4.3	.2	4.14
3	-	10.0	5.0	.50	.50	.050	200	.0603	4.3	.8	2.52

POND ROUTING BY STOR-IND METHOD

POND NO.	START ELEV. (FT)	FLOOD ELEV. (FT)	PEAK ELEV. (FT)	PEAK STORAGE (AF)	PEAK FLOW Qin (CFS)	PEAK FLOW Qout (CFS)	PEAK FLOW Qpri (CFS)	PEAK FLOW Qsec (CFS)	---Qout--- ATTEN. (%)	---Qout--- LAG (MIN)

SUBCATCHMENT 1

PEAK= 3.11 CFS @ 12.10 HRS, VOLUME= .26 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:AB**	
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'		8.7
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps		.1
RECT/VEE/TRAP CHANNEL	**Segment ID:**	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs		.9
	Total Length= 605 ft	Total Tc= 9.7

SUBCATCHMENT 2

PEAK= 1.69 CFS @ 12.16 HRS, VOLUME= .17 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	
Grass: Short n=.15 L=65' P2=3 in s=.0169 '/'		7.7
TR-55 SHEET FLOW	**Segment ID:**	
Grass: Short n=.15 L=85' P2=3 in s=.0471 '/'		6.3
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	
Short Grass Pasture Kv=7 L=80' s=.2113 '/' V=3.22 fps		.4
RECT/VEE/TRAP CHANNEL	**Segment ID:**	
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=160' Capacity=1548.3 cfs		.2
	Total Length= 390 ft	Total Tc= 14.6

SUBCATCHMENT 3

PEAK= 2.63 CFS @ 12.09 HRS, VOLUME= .22 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	7.4
Grass: Short n=.15 L=90' P2=3 in s=.0356 '/'		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	1.4
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374' s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09' s=.0603 '/' n=.05 V=15.48 fps L=120' Capacity=1548.3 cfs		
	Total Length= 335 ft Total Tc=	8.9

REACH 1

Not described

Qin = 7.22 CFS @ 12.12 HRS, VOLUME= .65 AF
Qout= 7.22 CFS @ 12.12 HRS, VOLUME= .65 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 4.19 CFS @ 12.13 HRS, VOLUME= .39 AF
Qout= 4.14 CFS @ 12.13 HRS, VOLUME= .39 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .09 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

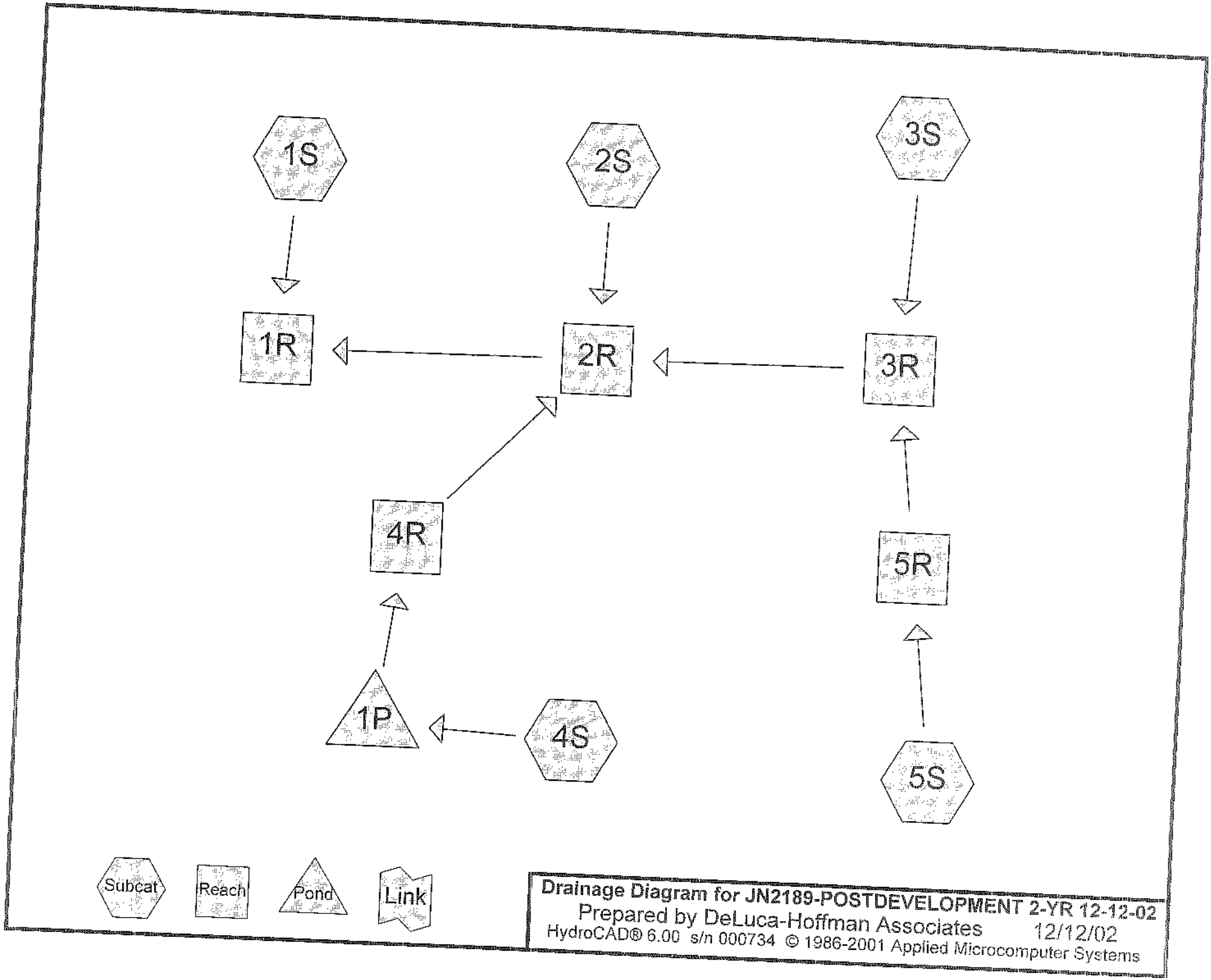
REACH 3

Qin = 2.63 CFS @ 12.09 HRS, VOLUME= .22 AF
Qout= 2.52 CFS @ 12.11 HRS, VOLUME= .22 AF, ATTEN= 4%, LAG= 1.3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .06 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS



Drainage Diagram for JN2189-POSTDEVELOPMENT 2-YR 12-12-02
Prepared by DeLuca-Hoffman Associates 12/12/02

Time span=0.00-25.00 hrs, dt=0.10 hrs, 251 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=3.00"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Tc=9.7 min CN=77 Area=0.900 ac Runoff= 0.93 cfs 0.080 af

Subcatchment 2S: Tc=3.8 min CN=77 Area=0.310 ac Runoff= 0.37 cfs 0.028 af

Subcatchment 3S: Tc=6.9 min CN=77 Area=0.260 ac Runoff= 0.27 cfs 0.023 af

Subcatchment 4S: Tc=5.0 min CN=97 Area=0.610 ac Runoff= 1.65 cfs 0.135 af

Subcatchment 5S: Tc=8.7 min CN=88 Area=0.350 ac Runoff= 0.64 cfs 0.053 af

Reach 1R: Inflow= 2.68 cfs 0.319 af
Outflow= 2.68 cfs 0.319 af

Reach 2R: Length= 45.0' Max Vel= 1.6 fps Capacity= 1,547.33 cfs Inflow= 1.83 cfs 0.239 af
Outflow= 1.81 cfs 0.239 af

Reach 3R: Length= 200.0' Max Vel= 1.3 fps Capacity= 1,548.33 cfs Inflow= 0.88 cfs 0.076 af
Outflow= 0.80 cfs 0.076 af

Reach 4R: Length= 100.0' Max Vel= 1.0 fps Capacity= 65.54 cfs Inflow= 0.85 cfs 0.135 af
Outflow= 0.84 cfs 0.135 af

Reach 5R: Length= 110.0' Max Vel= 1.8 fps Capacity= 458.78 cfs Inflow= 0.64 cfs 0.053 af
Outflow= 0.61 cfs 0.053 af

Pond 1P: POND 1 Peak Storage= 589 cf Inflow= 1.65 cfs 0.135 af
Primary= 0.85 cfs 0.135 af Outflow= 0.85 cfs 0.135 af

Runoff Area = 2.430 ac Volume = 0.319 af Average Depth = 1.58"

Subcatchment 1S:

Runoff = 0.93 cfs @ 12.11 hrs, Volume= 0.080 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.880	77	WOODS GOOD
0.020	91	GRAVEL
0.900	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	115	0.0391	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	30	0.6333	5.6		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.9	460	0.0204	9.0	900.57	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
9.7	605	Total			

Subcatchment 2S:

Runoff = 0.37 cfs @ 12.02 hrs, Volume= 0.028 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.310	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	70	0.1286	0.3		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	20	0.6900	5.8		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.1	80	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
3.8	170	Total			

Subcatchment 3S:

Runoff = 0.27 cfs @ 12.08 hrs, Volume= 0.023 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.260	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	80	0.0400	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.4	110	0.0073	4.9	1,482.54	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 10.0 '/' n= 0.050
0.0	15	0.4667	43.1	4,307.47	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
0.1	115	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
6.9	320	Total			

Subcatchment 4S:

Runoff = 1.65 cfs @ 12.02 hrs, Volume= 0.135 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.040	80	OPEN SPACE
0.570	98	IMPERVIOUS
0.610	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Segment ID:**

Subcatchment 5S:

Runoff = 0.64 cfs @ 12.09 hrs, Volume= 0.053 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=3.00"

Area (ac)	CN	Description
0.140	77	WOODS GOOD
0.090	91	GRAVEL
0.120	98	IMPERVIOUS
0.350	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0310	0.2		**Sheet Flow, Segment ID:**
					Grass: Short n= 0.150 P2= 3.00"
0.2	30	0.1030	2.2		**Shallow Concentrated Flow, Segment ID:**
					Short Grass Pasture Kv= 7.0 fps
8.7	130	Total			

Reach 1R:

Inflow = 2.68 cfs @ 12.14 hrs, Volume= 0.319 af
Outflow = 2.68 cfs @ 12.14 hrs, Volume= 0.319 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Reach 2R:

Inflow = 1.83 cfs @ 12.18 hrs, Volume= 0.239 af
Outflow = 1.81 cfs @ 12.19 hrs, Volume= 0.239 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.6 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.11'
Capacity at bank full= 1,547.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 45.0' Slope= 0.0602 '/'
Side Slope Z-value= 2.0 '/'

Reach 3R:

Inflow = 0.88 cfs @ 12.10 hrs, Volume= 0.076 af
Outflow = 0.80 cfs @ 12.19 hrs, Volume= 0.076 af, Atten= 9%, Lag= 5.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.3 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 3.4 min

Peak Depth= 0.07'
Capacity at bank full= 1,548.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 200.0' Slope= 0.0603 '/'
Side Slope Z-value= 2.0 '/'

Reach 4R:

Inflow = 0.85 cfs @ 12.20 hrs, Volume= 0.135 af
Outflow = 0.84 cfs @ 12.25 hrs, Volume= 0.135 af, Atten= 1%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.0 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.3 fps, Avg. Travel Time= 5.0 min

Peak Depth= 0.04'
Capacity at bank full= 65.54 cfs
20.00' x 0.50' deep channel, n= 0.050 Length= 100.0' Slope= 0.0800 '/'
Side Slope Z-value= 20.0 '/'

Reach 5R:

Inflow = 0.64 cfs @ 12.09 hrs, Volume= 0.053 af
Outflow = 0.61 cfs @ 12.11 hrs, Volume= 0.053 af, Atten= 4%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 1.9 min

Peak Depth= 0.07'
Capacity at bank full= 458.78 cfs
5.00' x 2.50' deep channel, n= 0.050 Length= 110.0' Slope= 0.1419 '/'
Side Slope Z-value= 3.0 '/'

Pond 1P: POND 1

Inflow = 1.65 cfs @ 12.02 hrs, Volume= 0.135 af
Outflow = 0.85 cfs @ 12.20 hrs, Volume= 0.135 af, Atten= 49%, Lag= 11.0 min
Primary = 0.85 cfs @ 12.20 hrs, Volume= 0.135 af

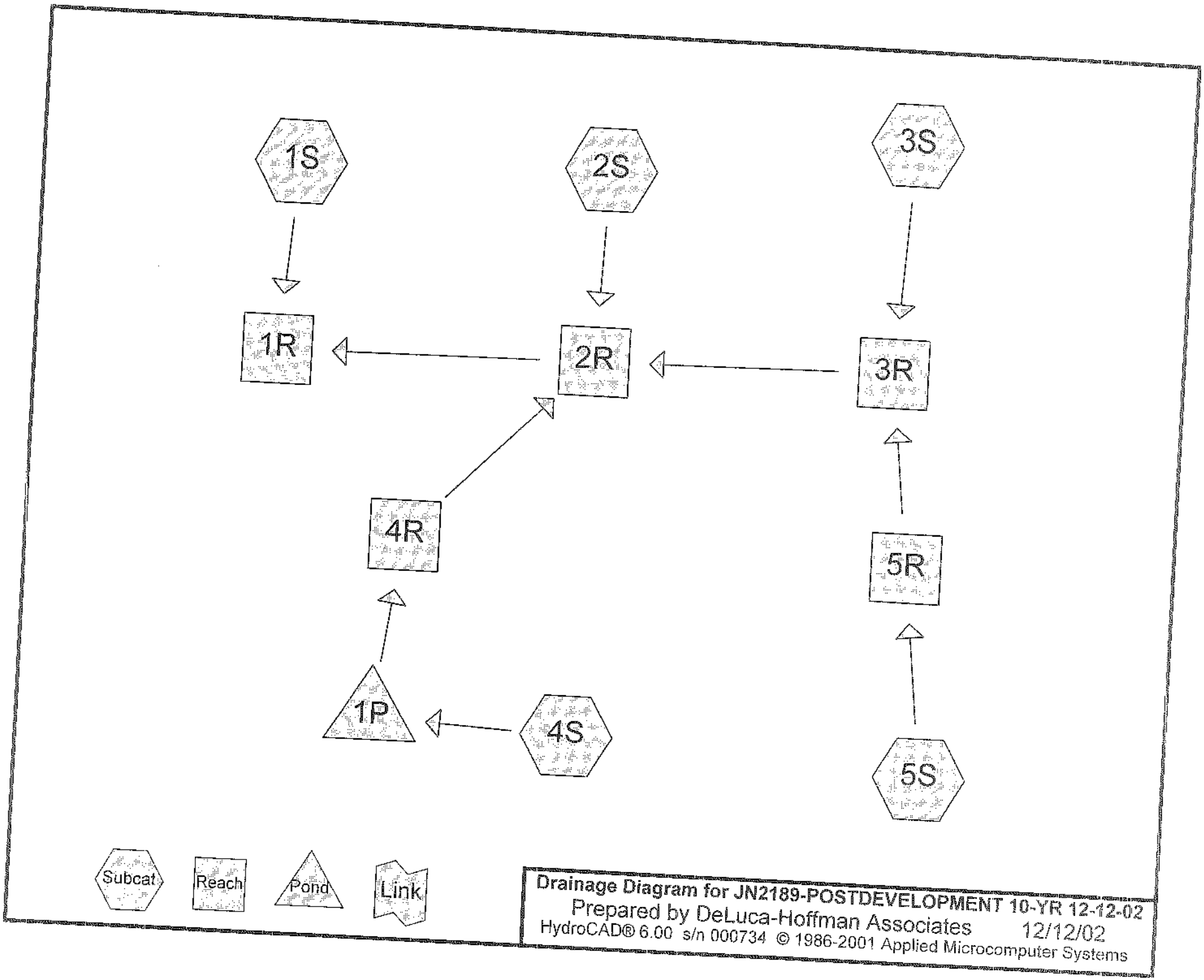
Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Peak Elev= 72.40' Storage= 589 cf
Plug-Flow detention time= 3.5 min calculated for 0.135 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	1,266	0	0
73.00	1,663	1,465	1,465
74.00	2,096	1,880	3,344
74.50	2,309	1,101	4,445

Primary OutFlow (Free Discharge)
↳1=Orifice/Grate

#	Routing	Invert	Outlet Devices
1	Primary	71.40'	**6.0" Vert. Orifice/Grate** C= 0.620


1S
2S
3S
1R
2R
3R
4R
5R
1P
4S
5S
Subcat
Reach
Pond
Link
Drainage Diagram for JN2189-POSTDEVELOPMENT 10-YR 12-12-02
Prepared by DeLuca-Hoffman Associates 12/12/02
HydroCAD® 6.00 s/n 000734 © 1986-2001 Applied Microcomputer Systems

Time span=0.00-25.00 hrs, dt=0.10 hrs, 251 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=4.70"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S:
Tc=9.7 min CN=77 Area=0.900 ac Runoff= 2.12 cfs 0.178 af

Subcatchment 2S:
Tc=3.8 min CN=77 Area=0.310 ac Runoff= 0.86 cfs 0.061 af

Subcatchment 3S:
Tc=6.9 min CN=77 Area=0.260 ac Runoff= 0.62 cfs 0.051 af

Subcatchment 4S:
Tc=5.0 min CN=97 Area=0.610 ac Runoff= 2.63 cfs 0.221 af

Subcatchment 5S:
Tc=8.7 min CN=88 Area=0.350 ac Runoff= 1.16 cfs 0.099 af

Reach 1R:
Inflow= 5.18 cfs 0.611 af
Outflow= 5.18 cfs 0.611 af

Reach 2R:
Length= 45.0' Max Vel= 2.0 fps Capacity= 1,547.33 cfs
Inflow= 3.12 cfs 0.433 af
Outflow= 3.08 cfs 0.433 af

Reach 3R:
Length= 200.0' Max Vel= 1.6 fps Capacity= 1,548.33 cfs
Inflow= 1.73 cfs 0.150 af
Outflow= 1.57 cfs 0.150 af

Reach 4R:
Length= 100.0' Max Vel= 1.1 fps Capacity= 65.54 cfs
Inflow= 1.12 cfs 0.221 af
Outflow= 1.11 cfs 0.221 af

Reach 5R:
Length= 110.0' Max Vel= 2.3 fps Capacity= 458.78 cfs
Inflow= 1.16 cfs 0.099 af
Outflow= 1.13 cfs 0.099 af

Pond 1P: POND 1
Peak Storage= 1,418 cf Inflow= 2.63 cfs 0.221 af
Primary= 1.12 cfs 0.221 af Outflow= 1.12 cfs 0.221 af

Runoff Area = 2.430 ac Volume = 0.611 af Average Depth = 3.02"

Subcatchment 1S:

Runoff = 2.12 cfs @ 12.10 hrs, Volume= 0.178 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.880	77	WOODS GOOD
0.020	91	GRAVEL
0.900	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	115	0.0391	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	30	0.6333	5.6		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.9	460	0.0204	9.0	900.57	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
9.7	605	Total			

Subcatchment 2S:

Runoff = 0.86 cfs @ 12.01 hrs, Volume= 0.061 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.310	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	70	0.1286	0.3		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	20	0.6900	5.8		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.1	80	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
3.8	170	Total			

Subcatchment 3S:

Runoff = 0.62 cfs @ 12.07 hrs, Volume= 0.051 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.260	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	80	0.0400	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.4	110	0.0073	4.9	1,482.54	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 10.0 '/' n= 0.050
0.0	15	0.4667	43.1	4,307.47	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
0.1	115	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
6.9	320	Total			

Subcatchment 4S:

Runoff = 2.63 cfs @ 12.02 hrs, Volume= 0.221 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.040	80	OPEN SPACE
0.570	98	IMPERVIOUS
0.610	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Segment ID:**

Subcatchment 5S:

Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.099 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.140	77	WOODS GOOD
0.090	91	GRAVEL
0.120	98	IMPERVIOUS
0.350	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0310	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.2	30	0.1030	2.2		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
8.7	130	Total			

Reach 1R:

Inflow = 5.18 cfs @ 12.11 hrs, Volume= 0.611 af
Outflow = 5.18 cfs @ 12.11 hrs, Volume= 0.611 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Reach 2R:

Inflow = 3.12 cfs @ 12.13 hrs, Volume= 0.433 af
Outflow = 3.08 cfs @ 12.14 hrs, Volume= 0.433 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 2.0 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.15'
Capacity at bank full= 1,547.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 45.0' Slope= 0.0602 '/'
Side Slope Z-value= 2.0 '/'

Reach 3R:

Inflow = 1.73 cfs @ 12.09 hrs, Volume= 0.150 af
Outflow = 1.57 cfs @ 12.15 hrs, Volume= 0.150 af, Atten= 10%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 3.4 min

Peak Depth= 0.10'
Capacity at bank full= 1,548.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 200.0' Slope= 0.0603 '/'
Side Slope Z-value= 2.0 '/'

Reach 4R:

Inflow = 1.12 cfs @ 12.24 hrs, Volume= 0.221 af
Outflow = 1.11 cfs @ 12.30 hrs, Volume= 0.221 af, Atten= 1%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.1 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 4.3 min

Peak Depth= 0.05'
Capacity at bank full= 65.54 cfs
20.00' x 0.50' deep channel, n= 0.050 Length= 100.0' Slope= 0.0800 '/'
Side Slope Z-value= 20.0 '/'

Reach 5R:

Inflow = 1.16 cfs @ 12.09 hrs, Volume= 0.099 af
Outflow = 1.13 cfs @ 12.10 hrs, Volume= 0.099 af, Atten= 3%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 1.9 min

Peak Depth= 0.10'
Capacity at bank full= 458.78 cfs
5.00' x 2.50' deep channel, n= 0.050 Length= 110.0' Slope= 0.1419 '/'
Side Slope Z-value= 3.0 '/'

Pond 1P: POND 1

Inflow = 2.63 cfs @ 12.02 hrs, Volume= 0.221 af
Outflow = 1.12 cfs @ 12.24 hrs, Volume= 0.221 af, Atten= 57%, Lag= 13.5 min
Primary = 1.12 cfs @ 12.24 hrs, Volume= 0.221 af

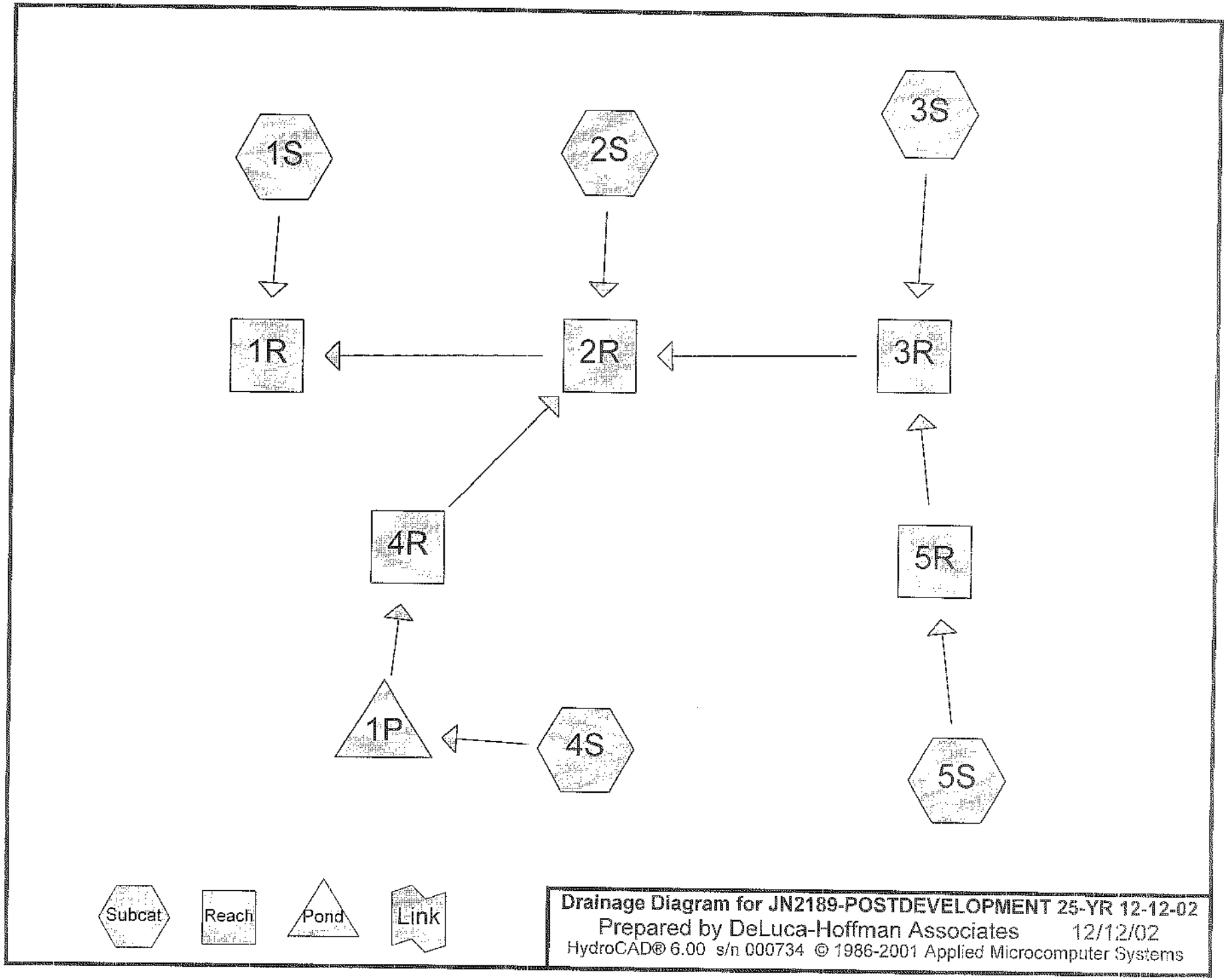
Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Peak Elev= 72.97' Storage= 1,418 cf
Plug-Flow detention time= 6.8 min calculated for 0.220 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	1,266	0	0
73.00	1,663	1,465	1,465
74.00	2,096	1,880	3,344
74.50	2,309	1,101	4,445

Primary OutFlow (Free Discharge)
↑—1=Orifice/Grate

#	Routing	Invert	Outlet Devices
1	Primary	71.40'	**6.0" Vert. Orifice/Grate** C= 0.620


1S
2S
3S
1R
2R
3R
4R
5R
1P
4S
5S
Subcat
Reach
Pond
Link
Drainage Diagram for JN2189-POSTDEVELOPMENT 25-YR 12-12-02
Prepared by DeLuca-Hoffman Associates 12/12/02
HydroCAD® 6.00 s/n 000734 © 1986-2001 Applied Microcomputer Systems

Time span=0.00-25.00 hrs, dt=0.10 hrs, 251 points
Runoff by SCS TR-20 method, UH=SCS, Type III 24-hr Rainfall=5.50"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S:
Tc=9.7 min CN=77 Area=0.900 ac Runoff= 2.72 cfs 0.228 af

Subcatchment 2S:
Tc=3.8 min CN=77 Area=0.310 ac Runoff= 1.10 cfs 0.079 af

Subcatchment 3S:
Tc=6.9 min CN=77 Area=0.260 ac Runoff= 0.79 cfs 0.066 af

Subcatchment 4S:
Tc=5.0 min CN=97 Area=0.610 ac Runoff= 3.08 cfs 0.262 af

Subcatchment 5S:
Tc=8.7 min CN=88 Area=0.350 ac Runoff= 1.41 cfs 0.121 af

Reach 1R:
Inflow= 6.44 cfs 0.756 af
Outflow= 6.44 cfs 0.756 af

Reach 2R:
Inflow= 3.77 cfs 0.527 af
Length= 45.0' Max Vel= 2.2 fps Capacity= 1,547.33 cfs Outflow= 3.73 cfs 0.527 af

Reach 3R:
Inflow= 2.15 cfs 0.187 af
Length= 200.0' Max Vel= 1.8 fps Capacity= 1,548.33 cfs Outflow= 1.99 cfs 0.187 af

Reach 4R:
Inflow= 1.22 cfs 0.262 af
Length= 100.0' Max Vel= 1.1 fps Capacity= 65.54 cfs Outflow= 1.21 cfs 0.262 af

Reach 5R:
Inflow= 1.41 cfs 0.121 af
Length= 110.0' Max Vel= 2.4 fps Capacity= 458.78 cfs Outflow= 1.37 cfs 0.121 af

Pond 1P: POND 1
Peak Storage= 1,836 cf Inflow= 3.08 cfs 0.262 af
Primary= 1.22 cfs 0.262 af Outflow= 1.22 cfs 0.262 af

Runoff Area = 2.430 ac Volume = 0.756 af Average Depth = 3.73"

Subcatchment 1S:

Runoff = 2.72 cfs @ 12.10 hrs, Volume= 0.228 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.880	77	WOODS GOOD
0.020	91	GRAVEL
0.900	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	115	0.0391	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	30	0.6333	5.6		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.9	460	0.0204	9.0	900.57	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
9.7	605	Total			

Subcatchment 2S:

Runoff = 1.10 cfs @ 12.01 hrs, Volume= 0.079 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.310	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	70	0.1286	0.3		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.1	20	0.6900	5.8		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
0.1	80	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
3.8	170	Total			

Subcatchment 3S:

Runoff = 0.79 cfs @ 12.06 hrs, Volume= 0.066 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.260	77	WOODS GOOD

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	80	0.0400	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.4	110	0.0073	4.9	1,482.54	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 10.0 '/' n= 0.050
0.0	15	0.4667	43.1	4,307.47	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
0.1	115	0.0603	15.5	1,548.33	**Trap/Vee/Rect Channel Flow, Segment ID:** Bot.W=10.00' D=5.00' Z= 2.0 '/' n= 0.050
6.9	320	Total			

Subcatchment 4S:

Runoff = 3.08 cfs @ 12.02 hrs, Volume= 0.262 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.040	80	OPEN SPACE
0.570	98	IMPERVIOUS
0.610	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Segment ID:**

Subcatchment 5S:

Runoff = 1.41 cfs @ 12.09 hrs, Volume= 0.121 af

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Type III 24-hr Rainfall=5.50"

Area (ac)	CN	Description
0.140	77	WOODS GOOD
0.090	91	GRAVEL
0.120	98	IMPERVIOUS
0.350	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0310	0.2		**Sheet Flow, Segment ID:** Grass: Short n= 0.150 P2= 3.00"
0.2	30	0.1030	2.2		**Shallow Concentrated Flow, Segment ID:** Short Grass Pasture Kv= 7.0 fps
8.7	130	Total			

Reach 1R:

Inflow = 6.44 cfs @ 12.11 hrs, Volume= 0.756 af
Outflow = 6.44 cfs @ 12.11 hrs, Volume= 0.756 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Reach 2R:

Inflow = 3.77 cfs @ 12.11 hrs, Volume= 0.527 af
Outflow = 3.73 cfs @ 12.12 hrs, Volume= 0.527 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 2.2 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.17'
Capacity at bank full= 1,547.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 45.0' Slope= 0.0602 '/'
Side Slope Z-value= 2.0 '/'

Reach 3R:

Inflow = 2.15 cfs @ 12.09 hrs, Volume= 0.187 af
Outflow = 1.99 cfs @ 12.14 hrs, Volume= 0.187 af, Atten= 7%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 3.3 min

Peak Depth= 0.12'
Capacity at bank full= 1,548.33 cfs
10.00' x 5.00' deep channel, n= 0.050 Length= 200.0' Slope= 0.0603 '/'
Side Slope Z-value= 2.0 '/'

Reach 4R:

Inflow = 1.22 cfs @ 12.26 hrs, Volume= 0.262 af
Outflow = 1.21 cfs @ 12.32 hrs, Volume= 0.262 af, Atten= 0%, Lag= 3.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs / 2
Max. Velocity= 1.1 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 4.1 min

Peak Depth= 0.05'
Capacity at bank full= 65.54 cfs
20.00' x 0.50' deep channel, n= 0.050 Length= 100.0' Slope= 0.0800 '/'
Side Slope Z-value= 20.0 '/'

Reach 5R:

Inflow = 1.41 cfs @ 12.09 hrs, Volume= 0.121 af
Outflow = 1.37 cfs @ 12.10 hrs, Volume= 0.121 af, Atten= 3%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.4 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 1.8 min

Peak Depth= 0.11'
Capacity at bank full= 458.78 cfs
5.00' x 2.50' deep channel, n= 0.050 Length= 110.0' Slope= 0.1419 '/'
Side Slope Z-value= 3.0 '/'

Pond 1P: POND 1

Inflow = 3.08 cfs @ 12.02 hrs, Volume= 0.262 af
Outflow = 1.22 cfs @ 12.26 hrs, Volume= 0.262 af, Atten= 61%, Lag= 14.7 min
Primary = 1.22 cfs @ 12.26 hrs, Volume= 0.262 af

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.10 hrs

Peak Elev= 73.20' Storage= 1,836 cf
Plug-Flow detention time= 8.3 min calculated for 0.261 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	1,266	0	0
73.00	1,663	1,465	1,465
74.00	2,096	1,880	3,344
74.50	2,309	1,101	4,445

Primary OutFlow (Free Discharge)
↑—1=Orifice/Grate

#	Routing	Invert	Outlet Devices
1	Primary	71.40'	**6.0" Vert. Orifice/Grate** C= 0.620

DeLUCA-HOFFMAN ASSOCIATES, INC.
Consulting Engineers
778 Main Street Suite 8
SOUTH PORTLAND, MAINE 04106
(207) 775-1121
FAX (207) 879-0896

JOB 2199 - RICE ST DRAINAGE IMPROVEMENTS
SHEET NO. 1 OF 1
CALCULATED BY TDD DATE 11/26/12
CHECKED BY UPDATED DATE 12/13/12
SCALE Adequacy of LL Spreader

Task: Determine whether Level Lip Spreader adequately reduces discharge velocities to pre-existing levels

References: ① Maine DOT Handbook S-45 and S-57
② Medium Intensity Soil Survey, Cumberland County
③ Routing Cards, dated 11/23/12

Calculations:

Step 1: Determine H in the following equation given, C = 2.6, b = 12' and Q_{25} = 1.22 cfs

$$Q_{25} = C\,b\,H^{3/2}$$

$$1.22\text{ cfs} = 2.6(12')\,H^{3/2}$$

$$\therefore H = \left(\frac{1.22\text{ cfs}}{2.6(12')}\right)^{2/3} = 0.115'$$

Step 2: Determine the velocity off level spreader given

$$A_{spreader} = bH = 12'(0.115') = 1.38\text{ SF}$$

$$Q_{25} = VA \quad \therefore V = \frac{Q_{25}}{A} = \frac{1.22\text{ cfs}}{1.38\text{ SF}} = \underline{0.88\text{ FPS}}$$

Allowable Velocity for vegetated Scantic Soil is 3.5 FPS and the Flow has been reduced to 0.88 FPS ✓

City of Portland Site Plan Application

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: Rice Street (40' easement to lot)		
Total Square Footage of Proposed Structure: 8,616 SF	Square Footage of Lot: 75,359 SF	
Tax Assessor's Chart, Block & Lot Chart# 354 Block# A Lot# 6	Property owner, mailing address: Gringolet Associates 55 Hardy Pond Road Falmouth, Maine 04105	Telephone: 797-6066
Consultant/Agent, mailing address, phone & contact person: DeLuca-Hoffman & Associates Inc 778 Main St South Portland, ME 04106 775-1121 ATTN: Steve Bushey	Applicant name, mailing address & telephone: Gringolet Associates 45 Bridgeton Road Westbrook, ME 04092	Project name: Warehouse/Office Building

Proposed Development (check all that applies) X New Building ___Building Addition ___Change of Use
___Residential ___Office ___Retail ___Manufacturing X Warehouse/Distribution ___Parking lot
___Subdivision, amount of lots_____
___Other:_____

Major Development_____ $500.00 Minor Development X $400.00 Zone IM

Who billing will be sent to:
Mailing address: Gringolet Associates
State and Zip: 45 Bridgeton Road Westbrook, ME 04092
Contact person: Bob Gaudreau
Phone: 797-6066

Nine (9) separate packets must include the following:

a. copy of application
b. cover letter stating the nature of the project
c. site plan containing the information found in the attached sample plans check list

All plans must be folded neatly and in packet form

Section 14-522 of the Zoning Ordinance outlines the process, copies are available at the counter at .25 per page, you may also visit the web site: ci.portland.me.us chapter 14

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, If a permit for work described in this application is issued, I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature of applicant: Steve Bushey Agent Date: 4/1/02

CITY OF PORTLAND DEPT. OF BUILDING INSPECTION APR 1 2002

This application is for site review ONLY, a building Permit application and associated fees will be required prior to construct

DeLUCA-HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS

778 MAIN STREET
SUITE 8
SOUTH PORTLAND, MAINE 04106
TEL. 207 775 1121
FAX 207 879 0896

- ROADWAY DESIGN
- ENVIRONMENTAL ENGINEERING
- TRAFFIC STUDIES AND MANAGEMENT
- PERMITTING
- AIRPORT ENGINEERING
- SITE PLANNING
- CONSTRUCTION ADMINISTRATION

May 6, 2002

Ms. Kandi Talbot
Portland Planning Department
389 Congress Street
Portland, Maine 04101

RE: 19 Rice Street - Gringolet Associates Warehouse Office Building
Responses to Comments from Jim Seymour

Dear Kandi:

Jim Seymour has provided a number of comments for our review. We have made revisions to the plans based on Jim's comments and provide 7 copies of the site plan, grading plan and a new detail sheet for the detention basin for your use. We offer the following responses to each of Jim's comments.

1. A riprap emergency spillway has been added to the detention basin. The basin detail sheet contains a detail for the construction of the spillway.

2. The basin detail sheet contains two cross-sections outlining the proposed construction for the basin. The basin will be a dry basin that will be topsoiled and permanently grassed.

3. The 2, 10 and 25-year storm elevations in the basin are labeled on the basin cross-sections.

4. The grading around the perimeter of the basin has been revised to increase the width of the top of the basin to 5'.

5. A reinforced turf detail has been added to the basin detail sheet.

6. The catch basin in the loading dock area has been labeled for rim elevation and invert. The parking lot catch basin invert in has been labeled and the pipe slope, length and material type called out for on the driveway cross culvert.

7. The applicant will be forwarding a copy of the easement agreement with the abutter to you within a few days.

8. A handicap parking space and ADA ramp have been added to the site plan. One space has been eliminated to accommodate the handicap space.

9. The radii have been labeled.

10. The shoulder along the driveway will be a 1'-6" wide gravel shoulder.

11. The driveway culvert has been lowered to avoid the conflict between the sewer and the culvert. The sewer will go over the top of the culvert by several inches.

12. The underground electric service route has been added to the plan. The electric service will not need to go under any paved areas. If necessary due to CMP requirements, the service will be installed in a PVC conduit in accordance with CMP standards.

13. The gas line in Rice Street will not be tapped for the building at this time.

14. Additional spot elevations and a defined drainage swale have been added to the rear of the building to improve drainage conveyance. A two-foot-wide drip strip of ¾" stone has also been added to the plans. The rear corner of the smaller building wing will have an exposed foundation face, as the exterior elevation will fall away from the finish floor elevation.

We feel that the plan revisions adequately address Jim Seymour's comments. The site development is placed tightly within the developable area; however we are confident that the building and site measures can be successfully constructed. We have purposely avoided significant construction near the top of bank of along the existing bank.

We trust you will find these responses acceptable and we look forward to your continued review and approval of the project.

Sincerely,

DeLUCA-HOFFMAN ASSOCIATES, INC.

Stephen Bushey, PE
Senior Engineer

SRB/sq/JN2189/Talbot05-03-02

c: Jim Seymour – Sebago Technics
Bob Gaudreau – Gringolet Associates

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- CONSTRUCTION ADMINISTRATION

March 29, 2002

Ms. Sarah Hopkins
Development Review Coordinator
City of Portland Planning Authority
City Hall
Congress Street
Portland, Maine 04103

RE: Application for Minor Site Plan Review
Rice Street
Applicant - Gringolet Associates

Dear Sarah:

DeLuca-Hoffman Associates, Inc. has prepared a submission package for a Minor Site Plan Review on behalf of Gringolet Associates. The proposed project will be located on a 1.73-acre parcel (Tax Map 354 Block A Lot 6) off Rice Street. Rice Street is a short dead-end street off the Riverside Industrial Parkway. The project site is located in the Industrial zone, thus the proposal qualifies for a Minor Site Plan Review. Location and resource maps contained in the application package depict the project location. Gringolet Associates proposes to construct an approximately 8,616 SF building that will be used for office and storage space. The proposed building will be a single-story pitched-roof structure.

The site will be accessed off Rice Street via an existing 40' wide access easement. A 24' wide paved drive will be constructed into the site, along with a paved parking surface that will have eleven parking spaces. Public utility service main extensions will be required for water and sanitary sewer service to the building. Power and telephone will be extended overhead into the build also. The nearest fire hydrant is located on Rice Street approximately 370' straight-line distance from the proposed building.

The building layout has been positioned to maintain a 25' setback from the top of the bank of a ravine that travels along the southern line of the property.

Stormwater runoff will be collected in a closed drainage system that will discharge stormwater into a small detention basin. The basin will provide both water quantity control and water quality treatment for stormwater runoff. The basin will discharge onto the adjacent property, thus a drainage easement will be required. Gringolet is currently in the process of obtaining this easement. A stormwater management review is contained in the application materials.

Erosion and sediment control measures are also provided on the plan. Silt fence and other traditional erosion control devices will be used to prevent erosion and the transport of sediment into the adjacent properties and resource areas.

The project will include only a minor amount of lighting, primarily security lighting over the door entrances into the building. At this time it is anticipated that these lights will be no more that 100 to 200 watt fixtures over each door. If necessary, lighting catalog cuts can be provided to the Planning Authority for review.

Landscaping will be minimal, since the project is located in an Industrial area and is also located within a densely wooded area already. Several large specimen pine trees will be maintained on the site, plus the zone along the existing ravine contains woods to remain. The project site will not be visible from the Riverside Industrial Parkway.

The following statements are provided in accordance with Section 14-525 (c):

(1) The proposed use will be for office space and warehouse storage. The proposed building size is approximately 8,616 SF.

(2) The project parcel size is 1.73 acres and the building size is 8,616 SF.

(3) The project site is accessed from an existing 40' wide easement across Tax Map 354. Lot A, Block 4. No other easements or burdens are to be placed on the project site although a drainage easement will be obtained for the adjacent parcel of Tax Map 354, Block A, Lot 5.

(4) The project will generate a small amount of construction debris that will be disposed off at the Riverside Street Disposal facility. After completion, the building operations are expected to generate only a small amount of solid waste that will be disposed of in an onsite dumpster that will be emptied on a weekly basis by an area trash hauler.

(5) Public water, sewer, and natural gas all of which are available from Rice Street will serve the project site. A 12 " water main and a 12" sewer main both will provide ample capacity to this project. The project is expected to generate less than 300 GPD of wastewater flow.

(6) A stormwater plan and adequate measures to collect and convey stormwater runoff have been provided. The project includes a stormwater detention basin that will provide quantity control and water quality treatment.

(7) Sheet 7 of the drawings contains an erosion control plan that outlines the construction sequence. The work is anticipated to begin this spring and be completed in early fall.

(8) The project is subject to a Minor Site plan review by the Portland Planning Authority and a Building Permit by the Code Enforcement Office. The building may require review by the State Fire Marshall. Gringolet Associates will be handling the Fire Marshall review separately, if necessary. No other permits are required.

(9) Gringolet Associates has provided a statement from a financial institution in support of their financial capacity to complete the project.

(10) A copy of the property deed is contained in the application package supporting Gringolet's ownership of the property.

(11) The site contains no unusual natural areas, wildlife or fisheries habitats or archaeological sites. The ravine on the south side of the site contains a stream, thus a 25' setback will be maintained in accordance with DEP regulations.

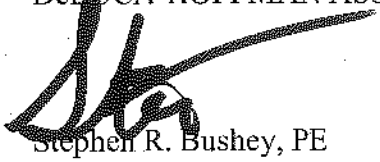
(12) DeLuca-Hoffman Associates, Inc can provide CADD.DXF files to the department upon Final approval of the plan.

(13) The proposed project will generate only a modest amount of recyclable materials. Paper and cardboard will be collected and containerized for removal by area paper and cardboard recyclers such as W. M. Goodman & Sons. This material will likely be collected inside the building in plastic containers supplied by the collection vendors. The materials will be collected on a regularly basis and removed from the site by a selected vendor.

We trust these statements and the supporting application plans and materials satisfy the City's requirements and we look forward to your review and approval of the project. Please contact this office with any staff questions and concerns.

Sincerely,

DeLUCA-HOFFMAN ASSOCIATES, INC.



Stephen R. Bushey, PE
Senior Engineer

SRB/sb/JN2213/hopkins03-28-02

Enclosures

c: Bob Gaudreau, Gringolet Associates

City of Portland

Application for Minor Site Plan Review

Warehouse/Office at Rice Street
Off Riverside Industrial Parkway

Prepared for:

Gringolet Associates
45 Bridgton Road
Westbrook, Maine 04092

Prepared by:

DeLuca-Hoffman Associates, Inc.
778 Main Street, Suite 8
South Portland, Maine 04106
(207) 775-1121
dhai@delucahoffman.com

March 2002

CITY OF PORTLAND, MAINE
SITE PLAN CHECKLIST

If a provision is not applicable, put "NA"

Section 1. Development Description

1.0 A. Narrative
1. Objectives and details
2. Total land area
3. Total floor area

1.1 B. Easements/Right-of-Way Statement
1. Location of existing
2. Location of proposed

C. Natural Resources

1.2 1. NRPA setbacks

1.3 D. Subsurface Conditions
1. USDA Medium Intensity Soils Statement
2. National Wetland Inventory Statement

1.4 E. Infrastructure
1. Sewer Availability
2. Water Availability
3. Right of Way

1.5 F. Construction Plan
1. Outline of construction sequence
2. Dates

1.6 G. Figures, Plates and Drawings

Section 2. Title, Right or Interest (copy of document)

Section 3. Financial Capacity

Att.3.1 A. Estimated costs

B. Financing

Att.3.2 1. Letter of commitment to fund

2. Self-financing

Att.3.3 a. Annual report

Att.3.4 b. Bank statement

Section 4. Technical Ability (description)

4.0 A. Prior experience (statement)

Att.4.1 B. Personnel (documents)

____ **Section 5. Unusual Natural Areas, Wildlife and Fisheries and Archaeological Sites**

Section 6. Review Criteria for Site Plan Approval

Section 7. Solid Waste

7.0 A. Narrative

7.1 B. Solid wastes during construction

7.2 C. Solid wastes during operation of development

Att.7.1 D. Computations

Section 8. Surface Drainage and Runoff

8.0 A. Introduction

8.1 1. Existing conditions

8.2 2. Proposed conditions

8.3 3. Stormwater runoff analysis

8.4 4. Conclusion

B. Maps

Sec.1.6,Fig.1 1. DeLorme location map with site boundaries
Sec.1.6,Fig.3 2. SCS soils map with site boundaries
Sec.1.6,Fig.5 3. NWI map with site boundaries
Sec.1.6,Fig.4 4. Aquifer map with site boundaries
Sec.1,Plate1 C. Predevelopment drainage plan
Sec.1,Plate2 D. Postdevelopment drainage plan

E. Runoff analysis (predevelopment and postdevelopment)

Att.8.1 1. Curve number computations
Att.8.1 2. Time of concentration calculations
Att.8.1 3. Travel time calculations
Att.8.1 4. Peak discharge calculations
Att.8.1 5. Reservoir routing calculations

Section 9. Temporary and Permanent Erosion and Sediment Control

Section 10. Landscape Plan

SECTION 1

DEVELOPMENT DESCRIPTION

1.0 Overview

Gringolet Associates is proposing to develop a one-story 9,200 square foot warehouse/office building on the existing 75,180 square foot lot off of Rice Street. An 11-space parking lot is also proposed as part of this development.

1.1 Existing and Proposed Easements/Rights-of-Way

As part of the development, a 24-foot access drive is proposed in the existing 40-foot right-of-way leading onto the existing lot. Also, DeLuca-Hoffman Associates, Inc. proposes to run a culvert under the 24-foot access drive which will require a one-time easement for the abutting property owners. The location of this easement is shown on Sheet 4 of the attached plan set.

1.2 Natural Resources

There is an embankment with a stream in the valley on the southern portion of the existing lot. As part of the Natural Resource Protection Act, any structures within the proposed development must be set back 25 feet from the embankment of the stream. This requirement has been accounted for in the layout plan.

1.3 Subsurface Conditions

According to the Medium Intensity Soil Survey for Cumberland County, the development site consists of the following soil(s):

Sn – Scantic silt loam

Scantic soils are normally indicative of wet areas. However, in this case the majority of the site sits high atop a plateau where the soils appear more granular. Wet soils are primarily confined to the lower elevations of the nearby ravine. According to the National Wetland Inventory (NWI) for Portland (North), Maine, there are no wetlands delineated in the development vicinity. Please see Figures 1 and 2 attached showing the soils and wetland areas with respect to the development location.

1.4 Infrastructure

The proposed development will include the following infrastructure modifications, as shown on Sheet 3 of the attached plan set:

- Installation of new water/sewer line utilities off the existing 12" sewer and 12" water on Rice Street.
- Construction of new, 24-foot access road from Rice Street through the existing 40-foot right-of-way onto the existing lot.
- Power and telephone will extend overhead into the site.

1.5 Construction Plan

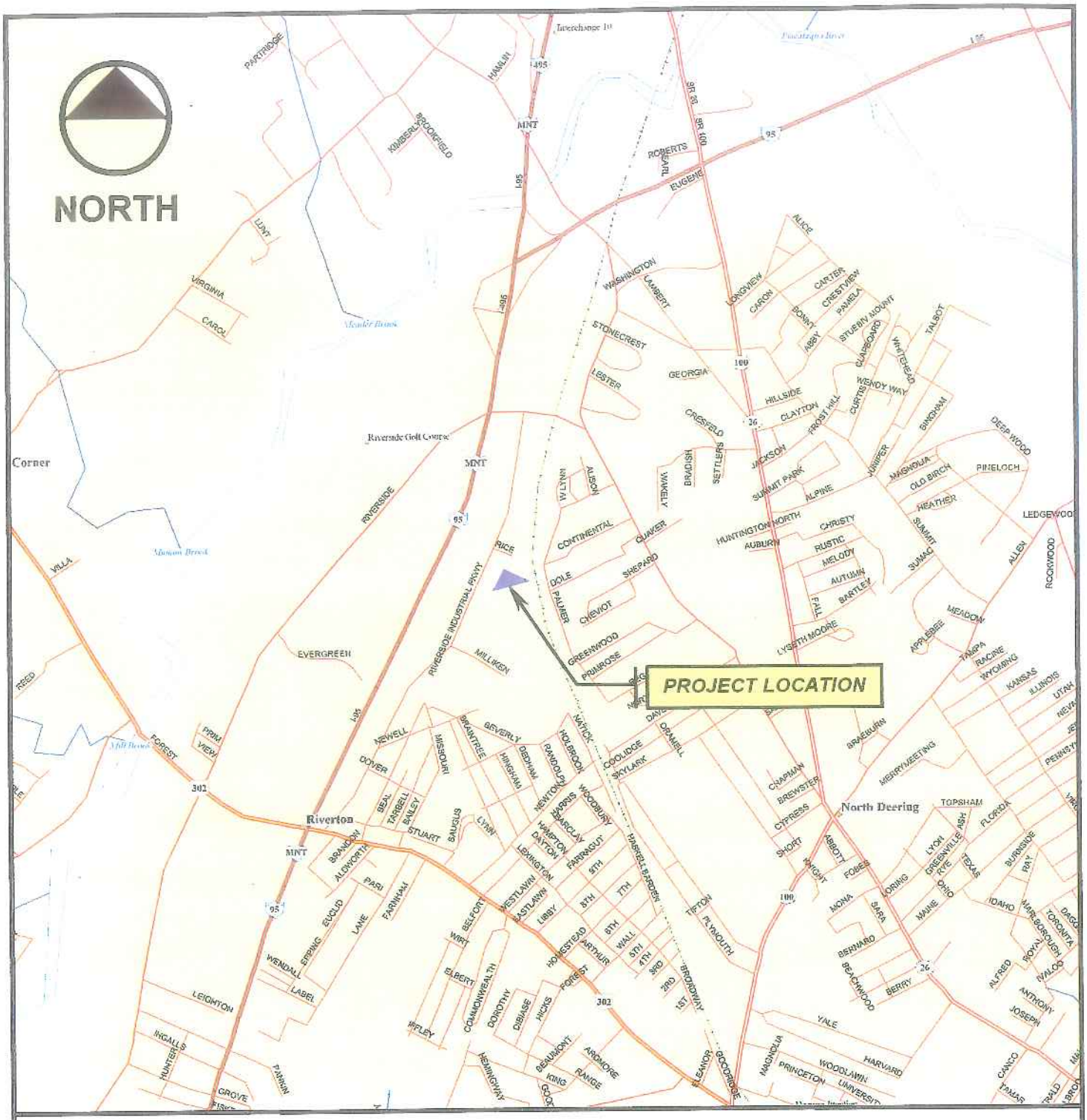
Table 1.1 - The proposed schedule developed for this project is as follows:		
Item	Site Work	Buildings
Local Site Plan	May 2002	May 2002
Start Construction	May 2002	May 2002
Building Construction	N/A	May 2002
Complete Site Work	September 2002	September 2002
Complete Building	October 2002	October 2002
Building Occupancy	N/A	October 2002

1.6 Figures, Plates and Drawings

Figure	Description
1	DeLorme Location Map
2	USGS Location Map
3	USDA Medium Intensity Soils Map
4	MGS Sand and Gravel Aquifer Map
5	National Wetland Inventory Map
6	Zoning Map
7	Tax Assessor's Map

Plates	Description
1	Predevelopment Watershed Plan
2	Postdevelopment Watershed Plan

Plan Sheets	Description
1	Cover Sheet, General Notes and Legend
2	Existing Conditions Plan
3	Site Layout and Utilities Plan
4	Grading, Drainage and Erosion Control Plan
5	Site Details
6	Utility, Erosion Control & Storm Drain Details
7	Erosion Control Notes



DeLORME LOCATION MAP

Rice Street Building – Portland, Maine

SOURCE: DeLORME MAP EXPERT; **DATED:** 1993

DeLUCA-HOFFMAN ASSOCIATES, INC.
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778 MAIN STREET, SUITE 8
SOUTH PORTLAND, MAINE 04106
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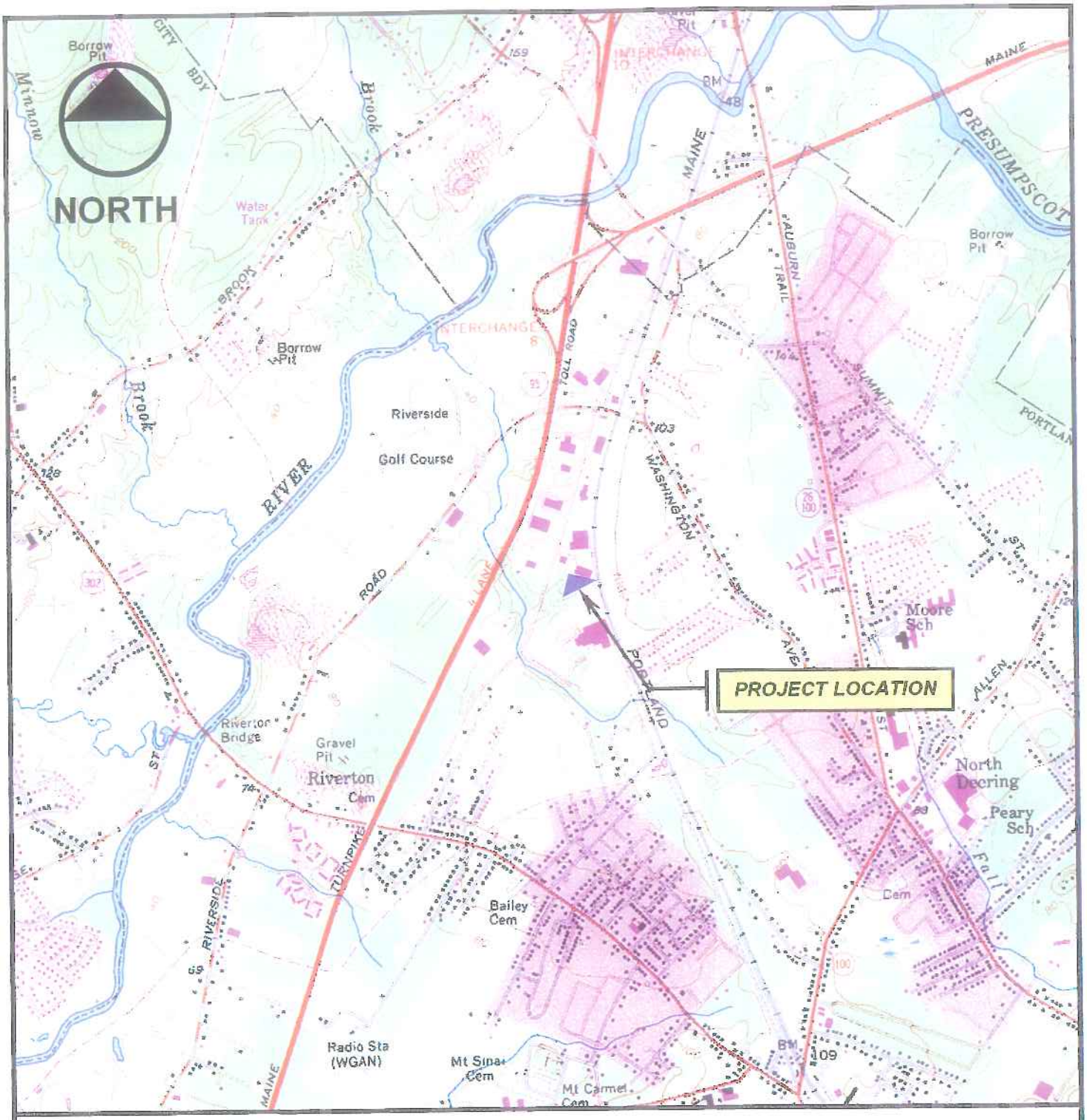
FAX 207-879-0896

DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 2000'+-	1
CHECKED	SRB	JOB NO.	2213	



USGS TOPOGRAPHIC MAP

Rice Street Building – Portland, Maine

SOURCE: TOPOSCOUT; Coastal Maine CD-ROM, USGS Portland West Quadrangle, 7.5 Minute Series (Topographic)

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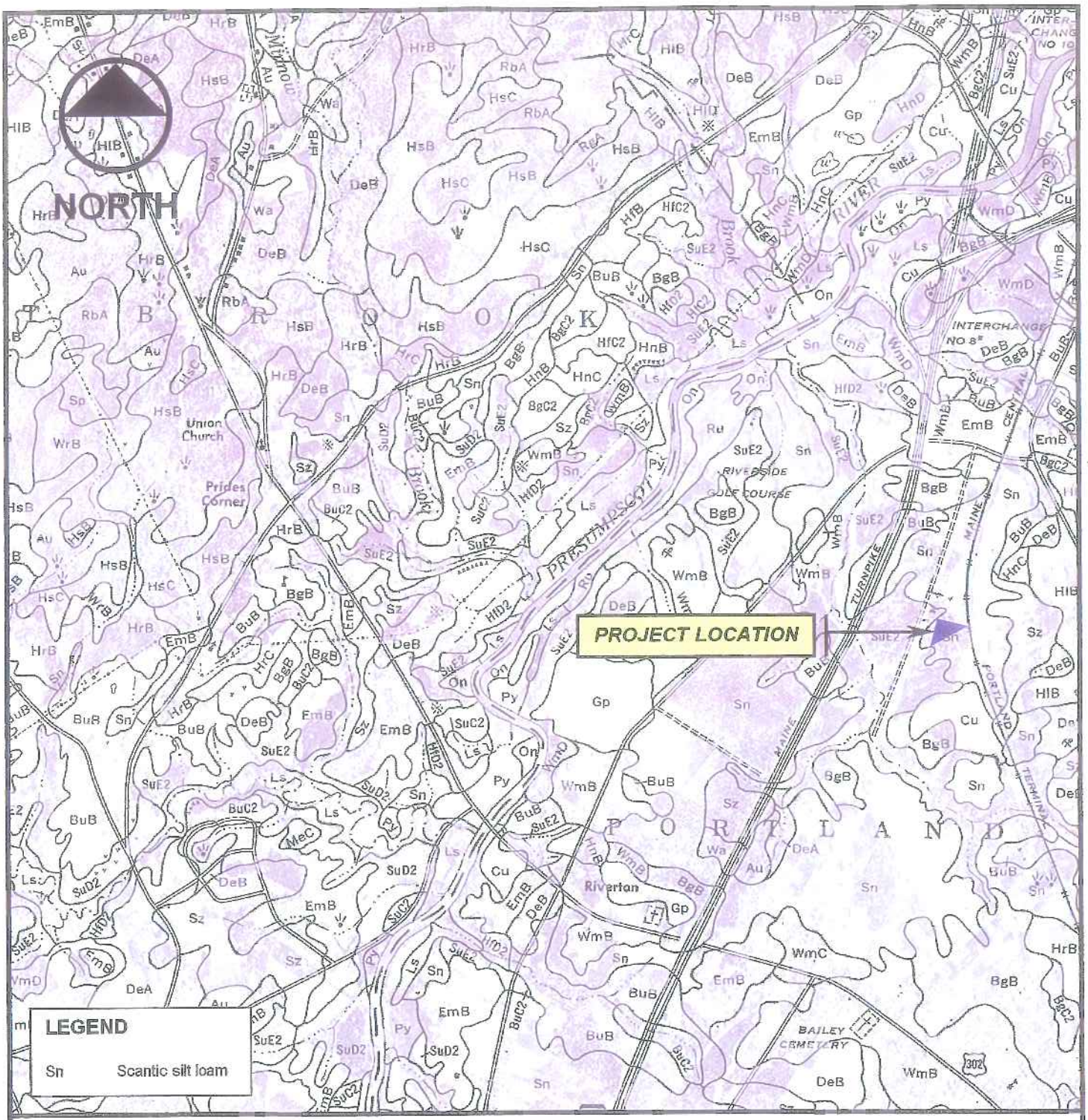
DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 2000'+-	2
CHECKED	SRB	JOB NO.	2213	



USDA SOILS MAP

Rice Street Building – Portland, Maine

SOURCE: SOIL SURVEY, Cumberland County, Maine; **SHEET NUMBER:** 75

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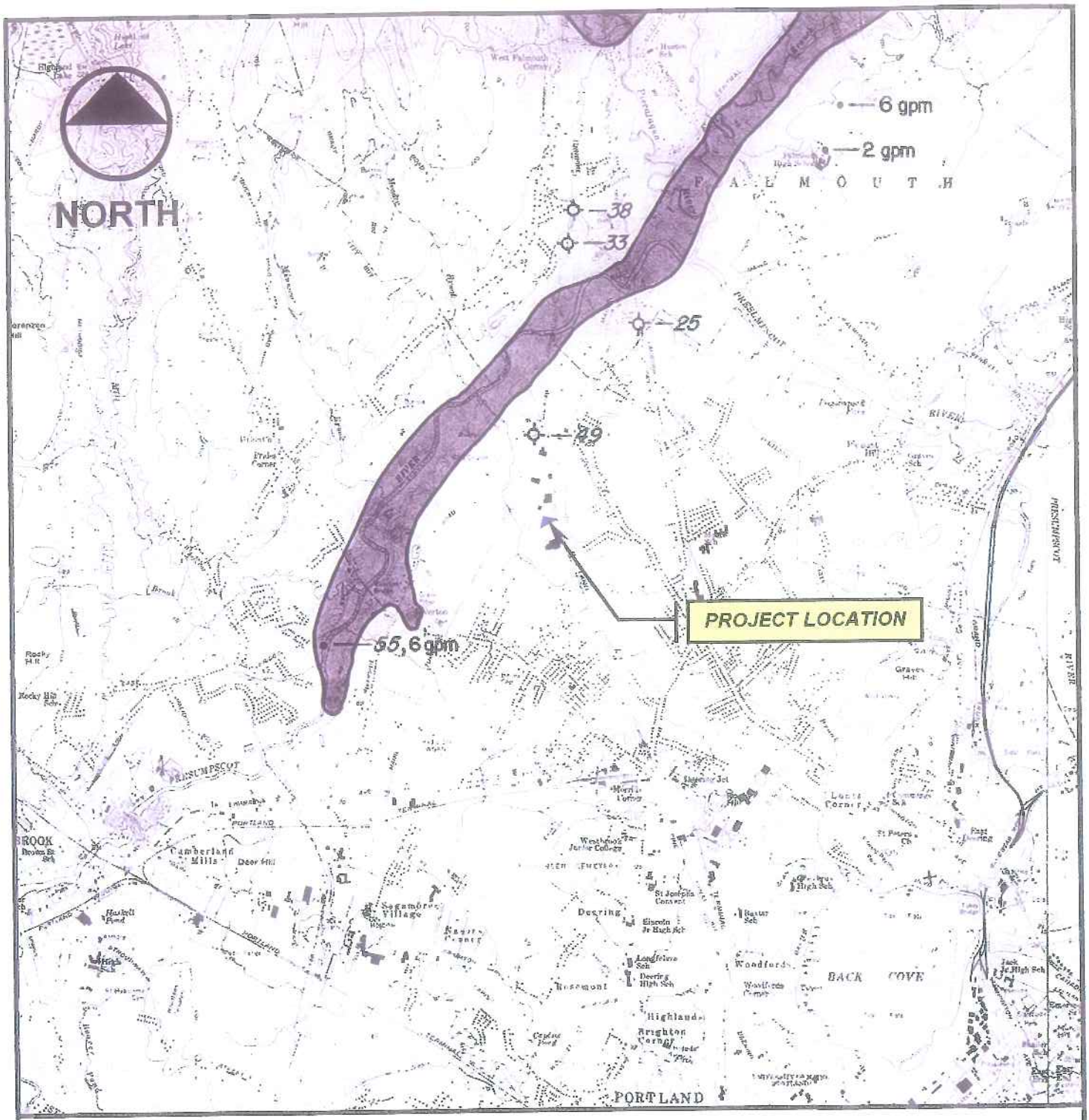
DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 4167'+-	3
CHECKED	SRB	JOB NO.	2213	



MGS SAND AND GRAVEL AQUIFER MAP

Rice Street Building – Portland, Maine

SOURCE: SAND AND GRAVEL AQUIFERS, CUMBERLAND AND YORK COUNTIES, MAINE; **MAP NUMBER:** 5; **OPEN-FILE NO.** 79-6; **DATED:** 1979

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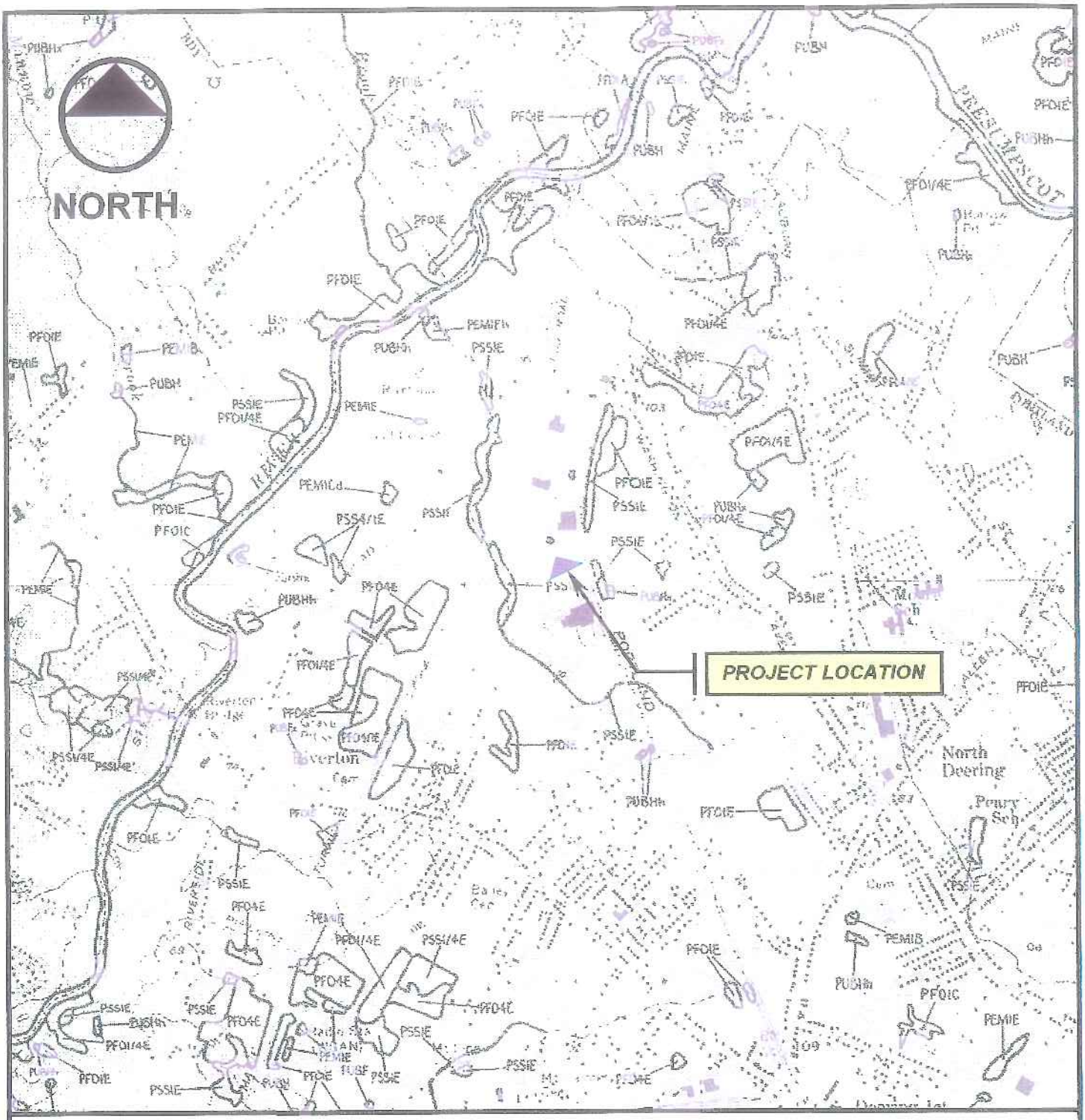
DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 4167'+-	4
CHECKED	SRB	JOB NO.	2213	



NATIONAL WETLANDS INVENTORY MAP

Rice Street Building – Portland, Maine

SOURCE: NATIONAL WETLANDS INVENTORY, PORTLAND WEST QUADRANGLE; **DATED:** 1992

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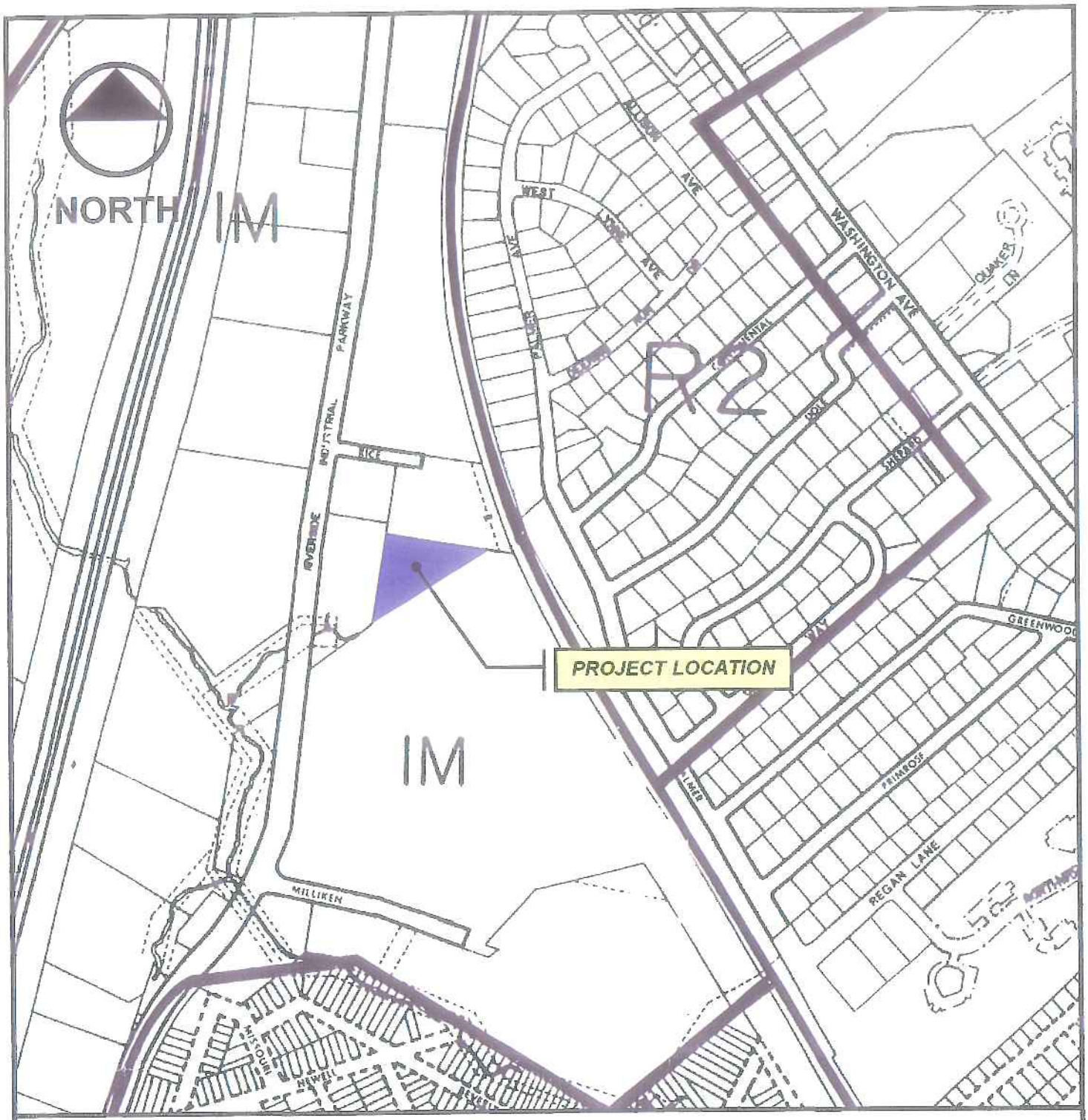
DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 2000'+-	5
CHECKED	SRB	JOB NO.	2213	



ZONING

Rice Street Building – Portland, Maine

SOURCE: CITY OF PORTLAND ZONING MAP

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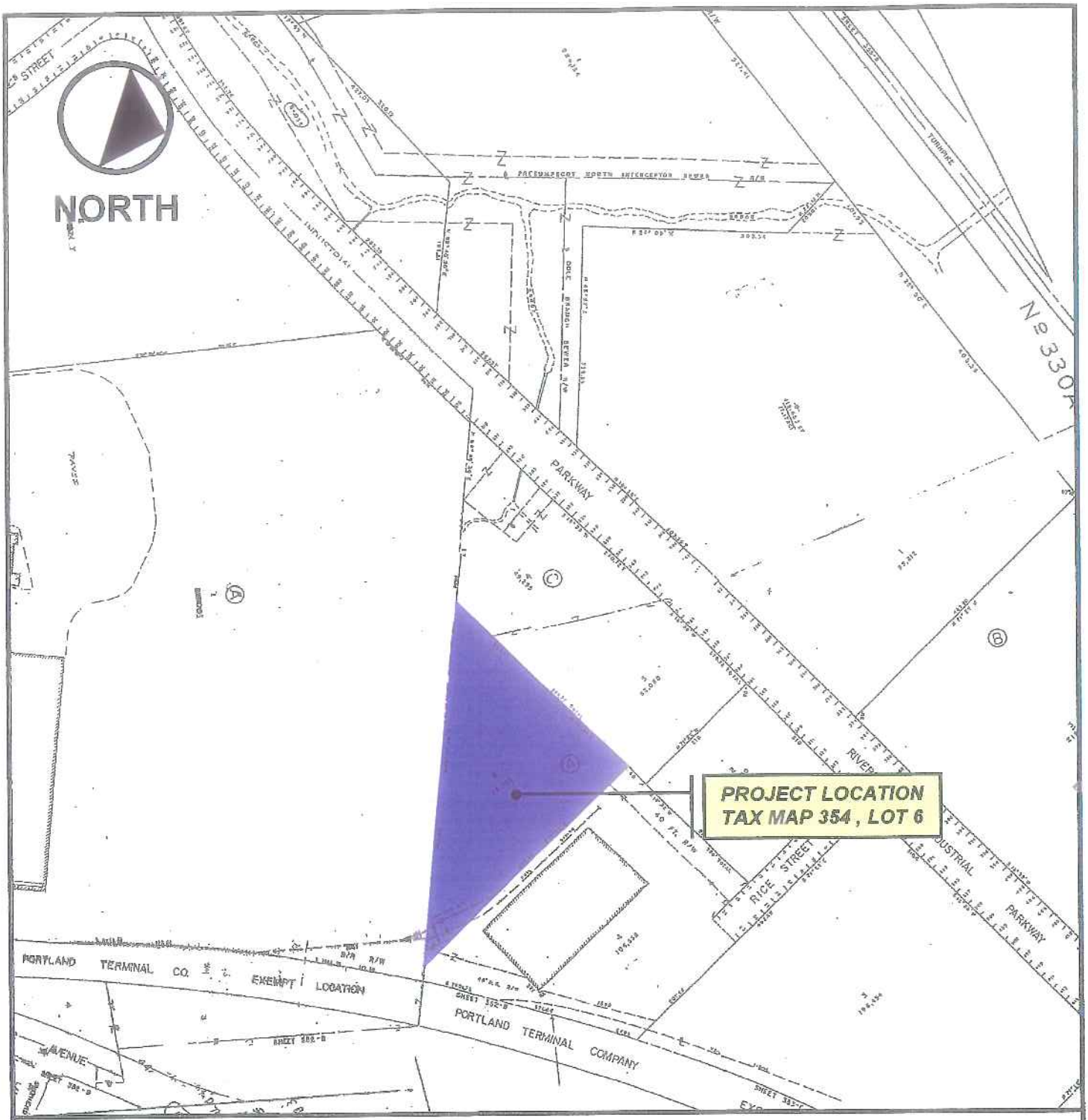
CONSULTING ENGINEERS
778 MAIN STREET, SUITE 8
SOUTH PORTLAND, MAINE 04106
TEL. 207-775-1121
FAX 207-879-0896

DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	N.T.S.	6
CHECKED	SRB	JOB NO.	2213	



PROPERTY TAX MAP

Rice Street Building – Portland, Maine

SOURCE: CITY OF PORTLAND ASSESSOR'S PLAN; **REVISED:** 3-78

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DESIGNED	TD	DATE	OCT. 2001	FIGURE
DRAWN	JDL	SCALE	1" = 2000'+-	7
CHECKED	SRB	JOB NO.	2213	

SECTION 2

TITLE, RIGHT AND INTEREST

2.0 Overview

Gringolet Associates owns the lot proposed for the development. Please see attached supporting documents.

QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS, that PINE TREE COUNCIL, INC. BOY SCOUTS OF AMERICA, a Maine corporation, in consideration of One Dollar ($1.00) and other good and valuable consideration, paid by GRINGOLET ASSOCIATES, a Maine corporation, having a mailing address of 55 Hardy Pond Road, Falmouth, Maine 04105, the receipt whereof it does hereby acknowledge, does hereby REMISE, RELEASE, BARGAIN, SELL and CONVEY and forever QUITCLAIM unto the said GRINGOLET ASSOCIATES, its successors and assigns forever, the following described property:

A certain lot or parcel of land, with any buildings thereon, situated in the City of Portland, County of Cumberland and State of Maine, easterly of but not adjacent to Riverside Industrial Parkway and westerly of but not adjacent to land of the Portland Terminal Company and being all of Lot C on a plan entitled "Composite Plan Riverside Industrial Park", dated April, 1975, and recorded in the Cumberland County Registry of Deeds in Plan Book 108, Page 6, being further bounded and described as follows:

Beginning at an iron set in the ground at the southwesterly corner of land conveyed by Greater Portland Building Fund, Inc. to Maine National Bank, as Trustee under Declaration of Trust entitled Riverside Building Co., by deed dated August 25, 1971, and recorded in said Registry of Deeds in Book 3187, Page 664, said iron being on the easterly line of land conveyed by Greater Portland Building Fund to Anna Belle Aggar by deed dated December 28, 1973 and recorded in said Registry of Deeds in Book 3498, Page 293; thence running South 18° 38' West by said Aggar land, 354.77 feet to the northwesterly line of land conveyed by ADC Building Fund Incorporated to Davis-Greene Co., by deed dated December 18, 1962 and recorded in said Registry of Deeds in Book 2723, Page 182; thence running North 68° 40' 30" East by said Davis-Greene Co. land 552.40 feet to the southeasterly line of land conveyed by Greater Portland Building Fund, Inc. to Maine National Bank, as Trustee under Declaration of Trust entitled Riverside Building Co. as aforesaid; thence running North 71° 22' West by land conveyed to Maine National Bank, as Trustee under Declaration of Trust entitled Riverside Building Co. as aforesaid, 423.42 feet to an iron set in the ground in the easterly line of said Aggar land and the point of beginning.

ALSO hereby conveying a forty (40) foot easement, which is appurtenant to and benefits the above-described premises, to pass and repass on foot and with vehicles at any and all times and to construct, lay and relay, repair, maintain, remove and replace utility pipes, mains and poles and wires upon, under or over said forty (40) foot wide strip together with all necessary fixtures and appurtenances, said forty (40) foot wide strip being bounded and describe as follows:

Beginning at an iron set at the northwesterly corner of land conveyed to Theodore H. Brodie and Glenn A. Brodie as Trustees by deed of Riverside Building Co. dated December 13, 1976. and recorded in said Registry of Deeds in Book 3952, Page 105 (hereinafter referred to as "Brodie land"); thence South 18°

MAINE REAL ESTATE TAX PAID

38' West by the westerly boundary of said Brodie land two hundred fifty (250) feet to another iron; thence South 71° 22' East by the above-described premises forty (40) feet to another iron; thence running North 18° 38' East two hundred fifty (250) feet to another iron; thence running North 71° 22' West forty (40) feet to the point of beginning.

Said forty (40) foot right of way and said Brodie land are shown on a plan made for Theodore H. Brodie by H. I. and E. C. Jordan dated November 17, 1976.

Being the same premises conveyed to Pine Tree Council, Inc. Boy Scouts of America by Riverside Building Co., by Quitclaim Deed dated December 31, 1979 and recorded in the Cumberland County Registry of Deeds in Book 4548, Page 213.

TO HAVE AND TO HOLD the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to GRINGOLET ASSOCIATES, its successors and assigns, to it and their use and behoof forever.

And it does COVENANT with the said Grantee, its successors and assigns, that it will WARRANT and DEFEND the premises to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons claiming by, through or under it.

IN WITNESS WHEREOF, the said PINE TREE COUNCIL, INC. BOY SCOUTS OF AMERICA has caused this instrument to be duly executed this 26 day of April, 2001.

WITNESS:

PINE TREE COUNCIL, INC. BOY SCOUTS OF AMERICA

By: Rees A. Falkner
Name:
Title: REES A. FALKNER
Scout Executive

STATE OF MAINE
CUMBERLAND, ss.

April 2, 2001

Then personally appeared before me the above-named Rees A. Falkner, Executive Director of PINE TREE COUNCIL, INC. BOY SCOUTS OF AMERICA, and acknowledged the foregoing instrument to be his free act and deed in said capacity, and the free act and deed of PINE TREE COUNCIL, INC. BOY SCOUTS OF AMERICA.

Notary Public/Attorney-at-Law

Print Name: ALAN ATKINS

~~My Commission Expires:~~

P:\DLO\GRINGOLE\RICEST\QUITCLAIMDEED.DOC

SECTION 3

FINANCIAL CAPACITY

3.0 Overview

Gringolet Associates is financing the proposed development. A copy of the agreement and estimate for the proposed development accompanies this report.

Peoples
A Banknorth Company

December 3, 2001

Sarah Hopkins, Development Review Program Manager
City of Portland - Planning & Urban Development
389 Congress Street
Portland, Maine 04101

RE: Hardypond Construction

Dear Ms. Hopkins:

Hardypond Construction has been a valued customer of Peoples Heritage Bank for over eight years now. Hardypond Construction and its affiliates have a comprehensive commercial lending and depository relationship with the Bank and it has always been handled as agreed without exception.

Based upon the information that Mr. Gaudreau has provided the Bank regarding the development of an 8,800 sq. ft. warehouse building in Portland, Hardypond Construction has the financial capacity to embark on such a project.

If I can be of further assistance, please do not hesitate to call me at 761-8782.

Sincerely,

Patricia L. Camelio
Vice President

Cc: Robert J. Gaudreau

DeLuca-Hoffman Associates, Inc.
778 Main Street
Suite 8
South Portland, Maine 04106

Rice Street Warehouse/Office
Portland, Maine
JN 2213

Engineer's Opinion of Cost
DESIGN DEVELOPMENT
Onsite Costs

I. EARTHWORK

Item	Description	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Clear Grub and Site Prep	0.92	ACRE	$ 500.00	$ 460.00
2	Common Excavation	1050	CY	$ 5.00	$ 5,250.00
3	Common Borrow	100	CY	$ 8.00	$ 800.00
4	Structural fill as building subgrade	285	CY	$ 12.00	$ 3,420.00
	Subtotal				$ 9,930.00

II. PARKING, DRIVES AND SIDEWALKS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Base Gravel, MDOT Type A Modified	192	CY	$ 16.00	$ 3,072.00
2	Subbase Gravel, MDOT Type D	535	CY	$ 13.00	$ 6,955.00
3	Bituminous Binder, MDOT Grade B	185	TON	$ 44.00	$ 8,140.00
4	Bituminous Surface, MDOT Grade C	138	TON	$ 44.00	$ 6,072.00
5	Concrete Sidewalk	37	SY	$ 100.00	$ 3,700.00
6	Granite Curb, Type 5 Sloped	80	LF	$ 16.00	$ 1,280.00
7	Curb Stop	4	EA	$ 150.00	$ 600.00
8	Pavement Striping	1	ALLOW	$ 150.00	$ 150.00
	Subtotal				$ 29,969.00

III. UTILITIES

Water

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	6" Dia. Water Main	315	LF	$ 30.00	$ 9,450.00
2	12"X6" TEE	1	EA	$ 500.00	$ 500.00
3	6" Valve	1	EA	$ 250.00	$ 250.00
4	6" Bend	1	EA	$ 200.00	$ 200.00
	Subtotal				$ 10,400.00

Sanitary Sewer

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	8" Dia. PVC	327	LF	$ 32.00	$ 10,464.00
2	12"X8" TEE	1	EA	$ 500.00	$ 500.00
3	4' Diam Sewer Manhole	1	EA	$ 2,400.00	$ 2,400.00
	Subtotal				$ 13,364.00

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DESIGN DEVELOPMENT
Onsite Costs

Storm Drainage

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	12" Dia. Storm Drain	70	EA	$ 28.00	$ 1,960.00
2	15" Dia. Storm Drain	55	EA	$ 32.00	$ 1,760.00
3	4' Diam Catch Basins	2	LF	$ 1,750.00	$ 3,500.00
4	Catch Basin traps	2	LF	$ 300.00	$ 600.00
5	Outlet Control Structure	1	EA	$ 5,000.00	$ 5,000.00
6	Level Lip Spreader	1	EA	$ 1,000.00	$ 1,000.00
	Subtotal				$ 13,820.00

IV. MISC. SITEWORK/IMPROVEMENTS AND EROSION & SED. CONTROL

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Guard Post Bollards	3	EA	$ 200.00	$ 600.00
2	Guiderail	35	LF	$ 20.00	$ 700.00
3	Landscape	1	ALLOW	$ 1,500.00	$ 1,500.00
4	Riprap	51	SY	$ 25.00	$ 1,275.00
5	Construction Entrance	1	EA	$ 1,650.00	$ 1,650.00
6	Silt Fence	400	LF	$ 3.00	$ 1,200.00
7	12" RCP Culvert	35	LF	$ 40.00	$ 1,400.00
8	Loam and Seed	16	UNIT	$ 350.00	$ 5,600.00
9	Underground Power for Lights	1	ALLOW	$ 5,000.00	$ 5,000.00
	Subtotal				$ 18,925.00

TOTAL	$ 96,408.00

DeLuca-Hoffman Associates, Inc.
778 Main Street
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South Portland, Maine 04106

Rice Street Warehouse/Office
Portland, Maine
JN 2213

Engineer's Opinion of Cost
DESIGN DEVELOPMENT
Onsite Costs

References:

1. Civil/Site Plans by DHAI Oct 2001 Design.
2. Costs for this Cost Opinion is based on similiar projects completed by DHAI.

Notes:

1. The opinions of quantities were derived from preliminary plans prepared by DHAI dated Oct. 2001
2. No provision for upgrading the public utilities has been provided. This work, if required, would be at additional cost.
3. Quantities and work are subject to variations and changes required by regulatory officials.
4. The pavement quantities are based on the following:

	Standard Pavement	Heavy Duty Pavement
Surface Pavement	1.5"	1.5"
Binder Pavement	2"	2"
Base Gravel	3"	3"
Subbase Gravel	12"	15"

5. The following are allowances only:
   A. Erosion control is also based on assumed locations.
   B. Landscape is an allowance only.
6. The overal estimate cost does not include structural quantities associated with the construction of the warehouse office building.
7. In providing this opinion of probable construction cost, it is understood the Consultant has no control over the cost or availability of labor, equipment, or materials, or over market conditions or the Contractor's method of pricing, and that the Consultant's opinions of probable construction costs are made on the basis of the Consultant's professional judgement and experience. The Consultant makes no warranty, express or implied, that the bids or the negociated cost of the work will not vary from the Consultant's opinion of probable construction cost.

SECTION 4

TECHNICAL ABILITY

4.0 Overview

The applicant has contracted the site development design and environmental permitting work to DeLuca-Hoffman Associates, Inc., a civil engineering firm located in South Portland, Maine. DeLuca-Hoffman Associates, Inc. was founded in 1986 and has provided engineering services to private, industrial, commercial, municipal and governmental clients for the past 15 years. Please find attached DeLuca-Hoffman Associates, Inc. qualification materials.

SECTION 5

UNUSUAL NATURAL AREAS, WILDLIFE AND FISHERIES HABITATS OR ARCHAEOLOGICAL SITES

5.0 Overview

The respective Agencies have been contacted in regards to the location of the proposed development for unusual areas, wildlife and fisheries habitats, and archaeological sites. It was determined by these agencies that there are no concerns in the development vicinity for any of these criteria.

SECTION 6

REVIEW CRITERIA

City of Portland, Maine Standards
Requirements for Site Approval

6.1 Provisions for traffic and pedestrian circulation both on and off the site

Access to the site from Rice Street will not aggravate or create a significant hazard to the safety of intersections in the project vicinity. Providing a drive exit onto Rice Street is not anticipated to create any significant impact to the intersection of Rice Street and Riverside Industrial Parkway due to the street being a dead end street.

6.2 Construction of new structures and parking requirements

The proposed new structure has a total floor area of 9200 square feet and under Article II of the Zoning Ordinance, off-street parking is not required. The parking supplied is based on foreseeable demand for the proposed site.

6.3 Impact of bulk, location or height of proposed buildings and structures on the neighbors

The proposed building and structures will have no adverse affects on abutting landowners. The building has been set back from the property lines as per Article III of the Portland Code.

6.4 Impact on value of neighboring property due to proposed buildings

The proposed building should not affect the values of abutting structures. The proposed new building will be constructed in a zone designated for industrial use.

6.5 Affect of proposed project on public utilities

The proposed project will not adversely affect the public utilities of the City of Portland.

6.6 On-site landscaping to provide a buffer with neighboring uses

The proposed development is 50 feet from the nearest building. Vegetated screening will be provided between all adjacent buildings and the proposed development.

6.7 The site plan minimizes to the extent feasible, any disturbance or destruction of significant vegetation

The proposed project site plan minimizes the disturbance of existing vegetation as shown on page 4 of the plan set.

6.8 Site plan does not create any significant soil or drainage problems

See page 4 of the plan set.

6.9 **Provision of appropriate exterior lighting**

The planned additional exterior lighting will not be hazardous to motorists traveling on adjacent streets due to the setback of the development from Rice Street. The lighting is adequate for users of the site and will not spillover or glare onto abutting properties.

6.10 **The development will not create fire or other safety hazards and provides adequate access to the site and to the buildings on the site for emergency vehicles**

A twenty-four foot ingress/egress access drive is proposed for the development which will provide adequate access to the site for emergency vehicles.

6.11 **The proposed development is designed so as to be consistent with off-premises infrastructure, existing or planned by the City of Portland**

The development does not interfere with any or proposed city infrastructure.

6.12 **Pertaining to industrial development**

N/A

6.13 **Pertaining to development in R-P Zone**

N/A

6.14 **Pertaining to planned unit developments**

N/A

6.15 **Pertaining to multi-family developments**

N/A

6.16 **Pertaining to development in B-3 Zone**

N/A

6.17 **The applicant has submitted all information required by this article and the development complies with all applicable provisions of this Code**

The application compiled addresses all provisions noted in this code to the best of our knowledge.

6.18 **Proximity to any landmark, historic district or historic landscape district**

The proposed structure is not within 100' of any landmark, historic district or historic landscape district to the best of our knowledge.

6.19 **Pertaining to view corridors**

N/A

6.20 **No adverse affect on existing natural resources**

No adverse affect on existing natural resources is anticipated from the proposed development. Stormwater runoff from paved areas is treated by use of Casco traps in catch basins and a stormwater detention basin.

6.21 **Pertaining to discharge to a significant groundwater aquifer**

According to the Portland west quadrangle map of the Maine Geological Survey, there is no significant aquifer in the vicinity of the project location.

6.22 **Pertaining to signs**

No signs are anticipated for the proposed project. No ingress/egress driveways are within 30 feet of an intersection.

6.23 **Pertaining to denial of sign under Section 14-369.5**

N/A

6.24 **Pertaining to major or minor businesses**

N/A

6.25 **Pertaining to development in industrial zones**

Landscaping has been provided to screen /enhance and buffer the property from all adjacent properties. The development has preserved the existing landscape to the greatest extent possible as shown on Sheet 4 of the plan set.

6.26 **Pertaining to development in B-5 and B-5b zones**

N/A

SECTION 7

SOLID WASTE

7.0 Overview

This section provides the estimates, the use of recycling, the transport and disposal of solid waste, which will be generated by the construction and operation of the proposed development.

7.1 Solid wastes generated during construction of the site work

The solid wastes generated during construction consist of tree clearing and stump removal.

The contractor will be permitted to dispose of trees and limbs by chipping with the biomass hauled to a biomass burner or use of the material as erosion control mix. Many of the trees are suitable for sale as saw logs. The contractor will be provided the following options for stump disposal:

- On-site chipping – to be used for erosion control mix or landscape mulch
- Transport to Riverside Transfer Station in Portland, Maine or another licensed facility.

7.2 Solid wastes generated from the operation of the Development

Please refer to the attachment on the following page. Cardboard from packaging will be compressed and privately hauled off. A dumpster will be provided for miscellaneous office wastes and will be hauled off by a private contractor. The development is expected to generate less than 10 cubic yards of solid waste per week.

Computations of Types and Volumes of Solid Wastes for Development Project

Solid Wastes Computations and Disposal

• Type	Wood waste from clearing	
• Basis of Quality Computations	Assume 400cy of stump/acre	
• Site Work Construction	Area to be cleared	Volume @ 400cy/acre
	0.8 acres	320 c.y.

SECTION 8

SURFACE DRAINAGE AND RUNOFF

8.0 Introduction

The following stormwater runoff analysis has been prepared for Gringolet Associates for the construction of warehouse/office facilities off of Rice Street.

8.1 Existing Conditions

The 1.73-acre triangular-shaped site is located off of Rice Street in Portland, Maine and consists of undeveloped woodlands. The site abuts natural drainageways to the north and south. A ravine on the south side is approximately 18 feet deep compared to the relatively flat development area in the middle of the site. Approximately half of the stormwater runoff flows via overland to the stream that runs along the southern border of the project site.

The remainder of the stormwater runoff flows via overland flow to the tributary swale to the north and eventually ties into the stream that runs from east to west along the southern border of the project site.

Based on the USDA medium intensity soil survey for Cumberland County, surficial soils across the site consist of Scantic Silt loam. These soils tend to be poorly drained. These soils appear to actually be confined to the lower ravine areas. More well drained soils appear within the development area.

Based on the National Wetlands Inventory for Portland, Maine (north) region, there are no mapped wetlands shown in this area. Soils and wetland maps are included as Figure 2 and 3 in this section of the application. The applicant has walked the site with Doug Burdick of the Maine Department of Environmental Protection. Mr. Burdick identified the ravines as containing wetland resources and a stream.

8.2 Proposed Conditions

The proposed project consists of constructing a twenty-four-foot access drive in the existing forty-foot Public Right Of Way, a 9,200 square foot warehouse/office facility and 11-space parking lot that will result in approximately 0.70 acres of new impervious surface. Approximately 10 percent of the new impervious surface will sheet flow off into adjacent wooded area. The runoff from the remainder of the site will be collected in the proposed storm drain system that will discharge to a detention basin. The detention basin will discharge to a level spreader and will sheet flow into a existing vegetated buffer prior to discharging to the stream to the south of the project site. The basin's outfall will extend offsite and will require a drainage easement from the abutting property owner.

8.3 Stormwater Runoff Analysis

The SCS medium intensity survey for Cumberland County was used to delineate surficial soil conditions for onsite areas. The soils with the site were classified as hydrologic soil group D.

Hydrological analysis for the pre-development and post development conditions have been conducted based on the methodology outlined in the Soil Conservation Service (SCS) Technical Release 20 (TR-20). The HydroCAD computer program has been used in this analysis.

The design storms used for this analysis were the 2, 10, and 25-year frequencies. Total 24-hour rainfall amounts for these storm events are 3.0, 4.7 and 5.5 inches, respectively. The rainfall distribution for this location is a Type III storm.

Land use cover, delineation of watershed subcatchments, hydraulic flow paths and hydrologic soil types were obtained using the flowing data sources:

1. Portland, WEST USGS 7.5 Minute Quadrangle
2. Sheet 75 of the SCS Medium Intensity Soil Survey for Cumberland County
3. On-site topographic survey with 1-foot contour intervals prepared by Stephen Martin, In. of Gorham, Maine.
4. Field reconnaissance by DeLuca-Hoffman, Associates, Inc.

Details of these calculations can be found in Attachment 8.1 following this report.

8.4 Conclusion

Runoff rates from the site have been analyzed for the existing and proposed conditions. Runoff rates would increase at the point of interest due to the proposed development without stormwater management. A storm drain system and a detention basin have been designed to reduce runoff to at or below existing runoff rates. A summary of the existing and proposed peak runoff rates is provided in Table 8.1 below.

Table 8.1
Summary of Peak Flows (CFS)

	2 year storm	10 year storm	25 year storm
Existing	2.57	5.67	7.22
Proposed	2.55	5.54	7.10

Attachment 8.1

Runoff Analysis (Pre and Postdevelopment)

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JOB 2213 - RICE ST.
SHEET NO. 1 OF 5
CALCULATED BY TDD DATE 10/5/01
CHECKED BY DATE
SCALE Stormwater Modelling

Task: Calculater Pre/Post-Development Watershed Runoff Quantities.

References: ① USDA Medium Intensity Soil Survey - Sheet 75 Cumberland County
② Survey by
③ TR20 - Hydrocad
④ TR55

Assumptions:
- Survey limited so field recon. to establish boundaries of watershed.
- for conservatism all soils classified as HSG D soils.

Calculations:

Pre-Development

Step 1. Planimeter Watershed Area = 2.43 Acres

Step 2: Planimeter Subcatchments:

- Subcatchment #1 = 1.03 Acres
- Subcatchment #2 = 0.65 Acres
- Subcatchment #3 = 0.75 Acres

Step 3: Determine Soil types ①

- All soils classified HSG D

Step 4: Determine Surface types/CN values ④ and subsequent areas (using planimeter):

- Subcatchment #1: Woods Good, CN = 77, A = 1.01 Acres
  Gravel, CN = 91, A = 0.02
- Subcatchment #2: Woods Good, CN = 77, A = 0.65 Acres
- Subcatchment #3: Woods Good, CN = 77, A = 0.54 Acres
  Gravel, CN = 91, A = 0.09 Acres
  Impervious, CN = 98, A = 0.12 Acres

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JOB 2213
SHEET NO. 2 OF 5
CALCULATED BY TDD DATE 10/5/01
CHECKED BY DATE
SCALE

Step 5: Diagram of Results Steps 1-4

Surface	CN	$A_{SUB\#1}$	$A_{SUB\#2}$	$A_{SUB\#3}$	Totals
woods	77	1.01	0.65	0.54	2.20
Gravel	91	0.02	0.00	0.09	0.11
Imp	98	0.00	0.00	0.12	0.12
		1.03 ✓	0.65 ✓	0.75 ✓	2.43 ✓

Step 6: Determine flow paths (Tc) for Subcatchments:

- Subcatchment #1: SF 45' $S = \frac{80.1 - 79}{45} = 0.0244$

  SF 65' $S = \frac{79 - 71}{65'} = 0.1231$

  SCF 80' W = 8', D = 5', $S = \frac{71 - 51}{80'} = 0.25$

  CF 245' W = 10', D = 5', SS = 0.50 $S = \frac{51 - 46}{245} = 0.0204$
  n = 0.05

- Subcatchment #2: SF 65' $S = 80.1 - 79/65 = 0.0169$

  SF 85' $S = 79 - 75/85 = 0.0471$

  SCF 80' $S = 75 - 58.1/80' = 0.2113$ W = 5', D = 2'

  CF 160' $S = 58.1 - 48.9/160 = 0.0603$ W = 10', D = 5' n = .05

- Subcatchment #3: SF 90' $S = 79 - 75.9/90 = 0.0356$

  SF 110' $S = 75.9 - 75/110 = 0.0073$

  CF 15' $S = 75 - 68/15 = 0.4667$

  CF 120' $S = 68 - 61/120 = 0.0583$

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JOB 2213
SHEET NO. 3 OF 5
CALCULATED BY TDD DATE 10/5/01
CHECKED BY DATE
SCALE

Step 7: Define Reaches

- Reach 1: Point of interest #1
- Reach 2: L = 45' S = 48.4 - 46/45 = 0.0603
  w = 10', D = 5', n = 0.05
- Reach 3: L = 200' S = 61 - 48.4/200' = 0.0603
  w = 10', D = 5', n = .05

Post-Development

Step 8: Planimeter Subcatchments

- Subcatchment #1 = 0.90 Acres
- Subcatchment #2 = 0.31 Acres
- Subcatchment #3 = 0.26 Acres
- Subcatchment #4 = 0.61 Acres
- Subcatchment #5 = 0.35 Acres

Step 9: Determine Surface Types / CN Values / Subsequent Areas

- Subcatchment #1: Woods Good, CN = 77, A = 0.86 Acres
  Gravel, CN = 91, A = 0.02 Acres
- Subcatchment #2: Woods Goods, CN = 77, A = 0.31 Acres
- Subcatchment #3: Woods Good, CN = 77, A = 0.26 Acres
- Subcatchment #4: Open Space, CN = 80, A = 0.04 Acres
  Impervious, CN = 98, A = 0.57 Acres
- Subcatchment #5: Woods Good, CN = 77, A = 0.14
  Gravel, CN = 91, A = 0.09
  Imp., CN = 98, A = 0.12

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SHEET NO. 4 OF 5
CALCULATED BY TDD DATE 10/5/01
CHECKED BY DATE
SCALE

Step 10: Diagram of Results Steps B and 9

Surface	CN	Asub#1	Asub#2	Asub#3	Asub#4	Asub#5	Totals
Woods	77	0.88	0.31	0.26	0.00	0.14	1.59
Gravel	91	0.02	0.00	0.00	0.00	0.09	0.11
Imp	98	0.00	0.00	0.00	0.57	0.12	0.69
Open Space	80	0.60	0.00	0.00	0.04	0.00	0.04
		0.90	0.31	0.26	0.61	0.35	2.43

Step 11: Determine flow Paths (Tc) for Subcatchments

- Subcatchment #1: SF 115' $S = 83.5 - 79/115 = 0.0391$
  SCF 30' $S = 79 - 60/30 = 0.6333$
  CF 460 $S = 55.946/460 = 0.0204$
- Subcatchment #2: SF 70' $S = 76 - 67.2/90 = 0.1286$
  SCF 20' $S = 67 - 53.2/20 = 0.6900$
  CF 80 $S = 53.2 - 48.4/80 = 0.0603$
- Subcatchment #3: SF 80 $S = 79 - 75.8/80 = 0.04$
  SCF 110 $S = 75.8 - 75/110 = 0.0073$
  SCF 15 $S = 75 - 69/15 = 0.4667$
  SCF 115 $S = 68 - 61.1/115 = 0.0603$
- Subcatchment #4: $T_c = 5$ min
- Subcatchment #5: SF 100 $S = 80.1 - 77/100 = 0.031$
  SCF 30 $S = 77 - 73.9/30 = 0.103$

Step 12: Define Reaches

- Reach 1: Point of interest
- Reach 2: Same as Pre
- Reach 3: Same as Pre
- Reach 4: L = 70' S = 0.1192
- Reach 5: L = 125' S = 0.0204
- Reach 6 L = 110' S = .1419

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JOB 2213
SHEET NO. 5 OF 5
CALCULATED BY TDD DATE 10/5/01
CHECKED BY DATE
SCALE

Step 13: Approximate Vs needed for storage basin using TR55

EQ $V_S/V_R = C_0 + C_1(q_o/q_i) + C_2(q_o/q_i)^2 + C_3(q_o/q_i)^3$

Given: ① 25 YR Storm, Type III Distr., Cumberland SE = 5.5"

② Subcatchment 4 - Goes to Basin

③ $C_0 = 0.682$, $C_1 = -1.43$, $C_2 = 1.64$, $C_3 = -.804$

$V_R = Q A_{SUB\,4}$

$$Q = \frac{[P - 0.2(1000/CN - 10)]^2}{P + 0.8(1000/CN - 10)}$$

$1000/CN - 10 = 1000/97 - 10 = 0.3093$

$$Q = \frac{[5.5 - 0.2(.3093)]^2}{5.5 + 0.8(.3093)} = 5.145 \text{ in}$$

$$V_R = [5.145 \text{ in}(0.61 \text{ Acres})]\left(3630 \frac{CF}{\text{Acre.in}}\right) = \underline{11393 \text{ CF}}$$

Determine allowable discharge for basin using hydrocad

q_o = Qpre - Qpost (w/o basin) = 7.22cfs - 5.58 cfs = 1.64 cfs

q_i = peak inflow to pond = 3.08

$$V_S = V_R[C_0 + C_1(q_o/q_i) + C_2(q_o/q_i)^2 + C_3(q_o/q_i)^3]$$

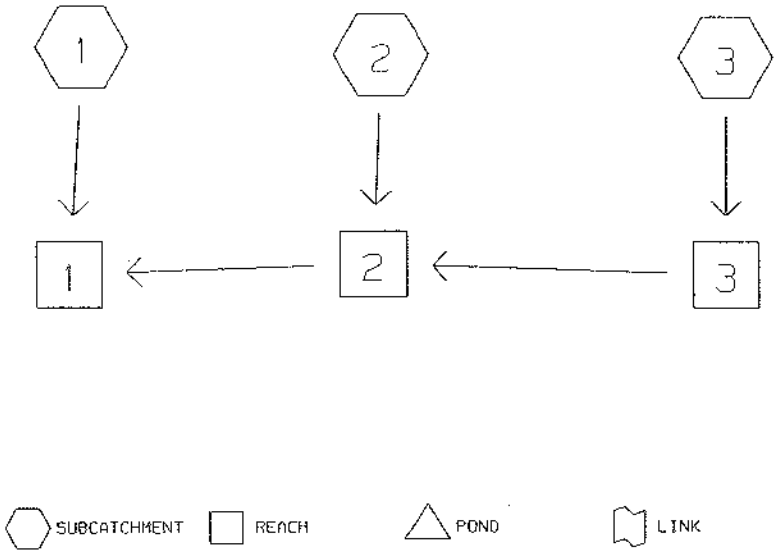
$$= 11393 \text{ CF}[.682 - 1.43(1.64/3.08) + 1.64(1.64/3.08)^2 - .804(1.64/3.08)^3]$$

$$= 3010 \text{ CF}$$

STEP 14: Detention Basin Storage

ELEV	SF
70	370
71	560
72	907
73	1395
74	1893

WATERSHED ROUTING ==========



SUBCATCHMENT 1

PEAK= 1.06 CFS @ 12.11 HRS, VOLUME= .09 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:AB**	8.7
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.1
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.9
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs		
	Total Length= 605 ft Total Tc=	9.7

SUBCATCHMENT 2

PEAK= .58 CFS @ 12.18 HRS, VOLUME= .06 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	7.7
Grass: Short n=.15 L=65' P2=3 in s=.0169 '/'		
TR-55 SHEET FLOW	**Segment ID:**	6.3
Grass: Short n=.15 L=85' P2=3 in s=.0471 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.4
Short Grass Pasture Kv=7 L=80' s=.2113 '/' V=3.22 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.2
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=160' Capacity=1548.3 cfs		
	Total Length= 390 ft Total Tc=	14.6

SUBCATCHMENT 3

PEAK= 1.03 CFS @ 12.10 HRS, VOLUME= .09 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	7.4
Grass: Short n=.15 L=90' P2=3 in s=.0356 '/'		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	1.4
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374'		
s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=120' Capacity=1548.3 cfs		
	Total Length= 335 ft Total Tc=	8.9

REACH 1

Not described

Qin = 2.57 CFS @ 12.13 HRS, VOLUME= .24 AF
Qout= 2.57 CFS @ 12.13 HRS, VOLUME= .24 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 1.54 CFS @ 12.14 HRS, VOLUME= .14 AF
Qout= 1.52 CFS @ 12.14 HRS, VOLUME= .14 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .03 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

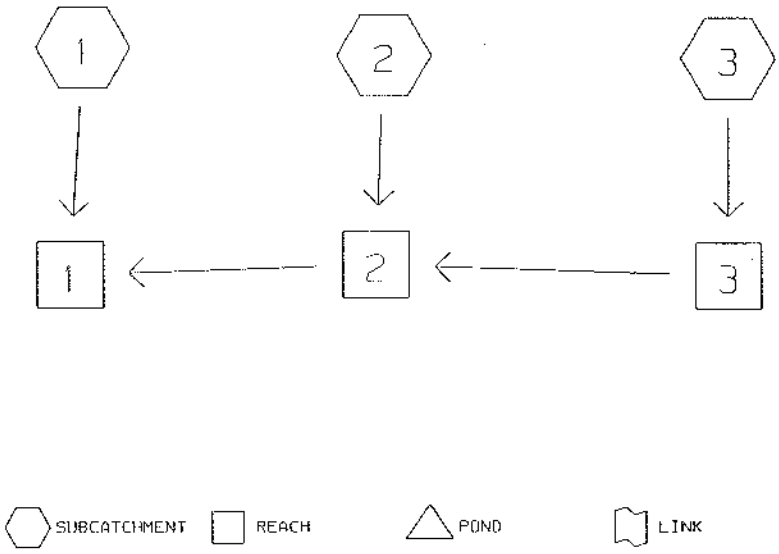
Qin = 1.03 CFS @ 12.10 HRS, VOLUME= .09 AF
Qout= .98 CFS @ 12.12 HRS, VOLUME= .09 AF, ATTEN= 4%, LAG= 1.3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .02 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

WATERSHED ROUTING ==========



SUBCATCHMENT 1

PEAK= 2.42 CFS @ 12.10 HRS, VOLUME= .20 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:AB**	8.7
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.1
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.9
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs		
	Total Length= 605 ft Total Tc=	9.7

SUBCATCHMENT 2

PEAK= 1.32 CFS @ 12.17 HRS, VOLUME= .13 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	7.7
Grass: Short n=.15 L=65' P2=3 in s=.0169 '/'		
TR-55 SHEET FLOW	**Segment ID:**	6.3
Grass: Short n=.15 L=85' P2=3 in s=.0471 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.4
Short Grass Pasture Kv=7 L=80' s=.2113 '/' V=3.22 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.2
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=160' Capacity=1548.3 cfs		
	Total Length= 390 ft Total Tc=	14.6

SUBCATCHMENT 3

PEAK= 2.11 CFS @ 12.09 HRS, VOLUME= .18 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	7.4
Grass: Short n=.15 L=90' P2=3 in s=.0356 '/'		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	1.4
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374'		
s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=120' Capacity=1548.3 cfs		
	Total Length= 335 ft Total Tc=	8.9

REACH 1

Not described

Qin = 5.67 CFS @ 12.12 HRS, VOLUME= .51 AF
Qout= 5.67 CFS @ 12.12 HRS, VOLUME= .51 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 3.31 CFS @ 12.13 HRS, VOLUME= .30 AF
Qout= 3.27 CFS @ 12.13 HRS, VOLUME= .30 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .07 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

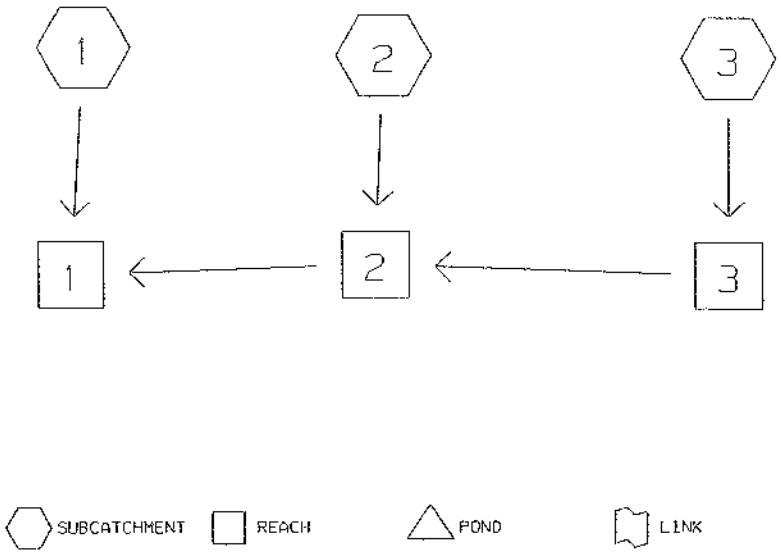
Qin = 2.11 CFS @ 12.09 HRS, VOLUME= .18 AF
Qout= 2.02 CFS @ 12.11 HRS, VOLUME= .18 AF, ATTEN= 4%, LAG= 1.3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .04 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

WATERSHED ROUTING ==========



SUBCATCHMENT 1

PEAK= 3.11 CFS @ 12.10 HRS, VOLUME= .26 AF

ACRES	CN	
1.01	77	WOODS GOOD
.02	91	GRAVEL
1.03	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:AB**	8.7
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.1
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.9
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs		
	Total Length= 605 ft Total Tc=	9.7

SUBCATCHMENT 2

PEAK= 1.69 CFS @ 12.16 HRS, VOLUME= .17 AF

ACRES	CN	
.65	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	7.7
Grass: Short n=.15 L=65' P2=3 in s=.0169 '/'		
TR-55 SHEET FLOW	**Segment ID:**	6.3
Grass: Short n=.15 L=85' P2=3 in s=.0471 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.4
Short Grass Pasture Kv=7 L=80' s=.2113 '/' V=3.22 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.2
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=160' Capacity=1548.3 cfs		
	Total Length= 390 ft Total Tc=	14.6

SUBCATCHMENT 3

PEAK= 2.63 CFS @ 12.09 HRS, VOLUME= .22 AF

ACRES	CN	
.54	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.75	82	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	7.4
Grass: Short n=.15 L=90' P2=3 in s=.0356 '/'		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	1.4
W=10' D=.5' SS= .1 '/' a=7.5 sq-ft Pw=20' r=.374'		
s=.0073 '/' n=.05 V=1.32 fps L=110' Capacity=9.9 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=120' Capacity=1548.3 cfs		
	Total Length= 335 ft Total Tc=	8.9

REACH 1

Not described

Qin = 7.22 CFS @ 12.12 HRS, VOLUME= .65 AF
Qout= 7.22 CFS @ 12.12 HRS, VOLUME= .65 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 4.19 CFS @ 12.13 HRS, VOLUME= .39 AF
Qout= 4.14 CFS @ 12.13 HRS, VOLUME= .39 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .09 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

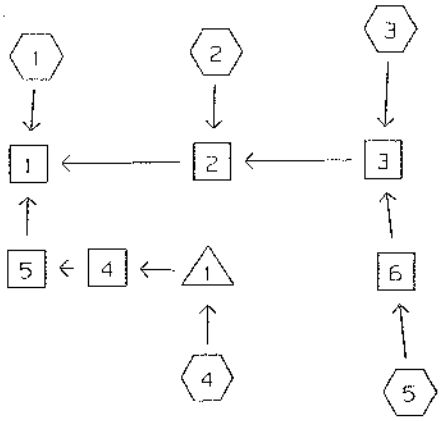
Qin = 2.63 CFS @ 12.09 HRS, VOLUME= .22 AF
Qout= 2.52 CFS @ 12.11 HRS, VOLUME= .22 AF, ATTEN= 4%, LAG= 1.3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .06 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

WATERSHED ROUTING



SUBCATCHMENT 1

PEAK= .93 CFS @ 12.11 HRS, VOLUME= .08 AF

ACRES	CN	
.88	77	WOODS GOOD
.02	91	GRAVEL
.90	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	8.7
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.1
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.9
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs		
	Total Length= 605 ft Total Tc=	9.7

SUBCATCHMENT 2

PEAK= .37 CFS @ 12.02 HRS, VOLUME= .03 AF

ACRES	CN	
.31	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	3.6
Grass: Short n=.15 L=70' P2=3 in s=.1286 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.1
Short Grass Pasture Kv=7 L=20' s=.69 '/' V=5.81 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=80' Capacity=1548.3 cfs		
	Total Length= 170 ft Total Tc=	3.8

SUBCATCHMENT 3

PEAK= .27 CFS @ 12.08 HRS, VOLUME= .02 AF

ACRES	CN	
.26	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	6.4
Grass: Short n=.15 L=80' P2=3 in s=.04 '/'		
RECT/VEE/TRAP CHANNEL	Segment ID:	.4
W=10' D=5' SS= .1 '/' a=300 sq-ft Pw=110.5' r=2.715'		
s=.0073 '/' n=.05 V=4.94 fps L=110' Capacity=1482.5 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=115' Capacity=1548.3 cfs		
	Total Length= 320 ft Total Tc=	6.9

SUBCATCHMENT 4

PEAK= 1.65 CFS @ 12.02 HRS, VOLUME= .14 AF

ACRES	CN	
.04	80	OPEN SPACE
.57	98	IMPERVIOUS
.61	97	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
DIRECT ENTRY	Segment ID:	5.0

SUBCATCHMENT 5

PEAK= .64 CFS @ 12.09 HRS, VOLUME= .05 AF

ACRES	CN	
.14	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.35	88	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 3.00 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	8.5
Grass: Short n=.15 L=100' P2=3 in s=.031 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=30' s=.103 '/' V=2.25 fps		
	Total Length= 130 ft Total Tc=	8.7

REACH 1

Not described

Qin = 2.55 CFS @ 12.11 HRS, VOLUME= .32 AF
Qout= 2.55 CFS @ 12.11 HRS, VOLUME= .32 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 1.12 CFS @ 12.09 HRS, VOLUME= .10 AF
Qout= 1.11 CFS @ 12.10 HRS, VOLUME= .10 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .02 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

Qin = .89 CFS @ 12.09 HRS, VOLUME= .08 AF
Qout= .86 CFS @ 12.12 HRS, VOLUME= .08 AF, ATTEN= 4%, LAG= 1.3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .02 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 4

Qin = .65 CFS @ 12.27 HRS, VOLUME= .13 AF
Qout= .64 CFS @ 12.30 HRS, VOLUME= .13 AF, ATTEN= 1%, LAG= 2.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.00	0.00
.05	1.03	1.40
.10	2.10	4.50
.15	3.23	8.93
.22	4.76	16.48
.30	6.90	29.22
.40	9.60	48.21
.50	12.50	71.47

20' x .5' CHANNEL
SIDE SLOPE= .1 '/'
n= .05
LENGTH= 70 FT
SLOPE= .1192 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .02 FT
PEAK VELOCITY= 1.4 FPS
TRAVEL TIME = .9 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 5

Qin = .64 CFS @ 12.30 HRS, VOLUME= .13 AF
Qout= .63 CFS @ 12.33 HRS, VOLUME= .13 AF, ATTEN= 1%, LAG= 1.6 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	13.70
1.00	12.0	44.96
1.50	19.5	91.76
2.15	30.7	176.10
3.00	48.0	328.79
4.00	72.0	575.18
5.00	100.0	900.57

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 125 FT
SLOPE= .0204 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .02 FT
PEAK VELOCITY= 2.5 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 6

Qin = .64 CFS @ 12.09 HRS, VOLUME= .05 AF
Qout= .62 CFS @ 12.10 HRS, VOLUME= .05 AF, ATTEN= 2%, LAG= .7 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.00	0.00
.25	1.44	5.84
.50	3.26	19.72
.75	5.45	41.36
1.08	8.88	81.92
1.50	14.32	158.42
2.00	22.12	286.65
2.50	31.44	461.28

5' x 2.5' CHANNEL
SIDE SLOPE= .33 '/'
n= .05
LENGTH= 110 FT
SLOPE= .1419 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .03 FT
PEAK VELOCITY= 4.1 FPS
TRAVEL TIME = .5 MIN
SPAN= 0-25 HRS, dt=.1 HRS

POND 1

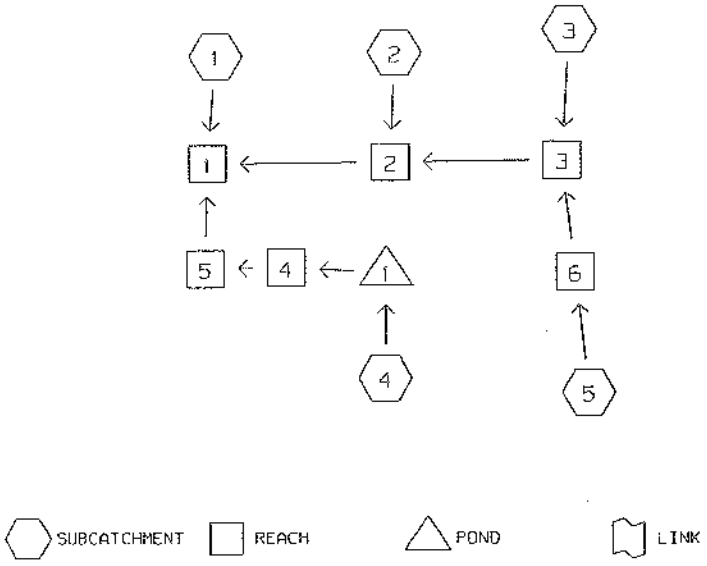
Qin = 1.65 CFS @ 12.02 HRS, VOLUME= .14 AF
Qout= .65 CFS @ 12.27 HRS, VOLUME= .13 AF, ATTEN= 61%, LAG= 15.1 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)
70.0	370	0	0
71.0	560	465	465
72.0	907	734	1199
73.0	1395	1151	2350
74.0	1883	1639	3989

STOR-IND METHOD
PEAK STORAGE = 1349 CF
PEAK ELEVATION= 72.1 FT
FLOOD ELEVATION= 74.0 FT
START ELEVATION= 70.0 FT
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING
Tdet= 41.7 MIN (.13 AF)

#	ROUTE	INVERT	OUTLET DEVICES
1	P	70.2'	4" ORIFICE/GRATE
			Q=.62 PI r^2 SQR(2g) SQR(H-r) (Use H/2 if H<d)
2	P	72.0'	8" ORIFICE/GRATE
			Q=.62 PI r^2 SQR(2g) SQR(H-r) (Use H/2 if H<d)

WATERSHED ROUTING



SUBCATCHMENT 1

PEAK= 2.12 CFS @ 12.10 HRS, VOLUME= .18 AF

ACRES	CN	
.88	77	WOODS GOOD
.02	91	GRAVEL
.90	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	8.7
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.1
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.9
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs		
	Total Length= 605 ft Total Tc=	9.7

SUBCATCHMENT 2

PEAK= .86 CFS @ 12.01 HRS, VOLUME= .06 AF

ACRES	CN	
.31	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	3.6
Grass: Short n=.15 L=70' P2=3 in s=.1286 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.1
Short Grass Pasture Kv=7 L=20' s=.69 '/' V=5.81 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=80' Capacity=1548.3 cfs		
	Total Length= 170 ft Total Tc=	3.8

SUBCATCHMENT 3

PEAK= .62 CFS @ 12.07 HRS, VOLUME= .05 AF

ACRES	CN	
.26	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	6.4
Grass: Short n=.15 L=80' P2=3 in s=.04 '/'		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.4
W=10' D=5' SS= .1 '/' a=300 sq-ft Pw=110.5' r=2.715'		
s=.0073 '/' n=.05 V=4.94 fps L=110' Capacity=1482.5 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=115' Capacity=1548.3 cfs		
	Total Length= 320 ft Total Tc=	6.9

SUBCATCHMENT 4

PEAK= 2.63 CFS @ 12.02 HRS, VOLUME= .22 AF

ACRES	CN	
.04	80	OPEN SPACE
.57	98	IMPERVIOUS
.61	97	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
DIRECT ENTRY	**Segment ID:**	5.0

SUBCATCHMENT 5

PEAK= 1.16 CFS @ 12.09 HRS, VOLUME= .10 AF

ACRES	CN	
.14	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.35	88	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 4.70 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	8.5
Grass: Short n=.15 L=100' P2=3 in s=.031 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.2
Short Grass Pasture Kv=7 L=30' s=.103 '/' V=2.25 fps		
	Total Length= 130 ft Total Tc=	8.7

REACH 1

Not described

Qin = 5.54 CFS @ 12.11 HRS, VOLUME= .61 AF
Qout= 5.54 CFS @ 12.11 HRS, VOLUME= .61 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 2.29 CFS @ 12.08 HRS, VOLUME= .21 AF
Qout= 2.27 CFS @ 12.08 HRS, VOLUME= .21 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .05 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

Qin = 1.75 CFS @ 12.09 HRS, VOLUME= .15 AF
Qout= 1.69 CFS @ 12.11 HRS, VOLUME= .15 AF, ATTEN= 3%, LAG= 1.3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .04 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 4

Qin = 1.54 CFS @ 12.16 HRS, VOLUME= .22 AF
Qout= 1.48 CFS @ 12.20 HRS, VOLUME= .22 AF, ATTEN= 4%, LAG= 2.6 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.00	0.00
.05	1.03	1.40
.10	2.10	4.50
.15	3.23	8.93
.22	4.76	16.48
.30	6.90	29.22
.40	9.60	48.21
.50	12.50	71.47

20' x .5' CHANNEL
SIDE SLOPE= .1 '/'
n= .05
LENGTH= 70 FT
SLOPE= .1192 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .05 FT
PEAK VELOCITY= 1.4 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 5

Qin = 1.48 CFS @ 12.20 HRS, VOLUME= .22 AF
Qout= 1.44 CFS @ 12.23 HRS, VOLUME= .22 AF, ATTEN= 3%, LAG= 1.7 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	13.70
1.00	12.0	44.96
1.50	19.5	91.76
2.15	30.7	176.10
3.00	48.0	328.79
4.00	72.0	575.18
5.00	100.0	900.57

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 125 FT
SLOPE= .0204 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .05 FT
PEAK VELOCITY= 2.5 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 6

Qin = 1.16 CFS @ 12.09 HRS, VOLUME= .10 AF
Qout= 1.14 CFS @ 12.10 HRS, VOLUME= .10 AF, ATTEN= 2%, LAG= .7 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.00	0.00
.25	1.44	5.84
.50	3.26	19.72
.75	5.45	41.36
1.08	8.88	81.92
1.50	14.32	158.42
2.00	22.12	286.65
2.50	31.44	461.28

5' x 2.5' CHANNEL
SIDE SLOPE= .33 '/'
n= .05
LENGTH= 110 FT
SLOPE= .1419 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .05 FT
PEAK VELOCITY= 4.1 FPS
TRAVEL TIME = .5 MIN
SPAN= 0-25 HRS, dt=.1 HRS

POND 1

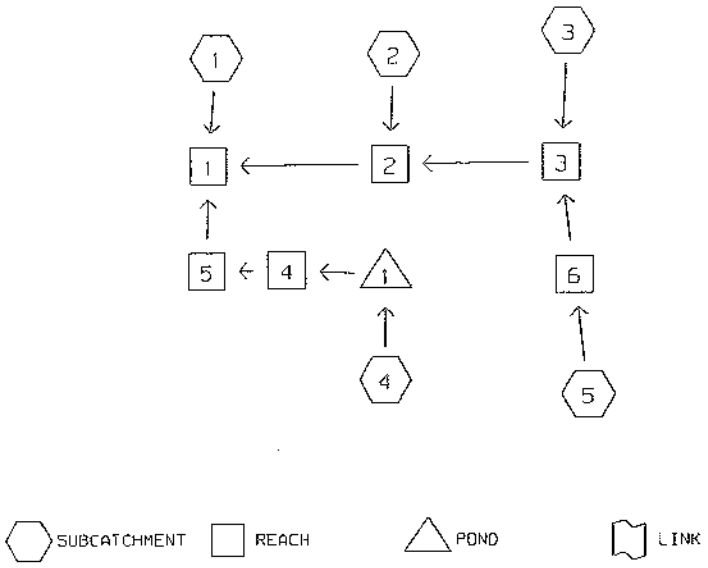
Qin = 2.63 CFS @ 12.02 HRS, VOLUME= .22 AF
Qout= 1.54 CFS @ 12.16 HRS, VOLUME= .22 AF, ATTEN= 41%, LAG= 8.8 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)
70.0	370	0	0
71.0	560	465	465
72.0	907	734	1199
73.0	1395	1151	2350
74.0	1883	1639	3989

STOR-IND METHOD
PEAK STORAGE = 1875 CF
PEAK ELEVATION= 72.6 FT
FLOOD ELEVATION= 74.0 FT
START ELEVATION= 70.0 FT
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING
Tdet= 33.5 MIN (.22 AF)

#	ROUTE	INVERT	OUTLET DEVICES
1	P	70.2'	**4" ORIFICE/GRATE**
			Q=.62 PI r^2 SQR(2g) SQR(H-r) (Use H/2 if H<d)
2	P	72.0'	**8" ORIFICE/GRATE**
			Q=.62 PI r^2 SQR(2g) SQR(H-r) (Use H/2 if H<d)

WATERSHED ROUTING ==========



SUBCATCHMENT 1

PEAK= 2.72 CFS @ 12.10 HRS, VOLUME= .23 AF

ACRES	CN	
.88	77	WOODS GOOD
.02	91	GRAVEL
.90	77	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	8.7
Grass: Short n=.15 L=115' P2=3 in s=.0391 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.1
Short Grass Pasture Kv=7 L=30' s=.6333 '/' V=5.57 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.9
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0204 '/' n=.05 V=9.01 fps L=460' Capacity=900.6 cfs		
	Total Length= 605 ft Total Tc=	9.7

SUBCATCHMENT 2

PEAK= 1.10 CFS @ 12.01 HRS, VOLUME= .08 AF

ACRES	CN	
.31	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	3.6
Grass: Short n=.15 L=70' P2=3 in s=.1286 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.1
Short Grass Pasture Kv=7 L=20' s=.69 '/' V=5.81 fps		
RECT/VEE/TRAP CHANNEL	**Segment ID:**	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=80' Capacity=1548.3 cfs		
	Total Length= 170 ft Total Tc=	3.8

SUBCATCHMENT 3

PEAK= .79 CFS @ 12.06 HRS, VOLUME= .07 AF

ACRES	CN	
.26	77	WOODS GOOD

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	6.4
Grass: Short n=.15 L=80' P2=3 in s=.04 '/'		
RECT/VEE/TRAP CHANNEL	Segment ID:	.4
W=10' D=5' SS= .1 '/' a=300 sq-ft Pw=110.5' r=2.715'		
s=.0073 '/' n=.05 V=4.94 fps L=110' Capacity=1482.5 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	0.0
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.4667 '/' n=.05 V=43.07 fps L=15' Capacity=4307.5 cfs		
RECT/VEE/TRAP CHANNEL	Segment ID:	.1
W=10' D=5' SS= .5 '/' a=100 sq-ft Pw=32.4' r=3.09'		
s=.0603 '/' n=.05 V=15.48 fps L=115' Capacity=1548.3 cfs		
	Total Length= 320 ft Total Tc=	6.9

SUBCATCHMENT 4

PEAK= 3.08 CFS @ 12.02 HRS, VOLUME= .26 AF

ACRES	CN	
.04	80	OPEN SPACE
.57	98	IMPERVIOUS
.61	97	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
DIRECT ENTRY	Segment ID:	5.0

SUBCATCHMENT 5

PEAK= 1.41 CFS @ 12.09 HRS, VOLUME= .12 AF

ACRES	CN	
.14	77	WOODS GOOD
.09	91	GRAVEL
.12	98	IMPERVIOUS
.35	88	

SCS TR-20 METHOD
TYPE III 24-HOUR
RAINFALL= 5.50 IN
SPAN= 0-25 HRS, dt=.1 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	8.5
Grass: Short n=.15 L=100' P2=3 in s=.031 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:	.2
Short Grass Pasture Kv=7 L=30' s=.103 '/' V=2.25 fps		
	Total Length= 130 ft Total Tc=	8.7

REACH 1

Not described

Qin = 7.10 CFS @ 12.11 HRS, VOLUME= .75 AF
Qout= 7.10 CFS @ 12.11 HRS, VOLUME= .75 AF, ATTEN= 0%, LAG= 0.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)

- METHOD
PEAK DEPTH= 0.00 FT
PEAK VELOCITY= 0.0 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 2

Qin = 2.86 CFS @ 12.07 HRS, VOLUME= .27 AF
Qout= 2.83 CFS @ 12.08 HRS, VOLUME= .27 AF, ATTEN= 1%, LAG= .3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 45 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .06 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 3

Qin = 2.16 CFS @ 12.09 HRS, VOLUME= .19 AF
Qout= 2.10 CFS @ 12.11 HRS, VOLUME= .19 AF, ATTEN= 3%, LAG= 1.3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	23.55
1.00	12.0	77.30
1.50	19.5	157.75
2.15	30.7	302.76
3.00	48.0	565.28
4.00	72.0	988.88
5.00	100.0	1548.33

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 200 FT
SLOPE= .0603 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .05 FT
PEAK VELOCITY= 4.3 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS

REACH 4

Qin = 1.92 CFS @ 12.15 HRS, VOLUME= .26 AF
Qout= 1.84 CFS @ 12.18 HRS, VOLUME= .26 AF, ATTEN= 4%, LAG= 2.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.00	0.00
.05	1.03	1.40
.10	2.10	4.50
.15	3.23	8.93
.22	4.76	16.48
.30	6.90	29.22
.40	9.60	48.21
.50	12.50	71.47

20' x .5' CHANNEL
SIDE SLOPE= .1 '/'
n= .05
LENGTH= 70 FT
SLOPE= .1192 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .06 FT
PEAK VELOCITY= 1.6 FPS
TRAVEL TIME = .7 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 5

Qin = 1.84 CFS @ 12.18 HRS, VOLUME= .26 AF
Qout= 1.80 CFS @ 12.22 HRS, VOLUME= .26 AF, ATTEN= 2%, LAG= 2.2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.0	0.00
.50	5.5	13.70
1.00	12.0	44.96
1.50	19.5	91.76
2.15	30.7	176.10
3.00	48.0	328.79
4.00	72.0	575.18
5.00	100.0	900.57

10' x 5' CHANNEL
SIDE SLOPE= .5 '/'
n= .05
LENGTH= 125 FT
SLOPE= .0204 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .07 FT
PEAK VELOCITY= 2.5 FPS
TRAVEL TIME = .8 MIN
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING

REACH 6

Qin = 1.41 CFS @ 12.09 HRS, VOLUME= .12 AF
Qout= 1.38 CFS @ 12.10 HRS, VOLUME= .12 AF, ATTEN= 2%, LAG= .7 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.00	0.00	0.00
.25	1.44	5.84
.50	3.26	19.72
.75	5.45	41.36
1.08	8.88	81.92
1.50	14.32	158.42
2.00	22.12	286.65
2.50	31.44	461.28

5' x 2.5' CHANNEL
SIDE SLOPE= .33 '/'
n= .05
LENGTH= 110 FT
SLOPE= .1419 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .06 FT
PEAK VELOCITY= 4.1 FPS
TRAVEL TIME = .5 MIN
SPAN= 0-25 HRS, dt=.1 HRS

POND 1

Qin = 3.08 CFS @ 12.02 HRS, VOLUME= .26 AF
Qout= 1.92 CFS @ 12.15 HRS, VOLUME= .26 AF, ATTEN= 38%, LAG= 8.0 MIN

ELEVATION (FT)	AREA (SF)	INC.STOR (CF)	CUM.STOR (CF)
70.0	370	0	0
71.0	560	465	465
72.0	907	734	1199
73.0	1395	1151	2350
74.0	1883	1639	3989

STOR-IND METHOD
PEAK STORAGE = 2105 CF
PEAK ELEVATION= 72.8 FT
FLOOD ELEVATION= 74.0 FT
START ELEVATION= 70.0 FT
SPAN= 0-25 HRS, dt=.1 HRS
2 x FINER ROUTING
Tdet= 30.9 MIN (.26 AF)

#	ROUTE	INVERT	OUTLET DEVICES
1	P	70.2'	4" ORIFICE/GRATE Q=.62 PI r^2 SQR(2g) SQR(H-r) (Use H/2 if H<d)
2	P	72.0'	8" ORIFICE/GRATE Q=.62 PI r^2 SQR(2g) SQR(H-r) (Use H/2 if H<d)

Runoff curve numbers for other agricultural lands[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing.[2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element.[3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	[4]30	48	65	73
Woods—grass combination (orchard or tree farm).[5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods.[6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	[4]30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* <50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: >75% ground cover and lightly or only occasionally grazed.

[3]*Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

[4]Actual curve number is less than 30; use CN = 30 for runoff computations.

[5]CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

[6]*Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

This appendix reprinted from S.C.S. TR-55, revised 1986.

SECTION 9

TEMPORARY AND PERMANENT EROSION AND SEDIMENTATION CONTROL

9.0 Overview

See attached plan set Sheet 4 Grading, Drainage and Erosion Control Plan and Sheet 3 Site Layout and Utilities Plan for location of temporary and permanent erosion and sediment control measures.

SECTION 10

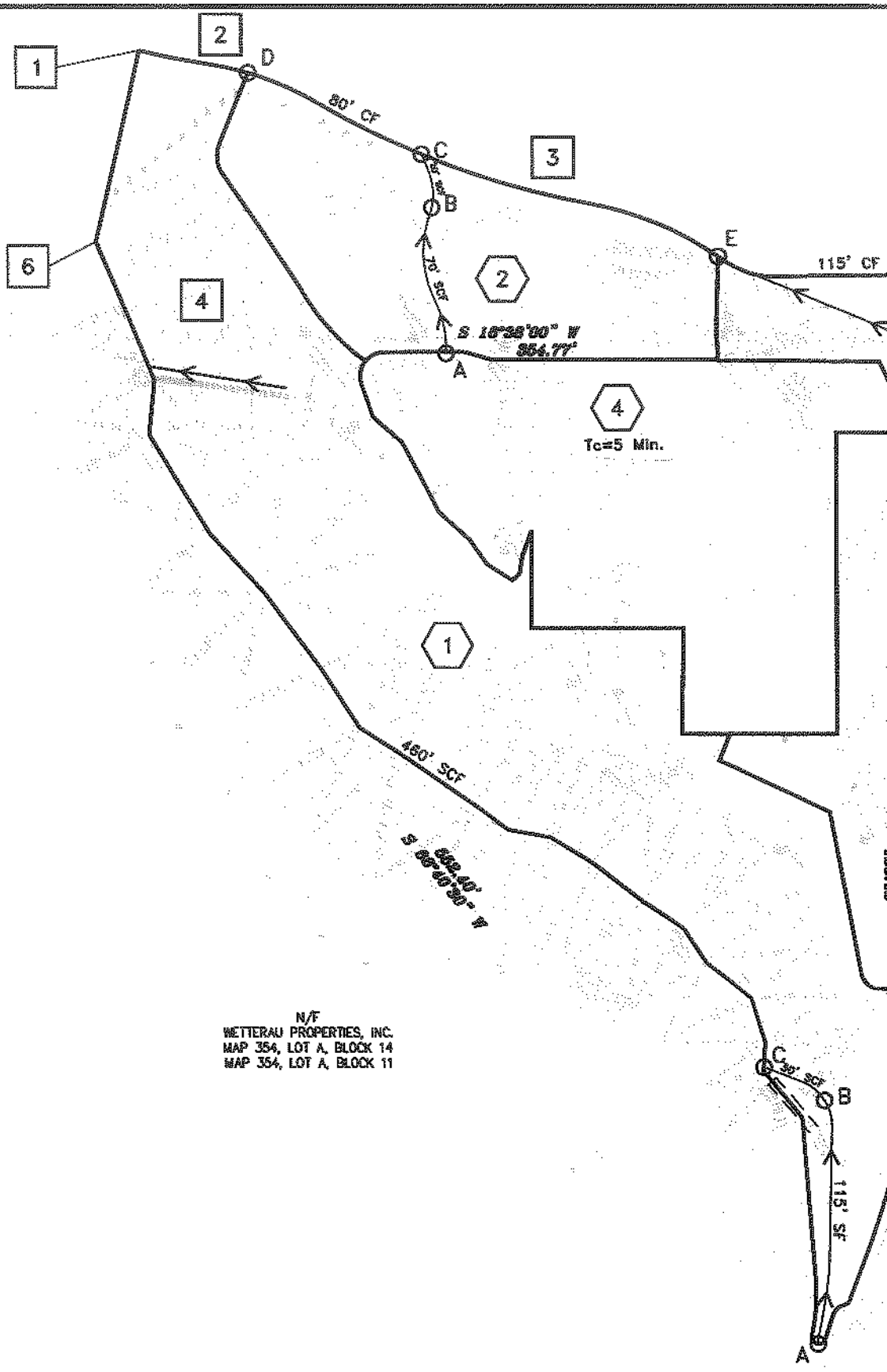
LANDSCAPE PLAN

10.0 Overview

The current site consists of primarily wooded areas. It is the intention of the owner to maintain the wooded environment around the proposed building.

To attain this goal, the owner or owner's representative will be working with the site contractor to minimize impact to the surrounding woods.

In areas where impact to the existing vegetation cannot be avoided, replacement tress and bushes that compliment the existing surroundings will be planted.



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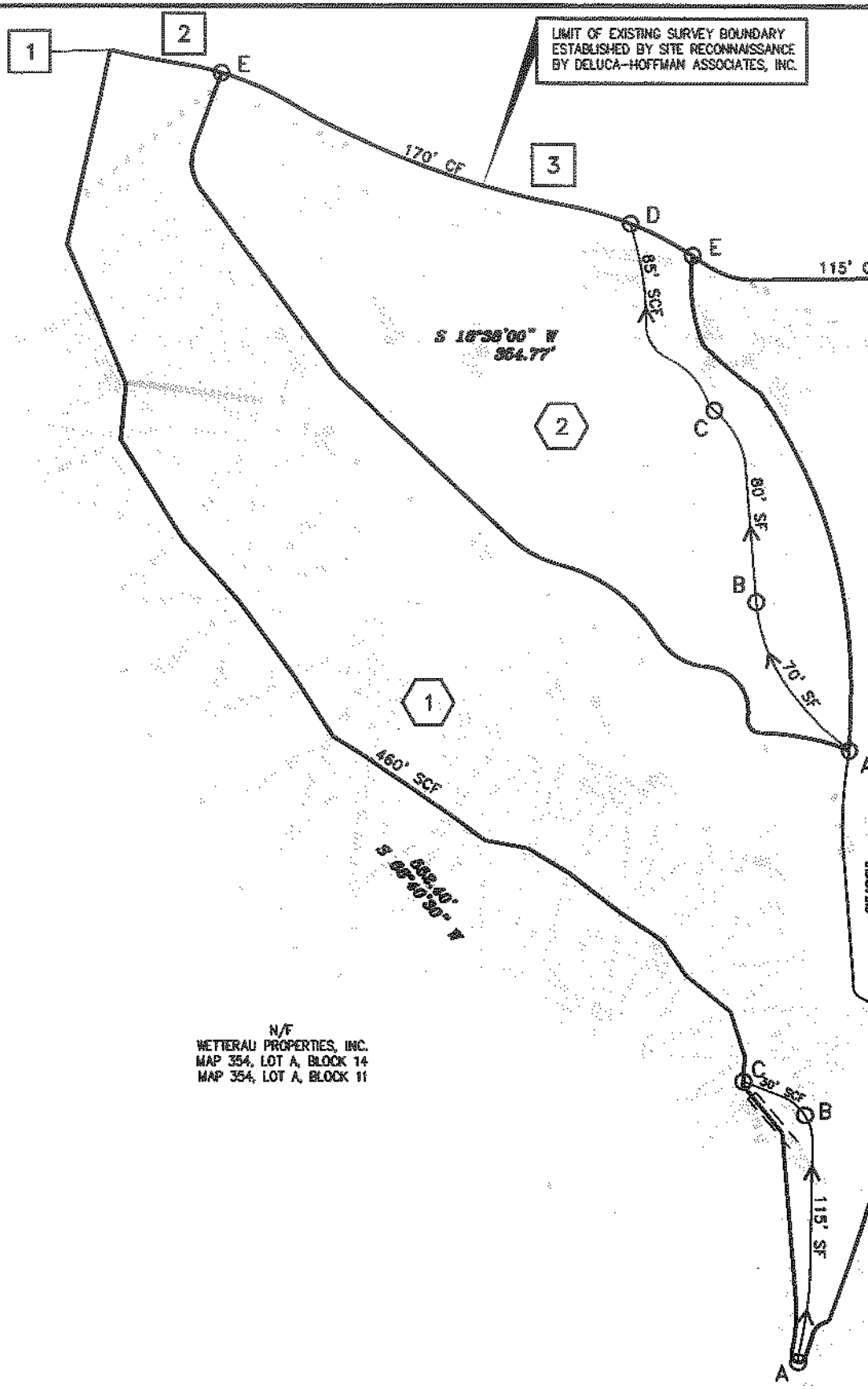

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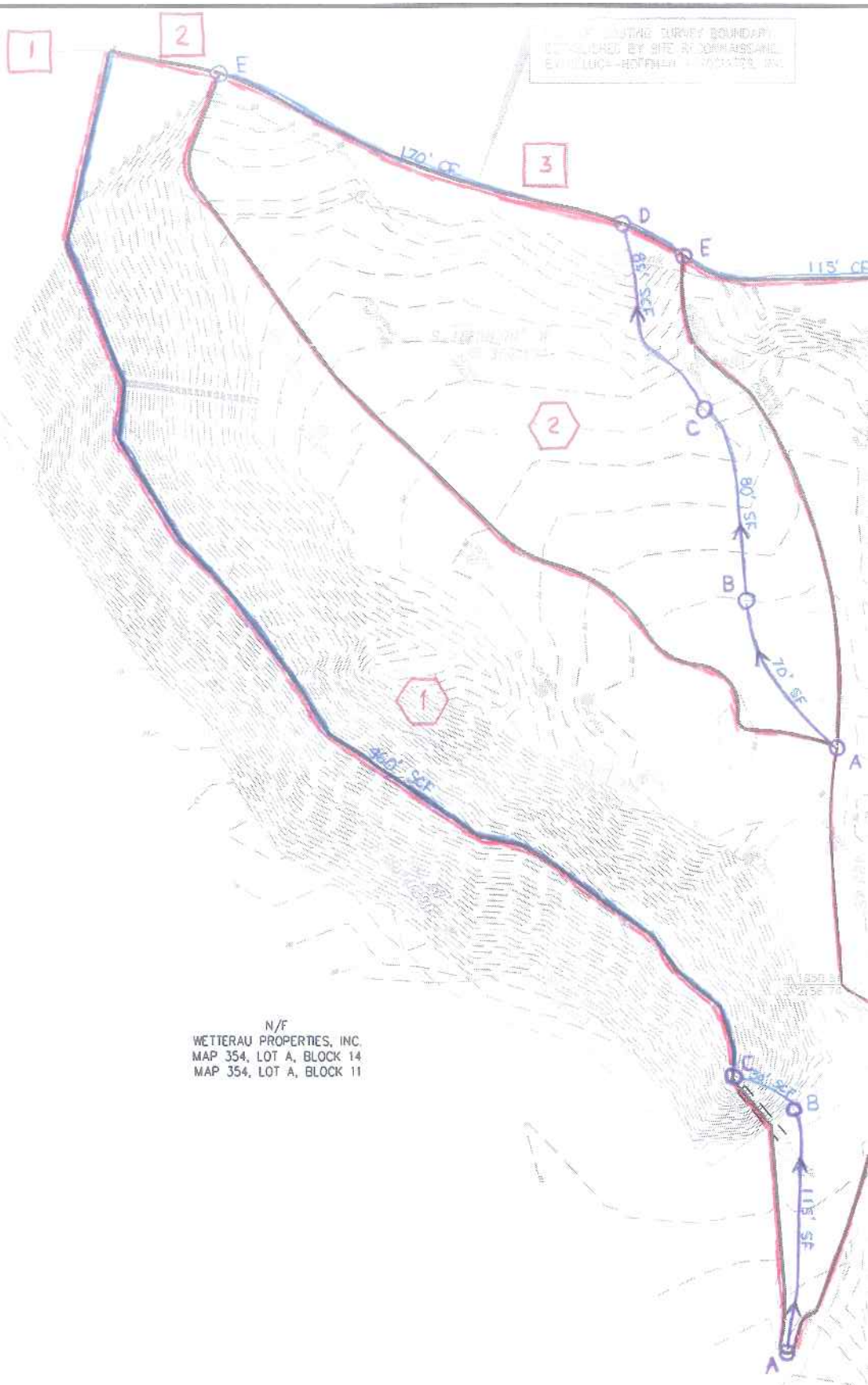

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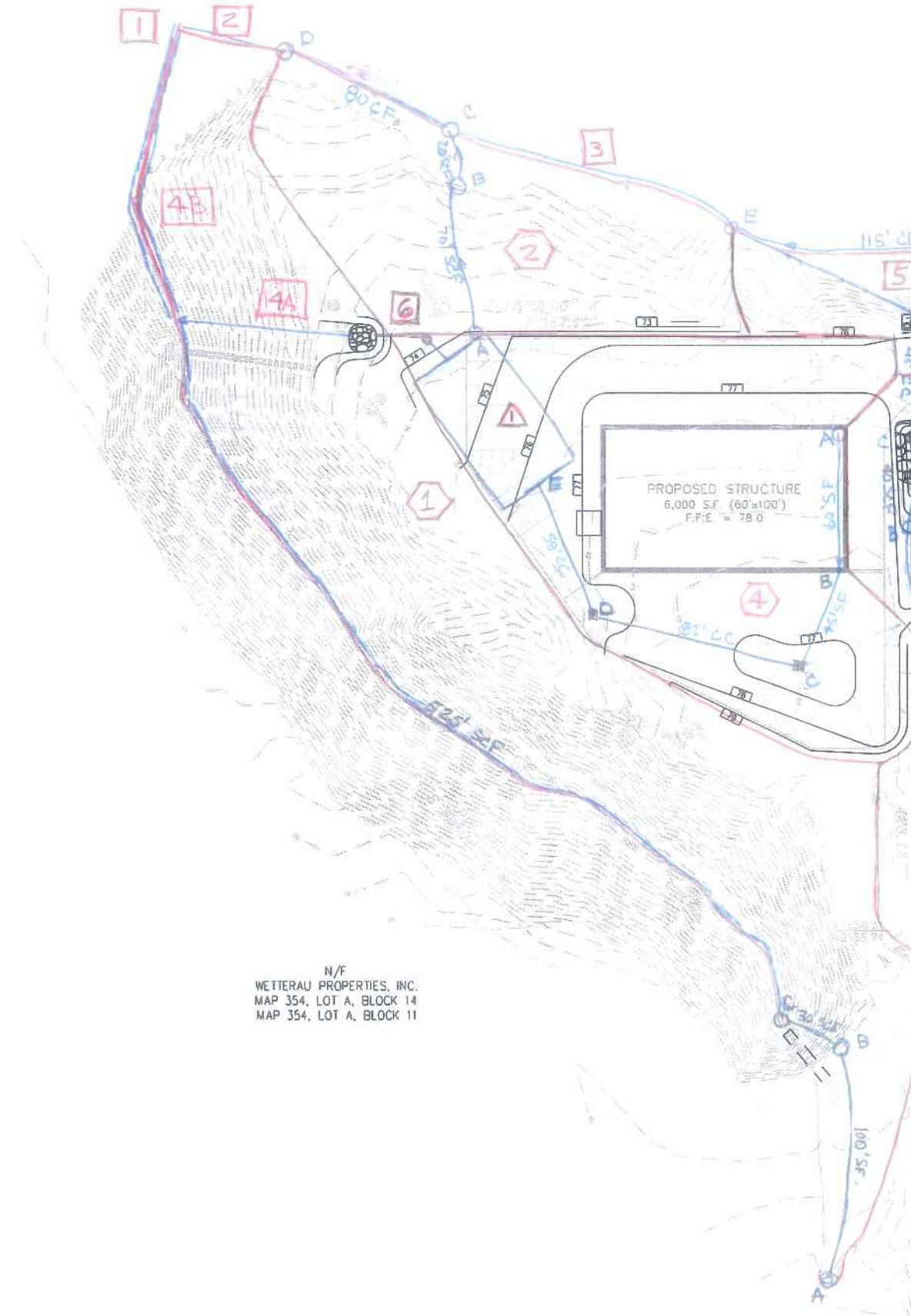

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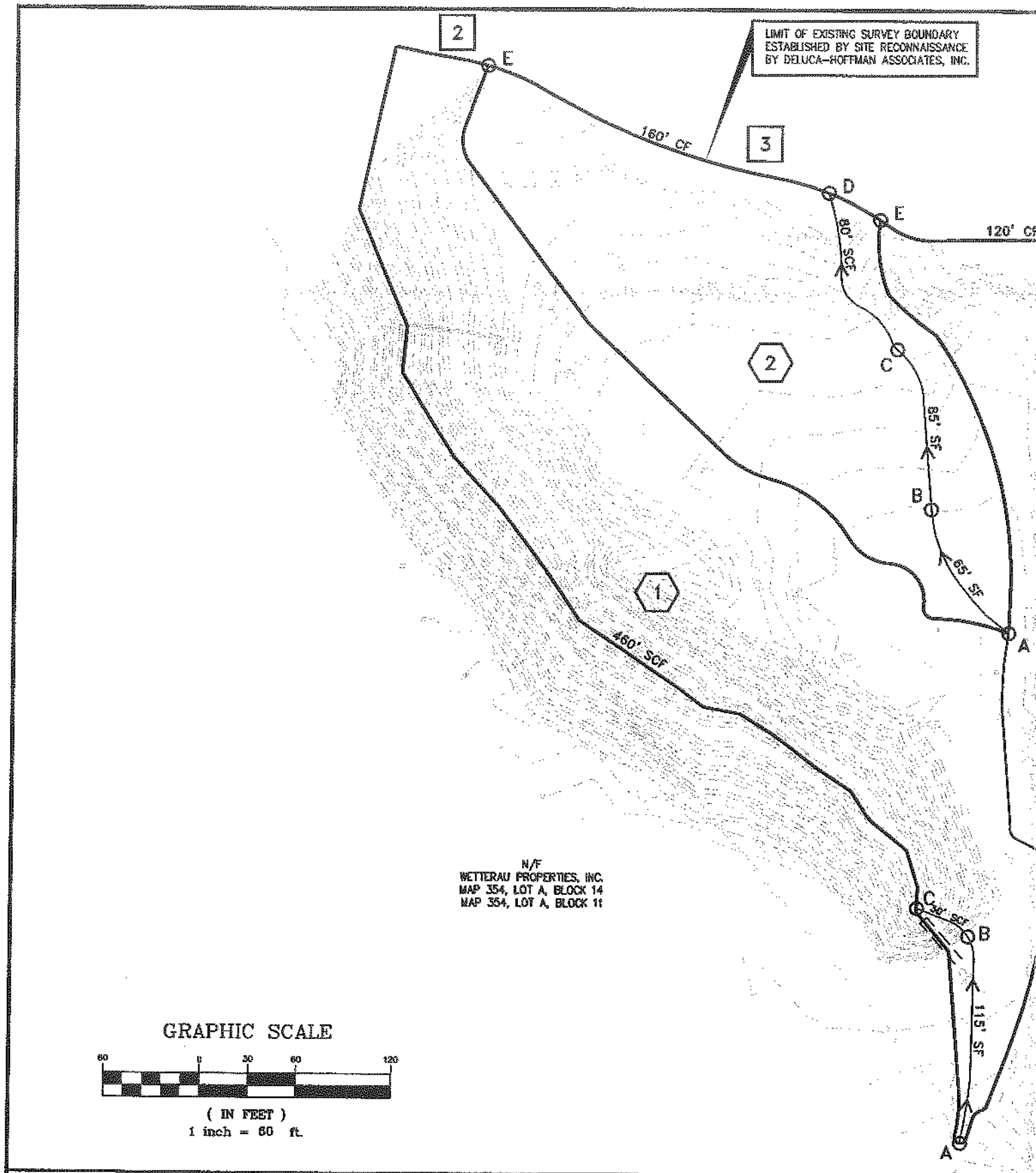

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)
1 inch = 60 ft.

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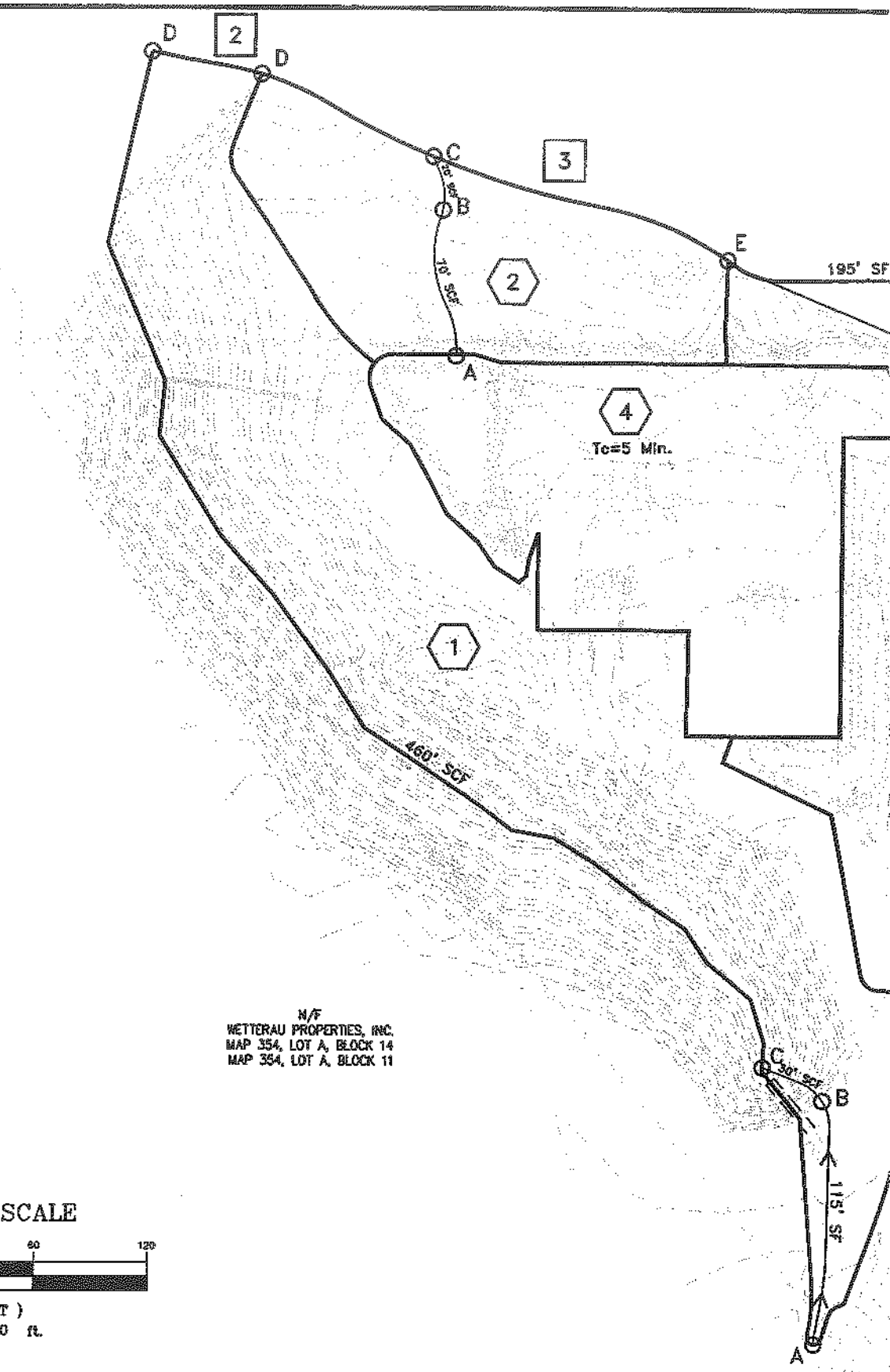

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