

Relationships.
Responsiveness.
Results.



**Final Application for
Major Subdivision
Orchard Road
Cumberland, Maine**

PREPARED FOR:
TZ Properties, LLC

May 2018

SUBMITTED BY:
Gorrill Palmer
707 Sable Oaks Drive
Suite 30
So. Portland, ME 04106
207.772.2515

May 22, 2018

Ms. Carla Nixon
Town Planner
Town of Cumberland
290 Tuttle Road
Cumberland, ME 04021

Subject: Orchard Road Subdivision
Orchard Road
Final Major Subdivision Plan

Dear Carla,

TZ Properties, LLC has retained Gorrill Palmer to prepare and submit a subdivision application to the Planning Board for a proposed residential development on Orchard Road. The site is shown on the Assessor's Map R08, Lot 59, is approximately 24.9 acres in size, and is located in the Rural Residential 2 (RR2) District. Figure 1 attached to this letter is a location map depicting the project site.

The Applicant submitted a preliminary subdivision application for the site in October of 2017. Since a land swap was being negotiated with an abutting property owner in order to provide the necessary setback for an additional lot, the Town determined that the application should be tabled until the land swap was finalized. The Town reviewed the application and provided comments based upon the preliminary subdivision application prior to the Planning Board meeting at which the decision to table the project was made. The land swap has been finalized and the Applicant requests a combined preliminary and final subdivision review since the Town has reviewed and commented on the original preliminary subdivision application. The plans have not changed from the original submission, with the exception of revisions due to the Town comments and the finalization of the land swap. The following narrative and application presents the preliminary subdivision information included in Attachment A, responses to the Town comments on the original preliminary submission included in Attachment B, and the required information for a final subdivision application included in Attachment C.

Site Description

The project site consists of Tax Map R08, Lot 59 as shown on the Cumberland Assessor's Map. The site is approximately 24.9 acres in size and has approximately 285 feet of frontage along Orchard Road.

The project site is currently undeveloped with moderate topography and generally slopes to the south. Abutting land uses include:

- North – Residential
- West – Residential/Apple Orchard
- South – Residential/Undeveloped
- East – Residential



Project Description

The development of the site is anticipated to include construction of a public roadway to support a residential development of single family homes. The lots will be served by individual wells and subsurface wastewater disposal systems. The current configuration of the subdivision includes 10 single family house lots designed as a clustered residential development. Open space consisting of 8.32 acres of undeveloped land has been provided.

Access to the subdivision is proposed as a public roadway entering the property from Orchard Road. The proposed roadway is a dead end with a cul-de-sac and is approximately 1,500 feet long. Each proposed lot will have a driveway off of the subdivision road.

The roadway is anticipated to consist of a 22' wide paved roadway with a 4' wide paved byway along the southerly side of the roadway. The northerly side of the roadway will have a 2 foot paved shoulder in curbed sections and a 2' gravel shoulder in non-curb sections. Lighting is not proposed for the roadway. Trash pickup is assumed to be municipal collection consistent with other Town roadways.

An abutting parcel northwest of the subject parcel has been designated on the plans as Lot A. A land swap between the Owners of Lot A and the Applicant has been finalized, which will allow for the creation of Lot 10. The land swap agreement is contained in Attachment D of this application.

The project will generate less than 200 trip ends per day, which would therefore qualify under the Cumberland Subdivision Ordinance to be classified as a "Residential Access" roadway.

Major Subdivision Requirement Waivers

The applicant respectfully requests the following waivers from the ordinance requirements:

Trees 10" diameter or more – A waiver is requested to depict trees 10" in diameter or larger. 32.5% of the wooded site is proposed as open space which will preserve the existing woodland and a 75' buffer is provided along the parcel boundary. The open space and buffers will protect the existing trees. The remainder of the site is subject to development therefore the location of the trees is not beneficial.

High Intensity Soil Survey – A waiver is requested for the High Intensity Soil Survey for this project, due to small scale of this project. Test Pits have been conducted on all lots to determine suitability for on-site septic systems and a Hydro-geologic study has also been conducted for the project. A copy of the test pit logs and hydro-geologic study are included in Attachment 7.

Soil boundaries and names superimposed on plot plan – Since a waiver of the High Intensity Soil Survey is requested, a waiver to put the soil boundaries on the plot plan is requested. A medium intensity soil survey is included in the Stormwater Management Report and the Erosion Control Report for this project.

Building locations – The Applicant proposes to construct the roadway, storm drainage, and electric service. The lots will be developed by the lot owners. Building locations will be proposed by the lot owners at the time of applying for building permits to develop each lot. The building envelope, potential subsurface disposal location, and potential well location is indicated for each lot on the subdivision plans. The applicant requests a waiver from the requirement to show building locations on the subdivision plans.



Location of temporary markers in field – A waiver is requested for location of temporary markers in field. The centerline of the proposed roadway has been marked.

Conclusion

As required by the Ordinance, Gorrill Palmer on behalf of TZ Properties, LLC has submitted the application for Preliminary and Final Subdivision Review. The project team looks forward to the Planning Staff and Board's review of this project.

An application fee of \$1,850 was submitted in October of 2017 with the preliminary application, and an additional \$1,000 was paid to the Town after the initial submission, for a total fee payment of \$2,850.

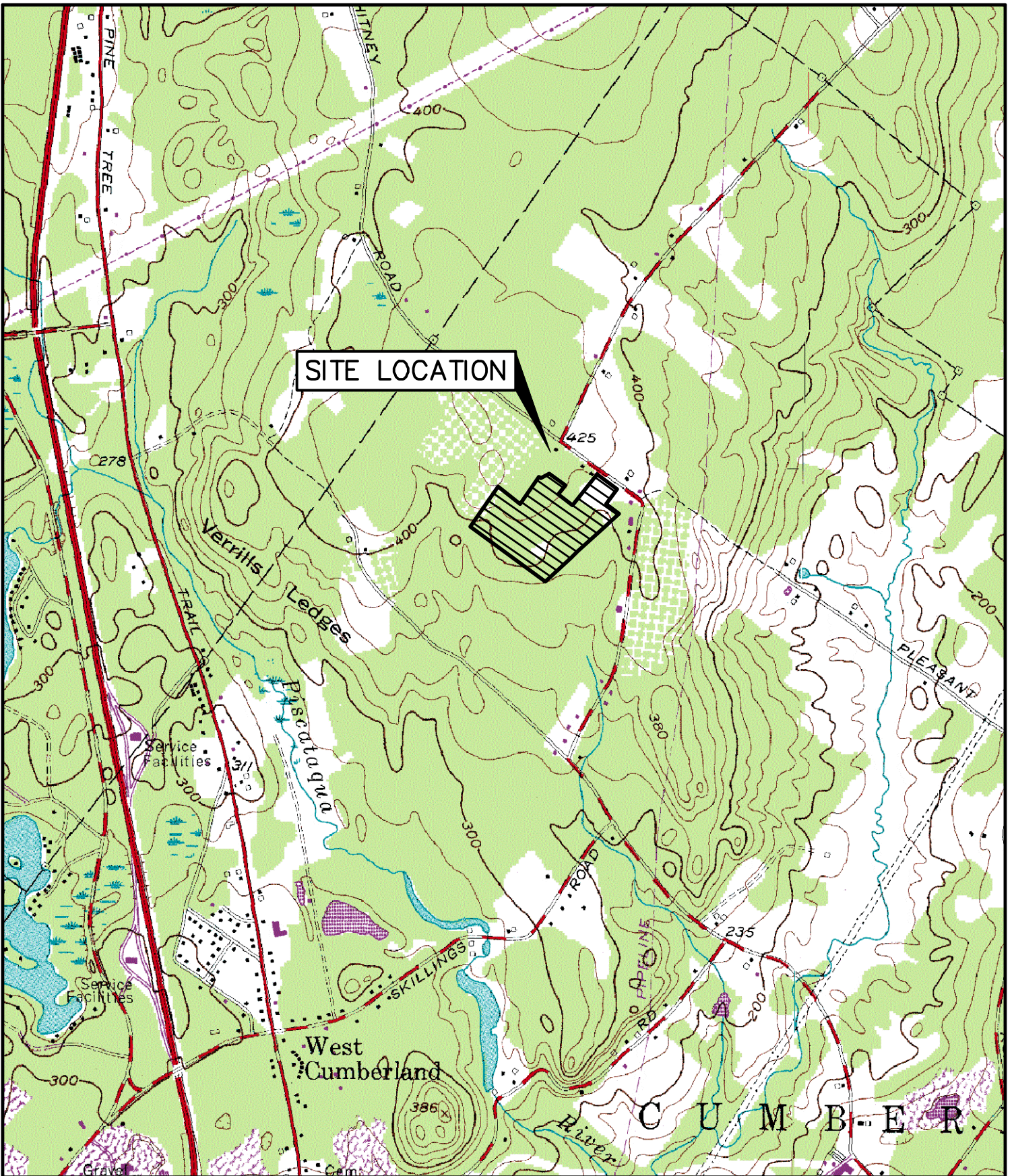
Sincerely,
Gorrill Palmer

A handwritten signature in black ink, appearing to read 'William C. Haskell'. The signature is fluid and cursive, with the first and last names being more prominent.

William C. Haskell, P.E.
Principal

Enclosure

Copy: Zareh DerHagopian



U.S.G.S. Location Map
 Subdivision Feasibility, Orchard Road, Cumberland, Maine
 U.S.G.S. Cumberland Center, State-7.5 Minute Series (Topographic)

Design: WCH	Date: OCT 2017
Draft: LAN	Job No.: 3236.01
Checked: WCH	Scale: None
File Name: 3236-LOCMAP.dwg	



Relationships. Responsiveness. Results.
www.gorrillpalmer.com
 207.772.2515

Figure

1



707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

October 19, 2017

Zareh DerHagopian
TZ Properties
23 Stormy Brook Road
Falmouth, ME 04105

RE: Designation of Agent

Dear Zareh,

As required by various approval agencies, please indicate by signing below that Gorrill Palmer is authorized to act as TZ Properties agent for the specific purpose of preparing and submitting permit applications on your behalf. This designation of agent is for the following development projects:

- Orchard Road Subdivision

Sincerely,

Gorrill-Palmer Consulting Engineers, Inc.

A handwritten signature in black ink, appearing to read 'William C. Haskell'.

William C. Haskell, PE
Principal

The undersigned hereby gives Gorrill Palmer the authority to act as agent for TZ Properties for the specific purpose of preparing and submitting permit applications for the project(s) identified above.

A handwritten signature in black ink, appearing to read 'Zareh DerHagopian'.

[Zareh DerHagopian]

10-19-17
Date

TZ Properties LLC23 Stormy Brook Rd
Falmouth, ME 04105

1298

25-80/440

PAY TO THE
ORDER OF

Oct 19 2017

Town of Cumberland \$ *1000.00*

One Thousand and 00/100 DOLLARS

Security features
are included.
Details on back.**UMB Bank N.A.**

Kansas City MO 64106

FOR

Insurance

⑆044000804⑆4228401206367⑆1298

MP

MONARCH

TZ Properties LLC23 Stormy Brook Rd
Falmouth, ME 04105

1297

25-80/440

PAY TO THE
ORDER OF

Oct 19 2017

Town of Cumberland \$ *850.00*

Eight hundred fifty and 00/100 DOLLARS

Security features
are included.
Details on back.**UMB Bank N.A.**

Kansas City MO 64106

FOR

Application Fee

⑆044000804⑆4228401206367⑆1297

MP

MONARCH

List of Attachments

Attachment

- A. Preliminary Subdivision Application Submitted October 2017
- B. Response to Comments received from the Town for the Preliminary Subdivision Application
- C. Final Site Plan Application
- D. Land Swap
- E. Financial Ability
- F. MDEP/ACOE Permits
- G. MHPC Response
- H. Groundwater Impact Study
- I. Homeowners Association Document

NARRATIVE

The following narrative addresses the approval criteria of the Town of Cumberland Subdivision Ordinance.

Chapter 250 Article I General Provisions

- A. Pollution – The proposed subdivision will not result in undue water or air pollution
 1. The property is located a minimum of 390 feet above sea level and is not within a zone A 100-year floodplain. Attachment 5 contains a copy of the flood map for the project area.
 2. Test pits have been excavated to determine the adequacy of the on-site soils to safely dispose of wastewater. The test pit logs are included in Attachment 7.
 3. The site does not contain excessive slopes. Subsurface wastewater disposal systems will be appropriately sized to treat wastewater based upon the test pit results in Attachment 7.
 4. The existing stream will not be used for disposal of effluents.
 5. The subsurface wastewater disposal systems and well locations will conform to all applicable state and local regulations.
- B. Sufficient Water – The lots will be served by individual wells, a hydrogeologic study is included in Attachment 7. A water sample was collected from an abutter's water system and submitted to Katahdin for testing. The results are included in Attachment 7.
- C. Municipal Water Supply – Not Applicable
- D. Erosion – The erosion and sedimentation control report contained in Attachment 10 addresses best management practices to limit the erosion of soil during the construction and post construction phases of the project.
- E. Traffic – A traffic assessment of the proposed project is included in Attachment 12.
- F. Sewage Disposal – Individual subsurface wastewater disposal systems are proposed for each lot. Attachment 7 contains subsurface investigation logs.
- G. Municipal Solid Waste Disposal – The ten single family residences proposed for this subdivision are not anticipated to cause an unreasonable burden on the Town's ability to dispose of solid waste. The applicant proposes that the roadway be accepted by the Town and the utilization of municipal solid waste disposal.
- H. Aesthetic, Cultural, and Natural Values – The subdivision is not anticipated to have an adverse impact on aesthetic, cultural, and natural values. A 75 foot wide no cut buffer is proposed along the project boundary, 8.13 acres of open space is proposed, and the State historic and natural resource agencies have been contacted to ensure that the project will not adversely affect historic or natural resources. The response from the Natural Areas Program and MDIF&W is included in Attachment 8. No rare botanical features within the project area or endangered, threatened, or special concern species are listed at the project site. The letter from MDIF&W suggests contacting the US Wildlife Service. An official species list from the US Wildlife Service is included in Attachment 8. The official species list notes that the Northern Long Ear Bat may be present in the project area. In order to avoid potential impacts to the Northern Long Eared Bat, tree cutting on the property will be prohibited during construction between June 1 and July 31. The Historic Preservation Commission contact letter is included in Attachment 8, response from the agency will be forwarded to the Town upon receipt.
- I. Conformance with local ordinances and plans – The proposed subdivision has been designed to conform to the Town of Cumberland Subdivision Ordinance.
- J. Financial and Technical Capacity – TZ properties, LLC has completed several projects in the Cumberland County area and has the financial capacity to complete the infrastructure construction for the proposed subdivision. A list of projects is included in

NARRATIVE

- Attachment 2. The Applicant has hired Gorrill Palmer to prepare the subdivision plans and application. Gorrill Palmer has experience in permitting subdivisions in Cumberland. Attachment 2 contains a list of the consultants who have provided information used to assemble this application.
- K. Surface Waters; Outstanding River Segments – The proposed subdivision will not adversely affect any surface water or outstanding river segment. The Erosion Control plan included with this application will provide strategies to avoid contamination of surface waters. The proposed stream crossing and wetland impacts will be submitted to, and conform to, the requirements of the MDEP and ACOE.
 - L. Groundwater – The proposed subdivision will not adversely affect groundwater. The proposed subsurface wastewater disposal systems will conform to the Maine Subsurface Wastewater Disposal Rules.
 - M. Flood Areas – Attachment 5 contains the Fema Flood Map for the project area. The site is not located within a Zone A 100-year flood zone.
 - N. Stormwater – The stormwater management report contained in Attachment 9 provides for stormwater control to limit the post development peak runoff from the 2-, 10-, and 25-year storm to predevelopment levels.
 - O. Freshwater Wetlands – Wetlands have been delineated and GPS located by TRC. The wetland memo is included in Attachment 11.
 - P. River Stream or Brook – A stream delineated by TRC is located at the northerly end of the parcel and is shown on the plans. The wetland memo in Attachment 11 discusses the stream.

Chapter 250 Article V General Requirements

250-19 Review and approval by other agencies

The project will require a Stormwater Permit, and NRPA Permit by Rule for a stream crossing from MDEP. The project will also require an ACOE Category 2 permit for the stream crossing and notification for wetland and vernal pool habitat impacts. Copies of the applications will be sent to the Town upon submission to the agencies. The approvals will be submitted to the Town prior to Final Plan submission.

250-21 Relationship of subdivision to community services

The applicant proposes the construction of the roadway, driveway aprons to the street line, electrical service from Orchard Road to the proposed transformers, construction of ditches and closed storm drain including driveway culverts, and construction of the two grassed underdrained soil filters. The applicant proposes that the Town accept the roadway as a Town road at which point the Town will be responsible for maintenance of the roadway and storm drainage within the right of way. The applicant proposes a Homeowners Association which will be responsible for the maintenance of the two grassed underdrained soil filters. A draft Homeowners Association document is included in Attachment 3. The ten proposed single family residences will have minimum impact to community services.

250-22 Retention of proposed public sites and open spaces

Open space consisting of 32.5 % of the parcel is proposed by the Applicant. The open space consists of woodland containing uplands and wetlands as well as the stream that traverses the northerly edge of the parcel.

NARRATIVE

250-23 Preservation of natural and historic features

Historic and natural resource agencies have been contacted as part of this application process. Attachment 8 contains a response from the Natural Areas Program and the MDIF&W. A request letter sent to the Historic Preservation Commission is also included. The Applicant will endeavor to preserve any natural or historic features identified by the agencies. Open space consisting of 32.5% of the parcel area has been proposed for preservation. The open space includes the stream at the northerly end of the property.

250-24 Land not suitable for development

The Applicant does not propose construction on land not suitable for development. The site is not located in a 100-year floodplain. Attachment 5 contains the flood map for the project area.

250-25 Blocks

Not applicable to this subdivision proposal.

250-26 Lots

The proposed lots have been laid out in substantial conformance with the Town Ordinance. All lots have the required minimum frontage for a cluster subdivision in the RR-2 zone. The parcel area adjacent to Orchard Road is part of the proposed open space and will provide a minimum 50 foot buffer.

250-27 Utilities

The lots will be served by individual subsurface wastewater disposal systems and wells. Electric service will be extended overhead across Orchard Road to a new pole. The electric service will be underground from the new pole to the transformers. An Ability to serve letter has been sent to CMP and is included in Attachment 6. The response will be forwarded to the Town upon receipt.

250-28 Water Supply

Individual drilled wells are proposed for the subdivision. Each lot owner will contract with a licensed well drilling company to have a well installed as part of the lot development. A well exclusion zone is depicted on the plans for each lot. Results of a water quality test performed on a sample from an abutter's water system is included in Attachment 7.

250-29 Sewage Disposal

Individual subsurface wastewater disposal systems are proposed for the lots. The lot owners will have their contractor construct each system during the lot development process. Attachment 7 contains the test pit information.

250-30 Trees, Open Spaces and Planting Screens

The Applicant proposes to dedicate 8.13 acres of the parcel as open space. As required by Section 315-43.B.4 of the Zoning ordinance, a minimum 75 foot buffer is proposed between the

NARRATIVE

clustered development and adjoining parcels. There are two proposed incursions into the buffer for the installation of stormwater management outlet pipes. The ordinance states that the buffer is intended to eliminate potential adverse impacts of the subdivision including glare, noise, and unsightly views of service areas. It is believed by Gorrill Palmer that the 4 inch diameter outlet pipes will be unobtrusive and will not result in adverse impacts.

List of Attachments

Attachment

1. Subdivision Checklist
2. Consultants
3. Title/Right/Interest
4. Abutters
5. Flood Map
6. Utilities
7. Hydro-geologic Study
8. Natural Resource Letters
9. Stormwater
10. Erosion Control Report
11. Wetland Memo
12. Traffic Assessment

Town of Cumberland
Major Subdivision Submission Checklist
BASED ON APPENDIX D
MAJOR SUBDIVISION SUBMISSION REQUIREMENTS

Subdivision Name

Orchard Road Subdivision

Applicant's Name TZ Properties, LLC Date _____

10-30-17

Per Section 4.1 *General Procedures*, please note: *The Code Enforcement Officer will first determine if the project will be classified as a major or minor subdivision. Classification will determine submission requirements.*

YOU MUST REVIEW THE PROPOSED PLAN WITH THE CODE ENFORCEMENT OFFICER AND TOWN PLANNER PRIOR SUBMITTING APPLICATION TO RECEIVE THE APPROPRIATE CLASSIFICATION.

Major subdivision x Minor Subdivision _____

The following is intended to provide a summary of the submission requirements for subdivision review and for the provision of evidence for Findings of Fact. For precise requirements, please refer to the Town of Cumberland Subdivision Ordinance.

THE TOWN PLANNER SHALL DETERMINE IF THE APPLICATION COMPLETE OR INCOMPLETE. ONLY COMPLETE APPLICATIONS SHALL BE REVIEWED BY THE PLANNING BOARD.

Waivers: Please make a check in the *Waiver Request* column for any requested waivers. Attach a separate sheet citing the Subdivision Ordinance section number, description, and reason for request. (Section 15.1)

Specify below the location of information,
i.e., plan #, narrative, binder section...

	Yes or No	Location of Information?	Waiver Requested?
General Submissions:			
15 copies of plans and materials. All sheet sized to be 24" x 36"	Yes		
1"=100' scale for general plan	Yes		
1"=40' scale for construction of required improvements	Yes		
Traffic Info?	Yes	Narrative	
Capacity to Serve letters?	Yes	Narrative	
Financial and Technical Capacity (Sec.14)	Yes	Narrative	

Sewer user permits required? Status?	N/A		
Deed restrictions, if any, describe	N/A		
Cover Sheet:			
Proposed subd. name & name of municipality	Yes	Plans	
Name & address of record owner, subdivider, and designer of preliminary plan	Yes	Plans	
Location Map:			
▪ Scale 1"=1000'	Yes	Plans	
▪ Shows area 1000' from property lines	Yes	Plans	
▪ All existing subdivisions	Yes	Plans	
Approximate tract lines of adjacent parcels	Yes	Plans	
Approximate tract lines of parcels directly across street	Yes	Plans	
<i>Location of existing & proposed streets, easements, lot lines & bldg. lines of proposed subd. & adjacent properties.</i>	Yes	Plans	
Existing Conditions Plan			
Existing buildings	N/A		
Watercourses	Yes	Plans	
Legend	Yes	Plans	
Wetlands	Yes	Plans	
existing physical features (trees 10" diameter or more.Stone walls	No		x
Trail System?	N/A		
Subdivision Plan:			
Date of plan submission, true north & graphic scale	Yes	Plans	

Net residential acreage calculations	Yes	Plans	
Legend	Yes	Plans	
Trail (connecting?)	N/A		
<i>Widths</i> of existing/proposed streets, easements & bldg. lines	Yes	Plans	
<i>Names</i> of existing/proposed streets, easements & bldg. lines	Yes	Plans	
Boundaries & designations of zoning districts, parks, public spaces	Yes	Plans	
Outline of proposed subd. w/ street system	Yes	Plans	
Future probable street system of remaining portion of tract.	N/A		
Opportunities for Connecting Road(s) (13.2D)	N/A		
Space & setback of district	Yes	Plans	
Classification of road	Yes	Plans	
Width of road(s)	Yes	Plans	
Drainage type (open, closed, mix)	Yes	Plans	
Type of byway provided (8.4D)	Yes	Plans	
Names of adj. subdivisions	N/A		
Names of owners of record of adjacent acreage	Yes	Plans	
Any zoning districts boundaries affecting subd.	Yes	Plans	
Location & size of existing or proposed sewers, water mains, culverts, hydrants and drains on property	Yes	Yes	
Connections w/existing sewer or water systems	N/A		
Private water supply shown	Yes	Plans	
Private septic shown	Yes	Plans	
Hydro-geologic study	Yes	Narrative	

(option for Board)			
Test pit locations	Yes	Plans	
Well locations	Yes	Plans	
Signature & lic. # of site evaluator	Yes	Narrative	
Existing streets: location, name(s), widths w/in and abutting	Yes	Plans	
Proposed streets: location, name(s), widths w/in and abutting	Yes	Plans	
The above for any highways, easements, bldg. lines, alleys, parks, other open spaces w/in and abutting	Yes	Plans	
Grades & street profiles of all streets, sidewalks or other public ways proposed	Yes	Plans	
2' contour lines	Yes	Plans	
High intensity soil survey by cert. soil scientist	No		x
Soil boundaries & names superimposed on plot plan	No		x
Deed reference & map of survey of tract boundary by reg. land surveyor tied to established reference points	Yes	Plans	
Surface drainage or stormwater mgmt plan w/profiles & cross sections by a P.E. showing prelim. design and conveyances	Yes	Plans/Narrative	
Proposed lot lines w/ dimensions and suggested bldg. locations.	No		x
Location of temp. markers in field	No		x
All parcels proposed to be dedicated to public use and conditions of such.	N/A		
Location of all natural features or site elements to be preserved	Yes	Plans	
Street lighting details	N/A		
Landscaping and grading plan including natural features to be preserved	Yes	Plans	

Survey stamped by P.E.	Yes	Plans	
Soil surveys w/# of soil scientist	N/A		
Septic plan w/ # of prof. site evaluator	Yes	Narrative	
Geological evals w/ reg. geologists number	N/A		
Architect's seal	N/A		
For Rt. One: 75' undisturbed buffer applicable to all buildings, structures, parking areas, drainage facilities and uses.	N/A		
Open Space?	Yes	Plans	
Any part of parcel in a shoreland zone?	No		
Flood Map Number and rating?	Yes	Plans	
Stormwater Report?	Yes	Narrative	
Rivers, ponds, wetlands?	Yes	Plans	
Historic, archeological features?	Yes	Narrative	
Solid waste disposal?	Yes	Narrative	
Required Notes on Plan:			
Fire Department notes	No		
Clearing limits note	No		
<i>Re: approval limit of 90 days before recording or null p. 10</i>	No		
Final Plan Submissions:	<i>See Appendix D</i>		
Actual field survey of boundary lines w/ monumentation shown			
Assessor's approval of street names and assignment of lot numbers.			
Designation of all open spaces w/ notes on ownership			
Copies of declarations, agreements or other documents showing the manner in which open space or easements are to			

be held and maintained.			
Written offer for any conveyance to the Town of open space or easements along with written evidence that the Council is willing to accept such offer			
Evidence of Outside Agency Approvals			

As per Section 7.2 - REVIEW AND APPROVAL BY OTHER AGENCIES:

- A. Where review and approval of any subdivisions or site plan by any other governmental agency is required, such approval shall be submitted to the Planning Board in writing prior to the submission of the Final Plan.*

Please list below all outside agency approvals that are required for this subdivision.

Maine Department of Environmental Protection: *List type of permit(s) required (e.g., SLODA, NRPA (tier type?), Maine Construction General Permit, etc.)*

Stormwater Permit/Construction General Permit, NRPA Permit by rule for stream crossing

US Army Corps of Engineers: Category 2 for stream crossing, wetland impact, vernal pool habitat impacts.

Maine Department of Transportation: *List type of permit(s) required.*

N/A

Maine Department of Inland Fisheries and Wildlife:

N/A

Other: (List)

Project Consultants

Civil Engineer

Gorrill Palmer
707 Sable Oaks Drive Suite 30
South Portland, ME 04106

Surveyor

Titcomb Associates
133 Gray Road
Falmouth, ME 04105

Site Evaluator

David Chapman
Sebago Technics
75 John Roberts Road Suite 1A
South Portland, ME 04106

Wetland Scientist

Lauren Leclerc
TRC
6 Ashley Drive
Scarborough, ME 04074

Projects

The following list contains projects completed by TZ Properties, LLC and by Zareh DerHagopian, and Tony Procida, the principals of TZ Properties.

Sorrento Condominiums – Gray, Maine (TZ Properties)
6 buildings – 12 units total currently completing construction

Back Cove Flats – 15 Morse Street, Portland, Maine (Zareh)
3 unit condominium – completed 2017

Whitney Ridge – Gray, Maine (Tony)
3 duplex units – completed 2015

Farmhouse Lane – Gray, Maine (Tony)
1 duplex – completed 2014

Single Family Residence Kenneth Street, Portland, Maine (Zareh)
Completed 2013

Single Family Residence Wilkie Street, Portland, Maine (Zareh)
Completed 2011

QUITCLAIM DEED WITH COVENANT

{Maine Statutory Short Form}

KNOW ALL MEN BY THESE PRESENTS, that **Virginia H. Ward**, of 1129 Zylstra Rd, Coupeville, Washington, in consideration of One Dollar (\$1.00) and other good and valuable consideration paid by **TZ Properties, LLC**, a Maine limited liability company with offices at 23 Stormy Brook Rd, Falmouth, Maine, the receipt whereof is hereby acknowledged, does hereby GIVE, GRANT, BARGAIN, SELL AND CONVEY unto the said **TZ Properties, LLC**, its successors and assigns forever, with Quitclaim Covenants, as follows:

A certain lot or parcel of land, together with any improvements thereon, situated on the westerly side of Orchard Road, so-called, in the Town of Cumberland, County of Cumberland and State of Maine, being more particularly described in the attached **Exhibit A**.

Meaning and intending to convey, and hereby conveying, a portion of that property described in a deed from Virginia H. Ward to Frances June Ward, April 29, 2002 and recorded in Cumberland County Registry of Deeds at Book 17716, Page 53. Frances June Ward died December 31, 2005, her estate having not been probated, leaving no widower and Virginia H. Ward as her only child and sole heir at law.

IN WITNESS WHEREOF, Virginia H. Ward has hereunto placed her hand and seal this 27 day of July 2017.

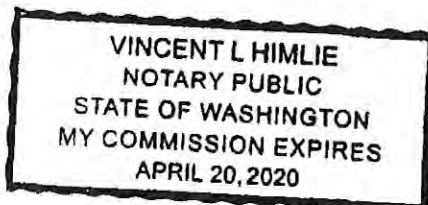
Witness

Virginia H. Ward
Virginia H. Ward

State of WA
County of MASON

7-27, 2017

Then personally appeared the above named Virginia H. Ward and acknowledged the foregoing instrument to be her free act and deed.



Vincent L Himlie
Notary Public/Attorney-at-Law

MAINE REAL ESTATE TAX PAID

Exhibit A

**Description of Large Ward "Back Lot"
On the Westerly Side of Orchard Road
Cumberland, Maine**

A certain parcel of land, located on the westerly side of Orchard Road in Cumberland, County of Cumberland, State of Maine, said parcel being a portion of those premises depicted on a plan entitled, "BOUNDARY SURVEY REMAINING LAND NOW OF VIRGINIA H. WARD dated January 18, 2017 conducted by Sitelines,PA and recorded in Cumberland County Registry of Deeds at Plan Book 217, Page 39 and more particularly described as follows:

BEGINNING at a 5/8 inch rebar set on the assumed westerly right of way line of Orchard Road at the most easterly corner of the Lilac LLC lot shown on said plan;

THENCE S 40° 40' 29" E on said road line, a distance of 285.49 feet to a 5/8 inch rebar set at land now or formerly of Philip J. Terison;

THENCE S 49° 19' 31" W along said Terison lot, a distance of 209.91 feet to a 5/8 inch rebar set;

THENCE S 40° 40' 29" E along said Terison lot, a distance of 179.00 feet to a 5/8 inch rebar set;

THENCE S 60° 36' 25" W along the stone wall marking land of Gordon, a distance of 234.00 feet to a survey pin with cap #1328;

THENCE S 60° 51' 11" W along said stone wall, marking land of Parker, a distance of 395.88 feet to a pin;

THENCE S 60° 39' 40" W along said stone wall, marking land of Stone, a distance of 99.90 feet to a pin;

THENCE S 60° 32' 58" W along said stone wall, marking land of McCabe, a distance of 396.73 feet to a 1/2 inch rebar;

THENCE N 40° 37' 30" W along land now or formerly of the Suzanne L. McCormack Trust, a distance of 1036.60 feet to a rebar set;

THENCE N 47° 14' 45" E along land now or formerly of Carl Terison, Jr, a distance of 548.95 feet to a rebar set;

THENCE S 38° 15' 34" E along land formerly of Allen, a distance of 314.44 feet to a rebar set;

THENCE N 48° 55' 44" E along said Allen lot, a distance of 368.95 feet to a point on the south side of the driveway;

THENCE S 41° 04' 16" E a distance of 20.00 feet;

THENCE N 76° 44' 18" E a distance of 111.58 feet to a rebar set at the most westerly corner of the Christopher S. Neagle lot, as shown on said plan;

THENCE S 40° 40' 29" E along said Neagle lot, a distance of 220.01 feet to a rebar set;

THENCE S 51° 12' 22" W along the aforesaid Lilac LLC lot, a distance of 128.27 feet to a rebar set;

THENCE S 38° 47' 38" E along said Lilac LLC lot, a distance of 200.50 feet to a rebar set;

THENCE N 51° 12' 22" E along said Lilac LLC lot, a distance of 445.02 feet to the **POINT OF BEGINNING.**

The Above Parcel Containing 24.97 ac. ± Total, being a portion of those premises conveyed to Frances June Ward by deed dated April 29, 2002 and recorded in Cumberland County Registry of Deeds at Book 17716, Page 053.

All survey pins set are 5/8" rebar with an aluminum cap bearing the name Smith and PLS 1175.

Received
Recorded Register of Deeds
Jul 31, 2017 02:45:56P
Cumberland County
Nancy A. Lane

signatures being necessary on such amendment, and/or the recording by the Declarant of an amended subdivision plan indicating the changes made;

2. To locate on the Property, even though not depicted on the Plan, and grant and reserve easements and rights of way for the installation, maintenance, repair, replacement and inspection of utility lines, wires, pipes, conduits and facilities, including, but not limited to, water, electric, telephone, cable and sewer;

3. To connect with and make use of utility lines, wires, pipes and conduits located on the Property for construction and sales purposes, provided that the Declarant shall be responsible for the cost of services so used;

4. To use the roads shown on the Plan and access easements appurtenant to the Property for ingress and egress to the Property or any portion thereof for all purposes including, but not limited to development and construction of a residential subdivision and use the Property for the storage of materials used in the construction of the residences and improvements on the Lots and infrastructure on the Property and equipment used in the completion of the project;

5. To install and maintain signs and lighting for marketing and sales purposes; and

6. To do all things reasonably necessary to facilitate the development of the Property and the marketing and sale of the Lots.

Declarant further reserves from the land described in Exhibit A attached hereto a perpetual easement in gross, assignable to any other party or parties in part or in whole, for vehicular and pedestrian access on and all utilities under, across or over the 50' wide roadway right-of-way as shown on the Plan. The foregoing reserved easement may benefit any additional land and any number of additional lots or dwellings without exceeding the scope of or overburdening the reserved easement rights. The foregoing reserved easement is perpetual in nature and does not expire upon the sale of the Lots by Declarant.

ARTICLE V **HOMEOWNERS ASSOCIATION.**

On or about the date of execution and recording of this Declaration, there will be formed *Orchard Road Subdivision Homeowners Association*, a non-profit, non-stock corporation organized under the laws of the State of Maine (the "Association"). Each Owner or Owners of a Lot, including the Declarant prior to the conveyance of each Lot, shall automatically become and be a member of the Association as long as said Owner(s) continues as record owner of a Lot. Upon termination of the interest of an Owner in a Lot, the Owner's membership and any interest in the Association shall automatically terminate and transfer and inure to the next successive record owner of the Lot. Each Owner shall be bound by the Bylaws of the Association, as the same may be amended from time to time, and each Owner shall comply strictly with such Bylaws. No holder of a mortgage on a Lot shall be considered as an Owner until such holder shall have acquired title to such Lot by foreclosure or deed in lieu of foreclosure. With respect to Association governance matters requiring a vote of the Owners, each Lot shall have One (1) vote.

ARTICLE VI **ASSESSMENTS FOR COMMON EXPENSES.**

1. Upon ratification of the budget for Common Expenses (as defined herein), the Association shall cause to be sent to each Owner a statement showing such Owner's share of the Common Expenses. The Common Expenses shall include, without limitation, the costs necessary to own, operate, manage, maintain, repair and replace the Remaining Land and Easement Areas and to operate, maintain, repair and replace the roads, curbing, landscaping, signage, drainage swales, grassed underdrained soil filter, and all structures and equipment related or connected thereto. Assessments for Common Expenses shall be billed on or about the first day of each quarter. All sums so assessed and billed shall become due no later than 30 days after the date of mailing or delivery of each bill. The Members of the Association may from time to time at special meetings levy additional assessments, in accordance with the terms of the Bylaws.

2. Assessments authorized and billed by the Association shall be a charge on the Lot and shall be a continuing lien upon the Lot upon which such assessment is made. If the assessment to an Owner shall not be paid within Thirty (30) days after the date when due, then said assessment shall be delinquent and shall, together with interest at the rate of one percent (1%) per month or any portion thereof, costs of collection and attorneys' fees, become a continuing lien on the Lot owned by the delinquent Owner, which lien shall bind the Lot with the Building and improvements thereon, as well as the delinquent Owner, his heirs, devisees, successors, personal representatives and assigns, without the necessity of filing any document of record. Such lien may be enforced and foreclosed by the Association in the manner provided by applicable law for the foreclosure of real estate mortgages. The lien for unpaid assessments established hereby shall be prior to all liens and encumbrances on the Lot other than (i) the first mortgage recorded prior to the date on which the assessment that is sought to be enforced becomes delinquent, (ii) any second mortgage in favor of Declarant, (iii) liens for real estate taxes and other governmental/municipal assessments or charges against the Lot, or (iv) any other lien that according to law takes priority over existing liens pursuant to any statute. All such assessments, in addition to being a lien, shall also constitute the personal liability of the Owner of the Lot so assessed at the time of the assessment. In the collection of any assessment, the defaulting Owner also shall pay all of the Association's costs of collection, including attorneys' fees.

ARTICLE VII **EASEMENTS.**

The Lots and the Remaining Land are and shall be subject to all of the conditions, restrictions, easements and reservations set forth on the Plan, as it may be amended from time to time, and as more fully described below, and all Owners shall be bound by all of said conditions, restrictions, easements and reservations.

1. "Common Open Space": An easement for maintenance and use of the land for passive recreational activities such as walking, running, snowshoeing, and Nordic skiing.

2. "Roadway Access and Utility Easement": An easement for access by pedestrians and vehicles to and from the Lots and including the right to construct, maintain, repair and replace the roadway, including without limitation the gravel, pavement and curbing therefor. Also an easement to construct, install, use, repair, maintain and replace above and/or below ground any and all utility lines, pipes, conduits, wires, poles, guys, transformer and juncture boxes including without limitation those necessary for the provision of sewer, water, electricity, telephone, cable television, data and other communication services, including the right to enter the easement area at any time and from time to time with workers and equipment to exercise the rights reserved pursuant to this easement, including without limitation the removal of stumps and roots, the construction decorative walls and columns, and the alteration of the grade of the earth, including the right to

maintain and replace all of the foregoing, including the right to enter the easement area at any time and from time to time with pedestrians, motor vehicles and equipment to exercise the rights reserved pursuant to this easement. Declarant reserves for itself and its successors and assigns the right to dedicate and convey the right-of-way to the Town of Cumberland for all public purposes.

3. “Drainage Swales”: An easement for the installation, maintenance, repair, and replacement of level lip spreaders and drainage swales for the purpose of treating storm water runoff, which easement includes access thereto with workers and equipment for such purposes.

4. “Winter Maintenance Easement”: An easement across the roadway for the Town of Cumberland to use for all purposes in connection with the plowing and snow removal activities on the roadway right-of-way, in the event that the roadway is offered and accepted by the Town of Cumberland for winter maintenance purposes.

ARTICLE VIII

MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

The Association shall comply with the recommendations and requirements contained in the “Stormwater management report and Erosion and Sedimentation Control Report for Orchard Road Subdivision, Cumberland, Maine” prepared by Gorrill Palmer for Declarant and dated November, 2017, and October, 2017, as such maintenance plan has been approved by the Town of Cumberland Planning Board and the Maine Department of Environmental Protection. The Maintenance of Facilities section of the Erosion and Sedimentation Report presents the required maintenance for the Orchard Road Subdivision and is included as follows.

Maintenance of facilities

The stormwater facilities will be maintained by the Applicant, TZ Properties, LLC or their assigned heirs. The contract documents will require the contractor to designate a person responsible for maintenance of the sedimentation control features during construction as required by the Erosion Control Report. Long-term operation/maintenance recommended for the stormwater facilities is presented below.

The responsible party may contract with such professionals, as may be necessary in order to comply with this provision and may rely on the advice of such professionals in carrying out its duty hereunder, provided, that the following operation and maintenance procedures are hereby established as a minimum for compliance with this section. A maintenance log of the inspections shall be kept by the responsible party.

Inspection and Maintenance Frequency and Corrective Measures:

The following areas, facilities, and measures will be inspected and the identified deficiencies will be corrected. Clean-out must include the removal and legal disposal of any accumulated sediments and debris.

Catch Basins:

Inspect catch basins 2 times per year (preferably in Spring and Fall) to ensure that the catch basins are working in their intended fashion and that they are free of debris. Clean structures when sediment depths reach 12” from invert of outlet. If the basin outlet is designed with a hood to trap floatable materials (i.e. Snout), check to ensure watertight

seal is working. At a minimum, remove floating debris and hydrocarbons at the time of the inspection.

Culverts:

Inspect culverts 2 times per year (preferably in Spring and Fall) to ensure that the culverts are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit and repair any erosion damage at the culvert's inlet and outlet.

Inlet/Outlet Control Structures:

Inspect structures and piping 2 times per year (preferably in Spring and Fall) to ensure that the structures are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris within the structure.

Stormdrain Outlets:

Inspect outlets 2 times per year (preferably in Spring and Fall) to ensure that the outlets are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the outlet and within the conduit. Repair any erosion damage at the stormdrain outlet.

Soil Filter – Bio-Filtration:

Inspect all upstream pre-treatment measures 2 times per year (preferably in Spring and Fall) for sediment and floatables accumulation. Remove and dispose of any sediments or debris.

Surface (Underdrain Pond, Swale or Bio-Filter):

The soil filter will be inspected within the first three months after construction; thereafter the filter will be inspected 2 times per year (preferably in Spring and Fall) to ensure that the filter is draining within 24 to 48 hours of a rain event equivalent to 1" or more. Adjustments will be made to the outlet valve to ensure that the grassed underdrained soil filter drains within 24 to 48 hours. Failure to drain in 72 hours will require part or all of the soil filter media to be removed and replaced with new material meeting the soil filter gradation. The facilities will be inspected after major storms and any identified deficiencies will be corrected. Harvesting and weeding of excessive growth shall be performed as needed. Inspect for unwanted or invasive plants and remove as necessary.

Vegetated Areas:

Inspect slopes and embankments early in the growing season to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows. The facilities will be inspected after major storms and any identified deficiencies will be corrected.

Ditches, Swales and other Open Stormwater Channels:

Inspect 2 times per year (preferably in Spring and Fall) to ensure they are working in their intended fashion and that they are free of sediment and debris. Remove any obstructions to flow, including accumulated sediments and debris and vegetated growth. Repair any erosion of the ditch lining. Vegetated ditches will be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. Correct any erosion of the channel's bottom or sideslopes. The facilities shall be inspected after major storms and any identified deficiencies shall be corrected.

Roadways and Parking Surfaces: Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader. Repair potholes and other roadway obstructions and hazards. Plowing and sanding of paved areas shall be performed as necessary to maintain vehicular traffic safety.

In the event that the Roadway is accepted by the Town of Cumberland, the maintenance requirements of all stormwater facilities within the right-of-way will become the responsibility of the Town of Cumberland. In the event that the Roadway is accepted by the Town of Cumberland, the Association shall be responsible for the maintenance of all stormwater facilities outside of the right-of-way, including but not limited to the grassed underdrained soil filters, inlet/outlet control structures, storm drain outlets, vegetated areas, and swales.

ARTICLE IX
RESTRICTED BUFFER AREAS.

To preserve the “75’ Buffer.” areas shown on the Plan (hereinafter referred to as the “75’ Buffer Areas”), the Buffer Areas shall be maintained as follows:

The Buffer Areas are and shall forever be held, transferred, sold, conveyed, occupied and maintained subject to the conditions and restrictions set forth in this Article IX of the Declaration (the “Restrictions”). The Restrictions shall run with the Buffer Areas and shall be binding on all parties having any right, title or interest in and to the Restricted Buffer Areas, or any portion thereof, and their heirs, personal representatives, successors, and assigns. Any present or future owner or occupant of the Buffer Areas or any portion thereof, by the acceptance of a deed of conveyance of all or part of the Buffer Areas or an instrument conveying any interest therein, whether or not the deed or instrument shall so express, shall be deemed to have accepted the Buffer Areas subject to the Restrictions and shall agree to be bound by, to comply with and to be subject to each and every one of the Restrictions hereinafter set forth.

1. Restrictions on Buffer Area. The Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Buffer Area to filter and absorb stormwater, the use of the Buffer Area is hereinafter limited as follows.

- a. No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material may be placed, stored or dumped on the Buffer Area, nor may the topography of the area be altered or manipulated in any way;
- b. Any removal of trees or other vegetation within the Buffer Area must be limited to the following:
 - (i) No purposefully cleared openings may be created and an evenly distributed stand of trees and other vegetation must be maintained. An "evenly distributed stand of trees " is defined as maintaining a minimum rating score of 24 points in any 50 foot by 50 foot square (2500 square feet) area, as determined by the following rating scheme:

Diameter of tree at 4 1/2 feet above ground level	Points
2-4 inches	1
4-8 inches	2
8-12 inches	4
>12 inches	8

Where existing trees and other vegetation result in a rating score less than 24 points, no trees may be cut or sprayed with biocides except for the normal maintenance of dead, wind-blown or damaged trees and for pruning of tree branches below a height of 12 feet provided two thirds of the tree's canopy is maintained;

- (ii) No undergrowth, ground cover vegetation, leaf litter, organic duff layer or mineral soil may be disturbed except that one winding path, that is no wider than six feet and that does not provide a downhill channel for runoff, is allowed through the area;
- c. No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Restricted Buffer Area, except for a sign, utility pole or fence;
- d. No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Restricted Buffer Area;

Any activity on or use of the Buffer Area inconsistent with the purpose of these Restrictions is prohibited.

2. **Binding Effect.** If a Buffer Area is at any time owned by more than one owner, each owner shall be bound by the foregoing restrictions to the extent that any of the Buffer Area is included within such owner's property.

ARTICLE X **AMENDMENTS.**

This declaration may be amended at any time and from time to time by written instrument duly executed by the Owners of record of six of the ten Lots; provided, however, that at any time during which the Declarant owns one or more Lots, no amendment shall be effective unless the written consent of the Declarant to such amendment is obtained and further provided that no provisions of this Declaration required as conditions of approval for the subdivision of the Property may be terminated or modified without the approval of the planning authority of the Town of Cumberland. Any such amendment shall be recorded in the Cumberland County Registry of Deeds.

ARTICLE XI
GENERAL PROVISIONS.

1. Enforcement. By the acceptance of the deed to a Lot, each Owner covenants and agrees for himself, his heirs, devisees, successors, personal representatives and assigns, to comply with the covenants and restrictions set forth in this Declaration. Any failure to so comply shall be grounds for an action against the Owner, his heirs, devisees, successors, personal representatives and assigns, to recover damages or for injunctive relief or both. Such action may be maintained by the Association, the Declarant or by any aggrieved Owner. Notwithstanding anything in this Declaration to the contrary, the Association shall enforce the provisions of this Declaration that satisfy the conditions of the Town Approvals. In the event the Association, Declarant or an Owner shall substantially prevail in any such action, they shall be entitled to recover attorneys' fees and related expenses incurred in enforcing the terms of this Declaration. Nothing herein shall require the Declarant to enforce any of the covenants and restrictions in this Declaration.

2. Waivers. No delay or omission on part of the Declarant, the Association, or any Owner in enforcing the covenants set forth herein shall be construed as a waiver of any right to enforce or seek such remedy or acquiescence in such breach.

3. Severability. In the event any one or more of the provisions of this Declaration shall be found for any reason by a court of competent jurisdiction to be unenforceable or null and void, such judgment or decree shall not affect, modify, change, abrogate or nullify any other provision of this Declaration.

4. Pronouns. Wherever used, the singular number shall include the plural, the plural the singular, and the use of any gender shall be applicable to all genders.

IN WITNESS WHEREOF, TZ Properties, LLC, has caused this Declaration to be executed by Anthony J. Procida, its duly-authorized Manager, as of the day and year first above written.

WITNESS:

TZ PROPERTIES, LLC

By:

Anthony J. Procida, its Manager

STATE OF MAINE
COUNTY OF CUMBERLAND

_____, 2017

Personally appeared before me the above-named Anthony J. Procida, Manager of TZ Properties, LLC, as aforesaid, and acknowledged the foregoing to be his free act and deed in said capacity and the free act and deed of said company.

Print name:
Notary Public/Attorney-at-Law

DRAFT

EXHIBIT A

[ADD PERIMETER DESCRIPTION OF PROPERTY FROM DEED]

The access and utility easement in gross reserved by Declarant pursuant to Article IV above.

DRAFT

**Abutters List
Orchard Road Subdivision
TZ Properties, LLC
JN 3236.01**

Tax Map R08 Lot 59 / Orchard Road

TZ Properties, LLC
23 Stormy Brook Lane
Falmouth, ME 04105

Tax Map R08 Lot 60 / 65 Orchard Road

Brian S. Stearns / Amanda L. Stearns
65 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 55A / 9 Whitney Road

Carl Terison Jr. / Annette Terison
62 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 60A / 79 Orchard Road

Evan J. Nicholas
79 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 56 / 8 WHitney Road

Carl Terison Jr. / Annette Terison
62 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 61 / 63 Orchard Road

Breanna J. Copp-Petersen / Ryan E. Petersen
63 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 57 / 4 Whitney Road

Jillane M. Bolduc / Christopher J. Bolduc
4 Whitney Road
Cumberland, ME 04021

Tax Map R08 Lot 62 / 50 Orchard Road

Amy Y. Parker
50 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 58 / 76 Orchard Road

Christopher S. Neagle
76 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 62A / 58 Orchard Road

Thomas U. Gordon / Norma J. Gordon
58 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 59A / 62 Orchard Road

Philip J. Terison
62 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 62C / 48 Orchard Road

Margaret E. Stone / Stephen S. Carey
48 Orchard Road
Cumberland, ME 04021

Tax Map R08 Lot 59B / 74 Orchard Road

Zachary O. Davis
Jenny J. Davis
21 Sawyer Street – Unit 31
Portland, ME 04103

Tax Map R08 Lot 67 / Blanchard Road

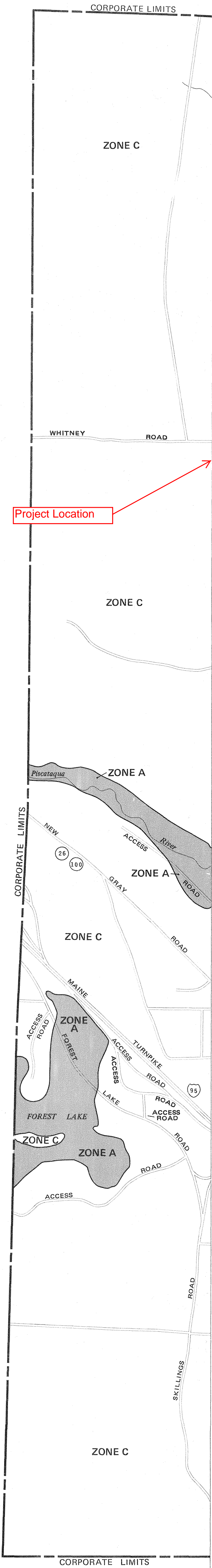
Peter J. McCabe / Cinderella J. McCabe
345 Blanchard Road
PO Box 17
Cumberland Ctr., ME 04021

Tax Map R08 Lot 59C / 78 Orchard Road

Tyler Weidner
9 Poswland Street – Unit #2
Portland, ME 04102

Tax Map R08 Lot 68A / 365 Blanchard Rd

Suzanne L. McCormack – Trustee
365 Blanchard Road
Cumberland Ctr., ME 04021



KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
Zone Designations* With Date of Identification e.g., 12/2/74
100-Year Flood Boundary
500-Year Flood Boundary
Base Flood Elevation Line With Elevation In Feet**
Base Flood Elevation in Feet Where Uniform Within Zone**
Elevation Reference Mark
River Mile
**Referenced to the National Geodetic Vertical Datum of 1929

ZONE B
ZONE A1 DATE
ZONE A5 DATE
ZONE B
513
(EL 987)
RM7 X
• M1.5

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.
This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.
For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:

AUGUST 30, 1977

FLOOD HAZARD BOUNDARY MAP REVISIONS:

FLOOD INSURANCE RATE MAP EFFECTIVE:

MAY 19, 1981

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620, or (800) 424-8872.



APPROXIMATE SCALE

800 0 800 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
CUMBERLAND, MAINE
CUMBERLAND COUNTY

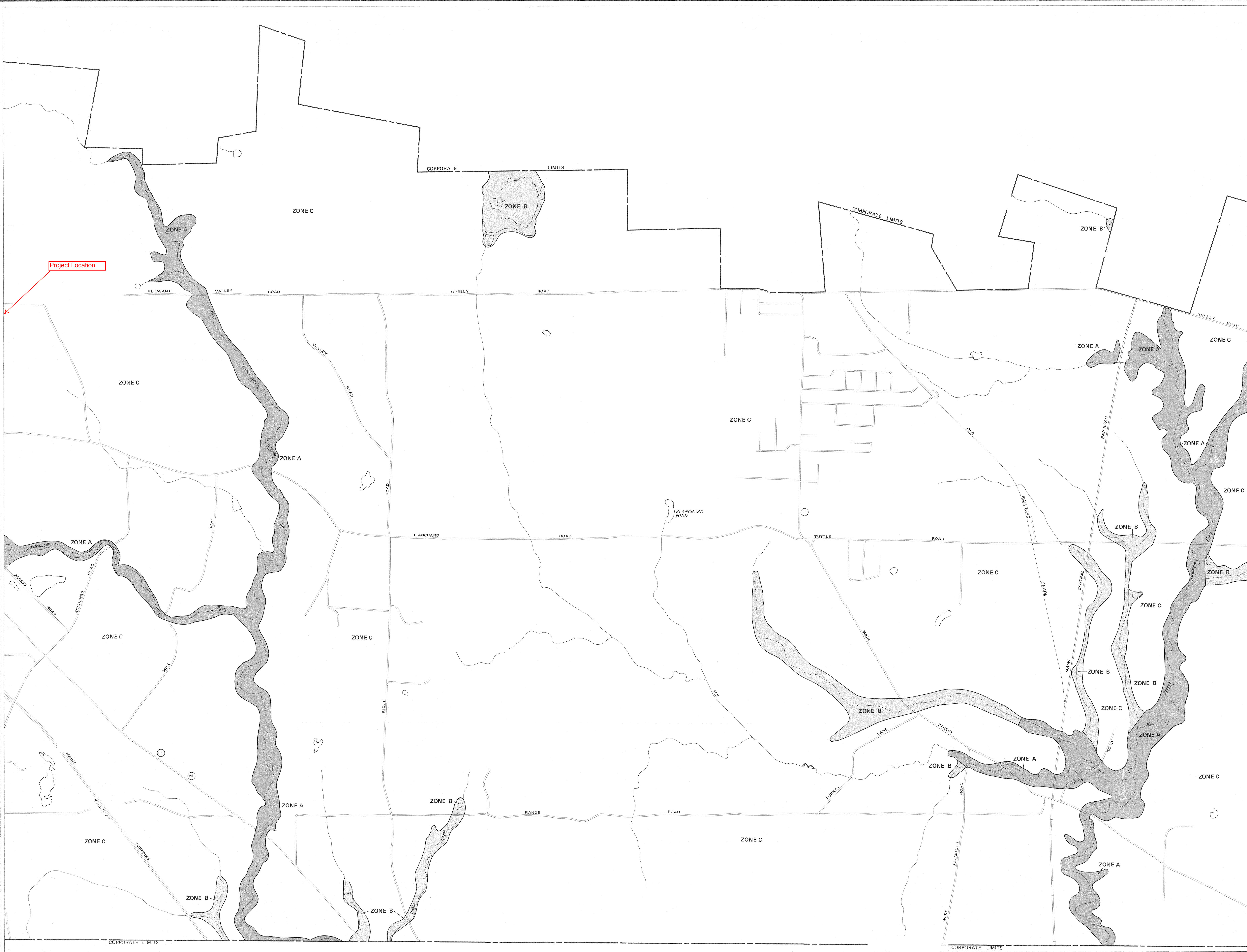
PANEL 10 OF 25
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230162 0010 B

EFFECTIVE DATE:
MAY 19, 1981



federal emergency management agency
federal insurance administration



KEY TO MAP

500-Year Flood Boundary ———

100-Year Flood Boundary ———

Zone Designations* With Date of Identification
e.s., 12/2/74

100-Year Flood Boundary ———

500-Year Flood Boundary ———

Base Flood Elevation Line
With Elevation In Feet**

Base Flood Elevation In Feet
Where Uniform Within Zone**

Elevation Reference Mark

River Mile

****Referenced to the National Geodetic Vertical Datum of 1929**

***EXPLANATION OF ZONE DESIGNATIONS**

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AD	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
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INITIAL IDENTIFICATION:
AUGUST 30, 1977

FLOOD HAZARD BOUNDARY MAP REVISIONS:

FLOOD INSURANCE RATE MAP EFFECTIVE:
MAY 19, 1981

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the **FLOOD INSURANCE RATE MAP EFFECTIVE** date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE

800 0 800 FEET

NATIONAL FLOOD INSURANCE PROGRAM

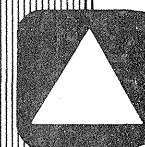
FIRM
FLOOD INSURANCE RATE MAP

TOWN OF CUMBERLAND, MAINE
CUMBERLAND COUNTY

PANEL 15 OF 25
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230162 0015 B

EFFECTIVE DATE:
MAY 19, 1981

 **federal emergency management agency**
federal insurance administration



707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

October 25, 2017

Central Maine Power
162 Canco Road
Portland, ME 04103

Re: Proposed Residential Subdivision
Orchard Road, Cumberland
Letter of Ability to Serve

To Whom It May Concern:

TZ Properties, LLC has retained Gorrill Palmer to prepare plans and permit applications for a proposed residential subdivision off Orchard Road. The site is shown on Assessor's Map R 08 Lot 59B, is approximately 24.9 acres in size and is located in the Residential Rural District 2 (RR-2). As required by the reviewing authorities, we are writing to request a letter indicating the ability of Central Maine Power to serve this project. A preliminary utility plan is enclosed for your review.

Description of Development Site

The project site is currently undeveloped with slopes of 5% to 17%.

Abutting land uses include:

- North –Residential
- West –Residential/Orchard
- South – Residential
- East – Residential

Refer to Figure 1 – Location Map following this page for the project location.

Project Description

The project is a proposed ten lot residential subdivision. Existing electric service is located at Orchard Road across the street from the site. Electric service is proposed overhead from the existing pole to a new pole along the parcel frontage. The service to the lots will be underground from the new pole. Transformers will be placed as needed along the proposed roadway.

At this time, service requirements are not known. It is anticipated that this development would have single phase electric service requirements similar to other residential developments within the Greater Portland area.



Ability to Serve

In support of the applications to the reviewing authorities, we are writing to request a letter indicating the ability of Central Maine Power Company to serve the project. In addition, we are interested in receiving:

- Indication as to the acceptability of the proposed layout.
- Information as to any easements that you may require on-site.
- Any estimate of connection fees
- Any other information that you believe would be useful as this project proceeds.

Sincerely,

Gorrill Palmer

A handwritten signature in blue ink that reads "James Attianese".

James Attianese



GROUNDWATER IMPACT STUDY ORCHARD ROAD SUBDIVISION ORCHARD ROAD, CUMBERLAND

INTRODUCTION:

The purpose of this study is to make an assessment of the hydrogeologic conditions of the above-mentioned site and estimate the groundwater quality impact caused by the proposed on-site subsurface wastewater disposal systems for 10 three-bedroom houses.

The proposed development is located along southwest and west sides of Orchard Road opposite the intersection of Orchard Road and Apple Blossom Way at the position indicated on the attached topographic map (Appendix A, Figure 1). Data used for this project includes a site plan titled *Concept Plan – Cluster for TZ Properties* prepared by Gorrill & Palmer and dated June, 2017 along with test pit logs generated by Sebago Technics and published regional maps and literature.

DISPOSAL FIELDS AND WATER SUPPLY:

The proposed disposal fields will be ten individual subsurface wastewater disposal systems (SSWD) each designed to serve a three-bedroom home. Water for this project will be provided by individual on-site wells. The location of test pits, wastewater disposal systems, well exclusion zones and simulated nitrate-nitrogen ($\text{NO}_3\text{-N}$) plumes are shown on the Groundwater Impact Study Map (Appendix A, Figure 2).

A potential water supply related concern was raised concerning the potential presence of arsenic in the groundwater under the site. Arsenic is a naturally occurring element in bedrock and was a component of some pesticides used in orchards historically. To evaluate the potential presence of arsenic in the bedrock aquifer under the site, Sebago Technics collected a sample from the water supply at 74 Orchard Road. The water supply consists of a drilled well located near the north wall of the house.

The sample was placed in containers provided by Katahdin Analytical (Katahdin) of Scarborough, Maine. The containers were stored in a cooler, on ice, and delivered to Katahdin the same day. Katahdin analyzed the samples for arsenic and nitrates. Katahdin reported the arsenic level at below the Practical Quantitation Level (PQL) of 0.008 mg/L. The nitrate concentration was reported at 1.1 mg/L. A copy of the Katahdin report is in Appendix B.

SURFICIAL GEOLOGY AND TOPOGRAPHY:

The site is located on the *U.S.G.S. Cumberland Center, Maine 7.5 Minute Series* (Appendix A, Figure 1). Site area topography slopes generally downward from north to south towards Blanchard Road.

The *Significant Sand and Gravel Aquifer Map of the Cumberland Center, Maine Quadrangle* (Appendix A, Figure 3) shows that the site does not fall within a Significant Sand and Gravel Aquifer.

The *Surficial Geology Map of the Cumberland Center, Maine Quadrangle* (Appendix A, Figure 5) shows glacial till underlying the Site.

According to the U.S. Department of Agriculture-National Cooperative Soil Service (USDA-NCSS) soil web, the soil under the site consists of four types of glacial till: Hollis fine sandy loam, Paxton fine sandy loam, Woodbridge fine sandy loam and Ridgebury fine sandy loam. Hollis and Paxton soil forms at the summits and shoulders of hills. Woodbridge soil forms till plains on the shoulders and back slopes of hills. Ridgebury forms till plains in toe slopes environments. Logs for Testpit 101 to 110 are included in Appendix B.

HYDROGEOLOGY:

Precipitation falling on this site enters the open pore spaces on the upper soil horizon, and percolates vertically downward until the water table is encountered. Thereupon, flow is both horizontal and downhill. Two factors of importance in determining the amount of recharge of precipitation into the soil on this site are the groundwater slope or gradient and soil texture. The groundwater seepage velocity is used to calculate the extent of groundwater impact downgradient of the disposal field sites and has been calculated utilizing the following equation:

$$v = Ki/n$$

where,

v	= groundwater seepage velocity (ft/day)
K	= hydraulic conductivity (ft/day)
i	= hydraulic gradient (ft/ft)
n	= effective porosity (dimensionless)

The hydraulic conductivity of the soil in the disposal area is estimated at 2 feet per day. The average hydraulic gradient under the areas downgradient of the disposal fields varied from 3 to 8%. A groundwater surface gradient of 1.5% was used for the flatter areas and 3% for steeper areas was used as the slope parameter in the model.

CONTAMINATION POTENTIAL:

It is assumed that the worst potential for contamination is the nitrate-nitrogen (NO₃-N) released from wastewater disposal fields. NO₃-N is known to cause methemoglobinemia in infants and is a suspected cause of stomach cancer. The average NO₃-N concentration value of untreated septic tank effluent entering a disposal field is assumed to be 40 milligrams per liter (mg/L). A level of 1.1 mg/L (according to onsite sampling results) was used as a background nitrate concentration in the aquifer. The Federal and State Drinking Water Limit for NO₃-N in public water supplies is 10 mg/L.

The primary mechanism of NO₃-N concentration reduction is through dilution in groundwater and surface water. Since groundwater is always slowly flowing beneath a disposal field, the NO₃-N intercepting the water table below a disposal field mixes and dilutes in the groundwater and moves in the direction of groundwater flow in the form of a plume. NO₃-N is more concentrated in the center than near the edges of a plume. A source that emanates a constant quantity of potential contaminants into groundwater will eventually reach a "steady state." The plume can then be characterized with regard to size, shape, and distribution of concentration.

The method of analysis used to assess the impact of the septic systems on groundwater is an analytical model used to simulate individual plumes. Analysis of the results of this model is instructive in assessing the possible shape and size of wastewater plumes. The model was developed by Baetsle (1969) to depict the migration of radionuclides in porous media, which is adapted here to represent the subsurface

migration of NO₃-N. It is a three-dimensional transport model of plumes generated by continuous, point sources in a uniform groundwater flow field. Variables employed include seepage velocity (hydraulic conductivity multiplied by hydraulic gradient, divided by effective porosity), nitrate mass, time, and dispersivity. The concentration of NO₃-N is calculated at a downgradient point at a specified time by use of the following equation:

$$C(x, y, z, t) = \left[\frac{CoVo}{8(\pi t)^{1.5} \sqrt{DxDyDz}} \right] \exp \left[-\frac{(x - vt)^2}{4Dxt} - \frac{y^2}{4Dyt} - \frac{z^2}{4Dzt} \right] ;$$

where,

C(x,y,z,t)	=	NO ₃ -N concentration at specified location and time (mg/L)
x	=	specified distance from source parallel to the direction of groundwater flow (ft)
y	=	specified distance from source perpendicular to the direction of groundwater flow (ft)
z	=	specified vertical distance from source (ft)
Co	=	initial concentration at the source (mg/L)
Vo	=	volume of source (ft ³)
t	=	time elapsed (day)
Dx,Dy,Dz	=	dispersion coefficient along the x,y,z axes (ft ² /day)
v	=	average linear velocity (ft/day).

Assuming that groundwater flow is horizontal, the dispersion coefficient can be calculated as follows:

$$D_{x,y,z} = v \alpha_{x,y,z};$$

where $\alpha_{x,y,z}$ is dispersivity (ft).

The contaminant velocity of a solute subject to sorption/adsorption is calculated as follows:

$$V_p = v/R_d;$$

where V_p is the contaminant velocity (ft/day) and R_d is the retardation factor (unitless). The retardation factor for NO₃-N is equal to one, however, so the contaminant velocity is equal to the average linear velocity ($V_p = v$). Dispersivity is estimated by an equation based on a weighted least-squares statistical analysis of collected longitudinal dispersivity data versus scale (Xu, Eckstein, 1995). Longitudinal dispersivity can be estimated based on the following calculation:

$$\alpha_x = (0.83)[\log_{10}(L_p)]^{2.414};$$

where α_x is longitudinal dispersivity (ft), and L_p is the plume length (ft). The plume length is a function of the elapsed time and is calculated by the following equation:

$$L_p = V_p t.$$

It has already been established that for NO₃-N, the contaminant velocity (V_p) is equal to the average linear velocity (v). Thus, $L_p = vt$. The transverse and vertical dispersivities are related to the longitudinal dispersivity, as shown below:

$$\alpha_y = \alpha_x/3$$

$$z = \frac{x}{20}.$$

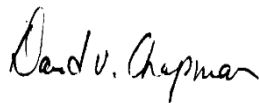
This method is used to calculate a downgradient $\text{NO}_3\text{-N}$ concentration at a specified elapsed time for a single release of $\text{NO}_3\text{-N}$. However, by applying the superposition technique, the estimated concentration of $\text{NO}_3\text{-N}$ downgradient at a specified time can be calculated for reoccurring daily $\text{NO}_3\text{-N}$ releases to simulate the $\text{NO}_3\text{-N}$ plume of a septic system (Chang, *et al.* 1998).

In the main equation, CoVo is represented as a daily mass of nitrate-nitrogen loaded into the subsurface wastewater disposal systems. This is estimated by multiplying the design flow volume of effluent by the assumed $\text{NO}_3\text{-N}$ concentration in the effluent. The simulations were run based on average annual precipitation during drought conditions (60% of average annual precipitation). The $\text{NO}_3\text{-N}$ concentration of the wastewater is diluted by the rainfall infiltrating the disposal fields during drought conditions. The rainfall is assumed to have a $\text{NO}_3\text{-N}$ concentration of 0.5 mg/L. The percent of rainfall infiltrating the soils above the disposal fields is estimated based on the soil type and ground surface slope (Maine Department of Environmental Protection, 1991).

Parameters and results for the disposal field are displayed in Appendix D. The resulting 10 mg/L $\text{NO}_3\text{-N}$ concentration plume lengths for the disposal fields are shown on the site plan. The 10 mg/L plumes do not cross the boundaries of the subdivision.

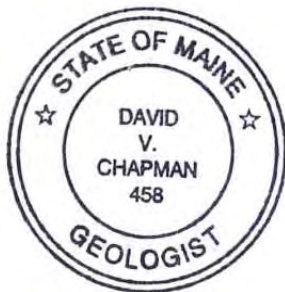
CONCLUSION:

According to the assumptions made for this simulation, the wastewater disposal system will not result in an increase of $\text{NO}_3\text{-N}$ concentrations above 10 mg/L in groundwater at the subdivision perimeter property line.



David Chapman
Maine Certified Geologist #458

DVC/llg



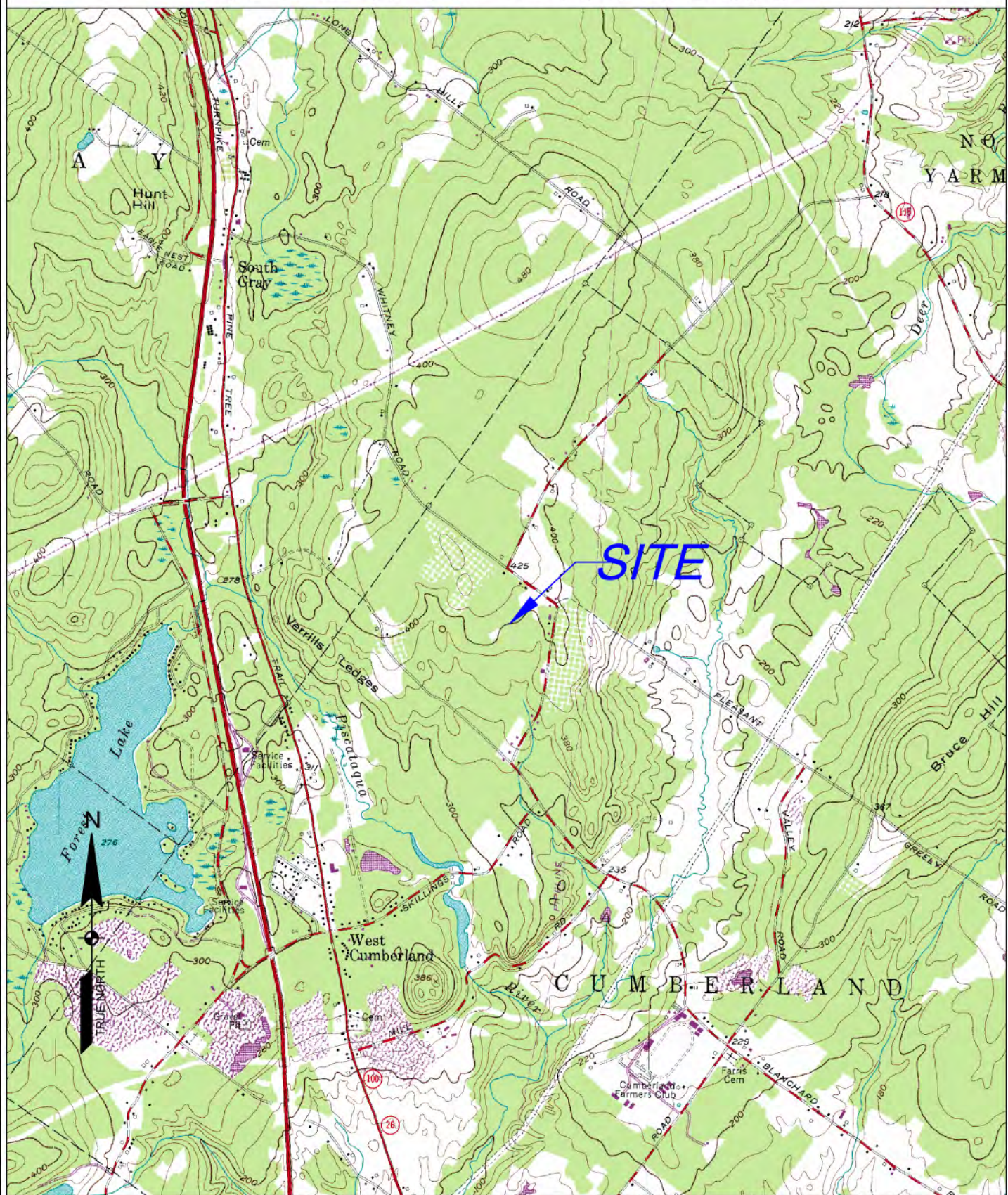
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- Maine Geological Survey, Cumberland Center Quadrangle (Maine), Surficial Geology.
- U.S.G.S., Cumberland Center Quadrangle (Maine) 7.5' Quadrangle 1:24,000, Topographic Map.
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APPENDIX A

FIGURES

FIGURE 1. TOPOGRAPHIC MAP



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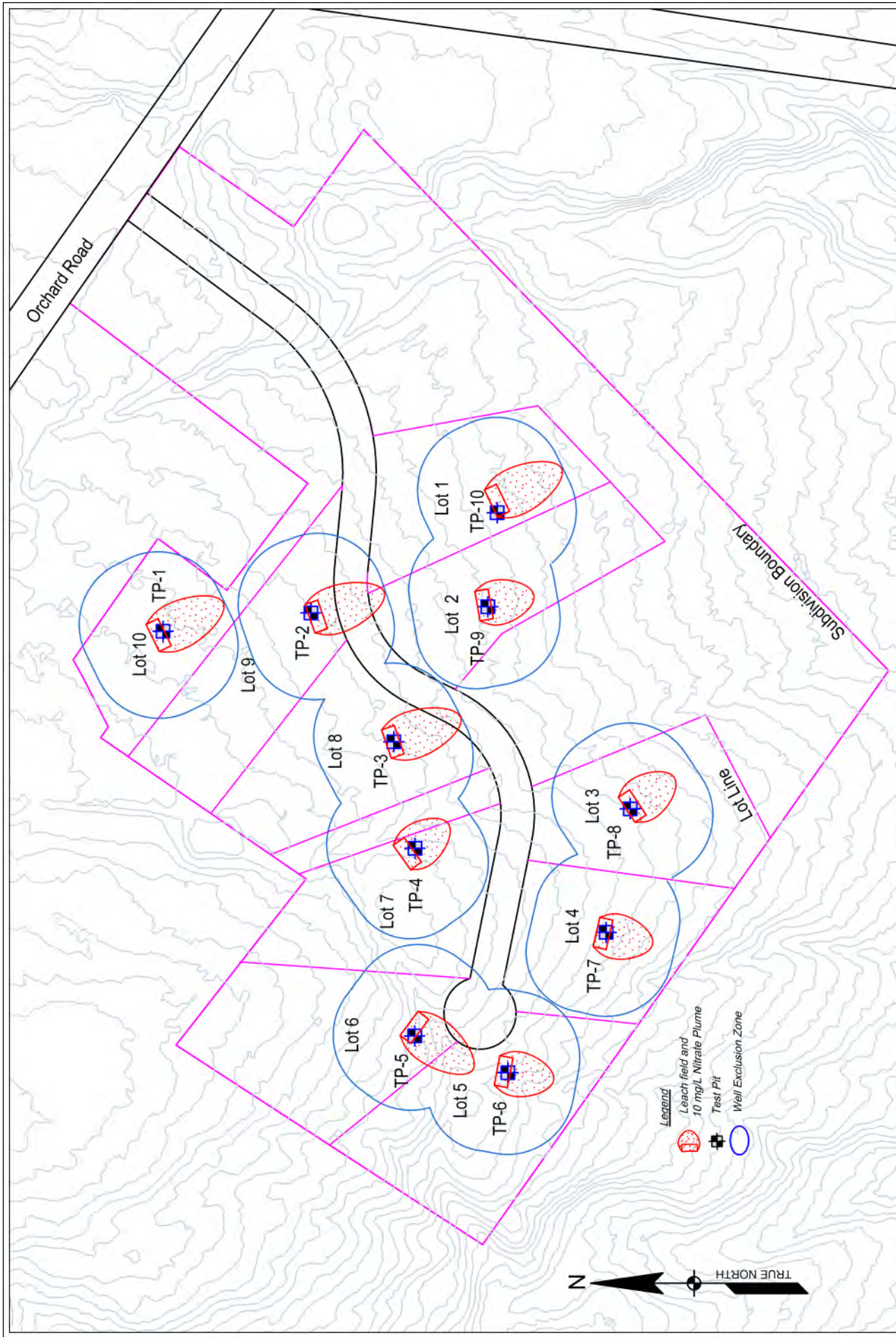
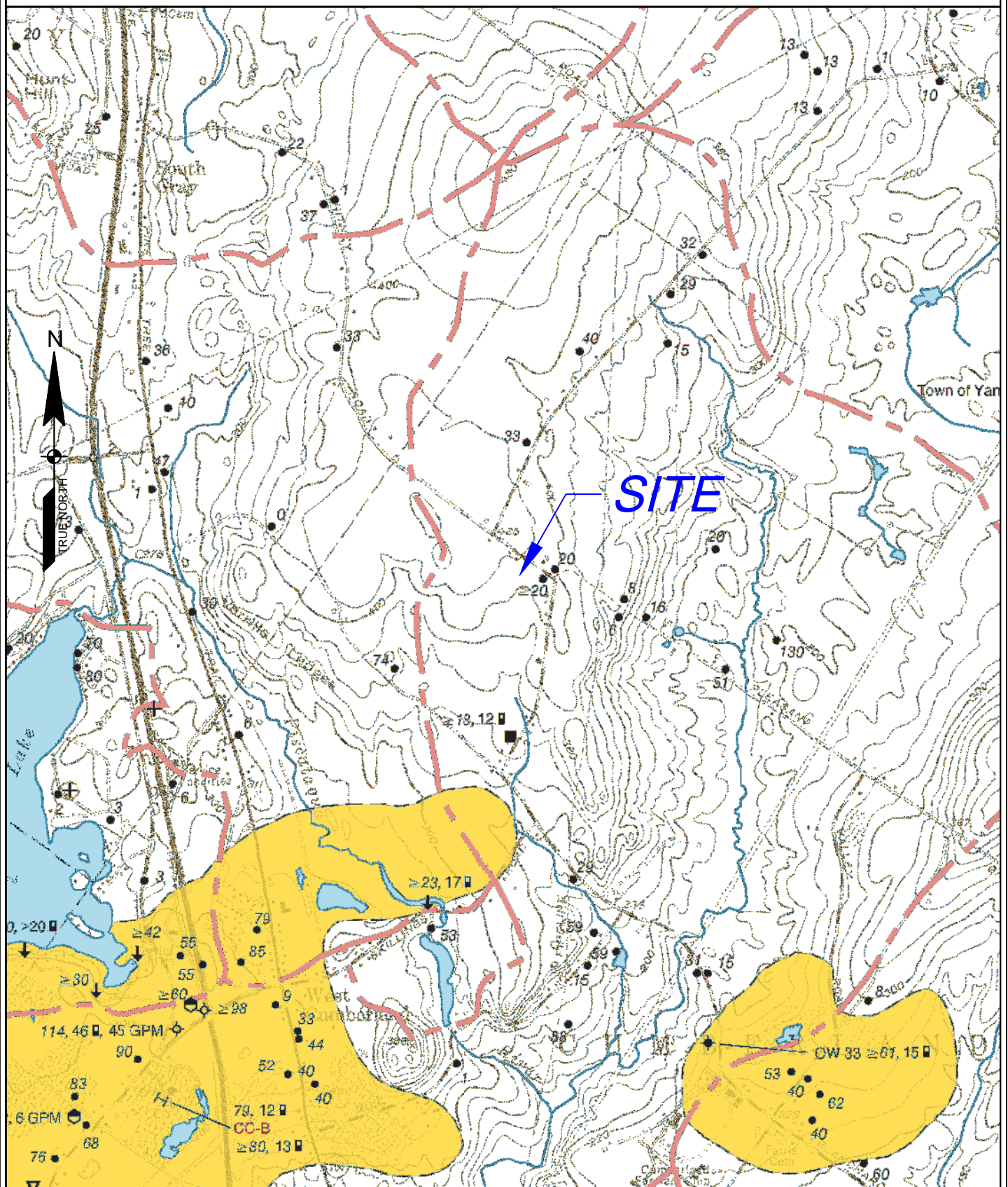


Figure 2
Groundwater Impact
Study Map

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FIGURE 3. SIGNIFICANT SAND & GRAVEL AQUIFERS



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FIGURE 4. AQUIFERS LEGEND

Significant Sand & Gravel Aquifer Map Unit and Symbol Descriptions



Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.



Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.



Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.



Drilled overburden well



Drilled bedrock well



Quarry



Dug well



Driven point



Test pit



Bedrock outcrop

50

Depth to bedrock, in feet below land surface

≥ 13

Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

6

Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)



Gravel pit (overburden thickness noted in feet, e.g. 5-12')

4 GPM

Yield (flow) of well or spring in gallons per minute (GPM)



Spring, with general direction of flow



Observation well (project well if labeled; nonproject well if unlabeled)



Test boring (project boring if labeled; nonproject boring if unlabeled)



Potential point source of ground-water contamination



Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.



MAP-7 131, 23

Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

69, 12

MAP-E

72, 12

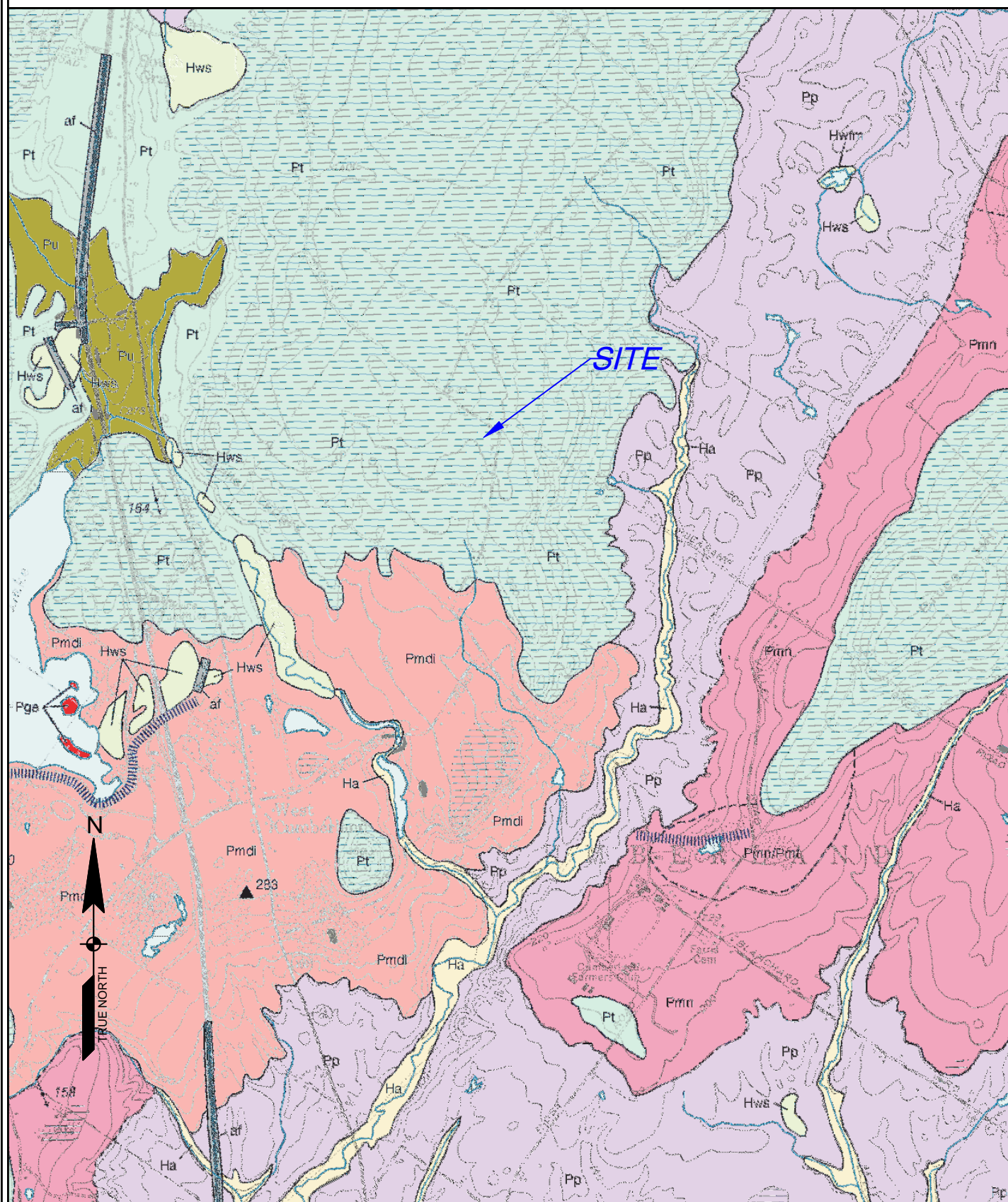
Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface.

Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

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FIGURE 5. SURFICIAL GEOLOGY



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FIGURE 6. SURFICIAL GEOLOGY LEGEND























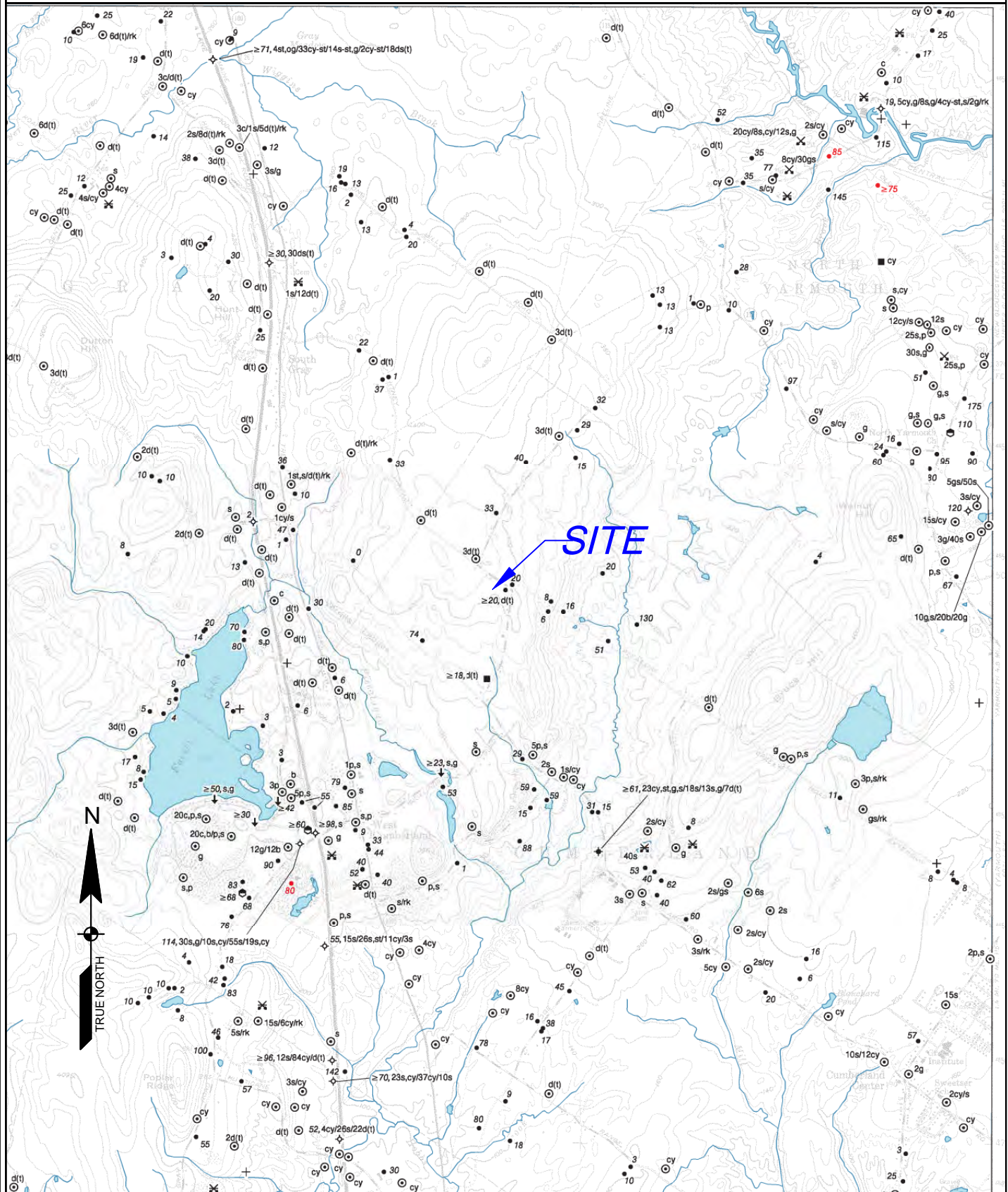
HOLOCENE DEPOSITS	
	Stream alluvium - Sand, silt, and minor amounts of gravel deposited on flood plains of modern streams
	Stream terraces - Flat alluvial benches situated above modern flood plains of streams. Materials forming the depositional terrace include gravel, sand, silt, and clay. Step-like morphology is created by downcutting of the stream through previously deposited material, of glacial or postglacial origin and age
	Wetland, swamp - Peat and fine-grained inorganic sediment. Poorly drained area with standing water common. Hwsp indicates swamps which are likely to include peat deposits that equal or exceed 1.5 meters in thickness
	Wetland, freshwater marsh - Peat and fine-grained inorganic sediment. Poorly drained grassland with standing water common. Hwfp indicates marshes that are likely to include peat deposits that equal or exceed 1.5 meters in thickness
PLEISTOCENE DEPOSITS	
	Marine nearshore deposits - Sand and gravel deposits formed as beaches, and shallow marine sand bodies formed during marine submergence and regression.
	Presumpscot Formation - Fine-grained marine mud (silt and clay with local sandy beds and lenses) locally with marine fossils and dropstones deposited in deeper quieter water during the marine submergence of the coastal lowland
	Marine fan - Layered gravel and sand deposited on the seafloor in a wedge or mound form at the glacier margin during marine submergence
	Marine delta - Sorted and stratified sand and gravel deposited in the late-glacial sea, with flat top graded to ocean surface
	Marine ice-contact delta - Ice-contact delta composed primarily of sorted and stratified sand and gravel. Deposit was graded to surface of late-glacial sea and is distinguished by flat top and foreset and topset beds
	Esker - Gravel and sand deposited in an ice tunnel by subglacial meltwater stream
	End moraine complex - Area of end moraines and associated glaciomarine sediments (submarine fan and sea-floor deposits). Composed of till, sand, and gravel deposited at the margin of the late Wisconsinan ice sheet
	Till - Poorly sorted mixture of gravel, sand, silt, and clay deposited directly by the action of glacier ice.
	Undifferentiated sediments - Pleistocene surficial sediments of uncertain origin.
	Bedrock - Gray dots indicate individual outcrops of ledge exposed at the surface. Horizontal ruled pattern indicates areas where bedrock is covered by a thin veneer of surficial sediments.
	Artificial fill - Mixture of till, gravel, sand, clay, and artificial materials transported and dumped to form elevated sections of roadways, etc.
	Contact - Indicates boundary between adjacent map units, dashed where approximate.
	Glacial striation or groove - Arrow shows direction of former ice movement. Dot marks point of observation.
	End moraine - Ridge of till, sand, and gravel deposited and/or deformed by glacier ice.
	Ice margin position - Line shows approximate position of ice margin during glacial retreat for major ice-margin positions. Dashed where approximate.
	Glacially streamlined hill - Symbol shows trend of long axis, which is parallel to former ice-flow direction.
	Marine fossil locality - Indicates site where marine fossils were located. Sites where radiocarbon age estimates were obtained also show radiocarbon age estimate.
	Glaciomarine delta - Elevation of contact between topset and foreset beds in glaciomarine delta, which indicates former position of sea level (from Thompson and others, 1989).
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FIGURE 7. SURFICIAL MATERIALS



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FIGURE 8. SURFICIAL MATERIALS LEGEND

Surficial Material Symbol Descriptions

This map shows the textures of surficial sediments in the quadrangle, independent of interpretations regarding their origin. For example, poorly sorted sediments deposited directly from glacial ice are shown here as "diamicton", although they may be genetically classified as "till".

The symbols listed below indicate materials observed in borrow pits and other surface exposures, as well as subsurface data from various sources. Where more than one textural class is present, materials are separated by commas and listed in decreasing order of abundance (e.g. s, st, cy). Individual materials may occur in distinct layers, or they may be mixed. Hyphens show the ranges of particle sizes present where their relative abundances are uncertain (e.g. st-c). Slash marks indicate superposition of materials; thicknesses are in feet (e.g. 10s/3cy). "E" indicates a significant stratigraphic sequence of interbedded materials. Some borrow pits and other localities may be designated by numbers that refer to descriptions in the quadrangle text. Not all symbols will necessarily be found on the map.

g Undifferentiated gravel, used as a general term. Can be subdivided by size as follows:

- b** Boulder gravel >256 mm (10")
- c** Cobble gravel 64-256 mm (2.5-10")
- p** Pebble gravel 2-64 mm (0.1-2.5")

gs Gravelly sand (this is a special case for sand with lesser amounts of intermixed gravel, i.e. pebbly sand, cobbly sand, or bouldery sand)

sg Sand and gravel (used only to describe slumped face or other site where relative abundances of sand vs. gravel are unknown).

s Undifferentiated sand, used as a general term. Can be subdivided by size as follows:

- vcs** Very coarse sand (1-2 mm)
- cs** Coarse sand (0.5-1 mm)
- ms** Medium sand (0.25-0.5 mm)
- fs** Fine sand (0.125-0.25 mm)
- vfs** Very fine sand (0.0625-0.125 mm)

st Silt (0.002-0.0625 mm)

cy Clay (<0.002 mm)

og Organic-rich sediment (can be any organic material, including forest litter, wood, shells, etc.)

pt Peat (reserved for actual fibrous peat)

d Undifferentiated diamicton (poorly-sorted sediment in which particle sizes may range from clay to boulders). Used as a general term or subdivided as follows:

- dg** Gravelly-matrix diamicton
- ds** Sandy-matrix diamicton
- dt** Silty-matrix diamicton
- dy** Clayey-matrix diamicton

Note: Diamictons of glacial origin may be classified as one of the following varieties of till (shown on the map in parentheses):

- t** Till, undifferentiated. Usually of late Wisconsinan age (deposited by the last glacial ice sheet).
- ta** Ablation till. Deposited during retreat of the late Wisconsinan ice sheet. Typically sandy, stony, and not very compact.
- tl** Lodgement till. Inferred to have been deposited at the base of the late Wisconsinan ice sheet. Usually very compact.
- tf** Flowtill. Deposited by slumping adjacent to glacial ice.
- T** Variably weathered till (usually a lodgment facies) of inferred pre-late Wisconsinan age.

af Artificial fill (e.g. road fills, building sites, dumps)

bd Scattered boulders; interpreted as till where followed by (t)

rk Bedrock (observed in pit floor, boring, or natural exposure)

rs Rottenstone, disintegrated or weathered bedrock, saprolite,

u Unknown (material unidentified)

R Refusal (in test boring or well)

(f) Fossiliferous (used to indicate fossiliferous units within a sequence).

- Bedrock well
- ⊗ Drilled overburden well
- Dug well
- ↓ Driven point
- ⊕ Bedrock outcrop
- ⊗ Quarry

◆ 20fs,st Observation well with materials data

◆ 10gs/rk Test boring with materials data

⊙ 8s-b Materials data from shovel hole, hand-auger hole, natural exposure, or excavation (other than borrow pit).

50 Depth to bedrock from well (≥ is used to indicate minimum depth to bedrock), in feet below land surface

✕ s-b Borrow pit, recently active at time of mapping, with materials data.

✕ s-p Borrow pit, evidently abandoned or in long disuse at time of mapping, with materials data.

Ⓜ Location of site for which a data sheet is on file at the Maine Geological Survey.

■ 50 Depth to bedrock from seismic line, in feet below land surface

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APPENDIX B
KATAHDIN ANALYTICAL REPORT

October 27, 2017

Mr. Dave Chapman
Sebago Technics
75 John Roberts Rd
Suite 1A
South Portland, ME 04106

RE: Katahdin Lab Number: SK9925
Project ID: Orchard Road IVIT
Project Manager: Mr. Galen Nickerson
Sample Receipt Date(s): October 25, 2017

Dear Mr. Chapman:

Please find enclosed the following information:

- * Report of Analysis (Analytical and/or Field)
- * Chain of Custody (COC)
- * Login Report

A copy of the Chain of Custody is included in the paginated report. The original COC is attached as an addendum to this report.

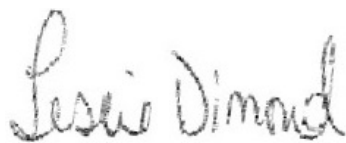
Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to <http://www.katahdinlab.com/cert.html> for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES



Authorized Signature - Quality Assurance Officer

10/27/2017

Date

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as “U” MDL have a 50% rate for false negatives compared to those results reported as “U” PQL “U” LOQ or “U” LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory’s Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is “analyze immediately”. Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH

H2 - DO

H3 - sulfite

H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL Maximum Contaminant Level

NL No limit

NFL No Free Liquid Present

FLP Free Liquid Present

NOD No Odor Detected

TON Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is ‘qualified’ because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.



REPORT OF ANALYTICAL RESULTS

Client: Dave Chapman
Sebago Technics
75 John Roberts Rd
Suite 1A
South Portland, ME 04106

Lab Sample ID: SK9925-001
Report Date: 10/27/2017
PO No.:
Project: Orchard Road IVIT

Sample Description					Matrix		Filtered	Date Sampled		Date Received			
74 ORCHARD ROAD					AQ		No(Total)	10/25/2017		10/25/2017			
Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ARSENIC	U 0.008	mg/L	0.008	1	0.008	SW846 6010	10/26/17	MD	SW846 3010	10/26/17	AMJ	KJ26ICW2	

Report of Analytical Results

Client: Dave Chapman
Sebago Technics
75 John Roberts Rd
South Portland, ME 04106

Lab Sample ID: SK9925-1
Report Date: 26-OCT-17
Client PO:
Project: Orchard Road IVIT
SDG: SK9925

Sample Description
74 ORCHARD ROAD

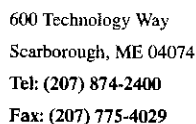
Matrix **Date Sampled** **Date Received**
AQ 25-OCT-17 09:20:00 25-OCT-17

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Nitrate As N	1.1 mg/L	0.050	.0152	EPA 353.2	WG216349	25-OCT-17 16:56:23	N/A	N/A	AP		

Client: <u>Sebago Tech</u>	KAS PM: <u>GN</u>	Sampled By: <u>Client</u>
Project:	KIMS Entry By: <u>SO</u>	Delivered By: <u>Client</u>
KAS Work Order#: <u>SK9925</u>	KIMS Review By: <u>GN</u>	Received By: <u>JCB</u>
SDG #:	Cooler: <u>1</u> of <u>1</u>	Date/Time Rec.: <u>10.25.17 1800</u>

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	<input checked="" type="checkbox"/>				
2. Chain of Custody present in cooler?	<input checked="" type="checkbox"/>				
3. Chain of Custody signed by client?	<input checked="" type="checkbox"/>				
4. Chain of Custody matches samples?	<input checked="" type="checkbox"/>				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	<input checked="" type="checkbox"/>				Temp (°C): <u>4.6</u>
Samples received at <6 °C w/o freezing?	<input checked="" type="checkbox"/>				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	<input checked="" type="checkbox"/>				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	<input checked="" type="checkbox"/>				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				<input checked="" type="checkbox"/>	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				<input checked="" type="checkbox"/>	
Soil/Sediment:					
Received in airtight container?				<input checked="" type="checkbox"/>	
Received in methanol?				<input checked="" type="checkbox"/>	
Methanol covering soil?				<input checked="" type="checkbox"/>	
D.I. Water - Received within 48 hour HT?				<input checked="" type="checkbox"/>	
Air: Refer to KAS COC for canister/flow controller requirements.	<input checked="" type="checkbox"/> if air included				
7. Trip Blank present in cooler?				<input checked="" type="checkbox"/>	
8. Proper sample containers and volume?	<input checked="" type="checkbox"/>				
9. Samples within hold time upon receipt?	<input checked="" type="checkbox"/>				
10. Aqueous samples properly preserved?	<input checked="" type="checkbox"/>				
Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH - pH <2					
Sulfide - >9				<input checked="" type="checkbox"/>	
Cyanide - pH >12				<input checked="" type="checkbox"/>	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.



**PLEASE BEAR DOWN AND
PRINT LEGIBLY IN PEN**

Page 1 of 1

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.



Katahdin Analytical Services
Login Chain of Custody Report (Ino1)

Page: 1 of 1

Oct. 25, 2017

11:05 AM

Quote/Incoming:

Login Number: SK9925

Account: SEBAGOTECH001

Sebago Technics

NoWeb

Project:

Primary Report Address:

Dave Chapman
Sebago Technics
75 John Roberts Rd
Suite 1A
South Portland, ME 04106
dchapman@sebagotechnics.com

Primary Invoice Address:

Accounts Payable
Sebago Technics
75 John Roberts Rd
Suite 1A
South Portland, ME 04106

Report CC Addresses:

Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS : FIRM-HARD COPY BY END OF DAY
CHECK NO. :
CLIENT PO# :
CLIENT PROJECT MANAGE :
CONTRACT :
COOLER TEMPERATURE : 4.6
DELIVERY SERVICES : Client
EDD FORMAT :
LOGIN INITIALS : SO
PM : GN
PROJECT NAME : Orchard Road IVIT
QC LEVEL : I
REPORT INSTRUCTIONS : email pdf, EDD and Invoice to Dave, no HC
SDG ID :
SDG STATUS :
VERBAL TAT :

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SK9925-1	74 ORCHARD ROAD	25-OCT-17 09:20	25-OCT-17		27-OCT-17	27-OCT-17	
Matrix	Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments		
Aqueous	S E353.2-NITRATE	27-OCT-17	125mL Plastic				
Aqueous	S SW3010-PREP	23-APR-18	250mL Plastic+HNO3				
Aqueous	S SW6010-ARSENIC	23-APR-18	250mL Plastic+HNO3				

Total Samples: 1

Total Analyses: 3

APPENDIX C
TESTPIT LOGS

SOIL PROFILE / CLASSIFICATION INFORMATION		DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES
Project Name: Orchard Road Subdivision	Applicant Name: Gorrill & Palmer	Project Location (municipality): Cumberland

Observation Hole # <u>TP-1</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Fine Sandy Loam	Friable	Dark Brown	
12				
18				
24	Sandy Loam	Firm	Light Olive Brown	Many/ Prominant
30				
36				
42				
48	Limit of Excavation at 20"			
Soil	Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
<u>3</u> Profile	<u>D</u> Condition	<u>0-3</u> Percent	<u>12"</u> Depth	

Observation Hole # <u>TP-2</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Fine Sandy Loam	Friable	Dark Brown	
12				
18				
24	Sandy Loam		Light Olive Brown	Common/ Distinct
30		Firm		
36				
42				
48	Limit of Excavation at 30"			
Soil	Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
<u>3</u> Profile	<u>C</u> Condition	<u>0-3</u> Percent	<u>12"</u> Depth	

Observation Hole # <u>TP-3</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Fine Sandy Loam	Friable	Dark Yellowish Brown	
12	Sandy Loam			
18				
24				
30		Firm	Light Olive Brown	Common/ Distinct
36				
42				
48	Limit of Excavation at 26"			
Soil	Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
<u>3</u> Profile	<u>C</u> Condition	<u>3-8</u> Percent	<u>24"</u> Depth	

Observation Hole # <u>TP-4</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6			Dark Yellowish Brown	
12	Sandy Loam	Friable		None Observed
18			Yellowish Brown	
24				
30				
36				
42				
48	Limit of Excavation at 24"			
Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
<u>3</u> Profile	<u>C</u> Condition	<u>3-8</u> Percent	<u>>24"</u> Depth	

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: <u>David V. Chapman</u>	Date: <u>9-27-17</u>
Name Printed/typed: <u>David V. Chapman</u>	Cert/Lic/Reg.# 293
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	

SOIL PROFILE / CLASSIFICATION INFORMATION		DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES
Project Name: Orchard Road Subdivision	Applicant Name: Gorrill & Palmer	Project Location (municipality): Cumberland

Observation Hole # <u>TP-5</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
0	Texture	Consistency	Color	Mottling
6	Sandy Loam	Friable	Dark Brown	
12			Light Olive Brown	None Observed
18				
24		Firm		
30				
36				
42				
48	Limit of Excavation at 24"			
	Soil <u>3</u> Profile	Classification <u>C</u> Condition	Slope <u>3-8</u> Percent	Limiting Factor <u>21</u> Depth
	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock			

Observation Hole # <u>TP-6</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
0	Texture	Consistency	Color	Mottling
6	Sandy Loam	Friable	Dark Brown	
12			Light Olive Brown	None Observed
18				
24		Firm		
30				
36				
42				
48	Limit of Excavation at 24"			
	Soil <u>3</u> Profile	Classification <u>D</u> Condition	Slope <u>3-8</u> Percent	Limiting Factor <u>21"</u> Depth
	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock			

Observation Hole # <u>TP-7</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
0	Texture	Consistency	Color	Mottling
6	Sandy Loam	Friable	Dark Yellowish Brown	
12			Light Olive Brown	None Observed
18				
24		Firm		
30				
36				
42				
48	Limit of Excavation at 25"			
	Soil <u>3</u> Profile	Classification <u>C</u> Condition	Slope <u>3-8</u> Percent	Limiting Factor <u>20"</u> Depth
	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock			

Observation Hole # <u>TP-8</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
0	Texture	Consistency	Color	Mottling
6	Sandy Loam	Friable	Dark Yellowish Brown	
12			Light Yellowish Brown	None Observed
18				
24		Firm		
30				
36				
42				
48	Limit of Excavation at 27"			
	Soil <u>3</u> Profile	Classification <u>C</u> Condition	Slope <u>0-3</u> Percent	Limiting Factor <u>23"</u> Depth
	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock			

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: <u>David V. Chapman</u>	Date: <u>9-27-17</u>
Name Printed/typed: <u>David V. Chapman</u>	Cert/Lic/Reg.# 293
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	

SOIL PROFILE / CLASSIFICATION INFORMATION		DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES
Project Name: Orchard Road Subdivision	Applicant Name: Gorrill & Palmer	Project Location (municipality): Cumberland

Observation Hole # <u>TP-9</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Sandy Loam	Friable	Brown	
12				
18			Light Olive Brown	Common/ Distinct
24				
30		Firm		
36				
42				
48				
Limit of Excavation at 27"				
Soil <u>3</u> Profile	Classification <u>D</u> Condition	Slope <u>0-3</u> Percent	Limiting Factor <u>14"</u> Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Observation Hole # <u>TP-10</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Sandy Loam	Friable	Dark Yellowish Brown	
12				
18			Light Olive Brown	Common/ Distinct
24				
30				
36				
42				
48				
Limit of Excavation at 22"				
Soil <u>3</u> Profile	Classification <u>D</u> Condition	Slope <u>0-3</u> Percent	Limiting Factor <u>10"</u> Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Observation Hole # _____ <input type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
_____ " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6				
12				
18				
24				
30				
36				
42				
48				
Soil _____ Profile	Classification _____ Condition	Slope _____ Percent	Limiting Factor _____ Depth	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Observation Hole # _____ <input type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
_____ " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6				
12				
18				
24				
30				
36				
42				
48				
Soil _____ Profile	Classification _____ Condition	Slope _____ Percent	Limiting Factor _____ Depth	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: <u>David V. Chapman</u>	Date: <u>9-27-17</u>
Name Printed/typed: <u>David V. Chapman</u>	Cert/Lic/Reg.# 293
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	

APPENDIX D

PARAMETERS AND RESULTS

**Groundwater Impact Study, Nitrates
Model Input Parameters and Solution
Orchard Road Subdivision
Orchard Road, Cumberland, Maine
Lot 1, 6, 8, 9, and 10**

Annual rainfall (inches):	44
Hydrologic soil group* (above disposal field):	C to D
% Slope (above disposal field):	3 to 8%
% Infiltration* (into disposal field):	21
Assumed rainfall flow into disposal field (gal/day):	14.20
Assumed rainfall flow into disposal field during drought conditions^(gal/day):	8.52
Background NO3-N concentration (mg/L):	0
Assumed effluent NO3-N concentration (mg/L):	41
Assumed effluent flow into disposal field (gal/day):	270
Assumed NO3-N concentration in rainfall (mg/L):	0.5
Hydraulic conductivity of aquifer (ft/day):	2
Hydraulic gradient of aquifer (ft/ft):	0.015
Effective porosity of aquifer:	0.21
Seepage velocity of aquifer (ft/day):	0.14
Retardation factor	1
Half-Life (0 for no decay)	0
Simulation duration to reach NO3-N concentration equilibrium (days)	2,312
Longitudinal dispersivity at end of simulation duration (ft)	2.08
Lateral dispersivity at end of simulation duration (ft)	0.69
Vertical dispersivity at end of simulation duration (ft)	0.10
Disposal bed length (ft)	45
Disposal bed width (ft)	20
Length of 10 mg/L plume during drought conditions (ft)	98

Notes:

* - from The State of Maine Department of Environmental Protection, 1991, The guidelines for expediting the processing of applications under the site location of development act.

^ - drought conditions equals 60% of average annual rainfall

% - percent

gal/day - gallons per day

ft - feet

mg/L - milligrams per liter

NO3-N - Nitrate-Nitrogen

**Groundwater Impact Study, Nitrates
Model Input Parameters and Solution
Orchard Road Subdivision
Orchard Road, Cumberland
Lots 2, 3, 4, 5, and 7**

Annual rainfall (inches):	44
Hydrologic soil group* (above disposal field):	C to D
% Slope (above disposal field):	1 to 5%
% Infiltration* (into disposal field):	21
Assumed rainfall flow into disposal field (gal/day):	14.20
Assumed rainfall flow into disposal field during drought conditions^(gal/day):	8.52
Background NO3-N concentration (mg/L):	0
Assumed effluent NO3-N concentration (mg/L):	41
Assumed effluent flow into disposal field (gal/day):	270
Assumed NO3-N concentration in rainfall (mg/L):	0.5
Hydraulic conductivity of aquifer (ft/day):	2
Hydraulic gradient of aquifer (ft/ft):	0.015
Effective porosity of aquifer:	0.21
Seepage velocity of aquifer (ft/day):	0.14
Retardation factor	1
Half-Life (0 for no decay)	0
Simulation duration to reach NO3-N concentration equilibrium (days)	1,001
Longitudinal dispersivity at end of simulation duration (ft)	3.85
Lateral dispersivity at end of simulation duration (ft)	1.28
Vertical dispersivity at end of simulation duration (ft)	0.19
Disposal bed length (ft)	45
Disposal bed width (ft)	20
Length of 10 mg/L plume during drought conditions (ft)	66

Notes:

* - from The State of Maine Department of Environmental Protection, 1991, The guidelines for expediting the processing of applications under the site location of development act.

^ - drought conditions equals 60% of average annual rainfall

% - percent

gal/day - gallons per day

ft - feet

mg/L - milligrams per liter

NO3-N - Nitrate-Nitrogen



PAUL R. LePAGE
GOVERNOR

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
93 STATE HOUSE STATION
AUGUSTA, MAINE 04333

WALTER E. WHITCOMB
COMMISSIONER

October 23, 2017

James Attianese
Gorrill Palmer
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106

Via email: jattianese@gorrillpalmer.com

Re: Rare and exemplary botanical features in proximity to: Job #3236.01, Orchard Road Subdivision, Cumberland, Maine

Dear Mr. Attianese:

I have searched the Natural Areas Program's Biological and Conservation Data System files in response to your request received October 20, 2017 for information on the presence of rare or unique botanical features documented from the vicinity of the project in Cumberland, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. You may want to have the site inventoried by a qualified field biologist to ensure that no undocumented rare features are inadvertently harmed.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM



PHONE: (207) 287-8044
FAX: (207) 287-8040
WWW.MAINE.GOV/DACF/MNAP

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

The Natural Areas Program has instituted a fee structure of \$75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for \$150.00 for two hours of our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

A handwritten signature in cursive script, appearing to read "Krist Puryear".

Kristen Puryear | Ecologist | Maine Natural Areas Program
207-287-8043 | kristen.puryear@maine.gov

Rare and Exemplary Botanical Features within 4 miles of Project: #3236.01, Orchard Road Subdivision, Cumberland, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Broad Beech Fern						
	SC	S2	G5	2001-08-28	28	Hardwood to mixed forest (forest, upland)
Engelmann's Spikerush						
	PE	SH	G4G5Q	1916-08-31	2	Open wetland, not coastal nor rivershore (non-forested, wetland)
Enriched Northern Hardwoods Forest						
	<null>	S3	GNR	2001-08-28	34	Hardwood to mixed forest (forest, upland)
Fern-leaved False Foxglove						
	SC	S3	G5	1902-09-02	13	Dry barrens (partly forested, upland),Hardwood to mixed forest (forest, upland)
Great Blue Lobelia						
	PE	SX	G5	1905-09	3	Forested wetland,Non-tidal rivershore (non-forested, seasonally wet)
Horned Pondweed						
	SC	S2	G5	1913-09-13	9	Tidal wetland (non-forested, wetland)
Marsh Milkwort						
	PE	SH	G5T4	1903-08-18	1	Dry barrens (partly forested, upland),Open wetland, not coastal nor rivershore (non-forested, wetland)
Oak - Hickory Forest						
	<null>	S1	G4G5	2014-08-21	5	Hardwood to mixed forest (forest, upland)
Rattlesnake Hawkweed						
	E	S1	G5T4Q	1909-07	1	Dry barrens (partly forested, upland)
Spotted Pondweed						
	T	S1	G5	1995-10-01	3	Open water (non-forested, wetland)
Spotted Wintergreen						
	E	S2	G5	2009-07-26	30	Conifer forest (forest, upland),Hardwood to mixed forest (forest, upland)

**Rare and Exemplary Botanical Features within 4 miles of
Project: #3236.01, Orchard Road Subdivision, Cumberland, Maine**

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Upper Floodplain Hardwood Forest						
<null>		S3	GNR	2010-08-24	18	Forested wetland
Water-plantain Spearwort						
PE		SH	G4	1903-07-29	2	Open water (non-forested, wetland)

STATE RARITY RANKS

- S1** Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- S2** Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- S3** Rare in Maine (20-100 occurrences).
- S4** Apparently secure in Maine.
- S5** Demonstrably secure in Maine.
- SU** Under consideration for assigning rarity status; more information needed on threats or distribution.
- SNR** Not yet ranked.
- SNA** Rank not applicable.
- S#?** Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines State Rarity Ranks for animals.

GLOBAL RARITY RANKS

- G1** Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.
- G2** Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- G3** Globally rare (20-100 occurrences).
- G4** Apparently secure globally.
- G5** Demonstrably secure globally.
- GNR** Not yet ranked.

Note: **Global Ranks** are determined by NatureServe.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered** and **Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

- E** ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
- T** THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

NON-LEGAL STATUS

- SC** SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
- PE** Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

ELEMENT OCCURRENCE RANKS - EO RANKS

Element Occurrence ranks are used to describe the quality of a rare plant population or natural community based on three factors:

- **Size**: Size of community or population relative to other known examples in Maine. Community or population's viability, capability to maintain itself.
- **Condition**: For communities, condition includes presence of representative species, maturity of species, and evidence of human-caused disturbance. For plants, factors include species vigor and evidence of human-caused disturbance.
- **Landscape context**: Land uses and/or condition of natural communities surrounding the observed area. Ability of the observed community or population to be protected from effects of adjacent land uses.

These three factors are combined into an overall ranking of the feature of **A**, **B**, **C**, or **D**, where **A** indicates an **excellent** example of the community or population and **D** indicates a **poor** example of the community or population. A rank of **E** indicates that the community or population is **extant** but there is not enough data to assign a quality rank. The Maine Natural Areas Program tracks all occurrences of rare (S1-S3) plants and natural communities as well as A and B ranked common (S4-S5) natural communities.

Note: **Element Occurrence Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines Element Occurrence ranks for animals.

Visit our website for more information on rare, threatened, and endangered species!
<http://www.maine.gov/dacf/mnap>



PAUL R. LEPAGE
GOVERNOR

STATE OF MAINE
DEPARTMENT OF
INLAND FISHERIES & WILDLIFE
284 STATE STREET
41 STATE HOUSE STATION
AUGUSTA ME 04333-0041

CHANDLER E. WOODCOCK
COMMISSIONER

October 27, 2017

James Attianese
Gorrill Palmer
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106

RE: Information Request - Orchard Road subdivision, Cumberland

Dear James:

Per your request received October 23, 2017, we have reviewed current Maine Department of Inland Fisheries and Wildlife (MDIFW) information for known locations of Endangered, Threatened, and Special Concern species; designated Essential and Significant Wildlife Habitats; and fisheries habitat concerns within the vicinity of the *Orchard Road subdivision Project* in Cumberland.

Our Department has not mapped any Essential Habitats or fisheries habitats that would be directly affected by your project.

Endangered, Threatened, and Special Concern Species

Bats

Of the eight species of bats that occur in Maine, the three *Myotis* species are protected under Maine's Endangered Species Act (MESA) and are afforded special protection under 12 M.R.S §12801 - §12810. The three *Myotis* species include little brown bat (*M. lucifugus*, State Endangered); northern long-eared bat (*M. septentrionalis*, State Endangered); and eastern small-footed bat (*M. leibii*, State Threatened). The five remaining bat species are listed as Special Concern: big brown bat (*Eptesicus fuscus*); red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), and tri-colored bat (*Perimyotis subflavus*).

While a comprehensive statewide inventory for bats has not been completed, it is likely that several of these species occur within the project area during migration and/or the breeding season. We recommend that you contact the U.S. Fish and Wildlife Service--Maine Fish and Wildlife Complex (Wende Mahaney, 207-902-1569) for further guidance, as the northern long-eared bat is also listed as a Threatened Species under the Federal Endangered Species Act. Otherwise, our Agency does not anticipate significant impacts to any of the bat species as a result of this project.

Significant Wildlife Habitat

Significant Vernal Pools

At this time, MDIFW Significant Wildlife Habitat (SWH) maps indicate no known presence of SWHs within the project area, which include Waterfowl and Wading Bird Habitats, Seabird Nesting Islands, Shorebird Areas, and Significant Vernal Pools. However, a comprehensive statewide inventory for Significant Vernal Pools has not been completed. Therefore, we strongly recommend that surveys for vernal pools be conducted within the project boundary by qualified wetland scientists prior to final project design to determine whether there are Significant Vernal Pools present in the area. These surveys should extend up to 250 feet beyond the anticipated project footprint because of potential performance standard requirements for off-site Significant Vernal Pools, assuming such pools are located on land owned or controlled by the applicant. Once surveys are completed, our Department will need to review and verify any vernal pool data prior to final determination of significance.

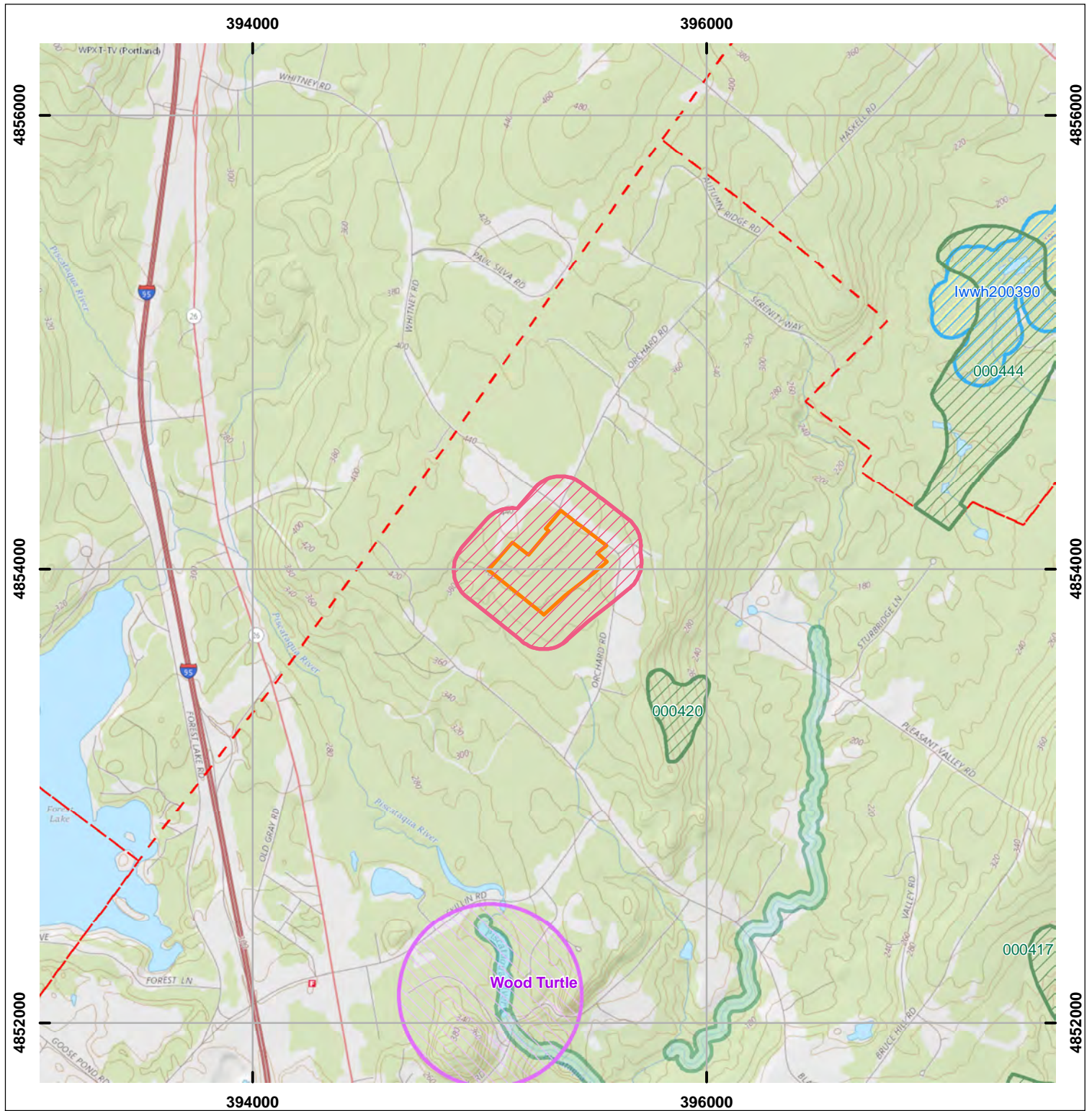
This consultation review has been conducted specifically for known MDIFW jurisdictional features and should not be interpreted as a comprehensive review for the presence of other regulated features that may occur in this area. Prior to the start of any future site disturbance we recommend additional consultation with the municipality, and other state resource agencies including the Maine Natural Areas Program and Maine Department of Environmental Protection in order to avoid unintended protected resource disturbance.

Please feel free to contact my office if you have any questions regarding this information, or if I can be of any further assistance.

Best regards,

A handwritten signature in blue ink, appearing to read 'John Perry', with a stylized flourish at the end.

John Perry
Environmental Review Coordinator

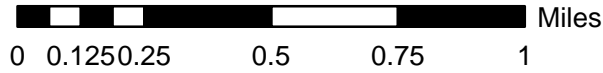


Environmental Review of Fish and Wildlife Observations and Priority Habitats

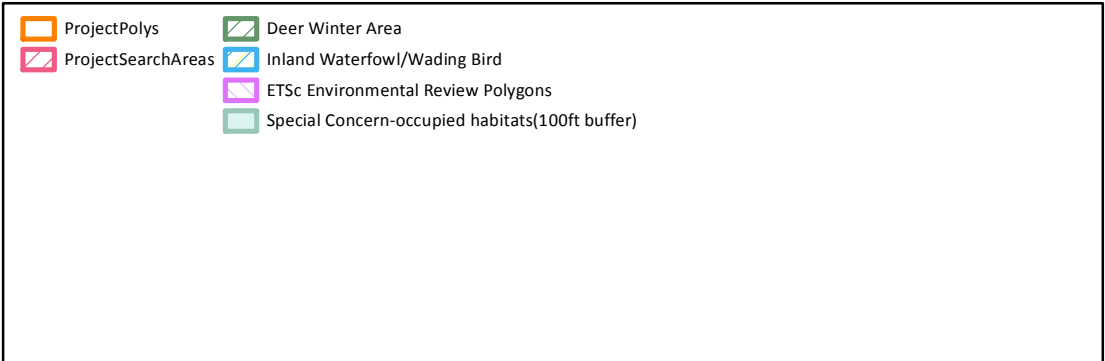
Project Name: raremussels (Version 1)



Maine Department of
Inland Fisheries and Wildlife



Projection: UTM, NAD83, Zone 19N
Date: 10/24/2017





United States Department of the Interior

FISH AND WILDLIFE SERVICE

Maine Ecological Services Field Office

P. O. Box A

East Orland, ME 04431

Phone: (207) 469-7300 Fax: (207) 902-1588

<http://www.fws.gov/mainefieldoffice/index.html>



In Reply Refer To:

September 14, 2017

Consultation Code: 05E1ME00-2017-SLI-1012

Event Code: 05E1ME00-2017-E-01978

Project Name: Orchard Road Subdivision

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies the threatened, endangered, candidate, and proposed species and designated or proposed critical habitat that may occur within the boundary of your proposed project or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC Web site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the Endangered Species Consultation Handbook at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

This species list also identifies candidate species under review for listing and those species that the Service considers species of concern. Candidate species have no protection under the Act but are included for consideration because they could be listed prior to completion of your project. Species of concern are those taxa whose conservation status is of concern to the Service (i.e., species previously known as Category 2 candidates), but for which further information is needed.

If a proposed project may affect only candidate species or species of concern, you are not required to prepare a Biological Assessment or biological evaluation or to consult with the Service. However, the Service recommends minimizing effects to these species to prevent future conflicts. Therefore, if early evaluation indicates that a project will affect a candidate species or species of concern, you may wish to request technical assistance from this office to identify appropriate minimization measures.

Please be aware that bald and golden eagles are not protected under the Endangered Species Act but are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). Projects affecting these species may require development of an eagle conservation plan: http://www.fws.gov/windenergy/eagle_guidance.html Information on the location of bald eagle nests in Maine can be found on the Maine Field Office Web site: <http://www.fws.gov/mainefieldoffice/Project%20review4.html>

Additionally, wind energy projects should follow the wind energy guidelines: <http://www.fws.gov/windenergy/> for minimizing impacts to migratory birds and bats. Projects may require development of an avian and bat protection plan.

Migratory birds are also a Service trust resource. Under the Migratory Bird Treaty Act, construction activities in grassland, wetland, stream, woodland, and other habitats that would result in the take of migratory birds, eggs, young, or active nests should be avoided. Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at:

<http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm> and at:
<http://www.towerkill.com>; and at:
<http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Maine Ecological Services Field Office

P. O. Box A

East Orland, ME 04431

(207) 469-7300

Project Summary

Consultation Code: 05E1ME00-2017-SLI-1012

Event Code: 05E1ME00-2017-E-01978

Project Name: Orchard Road Subdivision

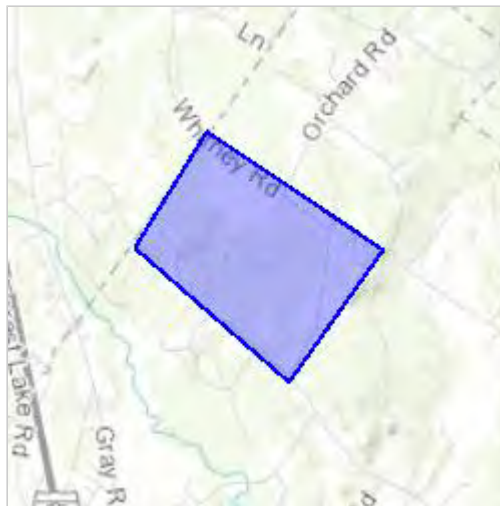
Project Type: DEVELOPMENT

Project Description: Residential Subdivision

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/43.830749558722346N70.30330228389299W>



Counties: Cumberland, ME

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i>	Threatened
No critical habitat has been designated for this species.	
Species profile: https://ecos.fws.gov/ecp/species/9045	

Critical habitats

There are no critical habitats within your project area under this office's jurisdiction.



707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

October 19, 2017

Mr. Kirk Mohny
State Historic Preservation Officer
Maine Historic Preservation Commission
55 Capitol Street, State House Station 65
Augusta, ME 04333

Subject: Presence of Historical Areas
Orchard Road Subdivision
Cumberland, Maine

Dear Mr. Mohny,

TZ Properties has retained Gorrill Palmer to prepare design plans for a ten lot single family residential subdivision located off Orchard Road in Cumberland, Maine. The development includes construction of a 1,500 linear foot roadway and associated utilities and stormwater controls with development of the lots by the lot owners.

The attached Location Map shows the project location.

The project will include a roadway stream crossing of an unnamed stream tributary to the Piscataqua River.

As part of permitting for the project, Gorrill Palmer requests information from your department relative to the presence of any nearby structure or area with historical, architectural or archeological significance as defined by the National Historic Preservation Act.

Thank you for your consideration. If you have any questions regarding the proposed project, please contact our office.

Sincerely,

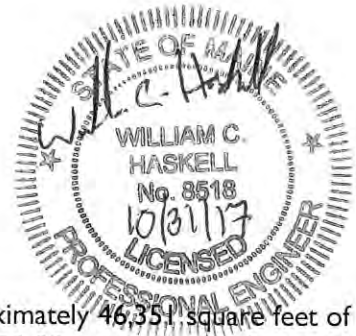
Gorrill Palmer

James Attianese

Enclosure

JWA/jwa/U:\3236.01 TZ Properties Orchard Rd Cumberland\IP Applications\Local\Resource Letters\Mohny_10-3-17.doc

STORMWATER MANAGEMENT



12.1 Overview

The proposed 10 lot single family residential subdivision will create approximately 46,351 square feet of impervious area. Pursuant to the Cumberland Subdivision Ordinance 250-38, projects which create more than 10,000 square feet of impervious area shall submit a stormwater management plan. Section 250-39 of the subdivision ordinance states that the peak discharge from the developed site shall not exceed the peak discharge for the undeveloped site for the two- and twenty five-year storms.

12.2 Introduction

Gorrill Palmer has been retained by TZ Properties, LLC to prepare a Stormwater Report for the proposed ten lot subdivision off Orchard Road in Cumberland, Maine. Figure 1 is a map showing the project location. The project will also need a Stormwater Permit from the MDEP. This narrative contains the stormwater management report for the construction of the project. The plans prepared by Gorrill Palmer include the infrastructure necessary to serve the project.

12.3 Development Description

The development site comprises approximately 24.9 acres and is currently undeveloped. The Applicant proposes the construction of a dead end roadway approximately 1,500 feet in length, construction of related stormwater drainage conveyances, and construction of two proposed grassed underdrained soil filters. The lot development will be by the individual lot owners.

Abutting land uses include:

- North – Residential
- East – Residential
- South – Residential/Undeveloped
- West – Residential/Apple Orchard

Runoff from the site is tributary to an unnamed stream which conveys the flow to the Piscataqua River. Neither the unnamed stream, nor the Piscataqua River are currently listed as "Urban Impaired Streams", therefore, the development will not be required to meet the Chapter 500 Urban Impaired Stream Standard.

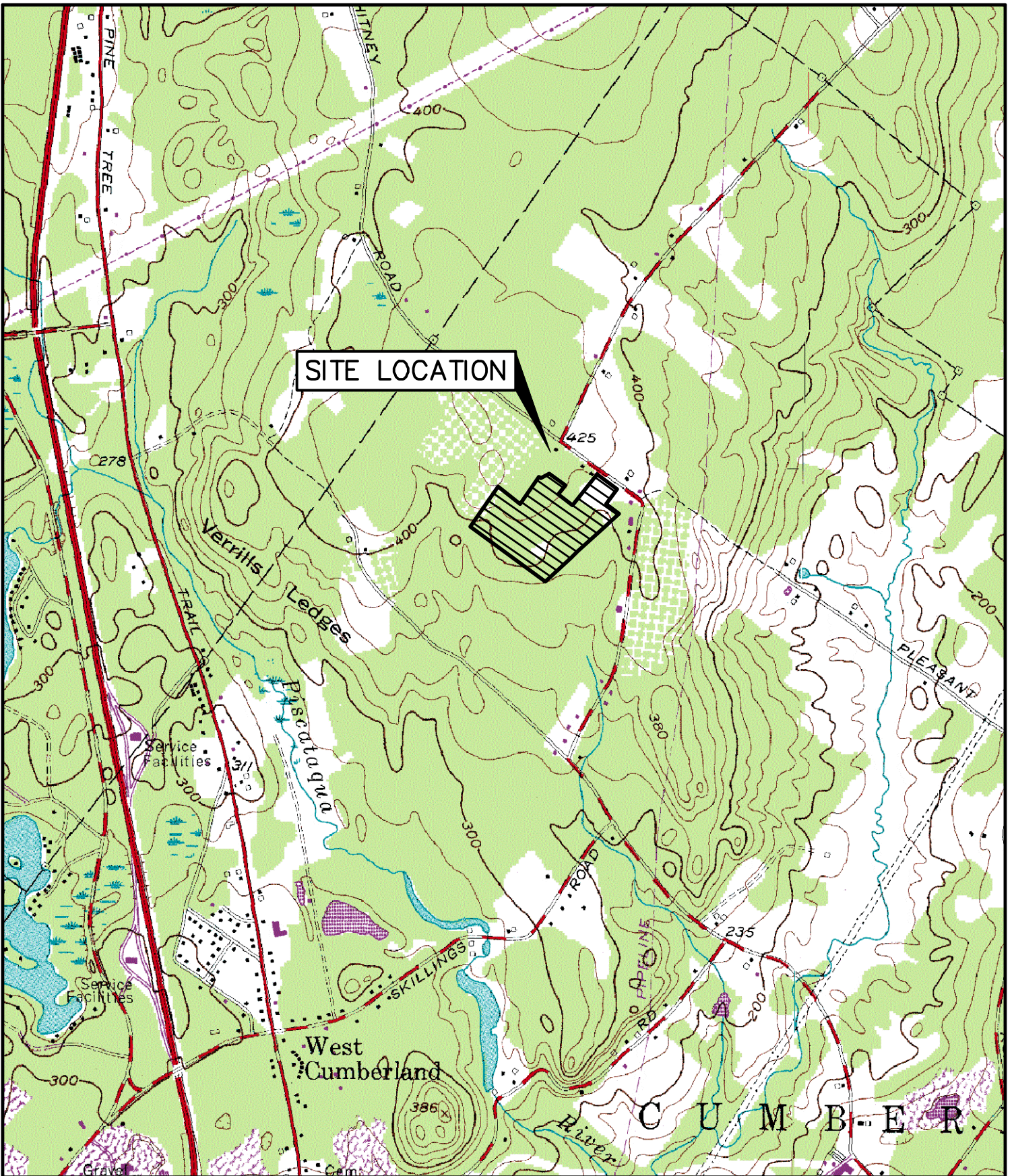
The construction of the subdivision roadway will result in approximately 1.08 acres of new impervious area.

12.4 Surface Water

There are no lakes located on, adjacent to or downstream of the project site.

12.5 General Topography

Topography in the area of the proposed construction is moderately steep with slopes of approximately 5% to 17%.



U.S.G.S. Location Map
 Subdivision Feasibility, Orchard Road, Cumberland, Maine
 U.S.G.S. Cumberland Center, State-7.5 Minute Series (Topographic)

Design: WCH	Date: OCT 2017
Draft: LAN	Job No.: 3236.01
Checked: WCH	Scale: None
File Name: 3236-LOCMAP.dwg	



Relationships. Responsiveness. Results.
www.gorrillpalmer.com
 207.772.2515

Figure

1

12.6 Flooding

Based upon the FEMA maps, no part of the site is located within a Zone A 100-year floodplain.

12.7 Natural Drainage Ways

The project will require a stream crossing and a wetland crossing which will be submitted to MDEP and the ACOE for permitting.

12.8 Alterations to Land Cover

Changes in land cover will include removal of wooded areas through portions of the project site and the addition of roof, paved surfaces and lawn areas.

12.9 Stormwater Management Control

This stormwater management report will address the Town of Cumberland peak flow requirements. Although the Applicant does not propose construction of the house lots, an allowance of 3,000 square feet of impervious area and 12,000 square feet of lawn was utilized in the post development condition for each lot to analyze the peak flow.

12.9.1 Approach and Analysis for Quantity Control

Since the proposed subdivision will require approval from the MDEP, grassed underdrained soil filters designed to conform with the MDEP BMP's have been used to provide stormwater peak control. The water quality control provided by the grassed underdrained soil filters will be addressed in the MDEP Stormwater Law permit submission which will be copied to the Town upon submission.

12.9.2 Water Quantity Sizing Requirements

The stormwater management study provides an analysis of predevelopment and post development stormwater runoff rates.

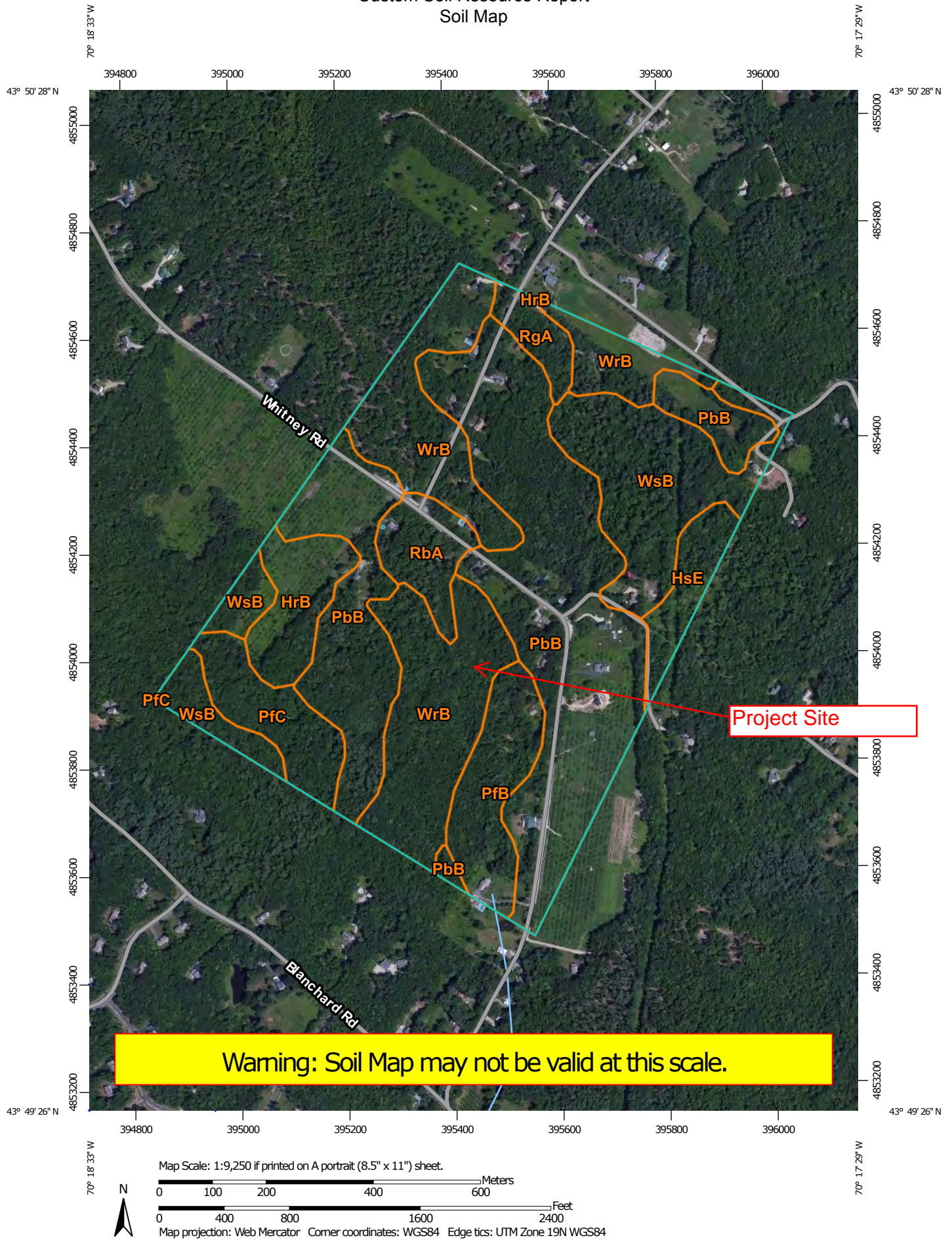
The soil types are shown on the watershed maps included in Attachment A and were obtained from the NRCS Cumberland County Medium Intensity Soil Survey which follows this page.

The SCS TR-20 methodology, using the HydroCad program, was employed by Gorrill Palmer to analyze predevelopment and post development conditions. A 24-hour, SCS Type III storm distribution for the two, ten, and twenty-five year storm frequencies were used. The corresponding rainfall amounts for these storms are 3.1", 4.6", and 5.8" respectively.

Land use cover, delineations of watershed hydraulic flow paths, and hydraulic soils data were obtained using the following data:

1. Cumberland Center 7.5 Minute Quadrangle Maps prepared by the U.S.G.S.
2. On-site topographic survey with 1' contour intervals from an existing conditions plan of the site.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot


 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop


 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole


 Slide or Slip


 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals


Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 12, Sep 15, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 20, 2010—Jul 18, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Cumberland County and Part of Oxford County, Maine (ME005)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HrB	Hollis fine sandy loam, 3 to 8 percent slopes	8.8	4.5%
HsE	Hollis very rocky fine sandy loam, 20 to 35 percent slopes	6.0	3.1%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	76.5	39.3%
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	11.9	6.1%
PfC	Paxton very stony fine sandy loam, 8 to 15 percent slopes	9.5	4.9%
RbA	Ridgebury fine sandy loam, 0 to 3 percent slopes	7.1	3.6%
RgA	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	3.9	2.0%
WrB	Woodbridge fine sandy loam, 0 to 8 percent slopes	42.9	22.0%
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	28.2	14.5%
Totals for Area of Interest		194.7	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different

3. Aerial Photography of the project site and aerial contours, obtained from the Maine Office of GIS.
4. Field Reconnaissance.

Predevelopment Conditions

The drainage study analyzes the watersheds in the predevelopment condition as depicted on the Predevelopment Watershed Map.

The predevelopment condition was analyzed as seven subcatchments with seven points of interest (POI). The tributary areas to the POIs which are affected by the proposed redevelopment are analyzed for this stormwater report.

Subcatchment 1 consists of wooded area and orchard tributary to POI 1. The orchard area was modelled as a meadow landcover. The subcatchment is the area that is tributary to an existing swale at the westerly corner of the property.

Subcatchment 2 is a wooded area tributary to a swale that exits the southwesterly edge of the parcel which is designated as POI 2.

Subcatchment 3 is a wooded area tributary to a swale that exits the southwesterly edge of the parcel which is designated as POI 3.

Subcatchment 4 contains onsite and offsite area consisting of woodland, residential land, and orchard, which is tributary to a drainage swale that exits the southerly edge of the parcel. POI 4 is located at the parcel property line. The existing drainage swale conveys runoff from an offsite farm pond across the subdivision parcel.

Subcatchment 5 is a wooded area that conveys runoff across the southeasterly property line. POI 5 is located within a wetland area at the parcel boundary.

Subcatchment 6 is a wooded area that also conveys runoff to the southeasterly property line with POI 6 located within a wetland area at the parcel boundary.

Subcatchment 7 contains onsite and offsite area tributary to the unnamed stream which exits the parcel at the southeasterly property line. The subcatchment consists of woodland, roadway, residential land, and orchard.

A watershed map for the predevelopment condition is attached to this section as drawing number W1 in Attachment A. Table 1 presents the peak flow rates at the POI for the design storms.

Table 1– Predevelopment Peak Flow Rates (cfs)			
Point of Interest	Peak Flow (cfs)		
	2 Year	10 Year	25 Year
POI #1	3.5	7.4	10.8
POI # 2	0.7	1.7	2.6
POI # 3	0.7	1.7	2.7
POI # 4	6.2	13.8	20.5
POI # 5	2.1	5.3	8.2
POI # 6	2.1	5.0	7.7
POI # 7	9.2	20.0	29.5

Copies of the calculations for the predevelopment conditions are included in Attachment B.

Post development Conditions

Analysis for the post development condition consists of determining post development peak flows and limiting the post development flows to predevelopment levels. Detention will be provided within the grassed underdrained soil filters.

The seven predevelopment subcatchments have been modified to reflect the proposed project, the post development condition contains nine subcatchments tributary to seven points of interest. The points of interest are the same as the predevelopment points of interest. The overall watershed area remains the same as in the predevelopment condition.

Subcatchment 1 is predevelopment subcatchment 1 reduced in size as a result of the proposed roadway construction.

Subcatchment 2 is predevelopment subcatchment 1 reduced in size as a result of the proposed roadway construction.

Subcatchment 3 is predevelopment subcatchment 1 reduced in size as a result of the proposed roadway construction.

Subcatchment 4 is predevelopment subcatchment 4 which is not tributary to the proposed grassed underdrained soil filter.

Subcatchment 4A is the area tributary to the grassed underdrained soil filter. The outflow of the grassed underdrained soil filter is tributary to POI 4.

Subcatchment 5 is the southerly portion of predevelopment subcatchment 5 tributary to POI 5.

Subcatchment 6 is the southerly portion of predevelopment subcatchment 6 tributary to POI 6.

Subcatchment 6A is the northerly portion of predevelopment subcatchment 5 and 6 which is tributary to the grassed underdrained soil filter. The outflow of the grassed underdrained soil filter is tributary to POI 6.

Subcatchment 7 is the post development area tributary to the unnamed stream and is tributary to POI 7.

A watershed map for the post development condition is attached as drawing number W2 in Attachment A. Attachment B contains the TR-20 calculations.

A comparison of predevelopment and post development peak flow at the POI without detention is presented in the following table.

Table 2 – Comparison of Peak flows without detention (cfs)						
Point of Interest	Peak Flow (cfs)					
	2 Year		10 Year		25 Year	
	Pre	Post	Pre	Post	Pre	Post
POI #1	3.5	3.5	7.4	7.1	10.8	10.3
POI #2	0.7	0.6	1.7	1.3	2.6	2.0
POI #3	0.7	0.7	1.7	1.7	2.7	2.6
POI #4	6.2	7.2	13.8	15.5	20.5	22.8
POI #5	2.1	1.8	5.3	4.3	8.2	6.5
POI #6	2.1	4.3	5.0	9.5	7.7	13.9
POI #7	9.2	9.1	20.0	19.8	29.5	29.2

As can be seen from Table 2, detention is required to reduce the peak flow at POI 4, and 6 to predevelopment levels. The remainder of subcatchments remain at or below predevelopment flows due to changes in subcatchment area.

The grassed underdrained soil filters will provide detention of stormwater runoff for this project.

Pond I

The grassed underdrained soil filter has been analyzed to determine its performance for the 2-, 10-, and 25-year storms. The stormwater runoff from subcatchment 4A will enter the grassed underdrained soil filter through the inlet ditch. The smaller storms which generate runoff volume equal to or less than the channel protection volume will be conveyed through the soil filter and underdrain system. Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure. The outlet control structure has an orifice with its invert set at the channel protection elevation, and a second orifice set at the 2-year stage. An emergency spillway is set at the 25-year storm stage and modelled as a broad crested weir. Flow over the weir during the 25 year storm, assuming the weir is the sole outlet, results in 1 foot of freeboard to the top of the pond berm. The following table presents the pond performance.

Table 3– Pond 1			
	Storm Event		
	2 Year	10 Year	25 Year
Peak Inflow (cfs)	2.42	5.13	7.49
Peak Outflow (cfs)	0.5	1.31	1.73
Stage (Max. Elevation)	397.68	398.46	399.13
Storage (cf)	4,251	8,587	13,048
Depth above base (ft)	2.01	2.79	3.46

Pond 2

The grassed underdrained soil filter has been analyzed to determine its performance for the 2-, 10-, and 25-year storms. The stormwater runoff from subcatchment 6A will enter the grassed underdrained soil filter through the stormdrain system. The smaller storms which generate runoff volume equal to or less than the channel protection volume will be conveyed through the soil filter and underdrain system. Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure. The outlet control structure has a weir with its invert set above channel protection elevation. An emergency spillway is set at the 25-year storm stage and modelled as a broad crested weir. Flow over the weir during the 25 year storm, assuming the weir is the sole outlet, results in 1 foot of freeboard to the top of the pond berm. The following table presents the pond performance.

Table 4– Pond 2			
	Storm Event		
	2 Year	10 Year	25 Year
Peak Inflow (cfs)	3.11	6.59	9.63
Peak Outflow (cfs)	0.85	3.10	5.07
Stage (Max. Elevation)	406.57	407.42	408.00
Storage (cf)	7,919	13,593	18,613
Depth above base (ft)	2.40	3.25	3.83

As presented in Table 2 previously, detention of tributary runoff to POI 4, and POI 6 is required. The following table presents a comparison of peak flow with detention at the two POIs.

Table 5 – Comparison of Peak flows with detention (cfs)						
Point of Interest	Peak Flow (cfs)					
	2 Year		10 Year		25 Year	
	Pre	Post	Pre	Post	Pre	Post
POI #4	6.2	6.2	13.8	13.8	20.5	20.2
POI #6	2.1	1.3	5.0	4.6	7.7	7.7

As can be seen from Table 5 above, the peak post development flow is at or below predevelopment levels at POI 4, and POI 6.

12.9.3 Conclusion – Overall Water Quantity

The peak flow at the Points of Interest have been reduced to be at or below predevelopment peak levels.

12.10 Construction BMPs

Additional water quality treatment will be provided during construction by best management practices (BMP). Standard BMPs to be employed include siltation fencing around the downslope construction perimeter, siltation fence around the vegetated underdrains, riprap, pipe, stabilized construction entrances, and erosion control fabrics applied to slopes prior to revegetation.

12.11 Maintenance of Facilities

See the Erosion and Sedimentation Control report for this project.

12.12 Conclusion

Gorrill Palmer has been retained by TZ Properties, LLC to prepare plans and permit applications for the proposed ten lot subdivision off Orchard Road in Cumberland. Based upon the attached calculations, the proposed subdivision meets or exceeds the Cumberland stormwater management requirement through the use of detention within grassed underdrained soil filters.

12.13 Attachments

Attached to this section are the following items:

Attachment A – Watershed Maps (Pre, Post,)

Attachment B – TR-20 Calculations

Attachment C – Ditch and Stormdrain Calculations

ATTACHMENT A

WATERSHED MAPS

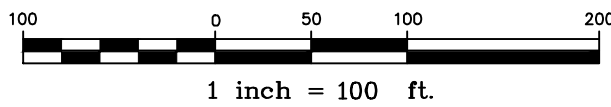
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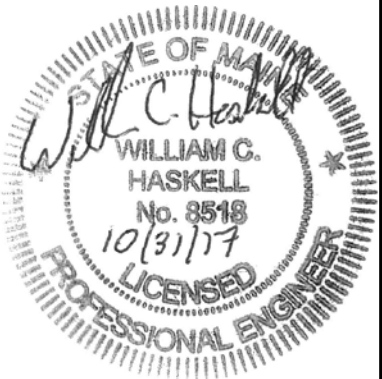
LEGEND

- SUBCATCHMENT AREA
- TIME OF CONCENTRATION FLOW PATH
- WATERSHED BOUNDARY
- WETLAND BOUNDARY
- SF SHEET FLOW
- PF PIPE FLOW
- SCF SHALLOW CONCENTRATED FLOW
- CF CHANNEL FLOW
- POI POINT OF INTEREST
- REACH

SOIL SCHEDULE	
SOIL	HYDROLOGIC SOIL GROUP
HrB - Hollis	D
PbB - Paxton	C
RbA - Ridgebury	C/D
WrB - Woodbridge	C
WsB - Woodbridge	C



NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.



Rev.	Date	Revision

Preliminary Subdivision Application		10-31-17	WCH
Issued For		Date	By

Design: JWA	Draft: LAN	Date: OCT 2017
Checked: WCH	Scale: 1"=100'	Job No.: 3236
File Name: 3236-WS-PRE.dwg		
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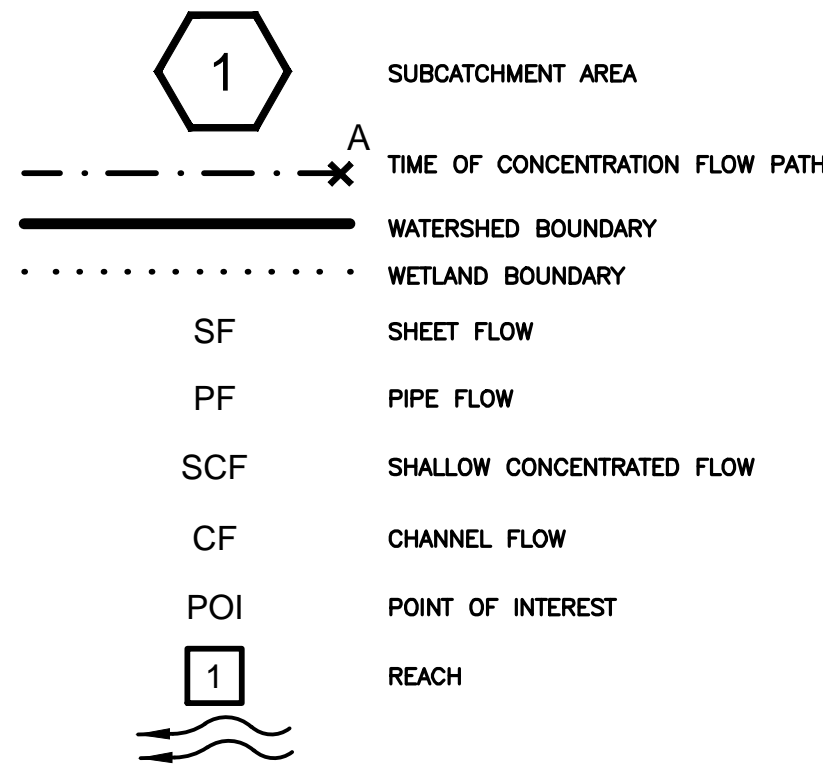
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Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.
W1

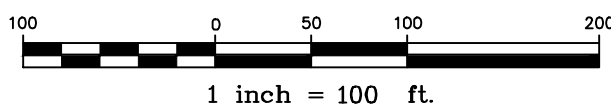
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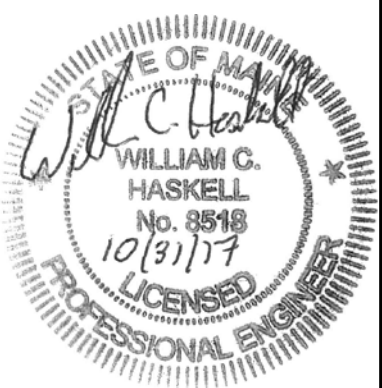
LEGEND



SOIL SCHEDULE	
SOIL	HYDROLOGIC SOIL GROUP
HrB - Hollis	D
PbB - Paxton	C
RbA - Ridgebury	C/D
WrB - Woodbridge	C
WsB - Woodbridge	C



NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.



Rev.	Date	Revision

Preliminary Subdivision Application		10-31-17	WCH
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Design: JWA	Draft: LAN	Date: OCT 2017
Checked: WCH	Scale: 1"=100'	Job No.: 3236
File Name: 3236-WS-POST.dwg		
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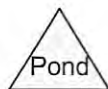
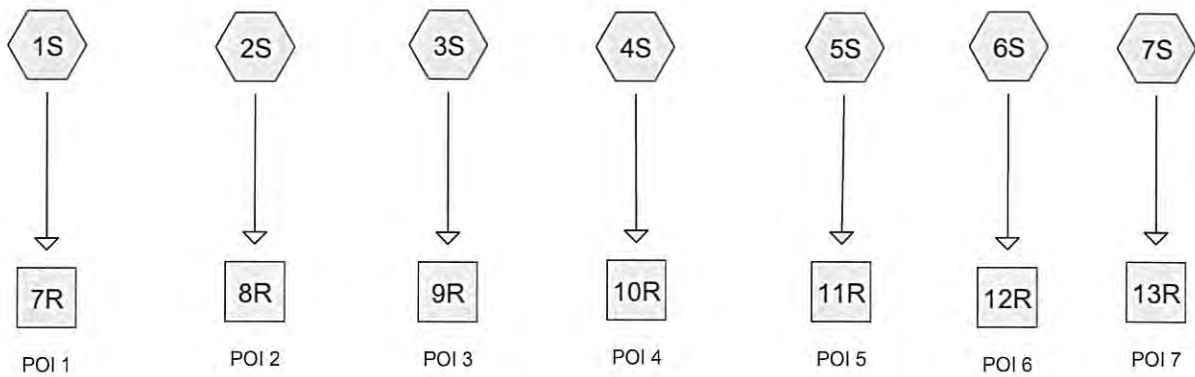
Drawing Name:	Post Development Watershed Map
Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.

W2

ATTACHMENT B

TR-20 CALCULATIONS



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S:	Runoff Area=211,000 sf 0.00% Impervious Runoff Depth=1.08" Flow Length=690' Tc=27.1 min CN=76 Runoff=3.48 cfs 0.437 af
Subcatchment 2S:	Runoff Area=56,900 sf 0.00% Impervious Runoff Depth=0.82" Flow Length=350' Tc=23.9 min CN=71 Runoff=0.70 cfs 0.089 af
Subcatchment 3S:	Runoff Area=65,200 sf 0.00% Impervious Runoff Depth=0.77" Flow Length=470' Tc=28.4 min CN=70 Runoff=0.69 cfs 0.096 af
Subcatchment 4S:	Runoff Area=485,000 sf 4.32% Impervious Runoff Depth=0.97" Flow Length=1,690' Tc=35.6 min CN=74 Runoff=6.23 cfs 0.902 af
Subcatchment 5S:	Runoff Area=244,400 sf 0.00% Impervious Runoff Depth=0.77" Flow Length=950' Tc=42.6 min CN=70 Runoff=2.13 cfs 0.360 af
Subcatchment 6S:	Runoff Area=222,000 sf 0.00% Impervious Runoff Depth=0.82" Flow Length=965' Tc=43.0 min CN=71 Runoff=2.09 cfs 0.348 af
Subcatchment 7S:	Runoff Area=800,400 sf 6.57% Impervious Runoff Depth=1.03" Flow Length=1,890' Tc=49.3 min CN=75 Runoff=9.21 cfs 1.572 af
Reach 7R: POI 1	Inflow=3.48 cfs 0.437 af Outflow=3.48 cfs 0.437 af
Reach 8R: POI 2	Inflow=0.70 cfs 0.089 af Outflow=0.70 cfs 0.089 af
Reach 9R: POI 3	Inflow=0.69 cfs 0.096 af Outflow=0.69 cfs 0.096 af
Reach 10R: POI 4	Inflow=6.23 cfs 0.902 af Outflow=6.23 cfs 0.902 af
Reach 11R: POI 5	Inflow=2.13 cfs 0.360 af Outflow=2.13 cfs 0.360 af
Reach 12R: POI 6	Inflow=2.09 cfs 0.348 af Outflow=2.09 cfs 0.348 af
Reach 13R: POI 7	Inflow=9.21 cfs 1.572 af Outflow=9.21 cfs 1.572 af

Total Runoff Area = 47.863 ac Runoff Volume = 3.805 af Average Runoff Depth = 0.95"
96.47% Pervious = 46.175 ac 3.53% Impervious = 1.688 ac

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S:	Runoff Area=211,000 sf 0.00% Impervious Runoff Depth=2.21" Flow Length=690' Tc=27.1 min CN=76 Runoff=7.39 cfs 0.892 af
Subcatchment 2S:	Runoff Area=56,900 sf 0.00% Impervious Runoff Depth=1.82" Flow Length=350' Tc=23.9 min CN=71 Runoff=1.70 cfs 0.198 af
Subcatchment 3S:	Runoff Area=65,200 sf 0.00% Impervious Runoff Depth=1.74" Flow Length=470' Tc=28.4 min CN=70 Runoff=1.72 cfs 0.218 af
Subcatchment 4S:	Runoff Area=485,000 sf 4.32% Impervious Runoff Depth=2.05" Flow Length=1,690' Tc=35.6 min CN=74 Runoff=13.78 cfs 1.902 af
Subcatchment 5S:	Runoff Area=244,400 sf 0.00% Impervious Runoff Depth=1.74" Flow Length=950' Tc=42.6 min CN=70 Runoff=5.31 cfs 0.816 af
Subcatchment 6S:	Runoff Area=222,000 sf 0.00% Impervious Runoff Depth=1.82" Flow Length=965' Tc=43.0 min CN=71 Runoff=5.02 cfs 0.773 af
Subcatchment 7S:	Runoff Area=800,400 sf 6.57% Impervious Runoff Depth=2.13" Flow Length=1,890' Tc=49.3 min CN=75 Runoff=20.00 cfs 3.260 af
Reach 7R: POI 1	Inflow=7.39 cfs 0.892 af Outflow=7.39 cfs 0.892 af
Reach 8R: POI 2	Inflow=1.70 cfs 0.198 af Outflow=1.70 cfs 0.198 af
Reach 9R: POI 3	Inflow=1.72 cfs 0.218 af Outflow=1.72 cfs 0.218 af
Reach 10R: POI 4	Inflow=13.78 cfs 1.902 af Outflow=13.78 cfs 1.902 af
Reach 11R: POI 5	Inflow=5.31 cfs 0.816 af Outflow=5.31 cfs 0.816 af
Reach 12R: POI 6	Inflow=5.02 cfs 0.773 af Outflow=5.02 cfs 0.773 af
Reach 13R: POI 7	Inflow=20.00 cfs 3.260 af Outflow=20.00 cfs 3.260 af

Total Runoff Area = 47.863 ac Runoff Volume = 8.058 af Average Runoff Depth = 2.02"
96.47% Pervious = 46.175 ac 3.53% Impervious = 1.688 ac

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S:	Runoff Area=211,000 sf 0.00% Impervious Runoff Depth=3.21" Flow Length=690' Tc=27.1 min CN=76 Runoff=10.80 cfs 1.295 af
Subcatchment 2S:	Runoff Area=56,900 sf 0.00% Impervious Runoff Depth=2.74" Flow Length=350' Tc=23.9 min CN=71 Runoff=2.60 cfs 0.298 af
Subcatchment 3S:	Runoff Area=65,200 sf 0.00% Impervious Runoff Depth=2.65" Flow Length=470' Tc=28.4 min CN=70 Runoff=2.67 cfs 0.330 af
Subcatchment 4S:	Runoff Area=485,000 sf 4.32% Impervious Runoff Depth=3.02" Flow Length=1,690' Tc=35.6 min CN=74 Runoff=20.50 cfs 2.800 af
Subcatchment 5S:	Runoff Area=244,400 sf 0.00% Impervious Runoff Depth=2.65" Flow Length=950' Tc=42.6 min CN=70 Runoff=8.21 cfs 1.238 af
Subcatchment 6S:	Runoff Area=222,000 sf 0.00% Impervious Runoff Depth=2.74" Flow Length=965' Tc=43.0 min CN=71 Runoff=7.70 cfs 1.163 af
Subcatchment 7S:	Runoff Area=800,400 sf 6.57% Impervious Runoff Depth=3.11" Flow Length=1,890' Tc=49.3 min CN=75 Runoff=29.54 cfs 4.766 af
Reach 7R: POI 1	Inflow=10.80 cfs 1.295 af Outflow=10.80 cfs 1.295 af
Reach 8R: POI 2	Inflow=2.60 cfs 0.298 af Outflow=2.60 cfs 0.298 af
Reach 9R: POI 3	Inflow=2.67 cfs 0.330 af Outflow=2.67 cfs 0.330 af
Reach 10R: POI 4	Inflow=20.50 cfs 2.800 af Outflow=20.50 cfs 2.800 af
Reach 11R: POI 5	Inflow=8.21 cfs 1.238 af Outflow=8.21 cfs 1.238 af
Reach 12R: POI 6	Inflow=7.70 cfs 1.163 af Outflow=7.70 cfs 1.163 af
Reach 13R: POI 7	Inflow=29.54 cfs 4.766 af Outflow=29.54 cfs 4.766 af

Total Runoff Area = 47.863 ac Runoff Volume = 11.890 af Average Runoff Depth = 2.98"
96.47% Pervious = 46.175 ac 3.53% Impervious = 1.688 ac

Summary for Subcatchment 1S:

Runoff = 10.80 cfs @ 12.38 hrs, Volume= 1.295 af, Depth= 3.21"

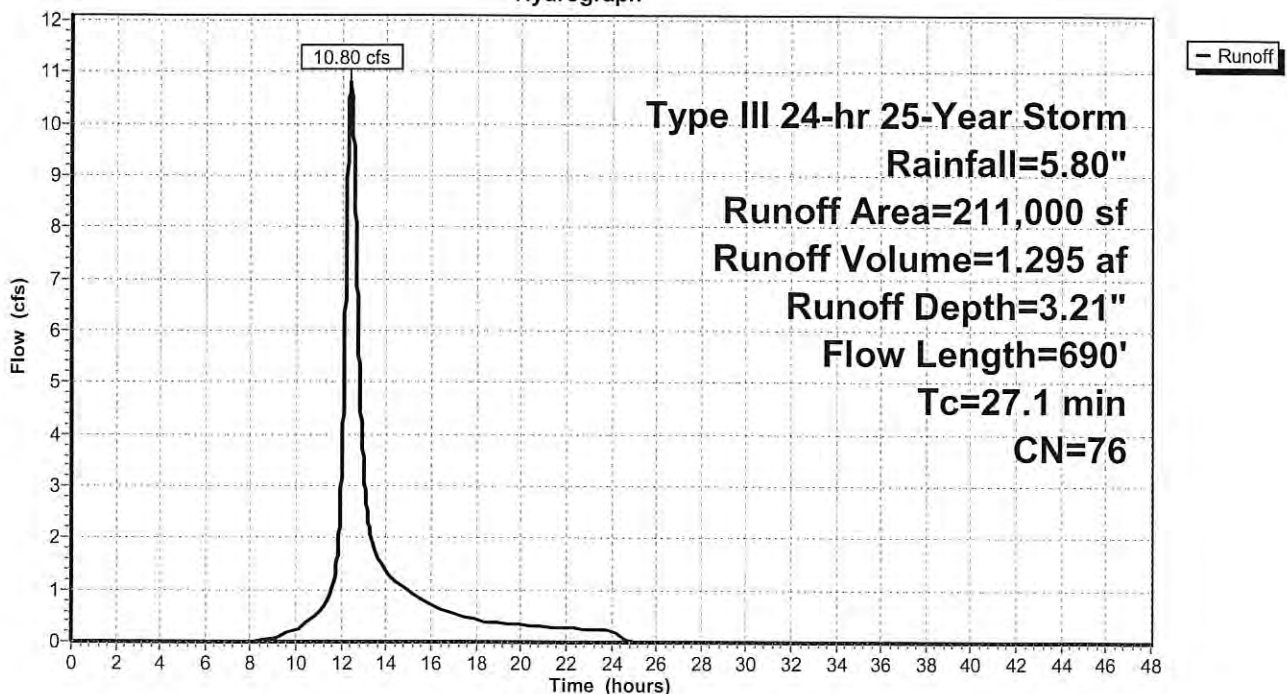
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
7,600	71	Meadow, non-grazed, HSG C
77,200	78	Meadow, non-grazed, HSG D
29,900	70	Woods, Good, HSG C
96,300	77	Woods, Good, HSG D
211,000	76	Weighted Average
211,000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.9	150	0.0400	0.11		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	240	0.0700	3.97		Shallow Concentrated Flow, B-C
					Grassed Waterway Kv= 15.0 fps
3.2	300	0.1000	1.58		Shallow Concentrated Flow, C-D
					Woodland Kv= 5.0 fps
27.1	690	Total			

Subcatchment 1S:

Hydrograph



Summary for Subcatchment 2S:

Runoff = 2.60 cfs @ 12.35 hrs, Volume= 0.298 af, Depth= 2.74"

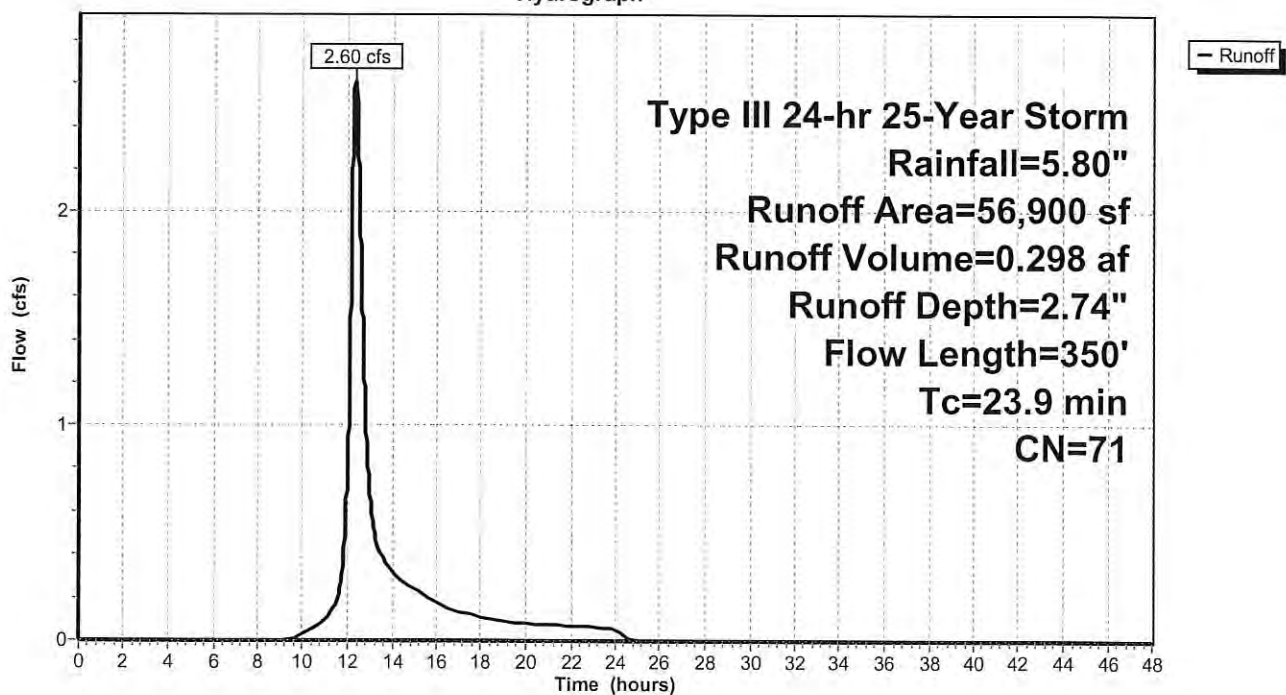
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
44,800	70	Woods, Good, HSG C
12,100	77	Woods, Good, HSG D
56,900	71	Weighted Average
56,900		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	150	0.0470	0.12		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.5	200	0.0700	1.32		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
23.9	350	Total			

Subcatchment 2S:

Hydrograph



Summary for Subcatchment 3S:

Runoff = 2.67 cfs @ 12.40 hrs, Volume= 0.330 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

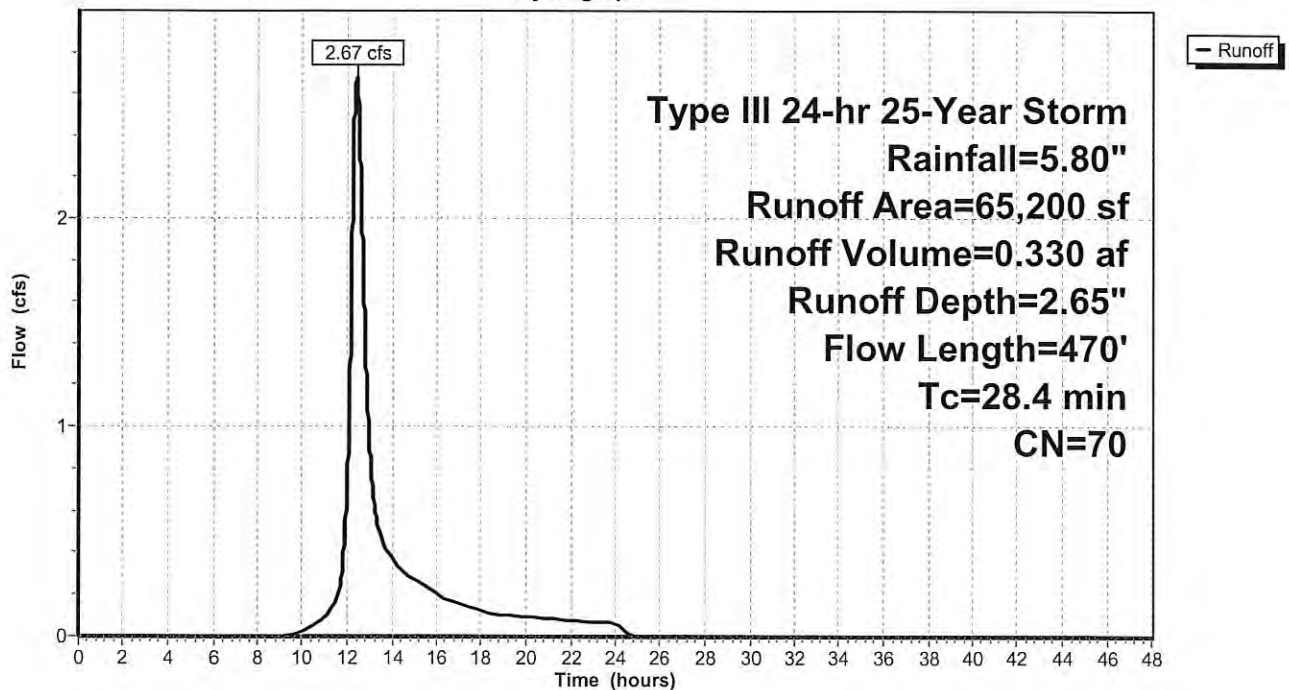
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
65,200	70	Woods, Good, HSG C
65,200		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	150	0.0360	0.10		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.5	320	0.0550	1.17		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
28.4	470	Total			

Subcatchment 3S:

Hydrograph



Summary for Subcatchment 4S:

Runoff = 20.50 cfs @ 12.50 hrs, Volume= 2.800 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
118,700	77	2 acre lots, 12% imp, HSG C
55,800	82	2 acre lots, 12% imp, HSG D
45,000	71	Meadow, non-grazed, HSG C
51,600	78	Meadow, non-grazed, HSG D
211,900	70	Woods, Good, HSG C
2,000	77	Woods, Good, HSG D
485,000	74	Weighted Average
464,060		Pervious Area
20,940		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	150	0.0300	0.15		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.10"
3.7	630	0.0360	2.85		Shallow Concentrated Flow, B-C
					Grassed Waterway Kv= 15.0 fps
14.8	910	0.0420	1.02		Shallow Concentrated Flow, C-D
					Woodland Kv= 5.0 fps
35.6	1,690	Total			

Pre 10-18-17

Prepared by Gorrill Palmer

HydroCAD® 8.50 s/n 001265 © 2007 HydroCAD Software Solutions LLC

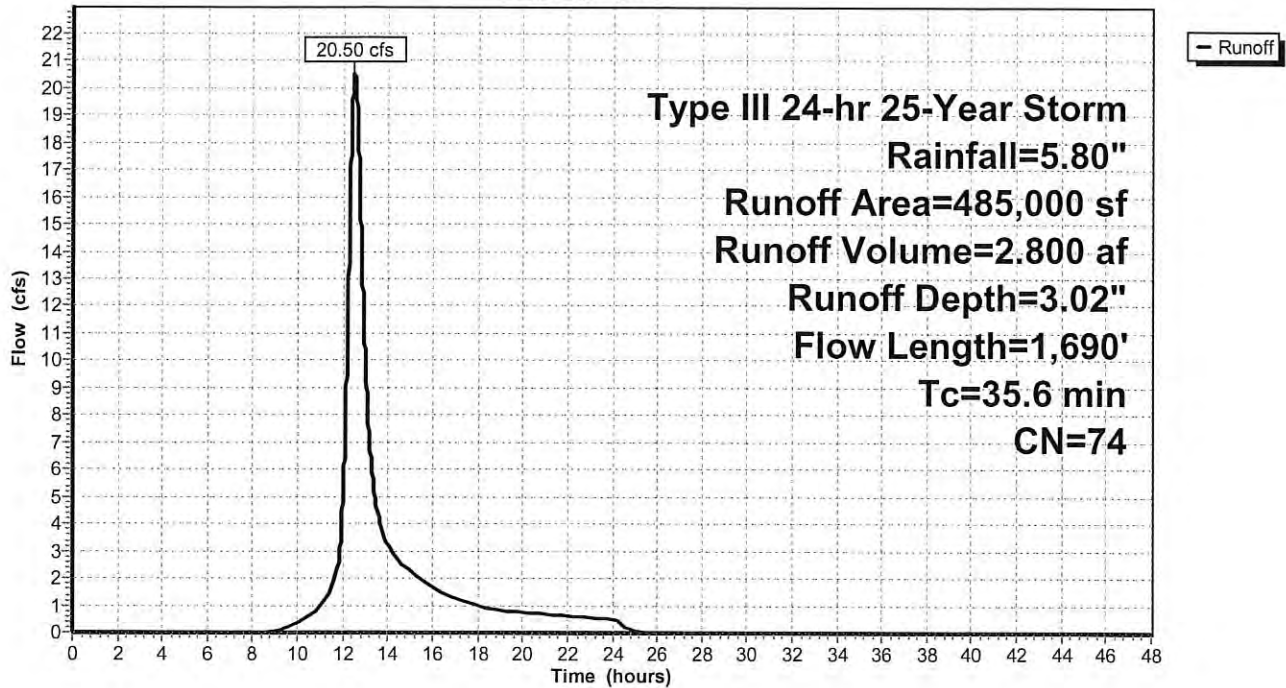
Type III 24-hr 25-Year Storm Rainfall=5.80"

Printed 10/27/2017

Page 7

Subcatchment 4S:

Hydrograph



Summary for Subcatchment 5S:

Runoff = 8.21 cfs @ 12.60 hrs, Volume= 1.238 af, Depth= 2.65"

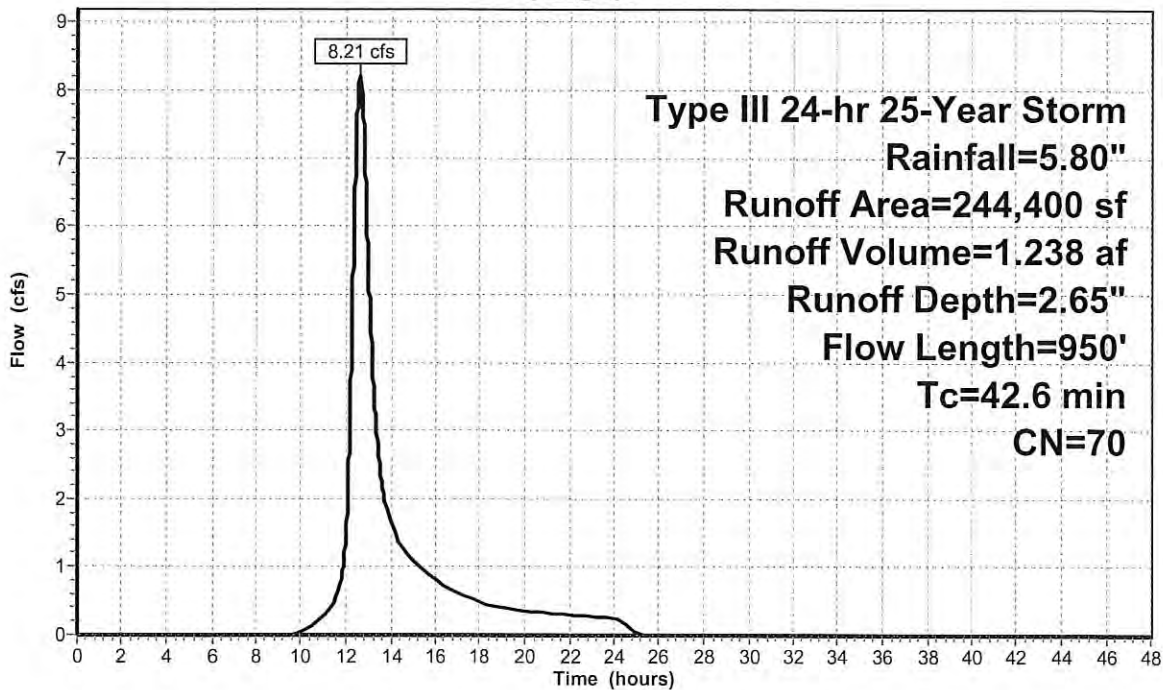
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
244,400	70	Woods, Good, HSG C
244,400		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.6	150	0.0210	0.08		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
13.0	800	0.0420	1.02		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
42.6	950	Total			

Subcatchment 5S:

Hydrograph



Summary for Subcatchment 6S:

Runoff = 7.70 cfs @ 12.61 hrs, Volume= 1.163 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

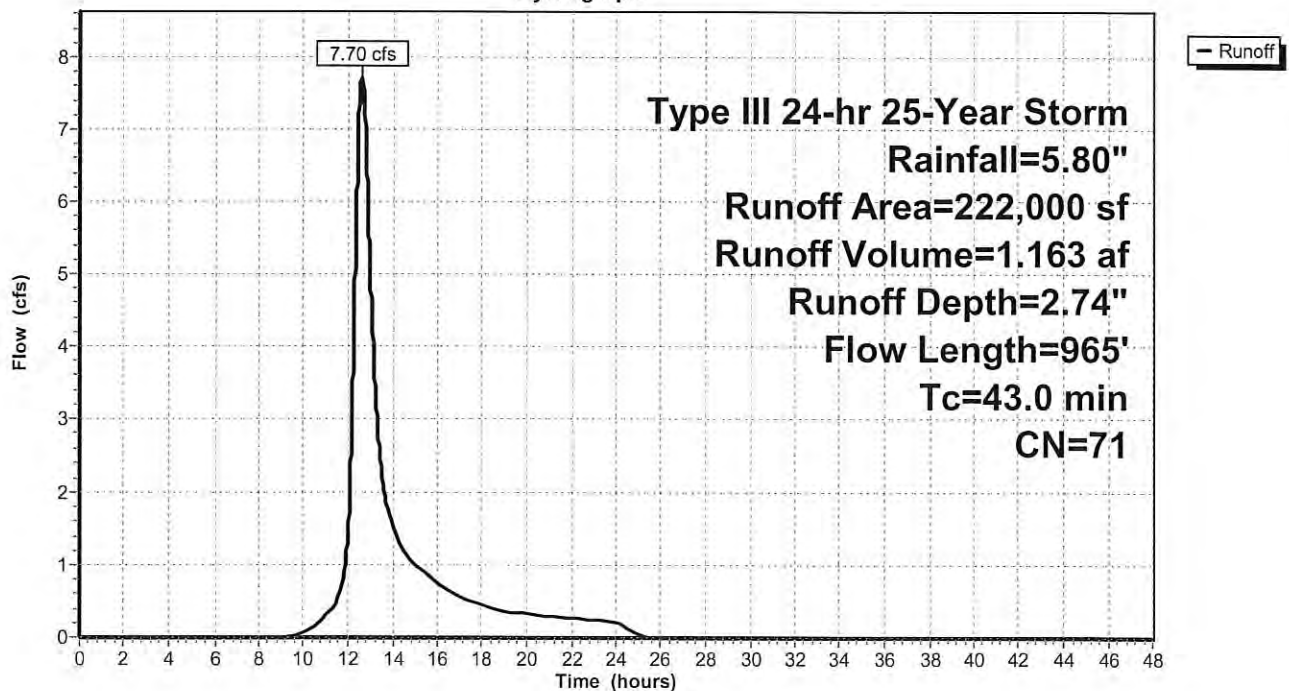
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
185,600	70	Woods, Good, HSG C
36,400	77	Woods, Good, HSG D
222,000	71	Weighted Average
222,000		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.8	150	0.0270	0.09		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
16.2	815	0.0280	0.84		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
43.0	965	Total			

Subcatchment 6S:

Hydrograph



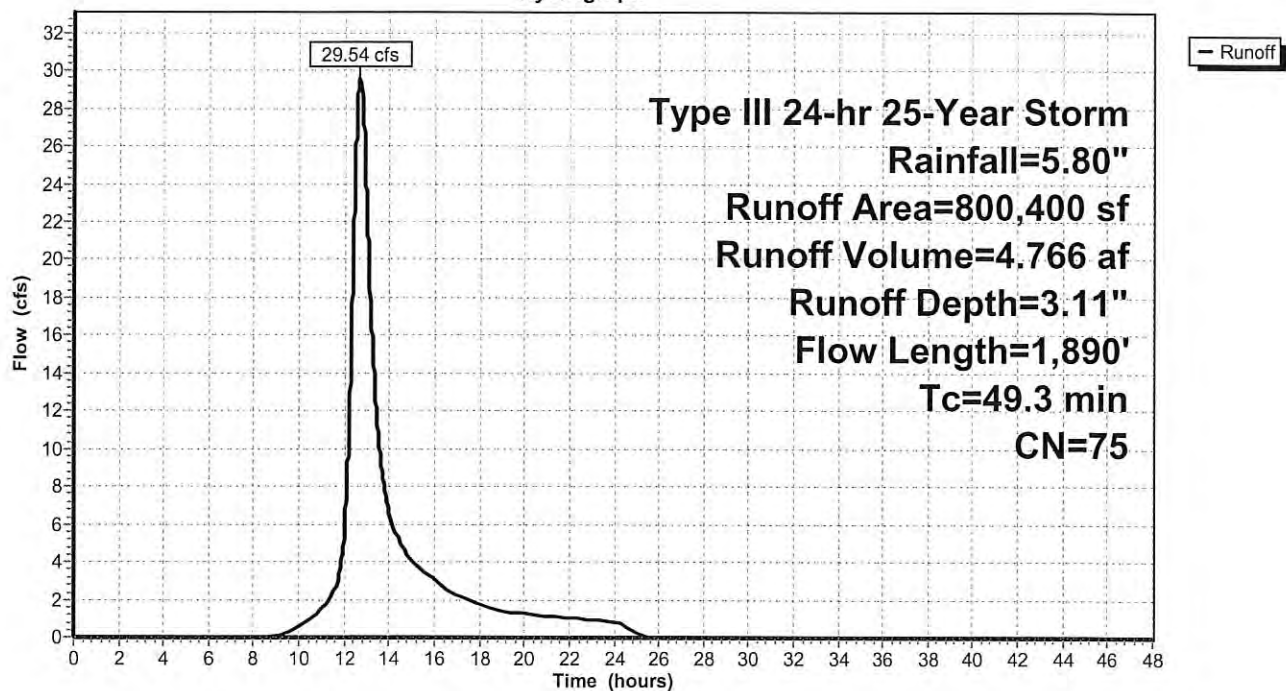
Summary for Subcatchment 7S:

Runoff = 29.54 cfs @ 12.66 hrs, Volume= 4.766 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,712	98	Paved parking & roofs
218,288	77	2 acre lots, 12% imp, HSG C
197,200	82	2 acre lots, 12% imp, HSG D
76,700	71	Meadow, non-grazed, HSG C
284,400	70	Woods, Good, HSG C
21,100	77	Woods, Good, HSG D
800,400	75	Weighted Average
747,829		Pervious Area
52,571		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0250	0.14		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.10"
2.8	390	0.0240	2.32		Shallow Concentrated Flow, B-C Grassed Waterway Kv= 15.0 fps
10.0	390	0.0170	0.65		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
0.1	20	0.0100	6.22	7.63	Circular Channel (pipe), D-E Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
18.1	940	0.0300	0.87		Shallow Concentrated Flow, E-F Woodland Kv= 5.0 fps
49.3	1,890	Total			

Subcatchment 7S:**Hydrograph**

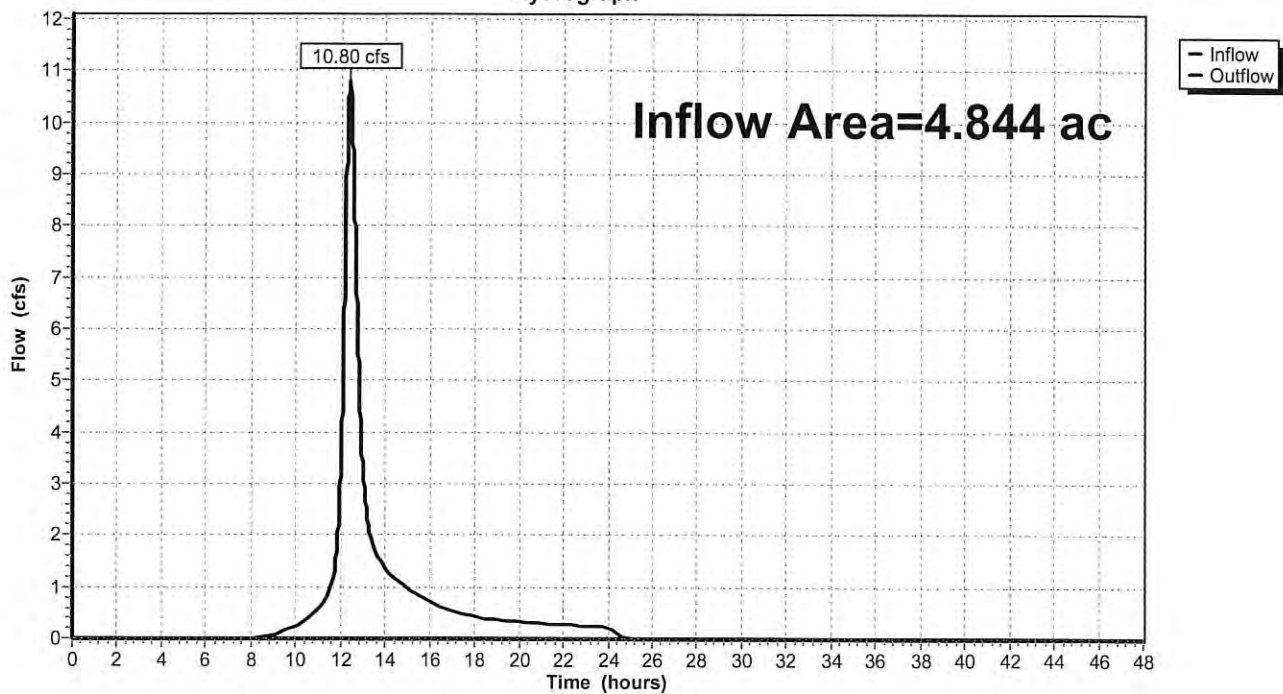
Summary for Reach 7R: POI 1

Inflow Area = 4.844 ac, 0.00% Impervious, Inflow Depth = 3.21" for 25-Year Storm event
Inflow = 10.80 cfs @ 12.38 hrs, Volume= 1.295 af
Outflow = 10.80 cfs @ 12.38 hrs, Volume= 1.295 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 7R: POI 1

Hydrograph



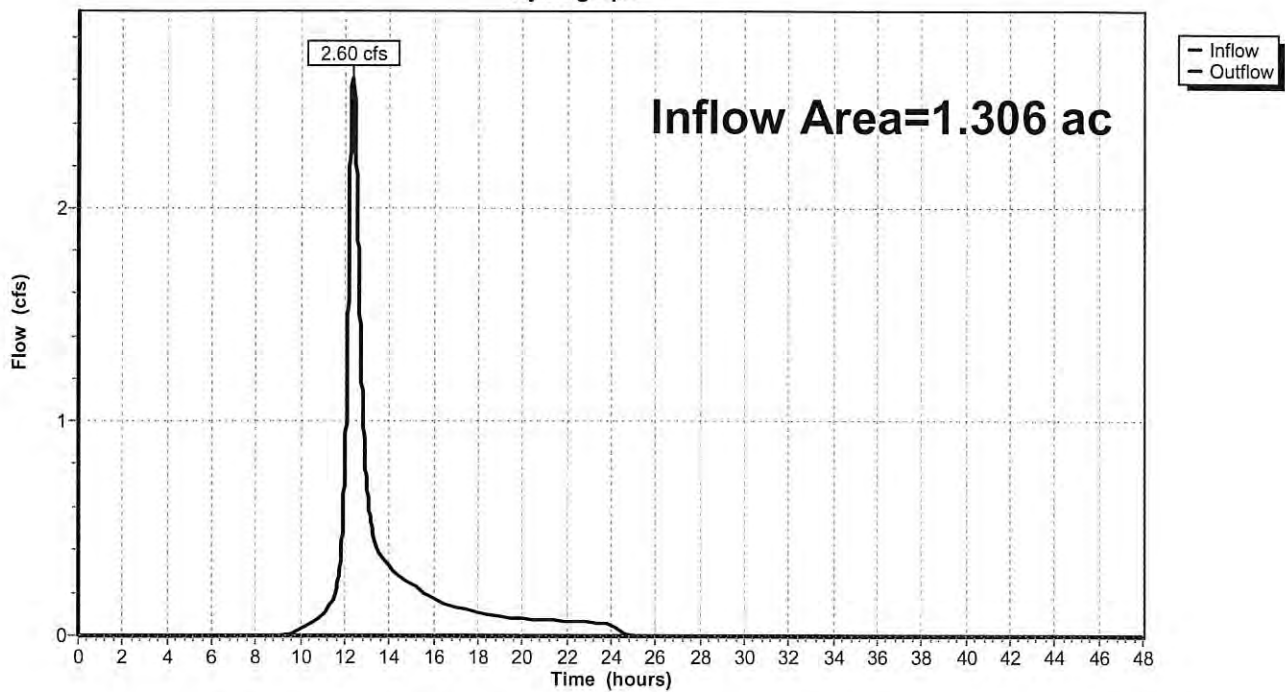
Summary for Reach 8R: POI 2

Inflow Area = 1.306 ac, 0.00% Impervious, Inflow Depth = 2.74" for 25-Year Storm event
Inflow = 2.60 cfs @ 12.35 hrs, Volume= 0.298 af
Outflow = 2.60 cfs @ 12.35 hrs, Volume= 0.298 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 8R: POI 2

Hydrograph



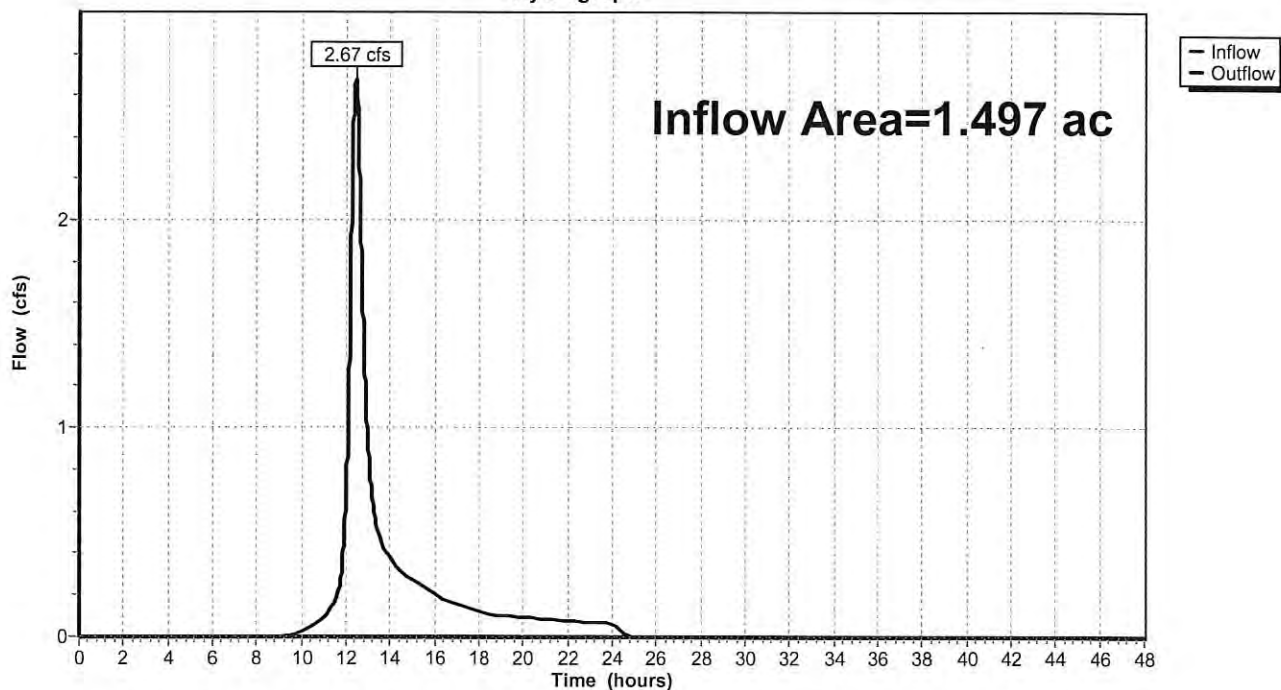
Summary for Reach 9R: POI 3

Inflow Area = 1.497 ac, 0.00% Impervious, Inflow Depth = 2.65" for 25-Year Storm event
Inflow = 2.67 cfs @ 12.40 hrs, Volume= 0.330 af
Outflow = 2.67 cfs @ 12.40 hrs, Volume= 0.330 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 9R: POI 3

Hydrograph



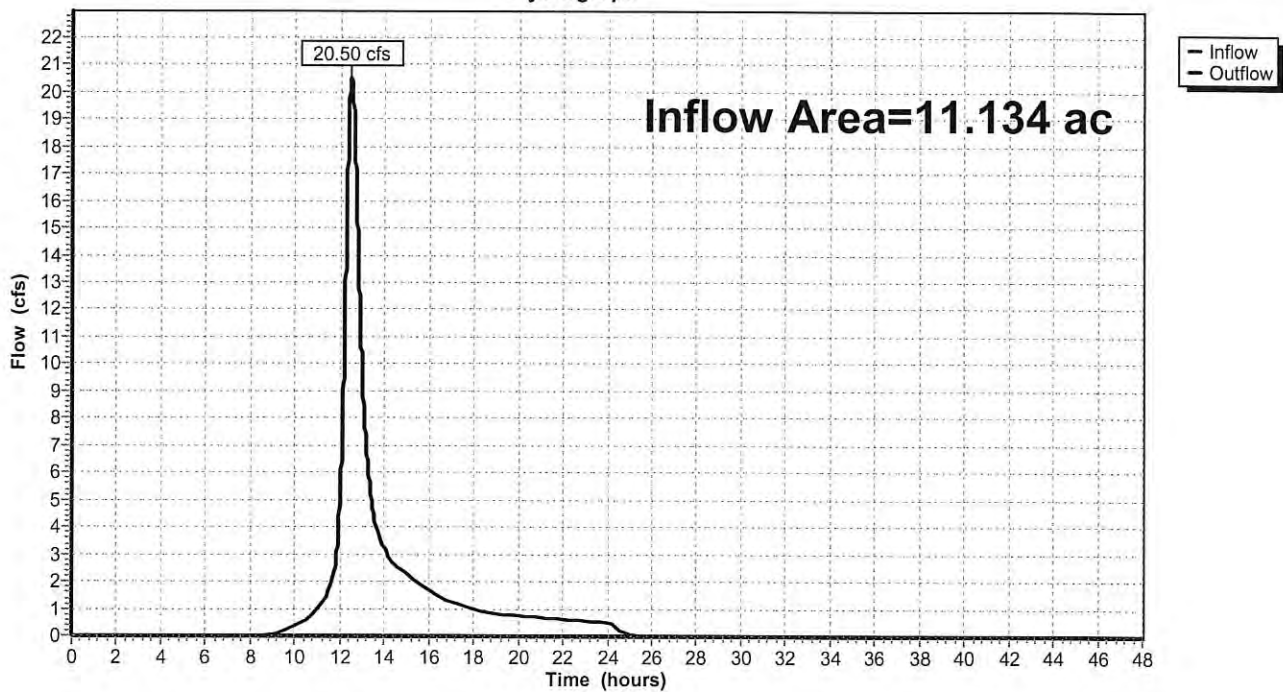
Summary for Reach 10R: POI 4

Inflow Area = 11.134 ac, 4.32% Impervious, Inflow Depth = 3.02" for 25-Year Storm event
Inflow = 20.50 cfs @ 12.50 hrs, Volume= 2.800 af
Outflow = 20.50 cfs @ 12.50 hrs, Volume= 2.800 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 10R: POI 4

Hydrograph



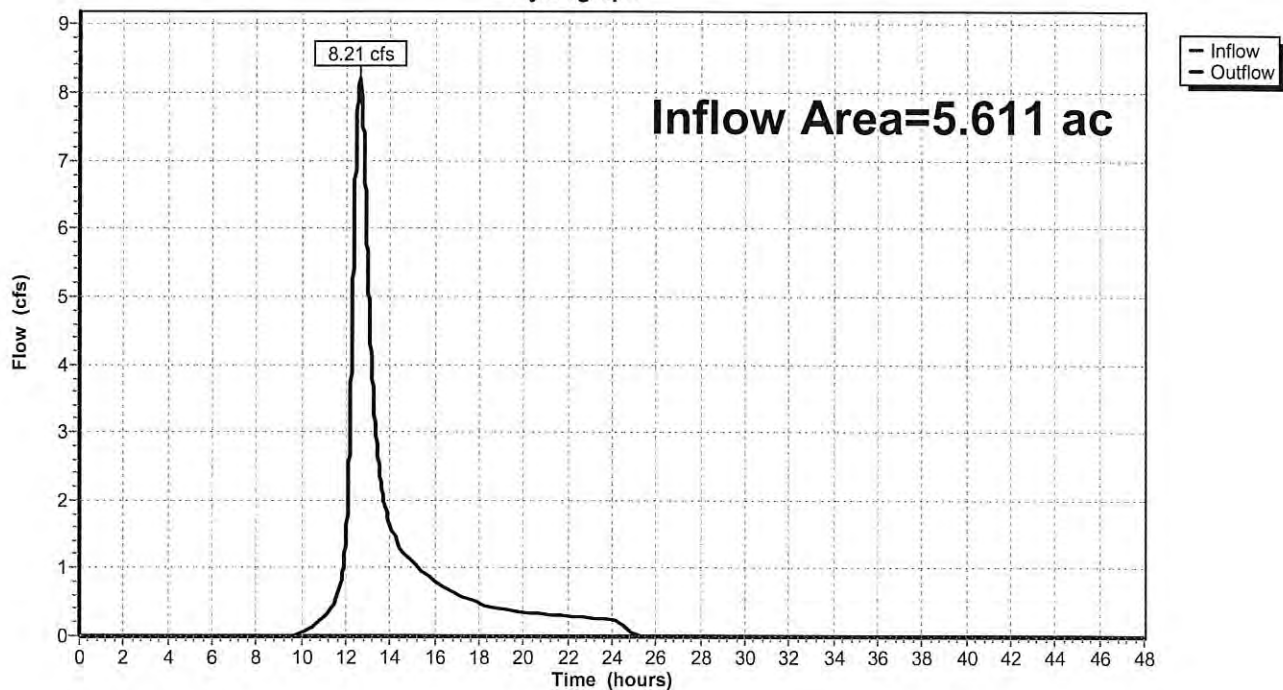
Summary for Reach 11R: POI 5

Inflow Area = 5.611 ac, 0.00% Impervious, Inflow Depth = 2.65" for 25-Year Storm event
Inflow = 8.21 cfs @ 12.60 hrs, Volume= 1.238 af
Outflow = 8.21 cfs @ 12.60 hrs, Volume= 1.238 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 11R: POI 5

Hydrograph



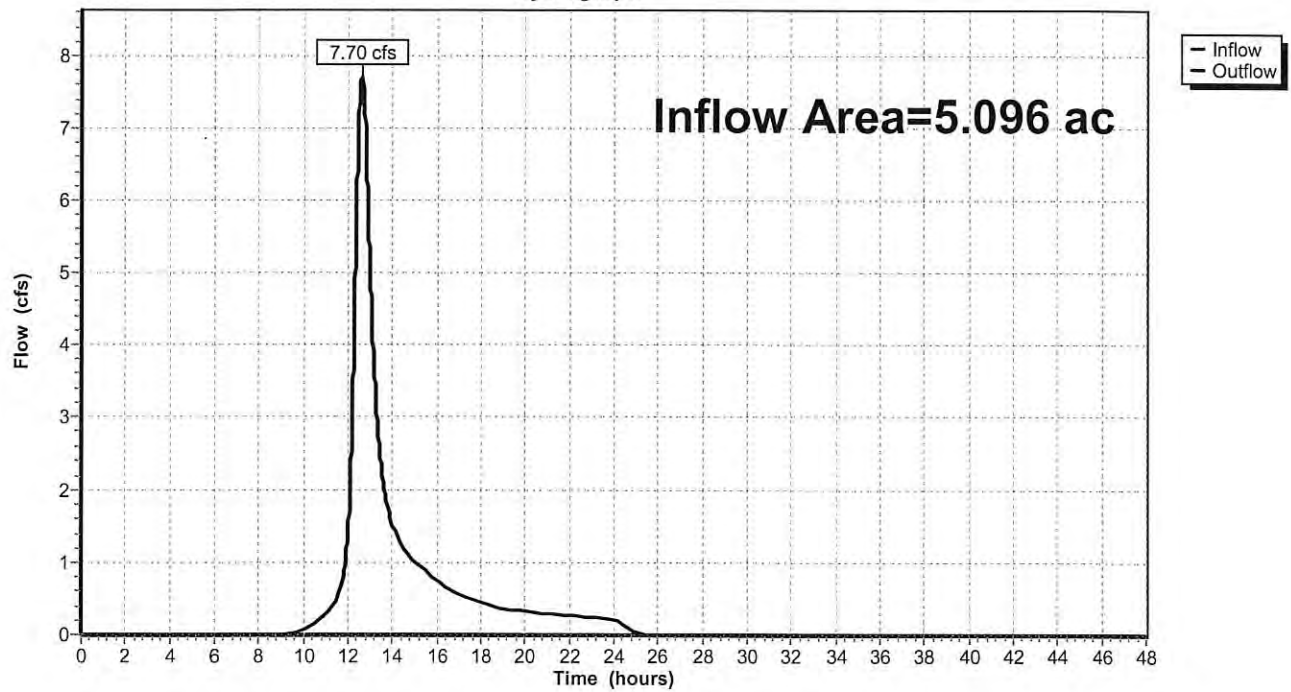
Summary for Reach 12R: POI 6

Inflow Area = 5.096 ac, 0.00% Impervious, Inflow Depth = 2.74" for 25-Year Storm event
Inflow = 7.70 cfs @ 12.61 hrs, Volume= 1.163 af
Outflow = 7.70 cfs @ 12.61 hrs, Volume= 1.163 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 12R: POI 6

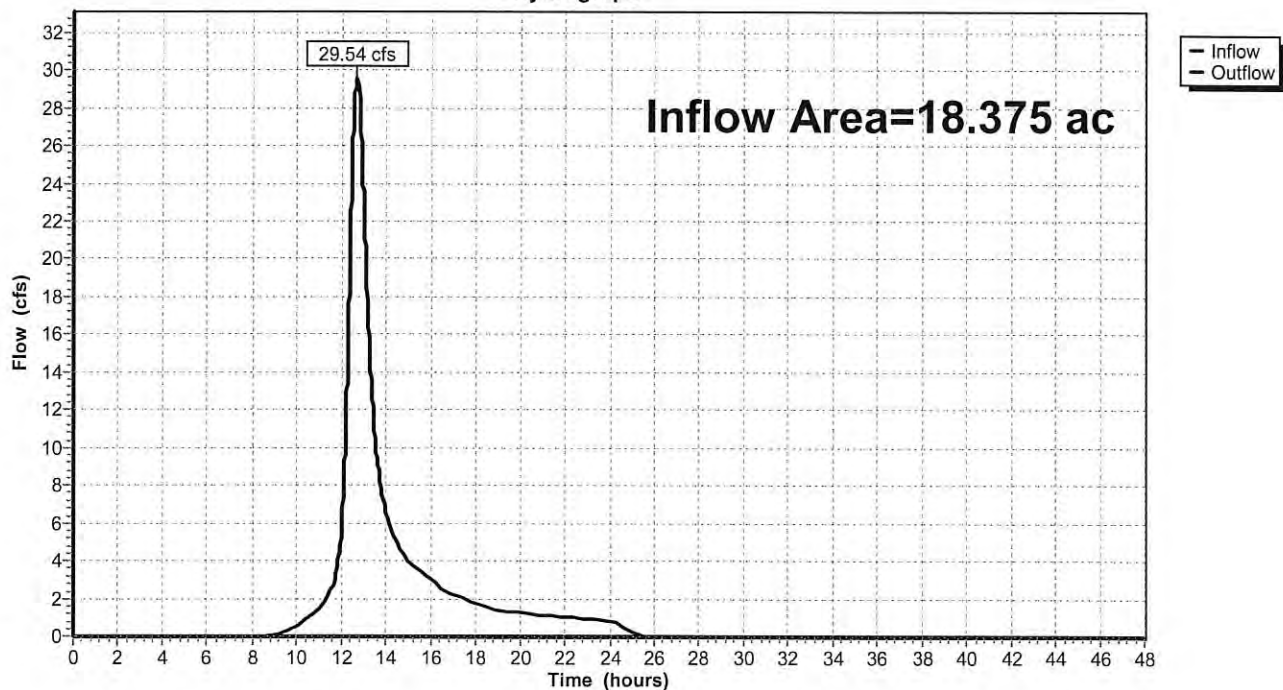
Hydrograph

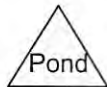
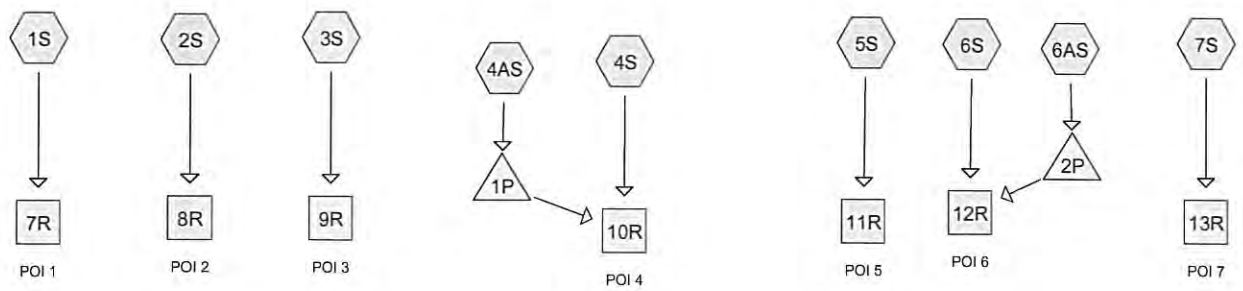


Summary for Reach 13R: POI 7

Inflow Area = 18.375 ac, 6.57% Impervious, Inflow Depth = 3.11" for 25-Year Storm event
Inflow = 29.54 cfs @ 12.66 hrs, Volume= 4.766 af
Outflow = 29.54 cfs @ 12.66 hrs, Volume= 4.766 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 13R: POI 7**Hydrograph**



Drainage Diagram for Post 10-26-17

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S:	Runoff Area=189,100 sf 3.29% Impervious Runoff Depth=1.20" Flow Length=690' Tc=27.1 min CN=78 Runoff=3.52 cfs 0.434 af
Subcatchment 2S:	Runoff Area=39,800 sf 4.46% Impervious Runoff Depth=0.92" Flow Length=200' Tc=22.0 min CN=73 Runoff=0.59 cfs 0.070 af
Subcatchment 3S:	Runoff Area=55,900 sf 5.37% Impervious Runoff Depth=0.87" Flow Length=300' Tc=26.0 min CN=72 Runoff=0.72 cfs 0.093 af
Subcatchment 4AS:	Runoff Area=115,632 sf 17.76% Impervious Runoff Depth=1.08" Flow Length=785' Tc=15.3 min CN=76 Runoff=2.42 cfs 0.240 af
Subcatchment 4S:	Runoff Area=424,528 sf 5.50% Impervious Runoff Depth=1.03" Flow Length=1,690' Tc=35.6 min CN=75 Runoff=5.82 cfs 0.834 af
Subcatchment 5S:	Runoff Area=158,400 sf 1.89% Impervious Runoff Depth=0.82" Flow Length=600' Tc=30.2 min CN=71 Runoff=1.77 cfs 0.248 af
Subcatchment 6AS:	Runoff Area=208,960 sf 13.69% Impervious Runoff Depth=1.08" Flow Length=760' Tc=34.1 min CN=76 Runoff=3.11 cfs 0.433 af
Subcatchment 6S:	Runoff Area=100,550 sf 2.98% Impervious Runoff Depth=0.87" Flow Length=390' Tc=27.3 min CN=72 Runoff=1.26 cfs 0.167 af
Subcatchment 7S:	Runoff Area=792,062 sf 7.10% Impervious Runoff Depth=1.03" Flow Length=1,890' Tc=49.3 min CN=75 Runoff=9.12 cfs 1.556 af
Reach 7R: POI 1	Inflow=3.52 cfs 0.434 af Outflow=3.52 cfs 0.434 af
Reach 8R: POI 2	Inflow=0.59 cfs 0.070 af Outflow=0.59 cfs 0.070 af
Reach 9R: POI 3	Inflow=0.72 cfs 0.093 af Outflow=0.72 cfs 0.093 af
Reach 10R: POI 4	Inflow=6.22 cfs 1.049 af Outflow=6.22 cfs 1.049 af
Reach 11R: POI 5	Inflow=1.77 cfs 0.248 af Outflow=1.77 cfs 0.248 af
Reach 12R: POI 6	Inflow=1.29 cfs 0.541 af Outflow=1.29 cfs 0.541 af
Reach 13R: POI 7	Inflow=9.12 cfs 1.556 af Outflow=9.12 cfs 1.556 af

Post 10-26-17

Type III 24-hr 2-Year Storm Rainfall=3.10"

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Pond 1P:

Peak Elev=397.68' Storage=4,251 cf Inflow=2.42 cfs 0.240 af
Primary=0.48 cfs 0.154 af Secondary=0.02 cfs 0.062 af Outflow=0.50 cfs 0.216 af

Pond 2P:

Peak Elev=406.57' Storage=7,919 cf Inflow=3.11 cfs 0.433 af
Primary=0.82 cfs 0.282 af Secondary=0.03 cfs 0.092 af Outflow=0.85 cfs 0.374 af

Total Runoff Area = 47.863 ac Runoff Volume = 4.074 af Average Runoff Depth = 1.02"
93.01% Pervious = 44.518 ac 6.99% Impervious = 3.346 ac

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S:	Runoff Area=189,100 sf 3.29% Impervious Runoff Depth=2.38" Flow Length=690' Tc=27.1 min CN=78 Runoff=7.15 cfs 0.859 af
Subcatchment 2S:	Runoff Area=39,800 sf 4.46% Impervious Runoff Depth=1.97" Flow Length=200' Tc=22.0 min CN=73 Runoff=1.34 cfs 0.150 af
Subcatchment 3S:	Runoff Area=55,900 sf 5.37% Impervious Runoff Depth=1.89" Flow Length=300' Tc=26.0 min CN=72 Runoff=1.68 cfs 0.203 af
Subcatchment 4AS:	Runoff Area=115,632 sf 17.76% Impervious Runoff Depth=2.21" Flow Length=785' Tc=15.3 min CN=76 Runoff=5.13 cfs 0.489 af
Subcatchment 4S:	Runoff Area=424,528 sf 5.50% Impervious Runoff Depth=2.13" Flow Length=1,690' Tc=35.6 min CN=75 Runoff=12.57 cfs 1.729 af
Subcatchment 5S:	Runoff Area=158,400 sf 1.89% Impervious Runoff Depth=1.82" Flow Length=600' Tc=30.2 min CN=71 Runoff=4.27 cfs 0.551 af
Subcatchment 6AS:	Runoff Area=208,960 sf 13.69% Impervious Runoff Depth=2.21" Flow Length=760' Tc=34.1 min CN=76 Runoff=6.59 cfs 0.883 af
Subcatchment 6S:	Runoff Area=100,550 sf 2.98% Impervious Runoff Depth=1.89" Flow Length=390' Tc=27.3 min CN=72 Runoff=2.96 cfs 0.364 af
Subcatchment 7S:	Runoff Area=792,062 sf 7.10% Impervious Runoff Depth=2.13" Flow Length=1,890' Tc=49.3 min CN=75 Runoff=19.79 cfs 3.226 af
Reach 7R: POI 1	Inflow=7.15 cfs 0.859 af Outflow=7.15 cfs 0.859 af
Reach 8R: POI 2	Inflow=1.34 cfs 0.150 af Outflow=1.34 cfs 0.150 af
Reach 9R: POI 3	Inflow=1.68 cfs 0.203 af Outflow=1.68 cfs 0.203 af
Reach 10R: POI 4	Inflow=13.81 cfs 2.193 af Outflow=13.81 cfs 2.193 af
Reach 11R: POI 5	Inflow=4.27 cfs 0.551 af Outflow=4.27 cfs 0.551 af
Reach 12R: POI 6	Inflow=4.55 cfs 1.187 af Outflow=4.55 cfs 1.187 af
Reach 13R: POI 7	Inflow=19.79 cfs 3.226 af Outflow=19.79 cfs 3.226 af

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Type III 24-hr 10-Year Storm Rainfall=4.60"

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Pond 1P:

Peak Elev=398.46' Storage=8,587 cf Inflow=5.13 cfs 0.489 af
Primary=1.29 cfs 0.400 af Secondary=0.02 cfs 0.064 af Outflow=1.31 cfs 0.464 af

Pond 2P:

Peak Elev=407.42' Storage=13,593 cf Inflow=6.59 cfs 0.883 af
Primary=3.07 cfs 0.727 af Secondary=0.03 cfs 0.096 af Outflow=3.10 cfs 0.823 af

Total Runoff Area = 47.863 ac Runoff Volume = 8.455 af Average Runoff Depth = 2.12"
93.01% Pervious = 44.518 ac 6.99% Impervious = 3.346 ac

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Type III 24-hr 25-Year Storm Rainfall=5.80"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S:	Runoff Area=189,100 sf 3.29% Impervious Runoff Depth=3.40" Flow Length=690' Tc=27.1 min CN=78 Runoff=10.27 cfs 1.231 af
Subcatchment 2S:	Runoff Area=39,800 sf 4.46% Impervious Runoff Depth=2.92" Flow Length=200' Tc=22.0 min CN=73 Runoff=2.02 cfs 0.223 af
Subcatchment 3S:	Runoff Area=55,900 sf 5.37% Impervious Runoff Depth=2.83" Flow Length=300' Tc=26.0 min CN=72 Runoff=2.55 cfs 0.303 af
Subcatchment 4AS:	Runoff Area=115,632 sf 17.76% Impervious Runoff Depth=3.21" Flow Length=785' Tc=15.3 min CN=76 Runoff=7.49 cfs 0.710 af
Subcatchment 4S:	Runoff Area=424,528 sf 5.50% Impervious Runoff Depth=3.11" Flow Length=1,690' Tc=35.6 min CN=75 Runoff=18.52 cfs 2.528 af
Subcatchment 5S:	Runoff Area=158,400 sf 1.89% Impervious Runoff Depth=2.74" Flow Length=600' Tc=30.2 min CN=71 Runoff=6.53 cfs 0.830 af
Subcatchment 6AS:	Runoff Area=208,960 sf 13.69% Impervious Runoff Depth=3.21" Flow Length=760' Tc=34.1 min CN=76 Runoff=9.63 cfs 1.282 af
Subcatchment 6S:	Runoff Area=100,550 sf 2.98% Impervious Runoff Depth=2.83" Flow Length=390' Tc=27.3 min CN=72 Runoff=4.49 cfs 0.544 af
Subcatchment 7S:	Runoff Area=792,062 sf 7.10% Impervious Runoff Depth=3.11" Flow Length=1,890' Tc=49.3 min CN=75 Runoff=29.24 cfs 4.716 af
Reach 7R: POI 1	Inflow=10.27 cfs 1.231 af Outflow=10.27 cfs 1.231 af
Reach 8R: POI 2	Inflow=2.02 cfs 0.223 af Outflow=2.02 cfs 0.223 af
Reach 9R: POI 3	Inflow=2.55 cfs 0.303 af Outflow=2.55 cfs 0.303 af
Reach 10R: POI 4	Inflow=20.18 cfs 3.212 af Outflow=20.18 cfs 3.212 af
Reach 11R: POI 5	Inflow=6.53 cfs 0.830 af Outflow=6.53 cfs 0.830 af
Reach 12R: POI 6	Inflow=7.65 cfs 1.765 af Outflow=7.65 cfs 1.765 af
Reach 13R: POI 7	Inflow=29.24 cfs 4.716 af Outflow=29.24 cfs 4.716 af

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Type III 24-hr 25-Year Storm Rainfall=5.80"

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Pond 1P:

Peak Elev=399.13' Storage=13,048 cf Inflow=7.49 cfs 0.710 af
Primary=1.71 cfs 0.619 af Secondary=0.02 cfs 0.066 af Outflow=1.73 cfs 0.684 af

Pond 2P:

Peak Elev=408.00' Storage=18,613 cf Inflow=9.63 cfs 1.282 af
Primary=5.04 cfs 1.123 af Secondary=0.03 cfs 0.098 af Outflow=5.07 cfs 1.221 af

Total Runoff Area = 47.863 ac Runoff Volume = 12.367 af Average Runoff Depth = 3.10"
93.01% Pervious = 44.518 ac 6.99% Impervious = 3.346 ac

Summary for Subcatchment 1S:

Runoff = 10.27 cfs @ 12.38 hrs, Volume= 1.231 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,212	98	Paved parking & roofs
18,000	80	>75% Grass cover, Good, HSG D
7,600	71	Meadow, non-grazed, HSG C
77,200	78	Meadow, non-grazed, HSG D
6,000	70	Woods, Good, HSG C
74,088	77	Woods, Good, HSG D
189,100	78	Weighted Average
182,888		Pervious Area
6,212		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.9	150	0.0400	0.11		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	240	0.0700	3.97		Shallow Concentrated Flow, B-C
					Grassed Waterway Kv= 15.0 fps
3.2	300	0.1000	1.58		Shallow Concentrated Flow, C-D
					Woodland Kv= 5.0 fps
27.1	690	Total			

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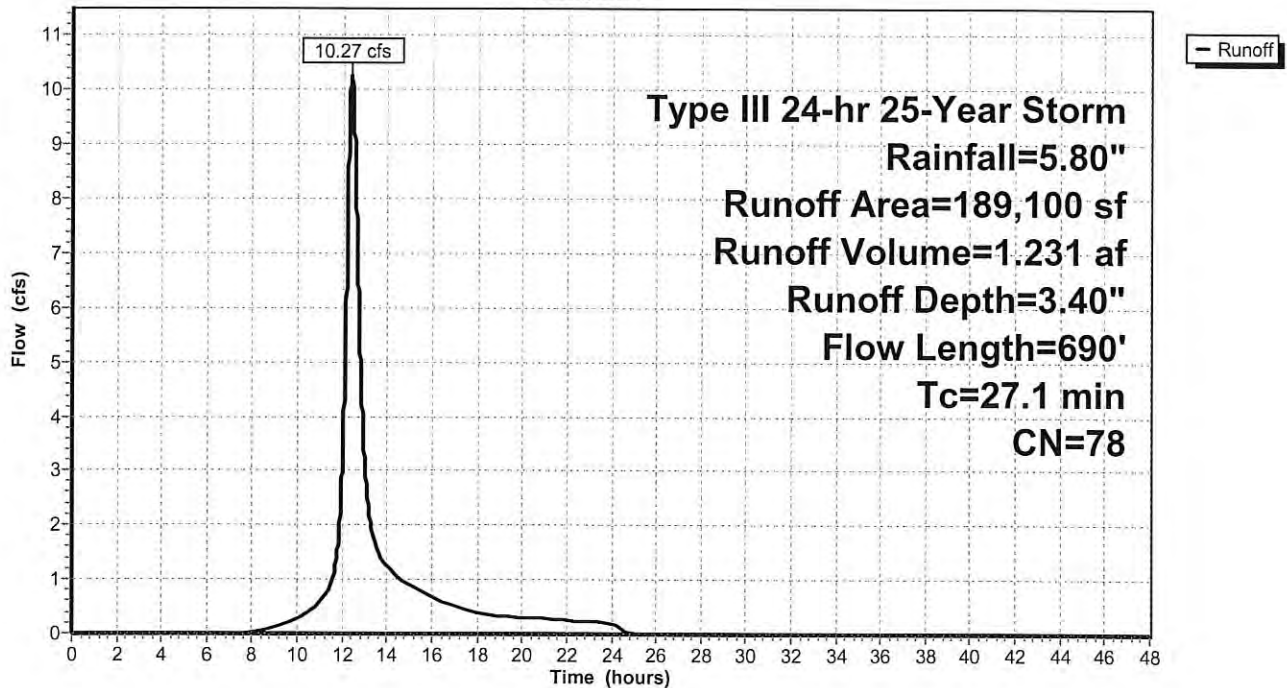
Type III 24-hr 25-Year Storm Rainfall=5.80"

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Subcatchment 1S:

Hydrograph



Summary for Subcatchment 2S:

Runoff = 2.02 cfs @ 12.30 hrs, Volume= 0.223 af, Depth= 2.92"

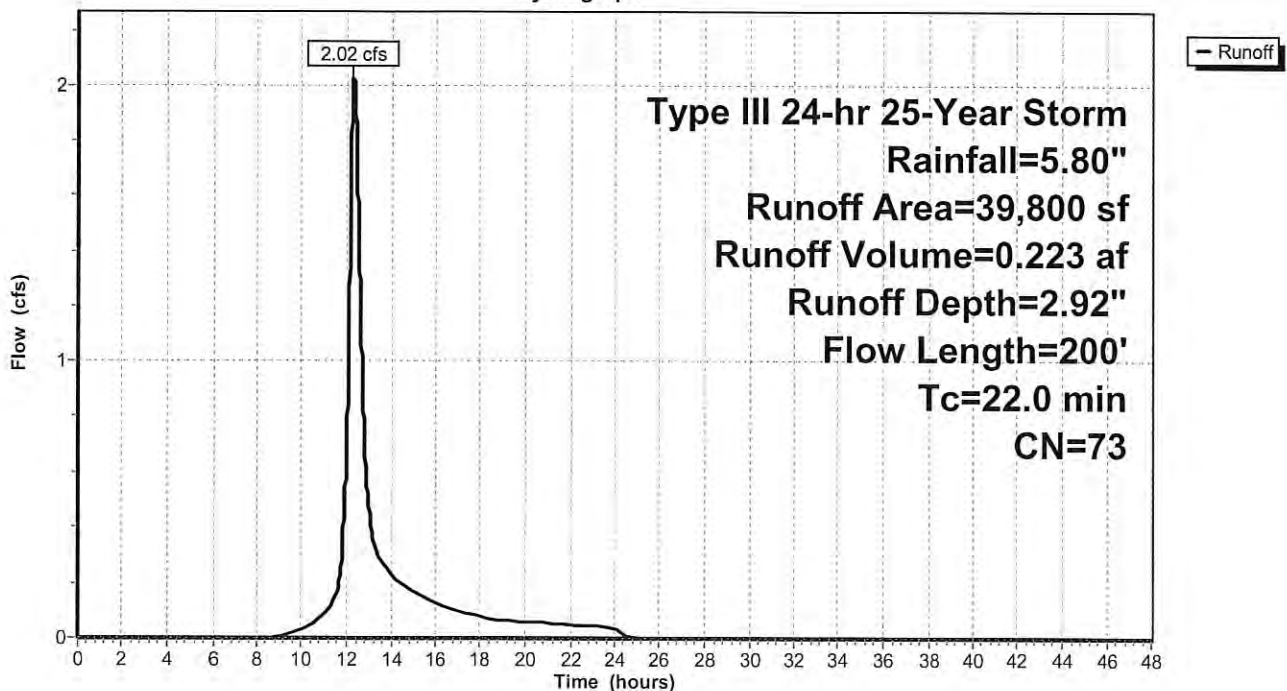
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
1,776	98	Paved parking & roofs
5,000	80	>75% Grass cover, Good, HSG D
28,400	70	Woods, Good, HSG C
4,624	77	Woods, Good, HSG D
39,800	73	Weighted Average
38,024		Pervious Area
1,776		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	150	0.0470	0.12		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.6	50	0.0700	1.32		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
22.0	200	Total			

Subcatchment 2S:

Hydrograph



Summary for Subcatchment 3S:

Runoff = 2.55 cfs @ 12.37 hrs, Volume= 0.303 af, Depth= 2.83"

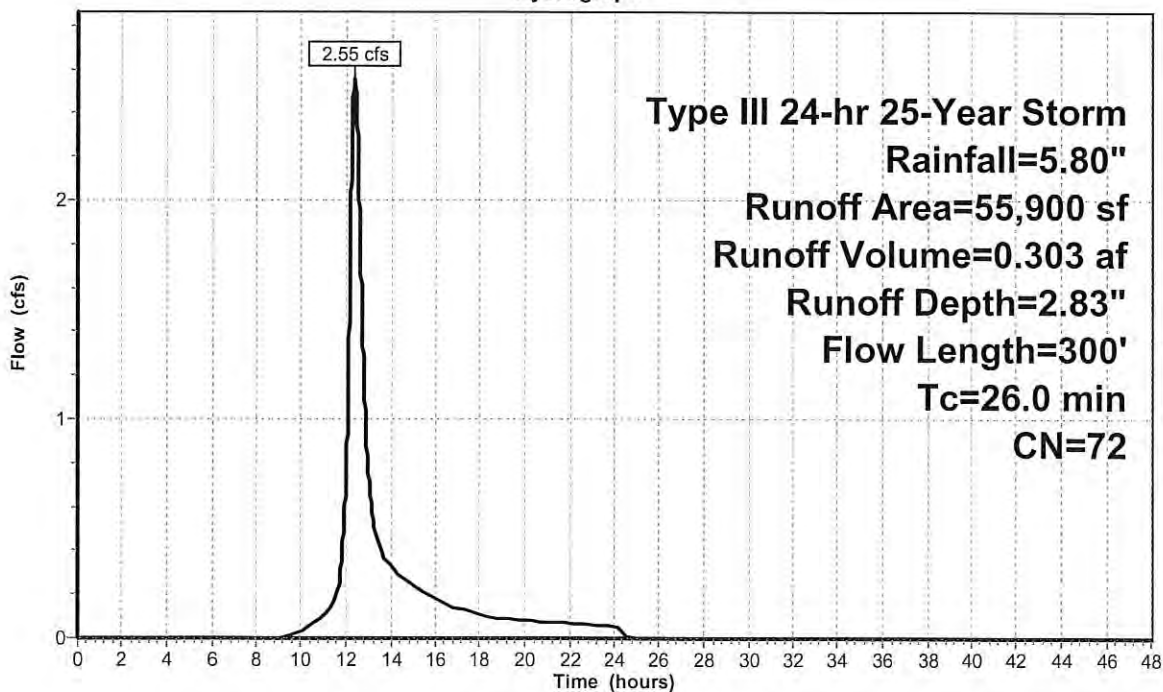
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
3,000	98	Paved parking & roofs
12,000	74	>75% Grass cover, Good, HSG C
40,900	70	Woods, Good, HSG C
55,900	72	Weighted Average
52,900		Pervious Area
3,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	150	0.0360	0.10		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.1	150	0.0550	1.17		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
26.0	300	Total			

Subcatchment 3S:

Hydrograph



Summary for Subcatchment 4AS:

Runoff = 7.49 cfs @ 12.21 hrs, Volume= 0.710 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
20,542	98	Paved parking & roofs
42,904	74	>75% Grass cover, Good, HSG C
52,186	70	Woods, Good, HSG C
115,632	76	Weighted Average
95,090		Pervious Area
20,542		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0250	0.13		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.10"
0.0	20	0.3300	8.62		Shallow Concentrated Flow, B-C
					Grassed Waterway Kv= 15.0 fps
0.3	65	0.0100	4.32	60.45	Trap/Vee/Rect Channel Flow, C-D
					Bot.W=1.00' D=2.00' Z= 3.0 ' Top.W=13.00' n= 0.035
1.2	380	0.0100	5.26	6.46	Circular Channel (pipe), D-E
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.5	220	0.0570	6.77	27.09	Trap/Vee/Rect Channel Flow, E-F
					Bot.W=1.00' D=1.00' Z= 3.0 ' Top.W=7.00' n= 0.035
15.3	785	Total			

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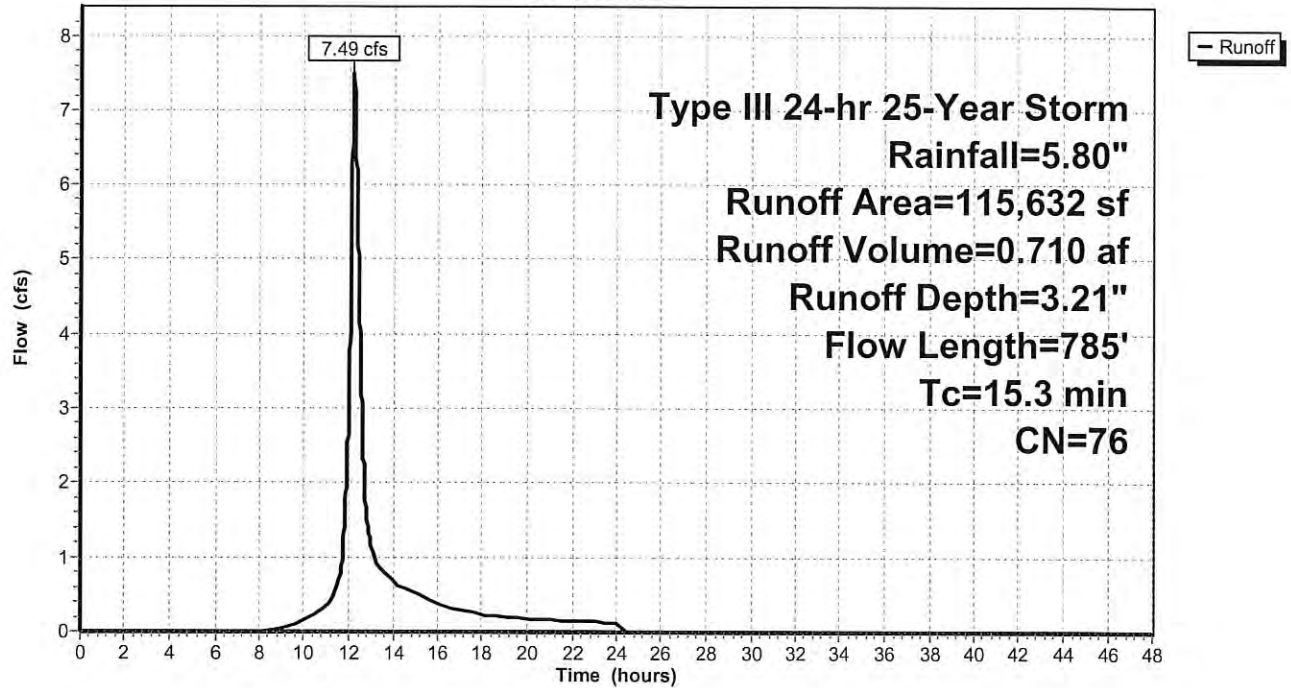
Type III 24-hr 25-Year Storm Rainfall=5.80"

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Subcatchment 4AS:

Hydrograph



Summary for Subcatchment 4S:

Runoff = 18.52 cfs @ 12.50 hrs, Volume= 2.528 af, Depth= 3.11"

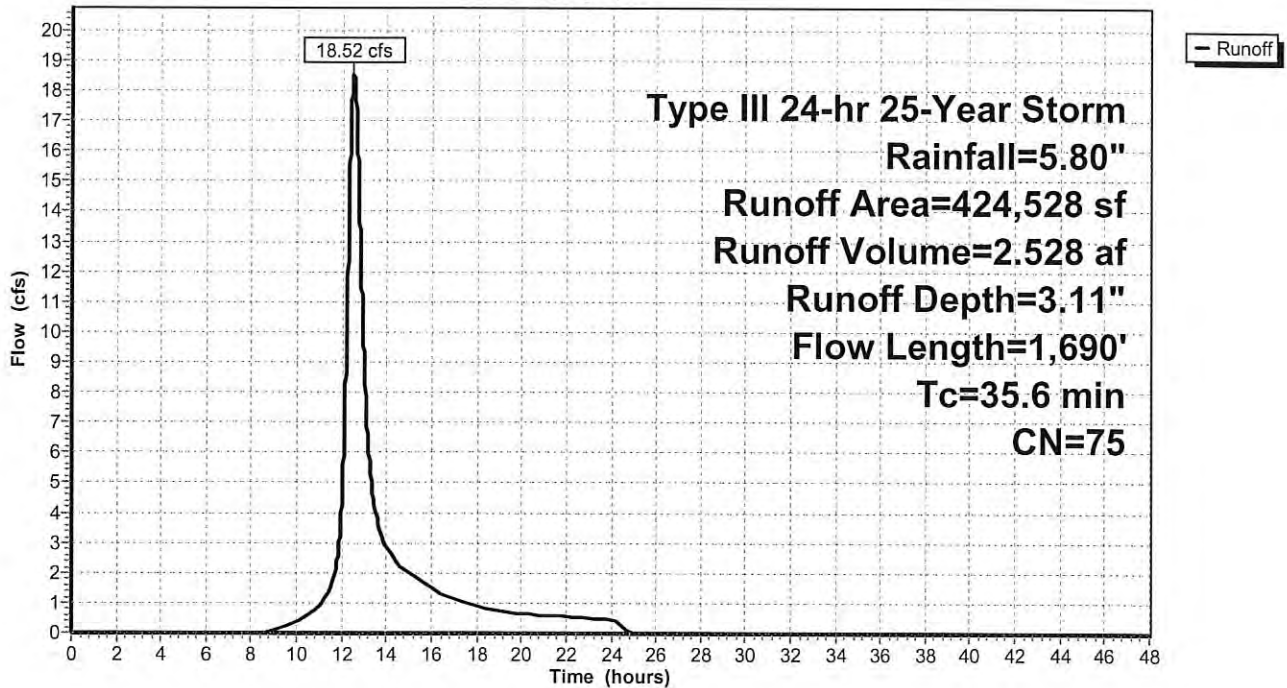
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,394	98	Paved parking & roofs
10,672	74	>75% Grass cover, Good, HSG C
118,700	77	2 acre lots, 12% imp, HSG C
55,800	82	2 acre lots, 12% imp, HSG D
45,000	71	Meadow, non-grazed, HSG C
51,600	78	Meadow, non-grazed, HSG D
138,362	70	Woods, Good, HSG C
2,000	77	Woods, Good, HSG D
424,528	75	Weighted Average
401,194		Pervious Area
23,334		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	150	0.0300	0.15		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.10"
3.7	630	0.0360	2.85		Shallow Concentrated Flow, B-C
					Grassed Waterway Kv= 15.0 fps
14.8	910	0.0420	1.02		Shallow Concentrated Flow, C-D
					Woodland Kv= 5.0 fps
35.6	1,690	Total			

Subcatchment 4S:

Hydrograph



Summary for Subcatchment 5S:

Runoff = 6.53 cfs @ 12.44 hrs, Volume= 0.830 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

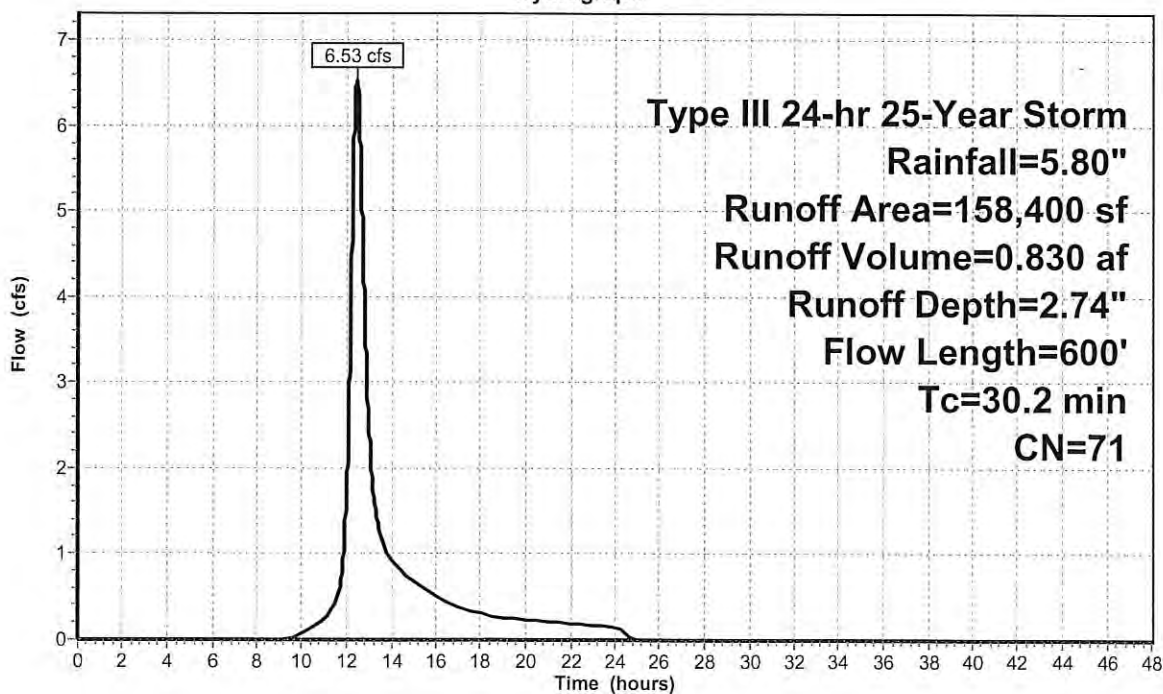
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
3,000	98	Paved parking & roofs
12,000	74	>75% Grass cover, Good, HSG C
143,400	70	Woods, Good, HSG C
158,400	71	Weighted Average
155,400		Pervious Area
3,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.9	150	0.0400	0.11		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
7.3	450	0.0420	1.02		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
30.2	600	Total			

Subcatchment 5S:

Hydrograph



Summary for Subcatchment 6AS:

Runoff = 9.63 cfs @ 12.47 hrs, Volume= 1.282 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
28,610	98	Paved parking & roofs
70,092	74	>75% Grass cover, Good, HSG C
82,558	70	Woods, Good, HSG C
27,700	77	Woods, Good, HSG D
208,960	76	Weighted Average
180,350		Pervious Area
28,610		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.6	150	0.0210	0.08		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.8	140	0.0270	0.82		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
1.3	330	0.0100	4.32	60.45	Trap/Vee/Rect Channel Flow, C-D
					Bot.W=1.00' D=2.00' Z= 3.0 ' ' Top.W=13.00' n= 0.035
0.4	140	0.0100	5.26	6.46	Circular Channel (pipe), D-E
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
34.1	760	Total			

Post 10-26-17

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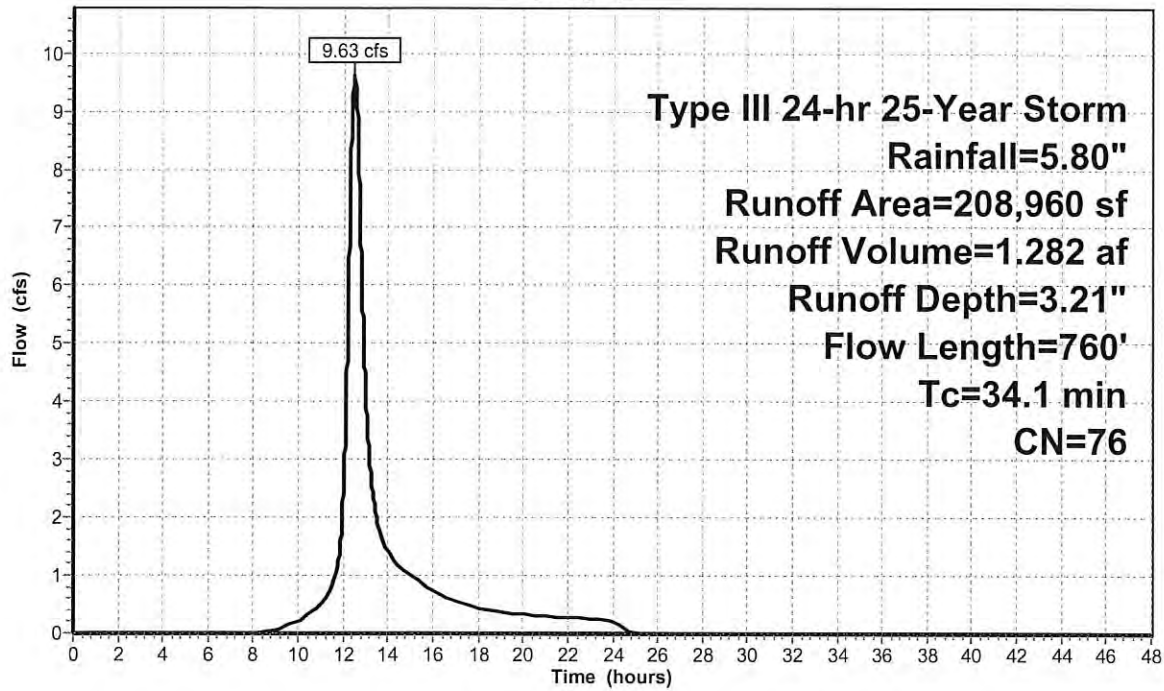
Type III 24-hr 25-Year Storm Rainfall=5.80"

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Subcatchment 6AS:

Hydrograph



Summary for Subcatchment 6S:

Runoff = 4.49 cfs @ 12.40 hrs, Volume= 0.544 af, Depth= 2.83"

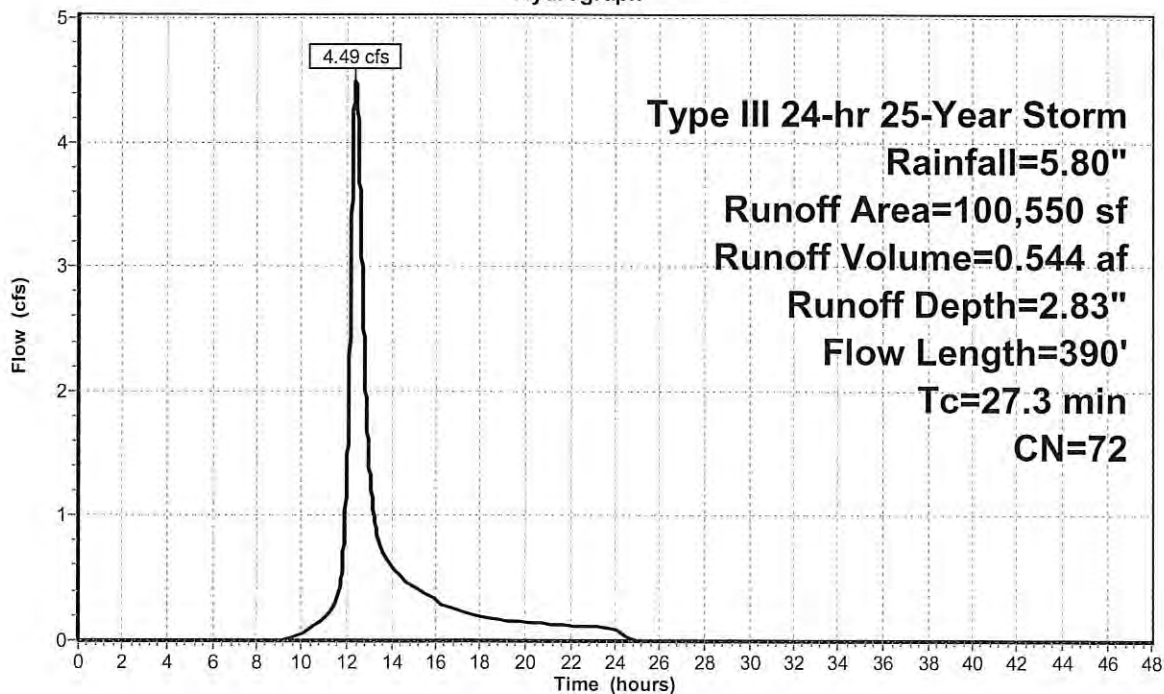
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
3,000	98	Paved parking & roofs
18,000	74	>75% Grass cover, Good, HSG C
79,550	70	Woods, Good, HSG C
100,550	72	Weighted Average
97,550		Pervious Area
3,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.9	150	0.0400	0.11		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.4	240	0.0330	0.91		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
27.3	390	Total			

Subcatchment 6S:

Hydrograph



Summary for Subcatchment 7S:

Runoff = 29.24 cfs @ 12.66 hrs, Volume= 4.716 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,412	98	Paved parking & roofs
6,800	74	>75% Grass cover, Good, HSG C
218,288	77	2 acre lots, 12% imp, HSG C
197,200	82	2 acre lots, 12% imp, HSG D
76,700	71	Meadow, non-grazed, HSG C
265,562	70	Woods, Good, HSG C
21,100	77	Woods, Good, HSG D
792,062	75	Weighted Average
735,791		Pervious Area
56,271		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0250	0.14		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.10"
2.8	390	0.0240	2.32		Shallow Concentrated Flow, B-C
					Grassed Waterway Kv= 15.0 fps
10.0	390	0.0170	0.65		Shallow Concentrated Flow, C-D
					Woodland Kv= 5.0 fps
0.1	20	0.0100	6.22	7.63	Circular Channel (pipe), D-E
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
18.1	940	0.0300	0.87		Shallow Concentrated Flow, E-F
					Woodland Kv= 5.0 fps
49.3	1,890	Total			

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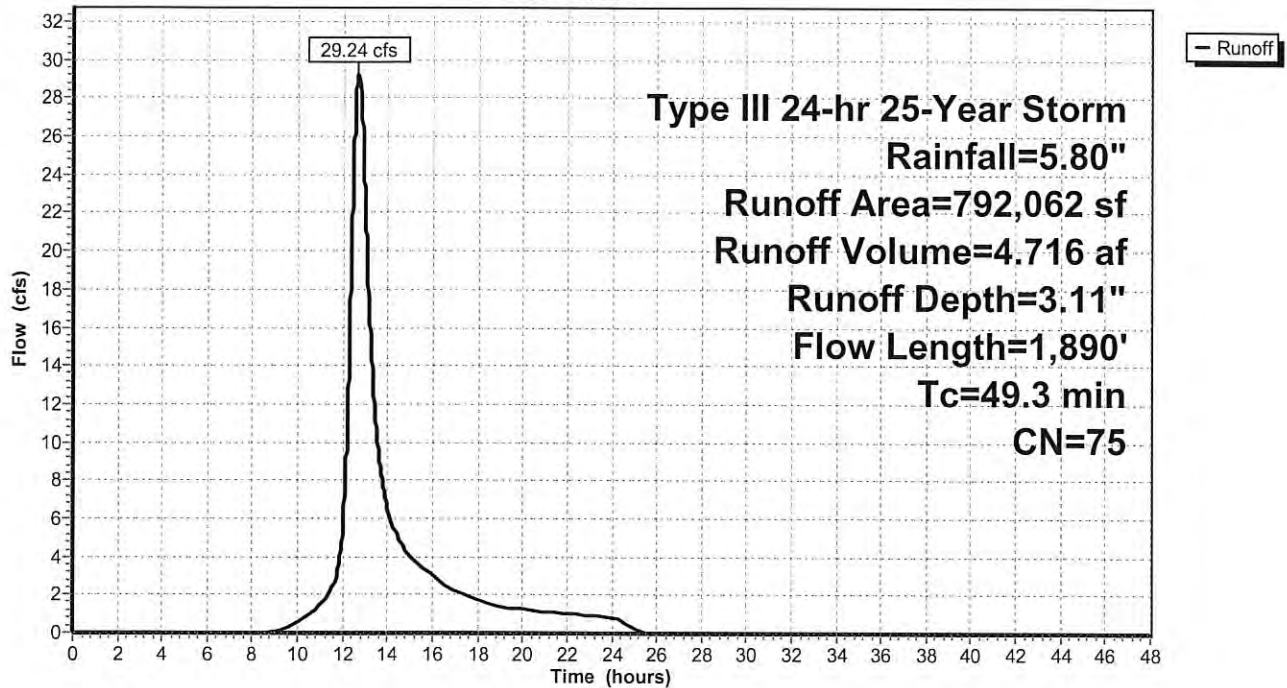
Type III 24-hr 25-Year Storm Rainfall=5.80"

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Subcatchment 7S:

Hydrograph



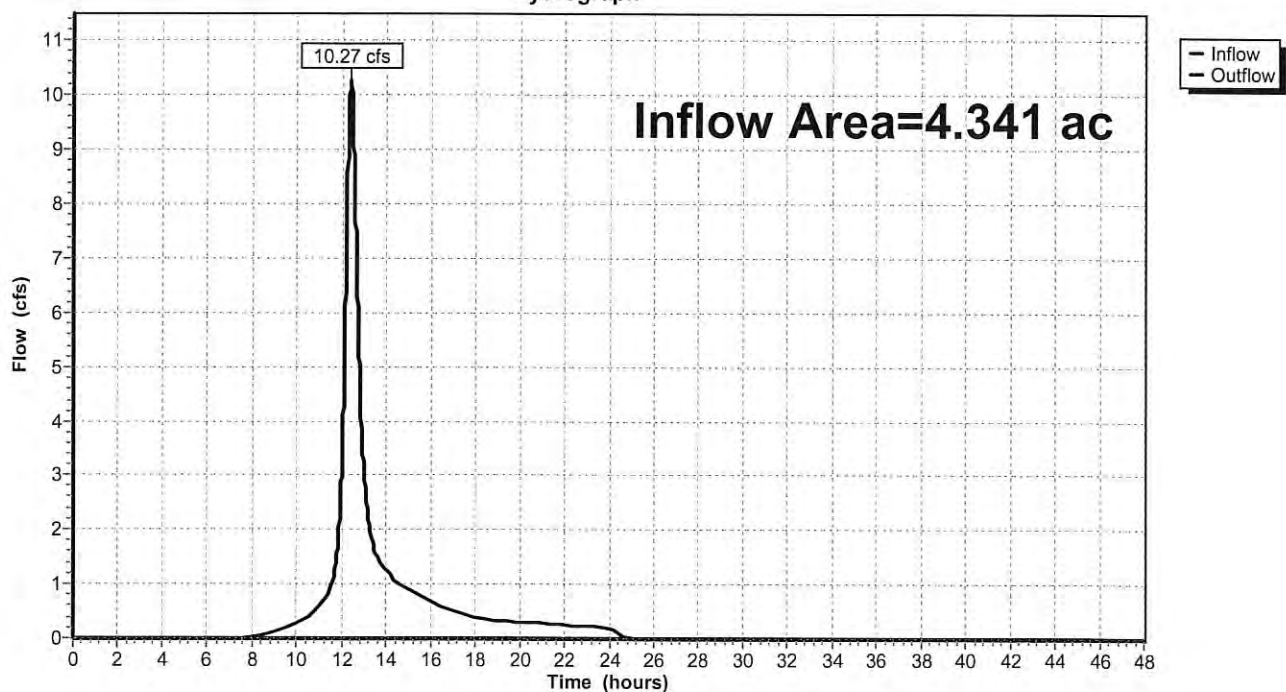
Summary for Reach 7R: POI 1

Inflow Area = 4.341 ac, 3.29% Impervious, Inflow Depth = 3.40" for 25-Year Storm event
Inflow = 10.27 cfs @ 12.38 hrs, Volume= 1.231 af
Outflow = 10.27 cfs @ 12.38 hrs, Volume= 1.231 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 7R: POI 1

Hydrograph



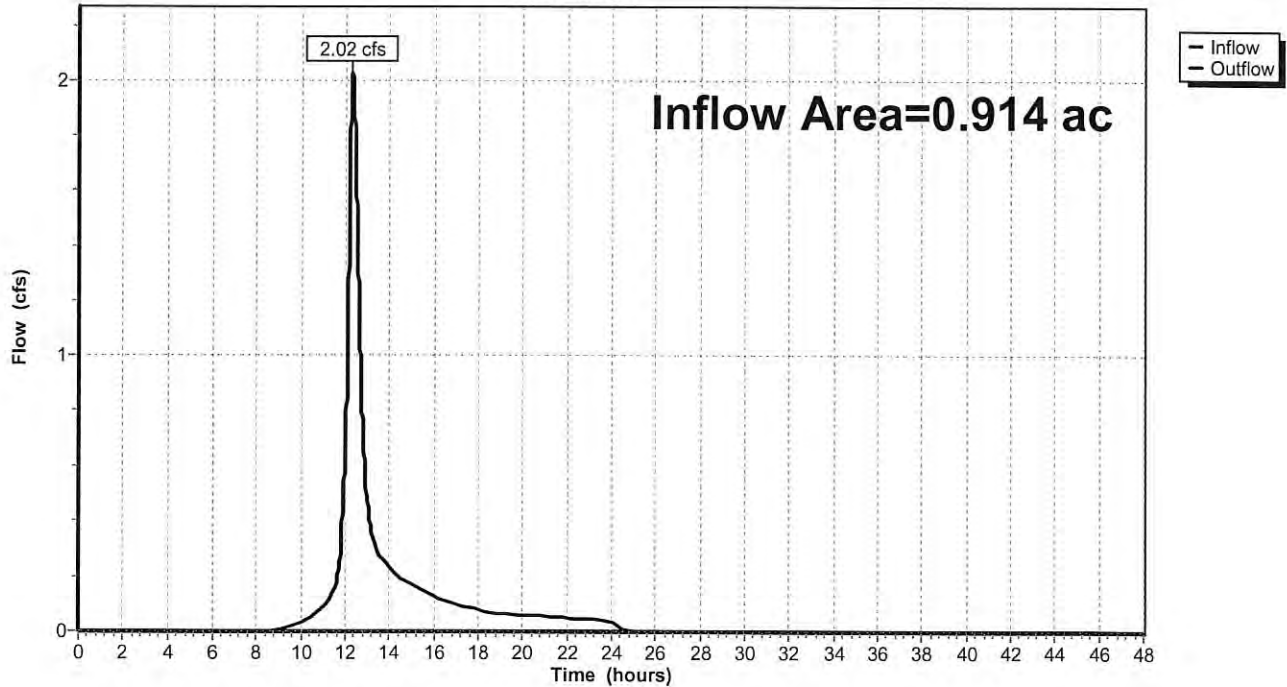
Summary for Reach 8R: POI 2

Inflow Area = 0.914 ac, 4.46% Impervious, Inflow Depth = 2.92" for 25-Year Storm event
 Inflow = 2.02 cfs @ 12.30 hrs, Volume= 0.223 af
 Outflow = 2.02 cfs @ 12.30 hrs, Volume= 0.223 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 8R: POI 2

Hydrograph



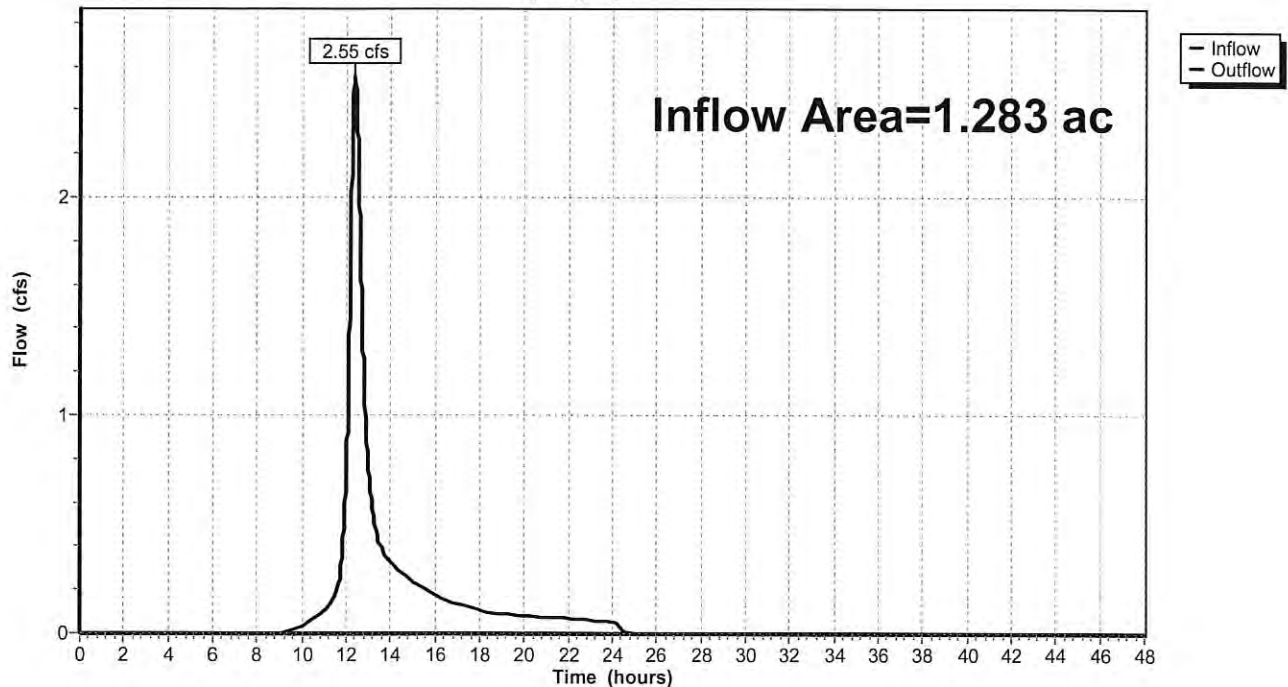
Summary for Reach 9R: POI 3

Inflow Area = 1.283 ac, 5.37% Impervious, Inflow Depth = 2.83" for 25-Year Storm event
Inflow = 2.55 cfs @ 12.37 hrs, Volume= 0.303 af
Outflow = 2.55 cfs @ 12.37 hrs, Volume= 0.303 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 9R: POI 3

Hydrograph



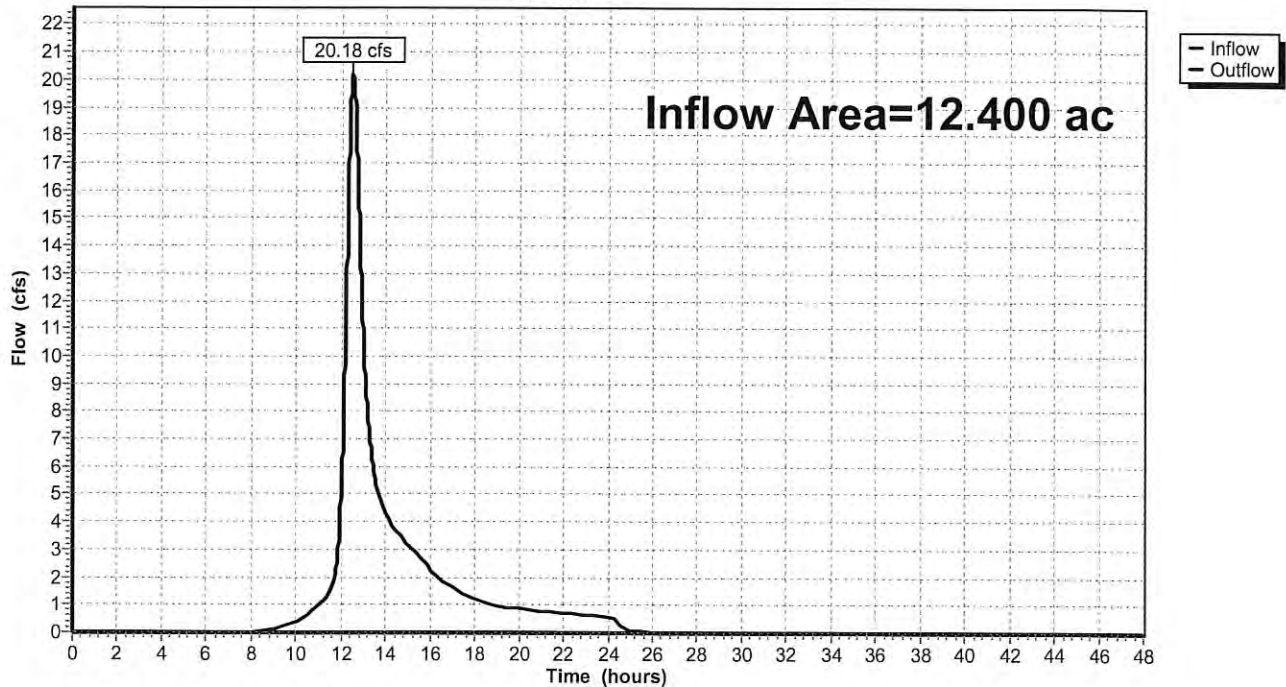
Summary for Reach 10R: POI 4

Inflow Area = 12.400 ac, 8.12% Impervious, Inflow Depth > 3.11" for 25-Year Storm event
Inflow = 20.18 cfs @ 12.50 hrs, Volume= 3.212 af
Outflow = 20.18 cfs @ 12.50 hrs, Volume= 3.212 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 10R: POI 4

Hydrograph



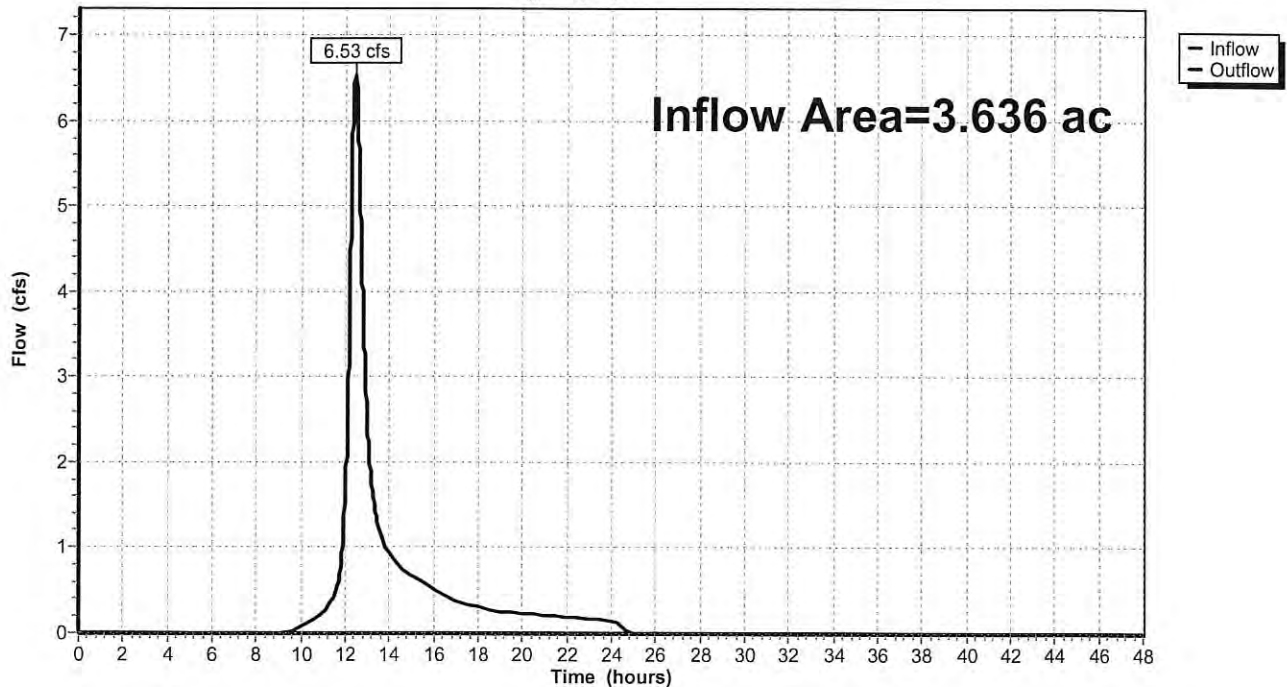
Summary for Reach 11R: POI 5

Inflow Area = 3.636 ac, 1.89% Impervious, Inflow Depth = 2.74" for 25-Year Storm event
 Inflow = 6.53 cfs @ 12.44 hrs, Volume= 0.830 af
 Outflow = 6.53 cfs @ 12.44 hrs, Volume= 0.830 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 11R: POI 5

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.80"

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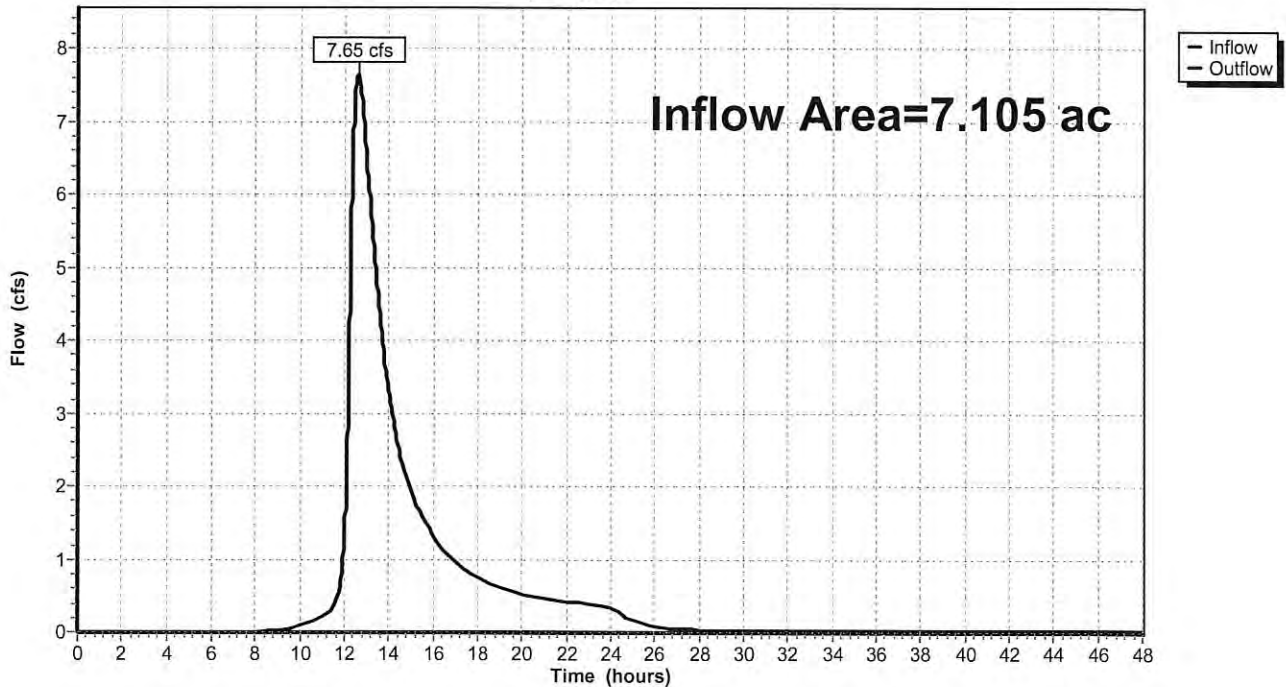
Summary for Reach 12R: POI 6

Inflow Area = 7.105 ac, 10.21% Impervious, Inflow Depth > 2.98" for 25-Year Storm event
Inflow = 7.65 cfs @ 12.59 hrs, Volume= 1.765 af
Outflow = 7.65 cfs @ 12.59 hrs, Volume= 1.765 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 12R: POI 6

Hydrograph



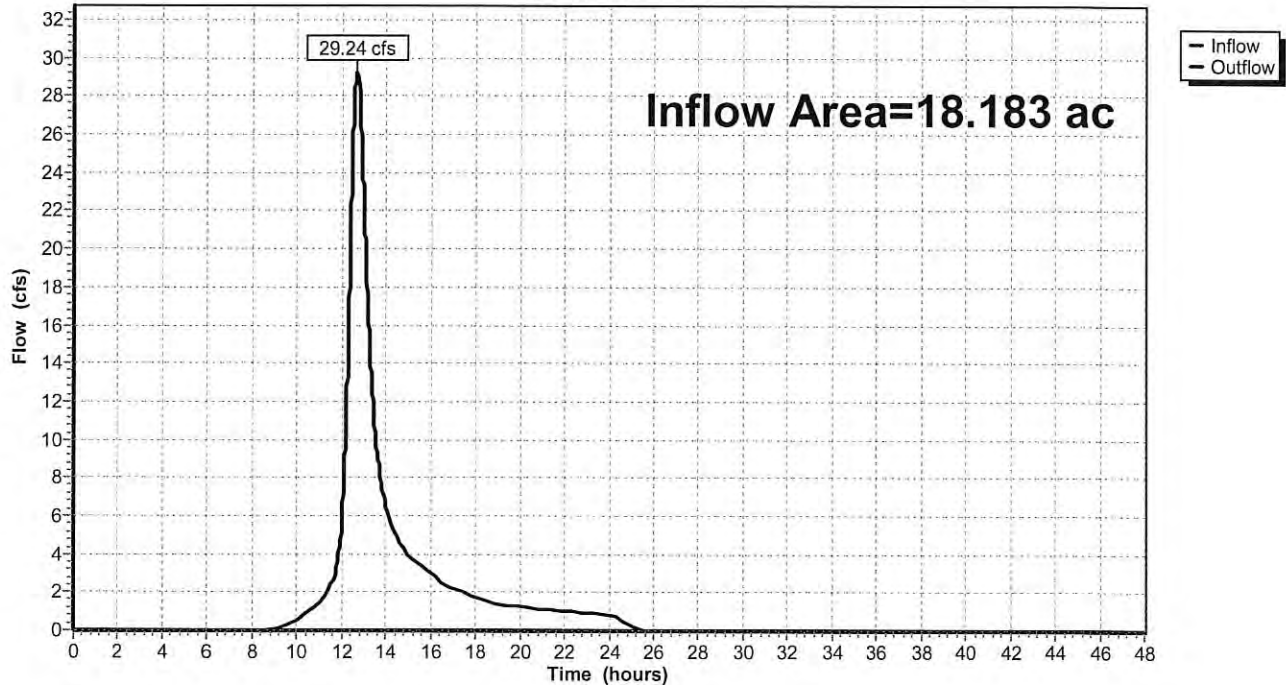
Summary for Reach 13R: POI 7

Inflow Area = 18.183 ac, 7.10% Impervious, Inflow Depth = 3.11" for 25-Year Storm event
 Inflow = 29.24 cfs @ 12.66 hrs, Volume= 4.716 af
 Outflow = 29.24 cfs @ 12.66 hrs, Volume= 4.716 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach 13R: POI 7

Hydrograph



Summary for Pond 1P:

Inflow Area = 2.655 ac, 17.76% Impervious, Inflow Depth = 3.21" for 25-Year Storm event
 Inflow = 7.49 cfs @ 12.21 hrs, Volume= 0.710 af
 Outflow = 1.73 cfs @ 12.76 hrs, Volume= 0.684 af, Atten= 77%, Lag= 32.8 min
 Primary = 1.71 cfs @ 12.76 hrs, Volume= 0.619 af
 Secondary = 0.02 cfs @ 9.05 hrs, Volume= 0.066 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 399.13' @ 12.76 hrs Surf.Area= 7,076 sf Storage= 13,048 cf

Plug-Flow detention time= 177.7 min calculated for 0.684 af (96% of inflow)
 Center-of-Mass det. time= 157.5 min (991.6 - 834.1)

Volume	Invert	Avail.Storage	Storage Description
#1	395.67'	19,701 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
395.67	1,244	0	0
397.17	2,196	2,580	2,580
398.00	5,700	3,277	5,857
400.00	8,144	13,844	19,701

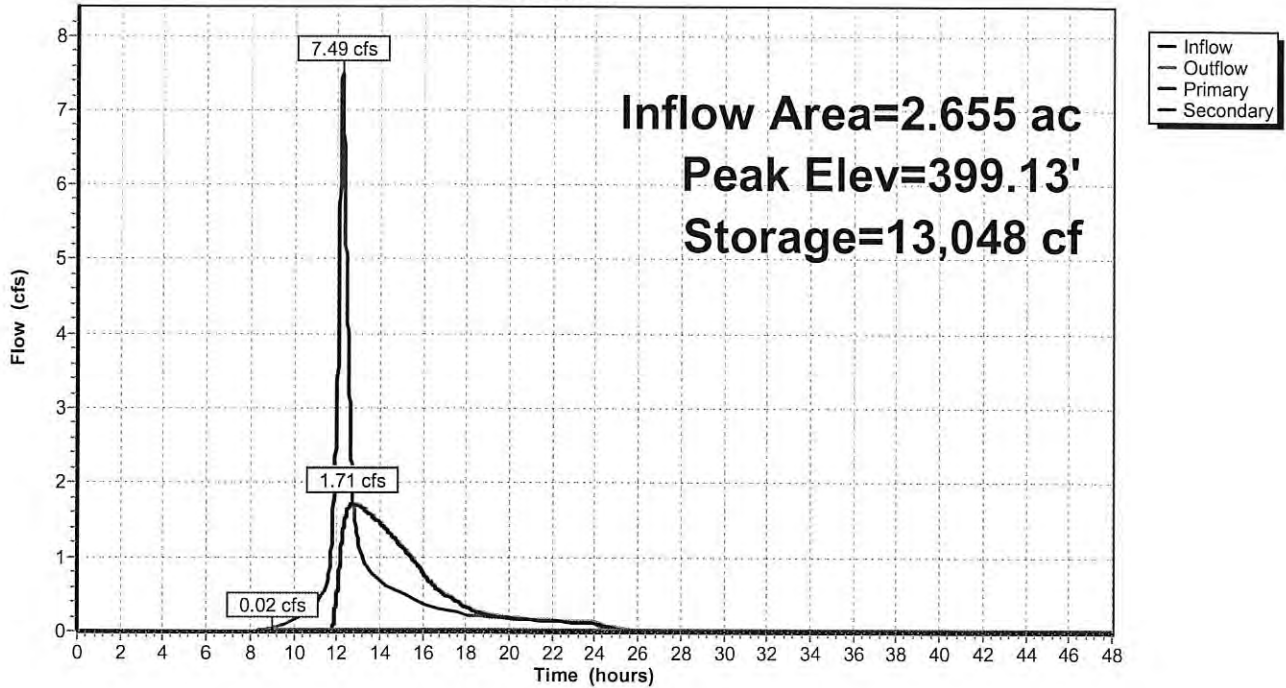
Device	Routing	Invert	Outlet Devices
#1	Secondary	395.67'	0.02 cfs Exfiltration at all elevations
#2	Primary	397.17'	6.0" Vert. Orifice/Grate C= 0.600
#3	Primary	397.68'	4.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.71 cfs @ 12.76 hrs HW=399.13' TW=0.00' (Dynamic Tailwater)
 ↳ **2=Orifice/Grate** (Orifice Controls 1.23 cfs @ 6.29 fps)
 ↳ **3=Orifice/Grate** (Orifice Controls 0.48 cfs @ 5.45 fps)

Secondary OutFlow Max=0.02 cfs @ 9.05 hrs HW=395.70' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond 1P:

Hydrograph



Summary for Pond 2P:

Inflow Area = 4.797 ac, 13.69% Impervious, Inflow Depth = 3.21" for 25-Year Storm event
 Inflow = 9.63 cfs @ 12.47 hrs, Volume= 1.282 af
 Outflow = 5.07 cfs @ 12.90 hrs, Volume= 1.221 af, Atten= 47%, Lag= 26.0 min
 Primary = 5.04 cfs @ 12.90 hrs, Volume= 1.123 af
 Secondary = 0.03 cfs @ 9.31 hrs, Volume= 0.098 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 408.00' @ 12.90 hrs Surf.Area= 9,389 sf Storage= 18,613 cf

Plug-Flow detention time= 152.2 min calculated for 1.221 af (95% of inflow)

Center-of-Mass det. time= 125.7 min (977.3 - 851.6)

Volume	Invert	Avail.Storage	Storage Description
#1	404.17'	29,326 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.17	2,136	0	0
405.67	3,168	3,978	3,978
409.00	12,056	25,348	29,326

Device	Routing	Invert	Outlet Devices
#1	Secondary	404.17'	0.03 cfs Exfiltration at all elevations
#2	Device 3	405.90'	0.5' long x 0.7' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32
#3	Primary	405.00'	15.0" x 37.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 404.00' S= 0.0270 ' /' Cc= 0.900 n= 0.013

Primary OutFlow Max=5.04 cfs @ 12.90 hrs HW=408.00' TW=0.00' (Dynamic Tailwater)

↑ **3=Culvert** (Passes 5.04 cfs of 9.11 cfs potential flow)

↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 5.04 cfs @ 4.80 fps)

Secondary OutFlow Max=0.03 cfs @ 9.31 hrs HW=404.20' TW=0.00' (Dynamic Tailwater)

↑ **1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Post 10-26-17

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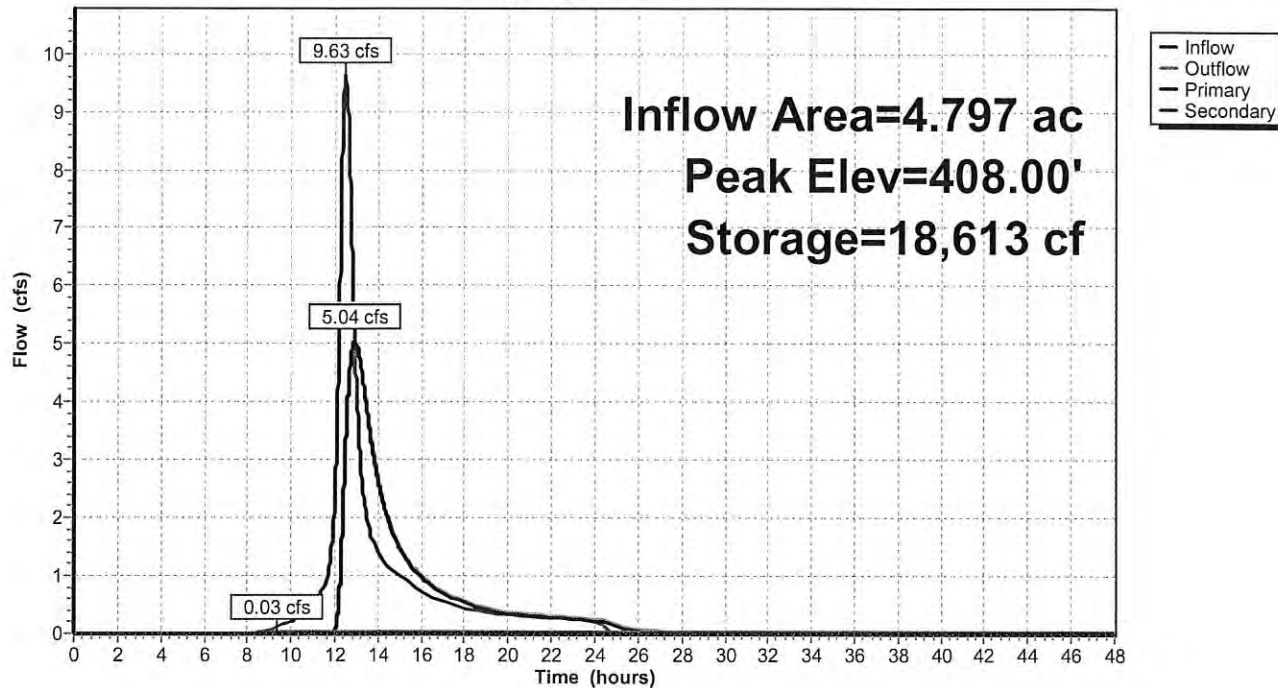
Type III 24-hr 25-Year Storm Rainfall=5.80"

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Pond 2P:

Hydrograph



ATTACHMENT C

DITCH AND STORMDRAIN



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JOB 3236.01
SHEET NO. 1 OF 1
CALCULATED BY JA DATE 10-27-17
CHECKED BY _____ DATE _____
SCALE _____

STORM DRAINAGE

DRIVEWAY CULVERT LOT 7

$$\text{TOTAL AREA} = 2.96(80^2) = 18,944 \text{ ft}^2 = 0.43 \text{ Ac}$$

$$\text{IMP} = 370(13) = 4810 \text{ ft}^2 = 0.11 \text{ Ac} \quad C = 0.9$$

$$\text{IMP} = 3000 \text{ ft}^2 (\text{HOUSE/DW}) = 0.07 \text{ Ac} \quad C = 0.9$$

$$\text{LAWN} = 6,000 \text{ ft}^2 = 0.14 \text{ Ac} \quad C = 0.2$$

$$\text{WOODS} = 5134 \text{ ft}^2 = 0.12 \text{ Ac} \quad C = 0.2$$

$$\text{ASSUME } T_c = 5 \text{ MIN} \quad i_{25} = 6.2 \text{ in/hr}$$

$$\text{COMPOSITE } C = \frac{0.18}{0.43}(0.9) + \frac{0.26}{0.43}(0.2) = 0.50$$

$$Q_{25} = 0.5(6.2)(0.43) = 1.3 \text{ cfs}$$

USE 12" CULVERT

INLET STA 24+00 RT

FROM LOT 7 DRIVEWAY CULVERT $A = 0.43 \quad C = 0.50$

$$\text{TOTAL ADDITIONAL AREA} = 5.02(80^2) = 32,128 \text{ ft}^2 = 0.74 \text{ Ac}$$

$$\text{PAVE} = 120(13) + 90(20) = 3360 \text{ ft}^2 = 0.08 \text{ Ac} \quad C = 0.9$$

$$\text{VEG} = 28,768 \text{ ft}^2 = 0.66 \text{ Ac} \quad C = 0.20$$

$$\text{COMPOSITE } C = \frac{0.43}{1.17}(0.5) + \frac{0.08}{1.17}(0.9) + \frac{0.66}{1.17}(0.20) = 0.36$$



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JOB 3236.01
SHEET NO. 2 OF
CALCULATED BY JP DATE 10-27-17
CHECKED BY DATE
SCALE

INLET STA 24+00 RT

ASSUME $T_c = 5 \text{ MIN}$ $i_{25} = 6.2 \text{ in/hr}$

$$Q_{25} = 0.36(6.2)(1.17) = 2.6 \text{ cfs}$$

USE 12" SD

INLET STA 24+00 LT USE 12" BY INSPECTION
 $A = 0.129 \text{ AC}$ $C = 0.55$

DRIVEWAY CULVERT LOT 8 USE 12" BY INSPECTION

DRIVEWAY CULVERT LOT 9

$$\text{TOTAL AREA} = 11.98(80^2) = 76,672 \text{ ft}^2 = 1.76 \text{ AC}$$

$$\text{IMP} = 3,000 + 3,000 + 250(13) = 9250 \text{ ft}^2 = 0.2 \text{ AC } C = 0.9$$

$$\text{VEL} = 67,422 \text{ ft}^2 = 1.55 \text{ AC } C = 0.2$$

$$\text{COMPOSITE } C = \frac{0.2}{1.76}(0.9) + \frac{1.55}{1.76}(0.2) = 0.28$$

$$\text{FROM HYDROCAD } T_c = 30 \text{ MIN } Q_{25} = 0.28(3)1.76 = 1.5 \text{ cfs}$$

$$i_{25} = 3 \text{ in/hr}$$

USE 12" CULVERT



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JOB 3236.01
SHEET NO. 3 OF 3
CALCULATED BY JA DATE 10-27-17
CHECKED BY _____ DATE _____
SCALE _____

LOT 10 DRIVEWAY CULVERT

FROM LOT 9 DRIVEWAY CULVERT $A = 1.76 A_c$ $C = 0.28$

$$\text{TOTAL ADDITIONAL AREA} = 12.65(80^2) = 80,960 \text{ ft}^2 \\ \text{TO INLET @ 15100 RT} \\ = 1.86 A_c$$

$$\text{IMP} = 3000 \text{ ft}^2 + 150(13) = 4950 \text{ ft}^2 \quad 0.11 A_c \quad C = 0.9$$

$$\text{VEG} = 76,010 \text{ ft}^2 = 1.74 A_c \quad C = 0.2$$

$$\text{COMPOSITE } C = \frac{1.76}{3.92} (0.28) + \frac{0.11}{3.92} (0.9) + \frac{1.74}{3.92} (0.2)$$

$$C = 0.24$$

$$Q_{25} = 0.24(3)(3.92) = 2.82 \text{ cfs}$$

USE 15" CULVERT

CB 1

$$\text{IMP} = 190(15) = 2850 \text{ ft}^2 \quad C = 0.9 \quad T_c = 5 \text{ MIN}$$

$$Q_{25} = 0.9(6.2) 0.06 = 0.33 \text{ cfs}$$

$$\text{CB 2} \quad 220(13) = 2860 \text{ ft}^2 \quad C = 0.9 \quad T_c = 5 \text{ MIN}$$

$$Q_{25} = 0.9(6.2) 0.07 = 0.39 \text{ cfs}$$

LOT 1 DRIVEWAY CULVERT = 12" BY INSPECTION



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JOB 3236.01
SHEET NO. 4 OF
CALCULATED BY JP DATE 10-27-17
CHECKED BY DATE
SCALE

ROADSIDE DITCH FLOW

ASSUMING WORST CASE AT STA 16+00 RT +

$$Q_{15} = 2.8 \text{ cfs}$$

PERMISSIBLE VEGETATED VELOCITY
WOOD BRIDGE SOIL = 3 ft/s

$$V = 2.8 \text{ ft/s}$$

USE VEGETATED LINING

DITCH TO GRASSED UNDERDRAINED SOIL
FILTER ADJACENT TO LOT 3

RIP RAP SLOPE $D_{50} = 6''$

DITCH TO GRASSED UNDERDRAINED SOIL FILTER
ADJACENT TO LOT 1

LOW FLOW FROM LEFT SIDE ROADSIDE DITCH

USE VEGETATED LINING

MAINE EROSION AND SEDIMENT CONTROL BMPs – 10/2016

SOIL NAME	K factor	SURFACE WATER PERMISSIBLE VELOCITY		WATERTABLE			DEPTH TO BEDROCK	HYDRIC SOIL	
	(10"-20")	BARE ft/sec	VEGETATED ft/sec.	INFLOW RATE cfs/1000 ft.	Kind	Depth in ft	Duration		inches
Hydrologic Group C									
Becket	0.17	1.5	3	0.1	Perched	2.0-3.5	Mar-Apr	>60	N
Chesuncook*	0.24/0.32	1.5	3	0.1	Perched	1.5-3.0	Mar-May	>60	N
Conant	0.24	2	3.5	0.15	Apparent	1.0-2.5	Nov-May	>60	N
Dixfield*	0.20	2	3.5	0.1	Perched	1.5-2.5	Nov-Apr	>60	N
Elliottsville	0.24	1.5	3	----	----	----	----	20-40	N
Howland*	0.24	2	3.5	0.1	Perched	1.5-2.5	Oct-May	>60	N
Linneus	0.28	1.5	3	----	----	----	----	20-40	N
Mapleton	0.20	2	3.5	----	----	----	----	10-20	N
Marlow	0.24/0.32/0.20	2	4	0.1	Perched	2.0-3.5	Mar-Apr	>60	N
Melrose	0.32/0.49	2	4	0.1	----	>6	----	>60	N
Paxton	0.24/0.32/0.20	2	4	0.1	Perched	2.0-3.5	Mar-Apr	>60	N
Penquis	0.32	1.5	3	----	----	----	----	20-40	N
Perham*	0.24/0.32/0.37	1.5	3	0.1	Perched	1.5-2.5	Mar-May	>60	N
Peru*	0.24/0.32/0.37	1.5	3	0.1	Perched	1.5-2.5	Nov-May	>60	N
Plaisted	0.24	2	3.5	0.1	Perched	2.0-3.5	Nov-May	>60	N
Ragmuff*	----	----	----	----	----	----	----	----	----
Rawsonville	----	----	----	----	----	----	----	----	----
Sisk	0.28/0.32	----	----	----	----	>6	----	>60	N
Skerry**	0.20/0.28/0.17	1.5	3	0.1	Perched	1.5-2.5	Nov-May	>60	N
Suffield	0.32/0.49	1.5	3.5	0.05	Perched	1.5-3.0	Nov-May	>60	N
Surplus*	0.28/0.32	----	----	----	Perched	1.0-2.0	Oct-May	>60	N
Tunbridge	0.24/0.20	2	3.5	----	----	----	----	20-40	N
Winnecook	0.28	1.5	3	1	----	----	----	20-40	N
Hydrologic Group C/D									
Boothbay #	0.32/0.49	1.5	3	0.05	Apparent	1.0-2.0	Nov-May	>60	N
Buxton #	0.32/0.49	1.5	3.5	0.05	Perched	1.5-3.0	Nov-May	>60	N
Chesuncook**	0.24/0.32	1.5	3	0.1	Perched	1.5-3.0	Mar-May	>60	N
Dixfield**	0.20	2	3.5	0.1	Perched	1.5-2.5	Nov-Apr	>60	N
Dixmont	0.28	1.5	3	0.15	Perched	1.0-2.0	Nov-Jun	>60	N
Easton	0.24/0.37	1.5	3	0.1	Apparent	0-1.5	Oct-May	>60	Y/N
Howland**	0.24	2	3.5	0.1	Perched	1.5-2.5	Oct-May	>60	N
Lamoine	0.32/0.49	1.5	3	0.05	Perched	0.5-2.0	Nov-Jun	>60	N
Leicester	0.32	1.5	3	0.1	Perched	0-1.0	Nov-Jun	>60	Y
Perham**	0.24/0.32/0.37	1.5	3	0.1	Perched	1.5-2.5	Mar-May	>60	N
Peru**	0.24/0.32/0.37	1.5	3	0.1	Perched	1.5-2.5	Nov-May	>60	N
Pushaw	----	----	----	----	----	----	----	----	----
Ragmuff**	----	----	----	----	----	----	----	----	----
Skerry*	0.20/0.28/0.17	1.5	3	0.1	Perched	1.5-2.5	Nov-May	>60	N
Surplus**	0.28/0.32	----	----	----	Perched	1.0-2.0	Oct-May	>60	N
Washburn	0.24/0.37	2	3.5	0.1	Apparent	+1-0.5	Oct-Jul	>60	Y
Woodbridge	0.24/0.32/0.37	1.5	3	0.1	Perched	1.5-2.5	Nov-May	>60	N

TRAPAZOIDAL DITCH SIZING
Gorrill Palmer

JOB DATA

Project: 3236.01
Calc. by: JWA
Date: 10/26/2017
Ditch at:

EQUATIONS:

Manning's Equation, $V = (1.49/n)R^{2/3}S^{1/2}$
 $Q = VA$
Froude number, $F = V/(gd)^{1/2}$

INPUT:

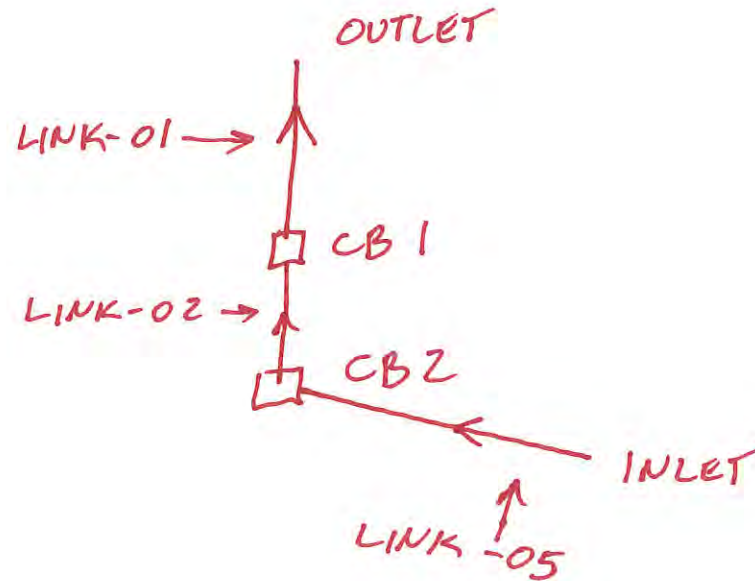
Base width (b) = 1.0 ft
Sideslope (z) = 3 on 1
Sideslope (z) = 3 on 1
Depth of flow (d) = 0.44 ft
Manning's n = 0.030 (grass)
Slope of ditch (s) = 0.0180 ft/ft

OUTPUT:

Wet Perimeter (P) = 3.78 ft
Area of Flow (A) = 1.02 sq. ft.
Hydr. Radius (R) = 0.27 ft
Velocity of Flow (V) = 2.8 fps
Flow Capacity (Q) = 2.8 cfs
Froude Number (F) = 0.74 < 1, subcritical flow



SN	Element Description ID	From (Inlet Node)	To (Outlet Node)	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Slope	Pipe Shape	Pipe Diameter or Height
				(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(inches)
1	Link-01	Inlet-01	Out-01	77.00	406.82	0.00	405.00	0.00	1.82	2.3600	CIRCULAR	15.000
2	Link-02	Inlet-02	Inlet-01	22.00	407.20	-0.10	406.92	0.10	0.28	1.2700	CIRCULAR	15.000
3	Link-05	64	Inlet-02	48.00	410.00	0.00	407.30	0.00	2.70	5.6200	CIRCULAR	15.000



Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate	Lengthening Factor	Peak Flow	Time of Peak Flow Occurrence	Max Flow Velocity	Travel Time	Design Flow Capacity
(inches)					(cfs)			(cfs)	(days hh:mm)	(ft/sec)	(min)	(cfs)
15.00	0.0150	0.5000	0.5000	0.0000	0.00	NO	1.00	2.77	0 00:30	5.85	0.22	8.61
15.00	0.0150	0.5000	0.5000	0.0000	0.00	NO	1.00	2.77	0 00:30	4.77	0.08	7.36
15.00	0.0150	0.5000	0.8000	0.0000	0.00	NO	1.00	2.77	0 00:30	5.51	0.15	13.28

Max Flow / Design Flow Ratio	Max Flow Depth / Total Depth Ratio	Total Time Surcharged (min)	Max Flow Depth (ft)	Reported Condition
0.32	0.41	0.00	0.51	Calculated
0.38	0.48	0.00	0.60	Calculated
0.21	0.43	0.00	0.54	Calculated

SN	Element ID	X Coordinate	Y Coordinate	Description	Invert Elevation	Boundary Type	Flap Gate	Fixed Water Elevation	Peak Inflow
					(ft)			(ft)	(cfs)
1	Out-01	2205.88	8431.37		405.00	NORMAL	NO		2.77

Peak Lateral Inflow	Maximum HGL Depth Attained	Maximum HGL Elevation Attained
(cfs)	(ft)	(ft)
0.00	0.49	405.49

SN	Element ID	X Coordinate	Y Coordinate	Description	Inlet Manufacturer	Manufacturer Part Number
1	Inlet-01	2205.88	7647.06		FHWA HEC-22 GENERIC	N/A
2	Inlet-02	2215.69	7088.24		FHWA HEC-22 GENERIC	N/A

Inlet Location	Number of Inlets	Catchbasin Invert Elevation	Max (Rim) Elevation	Max (Rim) Offset	Initial Water Elevation	Initial Water Depth	Ponded Area	Grate Clogging Factor	Roadway Longitudinal Slope
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft²)	(%)	(ft/ft)
On Sag	1	406.82	412.51	5.69	0.00	0.00	10.00	0.00	N/A
On Sag	1	407.30	412.55	5.25	0.00	0.00	10.00	0.00	N/A

Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (inches)	Median Ditch Longitudinal Slope (ft/ft)	Median Ditch Bottom Width (ft)	Median Ditch Left Side Slope (V:H)	Median Ditch Right Side Slope (V:H)
0.0200	0.0160	0.0620	2.00	2.0000	45.0000	45.0000	64	64
0.0200	0.0160	0.0620	2.00	2.0000	45.0000	45.0000	64	64

Median Ditch Manning's Roughness	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
45.0000	0.33	0.33	N/A	N/A	N/A	7.00	0.43	412.60
45.0000	0.39	0.39	N/A	N/A	N/A	7.00	0.51	412.66

Max Gutter Water Depth during Peak Flow (ft)	Time of Maximum Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-inches)	Total Time Flooded (minutes)
0.09	0 00:30	0.00	0.00
0.11	0 00:30	0.00	0.00

SN	Element ID	X Coordinate	Y Coordinate	Description	Invert Elevation	Ground/Rim (Max) Elevation	Ground/Rim (Max) Offset	Initial Water Elevation
					(ft)	(ft)	(ft)	(ft)
1	64	3705.88	6843.14		410.00	413.00	3.00	0.00

Initial Water Depth	Surcharge Elevation	Surcharge Depth	Ponded Area	Minimum Pipe Cover	Peak Inflow	Peak Lateral Inflow	Maximum HGL Elevation Attained	Maximum HGL Depth Attained	Maximum Surcharge Depth Attained
(ft)	(ft)	(ft)	(ft ²)	(inches)	(cfs)	(cfs)	(ft)	(ft)	(ft)
-410.00	0.00	-413.00	0.00	21.00	2.78	2.78	410.41	0.41	0.00

Minimum Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Maximum HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-inches)	Total Time Flooded (minutes)
2.59	410.04	0.04	0 00:30	0 00:00	0.00	0.00

SN	Element Description ID	Area	Drainage Node ID	Weighted Runoff Coefficient	Accumulated Precipitation	Total Runoff	Peak Runoff	Rainfall Intensity
		(acres)			(inches)	(inches)	(cfs)	(inches/hr)
1	Sub-01	3.92	64	0.2400	1.48	0.35	2.78	2.950
2	Sub-03	0.06	Inlet-01	0.9000	0.52	0.47	0.34	6.200
3	Sub-04	0.07	Inlet-02	0.9000	0.52	0.47	0.39	6.200

**Time
of
Concentration**

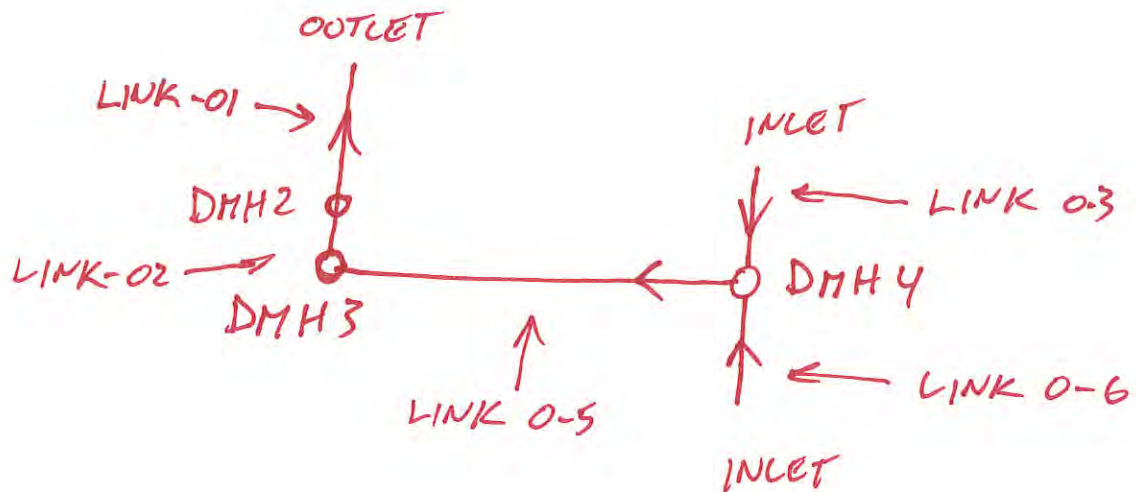
(days hh:mm:ss)

0 00:30:00

0 00:05:00

0 00:05:00

SN	Element Description ID	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)
1	Link-01	64	Out-01	55.00	407.40	0.00	407.00	0.00	0.40
2	Link-02	64	64	23.00	408.15	0.00	407.50	0.10	0.65
3	Link-03	Inlet-01	64	11.00	413.00	0.00	410.78	0.10	2.22
4	Link-05	64	64	255.00	410.68	0.00	408.25	0.10	2.43
5	Link-06	64	64	29.00	413.00	0.00	410.78	0.10	2.22



Average Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
(%)		(inches)	(inches)					(cfs)	
0.7300	CIRCULAR	15.000	15.00	0.0150	0.5000	0.5000	0.0000	0.00	NO
2.8300	CIRCULAR	12.000	12.00	0.0150	0.5000	0.5000	0.0000	0.00	NO
20.1800	CIRCULAR	12.000	12.00	0.0150	0.5000	0.8000	0.0000	0.00	NO
0.9500	CIRCULAR	12.000	12.00	0.0150	0.5000	0.8000	0.0000	0.00	NO
7.6600	CIRCULAR	12.000	12.00	0.0150	0.5000	0.8000	0.0000	0.00	NO

Lengthening Factor	Peak Flow	Time of Peak Flow Occurrence	Max Flow Velocity	Travel Time	Design Flow Capacity	Max Flow / Design Flow Ratio	Max Flow Depth / Total Depth Ratio	Total Time Surcharged
	(cfs)	(days hh:mm)	(ft/sec)	(min)	(cfs)			(min)
1.00	2.98	0 00:06	3.72	0.25	4.77	0.62	0.62	0.00
1.00	2.98	0 00:06	4.84	0.08	5.19	0.57	0.73	0.00
1.00	0.99	0 00:05	6.24	0.03	13.87	0.07	0.51	0.00
1.00	2.98	0 00:06	4.28	0.99	3.01	0.99	0.85	0.00
1.00	2.60	0 00:05	6.60	0.07	8.54	0.30	0.62	0.00

Max Flow Depth	Reported Condition
----------------------	-----------------------

(ft)

0.78	Calculated
0.73	Calculated
0.51	Calculated
0.85	Calculated
0.62	Calculated

SN	Element ID	X Coordinate	Y Coordinate	Description	Invert Elevation	Boundary Type	Flap Gate	Fixed Water Elevation	Peak Inflow
					(ft)			(ft)	(cfs)
1	Out-01	1627.45	7509.80		407.00	NORMAL	NO		2.98

Peak Lateral Inflow	Maximum HGL Depth Attained	Maximum HGL Elevation Attained
(cfs)	(ft)	(ft)
0.00	0.72	407.72

SN	Element ID	X Coordinate	Y Coordinate	Description	Invert Elevation	Ground/Rim (Max) Elevation	Ground/Rim (Max) Offset	Initial Water Elevation
					(ft)	(ft)	(ft)	(ft)
1	Inlet-01	3627.45	6568.63		413.00	416.00	3.00	0.00
2	64	1617.65	6735.29	DMH2	407.40	412.00	4.60	0.00
3	64	1616.81	6420.22	DMH3	408.15	418.00	9.85	0.00
4	64	3626.98	6312.68	DMH4	410.68	415.78	5.10	0.00
5	64	3631.12	6047.97		413.00	416.00	3.00	0.00

Initial Water Depth	Surcharge Elevation	Surcharge Depth	Ponded Area	Minimum Pipe Cover	Peak Inflow	Peak Lateral Inflow	Maximum HGL Elevation Attained	Maximum HGL Depth Attained	Maximum Surcharge Depth Attained
(ft)	(ft)	(ft)	(ft ²)	(inches)	(cfs)	(cfs)	(ft)	(ft)	(ft)
-413.00	0.00	-416.00	10.00	24.00	0.99	0.99	413.18	0.18	0.00
-407.40	0.00	-412.00	0.00	40.20	2.98	0.00	408.24	0.84	0.00
-408.15	0.00	-418.00	0.00	105.00	2.98	0.00	408.88	0.73	0.00
-410.68	0.00	-415.78	0.00	48.00	3.59	0.00	411.64	0.96	0.00
-413.00	0.00	-416.00	0.00	24.00	2.61	2.61	413.43	0.43	0.00

Minimum Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Maximum HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-inches)	(minutes)
2.82	413.01	0.01	0 00:05	0 00:00	0.00	0.00
3.76	407.42	0.02	0 00:06	0 00:00	0.00	0.00
9.12	408.17	0.02	0 00:06	0 00:00	0.00	0.00
4.14	410.71	0.03	0 00:06	0 00:00	0.00	0.00
2.57	413.01	0.01	0 00:05	0 00:00	0.00	0.00

SN	Element Description ID	Area	Drainage Node ID	Weighted Runoff Coefficient	Accumulated Precipitation	Total Runoff	Peak Runoff	Rainfall Intensity
		(acres)			(inches)	(inches)	(cfs)	(inches/hr)
1	Sub-01	0.29	Inlet-01	0.5500	0.52	0.28	0.99	6.200
2	Sub-02	1.17	64	0.3600	0.52	0.19	2.61	6.200

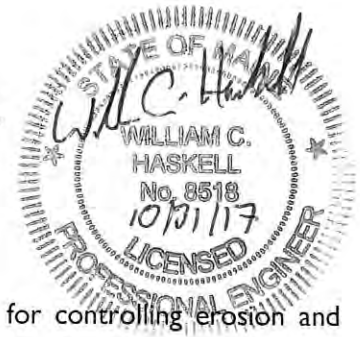
**Time
of
Concentration**

(days hh:mm:ss)

0 00:05:00

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EROSION AND SEDIMENTATION CONTROL BASIC STANDARDS



1.1 Overview

This Exhibit demonstrates the developer has made adequate provision for controlling erosion and sedimentation.

1.2 Introduction

Gorrill Palmer has been retained by TZ Properties, LLC to prepare an Erosion and Sedimentation Control Report for a proposed 10 lot residential subdivision off Orchard Road in Cumberland, Maine. TZ Properties, LLC proposes the construction of the roadway, stormwater management facilities, and electric service to the transformer location. House lot construction will be by the individual lot owners. Figure 1 is a map showing the project location. The developer is currently seeking a Subdivision Permit from the Town of Cumberland and a Stormwater Permit from MDEP. Gorrill Palmer has prepared an Erosion and Sedimentation Control Plan for the proposed development. This narrative contains the general erosion and sedimentation control measures, which are appropriate for the construction of the project.

1.3 Narrative

1.3.1 Existing Conditions and Soil Types

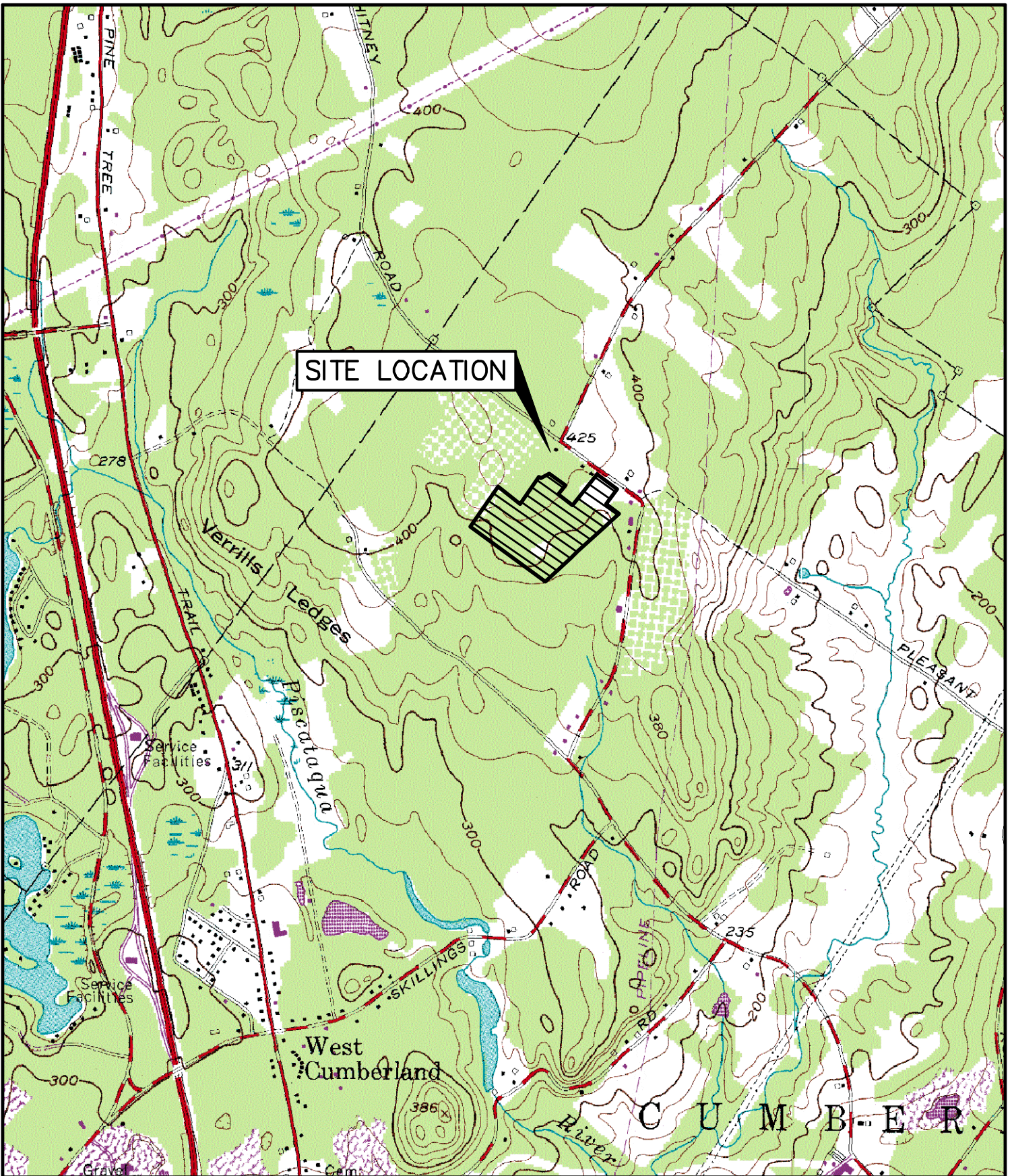
The development parcel is approximately 24.9 acres in size and is located off Orchard Road in Cumberland, Maine. The site is currently undeveloped and forested. Abutting land uses include:

- North – Residential
- East – Residential
- South – Residential/Undeveloped
- West – Residential/Apple Orchard

Topography in the area of the proposed construction is moderately steep with slopes of approximately 5% to 17%.

The Medium Intensity Soil Survey for Cumberland County as prepared by the Natural Resources Conservation Service was utilized in identifying the on-site soils. The soil report for this vicinity follows this page. The susceptibility of soils to erosion is indicated on a relative "K" scale of values over a range of 0.02 to 0.69. The higher values are indicative of the more erodible soils. The following table lists the soils found on site and their K values:

K VALUE		
Type	Subsurface	Substratum
Hollis	0.32	-
Paxton	0.32	0.20
Ridgebury	0.24	0.24
Woodbridge	0.32	0.24



U.S.G.S. Location Map
 Subdivision Feasibility, Orchard Road, Cumberland, Maine
 U.S.G.S. Cumberland Center, State-7.5 Minute Series (Topographic)

Design: WCH	Date: OCT 2017
Draft: LAN	Job No.: 3236.01
Checked: WCH	Scale: None
File Name: 3236-LOCMAP.dwg	

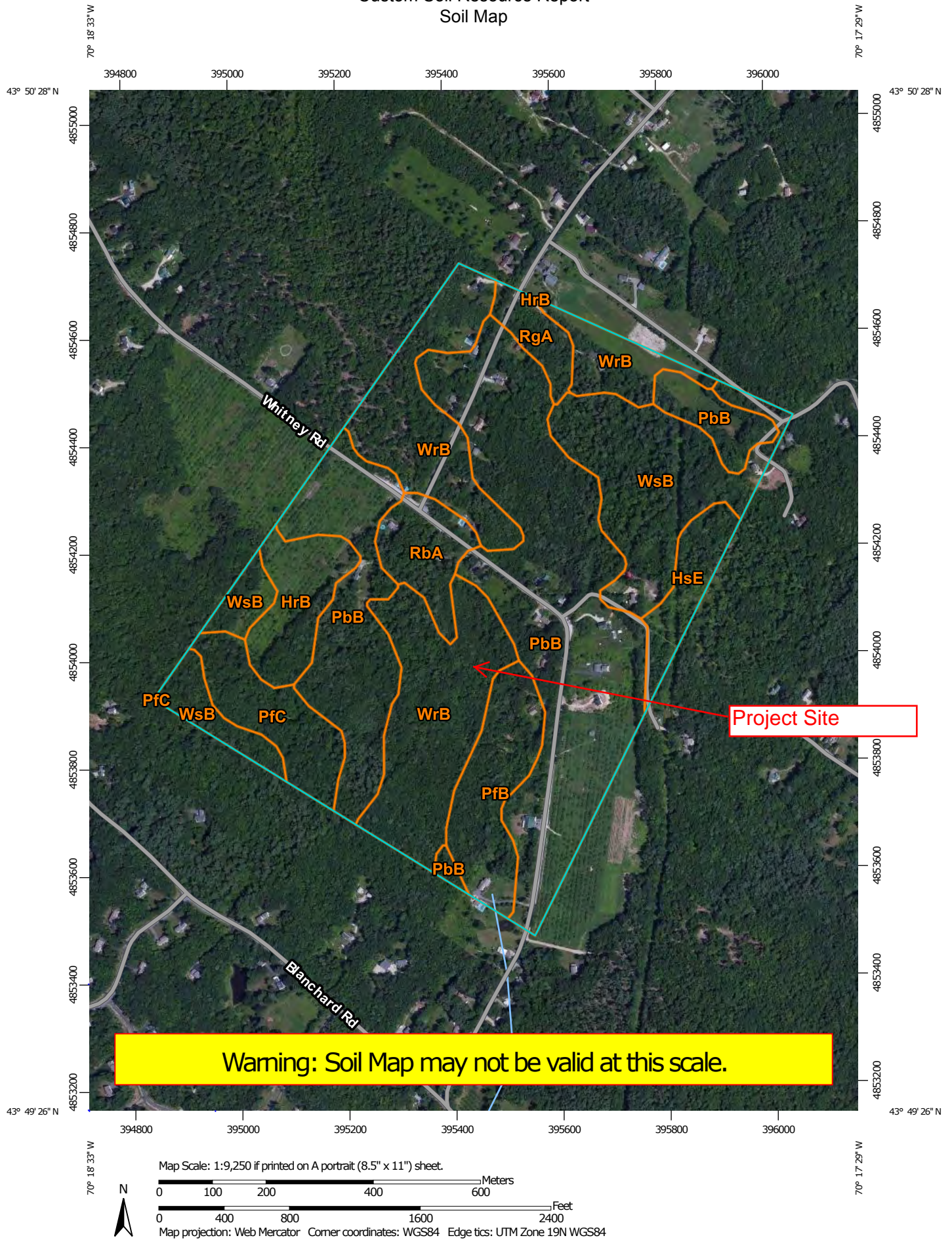


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Figure

1

Custom Soil Resource Report Soil Map



Custom Soil Resource Report


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout


 Borrow Pit


 Clay Spot


 Closed Depression

 Gravel Pit

 Gravelly Spot


 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip


 Sodic Spot

 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals


Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 12, Sep 15, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 20, 2010—Jul 18, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Cumberland County and Part of Oxford County, Maine (ME005)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HrB	Hollis fine sandy loam, 3 to 8 percent slopes	8.8	4.5%
HsE	Hollis very rocky fine sandy loam, 20 to 35 percent slopes	6.0	3.1%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	76.5	39.3%
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	11.9	6.1%
PfC	Paxton very stony fine sandy loam, 8 to 15 percent slopes	9.5	4.9%
RbA	Ridgebury fine sandy loam, 0 to 3 percent slopes	7.1	3.6%
RgA	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	3.9	2.0%
WrB	Woodbridge fine sandy loam, 0 to 8 percent slopes	42.9	22.0%
WsB	Woodbridge very stony fine sandy loam, 0 to 8 percent slopes	28.2	14.5%
Totals for Area of Interest		194.7	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different

Based on a review of the K Values, the on-site soils have moderate susceptibility to erosion.

I.3.2 Existing Erosion Problems

Gorrill Palmer is not aware of any existing erosion problems on site.

I.3.3 Critical Areas

Critical areas that would require special attention during construction would be side slopes adjacent to any wetlands or streams.

I.3.4 Protected Natural Resources

Wetlands on-site have been delineated and GPS located by TRC of Scarborough, Maine, and are shown on project plans. The total area of wetlands located on the site is approximately 88,453 +/- s.f. (2.03 acres). It is anticipated that approximately 3,802 s.f. of wetlands will be impacted during development of the site. Based upon the FEMA maps, the site is not located within a Zone A 100-year floodplain.

I.3.5 Erosion Control Measures and Site Stabilization

The primary emphasis of the erosion/sedimentation control plan, which will be implemented for this project, is as follows:

- ◆ Development of a careful construction sequence.
- ◆ Rapid revegetation of denuded areas to minimize the period of soil exposure.
- ◆ Rapid stabilization of drainage paths to avoid rill and gully erosion.
- ◆ The use of on-site measures to capture sediment (hay bales/ stone check dams/silt fence, etc.)

The following temporary and permanent erosion and sediment control devices will be implemented as part of the site development. These devices shall be installed as indicated on the plans or as described within this report. For further reference, see the latest edition of the Maine Erosion and Sediment Control Practices Field Guide for Contractors.

A. Dewatering

Water from construction trench dewatering shall pass first through a filter bag or secondary containment structure (e.g. hay bale lined pool) prior to discharge. The discharge site shall be selected to avoid flooding, icing, and sediment discharges to a protected resource. In no case shall the filter bag or containment structure be located within 50 feet of a protected natural resource.

B. Inspection and Monitoring

Maintenance measures shall be applied as needed during the entire construction season. After each rainfall, snow storm or period of thawing and runoff, the site contractor shall perform a visual inspection of all installed erosion control measures and perform repairs as needed to insure their continuous function. Following the temporary and/or final seeding and mulching, the contractor shall in the spring inspect and repair any damages and/or unestablished spots. Established vegetative cover means a minimum of 90% of areas vegetated with vigorous growth.

The following standards must be met during construction.

(a) **Inspection and corrective action.** Inspect disturbed and impervious areas, erosion control measures, materials storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. Inspect these areas at least once a week as well as before and within 24 hours after a storm event (rainfall), and prior to completing permanent stabilization measures. A person with knowledge of erosion and stormwater control, including the standards and conditions in the permit, shall conduct the inspections.

(b) **Maintenance.** If best management practices (BMPs) need to be repaired, the repair work should be initiated upon discovery of the problem but no later than the end of the next workday. If additional BMPs or significant repair of BMPs are necessary, implementation must be completed within 7 calendar days and prior to any storm event (rainfall). All measures must be maintained in effective operating condition until areas are permanently stabilized.

(c) **Documentation.** Keep a log (report) summarizing the inspections and any corrective action taken. The log must include the name(s) and qualifications of the person making the inspections, the date(s) of the inspections, and major observations about the operation and maintenance of erosion and sedimentation controls, materials storage areas, and vehicles access points to the parcel. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken.

The log must be made accessible to MDEP and Town of Cumberland staff and a copy must be provided upon request. The permittee shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

C. Temporary Erosion Control Measures

The following measures are planned as temporary erosion/sedimentation control measures during construction:

1. Crushed stone-stabilized construction entrance shall be placed at the entrance from Orchard Road.
2. Siltation fence or wood waste compost berms shall be installed downstream of any disturbed areas to trap runoff-borne sediments until grass areas are revegetated. The silt

fence and/or wood waste compost berms shall be installed per the details provided in this package and inspected at least once a week and before and immediately after a storm event of 0.5 inches or greater, and at least daily during prolonged rainfall. Repairs shall be made if there are any signs of erosion or sedimentation below the fence or berm line. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water behind the fence or berm, the barrier shall be replaced with a stone check dam. Wood waste compost berms are not to be used adjacent to wetland areas that are not to be disturbed.

3. Straw or hay mulch including hydroseeding is intended to provide cover for denuded or seeded areas until revegetation is established. Mulch placed between April 15th and October 15th on slopes of less than 15 percent shall be anchored by applying water; mulch placed on slopes of equal to or steeper than 15 percent shall be covered by a fabric netting and anchored with staples in accordance with manufacturer's recommendation. Fabric netting and staples shall be used on disturbed areas within 50' of lakes, streams, and wetlands regardless of the upstream slope. Mulch placed between October 15th and April 15th on slopes equal to or steeper than 8 percent shall be covered with a fabric netting and anchored with staples in accordance with the manufacturer's recommendations. Slopes steeper than 3:1 and equal to or flatter than 2:1, which are to be revegetated, shall receive curlex blankets by American Excelsior or equal. Slopes steeper than 2:1 shall receive riprap as noted on the plans. The mulch application rate for both temporary and permanent seeding is 75 lbs per 1000 sf as identified in Attachment A of this section. Mulch shall not be placed over snow.

4. Temporary stockpiles of stumps, grubblings, or common excavation will be protected as follows:

- a) Temporary stockpiles shall not be located within 100 feet of any wetlands which will not be disturbed and shall be located away from drainage swales.
- b) Stockpiles shall be stabilized within 7 days by either temporarily seeding the stockpile by a hydroseed method containing an emulsified mulch tackifier or by covering the stockpile with mulch, such as hay, straw, or erosion control mix.
- c) Stockpiles shall be surrounded by sedimentation barrier at the time of formation.

5. All denuded areas that are within 100 feet of an undisturbed wetland, which have been rough graded and are not located within a building pad, parking area, or access drive subbase area, shall receive mulch or erosion control mesh fabric within 48 hours of initial disturbance of soil. All areas within 100 feet of an undisturbed wetland shall be mulched prior to any predicted rain event regardless of the 48 hour window. In other areas, the time period may be extended to 7 days.

6. For work, which is conducted between October 15th and April 15th of any calendar year, all denuded areas, shall be covered with hay mulch or erosion control mix, applied at twice the normal application rate and anchored with a fabric netting. The time period for applying mulch shall be limited to 2 days for all areas.

7. Orchard Road shall be swept to control mud and dust as necessary. Additional stone shall be added to the stabilized construction entrance to minimize the tracking of material off the site and onto the surrounding roadways.
8. During grubbing operations stone check dams shall be installed at any evident concentrated flow discharge points and as directed on the Erosion Control Plans.
9. Silt fencing with a minimum stake spacing of 6 feet shall be used, unless the fence is supported by wire fence reinforcement of minimum 14 gauge and with a maximum mesh spacing of 6 inches, in which case stakes may be spaced a maximum of 10 feet apart. The bottom of the fence shall be anchored. A double row of silt fence shall be used adjacent to wetlands.
10. Wood waste compost/bark berms may be used in lieu of siltation fencing. Berms shall be removed and spread in a layer not to exceed 3" thick once upstream areas are completed and a 90% catch of vegetation is attained.
11. Storm drain catch basin inlet protection shall be provided through the use of stone sediment barriers or approved sediment bags (such as Silt Sack). Installation details are provided in the plan set. The barriers shall be inspected after each rainfall and repairs made as necessary. Sediment shall be removed and the barrier restored to its original dimensions when the sediment has accumulated to 1/2 the design depth of the barrier. The barrier shall be removed when the tributary drainage area has been stabilized.
12. Water and/or calcium chloride shall be furnished and applied in accordance with MDOT specifications – Section 637 – Dust Control.
13. Loam and seed is intended to serve, as the primary permanent revegetative measure for all denuded areas not provided with other erosion control measures, such as riprap. Application rates are provided in Attachment A of this section. Seeding shall not occur over snow.

D. Permanent Erosion Control Measures

The following permanent erosion control measures have been designed as part of the Erosion/Sedimentation Control Plan:

1. All areas disturbed during construction, but not subject to other restoration (paving, riprap, etc.) will be loamed, limed, fertilized, mulched, and seeded. Fabric netting, anchored with staples, shall be placed over the mulch in areas as noted in **Temporary Erosion Control Measures** paragraph 3 of this report. All areas within 100 feet of an undisturbed wetland shall be mulched prior to any predicted rain event regardless of the 48 hour window. Native topsoil shall be stockpiled and reused for final restoration when it is of sufficient quality.
2. All storm drain pipe outlets shall have riprap aprons at their outlet to protect the outlet and receiving channel from scour and deterioration. Installation details are provided in the plan set. The aprons shall be installed and stabilized to the extent practicable prior to directing runoff to the tributary pipe or culvert.

3. Catch basins shall be provided with sediment sumps and inlet hoods (the Snout) for all outlet pipes that are 18" in diameter or less.

I.4 Implementation Schedule

The following construction sequence shall be required to insure the effectiveness of the erosion and sedimentation control measures are optimized:

It is anticipated that construction of the Subdivision roadway and related infrastructure will commence in Spring of 2018 and be completed by Winter of 2018.

Note: For all grading activities, the contractor shall exercise extreme caution not to overexpose the site, this shall be accomplished by limiting the disturbed area.

1. Install stabilized construction entrance at the intersection of the proposed roadway and Orchard Road.
2. Install perimeter silt fence and/or wood waste berms prior to grubbing respective areas.
3. Clear and grub roadway and stormwater management areas using caution not to overexpose the site. Install stone check dams at any evident concentrated flow discharge points.
4. Commence earthwork and grading to subgrade.
5. Commence installation of drainage appurtenances.
6. Commence construction grassed underdrained soil filter.
7. Commence installation of electric/cable/telephone lines.
8. Complete remaining earthwork operations.
9. Complete installation of catch basins and appurtenances.
10. Install sub-base and base gravel within roadway.
11. Install curbing along the streets as needed.
12. Install base course paving for roadway.
13. Loam, lime, fertilize, seed and mulch disturbed areas.
14. Install surface course paving for roadway. Stripe per plan.
15. Once the site is stabilized and a 90% catch of vegetation has been obtained, remove all temporary erosion control measures.
16. Touch up loam and seed.

Note: All denuded areas not subject to final paving, riprap, or gravel shall be revegetated.

Prior to construction of the project, the contractor shall submit to the owner a schedule for the completion of the work, which will satisfy the following criteria:

1. The above construction sequence should generally be completed in the specified order; however, several separate items may be constructed simultaneously. Work must also be scheduled or phased to reduce the extent of the exposed areas as specified below. The intent of this sequence is to provide for erosion control and to have structural measures such as silt fence and construction entrances in place before large areas of land are denuded.
2. The work shall be conducted in sections which shall:
 - a) Limit the amount of exposed area to those areas in which work is expected to be undertaken during the proceeding 30 days.
 - b) Revegetate disturbed areas as rapidly as possible. All areas shall be permanently stabilized within 7 days of final grading or before a storm event; or temporarily stabilized within 48 hours of initial disturbance of soil for areas within 100 feet of an undisturbed wetland and 7 days for all other areas. Areas within 100 feet of an undisturbed wetland shall be mulched prior to any predicted rain event regardless of the 48 hour window.
 - c) Incorporate planned inlets and drainage system as early as possible into the construction phase. The ditches shall be immediately lined or revegetated as soon as their installation is complete.

1.5 Erosion, Sedimentation and Stabilization Control Plan

The Erosion Control Plan is included in the plan set.

1.6 Details and Specifications

The Erosion Control details and specifications are included in the plan set.

1.7 Winter Stabilization Plan

The winter construction period is from November 1 through April 15. If the construction site is not stabilized with pavement, a road gravel base, 75% mature vegetation cover or riprap by November 15 then the site needs to be protected with over-winter stabilization. An area considered open is any area not stabilized with pavement; vegetation, mulching, erosion control mats, riprap or gravel base on a road.

Winter excavation and earthwork shall be completed such that any area left exposed can be controlled by the contractor. Limit the exposed area to those areas in which work is expected to be under taken during the proceeding 15 days and that can be mulched in one day prior to any snow event.

All areas shall be considered to be denuded until the subbase gravel is installed in roadway/parking areas or the areas of future loam and seed have been loamed, seeded and mulched. Hay and straw mulch rate shall be a minimum of 150 lbs./1,000 s.f. (3 tons/acre) and shall be properly anchored.

The contractor shall install any added measures which may be necessary to control erosion/sedimentation from the site dependent upon the actual site and weather conditions. Continuation of earthwork operations on additional areas shall not begin until the exposed soil surface on the area being worked has been stabilized, in order to minimize areas without erosion control protection.

1. Soil Stockpiles

Stockpiles of soil or subsoil shall be mulched for over winter protection with hay or straw at twice the normal rate or at 150 lbs/1,000 s.f. (3 tons per acre) or with a four-inch layer of woodwaste erosion control mix. This shall be done within 24 hours of stocking and re-established prior to any rainfall or snowfall. Any soil stockpile shall not be placed (even covered with hay or straw) within 100 feet from any natural resources.

2. Natural Resource Protection

Any areas within 100 feet from any natural resources, if not stabilized with a minimum of 75% mature vegetation catch, shall be mulched by December 1 and anchored with plastic netting or protected with erosion control mats. During winter construction, a double line of sediment barriers (i.e. silt fence backed with hay bales or erosion control mix) shall be placed between any natural resource and the disturbed area. Projects crossing the natural resource shall be protected a minimum distance of 100 feet on either side from the resource. Existing projects not stabilized by December 1 shall be protected with the second line of sediment barrier to ensure functionality during the spring thaw and rains.

3. Sediment Barriers

During frozen conditions, sediment barriers shall consist of woodwaste filter berms as frozen soil prevents the proper installation of hay bales and sediment silt fences.

4. Mulching

An area shall be considered denuded until areas of future loam and seed have been loamed, seeded and mulched. Hay and straw mulch shall be applied at a rate of 150 lb. per 1,000 square feet or 3 tons/acre (twice the normal accepted rate of 75-lbs./1,000 s.f. or 1.5 tons/acre) and shall be properly anchored. Mulch shall not be spread on top of snow. The snow shall be removed down to a one-inch depth or less prior to application. After each day of final grading, the area shall be properly stabilized with anchored hay or straw or erosion control matting. An area shall be considered to have been stabilized when exposed surfaces have been either mulched with straw or hay at a rate of 150 lb. per 1,000 square feet (3 tons/acre) and adequately anchored that ground surface is not visible through the mulch.

Between the dates of November 1 and April 15, all mulch shall be anchored by peg line, mulch netting, asphalt emulsion chemical, or wood cellulose fiber. When ground surface is not visible through the mulch then cover is sufficient. After November 1st, mulch and anchoring of all bare soil shall occur at the end of each final grading workday.

5. Mulching on Slopes and Ditches

Slopes shall not be left exposed for any extended time of work suspension unless fully mulched and anchored with peg and netting or with erosion control blankets. Mulching shall be applied at a rate of 230 lbs/1,000 s.f. on all slopes greater than 8%.

Mulch netting shall be used to anchor mulch in all drainage ways with a slope greater than 3% for slopes exposed to direct winds and for all other slopes greater than 8%. Erosion control blankets shall be used in lieu of mulch in all drainage ways with slopes greater than 8%. Erosion control mix can be used to substitute erosion control blankets on all slopes except ditches.

6. Seeding

Between the dates of October 15 and April 1st, loam or seed will not be required. During periods of above freezing temperatures finished areas shall be fine graded and either protected with mulch or temporarily seeded and mulched until such time as the final treatment can be applied. If the date is after November 1st and if the exposed area has been loamed, final graded with a uniform surface, then the area may be dormant seeded at a rate of 3 times higher than specified for permanent seed and then mulched. Dormant seeding may be selected to be placed prior to the placement of mulch and fabric netting anchored with staples. If dormant seeding is used for the site, all disturbed areas shall receive 4" of loam and seed at an application rate of 5 lbs/1,000 s.f. All areas seeded during the winter shall be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 75% catch) shall be revegetated by replacing loam, seed and mulch. If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.

Standards for Timely Stabilization of Construction Sites During Winter

1. Standard for the timely stabilization of ditches and channels -- The applicant shall construct and stabilize all stone-lined ditches and channels on the site by November 15. The applicant shall construct and stabilize all grass-lined ditches and channels on the site by September 1. If the applicant fails to stabilize a ditch or channel to be grass-lined by September 1, then the applicant will take one of the following actions to stabilize the ditch for late fall and winter.

Install a sod lining in the ditch -- The applicant shall line the ditch with properly installed sod by October 1. Proper installation includes the applicant pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, watering the sod to promote root growth into the disturbed soil, and anchoring the sod with jute or plastic mesh to prevent the sod strips from sloughing during flow conditions.

Install a stone lining in the ditch -- The applicant shall line the ditch with stone riprap by November 15. The applicant shall hire a registered professional engineer to determine the stone size and lining thickness needed to withstand the anticipated flow velocities and flow depths within the ditch. If necessary, the applicant shall regrade the ditch prior to placing the stone lining so to prevent the stone lining from reducing the ditch's cross-sectional area.

2. Standard for the timely stabilization of disturbed slopes -- The applicant shall construct and stabilize stone-covered slopes by November 15. The applicant shall seed and mulch all slopes to be vegetated by September 1. The department shall consider any area having a grade greater than 15% to be a slope. If the applicant fails to stabilize any slope to be vegetated by September 1, then the applicant shall take one of the following actions to stabilize the slope for late fall and winter.

Stabilize the soil with temporary vegetation and erosion control mats -- By September 1 the applicant shall seed the disturbed slope with winter rye at a seeding rate of 3 pounds per 1,000 square feet and apply erosion control mats over the mulched slope. The applicant shall monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or cover at least 75% of the disturbed slope by November 1, then the applicant shall cover the slope with a layer of woodwaste compost as described in item iii of this standard or with stone riprap as described in item iv of this standard.

Stabilize the slope with sod -- The applicant shall stabilize the disturbed slope with properly installed sod by September 1. Proper installation includes the applicant pinning the sod onto the slope with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil. The applicant shall not use late-season sod installation to stabilize slopes having a grade greater than 33% (3H:1V).

Stabilize the slope with woodwaste compost -- The applicant shall place a six-inch layer of woodwaste compost on the slope by November 15. Prior to placing the woodwaste compost, the applicant shall remove any snow accumulation on the disturbed slope. The applicant shall not use woodwaste compost to stabilize slopes having grades greater than 50% (2H:1V) or having groundwater seeps on the slope face.

Stabilize the slope with stone riprap -- The applicant shall place a layer of stone riprap on the slope by November 15. The applicant shall hire a registered professional engineer to determine the stone size needed for stability and to design a filter layer for underneath the riprap.

3. Standard for the timely stabilization of disturbed soils -- By September 15 the applicant shall seed and mulch all disturbed soils on areas having a slope less than 15%. If the applicant fails to stabilize these soils by this date, then the applicant shall take one of the following actions to stabilize the soil for late fall and winter.

Stabilize the soil with temporary vegetation -- By September 1 the applicant shall seed the disturbed soil with winter rye at a seeding rate of 3 pounds per 1000 square feet, lightly mulch the seeded soil with hay or straw at 75 pounds per 1000 square feet, and anchor the mulch with plastic netting. The applicant shall monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or cover at least 75% of the disturbed soil before November 1, then the applicant shall mulch the area for over-winter protection as described below.

Stabilize the soil with sod -- The applicant shall stabilize the disturbed soil with properly installed sod by September 15. Proper installation includes the applicant pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil.

Stabilize the soil with mulch -- By November 15 the applicant shall mulch the disturbed soil by spreading hay or straw at a rate of at least 150 pounds per 1000 square feet on the area so that no soil is visible through the mulch. Prior to applying the mulch, the applicant shall remove any snow accumulation on the disturbed area. Immediately after applying the mulch, the applicant will anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

1.8 Maintenance of facilities

The stormwater facilities will be maintained by the Applicant, TZ Properties, LLC or their assigned heirs. The contract documents will require the contractor to designate a person responsible for maintenance of the sedimentation control features during construction as required by the Erosion Control Report. Long-term operation/maintenance recommended for the stormwater facilities is presented below.

The responsible party may contract with such professionals, as may be necessary in order to comply with this provision and may rely on the advice of such professionals in carrying out its duty hereunder, provided, that the following operation and maintenance procedures are hereby established as a minimum for compliance with this section. A maintenance log of the inspections shall be kept by the responsible party.

Inspection and Maintenance Frequency and Corrective Measures:

The following areas, facilities, and measures will be inspected and the identified deficiencies will be corrected. Clean-out must include the removal and legal disposal of any accumulated sediments and debris.

Catch Basins:

Inspect catch basins 2 times per year (preferably in Spring and Fall) to ensure that the catch basins are working in their intended fashion and that they are free of debris. Clean structures when sediment depths reach 12" from invert of outlet. If the basin outlet is designed with a hood to trap floatable materials (i.e. Snout), check to ensure watertight seal is working. At a minimum, remove floating debris and hydrocarbons at the time of the inspection.

Culverts:

Inspect culverts 2 times per year (preferably in Spring and Fall) to ensure that the culverts are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit and repair any erosion damage at the culvert's inlet and outlet.

Inlet/Outlet Control Structures:

Inspect structures and piping 2 times per year (preferably in Spring and Fall) to ensure that the structures are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris within the structure.

Stormdrain Outlets:

Inspect outlets 2 times per year (preferably in Spring and Fall) to ensure that the outlets are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the outlet and within the conduit. Repair any erosion damage at the stormdrain outlet.

Soil Filter – Bio-Filtration:

Inspect all upstream pre-treatment measures 2 times per year (preferably in Spring and Fall) for sediment and floatables accumulation. Remove and dispose of any sediments or debris.

Surface (Underdrain Pond, Swale or Bio-Filter):

The soil filter will be inspected within the first three months after construction; thereafter the filter will be inspected 2 times per year (preferably in Spring and Fall) to ensure that the filter is draining within 24 to 48 hours of a rain event equivalent to 1" or more. Adjustments will be made to the outlet valve to ensure that the grassed underdrained soil filter drains within 24 to 48 hours. Failure to drain in 72 hours will require part or all of the soil filter media to be removed and replaced with new material meeting the soil filter gradation. The facilities will be inspected after major storms and any identified deficiencies will be corrected. Harvesting and weeding of excessive growth shall be performed as needed. Inspect for unwanted or invasive plants and remove as necessary.

Vegetated Areas:

Inspect slopes and embankments early in the growing season to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows. The facilities will be inspected after major storms and any identified deficiencies will be corrected.

Ditches, Swales and other Open Stormwater Channels:

Inspect 2 times per year (preferably in Spring and Fall) to ensure they are working in their intended fashion and that they are free of sediment and debris. Remove any obstructions to flow, including accumulated sediments and debris and vegetated growth. Repair any erosion of the ditch lining. Vegetated ditches will be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. Correct any erosion of the channel's bottom or sideslopes. The facilities shall be inspected after major storms and any identified deficiencies shall be corrected.

Roadways and Parking Surfaces: Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader. Repair potholes and other roadway obstructions and hazards. Plowing and sanding of paved areas shall be performed as necessary to maintain vehicular traffic safety.

Recertification

As part of the Stormwater Permit, the applicant is required to meet the standards in Appendix B of the Chapter 500 Rules. Appendix B states that a project must submit a certification of the following to the department within three months of the expiration of each five-year interval from the date of issuance of the permit.

- (a) Identification and repair of erosion problems. All areas of the project site have been inspected for areas of erosion, and appropriate steps have been taken to permanently stabilize these areas.
- (b) Inspection and repair of stormwater control system. All aspects of the stormwater control system have been inspected for damage, wear, and malfunction, and appropriate steps have been taken to repair or replace the system, or portions of the system.

- (c) Maintenance. The erosion and stormwater maintenance plan for the site is being implemented as written, or modifications to the plan have been submitted to and approved by the department, and the maintenance log is being maintained.
- (d) Proprietary Systems. All proprietary systems have been maintained according to the manufacturer's recommendations. Where required by the Department, the permittee shall execute a 5-year maintenance contract with a qualified professional for the coming 5-year interval. The maintenance contract must include provisions for routine inspections, cleaning, and general maintenance.

Housekeeping

As part of the Stormwater Permit, the applicant is required to meet the standards in Appendix C of the Chapter 500 Rules. The following procedures are hereby established as a minimum for compliance with this section. For further information on the procedures listed below, refer to Chapter 500 rules – Appendix C.

Spill Prevention:

Appropriate spill prevention, containment, and response planning/implementation shall be used to prevent pollutants from being discharged from materials on site.

Groundwater Protection:

During construction, hazardous materials with the potential to contaminate groundwater shall not be stored or handled in areas of the site which drain to an infiltration area.

Fugitive Sediment and Dust:

Appropriate measures shall be taken to ensure that activities do not result in noticeable erosion of the soils and water and/or calcium chloride shall be used to ensure that activities do not result in fugitive dust emissions during or after construction.

Debris and Other Materials:

Litter, construction debris, and chemicals exposed to stormwater must be prevented from becoming a pollutant source.

Trench or Foundation De-watering:

Water collected through the process of trenching and/or de-watering must be removed from the ponded area, and must be spread through natural wooded buffers or other areas that are specifically designed to collect the maximum amount of sediment possible.

Non-stormwater Discharges:

Identify and prevent contamination by non-stormwater discharges.

Conclusion

The Applicant has provided temporary and permanent erosion control measures as well as specifying a sequence of construction as measures to minimize erosion and sedimentation.

Attachments

- Attachment A - Seeding Plan
- Attachment B - Inspection Report

ATTACHMENT A

SEEDING PLAN

SEEDING PLAN

Project: Orchard Road Subdivision

Site Location: Orchard Road, Cumberland, ME

☐ Permanent Seeding ☒ Temporary Seeding

1. Instruction on preparation of soil: Prepare a good seed bed for planting method used.
2. Apply lime as follows: _____ # / acres, OR 138 # /M Sq. Ft.
3. Fertilize with _____ pounds of _____ N-P-K/ac. OR 13.8 pounds of 10-10-10 N-P-K/M Sq. Ft.
4. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
5. Seed with the following mixture:
 50% Winter Rye
 50% Annual Rye
6. Mulching instructions: Apply at the rate of _____ per acre, OR 75 pounds per M. Sq. Ft.

	<u>Amount</u>	<u>Unit # Tons. Etc.</u>
7. TOTAL LIME	138	#/1000 sq. ft.
8. TOTAL FERTILIZER	13.8	#/1000 sq. ft.
9. TOTAL SEED	1.03	#/1000 sq. ft.
10. TOTAL MULCH	75	#/1000 sq. ft.
11. TOTAL other materials, seeds, etc.	<hr/>	
12. REMARKS		

Spring seeding is recommended; however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to August 5 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

SEEDING PLAN

Project: Orchard Road Subdivision

Site Location: Orchard Road, Cumberland, ME

☒ Permanent Seeding ☐ Temporary Seeding

1. Instruction on preparation of soil: Prepare a good seed bed for planting method used.
2. Apply lime as follows: _____ # / acres, OR 138 # /M Sq. Ft.
3. Fertilize with _____ pounds of _____ N-P-K/ac. OR 18.4 pounds of 10-20-20 N-P-K/M Sq. Ft.
4. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
5. Seed with the following mixture:
 - 40% Creeping Red Fescue
 - 30% Charger II Perennial Ryegrass
 - 20% KenBlue Kentucky Bluegrass
 - 10% Tiffany Chewings Fescue
6. Mulching instructions: Apply at the rate of _____ per acre, OR 75 pounds per M. Sq. Ft.

	<u>Amount</u>	<u>Unit # Tons. Etc.</u>
7. TOTAL LIME	138	#/1000 sq. ft.
8. TOTAL FERTILIZER	18.4	#/1000 sq. ft.
9. TOTAL SEED	1.03	#/1000 sq. ft.
10. TOTAL MULCH	75	#/1000 sq. ft.
11. TOTAL other materials, seeds, etc.	<hr/>	
12. REMARKS		

Spring seeding is recommended, however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to August 5 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

ATTACHMENT B

INSPECTION REPORT

STORMWATER POLLUTION PREVENTION PLAN

INSPECTION REPORT

PROJECT INFORMATION

Project Name: Orchard Road Subdivision

Address: Orchard Road
Cumberland, Maine

CONTRACTOR/SUBCONTRACTOR INFORMATION

Inspector Name: _____

Firm: _____

Title: _____

Qualifications: _____

INSPECTION SUMMARY

Date of Inspection: _____

Major Observations: _____

THE FACILITY IS IN COMPLIANCE WITH THE STORMWATER POLLUTION PREVENTION
PLAN WITH THE FOLLOWING EXCEPTIONS:

ACTIONS NECESSARY TO BRING FACILITY INTO COMPLIANCE:

REQUIRED MODIFICATIONS TO STORMWATER POLLUTION PREVENTION PLAN
(MUST BE IMPLEMENTED WITHIN 7 DAYS OF INSPECTION):

CERTIFICATION STATEMENT:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the systems, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Signature

Typed Name

Title

Date

TRC
6 Ashley Drive
Scarborough, ME 04074

Main 207-879-1930
Fax 207-879-9293

Memorandum

To: Will Haskell, Gorrill-Palmer

From: Lauren Leclerc

Subject: Ward Farm Property: Wetland, Stream and Vernal Pool Survey – Cumberland

Date: May 24, 2017

CC: Rich Jordan and David Brenneman (TRC)

Dear Will,

On May 3rd and 4th, 2017, I visited the Ward Farm property located south of Orchard Road, in Cumberland, Maine. The purpose of my site visit was to delineate wetlands, streams, and vernal pools on the property. A third site visit was conducted on May 10, 2017 for a second vernal pool check. Below I will detail the methods and findings of my recent resources delineation.

Property Description and Survey Area

The entire property is approximately 27 acres. The northwestern portion of the property is relatively flat while there is a valley with a wetland, stream and vernal pool located in the northeastern corner of the property. The topography of the central portion of the site slopes slightly to the southeast while the topography of the southern portion of the site slopes to the south. Uplands onsite are dominated by northern red oak (*Quercus rubra*), eastern white pine (*Pinus strobus*), quaking aspen (*Populus tremuloides*), American beech (*Fagus grandifolia*), and Canada mayflower (*Maianthemum canadense*). A small pine plantation is located in the southcentral portion of the site, near the southern property boundary. Wetlands are interspersed throughout the site, except within the southwestern corner which is comprised of upland. The property has been logged in the past and forestry trails can be found throughout the site. The entire property was surveyed for wetlands, waterbodies, and vernal pools. A map depicting the limits of my resources survey, which includes the natural resources identified is attached to this memo.

Methodology

To identify natural resources within the property boundary, I visited the study area on May 3rd and 4th, 2017. Prior to the site visit, I reviewed existing data sources including:

- United States Geological Survey (USGS) topographic mapping;
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping;
- Natural Resources Conservation Service (NRCS) medium-intensity soil survey mapping;
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs);

- State of Maine Office of GIS (MEGIS) data; and
- Recent and historic aerial photography.

These data were used to assist in the identification of protected natural resources during my field survey.

Wetlands: Wetland delineations were conducted in accordance with the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, v2 (U.S. Army Corps of Engineers [USACE] 2012). This supplement follows criteria established in the USACE Wetlands Delineation Manual (Environmental Laboratory, Technical Report T-87-1, 1987), but is region specific, giving the wetland delineator a better tool to apply to regional vegetation communities, indicators of hydrology and indicators of hydric soils when conducting a wetland boundary determination. This document provides a repeatable methodology to identify potential wetland areas.

The study area was investigated on foot. When a location having the requisite three factors that constitute a wetland (i.e., hydrophytic vegetation, indicators of hydrology, and the presence of hydric soils) was encountered, the boundaries were flagged in the field and each flag was geo-located using a mapping grade global positioning system (GPS) unit (Trimble GeoXT). The data was then post-processed using data collection and processing standards designed by the manufacturer to achieve sub-meter accuracy. These data were provided to Gorrill-Palmer for use in project design and planning natural resource avoidance and minimization measures.

Streams: Watercourse identification followed the Maine Natural Resources Protection Act (NRPA) definition of a “River, stream or brook.” Streams meeting this definition were flagged and geolocated as described in the wetlands section.

Vernal Pools: The study area was also surveyed for the presence of vernal pools. Wetlands that contain natural vernal pool habitat and exhibit a high level of breeding productivity are considered Significant Wildlife Habitat under the Maine NRPA. Under the USACE’s Maine General Permit, vernal pool habitats of natural or anthropogenic origin of any level of functionality may require a higher level of project review depending upon the scope of a project and its proposed impacts. Our field study was performed within the breeding season of vernal pool indicator species (e.g., wood frogs (*Lithobates sylvatica*) and spotted salamanders [*Ambystoma maculatum*]). Thus, a vernal pool (VP) survey was conducted pursuant to the Maine Association of Wetland Scientists’ (MAWS) Vernal Pool Survey Protocol (April 2014) description of “breeding season surveys.” TRC’s wetland scientist performed the survey within the study area based on current state and federal definitions, as well as looking for indicators such as topographic changes (including isolated depressions with a sparsely vegetated bottom), ecological use, standing water or evidence thereof, evidence of secondary indicator species (e.g., caddisfly larvae cases, fingernail clam shells, aquatic snail shells) and best professional judgment.

Findings

My survey identified seven wetlands, one perennial stream, and two natural, non-significant vernal pools on the property.

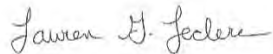
Attached you will find copies of the completed wetland summary and USACE data forms, Maine State Vernal Pool Assessment Forms, and a photographic log from my site visit. GIS shapefiles showing the location of the delineated resources were previously provided to you via email on May 10, 2017. The unique identifiers noted on the data forms can be crossed referenced against the data herein and the resources map to see where a particular resource is located. I have included summary tables below that outline the delineated resources.

RESOURCE SUMMARY TABLES			
WETLANDS			
Resource ID	Covertypes ¹	Dominant Vegetation	Comments
Wetland W 1	PFO1/4E	Red maple (<i>Acer rubrum</i>), eastern hemlock (<i>Tsuga canadensis</i>), quaking aspen, American beech, winterberry (<i>Ilex verticillata</i>), Canada mayflower	Pit and mound forested wetland which contains natural, non-significant vernal pool VP 1.
Wetland W 2	PFO1B	Red maple, quaking aspen, eastern hemlock, broad-leaf meadow sweet (<i>Spiraea latifolia</i>), red osier (<i>Cornus alba</i>), interrupted fern (<i>Osmunda claytoniana</i>)	Small isolated forested wetland.
Wetland W 3	PFO1E	Red maple, eastern white pine, yellow birch (<i>Betula alleghaniensis</i>)	Forested wetland swale fed by offsite pond.
Wetland W 4	PFO1B	Red maple, ash species (<i>Fraxinus</i> sp.), eastern hemlock	Headwaters of seep at property boundary.
Wetland W 5	PFO1E	Red maple, black ash (<i>Fraxinus nigra</i>), yellow birch, American beech, Canada mayflower, interrupted fern	Pit and mound forested wetland.
Wetland W 6	PEM1E/PFO1E	Red maple, meadowsweet, winterberry, sensitive fern (<i>Onoclea sensibilis</i>)	Emergent/forested wetland swale associated with perennial stream S 1 and natural, non-significant VP 2.
Wetland W 7	PFO1E	Red maple, yellow birch, quaking aspen, ash species, eastern hemlock, white pine, Canada mayflower, cinnamon fern (<i>Osmundastrum cinnamomeum</i>)	Pit and mound forested wetland.
¹ Per Cowardin et. al.			

STREAMS					
Resource ID	Flow Regime	Width (ft.)	Depth (in.)	Substrate	Comments
Stream S 1	Perennial	5-8	1-4	Sand, gravel, cobble	Unnamed tributary.

Thank you for allowing me to assist you in assessing the natural resources on this property. If you have any questions regarding my assessments, or if you would like additional assistance with project permitting, please do not hesitate to contact me or Rich.

Respectfully submitted,

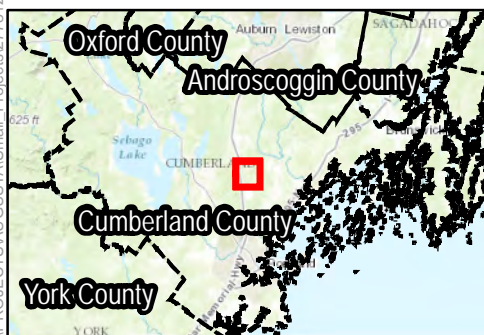
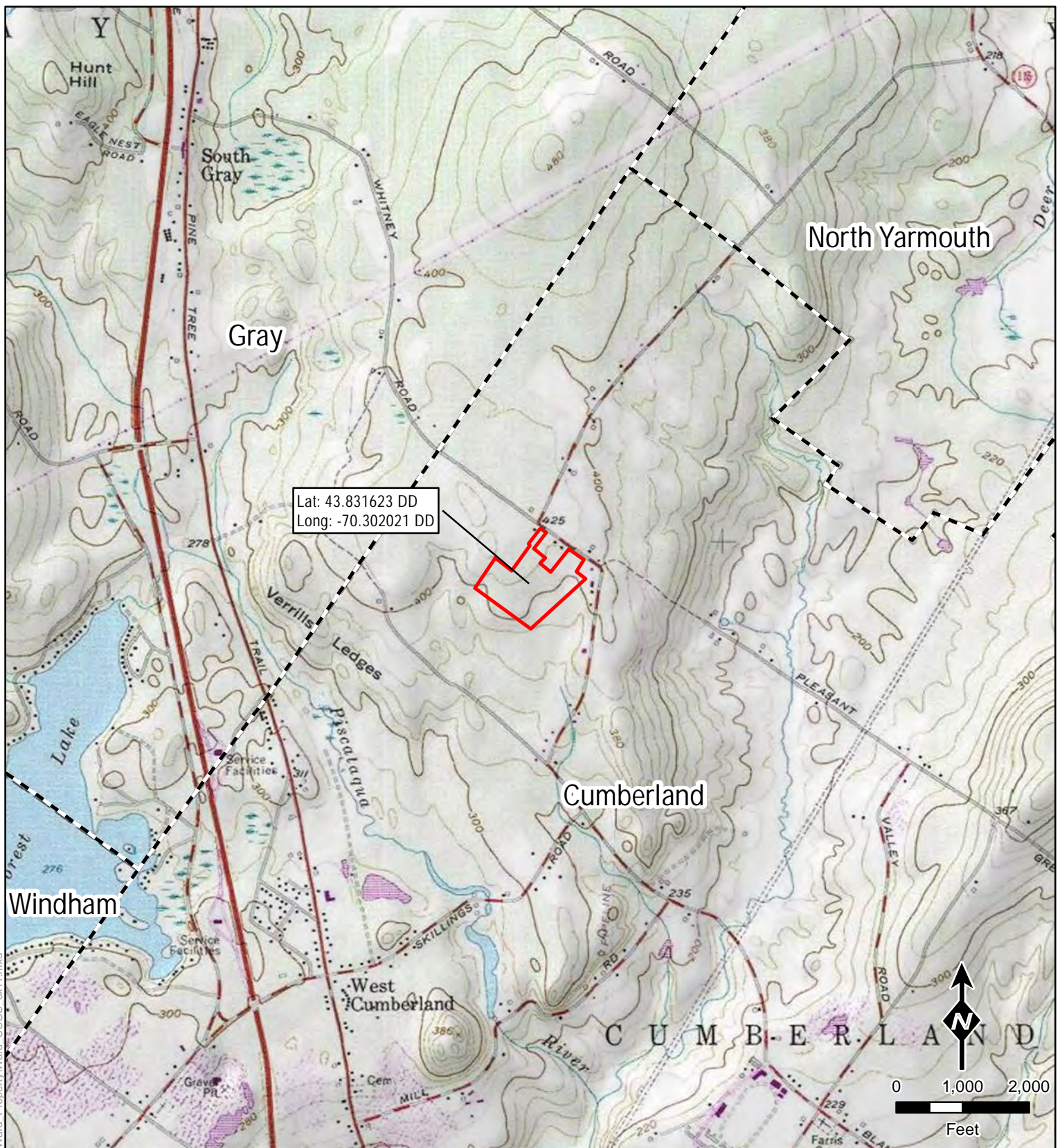


Lauren Leclerc, PWS (#2363)
Wetland Scientist

Cell: 207-756-9322 Office: 207-620-3857
Email: lleclerc@trcsolutions.com

ATTACHMENT A

Resource Mapping



- Subject Property
- Town Boundary
- County Boundary

Coordinate System: NAD 1983 StatePlane Maine West FIPS 1802 Feet
Units: Foot US
Sources: ESRI, USGS, MEGIS

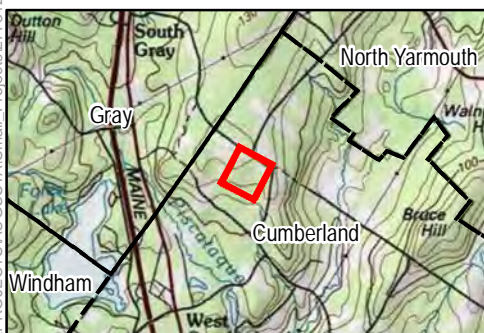
Ward Property

Cumberland County,
Cumberland, ME

USGS Location Map



5/10/2017



- Subject Property
- Delineated Stream
- Delineated Wetland
- Natural, Not Significant
- Delineated Vernal Pool
- Town Boundary

Coordinate System: NAD 1983 StatePlane Maine West FIPS 1802 Feet
Units: Foot US
Sources: ESRI, USGS, MEGIS

Ward Property

Cumberland County,
Cumberland, ME

Resource Map



5/10/2017

ATTACHMENT B

Photographic Log

Photographic Log
Ward Farm Property – Orchard Road, Cumberland, Maine



Wetland W 1: Looking northwest at forested wetland adjacent to driveway and Orchard Road, 05/03/2017.



Wetland W 1 and Vernal Pool VP 1: Looking northwest at forested wetland and natural, non-significant vernal pool south of Orchard Road, 05/03/2017.

Photographic Log
Ward Farm Property – Orchard Road, Cumberland, Maine



Vernal Pool VP 1: Spotted salamander egg mass within VP 1, 05/03/2017.



Wetland W 2: Looking west across the forested wetland, 05/03/2017.

Photographic Log
Ward Farm Property – Orchard Road, Cumberland, Maine



Wetland W 3: Looking south along the wetland swale which runs north-south across the southern extents of the property, 05/03/2017.



Wetland W 3: Looking north along the wetland swale which runs north-south across the southern extents of the property, 05/04/2017.

Photographic Log
Ward Farm Property – Orchard Road, Cumberland, Maine



Wetland W 4: Headwaters of forested wetland seep at southern property boundary, looking south, 05/04/2017.



Wetland W 5: Looking southeast from the northern end of the forested wetland, slightly downslope, 05/04/2017.

Photographic Log
Ward Farm Property – Orchard Road, Cumberland, Maine



Wetland W 5: Looking east at windthrows in forested wetland, near eastern property boundary, 05/04/2017.



Wetland W 6 and Stream S 1: Emergent component of wetland and associated Stream S 1 looking south and downstream, 05/04/2017.

Photographic Log
Ward Farm Property – Orchard Road, Cumberland, Maine



Wetland W 6 and Vernal Pool VP 2: Looking north at forested wetland and natural, non-significant VP 2, 05/04/2017.



Vernal Pool VP 2: Spotted salamander egg mass within VP 2, 05/04/2017.

Photographic Log
Ward Farm Property – Orchard Road, Cumberland, Maine



Wetland W 7: Looking north at forested wetland and seep, 05/04/2017.



Upland: Looking northeast at forested upland to the northeast of Wetland W 3, 05/04/2017.

Photographic Log
Ward Farm Property – Orchard Road, Cumberland, Maine



**Upland: Looking southwest at forested upland to the south of Wetland W 2,
05/03/2017.**

ATTACHMENT C

Wetland Summary and Wetland Data Forms

TRC -- [REDACTED] WETLAND SUMMARY FORM

Observers: L. Lederc Date: 5-4-17
 Corps plot: Yes ☒ No ☐ Feature ID: 21
 REVISIT? Yes ☒ No ☐ If Yes, any changes? ☐ Yes ☐ No ☐ If yes, Explain:

Dominant NWI Class: PFO/14E Other NWI Classes:

Representative/Dominant Wetland Vegetation by Strata

Tree	Sapling	Shrub	Herb	Vines
<u>Acer rub</u>	<u>Acer rub</u>	<u>Tsugar</u>	<u>Maican</u>	<u>NA</u>
<u>Tsugar</u>		<u>Ileaver</u>		
<u>Poptree</u>		<u>Acerub</u>		
<u>Fag. gra</u>				

Representative Wetland Hydrology

☐ Permanently Flooded ☒ Seasonally Flooded ☒ Saturated
 (approximate depth -) (approximate depth -)

Hydrologic Indicators: ☒ Surface Water; ☒ Water Stained Leaves; ☐ Sediment Deposits;
☐ Sparsely Vegetated Concave Surface; ☐ Water Marks; ☐ Drift Lines;
☐ Surface Scouring; ☐ Drainage Patterns; ☐ Buttressed Trees; ☐ Elevated Roots;
☐ Moss Trim Lines

Other Observations: Sett to surface
High wtr table w/lt 2" immed

Soils

Depth (inches)	Horizon	Matrix Color	Redox Features Color / Percent	Texture	Notes
<u>0-7</u>	<u>OL</u>	<u>black</u>			
<u>7-11</u>	<u>B</u>	<u>10YR 4/2</u>	<u>10YR 4/6-5</u>	<u>FSL</u>	<u>w/ gravel</u>

Representative Hydric Soils: ☒ Mineral ☐ Organic

Other Observations:

Stream # 1 Name: NA

Width (Top-of-Bank-Top-of-Bank): ☐ Depth @ Center: ☐ Perennial ☐ Intermittent ☐

Bank Configuration: ☐ Undercut ☐ Vertical ☐ Gradual

Channel Substrate: ☐ Peat-Muck ☐ Silt-Mud ☐ Sand ☐ Gravel/Cobble ☐ Boulder ☐ Bedrock

Stream # 2 Name:

Width (Top-of-Bank-Top-of-Bank): ☐ Depth @ Center: ☐ Perennial ☐ Intermittent ☐

Bank Configuration: ☐ Undercut ☐ Vertical ☐ Gradual

Channel Substrate: ☐ Peat-Muck ☐ Silt-Mud ☐ Sand ☐ Gravel/Cobble ☐ Boulder ☐ Bedrock

Wildlife Observations/Sign

spotted salamander egg masses passerine
birds

Notes

VPI assoc w/

SKETCH ON BACK

pit & mound microtopography

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Ward Farm Parcel City/County: Cumberland Sampling Date: 5-3-17
 Applicant/Owner: Garrill-Palmer State: ME Sampling Point: # 2
 Investigator(s): L. Leclerc Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Flat area Local relief (concave, convex, none): Slightly convex Slope (%): 0.5%
 Subregion (LRR or MLRA): LRR Lat: 43.83213044 Long: -70.3003181 Datum: NAD83
 Soil Map Unit Name: Woodbridge Fine Sandy loam NWI classification: PFO1B
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	If yes, optional Wetland Site ID: <u>#2</u>
Wetland Hydrology Present? Yes <u>X</u> No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

slight depression in flat upland landscape

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

☐ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)

☒ Water-Stained Leaves (B9)
☐ Aquatic Fauna (B13)
☐ Marl Deposits (B15)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres on Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Thin Muck Surface (C7)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

☐ Surface Soil Cracks (B6)
☐ Drainage Patterns (B10)
☐ Moss Trim Lines (B16)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Stunted or Stressed Plants (D1)
☒ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ Microtopographic Relief (D4)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
 Water Table Present? Yes X No _____ Depth (inches): to surface
 Saturation Present? Yes X No _____ Depth (inches): to surface
 (includes capillary fringe)

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: V2

Tree Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Populus tremuloides</u>	<u>30</u>	<u>X</u>	<u>FACU</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)
2. <u>Acer rubrum</u>	<u>25</u>	<u>X</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
<u>55</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Tsuga canadensis</u>	<u>10</u>	<u>X</u>	<u>FACU</u>	
2. <u>Spiraea latifolia</u>	<u>10</u>	<u>X</u>	<u>FACW</u>	
3. <u>Cornus alba</u>	<u>5</u>	<u>X</u>	<u>FACW</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>25</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Osmunda claytoniana</u>	<u>30</u>	<u>X</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Maianthemum canadense</u>	<u>5</u>			
3. <u>Carex species</u>	<u>2</u>			
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>37</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. <u>None</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.) <u>Adjusted tree & vine radius to 15' to account for narrow wetland</u>				

Sampling Point: 2

[illegible]²Location: PL=Pore Lining, M=Matrix.

Indicators for Problematic Hydric Soils³:

- | | | |
|---|--|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | <input type="checkbox"/> 2 cm Muck (A10) (LRR K, L, MLRA 149B) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L) | <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> Dark Surface (S7) (LRR K, L, M) |
| <input type="checkbox"/> Stratified Layers (A5) | <input checked="" type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR K, L) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR K, L) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149B) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | | <input type="checkbox"/> Mesic Spodic (TA6) (MLRA 144A, 145, 149B) |
| <input type="checkbox"/> Sandy Redox (S5) | | <input type="checkbox"/> Red Parent Material (F21) |
| <input type="checkbox"/> Stripped Matrix (S6) | | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B) | | <input type="checkbox"/> Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Type: rocky
Depth (inches): 16"

Hydric Soil Present? Yes Y No

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Ward Parcel City/County: Cumberland Sampling Date: 5-3-17
 Applicant/Owner: Gorrell - Palmer State: ME Sampling Point: U-V2
 Investigator(s): L. Leclerc Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): 0%
 Subregion (LRR or MLRA): LRR Lat: 43.83205175 Long: -70.36202252 Datum: NAD83
 Soil Map Unit Name: Woodbridge fine sandy loam NWI classification: Upland
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: (Explain alternative procedures here or in a separate report.) <u>upland has many old woods roads</u>	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes _____ No _____ Depth (inches):		
Water Table Present? Yes <u>X</u> No _____ Depth (inches): <u>6"</u>		
Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>9"</u>		
(includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION – Use scientific names of plants.

Sampling Point: U 12

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Populus tremuloides</u>	<u>40</u>	<u>X</u>	<u>FACU</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>14</u> ⁹⁰ (A/B)
2. <u>Quercus rubra</u>	<u>10</u>		<u>FACU</u>	
3. <u>Acer rubrum</u>	<u>20</u>	<u>X</u>	<u>FAC</u>	
4. _____				
5. _____				
6. _____				
7. _____				
<u>70</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>20</u> x 3 = <u>60</u> FACU species <u>120</u> x 4 = <u>480</u> UPL species <u>0</u> x 5 = _____ Column Totals: <u>190</u> (A) <u>540</u> (B) Prevalence Index = B/A = <u>3.86</u>
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Fagus grandifolia</u>	<u>25</u>	<u>X</u>	<u>FACU</u>	
2. <u>Pinus strobus</u>	<u>15</u>	<u>X</u>	<u>FACU</u>	
3. _____				
4. _____				
5. _____				
6. _____				
<u>40</u> = Total Cover				Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes _____ No <u>X</u>
1. <u>Pinus strobus</u>	<u>10</u>	<u>X</u>	<u>FACU</u>	
2. <u>Polystichum acrostichoides</u>	<u>5</u>	<u>X</u>	<u>FACU</u>	
3. <u>Maianthemum canadense</u>	<u>5</u>	<u>X</u>	<u>FACU</u>	
4. _____				
5. _____				
6. _____				
<u>20</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>None</u>				
2. _____				
3. _____				
4. _____				
_____ = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.) 				

Sampling Point: U-V2

[illegible]

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: WARD PARCEL City/County: Cumberland Sampling Date: 5-9-17
 Applicant/Owner: Gosnell-Palmer State: ME Sampling Point: Y3
 Investigator(s): L. Lederer Section, Township, Range: —
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Slightly concave Slope (%): 20%
 Subregion (LRR or MLRA): U2L2 Lat: 43.83097235 Long: -70.323289 Datum: WGS 1989
 Soil Map Unit Name: Woodbridge fine sandy loam NWI classification: PFO1E
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No — (If no, explain in Remarks.)
 Are Vegetation —, Soil —, or Hydrology — significantly disturbed? No — Are "Normal Circumstances" present? Yes X No —
 Are Vegetation —, Soil —, or Hydrology — naturally problematic? No — (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u>—</u>	Is the Sampled Area within a Wetland?	Yes <u>Y</u> No <u>—</u>
Hydric Soil Present?	Yes <u>X</u> No <u>—</u>		
Wetland Hydrology Present?	Yes <u>X</u> No <u>—</u>	If yes, optional Wetland Site ID:	<u>Y3</u>

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u>X</u> Surface Water (A1)	<u>X</u> Water-Stained Leaves (B9)	<u>X</u> Surface Soil Cracks (B6)
<u>X</u> High Water Table (A2)	<u>—</u> Aquatic Fauna (B13)	<u>X</u> Drainage Patterns (B10)
<u>X</u> Saturation (A3)	<u>—</u> Marl Deposits (B15)	<u>—</u> Moss Trim Lines (B16)
<u>—</u> Water Marks (B1)	<u>—</u> Hydrogen Sulfide Odor (C1)	<u>—</u> Dry-Season Water Table (C2)
<u>X</u> Sediment Deposits (B2)	<u>—</u> Oxidized Rhizospheres on Living Roots (C3)	<u>—</u> Crayfish Burrows (C8)
<u>X</u> Drift Deposits (B3)	<u>—</u> Presence of Reduced Iron (C4)	<u>—</u> Saturation Visible on Aerial Imagery (C9)
<u>—</u> Algal Mat or Crust (B4)	<u>—</u> Recent Iron Reduction in Tilled Soils (C6)	<u>—</u> Stunted or Stressed Plants (D1)
<u>—</u> Iron Deposits (B5)	<u>—</u> Thin Muck Surface (C7)	<u>—</u> Geomorphic Position (D2)
<u>—</u> Inundation Visible on Aerial Imagery (B7)	<u>—</u> Other (Explain in Remarks)	<u>—</u> Shallow Aquitard (D3)
<u>—</u> Sparsely Vegetated Concave Surface (B8)		<u>—</u> Microtopographic Relief (D4)
		<u>—</u> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes <u>X</u> No <u>—</u>	Depth (inches): <u>2"</u>	Wetland Hydrology Present? Yes <u>X</u> No <u>—</u>
Water Table Present?	Yes <u>X</u> No <u>—</u>	Depth (inches): <u>to surface</u>	
Saturation Present? (includes capillary fringe)	Yes <u>X</u> No <u>—</u>	Depth (inches): <u>to surface</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: Y3

Tree Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. <u>Acer rubrum</u>	<u>65</u>	<u>X</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)														
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)														
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)														
4. _____	_____	_____	_____	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>65</u></td> <td>x 3 = <u>195</u></td> </tr> <tr> <td>FACU species <u>5</u></td> <td>x 4 = <u>20</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>70</u> (A)</td> <td><u>215</u> (B)</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>65</u>	x 3 = <u>195</u>	FACU species <u>5</u>	x 4 = <u>20</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>70</u> (A)	<u>215</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>65</u>	x 3 = <u>195</u>																	
FACU species <u>5</u>	x 4 = <u>20</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>70</u> (A)	<u>215</u> (B)																	
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
Sapling/Shrub Stratum (Plot size: <u>15'</u>) <u>60</u> = Total Cover				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
1. <u>Pinus strobus</u>	<u>5</u>	<u>X</u>	<u>FACU</u>															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____	Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.														
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
Herb Stratum (Plot size: <u>5'</u>) <u>X</u> = Total Cover				Hydrophytic Vegetation Present? Yes <u>X</u> No														
1. <u>None</u>	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>15'</u>) _____ = Total Cover														
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
Remarks: (Include photo numbers here or on a separate sheet.) <u>Plot size adjusted to account for narrow wetland width</u>																		

Sampling Point: 3

Sampling Point:

[illegible]²Location: PL=Pore Lining, M=Matrix.

Indicators for Problematic Hydric Soils³:

- | | | |
|---|--|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | <input type="checkbox"/> 2 cm Muck (A10) (LRR K, L, MLRA 149B) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L) | <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> Dark Surface (S7) (LRR K, L, M) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR K, L) |
| <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR K, L) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149B) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | | <input type="checkbox"/> Mesic Spodic (TA6) (MLRA 144A, 145, 149B) |
| <input type="checkbox"/> Sandy Redox (S5) | | <input type="checkbox"/> Red Parent Material (F21) |
| <input type="checkbox"/> Stripped Matrix (S6) | | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B) | | <input type="checkbox"/> Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Type: rocky
Depth (inches): 19

Hydric Soil Present? Yes X No

Remarks:

TRC - [REDACTED] WETLAND SUMMARY FORM

Observers: LGL Date: 5-4-17
 Corps plot: Yes ☒ No ☐ Feature ID: 4
 REVISIT? Yes ☒ No ☐ If Yes, any changes? ? Yes ☐ No ☐ If yes, Explain:

Dominant NWI Class: PFO downslope Other NWI Classes: seep with in survey area

Representative/Dominant Wetland Vegetation by Strata

Tree Sapling Shrub Herb Vines
downslope & offsite Frasp Tsacan Tsu None
Ac rub

No wet. w/in in survey area

Representative Wetland Hydrology

Permanently Flooded ☐ Seasonally Flooded ☐ ☒ Saturated
 (approximate depth -) (approximate depth -)

Hydrologic Indicators: ☐ Surface Water; ☒ Water Stained Leaves; ☐ Sediment Deposits;
☒ Sparsely Vegetated Concave Surface; ☐ Water Marks; ☐ Drift Lines;
☐ Surface Scouring; ☒ Drainage Patterns; ☐ Buttressed Trees; ☐ Elevated Roots;
☐ Moss Trim Lines

Other Observations: high water table, saturation, 1/2-1" surface

Soils

Depth (inches)	Horizon	Matrix Color	Redox Features Color / Percent	Texture	Notes
0-3	A	10YR2/2	—	S.L	
3-9	B	10YR3/2	10YR3/4	S.L	
9+	rocky		10%		

Representative Hydric Soils: ☒ Mineral ☐ Organic

Other Observations:

Sat to surface, see H₂O @

Stream # 1 Name: NA
 Width (Top-of-Bank-Top-of-Bank): ☐ Depth @ Center: ☐ Perennial ☐ Intermittent ☐
 Bank Configuration: ☐ Undercut ☐ Vertical ☐ Gradual
 Channel Substrate: ☐ Peat-Muck ☐ Silt-Mud ☐ Sand ☐ Gravel/Cobble ☐ Boulder ☐ Bedrock

Stream # 2 Name: NA
 Width (Top-of-Bank-Top-of-Bank): ☐ Depth @ Center: ☐ Perennial ☐ Intermittent ☐
 Bank Configuration: ☐ Undercut ☐ Vertical ☐ Gradual
 Channel Substrate: ☐ Peat-Muck ☐ Silt-Mud ☐ Sand ☐ Gravel/Cobble ☐ Boulder ☐ Bedrock

Wildlife Observations/Sign

None obs.

Notes

Headwaters of seep with no veg

SKETCH ON BACK

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Ward Parcel City/County: Cumberland Sampling Date: 5-4-17
 Applicant/Owner: Gerrill-Palmer State: ME Sampling Point: 45
 Investigator(s): L Ledes Section, Township, Range: —
 Landform (hillslope, terrace, etc.): Slight swale Local relief (concave, convex, none): concave Slope (%): 12%
 Subregion (LRR or MLRA): LRL Lat: 43.83116276 Long: -70.3012013 Datum: NAD83
 Soil Map Unit Name: Woodbridge fine sandy loam NWI classification: PF01E
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No — (If no, explain in Remarks.)
 Are Vegetation —, Soil —, or Hydrology — significantly disturbed? No Are "Normal Circumstances" present? Yes X No —
 Are Vegetation —, Soil —, or Hydrology — naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u>—</u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u>—</u> If yes, optional Wetland Site ID: <u>45</u>
Hydric Soil Present? Yes <u>X</u> No <u>—</u>	
Wetland Hydrology Present? Yes <u>X</u> No <u>—</u>	
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<u>X</u> Surface Water (A1)	<u>X</u> Water-Stained Leaves (B9)	<u>X</u> Surface Soil Cracks (B6)
<u>X</u> High Water Table (A2)	<u>—</u> Aquatic Fauna (B13)	<u>X</u> Drainage Patterns (B10)
<u>X</u> Saturation (A3)	<u>—</u> Marl Deposits (B15)	<u>—</u> Moss Trim Lines (B16)
<u>—</u> Water Marks (B1)	<u>—</u> Hydrogen Sulfide Odor (C1)	<u>—</u> Dry-Season Water Table (C2)
<u>—</u> Sediment Deposits (B2)	<u>—</u> Oxidized Rhizospheres on Living Roots (C3)	<u>—</u> Crayfish Burrows (C8)
<u>—</u> Drift Deposits (B3)	<u>—</u> Presence of Reduced Iron (C4)	<u>—</u> Saturation Visible on Aerial Imagery (C9)
<u>—</u> Algal Mat or Crust (B4)	<u>—</u> Recent Iron Reduction in Tilled Soils (C6)	<u>—</u> Stunted or Stressed Plants (D1)
<u>—</u> Iron Deposits (B5)	<u>—</u> Thin Muck Surface (C7)	<u>—</u> Geomorphic Position (D2)
<u>—</u> Inundation Visible on Aerial Imagery (B7)	<u>—</u> Other (Explain in Remarks)	<u>—</u> Shallow Aquitard (D3)
<u>—</u> Sparsely Vegetated Concave Surface (B8)		<u>—</u> Microtopographic Relief (D4)
		<u>—</u> FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes <u>X</u> No <u>—</u>	Depth (inches): <u>nearby 12"</u>	Wetland Hydrology Present? Yes <u>X</u> No <u>—</u>
Water Table Present? Yes <u>X</u> No <u>—</u>	Depth (inches): <u>to surface</u>	
Saturation Present? Yes <u>X</u> No <u>—</u> (includes capillary fringe)	Depth (inches): <u>to surface</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: <u>Buttressed trunks & elevated roots on many trees</u>		

VEGETATION – Use scientific names of plants.

Sampling Point: Y5

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Acer rubrum</u>	<u>40</u>	<u>X</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)
2. <u>Fraxinus nigra</u>	<u>20</u>	<u>X</u>	<u>FACW</u>	
3. <u>Populus tremuloides</u>	<u>15</u>		<u>FACU</u>	
4. <u>Pinus strobus</u>	<u>15</u>		<u>FACU</u>	
5. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
_____	_____	_____	_____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>) <u>90</u> = Total Cover				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input checked="" type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
1. <u>Betula alleghaniensis</u>	<u>35</u>	<u>X</u>	<u>FACU</u>	
2. <u>Fagus grandifolia</u>	<u>10</u>	<u>X</u>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
Herb Stratum (Plot size: <u>5'</u>) <u>45</u> = Total Cover				Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.
1. <u>Hieracium canadense</u>	<u>10</u>	<u>X</u>	<u>FACU</u>	
2. <u>Osmunda claytoniana</u>	<u>10</u>	<u>X</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <u>X</u> No
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
Woody Vine Stratum (Plot size: <u>30'</u>) <u>_____</u> = Total Cover				
1. <u>None</u>	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	_____ = Total Cover
Remarks: (Include photo numbers here or on a separate sheet.)				

Sampling Point: 15

25

[illegible]²Location: PL=Pore Lining, M=Matrix.

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
☐ Coast Prairie Redox (A16) (LRR K, L, R)
☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
☐ Dark Surface (S7) (LRR K, L, M)
☐ Polyvalue Below Surface (S8) (LRR K, L)
☐ Thin Dark Surface (S9) (LRR K, L)
☐ Iron-Manganese Masses (F12) (LRR K, L, R)
☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

Restrictive Layer (if observed):

none observed

Hydric Soil Present? Yes ☒ No ☐

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Ward Parcel City/County: Cumberland Sampling Date: 5-4-17
 Applicant/Owner: Garrill - Palmer State: ME Sampling Point: U-3/15
 Investigator(s): L. Lederc Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): flat area Local relief (concave, convex, none): — Slope (%): 0%
 Subregion (LRR or MLRA): _____ Lat: 43.83100824 Long: -70.3026788 Datum: NAD83
 Soil Map Unit Name: Woodbridge fine sandy loam NWI classification: UPL
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes _____ No <u>X</u>	If yes, optional Wetland Site ID: <u>U btwn 3/15 385</u>
Wetland Hydrology Present? Yes _____ No <u>X</u>	
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) _____ Surface Water (A1) _____ Water-Stained Leaves (B9) _____ High Water Table (A2) _____ Aquatic Fauna (B13) _____ Saturation (A3) _____ Marl Deposits (B15) _____ Water Marks (B1) _____ Hydrogen Sulfide Odor (C1) _____ Sediment Deposits (B2) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Drift Deposits (B3) _____ Presence of Reduced Iron (C4) _____ Algal Mat or Crust (B4) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Iron Deposits (B5) _____ Thin Muck Surface (C7) _____ Inundation Visible on Aerial Imagery (B7) _____ Other (Explain in Remarks) _____ Sparsely Vegetated Concave Surface (B8)		Secondary Indicators (minimum of two required) _____ Surface Soil Cracks (B6) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>13"</u> (includes capillary fringe)		Wetland Hydrology Present? Yes _____ No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

Sampling Point: U ~~V~~ 3/5

Northcentral and Northeast Region – Version 2.0

Sampling Point: V 3/5

Northcentral and Northeast Region – Version 2.0

TRC - [REDACTED] WETLAND SUMMARY FORM

Observer: L. Leclerc Date: 5-4-17
 Corps plot: Yes ☒ No ☐ Feature ID: 16, VP2, 5th
 REVISIT? Yes ☒ No ☐ If Yes, any changes? ? Yes ☒ No ☐ If yes, Explain:

Dominant NWI Class: Pelt Other NWI Classes: PFO1 E

Representative/Dominant Wetland Vegetation by Strata

Tree Sapling Shrub Herb Vines
Acacia Spil Ile ver Oro sen
Spil

Representative Wetland Hydrology

Permanently Flooded ☐ Seasonally Flooded ☒ Saturated ☒
 (approximate depth -) (approximate depth - 2")

Hydrologic Indicators: ☒ Surface Water; ☒ Water Stained Leaves; ☒ Sediment Deposits;
☒ Sparsely Vegetated Concave Surface; ☒ Water Marks; ☐ Drift Lines;
☒ Surface Scouring; ☒ Drainage Patterns; ☐ Buttressed Trees; ☐ Elevated Roots;
☐ Moss Trim Lines

Other Observations:

Soils

Depth (inches)	Horizon	Matrix Color	Redox Features Color / Percent	Texture	Notes
0-2	A	10YR2/1	-	FSL	
2-11	B	10YR4/2	10YR4/6-10%	FSL	
11+	rocky				

Representative Hydric Soils: ☒ Mineral ☐ Organic

Other Observations:

Free H₂O @ 4" immediately 5dph

Stream # 1 Name:

Stream 1

Width (Top-of-Bank-Top-of-Bank): 5-8 Depth @ Center: 1-4 Perennial ☒ Intermittent ☐

Bank Configuration: ☐ Undercut ☐ Vertical ☒ Gradual

Channel Substrate: ☐ Peat-Muck ☐ Silt-Mud ☒ Sand ☒ Gravel/Cobble ☐ Boulder ☐ Bedrock

Stream # 2 Name:

NA

Width (Top-of-Bank-Top-of-Bank): ☐ Depth @ Center: ☐ Perennial ☐ Intermittent ☐

Bank Configuration: ☐ Undercut ☐ Vertical ☐ Gradual

Channel Substrate: ☐ Peat-Muck ☐ Silt-Mud ☐ Sand ☐ Gravel/Cobble ☐ Boulder ☐ Bedrock

Wildlife Observations/Sign

VP2 w/in

VP 1-6 END
CNCT TO 1

Notes

SKETCH ON BACK

TRC -- [REDACTED] - WETLAND SUMMARY FORM

Observers: L. Leders Date: 5-9-17
 Corps plot: Yes ☒ No ☐ Feature ID: 7
 REVISIT? Yes ☒ No ☐ If Yes, any changes? ? Yes ☐ No ☐ If yes, Explain:

Dominant NWI Class: PFOIF Other NWI Classes:

Representative/Dominant Wetland Vegetation by Strata

Tree	Sapling	Shrub	Herb	Vine
<u>Ac. rub</u>	<u>Betall</u>	<u>Tsugar</u>	<u>Mai can</u>	<u>NA</u>
<u>Betall</u>	<u>Ac. rub</u>	<u>Pingstr</u>	<u>osm cin</u>	
<u>Poptre</u>				
<u>Frasp</u>				

Representative Wetland Hydrology

Permanently Flooded ☐ Seasonally Flooded ☒ Saturated ☒
 (approximate depth -) (approximate depth - 1-2')

Hydrologic Indicators: ☒ Surface Water; ☒ Water Stained Leaves; ☐ Sediment Deposits;
☐ Sparsely Vegetated Concave Surface; ☐ Water Marks; ☐ Drift Lines;
☐ Surface Scouring; ☒ Drainage Patterns; ☐ Buttressed Trees; ☐ Elevated Roots;
☐ Moss Trim Lines
 Other Observations: soap @ headwaters

Soils

Depth (inches)	Horizon	Matrix Color	Redox Features Color / Percent	Texture	Notes
<u>0-8</u>	<u>A:</u>	<u>10YR2/1</u>		<u>S.L</u>	<u>mucky</u>
<u>8-12</u>	<u>B</u>	<u>10YR4/2</u>	<u>10YR4/6</u>	<u>S.L</u>	

Representative Hydric Soils: ☒ Mineral ☐ Organic

Other Observations: Free H₂O & sat. to surface

Stream # 1 Name: N/A
 Width (Top-of-Bank-Top-of-Bank): _____ Depth @ Center: _____ Perennial ☐ Intermittent ☐
 Bank Configuration: _____ Undercut ☐ Vertical ☐ Gradual ☐
 Channel Substrate: _____ Peat-Muck ☐ Silt-Mud ☐ Sand ☐ Gravel/Cobble ☐ Boulder ☐ Bedrock ☐
 Stream # 2 Name: _____
 Width (Top-of-Bank-Top-of-Bank): _____ Depth @ Center: _____ Perennial ☐ Intermittent ☐
 Bank Configuration: _____ Undercut ☐ Vertical ☐ Gradual ☐
 Channel Substrate: _____ Peat-Muck ☐ Silt-Mud ☐ Sand ☐ Gravel/Cobble ☐ Boulder ☐ Bedrock ☐

Wildlife Observations/Sign

passerine birds

Notes wind-throws

SKETCH ON BACK

ATTACHMENT D

2017 Vernal Pool Survey Results



Maine State Vernal Pool Assessment Form



INSTRUCTIONS:

- Complete all 3 pages of form thoroughly. Most fields are required for pool registration.
- Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.

Observer's Pool ID: VPI

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

- a. Observer name: L. Heclerc
- b. Contact and credentials previously provided? ☐ No (submit Addendum 1) ☒ Yes

2. PROJECT CONTACT INFORMATION

- a. Contact name: ☒ same as observer ☐ other _____
- b. Contact and credentials previously provided? ☐ No (submit Addendum 1) ☒ Yes
- c. Project Name: Unknown

3. LANDOWNER CONTACT INFORMATION

- a. Are you the landowner? ☐ Yes ☒ No If no, was landowner permission obtained for survey? ☒ Yes ☐ No
- b. Landowner's contact information (required)
- Name: _____ Phone: _____
- Street Address: _____ City: _____ State: _____ Zip: _____
- c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

- a. Location Township: Cumberland

Brief site directions to the pool (using mapped landmarks):

South of the intersection of Orchard & Whitney Roads in Cumberland, Maine, south of Orchard Rd

b. Mapping Requirements

- i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 43.833867 Latitude/Northing: -70.30517

Coordinate system: WGS 1984

Check one: ☒ GIS shapefile

- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

☐ The pool perimeter is delineated by multiple GPS points. (Excellent)

- Include map or spreadsheet with coordinates.

☐ The above GPS point is at the center of the pool. (Good)

☐ The center of the pool is approximately _____ m ☐ ft ☐ in the compass direction of _____ degrees from the above GPS point. (Acceptable)



Maine State Vernal Pool Assessment Form

VP 1



5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ☐ Isolated depression
☐ Floodplain depression
☒ Pool associated with larger wetland complex
☐ Other: _____

■ Check all wetland types that best apply to this pool:

- | | | | |
|--|---|--|---|
| <input checked="" type="checkbox"/> Forested swamp | <input type="checkbox"/> Wet meadow | <input type="checkbox"/> Slow stream | <input type="checkbox"/> Dug pond or borrow pit |
| <input checked="" type="checkbox"/> Shrub swamp | <input type="checkbox"/> Lake or pond cove | <input type="checkbox"/> Floodplain | <input type="checkbox"/> Roadside ditch |
| <input type="checkbox"/> Peatland (fen or bog) | <input type="checkbox"/> Abandoned beaver flowage | <input type="checkbox"/> Mostly unvegetated pool | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Emergent marsh | <input type="checkbox"/> Active beaver flowage | <input type="checkbox"/> ATV or skidder rut | |

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ☒ Natural ☐ Natural-Modified ☐ Unnatural ☐ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Though perhaps pooled as a result of road, although not likely as there is pooling on opposite side of road

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (required):

- ☐ Permanent
☐ Semi-permanent (drying partially in all years and completely in drought years)
☒ Ephemeral (drying out completely in most years)
☐ Unknown

Explain:

Winterberry & Cinnamon fern & grasses/sedges growing throughout pool bottom

■ Maximum depth at survey: ☒ 0-12" (0-1 ft.) ☐ 12-36" (1-3 ft.) ☐ 36-60" (3-5 ft.) ☐ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 30 m ☒ ft Length: 50 m ☒ ft

■ Predominate substrate in order of increasing hydroperiod:

- ☒ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
☐ Mineral soil (sphagnum moss present)
☐ Organic matter (peat/muck) shallow or restricted to deepest portion
☐ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- | | |
|--|---|
| <input type="checkbox"/> Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.) | <input type="checkbox"/> Wet site ferns (e.g. royal fern, marsh fern) |
| <input type="checkbox"/> Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern) | <input checked="" type="checkbox"/> Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly) |
| <input checked="" type="checkbox"/> Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern) | <input type="checkbox"/> Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes) |
| <input type="checkbox"/> Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle) | <input type="checkbox"/> Aquatic vascular spp. (e.g. pickerelweed, arrowhead) |
| <input type="checkbox"/> Sphagnum moss (anchored or suspended) | <input type="checkbox"/> Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort) |
| | <input type="checkbox"/> No vegetation in pool |

■ Faunal indicators (check all that apply):

- ☐ Fish ☐ Bullfrog or Green Frog tadpoles ☐ Other: none obs

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ☒ No inlet or outlet
☐ Intermittent inlet or outlet
☐ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
☐ Other or Unknown (explain): _____



Maine State Vernal Pool Assessment Form

VPI



6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5-9-17 & 5-10-17

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ☒ Yes ☐ No
- Was the entire pool surveyed for egg masses? ☐ Yes ☒ No; what % of entire pool surveyed? 70%
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae ⁴			
	Visit #1	Visit #2	Visit #3	Confidence Level ¹		Egg Mass Maturity ²		Observed		Confidence Level ¹
Wood Frog	0	0		3						
Spotted Salamander	2	2		3						
Blue-spotted Salamander	0	0		3						
Fairy Shrimp ³	NA	NA		3						

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy shrimp: X = present

4-Tadpoles/larvae: X = present

no WFEH or tadpoles observed

c. Rarity criteria

None observed

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Wood Turtle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Spotted Turtle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Ribbon Snake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ringed Boghaunter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1 = <60%, 2 = 60-95%, 3 = >95%

d. Optional observer recommendation:

- ☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

caddisfly larvae observed in pool

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only

Reviewed by MDIFW Date:

Initials:

This pool is: ☐ Significant ☐ Potentially Significant but lacking critical data ☐ Not Significant due to: ☐ does not meet biological criteria ☐ does not meet MDEP vernal pool criteria.

Comments:



Maine State Vernal Pool Assessment Form



INSTRUCTIONS:

- Complete all 3 pages of form thoroughly. Most fields are required for pool registration.
- Clear photographs of a) the pool AND b) the indicators (one example of each species egg mass) are required for all observers.

Observer's Pool ID: VP 2

MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

- a. Observer name: L. Lederer
- b. Contact and credentials previously provided? ☐ No (submit Addendum 1) ☒ Yes

2. PROJECT CONTACT INFORMATION

- a. Contact name: ☒ same as observer ☐ other _____
- b. Contact and credentials previously provided? ☐ No (submit Addendum 1) ☒ Yes
- c. Project Name: _____

3. LANDOWNER CONTACT INFORMATION

- a. Are you the landowner? ☐ Yes ☒ No If no, was landowner permission obtained for survey? ☒ Yes ☐ No
- b. Landowner's contact information (required)
- Name: _____ Phone: _____
- Street Address: _____ City: _____ State: _____ Zip: _____
- c. ☐ Large Projects: check if separate project landowner data file submitted

4. VERNAL POOL LOCATION INFORMATION

- a. Location Township: Cumberland

Brief site directions to the pool (using mapped landmarks):

Approx 600' to the east of the intersection of Orchard & Whiting roads in Cumberland & approx 300' south of Orchard Rd.

b. Mapping Requirements

- i. USGS topographic map OR aerial photograph with pool clearly marked.

ii. GPS location of vernal pool (use Datum NAD83 / WGS84)

Longitude/Easting: 43.831928 Latitude/Northing: -70.297705

Coordinate system: WGS 1984

Check one: ☒ GIS shapefile

- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (Best)

- ☐ The pool perimeter is delineated by multiple GPS points. (Excellent)
- Include map or spreadsheet with coordinates.

- ☐ The above GPS point is at the center of the pool. (Good)

- ☐ The center of the pool is approximately _____ m ☐ ft ☐ In the compass direction of _____ degrees from the above GPS point. (Acceptable)



Maine State Vernal Pool Assessment Form

VP 2 

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ☐ Isolated depression ☒ Pool associated with larger wetland complex
☐ Floodplain depression ☐ Other: _____

■ Check all wetland types that best apply to this pool:

- | | | | |
|---|---|--|---|
| <input type="checkbox"/> Forested swamp | <input type="checkbox"/> Wet meadow | <input type="checkbox"/> Slow stream | <input type="checkbox"/> Dug pond or borrow pit |
| <input checked="" type="checkbox"/> Shrub swamp | <input type="checkbox"/> Lake or pond cove | <input type="checkbox"/> Floodplain | |
| <input type="checkbox"/> Peatland (fen or bog) | <input type="checkbox"/> Abandoned beaver flowage | <input type="checkbox"/> Mostly unvegetated pool | <input type="checkbox"/> Roadside ditch |
| <input type="checkbox"/> Emergent marsh | <input type="checkbox"/> Active beaver flowage | <input type="checkbox"/> ATV or skidder rut | <input type="checkbox"/> Other: _____ |

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ☒ Natural ☐ Natural-Modified ☐ Unnatural ☐ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale in box (required):

- ☐ Permanent ☐ Semi-permanent (drying partially in all years and completely in drought years) ☒ Ephemeral (drying out completely in most years) ☐ Unknown

Explain:

Shallow depth with winterberry growing throughout pool

■ Maximum depth at survey: ☒ 0-12" (0-1 ft.) ☐ 12-36" (1-3 ft.) ☐ 36-60" (3-5 ft.) ☐ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 30 m ☒ ft Length: 45 m ☒ ft

■ Predominate substrate in order of increasing hydroperiod:

- ☒ Mineral soil (bare, leaf-litter bottom, or upland mosses present) ☐ Organic matter (peat/muck) shallow or restricted to deepest portion
☐ Mineral soil (sphagnum moss present) ☐ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- | | |
|---|---|
| <input checked="" type="checkbox"/> Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.) | <input type="checkbox"/> Wet site ferns (e.g. royal fern, marsh fern) |
| <input type="checkbox"/> Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern) | <input checked="" type="checkbox"/> Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly) |
| <input type="checkbox"/> Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern) | <input type="checkbox"/> Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes) |
| <input type="checkbox"/> Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle) | <input type="checkbox"/> Aquatic vascular spp. (e.g. pickerelweed, arrowhead) |
| <input type="checkbox"/> Sphagnum moss (anchored or suspended) | <input type="checkbox"/> Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort) |
| | <input type="checkbox"/> No vegetation in pool |

■ Faunal indicators (check all that apply): None obs.

- ☐ Fish ☐ Bullfrog or Green Frog tadpoles ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ☐ No inlet or outlet ☐ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
☒ Intermittent inlet or outlet ☐ Other or Unknown (explain): wetland seep above, wetland seep below → stream



Maine State Vernal Pool Assessment Form

VP2



6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5-4-17 & 5-10-17

b. Indicator abundance criteria and pool survey effort

- Is pool depression bisected by 2 ownerships (straddler pool)? ☐ Yes ☒ No
- Was the entire pool surveyed for egg masses? ☒ Yes ☐ No; what % of entire pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)						Tadpoles/Larvae ⁴			
	Visit #1	Visit #2	Visit #3	Confidence Level ¹		Egg Mass Maturity ²		Observed		Confidence Level ¹
Wood Frog	0	0		3						
Spotted Salamander	9	9		3						
Blue-spotted Salamander	0	0		3						
Fairy Shrimp ³	NA	NA		3						

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%

2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (loose matrix, curved embryos), H= Hatched or Hatching

3-Fairy shrimp: X = present

4-Tadpoles/larvae: X = present

mosquito larvae observed
no wood frog egg masses
or tadpoles observed

c. Rarity criteria None observed

- Note any rare species associated with vernal pools. Observations should be accompanied by photographs.

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Wood Turtle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Spotted Turtle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Ribbon Snake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ringed Boghaunter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

*Method of verification: P = Photographed, H = Handled, S = Seen

**CL - Confidence level in species determination: 1 = <60%, 2 = 60-95%, 3 = >95%

d. Optional observer recommendation:

- ☐ SVP ☐ Potential SVP ☒ Non Significant VP ☐ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date: _____ Initials: _____

This pool is: ☐ Significant ☐ Potentially Significant but lacking critical data ☐ Not Significant due to: ☐ does not meet biological criteria. ☐ does not meet MDEP vernal pool criteria.

Comments:

555M 1111

Traffic Assessment

Orchard Road Subdivision – Cumberland, Maine

October 2017

Introduction

Gorrill Palmer has completed a traffic assessment for the proposed Orchard Road Subdivision on Orchard Road in Cumberland, Maine. The site is proposed to be accessed via a full movement driveway on Orchard Road, approximately 750 ft south of its intersection with Whitney Road. The development is proposed to be a 10 lot subdivision for 10 single family homes. The following is a summary of the trip generation, crash history, and sight distance evaluation for the proposed project.

Trip Generation

The trip generation for the proposed 10 single family houses has been calculated using the Institute of Transportation Engineers' (ITE) publication, *Trip Generation*, Ninth Edition, Land Use Code (LUC) 210 – Single-Family Detached Housing. The proposed development is forecast to generate the following:

- Weekday: 95 trip ends
- AM peak hour of the generator: 8 trip ends
- PM peak hour of the generator: 10 trip ends
- AM peak hour of the adjacent street: 8 trip ends
- PM peak hour of the adjacent street: 10 trip ends
- Saturday: 99 trip ends
- Saturday Peak hour of the generator: 9 trip ends

This level of trip generation is not anticipated to have a significant impact on the surrounding roadway network. Additionally, the forecast trip generation is less than the threshold of 99 trip ends during a peak hour for requiring a MaineDOT Traffic Movement Permit.

Crash History

GP obtained the three year collision data in the vicinity of the site from MaineDOT (attached) for the period of 2014 to 2016, the most recent period available. To evaluate if a location has a higher rate of crashes, MaineDOT uses two criteria to define a High Crash Location (HCL). Both criteria must be met in order to be classified as an HCL.



1. A critical rate factor (CRF) of 1.00 or more for a three year period. A CRF compares the actual crash rate to the rate for similar intersections in the state. A CRF of less than 1.00 indicates a rate of less than average **and**:
2. A minimum of eight crashes over the same three year period.

Based on a review of the collision data, there are no HCLs in the vicinity of the site.

Sight Distance Evaluation

GP evaluated the sight distance at the proposed site access on Orchard Road. Both the Town and MaineDOT have guidelines for sight distance. The basic sight distance standards are as follows:

Standards for Sight Distance

Posted Speed (mph)	Sight Distance Requirement (ft)	
	Town of Cumberland	MaineDOT
25	250	200
30	300	250
35	350	305
40	400	360
45	450	425
50	500	495

The Town does not specify an evaluation method, so the sight distance has been evaluated using MaineDOT methodology. The evaluation methodology is as follows:

Driveway observation point:	10 feet off edge of traveled way
Height of eye at driveway:	3 ½ feet above ground
Height of approaching vehicle:	4 ¼ feet above ground

The speed limit on Orchard Road is 35 mph. The Town requires a sight distance of 350 ft and MaineDOT requires a sight distance of 305 ft. The following table summarizes the measured sight distances at the proposed subdivision road:

Existing Sight Distance Summary

Approach	Sight Distance (ft)			
	Looking Left	Looking Right	Requirement	
			Town	MaineDOT
Exiting Subdivision onto Orchard	275	340	350	305



As shown in the table, the existing sight distances are forecast to be less than the sight distances required by the Town and MaineDOT. However, if vegetation in the sight triangle is cleared, the sight distances are anticipated to exceed the Town and MaineDOT requirements. Looking left, if trees are removed adjacent to the site access, the sight distance is anticipated to be greater than 450 ft. Looking right, if brush is cleared along the roadway, the sight distance is anticipated to be 360 ft. The sight distance should be evaluated throughout construction of the site access, to ensure the Town and MaineDOT requirements are met.

Conclusions

The following is a summary of the conclusions:

1. The proposed project is forecast to generate 8 trip ends and 10 trip ends during the Weekday AM and PM peak hours of the generator respectively. This is less than the 99 trip end threshold for requiring a MaineDOT Traffic Movement Permit.
2. Based on a review of the MaineDOT crash data, there are no high crash locations in the vicinity of the site.
3. The sight distances at the site driveway are anticipated to meet the MaineDOT and Town requirements, with the removal of vegetation along the roadway adjacent to the site access.
4. Overall the project is anticipated to have minimal impact on the surrounding roadway network.

This narrative is in response to Town review comments dated November 15, 2017 and peer review comments from Daniel P. Diffin, P.E. of Sevee & Maher Engineers, Inc., dated November 14, 2017 for the Preliminary Subdivision Application for the Orchard Road Subdivision submitted in October 2017. The responses are reflected in the current plan set for the project.

For ease of review each comment as been repeated followed by our response.

Fire Chief's review comments

Comment:

The application material for this subdivision project does not show any fire protection requirements as mandated by the Town of Cumberland's ordinances which include, but are not limited to, the following:

- 1. As denoted in the project drawings, all dwellings in this subdivision shall include an automatic fire protection sprinkler system conforming to applicable National Fire Protection Association (NFPA) standards, State of Maine Fire Marshal's Office mandates and approval by the Cumberland Fire Chief.*
- 2. It is recommended, **but not required**, to have monitored fire alarm systems in each residence.*
- 3. It is recommended, **but not required**, to have fire department approved key boxes on each residence.*

Response: Sheet 4 Subdivision Plan, and Sheet 5 Overall Layout and Utility Plan, submitted with the Preliminary Subdivision application contain notes requiring sprinkler systems for all residential buildings within the subdivision.

Town Planner's review comments

Comment:

- 1. The Restrictions on Restricted Buffer Area should be referenced as a note on the plan.*

Response: The following notes have been added to the Subdivision Plan.

- 1. Restrictions on Restricted Buffer Area. The Restricted Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Restricted Buffer Area to filter and absorb stormwater, the use of the Restricted Buffer Area is hereinafter limited as follows.*
 - a. No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material may be placed, stored or dumped on the Restricted Buffer Area, nor may the topography of the area be altered or manipulated in any way;*
 - b. Any removal of trees or other vegetation within the Restricted Buffer Area must be limited to the following:*
 - (i) No purposefully cleared openings may be created and an evenly distributed stand of trees and other vegetation must be maintained. An "evenly distributed stand of trees" is defined as maintaining a minimum rating score of 24 points in any 50 foot by 50 foot square (2500 square feet) area, as determined by the following rating scheme:*



Diameter of tree at 4 1/2 feet above ground level	Points
2-4 inches	1
4-8 inches	2
8-12 inches	4
>12 inches	8

Where existing trees and other vegetation result in a rating score less than 24 points, no trees may be cut or sprayed with biocides except for the normal maintenance of dead, wind-blown or damaged trees and for pruning of tree branches below a height of 12 feet provided two thirds of the tree's canopy is maintained;

- (ii) No undergrowth, ground cover vegetation, leaf litter, organic duff layer or mineral soil may be disturbed except that one winding path, that is no wider than six feet and that does not provide a downhill channel for runoff, is allowed through the area;
- c. No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Restricted Buffer Area, except for a sign, utility pole or fence;
- d. No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Restricted Buffer Area;

Any activity on or use of the Restricted Buffer Area inconsistent with the purpose of these Restrictions is prohibited.

Comment:

- 2. *If Lot 10 is developed, there will be a break in the 75' perimeter buffer required for clustered subdivisions.*

Response: The land swap has been finalized, Lot 10 can be developed without impacting the 75' buffer.

Comment:

- 3. *Please confirm that there are no identified trails on the site.*

Response: The Applicant is not aware of any existing trails.

Comment:

- 4. *Landscaping and buffering plan?*

Response: The perimeter of the subdivision lots will contain a minimum 75 foot wooded buffer as shown on the plans. Landscaping of the existing forested buffer is not proposed with the exception of six blue spruce trees between the road and Lot A. See the Overall Layout and Utility Plan Sheet 5 of the plan set.

Comment:

- 5. *Provide a Subdivision Road name that is acceptable to Public Safety Chiefs.*



Response: The road name as approved by John E. Brushwein, the Town of Cumberland Tax Assessor is Cortland Court.

Comment:

6. *Clearing to obtain necessary sight distances should be done prior to final review; however removal of vegetation is limited to brush, not tree, clearing.*

Response: Brush clearing to the east of the proposed roadway has been completed. A clump of four six inch diameter trees will need to be removed from the Orchard Road right-of-way in order to provide the necessary sight distance. As directed by the comment, the trees have not been cut.

Sevee and Maher review comments

Comment:

1. *Section 250-1.J. – Financial Capacity - SME recommends the applicant provide evidence of Financial Capacity*

Response: A financial Capacity Letter is included in Attachment E.

Comment:

2. *Section 250-19 – Review and approval by other agencies - SME understands that stormwater and wetlands permitting are underway for the project.*

Response: The Applicant has received the MDEP Stormwater Permit and the ACOE Category 2 permit. The permits are included in Attachment F.

Comment:

3. *Section 250-23 Preservation of natural and historic features - The proposed underdrain soil filters will create large areas of clearing in the proposed open space and are designed adjacent to the existing wetland areas. Please provide detail on the required sizing of the soil filters, storage area and if a lower impact alternative has been reviewed.*

Response: The proposed grassed underdrained soil filters perform two tasks, 1) provide peak flow control as required by the Town's ordinance, and 2) provide water quality control as required by MDEP. Control for the peak flow in order to limit the post development peak runoff to predevelopment levels has few options. A detention pond is an accepted control. If detention wasn't required by the Town Ordinance, a lower impact water quality treatment could be utilized. The open space required for the subdivision is 25% of the parcel area. The open space provided is 33.3% including the grassed underdrained soil filters. Removing the grassed underdrained soil filter area from the proposed open space results in 29.8 % of open space provided, which exceeds the requirements. The storage aspects of the grassed underdrained soil filters are included in the stormwater report submitted with the preliminary subdivision application. The water quality sizing of the ponds as required for the MDEP Stormwater Permit was included with that submission and copied to the Town.

Comment:

4. *Section 250-23 Preservation of natural and historic features - The Maine Historic Preservation Commission (MHPC) has been contacted. SME recommends that the final review letter be provided with the final plan application.*

Response: Gorrill Palmer has received the reply from the MHPC which states that there will be no historic properties affected by the proposed undertaking. The response letter is included in Attachment G.

Comment:



5. *Section 250-27 – Utilities - It appears that there is a 10-foot wide drainage easement on Lot 10 that should be labeled an Utility Easement for access to the transformer.*

Response: The label has been revised.

Comment:

6. *Section 250-29 Sewage Disposal - Groundwater Impact Study - As depicted, the nitrate-nitrogen plume length for Lot 5 will be influenced by the plume from Lot 6. The groundwater impact study report does not address this condition.*

Response: The report has been revised to reflect 4-bedroom homes. The nitrate plume from one lot will have minimal impact to the plume on an adjacent lot. The extent of the 10 mg/L plume for each lot will remain within the subdivision boundary as depicted in the Groundwater Impact Study for the project.

Comment:

7. *Section 250-29 Sewage Disposal - Groundwater Impact Study - The nitrate-nitrogen study was completed for 3-bedroom homes. Is it the intent of the applicant to limit the design of the homes to 3-bedrooms only?*

Response: The study has been revised to reflect 4-bedroom homes. The revised groundwater impact study is included in Attachment H.

Comment:

8. *Section 250-29 Sewage Disposal - Groundwater Impact Study - The proposed subsurface disposal field location for Lot 7 shows what appears to be a zero-foot setback to the adjoining open space property line, and the fill extension for this proposed disposal field (as depicted) would almost certainly extend into the open space. It is recommended that the disposal field for Lot 7 be depicted with required setbacks of 10-feet in the final approved subdivision application.*

Response: The location of the subsurface systems have been revised to provide the necessary setbacks.

Comment:

9. *Section 250-29 Sewage Disposal - Groundwater Impact Study - The well exclusion zones as depicted would allow for a well to be installed 100 feet directly downgradient of a disposal field plume. SME recommends that the well exclusion zones be expanded to remove lot areas directly downgradient of the nitrate plumes.*

Response: The proposed well exclusion zones have been revised to provide additional setbacks on the affected lots. Proposed wells will be installed in accordance with applicable regulations.

Comment:

10. *Section 250-29 Sewage Disposal - Groundwater Impact Study - While it is unlikely that a dug or overburden well would be constructed for water supply, SME recommends that dug wells or overburden wells be prohibited on-site for drinking water supply.*

Response: A note is included on the subdivision plan prohibiting dug wells or overburden wells.

Comment:

11. *Section 250-29 Sewage Disposal - Groundwater Impact Study - If significant modifications are necessary to accommodate future building plans on a lot, then it is recommended that a revised groundwater impact study be prepared by a qualified Professional Engineer or Certified Geologist licensed in the State of Maine and submitted to the Town.*

Response: No reply necessary.



Comment:

12. Section 250-32 through 250-34 – Street Design and Construction standards - In existing conditions, there is not adequate sight distance at the intersection with Orchard Road, in either direction. The Applicant proposes removal of vegetation on both sides to provide adequate sight distance. SME recommends that removal of vegetation to provide the required sight distances be a condition of the Planning Board approval and the area be identified on the Subdivision Plan to be recorded.

Response: A note requiring removal of trees to improve sight distance is shown on the Subdivision Plan.

Comment:

13. Section 250-44 – Fire Protection - Please provide information on fire protection.

Response: Sheet 4 Subdivision Plan, and Sheet 5 Overall Layout and Utility Plan, submitted with the Preliminary Subdivision application contain notes requiring sprinkler systems for all residential buildings within the subdivision.

Comment:

14. Section 250-49 – Waivers and modifications. - Trees 10-inch diameter or more: SME recommends approval of this waiver.

Response: No response necessary.

Comment:

15. Section 250-49 – Waivers and modifications. - High Intensity Soil Survey: A wetland delineation and soil test pit information are consistent with the soils and geological map information provided in the Application. SME recommends approval of this waiver.

Response: No response necessary.

Comment:

16. Section 250-49 – Waivers and modifications. - Soil boundaries and names superimposed on plot plan: SME recommends approval of this waiver.

Response: No response necessary.

Comment:

17. Section 250-49 – Waivers and modifications. - Building locations: SME recommends approval of this waiver.

Response: No response necessary.

Comment:

18. Section 250-49 – Waivers and modifications. - Location of temporary markers in field: SME recommends approval of this waiver.

Response: No response necessary.

Comment:

19. SME recommends that space and bulk standards and notes from the Overall Layout and Utility Plan be added to the Subdivision Plan to be recorded.

Response: The standards and notes have been added to the Subdivision Plan.

Comment:

20. SME recommends that the transformer easements be labeled on the Subdivision Plan to be recorded.



Response: The transformer easements have been added to the Subdivision Plan.

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NARRATIVE

Final Plan Submission

The following narrative addresses the final subdivision application submittal requirements.

Chapter 250 -7.D.2

- a) Written approval from the MDEP and the ACOE is included in Attachment F.
- b) Individual wells are proposed for water service.
- c) Individual subsurface wastewater disposal systems are proposed for each lot. See Attachment H for Groundwater Impact Study. The individual lot owners will be responsible for obtaining a subsurface wastewater disposal system design for their lot.
- d) A solid waste disposal plan has not been provided. It has been assumed that municipal solid waste disposal will be provided.
- e) The stormwater management plan has been reviewed and approved by the MDEP as part of the Stormwater Permit application. See Attachment F for MDEP approval.

Chapter 250 -7.D.6

- b) The following construction schedule is submitted as required for the performance guarantee. The opinion of cost follows this page.

The following construction sequence shall be required to insure the effectiveness of the erosion and sedimentation control measures are optimized:

It is anticipated that construction of the Subdivision roadway and related infrastructure will commence in Spring of 2018 and be completed by Winter of 2018.

Note: For all grading activities, the contractor shall exercise extreme caution not to overexpose the site, this shall be accomplished by limiting the disturbed area.

- 1. Install stabilized construction entrance at the intersection of the proposed roadway and Orchard Road.
- 2. Install perimeter silt fence and/or wood waste berms prior to grubbing respective areas.
- 3. Clear and grub roadway and stormwater management areas using caution not to overexpose the site. Install stone check dams at any evident concentrated flow discharge points.
- 4. Commence earthwork and grading to subgrade.
- 5. Commence installation of drainage appurtenances.
- 6. Commence construction grassed underdrained soil filter.
- 7. Commence installation of electric/cable/telephone lines.
- 8. Complete remaining earthwork operations.
- 9. Complete installation of catch basins and appurtenances.

10. Install sub-base and base gravel within roadway.
11. Install curbing along the streets as needed.
12. Install base course paving for roadway.
13. Loam, lime, fertilize, seed and mulch disturbed areas.
14. Install surface course paving for roadway. Stripe per plan.
15. Once the site is stabilized and a 90% catch of vegetation has been obtained, remove all temporary erosion control measures.
16. Touch up loam and seed.

PURCHASE AND SALE AGREEMENT

AGREEMENT made this 21st day of MAY, 2018, by and between Zachary O. Davis and Jenny J. Davis (hereinafter called "Davis") and TZ Properties, LLC (hereinafter called "TZ").

In consideration of the covenants hereinafter set forth, Davis and TZ hereby agree as follows:

1. Purchase and Sale. Davis and TZ hereby agree to exchange parcels of land and agree that TZ will pay a sum of money in addition to conveying a parcel of land to Davis. In particular, TZ agrees to convey to Davis the unimproved land situated in Cumberland, Maine, consisting of .47 acres, more or less, further described in Exhibit A attached hereto. Davis agrees to convey to TZ abutting unimproved land situated in Cumberland, Maine, consisting of .46 acres, more or less, further described in Exhibit B attached hereto.

2. Purchase Price. The total purchase price to be paid by TZ (in addition to its conveyance of the above-described parcel to Davis) for the Property to be conveyed by Davis shall be Three Thousand Five Hundred Dollars (\$ 3500) payable by certified or bank check immediately upon approval of TZ's subdivision application by the Town of Cumberland. Davis will have no obligation to make any cash payment to TZ. The obligation of TZ to make this cash payment shall survive the closing.

3. Closing. Closing shall occur, except as may otherwise be provided herein, on or before JUNE 1, 2018, at the offices of DESMOND & RAND, Maine or shall occur at any other time, date and/or other place as may be agreed upon in writing by the parties hereto. The closing shall involve the exchange of parcels of real estate, but not the \$3500 cash payment above-referenced, which shall be made subsequent to closing and upon the final approval of the subdivision.

4. Conditions to Closing. This Agreement is subject to the following conditions precedent to closing:

(a) TZ shall not be required to pay the \$3500 above-referenced unless and until it receives final approval for its pending application for approval of a subdivision situated on Orchard Road, Cumberland, Maine, from the Cumberland Town Planning Board.

(b) The title to each parcel to be exchanged shall be marketable.

5. Conveyance; Title. At the Closing, each party shall execute and deliver to the other a good and sufficient deed with quitclaim covenant conveying to the respective grantee the parcel in fee simple, with good and marketable title thereto, free and clear of all liens and encumbrances. In the event that either party on the Closing Date cannot deliver title in such

IN WITNESS WHEREOF, the parties hereto, hereunto duly authorized, have executed and delivered this Agreement as of the day and year first above written.

Yvonne Lambert
Witness

Yvonne Lambert
Witness

Yvonne Lambert
Witness

Zachary O. Davis
Zachary O. Davis

Jenny J. Davis
Jenny J. Davis

TZ Properties, LLC

ZAREH DERHAKOPIAN

Zachary O. Davis
By:
Its: PRESIDENT

condition, the Closing Date shall be postponed for a period of thirty (30) days, and such conveying party shall use its best efforts to remove the title defect during such thirty (30) day period. If such defect cannot be removed by such conveying party during such thirty (30) day period, the other party may either (a) terminate this Agreement, in which case all parties hereto shall be released from their obligations hereunder; or (b) consummate the purchase of the Property in accordance with this Agreement, accepting such title as such conveying party is able to convey, with appropriate adjustment of the consideration.

6. Possession; Transfer Tax; Real Estate Tax; Income Tax Withholding, Pro-rations. At closing, each party will acquire the right to immediate possession of the parcel conveyed to it. The parties will each pay their respective share of the Maine state transfer tax due with respect to each parcel exchanged..

All real estate taxes will be pro-rated as of the date of closing. Each conveying party is responsible for any unpaid taxes for prior years, including any interest or penalties thereon.

7. Default. In the event of default by either party, the other shall have all its remedies at law or in equity, including the right to specific performance.

8. Other Terms and conditions: TZ agrees to plant six (6) evergreen trees to serve as a buffer along the property line of the lot it will acquire hereunder and the access road to the lots in the subdivision. This obligation shall survive the closing.

9. Notices. Any notice required or permitted hereunder shall be either hand delivered or mailed by certified mail, return receipt requested as follows:

To TZ: _____

To Davis: _____

10. Miscellaneous. This Agreement shall be binding upon the heirs, successors, personal representatives, and assigns of the parties hereto. This Agreement represents the entire agreement of the parties; all prior discussions, representations and agreements are integrated herein; and any modification or amendment hereby shall be in writing, signed by the parties hereto. This Agreement shall be interpreted in accordance with the laws of the State of Maine.

EXHIBIT A

Proposed Description

TZ Properties, LLC to Zachary O. & Jenny J. Davis

Orchard Road, Cumberland, Maine

December 13, 2017

A certain lot or parcel of land located on the southwesterly side of Orchard Road in the Town of Cumberland, County of Cumberland, State of Maine, bounded and described as follows:

Beginning at a capped iron rod found (PLS 1175) on the southwesterly sideline of Orchard Road at the easterly corner of land now or formerly of Zachary O. Davis and Jenny J. Davis as described in a deed recorded in the Cumberland County Registry of Deeds in Book 33622, Page 303. Thence:

- (1) S 53°49'19" E by said Orchard Road a distance of Fifty-Seven and 50/100 (57.50) feet to a point and remaining land of the Grantor;
- (2) S 36°39'29" W by said remaining land of the Grantor a distance of Two Hundred Forty-Three and 33/100 (243.33) feet to a point of curvature;
- (3) Southwesterly by said remaining land of the Grantor, following a curve to the right having a radius of Two Hundred and 00/100 (200.00) feet, an arc distance of One Hundred Seven and 43/100 (107.43) feet to a point, said point being located S 52°02'45" W a distance of One Hundred Six and 14/100 (106.14) feet from the last mentioned point;
- (4) N 51°56'28" W by said remaining land of the Grantor a distance of Thirty-Seven and 77/100 (37.77) feet to a point and the southeasterly sideline of said land of Davis;
- (5) N 38°03'32" E by said land of Davis a distance of Three Hundred Forty-Four and 36/100 (344.36) feet to the point of beginning.

The above described parcel contains 20,370 square feet, or 0.47 acres, and being a portion of property described in a deed to TZ Properties, LLC as described in a deed recorded in the Cumberland County Registry of Deeds in Book 34200, Page 67. Bearings are referenced to Grid North, Maine State Plane Coordinate System, West Zone (NAD83).

Reference is herein made to a Plan of Standard Boundary Survey made for Gorrill-Palmer by Titcomb Associates dated September 29, 2017 and revised December 13, 2017. Reference is also made to a Boundary Survey of Remaining Land Now of Virginia H. Ward made for Virginia H. Ward by Brian Smith at Sitelines, PA dated January 18, 2017.

EXHIBIT B

Proposed Description

Zachary O. & Jenny J. Davis to TZ Properties, LLC

Orchard Road, Cumberland, Maine

December 13, 2017

A certain lot or parcel of land located on the southwesterly side of, but not adjacent to, Orchard Road in the Town of Cumberland, County of Cumberland, State of Maine, bounded and described as follows:

Beginning at a capped iron rod found (PLS 1175) at the southeasterly corner of the Grantor at a corner of land now or formerly of TZ Properties, LLC as described in a deed recorded in the Cumberland County Registry of Deeds in Book 34200, Page 67. Thence:

- (1) N 51°56'28" W by said land of TZ Properties, LLC a distance of Two Hundred and 50/100 (200.50) feet to a capped iron rod found (PLS 1175);
- (2) N 38°03'32" E by said land of TZ Properties, LLC a distance of One Hundred and 66/100 (100.66) feet to a point and the southwesterly corner of remaining land of the Grantor;
- (3) S 51°56'28" E by said remaining land of the Grantor a distance of Two Hundred and 50/100 (200.50) feet to a point and land of said TZ Properties, LLC;
- (4) S 38°03'32" W by said land of TZ Properties, LLC a distance of One Hundred and 66/100 (100.66) feet to the point of beginning.

The above described parcel contains 20,183 square feet, or 0.46 acres, and being a portion of property described in a deed to Zachary O. Davis and Jenny J. Davis recorded in the Cumberland County Registry of Deeds in Book 33622, Page 303. Bearings are referenced to Grid North, Maine State Plane Coordinate System, West Zone (NAD83).

Reference is herein made to a Plan of Standard Boundary Survey made for Gorrill-Palmer by Titcomb Associates dated September 29, 2017 and revised December 13, 2017. Reference is also made to a Boundary Survey of Remaining Land Now of Virginia H. Ward made for Virginia H. Ward by Brian Smith at Sitelines, PA dated January 18, 2017.



UBS Financial Services Inc.
One City Center 7th Floor
Portland, ME 04101
ubs.com/fs

Confirmation

November 16, 2017

**Confirmation: Information regarding the credit line account of TZ Properties LLC
C/o Zareh Derhagopian -- UBS Account Number: 5Vxxx37**

I am writing in response to your request for verification of information concerning the UBS Financial Services Inc. ("UBS") account of TZ Properties LLC. As of the close of business on Wednesday, November 15, 2017, the above mentioned credit line account had cash available in excess of \$600,000.

Please be aware this account is linked to a securities account and is not a "bank" account. Securities, mutual funds and other non-deposit investment products are not FDIC-insured or bank guaranteed and are subject to market fluctuation. The above-referenced account value may reflect assets not held at UBS.

Questions

If you have any questions about this information, please contact Katie Ouellette at 207-791-5526.

UBS Financial Services is a member firm of the Securities Investor Protection Corporation (SIPC).

Sincerely,

Katie Ouellette, RP®
Wealth Management Associate
Senior Registered Client Service Assoc.
UBS Financial Services Inc.

Ground Breaking Excavation Inc.
460 Greely Rd Ext
Cumberland, ME 04021 US
(207) 650-1930
groundbreakr@gmail.com

Estimate

ADDRESS

Zareh Derhagopian
23 Stormy Brook Rd
Falmouth, ME 04105

ESTIMATE #

1213

DATE

11/12/2017

Please detach top portion and return with your payment.

ACTIVITY

AMOUNT

RE: Orchard Rd Subdivision. Cumberland, ME

Estimate includes: Erosion control, cutting trees, stumping and disposal, grubbing/installing @1500' of 26' wide road with base and finish gravel, allowance for testing, installing culverts/crossings, catch basins and grassed underdrains. Installing underground utilities(power/cable/tele). Installing curbing after base coat paving. Loaming/seeding/mulching the disturbed areas.

Estimate does not include: Surveys, paving, signs, landscaping.

Erosion Control, mulch, silt fence, construction entrance, Cutting trees.	8,000.00
Stumping/grinding on site/installing @1500' of 26' wide gravel road with cross culverts:	
Cat 312 Excavator	60,000.00
Skid-Steer	40,000.00
Trucking	20,000.00
Labor	7,000.00
Vibratory Roller, 52"	3,375.00
Disposal Fees/ Grinding stumps	10,000.00
Sieve test allowance	700.00
Sand	30,000.00
4" Crushed Gravel	46,800.00
1 1/2 Crushed Gravel	12,390.00
3/4" Crushed Stone	7,200.00
Insulation	2,880.00
36" N-12 Culvert	4,000.00

Ground Breaking Excavation Inc.

460 Greely Rd Ext
Cumberland, ME 04021 US
(207) 650-1930
groundbreakr@gmail.com

Estimate

ADDRESS
Zareh Derhagopian
23 Stormy Brook Rd
Falmouth, ME 04105

ESTIMATE # DATE
1213 11/12/2017

Please detach top portion and return with your payment.

ACTIVITY	AMOUNT
RE: Orchard Rd Subdivision. Cumberland, ME	
Estimate includes: Erosion control, cutting trees, stumping and disposal, grubbing/installing @1500' of 26' wide road with base and finish gravel, allowance for testing, installing culverts/crossings, catch basins and grassed underdrains. Installing underground utilities(power/cable/tele). Installing curbing after base coat paving. Loaming/seeding/mulching the disturbed areas.	
Estimate does not include: Surveys, paving, signs, landscaping.	
Erosion Control, mulch, silt fence, construction entrance, Cutting trees.	8,000.00
Stumping/grinding on site/installing @1500' of 26' wide gravel road with cross culverts:	
Cat 312 Excavator	60,000.00
Skid-Steer	40,000.00
Trucking	20,000.00
Labor	7,000.00
Vibratory Roller, 52"	3,375.00
Disposal Fees/ Grinding stumps	10,000.00
Sieve test allowance	700.00
Sand	30,000.00
4" Crushed Gravel	46,800.00
1 1/2 Crushed Gravel	12,390.00
3/4" Crushed Stone	7,200.00
Insulation	2,880.00
36" N-12 Culvert	4,000.00

ACTIVITY	AMOUNT
72" N-12 Culvert	5,760.00
15" N-12 Culvert	3,080.00
12" N/12 Smooth Bore Culvert	5,720.00
4' Catch Basins w/grates	5,000.00
Misc Fittings/pipe	1,000.00
Silt Sack, Erosion control for CB's	405.00
Catch Basin Snout	2,000.00
6" Rip Rap	3,600.00
Granite curb and concrete curb install:	
New granite curb installed.	3,600.00
Concrete curb installed	29,900.00
Underground conduit/transformers:	
Cat 312 Excavator	10,000.00
Skid-Steer	3,000.00
Trucking	3,200.00
Labor	2,000.00
Sand	3,800.00
Transformer Pads (Fiberglass))	3,325.00
4" Sched 40 Conduit, 2 runs (2.90 ft)	12,180.00
2 1/2" Conduit, 2 runs	7,350.00
Misc Fittings	500.00
Grassed underdrains:	
2, Grassed underdrain install.	35,000.00
Loaming/seeding disturbed areas:	
Cat 312 Excavator	8,400.00
Trucking	3,840.00
Skid-Steer	2,850.00
Labor	2,400.00
Screened Loam	13,200.00
Lawn Install, Seed, Fert, Mulch	6,400.00
TOTAL	\$429,855.00



WESCO
DISTRIBUTION®

200 PERIMETER ROAD
603-627-4659
MANCHESTER NH 03103

Quotation

UNLESS THERE ARE DIFFERENT OR ADDITIONAL TERMS AND CONDITIONS CONTAINED IN A MASTER AGREEMENT THAT MODIFY WESCO'S STANDARD TERMS, BUYER AGREES THAT THIS QUOTE AND ANY RESULTING PURCHASE ORDER WILL BE GOVERNED BY WESCO'S TERMS AND CONDITIONS DATED 011107 AVAILABLE AT [HTTP://WWW.WESCO.COM/TERMS AND CONDITIONS OF SALE.PDF](http://www.wesco.com/terms_and_conditions_of_sale.pdf), WHICH TERMS ARE INCORPORATED HEREIN BY REFERENCE AND MADE PART HEREOF. PLEASE CONTACT THE SELLER IDENTIFIED ON THIS QUOTE IF YOU REQUIRE A PRINTED COPY.

To: RUDY ALHQUIST
20 SMALL POND RD
TZ PROPERTIES / ORCHARD SUBDIV
GORHAM ME 040382091

Date: 04/10/18

Branch: 1120

Project Number: ORCHARD RD SUB

Project Name

Quoted To:

Date of Your Inquiry: 04/10/18

When ordering please refer
to Quotation Number: 527483

Item	Quantity	Catalog Number and Description	Unit Price	U/M	Total Price	Rate of Cash Discount	Shipping Time (Weeks)	Customer Delivery Date
10	3475	OKON 161-23-3060 2AL-15KV-URD 280 REEL PUT UPS OF 1 X 915'- 1 X 1,200'- 1 X 1360'.	2230.000	M	7749.25	0.00		04/19/18
23	8	T&B 162LR-B-5220 15KV 200A LB ELB	32.000	E	256.00	0.00		04/19/18
33	8	3M 8452 CABLE ACCESSORY SEALING K	12.500	E	100.00	0.00		04/19/18
43	1	T&B 161SOP STAND OFF PLUG 15KV	38.500	E	38.50	0.00		04/19/18
53	1	T&B 160DRG INSULATED CAP/GRD LEAD	25.000	E	25.00	0.00		04/19/18
63	4	ERC 615880 GR RODPTDCU-BONDNOM 5/	12.500	E	50.00	0.00		04/19/18
73	4	BUR GRC58 5/8 IN GRD ROD CLAMP	1.800	E	7.20	0.00		04/19/18
83	2	IDEAL 42-151 6-IN RED ELEC BURIED	46.000	E	92.00	0.00		04/19/18
93	4	HGL HL48M-DS BOX PAD	330.000	E	1320.00	0.00		04/19/18
95		INBOUND TRANSPORTATION			300.00			
96		OUTBOUND TRANSPORTATION			75.00			
		SUB-TOTAL			10012.95			
		ESTIMATED TAX			546.59			
		TOTAL			10559.54			

F.O.B. Point of Shipment. The prices stated in this offer shall, unless renewed, automatically expire fifteen days (15) from the date of this offer.

Per:



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

MAINE GENERAL PERMIT (GP)
AUTHORIZATION LETTER AND SCREENING SUMMARY

TZ PROPERTIES, LLC
23 STORMY BROOK ROAD
FALMOUTH, MAINE 04105

CORPS PERMIT # NAE-2018-00061
CORPS GP ID# 18-010
STATE ID# PBR

DESCRIPTION OF WORK:

Place temporary and permanent fill below the ordinary high water line of an unnamed stream and in adjacent freshwater wetlands off Orchard Road at Cumberland, Maine in order to develop a 10-lot residential subdivision. The work will result in approximately 771 s.f. of stream bed impact and 4,307 s.f. of wetland impact. This work is shown on the attached plans entitled "Orchard Road Subdivision" in five sheets dated "NOV 2017" and "Orchard Road Subdivision, Cumberland, Maine" in three sheets dated "NOV 2017".

LAT/LONG COORDINATES : 44.831650° N -70.300948° W USGS QUAD: CUMBERLAND CTR, ME

I. CORPS DETERMINATION:

Based on our review of the information you provided, we have determined that your project will have only minimal individual and cumulative impacts on waters and wetlands of the United States. Your work is therefore authorized by the U.S. Army Corps of Engineers under the enclosed Federal Permit, the Maine General Permit (GP). Accordingly, we do not plan to take any further action on this project.

You must perform the activity authorized herein in compliance with all the terms and conditions of the GP [including any attached Additional Conditions and any conditions placed on the State 401 Water Quality Certification including any required mitigation]. Please review the enclosed GP carefully, including the GP conditions beginning on page 5, to familiarize yourself with its contents. You are responsible for complying with all of the GP requirements; therefore you should be certain that whoever does the work fully understands all of the conditions. You may wish to discuss the conditions of this authorization with your contractor to ensure the contractor can accomplish the work in a manner that conforms to all requirements.

If you change the plans or construction methods for work within our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

Condition 38 of the GP (page 16) provides one year for completion of work that has commenced or is under contract to commence prior to the expiration of the GP on October 13, 2020. You will need to apply for reauthorization for any work within Corps jurisdiction that is not completed by October 13, 2021.

This authorization presumes the work shown on your plans noted above is in waters of the U.S. Should you desire to appeal our jurisdiction, please submit a request for an approved jurisdictional determination in writing to the undersigned.

No work may be started unless and until all other required local, State and Federal licenses and permits have been obtained. This includes but is not limited to a Flood Hazard Development Permit issued by the town if necessary.

II. STATE ACTIONS: PENDING [X], ISSUED [], DENIED [] DATE _____

APPLICATION TYPE: PBR: X, TIER 1: _____, TIER 2: _____, TIER 3: _____, LURC: _____, DMR LEASE: _____, NA: _____

III. FEDERAL ACTIONS:

JOINT PROCESSING MEETING: 1/11/18 LEVEL OF REVIEW: CATEGORY 1: _____ CATEGORY 2: X

AUTHORITY (Based on a review of plans and/or State/Federal applications): SEC 10 _____, 404 X, 10/404 _____, 103 _____

EXCLUSIONS: The exclusionary criteria identified in the general permit do not apply to this project.

FEDERAL RESOURCE AGENCY OBJECTIONS: EPA NO, USF&WS NO, NMFS NO

If you have any questions on this matter, please contact my staff at 207-623-8367 at our Augusta, Maine Project Office. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0

Jay L. Clement
JAY L. CLEMENT
SENIOR PROJECT MANAGER
MAINE PROJECT OFFICE

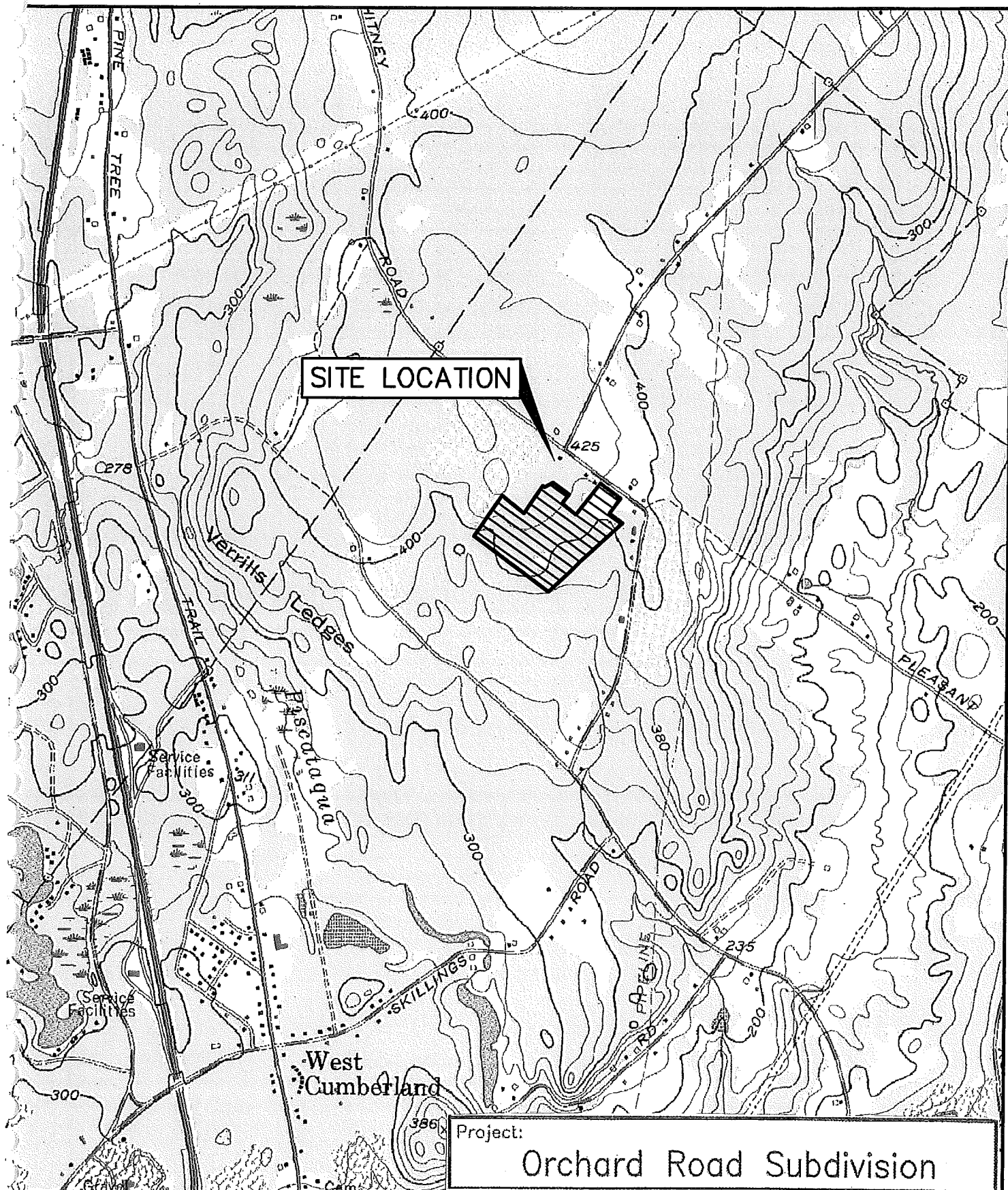
For Jay L. Clement 4/9/18
FRANK J. DEL GIUDICE
CHIEF, PERMITS & ENFORCEMENT BRANCH
REGULATORY DIVISION



**US Army Corps
of Engineers®**
New England District

**PLEASE NOTE THE FOLLOWING CONDITIONS FOR
DEPARTMENT OF THE ARMY
GENERAL PERMIT
NO. NAE-2018-00061**

1. This authorization requires you to 1) notify us before beginning work so we may inspect the project, and 2) submit a Compliance Certification Form. You must complete and return the enclosed Work Start Notification Form(s) to this office at least two weeks before the anticipated starting date. You must complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work and any required mitigation (but not mitigation monitoring, which requires separate submittals).
2. The permittee shall assure that a copy of this permit is at the work site whenever work is being performed and that all personnel performing work at the site of the work authorized by this permit are fully aware of the terms and conditions of the permit. This permit, including its drawings and any appendices and other attachments, shall be made a part of any and all contracts and sub-contracts for work which affects areas of Corps of Engineers' jurisdiction at the site of the work authorized by this permit. This shall be done by including the entire permit in the specifications for the work. If the permit is issued after construction specifications but before receipt of bids or quotes, the entire permit shall be included as an addendum to the specifications. The term "entire permit" includes permit amendments. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions of the entire permit, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps of Engineers jurisdiction.
3. Adequate sedimentation and erosion control devices, such as geotextile silt fences or other devices capable of filtering the fines involved, shall be installed and properly maintained to minimize impacts during construction. These devices must be removed upon completion of work and stabilization of disturbed areas. The sediment collected by these devices must also be removed and placed upland, in a manner that will prevent its later erosion and transport to a waterway or wetland.
4. All exposed soils resulting from the construction will be promptly seeded and mulched in order to achieve vegetative stabilization.
5. All areas of temporary fill shall be restored to their original contour and character upon completion of the work.
6. All tree cutting shall occur between October 16 and April 19 of any year to the maximum extent practicable and no tree cutting shall occur between June 1 and July 31 of any year in order to minimize potential impacts to federally listed northern long-eared bats.



U.S.G.S. Location Map
 Subdivision Feasibility, Orchard Road, Cumberland, Maine
 U.S.G.S. Cumberland Center, State-7.5 Minute Series (Topographic)

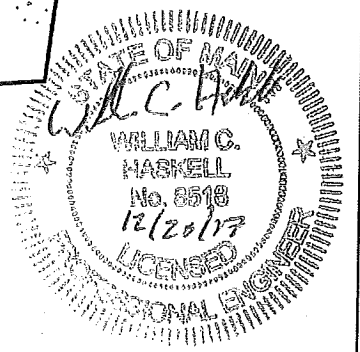
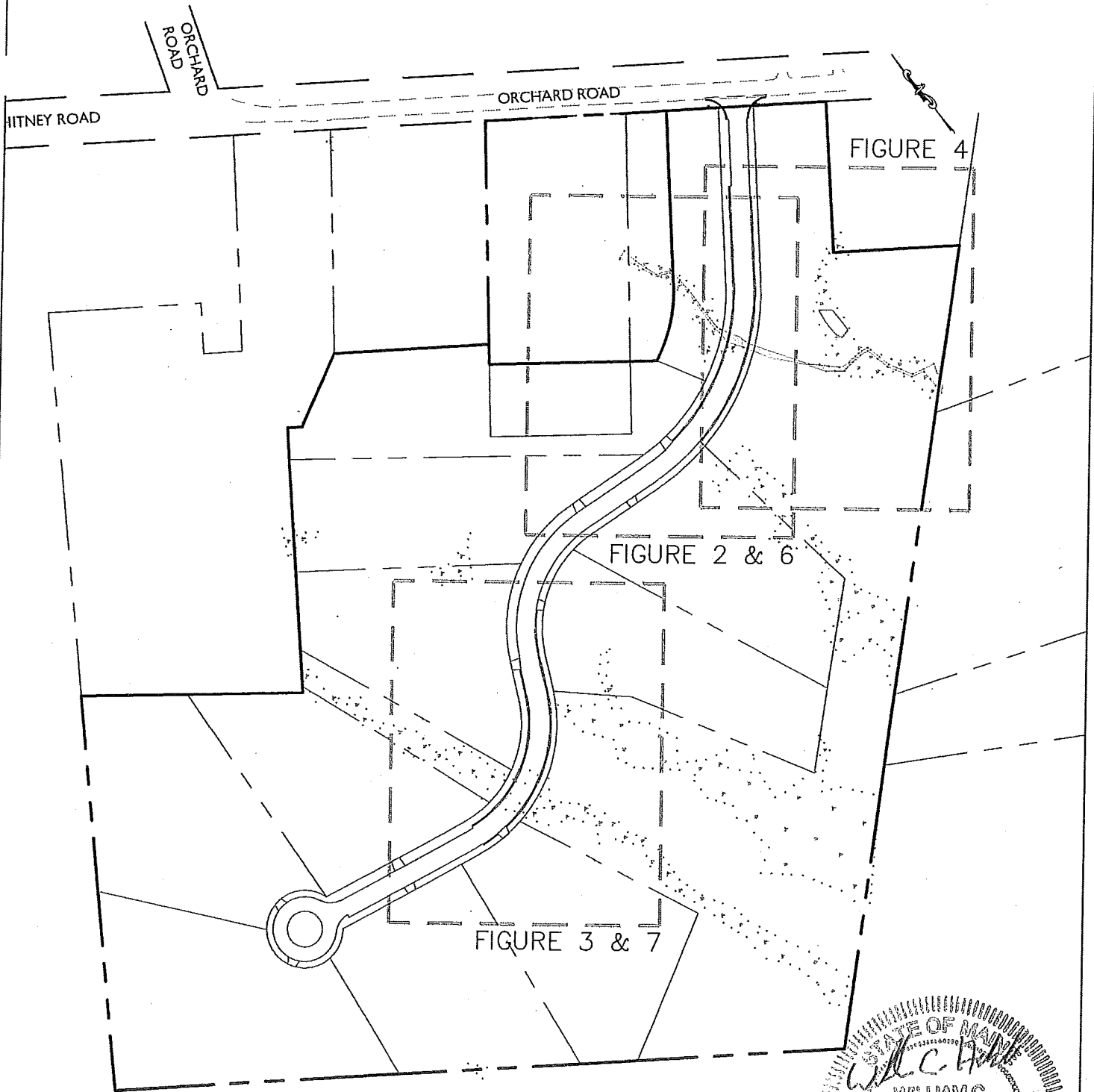
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Draft: LAN	Job No.: 3238.01
Checked: WCH	Scale: None
File Name: 3238-LOCMAP.dwg	



Relationships. Responsiveness. Results.
www.gorrillpalmer.com
 207.772.2515

Figure

1



1 inch = 200 ft.

Design: JWA	Date: NOV 2017
Draft: LAN	Job No.: 3236.01
Checked: WCH	Scale: 1" = 200'
File Name: 3236-GRADING	

GP GORRILL PALMER

Relationships. Responsiveness. Results.
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 207.772.2515

Drawing Name:	Sheet Index
Project:	Orchard Road Subdivision

Figure No.	1
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33622/303
R08, Lot 59-B

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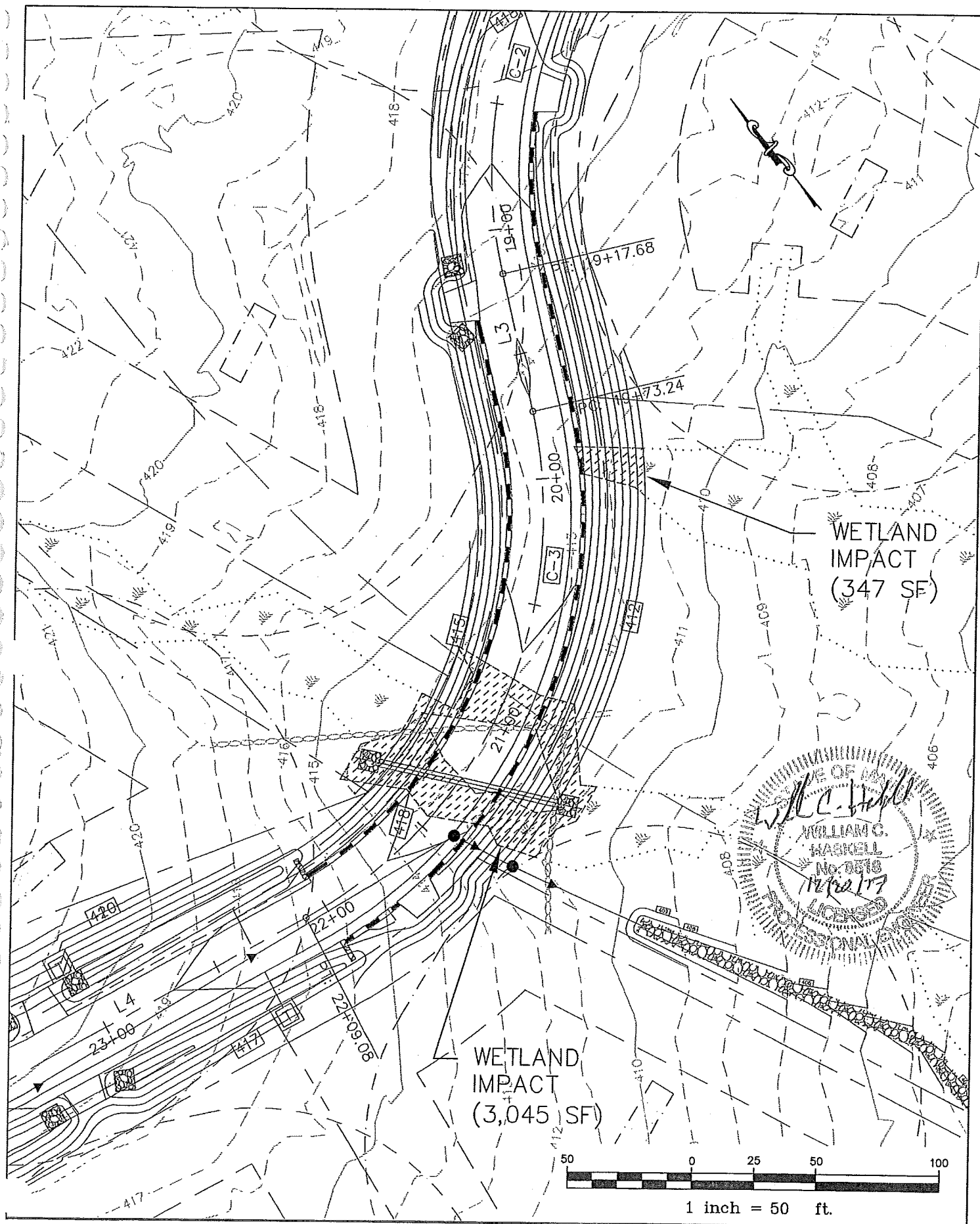
STREAM (TYP.)
WETLAND
BOUNDARY
(TYP.)
WETLAND IMPACT
(915 SF)

capped iron rod
12+74.93
13+00
14+00
15+00
16+00
17+00

WILLIAM C. HASKELL
No. 2518
12/20/17
LICENSED PROFESSIONAL ENGINEER

1 inch = 50 ft.

Figure No.
2

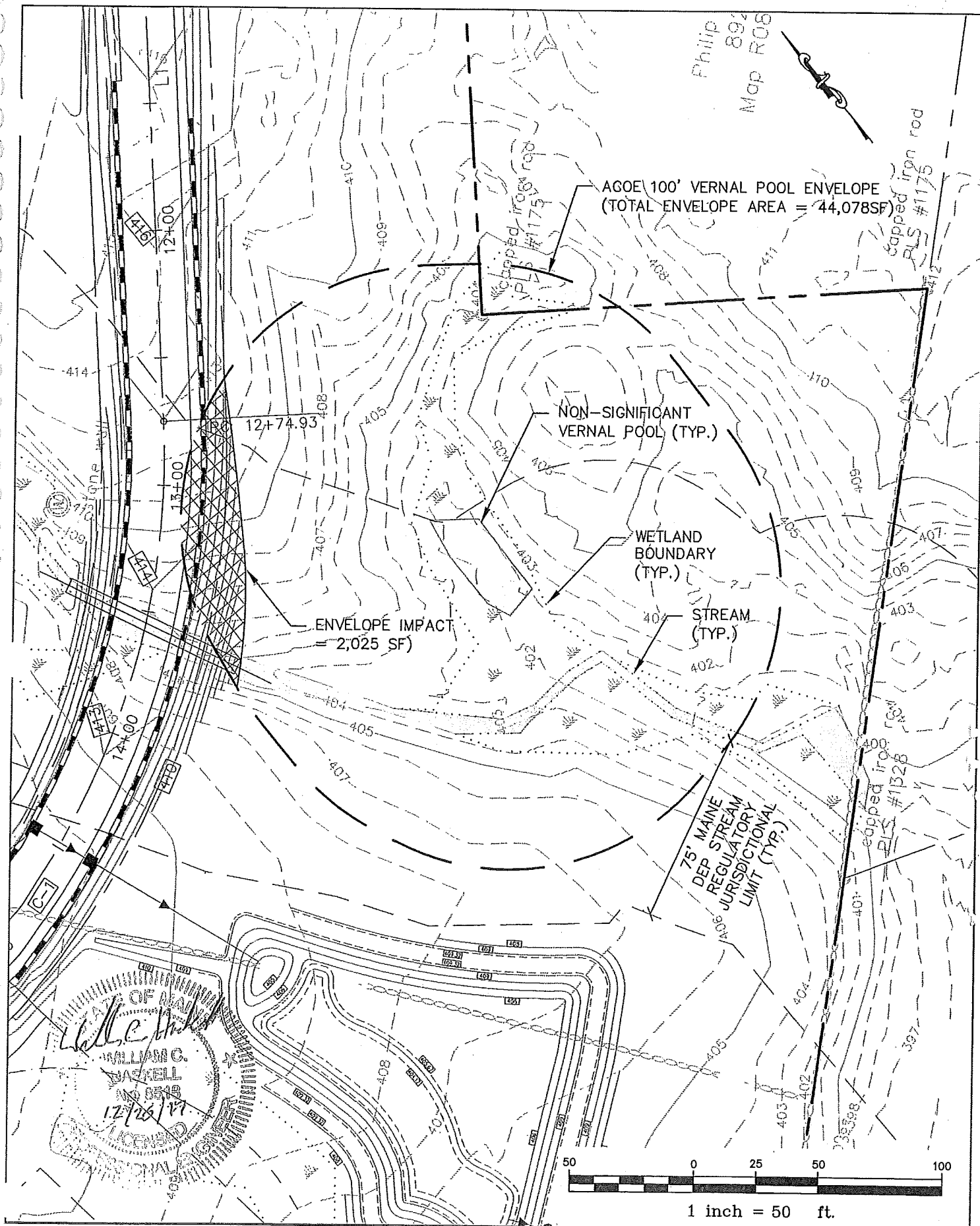


Design: JWA	Date: NOV 2017
Draft: LAN	Job No.: 3236.01
Checked: WCH	Scale: 1" = 50'
File Name: 3236-GRADING	

 GORRILL PALMER	Relationships. Responsiveness. Results.
	www.gorrillpalmer.com 207.772.2515

Drawing Name:	Wetland Impact
Project:	Orchard Road Subdivision

Figure No.	3
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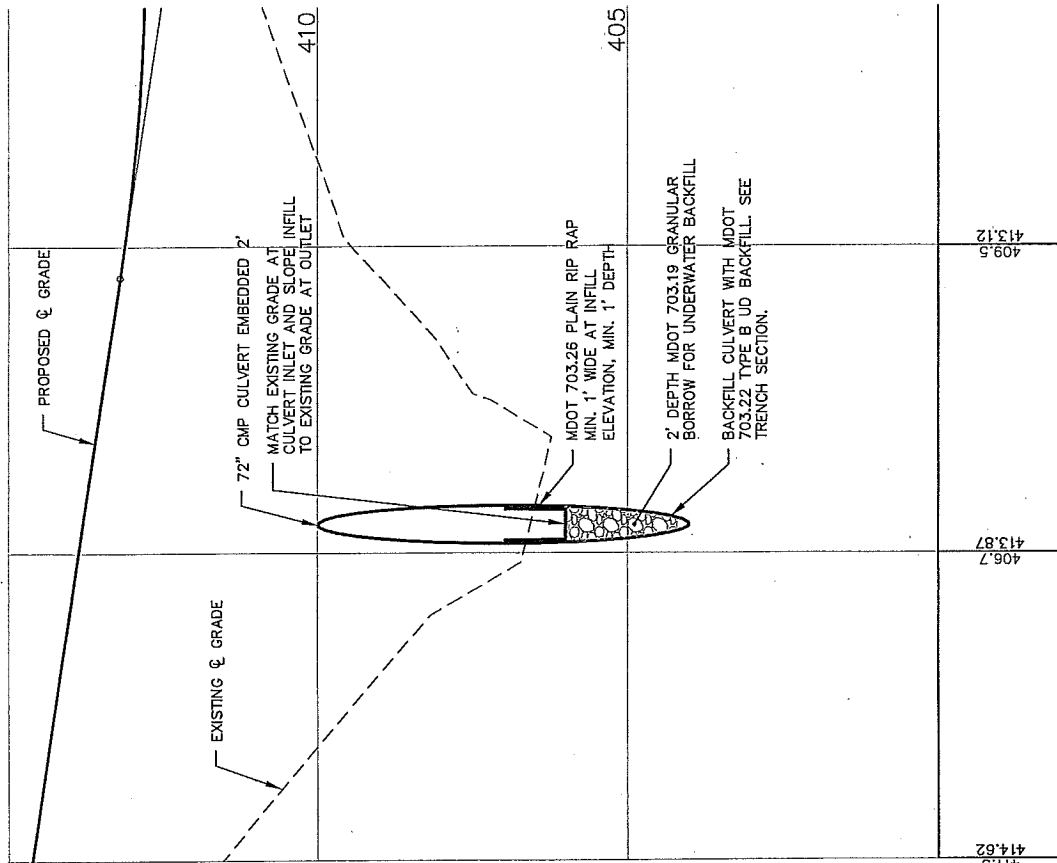


Design: JWA	Date: NOV 2017
Draft: LAN	Job No.: 3236.01
Checked: WCH	Scale: 1" = 50'
File Name: 3236-GRADING	

GP	GORRILL PALMER	Relationships. Responsiveness. Results www.gorrillpalmer.com 207.772.2515
-----------	-----------------------	---

Drawing Name:	Vernal Pool Envelope Impact
Project:	Orchard Road Subdivision

Figure No.	4
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CULVERT CROSSING PROFILE STA 13+55

SCALE: 1"=20' H, 1"=2' V

Design: JWA	Date: NOV 2017
Drawn: LAN	Job No: 3235.01
Checked: WCH	Scale: 1" = 20'
File Name: 3235-CULVERT.dwg	

Rev	Date	Revision



Relationships: Responsiveness, Results.
www.gorrillpalmer.com
207.777.2515

Drawing Name:

Culvert Crossing Plan & Profile Sta 13+55

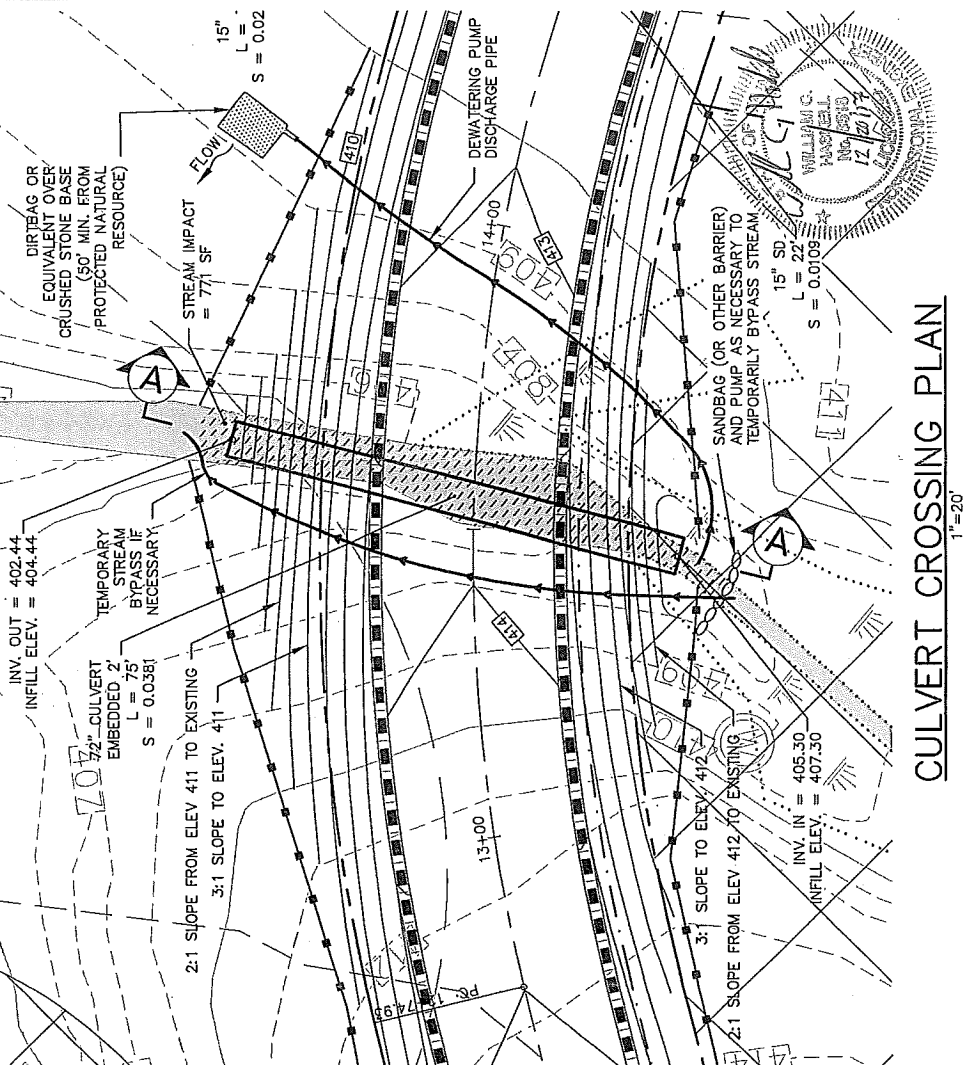
Project:

Orchard Road Subdivision
Cumberland, Maine

Figure No.

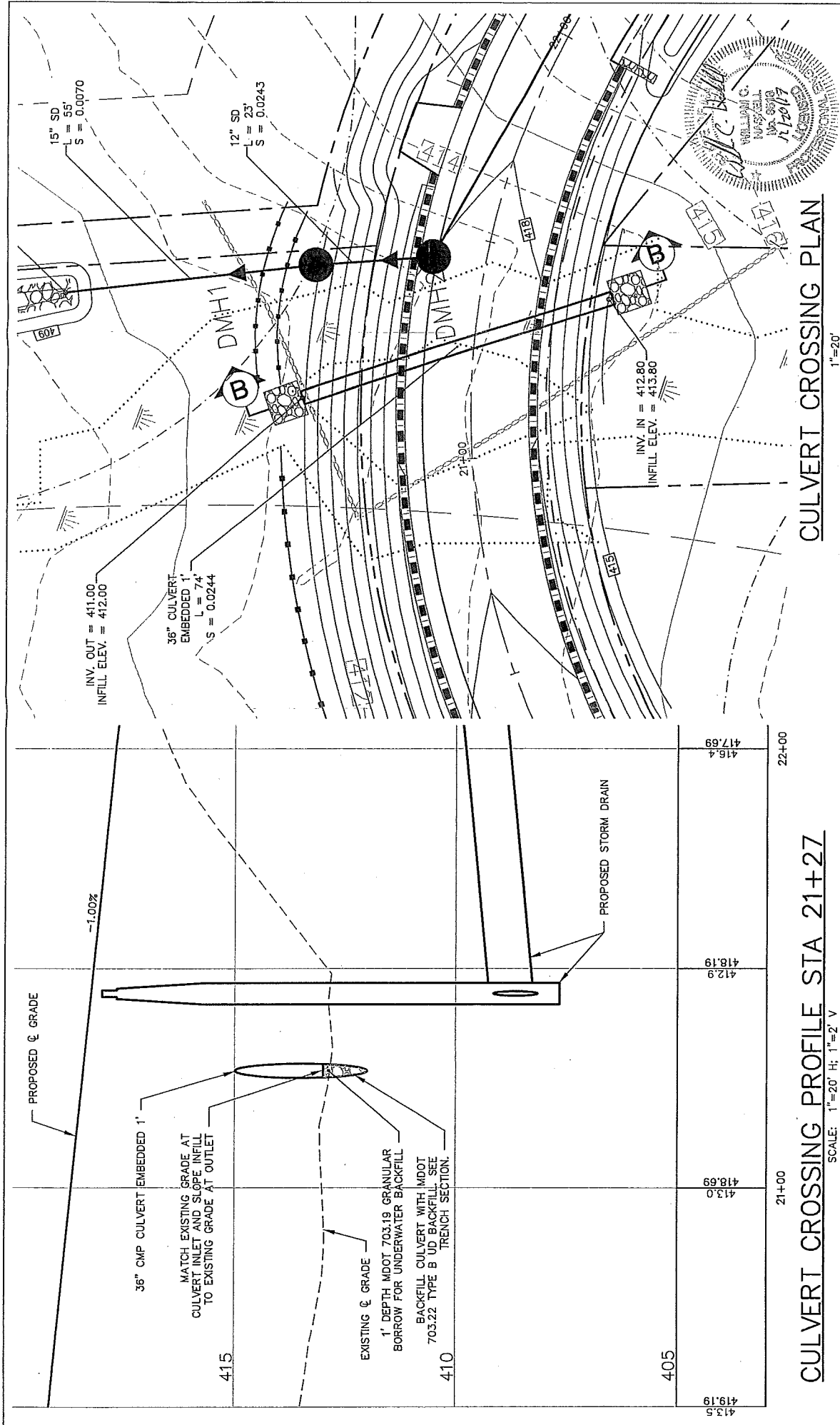
6

- NOTE:
1. CULVERT SHALL BE CONSTRUCTED BETWEEN JULY 15 AND OCTOBER 1.
 2. TEMPORARY STOCKPILES SHALL NOT BE LOCATED WITHIN 100' OF A PROTECTED NATURAL RESOURCE.
 3. CONTRACTOR SHALL SUBMIT A DEWATERING AND STREAM BYPASS PLAN TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO THE START OF CONSTRUCTION.



CULVERT CROSSING PLAN

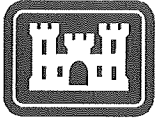
1"=20'



Design: JHA	Date: NOV 2017	GORRILL PALMER Relationships: Responsiveness, Results. www.gorillpalmer.com 207.777.2515	Drawing Name:	Culvert Crossing Details Sta 21+27
Draft: LAN	Job No: 3235.01		Project:	Orchard Road Subdivision Cumberland, Maine
Checked: WCH	Scale: 1" = 20'			

Rev.	Date	Revision
-	-	-

Figure No. 7



**US Army Corps
of Engineers®**
New England District

**GENERAL PERMIT
WORK-START NOTIFICATION FORM**
(Minimum Notice: Two weeks before work begins)

* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *

Corps of Engineers Permit No. NAE-2018-00061 was issued to TZ Properties, LLC
on . This work is located in an unnamed stream and in adjacent
freshwater wetlands off Orchard Road at Cumberland, Maine. The permit authorized the
permittee to place temporary and permanent fill in order to develop a 10-lot residential
subdivision. The work will result in approximately 771 s.f. of stream bed impact and 4,307 s.f.
of wetland impact.

The people (e.g., contractor) listed below will do the work, and they understand the permit's
conditions and limitations.

PLEASE PRINT OR TYPE

Name of Person/Firm: _____

Business Address: _____

Telephone Numbers: () _____ () _____

Proposed Work Dates: **Start:** _____ **Finish:** _____

Permittee/Agent Signature: _____ **Date:** _____

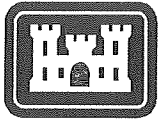
Printed Name: _____ **Title:** _____

Date Permit Issued: _____ **Date Permit Expires:** _____

FOR USE BY THE CORPS OF ENGINEERS

PM: Clement **Submittals Required:** No

Inspection Recommendation: Inspect as convenient



**US Army Corps
of Engineers®**
New England District

(Minimum Notice: Permittee must sign and return notification
within one month of the completion of work.)

COMPLIANCE CERTIFICATION FORM

Permit Number: NAE-2018-00061

Project Manager Clement

Name of Permittee: TZ Properties, LLC

Permit Issuance Date: _____

Please sign this certification and return it to the following address upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch C *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.

Signature of Permittee

Date

Printed Name

Date of Work Completion

() _____
Telephone Number

() _____
Telephone Number



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION AUGUSTA, MAINE 04333-0017

DEPARTMENT ORDER

IN THE MATTER OF

TZ PROPERTIES, LLC)	STORMWATER MANAGEMENT LAW
Cumberland, Cumberland County)	
ORCHARD ROAD SUBDIVISION)	
L-27792-NJ-A-N (Approval))	FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S. § 420-D, and Chapters 500 (06-096 C.M.R. ch.500, last amended August 12, 2015) of the Department's Regulations, the Department of Environmental Protection has considered the application of TZ PROPERTIES, LLC with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. Summary: The applicant proposes to construct a stormwater management system for an access road, called Orchard Road, which will service a 10-lot single family residential subdivision called Old Orchard Subdivision. The proposed project results in 1.06 acres of impervious area and 2.27 acres of developed area. The project is indicated on a set of plans the first of which is entitled "Orchard Road Subdivision Cumberland, Maine," prepared by Gorrill Palmer, and dated January 12, 2017. The project site is located off Whitney Road in the Town of Cumberland.

B. Current Use of the Site: The site of the proposed project is vacant fields and woodland. There are no structures on the property.

2. STORMWATER STANDARDS:

The proposed project includes approximately 2.27 acres of developed area of which 1.06 acres is impervious area. It lies within the watershed of Piscataqua River. The applicant submitted a stormwater management plan based on the Basic and General Standards contained in Department Rules, Chapter 500. The proposed stormwater management system consists of two underdrained soil filters.

A. Basic Standards:

(1) Erosion and Sedimentation Control: The applicant submitted an Erosion and Sedimentation Control Plan that is based on the performance standards contained in Appendix A of Chapter 500 and the Best Management Practices outlined in the Maine Erosion and Sediment Control BMPs, which were developed by the Department. This plan and plan sheets containing erosion control details were reviewed by, and revised in response to the comments of, the Bureau of Land Resources (BLR).

Erosion control details will be included on the final construction plans and the erosion control narrative will be included in the project specifications to be provided to the construction contractor.

(2) Inspection and Maintenance: The applicant submitted a maintenance plan that addresses both short and long-term maintenance requirements. The maintenance plan is based on the standards contained in Appendix B of Chapter 500. This plan was reviewed by, and revised in response to the comments of, BLR. The applicant will be responsible for the maintenance of all common facilities including the stormwater management system.

Storm sewer grit and sediment materials removed from stormwater control structures during maintenance activities must be disposed of in compliance with the Maine Solid Waste Management Rules.

(3) Housekeeping: The proposed project will comply with the performance standards outlined in Appendix C of Chapter 500.

Based on BLR's review of the erosion and sedimentation control plan and the maintenance plan, the Department finds that the proposed project meets the Basic Standards contained in Chapter 500(4)(B).

B. General Standards:

The applicant's stormwater management plan includes general treatment measures that will mitigate for the increased frequency and duration of channel erosive flows due to runoff from smaller storms, provide for effective treatment of pollutants in stormwater, and mitigate potential thermal impacts. The proposed road meets the definition of "a linear portion of a project" in Chapter 500 and the applicant is proposing to reduce runoff volume control to no less than 75% of the impervious area and no less than 50% of the developed area.

The stormwater management system proposed by the applicant was reviewed by, and revised in response to comments from, BLR. After a final review, BLR commented that the proposed stormwater management system is designed in accordance with the Chapter 500 General Standards and recommended that the applicant's design engineer or other qualified professional oversee the construction of the underdrained soil filters to ensure that they are installed in accordance with the details and notes specified on the approved plans. Within 30 days from completion of the entire system or if the project takes more than one year to complete, at least once per year, the applicant must submit a log of inspection reports detailing the items inspected, photographs taken, and the dates of each inspection to the BLR for review.

Based on the stormwater system's design and BLR's review, the Department finds that the applicant has made adequate provision to ensure that the proposed project will meet the Chapter 500 Basic and General Standards.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S. § 420-D, and Chapter 500 of the Department's Regulations:

- A. The applicant has made adequate provision to ensure that the proposed project will meet the Chapter 500 Basic Standards for: (1) erosion and sediment control; (2) inspection and maintenance; (3) housekeeping; and (4) grading and construction activity provided that sediment material removed during maintenance activities are properly disposed of as described in Finding 2A.
- B. The applicant has made adequate provision to ensure that the proposed project will meet the Chapter 500 General Standards provided that stormwater construction inspections and reports are completed as outlined in Finding 2B.

THEREFORE, the Department APPROVES the above noted application of TZ PROPERTIES, LLC to construct a stormwater management system as described above in Cumberland, Maine, SUBJECT TO THE FOLLOWING CONDITIONS, and all applicable standards and regulations:

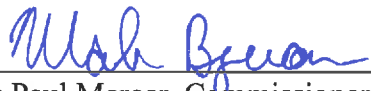
1. The Standard Conditions of Approval, a copy attached.
2. In addition to any specific erosion control measures described in this order, the applicant shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.
3. Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.
4. Storm sewer grit and sediment materials removed from stormwater control structures shall be disposed of in compliance with the Maine Solid Waste Management Rules.

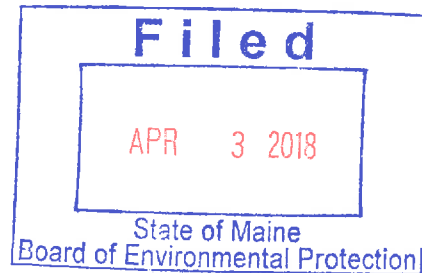
5. The applicant shall retain the design engineer or other qualified professional to oversee the construction of the stormwater management structures according to the details and notes specified on the approved plans. Within 30 days of completion of the entire system or if the project takes more than one year to complete, at least once per year, the applicant shall submit a log of inspection reports detailing the items inspected, photographs taken, and dates of each inspection to the BLR for review.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED IN AUGUSTA, MAINE, THIS 30th DAY OF MARCH, 2018.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: 
For: Paul Mercer, Commissioner



PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES.

AA/L27792AN/ATS#82639

STORMWATER STANDARD CONDITIONS

STRICT CONFORMANCE WITH THE STANDARD AND SPECIAL CONDITIONS OF THIS APPROVAL IS NECESSARY FOR THE PROJECT TO MEET THE STATUTORY CRITERIA FOR APPROVAL

Standard conditions of approval. Unless otherwise specifically stated in the approval, a department approval is subject to the following standard conditions pursuant to Chapter 500 Stormwater Management Law.

- (1) Approval of variations from plans. The granting of this approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from these plans, proposals, and supporting documents must be reviewed and approved by the department prior to implementation. Any variation undertaken without approval of the department is in violation of 38 M.R.S.A. §420-D(8) and is subject to penalties under 38 M.R.S.A. §349.
- (2) Compliance with all terms and conditions of approval. The applicant shall submit all reports and information requested by the department demonstrating that the applicant has complied or will comply with all terms and conditions of this approval. All preconstruction terms and conditions must be met before construction begins.
- (3) Advertising. Advertising relating to matters included in this application may not refer to this approval unless it notes that the approval has been granted WITH CONDITIONS, and indicates where copies of those conditions may be obtained.
- (4) Transfer of project. Unless otherwise provided in this approval, the applicant may not sell, lease, assign, or otherwise transfer the project or any portion thereof without written approval by the department where the purpose or consequence of the transfer is to transfer any of the obligations of the developer as incorporated in this approval. Such approval may only be granted if the applicant or transferee demonstrates to the department that the transferee agrees to comply with conditions of this approval and the proposals and plans contained in the application and supporting documents submitted by the applicant. Approval of a transfer of the permit must be applied for no later than two weeks after any transfer of property subject to the license.
- (5) Time frame for approvals. If the construction or operation of the activity is not begun within four years, this approval shall lapse and the applicant shall reapply to the department for a new approval. The applicant may not begin construction or operation of the project until a new approval is granted. A reapplication for approval may include information submitted in the initial application by reference. This approval, if construction is begun within the four-year time frame, is valid for seven years. If construction is not completed within the seven-year time frame, the applicant must reapply for, and receive, approval prior to continuing construction.
- (6) Certification. Contracts must specify that "all work is to comply with the conditions of the Stormwater Permit." Work done by a contractor or subcontractor pursuant to this approval may not begin before the contractor and any subcontractors have been shown a copy of this approval with the conditions by the developer, and the owner and each contractor and subcontractor has certified, on a form provided by the department, that the approval and conditions have been

- received and read, and that the work will be carried out in accordance with the approval and conditions. Completed certification forms must be forwarded to the department.
- (7) Maintenance. The components of the stormwater management system must be adequately maintained to ensure that the system operates as designed, and as approved by the department.
 - (8) Recertification requirement. Within three months of the expiration of each five-year interval from the date of issuance of the permit, the permittee shall certify the following to the department.
 - (a) All areas of the project site have been inspected for areas of erosion, and appropriate steps have been taken to permanently stabilize these areas.
 - (b) All aspects of the stormwater control system have been inspected for damage, wear, and malfunction, and appropriate steps have been taken to repair or replace the facilities.
 - (c) The erosion and stormwater maintenance plan for the site is being implemented as written, or modifications to the plan have been submitted to and approved by the department, and the maintenance log is being maintained.
 - (9) Severability. The invalidity or unenforceability of any provision, or part thereof, of this permit shall not affect the remainder of the provision or any other provisions. This permit shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

November 16, 2005 (revised December 27, 2011)



DEP INFORMATION SHEET

Appealing a Department Licensing Decision

Dated: March 2012

Contact: (207) 287-2811

SUMMARY

There are two methods available to an aggrieved person seeking to appeal a licensing decision made by the Department of Environmental Protection's ("DEP") Commissioner: (1) in an administrative process before the Board of Environmental Protection ("Board"); or (2) in a judicial process before Maine's Superior Court. An aggrieved person seeking review of a licensing decision over which the Board had original jurisdiction may seek judicial review in Maine's Superior Court.

A judicial appeal of final action by the Commissioner or the Board regarding an application for an expedited wind energy development (35-A M.R.S.A. § 3451(4)) or a general permit for an offshore wind energy demonstration project (38 M.R.S.A. § 480-HH(1)) or a general permit for a tidal energy demonstration project (38 M.R.S.A. § 636-A) must be taken to the Supreme Judicial Court sitting as the Law Court.

This INFORMATION SHEET, in conjunction with a review of the statutory and regulatory provisions referred to herein, can help a person to understand his or her rights and obligations in filing an administrative or judicial appeal.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

The laws concerning the DEP's *Organization and Powers*, 38 M.R.S.A. §§ 341-D(4) & 346, the *Maine Administrative Procedure Act*, 5 M.R.S.A. § 11001, and the DEP's *Rules Concerning the Processing of Applications and Other Administrative Matters* ("Chapter 2"), 06-096 CMR 2 (April 1, 2003).

HOW LONG YOU HAVE TO SUBMIT AN APPEAL TO THE BOARD

The Board must receive a written appeal within 30 days of the date on which the Commissioner's decision was filed with the Board. Appeals filed after 30 calendar days of the date on which the Commissioner's decision was filed with the Board will be rejected.

HOW TO SUBMIT AN APPEAL TO THE BOARD

Signed original appeal documents must be sent to: Chair, Board of Environmental Protection, c/o Department of Environmental Protection, 17 State House Station, Augusta, ME 04333-0017; faxes are acceptable for purposes of meeting the deadline when followed by the Board's receipt of mailed original documents within five (5) working days. Receipt on a particular day must be by 5:00 PM at DEP's offices in Augusta; materials received after 5:00 PM are not considered received until the following day. The person appealing a licensing decision must also send the DEP's Commissioner a copy of the appeal documents and if the person appealing is not the applicant in the license proceeding at issue the applicant must also be sent a copy of the appeal documents. All of the information listed in the next section must be submitted at the time the appeal is filed. Only the extraordinary circumstances described at the end of that section will justify evidence not in the DEP's record at the time of decision being added to the record for consideration by the Board as part of an appeal.

WHAT YOUR APPEAL PAPERWORK MUST CONTAIN

Appeal materials must contain the following information at the time submitted:

1. *Aggrieved Status.* The appeal must explain how the person filing the appeal has standing to maintain an appeal. This requires an explanation of how the person filing the appeal may suffer a particularized injury as a result of the Commissioner's decision.
2. *The findings, conclusions or conditions objected to or believed to be in error.* Specific references and facts regarding the appellant's issues with the decision must be provided in the notice of appeal.
3. *The basis of the objections or challenge.* If possible, specific regulations, statutes or other facts should be referenced. This may include citing omissions of relevant requirements, and errors believed to have been made in interpretations, conclusions, and relevant requirements.
4. *The remedy sought.* This can range from reversal of the Commissioner's decision on the license or permit to changes in specific permit conditions.
5. *All the matters to be contested.* The Board will limit its consideration to those arguments specifically raised in the written notice of appeal.
6. *Request for hearing.* The Board will hear presentations on appeals at its regularly scheduled meetings, unless a public hearing on the appeal is requested and granted. A request for public hearing on an appeal must be filed as part of the notice of appeal.
7. *New or additional evidence to be offered.* The Board may allow new or additional evidence, referred to as supplemental evidence, to be considered by the Board in an appeal only when the evidence is relevant and material and that the person seeking to add information to the record can show due diligence in bringing the evidence to the DEP's attention at the earliest possible time in the licensing process or that the evidence itself is newly discovered and could not have been presented earlier in the process. Specific requirements for additional evidence are found in Chapter 2.

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD

1. *Be familiar with all relevant material in the DEP record.* A license application file is public information, subject to any applicable statutory exceptions, made easily accessible by DEP. Upon request, the DEP will make the material available during normal working hours, provide space to review the file, and provide opportunity for photocopying materials. There is a charge for copies or copying services.
2. *Be familiar with the regulations and laws under which the application was processed, and the procedural rules governing your appeal.* DEP staff will provide this information on request and answer questions regarding applicable requirements.
3. *The filing of an appeal does not operate as a stay to any decision.* If a license has been granted and it has been appealed the license normally remains in effect pending the processing of the appeal. A license holder may proceed with a project pending the outcome of an appeal but the license holder runs the risk of the decision being reversed or modified as a result of the appeal.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will formally acknowledge receipt of an appeal, including the name of the DEP project manager assigned to the specific appeal. The notice of appeal, any materials accepted by the Board Chair as supplementary evidence, and any materials submitted in response to the appeal will be sent to Board members with a recommendation from DEP staff. Persons filing appeals and interested persons are notified in advance of the date set for Board consideration of an appeal or request for public hearing. With or without holding a public hearing, the Board may affirm, amend, or reverse a Commissioner decision or remand the matter to the Commissioner for further proceedings. The Board will notify the appellant, a license holder, and interested persons of its decision.

II. JUDICIAL APPEALS

Maine law generally allows aggrieved persons to appeal final Commissioner or Board licensing decisions to Maine's Superior Court, see 38 M.R.S.A. § 346(1); 06-096 CMR 2; 5 M.R.S.A. § 11001; & M.R. Civ. P 80C. A party's appeal must be filed with the Superior Court within 30 days of receipt of notice of the Board's or the Commissioner's decision. For any other person, an appeal must be filed within 40 days of the date the decision was rendered. Failure to file a timely appeal will result in the Board's or the Commissioner's decision becoming final.

An appeal to court of a license decision regarding an expedited wind energy development, a general permit for an offshore wind energy demonstration project, or a general permit for a tidal energy demonstration project may only be taken directly to the Maine Supreme Judicial Court. See 38 M.R.S.A. § 346(4).

Maine's Administrative Procedure Act, DEP statutes governing a particular matter, and the Maine Rules of Civil Procedure must be consulted for the substantive and procedural details applicable to judicial appeals.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal process, for administrative appeals contact the Board's Executive Analyst at (207) 287-2452 or for judicial appeals contact the court clerk's office in which your appeal will be filed.

Note: The DEP provides this INFORMATION SHEET for general guidance only; it is not intended for use as a legal reference. Maine law governs an appellant's rights.



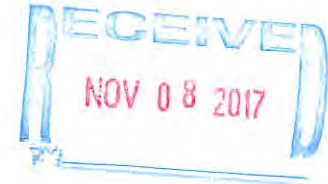
3236.01/p
707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

October 19, 2017

Mr. Kirk Mohney
State Historic Preservation Officer
Maine Historic Preservation Commission
55 Capitol Street, State House Station 65
Augusta, ME 04333



Subject: Presence of Historical Areas
Orchard Road Subdivision
Cumberland, Maine



Dear Mr. Mohney,

TZ Properties has retained Gorrill Palmer to prepare design plans for a ten lot single family residential subdivision located off Orchard Road in Cumberland, Maine. The development includes construction of a 1,500 linear foot roadway and associated utilities and stormwater controls with development of the lots by the lot owners.

The attached Location Map shows the project location.

The project will include a roadway stream crossing of an unnamed stream tributary to the Piscataqua River.

As part of permitting for the project, Gorrill Palmer requests information from your department relative to the presence of any nearby structure or area with historical, architectural or archeological significance as defined by the National Historic Preservation Act.

Thank you for your consideration. If you have any questions regarding the proposed project, please contact our office.

Sincerely,

Gorrill Palmer

James Attianese

Enclosure

Based on the information submitted, I have concluded that there will be no historic properties affected by the proposed undertaking, as defined by Section 106 of the National Historic Preservation Act. Consequently, pursuant to 36 CFR 800.4(d)(1), no further Section 106 consultation is required unless additional resources are discovered during project implementation pursuant to 36 CFR 800.13.

Kirk F. Mohney,
State Historic Preservation Officer
Maine Historic Preservation Commission

11/6/17
Date

JWA/jwa/U:\3236.01 TZ Properties Orchard Rd Cumberland\IP Applications\Local\Resource Letters\Mohney_10-3-17.doc



**GROUNDWATER IMPACT STUDY
ORCHARD ROAD SUBDIVISION
ORCHARD ROAD, CUMBERLAND**

INTRODUCTION:

The purpose of this study is to make an assessment of the hydrogeologic conditions of the above-mentioned site and estimate the groundwater quality impact caused by the proposed on-site subsurface wastewater disposal systems for 10 four-bedroom houses.

The proposed development is located along southwest and west sides of Orchard Road opposite the intersection of Orchard Road and Apple Blossom Way at the position indicated on the attached topographic map (Appendix A, Figure 1). Data used for this project includes a site plan titled *Concept Plan – Cluster for TZ Properties* prepared by Gorrill & Palmer and dated June, 2017 along with test pit logs generated by Sebago Technics and published regional maps and literature.

DISPOSAL FIELDS AND WATER SUPPLY:

The proposed disposal fields will be ten individual subsurface wastewater disposal systems (SSWD) each designed to serve a four-bedroom home. Water for this project will be provided by individual on-site wells. The location of test pits, wastewater disposal systems, well exclusion zones and simulated nitrate-nitrogen ($\text{NO}_3\text{-N}$) plumes are shown on the Groundwater Impact Study Map (Appendix A, Figure 2).

A potential water supply related concern was raised concerning the potential presence of arsenic in the groundwater under the site. Arsenic is a naturally occurring element in bedrock and was a component of some pesticides used in orchards historically. To evaluate the potential presence of arsenic in the bedrock aquifer under the site, Sebago Technics collected a sample from the water supply at 74 Orchard Road. The water supply consists of a drilled well located near the north wall of the house.

The sample was placed in containers provided by Katahdin Analytical (Katahdin) of Scarborough, Maine. The containers were stored in a cooler, on ice, and delivered to Katahdin the same day. Katahdin analyzed the samples for arsenic and nitrates. Katahdin reported the arsenic level at below the Practical Quantitation Level (PQL) of 0.008 mg/L. The nitrate concentration was reported at 1.1 mg/L. A copy of the Katahdin report is in Appendix B.

SURFICIAL GEOLOGY AND TOPOGRAPHY:

The site is located on the *U.S.G.S. Cumberland Center, Maine 7.5 Minute Series* (Appendix A, Figure 1). Site area topography slopes generally downward from north to south towards Blanchard Road.

The *Significant Sand and Gravel Aquifer Map of the Cumberland Center, Maine Quadrangle* (Appendix A, Figure 3) shows that the site does not fall within a Significant Sand and Gravel Aquifer.

The *Surficial Geology Map of the Cumberland Center, Maine Quadrangle* (Appendix A, Figure 5) shows glacial till underlying the Site.

According to the U.S. Department of Agriculture-National Cooperative Soil Service (USDA-NCSS) soil web, the soil under the site consists of four types of glacial till: Hollis fine sandy loam, Paxton fine sandy loam, Woodbridge fine sandy loam and Ridgebury fine sandy loam. Hollis and Paxton soil forms at the summits and shoulders of hills. Woodbridge soil forms till plains on the shoulders and back slopes of hills. Ridgebury forms till plains in toe slopes environments. Logs for Testpit 101 to 110 and 301 to 303 are included in Appendix B.

HYDROGEOLOGY:

Precipitation falling on this site enters the open pore spaces on the upper soil horizon, and percolates vertically downward until the water table is encountered. Thereupon, flow is both horizontal and downhill. Two factors of importance in determining the amount of recharge of precipitation into the soil on this site are the groundwater slope or gradient and soil texture. The groundwater seepage velocity is used to calculate the extent of groundwater impact downgradient of the disposal field sites and has been calculated utilizing the following equation:

$$v = Ki/n$$

where,

v	= groundwater seepage velocity (ft/day)
K	= hydraulic conductivity (ft/day)
i	= hydraulic gradient (ft/ft)
n	= effective porosity (dimensionless)

The hydraulic conductivity of the soil in the disposal area is estimated at 2 feet per day. The average hydraulic gradient under the areas downgradient of the disposal fields varied from 3 to 8%. A groundwater surface gradient of 1.5% was used for the flatter areas and 3% for steeper areas was used as the slope parameter in the model.

CONTAMINATION POTENTIAL:

It is assumed that the worst potential for contamination is the nitrate-nitrogen (NO₃-N) released from wastewater disposal fields. NO₃-N is known to cause methemoglobinemia in infants and is a suspected cause of stomach cancer. The average NO₃-N concentration value of untreated septic tank effluent entering a disposal field is assumed to be 40 milligrams per liter (mg/L). A level of 1.1 mg/L (according to onsite sampling results) was used as a background nitrate concentration in the aquifer. The Federal and State Drinking Water Limit for NO₃-N in public water supplies is 10 mg/L.

The primary mechanism of NO₃-N concentration reduction is through dilution in groundwater and surface water. Since groundwater is always slowly flowing beneath a disposal field, the NO₃-N intercepting the water table below a disposal field mixes and dilutes in the groundwater and moves in the direction of groundwater flow in the form of a plume. NO₃-N is more concentrated in the center than near the edges of a plume. A source that emanates a constant quantity of potential contaminants into groundwater will eventually reach a "steady state." The plume can then be characterized with regard to size, shape, and distribution of concentration.

The method of analysis used to assess the impact of the septic systems on groundwater is an analytical model used to simulate individual plumes. Analysis of the results of this model is instructive in assessing the possible shape and size of wastewater plumes. The model was developed by Baetsle (1969) to depict the migration of radionuclides in porous media, which is adapted here to represent the subsurface

migration of NO₃-N. It is a three-dimensional transport model of plumes generated by continuous, point sources in a uniform groundwater flow field. Variables employed include seepage velocity (hydraulic conductivity multiplied by hydraulic gradient, divided by effective porosity), nitrate mass, time, and dispersivity. The concentration of NO₃-N is calculated at a downgradient point at a specified time by use of the following equation:

$$C(x, y, z, t) = \left[\frac{CoVo}{8(\pi t)^{1.5} \sqrt{DxDyDz}} \right] \exp \left[-\frac{(x - vt)^2}{4Dxt} - \frac{y^2}{4Dyt} - \frac{z^2}{4Dzt} \right] ;$$

where,

C(x,y,z,t)	=	NO ₃ -N concentration at specified location and time (mg/L)
x	=	specified distance from source parallel to the direction of groundwater flow (ft)
y	=	specified distance from source perpendicular to the direction of groundwater flow (ft)
z	=	specified vertical distance from source (ft)
Co	=	initial concentration at the source (mg/L)
Vo	=	volume of source (ft ³)
t	=	time elapsed (day)
Dx,Dy,Dz	=	dispersion coefficient along the x,y,z axes (ft ² /day)
v	=	average linear velocity (ft/day).

Assuming that groundwater flow is horizontal, the dispersion coefficient can be calculated as follows:

$$D_{x,y,z} = v \alpha_{x,y,z};$$

where $\alpha_{x,y,z}$ is dispersivity (ft).

The contaminant velocity of a solute subject to sorption/adsorption is calculated as follows:

$$V_p = v/R_d;$$

where V_p is the contaminant velocity (ft/day) and R_d is the retardation factor (unitless). The retardation factor for NO₃-N is equal to one, however, so the contaminant velocity is equal to the average linear velocity ($V_p = v$). Dispersivity is estimated by an equation based on a weighted least-squares statistical analysis of collected longitudinal dispersivity data versus scale (Xu, Eckstein, 1995). Longitudinal dispersivity can be estimated based on the following calculation:

$$\alpha_x = (0.83)[\log_{10}(L_p)]^{2.414};$$

where α_x is longitudinal dispersivity (ft), and L_p is the plume length (ft). The plume length is a function of the elapsed time and is calculated by the following equation:

$$L_p = V_p t.$$

It has already been established that for NO₃-N, the contaminant velocity (V_p) is equal to the average linear velocity (v). Thus, $L_p = vt$. The transverse and vertical dispersivities are related to the longitudinal dispersivity, as shown below:

$$\alpha_y = \alpha_x / 3$$

$$z = \frac{x}{20}.$$

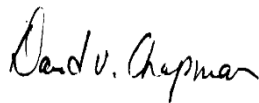
This method is used to calculate a downgradient $\text{NO}_3\text{-N}$ concentration at a specified elapsed time for a single release of $\text{NO}_3\text{-N}$. However, by applying the superposition technique, the estimated concentration of $\text{NO}_3\text{-N}$ downgradient at a specified time can be calculated for reoccurring daily $\text{NO}_3\text{-N}$ releases to simulate the $\text{NO}_3\text{-N}$ plume of a septic system (Chang, *et al.* 1998).

In the main equation, CoVo is represented as a daily mass of nitrate-nitrogen loaded into the subsurface wastewater disposal systems. This is estimated by multiplying the design flow volume of effluent by the assumed $\text{NO}_3\text{-N}$ concentration in the effluent. The simulations were run based on average annual precipitation during drought conditions (60% of average annual precipitation). The $\text{NO}_3\text{-N}$ concentration of the wastewater is diluted by the rainfall infiltrating the disposal fields during drought conditions. The rainfall is assumed to have a $\text{NO}_3\text{-N}$ concentration of 0.5 mg/L. The percent of rainfall infiltrating the soils above the disposal fields is estimated based on the soil type and ground surface slope (Maine Department of Environmental Protection, 1991).

Parameters and results for the disposal field are displayed in Appendix D. The resulting 10 mg/L $\text{NO}_3\text{-N}$ concentration plume lengths for the disposal fields are shown on the site plan. The 10 mg/L plumes do not cross the boundaries of the subdivision.

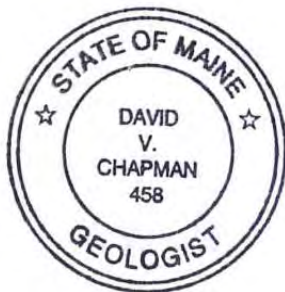
CONCLUSION:

According to the assumptions made for this simulation, the wastewater disposal system will not result in an increase of $\text{NO}_3\text{-N}$ concentrations above 10 mg/L in groundwater at the subdivision perimeter property line.



David Chapman
Maine Certified Geologist #458

DVC/llg



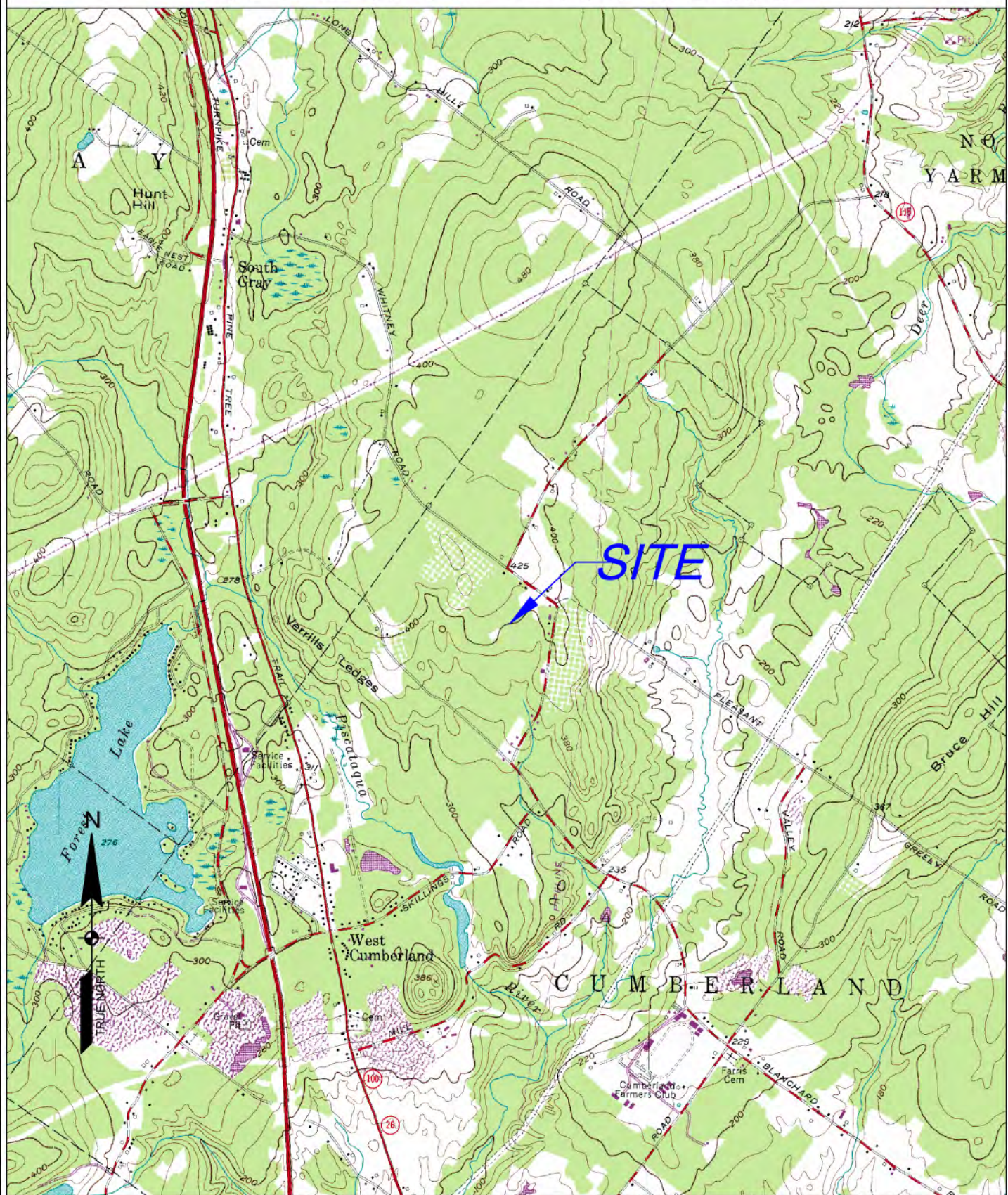
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- Maine Geological Survey, Cumberland Center, Maine, Significant Sand and Gravel Aquifers.
- Maine Geological Survey, Cumberland Center Quadrangle (Maine), Surficial Geology.
- U.S.G.S., Cumberland Center Quadrangle (Maine) 7.5' Quadrangle 1:24,000, Topographic Map.
- Xu, M. and Y. Eckstein, 1995, *Use of Weighted Least-Squares Method in Evaluation of the Relationship Between Dispersivity and Field Scale*: Ground Water, vol.33, No.6, pp.905-908.

APPENDIX A

FIGURES

FIGURE 1. TOPOGRAPHIC MAP



**ORCHARD ROAD SUBDIVISION
ORCHARD ROAD
CUMBERLAND**

Sebago Technics
75 John Roberts Road –
South Portland, ME
Phone: (207) 200-2100

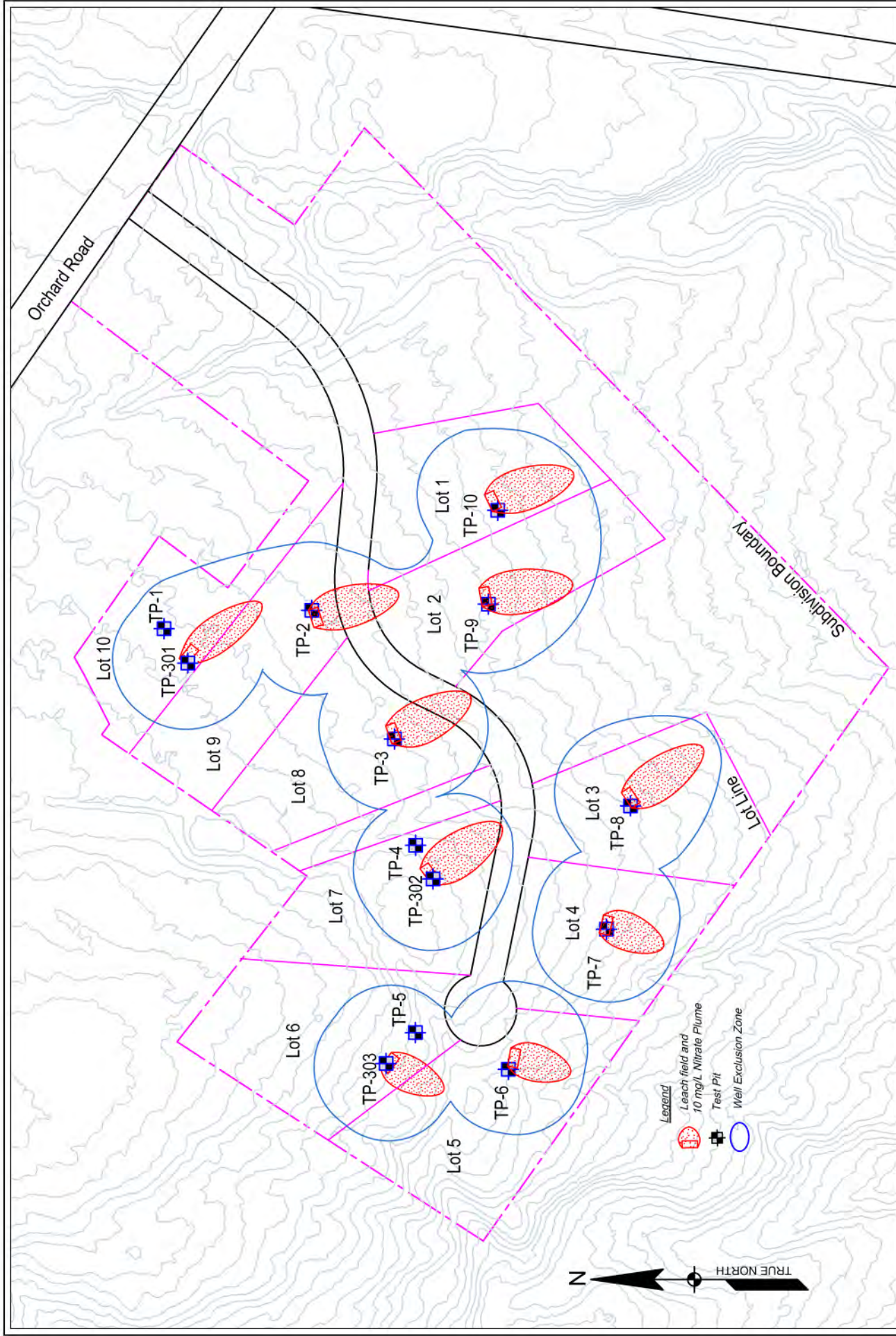
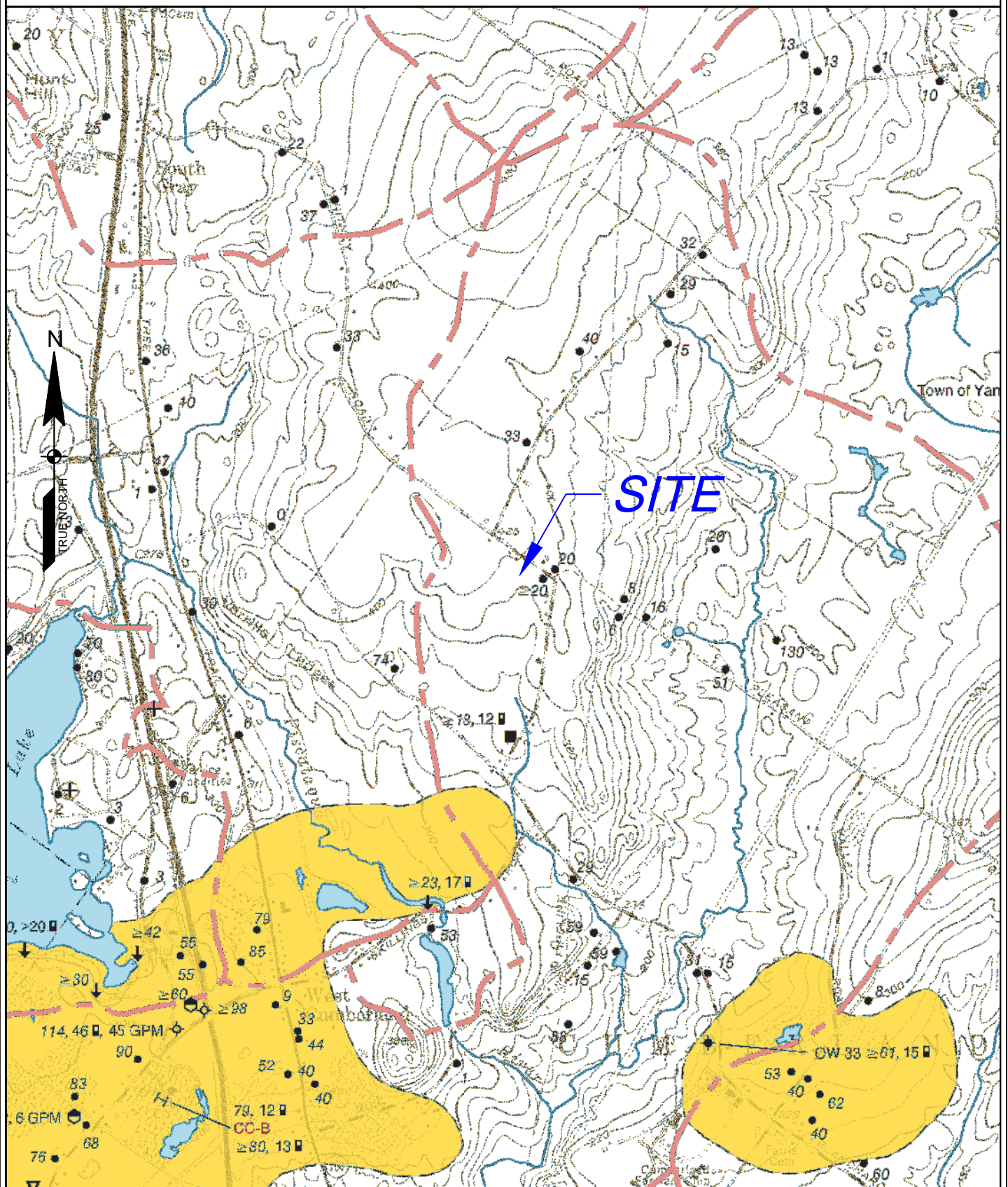


Figure 2
Groundwater Impact
Study Map

ORCHARD ROAD SUBDIVISION
ORCHARD ROAD
CUMBERLAND

Sebago Technics
75 John Roberts Road
South Portland, ME
Phone: (207) 200-2100

FIGURE 3. SIGNIFICANT SAND & GRAVEL AQUIFERS



**ORCHARD ROAD SUBDIVISION
ORCHARD ROAD
CUMBERLAND**

Sebago Technics
75 John Roberts Road –
South Portland, ME
Phone: (207) 200-2100

FIGURE 4. AQUIFERS LEGEND

Significant Sand & Gravel Aquifer Map Unit and Symbol Descriptions



Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.



Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.



Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.



Drilled overburden well



Drilled bedrock well



Quarry



Dug well



Driven point



Test pit



Bedrock outcrop

50

Depth to bedrock, in feet below land surface

≥ 13

Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

6

Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)



Gravel pit (overburden thickness noted in feet, e.g. 5-12')

4 GPM

Yield (flow) of well or spring in gallons per minute (GPM)



Spring, with general direction of flow



Observation well (project well if labeled; nonproject well if unlabeled)



Test boring (project boring if labeled; nonproject boring if unlabeled)



Potential point source of ground-water contamination



Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.



MAP-7 131, 23

Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

69, 12

Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface.

MAP-E

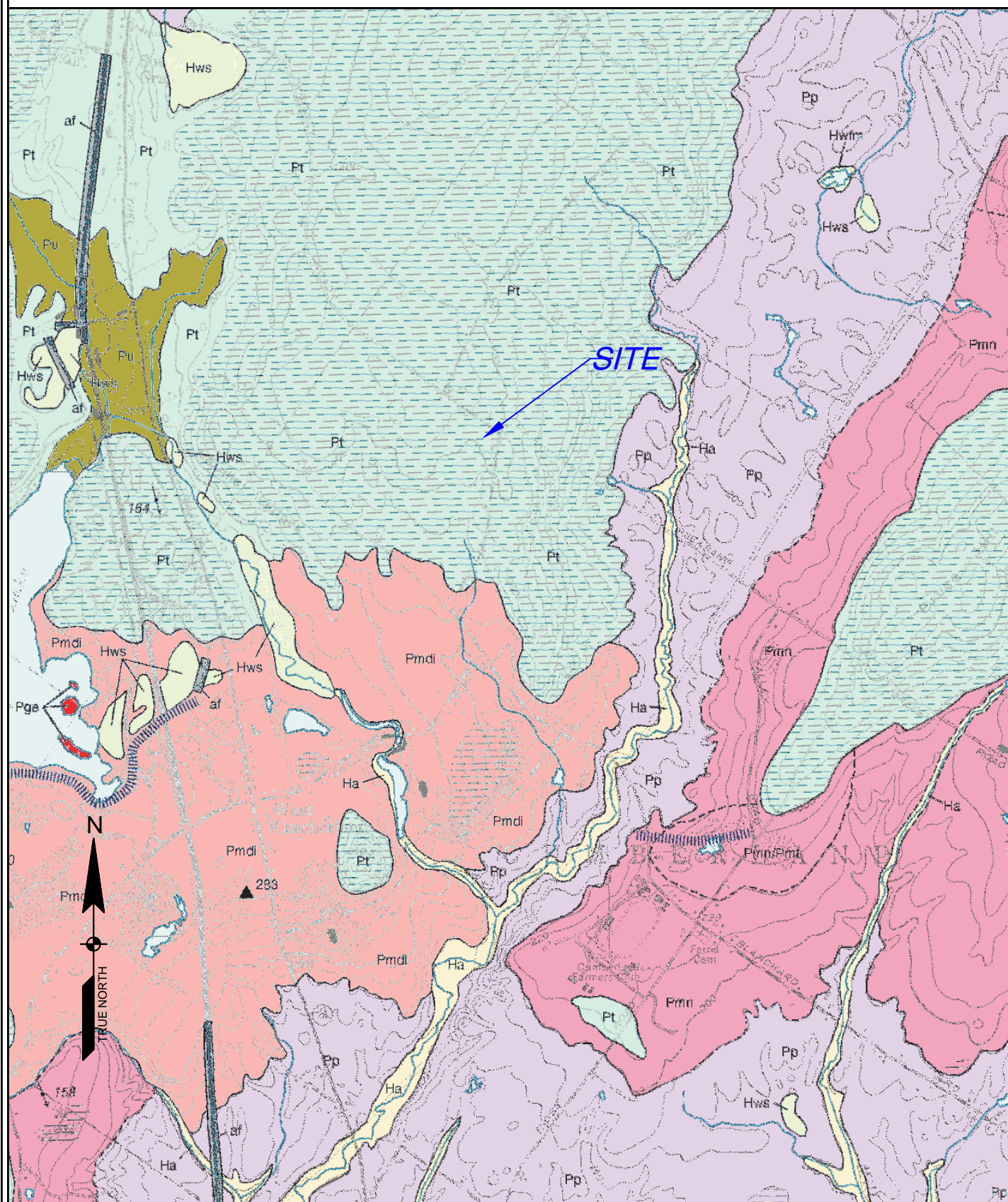
72, 12

Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

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ORCHARD ROAD
CUMBERLAND**

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South Portland, ME
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FIGURE 5. SURFICIAL GEOLOGY



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FIGURE 6. SURFICIAL GEOLOGY LEGEND























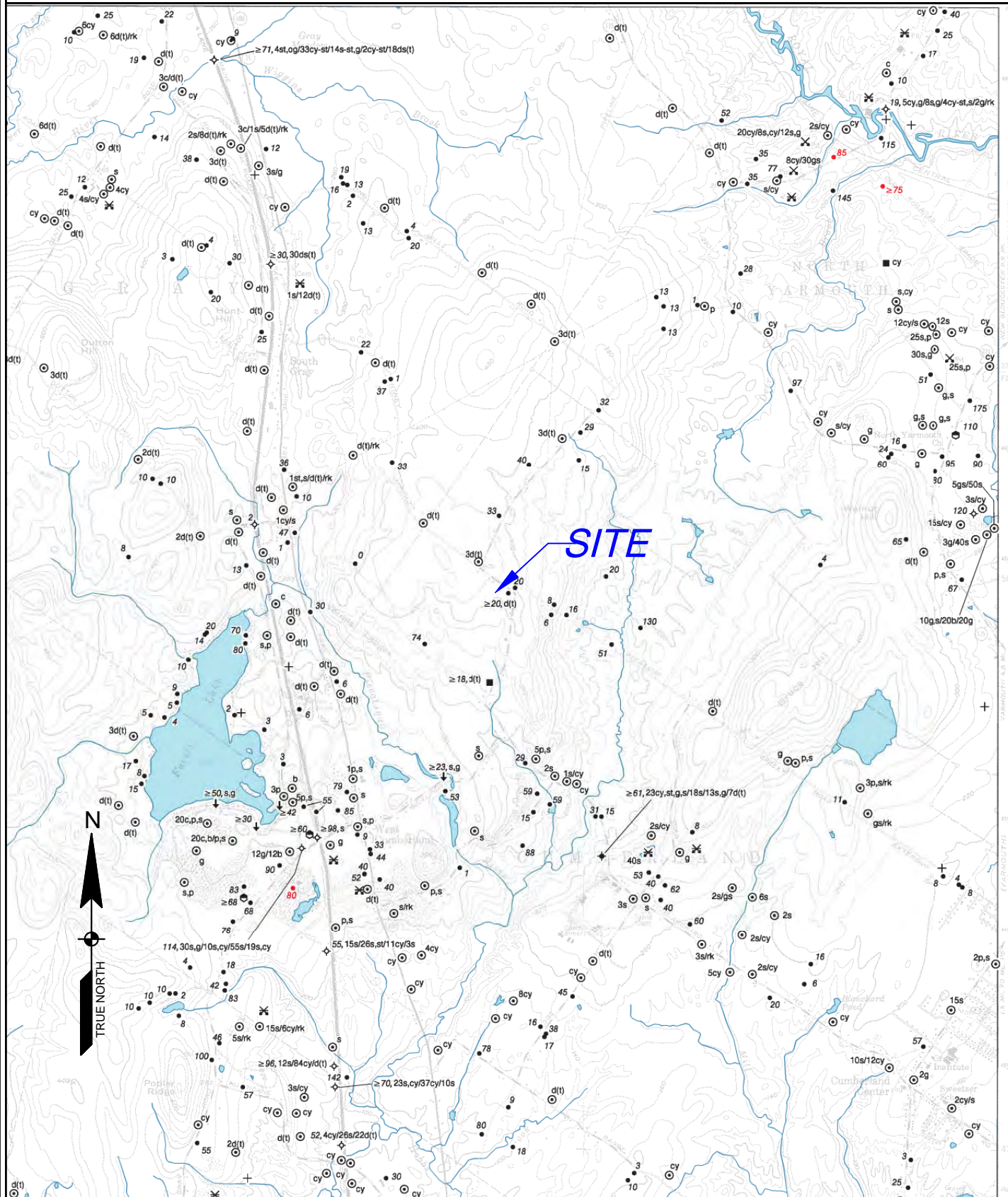
HOLOCENE DEPOSITS	
	Stream alluvium - Sand, silt, and minor amounts of gravel deposited on flood plains of modern streams
	Stream terraces - Flat alluvial benches situated above modern flood plains of streams. Materials forming the depositional terrace include gravel, sand, silt, and clay. Step-like morphology is created by downcutting of the stream through previously deposited material, of glacial or postglacial origin and age
	Wetland, swamp - Peat and fine-grained inorganic sediment. Poorly drained area with standing water common. Hwsp indicates swamps which are likely to include peat deposits that equal or exceed 1.5 meters in thickness
	Wetland, freshwater marsh - Peat and fine-grained inorganic sediment. Poorly drained grassland with standing water common. Hwfp indicates marshes that are likely to include peat deposits that equal or exceed 1.5 meters in thickness
PLEISTOCENE DEPOSITS	
	Marine nearshore deposits - Sand and gravel deposits formed as beaches, and shallow marine sand bodies formed during marine submergence and regression.
	Presumpscot Formation - Fine-grained marine mud (silt and clay with local sandy beds and lenses) locally with marine fossils and dropstones deposited in deeper quieter water during the marine submergence of the coastal lowland
	Marine fan - Layered gravel and sand deposited on the seafloor in a wedge or mound form at the glacier margin during marine submergence
	Marine delta - Sorted and stratified sand and gravel deposited in the late-glacial sea, with flat top graded to ocean surface
	Marine ice-contact delta - Ice-contact delta composed primarily of sorted and stratified sand and gravel. Deposit was graded to surface of late-glacial sea and is distinguished by flat top and foreset and topset beds
	Esker - Gravel and sand deposited in an ice tunnel by subglacial meltwater stream
	End moraine complex - Area of end moraines and associated glaciomarine sediments (submarine fan and sea-floor deposits). Composed of till, sand, and gravel deposited at the margin of the late Wisconsinan ice sheet
	Till - Poorly sorted mixture of gravel, sand, silt, and clay deposited directly by the action of glacier ice.
	Undifferentiated sediments - Pleistocene surficial sediments of uncertain origin.
	Bedrock - Gray dots indicate individual outcrops of ledge exposed at the surface. Horizontal ruled pattern indicates areas where bedrock is covered by a thin veneer of surficial sediments.
	Artificial fill - Mixture of till, gravel, sand, clay, and artificial materials transported and dumped to form elevated sections of roadways, etc.
	Contact - Indicates boundary between adjacent map units, dashed where approximate.
	Glacial striation or groove - Arrow shows direction of former ice movement. Dot marks point of observation.
	End moraine - Ridge of till, sand, and gravel deposited and/or deformed by glacier ice.
	Ice margin position - Line shows approximate position of ice margin during glacial retreat for major ice-margin positions. Dashed where approximate.
	Glacially streamlined hill - Symbol shows trend of long axis, which is parallel to former ice-flow direction.
	Marine fossil locality - Indicates site where marine fossils were located. Sites where radiocarbon age estimates were obtained also show radiocarbon age estimate.
	Glaciomarine delta - Elevation of contact between topset and foreset beds in glaciomarine delta, which indicates former position of sea level (from Thompson and others, 1989).
<div> <div>ORCHARD ROAD SUBDIVISION</div> <div>ORCHARD ROAD</div> <div>CUMBERLAND</div> </div> <div> <u>Sebago Technics</u> 75 John Roberts Road – South Portland, ME Phone: (207) 200-2100 </div>	

FIGURE 7. SURFICIAL MATERIALS



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FIGURE 8. SURFICIAL MATERIALS LEGEND

Surficial Material Symbol Descriptions

This map shows the textures of surficial sediments in the quadrangle, independent of interpretations regarding their origin. For example, poorly sorted sediments deposited directly from glacial ice are shown here as "diamicton", although they may be genetically classified as "till".

The symbols listed below indicate materials observed in borrow pits and other surface exposures, as well as subsurface data from various sources. Where more than one textural class is present, materials are separated by commas and listed in decreasing order of abundance (e.g. s, st, cy). Individual materials may occur in distinct layers, or they may be mixed. Hyphens show the ranges of particle sizes present where their relative abundances are uncertain (e.g. st-c). Slash marks indicate superposition of materials; thicknesses are in feet (e.g. 10s/3cy). "E" indicates a significant stratigraphic sequence of interbedded materials. Some borrow pits and other localities may be designated by numbers that refer to descriptions in the quadrangle text. Not all symbols will necessarily be found on the map.

g Undifferentiated gravel, used as a general term. Can be subdivided by size as follows:

- b** Boulder gravel >256 mm (10")
- c** Cobble gravel 64-256 mm (2.5-10")
- p** Pebble gravel 2-64 mm (0.1-2.5")

gs Gravelly sand (this is a special case for sand with lesser amounts of intermixed gravel, i.e. pebbly sand, cobbly sand, or bouldery sand)

sg Sand and gravel (used only to describe slumped face or other site where relative abundances of sand vs. gravel are unknown).

s Undifferentiated sand, used as a general term. Can be subdivided by size as follows:

- vcs** Very coarse sand (1-2 mm)
- cs** Coarse sand (0.5-1 mm)
- ms** Medium sand (0.25-0.5 mm)
- fs** Fine sand (0.125-0.25 mm)
- vfs** Very fine sand (0.0625-0.125 mm)

st Silt (0.002-0.0625 mm)

cy Clay (<0.002 mm)

og Organic-rich sediment (can be any organic material, including forest litter, wood, shells, etc.)

pt Peat (reserved for actual fibrous peat)

d Undifferentiated diamicton (poorly-sorted sediment in which particle sizes may range from clay to boulders). Used as a general term or subdivided as follows:

- dg** Gravelly-matrix diamicton
- ds** Sandy-matrix diamicton
- dt** Silty-matrix diamicton
- dy** Clayey-matrix diamicton

Note: Diamictons of glacial origin may be classified as one of the following varieties of till (shown on the map in parentheses):

- t** Till, undifferentiated. Usually of late Wisconsinan age (deposited by the last glacial ice sheet).
- ta** Ablation till. Deposited during retreat of the late Wisconsinan ice sheet. Typically sandy, stony, and not very compact.
- tl** Lodgement till. Inferred to have been deposited at the base of the late Wisconsinan ice sheet. Usually very compact.
- tf** Flowtill. Deposited by slumping adjacent to glacial ice.
- T** Variably weathered till (usually a lodgment facies) of inferred pre-late Wisconsinan age.

af Artificial fill (e.g. road fills, building sites, dumps)

bd Scattered boulders; interpreted as till where followed by (t)

rk Bedrock (observed in pit floor, boring, or natural exposure)

rs Rottenstone, disintegrated or weathered bedrock, saprolite,

u Unknown (material unidentified)

R Refusal (in test boring or well)

(f) Fossiliferous (used to indicate fossiliferous units within a sequence).

• Bedrock well

⊗ Drilled overburden well

■ Dug well

↓ Driven point

⊕ Bedrock outcrop

⊗ Quarry

◆ 20fs,st Observation well with materials data

◆ 10gs/rk Test boring with materials data

⊙ 8s-b Materials data from shovel hole, hand-auger hole, natural exposure, or excavation (other than borrow pit).

50 Depth to bedrock from well (≥ is used to indicate minimum depth to bedrock), in feet below land surface

✕ s-b Borrow pit, recently active at time of mapping, with materials data.

✕ s-p Borrow pit, evidently abandoned or in long disuse at time of mapping, with materials data.

Ⓜ Location of site for which a data sheet is on file at the Maine Geological Survey.

■ 50 Depth to bedrock from seismic line, in feet below land surface

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75 John Roberts Road –
South Portland, ME
Phone: (207) 200-2100

APPENDIX B
KATAHDIN ANALYTICAL REPORT

October 27, 2017

Mr. Dave Chapman
Sebago Technics
75 John Roberts Rd
Suite 1A
South Portland, ME 04106

RE: Katahdin Lab Number: SK9925
Project ID: Orchard Road IVIT
Project Manager: Mr. Galen Nickerson
Sample Receipt Date(s): October 25, 2017

Dear Mr. Chapman:

Please find enclosed the following information:

- * Report of Analysis (Analytical and/or Field)
- * Chain of Custody (COC)
- * Login Report

A copy of the Chain of Custody is included in the paginated report. The original COC is attached as an addendum to this report.

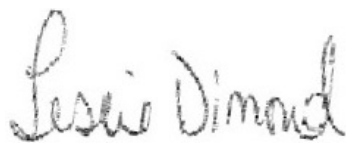
Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to <http://www.katahdinlab.com/cert.html> for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES



Authorized Signature - Quality Assurance Officer

10/27/2017

Date

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH

H2 - DO

H3 - sulfite

H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL Maximum Contaminant Level

NL

No limit

NFL No Free Liquid Present

FLP

Free Liquid Present

NOD No Odor Detected

TON

Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.



REPORT OF ANALYTICAL RESULTS

Client: Dave Chapman
Sebago Technics
75 John Roberts Rd
Suite 1A
South Portland, ME 04106

Lab Sample ID: SK9925-001
Report Date: 10/27/2017
PO No.:
Project: Orchard Road IVIT

Sample Description		Matrix		Filtered	Date Sampled	Date Received
74 ORCHARD ROAD		AQ		No(Total)	10/25/2017	10/25/2017

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ARSENIC	U 0.008	mg/L	0.008	1	0.008	SW846 6010	10/26/17	MD	SW846 3010	10/26/17	AMJ	KJ26ICW2	

Report of Analytical Results

Client: Dave Chapman
Sebago Technics
75 John Roberts Rd
South Portland, ME 04106

Lab Sample ID: SK9925-1
Report Date: 26-OCT-17
Client PO:
Project: Orchard Road IVIT
SDG: SK9925

Sample Description
74 ORCHARD ROAD

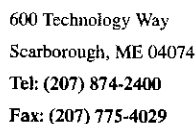
Matrix **Date Sampled** **Date Received**
AQ 25-OCT-17 09:20:00 25-OCT-17

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Nitrate As N	1.1 mg/L	0.050	.0152	EPA 353.2	WG216349	25-OCT-17 16:56:23	N/A	N/A	AP		

Client: <u>Sebago Tech</u>	KAS PM: <u>GN</u>	Sampled By: <u>Client</u>
Project:	KIMS Entry By: <u>SO</u>	Delivered By: <u>Client</u>
KAS Work Order#: <u>SK9925</u>	KIMS Review By: <u>GN</u>	Received By: <u>JCB</u>
SDG #:	Cooler: <u>1</u> of <u>1</u>	Date/Time Rec.: <u>10.25.17 1800</u>

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	<input checked="" type="checkbox"/>				
2. Chain of Custody present in cooler?	<input checked="" type="checkbox"/>				
3. Chain of Custody signed by client?	<input checked="" type="checkbox"/>				
4. Chain of Custody matches samples?	<input checked="" type="checkbox"/>				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	<input checked="" type="checkbox"/>				Temp (°C): <u>4.6</u>
Samples received at <6 °C w/o freezing?	<input checked="" type="checkbox"/>				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	<input checked="" type="checkbox"/>				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	<input checked="" type="checkbox"/>				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				<input checked="" type="checkbox"/>	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				<input checked="" type="checkbox"/>	
Soil/Sediment:					
Received in airtight container?				<input checked="" type="checkbox"/>	
Received in methanol?				<input checked="" type="checkbox"/>	
Methanol covering soil?				<input checked="" type="checkbox"/>	
D.I. Water - Received within 48 hour HT?				<input checked="" type="checkbox"/>	
Air: Refer to KAS COC for canister/flow controller requirements.	<input checked="" type="checkbox"/> if air included				
7. Trip Blank present in cooler?				<input checked="" type="checkbox"/>	
8. Proper sample containers and volume?	<input checked="" type="checkbox"/>				
9. Samples within hold time upon receipt?	<input checked="" type="checkbox"/>				
10. Aqueous samples properly preserved?	<input checked="" type="checkbox"/>				
Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH - pH <2					
Sulfide - >9				<input checked="" type="checkbox"/>	
Cyanide - pH >12				<input checked="" type="checkbox"/>	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.



**PLEASE BEAR DOWN AND
PRINT LEGIBLY IN PEN**

Page 1 of 1

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.



Katahdin Analytical Services
Login Chain of Custody Report (Ino1)

Page: 1 of 1

Oct. 25, 2017

11:05 AM

Quote/Incoming:

Login Number: SK9925

Account: SEBAGOTECH001

Sebago Technics

NoWeb

Project:

Primary Report Address:

Dave Chapman
Sebago Technics
75 John Roberts Rd
Suite 1A
South Portland, ME 04106
dchapman@sebagotechnics.com

Primary Invoice Address:

Accounts Payable
Sebago Technics
75 John Roberts Rd
Suite 1A
South Portland, ME 04106

Report CC Addresses:

Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS : FIRM-HARD COPY BY END OF DAY
CHECK NO. :
CLIENT PO# :
CLIENT PROJECT MANAGE :
CONTRACT :
COOLER TEMPERATURE : 4.6
DELIVERY SERVICES : Client
EDD FORMAT :
LOGIN INITIALS : SO
PM : GN
PROJECT NAME : Orchard Road IVIT
QC LEVEL : I
REPORT INSTRUCTIONS : email pdf, EDD and Invoice to Dave, no HC
SDG ID :
SDG STATUS :
VERBAL TAT :

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SK9925-1	74 ORCHARD ROAD	25-OCT-17 09:20	25-OCT-17		27-OCT-17	27-OCT-17	
Matrix	Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments		
Aqueous	S E353.2-NITRATE	27-OCT-17	125mL Plastic				
Aqueous	S SW3010-PREP	23-APR-18	250mL Plastic+HNO3				
Aqueous	S SW6010-ARSENIC	23-APR-18	250mL Plastic+HNO3				

Total Samples: 1

Total Analyses: 3

APPENDIX C
TESTPIT LOGS

SOIL PROFILE / CLASSIFICATION INFORMATION		DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES
Project Name: Orchard Road Subdivision	Applicant Name: Gorrill & Palmer	Project Location (municipality): Cumberland

Observation Hole # <u>TP-1</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Fine Sandy Loam	Friable	Dark Brown	
12				
18				
24	Sandy Loam	Firm	Light Olive Brown	Many/ Prominant
30				
36				
42				
48				
Limit of Excavation at 20"				
Soil	Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
<u>3</u> Profile	<u>D</u> Condition	<u>0-3</u> Percent	<u>12"</u> Depth	

Observation Hole # <u>TP-2</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Fine Sandy Loam	Friable	Dark Brown	
12				
18				
24	Sandy Loam		Light Olive Brown	Common/ Distinct
30		Firm		
36				
42				
48				
Limit of Excavation at 30"				
Soil	Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
<u>3</u> Profile	<u>C</u> Condition	<u>0-3</u> Percent	<u>12"</u> Depth	

Observation Hole # <u>TP-3</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Fine Sandy Loam	Friable	Dark Yellowish Brown	
12	Sandy Loam			
18				
24				
30		Firm	Light Olive Brown	Common/ Distinct
36				
42				
48				
Limit of Excavation at 26"				
Soil	Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
<u>3</u> Profile	<u>C</u> Condition	<u>3-8</u> Percent	<u>24"</u> Depth	

Observation Hole # <u>TP-4</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6			Dark Yellowish Brown	
12	Sandy Loam	Friable		None Observed
18			Yellowish Brown	
24				
30				
36				
42				
48				
Limit of Excavation at 24"				
Soil	Classification	Slope	Limiting Factor	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
<u>3</u> Profile	<u>C</u> Condition	<u>3-8</u> Percent	<u>>24"</u> Depth	

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: <u>David V. Chapman</u>	Date: <u>9-27-17</u>
Name Printed/typed: <u>David V. Chapman</u>	Cert/Lic/Reg.# 293
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	

SOIL PROFILE / CLASSIFICATION INFORMATION		DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES
Project Name: Orchard Road Subdivision	Applicant Name: Gorrill & Palmer	Project Location (municipality): Cumberland

Observation Hole # <u>TP-5</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
0	Texture	Consistency	Color	Mottling
6	Sandy Loam	Friable	Dark Brown	
12			Light Olive Brown	None Observed
18				
24		Firm		
30				
36				
42				
48	Limit of Excavation at 24"			
	Soil <u>3</u> Profile	Classification <u>C</u> Condition	Slope <u>3-8</u> Percent	Limiting Factor <u>21</u> Depth
	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock			

Observation Hole # <u>TP-6</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
0	Texture	Consistency	Color	Mottling
6	Sandy Loam	Friable	Dark Brown	
12			Light Olive Brown	None Observed
18				
24		Firm		
30				
36				
42				
48	Limit of Excavation at 24"			
	Soil <u>3</u> Profile	Classification <u>D</u> Condition	Slope <u>3-8</u> Percent	Limiting Factor <u>21"</u> Depth
	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock			

Observation Hole # <u>TP-7</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
0	Texture	Consistency	Color	Mottling
6	Sandy Loam	Friable	Dark Yellowish Brown	
12			Light Olive Brown	None Observed
18				
24		Firm		
30				
36				
42				
48	Limit of Excavation at 25"			
	Soil <u>3</u> Profile	Classification <u>C</u> Condition	Slope <u>3-8</u> Percent	Limiting Factor <u>20"</u> Depth
	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock			

Observation Hole # <u>TP-8</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
0	Texture	Consistency	Color	Mottling
6	Sandy Loam	Friable	Dark Yellowish Brown	
12			Light Yellowish Brown	None Observed
18				
24		Firm		
30				
36				
42				
48	Limit of Excavation at 27"			
	Soil <u>3</u> Profile	Classification <u>C</u> Condition	Slope <u>0-3</u> Percent	Limiting Factor <u>23"</u> Depth
	<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock			

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: <u>David V. Chapman</u>	Date: <u>9-27-17</u>
Name Printed/typed: <u>David V. Chapman</u>	Cert/Lic/Reg.# 293
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	

SOIL PROFILE / CLASSIFICATION INFORMATION		DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES
Project Name: Orchard Road Subdivision	Applicant Name: Gorrill & Palmer	Project Location (municipality): Cumberland

Observation Hole # <u>TP-9</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Sandy Loam	Friable	Brown	
12				
18			Light Olive Brown	Common/ Distinct
24				
30		Firm		
36				
42				
48				
Limit of Excavation at 27"				
Soil <u>3</u> Profile	Classification <u>D</u> Condition	Slope <u>0-3</u> Percent	Limiting Factor <u>14"</u> Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Observation Hole # <u>TP-10</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
<u>1-2</u> " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6	Sandy Loam	Friable	Dark Yellowish Brown	
12				
18			Light Olive Brown	Common/ Distinct
24				
30				
36				
42				
48				
Limit of Excavation at 22"				
Soil <u>3</u> Profile	Classification <u>D</u> Condition	Slope <u>0-3</u> Percent	Limiting Factor <u>10"</u> Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Observation Hole # _____ <input type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
_____ " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6				
12				
18				
24				
30				
36				
42				
48				
Soil _____ Profile	Classification _____ Condition	Slope _____ Percent	Limiting Factor _____ Depth	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Observation Hole # _____ <input type="checkbox"/> Test Pit <input type="checkbox"/> Boring				
_____ " Depth of organic horizon above mineral soil				
Texture	Consistency	Color	Mottling	
0				
6				
12				
18				
24				
30				
36				
42				
48				
Soil _____ Profile	Classification _____ Condition	Slope _____ Percent	Limiting Factor _____ Depth	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: <u>David V. Chapman</u>	Date: <u>9-27-17</u>
Name Printed/typed: <u>David V. Chapman</u>	Cert/Lic/Reg.# 293
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	

SOIL PROFILE / CLASSIFICATION INFORMATION		DETAILED DESCRIPTION OF SUBSURFACE CONDITIONS AT PROJECT SITES
Project Name: Orchard Road Subdivision	Applicant Name: TZ Properties	Project Location (municipality): Cumberland

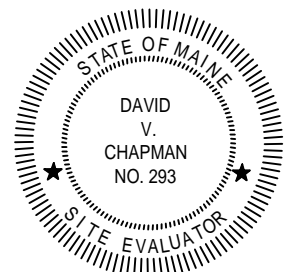
Observation Hole # <u>TP-301</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring					
_____ " Depth of organic horizon above mineral soil					
Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	
	0		Brown		
	6	Sandy Loam	Friable		
	12		Yellowish Brown		
	18		Olive Brown	Common/ Distinct	
	24		Light Olive Brown		
	30	Firm			
	36				
	42				
	48				
	Soil <u>3</u> Profile	Classification <u>C</u> Condition	Slope <u>0-3</u> Percent	Limiting Factor <u>17"</u> Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Observation Hole # <u>TP-302</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring					
_____ " Depth of organic horizon above mineral soil					
Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	
	0		Dark Brown		
	6	Sandy Loam	Friable		
	12		Yellowish Brown		
	18				
	24				
	30	Firm		Common/ Distinct	
	36				
	42				
	48				
	Soil <u>3</u> Profile	Classification <u>C</u> Condition	Slope <u>3-8</u> Percent	Limiting Factor <u>26"</u> Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Observation Hole # <u>TP-303</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring					
_____ " Depth of organic horizon above mineral soil					
Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	
	0		Dark Brown		
	6	Sandy Loam	Friable		
	12		Yellowish Brown		
	18				
	24			Common/ Distinct	
	30	Firm			
	36				
	42				
	48				
	Soil <u>3</u> Profile	Classification <u>C</u> Condition	Slope <u>3-8</u> Percent	Limiting Factor <u>24"</u> Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

Observation Hole # _____ <input type="checkbox"/> Test Pit <input type="checkbox"/> Boring					
_____ " Depth of organic horizon above mineral soil					
Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	
	0				
	6				
	12				
	18				
	24				
	30				
	36				
	42				
	48				
	Soil _____ Profile	Classification _____ Condition	Slope _____ Percent	Limiting Factor _____ Depth	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock

INVESTIGATOR INFORMATION AND SIGNATURE	
Signature: <u>David V. Chapman</u>	Date: <u>12-8-17</u>
Name Printed/typed: <u>David V. Chapman</u>	Cert/Lic/Reg.# <u>293</u>
Title: <input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Certified Geologist <input type="checkbox"/> Other:	



APPENDIX D

PARAMETERS AND RESULTS

**Groundwater Impact Study, Nitrates
Model Input Parameters and Solution
Orchard Road Subdivision
Orchard Road, Cumberland, Maine
Lot 1, 2, 3, 7, 8, 9, and 10**

Annual rainfall (inches):	44
Hydrologic soil group* (above disposal field):	C to D
% Slope (above disposal field):	2%
% Infiltration* (into disposal field):	21
Assumed rainfall flow into disposal field (gal/day):	6.63
Assumed rainfall flow into disposal field during drought conditions^(gal/day):	3.98
Background NO3-N concentration (mg/L):	0
Assumed effluent NO3-N concentration (mg/L):	41
Assumed effluent flow into disposal field (gal/day):	360
Assumed NO3-N concentration in rainfall (mg/L):	0.5
Hydraulic conductivity of aquifer (ft/day):	2
Hydraulic gradient of aquifer (ft/ft):	0.015
Effective porosity of aquifer:	0.21
Seepage velocity of aquifer (ft/day):	0.14
Retardation factor	1
Half-Life (0 for no decay)	0
Simulation duration to reach NO3-N concentration equilibrium (days)	2,655
Longitudinal dispersivity at end of simulation duration (ft)	2.23
Lateral dispersivity at end of simulation duration (ft)	0.74
Vertical dispersivity at end of simulation duration (ft)	0.11
Disposal bed length (ft)	15
Disposal bed width (ft)	28
Length of 10 mg/L plume during drought conditions (ft)	120

Notes:

* - from The State of Maine Department of Environmental Protection, 1991, The guidelines for expediting the processing of applications under the site location of development act.

^ - drought conditions equals 60% of average annual rainfall

% - percent

gal/day - gallons per day

ft - feet

mg/L - milligrams per liter

NO3-N - Nitrate-Nitrogen

**Groundwater Impact Study, Nitrates
Model Input Parameters and Solution
Orchard Road Subdivision
Orchard Road, Cumberland, Maine
Lots 4, 5, and 6**

Annual rainfall (inches):	44
Hydrologic soil group* (above disposal field):	C to D
% Slope (above disposal field):	2-3%
% Infiltration* (into disposal field):	21
Assumed rainfall flow into disposal field (gal/day):	6.63
Assumed rainfall flow into disposal field during drought conditions^(gal/day):	3.98
Background NO3-N concentration (mg/L):	0
Assumed effluent NO3-N concentration (mg/L):	41
Assumed effluent flow into disposal field (gal/day):	360
Assumed NO3-N concentration in rainfall (mg/L):	0.5
Hydraulic conductivity of aquifer (ft/day):	2
Hydraulic gradient of aquifer (ft/ft):	0.030
Effective porosity of aquifer:	0.21
Seepage velocity of aquifer (ft/day):	0.29
Retardation factor	1
Half-Life (0 for no decay)	0
Simulation duration to reach NO3-N concentration equilibrium (days)	1,135
Longitudinal dispersivity at end of simulation duration (ft)	4.12
Lateral dispersivity at end of simulation duration (ft)	1.37
Vertical dispersivity at end of simulation duration (ft)	0.21
Disposal bed length (ft)	28
Disposal bed width (ft)	15
Length of 10 mg/L plume during drought conditions (ft)	80

Notes:

* - from The State of Maine Department of Environmental Protection, 1991, The guidelines for expediting the processing of applications under the site location of development act.

^ - drought conditions equals 60% of average annual rainfall

% - percent

gal/day - gallons per day

ft - feet

mg/L - milligrams per liter

NO3-N - Nitrate-Nitrogen

**DECLARATION OF PROTECTIVE COVENANTS AND COMMON EASEMENTS
ORCHARD ROAD SUBDIVISION
TOWN OF CUMBERLAND, COUNTY OF CUMBERLAND, STATE OF MAINE
BY
TZ PROPERTIES, LLC**

THIS DECLARATION dated this _____ day of _____, 2017, by TZ Properties, LLC, a Maine limited liability company with a mailing address of _____ (hereinafter referred to as the "Declarant").

WITNESSETH:

WHEREAS, the Declarant owns certain real property in the Town of Cumberland, Cumberland County, State of Maine, as described on **Exhibit A** attached hereto and as delineated on a plan entitled "Orchard Road Subdivision, Cumberland, Maine" prepared for Declarant by Gorrill Palmer and dated October 2017, and recorded in the Cumberland County Registry of Deeds in Plan Book xxx, Page xxx (the "Plan"), which subdivision consists of Ten (10) lots numbered on the Plan as 1-10 and also a parcel of land designated "Open Space." Lots 1 through 10 inclusive shall hereinafter be referred to as the "Lots," and together with the appurtenant Common Open Space easements shown on the Plan or referenced in this Declaration hereinafter referred to as the "Property." Declarant proposes to develop and improve the Property in accordance with the Plan; and

WHEREAS, Declarant desires to assure quality standards for the orderly development of the Property and to promote the interest and welfare of each owner of a part of the Property and therefore desires to subject the Property to protective covenants and common easements as set forth hereinafter.

WHEREAS, Declarant desires to subject the Property to protective covenants and common easements as set forth hereinafter to incorporate the conditions of the Town of Cumberland Planning Board approval for the subdivision of the Property.

NOW, THEREFORE, Declarant hereby declares that the Property is and shall be owned, occupied, improved, transferred, leased and otherwise used and disposed of subject to the protective covenants and common easements set forth herein, all of which are declared to be in furtherance of a uniform scheme of mutual equitable servitudes upon each and every portion thereof, in favor of each and every other portion thereof, and to create reciprocal rights and privity of contract and estate between all persons acquiring or owning an interest in any portion thereof, which protective covenants and common easements shall be determined to run with the land and be a burden and benefit upon and to, and be enforceable by, all persons having any interest in any portion of the Property, their heirs, successors and assigns.

ARTICLE I
DEFINITIONS.

1. Association: "Association" shall mean and refer to *Orchard Road Subdivision Homeowners Association*, its successors and assigns, a non-profit, non-stock Maine corporation, to be formed by Declarant pursuant to the terms of Article V below.

2. Building: "Building" shall mean and refer to any dwelling, garage, or storage structures or other improvement now or hereafter constructed on a Lot.
3. Common Expenses: "Common Expenses" shall mean and refer to expenditures made by or financial liabilities of the Association, together with any allocations to capital or other reserve accounts.
4. Lot: "Lot" shall mean each whole Lot or any interest therein as joint tenants or tenants in common.
5. Remaining Land: "Remaining Land" shall mean and refer to any land not a Lot and all improvements thereon, including without limitation the roads, curbing, and storm water drainage fixtures and improvements, all as shown on the Plan. Remaining Land also shall include the Common Open Space, which shall be owned as tenants-in-common by each of the Lot Owners.
6. Easement Areas: "Easement Areas" shall mean and refer to all of the easements areas shown on the Plan or described below or on Exhibit A attached hereto that burden any Lot or Lots or that benefit the Association and all of the Lots, including without limitation utility easements, pedestrian access to open space easement, vehicle and pedestrian access easements in the roadway, forested buffer easements, drainage easements, and and all improvements on, in, across or under such easement areas including pavement, curbing, landscaping, storm water drainage fixtures and improvements.
7. Member: "Member" shall mean and refer to those persons entitled to membership in the Association as determined by the Bylaws of the Association and as set forth herein.
8. Owners: "Owners" or in the singular, "Owner", shall mean and refer to the record owner or owners of fee simple title in and to any Lot, and shall include the Declarant so long as it owns any Lot or any other portion of the Property, but shall not include any person or legal entity owning an interest merely as security for an obligation.

ARTICLE II

PROTECTIVE COVENANTS AND RESTRICTIONS.

Each conveyance by Declarant, its successors and assigns, of any Lot, and all subsequent conveyances of any Lot, whether directly or by operation of law, shall be subject to the following:

1. No Commercial Uses: Subject to the rights of the Declarant to develop and sell the Lots and such other rights of the Declarant as are set forth in this Declaration, each Lot shall be used only for residences, and no commercial enterprise of any nature or description shall be conducted or maintained on any portion of the Property, except that Lots may be used for a home office for telecommuting purposes by the Owners of such Lots provided that no customer, client or employee visits are made to the Lots incident to such commercial use.
2. Buildings and Lot Improvements: One single family residential structure shall be constructed or kept on any Lot. Each such Lot shall be improved subject to the following restrictions:
 - (a) Not less than 1 ½ stories in height that meets or exceeds seventeen hundred (1700) square feet of usable living area excluding basements, garages, decks and patios, one (1) private garage attached to the single-family dwelling or detached from said dwelling, for not more

than three (3) cars, in ground pool, pool house and outbuildings incidental and accessory to the permitted use of the premises. All structures shall comply with all applicable state and municipal building codes.

- (b) No structure shall be constructed outside of the building envelope shown on the Plan, which building envelope is determined by the application of the Town of Cumberland set-back requirements.
- (c) All construction, including paved driveway, must be completed not more than twenty-four (24) months from the commencement date. Commencement of construction shall be defined as the date on which site work has begun on the subject property.
- (d) Any additions to a structure after initial construction that increase the footprint, that materially change the exterior appearance, or that require structural modification to the structure must be approved by the Declarant, or after the Declarant has conveyed the last Lot, by the Board of Directors of the Association, in writing prior to commencement of construction of such additions or modifications.
- (e) Declarant reserves to itself, its successors and assigns, the exclusive right to erect, place and maintain such facilities in or upon any portion of the Property as in its sole discretion may be necessary or convenient while selling the Lots or portions thereof, selling or constructing residences and other improvements upon the Property. Such facilities shall include, but are not limited to, sales and construction offices, storage areas, model units, signs, and portable toilet facilities.

3. Damage of Destruction: Any Building on any Lot that is destroyed or damaged in whole or in part by fire, windstorm, or other casualty promptly must be rebuilt or all debris removed and the affected portion of the Lot restored to its natural condition without delay.

4. Compliance with Governmental Regulations: Owners shall occupy and maintain the Lots in accordance with the rules, regulations, ordinances, and statutes enacted by governmental entities having jurisdiction over the Property, including without limitation the terms and conditions imposed by the Town of Cumberland Planning Board in connection with the subdivision approval for the Property on xxx, and xxx (the "Town Approvals"), and as reflected on the Plan.

5. Maintenance of the Remaining Land and Easement Areas: The Association shall bear all cost (subject to the right to assess lots as provided below) and responsibility of operation, upkeep, maintenance, repair and replacement of any Remaining Land and Easement Areas, including without limitation any necessary routine maintenance and repair of the roads, storm drainage and grassed underdrained soil filters, landscaping, curbing, utility wires and conduits, development signage or other common area improvements. The Association shall also obtain and maintain adequate commercial general liability insurance on said Remaining Land and with respect to the Easement Areas, which insurance shall be obtained on an occurrence basis in an amount not less than \$5,000,000 combined single limit. Until and only until conveyance of any portion of the Remaining Land to the Association, the Declarant shall undertake the maintenance responsibilities of the Association with respect to the Remaining Land and Easement Areas; provided, however, the Association shall be unconditionally obligated to accept conveyance of the Remaining Land and Easement Areas or any part thereof, and Declarant may record a deed or deeds to the Association for such areas without further action by the Association. The Remaining Land shall be conveyed to the Association by Declarant at any time prior to or contemporaneously with Declarant conveying out the last Lot of the Property, with the timing of such conveyance to be in Declarant's sole

discretion. Upon any such conveyance to the Association, the Declarant shall be relieved of all obligations under this paragraph with respect to the land conveyed.

6. Animals: No poultry, swine, livestock or other animals shall be kept on a Lot or otherwise on the Property, except household pets of the kind and number normally housed in a residence. There shall be no exterior pet fencing, shelters, or caging. No boarding of dogs, cats or other household pets shall be conducted on a Lot.

7. Prohibited Vehicles: Except in the development and sale of the Lots by the Declarant and construction of houses and other Buildings by Owners, no business or commercial vehicle or vehicle of similar nature shall be brought upon, or be maintained, or be permitted to remain on the Property except that a business or commercial vehicle regularly used by an Owner in his or her occupation may remain on a Lot. No junk automobiles or other vehicles that do not display a current State of Maine motor vehicle inspection sticker may be kept or maintained on the Property unless parked in a garage or storage shed.

8. Prohibited Activities: No hunting or use of firearms, air guns, or bows shall be allowed anywhere on the Property.

9. Rubbish and Debris: Except during the initial construction of a Building, rubbish and debris shall be stored between pickups in the garage in sanitary receptacles with sealing covers or as required by Town of Cumberland ordinances or regulations and shall be placed curbside for pickup in such receptacles with the covers placed tightly over the receptacles and promptly re-stored in a garage after rubbish pickup.

10. Exterior Lighting: Any exterior lighting shall be directed to illuminate only the ground or the Buildings on the Lot and shall be installed such that no light is directly visible from any other part of the Property.

ARTICLE III **DURATION.**

The protective covenants, common easements and other provisions of this Declaration as set forth herein and as may be amended from time to time as provided below in Article X, shall run with the land and burden the Property and shall inure to the benefit of and be enforceable by the Declarant, the Association, and any other Owner of any portion of the Property, their respective legal representatives, heirs, successors or assigns, in perpetuity.

ARTICLE IV **DECLARANT'S RESERVED RIGHTS.**

The conveyance of the Lots to Owners shall be subject to the following rights reserved by the Declarant until completion of the construction, marketing and sale of all Lots:

1. To change the size, number, dimension, and location of Lots and other improvements owned by the Declarant, subject to the requirement that Declarant obtain necessary approval from the Town of Cumberland planning authority. The foregoing change or changes shall be effective upon the recording by the Declarant of an amendment to this Declaration, no other

signatures being necessary on such amendment, and/or the recording by the Declarant of an amended subdivision plan indicating the changes made;

2. To locate on the Property, even though not depicted on the Plan, and grant and reserve easements and rights of way for the installation, maintenance, repair, replacement and inspection of utility lines, wires, pipes, conduits and facilities, including, but not limited to, water, electric, telephone, cable and sewer;

3. To connect with and make use of utility lines, wires, pipes and conduits located on the Property for construction and sales purposes, provided that the Declarant shall be responsible for the cost of services so used;

4. To use the roads shown on the Plan and access easements appurtenant to the Property for ingress and egress to the Property or any portion thereof for all purposes including, but not limited to development and construction of a residential subdivision and use the Property for the storage of materials used in the construction of the residences and improvements on the Lots and infrastructure on the Property and equipment used in the completion of the project;

5. To install and maintain signs and lighting for marketing and sales purposes; and

6. To do all things reasonably necessary to facilitate the development of the Property and the marketing and sale of the Lots.

Declarant further reserves from the land described in Exhibit A attached hereto a perpetual easement in gross, assignable to any other party or parties in part or in whole, for vehicular and pedestrian access on and all utilities under, across or over the 50' wide roadway right-of-way as shown on the Plan. The foregoing reserved easement may benefit any additional land and any number of additional lots or dwellings without exceeding the scope of or overburdening the reserved easement rights. The foregoing reserved easement is perpetual in nature and does not expire upon the sale of the Lots by Declarant.

ARTICLE V **HOMEOWNERS ASSOCIATION.**

On or about the date of execution and recording of this Declaration, there will be formed *Orchard Road Subdivision Homeowners Association*, a non-profit, non-stock corporation organized under the laws of the State of Maine (the "Association"). Each Owner or Owners of a Lot, including the Declarant prior to the conveyance of each Lot, shall automatically become and be a member of the Association as long as said Owner(s) continues as record owner of a Lot. Upon termination of the interest of an Owner in a Lot, the Owner's membership and any interest in the Association shall automatically terminate and transfer and inure to the next successive record owner of the Lot. Each Owner shall be bound by the Bylaws of the Association, as the same may be amended from time to time, and each Owner shall comply strictly with such Bylaws. No holder of a mortgage on a Lot shall be considered as an Owner until such holder shall have acquired title to such Lot by foreclosure or deed in lieu of foreclosure. With respect to Association governance matters requiring a vote of the Owners, each Lot shall have One (1) vote.

ARTICLE VI **ASSESSMENTS FOR COMMON EXPENSES.**

1. Upon ratification of the budget for Common Expenses (as defined herein), the Association shall cause to be sent to each Owner a statement showing such Owner's share of the Common Expenses. The Common Expenses shall include, without limitation, the costs necessary to own, operate, manage, maintain, repair and replace the Remaining Land and Easement Areas and to operate, maintain, repair and replace the roads, curbing, landscaping, signage, drainage swales, grassed underdrained soil filter, and all structures and equipment related or connected thereto. Assessments for Common Expenses shall be billed on or about the first day of each quarter. All sums so assessed and billed shall become due no later than 30 days after the date of mailing or delivery of each bill. The Members of the Association may from time to time at special meetings levy additional assessments, in accordance with the terms of the Bylaws.

2. Assessments authorized and billed by the Association shall be a charge on the Lot and shall be a continuing lien upon the Lot upon which such assessment is made. If the assessment to an Owner shall not be paid within Thirty (30) days after the date when due, then said assessment shall be delinquent and shall, together with interest at the rate of one percent (1%) per month or any portion thereof, costs of collection and attorneys' fees, become a continuing lien on the Lot owned by the delinquent Owner, which lien shall bind the Lot with the Building and improvements thereon, as well as the delinquent Owner, his heirs, devisees, successors, personal representatives and assigns, without the necessity of filing any document of record. Such lien may be enforced and foreclosed by the Association in the manner provided by applicable law for the foreclosure of real estate mortgages. The lien for unpaid assessments established hereby shall be prior to all liens and encumbrances on the Lot other than (i) the first mortgage recorded prior to the date on which the assessment that is sought to be enforced becomes delinquent, (ii) any second mortgage in favor of Declarant, (iii) liens for real estate taxes and other governmental/municipal assessments or charges against the Lot, or (iv) any other lien that according to law takes priority over existing liens pursuant to any statute. All such assessments, in addition to being a lien, shall also constitute the personal liability of the Owner of the Lot so assessed at the time of the assessment. In the collection of any assessment, the defaulting Owner also shall pay all of the Association's costs of collection, including attorneys' fees.

ARTICLE VII **EASEMENTS.**

The Lots and the Remaining Land are and shall be subject to all of the conditions, restrictions, easements and reservations set forth on the Plan, as it may be amended from time to time, and as more fully described below, and all Owners shall be bound by all of said conditions, restrictions, easements and reservations.

1. "Common Open Space": An easement for maintenance and use of the land for passive recreational activities such as walking, running, snowshoeing, and Nordic skiing.

2. "Roadway Access and Utility Easement": An easement for access by pedestrians and vehicles to and from the Lots and including the right to construct, maintain, repair and replace the roadway, including without limitation the gravel, pavement and curbing therefor. Also an easement to construct, install, use, repair, maintain and replace above and/or below ground any and all utility lines, pipes, conduits, wires, poles, guys, transformer and juncture boxes including without limitation those necessary for the provision of sewer, water, electricity, telephone, cable television, data and other communication services, including the right to enter the easement area at any time and from time to time with workers and equipment to exercise the rights reserved pursuant to this easement, including without limitation the removal of stumps and roots, the construction decorative walls and columns, and the alteration of the grade of the earth, including the right to

maintain and replace all of the foregoing, including the right to enter the easement area at any time and from time to time with pedestrians, motor vehicles and equipment to exercise the rights reserved pursuant to this easement. Declarant reserves for itself and its successors and assigns the right to dedicate and convey the right-of-way to the Town of Cumberland for all public purposes.

3. “Drainage Swales”: An easement for the installation, maintenance, repair, and replacement of level lip spreaders and drainage swales for the purpose of treating storm water runoff, which easement includes access thereto with workers and equipment for such purposes.

4. “Winter Maintenance Easement”: An easement across the roadway for the Town of Cumberland to use for all purposes in connection with the plowing and snow removal activities on the roadway right-of-way, in the event that the roadway is offered and accepted by the Town of Cumberland for winter maintenance purposes.

ARTICLE VIII

MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

The Association shall comply with the recommendations and requirements contained in the “Stormwater management report and Erosion and Sedimentation Control Report for Orchard Road Subdivision, Cumberland, Maine” prepared by Gorrill Palmer for Declarant and dated November, 2017, and October, 2017, as such maintenance plan has been approved by the Town of Cumberland Planning Board and the Maine Department of Environmental Protection. The Maintenance of Facilities section of the Erosion and Sedimentation Report presents the required maintenance for the Orchard Road Subdivision and is included as follows.

Maintenance of facilities

The stormwater facilities will be maintained by the Applicant, TZ Properties, LLC or their assigned heirs. The contract documents will require the contractor to designate a person responsible for maintenance of the sedimentation control features during construction as required by the Erosion Control Report. Long-term operation/maintenance recommended for the stormwater facilities is presented below.

The responsible party may contract with such professionals, as may be necessary in order to comply with this provision and may rely on the advice of such professionals in carrying out its duty hereunder, provided, that the following operation and maintenance procedures are hereby established as a minimum for compliance with this section. A maintenance log of the inspections shall be kept by the responsible party.

Inspection and Maintenance Frequency and Corrective Measures:

The following areas, facilities, and measures will be inspected and the identified deficiencies will be corrected. Clean-out must include the removal and legal disposal of any accumulated sediments and debris.

Catch Basins:

Inspect catch basins 2 times per year (preferably in Spring and Fall) to ensure that the catch basins are working in their intended fashion and that they are free of debris. Clean structures when sediment depths reach 12” from invert of outlet. If the basin outlet is designed with a hood to trap floatable materials (i.e. Snout), check to ensure watertight

seal is working. At a minimum, remove floating debris and hydrocarbons at the time of the inspection.

Culverts:

Inspect culverts 2 times per year (preferably in Spring and Fall) to ensure that the culverts are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit and repair any erosion damage at the culvert's inlet and outlet.

Inlet/Outlet Control Structures:

Inspect structures and piping 2 times per year (preferably in Spring and Fall) to ensure that the structures are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris within the structure.

Stormdrain Outlets:

Inspect outlets 2 times per year (preferably in Spring and Fall) to ensure that the outlets are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the outlet and within the conduit. Repair any erosion damage at the stormdrain outlet.

Soil Filter – Bio-Filtration:

Inspect all upstream pre-treatment measures 2 times per year (preferably in Spring and Fall) for sediment and floatables accumulation. Remove and dispose of any sediments or debris.

Surface (Underdrain Pond, Swale or Bio-Filter):

The soil filter will be inspected within the first three months after construction; thereafter the filter will be inspected 2 times per year (preferably in Spring and Fall) to ensure that the filter is draining within 24 to 48 hours of a rain event equivalent to 1" or more. Adjustments will be made to the outlet valve to ensure that the grassed underdrained soil filter drains within 24 to 48 hours. Failure to drain in 72 hours will require part or all of the soil filter media to be removed and replaced with new material meeting the soil filter gradation. The facilities will be inspected after major storms and any identified deficiencies will be corrected. Harvesting and weeding of excessive growth shall be performed as needed. Inspect for unwanted or invasive plants and remove as necessary.

Vegetated Areas:

Inspect slopes and embankments early in the growing season to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows. The facilities will be inspected after major storms and any identified deficiencies will be corrected.

Ditches, Swales and other Open Stormwater Channels:

Inspect 2 times per year (preferably in Spring and Fall) to ensure they are working in their intended fashion and that they are free of sediment and debris. Remove any obstructions to flow, including accumulated sediments and debris and vegetated growth. Repair any erosion of the ditch lining. Vegetated ditches will be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. Correct any erosion of the channel's bottom or sideslopes. The facilities shall be inspected after major storms and any identified deficiencies shall be corrected.

Roadways and Parking Surfaces: Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader. Repair potholes and other roadway obstructions and hazards. Plowing and sanding of paved areas shall be performed as necessary to maintain vehicular traffic safety.

In the event that the Roadway is accepted by the Town of Cumberland, the maintenance requirements of all stormwater facilities within the right-of-way will become the responsibility of the Town of Cumberland. In the event that the Roadway is accepted by the Town of Cumberland, the Association shall be responsible for the maintenance of all stormwater facilities outside of the right-of-way, including but not limited to the grassed underdrained soil filters, inlet/outlet control structures, storm drain outlets, vegetated areas, and swales.

ARTICLE IX
RESTRICTED BUFFER AREAS.

To preserve the “75’ Buffer.” areas shown on the Plan (hereinafter referred to as the “75’ Buffer Areas”), the Buffer Areas shall be maintained as follows:

The Buffer Areas are and shall forever be held, transferred, sold, conveyed, occupied and maintained subject to the conditions and restrictions set forth in this Article IX of the Declaration (the “Restrictions”). The Restrictions shall run with the Buffer Areas and shall be binding on all parties having any right, title or interest in and to the Restricted Buffer Areas, or any portion thereof, and their heirs, personal representatives, successors, and assigns. Any present or future owner or occupant of the Buffer Areas or any portion thereof, by the acceptance of a deed of conveyance of all or part of the Buffer Areas or an instrument conveying any interest therein, whether or not the deed or instrument shall so express, shall be deemed to have accepted the Buffer Areas subject to the Restrictions and shall agree to be bound by, to comply with and to be subject to each and every one of the Restrictions hereinafter set forth.

1. Restrictions on Buffer Area. The Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Buffer Area to filter and absorb stormwater, the use of the Buffer Area is hereinafter limited as follows.

- a. No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material may be placed, stored or dumped on the Buffer Area, nor may the topography of the area be altered or manipulated in any way;
- b. Any removal of trees or other vegetation within the Buffer Area must be limited to the following:
 - (i) No purposefully cleared openings may be created and an evenly distributed stand of trees and other vegetation must be maintained. An "evenly distributed stand of trees " is defined as maintaining a minimum rating score of 24 points in any 50 foot by 50 foot square (2500 square feet) area, as determined by the following rating scheme:

Diameter of tree at 4 1/2 feet above ground level	Points
2-4 inches	1
4-8 inches	2
8-12 inches	4
>12 inches	8

Where existing trees and other vegetation result in a rating score less than 24 points, no trees may be cut or sprayed with biocides except for the normal maintenance of dead, wind-blown or damaged trees and for pruning of tree branches below a height of 12 feet provided two thirds of the tree's canopy is maintained;

- (ii) No undergrowth, ground cover vegetation, leaf litter, organic duff layer or mineral soil may be disturbed except that one winding path, that is no wider than six feet and that does not provide a downhill channel for runoff, is allowed through the area;
- c. No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Restricted Buffer Area, except for a sign, utility pole or fence;
- d. No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Restricted Buffer Area;

Any activity on or use of the Buffer Area inconsistent with the purpose of these Restrictions is prohibited.

2. **Binding Effect.** If a Buffer Area is at any time owned by more than one owner, each owner shall be bound by the foregoing restrictions to the extent that any of the Buffer Area is included within such owner's property.

ARTICLE X **AMENDMENTS.**

This declaration may be amended at any time and from time to time by written instrument duly executed by the Owners of record of six of the ten Lots; provided, however, that at any time during which the Declarant owns one or more Lots, no amendment shall be effective unless the written consent of the Declarant to such amendment is obtained and further provided that no provisions of this Declaration required as conditions of approval for the subdivision of the Property may be terminated or modified without the approval of the planning authority of the Town of Cumberland. Any such amendment shall be recorded in the Cumberland County Registry of Deeds.

ARTICLE XI
GENERAL PROVISIONS.

1. Enforcement. By the acceptance of the deed to a Lot, each Owner covenants and agrees for himself, his heirs, devisees, successors, personal representatives and assigns, to comply with the covenants and restrictions set forth in this Declaration. Any failure to so comply shall be grounds for an action against the Owner, his heirs, devisees, successors, personal representatives and assigns, to recover damages or for injunctive relief or both. Such action may be maintained by the Association, the Declarant or by any aggrieved Owner. Notwithstanding anything in this Declaration to the contrary, the Association shall enforce the provisions of this Declaration that satisfy the conditions of the Town Approvals. In the event the Association, Declarant or an Owner shall substantially prevail in any such action, they shall be entitled to recover attorneys' fees and related expenses incurred in enforcing the terms of this Declaration. Nothing herein shall require the Declarant to enforce any of the covenants and restrictions in this Declaration.

2. Waivers. No delay or omission on part of the Declarant, the Association, or any Owner in enforcing the covenants set forth herein shall be construed as a waiver of any right to enforce or seek such remedy or acquiescence in such breach.

3. Severability. In the event any one or more of the provisions of this Declaration shall be found for any reason by a court of competent jurisdiction to be unenforceable or null and void, such judgment or decree shall not affect, modify, change, abrogate or nullify any other provision of this Declaration.

4. Pronouns. Wherever used, the singular number shall include the plural, the plural the singular, and the use of any gender shall be applicable to all genders.

IN WITNESS WHEREOF, TZ Properties, LLC, has caused this Declaration to be executed by Anthony J. Procida, its duly-authorized Manager, as of the day and year first above written.

WITNESS:

TZ PROPERTIES, LLC

By: _____

Anthony J. Procida, its Manager

STATE OF MAINE
COUNTY OF CUMBERLAND

_____, 2017

Personally appeared before me the above-named Anthony J. Procida, Manager of TZ Properties, LLC, as aforesaid, and acknowledged the foregoing to be his free act and deed in said capacity and the free act and deed of said company.

Print name:
Notary Public/Attorney-at-Law

DRAFT

EXHIBIT A

[ADD PERIMETER DESCRIPTION OF PROPERTY FROM DEED]

The access and utility easement in gross reserved by Declarant pursuant to Article IV above.

DRAFT

**DECLARATION OF PROTECTIVE COVENANTS AND COMMON EASEMENTS
ORCHARD ROAD SUBDIVISION
TOWN OF CUMBERLAND, COUNTY OF CUMBERLAND, STATE OF MAINE
BY
TZ PROPERTIES, LLC**

THIS DECLARATION dated this _____ day of _____, 2017, by TZ Properties, LLC, a Maine limited liability company with a mailing address of _____ (hereinafter referred to as the "Declarant").

WITNESSETH:

WHEREAS, the Declarant owns certain real property in the Town of Cumberland, Cumberland County, State of Maine, as described on **Exhibit A** attached hereto and as delineated on a plan entitled "Orchard Road Subdivision, Cumberland, Maine" prepared for Declarant by Gorrill Palmer and dated October 2017, and recorded in the Cumberland County Registry of Deeds in Plan Book xxx, Page xxx (the "Plan"), which subdivision consists of Ten (10) lots numbered on the Plan as 1-10 and also a parcel of land designated "Open Space." Lots 1 through 10 inclusive shall hereinafter be referred to as the "Lots," and together with the appurtenant Common Open Space easements shown on the Plan or referenced in this Declaration hereinafter referred to as the "Property." Declarant proposes to develop and improve the Property in accordance with the Plan; and

WHEREAS, Declarant desires to assure quality standards for the orderly development of the Property and to promote the interest and welfare of each owner of a part of the Property and therefore desires to subject the Property to protective covenants and common easements as set forth hereinafter.

WHEREAS, Declarant desires to subject the Property to protective covenants and common easements as set forth hereinafter to incorporate the conditions of the Town of Cumberland Planning Board approval for the subdivision of the Property.

NOW, THEREFORE, Declarant hereby declares that the Property is and shall be owned, occupied, improved, transferred, leased and otherwise used and disposed of subject to the protective covenants and common easements set forth herein, all of which are declared to be in furtherance of a uniform scheme of mutual equitable servitudes upon each and every portion thereof, in favor of each and every other portion thereof, and to create reciprocal rights and privity of contract and estate between all persons acquiring or owning an interest in any portion thereof, which protective covenants and common easements shall be determined to run with the land and be a burden and benefit upon and to, and be enforceable by, all persons having any interest in any portion of the Property, their heirs, successors and assigns.

ARTICLE I
DEFINITIONS.

1. Association: "Association" shall mean and refer to *Orchard Road Subdivision Homeowners Association*, its successors and assigns, a non-profit, non-stock Maine corporation, to be formed by Declarant pursuant to the terms of Article V below.

2. Building: "Building" shall mean and refer to any dwelling, garage, or storage structures or other improvement now or hereafter constructed on a Lot.
3. Common Expenses: "Common Expenses" shall mean and refer to expenditures made by or financial liabilities of the Association, together with any allocations to capital or other reserve accounts.
4. Lot: "Lot" shall mean each whole Lot or any interest therein as joint tenants or tenants in common.
5. Remaining Land: "Remaining Land" shall mean and refer to any land not a Lot and all improvements thereon, including without limitation the roads, curbing, and storm water drainage fixtures and improvements, all as shown on the Plan. Remaining Land also shall include the Common Open Space, which shall be owned as tenants-in-common by each of the Lot Owners.
6. Easement Areas: "Easement Areas" shall mean and refer to all of the easements areas shown on the Plan or described below or on Exhibit A attached hereto that burden any Lot or Lots or that benefit the Association and all of the Lots, including without limitation utility easements, pedestrian access to open space easement, vehicle and pedestrian access easements in the roadway, forested buffer easements, drainage easements, and and all improvements on, in, across or under such easement areas including pavement, curbing, landscaping, storm water drainage fixtures and improvements.
7. Member: "Member" shall mean and refer to those persons entitled to membership in the Association as determined by the Bylaws of the Association and as set forth herein.
8. Owners: "Owners" or in the singular, "Owner", shall mean and refer to the record owner or owners of fee simple title in and to any Lot, and shall include the Declarant so long as it owns any Lot or any other portion of the Property, but shall not include any person or legal entity owning an interest merely as security for an obligation.

ARTICLE II

PROTECTIVE COVENANTS AND RESTRICTIONS.

Each conveyance by Declarant, its successors and assigns, of any Lot, and all subsequent conveyances of any Lot, whether directly or by operation of law, shall be subject to the following:

1. No Commercial Uses: Subject to the rights of the Declarant to develop and sell the Lots and such other rights of the Declarant as are set forth in this Declaration, each Lot shall be used only for residences, and no commercial enterprise of any nature or description shall be conducted or maintained on any portion of the Property, except that Lots may be used for a home office for telecommuting purposes by the Owners of such Lots provided that no customer, client or employee visits are made to the Lots incident to such commercial use.
2. Buildings and Lot Improvements: One single family residential structure shall be constructed or kept on any Lot. Each such Lot shall be improved subject to the following restrictions:
 - (a) Not less than 1 ½ stories in height that meets or exceeds seventeen hundred (1700) square feet of usable living area excluding basements, garages, decks and patios, one (1) private garage attached to the single-family dwelling or detached from said dwelling, for not more

than three (3) cars, in ground pool, pool house and outbuildings incidental and accessory to the permitted use of the premises. All structures shall comply with all applicable state and municipal building codes.

- (b) No structure shall be constructed outside of the building envelope shown on the Plan, which building envelope is determined by the application of the Town of Cumberland set-back requirements.
- (c) All construction, including paved driveway, must be completed not more than twenty-four (24) months from the commencement date. Commencement of construction shall be defined as the date on which site work has begun on the subject property.
- (d) Any additions to a structure after initial construction that increase the footprint, that materially change the exterior appearance, or that require structural modification to the structure must be approved by the Declarant, or after the Declarant has conveyed the last Lot, by the Board of Directors of the Association, in writing prior to commencement of construction of such additions or modifications.
- (e) Declarant reserves to itself, its successors and assigns, the exclusive right to erect, place and maintain such facilities in or upon any portion of the Property as in its sole discretion may be necessary or convenient while selling the Lots or portions thereof, selling or constructing residences and other improvements upon the Property. Such facilities shall include, but are not limited to, sales and construction offices, storage areas, model units, signs, and portable toilet facilities.

3. Damage of Destruction: Any Building on any Lot that is destroyed or damaged in whole or in part by fire, windstorm, or other casualty promptly must be rebuilt or all debris removed and the affected portion of the Lot restored to its natural condition without delay.

4. Compliance with Governmental Regulations: Owners shall occupy and maintain the Lots in accordance with the rules, regulations, ordinances, and statutes enacted by governmental entities having jurisdiction over the Property, including without limitation the terms and conditions imposed by the Town of Cumberland Planning Board in connection with the subdivision approval for the Property on xxx, and xxx (the "Town Approvals"), and as reflected on the Plan.

5. Maintenance of the Remaining Land and Easement Areas: The Association shall bear all cost (subject to the right to assess lots as provided below) and responsibility of operation, upkeep, maintenance, repair and replacement of any Remaining Land and Easement Areas, including without limitation any necessary routine maintenance and repair of the roads, storm drainage and grassed underdrained soil filters, landscaping, curbing, utility wires and conduits, development signage or other common area improvements. The Association shall also obtain and maintain adequate commercial general liability insurance on said Remaining Land and with respect to the Easement Areas, which insurance shall be obtained on an occurrence basis in an amount not less than \$5,000,000 combined single limit. Until and only until conveyance of any portion of the Remaining Land to the Association, the Declarant shall undertake the maintenance responsibilities of the Association with respect to the Remaining Land and Easement Areas; provided, however, the Association shall be unconditionally obligated to accept conveyance of the Remaining Land and Easement Areas or any part thereof, and Declarant may record a deed or deeds to the Association for such areas without further action by the Association. The Remaining Land shall be conveyed to the Association by Declarant at any time prior to or contemporaneously with Declarant conveying out the last Lot of the Property, with the timing of such conveyance to be in Declarant's sole

discretion. Upon any such conveyance to the Association, the Declarant shall be relieved of all obligations under this paragraph with respect to the land conveyed.

6. Animals: No poultry, swine, livestock or other animals shall be kept on a Lot or otherwise on the Property, except household pets of the kind and number normally housed in a residence. There shall be no exterior pet fencing, shelters, or caging. No boarding of dogs, cats or other household pets shall be conducted on a Lot.

7. Prohibited Vehicles: Except in the development and sale of the Lots by the Declarant and construction of houses and other Buildings by Owners, no business or commercial vehicle or vehicle of similar nature shall be brought upon, or be maintained, or be permitted to remain on the Property except that a business or commercial vehicle regularly used by an Owner in his or her occupation may remain on a Lot. No junk automobiles or other vehicles that do not display a current State of Maine motor vehicle inspection sticker may be kept or maintained on the Property unless parked in a garage or storage shed.

8. Prohibited Activities: No hunting or use of firearms, air guns, or bows shall be allowed anywhere on the Property.

9. Rubbish and Debris: Except during the initial construction of a Building, rubbish and debris shall be stored between pickups in the garage in sanitary receptacles with sealing covers or as required by Town of Cumberland ordinances or regulations and shall be placed curbside for pickup in such receptacles with the covers placed tightly over the receptacles and promptly re-stored in a garage after rubbish pickup.

10. Exterior Lighting: Any exterior lighting shall be directed to illuminate only the ground or the Buildings on the Lot and shall be installed such that no light is directly visible from any other part of the Property.

ARTICLE III **DURATION.**

The protective covenants, common easements and other provisions of this Declaration as set forth herein and as may be amended from time to time as provided below in Article X, shall run with the land and burden the Property and shall inure to the benefit of and be enforceable by the Declarant, the Association, and any other Owner of any portion of the Property, their respective legal representatives, heirs, successors or assigns, in perpetuity.

ARTICLE IV **DECLARANT'S RESERVED RIGHTS.**

The conveyance of the Lots to Owners shall be subject to the following rights reserved by the Declarant until completion of the construction, marketing and sale of all Lots:

1. To change the size, number, dimension, and location of Lots and other improvements owned by the Declarant, subject to the requirement that Declarant obtain necessary approval from the Town of Cumberland planning authority. The foregoing change or changes shall be effective upon the recording by the Declarant of an amendment to this Declaration, no other

signatures being necessary on such amendment, and/or the recording by the Declarant of an amended subdivision plan indicating the changes made;

2. To locate on the Property, even though not depicted on the Plan, and grant and reserve easements and rights of way for the installation, maintenance, repair, replacement and inspection of utility lines, wires, pipes, conduits and facilities, including, but not limited to, water, electric, telephone, cable and sewer;

3. To connect with and make use of utility lines, wires, pipes and conduits located on the Property for construction and sales purposes, provided that the Declarant shall be responsible for the cost of services so used;

4. To use the roads shown on the Plan and access easements appurtenant to the Property for ingress and egress to the Property or any portion thereof for all purposes including, but not limited to development and construction of a residential subdivision and use the Property for the storage of materials used in the construction of the residences and improvements on the Lots and infrastructure on the Property and equipment used in the completion of the project;

5. To install and maintain signs and lighting for marketing and sales purposes; and

6. To do all things reasonably necessary to facilitate the development of the Property and the marketing and sale of the Lots.

Declarant further reserves from the land described in Exhibit A attached hereto a perpetual easement in gross, assignable to any other party or parties in part or in whole, for vehicular and pedestrian access on and all utilities under, across or over the 50' wide roadway right-of-way as shown on the Plan. The foregoing reserved easement may benefit any additional land and any number of additional lots or dwellings without exceeding the scope of or overburdening the reserved easement rights. The foregoing reserved easement is perpetual in nature and does not expire upon the sale of the Lots by Declarant.

ARTICLE V **HOMEOWNERS ASSOCIATION.**

On or about the date of execution and recording of this Declaration, there will be formed *Orchard Road Subdivision Homeowners Association*, a non-profit, non-stock corporation organized under the laws of the State of Maine (the "Association"). Each Owner or Owners of a Lot, including the Declarant prior to the conveyance of each Lot, shall automatically become and be a member of the Association as long as said Owner(s) continues as record owner of a Lot. Upon termination of the interest of an Owner in a Lot, the Owner's membership and any interest in the Association shall automatically terminate and transfer and inure to the next successive record owner of the Lot. Each Owner shall be bound by the Bylaws of the Association, as the same may be amended from time to time, and each Owner shall comply strictly with such Bylaws. No holder of a mortgage on a Lot shall be considered as an Owner until such holder shall have acquired title to such Lot by foreclosure or deed in lieu of foreclosure. With respect to Association governance matters requiring a vote of the Owners, each Lot shall have One (1) vote.

ARTICLE VI **ASSESSMENTS FOR COMMON EXPENSES.**

1. Upon ratification of the budget for Common Expenses (as defined herein), the Association shall cause to be sent to each Owner a statement showing such Owner's share of the Common Expenses. The Common Expenses shall include, without limitation, the costs necessary to own, operate, manage, maintain, repair and replace the Remaining Land and Easement Areas and to operate, maintain, repair and replace the roads, curbing, landscaping, signage, drainage swales, grassed underdrained soil filter, and all structures and equipment related or connected thereto. Assessments for Common Expenses shall be billed on or about the first day of each quarter. All sums so assessed and billed shall become due no later than 30 days after the date of mailing or delivery of each bill. The Members of the Association may from time to time at special meetings levy additional assessments, in accordance with the terms of the Bylaws.

2. Assessments authorized and billed by the Association shall be a charge on the Lot and shall be a continuing lien upon the Lot upon which such assessment is made. If the assessment to an Owner shall not be paid within Thirty (30) days after the date when due, then said assessment shall be delinquent and shall, together with interest at the rate of one percent (1%) per month or any portion thereof, costs of collection and attorneys' fees, become a continuing lien on the Lot owned by the delinquent Owner, which lien shall bind the Lot with the Building and improvements thereon, as well as the delinquent Owner, his heirs, devisees, successors, personal representatives and assigns, without the necessity of filing any document of record. Such lien may be enforced and foreclosed by the Association in the manner provided by applicable law for the foreclosure of real estate mortgages. The lien for unpaid assessments established hereby shall be prior to all liens and encumbrances on the Lot other than (i) the first mortgage recorded prior to the date on which the assessment that is sought to be enforced becomes delinquent, (ii) any second mortgage in favor of Declarant, (iii) liens for real estate taxes and other governmental/municipal assessments or charges against the Lot, or (iv) any other lien that according to law takes priority over existing liens pursuant to any statute. All such assessments, in addition to being a lien, shall also constitute the personal liability of the Owner of the Lot so assessed at the time of the assessment. In the collection of any assessment, the defaulting Owner also shall pay all of the Association's costs of collection, including attorneys' fees.

ARTICLE VII **EASEMENTS.**

The Lots and the Remaining Land are and shall be subject to all of the conditions, restrictions, easements and reservations set forth on the Plan, as it may be amended from time to time, and as more fully described below, and all Owners shall be bound by all of said conditions, restrictions, easements and reservations.

1. "Common Open Space": An easement for maintenance and use of the land for passive recreational activities such as walking, running, snowshoeing, and Nordic skiing.

2. "Roadway Access and Utility Easement": An easement for access by pedestrians and vehicles to and from the Lots and including the right to construct, maintain, repair and replace the roadway, including without limitation the gravel, pavement and curbing therefor. Also an easement to construct, install, use, repair, maintain and replace above and/or below ground any and all utility lines, pipes, conduits, wires, poles, guys, transformer and juncture boxes including without limitation those necessary for the provision of sewer, water, electricity, telephone, cable television, data and other communication services, including the right to enter the easement area at any time and from time to time with workers and equipment to exercise the rights reserved pursuant to this easement, including without limitation the removal of stumps and roots, the construction decorative walls and columns, and the alteration of the grade of the earth, including the right to

maintain and replace all of the foregoing, including the right to enter the easement area at any time and from time to time with pedestrians, motor vehicles and equipment to exercise the rights reserved pursuant to this easement. Declarant reserves for itself and its successors and assigns the right to dedicate and convey the right-of-way to the Town of Cumberland for all public purposes.

3. “Drainage Swales”: An easement for the installation, maintenance, repair, and replacement of level lip spreaders and drainage swales for the purpose of treating storm water runoff, which easement includes access thereto with workers and equipment for such purposes.

4. “Winter Maintenance Easement”: An easement across the roadway for the Town of Cumberland to use for all purposes in connection with the plowing and snow removal activities on the roadway right-of-way, in the event that the roadway is offered and accepted by the Town of Cumberland for winter maintenance purposes.

ARTICLE VIII

MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

The Association shall comply with the recommendations and requirements contained in the “Stormwater management report and Erosion and Sedimentation Control Report for Orchard Road Subdivision, Cumberland, Maine” prepared by Gorrill Palmer for Declarant and dated November, 2017, and October, 2017, as such maintenance plan has been approved by the Town of Cumberland Planning Board and the Maine Department of Environmental Protection. The Maintenance of Facilities section of the Erosion and Sedimentation Report presents the required maintenance for the Orchard Road Subdivision and is included as follows.

Maintenance of facilities

The stormwater facilities will be maintained by the Applicant, TZ Properties, LLC or their assigned heirs. The contract documents will require the contractor to designate a person responsible for maintenance of the sedimentation control features during construction as required by the Erosion Control Report. Long-term operation/maintenance recommended for the stormwater facilities is presented below.

The responsible party may contract with such professionals, as may be necessary in order to comply with this provision and may rely on the advice of such professionals in carrying out its duty hereunder, provided, that the following operation and maintenance procedures are hereby established as a minimum for compliance with this section. A maintenance log of the inspections shall be kept by the responsible party.

Inspection and Maintenance Frequency and Corrective Measures:

The following areas, facilities, and measures will be inspected and the identified deficiencies will be corrected. Clean-out must include the removal and legal disposal of any accumulated sediments and debris.

Catch Basins:

Inspect catch basins 2 times per year (preferably in Spring and Fall) to ensure that the catch basins are working in their intended fashion and that they are free of debris. Clean structures when sediment depths reach 12” from invert of outlet. If the basin outlet is designed with a hood to trap floatable materials (i.e. Snout), check to ensure watertight

seal is working. At a minimum, remove floating debris and hydrocarbons at the time of the inspection.

Culverts:

Inspect culverts 2 times per year (preferably in Spring and Fall) to ensure that the culverts are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit and repair any erosion damage at the culvert's inlet and outlet.

Inlet/Outlet Control Structures:

Inspect structures and piping 2 times per year (preferably in Spring and Fall) to ensure that the structures are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris within the structure.

Stormdrain Outlets:

Inspect outlets 2 times per year (preferably in Spring and Fall) to ensure that the outlets are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the outlet and within the conduit. Repair any erosion damage at the stormdrain outlet.

Soil Filter – Bio-Filtration:

Inspect all upstream pre-treatment measures 2 times per year (preferably in Spring and Fall) for sediment and floatables accumulation. Remove and dispose of any sediments or debris.

Surface (Underdrain Pond, Swale or Bio-Filter):

The soil filter will be inspected within the first three months after construction; thereafter the filter will be inspected 2 times per year (preferably in Spring and Fall) to ensure that the filter is draining within 24 to 48 hours of a rain event equivalent to 1" or more. Adjustments will be made to the outlet valve to ensure that the grassed underdrained soil filter drains within 24 to 48 hours. Failure to drain in 72 hours will require part or all of the soil filter media to be removed and replaced with new material meeting the soil filter gradation. The facilities will be inspected after major storms and any identified deficiencies will be corrected. Harvesting and weeding of excessive growth shall be performed as needed. Inspect for unwanted or invasive plants and remove as necessary.

Vegetated Areas:

Inspect slopes and embankments early in the growing season to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows. The facilities will be inspected after major storms and any identified deficiencies will be corrected.

Ditches, Swales and other Open Stormwater Channels:

Inspect 2 times per year (preferably in Spring and Fall) to ensure they are working in their intended fashion and that they are free of sediment and debris. Remove any obstructions to flow, including accumulated sediments and debris and vegetated growth. Repair any erosion of the ditch lining. Vegetated ditches will be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. Correct any erosion of the channel's bottom or sideslopes. The facilities shall be inspected after major storms and any identified deficiencies shall be corrected.

Roadways and Parking Surfaces: Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader. Repair potholes and other roadway obstructions and hazards. Plowing and sanding of paved areas shall be performed as necessary to maintain vehicular traffic safety.

In the event that the Roadway is accepted by the Town of Cumberland, the maintenance requirements of all stormwater facilities within the right-of-way will become the responsibility of the Town of Cumberland. In the event that the Roadway is accepted by the Town of Cumberland, the Association shall be responsible for the maintenance of all stormwater facilities outside of the right-of-way, including but not limited to the grassed underdrained soil filters, inlet/outlet control structures, storm drain outlets, vegetated areas, and swales.

ARTICLE IX
RESTRICTED BUFFER AREAS.

To preserve the “75’ Buffer.” areas shown on the Plan (hereinafter referred to as the “75’ Buffer Areas”), the Buffer Areas shall be maintained as follows:

The Buffer Areas are and shall forever be held, transferred, sold, conveyed, occupied and maintained subject to the conditions and restrictions set forth in this Article IX of the Declaration (the “Restrictions”). The Restrictions shall run with the Buffer Areas and shall be binding on all parties having any right, title or interest in and to the Restricted Buffer Areas, or any portion thereof, and their heirs, personal representatives, successors, and assigns. Any present or future owner or occupant of the Buffer Areas or any portion thereof, by the acceptance of a deed of conveyance of all or part of the Buffer Areas or an instrument conveying any interest therein, whether or not the deed or instrument shall so express, shall be deemed to have accepted the Buffer Areas subject to the Restrictions and shall agree to be bound by, to comply with and to be subject to each and every one of the Restrictions hereinafter set forth.

1. Restrictions on Buffer Area. The Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Buffer Area to filter and absorb stormwater, the use of the Buffer Area is hereinafter limited as follows.

- a. No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material may be placed, stored or dumped on the Buffer Area, nor may the topography of the area be altered or manipulated in any way;
- b. Any removal of trees or other vegetation within the Buffer Area must be limited to the following:
 - (i) No purposefully cleared openings may be created and an evenly distributed stand of trees and other vegetation must be maintained. An "evenly distributed stand of trees " is defined as maintaining a minimum rating score of 24 points in any 50 foot by 50 foot square (2500 square feet) area, as determined by the following rating scheme:

Diameter of tree at 4 1/2 feet above ground level	Points
2-4 inches	1
4-8 inches	2
8-12 inches	4
>12 inches	8

Where existing trees and other vegetation result in a rating score less than 24 points, no trees may be cut or sprayed with biocides except for the normal maintenance of dead, wind-blown or damaged trees and for pruning of tree branches below a height of 12 feet provided two thirds of the tree's canopy is maintained;

- (ii) No undergrowth, ground cover vegetation, leaf litter, organic duff layer or mineral soil may be disturbed except that one winding path, that is no wider than six feet and that does not provide a downhill channel for runoff, is allowed through the area;
- c. No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Restricted Buffer Area, except for a sign, utility pole or fence;
- d. No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Restricted Buffer Area;

Any activity on or use of the Buffer Area inconsistent with the purpose of these Restrictions is prohibited.

2. **Binding Effect.** If a Buffer Area is at any time owned by more than one owner, each owner shall be bound by the foregoing restrictions to the extent that any of the Buffer Area is included within such owner's property.

ARTICLE X **AMENDMENTS.**

This declaration may be amended at any time and from time to time by written instrument duly executed by the Owners of record of six of the ten Lots; provided, however, that at any time during which the Declarant owns one or more Lots, no amendment shall be effective unless the written consent of the Declarant to such amendment is obtained and further provided that no provisions of this Declaration required as conditions of approval for the subdivision of the Property may be terminated or modified without the approval of the planning authority of the Town of Cumberland. Any such amendment shall be recorded in the Cumberland County Registry of Deeds.

ARTICLE XI
GENERAL PROVISIONS.

1. Enforcement. By the acceptance of the deed to a Lot, each Owner covenants and agrees for himself, his heirs, devisees, successors, personal representatives and assigns, to comply with the covenants and restrictions set forth in this Declaration. Any failure to so comply shall be grounds for an action against the Owner, his heirs, devisees, successors, personal representatives and assigns, to recover damages or for injunctive relief or both. Such action may be maintained by the Association, the Declarant or by any aggrieved Owner. Notwithstanding anything in this Declaration to the contrary, the Association shall enforce the provisions of this Declaration that satisfy the conditions of the Town Approvals. In the event the Association, Declarant or an Owner shall substantially prevail in any such action, they shall be entitled to recover attorneys' fees and related expenses incurred in enforcing the terms of this Declaration. Nothing herein shall require the Declarant to enforce any of the covenants and restrictions in this Declaration.

2. Waivers. No delay or omission on part of the Declarant, the Association, or any Owner in enforcing the covenants set forth herein shall be construed as a waiver of any right to enforce or seek such remedy or acquiescence in such breach.

3. Severability. In the event any one or more of the provisions of this Declaration shall be found for any reason by a court of competent jurisdiction to be unenforceable or null and void, such judgment or decree shall not affect, modify, change, abrogate or nullify any other provision of this Declaration.

4. Pronouns. Wherever used, the singular number shall include the plural, the plural the singular, and the use of any gender shall be applicable to all genders.

IN WITNESS WHEREOF, TZ Properties, LLC, has caused this Declaration to be executed by Anthony J. Procida, its duly-authorized Manager, as of the day and year first above written.

WITNESS:

TZ PROPERTIES, LLC

By:

Anthony J. Procida, its Manager

STATE OF MAINE
COUNTY OF CUMBERLAND

_____, 2017

Personally appeared before me the above-named Anthony J. Procida, Manager of TZ Properties, LLC, as aforesaid, and acknowledged the foregoing to be his free act and deed in said capacity and the free act and deed of said company.

Print name:
Notary Public/Attorney-at-Law

DRAFT

EXHIBIT A

[ADD PERIMETER DESCRIPTION OF PROPERTY FROM DEED]

The access and utility easement in gross reserved by Declarant pursuant to Article IV above.

DRAFT



UBS Financial Services Inc.
One City Center 7th Floor
Portland, ME 04101
ubs.com/fs

Confirmation

May 10, 2018

Confirmation: Information regarding the credit line account of TZ Properties LLC
C/o Zareh Derhagopian -- UBS Account Number: 5Vxxx37

I am writing in response to your request for verification of information concerning the UBS Financial Services Inc. ("UBS") account of TZ Properties LLC. As of the close of business on Wednesday, May 9, 2018, the above mentioned credit line account had cash available in excess of \$700,000.

Please be aware this account is linked to a securities account and is not a "bank" account. Securities, mutual funds and other non-deposit investment products are not FDIC-insured or bank guaranteed and are subject to market fluctuation. The above-referenced account value may reflect assets not held at UBS.

Questions

If you have any questions about this information, please contact Katie Ouellette at 207-791-5526.

UBS Financial Services is a member firm of the Securities Investor Protection Corporation (SIPC).

Sincerely,

Katie Ouellette, FPQP™
Wealth Management Associate
Senior Registered Client Service Assoc.
UBS Financial Services Inc.

C:\CAD Working\3236.01 Cumberland Subdivision\DWG\3236-COVER.dwg 5/22/2018 9:49 AM

PROJECT PARCEL SITE CUMBERLAND ASSESSOR'S MAP & LOT NUMBERS	
MAP	LOT
R08	59

Applicant:
TZ PROPERTIES
23 STORMY BROOK ROAD
FALMOUTH, ME 04105

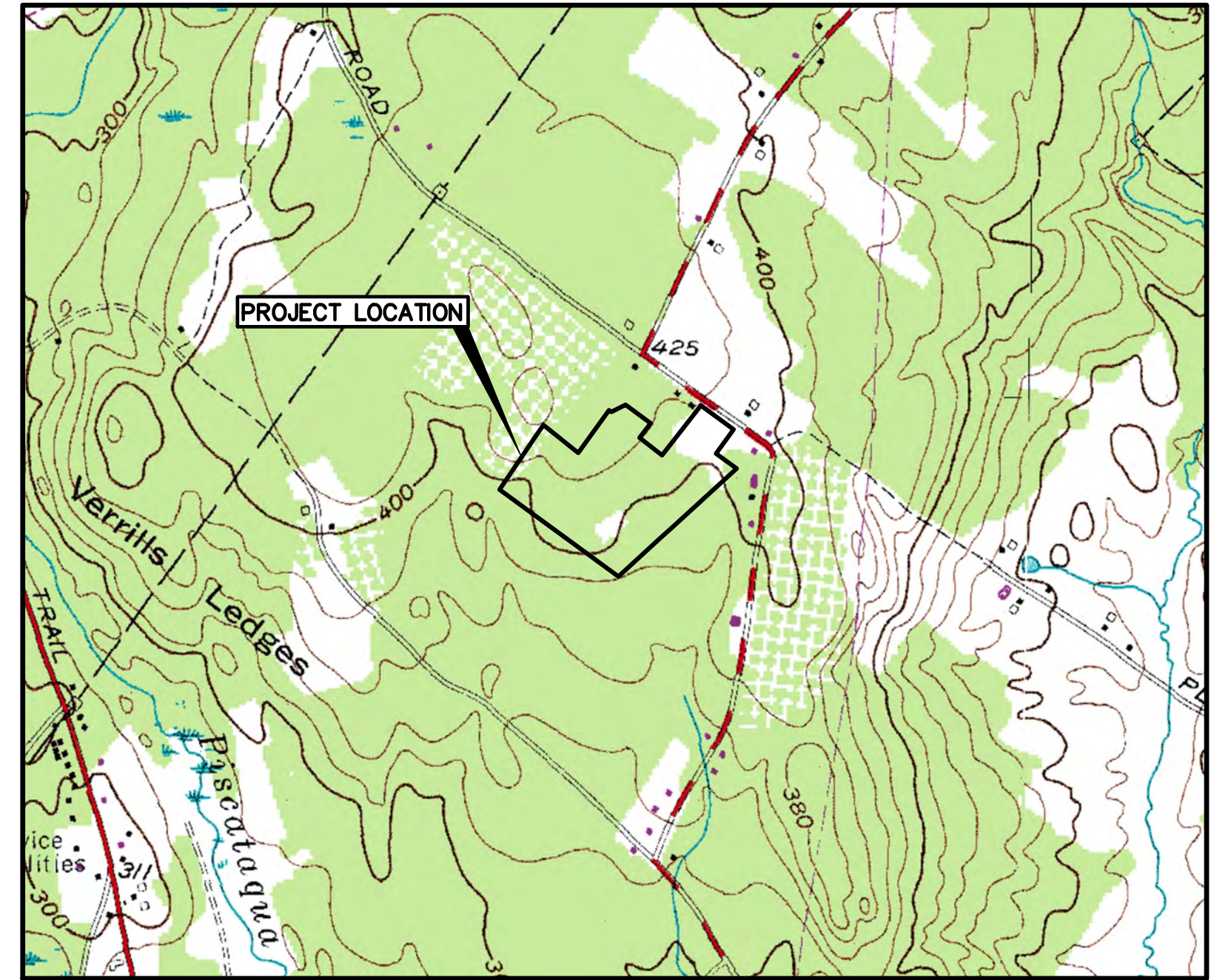
ORCHARD ROAD SUBDIVISION

CUMBERLAND, MAINE

PREPARED BY:



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LOCATION MAP
SCALE: 1" = 1000'

LEGEND

EXISTING	DESCRIPTION	PROPOSED
	BUILDING	
	RIGHT OF WAY	
	PROPERTY LINE	
	BUILDING SETBACK	
	ZONE LINE	
	WETLAND BOUNDARY	
	GUIDE RAIL	
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL DRIVE	
	GRADING CONTOUR LINE	
	SPOT ELEVATION	
	TREELINE	
	TREES & HEDGES	
	POLE WITH LIGHT FIXTURE(S)	
	UTILITY POLE	
	FREESTANDING SIGN	
	PAINTED DIRECTIONAL TRAFFIC ARROW	
	OVERHEAD ELECTRIC/TELEPHONE	
	UNDERGROUND ELECTRIC/TELEPHONE	
	WATER LINE	
	STORM DRAIN LINE	
	CULVERT	
	HYDRANT	
	WATER GATE VALVE	
	WATER SHUT OFF VALVE	
	MANHOLE	
	CATCH BASIN	
	TEST PIT	
	IRON ROD (SET)	
	IRON ROD (FOUND)	
	MONUMENT	
	RIPRAP	
	SILT FENCE - PERIMETER	
	STONE SEDIMENT BARRIER	
	FENCE	
	WELL	

GENERAL NOTES

GENERAL NOTES

- TOPOGRAPHIC DATA, EXISTING CONDITIONS, AND BOUNDARY SURVEY WAS PREPARED BY TITCOMB ASSOCIATES OF FALMOUTH, MAINE ON SEPTEMBER 29, 2017. FIELD SURVEYED TOPOGRAPHY INCLUDED A 100 FOOT WIDE STRIP CENTERED ON THE ROAD AND THE STORMWATER TREATMENT BASINS. ALL OTHER TOPOGRAPHY IS AERIAL BASED OBTAINED FROM THE MAINE GIS WEBSITE.
- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR THE ELEVATION OF THE EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AND DIG SAFE AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
- MAINTENANCE OF EROSION CONTROL MEASURES IS OF PARAMOUNT IMPORTANCE TO THE OWNER AND THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL EROSION CONTROL MEASURES SHOWN ON THE PLANS. ADDITIONAL EROSION CONTROL MEASURES SHALL BE INSTALLED IF DEEMED NECESSARY BY ON-SITE INSPECTIONS OF THE OWNER, THE TOWN OF CUMBERLAND OR THEIR REPRESENTATIVES AT NO ADDITIONAL COST TO THE OWNER.
- ALL MATERIAL SCHEDULES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL PREPARE HIS OWN MATERIAL SCHEDULES BASED UPON HIS PLAN REVIEW. ALL SCHEDULES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS OR PERFORMING WORK.
- ALL MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO MAINE DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, AND/OR TOWN OF CUMBERLAND SPECIFICATIONS.
- WETLANDS ON THIS PLAN WERE DELINEATED AND GPS LOCATED BY TRC OF SCARBOROUGH, MAINE.

PERMITTING NOTES

- THIS PROJECT IS SUBJECT TO THE TERMS AND CONDITIONS OF A SUBDIVISION PLAN APPROVAL FROM THE TOWN OF CUMBERLAND. THE CONSTRUCTION WILL BE COVERED BY THE TOWN OF CUMBERLAND ZONING ORDINANCE WHICH IS AVAILABLE FOR VIEWING AT THE OFFICE OF THE ENGINEER OR THE MUNICIPAL OFFICE.
- THIS PROJECT IS SUBJECT TO THE TERMS AND CONDITIONS OF A STORMWATER PERMIT AND NRPA PERMIT BY RULE FROM MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION AND A CATEGORY 2 PERMIT FROM THE U.S. ARMY CORPS OF ENGINEERS.
- THE CONTRACTOR SHALL REVIEW THE ABOVE REFERENCED PERMITS PRIOR TO SUBMITTING A BID FOR THIS PROJECT, AND INCLUDE COSTS AS NECESSARY TO COMPLY WITH THE CONDITIONS OF THESE PERMITS.

LAYOUT NOTES

- ALL DIMENSIONING, UNLESS NOTED OTHERWISE, IS TO THE FACE OF CURB.
- OFFSETS TO CATCH BASINS AND MANHOLES ARE TO THE CENTER OF THE FRAME.
- PIPE LENGTH EQUALS THE CENTER TO CENTER DISTANCES BETWEEN CATCH BASINS AND/OR MANHOLES MINUS ONE-HALF OF THE DIAMETER OF EACH CATCH BASIN OR MANHOLE.
- PROPERTY LINE AND R.O.W. MONUMENTS SHALL NOT BE DISTURBED BY CONSTRUCTION. IF DISTURBED, THEY SHALL BE RESET TO THEIR ORIGINAL LOCATIONS AT THE CONTRACTOR'S EXPENSE, BY A MAINE LICENSED LAND SURVEYOR.
- PROPOSED RIGHT OF WAY MONUMENTS AND PROPERTY LINE PINS SHALL BE INSTALLED UNDER THE DIRECTION OF A MAINE LICENSED LAND SURVEYOR.
- CURB RADII UNLESS OTHERWISE NOTED ON THE PLAN SHALL BE A MINIMUM OF 3'.

UTILITY NOTES

- THE LOCATION OF THE PROPOSED UNDERGROUND ELECTRICAL SERVICE IS APPROXIMATE AND THE CONTRACTOR SHALL COORDINATE THE EXACT LOCATION WITH CENTRAL MAINE POWER COMPANY.
- SUBSURFACE WASTEWATER DISPOSAL SHALL COMPLY WITH THE HHE-200 APPLICATION FOR EACH SITE.

GRADING AND DRAINAGE NOTES

- UNLESS OTHERWISE NOTED, ALL STORM DRAIN PIPE SHALL BE IN ACCORDANCE WITH MDOT SPECIFICATIONS SECTION 603-- PIPE CULVERTS AND STORM DRAINS, LATEST REVISION WITH THE EXCEPTION THAT THE ONLY ACCEPTABLE TYPES OF PIPE ARE AS FOLLOWS:
REINFORCED CONCRETE PIPE, CLASS III
POLYVINYL-CHLORIDE (PVC) PIPE
SMOOTH BORE POLYETHYLENE - ADS OR HANCOR
- TOPSOIL STRIPPED IN AREAS OF CONSTRUCTION THAT IS SUITABLE FOR REUSE AS LOAM SHALL BE STOCKPILED ON SITE AT A LOCATION TO BE DESIGNATED BY THE OWNER. UNSUITABLE SOIL SHALL BE SEPARATED, REMOVED AND DISPOSED OF AT AN APPROVED DISPOSAL LOCATION OFF SITE.
- THE CONTRACTOR SHALL ANTICIPATE THAT GROUNDWATER WILL BE ENCOUNTERED DURING CONSTRUCTION AND SHALL INCLUDE SUFFICIENT COSTS WITHIN THEIR BID TO PROVIDE DEWATERING AS NECESSARY. NO SEPARATE PAYMENT SHALL BE MADE TO THE CONTRACTOR FOR DEWATERING.

EROSION CONTROL NOTES

- LAND DISTURBING ACTIVITIES SHALL BE ACCOMPLISHED IN A MANNER AND SEQUENCE THAT CAUSES THE LEAST PRACTICAL DISTURBANCE OF THE SITE.
- PRIOR TO BEGINNING ANY CLEARING/LAND DISTURBING ACTIVITIES, THE CONTRACTOR SHALL INSTALL THE PERIMETER SILT FENCES AND THE CONSTRUCTION ENTRANCE.
- ALL GROUND AREAS DISTURBED FOR CONSTRUCTION WILL BE GRADED, LOAMED AND SEEDED AS SOON AS POSSIBLE. PERMANENT SEED MIXTURE SHALL CONFORM TO THE SEEDING PLAN CONTAINED IN THE EROSION CONTROL NOTES INCLUDED ON SHEET 15.
- PRIOR TO PAVING, THE CONTRACTOR SHALL FLUSH SEDIMENT FROM ALL STORM DRAIN LINES, REMOVE ACCUMULATED SEDIMENT FROM SUMPS AND INVERTS AND PROPERLY DISPOSE OF.
- ALL CATCH BASINS WITH OUTLET PIPES 18" DIAMETER OR LESS SHALL BE PROVIDED WITH A "SNOUT" SEDIMENTATION HOOD PER DETAIL.
- SILT FENCES SHALL BE INSPECTED, REPAIRED AND CLEANED AS NOTED IN THE EROSION CONTROL NOTES.
- THE CONTRACTOR SHALL REPAIR AND ADD STONE TO THE CONSTRUCTION ENTRANCE AS IT BECOMES SATURATED WITH MUD TO ENSURE THAT IT WORKS AS PLANNED DURING CONSTRUCTION.
- SILT REMOVED FROM AROUND INLETS AND BEHIND THE SILT FENCES SHALL BE PLACED ON A TOPSOIL STOCKPILE AND MIXED INTO IT FOR LATER USE IN LANDSCAPING OPERATIONS.
- EROSION CONTROL NOTES ACCOMPANY THIS PLAN SET AND ARE CONTAINED ON DRAWING 15 OF THIS PLAN SET.
- THE MAINTENANCE SCHEDULE FOR THE CATCH BASIN SEDIMENT SUMPS IS CONTAINED IN THE EROSION CONTROL NOTES INCLUDED ON SHEET 15.
- THE CONTRACTOR IS CAUTIONED THAT FAILURE TO COMPLY WITH THE SEQUENCE OF CONSTRUCTION, EROSION/SEDIMENT CONTROL PLAN, AND OTHER PERMIT REQUIREMENTS BASED UPON ANY THIRD PARTY REVIEW (ie MDEP) MAY RESULT IN MONETARY PENALTIES. THE CONTRACTOR SHALL BE ASSESSED ALL SUCH PENALTIES AT NO COST TO THE OWNER OR PERMITTEE.
- ALL NON-PAVED AREAS DISTURBED DURING CONSTRUCTION SHALL BE LOAMED AND SEEDED, UNLESS OTHERWISE DIRECTED BY THE OWNER.
- ALL DISTURBED AREAS ARE TO RECEIVE A MINIMUM OF 4" OF TOPSOIL PRIOR TO PERMANENT SEEDING.

UTILITIES

ELECTRIC:
CENTRAL MAINE POWER
162 CANCO ROAD
PORTLAND, MAINE 04103
(207) 828-2882
CONTACT: JAMES COUGH

TELEPHONE:
VERIZON
5 DAVIS FARM ROAD
PORTLAND, MAINE 04103
(207) 797-1842
CONTACT: TROY MACDONALD

CABLE:
TIME WARNER CABLE
118 JOHNSON ROAD
PORTLAND, MAINE 04102
(207) 253-2222

INDEX

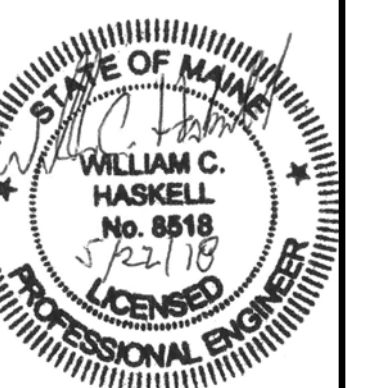
1	COVER SHEET, GENERAL NOTES, & LEGEND
2	EXISTING CONDITIONS PLAN
3	BOUNDARY SURVEY
4	SUBDIVISION PLAN
5	OVERALL LAYOUT AND UTILITY PLAN
6	OVERALL GRADING, DRAINAGE & EROSION CONTROL PLAN
7	LAYOUT AND UTILITY PLAN
8	GRADING AND DRAINAGE PLAN AND PROFILE
9	CULVERT DETAILS
10	SITE DETAILS
11	DRAINAGE & UTILITY DETAILS
12-13	GRASSED UNDERDRAIN DETAILS
14	EROSION CONTROL DETAILS
15	EROSION CONTROL NOTES

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PERMITS

TYPE OF PERMIT	GOVERNING BODY	STATUS
MDEP STORMWATER PERMIT AND NRPA PERMIT BY RULE	MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION 312 CANCO ROAD PORTLAND, ME 04103 (207) 822-6300	RECEIVED: 4/3/18
CATEGORY 2 PERMIT	U.S. ARMY CORPS OF ENGINEERS 675 WESTERN AVE #3 MANCHESTER, ME 04351	RECEIVED: 4/9/18
MAJOR SUBDIVISION APPLICATION	TOWN OF CUMBERLAND 280 TUTTLE ROAD CUMBERLAND, MAINE 04021 (207) 829-5559	SUBMITTED: 10/31/17 (PRELIMINARY PLAN)

NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.



Rev.	Date	Revision

Preliminary/Final Subdivision Application	5-22-18	WCH
MDEP/ACOE Permitting	12/22/17	WCH
Preliminary Subdivision Application	10-31-17	WCH
Issued For	Date	By

Design: JWA	Draft: LAN	Date: DEC 2017
Checked: WCH	Scale: NTS	Job No.: 3236.01
File Name: 3236-COVER.dwg		
This plan shall not be modified without written permission from GorrillPalmer(GP). Any alterations, authorized or otherwise, shall be at the user's sole risk and without liability to GP.		

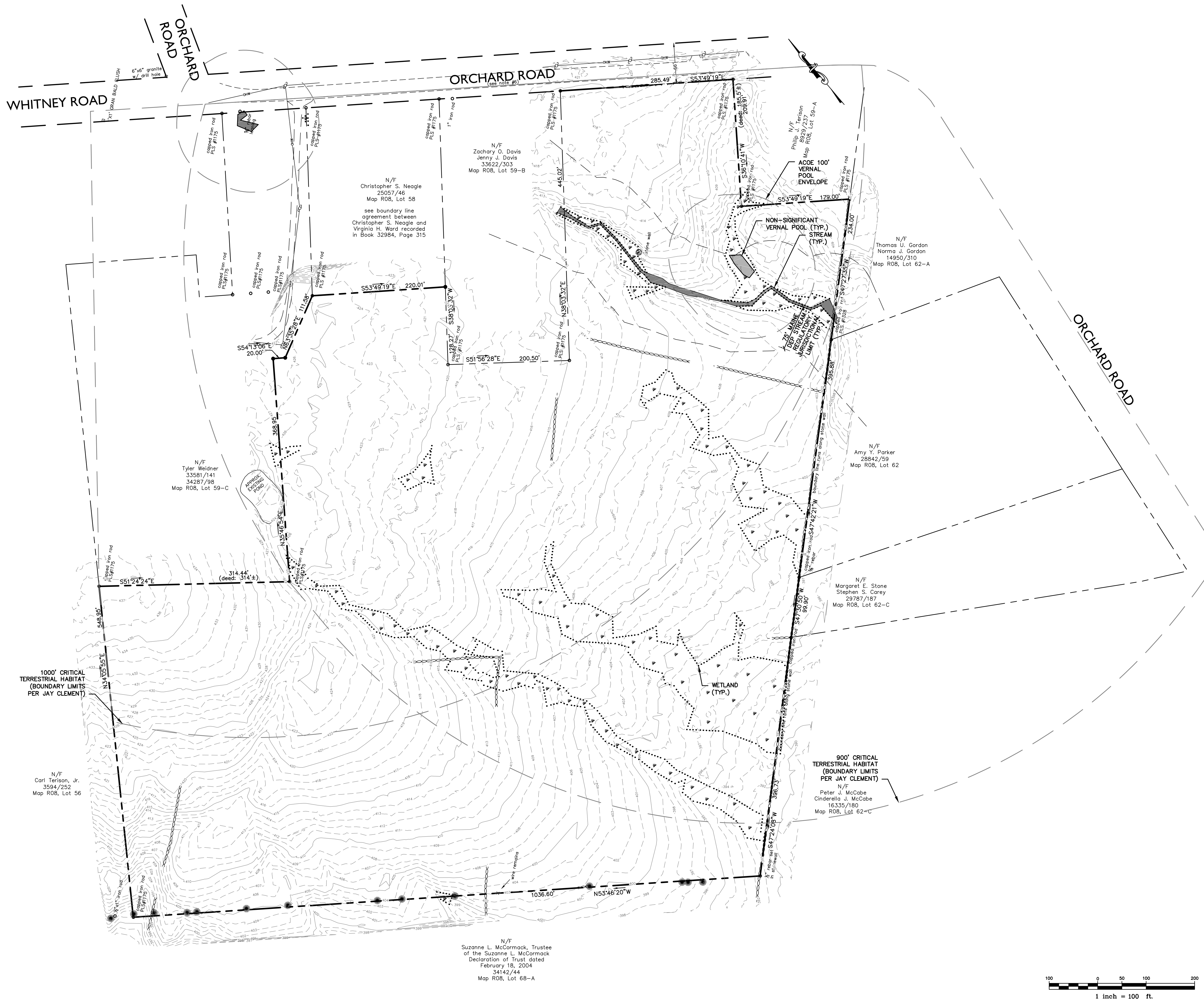


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Drawing Name:	Cover Sheet, General Notes, and Legend
Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.

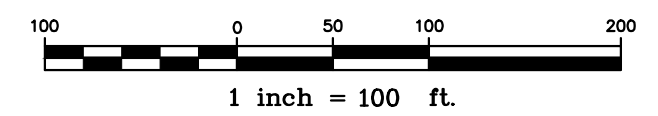
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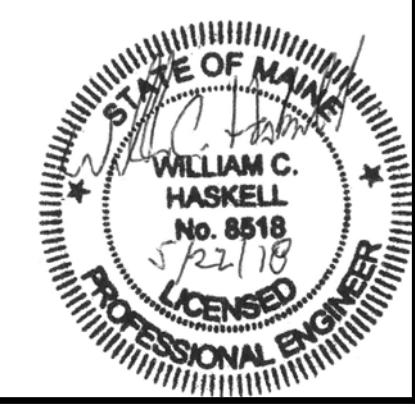
- LEGEND**
- Monument – found
 - Iron marker – found
 - Iron marker – set (#5 rebar)
 - Property line (abutter)
 - Right of way line
 - Stone wall
 - Edge of pavement
 - Edge of gravel
 - Utility pole
 - Guy wire
 - Overhead utility line
 - N/F
 - Now or formerly of
 - Deed reference (Book/Page)
 - Tree line
 - Wetlands
 - Coniferous tree w/ barbed wire remains

- NOTES**
- 1) Book and Page references are to the Cumberland County Registry of Deeds unless otherwise noted.
 - 2) Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone.
 - 3) Utility information on this plan is approximate, based on location of visible features. DigSafe and/or the appropriate utilities should be contacted prior to any construction.
 - 4) Property lies within Zone C based on FIRM Community #230162 Panels #0010-B and 0015-B, dated May 19, 1981. It does not lie within a special flood hazard area.
 - 5) Wetlands delineated by others.
 - 6) Orchard Road has a defined width of 4 rods (66 feet) as accepted by the Town of Cumberland on April 10, 1797. Apparent location shown.
 - 7) Not all interior stone walls have been located on the property.

- PLAN REFERENCES**
- 1) Plan of Boundary Survey – Remaining Land Now of Virginia H. Ward – Orchard Road – Made for Virginia H. Ward by Brian Smith at Sitelines, PA dated January 18, 2017. Recorded in Plan Book 217, Page 39.
 - 2) Plan of Settlement Worksheet of Chris S. Neagle & Virginia H. Ward – Common Boundary – Made for Chris S. Neagle by Brian Smith at Sitelines, PA dated December 22, 2015. Recorded in Plan Book 216, Page 25.
 - 3) Plan of Standard Boundary Survey of Land of Robert J. Plamplano and Brenda T. Plamplano made for Brenda T. Plamplano by Sebago Technics dated June 11, 1987 and revised through March 26, 1993. Recorded in Plan Book 199, page 177.
 - 4) Plan of Land on Blanchard Road made for Robert Plamplano by Owen Haskell revised through February 2, 1992. Recorded in Plan Book 192, Page 44.
 - 5) Plan of Standard Boundary Survey on Orchard Road made for Robert A. Milliken by Wayne T. Wood & Co. dated June 1990. Recorded in Plan Book 186, Page 24.



NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.



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Rev.	Date	Revision

Preliminary/Final Subdivision Application	5-22-18	WCH
MDEP/ACOE Permitting	12/22/17	WCH
Preliminary Subdivision Application	10-31-17	WCH
Issued For	Date	By

Design: JWA	Draft: LAN	Date: DEC 2017
Checked: WCH	Scale:	Job No.: 3236.01
File Name: 3236-xc.dwg		
This plan shall not be modified without written permission from GorrillPalmer(GP). Any alterations, authorized or otherwise, shall be at the user's sole risk and without liability to GP.		



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207.772.2515

Drawing Name:	Existing Conditions Plan
Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.
2



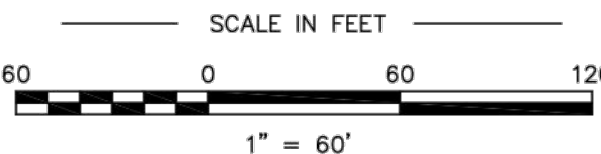
40 Scale

- 1) Book and Page references are to the Cumberland County Registry of Deeds unless otherwise noted.
- 2) Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone.
- 3) Utility information on this plan is approximate, based on location of visible features. DigSafe and/or the appropriate utilities should be contacted prior to any construction.
- 4) Property lies within Zone C based on FIRM Community #230162 Panels #0010-B and 0015-B, dated May 19, 1981. It does not lie within a special flood hazard area.
- 5) Wetlands delineated by others.
- 6) Orchard Road has a defined width of 4 rods (66 feet) as accepted by the Town of Cumberland on April 10, 1797. Apparent location shown.
- 7) Not all interior stone walls have been located on the property.

- 1) Plan of Boundary Survey – Remaining Land Now of Virginia H. Ward – Orchard Road – Made for Virginia H. Ward by Brian Smith at Sitelines, PA dated January 18, 2017. Recorded in Plan Book 210, Page 39.
- 2) Plan of Settlement Worksheet of Chris S. Neagle & Virginia H. Ward – Common Boundary – Made for Chris S. Neagle by Brian Smith at Sitelines, PA dated December 22, 2015. Recorded in Plan Book 216, Page 25.
- 3) Plan of Standard Boundary Survey of Land of Robert J. Piampiano and Brenda T. Piampiano made for Brenda T. Piampiano by Sebago Technics dated June 11, 1997 and revised through March 26, 1999. Recorded in Plan Book 199, page 177.
- 4) Plan of Land on Blanchard Road made for Robert Piampiano by Owen Haskell revised through February 2, 1992. Recorded in Plan Book 192, Page 44.
- 5) Plan of Standard Boundary Survey on Orchard Road made for Robert A. Milliken by Wayne T. Wood & Co. dated June 29, 1997. Recorded in Plan Book 186, Page 24.

1,087,921 Sq. Ft. / 24.98 Acres

TZ Properties, LLC
23 Stormy Brook Rd.
Falmouth, ME 04105
Book 34200, Page 6



Orchard Road Cumberland, Maine

Gorrill-Palmer

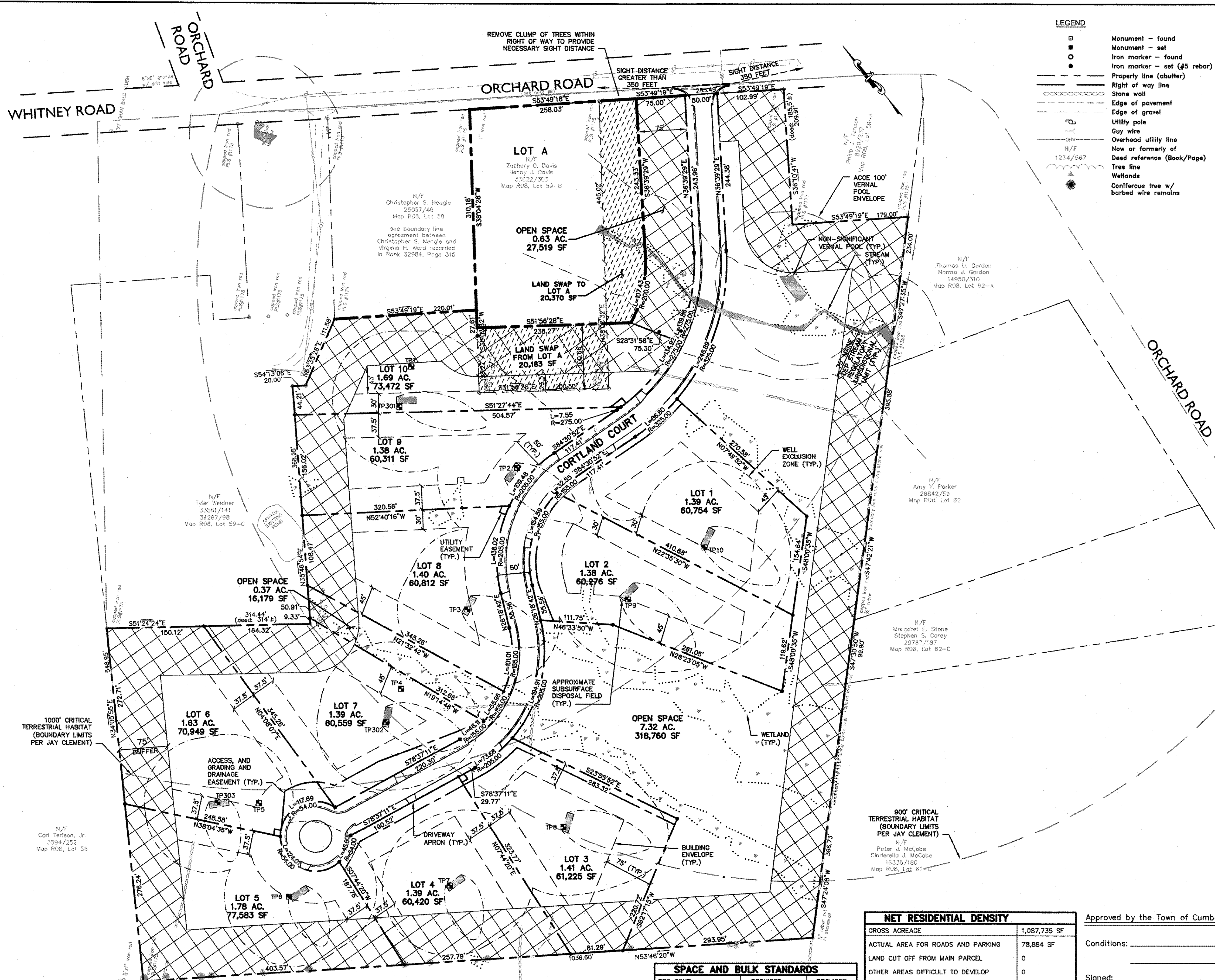
South Portland, Maine

JOB #217083	DATE: September 29, 2017	SCALE: 1" = 60'
BOOK #906	 <i>Titcomb Associates</i> 133 Gray Road, Falmouth, Maine 04105 (207)797-9199 www.titcombsurvey.com	
217083.dwg		

This survey conforms to the current standards of practice set forth by the Maine State Board of Licensure for Land Surveyors.

Nicholas S. Elliston, P.L.S. #2518





- LEGEND**
- Monument - found
 - Monument - set
 - Iron marker - found
 - Iron marker - set (#5 rebar)
 - Property line (abutter)
 - Right of way line
 - Stone wall
 - Edge of pavement
 - Edge of gravel
 - Utility pole
 - Overhead utility line
 - Now or formerly of
 - Dead reference (Book/Page)
 - Tree line
 - Wetlands
 - Coniferous tree w/ barbed wire remains

- SURVEY NOTES**
- Boundary Survey prepared by Tiltcomb Associates in September 2017.
 - Book and Page references are to the Cumberland County Registry of Deeds unless otherwise noted.
 - Bearings are referenced to grid north, Maine State Plane Coordinate System, NAD83, West Zone.
 - Utility information on this plan is approximate, based on location of visible features. DigSafe and/or the appropriate utilities should be contacted prior to any construction.
 - Property lies within Zone C based on FIRM Community #230162 Panels #0010-B and 0015-B, dated May 19, 1981. It does not lie within a special flood hazard area.
 - Wetland, stream and vernal pool delineation was conducted by TRC Solutions in May 2017.
 - Orchard Road has a defined width of 4 rods (66 feet) as accepted by the Town of Cumberland on April 10, 1787. Apparent location shown.
 - Not all interior stone walls have been located on the property.
 - Owner of record is TZ Properties, LLC recorded in the Cumberland County Registry of Deeds in Book 34200 on Page 67.
 - The total lot area is 1,087,735 sq. ft. (24.98 Acres).
 - The site is shown on assessor's map r08, lot 59, and is located in the rural residential district (RR2).

PLAN REFERENCES

- Plan of Boundary Survey - Remaining Land Now of Virginia H. Ward - Orchard Road - Made for Virginia H. Ward by Brian Smith at Sitelines, PA dated January 18, 2017. Recorded in Plan Book 217, Page 39.
- Plan of Settlement Worksheet of Chris S. Neagle & Virginia H. Ward - Common Boundary - Made for Chris S. Neagle by Brian Smith at Sitelines, PA dated December 22, 2015. Recorded in Plan Book 216, Page 25.
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- Plan of Land on Blanchard Road made for Robert Piampiano by Owen Haskell revised through February 2, 1992. Recorded in Plan Book 192, Page 44.
- Plan of Standard Boundary Survey on Orchard Road made for Robert A. Milliken by Wayne T. Wood & Co. dated June 1990. Recorded in Plan Book 186, Page 24.

SUBDIVISION NOTES:

- Coordinate electric service with CMP.
- Transformer and pull box final locations to be determined upon review from CMP.
- Lots shall have individual subsurface wastewater disposal systems.
- Lots shall have individual wells for water supply.
- The parcel is not located within a 100-year flood plain.
- All residential buildings constructed within this subdivision shall be equipped with automatic fire control sprinklers in accordance with chapter 98 article II of the Town of Cumberland ordinance.
- Septic system test pits completed by Dave Chapman with Sebago Technics in December 2017. Subsurface disposal field sized for four bedroom homes.
- All roadways are proposed to be Public Roads and shall be designed and constructed in accordance with the Town of Cumberland Residential Access Standards.
- The roadways shall be designed in accordance with the Residential Access Roadway Standards:
 - Right of way width = 50 feet
 - Pavement width = 22 feet
- The approval of this plan by the Planning Board shall not constitute acceptance by the Town of any street, easement, open space area, park, playground, or other recreation area thereon.
- All residential buildings constructed within this subdivision shall be equipped with automatic fire control sprinklers in accordance with Chapter 98 Article II of the Town of Cumberland Ordinance.
- Dug wells or overburden wells are prohibited on site for drinking water supply.
- Restrictions on Restricted Buffer Area. The Restricted Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Restricted Buffer Area to filter and absorb stormwater, the use of the Restricted Buffer Area is hereinafter limited as follows:

- (a) No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material may be placed, stored or dumped on the Restricted Buffer Area, nor may the topography of the area be altered or manipulated in any way;

- (b) Any removal of trees or other vegetation within the Restricted Buffer Area must be limited to the following:

- (i) No purposefully cleared openings may be created and an evenly distributed stand of trees and other vegetation must be maintained. An "evenly distributed stand of trees" is defined as maintaining a minimum rating score of 24 points in any 50 foot by 50 foot square (2500 square feet) area, as determined by the following rating scheme:

Diameter of tree at 4 1/2 feet above ground level	Points
2-4 inches	1
4-8 inches	2
8-12 inches	4
> 12 inches	8

Where existing trees and other vegetation result in a rating score less than 24 points, no trees may be cut or sprayed with biocides except for the normal maintenance of dead, wind-blown or damaged trees and for pruning of tree branches below a height of 12 feet provided two thirds of the tree's canopy is maintained;

- (ii) No undergrowth, ground cover vegetation, leaf litter, organic duff layer or mineral soil may be disturbed except that one winding path, that is no wider than six feet and that does not provide a downhill channel for runoff, is allowed through the area;

- (c) No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Restricted Buffer Area, except for a sign, utility pole or fence;

- (d) No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Restricted Buffer Area;

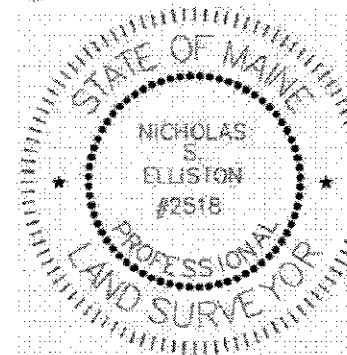
Any activity on or use of the Restricted Buffer Area inconsistent with the purpose of these Restrictions is prohibited.

1 inch = 80 ft

NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.

CERTIFICATION
This survey conforms to the current standards of practice set forth by the Maine State Board of Licensure for Land Surveyors.

Nicholas S. Elliston, P.L.S. #2518



State of Maine, Cumberland ss.
Registry of Deeds
Received _____ 20____
at _____ m and recorded in
Plan Book _____ Page _____
Attest: _____
Register

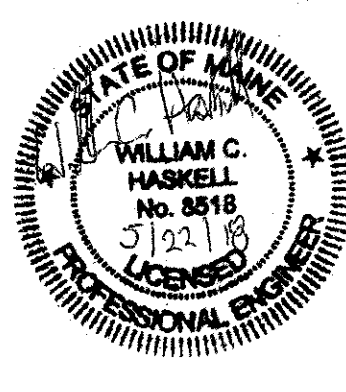
Suzanne L. McCormack, Trustee
of the Suzanne L. McCormack
Declaration of Trust dated
February 18, 2004
34442/44
Map R08, Lot 6B-A

SPACE AND BULK STANDARDS		
RR2 ZONE	REQUIRED	PROVIDED
MIN. LOT SIZE (CLUSTER)	60,000 S.F.	> 60,000 S.F.
MIN. FRONTAGE	100'	> 100'
BUILDING SETBACKS		
FRONT	50'	> 50'
SIDE	30' MIN.	> 30'
REAR	75' COMBINED	> 75'
OPEN SPACE	25%	33.3%

NET RESIDENTIAL DENSITY	
GROSS ACREAGE	1,087,735 SF
ACTUAL AREA FOR ROADS AND PARKING	78,884 SF
LAND CUT OFF FROM MAIN PARCEL	0
OTHER AREAS DIFFICULT TO DEVELOP	0
WETLANDS	88,453 SF
FLOOD PLAIN	0
RIGHTS OF WAY OR EASEMENTS	0
RESOURCE PROTECTION DISTRICTS	0
NET RESIDENTIAL ACREAGE	920,398 SF
ALLOWABLE DENSITY	87,120 SF/LOT
ALLOWABLE # OF LOTS	10.6 LOTS

Approved by the Town of Cumberland Planning Board:

Conditions: _____
Signed: _____
Date: _____



Rev.	Date	Revision

Preliminary/Final Subdivision Application	5-22-18	WCH
MDEP/ACOE Permitting	12/22/17	WCH
Preliminary Subdivision Application	10-31-17	WCH
Issued For		
	Date	By

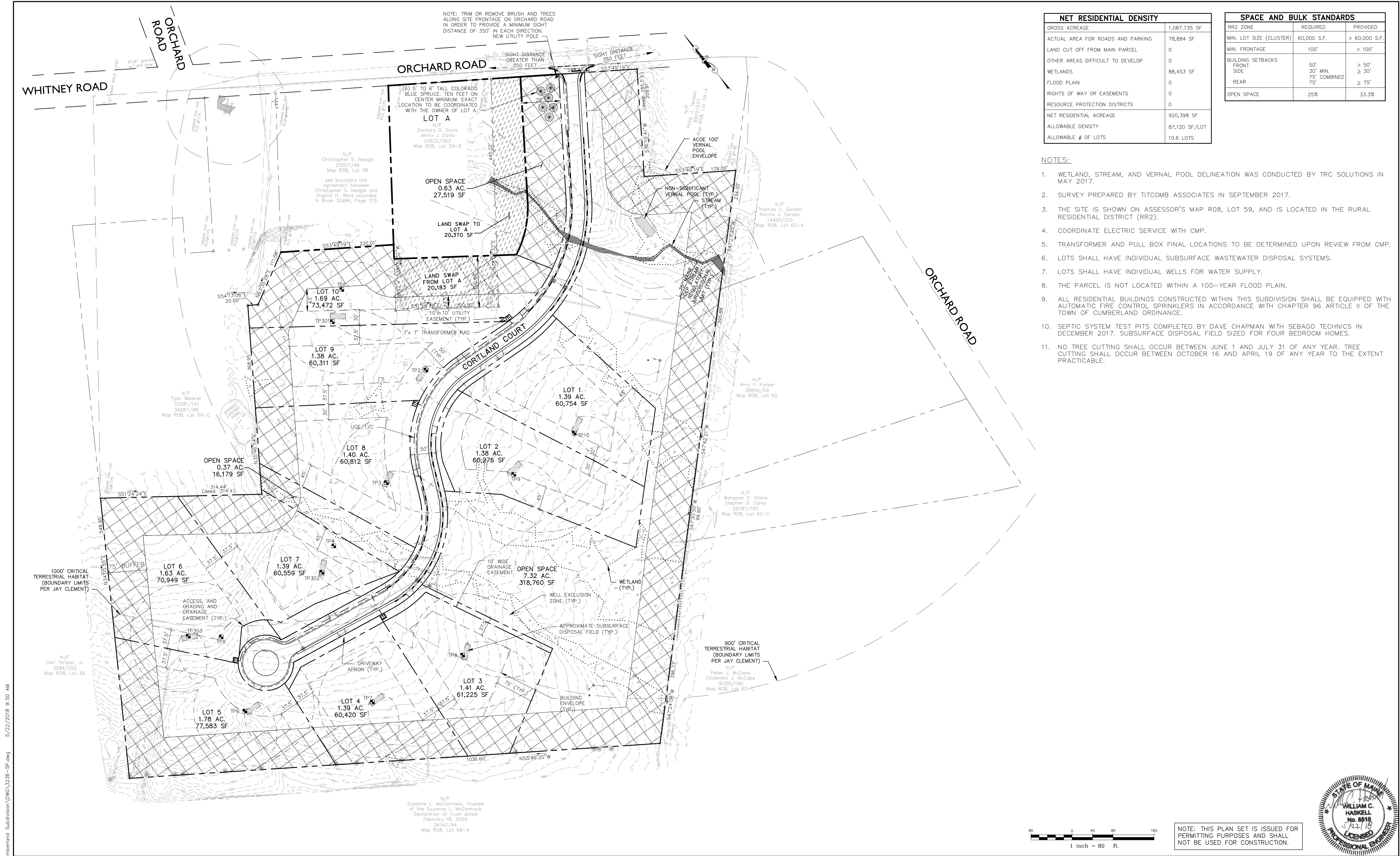
Design: JWA Draft: LAN Date: DEC 2017
Checked: WCH Scale: Job No.: 3236.01
File Name: 3236-SUBDIV.dwg
This plan shall not be modified without written permission from GorrillPalmer(GP). Any alterations, authorized or otherwise, shall be at the user's sole risk and without liability to GP.



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Drawing Name:	Subdivision Plan
Project:	Orchard Road Subdivision
Client:	TZ Properties Falmouth, Me 04105

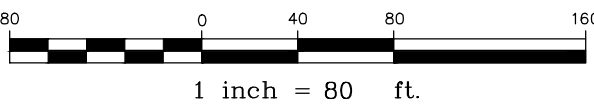
Drawing No.
4



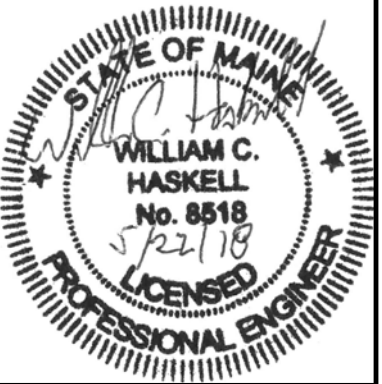
NET RESIDENTIAL DENSITY	
GROSS ACREAGE	1,087,735 SF
ACTUAL AREA FOR ROADS AND PARKING	78,884 SF
LAND CUT OFF FROM MAIN PARCEL	0
OTHER AREAS DIFFICULT TO DEVELOP	0
WETLANDS	88,453 SF
FLOOD PLAIN	0
RIGHTS OF WAY OR EASEMENTS	0
RESOURCE PROTECTION DISTRICTS	0
NET RESIDENTIAL ACREAGE	920,398 SF
ALLOWABLE DENSITY	87,120 SF/LOT
ALLOWABLE # OF LOTS	10.6 LOTS

SPACE AND BULK STANDARDS		
RR2 ZONE	REQUIRED	PROVIDED
MIN. LOT SIZE (CLUSTER)	60,000 S.F.	> 60,000 S.F.
MIN. FRONTAGE	100'	> 100'
BUILDING SETBACKS		
	50'	> 50'
	30' MIN.	≥ 30'
REAR	75' COMBINED	≥ 75'
OPEN SPACE	25%	33.3%

- NOTES:
1. WETLAND, STREAM, AND VERNAL POOL DELINEATION WAS CONDUCTED BY TRC SOLUTIONS IN MAY 2017.
 2. SURVEY PREPARED BY TITCOMB ASSOCIATES IN SEPTEMBER 2017.
 3. THE SITE IS SHOWN ON ASSESSOR'S MAP R08, LOT 59, AND IS LOCATED IN THE RURAL RESIDENTIAL DISTRICT (RR2).
 4. COORDINATE ELECTRIC SERVICE WITH CMP.
 5. TRANSFORMER AND PULL BOX FINAL LOCATIONS TO BE DETERMINED UPON REVIEW FROM CMP.
 6. LOTS SHALL HAVE INDIVIDUAL SUBSURFACE WASTEWATER DISPOSAL SYSTEMS.
 7. LOTS SHALL HAVE INDIVIDUAL WELLS FOR WATER SUPPLY.
 8. THE PARCEL IS NOT LOCATED WITHIN A 100-YEAR FLOOD PLAIN.
 9. ALL RESIDENTIAL BUILDINGS CONSTRUCTED WITHIN THIS SUBDIVISION SHALL BE EQUIPPED WITH AUTOMATIC FIRE CONTROL SPRINKLERS IN ACCORDANCE WITH CHAPTER 96 ARTICLE II OF THE TOWN OF CUMBERLAND ORDINANCE.
 10. SEPTIC SYSTEM TEST PITS COMPLETED BY DAVE CHAPMAN WITH SEBAGO TECHNICS IN DECEMBER 2017. SUBSURFACE DISPOSAL FIELD SIZED FOR FOUR BEDROOM HOMES.
 11. NO TREE CUTTING SHALL OCCUR BETWEEN JUNE 1 AND JULY 31 OF ANY YEAR. TREE CUTTING SHALL OCCUR BETWEEN OCTOBER 16 AND APRIL 19 OF ANY YEAR TO THE EXTENT PRACTICABLE.



NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.



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Rev.	Date	Revision

Preliminary/Final Subdivision Application	5-22-18	WCH
MDEP/ACOE Permitting	12/22/17	WCH
Preliminary Subdivision Application	10-31-17	WCH
Issued For	Date	By

Design: JWA	Draft: LAN	Date: DEC 2017
Checked: WCH	Scale:	Job No.: 3236.01
File Name: 3236-SP.dwg		
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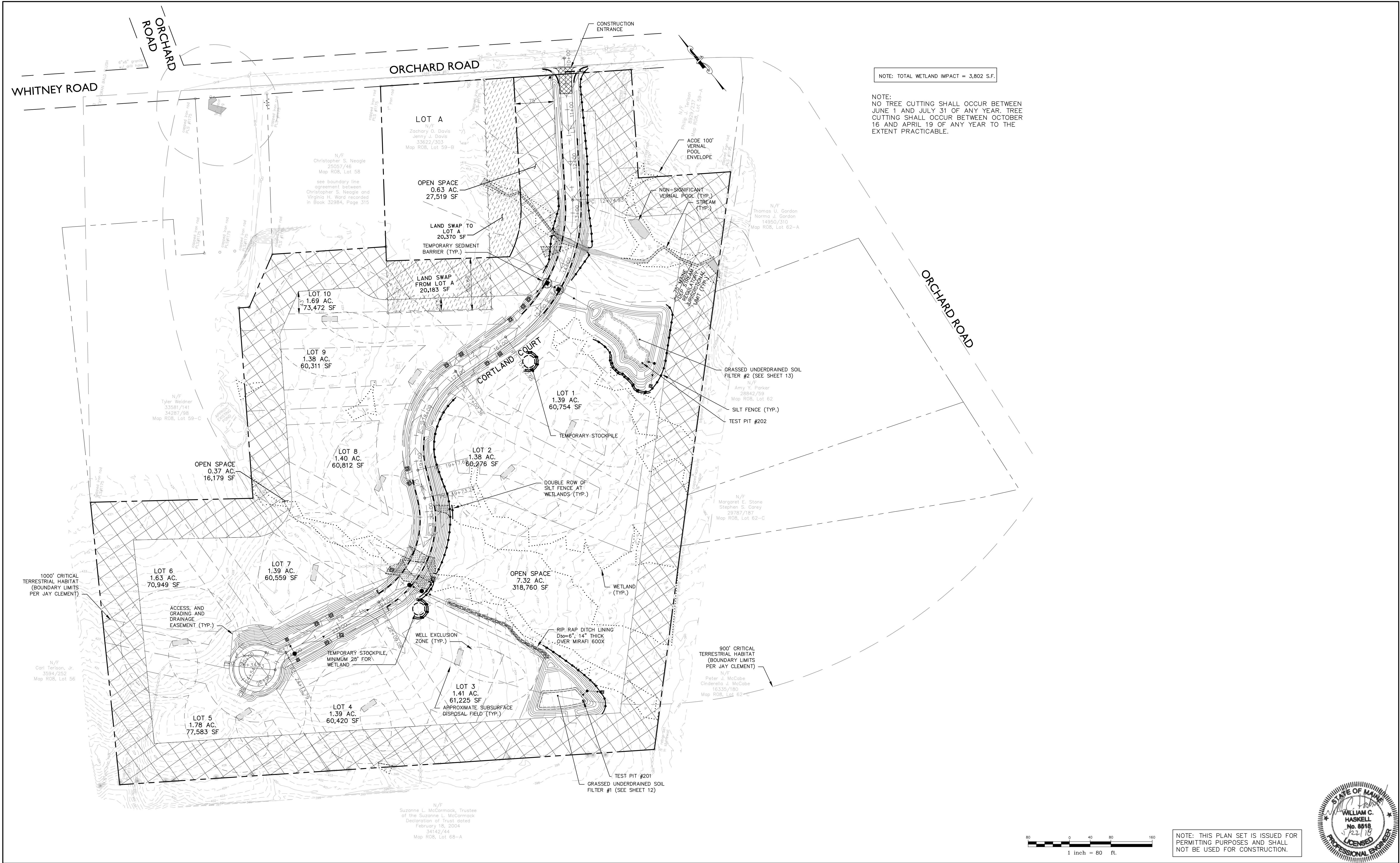


Relationships. Responsiveness. Results.
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Drawing Name:	Overall Layout and Utility Plan
Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.
5

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Rev.	Date	Revision

Preliminary/Final Subdivision Application	5-22-18	WCH
MDEP/ACOE Permitting	12/22/17	WCH
Preliminary Subdivision Application	10-31-17	WCH
Issued For	Date	By

Design: JWA	Draft: LAN	Date: DEC 2017
Checked: WCH	Scale:	Job No.: 3236.01
File Name: 3236-GRADING.dwg		
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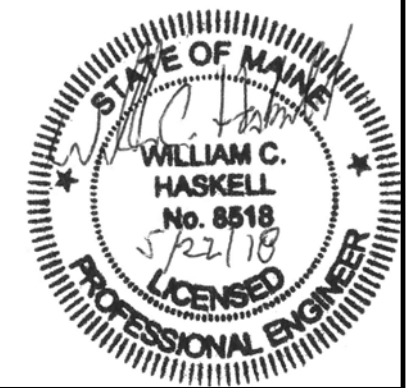


Relationships. Responsiveness. Results.
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207.772.2515

Drawing Name:	Overall Grading, Drainage and Erosion Control Plan
Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.

6



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Rev.	Date	Revision

Preliminary/Final Subdivision Application	5-22-18	WCH
MDEP/ACOE Permitting	12/22/17	WCH
Preliminary Subdivision Application	10-31-17	WCH
Issued For	Date	By

Design: JWA	Draft: LAN	Date: DEC. 2017
Checked: WCH	Scale:	Job No.: 3236.01
File Name: 3236-PP.dwg		
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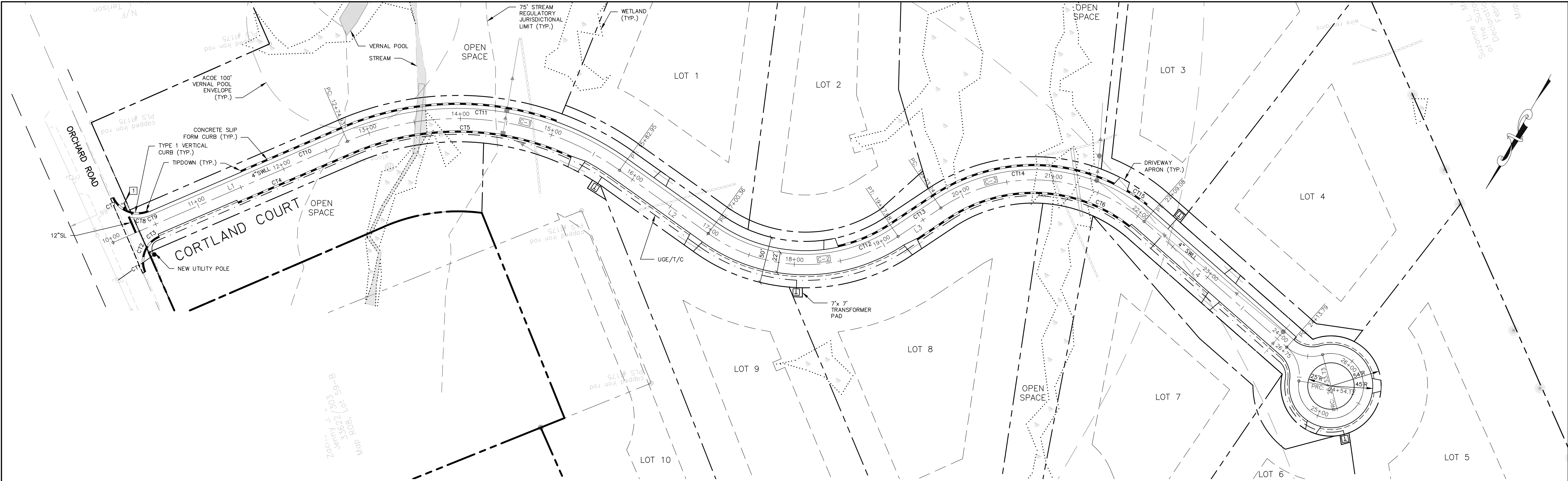


Relationships. Responsiveness. Results.
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Drawing Name:	Layout and Utility Plan
Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.

7



PLAN
SCALE: 1" = 50'

BASELINE LINE TABLE		
LINE NO.	LENGTH	BEARING
L1	274.93	S36°39'29"W
L2	117.41	N84°30'52"W
L3	55.56	S26°18'42"W
L4	204.72	N78°37'11"W

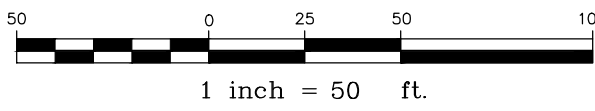
BASELINE CURVE TABLE							
CURVE NO.	LENGTH	RADIUS	TANGENT	DELTA	CHORD BEARING	START STATION	END STATION
C-1	308.02	300.00	169.14	58°49'38"	S66°04'18"W	12+74.93	15+82.95
C-2	217.32	180.00	124.11	69°10'26"	S60°53'55"W	17+00.36	19+17.68
C-3	235.83	180.00	138.29	75°04'07"	S63°50'45"W	19+73.24	22+09.08

CURBING LEGEND	
	VERTICAL GRANITE TYPE 1 CURB
	EXTRUDED CONCRETE TYPE 2 CURB

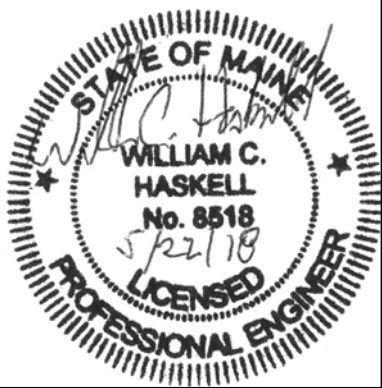
STRIPING LEGEND	
SIGNAGE, STRIPING AND PAVEMENT MARKING SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) REGARDING SIZE, INSTALLATION, LOCATION & REFLECTIVITY.	
12"SL - 12" WIDTH STOP LINE	
4"SWLL 4" SOLID WHITE LANE LINE	

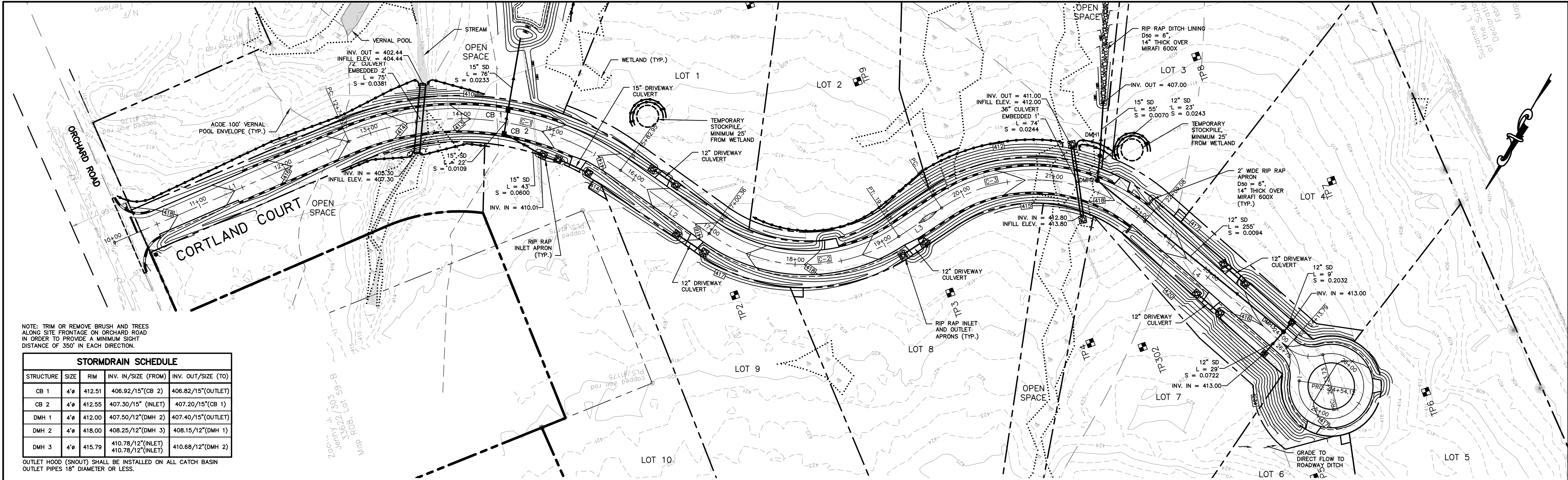
SIGN LEGEND	
	STOP
R1-1 30"x 30"	

CURB TABLE						
CURB ID	STATION/OFFSET FROM	STATION/OFFSET TO	LENGTH (FT)	RADIUS (FT)	CURB TYPE	COMMENT
CT1	10+18.15, 42.95' RT	10+18.43, 38.96' RT	4.00	30.00	TYPE 1 TIP DOWN	
CT2	10+18.43, 38.96' RT	10+44.16, 13.27' RT	39.07	30.00	TYPE 1	
CT3	10+44.16, 13.27' RT	10+48.15, 13.00' RT	4.00	30.00	TYPE 1 TIP DOWN	
CT4	10+99.30, 13.00' RT	12+74.93, 13.00' RT	175.63	-	EXTRUDED CONC.	
CT5	12+74.93, 13.00' RT	15+00.00, 13.00' RT	215.32	287.00	EXTRUDED CONC.	
CT6	20+50.00, 13.00' RT	22+00.00, 13.00' RT	139.17	167.00	EXTRUDED CONC.	
CT7	10+18.31, 44.46' LT	10+18.64, 40.48' LT	4.00	30.00	TYPE 1 TIP DOWN	
CT8	10+18.64, 40.48' LT	10+44.31, 15.27' LT	38.58	30.00	TYPE 1	
CT9	10+44.31, 15.27' LT	10+48.30, 15.00' LT	4.00	30.00	TYPE 1 TIP DOWN	
CT10	11+00.00, 15.00' LT	12+74.93, 15.00' LT	174.93	-	EXTRUDED CONC.	
CT11	12+74.93, 15.00' LT	15+00.00, 15.00' LT	236.32	315.00	EXTRUDED CONC.	
CT12	19+00.00, 15.00' LT	19+17.68, 15.00' LT	16.21	165.00	EXTRUDED CONC.	
CT13	19+17.68, 15.00' LT	19+73.24, 15.00' LT	55.56	-	EXTRUDED CONC.	
CT14	19+73.24, 15.00' LT	21+61.27, 15.00' LT	203.70	195.00	EXTRUDED CONC.	
CT15	21+76.35, 15.00' LT	22+00.00, 15.00' LT	25.62	195.00	EXTRUDED CONC.	



NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.

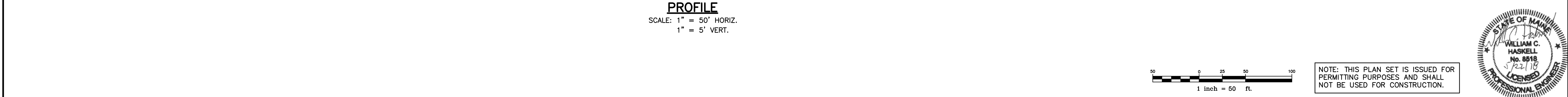
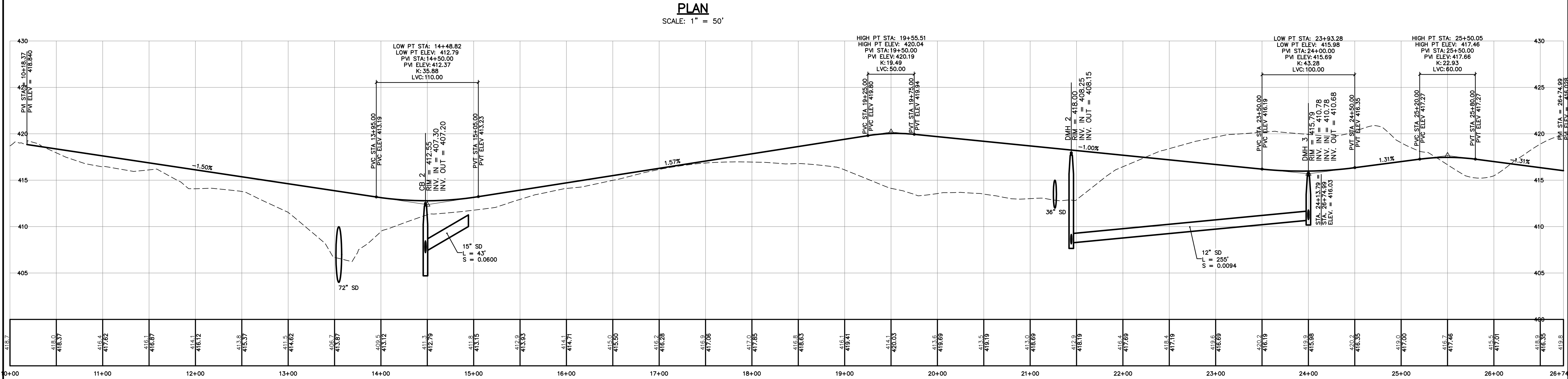




NOTE: TRIM OR REMOVE BRUSH AND TREES
ALONG SITE FRONTAGE ON ORCHARD ROAD
IN ORDER TO PROVIDE A MINIMUM SIGHT
DISTANCE OF 350' IN EACH DIRECTION.

STORMDRAIN SCHEDULE				
STRUCTURE	SIZE	RIM	INV. IN./SIZE (FROM)	INV. OUT./SIZE (TO)
CB 1	4'	412.51	406.92/15"(CB 2)	406.82/15"(OUTLET)
CB 2	4'	412.55	407.30/15" (INLET)	407.20/15"(CB 1)
DMH 1	4'	412.00	407.50/12"(DMH 2)	407.40/15"(OUTLET)
DMH 2	4'	418.00	408.25/12"(DMH 3)	408.15/12"(DMH 1)
DMH 3	4'	415.79	410.78/12"(INLET)	410.68/12"(DMH 2)

OUTLET HOOD (SNOUT) SHALL BE INSTALLED ON ALL CATCH BASIN
OUTLET PIPES 18" DIAMETER OR LESS.



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Design: JWA	Draft: LAN	Date: DEC 2017
Checked: WCH	Scale:	Job No.: 3236.01
File Name: 3236-PP.dwg		

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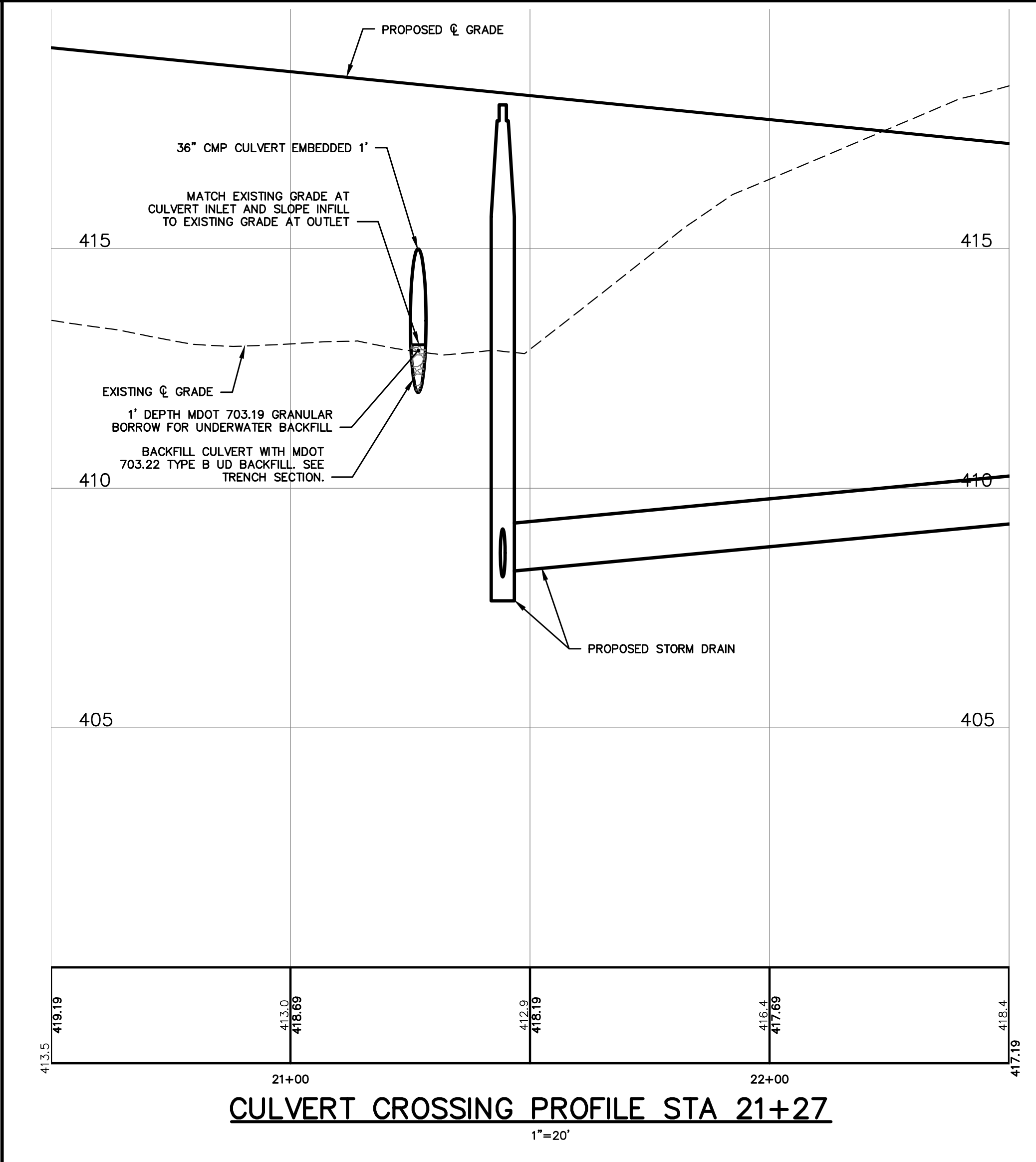
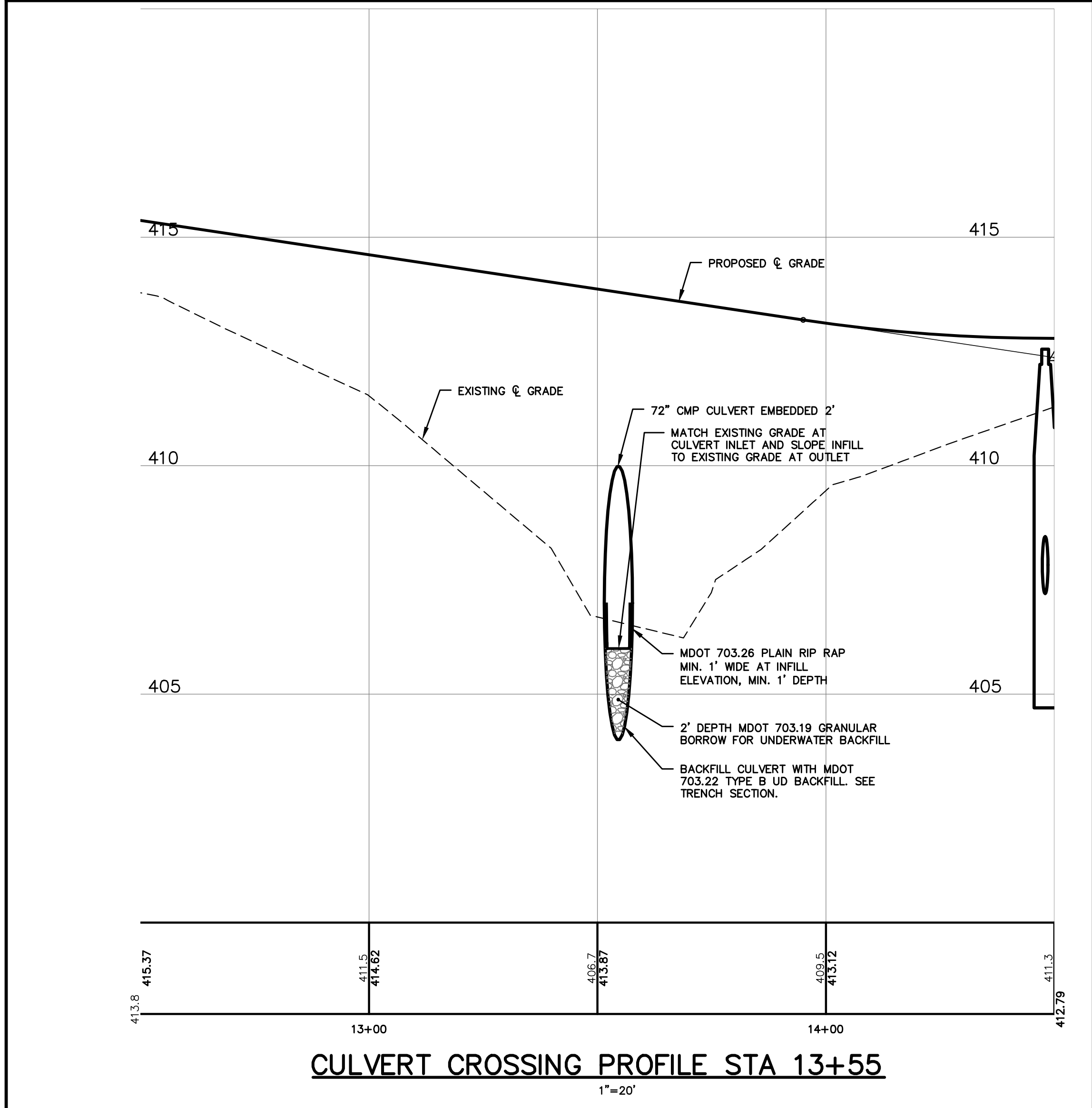
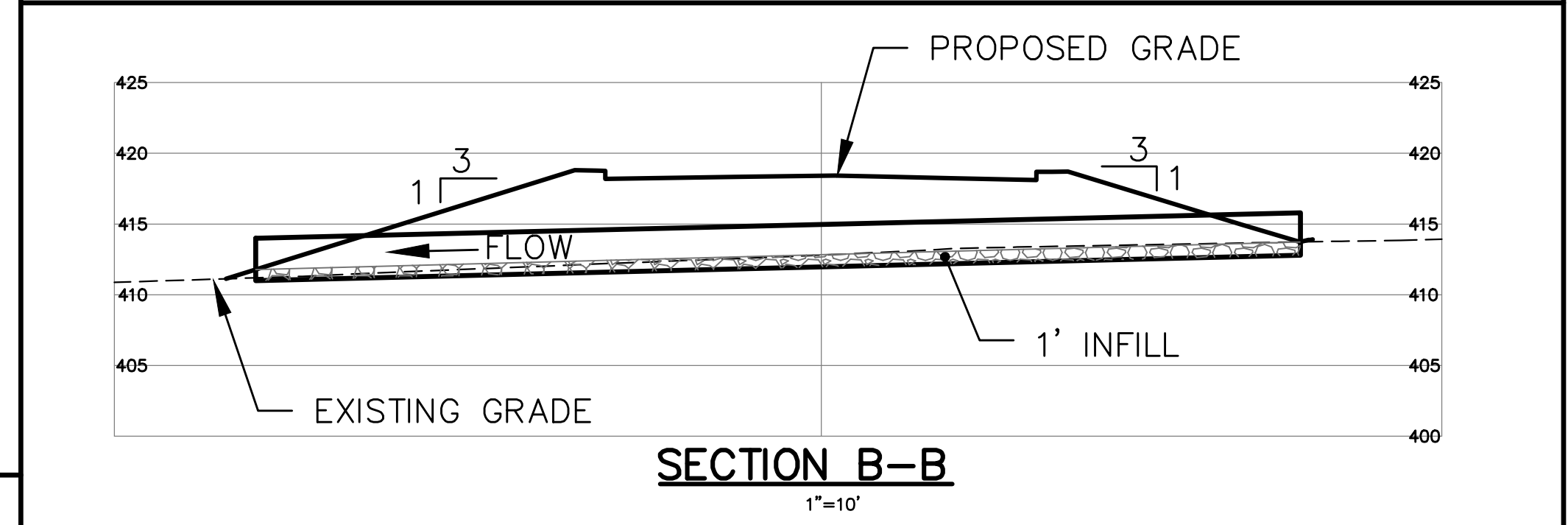
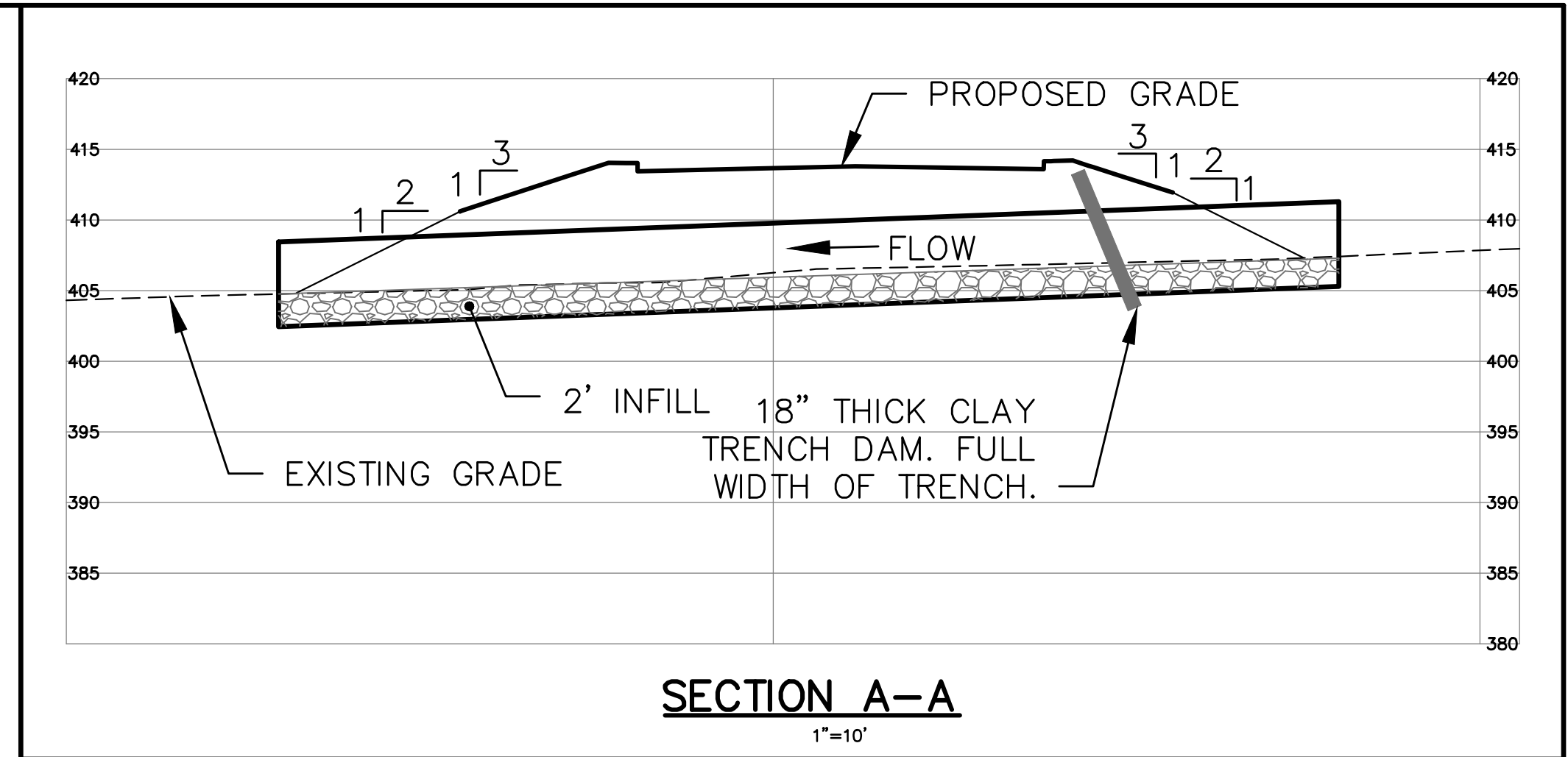
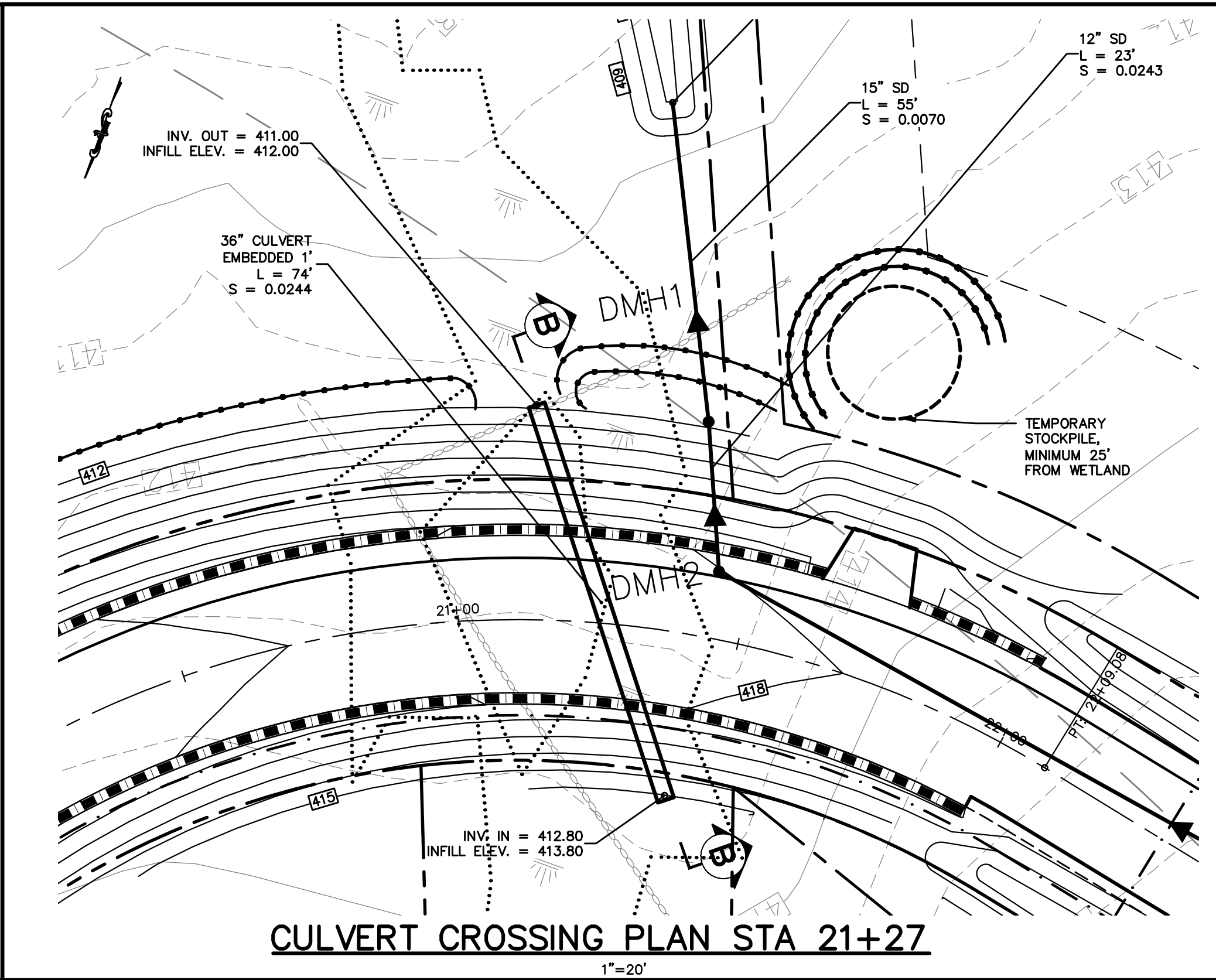
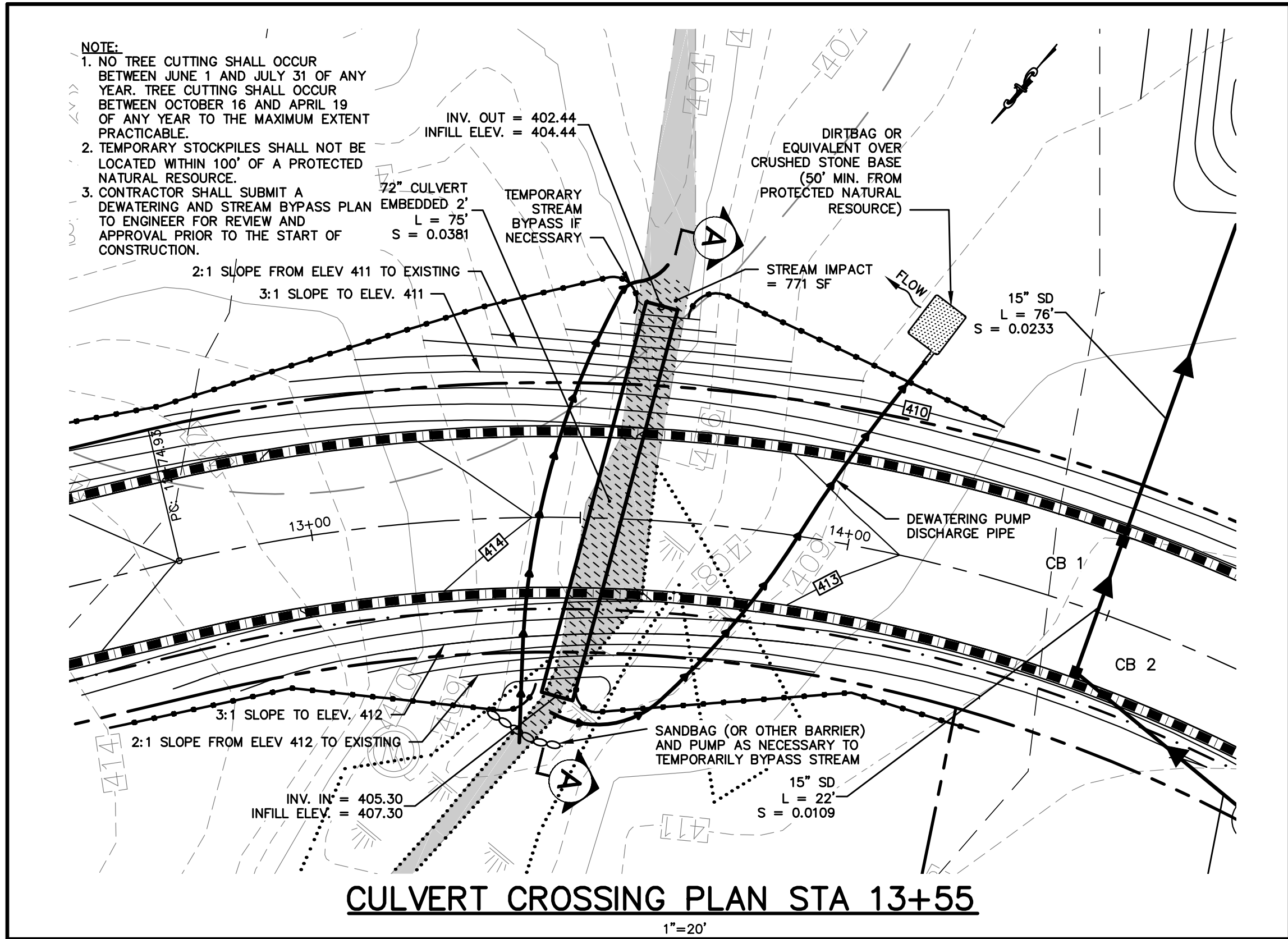
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Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.

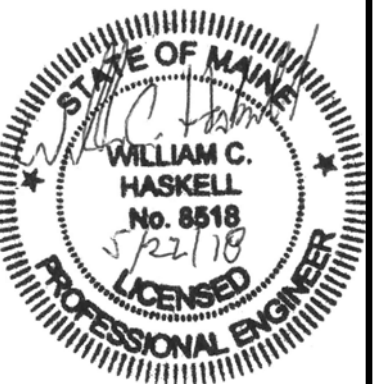
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Rev.	Date	Revision

Preliminary/Final Subdivision Application	5-22-18	WCH
MDP/ACOE Permitting	12/22/17	WCH
Preliminary Subdivision Application	10-31-17	WCH
Issued For		
Date		
By		

Design: JWA	Draft: LAN	Date: DEC 2017
Checked: WCH	Scale: AS SHOWN	Job No.: 3236.01
File Name: 3236-CULVERT.dwg		
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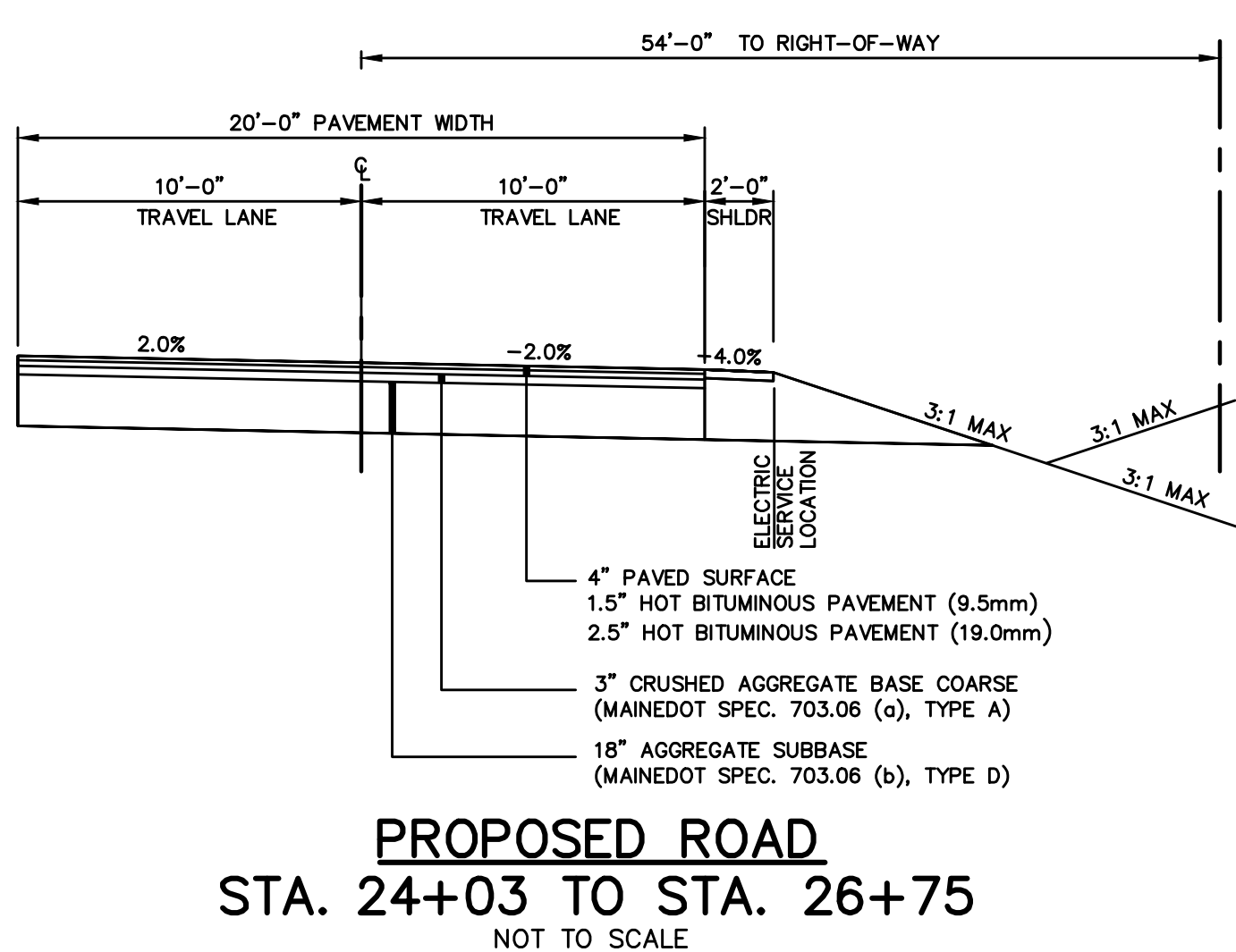
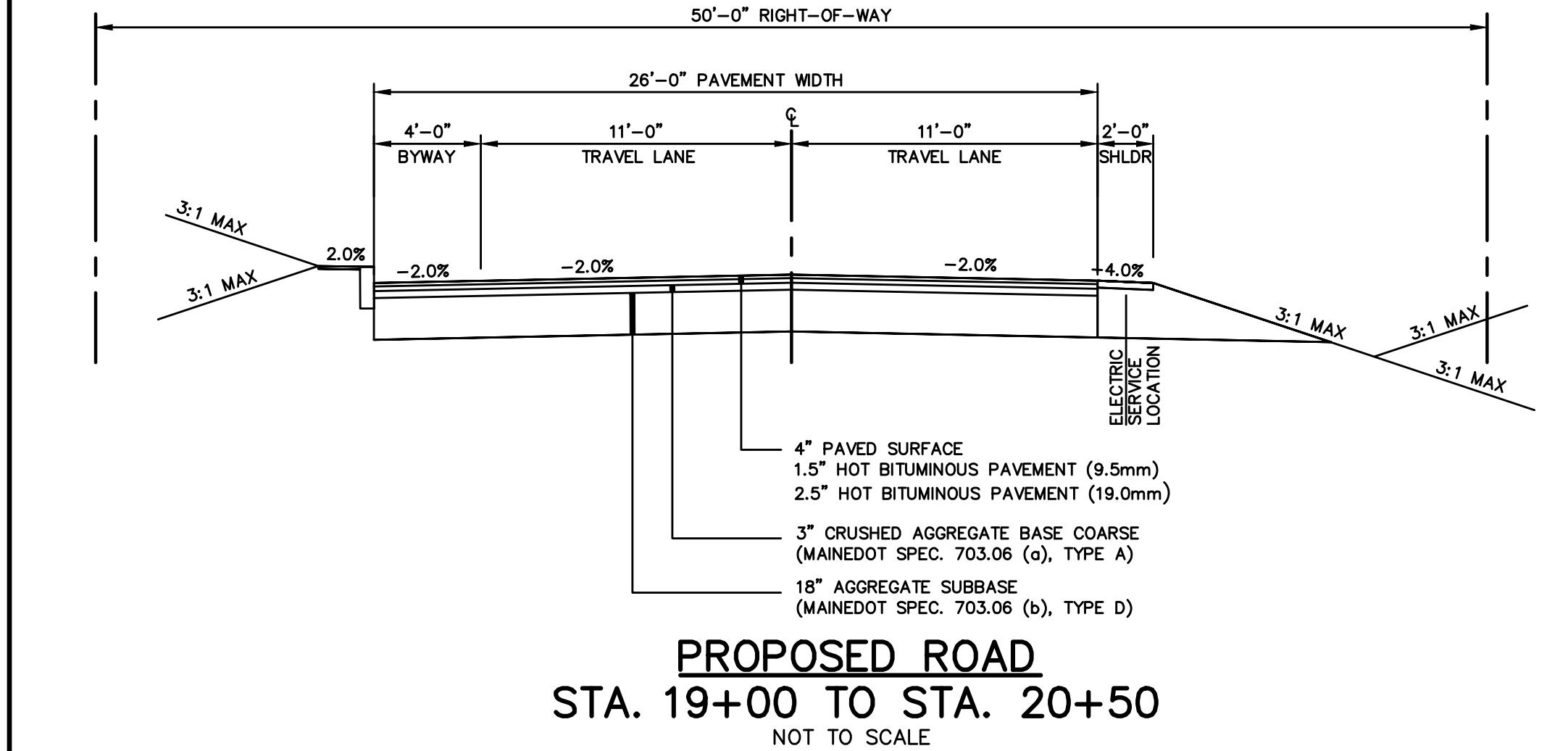
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Drawing Name:	Culvert Crossing Details
Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.

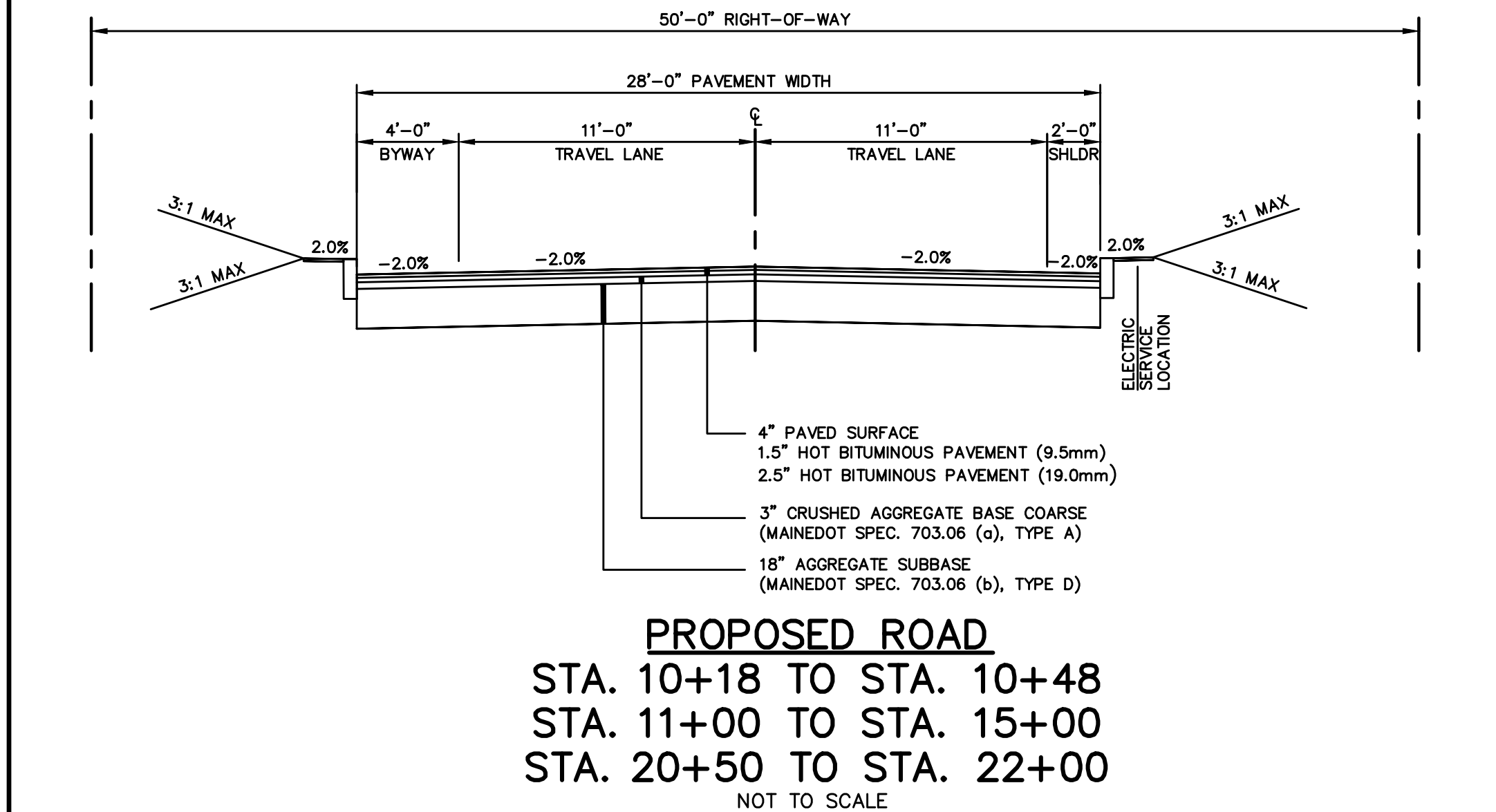
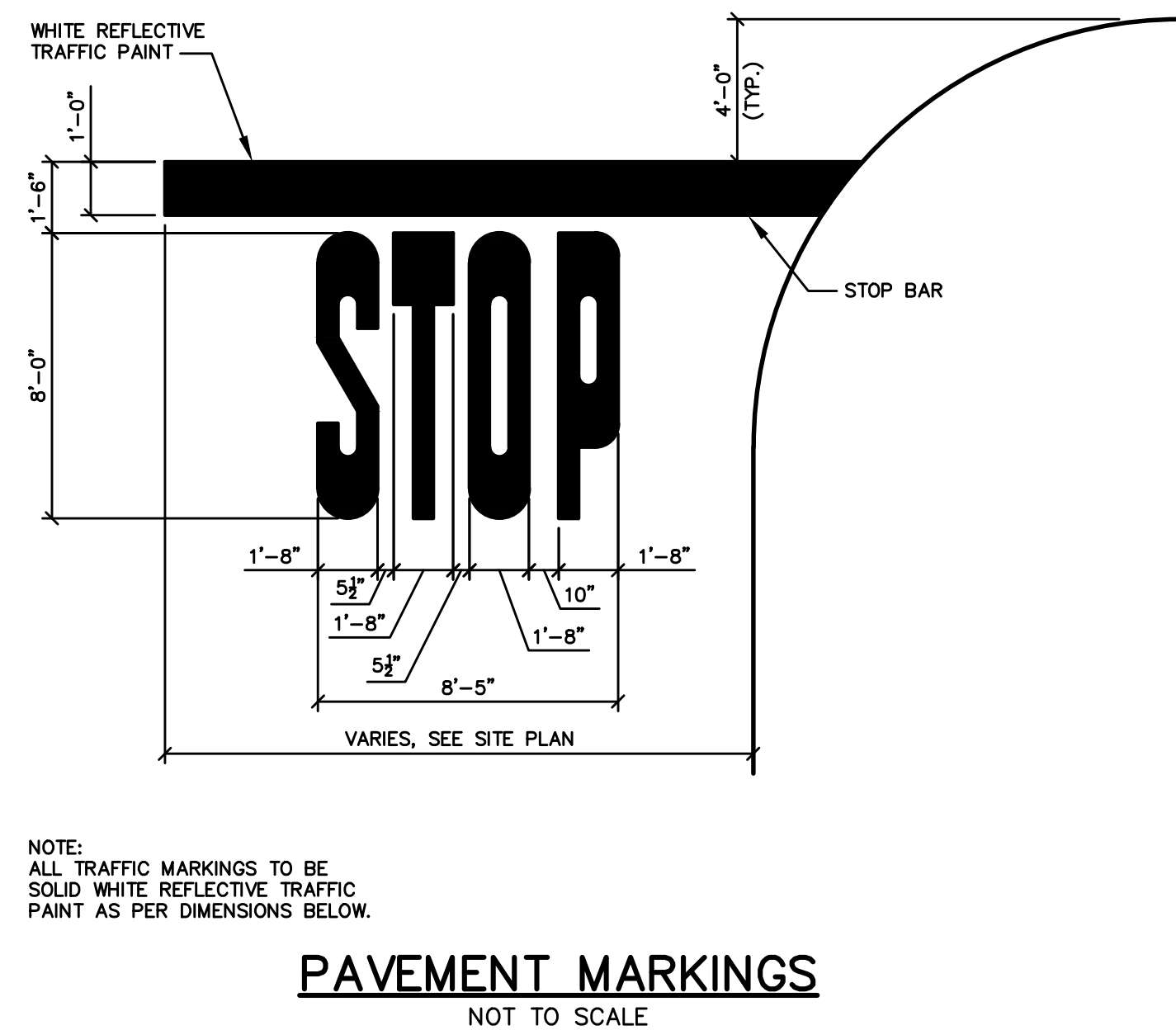
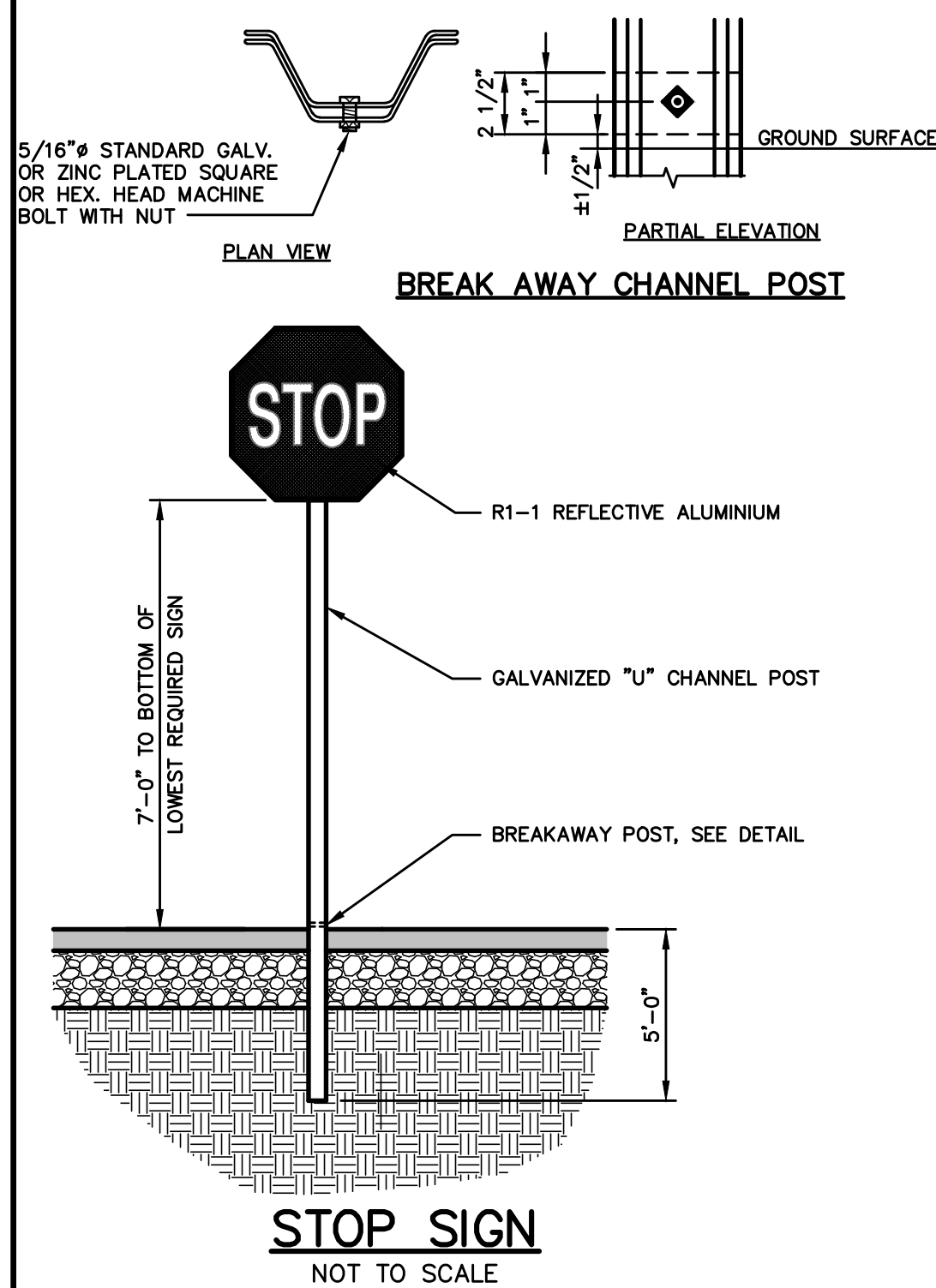
9

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NOTES:

1. COMPACT SUBGRADE TO 95% MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-1557.
2. ROADWAY TO MEET TOWN OF CUMBERLAND "RESIDENTIAL ACCESS" STANDARD.



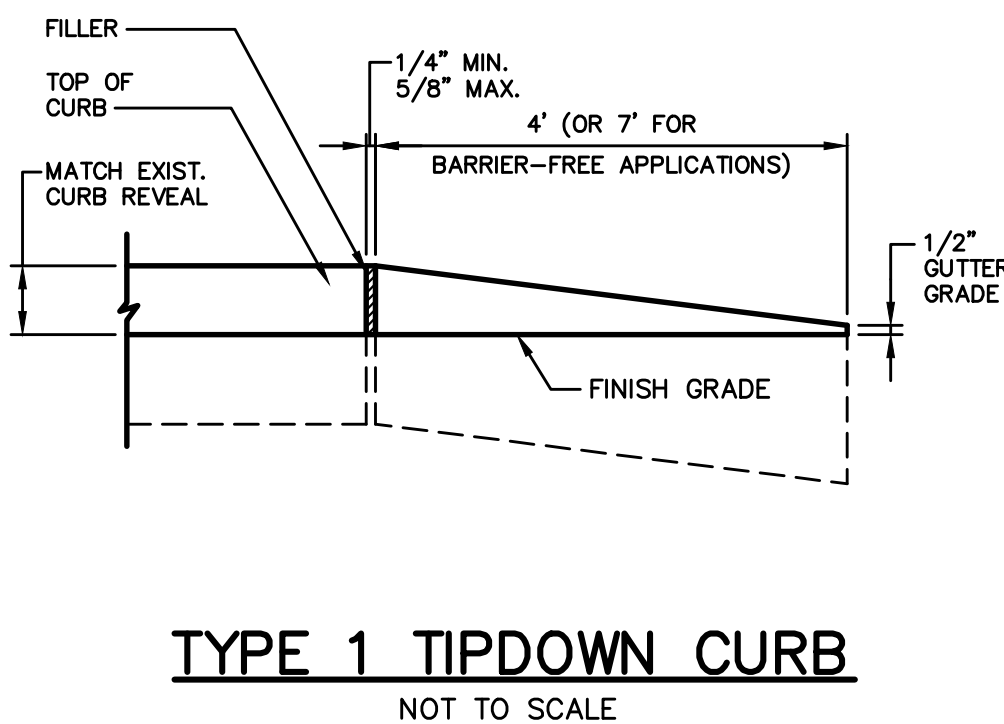
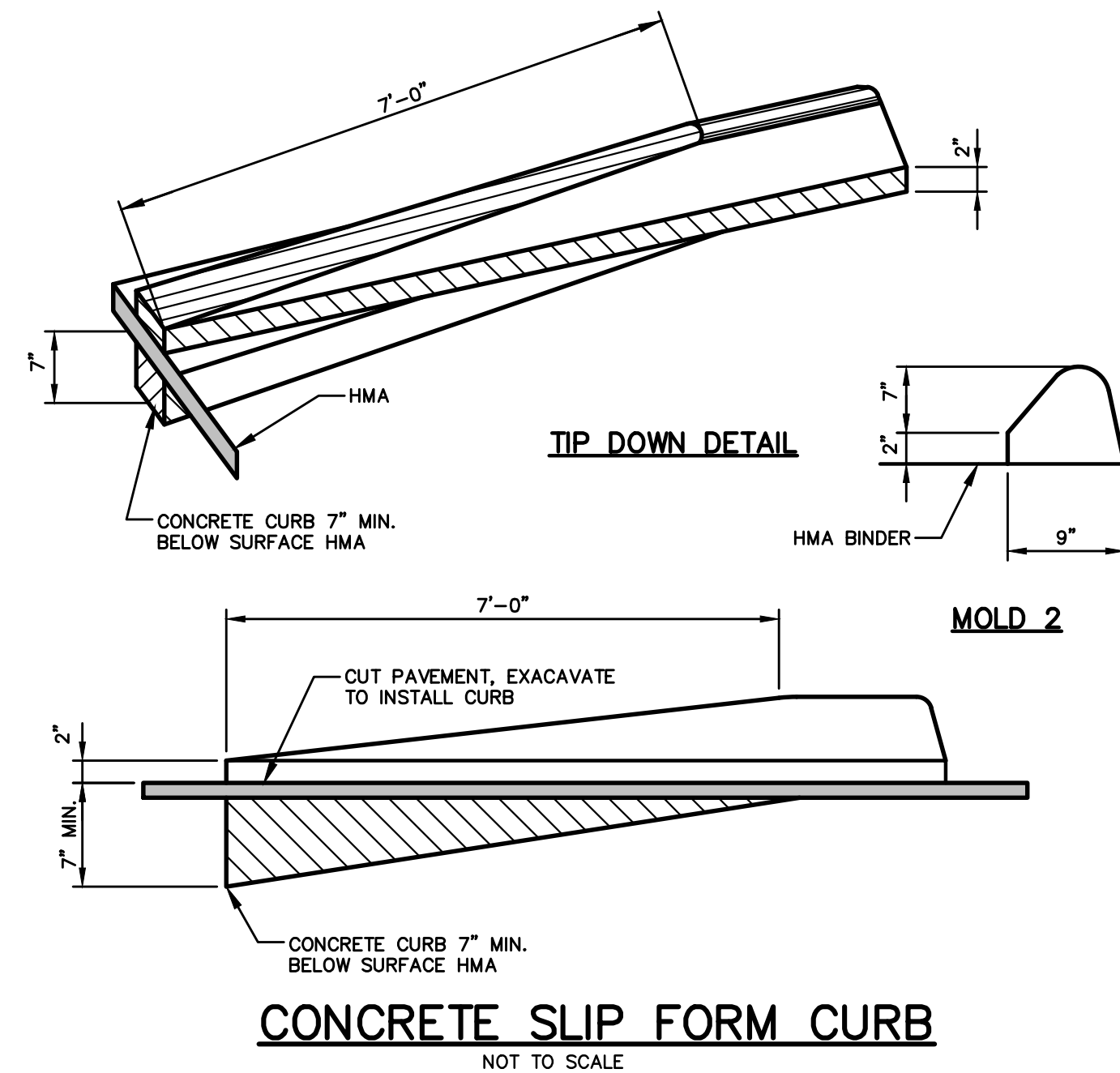
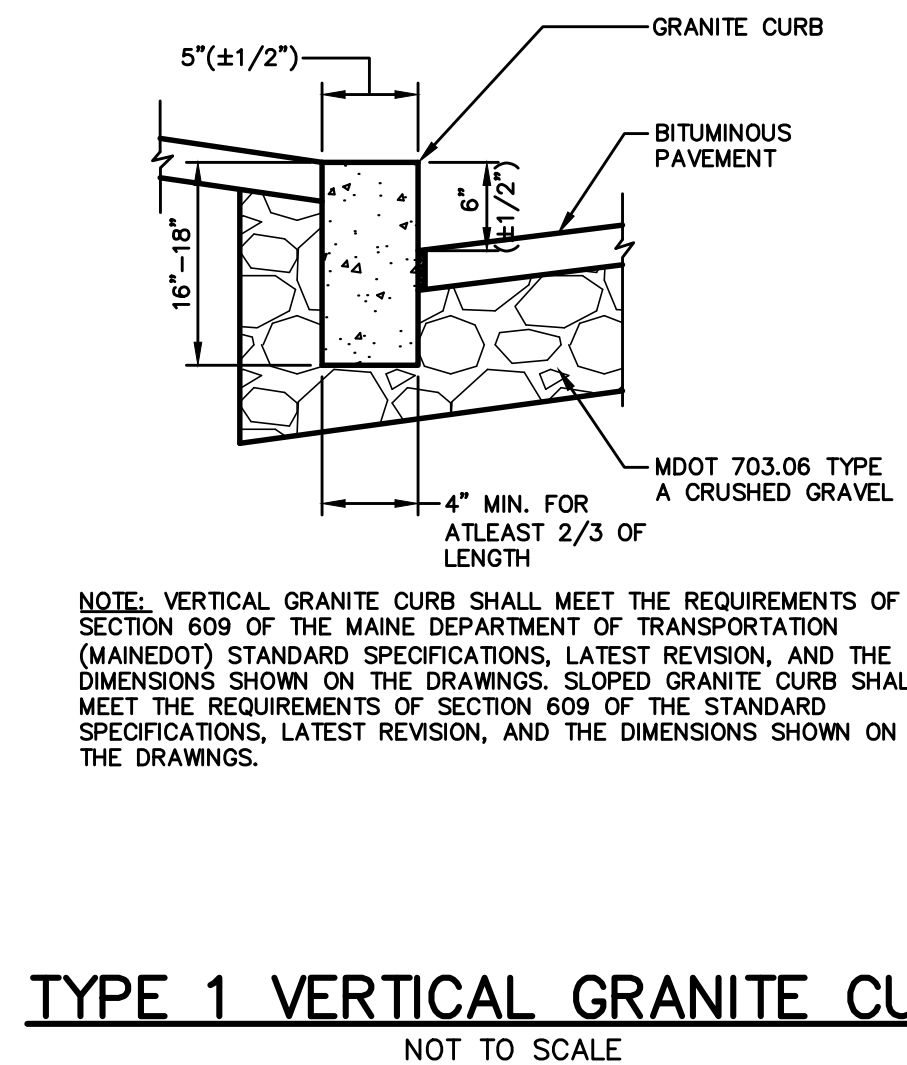
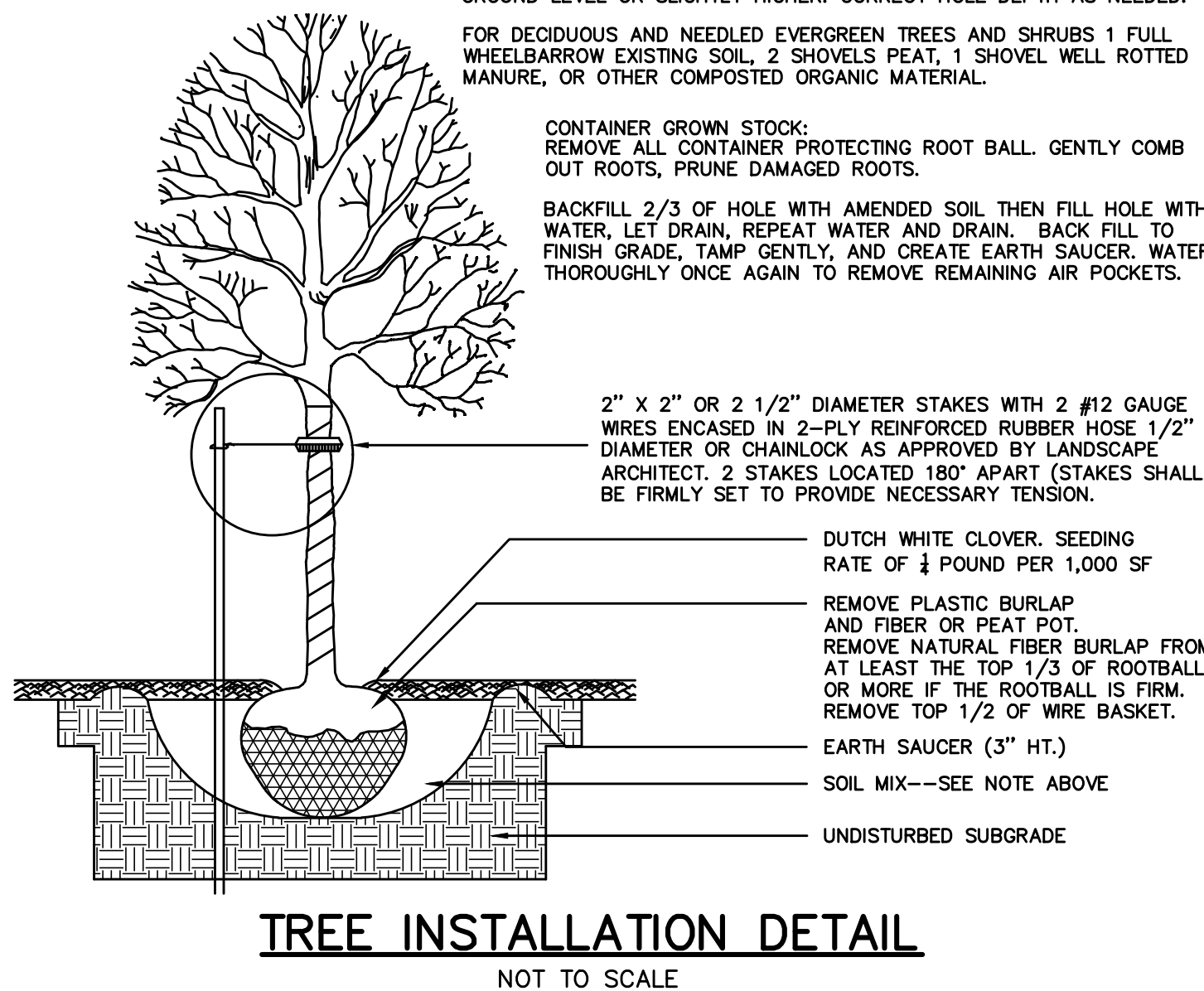
GENERAL PLANTING NOTES

1. ALL PLANT MATERIAL INSTALLED SHALL MEET THE SPECIFICATIONS OF "AMERICAN STANDARDS FOR NURSERY STOCK BY THE AMERICAN ASSOCIATION OF NURSERYMEN".
2. ALL PLANT MATERIAL SHALL BE FREE FROM INSECTS AND DISEASE.
3. ALL PLANTING SHALL BE DONE IN ACCORDANCE WITH ACCEPTABLE HORTICULTURAL PRACTICES. THIS IS TO INCLUDE PROPER PLANTING MAX, PLANT BED AND TREE PIT PREPARATION, PRUNING STAKING OR GUYING WRAPPING, SPRAYING, FERTILIZATION, PLANTING AND ADEQUATE MAINTENANCE UNTIL ACCEPTANCE FROM THE OWNER.
4. ALL GRASS, OTHER VEGETATION AND DEBRIS SHALL BE REMOVED FROM ALL PLANTING AREAS PRIOR TO PLANTING.
5. EXISTING TREES TO BE PRESERVED SHALL BE PROTECTED DURING CONSTRUCTION AND SHALL BE THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR.
6. ANY DEVIATION FROM THE LANDSCAPE PLAN, INCLUDING PLANT LOCATION, SELECTION, SIZE, QUANTITY, OR CONDITION SHALL BE REVIEWED AND APPROVED BY THE OWNER (AND MUNICIPAL AUTHORITY, IF APPLICABLE) PRIOR TO INSTALLATION ON SITE.
7. DAMAGE TO EXISTING SITE IMPROVEMENTS DURING INSTALLATION OF LANDSCAPE MATERIAL SHALL BE THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR.
8. CONTRACTOR SHALL COORDINATE INSPECTION OF PLANT MATERIAL AND LOCATIONS WITH OWNER PRIOR TO INSTALLATION. ALL PLANT MATERIAL SHALL BE ON-SITE AND PLACED BEFORE INSPECTION CAN BE COMPLETED. A MINIMUM OF 48 HOUR NOTIFICATION SHALL BE REQUIRED.
9. MAINTENANCE REQUIREMENTS: PRUNE DEAD OR DAMAGED BRANCHES POST INSTALLATION AND WATER AS REQUIRED UNTIL PROJECT COMPLETION AND ACCEPTANCE BY OWNER.
10. WATERING: ALL PLANTINGS SHALL BE THOROUGHLY WATERED UPON INSTALLATION, AND THEN WEEKLY WHENEVER ANY DRY SPELLS OCCUR, UNTIL ACCEPTANCE BY OWNER.
11. LANDSCAPE CONTRACTOR OR PLANT SUPPLIER SHALL GUARANTEE PLANTS AND PROVIDE REPLACEMENTS FOR TWO YEARS FROM INSTALLATION.

*SOIL MIX:

DIG HOLE AT LEAST 2 TIMES THE WIDTH OF ROOT BALL AND AS DEEP AS THE ROOT BALL (NO DEEPER). SET ROOT BALL CENTERED, WITH TOP AT GROUND LEVEL OR SLIGHTLY HIGHER. CORRECT HOLE DEPTH AS NEEDED.

FOR DECIDUOUS AND NEEDLED EVERGREEN TREES AND SHRUBS 1 FULL WHEELBARROW EXISTING SOIL, 2 SHOVELS PEAT, 1 SHOVEL WELL ROTTED MANURE, OR OTHER COMPOSTED ORGANIC MATERIAL.



Rev.	Date	Revision

Preliminary/Final Subdivision Application	5-22-18	WCH
MDAP/ACOE Permitting	12/22/17	WCH
Preliminary Subdivision Application	10-31-17	WCH
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Design: JWA	Draft: tAN	Date: 5/22/2016
Checked: WCH	Scale: NTS	Job No.: 3236.01
File Name: 3236-DETAILS.dwg		

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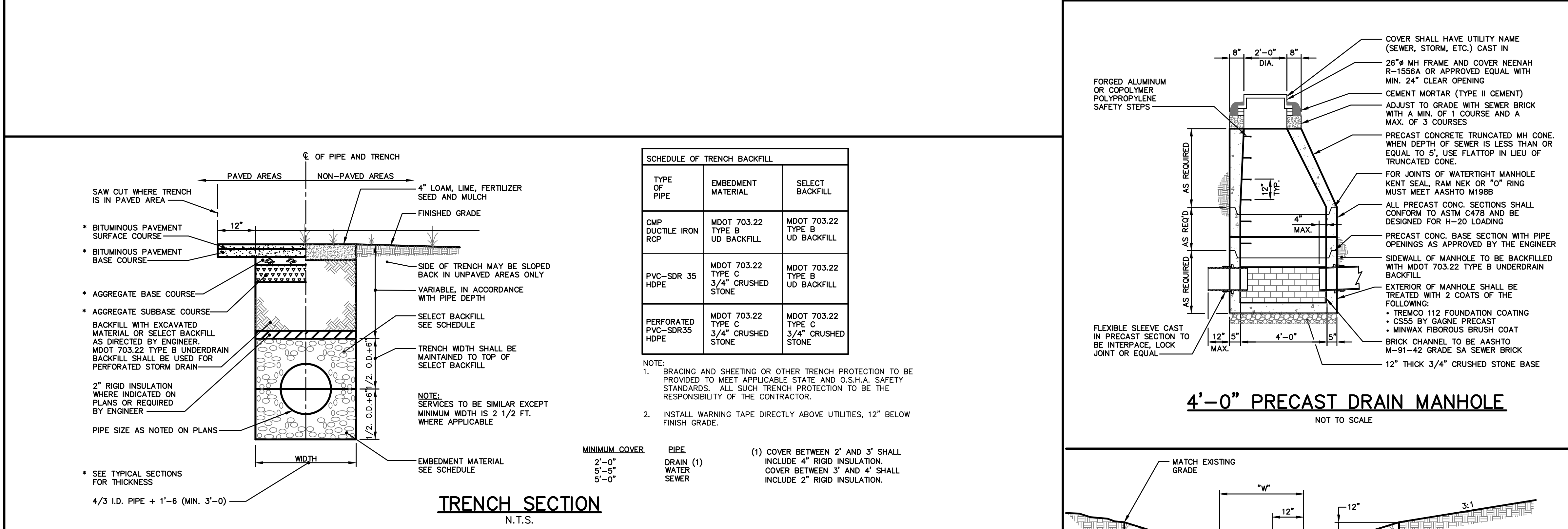
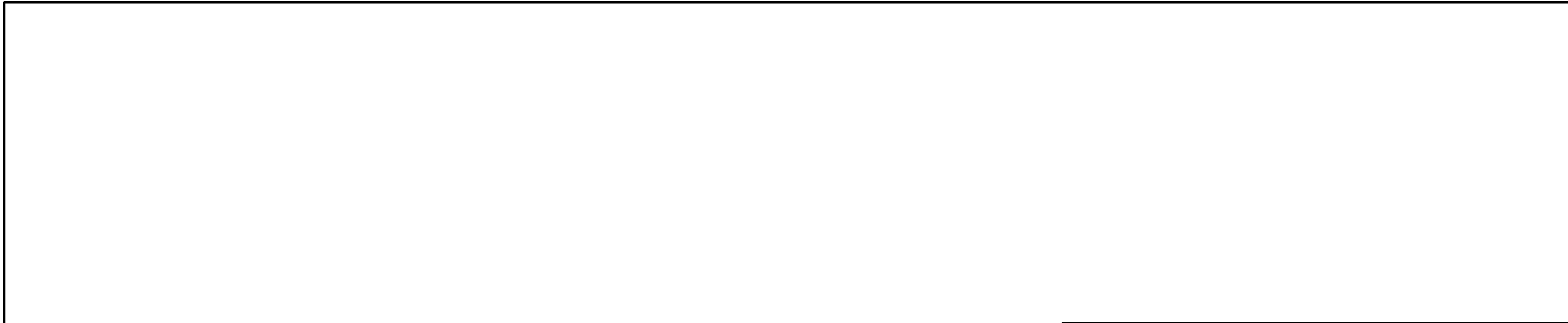
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Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.
10



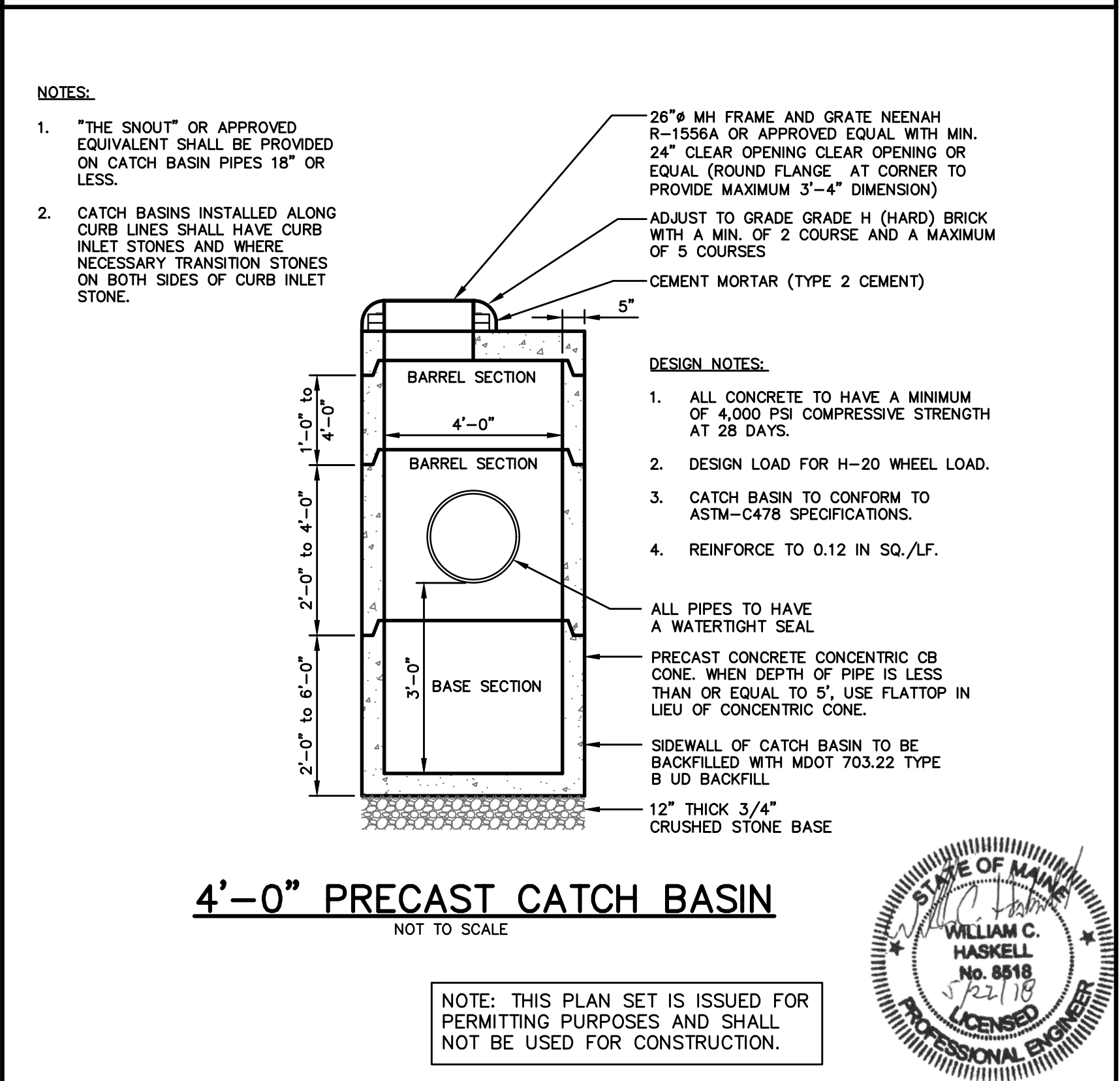
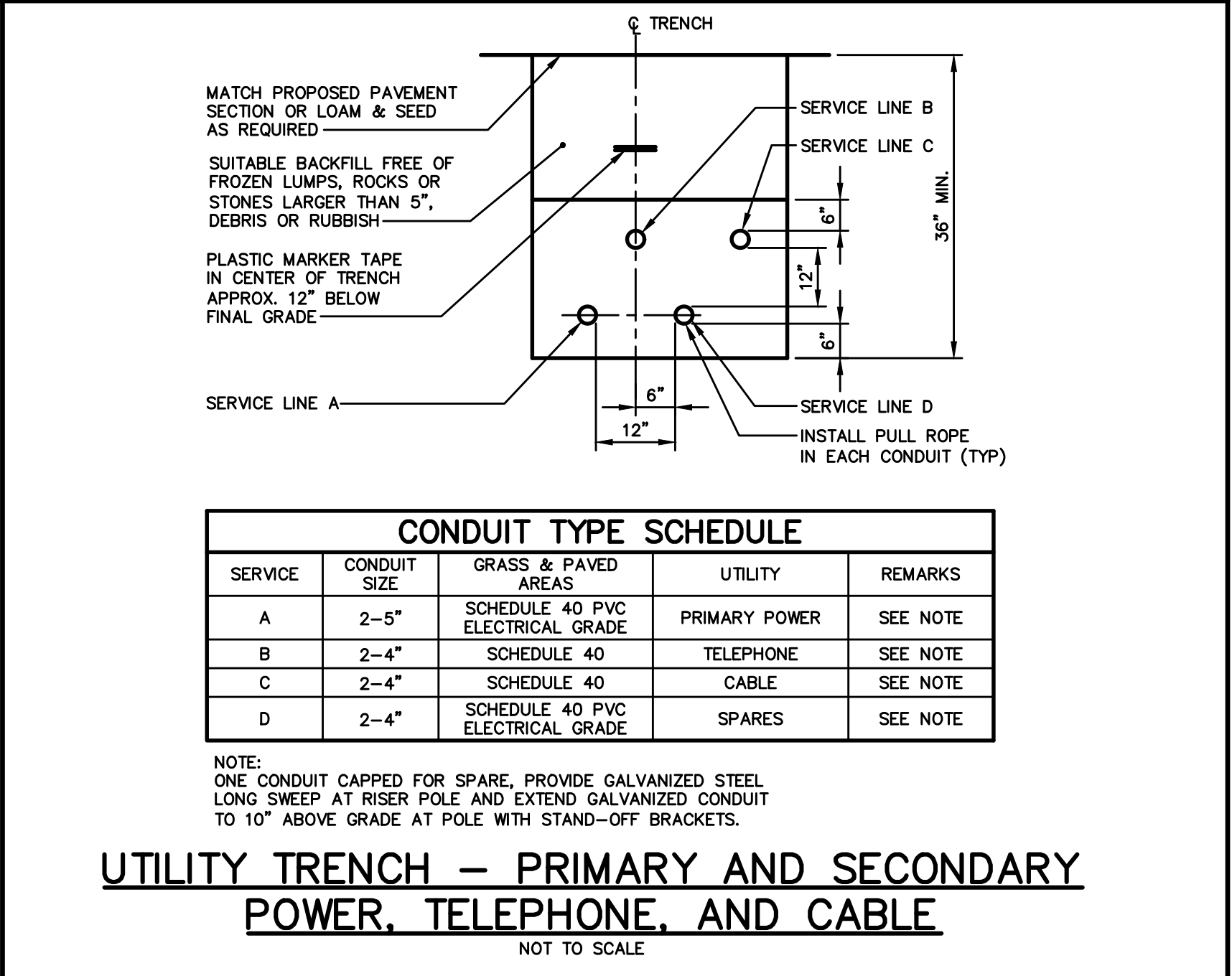
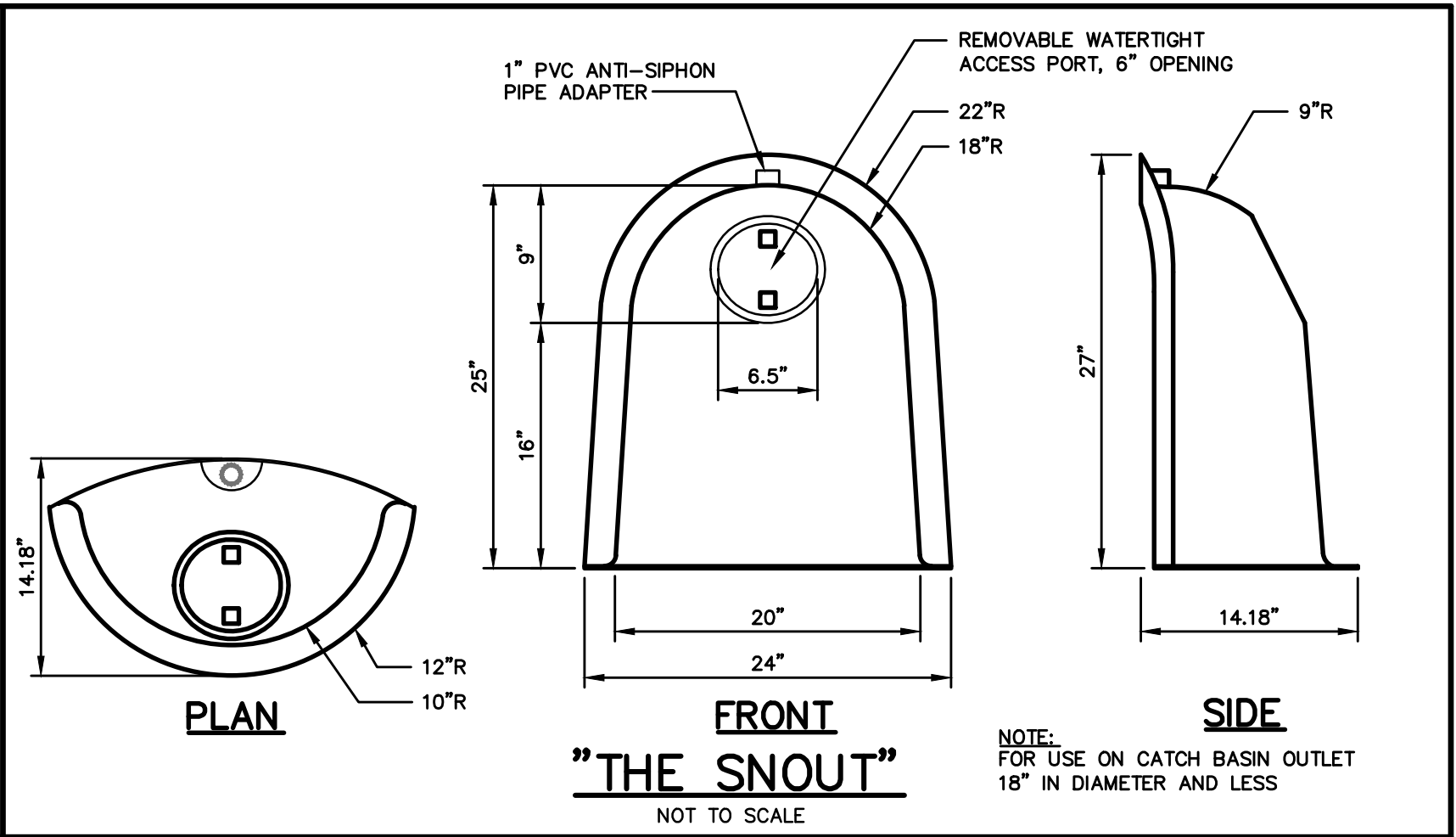
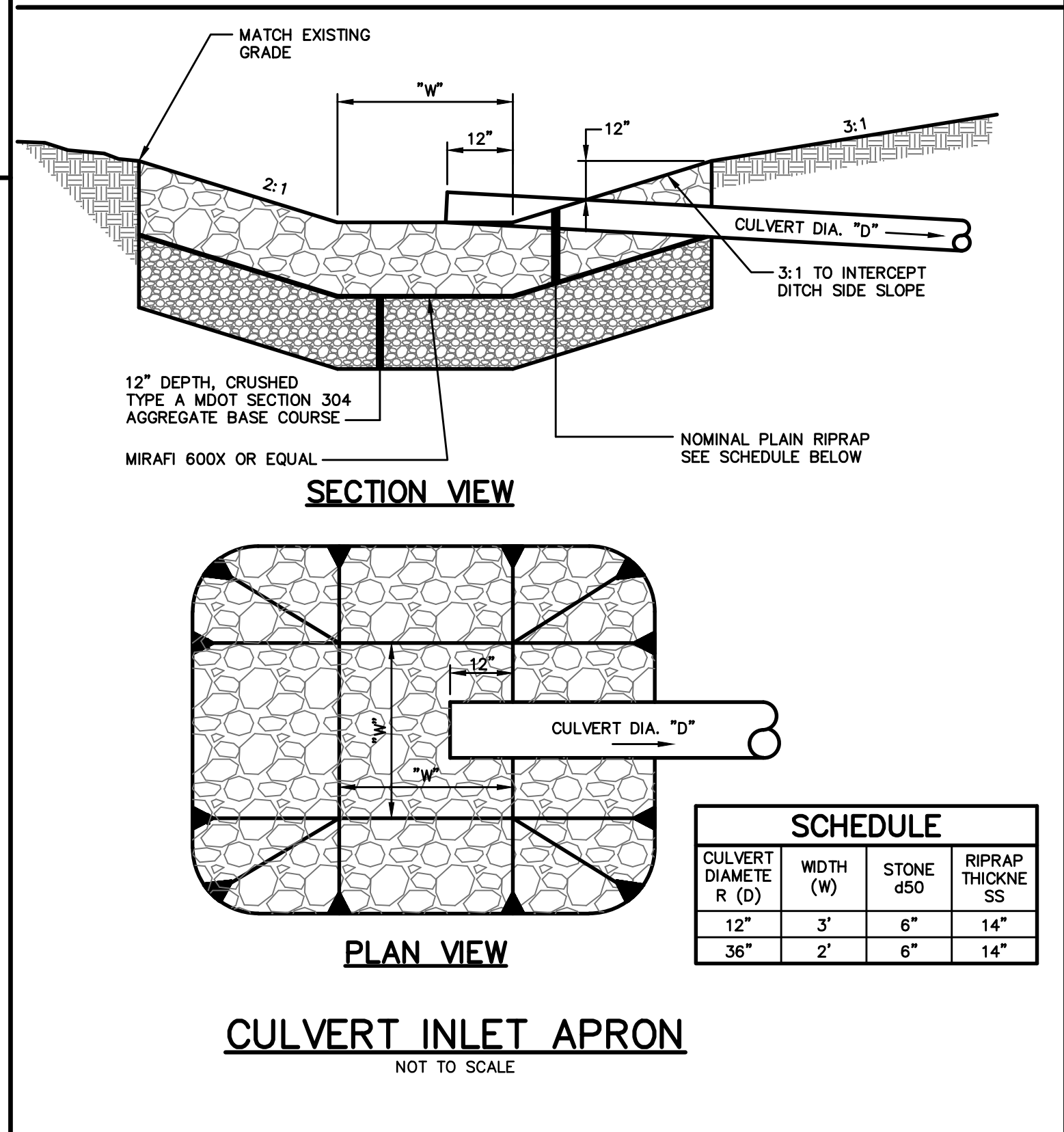
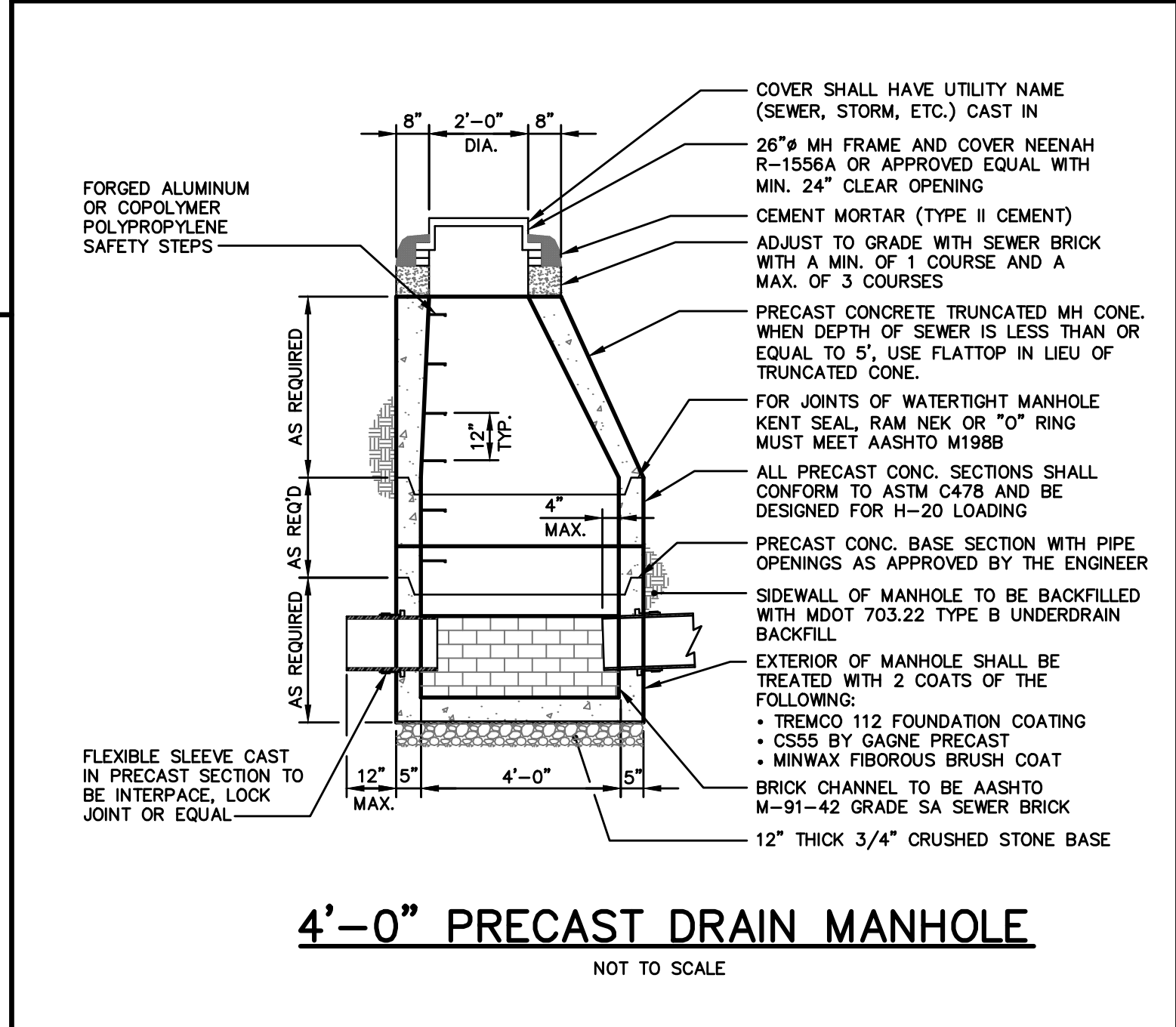
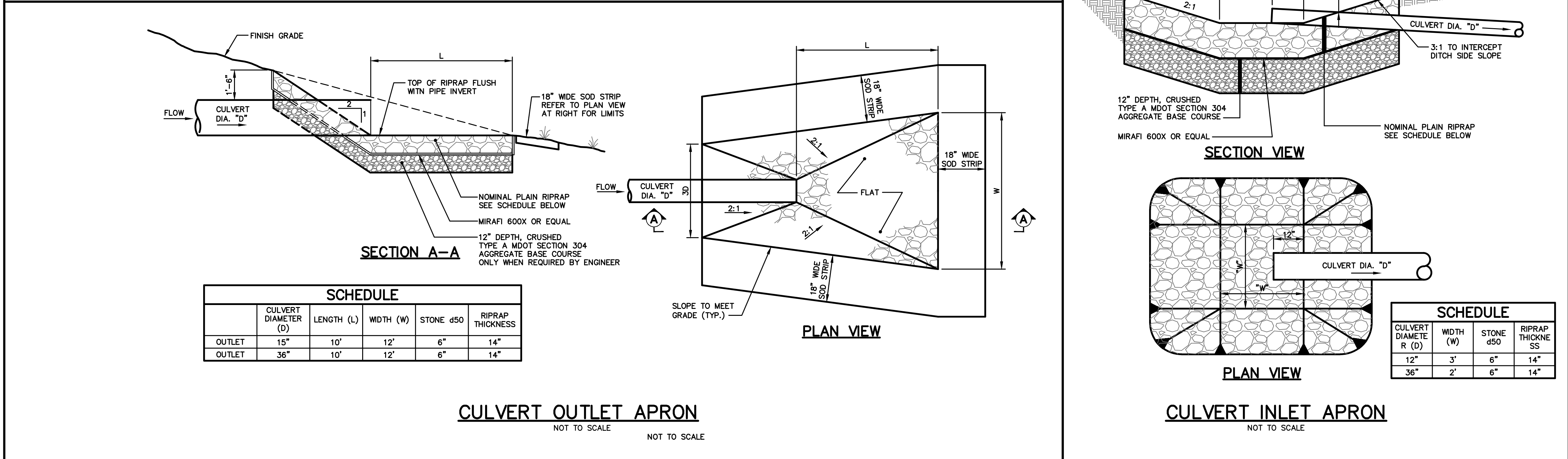
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SCHEDULE OF TRENCH BACKFILL		
TYPE OF PIPE	EMBEDMENT MATERIAL	SELECT BACKFILL
CMP DUCTILE IRON RCP	MDOT 703.22 TYPE B UD BACKFILL	MDOT 703.22 TYPE B UD BACKFILL
PVC-SDR 35 HDPE	MDOT 703.22 TYPE C 3/4" CRUSHED STONE	MDOT 703.22 TYPE B UD BACKFILL
PERFORATED PVC-SDR35 HDPE	MDOT 703.22 TYPE C 3/4" CRUSHED STONE	MDOT 703.22 TYPE C 3/4" CRUSHED STONE

- NOTE:
- BRACING AND SHEETING OR OTHER TRENCH PROTECTION TO BE PROVIDED TO MEET APPLICABLE STATE AND O.S.H.A. SAFETY STANDARDS. ALL SUCH TRENCH PROTECTION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
 - INSTALL WARNING TAPE DIRECTLY ABOVE UTILITIES, 12" BELOW FINISH GRADE.
- MINIMUM COVER
- | | | |
|-------|-----------|--|
| 2'-0" | PIPE | (1) COVER BETWEEN 2' AND 3' SHALL INCLUDE 4" RIGID INSULATION. |
| 5'-5" | DRAIN (1) | COVER BETWEEN 3' AND 4' SHALL INCLUDE 2" RIGID INSULATION. |
| 5'-0" | SEWER | |



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	Date	By

Design: dWA	Draft: tAN	Date: 5/22/2018
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Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

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11

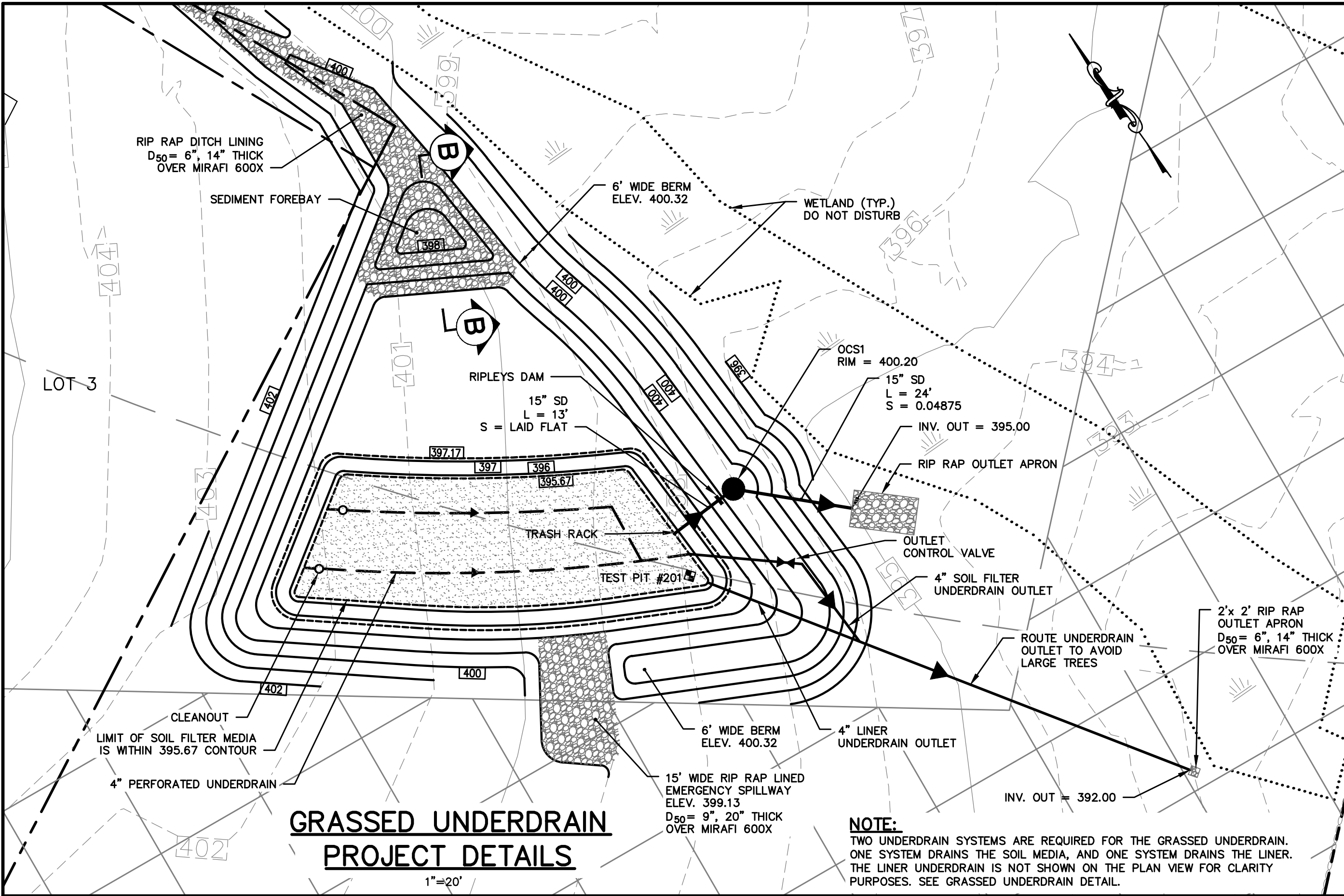
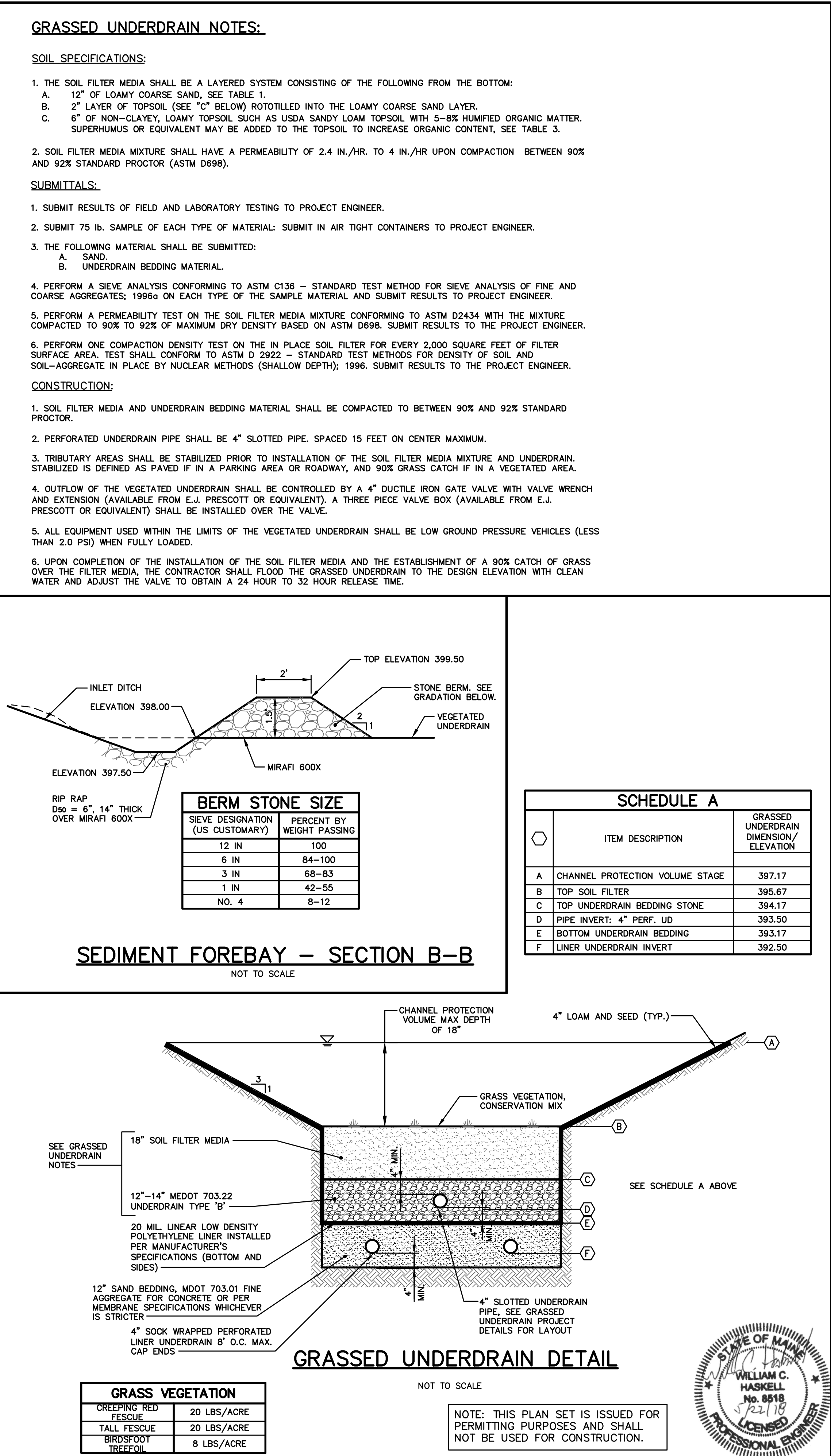
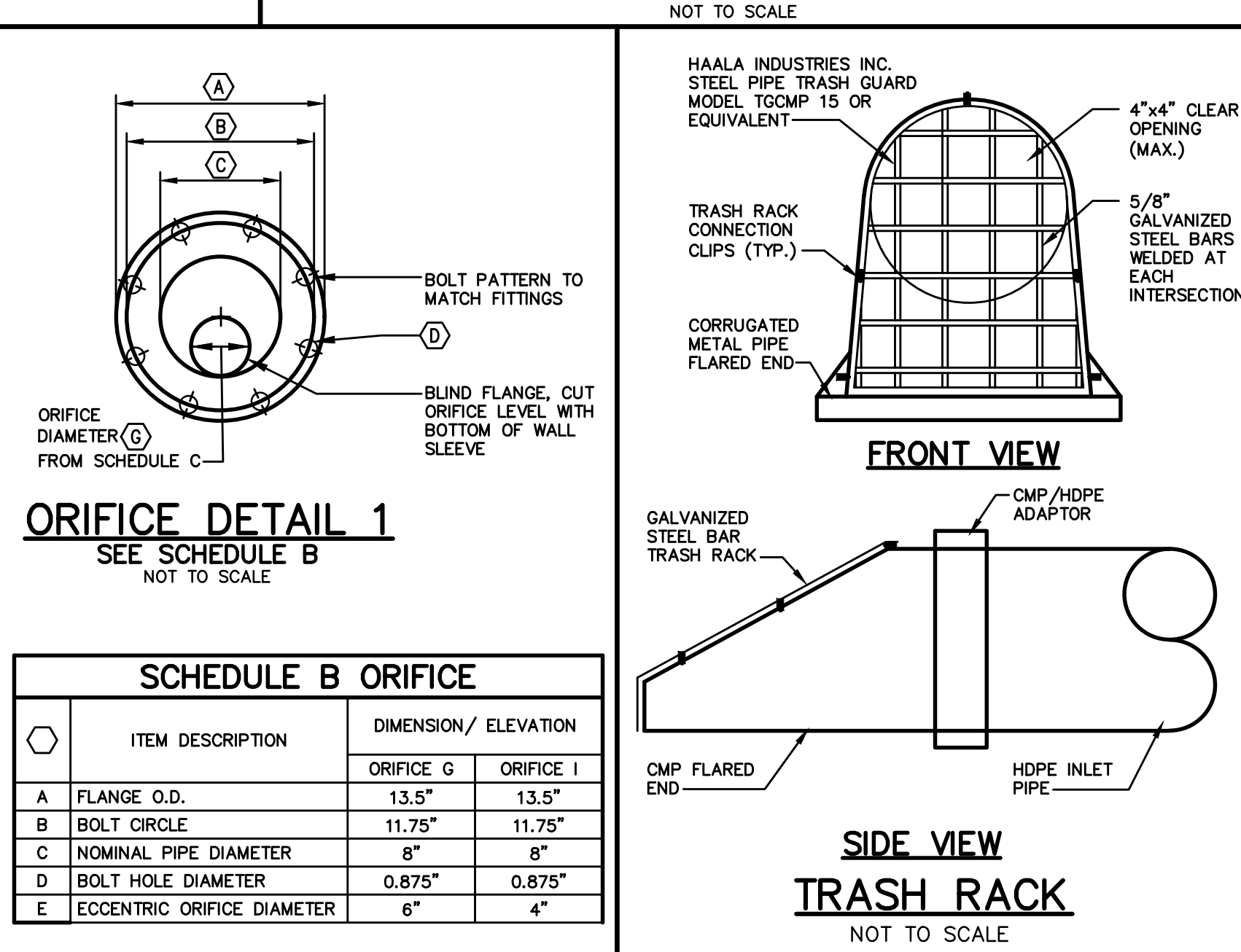
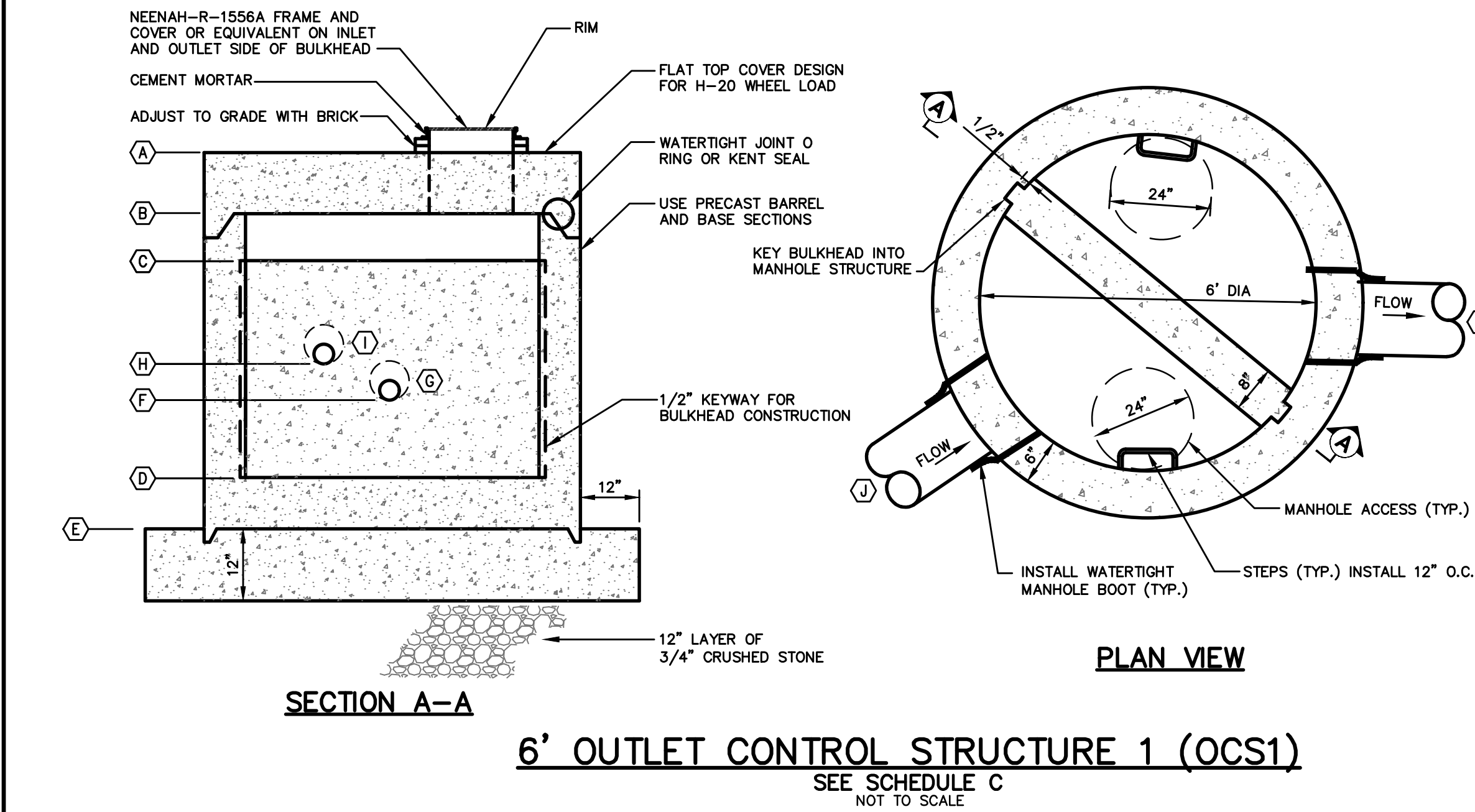


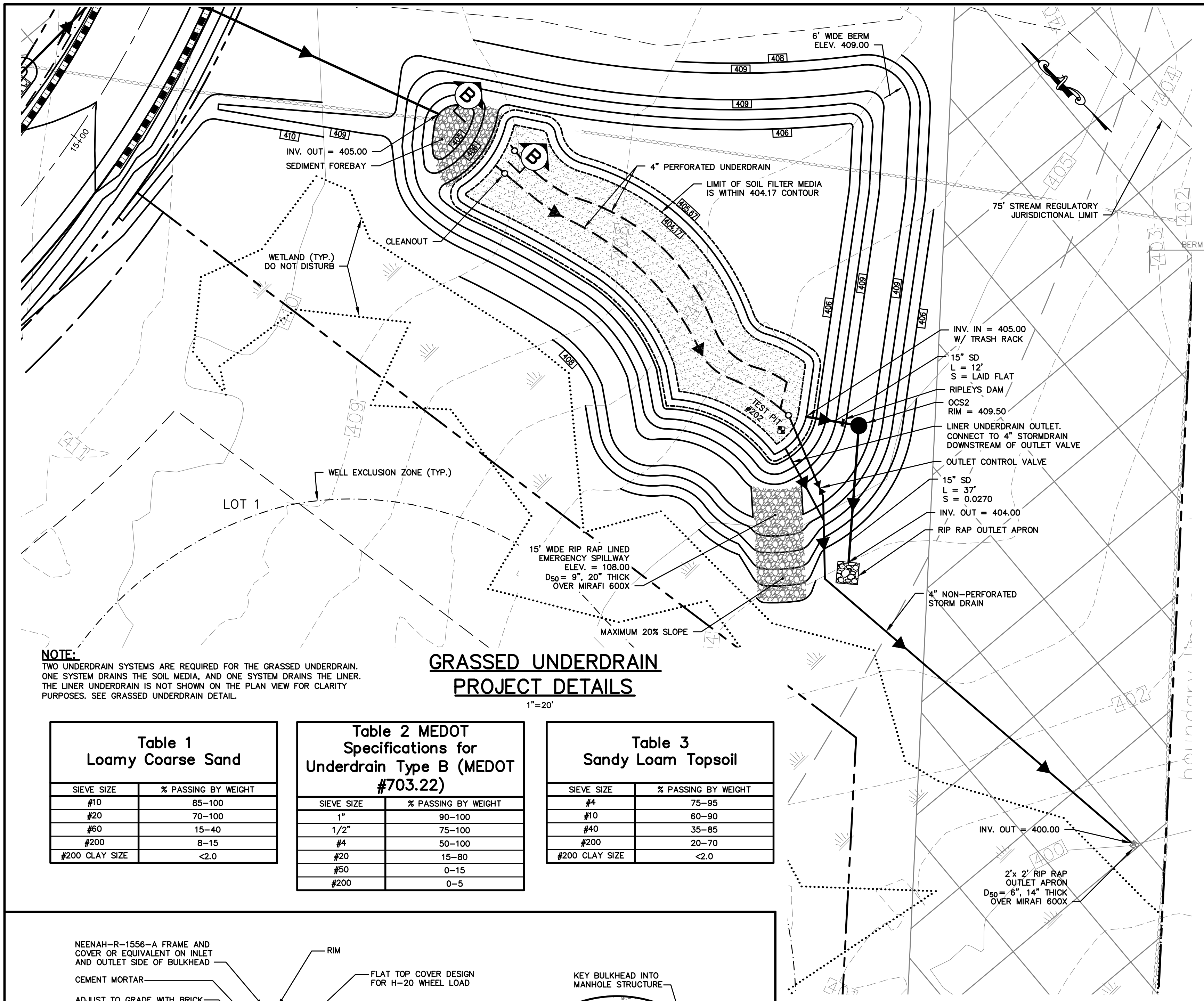
Table 1 Loamy Coarse Sand	
SIEVE SIZE	% PASSING BY WEIGHT
#10	85-100
#20	70-100
#60	15-40
#200	8-15
#200 CLAY SIZE	<2.0

Table 2 MEDOT Specifications for Underdrain Type B (MEDOT #703.22)	
SIEVE SIZE	% PASSING BY WEIGHT
1"	90-100
1/2"	75-100
#4	50-100
#20	15-80
#50	0-15
#200	0-5

Table 3 Sandy Loam Topsoil	
SIEVE SIZE	% PASSING BY WEIGHT
#4	75-95
#10	60-90
#40	35-65
#200	20-70
#200 CLAY SIZE	<2.0

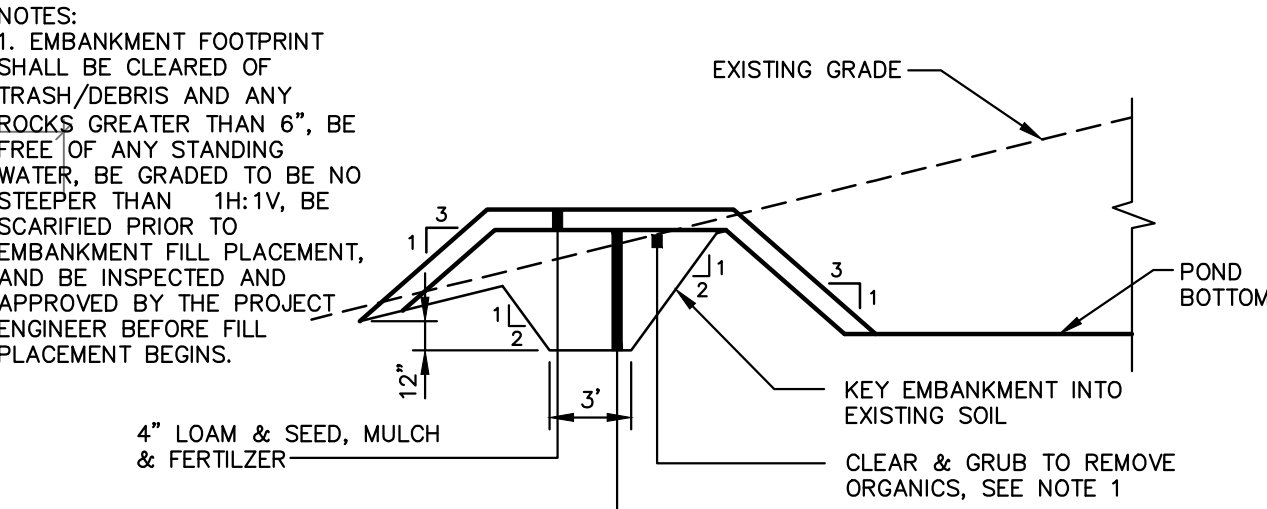
SCHEDULE C	
ITEM DESCRIPTION	ELEVATION
A TOP OF STRUCTURE	400.32
B UNDERSIDE TOP SLAB	399.65
C TOP CONCRETE BULKHEAD	399.12
D MANHOLE INVERT	395.67
E BOTTOM OF STRUCTURE	394.67
F ORIFICE INVERT	397.17
G ORIFICE DIAMETER	6"
H ORIFICE INVERT	397.68
I ORIFICE DIAMETER	4"
J PIPE DIAMETER	15"
K INVERT IN	395.67
L PIPE DIAMETER	15"
M INVERT OUT	397.00





CONSTRUCTION OVERSIGHT

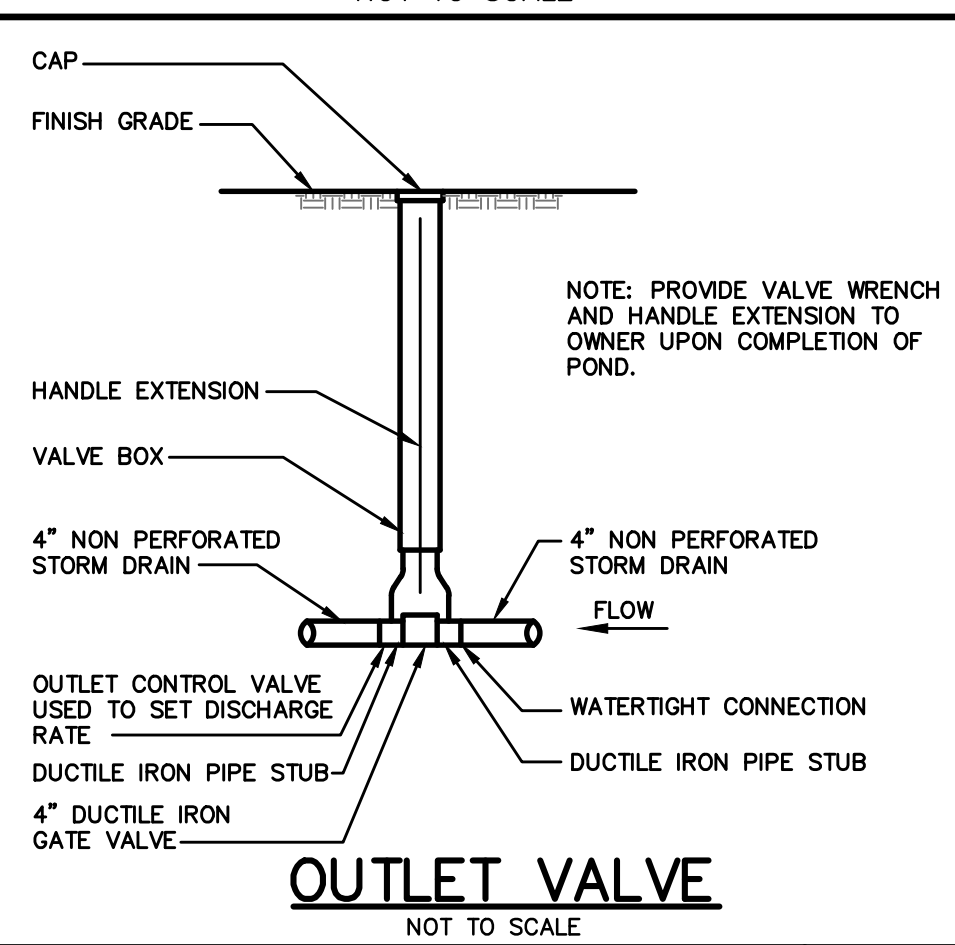
- INSPECTION OF THE FILTER BASIN SHALL BE PROVIDED FOR EACH PHASE OF CONSTRUCTION BY THE DESIGN ENGINEER WITH REQUIRED REPORTING TO THE DEP. AT A MINIMUM, INSPECTIONS WILL OCCUR:
- AFTER PRELIMINARY CONSTRUCTION OF THE FILTER GRADES AND ONCE THE UNDERDRAIN PIPES ARE INSTALLED BUT NOT BACKFILLED.
 - AFTER THE DRAINAGE LAYER IS CONSTRUCTED AND PRIOR TO THE INSTALLATION OF THE FILTER MEDIA.
 - AFTER THE FILTER MEDIA HAS BEEN INSTALLED AND SEEDING.
 - AFTER ONE YEAR TO INSPECT HEALTH OF THE VEGETATION AND MAKE CORRECTIONS.
 - ALL MATERIAL USED FOR THE CONSTRUCTION OF THE FILTER BASIN WILL BE APPROVED BY THE DESIGN ENGINEER AFTER TESTS BY A CERTIFIED LABORATORY SHOW THAT THEY ARE PASSING DEP SPECIFICATIONS.
- NOTE: CONTRACTOR SHALL NOTIFY PROJECT ENGINEER 48 HOURS PRIOR TO THE MILESTONES LISTED ABOVE TO ALLOW FOR INSPECTION.



BERM CONSTRUCTION

SCHEDULE B - EMBANKMENT SCHEDULE	
ITEM DESCRIPTION	DIMENSION/ELEVATION
(A) POND BASE ELEVATION	404.17
(B) PEAK ELEVATION - CHANNEL PROTECTION VOLUME	405.67
(C) PEAK ELEVATION - 2 YEAR STORM	406.34
(D) PEAK ELEVATION - 10 YEAR STORM	407.10
(E) PEAK ELEVATION - 25 YEAR STORM	407.70
(F) TOP OF BERM	409.00

TYPICAL POND CROSS SECTION



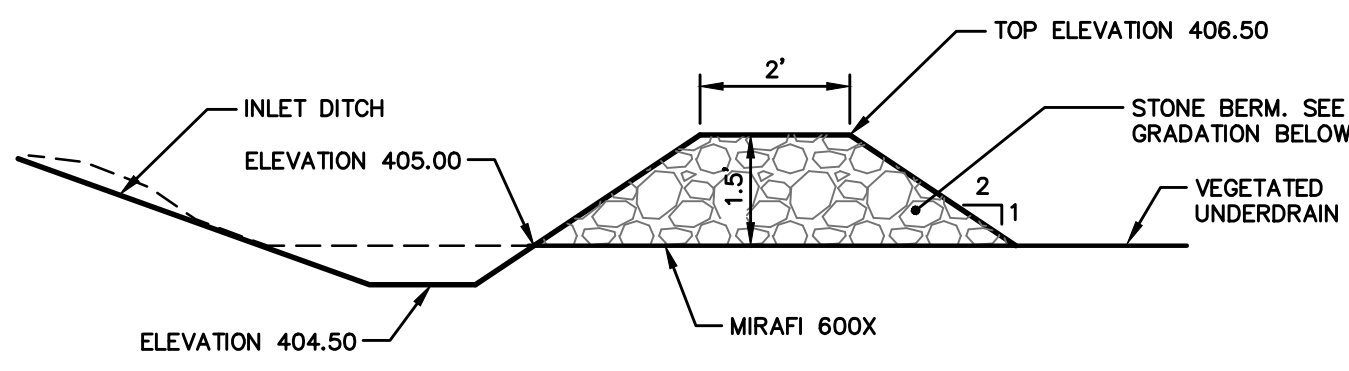
GRASSED UNDERDRAIN NOTES:

SOIL SPECIFICATIONS:

- THE SOIL FILTER MEDIA SHALL BE A LAYERED SYSTEM CONSISTING OF THE FOLLOWING FROM THE BOTTOM:
 - 12" OF LOAMY COARSE SAND, SEE TABLE 1.
 - 2" LAYER OF TOPSOIL (SEE "C" BELOW) ROTOTILLED INTO THE LOAMY COARSE SAND LAYER.
 - 6" OF NON-CLAYEY, LOAMY TOPSOIL SUCH AS USDA SANDY LOAM TOPSOIL WITH 5-8% HUMIFIED ORGANIC MATTER. SUPERHUMUS OR EQUIVALENT MAY BE ADDED TO THE TOPSOIL TO INCREASE ORGANIC CONTENT, SEE TABLE 3.
 - SOIL FILTER MEDIA MIXTURE SHALL HAVE A PERMEABILITY OF 2.4 IN./HR. TO 4 IN./HR UPON COMPACTION BETWEEN 90% AND 92% STANDARD PROCTOR (ASTM D698).
- SUBMITTALS:
- SUBMIT RESULTS OF FIELD AND LABORATORY TESTING TO PROJECT ENGINEER.
 - SUBMIT 75 lb. SAMPLE OF EACH TYPE OF MATERIAL: SUBMIT IN AIR TIGHT CONTAINERS TO PROJECT ENGINEER.
 - THE FOLLOWING MATERIAL SHALL BE SUBMITTED:
 - SAND.
 - UNDERDRAIN BEDDING MATERIAL.
 - PERFORM A SIEVE ANALYSIS CONFORMING TO ASTM C136 - STANDARD TEST METHOD FOR SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES; 1996a ON EACH TYPE OF THE SAMPLE MATERIAL AND SUBMIT RESULTS TO PROJECT ENGINEER.
 - PERFORM A PERMEABILITY TEST ON THE SOIL FILTER MEDIA MIXTURE CONFORMING TO ASTM D2434 WITH THE MIXTURE COMPACTED TO 90% TO 92% OF MAXIMUM DRY DENSITY BASED ON ASTM D698. SUBMIT RESULTS TO THE PROJECT ENGINEER.
 - PERFORM ONE COMPACTION DENSITY TEST ON THE IN PLACE SOIL FILTER FOR EVERY 2,000 SQUARE FEET OF FILTER SURFACE AREA. TEST SHALL CONFORM TO ASTM D 2922 - STANDARD TEST METHOD FOR DENSITY OF SOIL AND SOIL-AGGREGATE IN PLACE BY NUCLEAR METHODS (SHALLOW DEPTH); 1996. SUBMIT RESULTS TO THE PROJECT ENGINEER.

CONSTRUCTION:

- SOIL FILTER MEDIA AND UNDERDRAIN BEDDING MATERIAL SHALL BE COMPACTED TO BETWEEN 90% AND 92% STANDARD PROCTOR.
- PERFORATED UNDERDRAIN PIPE SHALL BE 4" SLOTTED PIPE. SPACED 15 FEET ON CENTER MAXIMUM.
- TRIBUTARY AREAS SHALL BE STABILIZED PRIOR TO INSTALLATION OF THE SOIL FILTER MEDIA MIXTURE AND UNDERDRAIN. STABILIZED IS DEFINED AS PAVED IF IN A PARKING AREA OR ROADWAY, AND 90% GRASS CATCH IF IN A VEGETATED AREA.
- OUTFLOW OF THE VEGETATED UNDERDRAIN SHALL BE CONTROLLED BY A 4" DUCTILE IRON GATE VALVE WITH VALVE WRENCH AND EXTENSION (AVAILABLE FROM E.J. PRESCOTT OR EQUIVALENT). A THREE PIECE VALVE BOX (AVAILABLE FROM E.J. PRESCOTT OR EQUIVALENT) SHALL BE INSTALLED OVER THE VALVE.
- ALL EQUIPMENT USED WITHIN THE LIMITS OF THE VEGETATED UNDERDRAIN SHALL BE LOW GROUND PRESSURE VEHICLES (LESS THAN 2.0 PSI) WHEN FULLY LOADED.
- UPON COMPLETION OF THE INSTALLATION OF THE SOIL FILTER MEDIA AND THE ESTABLISHMENT OF A 90% CATCH OF GRASS OVER THE FILTER MEDIA, THE CONTRACTOR SHALL FLOOD THE GRASSED UNDERDRAIN TO THE DESIGN ELEVATION WITH CLEAN WATER AND ADJUST THE VALVE TO OBTAIN A 24 HOUR TO 32 HOUR RELEASE TIME.



BERM STONE SIZE	
SIEVE DESIGNATION (US CUSTOMARY)	PERCENT BY WEIGHT PASSING
12 IN	100
6 IN	84-100
3 IN	68-83
1 IN	42-55
NO. 4	8-12

SEDIMENT FOREBAY - SECTION B-B

Table 1
Loamy Coarse Sand

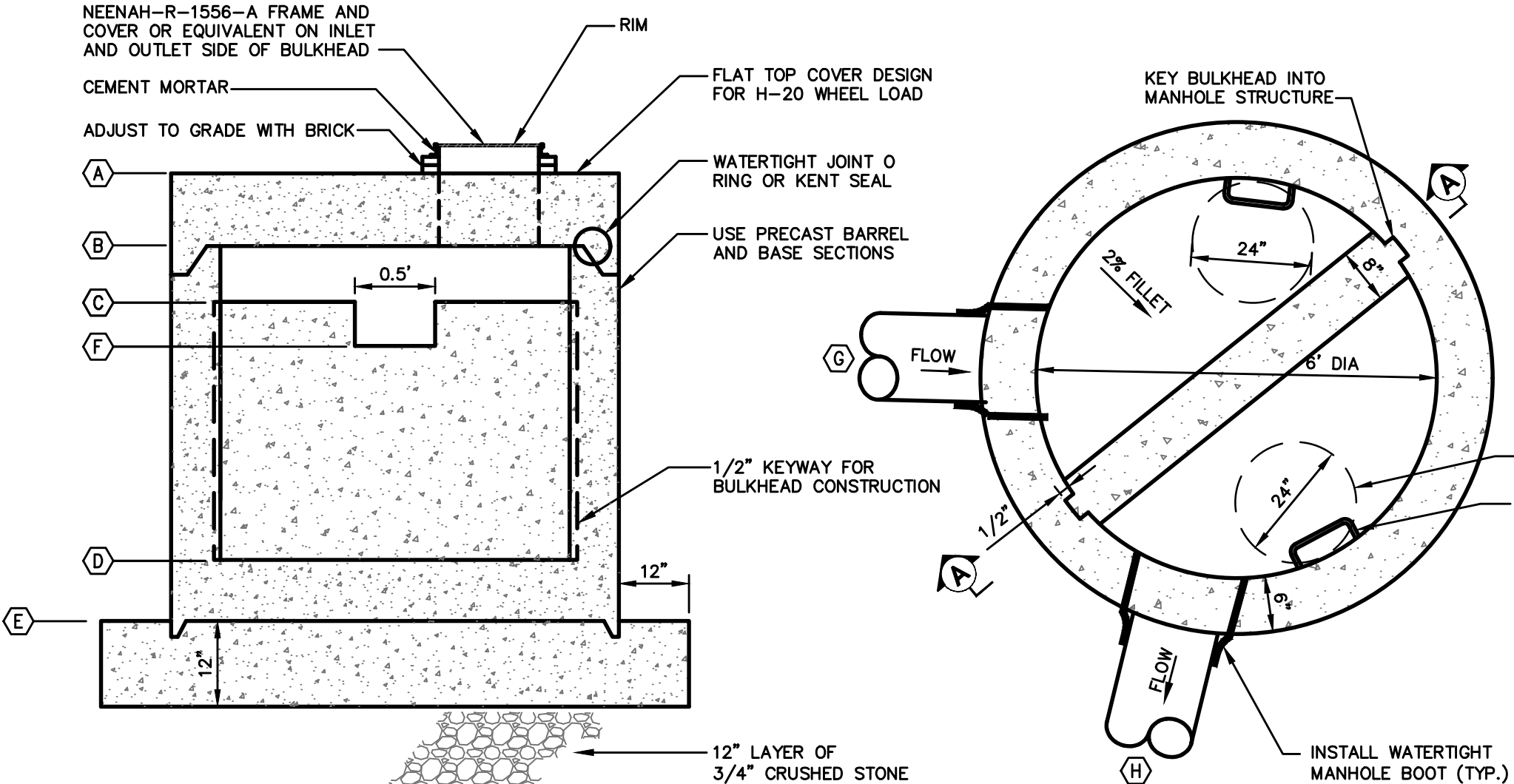
SIEVE SIZE	% PASSING BY WEIGHT
#10	85-100
#20	70-100
#60	15-40
#200	8-15
#200 CLAY SIZE	<2.0

Table 2 MEDOT
Specifications for
Underdrain Type B (MEDOT
#703.22)

SIEVE SIZE	% PASSING BY WEIGHT
1"	90-100
1/2"	75-100
#4	50-100
#20	15-80
#50	0-15
#200	0-5

Table 3
Sandy Loam Topsoil

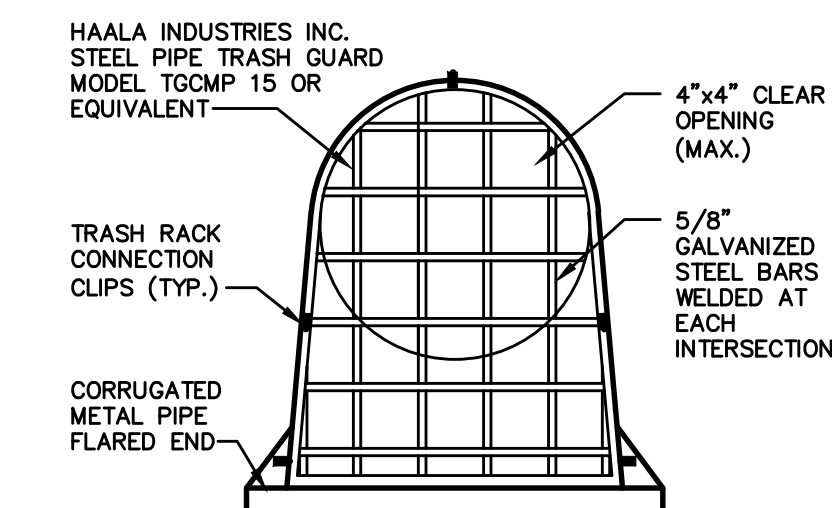
SIEVE SIZE	% PASSING BY WEIGHT
#4	75-95
#10	60-90
#40	35-85
#200	20-70
#200 CLAY SIZE	<2.0



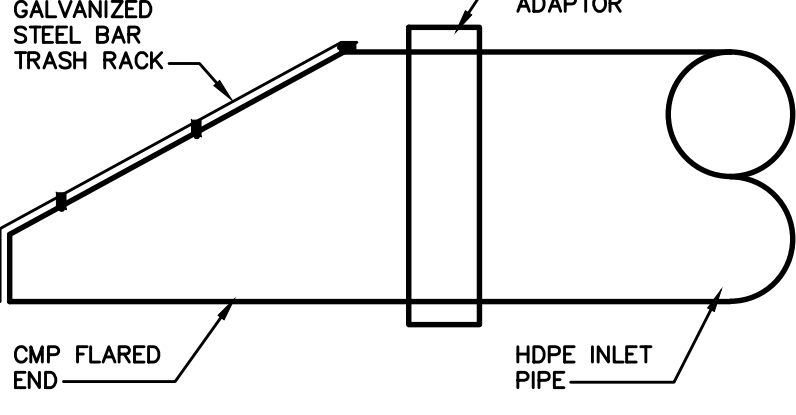
6' OUTLET CONTROL STRUCTURE 1 (OCS1)

SCHEDULE A	
ITEM DESCRIPTION	GRASSED UNDERDRAIN DIMENSION/ELEVATION
A CHANNEL PROTECTION VOLUME STAGE	405.67
B TOP SOIL FILTER	404.17
C TOP UNDERDRAIN BEDDING STONE	402.67
D PIPE INVERT: 4" PERF. UD	402.00
E BOTTOM UNDERDRAIN BEDDING	401.67
F LINER UNDERDRAIN INVERT	401.00

SCHEDULE C	
ITEM DESCRIPTION	ELEVATION
A TOP OF STRUCTURE	409.32
B UNDERSIDE TOP SLAB	408.65
C TOP CONCRETE BULKHEAD	408.00
D MANHOLE INVERT	405.00
E BOTTOM OF STRUCTURE	404.00
F WEIR CREST	405.90
G PIPE DIAMETER	15"
H INVERT IN	405.00
I PIPE DIAMETER	15"
J INVERT OUT	405.00



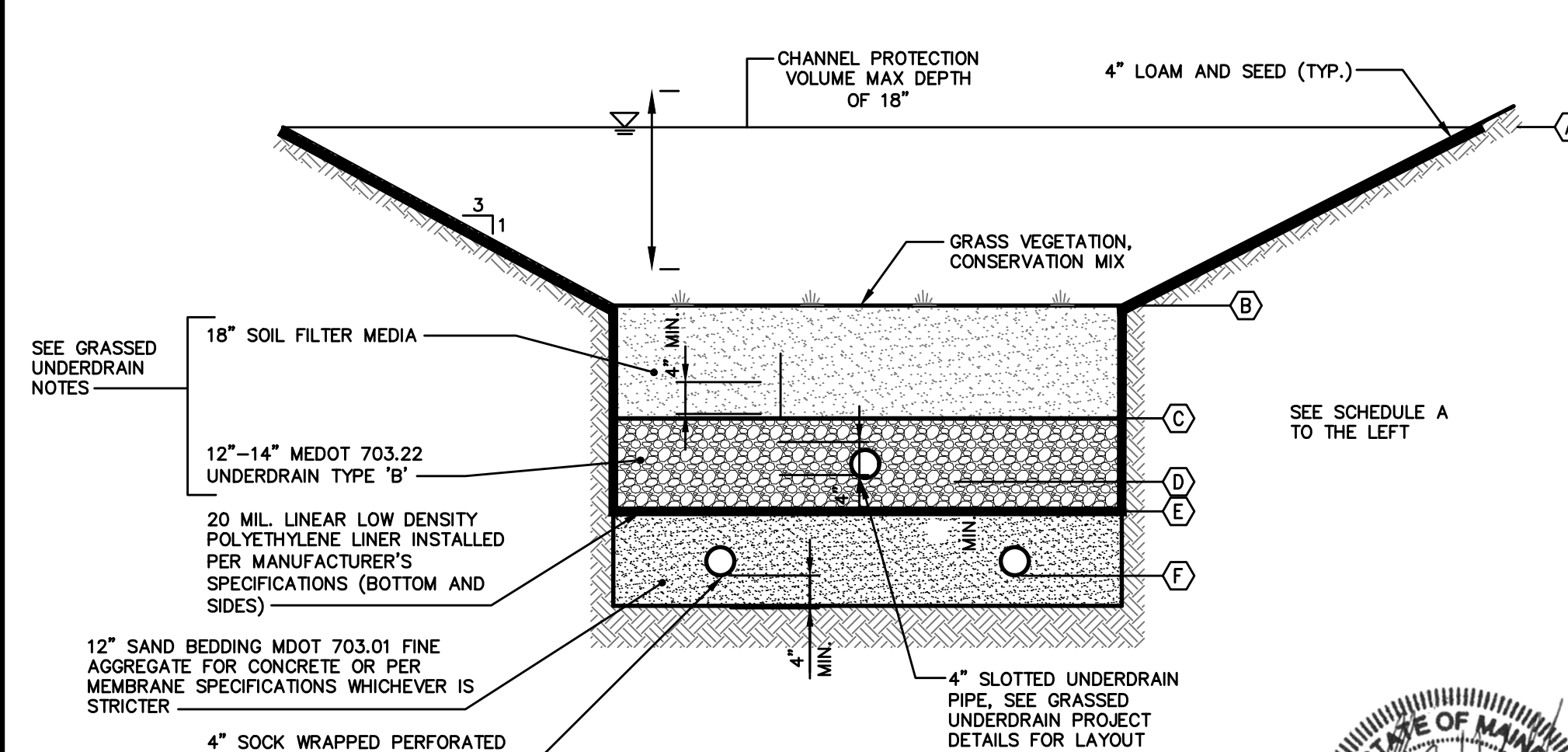
FRONT VIEW



SIDE VIEW

TRASH RACK

NOT TO SCALE



GRASSED UNDERDRAIN DETAIL

NOT TO SCALE

GRASS VEGETATION	
CREeping RED FESCUE	20 LBS/ACRE
TALL FESCUE	20 LBS/ACRE
BIRDFOOT TREFOIL	8 LBS/ACRE



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Design: JWA	Draft: LAN	Date: DEC 2017
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Drawing Name:	Grassed Underdrain Filter #2 Plan and Details
Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.
13

SEEDING PLAN

Project: Orchard Road Subdivision

Site Location: Orchard Road, Cumberland, ME

☐ Permanent Seeding ☒ Temporary Seeding

1. Instruction on preparation of soil: Prepare a good seed bed for planting method used.
2. Apply lime as follows: ____ # / acres, OR 138 # /M Sq. Ft.
3. Fertilize with ____ pounds of ____ N-P-K/ac. OR 13.8 pounds of 10-10-10 N-P-K/M Sq. Ft.
4. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
5. Seed with the following mixture:
50% Winter Rye
50% Annual Rye

6. Mulching instructions: Apply at the rate of ____per acre, OR 75 pounds per M. Sq. Ft.

	Amount	Unit # Tons, Etc.
7. TOTAL LIME	138	#/1000 sq. ft.
8. TOTAL FERTILIZER	13.8	#/1000 sq. ft.
9. TOTAL SEED	1.03	#/1000 sq. ft.
10. TOTAL MULCH	75	#/1000 sq. ft.
11. TOTAL other materials, seeds, etc.		
12. REMARKS		

Spring seeding is recommended; however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to August 5 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

SEEDING PLAN

Project: Orchard Road Subdivision

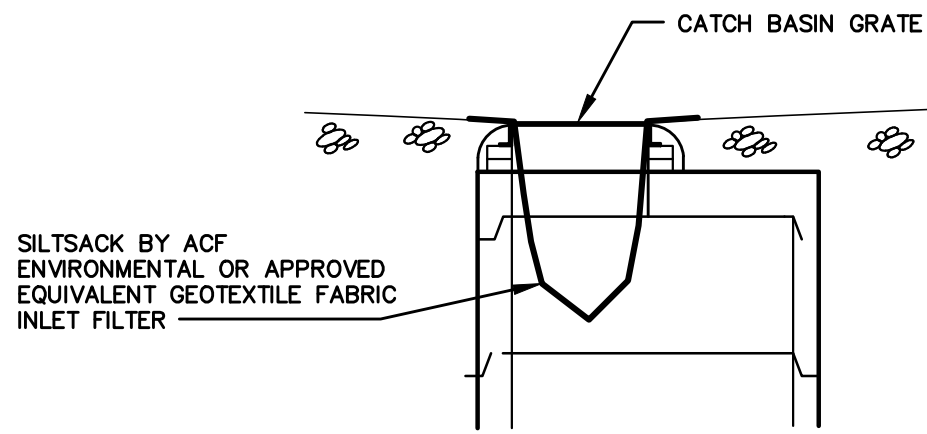
Site Location: Orchard Road, Cumberland, ME

☒ Permanent Seeding ☐ Temporary Seeding

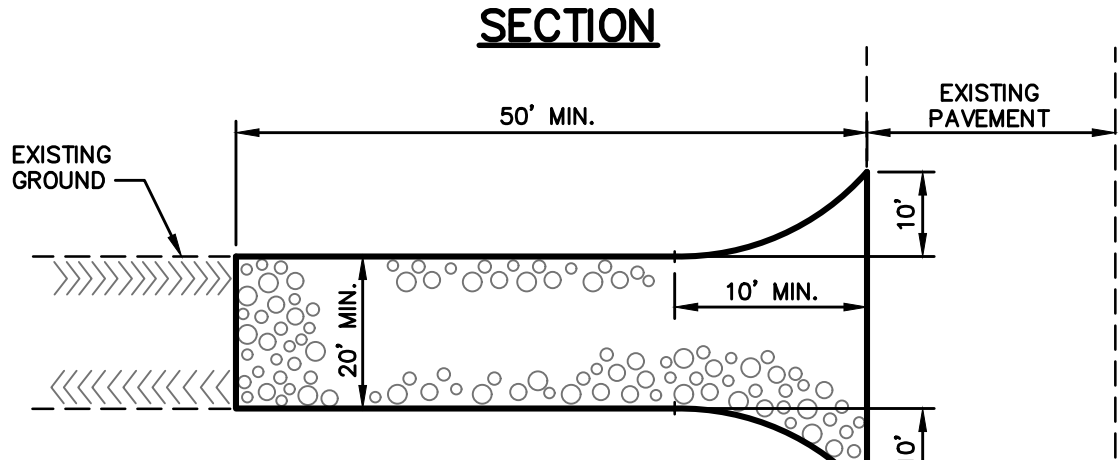
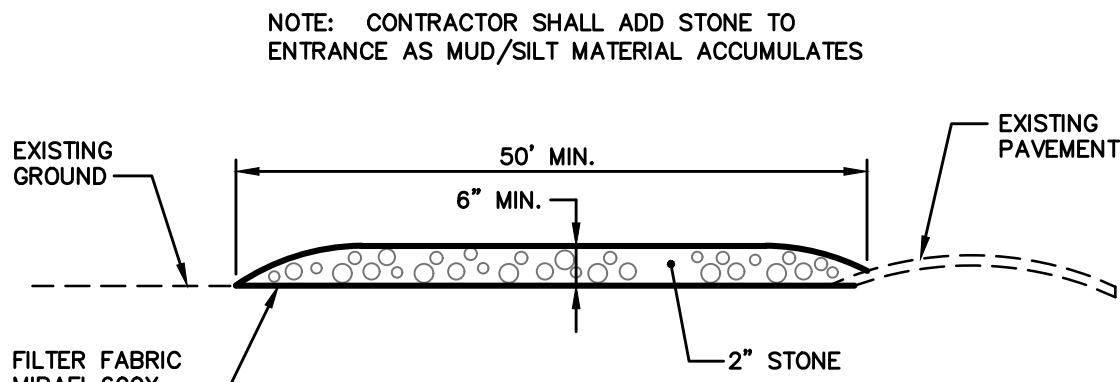
1. Instruction on preparation of soil: Prepare a good seed bed for planting method used.
2. Apply lime as follows: ____ # / acres, OR 138 # /M Sq. Ft.
3. Fertilize with ____ pounds of ____ N-P-K/ac. OR 18.4 pounds of 10-20-20 N-P-K/M Sq. Ft.
4. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
5. Seed with the following mixture:
40% Creeping Red Fescue
30% Charger II Perennial Ryegrass
20% KenBlue Kentucky Bluegrass
10% Tiffany Chewings Fescue
6. Mulching instructions: Apply at the rate of ____per acre, OR 75 pounds per M. Sq. Ft.

	Amount	Unit # Tons, Etc.
7. TOTAL LIME	138	#/1000 sq. ft.
8. TOTAL FERTILIZER	18.4	#/1000 sq. ft.
9. TOTAL SEED	1.03	#/1000 sq. ft.
10. TOTAL MULCH	75	#/1000 sq. ft.
11. TOTAL other materials, seeds, etc.		
12. REMARKS		

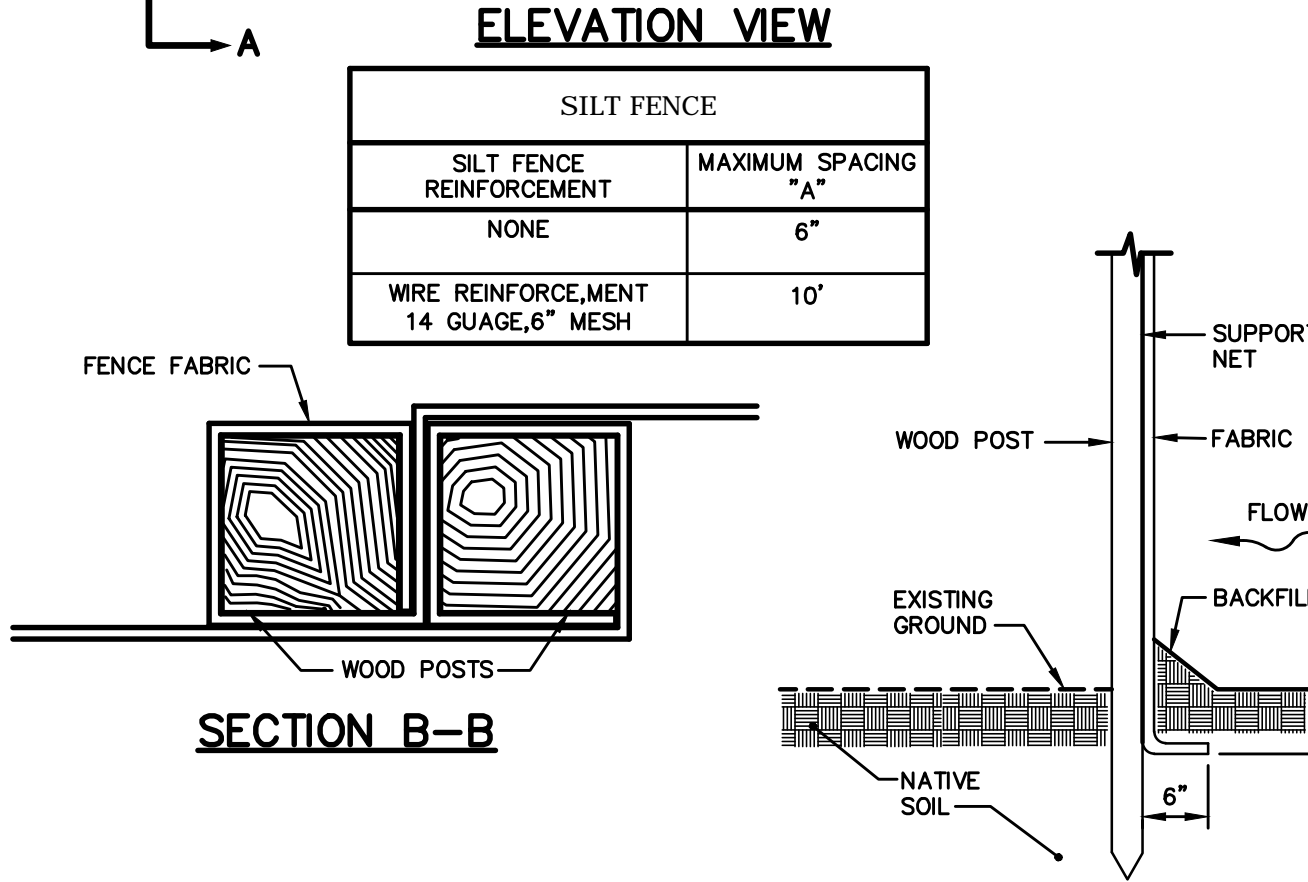
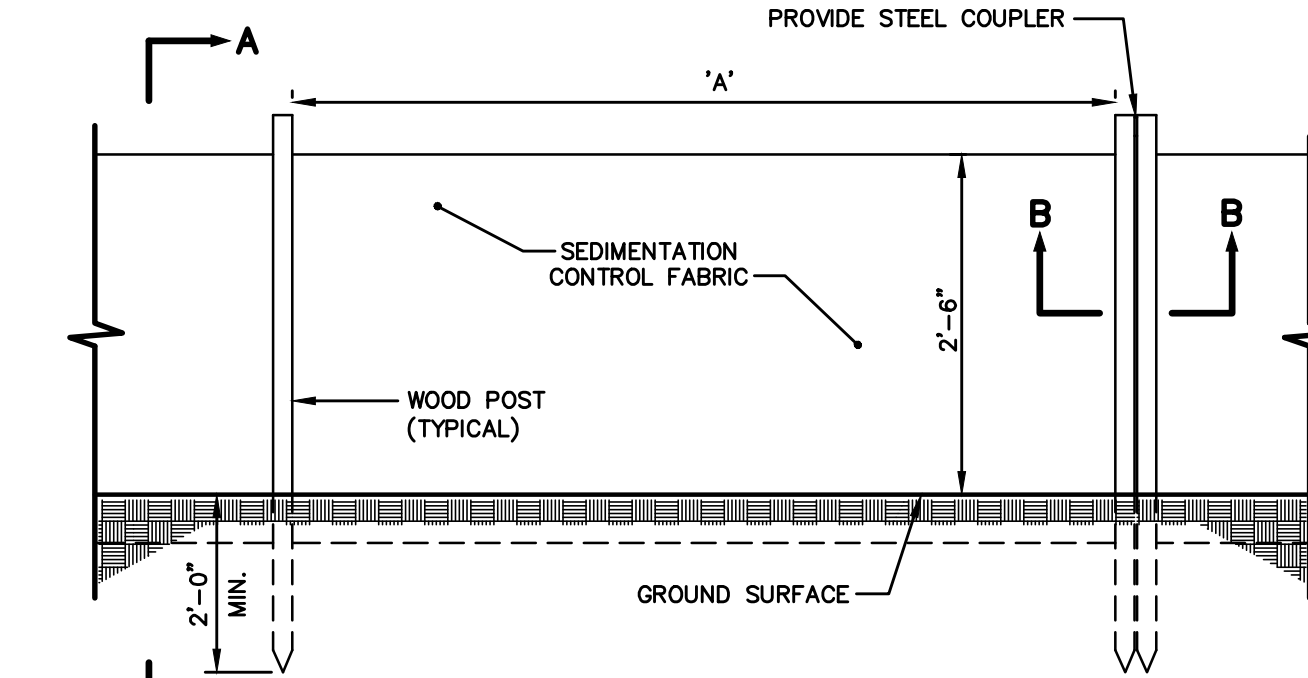
Spring seeding is recommended; however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to August 5 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.



CATCH BASIN INLET FILTER
NOT TO SCALE

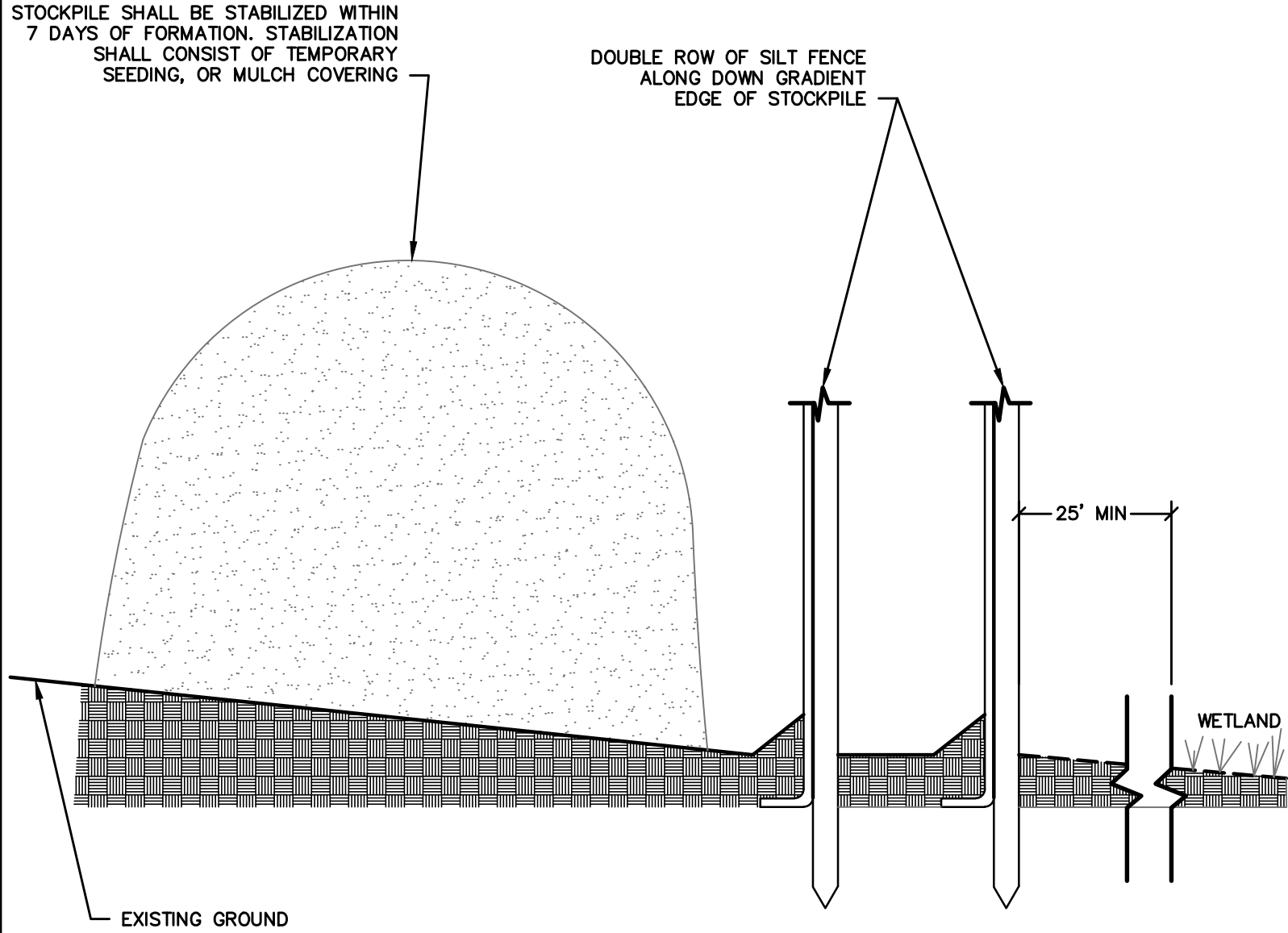


SECTION
PLAN VIEW
STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE

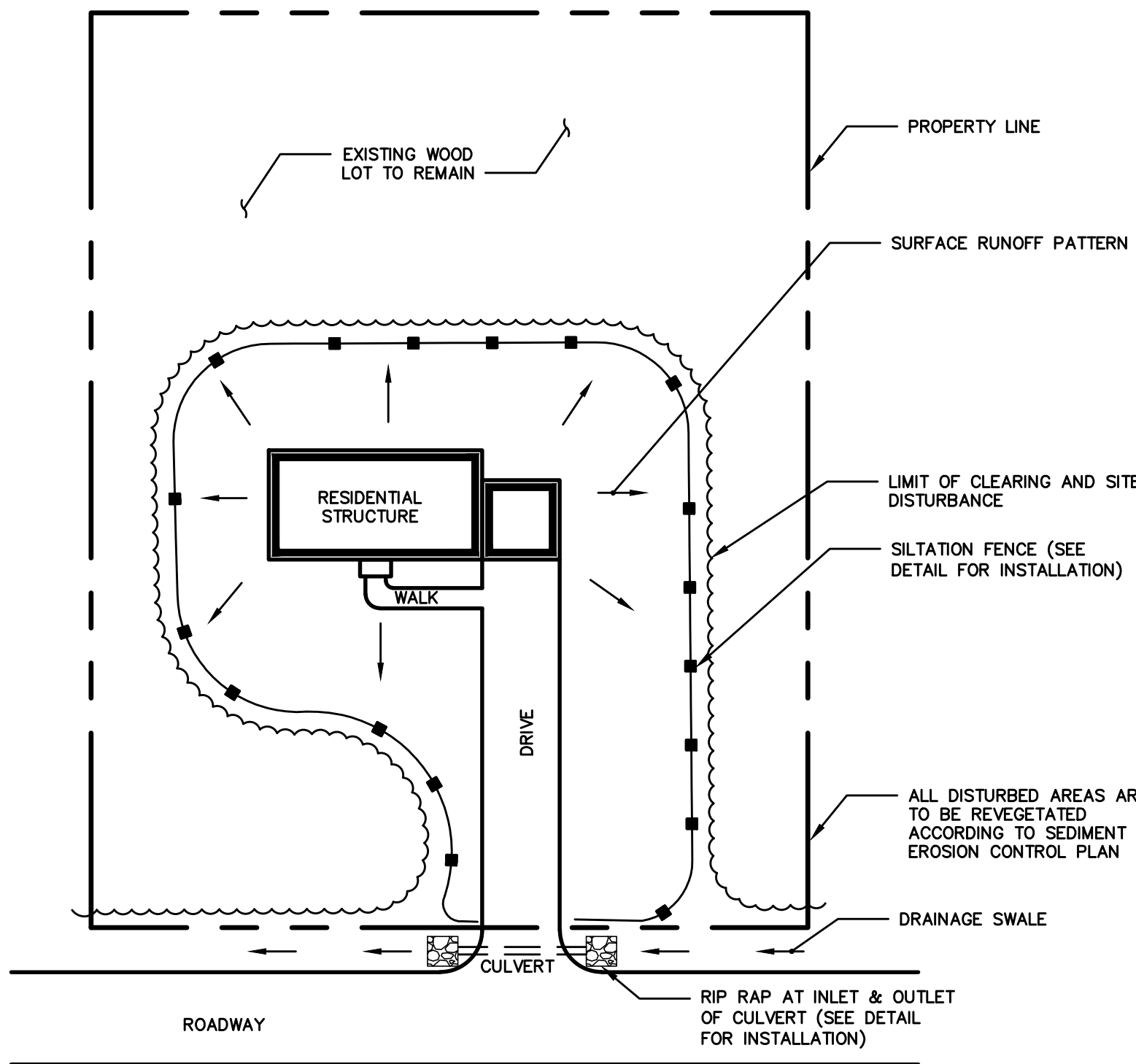


SILT FENCE	
SILT FENCE REINFORCEMENT	MAXIMUM SPACING "A"
NONE	6"
WIRE REINFORCEMENT	
14 GAUGE, 6" MESH	10'

SECTION B-B
SECTION A-A
SILTATION FENCE
NOT TO SCALE

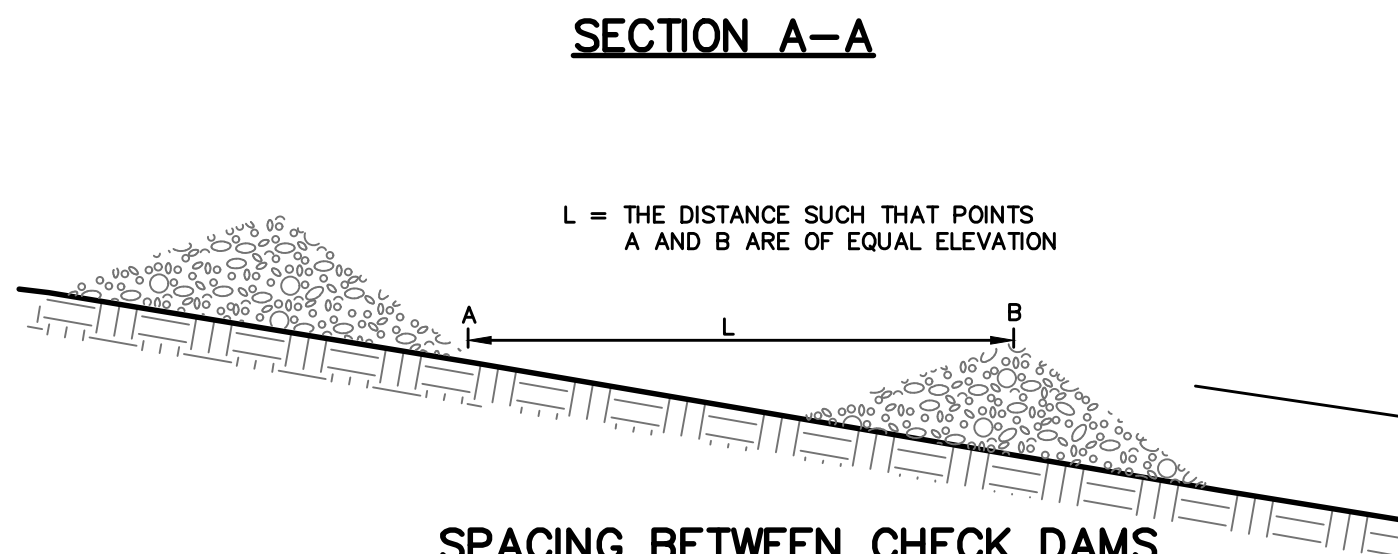
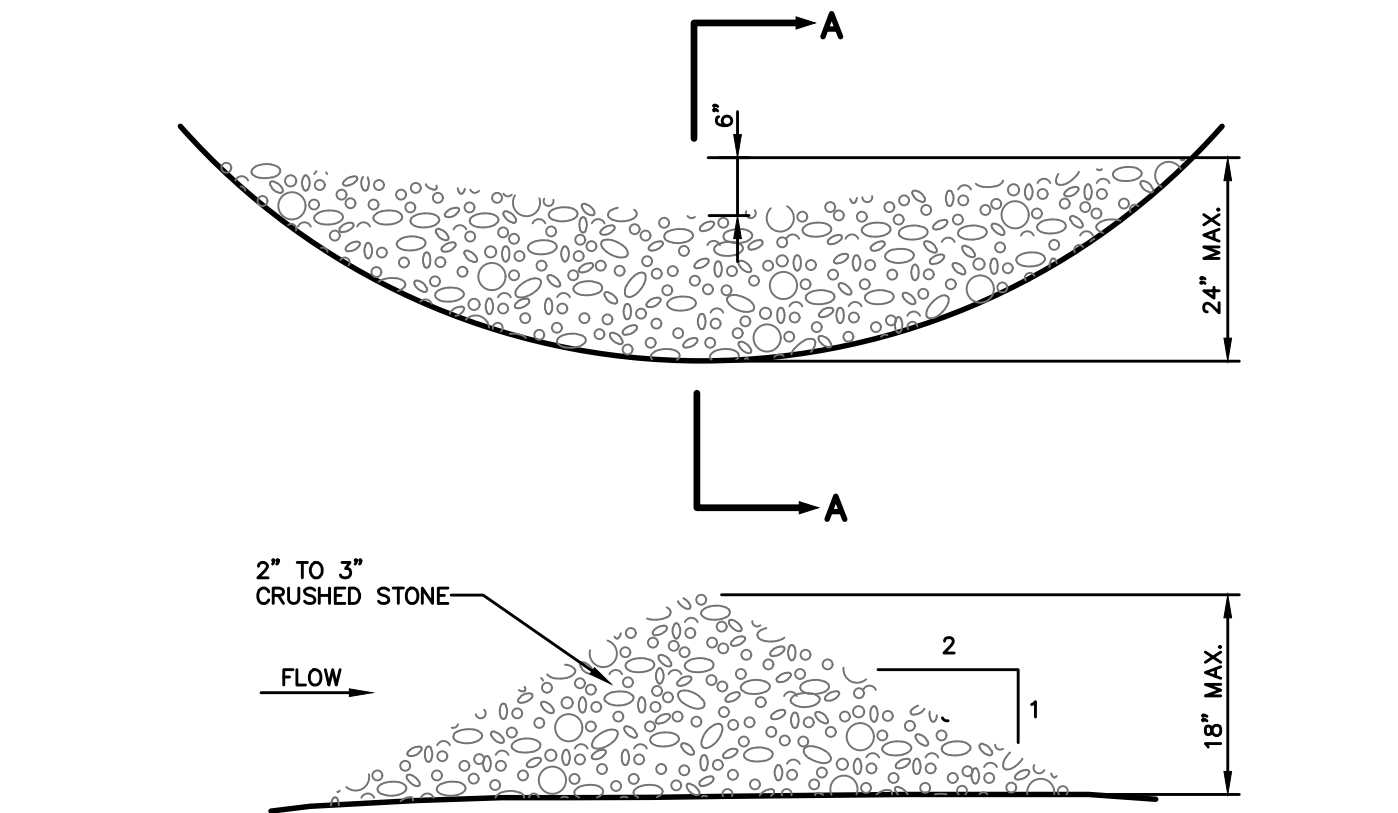


STOCKPILE
NOT TO SCALE



INSPECTION NOTES FOR LOT GRADING AND DRIVEWAY LOCATION
INSPECTIONS BY A PROFESSIONAL ENGINEER SHALL CONSIST OF A VISIT TO THE SITE PRIOR TO CONSTRUCTION TO CONSULT WITH THE EARTHWORK CONTRACTOR AND A POST CONSTRUCTION MEETING TO CONFIRM GRADING ON LOTS AND FOR ALL DRIVEWAYS TO ENSURE RUNOFF IS DIRECTED ACCORDINGLY TO PLANS AND TO OVERSEE THE RESTABILIZATION OF THE LOT INTO A VEGETATED COVER.

TYPICAL EROSION CONTROL
MEASURES FOR DWELLING UNITS
NOT TO SCALE

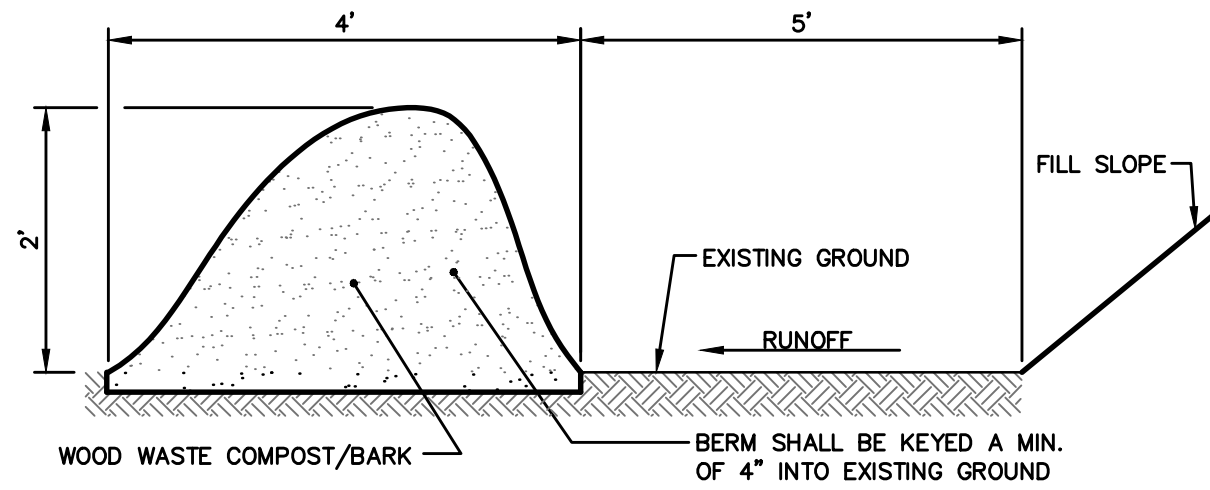


SPACING BETWEEN CHECK DAMS

S _p (FT./FT.)	L (FT.)
0.020	75
0.030	50
0.040	40
0.050	30
0.080	20
0.100	10

STONE CHECK DAM
NOT TO SCALE

- NOTES:
1. THE WOOD WASTE COMPOST/BARK MIX SHALL CONFORM TO THE FOLLOWING STANDARDS:
A. MOISTURE CONTENT - 30-60%
B. pH - 5.0 - 8.0
C. SCREEN SIZE - 100% LESS THAN 3", MAX. 70% LESS THAN 1"
D. NO LESS THAN 40% ORGANIC MATERIAL (DRY WEIGHT) BY LOSS OF IGNITION.
E. NO STONES LARGER THAN 2" IN DIAMETER.
F. SILTS, CLAYS OR SUGAR SANDS ARE NOT ACCEPTABLE IN THE MIX.
 2. THE COMPOST BERM SHALL BE PLACED, UNCOMPACTED, ALONG A RELATIVELY LEVEL CONTOUR.
 3. THE WOOD WASTE COMPOST/BARK FILTER BERM MAY BE USED IN LIEU OF SILTATION FENCE, AT THE TOE OF SHALLOW SLOPES, ON FROZEN GROUND, LEDGE OUT CROPS, VERY ROOTED FORESTED AREA OR AT THE EDGE OF GRAVEL PARKING AREAS.
 4. BERMS SHALL REMAIN IN PLACE UNTIL UPSTREAM AREA IS COMPLETED OR 70% CATCH OF VEGETATION IS ATTAINED. BERMS SHALL BE REMOVED BY SPREADING SUCH THAT NATIVE EARTH CAN BE SEEN BELOW.
 5. WOODWASTE COMPOST BARK FILTER SHALL NOT BE USED IN WETLAND AREAS.



WOOD WASTE COMPOST/BARK
FILTER BERM DETAIL
NOT TO SCALE

NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.



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Rev.	Date	Revision

Preliminary/Final Subdivision Application	5-22-18	WCH
MDEP/ACOE Permitting	12/22/17	WCH
Preliminary Subdivision Application	10-31-17	WCH
Issued For	Date	By

Design: JWA	Draft: LAN	Date: DEC 2017
Checked: WCH	Scale: NTS	Job No.: 3236.01
File Name: 3236-DETAILS.dwg		
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Drawing Name:	Erosion Control Details
Project:	Orchard Road Subdivision Cumberland, Maine
Client:	TZ Properties Falmouth, Me 04105

Drawing No.
14

