



PLANNING BOARD - AMENDED
AGENDA • JANUARY 14, 2021

Planning Board

Online Via Microsoft Teams

7:00 PM

Regular Meeting

Link Posted to graymaine.org Day of Meeting

I. MEETING COMMENCES

a. Roll Call

II. MINUTES APPROVAL

a. Planning Board - Regular Meeting - November 12, 2020 7:00 PM

III. BOARD BUSINESS

a. 2021 Election of Chair & Vice-Chair

IV. INFORMATION EXCHANGE

a. Commercial Solar Energy Project Plan Change

V. PUBLIC HEARINGS

a. Chapter 402 Ordinance Revisions - Farmers' Market

Proposed amendments to the Town of Gray Zoning Ordinance (Chapter 402) to add Farmers' Market as a new Use and the associated standards.

b. Verrill Farm Open Space Subdivision

A request by Ambrosia RE & Investment LLC for Preliminary Plan Review for a proposed 14-lot Open Space Subdivision located on a parcel currently owned by Ernest Verrill & Linda Pelletier at 194 +/- Shaker Road as shown on Tax Map 20, Lot 15-29 in the Rural Residential & Agricultural and Stream Protection (Shoreland) Zoning Districts.

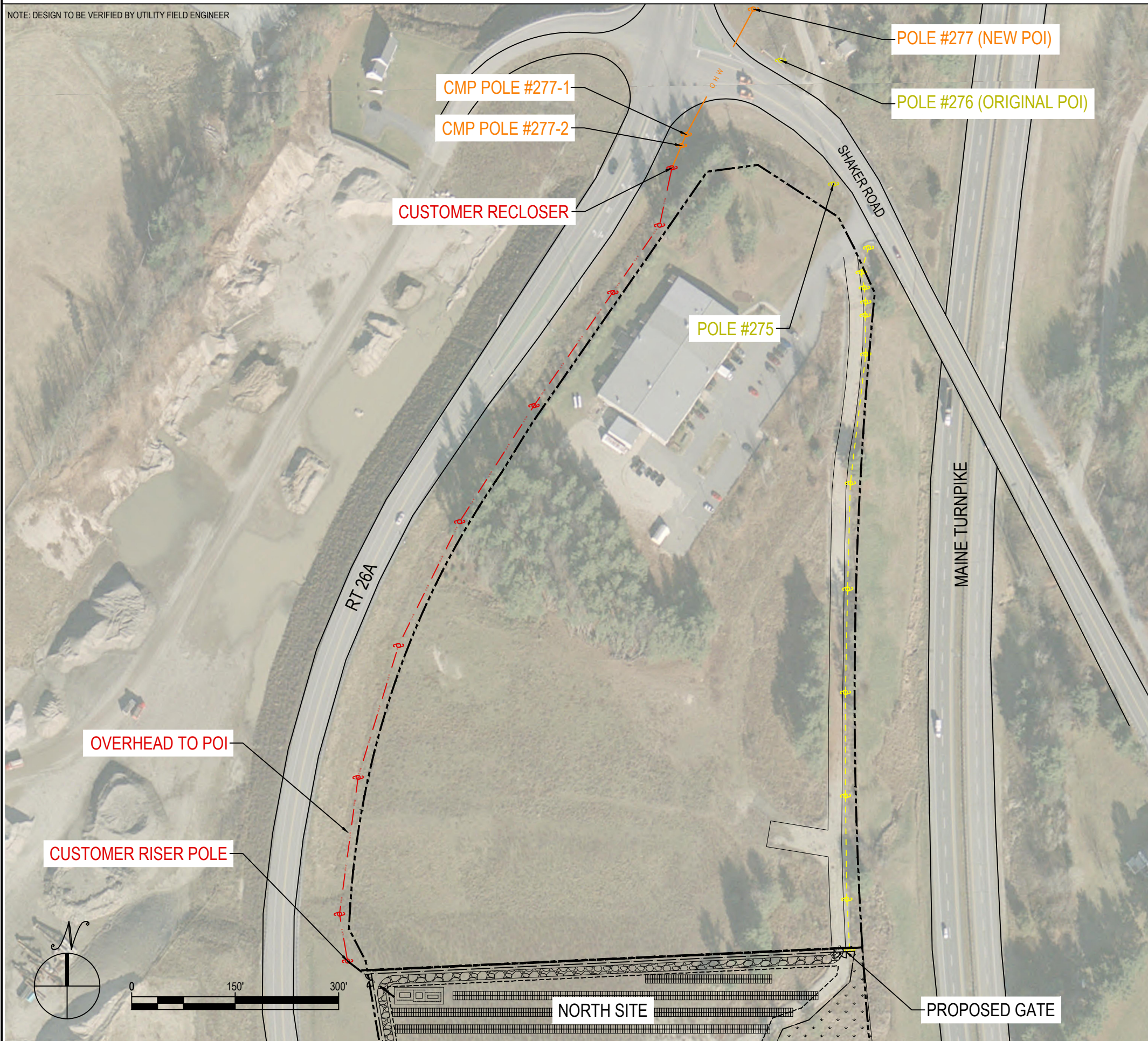
VI. ADJOURNMENT

** The Town of Gray is an equal opportunity employer and complies with all applicable equal access to public accommodations law. If you are planning to attend a Town Council or Town committee or board meeting and need assistance with a physical disability, please contact the Town Manager's office at least 48 hours in advance of the meeting to have the Town assist you. 657-3339. TTY 657-3931.*

Exhibit A

GRAY - 4.99MWAC - PV PROJECT

NOTE: DESIGN TO BE VERIFIED BY UTILITY FIELD ENGINEER



GRAY
97 SHAKER RD
GRAY, ME 04039

PROJECT NUMBER:
#ME-011

REV	DATE	RELEASE LEVEL	DRAWN		CHECKED	
			LS	ML	LS	ML
0	10/08/2019	PROPOSED LAYOUT				
1	11/18/2019	PROPOSED LAYOUT				
2	12/11/2019	PROPOSED LAYOUT				
3	01/23/2020	PROPOSED LAYOUT				
4	05/13/2020	PROPOSED LAYOUT				
5	11/19/2020	PROPOSED LAYOUT (X OPTION)				

SCALE:
VALID ONLY WHEN PLOTTED
ANSI FULL BLEED B 11" X 17"

ISMSOLAR
ISM SOLAR DEVELOPMENT, LLC
940 WATERMAN AVE
EAST PROVIDENCE, RI 02914
401-435-7900

NOTE:
PRELIMINARY DRAWING ONLY
NOT FOR CONSTRUCTION

PV-L0
PROPOSAL LAYOUT
(DOT IX OPTION)

Exhibit B

State of Maine
Department of Transportation, Augusta, Maine

LOCATION PERMIT

December 07, 2020

(14 DAY PERMIT BY RULE)

Permit No.: 130533

Pursuant to Title 35 A, M.S.R.A. Sec. 2503, **ISM SOLAR GRAY, LLC**, successors and assigns is hereby granted a Location Permit to construct, maintain and operate facilities in **Gray**, as described below. All work shall be accomplished in accordance with the conditions specified herein, and attached hereto. Any requested modification to this permit must be approved by the undersigned MaineDOT representative.

Route/Road/SA: 0026a / Maine Wildlife Parkway / State Aid not coded

Type of Work and Location: Installation Of Seven (7) Utility Poles On Route 26a (Maine Wildlife Parkway), Beginning At A Point Approximately 1,336 Feet Southwest Of The Intersection With Route 26 And Route 26a And Extending In A Northerly Direction For A Distance Of 1,366 Feet. Construction Expected To Start January 1, 2021 And Be Complete September 30, 2021.

	Latitude	Longitude		Latitude	Longitude
Beginning	43.895056	-70.345111	Ending	43.897861	-70.3438335

Applicant's Description: See attached application received by MaineDOT on **11/30/2020**

Public Notice in Publication: (None)

Date Permit Issued: 12/07/2020

BUREAU OF MAINTENANCE & OPERATIONS



Robert Betz, P.E.

Region Engineer, Region 1

Attachments: Location Permit - Standard Conditions and Regulations and Application

SPECIAL CONDITIONS:

LOCATION PERMIT

STANDARD CONDITIONS AND REGULATIONS

LOCATION, COMPLIANCE AND TOLERANCE: Locations shall be as permitted and shall comply with the Department's current utility accommodation and highway opening standards unless specifically noted otherwise. Minimum location standards shall be maintained unless specifically permitted above. Pipes and conduit may be moved three feet horizontally, unless specific limitations are required, and may cross, but shall not run directly over or under installations of other parties, without requiring an alteration of this permit. Unapproved alterations may void the permit. Alterations must be approved by the individual who issued the original permit. The Commissioner or his Designee will take such action, as they consider necessary to obtain compliance with the applicable laws, conditions and regulations.

DESIGN AND CONSTRUCTION: Design and construction must comply with all applicable laws, codes and regulations.

PERMIT LIMITED: This permit is for the approved installation at the approved location only within State of Maine highway right-of-way limits, with such variations as may be permitted by Title 35A, M.R.S.A. Section 2503. It is not authorization to provide service. It is not authorization to occupy or use jointly the plant of another utility without its consent. It is not authorization to locate on private property.

RESPONSIBILITY: The Utility shall be fully responsible for the design, construction, maintenance and operation of all facilities, appurtenances and services located within the highway right-of-way limits, including any damages that may result therefrom. The Utility shall obtain any and all other permits or licences which may be required. Aboveground utility plant not required for continued service shall be promptly removed.

COST OBLIGATION: Unless otherwise provided by agreement or law, all costs applicable to the proposed installation are to be borne by the Utility, including all costs of any further relocation, adjustment or removal, which may be necessary to accommodate highway needs.

ACCESS: Unless otherwise provided, access for construction, inspection, maintenance and operation of the facility may be made from the public way.

PROTECTION OF TRAFFIC: The Utility shall provide such protective services, including flaggers and police, as may be necessary to safeguard traffic during construction, inspection, maintenance and operation; and shall remove all equipment and material not in actual use for construction, inspection, maintenance and operation from the highway as expeditiously as possible. "The Manual on Uniform Traffic Control Devices, Part VI", shall be complied with.

UTILITY COORDINATION: Work must be coordinated with existing utilities in the area of this permit.

HIGHWAY OPENINGS: All permitted underground facilities must be constructed only after receiving a Highway Opening Permit from the MaineDOT region office.

TIME LIMIT: If construction of the applicant's facility is not commenced within 12 months after the date of the permit, this permit is void, and the application is resubmitted for review.



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11 MAIN STREET, SUITE 4
KENNEBUNK, MAINE 04043
(207) 985-4676 (Phone)
(207) 985-4932 (Fax)

December 11, 2020

VIA EMAIL

Kathy Tombarelli, Town Planner
Town of Gray
24 Main Street
Gray, Maine 04039

Re: ISM Solar Application Tax Map 35, Lots 20-42, 19-11

Dear Kathy:

As requested, I have reviewed the December 8 letter from Scott Anderson, the attorney for Greg Lucini and ISM Solar. Attorney Anderson's letter stated that ISM Solar may seek an alternative access route for its utility service. This alternative access would be located within the Maine DOT Route 26A right-of-way. This change would have the effect of moving the utility service to the opposite side of the proposed solar farm from its approved location roughly parallel to the Maine Turnpike.

Attorney Anderson has asked that you review this change in location as a de minimis change pursuant to the site plan's conditions of approval and Section 402.10.17(F) of the Town's Zoning Ordinance rather than requiring Planning Board approval. That section states:

Approvals of site plans are 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 the plans, proposals, and supporting documents, except minor changes that do not affect approval standards, is subject to review and approval by the Planning Board or Staff Review Committee.

~ Over 60 Years of Service ~

Jensen Baird
Gardner Henry

December 11, 2020

Page 2

The condition of approval on the site plan that states that “de minimis changes as so determined by the Town Planner which do not affect approval standards” are excepted from the requirement for Planning Board approval of changes to approved site plans.

There are two important factors in the consideration of this issue. First, only a very small portion of the site is impacted in any way by the change; the remainder of the change occurs in the MDOT ROW and is subject to a separate permitting process due to that location. Second, the proposed change does not affect any of the approval standards. Other than the relocation of the service, the solar facility itself remains unchanged.

Based upon these factors, I agree with Attorney Anderson that the proposed change is a de minimis change under the site plan condition of approval and, in turn, a minor change under Section 402.10.17(F) of the Town’s Zoning Ordinance. For that reason, the proposed revision does not require Planning Board review.

Please let me know if you have any questions. Thank you.

Sincerely,



Natalie L. Burns

**01/05/2020 Town Council Meeting
Proposed Farmers' Market Ordinance Amendments**

402.2.2 Definitions (Add the following definitions)

Farm and Food Products: Any agricultural, horticultural, forest or other product of the soil or water, including, but not limited to, fruits, vegetables, eggs, dairy products, meat and meat products, poultry and poultry products, fish and fish products, grain and grain products, honey, nuts, maple products, apple cider, fruit juice, malt liquor, wine, ornamental or vegetable plants, nursery products, fiber or fiber products, firewood and Christmas trees.

Farmer: A person who produces farm products.

Farmers' Market: A seasonal public market at which two (2) or more local farmers have raised and/or prepared farm and food products for direct sale to consumers.

Table 402.5.3 (Add Farmers' Market to USE table)

TABLE 402.5.3 TABLE OF PERMITTED USES AND CONDITIONAL USES															
		RRA	LD	MD	BD-1	BD-2	C	VC	VCP	BT-1	BT-2	WH-1	WH-2	LMOD	CSESOD
22	<u>Farm Stand++</u>	P	P	P	P	P	P	P	P	P	P		P		
23	<u>Farmers' Market ++</u>	<u>P</u>	<u>P</u>	<u>P</u>	<u>P</u>	<u>P</u>	<u>P</u>	<u>P</u>	<u>P</u>	<u>P</u>	<u>P</u>		<u>P</u>		
24	(change subsequent numbering in rest of table)														

++ Subject to performance standards in Article 7

402.7.21 FARMERS' MARKET (New Section)

A. The purpose of this ordinance is to regulate the temporary use of land for the establishment of farmers' markets as defined by 7 M.R.S. §415, where the primary purpose of the market is to make local farm and food products available to the public.

B. Administration and Enforcement: This ordinance shall be administered by the Community Development Department and enforced by the Code Enforcement Officer.

C. Farmers' Market on Town Property: The Town Council may authorize the Town Manager to enter into a lease or license agreement for the use of Town property for the purpose of operating a Farmers' Market. No license for the sale at a Farmers' Market of any items shall be issued by the Town Clerk until the applicant has filed with the Town Clerk a certificate evidencing liability coverage at the minimum amount recommended by Maine Municipal Association at the time of the event and naming the Town as an additional insured. The licensee shall maintain such insurance at all times while engaged in sales at a farmers' market, and the licensee shall provide the Town Clerk with not less than ten (10) days' advance written notice of the cancellation, expiration or non-renewal of said insurance.

D. Farmers' Market on Private Property: Farmers' Markets may take place on private property, where allowed as a permitted or conditional use under Chapter 402 with written consent of the property owner.

E. Prohibitions

1. A person may not use the terms "Farm and Food Products", "Farmer", or "Farmers' Market" to describe a market or other sales that does not meet the terms of the definitions set forth in 402.2.2.
2. A person may not sell farm and food products at a market labeled "farmers' market" unless at least 50% of the farm products offered by that person were grown, processed, or prepared by that person or under that person's direction.
3. A product not grown, processed, or prepared by the farmer or under that farmer's direction must have been grown, processed, or prepared by and purchased directly from another farmer and the name and location of the farm must be identified on the product or on a sign in close proximity to the displayed product.
4. Invasive terrestrial plants, weapons, fireworks, tobacco or tobacco products, and marijuana, marijuana products or tobacco/marijuana paraphernalia are prohibited. Hemp-based Cannabidiol (CBD) products are allowed if locally sourced and prepared by the farmer.
5. Live animals offered for sale are prohibited.

F. Additional Conditions for Farmers' Markets

1. Sufficient off-street parking, not within a public way, must be provided for both the Farmers' Market vendors and their patrons. One space per 400 sf of stalls/tables is required.
2. The items to be sold at the Farmers' Market are intended to be local farm products. Craft items made by the farmers/vendors are allowed but limited to 25% of the products offered for sale by the market.
3. Mobile, temporary, and non-permanent stationary food vending units, and mobile ice cream vendors, are prohibited from participating in duly approved Farmers' Market locations without a Mobile Vendor or Food Truck license issued by the Town of Gray.
4. The term of a license shall not extend beyond a 12-month period. Annual renewals may be permitted in the same manner as an initial license agreement.
5. Farmers' Markets that exceed 20 farmers and/or tables/stalls require Staff Review Committee or Planning Board approval as applicable.
6. Farmers' Markets are limited to two days a week between the hours of 8:00 am and 6:00 pm.
7. All Farmers' Markets must adhere to State standards including Title 7, Part 2, Chapter 101, Subchapter 1-A, subsection 415 which specifies produce and products eligible to be sold.

8. All Farmers' Markets must adhere to applicable Town standards, specifically including the Local Food Ordinance and Zoning Ordinance provisions.
9. This section does not prohibit a market from imposing more stringent requirements on its sellers than those imposed by the Town.
10. This section does not prohibit individual Farmers' Markets to charge their own table/stall fees in addition to the fees the Town charges pursuant to the Town Council approved Fee Schedule.
11. Signage for Farmers' Markets must comply to Chapter 406 Town of Gray Sign Ordinance.

G. Permitting Procedure

1. Application Submittal: Applicants shall submit an application packet in a manner specified by the Town and shall include such fees as established by the Town Council.
2. Staff Review: The Community Development Department shall circulate the application to Gray Fire Rescue and Public Works Department within 3 business days of receipt of a complete application. The Community Development Department shall submit any written comments within 5 business days to the Town Manager.
3. Farmers' Market with \leq 20 farmers and/or tables/stalls: Subsequent to the receipt by the Town Manager of the staff recommendation and prior to the issuance of a license agreement, the Town Council shall hold a Public Hearing at the first available Town Council Meeting. In addition to general notice, notice of the public hearing shall be mailed to immediate abutters no later than 7 days prior to the hearing.
4. Farmers' Markets with $>$ 20 farmers and/or tables/stalls: Subsequent to receipt of staff recommendations and all applicable materials for Site Plan Review are received by the Town Planner, the application shall be placed on the next available Staff Review Committee or Planning Board agenda as applicable for Site Plan Review and a Public Hearing. In addition to general notice, notice of the public hearing shall be mailed to abutters within 250' of the parcel on which the Farmers' Market is to be located no later than 7 days prior to the hearing.

Notes to Council – changes made to the ordinance since 12/1/2020 Meeting:

1. Section E. Prohibitions – separated E.2 into E.2 & E.3 (run-on). Added “or prepared by” to language based on Rachel Lyn comments about baked goods.
2. Deleted F.1 as pointed out by Sharon as repetitive and re-numbered section.
3. Moved the old F.4 up to section E as E.4 as it fit better in prohibitions. Clarified CBD language.
4. Added E.5 to prohibitions.
5. Re-worded F.2 to allow market to self-regulate the 25% craft threshold by market in aggregate and not individual vendors.
6. Combined sections G & H into one section.

License Expires Annually
December 31st

Application for a Farmers' Market License Town of Gray



**First Settled
1738**

For Office Use Only

Date Submitted: _____

Date Paid/Initials: _____

Amount Paid: _____

Private Property: Annual Renewal Fee: \$15* Vendor Fee: \$10/each

Public Property: Annual Renewal Fee: \$35* Vendor Fee: \$15/each

*additional fees for required abutter notification and legal advertisement apply

Contact Information

Market Name:		
Number of Participating Farms/Tables:	<20 Farms or Tables (Town staff approval)	>20 Farms or Tables* (requires Staff Review Committee or Planning Board Approval as applicable)
Applicant Name:		
Applicant E-Mail Address:		
Applicant Phone Number:		
Location - Town Map/Lot:		

Date(s) of Market: _____

Please list the items that you will be selling at the Farmers' Market:

Standards:

- Farmers' markets are limited to two days per week between the hours of 6:00 a.m. and 6:00 p.m.
- Farmers' markets may take place on private property, where allowed as a permitted or conditional use.
- Sufficient off-street parking, not within a public way, must be provided for both the farmers' market vendors and their patrons. One space per 400 sf of stalls/tables is required.
- The items to be sold at the farmers' market shall be limited to farm products. No resale of produce or other products is allowed.
- Prohibited Products: Live animals, invasive terrestrial plants, weapons, fireworks, tobacco or tobacco products, and marijuana or marijuana products & paraphernalia. Cannabidiol (CBD) is not regulated.
- Mobile, temporary, and non-permanent stationary food vending units, including push carts and mobile ice cream vendors, are prohibited from participating in duly approved farmers' market locations.
- The term of a license shall not extend beyond a 12-month period. Annual renewals may be permitted in the same manner as an initial license agreement.
- This license shall be administered by the Community Development Department and enforced by the Code Enforcement Officer. Farmers' Markets that exceed 20 Farms or Tables require Staff Review Committee or Planning Board approval as applicable.
- Prior to the issuance of License Agreement, the Town Council shall hold a Public Hearing. In addition to the required public notice, notice of the public hearing shall be mailed to immediate abutters no later than 7 days prior to the hearing.
- All Farmers' Markets must adhere to State standards including Title 7, Part 2, Chapter 101, Subchapter 1-A, subsection 415 which specifies produce and products eligible to be sold.
- All Farmers' Markets must adhere to applicable Town standards, specifically including the Local Food Ordinance and Zoning Ordinance provisions.
- Signage for Farmer's Markets must adhere to Chapter 406 Town of Gray Sign Ordinance.

Required Submittals Checklist:

- Application Form – Submitted 30 days prior to the event to ensure adequate public notification.
- For Farmers’ Markets on Private Property – Property Owner’s Consent (If different than applicant).
- Overall Plot Plan (scaled) showing parcel, structure, and outdoor area proposed for the Farmers’ Market.
- Plan showing anticipated number and approximate location of booths.
- For Farmers’ Markets in parking areas – provide a plan depicting adequate and safe interface between pedestrians and vehicles. Also include the direction of vehicular traffic flow.
- For Farmers’ Markets located on Public Property – A certificate evidencing liability coverage in an amount not less than what is recommended by the Maine Municipal Association at the time of the event to be verified and approved by the Town Finance Director.

Revocation of License: The Code Enforcement Officer is authorized to revoke or suspend any farmers’ market license for:

- Misrepresentation of information in the application.
- Creation of a public nuisance or a threat to the public’s health, safety, or welfare.
- Health inspection violation which is not corrected within 24 hours of notice.
- Inconsistencies with Town and/or State standards.
- Any violation of the provisions listed above.

I hereby certify that this Farmers’ Market License Application is authorized by the owner of record and that I (we) will conform to all applicable laws of this jurisdiction. I understand that the permit will expire on December 31, 20__ and that I (we) must meet all applicable standards and submit all required paperwork.

Applicant Signature

Date

Town CEO

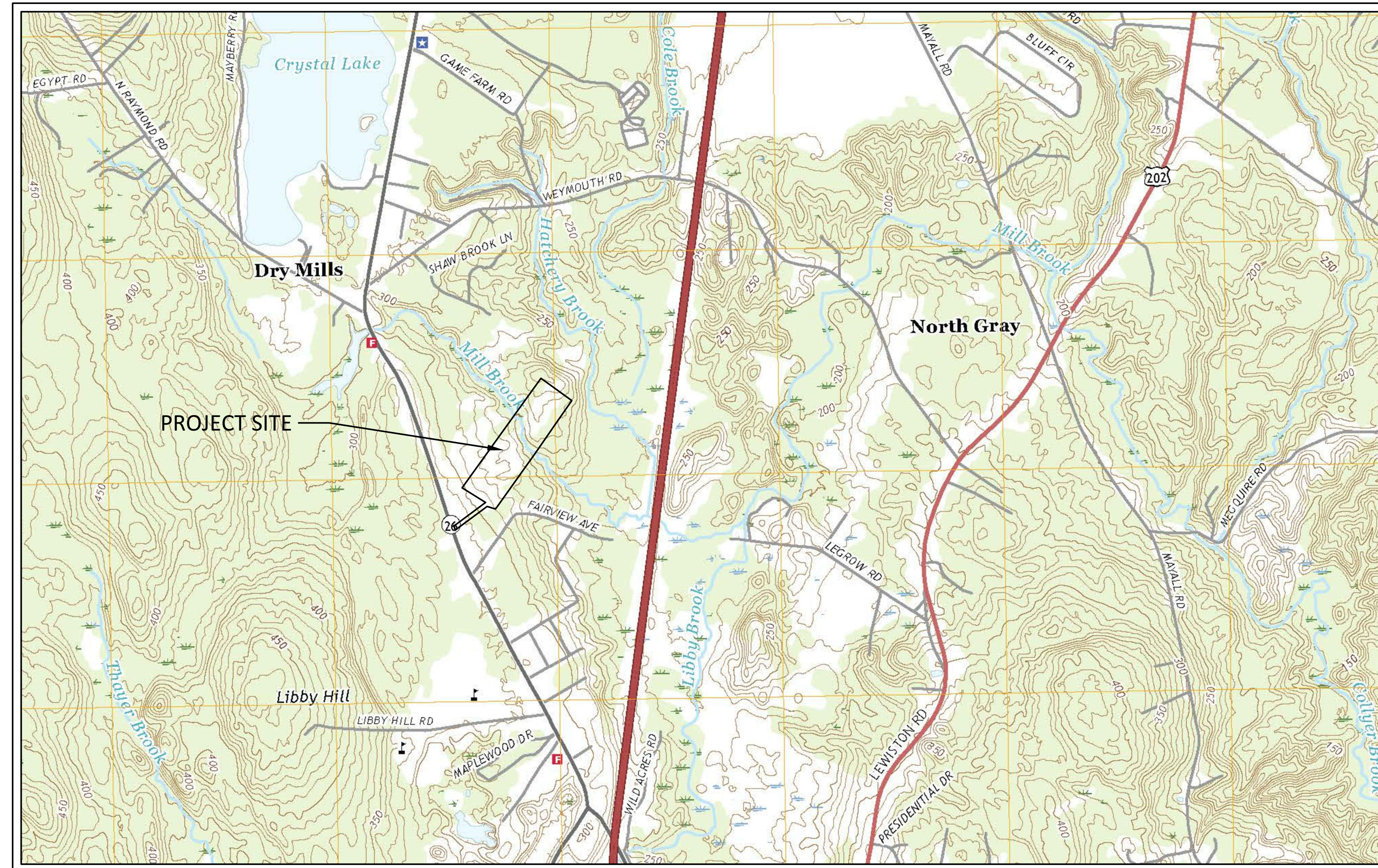
Date

Conditions/Comments:

VERRILL FARM SUBDIVISION

SHAKER ROAD
GRAY, MAINE

CONSULTANTS	
CIVIL ENGINEER	DM ROMA CONSULTING ENGINEERS
LAND SURVEYOR	WAYNE T. WOOD & COMPANY
SITE EVALUATOR & WETLAND SCIENTIST	MARK CENCI GEOLOGIC, INC.
SOIL SCIENTIST	MARK HAMPTON ASSOCIATES, INC.



PROJECT VICINITY MAP

ISSUED FOR PRELIMINARY SUBDIVISION REVIEW - NOT FOR CONSTRUCTION
DECEMBER 21, 2020

PREPARED BY:
DM ROMA
CONSULTING ENGINEERS
P.O. BOX 1116
WINDHAM, ME 04062
(207) 310 - 0506

APPLICANT:

AMBROSIA DEVELOPMENT & INVESTMENTS
28 WEARE ROAD
SEABROOK, NH 03874

VERRILL FARM SUBDIVISION

DRAWING SHEET INDEX

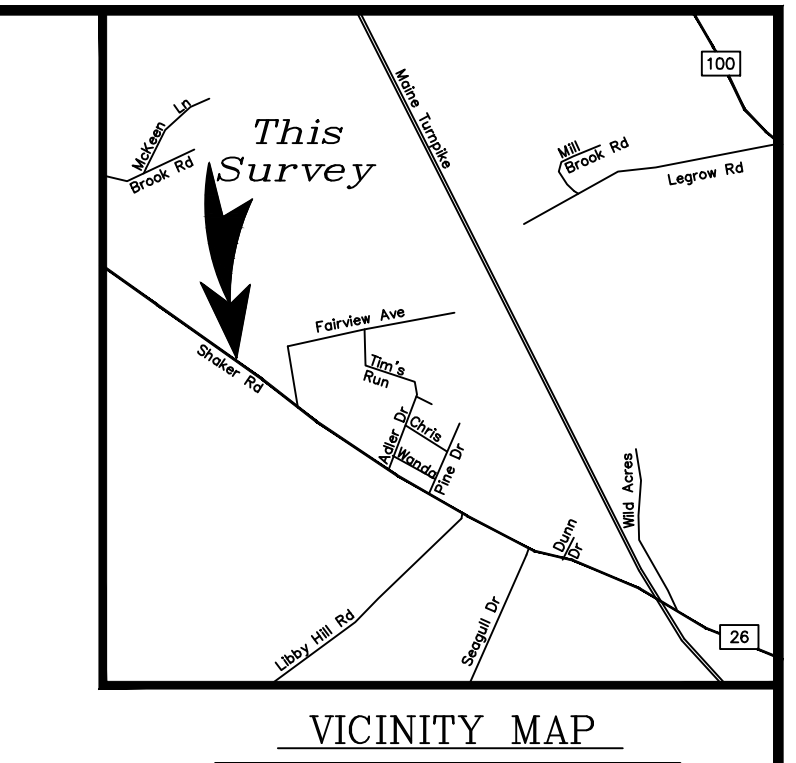
PAGE NO.	DESCRIPTION
1	TITLE SHEET
2	SUBDIVISION PLAN
3	CLASS B-HIGH INTENSITY SOIL SURVEY MAP
4	PLAN AND PROFILE: VISTA VIEW LANE
5	PLAN AND PROFILE: VISTA VIEW LANE
6	PLAN AND PROFILE: VISTA VIEW LANE
7	POND PLAN
8	POND PLAN
9	DETAILS
10	DETAILS
11	DETAILS

PLAN REFERENCES

1. "Standard Boundary Survey ~ Plan of Land on Shaker Road in Gray, Maine for Donald & Mary Verrill" dated September 1993 by Daniel T. C. LaPoint.
2. "Standard Boundary Survey and Lot Division for Stanley R. and Jean C. Wilbur ~ Legrow Road ~ Gray, Maine" dated July 1986 by John D. Palmiter, recorded in CCRD Plan Book 158 on Page 47.
3. "Standard Boundary Survey ~ Route 26 ~ Gray, Maine for Donald E. & Mary L. Verrill" undated by Survey, Inc.
4. "Standard Boundary Survey ~ Route 26 ~ Gray, Maine for Donald E. Verrill" dated November 2000 by Survey, Inc.
5. "Working Drawing ~ Plan of Land on Shaker Road ~ Gray, Maine for Ernest Verrill & Linda Pelletier" dated November 2007 by Wayne T. Wood & Co.

LEGEND

- ⊙ 5/8" Capped Rebar to be Set
- Iron Pipe or Pin Found as Noted
- ◆ Soils Test Pits
- Existing Contours (LIDAR)
- - - Building Setback Lines
- N/F Now or Formerly of
- (14,887/362) Deed Book and Page Reference
- CCRD Cumberland County Registry
- ▨ Buffers



NOTES

1. Owners of record are Linda M. Pelletier and Ernest D. Verrill by deed recorded in the Cumberland County Registry of Deeds in book 24,609 page 292.
2. All bearings are Magnetic of the year 1999 per the plan in reference 2 and calculated from angles of an actual on the ground survey.
3. Boundaries as shown on this plan were taken from referenced surveys.
4. The subject parcel is somewhat shown as Lot #15-29 on the Town of Gray Tax Map #20 and is situated in the (RRA) Rural Residential Agricultural Zone.
5. Elevation contours are from MEGIS LIDAR.
6. The wetlands shown and soils tests are from Mark Cenci Geologic.
7. The total area of this parcel is 26.58 acres
8. The total area of wetlands shown here on is 31,536 square feet.
9. The Developer shall establish a tree buffer along the Scinski and Wilbur property lines. The trees shall not exceed 8' in height and shall be of a species determined by Scinski and Wilbur.
10. This area is intended to be a temporary turn-around for Phase I and a parking area for the park for Phase II.
11. Soils information for this project was done by Mark Cenci Geologic and Mark Hampton Associates.
12. See also the engineering plans by DMRMA Consulting Engineers.

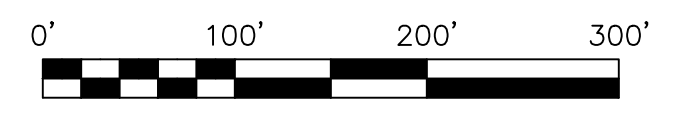
NET RESIDENTIAL ACERAGE CALCULATIONS

Total Lot Area	1,157,730 sq.ft.
Wetland Area	31,536 sq.ft.
Steep Slopes	0 sq.ft.
Somewhat Poorly Drained Soils @ 50%	63,233 sq.ft.
Roads	1,062,961 sq.ft.
Net Residential Acreage	956,665 sq.ft.
956,665 sq.ft./ 80,000 sq.ft. per lot = 11.96 lots	

Open Space	Required 35%	Actual 48.09%
Usable Open Space	Required 20%	Actual 45.37%

DENSITY BOUNSES

Allowed Lots	11.96 lots
Public Water Bonus	10% or 1.19 lots
Additional Open Space	5% or 0.60 lots
Internal Trail System	5% or 0.60 lots
Total Lots Allowed	14.35 lots



Approved by the Town of Gray Planning Board:

Signed: _____

Date: _____

State of Maine, Cumberland ss.

REGISTRY OF DEEDS

Received: _____ 20____

at ____h ____m ____M and recorded in

Plan Book: _____ Page: _____

Attest: _____ Register



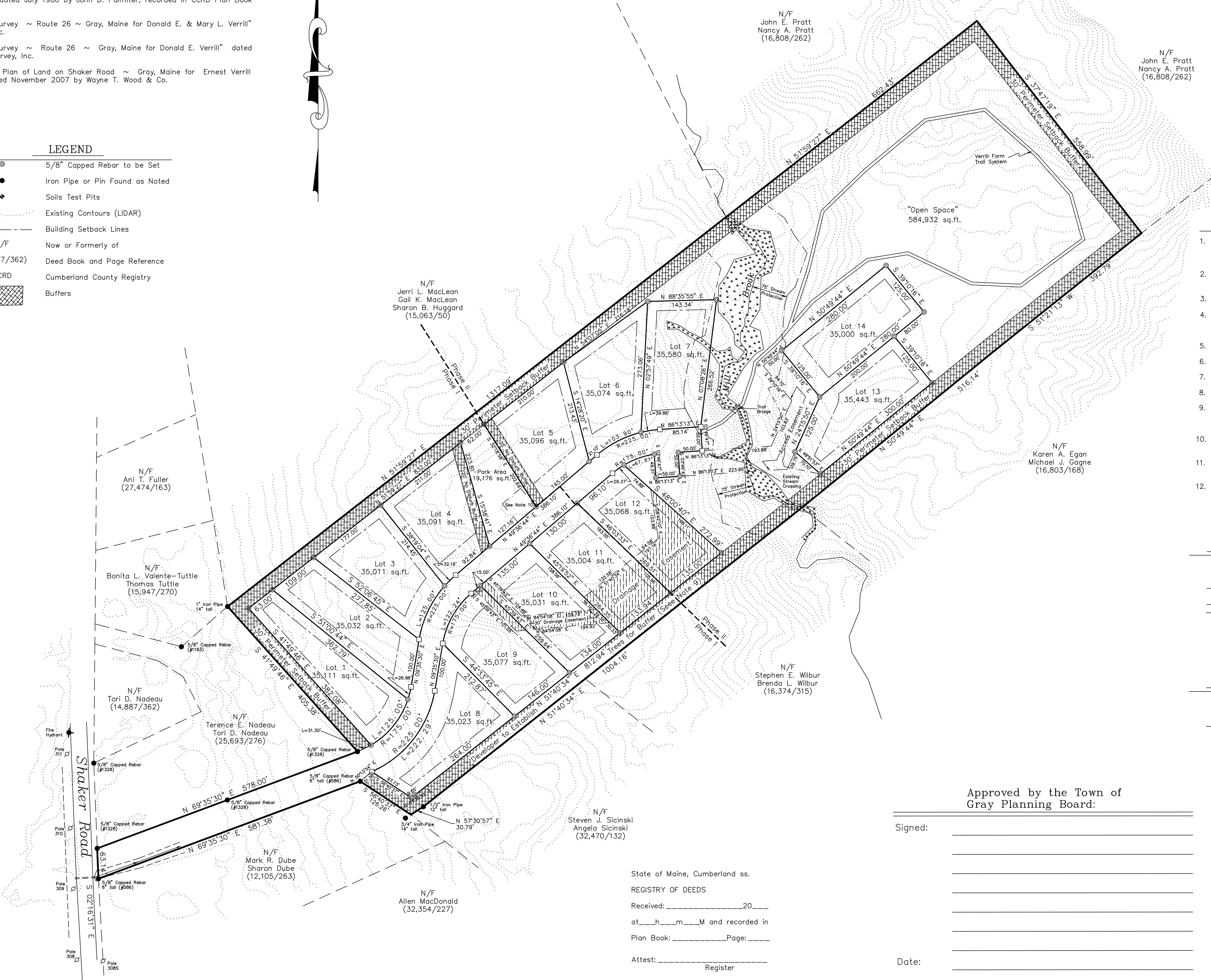
Preliminary Plan

"Verrill Farm"
Open Space Subdivision
On
Shaker Road
In
Gray, Maine

Ambrosia Development & Investments, LLC
28 Weare Rd., Seabrook, NH 03874

WAYNE T. WOOD & CO.

Gray, Maine 04039 (207)657-3330
Drawn By: K/LW/WTW Date
Scale: 1" = 100' December 2020
Checked By: WTW Job No.
Field Crew: n/a 220096



EROSION AND SEDIMENTATION CONTROL NOTES:

EXCAVATION AND EARTHWORK SHALL BE COMPLETED SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME. LIMIT THE EXPOSED AREA TO THOSE AREAS IN WHICH WORK IS TO OCCUR DURING THE FOLLOWING 15 DAYS AND THAT CAN BE MULCHED IN ONE DAY.

IN ORDER TO EFFECTIVELY PREVENT AND CONTROL EROSION RELATED TO SOIL DISTURBANCE, THE FOLLOWING BEST MANAGEMENT PRACTICES (BMPs) SHALL BE EMPLOYED:

1. POLLUTION PREVENTION

MINIMIZE DISTURBED AREAS AND PROTECT NATURAL DOWNGRADEMENT BUFFER AREAS TO THE EXTENT PRACTICABLE. CONTROL STORMWATER VOLUME AND VELOCITY WITHIN THE SITE TO MINIMIZE SOIL EROSION. MINIMIZE THE DISTURBANCE OF STEEP SLOPES. CONTROL STORMWATER DISCHARGES, INCLUDING BOTH PEAK FLOW RATES AND VOLUME, TO MINIMIZE EROSION AT OUTLETS. THE DISCHARGE MAY NOT RESULT IN EROSION OF ANY OPEN DRAINAGE CHANNELS, SWALES, STREAM CHANNELS OR STREAM BANKS, UPLAND, OR COASTAL OR FRESHWATER WETLANDS OFF THE PROJECT SITE.

WHENEVER PRACTICABLE, NO DISTURBANCE ACTIVITIES SHOULD TAKE PLACE WITHIN 50 FEET OF ANY PROTECTED NATURAL RESOURCE. IF DISTURBANCE ACTIVITIES TAKE PLACE WITHIN 50 FEET OF ANY PROTECTED NATURAL RESOURCE, AND STORMWATER DISCHARGES THROUGH THE DISTURBED AREAS TOWARD THE PROTECTED NATURAL RESOURCE, PERIMETER EROSION CONTROLS MUST BE DOUBLED. IF DISTURBANCE ACTIVITIES TAKE PLACE LESS THAN 30 FEET FROM ANY PROTECTED NATURAL RESOURCE, AND STORMWATER DISCHARGES THROUGH THE DISTURBED AREAS TOWARD THE PROTECTED NATURAL RESOURCE, PERIMETER EROSION CONTROLS MUST BE DOUBLED AND DISTURBED AREAS MUST BE TEMPORARILY OR PERMANENTLY STABILIZED WITHIN 7 DAYS.

2. TEMPORARY SOIL STABILIZATION BMPs

TEMPORARY MULCHING SHALL BE APPLIED IMMEDIATELY TO ANY AREAS THAT HAVE BEEN TEMPORARILY OR PERMANENTLY SEED. ANY DISTURBED SOIL WITHIN 75' OF A STREAM, WATER BODY OR WETLAND MUST RECEIVE TEMPORARY MULCH WITHIN 48 HOURS FOLLOWING DISTURBANCE AND BEFORE ANY STORM EVENT. ALL OTHER AREAS SHALL RECEIVE TEMPORARY MULCH WITHIN 7 DAYS OF DISTURBANCE. AREAS WHICH CANNOT BE SEED DURING THE GROWING SEASON SHALL BE MULCHED FOR OVER-WINTER PROTECTION. THE FOLLOWING ARE ACCEPTABLE TEMPORARY MULCHING METHODS:

HAY OR STRAW MULCHES NEED TO BE AIR-DRIED, FREE OF UNDESIRABLE SEEDS AND COARSE MATERIALS. APPLICATION RATE MUST BE 2 BALES (70-90 POUNDS) PER 1000 SQ FT OR 1.5 TO 2 TONS (90-100 BALES) PER ACRE TO COVER 75-90% OF THE GROUND SURFACE. HAY OR STRAW CAN BE DRIVEN INTO THE GROUND WITH TRACKED EQUIPMENT IF SLOPES ARE LESS THAN 3%, OR CAN BE ANCHORED WITH JUTE, WOOD FIBER OR PLASTIC NETTING ON STEEPER SLOPES.

EROSION CONTROL MIX MUST CONSIST PRIMARILY OF ORGANIC MATERIAL AND WILL INCLUDE ANY OF THE FOLLOWING: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK OR OTHER ACCEPTABLE PRODUCTS BASED ON A SIMILAR RAW SOURCE. WOOD OR BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSED WOOD PRODUCTS ARE NOT ACCEPTABLE. EROSION CONTROL MIX AS A STAND-ALONE REINFORCEMENT ON SLOPES OF 2 HORIZONTAL TO 1 VERTICAL OR LESS AND DRAINING IN SHEET FLOW. IT CAN BE PLACED WITH A HYDRAULIC BUCKET, WITH A PNEUMATIC BLOWER OR BY HAND, AND MUST PROVIDE 100% SOIL COVERAGE.

EROSION CONTROL MIX SHALL MEET THE FOLLOWING SPECIFICATIONS:
 -ORGANIC MATTER CONTENT SHALL BE BETWEEN 50-100%, DRY WEIGHT BASIS.
 -MINERAL PORTION OF THE MIX SHOULD BE NATURALLY INCLUDED IN THE MIX WITH NO LARGER ROCKS (>4")
 -ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED
 -LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX
 -IN STUMP GRINDING, THE MINERAL SOIL ORIGINATES FROM THE ROOT BALL AND SHOULD NOT BE REMOVED BEFORE GRINDING
 -THE MIX SHOULD BE FREE OF REFUSE, MATERIAL TOXIC TO PLANT GROWTH OR UNSUITABLE MATERIAL (BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSED WOOD PRODUCTS)

WHEN USED AS MULCH, THE THICKNESS OF THE EROSION CONTROL MIX IS BASED UPON THE FOLLOWING:

LENGTH OF SLOPE	3:1 SLOPE OR LESS	BETWEEN 2:1 AND 3:1 SLOPE
LESS THAN 20 FT	2.0 IN.	4.0 IN.
BETWEEN 20 - 60 FT	3.0 IN.	5.0 IN.
BETWEEN 60 - 100 FT	4.0 IN.	6.0 IN.

CHEMICAL MULCHES AND SOIL BINDERS MAY BE USED AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL CONSULT WITH THE MANUFACTURER TO DETERMINE ADEQUATE APPLICATION RATES AND METHODS.

TEMPORARY MULCH SHALL BE INSPECTED FOLLOWING ANY SIGNIFICANT RAINFALL EVENT (GREATER THAN 0.5 INCH RAINFALL, TYP.). IF LESS THAN 90% OF THE SOIL SURFACE IS COVERED BY MULCH, ADDITIONAL MULCH SHALL BE IMMEDIATELY APPLIED. EROSION CONTROL MATS AND MULCH ANCHORING MUST BE INSPECTED AFTER RAINFALL EVENTS FOR DISLOCATION OR FAILURE, AND REPAIRED IMMEDIATELY. INSPECTIONS SHALL TAKE PLACE UNTIL 95% OF THE SOIL SURFACE IS COVERED WITH PERMANENT VEGETATION. WHERE MULCH IS USED WITH ORNAMENTAL PLANTINGS, INSPECT PERIODICALLY THROUGHOUT THE YEAR TO DETERMINE IF MULCH IS MAINTAINING COVERAGE OF THE SOIL SURFACE, AND REPAIR AS NEEDED.

TEMPORARY VEGETATION SHALL BE ESTABLISHED ON SOILS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR A PERIOD OF MORE THAN 30 DAYS. IF TEMPORARY VEGETATION CANNOT BE ESTABLISHED PRIOR TO OCTOBER 15, TEMPORARY MULCH SHALL BE APPLIED THROUGHOUT THE WINTER AND TEMPORARY VEGETATION SHALL BE PLANTED AT THE BEGINNING OF THE GROWING SEASON THE FOLLOWING YEAR. TO PREPARE THE SEEDBED, THE CONTRACTOR SHALL APPLY FERTILIZER AT A RATE OF 600 POUNDS PER ACRE OF 10-10-10 (N-P205-K20) OR EQUIVALENT AND LIMESTONE AT A RATE OF 3 TONS PER ACRE, IF NECESSARY. LOOSEN SOIL TO A DEPTH OF 2 INCHES IN AREAS THAT HAVE BEEN COMPACTED BY CONSTRUCTION ACTIVITIES. GRASS SEED SHALL BE SELECTED BASED UPON THE TIME OF YEAR THE PLANTING WILL TAKE PLACE AS SUMMARIZED IN THE FOLLOWING TABLE:

SEED	LB. PER ACRE	RECOMMENDED SEEDING DATES
WINTER RYE	112	8/15 - 10/1
OATS	80	4/1 - 7/1 8/15 - 9/15
ANNUAL RYEGRASS	40	4/1 - 7/1

TEMPORARY SEEDING SHALL BE PERIODICALLY INSPECTED TO MAINTAIN AT LEAST 95% VEGETATIVE COVER OF SOIL SURFACE. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES SHALL BE USED IN THE INTERIM SUCH AS TEMPORARY MULCH, FILTER BARRIERS, ETC.

3. SEDIMENT BARRIER BMPs

PRIOR TO CONSTRUCTION TEMPORARY SEDIMENT BARRIERS SHALL BE INSTALLED AT THE DOWNGRADEMENT EDGE OF ANY AREA TO BE DISTURBED AND ADJACENT TO ANY DRAINAGE CHANNELS WITHIN THE DISTURBED AREA. SEDIMENT BARRIERS INCLUDE ANY OF THE FOLLOWING:

FILTER BARRIER FENCE, ALSO CALLED SILT FENCE, SHALL BE INSTALLED WHERE SHOWN ON THE PLANS AND IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. THE FILTER BARRIER SHALL BE A PERVIOUS SHEET OF PROPYLENE, NYLON, POLYESTER OR ETHYLENE YARN AND SHALL PROVIDE A MINIMUM OF 6 MONTHS USABLE CONSTRUCTION LIFE INCLUDING PROTECTION AGAINST ULTRA-VIOLET LIGHT. THE HEIGHT OF THE FENCE SHALL NOT EXCEED 36 INCHES INSTALLED AND POST SPACING SHALL NOT EXCEED 6 FEET. JOINTS IN THE FENCE SHALL BE AVOIDED TO THE EXTENT POSSIBLE, AND IF NECESSARY SHALL BE SPICED TOGETHER AT A SUPPORT POST WITH A MINIMUM 6 INCH OVERLAP. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 6 INCHES WIDE AND 4 INCHES DEEP, AND THE BOTTOM 6-8 INCHES OF FABRIC SHALL BE "TOED-IN" TO THE TRENCH AND COMPACTED. THE TRENCH SHOULD BE UPHILL OF THE FABRIC PRIOR TO BURIAL.

EROSION CONTROL MIX BERMS ARE LINEAR BARRIERS COMPOSED OF EROSION CONTROL MIX AS SPECIFIED ABOVE. THE BERM MUST BE A MINIMUM OF 12 INCHES TALL AND 24 INCHES WIDE AT THE BASE IF UPHILL SLOPES ARE LESS THAN 5%. STEEPER SLOPES OR SLOPES GREATER THAN 20 FEET LONG MAY REQUIRE A LARGER CHECK DAM. EROSION CONTROL MIX BERMS SHALL BE PROHIBITED AT THE BASE OF A LONG OR STEEP SLOPE (8% OR GREATER) WITHOUT THE ADDITIONAL SUPPORT OF A FILTER FENCE INSTALLED ON THE DOWNHILL SIDE OF THE BERM.

SEDIMENT BARRIERS SHOULD BE INSTALLED DOWNGRADEMENT OF SOIL OR SEDIMENT STOCKPILES AND STORMWATER SHOULD BE PREVENTED FROM RUNNING ONTO THE STOCKPILE. SEDIMENT BARRIERS SHALL BE INSPECTED AFTER ANY SIGNIFICANT RAINFALL EVENT (GREATER THAN 0.5 INCH RAINFALL) AND REPAIRED IMMEDIATELY IF THERE ARE ANY SIGNS OF EROSION OR SEDIMENTATION BELOW THE BARRIERS. IF THERE ARE SIGNS OF UNDERCUTTINGS AT THE CENTER OR EDGES OF THE BARRIER, OR IF LARGE VOLUMES OF WATER ARE IMPOUNDED BEHIND THE BARRIER, IT MAY BE NECESSARY TO REPLACE THE BARRIER WITH A TEMPORARY STONE CHECK DAM. SEDIMENT SHALL BE REMOVED ONCE IT REACHES HALF THE BARRIER HEIGHT. AFTER THE BARRIER IS REMOVED, ANY REMAINING SILT SHALL EITHER BE REMOVED OR GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

4. STORM DRAIN INLET PROTECTION

STORM DRAIN INLETS THAT ARE MADE OPERATIONAL BEFORE THEIR DRAINAGE AREA IS STABILIZED SHALL BE PROTECTED WITH A FILTER UNTIL THE DRAINAGE AREA IS EITHER PAVED OR STABILIZED WITH 95% VEGETATIVE GROWTH. THE FOLLOWING ARE ACCEPTABLE BMPs ASSOCIATED WITH STORM DRAIN INLET PROTECTION:

MANUFACTURED SEDIMENT FILTERS ARE THE PREFERRED METHOD FOR PROTECTING CATCH BASIN INLETS IN PAVED OR GRAVEL ROADWAYS. THE FILTERS TYPICALLY CONSIST OF A FABRIC OR OTHER PERVIOUS MATERIAL THAT IS PLACED ABOVE OR BELOW THE GRATE THAT TRAPS SEDIMENT ON THE SURFACE AND ALLOWS WATER TO FLOW THROUGH THE GRATE. CONSIDERATIONS SUCH AS WEATHER CONDITIONS, SLOPES, TRIBUTARY WATERSHED AREA AND EXPECTED SEDIMENT ACCUMULATION SHOULD BE FACTORED INTO MAKING A DECISION ON ANY PARTICULAR PRODUCT, AND THE MANUFACTURERS RECOMMENDATIONS ON INSTALLATION AND MAINTENANCE SHALL BE STRICTLY ADHERED TO.

5. STABILIZED CONSTRUCTION ENTRANCE/EXIT

TO REDUCE THE TRACKING OF SEDIMENT ONTO ROADWAYS, A STABILIZED CONSTRUCTION EXIT SHALL BE INSTALLED AT ALL POINTS OF EGRESS WHERE VEHICLES MAY TRAVEL FROM THE PROJECT SITE TO A PUBLIC ROAD OR OTHER PAVED AREA. THE STONE PAD SHALL CONSIST OF A MINIMUM 6-INCH DEPTH OF 2-INCH CRUSHED STONE, AND SHALL BE PLACED ON A GEOTEXTILE FABRIC. THE PAD SHALL EXTEND AT LEAST 50 FEET INTO THE PROJECT SITE AND BE A MINIMUM OF 10 FEET WIDE. THE EXIT SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, AND THE CONTRACTOR SHALL SWEEP PAVEMENT AT EXITS THAT HAVE EXPERIENCED ANY MUD-TRACKING PRIOR TO THE NEXT STORM EVENT. MAINTAIN THE PAD UNTIL ALL DISTURBED AREAS ARE STABILIZED.

6. DUST CONTROL

THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST ON THE PROJECT SITE AND ON ADJACENT ROADWAYS. EXPOSED SOIL SURFACES SHALL BE MOISTENED PERIODICALLY WITH ADEQUATE WATER TO CONTROL DUST. GRAVEL SURFACES SHALL EITHER BE TREATED WITH AN APPLICATION OF CALCIUM CHLORIDE OR COVERED WITH CRUSHED STONE IF DUST CONTROL BECOMES DIFFICULT WITH NORMAL WATER APPLICATIONS.

7. LAND GRADING AND SLOPE PREPARATION

GRADING SHALL BE PLANNED SO AS TO MINIMIZE THE LENGTH OF TIME BETWEEN INITIAL SOIL EXPOSURE AND FINAL GRADING. ON LARGE PROJECTS THIS SHOULD BE ACCOMPLISHED BY PHASING THE OPERATION AND COMPLETING THE FIRST PHASE UP TO FINAL GRADING AND SEEDING BEFORE STARTING THE NEXT PHASE. ANY EXPOSED AREA THAT WILL NOT BE FINISHED GRADED WITHIN 7 DAYS SHALL BE TREATED WITH MULCH OR COVERED WITH TEMPORARY CRUSHED STONE. MULCH SHALL BE PLACED ON A GEOTEXTILE FABRIC. THE PAD SHALL EXTEND AT LEAST 50 FEET INTO THE PROJECT SITE AND BE A MINIMUM OF 10 FEET WIDE. THE EXIT SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, AND THE CONTRACTOR SHALL SWEEP PAVEMENT AT EXITS THAT HAVE EXPERIENCED ANY MUD-TRACKING PRIOR TO THE NEXT STORM EVENT. MAINTAIN THE PAD UNTIL ALL DISTURBED AREAS ARE STABILIZED.

8. TOPSOIL

IF POSSIBLE, TOPSOIL SHALL BE STOCKPILED ON THE PROJECT SITE AND REUSED. HIGH QUALITY TOPSOIL SHALL BE FRIABLE AND LOAMY (LOAM, SANDY LOAM, SILT LOAM, SANDY CLAY LOAM, CLAY LOAM), AND SHALL BE FREE OF DEBRIS, TRASH, STUMPS, ROCKS, ROOTS AND NOXIOUS WEEDS. AFTER THE AREAS TO BE TOPSOILED HAVE BEEN BROUGHT TO GRADE, AND IMMEDIATELY PRIOR TO SPREADING THE TOPSOIL, THE SUBGRADE SHALL BE LOOSENED BY SCARIFYING TO A DEPTH OF AT LEAST 2 INCHES TO ENSURE BONDING WITH SUBSOIL. THE TOPSOIL SHALL BE UNIFORMLY DISTRIBUTED TO A MINIMUM COMPACTED DEPTH OF 4 INCHES. ANY IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS SHALL BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS. IT IS NECESSARY TO COMPACT THE TOPSOIL ENOUGH TO ENSURE GOOD CONTACT WITH THE UNDERLYING SOIL, BUT UNDUCE COMPACTION IS TO BE AVOIDED.

9. PERMANENT SOIL STABILIZATION

IF THE AREA WILL NOT BE WORKED FOR MORE THAN ONE YEAR OR HAS BEEN BROUGHT TO FINAL GRADE, THEN PERMANENTLY STABILIZE THE AREA WITHIN 7 DAYS BY PLANTING VEGETATION, SEEDING, SOD, OR THROUGH THE USE OF PERMANENT MULCH, OR RIPRAP, OR ROAD SUB-BASE. IF USING VEGETATION FOR STABILIZATION, SELECT THE PROPER VEGETATION FOR THE LIGHT, MOISTURE, AND SOIL CONDITIONS; AMEND AREAS OF DISTURBED SUBSOILS WITH TOPSOIL, COMPOST, OR FERTILIZERS; PROTECT SEEDING AREAS WITH MULCH OR, IF NECESSARY, EROSION CONTROL BLANKETS; AND SCHEDULE SODDING, PLANTING, AND SEEDING SO TO AVOID DIE-OFF FROM SUMMER DROUGHT AND FALL FROSTS. NEWLY SEED OR SODDED AREAS MUST BE PROTECTED FROM VEHICLE TRAFFIC, EXCESSIVE PEDESTRIAN TRAFFIC, AND CONCENTRATED RUNOFF UNTIL THE VEGETATION IS WELL-ESTABLISHED WITH 90% COVER BY HEALTHY VEGETATION. IF NECESSARY, AREAS MUST BE REWORKED AND RE-STABILIZED IF GERMINATION IS SPARSE, PLANT COVERAGE IS SPOTTY, OR TOPSOIL EROSION IS EVIDENT. ONE OR MORE OF THE FOLLOWING MAY APPLY TO A PARTICULAR SITE.

SEEDED AREAS: TO PREPARE THE SEEDBED, APPLY 10-20-20 FERTILIZER AT A RATE OF 800 POUNDS PER ACRE AND GROUND LIMESTONE AT A RATE OF 3 TONS PER ACRE. WORK THE FERTILIZER AND LIMESTONE INTO THE TOPSOIL TO A DEPTH OF 4 INCHES AND REMOVE ANY STONES, ROOTS OR OTHER VISIBLE DEBRIS. SELECT A SEED MIXTURE THAT IS APPROPRIATE FOR THE SOIL TYPE AND MOISTURE CONTENT AS FOUND AT THE SITE, AND FOR THE AMOUNT OF SUN EXPOSURE AND FOR LEVEL OF USE. REFER TO THE USDA SOIL CONSERVATION SERVICE OR THE LOCAL SOIL AND WATER CONSERVATION DISTRICT FOR APPROPRIATE SEED MIXTURES. APPLY SEED UNIFORMLY IN ACCORDANCE WITH THE SUPPLIER RECOMMENDATIONS AND IMMEDIATELY COVER WITH MULCH AS DESCRIBED IN THE TEMPORARY MULCHING SECTION OF THIS PLAN.

HYDROSEEDING SHALL BE DONE IN ACCORDANCE WITH SUPPLIERS RECOMMENDATIONS. FOR SEEDED AREAS TO BE PERMANENTLY STABILIZED, 90% OF THE DISTURBED SOIL SHALL BE COVERED WITH MATURE HEALTHY PLANTS WITH NO EVIDENCE OF WASHING OR RILLING OF THE TOPSOIL.

SOD STRIPS SHALL BE LAID AT RIGHT ANGLES TO DIRECTION OF SLOPE OR FLOW OF WATER STARTING AT LOWEST ELEVATION. JOINTS SHALL BE STAGGERED, AND ALL STRIPS SHALL BE ROLLED OR TAMPED INTO PLACE. ON SLOPES, SOD SHALL BE ANCHORED WITH STAPLES, WIRES OR GEOTEXTILE FABRIC. IRRIGATE SODDED AREA IMMEDIATELY AFTER INSTALLATION. FOR SODDED AREAS TO BE PERMANENTLY STABILIZED, THE ROOTS OF THE SOD MUST BE COMPLETELY BOUND INTO THE UNDERLYING SOIL WITH NO SLUMPING OF THE SOD OR DIE-OFF.

PERMANENT MULCH IS A LONG TERM COVER THAT PROVIDES A GOOD BUFFER AROUND DISTURBED AREAS. THE EROSION CONTROL MIX SHALL CONSIST PRIMARILY OF ORGANIC MATERIAL AND MAY INCLUDE SHREDDED BARK, STUMP GRINDINGS OR COMPOSTED BARK. WOOD CHIPS, GROUND CONSTRUCTION DEBRIS, REPROCESSED WOOD PRODUCTS OR BARK CHIPS ARE NOT ACCEPTABLE. THE EROSION CONTROL MIX SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4 INCHES IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS AND MATERIAL TOXIC TO PLANT GROWTH.

RIPRAP STONE SHALL CONSIST OF SUB-ANGULAR FIELD STONE OR ROUGH UNEVEN QUARRY STONE OF APPROXIMATELY RECTANGULAR SHAPE. THE DEPTH OF STONE SHALL BE A MINIMUM OF 2.2 TIMES THE MAXIMUM STONE DIAMETER. A GRAVEL OR GEOTEXTILE FILTER BLANKET SHALL BE PLACED BETWEEN THE RIPRAP AND UNDERLYING SOIL SURFACE. GRAVEL FILTER BLANKETS SHALL MEET MOOT TYPE UNDERDRAIN MATERIAL SPECIFICATIONS AND BE AT LEAST 6 INCHES THICK. GEOTEXTILE FILTER BLANKETS SHALL BE SPECIFIED BASED ON SITE CONDITIONS. RIPRAP SLOPES SHALL BE TOED INTO THE BASE OF THE EMBANKMENT BY EXCAVATING A TRENCH AT THE BOTTOM OF THE SLOPE AND INSTALLING A STABLE BASE OF RIPRAP TO GRADE.

DITCHES, CHANNELS AND SWALES ARE CONSIDERED PERMANENTLY STABILIZED WHEN THE CHANNEL HAS 90% COVER OF HEALTHY VEGETATION WITH A WELL-GRADED RIPRAP LINING, EROSION CONTROL BLANKET, OR WITH ANOTHER NON-EROSIVE LINING SUCH AS CONCRETE OR ASPHALT PAVEMENT. THERE MUST BE NO EVIDENCE OF SLUMPING OF THE CHANNEL LINING, UNDERCUTTING OF THE BANKS, OR DOWNCUTTING OF THE CHANNEL.

10. STORMWATER CHANNELS

EACH CHANNEL SHOULD BE CONSTRUCTED IN SECTIONS SO THAT THE SECTION'S GRADING, SHAPING, AND INSTALLATION OF THE PERMANENT LINING CAN BE COMPLETED THE SAME DAY. IF A CHANNEL'S FINAL GRADING OR LINING INSTALLATION MUST BE DELAYED, THEN DIVERSION BERMES MUST BE USED TO DIVERT STORMWATER AWAY FROM THE CHANNEL. PROPERLY SPACED CHECK DAMS MUST BE INSTALLED IN THE CHANNEL TO SLOW THE WATER VELOCITY, AND A TEMPORARY LINING INSTALLED ALONG THE CHANNEL TO PREVENT SCOURING.

WINTER EROSION AND SEDIMENTATION CONTROL NOTES:

THE WINTER CONSTRUCTION PERIOD TYPICALLY BEGINS IN EARLY NOVEMBER AND ENDS IN MID APRIL. IF A CONSTRUCTION SITE IS NOT STABILIZED WITH PAVEMENT, A ROAD GRAVEL BASE OR RIPRAP BY NOVEMBER 15 THEN THE SITE NEEDS TO BE PROTECTED WITH OVER-WINTER STABILIZATION. WINTER EXCAVATION AND EARTHWORK SHALL BE COMPLETED SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME. LIMIT THE EXPOSED AREA TO THOSE AREAS IN WHICH WORK IS TO OCCUR DURING THE FOLLOWING 15 DAYS AND THAT CAN BE MULCHED IN ONE DAY PRIOR TO ANY SNOW EVENT. AN AREA SHALL BE CONSIDERED DENUDED UNTIL THE SUBGRADE GRAVEL IS INSTALLED ABOVE THE AREAS OF FUTURE LOAM AND SEED HAVE BEEN LOADED, SEED AND MULCHED. A COVER OF EROSION CONTROL MIX IS THE PREFERRED TEMPORARY MULCH DURING WINTER CONDITIONS.

1. NATURAL RESOURCE PROTECTION

ANY AREAS WITHIN 75 FEET FROM ANY REGULATED NATURAL RESOURCES SHALL BE MULCHED BY DECEMBER 1 AND ANCHORED WITH PLASTIC NETTING OR PROTECTED WITH AN EROSION CONTROL COVER. DURING WINTER CONSTRUCTION, A DOUBLE ROW OF SEDIMENT BARRIERS (FOR EXAMPLE, SILT FENCE BACKED WITH HAY BALES OR EROSION CONTROL MIX) WILL BE PLACED BETWEEN ANY REGULATED NATURAL RESOURCE AND THE DISTURBED AREA. PROJECTS CROSSING THE REGULATED 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.

2. SEDIMENT BARRIERS

DURING FROZEN CONDITIONS, SEDIMENT BARRIERS MAY CONSIST OF EROSION CONTROL MIX BERMS OR ANY OTHER RECOGNIZED SEDIMENT BARRIERS AS FROZEN SOIL PREVENTS THE PROPER INSTALLATION OF HAY BALES OR SILT FENCES.

3. MULCHING

ALL AREAS SHALL BE CONSIDERED TO BE DENUDED UNTIL SEEDED AND MULCHED. HAY AND STRAW MULCH SHALL BE APPLIED AT A RATE OF 3 TONS PER ACRE (TWICE THE NORMAL ACCEPTED RATE) AND SHALL BE PROPERLY ANCHORED. EROSION CONTROL MIX MUST BE APPLIED WITH A MINIMUM 4 INCHES THICKNESS. MULCH SHALL NOT BE SPREAD ON TOP OF SNOW. SNOW MUST BE REMOVED DOWN TO A ONE-INCH DEPTH PRIOR TO APPLICATION. AFTER EACH DAY OF FINAL GRADING, THE AREA WILL 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 OR ADEQUATELY ANCHORED SO THAT GROUND SURFACE IS NOT VISIBLE THROUGH THE MULCH. BETWEEN THE DATES OF NOVEMBER 1 AND APRIL 15, ALL MULCH SHALL BE ANCHORED BY EITHER MULCH NETTING, TRACKING OR WOOD CELLULOSE FIBER. THE COVER WILL BE CONSIDERED SUFFICIENT WITH THE GROUND SURFACE IS NOT VISIBLE THROUGH THE MULCH. AFTER NOVEMBER 15T, MULCH AND ANCHORING OF ALL EXPOSED SOIL SHALL OCCUR AT THE END OF EACH FINAL GRADING WORKDAY.

4. SOIL STOCKPIILING

STOCKPILES OF SOIL OR SUBSOIL WILL BE MULCHED FOR OVER WINTER PROTECTION WITH HAY OR STRAW AT TWICE THE NORMAL RATE OR WITH A FOUR-INCH LAYER OF EROSION CONTROL MIX. THIS WILL BE DONE WITHIN 24 HOURS OF THE ESTABLISHED PRIOR TO ANY RAINFALL (0.5 INCH RAINFALL OR GREATER) OR SNOWFALL. SEDIMENT BARRIERS SHOULD BE INSTALLED DOWNGRADEMENT OF SOIL OR SEDIMENT STOCKPILES AND STORMWATER SHOULD BE PREVENTED FROM RUNNING ONTO THE STOCKPILE. ANY SOIL STOCKPILE WILL NOT BE PLACED WITHIN 100 FEET FROM ANY REGULATED NATURAL RESOURCE.

5. SEEDING

BETWEEN THE DATES OF OCTOBER 15 AND APRIL 1, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE FREEZING TEMPERATURES FINISHED AREAS SHALL BE FINE GRADED AND EITHER PROTECTED MULCH OR TEMPORARILY SEEDED AND MULCHED UNTIL SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 1 AND IF THE EXPOSED AREA HAS BEEN LOOSED, FINAL GRADED WITH A UNIFORM SURFACE, THEN THE AREA MAY BE DORMANT SEEDS AT A RATE OF 3 TIMES HIGHER THAN SPECIFIED FOR PERMANENT SEED AND THEN MULCHED. IF DORMANT SEEDING IS USED, ALL DISTURBED AREAS SHALL RECEIVE 4 INCHES OF LOAM AND SEED AT AN APPLICATION RATE OF 5 LBS PER 1,000 S.F. ALL AREAS INSUFFICIENTLY VEGETATED (LESS THAN 90%) IN THE SPRING SHALL BE REVEGETATED.

6. OVER-WINTER STABILIZATION OF DITCHES AND CHANNELS

ALL STONE-LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED BY NOVEMBER 1. ALL GRASS-LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED AND STABILIZED BY SEPTEMBER 1. IF A GRASS-LINED DITCH OR CHANNEL IS STABILIZED BY SEPTEMBER 1, THEN EITHER A SOD LINING SHALL BE INSTALLED PRIOR TO OCTOBER 1 OR THE DITCH MUST BE LINED WITH STONE RIPRAP BACKED BY AN APPROPRIATE GRAVEL BED OR GEOTEXTILE PRIOR TO NOVEMBER 1.

7. OVER-WINTER STABILIZATION OF DISTURBED SOILS

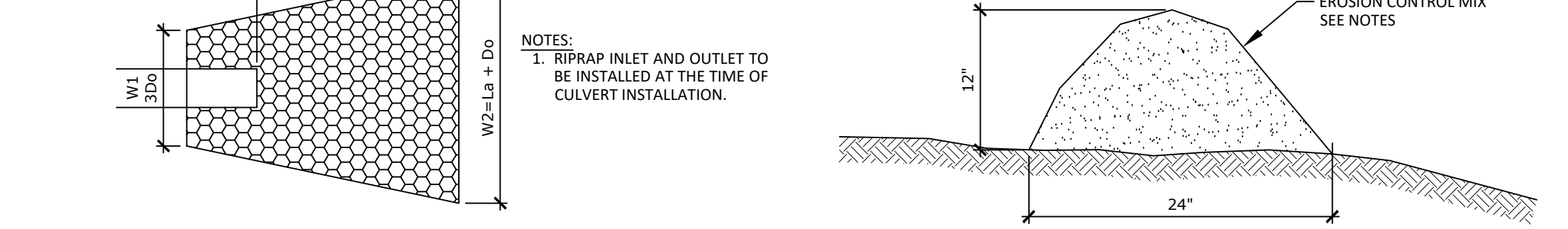
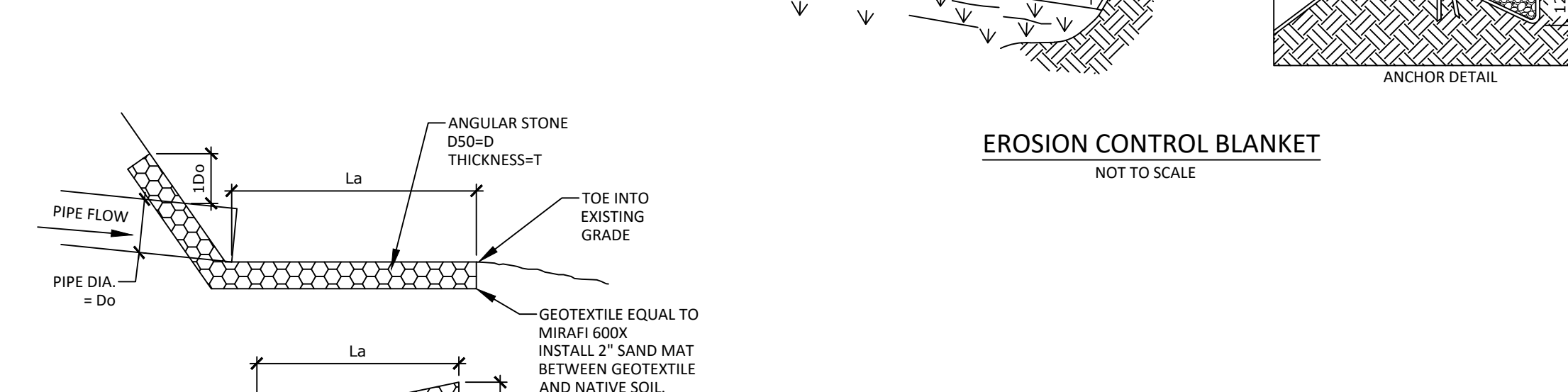
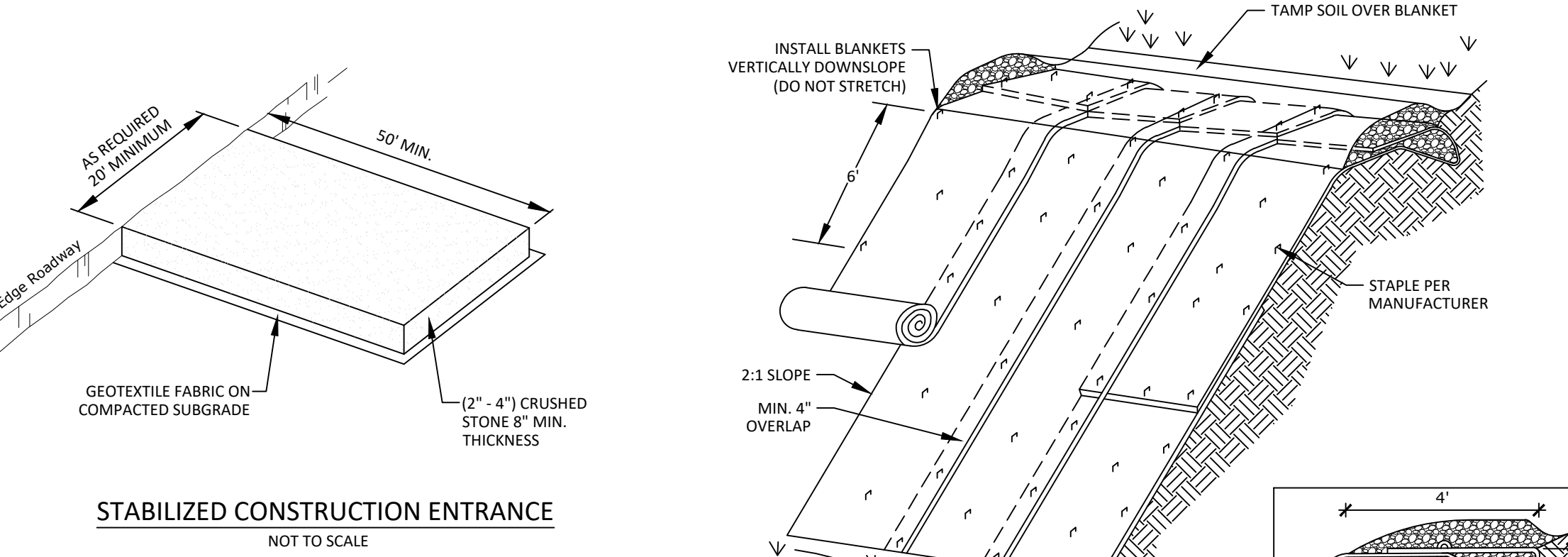
ALL STONE-COVERED SLOPES MUST BE CONSTRUCTED AND STABILIZED BY NOVEMBER 15. ALL SLOPES TO BE VEGETATED MUST BE SEEDED AND MULCHED BY SEPTEMBER 1. ALL AREAS HAVING A GRADE STEEPER THAN 8% SHALL BE CONSIDERED A SLOPE. IF A SLOPE TO BE VEGETATED IS NOT STABILIZED BY SEPTEMBER 1, THEN THE SLOPE SHALL EITHER BE STABILIZED WITH TEMPORARY VEGETATION AND EROSION CONTROL MATS BY OCTOBER 1, SOD BY OCTOBER 1, EROSION CONTROL MIX BY NOVEMBER 1 OR STONE RIPRAP BY NOVEMBER 15. SEE APPLICABLE SECTIONS UNDER EROSION AND SEDIMENTATION CONTROL NOTES FOR PROPER INSTALLATION METHODS.

8. OVER-WINTER STABILIZATION OF DISTURBED SOILS

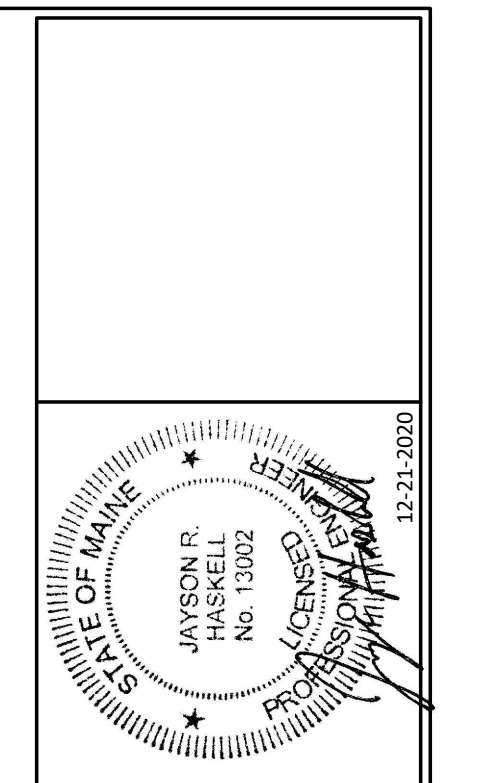
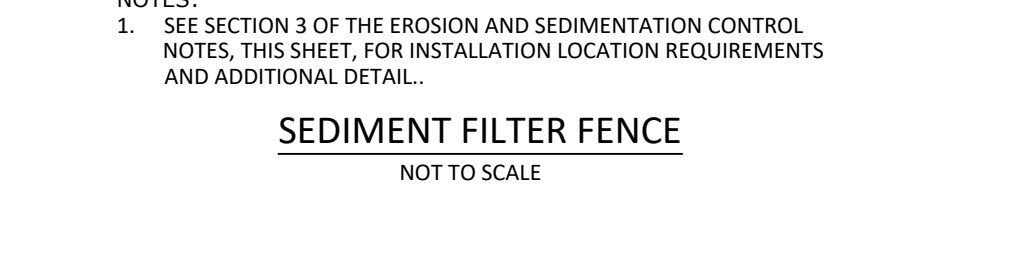
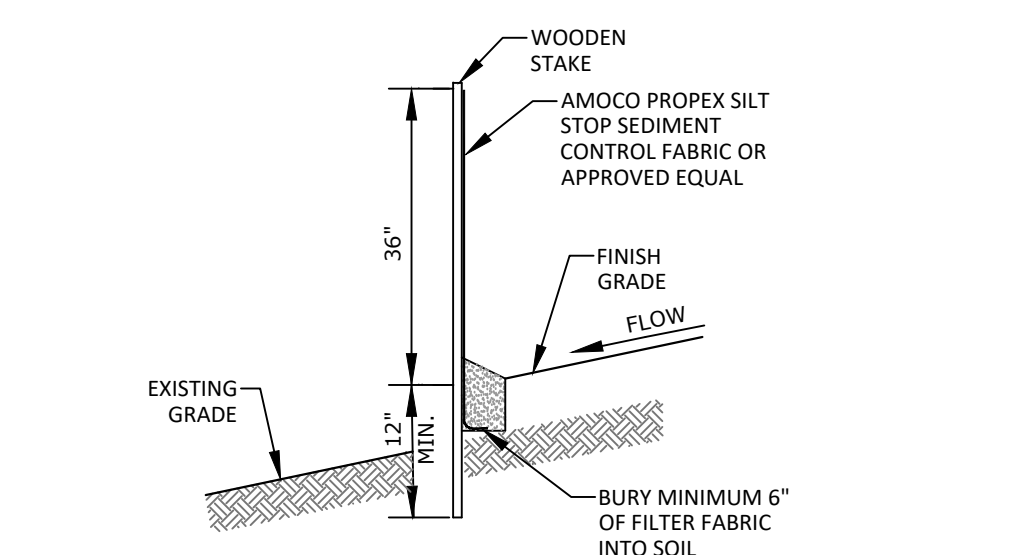
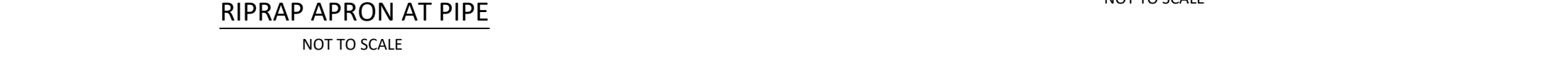
BY SEPTEMBER 15, ALL DISTURBED SOILS ON AREAS HAVING A SLOPE LESS THAN 15% MUST BE SEEDED AND MULCHED. IF THE DISTURBED AREAS ARE NOT STABILIZED BY THIS DATE, THEN THE AREA SHALL EITHER BE STABILIZED WITH TEMPORARY VEGETATION BY OCTOBER 1, SOD BY OCTOBER 1, OR MULCH BY NOVEMBER 15. SEE APPLICABLE SECTIONS UNDER EROSION AND SEDIMENTATION CONTROL NOTES FOR PROPER INSTALLATION METHODS.

9. MAINTENANCE

MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION SEASON. AFTER EACH RAINFALL, SNOW STORM, PERIOD OF THAWING AND RUNOFF AND AT LATEST ONCE A WEEK, 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 BARE SPOTS. AN ESTABLISHED VEGETATIVE COVER MEANS A MINIMUM OF 90% OF AREAS VEGETATED WITH VIGOROUS GROWTH.



SD DIA.	W1	W2	La	D	T
4" & 6"	2'	5'	4'	4"	9"
8" & 12"	3'	5'	6'	5"	12"
15"	4'	9'	8'	6"	14"
18"	5'	11'	9'	6"	14"

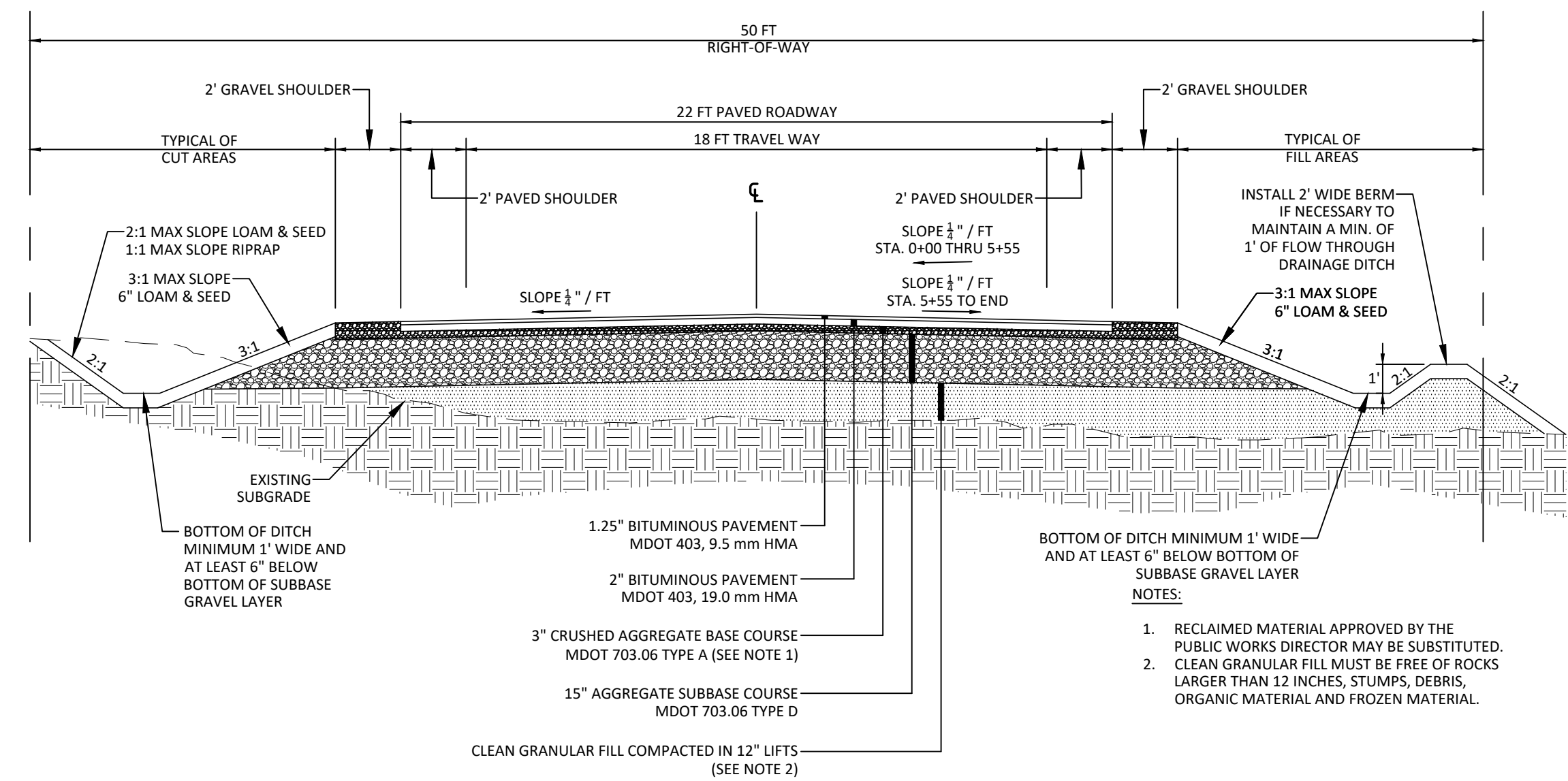


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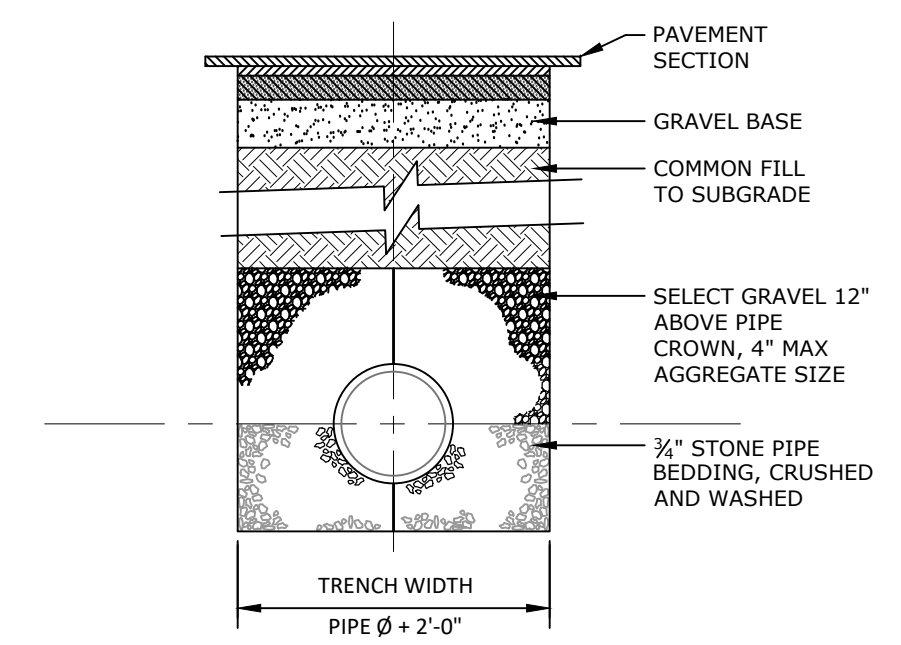
REV.	DATE	DESCRIPTION
A	12-21-20	ISSUED FOR PRELIMINARY SUBDIVISION REVIEW

DETAILS
VERRILL FARM SUBDIVISION
VISTA VIEW LANE & SHAKER ROAD
GRAY, MAINE
FOR:
AMBROSIA DEVELOPMENT & INVESTMENTS
28 WINDYBROOK ROAD
SEABROOK, NH 03874

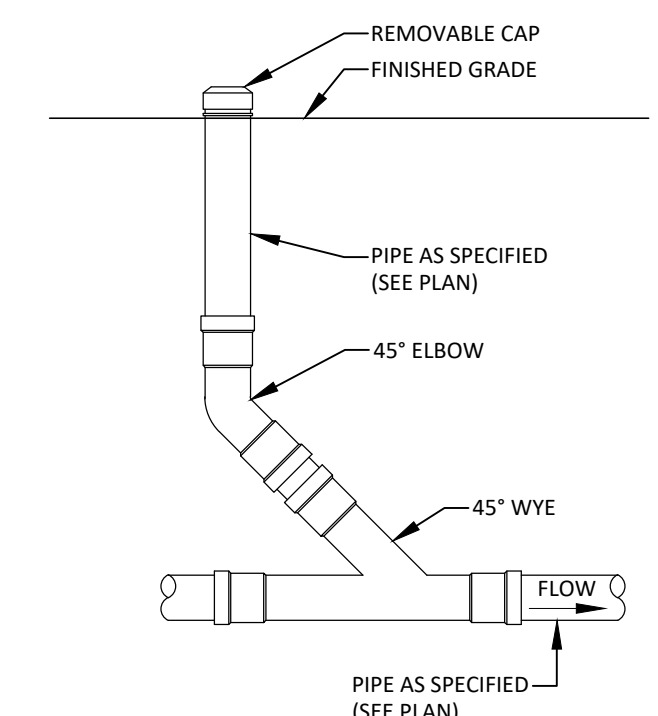
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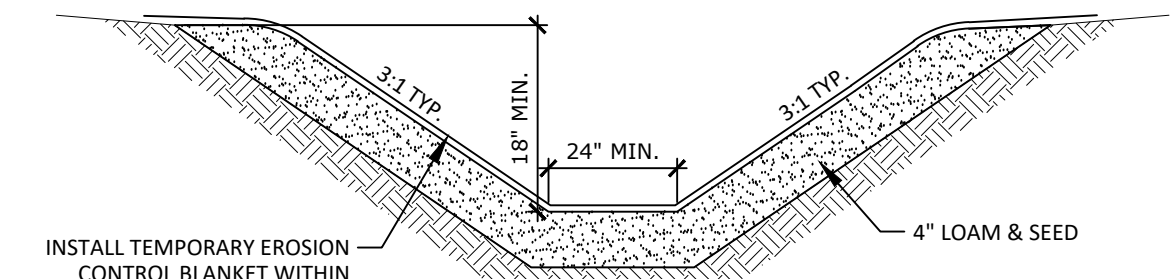
TYPICAL ROADWAY SECTION
NOT TO SCALE



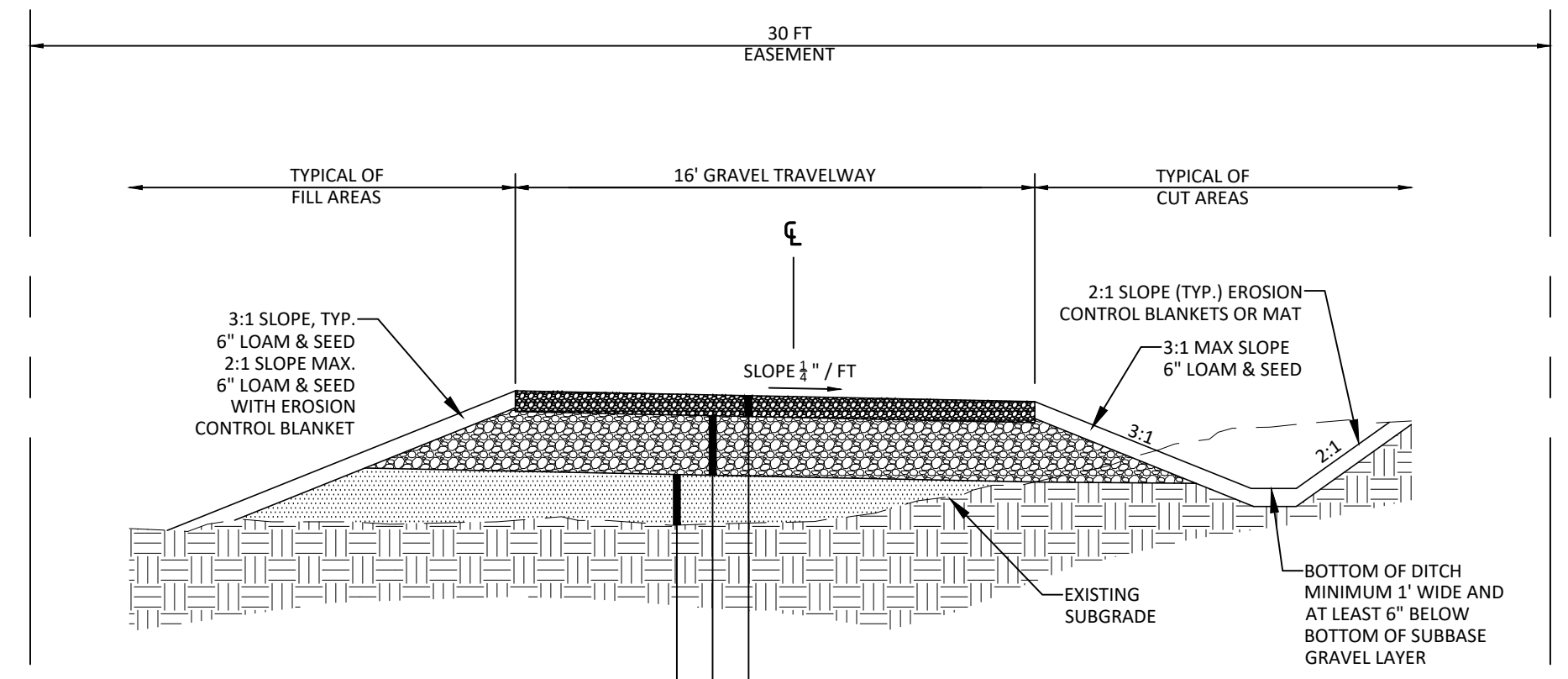
TYPICAL TRENCH SECTION
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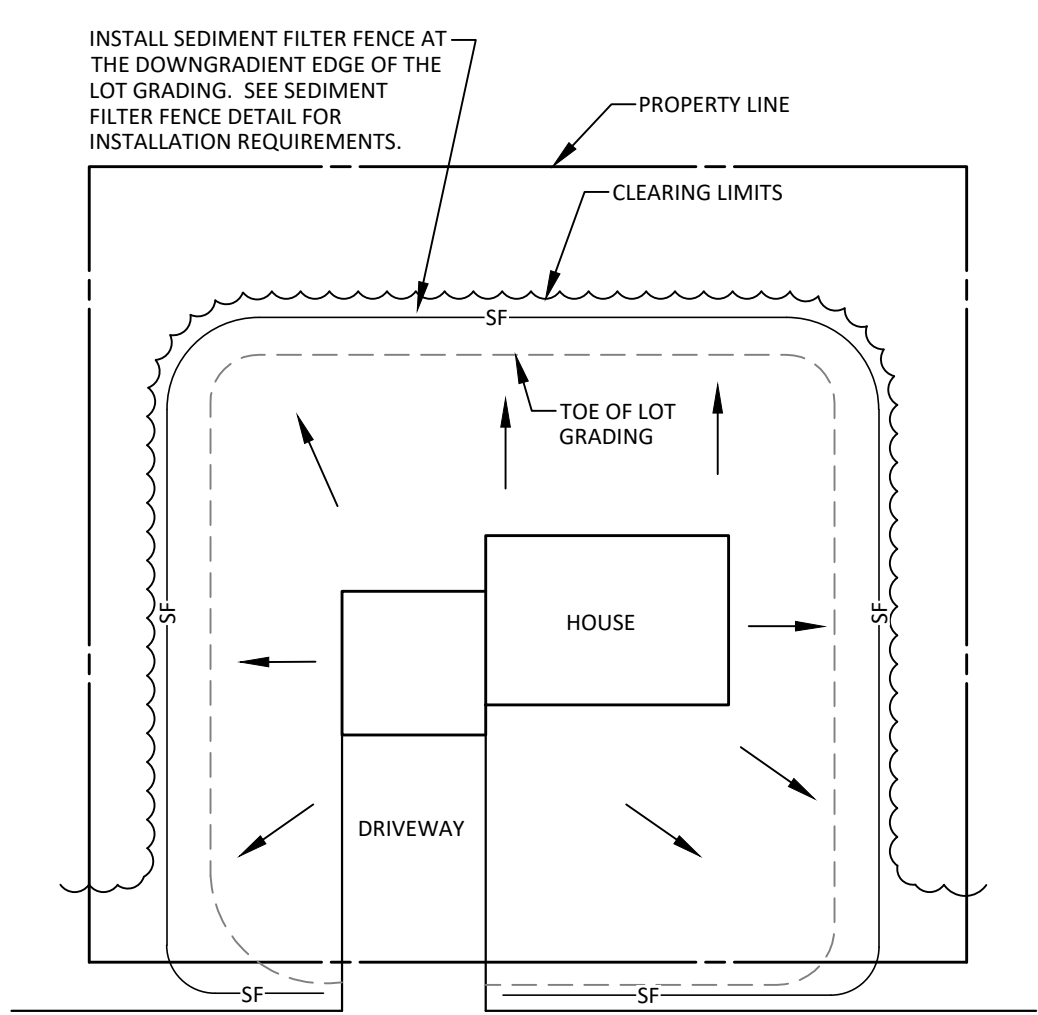
UNDERDRAIN CLEANOUT DETAIL
NOT TO SCALE



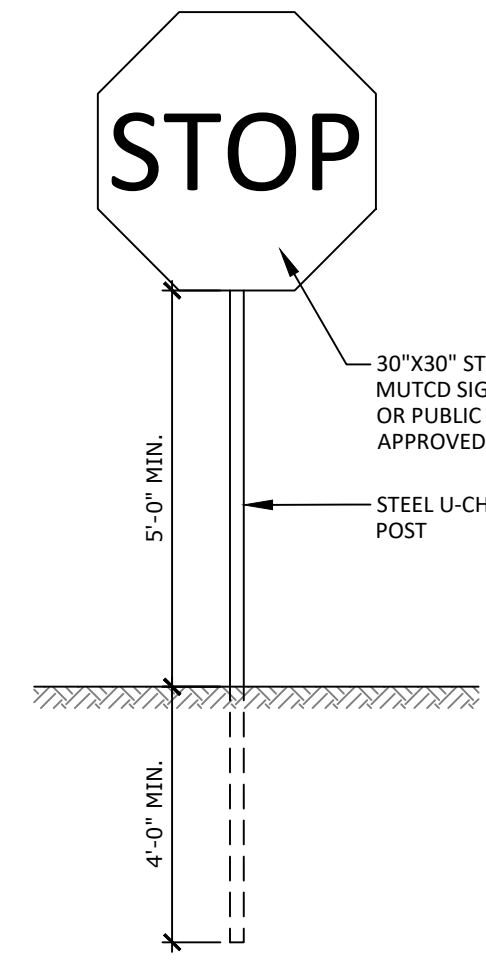
DRAINAGE SWALE
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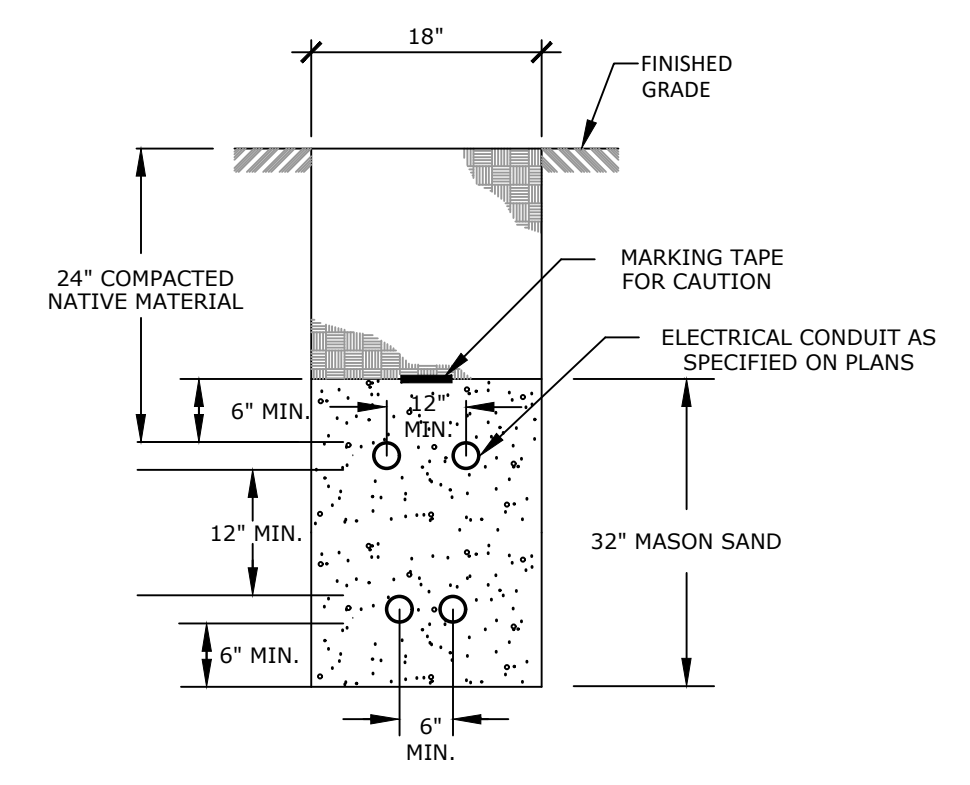
TYPICAL BACKLOT DRIVEWAY SECTION
NOT TO SCALE



TYPICAL HOUSE LOT EROSION CONTROL DETAIL
NOT TO SCALE

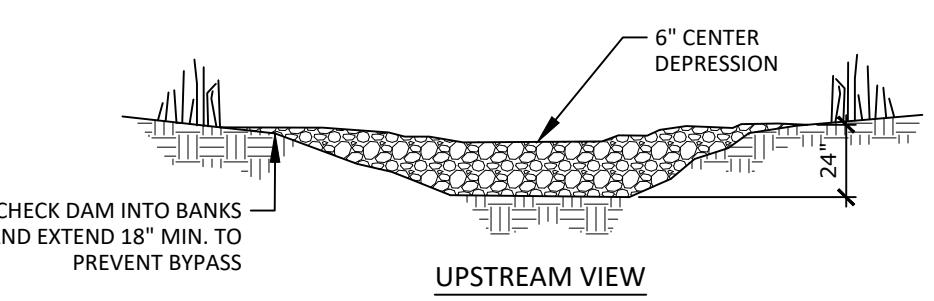


STOP SIGN INSTALLATION
NOT TO SCALE

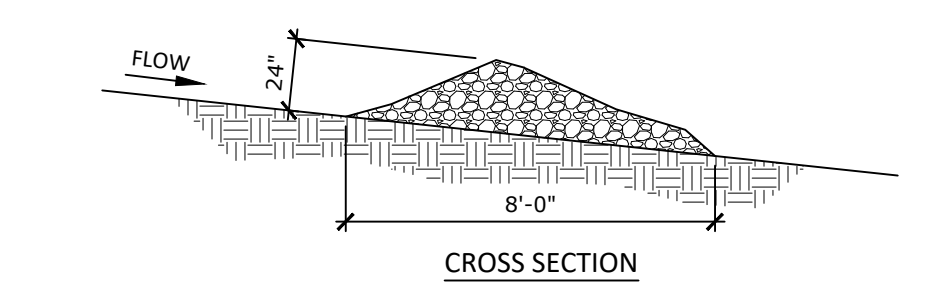


UTILITY TRENCH DETAIL
NOT TO SCALE

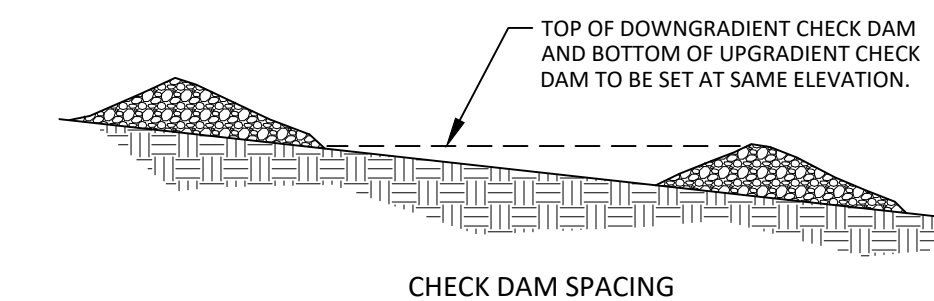
- NOTES:
1. ALL CONDUITS SHALL BE 4" DIA. PVC SCH 40 EXCEPT FOR ROAD CROSSINGS SHALL BE PVC SCH 80
 2. INSTALLATION SHOULD NOT ALLOW THE INTER-TWINGING OF CABLES.
 3. BEDDING AND BACKFILL SHALL BE FREE OF ROOTS, STUMPS AND OTHER DEBRIS.
 4. COMMUNICATION CABLE AND POWER CABLE SHALL HAVE NO LESS THAN 12 INCHES OF RADIAL SEPARATION.



UPSTREAM VIEW



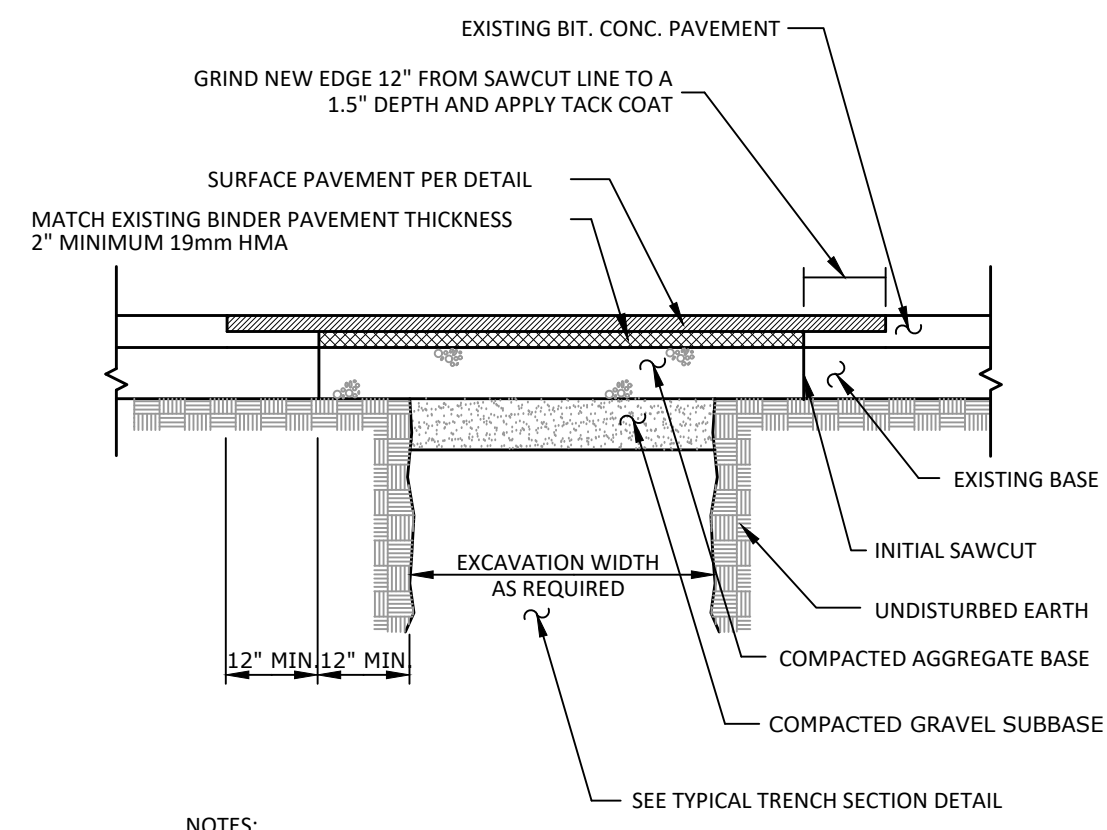
CROSS SECTION



CHECK DAM SPACING

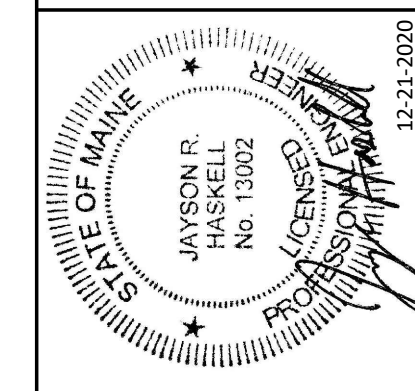
- NOTES:
1. CHECK DAMS SHOULD BE INSTALLED BEFORE RUNOFF IS DIRECTED TO THE SWALE.
 2. THE AREA AROUND THE CHECK DAM SHOULD BE FREE OF DEBRIS.
 3. A STONE CHECK DAM SHOULD BE COMPRISED OF WELL-GRADED CRUSHED ROCK WITH A MAXIMUM SIZE OF 6" AND A MINIMUM STONE SIZE OF 1".
 4. THE MAXIMUM HEIGHT OF A CHECK DAM SHOULD BE 2' WITH A 6" DEPRESSION AT ITS CENTER FOR OVERFLOW. THE EDGES OF THE DAM SHOULD BE KEVED INTO THE EMBANKMENTS TO PREVENT SIDE EROSION.
 5. MECHANICAL PLACEMENT FOLLOWED BY HAND PLACEMENT WILL BE NECESSARY TO ACHIEVE A TIGHT MASS WITHIN THE CHANNEL AND TO ENSURE THAT THE CENTER OF THE DAM IS LOWER THAN THE EDGES.
 6. ANY EROSION DOWNGRADIENT OR AROUND THE EDGES OF STONE CHECK DAMS SHOULD BE CORRECTED IMMEDIATELY.
 7. THE CHECK DAMS MAY BE REMOVED WHEN THE SWALE IS STABILIZED WITH VEGETATION (90% COVERAGE).

STONE CHECK DAM
NOT TO SCALE



- NOTES:
1. SEE TYPICAL ROAD SECTION FOR REQUIRED DEPTHS OF AGGREGATE AND PAVEMENT COURSES

PAVEMENT REPAIR DETAIL
NOT TO SCALE

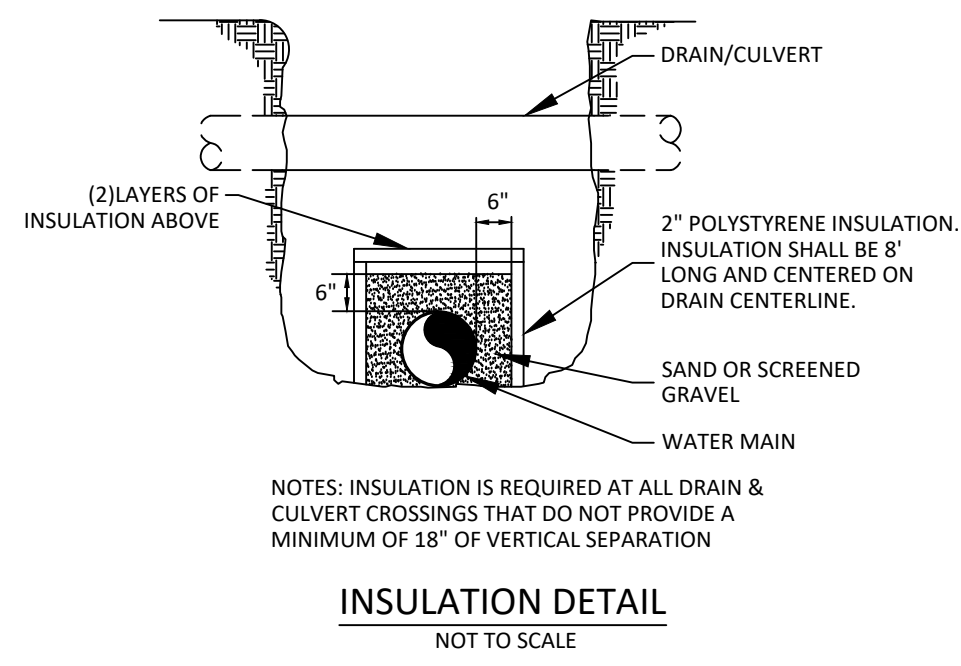


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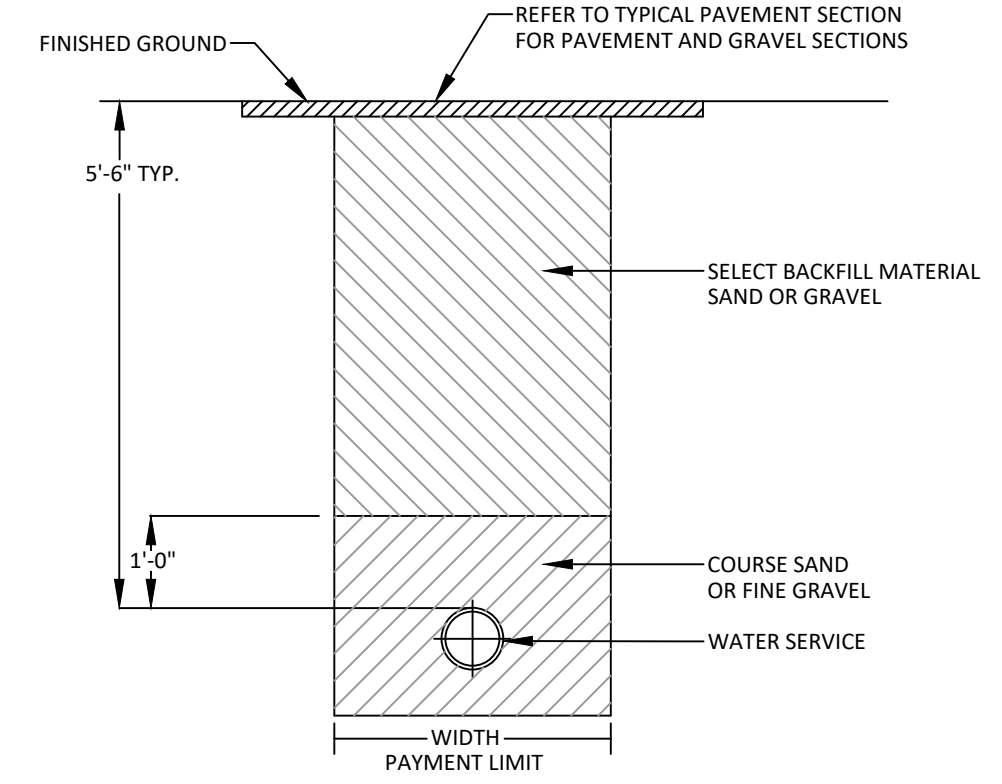
DETAILS
VERRILL FARM SUBDIVISION
VISTA VIEW LANE & SHAWER ROAD
GRAY, MAINE
FOR: AMBROSIA DEVELOPMENT & INVESTMENTS
78 WEBER ROAD
SEABROOK, NH 03874

20053
JOB NUMBER:
AS NOTED
SCALE:
12-21-2020
DATE:
SHEET 10 OF 11
D-2

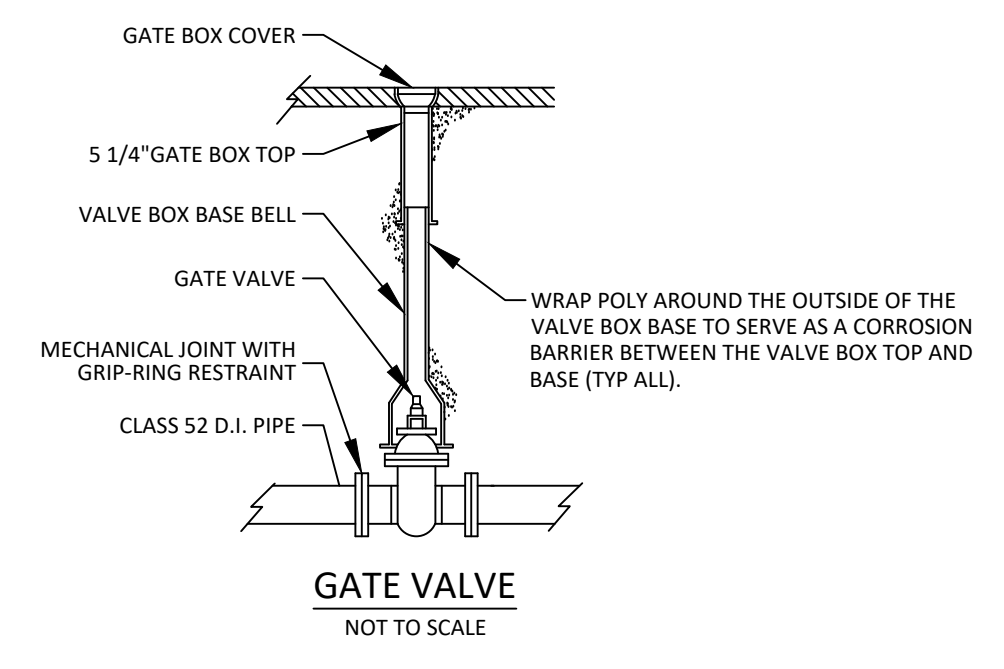


NOTES: INSULATION IS REQUIRED AT ALL DRAIN & CULVERT CROSSINGS THAT DO NOT PROVIDE A MINIMUM OF 18\"/>

INSULATION DETAIL
NOT TO SCALE



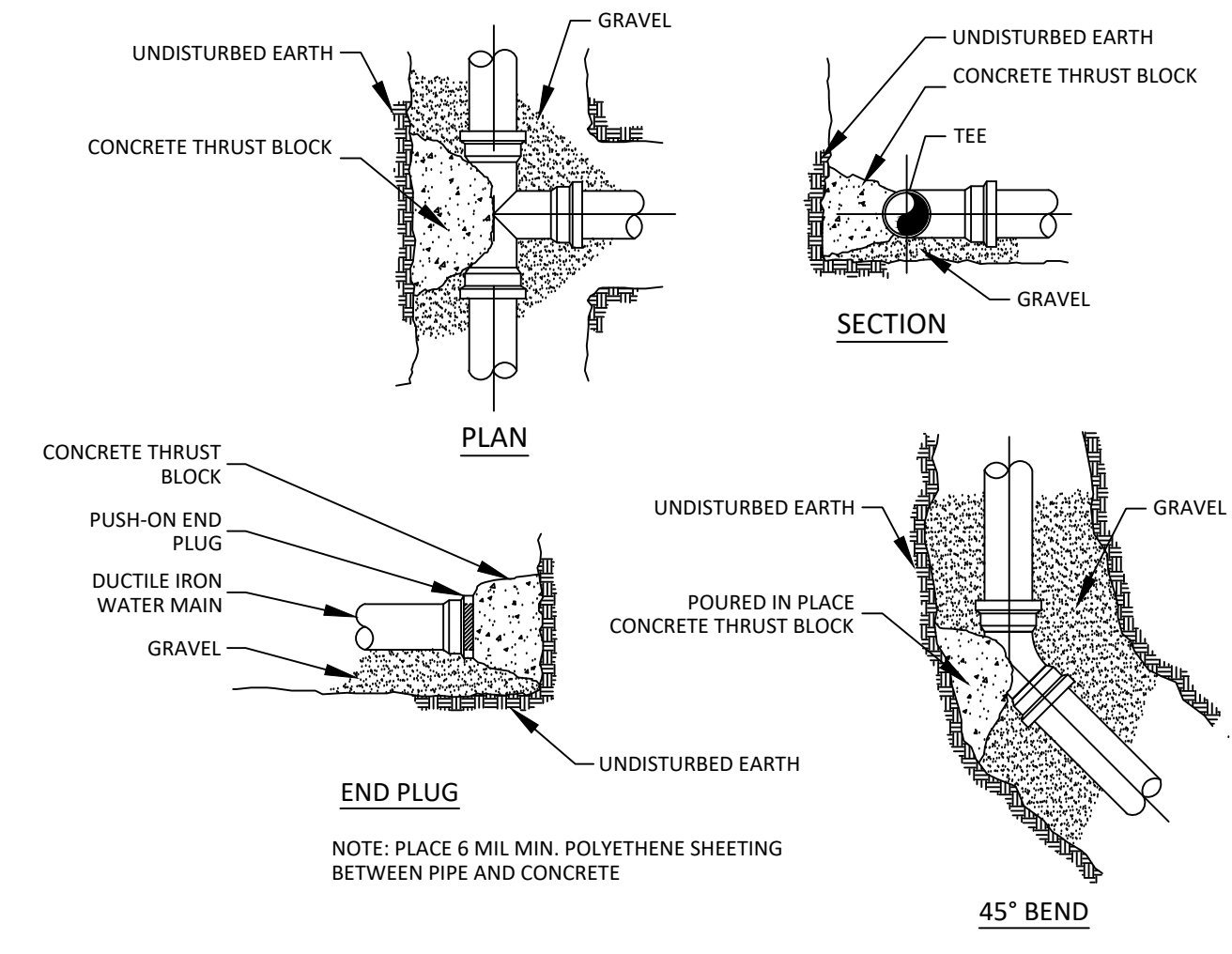
TYPICAL WATER SERVICE TRENCH CROSS-SECTION
NOT TO SCALE



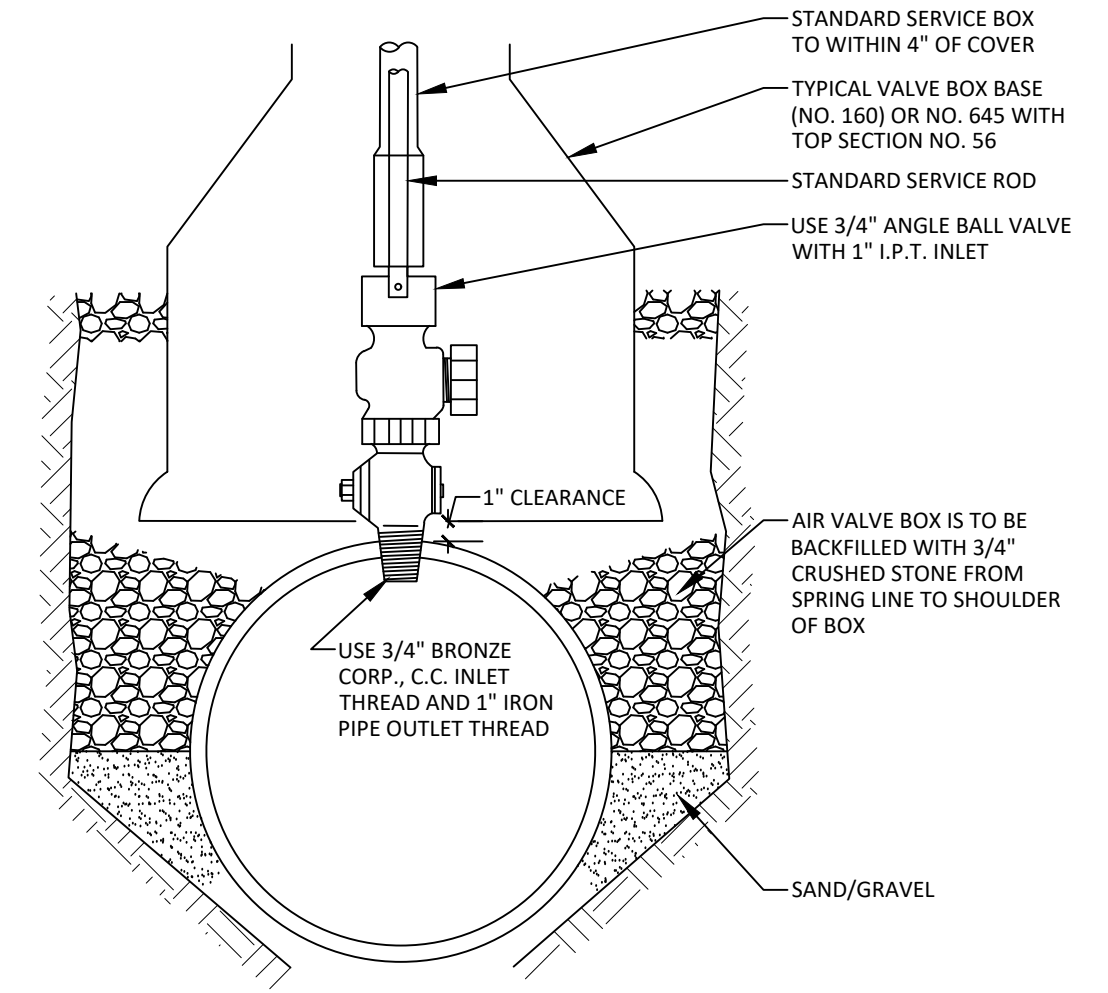
GATE VALVE
NOT TO SCALE

FITTINGS	CONCRETE THRUST BLOCK SIZE REQUIREMENTS			
	SQ. FT. OF BEARING ON UNDISTURBED SOIL			
PIPE SIZE	90° BENDS	45° BENDS	TEES	AND PLUGS
6"	4.0	2.0	3.0	
8"	8.0	4.0	6.0	
12"	15	9	12	
16"	26	14	19	
20"	40	22	28	

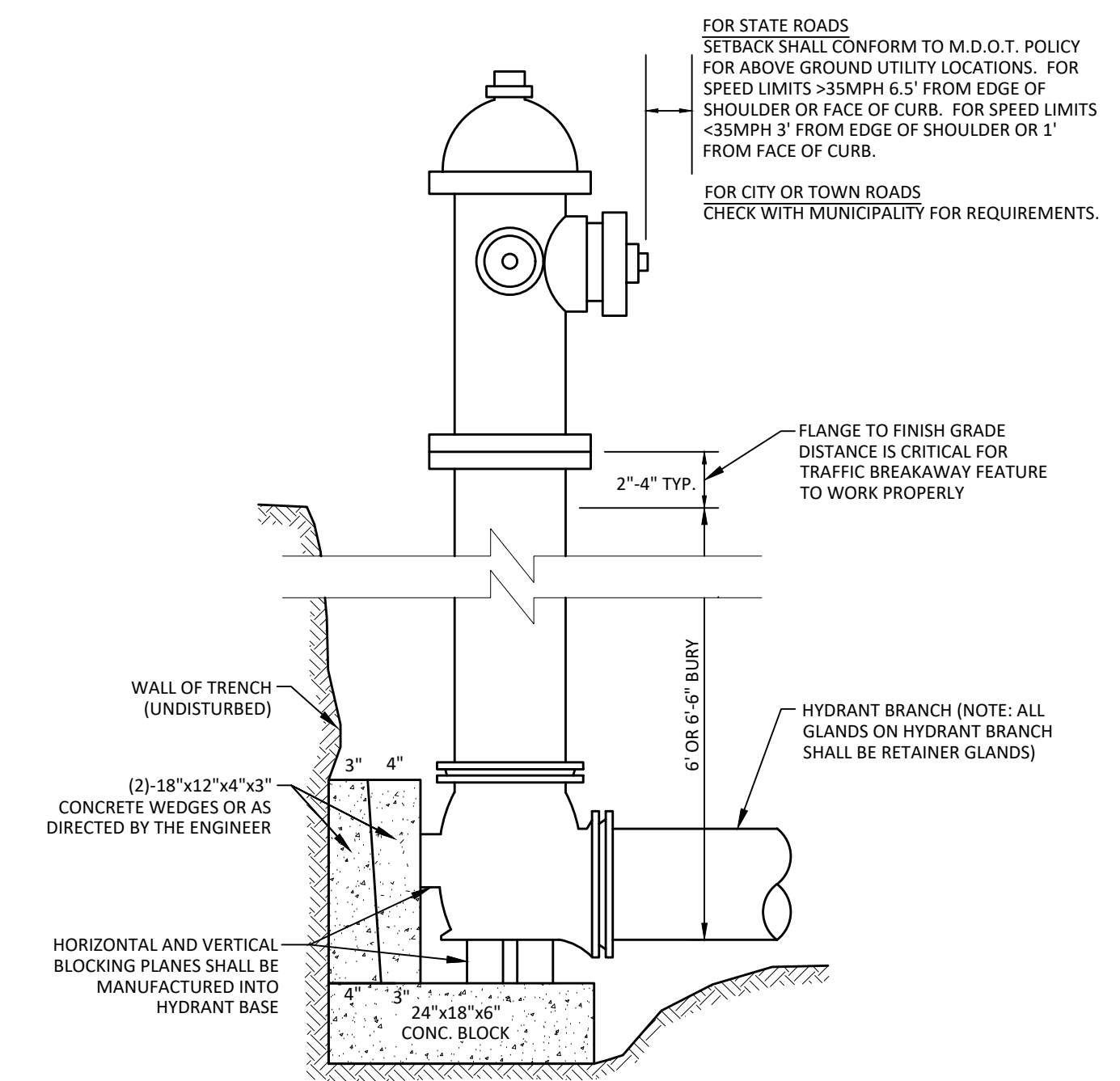
BASED ON SOIL BEARING PRESSURE OF 2000PSF AND 100PSI LINE PRESSURE. COMPACT COURSE TO FINE SANDS AND CLAYS REQUIRE ENGINEERED BLOCKS. ENGINEERED BLOCKS WILL TYPICALLY REQUIRE REINFORCING STEEL OF #5 AT 12\"/>



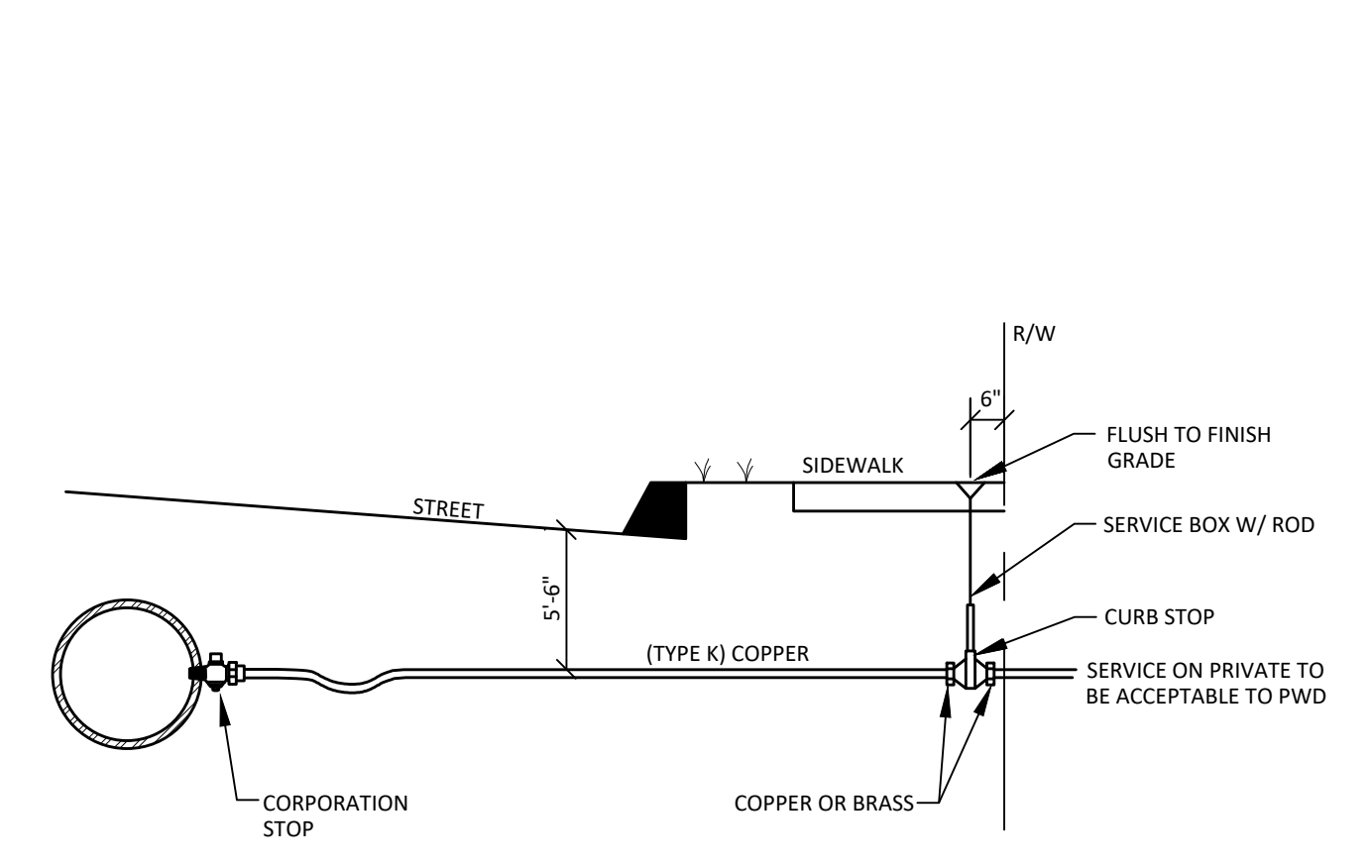
THRUST BLOCK DETAIL
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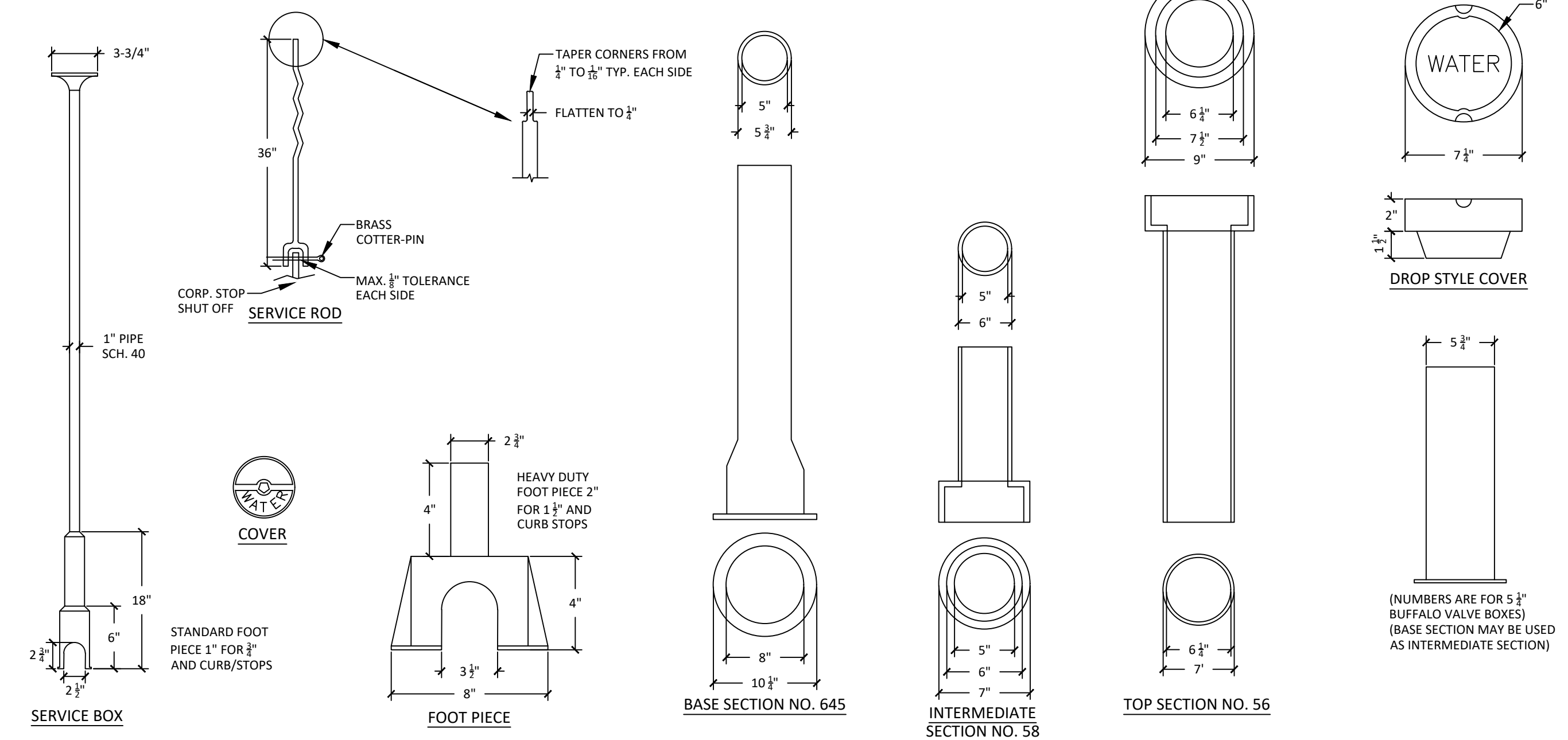
TYPICAL AIR VALVE (1")
NOT TO SCALE



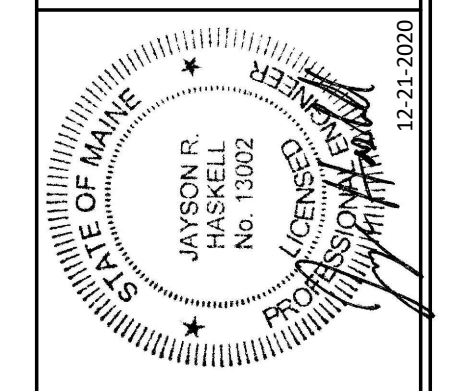
TYPICAL HYDRANT INSTALLATION DETAIL
NOT TO SCALE



TYPICAL SERVICE CONNECTION
NOT TO SCALE



VALVE BOX & COVER
NOT TO SCALE



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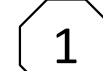






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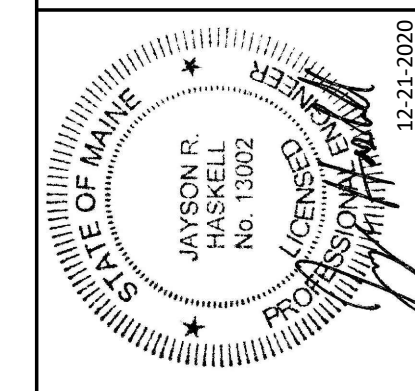
DETAILS
VERRILL FARM SUBDIVISION
VISTA VIEW LANE & SHAWER ROAD
GRAY, MAINE
FOR:
AMBROSIA DEVELOPMENT & INVESTMENTS
78 WEBER ROAD
SEABROOK, NH 03874

20053
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WATERSHED MAP LEGEND

-  WATERSHED NO.
-  REACH/STUDY POINT
-  POND
-  WATERSHED BOUNDARY
-  TIME OF CONCENTRATION
-  REACH PATH
-  SOIL BOUNDARY

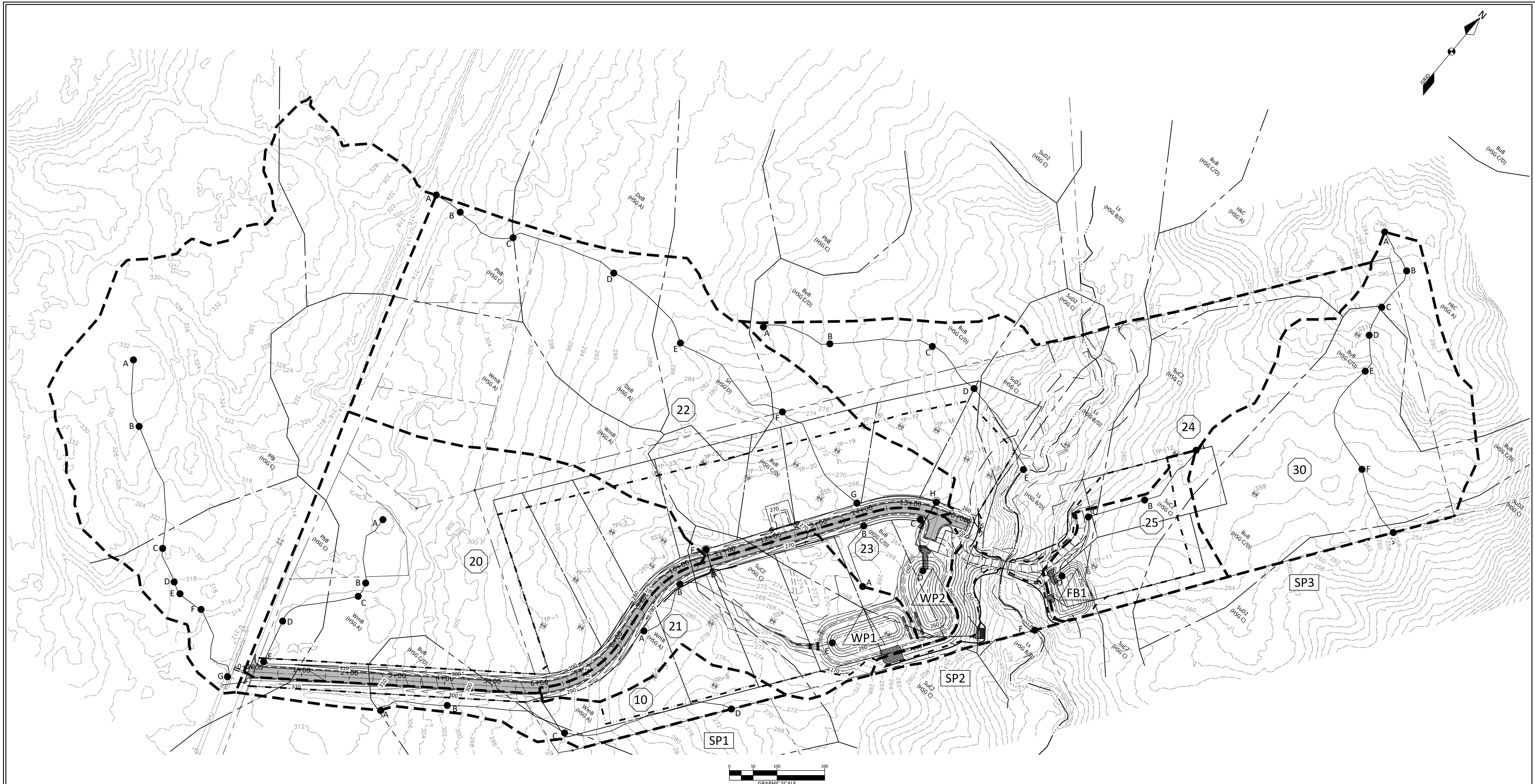


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REV	DATE	BY	DESCRIPTION
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WATERSHED MAP: PRE-DEVELOPMENT
 VERRILL FARM SUBDIVISION
 VISTA VIEW LANE & SHAKER ROAD
 GRAY, MAINE
 FOR: AMBROSIA DEVELOPMENT & INVESTMENTS
 78 WEARE ROAD
 SEABROOK, NH 03874

20053
 JOB NUMBER:
 1" = 100'
 SCALE:
 12-21-2020
 DATE:
 SHEET 1 OF 2
 WS-1



WATERSHED MAP LEGEND

- WATERSHED NO.
- REACH/STUDY POINT
- POND
- WATERSHED BOUNDARY
- TIME OF CONCENTRATION
- REACH PATH
- SOIL BOUNDARY

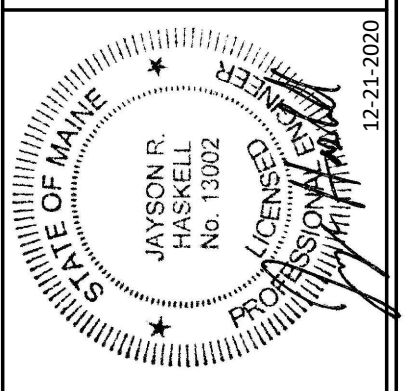
Stormwater Treatment Table

	Total Watershed Area (SF)	New Road Impervious Area (SF)	Assumed Lot Impervious Area (SF)	New Landscaped Area (SF)	Existing/Offsite Impervious Area (SF)*	Existing/Offsite Landscaping Area (SF)*	Existing Undeveloped Area (SF)	Treatment Provided	New Impervious Area Treated (SF)	New Landscaped Area Treated (SF)	Treatment Device
WS-1	501,875	0	0	0	65,753	88,162	347,960	No	0	0	None
WS-10	81,502	0	3,500	29,594	89	102	47,495	Drpdrdge	1,750	0	Drpdrdge Only
WS-20	371,549	21,539	10,500	96,924	32,059	55,438	155,090	Yes	32,039	96,924	Wet Pond 1
WS-21	144,268	8,917	10,500	117,741	0	0	7,110	Yes	19,417	117,741	Wet Pond 1
WS-22	482,613	8,135	10,500	84,484	25,224	61,186	293,083	Yes	18,635	84,484	Wet Pond 2
WS-23	49,842	5,754	3,500	40,589	0	0	0	Yes	9,254	40,589	Wet Pond 2
WS-24	386,191	1,240	3,500	55,088	944	8,195	317,224	Drpdrdge	1,750	0	None
WS-25	72,590	2,124	7,000	44,847	0	0	18,619	Yes	9,124	44,847	FB1
WS-30	257,515	0	0	0	0	0	257,515	No	0	0	None
Total		47,710	49,000	469,266					91,969	384,584	

* The project is not taking credit for the Existing / Offsite impervious and landscaped areas, but are included in the BMP sizing calculations for each treatment device.
 ** Development associated with wetland & stream road crossings are exempt from the Chapter 500 General Standards. Approximately 3,286 s.f. of impervious surface and 4,592 s.f. of landscaped area has been removed from WS-24, which is associated with the stream crossing for the back lot (Lots 13 & 14).

New Impervious Area = 96,710
 New Impervious Area Requiring Treatment (95%) = 91,874
 Provided New Impervious Treatment = 91,969
 95% New Impervious Area Treated

New Developed Area = 565,976
 New Developed Area Requiring Treatment (80%) = 452,781
 New Developed Area Treated = 476,554
 84% New Developed Area Treated



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WATERSHED MAP: POST-DEVELOPMENT
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 GRAY, MAINE
 FOR: AMBROSIA DEVELOPMENT & INVESTMENTS
 28 WEAVER ROAD
 SEABROOK, NH 03874

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 WS-2

STORMWATER MANAGEMENT REPORT

**VERRILL FARM RESIDENTIAL OPEN SPACE SUBDIVISION
SHAKER ROAD
GRAY, MAINE**

A. Narrative

Ambrosia Development & Investments, the applicant, is proposing to develop a 26.5-acre parcel off of Skaker Road in Gray, Maine. The project site is identified as Lot 15-29 on the Town of Gray Assessor's Map 20 and is located in the Rural Residential and Agriculture (RRA) zoning district. The site currently contains a vacant land that has been historically utilized as an agricultural field, and is bisected by Mill Brook.

The proposed development has been designed to the Town of Town of Gray Residential Open Space subdivision standards including 14 single family residential lots served by an approximately 1,600 linear foot paved road off of Shaker Road. The lots will be served by public water (12 of 14 lots) and private wells (2 lots), with all lots being served by private on-site septic systems and underground electrical services.

In general, the property drains southeasterly to Mill Brook ultimately discharging to the Royal River.

B. Alterations to Land Cover

Ambrosia Development & Investments, intends to construct the roadway, public utility and stormwater infrastructure and sell residential lots with homes. The applicant will be responsible for creating approximately 96,710 square feet (2.22± acres) of impervious surface consisting of the proposed roadway, houses and driveways and approximately 469,266 square feet (10.77± acres) of landscaped area totaling approximately 565,976 square feet (12.99± acres) of total developed area.

The Town of Gray's Subdivision Ordinance indicates that the project's stormwater design will be required to meet the Basic, General and Flooding Standards of the Chapter 500 Stormwater Management rules.

The site is moderately sloped (5-9%) with steeper slopes closer to Mill Brook. Soils on the property were determined utilizing the Medium Intensity Soil Maps for Cumberland County, Maine published by the Natural Resources Conservation Service. The soils boundaries and hydrologic soils group (HSG) designations are indicated on the Post Development Watershed Map within the design plan set and a Soils Map has been included as Attachment 1 of this report.

C. Methodology and Modeling Assumptions

The proposed stormwater management system has been designed utilizing Best Management Practices to maintain existing drainage patterns while providing stormwater quality improvement measures. The goal

of the storm drainage system design is to remove potential stormwater pollutants from runoff generated by the development while providing attenuation of the peak rates of runoff leaving the site. The method utilized to predict the surface water runoff rates in this analysis is a computer program entitled HydroCAD, which is based on the same methods that were originally developed by the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, and utilized in the TR-20 modeling program. Peak rates of runoff are forecasted based upon land use, hydrologic soil conditions, vegetative cover, contributing watershed area, time of concentration, rainfall data, storage volumes of detention basins and the hydraulic capacity of structures. The computer model predicts the amount of runoff as a function of time, with the ability to include the attenuation effect due to dams, lakes, large wetlands, floodplains and constructed stormwater management basins. The input data for rainfalls with statistical recurrence frequencies of 2-, 10- and 25 years was obtained from the Northeast Regional Climate Center's extreme precipitation tables for the project site. A highlighted extreme precipitation table is included in Attachment 1 illustrating the rainfall for the modeled storm events.

D. Basic Standards

The project is required by the MDEP and the Town to provide permanent and temporary Erosion Control Best Management Practices. These methods are incorporated into the project design and outlined in detail in the plan set.

E. General Standard

The Town of Gray requires the entire project to meet the General Standards outlined in the MDEP Chapter 500 to provide water quality treatment for no less than 95% of the new road and lot impervious surface and 80% of the total developed area associated with the project.

To provide the required stormwater treatment for the subdivision, two (2) wet ponds, one (1) underdrained filter basin, and roofline dripedges around each house will be constructed as part of the development. As a result of the proposed stormwater infrastructure, the project provides water quality treatment for 95% of the new impervious surfaces and 84% of the new developed areas. General Standard Calculations can be found on the Watershed Maps and enclosed as Attachment 3 in this report.

The BMPs have been designed based on the MDEP guidelines and to provide adequate flooding storage during the larger storm events. These sizing calculations have been included in Attachment 4 of this report. To demonstrate that the design of the wet ponds and the underdrained filter basin have the required 1 foot of freeboard between the emergency spillway and the top of berm during the 25-year storm event assuming failure of the other discharge devices, the HydroCAD output has been provided in Attachment 4 of this report. Additionally, within Attachment 4, are the hydrograph tables for the proposed ponds demonstrating that the outlet controls the release of runoff to drain the channel protection volume between 24 and 48 hours.

F. Flooding Standard

The Town of Gray requires the project to detain, retain or result in the infiltration of stormwater from the 24-hour storms of the 2-year, 10-year and 25-year frequencies such that the peak flows of

stormwater from the project site do not exceed the peak flows of stormwater prior to undertaking the project.

The project’s stormwater design incorporates the integration of two wet ponds and one underdrained soil filter to maintain these peak stormwater flows to pre-developed project conditions. The proposed BMPs are intended to collect the tributary runoff and gradually discharge the stormwater over a 24- to 48-hour period.

The proposed project design has been modeled to evaluate and analyze the stormwater runoff characteristics of the site prior to construction of the project and upon completion of all proposed construction activities.

The first study point, study point 1 (SP-1) is located along the southerly limits of the property, where stormwater generated from both off-site and on-site tributary areas is discharged from the site then continues to drain overland in a southeasterly direction to Mill Brook and ultimately into the Royal River. The sub basin watersheds draining to SP-1 are associated with the westerly portion of the project site as well as offsite area west of Shaker Road that is conveyed under Shaker Road in an existing 15” road culvert. Sub-basin watershed area for SP1 is made up of both proposed onsite development and offsite areas, and consists of developed land, undeveloped woodland and undeveloped meadow areas.

Study point 2 (SP-2) also located along the southerly limits of the property further east than SP-1, where stormwater discharged from the site, is intercepted and conveyed in Mill Brook and ultimately into the Royal River. The sub basin watersheds draining to SP-2 are associated with the central portion of the project site and consists of both off-site and on-site existing and proposed residential development, undeveloped meadow, and woodland.

Study point 3 (SP-2) is located along the southerly property limits further east of SP-2 where stormwater discharged from the site is conveyed overland and into an un-named tributary of Mill Brook. Discharge from SP-3 continues to drain overland in a southeasterly direction to the un-named tributary then into Mill Brook and ultimately into the Royal River. The sub basin watershed associated with SP-3 is associated with the eastern most portion of the project site as well as offsite areas, and consists of undeveloped meadow, and woodland.

The following table summarizes the analysis:

Study Point	2-Year (cfs)		10-Year (cfs)		25-Year (cfs)	
	Pre	Post	Pre	Post	Pre	Post
SP1	4.29	4.01	8.31	7.45	10.04	7.90
SP2	11.41	4.76	26.02	17.03	38.89	31.67
SP3	2.50	2.50	6.06	6.06	9.21	9.21

As illustrated in the table on the previous page, in general the proposed project’s design including the integration of the proposed BMPs, specifically the two proposed wet ponds and the proposed underdrained soil filter basins, maintains or reduces the peak rates of runoff at all study points.

The watershed maps showing pre-development and post-development drainage patterns are included in the plan set and the computations performed with the HydroCAD software program are included as Attachment 5 of this report.

G. Maintenance of common facilities or property

The applicant will be responsible for the maintenance of the stormwater facilities until a homeowner’s association is established and an Inspection, Maintenance and Housekeeping Plan for the project has been created and has been included in Attachment 6 of this report.

Prepared by:

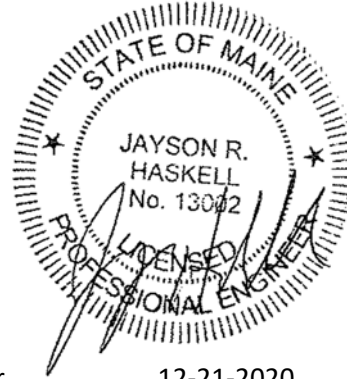
DM ROMA CONSULTING ENGINEERS



J.P. Connolly
Senior Project Engineer



Jayson R. Haskell P.E.
Southern Maine Regional Manager

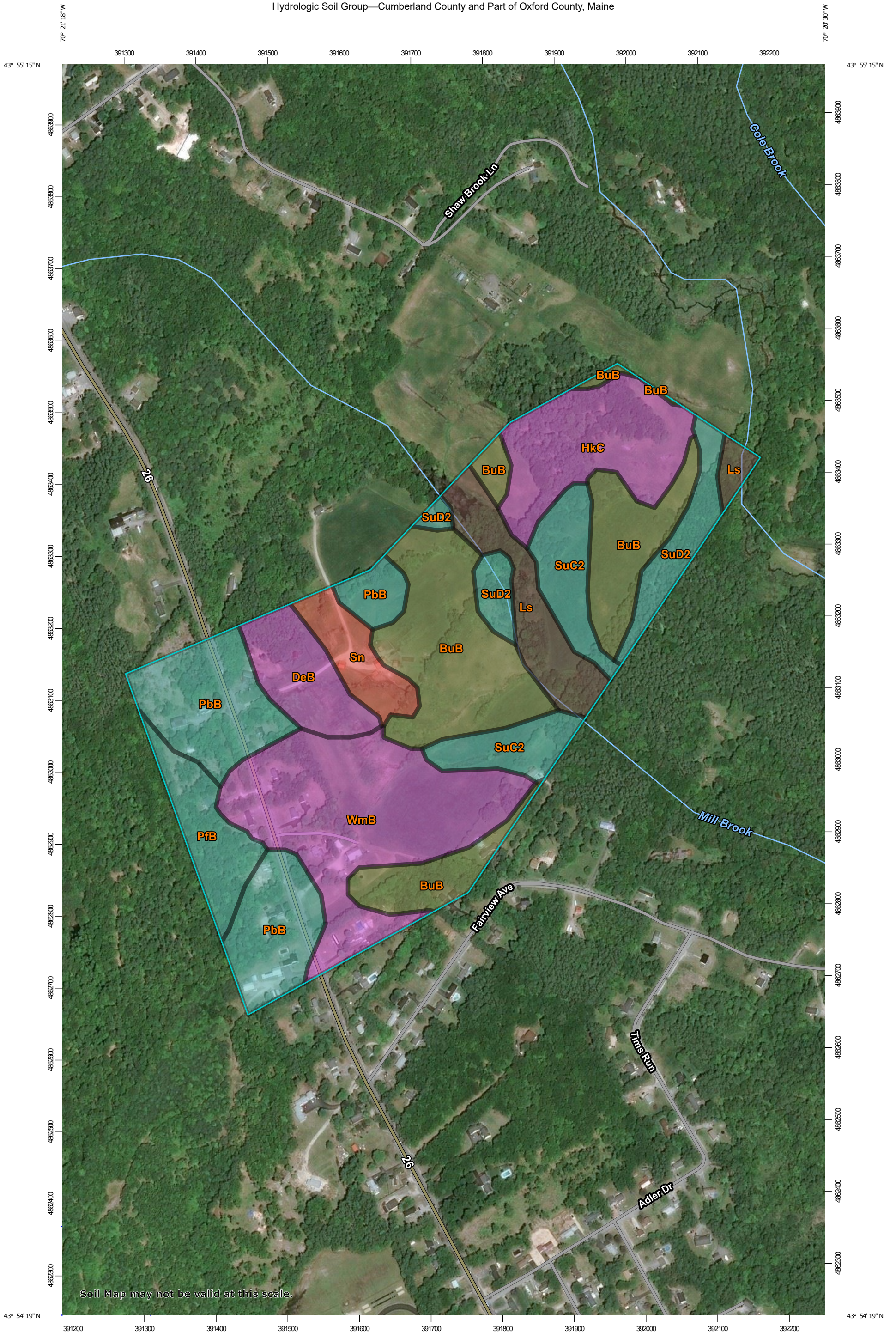


12-21-2020

ATTACHMENT 1

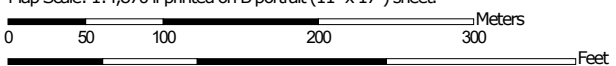
MEDIUM INTENSITY SOILS MAP & EXTREME PRECIPITATION TABLE

Hydrologic Soil Group—Cumberland County and Part of Oxford County, Maine



Soil Map may not be valid at this scale.


Map Scale: 1:4,870 if printed on B portrait (11" x 17") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


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:
 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 17, Jun 5, 2020

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

Date(s) aerial images were photographed: Jun 7, 2019—Jul 2, 2019

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BuB	Lamoine silt loam, 3 to 8 percent slopes	C/D	20.5	22.7%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	A	4.6	5.1%
HkC	Hermon sandy loam, 8 to 20 percent slopes, extremely stony	A	9.1	10.0%
Ls	Limerick-Saco silt loams	B/D	6.0	6.7%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	C	13.9	15.3%
PfB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	C	4.3	4.7%
Sn	Scantic silt loam, 0 to 3 percent slopes	D	3.3	3.6%
SuC2	Suffield silt loam, 8 to 15 percent slopes, eroded	C	6.8	7.5%
SuD2	Suffield silt loam, 15 to 25 percent slopes, eroded	C	4.9	5.5%
WmB	Windsor loamy sand, 0 to 8 percent slopes	A	17.1	18.9%
Totals for Area of Interest			90.5	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Maine
Location	
Longitude	70.352 degrees West
Latitude	43.911 degrees North
Elevation	0 feet
Date/Time	Mon, 21 Dec 2020 08:11:30 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.25	0.38	0.48	0.63	0.78	0.99	1yr	0.67	0.97	1.16	1.50	1.95	2.55	2.90	1yr	2.26	2.78	3.24	3.92	4.48	1yr
2yr	0.32	0.49	0.60	0.80	1.00	1.27	2yr	0.87	1.19	1.48	1.89	2.41	3.09	3.46	2yr	2.74	3.33	3.85	4.58	5.24	2yr
5yr	0.38	0.59	0.73	0.98	1.26	1.61	5yr	1.09	1.49	1.88	2.39	3.04	3.86	4.35	5yr	3.42	4.18	4.82	5.68	6.41	5yr
10yr	0.43	0.67	0.85	1.15	1.50	1.93	10yr	1.29	1.75	2.26	2.87	3.63	4.57	5.16	10yr	4.05	4.97	5.72	6.68	7.48	10yr
25yr	0.51	0.81	1.03	1.42	1.88	2.44	25yr	1.63	2.19	2.87	3.64	4.58	5.72	6.49	25yr	5.07	6.24	7.17	8.29	9.18	25yr
50yr	0.57	0.92	1.18	1.66	2.25	2.94	50yr	1.94	2.59	3.46	4.38	5.48	6.79	7.72	50yr	6.01	7.42	8.52	9.77	10.71	50yr
100yr	0.66	1.08	1.39	1.96	2.68	3.52	100yr	2.31	3.06	4.14	5.23	6.52	8.05	9.18	100yr	7.12	8.83	10.13	11.51	12.51	100yr
200yr	0.76	1.24	1.61	2.31	3.20	4.23	200yr	2.76	3.62	4.97	6.28	7.79	9.55	10.92	200yr	8.45	10.50	12.04	13.56	14.61	200yr
500yr	0.92	1.52	1.98	2.88	4.05	5.38	500yr	3.49	4.54	6.33	7.97	9.84	11.97	13.75	500yr	10.60	13.22	15.14	16.85	17.96	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.72	0.87	1yr	0.62	0.85	1.03	1.36	1.79	2.30	2.60	1yr	2.03	2.50	3.04	3.60	4.19	1yr
2yr	0.30	0.47	0.58	0.78	0.96	1.18	2yr	0.83	1.15	1.37	1.86	2.40	2.99	3.36	2yr	2.64	3.23	3.73	4.46	5.09	2yr
5yr	0.34	0.52	0.65	0.89	1.13	1.39	5yr	0.98	1.36	1.61	2.16	2.84	3.57	4.01	5yr	3.16	3.86	4.46	5.25	5.98	5yr
10yr	0.37	0.57	0.71	0.99	1.27	1.58	10yr	1.10	1.54	1.81	2.42	3.21	4.05	4.59	10yr	3.59	4.41	5.08	5.91	6.72	10yr
25yr	0.42	0.64	0.79	1.13	1.49	1.86	25yr	1.29	1.82	2.13	2.86	3.69	4.78	5.47	25yr	4.23	5.26	6.04	6.89	7.84	25yr
50yr	0.45	0.69	0.86	1.24	1.67	2.09	50yr	1.44	2.05	2.40	3.26	4.18	5.41	6.24	50yr	4.79	6.00	6.89	7.70	8.78	50yr
100yr	0.50	0.75	0.94	1.36	1.86	2.37	100yr	1.61	2.32	2.70	3.49	4.73	6.11	7.10	100yr	5.41	6.83	7.83	8.60	9.81	100yr
200yr	0.54	0.81	1.02	1.48	2.07	2.63	200yr	1.78	2.57	3.06	3.90	5.35	6.87	8.07	200yr	6.08	7.76	8.89	9.58	10.92	200yr
500yr	0.60	0.90	1.16	1.68	2.39	3.08	500yr	2.06	3.01	3.58	4.50	6.29	8.03	9.55	500yr	7.11	9.19	10.50	11.02	12.53	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.27	0.42	0.52	0.70	0.86	1.09	1yr	0.74	1.06	1.25	1.72	2.22	2.75	3.11	1yr	2.44	2.99	3.48	4.19	4.74	1yr
2yr	0.33	0.51	0.63	0.85	1.05	1.27	2yr	0.91	1.24	1.47	2.01	2.59	3.21	3.60	2yr	2.84	3.46	3.98	4.75	5.40	2yr
5yr	0.41	0.64	0.79	1.08	1.38	1.66	5yr	1.19	1.62	1.92	2.60	3.39	4.16	4.70	5yr	3.68	4.52	5.20	6.09	6.84	5yr
10yr	0.49	0.76	0.94	1.31	1.70	2.03	10yr	1.46	1.98	2.35	3.18	4.19	5.09	5.79	10yr	4.51	5.57	6.39	7.37	8.20	10yr
25yr	0.64	0.97	1.20	1.72	2.26	2.67	25yr	1.95	2.61	3.07	4.10	5.42	6.65	7.60	25yr	5.89	7.31	8.38	9.53	10.45	25yr
50yr	0.77	1.17	1.45	2.09	2.81	3.28	50yr	2.43	3.21	3.77	5.06	6.73	8.16	9.36	50yr	7.22	9.00	10.30	11.57	12.56	50yr
100yr	0.93	1.41	1.76	2.55	3.50	4.04	100yr	3.02	3.95	4.62	6.19	8.37	10.01	11.54	100yr	8.86	11.09	12.69	14.09	15.13	100yr
200yr	1.13	1.70	2.15	3.11	4.34	4.87	200yr	3.74	4.76	5.67	7.58	10.43	12.30	14.23	200yr	10.89	13.68	15.63	17.16	18.24	200yr
500yr	1.47	2.18	2.81	4.08	5.80	6.44	500yr	5.01	6.29	7.43	9.92	13.98	16.18	18.80	500yr	14.32	18.08	20.62	22.33	23.43	500yr



ATTACHMENT 2

TEST PIT LOGS



VERRILL FARMS, SHAKER ROAD, GRAY 9-4-20

<p>Observation Hole # <u>TP-1</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Depth below mineral soil surface (inches)</th> <th style="width: 20%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td>SANDY</td><td></td><td>DARK</td><td></td></tr> <tr><td>6</td><td>LOAM</td><td>FRIABLE</td><td>BROWN</td><td></td></tr> <tr><td>12</td><td>LOAMY SAND</td><td></td><td>YELLOW BROWN</td><td></td></tr> <tr><td>18</td><td>SILT LOAM</td><td>FIRM</td><td>GRAY</td><td>FEW</td></tr> <tr><td>24</td><td></td><td></td><td></td><td></td></tr> <tr><td>30</td><td></td><td></td><td></td><td></td></tr> <tr><td>36</td><td></td><td></td><td></td><td></td></tr> <tr><td>42</td><td></td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 10%;">Soil Profile</td> <td style="width: 15%;">Classification Condition</td> <td style="width: 10%;">Slope Percent</td> <td style="width: 15%;">Limiting Factor Depth</td> <td style="width: 50%;"> <input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> <tr> <td>7</td> <td>C</td> <td></td> <td>16</td> <td></td> </tr> </table>	Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	0	SANDY		DARK		6	LOAM	FRIABLE	BROWN		12	LOAMY SAND		YELLOW BROWN		18	SILT LOAM	FIRM	GRAY	FEW	24					30					36					42					48					Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth	7	C		16		<p>Observation Hole # <u>TP-2</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Depth below mineral soil surface (inches)</th> <th style="width: 20%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td>FINE SAND</td><td></td><td>DARK BROWN</td><td></td></tr> <tr><td>6</td><td>LOAM</td><td>FRIABLE</td><td>BROWN</td><td></td></tr> <tr><td>12</td><td>VERY FINE SAND</td><td></td><td>GRAY</td><td>FEW</td></tr> <tr><td>18</td><td>FINE SANDY LOAM</td><td>FIRM</td><td></td><td></td></tr> <tr><td>24</td><td>TD</td><td></td><td></td><td></td></tr> <tr><td>30</td><td>SILT</td><td></td><td></td><td></td></tr> <tr><td>36</td><td>LOAM</td><td></td><td></td><td></td></tr> <tr><td>42</td><td></td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 10%;">Soil Profile</td> <td style="width: 15%;">Classification Condition</td> <td style="width: 10%;">Slope Percent</td> <td style="width: 15%;">Limiting Factor Depth</td> <td style="width: 50%;"> <input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> <tr> <td>8</td> <td>D</td> <td></td> <td>10</td> <td></td> </tr> </table>	Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	0	FINE SAND		DARK BROWN		6	LOAM	FRIABLE	BROWN		12	VERY FINE SAND		GRAY	FEW	18	FINE SANDY LOAM	FIRM			24	TD				30	SILT				36	LOAM				42					48					Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth	8	D		10	
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Site Evaluator Signature

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VERRILL FARMS, SHAKER ROAD, GRAY 9-4-20

<p>Observation Hole # <u>TP5</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Depth below mineral soil surface (inches)</th> <th style="width: 15%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td></td><td></td><td>DARK BROWN</td><td></td></tr> <tr><td>6</td><td>FINE SANDY/LOAM</td><td>FRIABLE</td><td>BROWN</td><td></td></tr> <tr><td>12</td><td></td><td></td><td>LIGHT BROWN</td><td></td></tr> <tr><td>18</td><td></td><td></td><td></td><td>FEW</td></tr> <tr><td>24</td><td>SILT LOAM</td><td>FIRM</td><td>GRAY BROWN</td><td></td></tr> <tr><td>30</td><td></td><td></td><td></td><td></td></tr> <tr><td>36</td><td></td><td></td><td></td><td></td></tr> <tr><td>42</td><td></td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile</td> <td style="width: 15%;">Classification Condition</td> <td style="width: 15%;">Slope Percent</td> <td style="width: 15%;">Limiting Factor Depth</td> <td style="width: 40%;"> <input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> <tr> <td></td> <td style="text-align: center;">C</td> <td></td> <td style="text-align: center;">16</td> <td></td> </tr> </table>	Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	0			DARK BROWN		6	FINE SANDY/LOAM	FRIABLE	BROWN		12			LIGHT BROWN		18				FEW	24	SILT LOAM	FIRM	GRAY BROWN		30					36					42					48					Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth		C		16		<p>Observation Hole # <u>TP6</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Depth below mineral soil surface (inches)</th> <th style="width: 15%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td></td><td></td><td>DARK BROWN</td><td></td></tr> <tr><td>6</td><td>FINE SANDY/LOAM</td><td>FRIABLE</td><td>BROWN</td><td></td></tr> <tr><td>12</td><td></td><td></td><td>YELLOW BROWN</td><td></td></tr> <tr><td>18</td><td></td><td></td><td></td><td></td></tr> <tr><td>24</td><td>SILT LOAM</td><td>FIRM</td><td>GRAY BROWN</td><td>FEW</td></tr> <tr><td>30</td><td></td><td></td><td></td><td></td></tr> <tr><td>36</td><td></td><td></td><td></td><td></td></tr> <tr><td>42</td><td></td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile</td> <td style="width: 15%;">Classification Condition</td> <td style="width: 15%;">Slope Percent</td> <td style="width: 15%;">Limiting Factor Depth</td> <td style="width: 40%;"> <input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> <tr> <td></td> <td style="text-align: center;">C</td> <td></td> <td style="text-align: center;">16</td> <td></td> </tr> </table>	Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	0			DARK BROWN		6	FINE SANDY/LOAM	FRIABLE	BROWN		12			YELLOW BROWN		18					24	SILT LOAM	FIRM	GRAY BROWN	FEW	30					36					42					48					Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth		C		16	
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Mark Cenci 262 9-23-20
 Site Evaluator Signature SE # Date

93 Mill Road • North Yarmouth, Maine 04097
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VERRILL FARMS, SHAKER ROAD, GRAY 9-4-20

<p>Observation Hole # <u>TP-9</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td>FINE</td><td>DARK</td><td></td></tr> <tr><td>6</td><td>SANDY LOAM</td><td>FRIABLE BROWN</td><td></td></tr> <tr><td>12</td><td></td><td>YELLOW</td><td></td></tr> <tr><td>18</td><td>FINE SAND</td><td>LOOSE BROWN</td><td></td></tr> <tr><td>24</td><td></td><td></td><td></td></tr> <tr><td>30</td><td></td><td></td><td></td></tr> <tr><td>36</td><td></td><td>GRAY BROWN</td><td>NONE</td></tr> <tr><td>42</td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile <u>5</u></td> <td style="width: 15%;">Classification Condition <u>B</u></td> <td style="width: 15%;">Slope Percent</td> <td style="width: 15%;">Limiting Factor Depth <u>—</u></td> <td style="width: 40%;"> <input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> </table>	Texture	Consistency	Color	Mottling	0	FINE	DARK		6	SANDY LOAM	FRIABLE BROWN		12		YELLOW		18	FINE SAND	LOOSE BROWN		24				30				36		GRAY BROWN	NONE	42				48				Soil Profile <u>5</u>	Classification Condition <u>B</u>	Slope Percent	Limiting Factor Depth <u>—</u>	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth	<p>Observation Hole # <u>TP-10</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td>FINE</td><td>DARK</td><td></td></tr> <tr><td>6</td><td>SANDY LOAM</td><td>FRIABLE BROWN</td><td></td></tr> <tr><td>12</td><td></td><td>YELLOW</td><td></td></tr> <tr><td>18</td><td>FINE SAND</td><td>LOOSE BROWN</td><td></td></tr> <tr><td>24</td><td></td><td></td><td></td></tr> <tr><td>30</td><td></td><td></td><td></td></tr> <tr><td>36</td><td>SILT LOAM</td><td>FIRM GRAY</td><td>FEW</td></tr> <tr><td>42</td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile <u>7</u></td> <td style="width: 15%;">Classification Condition <u>C</u></td> <td style="width: 15%;">Slope Percent</td> <td style="width: 15%;">Limiting Factor Depth <u>30</u></td> <td style="width: 40%;"> <input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> </table>	Texture	Consistency	Color	Mottling	0	FINE	DARK		6	SANDY LOAM	FRIABLE BROWN		12		YELLOW		18	FINE SAND	LOOSE BROWN		24				30				36	SILT LOAM	FIRM GRAY	FEW	42				48				Soil Profile <u>7</u>	Classification Condition <u>C</u>	Slope Percent	Limiting Factor Depth <u>30</u>	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
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<p>Observation Hole # <u>TP-11</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td>FINE</td><td>DARK</td><td></td></tr> <tr><td>6</td><td>SANDY LOAM</td><td>FRIABLE BROWN</td><td></td></tr> <tr><td>12</td><td></td><td>OLIVE BROWN</td><td>COMMON</td></tr> <tr><td>18</td><td>SILT LOAM</td><td>FIRM GRAY BROWN</td><td></td></tr> <tr><td>24</td><td></td><td></td><td></td></tr> <tr><td>30</td><td></td><td></td><td></td></tr> <tr><td>36</td><td></td><td></td><td></td></tr> <tr><td>42</td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile <u>8</u></td> <td style="width: 15%;">Classification Condition <u>D</u></td> <td style="width: 15%;">Slope Percent</td> <td style="width: 15%;">Limiting Factor Depth <u>10</u></td> <td style="width: 40%;"> <input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> </table>	Texture	Consistency	Color	Mottling	0	FINE	DARK		6	SANDY LOAM	FRIABLE BROWN		12		OLIVE BROWN	COMMON	18	SILT LOAM	FIRM GRAY BROWN		24				30				36				42				48				Soil Profile <u>8</u>	Classification Condition <u>D</u>	Slope Percent	Limiting Factor Depth <u>10</u>	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth	<p>Observation Hole # <u>TP-12</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td>SILT</td><td>SOME BK.</td><td></td></tr> <tr><td>6</td><td>LOAM</td><td>WHIT BROWN</td><td></td></tr> <tr><td>12</td><td></td><td>FIRM</td><td></td></tr> <tr><td>18</td><td>SAND</td><td>LOOSE YELLOW</td><td></td></tr> <tr><td>24</td><td></td><td>BROWN</td><td></td></tr> <tr><td>30</td><td></td><td></td><td></td></tr> <tr><td>36</td><td></td><td></td><td></td></tr> <tr><td>42</td><td>SANDY LOAM</td><td>FIRM GRAY</td><td>COMMON</td></tr> <tr><td>48</td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile <u>7</u></td> <td style="width: 15%;">Classification Condition <u>C</u></td> <td style="width: 15%;">Slope Percent</td> <td style="width: 15%;">Limiting Factor Depth <u>40</u></td> <td style="width: 40%;"> <input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> </table>	Texture	Consistency	Color	Mottling	0	SILT	SOME BK.		6	LOAM	WHIT BROWN		12		FIRM		18	SAND	LOOSE YELLOW		24		BROWN		30				36				42	SANDY LOAM	FIRM GRAY	COMMON	48				Soil Profile <u>7</u>	Classification Condition <u>C</u>	Slope Percent	Limiting Factor Depth <u>40</u>	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
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VERRILL FARMS, SLAKER ROAD, GRAY 9-4-20

<p>Observation Hole # <u>TP-13</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Depth below mineral soil surface (inches)</th> <th style="width: 15%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td></td><td></td><td>DARK BROWN</td><td></td></tr> <tr><td>6</td><td>FINE</td><td></td><td></td><td></td></tr> <tr><td>12</td><td>SANDY FINE</td><td>FRAGILE</td><td>LIGHT BROWN</td><td></td></tr> <tr><td>18</td><td>LOAM</td><td></td><td></td><td></td></tr> <tr><td>24</td><td></td><td></td><td></td><td></td></tr> <tr><td>30</td><td>SILT LOAM</td><td>FIRM</td><td>GRAY</td><td>FEW</td></tr> <tr><td>36</td><td></td><td></td><td></td><td></td></tr> <tr><td>42</td><td></td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile: <u>8</u></td> <td style="width: 15%;">Classification: <u>C</u></td> <td style="width: 15%;">Slope: _____ Percent</td> <td style="width: 15%;">Limiting Factor: <u>30</u> Depth</td> <td style="width: 40%;"> <input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> </table>	Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	0			DARK BROWN		6	FINE				12	SANDY FINE	FRAGILE	LIGHT BROWN		18	LOAM				24					30	SILT LOAM	FIRM	GRAY	FEW	36					42					48					Soil Profile: <u>8</u>	Classification: <u>C</u>	Slope: _____ Percent	Limiting Factor: <u>30</u> Depth	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth	<p>Observation Hole # <u>TP-14</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Depth below mineral soil surface (inches)</th> <th style="width: 15%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td></td><td></td><td>DARK BROWN</td><td></td></tr> <tr><td>6</td><td>FINE SANDY</td><td>FRAGILE</td><td>YELLOW BROWN</td><td></td></tr> <tr><td>12</td><td>LOAM</td><td></td><td></td><td></td></tr> <tr><td>18</td><td>SILT LOAM</td><td>FIRM</td><td>GRAY BROWN</td><td></td></tr> <tr><td>24</td><td></td><td></td><td></td><td></td></tr> <tr><td>30</td><td></td><td></td><td></td><td></td></tr> <tr><td>36</td><td></td><td></td><td></td><td></td></tr> <tr><td>42</td><td></td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile: <u>8</u></td> <td style="width: 15%;">Classification: <u>C</u></td> <td style="width: 15%;">Slope: _____ Percent</td> <td style="width: 15%;">Limiting Factor: _____ Depth</td> <td style="width: 40%;"> <input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> </table>	Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	0			DARK BROWN		6	FINE SANDY	FRAGILE	YELLOW BROWN		12	LOAM				18	SILT LOAM	FIRM	GRAY BROWN		24					30					36					42					48					Soil Profile: <u>8</u>	Classification: <u>C</u>	Slope: _____ Percent	Limiting Factor: _____ Depth	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
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Date



VERRILL FARMS, SHAKER ROAD, GRAY 9-4-20

<p>Observation Hole # <u>TP-17</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Depth below mineral soil surface (inches)</th> <th style="width: 20%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td>FINE</td><td></td><td>DARK</td><td></td></tr> <tr><td>6</td><td>SANDY</td><td>FRIABLE</td><td>BROWN</td><td></td></tr> <tr><td>12</td><td>LOAM</td><td></td><td>LIGHT BROWN</td><td></td></tr> <tr><td>18</td><td></td><td></td><td></td><td>FEW</td></tr> <tr><td>24</td><td>SILT</td><td>FIRM</td><td>GRAY</td><td></td></tr> <tr><td>30</td><td>LOAM</td><td></td><td>BROWN</td><td></td></tr> <tr><td>36</td><td></td><td></td><td></td><td></td></tr> <tr><td>42</td><td></td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile <u>8</u></td> <td style="width: 15%;">Classification Condition <u>C</u></td> <td style="width: 15%;">Slope Percent _____</td> <td style="width: 15%;">Limiting Factor Depth <u>15</u></td> <td style="width: 40%;"> <input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> </table>	Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	0	FINE		DARK		6	SANDY	FRIABLE	BROWN		12	LOAM		LIGHT BROWN		18				FEW	24	SILT	FIRM	GRAY		30	LOAM		BROWN		36					42					48					Soil Profile <u>8</u>	Classification Condition <u>C</u>	Slope Percent _____	Limiting Factor Depth <u>15</u>	<input checked="" type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth	<p>Observation Hole # <u>TP-18</u> <input checked="" type="checkbox"/> Test Pit <input type="checkbox"/> Boring</p> <p>_____ " Depth of organic horizon above mineral soil</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Depth below mineral soil surface (inches)</th> <th style="width: 20%;">Texture</th> <th style="width: 15%;">Consistency</th> <th style="width: 15%;">Color</th> <th style="width: 10%;">Mottling</th> </tr> </thead> <tbody> <tr><td>0</td><td>FINE</td><td></td><td>DARK</td><td></td></tr> <tr><td>6</td><td>SANDY</td><td>FRIABLE</td><td>BROWN</td><td></td></tr> <tr><td>12</td><td>LOAM</td><td></td><td>YELLOW BROWN</td><td></td></tr> <tr><td>18</td><td></td><td></td><td></td><td>FEW</td></tr> <tr><td>24</td><td>SILT</td><td>FIRM</td><td>GRAY</td><td></td></tr> <tr><td>30</td><td>LOAM</td><td></td><td></td><td></td></tr> <tr><td>36</td><td></td><td></td><td></td><td></td></tr> <tr><td>42</td><td></td><td></td><td></td><td></td></tr> <tr><td>48</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;">Soil Profile <u>8</u></td> <td style="width: 15%;">Classification Condition <u>D</u></td> <td style="width: 15%;">Slope Percent _____</td> <td style="width: 15%;">Limiting Factor Depth <u>11</u></td> <td style="width: 40%;"> <input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth </td> </tr> </table>	Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling	0	FINE		DARK		6	SANDY	FRIABLE	BROWN		12	LOAM		YELLOW BROWN		18				FEW	24	SILT	FIRM	GRAY		30	LOAM				36					42					48					Soil Profile <u>8</u>	Classification Condition <u>D</u>	Slope Percent _____	Limiting Factor Depth <u>11</u>	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
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Mark Cenci
Site Evaluator Signature

262
SE #

9-23-20
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Mark Cenci 262 9-23-20
 Site Evaluator Signature SE # Date

ATTACHMENT 3

STORMWATER TREATMENT CALCULATIONS

Stormwater Treatment Table

	Total Watershed Area (SF)	New Road Impervious Area (SF)	Assumed Lot Impervious Area (SF)	New Landscaped Area (SF)	Existing/Offsite Impervious Area (SF)*	Existing/Offsite Landscaping Area (SF)*	Existing Undeveloped Area (SF)	Treatment Provided	New Impervious Area Treated (SF)	New Landscaped Area Treated (SF)	Treatment Device
WS-1	501,875	0	0	0	65,753	88,162	347,960	No	0	0	None
WS-10	81,502	0	3,500	29,594	809	102	47,496	Dripedge	1,750	0	Dripedge Only
WS-20	371,549	21,539	10,500	96,924	32,059	55,438	155,090	Yes	32,039	96,924	Wet Pond 1
WS-21	144,268	8,917	10,500	117,741	0	0	7,110	Yes	19,417	117,741	Wet Pond 1
WS-22	482,613	8,135	10,500	84,484	25,224	61,186	293,083	Yes	18,635	84,484	Wet Pond 2
WS-23	49,842	5,754	3,500	40,589	0	0	0	Yes	9,254	40,589	Wet Pond 2
WS-24	386,191	1,240	3,500	55,088	944	8,195	317,224	Dripedge	1,750	0	None
WS-25	72,590	2,124	7,000	44,847	0	0	18,619	Yes	9,124	44,847	FB1
WS-30	257,515	0	0	0	0	0	257,515	No	0	0	None
Total		47,710	49,000	469,266					91,969	384,584	

* The project is not taking credit for the Existing / Offsite impervious and landscaped areas, but are included in the BMP sizing calculations for each treatment device.

** Development associated with wetland & stream road crossings are exempt from the Chapter 500 General Standards. Approximately 3,286± s.f. of impervious surface and 4,592± s.f of landscaped area has been removed from WS-24, which is associated with the stream crossing for the back lot (Lots 13 & 14).

New Impervious Area = 96,710
 New Impervious Area Requiring Treatment (95%) = 91,874
 Provided New Impervious Treatment= 91,969
 95% New Impervious Area Treated

New Developed Area = 565,976
 New Developed Area Requiring Treatment (80%)= 452,781
 New Developed Area Treated= 476,554
 84% New Developed Area Treated

ATTACHMENT 4

BMP SIZING CALCULATIONS

Wet Pond WP-1 Calculations

Permanent Pool Volume (PPV) Calculation			
Tributary Impervious Area=	83,515 sf	(WS-20 & WS-21 Impervious Area)	
Tributary Landscaped Area=	270,102 sf	(WS-20 & WS-21 Landscaped Area)	
PPV = 2.00"xImpervious Area + 0.80"xLandscaped Area			
PPV (Required)=	31,926 cf		
PPV Sizing			
Stage Storage Volume			
Elevation	Area (sf)	Storage (cf)	
254.5	3,421	0	
260	9,231	33,952	
Permanent Pool Elevation=		260	
Provided PPV=		33,952 cf > Required	
Mean Depth Calculation			
Mean Depth @ 1' Below Permanent Pool			
Mean Depth= Storage Volume / Surface Area > 3.0			
	259	25,326 cf	
		8,034 sf	
Mean Depth=	3.15	>3'	

Channel Protection Volume (CPV) Calculation			
CPV (Required) = 1.0"xImpervious Area + 0.4"xLandscaped Area			
CPV (Required) =	15,963 cf		
Stage Storage Volume			
Elevation	Area (sf)	Storage (cf)	
260	9,231	0	
261	13,193	11,431	
262	14,593	25,319	
263	16,098	40,658	
Outlet of Pond Set @		261.34	
Provided CPV=		15,997 cf > Required	

Gravel Bench Calculations	
Bench Length (Required) = 3' for every 1,000 cf of Provided CPV	
Bench Length (Required) =	48.0 If
Bench Length (Provided):	50.0 If > Required

Sediment Forebay Sizing	
Tributary Pavement Requiring Sanding:	30,456 sf
Required Sediment Forebay Volume :	
10 storms/year x sanded area (acres) x 500lbs/acre-storm / 90 lbs/cf	
Sediment Volume (Required)	38.8 cf
Sediment Volume (Provided):	105.0 cf > Required

Wet Pond WP-2 Calculations

Permanent Pool Volume (PPV) Calculation			
Tributary Impervious Area=	53,113 sf	(WS-22 & WS-23 Impervious Area)	
Tributary Landscaped Area=	186,259 sf	(WS-22 & WS-23 Landscaped Area)	
PPV = 2.00"xImpervious Area + 0.80"xLandscaped Area			
PPV (Required)=	21,269 cf		
PPV Sizing			
Stage Storage Volume			
Elevation	Area (sf)	Storage (cf)	
254.5	2,386	0	
260	7,704	26,897	
Permanent Pool Elevation=	260		
Provided PPV=	26,897 cf > Required		
Mean Depth Calculation			
Mean Depth @ 1' Below Permanent Pool			
Mean Depth= Storage Volume / Surface Area > 3.0			
	259	19,887 cf	
		6,616 sf	
Mean Depth=	3.01 >3'		

Channel Protection Volume (CPV) Calculation			
CPV (Required) = 1.0"xImpervious Area + 0.4"xLandscaped Area			
CPV (Required) =	10,635 cf		
Stage Storage Volume			
Elevation	Area (sf)	Storage (cf)	
260	7,704	0	
260.8	11,048	7,461	
262	12,648	21,668	
263	14,043	35,007	
Outlet of Pond Set @	261.34		
Provided CPV=	13,616 cf > Required		

Gravel Bench Calculations	
Bench Length (Required) = 3' for every 1,000 cf of Provided CPV	
Bench Length (Required) =	40.8 lf
Bench Length (Provided):	50.0 lf > Required

Sediment Forebay Sizing	
Tributary Pavement Requiring Sanding	13,889 sf
Required Sediment Forebay Volume :	
10 storms/year x sanded area (acres) x 500lbs/acre-storm / 90 lbs/cf	
Sediment Volume (Required)	17.7 cf
Sediment Volume (Provided):	188.0 cf > Required

WET POND DRAWDOWN TIME

20053-POST

Type III 24-hr WQ EVENT Rainfall=2.68"

Prepared by {enter your company name here}

Printed 12/21/2020

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Hydrograph for Pond WP: Wet Pond

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	260.00	0.00	0.00	0.00
1.00	0.00	0	260.00	0.00	0.00	0.00
2.00	0.00	0	260.00	0.00	0.00	0.00
3.00	0.01	19	260.00	0.00	0.00	0.00
4.00	0.03	54	260.00	0.02	0.00	0.02
5.00	0.05	86	260.01	0.04	0.00	0.04
6.00	0.07	112	260.01	0.06	0.00	0.06
7.00	0.10	140	260.01	0.09	0.00	0.09
8.00	0.14	180	260.01	0.13	0.00	0.13
9.00	0.21	232	260.01	0.19	0.00	0.19
10.00	0.31	305	260.02	0.29	0.00	0.29
11.00	0.47	437	260.03	0.37	0.00	0.37
12.00	2.09	2,005	260.12	0.37	0.00	0.37
13.00	2.90	20,062	261.02	0.44	0.00	0.44
14.00	1.16	24,467	261.21	0.45	0.00	0.45
15.00	0.84	26,351	261.29	0.45	0.00	0.45
16.00	0.63	27,371	261.33	0.46	0.00	0.46
17.00	0.48	27,595	261.34	0.49	0.00	0.49
18.00	0.38	27,436	261.34	0.46	0.00	0.46
19.00	0.32	27,020	261.32	0.45	0.00	0.45
20.00	0.29	26,470	261.30	0.45	0.00	0.45
21.00	0.26	25,824	261.27	0.45	0.00	0.45
22.00	0.24	25,101	261.24	0.45	0.00	0.45
23.00	0.22	24,305	261.21	0.45	0.00	0.45
24.00	0.19	23,433	261.17	0.44	0.00	0.44
25.00	0.01	22,172	261.11	0.44	0.00	0.44
26.00	0.00	20,602	261.05	0.44	0.00	0.44
27.00	0.00	19,036	260.98	0.43	0.00	0.43
28.00	0.00	17,487	260.91	0.43	0.00	0.43
29.00	0.00	15,954	260.83	0.42	0.00	0.42
30.00	0.00	14,438	260.76	0.42	0.00	0.42
31.00	0.00	12,940	260.69	0.41	0.00	0.41
32.00	0.00	11,459	260.62	0.41	0.00	0.41
33.00	0.00	9,996	260.55	0.40	0.00	0.40
34.00	0.00	8,551	260.47	0.40	0.00	0.40
35.00	0.00	7,125	260.40	0.39	0.00	0.39
36.00	0.00	5,718	260.32	0.39	0.00	0.39
37.00	0.00	4,330	260.25	0.38	0.00	0.38
38.00	0.00	2,962	260.17	0.38	0.00	0.38
39.00	0.00	1,615	260.09	0.37	0.00	0.37
40.00	0.00	298	260.02	0.28	0.00	0.28
41.00	0.00	41	260.00	0.01	0.00	0.01
42.00	0.00	16	260.00	0.00	0.00	0.00
43.00	0.00	8	260.00	0.00	0.00	0.00
44.00	0.00	5	260.00	0.00	0.00	0.00
45.00	0.00	3	260.00	0.00	0.00	0.00
46.00	0.00	2	260.00	0.00	0.00	0.00
47.00	0.00	2	260.00	0.00	0.00	0.00
48.00	0.00	1	260.00	0.00	0.00	0.00

**POND PEAK @ HOUR 17
POND EMPTY @ HOUR 41
DRAWDOWN TIME = 24 HRS**

WET POND BASIN BERM DESIGN ~ SPILLWAY OUTLET ONLY CALCULATION

20053-POST

Type III 24-hr 25-Year Rainfall=5.72"

Prepared by {enter your company name here}

Printed 12/21/2020

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Page 1

Summary for Pond WP: Wet Pond

Inflow Area = 1,044,466 sf, 9.96% Impervious, Inflow Depth = 1.80" for 25-Year event
 Inflow = 26.22 cfs @ 12.39 hrs, Volume= 156,904 cf
 Outflow = 21.66 cfs @ 12.58 hrs, Volume= 127,932 cf, Atten= 17%, Lag= 11.6 min
 Primary = 21.66 cfs @ 12.58 hrs, Volume= 127,932 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

WET POND PROPOSED BERM
 EL. = 263.0
 FREEBOARD = 0.94'=1'+/-

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 262.06' @ 12.58 hrs Surf.Area= 28,651 sf Storage= 46,620 cf

Plug-Flow detention time= 150.3 min calculated for 127,932 cf (82% of inflow)
 Center-of-Mass det. time= 71.6 min (901.6 - 830.0)

Volume	Invert	Avail.Storage	Storage Description			
#1	260.00'	74,980 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
260.00	16,935	778.1	0	0	16,935	
262.00	28,459	1,082.3	44,898	44,898	62,009	
263.00	31,734	1,100.8	30,082	74,980	65,403	

Device	Routing	Invert	Outlet Devices									
#1	Primary	261.40'	15.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64									
#2	Secondary	257.40'	18.0" Round Culvert X 0.00 L= 116.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 257.40' / 250.00' S= 0.0638 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf									
#3	Device 2	257.50'	3.0" Vert. Orifice/Grate - 3" C= 0.600									
#4	Device 3	260.00'	50.0' long x 4.0' breadth Gravel Bench- 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 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32									
#5	Device 2	261.34'	Neenah R4345 Beehive Grate Light Duty-req. structure Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600									

Primary OutFlow Max=21.60 cfs @ 12.58 hrs HW=262.06' TW=0.00' (Dynamic Tailwater)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 21.60 cfs @ 2.18 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=260.00' TW=0.00' (Dynamic Tailwater)
 ↑2=**Culvert** (Controls 0.00 cfs)
 ↑3=**Orifice/Grate - 3"** (Passes 0.00 cfs of 0.36 cfs potential flow)
 ↑4=**Gravel Bench- Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↑5=**Neenah R4345 Beehive Grate Light Duty-req. structure** (Controls 0.00 cfs)

Underdrained Filter Basin Sizing Calculations

Filter Basin FB-1

Tributary Impervious Area= 9,124 sf (WS-25 Impervious Area)
Tributary Landscaped Area= 44,847 sf (WS-25 Landscape Area)

Water Quality Volume (WQV) Calculation

WQV (Required) = 1.0"xImpervious Area + 0.4"xLandsaped Area

WQV (Required) = 2,255 cf

Stage Storage Volume

Elevation	Area (sf)	Storage (cf)
246	2,992	0
248	4,446	7,390
250	6,128	17,919

Outlet Elevation = 247.50
Storage Volume Provided= **5,266 cf > Required**

Filter Bottom Calculation

Filter Area (Required) = 5%xImpervious Area + 2%xLandsaped Area

Filter Area Required = 1,353 sf
Filter Area Provided = 2,992 sf > Required

FILTER BASIN DRAWDOWN TIME

20053-POST

Type III 24-hr WQ EVENT fb Rainfall=3.68"

Prepared by {enter your company name here}

Printed 12/21/2020

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Hydrograph for Pond FB1: Underdrained soil filter

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	246.00	0.00	0.00	0.00
1.00	0.00	0	246.00	0.00	0.00	0.00
2.00	0.00	0	246.00	0.00	0.00	0.00
3.00	0.00	0	246.00	0.00	0.00	0.00
4.00	0.00	0	246.00	0.00	0.00	0.00
5.00	0.01	0	246.00	0.01	0.00	0.01
6.00	0.01	0	246.00	0.01	0.00	0.01
7.00	0.01	0	246.00	0.01	0.00	0.01
8.00	0.02	0	246.00	0.02	0.00	0.02
9.00	0.02	0	246.00	0.02	0.00	0.02
10.00	0.03	0	246.00	0.03	0.00	0.03
11.00	0.06	0	246.00	0.06	0.00	0.06
12.00	0.55	368	246.12	0.06	0.00	0.06
13.00	0.40	3,854	247.14	0.07	0.00	0.07
14.00	0.21	4,561	247.32	0.08	0.00	0.08
15.00	0.16	4,945	247.42	0.08	0.00	0.08
16.00	0.12	5,171	247.48	0.08	0.00	0.08
17.00	0.09	5,263	247.50	0.08	0.00	0.08
18.00	0.07	5,279	247.50	0.08	0.00	0.08
19.00	0.06	5,238	247.49	0.08	0.00	0.08
20.00	0.06	5,173	247.48	0.08	0.00	0.08
21.00	0.05	5,089	247.46	0.08	0.00	0.08
22.00	0.05	4,990	247.43	0.08	0.00	0.08
23.00	0.04	4,876	247.40	0.08	0.00	0.08
24.00	0.04	4,746	247.37	0.08	0.00	0.08
25.00	0.00	4,516	247.31	0.08	0.00	0.08
26.00	0.00	4,246	247.24	0.07	0.00	0.07
27.00	0.00	3,979	247.17	0.07	0.00	0.07
28.00	0.00	3,714	247.10	0.07	0.00	0.07
29.00	0.00	3,451	247.03	0.07	0.00	0.07
30.00	0.00	3,191	246.96	0.07	0.00	0.07
31.00	0.00	2,934	246.89	0.07	0.00	0.07
32.00	0.00	2,679	246.82	0.07	0.00	0.07
33.00	0.00	2,427	246.75	0.07	0.00	0.07
34.00	0.00	2,177	246.68	0.07	0.00	0.07
35.00	0.00	1,930	246.60	0.07	0.00	0.07
36.00	0.00	1,686	246.53	0.07	0.00	0.07
37.00	0.00	1,444	246.46	0.07	0.00	0.07
38.00	0.00	1,206	246.39	0.07	0.00	0.07
39.00	0.00	970	246.31	0.07	0.00	0.07
40.00	0.00	737	246.24	0.06	0.00	0.06
41.00	0.00	507	246.17	0.06	0.00	0.06
42.00	0.00	280	246.09	0.06	0.00	0.06
43.00	0.00	56	246.02	0.06	0.00	0.06
44.00	0.00	0	246.00	0.00	0.00	0.00
45.00	0.00	0	246.00	0.00	0.00	0.00
46.00	0.00	0	246.00	0.00	0.00	0.00
47.00	0.00	0	246.00	0.00	0.00	0.00
48.00	0.00	0	246.00	0.00	0.00	0.00

POND PEAK @ HOUR 18
POND EMPTY @ HOUR 44
DRAWDOWN TIME = 26 HRS

FILTER BASIN BERM DESIGN ~ SPILLWAY OUTLET ONLY CALCULATION

20053-POST

Type III 24-hr 25-Year Rainfall=5.72"

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Summary for Pond FB1: Underdrained soil filter

Inflow Area = 72,590 sf, 9.64% Impervious, Inflow Depth = 2.99" for 25-Year event
 Inflow = 3.76 cfs @ 12.28 hrs, Volume= 18,102 cf
 Outflow = 1.93 cfs @ 12.63 hrs, Volume= 10,712 cf, Atten= 49%, Lag= 20.9 min
 Primary = 1.93 cfs @ 12.63 hrs, Volume= 10,712 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

**FILTER BASIN
 PROPOSED BERM
 EL. = 249.20
 FREEBOARD = 1.02'**

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 248.18' @ 12.63 hrs Surf.Area= 4,585 sf Storage= 8,193 cf

Plug-Flow detention time= 218.4 min calculated for 10,701 cf (59% of inflow)
 Center-of-Mass det. time= 105.0 min (935.6 - 830.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	246.00'	17,919 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
246.00	2,992	223.7	0	0	2,992	
248.00	4,446	261.4	7,390	7,390	4,526	
250.00	6,128	299.1	10,529	17,919	6,299	

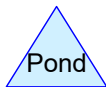
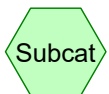
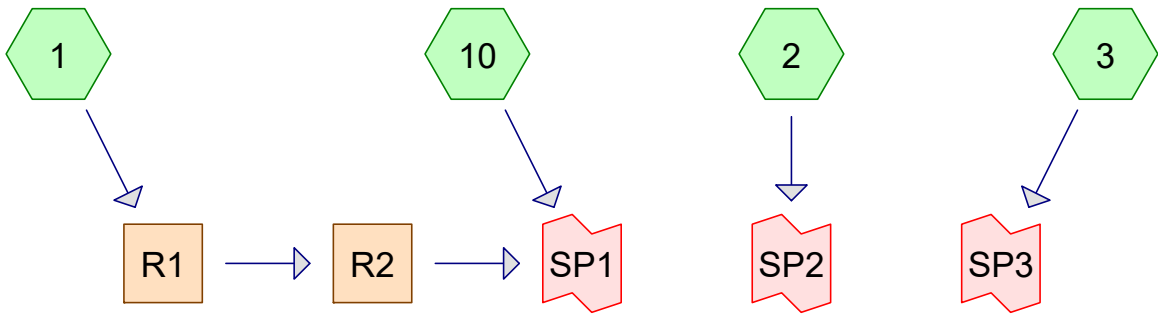
Device	Routing	Invert	Outlet Devices
#1	Primary	248.00'	10.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Secondary	243.30'	1.2" Vert. 1-1/4" Drill Hole X 0.00 C= 0.600
#3	Device 2	243.73'	4.0" Round Culvert L= 80.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 243.73' / 243.30' S= 0.0053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#4	Device 3	246.00'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 240.00'
#5	Device 3	247.50'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.91 cfs @ 12.63 hrs HW=248.18' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 1.91 cfs @ 1.08 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=246.00' TW=0.00' (Dynamic Tailwater)
 ↳ **2=1-1/4" Drill Hole** (Controls 0.00 cfs)
 ↳ **3=Culvert** (Passes 0.00 cfs of 0.31 cfs potential flow)
 ↳ **4=Exfiltration** (Passes 0.00 cfs of 0.17 cfs potential flow)
 ↳ **5=Orifice/Grate** (Controls 0.00 cfs)

ATTACHMENT 5

HYDROCAD CALCULATIONS



Routing Diagram for 20053-Pre
Prepared by {enter your company name here}, Printed 12/20/2020
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20053-Pre

Type III 24-hr 2-Year Rainfall=3.09"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=501,875 sf 7.27% Impervious Runoff Depth=0.99"
Flow Length=749' Tc=79.2 min CN=WQ Runoff=3.94 cfs 0.947 af

Subcatchment 2: Runoff Area=1,362,400 sf 1.76% Impervious Runoff Depth=0.57"
Flow Length=1,351' Tc=24.7 min CN=WQ Runoff=11.41 cfs 1.479 af

Subcatchment 3: Runoff Area=257,515 sf 0.00% Impervious Runoff Depth=0.74"
Flow Length=829' Tc=32.4 min CN=WQ Runoff=2.50 cfs 0.365 af

Subcatchment 10: Runoff Area=226,146 sf 2.72% Impervious Runoff Depth=0.46"
Flow Length=775' Tc=30.1 min CN=WQ Runoff=1.44 cfs 0.197 af

Reach R1: Avg. Flow Depth=0.67' Max Vel=5.94 fps Inflow=3.94 cfs 0.947 af
15.0" Round Pipe n=0.013 L=41.4' S=0.0121 '/ Capacity=7.10 cfs Outflow=3.94 cfs 0.947 af

Reach R2: Avg. Flow Depth=0.26' Max Vel=2.45 fps Inflow=3.94 cfs 0.947 af
n=0.030 L=1,055.3' S=0.0380 '/ Capacity=147.42 cfs Outflow=3.88 cfs 0.947 af

Link SP1: Inflow=4.29 cfs 1.144 af
Primary=4.29 cfs 1.144 af

Link SP2: Inflow=11.41 cfs 1.479 af
Primary=11.41 cfs 1.479 af

Link SP3: Inflow=2.50 cfs 0.365 af
Primary=2.50 cfs 0.365 af

20053-Pre

Type III 24-hr 2-Year Rainfall=3.09"

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Summary for Subcatchment 1:

Runoff = 3.94 cfs @ 13.11 hrs, Volume= 0.947 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

Area (sf)	CN	Description
* 29,261	96	Ex. Gravel surface
* 0	96	Prop. Gravel surface
* 36,492	98	Ex. paved roads/driveways
* 0	98	Proposed lot impervious allocation
* 0	98	Proposed paved roads/driveways
* 26,739	39	Ex. lawn >75% Grass cover, Good, HSG A
* 61,404	74	Ex. lawn >75% Grass cover, Good, HSG C
0	30	Meadow, non-grazed, HSG A
0	39	>75% Grass cover, Good, HSG A
0	74	>75% Grass cover, Good, HSG C
15,837	30	Woods, Good, HSG A
332,142	70	Woods, Good, HSG C
501,875		Weighted Average
465,383		92.73% Pervious Area
36,492		7.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
71.3	150	0.0023	0.04		Sheet Flow, Seg A to B Woods: Light underbrush n= 0.400 P2= 3.13"
4.6	268	0.0373	0.97		Shallow Concentrated Flow, Seg B to C Woodland Kv= 5.0 fps
1.6	77	0.0259	0.80		Shallow Concentrated Flow, Seg C to D Woodland Kv= 5.0 fps
0.2	28	0.0178	2.15		Shallow Concentrated Flow, Seg D to E Unpaved Kv= 16.1 fps
0.3	55	0.0273	3.35		Shallow Concentrated Flow, Seg E to F Paved Kv= 20.3 fps
1.2	171	0.0220	2.39		Shallow Concentrated Flow, Seg F to G Unpaved Kv= 16.1 fps
79.2	749	Total			

Summary for Subcatchment 2:

Runoff = 11.41 cfs @ 12.38 hrs, Volume= 1.479 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

20053-Pre

Type III 24-hr 2-Year Rainfall=3.09"

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Area (sf)	CN	Description
*	11,612	96 Ex. Gravel surface
*	2,202	96 Prop. Gravel surface
*	5,197	98 Ex. roofs
*	18,781	98 Ex. paved roads/driveways
*	0	98 Proposed lot impervious allocation
*	0	98 Proposed paved roads/driveways
*	64,188	39 >75% Grass cover, Good, HSG A
*	22,526	74 >75% Grass cover, Good, HSG C
	18,441	80 >75% Grass cover, Good, HSG D
	315,987	30 Meadow, non-grazed, HSG A
	39,957	58 Meadow, non-grazed, HSG B
	569,596	71 Meadow, non-grazed, HSG C
	38,806	78 Meadow, non-grazed, HSG D
	120,301	30 Woods, Good, HSG A
	7,665	55 Woods, Good, HSG B
	122,883	70 Woods, Good, HSG C
	4,258	77 Woods, Good, HSG D
<hr/>		
1,362,400		Weighted Average
1,338,422		98.24% Pervious Area
23,978		1.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	62	0.0052	0.72		Sheet Flow, Seg A to B Smooth surfaces n= 0.011 P2= 3.13"
4.4	40	0.0631	0.15		Sheet Flow, Seg B to C Grass: Dense n= 0.240 P2= 3.13"
14.3	53	0.0637	0.06		Sheet Flow, Seg C to D Woods: Dense underbrush n= 0.800 P2= 3.13"
1.6	96	0.0418	1.02		Shallow Concentrated Flow, Seg D to E Woodland Kv= 5.0 fps
0.5	179	0.0447	6.57	494.81	Channel Flow, Seg E to F Area= 75.3 sf Perim= 151.5' r= 0.50' n= 0.030 Earth, grassed & winding
0.6	210	0.0383	6.08	458.02	Channel Flow, Seg F to G Area= 75.3 sf Perim= 151.5' r= 0.50' n= 0.030 Earth, grassed & winding
0.8	273	0.0331	5.60	338.63	Channel Flow, Seg G to H Area= 60.5 sf Perim= 123.6' r= 0.49' n= 0.030 Earth, grassed & winding
0.5	283	0.0848	9.01	209.92	Channel Flow, Seg I to J Area= 23.3 sf Perim= 47.2' r= 0.49' n= 0.030 Earth, grassed & winding
0.6	155	0.0194	4.24	111.20	Channel Flow, Seg J to K Area= 26.2 sf Perim= 54.3' r= 0.48' n= 0.030 Earth, grassed & winding
<hr/>					
24.7	1,351	Total			

20053-Pre

Type III 24-hr 2-Year Rainfall=3.09"

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Summary for Subcatchment 3:

Runoff = 2.50 cfs @ 12.51 hrs, Volume= 0.365 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

Area (sf)	CN	Description
*	0	96 Ex. Gravel surface
*	0	96 Prop. Gravel surface
*	0	98 Ex. roofs
*	0	98 Ex. paved roads/driveways
*	0	98 Proposed lot impervious allocation
*	0	98 Proposed paved roads/driveways
*	0	39 >75% Grass cover, Good, HSG A
*	0	74 >75% Grass cover, Good, HSG C
	0	61 >75% Grass cover, Good, HSG B
	3,941	30 Meadow, non-grazed, HSG A
	160,294	71 Meadow, non-grazed, HSG C
	0	78 Meadow, non-grazed, HSG D
	14,065	30 Woods, Good, HSG A
	0	55 Woods, Good, HSG B
	79,215	70 Woods, Good, HSG C
257,515		Weighted Average
257,515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	95	0.0632	0.12		Sheet Flow, Seg A to B Woods: Light underbrush n= 0.400 P2= 3.13"
16.5	94	0.0371	0.10		Sheet Flow, Seg B to C Grass: Bermuda n= 0.410 P2= 3.13"
0.9	65	0.0612	1.24		Shallow Concentrated Flow, Seg C to D Woodland Kv= 5.0 fps
0.4	81	0.0198	3.77	127.59	Channel Flow, Seg D to E Area= 33.8 sf Perim= 67.3' r= 0.50' n= 0.035 Earth, dense weeds
0.8	247	0.0324	5.45	576.76	Channel Flow, Seg E to F Area= 105.8 sf Perim= 221.3' r= 0.48' n= 0.030 Earth, grassed & winding
0.6	247	0.0530	6.88	558.59	Channel Flow, Seg F to G Area= 81.2 sf Perim= 173.3' r= 0.47' n= 0.030 Earth, grassed & winding
32.4	829	Total			

Summary for Subcatchment 10:

Runoff = 1.44 cfs @ 12.44 hrs, Volume= 0.197 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

20053-Pre

Type III 24-hr 2-Year Rainfall=3.09"

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Area (sf)	CN	Description
* 8,123	96	Ex. Gravel surface
* 1,129	98	Roofs
* 5,025	98	Ex. paved roads/driveways
128,882	39	>75% Grass cover, Good, HSG A
49,920	74	>75% Grass cover, Good, HSG C
12,251	30	Woods, Good, HSG A
20,816	70	Woods, Good, HSG C
226,146		Weighted Average
219,992		97.28% Pervious Area
6,154		2.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	150	0.0343	0.10		Sheet Flow, Seg A to B Woods: Light underbrush n= 0.400 P2= 3.13"
4.2	260	0.0423	1.03		Shallow Concentrated Flow, Seg A to B Woodland Kv= 5.0 fps
1.7	365	0.0520	3.67		Shallow Concentrated Flow, Seg C to D Unpaved Kv= 16.1 fps
30.1	775	Total			

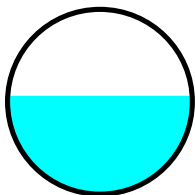
Summary for Reach R1:

Inflow Area = 11.521 ac, 7.27% Impervious, Inflow Depth = 0.99" for 2-Year event
 Inflow = 3.94 cfs @ 13.11 hrs, Volume= 0.947 af
 Outflow = 3.94 cfs @ 13.11 hrs, Volume= 0.947 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Max. Velocity= 5.94 fps, Min. Travel Time= 0.1 min
 Avg. Velocity= 2.46 fps, Avg. Travel Time= 0.3 min

Peak Storage= 27 cf @ 13.11 hrs
 Average Depth at Peak Storage= 0.67'
 Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.10 cfs

15.0" Round Pipe
 n= 0.013 Corrugated PE, smooth interior
 Length= 41.4' Slope= 0.0121 '/
 Inlet Invert= 312.20', Outlet Invert= 311.70'



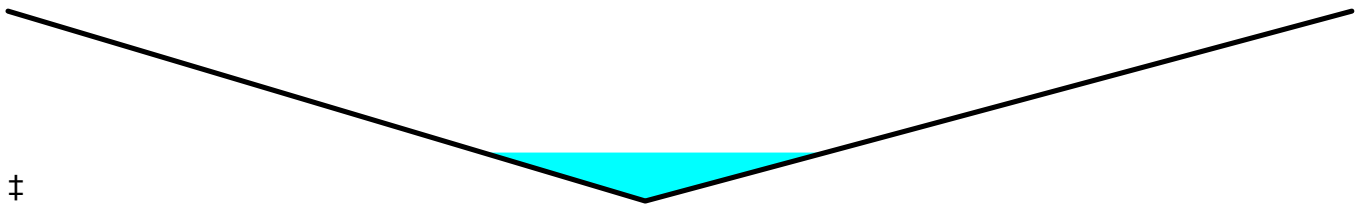
Summary for Reach R2:

Inflow Area = 11.521 ac, 7.27% Impervious, Inflow Depth = 0.99" for 2-Year event
 Inflow = 3.94 cfs @ 13.11 hrs, Volume= 0.947 af
 Outflow = 3.88 cfs @ 13.21 hrs, Volume= 0.947 af, Atten= 2%, Lag= 6.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.45 fps, Min. Travel Time= 7.2 min
 Avg. Velocity = 1.03 fps, Avg. Travel Time= 17.1 min

Peak Storage= 1,673 cf @ 13.21 hrs
 Average Depth at Peak Storage= 0.26'
 Bank-Full Depth= 1.00' Flow Area= 24.3 sf, Capacity= 147.42 cfs

Custom cross-section, Length= 1,055.3' Slope= 0.0380 '/'
 Constant n= 0.030 Earth, grassed & winding
 Inlet Invert= 311.10', Outlet Invert= 271.00'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	300.00	0.00
23.00	299.00	1.00
48.50	300.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
1.00	24.3	48.5	25,591	147.42

Summary for Link SP1:

Inflow Area = 16.713 ac, 5.86% Impervious, Inflow Depth = 0.82" for 2-Year event
 Inflow = 4.29 cfs @ 13.16 hrs, Volume= 1.144 af
 Primary = 4.29 cfs @ 13.16 hrs, Volume= 1.144 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP2:

Inflow Area = 31.276 ac, 1.76% Impervious, Inflow Depth = 0.57" for 2-Year event
 Inflow = 11.41 cfs @ 12.38 hrs, Volume= 1.479 af
 Primary = 11.41 cfs @ 12.38 hrs, Volume= 1.479 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP3:

Inflow Area = 5.912 ac, 0.00% Impervious, Inflow Depth = 0.74" for 2-Year event
Inflow = 2.50 cfs @ 12.51 hrs, Volume= 0.365 af
Primary = 2.50 cfs @ 12.51 hrs, Volume= 0.365 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=501,875 sf 7.27% Impervious Runoff Depth=1.95"
Flow Length=749' Tc=79.2 min CN=WQ Runoff=8.26 cfs 1.872 af

Subcatchment 2: Runoff Area=1,362,400 sf 1.76% Impervious Runoff Depth=1.20"
Flow Length=1,351' Tc=24.7 min CN=WQ Runoff=26.02 cfs 3.138 af

Subcatchment 3: Runoff Area=257,515 sf 0.00% Impervious Runoff Depth=1.65"
Flow Length=829' Tc=32.4 min CN=WQ Runoff=6.06 cfs 0.812 af

Subcatchment 10: Runoff Area=226,146 sf 2.72% Impervious Runoff Depth=0.94"
Flow Length=775' Tc=30.1 min CN=WQ Runoff=2.87 cfs 0.407 af

Reach R1: Avg. Flow Depth=1.25' Max Vel=6.59 fps Inflow=8.26 cfs 1.872 af
15.0" Round Pipe n=0.013 L=41.4' S=0.0121 '/ Capacity=7.10 cfs Outflow=7.46 cfs 1.872 af

Reach R2: Avg. Flow Depth=0.32' Max Vel=2.85 fps Inflow=7.46 cfs 1.872 af
n=0.030 L=1,055.3' S=0.0380 '/ Capacity=147.42 cfs Outflow=7.10 cfs 1.872 af

Link SP1: Inflow=8.31 cfs 2.279 af
Primary=8.31 cfs 2.279 af

Link SP2: Inflow=26.02 cfs 3.138 af
Primary=26.02 cfs 3.138 af

Link SP3: Inflow=6.06 cfs 0.812 af
Primary=6.06 cfs 0.812 af

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=501,875 sf 7.27% Impervious Runoff Depth=2.80"
Flow Length=749' Tc=79.2 min CN=WQ Runoff=12.03 cfs 2.686 af

Subcatchment 2: Runoff Area=1,362,400 sf 1.76% Impervious Runoff Depth=1.79"
Flow Length=1,351' Tc=24.7 min CN=WQ Runoff=38.89 cfs 4.662 af

Subcatchment 3: Runoff Area=257,515 sf 0.00% Impervious Runoff Depth=2.46"
Flow Length=829' Tc=32.4 min CN=WQ Runoff=9.21 cfs 1.214 af

Subcatchment 10: Runoff Area=226,146 sf 2.72% Impervious Runoff Depth=1.44"
Flow Length=775' Tc=30.1 min CN=WQ Runoff=4.18 cfs 0.623 af

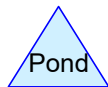
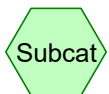
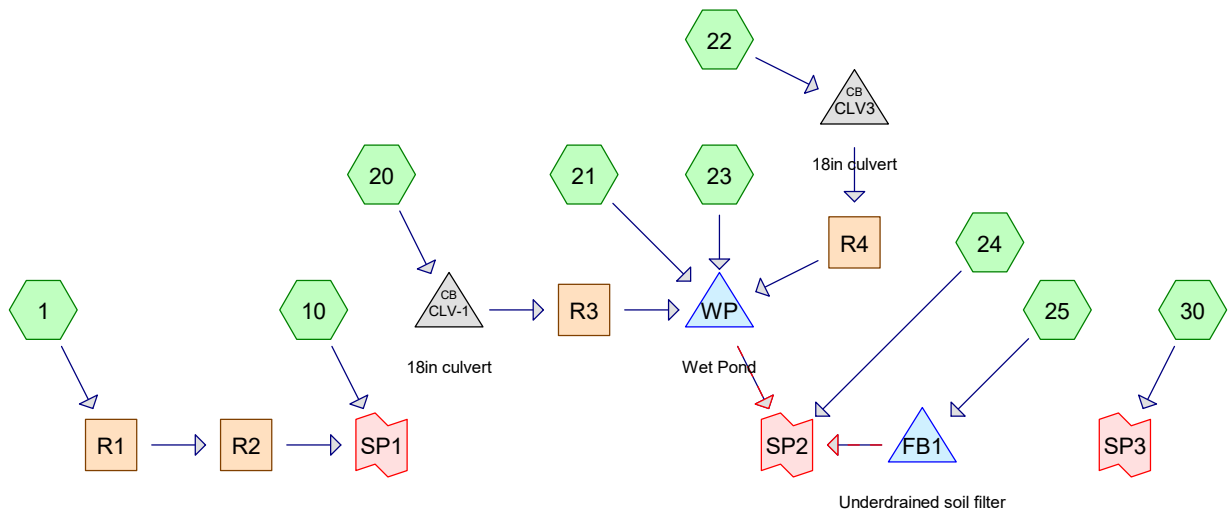
Reach R1: Avg. Flow Depth=1.25' Max Vel=6.59 fps Inflow=12.03 cfs 2.686 af
15.0" Round Pipe n=0.013 L=41.4' S=0.0121 '/ Capacity=7.10 cfs Outflow=7.10 cfs 2.686 af

Reach R2: Avg. Flow Depth=0.32' Max Vel=2.85 fps Inflow=7.10 cfs 2.686 af
n=0.030 L=1,055.3' S=0.0380 '/ Capacity=147.42 cfs Outflow=7.10 cfs 2.686 af

Link SP1: Inflow=10.04 cfs 3.309 af
Primary=10.04 cfs 3.309 af

Link SP2: Inflow=38.89 cfs 4.662 af
Primary=38.89 cfs 4.662 af

Link SP3: Inflow=9.21 cfs 1.214 af
Primary=9.21 cfs 1.214 af



Routing Diagram for 20053-POST
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20053-POST

Type III 24-hr 2-Year Rainfall=3.09"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=501,875 sf 7.27% Impervious Runoff Depth=0.99"
 Flow Length=749' Tc=79.2 min CN=WQ Runoff=3.94 cfs 41,242 cf

Subcatchment 10: Runoff Area=81,502 sf 4.87% Impervious Runoff Depth=0.43"
 Flow Length=775' Tc=30.1 min CN=WQ Runoff=0.47 cfs 2,900 cf

Subcatchment 20: Runoff Area=371,549 sf 13.07% Impervious Runoff Depth=0.57"
 Flow Length=1,488' Tc=33.5 min CN=WQ Runoff=2.78 cfs 17,626 cf

Subcatchment 21: Runoff Area=144,268 sf 12.50% Impervious Runoff Depth=0.80"
 Flow Length=493' Tc=30.3 min CN=WQ Runoff=1.60 cfs 9,644 cf

Subcatchment 22: Runoff Area=478,806 sf 6.17% Impervious Runoff Depth=0.69"
 Flow Length=1,276' Tc=25.5 min CN=WQ Runoff=5.01 cfs 27,605 cf

Subcatchment 23: Runoff Area=49,843 sf 15.82% Impervious Runoff Depth=1.31"
 Flow Length=376' Tc=19.2 min CN=WQ Runoff=1.11 cfs 5,446 cf

Subcatchment 24: Runoff Area=386,191 sf 1.41% Impervious Runoff Depth=0.73"
 Flow Length=1,107' Tc=20.3 min CN=WQ Runoff=4.30 cfs 23,334 cf

Subcatchment 25: Runoff Area=72,590 sf 9.64% Impervious Runoff Depth=1.06"
 Flow Length=420' Tc=20.3 min CN=WQ Runoff=1.23 cfs 6,403 cf

Subcatchment 30: Runoff Area=257,515 sf 0.00% Impervious Runoff Depth=0.74"
 Flow Length=829' Tc=32.4 min CN=WQ Runoff=2.50 cfs 15,905 cf

Reach R1: Avg. Flow Depth=0.67' Max Vel=5.94 fps Inflow=3.94 cfs 41,242 cf
 15.0" Round Pipe n=0.013 L=41.4' S=0.0121 '/' Capacity=7.10 cfs Outflow=3.94 cfs 41,242 cf

Reach R2: Avg. Flow Depth=0.26' Max Vel=2.45 fps Inflow=3.94 cfs 41,242 cf
 n=0.030 L=1,055.3' S=0.0380 '/' Capacity=147.42 cfs Outflow=3.88 cfs 41,242 cf

Reach R3: Avg. Flow Depth=0.33' Max Vel=2.83 fps Inflow=2.78 cfs 17,626 cf
 n=0.030 L=320.3' S=0.0219 '/' Capacity=124.26 cfs Outflow=2.77 cfs 17,626 cf

Reach R4: Avg. Flow Depth=1.09' Max Vel=0.86 fps Inflow=5.01 cfs 27,605 cf
 n=0.030 L=110.0' S=0.0005 '/' Capacity=19.63 cfs Outflow=4.98 cfs 27,605 cf

Pond CLV-1: 18in culvert Peak Elev=272.19' Inflow=2.78 cfs 17,626 cf
 18.0" Round Culvert n=0.013 L=45.0' S=0.0289 '/' Outflow=2.78 cfs 17,626 cf

Pond CLV3: 18in culvert Peak Elev=263.41' Inflow=5.01 cfs 27,605 cf
 18.0" Round Culvert n=0.013 L=53.0' S=0.0047 '/' Outflow=5.01 cfs 27,605 cf

Pond FB1: Underdrained soil filter Peak Elev=247.03' Storage=3,447 cf Inflow=1.23 cfs 6,403 cf
 Primary=0.00 cfs 0 cf Secondary=0.07 cfs 6,407 cf Outflow=0.07 cfs 6,407 cf

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Pond WP: Wet Pond

Peak Elev=261.43' Storage=29,754 cf Inflow=10.19 cfs 60,320 cf
Primary=0.22 cfs 896 cf Secondary=1.29 cfs 59,422 cf Outflow=1.51 cfs 60,319 cf

Link SP1:

Inflow=4.01 cfs 44,142 cf
Primary=4.01 cfs 44,142 cf

Link SP2:

Inflow=4.76 cfs 90,059 cf
Primary=4.76 cfs 90,059 cf

Link SP3:

Inflow=2.50 cfs 15,905 cf
Primary=2.50 cfs 15,905 cf

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Type III 24-hr 2-Year Rainfall=3.09"

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Summary for Subcatchment 1:

Runoff = 3.94 cfs @ 13.11 hrs, Volume= 41,242 cf, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

Area (sf)	CN	Description
* 29,261	96	Ex. Gravel surface
* 0	96	Prop. Gravel surface
* 36,492	98	Ex. paved roads/driveways
* 0	98	Proposed lot impervious allocation
* 0	98	Proposed paved roads/driveways
* 26,739	39	Ex. lawn >75% Grass cover, Good, HSG A
* 61,404	74	Ex. lawn >75% Grass cover, Good, HSG C
0	30	Meadow, non-grazed, HSG A
0	39	>75% Grass cover, Good, HSG A
0	74	>75% Grass cover, Good, HSG C
15,837	30	Woods, Good, HSG A
332,142	70	Woods, Good, HSG C
501,875		Weighted Average
465,383		92.73% Pervious Area
36,492		7.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
71.3	150	0.0023	0.04		Sheet Flow, Seg A to B Woods: Light underbrush n= 0.400 P2= 3.13"
4.6	268	0.0373	0.97		Shallow Concentrated Flow, Seg B to C Woodland Kv= 5.0 fps
1.6	77	0.0259	0.80		Shallow Concentrated Flow, Seg C to D Woodland Kv= 5.0 fps
0.2	28	0.0178	2.15		Shallow Concentrated Flow, Seg D to E Unpaved Kv= 16.1 fps
0.3	55	0.0273	3.35		Shallow Concentrated Flow, Seg E to F Paved Kv= 20.3 fps
1.2	171	0.0220	2.39		Shallow Concentrated Flow, Seg F to G Unpaved Kv= 16.1 fps
79.2	749	Total			

Summary for Subcatchment 10:

Runoff = 0.47 cfs @ 12.44 hrs, Volume= 2,900 cf, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

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Area (sf)	CN	Description			
*	331	96 Ex. Gravel surface			
*	1,218	96 Prop. Gravel surface			
*	466	98 Ex. paved roads/driveways			
*	3,500	98 Proposed lot impervious allocation			
*	0	98 Proposed paved roads/driveways			
*	102	74 Ex. lawn >75% Grass cover, Good, HSG C			
	12,318	30 Meadow, non-grazed, HSG A			
	32,255	39 >75% Grass cover, Good, HSG A			
	6,563	74 >75% Grass cover, Good, HSG C			
	7,832	30 Woods, Good, HSG A			
	16,917	70 Woods, Good, HSG C			
<hr/>					
	81,502	Weighted Average			
	77,536	95.13% Pervious Area			
	3,966	4.87% Impervious Area			
<hr/>					
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	150	0.0343	0.10		Sheet Flow, Seg A to B Woods: Light underbrush n= 0.400 P2= 3.13"
4.2	260	0.0423	1.03		Shallow Concentrated Flow, Seg A to B Woodland Kv= 5.0 fps
1.7	365	0.0520	3.67		Shallow Concentrated Flow, Seg C to D Unpaved Kv= 16.1 fps
<hr/>					
30.1	775	Total			

Summary for Subcatchment 20:

Runoff = 2.78 cfs @ 12.45 hrs, Volume= 17,626 cf, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

Area (sf)	CN	Description
*	12,236	96 Ex. Gravel surface
*	2,102	96 Prop. Gravel surface
*	9,167	98 Ex. roofs
*	10,656	98 Ex. paved roads/driveways
*	10,500	98 Proposed lot impervious allocation
*	18,220	98 Proposed paved roads/driveways
*	139,913	39 >75% Grass cover, Good, HSG A
*	12,463	74 >75% Grass cover, Good, HSG C
	75,873	30 Meadow, non-grazed, HSG A
	18,460	71 Meadow, non-grazed, HSG C
	51,658	30 Woods, Good, HSG A
	10,301	70 Woods, Good, HSG C
<hr/>		
	371,549	Weighted Average
	323,006	86.93% Pervious Area
	48,543	13.07% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0117	0.10		Sheet Flow, Seg A to B Grass: Dense n= 0.240 P2= 3.13"
0.2	32	0.0186	2.20		Shallow Concentrated Flow, Seg B to C Unpaved Kv= 16.1 fps
6.8	174	0.0007	0.43		Shallow Concentrated Flow, Seg C to D Unpaved Kv= 16.1 fps
0.5	94	0.0053	3.29	55.90	Trap/Vee/Rect Channel Flow, Seg D to E Bot.W=3.00' D=1.00' Z= 20.0 & 8.0 '/' Top.W=31.00' n= 0.022 Earth, clean & straight
1.3	1,038	0.0394	13.30	438.92	Trap/Vee/Rect Channel Flow, Seg E to F Bot.W=2.00' D=3.00' Z= 3.0 '/' Top.W=20.00' n= 0.030 Earth, grassed & winding
33.5	1,488	Total			

Summary for Subcatchment 21:

Runoff = 1.60 cfs @ 12.43 hrs, Volume= 9,644 cf, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

Area (sf)	CN	Description
*	0	96 Ex. Gravel surface
*	1,389	96 Prop. Gravel surface
*	0	98 Ex. roofs
*	0	98 Ex. paved roads/driveways
*	10,500	98 Proposed lot impervious allocation
*	7,528	98 Proposed paved roads/driveways
*	59,915	39 >75% Grass cover, Good, HSG A
*	59,768	74 >75% Grass cover, Good, HSG C
	1,713	30 Meadow, non-grazed, HSG A
	3,455	71 Meadow, non-grazed, HSG C
	0	30 Woods, Good, HSG A
	0	70 Woods, Good, HSG C
144,268		Weighted Average
126,240		87.50% Pervious Area
18,028		12.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	132	0.0057	0.07		Sheet Flow, Seg A to B Grass: Dense n= 0.240 P2= 3.13"
0.5	361	0.0541	12.22	195.50	Trap/Vee/Rect Channel Flow, Seg B to C Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030 Earth, grassed & winding
30.3	493	Total			

Summary for Subcatchment 22:

Runoff = 5.01 cfs @ 12.37 hrs, Volume= 27,605 cf, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

Area (sf)	CN	Description
* 11,612	96	Ex. Gravel surface
* 2,202	96	Prop. Gravel surface
* 5,197	98	Ex. roofs
* 8,414	98	Ex. paved roads/driveways
* 10,500	98	Proposed lot impervious allocation
* 5,428	98	Proposed paved roads/driveways
* 30,452	39	>75% Grass cover, Good, HSG A
* 94,980	74	>75% Grass cover, Good, HSG C
18,441	80	>75% Grass cover, Good, HSG D
133,324	30	Meadow, non-grazed, HSG A
22,340	71	Meadow, non-grazed, HSG C
38,806	78	Meadow, non-grazed, HSG D
60,130	30	Woods, Good, HSG A
32,722	70	Woods, Good, HSG C
4,258	77	Woods, Good, HSG D
478,806		Weighted Average
449,267		93.83% Pervious Area
29,539		6.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	62	0.0052	0.72		Sheet Flow, Seg A to B Smooth surfaces n= 0.011 P2= 3.13"
16.6	132	0.0683	0.13		Sheet Flow, Seg B to C Woods: Light underbrush n= 0.400 P2= 3.13"
2.7	234	0.0427	1.45		Shallow Concentrated Flow, Seg C to D Short Grass Pasture Kv= 7.0 fps
0.6	209	0.0383	6.08	458.02	Channel Flow, Seg D to E Area= 75.3 sf Perim= 151.5' r= 0.50' n= 0.030 Earth, grassed & winding
0.6	209	0.0383	6.02	364.26	Channel Flow, Seg E to F Area= 60.5 sf Perim= 123.6' r= 0.49' n= 0.030 Earth, grassed & winding
3.3	258	0.0357	1.32		Shallow Concentrated Flow, Seg F to G Short Grass Pasture Kv= 7.0 fps
0.3	172	0.0204	9.57	315.83	Trap/Vee/Rect Channel Flow, Seg G to H Bot.W=2.00' D=3.00' Z= 3.0 ' /' Top.W=20.00' n= 0.030 Earth, grassed & winding
25.5	1,276	Total			

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Summary for Subcatchment 23:

Runoff = 1.11 cfs @ 12.27 hrs, Volume= 5,446 cf, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

Area (sf)	CN	Description
*	0	96 Ex. Gravel surface
*	1,367	96 Prop. Gravel surface
*	0	98 Ex. roofs
*	0	98 Ex. paved roads/driveways
*	3,500	98 Proposed lot impervious allocation
*	4,387	98 Proposed paved roads/driveways
*	0	39 >75% Grass cover, Good, HSG A
*	40,589	74 >75% Grass cover, Good, HSG C
	0	30 Meadow, non-grazed, HSG A
	0	71 Meadow, non-grazed, HSG C
	0	30 Woods, Good, HSG A
	0	70 Woods, Good, HSG C
49,843		Weighted Average
41,956		84.18% Pervious Area
7,887		15.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	144	0.0210	0.13		Sheet Flow, Seg A to B Grass: Dense n= 0.240 P2= 3.13"
0.2	122	0.0347	12.48	411.91	Trap/Vee/Rect Channel Flow, Seg B to C Bot.W=2.00' D=3.00' Z= 3.0 '/' Top.W=20.00' n= 0.030 Earth, grassed & winding
0.1	110	0.0659	13.49	215.77	Trap/Vee/Rect Channel Flow, Seg C to D Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
19.2	376	Total			

Summary for Subcatchment 24:

Runoff = 4.30 cfs @ 12.31 hrs, Volume= 23,334 cf, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

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Area (sf)	CN	Description
*	0	96 Ex. Gravel surface
*	3,531	96 Prop. Gravel surface
*	944	98 Ex. roofs
*	0	98 Ex. paved roads/driveways
*	3,500	98 Proposed lot impervious allocation
*	995	98 Proposed paved roads/driveways
*	0	39 >75% Grass cover, Good, HSG A
*	56,068	74 >75% Grass cover, Good, HSG C
	3,929	61 >75% Grass cover, Good, HSG B
	16,876	58 Meadow, non-grazed, HSG B
	78,178	71 Meadow, non-grazed, HSG C
	38,806	78 Meadow, non-grazed, HSG D
	16,672	30 Woods, Good, HSG A
	78,904	55 Woods, Good, HSG B
	87,788	70 Woods, Good, HSG C
<hr/>		
386,191		Weighted Average
380,752		98.59% Pervious Area
5,439		1.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	150	0.0600	0.19		Sheet Flow, Seg A to B Grass: Dense n= 0.240 P2= 3.13"
2.6	219	0.0411	1.42		Shallow Concentrated Flow, Seg B to C Short Grass Pasture Kv= 7.0 fps
2.4	127	0.0314	0.89		Shallow Concentrated Flow, Seg C to D Woodland Kv= 5.0 fps
0.4	204	0.0883	7.69	251.50	Channel Flow, Seg D to E Area= 32.7 sf Perim= 68.7' r= 0.48' n= 0.035 Earth, dense weeds
2.0	407	0.0172	3.34	87.05	Channel Flow, Seg E to F Area= 26.1 sf Perim= 56.3' r= 0.46' n= 0.035 Earth, dense weeds
<hr/>					
20.3	1,107	Total			

Summary for Subcatchment 25:

Runoff = 1.23 cfs @ 12.30 hrs, Volume= 6,403 cf, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
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Area (sf)	CN	Description
* 0	96	Ex. Gravel surface
* 2,124	96	Prop. Gravel surface
* 0	98	Ex. roofs
* 0	98	Ex. paved roads/driveways
* 7,000	98	Proposed lot impervious allocation
* 0	98	Proposed paved roads/driveways
12,507	61	>75% Grass cover, Good, HSG B
* 32,340	74	>75% Grass cover, Good, HSG C
277	58	Meadow, non-grazed, HSG B
18,342	71	Meadow, non-grazed, HSG C
0	30	Woods, Good, HSG A
0	70	Woods, Good, HSG C
72,590		Weighted Average
65,590		90.36% Pervious Area
7,000		9.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0210	0.13		Sheet Flow, Seg A to B Grass: Dense n= 0.240 P2= 3.13"
0.6	123	0.0488	3.56		Shallow Concentrated Flow, Seg B to C Unpaved Kv= 16.1 fps
0.1	147	0.1017	16.75	268.05	Trap/Vee/Rect Channel Flow, Seg C to D Bot.W=2.00' D=2.00' Z= 3.0 ' /' Top.W=14.00' n= 0.030
20.3	420	Total			

Summary for Subcatchment 30:

Runoff = 2.50 cfs @ 12.51 hrs, Volume= 15,905 cf, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.09"

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Area (sf)	CN	Description
*	0	96 Ex. Gravel surface
*	0	96 Prop. Gravel surface
*	0	98 Ex. roofs
*	0	98 Ex. paved roads/driveways
*	0	98 Proposed lot impervious allocation
*	0	98 Proposed paved roads/driveways
*	0	39 >75% Grass cover, Good, HSG A
*	0	74 >75% Grass cover, Good, HSG C
	0	61 >75% Grass cover, Good, HSG B
	3,941	30 Meadow, non-grazed, HSG A
	160,294	71 Meadow, non-grazed, HSG C
	0	78 Meadow, non-grazed, HSG D
	14,065	30 Woods, Good, HSG A
	0	55 Woods, Good, HSG B
	79,215	70 Woods, Good, HSG C
257,515		Weighted Average
257,515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	95	0.0632	0.12		Sheet Flow, Seg A to B Woods: Light underbrush n= 0.400 P2= 3.13"
16.5	94	0.0371	0.10		Sheet Flow, Seg B to C Grass: Bermuda n= 0.410 P2= 3.13"
0.9	65	0.0612	1.24		Shallow Concentrated Flow, Seg C to D Woodland Kv= 5.0 fps
0.4	81	0.0198	3.77	127.59	Channel Flow, Seg D to E Area= 33.8 sf Perim= 67.3' r= 0.50' n= 0.035 Earth, dense weeds
0.8	247	0.0324	5.45	576.76	Channel Flow, Seg E to F Area= 105.8 sf Perim= 221.3' r= 0.48' n= 0.030 Earth, grassed & winding
0.6	247	0.0530	6.88	558.59	Channel Flow, Seg F to G Area= 81.2 sf Perim= 173.3' r= 0.47' n= 0.030 Earth, grassed & winding
32.4	829	Total			

Summary for Reach R1:

Inflow Area = 501,875 sf, 7.27% Impervious, Inflow Depth = 0.99" for 2-Year event
 Inflow = 3.94 cfs @ 13.11 hrs, Volume= 41,242 cf
 Outflow = 3.94 cfs @ 13.11 hrs, Volume= 41,242 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Max. Velocity= 5.94 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 2.46 fps, Avg. Travel Time= 0.3 min

Peak Storage= 27 cf @ 13.11 hrs
 Average Depth at Peak Storage= 0.67'
 Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.10 cfs

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Type III 24-hr 2-Year Rainfall=3.09"

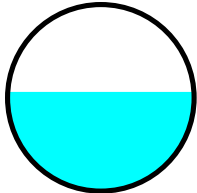
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15.0" Round Pipe
 n= 0.013 Corrugated PE, smooth interior
 Length= 41.4' Slope= 0.0121 '/'
 Inlet Invert= 312.20', Outlet Invert= 311.70'



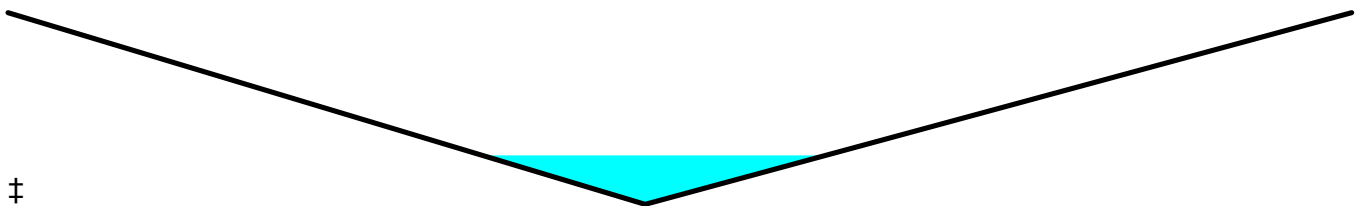
Summary for Reach R2:

Inflow Area = 501,875 sf, 7.27% Impervious, Inflow Depth = 0.99" for 2-Year event
 Inflow = 3.94 cfs @ 13.11 hrs, Volume= 41,242 cf
 Outflow = 3.88 cfs @ 13.21 hrs, Volume= 41,242 cf, Atten= 2%, Lag= 6.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.45 fps, Min. Travel Time= 7.2 min
 Avg. Velocity = 1.03 fps, Avg. Travel Time= 17.1 min

Peak Storage= 1,673 cf @ 13.21 hrs
 Average Depth at Peak Storage= 0.26'
 Bank-Full Depth= 1.00' Flow Area= 24.3 sf, Capacity= 147.42 cfs

Custom cross-section, Length= 1,055.3' Slope= 0.0380 '/'
 Constant n= 0.030 Earth, grassed & winding
 Inlet Invert= 311.10', Outlet Invert= 271.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	300.00	0.00
23.00	299.00	1.00
48.50	300.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0	0.00
1.00	24.3	48.5	25,591	147.42

Summary for Reach R3:

Inflow Area = 371,549 sf, 13.07% Impervious, Inflow Depth = 0.57" for 2-Year event
Inflow = 2.78 cfs @ 12.45 hrs, Volume= 17,626 cf
Outflow = 2.77 cfs @ 12.48 hrs, Volume= 17,626 cf, Atten= 0%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.83 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.99 fps, Avg. Travel Time= 5.4 min

Peak Storage= 313 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 124.26 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 ' Top Width= 14.00'
Length= 320.3' Slope= 0.0219 '
Inlet Invert= 270.00', Outlet Invert= 263.00'



Summary for Reach R4:

Inflow Area = 478,806 sf, 6.17% Impervious, Inflow Depth = 0.69" for 2-Year event
Inflow = 5.01 cfs @ 12.37 hrs, Volume= 27,605 cf
Outflow = 4.98 cfs @ 12.40 hrs, Volume= 27,605 cf, Atten= 1%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.86 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.30 fps, Avg. Travel Time= 6.1 min

Peak Storage= 633 cf @ 12.40 hrs
Average Depth at Peak Storage= 1.09'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 19.63 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 ' Top Width= 14.00'
Length= 110.0' Slope= 0.0005 '
Inlet Invert= 261.75', Outlet Invert= 261.69'



Summary for Pond CLV-1: 18in culvert

Inflow Area = 371,549 sf, 13.07% Impervious, Inflow Depth = 0.57" for 2-Year event
 Inflow = 2.78 cfs @ 12.45 hrs, Volume= 17,626 cf
 Outflow = 2.78 cfs @ 12.45 hrs, Volume= 17,626 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.78 cfs @ 12.45 hrs, Volume= 17,626 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 272.19' @ 12.45 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	271.30'	18.0" Round Culvert L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 271.30' / 270.00' S= 0.0289 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.77 cfs @ 12.45 hrs HW=272.19' TW=270.33' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 2.77 cfs @ 2.54 fps)

Summary for Pond CLV3: 18in culvert

Inflow Area = 478,806 sf, 6.17% Impervious, Inflow Depth = 0.69" for 2-Year event
 Inflow = 5.01 cfs @ 12.37 hrs, Volume= 27,605 cf
 Outflow = 5.01 cfs @ 12.37 hrs, Volume= 27,605 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.01 cfs @ 12.37 hrs, Volume= 27,605 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 263.41' @ 12.40 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	262.00'	18.0" Round Culvert L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 262.00' / 261.75' S= 0.0047 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.87 cfs @ 12.37 hrs HW=263.40' TW=262.84' (Dynamic Tailwater)
 ↑1=Culvert (Outlet Controls 4.87 cfs @ 3.69 fps)

Summary for Pond FB1: Underdrained soil filter

Inflow Area = 72,590 sf, 9.64% Impervious, Inflow Depth = 1.06" for 2-Year event
 Inflow = 1.23 cfs @ 12.30 hrs, Volume= 6,403 cf
 Outflow = 0.07 cfs @ 16.79 hrs, Volume= 6,407 cf, Atten= 94%, Lag= 269.2 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Secondary = 0.07 cfs @ 16.79 hrs, Volume= 6,407 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 247.03' @ 16.79 hrs Surf.Area= 3,706 sf Storage= 3,447 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 488.0 min (1,336.8 - 848.9)

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Volume	Invert	Avail.Storage	Storage Description
#1	246.00'	17,919 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
246.00	2,992	223.7	0	0	2,992
248.00	4,446	261.4	7,390	7,390	4,526
250.00	6,128	299.1	10,529	17,919	6,299

Device	Routing	Invert	Outlet Devices
#1	Primary	248.00'	10.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Secondary	243.30'	1.2" Vert. 1-1/4" Drill Hole C= 0.600
#3	Device 2	243.73'	4.0" Round Culvert L= 80.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 243.73' / 243.30' S= 0.0053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#4	Device 3	246.00'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 240.00'
#5	Device 3	247.50'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=246.00' TW=0.00' (Dynamic Tailwater)

↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.07 cfs @ 16.79 hrs HW=247.03' TW=0.00' (Dynamic Tailwater)

↑2=**1-1/4" Drill Hole** (Orifice Controls 0.07 cfs @ 9.24 fps)

↑3=**Culvert** (Passes 0.07 cfs of 0.37 cfs potential flow)

↑4=**Exfiltration** (Passes 0.07 cfs of 0.24 cfs potential flow)

↑5=**Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond WP: Wet Pond

Inflow Area = 1,044,466 sf, 9.96% Impervious, Inflow Depth = 0.69" for 2-Year event
 Inflow = 10.19 cfs @ 12.41 hrs, Volume= 60,320 cf
 Outflow = 1.51 cfs @ 13.87 hrs, Volume= 60,319 cf, Atten= 85%, Lag= 87.8 min
 Primary = 0.22 cfs @ 13.87 hrs, Volume= 896 cf
 Secondary = 1.29 cfs @ 13.87 hrs, Volume= 59,422 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 261.43' @ 13.87 hrs Surf.Area= 24,882 sf Storage= 29,754 cf

Plug-Flow detention time= 527.1 min calculated for 60,256 cf (100% of inflow)
 Center-of-Mass det. time= 527.7 min (1,360.7 - 833.0)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	74,980 cf	Custom Stage Data (Irregular) Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
260.00	16,935	778.1	0	0	16,935
262.00	28,459	1,082.3	44,898	44,898	62,009
263.00	31,734	1,100.8	30,082	74,980	65,403

Device	Routing	Invert	Outlet Devices
#1	Primary	261.40'	15.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Secondary	257.40'	18.0" Round Culvert L= 116.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 257.40' / 250.00' S= 0.0638 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	257.50'	3.0" Vert. Orifice/Grate - 3" C= 0.600
#4	Device 3	260.00'	50.0' long x 4.0' breadth Gravel Bench- 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 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#5	Device 2	261.34'	Neenah R4345 Beehive Grate Light Duty-req. structure Head (feet) 0.00 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Disch. (cfs) 0.000 0.900 1.600 2.500 3.500 4.000 4.600 5.300 6.800 7.500 8.100 8.600 9.100 9.600

Primary OutFlow Max=0.22 cfs @ 13.87 hrs HW=261.43' TW=0.00' (Dynamic Tailwater)

↑1=**Broad-Crested Rectangular Weir** (Weir Controls 0.22 cfs @ 0.46 fps)

Secondary OutFlow Max=1.29 cfs @ 13.87 hrs HW=261.43' TW=0.00' (Dynamic Tailwater)

↑2=**Culvert** (Passes 1.29 cfs of 15.41 cfs potential flow)

↑3=**Orifice/Grate - 3"** (Orifice Controls 0.46 cfs @ 9.39 fps)

↑4=**Gravel Bench- Broad-Crested Rectangular Weir** (Passes 0.46 cfs of 227.12 cfs potential flow)

↑5=**Neenah R4345 Beehive Grate Light Duty-req. structure** (Custom Controls 0.83 cfs)

Summary for Link SP1:

Inflow Area = 583,377 sf, 6.94% Impervious, Inflow Depth = 0.91" for 2-Year event
 Inflow = 4.01 cfs @ 13.20 hrs, Volume= 44,142 cf
 Primary = 4.01 cfs @ 13.20 hrs, Volume= 44,142 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP2:

Inflow Area = 1,503,247 sf, 7.75% Impervious, Inflow Depth = 0.72" for 2-Year event
 Inflow = 4.76 cfs @ 12.32 hrs, Volume= 90,059 cf
 Primary = 4.76 cfs @ 12.32 hrs, Volume= 90,059 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Link SP3:

Inflow Area = 257,515 sf, 0.00% Impervious, Inflow Depth = 0.74" for 2-Year event
Inflow = 2.50 cfs @ 12.51 hrs, Volume= 15,905 cf
Primary = 2.50 cfs @ 12.51 hrs, Volume= 15,905 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=501,875 sf 7.27% Impervious Runoff Depth=1.95"
 Flow Length=749' Tc=79.2 min CN=WQ Runoff=8.26 cfs 81,533 cf

Subcatchment 10: Runoff Area=81,502 sf 4.87% Impervious Runoff Depth=0.86"
 Flow Length=775' Tc=30.1 min CN=WQ Runoff=0.95 cfs 5,845 cf

Subcatchment 20: Runoff Area=371,549 sf 13.07% Impervious Runoff Depth=0.98"
 Flow Length=1,488' Tc=33.5 min CN=WQ Runoff=4.56 cfs 30,204 cf

Subcatchment 21: Runoff Area=144,268 sf 12.50% Impervious Runoff Depth=1.51"
 Flow Length=493' Tc=30.3 min CN=WQ Runoff=3.03 cfs 18,204 cf

Subcatchment 22: Runoff Area=478,806 sf 6.17% Impervious Runoff Depth=1.30"
 Flow Length=1,276' Tc=25.5 min CN=WQ Runoff=9.73 cfs 52,068 cf

Subcatchment 23: Runoff Area=49,843 sf 15.82% Impervious Runoff Depth=2.45"
 Flow Length=376' Tc=19.2 min CN=WQ Runoff=2.15 cfs 10,170 cf

Subcatchment 24: Runoff Area=386,191 sf 1.41% Impervious Runoff Depth=1.60"
 Flow Length=1,107' Tc=20.3 min CN=WQ Runoff=10.42 cfs 51,339 cf

Subcatchment 25: Runoff Area=72,590 sf 9.64% Impervious Runoff Depth=2.09"
 Flow Length=420' Tc=20.3 min CN=WQ Runoff=2.58 cfs 12,650 cf

Subcatchment 30: Runoff Area=257,515 sf 0.00% Impervious Runoff Depth=1.65"
 Flow Length=829' Tc=32.4 min CN=WQ Runoff=6.06 cfs 35,384 cf

Reach R1: Avg. Flow Depth=1.25' Max Vel=6.59 fps Inflow=8.26 cfs 81,533 cf
 15.0" Round Pipe n=0.013 L=41.4' S=0.0121 '/ Capacity=7.10 cfs Outflow=7.46 cfs 81,533 cf

Reach R2: Avg. Flow Depth=0.32' Max Vel=2.85 fps Inflow=7.46 cfs 81,533 cf
 n=0.030 L=1,055.3' S=0.0380 '/ Capacity=147.42 cfs Outflow=7.10 cfs 81,533 cf

Reach R3: Avg. Flow Depth=0.43' Max Vel=3.26 fps Inflow=4.56 cfs 30,204 cf
 n=0.030 L=320.3' S=0.0219 '/ Capacity=124.26 cfs Outflow=4.55 cfs 30,204 cf

Reach R4: Avg. Flow Depth=1.47' Max Vel=1.02 fps Inflow=9.73 cfs 52,068 cf
 n=0.030 L=110.0' S=0.0005 '/ Capacity=19.63 cfs Outflow=9.68 cfs 52,068 cf

Pond CLV-1: 18in culvert Peak Elev=272.52' Inflow=4.56 cfs 30,204 cf
 18.0" Round Culvert n=0.013 L=45.0' S=0.0289 '/ Outflow=4.56 cfs 30,204 cf

Pond CLV3: 18in culvert Peak Elev=265.29' Inflow=9.73 cfs 52,068 cf
 18.0" Round Culvert n=0.013 L=53.0' S=0.0047 '/ Outflow=9.73 cfs 52,068 cf

Pond FB1: Underdrained soil filter Peak Elev=248.03' Storage=7,528 cf Inflow=2.58 cfs 12,650 cf
 Primary=0.14 cfs 1,095 cf Secondary=0.08 cfs 10,707 cf Outflow=0.22 cfs 11,801 cf

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Pond WP: Wet Pond

Peak Elev=261.71' Storage=36,837 cf Inflow=18.87 cfs 110,646 cf
Primary=6.63 cfs 21,164 cf Secondary=5.32 cfs 89,479 cf Outflow=11.94 cfs 110,643 cf

Link SP1:

Inflow=7.45 cfs 87,378 cf
Primary=7.45 cfs 87,378 cf

Link SP2:

Inflow=17.03 cfs 173,783 cf
Primary=17.03 cfs 173,783 cf

Link SP3:

Inflow=6.06 cfs 35,384 cf
Primary=6.06 cfs 35,384 cf

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Type III 24-hr 25-Year Rainfall=5.72"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=501,875 sf 7.27% Impervious Runoff Depth=2.80"
 Flow Length=749' Tc=79.2 min CN=WQ Runoff=12.03 cfs 116,994 cf

Subcatchment 10: Runoff Area=81,502 sf 4.87% Impervious Runoff Depth=1.30"
 Flow Length=775' Tc=30.1 min CN=WQ Runoff=1.38 cfs 8,839 cf

Subcatchment 20: Runoff Area=371,549 sf 13.07% Impervious Runoff Depth=1.38"
 Flow Length=1,488' Tc=33.5 min CN=WQ Runoff=6.11 cfs 42,626 cf

Subcatchment 21: Runoff Area=144,268 sf 12.50% Impervious Runoff Depth=2.18"
 Flow Length=493' Tc=30.3 min CN=WQ Runoff=4.27 cfs 26,157 cf

Subcatchment 22: Runoff Area=478,806 sf 6.17% Impervious Runoff Depth=1.85"
 Flow Length=1,276' Tc=25.5 min CN=WQ Runoff=13.72 cfs 73,939 cf

Subcatchment 23: Runoff Area=49,843 sf 15.82% Impervious Runoff Depth=3.41"
 Flow Length=376' Tc=19.2 min CN=WQ Runoff=3.02 cfs 14,182 cf

Subcatchment 24: Runoff Area=386,191 sf 1.41% Impervious Runoff Depth=2.39"
 Flow Length=1,107' Tc=20.3 min CN=WQ Runoff=16.01 cfs 76,758 cf

Subcatchment 25: Runoff Area=72,590 sf 9.64% Impervious Runoff Depth=2.99"
 Flow Length=420' Tc=20.3 min CN=WQ Runoff=3.76 cfs 18,102 cf

Subcatchment 30: Runoff Area=257,515 sf 0.00% Impervious Runoff Depth=2.46"
 Flow Length=829' Tc=32.4 min CN=WQ Runoff=9.21 cfs 52,861 cf

Reach R1: Avg. Flow Depth=1.25' Max Vel=6.59 fps Inflow=12.03 cfs 116,994 cf
 15.0" Round Pipe n=0.013 L=41.4' S=0.0121 '/ Capacity=7.10 cfs Outflow=7.10 cfs 116,994 cf

Reach R2: Avg. Flow Depth=0.32' Max Vel=2.85 fps Inflow=7.10 cfs 116,994 cf
 n=0.030 L=1,055.3' S=0.0380 '/ Capacity=147.42 cfs Outflow=7.10 cfs 116,994 cf

Reach R3: Avg. Flow Depth=0.49' Max Vel=3.54 fps Inflow=6.11 cfs 42,626 cf
 n=0.030 L=320.3' S=0.0219 '/ Capacity=124.26 cfs Outflow=6.10 cfs 42,626 cf

Reach R4: Avg. Flow Depth=1.71' Max Vel=1.12 fps Inflow=13.72 cfs 73,939 cf
 n=0.030 L=110.0' S=0.0005 '/ Capacity=19.63 cfs Outflow=13.68 cfs 73,939 cf

Pond CLV-1: 18in culvert Peak Elev=272.88' Inflow=6.11 cfs 42,626 cf
 18.0" Round Culvert n=0.013 L=45.0' S=0.0289 '/ Outflow=6.11 cfs 42,626 cf

Pond CLV3: 18in culvert Peak Elev=267.60' Inflow=13.72 cfs 73,939 cf
 18.0" Round Culvert n=0.013 L=53.0' S=0.0047 '/ Outflow=13.72 cfs 73,939 cf

Pond FB1: Underdrained soil filter Peak Elev=248.13' Storage=7,978 cf Inflow=3.76 cfs 18,102 cf
 Primary=1.21 cfs 6,071 cf Secondary=0.08 cfs 10,985 cf Outflow=1.30 cfs 17,056 cf

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Type III 24-hr 25-Year Rainfall=5.72"

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Pond WP: Wet Pond

Peak Elev=261.89' Storage=41,740 cf Inflow=26.22 cfs 156,904 cf
Primary=13.56 cfs 45,251 cf Secondary=7.62 cfs 111,650 cf Outflow=21.18 cfs 156,901 cf

Link SP1:

Inflow=7.90 cfs 125,833 cf
Primary=7.90 cfs 125,833 cf

Link SP2:

Inflow=31.67 cfs 250,714 cf
Primary=31.67 cfs 250,714 cf

Link SP3:

Inflow=9.21 cfs 52,861 cf
Primary=9.21 cfs 52,861 cf

ATTACHMENT 6

INSPECTION, MAINTENANCE & HOUSEKEEPING PLAN



INSPECTION, MAINTENANCE, AND HOUSEKEEPING PLAN
(Prepared by Jayson Haskell, PE #13002)

VERRILL FARM SUBDIVISION
VISTA VIEW LANE (OFF SHAKER ROAD)
GRAY, MAINE

Responsible Party

Owner: Ambrosia Development & Investments
28 Weare Road
Seabrook, New Hampshire 03874

The owner/applicant is responsible for the maintenance of all stormwater management structures and related site components and the keeping of a maintenance log book with service records until a homeowner's association is established. Once the association is established, maintenance will be the responsibility of the homeowners. Records of all inspections and maintenance work performed must be kept on file with the owner and retained for a minimum of five years. The maintenance log will be made available to the Town and Maine Department of Environmental Protection (MDEP) upon request. At a minimum, the maintenance of stormwater management systems will be performed on the prescribed schedule.

The procedures outlined in this plan are provided as a general overview of the anticipated practices to be utilized on this site. In some instances, additional measures may be required due to unexpected conditions. *The Maine Erosion and Sedimentation Control BMP and Stormwater Management for Maine: Best Management Practices* Manuals published by the MDEP should be referenced for additional information.

During Construction

- 1. Inspection and Corrective Action:** It is the contractor's responsibility to comply with the inspection and maintenance procedures outlined in this section. Inspection shall occur on all disturbed and impervious areas, erosion control measures, material storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. These areas shall be inspected at least once a week as well as 24 hours before and after a storm event generating more than 0.5 inch of rainfall over a 24-hour period 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.
- 2. Maintenance:** Erosion controls shall be maintained in effective operating condition until areas are permanently stabilized. 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 BMPs need to be maintained or modified, additional BMPs are necessary, or other corrective action is needed, implementation must be completed within seven calendar days and prior to any rainfall event.

3. **Construction vehicles and equipment:** Construction vehicles and equipment shall not be driven or stored within the stormwater basins. To ensure the basins function as designed perpetually, prohibiting vehicles and equipment from these areas will limit the risk of inhibiting the function of the basins due to compaction.
4. **Snow Storage:** The proposed underdrained filter basin and wet ponds shall not be utilized for snow storage. Snow storage areas shall be located away from the basins, and in areas that will direct snow melt runoff into one of the basins on site.
5. **Documentation:** A report summarizing the inspections and any corrective action taken must be maintained on site. The log must include the name(s) and qualifications of the person making the inspections; the date(s) of the inspections; and the major observations about the operation and maintenance of erosion and sedimentation controls, materials storage areas, and vehicle 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 staff, and a copy must be provided upon request. The owner shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

Housekeeping

1. **Spill prevention:** Controls must be used to prevent pollutants from construction and waste materials on site to enter stormwater, which includes storage practices to minimize exposure of the materials to stormwater. The site contractor or operator must develop, and implement as necessary, appropriate spill prevention, containment, and response planning measures.
2. **Groundwater protection:** During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials. Any project proposing infiltration of stormwater must provide adequate pre-treatment of stormwater prior to discharge of stormwater to the infiltration area, or provide for

treatment within the infiltration area, in order to prevent the accumulation of fines, reduction in infiltration rate, and consequent flooding and destabilization.

- 3. Fugitive sediment and dust:** Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control, but other water additives may be considered as needed. A stabilized construction entrance (SCE) should be included to minimize tracking of mud and sediment. If off-site tracking occurs, public roads should be swept immediately and no less than once a week and prior to significant storm events. Operations during dry months, that experience fugitive dust problems, should wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.
- 4. Debris and other materials:** Minimize the exposure of construction debris, building and landscaping materials, trash, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials to precipitation and stormwater runoff. These materials must be prevented from becoming a pollutant source.
- 5. Excavation de-watering:** Excavation de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water removed from the ponded area, either through gravity or pumping, must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the Department.
- 6. Authorized Non-stormwater discharges:** Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:
 - (a) Discharges from firefighting activity;
 - (b) Fire hydrant flushings;
 - (c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);
 - (d) Dust control runoff in accordance with permit conditions and Appendix (C)(3);
 - (e) Routine external building washdown, not including surface paint removal, that does not involve detergents;
 - (f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;
 - (g) Uncontaminated air conditioning or compressor condensate;
 - (h) Uncontaminated groundwater or spring water;
 - (i) Foundation or footer drain-water where flows are not contaminated;

- (j) Uncontaminated excavation dewatering (see requirements in Appendix C(5));
- (k) Potable water sources including waterline flushings; and
- (l) Landscape irrigation.

- 7. Unauthorized non-stormwater discharges:** Approval from the Town does not authorize a discharge that is mixed with a source of non-stormwater, other than those discharges in compliance with Section 6 above. Specifically, the Town's approval does not authorize discharges of the following:
- (a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;
 - (b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;
 - (c) Soaps, solvents, or detergents used in vehicle and equipment washing; and
 - (d) Toxic or hazardous substances from a spill or other release.

Post Construction

- 1. Inspection and Corrective Action:** All stormwater measure, must be maintained by the owner in effective operating condition. A qualified third-party inspector hired by the owner shall at least annually inspect the stormwater management facilities. This person should have knowledge of erosion and stormwater control including the standards and conditions of the site's approvals. The inspector shall be certified through the MDEP to inspect the stormwater infrastructure. The following areas, facilities, and measures must be inspected, and identified deficiencies must be corrected. Areas, facilities, and measures other than those listed below may also require inspection on a specific site.
- A. Vegetated Areas:** Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.
 - B. Ditches, Swales, and Open Channels:** Inspect ditches, swales, and other open channels in the spring, late fall, and after heavy rains to remove any obstructions to flow, remove accumulated sediments and debris, control vegetative growth that could obstruct flow, and repair any erosion of the ditch lining. Vegetated ditches must be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Repair any slumping side slopes as soon as practicable. The channel must receive adequate routine maintenance to maintain capacity and prevent or correct any erosion of the channel's bottom or side slopes.
 - C. Storm Drains:** Inspect storm drains in the spring, late fall, and after heavy rains to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit; and to repair any erosion damage at the storm drain's outlet.

- D. Roofline Drip edges:** The drip edges should be inspected semi-annually and following major storm events for the first year and every six months thereafter. The reservoir crushed stone should drain within 24 to 48 hours following a major storm event. If ponding exceeds 48 hours, the stone reservoir course shall be removed and the filter bed be rototilled to reestablish the soil's filtration capacity. If water ponds in the reservoir course for more than 72 hours, the top several inches of the filter shall be replaced with fresh material. Inspect for debris and sediment build up at surface and remove as needed. The drip edges are part of the stormwater management plan and cannot be paved over or altered in anyway.
- E. Outlet Control Structures:** Inspect and, if required, clean out structure at least once a year, preferably in early spring. Clean out must include the removal and legal disposal of any accumulated sediments and debris at the bottom of the structure and inlet grate.
- F. Wet Pond:** Inspect gravel trench outlet after every major storm in the first few months to ensure proper function. Thereafter the gravel trench should be inspected at least once every six months. The wet pond should drain within 12 to 24 hours of the end of the storm event. If water does not drain through the gravel trench within 72 hours, the top several inches of the gravel must be replaced with fresh material. The removed sediment shall be disposed of in an acceptable manner. Wet Ponds should also be inspected annually for erosion, destabilization of side slopes, embankment settling and other signs of structural failure. Dredging should occur to remove sediment once the accumulated volume loss reaches 15% or approximately every 15-20 years.
- G. Underdrained Filter Basin:** The filter basins are not intended to function as snow storage areas. Inspector to verify that winter plowing operations are not dumping or pushing snow into the basins. The basins shall also not be used for vehicle or heavy equipment storage. Basin should be inspected after several major storm events (0.5 inches rainfall over 24 hours) to determine drawdown time during the first year. Basins to be inspected every six months thereafter with at least one inspection after a major storm event.

The basin should drain dry within 24 to 48 hours following a one-inch storm. If ponding exceeds 48 hours, the top of the filter bed must be rototilled to reestablish the soil's filtration capacity. If water ponds on the surface of the bed for more than 72 hours, the top several inches of the filter shall be replaced with fresh material. Inspect for debris and sediment build up in the forebay and basin and remove as needed. Mowing of the basin can only occur semi-annually to a height of no less than 6 inches utilizing a hand-held string trimmer or push-mower. Any bare areas or erosion rills shall be repaired with new filter media or sandy loam then seeded and

mulched. The basin should also be inspected annually for destabilization of side slopes, embankment settling and other signs of structural failure.

- H. Emergency Spillway:** Spillways should be inspected semi-annually and following major storm events for the first year and every six months thereafter to remove any obstructions to flow. Any woody vegetation growing through riprap lining must be removed. Replace riprap on areas where any underlying filter fabric is showing through the stone or where stones have been dislodged.
- I. Regular Maintenance:** Clear accumulations of winter sand along roadway and parking areas once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along pavement shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader.
- J. Documentation:** Keep a log (report) summarizing inspections, maintenance, and any corrective actions taken. The log must include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, indicate where the sediment and debris was disposed after removal. The log must be made accessible to Town and MDEP staff upon request. The permittee shall retain a copy of the log for a period of at least five years from the completion of permanent stabilization. Attached is a sample log.

Re-certification

Submit a certification of the following to the MDEP 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.

Municipalities with separate storm sewer systems regulated under the Maine Pollutant Discharge Elimination System (MPDES) Program may report on all regulated systems under

their control as part of their required annual reporting in lieu of separate certification of each system. Municipalities not regulated by the MPDES Program, but that are responsible for maintenance of permitted stormwater systems, may report on multiple stormwater systems in one report.

Duration of Maintenance

Perform maintenance as described.

INSPECTION AND MAINTENANCE LOG – GENERAL INSPECTION

VERRILL FARM SUBDIVISION VISTA VIEW LANE (OFF SHAKER ROAD) GRAY, MAINE

The following stormwater management and erosion control items shall be inspected and maintained as prescribed in the Maintenance Plan with recommended frequencies as identified below. The owner is responsible for keeping this maintenance log on file for a minimum of five years and shall provide a copy to the Town and MDEP upon request. Inspections are to be performed by a qualified third-party inspector and all corrective actions shall be performed by personnel familiar with stormwater management systems and erosion controls.

Maintenance Item	Maintenance Event	Date Performed	Responsible Personnel	Comments
Vegetated Areas	Inspect slopes and embankments early in Spring.			
Storm Drains	Inspect semiannually and after major rainfall.			
	Repair erosion at inlet or outlet of pipe.			
	Repair displaced riprap.			
	Clean accumulated sediment in culverts when >20% full.			
Roofline Dripedges	Check after each rainfall event to ensure that the stone reservoir drains within 24-48 hours.			
	Replace top several inches of filter if reservoir does not drain within 72 hours.			
	Inspect and remove sediment or debris build up on the surface of the stone			
	Inspect semi-annually for erosion or sediment accumulation and repair as necessary.			
Regular Maintenance	Clear accumulation of winter sand in paved areas annually.			

INSPECTION AND MAINTENANCE LOG – WET POND

VERRILL FARM SUBDIVISION VISTA VIEW LANE (OFF SHAKER ROAD) GRAY, MAINE

The following stormwater management and erosion control items shall be inspected and maintained as prescribed in the Maintenance Plan with recommended frequencies as identified below. The owner is responsible for keeping this maintenance log on file for a minimum of five years and shall provide a copy to the Town and MDEP upon request. Inspections are to be performed by a qualified third-party inspector and all corrective actions shall be performed by personnel familiar with stormwater management systems and erosion controls.

Maintenance Item	Maintenance Event	Date Performed	Responsible Personnel	Comments
Wet Pond	Check after each rainfall event to ensure that pond drains within 12-24 hours.			
	Replace top several inches of gravel in trench if pond does not drain within 72 hours.			
	Inspect annually for erosion or sediment accumulation and repair as necessary.			
Outlet Control Structure	Inspect to ensure that structure is properly draining.			
	Remove accumulated sediment semiannually.			
	Inspect grates/inlets and remove debris as needed.			
Emergency Spillway	Inspect and remove obstructions as necessary.			
	Remove woody vegetation.			
	Replace riprap as necessary.			

INSPECTION AND MAINTENANCE LOG – UNDERDRAINED FILTER BASIN

VERRILL FARM SUBDIVISION VISTA VIEW LANE (OFF SHAKER ROAD) GRAY, MAINE

The following stormwater management and erosion control items shall be inspected and maintained as prescribed in the Maintenance Plan with recommended frequencies as identified below. The owner is responsible for keeping this maintenance log on file for a minimum of five years and shall provide a copy to the Town and MDEP upon request. Inspections are to be performed by a qualified third-party inspector and all corrective actions shall be performed by personnel familiar with stormwater management systems and erosion controls.

Maintenance Item	Maintenance Event	Date Performed	Responsible Personnel	Comments
Underdrained Filter Basin	Check after each rainfall event to ensure that pond drains within 24-48 hours.			
	Replace top several inches of filter if pond does not drain within 72 hours.			
	Mow grass no more than twice a year to no less than 6 inches in height.			
	Inspect semi-annually for erosion or sediment accumulation and repair as necessary.			
	Inspector to verify basin not utilized for snow storage			
	Inspector to verify basin not utilized for vehicle or heavy equipment storage.			
Outlet Control Structure	Inspect to ensure that structure is properly draining.			
	Remove accumulated sediment semiannually.			
	Inspect grates/inlets and remove debris as needed.			
Emergency Spillway	Inspect and remove obstructions as necessary.			
	Remove woody vegetation.			
	Replace riprap as necessary.			