JONES & BEACH
ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

August 21, 2024

Portsmouth Technical Advisory Committee
Attn: Peter Stith, Principal Planner
1 Junkins Avenue, Suite 3rd Floor
Portsmouth, NH 03801

RE: Response Letter – Peer Review
635 Sagamore Ave, Portsmouth, NH
Tax Map 222, Lot 19
JBE Project No. 18134.1

Dear Mr. Stith,

We are in receipt of comments from Eric Weinrieb, P.E., Altus Engineering dated June 4, 2024. Review comments are listed below with our responses in bold. In addition to the below comments, the City DPW requested two changes to the plans and drainage model at an on-site meeting with Mike Garrepy of 635 Sagamore Development, LLC on July 24th, 2024 while the new test pits were being dug.

It was recommended that the site and offsite contributing watershed area be modelled as Hydrologic Soil Group C rather than B. According to the site-specific soil survey performed on the subject parcel by Gove Environmental Services, Inc., the pervious areas of the subject parcel consist of two soil types: Chatfield-Hollis-Rock Outcrop complex and Chatfield Variant, both of which are classified as Hydrologic Soil Group B. However, it is our understanding that the Society of Soil Scientists of Northern New England is currently in the process of revising "Ksat Values for New Hampshire Soils," SSSNNE Special Publication No. 5, and that among the revisions, Chatfield will be classified as a HSG C soil moving forward. These changes are anticipated to take effect in the next year. For this reason, we agree with this approach of modelling the site watershed as HSG C. We consulted the project soil scientist, Jim Gove of Gove Environmental Services, Inc., and he agrees with this approach as well. Therefore, we have modelled the site watershed entirely as HSG C in both the pre- and post-construction conditions drainage analysis.

A new catch basin has been installed just to the south of the intersection between Sagamore Avenue and the Tidewatch Condominium roadway curb cut as part of the ongoing Sagamore Avenue roadway improvements. For this reason, DPW recommended that we mimic existing flow patterns to the extent possible. We have moved catch basins 101 and 102 to be just behind the driveway for Unit 1 to maintain existing drainage flow patterns.. The peak flow rate and volume toward both the Sagamore Avenue right of way and the back of the site is still reduced from the pre-construction condition with this change. Because of the addition of the proposed catch basin along the Sagamore Avenue gutter line, the water that reaches the Sagamore Avenue right of way from the subject parcel will be captured into a closed drainage system rather than be allowed to flow down the Tidewatch Condominium roadway and contribute to the existing drainage situation like it does currently.

Because the peak flow and runoff volumes toward the newly installed catch basin from the subject parcel are being decreased, and less impervious surface is proposed to drain toward it from the subject parcel in the post-construction condition, we anticipate that the City's drainage system is equipped to handle this. For this reason, the pollutant removal calculations that were provided within the drainage report in order to demonstrate compliance with Section 7.6.2.1(a) of the Site Plan Review Regulations have been revised to omit the on-site impervious surface that drains toward the Sagamore Avenue right of way and to only account for the runoff toward Analysis Points 3 and 4, which are different points along the Tidewatch Condominium roadway.

ALTUS COMMENTS:

1. Based on the observations, the test pits may not be correctly depicted on the plans.
RESPONSE: The test pits have been survey located and are now shown in their correct locations.

2. The design is deficient test pits in the infiltration areas including both the stone drip edges and the infiltration pond. Additional pits will be required to demonstrate that infiltration is viable on this site. It is suggested that Altus witness the test pits to confirm the site conditions.
RESPONSE: Additional test pits were performed on July 24th, 2024 and witnessed by Dave Desfosses of the City DPW rather than Altus as recommended given time constraints and vacation schedules.

3. The NRCS soils report for Chatfield-Hollis-Rock Outcrop indicates that the KSAT value is very low, 0.00 in/hr. It is Altus' opinion that unless supported otherwise with test pits and infiltration tests, infiltration is not viable on this parcel.
RESPONSE: Infiltration tests have been performed and the existing soil on the site has a much higher saturated hydraulic conductivity than initially anticipated. Infiltration test results are included within the appendix of the revised drainage report. The proposed bioretention system is now modelled with an infiltration rate of 7.4 inches per hour because the material between the bottom of the coarse gravel layer and the seasonal high water table will be native. An infiltration rate of 0.3 inches per hour is still being used for the stone infiltration areas as the subgrade will be fill material.

4. Additional proposed spot grades are suggested to ensure that the transition from a super elevated roadway to a crowned roadway will properly drain.
RESPONSE: Additional spot grades have been added to the grading and drainage plan to ensure that this section of the roadway will properly drain.

5. The Developer is proposing buffer plantings in various locations on the site. The site has significant ledge outcrops that are not delineated on the plans. It is suggested that the ledge outcrops are shown on the plan to ensure that the natural features are being maintained and that the planting can be installed as depicted on the plans.
RESPONSE: Ledge outcrops are now shown on the plans. The proposed plantings in the vicinity of the ledge outcrops have been adjusted to go around the ledge outcrops rather than over them.

6. Proposed plantings are shown behind building units 1 and 2. There is mature vegetation in this area. The Designer and landscape architect should look at the existing vegetation to see if the existing buffer can be maintained and enhanced.
RESPONSE: Buffer plantings are proposed in order to enhance the existing vegetated buffer. Per Note #17 on the landscape plan, the contractor *shall* place plantings where necessary in order to enhance the existing wooded buffer and block visibility from Tidewatch Condominium property.

7. Based on the Cuomo report and Altus' observations, note 6 on Sheet C2 needs to be corrected. The 100-foot wetland buffer extends onto the property. The buffer should be depicted on the plans.
RESPONSE: Brenden Walden, CWS, and Mike Cuomo, CWS, determined in the field that the wetlands on the Tidewatch Condominium property are well offsite. See attached letter from RCCD. It is apparent that the proposed disturbance is outside of the wetland buffer, because the proposed disturbance is approximately 100 feet from the far edge of pavement of the Tidewatch Condominium roadway at its closest point. Note #6 on Sheet C2 has been revised.

8. Units 3 and 4 are described as being walk out basements. It is presumed that units 3 and 4 will not have perimeter drains as the Designer is proposing to utilize stone drip edges for infiltration. The foundation/stone drip edge detail indicates that there are no perimeter drains for those units. It is unclear if units 1 and 2 will have basements and perimeter drains. Outlets for perimeter drains should be depicted on the plans.
RESPONSE: The stone drip edges are now proposed to be lined and underdrained to prevent infiltration to the perimeter drain. We are instead placing 3' of stone underneath the decks for Units 3 and 4 and routing the drip edge underdrains into the stone underneath the decks in order to infiltrate the roof water. This is not required for flow or volume reduction, but the stone is proposed for infiltration in order to meet the City of Portsmouth's stormwater pollutant removal requirement (Site Plan Review Regulations 7.6.2.1(a)).

All four units will need to have perimeter drains. However, foundation drain locations are typically determined by the building contractor and not shown on proposed development plans. It should be noted that the basements for the back two units are going to be almost entirely above the seasonal high water table.

9. It is unclear as to why a portion of the roadway turnaround area is within the limited common area for unit 3.
RESPONSE: The limited common area for Unit 3 has been revised to exclude the turnaround.

10. A portion of the retaining wall is within the common area of unit 4. The condominium documents should clearly indicate who is responsible for the maintenance of the retaining wall.
RESPONSE: The limited common area lines for Unit 4 have been adjusted so that the retaining wall is in common area.

11. The Designer should check the north arrow on the Highway Access Plan.
RESPONSE: The north arrow on Sheet H1 has been revised for accuracy.

12. The plans indicate that the patios will be constructed using permeable pavers. The detail seems to indicate that the pavers will not be permeable. Additionally, the Designer needs to demonstrate that there is an adequate receiving area beneath the pavers to provide infiltration.
RESPONSE: The note stating that the patios will be constructed using permeable pavers has been removed.

13. It appears that the north bound 244-foot stopping distance sight line intercepts the road surface. The Designer should check their design assumptions.
RESPONSE: The plans depict two different stopping sight distance lines in the northbound direction. One of these represents a 244-foot stopping sight line as recommended per AASHTO for a road with the slope of Sagamore Avenue in this location and an 85th percentile speed of 33 mph as was determined by Stephen Pernaw. We acknowledge that this cuts through the existing grade line. The other represents the 228 feet of stopping sight distance that is actually provided.

We have attached correspondence with Eric Eby, dated from December 2023 to February 2024, concerning the stopping sight lines at the intersection of Sagamore Avenue and the proposed driveway particularly in the northbound direction. Mr. Eby ultimately signed off on our proposal for a driveway with a stopping sight distance of 228 feet, given that the driveway is proposed in its optimal location and that this will be an improvement over the existing paved apron for the Luster King. We also considered placing the curb cut on the southern end of the subject parcel. From the southern end of the subject parcel, only 139 feet stopping sight distance would be available in the southbound direction. Mr. Eby stated in the enclosed email, dated February 23, 2024, that the driveway may meet the AASHTO recommended 244 feet of stopping sight distance after the Sagamore Avenue roadwork is completed, but that if it still comes short, then mitigation measures such as a blind driveway sign or an advisory speed plaque of 25 MPH could be added just to the south of the crest of the hill along the northbound travel lane.

14. It appears that the rim of the pond overflow structure is only 4.2-inches below the berm elevation. It does not appear that there is adequate freeboard. Additionally, the drainage computations indicate that the peak elevation in the 50-year storm event will be 62.85, less than 2-inches below the top of the berm.
RESPONSE: The rim of the overflow structure has been lowered in order to provide a foot of freeboard on the bioretention pond in the 50-year storm. The overflow rim will be one foot below the pond berm and the 50-year storm peak elevation will be equal to the elevation of the overflow rim. Additionally, the design infiltration rate has been increased to 7.4 inches per hour per the results of the infiltration tests in order to model the pond more accurately. This also helps us to achieve a foot of freeboard.

15. The notes on the anti-seep collar detail conflicts with locations shown on the plans. Clarification is needed.
RESPONSE: The Anti-Seep Collar detail states that anti-seep collars shall be placed 15' and 25' downstream of a culvert inlet unless otherwise specified, AND that they shall be placed on both sides of a clay core. The outlet culvert from the proposed bioretention pond, which passes through a clay core berm, is only 20' long. Therefore, anti-seep collars are proposed on both sides of the clay core berm. In our judgement there is no reason to place another one 5 feet from the outlet headwall.

16. It is presumed that the clay core berm will interface with exposed ledge. The detail should clearly note how the interface will be constructed to ensure that there is no seepage.
RESPONSE: Note #5 has been added to the clay core berm detail on Sheet D4, stating that ledge shall be removed to at least 2' outside of and below the clay core.

17. The Designer needs to confirm that their design intent is to have the top portion of the pond underdrain in the pea stone layer.
RESPONSE: The underdrain invert has been lowered so that the underdrain will be entirely within the coarse stone layer.

18. Catch basins should be installed off-line to be considered adequate for pre-treatment.
RESPONSE: A sediment forebay has been added to the proposed bioretention pond for pre-treatment. Deep sumps for pre-treatment are no longer proposed.

PRE-DEVELOPMENT DRAINAGE ANALYSIS:

19. Pre-development subcatchment 1S needs to be amended to include all of the area upgradient to the south that discharges onto the site and into Sagamore Avenue.
RESPONSE: Pre-development subcatchment 1S has been amended to extend to the crest of the hill along Sagamore Avenue.

20. Based on the site conditions at the time of the visit, it appears that most of the area shown in subcatchment 2S is actually part of subcatchment 1S.
RESPONSE: The boundary between subcatchments 1S and 2S has been moved to the north in order to follow the high point.

21. The Designer should confirm the offsite contribution to subcatchment 4S.
RESPONSE: This has been reviewed in the field. We have made minor adjustments to subcatchment boundary as it is apparent that more of the ledge outcrop drains toward the subject parcel than we initially realized.

22. Due to the severity of the site grades, the Designer should consider limiting the Tc to 50-feet. Altus finds it curious that both pre-development subcatchment 2S and 3S have the same lengths for sheet flow.
RESPONSE: The sheet flow segments in each Tc path, both pre- and post-development, have been limited to 50 feet.

23. It is Altus' opinion that the longest flow path shown on the plans for both subcatchments 3S and 4S are underestimated. The Designer should confirm their assumptions.
RESPONSE: We ran other flow paths in HydroCAD and it turns out that our originally selected Tc paths for both of these subcatchments actually are the longest flow paths. The existing watershed plan shows the other candidate Tc paths within subcatchments 3S and 4S along with the resulting times of concentration. We have also reviewed and confirmed the modelled lengths and slopes for the Tc paths for both of these subcatchments.

24. Reach 1R is unnecessary and should be included as part of the longest flow path in subcatchment 3S.
RESPONSE: Reach 1R has been removed from the pre-construction drainage analysis and instead included as a Tc segment for Subcatchment 3S. It is included as a reach in the post-construction conditions analysis as Reach 8R, which is downstream of reaches 6R and 7R,

only because any overflow from the bioretention pond and from the stone under the decks for Units 3 and 4 is directed toward the swale. Subcatchment 3S is not directed toward Reach 8R in the post-construction drainage analysis and instead it is modelled as a Tc segment for the subcatchment.

25. The watershed plan indicates that the off-site topography is from NH Granit lidar. The plans should include the off-site topography for the portion of the Tidewatch condominium roadway and the northerly abutter's property.
RESPONSE: NH Granit lidar topography has been added for the portion of the Tidewatch Condominium roadway nearest the subject parcel and for the northerly abutter's property.

26. One of the project points of analysis should be the off-site catch basin on Tidewatch.
RESPONSE: Analysis Point 4 is the off-site catch basin adjacent to the Tidewatch Condominium mailhouse.

27. Altus notes that the Tidewatch closed drainage system does not operate properly. Stormwater bypasses the culverts as the roadway and drainage system is not properly maintained.
RESPONSE: This is evident as confirmed in the field during a rainstorm on May 30, 2024. As such, runoff that reaches Analysis Point 1 (the location of the newly installed catch basin) in the existing condition analysis then follows a series of reaches representing the curb lines of Sagamore Avenue and of the Tidewatch Condominium roadway, bypassing the existing catch basins, and ending at Analysis Point 3 (the same water collection point along the Tidewatch Condominium Roadway toward which the proposed bioretention pond outlets). Effectively, all runoff that ends up in the Sagamore Avenue right of way from the subject parcel in the existing condition reaches the low point along the Tidewatch Condominium roadway because of the fact that the existing catch basins along the Tidewatch Condominium roadway were observed to not operate properly.

However, where a new catch basin is being installed in the gutter line of Sagamore Avenue just to the south of the intersection of Sagamore Avenue and the Tidewatch Condominium roadway, the runoff toward the Sagamore Avenue right of way (Analysis Point 1) is NOT routed to the Tidewatch water collection point (Analysis Point 3) in the post-construction conditions analysis. Instead, Analysis Point 1 represents the new catch basin in the post-construction conditions analysis.

28. Post Development drainage analysis will be reviewed after the predevelopment issues have been addressed.
RESPONSE: No response necessary.

29. Compliance with Section 7.2 of the Site Plan Review Regulations will be completed upon receipt of revised plans and documents.
RESPONSE: No response necessary.

Included with this response letter are the following:

1. One (1) Full Size Revised Plan Set.
2. One (1) Drainage Analysis (Infiltration Test Results Enclosed).
3. Updated Test Pit Log.
4. Email Chain between JBE and Eric Eby regarding stopping sight distance, last message dated February 23, 2024.
5. RCCD Offsite Wetland Letter.
6. Dave Desfosses Email dated July 25, 2024.

Thank you very much for your time.

Very truly yours,
JONES & BEACH ENGINEERS, INC.

Daniel Meditz

Daniel Meditz, P.E.
Project Engineer

cc: Eric Weinrieb, P.E., Altus Engineering (via email and hand delivered)
Michael Garrepy (via email)

City of Portsmouth, New Hampshire

Site Plan Application Checklist

This site plan application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. The checklist is required to be completed and uploaded to the Site Plan application in the City's online permitting system. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all site plan review requirements. Please refer to the Site Plan review regulations for full details.

Applicant Responsibilities (Section 2.5.2): Applicable fees are due upon application submittal along with required attachments. The application shall be complete as submitted and provide adequate information for evaluation of the proposed site development. Waiver requests must be submitted in writing with appropriate justification.

Name of Applicant: 635 Sagamore Development, LLC Date Submitted: 3/18/24

Application # (in City's online permitting): LU-24-34

Site Address: 635 Sagamore Avenue Map: 222 Lot: 19

Application Requirements			
☑	**Required Items for Submittal**	**Item Location (e.g. Page or Plan Sheet/Note #)**	**Waiver Requested**
☒	Complete application form submitted via the City's web-based permitting program (2.5.2.1**(2.5.2.3A)**		N/A
☒	All application documents, plans, supporting documentation and other materials uploaded to the application form in viewpoint in digital Portable Document Format (PDF). One hard copy of all plans and materials shall be submitted to the Planning Department by the published deadline. **(2.5.2.8)**		N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	Statement that lists and describes "green" building components and systems. **(2.5.3.1B)**	Pending	
☒	Existing and proposed gross floor area and dimensions of all buildings and statement of uses and floor area for each floor. **(2.5.3.1C)**	Architectural Plans	N/A
☒	Tax map and lot number, and current zoning of all parcels under Site Plan Review. **(2.5.3.1D)**	Cover Sheet & Sheet C2	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. **(2.5.3.1E)**	Cover Sheet	N/A
☒	Names and addresses (including Tax Map and Lot number and zoning districts) of all direct abutting property owners (including properties located across abutting streets) and holders of existing conservation, preservation or agricultural preservation restrictions affecting the subject property. **(2.5.3.1F)**	Cover Sheet	N/A
☒	Names, addresses and telephone numbers of all professionals involved in the site plan design. **(2.5.3.1G)**	Cover Sheet	N/A
☒	List of reference plans. **(2.5.3.1H)**	C1	N/A
☒	List of names and contact information of all public or private utilities servicing the site. **(2.5.3.1I)**	Cover Sheet	N/A

Site Plan Specifications			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Full size plans shall not be larger than 22 inches by 34 inches with match lines as required, unless approved by the Planning Director.. **(2.5.4.1A)**	Required on all plan sheets	N/A
☒	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. **(2.5.4.1B)**	Required on all plan sheets	N/A
☒	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. **(2.5.4.1C)**	C1, Note #3	N/A
☒	Plans shall be drawn to scale and stamped by a NH licensed civil engineer. **(2.5.4.1D)**	Required on all plan sheets	N/A
☒	Wetlands shall be delineated by a NH certified wetlands scientist and so stamped. **(2.5.4.1E)**	None Observed, Wetland Delineation Report Included	N/A
☒	Title (name of development project), north point, scale, legend. **(2.5.4.2A)**	C1	N/A
☒	Date plans first submitted, date and explanation of revisions. **(2.5.4.2B)**	All Sheets	N/A
☒	Individual plan sheet title that clearly describes the information that is displayed. **(2.5.4.2C)**	Required on all plan sheets	N/A
☒	Source and date of data displayed on the plan. **(2.5.4.2D)**	C1	N/A

Site Plan Specifications – Required Exhibits and Data			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	**1. Existing Conditions: (2.5.4.3A)** • Surveyed plan of site showing existing natural and built features; • Existing building footprints and gross floor area; • Existing parking areas and number of parking spaces provided; • Zoning district boundaries; • Existing, required, and proposed dimensional zoning requirements including building and open space coverage, yards and/or setbacks, and dwelling units per acre; • Existing impervious and disturbed areas; • Limits and type of existing vegetation; • Wetland delineation, wetland function and value assessment (including vernal pools); • SFHA, 100-year flood elevation line and BFE data, as required.	C1	
☒	**2. Buildings and Structures: (2.5.4.3B)** • Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation; • Elevations: Height, massing, placement, materials, lighting, façade treatments; • Total Floor Area; • Number of Usable Floors; • Gross floor area by floor and use.	Architectural Plans	
☒	**3. Access and Circulation: (2.5.4.3C)** • Location/width of access ways within site; • Location of curbing, right of ways, edge of pavement and sidewalks; • Location, type, size and design of traffic signing (pavement markings); • Names/layout of existing abutting streets; • Driveway curb cuts for abutting prop. and public roads; • If subdivision; Names of all roads, right of way lines and easements noted; • AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).	C2 T1-T2	
☒	**4. Parking and Loading: (2.5.4.3D)** • Location of off street parking/loading areas, landscaped areas/buffers; • Parking Calculations (# required and the # provided).	C2, Note #3	
☒	**5. Water Infrastructure: (2.5.4.3E)** • Size, type and location of water mains, shut-offs, hydrants & Engineering data; • Location of wells and monitoring wells (include protective radii).	C4	
☒	**6. Sewer Infrastructure: (2.5.4.3F)** • Size, type and location of sanitary sewage facilities & Engineering data, including any onsite temporary facilities during construction period.	C4 & P2	

☒	**7. Utilities: (2.5.4.3G)** - The size, type and location of all above & below ground utilities; - Size type and location of generator pads, transformers and other fixtures.	C4	
☒	**8. Solid Waste Facilities: (2.5.4.3H)**	C2, Note #22	
	- The size, type and location of solid waste facilities.		
☒	**9. Storm water Management: (2.5.4.3I)** - The location, elevation and layout of all storm-water drainage. - The location of onsite snow storage areas and/or proposed off-site snow removal provisions. - Location and containment measures for any salt storage facilities - Location of proposed temporary and permanent material storage locations and distance from wetlands, water bodies, and stormwater structures.	Snow Storage - C2 Everything Else - C3	
☒	**10. Outdoor Lighting: (2.5.4.3J)** - Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and photometric plan.	L2	
☒	11. Indicate where dark sky friendly lighting measures have been implemented. (10.1)	Everywhere	
☒	**12. Landscaping: (2.5.4.3K)** - Identify all undisturbed area, existing vegetation and that which is to be retained; - Location of any irrigation system and water source.	L1	
☒	**13. Contours and Elevation: (2.5.4.3L)** - Existing/Proposed contours (2 foot minimum) and finished grade elevations.	C3	
☒	**14. Open Space: (2.5.4.3M)** - Type, extent and location of all existing/proposed open space.	C2, Note #2	
☐	**15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)**	N/A	
☐	**16. Character/Civic District (All following information shall be included): (2.5.4.3P)** - Applicable Building Height (10.5A21.20 & 10.5A43.30); - Applicable Special Requirements (10.5A21.30); - Proposed building form/type (10.5A43); - Proposed community space (10.5A46).	N/A	
☐	**17. Special Flood Hazard Areas (2.5.4.3Q)** - The proposed development is consistent with the need to minimize flood damage; - All public utilities and facilities are located and construction to minimize or eliminate flood damage; - Adequate drainage is provided so as to reduce exposure to flood hazards.	N/A	

Other Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	Traffic Impact Study or Trip Generation Report, as required. **(3.2.1-2)**	Included with Submission	
☒	Indicate where Low Impact Development Design practices have been incorporated. **(7.1)**	C3	
☒	Indicate whether the proposed development is located in a wellhead protection or aquifer protection area. Such determination shall be approved by the Director of the Dept. of Public Works. **(7.3.1)**	C2, Note #23	
☒	Stormwater Management and Erosion Control Plan. **(7.4)**	Included with Submission	
☒	Inspection and Maintenance Plan **(7.6.5)**	Included with Submission	

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☒	All local approvals, permits, easements and licenses required, including but not limited to: • Waivers; • Driveway permits; • Special exceptions; • Variances granted; • Easements; • Licenses. **(2.5.3.2A)**	C2, Note # 4 & 5	
☒	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: • Calculations relating to stormwater runoff; • Information on composition and quantity of water demand and wastewater generated; • Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; • Estimates of traffic generation and counts pre- and post-construction; • Estimates of noise generation; • A Stormwater Management and Erosion Control Plan; • Endangered species and archaeological / historical studies; • Wetland and water body (coastal and inland) delineations; • Environmental impact studies. **(2.5.3.2B)**	Included with Submission	
☒	A document from each of the required private utility service providers indicating approval of the proposed site plan and indicating an ability to provide all required private utilities to the site. **(2.5.3.2D)**	Pending	

Final Site Plan Approval Required Information

☑	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	A list of any required state and federal permit applications required for the project and the status of same. **(2.5.3.2E)**	C2, Note #5	
☒	A note shall be provided on the Site Plan stating: "All conditions on this Plan shall remain in effect in perpetuity pursuant to the requirements of the Site Plan Review Regulations." **(2.5.4.2E)**	C2, Note #21	N/A
☒	For site plans that involve land designated as "Special Flood Hazard Areas" (SFHA) by the National Flood Insurance Program (NFIP) confirmation that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334. **(2.5.4.2F)**	N/A	
☒	Plan sheets submitted for recording shall include the following notes: a. "This Site Plan shall be recorded in the Rockingham County Registry of Deeds." b. "All improvements shown on this Site Plan shall be constructed and maintained in accordance with the Plan by the property owner and all future property owners. No changes shall be made to this Site Plan without the express approval of the Portsmouth Planning Director." **(2.13.3)**	C2, Note #19 & 20	N/A

Applicant's Signature: Daniel Meditz **Date:** 3/14/2024

E # 21060614 09/24/2021 09:32:59 AM
Book 6332 Page 1158 Page 1 of 2
Register of Deeds, Rockingham County

Cathy Ann Stacey

LCHIP	**ROA585829**	**25.00**
TRANSFER TAX	**RO109828**	**5,807.00**
RECORDING		**14.00**
SURCHARGE		**2.00**

Return to:

WARRANTY DEED

KNOW ALL BY THESE PRESENTS, that I, **WILLIAM A. HINES**, married person, **TRUSTEE OF THE WILLIAM A. HINES FAMILY REVOCABLE TRUST** a/k/a The Hines Family Revocable Trust of 2006, of 635 Sagamore Avenue, Portsmouth, New Hampshire 03801, for consideration paid, hereby grant to **635 SAGAMORE DEVELOPMENT, LLC**, a New Hampshire limited liability company with a mailing address of 3612 Lafayette Road, Dept. 4, Portsmouth, New Hampshire 03801 with WARRANTY COVENANTS, the following described premises:

A certain tract of land with the buildings thereon, situate on Sagamore Avenue in said Portsmouth, more particularly described as follows:

Beginning at a point on Sagamore Avenue at land now or formerly of Arnold, thence running Westerly by said Arnold land three hundred (300) feet, more or less, to land now or formerly of W.W. and D.M. Johnston; thence turning and running Northwesterly by said Johnston land one hundred and twenty-four (124) feet; thence turning and running Northerly also by said Johnston land one hundred sixty-two (162) feet to land now or formerly of C.W. Walker; thence turning and running Easterly by said Walker land four hundred nineteen (419) feet to Sagamore Avenue; thence turning and running Easterly one hundred forty (140) feet; thence turning and running along said Sagamore Avenue thirty (30) feet to land of one Smith; thence turning and running Westerly one hundred forty (140) feet; thence turning and running Southerly ninety (90) feet; thence turning and running Easterly one hundred forty (140) feet to Sagamore Avenue; the last three bounds being land of Smith; thence turning running Southerly by said Sagamore Avenue one hundred sixty (160) feet to the point of beginning.

EXCEPTING AND RESERVING to the said William A. Hines and his wife Bonnie Hines a life estate in the above-described property permitting them to reside in the existing residential apartment on the property for the remainder of William A. Hines natural life, plus one year unless Bonne Hines shall have predeceased.

Meaning and intending to convey the same premises conveyed to the Grantor by deed of William A. Hines dated February 11, 2008 and recorded in the Rockingham County Registry of Deeds at Book 4885, Page 1538.

BY SIGNING BELOW, William A. Hines and Bonnie Hines release all homestead rights to the Premises.

TRUSTEE CERTIFICATE

I, William A. Hines, Trustee of the William A. Hines Family Revocable Trust A/K/A The Hines Family Revocable Trust of 2006, hereby covenant that said Trust is duly organized under the laws of the State of New Hampshire; that I am the sole trustee pursuant to said Declaration of Trust; that said Trust is still in full force and effect; that I have the power thereunder to convey as aforesaid; and that, in making this conveyance, I have, in all respects, acted pursuant to the authority vested in and granted to me therein and no purchaser or third party shall be bound to inquire whether the Trustee has said power or are properly exercising said power or to see to the application of any trust assets paid to the Trustee for a conveyance thereof.

Signed this 3rd day of September, 2021.

William A. Hines, Trustee of the William A. Hines
Family Revocable Trust A/K/A The Hines Family
Revocable Trust of 2006

Bonnie L. Hines

Bonnie Hines

STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

On this, the 3rd day of September, 2021, before me, the undersigned Officer, personally appeared William A. Hines, Trustee of the William A. Hines Family Revocable Trust A/K/A The Hines Family Revocable Trust of 2006, known to me, or satisfactorily proven, to be the person whose name is subscribed to the foregoing instrument, and acknowledged that he executed the same for the purposes set forth therein.

Laura Ramsdell

Justice of the Peace/Notary Public
My commission expires: ________

LAURA H. RAMSDELL
MY COMMISSION EXPIRES MAY 20, 2025

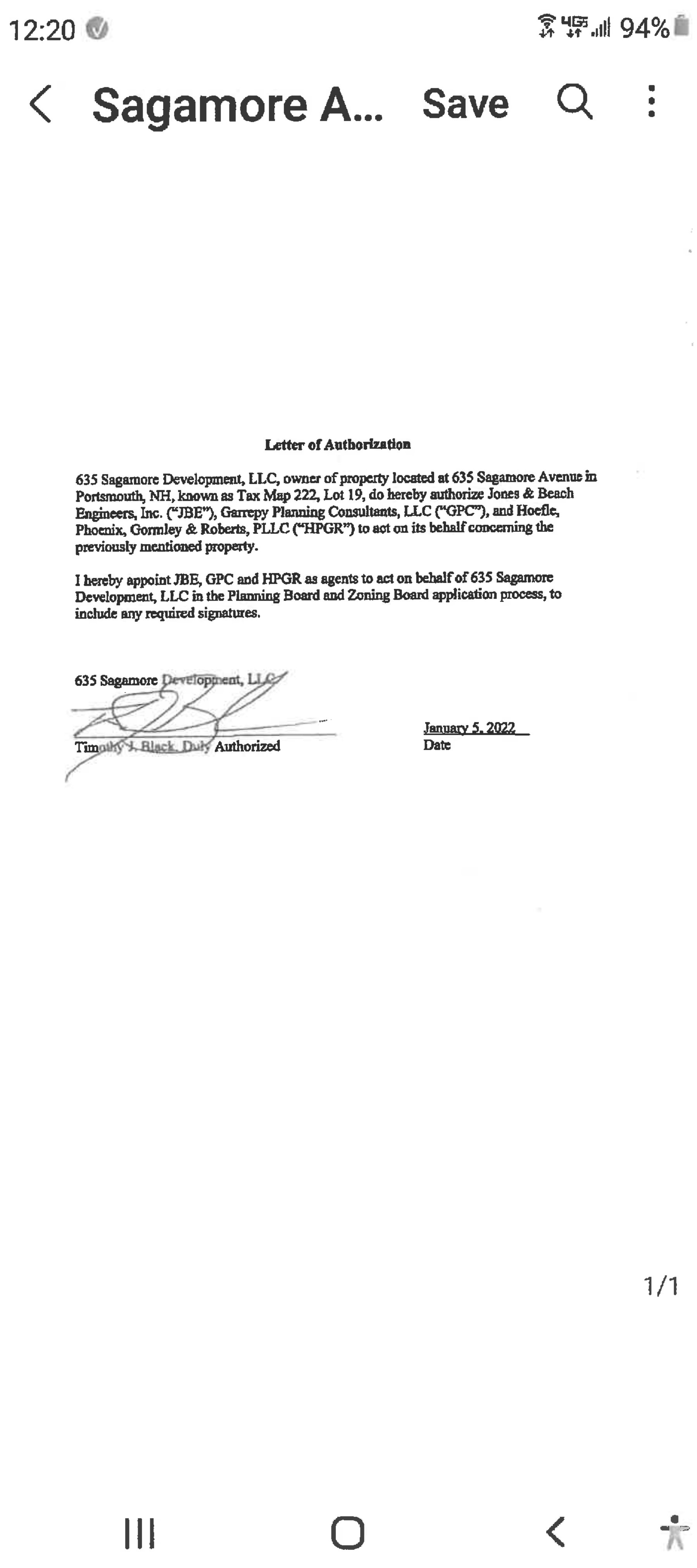
STATE OF NEW HAMPSHIRE
COUNTY OF ROCKINGHAM

On this, the 3rd day of September, 2021, before me, the undersigned Officer, personally appeared Bonnie Hines, known to me, or satisfactorily proven, to be the person whose name is subscribed to the foregoing instrument, and acknowledged that she executed the same for the purposes set forth therein.

Laura Ramsdell

Justice of the Peace/Notary Public
My commission expires: ________

LAURA H. RAMSDELL
MY COMMISSION EXPIRES MAY 20, 2025



Letter of Authorization

635 Sagamore Development, LLC, owner of property located at 635 Sagamore Avenue in Portsmouth, NH, known as Tax Map 222, Lot 19, do hereby authorize Jones & Beach Engineers, Inc. ("JBE"), Garrepy Planning Consultants, LLC ("GPC"), and Hoefle, Phoenix, Gormley & Roberts, PLLC ("HPGR") to act on its behalf concerning the previously mentioned property.

I hereby appoint JBE, GPC and HPGR as agents to act on behalf of 635 Sagamore Development, LLC in the Planning Board and Zoning Board application process, to include any required signatures.

635 Sagamore Development, LLC

Timothy J. Black, Duly Authorized

January 5, 2022
Date

GOVE ENVIRONMENTAL SERVICES, INC.

TEST PIT DATA

Project 635 Sagamore Ave
Client 635 Sagamore Development LLC
GES Project No. GES 2021307
MM/DD/YY Staff 3-18-2022 JPG

Test Pit No. 1
ESHWT: n/a
Termination @ 15”
Refusal: 15” SCS Soil: Hollis
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–5”	10YR 3/2	FSL	GR	FR	NONE
5–15”	10YR 5/6	FSL	GR	FR	NONE

Test Pit No. 2
ESHWT: n/a
Termination @ 25”
Refusal: 25” SCS Soil: Chatfield
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–5”	10YR 3/2	FSL	GR	FR	NONE
5–25”	10YR 5/6	FSL	GR	FR	NONE

Test Pit No. 3
ESHWT: n/a
Termination @ 25”
Refusal: 25” SCS Soil: Chatfield
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–6”	10YR 3/2	FSL	GR	FR	NONE
6–25”	10YR 5/6	FSL	GR	FR	NONE

8 Continental Dr Bldg 2 Unit H, Exeter, NH 03833-7526
Ph (603) 778 0644 / *Fax* (603) 778 0654
info@gesinc.biz
www.gesinc.biz

Test Pit No. 4
ESHWT: n/a
Termination @ 15”
Refusal: 15” SCS Soil: Hollis
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–15”	10YR 3/2	FSL	GR	FR	NONE

Test Pit No. 5
ESHWT: 30”
Termination @ 36”
Refusal: 36” SCS Soil: Chatfield variant
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–8”	10YR 3/2	FSL	GR	FR	NONE
8–30”	10YR 4/6	FSL	GR	FR	NONE
30–36”	2.5Y 5/3	FSL	GR	FR	10% Distinct

Test Pit No. 6
ESHWT: n/a
Termination @ 12”
Refusal: 12” SCS Soil: Hollis
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–12”	10YR 3/2	FSL	GR	FR	NONE

Test Pit No. 7
ESHWT: n/a
Termination @ 27”
Refusal: 27” SCS Soil: Chatfield
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–4”	10YR 3/2	FSL	GR	FR	NONE
4–27”	10YR 5/6	FSL	GR	FR	NONE

Test Pit No. 8
ESHWT: 35”
Termination @ 40”
Refusal: 40” SCS Soil: Chatfield variant
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–6”	10YR 3/2	FSL	GR	FR	NONE
6–35”	10YR 5/6	FSL	GR	FR	NONE
35–40”	2.5Y 5/3	FSL	OM	FI	10% Distinct

Test Pit No. 9
ESHWT: n/a
Termination @ 27”
Refusal: 27” SCS Soil: Chatfield
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–4”	10YR 3/2	FSL	GR	FR	NONE
4–27”	10YR 5/6	FSL	GR	FR	NONE

Test Pit No. 10
ESHWT: 35
Termination @ 62”
Refusal: 62” SCS Soil: Scituate
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–10”	10YR 3/2	FSL	GR	FR	NONE
10–35”	10YR 5/6	FSL	GR	FR	NONE
35–62”	2.5Y 5/3	FSL	PL	FI	10%, Distinct

STATE OF NEW HAMPSHIRE
JAMES
P.
GOVE
NO. 004
CERTIFIED SOIL SCIENTIST

3-21-2022

Legend:

FSL = fine sandy loam
GR = granular
PL = platy
FI = firm

GOVE ENVIRONMENTAL SERVICES, INC.

TEST PIT DATA

Project 635 Sagamore Ave., Portsmouth NH
Client 635 Sagamore Development LLC
GES Project No. 2021308
MM/DD/YY Staff 07-24-2024 James Gove, CSS#004

Witnessed by: David Desfosses, City of Portsmouth

Test Pit No.	**11**	Soils Series:	Udorthents
ESHWT::	none	Landscape:	Paved
Termination @	32”	Slope:	B
Refusal:	32”	Parent Material:	Fill over till
Obs. Water:	None	Hydrologic Soil Group:	Impervious

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
Fill 1, 0-8”	10YR4/4	fine sandy loam	massive-friable-none
Fill 2, 8-19”	10YR2/1	ground pavement	massive-firm-none
Bw 18-32”	10YR5/6	fine sandy loam	granular-friable-none

Test Pit No.	**12**	Soils Series:	Chatfield
ESHWT::	none	Landscape:	Hillside
Termination @	28”	Slope:	C
Refusal:	28”	Parent Material:	Bedrock Till
Obs. Water:	None	Hydrologic Soil Group:	B

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-6”	10YR3/2	fine sandy loam	granular-friable-none
Bw 6-28”	10YR5/6	fine sandy loam	granular-friable-none

Bedrock ranges from 20” to 28” in test pit.

8 Continental Dr Bldg 2 Unit H, Exeter, NH 03833-7526
Ph (603) 778 0644 / *Fax* (603) 778 0654
info@gesinc.biz
www.gesinc.biz

Test Pit No.	**13**	Soils Series:	Chatfield
ESHWT::	none	Landscape:	Hillside
Termination @	36”	Slope:	C
Refusal:	36”	Parent Material:	Bedrock Till
Obs. Water:	None	Hydrologic Soil Group:	B

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-6”	10YR3/2	fine sandy loam	granular-friable-none
Bw 6-24”	10YR4/6	fine sandy loam	granular-friable-none
C 24-36”	2.5Y5/3	fine sandy loam	granular-friable-none

Bedrock ranges from 24” to 36” in test pit.

Note: Site should be calculated as HSG C, due to the limited infiltration in thin soil layers above the bedrock.

STATE OF NEW HAMPSHIRE
JAMES
P.
GOVE
NO. 004
CERTIFIED SOIL SCIENTIST

7-24-2024

From:	Eric B. Eby <ebeby@cityofportsmouth.com>
Sent:	Friday, February 23, 2024 9:06 AM
To:	Daniel Meditz; Joseph Coronati; Zachary M. Cronin; Dave J. Desfosses
Cc:	Mike Garrepy (mgarrepy@gmail.com); Steve Pernaw
Subject:	RE: 18134.1 - Luster Cluster, Sight Distance

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Daniel
I've had a chance to review the Green Book section on sight distance and I am fine with your calcs and explanation. As described in the Green Book, stopping sight distance is broken into two portions. One is the distance traveled during the brake reaction time and the second is the distance to brake the vehicle to a stop. At 33 mph, the brake reaction distance is 121 feet, meaning that with a sight distance of 228 feet, 107 feet remains to bring the vehicle to a stop. This is approximately the 100 feet that is being assumed in this case, so I am fine with your calculations. As the sight distance is very close to the minimum requirement, there is a chance it may meet the minimum requirements after the City finishes the roadwork planned for this year. I would recommend checking it again after the roadwork is complete and if still short on the sight line, then I would recommend the installation of an advance warning sign for BLIND DRIVEWAY with a supplementary advisory speed plaque of 25 MPH.
Best,
Eric

Eric B. Eby, P.E.
City Engineer – Parking, Transportation, and Planning
Department of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801
(603) 766-1415
Cell (603)-815-1761

From: Daniel Meditz <DMeditz@jonesandbeach.com>
Sent: Wednesday, February 21, 2024 8:51 AM
To: Eric B. Eby <ebeby@cityofportsmouth.com>; Joseph Coronati <jcoronati@Jonesandbeach.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Steve Pernaw <sgp@pernaw.com>
Subject: RE: 18134.1 - Luster Cluster, Sight Distance

Eric,

The 100 feet braking distance was an approximation after consulting with Steve Pernaw, who is copied on this email. The only thing it really effects in terms of our analysis is that the slope we used to determine the required stopping sight distance is based on the average slope for the first 100' along the approach.

Thanks,

Daniel Meditz, P.E.
Lead Design Engineer

JONES&BEACH ENGINEERS, INC.
85 Portsmouth Avenue
PO Box 219
Stratham, NH 03885
(603) 772-4746 (ext. #128)
http://www.jonesandbeach.com

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From: Eric B. Eby <ebeby@cityofportsmouth.com>
Sent: Friday, February 16, 2024 3:43 PM
To: Daniel Meditz <DMeditz@jonesandbeach.com>; Joseph Coronati <jcoronati@Jonesandbeach.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Steve Pernaw <sgp@pernaw.com>
Subject: RE: 18134.1 - Luster Cluster, Sight Distance

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Daniel

Thank you for the explanation and revised plans. I think we are very close. I want to check on the 100-foot assumption of when vehicles apply their brakes. Is that guidance from the Green Book or just an assumption on your part? That distance would seem to depend on their speed. I think they may be applying the brakes sooner, and on the northbound approach they may still be going uphill, which could reduce the required sight distance needed and allow the minimum sight line to be provided.

For a vehicle waiting to turn out of the driveway onto Sagamore, they need to be able to see the minimum stopping sight distance to the south, which, if the driver's eye is at 69 feet, would appear to be sufficient, even for the sight line as currently calculated. This is based on my rough drawing of lines on my computer screen. That can be checked once we agree on what the sight distance should be for the northbound approach.

I agree it will be an improvement over existing conditions, but I would prefer that we do all we can to meet or exceed the required minimums.

I am out of the office this afternoon, so I don't have access to the Green Book or my other materials on sight distance. I will check them when I return on Tuesday.

Eric B. Eby, P.E.
City Engineer – Parking, Transportation, and Planning
Department of Public Works
City of Portsmouth
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Portsmouth, NH 03801
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Cell (603)-815-1761

From: Daniel Meditz <DMeditz@jonesandbeach.com>
Sent: Thursday, February 15, 2024 3:44 PM
To: Eric B. Eby <ebeby@cityofportsmouth.com>; Joseph Coronati <jcoronati@Jonesandbeach.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Steve Pernaw <sgp@pernaw.com>
Subject: RE: 18134.1 - Luster Cluster, Sight Distance

Eric,

Thank you for reviewing. The profile I was showing actually reflected the grade of the centerline of Sagamore Avenue where I had the stationing, though I can see the confusion as I had the sight line itself thick, dashed and in red. I inverted the color scheme for those but I am still showing the line of sight from the driveway as a solid line. Second, I switched the profile from being along the centerline of the road to the centerline of each lane. Third, I am no longer accounting for the driveway grade in the stopping sight distance profile – As you said, that will impact intersection sight distance but not stopping sight distance.

I have updated the plans and report accordingly. Let me know if you have any more questions or comments.

Thanks,

Daniel Meditz, P.E.
Lead Design Engineer
JONES&BEACH ENGINEERS, INC.
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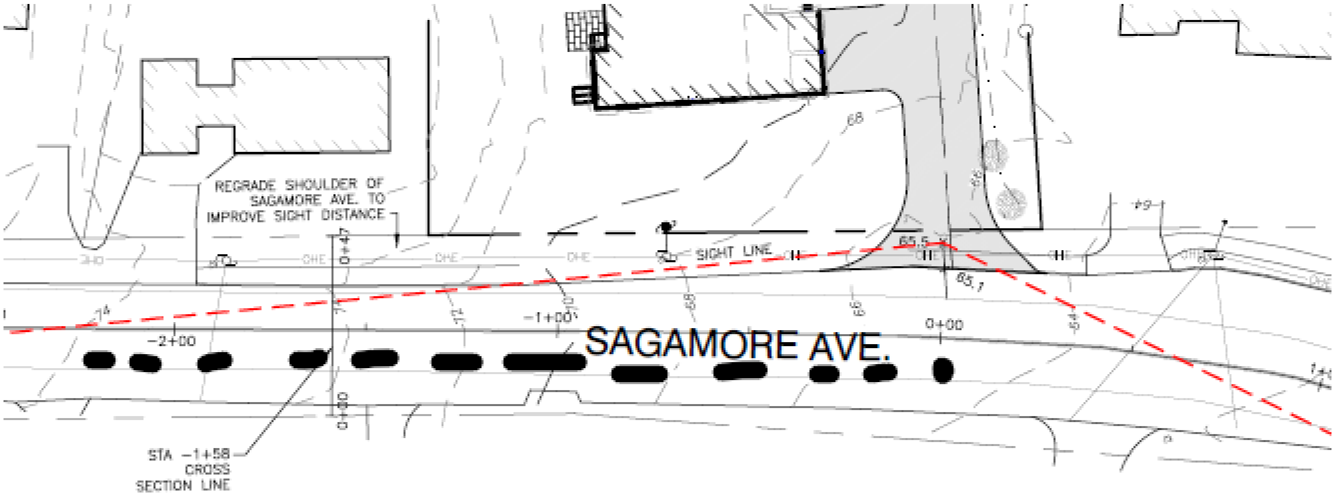
From: Eric B. Eby <ebeby@cityofportsmouth.com>
Sent: Thursday, February 15, 2024 2:07 PM
To: Daniel Meditz <DMeditz@jonesandbeach.com>; Joseph Coronati <jcoronati@Jonesandbeach.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Steve Pernaw <sgp@pernaw.com>
Subject: RE: 18134.1 - Luster Cluster, Sight Distance

Daniel
Looking at the plans, it appears that the sight line was plotted along the red dashed line. However, this line would represent the intersection sight line and not the stopping sight line. The 2-foot object height for stopping sight distance needs to be at a point in the travel lane, not at a point 14.5 feet from the edge of the travel lane. Stopping sight distance is for approaching vehicles to be able to see and react to a vehicle stopped in Sagamore Ave waiting to turn left into the site driveway. I don’t know how much of a difference, if any, the location of the 2-foot object will have on the sight lines, but it needs to be shown and the report updated to reflect the proper location.
The black dotted line in the figure below illustrates where the 2-foot object should be located.
Let me know if you have any questions.
Best,
Eric



Eric B. Eby, P.E.
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Cell (603)-815-1761

From: Daniel Meditz <DMeditz@jonesandbeach.com>
Sent: Wednesday, February 14, 2024 8:58 AM
To: Eric B. Eby <ebeby@cityofportsmouth.com>; Joseph Coronati <jcoronati@Jonesandbeach.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Steve Pernaw <sgp@pernaw.com>
Subject: RE: 18134.1 - Luster Cluster, Sight Distance

Eric,

Please see attached technical report and revised sight distance plans. The northern curb cut would provide us with the best sight distance. Please review and let us know if you have any questions.

Thanks,

Daniel Meditz, P.E.
Lead Design Engineer
JONES&BEACH ENGINEERS, INC.
85 Portsmouth Avenue
PO Box 219
Stratham, NH 03885
(603) 772-4746 (ext. #128)
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From: Eric B. Eby <ebeby@cityofportsmouth.com>
Sent: Wednesday, January 3, 2024 12:03 PM
To: Joseph Coronati <jcoronati@Jonesandbeach.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Steve Pernaw <sgp@pernaw.com>; Daniel Meditz <DMeditz@jonesandbeach.com>
Subject: RE: 18134.1 - Luster Cluster, Sight Distance

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Joe,

Thank you for the updated plans.

Looking at the sight lines, neither driveway location has adequate Stopping Sight distance under current conditions. Due to the existing grade of the driveway at 695 Sagamore, we wouldn't be able to lower the top of the hill on Sagamore more than a few inches. While you might want to look and determine if it is possible to raise your driveway a bit to improve Intersection Sight lines, a profile adjustment of Sagamore is most likely the key to providing adequate Stopping Sight distance. Raising Sagamore a bit near the driveway should also be looked at to see if it is feasible without acquiring easements.

Stopping Sight distance is the critical requirement, whereas Intersection Sight distance is desirable but at a minimum must at least equal the Stopping Sight distance. With that in mind, the Option 2 location would appear to have more of a chance of meeting Stopping Sight line requirements if the profile of the roadway could be modified sufficiently. I would suggest that you develop a profile of Sagamore Ave that will provide the minimum Stopping Sight distance at the Option 2 location and then we can review that with our design consultant to determine if it is feasible.

Eric B. Eby, P.E.
City Engineer – Parking, Transportation, and Planning
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City of Portsmouth
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From: Joseph Coronati <jcoronati@Jonesandbeach.com>
Sent: Wednesday, January 3, 2024 10:06 AM
To: Eric B. Eby <ebeby@cityofportsmouth.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Steve Pernaw <sgp@pernaw.com>; Daniel Meditz <DMeditz@jonesandbeach.com>
Subject: Re: 18134.1 - Luster Cluster, Sight Distance

Eric,
Hope you had a good holiday. Was wondering if you have had a chance to review this.

thanks

Joseph Coronati
Vice President
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
PO Box 219
Stratham, NH 03885
(603) 772-4746 (ext. #114)
jcoronati@jonesandbeach.com
http://www.jonesandbeach.com

From: Joseph Coronati
Sent: Thursday, December 21, 2023 1:28:06 PM
To: Eric B. Eby <ebeby@cityofportsmouth.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Steve Pernaw <sgp@pernaw.com>; Daniel Meditz <DMeditz@jonesandbeach.com>
Subject: RE: 18134.1 - Luster Cluster, Sight Distance

Eric,
Here's the modified plans and the speed study that Steve Pernaw did for the site. Let us know if you want to have a quick Teams meeting to determine the best driveway location.

Thanks

Joseph Coronati
Vice President
JONES&BEACH ENGINEERS, INC.
85 Portsmouth Avenue
PO Box 219
Stratham, NH 03885
(603) 772-4746 (ext. #114)
jcoronati@jonesandbeach.com
http://www.jonesandbeach.com

From: Eric B. Eby <ebeby@cityofportsmouth.com>
Sent: Thursday, December 7, 2023 12:47 PM
To: Joseph Coronati <jcoronati@Jonesandbeach.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>
Subject: RE: 18134.1 - Luster Cluster, Sight Distance

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Joe
Thank you for the plans and the update. Looking quickly at the profile plans, you have provided plans for both Intersection Sight Distance (ISD) on Sheet H1 and Stopping Sight Distance (SSD) on Sheet H2. ISD is for vehicles turning out of the driveway. SSD is for vehicles approaching the driveway on Sagamore Ave. The ISD appears to be plotted correctly. However, in the case of SSD, the 3.5-foot driver height should be a 2-foot object height. Revising the plans

with the 2-foot object height is needed to provide a more complete picture of the constraints and limitations at the driveway location.
It also appears that you used a 33 MPH design speed in your calculations. Did we give you that information or did you do your own speed data collection? Need to be sure that it is based on 85th %ile speeds, and not just an estimation.
I am available anytime on Tuesday and Wednesday next week, as well as parts of other days.

Eric B. Eby, P.E.
City Engineer – Parking, Transportation, and Planning
Department of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801
(603) 766-1415
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From: Joseph Coronati <jcoronati@Jonesandbeach.com>
Sent: Wednesday, December 6, 2023 5:16 PM
To: Eric B. Eby <ebeby@cityofportsmouth.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Cc: Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>
Subject: 18134.1 - Luster Cluster, Sight Distance

Eric, Zach & Dave,
We have been coordinating with Steve Pernaw, who is retired so this took a little longer than expected. Please review the plans and let us know if you have any questions. I think in the end, it would be better to look at each of these locations in person as it is tight. The sight lines go over sidewalk, which is changing and uneven and over lawn areas with vegetation at the uphill section. I'm not sure how much you are lowering the hill in your next contract with Severino.

Let me know if you can meet next week to look at this so we can determine the best driveway location.

Thanks

Joseph Coronati
Vice President
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ROCKINGHAM COUNTY CONSERVATION DISTRICT

110 North Road, Brentwood, NH 03833-6614
Tel: 603-679-2790 • Fax: 603-679-2860
www.rockinghamccd.org

23 May 2024

Peter Britz, Director of Planning
City of Portsmouth Planning Dept.
1 Junkins Avenue
Portsmouth, NH 03801

RE: 635 Sagamore Avenue
Tax map/lot: 222, lot 19
RCCD #PR222-19 N24

Dear Mr. Britz;

At your instruction, Rockingham County Conservation District (RCCD) performed a wetland review of this site. The scope of work included a wetland review on the project site and a determination of reference lines for buffer measurements from off-site wetlands. A site visit was conducted on 22 May 2024 by Michael Cuomo of the Rockingham County Conservation District and Brenden Walden of Gove Environmental Services.

1) Confirming the findings of Mr. Walden's letter dated 8 November 2021, there are no wetlands on the project site.

2) There are two wetlands across the street from the project site on the Tidewatch Condominium property. The attached Sketch One shows the general locations, overlaid on part of the Jones and Beach existing conditions plan. The wetlands were not flagged because they are off the project site. Measurements were taken from the wetland boundary to the centerline of the road for location reference. The Easterly wetland requires a 100 foot buffer and the Westerly wetland does not, according to the City's GIS.

3) Sketch Two is taken from the City's GIS. It generally shows the two wetlands discussed above and a third 'wetland' south and east of the project site, partially on the Tidewatch Condominium property. This 'wetland' does not exist; its is a map error.

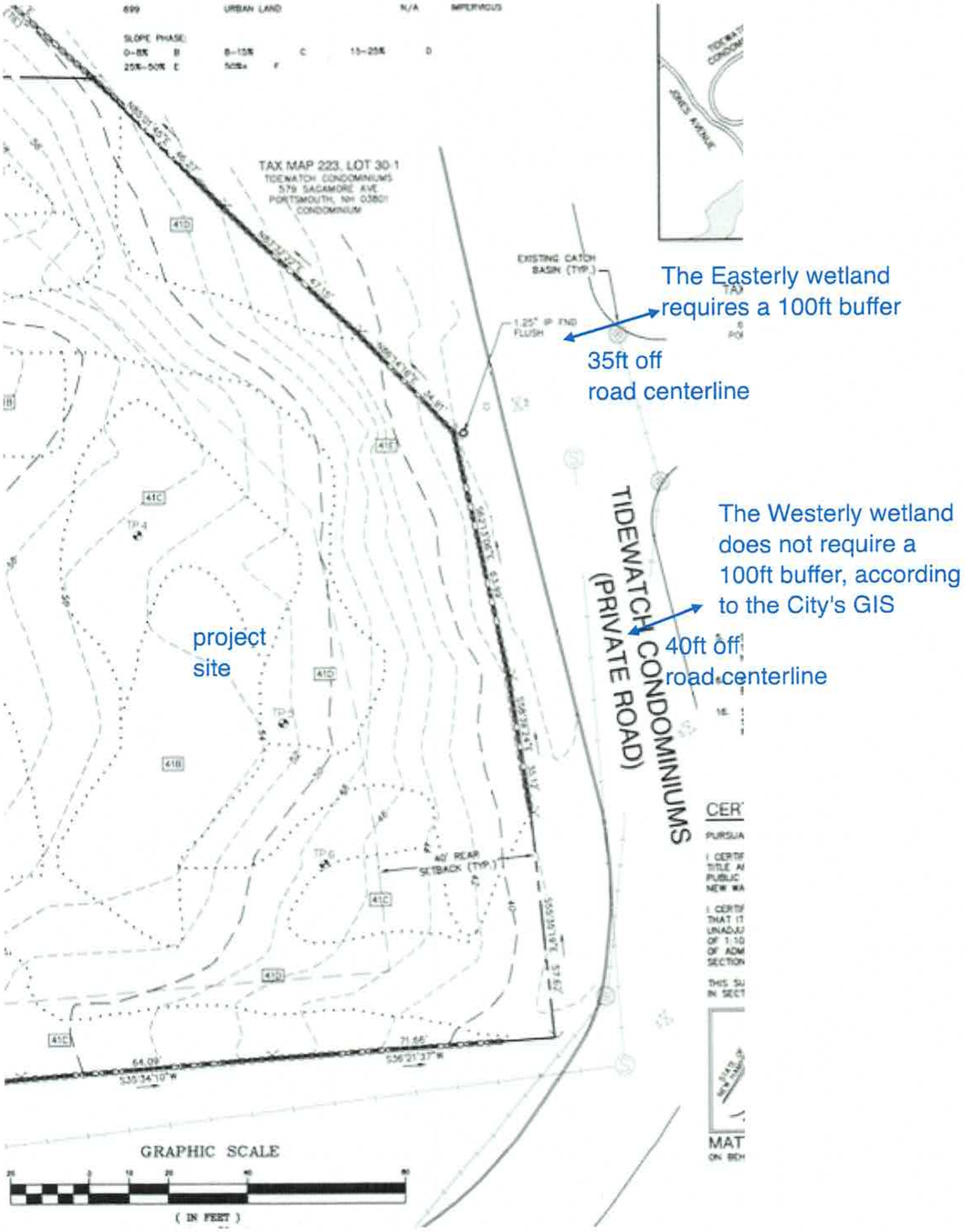
Sincerely,

Michael Cuomo
NH Certified Soil Scientist #6
NH Certified Wetland Scientist #4

Copy to: plbritz@cityofportsmouth.com
bwalden@gesinc.biz
mgarrepy@gmail.com

The mission of the Rockingham County Conservation District is to conserve and sustain the natural environment for present and future generations by working to make wise land-use decisions.

Sketch One
Part of 635 Sagamore Ave, Portsmouth
Buffer from off-site wetlands
23 May 2024
Michael Cuomo, RCCD



The Easterly wetland requires a 100ft buffer

35ft off road centerline

The Westerly wetland does not require a 100ft buffer, according to the City's GIS

40ft off road centerline

project site

Sketch Two
635 Sagamore Avenue, Portsmouth
Wetlands around site
23 May 2024
Michael Cuomo, RCCD

Daniel Meditz

From:	Paige Libbey
Sent:	Tuesday, August 20, 2024 10:28 AM
To:	Daniel Meditz
Subject:	FW: 18134.1 - Luster Cluster, 635 Sagamore Ave.

Paige Libbey, P.E.
Associate Principal
JONES&BEACH ENGINEERS, INC.
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From: Dave J. Desfosses <djdesfosses@cityofportsmouth.com>
Sent: Friday, July 26, 2024 6:47 AM
To: Joseph Coronati <jcoronati@Jonesandbeach.com>
Cc: Mark Rainey <mrainey@severinotrucking.com>; Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Paige Libbey <plibbey@jonesandbeach.com>; Zachary M. Cronin <zmcronin@cityofportsmouth.com>; eric weinrieb <eweinrieb@altus-eng.com>; Douglas N. Sparks <dnsparks@cityofportsmouth.com>
Subject: RE: 18134.1 - Luster Cluster, 635 Sagamore Ave.

From: Joseph Coronati <jcoronati@Jonesandbeach.com>
Sent: Thursday, July 25, 2024 3:47 PM
To: Dave J. Desfosses <djdesfosses@cityofportsmouth.com>; James V. Tow <jvtow@cityofportsmouth.com>; eric weinrieb <eweinrieb@altus-eng.com>
Cc: Mark Rainey <mrainey@severinotrucking.com>; Mike Garrepy (mgarrepy@gmail.com) <mgarrepy@gmail.com>; Paige Libbey <plibbey@jonesandbeach.com>
Subject: 18134.1 - Luster Cluster, 635 Sagamore Ave.

Dave,
Thanks for witnessing the test pits with us this week. I talked with Mike Garrepy about the drainage and the new catch basin that was installed recently on Sagamore ave by Severino. It sounded like you were ok if we allowed some of our stormwater from the front of the site to drain out into Sagamore ave and go down the gutter line to the new catch basin. This would allow us to move the first row of catch basins in our driveway back onto our site and avoid the congestion of the utilities that have been stubbed onto the property, which would be great. Can you let us know if we have understood correctly so we don't redesign to something that you aren't comfortable with?

Yes, mimic existing conditions regarding flow patterns and show existing conditions correctly.

On the water service to the building, we have an existing water service located near the front door of the Luster King building. There is a tenant in the property so we can't stop the water supply unless we re-connect the building. We would prefer not to run a temporary service from our new water stub that was placed on the lot as it will be a lot of ledge removal needed to do that and that area is currently being used as a staging area for Severino. Can we keep the water service in place and cap it at the back of the sidewalk once construction begins on the 4 unit housing project so we don't have to go out to the watermain (which is on our side of the road, but the sidewalk will be newly installed)?

The service MUST be terminated at the main. If you don't remove the water service before the final paving of Sagamore Ave, the City will be forced to make the applicant mill and pave Sagamore Ave so that there is no patch unless you wait the 4 years for the moratorium to end.

Let me know if you want to have a call to all get on the same page or a meeting, virtual or in person.

Thanks

JOSEPH CORONATI
Vice President
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DRAINAGE ANALYSIS

SEDIMENT AND EROSION CONTROL PLAN

“Luster Cluster”
635 Sagamore Ave.
Portsmouth, NH 03801
Tax Map 222, Lot 19

Prepared for:

635 Sagamore Development LLC
3612 Lafayette Rd., Dept 4
Portsmouth, NH 03801

STATE OF NEW HAMPSHIRE
DANIEL
JAMES
MEDITZ
No.18152
LICENSED
PROFESSIONAL ENGINEER
08/20/2024

Prepared by:
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746
March 14, 2024
Revised April 18, 2024
Revised August 16, 2024
JBE Project No. 18134.1

EXECUTIVE SUMMARY

635 Sagamore Development LLC proposes to demolish an existing commercial development and construct a 4-unit multi-family residential site on the subject parcel located at 635 Sagamore Ave. in Portsmouth, NH. In the existing condition, the subject parcel is home to two buildings and a paved parking area that used to comprise the "Luster King," a former auto detailing business that has since closed.

A drainage analysis of the entire site as well as offsite contributing watershed area was conducted for the purpose of estimating the peak rate of stormwater runoff and to subsequently design adequate drainage structures. Two models were compiled, one for the area in its existing (pre-construction) condition, and a second for its proposed (post-construction) condition. The analysis was conducted using data for the 2 Year – 24 Hour (3.70"), 10 Year – 24 Hour (5.61"), 25 Year – 24 Hour (7.12"), and 50 Year – 24 Hour (8.53") storm events using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. This data was taken from the Extreme Precipitation Tables developed by the Northeast Regional Climate Center (NRCC), and the values have been increased by 15% due to the project being within the Coastal/Great Bay Region. A summary of the existing and proposed conditions peak rates of runoff toward the three analysis points and toward the existing drainage ditch on the Tidewatch Condominium property (Reach 1R) in units of cubic feet per second (cfs) is as follows:

Analysis Point	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	1.35	1.02	2.37	1.82	3.18	2.45	3.93	3.03
Analysis Point #2	0.09	0.06	0.20	0.13	0.29	0.19	0.37	0.24
Analysis Point #3	2.88	2.24	5.74	4.16	8.14	5.50	10.41	7.16
Analysis Point #4	1.08	0.82	2.18	1.68	3.10	2.40	3.97	3.08

A similar summary of the existing and proposed peak volumes in units of acre-feet is as follows:

Analysis Point	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	0.100	0.076	0.177	0.135	0.241	0.185	0.301	0.231
Analysis Point #2	0.007	0.005	0.014	0.009	0.021	0.014	0.027	0.018
Analysis Point #3	0.247	0.157	0.487	0.331	0.693	0.488	0.892	0.641
Analysis Point #4	0.084	0.061	0.167	0.122	0.238	0.175	0.307	0.266

Peak flows and volumes are being reduced in the post-construction condition toward all analysis points during all analyzed storm events. The subject parcel is located in the Single Residence A (SRA) Zoning District. The subject parcel currently consists of the aforementioned former commercial site which is proposed to be demolished. Despite impervious surface existing on the subject parcel now, the proposed development results in an increase in impervious surface on the subject parcel. The addition of the proposed impervious surfaces causes an increase in the curve number (C_n) and a decrease in the time of concentration (T_c), and if a stormwater management system were not implemented, the net result of this would be a potential increase in peak rates of runoff from the site. In order to avoid this potential, a stormwater management system has been designed, consisting of a bioretention system with a sediment forebay for pre-treatment of runoff, stone drip edges, and stone underneath decks. Due to the use of these stormwater management features, the peak flow and volume of runoff will be reduced toward all analysis points during all analyzed storm events in the proposed condition as compared to the existing condition, and the treatment requirements of the City of Portsmouth are met. Additionally, the NHDES Alteration of Terrain Bureau’s groundwater recharge volume and channel protection requirements are met with the proposed development. Although some runoff from the front of the site proposed to drain into the Sagamore Avenue right of way and into a new catch basin without on-site treatment, the catch basin was presumably designed for the impervious surface being directed toward it from the Luster King development that currently exists. We are decreasing the amount of impervious surface as well as the peak flow rate and volume of runoff being directed toward this catch basin compared to what it was designed for. Therefore, if there is a treatment system at the outfall of the closed drainage network, then it will continue to function as designed for the runoff being directed to it from the proposed development. **The stormwater management system as designed meets all requirements of the City of Portsmouth stormwater regulations per Section 7.1 and 7.4-7.6 of the Site Plan Review Regulations.**

The use of Best Management Practices per the NHDES Stormwater Manual have been applied to the design of this stormwater management system and will be observed during all stages of construction. All land disturbed during construction will be stabilized within thirty days of groundbreaking and abutting property owners will suffer minimal adversity resultant to this development.

TABLE OF CONTENTS

1.0 RAINFALL CHARACTERISTICS

This drainage report includes an existing conditions analysis of the area involved in the proposed development, as well as a proposed condition, or post-construction analysis, of the same area. These analyses were accomplished using the USDA SCS TR-20 Method within the HydroCAD 10.20-3c Stormwater Modeling System. The curve numbers were developed using the SCS TR-55 Runoff Curve numbers for Urban Areas. A Type III SCS 24-hour rainfall distribution was utilized in analyzing the data for the 2 Year – 24 Hour (3.70”), 10 Year – 24 Hour (5.61”), 25 Year – 24 Hour (7.12"), and 50 Year – 24 Hour (8.53") storm events. This data was taken from the Extreme Precipitation Tables developed by the Northeast Regional Climate Center (NRCC), and the values have been increased by 15% due to the project being within the Coastal/Great Bay Region.

The peak rates and volume of runoff will be reduced from the existing condition, thereby minimizing any potential for a negative impact on abutting properties. This is accomplished through treatment of stormwater runoff and attenuation of peak flows and volumes resulting from storm events.

2.0 EXISTING CONDITIONS ANALYSIS

In the existing condition, the site consists of two commercial buildings as well as a shed and a paved parking area that comprise the former Luster King auto detailing business, which has since closed. Most of the area behind the existing commercial development is wooded with light underbrush and large ledge outcrops. Due to these features of the woodlands, the woods area has been modelled as “fair” rather than “good” for the purposes of stormwater runoff calculations. There is some lawn space around the existing developed area as well.

The existing topography and roof ridges divide the subject parcel and offsite contributing watershed areas into four subcatchments, draining toward three analysis points. Subcatchment 1 represents the front of the subject parcel as well as a stretch of the northbound lane of Sagamore Avenue and some offsite contributing watershed. This subcatchment is entirely developed in the existing condition, and it drains directly into the Sagamore Ave. right of way, down a flow path modelled as Reach 3R. Reach 3R ends at Analysis Point 1, a specific point along the Sagamore Avenue right of way. The reason why Analysis Point 1 was located at the specific place where it was is explained later in this report.

Runoff that reaches Analysis Point 1 from the subject parcel then follows the curb lines of Sagamore Avenue and of the Tidewatch Condominium Roadway, modelled as Reaches 4R and 5R, toward an existing water collection point on the side of the Tidewatch Condominium Roadway where it appears that a significant amount of runoff puddles in the existing condition, modelled as Analysis Point 3.

A new catch basin has been installed just to the south of the intersection of Sagamore Avenue and the Tidewatch Condominium roadway as part of the ongoing Sagamore Avenue roadway improvements. This catch basin captures all runoff directed toward Analysis Point 1 immediately downstream of Reach 3R. Therefore, Analysis Point 1 was placed at the location of the newly installed catch basin The addition of this catch basin prevents water from the Sagamore Avenue right of way up to the top of the hill to the south of the subject parcel from draining down the Tidewatch Condominium roadway, and therefore it will somewhat mitigate the existing drainage issue. However, because this catch basin was not yet installed at the time that the design of the proposed project began, we are modelling the hydrology of the site as it was before the catch basin was installed for the purposes of the existing conditions analysis. This is consistent with Env-Wq 1503.12(d), which requires that the existing conditions for a project site be modelled as the site was 10 years ago. In the proposed conditions analysis, we are modelling the site hydrology as it will be with the catch basin installed, as we assume that it will be installed by the time that the proposed development is constructed.

Subcatchment 2S represents a small section of the developed portion of the property to the north of an existing high point which drains on to abutting Tax Map 222, Lot 20, modelled as Analysis Point 2. It is very important that peak flows and volumes draining toward Analysis Points 1 and 2 are reduced in the post-construction condition, as these two analysis points represent a highway and a house lot, respectively. Runoff directed toward Analysis Point 2 is directed through Reach 2R, a flow path through Tax Map 222 Lot 20, toward aforementioned Reach 3R, from where the runoff then collects at AP1 before following Reaches 4R and 5R toward Analysis Point 3. In effect, the runoff directed toward AP1 includes the runoff directed toward AP2, and the runoff directed toward AP3 includes the runoff directed toward both AP1 and AP2 in the existing condition.

The largest subcatchment is Subcatchment 3S. Subcatchment 3S is roughly the western quarter of the property and it consists primarily of woodland with large ledge outcrops. Subcatchment 3S drains toward an existing drainage ditch alongside and below the grade of the Tidewatch Condominium private roadway, which is curbed so that no runoff from the roadway itself enters the ditch. This drainage ditch is modelled as a Tc segment for the subcatchment and it drains toward Analysis Point 3. Analysis Point 3 is an existing water collection point along the Tidewatch Condominium Road. In theory, water that collects here eventually infiltrates or overflows, but from on-site observations, there is erosion and puddling which is evidence that runoff mostly stops in this spot. Therefore, it is modelled as an analysis point with no overflow. This point receives the runoff from 3S as well as the runoff from AP1 and AP2 upstream.

Finally, a section of both developed and undeveloped land in the western end of the property, modelled as Subcatchment 4S, drains into abutting woodland on the Tidewatch Condominium property and ultimately toward a catch basin adjacent to the Tidewatch Condominium mailhouse that is modelled as Analysis Point 4.

Existing soil types were determined through a Site Specific Soil Survey conducted by a Certified Soil Scientist. The pervious soils are categorized into Hydrologic Soil Group (HSG) B while the impervious areas of the subject parcel are categorized as Urban Land (SSS Symbol 699). The pervious sections of the property are represented as Chatfield-Hollis-Rock Outcrop complex and Chatfield Variant (moderately well drained). Although these soils are categorized as HSG B currently, it is our understanding that the "Ksat Values for New Hampshire Soils," Special Publication No. 5 sponsored by the Society of Soil Scientists of Northern New England (SSSNNE) is in the process of being updated and there are plans to reclassify Chatfield as a HSG C soil. For this reason, Dave Desfosses of the Portsmouth Department of Public Works has requested that we model the entire site and all offsite contributing watershed areas as HSG C. We asked the project soil scientist, who confirmed that this is an acceptable approach in his professional opinion as well. Therefore, we have modelled the entire site and all offsite areas as HSG C.

According to "Ksat Values for New Hampshire Soils," Special Publication No. 5 sponsored by the Society of Soil Scientists of Northern New England (SSSNNE), Chatfield, Chatfield Variant, and Hollis soils all have identical saturated hydraulic conductivities, ranging from 0.6 to 6.0 inches/hour within both the B and C horizons.

To further determine the appropriate Ksat to use for design, infiltration testing was performed on site using a Compact Constant Head Permeameter (CCHP, also known as an amoozemeter) on July 2,

2024. Three (3) pits were dug using a shovel in the soil and three (3) infiltration tests were performed in each pit. The first pit was dug in the front of the site in order to evaluate the feasibility of adding a new infiltration practice here. The second pit was dug in the footprint of the proposed bioretention system. The third and final pit was dug in the vicinity of Unit #4.

Standard size auger holes, 4 cm in diameter were dug within each pit to the depth of the bottom of each respective practice to obtain an accurate permeability reading below the bottom of the proposed systems. Water was then discharged through the soil and the drop in water level on the tube in which the water was stored before being discharged was recorded at several time intervals. The comparison between the drop in water level and the elapsed time from the start of the test was used to calculate the Ksat value. For example, if the water level dropped 3 cm after 5 minutes and 5 cm after 10 minutes, this was recorded and used as data to calculate the Ksat using the formulas listed in the data spreadsheets in the appendix of this report. The Ksat values from each time increment were then averaged to determine the mean Ksat, and lowest mean Ksat from each area was divided by a factor of safety of two in order to determine the saturated hydraulic conductivity to use for design purposes.

It should be noted that the CCHP was observed to drain very rapidly on these holes and it was difficult to achieve a steady state. The device was consistently draining while still attempting to fill the auger holes with water. When the test could finally be started, the first one or two increments on each test needed to be discarded from the results because they were much larger than the following increments after the soils were saturated and the infiltration rate stabilized. The saturated hydraulic conductivity that was determined at each test site was ultimately much higher than anticipated, but logically it makes sense as the substrate was observed to consist of coarse sand with many stones.

The results of the permeability testing are as summarized below:

Test	Ksat (in/hr)
Front of site – Test #1	27.33
Front of site – Test #2	30.85
Front of site – Test #3	22.26
Front of site – Low Ksat	**22.26**
Bioretention – Test #1	14.84
Bioretention – Test #2	33.41
Bioretention – Test #3	65.74
Bioretention – Low Ksat	**14.84**
Unit 4 – Test #1	30.64
Unit 4 – Test #2	25.41
Unit 4 – Test #3	37.31
Unit 4 – Low Ksat	**25.41**

A further breakdown of the data used to arrive at the final Ksat values is included in the appendix of this report. Applying a factor of safety of two, this comes out to a saturated hydraulic conductivity of **11.1 in/hr** to use for the front of the site, **7.4 in/hr** to use for the bioretention system, and **12.71 in/hr** to use for the infiltration practices around the back two units. Because the bioretention system is in a cut, the field-observed Ksat of 7.4 in/hr was utilized. Because the infiltration practices are in a fill, a design infiltration rate of 0.3 in/hr was utilized as a worst-case scenario for the fill material.

3.0 PROPOSED CONDITIONS ANALYSIS

The addition of the proposed impervious surfaces causes an increase in the curve number (C_n) and a decrease in the time of concentration (T_c), and if a stormwater management system were not implemented, the net result of this would be a potential increase in peak rates of runoff from the site. A stormwater management system was designed in order to avoid this potential. The proposed development, consisting of the aforementioned four (4) residential units with associated paved roadway and driveways as well as stormwater management features divide the subject parcel into fifteen (15) subcatchments. Subcatchments 1S-4S drain directly toward Analysis Points 1-4, respectively, as previously outlined. However, because a new catch basin will now intercept the flow that reaches the Sagamore Avenue right of way (Analysis Point 1) from the subject parcel, analysis point 3 is no longer modelled downstream of analysis point 1.

Subcatchment 5S has been removed from the drainage analysis as it was the subcatchment associated with a stormwater pond that has since been removed from the drainage design. Subcatchments 6S-9S drain through catch basins into a closed drainage system which outlets toward a bioretention pond modelled as Pond 1P. The bioretention pond is designed to treat and infiltrate runoff directed toward it during smaller storms, or in larger storms, infiltrate as much as possible and attenuate and slowly discharge outflow. The bioretention pond will have a sediment forebay for pre-treatment. Any discharge from Pond 1P follows a path through Subcatchment 3S represented as Reach 7R, toward Reach 8R, an existing roadside ditch on the Tidewatch condominium property leading to Analysis Point 3.

Subcatchments 11S and 12S consist of lawn and roof areas that drain toward yard drains 1 and 2, respectively. The runoff that is caught by these yard drains additionally enters the previously described closed drainage system that outlets toward Pond 1P.

Subcatchments 13S and 14S represent roof and deck areas on Units 3-4 which are routed toward infiltration stone underneath these units back decks. These devices are modelled as Ponds 3P and 4P.

Subcatchments 15S and 16S represent roof areas on Units 3 and 4 which drain into stone drip edges. The stone drip edges, modelled as Ponds 5P and 6P, will be lined and underdrained for the sole purpose of directing this roof water into the aforementioned stone areas underneath the back decks of these units (3P and 4P) in order to meet the City's pollutant removal requirements.

Finally, Subcatchment 18S represents the grassed and roof area that drains directly toward Pond 1P without passing through the closed drainage system in the proposed condition.

As a result of the implementation of this stormwater management system, peak flows and runoff volumes are reduced toward all four analysis points during all analyzed storm events in the proposed condition as compared with the existing condition. The NHDES Alteration of Terrain Bureau allows an increase in runoff volume of up to 0.1 acre-feet during the 2-year 24-hour storm event. We are decreasing runoff volumes and therefore this would be approvable by the AOT Bureau if the project needed an AOT permit (which it does not as the area of disturbance is below 100,000 SF).

Furthermore, the project as designed exceeds the AOT Bureau's groundwater recharge volume requirement. A GRV worksheet is contained within the appendix of this report in order to illustrate this. Therefore, we have designed the drainage system to avoid adverse impacts to abutting infrastructure and the requirement per Section 7.1 of the Site Plan Review Regulations to "design practices to the maximum extent practical (MEP) to reduce stormwater runoff volumes, maintain predevelopment site hydrology, and protect water quality in receiving waters" is met. Furthermore, rain gardens (also known as bioretention systems) are recommended as a Low Impact Development practice in this same section of the regulations. We are using bioretention systems to treat and attenuate runoff from paved areas of the subject parcel in the proposed condition.

According to the NH Stormwater Manual, bioretention systems provide a pollutant removal efficiency of 90% for TSS and 65% for nitrogen, and drip edges provide a removal efficiency of 90% for TSS and 55% for nitrogen. While drip edges cannot be used for infiltration in this case as the units will have foundation drains, stone underneath a deck is assumed to provide similar stormwater treatment to a stone drip edge. The City of Portsmouth Site Plan Review Regulations stipulate that stormwater BMPs shall be designed for 80% TSS removal and 50% nitrogen removal of stormwater runoff from post-construction impervious surfaces. This plan meets the pollutant removal requirement for runoff directed toward Analysis Points 3 and 4 in the post-construction condition. A breakdown of pollutant removal efficiencies for the runoff that passes through the bioretention ponds, stone infiltration areas, or no treatment BMP and reaches Analysis Points 3 and 4 from the subject parcel is contained within the appendix of this report in order to demonstrate this.

No impervious surface is directed toward Analysis Point 2 post-construction. Presumably, the flow directed toward the new catch basin along the gutter line of Sagamore Avenue from the existing Luster King development was accounted for in the design of the City's closed drainage network. Because the amount of impervious surface being directed toward Analysis Point 1 is being decreased post-construction, we presume that whatever stormwater management the City had proposed for the runoff downstream of the new catch basin will continue to function as intended post-construction. Therefore, no on-site treatment BMP's are proposed for the impervious surface directed toward Analysis Point 1 post-construction, and the impervious surface directed toward analysis point 1 post-construction is excluded from the pollutant removal calculations. Even if we did propose a treatment BMP for the runoff directed toward the Sagamore Avenue right of way, what would result is a point discharge of stormwater from an outlet pipe or weir directly toward pavement, which is not advisable. Therefore, this water *cannot* be treated on site, which will not be a problem assuming that the City designed an appropriate BMP for the runoff directed toward its catch basin from the Luster King site.

5.0 CONCLUSION

This proposed site development will have minimal adverse effect on abutting infrastructures, properties, and downstream wetlands by way of stormwater runoff or siltation. Appropriate steps will be taken to eliminate erosion and sedimentation; this will be accomplished through the construction of a drainage system consisting of site grading, catch basins, yard drains, a bioretention system, lined stone drip edges, infiltration stone underneath decks, and temporary erosion control measures including but not limited to silt fence and the use of a stabilized construction entrance. Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and their application will be enforced throughout the construction process. Peak rates and volumes of runoff from the site will be reduced toward all analysis points during all analyzed storm events.

This project disturbs less than 100,000 S.F. and does <u>not</u> require a NHDES Alteration of Terrain Permit.

Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.

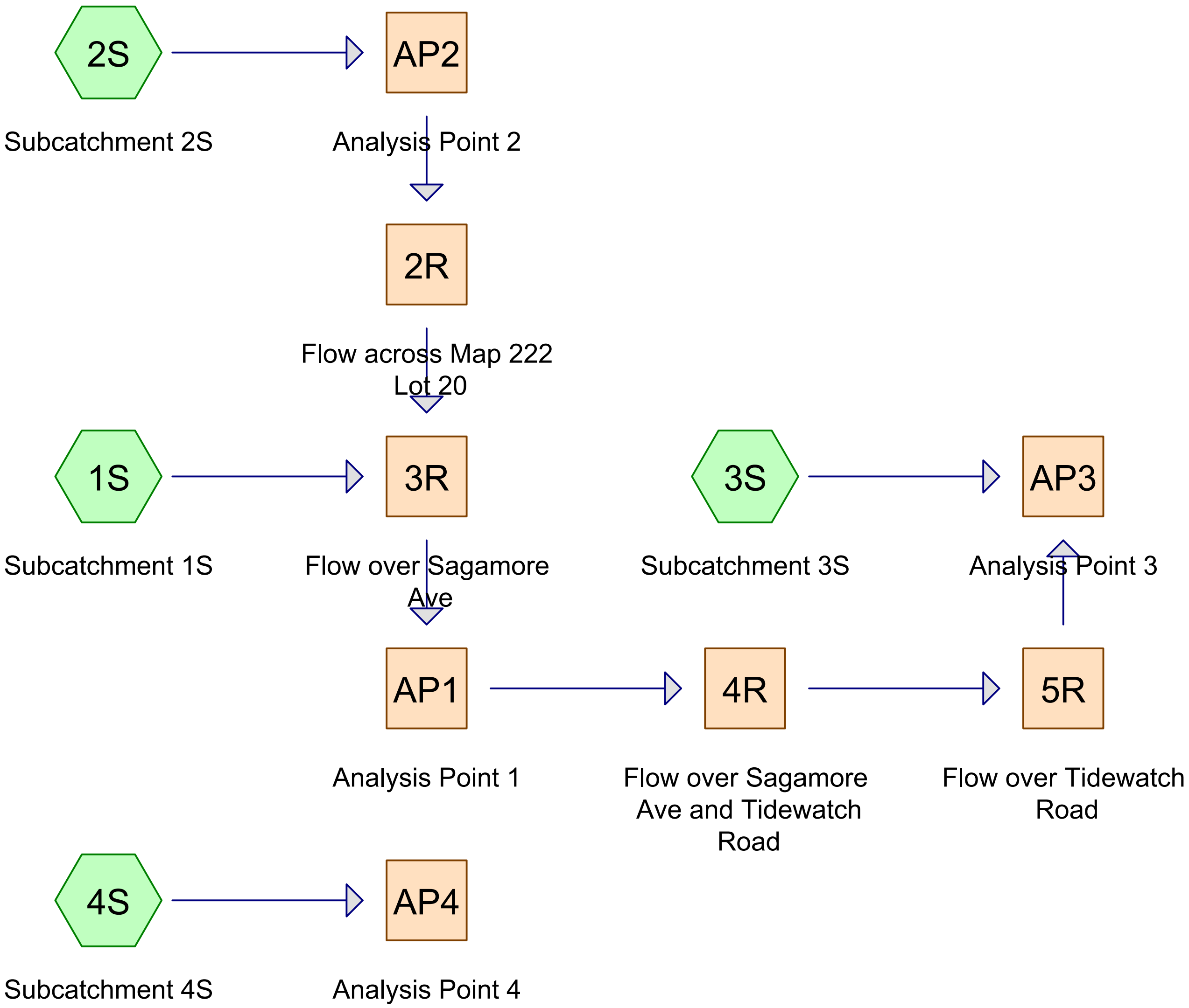
Daniel Meditz

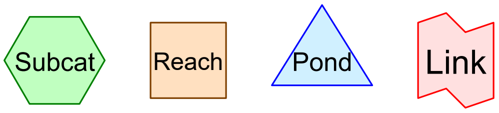
Daniel Meditz, P.E
Lead Design Engineer

APPENDIX I

EXISTING CONDITIONS DRAINAGE ANALYSIS

Summary 2 YEAR
Complete 10 YEAR
Summary 25 YEAR
Complete 50 YEAR





Routing Diagram for 18134-EXISTING
Prepared by Jones & Beach Engineers Inc, Printed 8/16/2024
HydroCAD® 10.20-3c s/n 00762 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.621	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S)
0.230	98	Paved parking, HSG C (1S, 4S)
0.129	98	Roofs, HSG C (1S, 3S, 4S)
1.535	73	Woods, Fair, HSG C (3S, 4S)
0.003	70	Woods, Good, HSG C (1S, 2S)
2.518	**77**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.518	HSG C	1S, 2S, 3S, 4S
0.000	HSG D	
0.000	Other	
2.518		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=20,592 sf 54.90% Impervious Runoff Depth>2.36"
Flow Length=187' Tc=6.0 min CN=87 Runoff=1.28 cfs 0.093 af

Subcatchment2S: Subcatchment2S Runoff Area=2,614 sf 0.00% Impervious Runoff Depth>1.38"
Flow Length=20' Slope=0.1000 '/' Tc=6.0 min CN=74 Runoff=0.09 cfs 0.007 af

Subcatchment3S: Subcatchment3S Runoff Area=58,629 sf 0.32% Impervious Runoff Depth>1.31"
Flow Length=447' Tc=11.9 min CN=73 Runoff=1.62 cfs 0.147 af

Subcatchment4S: Subcatchment4S Runoff Area=27,837 sf 14.82% Impervious Runoff Depth>1.58"
Flow Length=216' Tc=7.8 min CN=77 Runoff=1.08 cfs 0.084 af

Reach 2R: Flow across Map 222 Lot 20 Avg. Flow Depth=0.07' Max Vel=0.25 fps Inflow=0.09 cfs 0.007 af
n=0.150 L=52.0' S=0.0385 '/' Capacity=6.22 cfs Outflow=0.08 cfs 0.007 af

Reach 3R: Flow over Sagamore Ave Avg. Flow Depth=0.14' Max Vel=2.71 fps Inflow=1.35 cfs 0.100 af
n=0.016 L=101.0' S=0.0297 '/' Capacity=39.77 cfs Outflow=1.35 cfs 0.100 af

Reach 4R: Flow over Sagamore Ave and Avg. Flow Depth=0.14' Max Vel=2.85 fps Inflow=1.35 cfs 0.100 af
n=0.016 L=145.0' S=0.0345 '/' Capacity=42.85 cfs Outflow=1.34 cfs 0.100 af

Reach 5R: Flow over Tidewatch Road Avg. Flow Depth=0.12' Max Vel=3.37 fps Inflow=1.34 cfs 0.100 af
n=0.016 L=253.0' S=0.0553 '/' Capacity=54.28 cfs Outflow=1.30 cfs 0.100 af

Reach AP1: Analysis Point 1 Inflow=1.35 cfs 0.100 af
Outflow=1.35 cfs 0.100 af

Reach AP2: Analysis Point 2 Inflow=0.09 cfs 0.007 af
Outflow=0.09 cfs 0.007 af

Reach AP3: Analysis Point 3 Inflow=2.88 cfs 0.247 af
Outflow=2.88 cfs 0.247 af

Reach AP4: Analysis Point 4 Inflow=1.08 cfs 0.084 af
Outflow=1.08 cfs 0.084 af

Total Runoff Area = 2.518 ac Runoff Volume = 0.331 af Average Runoff Depth = 1.58"
85.76% Pervious = 2.159 ac 14.24% Impervious = 0.359 ac

```
                     Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
                     Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
          Reach routing by Dyn-Stor-Ind method  -  Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S        Runoff Area=20,592 sf   54.90% Impervious   Runoff Depth>4.14"
                                     Flow Length=187'   Tc=6.0 min   CN=87   Runoff=2.19 cfs  0.163 af

Subcatchment2S: Subcatchment2S           Runoff Area=2,614 sf   0.00% Impervious   Runoff Depth>2.86"
                           Flow Length=20'   Slope=0.1000 '/'   Tc=6.0 min   CN=74   Runoff=0.20 cfs  0.014 af

Subcatchment3S: Subcatchment3S          Runoff Area=58,629 sf   0.32% Impervious   Runoff Depth>2.76"
                                    Flow Length=447'   Tc=11.9 min   CN=73   Runoff=3.56 cfs  0.310 af

Subcatchment4S: Subcatchment4S        Runoff Area=27,837 sf   14.82% Impervious   Runoff Depth>3.14"
                                     Flow Length=216'   Tc=7.8 min   CN=77   Runoff=2.18 cfs  0.167 af

Reach 2R: Flow across Map 222 Lot 20   Avg. Flow Depth=0.10'   Max Vel=0.31 fps   Inflow=0.20 cfs  0.014 af
                          n=0.150   L=52.0'   S=0.0385 '/'   Capacity=6.22 cfs   Outflow=0.18 cfs  0.014 af

Reach 3R: Flow over Sagamore Ave       Avg. Flow Depth=0.17'   Max Vel=3.11 fps   Inflow=2.36 cfs  0.177 af
                        n=0.016   L=101.0'   S=0.0297 '/'   Capacity=39.77 cfs   Outflow=2.37 cfs  0.177 af

Reach 4R: Flow over Sagamore Ave and Avg. Flow Depth=0.17'   Max Vel=3.28 fps   Inflow=2.37 cfs  0.177 af
                        n=0.016   L=145.0'   S=0.0345 '/'   Capacity=42.85 cfs   Outflow=2.35 cfs  0.177 af

Reach 5R: Flow over Tidewatch Road     Avg. Flow Depth=0.15'   Max Vel=3.87 fps   Inflow=2.35 cfs  0.177 af
                        n=0.016   L=253.0'   S=0.0553 '/'   Capacity=54.28 cfs   Outflow=2.30 cfs  0.177 af

Reach AP1: Analysis Point 1                                                    Inflow=2.37 cfs  0.177 af
                                                                              Outflow=2.37 cfs  0.177 af

Reach AP2: Analysis Point 2                                                    Inflow=0.20 cfs  0.014 af
                                                                              Outflow=0.20 cfs  0.014 af

Reach AP3: Analysis Point 3                                                    Inflow=5.74 cfs  0.487 af
                                                                              Outflow=5.74 cfs  0.487 af

Reach AP4: Analysis Point 4                                                    Inflow=2.18 cfs  0.167 af
                                                                              Outflow=2.18 cfs  0.167 af

           Total Runoff Area = 2.518 ac   Runoff Volume = 0.654 af   Average Runoff Depth = 3.12"
                                       85.76% Pervious = 2.159 ac     14.24% Impervious = 0.359 ac
```

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 2.19 cfs @ 12.09 hrs, Volume= 0.163 af, Depth> 4.14"
Routed to Reach 3R : Flow over Sagamore Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
2,869	98	Roofs, HSG C
8,436	98	Paved parking, HSG C
9,256	74	>75% Grass cover, Good, HSG C
31	70	Woods, Good, HSG C
20,592	87	Weighted Average
9,287		45.10% Pervious Area
11,305		54.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	46	0.1090	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.1	4	0.0670	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.70"
0.1	41	0.0670	5.25		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	96	0.0360	3.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.1	187	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Depth> 2.86"
Routed to Reach AP2 : Analysis Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
2,495	74	>75% Grass cover, Good, HSG C
119	70	Woods, Good, HSG C
2,614	74	Weighted Average
2,614		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	20	0.1000	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.3	20	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 3.56 cfs @ 12.17 hrs, Volume= 0.310 af, Depth> 2.76"
Routed to Reach AP3 : Analysis Point 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
187	98	Roofs, HSG C
9,391	74	>75% Grass cover, Good, HSG C
49,051	73	Woods, Fair, HSG C
58,629	73	Weighted Average
58,442		99.68% Pervious Area
187		0.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0415	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.7	62	0.0968	1.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	54	0.0741	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	122	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	159	0.0189	4.55	18.20	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Short grass
11.9	447	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 2.18 cfs @ 12.11 hrs, Volume= 0.167 af, Depth> 3.14"
Routed to Reach AP4 : Analysis Point 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
2,555	98	Roofs, HSG C
1,571	98	Paved parking, HSG C
5,912	74	>75% Grass cover, Good, HSG C
17,799	73	Woods, Fair, HSG C
27,837	77	Weighted Average
23,711		85.18% Pervious Area
4,126		14.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	14	0.0210	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
4.2	36	0.1280	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.5	50	0.1280	1.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	87	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	29	0.2860	2.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.8	216	Total			

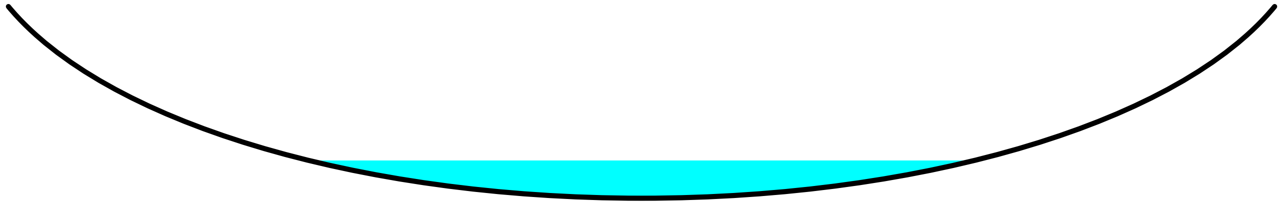
Summary for Reach 2R: Flow across Map 222 Lot 20

```
Inflow Area =          0.060 ac,   0.00% Impervious,  Inflow Depth >   2.86"    for  10 Yr 24 Hr +15% event
Inflow      =         0.20 cfs @   12.09 hrs,  Volume=            0.014 af
Outflow     =         0.18 cfs @   12.13 hrs,  Volume=            0.014 af,  Atten= 7%,  Lag= 1.9 min
    Routed to Reach 3R : Flow over Sagamore Ave
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.31 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 7.6 min

Peak Storage= 30 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 8.86'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 6.22 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.150 Sheet flow over Short Grass
Length= 52.0' Slope= 0.0385 '/'
Inlet Invert= 66.00', Outlet Invert= 64.00'



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Summary for Reach 3R: Flow over Sagamore Ave

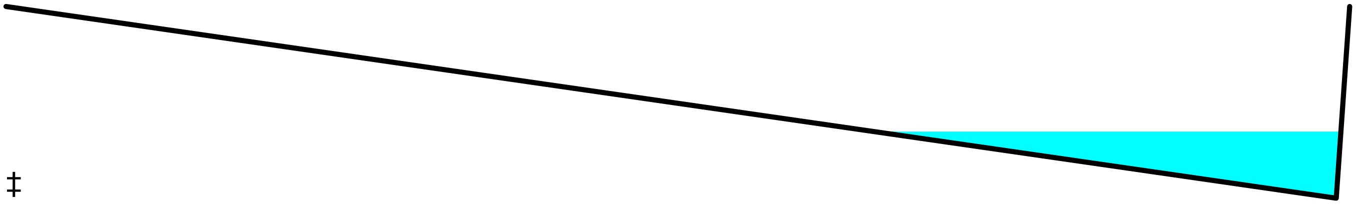
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[62] Hint: Exceeded Reach 2R OUTLET depth by 0.08' @ 12.05 hrs

```
Inflow Area =          0.533 ac,  48.72% Impervious,  Inflow Depth >   4.00"    for  10 Yr 24 Hr +15% event
Inflow      =         2.36 cfs @   12.09 hrs,  Volume=            0.177 af
Outflow     =         2.37 cfs @   12.10 hrs,  Volume=            0.177 af,  Atten= 0%,  Lag= 0.4 min
    Routed to Reach AP1 : Analysis Point 1
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.11 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 1.4 min

Peak Storage= 77 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 8.77'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 39.77 cfs

0.00' x 0.50' deep channel, n= 0.016 Asphalt, rough
Side Slope Z-value= 50.0 0.5 '/' Top Width= 25.25'
Length= 101.0' Slope= 0.0297 '/'
Inlet Invert= 64.00', Outlet Invert= 61.00'



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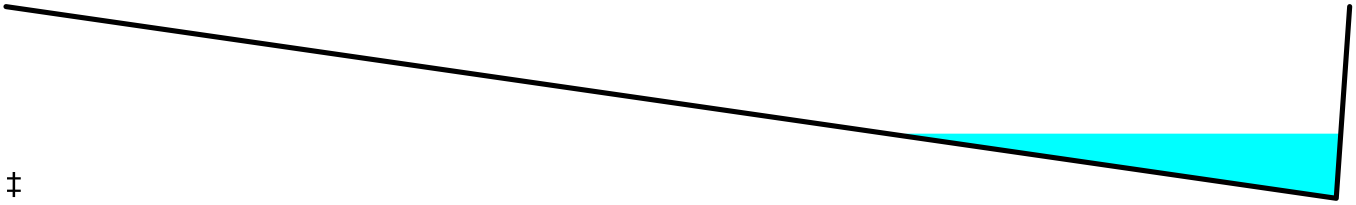
Summary for Reach 4R: Flow over Sagamore Ave and Tidewatch Road

Inflow Area = 0.533 ac, 48.72% Impervious, Inflow Depth > 4.00" for 10 Yr 24 Hr +15% event
Inflow = 2.37 cfs @ 12.10 hrs, Volume= 0.177 af
Outflow = 2.35 cfs @ 12.11 hrs, Volume= 0.177 af, Atten= 1%, Lag= 0.6 min
Routed to Reach 5R : Flow over Tidewatch Road

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.28 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 1.9 min

Peak Storage= 104 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 8.50'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 42.85 cfs

0.00' x 0.50' deep channel, n= 0.016 Asphalt, rough
Side Slope Z-value= 50.0 0.5 '/' Top Width= 25.25'
Length= 145.0' Slope= 0.0345 '/'
Inlet Invert= 61.00', Outlet Invert= 56.00'



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Summary for Reach 5R: Flow over Tidewatch Road

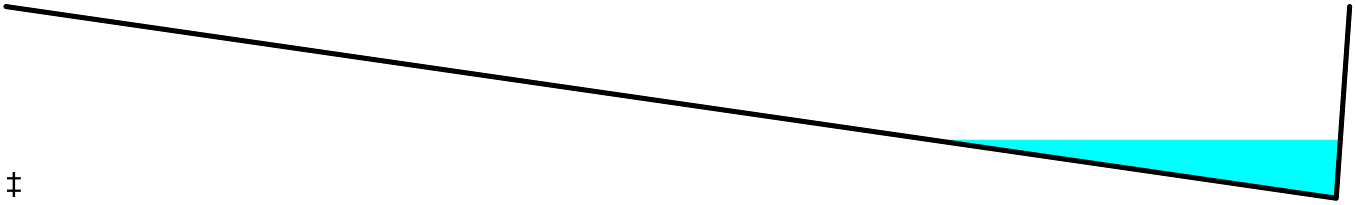
[61] Hint: Exceeded Reach 4R outlet invert by 0.15' @ 12.10 hrs

```
Inflow Area =        0.533 ac,  48.72% Impervious,  Inflow Depth >   3.99"    for  10 Yr 24 Hr +15% event
Inflow      =        2.35 cfs @   12.11 hrs,  Volume=           0.177 af
Outflow     =        2.30 cfs @   12.12 hrs,  Volume=           0.177 af,  Atten= 2%,  Lag= 1.0 min
    Routed to Reach AP3 : Analysis Point 3
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.87 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 2.7 min

Peak Storage= 149 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 7.73'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 54.28 cfs

0.00' x 0.50' deep channel, n= 0.016 Asphalt, rough
Side Slope Z-value= 50.0 0.5 '/' Top Width= 25.25'
Length= 253.0' Slope= 0.0553 '/'
Inlet Invert= 56.00', Outlet Invert= 42.00'



Summary for Reach AP1: Analysis Point 1

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =        0.533 ac,  48.72% Impervious,  Inflow Depth >   4.00"    for  10 Yr 24 Hr +15% event
Inflow      =        2.37 cfs @   12.10 hrs,  Volume=           0.177 af
Outflow     =        2.37 cfs @   12.10 hrs,  Volume=           0.177 af,  Atten= 0%,  Lag= 0.0 min
    Routed to Reach 4R : Flow over Sagamore Ave and Tidewatch Road
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =        0.060 ac,   0.00% Impervious,  Inflow Depth >   2.86"    for  10 Yr 24 Hr +15% event
Inflow      =        0.20 cfs @   12.09 hrs,  Volume=           0.014 af
Outflow     =        0.20 cfs @   12.09 hrs,  Volume=           0.014 af,  Atten= 0%,  Lag= 0.0 min
    Routed to Reach 2R : Flow across Map 222 Lot 20
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP3: Analysis Point 3

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      1.879 ac, 14.04% Impervious, Inflow Depth >  3.11"   for 10 Yr 24 Hr +15% event
Inflow      =      5.74 cfs @  12.15 hrs, Volume=        0.487 af
Outflow     =      5.74 cfs @  12.15 hrs, Volume=        0.487 af, Atten= 0%, Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP4: Analysis Point 4

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      0.639 ac, 14.82% Impervious, Inflow Depth >  3.14"   for 10 Yr 24 Hr +15% event
Inflow      =      2.18 cfs @  12.11 hrs, Volume=        0.167 af
Outflow     =      2.18 cfs @  12.11 hrs, Volume=        0.167 af, Atten= 0%, Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=20,592 sf 54.90% Impervious Runoff Depth>5.59"
Flow Length=187' Tc=6.0 min CN=87 Runoff=2.91 cfs 0.220 af

Subcatchment2S: Subcatchment2S Runoff Area=2,614 sf 0.00% Impervious Runoff Depth>4.14"
Flow Length=20' Slope=0.1000 '/' Tc=6.0 min CN=74 Runoff=0.29 cfs 0.021 af

Subcatchment3S: Subcatchment3S Runoff Area=58,629 sf 0.32% Impervious Runoff Depth>4.03"
Flow Length=447' Tc=11.9 min CN=73 Runoff=5.22 cfs 0.452 af

Subcatchment4S: Subcatchment4S Runoff Area=27,837 sf 14.82% Impervious Runoff Depth>4.47"
Flow Length=216' Tc=7.8 min CN=77 Runoff=3.10 cfs 0.238 af

Reach 2R: Flow across Map 222 Lot 20 Avg. Flow Depth=0.12' Max Vel=0.35 fps Inflow=0.29 cfs 0.021 af
n=0.150 L=52.0' S=0.0385 '/' Capacity=6.22 cfs Outflow=0.27 cfs 0.021 af

Reach 3R: Flow over Sagamore Ave Avg. Flow Depth=0.19' Max Vel=3.35 fps Inflow=3.17 cfs 0.241 af
n=0.016 L=101.0' S=0.0297 '/' Capacity=39.77 cfs Outflow=3.18 cfs 0.241 af

Reach 4R: Flow over Sagamore Ave and Avg. Flow Depth=0.19' Max Vel=3.54 fps Inflow=3.18 cfs 0.241 af
n=0.016 L=145.0' S=0.0345 '/' Capacity=42.85 cfs Outflow=3.16 cfs 0.241 af

Reach 5R: Flow over Tidewatch Road Avg. Flow Depth=0.17' Max Vel=4.18 fps Inflow=3.16 cfs 0.241 af
n=0.016 L=253.0' S=0.0553 '/' Capacity=54.28 cfs Outflow=3.10 cfs 0.241 af

Reach AP1: Analysis Point 1 Inflow=3.18 cfs 0.241 af
Outflow=3.18 cfs 0.241 af

Reach AP2: Analysis Point 2 Inflow=0.29 cfs 0.021 af
Outflow=0.29 cfs 0.021 af

Reach AP3: Analysis Point 3 Inflow=8.14 cfs 0.693 af
Outflow=8.14 cfs 0.693 af

Reach AP4: Analysis Point 4 Inflow=3.10 cfs 0.238 af
Outflow=3.10 cfs 0.238 af

Total Runoff Area = 2.518 ac Runoff Volume = 0.931 af Average Runoff Depth = 4.44"
85.76% Pervious = 2.159 ac 14.24% Impervious = 0.359 ac

```
                          Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
                          Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
                Reach routing by Dyn-Stor-Ind method  -  Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S        Runoff Area=20,592 sf   54.90% Impervious   Runoff Depth>6.96"
                                     Flow Length=187'   Tc=6.0 min   CN=87   Runoff=3.58 cfs  0.274 af

Subcatchment2S: Subcatchment2S          Runoff Area=2,614 sf   0.00% Impervious   Runoff Depth>5.40"
                         Flow Length=20'   Slope=0.1000 '/'   Tc=6.0 min   CN=74   Runoff=0.37 cfs  0.027 af

Subcatchment3S: Subcatchment3S         Runoff Area=58,629 sf   0.32% Impervious   Runoff Depth>5.27"
                                    Flow Length=447'   Tc=11.9 min   CN=73   Runoff=6.81 cfs  0.591 af

Subcatchment4S: Subcatchment4S        Runoff Area=27,837 sf   14.82% Impervious   Runoff Depth>5.76"
                                     Flow Length=216'   Tc=7.8 min   CN=77   Runoff=3.97 cfs  0.307 af

Reach 2R: Flow across Map 222 Lot 20   Avg. Flow Depth=0.13'   Max Vel=0.38 fps   Inflow=0.37 cfs  0.027 af
                      n=0.150   L=52.0'   S=0.0385 '/'   Capacity=6.22 cfs   Outflow=0.35 cfs  0.027 af

Reach 3R: Flow over Sagamore Ave       Avg. Flow Depth=0.21'   Max Vel=3.53 fps   Inflow=3.92 cfs  0.301 af
                     n=0.016   L=101.0'   S=0.0297 '/'   Capacity=39.77 cfs   Outflow=3.93 cfs  0.301 af

Reach 4R: Flow over Sagamore Ave and   Avg. Flow Depth=0.20'   Max Vel=3.73 fps   Inflow=3.93 cfs  0.301 af
                     n=0.016   L=145.0'   S=0.0345 '/'   Capacity=42.85 cfs   Outflow=3.92 cfs  0.301 af

Reach 5R: Flow over Tidewatch Road     Avg. Flow Depth=0.19'   Max Vel=4.42 fps   Inflow=3.92 cfs  0.301 af
                     n=0.016   L=253.0'   S=0.0553 '/'   Capacity=54.28 cfs   Outflow=3.85 cfs  0.301 af

Reach AP1: Analysis Point 1                                                     Inflow=3.93 cfs  0.301 af
                                                                               Outflow=3.93 cfs  0.301 af

Reach AP2: Analysis Point 2                                                     Inflow=0.37 cfs  0.027 af
                                                                               Outflow=0.37 cfs  0.027 af

Reach AP3: Analysis Point 3                                                    Inflow=10.41 cfs  0.892 af
                                                                              Outflow=10.41 cfs  0.892 af

Reach AP4: Analysis Point 4                                                     Inflow=3.97 cfs  0.307 af
                                                                               Outflow=3.97 cfs  0.307 af

            Total Runoff Area = 2.518 ac   Runoff Volume = 1.199 af   Average Runoff Depth = 5.72"
                                   85.76% Pervious = 2.159 ac     14.24% Impervious = 0.359 ac
```

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 3.58 cfs @ 12.09 hrs, Volume= 0.274 af, Depth> 6.96"
Routed to Reach 3R : Flow over Sagamore Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
2,869	98	Roofs, HSG C
8,436	98	Paved parking, HSG C
9,256	74	>75% Grass cover, Good, HSG C
31	70	Woods, Good, HSG C
20,592	87	Weighted Average
9,287		45.10% Pervious Area
11,305		54.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	46	0.1090	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.1	4	0.0670	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.70"
0.1	41	0.0670	5.25		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	96	0.0360	3.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.1	187	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af, Depth> 5.40"
Routed to Reach AP2 : Analysis Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
2,495	74	>75% Grass cover, Good, HSG C
119	70	Woods, Good, HSG C
2,614	74	Weighted Average
2,614		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	20	0.1000	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.3	20	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 6.81 cfs @ 12.16 hrs, Volume= 0.591 af, Depth> 5.27"
Routed to Reach AP3 : Analysis Point 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
187	98	Roofs, HSG C
9,391	74	>75% Grass cover, Good, HSG C
49,051	73	Woods, Fair, HSG C
58,629	73	Weighted Average
58,442		99.68% Pervious Area
187		0.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0415	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.7	62	0.0968	1.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	54	0.0741	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	122	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	159	0.0189	4.55	18.20	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Short grass
11.9	447	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 3.97 cfs @ 12.11 hrs, Volume= 0.307 af, Depth> 5.76"
Routed to Reach AP4 : Analysis Point 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
2,555	98	Roofs, HSG C
1,571	98	Paved parking, HSG C
5,912	74	>75% Grass cover, Good, HSG C
17,799	73	Woods, Fair, HSG C
27,837	77	Weighted Average
23,711		85.18% Pervious Area
4,126		14.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	14	0.0210	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
4.2	36	0.1280	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.5	50	0.1280	1.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	87	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	29	0.2860	2.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.8	216	Total			

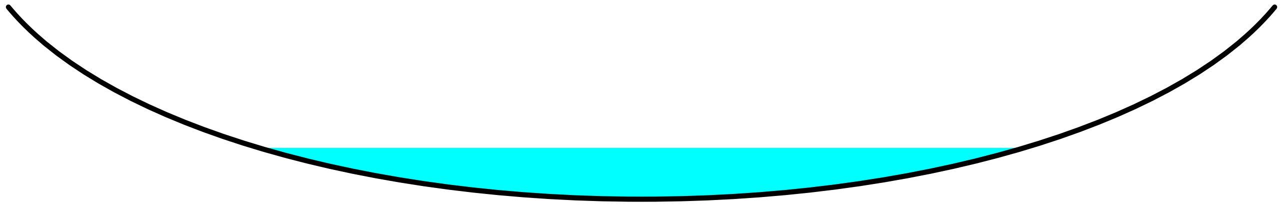
Summary for Reach 2R: Flow across Map 222 Lot 20

Inflow Area = 0.060 ac, 0.00% Impervious, Inflow Depth > 5.40" for 50 Yr 24 Hr +15% event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af
Outflow = 0.35 cfs @ 12.12 hrs, Volume= 0.027 af, Atten= 4%, Lag= 1.5 min
Routed to Reach 3R : Flow over Sagamore Ave

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.38 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 6.6 min

Peak Storage= 48 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 10.32'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 6.22 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.150 Sheet flow over Short Grass
Length= 52.0' Slope= 0.0385 '/'
Inlet Invert= 66.00', Outlet Invert= 64.00'



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Summary for Reach 3R: Flow over Sagamore Ave

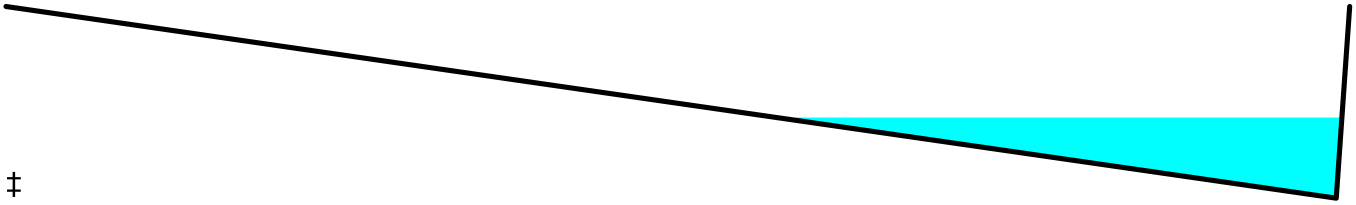
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[62] Hint: Exceeded Reach 2R OUTLET depth by 0.08' @ 12.05 hrs

Inflow Area = 0.533 ac, 48.72% Impervious, Inflow Depth > 6.78" for 50 Yr 24 Hr +15% event
Inflow = 3.92 cfs @ 12.09 hrs, Volume= 0.301 af
Outflow = 3.93 cfs @ 12.10 hrs, Volume= 0.301 af, Atten= 0%, Lag= 0.4 min
Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.53 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 1.2 min

Peak Storage= 112 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.21' , Surface Width= 10.60'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 39.77 cfs

0.00' x 0.50' deep channel, n= 0.016 Asphalt, rough
Side Slope Z-value= 50.0 0.5 '/' Top Width= 25.25'
Length= 101.0' Slope= 0.0297 '/'
Inlet Invert= 64.00', Outlet Invert= 61.00'



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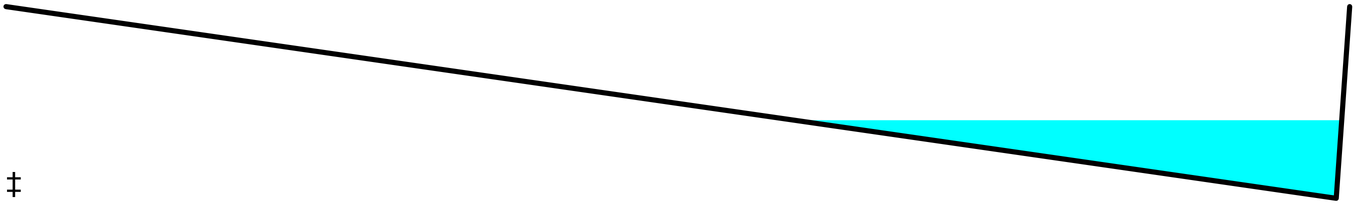
Summary for Reach 4R: Flow over Sagamore Ave and Tidewatch Road

Inflow Area = 0.533 ac, 48.72% Impervious, Inflow Depth > 6.78" for 50 Yr 24 Hr +15% event
Inflow = 3.93 cfs @ 12.10 hrs, Volume= 0.301 af
Outflow = 3.92 cfs @ 12.11 hrs, Volume= 0.301 af, Atten= 0%, Lag= 0.5 min
Routed to Reach 5R : Flow over Tidewatch Road

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.73 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 1.7 min

Peak Storage= 152 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 10.29'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 42.85 cfs

0.00' x 0.50' deep channel, n= 0.016 Asphalt, rough
Side Slope Z-value= 50.0 0.5 '/' Top Width= 25.25'
Length= 145.0' Slope= 0.0345 '/'
Inlet Invert= 61.00', Outlet Invert= 56.00'



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Summary for Reach 5R: Flow over Tidewatch Road

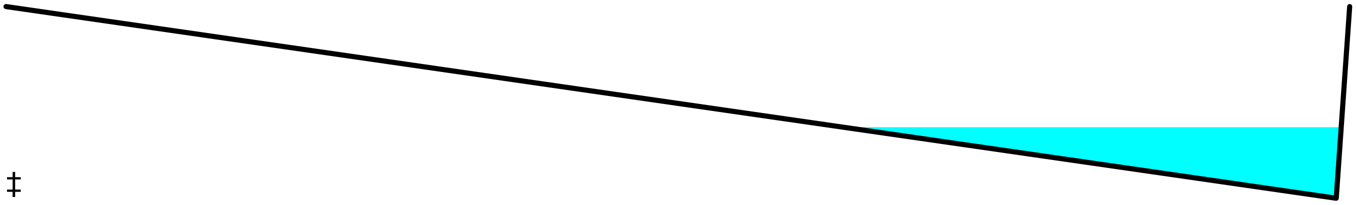
[61] Hint: Exceeded Reach 4R outlet invert by 0.18' @ 12.10 hrs

Inflow Area = 0.533 ac, 48.72% Impervious, Inflow Depth > 6.78" for 50 Yr 24 Hr +15% event
Inflow = 3.92 cfs @ 12.11 hrs, Volume= 0.301 af
Outflow = 3.85 cfs @ 12.12 hrs, Volume= 0.301 af, Atten= 2%, Lag= 0.8 min
Routed to Reach AP3 : Analysis Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 4.42 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.74 fps, Avg. Travel Time= 2.4 min

Peak Storage= 220 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.19' , Surface Width= 9.37'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 54.28 cfs

0.00' x 0.50' deep channel, n= 0.016 Asphalt, rough
Side Slope Z-value= 50.0 0.5 '/' Top Width= 25.25'
Length= 253.0' Slope= 0.0553 '/'
Inlet Invert= 56.00', Outlet Invert= 42.00'



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Summary for Reach AP1: Analysis Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.533 ac, 48.72% Impervious, Inflow Depth > 6.78" for 50 Yr 24 Hr +15% event
Inflow = 3.93 cfs @ 12.10 hrs, Volume= 0.301 af
Outflow = 3.93 cfs @ 12.10 hrs, Volume= 0.301 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 4R : Flow over Sagamore Ave and Tidewatch Road

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.060 ac, 0.00% Impervious, Inflow Depth > 5.40" for 50 Yr 24 Hr +15% event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af
Outflow = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2R : Flow across Map 222 Lot 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP3: Analysis Point 3

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =       1.879 ac,  14.04% Impervious,  Inflow Depth >   5.70"    for  50 Yr 24 Hr +15% event
Inflow      =      10.41 cfs @   12.15 hrs,  Volume=          0.892 af
Outflow     =      10.41 cfs @   12.15 hrs,  Volume=          0.892 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP4: Analysis Point 4

[40] Hint: Not Described (Outflow=Inflow)

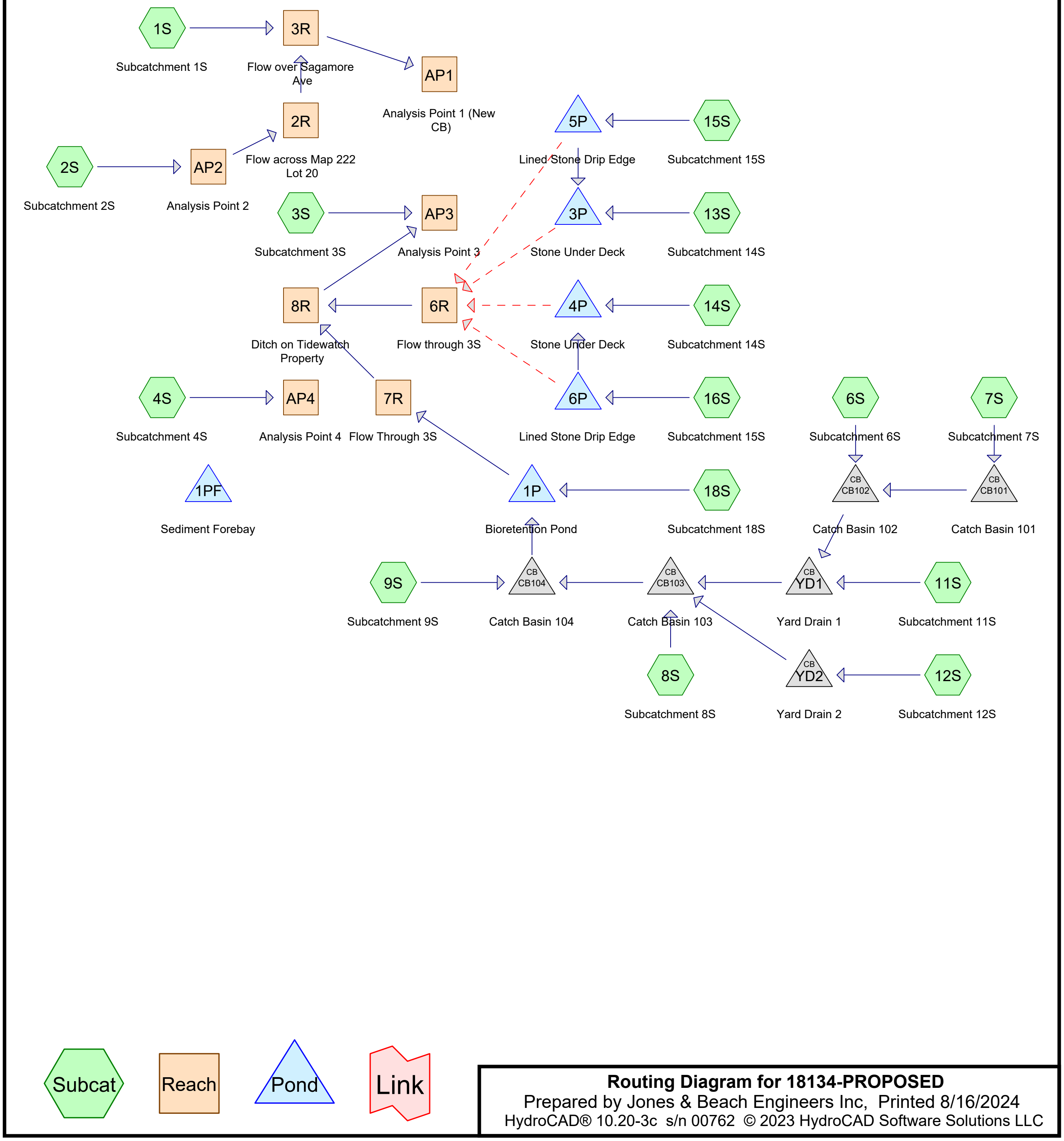
```
Inflow Area =       0.639 ac,  14.82% Impervious,  Inflow Depth >   5.76"    for  50 Yr 24 Hr +15% event
Inflow      =       3.97 cfs @   12.11 hrs,  Volume=          0.307 af
Outflow     =       3.97 cfs @   12.11 hrs,  Volume=          0.307 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

APPENDIX II

PROPOSED CONDITIONS DRAINAGE ANALYSIS

Summary 2 YEAR
Complete 10 YEAR
Summary 25 YEAR
Complete 50 YEAR



Routing Diagram for 18134-PROPOSED
Prepared by Jones & Beach Engineers Inc, Printed 8/16/2024
HydroCAD® 10.20-3c s/n 00762 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.155	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 11S, 12S, 18S)
0.287	98	Paved parking, HSG C (1S, 6S, 7S, 8S, 9S, 11S, 18S)
0.241	98	Roofs, HSG C (1S, 4S, 8S, 11S, 12S, 13S, 14S, 15S, 16S, 18S)
0.009	98	Water Surface, 0% imp, HSG C (15S, 16S)
0.826	73	Woods, Fair, HSG C (3S, 4S)
2.518	**79**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.518	HSG C	1S, 2S, 3S, 4S, 6S, 7S, 8S, 9S, 11S, 12S, 13S, 14S, 15S, 16S, 18S
0.000	HSG D	
0.000	Other	
2.518		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=16,321 sf 51.36% Impervious Runoff Depth>2.27"
Flow Length=186' Tc=6.0 min CN=86 Runoff=0.98 cfs 0.071 af

Subcatchment2S: Subcatchment2S Runoff Area=1,728 sf 0.00% Impervious Runoff Depth>1.38"
Flow Length=20' Slope=0.1000 '/' Tc=6.0 min CN=74 Runoff=0.06 cfs 0.005 af

Subcatchment3S: Subcatchment3S Runoff Area=44,464 sf 0.00% Impervious Runoff Depth>1.31"
Flow Length=447' Tc=11.9 min CN=73 Runoff=1.23 cfs 0.112 af

Subcatchment4S: Subcatchment4S Runoff Area=20,991 sf 8.04% Impervious Runoff Depth>1.51"
Flow Length=210' Tc=6.2 min CN=76 Runoff=0.82 cfs 0.061 af

Subcatchment6S: Subcatchment6S Runoff Area=1,084 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment7S: Subcatchment7S Runoff Area=954 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.08 cfs 0.006 af

Subcatchment8S: Subcatchment8S Runoff Area=3,011 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.24 cfs 0.020 af

Subcatchment9S: Subcatchment9S Runoff Area=325 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.03 cfs 0.002 af

Subcatchment11S: Subcatchment11S Runoff Area=4,571 sf 49.42% Impervious Runoff Depth>2.27"
Flow Length=77' Slope=0.0396 '/' Tc=6.0 min CN=86 Runoff=0.27 cfs 0.020 af

Subcatchment12S: Subcatchment12S Runoff Area=3,734 sf 35.30% Impervious Runoff Depth>1.95"
Flow Length=50' Slope=0.0320 '/' Tc=6.0 min CN=82 Runoff=0.19 cfs 0.014 af

Subcatchment13S: Subcatchment14S Runoff Area=560 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment14S: Subcatchment14S Runoff Area=560 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment15S: Subcatchment15S Runoff Area=779 sf 75.74% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.06 cfs 0.005 af

Subcatchment16S: Subcatchment15S Runoff Area=779 sf 75.74% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.06 cfs 0.005 af

Subcatchment18S: Subcatchment18S Runoff Area=9,821 sf 17.16% Impervious Runoff Depth>1.65"
Flow Length=58' Tc=6.0 min CN=78 Runoff=0.42 cfs 0.031 af

Reach 2R: Flow across Map 222 Lot 20 Avg. Flow Depth=0.06' Max Vel=0.22 fps Inflow=0.06 cfs 0.005 af
n=0.150 L=52.0' S=0.0385 '/' Capacity=6.22 cfs Outflow=0.05 cfs 0.005 af

Reach 3R: Flow over Sagamore Ave Avg. Flow Depth=0.13' Max Vel=2.52 fps Inflow=1.03 cfs 0.076 af
n=0.016 L=101.0' S=0.0297 '/' Capacity=39.77 cfs Outflow=1.02 cfs 0.076 af

Reach 6R: Flow through 3S Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=81.0' S=0.3457 '/' Capacity=740.30 cfs Outflow=0.00 cfs 0.000 af

Reach 7R: Flow Through 3S Avg. Flow Depth=0.10' Max Vel=3.09 fps Inflow=1.08 cfs 0.045 af
n=0.030 L=220.0' S=0.0909 '/' Capacity=66.79 cfs Outflow=1.08 cfs 0.045 af

Reach 8R: Ditch on Tidewatch Property Avg. Flow Depth=0.27' Max Vel=2.16 fps Inflow=1.08 cfs 0.045 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=1.05 cfs 0.045 af

Reach AP1: Analysis Point 1 (New CB) Inflow=1.02 cfs 0.076 af
Outflow=1.02 cfs 0.076 af

Reach AP2: Analysis Point 2 Inflow=0.06 cfs 0.005 af
Outflow=0.06 cfs 0.005 af

Reach AP3: Analysis Point 3 Inflow=2.24 cfs 0.157 af
Outflow=2.24 cfs 0.157 af

Reach AP4: Analysis Point 4 Inflow=0.82 cfs 0.061 af
Outflow=0.82 cfs 0.061 af

Pond 1P: Bioretention Pond Peak Elev=59.91' Storage=61 cf Inflow=1.32 cfs 0.100 af
Discarded=0.23 cfs 0.055 af Primary=1.08 cfs 0.045 af Outflow=1.32 cfs 0.100 af

Pond 1PF: Sediment Forebay Peak Elev=0.00' Storage=0 cf

Pond 3P: Stone Under Deck Peak Elev=64.99' Storage=0.005 af Inflow=0.11 cfs 0.009 af
Discarded=0.00 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.005 af

Pond 4P: Stone Under Deck Peak Elev=65.95' Storage=0.005 af Inflow=0.11 cfs 0.009 af
Discarded=0.00 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.005 af

Pond 5P: Lined Stone Drip Edge Peak Elev=66.05' Storage=0.000 af Inflow=0.06 cfs 0.005 af
Primary=0.06 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.005 af

Pond 6P: Lined Stone Drip Edge Peak Elev=66.05' Storage=0.000 af Inflow=0.06 cfs 0.005 af
Primary=0.06 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.005 af

Pond CB101: Catch Basin 101 Peak Elev=66.78' Inflow=0.08 cfs 0.006 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0071 '/' Outflow=0.08 cfs 0.006 af

Pond CB102: Catch Basin 102 Peak Elev=66.69' Inflow=0.16 cfs 0.014 af
12.0" Round Culvert n=0.012 L=15.0' S=0.0067 '/' Outflow=0.16 cfs 0.014 af

Pond CB103: Catch Basin 103 Peak Elev=66.36' Inflow=0.87 cfs 0.067 af
12.0" Round Culvert n=0.012 L=43.0' S=0.0070 '/' Outflow=0.87 cfs 0.067 af

```
Pond CB104: Catch Basin 104                                  Peak Elev=65.97'   Inflow=0.90 cfs  0.069 af
                         12.0"  Round Culvert  n=0.012  L=31.0'  S=0.0065 '/'   Outflow=0.90 cfs  0.069 af

Pond YD1: Yard Drain 1                                       Peak Elev=66.62'   Inflow=0.44 cfs  0.033 af
                         12.0"  Round Culvert  n=0.012  L=52.0'  S=0.0058 '/'   Outflow=0.44 cfs  0.033 af

Pond YD2: Yard Drain 2                                       Peak Elev=67.28'   Inflow=0.19 cfs  0.014 af
                          8.0"  Round Culvert  n=0.012  L=13.0'  S=0.0669 '/'   Outflow=0.19 cfs  0.014 af

          Total Runoff Area = 2.518 ac   Runoff Volume = 0.366 af   Average Runoff Depth = 1.74"
                                    79.02% Pervious = 1.990 ac     20.98% Impervious = 0.528 ac
```

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=16,321 sf 51.36% Impervious Runoff Depth>4.04"
Flow Length=186' Tc=6.0 min CN=86 Runoff=1.70 cfs 0.126 af

Subcatchment2S: Subcatchment2S Runoff Area=1,728 sf 0.00% Impervious Runoff Depth>2.86"
Flow Length=20' Slope=0.1000 '/' Tc=6.0 min CN=74 Runoff=0.13 cfs 0.009 af

Subcatchment3S: Subcatchment3S Runoff Area=44,464 sf 0.00% Impervious Runoff Depth>2.76"
Flow Length=447' Tc=11.9 min CN=73 Runoff=2.70 cfs 0.235 af

Subcatchment4S: Subcatchment4S Runoff Area=20,991 sf 8.04% Impervious Runoff Depth>3.04"
Flow Length=210' Tc=6.2 min CN=76 Runoff=1.68 cfs 0.122 af

Subcatchment6S: Subcatchment6S Runoff Area=1,084 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment7S: Subcatchment7S Runoff Area=954 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Subcatchment8S: Subcatchment8S Runoff Area=3,011 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.37 cfs 0.031 af

Subcatchment9S: Subcatchment9S Runoff Area=325 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.04 cfs 0.003 af

Subcatchment11S: Subcatchment11S Runoff Area=4,571 sf 49.42% Impervious Runoff Depth>4.04"
Flow Length=77' Slope=0.0396 '/' Tc=6.0 min CN=86 Runoff=0.48 cfs 0.035 af

Subcatchment12S: Subcatchment12S Runoff Area=3,734 sf 35.30% Impervious Runoff Depth>3.63"
Flow Length=50' Slope=0.0320 '/' Tc=6.0 min CN=82 Runoff=0.35 cfs 0.026 af

Subcatchment13S: Subcatchment14S Runoff Area=560 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment14S: Subcatchment14S Runoff Area=560 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment15S: Subcatchment15S Runoff Area=779 sf 75.74% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Subcatchment16S: Subcatchment15S Runoff Area=779 sf 75.74% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Subcatchment18S: Subcatchment18S Runoff Area=9,821 sf 17.16% Impervious Runoff Depth>3.23"
Flow Length=58' Tc=6.0 min CN=78 Runoff=0.84 cfs 0.061 af

Reach 2R: Flow across Map 222 Lot 20 Avg. Flow Depth=0.08' Max Vel=0.28 fps Inflow=0.13 cfs 0.009 af
n=0.150 L=52.0' S=0.0385 '/' Capacity=6.22 cfs Outflow=0.12 cfs 0.009 af

Reach 3R: Flow over Sagamore Ave Avg. Flow Depth=0.16' Max Vel=2.91 fps Inflow=1.81 cfs 0.135 af
n=0.016 L=101.0' S=0.0297 '/' Capacity=39.77 cfs Outflow=1.82 cfs 0.135 af

Reach 6R: Flow through 3S Avg. Flow Depth=0.00' Max Vel=1.03 fps Inflow=0.02 cfs 0.001 af
n=0.030 L=81.0' S=0.3457 '/' Capacity=740.30 cfs Outflow=0.02 cfs 0.001 af

Reach 7R: Flow Through 3S Avg. Flow Depth=0.12' Max Vel=3.45 fps Inflow=1.46 cfs 0.095 af
n=0.030 L=220.0' S=0.0909 '/' Capacity=66.79 cfs Outflow=1.45 cfs 0.095 af

Reach 8R: Ditch on Tidewatch Property Avg. Flow Depth=0.32' Max Vel=2.37 fps Inflow=1.45 cfs 0.096 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=1.46 cfs 0.096 af

Reach AP1: Analysis Point 1 (New CB) Inflow=1.82 cfs 0.135 af
Outflow=1.82 cfs 0.135 af

Reach AP2: Analysis Point 2 Inflow=0.13 cfs 0.009 af
Outflow=0.13 cfs 0.009 af

Reach AP3: Analysis Point 3 Inflow=4.16 cfs 0.331 af
Outflow=4.16 cfs 0.331 af

Reach AP4: Analysis Point 4 Inflow=1.68 cfs 0.122 af
Outflow=1.68 cfs 0.122 af

Pond 1P: Bioretention Pond Peak Elev=60.98' Storage=212 cf Inflow=2.33 cfs 0.177 af
Discarded=0.46 cfs 0.082 af Primary=1.46 cfs 0.095 af Outflow=1.92 cfs 0.177 af

Pond 1PF: Sediment Forebay Peak Elev=0.00' Storage=0 cf

Pond 3P: Stone Under Deck Peak Elev=66.20' Storage=0.008 af Inflow=0.17 cfs 0.014 af
Discarded=0.01 cfs 0.007 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af

Pond 4P: Stone Under Deck Peak Elev=67.08' Storage=0.008 af Inflow=0.17 cfs 0.014 af
Discarded=0.01 cfs 0.007 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af

Pond 5P: Lined Stone Drip Edge Peak Elev=66.20' Storage=0.000 af Inflow=0.10 cfs 0.008 af
Primary=0.10 cfs 0.008 af Secondary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.008 af

Pond 6P: Lined Stone Drip Edge Peak Elev=67.00' Storage=0.001 af Inflow=0.10 cfs 0.008 af
Primary=0.10 cfs 0.008 af Secondary=0.02 cfs 0.001 af Outflow=0.10 cfs 0.007 af

Pond CB101: Catch Basin 101 Peak Elev=66.88' Inflow=0.12 cfs 0.010 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0071 '/' Outflow=0.12 cfs 0.010 af

Pond CB102: Catch Basin 102 Peak Elev=66.85' Inflow=0.25 cfs 0.021 af
12.0" Round Culvert n=0.012 L=15.0' S=0.0067 '/' Outflow=0.25 cfs 0.021 af

Pond CB103: Catch Basin 103 Peak Elev=66.59' Inflow=1.45 cfs 0.113 af
12.0" Round Culvert n=0.012 L=43.0' S=0.0070 '/' Outflow=1.45 cfs 0.113 af

Pond CB104: Catch Basin 104 Peak Elev=66.18' Inflow=1.49 cfs 0.116 af
12.0" Round Culvert n=0.012 L=31.0' S=0.0065 '/' Outflow=1.49 cfs 0.116 af

Pond YD1: Yard Drain 1 Peak Elev=66.81' Inflow=0.73 cfs 0.056 af
12.0" Round Culvert n=0.012 L=52.0' S=0.0058 '/' Outflow=0.73 cfs 0.056 af

Pond YD2: Yard Drain 2 Peak Elev=67.39' Inflow=0.35 cfs 0.026 af
8.0" Round Culvert n=0.012 L=13.0' S=0.0669 '/' Outflow=0.35 cfs 0.026 af

Total Runoff Area = 2.518 ac Runoff Volume = 0.697 af Average Runoff Depth = 3.32"
79.02% Pervious = 1.990 ac 20.98% Impervious = 0.528 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 1.70 cfs @ 12.09 hrs, Volume= 0.126 af, Depth> 4.04"
Routed to Reach 3R : Flow over Sagamore Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
6,930	98	Paved parking, HSG C
7,938	74	>75% Grass cover, Good, HSG C
1,453	98	Roofs, HSG C
16,321	86	Weighted Average
7,938		48.64% Pervious Area
8,383		51.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	50	0.1250	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.0	6	0.1250	2.47		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	30	0.0670	1.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	100	0.0360	3.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.2	186	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 2.86"
Routed to Reach AP2 : Analysis Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
1,728	74	>75% Grass cover, Good, HSG C
1,728		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	20	0.1000	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.3	20	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 2.70 cfs @ 12.17 hrs, Volume= 0.235 af, Depth> 2.76"
Routed to Reach AP3 : Analysis Point 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
16,641	74	>75% Grass cover, Good, HSG C
27,823	73	Woods, Fair, HSG C
44,464	73	Weighted Average
44,464		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0415	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.7	62	0.0968	1.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	54	0.0741	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	122	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	159	0.0189	4.55	18.20	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Short grass
11.9	447	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 1.68 cfs @ 12.10 hrs, Volume= 0.122 af, Depth> 3.04"
Routed to Reach AP4 : Analysis Point 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
11,135	74	>75% Grass cover, Good, HSG C
8,169	73	Woods, Fair, HSG C
1,687	98	Roofs, HSG C
20,991	76	Weighted Average
19,304		91.96% Pervious Area
1,687		8.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	14	0.0357	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.9	14	0.1429	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
1.3	22	0.1333	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.3	50	0.1333	2.56		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	80	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2667	2.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.2	210	Total			

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 5.37"
Routed to Pond CB102 : Catch Basin 102

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
1,084	98	Paved parking, HSG C
1,084		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af, Depth> 5.37"
Routed to Pond CB101 : Catch Basin 101

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
954	98	Paved parking, HSG C
954		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 8S: Subcatchment 8S

Runoff = 0.37 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 5.37"
Routed to Pond CB103 : Catch Basin 103

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
2,554	98	Paved parking, HSG C
457	98	Roofs, HSG C
3,011	98	Weighted Average
3,011		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 9S: Subcatchment 9S

Runoff = 0.04 cfs @ 12.09 hrs, Volume= 0.003 af, Depth> 5.37"
Routed to Pond CB104 : Catch Basin 104

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
325	98	Paved parking, HSG C
325		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.035 af, Depth> 4.04"
Routed to Pond YD1 : Yard Drain 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
1,998	98	Roofs, HSG C
2,312	74	>75% Grass cover, Good, HSG C
261	98	Paved parking, HSG C
4,571	86	Weighted Average
2,312		50.58% Pervious Area
2,259		49.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0396	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.3	27	0.0396	1.39		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	77	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 12S: Subcatchment 12S

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.026 af, Depth> 3.63"
Routed to Pond YD2 : Yard Drain 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
1,318	98	Roofs, HSG C
2,416	74	>75% Grass cover, Good, HSG C
3,734	82	Weighted Average
2,416		64.70% Pervious Area
1,318		35.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0320	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
4.3	50	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 13S: Subcatchment 14S

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.006 af, Depth> 5.37"
Routed to Pond 3P : Stone Under Deck

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
560	98	Roofs, HSG C
560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 14S: Subcatchment 14S

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.006 af, Depth> 5.37"
Routed to Pond 4P : Stone Under Deck

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
560	98	Roofs, HSG C
560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 15S: Subcatchment 15S

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Depth> 5.37"
Routed to Pond 5P : Lined Stone Drip Edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
590	98	Roofs, HSG C
189	98	Water Surface, 0% imp, HSG C
779	98	Weighted Average
189		24.26% Pervious Area
590		75.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 16S: Subcatchment 15S

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Depth> 5.37"
Routed to Pond 6P : Lined Stone Drip Edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
590	98	Roofs, HSG C
189	98	Water Surface, 0% imp, HSG C
779	98	Weighted Average
189		24.26% Pervious Area
590		75.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 18S: Subcatchment 18S

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Depth> 3.23"
Routed to Pond 1P : Bioretention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Yr 24 Hr +15% Rainfall=5.61"

Area (sf)	CN	Description
8,136	74	>75% Grass cover, Good, HSG C
1,285	98	Roofs, HSG C
400	98	Paved parking, HSG C
9,821	78	Weighted Average
8,136		82.84% Pervious Area
1,685		17.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	43	0.0930	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.4	7	0.3333	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.0	8	0.3333	4.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.9	58	Total, Increased to minimum Tc = 6.0 min			

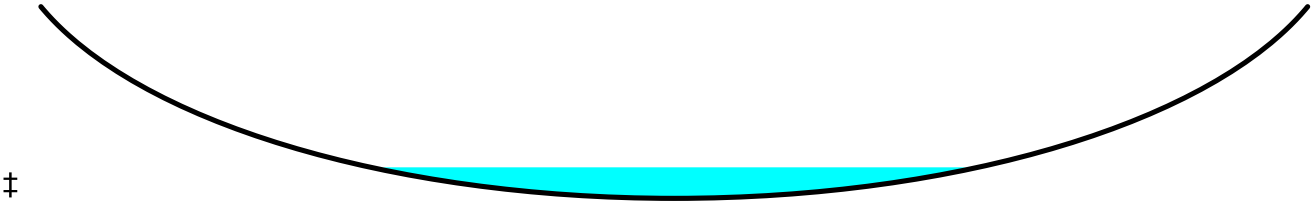
Summary for Reach 2R: Flow across Map 222 Lot 20

Inflow Area = 0.040 ac, 0.00% Impervious, Inflow Depth > 2.86" for 10 Yr 24 Hr +15% event
Inflow = 0.13 cfs @ 12.09 hrs, Volume= 0.009 af
Outflow = 0.12 cfs @ 12.13 hrs, Volume= 0.009 af, Atten= 8%, Lag= 2.2 min
Routed to Reach 3R : Flow over Sagamore Ave

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.28 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 8.6 min

Peak Storage= 22 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 8.03'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 6.22 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.150 Sheet flow over Short Grass
Length= 52.0' Slope= 0.0385 '/'
Inlet Invert= 66.00', Outlet Invert= 64.00'



Summary for Reach 3R: Flow over Sagamore Ave

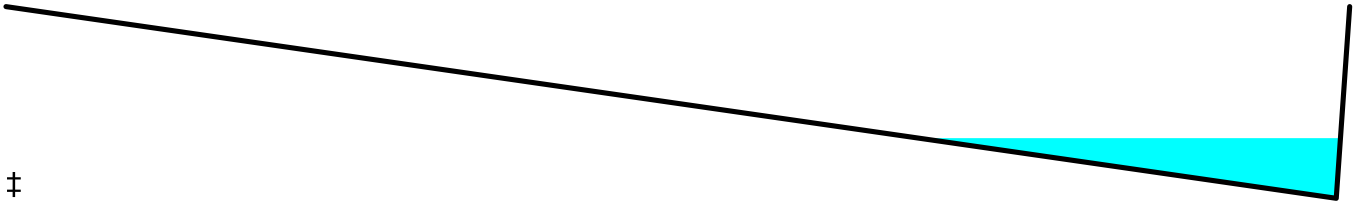
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[62] Hint: Exceeded Reach 2R OUTLET depth by 0.08' @ 12.05 hrs

```
Inflow Area =         0.414 ac,  46.45% Impervious,  Inflow Depth >   3.92"    for  10 Yr 24 Hr +15% event
Inflow      =         1.81 cfs @   12.09 hrs,  Volume=          0.135 af
Outflow     =         1.82 cfs @   12.10 hrs,  Volume=          0.135 af,  Atten= 0%,  Lag= 0.5 min
    Routed to Reach AP1 : Analysis Point 1 (New CB)
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.91 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 1.5 min

Peak Storage= 63 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 7.93'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 39.77 cfs

0.00' x 0.50' deep channel, n= 0.016 Asphalt, rough
Side Slope Z-value= 50.0 0.5 '/' Top Width= 25.25'
Length= 101.0' Slope= 0.0297 '/'
Inlet Invert= 64.00', Outlet Invert= 61.00'



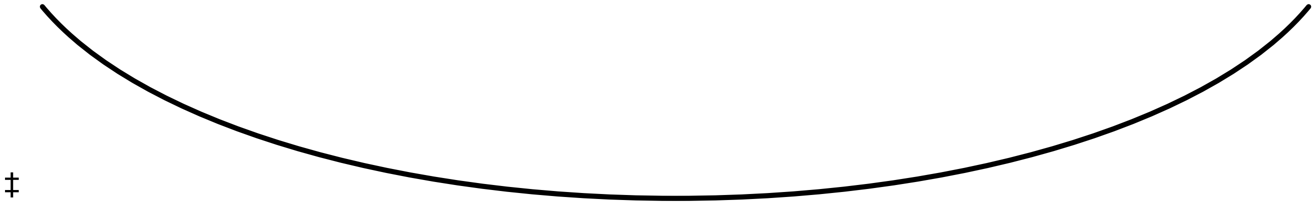
Summary for Reach 6R: Flow through 3S

```
Inflow      =         0.02 cfs @   12.59 hrs,  Volume=          0.001 af
Outflow     =         0.02 cfs @   12.61 hrs,  Volume=          0.001 af,  Atten= 10%,  Lag= 1.2 min
    Routed to Reach 8R : Ditch on Tidewatch Property
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.03 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 1.3 min

Peak Storage= 1 cf @ 12.61 hrs
Average Depth at Peak Storage= 0.00' , Surface Width= 3.35'
Bank-Full Depth= 1.00' Flow Area= 33.3 sf, Capacity= 740.30 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.030 Stream, clean & straight
Length= 81.0' Slope= 0.3457 '/'
Inlet Invert= 66.00', Outlet Invert= 38.00'



Summary for Reach 7R: Flow Through 3S

Inflow Area = 0.539 ac, 45.26% Impervious, Inflow Depth = 2.11" for 10 Yr 24 Hr +15% event
Inflow = 1.46 cfs @ 12.14 hrs, Volume= 0.095 af
Outflow = 1.45 cfs @ 12.14 hrs, Volume= 0.095 af, Atten= 1%, Lag= 0.0 min
Routed to Reach 8R : Ditch on Tidewatch Property

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.45 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 3.2 min

Peak Storage= 92 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 3.75'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 66.79 cfs

3.00' x 1.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 220.0' Slope= 0.0909 '/'
Inlet Invert= 58.00', Outlet Invert= 38.00'

Summary for Reach 8R: Ditch on Tidewatch Property

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[62] Hint: Exceeded Reach 6R OUTLET depth by 0.32' @ 12.15 hrs
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.19' @ 12.15 hrs

Inflow Area = 0.539 ac, 45.26% Impervious, Inflow Depth = 2.14" for 10 Yr 24 Hr +15% event
Inflow = 1.45 cfs @ 12.14 hrs, Volume= 0.096 af
Outflow = 1.46 cfs @ 12.16 hrs, Volume= 0.096 af, Atten= 0%, Lag= 1.2 min
Routed to Reach AP3 : Analysis Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.37 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 3.1 min

Peak Storage= 98 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.32' , Surface Width= 2.90'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 18.18 cfs

1.00' x 1.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 159.0' Slope= 0.0189 '/'
Inlet Invert= 38.00', Outlet Invert= 35.00'

Summary for Reach AP1: Analysis Point 1 (New CB)

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      0.414 ac,  46.45% Impervious,  Inflow Depth >  3.92"   for  10 Yr 24 Hr +15% event
Inflow      =      1.82 cfs @  12.10 hrs,  Volume=         0.135 af
Outflow     =      1.82 cfs @  12.10 hrs,  Volume=         0.135 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      0.040 ac,   0.00% Impervious,  Inflow Depth >  2.86"   for  10 Yr 24 Hr +15% event
Inflow      =      0.13 cfs @  12.09 hrs,  Volume=         0.009 af
Outflow     =      0.13 cfs @  12.09 hrs,  Volume=         0.009 af,  Atten= 0%,  Lag= 0.0 min
    Routed to Reach 2R : Flow across Map 222 Lot 20
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP3: Analysis Point 3

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      1.560 ac,  15.65% Impervious,  Inflow Depth >  2.55"   for  10 Yr 24 Hr +15% event
Inflow      =      4.16 cfs @  12.17 hrs,  Volume=         0.331 af
Outflow     =      4.16 cfs @  12.17 hrs,  Volume=         0.331 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP4: Analysis Point 4

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =         0.482 ac,    8.04% Impervious,  Inflow Depth >   3.04"    for  10 Yr 24 Hr +15% event
Inflow       =        1.68 cfs @   12.10 hrs,  Volume=          0.122 af
Outflow      =        1.68 cfs @   12.10 hrs,  Volume=          0.122 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Bioretention Pond

Existing high contour within footprint of filter course = 61.0, SHWT depth = 35" per TP 10, so SHWT El. = 58.08, which is 0.01' below the bottom of stone. However, in our experience, modelling the SHWTwith such a small separation to the bottom of stone causes an unrealistically high amount of infiltration to appear in the calculations. Therefore, the SHWT has been modelled 2" lower as a factor of safety.

```
Inflow Area =         0.539 ac,  45.26% Impervious,  Inflow Depth >   3.94"    for  10 Yr 24 Hr +15% event
Inflow       =        2.33 cfs @   12.09 hrs,  Volume=          0.177 af
Outflow      =        1.92 cfs @   12.15 hrs,  Volume=          0.177 af,  Atten= 18%,  Lag= 3.3 min
Discarded  =        0.46 cfs @   12.15 hrs,  Volume=          0.082 af
Primary      =        1.46 cfs @   12.14 hrs,  Volume=          0.095 af
    Routed to Reach 7R : Flow Through 3S
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 60.98' @ 12.14 hrs Surf.Area= 683 sf Storage= 212 cf

Plug-Flow detention time= 2.0 min calculated for 0.177 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (793.7 - 792.0)

Volume	Invert	Avail.Storage	Storage Description
#1	58.09'	2,677 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.09	117	48.0	0.0	0	0	117
58.10	117	48.0	40.0	0	0	117
59.09	117	48.0	40.0	46	47	165
59.10	117	48.0	15.0	0	47	165
60.59	117	48.0	15.0	26	73	237
60.60	117	48.0	100.0	1	74	237
60.99	702	116.0	100.0	144	218	1,126
61.00	1,026	144.0	100.0	9	227	1,705
62.00	1,487	163.0	100.0	1,249	1,476	2,194
62.70	1,898	178.0	100.0	1,182	2,658	2,618
62.71	1,898	178.0	100.0	19	2,677	2,620

Device	Routing	Invert	Outlet Devices
#1	Primary	58.35'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.35' / 58.00' S= 0.0175 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	58.35'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	61.70'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	58.09'	**7.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 57.92' Phase-In= 0.10'

Discarded OutFlow Max=0.46 cfs @ 12.15 hrs HW=60.97' (Free Discharge)
└─**4=Exfiltration** (Controls 0.46 cfs)

Primary OutFlow Max=1.46 cfs @ 12.14 hrs HW=60.97' TW=58.12' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.46 cfs of 4.35 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.46 cfs @ 7.42 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 1PF: Sediment Forebay

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	231 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.00	15	0	0
60.00	101	58	58
61.00	245	173	231

Summary for Pond 3P: Stone Under Deck

Ledge surface modelled 24" below original grade based on TP 13 (Bedrock found from 24" to 36".
Proposed grade is approximately 3.2' above existing grade and therefore 5.2' above ledge.

Inflow Area = 0.031 ac, 85.88% Impervious, Inflow Depth > 5.37" for 10 Yr 24 Hr +15% event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.01 cfs @ 14.27 hrs, Volume= 0.007 af, Atten= 95%, Lag= 130.9 min
Discarded = 0.01 cfs @ 14.20 hrs, Volume= 0.007 af
Secondary = 0.00 cfs @ 14.27 hrs, Volume= 0.000 af
Routed to Reach 6R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.20' @ 14.20 hrs Surf.Area= 0.006 ac Storage= 0.008 af

Plug-Flow detention time= 327.0 min calculated for 0.007 af (49% of inflow)
Center-of-Mass det. time= 190.7 min (942.0 - 751.3)

Volume	Invert	Avail.Storage	Storage Description
#1	62.90'	0.008 af	**14.00'W x 20.00'L x 3.30'H Prismatoid** 0.021 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	66.20'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	62.90'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 61.00' Phase-In= 0.10'

Discarded OutFlow Max=0.01 cfs @ 14.20 hrs HW=66.20' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 14.27 hrs HW=66.20' TW=66.00' (Dynamic Tailwater)

Summary for Pond 4P: Stone Under Deck

Ledge surface modelled 20" below original grade based on TP 12 (Bedrock ranging from 20" to 28".
Proposed grade is approximately 3.2' above existing grade and therefore 4.87' above ledge.

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[80] Warning: Exceeded Pond 6P by 0.08' @ 13.05 hrs (0.27 cfs 0.041 af)

Inflow Area = 0.031 ac, 85.88% Impervious, Inflow Depth > 5.33" for 10 Yr 24 Hr +15% event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.01 cfs @ 13.01 hrs, Volume= 0.007 af, Atten= 96%, Lag= 55.1 min
Discarded = 0.01 cfs @ 13.01 hrs, Volume= 0.007 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 6R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.08' @ 13.01 hrs Surf.Area= 0.006 ac Storage= 0.008 af

Plug-Flow detention time= 329.3 min calculated for 0.007 af (52% of inflow)
Center-of-Mass det. time= 185.7 min (947.7 - 762.0)

Volume	Invert	Avail.Storage	Storage Description
#1	63.90'	0.008 af	**14.00'W x 20.00'L x 3.30'H Prismatoid** 0.021 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	67.20'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	63.90'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 62.33' Phase-In= 0.10'

Discarded OutFlow Max=0.01 cfs @ 13.01 hrs HW=67.08' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=63.90' TW=66.00' (Dynamic Tailwater)

Summary for Pond 5P: Lined Stone Drip Edge

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=51)

Inflow Area = 0.018 ac, 75.74% Impervious, Inflow Depth > 5.37" for 10 Yr 24 Hr +15% event
Inflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af
Outflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.5 min
Primary = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af
Routed to Pond 3P : Stone Under Deck
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 6R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.20' @ 14.25 hrs Surf.Area= 0.003 ac Storage= 0.000 af

Plug-Flow detention time= 9.8 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 9.5 min (755.3 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	0.001 af	**2.00'W x 63.00'L x 1.01'H Prismatoid** 0.003 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	67.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	66.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	67.00'	**63.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.09 cfs @ 12.09 hrs HW=66.07' TW=64.86' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Weir Controls 0.09 cfs @ 0.86 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=66.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 6P: Lined Stone Drip Edge

[44] Hint: Outlet device #1 is below defined storage
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=55)

Inflow Area = 0.018 ac, 75.74% Impervious, Inflow Depth > 5.37" for 10 Yr 24 Hr +15% event
Inflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af
Outflow = 0.10 cfs @ 12.09 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.1 min
Primary = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af
Routed to Pond 4P : Stone Under Deck
Secondary = 0.02 cfs @ 12.59 hrs, Volume= 0.001 af
Routed to Reach 6R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 67.00' @ 12.60 hrs Surf.Area= 0.003 ac Storage= 0.001 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 41.0 min (786.8 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	66.01'	0.001 af	**2.00'W x 63.00'L x 1.01'H Prismatoid** 0.003 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	67.00'	**63.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.09 cfs @ 12.09 hrs HW=66.07' TW=65.81' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 0.09 cfs @ 0.86 fps)

Secondary OutFlow Max=0.02 cfs @ 12.59 hrs HW=67.00' TW=66.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.12 fps)

Summary for Pond CB101: Catch Basin 101

Inflow Area = 0.022 ac,100.00% Impervious, Inflow Depth > 5.37" for 10 Yr 24 Hr +15% event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
Primary = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af
Routed to Pond CB102 : Catch Basin 102

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.88' @ 12.10 hrs
Flood Elev= 70.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.60' / 66.50' S= 0.0071 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.10 cfs @ 12.09 hrs HW=66.87' TW=66.84' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.10 cfs @ 0.84 fps)

Summary for Pond CB102: Catch Basin 102

Inflow Area = 0.047 ac,100.00% Impervious, Inflow Depth > 5.37" for 10 Yr 24 Hr +15% event
Inflow = 0.25 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.25 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.25 cfs @ 12.09 hrs, Volume= 0.021 af
Routed to Pond yd1 : Yard Drain 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.85' @ 12.09 hrs
Flood Elev= 70.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.40'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.40' / 66.30' S= 0.0067 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 12.09 hrs HW=66.84' TW=66.80' (Dynamic Tailwater)
⮤**1=Culvert** (Outlet Controls 0.22 cfs @ 0.97 fps)

Summary for Pond CB103: Catch Basin 103

Inflow Area = 0.307 ac, 64.59% Impervious, Inflow Depth > 4.43" for 10 Yr 24 Hr +15% event
Inflow = 1.45 cfs @ 12.09 hrs, Volume= 0.113 af
Outflow = 1.45 cfs @ 12.09 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min
Primary = 1.45 cfs @ 12.09 hrs, Volume= 0.113 af
Routed to Pond CB104 : Catch Basin 104

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.59' @ 12.09 hrs
Flood Elev= 72.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.80'	**12.0" Round Culvert** L= 43.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.80' / 65.50' S= 0.0070 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.42 cfs @ 12.09 hrs HW=66.58' TW=66.17' (Dynamic Tailwater)
⮤**1=Culvert** (Outlet Controls 1.42 cfs @ 2.99 fps)

Summary for Pond CB104: Catch Basin 104

Inflow Area = 0.314 ac, 65.44% Impervious, Inflow Depth > 4.45" for 10 Yr 24 Hr +15% event
Inflow = 1.49 cfs @ 12.09 hrs, Volume= 0.116 af
Outflow = 1.49 cfs @ 12.09 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min
Primary = 1.49 cfs @ 12.09 hrs, Volume= 0.116 af
Routed to Pond 1P : Bioretention Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.18' @ 12.09 hrs
Flood Elev= 71.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.40'	**12.0" Round Culvert** L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.40' / 65.20' S= 0.0065 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.46 cfs @ 12.09 hrs HW=66.17' TW=60.89' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 1.46 cfs @ 3.10 fps)

Summary for Pond YD1: Yard Drain 1

Inflow Area =	0.152 ac,	65.02% Impervious, Inflow Depth >	4.45"	for 10 Yr 24 Hr +15% event
Inflow =	0.73 cfs @	12.09 hrs, Volume=	0.056 af	
Outflow =	0.73 cfs @	12.09 hrs, Volume=	0.056 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.73 cfs @	12.09 hrs, Volume=	0.056 af	

Routed to Pond CB103 : Catch Basin 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.81' @ 12.09 hrs
Flood Elev= 69.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.20'	**12.0" Round Culvert** L= 52.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.20' / 65.90' S= 0.0058 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.71 cfs @ 12.09 hrs HW=66.80' TW=66.58' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.71 cfs @ 2.06 fps)

Summary for Pond YD2: Yard Drain 2

Inflow Area =	0.086 ac,	35.30% Impervious, Inflow Depth >	3.63"	for 10 Yr 24 Hr +15% event
Inflow =	0.35 cfs @	12.09 hrs, Volume=	0.026 af	
Outflow =	0.35 cfs @	12.09 hrs, Volume=	0.026 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.35 cfs @	12.09 hrs, Volume=	0.026 af	

Routed to Pond CB103 : Catch Basin 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.39' @ 12.09 hrs
Flood Elev= 70.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.00'	**8.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.00' / 66.13' S= 0.0669 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.35 cfs @ 12.09 hrs HW=67.38' TW=66.58' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.35 cfs @ 1.67 fps)

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=16,321 sf 51.36% Impervious Runoff Depth>5.48"
Flow Length=186' Tc=6.0 min CN=86 Runoff=2.27 cfs 0.171 af

Subcatchment2S: Subcatchment2S Runoff Area=1,728 sf 0.00% Impervious Runoff Depth>4.14"
Flow Length=20' Slope=0.1000 '/' Tc=6.0 min CN=74 Runoff=0.19 cfs 0.014 af

Subcatchment3S: Subcatchment3S Runoff Area=44,464 sf 0.00% Impervious Runoff Depth>4.03"
Flow Length=447' Tc=11.9 min CN=73 Runoff=3.96 cfs 0.343 af

Subcatchment4S: Subcatchment4S Runoff Area=20,991 sf 8.04% Impervious Runoff Depth>4.36"
Flow Length=210' Tc=6.2 min CN=76 Runoff=2.40 cfs 0.175 af

Subcatchment6S: Subcatchment6S Runoff Area=1,084 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment7S: Subcatchment7S Runoff Area=954 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.013 af

Subcatchment8S: Subcatchment8S Runoff Area=3,011 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.47 cfs 0.040 af

Subcatchment9S: Subcatchment9S Runoff Area=325 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment11S: Subcatchment11S Runoff Area=4,571 sf 49.42% Impervious Runoff Depth>5.48"
Flow Length=77' Slope=0.0396 '/' Tc=6.0 min CN=86 Runoff=0.64 cfs 0.048 af

Subcatchment12S: Subcatchment12S Runoff Area=3,734 sf 35.30% Impervious Runoff Depth>5.02"
Flow Length=50' Slope=0.0320 '/' Tc=6.0 min CN=82 Runoff=0.49 cfs 0.036 af

Subcatchment13S: Subcatchment14S Runoff Area=560 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment14S: Subcatchment14S Runoff Area=560 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment15S: Subcatchment15S Runoff Area=779 sf 75.74% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Subcatchment16S: Subcatchment15S Runoff Area=779 sf 75.74% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Subcatchment18S: Subcatchment18S Runoff Area=9,821 sf 17.16% Impervious Runoff Depth>4.58"
Flow Length=58' Tc=6.0 min CN=78 Runoff=1.18 cfs 0.086 af

Reach 2R: Flow across Map 222 Lot 20 Avg. Flow Depth=0.10' Max Vel=0.31 fps Inflow=0.19 cfs 0.014 af
n=0.150 L=52.0' S=0.0385 '/' Capacity=6.22 cfs Outflow=0.18 cfs 0.014 af

Reach 3R: Flow over Sagamore Ave Avg. Flow Depth=0.18' Max Vel=3.14 fps Inflow=2.44 cfs 0.185 af
n=0.016 L=101.0' S=0.0297 '/' Capacity=39.77 cfs Outflow=2.45 cfs 0.185 af

Reach 6R: Flow through 3S Avg. Flow Depth=0.02' Max Vel=1.81 fps Inflow=0.20 cfs 0.008 af
n=0.030 L=81.0' S=0.3457 '/' Capacity=740.30 cfs Outflow=0.20 cfs 0.008 af

Reach 7R: Flow Through 3S Avg. Flow Depth=0.13' Max Vel=3.53 fps Inflow=1.55 cfs 0.137 af
n=0.030 L=220.0' S=0.0909 '/' Capacity=66.79 cfs Outflow=1.55 cfs 0.137 af

Reach 8R: Ditch on Tidewatch Property Avg. Flow Depth=0.34' Max Vel=2.47 fps Inflow=1.71 cfs 0.145 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=1.71 cfs 0.145 af

Reach AP1: Analysis Point 1 (New CB) Inflow=2.45 cfs 0.185 af
Outflow=2.45 cfs 0.185 af

Reach AP2: Analysis Point 2 Inflow=0.19 cfs 0.014 af
Outflow=0.19 cfs 0.014 af

Reach AP3: Analysis Point 3 Inflow=5.50 cfs 0.488 af
Outflow=5.50 cfs 0.488 af

Reach AP4: Analysis Point 4 Inflow=2.40 cfs 0.175 af
Outflow=2.40 cfs 0.175 af

Pond 1P: Bioretention Pond Peak Elev=61.27' Storage=524 cf Inflow=3.14 cfs 0.241 af
Discarded=0.59 cfs 0.104 af Primary=1.55 cfs 0.137 af Outflow=2.14 cfs 0.240 af

Pond 1PF: Sediment Forebay Peak Elev=0.00' Storage=0 cf

Pond 3P: Stone Under Deck Peak Elev=66.20' Storage=0.008 af Inflow=0.21 cfs 0.018 af
Discarded=0.01 cfs 0.007 af Secondary=0.11 cfs 0.004 af Outflow=0.12 cfs 0.010 af

Pond 4P: Stone Under Deck Peak Elev=67.20' Storage=0.008 af Inflow=0.26 cfs 0.015 af
Discarded=0.01 cfs 0.007 af Secondary=0.11 cfs 0.001 af Outflow=0.12 cfs 0.009 af

Pond 5P: Lined Stone Drip Edge Peak Elev=66.21' Storage=0.000 af Inflow=0.12 cfs 0.010 af
Primary=0.12 cfs 0.010 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.010 af

Pond 6P: Lined Stone Drip Edge Peak Elev=67.01' Storage=0.001 af Inflow=0.12 cfs 0.010 af
Primary=0.19 cfs 0.008 af Secondary=0.08 cfs 0.003 af Outflow=0.08 cfs 0.010 af

Pond CB101: Catch Basin 101 Peak Elev=67.00' Inflow=0.15 cfs 0.013 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0071 '/' Outflow=0.15 cfs 0.013 af

Pond CB102: Catch Basin 102 Peak Elev=66.99' Inflow=0.32 cfs 0.027 af
12.0" Round Culvert n=0.012 L=15.0' S=0.0067 '/' Outflow=0.32 cfs 0.027 af

Pond CB103: Catch Basin 103 Peak Elev=66.77' Inflow=1.91 cfs 0.150 af
12.0" Round Culvert n=0.012 L=43.0' S=0.0070 '/' Outflow=1.91 cfs 0.150 af

Pond CB104: Catch Basin 104 Peak Elev=66.34' Inflow=1.96 cfs 0.154 af
12.0" Round Culvert n=0.012 L=31.0' S=0.0065 '/' Outflow=1.96 cfs 0.154 af

Pond YD1: Yard Drain 1 Peak Elev=66.97' Inflow=0.96 cfs 0.075 af
12.0" Round Culvert n=0.012 L=52.0' S=0.0058 '/' Outflow=0.96 cfs 0.075 af

Pond YD2: Yard Drain 2 Peak Elev=67.47' Inflow=0.49 cfs 0.036 af
8.0" Round Culvert n=0.012 L=13.0' S=0.0669 '/' Outflow=0.49 cfs 0.036 af

Total Runoff Area = 2.518 ac Runoff Volume = 0.978 af Average Runoff Depth = 4.66"
79.02% Pervious = 1.990 ac 20.98% Impervious = 0.528 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=16,321 sf 51.36% Impervious Runoff Depth>6.84"
Flow Length=186' Tc=6.0 min CN=86 Runoff=2.81 cfs 0.214 af

Subcatchment2S: Subcatchment2S Runoff Area=1,728 sf 0.00% Impervious Runoff Depth>5.40"
Flow Length=20' Slope=0.1000 '/' Tc=6.0 min CN=74 Runoff=0.24 cfs 0.018 af

Subcatchment3S: Subcatchment3S Runoff Area=44,464 sf 0.00% Impervious Runoff Depth>5.27"
Flow Length=447' Tc=11.9 min CN=73 Runoff=5.17 cfs 0.448 af

Subcatchment4S: Subcatchment4S Runoff Area=20,991 sf 8.04% Impervious Runoff Depth>5.64"
Flow Length=210' Tc=6.2 min CN=76 Runoff=3.08 cfs 0.226 af

Subcatchment6S: Subcatchment6S Runoff Area=1,084 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.20 cfs 0.017 af

Subcatchment7S: Subcatchment7S Runoff Area=954 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment8S: Subcatchment8S Runoff Area=3,011 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.57 cfs 0.048 af

Subcatchment9S: Subcatchment9S Runoff Area=325 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.06 cfs 0.005 af

Subcatchment11S: Subcatchment11S Runoff Area=4,571 sf 49.42% Impervious Runoff Depth>6.84"
Flow Length=77' Slope=0.0396 '/' Tc=6.0 min CN=86 Runoff=0.79 cfs 0.060 af

Subcatchment12S: Subcatchment12S Runoff Area=3,734 sf 35.30% Impervious Runoff Depth>6.36"
Flow Length=50' Slope=0.0320 '/' Tc=6.0 min CN=82 Runoff=0.61 cfs 0.045 af

Subcatchment13S: Subcatchment14S Runoff Area=560 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Subcatchment14S: Subcatchment14S Runoff Area=560 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Subcatchment15S: Subcatchment15S Runoff Area=779 sf 75.74% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment16S: Subcatchment15S Runoff Area=779 sf 75.74% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment18S: Subcatchment18S Runoff Area=9,821 sf 17.16% Impervious Runoff Depth>5.88"
Flow Length=58' Tc=6.0 min CN=78 Runoff=1.50 cfs 0.110 af

Reach 2R: Flow across Map 222 Lot 20 Avg. Flow Depth=0.11' Max Vel=0.34 fps Inflow=0.24 cfs 0.018 af
n=0.150 L=52.0' S=0.0385 '/' Capacity=6.22 cfs Outflow=0.23 cfs 0.018 af

Reach 3R: Flow over Sagamore Ave Avg. Flow Depth=0.19' Max Vel=3.31 fps Inflow=3.03 cfs 0.231 af
n=0.016 L=101.0' S=0.0297 '/' Capacity=39.77 cfs Outflow=3.03 cfs 0.231 af

Reach 6R: Flow through 3S Avg. Flow Depth=0.03' Max Vel=2.25 fps Inflow=0.51 cfs 0.014 af
n=0.030 L=81.0' S=0.3457 '/' Capacity=740.30 cfs Outflow=0.46 cfs 0.014 af

Reach 7R: Flow Through 3S Avg. Flow Depth=0.13' Max Vel=3.60 fps Inflow=1.64 cfs 0.178 af
n=0.030 L=220.0' S=0.0909 '/' Capacity=66.79 cfs Outflow=1.64 cfs 0.178 af

Reach 8R: Ditch on Tidewatch Property Avg. Flow Depth=0.37' Max Vel=2.60 fps Inflow=2.08 cfs 0.192 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=2.07 cfs 0.192 af

Reach AP1: Analysis Point 1 (New CB) Inflow=3.03 cfs 0.231 af
Outflow=3.03 cfs 0.231 af

Reach AP2: Analysis Point 2 Inflow=0.24 cfs 0.018 af
Outflow=0.24 cfs 0.018 af

Reach AP3: Analysis Point 3 Inflow=7.16 cfs 0.641 af
Outflow=7.16 cfs 0.641 af

Reach AP4: Analysis Point 4 Inflow=3.08 cfs 0.226 af
Outflow=3.08 cfs 0.226 af

Pond 1P: Bioretention Pond Peak Elev=61.60' Storage=924 cf Inflow=3.91 cfs 0.301 af
Discarded=0.68 cfs 0.122 af Primary=1.64 cfs 0.178 af Outflow=2.31 cfs 0.301 af

Pond 1PF: Sediment Forebay Peak Elev=0.00' Storage=0 cf

Pond 3P: Stone Under Deck Peak Elev=66.20' Storage=0.008 af Inflow=0.23 cfs 0.021 af
Discarded=0.01 cfs 0.007 af Secondary=0.19 cfs 0.006 af Outflow=0.20 cfs 0.014 af

Pond 4P: Stone Under Deck Peak Elev=67.20' Storage=0.008 af Inflow=0.34 cfs 0.017 af
Discarded=0.01 cfs 0.008 af Secondary=0.19 cfs 0.002 af Outflow=0.19 cfs 0.010 af

Pond 5P: Lined Stone Drip Edge Peak Elev=66.22' Storage=0.000 af Inflow=0.15 cfs 0.012 af
Primary=0.13 cfs 0.012 af Secondary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.012 af

Pond 6P: Lined Stone Drip Edge Peak Elev=67.01' Storage=0.001 af Inflow=0.15 cfs 0.012 af
Primary=0.24 cfs 0.008 af Secondary=0.15 cfs 0.005 af Outflow=0.15 cfs 0.012 af

Pond CB101: Catch Basin 101 Peak Elev=67.27' Inflow=0.18 cfs 0.015 af
12.0" Round Culvert n=0.012 L=14.0' S=0.0071 '/' Outflow=0.18 cfs 0.015 af

Pond CB102: Catch Basin 102 Peak Elev=67.23' Inflow=0.38 cfs 0.032 af
12.0" Round Culvert n=0.012 L=15.0' S=0.0067 '/' Outflow=0.38 cfs 0.032 af

Pond CB103: Catch Basin 103 Peak Elev=67.15' Inflow=2.34 cfs 0.185 af
12.0" Round Culvert n=0.012 L=43.0' S=0.0070 '/' Outflow=2.34 cfs 0.185 af

Pond CB104: Catch Basin 104 Peak Elev=66.54' Inflow=2.40 cfs 0.190 af
12.0" Round Culvert n=0.012 L=31.0' S=0.0065 '/' Outflow=2.40 cfs 0.190 af

Pond YD1: Yard Drain 1 Peak Elev=67.30' Inflow=1.17 cfs 0.092 af
12.0" Round Culvert n=0.012 L=52.0' S=0.0058 '/' Outflow=1.17 cfs 0.092 af

Pond YD2: Yard Drain 2 Peak Elev=67.55' Inflow=0.61 cfs 0.045 af
8.0" Round Culvert n=0.012 L=13.0' S=0.0669 '/' Outflow=0.61 cfs 0.045 af

Total Runoff Area = 2.518 ac Runoff Volume = 1.250 af Average Runoff Depth = 5.96"
79.02% Pervious = 1.990 ac 20.98% Impervious = 0.528 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 2.81 cfs @ 12.09 hrs, Volume= 0.214 af, Depth> 6.84"
Routed to Reach 3R : Flow over Sagamore Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
6,930	98	Paved parking, HSG C
7,938	74	>75% Grass cover, Good, HSG C
1,453	98	Roofs, HSG C
16,321	86	Weighted Average
7,938		48.64% Pervious Area
8,383		51.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	50	0.1250	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.0	6	0.1250	2.47		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	30	0.0670	1.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	100	0.0360	3.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.2	186	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.018 af, Depth> 5.40"
Routed to Reach AP2 : Analysis Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
1,728	74	>75% Grass cover, Good, HSG C
1,728		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	20	0.1000	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.3	20	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 5.17 cfs @ 12.16 hrs, Volume= 0.448 af, Depth> 5.27"
Routed to Reach AP3 : Analysis Point 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
16,641	74	>75% Grass cover, Good, HSG C
27,823	73	Woods, Fair, HSG C
44,464	73	Weighted Average
44,464		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0415	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.7	62	0.0968	1.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	54	0.0741	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	122	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	159	0.0189	4.55	18.20	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Short grass
11.9	447	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 3.08 cfs @ 12.09 hrs, Volume= 0.226 af, Depth> 5.64"
Routed to Reach AP4 : Analysis Point 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
11,135	74	>75% Grass cover, Good, HSG C
8,169	73	Woods, Fair, HSG C
1,687	98	Roofs, HSG C
20,991	76	Weighted Average
19,304		91.96% Pervious Area
1,687		8.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	14	0.0357	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.9	14	0.1429	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
1.3	22	0.1333	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.3	50	0.1333	2.56		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.0	80	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2667	2.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.2	210	Total			

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 8.28"
Routed to Pond CB102 : Catch Basin 102

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
1,084	98	Paved parking, HSG C
1,084		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af, Depth> 8.28"
Routed to Pond CB101 : Catch Basin 101

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
954	98	Paved parking, HSG C
954		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 8S: Subcatchment 8S

Runoff = 0.57 cfs @ 12.09 hrs, Volume= 0.048 af, Depth> 8.28"
Routed to Pond CB103 : Catch Basin 103

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
2,554	98	Paved parking, HSG C
457	98	Roofs, HSG C
3,011	98	Weighted Average
3,011		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 9S: Subcatchment 9S

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.005 af, Depth> 8.28"
Routed to Pond CB104 : Catch Basin 104

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
325	98	Paved parking, HSG C
325		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 0.79 cfs @ 12.09 hrs, Volume= 0.060 af, Depth> 6.84"
Routed to Pond YD1 : Yard Drain 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
1,998	98	Roofs, HSG C
2,312	74	>75% Grass cover, Good, HSG C
261	98	Paved parking, HSG C
4,571	86	Weighted Average
2,312		50.58% Pervious Area
2,259		49.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0396	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.3	27	0.0396	1.39		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.3	77	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 12S: Subcatchment 12S

Runoff = 0.61 cfs @ 12.09 hrs, Volume= 0.045 af, Depth> 6.36"
Routed to Pond YD2 : Yard Drain 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
1,318	98	Roofs, HSG C
2,416	74	>75% Grass cover, Good, HSG C
3,734	82	Weighted Average
2,416		64.70% Pervious Area
1,318		35.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0320	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
4.3	50	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 13S: Subcatchment 14S

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 8.28"
Routed to Pond 3P : Stone Under Deck

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
560	98	Roofs, HSG C
560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 14S: Subcatchment 14S

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 8.28"
Routed to Pond 4P : Stone Under Deck

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
560	98	Roofs, HSG C
560		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 15S: Subcatchment 15S

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 8.28"
Routed to Pond 5P : Lined Stone Drip Edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
590	98	Roofs, HSG C
189	98	Water Surface, 0% imp, HSG C
779	98	Weighted Average
189		24.26% Pervious Area
590		75.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 16S: Subcatchment 15S

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 8.28"
Routed to Pond 6P : Lined Stone Drip Edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
590	98	Roofs, HSG C
189	98	Water Surface, 0% imp, HSG C
779	98	Weighted Average
189		24.26% Pervious Area
590		75.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 18S: Subcatchment 18S

Runoff = 1.50 cfs @ 12.09 hrs, Volume= 0.110 af, Depth> 5.88"
Routed to Pond 1P : Bioretention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Yr 24 Hr +15% Rainfall=8.53"

Area (sf)	CN	Description
8,136	74	>75% Grass cover, Good, HSG C
1,285	98	Roofs, HSG C
400	98	Paved parking, HSG C
9,821	78	Weighted Average
8,136		82.84% Pervious Area
1,685		17.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	43	0.0930	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.4	7	0.3333	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.0	8	0.3333	4.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.9	58	Total, Increased to minimum Tc = 6.0 min			

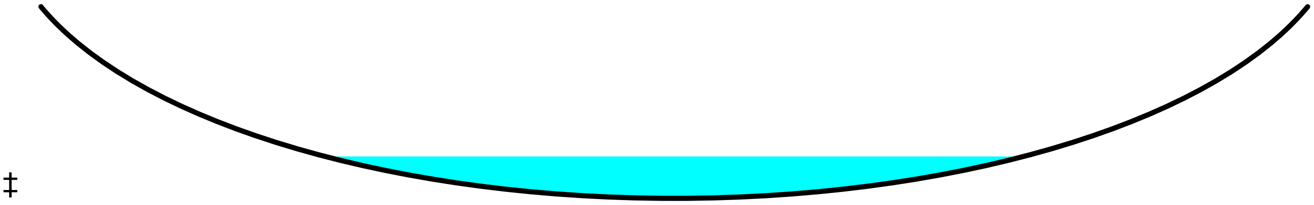
Summary for Reach 2R: Flow across Map 222 Lot 20

Inflow Area = 0.040 ac, 0.00% Impervious, Inflow Depth > 5.40" for 50 Yr 24 Hr +15% event
Inflow = 0.24 cfs @ 12.09 hrs, Volume= 0.018 af
Outflow = 0.23 cfs @ 12.12 hrs, Volume= 0.018 af, Atten= 6%, Lag= 1.7 min
Routed to Reach 3R : Flow over Sagamore Ave

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.34 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 7.5 min

Peak Storage= 35 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 9.36'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 6.22 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.150 Sheet flow over Short Grass
Length= 52.0' Slope= 0.0385 '/'
Inlet Invert= 66.00', Outlet Invert= 64.00'



Summary for Reach 3R: Flow over Sagamore Ave

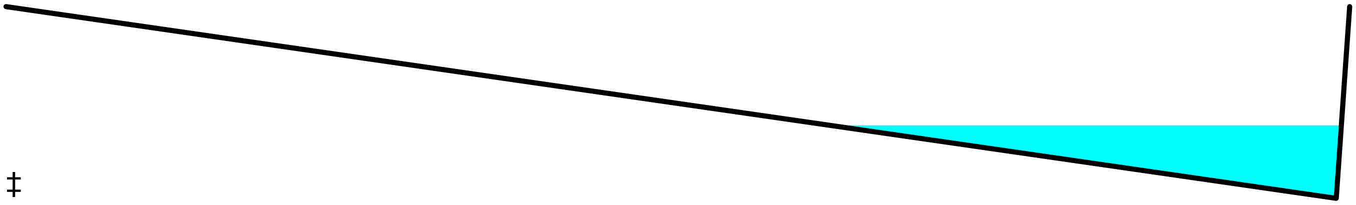
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[62] Hint: Exceeded Reach 2R OUTLET depth by 0.08' @ 12.05 hrs

Inflow Area = 0.414 ac, 46.45% Impervious, Inflow Depth > 6.70" for 50 Yr 24 Hr +15% event
Inflow = 3.03 cfs @ 12.09 hrs, Volume= 0.231 af
Outflow = 3.03 cfs @ 12.10 hrs, Volume= 0.231 af, Atten= 0%, Lag= 0.4 min
Routed to Reach AP1 : Analysis Point 1 (New CB)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.31 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 1.3 min

Peak Storage= 93 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.19' , Surface Width= 9.62'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 39.77 cfs

0.00' x 0.50' deep channel, n= 0.016 Asphalt, rough
Side Slope Z-value= 50.0 0.5 '/' Top Width= 25.25'
Length= 101.0' Slope= 0.0297 '/'
Inlet Invert= 64.00', Outlet Invert= 61.00'



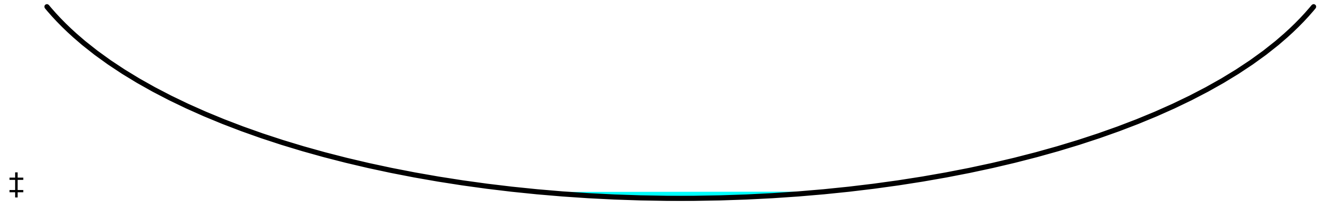
Summary for Reach 6R: Flow through 3S

Inflow = 0.51 cfs @ 12.16 hrs, Volume= 0.014 af
Outflow = 0.46 cfs @ 12.17 hrs, Volume= 0.014 af, Atten= 11%, Lag= 0.7 min
Routed to Reach 8R : Ditch on Tidewatch Property

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.25 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 1.2 min

Peak Storage= 16 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.03' , Surface Width= 9.16'
Bank-Full Depth= 1.00' Flow Area= 33.3 sf, Capacity= 740.30 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.030 Stream, clean & straight
Length= 81.0' Slope= 0.3457 '/'
Inlet Invert= 66.00', Outlet Invert= 38.00'



Summary for Reach 7R: Flow Through 3S

Inflow Area = 0.539 ac, 45.26% Impervious, Inflow Depth = 3.97" for 50 Yr 24 Hr +15% event
Inflow = 1.64 cfs @ 12.21 hrs, Volume= 0.178 af
Outflow = 1.64 cfs @ 12.22 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.6 min
Routed to Reach 8R : Ditch on Tidewatch Property

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.60 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 3.0 min

Peak Storage= 100 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 3.80'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 66.79 cfs

3.00' x 1.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 220.0' Slope= 0.0909 '/'
Inlet Invert= 58.00', Outlet Invert= 38.00'

Summary for Reach 8R: Ditch on Tidewatch Property

[62] Hint: Exceeded Reach 6R OUTLET depth by 0.34' @ 12.20 hrs
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.24' @ 12.20 hrs

Inflow Area = 0.539 ac, 45.26% Impervious, Inflow Depth = 4.28" for 50 Yr 24 Hr +15% event
Inflow = 2.08 cfs @ 12.17 hrs, Volume= 0.192 af
Outflow = 2.07 cfs @ 12.20 hrs, Volume= 0.192 af, Atten= 1%, Lag= 1.6 min
Routed to Reach AP3 : Analysis Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.60 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 2.9 min

Peak Storage= 126 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.37' , Surface Width= 3.25'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 18.18 cfs

1.00' x 1.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 159.0' Slope= 0.0189 '/'
Inlet Invert= 38.00', Outlet Invert= 35.00'

Summary for Reach AP1: Analysis Point 1 (New CB)

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      0.414 ac, 46.45% Impervious, Inflow Depth >  6.70"   for 50 Yr 24 Hr +15% event
Inflow      =      3.03 cfs @  12.10 hrs, Volume=         0.231 af
Outflow     =      3.03 cfs @  12.10 hrs, Volume=         0.231 af, Atten= 0%, Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      0.040 ac,  0.00% Impervious, Inflow Depth >  5.40"   for 50 Yr 24 Hr +15% event
Inflow      =      0.24 cfs @  12.09 hrs, Volume=         0.018 af
Outflow     =      0.24 cfs @  12.09 hrs, Volume=         0.018 af, Atten= 0%, Lag= 0.0 min
   Routed to Reach 2R : Flow across Map 222 Lot 20
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP3: Analysis Point 3

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      1.560 ac, 15.65% Impervious, Inflow Depth >  4.93"   for 50 Yr 24 Hr +15% event
Inflow      =      7.16 cfs @  12.17 hrs, Volume=         0.641 af
Outflow     =      7.16 cfs @  12.17 hrs, Volume=         0.641 af, Atten= 0%, Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP4: Analysis Point 4

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =       0.482 ac,   8.04% Impervious,  Inflow Depth >   5.64"    for  50 Yr 24 Hr +15% event
Inflow      =      3.08 cfs @   12.09 hrs,  Volume=          0.226 af
Outflow     =      3.08 cfs @   12.09 hrs,  Volume=          0.226 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Bioretention Pond

Existing high contour within footprint of filter course = 61.0, SHWT depth = 35" per TP 10, so SHWT El. = 58.08, which is 0.01' below the bottom of stone. However, in our experience, modelling the SHWTwith such a small separation to the bottom of stone causes an unrealistically high amount of infiltration to appear in the calculations. Therefore, the SHWT has been modelled 2" lower as a factor of safety.

```
Inflow Area =       0.539 ac,  45.26% Impervious,  Inflow Depth >   6.69"    for  50 Yr 24 Hr +15% event
Inflow      =      3.91 cfs @   12.09 hrs,  Volume=          0.301 af
Outflow     =      2.31 cfs @   12.21 hrs,  Volume=          0.301 af,  Atten= 41%,  Lag= 7.1 min
Discarded   =      0.68 cfs @   12.21 hrs,  Volume=          0.122 af
Primary     =      1.64 cfs @   12.21 hrs,  Volume=          0.178 af
    Routed to Reach 7R : Flow Through 3S
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 61.60' @ 12.21 hrs   Surf.Area= 1,294 sf   Storage= 924 cf

Plug-Flow detention time= 2.8 min calculated for 0.300 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (783.5 - 781.0)

Volume	Invert	Avail.Storage	Storage Description
#1	58.09'	2,677 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.09	117	48.0	0.0	0	0	117
58.10	117	48.0	40.0	0	0	117
59.09	117	48.0	40.0	46	47	165
59.10	117	48.0	15.0	0	47	165
60.59	117	48.0	15.0	26	73	237
60.60	117	48.0	100.0	1	74	237
60.99	702	116.0	100.0	144	218	1,126
61.00	1,026	144.0	100.0	9	227	1,705
62.00	1,487	163.0	100.0	1,249	1,476	2,194
62.70	1,898	178.0	100.0	1,182	2,658	2,618
62.71	1,898	178.0	100.0	19	2,677	2,620

Device	Routing	Invert	Outlet Devices
#1	Primary	58.35'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.35' / 58.00' S= 0.0175 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	58.35'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	61.70'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	58.09'	**7.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 57.92' Phase-In= 0.10'

```
Discarded OutFlow Max=0.68 cfs @ 12.21 hrs  HW=61.60'   (Free Discharge)
└─4=Exfiltration ( Controls 0.68 cfs)

Primary OutFlow Max=1.64 cfs @ 12.21 hrs  HW=61.60'  TW=58.13'   (Dynamic Tailwater)
└─1=Culvert  (Passes 1.64 cfs of 4.95 cfs potential flow)
   ├─2=Orifice/Grate (Orifice Controls 1.64 cfs @ 8.34 fps)
   └─3=Orifice/Grate ( Controls 0.00 cfs)
```

Summary for Pond 1PF: Sediment Forebay

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	231 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.00	15	0	0
60.00	101	58	58
61.00	245	173	231

Summary for Pond 3P: Stone Under Deck

Ledge surface modelled 24" below original grade based on TP 13 (Bedrock found from 24" to 36".
Proposed grade is approximately 3.2' above existing grade and therefore 5.2' above ledge.

```
Inflow Area =      0.031 ac, 85.88% Impervious, Inflow Depth >  8.28"   for 50 Yr 24 Hr +15% event
Inflow     =      0.23 cfs @  12.07 hrs, Volume=        0.021 af
Outflow    =      0.20 cfs @  12.17 hrs, Volume=        0.014 af, Atten= 15%, Lag= 6.3 min
Discarded  =      0.01 cfs @  12.15 hrs, Volume=        0.007 af
Secondary  =      0.19 cfs @  12.17 hrs, Volume=        0.006 af
   Routed to Reach 6R : Flow through 3S
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.20' @ 12.15 hrs Surf.Area= 0.006 ac Storage= 0.008 af

Plug-Flow detention time= 212.7 min calculated for 0.014 af (64% of inflow)
Center-of-Mass det. time= 102.0 min (847.7 - 745.8)

Volume	Invert	Avail.Storage	Storage Description
#1	62.90'	0.008 af	**14.00'W x 20.00'L x 3.30'H Prismatoid** 0.021 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	66.20'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	62.90'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 61.00' Phase-In= 0.10'

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=66.20' (Free Discharge)
└**1=Exfiltration** (Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.17 hrs HW=66.20' TW=66.03' (Dynamic Tailwater)

Summary for Pond 4P: Stone Under Deck

Ledge surface modelled 20" below original grade based on TP 12 (Bedrock ranging from 20" to 28". Proposed grade is approximately 3.2' above existing grade and therefore 4.87' above ledge.

---

[80] Warning: Exceeded Pond 6P by 0.20' @ 12.60 hrs (0.42 cfs 0.144 af)

```
Inflow Area =       0.031 ac,  85.88% Impervious,  Inflow Depth >   6.63"    for  50 Yr 24 Hr +15% event
Inflow      =       0.34 cfs @   12.09 hrs,  Volume=          0.017 af
Outflow     =       0.19 cfs @   12.16 hrs,  Volume=          0.010 af,  Atten= 43%,  Lag= 3.9 min
Discarded  =        0.01 cfs @   12.15 hrs,  Volume=          0.008 af
Secondary =         0.19 cfs @   12.16 hrs,  Volume=          0.002 af
    Routed to Reach 6R : Flow through 3S
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.20' @ 12.15 hrs Surf.Area= 0.006 ac Storage= 0.008 af

Plug-Flow detention time= 280.5 min calculated for 0.010 af (58% of inflow)
Center-of-Mass det. time= 142.9 min (878.2 - 735.3)

Volume	Invert	Avail.Storage	Storage Description
#1	63.90'	0.008 af	**14.00'W x 20.00'L x 3.30'H Prismatoid** 0.021 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	67.20'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	63.90'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 62.33' Phase-In= 0.10'

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=67.20' (Free Discharge)
└**1=Exfiltration** (Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.16 hrs HW=67.20' TW=66.03' (Dynamic Tailwater)

Summary for Pond 5P: Lined Stone Drip Edge

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=29)

Inflow Area = 0.018 ac, 75.74% Impervious, Inflow Depth > 8.28" for 50 Yr 24 Hr +15% event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.13 cfs @ 12.06 hrs, Volume= 0.012 af, Atten= 10%, Lag= 0.0 min
Primary = 0.13 cfs @ 12.06 hrs, Volume= 0.012 af
Routed to Pond 3P : Stone Under Deck
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 6R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.22' @ 12.17 hrs Surf.Area= 0.003 ac Storage= 0.000 af

Plug-Flow detention time= 10.2 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 9.9 min (749.9 - 740.0)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	0.001 af	**2.00'W x 63.00'L x 1.01'H Prismatoid** 0.003 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	67.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	66.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	67.00'	**63.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.16 cfs @ 12.06 hrs HW=66.10' TW=65.88' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 0.16 cfs @ 1.03 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=66.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Pond 6P: Lined Stone Drip Edge

[44] Hint: Outlet device #1 is below defined storage
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=87)

Inflow Area = 0.018 ac, 75.74% Impervious, Inflow Depth > 8.28" for 50 Yr 24 Hr +15% event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.15 cfs @ 12.14 hrs, Volume= 0.012 af, Atten= 0%, Lag= 3.2 min
Primary = 0.24 cfs @ 12.09 hrs, Volume= 0.008 af
Routed to Pond 4P : Stone Under Deck
Secondary = 0.15 cfs @ 12.14 hrs, Volume= 0.005 af
Routed to Reach 6R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.01' @ 12.15 hrs Surf.Area= 0.003 ac Storage= 0.001 af

Plug-Flow detention time= 54.1 min calculated for 0.012 af (94% of inflow)
Center-of-Mass det. time= 19.6 min (759.7 - 740.0)

Volume	Invert	Avail.Storage	Storage Description
#1	66.01'	0.001 af	**2.00'W x 63.00'L x 1.01'H Prismatoid** 0.003 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	67.00'	**63.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=66.95' TW=67.09' (Dynamic Tailwater)
↰**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.14 cfs @ 12.14 hrs HW=67.01' TW=66.03' (Dynamic Tailwater)
↰**2=Broad-Crested Rectangular Weir** (Weir Controls 0.14 cfs @ 0.25 fps)

Summary for Pond CB101: Catch Basin 101

Inflow Area = 0.022 ac,100.00% Impervious, Inflow Depth > 8.28" for 50 Yr 24 Hr +15% event
Inflow = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
Primary = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af
Routed to Pond CB102 : Catch Basin 102

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.27' @ 12.13 hrs
Flood Elev= 70.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.60'	**12.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.60' / 66.50' S= 0.0071 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=67.13' TW=67.18' (Dynamic Tailwater)
↰**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB102: Catch Basin 102

[80] Warning: Exceeded Pond CB101 by 0.07' @ 12.05 hrs (0.33 cfs 0.003 af)

Inflow Area = 0.047 ac,100.00% Impervious, Inflow Depth > 8.28" for 50 Yr 24 Hr +15% event
Inflow = 0.38 cfs @ 12.09 hrs, Volume= 0.032 af
Outflow = 0.38 cfs @ 12.09 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 12.09 hrs, Volume= 0.032 af
Routed to Pond yd1 : Yard Drain 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.23' @ 12.10 hrs
Flood Elev= 70.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.40'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.40' / 66.30' S= 0.0067 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=67.18' TW=67.25' (Dynamic Tailwater)
⮤**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB103: Catch Basin 103

Inflow Area = 0.307 ac, 64.59% Impervious, Inflow Depth > 7.25" for 50 Yr 24 Hr +15% event
Inflow = 2.34 cfs @ 12.09 hrs, Volume= 0.185 af
Outflow = 2.34 cfs @ 12.09 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.0 min
Primary = 2.34 cfs @ 12.09 hrs, Volume= 0.185 af
Routed to Pond CB104 : Catch Basin 104

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.15' @ 12.09 hrs
Flood Elev= 72.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.80'	**12.0" Round Culvert** L= 43.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.80' / 65.50' S= 0.0070 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.28 cfs @ 12.09 hrs HW=67.10' TW=66.52' (Dynamic Tailwater)
⮤**1=Culvert** (Inlet Controls 2.28 cfs @ 2.91 fps)

Summary for Pond CB104: Catch Basin 104

Inflow Area = 0.314 ac, 65.44% Impervious, Inflow Depth > 7.28" for 50 Yr 24 Hr +15% event
Inflow = 2.40 cfs @ 12.09 hrs, Volume= 0.190 af
Outflow = 2.40 cfs @ 12.09 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.0 min
Primary = 2.40 cfs @ 12.09 hrs, Volume= 0.190 af
Routed to Pond 1P : Bioretention Pond

```
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.54' @ 12.09 hrs
Flood Elev= 71.60'

Device  Routing         Invert  Outlet Devices
    #1  Primary         65.40'  12.0"  Round Culvert
                                L= 31.0'   CPP, projecting, no headwall,  Ke= 0.900
                                Inlet / Outlet Invert= 65.40' / 65.20'   S= 0.0065 '/'   Cc= 0.900
                                n= 0.012,  Flow Area= 0.79 sf

Primary OutFlow  Max=2.34 cfs @ 12.09 hrs  HW=66.52'  TW=61.30'   (Dynamic Tailwater)
└─1=Culvert  (Inlet Controls 2.34 cfs @ 2.98 fps)
```

Summary for Pond YD1: Yard Drain 1

```
[80] Warning: Exceeded Pond CB102 by 0.07' @ 12.05 hrs (0.62 cfs 0.006 af)

Inflow Area =      0.152 ac,  65.02% Impervious,  Inflow Depth >   7.29"   for  50 Yr 24 Hr +15% event
Inflow      =       1.17 cfs @   12.09 hrs,  Volume=          0.092 af
Outflow     =       1.17 cfs @   12.09 hrs,  Volume=          0.092 af,  Atten= 0%,  Lag= 0.0 min
Primary     =       1.17 cfs @   12.09 hrs,  Volume=          0.092 af
    Routed to Pond CB103 : Catch Basin 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.30' @ 12.09 hrs
Flood Elev= 69.30'

Device  Routing         Invert  Outlet Devices
    #1  Primary         66.20'  12.0"  Round Culvert
                                L= 52.0'   CPP, projecting, no headwall,  Ke= 0.900
                                Inlet / Outlet Invert= 66.20' / 65.90'   S= 0.0058 '/'   Cc= 0.900
                                n= 0.012,  Flow Area= 0.79 sf

Primary OutFlow  Max=1.17 cfs @ 12.09 hrs  HW=67.25'  TW=67.10'   (Dynamic Tailwater)
└─1=Culvert  (Inlet Controls 1.17 cfs @ 1.48 fps)
```

Summary for Pond YD2: Yard Drain 2

```
Inflow Area =      0.086 ac,  35.30% Impervious,  Inflow Depth >   6.36"   for  50 Yr 24 Hr +15% event
Inflow      =       0.61 cfs @   12.09 hrs,  Volume=          0.045 af
Outflow     =       0.61 cfs @   12.09 hrs,  Volume=          0.045 af,  Atten= 0%,  Lag= 0.0 min
Primary     =       0.61 cfs @   12.09 hrs,  Volume=          0.045 af
    Routed to Pond CB103 : Catch Basin 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.55' @ 12.09 hrs
Flood Elev= 70.20'

Device  Routing         Invert  Outlet Devices
    #1  Primary         67.00'  8.0"  Round Culvert
```

L= 13.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 67.00' / 66.13' S= 0.0669 '/' Cc= 0.900
n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.59 cfs @ 12.09 hrs HW=67.54' TW=67.11' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.59 cfs @ 1.97 fps)

APPENDIX III

Test Pit Logs

GOVE ENVIRONMENTAL SERVICES, INC.

TEST PIT DATA

Project 635 Sagamore Ave
Client 635 Sagamore Development LLC
GES Project No. GES 2021307
MM/DD/YY Staff 3-18-2022 JPG

Test Pit No. 1
ESHWT: n/a
Termination @ 15”
Refusal: 15” SCS Soil: Hollis
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–5”	10YR 3/2	FSL	GR	FR	NONE
5–15”	10YR 5/6	FSL	GR	FR	NONE

Test Pit No. 2
ESHWT: n/a
Termination @ 25”
Refusal: 25” SCS Soil: Chatfield
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–5”	10YR 3/2	FSL	GR	FR	NONE
5–25”	10YR 5/6	FSL	GR	FR	NONE

Test Pit No. 3
ESHWT: n/a
Termination @ 25”
Refusal: 25” SCS Soil: Chatfield
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–6”	10YR 3/2	FSL	GR	FR	NONE
6–25”	10YR 5/6	FSL	GR	FR	NONE

8 Continental Dr Bldg 2 Unit H, Exeter, NH 03833-7526
Ph (603) 778 0644 / *Fax* (603) 778 0654
info@gesinc.biz
www.gesinc.biz

Test Pit No. 4
ESHWT: n/a
Termination @ 15”
Refusal: 15” SCS Soil: Hollis
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–15”	10YR 3/2	FSL	GR	FR	NONE

Test Pit No. 5
ESHWT: 30”
Termination @ 36”
Refusal: 36” SCS Soil: Chatfield variant
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–8”	10YR 3/2	FSL	GR	FR	NONE
8–30”	10YR 4/6	FSL	GR	FR	NONE
30–36”	2.5Y 5/3	FSL	GR	FR	10% Distinct

Test Pit No. 6
ESHWT: n/a
Termination @ 12”
Refusal: 12” SCS Soil: Hollis
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–12”	10YR 3/2	FSL	GR	FR	NONE

Test Pit No. 7
ESHWT: n/a
Termination @ 27”
Refusal: 27” SCS Soil: Chatfield
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–4”	10YR 3/2	FSL	GR	FR	NONE
4–27”	10YR 5/6	FSL	GR	FR	NONE

Test Pit No. 8
ESHWT: 35”
Termination @ 40”
Refusal: 40” SCS Soil: Chatfield variant
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–6”	10YR 3/2	FSL	GR	FR	NONE
6–35”	10YR 5/6	FSL	GR	FR	NONE
35–40”	2.5Y 5/3	FSL	OM	FI	10% Distinct

Test Pit No. 9
ESHWT: n/a
Termination @ 27”
Refusal: 27” SCS Soil: Chatfield
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–4”	10YR 3/2	FSL	GR	FR	NONE
4–27”	10YR 5/6	FSL	GR	FR	NONE

Test Pit No. 10
ESHWT: 35
Termination @ 62”
Refusal: 62” SCS Soil: Scituate
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–10”	10YR 3/2	FSL	GR	FR	NONE
10–35”	10YR 5/6	FSL	GR	FR	NONE
35–62”	2.5Y 5/3	FSL	PL	FI	10%, Distinct

STATE OF NEW HAMPSHIRE
JAMES
P.
GOVE
NO. 004
CERTIFIED SOIL SCIENTIST

3-21-2022

Legend:

FSL = fine sandy loam
GR = granular
PL = platy
FI = firm

GOVE ENVIRONMENTAL SERVICES, INC.

TEST PIT DATA

Project 635 Sagamore Ave., Portsmouth NH
Client 635 Sagamore Development LLC
GES Project No. 2021308
MM/DD/YY Staff 07-24-2024 James Gove, CSS#004

Witnessed by: David Desfosses, City of Portsmouth

Test Pit No.	**11**	Soils Series:	Udorthents
ESHWT::	none	Landscape:	Paved
Termination @	32”	Slope:	B
Refusal:	32”	Parent Material:	Fill over till
Obs. Water:	None	Hydrologic Soil Group:	Impervious

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
Fill 1, 0-8”	10YR4/4	fine sandy loam	massive-friable-none
Fill 2, 8-19”	10YR2/1	ground pavement	massive-firm-none
Bw 18-32”	10YR5/6	fine sandy loam	granular-friable-none

Test Pit No.	**12**	Soils Series:	Chatfield
ESHWT::	none	Landscape:	Hillside
Termination @	28”	Slope:	C
Refusal:	28”	Parent Material:	Bedrock Till
Obs. Water:	None	Hydrologic Soil Group:	B

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-6”	10YR3/2	fine sandy loam	granular-friable-none
Bw 6-28”	10YR5/6	fine sandy loam	granular-friable-none

Bedrock ranges from 20” to 28” in test pit.

Test Pit No.	**13**	Soils Series:	Chatfield
ESHWT::	none	Landscape:	Hillside
Termination @	36”	Slope:	C
Refusal:	36”	Parent Material:	Bedrock Till
Obs. Water:	None	Hydrologic Soil Group:	B

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-6”	10YR3/2	fine sandy loam	granular-friable-none
Bw 6-24”	10YR4/6	fine sandy loam	granular-friable-none
C 24-36”	2.5Y5/3	fine sandy loam	granular-friable-none

Bedrock ranges from 24” to 36” in test pit.

Note: Site should be calculated as HSG C, due to the limited infiltration in thin soil layers above the bedrock.

STATE OF NEW HAMPSHIRE
JAMES
P.
GOVE
NO. 004
CERTIFIED SOIL SCIENTIST

7-24-2024

APPENDIX IV

Site Specific Soil Survey Report and Map

GOVE ENVIRONMENTAL SERVICES, INC

SITE-SPECIFIC SOIL SURVEY REPORT
For
635 Sagamore Avenue, Portsmouth, NH
By
GES, Inc.
Project # 2021308
Date: 02-20-2024

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 7.0, July, 2021.

This map product is within the technical standards of the National Cooperative Soil Survey. It is a special purpose product, intended for infiltration requirements by the NH DES Alteration of Terrain Bureau. The soil map was produced by a professional soil scientist and is not a product of the USDA Natural Resources Conservation Service. This report accompanies the soil map.

The site-specific soil map (SSSM) was produced 2-20-2024; prepared by JP Gove, CSS #004, GES, Inc.

Soils were identified with the New Hampshire State-wide Numerical Soils Legend, USDA NRCS, Durham, NH. Issue # 10, January 2011.

Hydrologic Soil Group was determined using SSSNNE Special Publication No. 5, Ksat Values for New Hampshire Soils, September 2009.

High Intensity Soil Map symbols, based upon SSSNNE Special Publication 1, December 2017, were added to the Soil Legend.

Scale of soil map: Approximately 1" = 20'.

Contours Interval: 2 feet

2. LANDFORMS & EXISTING CONDITIONS:

The site is located on sloping hillside that is bedrock controlled. Rock outcrops are numerous. At the top of the hill, adjacent Sagamore Avenue, is an existing commercial building and paved areas. Behind the impervious areas to the south, the hillside slopes downward. The area is forested in white pines. There are no wetlands on the site.

3. DATE SOIL MAP PRODUCED

Date(s) of on-site field work:	3-18-2022
Date(s) of test pits:	3-18-2922
Test pits recorded by:	JP Gove, CSS # 004

4. GEOGRAPHIC LOCATION AND SIZE OF SITE

City or town where soil mapping was conducted: Portsmouth, NH

Location: Tax Map 222 Lot 19

Size of area: Approximately 2 acres

Was the map for the entire lot? Yes

If no, where was the mapping conducted on the parcel: n/a

5. PURPOSE OF THE SOIL MAP

Was the map prepared to meet the requirement of Alteration of Terrain? No

If no, what was the purpose of the map? City of Portsmouth requirements

Who was the map prepared for? Jones & Beach Engineers, Inc.

6. SOIL IDENTIFICATION LEGEND

Map Unit Symbol	Map Unit Name	HISS Symbol	Hydrologic Soil Group
41	Chatfield-Hollis-Rock Outcrop complex	228	B
289	Chatfield Variant (moderately well drained)	327	B
699	Urban Land	n/a	Impervious

SLOPE PHASE:

0-8%	B	8-15%	C	15-25%	D
25%-50%	E	50%+	F		

7. NARRATIVE MAP UNIT DESCRIPTIONS

SITE-SPECIFIC MAP UNIT: 41

CORRELATED SOIL SERIES: Chatfield-Hollis-Rock Outcrop complex

LANDSCAPE SETTING: Sloping to very steep hillside.

CHARACTERISTIC SURFACE FEATURES: Numerous rock outcrops

DRAINAGE CLASS: Well drained

PARENT MATERIAL: Glacial Till

NATURE OF DISSIMILAR INCLUSIONS: With a complex, several similar soils are present. While the major soil is the moderately deep Chatfield, the shallow Hollis and the exposed ledge of the Rock Outcrop, are large minor components. Chatfield is 50%, Hollis is 25%, and Rock Outcrop is 25%. A few deeper soil areas are present in hollow in the bedrock.

ESTIMATED PERCENTAGE OF DISSIMILAR INCLUSIONS: less than 5%.

SOIL PROFILE DESCRIPTIONS- horizon designation, depth, soil texture, Munsell color notation, Munsell color of redox features, soil structure, soil consistence, estimated coarse fragments, estimated seasonal high water table (ESHWT), observed water table (OBSWT), kind of water table (perched, apparent, or both), depth to lithic or paralithic contact:

Test Pit No. 3
ESHWT: n/a
Termination @ 25”
Refusal: 25” SCS Soil: Chatfield
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–6”	10YR 3/2	FSL	GR	FR	NONE
6–25”	10YR 5/6	FSL	GR	FR	NONE

No OBSWT, no ESHWT, lithic contact at 25”, 20% rock fragments.

Test Pit No. 1
ESHWT: n/a
Termination @ 15”
Refusal: 15” SCS Soil: Hollis
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–5”	10YR 3/2	FSL	GR	FR	NONE
5–15”	10YR 5/6	FSL	GR	FR	NONE

No OBSWT, no ESHWT, lithic contact at 15”, 20% rock fragments.

SITE-SPECIFIC MAP UNIT: 289

CORRELATED SOIL SERIES: Chatfield Variant (moderately well drained)

LANDSCAPE SETTING: At the top of the slope, a slightly deeper soil area on the northwest corner of the site.

CHARACTERISTIC SURFACE FEATURES: Fewer outcrops than the rest of the site.

DRAINAGE CLASS: Moderately well drained.

PARENT MATERIAL: Glacial till.

NATURE OF DISSIMILAR INCLUSIONS: Scituate soils with a hard pan above the bedrock,

ESTIMATED PERCENTAGE OF DISSIMILAR INCLUSIONS: 5%

SOIL PROFILE DESCRIPTIONS- horizon designation, depth, soil texture, Munsell color notation, Munsell color of redox features, soil structure, soil consistence, estimated coarse fragments, estimated seasonal high water table (ESHWT), observed water table (OBSWT), kind of water table (perched, apparent, or both), depth to lithic or paralithic contact:

Test Pit No. 5
ESHWT: 30”
Termination @ 36”
Refusal: 36” SCS Soil: Chatfield variant
Obs. Water: none

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–8”	10YR 3/2	FSL	GR	FR	NONE
8–30”	10YR 4/6	FSL	GR	FR	NONE
30–36”	2.5Y 5/3	FSL	GR	FR	10% Distinct

ESHWT is 30”, no OBSWT, lithic contact at 36”, 20% rock fragments.

SITE-SPECIFIC MAP UNIT: 699

CORRELATED SOIL SERIES: Urban land

LANDSCAPE SETTING: Top of slope adjacent to Sagamore Avenue.

CHARACTERISTIC SURFACE FEATURES: Impervious.

DRAINAGE CLASS: N/A

PARENT MATERIAL: N/A

NATURE OF DISSIMILAR INCLUSIONS: N/A

ESTIMATED PERCENTAGE OF DISSIMILAR INCLUSIONS: N/A

SOIL PROFILE DESCRIPTIONS- horizon designation, depth, soil texture, Munsell color notation, Munsell color of redox features, soil structure, soil consistence, estimated coarse fragments, estimated seasonal high water table (ESHWT), observed water table (OBSWT), kind of water table (perched, apparent, or both), depth to lithic or paralithic contact:

N/A ---- Pavement and buildings.

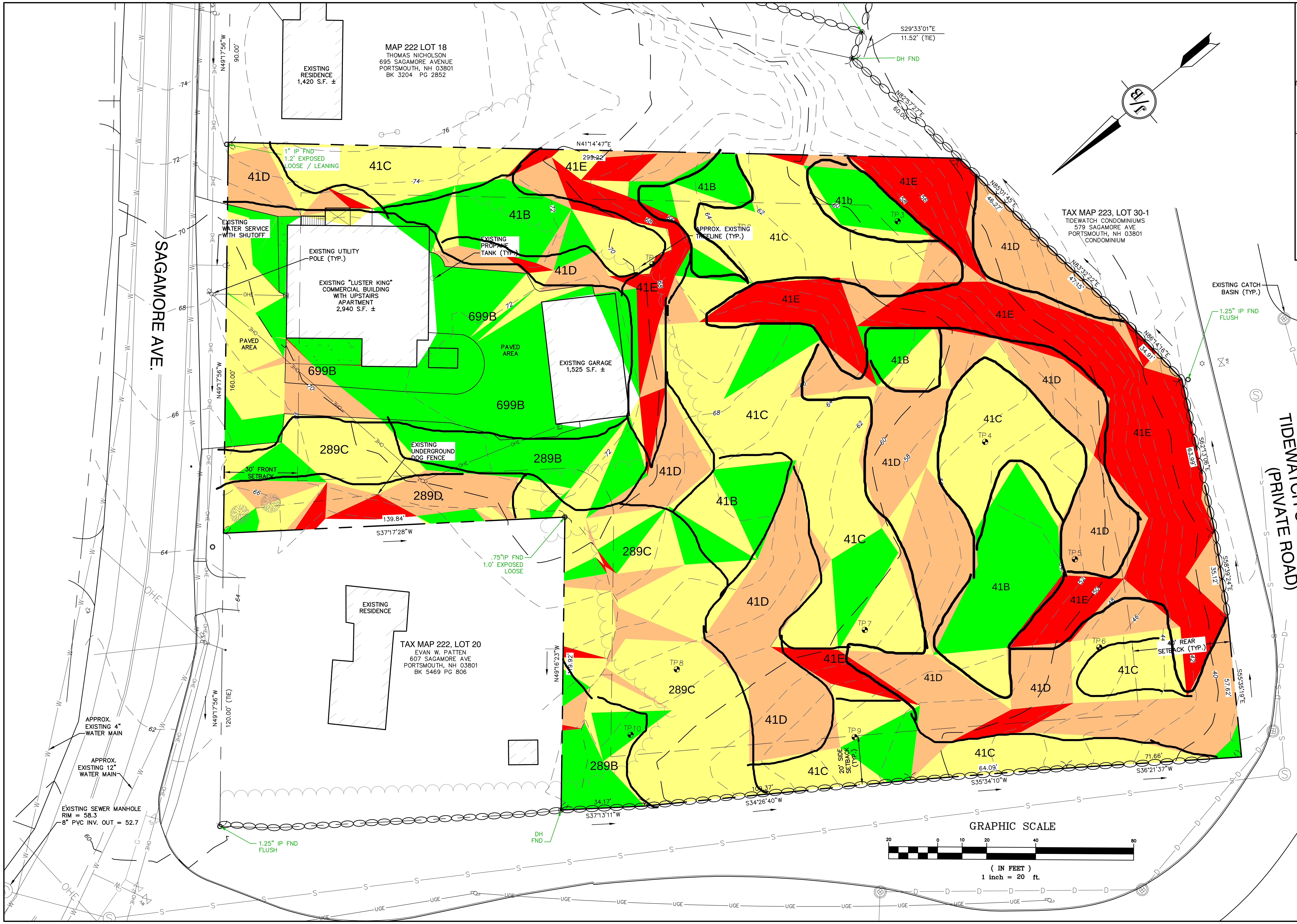
8. RESPONSIBLE SOIL SCIENTIST

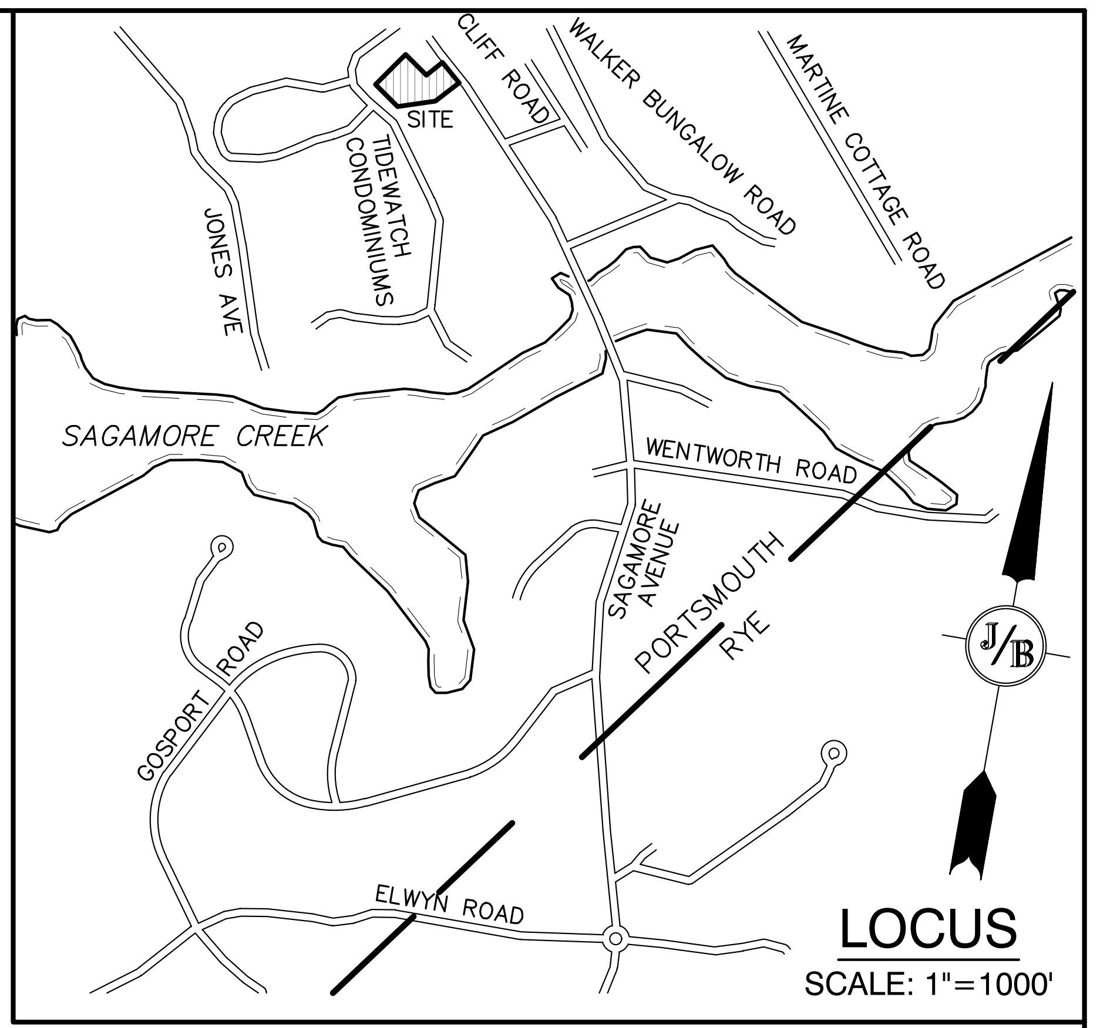
Name: James Gove

Certified Soil Scientist Number: 004

9. OTHER DISTINGUISHING FEATURES OF SITE

Is the site in a natural condition? Yes, with exception of existing development.





LOCUS

SCALE: 1"=1000'

ABUTTERS ACROSS
SAGAMORE AVE.:

TAX MAP 222, LOT 14
JOHN O'SULLIVAN
DENISE BROWN
692 SAGAMORE AVE
PORTSMOUTH, NH 03801
BK 2350 PG 181

TAX MAP 222, LOT 14-1
BROWN FAMILY REV. TRUST
VINCENT A. & LINDA M.
BROWN, TRUSTEES
DENISE BROWN
650 SAGAMORE AVE
PORTSMOUTH, NH 03801
BK 6074 PG 238

EXISTING CONDITIONS NOTES:

1. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 1–888–DIG–SAFE (1–888–344–7233).
2. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING FEATURES LOCATED ON CITY OF PORTSMOUTH TAX MAP 222, LOT 19.
3. SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
4. NO WETLANDS WERE OBSERVED WITHIN 100' OF THE PROPERTY BOUNDARY. SEE LETTER FROM GOVE ENVIRONMENTAL SERVICES, INC.

SLOPE ZONE LEGEND

🟩	< 8%
🟨	8% TO 15%
🟧	15% TO 25%
🟥	25% TO 100%
🟪	> 100%

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: JAC	Draft: DJM	Date: 12/07/2021
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134-CONCEPT-8.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

REV.	DATE	REVISION	BY
11	1/31/24	MINOR REVISIONS TO SIGHT DISTANCE PLAN AND PROFILE	DJM
10	10/27/23	MINOR REVISIONS	DJM
9	10/20/23	MINOR REVISIONS	DJM
8	9/27/23	REVISED PER TAC COMMENTS	DJM
7	9/5/23	ISSUED TO TAC	DJM

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING CONDITIONS PLAN
Project: 4-UNIT RESIDENTIAL SITE
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT, LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
C1
SHEET 2 OF 8
JBE PROJECT NO. 18134.1

APPENDIX V

NRCS Soil Map

Soil Map—Rockingham County, New Hampshire
(635 Sagamore Ave.)

Map Scale: 1:893 if printed on A landscape (11" x 8.5") 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 Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
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: Rockingham County, New Hampshire
Survey Area Data: Version 26, Aug 22, 2023

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

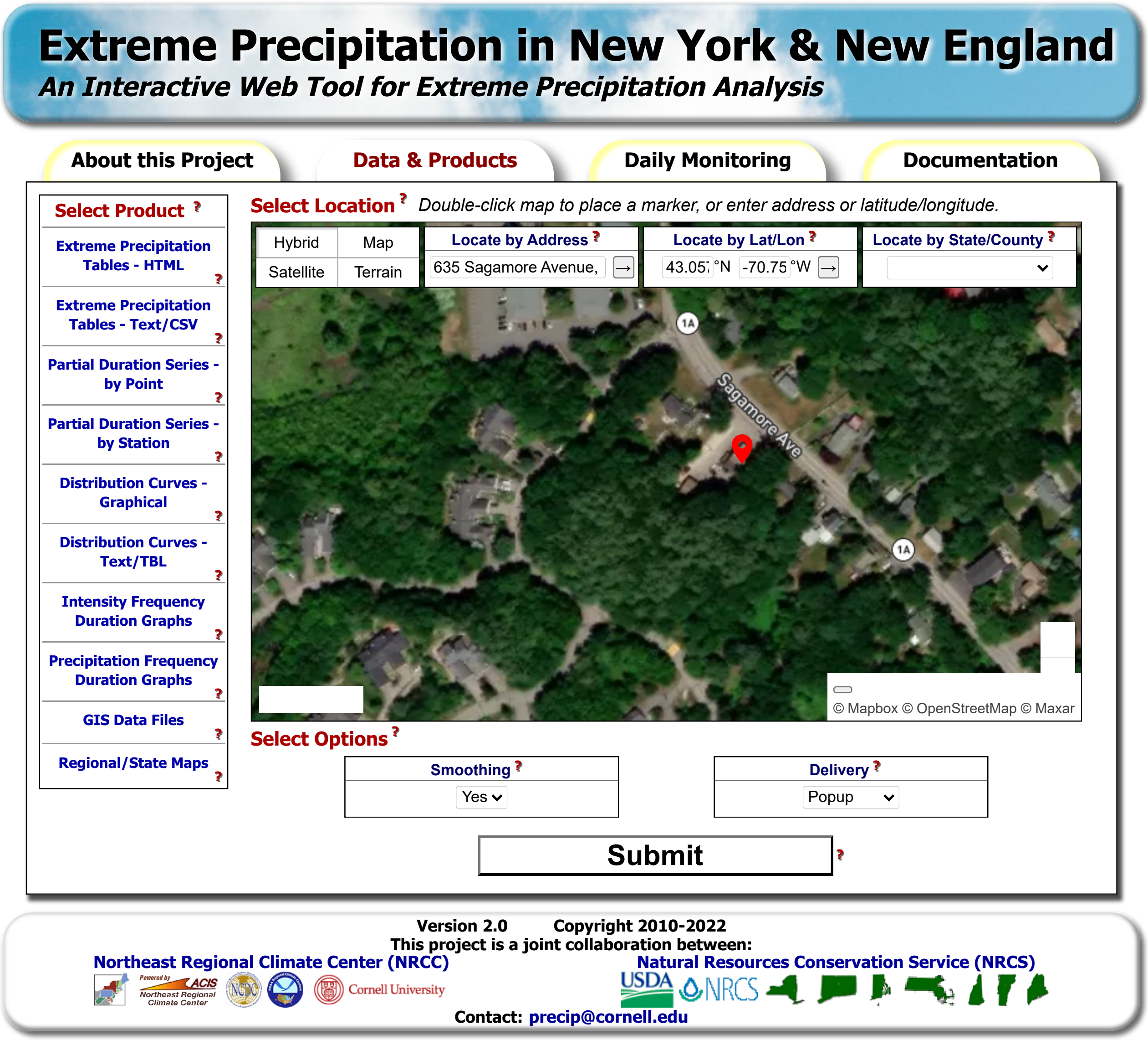
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	0.7	30.5%
140D	Chatfield-Hollis-Canton complex, 15 to 35 percent slopes, rocky	1.6	69.5%
Totals for Area of Interest		**2.3**	**100.0%**

APPENDIX VI

Extreme Precipitation Estimates



Extreme Precipitation in New York & New England

An Interactive Web Tool for Extreme Precipitation Analysis

Select Product ?

Select Location ? *Double-click map to place a marker, or enter address or latitude/longitude.*

Locate by Address ? 635 Sagamore Avenue, →

Locate by Lat/Lon ? 43.05 °N -70.75 °W →

Locate by State/County ?

Select Options ?

Smoothing ? Yes

Delivery ? Popup

Version 2.0 Copyright 2010-2022

This project is a joint collaboration between:

Northeast Regional Climate Center (NRCC) **Natural Resources Conservation Service (NRCS)**

Contact: precip@cornell.edu

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point

Smoothing	Yes
State	
Location	
Latitude	43.058 degrees North
Longitude	70.753 degrees West
Elevation	10 feet
Date/Time	Wed Feb 21 2024 09:41:54 GMT-0500 (Eastern Standard Time)

+15% due to location in Coastal/Great Bay Region
2yr: 3.22*1.15 = 3.70 in
10yr: 4.88*1.15 = 5.16 in
25yr: 6.19*1.15 = 7.12 in
50yr: 7.42*1.15 = 8.53 in

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day
1yr	0.26	0.40	0.50	0.65	0.82	1.04	**1yr**	0.70	0.98	1.21	1.56	2.03	2.67	2.94	**1yr**	2.36	2.82	3.24	3.96	4.57
2yr	0.32	0.50	0.62	0.82	1.03	1.30	**2yr**	0.89	1.18	1.52	1.94	2.49	3.22	3.58	**2yr**	2.85	3.45	3.95	4.70	5.35
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.44	3.15	4.08	4.60	**5yr**	3.61	4.42	5.07	5.96	6.73
10yr	0.41	0.65	0.82	1.12	1.46	1.90	**10yr**	1.26	1.73	2.24	2.90	3.76	4.88	5.55	**10yr**	4.32	5.34	6.12	7.14	8.01
25yr	0.48	0.76	0.97	1.34	1.78	2.35	**25yr**	1.54	2.15	2.79	3.65	4.76	6.19	7.13	**25yr**	5.48	6.86	7.85	9.07	10.09
50yr	0.54	0.86	1.11	1.55	2.08	2.77	**50yr**	1.80	2.54	3.31	4.35	5.69	7.42	8.62	**50yr**	6.57	8.29	9.48	10.87	12.02
100yr	0.60	0.97	1.25	1.78	2.43	3.28	**100yr**	2.10	2.99	3.93	5.19	6.80	8.89	10.42	**100yr**	7.87	10.02	11.46	13.04	14.33
200yr	0.68	1.11	1.44	2.06	2.85	3.86	**200yr**	2.46	3.54	4.65	6.17	8.12	10.65	12.60	**200yr**	9.43	12.12	13.85	15.64	17.09
500yr	0.81	1.33	1.73	2.51	3.51	4.80	**500yr**	3.03	4.41	5.81	7.76	10.28	13.54	16.21	**500yr**	11.98	15.59	17.81	19.90	21.58

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	0.88	**1yr**	0.62	0.86	0.93	1.33	1.69	2.26	2.51	**1yr**	2.00	2.41	2.88	3.20	3.93
2yr	0.32	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.82	2.33	3.07	3.47	**2yr**	2.72	3.33	3.84	4.56	5.11
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.11	2.73	3.80	4.21	**5yr**	3.36	4.05	4.74	5.56	6.27
10yr	0.39	0.59	0.74	1.03	1.33	1.60	**10yr**	1.15	1.57	1.81	2.38	3.05	4.39	4.88	**10yr**	3.88	4.70	5.48	6.45	7.23
25yr	0.44	0.67	0.83	1.19	1.57	1.90	**25yr**	1.35	1.86	2.10	2.74	3.52	4.77	5.92	**25yr**	4.22	5.70	6.70	7.85	8.73
50yr	0.48	0.73	0.92	1.32	1.77	2.17	**50yr**	1.53	2.12	2.35	3.06	3.91	5.40	6.84	**50yr**	4.78	6.58	7.79	9.11	10.08
100yr	0.54	0.81	1.02	1.47	2.02	2.47	**100yr**	1.74	2.42	2.63	3.39	4.33	6.08	7.90	**100yr**	5.38	7.60	9.07	10.60	11.64
200yr	0.59	0.89	1.13	1.64	2.29	2.82	**200yr**	1.97	2.75	2.94	3.75	4.76	6.83	9.12	**200yr**	6.05	8.77	10.54	12.34	13.47
500yr	0.69	1.02	1.32	1.92	2.72	3.37	**500yr**	2.35	3.29	3.42	4.28	5.41	7.97	11.03	**500yr**	7.06	10.61	12.87	15.13	16.32

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day
1yr	0.29	0.44	0.54	0.72	0.89	1.08	**1yr**	0.77	1.06	1.26	1.74	2.20	2.99	3.18	**1yr**	2.64	3.05	3.59	4.38	5.06
2yr	0.34	0.52	0.64	0.87	1.07	1.27	**2yr**	0.92	1.24	1.48	1.96	2.51	3.43	3.72	**2yr**	3.03	3.57	4.10	4.86	5.64
5yr	0.40	0.62	0.77	1.05	1.34	1.63	**5yr**	1.16	1.59	1.89	2.54	3.25	4.36	4.98	**5yr**	3.85	4.79	5.40	6.40	7.18
10yr	0.47	0.72	0.89	1.25	1.61	1.98	**10yr**	1.39	1.94	2.29	3.11	3.96	5.36	6.22	**10yr**	4.74	5.98	6.84	7.87	8.78
25yr	0.58	0.88	1.09	1.56	2.06	2.58	**25yr**	1.77	2.52	2.96	4.08	5.17	7.77	8.36	**25yr**	6.87	8.04	9.18	10.37	11.44
50yr	0.67	1.03	1.28	1.84	2.48	3.15	**50yr**	2.14	3.08	3.61	5.01	6.35	9.71	10.48	**50yr**	8.60	10.08	11.48	12.76	14.00
100yr	0.80	1.20	1.51	2.17	2.98	3.83	**100yr**	2.57	3.75	4.39	6.18	7.80	12.14	13.13	**100yr**	10.74	12.62	14.35	15.74	17.13
200yr	0.93	1.40	1.78	2.57	3.58	4.69	**200yr**	3.09	4.58	5.36	7.61	9.60	15.22	16.46	**200yr**	13.47	15.83	17.96	19.40	20.96
500yr	1.16	1.72	2.22	3.22	4.58	6.09	**500yr**	3.95	5.95	6.96	10.07	12.65	20.54	22.22	**500yr**	18.18	21.36	24.18	25.57	27.38

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Northeast Regional Climate Center

APPENDIX VII

Rip Rap Calculations

RIP RAP CALCULATIONS
"Luster Cluster"
635 Sagamore Ave.
Portsmouth, NH

Jones & Beach Engineers, Inc.
P.O. Box 219
Stratham, NH 03885
3/14/2024 REVISED 4/19/2024 REVISED 8/8/2024

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.*
Aprons are sized for the 10-Year storm event.

TAILWATER < HALF THE D_o

$L_a = (1.8 \times Q) / D_0^{3/2} + (7 \times D_o)$

$W = L_a + (3 \times D_o)$ or defined channel width

$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)
1P Outlet Pipe	0.37	1.55	1	9.8	13	0.10

TAILWATER > HALF THE D_o

$L_a = (3.0 \times Q) / D_0^{3/2} + (7 \times D_o)$

$W = (0.4 \times L_a) + (3 \times D_o)$ or defined channel width

$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)
CB104 Outlet Pipe	0.59	1.96	1	12.9	8	0.08

Table 7-24 -- Recommended Rip Rap Gradation Ranges

d_{50} Size =	0.25	Feet	3	Inches
% of Weight Smaller Than the Given d_{50} Size		Size of Stone (Inches)		
		From		To
100%		5		6
85%		4		5
50%		3		5
15%		1		2

Table 7-24 -- Recommended Rip Rap Gradation Ranges

d_{50} Size =	0.5	Feet	6	Inches
% of Weight Smaller Than the Given d_{50} Size		Size of Stone (Inches)		
		From		To
100%		9		12
85%		8		11
50%		6		9
15%		2		3

APPENDIX VIII

BMP Worksheets

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Bioretention Pond (1P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.54	ac	A = Area draining to the practice	
0.24	ac	A_I = Impervious area draining to the practice	
0.45	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.46	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.25	ac-in	WQV= 1" x Rv x A	
895	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
224	cf	25% x WQV (check calc for sediment forebay volume)	
671	cf	75% x WQV (check calc for surface sand filter volume)	
Sediment Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
231	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
61.61	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
2.32	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.21	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
59.10	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
58.35	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
58.08	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
57.67	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
0.75	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
1.43	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.02	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
61.60	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
62.70	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
992	cf	V = Volume of storage[3] (attach a stage-storage table)	**$\geq$ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	D4	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**$\geq$ 3:1**
Sheet	D4	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

SHWT elevation at high contour is only 0.01' below the bottom of the stone. However, we modelled it 2" lower in the HydroCAD calculations as a factor of safety. Modelling such a small separation from the bottom of the stone to the SHWT causes an unrealistically high amount of exfiltration to appear in the results.

Test Pits #8 and #10 used for design. Both test pits indicate a depth to SHWT of 35". TP 8 indicates a depth to refusal of 40". Existing high contour in filter course area is 61, so SHWT and bedrock elevations were derived accordingly.

Stage-Area-Storage for Pond 1P: Bioretention Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.09	117	0
58.14	117	2
58.19	117	5
58.24	117	7
58.29	117	9
58.34	117	12
58.39	117	14
58.44	117	16
58.49	117	19
58.54	117	21
58.59	117	23
58.64	117	26
58.69	117	28
58.74	117	30
58.79	117	33
58.84	117	35
58.89	117	37
58.94	117	40
58.99	117	42
59.04	117	44
59.09	117	47
59.14	117	48
59.19	117	49
59.24	117	49
59.29	117	50
59.34	117	51
59.39	117	52
59.44	117	53
59.49	117	54
59.54	117	55
59.59	117	56
59.64	117	56
59.69	117	57
59.74	117	58
59.79	117	59
59.84	117	60
59.89	117	61
59.94	117	62
59.99	117	63
60.04	117	63
60.09	117	64
60.14	117	65
60.19	117	66
60.24	117	67
60.29	117	68
60.34	117	69
60.39	117	70
60.44	117	70
60.49	117	71
60.54	117	72
60.59	117	73
60.64	154	80
60.69	208	89
60.74	270	101
60.79	341	116
60.84	419	135
60.89	505	158
60.94	600	186
60.99	702	218
61.04	1,043	268
61.09	1,064	321
61.14	1,085	374
61.19	1,107	429
61.24	1,129	485
61.29	1,151	542
61.34	1,173	600
61.39	1,196	659
61.44	1,218	720
61.49	1,241	781
61.54	1,264	844
61.59	1,288	908
61.64	1,311	973
61.69	1,335	1,039
61.74	1,359	1,106
61.79	1,383	1,175
61.84	1,408	1,244
61.89	1,432	1,315
61.94	1,457	1,388
61.99	1,482	1,461
62.04	1,509	1,536
62.09	1,537	1,612
62.14	1,565	1,690
62.19	1,594	1,769
62.24	1,622	1,849
62.29	1,651	1,931
62.34	1,680	2,014
62.39	1,710	2,099
62.44	1,739	2,185
62.49	1,769	2,273
62.54	1,800	2,362
62.59	1,830	2,453
62.64	1,861	2,545
62.69	**1,892**	**2,639**

Underdrain inv. = 58.35
Vol. below = 12 cfs for
GRV calculation

Bottom of filter course = 59.1
Volume in stone voids below
= 47 cf
WQV Required = 895 cf
Vol. below E(WQV) =
895+47 = 942 cf
E(WQV) = 61.61 by
interpolation

Overflow el. = 61.7
Vol. below = 1,039 cf

WQV Provided = 1039-47 =
992 cf > 895 cf

Stage-Discharge for Pond 1P: Bioretention Pond

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
58.09	0.00	0.00	0.00
58.14	0.01	0.01	0.00
58.19	0.03	0.03	0.00
58.24	0.04	0.04	0.00
58.29	0.04	0.04	0.00
58.34	0.05	0.05	0.00
58.39	0.06	0.06	0.01
58.44	0.09	0.06	0.02
58.49	0.12	0.07	0.06
58.54	0.17	0.07	0.10
58.59	0.23	0.08	0.16
58.64	0.30	0.08	0.22
58.69	0.37	0.09	0.28
58.74	0.45	0.10	0.35
58.79	0.52	0.10	0.41
58.84	0.57	0.11	0.47
58.89	0.62	0.11	0.51
58.94	0.67	0.12	0.55
58.99	0.72	0.13	0.59
59.04	0.76	0.13	0.63
59.09	0.80	0.14	0.66
59.14	0.84	0.14	0.69
59.19	0.88	0.15	0.73
59.24	0.91	0.16	0.76
59.29	0.95	0.16	0.79
59.34	0.98	0.17	0.81
59.39	1.01	0.17	0.84
59.44	1.05	0.18	0.87
59.49	1.08	0.19	0.89
59.54	1.11	0.19	0.92
59.59	1.14	0.20	0.94
59.64	1.17	0.20	0.96
59.69	1.20	0.21	0.99
59.74	1.22	0.21	1.01
59.79	1.25	0.22	1.03
59.84	1.28	0.23	1.05
59.89	1.31	0.23	1.07
59.94	1.33	0.24	1.09
59.99	1.36	0.24	1.11
60.04	1.38	0.25	1.13
60.09	1.41	0.26	1.15
60.14	1.43	0.26	1.17
60.19	1.46	0.27	1.19
60.24	1.48	0.27	1.21
60.29	1.51	0.28	1.23
60.34	1.53	0.29	1.25
60.39	1.56	0.29	1.26
60.44	1.58	0.30	1.28
60.49	1.60	0.30	1.30
60.54	1.63	0.31	1.32
60.59	1.65	0.31	1.33
60.64	1.68	0.33	1.35
60.69	1.71	0.34	1.37
60.74	1.74	0.36	1.38
60.79	1.78	0.38	1.40
60.84	1.81	0.40	1.41
60.89	1.85	0.42	1.43
60.94	1.89	0.44	1.45
60.99	1.93	0.47	1.46
61.04	2.01	0.53	1.48
61.09	2.04	0.55	1.49
61.14	2.07	0.56	1.51
61.19	2.09	0.57	1.52
61.24	2.12	0.58	1.54
61.29	2.15	0.60	1.55
61.34	2.17	0.61	1.56
61.39	2.20	0.62	1.58
61.44	2.23	0.63	1.59
61.49	2.25	0.65	1.61
61.54	2.28	0.66	1.62
61.59	2.31	0.67	1.63
61.64	2.33	0.69	1.65
61.69	2.36	0.70	1.66
61.74	2.51	0.71	1.80
61.79	2.83	0.73	2.10
61.84	3.25	0.74	2.51
61.89	3.74	0.75	2.99
61.94	4.31	0.77	3.54
61.99	4.93	0.78	4.15
62.04	5.60	0.80	4.81
62.09	6.18	0.81	5.37
62.14	6.24	0.82	5.42
62.19	6.30	0.84	5.46
62.24	6.35	0.85	5.50
62.29	6.41	0.87	5.54
62.34	6.46	0.88	5.58
62.39	6.52	0.90	5.62
62.44	6.57	0.91	5.66
62.49	6.63	0.93	5.70
62.54	6.68	0.94	5.74
62.59	6.73	0.96	5.77
62.64	6.79	0.98	5.81
62.69	**6.84**	**0.99**	**5.85**

E(WQV) = 61.61 per
stage storage table
Q(WQV) = 2.32 cfs

NEW HAMPSHIRE
DEPARTMENT OF
Environmental
Services

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION
(Env-Wq 1507.04)

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.12	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.25	inches	Rd = Weighted groundwater recharge depth	
0.031	ac-in	GRV = AI * Rd	
113	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

Stone Beneath Units 3&4 decks: (14 ft * 20 ft *3 ft)*0.4*2 = 672 cf

Bioretention: 12 cf GRV provided below UD end cap orifice per stage storage table

GRV Provided = 672+12 = 684 cf > 113 cf

APPENDIX IX

Pollutant Removal Calculations

POLLUTANT REMOVAL CALCULATIONS

BMP	Drip Edge	Bioretention	None	Total	Required
Acres Impervious	0.053	0.244	0.039	0.335	
TSS Removal (%)	90%	90%	0%	**80%**	**80%**
TN Removal (%)	55%	65%	0%	**67%**	**50%**

Calculations are based on post-construction impervious surfaces directed toward AP3 and AP4.
Post-construction impervious surfaces directed toward AP1 are handled offsite via the City's drainage system, and the amount of impervious surface directed toward AP1 is being decreased post-construction.
Stone underneath decks are assumed to provide similar treatment to a stone drip edge.
TSS removal of 80% provided meets 80% requirement
TN removal of 67% provided exceeds 50% requirement

Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Stormwater Ponds	Wet Pond		B, F	70%	35%	45%
	Wet Extended Detention Pond		A, B	80%	55%	68%
	Micropool Extended Detention Pond	TBA				
	Multiple Pond System	TBA				
	Pocket Pond	TBA				
Stormwater Wetlands	Shallow Wetland		A, B, F, I	80%	55%	45%
	Extended Detention Wetland		A, B, F, I	80%	55%	45%
	Pond/Wetland System	TBA				
	Gravel Wetland		H	95%	85%	64%
Infiltration Practices	Infiltration Trench (≥75 ft from surface water)		B, D, I	90%	55%	60%
	Infiltration Trench (<75 ft from surface water)		B, D, I	90%	10%	60%
	Infiltration Basin (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Infiltration Basin (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Dry Wells			90%	55%	60%
	Drip Edges			90%	55%	60%
Filtering Practices	Aboveground or Underground Sand Filter that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Aboveground or Underground Sand Filter that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Aboveground or Underground Sand Filter with underdrain		A, I, F, G, H	85%	10%	45%
	Tree Box Filter	TBA				
	Bioretention System		I, G, H	90%	65%	65%
	Permeable Pavement that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Permeable Pavement that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Permeable Pavement with underdrain		Use TN and TP values for sand filter w/ underdrain and outlet pipe	90%	10%	45%

Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Treatment Swales	Flow Through Treatment Swale	TBA				
Vegetated Buffers	Vegetated Buffers		A, B, I	73%	40%	45%
Pre-Treatment Practices	Sediment Forebay	TBA				
	Vegetated Filter Strip		A, B, I	73%	40%	45%
	Vegetated Swale		A, B, C, F, H, I	65%	20%	25%
	Flow-Through Device - Hydrodynamic Separator		A, B, G, H	35%	10%	5%
	Flow-Through Device - ADS Underground Multichamber Water Quality Unit (WQU)		G, H	72%	10%	9%
	Other Flow-Through Devices	TBA				
	Off-line Deep Sump Catch Basin		J, K, L, M	15%	5%	5%

APPENDIX X

Infiltration Testing Data

Front of Site - Test #1

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
6.2	105	0.5	0.008333	78120.0	82.4947	32.4782
9.9	105	1	0.016667	62370.0	65.8627	25.9302
13.5	105	1.5	0.025	56700.0	59.8752	23.5729

Mean	**27.3271**
σ (Std. Dev.)	**3.7674**

Constant	105	cm^2
Glover Coefficient:	0.001056	1/cm^2

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Lowest Mean Ksat = 22.3 iph (Test #3)

With factor of safety of two = 11.15 iph

Front of Site - Test #2

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
6.7	105	0.5	0.008333	84420.0	89.1475	35.0974
11.2	105	1	0.016667	70560.0	74.5114	29.3352
16.1	105	1.5	0.025	67620.0	71.4067	28.1129

Mean	**30.8485**
σ (Std. Dev.)	**3.0456**

Constant	105	cm^2
Glover Coefficient:	0.001056	$1/cm^2$

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Lowest Mean Ksat = 22.3 iph (Test #3)

With factor of safety of two = 11.15 iph

Front of Site - Test #3

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
4.8	105	0.5	0.008333	60480.0	63.8669	25.1444
8.3	105	1	0.016667	52290.0	55.2182	21.7395
11.4	105	1.5	0.025	47880.0	50.5613	19.9060

Mean	**22.2633**
σ (Std. Dev.)	**2.1704**

Constant	105	cm^2
Glover Coefficient:	0.001056	$1/cm^2$

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Lowest Mean Ksat = 22.3 iph (Test #3)

With factor of safety of two = 11.15 iph

Bioretention - Test #1

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
2.9	105	0.5	0.008333	36540.0	38.5862	15.1914
5.7	105	1	0.016667	35910.0	37.9210	14.9295
8	105	1.5	0.025	33600.0	35.4816	13.9691
10.65	105	2	0.033333	33547.5	35.4262	13.9473
14.7	105	2.5	0.041667	37044.0	39.1185	15.4010
17.9	105	3	0.05	37590.0	39.6950	15.6280

Mean	**14.8444**
σ (Std. Dev.)	**0.6611**

Constant	105	cm^2
Glover Coefficient:	0.001056	$1/cm^2$

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Lowest Mean Ksat = 14.8 iph (Test #1)

With factor of safety of two = 7.4 iph

Bioretention - Test #2

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
6.8	105	0.5	0.008333	85680.0	90.4781	35.6213
13	105	1	0.016667	81900.0	86.4864	34.0498
17.5	105	1.5	0.025	73500.0	77.6160	30.5575

Mean	**33.4095**
σ (Std. Dev.)	**2.1163**

Constant	105	cm^2
Glover Coefficient:	0.001056	1/cm^2

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Lowest Mean Ksat = 14.8 iph (Test #1)

With factor of safety of two = 7.4 iph

Bioretention - Test #3

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
12.6	105	0.5	0.008333	158760.0	167.6506	66.0042
25	105	1	0.016667	157500.0	166.3200	65.4803

Mean	**65.7422**
σ (Std. Dev.)	**0.2619**

Constant	105	cm^2
Glover Coefficient:	0.001056	$1/cm^2$

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Lowest Mean Ksat = 14.8 iph (Test #1)

With factor of safety of two = 7.4 iph

Unit 4 - Test #1

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
6.5	105	0.5	0.008333	81900.0	86.4864	34.0498
11.7	105	1	0.016667	73710.0	77.8378	30.6448
15.6	105	1.5	0.025	65520.0	69.1891	27.2398

Mean	**30.6448**
σ (Std. Dev.)	**2.7802**

Constant	105	cm^2
Glover Coefficient:	0.001056	1/cm^2

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Lowest Mean Ksat = 25.4 iph (Test #2)

With factor of safety of two = 12.7 iph

Unit 4 - Test #2

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
5.6	105	0.5	0.008333	70560.0	74.5114	29.3352
9.5	105	1	0.016667	59850.0	63.2016	24.8825
12.6	105	1.5	0.025	52920.0	55.8835	22.0014

Mean	**25.4064**
σ (Std. Dev.)	**3.0168**

Constant	105	cm^2
Glover Coefficient:	0.001056	$1/cm^2$

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Lowest Mean Ksat = 25.4 iph (Test #2)

With factor of safety of two = 12.7 iph

Unit 4 - Test #3

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
8.4	105	0.5	0.008333	105840.0	111.7670	44.0028
13.6	105	1	0.016667	85680.0	90.4781	35.6213
18.5	105	1.5	0.025	77700.0	82.0512	32.3036

Mean	**37.3092**
σ (Std. Dev.)	**4.9230**

Constant	105	cm^2
Glover Coefficient:	0.001056	1/cm^2

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Lowest Mean Ksat = 25.4 iph (Test #2)

With factor of safety of two = 12.7 iph

AMOOZEMETER DATA SHEET

JONES&BEACH
ENGINEERS INC.

Project #: 18134.1
Test Pit #: Front - [illegible]
Permeameter Test #: 1
Date: 7/2/24
Location: 635 Sag
Soil Map Unit Series:
Horizon: **B / C** (circle one)

Test hole profile:
Unit
10 "
8 ~~[illegible]~~ "

Set-Up Calculation

Hole Depth (cm):	
Distance From Bottom of Bubble:	
Tube to Soil Surface (cm):	
Desired Water Depth In Hole (cm):	
= CHT Tube Setting (cm):	

Outflow Chamber(s) Used (circle one) : **Small ("1 on")** [✓ **Both ("2 on")**] <-- "B"
Associated Conversion Factor: (= 20.0cm^2) [✓ (= 105.0 cm^2)]

A	B				D	E	F
Drop In Water Level	Outflow Chamber	Clock Time	Elapsed Time	C	Outflow (Q)	Saturated Hydraulic Conductivity (Ksat)	
(cm)	(C.F.)	(hr : min)	(min)	(min/hr)	(cm^3/hr)	(cm/hr)	(in/hr)
Example:	*20*	*10:17*	*15*	*0.25*	*392*	*0.4139*	*0.1629*
Start (0)							
					Mean Ksat		

Calculation Formulas:
D = (AxB)/C
E = D x 0.001056
F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

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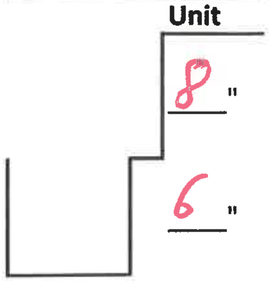
AMOOZEMETER DATA SHEET

JONES&BEACH
ENGINEERS INC.

Project #: 18134~~z~~.1
Test Pit #: Front ~~PL~~ 2
Permeameter Test #:
Date: 7/2/24
Location: 635 Sag
Soil Map Unit Series:
Horizon: B / C (circle one)

Test hole profile:



Set-Up Calculation	
Hole Depth (cm):	
Distance From Bottom of Bubble:	
Tube to Soil Surface (cm):	
Desired Water Depth In Hole (cm):	
= CHT Tube Setting (cm):	

Outflow Chamber(s) Used (circle one) :	Small ("1 on")	[✓ Both ("2 on")]	<-- "B"
Associated Conversion Factor:	(= 20.0cm^2)	[✓ (= 105.0 cm^2)]	

A	B				D	E	F
Drop In Water Level	Outflow Chamber	Clock Time	Elapsed Time		Outflow (Q)	Saturated Hydraulic Conductivity (Ksat)	
				C			
(cm)	(C.F.)	(hr : min)	(min)	(min/hr)	(cm^3/hr)	(cm/hr)	(in/hr)
Example:	*20*	*10:17*	*15*	*0.25*	*392*	*0.4139*	*0.1629*
Start (0)							
					Mean Ksat		

Calculation Formulas:
D = (AxB)/C
E = D x 0.001056
F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

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AMOOZEMETER DATA SHEET

JONES&BEACH ENGINEERS INC.

Project #: 18134,1
Test Pit #: ~~#1~~ Front
Permeameter Test #: 3
Date: 7/2/24
Location: 635 Say
Soil Map Unit Series:
Horizon: **B / C** (circle one)

Test hole profile:
Unit
9 "
9 "

Set-Up Calculation	
Hole Depth (cm):	
Distance From Bottom of Bubble:	
Tube to Soil Surface (cm):	
Desired Water Depth In Hole (cm):	
= CHT Tube Setting (cm):	

Outflow Chamber(s) Used (circle one) :	**Small ("1 on")**	[✓ **Both ("2 on")**]	**<-- "B"**
Associated Conversion Factor:	**(= 20.0cm^2)**	[✓ **(= 105.0 cm^2)**]	

A	**B**				**D**	**E**	**F**
Drop In Water Level	**Outflow Chamber**	**Clock Time**	**Elapsed Time**		**Outflow (Q)**	**Saturated Hydraulic Conductivity (Ksat)**	
				C			
(cm)	**(C.F.)**	**(hr : min)**	**(min)**	**(min/hr)**	**(cm^3/hr)**	**(cm/hr)**	**(in/hr)**
Example:	*20*	*10:17*	*15*	*0.25*	*392*	*0.4139*	*0.1629*
Start (0)							
					Mean Ksat		

Calculation Formulas:

D = (AxB)/C

E = D x 0.001056

F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

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Start Test →

AMOOZEMETER DATA SHEET

JONES&BEACH
ENGINEERS INC.

Project #: 18134.1
Test Pit #: Bioretention
Permeameter Test #: 1
Date: 7/21/24
Location: 635 Sag
Soil Map Unit Series:
Horizon: B / C (circle one)

Test hole profile:

Unit

9 "

6 "

Set-Up Calculation	
Hole Depth (cm):	
Distance From Bottom of Bubble:	
Tube to Soil Surface (cm):	
Desired Water Depth In Hole (cm):	
= CHT Tube Setting (cm):	

Outflow Chamber(s) Used (circle one) : Small ("1 on") [✓ Both ("2 on")] <-- "B"

Associated Conversion Factor: (= 20.0cm^2) [✓ (= 105.0 cm^2)]

A	B				D	E	F
Drop In Water Level	Outflow Chamber	Clock Time	Elapsed Time		Outflow (Q)	Saturated Hydraulic Conductivity (Ksat)	
				C			
(cm)	(C.F.)	(hr : min)	(min)	(min/hr)	(cm^3/hr)	(cm/hr)	(in/hr)
Example:	*20*	*10:17*	*15*	*0.25*	*392*	*0.4139*	*0.1629*
Start (0)							
					Mean Ksat		

Calculation Formulas:

D = (AxB)/C
E = D x 0.001056
F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

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AMOOZEMETER DATA SHEET

JONES&BEACH
ENGINEERS INC.

Project #: 18134.1
Test Pit #: BioRetention 1
Permeameter Test #: 2
Date: 7/2/24
Location: 635 Sag
Soil Map Unit Series:
Horizon: B / C (circle one)

Test hole profile:

Unit
7 "
9 "

Set-Up Calculation	
Hole Depth (cm):	
Distance From Bottom of Bubble:	
Tube to Soil Surface (cm):	
Desired Water Depth In Hole (cm):	
= CHT Tube Setting (cm):	

Outflow Chamber(s) Used (circle one) : Small ("1 on") [✓ Both ("2 on")] <-- "B"
Associated Conversion Factor: (= 20.0cm^2) [✓ (= 105.0 cm^2)]

A	B				D	E	F
Drop In Water Level	Outflow Chamber	Clock Time	Elapsed Time		Outflow (Q)	Saturated Hydraulic Conductivity (Ksat)	
				C			
(cm)	(C.F.)	(hr : min)	(min)	(min/hr)	(cm^3/hr)	(cm/hr)	(in/hr)
Example:	*20*	*10:17*	*15*	*0.25*	*392*	*0.4139*	*0.1629*
Start (0)							
					Mean Ksat		

Calculation Formulas:
D = (AxB)/C
E = D x 0.001056
F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

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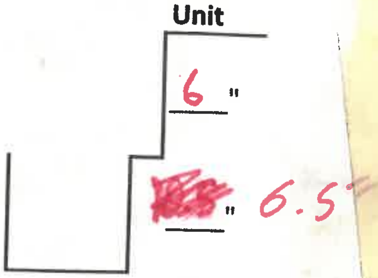
AMOOZEMETER DATA SHEET

JONES&BEACH
ENGINEERS INC.

Project #: 18134.1
Test Pit #: Bioretention #1
Permeameter Test #: 3
Date: 7/2/24
Location: 635 Sag
Soil Map Unit Series:
Horizon: **B / C** (circle one)

Test hole profile:



Set-Up Calculation

Hole Depth (cm):	
Distance From Bottom of Bubble:	
Tube to Soil Surface (cm):	
Desired Water Depth In Hole (cm):	
= CHT Tube Setting (cm):	

Outflow Chamber(s) Used (circle one) : **Small ("1 on")** **Both ("2 on")**
Associated Conversion Factor: **(= 20.0cm^2)** **(= 105.0 cm^2)** **<-- "B"**

A	B				D	E	F
Drop In Water Level	**Outflow Chamber**	**Clock Time**	**Elapsed Time**		**Outflow (Q)**	**Saturated Hydraulic Conductivity (Ksat)**	
				C			
(cm)	**(C.F.)**	**(hr : min)**	**(min)**	**(min/hr)**	**(cm^3/hr)**	**(cm/hr)**	**(in/hr)**
Example:	*20*	*10:17*	*15*	*0.25*	*392*	*0.4139*	*0.1629*
Start (0)							
					Mean Ksat		

Calculation Formulas:

D = (AxB)/C
E = D x 0.001056
F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

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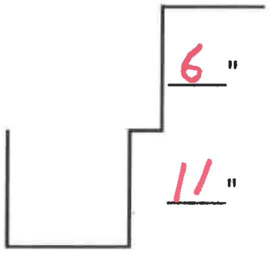
AMOOZEMETER DATA SHEET

JONES&BEACH
ENGINEERS INC.

Project #: 18134.1
Test Pit #: Unit 4
Permeameter Test #: 1
Date: 7/2/2024
Location: 635 Sag
Soil Map Unit Series:
Horizon: **B / C** (circle one)

Test hole profile:

Unit



Set-Up Calculation	
Hole Depth (cm):	
Distance From Bottom of Bubble:	
Tube to Soil Surface (cm):	
Desired Water Depth In Hole (cm):	
= CHT Tube Setting (cm):	

Outflow Chamber(s) Used (circle one) : **Small ("1 on")** **Both ("2 on")** <-- "B"
Associated Conversion Factor: **(= 20.0cm^2)** **(= 105.0 cm^2)**

A	B				D	E	F
Drop In Water Level	**Outflow Chamber**	**Clock Time**	**Elapsed Time**		**Outflow (Q)**	**Saturated Hydraulic Conductivity (Ksat)**	
				C			
(cm)	**(C.F.)**	**(hr : min)**	**(min)**	**(min/hr)**	**(cm^3/hr)**	**(cm/hr)**	**(in/hr)**
Example:	*20*	*10:17*	*15*	*0.25*	*392*	*0.4139*	*0.1629*
Start (0)							
					Mean Ksat		

Calculation Formulas:

D = (AxB)/C
E = D x 0.001056
F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

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Discard

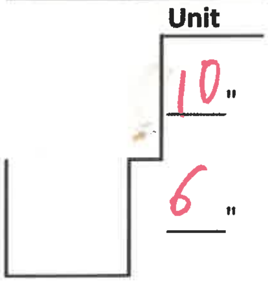
Start ->

AMOOZEMETER DATA SHEET

JONES&BEACH ENGINEERS INC.

Project #: 18134.1
Test Pit #: Unit 4
Permeameter Test #: 2
Date: 7/2/2024
Location: 635 Sag
Soil Map Unit Series:
Horizon: **B / C** (circle one)

Test hole profile:



Set-Up Calculation	
Hole Depth (cm):	
Distance From Bottom of Bubble:	
Tube to Soil Surface (cm):	
Desired Water Depth In Hole (cm):	
= CHT Tube Setting (cm):	

Outflow Chamber(s) Used (circle one) : **Small ("1 on")** **Both ("2 on")** <-- "B"
Associated Conversion Factor: (= 20.0cm^2) (= 105.0 cm^2)

A	B				D	E	F
Drop In Water Level	Outflow Chamber	Clock Time	Elapsed Time		Outflow (Q)	Saturated Hydraulic Conductivity (Ksat)	
				C			
(cm)	(C.F.)	(hr : min)	(min)	(min/hr)	(cm^3/hr)	(cm/hr)	(in/hr)
Example:	*20*	*10:17*	*15*	*0.25*	*392*	*0.4139*	*0.1629*
Start (0)							
					Mean Ksat		

Calculation Formulas:

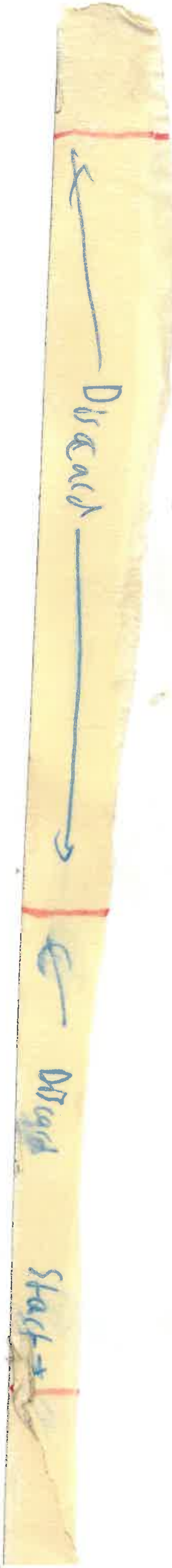
$D = (AxB)/C$

$E = D \times 0.001056$

$F = E / 2.54$

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

F:\Forms, Apps, Regs\Templates\Amoozemeter\Amoozemeter Data Sheet.xlsx

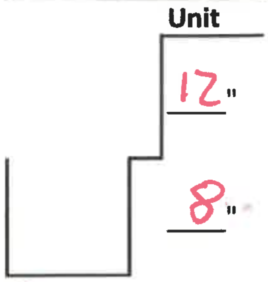


AMOOZEMETER DATA SHEET

JONES&BEACH
ENGINEERS INC.

Project #: 18134.1
Test Pit #: Unit 4
Permeameter Test #: 3
Date: 7/2/24
Location: 635 509
Soil Map Unit Series:
Horizon: B / C (circle one)

Test hole profile:



Set-Up Calculation	
Hole Depth (cm):	
Distance From Bottom of Bubble:	
Tube to Soil Surface (cm):	
Desired Water Depth In Hole (cm):	
= CHT Tube Setting (cm):	

Outflow Chamber(s) Used (circle one) : Small ("1 on") [✓ Both ("2 on")] <-- "B"
Associated Conversion Factor: (= 20.0cm^2) (= 105.0 cm^2)

A	B				D	E	F
Drop In Water Level	Outflow Chamber	Clock Time	Elapsed Time		Outflow (Q)	Saturated Hydraulic Conductivity (Ksat)	
				C			
(cm)	(C.F.)	(hr : min)	(min)	(min/hr)	(cm^3/hr)	(cm/hr)	(in/hr)
Example:	*20*	*10:17*	*15*	*0.25*	*392*	*0.4139*	*0.1629*
Start (0)							
					Mean Ksat		

Calculation Formulas:

D = (AxB)/C
E = D x 0.001056
F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

F:\Forms, Apps, Regs\Templates\Amoozemeter\Amoozemeter Data Sheet.xlsx

30
1:00
1:30

APPENDIX XI

Stormwater Operations and Maintenance Manual

JONES & BEACH
ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE MANUAL

Luster Cluster
635 Sagamore Ave.
Portsmouth, NH 03801
Tax Map 222, Lot 19

Prepared for:

635 Sagamore Development LLC
3612 Lafayette Rd., Dept 4
Portsmouth, NH 03801

Prepared by:
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746
March 18, 2024
Revised April 15, 2024
Revised August 8, 2024
JBE Project No. 18134.1

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. The Condominium Association, future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. The Association, future owners and assigns shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form and shall submit an Operations and Maintenance report on a yearly basis to the Portsmouth Planning Department by December 31st.

B. General Inspection and Maintenance Requirements

1. Permanent stormwater and sediment and erosion control facilities to be maintained on the site include, but are not limited to, the following:

   a. Roadway and driveways
   b. Vegetation and landscaping
   c. Sediment Forebay
   d. Bioretention system
   e. Catch Basins & Yard Drains
   f. Stone Drip Edges
   g. Stone Underneath Decks
   h. Culverts
   i. Rip-Rap Outlet Protection Aprons
   j. Swale

2. Maintenance of permanent measures shall follow the following schedule:

   a. Normal winter roadway maintenance including plowing and snow removal. Road sweeping at the end of every winter, preferably before the start of the spring rain season.

   b. **Annual inspection** of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately. **Annual inspection** of site's vegetation and landscaping. Any areas that are bare shall be reseeded and mulched with hay or, if the case is extreme, loamed and seeded or sodded to ensure adequate vegetative cover. Landscape specimens shall be replaced in kind, if they are found to be dead or dying.

   c. Cleaning Criteria for all Sedimentation Forebays: Sediment shall be removed from the sedimentation chamber (forebay) when it accumulates to a depth of more than 12 inches (30 cm) or 10 percent of the pretreatment volume. The sedimentation forebay shall be cleaned of vegetation if persistent standing water and wetland vegetation becomes dominant. The cleaning interval is once every year. A dry sedimentation forebay is the optimal condition while in practice this condition is rarely achieved. The sedimentation chamber, forebay, and treatment cell outlet devices shall be cleaned when drawdown times exceed 60 to 72 hours. Materials can be removed with heavy construction equipment; however, this equipment shall not track on the wetland surface. Revegetate disturbed areas as necessary. Removed sediments shall be dewatered (if necessary) and disposed of in an acceptable manner.

d. Bioretention Systems:

- Visually inspect monthly and repair erosion. Use small stones to stabilize erosion along drainage paths.
- Check the pH once a year if grass is not surviving. Apply an alkaline product, such as limestone, if needed.
- Re-seed any bare areas by hand as needed.
- Immediately after the completion of cell construction, water grass for 14 consecutive days unless there is sufficient natural rainfall.
- Once a month (more frequently in the summer), the land owner or Association shall visually inspect vegetation for disease or pest problems and treat as required.
- During times of extended drought, look for physical features of stress. Water in the early morning as needed.
- Weed regularly, if needed.
- After rainstorms, inspect the cell and make sure that drainage paths are clear and that ponding water dissipates over 4-6 hours. (Water may pond for longer times during the winter and early spring.)
- Twice annually, inspect the outlet control structures to ensure that they are not clogged and correct any clogging found as needed.
- Any debris and sediment accumulations shall be removed from the outlet structures, overflow risers, and emergency spillways and disposed of properly.
- Inspect outlet structure for deterioration and or clogging.
- If erosion is evident on the berm or emergency spillway, stabilize the affected area by seeding. Trees must not be allowed to grow in these areas.
- KEEP IN MIND, THE BIORETENTION CELL IS NOT A POND. IT SHALL NOT PROVIDE A BREEDING GROUND FOR MOSQUITOES. MOSQUITOES NEED AT LEAST FOUR (4) DAYS OF STANDING WATER TO DEVELOP AS LARVA.

e. **Annual inspection** of catch basins and yard drains to determine if they need to be cleaned. Catch basins and yard drains are to be cleaned if the depth of deposits is greater than one-half the depth from the basin bottom to the invert of the lowest pipe or opening into or out of the basin. If a catch basin or yard drain significantly exceeds the one-half depth standard during the inspection, then it shall be cleaned more frequently. If woody debris or trash accumulates in the catch basin or yard drain, then it shall be cleaned on a weekly basis. The catch basin or yard drain can be cleaned either manually or by specially designed equipment including, but not limited to, bucket loaders and vacuum pumps. Before any materials can be disposed, it is necessary to perform a detailed chemical analysis to determine if the materials meet the EPA criteria for hazardous waste. This will help determine how the materials shall be stored, treated, and disposed. Grease hoods are to be wiped clean and the rags disposed of properly. Debris obscuring the grate inlet shall also be removed.

f. Stone drip edges:

Units 3 & 4 feature stone drip edges to collect roof runoff into a pipe in order to direct it into the stone areas underneath the unit decks. These practices shall be lined and are not intended for infiltration. The following course of action will help assure that the roof drip edges are maintained to preserve its effectiveness.

In the spring and fall, visually inspect the area around the edges and repair any erosion. Use small stones to stabilize erosion along drainage paths. Inspect stone area to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock shall be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation shall not be allowed to become established in stone areas, and/or any debris removed from the void spaces between the stones

g. Stone underneath decks:

Units 3 and 4 feature stone areas underneath their associated rear decks for infiltration of roof runoff. The following guidelines will help ensure proper functioning of the system.

In the spring and fall, visually inspect the area around the edges and repair any erosion. Use small stones to stabilize erosion along drainage paths. Inspect stone area to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock shall be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation shall not be allowed to become established in stone areas, and/or any debris removed from the void spaces between the stones.

h. **Inspection** of culvert inlets and outlets at least **once per month** during the rainy season (March to November). Any debris is to be removed and disposed of properly.

i. Rock riprap shall be **inspected annually** in order to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock shall be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation must not be allowed to become established in riprap areas, and/or any debris removed from the void spaces between the rocks. If the riprap is adjacent to a stream or other waterbody, the water shall be kept clear of obstructions, debris, and sediment deposits

j. Swale – There is a swale on the north side of Unit 3, leading to the bioretention pond. Inspect swale annually for erosion, sediment accumulation, vegetation loss, and presence of invasive species. Perform periodic mowing; frequency depends on location and type of grass. Remove debris and accumulated sediment, based on inspection. Repair eroded areas, remove invasive species and dead vegetation, and reseed as warranted by inspection

See attached sample forms as a guideline.

Any inquiries in regards to the design, function, and/or maintenance of any one of the above-mentioned facilities or tasks shall be directed to the project engineer:

Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885

T#: (603) 772-4746
F#: (603) 772-0227

Commitment to maintenance requirements

I agree to complete and/or observe all of the required maintenance practices and their respective schedules as outlined above.

____

Signature

____

Print Name

____

Title

____

Date

Annual Operations and Maintenance Report

The Condominium Association, future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. The Association, future owners and assigns shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form and shall submit an Operations and Maintenance report on a yearly basis to the Portsmouth Planning Department by December 31st.

Construction Activity	**Date of Inspection**	**Who Inspected**	**Findings of Inspector**
Roadway and Driveways			
Vegetation and Landscaping			
Sediment Forebay			
Bioretention Pond			
Catch Basins & Yard Drains			

Unit 3 Stone Drip Edge			
Unit 4 Stone Drip Edge			
Stone underneath unit 3 deck			
Stone underneath unit 4 deck			
Culverts			
Rip Rap Outlet Protection			
Swale			

Other (please note):			

Regular Inspection and Maintenance Guidance for Bioretention Systems / Tree Filters

Maintenance of bioretention systems and tree filters can typically be performed as part of standard landscaping. Regular inspection and maintenance is critical to the effective operation of bioretention systems and tree filters to insure they remain clear of leaves and debris and free draining. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, overly wet or dry (I.E., drought), regional hydrologic conditions, and the upstream land use.

ACTIVITIES

The most common maintenance activity is the removal of leaves from the system and bypass structure. Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Mulch and/or vegetation coverage is integral to the performance of the system, including infiltration rate and nutrient uptake. Vegetation care is important to system productivity and health.

ACTIVITY	FREQUENCY
A record should be kept of the time to drain for the system completely after a storm event. The system should drain completely within 72 hours.	After every major storm in the first few months, then biannually.
Check to insure the filter surface remains well draining after storm event. **Remedy**: If filter bed is clogged, draining poorly, or standing water covers more than 15% of the surface 48 hours after a precipitation event, then remove top few inches of discolored material. Till or rake remaining material as needed.	
Check inlets and outlets for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet and overflow if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
Check for animal burrows and short circuiting in the system **Remedy**: Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted.	
Check to insure the filter bed does not contain more than 2 inches accumulated material **Remedy**: Remove sediment as necessary. If 2 inches or more of filter bed has been removed, replace media with either mulch or a (50% sand, 20% woodchips, 20% compost, 10% soil) mixture.	
During extended periods without rainfall, inspect plants for signs of distress. **Remedy**: Plants should be watered until established (typical only for first few months) or as needed thereafter.	
Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy**: Repair or replace any damaged structural parts, inlets, outlets, sidewalls.	Annually
Check for robust vegetation coverage throughout the system. **Remedy**: If at least 50% vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
Check for dead or dying plants, and general long term plant health. **Remedy**: This vegetation should be cut and removed from the system. If woody vegetation is present, care should be taken to remove dead or decaying plant Material. Separation of Herbaceous vegetation rootstock should occur when overcrowding is observed.	As needed

1/15/2011, University of New Hampshire Stormwater Center

CHECKLIST FOR INSPECTION OF BIORETENTION SYSTEM / TREE FILTERS

Location: Inspector:

Date: Time: Site Conditions:

Date Since Last Rain Event:

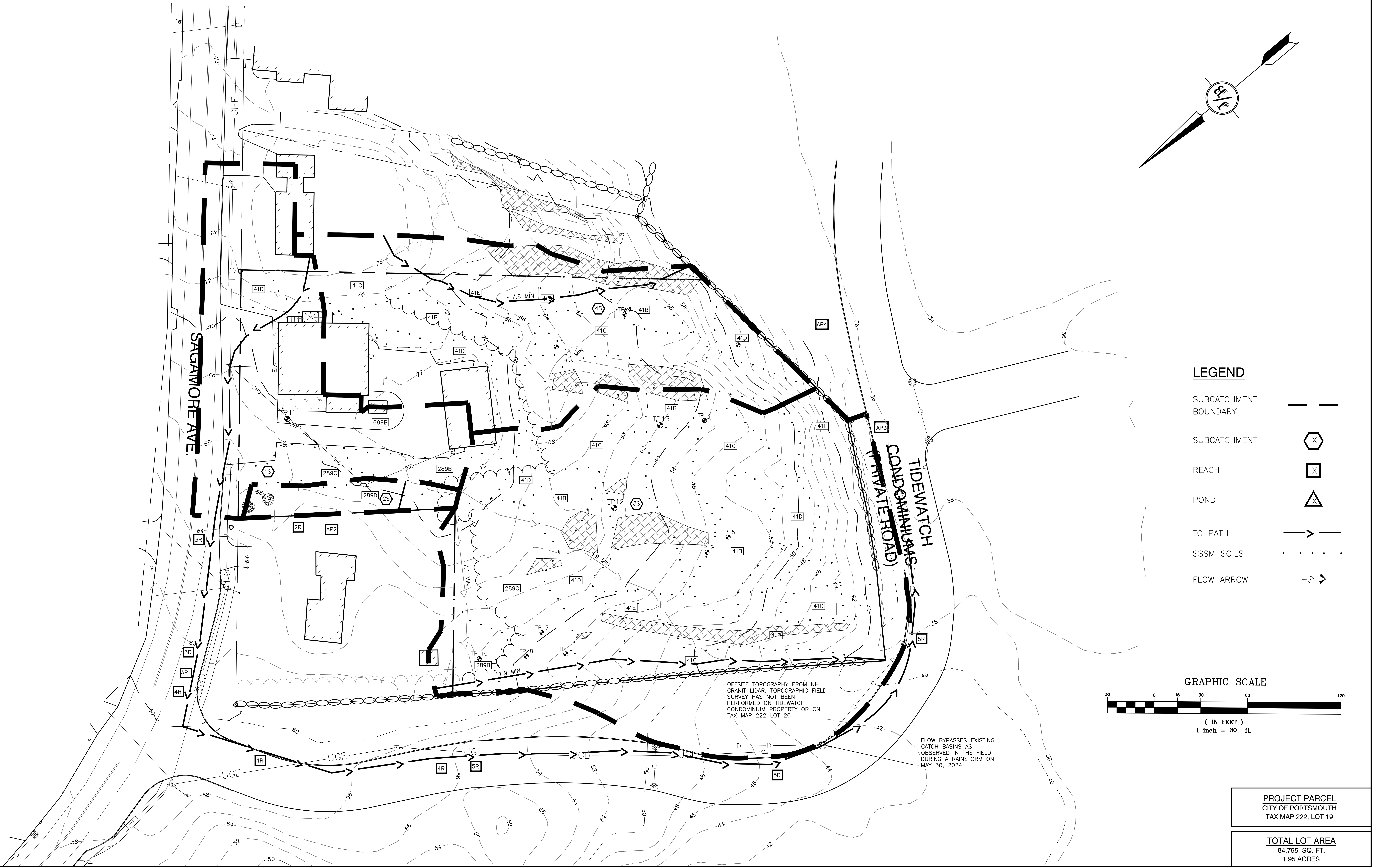
Inspection Items	**Satisfactory (S) or Unsatisfactory (U)**	**Comments/Corrective Action**
1. Initial Inspection After Planting and Mulching		
Plants are stable, roots not exposed	**S U**	
Surface is at design level, typically 4” below overpass	**S U**	
Overflow bypass / inlet (if available) is functional	**S U**	
2. Debris Cleanup (2 times a year minimum, Spring & Fall)		
Litter, leaves, and dead vegetation removed from the system	**S U**	
Prune perennial vegetation	**S U**	
3. Standing Water (1 time a year, After large storm events)		
No evidence of standing water after 72 hours	**S U**	
4. Short Circuiting & Erosion (1 time a year, After large storm events)		
No evidence of animal burrows or other holes	**S U**	
No evidence of erosion	**S U**	
5. Drought Conditions (As needed)		
Water plants as needed	**S U**	
Dead or dying plants		
6. Overflow Bypass / Inlet Inspection (1 time a year, After large storm events)		
No evidence of blockage or accumulated leaves	**S U**	
Good condition, no need for repair	**S U**	
7. Vegetation Coverage (once a year)		
50% coverage established throughout system by first year	**S U**	
Robust coverage by year 2 or later	**S U**	
8. Mulch Depth (if applicable)(once every 2 years)		
Mulch at original design depth after tilling or replacement	**S U**	
9. Vegetation Health (once every 3 years)		
Dead or decaying plants removed from the system	**S U**	
10. Tree Pruning (once every 3 years)		
Prune dead, diseased, or crossing branches	**S U**	

Corrective Action Needed	**Due Date**
1.	
2.	
3.	

1/15/2011, University of New Hampshire Stormwater Center

APPENDIX XII

Pre- and Post-Construction Watershed Plans



OFFSITE TOPOGRAPHY FROM NH GRANIT LIDAR. TOPOGRAPHIC FIELD SURVEY HAS NOT BEEN PERFORMED ON TIDEWATCH CONDOMINIUM PROPERTY OR ON TAX MAP 222 LOT 20

FLOW BYPASSES EXISTING CATCH BASINS AS OBSERVED IN THE FIELD DURING A RAINSTORM ON MAY 30, 2024.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: DJM	Date: 2/26/2024
Checked: PSL	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134-WATERSHED.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

DANIEL JAMES MEDITZ
No.18152
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/8/24	ISSUED FOR REVIEW	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING WATERSHED PLAN
Project: "LUSTER CLUSTER"
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
W1
SHEET 1 OF 2
JBE PROJECT NO. 18134.1

OFFSITE TOPOGRAPHY FROM NH GRANIT LIDAR. TOPOGRAPHIC FIELD SURVEY HAS NOT BEEN PERFORMED ON TIDEWATCH CONDOMINIUM PROPERTY OR ON TAX MAP 222 LOT 20

FLOW BYPASSES EXISTING CATCH BASINS AS OBSERVED IN THE FIELD DURING A RAINSTORM ON MAY 30, 2024.

LEGEND

SUBCATCHMENT BOUNDARY	— —
SUBCATCHMENT	⬡ X
REACH	☒
POND	△ X
TC PATH	—> —
SSSM SOILS	· · · ·
FLOW ARROW	⤳

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: DJM	Date: 2/26/2024
Checked: PSL	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134-WATERSHED.dwg		

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DANIEL JAMES MEDITZ No.18152
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/8/24	ISSUED FOR REVIEW	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: **PROPOSED WATERSHED PLAN**

Project: "LUSTER CLUSTER"
635 SAGAMORE AVE., PORTSMOUTH, NH

Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

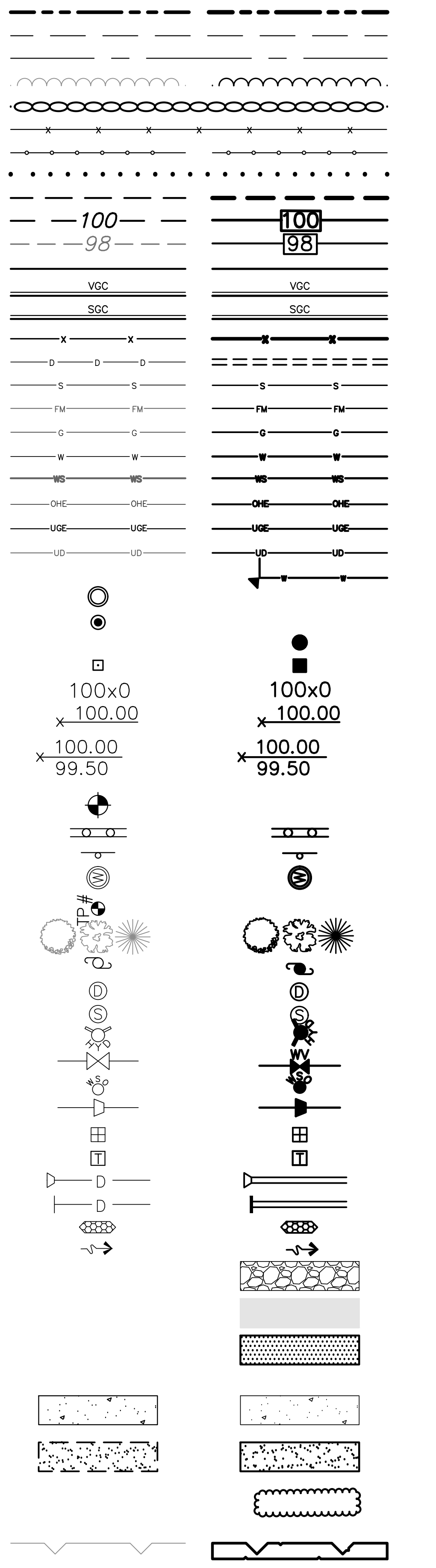
DRAWING No.
W2
SHEET 2 OF 2
JBE PROJECT NO. 18134.1

SINGLE FAMILY CONDOMINIUM
"LUSTER CLUSTER"
TAX MAP 222, LOT 19
635 SAGAMORE AVE., PORTSMOUTH, NH

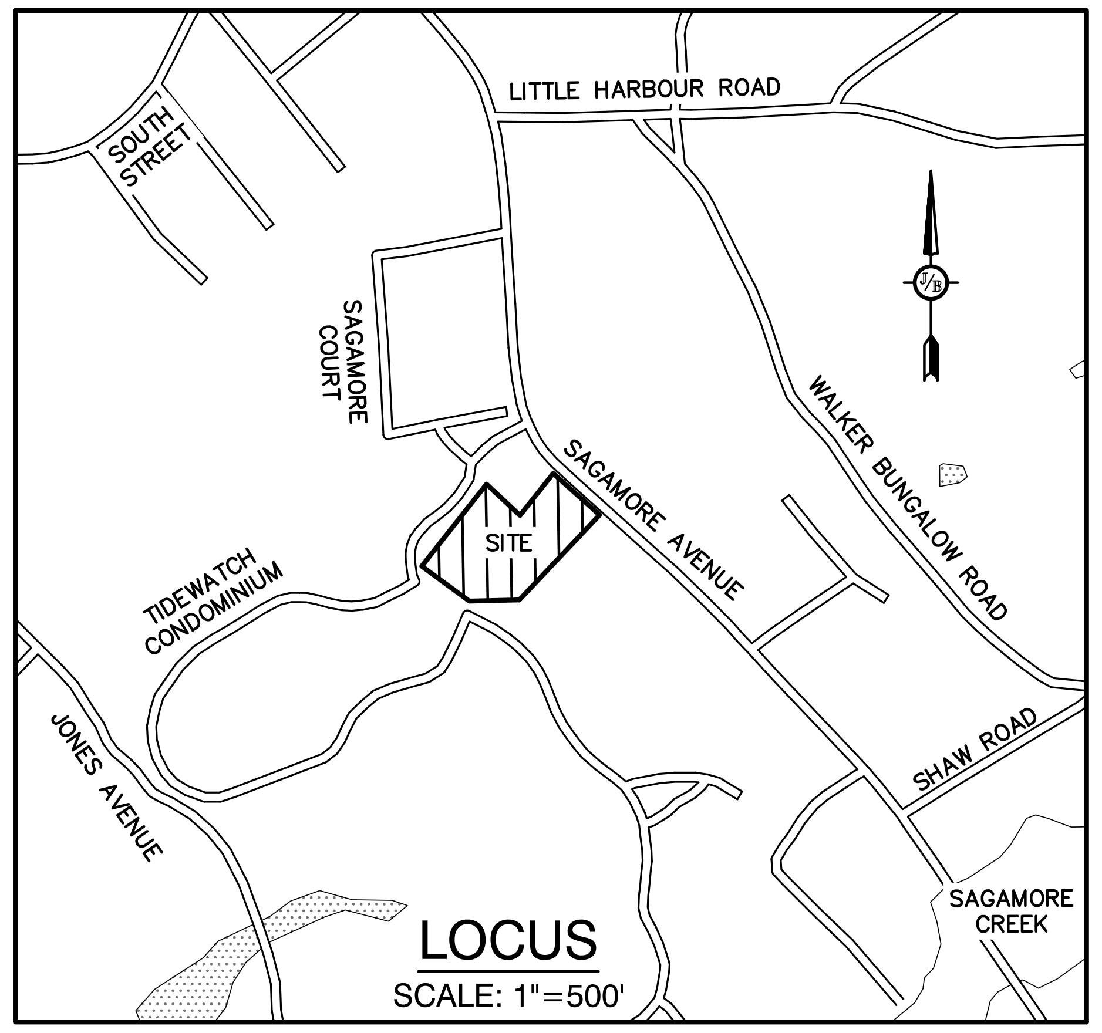
Know what's **below**
811 before you dig

GENERAL LEGEND

EXISTING | PROPOSED | DESCRIPTION



- PROPERTY LINES
- SETBACK LINES
- CENTERLINE
- TREE LINE
- STONEWALL
- BARBED WIRE
- FENCE
- SOIL BOUNDARY
- EASEMENT
- MAJOR CONTOUR
- MINOR CONTOUR
- EDGE OF PAVEMENT
- VERTICAL GRANITE CURB
- SLOPE GRANITE CURB
- FIBER BERM
- DRAINAGE LINE
- SEWER LINE
- SEWER FORCE MAIN
- GAS LINE
- WATER LINE
- WATER SERVICE
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERDRAIN
- THRUST BLOCK
- IRON PIPE/IRON ROD
- DRILL HOLE
- IRON ROD/DRILL HOLE
- STONE/GRANITE BOUND
- SPOT GRADE
- PAVEMENT SPOT GRADE
- CURB SPOT GRADE
- BENCHMARK (TBM)
- DOUBLE POST SIGN
- SINGLE POST SIGN
- WELL
- TEST PIT
- TREES AND BUSHES
- UTILITY POLE
- DRAIN MANHOLE
- SEWER MANHOLE
- HYDRANT
- WATER GATE VALVE
- WATER SHUT OFF
- REDUCER
- SINGLE GRATE CATCH BASIN
- TRANSFORMER
- CULVERT W/FLARED END SECTION
- CULVERT W/STRAIGHT HEADWALL
- STONE CHECK DAM
- DRAINAGE FLOW DIRECTION
- RIPRAP
- PAVEMENT HATCH
- STABILIZED CONSTRUCTION ENTRANCE
- CONCRETE
- GRAVEL
- SNOW STORAGE
- RETAINING WALL



LOCUS
SCALE: 1"=500'

CIVIL ENGINEER / SURVEYOR
JONES & BEACH ENGINEERS, INC.
85 PORTSMOUTH AVENUE
PO BOX 219
STRATHAM, NH 03885
(603) 772-4746
CONTACT: JOSEPH CORONATI
EMAIL: JCORONATI@JONESANDBEACH.COM

TRAFFIC ENGINEER
STEPHEN G. PERNAW & COMPANY, INC.
P.O. BOX 1721
CONCORD, NH 03302
(603) 731-8500
CONTACT: STEPHEN PERNAW

SOILS CONSULTANT
GOVE ENVIRONMENTAL SERVICES, INC.
8 CONTINENTAL DRIVE, BLDG 2, UNIT H
EXETER, NH 03833-7507
(603) 418-7260
CONTACT: JAMES GOVE
EMAIL: JGOVE@GESINC.BIZ

LANDSCAPE DESIGNER
LM LAND DESIGN, LLC
11 SOUTH ROAD
BRENTWOOD, NH 03833
(603) 770-7728
CONTACT: LISE MCNAUGHTON

WATER
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS
WATER DIVISION
680 PEVERLY HILL ROAD
PORTSMOUTH, NH 03801
(603) 427-1530

SEWER
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS
SEWER DIVISION
680 PEVERLY HILL ROAD
PORTSMOUTH, NH 03801
(603) 766-1421

LIGHTING DESIGN
EXPOSURE LIGHTING
501 ISLINGTON STREET,UNIT 1A
PORTSMOUTH, NH 03801
CONTACT: KEN SWEENEY

ELECTRIC
EVERSOURCE
1700 LAFAYETTE ROAD
PORTSMOUTH, NH 03801
(800) 662-7764

TELEPHONE
CONSOLIDATED COMMUNICATIONS
1575 GREENLAND ROAD
GREENLAND, NH 03840
(800) 427-5525

CABLE TV
COMCAST COMMUNICATION CORPORATION
334-B CALEF HIGHWAY
EPPING, NH 03042-2325
(603) 679-5695

SHEET INDEX

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON ______________ DATE ______________

Design: DJM | Draft: KDR | Date: 2/26/2024
Checked: JAC | Scale: AS NOTED | Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
08/20/2024

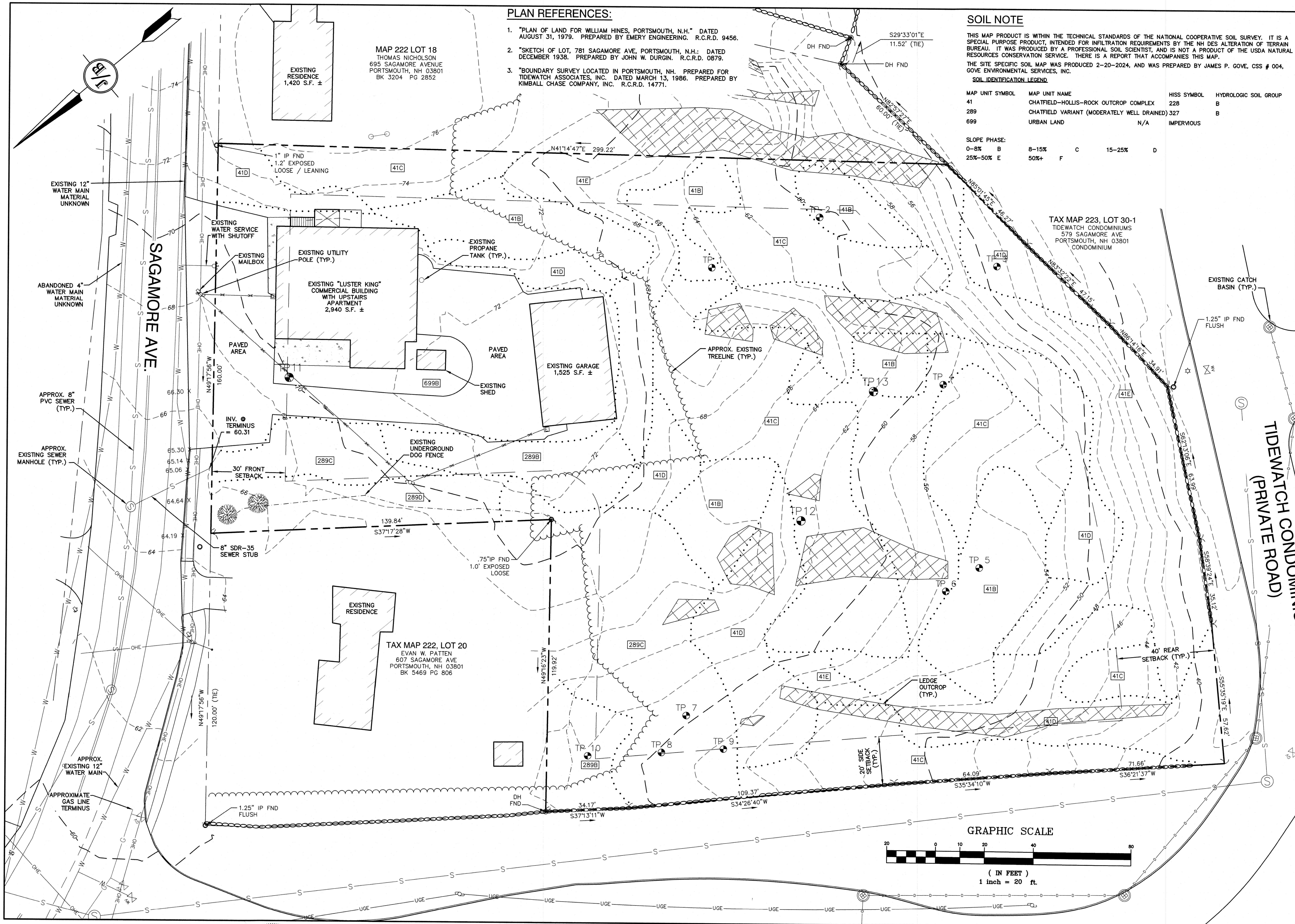
REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: COVER SHEET
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
CS
SHEET 1 OF 20
JBE PROJECT NO. 18134.1

635 SAGAMORE AVE, PORTSMOUTH, NH
JBE # 18134.1 REVISION 2, 8/16/24



PLAN REFERENCES:

1. "PLAN OF LAND FOR WILLIAM HINES, PORTSMOUTH, N.H." DATED AUGUST 31, 1979. PREPARED BY EMERY ENGINEERING. R.C.R.D. 9456.
2. "SKETCH OF LOT, 781 SAGAMORE AVE, PORTSMOUTH, N.H.: DATED DECEMBER 1938. PREPARED BY JOHN W. DURGIN. R.C.R.D. 0879.
3. "BOUNDARY SURVEY LOCATED IN PORTSMOUTH, NH. PREPARED FOR TIDEWATCH ASSOCIATES, INC. DATED MARCH 13, 1986. PREPARED BY KIMBALL CHASE COMPANY, INC. R.C.R.D. 14771.

SOIL NOTE

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION OF TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP.

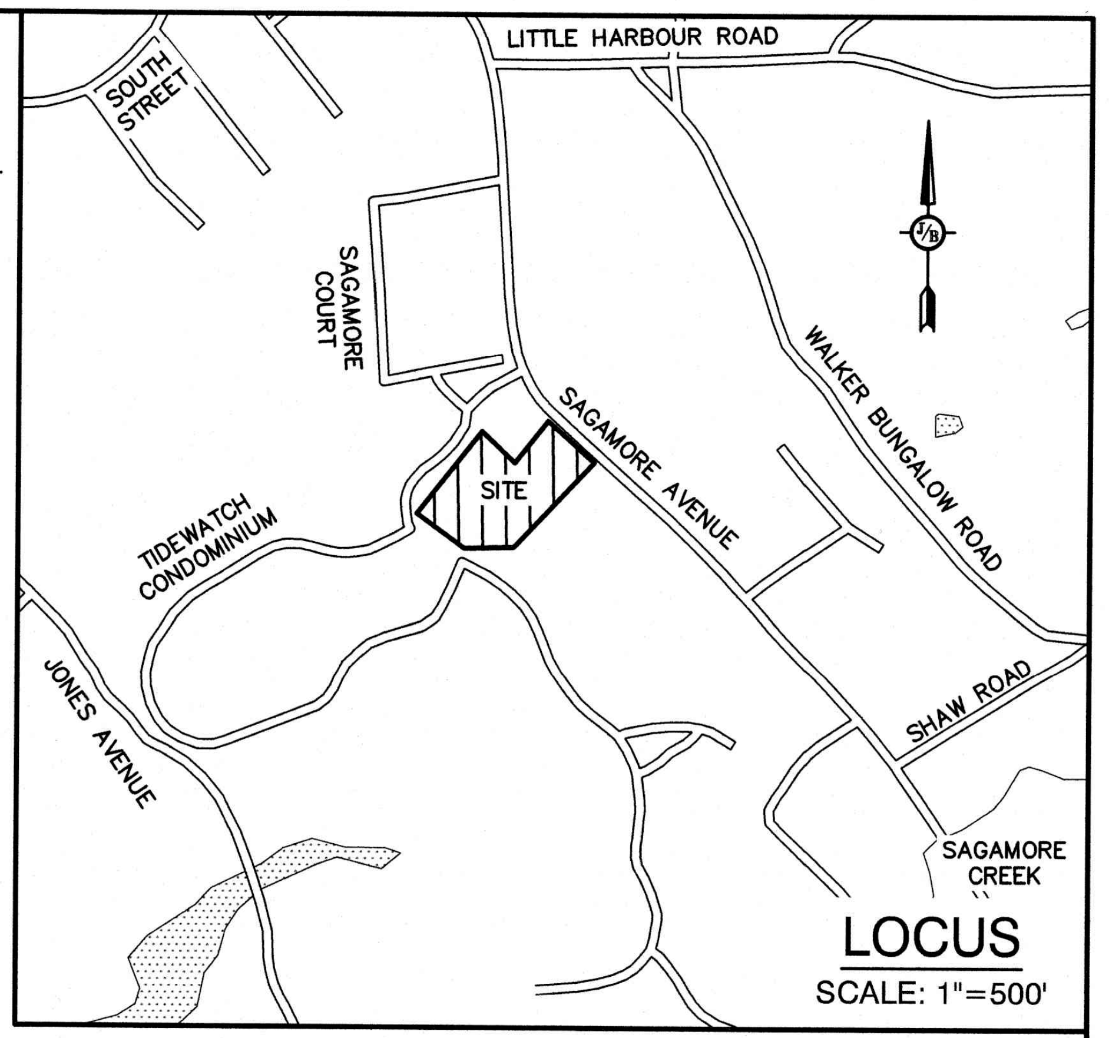
THE SITE SPECIFIC SOIL MAP WAS PRODUCED 2-20-2024, AND WAS PREPARED BY JAMES P. GOVE, CSS # 004, GOVE ENVIRONMENTAL SERVICES, INC.

SOIL IDENTIFICATION LEGEND

MAP UNIT SYMBOL	MAP UNIT NAME	HISS SYMBOL	HYDROLOGIC SOIL GROUP
41	CHATFIELD-HOLLIS-ROCK OUTCROP COMPLEX	228	B
289	CHATFIELD VARIANT (MODERATELY WELL DRAINED)	327	B
699	URBAN LAND	N/A	IMPERVIOUS

SLOPE PHASE:

0-8%	B	8-15%	C	15-25%	D
25%-50%	E	50%+	F		



LOCUS

SCALE: 1"=500'

ABUTTERS ACROSS 635 SAGAMORE AVE.:

TAX MAP 222, LOT 14
JOHN O'SULLIVAN
DENISE BROWN
692 SAGAMORE AVE
PORTSMOUTH, NH 03801
BK 2350 PG 181

TAX MAP 222, LOT 14-1
BROWN FAMILY REV. TRUST
VINCENT A. & LINDA M. BROWN, TRUSTEES
DENISE BROWN
650 SAGAMORE AVE
PORTSMOUTH, NH 03801
BK 6074 PG 238

EXISTING CONDITIONS NOTES:

1. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 1-888-DIG-SAFE (1-888-344-7233).
2. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING FEATURES LOCATED ON CITY OF PORTSMOUTH TAX MAP 222, LOT 19.
3. VERTICAL DATUM: NAVD88. HORIZONTAL DATUM: NH STATE PLANE
4. SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
5. NO WETLANDS WERE OBSERVED WITHIN 100' OF THE PROPERTY BOUNDARY. SEE LETTER FROM GOVE ENVIRONMENTAL SERVICES, INC.
6. SURVEY TIE LINES SHOWN HEREON ARE NOT BOUNDARY LINES. THEY SHOULD ONLY BE USED TO LOCATE THE PARCEL SURVEYED FROM THE FOUND MONUMENTS SHOWN AND LOCATED BY THIS SURVEY.

CERTIFICATION:

PURSUANT TO RSA 676:18-III AND RSA 672:14

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

I CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN UNADJUSTED LINEAR ERROR OF CLOSURE THAT EXCEED BOTH THE MINIMUM OF 1:10,000 AS DEFINED IN SECTION 503.04 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES AND THE MINIMUM OF 1:15,000 AS DEFINED IN SECTION 4.2 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

THIS SURVEY CONFORMS TO A CATEGORY 1 CONDITION 1 SURVEY AS DEFINED IN SECTION 4.1 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

No. 1030 MATTHEW J. SALVUCCI

SIGNATURE

8/21/24

MATTHEW J. SALVUCCI, LLS 1030 DATE:
ON BEHALF OF JONES & BEACH ENGINEERS, INC.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

DANIEL JAMES MEDITZ No.18152

08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING CONDITIONS PLAN

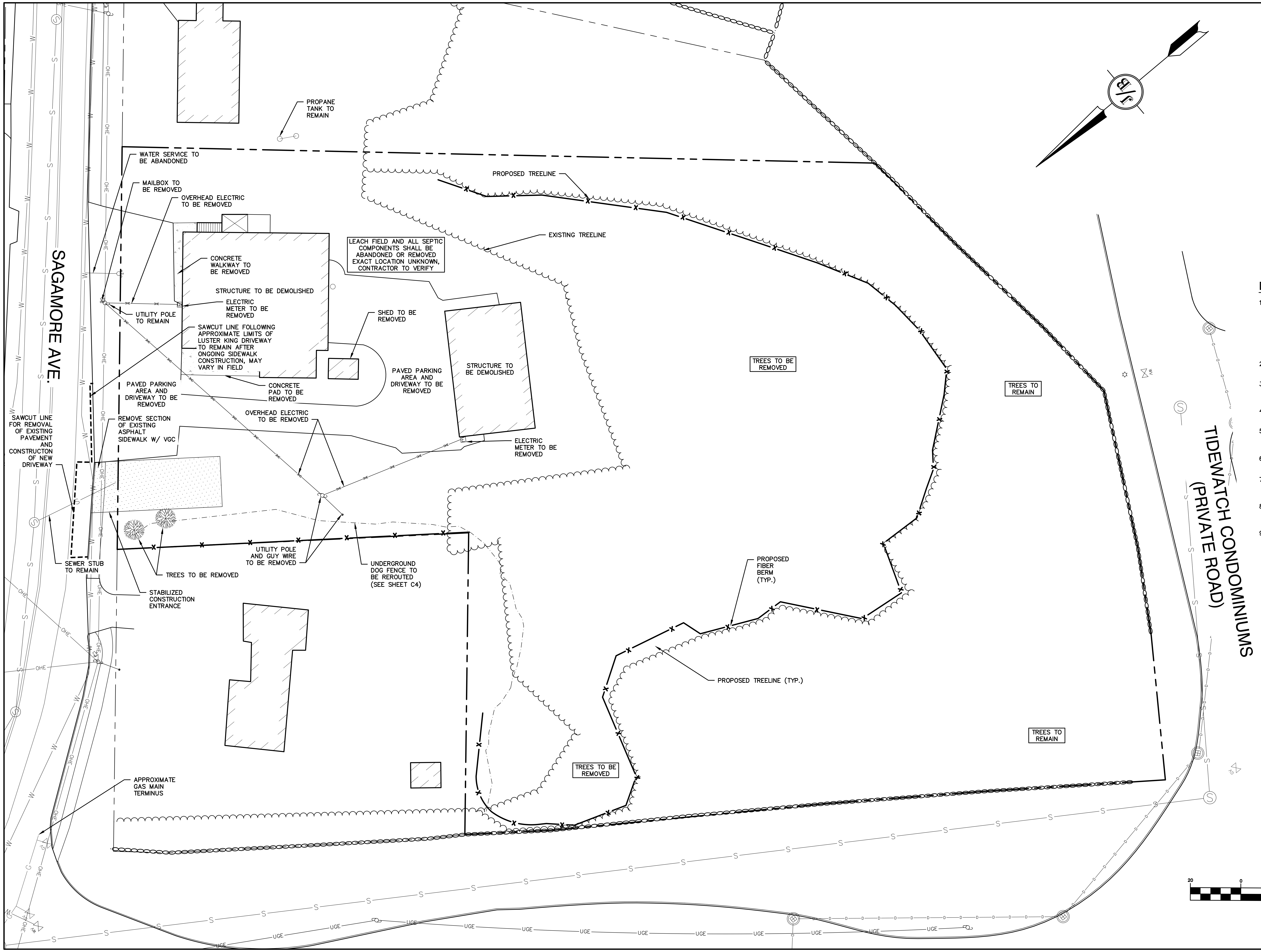
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH

Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

C1

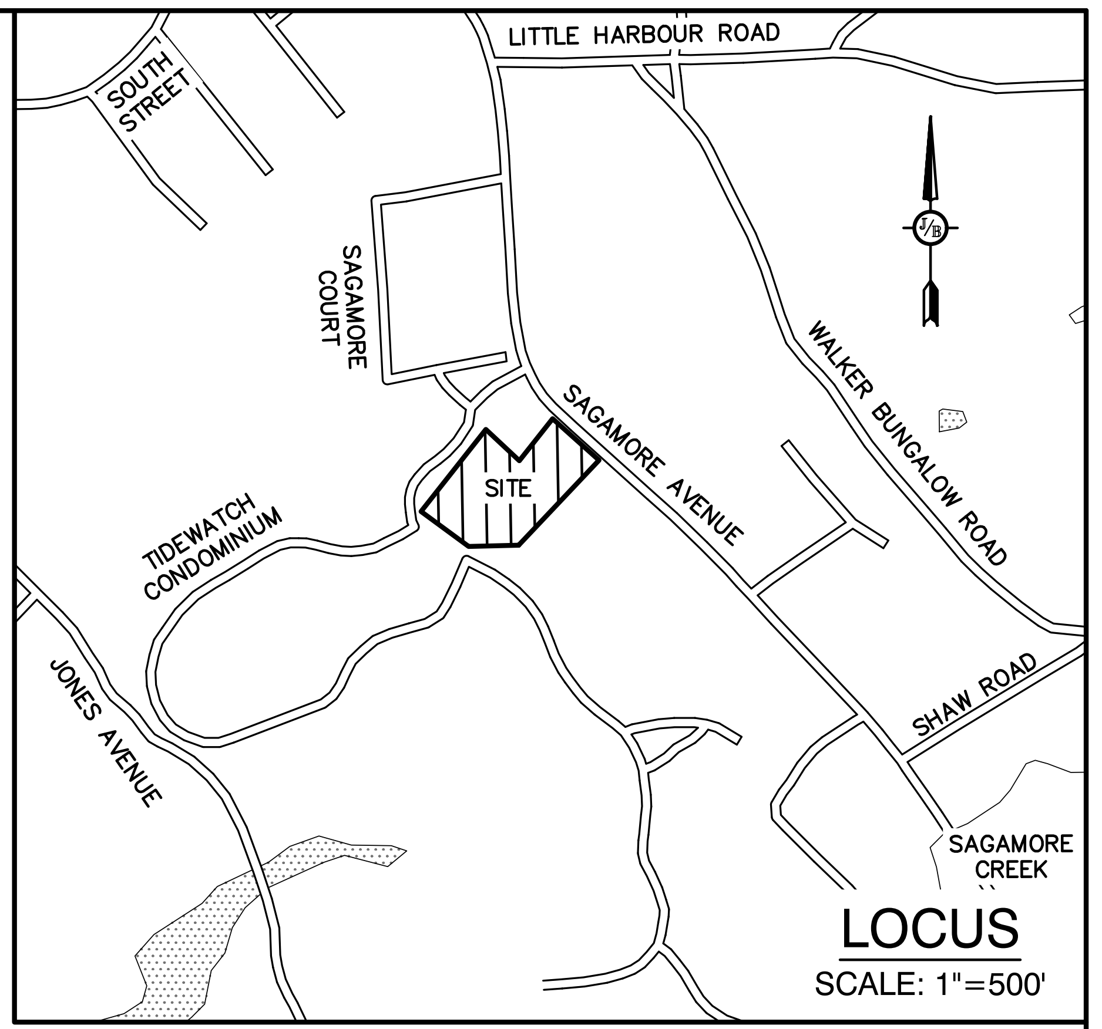
SHEET 2 OF 20
JBE PROJECT NO. 18134.1



GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.



LOCUS

SCALE: 1"=500'

DEMOLITION NOTES:

1. THIS PLAN IS INTENDED TO PROVIDE MINIMUM GUIDELINES FOR SITE DEMOLITION. IT SHOULD BE NOTED THAT ALL MANMADE FEATURES, PAVEMENT, SIGNS, POLES, CURBING, CONCRETE WALKS, UTILITIES, ETC., SHALL BE REMOVED AS NECESSARY TO CONSTRUCT WORK, UNLESS OTHERWISE NOTED TO REMAIN. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCIES FROM DATA AS SHOWN ON DESIGN PLANS. THIS INCLUDES ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS OF THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED.
2. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO HAVE THE PROJECT LAND SURVEYOR STAKE OR FLAG CLEARING LIMITS. A MINIMUM OF 48 HOURS NOTICE IS REQUIRED.
3. ALL EXISTING STRUCTURES WITHIN THE CONSTRUCTION AREA, UNLESS OTHERWISE NOTED TO REMAIN, SHALL BE REMOVED AND DISPOSED OF OFF-SITE IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL GUIDELINES. ANY BURNING ON-SITE SHALL BE SUBJECT TO LOCAL ORDINANCES.
4. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL CONTAMINATED MATERIAL LOCATED IN THE AREA OF EXISTING LEACHFIELDS IN ACCORDANCE WITH LOCAL AND STATE REGULATIONS.
5. ALL CURBING, CONCRETE, PAVEMENT, BUILDINGS AND SUBBASE MATERIALS LOCATED WITHIN PROPOSED LANDSCAPED AREAS SHALL BE REMOVED AND REPLACED WITH LOAM MATERIALS SUITABLE FOR LANDSCAPING IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS. (SEE ALSO LANDSCAPE PLAN).
6. THE CONTRACTOR SHALL OBTAIN TREE CLEARING PERMIT FROM LOCAL AND STATE AUTHORITIES PRIOR TO START OF CONSTRUCTION (IF REQUIRED).
7. IN AREAS WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED.
8. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO CONSTRUCTION AND ANY EARTH MOVING OPERATIONS. FIBER BERM SHALL BE INSTALLED AT THE LIMITS OF IMPACT AREAS ACCORDING TO THE DETAILS SHOWN ON SHEET E1.
9. EXCAVATED MATERIALS WILL BE PLACED WITHIN UPLAND AREAS AS FILL MATERIAL OR HAULED OFF-SITE FOR DISPOSAL IN AN APPROPRIATE UPLAND LOCATION.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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DANIEL JAMES MEDITZ
No.18152
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

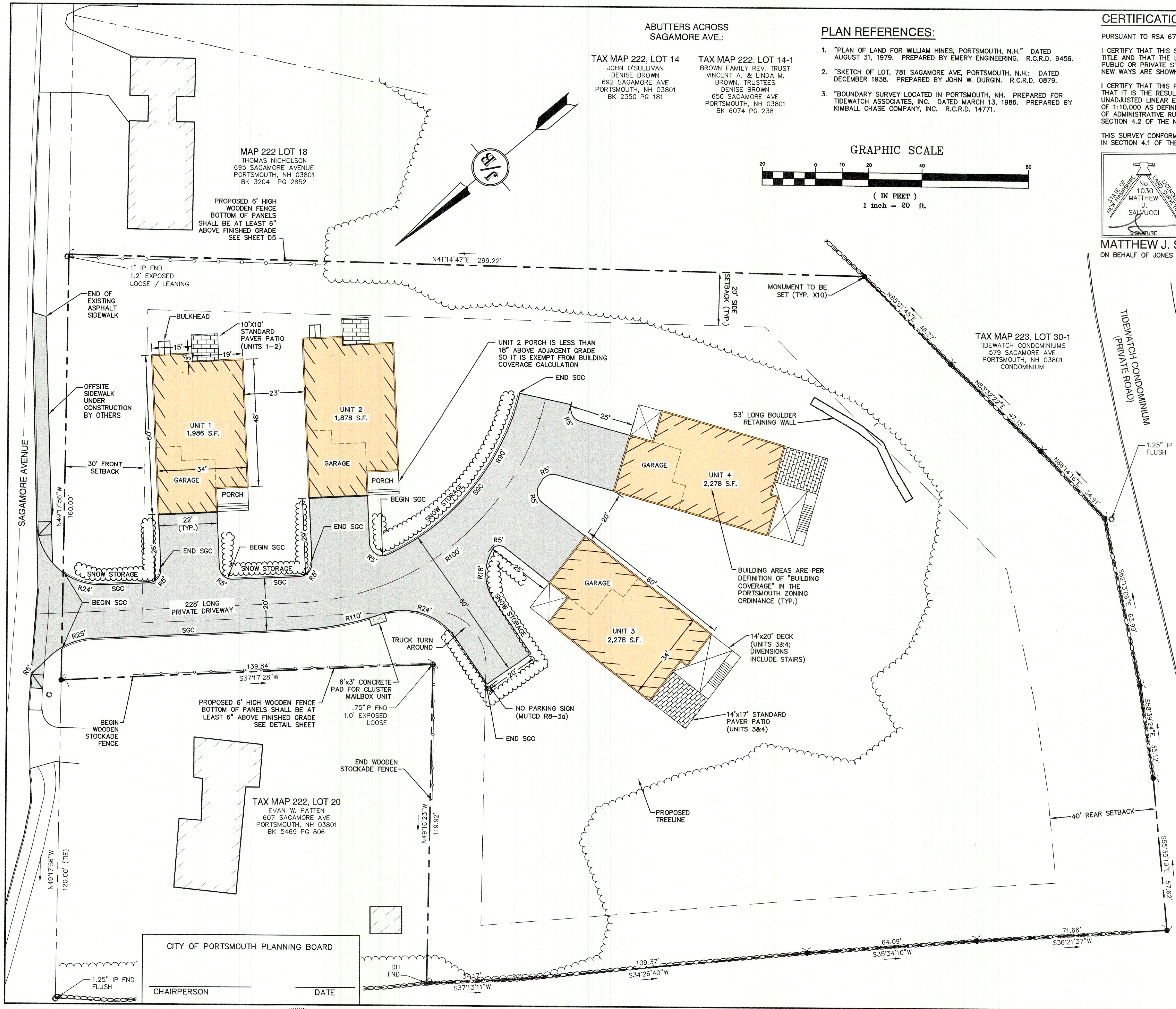
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DEMOLITION PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

DM-1

SHEET 3 OF20
JBE PROJECT NO. 18134.1



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2. "SKETCH OF LOT, 781 SAGAMORE AVE, PORTSMOUTH, N.H.: DATED DECEMBER 1938. PREPARED BY JOHN W. DURGIN. R.C.R.D. 0879.
3. "BOUNDARY SURVEY LOCATED IN PORTSMOUTH, NH. PREPARED FOR TIDEWATCH ASSOCIATES, INC. DATED MARCH 13, 1986. PREPARED BY KIMBALL CHASE COMPANY, INC. R.C.R.D. 14771.

CERTIFICATION:

PURSUANT TO RSA 676:18–III AND RSA 672:14

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

I CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN UNADJUSTED LINEAR ERROR OF CLOSURE THAT EXCEED BOTH THE MINIMUM OF 1:10,000 AS DEFINED IN SECTION 503.04 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES AND THE MINIMUM OF 1:15,000 AS DEFINED IN SECTION 4.2 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

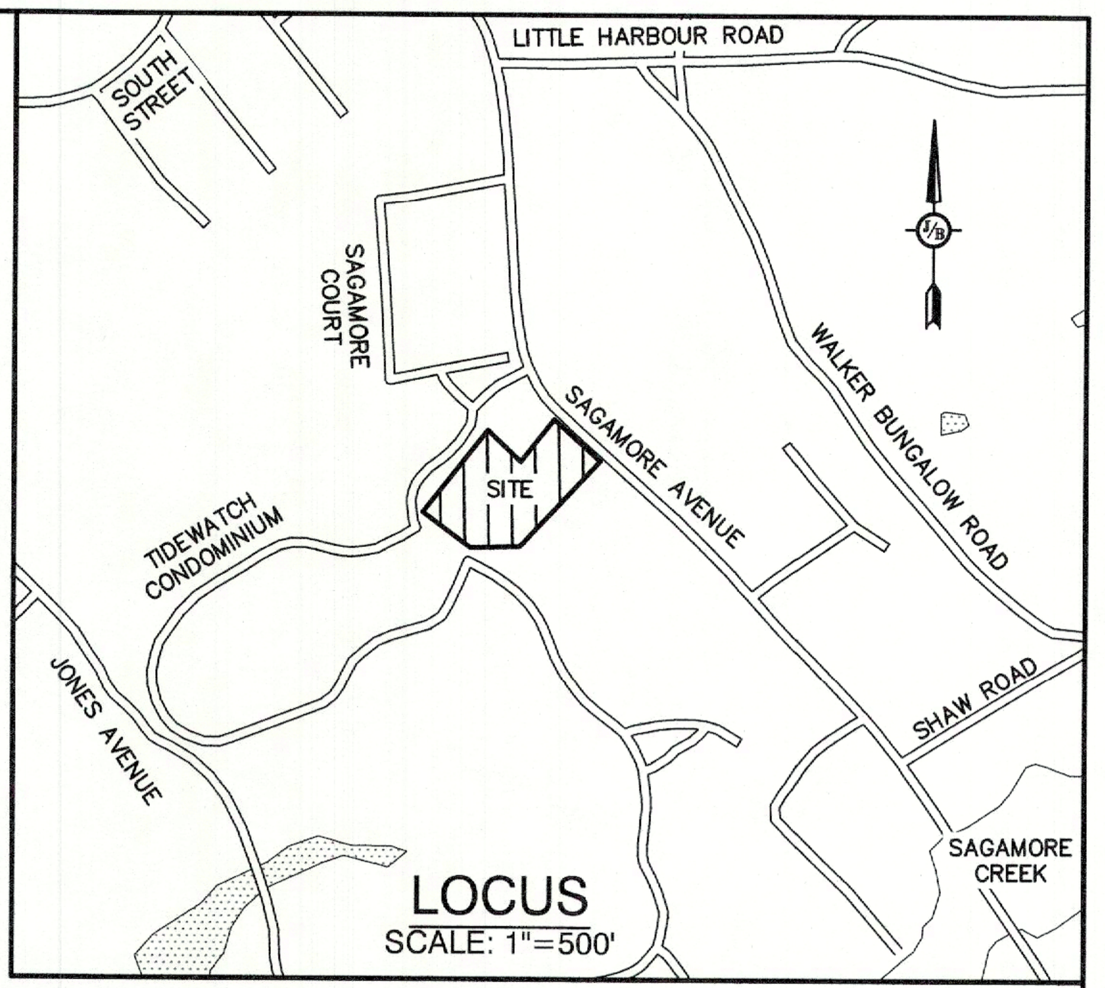
THIS SURVEY CONFORMS TO A CATEGORY 1 CONDITION 1 SURVEY AS DEFINED IN SECTION 4.1 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

No. 1030 MATTHEW J. SALVUCCI

SIGNATURE

8/21/24

MATTHEW J. SALVUCCI, LLS 1030 DATE:
ON BEHALF OF JONES & BEACH ENGINEERS, INC.



LOCUS
SCALE: 1"=500'

SITE NOTES:

1. THE INTENT OF THIS PLAN IS TO REMOVE EXISTING STRUCTURES AND CONSTRUCT A 4–UNIT MULTI–FAMILY RESIDENTIAL DEVELOPMENT.
2. ZONING DISTRICT: SINGLE RESIDENCE A (SRA)
   LOT AREA MINIMUM = 1 ACRE
   LOT FRONTAGE MINIMUM = 150'
   LOT DEPTH MINIMUM = 200'
   BUILDING SETBACKS (MINIMUM):
      FRONT SETBACK = 30'
      SIDE SETBACK = 20'
      REAR SETBACK = 40'
      WETLAND SETBACK = 100' FROM WETLANDS GREATER THAN 10,000 S.F.
   MAX. BUILDING HEIGHT = 35' FOR SLOPED ROOF; 30' FOR FLAT ROOF
   MAX. BUILDING COVERAGE = 10%
   BUILDING COVERAGE PROPOSED = 8,420 S.F. = 9.9%
   MAX. DENSITY = 1 DWELLING UNIT / ACRE
   DENSITY PROPOSED = 4 DWELLING UNITS / 1.947 AC. = 2.05 UNITS / ACRE
   (1 UNIT / 21,248 S.F.)
   MIN. OPEN SPACE = 50%
   OPEN SPACE PROPOSED = 68,700 S.F. = 80.0%
3. PARKING CALCULATIONS:
   DWELLING UNIT FLOOR AREA OVER 750 S.F. – 1.3 SPACES REQUIRED PER UNIT
   1.3 * 4 DWELLING UNITS = 5.2 SPACES REQUIRED
   2 SPACES IN GARAGE + 2 SPACES IN DRIVEWAY PER UNIT = 4 SPACES PER UNIT * 4 UNITS
   16 SPACES PROVIDED
   ONE BICYCLE SPACE PROVIDED IN EACH GARAGE (1 REQUIRED FOR EVERY 5 DWELLING UNITS PER ZONING)
4. ON MAY 23, 2023, THE PORTSMOUTH, NH ZONING BOARD OF ADJUSTMENT VOTED TO APPROVE VARIANCES FROM THE FOLLOWING SECTIONS OF THE ZONING ORDINANCE:
   A) SECTION 10.513 – TO PERMIT MORE THAN ONE FREE–STANDING DWELLING ON A LOT
   B) SECTION 10.521 – TO PERMIT LESS THAN ONE ACRE PER DWELLING UNIT
5. NHDES SEWER CONNECTION PERMIT NO. , DATED .
6. AS DETERMINED IN THE FIELD BY BRENDEN WALDEN, CWS AND MIKE CUOMO, CWS, THE WETLAND ON THE TIDEWATCH CONDOMINIUM PROPERTY IS FAR OFFSITE AND IT IS APPARENT THAT THE PROPOSED DISTURBANCE WILL BE OUTSIDE OF ITS ASSOCIATED 100 FOOT BUFFER.
7. THIS PLAN SET HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC., FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON–SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA AS SHOWN ON THE DESIGN PLANS, INCLUDING ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS ON THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON–SITE CONDITIONS, MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED. CONTRACTOR TO ALWAYS CONTACT DIG SAFE PRIOR TO DIGGING ONSITE OR OFFSITE TO ENSURE SAFETY AND OBEY THE LAW.
8. ALL CONSTRUCTION SHALL CONFORM TO TOWN STANDARDS AND REGULATIONS, AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.
9. SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
10. LANDOWNERS ARE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WETLAND REGULATIONS, INCLUDING PERMITTING REQUIRED UNDER THESE REGULATIONS.
11. ALL CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (S.W.P.P.P.). THIS DOCUMENT IS TO BE KEPT ONSITE AT ALL TIMES AND UPDATED AS REQUIRED.
12. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, FEES AND BONDS.
13. ALL SIGNAGE AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) AND NHDOT STANDARDS AND SPECIFICATIONS (NON–REFLECTORIZED PAVEMENT MARKINGS), UNLESS OTHERWISE NOTED.
14. ALL BUILDING DIMENSIONS SHALL BE VERIFIED WITH THE ARCHITECTURAL AND STRUCTURAL PLANS PROVIDED BY THE OWNER. ANY DISCREPANCIES SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND OWNER PRIOR TO THE START OF CONSTRUCTION. BUILDING DIMENSIONS AND AREAS TO BE TO OUTSIDE OF MASONRY, UNLESS OTHERWISE NOTED.
15. SNOW TO BE STORED AT EDGE OF PAVEMENT AND IN AREAS SHOWN ON THE PLANS, OR TRUCKED OFFSITE TO AN APPROVED SNOW DUMPING LOCATION.
16. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
17. AN ACCESS EASEMENT SHALL BE GRANTED TO THE CITY OF PORTSMOUTH FOR ACCESS AND LEAK DETECTION OF THE WATER MAIN, SHUTOFFS, AND METERS ON THE PROPERTY. EASEMENT DESCRIPTION MUST BE APPROVED BY THE CITY'S LEGAL DEPARTMENT AND ACCEPTED BY THE CITY COUNCIL.
18. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THE SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
19. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
20. ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
21. THE OWNER OF EACH UNIT SHALL STORE TRASH IN THEIR GARAGE. TRASH WILL BE PICKED UP BY A PRIVATE HAULER.
22. THE SUBJECT PARCEL IS NOT LOCATED WITHIN A WELLHEAD PROTECTION OR AQUIFER PROTECTION AREA PER NHDES ONESTOP DATA.
23. SIDEWALK WORK IN SAGAMORE AVE. RIGHT OF WAY SHALL BE DONE BY THE CITY AND COORDINATED WITH THIS DEVELOPMENT.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON
DATE

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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DANIEL JAMES MEDITZ No.18152
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
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Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
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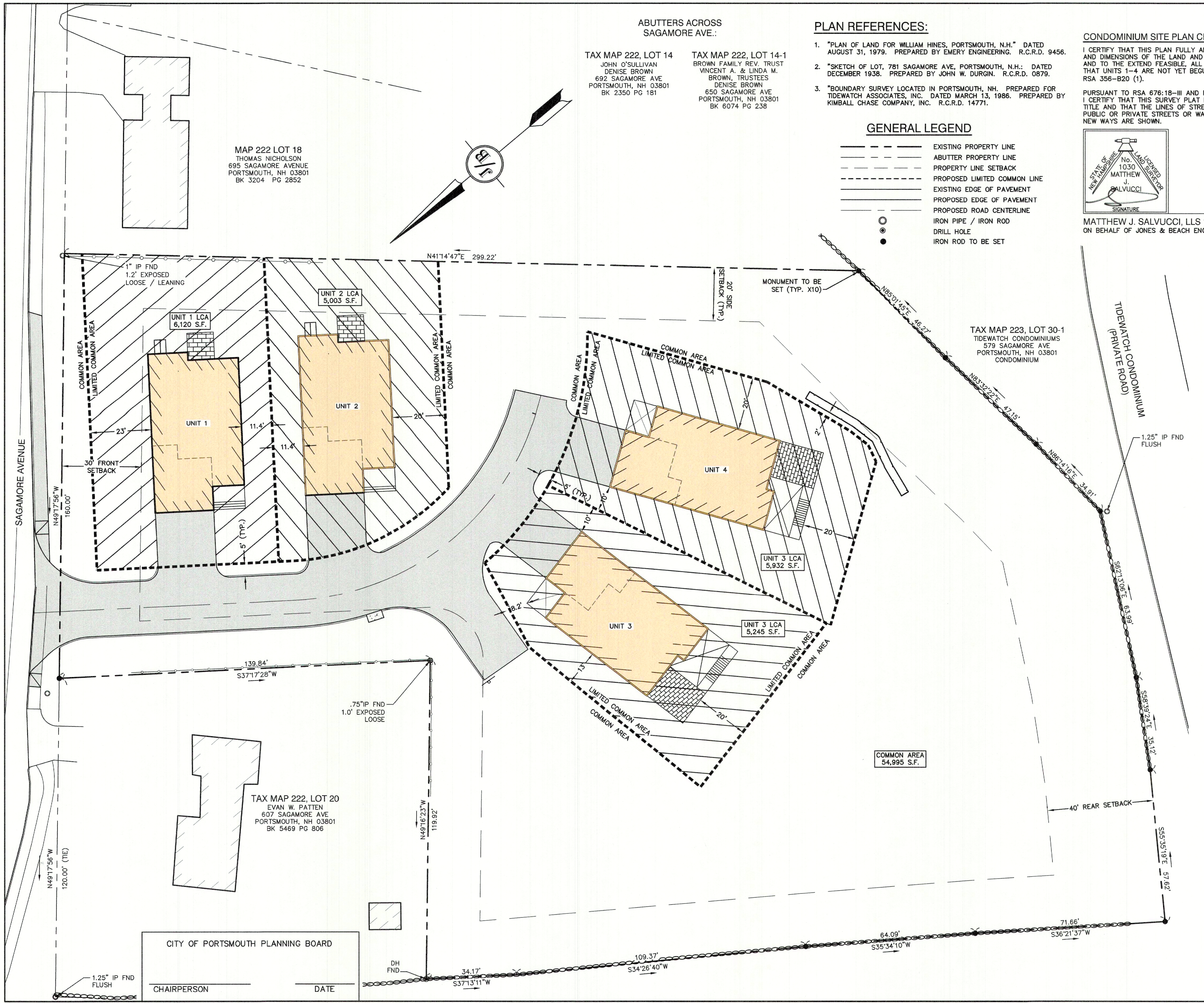
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	SITE PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
C2
SHEET 4 OF 20
JBE PROJECT NO. 18134.1



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GENERAL LEGEND

EXISTING PROPERTY LINE
ABUTTER PROPERTY LINE
PROPERTY LINE SETBACK
PROPOSED LIMITED COMMON LINE
EXISTING EDGE OF PAVEMENT
PROPOSED EDGE OF PAVEMENT
PROPOSED ROAD CENTERLINE
◎ IRON PIPE / IRON ROD
◉ DRILL HOLE
● IRON ROD TO BE SET

CONDOMINIUM SITE PLAN CERTIFICATION:

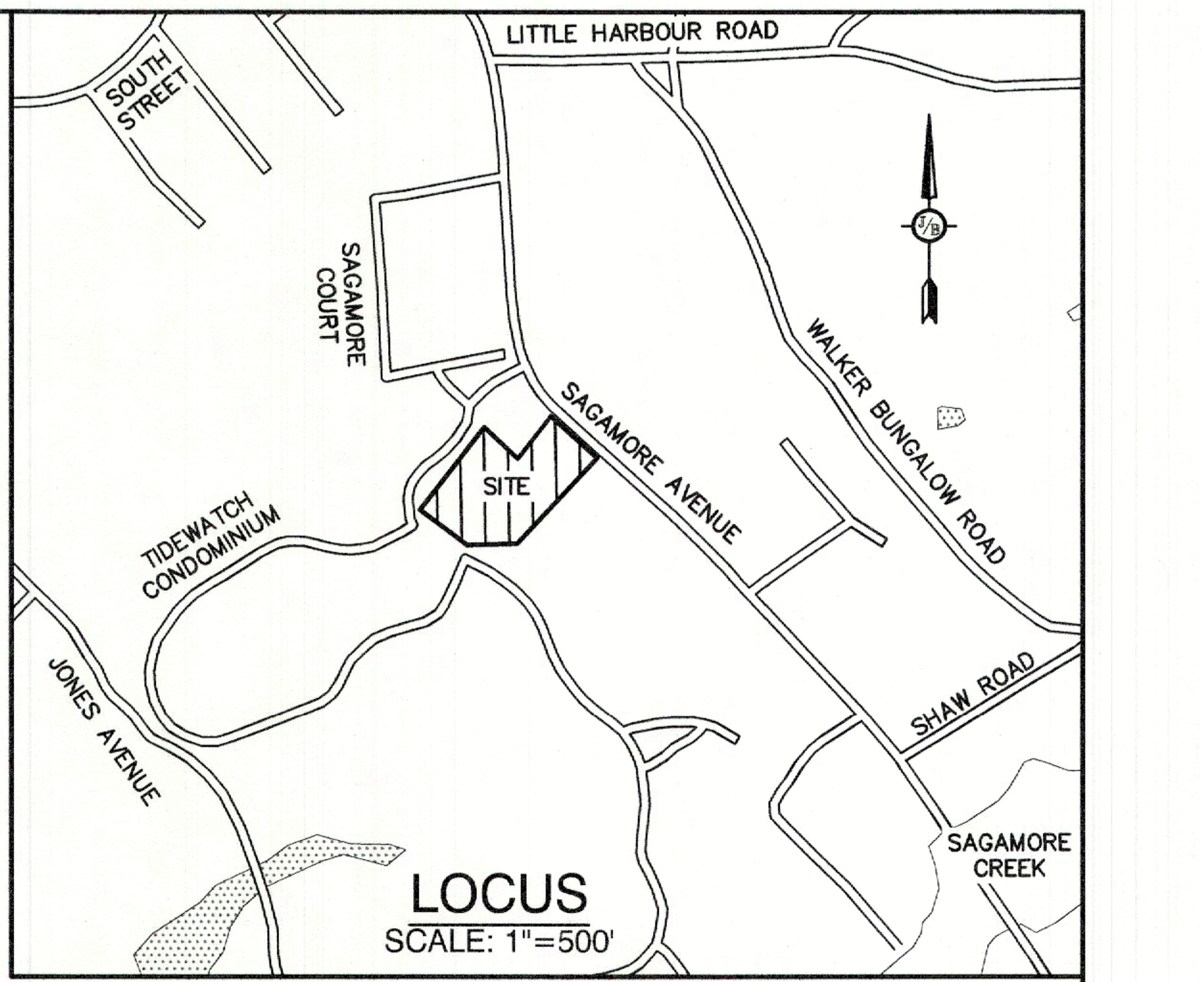
I CERTIFY THAT THIS PLAN FULLY AND ACCURATELY DEPICTS THE LOCATION AND DIMENSIONS OF THE LAND AND EXISTING IMPROVEMENTS SHOWN THEREON AND TO THE EXTEND FEASIBLE, ALL EASEMENTS APPURTENANT THERETO, THAT UNITS 1–4 ARE NOT YET BEGUN AND THIS PLAN COMPLIES WITH NH RSA 356-B20 (1).

PURSUANT TO RSA 676:18–III AND RSA 672:14
I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

No. 1030 MATTHEW J. SALVUCCI

SIGNATURE

MATTHEW J. SALVUCCI, LLS 1030 DATE: 8/21/24
ON BEHALF OF JONES & BEACH ENGINEERS, INC.



LOCUS
SCALE: 1"=500'

SITE NOTES:

1. THE INTENT OF THIS PLAN IS TO REMOVE EXISTING STRUCTURES AND CONSTRUCT A 4–UNIT MULTI–FAMILY RESIDENTIAL DEVELOPMENT.
2. ZONING DISTRICT: SINGLE RESIDENCE A (SRA)
   LOT AREA MINIMUM = 1 ACRE
   LOT FRONTAGE MINIMUM = 150'
   LOT DEPTH MINIMUM = 200'
   BUILDING SETBACKS (MINIMUM):
      FRONT SETBACK = 30'
      SIDE SETBACK = 20'
      REAR SETBACK = 40'
      WETLAND SETBACK = 100' FROM WETLANDS GREATER THAN 10,000 S.F.
   MAX. BUILDING HEIGHT = 35' FOR SLOPED ROOF; 30' FOR FLAT ROOF
   MAX. BUILDING COVERAGE = 10%
   BUILDING COVERAGE PROPOSED = 8,476 S.F. = JUST UNDER 10%
   MAX. DENSITY = 1 DWELLING UNIT / ACRE
   DENSITY PROPOSED = 4 DWELLING UNITS / 1.947 AC. = 2.05 UNITS / ACRE
   (1 UNIT / 21,248 S.F.)
   MIN. OPEN SPACE = 50%
   OPEN SPACE PROPOSED = 68,700 S.F. = 80.0%
3. PARKING CALCULATIONS:
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   2 SPACES IN GARAGE + 2 SPACES IN DRIVEWAY PER UNIT = 4 SPACES PER UNIT * 4 UNITS
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   A) SECTION 10.513 – TO PERMIT MORE THAN ONE FREE–STANDING DWELLING ON A LOT
   B) SECTION 10.521 – TO PERMIT LESS THAN ONE ACRE PER DWELLING UNIT
5. NHDES SEWER CONNECTION PERMIT NO. , DATED .
6. AS–BUILT CONDOMINIUM SITE AND FLOOR PLANS SHALL BE RECORDED.
7. BASIS OF BEARING:
   HORIZONTAL – NH STATE PLANE. VERTICAL – NAVD88.
8. ALL BOOK AND PAGE NUMBERS REFER TO THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
9. THE TAX MAP AND LOT NUMBERS ARE BASED ON THE CITY OF PORTSMOUTH TAX RECORDS AND ARE SUBJECT TO CHANGE.
10. ALL LAND WITHIN THE LCA LINES WITH THE EXCEPTION OF THE BUILDING INTERIORS SHALL BE LIMITED COMMON AREA. LIMITED COMMON AREAS MAY BE ACCESSED BY THE ASSOCIATION FOR ANY WORK ASSOCIATED WITH UTILITIES, DRAINAGE, AND LANDSCAPING THAT IS DEEMED NECESSARY.
11. THIS SURVEY IS NOT A CERTIFICATION TO OWNERSHIP OR TITLE OF LANDS SHOWN. OWNERSHIP AND ENCUMBRANCES ARE MATTERS OF TITLE EXAMINATION NOT OF A BOUNDARY SURVEY. THE INTENT OF THIS PLAN IS TO RETRACE THE BOUNDARY LINES OF DEEDS REFERENCED HEREON. OWNERSHIP OF ADJOINING PROPERTIES IS ACCORDING TO ASSESSOR'S RECORDS. THIS PLAN MAY OR MAY NOT INDICATE ALL ENCUMBRANCES EXPRESSED, IMPLIED OR PRESCRIPTIVE.
12. SURVEY TIE LINES SHOWN HEREON ARE NOT BOUNDARY LINES. THEY SHOULD ONLY BE USED TO LOCATE THE PARCEL SURVEYED FROM THE FOUND MONUMENTS SHOWN AND LOCATED BY THIS SURVEY
13. THIS PLAN SET HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC., FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON–SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA AS SHOWN ON THE DESIGN PLANS, INCLUDING ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS ON THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON–SITE CONDITIONS, MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED. CONTRACTOR TO ALWAYS CONTACT DIG SAFE PRIOR TO DIGGING ONSITE OR OFFSITE TO ENSURE SAFETY AND OBEY THE LAW.
14. THIS PLAN IS THE RESULT OF A CLOSED TRAVERSE WITH A RAW, UNADJUSTED LINEAR ERROR OF CLOSURE GREATER THAN 1 IN 15,000
15. SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
16. AN ACCESS EASEMENT SHALL BE GRANTED TO THE CITY OF PORTSMOUTH FOR ACCESS AND LEAK DETECTION OF THE WATER MAIN, SHUTOFFS, AND METERS ON THE PROPERTY. EASEMENT DESCRIPTION MUST BE APPROVED BY THE CITY'S LEGAL DEPARTMENT AND ACCEPTED BY THE CITY COUNCIL.
17. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THE SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
18. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
19. ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
20. THE OWNER OF EACH UNIT SHALL STORE TRASH IN THEIR GARAGE. TRASH WILL BE PICKED UP BY A PRIVATE HAULER.
21. THE SUBJECT PARCEL IS NOT LOCATED WITHIN A WELLHEAD PROTECTION OR AQUIFER PROTECTION AREA PER NHDES ONESTOP DATA.
22. THE IMPROVEMENTS SHOWN HEREON HAVE NOT YET BEEN CONSTRUCTED.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON

DATE

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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DANIEL JAMES MEDITZ No.18152

8/21/2024

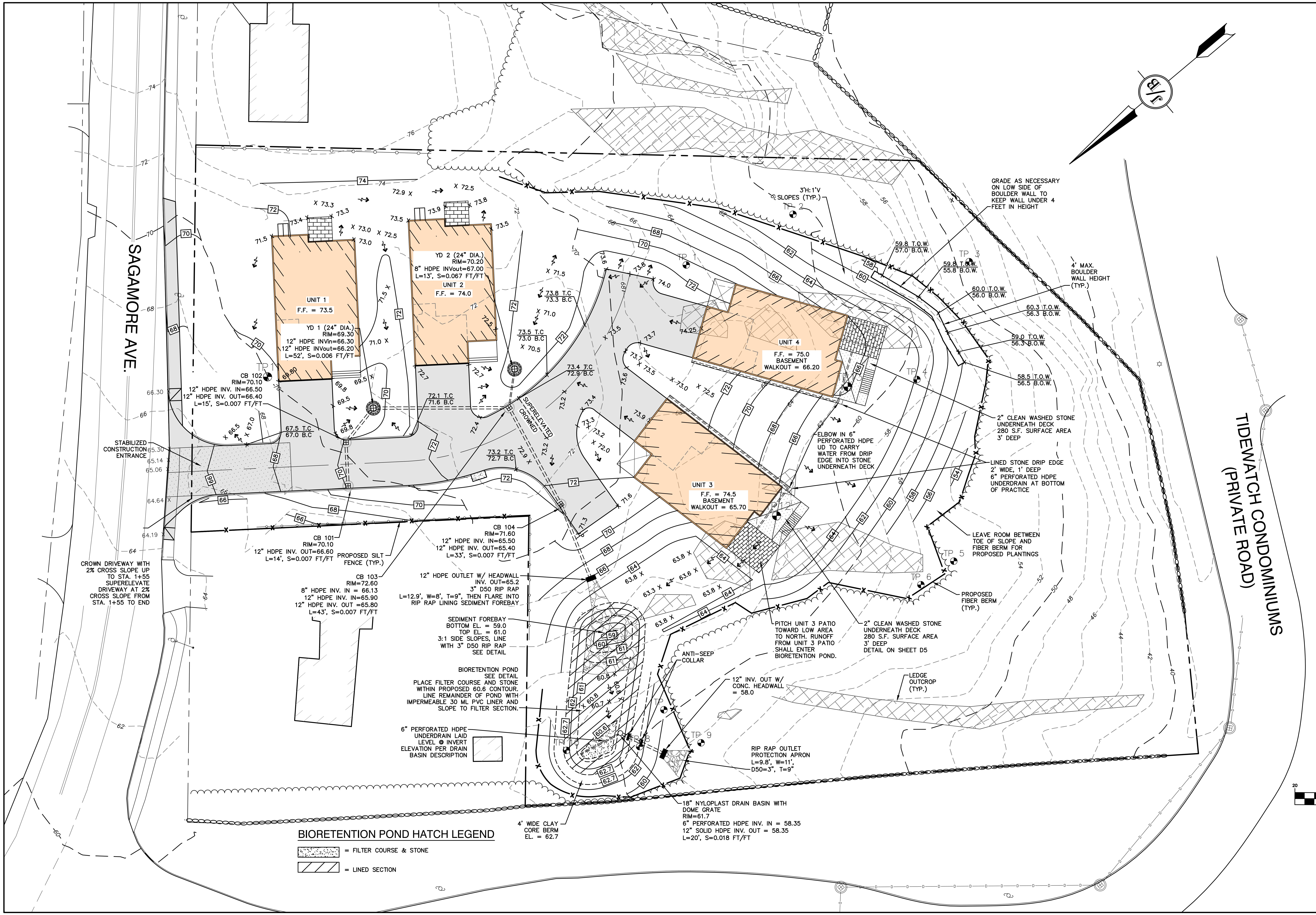
Daniel Meditz

REV.	DATE	REVISION	BY
2	8/14/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: CONDOMINIUM SITE PLAN
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

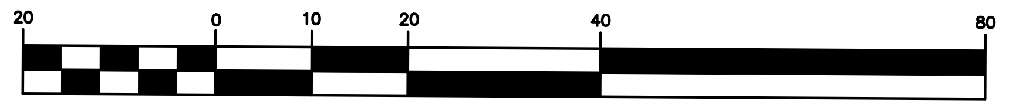
DRAWING No.
CS1
SHEET 5 OF 20
JBE PROJECT NO. 18134.1



GRADING AND DRAINAGE NOTES:

1. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES AND/OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 888–DIG–SAFE (888–344–7233).
2. VERTICAL DATUM: NAVD88.
3. ALL BENCHMARKS AND TOPOGRAPHY SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
4. SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED. SEE CONSTRUCTION SEQUENCE ON SHEET E1.
5. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO HAVE THE PROJECT'S LAND SURVEYOR STAKE OR FLAG CLEARING LIMITS. A MINIMUM OF 48 HOURS NOTICE IS REQUIRED.
6. ALL SWALES AND STORMWATER PONDS SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
7. PROPOSED RIM ELEVATIONS OF DRAINAGE STRUCTURES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES.
8. ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS. CATCH BASINS SHALL HAVE 3' DEEP SUMPS WITH GREASE HOODS, UNLESS OTHERWISE NOTED.
9. ALL DRAINAGE STRUCTURES SHALL BE PRECAST, UNLESS OTHERWISE SPECIFIED. SEE DETAIL SHEETS FOR DRAINAGE DETAILS.
10. ALL DRAINAGE STRUCTURES AND STORMWATER PIPES SHALL MEET HEAVY DUTY TRAFFIC H20 LOADING AND SHALL BE INSTALLED ACCORDINGLY.
11. IN AREAS WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED.
12. ALL DRAINAGE PIPE SHALL BE NON–PERFORATED ADS N–12 OR APPROVED EQUAL.
13. STONE INLET PROTECTION SHALL BE PLACED AT ALL CATCH BASINS AND YARD DRAINS. SEE DETAIL WITHIN THE DETAIL SHEETS.
14. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY ALL GOVERNING AUTHORITIES. THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE EPA SWPPP DURING CONSTRUCTION OPERATIONS.
15. ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 3 DAYS OF FINAL GRADING AND ANYTIME CONSTRUCTION STOPS FOR LONGER THAN 3 DAYS.
16. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN EVENT OF 0.25" OR GREATER IN A 24 HOUR PERIOD AND AT LEAST ONCE A WEEK.
17. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE, AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
18. CONSTRUCTION VEHICLES SHALL UTILIZE THE STABILIZED CONSTRUCTION ENTRANCE TO THE EXTENT POSSIBLE THROUGHOUT CONSTRUCTION.
19. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
20. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
21. SEDIMENT SHALL BE REMOVED FROM ALL SEDIMENT BASINS BEFORE THEY ARE 25% FULL.
22. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
23. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED, IF DEEMED NECESSARY BY ON–SITE INSPECTION BY ENGINEER AND/OR REGULATORY OFFICIALS.
24. SEE ALSO EROSION AND SEDIMENT CONTROL SPECIFICATIONS ON SHEET E1.
25. CB = CATCH BASIN, YD = YARD DRAIN

GRADING SCALE



(IN FEET)
1 inch = 20 ft.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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DANIEL JAMES MEDITZ
No.18152
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

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Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
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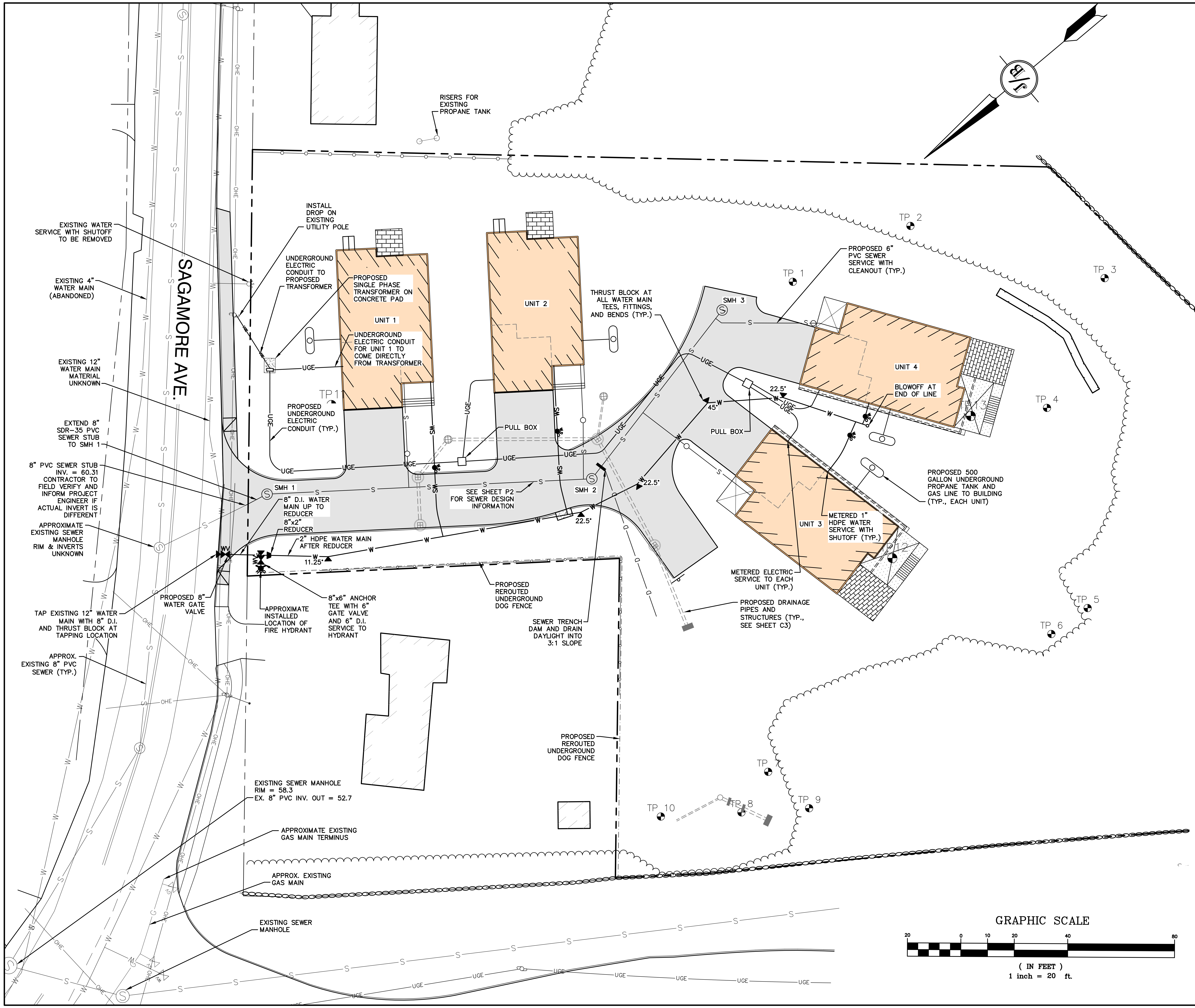
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: GRADING AND DRAINAGE PLAN
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
C3
SHEET 6 OF 20
JBE PROJECT NO. 18134.1



UTILITY NOTES:

1. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, CONNECTION FEES AND BONDS.
2. THE CONTRACTOR SHALL PROVIDE A MINIMUM NOTICE OF FOURTEEN (14) DAYS TO ALL CORPORATIONS, COMPANIES AND/OR LOCAL AUTHORITIES OWNING OR HAVING A JURISDICTION OVER UTILITIES RUNNING TO, THROUGH OR ACROSS PROJECT AREAS PRIOR TO DEMOLITION AND/OR CONSTRUCTION ACTIVITIES.
3. THE LOCATION, SIZE, DEPTH AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE TO THE STANDARDS AND REQUIREMENTS OF THE RESPECTIVE UTILITY COMPANY (ELECTRIC, TELEPHONE, CABLE TELEVISION, WATER, AND SEWER).
4. A PRECONSTRUCTION MEETING SHALL BE HELD WITH THE OWNER, ENGINEER, ARCHITECT, CONTRACTOR, LOCAL OFFICIALS, AND ALL PROJECT-RELATED UTILITY COMPANIES (PUBLIC AND PRIVATE) PRIOR TO START OF CONSTRUCTION.
5. ALL CONSTRUCTION SHALL CONFORM TO THE CITY STANDARDS AND REGULATIONS, AND NHDES STANDARDS AND SPECIFICATIONS, WHICHEVER ARE MORE STRINGENT, UNLESS OTHERWISE SPECIFIED.
6. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
7. BUILDINGS TO BE SERVICED BY UNDERGROUND UTILITIES UNLESS OTHERWISE NOTED.
8. AS-BUILT PLANS SHALL BE SUBMITTED TO DEPARTMENT OF PUBLIC WORKS.
9. INVERTS AND SHELVES: MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW AT CHANGES IN DIRECTION. THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE THROUGH CHANNEL UNDERLAYMENT OF INVERT, AND SHELF SHALL CONSIST OF BRICK MASONRY.
10. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30 INCH DIA, CLEAR OPENING. THE WORD "SEWER" SHALL BE CAST INTO THE CENTER OF THE UPPER FACE OF EACH COVER WITH RAISED, 3" LETTERS.
11. SHALLOW MANHOLE: IN LIEU OF A CONE SECTION, WHEN MANHOLE DEPTH IS LESS THAN 6 FEET, A REINFORCED CONCRETE SLAB COVER MAY BE USED HAVING AN ECCENTRIC ENTRANCE OPENING AND CAPABLE OF SUPPORTING H20 LOADS. (THIS APPLIES TO SMH 1)
12. CONTRACTOR SHALL PLACE 2" WIDE METAL WIRE IMPREGNATED RED PLASTIC WARNING TAPE OVER ENTIRE LENGTH OF ALL GRAVITY SEWERS, SERVICES, AND FORCE MAINS.
13. SANITARY SEWER FLOW CALCULATIONS:
    4 – FOUR BEDROOM UNITS. ASSUME 5 PEOPLE IN 4-BEDROOM UNITS.
    PER METCALF & EDDY TABLE 3-2: 61 GPD/PERSON IN 5 PERSON HOUSE
    (61 GPD * 5 PEOPLE * 4) = 1,220 GPD. SEE SHEET 2 FOR BEDROOM NUMBER DESIGNATION.
14. ALL SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS.
15. PROPOSED RIM ELEVATIONS OF DRAINAGE AND SANITARY MANHOLES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES. ADJUST ALL OTHER RIM ELEVATIONS OF MANHOLES, WATER GATES, AND OTHER UTILITIES TO FINISH GRADE AS SHOWN ON THE GRADING AND DRAINAGE PLAN.
16. ALL WATER MAINS AND SERVICE PIPES SHALL HAVE A MINIMUM 12" VERTICAL AND 24" HORIZONTAL SEPARATION TO MANHOLES, OR CONTRACTOR SHALL INSTALL BOARD INSULATION FOR FREEZING PROTECTION.
17. WATER MAINS SHALL BE HYDROSTATICALLY PRESSURE TESTED FOR LEAKAGE PRIOR TO ACCEPTANCE. WATERMAINS SHALL BE TESTED AT 1.5 TIMES THE WORKING PRESSURE OR 150 PSI, WHICH EVER IS GREATER. TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 4 OF AWWA STANDARD C 600. WATERMAINS SHALL BE DISINFECTED AFTER THE ACCEPTANCE OF THE PRESSURE AND LEAKAGE TESTS ACCORDING TO AWWA STANDARD C 651.
18. ALL WATER AND SANITARY LEADS TO BUILDING(S) SHALL END 5' OUTSIDE THE BUILDING LIMITS AS SHOWN ON PLANS AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT END.
19. THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS, TEES, MECHANICAL JOINTS AND FIRE HYDRANTS.
20. DIMENSIONS ARE SHOWN TO CENTERLINE OF PIPE OR FITTING.
21. CONTRACTOR TO FURNISH SHOP DRAWINGS FOR UTILITY RELATED ITEMS TO ENSURE CONFORMANCE WITH THE PLANS AND SPECIFICATIONS. SHOP DRAWINGS SHOULD BE SENT IN TRIPLICATE TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
22. EXISTING UTILITIES SHALL BE DIGSAFED BEFORE CONSTRUCTION.
23. ALL WATER LINES SHALL HAVE TESTABLE BACKFLOW PREVENTERS AT THE ENTRANCE TO EACH BUILDING.
24. ALL GRAVITY SEWER PIPE, MANHOLES, AND FORCE MAINS SHALL BE TESTED ACCORDING TO NHDES STANDARDS OF DESIGN AND CONSTRUCTION FOR SEWAGE AND WASTEWATER TREATMENT FACILITIES, CHAPTER ENV-WQ 700. ADOPTED ON 10-15-14.
25. ENV-WQ 704.06 GRAVITY SEWER PIPE TESTING: GRAVITY SEWERS SHALL BE TESTED FOR WATER TIGHTNESS BY USE OF LOW-PRESSURE AIR TESTS CONFORMING WITH ASTM F1417-92(2005) OR UNI-BELL PVC PIPE ASSOCIATION UNI-B-6. LINES SHALL BE CLEANED AND VISUALLY INSPECTED AND TRUE TO LINE AND GRADE. DEFLECTION TESTS SHALL TAKE PLACE AFTER 30 DAYS FOLLOWING INSTALLATION AND THE MAXIMUM ALLOWABLE DEFLECTION OF FLEXIBLE SEWER PIPE SHALL BE 5% OF AVERAGE INSIDE DIAMETER. A RIGID BALL OR MANDREL WITH A DIAMETER OF AT LEAST 95% OF THE AVERAGE INSIDE PIPE DIAMETER SHALL BE USED FOR TESTING PIPE DEFLECTION. THE DEFLECTION TEST SHALL BE CONDUCTED WITHOUT MECHANICAL PULLING DEVICES.
26. ENV-WQ 704.17 SEWER MANHOLE TESTING: SHALL BE TESTED FOR LEAKAGE USING A VACUUM TEST PRIOR TO BACKFILLING AND PLACEMENT OF SHELVES AND INVERTS.
27. SANITARY SEWER LINES SHALL BE LOCATED AT LEAST TEN (10) FEET HORIZONTALLY FROM AN EXISTING OR PROPOSED WATER LINE. WHEN A SEWER LINE CROSSES UNDER A WATER LINE, THE SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 6 FEET HORIZONTALLY FROM THE WATERMAIN. THE SEWER LINE SHALL ALSO MAINTAIN A VERTICAL SEPARATION OF NOT LESS THAN 18 INCHES.
28. SEWERS SHALL BE BURIED TO A MINIMUM DEPTH OF 6 FEET BELOW GRADE IN ALL ROADWAY LOCATIONS, AND TO A MINIMUM DEPTH OF 4 FEET BELOW GRADE IN ALL CROSS-COUNTRY LOCATIONS. PROVIDE TWO-INCHES OF R-10 FOAM BOARD INSULATION 2-FOOT WIDE TO BE INSTALLED 6-INCHES OVER SEWER PIPE IN AREAS WHERE DEPTH IS NOT ACHIEVED. A WAIVER FROM THE DEPARTMENT OF ENVIRONMENTAL SERVICES WASTEWATER ENGINEERING BUREAU IS REQUIRED PRIOR TO INSTALLING SEWER AT LESS THAN MINIMUM COVER.
29. THE CONTRACTOR SHALL MINIMIZE THE DISRUPTIONS TO THE EXISTING SEWER FLOWS AND THOSE INTERRUPTIONS SHALL BE LIMITED TO FOUR (4) HOURS OR LESS AS DESIGNATED BY THE CITY SEWER DEPARTMENT.
30. LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRIC CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
31. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.
32. DISINFECTION OF WATER MAINS SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH AWWA STANDARD C651, LATEST EDITION. THE BASIC PROCEDURE TO BE FOLLOWED FOR DISINFECTING WATER MAINS IS AS FOLLOWS:
    a. PREVENT CONTAMINATING MATERIALS FROM ENTERING THE WATER MAIN DURING STORAGE, CONSTRUCTION, OR REPAIR.
    b. REMOVE, BY FLUSHING OR OTHER MEANS, THOSE MATERIALS THAT MAY HAVE ENTERED THE WATER MAINS.
    c. CHLORINATE ANY RESIDUAL CONTAMINATION THAT MAY REMAIN, AND FLUSH THE CHLORINATED WATER FROM THE MAIN.
    d. PROTECT THE EXISTING DISTRIBUTION SYSTEM FROM BACKFLOW DUE TO HYDROSTATIC PRESSURE TEST AND DISINFECTION PROCEDURES.
    e. DETERMINE THE BACTERIOLOGICAL QUALITY BY LABORATORY TEST AFTER DISINFECTION.
    f. MAKE FINAL CONNECTION OF THE APPROVED NEW WATER MAIN TO THE ACTIVE DISTRIBUTION SYSTEM
33. DOMESTIC SHUTOFFS & VALVES SHALL BE PAINTED BLUE. FIRE SERVICE SHUTOFFS & VALVES SHALL BE PAINTED RED. COORDINATE WITH CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS FOR EXACT COLORS.
34. SEWER TRENCH DAMS SHALL BE INSTALLED EVERY 75' ALONG GRAVITY SEWER PIPE.
35. IF IRRIGATION IS TO BE USED, THE PIPING SYSTEM SHALL BE REVIEWED AND APPROVED BY THE PORTSMOUTH CITY PLANNER, CITY ENGINEER, AND THE WATER DEPARTMENT PRIOR TO INSTALLATION.
36. WATER LINE TO BE CONSTRUCTED PER CITY OF PORTSMOUTH SPECIFICATIONS.
37. AN AS-BUILT PLAN OF THE WATER LINE IS TO BE PREPARED AND SUBMITTED TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM | Draft: KDR | Date: 2/26/2024
Checked: JAC | Scale: AS NOTED | Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg

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DANIEL JAMES MEDITZ No.18152
08/20/2024

2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR
REV.	DATE	REVISION	BY

Designed and Produced in NH
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Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
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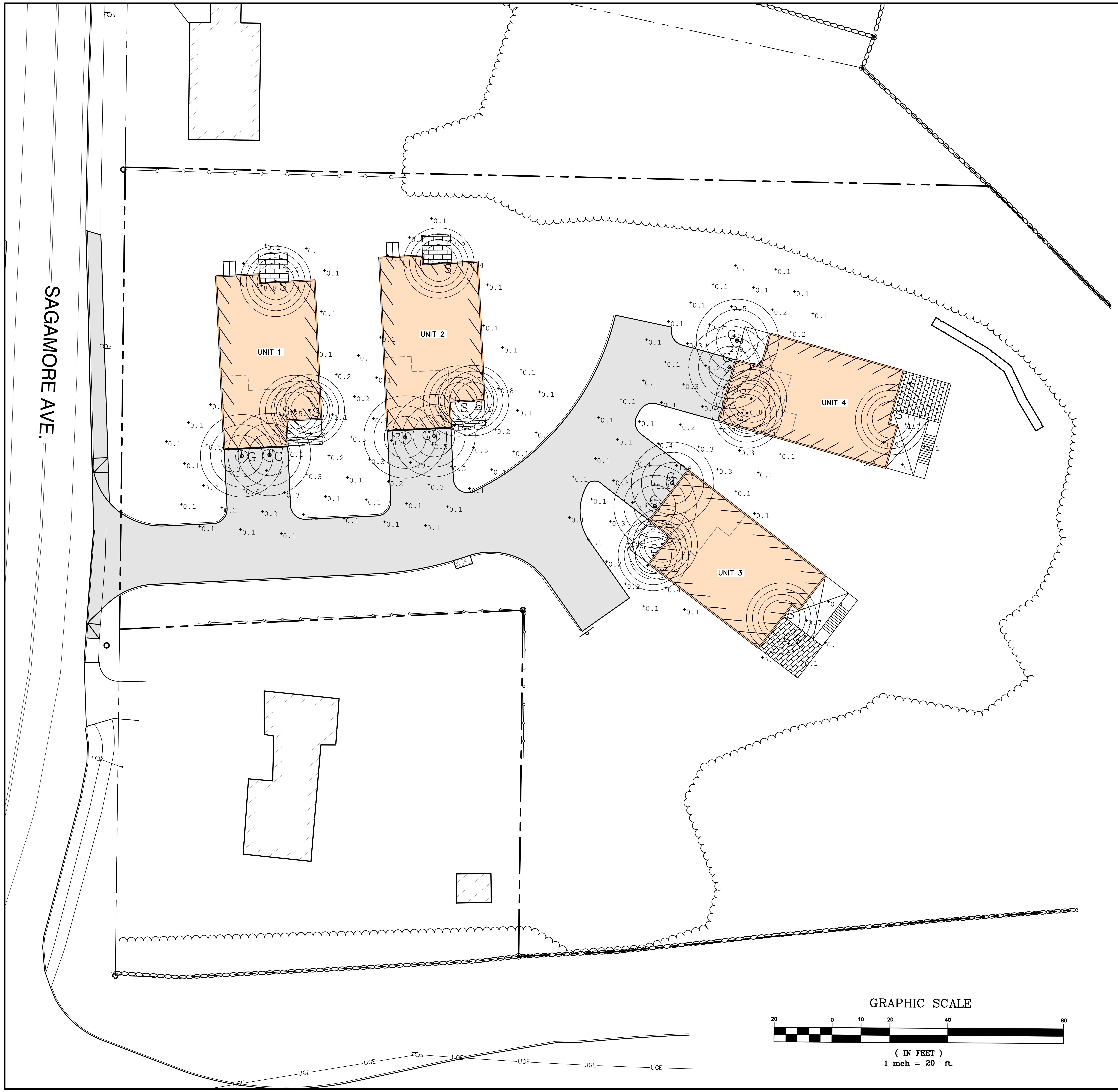
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: UTILITY PLAN
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
C4
SHEET 7 OF 20
JBE PROJECT NO. 18134.1



LIGHTING AND ELECTRICAL NOTES:

1. SITE ELECTRICAL CONTRACTOR SHALL COORDINATE LOCATION OF EASEMENTS, UNDERGROUND UTILITIES AND DRAINAGE BEFORE DRILLING POLE BASES.
2. CONTRACTOR SHALL INSTALL PROPOSED LIGHT POLES ACCORDING TO TOWN REGULATIONS.
3. ALL OUTDOOR LIGHTING SYSTEMS SHALL BE EQUIPPED WITH TIMERS TO REDUCE ILLUMINATION LEVELS TO NON–OPERATIONAL VALUES PER TOWN REGULATIONS.
4. LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRICAL CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
5. ILLUMINATION READINGS SHOWN ARE BASED ON A TOTAL LLF OF 0.75 AT GRADE. ILLUMINATION READINGS SHOWN ARE IN UNITS OF FOOT–CANDLES.
6. LIGHTING CALCULATIONS SHOWN ARE NOT A SUBSTITUTE FOR INDEPENDENT ENGINEERING ANALYSIS OF LIGHTING SYSTEM AND SAFETY.
7. ALL LIGHTING FIXTURES SHALL BE FULL CUT–OFF DARK–SKY COMPLIANT, UNLESS OTHERWISE NOTED.
8. THE PROPOSED LIGHTING CALCULATIONS AND DESIGN WAS PERFORMED BY EXPOSURE LIGHTING, 501 ISLINGTON ST, UNIT 1A, PORTSMOUTH, NH 03801, ATTENTION KEN SWEENEY. ALL LIGHTS SHOULD BE PURCHASED FROM THIS COMPANY, OR AN EQUAL LIGHTING DESIGN SHALL BE SUBMITTED FOR REVIEW IF EQUAL SUBSTITUTIONS ARE PROPOSED BY THE CONTRACTOR OR OWNER.

UAA-30146
Atlantic 7 Small Shade Surface

LIGMAN LIGHTING USA

29w COB 1105 Lumens
IP55 • Suitable For Wet Locations
IK04 • Impact Resistant
Weight 14 lbs

Mounting Detail

Construction

Aluminum
Less than 0.1% copper content – Marine Grade 6060 extruded & LM6 Aluminum High Pressure die casting provides excellent mechanical strength , clean detailed product lines and excellent heat dissipation.

Pre paint
8 step degrease and phosphate process that includes deoxidizing and etching as well as a zinc and nickel phosphate process before product painting.

Memory Retentive -Silicon Gasket
Provided with special injection molded "fit for purpose" long life high temperature memory retentive silicon gaskets. Maintains the gaskets exact profile and seal over years of use and compression.

Thermal management
LM6 Aluminum is used for its excellent mechanical strength and thermal dissipation properties in low and high ambient temperatures. The superior thermal heat sink design by Ligman used in conjunction with the driver, controls thermals below critical temperature range to ensure maximum luminous flux output, as well as providing long LED service life and ensuring less than 10% lumen depreciation at 50,000 hours.

Surge Suppression
Standard 10kv surge suppressor provided with all fixtures.

BUG Rating
B1 - U3 - G1

Finishing
All Ligman products go through an extensive finishing process that includes fettling to improve paint adherence.

Paint
UV Stabilized 4.9Mil thick powder coat paint and baked at 200 Deg C. This process ensures that Ligman products can withstand harsh environments. Rated for use in natatoriums.

Inspired by Nature Finishes
The Inspired by nature Finishing is a unique system of decorative powder coating. Our metal decoration process can easily transform the appearance of metal or aluminum product into a wood grain finish.

This patented technology enables the simulation of wood grain, and even marble or granite finish through the use of decorative powder coating.

The wood grain finish is so realistic that it's almost undistinguishable from real wood, even from a close visual inspection. The system of coating permeates the entire thickness of the coat and as a result, the coating cannot be removed by normal rubbing, chipping, or scratching.

The Coating Process
After pre-treatment the prepared parts are powder coated with a specially formulated polyurethane powder. This powder provides protection against wear, abrasion, impact and corrosion and acts as the relief base color for the finalized metal decoration.

The component is then wrapped with a sheet of non-porous film with the selected decoration pattern printed on it using special high temperature inks.

This printed film transfer is vacuum-sealed to the surface for a complete thermo print and then transferred into a customized oven. The oven transforms the ink into different forms within the paint layer before it becomes solid. Finally, the film is removed, and a vivid timber look on aluminum remains.

Wood grain coating can create beautiful wood-looking products of any sort. There are over 300 combinations of designs currently in use. Wood grains can be made with different colors, designs, etc.

Our powder coatings are certified for indoor and outdoor applications and are backed by a comprehensive warranty. These coatings rise to the highest conceivable standard of performance excellence and design innovation.

Added Benefits
- Resistance to salt-acid room, accelerated aging
- Boiling water, lime and condensed water resistant
- Anti-Graffiti, Anti-Slip, Anti-Microbial, Anti-Scratch
- Super durable (UV restant)
- TGIC free (non-toxic)

Hardware
Provided Hardware is Marine grade 316 Stainless steel.

Anti Seize Screw Holes
Tapped holes are infused with a special anti seize compound designed to prevent seizure of threaded connections, due to electrolysis from heat, corrosive atmospheres and moisture.

Opal Borosilicate Glass Lens
Provided with opal borosilicate impact resistant glass.

Optics & LED
Precise optic design provides exceptional light control and precise distribution of light.
LED CRI > 80

Lumen - Maintenance Life
L80 /B10 at 50,000 hours (This means that at least 90% of the LED still achieve 80% of their original flux)

Classic urban neighborhood wall-mounted luminaire family. Timeless lines coupled with unparalleled build quality, flexibility and performance.

A small and medium size shade decorative wall lantern with symmetrical light distribution. Developed to complement the Atlantic bollard and Atlantic pillar light. Designed for lighting of entrances and footpaths.
Custom wattages can be provided to suit customer and Title 24 requirements. (Specify total watts per fixture)

All Ligman fixtures can be manufactured using a special pre-treatment and coating process that ensures the fixture can be installed in natatoriums as well as environments with high concentrations of chlorine or salt and still maintain the 5 year warranty. For this natatorium rated process please specify NAT in options.

Ligman Lighting USA reserves the right to change specifications without prior notice, please contact factory for latest information. Due to the continual improvements in LED technology data and components may change without notice.

UCI-30131
Cinati Type I, II, III & IV Surface

GERMAN INNOVATION AWARD

microVos TECHNOLOGY

LIGMAN LIGHTING USA

18w LED 2309 Lumens | 30w LED 3848 Lumens
21w COB 1984 Lumens
IP65 • Suitable For Wet Locations
IK08 • Impact Resistant (Vandal Resistant)
Weight 8 lbs

Mounting Detail

microVos TECHNOLOGY

Ligman's micro Variable Optical System provides the ability to interchange, mix & rotate optics to provide specific light distributions for optimized spacing and uniformity.

Type I
Type II
Type III
Type IV
Type V

The variable optic system allows for the designer to create hybrid distributions for precise lighting requirements.

HYBRID
TYPE I & TYPE IV

Construction

Aluminum
Less than 0.1% copper content – Marine Grade 6060 extruded & LM6 Aluminum High Pressure die casting provides excellent mechanical strength , clean detailed product lines and excellent heat dissipation.

Pre paint
8 step degrease and phosphate process that includes deoxidizing and etching as well as a zinc and nickel phosphate process before product painting.

Memory Retentive -Silicon Gasket
Provided with special injection molded "fit for purpose" long life high temperature memory retentive silicon gaskets. Maintains the gaskets exact profile and seal over years of use and compression.

Thermal management
LM6 Aluminum is used for its excellent mechanical strength and thermal dissipation properties in low and high ambient temperatures. The superior thermal heat sink design by Ligman used in conjunction with the driver, controls thermals below critical temperature range to ensure maximum luminous flux output, as well as providing long LED service life and ensuring less than 10% lumen depreciation at 50,000 hours.

Surge Suppression
Standard 10kv surge suppressor provided with all fixtures.

BUG Rating
B2 - U0 - G0

Finishing
All Ligman products go through an extensive finishing process that includes fettling to improve paint adherence.

Paint
UV Stabilized 4.9Mil thick powder coat paint and baked at 200 Deg C. This process ensures that Ligman products can withstand harsh environments. Rated for use in natatoriums.

Inspired by Nature Finishes
The Inspired by nature Finishing is a unique system of decorative powder coating. Our metal decoration process can easily transform the appearance of metal or aluminum product into a wood grain finish.

This patented technology enables the simulation of wood grain, and even marble or granite finish through the use of decorative powder coating.

The wood grain finish is so realistic that it's almost undistinguishable from real wood, even from a close visual inspection. The system of coating permeates the entire thickness of the coat and as a result, the coating cannot be removed by normal rubbing, chipping, or scratching.

The Coating Process
After pre-treatment the prepared parts are powder coated with a specially formulated polyurethane powder. This powder provides protection against wear, abrasion, impact and corrosion and acts as the relief base color for the finalized metal decoration.

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Added Benefits
- Resistance to salt-acid room, accelerated aging
- Boiling water, lime and condensed water resistant
- Anti-Graffiti, Anti-Slip, Anti-Microbial, Anti-Scratch
- Super durable (UV restant)
- TGIC free (non-toxic)

Hardware
Provided Hardware is Marine grade 316 Stainless steel.

Anti Seize Screw Holes
Tapped holes are infused with a special anti seize compound designed to prevent seizure of threaded connections, due to electrolysis from heat, corrosive atmospheres and moisture.

Crystal Clear Low Iron Glass Lens
Provided with tempered, impact resistant crystal clear low iron glass ensuring no green glass tinge.

Optics & LED
Precise optic design provides exceptional light control and precise distribution of light.
LED CRI > 80

Lumen - Maintenance Life
L80 /B10 at 50,000 hours (This means that at least 90% of the LED still achieve 80% of their original flux)

Cone-shaped wall-mounted downlight fixtures. Simple clean form hiding multiple high-performance glare free optic choices.

A cone shaped wall wash luminaire. Suitable for outdoor up, or down light applications. This luminaire is provided with precision optics and high powered LEDs, to provide narrow, medium, wide and very wide distributions. The vandal resistant tempered glass is available in clear or lightly frosted versions.

This product is suitable for commercial, as well as residential applications and with the selection of optics available can provide an excellent lighting solution. Integral electronic driver. Fixture is mounted over a 3" octagonal junction box.

To meet International Dark Sky criteria, 3000k or warmer LEDs must be selected and luminaire fix mounted (+/- 15˚ allowable to permit leveling).

Additional Options (Consult Factory For Pricing)

SCBT
Surface Conduit Box Trim

NOTE: This trim covers a shallow single gang, surface mount junction box [Provided by contractor]
Example: Hubbell: - 5322-0 - 1-Gang Weatherproof Box, Five 1/2" in. Threaded Outlets - or - 5332-0 - 1-Gang Weatherproof Box, Five 3/4 in. Threaded Outlets

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Luminaire Schedule

Symbol	Qty	Label	Arrangement	Description	Tag	[MANUFAC]
–⊙	8	G	Single	UAA-30146-29W-2-1-W27-01	MOUNTED OVER GARAGE DOORS	LIGMAN
⊙	12	S	Single	UCI-30131-21W-VW-W27-01	MOUNTED AT HOUSE DOORS	LIGMAN

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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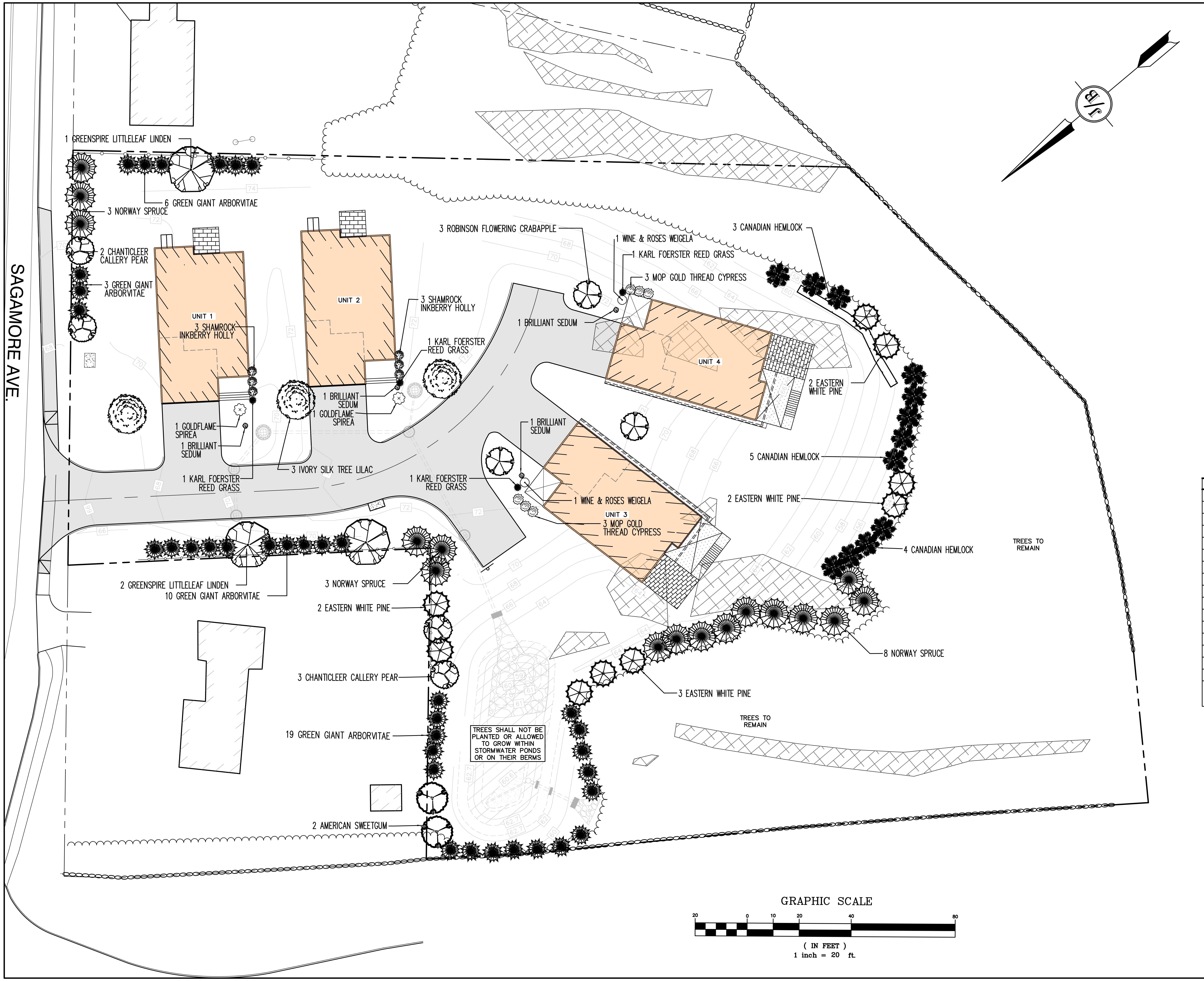
DANIEL JAMES MEDITZ
No.18152
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: LIGHTING PLAN
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
L1
SHEET 8 OF 20
JBE PROJECT NO. 18134.1



LANDSCAPE NOTES:

1. THE CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO STARTING WORK.
2. THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTINGS SHOWN ON THE DRAWINGS.
3. ALL MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
4. PLANTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL AT THE PLACE OF GROWTH, UPON DELIVERY OR AT THE JOB SITE WHILE WORK IS ON–GOING FOR CONFORMITY TO SPECIFIED QUALITY, SIZE AND VARIETY.
5. PLANTS FURNISHED IN CONTAINERS SHALL HAVE THE ROOTS WELL ESTABLISHED IN THE SOIL MASS AND SHALL HAVE AT LEAST ONE (1) GROWING SEASON. ROOT–BOUND PLANTS OR INADEQUATELY SIZED CONTAINERS TO SUPPORT THE PLANT MAY BE DEEMED UNACCEPTABLE.
6. NO PLANT SHALL BE PUT IN THE GROUND BEFORE GRADING HAS BEEN COMPLETED.
7. ALL WORK AND PLANTS SHALL BE DONE, INSTALLED AND DETAILED IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
8. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24–HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL BE WATERED WEEKLY, OR MORE OFTEN IF NECESSARY, DURING THE FIRST GROWING SEASON.
9. ALL LANDSCAPE AREAS TO BE GRASS COMMON TO REGION, EXCEPT FOR INTERIOR LANDSCAPED ISLANDS OR WHERE OTHER PLANT MATERIAL IS SPECIFIED.
10. ALL TREES AND SHRUBS SHALL BE PLANTED IN MULCH BEDS WITH EDGE STRIPS TO SEPARATE TURF GRASS AREAS.
11. THE CONTRACTOR SHALL REMOVE WEEDS, ROCKS, CONSTRUCTION ITEMS, ETC. FROM ANY LANDSCAPE AREA SO DESIGNATED TO REMAIN, WHETHER ON OR OFF–SITE. GRASS SEED OR PINE BARK MULCH SHALL BE APPLIED AS DEPICTED ON PLANS.
12. EXISTING TREES TO REMAIN SHALL BE PROTECTED WITH TEMPORARY SNOW FENCING AT THE DRIPLINE OF THE TREE. THE CONTRACTOR SHALL NOT STORE VEHICLES OR MATERIALS WITHIN THE LANDSCAPED AREAS. ANY DAMAGE TO EXISTING TREES, SHRUBS OR LAWN SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
13. ALL MULCH AREAS SHALL RECEIVE A 3" LAYER OF SHREDDED PINE BARK MULCH OVER A 10 MIL WEED MAT EQUAL TO 'WEEDBLOCK' BY EASY GARDENER OR DEWITT WEED BARRIER.
14. ALL LANDSCAPED AREAS SHALL HAVE SELECT MATERIALS REMOVED TO A DEPTH OF AT LEAST 9" BELOW FINISH GRADE. THE RESULTING VOID IS TO BE FILLED WITH A MINIMUM OF 9" HIGH–QUALITY SCREENED LOAM AMENDED WITH 3" OF AGED ORGANIC COMPOST.
15. THIS PLAN IS INTENDED FOR LANDSCAPING PURPOSES ONLY. REFER TO CIVIL/SITE DRAWINGS FOR OTHER SITE CONSTRUCTION INFORMATION.
16. IRRIGATION PIPING SYSTEM SHALL BE REVIEWED AND APPROVED BY OWNER AND ENGINEER PRIOR TO INSTALLATION.
17. WITH AUTHORIZATION OF THE PROJECT ENGINEER, PROPOSED TREES ALONG EDGE OF WOODED BUFFER SHALL BE PLACED WHEREVER NECESSARY IN ORDER TO COVER GAPS IN EXISTING WOODED BUFFER IN ORDER TO BLOCK VISIBILITY FROM TIDEWATCH CONDOMINIUM PROPERTY.
18. TREES SHALL NOT BE PLANTED ON BERMS OF STORMWATER PONDS.
19. ALL PLANTING SHALL ADHERE TO THE GENERAL REQUIREMENTS OUTLINED IN SECTION 6.3 AND THE PLANTING REQUIREMENTS OUTLINED IN SECTION 6.4 OF THE PORTSMOUTH SITE PLAN REVIEW REGULATIONS.
20. ALL PLANTING SHALL FOLLOW THE ANSI A300 PART 6 STANDARD PRACTICES FOR PLANTING AND TRANSPLANTING (AS AMENDED).

Quantity	Botanical Name	Common Name	Size
4	Calamagrostis x acutiflora 'Karl Foerster'	KARL FOERSTER REED GRASS **	2 Gallon
6	Chamaecyparis pisifera 'Mop'	MOP GOLD THREAD CYPRESS **	5 Gallon
6	Ilex glabra 'Shamrock'	SHAMROCK INKBERRY HOLLY **	5 Gallon
2	Liquidambar styraciflua	AMERICAN SWEETGUM **	3" Caliper
3	Malus x 'Robinson'	ROBINSON FLOWERING CRABAPPLE **	2" Caliper
16	Picea abies	NORWAY SPRUCE	8-9 Ft. Ht.
9	Pinus strobus	EASTERN WHITE PINE	8-9 Ft. Ht.
4	Pyrus calleryana 'Chanticleer'	CHANTICLEER CALLERY PEAR **	2.5" Caliper
4	Sedum spectabile 'Brilliant'	BRILLIANT SEDUM **	1 Gallon
2	Spiraea japonica 'Goldflame'	GOLDFLAME SPIREA **	5 Gallon
3	Syringa reticulata 'Ivory Silk'	IVORY SILK TREE LILAC	2" Caliper
38	Thuja plicata 'Green Giant'	GREEN GIANT ARBORVITAE **	7-8 Ft. Ht.
3	Tilia cordata 'Greenspire'	GREENSPIRE LITTLELEAF LINDEN **	3" Caliper
12	Tsuga canadensis	CANADIAN HEMLOCK	8-9 Ft. Ht.
2	Weigela florida 'Alexandra'	WINE & ROSES WEIGELA	5 Gallon
**	Denotes plants that are tolerant of urban conditions including road salt, soil compaction, drought, heat, and air pollution.		

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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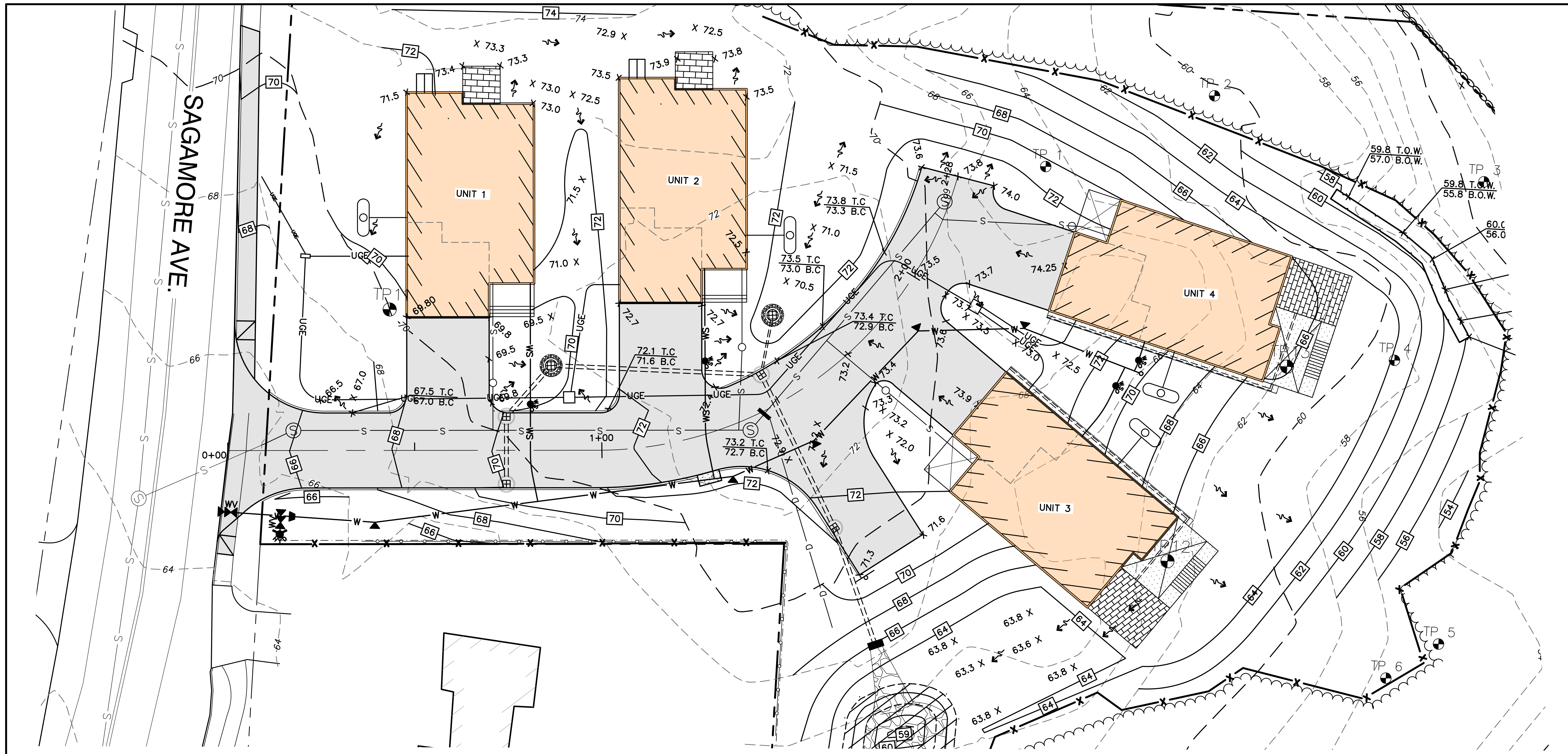
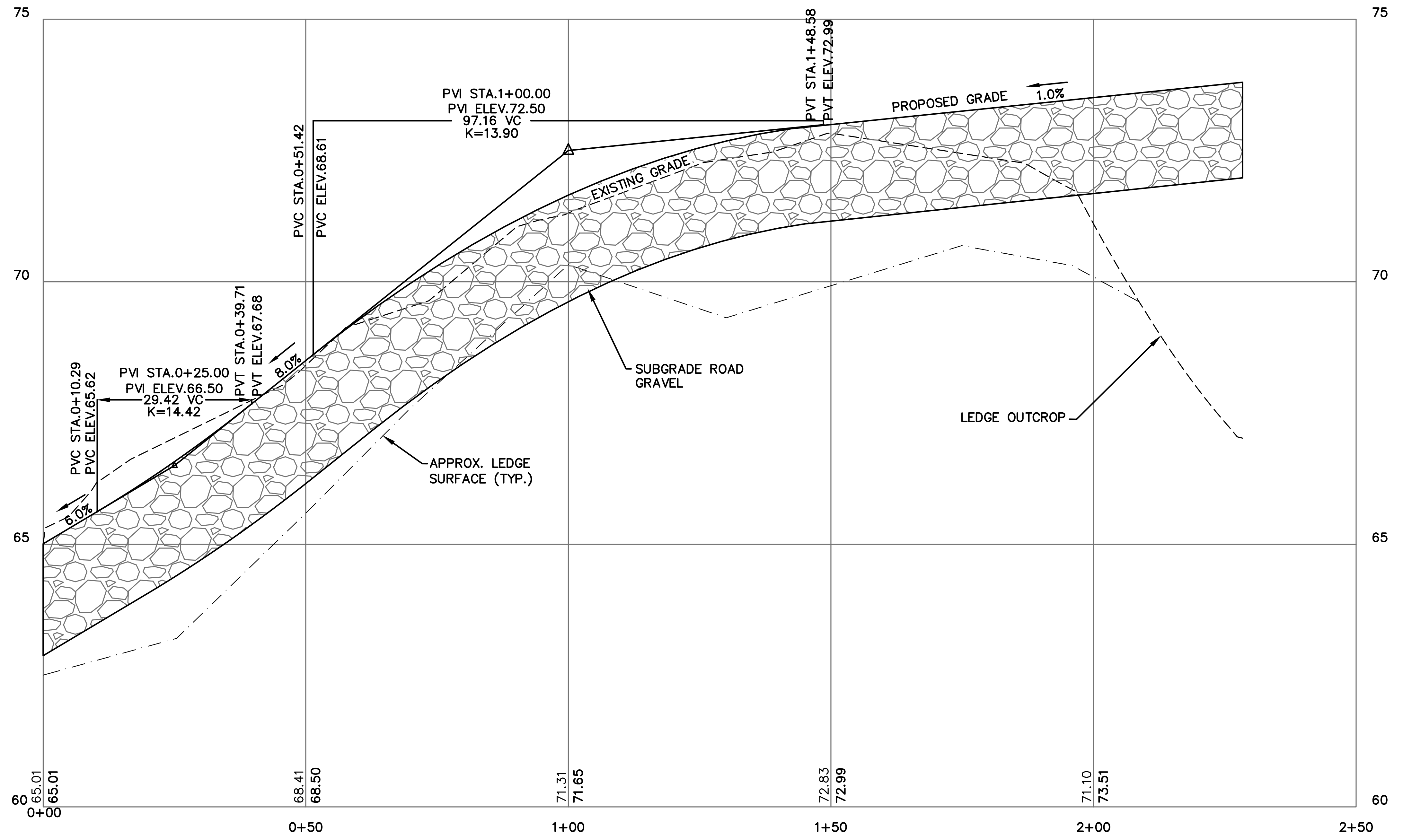
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR
REV.	DATE	REVISION	BY

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: LANDSCAPE PLAN
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
L1
SHEET 9 OF 20
JBE PROJECT NO. 18134.1





NOTES:

1. THIS SITE WILL REQUIRE A USEPA NPDES PERMIT FOR STORMWATER DISCHARGE FOR THE CONSTRUCTION SITE. THE CONSTRUCTION SITE OPERATOR SHALL DEVELOP AND IMPLEMENT A CONSTRUCTION STORM WATER POLLUTION PREVENTION PLAN (SWPPP), WHICH SHALL REMAIN ON SITE AND BE MADE ACCESSIBLE TO THE PUBLIC. THE CONSTRUCTION SITE OPERATOR SHALL SUBMIT A NOTICE OF INTENT (NOI) TO THE EPA REGIONAL OFFICE SEVEN DAYS PRIOR TO COMMENCEMENT OF ANY WORK ON SITE. EPA WILL POST THE NOI AT HTTP://CFPUB1.EPA.GOV/NPDES/STORMWATER/NOI/NOISEARCH.CFM. AUTHORIZATION IS GRANTED UNDER THE PERMIT ONCE THE NOI IS SHOWN IN "ACTIVE" STATUS ON THIS WEBSITE. A COMPLETED NOTICE OF TERMINATION SHALL BE SUBMITTED TO THE NPDES PERMITTING AUTHORITY WITHIN 30 DAYS AFTER EITHER OF THE FOLLOWING CONDITIONS HAVE BEEN MET:
   A. FINAL STABILIZATION HAS BEEN ACHIEVED ON ALL PORTIONS OF THE SITE FOR WHICH THE PERMITTEE IS RESPONSIBLE; OR
   B. ANOTHER OPERATOR/PERMITTEE HAS ASSUMED CONTROL OVER ALL AREAS OF THE SITE THAT HAVE NOT BEEN FINALLY STABILIZED. PROVIDE DPW WITH A COPY OF THE NOTICE OF TERMINATION (NOT).

2. ALL ROAD AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR THE CITY, AND NHDOT SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.

3. AS-BUILT PLANS TO BE SUBMITTED TO THE CITY PRIOR TO ACCEPTANCE OF THE ROADWAY.

4. CONTRACTOR TO COORDINATE AND COMPLETE ALL WORK REQUIRED FOR THE RELOCATION AND/OR INSTALLATION OF ELECTRIC, CATV, TELEPHONE, PER UTILITY DESIGN AND STANDARDS. LOCATIONS SHOWN ARE APPROXIMATE. LOW PROFILE STRUCTURES SHALL BE USED TO THE GREATEST EXTENT POSSIBLE.

5. THIS PLAN HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC. FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON-SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA SHOWN ON THE DESIGN PLANS. THIS INCLUDES ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS OF THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED.

6. SILTATION AND EROSION CONTROLS SHALL BE INSTALLED PRIOR TO CONSTRUCTION, SHALL BE MAINTAINED DURING CONSTRUCTION, AND SHALL REMAIN UNTIL SITE HAS BEEN STABILIZED WITH PERMANENT VEGETATION. SEE DETAIL SHEET E1 FOR ADDITIONAL NOTES ON EROSION CONTROL.

7. ALL DISTURBED AREAS NOT STABILIZED BY OCTOBER 15TH SHALL BE COVERED WITH AN EROSION CONTROL BLANKET. PRODUCT TO BE SPECIFIED BY THE ENGINEER.

8. FINAL DRAINAGE, GRADING AND EROSION PROTECTION MEASURES SHALL CONFORM TO REGULATIONS OF THE PUBLIC WORKS DEPARTMENT.

9. CONTRACTOR TO VERIFY EXISTING UTILITIES AND TO NOTIFY ENGINEER OF ANY DISCREPANCY IMMEDIATELY.

10. DRAINAGE INSPECTION AND MAINTENANCE SCHEDULE: SILT FENCING WILL BE INSPECTED DURING AND AFTER STORM EVENTS TO ENSURE THAT THE FENCE STILL HAS INTEGRITY AND IS NOT ALLOWING SEDIMENT TO PASS. SEDIMENT BUILD UP IN SWALES WILL BE REMOVED IF IT IS DEEPER THAN SIX INCHES, AND IS TO BE REMOVED FROM SUMPS BELOW THE INLET OF CULVERTS SEMIANNUALLY, AS WELL AS FROM CATCH BASINS. FOLLOWING MAJOR STORM EVENTS, THE STAGE DISCHARGE OUTLET STRUCTURES ARE TO BE INSPECTED AND ANY DEBRIS REMOVED FROM THE ORIFICE, TRASH TRACK AND EMERGENCY SPILL WAY. INFREQUENTLY, SEDIMENT MAY ALSO HAVE TO BE REMOVED FROM THE SUMP OF THE STRUCTURE.

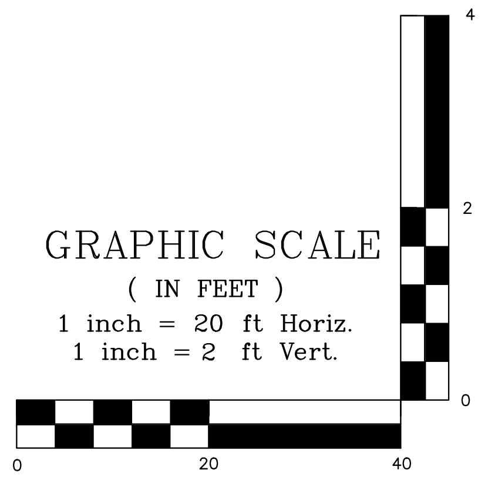
11. ALL DRAINAGE INFRASTRUCTURE SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING ANY RUNOFF TO IT.

12. BIORETENTION PONDS REQUIRE TIMELY MAINTENANCE AND SHOULD BE INSPECTED AFTER EVERY MAJOR STORM EVENT, AS WELL AS FREQUENTLY DURING THE FIRST YEAR OF OPERATION, AND ANNUALLY THEREAFTER. EVERY FIVE YEARS, THE SERVICES OF A PROFESSIONAL ENGINEER SHOULD BE RETAINED TO PERFORM A THOROUGH INSPECTION OF THE BIORETENTION POND AND ITS INFRASTRUCTURE. ANY DEBRIS AND SEDIMENT ACCUMULATIONS SHOULD BE REMOVED FROM THE OUTLET STRUCTURE(S) AND EMERGENCY SPILLWAY(S) AND DISPOSED OF PROPERLY. BIORETENTION POND BERMS SHOULD BE MOWED AT LEAST ONCE ANNUALLY SO AS TO PREVENT THE ESTABLISHMENT OF WOODY VEGETATION. TREES SHOULD NEVER BE ALLOWED TO GROW ON A BIORETENTION POND BERM, AS THEY MAY DESTABILIZE THE STRUCTURE AND INCREASE THE POTENTIAL FOR FAILURE. AREAS SHOWING SIGNS OF EROSION OR THIN OR DYING VEGETATION SHOULD BE REPAIRED IMMEDIATELY BY WHATEVER MEANS NECESSARY, WITH THE EXCEPTION OF FERTILIZER. RODENT BORROWS SHOULD BE REPAIRED IMMEDIATELY AND THE ANIMALS SHOULD BE TRAPPED AND RELOCATED IF THE PROBLEM PERSISTS.

13. IN THOSE AREAS WHERE THE BERMS OF THE BIORETENTION SYSTEMS MUST BE CONSTRUCTED BY THE PLACEMENT OF FILL, THE ENTIRE EMBANKMENT AREA OF THE BIORETENTION PONDS SHALL BE EXCAVATED TO PROPOSED GRADE, STRIPPED OF ALL ORGANIC MATERIALS, COMPACTED TO AT LEAST 95% AND SCARIFIED PRIOR TO THE PLACEMENT OF THE EMBANKMENT MATERIAL. IN THE EVENT THE FOUNDATION MATERIAL EXPOSED DOES NOT ALLOW THE SPECIFIED COMPACTION, AN ADDITIONAL ONE FOOT (1') OF EXCAVATION AND THE PLACEMENT OF A ONE FOOT (1') THICK, TWELVE FOOT (12') WIDE PAD OF THE MATERIAL DESCRIBED IN THE NOTE BELOW, COMPACTED TO 95% OF ASTM D-1557 MAY BE NECESSARY. PLACEMENT AND COMPACTION SHOULD OCCUR AT A MOISTURE CONTENT OF OPTIMUM PLUS OR MINUS 3%, AND NO FROZEN OR ORGANIC MATERIAL SHOULD BE PLACED WITHIN FOR ANY REASON.

14. EMBANKMENT IS TO HAVE 3:1 SIDE SLOPES (MAX.) AND IS TO BE BROUGHT TO SPECIFIED GRADES PRIOR TO THE ADDITION OF LOAM (4" MINIMUM) SO AS TO ALLOW FOR THE COMPACTION OF THE STRUCTURE OVER TIME WHILE MAINTAINING THE PROPER BERM ELEVATION.

15. COMPACTION TESTING SERVICES (I.E. NUCLEAR DENSITY TESTS) ARE TO BE PERFORMED BY AN INDEPENDENT GEOTECHNICAL ENGINEER RETAINED BY THE CONTRACTOR FOR ROADWAY CONSTRUCTION, AND ON THE FOUNDATION OF THE BERM AND ON EVERY LIFT OF NEWLY PLACED MATERIAL.



Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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DANIEL JAMES MEDITZ
No.18152
08/20/2024

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Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

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FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: DRIVEWAY PLAN AND PROFILE

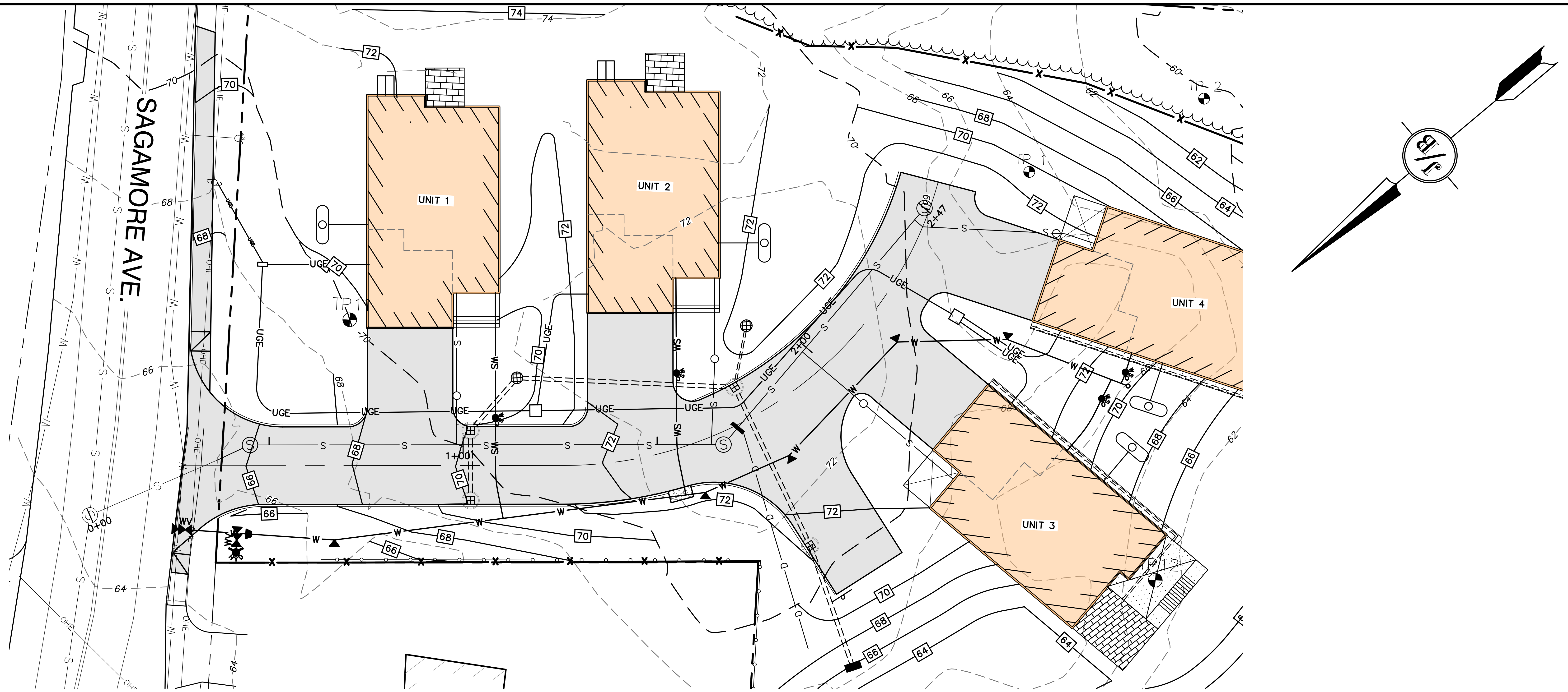
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH

Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

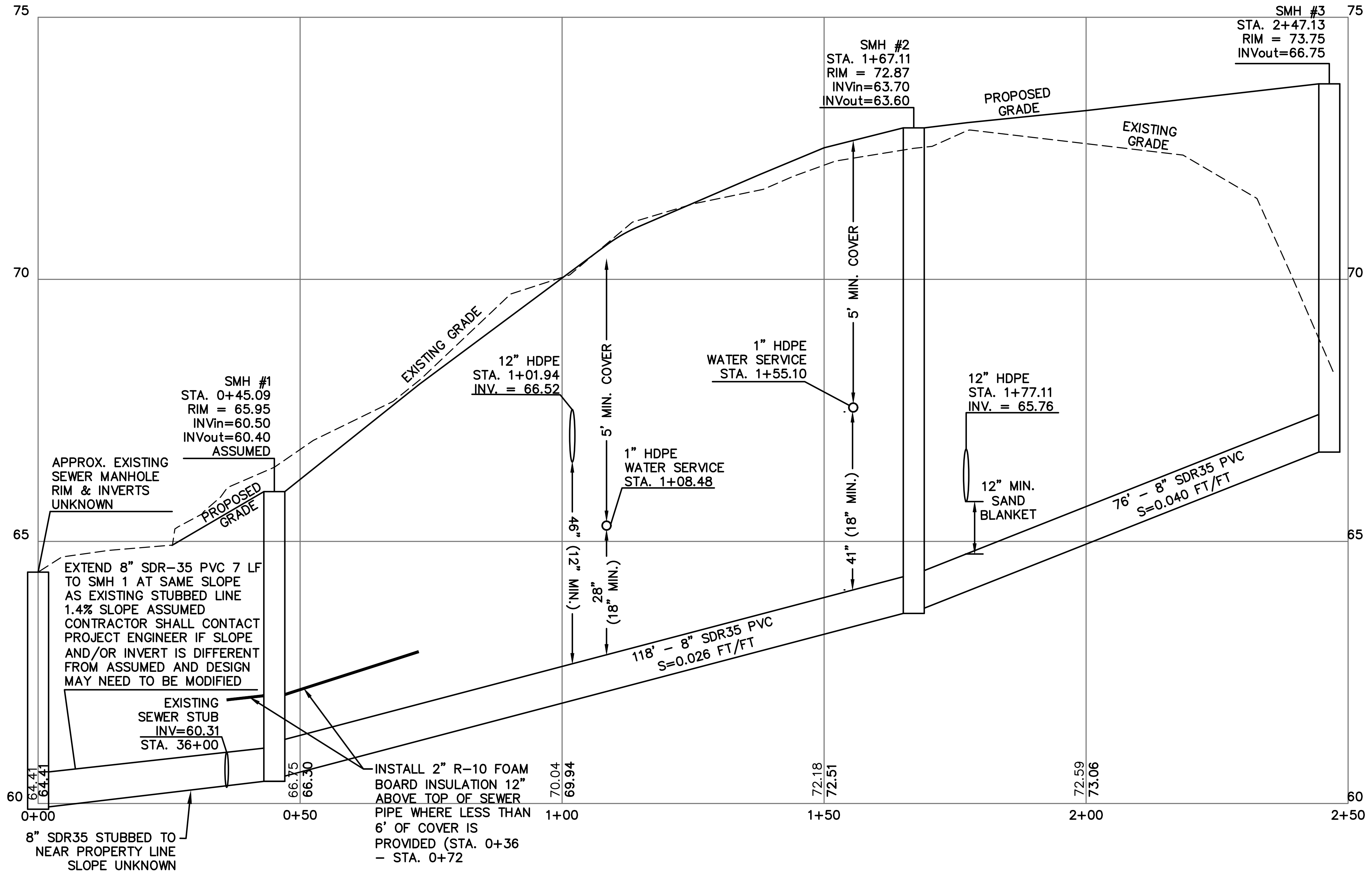
P1

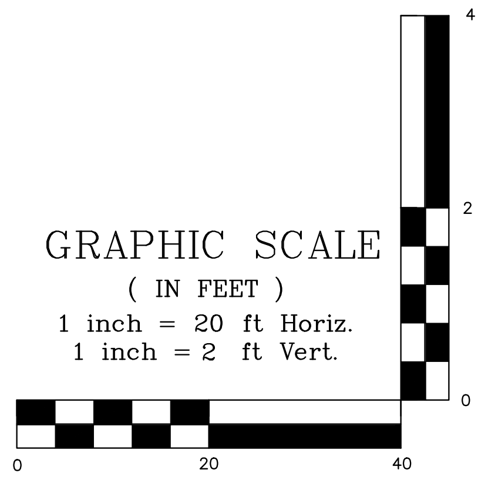
SHEET 10 OF 20
JBE PROJECT NO. 18134.1



NOTES:

1. PROPOSED GRADES SHOWN HEREON ARE APPROXIMATE. REFER TO SHEETS C3 AND P1 FOR GRADING OF SITE AND DRIVEWAY. SET RIM ELEVATIONS OF SEWER STRUCTURES FLUSH WITH PROPOSED GRADE.
2. STATIONS REFER TO CENTERLINE OF SEWER STRUCTURE OR CROSSING DRAINAGE/WATER PIPE.
3. CONTRACTOR TO CONFIRM ACTUAL EXISTING INVERT OF STUB IN THE FIELD AND NOTIFY ENGINEER IF IT IS MORE THAN 0.1' DIFFERENT FROM THE STATED INVERT.





GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft Horiz.
1 inch = 2 ft Vert.

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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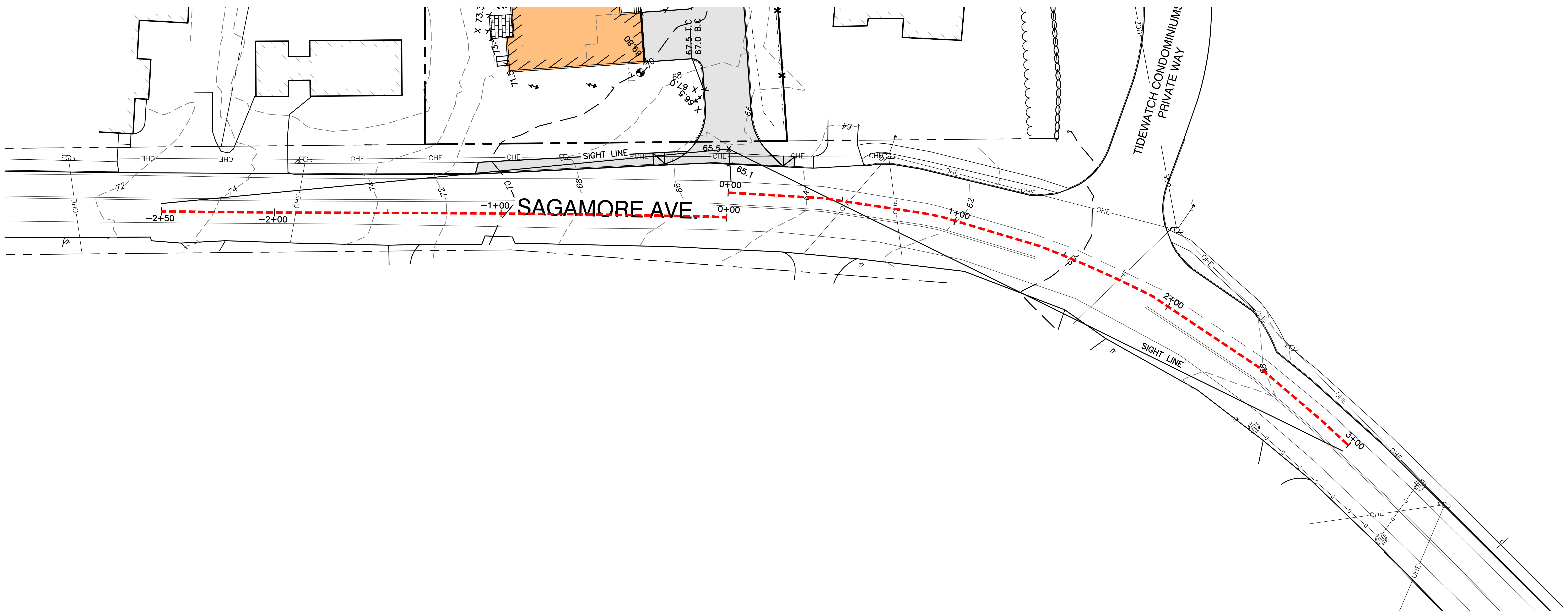
DANIEL JAMES MEDITZ
No.18152
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: SEWER PLAN AND PROFILE
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
P2
SHEET 11 OF 20
JBE PROJECT NO. 18134.1



$$S = 1.47V(2.5) + \frac{V^2}{30\left[0.347826 \pm \left(\frac{G}{100}\right)\right]}$$

Where:

S = Stopping sight distance on grade (ft)
V = Design speed (mph)
G = Grade (%)

Stopping Sight Distance on Grades
Exhibit 1260-3

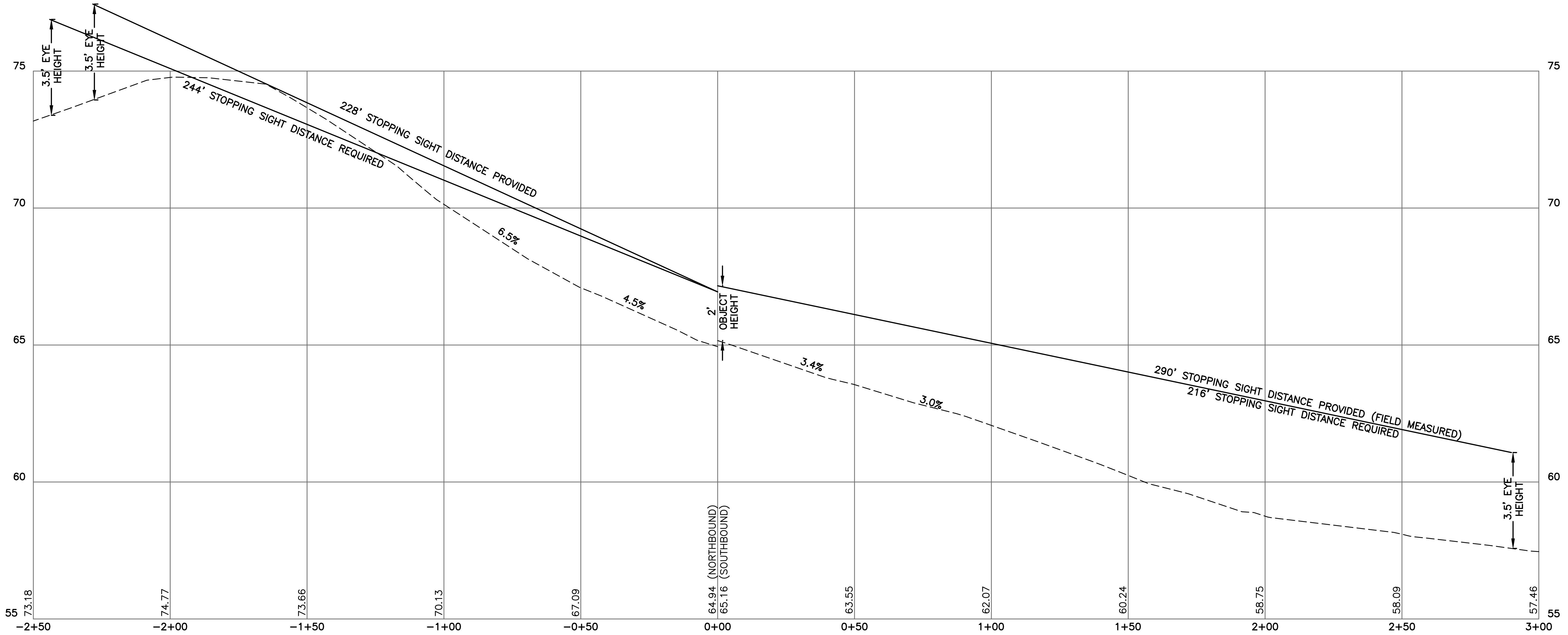
PER AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS:

NORTHBOUND APPROACH
DESIGN SPEED: 33 MPH
AVERAGE ROAD GRADE OVER FIRST 100 FEET: −5.2% (5.2' DROP OVER 100 FEET)
REQUIRED SIGHT DISTANCE:
1.47(33)(2.5)+((33)^2/(30*(0.347826−(5.2/100)))) = 244' SIGHT DISTANCE REQUIRED

SOUTHBOUND APPROACH
DESIGN SPEED: 33 MPH
AVERAGE ROAD GRADE OVER FIRST 100 FEET: 3.3% (3.3' GAIN OVER 100 FEET)
REQUIRED SIGHT DISTANCE:
1.47(33)(2.5)+((33)^2/(30*(0.347826+(3.3/100)))) = 216' SIGHT DISTANCE REQUIRED

PORTSMOUTH SITE PLAN REVIEW REGULATIONS SECTION 3.3.2.1

ACCESSWAYS AND DRIVEWAYS SHALL, WHERE PRACTICAL, HAVE AN ALL−SEASON SAFE SIGHT DISTANCE (ACCORDING TO AASHTO STANDARDS) IN BOTH DIRECTIONS ALONG THE PUBLIC STREET. WHERE ONLY A LESSER SIGHT DISTANCE IS OBTAINABLE, NO MORE THAN ONE ACCESSWAY PER SINGLE PARCEL SHALL BE ALLOWED.



STOPPING SIGHT DISTANCE PLAN & PROFILE

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft Horiz.
1 inch = 3 ft Vert.

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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No.18152
08/20/2024

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0	3/18/24	ISSUED FOR REVIEW	KDR

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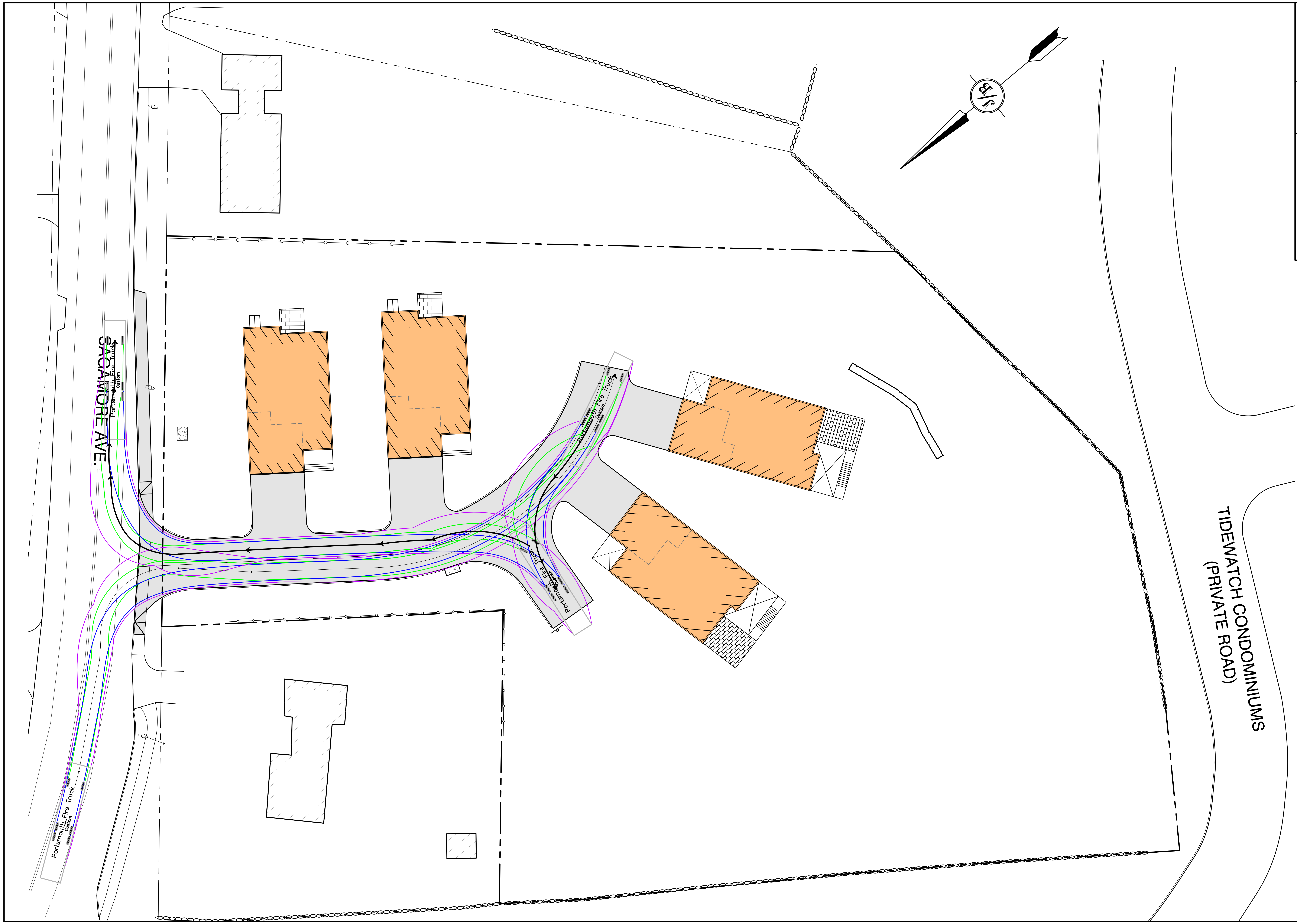
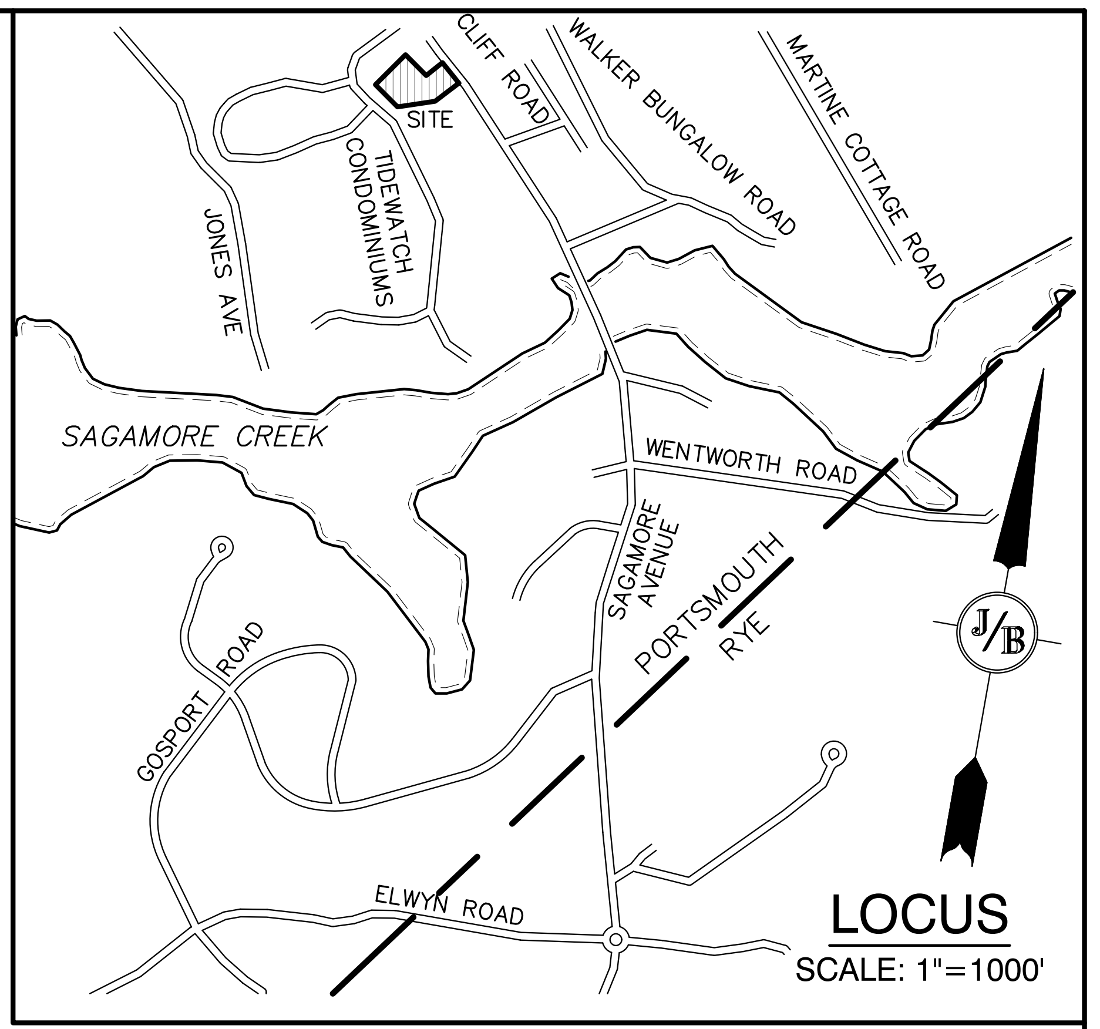
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

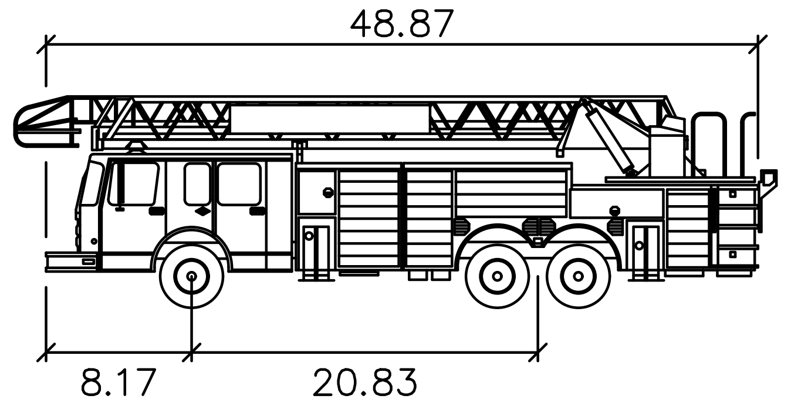
Plan Name: HIGHWAY ACCESS PLAN
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
H1
SHEET 12 OF 20
JBE PROJECT NO. 18134.1





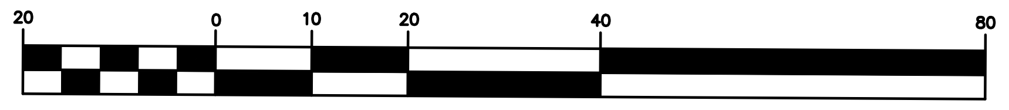
LOCUS
SCALE: 1"=1000'



Portsmouth Fire Truck

		feet
Width	:	8.50
Track	:	6.91
Lock to Lock Time	:	6.0
Steering Angle	:	38.7

GRAPHIC SCALE



(IN FEET)
1 inch = 20 ft.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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DANIEL JAMES MEDITZ
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08/20/2024

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0	3/18/24	ISSUED FOR REVIEW	KDR

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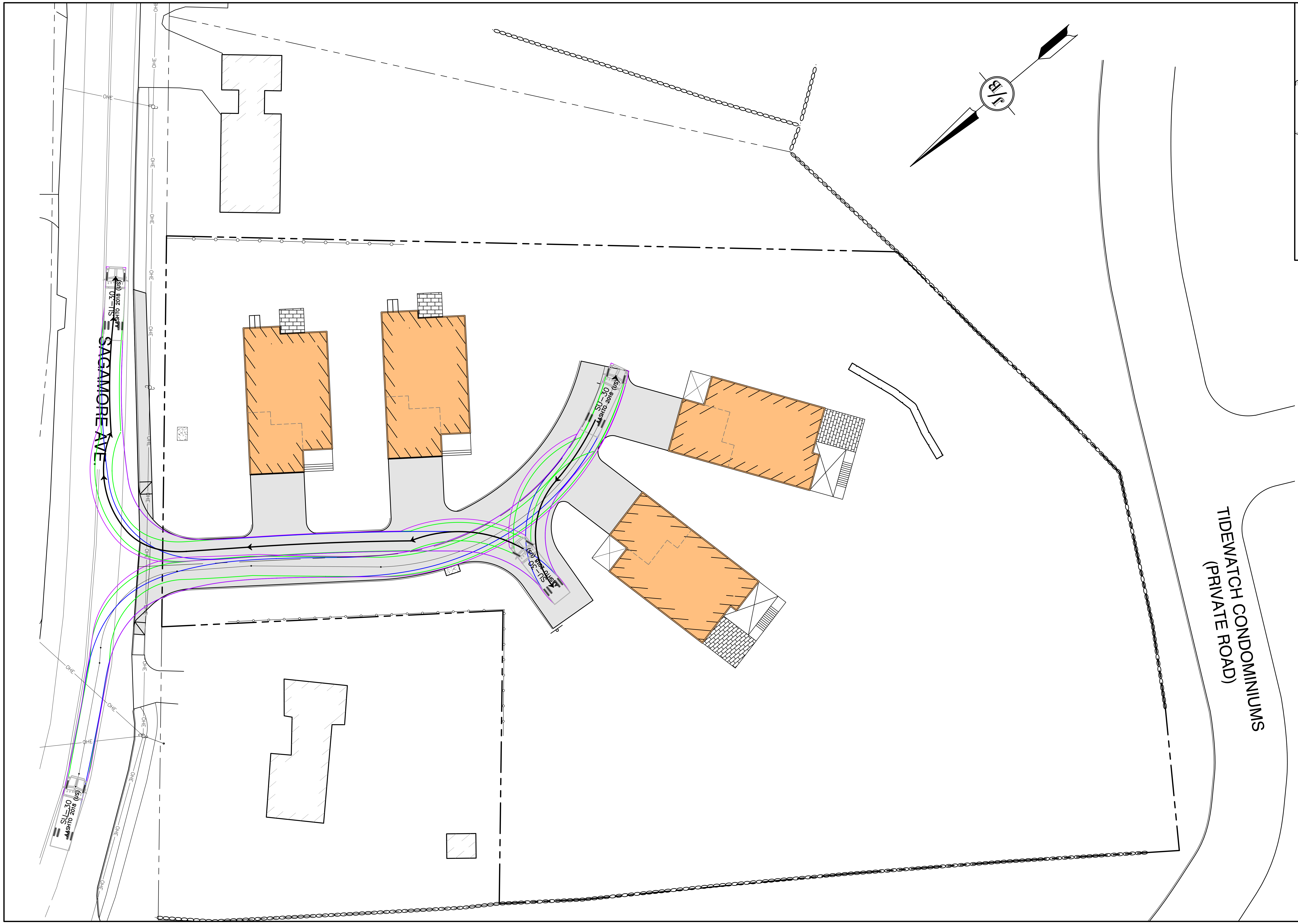
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

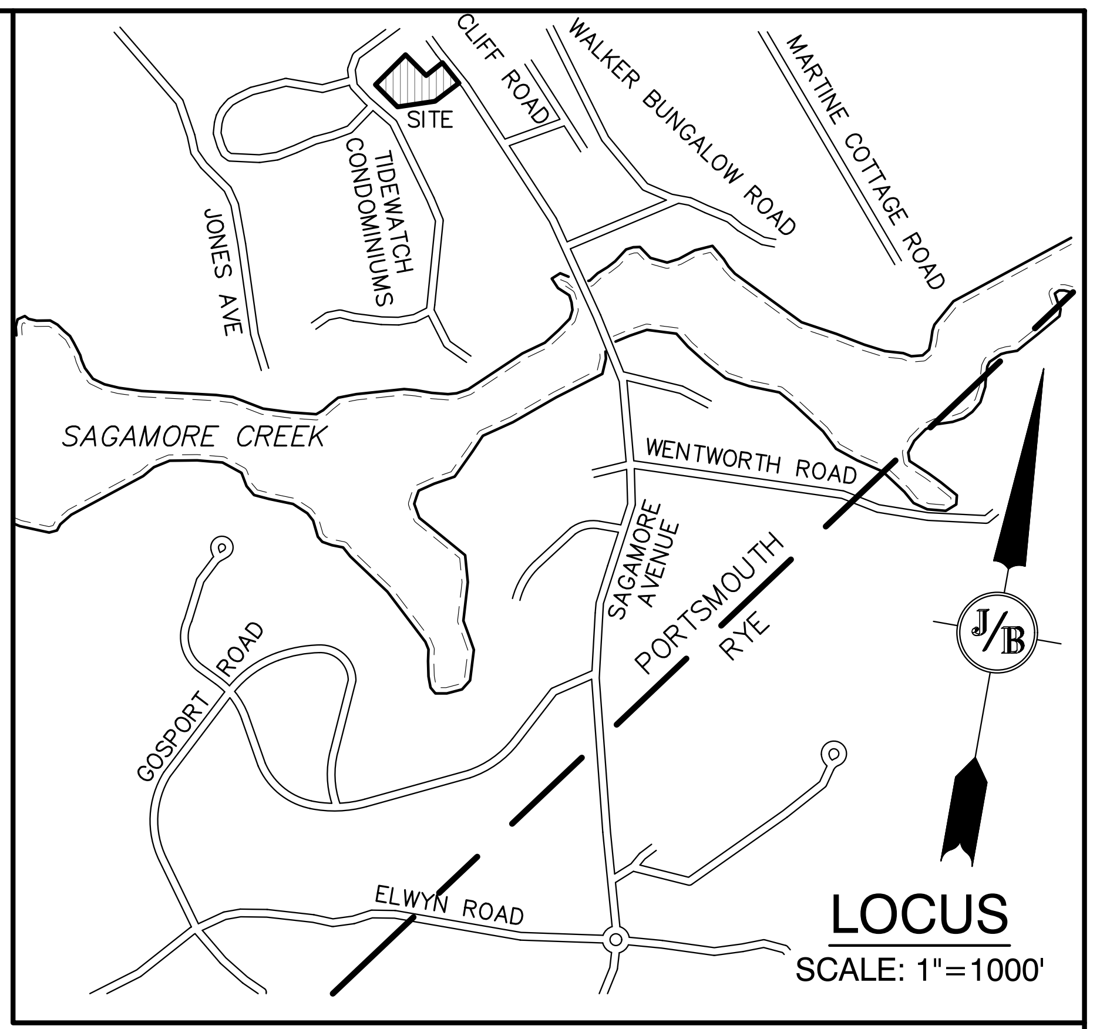
Plan Name: TRUCK TURNING PLAN

Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH

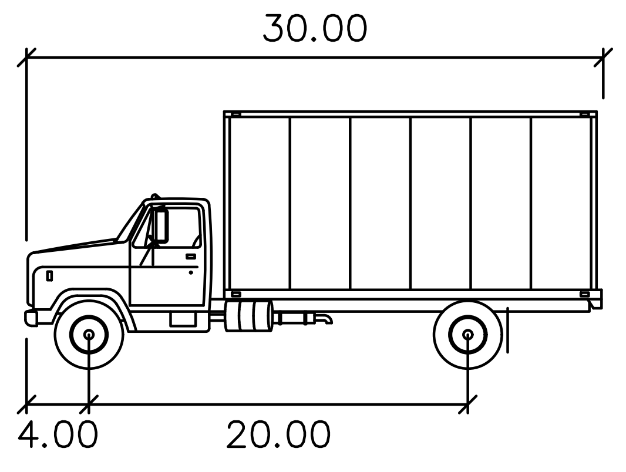
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
T1
SHEET 13 OF 20
JBE PROJECT NO. 18134.1





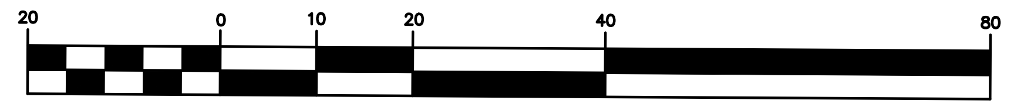
LOCUS
SCALE: 1"=1000'



SU-30

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

GRAPHIC SCALE



(IN FEET)
1 inch = 20 ft.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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DANIEL JAMES MEDITZ
No.18152
08/20/2024

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0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

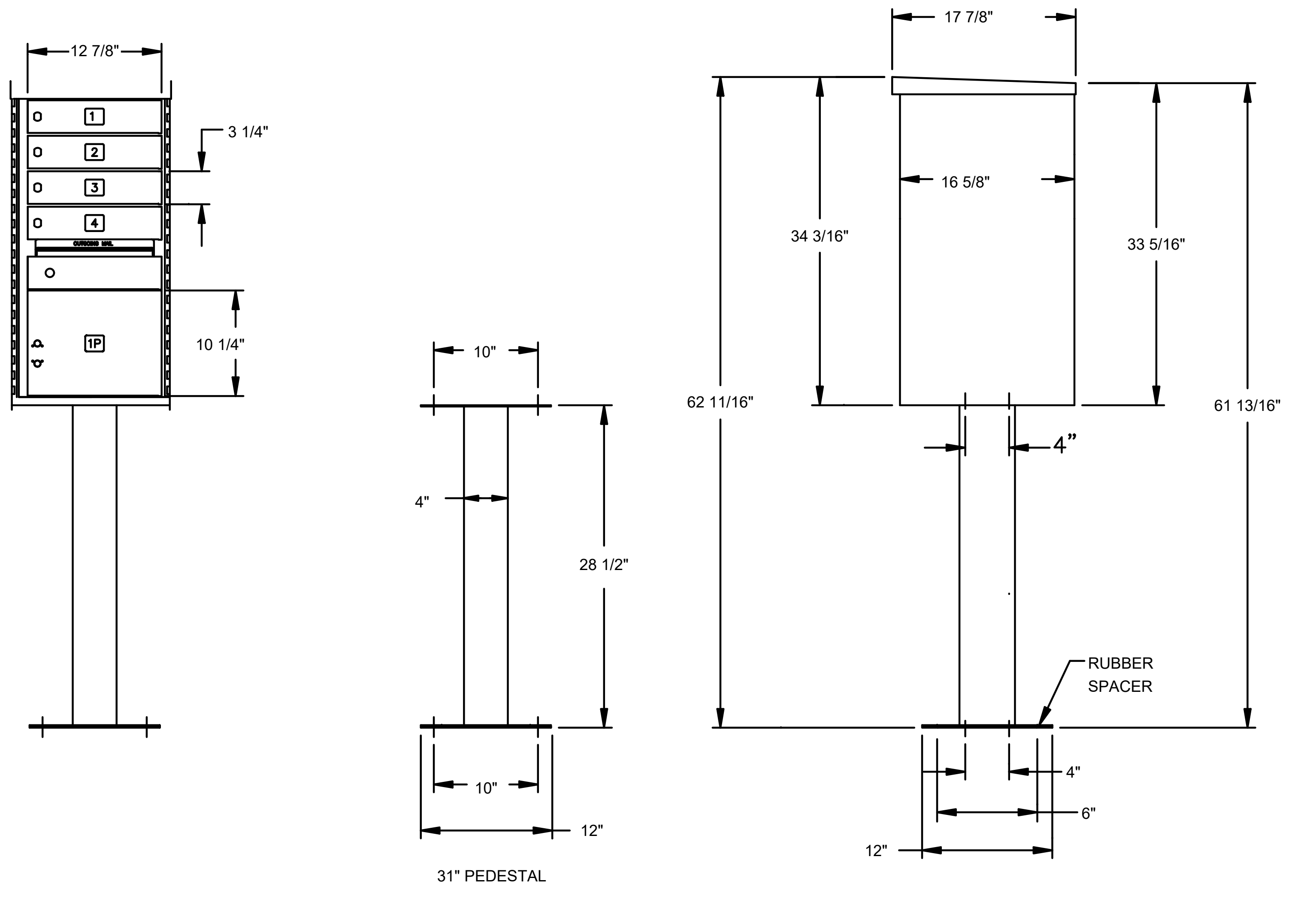
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	TRUCK TURNING PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

T2

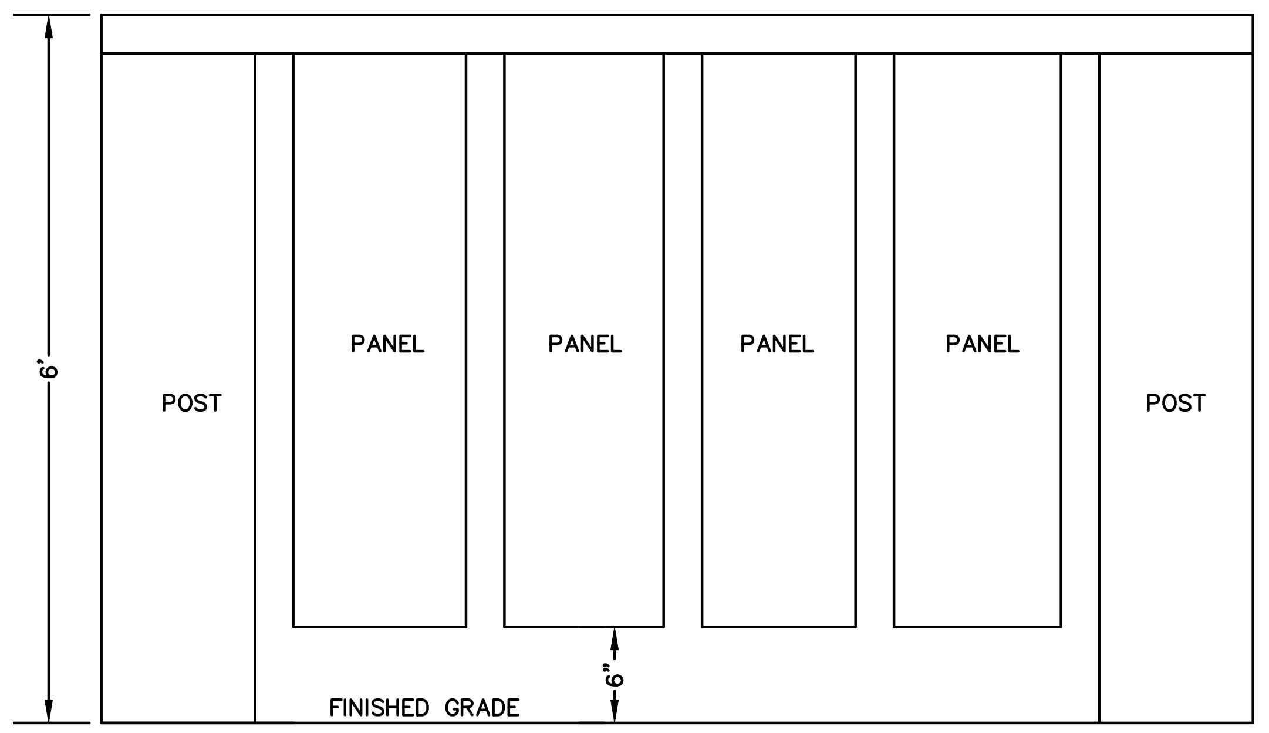
SHEET 14 OF 20
JBE PROJECT NO. 18134.1



POSTAL PRODUCTS UNLIMITED, INC.™ A Division of American Postal Manufacturing, Inc. Phone. 1-800-229-4500 500 W. Oklahoma Ave. Milwaukee, WI 53207-2649	Product: Type II CBU with Pedestal – Front Loading – N1027875			
	Distribution: USPS Approved		Finish: Powder Coat	
	Mounting: Pedestal		Total Mailboxes: 12 Doors – 1 Locker	
	Date: 02/02/06	Scale: NONE	Drawn By: CDO	Checked By: AJK

CLUSTER MAILBOX UNIT DETAIL

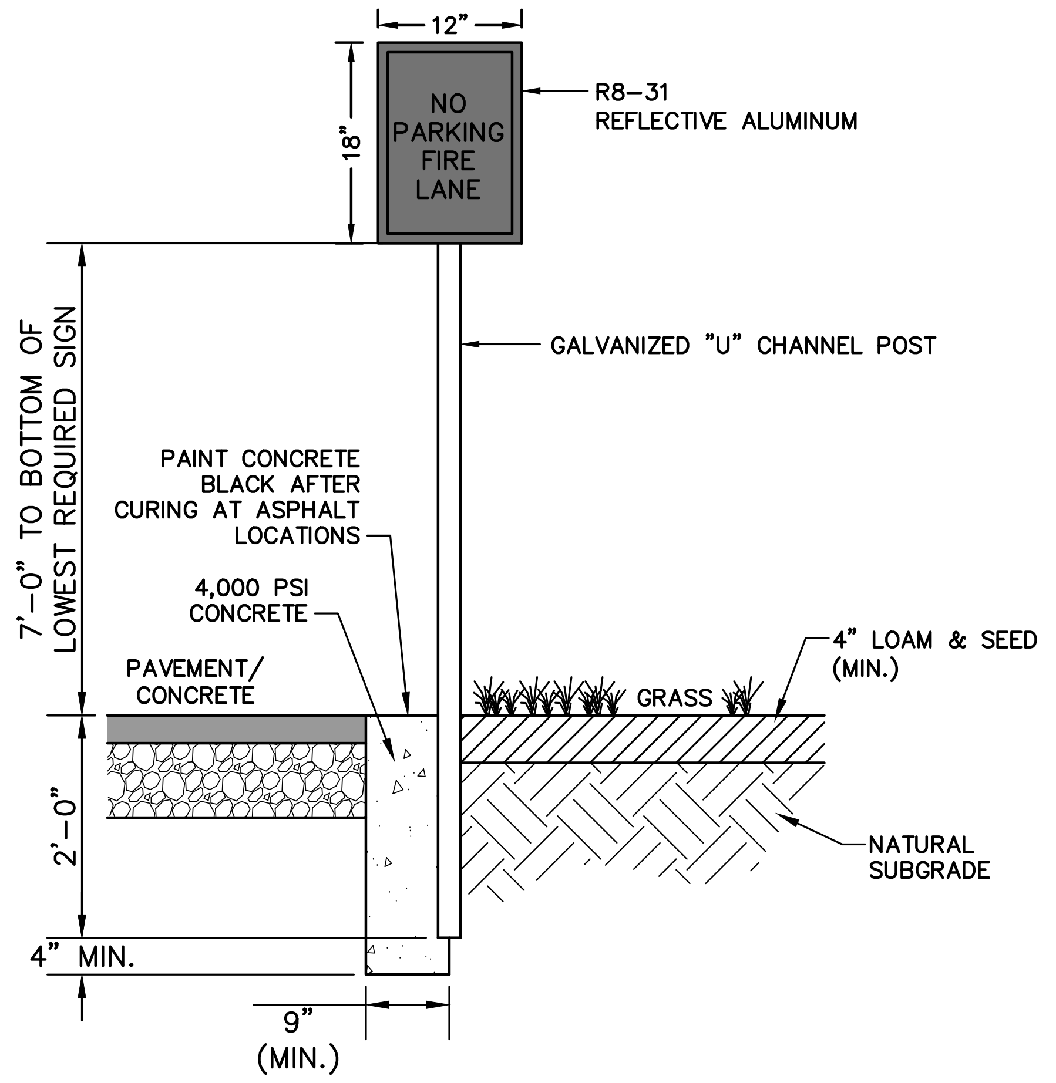
NOT TO SCALE



1. THE INTENT OF THIS DETAIL IS TO SHOW THE REQUIRED CLEARANCE FROM FINISHED GRADE TO THE BOTTOM OF THE WOODEN PANELS ON THE PROPOSED FENCE. THIS DETAIL SHALL NOT CONSTRUE A REQUIREMENT WITH REGARDS TO POST OR PANEL PLACEMENT ALONG THE LENGTH OF THE FENCE.

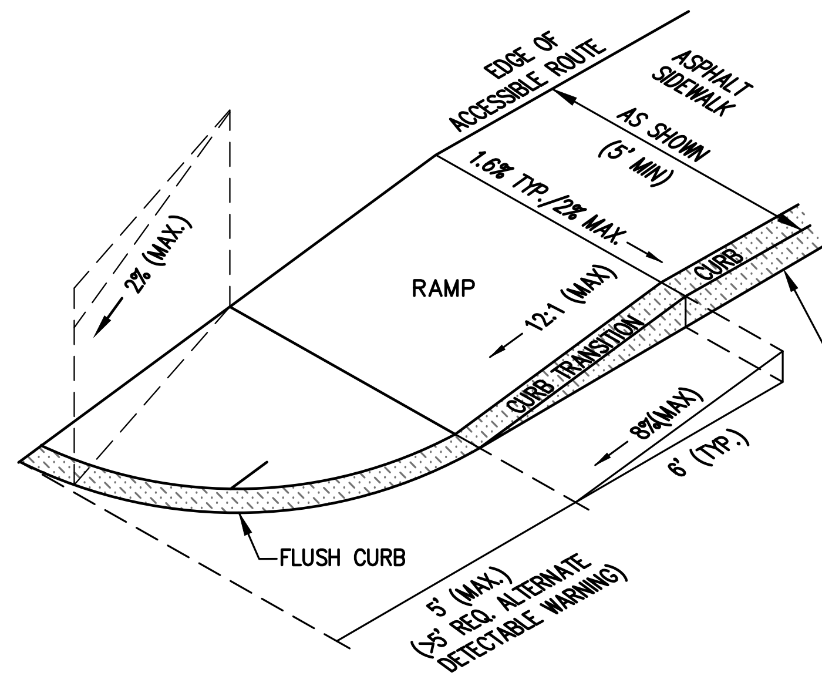
6' HIGH WOODEN STOCKADE FENCE DETAIL

NOT TO SCALE



"NO PARKING" SIGN (MUTCD R8-31)

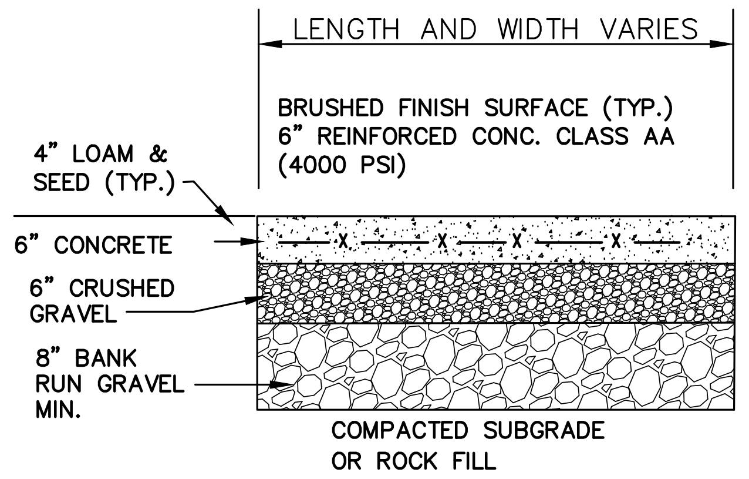
NOT TO SCALE



NOTES:
1. THE MAXIMUM ALLOWABLE CROSS SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) AND CURB SHALL BE 1.5%.
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) CURB RAMPS SHALL BE 8%.
4. A MINIMUM OF 4 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (i.e., HYDRANTS, UTLITY POLES, TREE WELLS, SIGNS, ETC.).
5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
6. BASE OF RAMP SHALL BE GRADED TO PREVENT PONDING.
7. SEE TYPICAL SECTION FOR RAMP CONSTRUCTION.

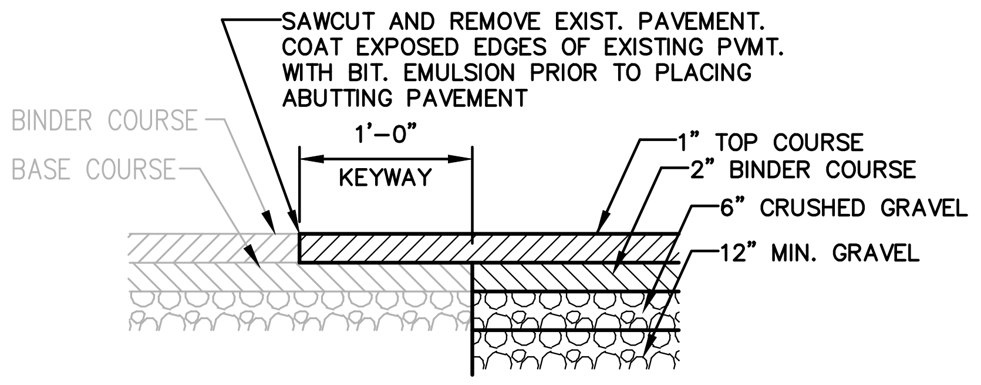
ACCESSIBLE CURB RAMP (TYPE 'B')

NOT TO SCALE



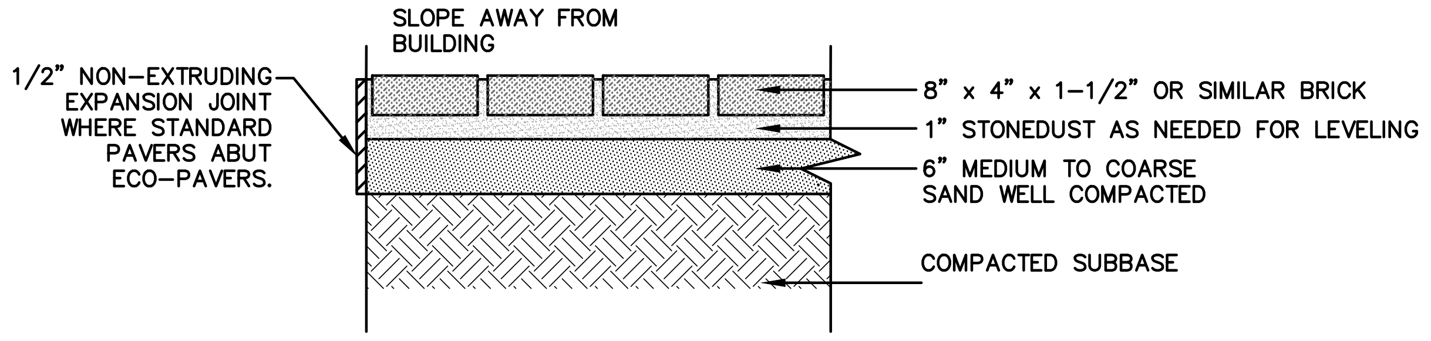
CONCRETE PAD DETAIL

NOT TO SCALE



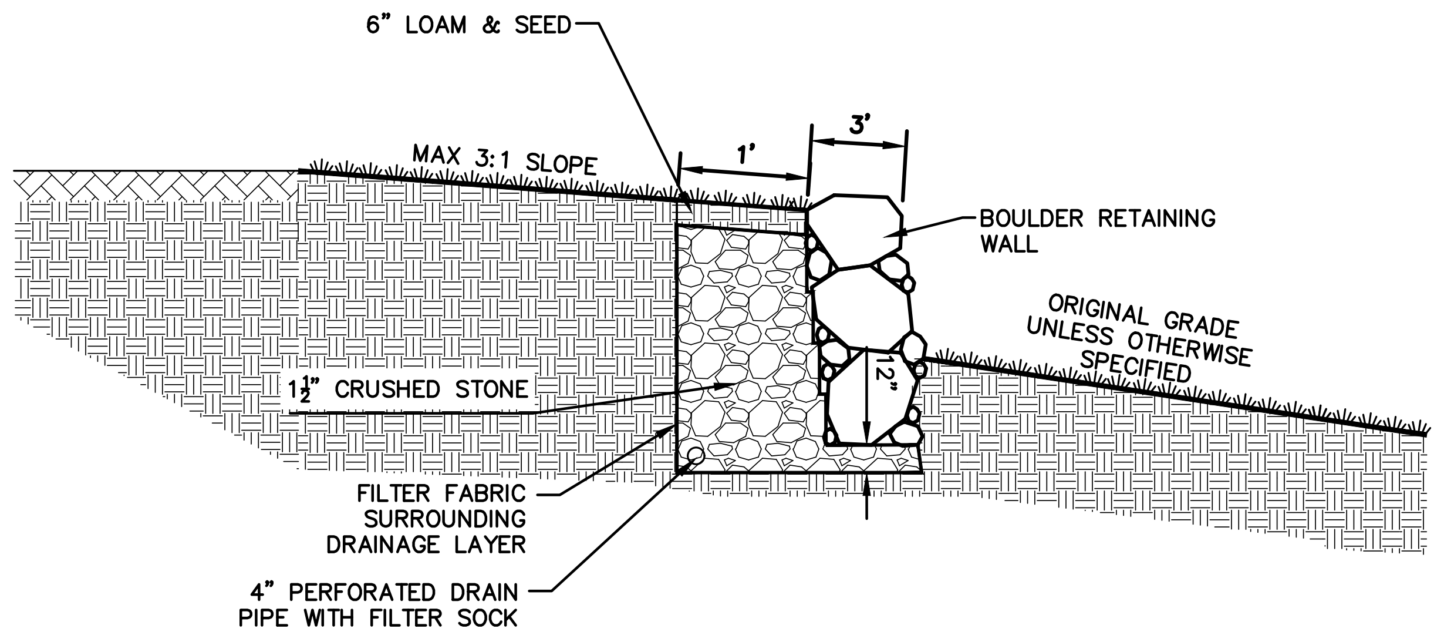
KEYWAY DETAIL FOR CONNECTION TO EXISTING PAVEMENT

NOT TO SCALE



STANDARD BRICK PAVER

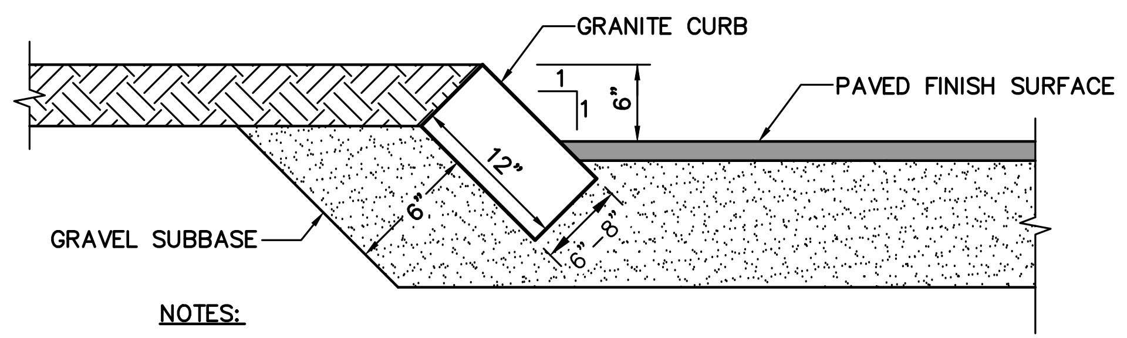
NOT TO SCALE



THE CONTRACTOR IS RESPONSIBLE FOR RETAINING THE SERVICES OF A STRUCTURAL ENGINEER LISENCED IN THE STATE OF NEW HAMPSHIRE TO DESIGN ANY WALL THAT HAS A HEIGHT OVER 4.0'. JONES & BEACH ENGINEERS, INC. DOES NOT ACCEPT ANY LIABILITY FOR THE STRUCTURAL DESIGN AND/OR INSTALLATION OF ANY RETAINING WALL OF ANY TYPE ABOVE THIS HEIGHT. THIS DETAIL IS INTENDED TO PROVIDE AN EXAMPLE OF THE RETAINING WALL FOR PLANNING PURPOSES ONLY AND IS SPECIFICALLY NOT INTENDED FOR USE BY THE CONTRACTOR IN ANY CONSTRUCTION–RELATED ACTIVITY FOR A WALL GREATER THAN 4.0' IN HEIGHT.

BOULDER RETAINING WALL CROSS SECTION

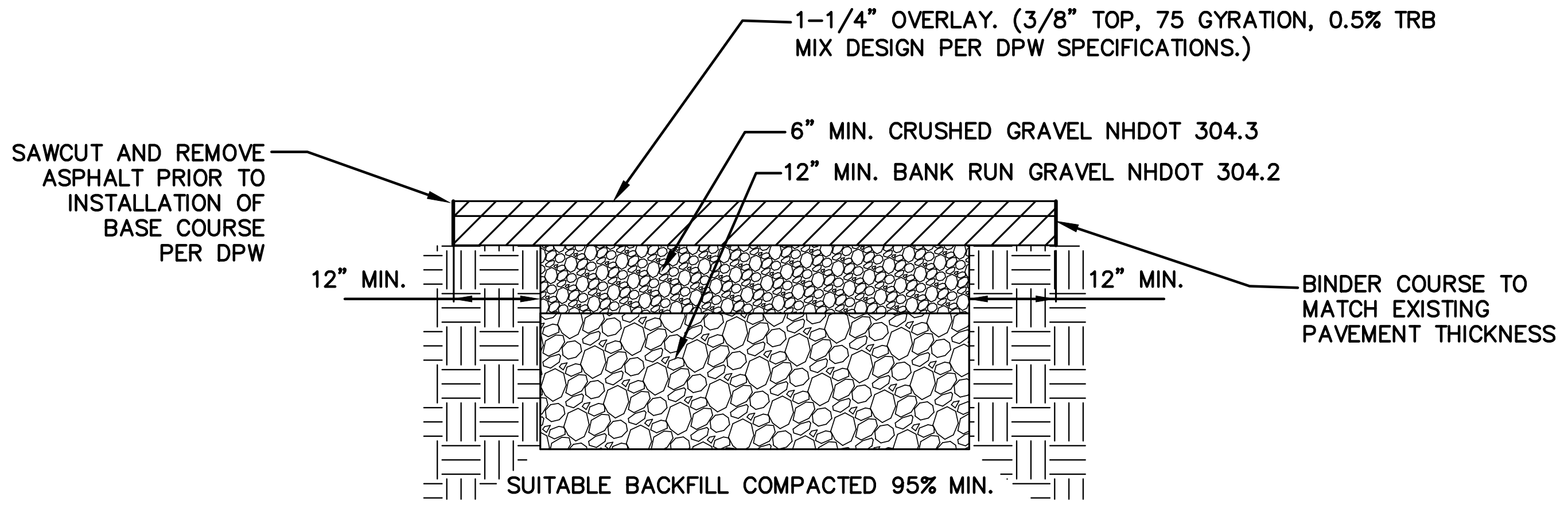
NOT TO SCALE



NOTES:
1. EDGING TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.
2. JOINTS BETWEEN STONES SHALL BE MORTARED.
3. SALVAGE GRANITE CURBS ON–SITE AND RESET TO THE EXTENT POSSIBLE.

SLOPED GRANITE CURB

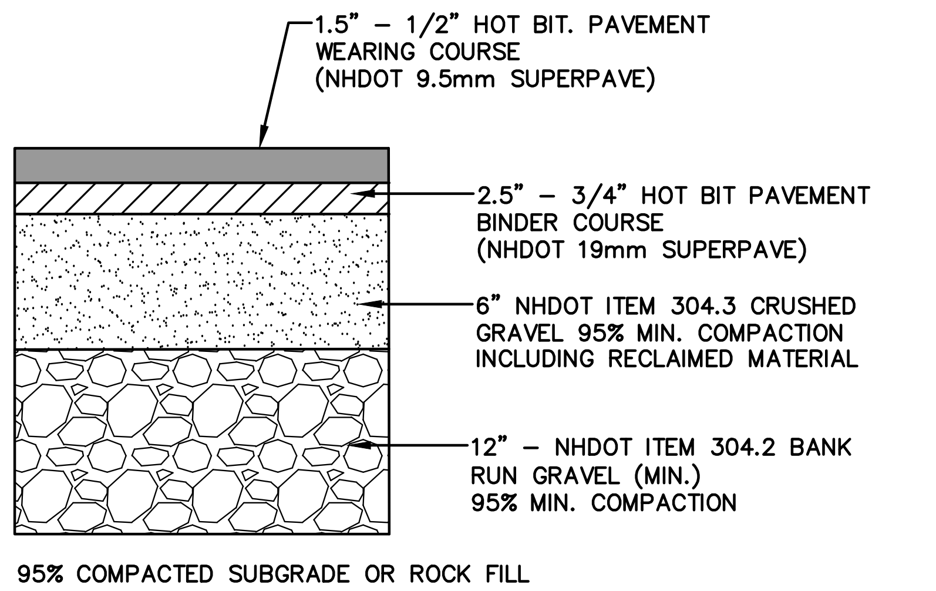
NOT TO SCALE



1. AFTER PROPER BACKFILLING AND COMPACTION, ADJACENT PAVEMENT MUST BE "SAW CUT" (STRAIGHT CUTS) A MINIMUM OF ONE FOOT (1') AROUND THE PERIMETER OF THE EXCAVATION. PAVEMENT MUST BE REMOVED.
2. INSTALL BASE COURSE LEAVING A REVEAL FOR SURFACE COURSE.
3. INSTALL SURFACE COURSE OF ASPHALT PAVING.
4. APPLY EMULSION SEALANT AT PERIMETER OF JOINT OVERLAPPING BASE COURSE. INSTALL WEARING COURSE OF ASPHALT TO GRADE. APPLY LIGHT SAND TO ABSORB EXCESS JOINT SEALANT.
5. GRAVEL COMPACTIONS TO MEET 95% MINIMUM.

TYPICAL PAVEMENT REPAIR DETAIL

NOT TO SCALE



TYPICAL BITUMINOUS PAVEMENT

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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DANIEL JAMES MEDITZ
No.18152
08/20/2024

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1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH

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Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

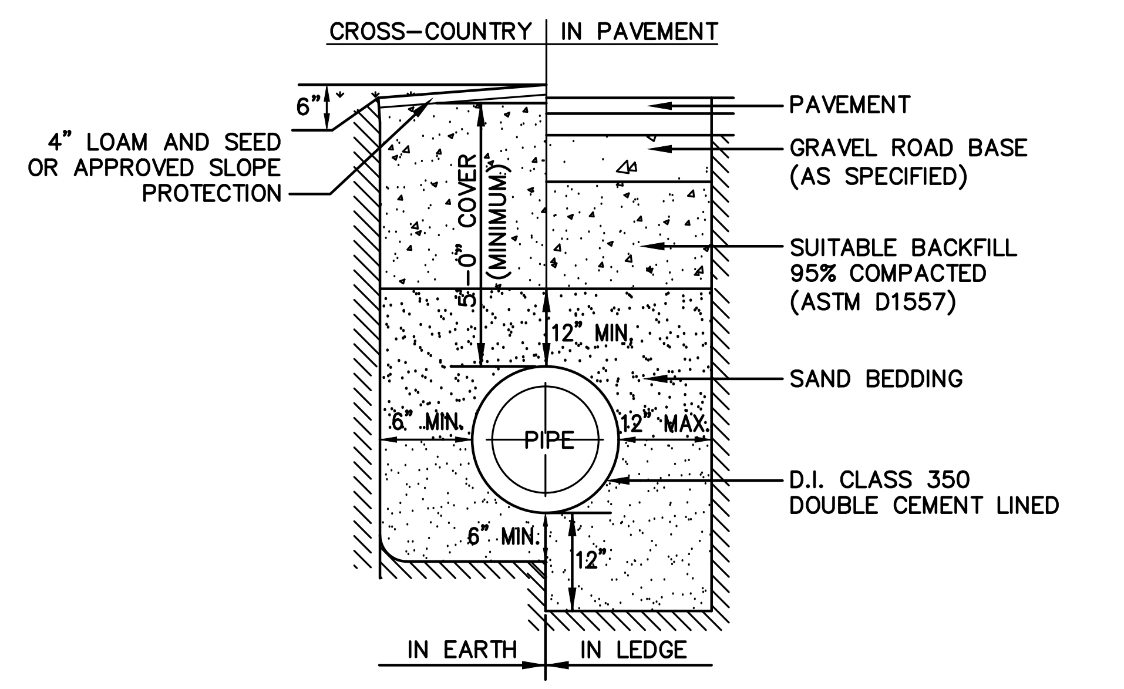
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: DETAIL SHEET

Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH

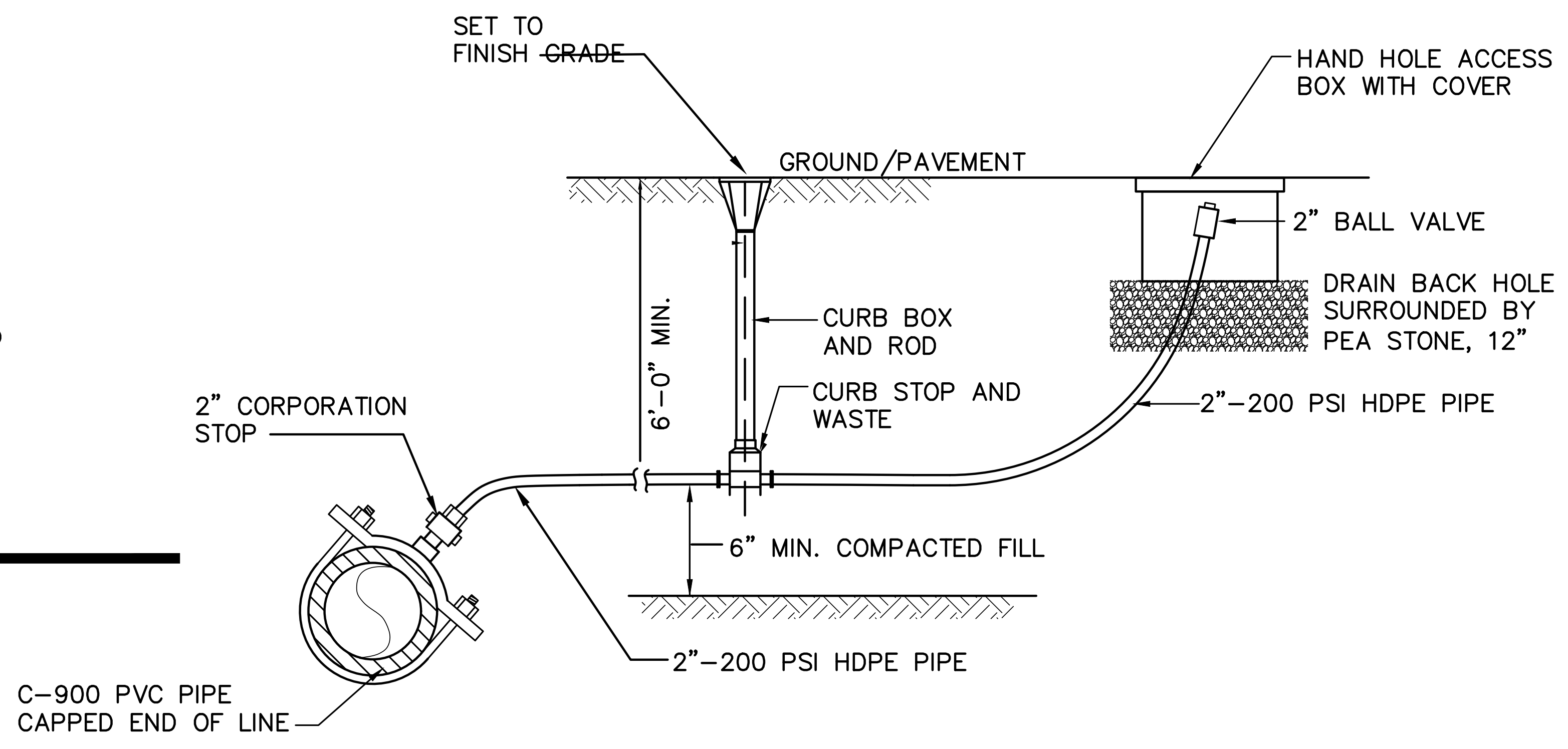
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
D1
SHEET 15 OF 20
JBE PROJECT NO. 18134.1



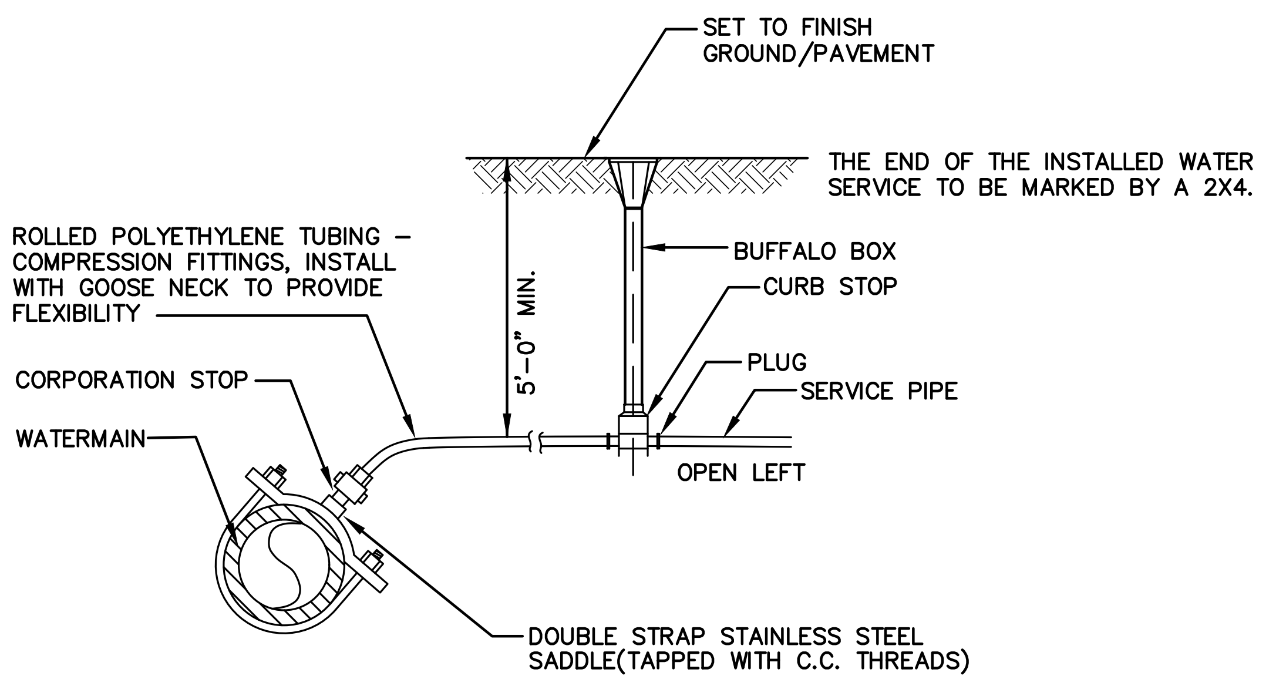
WATER SYSTEM TRENCH

NOT TO SCALE



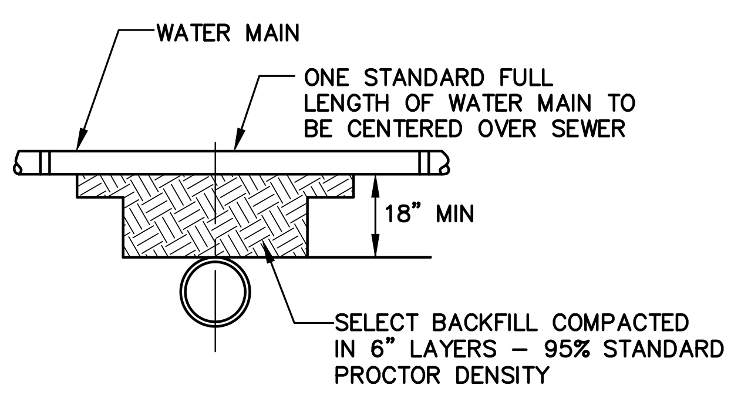
TYPICAL WATER MAIN BLOWOFF

NOT TO SCALE



WATER SERVICE CONNECTION-POLYETHYLENE

NOT TO SCALE

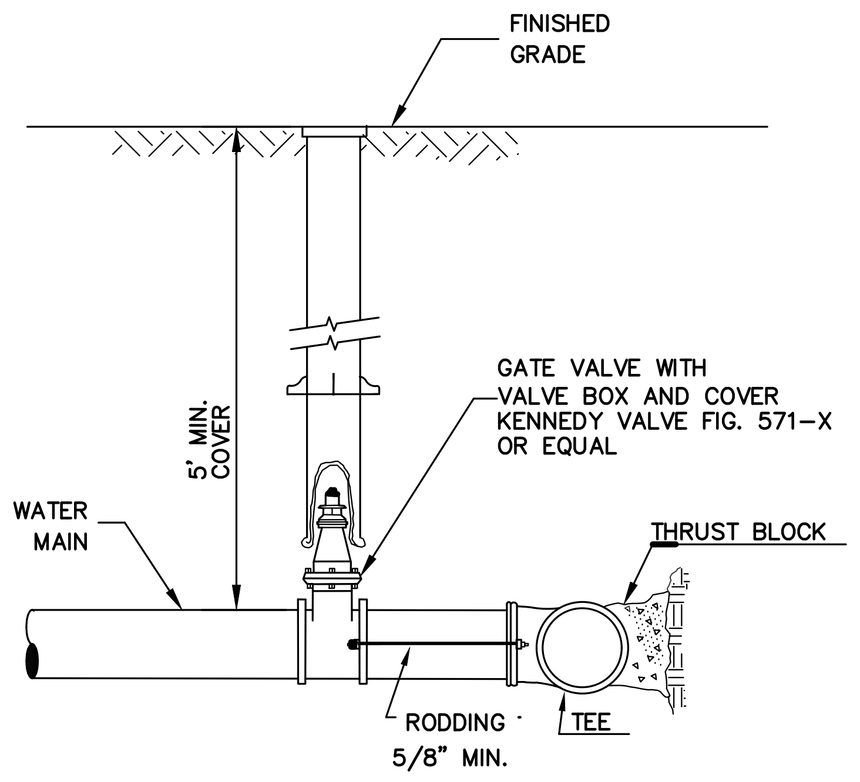


SEPARATION NOTES:

1. WATER MAINS SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED SEWERS. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE.
2. WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN PIPES. SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 6 FEET HORIZONTALLLY FROM THE WATER MAIN.

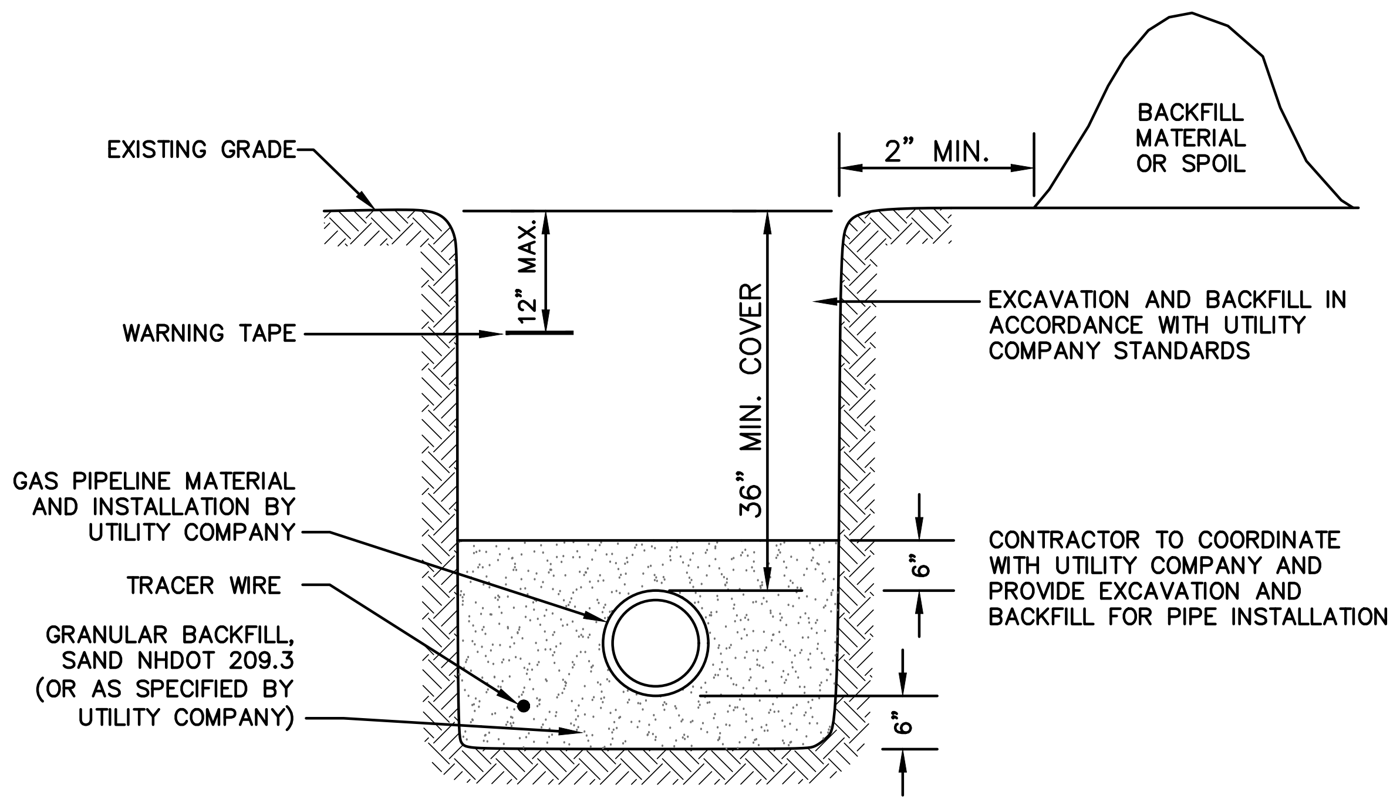
TYPICAL WATER / SEWER SEPARATION

NOT TO SCALE



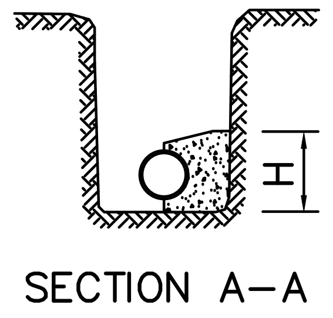
BURIED GATE VALVE DETAIL

NOT TO SCALE



GAS TRENCH

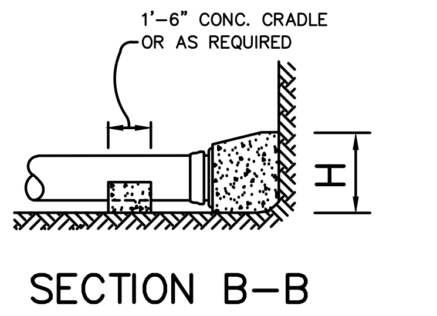
NOT TO SCALE



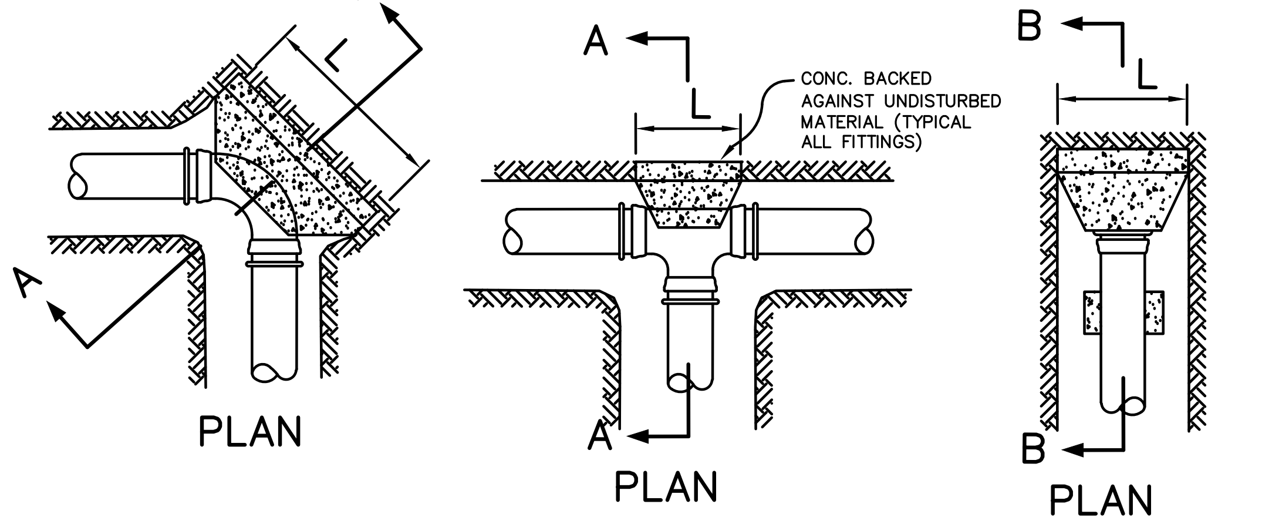
SECTION A–A

CONCRETE THRUST BLOCK DIMENSIONS								
PIPE DIA. (IN.)	TEE		90° BEND OR STUB		45° BEND		22.5° BEND	
	H	L	H	L	H	L	H	L
4"/6"	1'–6"	1'–6"	1'–6"	2'–0"	1'–6"	1'–6"	1'–6"	1'–6"
8"	2'–0"	2'–0"	2'–0"	3'–0"	1'–6"	2'–0"	1'–6"	1'–6"
10"	2'–0"	3'–0"	2'–6"	3'–6"	2'–0"	2'–6"	1'–6"	2'–0"
12"	2'–6"	3'–6"	3'–0"	4'–0"	2'–0"	3'–6"	1'–6"	2'–6"
15"	3'–0"	4'–6"	3'–6"	5'–6"	3'–0"	3'–6"	2'–0"	2'–6"
18"	4'–0"	5'–0"	4'–6"	6'–0"	3'–6"	4'–0"	2'–6"	3'–0"
24"	5'–0"	7'–0"	6'–0"	8'–0"	4'–0"	6'–0"	3'–0"	4'–6"

PIPING W/ MECHANICAL JOINT FITTINGS SHALL HAVE RETAINING GLANDS

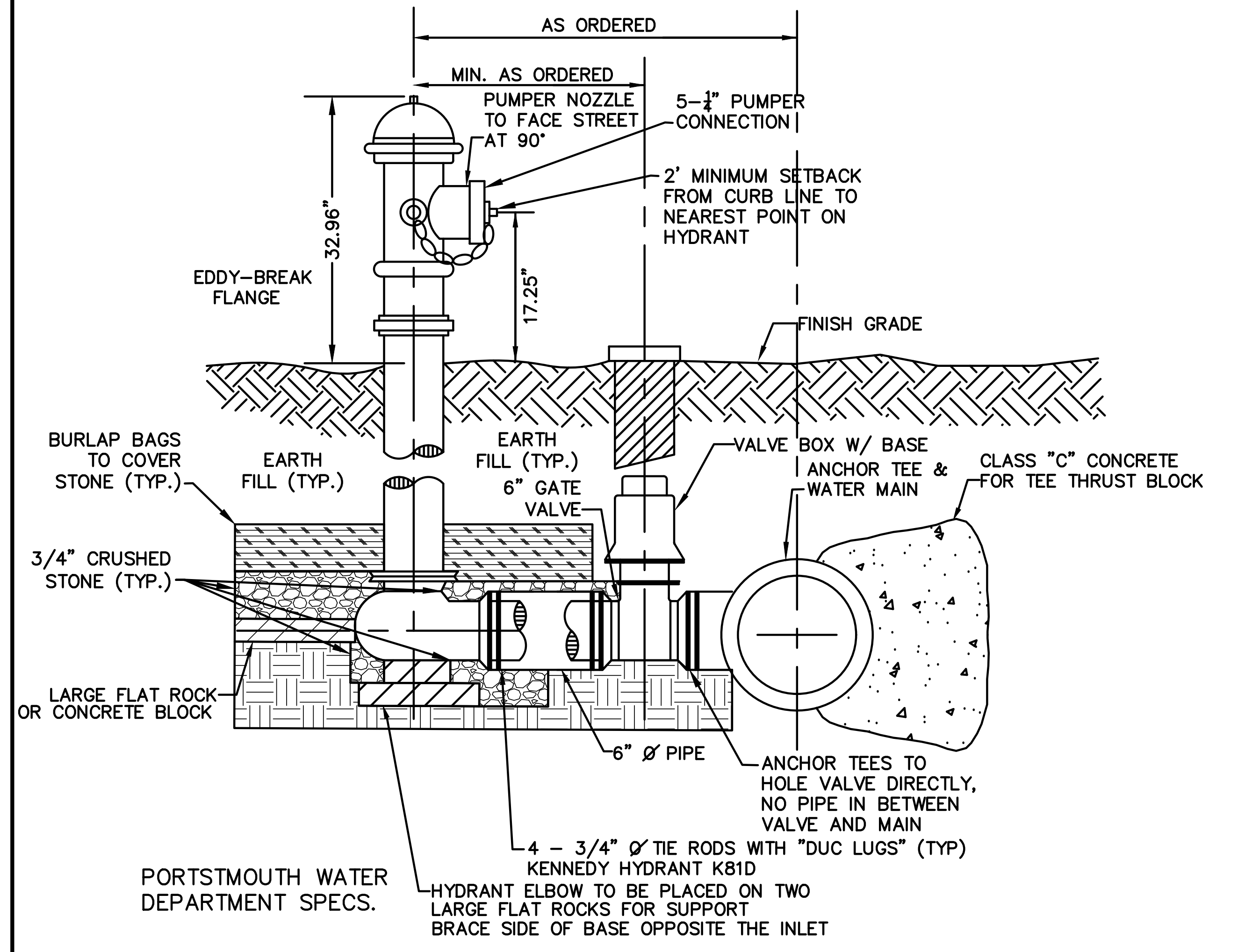


SECTION B–B



THRUST BLOCK DETAILS

NOT TO SCALE



NOTES

1. ALL PIPE FITTINGS TO BE D.I. PRESSURE CLASS 350, THICKNESS CLASS 52.
2. HYDRANT TO BE PAINTED RED WITH WHITE "REFLECTOR" PAINT ON BONNET.
3. MECHANICAL JOINTS SHALL HAVE MEGALUG RETAINING GLANDS AS MADE BY EBBA OR APPROVED EQUAL.
4. NATIONAL STANDARD THREAD.
5. HYDRANT AND ALL VALVES SHALL OPEN RIGHT
6. ANCHOR TEES SHALL HOLD VALVE DIRECTLY WITH NO PIPE IN BETWEEN VALVE AND MAIN.

HYDRANT INSTALLATION

NOT TO SCALE

SUBMITTALS

SHOP DRAWINGS, INCLUDING SPECIFICATIONS, CATALOG CUTS, DATA SHEETS, DRAWINGS AND OTHER DESCRIPTIVE MATERIAL SHALL BE SUPPLIED TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION. A CERTIFICATE OF COMPLIANCE FROM THE MANUFACTURER INDICATING CONFORMANCE WITH THE SPECIFIED REQUIREMENTS FOR DUCTILE IRON PIPE SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

DELIVERY, HANDLING, AND STORAGE

ALL PIPE AND APPURTENANCES ARE SUBJECT TO INSPECTION BY THE ENGINEER AT THE POINT OF DELIVERY. MATERIAL FOUND TO BE DEFECTIVE DUE TO MANUFACTURE OR DAMAGE IN SHIPMENT SHALL BE REJECTED OR RECORDED ON THE BILL OF LADING AND REMOVED FROM THE JOB SITE. ALL MATERIALS, IF STORED, SHALL BE KEPT SAFE FROM ANY POTENTIAL DAMAGE.

SAND BEDDING

SAND BLANKET SHALL CONSIST OF CLEAN SAND THAT IS FREE FROM ORGANIC MATTER AND GRADED SO THAT 90–100% PASSES A 1/2" SIEVE AND NOT MORE THAN 15% WILL PASS A #200 SIEVE.

BACKFILL

SUITABLE MATERIAL FOR BACKFILL IN ROADS, ROAD SHOULDERS, AND WALKWAYS SHALL BE THE NATURAL MATERIAL REMOVED DURING THE COURSE OF TRENCH EXCAVATION, BUT SHALL EXCLUDE ANY DEBRIS, PAVEMENT, ORGANIC MATTER, LOAM, WET OR SOFT MUCK, PEAT, OR CLAY. BACKFILL MATERIAL SHALL BE PLACED IN 6" LIFTS AND SHALL BE COMPACTED TO 95% OF ASTM–1557 AT OPTIMUM MOISTURE CONTENT.

DUCTILE IRON PIPE–CLASS 52

JOINTS SHALL BE OF "PUSH–ON" TYPE UNLESS OTHERWISE SPECIFIED. PIPE SHALL HAVE A DOUBLE CEMENT LINING WITH SEAL COATING INSIDE AND BITUMINOUS COATING OUTSIDE THAT MEETS OR EXCEEDS THE REQUIREMENTS OF AWWA/ANSI C104/A21.4. GASKETS FOR DUCTILE IRON PIPE SHALL BE OIL–RESISTANT RUBBER WHICH MEETS OR EXCEEDS THE REQUIREMENTS OF AWWA/ANSI C111/A21.11. PIPE SHALL BE FURNISHED COMPLETE WITH ALL GASKETS AND LUBRICANT.

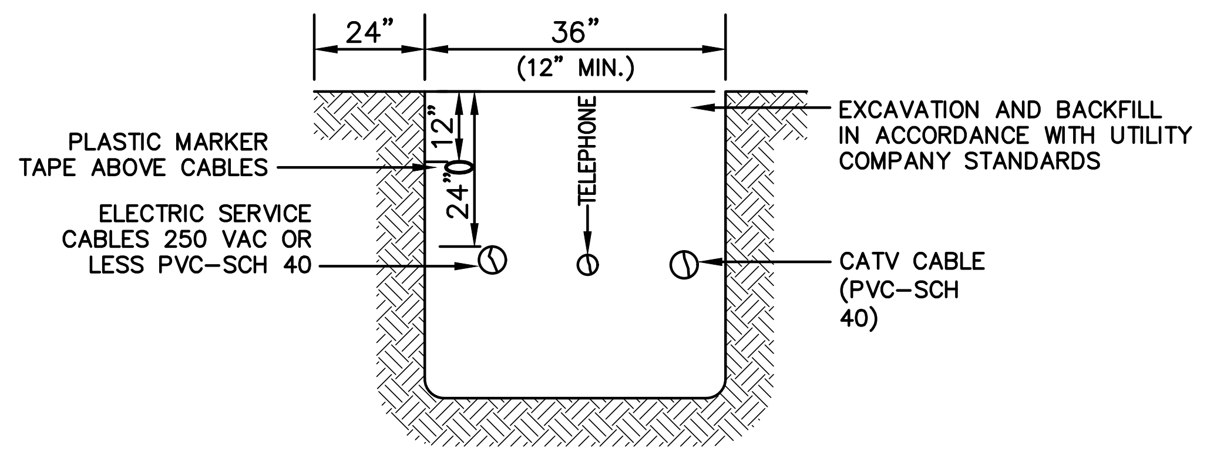
WATERMAIN TESTING

ALL WATER MAINS WILL BE CLEANED AND HYDROSTATICALLY TESTED AT A MINIMUM PRESSURE OF 150psi AT THE HIGHEST POINT ALONG THE TEST SECTION. THE HYDROSTATIC TEST SHALL BE CONDUCTED FOR A MINIMUM OF TWO HOURS DURING WHICH TEST PRESSURE SHALL NOT VARY MORE THAN ±5psi. LEAKAGE CALCULATIONS WILL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN WATER WORKS ASSOCIATION. DISINFECTION WILL BE REQUIRED PER THE SPECIFICATIONS OF ANSI/AWWA C651. WITHIN 24 HOURS OF DISINFECTION, ALL NEWLY INSTALLED MAINS SHALL BE FLUSHED.

NOTES

1. CONTRACTOR TO INSTALL 2" RIGID INSULATION BETWEEN THE PROPOSED WATERMAIN(S) AND DRAINAGE LINES IN ALL AREAS WHERE SEPARATION IS TO BE IN 4' OR LESS.
2. ALL PIPE, FITTINGS, HYDRANTS, AND WORKMANSHIP SHALL BE INSPECTED AND APPROVED BY THE MUNICIPAL WATER/SEWER DEPARTMENT.
4. ALL CONSTRUCTION AND TESTING SHALL COMPLY WITH THE REGULATIONS OF THE MUNICIPAL, THE STATE, AND THE AMERICAN WATER WORKS ASSOCIATION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND DETERMINING THE LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UNFORESEEN UTILITY FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION. ANY APPROPRIATE REMEDIAL ACTION MUST BE AGREED TO BY THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING "DIG–SAFE" AT 1–888–344–7233 AT LEAST 72 HOURS BEFORE DIGGING.
6. ALL CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF NOT LESS THAN 2000 PSI AFTER 28 DAYS.
7. CONTRACTOR TO INSTALL CORPORATION FITTINGS AT EACH CONNECTION TO THE WATER MAIN FOR TESTING PURPOSES. CORPORATIONS SHALL BE REMOVED AND PLUGGED AT THE COMPLETION OF TESTING.
8. CONTRACTOR TO OBSERVE ALL APPROPRIATE BEST MANAGEMENT PRACTICES.
9. ALL GATE VALVES TO BE MUELLER RESILIENT WEDGE (OPEN RIGHT).
10. ALL TEES TO BE ANCHOR TEES.
11. THE TERMINAL 36' OF ALL "DEAD END" WATERMAINS AND ALL BENDS AND TEES ARE TO BE FITTED WITH MECHANICAL RESTRAINING JOINTS, "MEGALUG" OR APPROVED EQUAL AND THRUST BLOCKS.
12. INSTALL THRUST BLOCKS AT ALL TEES, BENDS, AND FITTINGS.

WATER LINE TECHNICAL SPECIFICATIONS



NOTE: ALL UTILITIES SHALL BE REVIEWED AND APPROVED BY APPROPRIATE UTILITY COMPANY.

UTILITY TRENCH

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Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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DANIEL JAMES MEDITZ
No.18152
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

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PO Box 219
Stratham, NH 03885

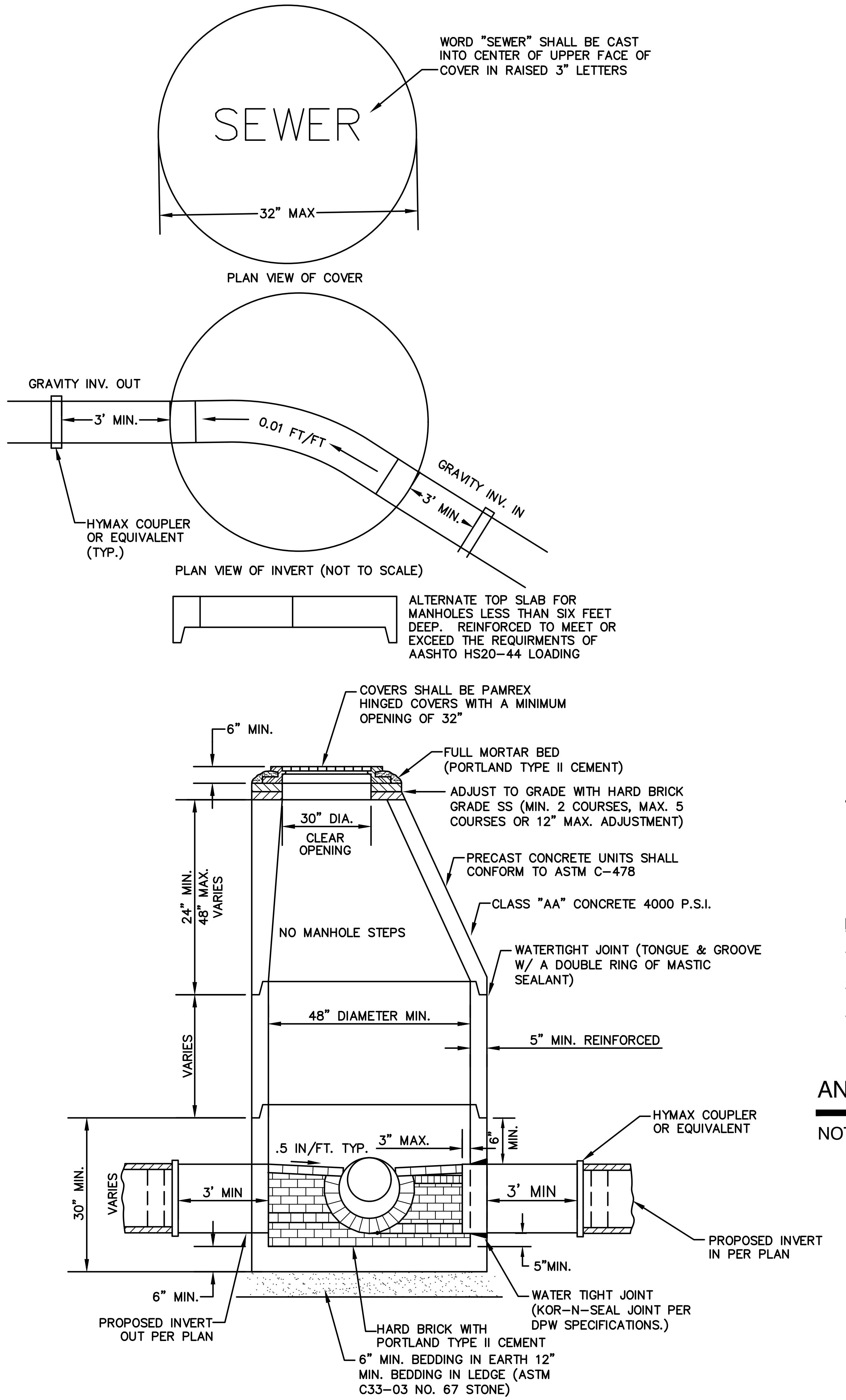
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

D2

SHEET 16 OF 20
JBE PROJECT NO. 18134.1

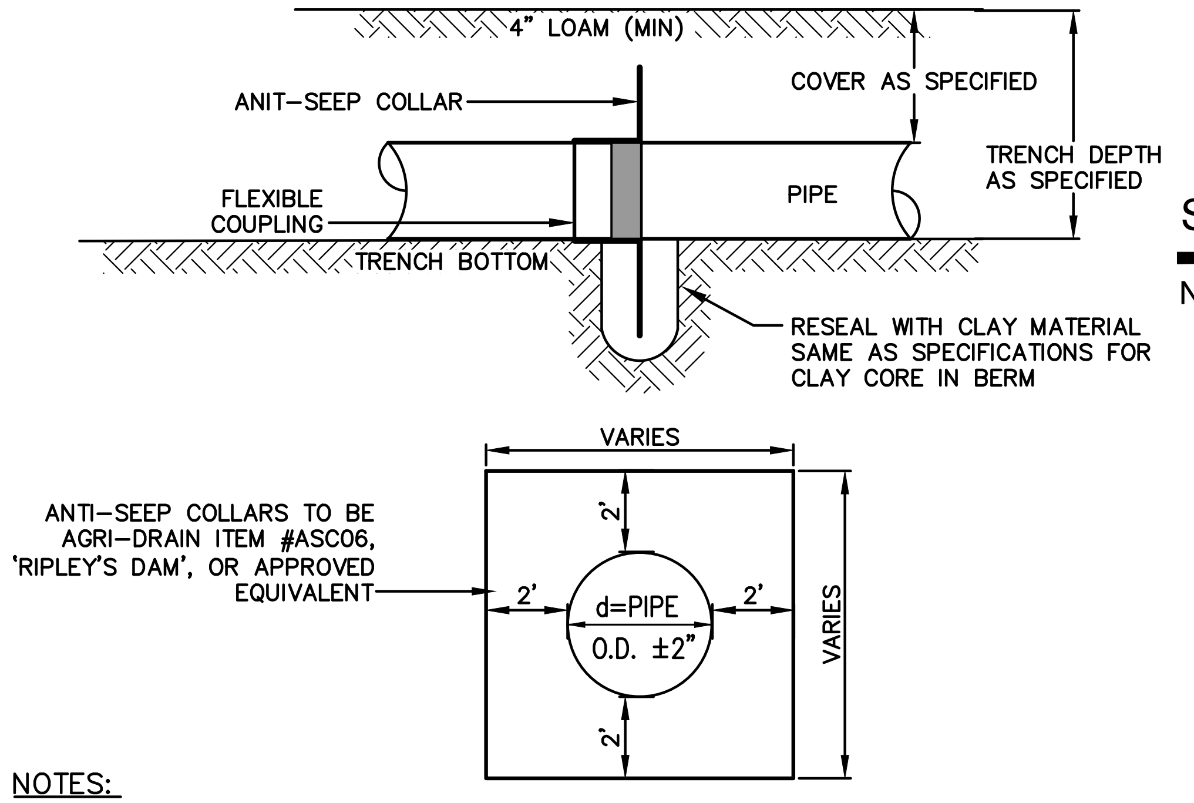


NOTES:

1. PER NHDES ENV-WQ 704.13(C), THE MORTAR SPECIFICATION SHALL BE AS FOLLOWS:
   1. MORTAR SHALL BE COMPOSED OF PORTLAND CEMENT AND SAND WITH OR WITHOUT HYDRATED LIME ADDITION;
   2. PROPORTIONS IN MORTAR OF PARTS BY VOLUMES SHALL BE:
      A. 4.5 PARTS SAND AND 1.5 PARTS CEMENT; OR
      B. 4.5 PARTS SAND, ONE PART CEMENT AND 0.5 PART HYDRATED LIME;
   3. CEMENT SHALL BE TYPE II PORTLAND CEMENT CONFORMING TO ASTM C150-05;
   4. HYDRATED LIME SHALL BE TYPE S CONFORMING TO THE ASTM C207-06 "STANDARD SPECIFICATIONS FOR HYDRATED LIME FOR MASONRY PURPOSES";
   5. SAND SHALL CONSIST OF INERT NATURAL SAND CONFORMING TO THE ASTM C33-03 "STANDARD SPECIFICATIONS FOR CONCRETE, FINE AGGREGATES";
2. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPED TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL IN ACCORDANCE WITH ENV-WQ 704.12 (K).
3. ALL MANHOLES SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH ENV-WQ 704.17 (a) THROUGH (e).
4. SEWER MANHOLE COVERS SHALL CONFORM TO ASTM A48 WITH A CASTING EQUAL TO CLASS 30 IN ACCORDANCE WITH ENV-WQ 704.13 (a).
5. ALL ASBESTOS CONTAINING WASTE MATERIALS MUST BE PROPERLY IDENTIFIED, PACKAGED AND DELIVERED TO A LANDFILL LICENCED BY THE NHDES SOLID WASTE MANAGEMENT PROGRAM FOR DISPOSAL. CALL (603) 271-2925 FOR MORE INFORMATION.
6. PORTSMOUTH STANDARD SEWER MANHOLE SHALL BE USED.
7. CONTRACTOR TO PURCHASE SEWER MANHOLE COVERS FROM THE CITY OF PORTSMOUTH DIRECTLY.
8. MANHOLE BASE SECTIONS SHALL BE MONOLITHIC TO A POINT AT LEAST 6" ABOVE THE HIGHEST INCOMING SEWER PIPE PER ENV-WQ 704.12 (e).
9. MANHOLE CASTINGS SHALL CONFORM TO ASTM A48 PER ENV-WQ 704.13 (a) (8).

PORTSMOUTH SEWER MANHOLE

NOT TO SCALE

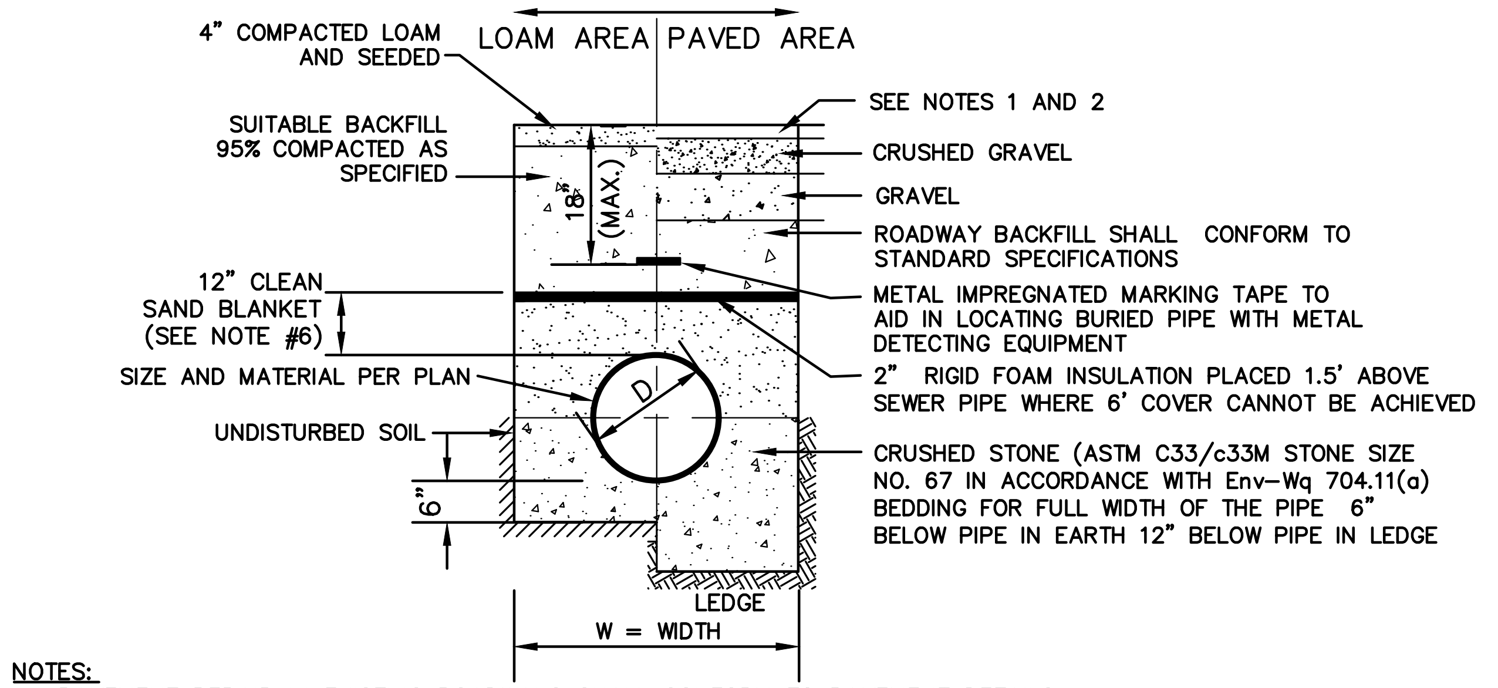


NOTES:

1. CONTRACTOR SHALL INSTALL COLLAR(S) PER MANUFACTURER'S SPECIFICATIONS.
2. CONTRACTOR SHALL ENSURE A WATERTIGHT SEAL BETWEEN THE COLLAR(S) AND PIPE(S).
3. ANTI-SEEP COLLARS SHALL BE PLACED ±15' AND ±25' DOWNSTREAM OF THE CULVERT INLETS, UNLESS OTHERWISE SPECIFIED. WHEN A CLAY CORE IS SPECIFIED, A COLLAR SHALL BE INSTALLED ON BOTH SIDES OF THE CORE.

ANTI-SEEP COLLAR

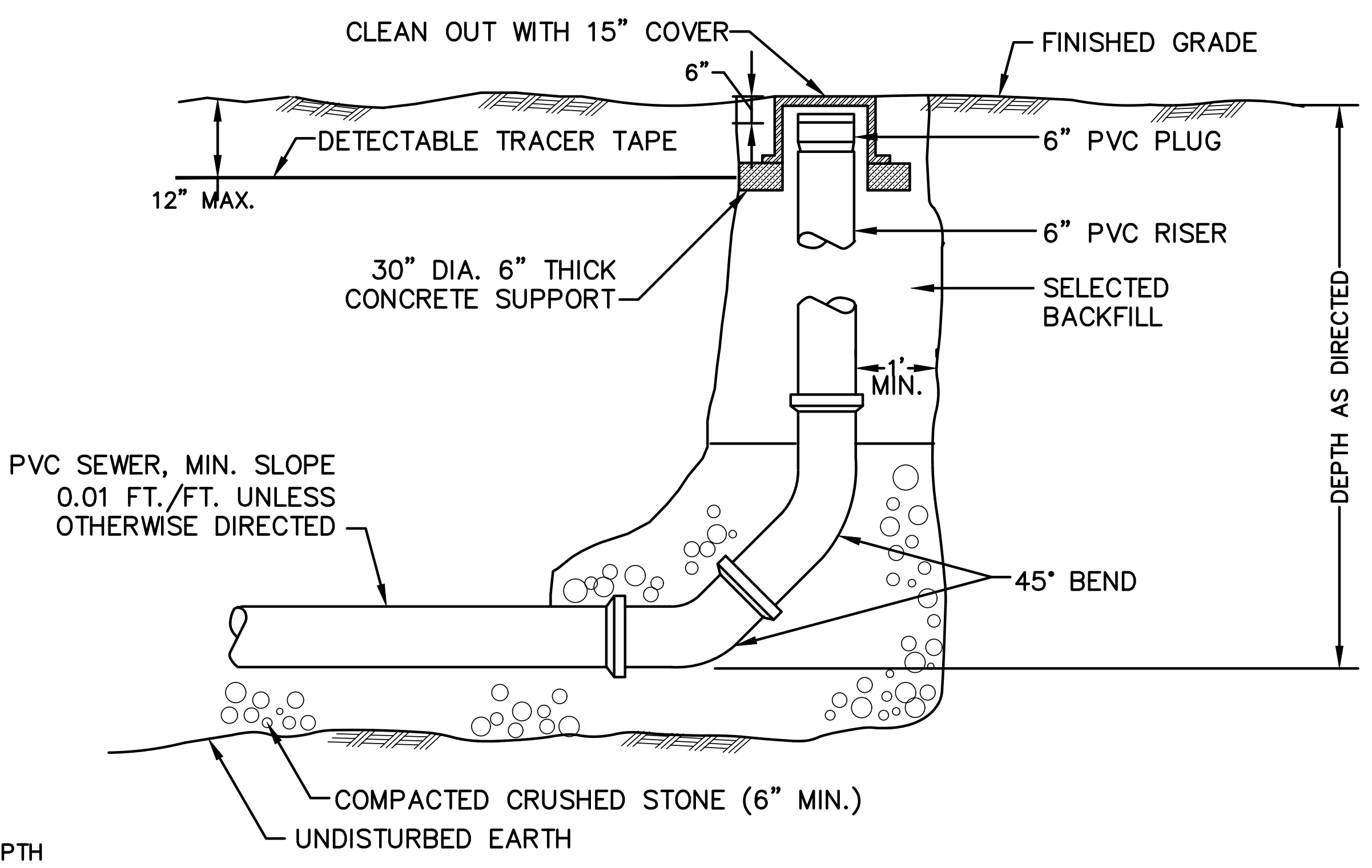
NOT TO SCALE



NOTES:
1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO PAVEMENT DETAILS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO SUBDIVISION SPECIFICATIONS.
3. TRENCH BACKFILL SHALL CONFORM WITH ENV. Wq 704.11(h) AND BE FREE OF DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, WET OR SOFT MUCK, PEAT OR CLAY, EXCAVATED LEDGE OR ROCKS OVER SIX INCHES.
4. W= MAXIMUM ALLOWABLE TRENCH WIDTH TO A PLANE 12" INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, WIDTH SHALL BE NO MORE THAN 36"; FOR PIPES GREATER THAN 15 INCHES NOMINAL DIAMETER, WIDTH SHALL BE 24 INCHES PLUS PIPE O.D. WIDTH SHALL ALSO BE THE PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE.
5. RIGID FOAM INSULATION TO BE PROVIDED WHERE COVER IN THE ROADWAY IS LESS THAN 6' AND CROSS COUNTRY IS LESS THAN 4', PURSUANT TO DES WAIVER BEING ISSUED.
6. PIPE SAND BLANKET MATERIAL SHALL BE GRADED SAND, FREE FROM ORGANIC MATERIALS, GRADED SUCH THAT 100% PASSES A 1/2 " SIEVE AND A MAXIMUM OF 15% PASSES A #200 SIEVE IN ACCORDANCE WITH Env-Wq 704.11(b).
7. JOINT SEALS FOR PVC PIPE SHALL BE OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL AND CERTIFIED BY THE MANUFACTURER AS CONFORMING TO THE ASTM D3212 STANDARD IN EFFECT WHEN THE JOINT SEALS WERE MANUFACTURED, AND SHALL BE PUSH-ON, BELL-AND-SPIGOT TYPE PER Env-Wq 704.05 (e).
8. PVC PIPE SHALL CONFORM WITH ASTM D3034 AND ASTM D2412.

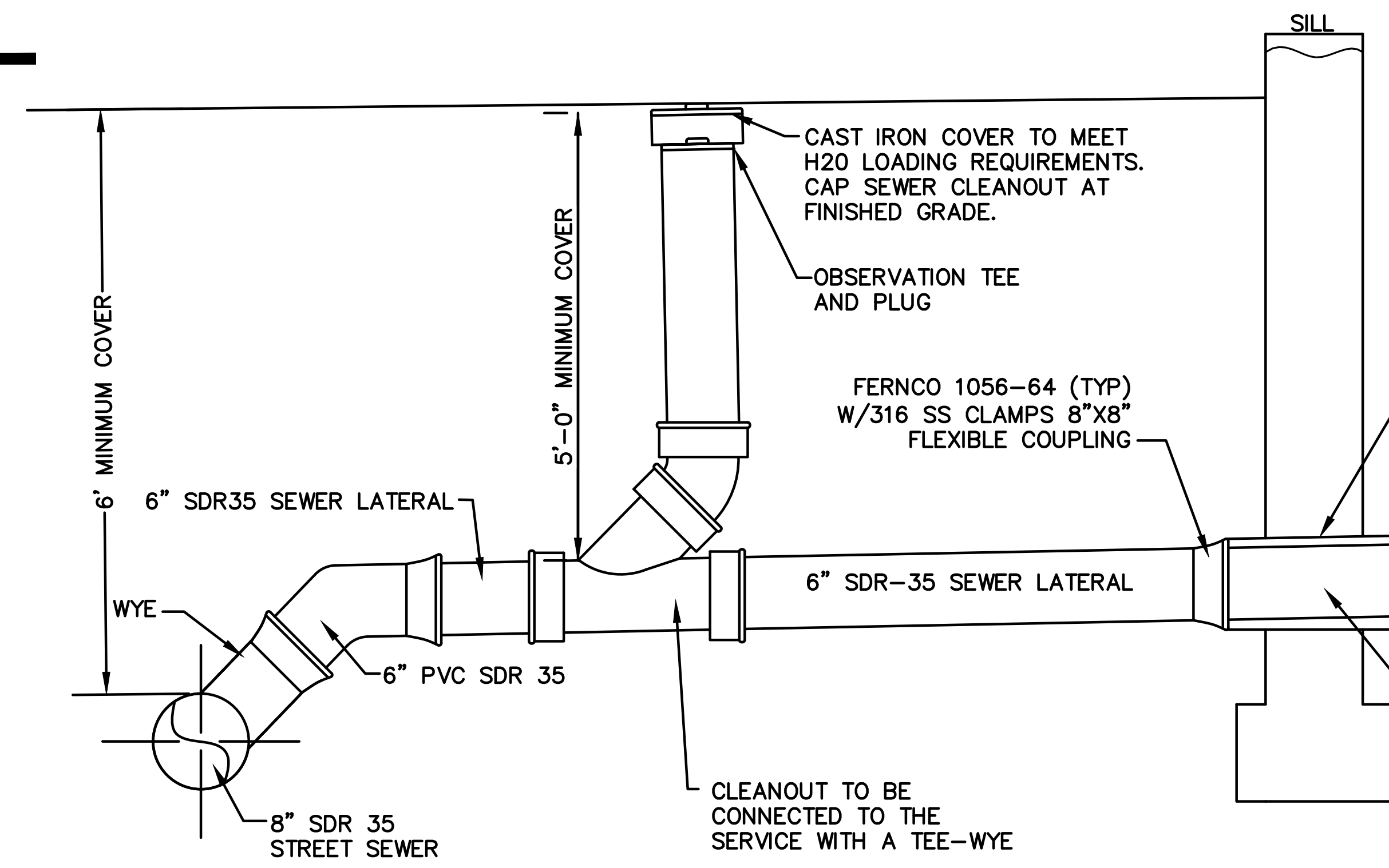
GRAVITY SEWER TRENCH

NOT TO SCALE



SEWER CLEAN OUT

NOT TO SCALE

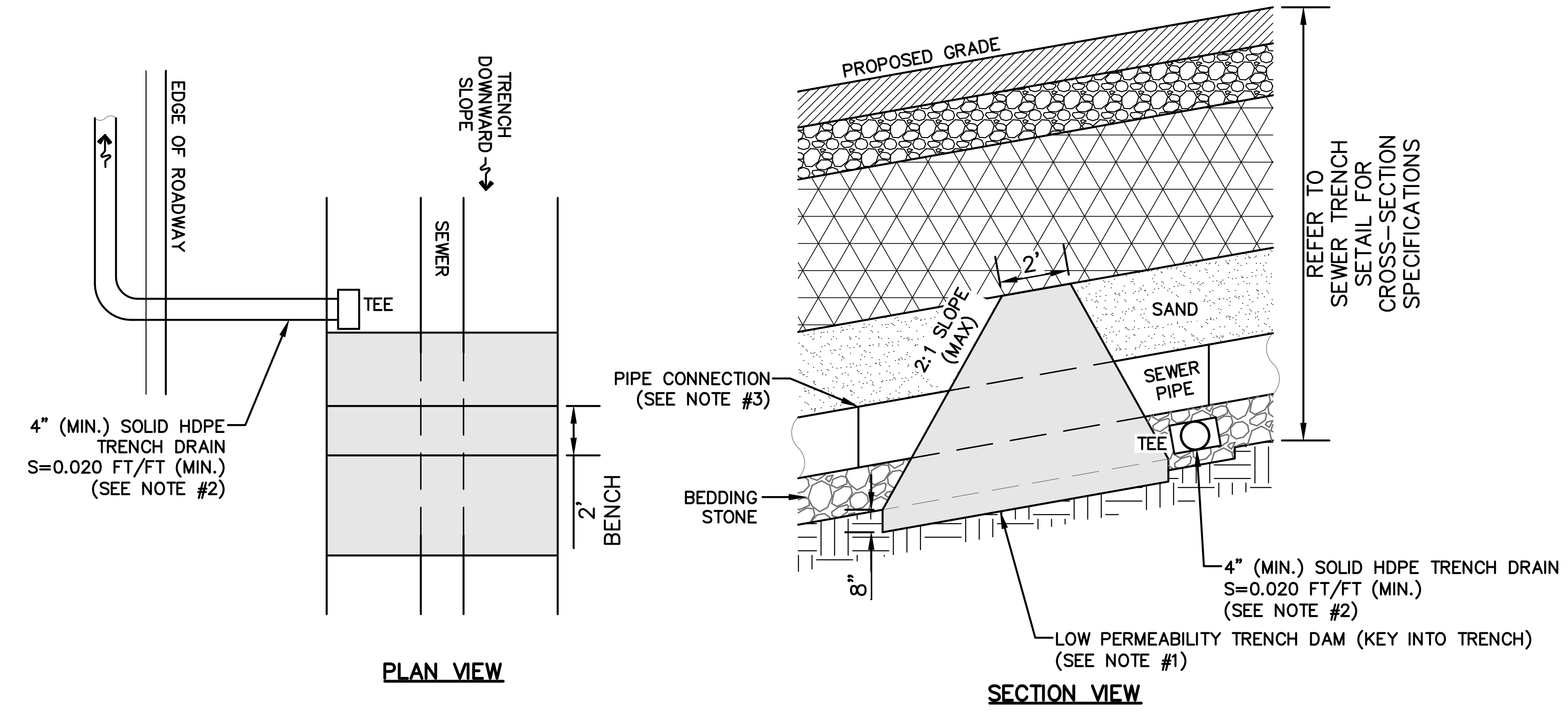


NOTES:

1. CLEANOUT COVER SHALL BE RAISED TO GRADE.

HOUSE SEWER SERVICE

NOT TO SCALE



NOTES:
1. LOW PERMEABILITY SOIL USED FOR TRENCH DAM SHALL MEET THE FOLLOWING SPECIFICATION: CLAYEY SOIL – MIN. 15% PASSING THE #200 SEIVE AND A MIN. PERMEABILITY OF $1x10^{-5}$ CM/SEC
2. DRAINS SHALL DAYLIGHT TO NEAREST AT-GRADE POINT, TIE INTO A DRAINAGE STRUCTURE, OR INTO A NETWORK OR TRENCH DRAINS.
3. CONTRACTOR SHALL NOT LOCATE A PIPE CONNECTION WITHIN THE LIMITS OF THE TRENCH DAM. A 2' SEPARATION BETWEEN LIMIT OF TRENCH DAM AND CONNECTION IS RECOMMENDED.
4. CONTRACTOR SHALL INSTALL DAMS & DRAINS AT A MAXIMUM. 75' SPACING. REFER TO PROJECT PLANS.

SEWER TRENCH DAM & DRAIN

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Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
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STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
08/20/2024

2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
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0	3/18/24	ISSUED FOR REVIEW	KDR
REV.	DATE	REVISION	BY

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DRAWING No.
D3
SHEET 17 OF20
JBE PROJECT NO. 18134.1

BIORETENTION SYSTEM ELEVATIONS	
ELEVATION	SYSTEM #1
A	62.70
B	60.60
C	59.10
D	58.85
E	58.10
BOTTOM SURFACE AREA (S.F.)	117

SAND SPECIFICATION

SIEVE SIZE	% BY WEIGHT
3/8"	100
#4	95–100
#8	80–100
#16	50–85
#30	25–60
#60	10–30
#100	2–10
#200	0–5

TOPSOIL SPECIFICATION

LOAMY SAND TOPSOIL WITH MINIMAL CLAY CONTENT AND BETWEEN 15 TO 25% FINES PASSING THE #200 SIEVE.

MULCH SPECIFICATION

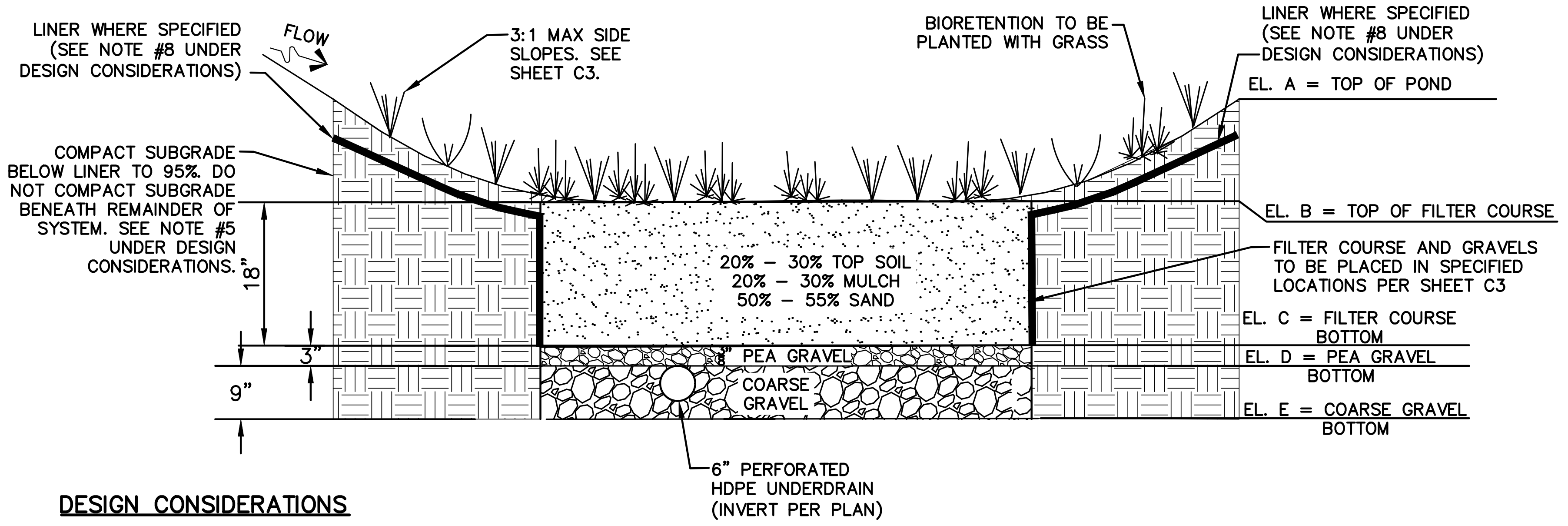
MODERATELY FINE, SHREDDED BARK OR WOOD FIBER MULCH WITH LESS THAN 5% PASSING THE #200 SIEVE.

PEA GRAVEL SPECIFICATION

SIEVE SIZE	% BY WEIGHT
1/2"	100
3/8"	85–100
#4	10–30
#8	0–10
#16	0–15

COARSE GRAVEL SPECIFICATION

SIEVE SIZE	% BY WEIGHT
1"	90–100
1/2"	75–100
#4	50–100
#20	15–80
#50	0–15
#200	0–5



DESIGN CONSIDERATIONS

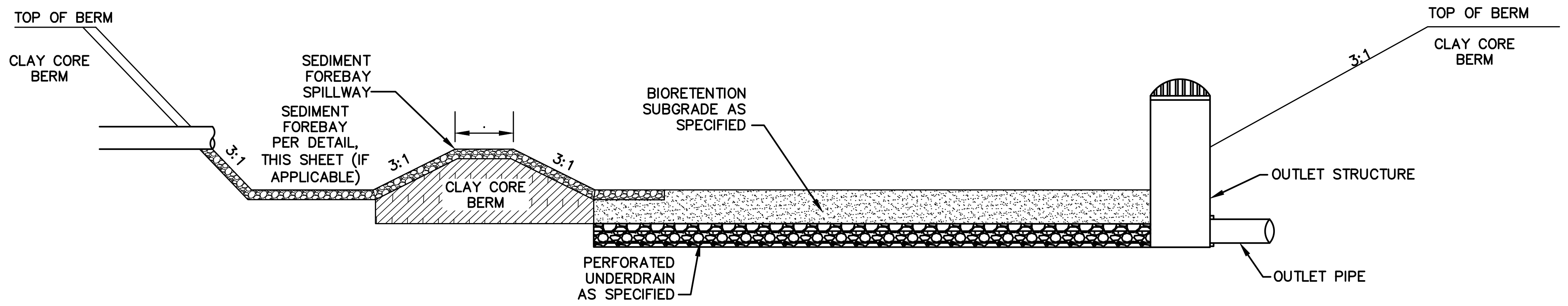
1. DO NOT PLACE BIORETENTION SYSTEMS INTO SERVICE UNTIL THE BMP HAS BEEN SEEDED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
2. DO NOT DISCHARGE SEDIMENT–LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUN–OFF, WATER FROM EXCAVATIONS) TO THE BIORETENTION AREA DURING ANY STAGE OF CONSTRUCTION.
3. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.
4. REMOVE LEDGE TO AT LEAST TWO FEET BELOW BOTTOM OF COARSE GRAVEL LAYER IF ENCOUNTERED.
5. IN ADDITION TO DESIGN CRITERIA LISTED HERE, REFER TO GUIDELINES LISTED IN UNIVERSITY OF NEW HAMPSHIRE (UNH) STORMWATER CENTER BIORETENTION SOIL SPECIFICATION.
7. UPSTREAM DEEP SUMP CATCH BASINS PROVIDE PRE–TREATMENT IN LIEU OF A SEDIMENT FOREBAY.
8. ONLY PLACE FILTER MEDIA AND STONE BENEATH DOTTED HATCH AREA ON SHEET C3. REMAINDER OF POND TO BE LINED WITH 30ML LINER 6" BELOW SURFACE. FILTER MEDIA AND STONE SECTIONS ARE NOT TO BE LINED. LINER SHALL CONTINUE DOWN THE SIDES OF THE FILTER COURSE BUT MUST NOT BE PLACED ON THE SIDES OF THE PEA GRAVEL OR COARSE GRAVEL OR PLACED BENEATH THE FILTER COURSE AND/OR GRAVELS.
9. THE EXISTING NATIVE SUBGRADE MATERIAL SHALL NOT BE COMPACTED OR SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO STONE PLACEMENT. IF SOIL MEDIA OR SUBGRADE IS OVER COMPACTED, DISTURBED, OR CONTAMINATED BY FOREIGN OR DELETERIOUS MATERIALS OR LIQUIDS, REMOVE THE SOIL MEDIA AND CONTAMINATION; RESTORE THE SUBGRADE AS DIRECTED BY ENGINEER AND REPLACE CONTAMINATED SOIL MEDIA WITH NEW SOIL MEDIA.

MAINTENANCE REQUIREMENTS:

1. SYSTEMS SHALL BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EVENT EXCEEDING 2.5 INCHES IN A 24 HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.
5. PRETREATMENT MEASURES SHALL BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.
6. TRASH AND DEBRIS SHALL BE REMOVED AT EACH INSPECTION.
7. AT LEAST ONCE ANNUALLY, SYSTEM SHALL BE INSPECTED FOR DRAWDOWN TIME. IF BIORETENTION SYSTEM DOES NOT DRAIN WITHIN 72 HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHALL ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION, INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER MEDIA.
8. VEGETATION SHALL BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING PRUNING, REMOVAL AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.
9. COMPACTION AND MATERIALS TESTING SERVICES SHALL BE PERFORMED BY AN INDEPENDENT GEOTECHNICAL ENGINEER RETAINED BY THE OWNER.

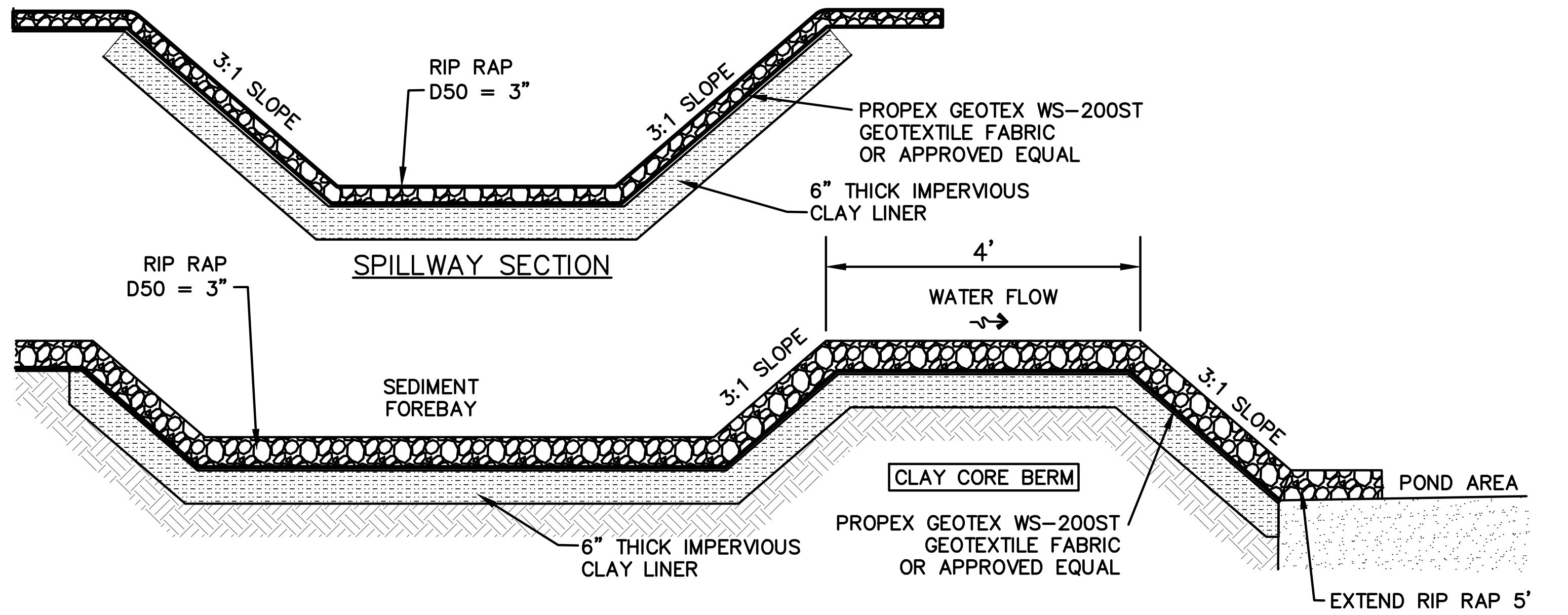
BIORETENTION SYSTEM WITH UNDERDRAIN

NOT TO SCALE



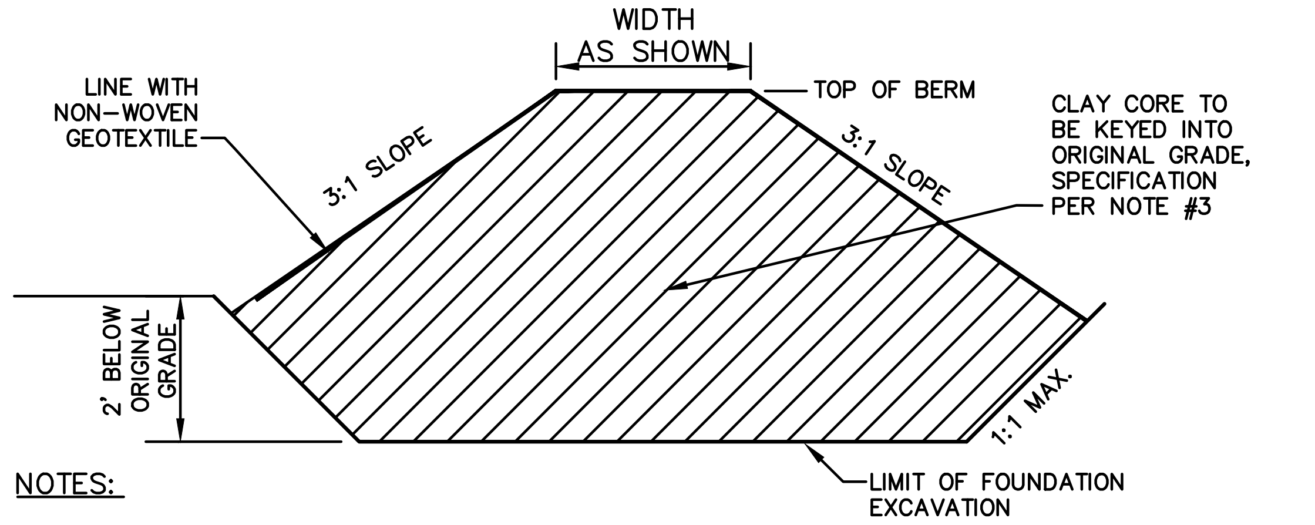
TYPICAL BIORETENTION OVERVIEW CROSS SECTION

NOT TO SCALE



SEDIMENT FOREBAY SPILLWAY

NOT TO SCALE



NOTES:

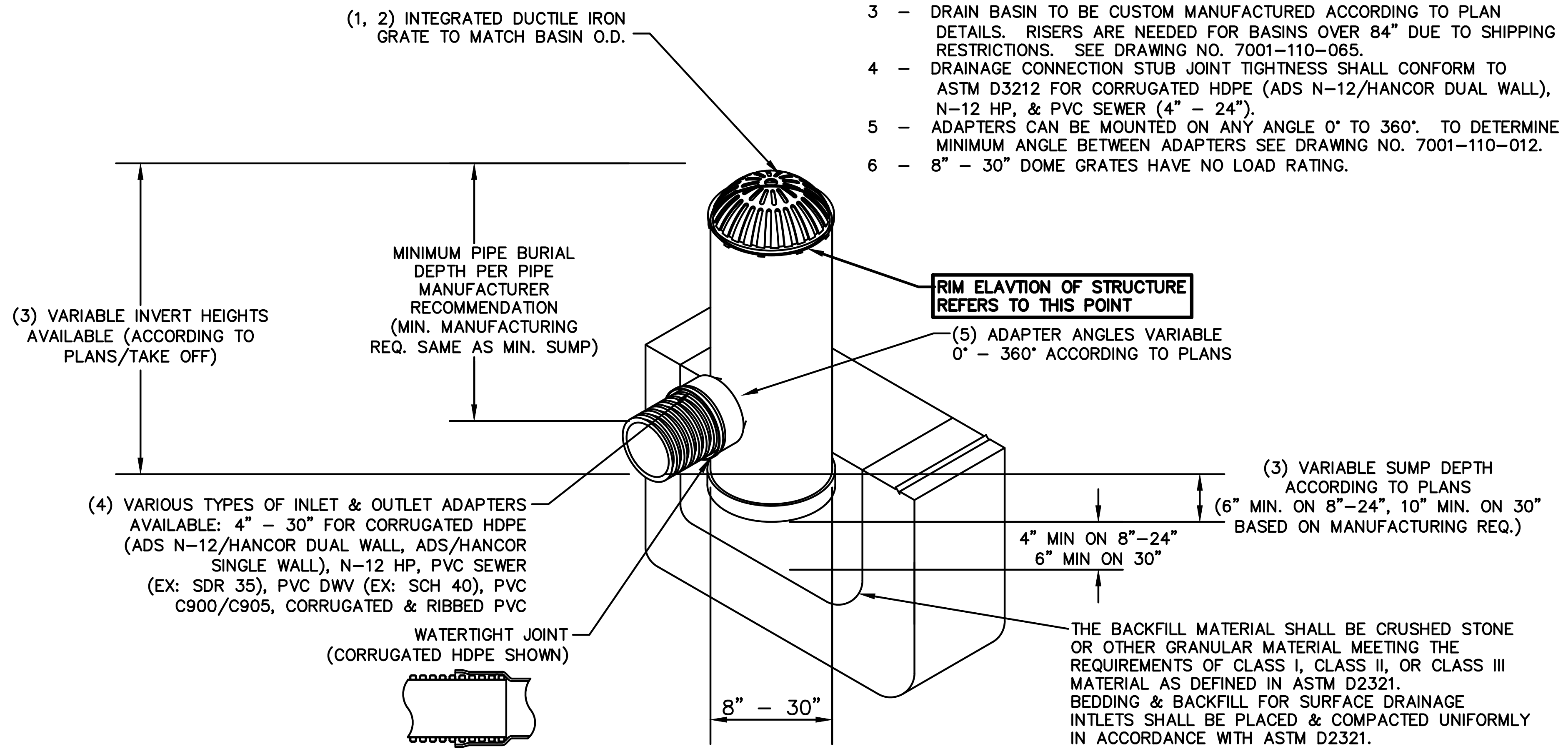
1. BERM SHALL BE CONSTRUCTED WITH A CLAY CORE TO BE KEYED INTO ORIGINAL GRADE, AS WELL AS A FINE GEOTEXTILE, TO AVOID WATER SEEPAGE AND SOIL PIPING THROUGH THE EARTHEN DIVIDER
2. THE ENTIRE EMBANKMENT AREA OF THE BIORETENTION AREA SHALL BE EXCAVATED A MINIMUM 2' BELOW THE ORIGINAL GRADE, STRIPPED OF ALL ORGANIC MATERIALS, COMPACTED TO AT LEAST 92% OF ASTM D–1557, AND SCARIFIED PRIOR TO THE PLACEMENT OF THE EMBANKMENT MATERIAL. PLACEMENT AND COMPACTION SHOULD OCCUR AT A MOISTURE CONTENT OF OPTIMUM PLUS OR MINUS 3%, AND NO FROZEN OR ORGANIC MATERIAL SHALL BE PLACED FOR ANY REASON.
3. CLAY CORE MATERIAL SHALL BE CLEAN SILTY–CLAY BORROW FREE OF ROOTS, ORGANIC MATTER, AND OTHER DELETERIOUS SUBSTANCES, AND SHALL CONTAIN NO ROCKS OR LUMPS OVER THREE INCHES (3") IN DIAMETER. THIS MATERIAL SHALL BE INSTALLED IN 6" LIFTS COMPACTED TO 92% OF ASTM D–1557, AND SHALL MEET THE FOLLOWING SPECIFICATIONS: 6" PASSING 100%, #4 SIEVE 95–100%, #40 SIEVE 60–90%, #100 SIEVE 40–60%, #200 SIEVE 25–45% (OF THE FRACTION PASSING THE #4 SIEVE). THE CLAY COMPONENT SHALL HAVE A PLASTICITY INDEX OF AT LEAST 8 AND A HYDRAULIC CONDUCTIVITY OF 10 TO THE –6 CM/SEC.
4. COMPACTION AND MATERIALS TESTING SERVICES SHALL BE PERFORMED BY AN INDEPENDENT GEOTECHNICAL ENGINEER RETAINED BY THE OWNER.
5. REMOVE LEDGE TO AT LEAST 2' OUTSIDE OF AND BELOW LIMITS OF CLAY CORE.

CLAY CORE BERM

NOT TO SCALE

NOTES:

1 – 8" – 30" DOME GRATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70–50–05.
2 – 8" & 10" DOME GRATES FIT ONTO THE DRAIN BASINS WITH THE USE OF A PVC BODY TOP. SEE DRAWING NO. 7001–110–045.
3 – DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001–110–065.
4 – DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N–12/HANCOR DUAL WALL), N–12 HP, & PVC SEWER (4" – 24").
5 – ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001–110–012.
6 – 8" – 30" DOME GRATES HAVE NO LOAD RATING.



24" DIA. NYLOPLAST DRAIN BASIN (YARD DRAIN & POND OUTLET STRUCTURE SPECIFICATION)

NOT TO SCALE

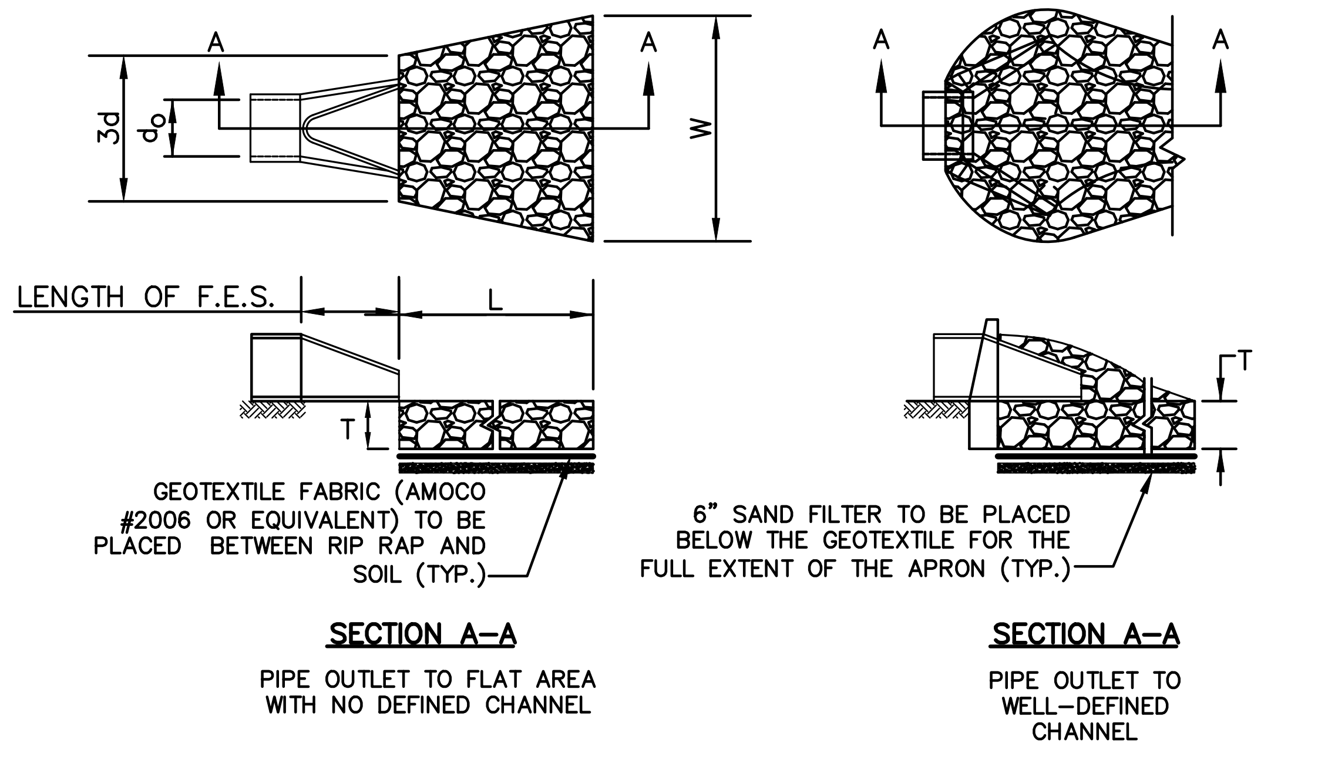


TABLE 7–24––RECOMMENDED RIP RAP GRADATION RANGES				
THICKNESS OF RIP RAP = 0.75 FEET				
d50 SIZE=	0.25	FEET	3	INCHES
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM		TO	
100%	5		6	
85%	4		5	
50%	3		5	
15%	1		2	

NOTES:

1. THE SUBGRADE FOR THE GEOTEXTILE FABRIC AND RIP RAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE RIP RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.
5. OUTLETS TO A DEFINED CHANNEL SHALL HAVE 2:1 OR FLATTER SIDE SLOPES AND SHOULD BEGIN AT THE TOP OF THE CULVERT AND TAPER DOWN TO THE CHANNEL BOTTOM THROUGH THE LENGTH OF THE APRON.
6. MAINTENANCE: THE OUTLET PROTECTION SHOULD BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIP RAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHOULD BE REPAIRED IMMEDIATELY. THE CHANNEL IMMEDIATELY BELOW THE OUTLET SHOULD BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO OUTLET PROTECTION.

RIP RAP OUTLET PROTECTION APRON

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 2/26/2024
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DANIEL JAMES MEDITZ
No.18152
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

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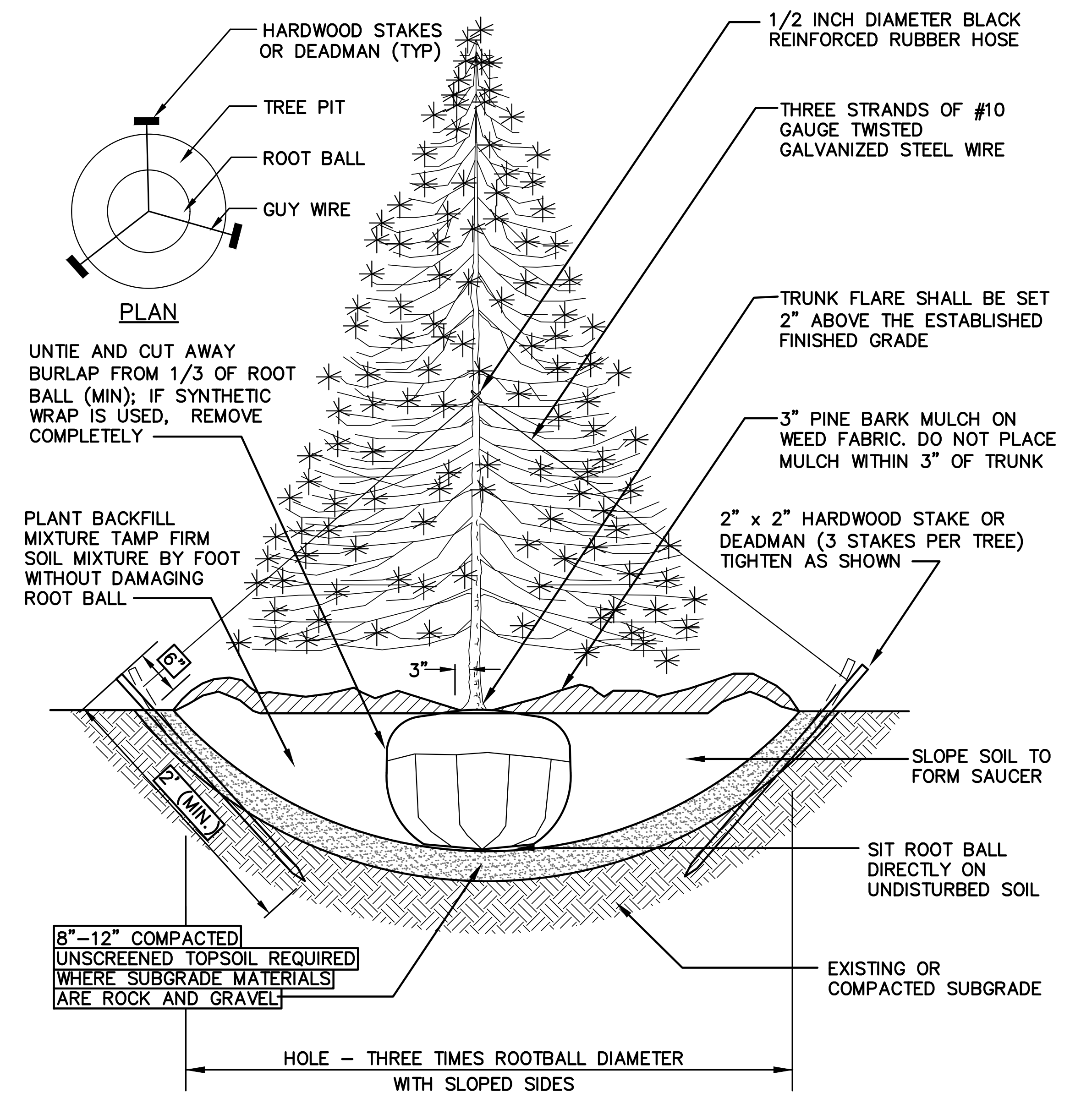
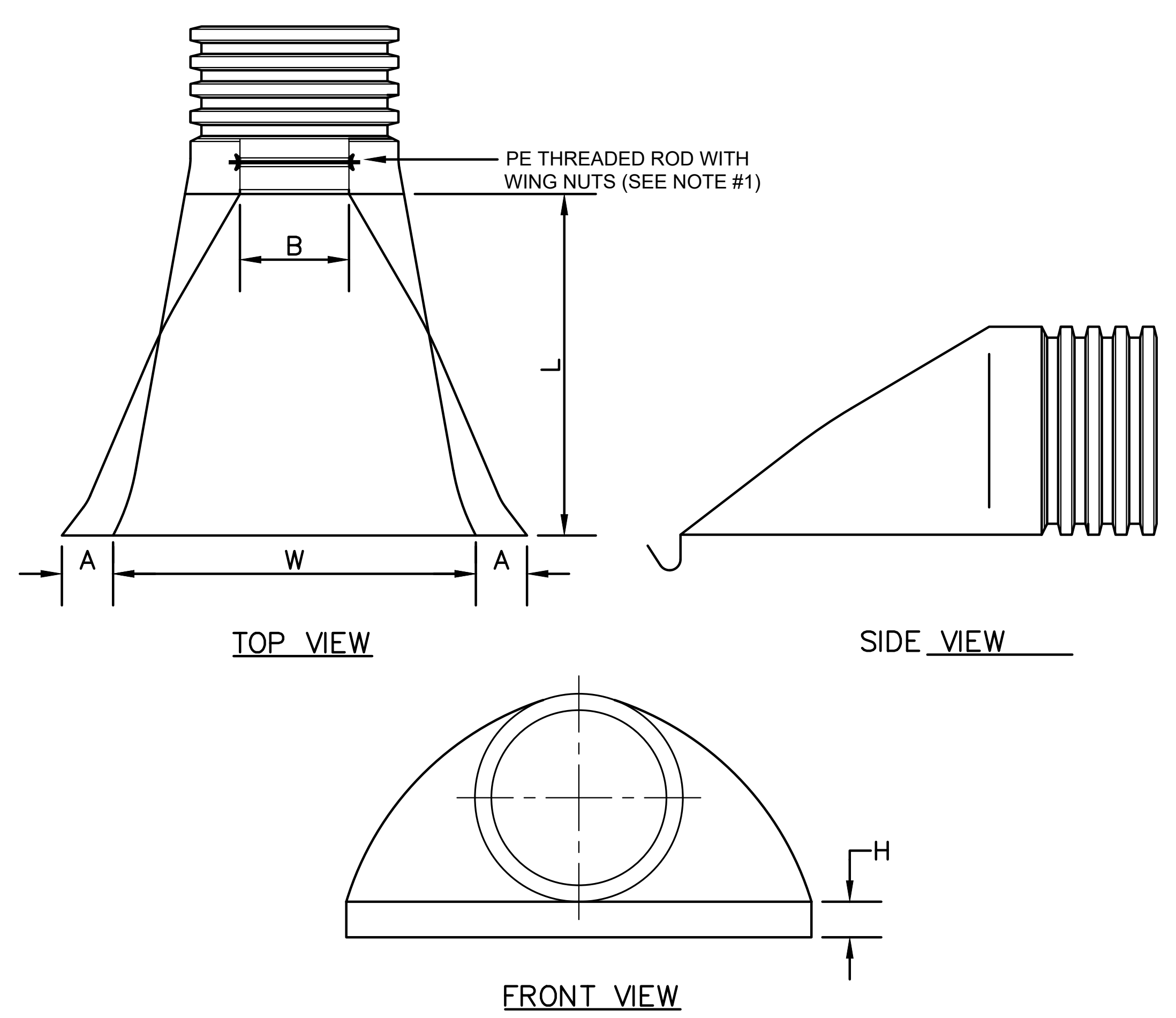
Plan Name:	DETAIL SHEET
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
D4
SHEET 18 OF 20
JBE PROJECT NO. 18134.1



EVERGREEN PLANTING

NOT TO SCALE



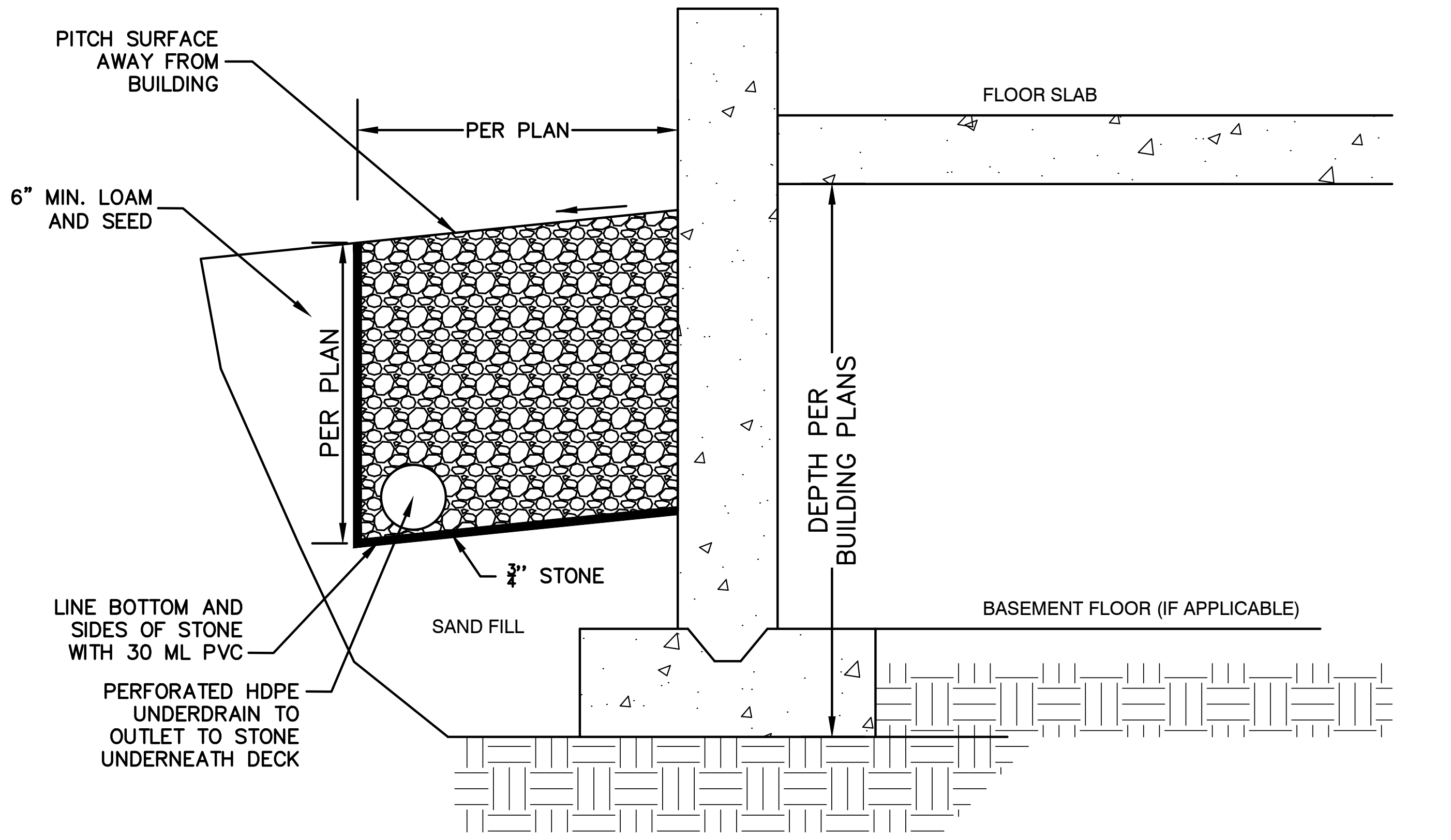
PART NO.	PIPE SIZE	A	B (MAX)	H	L	W
1210-NP	12"	6.5"	10"	6.5"	25"	29"
1510-NP	15"	6.5"	10"	6.5"	25"	29"
1810-NP	18"	7.5"	15"	6.5"	32"	35"
2410-NP	24"	7.5"	18"	6.5"	36"	45"
3010-NP	30"	10.5"	N/A	7.0"	53"	68"
3610-NP	36"	10.5"	N/A	7.0"	53"	68"

NOTES:

1. PE THREADED ROD WITH WING NUTS PROVIDED FOR END SECTIONS 12"-24". 30" AND 36" END SECTIONS TO BE WELDED PER MANUFACTURER'S RECOMMENDATIONS.
2. ALL DIMENSIONS ARE NOMINAL.

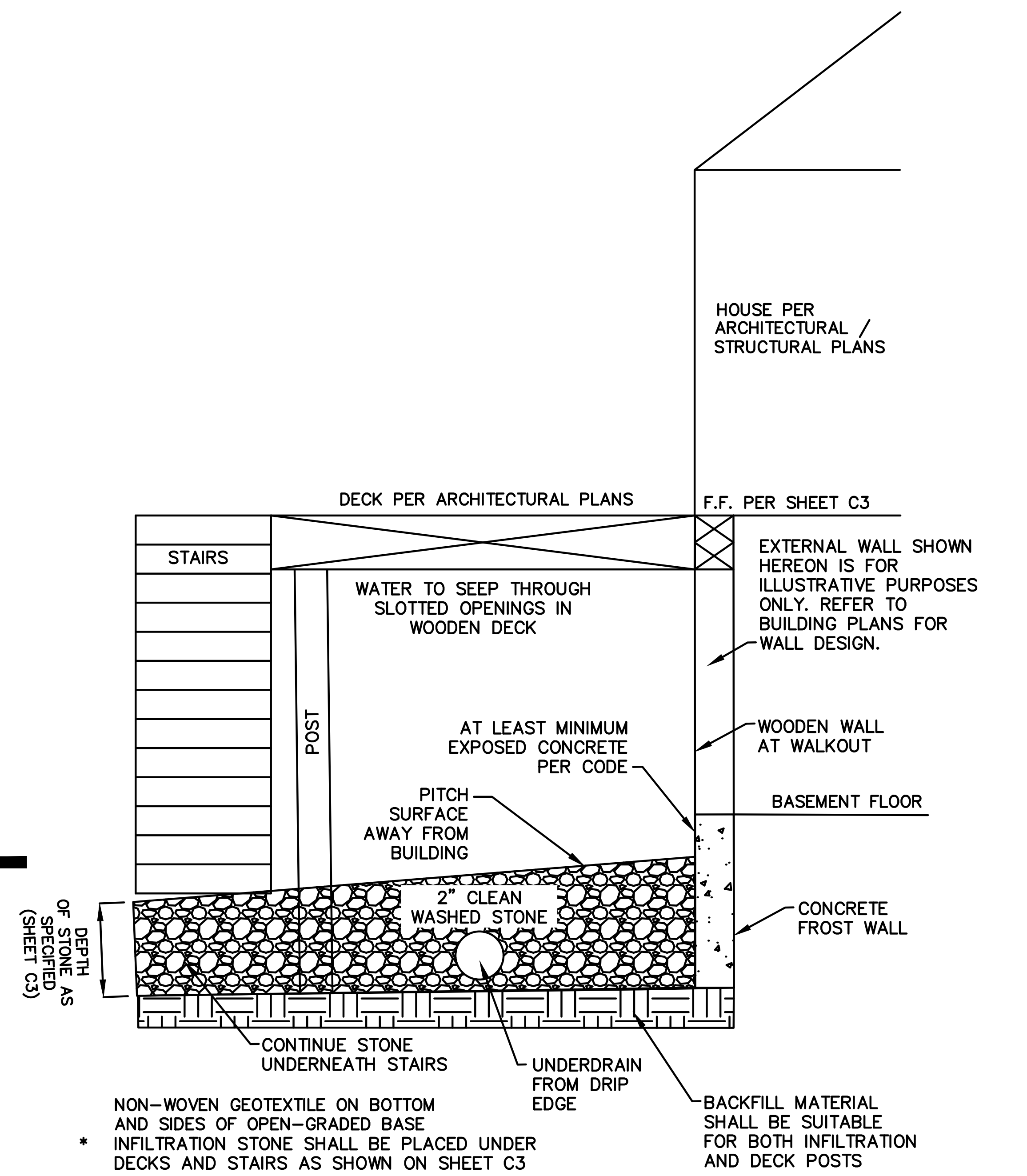
ADS N-12 FLARED END SECTION

NOT TO SCALE



LINED STONE DRIP EDGE DETAIL

NOT TO SCALE

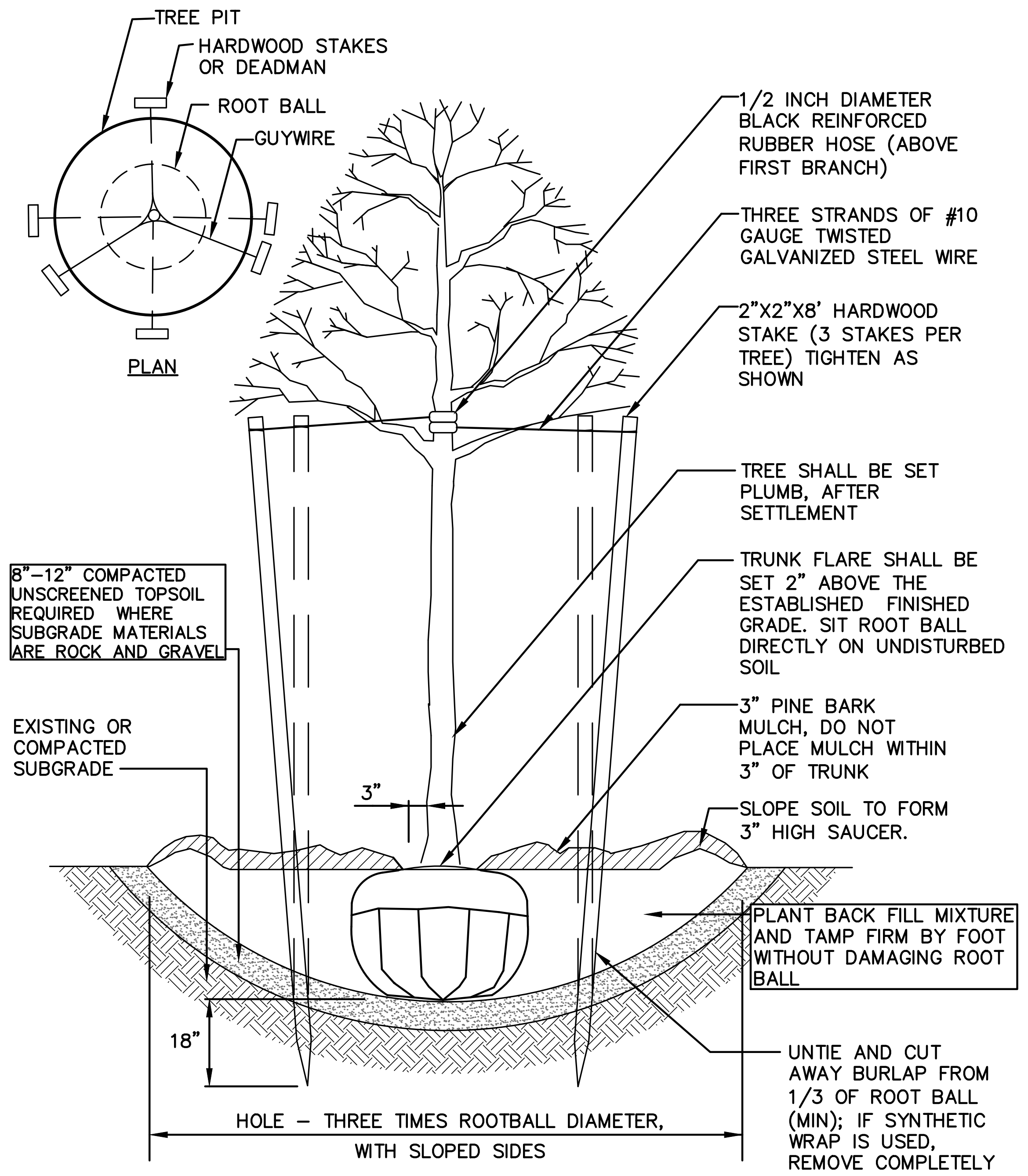


NON-WOVEN GEOTEXTILE ON BOTTOM AND SIDES OF OPEN-GRADED BASE

* INFILTRATION STONE SHALL BE PLACED UNDER DECKS AND STAIRS AS SHOWN ON SHEET C3

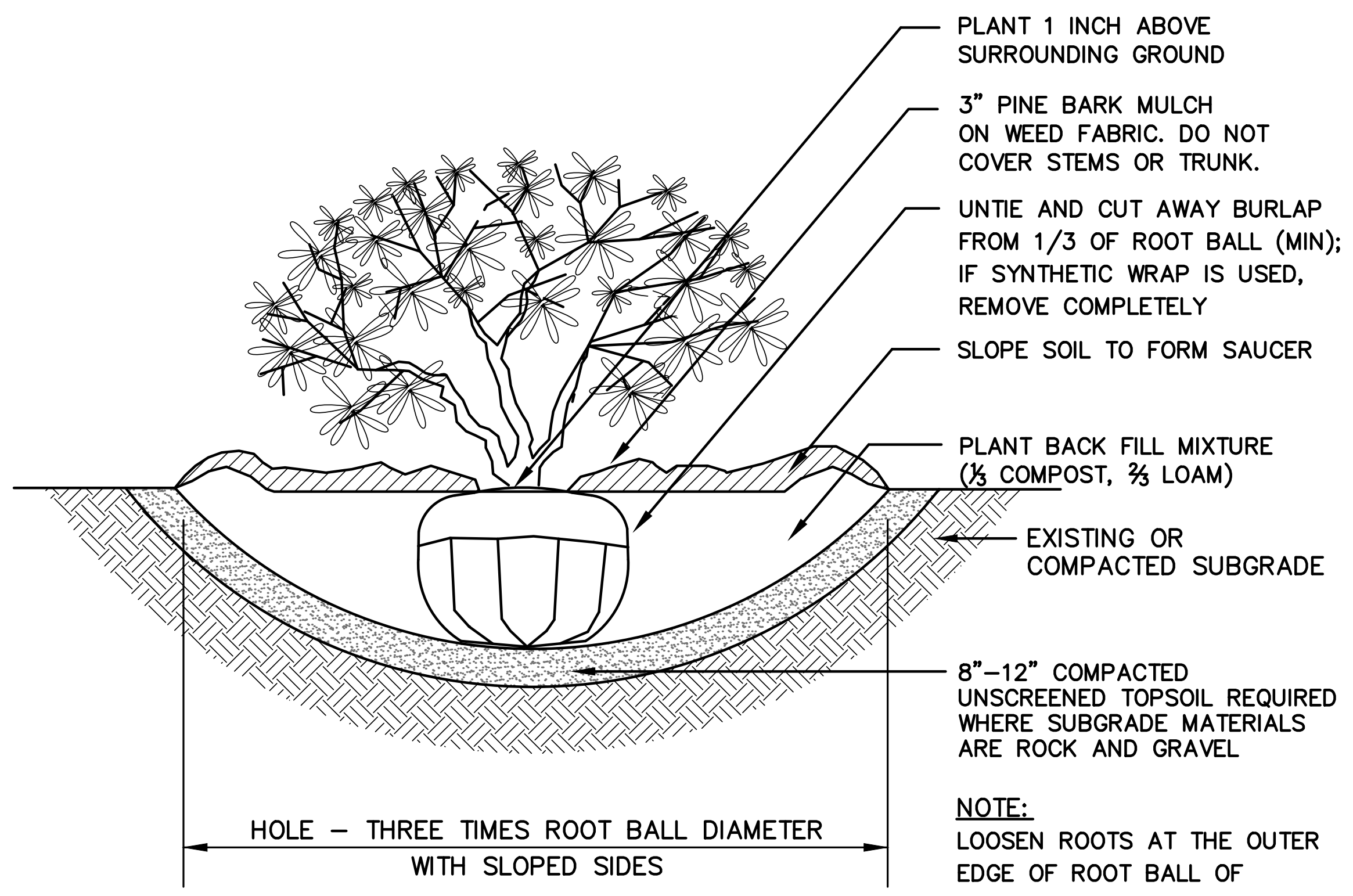
INFILTRATION STONE UNDERNEATH DECK

NOT TO SCALE



TREE PLANTING (FOR TREES UNDER 4" CALIPER)

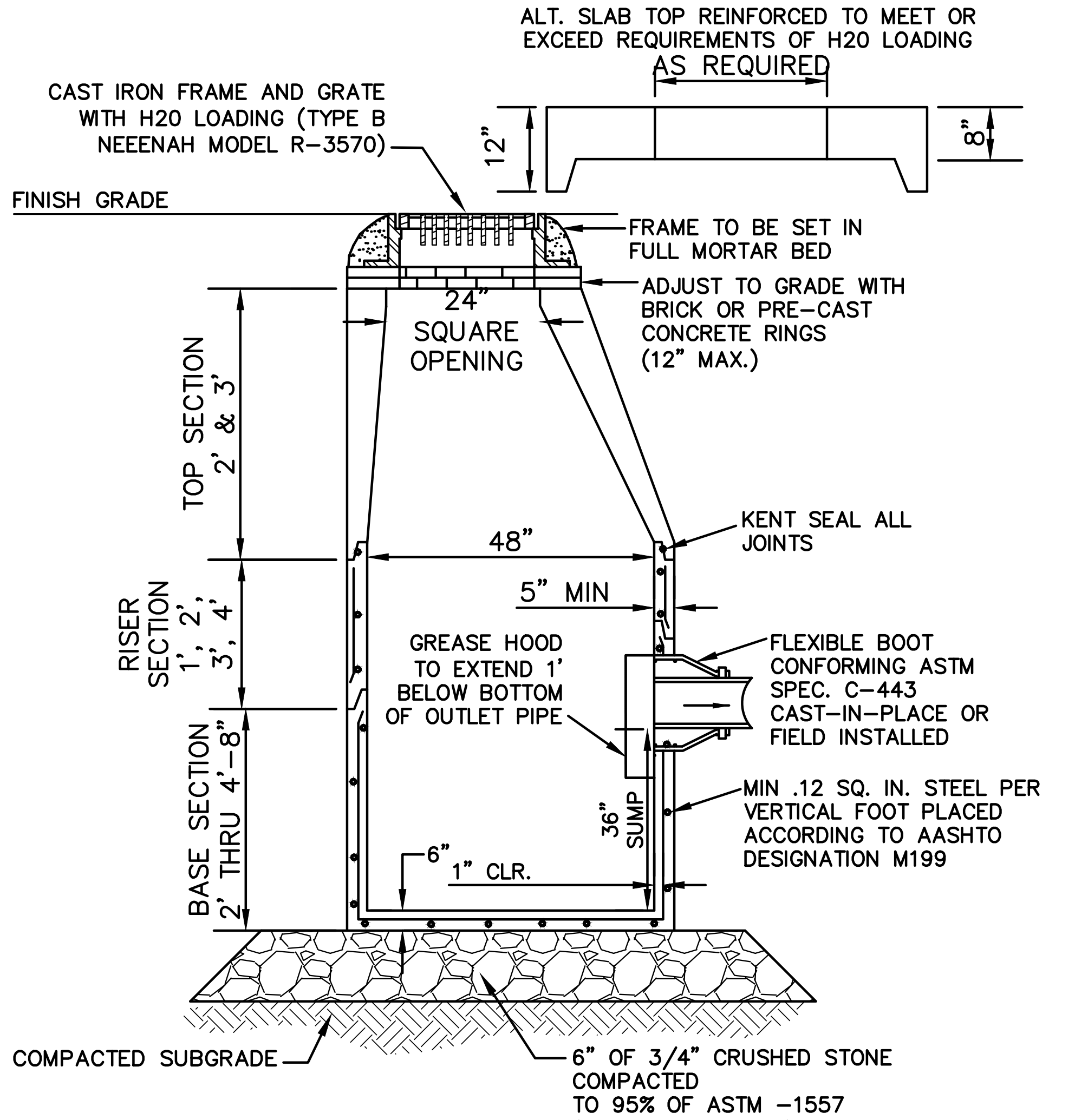
NOT TO SCALE



NOTE:
LOOSEN ROOTS AT THE OUTER EDGE OF ROOT BALL OF CONTAINER GROWN SHRUBS.

SHRUB PLANTING

NOT TO SCALE

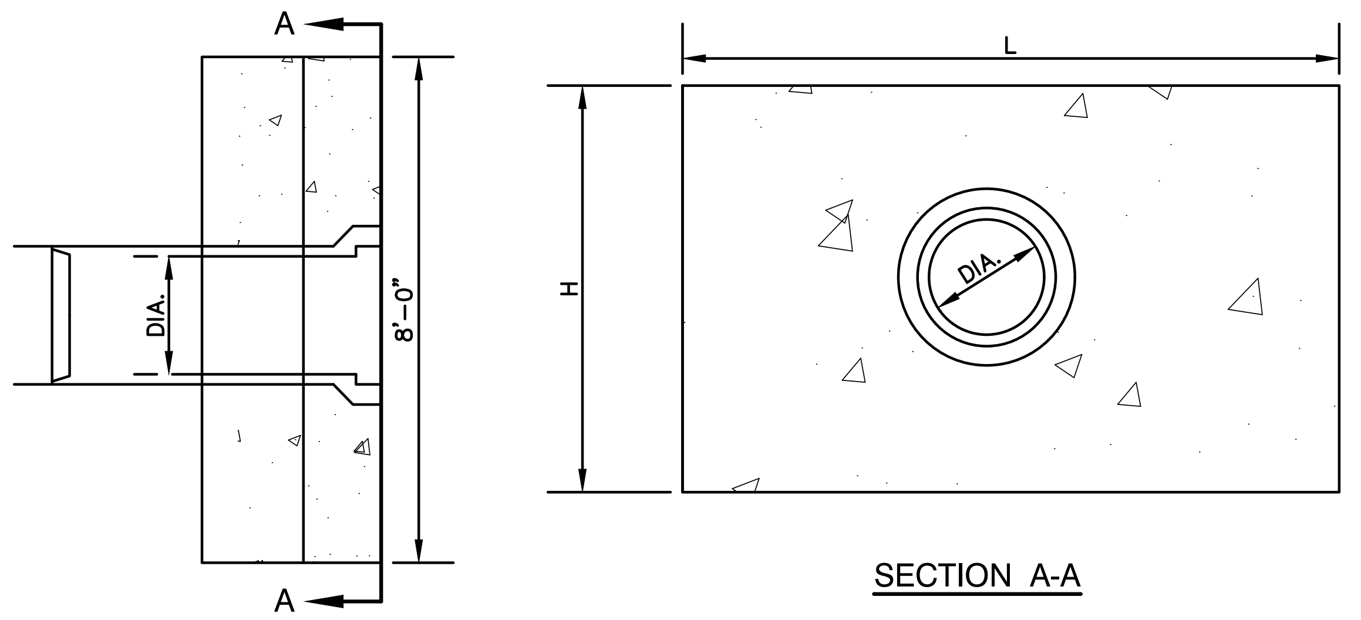


NOTES:

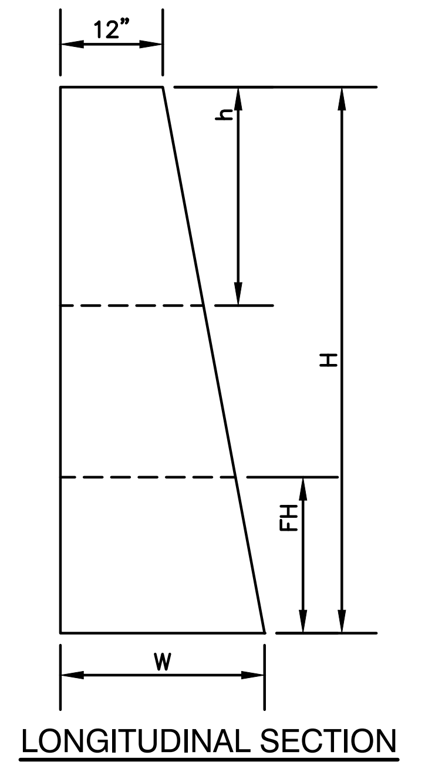
1. BASE SECTION SHALL BE MONOLITHIC WITH 48" INSIDE DIAMETER.
2. ALL SECTIONS SHALL BE DESIGNED FOR H20 LOADING.
3. CONCRETE SHALL BE COMPRESSIVE STRENGTH 4000 PSI, TYPE II CEMENT.
4. FRAMES AND GRATES SHALL BE HEAVY DUTY AND DESIGNED FOR H20 LOADING
5. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS SO AS TO BE WATERTIGHT.
6. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
7. STANDARD CATCH BASIN FRAME AND GRATE(S) SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM, BUT NO MORE THAN 12"), OR PRECAST CONCRETE 'DONUTS'.
8. CATCH BASINS SHALL HAVE A 36" MINIMUM SUMP AS SHOWN.

CATCH BASIN

NOT TO SCALE



SECTION A-A



LONGITUDINAL SECTION

DIA.	HEADWALL LENGTH	HEADWALL HEIGHT	FILL HEIGHT	PIPE COVER	HEADWALL BOTTOM WIDTH
D	L	H	FH	h	W
12"	4'-2"	3'-9"	1'-6"	1'-3"	1'-11"
15"	5'-11"	4'-2"	1'-6"	1'-5"	2'-0"
18"	6'-11"	4'-5"	1'-6"	1'-5"	2'-1"
24"	8'-10"	4'-11"	1'-6"	1'-5"	2'-3"

NOTES:

1. ALL DIMENSIONS GIVEN IN FEET & INCHES.
2. PROVIDE BELL END AT INLET HEADWALL, AND SPIGOT END AT OUTLET END HEADWALL.
3. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS. CEMENT TO BE TYPE III PER ASTM C-150. REINFORCING TO MEET OR EXCEED ASTM A-615 GRADE 60 DEFORMED BARS.
4. 1" THREADED INSERTS PROVED FOR FINAL ATTACHMENT IN FIELD BY OTHERS.

PRECAST CONCRETE HEADWALL

NOT TO SCALE

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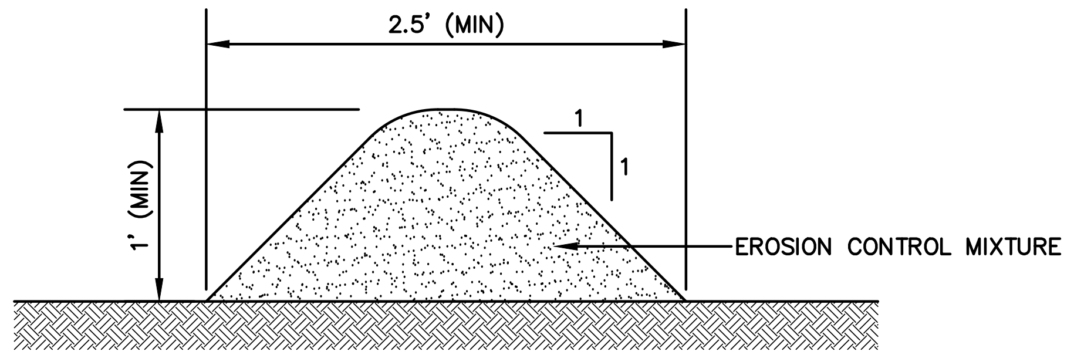
DRAWING No.
D5
SHEET 19 OF 20
JBE PROJECT NO. 18134.1

TEMPORARY EROSION CONTROL NOTES

1. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME. AT NO TIME SHALL AN AREA IN EXCESS OF 5 ACRES BE EXPOSED AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND AT LOCATIONS AS REQUIRED, DIRECTED BY THE ENGINEER.
3. ALL DISTURBED AREAS (INCLUDING POND AREAS BELOW THE PROPOSED WATERLINE) SHALL BE RETURNED TO PROPOSED GRADES AND ELEVATIONS. DISTURBED AREAS SHALL BE LOAMED WITH A MINIMUM OF 6" OF SCREENED ORGANIC LOAM AND SEEDED WITH SEED MIXTURE 'C' AT A RATE NOT LESS THAN 1.10 POUNDS OF SEED PER 1,000 S.F. OF AREA (48 LBS. / ACRE).
4. SILT FENCES AND OTHER BARRIERS SHALL BE INSPECTED EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 0.5" OR GREATER. ALL DAMAGED AREAS SHALL BE REPAIRED, AND SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED OF.
5. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED AND THE AREA DISTURBED BY THE REMOVAL SMOOTHED AND RE-VEGETATED.
6. AREAS MUST BE SEEDED AND MULCHED OR OTHERWISE PERMANENTLY STABILIZED WITHIN 3 DAYS OF FINAL GRADING, OR TEMPORARILY STABILIZED WITHIN 14 DAYS OF THE INITIAL DISTURBANCE OF SOIL. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
7. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING NORTH AMERICAN GREEN S75 EROSION CONTROL BLANKETS (OR AN EQUIVALENT APPROVED IN WRITING BY THE ENGINEER) ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
8. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
9. AFTER OCTOBER 15th, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3" OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.
10. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    a. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
    b. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
    c. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH STONE OR RIPRAP HAS BEEN INSTALLED; OR
    d. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
11. FUGITIVE DUST CONTROL IS REQUIRED TO BE CONTROLLED IN ACCORDANCE WITH ENV-A 1000, AND THE PROJECT IS TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES.

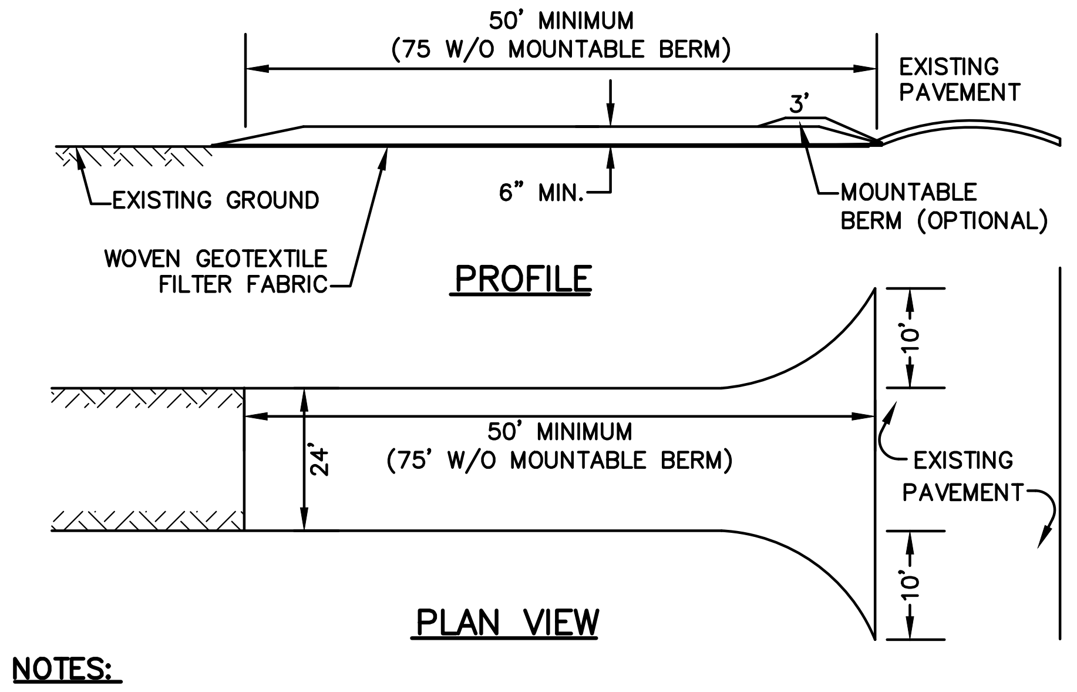


NOTES:

1. ORGANIC FILTER BERMS SHALL BE UTILIZED IN LIEU OF SILT FENCE.
2. THE EROSION CONTROL MIX USED IN THE FILTER BERMS SHALL BE A WELL-GRADED MIXTURE OF PARTICLE SIZES, MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER, STUMP GRINDINGS, SHREDDED OR COMPOSTED BARK, OR ACCEPTABEL MANUFACTURED PRODUCTS, AND SHALL BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH, AND SHALL MEET THE FOLLOWING STANDARDS:
    a) THE ORGANIC CONTENT SHALL BE 25-65% OF DRY WEIGHT.
    b) PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 3" SCREEN, 90-100% PASSING A 1" SCREEN, 70-100& PASSING A 0.75" SCREEN, AND 30-75% PASSING A 0.25" SCREEN.
    c) THE ORGANIC PORTION SHALL BE FIBROUS AND ELONGATED.
    d) LARGE PORTIONS OF SILTS, CLAYS, OR FINE SANDS SHALL NOT BE INCLUDED IN THE MIXTURE.
    e) SOLUBLE SALTS CONTENT SHALL BE >4.0mmhos/cm.
    f) THE pH SHALL BE BETWEEN 5.0 AND 8.0.
3. ORGANIC FILTER BERMS SHALL BE INSTALLED ALONG A RELATIVELY LEVEL CONTOUR. IT MAY BE NECESSARY TO CUT TALL GRASSES OR WOODY VEGETATION TO AVOID CREATING VOIDS AND BRIDGES THAT WOULD ENABLE FINES TO WASH UNDER THE BERM.
4. ON SLOPES LESS THAN 5%, OR AT THE BOTTOM OF SLOPES STEEPER THAN 3:1, UP TO 20' LONG, THE BERM SHALL BE A MINIMUM OF 12" HIGH (AS MEASURED ON THE UPHILL SIDE), AND A MINIMUM OF 36" WIDE. ON LONGER OR STEEPER SLOPES, THE BERM SHALL BE WIDER TO ACCOMMODATE THE POTENTIAL ADDITIONAL RUNOFF.
5. FROZEN GROUND, OUTCROPS OF BEDROCK, AND VERY ROOTED FORESTED AREAS PRESENT THE MOST PRACTICAL AND EFFECTIVE LOCATIONS FOR ORGANIC FILTER BERMS. OTHER BMP'S SHOULD BE USED AT LOW POINTS OF CONCENTRATED RUNOFF, BELOW CULVERT OUTLET APRONS, AROUND CATCH BASINS, AND AT THE BOTTOM OF STEEP PERIMETER SLOPES THAT HAVE A LARGE CONTRIBUTING AREA.
6. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURES WHEN IT HAS ACCUMULATED TO ONE HALF THE ORIGINAL HEIGHT OF THE STRUCTURE.
7. STRUCTURES MAY BE LEFT IN PLACE ONCE THE SITE IS STABILIZED.

ORGANIC FILTER BERM / FIBER BERM

NOT TO SCALE



NOTES:

1. STONE FOR STABILIZED CONSTRUCTION ENTRANCE SHALL BE 3 INCH STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET, 75' WITHOUT A MOUNTABLE BERM, AND EXCEPT FOR A SINGLE RESIDENTIAL LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4. THE WIDTH OF THE ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS, OR 10 FEET, WHICHEVER IS GREATER.
5. GEOTEXTILE FILTER FABRIC SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE. FILTER FABRIC IS NOT REQUIRED FOR A SINGLE FAMILY RESIDENTIAL LOT.
6. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A STONE BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO THE PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

SEEDING SPECIFICATIONS

1. GRADING AND SHAPING
    A. SLOPES SHALL NOT BE STEEPER THAN 2:1 WITHOUT APPROPRIATE EROSION CONTROL MEASURES AS SPECIFIED ON THE PLANS (3:1 SLOPES OR FLATTER ARE PREFERRED).
    B. WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.
2. SEEDBED PREPARATION
    A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
    B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDBED AND FERTILIZER AND LIME MIXED INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.
3. ESTABLISHING A STAND
    A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. TYPES AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
       AGRICULTURAL LIMESTONE, 2 TONS PER ACRE OR 100 LBS. PER 1,000 SQ.FT.
       NITROGEN(N), 50 LBS. PER ACRE OR 1.1 LBS. PER 1,000 SQ.FT.
       PHOSPHATE(P205), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
       POTASH(K20), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
       (NOTE: THIS IS THE EQUIVALENT OF 500 LBS. PER ACRE OF 10-20-20 FERTILIZER OR 1,000 LBS. PER ACRE OF 5-10-10.)
    B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING AND HYDROSEEDING. WHERE BROADCASTING IS USED, COVER SEED WITH .25 INCH OF SOIL OR LESS, BY CULTIPACKING OR RAKING.
    C. REFER TO THE 'SEEDING GUIDE' AND 'SEEDING RATES' TABLES ON THIS SHEET FOR APPROPRIATE SEED MIXTURES AND RATES OF SEEDING. ALL LEGUMES (CROWNVETCH, BIRDSFOOT, TREFOIL AND FLATPEA) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT PRIOR TO THEIR INTRODUCTION TO THE SITE.
    D. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20th OR FROM AUGUST 10th TO SEPTEMBER 1st.
4. MULCH
    A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.
    B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING. HAY OR STRAW MULCH SHALL BE PLACED AT A RATE OF 90 LBS PER 1000 S.F.
5. MAINTENANCE TO ESTABLISH A STAND
    A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.
    B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ONSITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE 2 TO 3 YEARS TO BECOME FULLY ESTABLISHED.
    C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, ANNUAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

USE	SEEDING MIXTURE 1/	DROUGHTY	WELL DRAINED	MODERATELY WELL DRAINED	POORLY DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A	FAIR	GOOD	GOOD	FAIR
	B	POOR	GOOD	FAIR	FAIR
	C	POOR	GOOD	EXCELLENT	GOOD
	D	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES.	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	FAIR	POOR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	E	FAIR	EXCELLENT	EXCELLENT	2/
	F	FAIR	EXCELLENT	EXCELLENT	2/

GRAVEL PIT, SEE NH-PM-24 IN APPENDIX FOR RECOMMENDATION REGARDING RECLAMATION OF SAND AND GRAVEL PITS.

1/ REFER TO SEEDING MIXTURES AND RATES IN TABLE BELOW.
2/ POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAYING AREA AND ATHLETIC FIELDS.

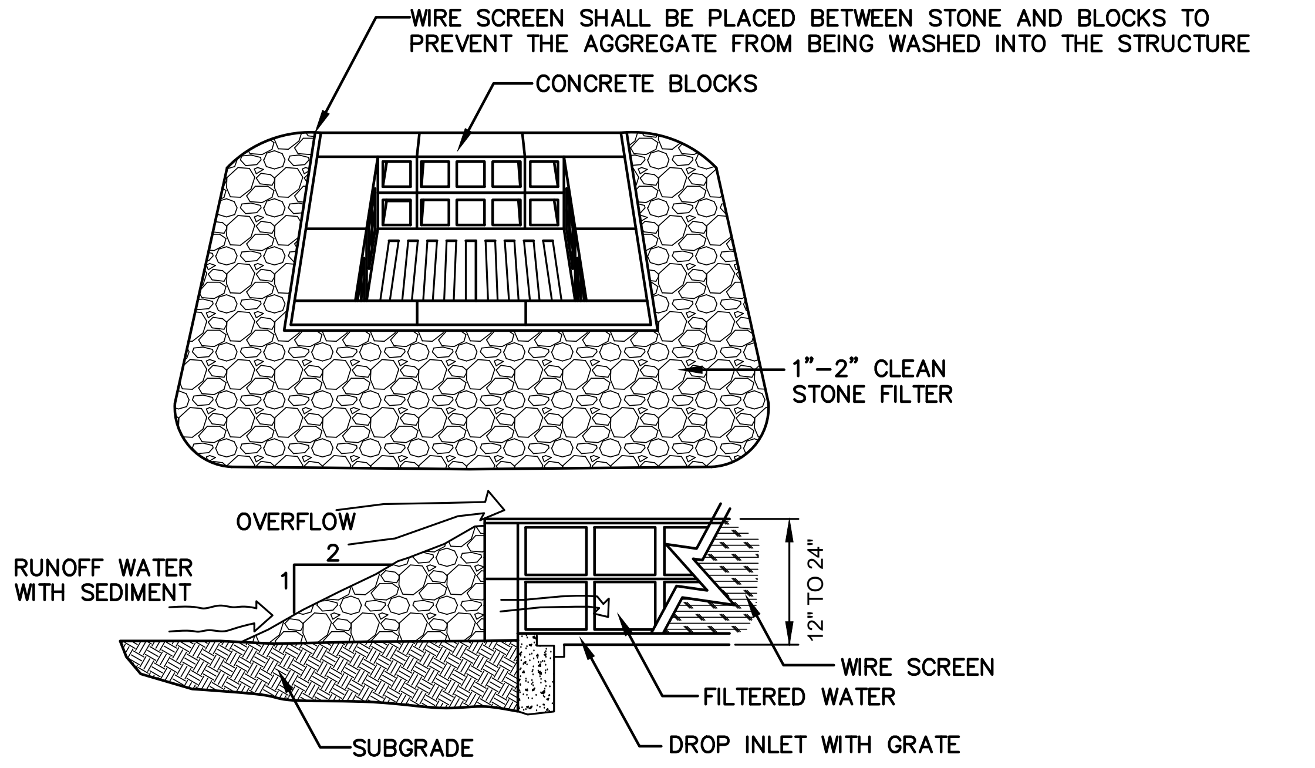
NOTE: TEMPORARY SEED MIX FOR STABILIZATION OF TURF SHALL BE WINTER RYE OR OATS AT A RATE OF 2.5 LBS. PER 1000 S.F. AND SHALL BE PLACED PRIOR TO OCTOBER 15th, IF PERMANENT SEEDING NOT YET COMPLETE.

SEEDING GUIDE

MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 Sq. Ft..
A. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
RED TOP	2	0.05
TOTAL	42	0.95
B. TALL FESCUE	15	0.35
CREEPING RED FESCUE	10	0.25
CROWN VETCH	15	0.35
OR		
FLAT PEA	30	0.75
TOTAL	40 OR 55	0.95 OR 1.35
* C. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
BIRDS FOOT TREFOIL	8	0.20
TOTAL	48	1.10
D. TALL FESCUE	20	0.45
FLAT PEA	30	0.75
TOTAL	50	1.20
E. CREEPING RED FESCUE 1/	50	1.15
KENTUCKY BLUEGRASS 1/	50	1.15
TOTAL	100	2.30
F. TALL FESCUE 1	150	3.60

1/ FOR HEAVY USE ATHLETIC FIELDS CONSULT THE UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION TURF SPECIALIST FOR CURRENT VARIETIES AND SEEDING RATES.

SEEDING RATES



MAINTENANCE NOTE:

1. ALL STRUCTURES SHOULD BE INSPECTED AFTER EVERY RAINFALL AND REPAIRS MADE AS NECESSARY. SEDIMENT SHOULD BE REMOVED FROM TRAPPING DEVICES AFTER THE SEDIMENT HAS REACHED A MAXIMUM OF ONE HALF THE DEPTH OF THE TRAP. THE SEDIMENT SHOULD BE DISPOSED IN A SUITABLE UPLAND AREA AND PROTECTED FROM EROSION BY EITHER STRUCTURE OR VEGETATIVE MEANS. THE TEMPORARY TRAPS SHOULD BE REMOVED AND THE AREA REPAIRED AS SOON AS THE CONTRIBUTING DRAINAGE AREA TO THE INLET HAS BEEN COMPLETELY STABILIZED.

TEMPORARY CATCH BASIN INLET PROTECTION
(Block and Gravel Drop Inlet Sediment Filter)

NOT TO SCALE

CONSTRUCTION SEQUENCE

1. PRIOR TO THE START OF ANY ACTIVITY, IT IS THE RESPONSIBILITY OF THE SITE'S SITE DEVELOPER (OR OWNER) TO FILE A NOTICE OF INTENT (NOI) FORM WITH THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN ORDER TO GAIN COVERAGE UNDER THE NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES. A PRE CONSTRUCTION MEETING IS TO BE HELD WITH ALL DEPARTMENT HEADS PRIOR TO THE START OF CONSTRUCTION.
2. CUT AND REMOVE TREES IN CONSTRUCTION AREA AS REQUIRED OR DIRECTED.
3. INSTALL FIBER BERM, HAY BALES AND CONSTRUCTION ENTRANCES PRIOR TO THE START OF CONSTRUCTION. THESE ARE TO BE MAINTAINED UNTIL THE FINAL PAVEMENT SURFACING AND LANDSCAPING AREAS ARE ESTABLISHED.
4. CLEAR, CUT, GRUB AND DISPOSE OF DEBRIS IN APPROVED FACILITIES. THIS INCLUDES ANY REQUIRED DEMOLITION OF EXISTING STRUCTURES, UTILITIES, ETC.
5. CONSTRUCT AND/OR INSTALL TEMPORARY OR PERMANENT SEDIMENT AND/OR DETENTION BASIN(S) AS REQUIRED. THESE FACILITIES SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING RUN-OFF TO THEM.
6. STRIP LOAM AND PAVEMENT PER THE RECOMMENDATIONS OF THE PROJECT ENGINEER AND STOCKPILE EXCESS MATERIAL. STABILIZE STOCKPILE AS NECESSARY.
7. PERFORM PRELIMINARY SITE GRADING IN ACCORDANCE WITH THE PLANS.
8. INSTALL THE SEWER AND DRAINAGE SYSTEMS FIRST, THEN ANY OTHER UTILITIES IN ACCORDANCE WITH THE PLAN AND DETAILS. ANY CONFLICTS BETWEEN UTILITIES ARE TO BE RESOLVED WITH THE INVOLVEMENT AND APPROVAL OF THE ENGINEER.
9. INSTALL INLET PROTECTION AT ALL CATCH BASINS AS THEY ARE CONSTRUCTED IN ACCORDANCE WITH DETAILS.
10. ALL SWALES AND DRAINAGE STRUCTURES ARE TO BE CONSTRUCTED AND STABILIZED PRIOR TO HAVING RUN-OFF DIRECTED TO THEM.
11. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINAGE DITCHES, CHECK DAMS, SEDIMENT TRAPS, ETC., TO PREVENT EROSION ON THE SITE AND PREVENT ANY SILTATION OF ABUTTING WATERS AND/OR PROPERTY.
12. PERFORM FINAL FINE GRADING, INCLUDING PLACEMENT OF 'SELECT' SUBGRADE MATERIALS.
13. PAVE ROADWAY AND DRIVEWAYS WITH INITIAL 'BASE COURSE'.
14. PERFORM ALL REMAINING SITE CONSTRUCTION (i.e. BUILDING, CURBING, UTILITY CONNECTIONS, ETC.).
15. LOAM AND SEED ALL DISTURBED AREAS AND INSTALL ANY REQUIRED SEDIMENT AND EROSION CONTROL FACILITIES (i.e. RIP RAP, EROSION CONTROL BLANKETS, ETC.).
16. FINISH PAVING ROADWAY AND DRIVEWAYS WITH 'FINISH' COURSE.
17. ROADWAY AND DRIVEWAYS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
18. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
19. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
20. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEDING AREAS HAVE BEEN 75%-85% ESTABLISHED AND SITE IMPROVEMENTS ARE COMPLETE. SMOOTH AND RE-VEGETATE ALL DISTURBED AREAS.
21. CLEAN SITE AND ALL DRAINAGE STRUCTURES, PIPES AND SUMPS OF ALL SILT AND DEBRIS.
22. INSTALL ALL PAINTED PAVEMENT MARKINGS AND SIGNAGE PER THE PLANS AND DETAILS.
23. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY QUARTER-INCH OF RAINFALL.
24. UPON COMPLETION OF CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ANY RELEVANT PERMITTING AGENCIES THAT THE CONSTRUCTION HAS BEEN FINISHED IN A SATISFACTORY MANNER.

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
08/20/2024

REV.	DATE	REVISION	BY
2	8/16/24	REVISED PER CITY REVIEW ENGINEER COMMENTS	DJM
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

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Plan Name: EROSION AND SEDIMENT CONTROL DETAILS
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
E1
SHEET 20 OF 20
JBE PROJECT NO. 18134.1