

# JONES & BEACH ENGINEERS INC.

85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885  
603.772.4746 - JonesandBeach.com

January 19, 2023

Portsmouth Technical Advisory Committee  
Attn. Board Members  
1 Junkins Avenue, 3<sup>rd</sup> Floor  
Portsmouth, NH 03801

**RE: Response Letter 4 –TAC Comments**  
**212, 214, & 216 Woodbury Ave., Portsmouth, NH, 03801**  
**Tax Map 175, Lots 1, 2, & 3**  
**JBE Project No. 21254**

Dear Board Members,

We are in receipt of comments from Stefanie Casella, Portsmouth Planning Department, dated December 30, 2022 as well as comments from Eric Weinrieb, Altus Engineering, dated January 11, 2023. Review comments are listed below with our responses in bold.

## Portsmouth Planning Department Comments

1. *Landscaping plans should be stamped by a licensed landscape architect.*  
**RESPONSE: The landscape plan was prepared by Lise McNaughton of LM Land Design, LLC, who is an experienced landscape designer. A landscape architect stamp is not a City requirement for site plans.**
2. *Green building statement to be provided in every submission.*  
**RESPONSE: The green building statement is included with this submission and was submitted in June and December. This is uploaded to the OpenGov Viewpoint Cloud.**
3. *The 9" 'Sycamore' (London Plane) tree in front of 216 Woodbury will need to go before Trees and Greenery for permission to remove. The tree should be replaced with a suitable species.*  
**RESPONSE: We are applying to Trees and Greenery for approval and the Trees and Greenery request letter is going directly to DPW. The Planning Department will be copied via email on this submission. As shown on Sheet L1, the sycamore is proposed to be replaced with a 3" caliper American Sentry Linden, which is narrow and will avoid the utility wires.**
4. *The sidewalk should terminate at the driveway entrance to the hotel. Please clarify the proposed sidewalk notes to indicate that.*  
**RESPONSE: The sidewalk has been revised to terminate at the driveway entrance to the hotel. Sheet C2 now shows this and calls it out.**

5. *If Boyd Road is reconstructed (due to happen in this coming construction season) prior to the site work in Boyd Road being constructed, Boyd Road will require a mill and fill pavement resurfacing for all disturbed areas to the satisfaction of the DPW.*

**RESPONSE:** See Note #30 on Sheet C2.

6. *Please smooth out the proposed curb alignment on Boyd Road near the intersection of Woodbury.*

**RESPONSE:** The jog that was shown in the proposed curb has been removed.

7. *Altus to conclude review and comment on submission.*

**RESPONSE:** Altus review comments are addressed with this response.

8. *No welded wire shall be used in any sidewalks in the City's ROW. Use 4000psi fiber-mesh instead.*

**RESPONSE:** The details have been revised to call for a 4000 psi fiber mesh instead of welded wire reinforcement within the sidewalk.

9. *The sewer services will need to be tested. Extend the cleanout for each service to the surface within 5' of each structure.*

**RESPONSE:** A cleanout is now shown on each gravity service 5' from the unit that it services. As shown on the sewer service detail on Sheet D2, the sewer cleanout shall be capped at finished grade.

10. *Additional information needed on Potential Irrigation Meter.*

**RESPONSE:** If irrigation is required, water usage for irrigation for the entire development will be metered using a meter on Unit 2 as shown. The irrigation meter will be above ground and inside of a structure and will have a backflow enclosure as required per City requirements.

11. *Fire services to buildings 5-8 are shown as capped before entering the buildings.*

**RESPONSE:** Fire services to buildings 5-8 are shown stubbed in lawn areas. The fire service lines will be installed before the units are built so they will be stubbed just before each building and then the line extended to the unit once the unit is constructed.

12. *Easement required to DPW for access to water shutoffs.*

**RESPONSE:** See Note #25 on Sheet C2.

13. *State location of outlet to overflow risers in bioretention system #2.*

**RESPONSE:** The overflow risers do not have an outlet. They are connected to each other with a perforated underdrain to infiltrate runoff beyond the water quality volume. This helps to allow infiltration during the winter when the ground is frozen.

14. *Third party review of responses to stormwater comments.*

**RESPONSE:** Altus comments are addressed with this response.

15. *State outlet of bioretention system #1.*

**RESPONSE:** Bioretention system #1 has an outlet structure and a pipe coming out of the outlet structure. This pipe is designed to carry any overflow into the adjacent stone infiltration bed, through which the overflow will be infiltrated to groundwater.

16. *Proposed curbstop and blowoff at end of water main should be a 2" blowoff hydrant.*

**RESPONSE:** A 2" blowoff hydrant is proposed at the end of the water main as shown on Sheet C4.

17. *Correct spelling of Thornton Street.*

**RESPONSE:** The spelling of Thornton Street has been corrected.

18. *Property owner should consider plant irrigation for the first two years of growth (Note 7 Sheet L1).*

**RESPONSE:** This verbiage has been added to Note 7 on Sheet L1.

19. *Please identify areas where protective groundcover measures could be applied in lieu of grass, mulch is also not considered a groundcover. Managed turf areas should be kept to a minimum to reduce mowing and fertilizer needs. (Note 8 Sheet L1).*

**RESPONSE:** Bearberry is now proposed in several areas of the site. This is a native spreading groundcover that would provide a shallow rooting mat over these areas.

20. *Staff recommends requiring the applicant plan for at least two years of monitoring and maintaining the new plantings. If after one year the plantings do not have at least an 80% success rate, replanting will be required. (Note 19 Sheet L1).*

**RESPONSE:** See Note #24 on Sheet L1.

21. *Please include more evergreen plantings along the northern edge of the property – see site plan review regulation 6.9.2.*

**RESPONSE:** Groups of black pine, autumn gold ginkgo, green giant arborvitae, and white fir have been added along the northern edge of the property to supplement the existing vegetation to remain.

22. *Include smart controllers for the planned irrigation of landscaped areas for more efficient use of water resources – see site plan review regulation 6.11.2. Please also consider using recycled water when possible for irrigation needs.*

**RESPONSE:** See Note #25 on Sheet L1.

23. *Although the project density may be in compliance with the dimensional regulations of the zoning ordinance, staff continues to maintain that the overall impact to the existing topography and vegetation on the site is excessive. As shown on the demolition plan, the revised plan now shows the limit-of-work in which the grading and vegetation will be substantially removed or regraded in order to support the proposed buildings, parking, driveways and other infrastructure. Importantly, the proposed limit-of-work comprises of over 90% of the natural areas located behind the existing single family structures on Woodbury Ave. Over 30 mature trees are proposed for removal, including many trees over 12 inches in diameter. Much of this vegetative material currently provides a strong visual screen to the high-density commercial properties along Route 1 and the Traffic Circle. Thus, the removal of this nature vegetation will significantly reduce this visual buffer. Further, the applicant's proposal to selectively target a thin screening of arborvitae will likely result in a significant reduction in the quality of the buffer or visual screen. Understanding that subsequent zoning relief would be required to significantly reduce the limit-of-work and its associated tree removal, staff remain supportive of that approach should the applicant seek to revisit this issue. Otherwise, a careful assessment of the proposed landscape screen, including the use of fencing, should be undertaken to ensure this project design complies with the screening requirements of the Site Plan Regulations.*

**RESPONSE:** The trees in the vicinity of the houses and infrastructure will be removed as is typical of all developments. The landscape plan shows how the trees will be re-planted within the middle of the development as well as buffer plantings on the exterior. The trees around the existing homes to remain will be retained as well as the tall trees and brush along the property lines with the existing hotels.

#### Altus Engineering Comments

24. *The revised drainage study has some minor technical inconsistencies such as minor discrepancies in the longest flow path and a subcatchment that is no longer relevant to the computations. However, it is our opinion that they have no relevance on the accuracy of the computations. Revisions are not necessary.*

**RESPONSE:** No response necessary.

25. *The Stormwater Management Operation and Maintenance Manual should be expanded to include specific language on maintaining the swales, spillway and foundation drain outfalls.*

**RESPONSE:** A section for maintaining swales has been added to the Operation and Maintenance manual. Specific notes regarding the spillways, overflow risers, and outlet structures have been added to the bioretention system section of the O&M Manual. In order to facilitate inspections and maintenance of the sump pump drains, inspection ports have been added to each sump pump drain just before they tie into the perforated pipe that runs through the stone infiltration bed that is used to infiltrate the sump pump discharge. A section for inspections and maintenance of the sump pump drains has been added to the O&M Manual as well.

26. *The Stormwater Management Operation and Maintenance Manual should be recorded with the condominium documents and be referenced in the condominium documents.*

**RESPONSE:** The Stormwater Management and Operation and Maintenance Manual will be recorded with the condominium documents and referenced in those documents.



27. *The clay core should be depicted on the spillway detail and should be shown being keyed into the original grade to ensure that lateral movement of water does not occur.*

**RESPONSE: The clay core has been added to the spillway detail and it is noted on the detail that it shall be keyed into original grade to ensure that lateral movement of water does not occur. The bioretention berm section detail on Sheet D4 states the same.**

Included with this response letter are the following:

1. One (1) Full Size Plan Set Folded.
2. One (1) Revised Operation and Maintenance Manual
3. Green Building Statement.

Thank you very much for your time.

Very truly yours,

**JONES & BEACH ENGINEERS, INC.**



Daniel Meditz, E.I.T.  
Project Engineer

cc: Eric Weinrieb, P.E., Altus Engineering (via email and hand delivered)  
Michael Garrepy, Tuck Realty Corporation (via email)  
Tim Phoenix, Hoefle, Phoenix, Gormley & Roberts, PLLC (via email)  
Kevin Baum, Hoefle, Phoenix, Gormley & Roberts, PLLC (via email)  
Lise McNaughton, LM Land Design (via email)

# **JONES & BEACH ENGINEERS INC.**

85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885  
603.772.4746 - JonesandBeach.com

## **STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE MANUAL**

**“Grapevine Run”  
212, 214, & 216 Woodbury Ave.  
Portsmouth, NH 03801  
Tax Map 175, Lots 1, 2, & 3**

**Prepared for:**

**Tuck Realty Corp.  
ATTN: Turner Porter  
P.O. Box 190  
Exeter, NH 03833**

**Prepared by:**

**Jones & Beach Engineers, Inc.  
85 Portsmouth Avenue  
P.O. Box 219  
Stratham, NH 03885  
(603) 772-4746  
June 21, 2022  
REVISED July 27, 2022  
REVISED September 20, 2022  
REVISED November 30, 2022  
REVISED January 19, 2023  
JBE Project No. 21254**

# 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 shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form.

## 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. Bioretention systems
  - d. Sediment Forebays
  - e. Permeable Paver Driveways
  - f. Stone Drip Edge
  - g. Subsurface Stone Infiltration Areas
  - h. Pre-Tx Curb Inlet Structure
  - i. Culverts
  - j. Rip-Rap Outlet Protection Aprons
  - k. Swales
  - l. Sump Pump Drain Outfall Pipes
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 at 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. 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), residents are encouraged to 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 should 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 should not be allowed to grow in these areas.
- **KEEP IN MIND, THE BIORETENTION CELL IS NOT A POND. IT SHOULD NOT PROVIDE A BREEDING GROUND FOR MOSQUITOES. MOSQUITOES NEED AT LEAST FOUR (4) DAYS OF STANDING WATER TO DEVELOP AS LARVA.**

d. **Cleaning Criteria for all Sedimentation Forebays:** Sediment should 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 should 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 should be cleaned when drawdown times exceed 60 to 72 hours. Materials can be removed with heavy construction equipment; however, this equipment should not track on the wetland surface. Revegetate disturbed areas as necessary. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.

e. **Permeable paver driveways:**

Units 6-8 feature permeable paver driveways for stormwater management; the remainder of road surface on site is constructed from standard asphalt. The following recommendations will help assure that the pavement is maintained to preserve its hydrologic effectiveness.

**Winter maintenance:**

- Sanding for winter traction is prohibited. Deicing is permitted (NaCl, MgCl<sub>2</sub>, or equivalent). Reduced salt application is possible and can be a cost savings for winter maintenance. Nontoxic, organic deicers, applied either as blended, magnesium chloride-based liquid products or as pretreated salt, are preferable.
- Plowing is allowed, blade should be set approximately 1" above the paver surface. Ice and light snow accumulation are generally not as problematic as for standard asphalt. Snow will accumulate during heavier storms and should be plowed. (more than usual, about an inch).

#### **Routine maintenance:**

- Seal coating is absolutely forbidden. Surface seal coating is not reversible.
- The paver surface should be vacuumed 2 or 3 times per year, and at any additional times sediment is spilled, eroded, or tracked onto the surface.
- Planted areas adjacent to permeable pavers should be well maintained to prevent soil washout onto the pavers. If any bare spots or eroded areas are observed within the planted areas, they should be replanted and/or stabilized at once.
- Immediately clean any soil deposited on pavers. Superficial dirt does not necessarily clog the paver voids. However, dirt that is ground in repeatedly by tires can lead to clogging. Therefore, trucks or other heavy vehicles should be prevented from tracking or spilling dirt onto the pavers.
- Do not allow construction staging, soil/mulch storage, etc. on unprotected paver surface. Contractor to lay down tarps, plywood or removable item and take care not to track material onto unprotected pavers.
- Repairs: Potholes or other surface blemishes shall be replaced in kind. Any required repair of drainage structures should be done promptly to ensure continued proper functioning of the system.
- Written and verbal communication to the future owner should make clear the pavement's special purpose and special maintenance requirements such as those listed here.

#### **f. Stone Drip Edge:**

A stone drip edge is behind Units 3 & 4 to collect roof runoff into a pipe in order to direct it into a subsurface stone infiltration bed. This practice shall be lined and is not intended for infiltration. The following recommendations 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 should be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation should not be allowed to become established in stone areas, and/or any debris removed from the void spaces between the stones.

g. Subsurface Stone Infiltration Beds:

The following recommendations will help assure that the stone areas are maintained to preserve their effectiveness. These are located between Units 4 and the road, between Units 5&6, between Units 7&8, and behind Unit 1 and each one has a cleanout within the footprint of the system to be used for inspections.

In the spring and fall, visually inspect the area around these underground systems and repair any erosion. Use small stones to stabilize erosion along drainage paths. Twice a year open the cleanout and check for signs of debris, sediment build-up, or standing water. If more than 12" of sediment is observed, plug the outlet and flush the system thoroughly. Pump water into system until at least 1" of standing water covers the system bottom. Capture sediment-laden water for proper disposal according to local state, and EPA regulation. **If the practice cannot be remediated as noted, it shall be replaced, and the City of Portsmouth shall be notified that the system has failed.**

h. Pre-Tx Curb Inlet Structure

See attached Pre-Tx operations and maintenance guidelines.

i. **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.

j. Rock riprap should be **inspected annually** in order to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock should be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation should 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 should be kept clear of obstructions, debris, and sediment deposits

k. Swales - Inspect swales 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

l. Sump Pump Drain Outfall Pipes – If basement flooding occurs or otherwise twice annually, open the sump pump drain inspection ports and check for signs of debris, sediment build-up, or standing water. If more than 12" of sediment is observed, plug the outlet and flush the system thoroughly. Pump water into system until at least 1" of standing water covers the system bottom. Capture sediment-laden water for proper disposal according to local state, and EPA regulation.

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.

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Signature

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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 shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form.

Construction Activity	Date of Inspection	Who Inspected	Findings of Inspector
Roadway and Driveways			
Vegetation and Landscaping			
Bioretention #1			
Bioretention #2			
Permeable Paver Driveways (Units 6-8)			

Sediment Forebay			
Stone Drip Edge			
Subsurface Stone Infiltration Beds			
Pre-Tx Curb Inlet Structure			
Culverts			
Rip Rap Outlet Protection			
Swales			
Sump Pump Drain Outfall Pipes			
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
<p>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.</p> <p>Check to insure the filter surface remains well draining after storm event. <b>Remedy:</b> 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.</p>	After every major storm in the first few months, then biannually.
<p>Check inlets and outlets for leaves and debris. <b>Remedy:</b> Rake in and around the system to clear it of debris. Also, clear the inlet and overflow if obstructed.</p> <p>Check for animal burrows and short circuiting in the system <b>Remedy:</b> Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted.</p> <p>Check to insure the filter bed does not contain more than 2 inches accumulated material <b>Remedy:</b> 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.</p> <p>During extended periods without rainfall, inspect plants for signs of distress. <b>Remedy:</b> Plants should be watered until established (typical only for first few months) or as needed thereafter.</p>	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
<p>Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. <b>Remedy:</b> Repair or replace any damaged structural parts, inlets, outlets, sidewalls.</p> <p>Check for robust vegetation coverage throughout the system. <b>Remedy:</b> If at least 50% vegetation coverage is not established after 2 years, reinforcement planting should be performed.</p>	Annually
<p>Check for dead or dying plants, and general long term plant health. <b>Remedy:</b> 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.</p>	As needed



## CHECKLIST FOR INSPECTION OF BIORETENTION SYSTEM / TREE FILTERS

Location:

Inspector:

Date:

Time:

Site Conditions:

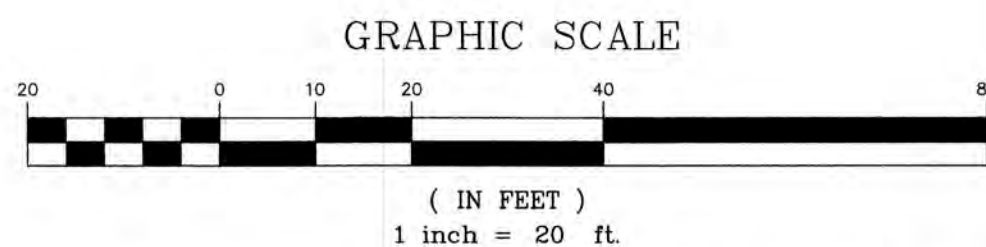
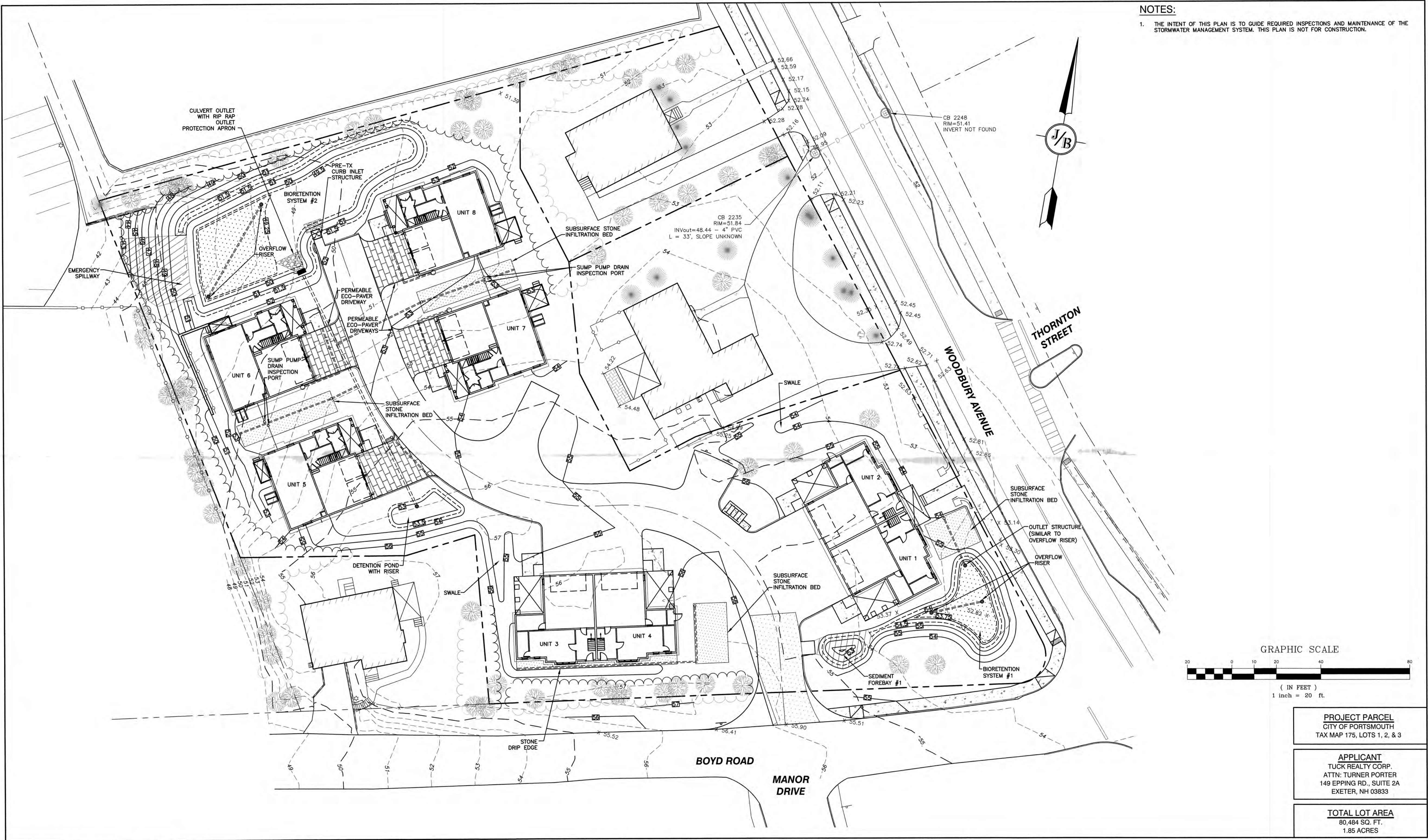
Date Since Last Rain Event:

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
<b>1. Initial Inspection After Planting and Mulching</b>		
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	
<b>2. Debris Cleanup (2 times a year minimum, Spring &amp; Fall)</b>		
Litter, leaves, and dead vegetation removed from the system	S U	
Prune perennial vegetation	S U	
<b>3. Standing Water (1 time a year, After large storm events)</b>		
No evidence of standing water after 72 hours	S U	
<b>4. Short Circuiting &amp; Erosion (1 time a year, After large storm events)</b>		
No evidence of animal burrows or other holes	S U	
No evidence of erosion	S U	
<b>5. Drought Conditions (As needed)</b>		
Water plants as needed	S U	
Dead or dying plants		
<b>6. Overflow Bypass / Inlet Inspection (1 time a year, After large storm events)</b>		
No evidence of blockage or accumulated leaves	S U	
Good condition, no need for repair	S U	
<b>7. Vegetation Coverage (once a year)</b>		
50% coverage established throughout system by first year	S U	
Robust coverage by year 2 or later	S U	
<b>8. Mulch Depth (if applicable)(once every 2 years)</b>		
Mulch at original design depth after tilling or replacement	S U	
<b>9. Vegetation Health (once every 3 years)</b>		
Dead or decaying plants removed from the system	S U	
<b>10. Tree Pruning (once every 3 years)</b>		
Prune dead, diseased, or crossing branches	S U	
<b>Corrective Action Needed</b>		<b>Due Date</b>
1.		
2.		
3.		



**NOTES:**

1. THE INTENT OF THIS PLAN IS TO GUIDE REQUIRED INSPECTIONS AND MAINTENANCE OF THE STORMWATER MANAGEMENT SYSTEM. THIS PLAN IS NOT FOR CONSTRUCTION.



PROJECT PARCEL  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1, 2, & 3

APPLICANT  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
149 EPPING RD., SUITE 2A  
EXETER, NH 03833

TOTAL LOT AREA  
80,484 SQ. FT.  
1.85 ACRES

Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: 1"=20'	Project No.: 21254
Drawing Name: 21254-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.		

8	1/19/23	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
7	12/20/22	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
6	10/18/22	REVISED PER REVIEW ENGINEER AND TAC COMMENTS	DJM
5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

Designed and Produced in NH

**J/B Jones & Beach Engineers, Inc.**

85 Portsmouth Ave. PO Box 219 Stratham, NH 03885

*Civil Engineering Services*

603-772-4746  
FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	OPERATIONS AND MAINTENANCE PLAN
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894
	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

DRAWING No.
<b>OM1</b>
SHEET 1 OF 1 JBE PROJECT NO. 21254



# Art Form Architecture, Inc.

PO Box 535,44 Lafayette Road, North Hampton, NH 03862

Wendy@ArtForm.us

(603) 431-9559 Phone

June 10, 2022

City of Portsmouth  
Planning Department  
Attn: Peter Stith, Principal Planner  
1 Junkins Ave, 3<sup>rd</sup> Floor  
Portsmouth, NH 03801

RE: Grapevine Run, 212-216 Woodbury Ave, Portsmouth NH

Dear Mr. Stith

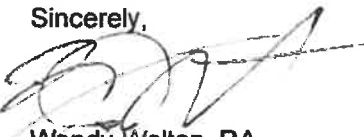
The residential units proposed for the project referenced above are being designed to meet or exceed the applicable green building standards as set forth in the 2015 set of iCodes adopted by the State of New Hampshire along with associated amendments codified by the City of Portsmouth.

We have identified the following areas where components of these buildings can exceed code.

- Low maintenance exterior materials, reducing both replacement of the materials, and of chemicals needed to maintain them.
- Air quality and energy cost considerations on the mechanical systems, such as whole house ventilation, programmable thermostats, and high efficiency hot water, heat and cooling equipment.
- High efficiency lighting.
- Energy Star appliances.
- We've already designed with a relatively modest window area by modern standards.
- Designing for modern life is a green move in and of itself. The four bedrooms plus a study in these units was not done with the assumption that large families will live in downtown condos with minimal private yards. It was done assuming that the smallest front bedroom would also be used as a home office, allowing both parents to work from home. With this location enabling walking to all shopping and other amenities, we had in mind to minimize car use

Assemblies and systems for the units will be specified during the Building Permit application phase. Where some of these items are permitted separately from the architectural drawings, our client has committed to these same measures.

Sincerely,



Wendy Welton, RA  
President



## 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: Tuck Realty Corp. Date Submitted: 6/21/22

Application # (in City's online permitting): \_\_\_\_\_

Site Address: 212, 214 & 216 Woodbury Avenue Map: 175 Lot: 1, 2, & 3

Application Requirements			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Complete <u>application</u> form submitted via the City's web-based permitting program (2.5.2.1(2.5.2.3A))		N/A
<input checked="" type="checkbox"/>	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			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Statement that lists and describes "green" building components and systems. (2.5.3.1B)		
<input checked="" type="checkbox"/>	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)		N/A
<input checked="" type="checkbox"/>	Tax map and lot number, and current zoning of all parcels under Site Plan Review. (2.5.3.1D)		N/A

Site Plan Review Application Required Information			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. (2.5.3.1E)		N/A
<input checked="" type="checkbox"/>	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)		N/A
<input checked="" type="checkbox"/>	Names, addresses and telephone numbers of all professionals involved in the site plan design. (2.5.3.1G)		N/A
<input checked="" type="checkbox"/>	List of reference plans. (2.5.3.1H)		N/A
<input checked="" type="checkbox"/>	List of names and contact information of all public or private utilities servicing the site. (2.5.3.1I)		N/A

Site Plan Specifications			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. (2.5.4.1C)		N/A
<input checked="" type="checkbox"/>	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
<input type="checkbox"/>	Wetlands shall be delineated by a NH certified wetlands scientist and so stamped. (2.5.4.1E)	N/A, none onsite	N/A
<input checked="" type="checkbox"/>	Title (name of development project), north point, scale, legend. (2.5.4.2A)		N/A
<input checked="" type="checkbox"/>	Date plans first submitted, date and explanation of revisions. (2.5.4.2B)		N/A
<input checked="" type="checkbox"/>	Individual plan sheet title that clearly describes the information that is displayed. (2.5.4.2C)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Source and date of data displayed on the plan. (2.5.4.2D)		N/A



### Site Plan Specifications – Required Exhibits and Data

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	<b>1. Existing Conditions: (2.5.4.3A)</b> <ul style="list-style-type: none"> <li>• Surveyed plan of site showing existing natural and built features;</li> <li>• Existing building footprints and gross floor area;</li> <li>• Existing parking areas and number of parking spaces provided;</li> <li>• Zoning district boundaries;</li> <li>• Existing, required, and proposed dimensional zoning requirements including building and open space coverage, yards and/or setbacks, and dwelling units per acre;</li> <li>• Existing impervious and disturbed areas;</li> <li>• Limits and type of existing vegetation;</li> <li>• Wetland delineation, wetland function and value assessment (including vernal pools);</li> <li>• SFHA, 100-year flood elevation line and BFE data, as required.</li> </ul>	Existing Conditions	
<input checked="" type="checkbox"/>	<b>2. Buildings and Structures: (2.5.4.3B)</b> <ul style="list-style-type: none"> <li>• Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation;</li> <li>• Elevations: Height, massing, placement, materials, lighting, façade treatments;</li> <li>• Total Floor Area;</li> <li>• Number of Usable Floors;</li> <li>• Gross floor area by floor and use.</li> </ul>	Architectural Drawings	
<input checked="" type="checkbox"/>	<b>3. Access and Circulation: (2.5.4.3C)</b> <ul style="list-style-type: none"> <li>• Location/width of access ways within site;</li> <li>• Location of curbing, right of ways, edge of pavement and sidewalks;</li> <li>• Location, type, size and design of traffic signing (pavement markings);</li> <li>• Names/layout of existing abutting streets;</li> <li>• Driveway curb cuts for abutting prop. and public roads;</li> <li>• If subdivision; Names of all roads, right of way lines and easements noted;</li> <li>• AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).</li> </ul>	Site Plan	
<input checked="" type="checkbox"/>	<b>4. Parking and Loading: (2.5.4.3D)</b> <ul style="list-style-type: none"> <li>• Location of off street parking/loading areas, landscaped areas/buffers;</li> <li>• Parking Calculations (# required and the # provided).</li> </ul>	Site Plan Notes	
<input checked="" type="checkbox"/>	<b>5. Water Infrastructure: (2.5.4.3E)</b> <ul style="list-style-type: none"> <li>• Size, type and location of water mains, shut-offs, hydrants &amp; Engineering data;</li> <li>• Location of wells and monitoring wells (include protective radii).</li> </ul>	Utility Plan	
<input checked="" type="checkbox"/>	<b>6. Sewer Infrastructure: (2.5.4.3F)</b> <ul style="list-style-type: none"> <li>• Size, type and location of sanitary sewage facilities &amp; Engineering data, including any onsite temporary facilities during construction period.</li> </ul>	Utility Plan	

<input checked="" type="checkbox"/>	<b>7. Utilities: (2.5.4.3G)</b> <ul style="list-style-type: none"> <li>The size, type and location of all above &amp; below ground utilities;</li> <li>Size type and location of generator pads, transformers and other fixtures.</li> </ul>	Utility Plan	
<input checked="" type="checkbox"/>	<b>8. Solid Waste Facilities: (2.5.4.3H)</b> <ul style="list-style-type: none"> <li>The size, type and location of solid waste facilities.</li> </ul>	Site Plan Notes	
<input checked="" type="checkbox"/>	<b>9. Storm water Management: (2.5.4.3I)</b> <ul style="list-style-type: none"> <li>The location, elevation and layout of all storm-water drainage.</li> <li>The location of onsite snow storage areas and/or proposed off-site snow removal provisions.</li> <li>Location and containment measures for any salt storage facilities</li> <li>Location of proposed temporary and permanent material storage locations and distance from wetlands, water bodies, and stormwater structures.</li> </ul>	Drainage report	
<input checked="" type="checkbox"/>	<b>10. Outdoor Lighting: (2.5.4.3J)</b> <ul style="list-style-type: none"> <li>Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and photometric plan.</li> </ul>	Lighting Plan	
<input checked="" type="checkbox"/>	<b>11. Indicate where dark sky friendly lighting measures have been implemented. (10.1)</b>		
<input checked="" type="checkbox"/>	<b>12. Landscaping: (2.5.4.3K)</b> <ul style="list-style-type: none"> <li>Identify all undisturbed area, existing vegetation and that which is to be retained;</li> <li>Location of any irrigation system and water source.</li> </ul>		
<input checked="" type="checkbox"/>	<b>13. Contours and Elevation: (2.5.4.3L)</b> <ul style="list-style-type: none"> <li>Existing/Proposed contours (2 foot minimum) and finished grade elevations.</li> </ul>		
<input type="checkbox"/>	<b>14. Open Space: (2.5.4.3M)</b> <ul style="list-style-type: none"> <li>Type, extent and location of all existing/proposed open space.</li> </ul>	N/A	
<input checked="" type="checkbox"/>	<b>15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)</b>		
<input type="checkbox"/>	<b>16. Character/Civic District (All following information shall be included): (2.5.4.3P)</b> <ul style="list-style-type: none"> <li>Applicable Building Height (10.5A21.20 &amp; 10.5A43.30);</li> <li>Applicable Special Requirements (10.5A21.30);</li> <li>Proposed building form/type (10.5A43);</li> <li>Proposed community space (10.5A46).</li> </ul>	N/A	
<input type="checkbox"/>	<b>17. Special Flood Hazard Areas (2.5.4.3Q)</b> <ul style="list-style-type: none"> <li>The proposed development is consistent with the need to minimize flood damage;</li> <li>All public utilities and facilities are located and construction to minimize or eliminate flood damage;</li> <li>Adequate drainage is provided so as to reduce exposure to flood hazards.</li> </ul>	N/A	

### Other Required Information

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input type="checkbox"/>	Traffic Impact Study or Trip Generation Report, as required. (3.2.1-2)	N/A	
<input checked="" type="checkbox"/>	Indicate where Low Impact Development Design practices have been incorporated. (7.1)	Grading & Drainage Plan	
<input type="checkbox"/>	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)	N/A	
<input checked="" type="checkbox"/>	Stormwater Management and Erosion Control Plan. (7.4)	Plans & Drainage Report	
<input checked="" type="checkbox"/>	Inspection and Maintenance Plan (7.6.5)	Drainage Report	

### Final Site Plan Approval Required Information

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	All local approvals, permits, easements and licenses required, including but not limited to: <ul style="list-style-type: none"> <li>• Waivers;</li> <li>• Driveway permits;</li> <li>• Special exceptions;</li> <li>• Variances granted;</li> <li>• Easements;</li> <li>• Licenses.</li> </ul> (2.5.3.2A)	Site Plan Notes	
<input checked="" type="checkbox"/>	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: <ul style="list-style-type: none"> <li>• Calculations relating to stormwater runoff;</li> <li>• Information on composition and quantity of water demand and wastewater generated;</li> <li>• Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls;</li> <li>• Estimates of traffic generation and counts pre- and post- construction;</li> <li>• Estimates of noise generation;</li> <li>• A Stormwater Management and Erosion Control Plan;</li> <li>• Endangered species and archaeological / historical studies;</li> <li>• Wetland and water body (coastal and inland) delineations;</li> <li>• Environmental impact studies.</li> </ul> (2.5.3.2B)	Drainage Report	
<input type="checkbox"/>	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

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	A list of any required state and federal permit applications required for the project and the status of same. (2.5.3.2E)	Site Plan Notes	
<input checked="" type="checkbox"/>	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)	Site Plan Notes	N/A
<input type="checkbox"/>	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	
<input checked="" type="checkbox"/>	Plan sheets submitted for recording shall include the following notes: <ul style="list-style-type: none"> <li>a. "This Site Plan shall be recorded in the Rockingham County Registry of Deeds."</li> <li>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."</li> </ul> (2.13.3)	Site Plan Notes	N/A

Applicant's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

6/21/22



## City of Portsmouth, New Hampshire

### Subdivision Application Checklist

This subdivision application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. 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 subdivision review requirements. Please refer to the Subdivision review regulations for full details.

**Applicant Responsibilities (Section III.C):** Applicable fees are due upon application submittal along with required number of copies of the Preliminary or final plat and supporting documents and studies. Please consult with Planning staff for submittal requirements.

Owner: Frederick J. Bailey & Joyce S. Nelson Date Submitted: June 21, 2022

Applicant: Tuck Realty Corp.

Phone Number: 603-778-6894 E-mail: turnerporterjr@gmail.com

Site Address 1: 212 Woodbury Avenue Map: 175 Lot: 2, 3

Site Address 2: 214 & 216 Woodbury Avenue Map: 175 Lot: 2, 3

Application Requirements			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Completed Application form. (III.C.2-3)		N/A
<input checked="" type="checkbox"/>	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF) on compact disc, DVD or flash drive. (III.C.4)		N/A

Requirements for Preliminary/Final Plat				
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Required for Preliminary / Final Plat	Waiver Requested
<input checked="" type="checkbox"/>	Name and address of record owner, any option holders, descriptive name of subdivision, engineer and/or surveyor or name of person who prepared the plat. (Section IV.1/V.1)	Plan Set	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	N/A

Requirements for Preliminary/Final Plat				
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Required for Preliminary / Final Plat	Waiver Requested
<input checked="" type="checkbox"/>	<b>Preliminary Plat</b> Names and addresses of all adjoining property owners. (Section IV.2) <b>Final Plat</b> Names and addresses of all abutting property owners, locations of buildings within one hundred (100) feet of the parcel, and any new house numbers within the subdivision. (Section V.2)	Existing Conditions Plan	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	N/A
<input checked="" type="checkbox"/>	North point, date, and bar scale. (Section IV.3/V3)	Required on all Plan Sheets	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	N/A
<input checked="" type="checkbox"/>	Zoning classification and minimum yard dimensions required. (Section IV.4/V.4)	Existing Conditions Plan	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	N/A
<input checked="" type="checkbox"/>	<b>Preliminary Plat</b> Scale (not to be smaller than one hundred (100) feet = 1 inch) and location map (at a scale of 1" = 1000'). (Section IV.5) <b>Final Plat</b> Scale (not to be smaller than 1"=100'), Location map (at a scale of 1"=1,000') showing the property being subdivided and its relation to the surrounding area within a radius of 2,000 feet. Said location map shall delineate all streets and other major physical features that may either affect or be affected by the proposed development. (Section V.5)	Existing Conditions Plan	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	N/A
<input checked="" type="checkbox"/>	Location and approximate dimensions of all existing and proposed property lines including the entire area proposed to be subdivided, the areas of proposed lots, and any adjacent parcels in the same ownership. (Section IV.6)	Existing Conditions Plan	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	
<input checked="" type="checkbox"/>	Dimensions and areas of all lots and any and all property to be dedicated or reserved for schools, parks, playgrounds, or other public purpose. Dimensions shall include radii and length of all arcs and calculated bearing for all straight lines. (Section V.6/ IV.7)	Existing Conditions Plan	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	N/A
<input checked="" type="checkbox"/>	Location, names, and present widths of all adjacent streets, with a designation as to whether public or private and approximate location of existing utilities to be used. Curbs and sidewalks shall be shown. (Section IV.8/V.7)	Existing Conditions Plan	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	

Requirements for Preliminary/Final Plat				Waiver Requested
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Required for Preliminary / Final Plat	
<input checked="" type="checkbox"/>	Location of significant physical features, including bodies of water, watercourses, wetlands, railroads, important vegetation, stone walls and soils types that may influence the design of the subdivision. (Section IV.9/V.8)	Existing Conditions Plan	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	
<input checked="" type="checkbox"/>	<b>Preliminary Plat</b> Proposed locations, widths and other dimensions of all new streets and utilities, including water mains, storm and sanitary sewer mains, catch basins and culverts, street lights, fire hydrants, sewerage pump stations, etc. (Section IV.10) <b>Final Plat</b> Proposed locations and profiles of all proposed streets and utilities, including water mains, storm and sanitary sewer mains, catchbasins and culverts, together with typical cross sections. Profiles shall be drawn to a horizontal scale of 1"=50' and a vertical scale of 1"=5', showing existing centerline grade, existing left and right sideline grades, and proposed centerline grade. (Section V.9)	Existing Conditions & Utility Plan	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	
<input checked="" type="checkbox"/>	When required by the Board, the plat shall be accompanied by profiles of proposed street grades, including extensions for a reasonable distance beyond the subject land; also grades and sizes of proposed utilities. (Section IV.10)	Plan & Profile Sheet	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	
<input type="checkbox"/>	Base flood elevation (BFE) for subdivisions involving greater than five (5) acres or fifty (50) lots. (Section IV.11)	N/A	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	
<input checked="" type="checkbox"/>	For subdivisions of five (5) lots or more, or at the discretion of the Board otherwise, the preliminary plat shall show contours at intervals no greater than two (2) feet. Contours shall be shown in dotted lines for existing natural surface and in solid lines for proposed final grade, together with the final grade elevations shown in figures at all lot corners. If existing grades are not to be changed, then the contours in these areas shall be solid lines. (Section IV.12/ V.12)	Existing Conditions, Grading & Drainage Plans	<input checked="" type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	

Requirements for Preliminary/Final Plat				
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Required for Preliminary / Final Plat	Waiver Requested
<input checked="" type="checkbox"/>	Dates and permit numbers of all necessary permits from governmental agencies from which approval is required by Federal or State law. (Section V.10)	Site Plan	<input type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	
<input type="checkbox"/>	For subdivisions involving greater than five (5) acres or fifty (50) lots, the final plat shall show hazard zones and shall include elevation data for flood hazard zones. (Section V.11)	N/A	<input type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	
<input checked="" type="checkbox"/>	Location of all permanent monuments. (Section V.12)	Lot Line Adjustment Plan	<input type="checkbox"/> Preliminary Plat <input checked="" type="checkbox"/> Final Plat	



General Requirements <sup>1</sup>			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input type="checkbox"/>	<b>1. Basic Requirements: (VI.1)</b>		
<input checked="" type="checkbox"/>	a. Conformity to Official Plan or Map		
<input checked="" type="checkbox"/>	b. Hazards		
<input checked="" type="checkbox"/>	c. Relation to Topography		
<input type="checkbox"/>	d. Planned Unit Development		
<input type="checkbox"/>	<b>2. Lots: (VI.2)</b>		
<input checked="" type="checkbox"/>	a. Lot Arrangement		
<input checked="" type="checkbox"/>	b. Lot sizes		
<input type="checkbox"/>	c. Commercial and Industrial Lots		
<input type="checkbox"/>	<b>3. Streets: (VI.3)</b>		
<input checked="" type="checkbox"/>	a. Relation to adjoining Street System		
<input checked="" type="checkbox"/>	b. Street Rights-of-Way		
<input checked="" type="checkbox"/>	c. Access		
<input type="checkbox"/>	d. Parallel Service Roads		
<input checked="" type="checkbox"/>	e. Street Intersection Angles		
<input type="checkbox"/>	f. Merging Streets		
<input checked="" type="checkbox"/>	g. Street Deflections and Vertical Alignment		
<input type="checkbox"/>	h. Marginal Access Streets		
<input type="checkbox"/>	i. Cul-de-Sacs		
<input checked="" type="checkbox"/>	j. Rounding Street Corners		
<input checked="" type="checkbox"/>	k. Street Name Signs		
<input type="checkbox"/>	l. Street Names		
<input type="checkbox"/>	m. Block Lengths		
<input type="checkbox"/>	n. Block Widths		
<input checked="" type="checkbox"/>	o. Grade of Streets		
<input type="checkbox"/>	p. Grass Strips		
<input checked="" type="checkbox"/>	<b>4. Curbing: (VI.4)</b>		
<input checked="" type="checkbox"/>	<b>5. Driveways: (VI.5)</b>		
<input checked="" type="checkbox"/>	<b>6. Drainage Improvements: (VI.6)</b>		
<input checked="" type="checkbox"/>	<b>7. Municipal Water Service: (VI.7)</b>		
<input checked="" type="checkbox"/>	<b>8. Municipal Sewer Service: (VI.8)</b>		
<input type="checkbox"/>	<b>9. Installation of Utilities: (VI.9)</b>		
<input checked="" type="checkbox"/>	a. All Districts		
<input checked="" type="checkbox"/>	b. Indicator Tape		
<input type="checkbox"/>	<b>10. On-Site Water Supply: (VI.10)</b>	N/A	
<input type="checkbox"/>	<b>11. On-Site Sewage Disposal Systems: (VI.11)</b>	N/A	
<input type="checkbox"/>	<b>12. Open Space: (VI.12)</b>	N/A	
<input type="checkbox"/>	a. Natural Features		
<input type="checkbox"/>	b. Buffer Strips		
<input type="checkbox"/>	c. Parks		
<input type="checkbox"/>	d. Tree Planting		
<input type="checkbox"/>	<b>13. Flood Hazard Areas: (VI.13)</b>	N/A	
<input type="checkbox"/>	a. Permits		
<input type="checkbox"/>	b. Minimization of Flood Damage		
<input type="checkbox"/>	c. Elevation and Flood-Proofing Records		
<input type="checkbox"/>	d. Alteration of Watercourses		
<input checked="" type="checkbox"/>	<b>14. Erosion and Sedimentation Control (VI.14)</b>		

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input type="checkbox"/>	<b>15. Easements (VI.15)</b>	N/A	
<input type="checkbox"/>	a. Utilities		
<input type="checkbox"/>	b. Drainage		
<input checked="" type="checkbox"/>	<b>16. Monuments: (VI.16)</b>		
<input checked="" type="checkbox"/>	<b>17. Benchmarks: (VI.17)</b>		
<input checked="" type="checkbox"/>	<b>18. House Numbers (VI.18)</b>		

Design Standards			
	Required Items for Submittal	Indicate compliance and/or provide explanation as to alternative design	Waiver Requested
<input checked="" type="checkbox"/>	<b>1. Streets have been designed according to the design standards required under Section (VII.1).</b> a. Clearing b. Excavation c. Rough Grade and Preparation of Sub-Grade d. Base Course e. Street Paving f. Side Slopes g. Approval Specifications h. Curbing i. Sidewalks j. Inspection and Methods	Complied	
<input checked="" type="checkbox"/>	<b>2. Storm water Sewers and Other Drainage Appurtenances have been designed according to the design standards required under Section (VII.2).</b> a. Design b. Standards of Construction	Complied	
<input checked="" type="checkbox"/>	<b>3. Sanitary Sewers have been designed according to the design standards required under Section (VII.3).</b> a. Design b. Lift Stations c. Materials d. Construction Standards	Complied	
<input checked="" type="checkbox"/>	<b>4. Water Mains and Fire Hydrants have been designed according to the design standards required under Section (VII.4).</b> a. Connections to Lots b. Design and Construction c. Materials d. Notification Prior to Construction	Complied	

Applicant's/Representative's Signature: \_\_\_\_\_

Date: **June 21, 2022**


<sup>1</sup> See City of Portsmouth, NH Subdivision Rules and Regulations for details.  
Subdivision Application Checklist/January 2018

**Letter of Authorization**

We, Frederick Bailey & Joyce Nelson, owners of property located at 212, 214 & 216 Woodbury Avenue & 6 Boyd in Portsmouth, NH, known as Tax Map 175, Lots 1, 2, 3 & 13 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 our behalf in the Planning Board and Zoning Board application process, to include any required signatures.

Frederick Bailey

  
As Partners and, Individually

1/5/22  
Date

Joyce Nelson

  
As Partners and, Individually

1/05/22  
Date

### Letter of Authorization

I, Turner Porter, Tuck Realty Corporation, PO Box 190, Exeter, NH 03833, developer of property known as Tax Map 175, Lots 1, 2, 3, do hereby authorize Jones & Beach Engineers, Inc., PO Box 219, Stratham, NH, to act on my behalf concerning the previously-mentioned property. The parcels are located on 212, 214 & 216 Woodbury Avenue in Portsmouth, NH.

I hereby appoint Jones & Beach Engineers, Inc., as my agent to act on my behalf in the review process, to include any required signatures.

Susan Porter  
Witness

Turner Porter  
Turner Porter  
Tuck Realty Corporation

1/5/22  
Date

## DEED

KNOW ALL MEN BY THESE PRESENTS that we, Seron E. Nelson and Peter A. Nelson, both of 19 Buckingham Drive, Bow, NH 03304 for nominal (less than \$1.00) consideration paid, do hereby release and disclaim any and all claim to or interest in and do hereby give and grant to the other parties of interest, to wit, Frederick J. Bailey III of 27 Kirriemuir, Stratham, NH and Joyce S. Nelson of 19 Buckingham Drive, Bow, NH with QUIT-CLAIM COVENANTS, the following undivided interest in the following described tract of land, to wit:

All of the Grantors estate's right, title and interest in and to eight certain tracts of land with the buildings thereon situated in Portsmouth, County of Rockingham, State of New Hampshire, bounded and described as follow:

TRACTS I, III, V, VI, AND VII

Beginning at land of the State of New Hampshire at a concrete post in the ground which is a New Hampshire Highway Bound situated at the northeasterly corner of the premises hereby conveyed, which bound is also located at the northwesterly corner of land of Spectrum Enterprises, Inc., thence turning and running S 14 degrees 15' E along land of Spectrum Enterprises, Inc., a distance of two hundred sixty-seven and 40/100 (267.40) feet to a drill hole in a boulder at other land formerly of Colony Motor Hotel, Inc.; thence turning and running S 14 degrees 08' E along land formerly of Colony Motor Hotel, Inc., a distance of ninety-six and 14/100 (96.14) feet to a corner of other land formerly of Colony Motor Hotel, Inc.; thence turning and running N 82 degrees 49' W along other land formerly of Colony Motor Hotel, Inc. a distance of one hundred twelve and no/100 (112.00) feet to the northeast corner of such other land formerly of Colony Motor Hotel, Inc. (There is also included in the aforesaid tract the right to use so much, if any, of the area owned by the grantor south of such line as is now occupied by the pool or cooling tower now located on the aforesaid tract); thence turning and running S 14 degrees 08' E along such other land formerly of Colony Motor Hotel, Inc. a distance of one hundred fifty and no/100 (150.00) feet to the northerly sideline of Boyd Road at the southeasterly corner of the premises hereby conveyed; thence turning and running N 82 degrees 49' W along the northerly sideline of the said Boyd Road a distance of two hundred ninety-eight and no/100 (298.00) feet to a point in such sideline; thence turning and running N 84 degrees 25' 10" W still along the northerly sideline of Boyd Road a distance of one hundred seven and 39/100 (107.39) feet to an iron pipe set in the ground at land of the State of New Hampshire; thence turning and running N 13 degrees 10' 55" E along land of the State of New Hampshire a distance of twenty-four and 88/100 (24.88) feet to and iron pipe set in the ground; thence turning and running N 20 degrees 19' 40" E still along land of the State of New Hampshire a distance of two hundred seventy-two and 92/100 (272.92) feet to an iron pipe set in the ground; thence turning and running N 43 degrees 09' 40" E still along land of the State of New Hampshire a distance of seventy-seven and 61/100 (77.61) feet to an iron pipe set in the ground; thence turning and running N 67 degrees 00' 10" E still along land of the State of New Hampshire a distance of two

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ROCKINGHAM COUNTY  
REGISTRY OF DEEDS

## DEED

hundred fifty-four and 38/100 (254.38) feet to the New Hampshire Highway Bound at the place of beginning.

The foregoing described premises include (as Tract VII) the whole of the premises conveyed by the State of New Hampshire to Colony Motor Hotel, Inc. by deed dated November 12, 1975, and recorded in the Rockingham County Registry of Deeds, Book 2247, Page 0552; (as Tract VI) the whole of the premises conveyed by Parkwood, Inc. to Colony Motor Hotel, Inc. by deed dated February 6, 1973, and recorded in the Rockingham County Registry of Deeds, Book 2196, Page 1564; the whole of Tract I (original motel lot) and Tract III (original adjunct to pool lot), and Tract V (triangular lot at corner of State land) as conveyed by Frederick J Bailey and Seron W. Bailey to Colony Motor Hotel, Inc. by deed dated June 30, 1976, and recorded in the Rockingham County Registry of Deeds, Book 2261, Page 0479, together with all grantor's right, title and interest in and to rights of way, easements, options, etc., as set forth on the last page of said Baileys to Colony deed in Book 2261, Page 0479.

There is expressly excepted and reserved to the State of New Hampshire as to the tract adjacent to the Portsmouth Traffic Circle the rights by said State reserved to itself in said deed by the State of New Hampshire to Colony Motor Hotel, Inc. dated November 12, 1975 recorded in said Rockingham County Registry of Deeds, Book 2247, Page 0552 in the following terms as therein set forth, namely:

"There is expressly excepted and reserved to the grantor herein all rights of access, light, air and view, appurtenant to the parcel herein conveyed, over, from and to US Route 1 By-Pass and the Woodbury Avenue Ramp along the first four (4) described courses with the exception of two (2) points of access, as presently existing along the fourth described course at the new right of way line established by this conveyance, said two (2) points of access being as shown on the plan herein above referred to.

Attached hereto is a copy of the relevant portion of the plan referred to above."

Former easement reserved by deed of Parkwood, Inc. to Colony Motor Hotel, Inc. dated February 6, 1973, recorded in Rockingham County Registry of Deeds, Book 2196, Page 1564, reserving easement to Frederick J. Bailey and Seron W. Bailey over strip of land 20 feet in width along southerly side of restaurant property, having since become meaningless, was terminated by conveyance of such easement in total by said Frederick J. Bailey and Seron W. Bailey by deed to Colony Motor Hotel, Inc. dated July 24, 1981, recorded on July 29, 1981, in said Rockingham Deeds, Book 2394, Page 1324.

TRACT II

A certain parcel of land with the buildings thereon, situate in said Portsmouth, and County of Rockingham and State of New Hampshire, on the northerly side of Boyd Road, so -called, and bounded and described as follows:

## DEED

Beginning on said Road at the southwesterly corner of land formerly owned by one Taccetta at a stake in the ground and thence running in a northerly direction in part by said land formerly of said Taccetta and in part by Tract IV in this deed one hundred and fifty (150) feet to a stake in the ground at land formerly of Joseph Cohen, (now Tract III in this deed); thence turning and running in a generally westerly direction by said land (Tract III herein) one hundred and twelve (112) feet to a stake in the ground; thence turning and running still by land formerly of said Hazel E. Wood (Tract I in this deed) in a generally southerly direction one hundred and fifty (150) feet to said Boyd Road to a stake in the ground; thence turning and running by said Boyd Road in a generally easterly direction one hundred and twelve (112) feet to said stake in the ground at said southwesterly corner of said land formerly of said Taccetta to the place begun at.

Tract II above described being the same premises as Tract II conveyed by deed of Frederick J. Bailey and Seron W. Bailey dated June 30, 1976, recorded Rockingham County Registry of Deeds, Book 2261, Page 0479.

TRACT IV.

A certain lot or parcel of land with the buildings thereon, situated on the westerly side of Woodbury Avenue, in said Portsmouth, and County of Rockingham and State of New Hampshire, and more particularly bounded and described as follows:

Beginning at the northeasterly side of the premises herein described at the southeast corner of land now or formerly of Priscilla Hamilton; thence running by said Woodbury Avenue, S 21 degrees 30' E, 85.0 feet, to land formerly of Vincent Taccetta, Jr.; thence turning and running by said Taccetta, Jr. land S 68 degrees 30' W, 99.2 feet to a point at said Taccetta Jr., land; thence turning and running still by said Taccetta, Jr. land S 85 degrees 23' W, 203.8 feet to land formerly of Parkwood, Inc., (now Tract II in this deed), thence turning and running by said land (Tracts II and III in this deed and other land formerly of Colony Motor Hotel, Inc.) N 14 degrees 50' W, 86.5 feet to land formerly of said Hamilton; thence turning and running by said Hamilton land, N 80 degrees 24' E, 290.4 feet to Woodbury Avenue and the point of the beginning.

Reserving and excepting from the above described premises a strip of land along the southerly side thereof conveyed to Vincent Taccetta, Jr. et al by deed dated June 21, 1966, recorded in the Rockingham County Registry of Deeds, Book 1833, Page 435.

Tract IV being the same premises as Tract IV conveyed by deed of Frederick J. Bailey and Seron W. Bailey, dated June 30, 1976, and recorded in the Rockingham County Registry of Deeds, Book 2261, Page 0479.

## DEED

The foregoing premises all being that portion of the same premises conveyed by deed of Colony Motor Hotel, Inc. dated December 15, 1986, recorded in the Rockingham County Registry of Deeds, Book 2652, Page 550.

The foregoing premises all being conveyed to by deed of Frederick J. Bailey and Frederick J. Bailey III as co-executors Estate of Seron W. Bailey dated January 1, 1987, recorded in the Rockingham County Registry of Deeds, Book , Page and by Frederick J. Bailey, Frederick J. Bailey III, and Joyce S. Nelson as Trustees of Seron W. Bailey Trust A by Deed dated December 31, 1989 and recorded in Book 2823 Page 1009.

The premises hereby conveyed, namely Tracts I-VII inclusive, are also conveyed subject to any and all existing rights or easements or record with respect to poles, wires or other facilities of public utilities and to any and all existing access, view and other rights and easements of the State of New Hampshire and/or others for highway or right of way purposes.

TRACT VIII.

Beginning at the intersection of the Easterly Sideline of said By-Pass and the Southerly sideline of Boyd Road; thence running Easterly by said Road Forty-five (45) feet, more or less, to the Westerly sideline of a proposed street known as Center Street; thence turning and running Southeasterly by said proposed street Two Hundred Forty-nine (249) feet to the Northerly sideline of a proposed street known as Garden Street; thence continuing in a straight line across said Garden Street Fifty (50) feet and continuing further in a straight line Fifty (50) feet to land now, or formerly of, one Regan; thence turning and running Westerly by land of said Regan and land of another Two Hundred (200) feet, more or less, to the Easterly sideline of said By-Pass One Hundred (100) feet, more or less, to land of Harry E. Yoken, et. al or Darley Realty Company; thence continuing in a general Northeasterly direction Three Hundred Nine (309) feet, more or less, by the Easterly sideline of said By-Pass to the point of beginning; subject, however, to such rights, if any, as the public or adjoining owners may have in that portion of Garden and Inland Street, so called, included in the above description, and meaning and intending to convey all right of the grantor in Center Street, Garden Street, and Inland Street as shown on Plan of Land belonging to Frank Jones, recorded in Rockingham County Records, Book 584, Page 481, and also shown on Plan of Spadea Lots, Garden and Center Streets, Portsmouth, New Hampshire, by John W. Durgin, C. E., recorded in Rockingham Records, Plat 53, page 10, excepting, however, from the above description a parcel of land one hundred twenty (120) feet in length and twenty-five (25) feet in depth extending from the Northerly sideline of Garden Street Northeasterly along the Easterly sideline of said By-Pass, all as shown on said Plan.

To have and to hold the same, with all the rights, privileges, and appurtenances thereunto appertaining unto and to the use of the said Frederick J. Bailey III, and Joyce S. Nelson, and their successors and assigns forever.



## DEED

Either statutory minimum or no Documentary Stamps are required, as this is a release and disclaimer of an interest. *Non contractual transfer.*

IN WITNESS WHEREOF Seron E. Nelson and Peter A. Nelson have affixed their hands under seal this 27<sup>th</sup> day of December, 2002.

In the presence of:

*Sheila Castelletz-Cook*

*Seron E. Nelson*  
Seron E. Nelson

*Sheila Castelletz-Cook*

*Peter A. Nelson*  
Peter A. Nelson

STATE OF NEW HAMPSHIRE  
ROCKINGHAM, SS.

December 27, 2002

Personally appeared the above named, Seron E. Nelson and acknowledges the foregoing instrument be of her free act and deed.

Before me,

*Jane H. Dodge*  
Notary Public

JANE H. DODGE, Notary Public  
My Commission Expires September 25, 2007



STATE OF NEW HAMPSHIRE  
ROCKINGHAM, SS.

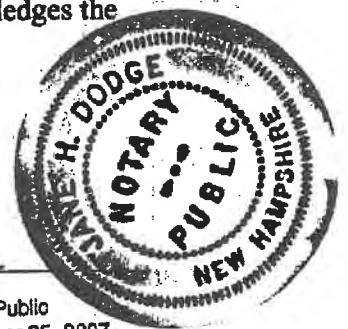
December 27, 2002

Personally appeared the above named Peter A. Nelson and acknowledges the foregoing instrument to of his free act and deed.

Before me,

*Jane H. Dodge*  
Notary Public

JANE H. DODGE, Notary Public  
My Commission Expires September 25, 2007



## WARRANTY DEED

We, Mitchell A. Hyder, Edward A. Hyder, Henry K. Hyder, Jr., A. Robert McGuire, and Henry K. Hyder III, all as Trustee's of the Mitchell A. Hyder and Edward A. Hyder Irrevocable Trust of 1993, of One Raynes Avenue, Portsmouth, Rockingham County, New Hampshire

Frederick J. Bailey, III and Joyce S. Nelson with a mailing address of 27  
FOR CONSIDERATION PAID GRANT TO / Kirriemuir Road, Stratham, New Hampshire 03885,  
as tenants in partnership in accordance with the Bailey Nelson Partnership.

## with Warranty Covenants

A certain tract or parcel of land, with the buildings thereon, situate in Portsmouth, County of Rockingham and State of New Hampshire, and more particularly bounded and described as follows:

Beginning on the Westerly side of Woodbury Avenue at the Northeasterly corner of land now or formerly of James and Mary Verna; thence running S 68° 30' W, by said Verna land, ninety-nine and two-tenths (99.2) feet, more or less, to other land of said Verna; thence N 21° 30' W by said Verna land, ten (10) feet, thence S 68° 30' W by said Verna land, seventy-two (72) feet, thence S 80° 24' W, by said Verna land in part, and by land of John F. and Gloria C. Collins in part sixty-eight and three-tenths (68.3) feet; thence N 84° 6' N by said Collins land, seventy-four and five-tenths (74.5) feet to land formerly of Edward C. Berry; thence by said Berry land in part and by land of Parkwood, Inc. in part, N 14° 50' W, eighty-six and five-tenths (86.5) feet to land formerly of Vincent Taccetta; thence by land formerly of Vincent Taccetta, N 85° 23' E. one hundred sixteen and nine-tenths (116.9) feet; thence still by land formerly of Vincent Taccetta, N 70° 23' 30" W, one hundred eighty-two and four-tenths (182.4) feet to Woodbury Avenue; thence S 21° 30' E, by said Woodbury Avenue, one hundred four and four-tenths (104.4) feet to the point of beginning.

Being parcel No. 6 as described in Deed at Registry of Deeds in Book 3005, Page 1883 dated August 31, 1993.

Executed as a sealed instrument this 16 day of Nov. 2005.

MITCHELL A. HYDER  
EDWARD A. HYDER  
IRREVOCABLE TRUST OF 1993

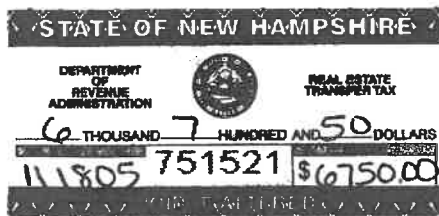
Mitchell A. Hyder  
Mitchell A. Hyder, Trustee

Edward A. Hyder  
Edward A. Hyder, Trustee

A. Robert McGuire, Jr.  
A. Robert McGuire, Jr. Trustee

Henry K. Hyder, Jr.  
Henry K. Hyder, Jr., Trustee

Henry K. Hyder, Jr.  
Henry K. Hyder, Jr., Trustee



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ROCKINGHAM COUNTY  
REGISTRY OF DEEDS

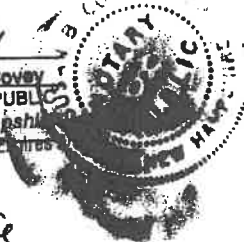
State of New Hampshire  
 THE COMMONWEALTH OF MASSACHUSETTS

Rockingham  
 ESSEX, ss

November 16, 2005

On this 16 day of ~~November~~ 2005, before me, the undersigned notary public, personally appeared Henry K. Hyder III proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he signed it voluntarily for its stated purpose,

Susan Covey  
 Susan Covey  
 Notary Public  
 My Commission Expires: New Hampshire  
 My Commission Expires:                     




State of New Hampshire  
 THE COMMONWEALTH OF MASSACHUSETTS

Rockingham  
 ESSEX, ss

Nov 16, 2005

On this 16<sup>th</sup> day of NOV, 2005, before me, the undersigned notary public, personally appeared Henry K. Hyder, Jr., proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he signed it voluntarily for its stated purpose,

Pamela J. Starkey  
 Pamela J. Starkey  
 Notary Public  
 My Commission Expires:                       
 My Commission Expires:                     



State of New Hampshire  
 County of Rockingham

On this the 16<sup>th</sup> day of November, 2005, before me, Michael A. Hyder, the undersigned officer, personally appeared Mitchell A. Hyder, known to me (or satisfactorily proven) to be the person whose name is subscribed to the within instrument and acknowledged that he executed the same for the purposes therein contained.  
 In witness whereof I hereunto set my hand and official seal.



Michael A. Hyder  
 Notary Public  
 My Commission Expires: 4/21/08

State of New Hampshire  
 County of Rockingham

On this the 16 day of November, 2005, before me, the undersigned officer, personally appeared Edward A. Hyder, known to me (or satisfactorily proven) to be the person whose name is subscribed to the within instrument and acknowledged that he executed the same for the purposes therein contained.  
 In witness whereof I hereunto set my hand and official seal.



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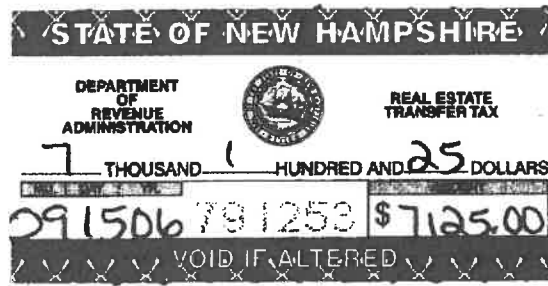
Michael A Sanderell  
Notary Public  
My Commission Expires: 4/21/09

State of New Hampshire  
County of Rockingham

On this the 16 day of <sup>NOVEMBER</sup>, 2005, before me, the undersigned officer, personally appeared A. Robert McGuire, known to me (or satisfactorily proven) to be the person whose name is subscribed to the within instrument and acknowledged that he executed the same for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

Michael A Sanderell  
Notary Public  
My Commission Expires: 4/21/09



## WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS, that JOSEPH M. VERNA, married, of 347 Meadow Road, Portsmouth, Rockingham County, New Hampshire, and GLORIA C. COLLINS, an unmarried widow, of 6 Boyd Road, Portsmouth, New Hampshire,

for consideration paid, grants to FREDERICK J. BAILEY, III, and JOYCE NELSON, of 27 Kirriemuir Road, Stratham, Rockingham County, New Hampshire, as tenants in partnership in accordance with the Bailey Nelson Partnership, with WARRANTY COVENANTS, the following described premises:

A certain tract or parcel of land with the buildings thereon situate in Portsmouth, County of Rockingham, State of New Hampshire, being shown as Lot 1 on a plan entitled "Lot Line Adjustment Plan for John & Gloria Collins in Portsmouth, NH" dated October 27, 1988, Scale 1"=20', prepared by Seacoast Engineering Associates, Inc., recorded at the Rockingham County Registry of Deeds as Plan D#18914, and being more particularly bounded and described as follows:

Beginning on Woodbury Avenue at land now or formerly of Margaret H. Taccetta, and running by said Woodbury Avenue South 21°30' East 141.9 feet to a point; thence by a curve whose radius is 12.97 feet, Southerly and Westerly to a point on Boyd Road; thence by said last named road North 86°8' West 240.56 feet to land now or formerly of John F. and Gloria C. Collins; thence turning and running North 01°16'23" West, by land now or formerly of said Collins, a distance of 74.00 feet to a point; thence turning and running North 80°24'02" East, by land now or formerly of Hyder Management, a distance of 36.83 feet to a point; thence turning and running North 68°30'00" East, by land now or formerly of said Hyder Management a distance of 72.00 feet to a point; thence turning and running South 21°30'01" East by land of said Hyder Management, a distance of 10.0 feet to a point; thence turning and running North 68°30'00" East, a distance of 99.20 feet to the point of beginning.

Together with a right of way for all purposes to and from said conveyed premises and Woodbury Avenue over adjoining land now or formerly of Margaret H. Taccetta ten feet wide and carrying that width back 99.2 feet from said Avenue; and subject to a similar right of way, as appurtenant to said land of Margaret H. Taccetta over the land conveyed,

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ROCKINGHAM COUNTY  
REGISTRY OF DEEDS

to and from said premises now or formerly of said Margaret H. Taccetta and said Woodbury Avenue, adjoining the aforementioned right of way and similarly ten feet wide and carrying that width back 99.2 feet from said Avenue; the two rights of way together constituting a strip of land 20 feet wide and 99.2 feet deep, over which the two adjoining properties have mutual rights of way. Being a part of the premises described in the deed from Guiseppe Vincini to Croce Taccetta, dated October, 5, 1923, and recording in the Rockingham County Registry of Deeds in Book 781, Page 24.

SUBJECT TO all plans, easements, covenants and restrictions of record, if any.

The is not homestead property of the Grantors and the Grantors release all other interest in the property.

Meaning and intending to describe and convey the same premises conveyed by Corrective Quitclaim Deed to Christine V. Harris, having a life estate, and remainder interest of Joseph M. Verna, and Gloria C. Collins, from Christine V. Harris, Trustee under the Trust created under the Will of James Verna, dated September 15, 2006, and recorded contemporaneously with this deed at the Rockingham County Registry of Deeds.



IN WITNESS WHEREOF, signed this 15<sup>th</sup> day of September, 2006.

  
JOSEPH M. VERNA

  
GLORIA C. COLLINS

**STATE OF NEW HAMPSHIRE  
COUNTY OF ROCKINGHAM**

Personally appeared this 15<sup>th</sup> day of September, 2006, the above-named Joseph M. Verna and Gloria C. Collins, acknowledged the foregoing instrument to be their voluntary act and deed.  
Before me,

  
Notary Public  
My commission expires: 

GOVE ENVIRONMENTAL SERVICES, INC.  
TEST PIT DATA

Project: 212 Woodbury Ave, Portsmouth  
Client: Tuck Realty Corp.  
GES Project No. 2021307  
MM/DD/YY Staff 3-18-2022 JPG

### Test Pit No. 1

ESHWT: 21" 2" gravel at surface.

Termination @ 43"

Refusal: None NRCS : Woodbridge

Obs. Water: 40"

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–9"	10YR 3/2	FSL	GR	FR	NONE
9–21"	10YR 4/6	FSL	GR	FR	NONE
21–43"	2.5Y 5/2	FSL	PL	FI	30%, Distinct

**Test Pit No. 2**

ESHWT: 30"

### Termination @ 51"

Refusal: None NRCS : Woodbridge

Obs. Water: None

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–9"	10YR 3/2	FSL	GR	FR	NONE
9–30"	10YR 4/6	FSL	GR	FR	NONE
30–51"	2.5Y 5/3	FSL	PL	FI	20%, Distinct

### Test Pit No. 3

ESHWT: 27"

Termination @ 45"

Refusal: None NRCS : Woodbridge

Obs. Water: None

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–9"	10YR 3/2	FSL	GR	FR	NONE
9–27"	10YR 4/6	FSL	GR	FR	NONE
27–45"	2.5Y 5/3	FSL	PL	FI	20%, Distinct

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**

ESHW: 15"

Termination @ 41"

Refusal: None - boulder

Obs. Water: None

NRCS : Woodbridge

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-8"	10YR 3/2	FSL	GR	FR	NONE
8-15"	2.5Y 5/4	FSL	GR	FR	NONE
15-41"	2.5Y 5/3	FSL	PL	FI	10%, Distinct

**Test Pit No. 5**

ESHW: 27"

Termination @ 50"

Refusal: None - stony

Obs. Water: None

NRCS : Woodbridge

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-12"	10YR 3/2	FSL	GR	FR	NONE
12-27"	10YR 4/6	FSL	GR	FR	NONE
27-50"	2.5Y 5/3	FSL	PL	FI	10%, Distinct

**Test Pit No. 6**

ESHW: 26"

Termination @ 45"

Refusal: None

Obs. Water: None

NRCS : Woodbridge

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-10"	10YR 3/2	FSL	GR	FR	NONE
10-26"	10YR 5/6	FSL	GR	FR	NONE
26-45"	2.5Y 5/3	FSL	PL	FI	10%, Distinct

**Test Pit No. 7**

ESHW: 26"

Termination @ 40"

Refusal: None

Obs. Water: None

NRCS : Woodbridge

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-9"	10YR 3/2	FSL	GR	FR	NONE
9-26"	10YR 4/6	FSL	GR	FR	NONE
26-40"	2.5Y 5/3	FSL	PL	FI	10%, Distinct



**Legend:**

FSL = fine sandy loam

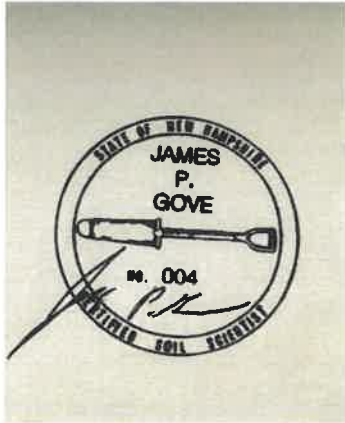
GR = granular

FR = friable

PL = platy

FI = firm

**Soil Colors at Munsell.**



3-22-2022

**TEST PITS  
FOR  
214 WOODBURY AVENUE  
PORTSMOUTH, NEW HAMPSHIRE  
SEPTEMBER 7, 2022  
JBE Project No. 21254**

Performed by: Anthony Jones, Jones & Beach Engineers, Inc., SSD #1900

**Test Pit #8**

0"- 8"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
8"- 22"	10YR 4/6	dark yellowish brown fine sandy loam granular, friable common roots
22" - 35"	2.5Y 5/3	light olive brown fine sandy loam platey, firm few, distinct redox

SHWT = 22"

Roots: 22"

No H<sub>2</sub>O observed

Refusal @ 35"

Perc Rate = 14 min/inch

**Test Pit #9**

0"- 8"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
8"- 27"	10YR 4/6	dark yellowish brown fine sandy loam granular, friable common roots
27" - 40"	2.5Y 5/3	light olive brown fine sandy loam platey, firm common, distinct redox

SHWT = 27"

Roots: 27"

No H<sub>2</sub>O observed

Refusal @ 40"

Perc Rate = 14 min/inch



GOVE ENVIRONMENTAL SERVICES, INC.

## TEST PIT DATA

Project – Woodbury Avenue, Portsmouth, NH

Client - Jones & Beach Engineers, Inc.

GES Project No. 2022091

MM/DD/YY Staff 11-17-2022 JPG

### Test Pit No. 10

ESHWT: 24"

Termination @ 72"

Refusal: None

Obs. Water: None

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0–24"	10YR 3/3	FSL	GR	FR	NONE , Fill
24–47"	2.5Y 6/4	FSL	GR	FR	5%, Bw
47–72"	2.5Y5/3	SL	PL	FI	5%, Cd

### Test Pit No. 11

ESHWT: 37"

Termination @ 72"

Refusal: None

Obs. Water: None

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0–20"	10YR 3/2	FSL	GR	FR	NONE , Ap
20–37"	10YR 5/4	FSL	GR	FR	NONE, Bw
37–72"	2.5Y5/3	SL	PL	FI	5%, Cd

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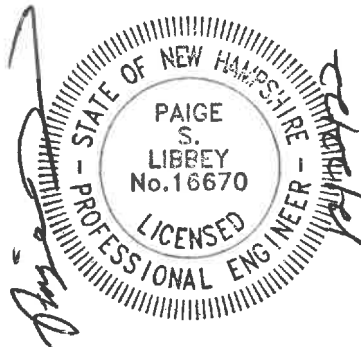
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**DRAINAGE ANALYSIS**  
**SEDIMENT AND EROSION CONTROL PLAN**

**Grapevine Run**  
**212, 214, & 216 Woodbury Ave.**  
**Portsmouth, NH 03801**  
**Tax Map 175, Lots 1, 2, & 3**

**Prepared for:**

**Tuck Realty Corp**  
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**June 21, 2022**  
**REVISED August 1, 2022**  
**REVISED September 20, 2022**  
**REVISED October 18, 2022**  
**REVISED December 15, 2022**  
**JBE Project No. 21254**

## EXECUTIVE SUMMARY

Tuck Realty Corp proposes to construct eight (8) residential condominium units along a 338' proposed private driveway on a 1.38-acre parcel of land (after lot line adjustment) located at 212, 214, & 216 Woodbury Avenue (Tax Map 175, Lots 1-3 respectively) in Portsmouth, NH, with access from Boyd Rd. In the existing condition, Lots 1-3 each contain a single-family residence with a paved driveway, and there is a detached garage on Lot 1. The house, garage, driveway, and other site features on Lot 1 are to be removed to make available land for the proposed development.

A drainage analysis of the entire site 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 (3.21"), 10 Year – 24 Hour (4.87"), 25 Year – 24 Hour (6.17"), and 50 Year – 24 Hour (7.39") 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). A summary of the existing and proposed conditions peak rates of runoff 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	1.37	1.29	2.79	2.24	3.99	2.99	5.04	3.69
Analysis Point #2	0.06	0.06	0.12	0.12	0.17	0.17	0.21	0.21
Analysis Point #3	0.50	0.16	1.33	0.46	2.00	0.73	2.63	1.57
Analysis Point #4	0.14	0.13	0.28	0.24	0.40	0.34	0.51	0.43
Analysis Point #5	0.15	0.13	0.37	0.28	0.55	0.41	0.74	0.53

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	0.145	0.112	0.282	0.198	0.395	0.268	0.504	0.334
Analysis Point #2	0.005	0.005	0.009	0.009	0.013	0.013	0.016	0.016
Analysis Point #3	0.071	0.022	0.161	0.050	0.240	0.093	0.318	0.172
Analysis Point #4	0.011	0.010	0.023	0.020	0.032	0.028	0.042	0.035
Analysis Point #5	0.015	0.010	0.033	0.021	0.050	0.031	0.066	0.041

The subject parcels are located in the General Residence A (GRA) Zoning District. The subject parcels currently consist of the aforementioned single-family residences with associated driveways, sheds, and a detached garage, all of which is proposed to be demolished. The topography of the site as well as a stretch of Woodbury Ave. and Boyd Rd. that is considered in this analysis define nine (9) subcatchments, which drain to five (5) analysis points. Subcatchments 1S-4S drain directly toward their respective analysis points while subcatchments 5S-8S drains toward four separate depressions, modelled as 1P-4P respectively. When the aforementioned depressions fills with water, the runoff crests over the berms and drains toward one of the five analysis points. Depressions 2P, 3P, and 4P drain overland toward the catch basin represented as Analysis Point 1, while depression 1P drains over land toward Analysis Point 3.

The proposed site development consists of the aforementioned eight (8) condominium units with an associated shared private driveway and individual driveways coming off of it. The addition of the proposed impervious paved areas and buildings causes an increase in the curve number ( $C_n$ ) and a decrease in the time of concentration ( $T_c$ ), the net result being a potential increase in peak rates of runoff from the site. A stormwater management system was designed in order to mitigate this possibility. The proposed site development divides the site into fifteen (15) subcatchments, representing both the periphery of the site that will continue its existing flow pattern toward the aforementioned analysis points as well as the developed portions that will be routed into the site's stormwater management system for treatment and reduction of peak flows. Additionally, four links are included in the model to represent the discharge from the sump pumps of units 5, 6, 7, and 8. The proposed stormwater management system consists of two bioretention systems designed for treatment and infiltration of road and roof water up to the 10-Year storm, individual permeable Eco-Paver driveways for Units 6-8, four subsurface stone infiltration areas, and a small detention area. Through the use of these practices, the peak rates and volumes of runoff are reduced toward Analysis Points #1-5 during all analyzed storm events. All runoff from proposed paved areas and some of the runoff from proposed roofs will be treated, while some of the runoff from the proposed roofs will be piped into the stone underneath the aforementioned permeable pavers for infiltration and a small section of proposed roofs simply allowed to runoff.

The use of Best Management Practices per the NHDES Stormwater Manual have been applied to the design of this drainage 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 of this development.

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## **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 location. These analyses were accomplished using the USDA SCS TR-20 Method within the HydroCAD 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 (3.21"), 10 Year – 24 Hour (4.87"), 25 Year – 24 Hour (6.17"), and 50 Year – 24 Hour (7.39") storm events. This data was taken from the Extreme Precipitation Tables developed by the Northeast Regional Climate Center (NRCC).

The peak rates and volumes of runoff will be reduced from the existing condition and stormwater treatment will exceed requirements in the proposed condition, thereby minimizing the potential for a negative impact on abutting properties or downstream waterbodies.

## **2.0 EXISTING CONDITIONS ANALYSIS**

The three existing single-family residential properties each feature a single-family house with a paved driveway, and Lot 1 also includes a detached garage. Otherwise, the undeveloped areas of the three parcels are covered by both woods and grass, and no wetlands were observed on site. The abutting properties include several residential uses as well as two hotels.

In the existing condition, the topography of the subject parcel as well as a stretch of Woodbury Ave. and Boyd Rd. that was considered is such that the study area is split into 9 Subcatchments draining toward 5 Analysis Points.

Analysis Point 1 is a catch basin just off of Woodbury Ave along the driveway leading to the house on Lot 2, which receives runoff from part of the study area in both the existing and proposed condition. This is near the northeast area of the study area. Analysis Point 2 represents a slope adjacent to what appears to be a single-family residence that is apparently in the southeastern corner of Tax Map 175, Lot 11 per Portsmouth tax maps, abutting Boyd Rd. This analysis point receives a small amount of runoff from a section of the study area in the existing and proposed conditions. Analysis Point 3 represents a catch basin in the parking lot on Tax Map 174, Lot 11, which is home to a Best Western Plus hotel, and receives a fair amount of runoff from the site in the existing condition. In the proposed condition, steps are being taken to eliminate this situation to the extent practicable. Runoff directed toward Analysis Point 3 ultimately drains into a catch basin in the center of the Best Western Plus parking lot. Analysis Point 4 represents the Boyd Rd. drainage system. This receives a small amount of runoff from the study area in both the existing and proposed conditions, mostly from abutting Tax Map 175, Lot 13, although it is modelled because a small part of the subcatchment draining toward this Analysis Point is on the subject property and therefore is affected by this development. Finally, Analysis Point 5 represents a yard area between the home that is apparently on Tax Map 175, Lot 11 and the Best Western Plus parking lot. This receives some runoff from the subject parcel in the existing condition as well.

Subcatchments 1S-4S drain directly toward Analysis Points AP1-AP4, while Subcatchments 5S-8S drain toward shallow depressions which fill up with water and eventually overflow toward the analysis points. Subcatchment 9S drains directly toward Analysis Point 5. Peak rates and volumes of runoff are reduced in the proposed condition during all analyzed storm events.

The existing soil type for the entire subject parcel is 29B – Woodbridge Fine Sandy Loam, as classified by a Certified Soil Scientist. This soil type is classified by Hydrologic Soil Group “C”. According to “Ksat Values for New Hampshire Soils” sponsored by the Society of Soil Scientists of Northern New England SSSNNE Special Publication No. 5, this soil type has a saturated hydraulic conductivity (Ksat) of 0.6-2.0 in/hr in the B Horizon and a Ksat of 0.0-0.6 in/hr in the C horizon.

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 amoozometer) on July 19, 2022. Two (2) pits were dug using a shovel in the soil and three (3) infiltration tests were performed in each pit. The two pits were dug in the footprints of the two proposed bioretention systems, further discussed in the proposed conditions analysis. “Pit #1” refers to the pit that was dug in the footprint of proposed bioretention system #1 in the south end of the site near Boyd Rd., and “Pit #2” refers to the pit that was dug in the footprint of proposed bioretention system #2 in the north end of the site.

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 Appendix VII. The Ksat values from each time increment were then averaged to determine the mean Ksat, and this value divided by a factor of safety of two to determine the saturated hydraulic conductivity to use for design purposes.

The permeability tests were performed. The results of the permeability testing are as summarized below:

Test	Ksat (in/hr)
Pit #1 – Test #1	3.69
Pit #1 – Test #2	6.83
Pit #1 – Test #3	1.77
<b>Pit #1 – Mean Ksat</b>	<b>4.10</b>
Pit #2 – Test #1	0.73
Pit #2 – Test #2	0.69
Pit #2 – Test #3	0.48
<b>Pit #2 – Mean Ksat</b>	<b>0.63</b>

A further breakdown of the data used to arrive at the final Ksat values is included in Appendix VII.

For Pit #1, the Ksat from Test #3 was utilized for design because the raw number obtained from this test is below the result of averaging the three tests performed in Pit #1 and dividing by a factor of safety of two ( $4.1/2 = 2.05$ , and 1.77 in/hr is lower than 2.05 in/hr). For this reason, it seems that the average may be skewed by the high result obtained in Test #2. Therefore, the third test is a better representation of the true permeability of the soil and is the most conservative rate to use for design. The infiltration rate obtained from Test #3 was divided by a factor of safety of two to arrive at a Ksat of **0.89 in/hr** to use for design of stormwater features in the south end of the site.

For Pit #2, the mean Ksat of all three tests was utilized and divided by a factor of safety of two to arrive at a design Ksat of 0.315 in/hr, rounded down to **0.3 in/hr** which is the same as the published value after providing a factor of safety and is below the raw result of the most conservative test. This value was used to design stormwater features in the north end of the site and, because a factor of safety of two was used, it happens to be below even the lowest raw infiltration rate obtained from any of the tests performed in Pit #2. Therefore, this is a valid Ksat to use for design purposes.

### **3.0 PROPOSED CONDITIONS ANALYSIS**

The addition of the proposed impervious paved areas and buildings causes an increase in the curve number ( $C_n$ ) and a decrease in the time of concentration ( $T_c$ ), the net result being a potential increase in peak rates of runoff from the site. A stormwater management system was designed in order to mitigate this potential. The proposed development, consisting of the aforementioned eight (8) condominium units with an associated paved shared driveway as well as individual unit driveways and stormwater management features divide the same study area from the existing conditions analysis into fifteen (15) subcatchments, all still draining toward the five same analysis points. Although there are 15 subcatchments, the subcatchment numbers go up to 17 because three subcatchments (including 18S) have been removed but the subcatchment numbers that remain have been kept the same for consistency.

Subcatchments 1S-4S drain directly toward corresponding Analysis Points AP1-AP4, and Subcatchment 5S drains toward the offsite depression modelled as 1P in which water puddles and eventually overflows toward Analysis Point AP3; so far identical to the existing conditions analysis routing. However, the remainder of the isolated depressions from the existing conditions analysis are proposed to be developed over. Subcatchment 6S represents the watershed of bioretention system #2, modelled as Pond 2P. Subcatchment 7S represents a roof area that drains toward the subsurface stone infiltration bed modelled as Ponds 4P. The runoff from Subcatchment 7S first falls on to lined stone drip edge 3P so that water will enter an underdrain and be carried through a pipe into stone infiltration bed 4P, where a gutter and downspout system would not be feasible due to shape the of the proposed roofline. Subcatchment 9S represents the watershed of bioretention system #1, modelled as Pond 6P. Overflow from Pond 6P is routed toward a subsurface stone infiltration area modelled as Pond 12P. Subcatchments 10S-12S represent the watersheds directed toward Ponds 7P-9P, which are the permeable Eco-Paver driveways of Units 6-8, respectively. These Eco-Paver driveways provide treatment for runoff before discharge to groundwater by way of a filter course. These features treat direct run-on, and also a portion of the roofs of the corresponding units is piped into each permeable driveway.

Additionally, a swale leading to a small detention pond is proposed along the property line with 6 Boyd Road. The subcatchments draining toward the swale is represented as Subcatchments 13S, and the swale is represented as 1R. The subcatchment draining toward the detention pond is modelled as 14S and the detention pond itself is modelled as 10P. The detention pond provides some attenuation, and flows from the detention pond are then routed through a closed drainage system to bioretention pond #2 for further detention, treatment, and infiltration.

Subcatchment 16S represents a small area of the periphery of the site that runs off directly toward Analysis Point #5. Subcatchment 17S represents the area that drains toward a vee channel that is created by the intersection of the proposed grading for bioretention pond #2 with the existing topography. The vee channel itself is modelled as Reach 3R, which drains toward Analysis Point 3.

Units 5-8 will have basements in the groundwater table and therefore will require sump pumps. Estimated sump pump discharge rates and volumes were calculated based on the footprint and depth of each foundation as well as the void ratio and permeability rate of the soil. The finished floor elevation of each unit was subtracted by 8 feet to determine the bottom of foundation for each unit. Then the average seasonal high water table elevation throughout the foundation footprint was calculated. The difference between the depth of foundation and the average SHWT depth is effectively the depth by which the foundation is within the water table. This resultant depth was then multiplied by the footprint area of the foundation to determine the volume of the foundation, and this was multiplied by a conservative void ratio of 0.5 to determine the volume of groundwater displaced by each unit's foundation in a worst-case scenario in which the water table elevation is equal to the SHWT.

The sump pump discharge rate lags from the beginning of operation to peak discharge, at which time the highest point of groundwater displaced by the foundation has reached the sump pump. The permeability rate of the soil was determined by the aforementioned infiltration tests and multiplied by a factor of safety of two. The depth of the bottom of the foundation below the seasonal high water table elevation was then divided by the permeability rate of the soil with the factor of safety applied in order to determine the lag time to peak sump pump discharge in units of seconds.

Finally, the volume was divided by the lag time to determine the peak flow rate of sump pump discharge. These calculations are located in Appendix X within this drainage report.

The peak discharge rate and lag time were then used to manually generate a 24-hour hydrograph for each sump pump at one-hour increments. The peak discharge rate that was calculated was placed on the hydrograph at the lag time that was calculated and instantaneous flow rates at 1-hour increments were determined by interpolating between 0 cfs at 0 hours and at the end of the cycle, and the peak flow rate at the lag time. For example, if the peak flow rate was calculated to be 0.05 cfs and the lag time 5 hours, 0.05 cfs was put into the hydrograph at 5 hours, and each 1-hour increment would add  $0.05/5 = 0.01$  cfs. The flow rate at 2 hours would be 0.02 cfs, the flow rate at 3 hours would be 0.03 cfs, etc. Then flows would be subtracted by the same increment for each subsequent hour and the flow would again be zero at 10 hours. This results in a representation of the discharge rate over time and the volume of sump pump discharge that can be modelled into a 24-hour storm modelling software.

The resulting per-hour flows were then modelled into HydroCAD as four separate links; one representing the sump pump discharge for each respective unit. Two subsurface infiltration systems were designed to fully infiltrate the 24-hour discharge from the sump pumps, and each was designed with an overflow fully above the calculated peak elevation of discharge water within the system. Pond 5P is a subsurface stone infiltration bed designed to infiltrate the sump pump discharge from units 5&6, and Pond 11P is a subsurface stone infiltration bed designed to infiltrate the sump pump discharge from units 7&8. Any overflow would be piped into bioretention system #2, though as modelled the sump pump discharge appears to fully infiltrate.

As explained in the executive summary, the proposed stormwater management features help to reduce peak rates and volumes of runoff toward AP1-AP5 to below the existing condition in the 2-, 10-, 25-, and 50-Year storm events. The two bioretention ponds are designed to treat and infiltrate all runoff directed to them up to the at least the 10-Year storm event. Each bioretention pond has a proposed mechanism for positive overflow in extreme storm events. Overflow risers are additionally incorporated just above the elevation of the water quality volume on each of the bioretention ponds in order to maintain infiltration during winter. This exceeds the requirements of the City of Portsmouth,

which state, among other things, that peak flows and volumes must be reduced and that the water quality volume must be treated to achieve certain removal efficiencies as discussed at the end of the proposed conditions analysis. However, this design approach was used so that abutting properties would not be inundated by runoff from the subject parcel.

The methodology described in the existing conditions analysis was used to determine the design infiltration rates for each infiltration practice. The design Ksat that was used was half of the mean Ksat determined via the field tests. Pit #1 delivered the results that were used for the design of bioretention #1 (6P) and two of the subsurface stone infiltration systems (4P and 11P). A design Ksat value of 0.89 in/hr was used for these practices per the results of the infiltration tests performed using the CCHP. Pit #2 delivered the results that were used for the design of the remainder of the practices, giving a design Ksat value of 0.3 in/hr.

The seasonal high water table (SHWT) beneath each infiltration and filtration practice was determined based off nearby test pits. The SHWT depth from the test pit was subtracted from the highest existing ground elevation within the footprint of the practice. For the subsurface stone infiltration bed next to Units 3 & 4, Test Pit 8 was used, where SHWT was found at 22" below ground and the highest existing ground elevation was slightly below 56.3. Therefore, the groundwater elevation used for design was  $56.3 - 22/12 = 54.47$ . For the subsurface stone infiltration bed next to Units 5 & 6, Test Pit 9 was used, where SHWT was found at 27". Highest existing ground elevation within this footprint of this practice is 53.0 so the groundwater elevation was modelled is 50.75. Test Pit #11 was used for the subsurface stone infiltration bed between units 7&8, where SHWT was also found at 37". Highest existing ground elevation within the footprint of this practice is 52.20, so the groundwater elevation was modelled at 49.12.

Test Pit 6 is located within the footprint of the proposed bioretention system #1. SHWT on this test pit was found at a depth of 26". Where the filter course and infiltration components of the system are located in an area where the highest existing ground elevation is 53.3, the modelled groundwater elevation is 51.13. The bioretention system is designed so that the bottom of the filter course is at least 1' above the SHWT. The same test pit was used to design the subsurface stone infiltration basin toward which overflows from the bioretention pond are routed. The groundwater elevation beneath this practice was modelled at 51.2 because the highest existing ground elevation in the footprint of the practice is 53.2.

Test Pit 1 is located within the footprint of the proposed bioretention system #2. SHWT on this test pit was found at a depth of 21". Where the filter course and infiltration components are located in an area where the highest existing ground elevation is 48.0, the modelled groundwater elevation is 46.25. The bioretention system is designed so that the bottom of the filter course is at least 1' above the SHWT.

For the three proposed permeable paver driveways, proposed grade is variable, so the SHWT at the highest ground elevation was not necessarily the one used for design. Rather, the location at which proposed grade is closest to existing grade and by extension closest to SHWT was used to determine both the design SHWT and the elevations to use for the overall profile of the system to model. The permeable paver driveways were designed based on the following data:

Unit #	Test Pit #	SHWT Depth	Existing Grade	Design SHWT
6	2	30"	51.9	49.4
7	3	27"	53.5	51.25
8	1	21"	50.8	49.05

According to the NH Stormwater Manual, bioretention systems provide a pollutant removal efficiency of 90% for TSS and 65% for nitrogen, and permeable pavers provide a pollutant removal efficiency of 90% for TSS and 60% for nitrogen. The City of Portsmouth Site Plan Review Regulations stipulate that stormwater BMPs should either be designed for 80% TSS removal and 50% nitrogen removal, or to retain and treat the Water Quality Volume. Per the pollutant removal efficiency calculation worksheet included in Appendix IX, the proposed stormwater management system provides a removal efficiency of 84% TSS, 60% total phosphorous, and 61% total nitrogen. This plan exceeds the requirements for pollutant removal because appropriate treatment / groundwater recharge systems are utilized and all runoff from paved surfaces is treated and infiltrated up to the 10-Year storm event, exceeding the water quality volume requirement.

## 5.0 CONCLUSION

This proposed site development will have minimal adverse effect on abutting infrastructures, and properties by way of stormwater runoff or siltation. Appropriate steps will be taken to eliminate erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of site grading, bioretention systems with associated pre-treatment practices, permeable pavers with a filter course, and subsurface stone infiltration beds, as well as temporary erosion control measures including but not limited to silt fence and the use of a stabilized construction entrance. The peak rate and volumes of runoff will be reduced toward all analysis points during all analyzed storm events in the post-construction condition and the bioretention systems are designed to treat and infiltrate runoff up to at least the 25-Year storm, exceeding requirements. 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.

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

Respectfully Submitted,  
**JONES & BEACH ENGINEERS, INC.**

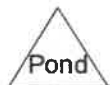
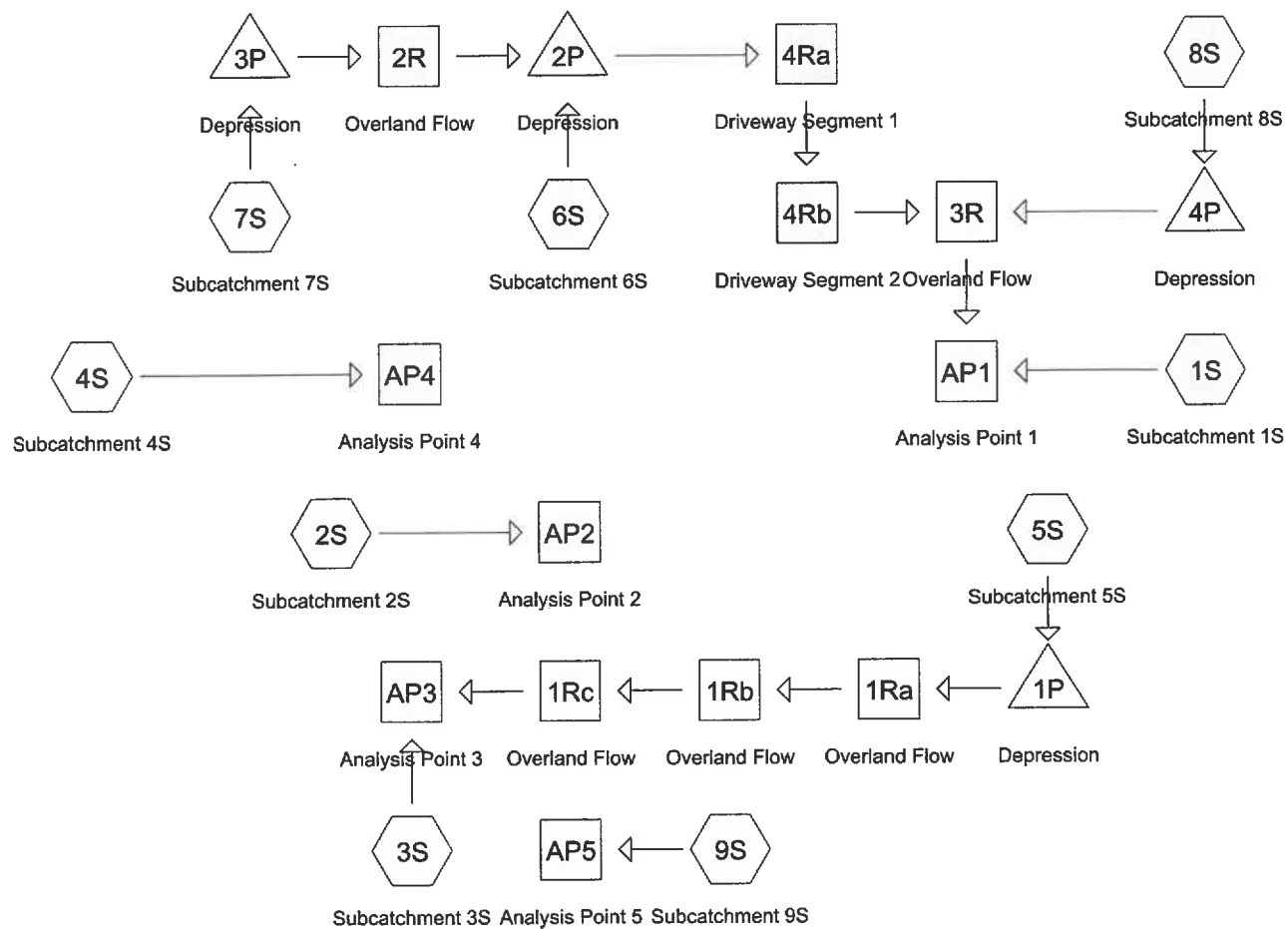


Daniel Meditz, E.I.T  
Project Engineer

## APPENDIX I

### EXISTING CONDITIONS DRAINAGE ANALYSIS

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



### Routing Diagram for 21254-EXISTING

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**21254-EXISTING**

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
1.258	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S)
0.369	98	Paved parking, HSG C (1S, 4S, 8S)
0.174	98	Roofs, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 8S, 9S)
0.582	70	Woods, Good, HSG C (2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S)
<b>2.382</b>	<b>78</b>	<b>TOTAL AREA</b>

**21254-EXISTING**

Prepared by Jones &amp; Beach Engineers Inc

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.382	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S
0.000	HSG D	
0.000	Other	
<b>2.382</b>		<b>TOTAL AREA</b>

**21254-EXISTING**

Type III 24-hr 2 Yr 24 Hr Rainfall=3.21"

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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

<b>Subcatchment1S: Subcatchment1S</b>	Runoff Area=30,350 sf 51.45% Impervious Runoff Depth>1.84" Flow Length=254' Tc=19.4 min CN=86 Runoff=1.03 cfs 0.107 af
<b>Subcatchment2S: Subcatchment2S</b>	Runoff Area=1,702 sf 28.08% Impervious Runoff Depth>1.41" Flow Length=67' Tc=7.6 min CN=80 Runoff=0.06 cfs 0.005 af
<b>Subcatchment3S: Subcatchment3S</b>	Runoff Area=35,181 sf 4.23% Impervious Runoff Depth>0.98" Flow Length=187' Tc=29.1 min CN=73 Runoff=0.50 cfs 0.066 af
<b>Subcatchment4S: Subcatchment4S</b>	Runoff Area=4,408 sf 26.97% Impervious Runoff Depth>1.34" Flow Length=55' Slope=0.0500 '/' Tc=9.1 min CN=79 Runoff=0.14 cfs 0.011 af
<b>Subcatchment5S: Subcatchment5S</b>	Runoff Area=3,966 sf 15.05% Impervious Runoff Depth>1.22" Flow Length=67' Tc=13.1 min CN=77 Runoff=0.10 cfs 0.009 af
<b>Subcatchment6S: Subcatchment6S</b>	Runoff Area=2,101 sf 15.37% Impervious Runoff Depth>1.22" Flow Length=76' Slope=0.0260 '/' Tc=9.4 min CN=77 Runoff=0.06 cfs 0.005 af
<b>Subcatchment7S: Subcatchment7S</b>	Runoff Area=4,509 sf 0.00% Impervious Runoff Depth>0.99" Flow Length=42' Slope=0.0240 '/' Tc=9.6 min CN=73 Runoff=0.10 cfs 0.009 af
<b>Subcatchment8S: Subcatchment8S</b>	Runoff Area=13,227 sf 27.07% Impervious Runoff Depth>1.41" Flow Length=136' Tc=12.3 min CN=80 Runoff=0.40 cfs 0.036 af
<b>Subcatchment9S: Subcatchment9S</b>	Runoff Area=8,332 sf 4.42% Impervious Runoff Depth>0.93" Flow Length=164' Tc=12.9 min CN=72 Runoff=0.15 cfs 0.015 af
<b>Reach 1Ra: Overland Flow</b>	Avg. Flow Depth=0.04' Max Vel=0.11 fps Inflow=0.05 cfs 0.005 af n=0.150 L=35.0' S=0.0100 '/' Capacity=0.54 cfs Outflow=0.03 cfs 0.005 af
<b>Reach 1Rb: Overland Flow</b>	Avg. Flow Depth=0.04' Max Vel=0.23 fps Inflow=0.03 cfs 0.005 af n=0.150 L=122.0' S=0.0443 '/' Capacity=0.43 cfs Outflow=0.02 cfs 0.005 af
<b>Reach 1Rc: Overland Flow</b>	Avg. Flow Depth=0.01' Max Vel=0.16 fps Inflow=0.02 cfs 0.005 af n=0.150 L=30.0' S=0.1167 '/' Capacity=74.58 cfs Outflow=0.02 cfs 0.005 af
<b>Reach 2R: Overland Flow</b>	Avg. Flow Depth=0.02' Max Vel=0.10 fps Inflow=0.01 cfs 0.004 af n=0.150 L=37.0' S=0.0297 '/' Capacity=1.78 cfs Outflow=0.01 cfs 0.004 af
<b>Reach 3R: Overland Flow</b>	Avg. Flow Depth=0.20' Max Vel=0.21 fps Inflow=0.43 cfs 0.039 af n=0.150 L=171.0' S=0.0068 '/' Capacity=0.14 cfs Outflow=0.13 cfs 0.031 af Overflow=0.29 cfs 0.007 af
<b>Reach 4Ra: Driveway Segment 1</b>	Avg. Flow Depth=0.01' Max Vel=0.61 fps Inflow=0.06 cfs 0.008 af n=0.016 L=50.0' S=0.0260 '/' Capacity=56.25 cfs Outflow=0.06 cfs 0.008 af
<b>Reach 4Rb: Driveway Segment 2</b>	Avg. Flow Depth=0.01' Max Vel=0.49 fps Inflow=0.06 cfs 0.008 af n=0.016 L=72.0' S=0.0139 '/' Capacity=41.11 cfs Outflow=0.05 cfs 0.008 af

**21254-EXISTING***Type III 24-hr 2 Yr 24 Hr Rainfall=3.21"*

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**Reach AP1: Analysis Point 1**Inflow=1.37 cfs 0.145 af  
Outflow=1.37 cfs 0.145 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=0.50 cfs 0.071 af  
Outflow=0.50 cfs 0.071 af**Reach AP4: Analysis Point 4**Inflow=0.14 cfs 0.011 af  
Outflow=0.14 cfs 0.011 af**Reach AP5: Analysis Point 5**Inflow=0.15 cfs 0.015 af  
Outflow=0.15 cfs 0.015 af**Pond 1P: Depression**Peak Elev=51.31' Storage=167 cf Inflow=0.10 cfs 0.009 af  
Outflow=0.05 cfs 0.005 af**Pond 2P: Depression**Peak Elev=55.31' Storage=33 cf Inflow=0.06 cfs 0.009 af  
Outflow=0.06 cfs 0.008 af**Pond 3P: Depression**Peak Elev=56.21' Storage=189 cf Inflow=0.10 cfs 0.009 af  
Outflow=0.01 cfs 0.004 af**Pond 4P: Depression**Peak Elev=53.11' Storage=236 cf Inflow=0.40 cfs 0.036 af  
Outflow=0.38 cfs 0.030 af**Total Runoff Area = 2.382 ac   Runoff Volume = 0.262 af   Average Runoff Depth = 1.32"**  
**77.22% Pervious = 1.840 ac   22.78% Impervious = 0.543 ac**

**21254-EXISTING**

Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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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

<b>Subcatchment1S: Subcatchment1S</b>	Runoff Area=30,350 sf 51.45% Impervious Runoff Depth>3.34" Flow Length=254' Tc=19.4 min CN=86 Runoff=1.85 cfs 0.194 af
<b>Subcatchment2S: Subcatchment2S</b>	Runoff Area=1,702 sf 28.08% Impervious Runoff Depth>2.78" Flow Length=67' Tc=7.6 min CN=80 Runoff=0.12 cfs 0.009 af
<b>Subcatchment3S: Subcatchment3S</b>	Runoff Area=35,181 sf 4.23% Impervious Runoff Depth>2.16" Flow Length=187' Tc=29.1 min CN=73 Runoff=1.17 cfs 0.146 af
<b>Subcatchment4S: Subcatchment4S</b>	Runoff Area=4,408 sf 26.97% Impervious Runoff Depth>2.69" Flow Length=55' Slope=0.0500 '/ Tc=9.1 min CN=79 Runoff=0.28 cfs 0.023 af
<b>Subcatchment5S: Subcatchment5S</b>	Runoff Area=3,966 sf 15.05% Impervious Runoff Depth>2.51" Flow Length=67' Tc=13.1 min CN=77 Runoff=0.21 cfs 0.019 af
<b>Subcatchment6S: Subcatchment6S</b>	Runoff Area=2,101 sf 15.37% Impervious Runoff Depth>2.51" Flow Length=76' Slope=0.0260 '/ Tc=9.4 min CN=77 Runoff=0.12 cfs 0.010 af
<b>Subcatchment7S: Subcatchment7S</b>	Runoff Area=4,509 sf 0.00% Impervious Runoff Depth>2.17" Flow Length=42' Slope=0.0240 '/ Tc=9.6 min CN=73 Runoff=0.23 cfs 0.019 af
<b>Subcatchment8S: Subcatchment8S</b>	Runoff Area=13,227 sf 27.07% Impervious Runoff Depth>2.77" Flow Length=136' Tc=12.3 min CN=80 Runoff=0.80 cfs 0.070 af
<b>Subcatchment9S: Subcatchment9S</b>	Runoff Area=8,332 sf 4.42% Impervious Runoff Depth>2.09" Flow Length=164' Tc=12.9 min CN=72 Runoff=0.37 cfs 0.033 af
<b>Reach 1Ra: Overland Flow</b>	Avg. Flow Depth=0.12' Max Vel=0.20 fps Inflow=0.21 cfs 0.015 af n=0.150 L=35.0' S=0.0100 '/ Capacity=0.54 cfs Outflow=0.20 cfs 0.015 af
<b>Reach 1Rb: Overland Flow</b>	Avg. Flow Depth=0.13' Max Vel=0.42 fps Inflow=0.20 cfs 0.015 af n=0.150 L=122.0' S=0.0443 '/ Capacity=0.43 cfs Outflow=0.17 cfs 0.015 af
<b>Reach 1Rc: Overland Flow</b>	Avg. Flow Depth=0.03' Max Vel=0.31 fps Inflow=0.17 cfs 0.015 af n=0.150 L=30.0' S=0.1167 '/ Capacity=74.58 cfs Outflow=0.17 cfs 0.015 af
<b>Reach 2R: Overland Flow</b>	Avg. Flow Depth=0.07' Max Vel=0.22 fps Inflow=0.22 cfs 0.014 af n=0.150 L=37.0' S=0.0297 '/ Capacity=1.78 cfs Outflow=0.19 cfs 0.014 af
<b>Reach 3R: Overland Flow</b>	Avg. Flow Depth=0.20' Max Vel=0.21 fps Inflow=0.96 cfs 0.089 af n=0.150 L=171.0' S=0.0068 '/ Capacity=0.14 cfs Outflow=0.14 cfs 0.056 af Overflow=0.82 cfs 0.032 af
<b>Reach 4Ra: Driveway Segment 1</b>	Avg. Flow Depth=0.02' Max Vel=1.10 fps Inflow=0.26 cfs 0.024 af n=0.016 L=50.0' S=0.0260 '/ Capacity=56.25 cfs Outflow=0.26 cfs 0.024 af
<b>Reach 4Rb: Driveway Segment 2</b>	Avg. Flow Depth=0.02' Max Vel=0.91 fps Inflow=0.26 cfs 0.024 af n=0.016 L=72.0' S=0.0139 '/ Capacity=41.11 cfs Outflow=0.26 cfs 0.024 af

**21254-EXISTING***Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"*

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**Reach AP1: Analysis Point 1**Inflow=2.79 cfs 0.282 af  
Outflow=2.79 cfs 0.282 af**Reach AP2: Analysis Point 2**Inflow=0.12 cfs 0.009 af  
Outflow=0.12 cfs 0.009 af**Reach AP3: Analysis Point 3**Inflow=1.33 cfs 0.161 af  
Outflow=1.33 cfs 0.161 af**Reach AP4: Analysis Point 4**Inflow=0.28 cfs 0.023 af  
Outflow=0.28 cfs 0.023 af**Reach AP5: Analysis Point 5**Inflow=0.37 cfs 0.033 af  
Outflow=0.37 cfs 0.033 af**Pond 1P: Depression**Peak Elev=51.31' Storage=167 cf Inflow=0.21 cfs 0.019 af  
Outflow=0.21 cfs 0.015 af**Pond 2P: Depression**Peak Elev=55.31' Storage=33 cf Inflow=0.28 cfs 0.024 af  
Outflow=0.26 cfs 0.024 af**Pond 3P: Depression**Peak Elev=56.21' Storage=189 cf Inflow=0.23 cfs 0.019 af  
Outflow=0.22 cfs 0.014 af**Pond 4P: Depression**Peak Elev=53.11' Storage=236 cf Inflow=0.80 cfs 0.070 af  
Outflow=0.78 cfs 0.065 af**Total Runoff Area = 2.382 ac Runoff Volume = 0.522 af Average Runoff Depth = 2.63"**  
**77.22% Pervious = 1.840 ac 22.78% Impervious = 0.543 ac**

**21254-EXISTING**

Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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**Summary for Subcatchment 1S: Subcatchment 1S**

Runoff = 1.85 cfs @ 12.26 hrs, Volume= 0.194 af, Depth> 3.34"  
 Routed to Reach AP1 : Analysis Point 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 Rainfall=4.87"

Area (sf)	CN	Description
12,369	98	Paved parking, HSG C
3,246	98	Roofs, HSG C
14,735	74	>75% Grass cover, Good, HSG C
30,350	86	Weighted Average
14,735		48.55% Pervious Area
15,615		51.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	78	0.0100	0.12		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
2.4	22	0.0330	0.15		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
4.5	48	0.0330	0.18		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.2	22	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
1.6	66	0.0100	0.70		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
0.1	18	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
19.4	254	Total			

**Summary for Subcatchment 2S: Subcatchment 2S**

Runoff = 0.12 cfs @ 12.11 hrs, Volume= 0.009 af, Depth> 2.78"  
 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 Rainfall=4.87"

Area (sf)	CN	Description
836	74	>75% Grass cover, Good, HSG C
478	98	Roofs, HSG C
388	70	Woods, Good, HSG C
1,702	80	Weighted Average
1,224		71.92% Pervious Area
478		28.08% Impervious Area

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	26	0.0310	0.16		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.3	16	0.0750	0.20		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.7	13	0.1900	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
1.3	7	0.1140	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.5	5	0.5000	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
7.6	67	Total			

**Summary for Subcatchment 3S: Subcatchment 3S**

Runoff = 1.17 cfs @ 12.42 hrs, Volume= 0.146 af, Depth> 2.16"  
 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 Rainfall=4.87"

Area (sf)	CN	Description
1,489	98	Roofs, HSG C
19,916	74	>75% Grass cover, Good, HSG C
13,776	70	Woods, Good, HSG C
35,181	73	Weighted Average
33,692		95.77% Pervious Area
1,489		4.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	48	0.0100	0.05		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
9.8	41	0.0240	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
2.5	11	0.0520	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.3	22	0.0520	1.14		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.6	45	0.0670	1.29		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	20	0.1220	1.75		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
29.1	187	Total			



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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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**Summary for Subcatchment 4S: Subcatchment 4S**

Runoff = 0.28 cfs @ 12.13 hrs, Volume= 0.023 af, Depth> 2.69"  
 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 Rainfall=4.87"

Area (sf)	CN	Description
1,661	74	>75% Grass cover, Good, HSG C
453	98	Paved parking, HSG C
736	98	Roofs, HSG C
1,558	70	Woods, Good, HSG C
4,408	79	Weighted Average
3,219		73.03% Pervious Area
1,189		26.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	5	0.0500	0.14		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
8.5	50	0.0500	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
9.1	55	Total			

**Summary for Subcatchment 5S: Subcatchment 5S**

Runoff = 0.21 cfs @ 12.19 hrs, Volume= 0.019 af, Depth> 2.51"  
 Routed to Pond 1P : Depression

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 Rainfall=4.87"

Area (sf)	CN	Description
597	98	Roofs, HSG C
2,345	74	>75% Grass cover, Good, HSG C
1,024	70	Woods, Good, HSG C
3,966	77	Weighted Average
3,369		84.95% Pervious Area
597		15.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
10.3	40	0.0200	0.06		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.1	7	0.1400	1.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
13.1	67	Total			

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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**Summary for Subcatchment 6S: Subcatchment 6S**

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 2.51"  
 Routed to Pond 2P : Depression

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 Rainfall=4.87"

Area (sf)	CN	Description
323	98	Roofs, HSG C
1,641	74	>75% Grass cover, Good, HSG C
137	70	Woods, Good, HSG C
2,101	77	Weighted Average
1,778		84.63% Pervious Area
323		15.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	10	0.0260	0.05		<b>Sheet Flow,</b>
					Woods: Light underbrush n= 0.400 P2= 3.21"
6.3	66	0.0260	0.17		<b>Sheet Flow,</b>
					Grass: Short n= 0.150 P2= 3.21"
9.4	76	Total			

**Summary for Subcatchment 7S: Subcatchment 7S**

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 2.17"  
 Routed to Pond 3P : Depression

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 Rainfall=4.87"

Area (sf)	CN	Description
3,271	74	>75% Grass cover, Good, HSG C
1,238	70	Woods, Good, HSG C
4,509	73	Weighted Average
4,509		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	34	0.0240	0.07		<b>Sheet Flow,</b>
					Woods: Light underbrush n= 0.400 P2= 3.21"
1.2	8	0.0240	0.11		<b>Sheet Flow,</b>
					Grass: Short n= 0.150 P2= 3.21"
9.6	42	Total			

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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**Summary for Subcatchment 8S: Subcatchment 8S**

Runoff = 0.80 cfs @ 12.17 hrs, Volume= 0.070 af, Depth> 2.77"  
 Routed to Pond 4P : Depression

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 Rainfall=4.87"

Area (sf)	CN	Description
324	98	Roofs, HSG C
3,257	98	Paved parking, HSG C
9,288	74	>75% Grass cover, Good, HSG C
358	70	Woods, Good, HSG C
13,227	80	Weighted Average
9,646		72.93% Pervious Area
3,581		27.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	30	0.0330	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
1.3	10	0.0330	0.13		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.6	27	0.0100	0.80		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.21"
3.2	33	0.0360	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.5	36	0.0360	1.33		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
12.3	136	Total			

**Summary for Subcatchment 9S: Subcatchment 9S**

Runoff = 0.37 cfs @ 12.19 hrs, Volume= 0.033 af, Depth> 2.09"  
 Routed to Reach AP5 : Analysis Point 5

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 Rainfall=4.87"

Area (sf)	CN	Description
1,091	74	>75% Grass cover, Good, HSG C
368	98	Roofs, HSG C
6,873	70	Woods, Good, HSG C
8,332	72	Weighted Average
7,964		95.58% Pervious Area
368		4.42% Impervious Area

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	38	0.0370	0.18		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
8.5	62	0.0770	0.12		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.2	14	0.0857	1.46		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.7	50	0.0640	1.26		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
12.9	164	Total			

**Summary for Reach 1Ra: Overland Flow**

[80] Warning: Exceeded Pond 1P by 1.05' @ 0.00 hrs (2.56 cfs 5.434 af)

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 2.00" for 10 Yr 24 Hr event  
 Inflow = 0.21 cfs @ 12.21 hrs, Volume= 0.015 af  
 Outflow = 0.20 cfs @ 12.27 hrs, Volume= 0.015 af, Atten= 4%, Lag= 3.3 min  
 Routed to Reach 1Rb : Overland Flow

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Max. Velocity= 0.20 fps, Min. Travel Time= 2.9 min  
 Avg. Velocity = 0.07 fps, Avg. Travel Time= 8.0 min

Peak Storage= 35 cf @ 12.27 hrs  
 Average Depth at Peak Storage= 0.12' , Surface Width= 10.73'  
 Bank-Full Depth= 0.20' Flow Area= 2.0 sf, Capacity= 0.54 cfs

6.00' x 0.20' deep channel, n= 0.150 Sheet flow over Short Grass  
 Side Slope Z-value= 20.0 ' / ' Top Width= 14.00'  
 Length= 35.0' Slope= 0.0100 ' / '  
 Inlet Invert= 51.55', Outlet Invert= 51.20'

**Summary for Reach 1Rb: Overland Flow**

[62] Hint: Exceeded Reach 1Ra OUTLET depth by 0.02' @ 12.45 hrs

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 1.99" for 10 Yr 24 Hr event  
 Inflow = 0.20 cfs @ 12.27 hrs, Volume= 0.015 af  
 Outflow = 0.17 cfs @ 12.36 hrs, Volume= 0.015 af, Atten= 14%, Lag= 5.4 min  
 Routed to Reach 1Rc : Overland Flow

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

Max. Velocity= 0.42 fps, Min. Travel Time= 4.8 min

Avg. Velocity = 0.17 fps, Avg. Travel Time= 12.0 min

Peak Storage= 50 cf @ 12.36 hrs

Average Depth at Peak Storage= 0.13' , Surface Width= 4.51'

Bank-Full Depth= 0.20' Flow Area= 0.8 sf, Capacity= 0.43 cfs

2.00' x 0.20' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 10.0 ' / ' Top Width= 6.00'

Length= 122.0' Slope= 0.0443 ' / '

Inlet Invert= 51.20', Outlet Invert= 45.80'



### Summary for Reach 1Rc: Overland Flow

[61] Hint: Exceeded Reach 1Rb outlet invert by 0.03' @ 12.35 hrs

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 1.98" for 10 Yr 24 Hr event

Inflow = 0.17 cfs @ 12.36 hrs, Volume= 0.015 af

Outflow = 0.17 cfs @ 12.37 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.9 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= 0.31 fps, Min. Travel Time= 1.6 min

Avg. Velocity = 0.16 fps, Avg. Travel Time= 3.1 min

Peak Storage= 17 cf @ 12.37 hrs

Average Depth at Peak Storage= 0.03' , Surface Width= 20.28'

Bank-Full Depth= 1.00' Flow Area= 25.0 sf, Capacity= 74.58 cfs

20.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 5.0 ' / ' Top Width= 30.00'

Length= 30.0' Slope= 0.1167 ' / '

Inlet Invert= 45.80', Outlet Invert= 42.30'



**Summary for Reach 2R: Overland Flow**

[80] Warning: Exceeded Pond 3P by 0.50' @ 0.00 hrs (1.16 cfs 2.439 af)

Inflow Area = 0.104 ac, 0.00% Impervious, Inflow Depth > 1.67" for 10 Yr 24 Hr event  
 Inflow = 0.22 cfs @ 12.21 hrs, Volume= 0.014 af  
 Outflow = 0.19 cfs @ 12.27 hrs, Volume= 0.014 af, Atten= 13%, Lag= 3.1 min  
 Routed to Pond 2P : Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Max. Velocity= 0.22 fps, Min. Travel Time= 2.8 min  
 Avg. Velocity = 0.09 fps, Avg. Travel Time= 6.8 min

Peak Storage= 32 cf @ 12.27 hrs  
 Average Depth at Peak Storage= 0.07' , Surface Width= 17.93'  
 Bank-Full Depth= 0.20' Flow Area= 4.0 sf, Capacity= 1.78 cfs

30.00' x 0.20' deep Parabolic Channel, n= 0.150 Sheet flow over Short Grass  
 Length= 37.0' Slope= 0.0297 ' / '  
 Inlet Invert= 56.40', Outlet Invert= 55.30'

**Summary for Reach 3R: Overland Flow**

[62] Hint: Exceeded Reach 4Rb OUTLET depth by 0.19' @ 13.15 hrs  
 [80] Warning: Exceeded Pond 4P by 0.09' @ 13.10 hrs (0.81 cfs 0.184 af)

Inflow Area = 0.455 ac, 19.68% Impervious, Inflow Depth > 2.34" for 10 Yr 24 Hr event  
 Inflow = 0.96 cfs @ 12.23 hrs, Volume= 0.089 af  
 Outflow = 0.14 cfs @ 13.10 hrs, Volume= 0.056 af, Atten= 85%, Lag= 52.0 min  
 Routed to Reach AP1 : Analysis Point 1  
 Overflow = 0.82 cfs @ 12.23 hrs, Volume= 0.032 af  
 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= 0.21 fps, Min. Travel Time= 13.4 min  
 Avg. Velocity = 0.15 fps, Avg. Travel Time= 19.1 min

Peak Storage= 114 cf @ 13.10 hrs  
 Average Depth at Peak Storage= 0.20' , Surface Width= 5.00'  
 Bank-Full Depth= 0.20' Flow Area= 0.7 sf, Capacity= 0.14 cfs  
 Any excess flow will be diverted to the secondary overflow

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5.00' x 0.20' deep Parabolic Channel,  $n = 0.150$  Sheet flow over Short Grass  
 Length= 171.0' Slope= 0.0068 '/  
 Inlet Invert= 53.00', Outlet Invert= 51.84'

**Summary for Reach 4Ra: Driveway Segment 1**

[80] Warning: Exceeded Pond 2P by 0.01' @ 12.30 hrs (0.06 cfs 0.002 af)

Inflow Area = 0.152 ac, 4.89% Impervious, Inflow Depth > 1.88" for 10 Yr 24 Hr event  
 Inflow = 0.26 cfs @ 12.29 hrs, Volume= 0.024 af  
 Outflow = 0.26 cfs @ 12.30 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.6 min  
 Routed to Reach 4Rb : Driveway Segment 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Max. Velocity= 1.10 fps, Min. Travel Time= 0.8 min  
 Avg. Velocity = 0.47 fps, Avg. Travel Time= 1.8 min

Peak Storage= 12 cf @ 12.30 hrs  
 Average Depth at Peak Storage= 0.02', Surface Width= 12.04'  
 Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 56.25 cfs

12.00' x 0.50' deep channel,  $n = 0.016$  Asphalt, rough  
 Side Slope Z-value= 1.0 '/ Top Width= 13.00'  
 Length= 50.0' Slope= 0.0260 '/  
 Inlet Invert= 55.30', Outlet Invert= 54.00'

**Summary for Reach 4Rb: Driveway Segment 2**

[61] Hint: Exceeded Reach 4Ra outlet invert by 0.02' @ 12.30 hrs

Inflow Area = 0.152 ac, 4.89% Impervious, Inflow Depth > 1.87" for 10 Yr 24 Hr event  
 Inflow = 0.26 cfs @ 12.30 hrs, Volume= 0.024 af  
 Outflow = 0.26 cfs @ 12.31 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.9 min  
 Routed to Reach 3R : Overland Flow

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

Max. Velocity= 0.91 fps, Min. Travel Time= 1.3 min

Avg. Velocity = 0.36 fps, Avg. Travel Time= 3.3 min

Peak Storage= 21 cf @ 12.31 hrs

Average Depth at Peak Storage= 0.02' , Surface Width= 12.05'

Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 41.11 cfs

12.00' x 0.50' deep channel, n= 0.016 Asphalt, rough

Side Slope Z-value= 1.0 '/' Top Width= 13.00'

Length= 72.0' Slope= 0.0139 '/'

Inlet Invert= 54.00', Outlet Invert= 53.00'

**Summary for Reach AP1: Analysis Point 1**

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

Inflow Area = 1.152 ac, 38.89% Impervious, Inflow Depth &gt; 2.93" for 10 Yr 24 Hr event

Inflow = 2.79 cfs @ 12.25 hrs, Volume= 0.282 af

Outflow = 2.79 cfs @ 12.25 hrs, Volume= 0.282 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 = 0.039 ac, 28.08% Impervious, Inflow Depth &gt; 2.78" for 10 Yr 24 Hr event

Inflow = 0.12 cfs @ 12.11 hrs, Volume= 0.009 af

Outflow = 0.12 cfs @ 12.11 hrs, Volume= 0.009 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 AP3: Analysis Point 3**

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

Inflow Area = 0.899 ac, 5.33% Impervious, Inflow Depth &gt; 2.15" for 10 Yr 24 Hr event

Inflow = 1.33 cfs @ 12.41 hrs, Volume= 0.161 af

Outflow = 1.33 cfs @ 12.41 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min



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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 = 0.101 ac, 26.97% Impervious, Inflow Depth > 2.69" for 10 Yr 24 Hr event  
 Inflow = 0.28 cfs @ 12.13 hrs, Volume= 0.023 af  
 Outflow = 0.28 cfs @ 12.13 hrs, Volume= 0.023 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 AP5: Analysis Point 5**

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

Inflow Area = 0.191 ac, 4.42% Impervious, Inflow Depth > 2.09" for 10 Yr 24 Hr event  
 Inflow = 0.37 cfs @ 12.19 hrs, Volume= 0.033 af  
 Outflow = 0.37 cfs @ 12.19 hrs, Volume= 0.033 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: Depression**

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 2.51" for 10 Yr 24 Hr event  
 Inflow = 0.21 cfs @ 12.19 hrs, Volume= 0.019 af  
 Outflow = 0.21 cfs @ 12.21 hrs, Volume= 0.015 af, Atten= 1%, Lag= 1.7 min  
 Primary = 0.21 cfs @ 12.21 hrs, Volume= 0.015 af

Routed to Reach 1Ra : Overland Flow

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

Peak Elev= 51.31' @ 12.15 hrs Surf.Area= 593 sf Storage= 167 cf

Plug-Flow detention time= 114.8 min calculated for 0.015 af (80% of inflow)

Center-of-Mass det. time= 37.3 min ( 873.3 - 836.0 )

Volume	Invert	Avail.Storage	Storage Description			
#1	50.50'	167 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
50.50	45	30.0	0	0	45	
51.00	177	68.0	52	52	342	
51.30	593	121.0	109	161	1,140	
51.31	593	121.0	6	167	1,141	

Device	Routing	Invert	Outlet Devices											
#0	Primary	51.31'	<b>Automatic Storage Overflow</b> (Discharged without head)											
#1	Primary	51.30'	<b>8.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b>											
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00	
				2.50	3.00	3.50								

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Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88  
 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=0.00 cfs @ 12.21 hrs HW=51.31' TW=51.66' (Dynamic Tailwater)

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

**Summary for Pond 2P: Depression**

[62] Hint: Exceeded Reach 2R OUTLET depth by 0.01' @ 11.80 hrs

Inflow Area = 0.152 ac, 4.89% Impervious, Inflow Depth > 1.93" for 10 Yr 24 Hr event  
 Inflow = 0.28 cfs @ 12.26 hrs, Volume= 0.024 af  
 Outflow = 0.26 cfs @ 12.29 hrs, Volume= 0.024 af, Atten= 5%, Lag= 1.8 min  
 Primary = 0.26 cfs @ 12.29 hrs, Volume= 0.024 af  
 Routed to Reach 4Ra : Driveway Segment 1

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

Peak Elev= 55.31' @ 11.80 hrs Surf.Area= 126 sf Storage= 33 cf

Plug-Flow detention time= 24.2 min calculated for 0.024 af (97% of inflow)

Center-of-Mass det. time= 7.8 min ( 874.2 - 866.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	33 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.00	88	0	0
55.30	126	32	32
55.31	126	1	33

Device	Routing	Invert	Outlet Devices
#0	Primary	55.31'	<b>Automatic Storage Overflow</b> (Discharged without head)
#1	Primary	55.30'	<b>45.0 deg x 8.0' long x 0.20' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Primary OutFlow** Max=0.00 cfs @ 12.29 hrs HW=55.31' TW=55.32' (Dynamic Tailwater)

↑1=Sharp-Crested Vee/Trap Weir( Controls 0.00 cfs)

**Summary for Pond 3P: Depression**

Inflow Area = 0.104 ac, 0.00% Impervious, Inflow Depth > 2.17" for 10 Yr 24 Hr event  
 Inflow = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af  
 Outflow = 0.22 cfs @ 12.21 hrs, Volume= 0.014 af, Atten= 4%, Lag= 4.3 min  
 Primary = 0.22 cfs @ 12.21 hrs, Volume= 0.014 af  
 Routed to Reach 2R : Overland Flow

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

Peak Elev= 56.21' @ 12.15 hrs Surf.Area= 1,071 sf Storage= 189 cf

Plug-Flow detention time= 127.5 min calculated for 0.014 af (77% of inflow)

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Center-of-Mass det. time= 42.7 min ( 886.2 - 843.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	55.90'	189 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.90	52	0	0
56.00	456	25	25
56.20	1,071	153	178
56.21	1,071	11	189

Device	Routing	Invert	Outlet Devices
#0	Primary	56.21'	<b>Automatic Storage Overflow</b> (Discharged without head)
#1	Primary	56.20'	<b>45.0 deg x 4.0' long x 0.20' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Primary OutFlow** Max=0.00 cfs @ 12.21 hrs HW=56.21' TW=56.46' (Dynamic Tailwater)↑**1=Sharp-Crested Vee/Trap Weir**( Controls 0.00 cfs)**Summary for Pond 4P: Depression**

Inflow Area = 0.304 ac, 27.07% Impervious, Inflow Depth > 2.77" for 10 Yr 24 Hr event  
 Inflow = 0.80 cfs @ 12.17 hrs, Volume= 0.070 af  
 Outflow = 0.78 cfs @ 12.20 hrs, Volume= 0.065 af, Atten= 2%, Lag= 1.8 min  
 Primary = 0.78 cfs @ 12.20 hrs, Volume= 0.065 af  
 Routed to Reach 3R : Overland Flow

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

Peak Elev= 53.11' @ 11.55 hrs Surf.Area= 1,846 sf Storage= 236 cf

Plug-Flow detention time= 56.0 min calculated for 0.065 af (92% of inflow)

Center-of-Mass det. time= 18.5 min ( 846.0 - 827.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	52.82'	236 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.82	5	0	0
53.00	889	80	80
53.10	1,846	137	217
53.11	1,846	18	236

Device	Routing	Invert	Outlet Devices
#0	Primary	53.11'	<b>Automatic Storage Overflow</b> (Discharged without head)
#1	Primary	53.10'	<b>45.0 deg x 8.0' long x 0.20' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Primary OutFlow** Max=0.00 cfs @ 12.20 hrs HW=53.11' TW=53.20' (Dynamic Tailwater)↑**1=Sharp-Crested Vee/Trap Weir**( Controls 0.00 cfs)

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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

<b>Subcatchment1S: Subcatchment1S</b>	Runoff Area=30,350 sf 51.45% Impervious Runoff Depth>4.56" Flow Length=254' Tc=19.4 min CN=86 Runoff=2.49 cfs 0.265 af
<b>Subcatchment2S: Subcatchment2S</b>	Runoff Area=1,702 sf 28.08% Impervious Runoff Depth>3.93" Flow Length=67' Tc=7.6 min CN=80 Runoff=0.17 cfs 0.013 af
<b>Subcatchment3S: Subcatchment3S</b>	Runoff Area=35,181 sf 4.23% Impervious Runoff Depth>3.21" Flow Length=187' Tc=29.1 min CN=73 Runoff=1.75 cfs 0.216 af
<b>Subcatchment4S: Subcatchment4S</b>	Runoff Area=4,408 sf 26.97% Impervious Runoff Depth>3.83" Flow Length=55' Slope=0.0500 '/' Tc=9.1 min CN=79 Runoff=0.40 cfs 0.032 af
<b>Subcatchment5S: Subcatchment5S</b>	Runoff Area=3,966 sf 15.05% Impervious Runoff Depth>3.62" Flow Length=67' Tc=13.1 min CN=77 Runoff=0.31 cfs 0.027 af
<b>Subcatchment6S: Subcatchment6S</b>	Runoff Area=2,101 sf 15.37% Impervious Runoff Depth>3.62" Flow Length=76' Slope=0.0260 '/' Tc=9.4 min CN=77 Runoff=0.18 cfs 0.015 af
<b>Subcatchment7S: Subcatchment7S</b>	Runoff Area=4,509 sf 0.00% Impervious Runoff Depth>3.22" Flow Length=42' Slope=0.0240 '/' Tc=9.6 min CN=73 Runoff=0.34 cfs 0.028 af
<b>Subcatchment8S: Subcatchment8S</b>	Runoff Area=13,227 sf 27.07% Impervious Runoff Depth>3.93" Flow Length=136' Tc=12.3 min CN=80 Runoff=1.13 cfs 0.099 af
<b>Subcatchment9S: Subcatchment9S</b>	Runoff Area=8,332 sf 4.42% Impervious Runoff Depth>3.13" Flow Length=164' Tc=12.9 min CN=72 Runoff=0.55 cfs 0.050 af
<b>Reach 1Ra: Overland Flow</b>	Avg. Flow Depth=0.15' Max Vel=0.23 fps Inflow=0.30 cfs 0.024 af n=0.150 L=35.0' S=0.0100 '/' Capacity=0.54 cfs Outflow=0.29 cfs 0.024 af
<b>Reach 1Rb: Overland Flow</b>	Avg. Flow Depth=0.16' Max Vel=0.48 fps Inflow=0.29 cfs 0.024 af n=0.150 L=122.0' S=0.0443 '/' Capacity=0.43 cfs Outflow=0.28 cfs 0.023 af
<b>Reach 1Rc: Overland Flow</b>	Avg. Flow Depth=0.04' Max Vel=0.37 fps Inflow=0.28 cfs 0.023 af n=0.150 L=30.0' S=0.1167 '/' Capacity=74.58 cfs Outflow=0.28 cfs 0.023 af
<b>Reach 2R: Overland Flow</b>	Avg. Flow Depth=0.09' Max Vel=0.26 fps Inflow=0.33 cfs 0.023 af n=0.150 L=37.0' S=0.0297 '/' Capacity=1.78 cfs Outflow=0.32 cfs 0.023 af
<b>Reach 3R: Overland Flow</b>	Avg. Flow Depth=0.20' Max Vel=0.21 fps Inflow=1.58 cfs 0.131 af n=0.150 L=171.0' S=0.0068 '/' Capacity=0.14 cfs Outflow=0.14 cfs 0.074 af Overflow=1.44 cfs 0.057 af
<b>Reach 4Ra: Driveway Segment 1</b>	Avg. Flow Depth=0.03' Max Vel=1.39 fps Inflow=0.48 cfs 0.037 af n=0.016 L=50.0' S=0.0260 '/' Capacity=56.25 cfs Outflow=0.48 cfs 0.037 af
<b>Reach 4Rb: Driveway Segment 2</b>	Avg. Flow Depth=0.03' Max Vel=1.15 fps Inflow=0.48 cfs 0.037 af n=0.016 L=72.0' S=0.0139 '/' Capacity=41.11 cfs Outflow=0.48 cfs 0.037 af

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**Reach AP1: Analysis Point 1**Inflow=3.99 cfs 0.395 af  
Outflow=3.99 cfs 0.395 af**Reach AP2: Analysis Point 2**Inflow=0.17 cfs 0.013 af  
Outflow=0.17 cfs 0.013 af**Reach AP3: Analysis Point 3**Inflow=2.00 cfs 0.240 af  
Outflow=2.00 cfs 0.240 af**Reach AP4: Analysis Point 4**Inflow=0.40 cfs 0.032 af  
Outflow=0.40 cfs 0.032 af**Reach AP5: Analysis Point 5**Inflow=0.55 cfs 0.050 af  
Outflow=0.55 cfs 0.050 af**Pond 1P: Depression**Peak Elev=51.31' Storage=167 cf Inflow=0.31 cfs 0.027 af  
Outflow=0.30 cfs 0.024 af**Pond 2P: Depression**Peak Elev=55.31' Storage=33 cf Inflow=0.49 cfs 0.038 af  
Outflow=0.48 cfs 0.037 af**Pond 3P: Depression**Peak Elev=56.21' Storage=189 cf Inflow=0.34 cfs 0.028 af  
Outflow=0.33 cfs 0.023 af**Pond 4P: Depression**Peak Elev=53.11' Storage=236 cf Inflow=1.13 cfs 0.099 af  
Outflow=1.11 cfs 0.094 af**Total Runoff Area = 2.382 ac Runoff Volume = 0.745 af Average Runoff Depth = 3.75"**  
**77.22% Pervious = 1.840 ac 22.78% Impervious = 0.543 ac**

**21254-EXISTING**

Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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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

<b>Subcatchment1S: Subcatchment1S</b>	Runoff Area=30,350 sf 51.45% Impervious Runoff Depth>5.72" Flow Length=254' Tc=19.4 min CN=86 Runoff=3.10 cfs 0.332 af
<b>Subcatchment2S: Subcatchment2S</b>	Runoff Area=1,702 sf 28.08% Impervious Runoff Depth>5.05" Flow Length=67' Tc=7.6 min CN=80 Runoff=0.21 cfs 0.016 af
<b>Subcatchment3S: Subcatchment3S</b>	Runoff Area=35,181 sf 4.23% Impervious Runoff Depth>4.25" Flow Length=187' Tc=29.1 min CN=73 Runoff=2.32 cfs 0.286 af
<b>Subcatchment4S: Subcatchment4S</b>	Runoff Area=4,408 sf 26.97% Impervious Runoff Depth>4.94" Flow Length=55' Slope=0.0500 '/' Tc=9.1 min CN=79 Runoff=0.51 cfs 0.042 af
<b>Subcatchment5S: Subcatchment5S</b>	Runoff Area=3,966 sf 15.05% Impervious Runoff Depth>4.71" Flow Length=67' Tc=13.1 min CN=77 Runoff=0.40 cfs 0.036 af
<b>Subcatchment6S: Subcatchment6S</b>	Runoff Area=2,101 sf 15.37% Impervious Runoff Depth>4.71" Flow Length=76' Slope=0.0260 '/' Tc=9.4 min CN=77 Runoff=0.23 cfs 0.019 af
<b>Subcatchment7S: Subcatchment7S</b>	Runoff Area=4,509 sf 0.00% Impervious Runoff Depth>4.27" Flow Length=42' Slope=0.0240 '/' Tc=9.6 min CN=73 Runoff=0.45 cfs 0.037 af
<b>Subcatchment8S: Subcatchment8S</b>	Runoff Area=13,227 sf 27.07% Impervious Runoff Depth>5.05" Flow Length=136' Tc=12.3 min CN=80 Runoff=1.44 cfs 0.128 af
<b>Subcatchment9S: Subcatchment9S</b>	Runoff Area=8,332 sf 4.42% Impervious Runoff Depth>4.15" Flow Length=164' Tc=12.9 min CN=72 Runoff=0.74 cfs 0.066 af
<b>Reach 1Ra: Overland Flow</b>	Avg. Flow Depth=0.17' Max Vel=0.24 fps Inflow=0.39 cfs 0.032 af n=0.150 L=35.0' S=0.0100 '/' Capacity=0.54 cfs Outflow=0.38 cfs 0.032 af
<b>Reach 1Rb: Overland Flow</b>	Avg. Flow Depth=0.18' Max Vel=0.52 fps Inflow=0.38 cfs 0.032 af n=0.150 L=122.0' S=0.0443 '/' Capacity=0.43 cfs Outflow=0.36 cfs 0.032 af
<b>Reach 1Rc: Overland Flow</b>	Avg. Flow Depth=0.04' Max Vel=0.42 fps Inflow=0.36 cfs 0.032 af n=0.150 L=30.0' S=0.1167 '/' Capacity=74.58 cfs Outflow=0.36 cfs 0.032 af
<b>Reach 2R: Overland Flow</b>	Avg. Flow Depth=0.10' Max Vel=0.29 fps Inflow=0.44 cfs 0.032 af n=0.150 L=37.0' S=0.0297 '/' Capacity=1.78 cfs Outflow=0.43 cfs 0.032 af
<b>Reach 3R: Overland Flow</b>	Avg. Flow Depth=0.20' Max Vel=0.21 fps Inflow=2.04 cfs 0.173 af n=0.150 L=171.0' S=0.0068 '/' Capacity=0.14 cfs Outflow=0.14 cfs 0.089 af Overflow=1.90 cfs 0.083 af
<b>Reach 4Ra: Driveway Segment 1</b>	Avg. Flow Depth=0.03' Max Vel=1.56 fps Inflow=0.63 cfs 0.051 af n=0.016 L=50.0' S=0.0260 '/' Capacity=56.25 cfs Outflow=0.63 cfs 0.051 af
<b>Reach 4Rb: Driveway Segment 2</b>	Avg. Flow Depth=0.04' Max Vel=1.29 fps Inflow=0.63 cfs 0.051 af n=0.016 L=72.0' S=0.0139 '/' Capacity=41.11 cfs Outflow=0.63 cfs 0.051 af

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**Reach AP1: Analysis Point 1**Inflow=5.04 cfs 0.504 af  
Outflow=5.04 cfs 0.504 af**Reach AP2: Analysis Point 2**Inflow=0.21 cfs 0.016 af  
Outflow=0.21 cfs 0.016 af**Reach AP3: Analysis Point 3**Inflow=2.63 cfs 0.318 af  
Outflow=2.63 cfs 0.318 af**Reach AP4: Analysis Point 4**Inflow=0.51 cfs 0.042 af  
Outflow=0.51 cfs 0.042 af**Reach AP5: Analysis Point 5**Inflow=0.74 cfs 0.066 af  
Outflow=0.74 cfs 0.066 af**Pond 1P: Depression**Peak Elev=51.31' Storage=167 cf Inflow=0.40 cfs 0.036 af  
Outflow=0.39 cfs 0.032 af**Pond 2P: Depression**Peak Elev=55.31' Storage=33 cf Inflow=0.64 cfs 0.051 af  
Outflow=0.63 cfs 0.051 af**Pond 3P: Depression**Peak Elev=56.21' Storage=189 cf Inflow=0.45 cfs 0.037 af  
Outflow=0.44 cfs 0.032 af**Pond 4P: Depression**Peak Elev=53.11' Storage=236 cf Inflow=1.44 cfs 0.128 af  
Outflow=1.41 cfs 0.122 af**Total Runoff Area = 2.382 ac   Runoff Volume = 0.962 af   Average Runoff Depth = 4.84"**  
**77.22% Pervious = 1.840 ac   22.78% Impervious = 0.543 ac**

**21254-EXISTING**

Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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**Summary for Subcatchment 1S: Subcatchment 1S**

Runoff = 3.10 cfs @ 12.26 hrs, Volume= 0.332 af, Depth> 5.72"  
 Routed to Reach AP1 : Analysis Point 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 Rainfall=7.39"

Area (sf)	CN	Description
12,369	98	Paved parking, HSG C
3,246	98	Roofs, HSG C
14,735	74	>75% Grass cover, Good, HSG C
30,350	86	Weighted Average
14,735		48.55% Pervious Area
15,615		51.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	78	0.0100	0.12		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
2.4	22	0.0330	0.15		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
4.5	48	0.0330	0.18		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.2	22	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
1.6	66	0.0100	0.70		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
0.1	18	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
19.4	254	Total			

**Summary for Subcatchment 2S: Subcatchment 2S**

Runoff = 0.21 cfs @ 12.11 hrs, Volume= 0.016 af, Depth> 5.05"  
 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 Rainfall=7.39"

Area (sf)	CN	Description
836	74	>75% Grass cover, Good, HSG C
478	98	Roofs, HSG C
388	70	Woods, Good, HSG C
1,702	80	Weighted Average
1,224		71.92% Pervious Area
478		28.08% Impervious Area



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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	26	0.0310	0.16		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.3	16	0.0750	0.20		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.7	13	0.1900	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
1.3	7	0.1140	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.5	5	0.5000	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
7.6	67	Total			

**Summary for Subcatchment 3S: Subcatchment 3S**

Runoff = 2.32 cfs @ 12.41 hrs, Volume= 0.286 af, Depth> 4.25"  
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 Rainfall=7.39"

Area (sf)	CN	Description
1,489	98	Roofs, HSG C
19,916	74	>75% Grass cover, Good, HSG C
13,776	70	Woods, Good, HSG C
35,181	73	Weighted Average
33,692		95.77% Pervious Area
1,489		4.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	48	0.0100	0.05		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
9.8	41	0.0240	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
2.5	11	0.0520	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.3	22	0.0520	1.14		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.6	45	0.0670	1.29		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	20	0.1220	1.75		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
29.1	187	Total			

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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**Summary for Subcatchment 4S: Subcatchment 4S**

Runoff = 0.51 cfs @ 12.13 hrs, Volume= 0.042 af, Depth> 4.94"  
 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 Rainfall=7.39"

Area (sf)	CN	Description
1,661	74	>75% Grass cover, Good, HSG C
453	98	Paved parking, HSG C
736	98	Roofs, HSG C
1,558	70	Woods, Good, HSG C
4,408	79	Weighted Average
3,219		73.03% Pervious Area
1,189		26.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	5	0.0500	0.14		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
8.5	50	0.0500	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
9.1	55	Total			

**Summary for Subcatchment 5S: Subcatchment 5S**

Runoff = 0.40 cfs @ 12.18 hrs, Volume= 0.036 af, Depth> 4.71"  
 Routed to Pond 1P : Depression

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 Rainfall=7.39"

Area (sf)	CN	Description
597	98	Roofs, HSG C
2,345	74	>75% Grass cover, Good, HSG C
1,024	70	Woods, Good, HSG C
3,966	77	Weighted Average
3,369		84.95% Pervious Area
597		15.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
10.3	40	0.0200	0.06		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.1	7	0.1400	1.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
13.1	67	Total			

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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**Summary for Subcatchment 6S: Subcatchment 6S**

Runoff = 0.23 cfs @ 12.13 hrs, Volume= 0.019 af, Depth> 4.71"  
 Routed to Pond 2P : Depression

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 Rainfall=7.39"

Area (sf)	CN	Description
323	98	Roofs, HSG C
1,641	74	>75% Grass cover, Good, HSG C
137	70	Woods, Good, HSG C
2,101	77	Weighted Average
1,778		84.63% Pervious Area
323		15.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	10	0.0260	0.05		<b>Sheet Flow,</b>
					Woods: Light underbrush n= 0.400 P2= 3.21"
6.3	66	0.0260	0.17		<b>Sheet Flow,</b>
					Grass: Short n= 0.150 P2= 3.21"
9.4	76	Total			

**Summary for Subcatchment 7S: Subcatchment 7S**

Runoff = 0.45 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 4.27"  
 Routed to Pond 3P : Depression

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 Rainfall=7.39"

Area (sf)	CN	Description
3,271	74	>75% Grass cover, Good, HSG C
1,238	70	Woods, Good, HSG C
4,509	73	Weighted Average
4,509		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	34	0.0240	0.07		<b>Sheet Flow,</b>
					Woods: Light underbrush n= 0.400 P2= 3.21"
1.2	8	0.0240	0.11		<b>Sheet Flow,</b>
					Grass: Short n= 0.150 P2= 3.21"
9.6	42	Total			

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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**Summary for Subcatchment 8S: Subcatchment 8S**

Runoff = 1.44 cfs @ 12.17 hrs, Volume= 0.128 af, Depth> 5.05"  
 Routed to Pond 4P : Depression

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 Rainfall=7.39"

Area (sf)	CN	Description
324	98	Roofs, HSG C
3,257	98	Paved parking, HSG C
9,288	74	>75% Grass cover, Good, HSG C
358	70	Woods, Good, HSG C
13,227	80	Weighted Average
9,646		72.93% Pervious Area
3,581		27.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	30	0.0330	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
1.3	10	0.0330	0.13		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.6	27	0.0100	0.80		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.21"
3.2	33	0.0360	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.5	36	0.0360	1.33		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
12.3	136	Total			

**Summary for Subcatchment 9S: Subcatchment 9S**

Runoff = 0.74 cfs @ 12.18 hrs, Volume= 0.066 af, Depth> 4.15"  
 Routed to Reach AP5 : Analysis Point 5

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 Rainfall=7.39"

Area (sf)	CN	Description
1,091	74	>75% Grass cover, Good, HSG C
368	98	Roofs, HSG C
6,873	70	Woods, Good, HSG C
8,332	72	Weighted Average
7,964		95.58% Pervious Area
368		4.42% Impervious Area

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	38	0.0370	0.18		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
8.5	62	0.0770	0.12		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.2	14	0.0857	1.46		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.7	50	0.0640	1.26		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
12.9	164	Total			

**Summary for Reach 1Ra: Overland Flow**

[80] Warning: Exceeded Pond 1P by 1.05' @ 0.00 hrs (2.56 cfs 5.636 af)

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 4.20" for 50 Yr 24 Hr event  
 Inflow = 0.39 cfs @ 12.21 hrs, Volume= 0.032 af  
 Outflow = 0.38 cfs @ 12.24 hrs, Volume= 0.032 af, Atten= 2%, Lag= 1.9 min  
 Routed to Reach 1Rb : Overland Flow

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Max. Velocity= 0.24 fps, Min. Travel Time= 2.4 min  
 Avg. Velocity = 0.09 fps, Avg. Travel Time= 6.4 min

Peak Storage= 54 cf @ 12.24 hrs  
 Average Depth at Peak Storage= 0.17', Surface Width= 12.67'  
 Bank-Full Depth= 0.20' Flow Area= 2.0 sf, Capacity= 0.54 cfs

6.00' x 0.20' deep channel, n= 0.150 Sheet flow over Short Grass  
 Side Slope Z-value= 20.0 ' / ' Top Width= 14.00'  
 Length= 35.0' Slope= 0.0100 ' / '  
 Inlet Invert= 51.55', Outlet Invert= 51.20'

**Summary for Reach 1Rb: Overland Flow**

[62] Hint: Exceeded Reach 1Ra OUTLET depth by 0.03' @ 12.40 hrs

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 4.19" for 50 Yr 24 Hr event  
 Inflow = 0.38 cfs @ 12.24 hrs, Volume= 0.032 af  
 Outflow = 0.36 cfs @ 12.29 hrs, Volume= 0.032 af, Atten= 5%, Lag= 3.0 min  
 Routed to Reach 1Rc : Overland Flow

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

Max. Velocity= 0.52 fps, Min. Travel Time= 3.9 min

Avg. Velocity = 0.21 fps, Avg. Travel Time= 9.8 min

Peak Storage= 85 cf @ 12.29 hrs

Average Depth at Peak Storage= 0.18' , Surface Width= 5.66'

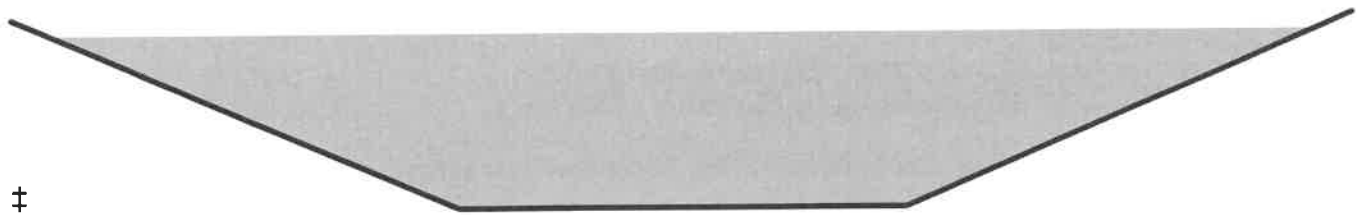
Bank-Full Depth= 0.20' Flow Area= 0.8 sf, Capacity= 0.43 cfs

2.00' x 0.20' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 10.0 ' / ' Top Width= 6.00'

Length= 122.0' Slope= 0.0443 ' / '

Inlet Invert= 51.20', Outlet Invert= 45.80'



### Summary for Reach 1Rc: Overland Flow

[61] Hint: Exceeded Reach 1Rb outlet invert by 0.04' @ 12.30 hrs

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 4.18" for 50 Yr 24 Hr event

Inflow = 0.36 cfs @ 12.29 hrs, Volume= 0.032 af

Outflow = 0.36 cfs @ 12.30 hrs, Volume= 0.032 af, Atten= 0%, 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= 0.42 fps, Min. Travel Time= 1.2 min

Avg. Velocity = 0.17 fps, Avg. Travel Time= 2.9 min

Peak Storage= 26 cf @ 12.30 hrs

Average Depth at Peak Storage= 0.04' , Surface Width= 20.43'

Bank-Full Depth= 1.00' Flow Area= 25.0 sf, Capacity= 74.58 cfs

20.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 5.0 ' / ' Top Width= 30.00'

Length= 30.0' Slope= 0.1167 ' / '

Inlet Invert= 45.80', Outlet Invert= 42.30'



**Summary for Reach 2R: Overland Flow**

[80] Warning: Exceeded Pond 3P by 0.50' @ 0.00 hrs (1.16 cfs 2.485 af)

Inflow Area = 0.104 ac, 0.00% Impervious, Inflow Depth > 3.76" for 50 Yr 24 Hr event  
 Inflow = 0.44 cfs @ 12.16 hrs, Volume= 0.032 af  
 Outflow = 0.43 cfs @ 12.19 hrs, Volume= 0.032 af, Atten= 3%, Lag= 1.8 min  
 Routed to Pond 2P : Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Max. Velocity= 0.29 fps, Min. Travel Time= 2.1 min  
 Avg. Velocity = 0.11 fps, Avg. Travel Time= 5.6 min

Peak Storage= 55 cf @ 12.19 hrs  
 Average Depth at Peak Storage= 0.10', Surface Width= 21.60'  
 Bank-Full Depth= 0.20' Flow Area= 4.0 sf, Capacity= 1.78 cfs

30.00' x 0.20' deep Parabolic Channel, n= 0.150 Sheet flow over Short Grass  
 Length= 37.0' Slope= 0.0297 '/  
 Inlet Invert= 56.40', Outlet Invert= 55.30'

**Summary for Reach 3R: Overland Flow**

[62] Hint: Exceeded Reach 4Rb OUTLET depth by 0.19' @ 14.40 hrs  
 [80] Warning: Exceeded Pond 4P by 0.09' @ 14.35 hrs (0.81 cfs 0.360 af)

Inflow Area = 0.455 ac, 19.68% Impervious, Inflow Depth > 4.55" for 50 Yr 24 Hr event  
 Inflow = 2.04 cfs @ 12.20 hrs, Volume= 0.173 af  
 Outflow = 0.14 cfs @ 14.35 hrs, Volume= 0.089 af, Atten= 93%, Lag= 128.8 min  
 Routed to Reach AP1 : Analysis Point 1  
 Overflow = 1.90 cfs @ 12.20 hrs, Volume= 0.083 af  
 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= 0.21 fps, Min. Travel Time= 13.4 min  
 Avg. Velocity = 0.17 fps, Avg. Travel Time= 16.9 min

Peak Storage= 114 cf @ 14.35 hrs  
 Average Depth at Peak Storage= 0.20', Surface Width= 5.00'  
 Bank-Full Depth= 0.20' Flow Area= 0.7 sf, Capacity= 0.14 cfs  
 Any excess flow will be diverted to the secondary overflow

**21254-EXISTING**

Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

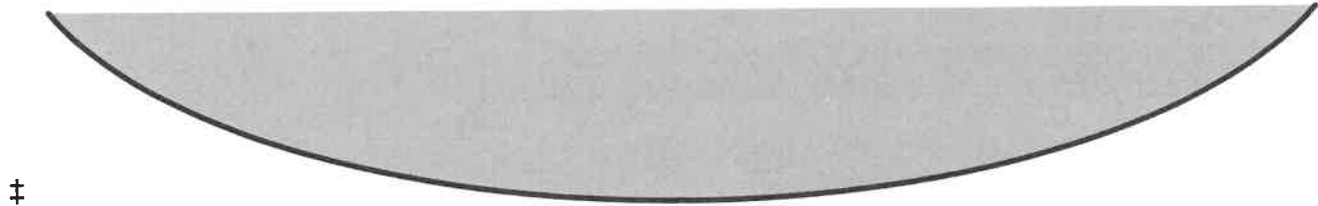
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5.00' x 0.20' deep Parabolic Channel, n= 0.150 Sheet flow over Short Grass  
 Length= 171.0' Slope= 0.0068 '/  
 Inlet Invert= 53.00', Outlet Invert= 51.84'

**Summary for Reach 4Ra: Driveway Segment 1**

[80] Warning: Exceeded Pond 2P by 0.02' @ 12.20 hrs (0.15 cfs 0.006 af)

Inflow Area = 0.152 ac, 4.89% Impervious, Inflow Depth > 4.00" for 50 Yr 24 Hr event  
 Inflow = 0.63 cfs @ 12.20 hrs, Volume= 0.051 af  
 Outflow = 0.63 cfs @ 12.20 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.3 min  
 Routed to Reach 4Rb : Driveway Segment 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Max. Velocity= 1.56 fps, Min. Travel Time= 0.5 min  
 Avg. Velocity= 0.52 fps, Avg. Travel Time= 1.6 min

Peak Storage= 20 cf @ 12.20 hrs  
 Average Depth at Peak Storage= 0.03', Surface Width= 12.07'  
 Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 56.25 cfs

12.00' x 0.50' deep channel, n= 0.016 Asphalt, rough  
 Side Slope Z-value= 1.0 '/ Top Width= 13.00'  
 Length= 50.0' Slope= 0.0260 '/  
 Inlet Invert= 55.30', Outlet Invert= 54.00'

**Summary for Reach 4Rb: Driveway Segment 2**

[62] Hint: Exceeded Reach 4Ra OUTLET depth by 0.01' @ 12.25 hrs

Inflow Area = 0.152 ac, 4.89% Impervious, Inflow Depth > 4.00" for 50 Yr 24 Hr event  
 Inflow = 0.63 cfs @ 12.20 hrs, Volume= 0.051 af  
 Outflow = 0.63 cfs @ 12.21 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.6 min  
 Routed to Reach 3R : Overland Flow



## 21254-EXISTING

Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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

Max. Velocity= 1.29 fps, Min. Travel Time= 0.9 min

Avg. Velocity = 0.41 fps, Avg. Travel Time= 3.0 min

Peak Storage= 35 cf @ 12.21 hrs

Average Depth at Peak Storage= 0.04' , Surface Width= 12.08'

Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 41.11 cfs

12.00' x 0.50' deep channel, n= 0.016 Asphalt, rough

Side Slope Z-value= 1.0 ' / ' Top Width= 13.00'

Length= 72.0' Slope= 0.0139 ' / '

Inlet Invert= 54.00', Outlet Invert= 53.00'



### Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 1.152 ac, 38.89% Impervious, Inflow Depth > 5.25" for 50 Yr 24 Hr event

Inflow = 5.04 cfs @ 12.23 hrs, Volume= 0.504 af

Outflow = 5.04 cfs @ 12.23 hrs, Volume= 0.504 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 = 0.039 ac, 28.08% Impervious, Inflow Depth > 5.05" for 50 Yr 24 Hr event

Inflow = 0.21 cfs @ 12.11 hrs, Volume= 0.016 af

Outflow = 0.21 cfs @ 12.11 hrs, Volume= 0.016 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 AP3: Analysis Point 3

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

Inflow Area = 0.899 ac, 5.33% Impervious, Inflow Depth > 4.24" for 50 Yr 24 Hr event

Inflow = 2.63 cfs @ 12.39 hrs, Volume= 0.318 af

Outflow = 2.63 cfs @ 12.39 hrs, Volume= 0.318 af, Atten= 0%, Lag= 0.0 min

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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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 = 0.101 ac, 26.97% Impervious, Inflow Depth > 4.94" for 50 Yr 24 Hr event  
 Inflow = 0.51 cfs @ 12.13 hrs, Volume= 0.042 af  
 Outflow = 0.51 cfs @ 12.13 hrs, Volume= 0.042 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 AP5: Analysis Point 5**

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

Inflow Area = 0.191 ac, 4.42% Impervious, Inflow Depth > 4.15" for 50 Yr 24 Hr event  
 Inflow = 0.74 cfs @ 12.18 hrs, Volume= 0.066 af  
 Outflow = 0.74 cfs @ 12.18 hrs, Volume= 0.066 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: Depression**

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 4.71" for 50 Yr 24 Hr event  
 Inflow = 0.40 cfs @ 12.18 hrs, Volume= 0.036 af  
 Outflow = 0.39 cfs @ 12.21 hrs, Volume= 0.032 af, Atten= 1%, Lag= 1.6 min  
 Primary = 0.39 cfs @ 12.21 hrs, Volume= 0.032 af

Routed to Reach 1Ra : Overland Flow

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

Peak Elev= 51.31' @ 11.60 hrs Surf.Area= 593 sf Storage= 167 cf

Plug-Flow detention time= 74.2 min calculated for 0.032 af (89% of inflow)

Center-of-Mass det. time= 24.4 min ( 842.6 - 818.1 )

Volume	Invert	Avail.Storage	Storage Description			
#1	50.50'	167 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
50.50	45	30.0	0	0	45	
51.00	177	68.0	52	52	342	
51.30	593	121.0	109	161	1,140	
51.31	593	121.0	6	167	1,141	

Device	Routing	Invert	Outlet Devices											
#0	Primary	51.31'	<b>Automatic Storage Overflow</b> (Discharged without head)											
#1	Primary	51.30'	<b>8.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b>											
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00	
				2.50	3.00	3.50								

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88  
 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=0.00 cfs @ 12.21 hrs HW=51.31' TW=51.71' (Dynamic Tailwater)

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

**Summary for Pond 2P: Depression**

[62] Hint: Exceeded Reach 2R OUTLET depth by 0.01' @ 11.60 hrs

Inflow Area = 0.152 ac, 4.89% Impervious, Inflow Depth > 4.06" for 50 Yr 24 Hr event  
 Inflow = 0.64 cfs @ 12.17 hrs, Volume= 0.051 af  
 Outflow = 0.63 cfs @ 12.20 hrs, Volume= 0.051 af, Atten= 2%, Lag= 1.7 min  
 Primary = 0.63 cfs @ 12.20 hrs, Volume= 0.051 af  
 Routed to Reach 4Ra : Driveway Segment 1

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

Peak Elev= 55.31' @ 11.60 hrs Surf.Area= 126 sf Storage= 33 cf

Plug-Flow detention time= 13.6 min calculated for 0.050 af (98% of inflow)

Center-of-Mass det. time= 5.3 min ( 843.3 - 838.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	33 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.00	88	0	0
55.30	126	32	32
55.31	126	1	33

Device	Routing	Invert	Outlet Devices
#0	Primary	55.31'	<b>Automatic Storage Overflow</b> (Discharged without head)
#1	Primary	55.30'	<b>45.0 deg x 8.0' long x 0.20' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Primary OutFlow** Max=0.00 cfs @ 12.20 hrs HW=55.31' TW=55.33' (Dynamic Tailwater)

↑**1=Sharp-Crested Vee/Trap Weir**( Controls 0.00 cfs)

**Summary for Pond 3P: Depression**

Inflow Area = 0.104 ac, 0.00% Impervious, Inflow Depth > 4.27" for 50 Yr 24 Hr event  
 Inflow = 0.45 cfs @ 12.14 hrs, Volume= 0.037 af  
 Outflow = 0.44 cfs @ 12.16 hrs, Volume= 0.032 af, Atten= 2%, Lag= 1.5 min  
 Primary = 0.44 cfs @ 12.16 hrs, Volume= 0.032 af  
 Routed to Reach 2R : Overland Flow

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

Peak Elev= 56.21' @ 11.80 hrs Surf.Area= 1,071 sf Storage= 189 cf

Plug-Flow detention time= 77.9 min calculated for 0.032 af (88% of inflow)

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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Center-of-Mass det. time= 24.3 min ( 848.5 - 824.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	55.90'	189 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.90	52	0	0
56.00	456	25	25
56.20	1,071	153	178
56.21	1,071	11	189

Device	Routing	Invert	Outlet Devices
#0	Primary	56.21'	<b>Automatic Storage Overflow</b> (Discharged without head)
#1	Primary	56.20'	<b>45.0 deg x 4.0' long x 0.20' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

**Primary OutFlow** Max=0.00 cfs @ 12.16 hrs HW=56.21' TW=56.50' (Dynamic Tailwater)

↑1=Sharp-Crested Vee/Trap Weir( Controls 0.00 cfs)

**Summary for Pond 4P: Depression**

Inflow Area = 0.304 ac, 27.07% Impervious, Inflow Depth > 5.05" for 50 Yr 24 Hr event  
 Inflow = 1.44 cfs @ 12.17 hrs, Volume= 0.128 af  
 Outflow = 1.41 cfs @ 12.20 hrs, Volume= 0.122 af, Atten= 2%, Lag= 1.7 min  
 Primary = 1.41 cfs @ 12.20 hrs, Volume= 0.122 af  
 Routed to Reach 3R : Overland Flow

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

Peak Elev= 53.11' @ 10.10 hrs Surf.Area= 1,846 sf Storage= 236 cf

Plug-Flow detention time= 37.1 min calculated for 0.122 af (96% of inflow)

Center-of-Mass det. time= 13.9 min ( 824.4 - 810.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	52.82'	236 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.82	5	0	0
53.00	889	80	80
53.10	1,846	137	217
53.11	1,846	18	236

Device	Routing	Invert	Outlet Devices
#0	Primary	53.11'	<b>Automatic Storage Overflow</b> (Discharged without head)
#1	Primary	53.10'	<b>45.0 deg x 8.0' long x 0.20' rise Sharp-Crested Vee/Trap Weir</b> Cv= 2.56 (C= 3.20)

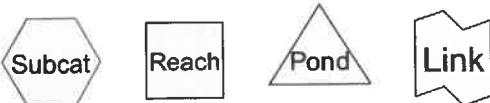
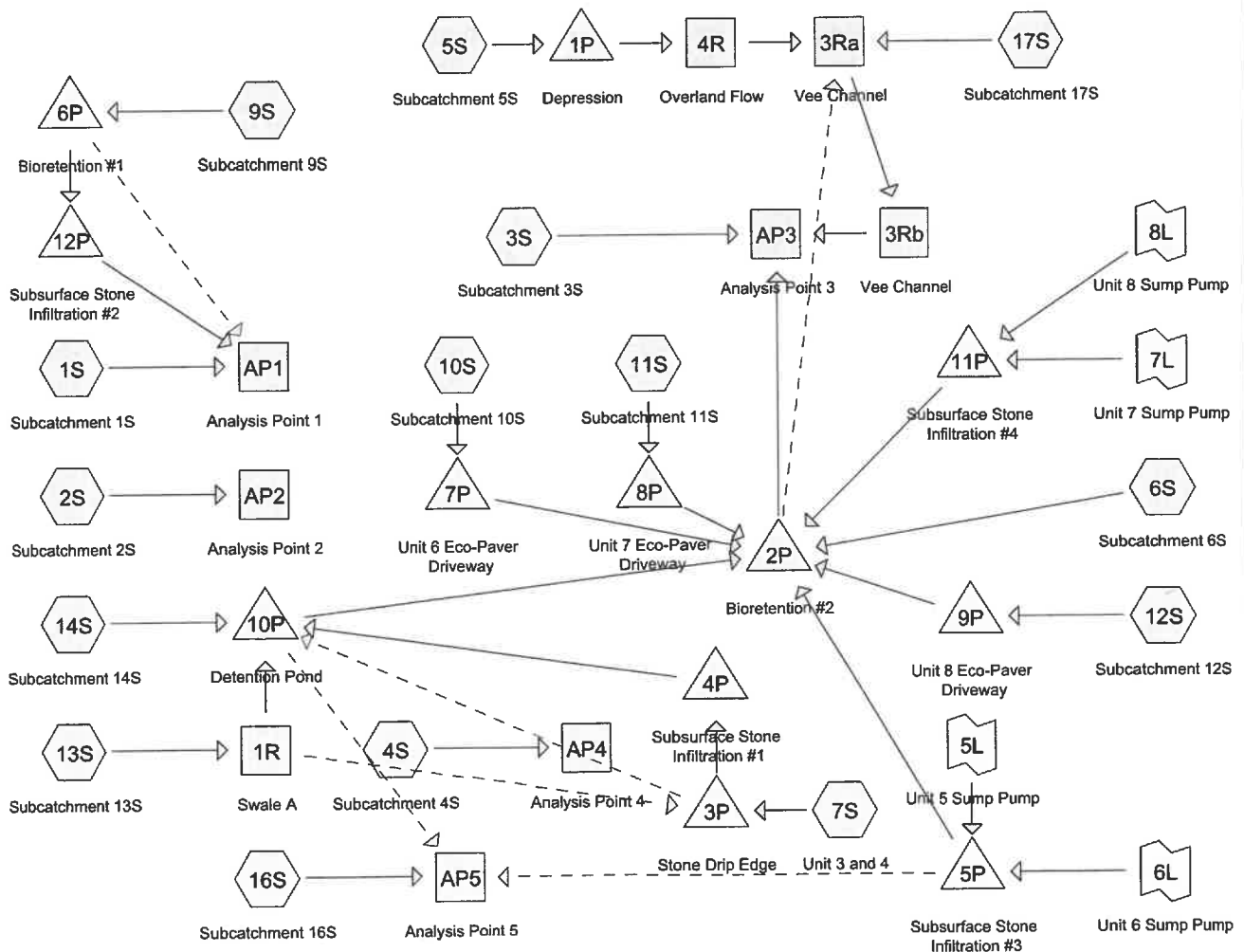
**Primary OutFlow** Max=0.00 cfs @ 12.20 hrs HW=53.11' TW=53.20' (Dynamic Tailwater)

↑1=Sharp-Crested Vee/Trap Weir( Controls 0.00 cfs)

## APPENDIX II

### PROPOSED CONDITIONS DRAINAGE ANALYSIS

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



**Routing Diagram for 21254-PROPOSED**  
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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
1.169	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 9S, 12S, 13S, 14S, 16S, 17S)
0.652	98	Paved parking, HSG C (1S, 4S, 6S, 9S, 10S, 11S, 12S, 17S)
0.406	98	Roofs, HSG C (1S, 2S, 4S, 5S, 6S, 7S, 9S, 10S, 11S, 12S, 13S, 14S, 16S, 17S)
0.006	98	Water Surface, HSG C (7S)
0.149	70	Woods, Good, HSG C (2S, 3S, 4S, 5S, 6S, 9S, 13S, 14S, 16S, 17S)
<b>2.382</b>	<b>84</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.382	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S, 12S, 13S, 14S, 16S, 17S
0.000	HSG D	
0.000	Other	
<b>2.382</b>		<b>TOTAL AREA</b>



**21254-PROPOSED**

Type III 24-hr 2 Yr 24 Hr Rainfall=3.21"

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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

<b>Subcatchment1S: Subcatchment1S</b>	Runoff Area=29,271 sf 57.36% Impervious Runoff Depth>2.00" Flow Length=221' Tc=11.9 min CN=88 Runoff=1.29 cfs 0.112 af
<b>Subcatchment2S: Subcatchment2S</b>	Runoff Area=1,702 sf 28.08% Impervious Runoff Depth>1.41" Flow Length=67' Tc=7.6 min CN=80 Runoff=0.06 cfs 0.005 af
<b>Subcatchment3S: Subcatchment3S</b>	Runoff Area=1,237 sf 0.00% Impervious Runoff Depth>0.99" Flow Length=34' Tc=6.0 min CN=73 Runoff=0.03 cfs 0.002 af
<b>Subcatchment4S: Subcatchment4S</b>	Runoff Area=3,492 sf 34.05% Impervious Runoff Depth>1.54" Flow Length=47' Slope=0.0250 '/' Tc=9.4 min CN=82 Runoff=0.13 cfs 0.010 af
<b>Subcatchment5S: Subcatchment5S</b>	Runoff Area=3,966 sf 15.05% Impervious Runoff Depth>1.22" Flow Length=67' Tc=13.1 min CN=77 Runoff=0.10 cfs 0.009 af
<b>Subcatchment6S: Subcatchment6S</b>	Runoff Area=28,965 sf 45.86% Impervious Runoff Depth>1.76" Flow Length=133' Tc=19.6 min CN=85 Runoff=0.93 cfs 0.097 af
<b>Subcatchment7S: Unit 3 and 4</b>	Runoff Area=1,232 sf 100.00% Impervious Runoff Depth>2.98" Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af
<b>Subcatchment9S: Subcatchment9S</b>	Runoff Area=10,560 sf 57.77% Impervious Runoff Depth>2.00" Flow Length=72' Slope=0.0100 '/' Tc=6.0 min CN=88 Runoff=0.56 cfs 0.040 af
<b>Subcatchment10S: Subcatchment10S</b>	Runoff Area=1,309 sf 100.00% Impervious Runoff Depth>2.98" Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af
<b>Subcatchment11S: Subcatchment11S</b>	Runoff Area=1,297 sf 100.00% Impervious Runoff Depth>2.98" Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af
<b>Subcatchment12S: Subcatchment12S</b>	Runoff Area=1,970 sf 66.04% Impervious Runoff Depth>2.18" Tc=6.0 min CN=90 Runoff=0.11 cfs 0.008 af
<b>Subcatchment13S: Subcatchment13S</b>	Runoff Area=1,624 sf 4.99% Impervious Runoff Depth>1.04" Flow Length=43' Tc=7.1 min CN=74 Runoff=0.04 cfs 0.003 af
<b>Subcatchment14S: Subcatchment14S</b>	Runoff Area=6,327 sf 19.36% Impervious Runoff Depth>1.34" Flow Length=50' Slope=0.0230 '/' Tc=6.0 min CN=79 Runoff=0.22 cfs 0.016 af
<b>Subcatchment16S: Subcatchment16S</b>	Runoff Area=4,616 sf 12.56% Impervious Runoff Depth>1.16" Flow Length=64' Tc=7.8 min CN=76 Runoff=0.13 cfs 0.010 af
<b>Subcatchment17S: Subcatchment17S</b>	Runoff Area=6,175 sf 14.35% Impervious Runoff Depth>1.21" Flow Length=95' Slope=0.0050 '/' Tc=16.3 min CN=77 Runoff=0.14 cfs 0.014 af
<b>Reach 1R: Swale A</b>	Avg. Flow Depth=0.22' Max Vel=0.22 fps Inflow=0.04 cfs 0.003 af n=0.150 L=100.0' S=0.0100 '/' Capacity=0.70 cfs Outflow=0.03 cfs 0.003 af Overflow=0.00 cfs 0.000 af

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<b>Reach 3Ra: Vee Channel</b>	Avg. Flow Depth=0.30' Max Vel=0.54 fps Inflow=0.14 cfs 0.020 af n=0.150 L=50.0' S=0.0400 ' Capacity=3.62 cfs Outflow=0.14 cfs 0.020 af
<b>Reach 3Rb: Vee Channel</b>	Avg. Flow Depth=0.27' Max Vel=0.67 fps Inflow=0.14 cfs 0.020 af n=0.150 L=35.0' S=0.0714 ' Capacity=4.83 cfs Outflow=0.14 cfs 0.020 af
<b>Reach 4R: Overland Flow</b>	Avg. Flow Depth=0.12' Max Vel=0.10 fps Inflow=0.05 cfs 0.005 af n=0.150 L=83.0' S=0.0047 ' Capacity=1.01 cfs Outflow=0.02 cfs 0.005 af
<b>Reach AP1: Analysis Point 1</b>	Inflow=1.29 cfs 0.112 af Outflow=1.29 cfs 0.112 af
<b>Reach AP2: Analysis Point 2</b>	Inflow=0.06 cfs 0.005 af Outflow=0.06 cfs 0.005 af
<b>Reach AP3: Analysis Point 3</b>	Inflow=0.16 cfs 0.022 af Outflow=0.16 cfs 0.022 af
<b>Reach AP4: Analysis Point 4</b>	Inflow=0.13 cfs 0.010 af Outflow=0.13 cfs 0.010 af
<b>Reach AP5: Analysis Point 5</b>	Inflow=0.13 cfs 0.010 af Outflow=0.13 cfs 0.010 af
<b>Pond 1P: Depression</b>	Peak Elev=51.31' Storage=167 cf Inflow=0.10 cfs 0.009 af Outflow=0.05 cfs 0.005 af
<b>Pond 2P: Bioretention#2</b>	Peak Elev=49.85' Storage=2,206 cf Inflow=1.08 cfs 0.117 af Discarded=0.18 cfs 0.112 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.18 cfs 0.112 af
<b>Pond 3P: Stone Drip Edge</b>	Peak Elev=55.29' Storage=20 cf Inflow=0.09 cfs 0.007 af Primary=0.08 cfs 0.007 af Secondary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.007 af
<b>Pond 4P: Subsurface Stone Infiltration #1</b>	Peak Elev=54.97' Storage=0.001 af Inflow=0.08 cfs 0.007 af Discarded=0.03 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.007 af
<b>Pond 5P: Subsurface Stone Infiltration #3</b>	Peak Elev=51.38' Storage=0.002 af Inflow=0.05 cfs 0.051 af Discarded=0.04 cfs 0.050 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.050 af
<b>Pond 6P: Bioretention#1</b>	Peak Elev=53.87' Storage=384 cf Inflow=0.56 cfs 0.040 af Discarded=0.26 cfs 0.040 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.26 cfs 0.040 af
<b>Pond 7P: Unit 6 Eco-Paver Driveway</b>	Peak Elev=50.44' Storage=131 cf Inflow=0.09 cfs 0.007 af Discarded=0.01 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af
<b>Pond 8P: Unit 7 Eco-Paver Driveway</b>	Peak Elev=51.91' Storage=97 cf Inflow=0.09 cfs 0.007 af Discarded=0.02 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.007 af
<b>Pond 9P: Unit 8 Eco-Paver Driveway</b>	Peak Elev=49.83' Storage=117 cf Inflow=0.11 cfs 0.008 af Discarded=0.03 cfs 0.008 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.008 af

**21254-PROPOSED***Type III 24-hr 2 Yr 24 Hr Rainfall=3.21"*

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**Pond 10P: Detention Pond**Peak Elev=53.06' Storage=14 cf Inflow=0.24 cfs 0.019 af  
Primary=0.24 cfs 0.019 af Secondary=0.00 cfs 0.000 af Outflow=0.24 cfs 0.019 af**Pond 11P: Subsurface Stone Infiltration #4**Peak Elev=50.59' Storage=0.006 af Inflow=0.06 cfs 0.056 af  
Discarded=0.06 cfs 0.056 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.056 af**Pond 12P: Subsurface Stone Infiltration #2**Peak Elev=51.30' Storage=0.000 af Inflow=0.00 cfs 0.000 af  
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af**Link 5L: Unit 5 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.044 af  
Primary=0.04 cfs 0.044 af**Link 6L: Unit 6 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.007 af  
Primary=0.04 cfs 0.007 af**Link 7L: Unit 7 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.036 af  
Primary=0.04 cfs 0.036 af**Link 8L: Unit 8 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.020 af  
Primary=0.04 cfs 0.020 af**Total Runoff Area = 2.382 ac Runoff Volume = 0.351 af Average Runoff Depth = 1.77"**  
**55.32% Pervious = 1.318 ac 44.68% Impervious = 1.064 ac**

**21254-PROPOSED**

Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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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

<b>Subcatchment1S: Subcatchment1S</b>	Runoff Area=29,271 sf 57.36% Impervious Runoff Depth>3.54" Flow Length=221' Tc=11.9 min CN=88 Runoff=2.24 cfs 0.198 af
<b>Subcatchment2S: Subcatchment2S</b>	Runoff Area=1,702 sf 28.08% Impervious Runoff Depth>2.78" Flow Length=67' Tc=7.6 min CN=80 Runoff=0.12 cfs 0.009 af
<b>Subcatchment3S: Subcatchment3S</b>	Runoff Area=1,237 sf 0.00% Impervious Runoff Depth>2.18" Flow Length=34' Tc=6.0 min CN=73 Runoff=0.07 cfs 0.005 af
<b>Subcatchment4S: Subcatchment4S</b>	Runoff Area=3,492 sf 34.05% Impervious Runoff Depth>2.96" Flow Length=47' Slope=0.0250 '/' Tc=9.4 min CN=82 Runoff=0.24 cfs 0.020 af
<b>Subcatchment5S: Subcatchment5S</b>	Runoff Area=3,966 sf 15.05% Impervious Runoff Depth>2.51" Flow Length=67' Tc=13.1 min CN=77 Runoff=0.21 cfs 0.019 af
<b>Subcatchment6S: Subcatchment6S</b>	Runoff Area=28,965 sf 45.86% Impervious Runoff Depth>3.24" Flow Length=133' Tc=19.6 min CN=85 Runoff=1.71 cfs 0.179 af
<b>Subcatchment7S: Unit 3 and 4</b>	Runoff Area=1,232 sf 100.00% Impervious Runoff Depth>4.63" Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af
<b>Subcatchment9S: Subcatchment9S</b>	Runoff Area=10,560 sf 57.77% Impervious Runoff Depth>3.54" Flow Length=72' Slope=0.0100 '/' Tc=6.0 min CN=88 Runoff=0.96 cfs 0.072 af
<b>Subcatchment10S: Subcatchment10S</b>	Runoff Area=1,309 sf 100.00% Impervious Runoff Depth>4.63" Tc=6.0 min CN=98 Runoff=0.14 cfs 0.012 af
<b>Subcatchment11S: Subcatchment11S</b>	Runoff Area=1,297 sf 100.00% Impervious Runoff Depth>4.63" Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af
<b>Subcatchment12S: Subcatchment12S</b>	Runoff Area=1,970 sf 66.04% Impervious Runoff Depth>3.75" Tc=6.0 min CN=90 Runoff=0.19 cfs 0.014 af
<b>Subcatchment13S: Subcatchment13S</b>	Runoff Area=1,624 sf 4.99% Impervious Runoff Depth>2.26" Flow Length=43' Tc=7.1 min CN=74 Runoff=0.09 cfs 0.007 af
<b>Subcatchment14S: Subcatchment14S</b>	Runoff Area=6,327 sf 19.36% Impervious Runoff Depth>2.69" Flow Length=50' Slope=0.0230 '/' Tc=6.0 min CN=79 Runoff=0.45 cfs 0.033 af
<b>Subcatchment16S: Subcatchment16S</b>	Runoff Area=4,616 sf 12.56% Impervious Runoff Depth>2.43" Flow Length=64' Tc=7.8 min CN=76 Runoff=0.28 cfs 0.021 af
<b>Subcatchment17S: Subcatchment17S</b>	Runoff Area=6,175 sf 14.35% Impervious Runoff Depth>2.51" Flow Length=95' Slope=0.0050 '/' Tc=16.3 min CN=77 Runoff=0.30 cfs 0.030 af
<b>Reach 1R: Swale A</b>	Avg. Flow Depth=0.31' Max Vel=0.27 fps Inflow=0.09 cfs 0.007 af n=0.150 L=100.0' S=0.0100 '/' Capacity=0.70 cfs Outflow=0.08 cfs 0.007 af Overflow=0.00 cfs 0.000 af

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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<b>Reach 3Ra: Vee Channel</b>	Avg. Flow Depth=0.45' Max Vel=0.71 fps Inflow=0.42 cfs 0.045 af n=0.150 L=50.0' S=0.0400 '/' Capacity=3.62 cfs Outflow=0.42 cfs 0.045 af
<b>Reach 3Rb: Vee Channel</b>	Avg. Flow Depth=0.40' Max Vel=0.88 fps Inflow=0.42 cfs 0.045 af n=0.150 L=35.0' S=0.0714 '/' Capacity=4.83 cfs Outflow=0.43 cfs 0.045 af
<b>Reach 4R: Overland Flow</b>	Avg. Flow Depth=0.25' Max Vel=0.17 fps Inflow=0.21 cfs 0.015 af n=0.150 L=83.0' S=0.0047 '/' Capacity=1.01 cfs Outflow=0.15 cfs 0.015 af
<b>Reach AP1: Analysis Point 1</b>	Inflow=2.24 cfs 0.198 af Outflow=2.24 cfs 0.198 af
<b>Reach AP2: Analysis Point 2</b>	Inflow=0.12 cfs 0.009 af Outflow=0.12 cfs 0.009 af
<b>Reach AP3: Analysis Point 3</b>	Inflow=0.46 cfs 0.050 af Outflow=0.46 cfs 0.050 af
<b>Reach AP4: Analysis Point 4</b>	Inflow=0.24 cfs 0.020 af Outflow=0.24 cfs 0.020 af
<b>Reach AP5: Analysis Point 5</b>	Inflow=0.28 cfs 0.021 af Outflow=0.28 cfs 0.021 af
<b>Pond 1P: Depression</b>	Peak Elev=51.31' Storage=167 cf Inflow=0.21 cfs 0.019 af Outflow=0.21 cfs 0.015 af
<b>Pond 2P: Bioretention#2</b>	Peak Elev=50.65' Storage=4,756 cf Inflow=2.01 cfs 0.219 af Discarded=0.23 cfs 0.205 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.205 af
<b>Pond 3P: Stone Drip Edge</b>	Peak Elev=55.34' Storage=25 cf Inflow=0.13 cfs 0.011 af Primary=0.12 cfs 0.011 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.011 af
<b>Pond 4P: Subsurface Stone Infiltration #1</b>	Peak Elev=55.21' Storage=0.002 af Inflow=0.12 cfs 0.011 af Discarded=0.05 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.011 af
<b>Pond 5P: Subsurface Stone Infiltration #3</b>	Peak Elev=51.38' Storage=0.002 af Inflow=0.05 cfs 0.051 af Discarded=0.04 cfs 0.050 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.050 af
<b>Pond 6P: Bioretention#1</b>	Peak Elev=54.43' Storage=787 cf Inflow=0.96 cfs 0.072 af Discarded=0.32 cfs 0.072 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.32 cfs 0.072 af
<b>Pond 7P: Unit 6 Eco-Paver Driveway</b>	Peak Elev=51.73' Storage=201 cf Inflow=0.14 cfs 0.012 af Discarded=0.03 cfs 0.012 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.012 af
<b>Pond 8P: Unit 7 Eco-Paver Driveway</b>	Peak Elev=52.98' Storage=130 cf Inflow=0.14 cfs 0.011 af Discarded=0.06 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.011 af
<b>Pond 9P: Unit 8 Eco-Paver Driveway</b>	Peak Elev=50.37' Storage=209 cf Inflow=0.19 cfs 0.014 af Discarded=0.05 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.014 af

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**Pond 10P: Detention Pond**

Peak Elev=53.10' Storage=23 cf Inflow=0.51 cfs 0.040 af  
Primary=0.51 cfs 0.039 af Secondary=0.00 cfs 0.000 af Outflow=0.51 cfs 0.039 af

**Pond 11P: Subsurface Stone Infiltration #4**

Peak Elev=50.59' Storage=0.006 af Inflow=0.06 cfs 0.056 af  
Discarded=0.06 cfs 0.056 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.056 af

**Pond 12P: Subsurface Stone Infiltration #2**

Peak Elev=51.30' Storage=0.000 af Inflow=0.00 cfs 0.000 af  
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Link 5L: Unit 5 Sump Pump**

Manual Hydrograph Inflow=0.04 cfs 0.044 af  
Primary=0.04 cfs 0.044 af

**Link 6L: Unit 6 Sump Pump**

Manual Hydrograph Inflow=0.04 cfs 0.007 af  
Primary=0.04 cfs 0.007 af

**Link 7L: Unit 7 Sump Pump**

Manual Hydrograph Inflow=0.04 cfs 0.036 af  
Primary=0.04 cfs 0.036 af

**Link 8L: Unit 8 Sump Pump**

Manual Hydrograph Inflow=0.04 cfs 0.020 af  
Primary=0.04 cfs 0.020 af

**Total Runoff Area = 2.382 ac Runoff Volume = 0.641 af Average Runoff Depth = 3.23"**  
**55.32% Pervious = 1.318 ac 44.68% Impervious = 1.064 ac**

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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**Summary for Subcatchment 1S: Subcatchment 1S**

Runoff = 2.24 cfs @ 12.16 hrs, Volume= 0.198 af, Depth> 3.54"  
 Routed to Reach AP1 : Analysis Point 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 Rainfall=4.87"

Area (sf)	CN	Description
14,174	98	Paved parking, HSG C
2,616	98	Roofs, HSG C
12,481	74	>75% Grass cover, Good, HSG C
29,271	88	Weighted Average
12,481		42.64% Pervious Area
16,790		57.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0220	0.18		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.3	15	0.0167	0.90		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
0.2	22	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
2.0	84	0.0100	0.70		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.9	221	Total			

**Summary for Subcatchment 2S: Subcatchment 2S**

Runoff = 0.12 cfs @ 12.11 hrs, Volume= 0.009 af, Depth> 2.78"  
 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 Rainfall=4.87"

Area (sf)	CN	Description
836	74	>75% Grass cover, Good, HSG C
478	98	Roofs, HSG C
388	70	Woods, Good, HSG C
1,702	80	Weighted Average
1,224		71.92% Pervious Area
478		28.08% Impervious Area

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	26	0.0310	0.16		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.3	16	0.0750	0.20		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.7	13	0.1900	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
1.3	7	0.1140	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.5	5	0.5000	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
7.6	67	Total			

**Summary for Subcatchment 3S: Subcatchment 3S**

Runoff = 0.07 cfs @ 12.10 hrs, Volume= 0.005 af, Depth> 2.18"  
 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 Rainfall=4.87"

Area (sf)	CN	Description
951	74	>75% Grass cover, Good, HSG C
286	70	Woods, Good, HSG C
1,237	73	Weighted Average
1,237		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	17	0.3300	0.17		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.5	11	0.3300	0.34		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.0	6	0.1670	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
3.2	34	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 4S: Subcatchment 4S**

Runoff = 0.24 cfs @ 12.13 hrs, Volume= 0.020 af, Depth> 2.96"  
 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 Rainfall=4.87"



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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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Area (sf)	CN	Description
1,717	74	>75% Grass cover, Good, HSG C
453	98	Paved parking, HSG C
736	98	Roofs, HSG C
586	70	Woods, Good, HSG C
3,492	82	Weighted Average
2,303		65.95% Pervious Area
1,189		34.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	20	0.0250	0.14		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
6.9	27	0.0250	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
9.4	47	Total			

**Summary for Subcatchment 5S: Subcatchment 5S**

Runoff = 0.21 cfs @ 12.19 hrs, Volume= 0.019 af, Depth> 2.51"  
 Routed to Pond 1P : Depression

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 Rainfall=4.87"

Area (sf)	CN	Description
597	98	Roofs, HSG C
2,345	74	>75% Grass cover, Good, HSG C
1,024	70	Woods, Good, HSG C
3,966	77	Weighted Average
3,369		84.95% Pervious Area
597		15.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
10.3	40	0.0200	0.06		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.1	7	0.1400	1.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
13.1	67	Total			

**Summary for Subcatchment 6S: Subcatchment 6S**

Runoff = 1.71 cfs @ 12.27 hrs, Volume= 0.179 af, Depth> 3.24"  
 Routed to Pond 2P : Bioretention #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 Rainfall=4.87"

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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Area (sf)	CN	Description
8,011	98	Paved parking, HSG C
5,272	98	Roofs, HSG C
14,477	74	>75% Grass cover, Good, HSG C
1,205	70	Woods, Good, HSG C
28,965	85	Weighted Average
15,682		54.14% Pervious Area
13,283		45.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	22	0.0450	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
16.6	78	0.0230	0.08		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.4	11	0.0100	0.50		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	22	0.0100	0.70		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
19.6	133	Total			

**Summary for Subcatchment 7S: Unit 3 and 4**

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 4.63"  
Routed to Pond 3P : 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 Rainfall=4.87"

Area (sf)	CN	Description
984	98	Roofs, HSG C
248	98	Water Surface, HSG C
1,232	98	Weighted Average
1,232		100.00% Impervious Area

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

**Summary for Subcatchment 9S: Subcatchment 9S**

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 0.072 af, Depth> 3.54"  
Routed to Pond 6P : Bioretention #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 Rainfall=4.87"

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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Area (sf)	CN	Description
4,178	98	Paved parking, HSG C
1,922	98	Roofs, HSG C
4,331	74	>75% Grass cover, Good, HSG C
129	70	Woods, Good, HSG C
10,560	88	Weighted Average
4,460		42.23% Pervious Area
6,100		57.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	14	0.0100	0.09		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.8	45	0.0100	0.89		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.21"
0.3	13	0.0100	0.70		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
3.8	72	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 10S: Subcatchment 10S**

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 4.63"  
 Routed to Pond 7P : Unit 6 Eco-Paver Driveway

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 Rainfall=4.87"

Area (sf)	CN	Description
876	98	Roofs, HSG C
433	98	Paved parking, HSG C
1,309	98	Weighted Average
1,309		100.00% Impervious Area

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

**Summary for Subcatchment 11S: Subcatchment 11S**

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 4.63"  
 Routed to Pond 8P : Unit 7 Eco-Paver Driveway

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 Rainfall=4.87"

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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Area (sf)	CN	Description
876	98	Roofs, HSG C
421	98	Paved parking, HSG C
1,297	98	Weighted Average
1,297		100.00% Impervious Area

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

**Summary for Subcatchment 12S: Subcatchment 12S**

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af, Depth> 3.75"  
 Routed to Pond 9P : Unit 8 Eco-Paver Driveway

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 Rainfall=4.87"

Area (sf)	CN	Description
876	98	Roofs, HSG C
425	98	Paved parking, HSG C
669	74	>75% Grass cover, Good, HSG C
1,970	90	Weighted Average
669		33.96% Pervious Area
1,301		66.04% Impervious Area

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

**Summary for Subcatchment 13S: Subcatchment 13S**

Runoff = 0.09 cfs @ 12.11 hrs, Volume= 0.007 af, Depth> 2.26"  
 Routed to Reach 1R : Swale A

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 Rainfall=4.87"

Area (sf)	CN	Description
1,013	74	>75% Grass cover, Good, HSG C
530	70	Woods, Good, HSG C
81	98	Roofs, HSG C
1,624	74	Weighted Average
1,543		95.01% Pervious Area
81		4.99% Impervious Area

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	28	0.0210	0.13		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
3.3	10	0.0210	0.05		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.3	5	0.3300	0.29		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
7.1	43	Total			

**Summary for Subcatchment 14S: Subcatchment 14S**

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.033 af, Depth> 2.69"  
Routed to Pond 10P : Detention 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 Rainfall=4.87"

Area (sf)	CN	Description
5,067	74	>75% Grass cover, Good, HSG C
35	70	Woods, Good, HSG C
1,225	98	Roofs, HSG C
6,327	79	Weighted Average
5,102		80.64% Pervious Area
1,225		19.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0230	0.16		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
5.3	50	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 16S: Subcatchment 16S**

Runoff = 0.28 cfs @ 12.11 hrs, Volume= 0.021 af, Depth> 2.43"  
Routed to Reach AP5 : Analysis Point 5

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 Rainfall=4.87"

Area (sf)	CN	Description
3,173	74	>75% Grass cover, Good, HSG C
863	70	Woods, Good, HSG C
580	98	Roofs, HSG C
4,616	76	Weighted Average
4,036		87.44% Pervious Area
580		12.56% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	41	0.0120	0.12		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.6	12	0.3300	0.34		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.6	5	0.0500	0.14		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.7	6	0.3300	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
7.8	64	Total			

**Summary for Subcatchment 17S: Subcatchment 17S**

Runoff = 0.30 cfs @ 12.23 hrs, Volume= 0.030 af, Depth> 2.51"  
 Routed to Reach 3Ra : Vee Channel

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 Rainfall=4.87"

Area (sf)	CN	Description
3,861	74	>75% Grass cover, Good, HSG C
1,428	70	Woods, Good, HSG C
301	98	Paved parking, HSG C
585	98	Roofs, HSG C
6,175	77	Weighted Average
5,289		85.65% Pervious Area
886		14.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	95	0.0050	0.10		<b>Sheet Flow, Longest path to enter the Vee Channel</b> Grass: Short n= 0.150 P2= 3.21"

**Summary for Reach 1R: Swale A**

Inflow Area = 0.037 ac, 4.99% Impervious, Inflow Depth > 2.26" for 10 Yr 24 Hr event  
 Inflow = 0.09 cfs @ 12.11 hrs, Volume= 0.007 af  
 Outflow = 0.08 cfs @ 12.17 hrs, Volume= 0.007 af, Atten= 18%, Lag= 4.0 min  
 Routed to Pond 10P : Detention Pond  
 Overflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 3P : Stone Drip Edge

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Max. Velocity= 0.27 fps, Min. Travel Time= 6.1 min  
 Avg. Velocity = 0.12 fps, Avg. Travel Time= 13.4 min

Peak Storage= 28 cf @ 12.17 hrs  
 Average Depth at Peak Storage= 0.31', Surface Width= 1.84'  
 Bank-Full Depth= 0.70' Flow Area= 1.5 sf, Capacity= 0.70 cfs  
 Any excess flow will be diverted to the secondary overflow

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Type III 24-hr 10 Yr 24 Hr Rainfall=4.87"

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0.00' x 0.70' deep channel, n= 0.150 Sheet flow over Short Grass  
Side Slope Z-value= 3.0 '/' Top Width= 4.20'  
Length= 100.0' Slope= 0.0100 '/'  
Inlet Invert= 56.00', Outlet Invert= 55.00'

**Summary for Reach 3Ra: Vee Channel**

[62] Hint: Exceeded Reach 4R OUTLET depth by 0.33' @ 12.10 hrs

Inflow Area = 0.233 ac, 14.62% Impervious, Inflow Depth > 2.30" for 10 Yr 24 Hr event  
Inflow = 0.42 cfs @ 12.28 hrs, Volume= 0.045 af  
Outflow = 0.42 cfs @ 12.30 hrs, Volume= 0.045 af, Atten= 0%, Lag= 1.1 min  
Routed to Reach 3Rb : Vee Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 0.71 fps, Min. Travel Time= 1.2 min  
Avg. Velocity = 0.33 fps, Avg. Travel Time= 2.5 min

Peak Storage= 30 cf @ 12.30 hrs  
Average Depth at Peak Storage= 0.45', Surface Width= 2.69'  
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 3.62 cfs

0.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass  
Side Slope Z-value= 3.0 '/' Top Width= 6.00'  
Length= 50.0' Slope= 0.0400 '/'  
Inlet Invert= 51.00', Outlet Invert= 49.00'

**Summary for Reach 3Rb: Vee Channel**

[61] Hint: Exceeded Reach 3Ra outlet invert by 0.40' @ 12.30 hrs

Inflow Area = 0.233 ac, 14.62% Impervious, Inflow Depth > 2.30" for 10 Yr 24 Hr event  
Inflow = 0.42 cfs @ 12.30 hrs, Volume= 0.045 af  
Outflow = 0.43 cfs @ 12.31 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.5 min  
Routed to Reach AP3 : Analysis Point 3

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

Max. Velocity= 0.88 fps, Min. Travel Time= 0.7 min

Avg. Velocity = 0.41 fps, Avg. Travel Time= 1.4 min

Peak Storage= 17 cf @ 12.31 hrs

Average Depth at Peak Storage= 0.40' , Surface Width= 2.41'

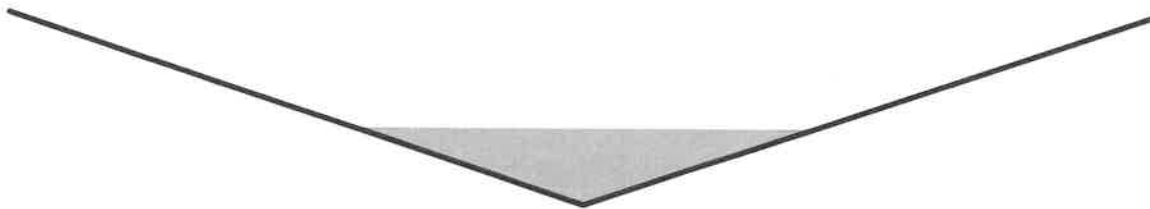
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 4.83 cfs

0.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 3.0 '/' Top Width= 6.00'

Length= 35.0' Slope= 0.0714 '/'

Inlet Invert= 49.00', Outlet Invert= 46.50'

**Summary for Reach 4R: Overland Flow**

[80] Warning: Exceeded Pond 1P by 0.89' @ 0.00 hrs (0.55 cfs 2.092 af)

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth &gt; 2.00" for 10 Yr 24 Hr event

Inflow = 0.21 cfs @ 12.21 hrs, Volume= 0.015 af

Outflow = 0.15 cfs @ 12.36 hrs, Volume= 0.015 af, Atten= 26%, Lag= 8.9 min

Routed to Reach 3Ra : Vee Channel

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

Max. Velocity= 0.17 fps, Min. Travel Time= 8.2 min

Avg. Velocity = 0.08 fps, Avg. Travel Time= 16.4 min

Peak Storage= 76 cf @ 12.36 hrs

Average Depth at Peak Storage= 0.25' , Surface Width= 7.40'

Bank-Full Depth= 0.50' Flow Area= 3.8 sf, Capacity= 1.01 cfs

0.00' x 0.50' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 15.0 '/' Top Width= 15.00'

Length= 83.0' Slope= 0.0047 '/'

Inlet Invert= 51.39', Outlet Invert= 51.00'



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**Summary for Reach AP1: Analysis Point 1**

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

Inflow Area = 0.914 ac, 57.47% Impervious, Inflow Depth > 2.60" for 10 Yr 24 Hr event  
Inflow = 2.24 cfs @ 12.16 hrs, Volume= 0.198 af  
Outflow = 2.24 cfs @ 12.16 hrs, Volume= 0.198 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 = 0.039 ac, 28.08% Impervious, Inflow Depth > 2.78" for 10 Yr 24 Hr event  
Inflow = 0.12 cfs @ 12.11 hrs, Volume= 0.009 af  
Outflow = 0.12 cfs @ 12.11 hrs, Volume= 0.009 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 AP3: Analysis Point 3**

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

Inflow Area = 1.242 ac, 39.21% Impervious, Inflow Depth > 0.48" for 10 Yr 24 Hr event  
Inflow = 0.46 cfs @ 12.30 hrs, Volume= 0.050 af  
Outflow = 0.46 cfs @ 12.30 hrs, Volume= 0.050 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 = 0.080 ac, 34.05% Impervious, Inflow Depth > 2.96" for 10 Yr 24 Hr event  
Inflow = 0.24 cfs @ 12.13 hrs, Volume= 0.020 af  
Outflow = 0.24 cfs @ 12.13 hrs, Volume= 0.020 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 AP5: Analysis Point 5**

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

Inflow Area = 0.106 ac, 12.56% Impervious, Inflow Depth > 2.43" for 10 Yr 24 Hr event  
Inflow = 0.28 cfs @ 12.11 hrs, Volume= 0.021 af  
Outflow = 0.28 cfs @ 12.11 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

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

**Summary for Pond 1P: Depression**

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 2.51" for 10 Yr 24 Hr event  
 Inflow = 0.21 cfs @ 12.19 hrs, Volume= 0.019 af  
 Outflow = 0.21 cfs @ 12.21 hrs, Volume= 0.015 af, Atten= 1%, Lag= 1.7 min  
 Primary = 0.21 cfs @ 12.21 hrs, Volume= 0.015 af  
 Routed to Reach 4R : Overland Flow

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

Peak Elev= 51.31' @ 12.15 hrs Surf.Area= 593 sf Storage= 167 cf

Plug-Flow detention time= 114.8 min calculated for 0.015 af (80% of inflow)

Center-of-Mass det. time= 37.3 min ( 873.3 - 836.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	50.50'	167 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
50.50	45	30.0	0	0	45
51.00	177	68.0	52	52	342
51.30	593	121.0	109	161	1,140
51.31	593	121.0	6	167	1,141

Device	Routing	Invert	Outlet Devices											
#0	Primary	51.31'	<b>Automatic Storage Overflow</b> (Discharged without head)											
#1	Primary	51.30'	<b>8.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b>											
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00	
				2.50	3.00	3.50								
			Coef. (English)	2.54	2.61	2.61	2.60	2.66	2.70	2.77	2.89	2.88		
				2.85	3.07	3.20	3.32							

Primary OutFlow Max=0.00 cfs @ 12.21 hrs HW=51.31' TW=51.58' (Dynamic Tailwater)

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

**Summary for Pond 2P: Bioretention #2**

Inflow Area = 0.981 ac, 46.18% Impervious, Inflow Depth > 2.68" for 10 Yr 24 Hr event  
 Inflow = 2.01 cfs @ 12.25 hrs, Volume= 0.219 af  
 Outflow = 0.23 cfs @ 13.67 hrs, Volume= 0.205 af, Atten= 89%, Lag= 85.4 min  
 Discarded = 0.23 cfs @ 13.67 hrs, Volume= 0.205 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Reach AP3 : Analysis Point 3  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Reach 3Ra : Vee Channel

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

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Peak Elev= 50.65' @ 13.67 hrs Surf.Area= 3,523 sf Storage= 4,756 cf

Plug-Flow detention time= 238.3 min calculated for 0.204 af (93% of inflow)

Center-of-Mass det. time= 204.2 min ( 1,025.2 - 821.0 )

Volume	Invert	Avail.Storage	Storage Description			
#1	46.41'	8,120 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
46.41	1,080	138.0	0.0	0	0	1,080
46.42	1,080	138.0	40.0	4	4	1,081
47.74	1,080	138.0	40.0	570	575	1,264
47.75	1,080	138.0	15.0	2	576	1,265
49.24	1,080	138.0	15.0	241	818	1,471
49.25	1,080	138.0	100.0	11	828	1,472
49.50	2,550	271.0	100.0	441	1,269	5,801
50.00	2,971	283.0	100.0	1,379	2,648	6,348
51.00	3,839	301.0	100.0	3,396	6,044	7,234
51.50	4,298	310.0	100.0	2,033	8,077	7,697
51.51	4,331	315.0	100.0	43	8,120	7,946

Device	Routing	Invert	Outlet Devices											
#1	Secondary	51.50'	<b>100.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b>											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00											
			2.50 3.00 3.50											
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88											
			2.85 3.07 3.20 3.32											
#2	Primary	51.00'	<b>2.0' long + 3.0 ' SideZ x 28.0' breadth Broad-Crested Rectangular Weir</b>											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60											
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63											
#3	Discarded	46.41'	<b>0.300 in/hr Exfiltration over Surface area</b>											
			Conductivity to Groundwater Elevation = 46.25' Phase-In= 0.01'											

**Discarded OutFlow** Max=0.23 cfs @ 13.67 hrs HW=50.65' (Free Discharge)↑**3=Exfiltration** ( Controls 0.23 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=46.41' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir**( Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=46.41' TW=51.00' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**( Controls 0.00 cfs)**Summary for Pond 3P: Stone Drip Edge**

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Inflow Area = 0.028 ac, 100.00% Impervious, Inflow Depth > 4.63" for 10 Yr 24 Hr event  
 Inflow = 0.13 cfs @ 12.09 hrs, Volume= 0.011 af  
 Outflow = 0.12 cfs @ 12.12 hrs, Volume= 0.011 af, Atten= 5%, Lag= 1.7 min  
 Primary = 0.12 cfs @ 12.12 hrs, Volume= 0.011 af  
 Routed to Pond 4P : Subsurface Stone Infiltration #1  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 10P : Detention Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 55.34' @ 12.12 hrs Surf.Area= 248 sf Storage= 25 cf

Plug-Flow detention time= 14.0 min calculated for 0.011 af (99% of inflow)  
 Center-of-Mass det. time= 9.5 min ( 757.5 - 748.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	55.09'	93 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.09	-	248	0.0	0
55.10	248	40.0	1	1
56.00	248	40.0	89	90
56.01	248	100.0	2	93

Device	Routing	Invert	Outlet Devices
#1	Primary	55.10'	<b>6.0" Round Culvert</b> L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.10' / 54.98' S= 0.0150 ' S= 0.0150 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	55.10'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Secondary	56.00'	<b>72.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> 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=0.12 cfs @ 12.12 hrs HW=55.34' TW=55.01' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 0.12 cfs @ 1.31 fps)

↑ **2=Orifice/Grate** (Passes 0.12 cfs of 0.15 cfs potential flow)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=55.09' TW=53.00' (Dynamic Tailwater)

↑ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

### Summary for Pond 4P: Subsurface Stone Infiltration #1

Inflow Area = 0.028 ac, 100.00% Impervious, Inflow Depth > 4.60" for 10 Yr 24 Hr event  
 Inflow = 0.12 cfs @ 12.12 hrs, Volume= 0.011 af  
 Outflow = 0.05 cfs @ 12.37 hrs, Volume= 0.011 af, Atten= 62%, Lag= 15.3 min  
 Discarded = 0.05 cfs @ 12.37 hrs, Volume= 0.011 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 10P : Detention Pond

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 55.21' @ 12.37 hrs Surf.Area= 0.009 ac Storage= 0.002 af

Plug-Flow detention time= 17.6 min calculated for 0.011 af (100% of inflow)  
 Center-of-Mass det. time= 17.3 min ( 774.8 - 757.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	54.60'	0.004 af	<b>15.00'W x 27.00'L x 1.01'H Prismatic</b> 0.009 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.60'	<b>0.890 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 54.47' Phase-In= 0.01'
#2	Primary	55.60'	<b>20.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> 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

**Discarded OutFlow** Max=0.05 cfs @ 12.37 hrs HW=55.21' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.05 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=54.60' TW=53.00' (Dynamic Tailwater)  
 ↑2=Broad-Crested Rectangular Weir( Controls 0.00 cfs)

**Summary for Pond 5P: Subsurface Stone Infiltration #3**

Inflow = 0.05 cfs @ 2.01 hrs, Volume= 0.051 af  
 Outflow = 0.04 cfs @ 15.05 hrs, Volume= 0.050 af, Atten= 21%, Lag= 782.5 min  
 Discarded = 0.04 cfs @ 15.05 hrs, Volume= 0.050 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 2P : Bioretention #2  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Reach AP5 : Analysis Point 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 51.38' @ 15.05 hrs Surf.Area= 0.010 ac Storage= 0.002 af

Plug-Flow detention time= 41.9 min calculated for 0.050 af (99% of inflow)  
 Center-of-Mass det. time= 34.1 min ( 753.2 - 719.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	50.80'	0.006 af	<b>10.00'W x 45.00'L x 1.41'H Prismatic</b> 0.015 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	50.80'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 50.75' Phase-In= 0.01'
#2	Secondary	52.20'	<b>45.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00

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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  
 #3 Device 4 51.50' **6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads  
 #4 Primary 51.40' **6.0" Round Culvert**  
 L= 12.0' CPP, projecting, no headwall, Ke= 0.900  
 Inlet / Outlet Invert= 51.40' / 50.23' S= 0.0975 ' S= 0.0975 ' Cc= 0.900  
 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

**Discarded OutFlow** Max=0.04 cfs @ 15.05 hrs HW=51.38' (Free Discharge)

1=Exfiltration ( Controls 0.04 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=50.80' TW=46.41' (Dynamic Tailwater)

4=Culvert ( Controls 0.00 cfs)

3=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=50.80' TW=0.00' (Dynamic Tailwater)

2=Broad-Crested Rectangular Weir( Controls 0.00 cfs)

**Summary for Pond 6P: Bioretention #1**

Inflow Area = 0.242 ac, 57.77% Impervious, Inflow Depth > 3.54" for 10 Yr 24 Hr event  
 Inflow = 0.96 cfs @ 12.09 hrs, Volume= 0.072 af  
 Outflow = 0.32 cfs @ 12.39 hrs, Volume= 0.072 af, Atten= 67%, Lag= 17.9 min  
 Discarded = 0.32 cfs @ 12.39 hrs, Volume= 0.072 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 12P : Subsurface Stone Infiltration #2  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 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

Peak Elev= 54.43' @ 12.39 hrs Surf.Area= 965 sf Storage= 787 cf

Plug-Flow detention time= 27.4 min calculated for 0.072 af (100% of inflow)

Center-of-Mass det. time= 27.1 min ( 825.4 - 798.4 )

Volume	Invert	Avail.Storage	Storage Description			
#1	51.24'	1,473 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.24	502	118.0	0.0	0	0	502
51.25	502	118.0	40.0	2	2	503
52.24	502	118.0	40.0	199	201	620
52.25	502	118.0	15.0	1	202	621
53.74	502	118.0	15.0	112	314	797
53.75	502	118.0	100.0	5	319	798
54.00	595	130.0	100.0	137	456	1,037
54.50	1,035	224.0	100.0	402	858	3,687
55.00	1,376	234.0	100.0	601	1,459	4,069
55.01	1,376	234.0	100.0	14	1,473	4,071

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Device	Routing	Invert	Outlet Devices
#1	Primary	52.00'	<b>6.0" Round Culvert</b> L= 6.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 52.00' / 51.90' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	55.00'	<b>30.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Device 1	54.70'	<b>18.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Discarded	51.24'	<b>0.890 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 51.13' Phase-In= 0.01'

**Discarded OutFlow** Max=0.32 cfs @ 12.39 hrs HW=54.43' (Free Discharge)↑**4=Exfiltration** ( Controls 0.32 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=51.24' TW=51.30' (Dynamic Tailwater)↑**1=Culvert** ( Controls 0.00 cfs)↑**3=Orifice/Grate** ( Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=51.24' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir**( Controls 0.00 cfs)**Summary for Pond 7P: Unit 6 Eco-Paver Driveway**

Inflow Area = 0.030 ac, 100.00% Impervious, Inflow Depth > 4.63" for 10 Yr 24 Hr event  
 Inflow = 0.14 cfs @ 12.09 hrs, Volume= 0.012 af  
 Outflow = 0.03 cfs @ 12.53 hrs, Volume= 0.012 af, Atten= 81%, Lag= 26.5 min  
 Discarded = 0.03 cfs @ 12.53 hrs, Volume= 0.012 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 2P : Bioretention #2

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

Peak Elev= 51.73' @ 12.53 hrs Surf.Area= 421 sf Storage= 201 cf

Plug-Flow detention time= 120.3 min calculated for 0.012 af (100% of inflow)

Center-of-Mass det. time= 118.6 min ( 866.7 - 748.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	49.66'	338 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
49.66	421	0.0	0	0
49.67	421	40.0	2	2
50.49	421	40.0	138	140
50.50	421	5.0	0	140
51.49	421	5.0	21	161
51.50	421	40.0	2	163
52.49	421	40.0	167	329
52.50	421	100.0	4	333
52.51	421	100.0	4	338

Device	Routing	Invert	Outlet Devices
#1	Primary	52.50'	<b>100.0' long x 50.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	49.66'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 49.40' Phase-In= 0.01'

**Discarded OutFlow** Max=0.03 cfs @ 12.53 hrs HW=51.73' (Free Discharge)

└─2=Exfiltration ( Controls 0.03 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=49.66' TW=46.41' (Dynamic Tailwater)

└─1=Broad-Crested Rectangular Weir( Controls 0.00 cfs)

**Summary for Pond 8P: Unit 7 Eco-Paver Driveway**

Inflow Area = 0.030 ac, 100.00% Impervious, Inflow Depth > 4.63" for 10 Yr 24 Hr event  
 Inflow = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af  
 Outflow = 0.06 cfs @ 12.26 hrs, Volume= 0.011 af, Atten= 54%, Lag= 10.6 min  
 Discarded = 0.06 cfs @ 12.26 hrs, Volume= 0.011 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 2P : Bioretention #2

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

Peak Elev= 52.98' @ 12.26 hrs Surf.Area= 421 sf Storage= 130 cf

Plug-Flow detention time= 41.2 min calculated for 0.011 af (100% of inflow)

Center-of-Mass det. time= 40.2 min ( 788.2 - 748.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	51.33'	225 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)



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Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
51.33	421	0.0	0	0
51.34	421	40.0	2	2
51.91	421	40.0	96	98
51.92	421	5.0	0	98
52.91	421	5.0	21	119
52.92	421	40.0	2	120
53.49	421	40.0	96	216
53.50	421	100.0	4	221
53.51	421	100.0	4	225

Device	Routing	Invert	Outlet Devices
#1	Primary	53.50'	<b>100.0' long x 50.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	51.33'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 51.25' Phase-In= 0.01'

**Discarded OutFlow** Max=0.06 cfs @ 12.26 hrs HW=52.97' (Free Discharge)

↑2=Exfiltration ( Controls 0.06 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=51.33' TW=46.41' (Dynamic Tailwater)

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

**Summary for Pond 9P: Unit 8 Eco-Paver Driveway**

Inflow Area = 0.045 ac, 66.04% Impervious, Inflow Depth > 3.75" for 10 Yr 24 Hr event  
 Inflow = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af  
 Outflow = 0.05 cfs @ 12.46 hrs, Volume= 0.014 af, Atten= 74%, Lag= 22.5 min  
 Discarded = 0.05 cfs @ 12.46 hrs, Volume= 0.014 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 2P : Bioretention #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 50.37' @ 12.46 hrs Surf.Area= 421 sf Storage= 209 cf

Plug-Flow detention time= 56.1 min calculated for 0.014 af (100% of inflow)  
 Center-of-Mass det. time= 55.0 min ( 846.2 - 791.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	49.13'	393 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
49.13	421	0.0	0	0
49.14	421	40.0	2	2
50.71	421	40.0	264	266
50.72	421	5.0	0	266
51.71	421	5.0	21	287
51.72	421	40.0	2	289
52.29	421	40.0	96	385
52.30	421	100.0	4	389
52.31	421	100.0	4	393

Device	Routing	Invert	Outlet Devices
#1	Primary	52.30'	<b>100.0' long x 50.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	49.13'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 49.05' Phase-In= 0.01'

Discarded OutFlow Max=0.05 cfs @ 12.46 hrs HW=50.37' (Free Discharge)

↑2=Exfiltration ( Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=49.13' TW=46.41' (Dynamic Tailwater)

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

**Summary for Pond 10P: Detention Pond**

Inflow Area = 0.211 ac, 27.64% Impervious, Inflow Depth > 2.25" for 10 Yr 24 Hr event  
 Inflow = 0.51 cfs @ 12.10 hrs, Volume= 0.040 af  
 Outflow = 0.51 cfs @ 12.11 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.5 min  
 Primary = 0.51 cfs @ 12.11 hrs, Volume= 0.039 af  
 Routed to Pond 2P : Bioretention #2  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Reach AP5 : Analysis Point 5

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

Peak Elev= 53.10' @ 12.11 hrs Surf.Area= 238 sf Storage= 23 cf

Plug-Flow detention time= 1.5 min calculated for 0.039 af (100% of inflow)

Center-of-Mass det. time= 1.1 min ( 830.0 - 828.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	53.00'	337 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
53.00	213	0	0
54.00	451	332	332
54.01	451	5	337

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Device	Routing	Invert	Outlet Devices
#1	Primary	50.50'	<b>8.0" Round Culvert</b> L= 117.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 50.50' / 49.80' S= 0.0060 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	53.00'	<b>18.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Secondary	54.00'	<b>6.0' long x 4.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

**Primary OutFlow** Max=0.50 cfs @ 12.11 hrs HW=53.10' TW=49.63' (Dynamic Tailwater)

1=Culvert (Passes 0.50 cfs of 1.59 cfs potential flow)

2=Orifice/Grate (Weir Controls 0.50 cfs @ 1.04 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=53.00' TW=0.00' (Dynamic Tailwater)

3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 11P: Subsurface Stone Infiltration #4**

Inflow = 0.06 cfs @ 6.13 hrs, Volume= 0.056 af  
 Outflow = 0.06 cfs @ 8.24 hrs, Volume= 0.056 af, Atten= 4%, Lag= 127.0 min  
 Discarded = 0.06 cfs @ 8.24 hrs, Volume= 0.056 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 2P : Bioretention #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 50.59' @ 8.24 hrs Surf.Area= 0.010 ac Storage= 0.006 af

Plug-Flow detention time= 69.2 min calculated for 0.056 af (100% of inflow)  
 Center-of-Mass det. time= 69.1 min ( 623.2 - 554.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	49.20'	0.009 af	<b>10.00'W x 45.00'L x 2.21'H Prismatic</b> 0.023 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.20'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 49.12' Phase-In= 0.01'
#2	Primary	51.40'	<b>45.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> 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
#3	Device 4	50.70'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	50.60'	<b>6.0" Round Culvert</b> L= 42.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 50.60' / 50.08' S= 0.0124 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

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**Discarded OutFlow** Max=0.06 cfs @ 8.24 hrs HW=50.59' (Free Discharge)↑**1=Exfiltration** ( Controls 0.06 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=49.20' TW=46.41' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)↑**4=Culvert** ( Controls 0.00 cfs)↑**3=Orifice/Grate** ( Controls 0.00 cfs)**Summary for Pond 12P: Subsurface Stone Infiltration #2**

Inflow Area = 0.242 ac, 57.77% Impervious, Inflow Depth = 0.00" for 10 Yr 24 Hr event

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

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

Peak Elev= 51.30' @ 0.00 hrs Surf.Area= 0.008 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	51.30'	0.007 af	<b>17.00'W x 20.00'L x 2.21'H Prismatoid</b> 0.017 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	51.30'	<b>0.890 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 51.20' Phase-In= 0.01'
#2	Primary	53.50'	<b>14.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> 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

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=51.30' (Free Discharge)↑**1=Exfiltration** ( Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=51.30' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Link 5L: Unit 5 Sump Pump**

Factor of safety of 2 provided

Inflow	=	0.04 cfs @ 13.00 hrs, Volume=	0.044 af
Primary	=	0.04 cfs @ 13.00 hrs, Volume=	0.044 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 5P : Subsurface Stone Infiltration #3			

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Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

29 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, cfs =

0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03
0.03	0.03	0.03	0.04	0.04	0.04	0.03	0.03	0.03	0.03
0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	

**Summary for Link 6L: Unit 6 Sump Pump**

Factor of safety of 2 provided

---

Inflow = 0.04 cfs @ 2.00 hrs, Volume= 0.007 af  
 Primary = 0.04 cfs @ 2.00 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min  
 Routed to Pond 5P : Subsurface Stone Infiltration #3

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

5 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, cfs =

0.00	0.02	0.04	0.02	0.00
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**Summary for Link 7L: Unit 7 Sump Pump**

Factor of safety of 2 provided

---

Inflow = 0.04 cfs @ 10.00 hrs, Volume= 0.036 af  
 Primary = 0.04 cfs @ 10.00 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min  
 Routed to Pond 11P : Subsurface Stone Infiltration #4

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

23 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, cfs =

0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.03
0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.01	0.01
0.01	0.00	0.00							

**Summary for Link 8L: Unit 8 Sump Pump**

Factor of safety of 2 provided

---

Inflow = 0.04 cfs @ 6.00 hrs, Volume= 0.020 af  
 Primary = 0.04 cfs @ 6.00 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min  
 Routed to Pond 11P : Subsurface Stone Infiltration #4

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

16 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, cfs =

0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.03	0.03	0.02
0.01	0.01	0.00	0.00	0.00	0.00				

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Type III 24-hr 25 Yr 24 Hr Rainfall=6.17"

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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

<b>Subcatchment1S: Subcatchment1S</b>	Runoff Area=29,271 sf 57.36% Impervious Runoff Depth>4.78" Flow Length=221' Tc=11.9 min CN=88 Runoff=2.99 cfs 0.268 af
<b>Subcatchment2S: Subcatchment2S</b>	Runoff Area=1,702 sf 28.08% Impervious Runoff Depth>3.93" Flow Length=67' Tc=7.6 min CN=80 Runoff=0.17 cfs 0.013 af
<b>Subcatchment3S: Subcatchment3S</b>	Runoff Area=1,237 sf 0.00% Impervious Runoff Depth>3.23" Flow Length=34' Tc=6.0 min CN=73 Runoff=0.11 cfs 0.008 af
<b>Subcatchment4S: Subcatchment4S</b>	Runoff Area=3,492 sf 34.05% Impervious Runoff Depth>4.14" Flow Length=47' Slope=0.0250 '/' Tc=9.4 min CN=82 Runoff=0.34 cfs 0.028 af
<b>Subcatchment5S: Subcatchment5S</b>	Runoff Area=3,966 sf 15.05% Impervious Runoff Depth>3.62" Flow Length=67' Tc=13.1 min CN=77 Runoff=0.31 cfs 0.027 af
<b>Subcatchment6S: Subcatchment6S</b>	Runoff Area=28,965 sf 45.86% Impervious Runoff Depth>4.45" Flow Length=133' Tc=19.6 min CN=85 Runoff=2.32 cfs 0.247 af
<b>Subcatchment7S: Unit 3 and 4</b>	Runoff Area=1,232 sf 100.00% Impervious Runoff Depth>5.93" Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af
<b>Subcatchment9S: Subcatchment9S</b>	Runoff Area=10,560 sf 57.77% Impervious Runoff Depth>4.79" Flow Length=72' Slope=0.0100 '/' Tc=6.0 min CN=88 Runoff=1.28 cfs 0.097 af
<b>Subcatchment10S: Subcatchment10S</b>	Runoff Area=1,309 sf 100.00% Impervious Runoff Depth>5.93" Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af
<b>Subcatchment11S: Subcatchment11S</b>	Runoff Area=1,297 sf 100.00% Impervious Runoff Depth>5.93" Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af
<b>Subcatchment12S: Subcatchment12S</b>	Runoff Area=1,970 sf 66.04% Impervious Runoff Depth>5.01" Tc=6.0 min CN=90 Runoff=0.25 cfs 0.019 af
<b>Subcatchment13S: Subcatchment13S</b>	Runoff Area=1,624 sf 4.99% Impervious Runoff Depth>3.32" Flow Length=43' Tc=7.1 min CN=74 Runoff=0.14 cfs 0.010 af
<b>Subcatchment14S: Subcatchment14S</b>	Runoff Area=6,327 sf 19.36% Impervious Runoff Depth>3.83" Flow Length=50' Slope=0.0230 '/' Tc=6.0 min CN=79 Runoff=0.64 cfs 0.046 af
<b>Subcatchment16S: Subcatchment16S</b>	Runoff Area=4,616 sf 12.56% Impervious Runoff Depth>3.52" Flow Length=64' Tc=7.8 min CN=76 Runoff=0.41 cfs 0.031 af
<b>Subcatchment17S: Subcatchment17S</b>	Runoff Area=6,175 sf 14.35% Impervious Runoff Depth>3.62" Flow Length=95' Slope=0.0050 '/' Tc=16.3 min CN=77 Runoff=0.44 cfs 0.043 af
<b>Reach 1R: Swale A</b>	Avg. Flow Depth=0.36' Max Vel=0.30 fps Inflow=0.14 cfs 0.010 af n=0.150 L=100.0' S=0.0100 '/' Capacity=0.70 cfs Outflow=0.12 cfs 0.010 af Overflow=0.00 cfs 0.000 af

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Type III 24-hr 25 Yr 24 Hr Rainfall=6.17"

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<b>Reach 3Ra: Vee Channel</b>	Avg. Flow Depth=0.53' Max Vel=0.79 fps Inflow=0.68 cfs 0.066 af n=0.150 L=50.0' S=0.0400 '/' Capacity=3.62 cfs Outflow=0.68 cfs 0.066 af
<b>Reach 3Rb: Vee Channel</b>	Avg. Flow Depth=0.48' Max Vel=0.98 fps Inflow=0.68 cfs 0.066 af n=0.150 L=35.0' S=0.0714 '/' Capacity=4.83 cfs Outflow=0.68 cfs 0.066 af
<b>Reach 4R: Overland Flow</b>	Avg. Flow Depth=0.30' Max Vel=0.19 fps Inflow=0.30 cfs 0.024 af n=0.150 L=83.0' S=0.0047 '/' Capacity=1.01 cfs Outflow=0.26 cfs 0.023 af
<b>Reach AP1: Analysis Point 1</b>	Inflow=2.99 cfs 0.268 af Outflow=2.99 cfs 0.268 af
<b>Reach AP2: Analysis Point 2</b>	Inflow=0.17 cfs 0.013 af Outflow=0.17 cfs 0.013 af
<b>Reach AP3: Analysis Point 3</b>	Inflow=0.73 cfs 0.093 af Outflow=0.73 cfs 0.093 af
<b>Reach AP4: Analysis Point 4</b>	Inflow=0.34 cfs 0.028 af Outflow=0.34 cfs 0.028 af
<b>Reach AP5: Analysis Point 5</b>	Inflow=0.41 cfs 0.031 af Outflow=0.41 cfs 0.031 af
<b>Pond 1P: Depression</b>	Peak Elev=51.31' Storage=167 cf Inflow=0.31 cfs 0.027 af Outflow=0.30 cfs 0.024 af
<b>Pond 2P: Bioretention#2</b>	Peak Elev=51.11' Storage=6,485 cf Inflow=2.75 cfs 0.303 af Discarded=0.26 cfs 0.243 af Primary=0.23 cfs 0.019 af Secondary=0.00 cfs 0.000 af Outflow=0.49 cfs 0.262 af
<b>Pond 3P: Stone Drip Edge</b>	Peak Elev=55.39' Storage=29 cf Inflow=0.17 cfs 0.014 af Primary=0.16 cfs 0.014 af Secondary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.014 af
<b>Pond 4P: Subsurface Stone Infiltration #1</b>	Peak Elev=55.36' Storage=0.003 af Inflow=0.16 cfs 0.014 af Discarded=0.06 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.014 af
<b>Pond 5P: Subsurface Stone Infiltration #3</b>	Peak Elev=51.38' Storage=0.002 af Inflow=0.05 cfs 0.051 af Discarded=0.04 cfs 0.050 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.050 af
<b>Pond 6P: Bioretention#1</b>	Peak Elev=54.73' Storage=1,119 cf Inflow=1.28 cfs 0.097 af Discarded=0.36 cfs 0.095 af Primary=0.10 cfs 0.001 af Secondary=0.00 cfs 0.000 af Outflow=0.46 cfs 0.097 af
<b>Pond 7P: Unit 6 Eco-Paver Driveway</b>	Peak Elev=52.11' Storage=265 cf Inflow=0.18 cfs 0.015 af Discarded=0.03 cfs 0.015 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.015 af
<b>Pond 8P: Unit 7 Eco-Paver Driveway</b>	Peak Elev=53.19' Storage=167 cf Inflow=0.18 cfs 0.015 af Discarded=0.07 cfs 0.015 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.015 af
<b>Pond 9P: Unit 8 Eco-Paver Driveway</b>	Peak Elev=51.15' Storage=275 cf Inflow=0.25 cfs 0.019 af Discarded=0.08 cfs 0.019 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.019 af

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**Pond 10P: Detention Pond**Peak Elev=53.13' Storage=30 cf Inflow=0.73 cfs 0.057 af  
Primary=0.73 cfs 0.057 af Secondary=0.00 cfs 0.000 af Outflow=0.73 cfs 0.057 af**Pond 11P: Subsurface Stone Infiltration #4**Peak Elev=50.59' Storage=0.006 af Inflow=0.06 cfs 0.056 af  
Discarded=0.06 cfs 0.056 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.056 af**Pond 12P: Subsurface Stone Infiltration #2**Peak Elev=51.60' Storage=0.001 af Inflow=0.10 cfs 0.001 af  
Discarded=0.03 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.001 af**Link 5L: Unit 5 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.044 af  
Primary=0.04 cfs 0.044 af**Link 6L: Unit 6 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.007 af  
Primary=0.04 cfs 0.007 af**Link 7L: Unit 7 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.036 af  
Primary=0.04 cfs 0.036 af**Link 8L: Unit 8 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.020 af  
Primary=0.04 cfs 0.020 af**Total Runoff Area = 2.382 ac Runoff Volume = 0.879 af Average Runoff Depth = 4.43"**  
**55.32% Pervious = 1.318 ac 44.68% Impervious = 1.064 ac**



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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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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

<b>Subcatchment1S: Subcatchment1S</b>	Runoff Area=29,271 sf 57.36% Impervious Runoff Depth>5.96" Flow Length=221' Tc=11.9 min CN=88 Runoff=3.69 cfs 0.334 af
<b>Subcatchment2S: Subcatchment2S</b>	Runoff Area=1,702 sf 28.08% Impervious Runoff Depth>5.05" Flow Length=67' Tc=7.6 min CN=80 Runoff=0.21 cfs 0.016 af
<b>Subcatchment3S: Subcatchment3S</b>	Runoff Area=1,237 sf 0.00% Impervious Runoff Depth>4.27" Flow Length=34' Tc=6.0 min CN=73 Runoff=0.14 cfs 0.010 af
<b>Subcatchment4S: Subcatchment4S</b>	Runoff Area=3,492 sf 34.05% Impervious Runoff Depth>5.28" Flow Length=47' Slope=0.0250 '/' Tc=9.4 min CN=82 Runoff=0.43 cfs 0.035 af
<b>Subcatchment5S: Subcatchment5S</b>	Runoff Area=3,966 sf 15.05% Impervious Runoff Depth>4.71" Flow Length=67' Tc=13.1 min CN=77 Runoff=0.40 cfs 0.036 af
<b>Subcatchment6S: Subcatchment6S</b>	Runoff Area=28,965 sf 45.86% Impervious Runoff Depth>5.61" Flow Length=133' Tc=19.6 min CN=85 Runoff=2.90 cfs 0.311 af
<b>Subcatchment7S: Unit 3 and 4</b>	Runoff Area=1,232 sf 100.00% Impervious Runoff Depth>7.15" Tc=6.0 min CN=98 Runoff=0.20 cfs 0.017 af
<b>Subcatchment9S: Subcatchment9S</b>	Runoff Area=10,560 sf 57.77% Impervious Runoff Depth>5.97" Flow Length=72' Slope=0.0100 '/' Tc=6.0 min CN=88 Runoff=1.58 cfs 0.121 af
<b>Subcatchment10S: Subcatchment10S</b>	Runoff Area=1,309 sf 100.00% Impervious Runoff Depth>7.15" Tc=6.0 min CN=98 Runoff=0.21 cfs 0.018 af
<b>Subcatchment11S: Subcatchment11S</b>	Runoff Area=1,297 sf 100.00% Impervious Runoff Depth>7.15" Tc=6.0 min CN=98 Runoff=0.21 cfs 0.018 af
<b>Subcatchment12S: Subcatchment12S</b>	Runoff Area=1,970 sf 66.04% Impervious Runoff Depth>6.20" Tc=6.0 min CN=90 Runoff=0.30 cfs 0.023 af
<b>Subcatchment13S: Subcatchment13S</b>	Runoff Area=1,624 sf 4.99% Impervious Runoff Depth>4.38" Flow Length=43' Tc=7.1 min CN=74 Runoff=0.18 cfs 0.014 af
<b>Subcatchment14S: Subcatchment14S</b>	Runoff Area=6,327 sf 19.36% Impervious Runoff Depth>4.94" Flow Length=50' Slope=0.0230 '/' Tc=6.0 min CN=79 Runoff=0.82 cfs 0.060 af
<b>Subcatchment16S: Subcatchment16S</b>	Runoff Area=4,616 sf 12.56% Impervious Runoff Depth>4.60" Flow Length=64' Tc=7.8 min CN=76 Runoff=0.53 cfs 0.041 af
<b>Subcatchment17S: Subcatchment17S</b>	Runoff Area=6,175 sf 14.35% Impervious Runoff Depth>4.70" Flow Length=95' Slope=0.0050 '/' Tc=16.3 min CN=77 Runoff=0.57 cfs 0.056 af
<b>Reach 1R: Swale A</b>	Avg. Flow Depth=0.40' Max Vel=0.33 fps Inflow=0.18 cfs 0.014 af n=0.150 L=100.0' S=0.0100 '/' Capacity=0.70 cfs Outflow=0.16 cfs 0.014 af Overflow=0.00 cfs 0.000 af

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**Reach 3Ra: Vee Channel**Avg. Flow Depth=0.59' Max Vel=0.85 fps Inflow=0.90 cfs 0.087 af  
n=0.150 L=50.0' S=0.0400 ' Capacity=3.62 cfs Outflow=0.90 cfs 0.087 af**Reach 3Rb: Vee Channel**Avg. Flow Depth=0.53' Max Vel=1.06 fps Inflow=0.90 cfs 0.087 af  
n=0.150 L=35.0' S=0.0714 ' Capacity=4.83 cfs Outflow=0.90 cfs 0.087 af**Reach 4R: Overland Flow**Avg. Flow Depth=0.33' Max Vel=0.21 fps Inflow=0.39 cfs 0.032 af  
n=0.150 L=83.0' S=0.0047 ' Capacity=1.01 cfs Outflow=0.34 cfs 0.032 af**Reach AP1: Analysis Point 1**Inflow=3.69 cfs 0.334 af  
Outflow=3.69 cfs 0.334 af**Reach AP2: Analysis Point 2**Inflow=0.21 cfs 0.016 af  
Outflow=0.21 cfs 0.016 af**Reach AP3: Analysis Point 3**Inflow=1.57 cfs 0.172 af  
Outflow=1.57 cfs 0.172 af**Reach AP4: Analysis Point 4**Inflow=0.43 cfs 0.035 af  
Outflow=0.43 cfs 0.035 af**Reach AP5: Analysis Point 5**Inflow=0.53 cfs 0.041 af  
Outflow=0.53 cfs 0.041 af**Pond 1P: Depression**Peak Elev=51.31' Storage=167 cf Inflow=0.40 cfs 0.036 af  
Outflow=0.39 cfs 0.032 af**Pond 2P: Bioretention#2**Peak Elev=51.29' Storage=7,196 cf Inflow=3.44 cfs 0.384 af  
Discarded=0.27 cfs 0.258 af Primary=1.13 cfs 0.074 af Secondary=0.00 cfs 0.000 af Outflow=1.40 cfs 0.333 af**Pond 3P: Stone Drip Edge**Peak Elev=55.51' Storage=42 cf Inflow=0.20 cfs 0.017 af  
Primary=0.18 cfs 0.017 af Secondary=0.00 cfs 0.000 af Outflow=0.18 cfs 0.017 af**Pond 4P: Subsurface Stone Infiltration#1**Peak Elev=55.50' Storage=0.003 af Inflow=0.18 cfs 0.017 af  
Discarded=0.07 cfs 0.017 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.017 af**Pond 5P: Subsurface Stone Infiltration#3**Peak Elev=51.38' Storage=0.002 af Inflow=0.05 cfs 0.051 af  
Discarded=0.04 cfs 0.050 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.050 af**Pond 6P: Bioretention#1**Peak Elev=54.81' Storage=1,214 cf Inflow=1.58 cfs 0.121 af  
Discarded=0.36 cfs 0.110 af Primary=0.58 cfs 0.010 af Secondary=0.00 cfs 0.000 af Outflow=0.95 cfs 0.120 af**Pond 7P: Unit 6 Eco-Paver Driveway**Peak Elev=52.47' Storage=326 cf Inflow=0.21 cfs 0.018 af  
Discarded=0.03 cfs 0.017 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.017 af**Pond 8P: Unit 7 Eco-Paver Driveway**Peak Elev=53.41' Storage=203 cf Inflow=0.21 cfs 0.018 af  
Discarded=0.08 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.018 af**Pond 9P: Unit 8 Eco-Paver Driveway**Peak Elev=51.91' Storage=320 cf Inflow=0.30 cfs 0.023 af  
Discarded=0.10 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.023 af

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**Pond 10P: Detention Pond**Peak Elev=53.16' Storage=36 cf Inflow=0.95 cfs 0.073 af  
Primary=0.95 cfs 0.073 af Secondary=0.00 cfs 0.000 af Outflow=0.95 cfs 0.073 af**Pond 11P: Subsurface Stone Infiltration #4**Peak Elev=50.59' Storage=0.006 af Inflow=0.06 cfs 0.056 af  
Discarded=0.06 cfs 0.056 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.056 af**Pond 12P: Subsurface Stone Infiltration #2**Peak Elev=53.46' Storage=0.007 af Inflow=0.58 cfs 0.010 af  
Discarded=0.16 cfs 0.010 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.010 af**Link 5L: Unit 5 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.044 af  
Primary=0.04 cfs 0.044 af**Link 6L: Unit 6 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.007 af  
Primary=0.04 cfs 0.007 af**Link 7L: Unit 7 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.036 af  
Primary=0.04 cfs 0.036 af**Link 8L: Unit 8 Sump Pump**Manual Hydrograph Inflow=0.04 cfs 0.020 af  
Primary=0.04 cfs 0.020 af**Total Runoff Area = 2.382 ac Runoff Volume = 1.108 af Average Runoff Depth = 5.58"**  
**55.32% Pervious = 1.318 ac 44.68% Impervious = 1.064 ac**

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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**Summary for Subcatchment 1S: Subcatchment 1S**

Runoff = 3.69 cfs @ 12.16 hrs, Volume= 0.334 af, Depth> 5.96"  
 Routed to Reach AP1 : Analysis Point 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 Rainfall=7.39"

Area (sf)	CN	Description
14,174	98	Paved parking, HSG C
2,616	98	Roofs, HSG C
12,481	74	>75% Grass cover, Good, HSG C
29,271	88	Weighted Average
12,481		42.64% Pervious Area
16,790		57.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0220	0.18		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.3	15	0.0167	0.90		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
0.2	22	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
2.0	84	0.0100	0.70		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
11.9	221	Total			

**Summary for Subcatchment 2S: Subcatchment 2S**

Runoff = 0.21 cfs @ 12.11 hrs, Volume= 0.016 af, Depth> 5.05"  
 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 Rainfall=7.39"

Area (sf)	CN	Description
836	74	>75% Grass cover, Good, HSG C
478	98	Roofs, HSG C
388	70	Woods, Good, HSG C
1,702	80	Weighted Average
1,224		71.92% Pervious Area
478		28.08% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	26	0.0310	0.16		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.3	16	0.0750	0.20		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.7	13	0.1900	0.13		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
1.3	7	0.1140	0.09		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.5	5	0.5000	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
7.6	67	Total			

**Summary for Subcatchment 3S: Subcatchment 3S**

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af, Depth> 4.27"  
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 Rainfall=7.39"

Area (sf)	CN	Description
951	74	>75% Grass cover, Good, HSG C
286	70	Woods, Good, HSG C
1,237	73	Weighted Average
1,237		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	17	0.3300	0.17		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.5	11	0.3300	0.34		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
1.0	6	0.1670	0.10		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
3.2	34	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 4S: Subcatchment 4S**

Runoff = 0.43 cfs @ 12.13 hrs, Volume= 0.035 af, Depth> 5.28"  
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 Rainfall=7.39"

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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Area (sf)	CN	Description
1,717	74	>75% Grass cover, Good, HSG C
453	98	Paved parking, HSG C
736	98	Roofs, HSG C
586	70	Woods, Good, HSG C
3,492	82	Weighted Average
2,303		65.95% Pervious Area
1,189		34.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	20	0.0250	0.14		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
6.9	27	0.0250	0.07		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
9.4	47	Total			

**Summary for Subcatchment 5S: Subcatchment 5S**

Runoff = 0.40 cfs @ 12.18 hrs, Volume= 0.036 af, Depth> 4.71"  
 Routed to Pond 1P : Depression

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 Rainfall=7.39"

Area (sf)	CN	Description
597	98	Roofs, HSG C
2,345	74	>75% Grass cover, Good, HSG C
1,024	70	Woods, Good, HSG C
3,966	77	Weighted Average
3,369		84.95% Pervious Area
597		15.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
10.3	40	0.0200	0.06		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.1	7	0.1400	1.87		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
13.1	67	Total			

**Summary for Subcatchment 6S: Subcatchment 6S**

Runoff = 2.90 cfs @ 12.26 hrs, Volume= 0.311 af, Depth> 5.61"  
 Routed to Pond 2P : Bioretention #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 Rainfall=7.39"

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Area (sf)	CN	Description
8,011	98	Paved parking, HSG C
5,272	98	Roofs, HSG C
14,477	74	>75% Grass cover, Good, HSG C
1,205	70	Woods, Good, HSG C
28,965	85	Weighted Average
15,682		54.14% Pervious Area
13,283		45.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	22	0.0450	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
16.6	78	0.0230	0.08		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.4	11	0.0100	0.50		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.5	22	0.0100	0.70		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
19.6	133	Total			

**Summary for Subcatchment 7S: Unit 3 and 4**

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 7.15"  
 Routed to Pond 3P : 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 Rainfall=7.39"

Area (sf)	CN	Description
984	98	Roofs, HSG C
248	98	Water Surface, HSG C
1,232	98	Weighted Average
1,232		100.00% Impervious Area

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

**Summary for Subcatchment 9S: Subcatchment 9S**

Runoff = 1.58 cfs @ 12.09 hrs, Volume= 0.121 af, Depth> 5.97"  
 Routed to Pond 6P : Bioretention #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 Rainfall=7.39"

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Area (sf)	CN	Description
4,178	98	Paved parking, HSG C
1,922	98	Roofs, HSG C
4,331	74	>75% Grass cover, Good, HSG C
129	70	Woods, Good, HSG C
10,560	88	Weighted Average
4,460		42.23% Pervious Area
6,100		57.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	14	0.0100	0.09		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.8	45	0.0100	0.89		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.21"
0.3	13	0.0100	0.70		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
3.8	72	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 10S: Subcatchment 10S**

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.018 af, Depth> 7.15"  
 Routed to Pond 7P : Unit 6 Eco-Paver Driveway

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 Rainfall=7.39"

Area (sf)	CN	Description
876	98	Roofs, HSG C
433	98	Paved parking, HSG C
1,309	98	Weighted Average
1,309		100.00% Impervious Area

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

**Summary for Subcatchment 11S: Subcatchment 11S**

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.018 af, Depth> 7.15"  
 Routed to Pond 8P : Unit 7 Eco-Paver Driveway

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 Rainfall=7.39"



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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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Area (sf)	CN	Description
876	98	Roofs, HSG C
421	98	Paved parking, HSG C
1,297	98	Weighted Average
1,297		100.00% Impervious Area

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

**Summary for Subcatchment 12S: Subcatchment 12S**

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af, Depth> 6.20"  
 Routed to Pond 9P : Unit 8 Eco-Paver Driveway

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 Rainfall=7.39"

Area (sf)	CN	Description
876	98	Roofs, HSG C
425	98	Paved parking, HSG C
669	74	>75% Grass cover, Good, HSG C
1,970	90	Weighted Average
669		33.96% Pervious Area
1,301		66.04% Impervious Area

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

**Summary for Subcatchment 13S: Subcatchment 13S**

Runoff = 0.18 cfs @ 12.10 hrs, Volume= 0.014 af, Depth> 4.38"  
 Routed to Reach 1R : Swale A

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 Rainfall=7.39"

Area (sf)	CN	Description
1,013	74	>75% Grass cover, Good, HSG C
530	70	Woods, Good, HSG C
81	98	Roofs, HSG C
1,624	74	Weighted Average
1,543		95.01% Pervious Area
81		4.99% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	28	0.0210	0.13		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
3.3	10	0.0210	0.05		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
0.3	5	0.3300	0.29		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
7.1	43	Total			

**Summary for Subcatchment 14S: Subcatchment 14S**

Runoff = 0.82 cfs @ 12.09 hrs, Volume= 0.060 af, Depth> 4.94"  
Routed to Pond 10P : Detention 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 Rainfall=7.39"

Area (sf)	CN	Description
5,067	74	>75% Grass cover, Good, HSG C
35	70	Woods, Good, HSG C
1,225	98	Roofs, HSG C
6,327	79	Weighted Average
5,102		80.64% Pervious Area
1,225		19.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0230	0.16		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
5.3	50	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 16S: Subcatchment 16S**

Runoff = 0.53 cfs @ 12.11 hrs, Volume= 0.041 af, Depth> 4.60"  
Routed to Reach AP5 : Analysis Point 5

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 Rainfall=7.39"

Area (sf)	CN	Description
3,173	74	>75% Grass cover, Good, HSG C
863	70	Woods, Good, HSG C
580	98	Roofs, HSG C
4,616	76	Weighted Average
4,036		87.44% Pervious Area
580		12.56% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	41	0.0120	0.12		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.6	12	0.3300	0.34		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.6	5	0.0500	0.14		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.21"
0.7	6	0.3300	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.21"
7.8	64	Total			

**Summary for Subcatchment 17S: Subcatchment 17S**

Runoff = 0.57 cfs @ 12.22 hrs, Volume= 0.056 af, Depth> 4.70"  
 Routed to Reach 3Ra : Vee Channel

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 Rainfall=7.39"

Area (sf)	CN	Description
3,861	74	>75% Grass cover, Good, HSG C
1,428	70	Woods, Good, HSG C
301	98	Paved parking, HSG C
585	98	Roofs, HSG C
6,175	77	Weighted Average
5,289		85.65% Pervious Area
886		14.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	95	0.0050	0.10		<b>Sheet Flow, Longest path to enter the Vee Channel</b> Grass: Short n= 0.150 P2= 3.21"

**Summary for Reach 1R: Swale A**

Inflow Area = 0.037 ac, 4.99% Impervious, Inflow Depth > 4.38" for 50 Yr 24 Hr event  
 Inflow = 0.18 cfs @ 12.10 hrs, Volume= 0.014 af  
 Outflow = 0.16 cfs @ 12.16 hrs, Volume= 0.014 af, Atten= 14%, Lag= 3.4 min  
 Routed to Pond 10P : Detention Pond  
 Overflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 3P : Stone Drip Edge

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Max. Velocity= 0.33 fps, Min. Travel Time= 5.1 min  
 Avg. Velocity = 0.14 fps, Avg. Travel Time= 11.9 min

Peak Storage= 48 cf @ 12.16 hrs  
 Average Depth at Peak Storage= 0.40' , Surface Width= 2.39'  
 Bank-Full Depth= 0.70' Flow Area= 1.5 sf, Capacity= 0.70 cfs  
 Any excess flow will be diverted to the secondary overflow

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0.00' x 0.70' deep channel,  $n = 0.150$  Sheet flow over Short Grass  
Side Slope Z-value= 3.0 ' ' Top Width= 4.20'  
Length= 100.0' Slope= 0.0100 ' '  
Inlet Invert= 56.00', Outlet Invert= 55.00'

**Summary for Reach 3Ra: Vee Channel**

[62] Hint: Exceeded Reach 4R OUTLET depth by 0.26' @ 12.25 hrs  
[80] Warning: Exceeded Pond 2P by 1.21' @ 12.15 hrs (2.13 cfs 0.120 af)

Inflow Area = 0.233 ac, 14.62% Impervious, Inflow Depth > 4.50" for 50 Yr 24 Hr event  
Inflow = 0.90 cfs @ 12.25 hrs, Volume= 0.087 af  
Outflow = 0.90 cfs @ 12.26 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.8 min  
Routed to Reach 3Rb : Vee Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 0.85 fps, Min. Travel Time= 1.0 min  
Avg. Velocity = 0.37 fps, Avg. Travel Time= 2.3 min

Peak Storage= 53 cf @ 12.26 hrs  
Average Depth at Peak Storage= 0.59' , Surface Width= 3.56'  
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 3.62 cfs

0.00' x 1.00' deep channel,  $n = 0.150$  Sheet flow over Short Grass  
Side Slope Z-value= 3.0 ' ' Top Width= 6.00'  
Length= 50.0' Slope= 0.0400 ' '  
Inlet Invert= 51.00', Outlet Invert= 49.00'

**Summary for Reach 3Rb: Vee Channel**

[61] Hint: Exceeded Reach 3Ra outlet invert by 0.53' @ 12.25 hrs

Inflow Area = 0.233 ac, 14.62% Impervious, Inflow Depth > 4.50" for 50 Yr 24 Hr event  
Inflow = 0.90 cfs @ 12.26 hrs, Volume= 0.087 af  
Outflow = 0.90 cfs @ 12.27 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.4 min  
Routed to Reach AP3 : Analysis Point 3

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

Max. Velocity= 1.06 fps, Min. Travel Time= 0.6 min

Avg. Velocity = 0.45 fps, Avg. Travel Time= 1.3 min

Peak Storage= 30 cf @ 12.27 hrs

Average Depth at Peak Storage= 0.53' , Surface Width= 3.19'

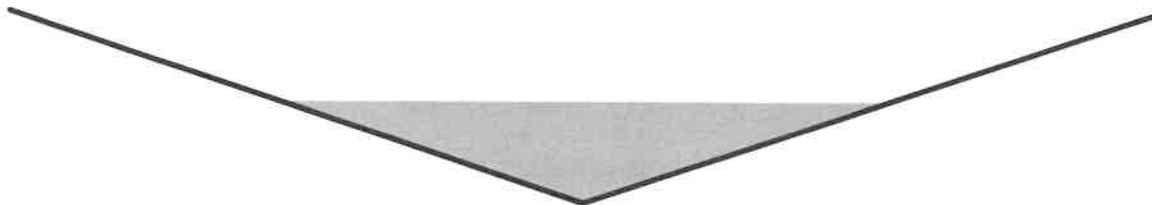
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 4.83 cfs

0.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 3.0 '/' Top Width= 6.00'

Length= 35.0' Slope= 0.0714 '/'

Inlet Invert= 49.00', Outlet Invert= 46.50'

**Summary for Reach 4R: Overland Flow**

[80] Warning: Exceeded Pond 1P by 0.89' @ 0.00 hrs (0.55 cfs 2.484 af)

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth &gt; 4.20" for 50 Yr 24 Hr event

Inflow = 0.39 cfs @ 12.21 hrs, Volume= 0.032 af

Outflow = 0.34 cfs @ 12.29 hrs, Volume= 0.032 af, Atten= 12%, Lag= 4.8 min

Routed to Reach 3Ra : Vee Channel

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

Max. Velocity= 0.21 fps, Min. Travel Time= 6.7 min

Avg. Velocity = 0.10 fps, Avg. Travel Time= 14.1 min

Peak Storage= 138 cf @ 12.29 hrs

Average Depth at Peak Storage= 0.33' , Surface Width= 10.00'

Bank-Full Depth= 0.50' Flow Area= 3.8 sf, Capacity= 1.01 cfs

0.00' x 0.50' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 15.0 '/' Top Width= 15.00'

Length= 83.0' Slope= 0.0047 '/'

Inlet Invert= 51.39', Outlet Invert= 51.00'



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**Summary for Reach AP1: Analysis Point 1**

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

Inflow Area = 0.914 ac, 57.47% Impervious, Inflow Depth > 4.38" for 50 Yr 24 Hr event  
Inflow = 3.69 cfs @ 12.16 hrs, Volume= 0.334 af  
Outflow = 3.69 cfs @ 12.16 hrs, Volume= 0.334 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 = 0.039 ac, 28.08% Impervious, Inflow Depth > 5.05" for 50 Yr 24 Hr event  
Inflow = 0.21 cfs @ 12.11 hrs, Volume= 0.016 af  
Outflow = 0.21 cfs @ 12.11 hrs, Volume= 0.016 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 AP3: Analysis Point 3**

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

Inflow Area = 1.242 ac, 39.21% Impervious, Inflow Depth > 1.66" for 50 Yr 24 Hr event  
Inflow = 1.57 cfs @ 12.60 hrs, Volume= 0.172 af  
Outflow = 1.57 cfs @ 12.60 hrs, Volume= 0.172 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 = 0.080 ac, 34.05% Impervious, Inflow Depth > 5.28" for 50 Yr 24 Hr event  
Inflow = 0.43 cfs @ 12.13 hrs, Volume= 0.035 af  
Outflow = 0.43 cfs @ 12.13 hrs, Volume= 0.035 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 AP5: Analysis Point 5**

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

Inflow Area = 0.106 ac, 12.56% Impervious, Inflow Depth > 4.60" for 50 Yr 24 Hr event  
Inflow = 0.53 cfs @ 12.11 hrs, Volume= 0.041 af  
Outflow = 0.53 cfs @ 12.11 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

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

**Summary for Pond 1P: Depression**

Inflow Area = 0.091 ac, 15.05% Impervious, Inflow Depth > 4.71" for 50 Yr 24 Hr event  
 Inflow = 0.40 cfs @ 12.18 hrs, Volume= 0.036 af  
 Outflow = 0.39 cfs @ 12.21 hrs, Volume= 0.032 af, Atten= 1%, Lag= 1.6 min  
 Primary = 0.39 cfs @ 12.21 hrs, Volume= 0.032 af  
 Routed to Reach 4R : Overland Flow

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

Peak Elev= 51.31' @ 11.60 hrs Surf.Area= 593 sf Storage= 167 cf

Plug-Flow detention time= 74.2 min calculated for 0.032 af (89% of inflow)

Center-of-Mass det. time= 24.4 min ( 842.6 - 818.1 )

Volume	Invert	Avail.Storage	Storage Description		
#1	50.50'	167 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
50.50	45	30.0	0	0	45
51.00	177	68.0	52	52	342
51.30	593	121.0	109	161	1,140
51.31	593	121.0	6	167	1,141

Device	Routing	Invert	Outlet Devices										
#0	Primary	51.31'	<b>Automatic Storage Overflow</b> (Discharged without head)										
#1	Primary	51.30'	<b>8.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b>										
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00
				2.50	3.00	3.50							
			Coef. (English)	2.54	2.61	2.61	2.60	2.66	2.70	2.77	2.89	2.88	
				2.85	3.07	3.20	3.32						

Primary OutFlow Max=0.00 cfs @ 12.21 hrs HW=51.31' TW=51.71' (Dynamic Tailwater)

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

**Summary for Pond 2P: Bioretention #2**

[80] Warning: Exceeded Pond 11P by 1.18' @ 18.30 hrs (0.00 cfs 0.120 af)

Inflow Area = 0.981 ac, 46.18% Impervious, Inflow Depth > 4.70" for 50 Yr 24 Hr event  
 Inflow = 3.44 cfs @ 12.24 hrs, Volume= 0.384 af  
 Outflow = 1.40 cfs @ 12.65 hrs, Volume= 0.333 af, Atten= 59%, Lag= 24.4 min  
 Discarded = 0.27 cfs @ 12.65 hrs, Volume= 0.258 af  
 Primary = 1.13 cfs @ 12.65 hrs, Volume= 0.074 af  
 Routed to Reach AP3 : Analysis Point 3  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Reach 3Ra : Vee Channel

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

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Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

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Peak Elev= 51.29' @ 12.65 hrs Surf.Area= 4,102 sf Storage= 7,196 cf

Plug-Flow detention time= 212.3 min calculated for 0.332 af (86% of inflow)

Center-of-Mass det. time= 154.3 min ( 959.7 - 805.4 )

Volume	Invert	Avail.Storage	Storage Description			
#1	46.41'	8,120 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
46.41	1,080	138.0	0.0	0	0	1,080
46.42	1,080	138.0	40.0	4	4	1,081
47.74	1,080	138.0	40.0	570	575	1,264
47.75	1,080	138.0	15.0	2	576	1,265
49.24	1,080	138.0	15.0	241	818	1,471
49.25	1,080	138.0	100.0	11	828	1,472
49.50	2,550	271.0	100.0	441	1,269	5,801
50.00	2,971	283.0	100.0	1,379	2,648	6,348
51.00	3,839	301.0	100.0	3,396	6,044	7,234
51.50	4,298	310.0	100.0	2,033	8,077	7,697
51.51	4,331	315.0	100.0	43	8,120	7,946

Device	Routing	Invert	Outlet Devices
#1	Secondary	51.50'	<b>100.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	51.00'	<b>2.0' long + 3.0 'I' SideZ x 28.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	46.41'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 46.25' Phase-In= 0.01'

**Discarded OutFlow** Max=0.27 cfs @ 12.65 hrs HW=51.29' (Free Discharge)↑ **3=Exfiltration** ( Controls 0.27 cfs)**Primary OutFlow** Max=1.13 cfs @ 12.65 hrs HW=51.29' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir**(Weir Controls 1.13 cfs @ 1.36 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=46.41' TW=51.00' (Dynamic Tailwater)↑ **1=Broad-Crested Rectangular Weir**( Controls 0.00 cfs)**Summary for Pond 3P: Stone Drip Edge**



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Inflow Area = 0.028 ac, 100.00% Impervious, Inflow Depth > 7.15" for 50 Yr 24 Hr event  
 Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af  
 Outflow = 0.18 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 9%, Lag= 0.5 min  
 Primary = 0.18 cfs @ 12.09 hrs, Volume= 0.017 af  
 Routed to Pond 4P : Subsurface Stone Infiltration #1  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 10P : Detention Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 55.51' @ 12.37 hrs Surf.Area= 248 sf Storage= 42 cf

Plug-Flow detention time= 12.3 min calculated for 0.017 af (99% of inflow)  
 Center-of-Mass det. time= 8.9 min ( 750.7 - 741.8 )

Volume	Invert	Avail.Storage	Storage Description	
#1	55.09'	93 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.09	248	0.0	0	0
55.10	248	40.0	1	1
56.00	248	40.0	89	90
56.01	248	100.0	2	93

Device	Routing	Invert	Outlet Devices
#1	Primary	55.10'	<b>6.0" Round Culvert</b> L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.10' / 54.98' S= 0.0150 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	55.10'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Secondary	56.00'	<b>72.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> 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=0.18 cfs @ 12.09 hrs HW=55.41' TW=55.25' (Dynamic Tailwater)

↑1=Culvert (Outlet Controls 0.18 cfs @ 2.03 fps)

↑2=Orifice/Grate (Passes 0.18 cfs of 0.25 cfs potential flow)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=55.09' TW=53.00' (Dynamic Tailwater)

↑3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

### Summary for Pond 4P: Subsurface Stone Infiltration #1

Inflow Area = 0.028 ac, 100.00% Impervious, Inflow Depth > 7.11" for 50 Yr 24 Hr event  
 Inflow = 0.18 cfs @ 12.09 hrs, Volume= 0.017 af  
 Outflow = 0.07 cfs @ 12.37 hrs, Volume= 0.017 af, Atten= 64%, Lag= 16.6 min  
 Discarded = 0.07 cfs @ 12.37 hrs, Volume= 0.017 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 10P : Detention Pond

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 55.50' @ 12.37 hrs Surf.Area= 0.009 ac Storage= 0.003 af

Plug-Flow detention time= 21.1 min calculated for 0.017 af (100% of inflow)  
 Center-of-Mass det. time= 20.8 min ( 771.5 - 750.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	54.60'	0.004 af	<b>15.00'W x 27.00'L x 1.01'H Prismatic</b> 0.009 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.60'	<b>0.890 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 54.47' Phase-In= 0.01'
#2	Primary	55.60'	<b>20.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> 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

**Discarded OutFlow** Max=0.07 cfs @ 12.37 hrs HW=55.50' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.07 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=54.60' TW=53.00' (Dynamic Tailwater)  
 ↑2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 5P: Subsurface Stone Infiltration #3**

Inflow = 0.05 cfs @ 2.01 hrs, Volume= 0.051 af  
 Outflow = 0.04 cfs @ 15.05 hrs, Volume= 0.050 af, Atten= 21%, Lag= 782.5 min  
 Discarded = 0.04 cfs @ 15.05 hrs, Volume= 0.050 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Pond 2P : Bioretention #2  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Reach AP5 : Analysis Point 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 51.38' @ 15.05 hrs Surf.Area= 0.010 ac Storage= 0.002 af

Plug-Flow detention time= 41.9 min calculated for 0.050 af (99% of inflow)  
 Center-of-Mass det. time= 34.1 min ( 753.2 - 719.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	50.80'	0.006 af	<b>10.00'W x 45.00'L x 1.41'H Prismatic</b> 0.015 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	50.80'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 50.75' Phase-In= 0.01'
#2	Secondary	52.20'	<b>45.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00

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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  
 #3 Device 4 51.50' **6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads  
 #4 Primary 51.40' **6.0" Round Culvert**  
 L= 12.0' CPP, projecting, no headwall, Ke= 0.900  
 Inlet / Outlet Invert= 51.40' / 50.23' S= 0.0975 ' S= 0.0975 ' Cc= 0.900  
 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

**Discarded OutFlow** Max=0.04 cfs @ 15.05 hrs HW=51.38' (Free Discharge)

1=Exfiltration ( Controls 0.04 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=50.80' TW=46.41' (Dynamic Tailwater)

4=Culvert ( Controls 0.00 cfs)

3=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=50.80' TW=0.00' (Dynamic Tailwater)

2=Broad-Crested Rectangular Weir( Controls 0.00 cfs)

**Summary for Pond 6P: Bioretention #1**

Inflow Area = 0.242 ac, 57.77% Impervious, Inflow Depth > 5.97" for 50 Yr 24 Hr event  
 Inflow = 1.58 cfs @ 12.09 hrs, Volume= 0.121 af  
 Outflow = 0.95 cfs @ 12.22 hrs, Volume= 0.120 af, Atten= 40%, Lag= 7.7 min  
 Discarded = 0.36 cfs @ 12.22 hrs, Volume= 0.110 af  
 Primary = 0.58 cfs @ 12.22 hrs, Volume= 0.010 af  
 Routed to Pond 12P : Subsurface Stone Infiltration #2  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 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

Peak Elev= 54.81' @ 12.22 hrs Surf.Area= 1,243 sf Storage= 1,214 cf

Plug-Flow detention time= 30.3 min calculated for 0.120 af (100% of inflow)

Center-of-Mass det. time= 28.7 min ( 812.8 - 784.1 )

Volume	Invert	Avail.Storage	Storage Description			
#1	51.24'	1,473 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.24	502	118.0	0.0	0	0	502
51.25	502	118.0	40.0	2	2	503
52.24	502	118.0	40.0	199	201	620
52.25	502	118.0	15.0	1	202	621
53.74	502	118.0	15.0	112	314	797
53.75	502	118.0	100.0	5	319	798
54.00	595	130.0	100.0	137	456	1,037
54.50	1,035	224.0	100.0	402	858	3,687
55.00	1,376	234.0	100.0	601	1,459	4,069
55.01	1,376	234.0	100.0	14	1,473	4,071

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Device	Routing	Invert	Outlet Devices
#1	Primary	52.00'	<b>6.0" Round Culvert</b> L= 6.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 52.00' / 51.90' S= 0.0167 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	55.00'	<b>30.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Device 1	54.70'	<b>18.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Discarded	51.24'	<b>0.890 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 51.13' Phase-In= 0.01'

**Discarded OutFlow** Max=0.36 cfs @ 12.22 hrs HW=54.81' (Free Discharge)↑**4=Exfiltration** ( Controls 0.36 cfs)**Primary OutFlow** Max=0.54 cfs @ 12.22 hrs HW=54.81' TW=52.14' (Dynamic Tailwater)↑**1=Culvert** (Passes 0.54 cfs of 1.19 cfs potential flow)↑**3=Orifice/Grate** (Weir Controls 0.54 cfs @ 1.07 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=51.24' TW=0.00' (Dynamic Tailwater)↑**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond 7P: Unit 6 Eco-Paver Driveway**

Inflow Area = 0.030 ac, 100.00% Impervious, Inflow Depth > 7.15" for 50 Yr 24 Hr event  
 Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.018 af  
 Outflow = 0.03 cfs @ 12.56 hrs, Volume= 0.017 af, Atten= 84%, Lag= 28.5 min  
 Discarded = 0.03 cfs @ 12.56 hrs, Volume= 0.017 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 2P : Bioretention #2

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

Peak Elev= 52.47' @ 12.56 hrs Surf.Area= 421 sf Storage= 326 cf

Plug-Flow detention time= 131.5 min calculated for 0.017 af (97% of inflow)

Center-of-Mass det. time= 116.6 min ( 858.4 - 741.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	49.66'	338 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
49.66	421	0.0	0	0
49.67	421	40.0	2	2
50.49	421	40.0	138	140
50.50	421	5.0	0	140
51.49	421	5.0	21	161
51.50	421	40.0	2	163
52.49	421	40.0	167	329
52.50	421	100.0	4	333
52.51	421	100.0	4	338

Device	Routing	Invert	Outlet Devices
#1	Primary	52.50'	<b>100.0' long x 50.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	49.66'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 49.40' Phase-In= 0.01'

**Discarded OutFlow** Max=0.03 cfs @ 12.56 hrs HW=52.47' (Free Discharge)↑ **2=Exfiltration** ( Controls 0.03 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=49.66' TW=46.41' (Dynamic Tailwater)↑ **1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond 8P: Unit 7 Eco-Paver Driveway**

Inflow Area = 0.030 ac, 100.00% Impervious, Inflow Depth > 7.15" for 50 Yr 24 Hr event  
 Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.018 af  
 Outflow = 0.08 cfs @ 12.33 hrs, Volume= 0.018 af, Atten= 63%, Lag= 14.5 min  
 Discarded = 0.08 cfs @ 12.33 hrs, Volume= 0.018 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 2P : Bioretention #2

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

Peak Elev= 53.41' @ 12.33 hrs Surf.Area= 421 sf Storage= 203 cf

Plug-Flow detention time= 43.0 min calculated for 0.018 af (100% of inflow)

Center-of-Mass det. time= 42.0 min ( 783.8 - 741.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	51.33'	225 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
51.33	421	0.0	0	0
51.34	421	40.0	2	2
51.91	421	40.0	96	98
51.92	421	5.0	0	98
52.91	421	5.0	21	119
52.92	421	40.0	2	120
53.49	421	40.0	96	216
53.50	421	100.0	4	221
53.51	421	100.0	4	225

Device	Routing	Invert	Outlet Devices
#1	Primary	53.50'	<b>100.0' long x 50.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	51.33'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 51.25' Phase-In= 0.01'

**Discarded OutFlow** Max=0.08 cfs @ 12.33 hrs HW=53.41' (Free Discharge)↑**2=Exfiltration** ( Controls 0.08 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=51.33' TW=46.41' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Pond 9P: Unit 8 Eco-Paver Driveway**

Inflow Area = 0.045 ac, 66.04% Impervious, Inflow Depth > 6.20" for 50 Yr 24 Hr event  
 Inflow = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af  
 Outflow = 0.10 cfs @ 12.36 hrs, Volume= 0.023 af, Atten= 65%, Lag= 16.6 min  
 Discarded = 0.10 cfs @ 12.36 hrs, Volume= 0.023 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 2P : Bioretention #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 51.91' @ 12.36 hrs Surf.Area= 421 sf Storage= 320 cf

Plug-Flow detention time= 57.2 min calculated for 0.023 af (100% of inflow)  
 Center-of-Mass det. time= 55.9 min ( 833.7 - 777.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	49.13'	393 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
49.13	421	0.0	0	0
49.14	421	40.0	2	2
50.71	421	40.0	264	266
50.72	421	5.0	0	266
51.71	421	5.0	21	287
51.72	421	40.0	2	289
52.29	421	40.0	96	385
52.30	421	100.0	4	389
52.31	421	100.0	4	393

Device	Routing	Invert	Outlet Devices
#1	Primary	52.30'	<b>100.0' long x 50.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	49.13'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 49.05' Phase-In= 0.01'

**Discarded OutFlow** Max=0.10 cfs @ 12.36 hrs HW=51.91' (Free Discharge)↑**2=Exfiltration** ( Controls 0.10 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=49.13' TW=46.41' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**( Controls 0.00 cfs)**Summary for Pond 10P: Detention Pond**

Inflow Area = 0.211 ac, 27.64% Impervious, Inflow Depth > 4.17" for 50 Yr 24 Hr event  
 Inflow = 0.95 cfs @ 12.10 hrs, Volume= 0.073 af  
 Outflow = 0.95 cfs @ 12.10 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.5 min  
 Primary = 0.95 cfs @ 12.10 hrs, Volume= 0.073 af  
     Routed to Pond 2P : Bioretention #2  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
     Routed to Reach AP5 : Analysis Point 5

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

Peak Elev= 53.16' @ 12.10 hrs Surf.Area= 250 sf Storage= 36 cf

Plug-Flow detention time= 1.3 min calculated for 0.073 af (100% of inflow)

Center-of-Mass det. time= 1.0 min ( 812.2 - 811.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	53.00'	337 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
53.00	213	0	0
54.00	451	332	332
54.01	451	5	337

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Device	Routing	Invert	Outlet Devices
#1	Primary	50.50'	<b>8.0" Round Culvert</b> L= 117.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 50.50' / 49.80' S= 0.0060 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	53.00'	<b>18.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Secondary	54.00'	<b>6.0' long x 4.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

**Primary OutFlow** Max=0.94 cfs @ 12.10 hrs HW=53.15' TW=50.18' (Dynamic Tailwater)

↑1=Culvert (Passes 0.94 cfs of 1.60 cfs potential flow)  
 ↑2=Orifice/Grate (Weir Controls 0.94 cfs @ 1.29 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=53.00' TW=0.00' (Dynamic Tailwater)

↑3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

**Summary for Pond 11P: Subsurface Stone Infiltration #4**

Inflow = 0.06 cfs @ 6.13 hrs, Volume= 0.056 af  
 Outflow = 0.06 cfs @ 8.24 hrs, Volume= 0.056 af, Atten= 4%, Lag= 127.0 min  
 Discarded = 0.06 cfs @ 8.24 hrs, Volume= 0.056 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Routed to Pond 2P : Bioretention #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 50.59' @ 8.24 hrs Surf.Area= 0.010 ac Storage= 0.006 af

Plug-Flow detention time= 69.2 min calculated for 0.056 af (100% of inflow)  
 Center-of-Mass det. time= 69.1 min ( 623.2 - 554.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	49.20'	0.009 af	<b>10.00'W x 45.00'L x 2.21'H Prismatic</b> 0.023 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.20'	<b>0.300 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 49.12' Phase-In= 0.01'
#2	Primary	51.40'	<b>45.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> 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
#3	Device 4	50.70'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	50.60'	<b>6.0" Round Culvert</b> L= 42.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 50.60' / 50.08' S= 0.0124 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf



**21254-PROPOSED**

Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

Prepared by Jones &amp; Beach Engineers Inc

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**Discarded OutFlow** Max=0.06 cfs @ 8.24 hrs HW=50.59' (Free Discharge)↑ **1=Exfiltration** ( Controls 0.06 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=49.20' TW=46.41' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)↑ **4=Culvert** ( Controls 0.00 cfs)↑ **3=Orifice/Grate** ( Controls 0.00 cfs)**Summary for Pond 12P: Subsurface Stone Infiltration #2**

Inflow Area = 0.242 ac, 57.77% Impervious, Inflow Depth = 0.51" for 50 Yr 24 Hr event  
 Inflow = 0.58 cfs @ 12.22 hrs, Volume= 0.010 af  
 Outflow = 0.16 cfs @ 12.45 hrs, Volume= 0.010 af, Atten= 73%, Lag= 13.9 min  
 Discarded = 0.16 cfs @ 12.45 hrs, Volume= 0.010 af  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 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  
 Peak Elev= 53.46' @ 12.45 hrs Surf.Area= 0.008 ac Storage= 0.007 af

Plug-Flow detention time= 28.7 min calculated for 0.010 af (100% of inflow)  
 Center-of-Mass det. time= 28.6 min ( 765.8 - 737.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	51.30'	0.007 af	<b>17.00'W x 20.00'L x 2.21'H Prismatic</b> 0.017 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	51.30'	<b>0.890 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 51.20' Phase-In= 0.01'
#2	Primary	53.50'	<b>14.0' long x 1.0' breadth Broad-Crested Rectangular Weir</b> 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

**Discarded OutFlow** Max=0.16 cfs @ 12.45 hrs HW=53.46' (Free Discharge)↑ **1=Exfiltration** ( Controls 0.16 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=51.30' TW=0.00' (Dynamic Tailwater)↑ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)**Summary for Link 5L: Unit 5 Sump Pump**

Factor of safety of 2 provided

Inflow = 0.04 cfs @ 13.00 hrs, Volume= 0.044 af  
 Primary = 0.04 cfs @ 13.00 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min  
 Routed to Pond 5P : Subsurface Stone Infiltration #3

**21254-PROPOSED**

Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

Prepared by Jones &amp; Beach Engineers Inc

Printed 12/21/2022

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Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

29 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, cfs =

0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03
0.03	0.03	0.03	0.04	0.04	0.04	0.03	0.03	0.03	0.03
0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	

**Summary for Link 6L: Unit 6 Sump Pump**

Factor of safety of 2 provided

---

Inflow = 0.04 cfs @ 2.00 hrs, Volume= 0.007 af  
 Primary = 0.04 cfs @ 2.00 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min  
 Routed to Pond 5P : Subsurface Stone Infiltration #3

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

5 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, cfs =

0.00	0.02	0.04	0.02	0.00
------	------	------	------	------

**Summary for Link 7L: Unit 7 Sump Pump**

Factor of safety of 2 provided

---

Inflow = 0.04 cfs @ 10.00 hrs, Volume= 0.036 af  
 Primary = 0.04 cfs @ 10.00 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min  
 Routed to Pond 11P : Subsurface Stone Infiltration #4

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

23 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, cfs =

0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.03
0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.01	0.01
0.01	0.00	0.00							

**Summary for Link 8L: Unit 8 Sump Pump**

Factor of safety of 2 provided

---

Inflow = 0.04 cfs @ 6.00 hrs, Volume= 0.020 af  
 Primary = 0.04 cfs @ 6.00 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min  
 Routed to Pond 11P : Subsurface Stone Infiltration #4

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

16 Point manual hydrograph, To= 0.00 hrs, dt= 1.00 hrs, cfs =

0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.03	0.03	0.02
0.01	0.01	0.00	0.00	0.00	0.00				

## APPENDIX III

### **Test Pit Logs**



GOVE ENVIRONMENTAL SERVICES, INC.  
TEST PIT DATA

Project: 212 Woodbury Ave, Portsmouth  
Client: Tuck Realty Corp.  
GES Project No. 2021307  
MM/DD/YY Staff 3-18-2022 JPG

**Test Pit No. 1**

ESHW: 21" 2" gravel at surface.

Termination @ 43"

Refusal: None NRCS : Woodbridge

Obs. Water: 40"

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-9"	10YR 3/2	FSL	GR	FR	NONE
9-21"	10YR 4/6	FSL	GR	FR	NONE
21-43"	2.5Y 5/2	FSL	PL	FI	30%, Distinct

**Test Pit No. 2**

ESHW: 30"

Termination @ 51"

Refusal: None NRCS : Woodbridge

Obs. Water: None

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-9"	10YR 3/2	FSL	GR	FR	NONE
9-30"	10YR 4/6	FSL	GR	FR	NONE
30-51"	2.5Y 5/3	FSL	PL	FI	20%, Distinct

**Test Pit No. 3**

ESHW: 27"

Termination @ 45"

Refusal: None NRCS : Woodbridge

Obs. Water: None

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-9"	10YR 3/2	FSL	GR	FR	NONE
9-27"	10YR 4/6	FSL	GR	FR	NONE
27-45"	2.5Y 5/3	FSL	PL	FI	20%, Distinct

**Test Pit No. 4**

ESHWT: 15"

Termination @ 41"

Refusal: None - boulder

Obs. Water: None

NRCS : Woodbridge

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-8"	10YR 3/2	FSL	GR	FR	NONE
8-15"	2.5Y 5/4	FSL	GR	FR	NONE
15-41"	2.5Y 5/3	FSL	PL	FI	10%, Distinct

**Test Pit No. 5**

ESHWT: 27"

Termination @ 50"

Refusal: None - stony

Obs. Water: None

NRCS : Woodbridge

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-12"	10YR 3/2	FSL	GR	FR	NONE
12-27"	10YR 4/6	FSL	GR	FR	NONE
27-50"	2.5Y 5/3	FSL	PL	FI	10%, Distinct

**Test Pit No. 6**

ESHWT: 26"

Termination @ 45"

Refusal: None

Obs. Water: None

NRCS : Woodbridge

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-10"	10YR 3/2	FSL	GR	FR	NONE
10-26"	10YR 5/6	FSL	GR	FR	NONE
26-45"	2.5Y 5/3	FSL	PL	FI	10%, Distinct

**Test Pit No. 7**

ESHWT: 26"

Termination @ 40"

Refusal: None

Obs. Water: None

NRCS : Woodbridge

Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0-9"	10YR 3/2	FSL	GR	FR	NONE
9-26"	10YR 4/6	FSL	GR	FR	NONE
26-40"	2.5Y 5/3	FSL	PL	FI	10%, Distinct

Legend:

FSL = fine sandy loam

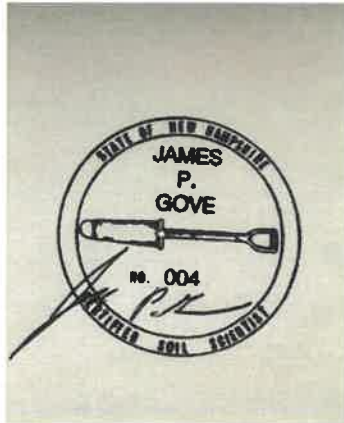
GR = granular

FR = friable

PL = platy

FI = firm

Soil Colors at Munsell.



3-22-2022

**TEST PITS  
FOR  
214 WOODBURY AVENUE  
PORTSMOUTH, NEW HAMPSHIRE  
SEPTEMBER 7, 2022  
JBE Project No. 21254**

Performed by: Anthony Jones, Jones & Beach Engineers, Inc., SSD #1900

**Test Pit #8**

0"- 8"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
8"- 22"	10YR 4/6	dark yellowish brown fine sandy loam granular, friable common roots
22" – 35"	2.5Y 5/3	light olive brown fine sandy loam platey, firm few, distinct redox

SHWT = 22"

Roots: 22"

No H<sub>2</sub>O observed

Refusal @ 35"

Perc Rate = 14 min/inch

**Test Pit #9**

0"- 8"	10YR 3/2	very dark grayish brown fine sandy loam granular, friable many roots
8"- 27"	10YR 4/6	dark yellowish brown fine sandy loam granular, friable common roots
27" – 40"	2.5Y 5/3	light olive brown fine sandy loam platey, firm common, distinct redox

SHWT = 27"

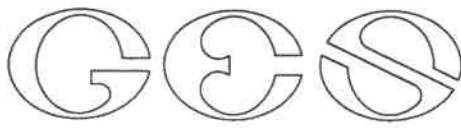
Roots: 27"

No H<sub>2</sub>O observed

Refusal @ 40"

Perc Rate = 14 min/inch





GOVE ENVIRONMENTAL SERVICES, INC.

## TEST PIT DATA

Project – Woodbury Avenue, Portsmouth, NH

Client - Jones & Beach Engineers, Inc.

GES Project No. 2022091

MM/DD/YY Staff 11-17-2022 JPG

### Test Pit No. 10

ESHWT: 24"

Termination @ 72"

Refusal: None

Obs. Water: None

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0-24"	10YR 3/3	FSL	GR	FR	NONE , Fill
24-47"	2.5Y 6/4	FSL	GR	FR	5%, Bw
47-72"	2.5Y5/3	SL	PL	FI	5%, Cd

### Test Pit No. 11

ESHWT: 37"

Termination @ 72"

Refusal: None

Obs. Water: None

Depth	Color	Texture	Structure	Consistence	Redox %, Layer
0-20"	10YR 3/2	FSL	GR	FR	NONE , Ap
20-37"	10YR 5/4	FSL	GR	FR	NONE, Bw
37-72"	2.5Y5/3	SL	PL	FI	5%, Cd

8 Continental Dr Bldg 2 Unit H, Exeter, NH 03833-7526

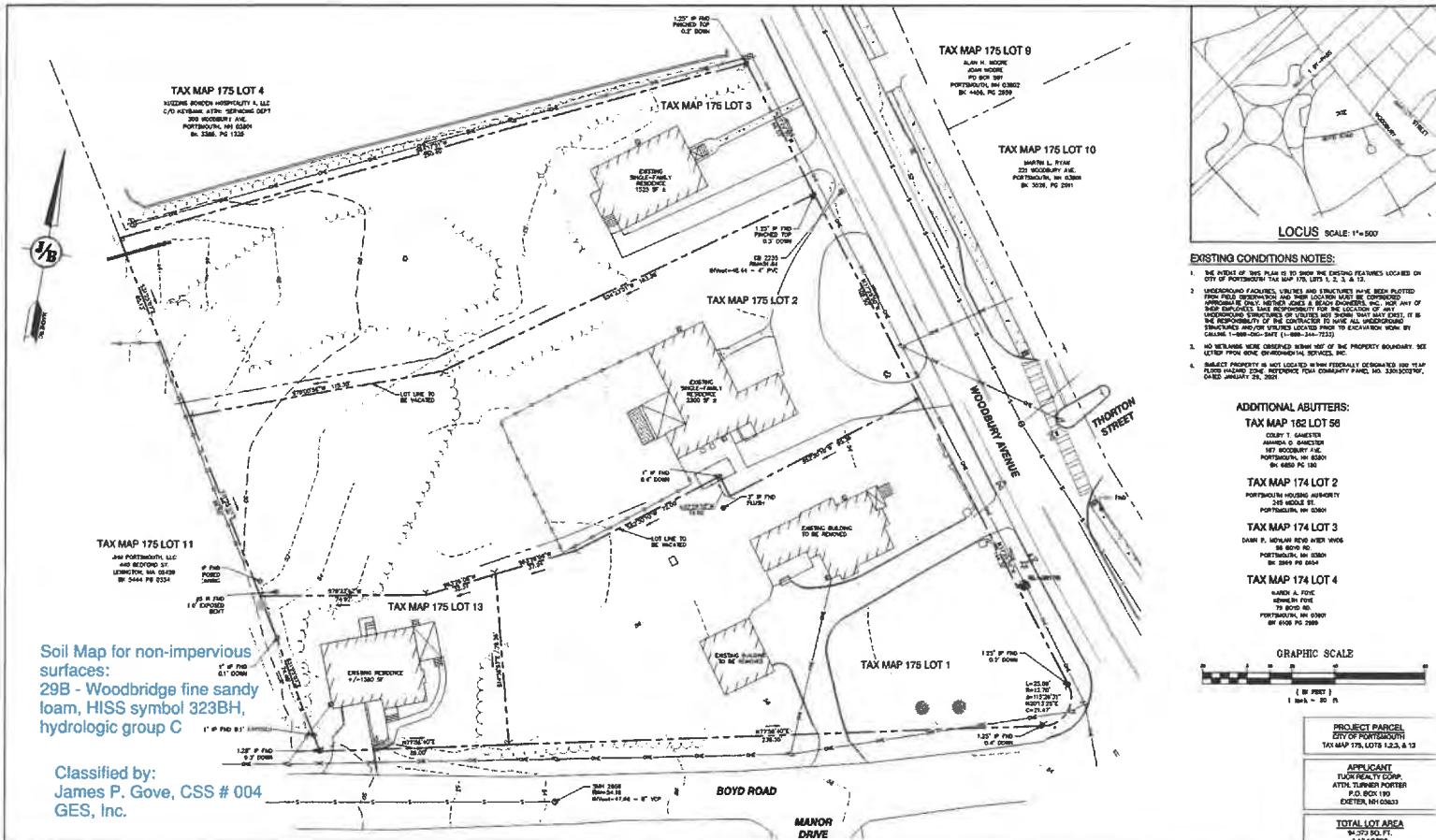
Ph (603) 778 0644 / Fax (603) 778 0654

*info@gesinc.biz*

*www.gesinc.biz*

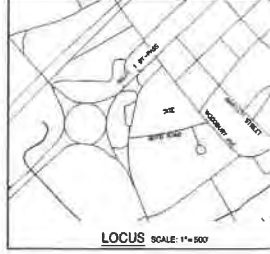
## APPENDIX IV

### **Professional Soil Classification Exhibit**



Soil Map for non-impervious surfaces:  
29B - Woodbridge fine sandy loam, HISS symbol 323BH, hydrologic group C

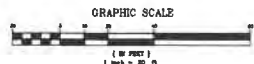
Classified by:  
James P. Gove, CSS # 004  
GES, Inc.



- EXISTING CONDITIONS NOTES:**
- THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING FEATURES LOCATED ON CITY OF PORTSMOUTH TAX MAP 175, LOTS 1, 2, 3, & 13.
  - UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN LOCATED FROM FIELD OBSERVATION AND THIS LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NO FIELD GROUND OR RECORD DOCUMENTS, NOR ANY OF THEM, SHALL BE USED TO DETERMINE THE LOCATION OF ANY UNDERGROUND FACILITIES OR UTILITIES. THE USER MUST BE AWARE THAT THE RESPONSIBILITY OF THE USER TO DETERMINE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 1-800-368-5874 (1-800-334-7333).
  - NO RECORDS WERE OBSERVED WITHIN THE CITY OF PORTSMOUTH, NEW HAMPSHIRE, RECORDS DEPARTMENT.
  - SUBJECT PROPERTY IS NOT LOCATED WITHIN PREVIOUSLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 3305C0007, DATED JANUARY 28, 2001.

**ADDITIONAL ADJUTERS:**

- TAX MAP 162 LOT 56**  
COLBY T. GANES  
167 BROADWAY AVE.  
PORTSMOUTH, NH 03801  
BX 4889 PG 185
- TAX MAP 174 LOT 2**  
PORTSMOUTH HOUSING AUTHORITY  
PORTSMOUTH, NH 03801
- TAX MAP 174 LOT 3**  
DARR F. MOYLAN REVISED 1985  
88 BOND RD.  
PORTSMOUTH, NH 03801  
BX 3889 PG 054
- TAX MAP 174 LOT 4**  
WALTER A. FORD  
BOWEN FORD  
79 BOND RD.  
PORTSMOUTH, NH 03801  
BX 6108 PG 288



Drawn: JAC	Check: AGH	Date: 07/26/07
Checked: JAC	Scale: 1"=50'	Project: 21284
Drawn: JAC	Scale: 1"=50'	Project: 21284

REV.	DATE	REVISION	BY
1	3/21/02	REVISED PER CLIENT	CLM
2	1/6/02	ISSUED FOR REVIEW	AGH

**J/B Jones & Beach Engineers, Inc.**  
Civil Engineering Services  
88 Portsmouth Ave.  
PO Box 219  
Seabrook, NH 03888  
803-773-4749  
FAX: 803-773-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	<b>EXISTING CONDITIONS PLAN</b>
Project:	<b>"GRAPEVINE RUN"</b> PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY II & JOYCE S. NELSON 4 SHORE RD., WOLFESBORO, NH 03884
Drawing No:	<b>C1</b>

## APPENDIX V

### **NRCS Soil Map**

Soil Map—Rockingham County, New Hampshire  
(Grapevine Run)







































Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

6/15/2022  
Page 1 of 3

Soil Map—Rockingham County, New Hampshire  
(Grapevine Run)

## MAP LEGEND

<b>Area of Interest (AOI)</b>			Spoil Area
	Area of Interest (AOI)		Stony Spot
<b>Soils</b>			Very Stony Spot
	Soil Map Unit Polygons		Wet Spot
	Soil Map Unit Lines		Other
	Soil Map Unit Points		Special Line Features
<b>Special Point Features</b>		<b>Water Features</b>	
	Blowout		Streams and Canals
	Borrow Pit	<b>Transportation</b>	
	Clay Spot		Rails
	Closed Depression		Interstate Highways
	Gravel Pit		US Routes
	Gravelly Spot		Major Roads
	Landfill		Local Roads
	Lava Flow	<b>Background</b>	
	Marsh or swamp		Aerial Photography
	Mine or Quarry		
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

## 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 24, Aug 31, 2021

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

Date(s) aerial images were photographed: Sep 19, 2021—Nov 1, 2021

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
799	Urban land-Canton complex, 3 to 15 percent slopes	2.4	100.0%
<b>Totals for Area of Interest</b>		<b>2.4</b>	<b>100.0%</b>

## APPENDIX VI

### **Extreme Precipitation Estimates**



Select Product?

Extreme Precipitation  
Tables - HTML?

Extreme Precipitation  
Tables - Text/CSV?

Partial Duration Series -  
by Point?

Partial Duration Series -  
by Station?

Distribution Curves -  
Graphical?

Distribution Curves -  
Text/TBL?

Intensity Frequency  
Duration Graphs?

Precipitation Frequency  
Duration Graphs?

GIS Data Files?

Regional/State Maps?

Select Location? Double-click the map to place a marker, or enter address or latitude/longitude.

Locate by Address?

212 woodbury ave., port

Locate by Lat/Lon?

°N

°W

Locate by State/County?



Map data ©2022 Imagery ©2022, CNES / Airbus, Maine GeoLibrary, Maxar Technologies, U.S. Geological Survey, USDA/FPAC/GEO

Select Options?

Smoothing?

Yes

Delivery?

Popup

Submit?

# Extreme Precipitation Tables

## Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.777 degrees West
Latitude	43.073 degrees North
Elevation	0 feet
Date/Time	Wed, 04 May 2022 15:24:32 -0400

## 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	0.81	1.04	1yr	0.70	0.98	1.21	1.56	2.03	2.66	2.92	1yr	2.35	2.81	3.22	3.94	4.55	1yr
2yr	0.32	0.50	0.62	0.81	1.02	1.30	2yr	0.88	1.18	1.52	1.94	2.49	3.21	3.57	2yr	2.84	3.43	3.94	4.68	5.33	2yr
5yr	0.37	0.58	0.73	0.97	1.25	1.60	5yr	1.08	1.46	1.88	2.43	3.14	4.07	4.58	5yr	3.60	4.40	5.04	5.93	6.70	5yr
10yr	0.41	0.65	0.82	1.11	1.45	1.89	10yr	1.25	1.72	2.23	2.89	3.75	4.87	5.53	10yr	4.31	5.32	6.08	7.11	7.98	10yr
25yr	0.48	0.76	0.96	1.33	1.77	2.33	25yr	1.53	2.14	2.77	3.62	4.74	6.17	7.10	25yr	5.46	6.83	7.80	9.02	10.05	25yr
50yr	0.53	0.86	1.10	1.53	2.06	2.75	50yr	1.78	2.52	3.28	4.32	5.66	7.39	8.58	50yr	6.54	8.25	9.42	10.81	11.98	50yr
100yr	0.59	0.96	1.24	1.76	2.41	3.24	100yr	2.08	2.97	3.89	5.15	6.76	8.86	10.38	100yr	7.84	9.98	11.37	12.96	14.28	100yr
200yr	0.67	1.10	1.42	2.04	2.81	3.82	200yr	2.43	3.50	4.60	6.11	8.07	10.61	12.55	200yr	9.39	12.07	13.74	15.55	17.04	200yr
500yr	0.79	1.31	1.70	2.47	3.46	4.74	500yr	2.98	4.36	5.74	7.68	10.21	13.49	16.15	500yr	11.94	15.53	17.65	19.78	21.52	500yr

## Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.73	0.89	1yr	0.63	0.87	0.92	1.32	1.67	2.22	2.51	1yr	1.97	2.41	2.86	3.16	3.88	1yr
2yr	0.31	0.49	0.60	0.81	1.00	1.19	2yr	0.86	1.16	1.37	1.82	2.34	3.06	3.45	2yr	2.70	3.32	3.82	4.55	5.08	2yr
5yr	0.35	0.54	0.67	0.92	1.17	1.40	5yr	1.01	1.37	1.61	2.12	2.74	3.79	4.20	5yr	3.36	4.04	4.72	5.54	6.25	5yr
10yr	0.39	0.59	0.73	1.03	1.33	1.60	10yr	1.14	1.56	1.81	2.39	3.06	4.38	4.87	10yr	3.87	4.69	5.45	6.42	7.21	10yr

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
<b>25yr</b>	0.44	0.67	0.83	1.19	1.56	1.90	<b>25yr</b>	1.35	1.86	2.10	2.76	3.54	4.70	5.91	<b>25yr</b>	4.16	5.69	6.67	7.81	8.70	<b>25yr</b>
<b>50yr</b>	0.48	0.73	0.91	1.31	1.77	2.17	<b>50yr</b>	1.52	2.12	2.35	3.08	3.94	5.31	6.83	<b>50yr</b>	4.70	6.57	7.76	9.07	10.04	<b>50yr</b>
<b>100yr</b>	0.54	0.81	1.02	1.47	2.01	2.47	<b>100yr</b>	1.74	2.42	2.63	3.43	4.37	5.96	7.89	<b>100yr</b>	5.27	7.59	9.02	10.54	11.59	<b>100yr</b>
<b>200yr</b>	0.59	0.89	1.13	1.64	2.28	2.82	<b>200yr</b>	1.97	2.75	2.94	3.80	4.82	6.67	9.12	<b>200yr</b>	5.90	8.77	10.49	12.27	13.41	<b>200yr</b>
<b>500yr</b>	0.69	1.02	1.32	1.91	2.72	3.37	<b>500yr</b>	2.35	3.29	3.41	4.34	5.49	7.75	11.03	<b>500yr</b>	6.86	10.61	12.81	15.02	16.23	<b>500yr</b>

## Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
<b>1yr</b>	0.28	0.44	0.54	0.72	0.89	1.08	<b>1yr</b>	0.77	1.06	1.26	1.74	2.21	2.99	3.15	<b>1yr</b>	2.65	3.03	3.58	4.38	5.05	<b>1yr</b>
<b>2yr</b>	0.34	0.52	0.64	0.86	1.06	1.27	<b>2yr</b>	0.92	1.24	1.48	1.96	2.51	3.43	3.70	<b>2yr</b>	3.03	3.56	4.08	4.83	5.64	<b>2yr</b>
<b>5yr</b>	0.40	0.62	0.76	1.05	1.33	1.62	<b>5yr</b>	1.15	1.58	1.88	2.53	3.25	4.34	4.95	<b>5yr</b>	3.84	4.76	5.37	6.36	7.14	<b>5yr</b>
<b>10yr</b>	0.47	0.72	0.89	1.24	1.61	1.97	<b>10yr</b>	1.39	1.93	2.28	3.10	3.94	5.34	6.19	<b>10yr</b>	4.72	5.95	6.79	7.82	8.74	<b>10yr</b>
<b>25yr</b>	0.57	0.87	1.09	1.55	2.04	2.56	<b>25yr</b>	1.76	2.50	2.95	4.06	5.13	7.81	8.31	<b>25yr</b>	6.91	7.99	9.10	10.31	11.39	<b>25yr</b>
<b>50yr</b>	0.67	1.02	1.27	1.82	2.45	3.12	<b>50yr</b>	2.11	3.05	3.59	4.99	6.29	9.78	10.41	<b>50yr</b>	8.66	10.01	11.37	12.69	13.93	<b>50yr</b>
<b>100yr</b>	0.78	1.19	1.49	2.15	2.94	3.79	<b>100yr</b>	2.54	3.71	4.36	6.14	7.72	12.25	13.04	<b>100yr</b>	10.84	12.54	14.20	15.65	17.05	<b>100yr</b>
<b>200yr</b>	0.92	1.38	1.75	2.53	3.53	4.63	<b>200yr</b>	3.05	4.52	5.32	7.55	9.47	15.38	16.35	<b>200yr</b>	13.61	15.72	17.75	19.28	20.87	<b>200yr</b>
<b>500yr</b>	1.14	1.69	2.18	3.16	4.50	6.00	<b>500yr</b>	3.88	5.87	6.90	9.98	12.44	20.79	22.06	<b>500yr</b>	18.40	21.21	23.87	25.41	27.28	<b>500yr</b>

## APPENDIX VII

### **Amoozometer Test Results**

**Pit #1 - Test #1**

Height	Constant	Time		Outflow	Rate ( $K_{sat}$ )	
cm	cm <sup>2</sup>	Minutes	Hours	cm <sup>3</sup> /hr	cm/hr	in/hr
0						
6.8	20	0.5	0.008333	16320.0	17.2339	6.7850
10.5	20	1	0.016667	12600.0	13.3056	5.2384
13	20	1.5	0.025	10400.0	10.9824	4.3238
15.1	20	2	0.033333	9060.0	9.5674	3.7667
19.5	20	3	0.05	7800.0	8.2368	3.2428
23.6	20	4	0.066667	7080.0	7.4765	2.9435
28.1	20	5	0.083333	6744.0	7.1217	2.8038
32.3	20	6	0.1	6460.0	6.8218	2.6857
36.5	20	7	0.116667	6257.1	6.6075	2.6014
40.2	20	8	0.133333	6030.0	6.3677	2.5070

Mean	3.6898
$\sigma$ (Std. Dev.)	1.3236

Constant 20 cm<sup>2</sup>  
 Glover Coefficient: 0.001056 1/cm<sup>2</sup>

**Calculations:**

Constant = 20 cm<sup>2</sup> for one tube, 153 cm<sup>2</sup> for two tubes (one tube used)

Hours = Minutes / 60

Outflow = (Height\*Constant)/Hours

Ksat = Outflow\*Glover Coefficient

**Pit #1 - Test #2**

Height cm	Constant cm <sup>2</sup>	Time		Outflow cm <sup>3</sup> /hr	Rate (K <sub>sat</sub> )	
		Minutes	Hours		cm/hr	in/hr
0						
10.5	20	0.5	0.008333	25200.0	26.6112	10.4769
22.1	20	1.25	0.020833	21216.0	22.4041	8.8205
27.1	20	2	0.033333	16260.0	17.1706	6.7601
30.8	20	2.5	0.041667	14784.0	15.6119	6.1464
33.9	20	3	0.05	13560.0	14.3194	5.6375
36	20	3.5	0.058333	12342.9	13.0341	5.1315
38.9	20	4	0.066667	11670.0	12.3235	4.8518
	105		0	#DIV/0!	#DIV/0!	
	105		0	#DIV/0!	#DIV/0!	
	105		0	#DIV/0!	#DIV/0!	

Mean	6.8321
σ (Std. Dev.)	1.9255

Constant 20 cm<sup>2</sup>  
 Glover Coefficient: 0.001056 1/cm<sup>2</sup>

**Calculations:**

Constant = 20 cm<sup>2</sup> for one tube, 153 cm<sup>2</sup> for two tubes (one tube used)

Hours = Minutes / 60

Outflow = (Height\*Constant)/Hours

Ksat = Outflow\*Glover Coefficient

**Pit #1 - Test #3**

Height	Constant	Time		Outflow	Rate ( $K_{sat}$ )	
cm	cm <sup>2</sup>	Minutes	Hours	cm <sup>3</sup> /hr	cm/hr	in/hr
0						
2.2	20	0.5	0.008333	5280.0	5.5757	2.1951
3	20	1	0.016667	3600.0	3.8016	1.4967
5.7	20	1.5	0.025	4560.0	4.8154	1.8958
7.5	20	2	0.033333	4500.0	4.7520	1.8709
10.8	20	3	0.05	4320.0	4.5619	1.7960
14.1	20	4	0.066667	4230.0	4.4669	1.7586
17.3	20	5	0.083333	4152.0	4.3845	1.7262
20.7	20	6	0.1	4140.0	4.3718	1.7212
23.8	20	7	0.116667	4080.0	4.3085	1.6963
27	20	8	0.133333	4050.0	4.2768	1.6838
30.4	20	9	0.15	4053.3	4.2803	1.6852
33.6	20	10	0.166667	4032.0	4.2578	1.6763

Mean	1.7668
$\sigma$ (Std. Dev.)	0.1621

**Calculations:**

Constant = 20 cm<sup>2</sup> for one tube, 153 cm<sup>2</sup> for two tubes (one tube used)

Hours = Minutes / 60

Outflow = (Height\*Constant)/Hours

Ksat = Outflow\*Glover Coefficient

Constant 20 cm<sup>2</sup>  
Glover Coefficient: 0.001056 1/cm<sup>2</sup>

# Pit #2 - Test #1

Height cm	Constant cm <sup>2</sup>	Time		Outflow cm <sup>3</sup> /hr	Rate (K <sub>sat</sub> )	
		Minutes	Hours		cm/hr	in/hr
0						
5	20	2	0.033333	3000.0	3.1680	1.2472
7.6	20	5	0.083333	1824.0	1.9261	0.7583
12	20	10	0.166667	1440.0	1.5206	0.5987
15.9	20	15	0.25	1272.0	1.3432	0.5288
20	20	20	0.333333	1200.0	1.2672	0.4989
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	

Mean	0.7264
σ (Std. Dev.)	0.2755

Constant 20 cm<sup>2</sup>  
Glover Coefficient: 0.001056 1/cm<sup>2</sup>

## Calculations:

Constant = 20 cm<sup>2</sup> for one tube, 153 cm<sup>2</sup> for two tubes (one tube used)

Hours = Minutes / 60

Outflow = (Height\*Constant)/Hours

Ksat = Outflow\*Glover Coefficient



**Pit #2 - Test #2**

Height cm	Constant cm <sup>2</sup>	Time		Outflow		Rate (K <sub>sat</sub> )	
		Minutes	Hours	cm <sup>3</sup> /hr	cm/hr	in/hr	
0							
9.1	20	5	0.083333	2184.0	2.3063	0.9080	
15.2	20	10	0.166667	1824.0	1.9261	0.7583	
17.5	20	15	0.25	1400.0	1.4784	0.5820	
21.5	20	20	0.333333	1290.0	1.3622	0.5363	
	20		0	#DIV/0!	#DIV/0!		
	20		0	#DIV/0!	#DIV/0!		
	20		0	#DIV/0!	#DIV/0!		
	20		0	#DIV/0!	#DIV/0!		
	20		0	#DIV/0!	#DIV/0!		
	20		0	#DIV/0!	#DIV/0!		
	20		0	#DIV/0!	#DIV/0!		
	20		0	#DIV/0!	#DIV/0!		
	20		0	#DIV/0!	#DIV/0!		

Mean	0.6962
σ (Std. Dev.)	0.1477

Constant 20 cm<sup>2</sup>  
 Glover Coefficient: 0.001056 1/cm<sup>2</sup>

**Calculations:**

Constant = 20 cm<sup>2</sup> for one tube, 153 cm<sup>2</sup> for two tubes (one tube used)

Hours = Minutes / 60

Outflow = (Height\*Constant)/Hours

Ksat = Outflow\*Glover Coefficient

**Pit #2 - Test #3**

Height	Constant	Time		Outflow	Rate ( $K_{sat}$ )	
cm	cm <sup>2</sup>	Minutes	Hours	cm <sup>3</sup> /hr	cm/hr	in/hr
0						
5.6	20	5	0.083333	1344.0	1.4193	0.5588
9.4	20	10	0.166667	1128.0	1.1912	0.4690
13.4	20	15	0.25	1072.0	1.1320	0.4457
17.6	20	20	0.333333	1056.0	1.1151	0.4390
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	
	20		0	#DIV/0!	#DIV/0!	

Mean	0.4781
$\sigma$ (Std. Dev.)	0.0479

Constant 20 cm<sup>2</sup>  
 Glover Coefficient: 0.001056 1/cm<sup>2</sup>

**Calculations:**

Constant = 20 cm<sup>2</sup> for one tube, 153 cm<sup>2</sup> for two tubes (one tube used)

Hours = Minutes / 60

Outflow = (Height\*Constant)/Hours

Ksat = Outflow\*Glover Coefficient

## APPENDIX VIII

### **BMP Worksheets**



## FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: \_\_\_\_\_

**Bioretention #1 (6P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

	Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.24	ac	A = Area draining to the practice
0.14	ac	A <sub>i</sub> = Impervious area draining to the practice
0.58	decimal	I = Percent impervious area draining to the practice, in decimal form
0.57	unitless	R <sub>v</sub> = Runoff coefficient = 0.05 + (0.9 x I)
0.14	ac-in	WQV = 1" x R <sub>v</sub> x A
501	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")
125	cf	25% x WQV (check calc for sediment forebay volume)
375	cf	75% x WQV (check calc for surface sand filter volume)
<b>Sediment Forebay</b>		
165	cf	Method of Pretreatment? (not required for clean or roof runoff) V <sub>SED</sub> = Sediment forebay volume, if used for pretreatment <span style="float: right;">≥ 25%WQV</span>
Calculate time to drain if system IS NOT underdrained:		
502	sf	A <sub>SA</sub> = Surface area of the practice
0.89	iph	K <sub>sat</sub> <sub>DESIGN</sub> = Design infiltration rate <sup>1</sup>
	Yes/No	If K <sub>sat</sub> (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)
13.4	hours	T <sub>DRAIN</sub> = Drain time = V / (A <sub>SA</sub> * I <sub>DESIGN</sub> ) <span style="float: right;">≤ 72-hrs</span>
Calculate time to drain if system IS underdrained:		
	ft	E <sub>WQV</sub> = Elevation of WQV (attach stage-storage table)
	cfs	Q <sub>WQV</sub> = Discharge at the E <sub>WQV</sub> (attach stage-discharge table)
-	hours	T <sub>DRAIN</sub> = Drain time = 2WQV/Q <sub>WQV</sub> <span style="float: right;">≤ 72-hrs</span>
52.25	feet	E <sub>FC</sub> = Elevation of the bottom of the filter course material <sup>2</sup>
	feet	E <sub>UD</sub> = Invert elevation of the underdrain (UD), if applicable
51.13	feet	E <sub>SHWT</sub> = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)
49.95	feet	E <sub>ROCK</sub> = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)
52.25	feet	D <sub>FC to UD</sub> = Depth to UD from the bottom of the filter course <span style="float: right;">≥ 1'</span>
2.30	feet	D <sub>FC to ROCK</sub> = Depth to bedrock from the bottom of the filter course <span style="float: right;">≥ 1'</span>
1.12	feet	D <sub>FC to SHWT</sub> = Depth to SHWT from the bottom of the filter course <span style="float: right;">≥ 1'</span>
54.81	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)
55.00	ft	Elevation of the top of the practice
YES		50 peak elevation ≤ Elevation of the top of the practice <span style="float: right;">← yes</span>
<b>If a surface sand filter or underground sand filter is proposed:</b>		
YES	ac	Drainage Area check. <span style="float: right;">&lt; 10 ac</span>
	cf	V = Volume of storage <sup>3</sup> (attach a stage-storage table) <span style="float: right;">≥ 75%WQV</span>
	inches	D <sub>FC</sub> = Filter course thickness <span style="float: right;">18", or 24" if within GPA</span>
Sheet		Note what sheet in the plan set contains the filter course specification.
Yes/No		Access grate provided? <span style="float: right;">← yes</span>



**21254-PROPOSED**

Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

Prepared by Jones and Beach Engineers, Inc.

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**Stage-Area-Storage for Pond 6P: Bioretention #1**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	
51.24	502	0	53.84	535	365	
51.29	502	10	53.89	553	393	
51.34	502	20	53.94	572	421	
51.39	502	30	53.99	591	450	
51.44	502	40	54.04	626	480	
51.49	502	50	54.09	665	512	
51.54	502	60	54.14	706	547	Elevation of overflow risers = 54.15
51.59	502	70	54.19	748	583	Vol. below = 547 cf
51.64	502	80	54.24	791	622	Vol. Sediment forebay (included in WQV calculation) = 165 cf
51.69	502	90	54.29	835	662	Vol. below filter course (excluded from WQV calculation) = 201 cf
51.74	502	100	54.34	881	705	
51.79	502	110	54.39	928	750	
51.84	502	120	54.44	976	798	
51.89	502	131	54.49	1,025	848	
51.94	502	141	54.54	1,060	900	
51.99	502	151	54.59	1,093	954	WQV Required = 501 cf
52.04	502	161	54.64	1,126	1,009	
52.09	502	171	54.69	1,159	1,066	WQV Provided
52.14	502	181	54.74	1,193	1,125	547+165-201 = 511 cf
52.19	502	191	54.79	1,227	1,186	
Bottom of filter course El. = 52.25 Vol. below = 201 cf Excluded from WQV Calculation	52.24	201	54.84	1,262	1,248	
	52.29	205	54.89	1,297	1,312	
	52.34	208	54.94	1,333	1,378	
	52.39	212	54.99	1,369	1,445	
	52.44	216				
	52.49	220				
	52.54	223				
	52.59	227				
	52.64	231				
	52.69	235				
	52.74	238				
	52.79	242				
	52.84	246				
	52.89	250				
	52.94	254				
	52.99	257				
	53.04	261				
	53.09	265				
	53.14	269				
	53.19	272				
	53.24	276				
	53.29	280				
	53.34	284				
	53.39	287				
	53.44	291				
	53.49	295				
	53.54	299				
	53.59	302				
	53.64	306				
	53.69	310				
	53.74	314				
	53.79	339				



## FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: \_\_\_\_\_

**Bioretention #2 (2P) SEE DESIGNER NOTES BELOW**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.88	ac	A = Area draining to the practice	
0.36	ac	A <sub>I</sub> = Impervious area draining to the practice	
0.41	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.42	unitless	R <sub>v</sub> = Runoff coefficient = 0.05 + (0.9 x I)	
0.37	ac-in	WQV = 1" x R <sub>v</sub> x A	
1,346	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
336	cf	25% x WQV (check calc for sediment forebay volume)	
1,009	cf	75% x WQV (check calc for surface sand filter volume)	
Pre-Tx		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V <sub>SED</sub> = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
1,080	sf	A <sub>SA</sub> = Surface area of the practice	
0.30	iph	K <sub>sat</sub> <sub>DESIGN</sub> = Design infiltration rate <sup>1</sup>	
		If K <sub>sat</sub> (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
49.8	hours	T <sub>DRAIN</sub> = Drain time = V / (A <sub>SA</sub> * I <sub>DESIGN</sub> )	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
	ft	E <sub>WQV</sub> = Elevation of WQV (attach stage-storage table)	
	cfs	Q <sub>WQV</sub> = Discharge at the E <sub>WQV</sub> (attach stage-discharge table)	
	- hours	T <sub>DRAIN</sub> = Drain time = 2WQV/Q <sub>WQV</sub>	≤ 72-hrs
47.75	feet	E <sub>FC</sub> = Elevation of the bottom of the filter course material <sup>2</sup>	
	feet	E <sub>UD</sub> = Invert elevation of the underdrain (UD), if applicable	
46.25	feet	E <sub>SHWT</sub> = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
44.42	feet	E <sub>ROCK</sub> = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
47.75	feet	D <sub>FC to UD</sub> = Depth to UD from the bottom of the filter course	≥ 1'
3.33	feet	D <sub>FC to ROCK</sub> = Depth to bedrock from the bottom of the filter course	≥ 1'
1.50	feet	D <sub>FC to SHWT</sub> = Depth to SHWT from the bottom of the filter course	≥ 1'
51.29	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
51.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes
<b>If a surface sand filter or underground sand filter is proposed:</b>			
YES	ac	Drainage Area check.	< 10 ac
	cf	V = Volume of storage <sup>3</sup> (attach a stage-storage table)	≥ 75%WQV
	inches	D <sub>FC</sub> = 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
1,361	cf	V = Volume of storage <sup>3</sup> (attach a stage-storage table)	≥ WQV
18.0	inches	D <sub>FC</sub> = 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	≥ 3:1
Sheet	L1	Note what sheet in the plan set contains the planting plans and surface cover	
<b>If porous pavement is proposed:</b>			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A <sub>SA</sub> = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
	inches	D <sub>FC</sub> = Filter course thickness	12", or 18" if within GPA
			mod. 304.1 (see spec)
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). K<sub>sat<sub>design</sub></sub> includes factor of safety. 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 structure, 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:

"Area draining to practice" excludes Eco-Paver driveways and subsurface stone basins, which are hydraulically routed to the bioretention in HydroCAD. Therefore there is a slight discrepancy, but these practices do not actually overflow to the bioretention system.



**21254-PROPOSED**

Type III 24-hr 50 Yr 24 Hr Rainfall=7.39"

Prepared by Jones &amp; Beach Engineers Inc

Printed 12/16/2022

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**Stage-Area-Storage for Pond 2P: Bioretention #2**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
46.41	1,080	0	49.01	1,080	780
46.46	1,080	22	49.06	1,080	788
46.51	1,080	43	49.11	1,080	797
46.56	1,080	65	49.16	1,080	805
46.61	1,080	86	49.21	1,080	813
46.66	1,080	108	49.26	1,127	839
46.71	1,080	130	49.31	1,376	902
46.76	1,080	151	49.36	1,650	977
46.81	1,080	173	49.41	1,949	1,067
46.86	1,080	194	49.46	2,273	1,173
46.91	1,080	216	49.51	2,558	1,295
46.96	1,080	238	49.56	2,599	1,424
47.01	1,080	259	49.61	2,640	1,555
47.06	1,080	281	49.66	2,681	1,688
47.11	1,080	302	49.71	2,723	1,823
47.16	1,080	324	49.76	2,765	1,960
47.21	1,080	346	49.81	2,807	2,099
47.26	1,080	367	49.86	2,850	2,241
47.31	1,080	389	49.91	2,893	2,384
47.36	1,080	410	49.96	2,936	2,530
47.41	1,080	432	50.01	2,979	2,678
47.46	1,080	454	50.06	3,020	2,828
47.51	1,080	475	50.11	3,061	2,980
47.56	1,080	497	50.16	3,102	3,134
47.61	1,080	518	50.21	3,144	3,290
47.66	1,080	540	50.26	3,186	3,448
47.71	1,080	562	50.31	3,228	3,609
47.76	1,080	578	50.36	3,271	3,771
47.81	1,080	586	50.41	3,313	3,936
47.86	1,080	594	50.46	3,356	4,102
47.91	1,080	602	50.51	3,400	4,271
47.96	1,080	610	50.56	3,443	4,442
48.01	1,080	618	50.61	3,487	4,616
48.06	1,080	626	50.66	3,531	4,791
48.11	1,080	635	50.71	3,576	4,969
48.16	1,080	643	50.76	3,621	5,149
48.21	1,080	651	50.81	3,666	5,331
48.26	1,080	659	50.86	3,711	5,515
48.31	1,080	667	50.91	3,756	5,702
48.36	1,080	675	50.96	3,802	5,891
48.41	1,080	683	51.01	3,848	6,082
48.46	1,080	691	51.06	3,893	6,276
48.51	1,080	699	51.11	3,938	6,472
48.56	1,080	707	51.16	3,983	6,670
48.61	1,080	716	51.21	4,029	6,870
48.66	1,080	724	51.26	4,074	7,072
48.71	1,080	732	51.31	4,121	7,277
48.76	1,080	740	51.36	4,167	7,484
48.81	1,080	748	51.41	4,213	7,694
48.86	1,080	756	51.46	4,260	7,906
48.91	1,080	764	51.51	4,331	8,120
48.96	1,080	772			

Bottom of filter course el. = 47.75  
 Vol. below = 576 cf  
 Excluded from WQV calculation

Overflow riser el. = 49.75  
 Vol. below riser = 1,937 cf  
 WQV Required = 1,346 cf

WQV Provided  
 1937-576 = 1,361 cf



## FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

**Type/Node Name:** \_\_\_\_\_

**Unit 6 Permeable Paver Driveway (7P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.03	ac	A = Area draining to the practice	
0.03	ac	A <sub>I</sub> = Impervious area draining to the practice	
1.00	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95	unitless	R <sub>v</sub> = Runoff coefficient = 0.05 + (0.9 x I)	
0.03	ac-in	WQV = 1" x R <sub>v</sub> x A	
103	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
26	cf	25% x WQV (check calc for sediment forebay volume)	
78	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
cf		V <sub>SED</sub> = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
421	sf	A <sub>SA</sub> = Surface area of the practice	
0.30	iph	K <sub>sat</sub> <sub>DESIGN</sub> = Design infiltration rate <sup>1</sup>	
		If K <sub>sat</sub> (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
Yes/No		(Use the calculations below)	
9.8	hours	T <sub>DRAIN</sub> = Drain time = V / (A <sub>SA</sub> * I <sub>DESIGN</sub> )	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
ft		E <sub>WQV</sub> = Elevation of WQV (attach stage-storage table)	
cfs		Q <sub>WQV</sub> = Discharge at the E <sub>WQV</sub> (attach stage-discharge table)	
-	hours	T <sub>DRAIN</sub> = Drain time = 2WQV/Q <sub>WQV</sub>	≤ 72-hrs
feet		E <sub>FC</sub> = Elevation of the bottom of the filter course material <sup>2</sup>	
feet		E <sub>UD</sub> = Invert elevation of the underdrain (UD), if applicable	
feet		E <sub>SHWT</sub> = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
feet		E <sub>ROCK</sub> = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	D <sub>FC to UD</sub> = Depth to UD from the bottom of the filter course	≥ 1'
-	feet	D <sub>FC to ROCK</sub> = Depth to bedrock from the bottom of the filter course	≥ 1'
-	feet	D <sub>FC to SHWT</sub> = Depth to SHWT from the bottom of the filter course	≥ 1'
ft		Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
ft		Elevation of the top of the practice	
-		50 peak elevation ≤ Elevation of the top of the practice	← yes
<b>If a surface sand filter or underground sand filter is proposed:</b>			
YES	ac	Drainage Area check.	< 10 ac
cf		V = Volume of storage <sup>3</sup> (attach a stage-storage table)	≥ 75%WQV
inches		D <sub>FC</sub> = 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

YES	ac	Drainage Area no larger than 5 ac?	← yes
	cf	V = Volume of storage <sup>3</sup> (attach a stage-storage table)	≥ WQV
	inches	D <sub>FC</sub> = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	≥ 3:1
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
<b>If porous pavement is proposed:</b>			
	Pavers	Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
0.0	acres	A <sub>SA</sub> = Surface area of the pervious pavement	
3.0	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
12.0	inches	D <sub>FC</sub> = Filter course thickness	12", or 18" if within GPA
Sheet	D4	Note what sheet in the plan set contains the filter course spec.	mod. 304.1 (see spec)

- Designer's Notes:



## FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

**Type/Node Name:** Unit 7 Permeable Paver Driveway (8P)

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

	Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.03 ac	A = Area draining to the practice	
0.03 ac	A <sub>I</sub> = Impervious area draining to the practice	
1.00 decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95 unitless	R <sub>v</sub> = Runoff coefficient = 0.05 + (0.9 x I)	
0.03 ac-in	WQV = 1" x R <sub>v</sub> x A	
103 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
26 cf	25% x WQV (check calc for sediment forebay volume)	
78 cf	75% x WQV (check calc for surface sand filter volume)	
	Method of Pretreatment? (not required for clean or roof runoff)	
cf	V <sub>SED</sub> = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
<b>Calculate time to drain if system IS NOT underdrained:</b>		
421 sf	A <sub>SA</sub> = Surface area of the practice	
0.30 iph	K <sub>sat</sub> <sub>DESIGN</sub> = Design infiltration rate <sup>1</sup>	
	If K <sub>sat</sub> (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
Yes/No	(Use the calculations below)	
9.8 hours	T <sub>DRAIN</sub> = Drain time = V / (A <sub>SA</sub> * I <sub>DESIGN</sub> )	≤ 72-hrs
<b>Calculate time to drain if system IS underdrained:</b>		
ft	E <sub>WQV</sub> = Elevation of WQV (attach stage-storage table)	
cfs	Q <sub>WQV</sub> = Discharge at the E <sub>WQV</sub> (attach stage-discharge table)	
- hours	T <sub>DRAIN</sub> = Drain time = 2WQV/Q <sub>WQV</sub>	≤ 72-hrs
feet	E <sub>FC</sub> = Elevation of the bottom of the filter course material <sup>2</sup>	
feet	E <sub>UD</sub> = Invert elevation of the underdrain (UD), if applicable	
feet	E <sub>SHWT</sub> = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
feet	E <sub>ROCK</sub> = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
- feet	D <sub>FC to UD</sub> = Depth to UD from the bottom of the filter course	≥ 1'
- feet	D <sub>FC to ROCK</sub> = Depth to bedrock from the bottom of the filter course	≥ 1'
- feet	D <sub>FC to SHWT</sub> = Depth to SHWT from the bottom of the filter course	≥ 1'
ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
ft	Elevation of the top of the practice	
-	50 peak elevation ≤ Elevation of the top of the practice	← yes
<b>If a surface sand filter or underground sand filter is proposed:</b>		
YES ac	Drainage Area check.	< 10 ac
cf	V = Volume of storage <sup>3</sup> (attach a stage-storage table)	≥ 75%WQV
inches	D <sub>FC</sub> = 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

<b>If a bioretention area is proposed:</b>			
YES	ac	Drainage Area no larger than 5 ac?	← yes
	cf	V = Volume of storage <sup>3</sup> (attach a stage-storage table)	≥ WQV
	inches	D <sub>FC</sub> = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	≥ 3:1
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
<b>If porous pavement is proposed:</b>			
	Pavers	Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	0.0 acres	A <sub>SA</sub> = Surface area of the pervious pavement	
3.0	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
	12.0 inches	D <sub>FC</sub> = Filter course thickness	12", or 18" if within GPA
			mod. 304.1 (see spec)
Sheet	D4	Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). K<sub>sat<sub>design</sub></sub> includes factor of safety. 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 structure, 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:

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## FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

**Type/Node Name:** Unit 8 Permeable Paver Driveway (9P)

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.05	ac	A = Area draining to the practice	
0.03	ac	A <sub>I</sub> = Impervious area draining to the practice	
0.67	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.65	unitless	R <sub>v</sub> = Runoff coefficient = 0.05 + (0.9 x I)	
0.03	ac-in	WQV = 1" x R <sub>v</sub> x A	
106	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
27	cf	25% x WQV (check calc for sediment forebay volume)	
80	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V <sub>SED</sub> = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
<b>Calculate time to drain if system IS NOT underdrained:</b>			
421	sf	A <sub>SA</sub> = Surface area of the practice	
0.30	iph	K <sub>sat</sub> <sub>DESIGN</sub> = Design infiltration rate <sup>1</sup>	
		If K <sub>sat</sub> (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
10.1	hours	T <sub>DRAIN</sub> = Drain time = V / (A <sub>SA</sub> * I <sub>DESIGN</sub> )	≤ 72-hrs
<b>Calculate time to drain if system IS underdrained:</b>			
	ft	E <sub>WQV</sub> = Elevation of WQV (attach stage-storage table)	
	cfs	Q <sub>WQV</sub> = Discharge at the E <sub>WQV</sub> (attach stage-discharge table)	
-	hours	T <sub>DRAIN</sub> = Drain time = 2WQV/Q <sub>WQV</sub>	≤ 72-hrs
	feet	E <sub>FC</sub> = Elevation of the bottom of the filter course material <sup>2</sup>	
	feet	E <sub>UD</sub> = Invert elevation of the underdrain (UD), if applicable	
	feet	E <sub>SHWT</sub> = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
	feet	E <sub>ROCK</sub> = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	D <sub>FC to UD</sub> = Depth to UD from the bottom of the filter course	≥ 1'
-	feet	D <sub>FC to ROCK</sub> = Depth to bedrock from the bottom of the filter course	≥ 1'
-	feet	D <sub>FC to SHWT</sub> = Depth to SHWT from the bottom of the filter course	≥ 1'
	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
	ft	Elevation of the top of the practice	
-		50 peak elevation ≤ Elevation of the top of the practice	← yes
<b>If a surface sand filter or underground sand filter is proposed:</b>			
YES	ac	Drainage Area check.	< 10 ac
	cf	V = Volume of storage <sup>3</sup> (attach a stage-storage table)	≥ 75%WQV
	inches	D <sub>FC</sub> = 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

<b>If a bioretention area is proposed:</b>			
YES	ac	Drainage Area no larger than 5 ac?	← yes
	cf	V = Volume of storage <sup>3</sup> (attach a stage-storage table)	≥ WQV
	inches	D <sub>FC</sub> = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	≥ 3:1
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
<b>If porous pavement is proposed:</b>			
	Pavers	Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	0.0 acres	A <sub>SA</sub> = Surface area of the pervious pavement	
4.5	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
	12.0 inches	D <sub>FC</sub> = Filter course thickness	12", or 18" if within GPA
Sheet	D4	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<sub>design</sub> includes factor of safety. 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 structure, 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:

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## APPENDIX IX

### **Pollutant Removal Efficiency Data & Worksheet**



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 ( $\geq 75$ 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 ( $\geq 75$ 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 ( $\geq 75$ 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 ( $\geq 75$ 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%

	A	B	C (A*B)	D (C/A)
	Non-Roof			Total
<b>TSS Removal</b>	Impervious Area	Removal	Amount	Removal
	(acres)	Efficiency	Removed	Efficiency
Bioretention	0.390	90%	0.351	
Porous Pavers	0.029	90%	0.026	
Infiltration	0.022	90%	0.020	
Untreated	0.030	0%	0.000	
Total Impervious	0.472		0.398	84%

	A	B	C (A*B)	D (C/A)
	Non-Roof			Total
<b>Phosphorous Removal</b>	Impervious Area	Removal	Amount	Removal
	(acres)	Efficiency	Removed	Efficiency
Bioretention Pond #1	0.390	65%	0.254	
Porous Pavers	0.029	60%	0.018	
Infiltration	0.022	60%	0.013	
Untreated	0.030	0%	0.000	
Total Impervious	0.472		0.285	60%

	A	B	C (A*B)	D (C/A)
	Non-Roof			Total
<b>Nitrogen Removal</b>	Impervious Area	Removal	Amount	Removal
	(acres)	Efficiency	Removed	Efficiency
Bioretention Pond #1	0.390	65%	0.254	
Porous Pavers	0.029	65%	0.019	
Infiltration	0.022	65%	0.015	
Untreated	0.030	0%	0.000	
Total Impervious	0.472		0.287	61%

## APPENDIX X

### **Sump Pump Discharge Calculation Worksheet**

## Sump Pump Discharge Calculation Worksheet

Y	Surface Area	953 SF		
Permeability		1.78 iph		
		3.56 iph	Factor of Safety = 2	
		0.296667 fph		
Z		8.24E-05 fps	Void ratio	0.5
	Unit 5			
A	FF	55.5 feet		
B	Excavation Depth	47.5 feet	B=A-8	
C	Average Ex Grade	52.85 feet		
D	SHWT Depth	1.25 feet		
E	SHWT El.	51.6 feet	E=C-D	
F	Depth in SHWT	4.1 feet	F=E-B	
G	Volume	1953.65 cf	G=Y*F*0.5	
H	Lag	49752.81 seconds	H=F/Z	13.82022 hours
Q	Flow	0.039267 cfs	Q=G/H	
	Unit 6			
A	FF	55.5 feet		
B	Excavation Depth	47.5 feet	B=A-8	
C	Average Ex Grade	49.4 feet		
D	SHWT Depth	2.5 feet		
E	SHWT El.	46.9 feet	E=C-D	
F	Depth in SHWT	0.6 feet	F=E-B	
G	Volume	285.9 cf	G=Y*F*0.5	
H	Lag	7280.899 seconds	H=F/Z	2.022472 hours
Q	Flow	0.039267 cfs	Q=G/H	
	Unit 7			
A	FF	55.5 feet		
B	Excavation Depth	47.5 feet	B=A-8	
C	Average Ex Grade	53 feet		
D	SHWT Depth	2.25 feet		
E	SHWT El.	50.75 feet	E=C-D	
F	Depth in SHWT	3.25 feet	F=E-B	
G	Volume	1548.625 cf	G=Y*F*0.5	
H	Lag	39438.2 seconds	H=F/Z	10.95506 hours
Q	Flow	0.039267 cfs	Q=G/H	
	Unit 8			
A	FF	55 feet		
B	Excavation Depth	47 feet	B=A-8	
C	Average Ex Grade	50.5 feet		
D	SHWT Depth	1.75 feet		
E	SHWT El.	48.75 feet	E=C-D	
F	Depth in SHWT	1.75 feet	F=E-B	
G	Volume	833.875 cf	G=Y*F*0.5	
H	Lag	21235.96 seconds	H=F/Z	5.898876 hours
Q	Flow	0.039267 cfs	Q=G/H	

**Unit 5 Hydrograph**

Hour	Discharge rate (cfs)
0	0.000
1	0.003
2	0.006
3	0.009
4	0.011
5	0.014
6	0.017
7	0.020
8	0.023
9	0.026
10	0.028
11	0.031
12	0.034
13	0.037
14	0.040
15	0.037
16	0.034
17	0.031
18	0.028
19	0.026
20	0.023
21	0.020
22	0.017
23	0.014
24	0.011
25	0.009
26	0.006
27	0.003
28	0.000

**Unit 6 Hydrograph**

Hour	Discharge rate (cfs)
0	0.000
1	0.019
2	0.039
3	0.019
4	0.000

**Unit 7 Hydrograph**

Hour	Discharge rate (cfs)
0	0.000
1	0.004
2	0.007
3	0.011
4	0.014
5	0.018
6	0.022
7	0.025
8	0.029
9	0.032
10	0.036
11	0.039
12	0.036
13	0.032
14	0.029
15	0.025
16	0.022
17	0.018
18	0.014
19	0.011
20	0.007
21	0.004
22	0.000

**Unit 8 Hydrograph**

Hour	Discharge rate (cfs)
0	0.000
1	0.007
2	0.013
3	0.020
4	0.027
5	0.033
6	0.040
7	0.033
8	0.027
9	0.020
10	0.013
11	0.007
12	0.000

## APPENDIX XI

### **Rip Rap Sizing Calculations**



## RIP RAP CALCULATIONS

Grapevine Run  
212, 214, & 216 Woodbury Ave  
Portsmouth, NH 03801

### Jones & Beach Engineers, Inc.

P.O. Box 219  
Stratham, NH 03885  
28-Nov-22

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 25-Year storm event.

---

#### TAILWATER < HALF THE $D_o$

$$L_a = (1.8 \times Q) / D_o^{3/2} + (7 \times D_o)$$

$$W = L_a + (3 \times D_o) \text{ or defined channel width}$$

$$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_o)$$

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)
				#DIV/0!	#DIV/0!	#DIV/0!

---

#### TAILWATER > HALF THE $D_o$

$$L_a = (3.0 \times Q) / D_o^{3/2} + (7 \times D_o)$$

$$W = (0.4 \times L_a) + (3 \times D_o) \text{ or defined channel width}$$

$$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_o)$$

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)
8" HDPE (Pond 10P)	0.44	0.73	0.67	8.7	5	0.04

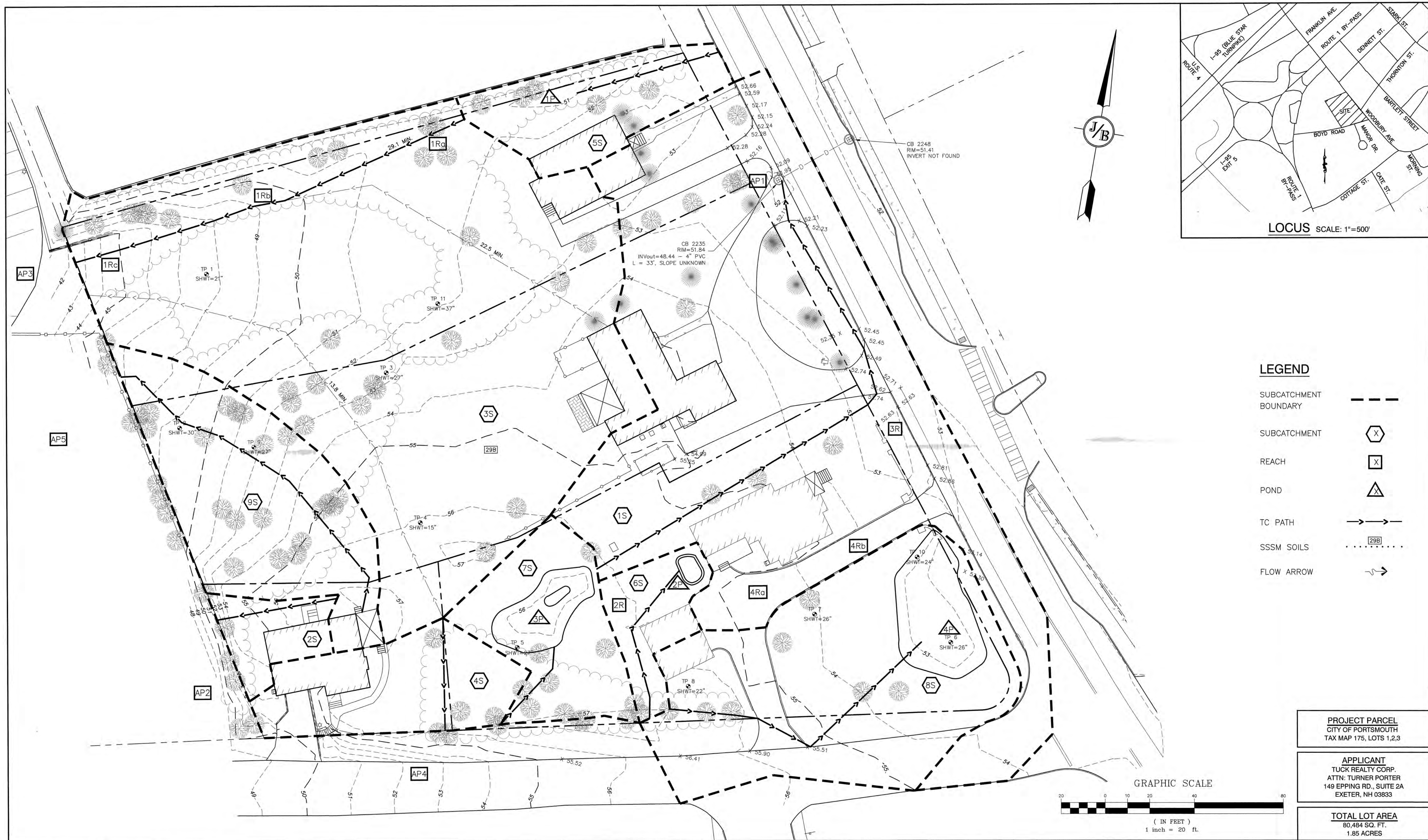
Table 7-24 -- Recommended Rip Rap Gradation Ranges				
$d_{50}$ Size =	0.25	Feet	3	Inches
% of Weight Smaller Than the Given $d_{50}$ Size	Size of Stone (Inches)			
	From		To	
100%	5		6	
85%	4		5	
50%	3		5	
15%	1		2	

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 XII

### **Pre- and Post-Construction Watershed Plans**





**LEGEND**

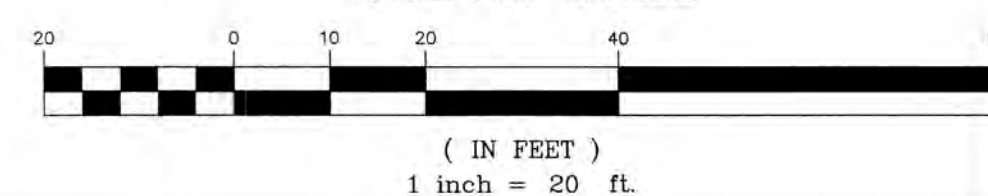
- SUBCATCHMENT  
BOUNDARY
- SUBCATCHMENT
- REACH
- POND
- TC PATH
- SSSM SOILS
- FLOW ARROW

**PROJECT PARCEL**  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1,2,3

**APPLICANT**  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
149 EPPING RD., SUITE 2A  
EXETER, NH 03833

**TOTAL LOT AREA**  
80,484 SQ. FT.  
1.85 ACRES

GRAPHIC SCALE



Design: DJM Draft: DJM Date: 01/05/22  
Checked: PSL Scale: 1"=20' Project No.: 21254  
Drawing Name: 21254-WATERSHED.dwg

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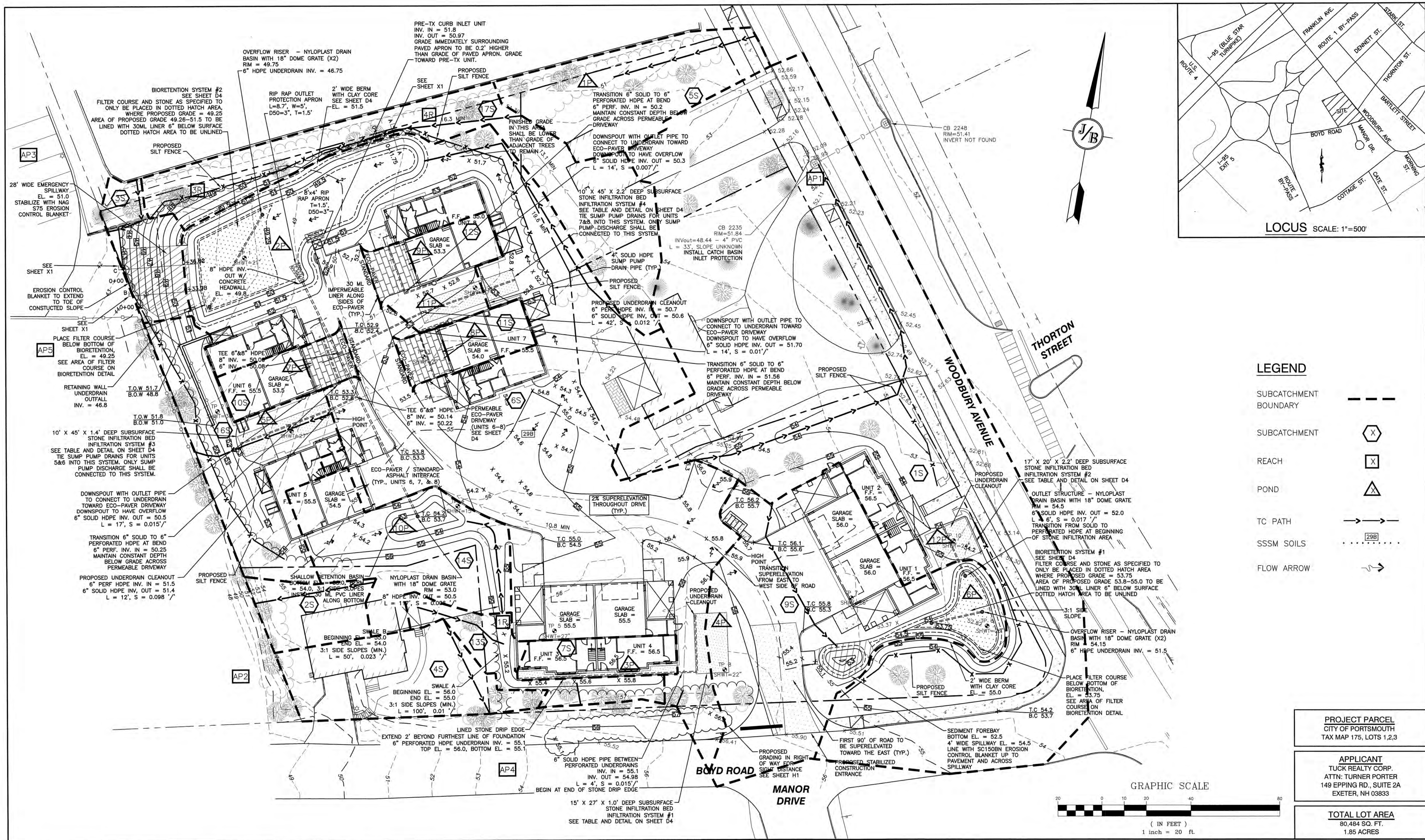
5	12/20/22	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
4	10/18/22	REVISED PER REVIEW ENGINEER AND TAC COMMENTS	DJM
3	9/16/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
2	8/1/22	REVISED PER TAC COMMENTS	DJM
1	6/21/22	ISSUED FOR REVIEW	DJM
REV.	DATE	REVISION	BY

**J/B** Jones & Beach Engineers, Inc.  
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885  
Civil Engineering Services  
603-772-4746  
FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: **EXISTING WATERSHED PLAN**  
Project: "GRAPEVINE RUN"  
212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801  
Owner of Record: FREDERICK J. BAILEY III & JOYCE S. NELSON  
4 SHORE RD., WOLFEBORO, NH 03894  
LOT 1: BK 4708 PG 979  
LOT 2: BK 4582 PG 888  
LOT 3: BK 3919 PG 1345

DRAWING No.  
**W1**  
SHEET 1 OF 2  
JBE PROJECT NO. 21254





LEGEND

- SUBCATCHMENT
- BOUNDARY
- SUBCATCHMENT
- REACH
- POND
- TC PATH
- SSSM SOILS
- FLOW ARROW

PROJECT PARCEL  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1,2,3

APPLICANT  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
149 EPPING RD., SUITE 2A  
EXETER, NH 03833

TOTAL LOT AREA  
80,484 SQ. FT.  
1.85 ACRES

Design: DJM Draft: DJM Date: 01/05/22  
Checked: PSL Scale: 1"=20' Project No.: 21254  
Drawing Name: 21254-WATERSHED.dwg  
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5	12/20/22	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
4	10/18/22	REVISED PER REVIEW ENGINEER AND TAC COMMENTS	DJM
3	9/16/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
2	8/1/22	REVISED PER TAC COMMENTS	DJM
1	6/21/22	ISSUED FOR REVIEW	DJM
REV.	DATE	REVISION	BY

Designed and Produced in NH  
**J/B Jones & Beach Engineers, Inc.**  
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885  
Civil Engineering Services  
603-772-4746  
FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: **PROPOSED WATERSHED PLAN**  
Project: "GRAPEVINE RUN"  
212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801  
Owner of Record: FREDERICK J. BAILEY III & JOYCE S. NELSON  
4 SHORE RD., WOLFEBORO, NH 03894  
LOT 1: BK 4708 PG 979  
LOT 2: BK 4582 PG 888  
LOT 3: BK 3919 PG 1345

DRAWING No.  
**W2**  
SHEET 2 OF 2  
JBE PROJECT NO. 21254



5/16/2022

# Tarquin

1108.124 GR (5/16/2022)

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Tarquin 1108.124 GR

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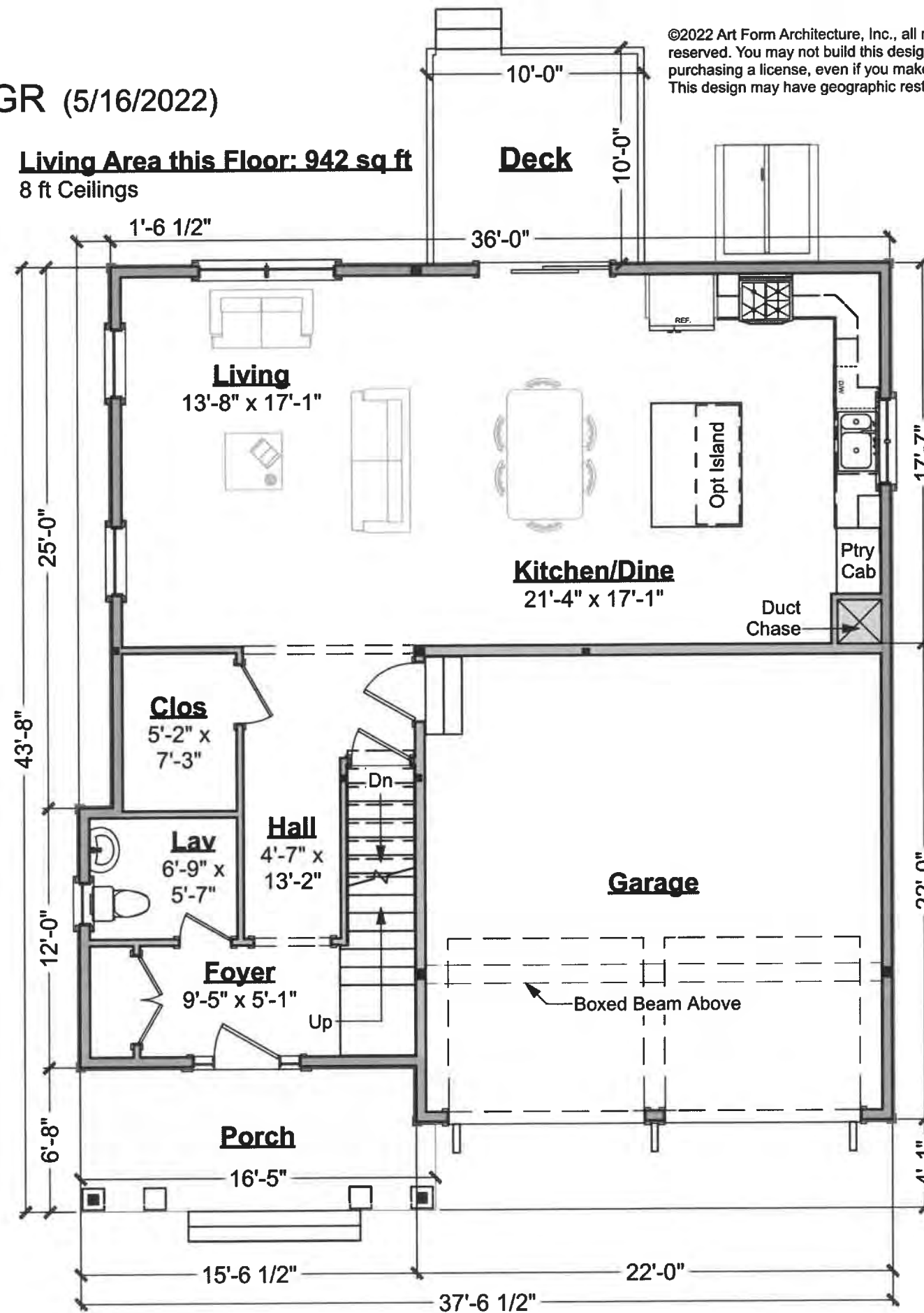
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## First Floor Plan

Scale: 1/8" = 1'-0"

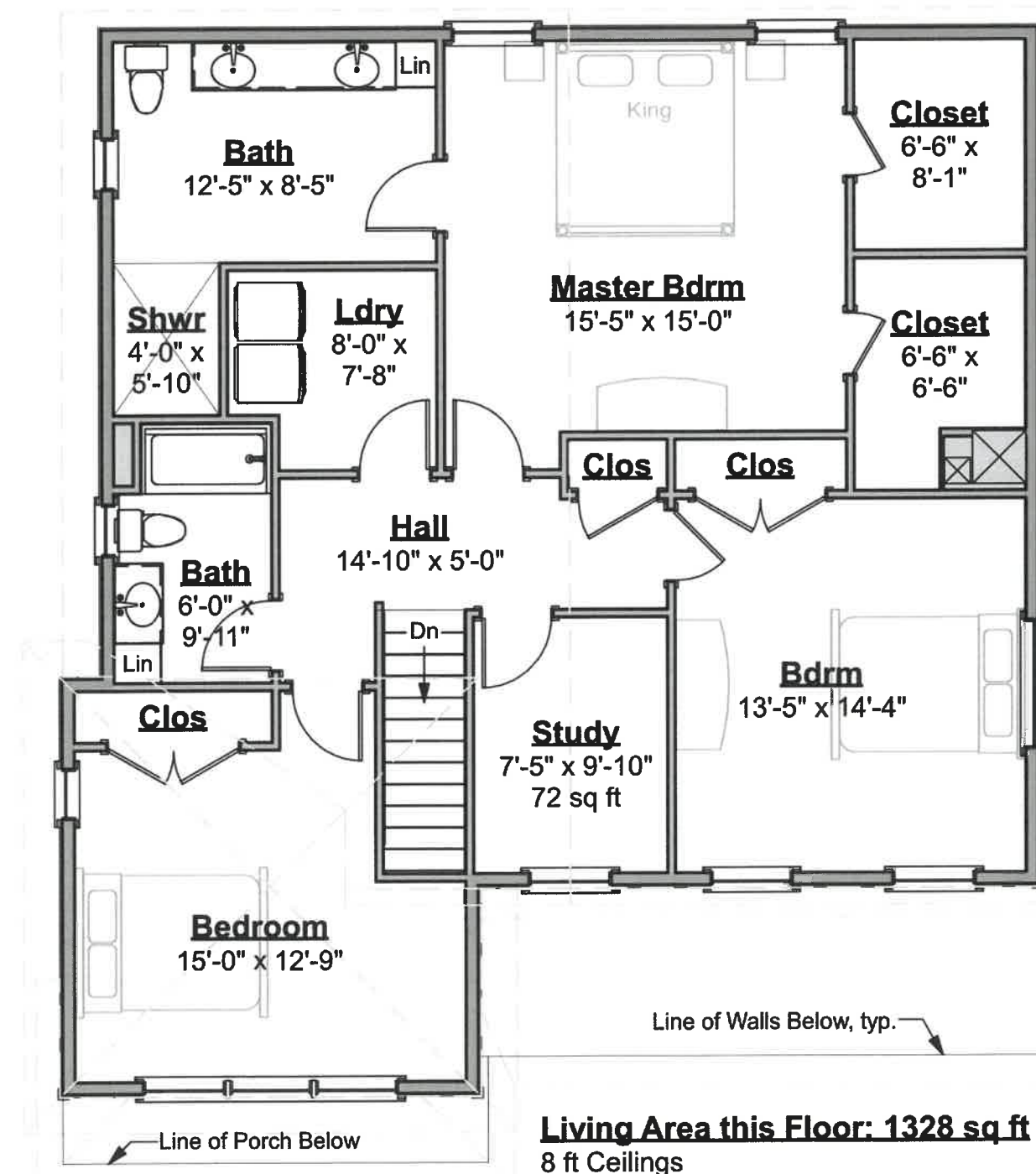
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**Second Floor Plan**  
Scale: 1/8" = 1'-0"

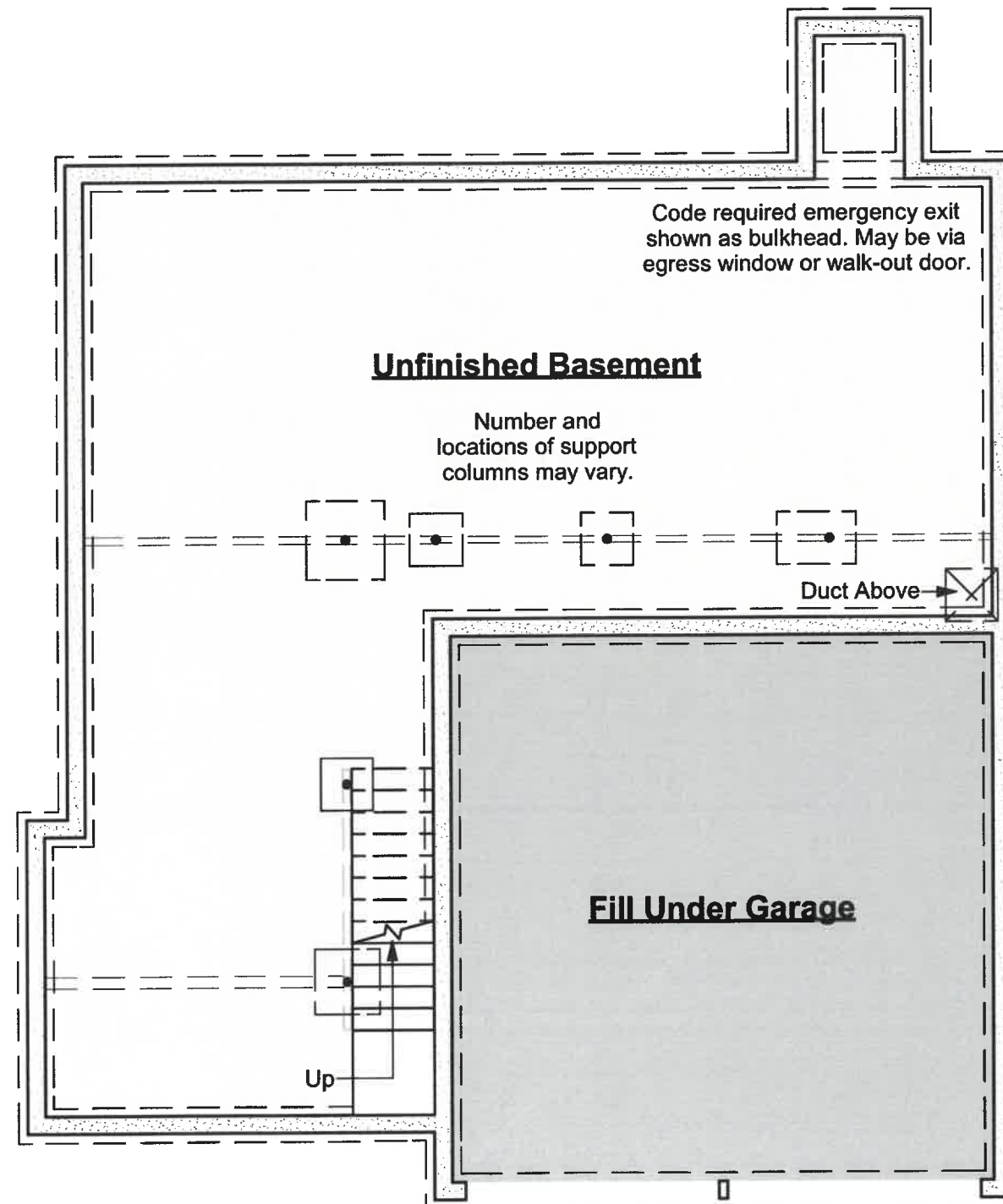
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**Foundation Plan**  
Scale: 1/8" = 1'-0"

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**Front Elevation**

Scale: 1/8" = 1'-0"

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**Right Elevation**  
Scale: 1/8" = 1'-0"



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**Rear Elevation**  
Scale: 1/8" = 1'-0"

5/16/2022

# Tarquin

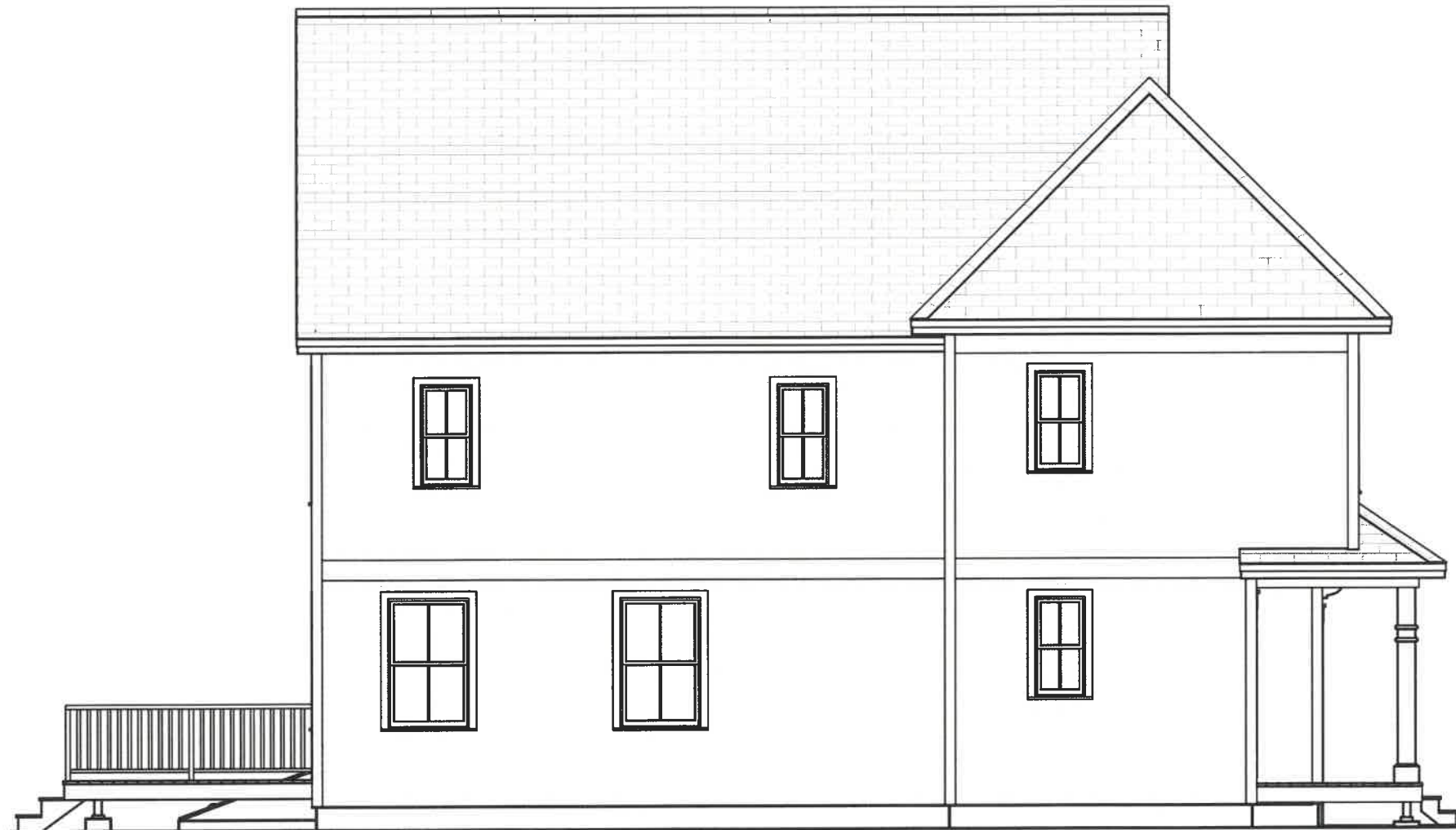
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**Left Elevation**  
Scale: 1/8" = 1'-0"

# Matthias Duplex

1107.224 (5/13/2022)

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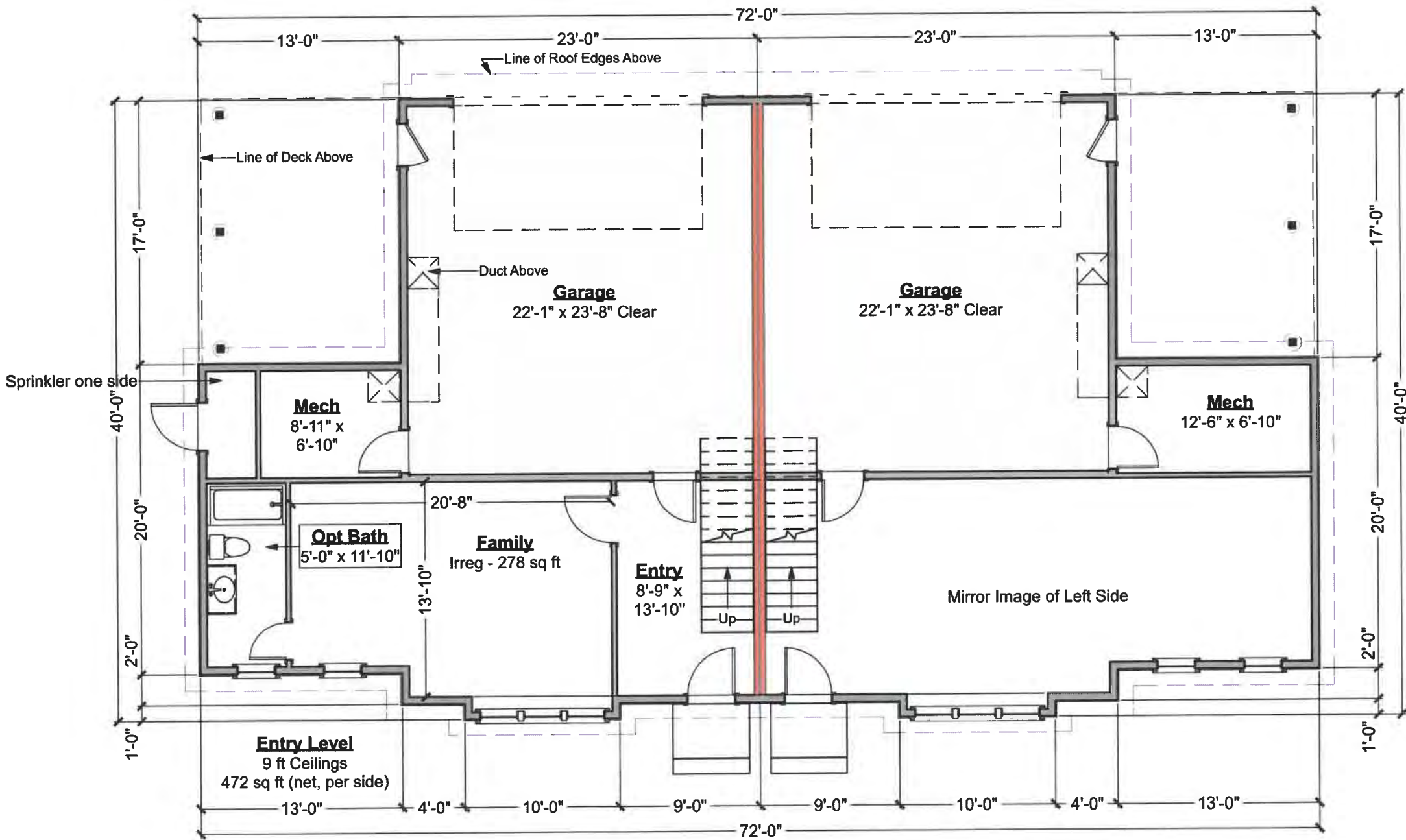
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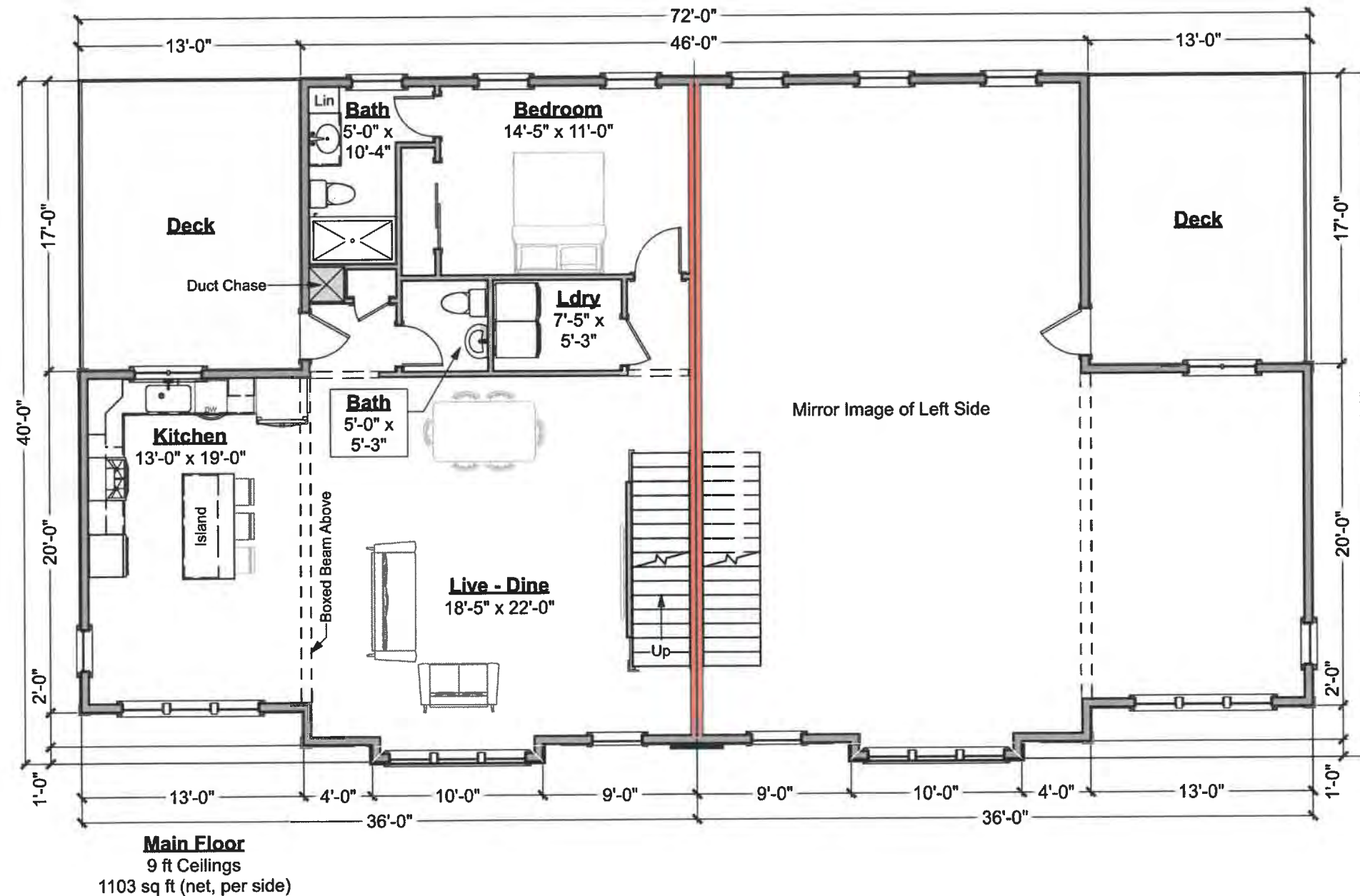
First Floor Plan  
Scale: 1/8" = 1'-0"

## 1107.224 (5/13/2022)

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Scale: 1/8" = 1'-0"

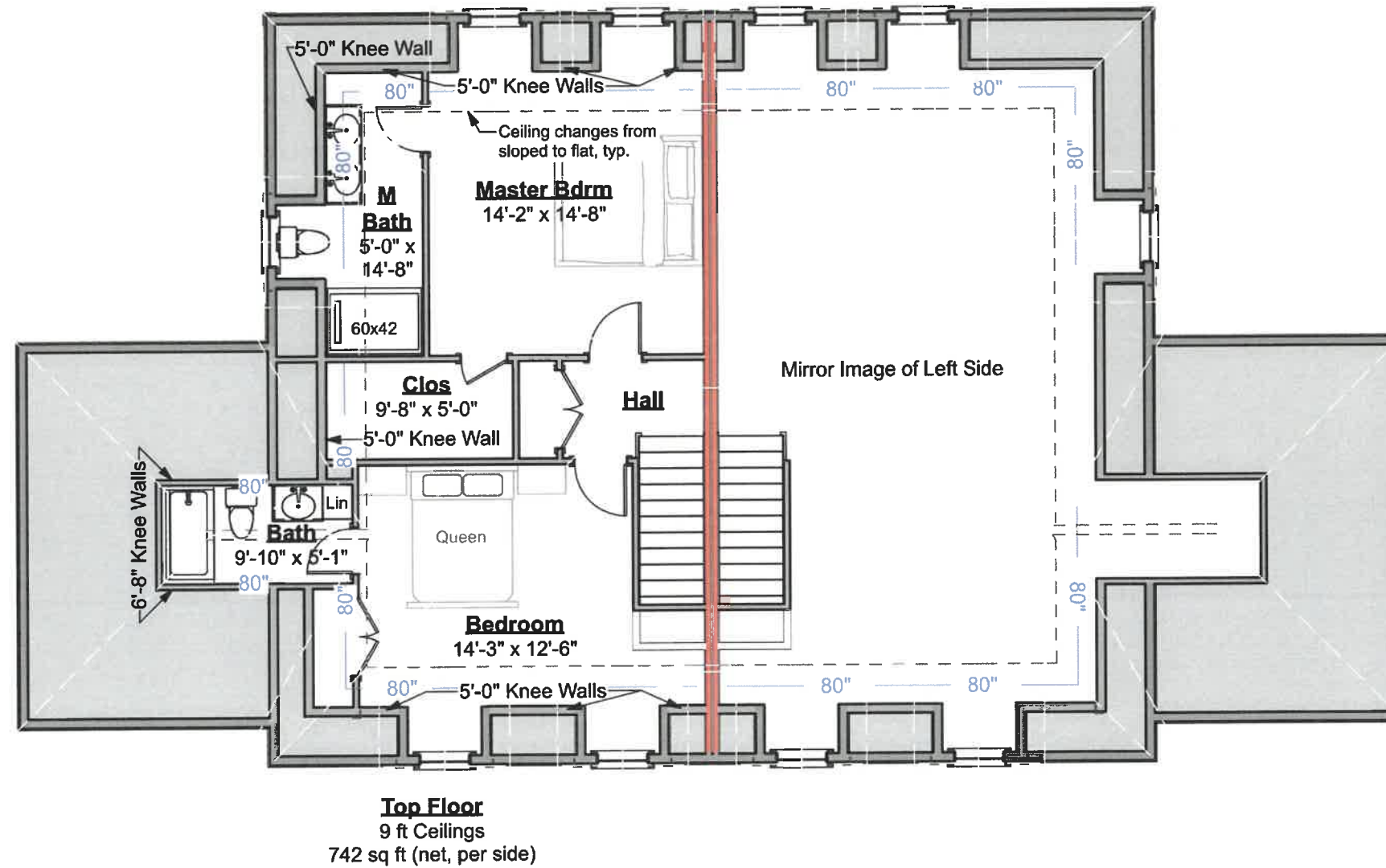
1107.224 (5/13/2022)

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Scale: 1/8" = 1'-0"



**Matthias Duplex**  
1107.224 (5/13/2022)

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**Front**



**Right**

**Elevations**  
Scale: 1/8" = 1'-0"

**Matthias Duplex**  
1107.224 (5/13/2022)

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**Rear**



**Left**

**Elevations**  
Scale: 1/8" = 1'-0"



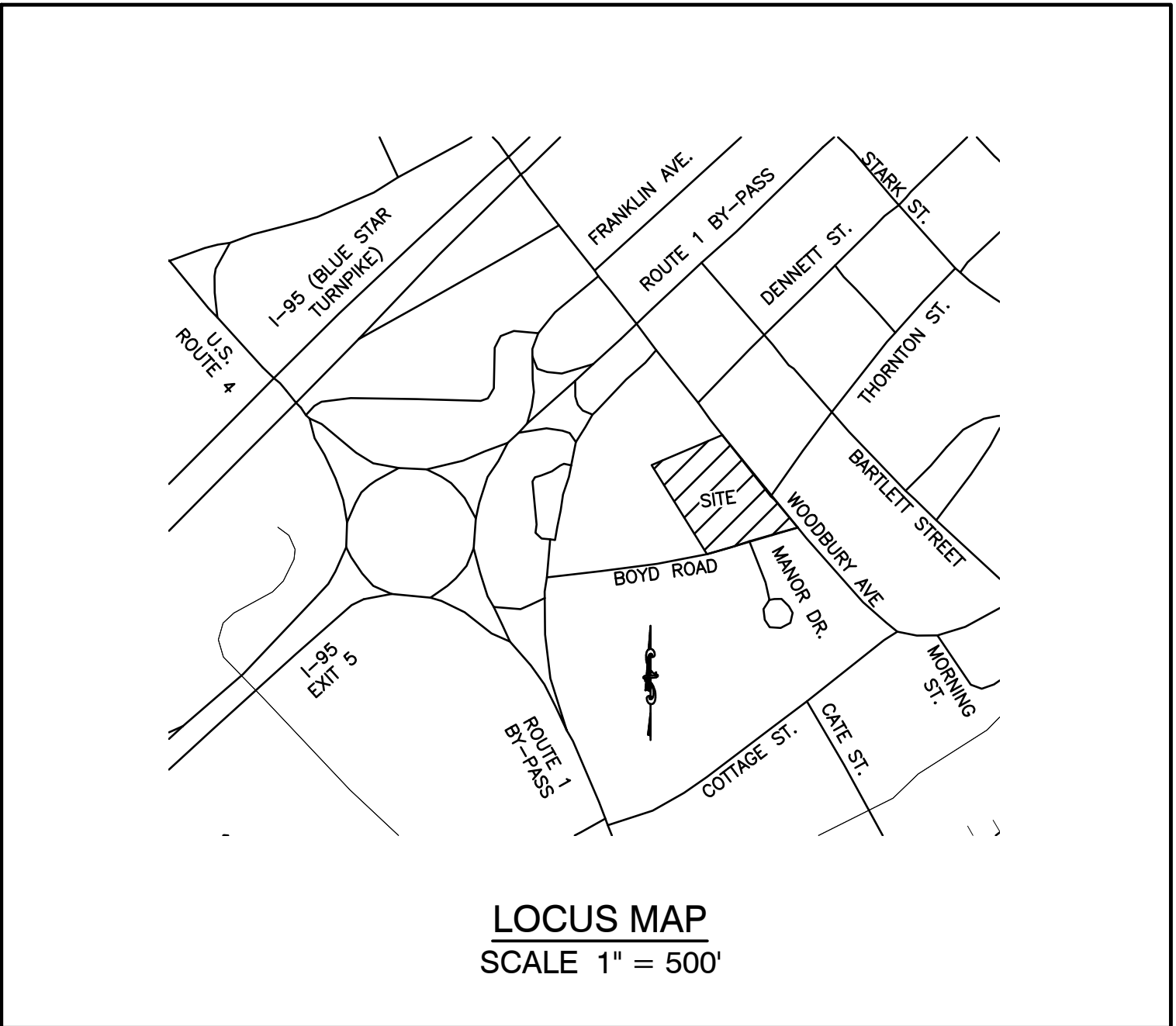
MULTI-FAMILY RESIDENTIAL SITE PLAN  
"GRAPEVINE RUN"

TAX MAP 175, LOTS 1, 2, & 3

212, 214, & 216 WOODBURY AVE., PORTSMOUTH, NH

GENERAL LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROPERTY LINES
		SETBACK LINES
		CENTERLINE
		TREE LINE
		STONEWALL
		FENCE
		SOIL BOUNDARY
		ZONELINE
		EASEMENT
		MAJOR CONTOUR
		MINOR CONTOUR
		EDGE OF PAVEMENT
		VERTICAL GRANITE CURB
		SLOPE GRANITE CURB
		SILT FENCE
		DRAINAGE LINE
		SEWER LINE
		SEWER FORCE MAIN
		GAS LINE
		WATER LINE
		WATER SERVICE
		OVERHEAD ELECTRIC
		UNDERGROUND ELECTRIC
		FIRE PROTECTION LINE
		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
		TEST PIT
		FAILED TEST PIT
		TREES AND BUSHES
		UTILITY POLE
		LIGHT POLES
		SEWER MANHOLE
		HYDRANT
		WATER GATE
		WATER SHUT OFF
		REDUCER
		SINGLE GRATE CATCH BASIN
		DOUBLE GRATE CATCH BASIN
		TRANSFORMER
		CULVERT W/WINGWALLS
		CULVERT W/FLARED END SECTION
		CULVERT W/STRAIGHT HEADWALL
		DRAINAGE FLOW DIRECTION
		RIPRAP
		STABILIZED CONSTRUCTION
		ENTRANCE CONCRETE
		SNOW STORAGE
		RETAINING WALL



SHEET INDEX

CS	COVER SHEET
C1	EXISTING CONDITIONS PLAN
DM-1	DEMOLITION PLAN
A1	LOT LINE ADJUSTMENT PLAN
C2	SITE PLAN
C3	GRADING AND DRAINAGE PLAN
C4	UTILITY PLAN
P1	PLAN AND ROAD PROFILE
P2	PLAN AND SEWER PROFILE
L1	LANDSCAPE PLAN
L2	LIGHTING PLAN
D1-D6	DETAIL SHEETS
E1	EROSION AND SEDIMENT CONTROL DETAILS
X1	SLOPE CROSS SECTIONS
T1-T2	TRUCK TURNING PLAN
H1	HIGHWAY ACCESS PLAN
DR1	OFFSITE DRAINAGE PLAN

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

LIGHTING CONSULTANT

CHARRON, INC.  
P.O BOX 4550  
MANCHESTER, NH 03108  
(603) 945-3500  
CONTACT: DANIEL HEBERT  
EMAIL: DHEBERT@CHARRONINC.COM

SOILS CONSULTANT

GOVE ENVIRONMENTAL SERVICES, INC.  
8 CONTINENTAL DR., 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  
CONTACT: BRIAN GOETZ, P.E.  
(603) 427-1530

SEWER

CITY OF PORTSMOUTH  
DEPARTMENT OF PUBLIC WORKS  
SEWER DIVISION  
680 PEVERLY HILL ROAD  
PORTSMOUTH, NH 03801  
CONTACT: ZACHARY CRONIN  
(603) 766-1421

ELECTRIC

EVERSOURCE  
1700 LAFAYETTE ROAD  
PORTSMOUTH, NH 03801  
(603) 634-3029  
CONTACT: CASEY MACDONALD  
TELEPHONE  
FAIRPOINT COMMUNICATIONS  
1575 GREENLAND ROAD  
GREENLAND, NH 03840  
(800) 427-5525  
CONTACT: JOE CONSIDINE

CABLE TV

COMCAST COMMUNICATION CORPORATION  
334-B CALEF HIGHWAY  
EPPING, NH 03042-2325  
(603) 679-5695

PROJECT PARCEL  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1, 2, & 3

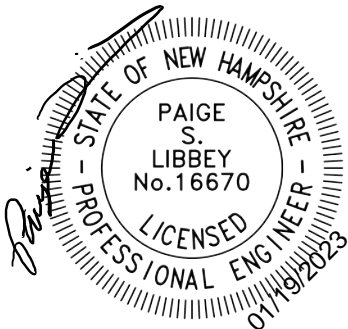
APPLICANT  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
149 EPPING RD., SUITE 2A  
EXETER, NH 03833

TOTAL LOT AREA  
80,484 SQ. FT.  
1.85 ACRES

APPROVED - PORTSMOUTH, NH  
PLANNING BOARD

DATE:

Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: AS NOTED	Project No.: 21254
Drawing Name: 21254-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.		



8	1/19/23	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
7	12/20/22	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
6	10/18/22	REVISED PER REVIEW ENGINEER AND TAC COMMENTS	DJM
5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

Designed and Produced in NH

**J/B Jones & Beach Engineers, Inc.**

85 Portsmouth Ave. PO Box 219 Stratham, NH 03885

*Civil Engineering Services*

603-772-4746  
FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	COVER SHEET
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894 LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

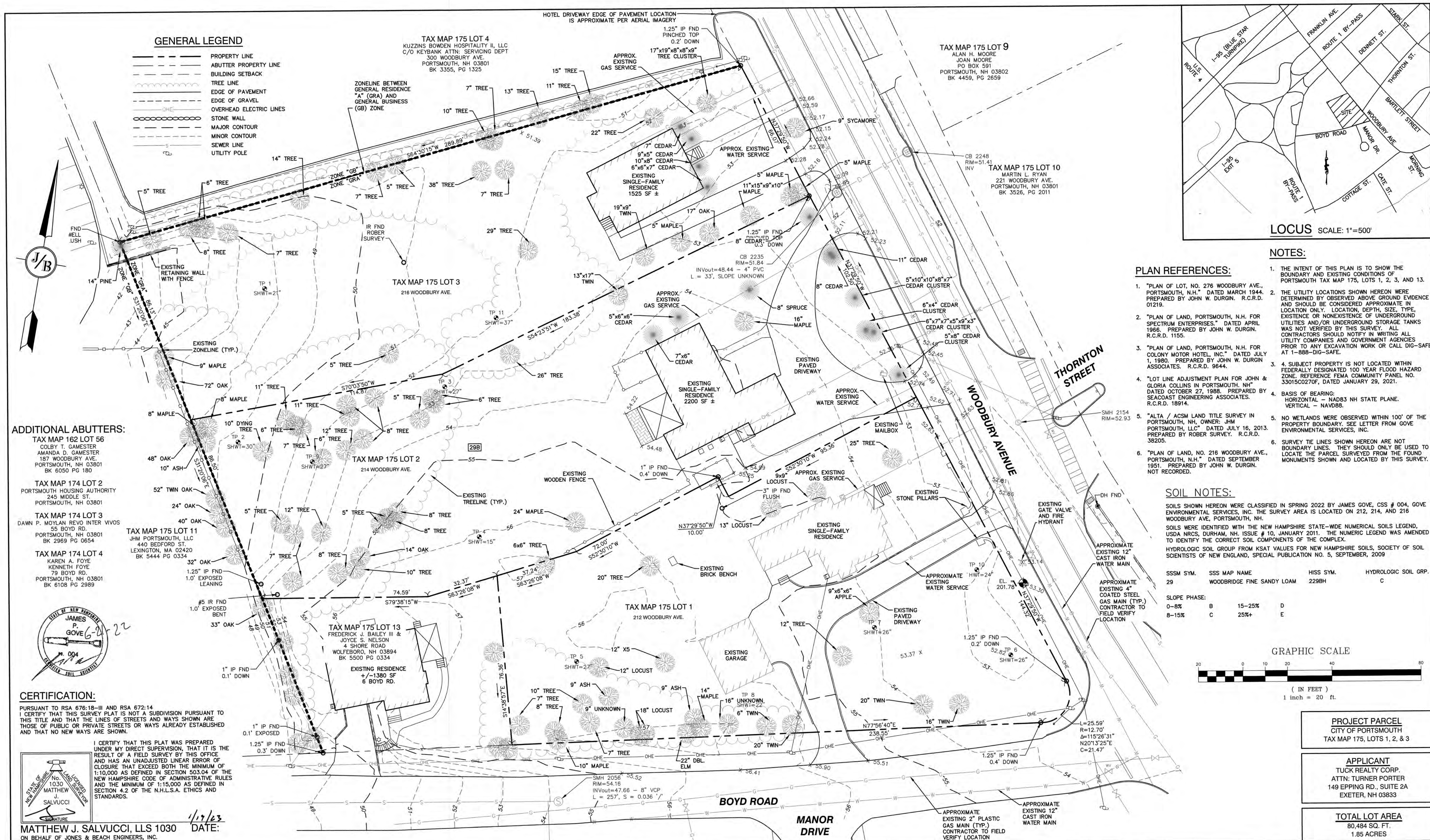
DRAWING No.

**CS**

SHEET 1 OF 23  
JBE PROJECT NO. 21254

GRAPEVINE RUN, PORTSMOUTH, NH  
JBE # 21254  
REVISION 01/15/23





**CERTIFICATION:**

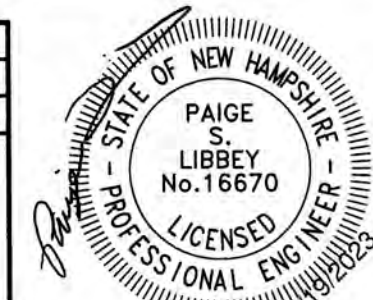
PURSUANT TO RSA 676:18-III AND RSA 672:14 I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

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 EXCEEDS 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.

MATTHEW J. SALVUCCI, LLS 1030  
ON BEHALF OF JONES & BEACH ENGINEERS, INC.

DATE: 1/17/23

Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: 1"=20'	Project No.: 21254
Drawing Name: 21254-PLAN.dwg		
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REV.	DATE	REVISION	BY
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5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM

**J/B Jones & Beach Engineers, Inc.**  
85 Portsmouth Ave.  
PO Box 219  
Stratham, NH 03885

Designed and Produced in NH

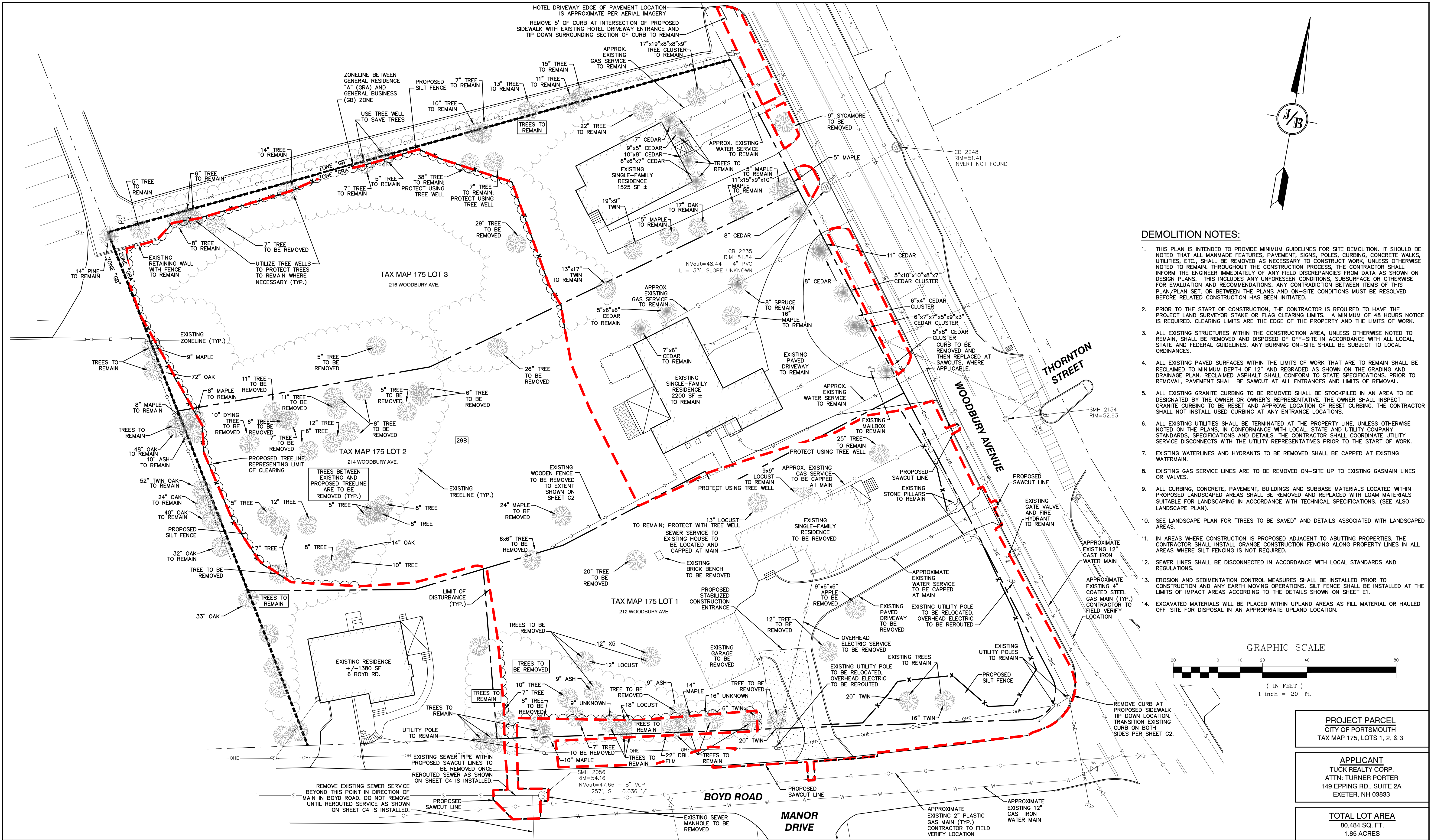
**Civil Engineering Services**

603-772-4746  
FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	<b>EXISTING CONDITIONS PLAN</b>
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894

DRAWING No.	<b>C1</b>
SHEET 2 OF 23	JBE PROJECT NO. 21254

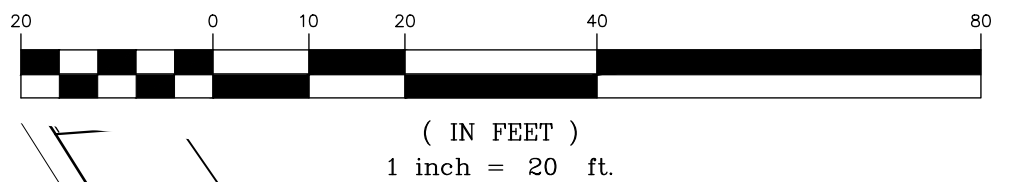




#### DEMOLITION NOTES:

- 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.
- 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. CLEARING LIMITS ARE THE EDGE OF THE PROPERTY AND THE LIMITS OF WORK.
- 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.
- ALL EXISTING PAVED SURFACES WITHIN THE LIMITS OF WORK THAT ARE TO REMAIN SHALL BE RECLAIMED TO MINIMUM DEPTH OF 12" AND REGRADED AS SHOWN ON THE GRADING AND DRAINAGE PLAN. RECLAIMED ASPHALT SHALL CONFORM TO STATE SPECIFICATIONS. PRIOR TO REMOVAL, PAVEMENT SHALL BE SAWCUT AT ALL ENTRANCES AND LIMITS OF REMOVAL.
- ALL EXISTING GRANITE CURBING TO BE REMOVED SHALL BE STOCKPILED IN AN AREA TO BE DESIGNATED BY THE OWNER OR OWNER'S REPRESENTATIVE. THE OWNER SHALL INSPECT GRANITE CURBING TO BE RESET AND APPROVE LOCATION OF RESET CURBING. THE CONTRACTOR SHALL NOT INSTALL USED CURBING AT ANY ENTRANCE LOCATIONS.
- ALL EXISTING UTILITIES SHALL BE TERMINATED AT THE PROPERTY LINE, UNLESS OTHERWISE NOTED ON THE PLANS, IN CONFORMANCE WITH LOCAL, STATE AND UTILITY COMPANY STANDARDS, SPECIFICATIONS AND DETAILS. THE CONTRACTOR SHALL COORDINATE UTILITY SERVICE DISCONNECTS WITH THE UTILITY REPRESENTATIVES PRIOR TO THE START OF WORK.
- EXISTING WATERLINES AND HYDRANTS TO BE REMOVED SHALL BE CAPPED AT EXISTING WATERMAIN.
- EXISTING GAS SERVICE LINES ARE TO BE REMOVED ON-SITE UP TO EXISTING GASMAIN LINES OR VALVES.
- 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).
- SEE LANDSCAPE PLAN FOR "TREES TO BE SAVED" AND DETAILS ASSOCIATED WITH LANDSCAPED AREAS.
- 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.
- SEWER LINES SHALL BE DISCONNECTED IN ACCORDANCE WITH LOCAL STANDARDS AND REGULATIONS.
- EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO CONSTRUCTION AND ANY EARTH MOVING OPERATIONS. SILT FENCE SHALL BE INSTALLED AT THE LIMITS OF IMPACT AREAS ACCORDING TO THE DETAILS SHOWN ON SHEET E1.
- EXCAVATED MATERIALS WILL BE PLACED WITHIN UPLAND AREAS AS FILL MATERIAL OR HAULED OFF-SITE FOR DISPOSAL IN AN APPROPRIATE UPLAND LOCATION.

#### GRAPHIC SCALE

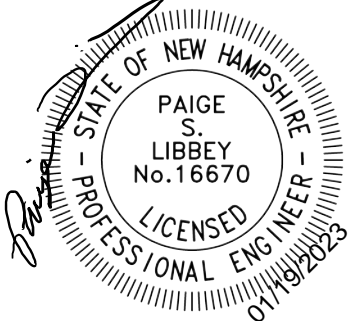


PROJECT PARCEL  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1, 2, & 3

APPLICANT  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
149 EPPING RD., SUITE 2A  
EXETER, NH 03833

TOTAL LOT AREA  
80,484 SQ. FT.  
1.85 ACRES

Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: 1"=20'	Project No.: 21254
Drawing Name: 21254-PLAN.dwg		
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5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

Designed and Produced in NH

**J/B Jones & Beach Engineers, Inc.**

85 Portsmouth Ave. PO Box 219 Stratham, NH 03885

Civil Engineering Services

603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DEMOLITION PLAN
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894
	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

DRAWING No.
DM-1
SHEET 3 OF 23 JBE PROJECT NO. 21254



PLAN REFERENCES:

- "PLAN OF LOT, NO. 276 WOODBURY AVE., PORTSMOUTH, N.H." DATED MARCH 1944. PREPARED BY JOHN W. DURGIN. R.C.R.D. 01219.
- "PLAN OF LAND, PORTSMOUTH, N.H. FOR SPECTRUM ENTERPRISES." DATED APRIL 1966. PREPARED BY JOHN W. DURGIN. R.C.R.D. 1155.
- "PLAN OF LAND, PORTSMOUTH, N.H. FOR COLONY MOTOR HOTEL, INC." DATED JULY 1, 1980. PREPARED BY JOHN W. DURGIN ASSOCIATES. R.C.R.D. 9644.
- "LOT LINE ADJUSTMENT PLAN FOR JOHN & GLORIA COLLINS IN PORTSMOUTH, NH" DATED OCTOBER 27, 1988. PREPARED BY SEACOAST ENGINEERING ASSOCIATES. R.C.R.D. 18914.
- "ALTA / ACSM LAND TITLE SURVEY IN PORTSMOUTH, NH, OWNER: JHM PORTSMOUTH, LLC" DATED JULY 16, 2013. PREPARED BY ROBER SURVEY. R.C.R.D. 38205.
- "PLAN OF LAND, NO. 216 WOODBURY AVE., PORTSMOUTH, N.H." DATED SEPTEMBER 1951. PREPARED BY JOHN W. DURGIN. NOT RECORDED.

TAX MAP 175 LOT 4  
KUZZINS BOWDEN HOSPITALITY II, LLC  
C/O KEYBANK ATTN: SERVICING DEPT  
300 WOODBURY AVE.  
PORTSMOUTH, NH 03801  
BK 3355, PG 1325

ZONELINE BETWEEN  
GENERAL RESIDENCE  
"A" (GRA) AND  
GENERAL BUSINESS  
(GB) ZONE

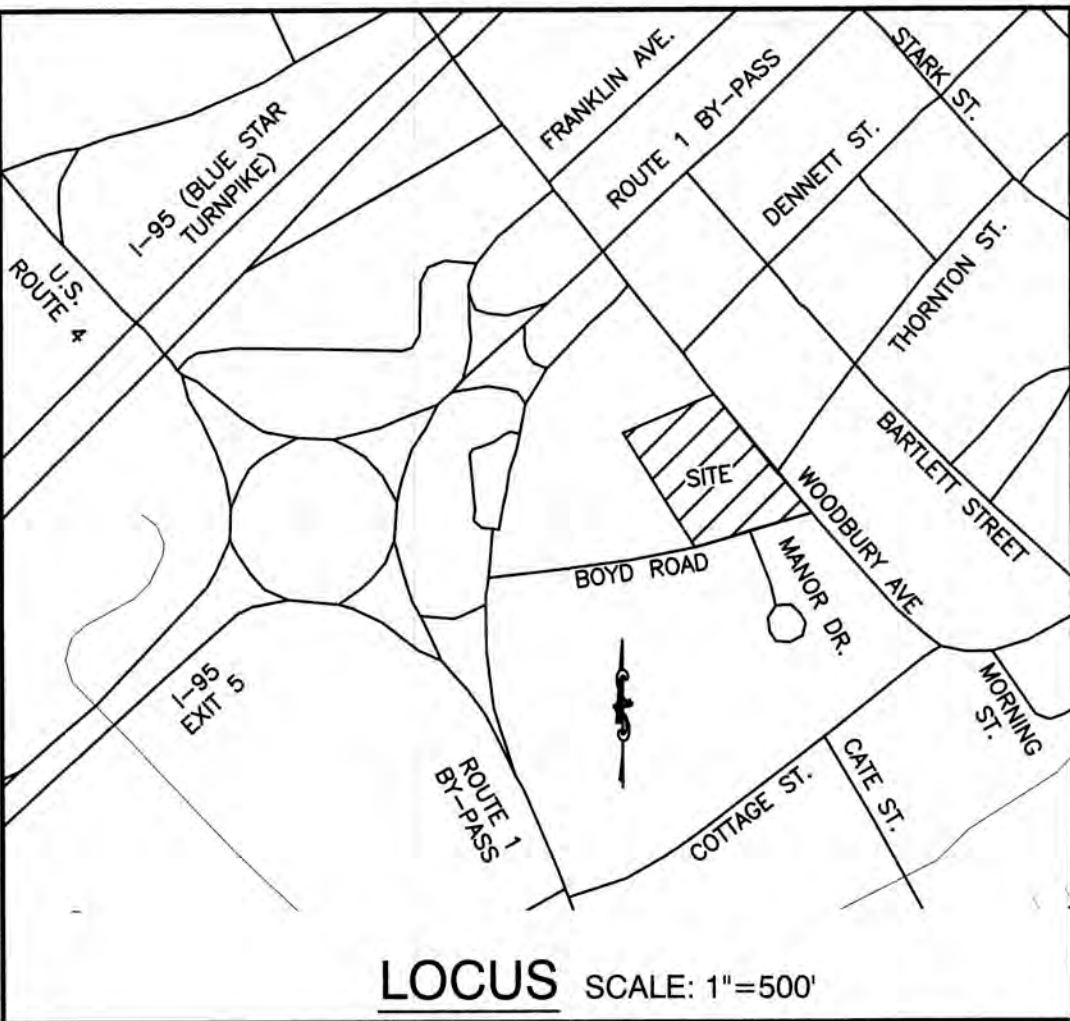
TAX MAP 175 LOT 3  
EXISTING LOT AREA:  
24,936 SQ. FT.  
0.57 AC.  
PROPOSED LOT AREA:  
7,932 SF  
0.18 AC.

TAX MAP 175 LOT 9  
ALAN H. MOORE  
JOAN MOORE  
PO BOX 591  
PORTSMOUTH, NH 03802  
BK 4459, PG 2659

TAX MAP 175 LOT 10  
MARTIN L. RYAN  
221 WOODBURY AVE.  
PORTSMOUTH, NH 03801  
BK 3526, PG 2011

GENERAL LEGEND

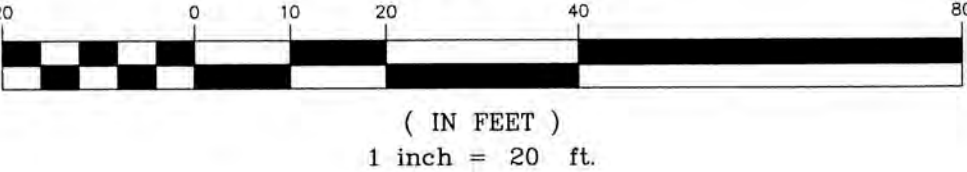
- PROPERTY LINE
- ABUTTER PROPERTY LINE
- BUILDING SETBACK
- EASEMENT
- TREE LINE
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- OVERHEAD ELECTRIC LINES
- STONE WALL
- MAJOR CONTOUR
- MINOR CONTOUR
- SEWER LINE
- UTILITY POLE



SUBDIVISION NOTES:

- THE INTENT OF THIS PLAN IS TO ADJUST THE LOT LINE BETWEEN TAX MAP 175, LOTS 1, 2, AND 3.
- ZONING DISTRICT: GENERAL RESIDENTIAL A (GRA)  
LOT AREA MINIMUM = 7,500 S.F.  
MAX DENSITY = 1 DWELLING UNIT PER 7,500 S.F. LOT AREA  
LOT FRONTAGE MINIMUM = 100'  
LOT DEPTH MINIMUM = 70'  
BUILDING SETBACKS (MINIMUM):  
FRONT SETBACK = 15'  
SIDE SETBACK = 10'  
REAR SETBACK = 20'  
MAX. BUILDING HEIGHT = 35' WITH SLOPED ROOF, 30' WITH FLAT ROOF  
MAX. BUILDING COVERAGE = 25%  
MIN. OPEN SPACE = 30%
- 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.
- SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
- IRON RODS WITH SURVEY CAPS TO BE SET AT ALL PROPERTY CORNERS AND ANGLE POINTS, UNLESS OTHERWISE INDICATED. ALL MONUMENTS SET ARE 5/8" IRON RODS WITH ALUMINUM CAPS MARKED "JONES & BEACH ENGINEERS BOUNDARY, DO NOT DISTURB, STRATHAM, N.H." AS SHOWN.
- NO WETLANDS WERE OBSERVED ON THE SUBJECT PREMISES.
- ALL BOOK AND PAGE NUMBERS REFER TO THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
- THE TAX MAP AND LOT NUMBERS AND ABUTTING OWNERS ARE BASED ON THE CITY OF PORTSMOUTH TAX RECORDS AND ARE SUBJECT TO CHANGE.
- RESEARCH WAS PERFORMED AT THE CITY OF PORTSMOUTH ASSESSORS OFFICE AND THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
- 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.
- ANY USE OF THIS PLAN AND OR ACCOMPANYING DESCRIPTIONS SHOULD BE DONE WITH LEGAL COUNSEL TO BE CERTAIN THAT TITLES ARE CLEAR, THAT INFORMATION IS CURRENT, AND THAT ANY NECESSARY CERTIFICATES ARE IN PLACE FOR A PARTICULAR CONVEYANCE, OR OTHER USES.

GRAPHIC SCALE



ADDITIONAL ABUTTERS:

TAX MAP 162 LOT 56  
COLBY T. GEMESTER  
AMANDA D. GEMESTER  
187 WOODBURY AVE.  
PORTSMOUTH, NH 03801  
BK 6050 PG 180

TAX MAP 174 LOT 2  
PORTSMOUTH HOUSING AUTHORITY  
245 MIDDLE ST.  
PORTSMOUTH, NH 03801

TAX MAP 174 LOT 3  
DAWN P. MOYLAN REVO INTER VIVOS  
55 BOYD RD.  
PORTSMOUTH, NH 03801  
BK 2969 PG 0654

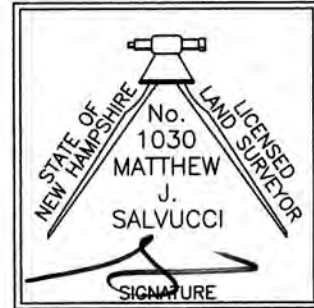
TAX MAP 174 LOT 4  
KAREN A. FOYE  
KENNETH FOYE  
79 BOYD RD.  
PORTSMOUTH, NH 03801  
BK 6108 PG 2989

TAX MAP 175 LOT 11  
JHM PORTSMOUTH, LLC  
440 BEDFORD ST.  
LEXINGTON, MA 02420  
BK 5444 PG 0334

CERTIFICATION:

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 EXCEEDS 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.



MATTHEW J. SALVUCCI, LLS 1030  
ON BEHALF OF JONES & BEACH ENGINEERS, INC.

DATE: 1/19/23

Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: 1"=20'	Project No.: 21254
Drawing Name: 21254-PLAN.dwg		

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REV.	DATE	REVISION	BY

**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

LOT LINE ADJUSTMENT PLAN TAX MAP 175, LOTS 1, 2, & 3		
Plan Name:	"GRAPEVINE RUN"	
Project:	212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801	
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894	
	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345	

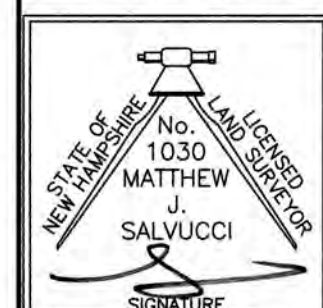
DRAWING No.
<b>A1</b>
SHEET 4 OF 23 JBE PROJECT NO. 21254



# CERTIFICATION:

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MATTHEW J. SALVUCCI, LLS 1030  
ON BEHALF OF JONES & BEACH ENGINEERS, INC.

DATE: 1/11/23

TAX MAP 175 LOT 4  
KUZINS BOWEN HOSPITALITY II, LLC  
C/O KEYBANK ATTN: SERVICING DEPT  
300 WOODBURY AVE.  
PORTSMOUTH, NH 03801  
BK 3355, PG 1325

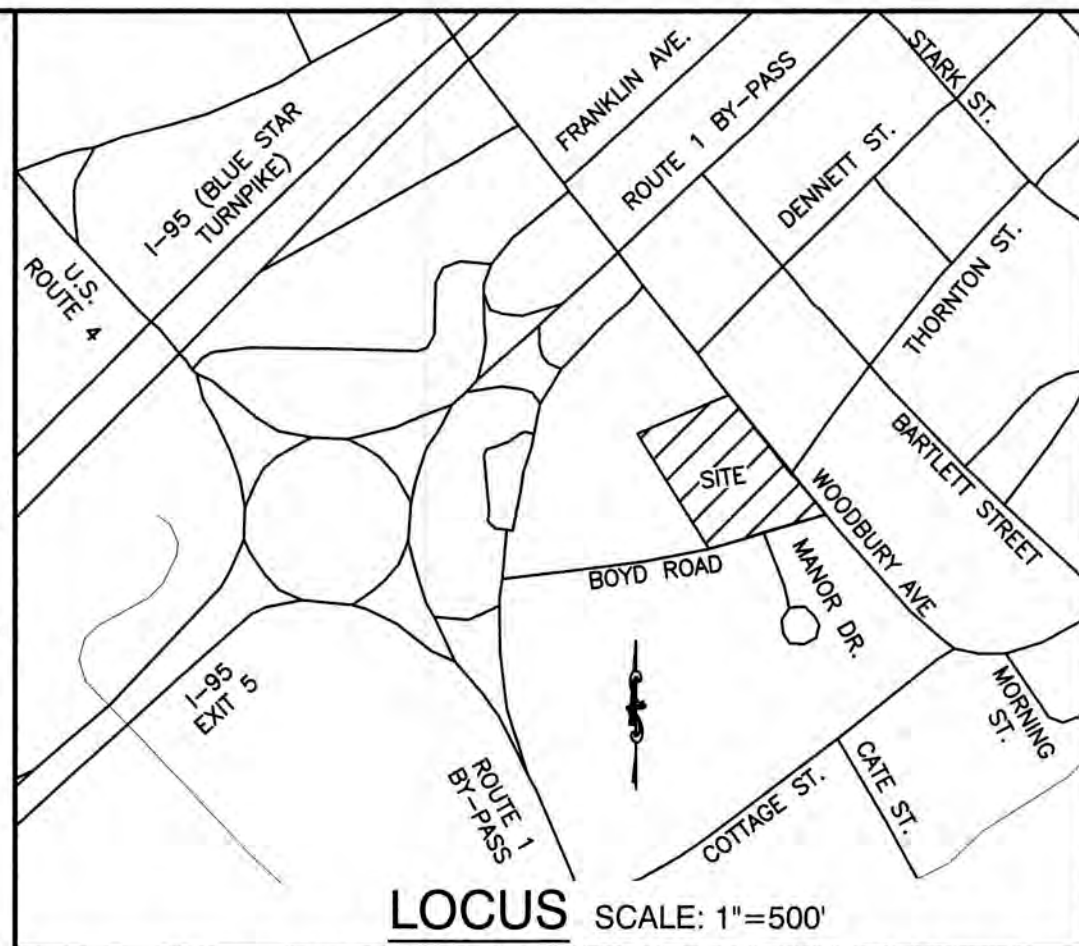
HOTEL DRIVEWAY EDGE OF PAVEMENT LOCATION  
IS APPROXIMATE PER AERIAL IMAGERY

TAX MAP 175 LOT 9  
ALAN H. MOORE  
JOAN MOORE  
PO BOX 591  
PORTSMOUTH, NH 03802  
BK 4459, PG 2659

TAX MAP 175 LOT 10  
MARTIN L. RYAN  
221 WOODBURY AVE.  
PORTSMOUTH, NH 03801  
BK 3526, PG 2011

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- "PLAN OF LAND, NO. 216 WOODBURY AVE., PORTSMOUTH, N.H." DATED SEPTEMBER 1951. PREPARED BY JOHN W. DURGIN. NOT RECORDED.



## SITE NOTES:

- THE INTENT OF THIS PLAN IS TO REMOVE THE HOUSE AND GARAGE ON LOT 1, ADJUST THE LOT LINE BETWEEN LOT 1 WITH LOTS 2 & 3, AND PROPOSE AN 8-UNIT MULTI-FAMILY RESIDENTIAL DEVELOPMENT ON LOT 1 WITH ACCESS FROM BOYD ROAD.
- ZONING DISTRICT: GENERAL RESIDENTIAL A (GRA)  
LOT AREA MINIMUM = 7,500 S.F.  
MAX DENSITY = 1 DWELLING UNIT PER 7,500 S.F. LOT AREA  
PROPOSED ON LOT 1 = 60,075 S.F. / 8 = 1 UNIT PER 7,509 S.F. PROVIDED  
LOT FRONTAGE MINIMUM = 100'  
LOT DEPTH MINIMUM = 70'  
BUILDING SETBACKS (MINIMUM):  
FRONT SETBACK = 15'  
SIDE SETBACK = 10'  
REAR SETBACK = 20'  
MAX. BUILDING HEIGHT = 35' WITH SLOPED ROOF, 30' WITH FLAT ROOF  
MAX. BUILDING COVERAGE = 25%  
PROPOSED, LOT 1 = 21.1%  
PROPOSED, LOT 2 = 17.6%  
PROPOSED, LOT 3 = 19.3%  
MAX. OPEN SPACE = 30%  
PROPOSED, LOT 1 = 58.7%  
PROPOSED, LOT 2 = 58.1%  
PROPOSED, LOT 3 = 68.2%
- PARKING CALCULATIONS  
UNITS OVER 750 S.F. - 1.3 SPACES REQUIRED PER UNIT PLUS 1 VISITOR SPACE PER EVERY 5 DWELLING UNITS OR PORTION THEREOF  
8 UNITS \* 1.3 SPACES REQUIRED = 11 SPACES REQUIRED, 16 SPACES PROVIDED IN GARAGES  
8 UNITS: 2 VISITOR SPACES REQUIRED, 2 VISITOR SPACES PROVIDED  
TOTAL: 13 SPACES REQUIRED, 18 SPACES PROVIDED
- LOT 1 CALCULATIONS  
TOTAL BUILDING FOOTPRINT = 12,700 SF  
TOTAL IMPERVIOUS PAVED AREA = 10,900 SF  
TOTAL IMPERVIOUS ON LOT 1 = 23,600 S.F. = 39.2% OF LOT 1  
PERVIOUS PAVERS = 1,350 S.F. = 2.2% OF LOT 1  
TOTAL OPEN SPACE ON LOT 1 = 100% - 39.2% - 2.2% = 58.6%
- NHDES SEWER CONNECTION PERMIT NO. , DATED ,
- AT ITS MEETING ON APRIL 19, 2022, THE CITY OF PORTSMOUTH ZONING BOARD OF ADJUSTMENT VOTED TO GRANT A VARIANCE FROM THE FOLLOWING REQUIREMENT:  
SECTION 10.513 - TO ALLOW MORE THAN ONE FREE-STANDING DWELLING ON A SINGLE LOT WITHIN THE GRA ZONE
- 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 ON-SITE OR OFF-SITE TO ENSURE SAFETY AND OBEY THE LAW.
- ALL CONSTRUCTION SHALL CONFORM TO TOWN STANDARDS AND REGULATIONS, AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.
- SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 3301500270F, DATED JANUARY 29, 2021.
- ALL CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (S.W.P.P.). THIS DOCUMENT IS TO BE KEPT ON-SITE AT ALL TIMES AND UPDATED AS REQUIRED.
- 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.
- ALL PROPOSED SIGNAGE SHALL CONFORM WITH THE TOWN ZONING REGULATIONS, UNLESS A VARIANCE IS OTHERWISE REQUESTED.
- 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.
- ALL STOP BARS SHALL BE 18" IN WIDTH IN A COLOR OF WHITE; ALL TRAFFIC ARROWS SHALL BE PAINTED IN A COLOR OF WHITE.
- 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.
- SNOW TO BE STORED AT EDGE OF PAVEMENT AND IN AREAS SHOWN ON THE PLANS, OR TRUCKED OFF-SITE TO AN APPROVED SNOW DUMPING LOCATION.
- ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
- ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
- THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
- 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.
- THE OWNER OF EACH UNIT SHALL STORE TRASH IN THEIR GARAGE. TRASH WILL BE PICKED UP BY A PRIVATE HAULER.
- THE TAX MAP AND LOT NUMBERS ARE BASED ON THE CITY OF PORTSMOUTH TAX RECORDS AND ARE SUBJECT TO CHANGE.
- 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.
- 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.
- 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.
- THIS PLAN IS THE RESULT OF A CLOSED TRAVERSE WITH A RAW, UNADJUSTED LINEAR ERROR OF CLOSURE GREATER THAN 1 IN 15,000.
- ON-SITE SALT STORAGE IS PROHIBITED WITHIN 250' OF AN INLAND WETLAND UNLESS COMPLETELY COVERED AND CONTAINED IN A STRUCTURE.
- BUILDINGS SHALL BE CONSTRUCTED IN THE FOOTPRINTS SHOWN HEREON. NOTIFY THE PROJECT ENGINEER IF THE PROPOSED ROOF LAYOUT, GUTTERS, AND/OR ROOF LINES ARE MODIFIED AFTER FINAL PLANS ARE SUBMITTED. UNITS 1-4 WILL NOT HAVE BASEMENTS, SUMP PUMPS, OR FOUNDATION DRAINS.
- AREA OF DISTURBANCE = 58,000 S.F. (ON AND OFF SITE)
- IF BOYD ROAD IS RECONSTRUCTED PRIOR TO THE SITE WORK IN BOYD ROAD BEING CONSTRUCTED, BOYD ROAD WILL REQUIRE A MILL AND FILL PAVEMENT RESURFACING FOR ALL DISTURBED AREAS TO THE SATISFACTION OF THE DEPARTMENT OF PUBLIC WORKS.

## ADDITIONAL ABUTTERS:

TAX MAP 162 LOT 56  
COLBY T. GAMESTER  
AMANDA D. GAMESTER  
187 WOODBURY AVE.  
PORTSMOUTH, NH 03801  
BK 6050 PG 180

TAX MAP 174 LOT 2  
PORTSMOUTH HOUSING AUTHORITY  
245 MIDDLE ST.  
PORTSMOUTH, NH 03801

TAX MAP 174 LOT 3  
DAWN P. MOYLAN REVO INTER VIVOS  
55 BOYD RD.  
PORTSMOUTH, NH 03801  
BK 2969 PG 0654

TAX MAP 174 LOT 4  
KAREN A. FOYE  
KENNETH FOYE  
79 BOYD RD.  
PORTSMOUTH, NH 03801  
BK 6108 PG 2989

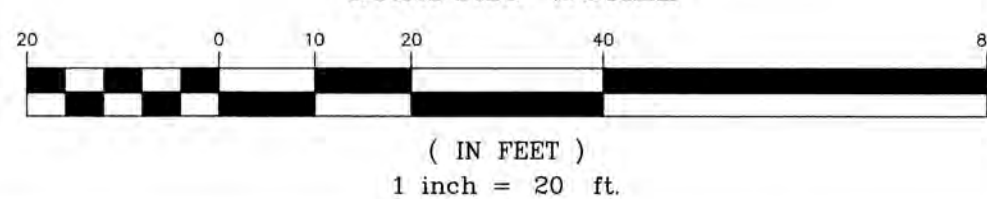
TAX MAP 175 LOT 13  
FREDERICK J. BAILEY III &  
JOYCE S. NELSON  
4 SHORE ROAD  
WOLFEBORO, NH 03894  
BK 5500 PG 0334

## GENERAL LEGEND

EXISTING PROPOSED

DESCRIPTION  
PROPERTY LINES  
SETBACK LINES  
CENTERLINE  
EASEMENT  
TREE LINE  
FENCE  
EDGE OF PAVEMENT  
TREES AND BUSHES  
UTILITY POLE

## GRAPHIC SCALE



APPROVED - PORTSMOUTH, NH  
PLANNING BOARD

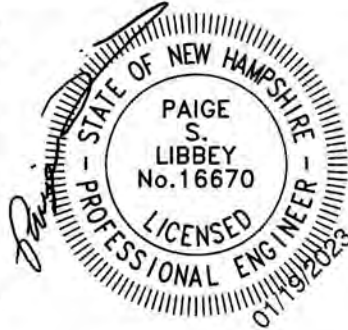
PROJECT PARCEL  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1, 2, & 3

APPLICANT  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
149 EPPING RD., SUITE 2A  
EXETER, NH 03833

TOTAL LOT AREA  
80,484 SQ. FT.  
1.85 ACRES

DATE:

Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: 1"=20'	Project No.: 21254
Drawing Name: 21254-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.		



8	1/19/23	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
7	12/20/22	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
6	10/18/22	REVISED PER REVIEW ENGINEER AND TAC COMMENTS	DJM
5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

Designed and Produced in NH

**J/B Jones & Beach Engineers, Inc.**

85 Portsmouth Ave. PO Box 219 Stratham, NH 03885

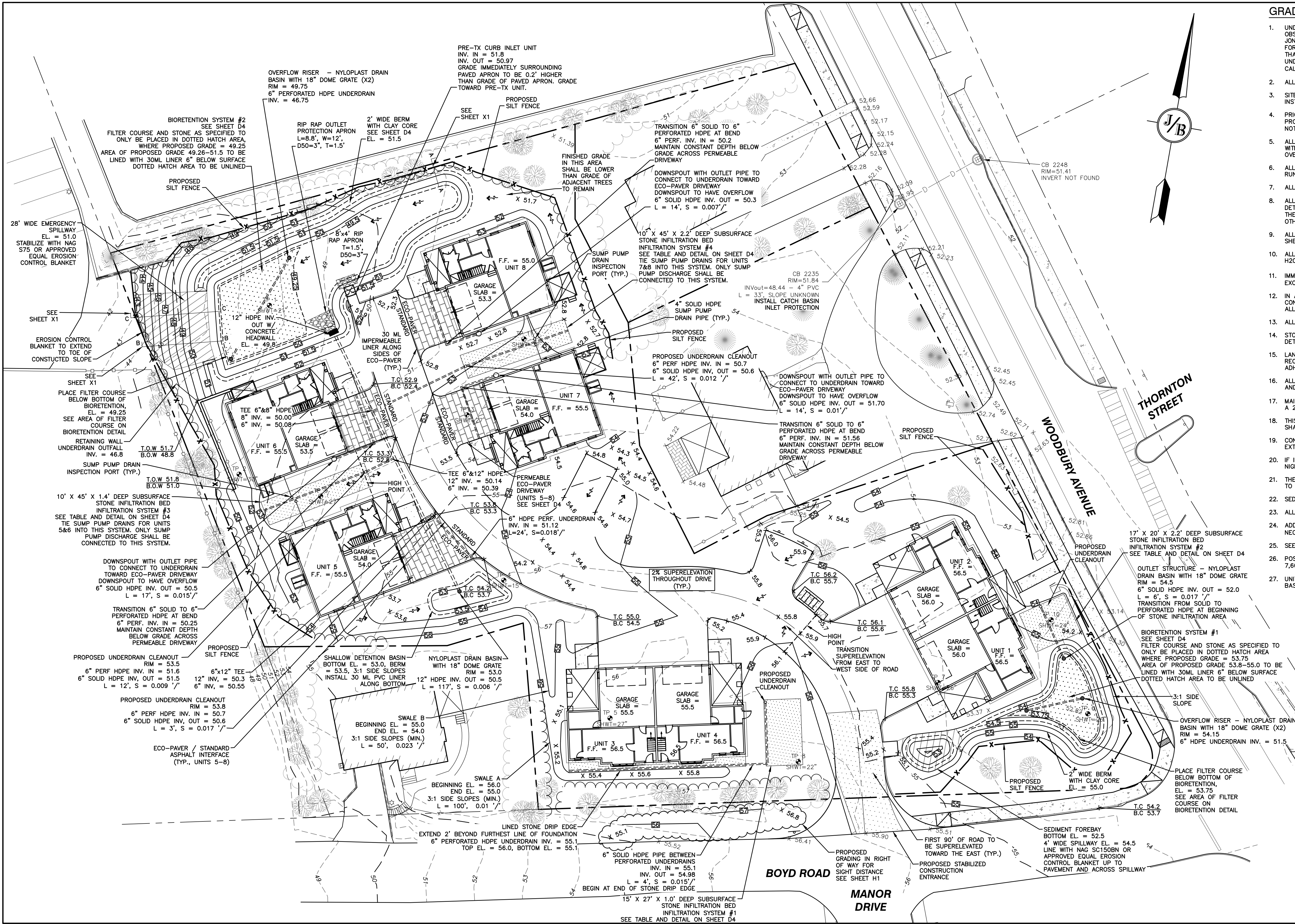
Civil Engineering Services

603-772-4746  
FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	<b>SITE PLAN</b>
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owners of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894

DRAWING No.	C2
SHEET 5 OF 23	JBE PROJECT NO. 21254

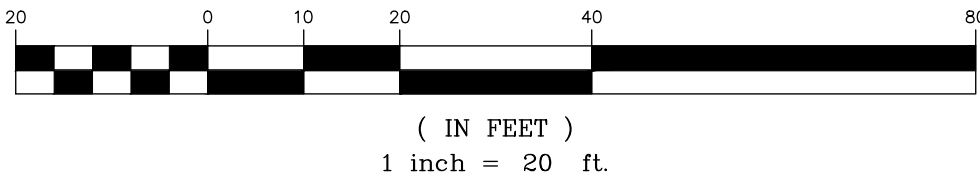




GRADING AND DRAINAGE NOTES:

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. ALL BENCHMARKS AND TOPOGRAPHY SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
3. SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED. SEE CONSTRUCTION SEQUENCE ON SHEET E1.
4. 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.
5. ALL ROOF DRAINS FROM BUILDING SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT THE END. ALL EXTERIOR ROOF DOWNSPOUTS ARE TO BE INSTALLED WITH OVERFLOW DEVICES.
6. ALL SWALES AND BIORETENTION SYSTEMS ARE TO BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
7. ALL SLOPES SHALL BE 3:1 OR FLATTER AS DIRECTED.
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 H2O LOADING AND SHALL BE INSTALLED ACCORDINGLY.
11. IMMEDIATELY APPLY AND COMPACT STONE BASE FOR BUILDING PAD TO +/- 1/2" PRIOR TO EXCAVATING INTERIOR AND PERIMETER FOOTINGS.
12. 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.
13. ALL DRAINAGE PIPE SHALL BE NON-PERFORATED ADS N-12 OR APPROVED EQUAL.
14. STONE INLET PROTECTION SHALL BE PLACED AT ALL CATCH BASINS. SEE DETAIL WITHIN THE DETAIL SHEETS.
15. 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.
16. ALL EXPOSED AREAS SHALL BE SEEDDED AS SPECIFIED WITHIN 3 DAYS OF FINAL GRADING AND ANYTIME CONSTRUCTION STOPS FOR LONGER THAN 3 DAYS.
17. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN EVENT OF 0.25" OR GREATER IN A 24 HOUR PERIOD AND AT LEAST ONCE A WEEK.
18. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE, AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
19. CONSTRUCTION VEHICLES SHALL UTILIZE THE STABILIZED CONSTRUCTION ENTRANCE TO THE EXTENT POSSIBLE THROUGHOUT CONSTRUCTION.
20. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
21. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
22. SEDIMENT SHALL BE REMOVED FROM ALL SEDIMENT BASINS BEFORE THEY ARE 25% FULL.
23. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
24. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED, IF DEEMED NECESSARY BY ON-SITE INSPECTION BY ENGINEER AND/OR REGULATORY OFFICIALS.
25. SEE ALSO EROSION AND SEDIMENT CONTROL SPECIFICATIONS ON SHEET E1.
26. POST-CONSTRUCTION EFFECTIVE IMPERVIOUS AREA ON TAX MAP 175, LOT 1, 2, & 3 = 7,600 S.F. (9.4% OF PARCELS).
27. UNITS 5-8 SHALL HAVE BASEMENTS WITH SUMP PUMPS. UNITS 1-4 SHALL NOT HAVE BASEMENTS. SUMP PUMPS, OR FOUNDATION DRAINS.

GRAPHIC SCALE



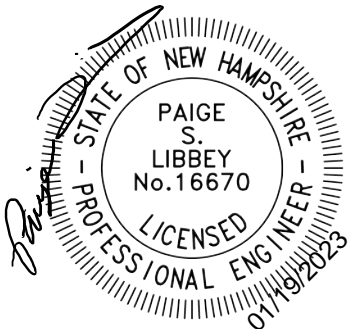
PROJECT PARCEL  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1, 2, & 3

APPLICANT  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
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TOTAL LOT AREA  
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5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY



Designed and Produced in NH

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85 Portsmouth Ave. PO Box 219 Stratham, NH 03885  
Civil Engineering Services  
603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	GRADING AND DRAINAGE PLAN
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894

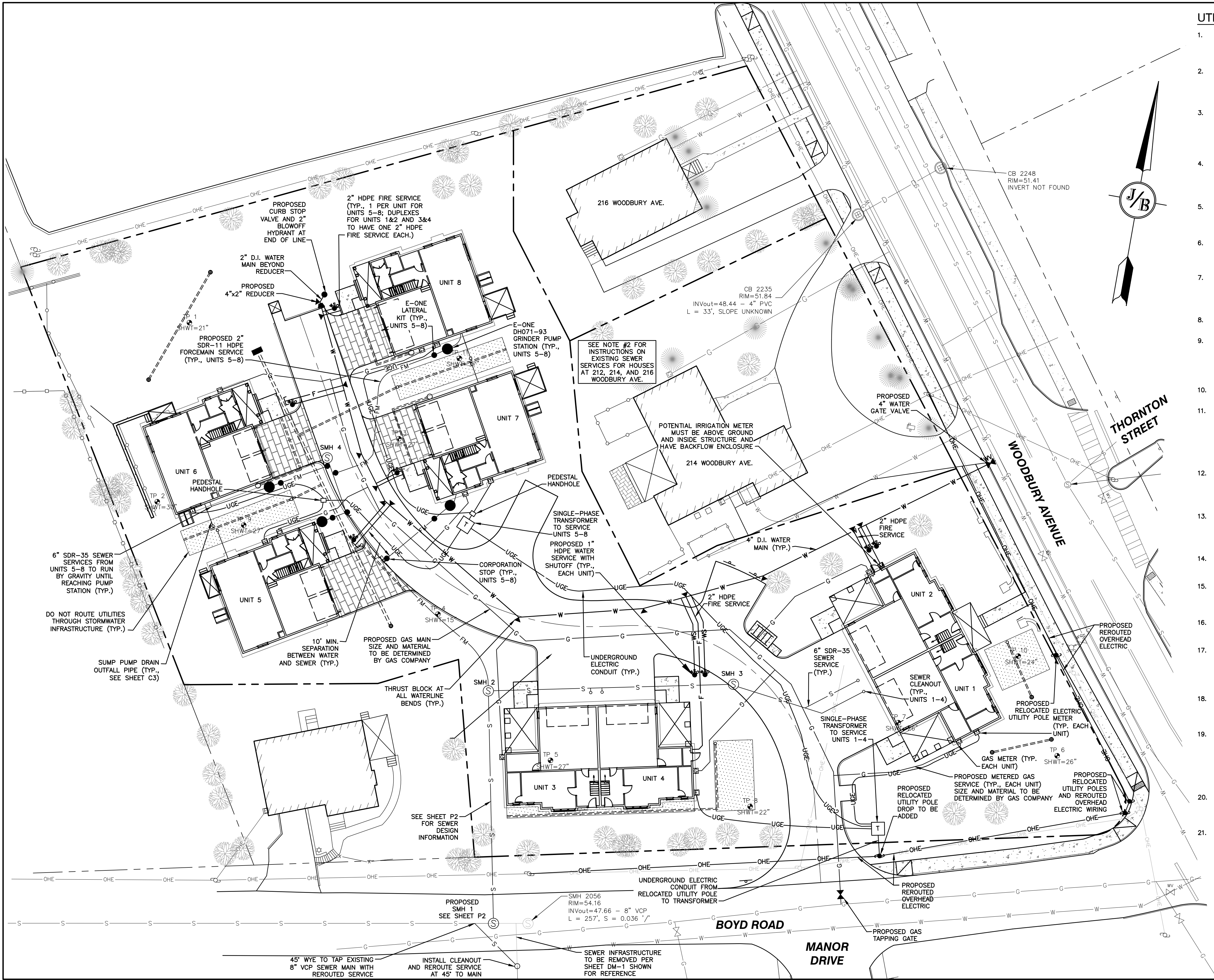
LOT 1: BK 4708 PG 979  
LOT 2: BK 4582 PG 888  
LOT 3: BK 3919 PG 1345

DRAWING No.

**C3**

SHEET 6 OF 23  
JBE PROJECT NO. 21254

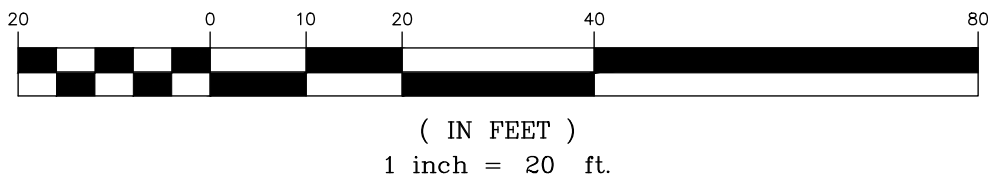




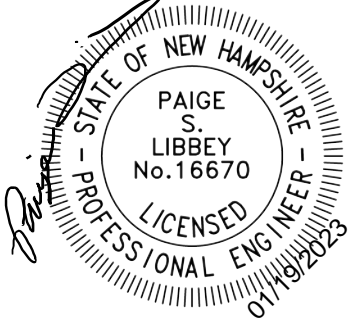
UTILITY NOTES:

- 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.
- CUT & CAP SEWER SERVICE FOR 212 WOODBURY AVENUE TO PROPERTY LINE. SEWER SERVICES FOR 214 AND 216 WOODBURY AVENUE ARE TO REMAIN. NOTIFY PROJECT ENGINEER IF EITHER OF THE TWO SEWER SERVICES TO REMAIN CONFLICT WITH THE PROPOSED DEVELOPMENT.
- 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.
- 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, FIRE ALARM, GAS, WATER, AND SEWER).
- 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.
- ALL CONSTRUCTION SHALL CONFORM TO THE TOWN STANDARDS AND REGULATIONS, AND NHDES STANDARDS AND SPECIFICATIONS, WHICHEVER ARE MORE STRINGENT, UNLESS A WAIVER IS OTHERWISE OBTAINED.
- ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS
- BUILDING TO BE SERVICED BY UNDERGROUND UTILITIES UNLESS OTHERWISE NOTED.
- THE CONTRACTOR IS TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITY STUDS PRIOR TO CONSTRUCTION AND DISCONNECT ALL EXISTING SERVICE CONNECTIONS AT THEIR RESPECTIVE MAINS IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY'S STANDARDS AND SPECIFICATIONS. ENGINEER TO BE NOTIFIED.
- AS-BUILT PLANS SHALL BE SUBMITTED TO DEPARTMENT OF PUBLIC WORKS.
- 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.
- FRAMES AND COVERS: MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30 INCH DIA. CLEAR OPENING. THE WORD "SEWER" OR "DRAIN" SHALL BE CAST INTO THE CENTER OF THE UPPER FACE OF EACH COVER WITH RAISED, 3" LETTERS.
- 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.
- CONTRACTOR SHALL PLACE 2" WIDE METAL WIRE IMPREGNATED RED PLASTIC WARNING TAPE OVER ENTIRE LENGTH OF ALL GRAVITY SEWERS, SERVICES, AND FORCE MAINS.
- SANITARY SEWER FLOW CALCULATIONS:  
8 - THREE BEDROOM UNITS @ 150 GPD/BEDROOM = 3,600 GPD  
IRRIGATION USE = 1,000 GPD ±
- ALL SANITARY STRUCTURE INTERIOR DIAMETERS (4" MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS.
- 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, GAS GATES AND OTHER UTILITIES TO FINISH GRADE AS SHOWN ON THE GRADING AND DRAINAGE PLAN.
- 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.
- 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, WHICHEVER 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.
- 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.
- THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS, TEES, MECHANICAL JOINTS AND FIRE HYDRANTS.
- DIMENSIONS ARE SHOWN TO CENTERLINE OF PIPE OR FITTING.
- THE CONTRACTOR SHALL HAVE THE APPROVAL OF ALL GOVERNING AGENCIES HAVING JURISDICTION OVER FIRE PROTECTION SYSTEM PRIOR TO INSTALLATION.
- CONTRACTOR TO FURNISH SHOP DRAWINGS FOR UTILITY RELATED ITEMS TO ENSURE CONFORMANCE WITH THE PLANS AND SPECIFICATIONS. SHOP DRAWINGS SHALL BE SENT IN TRIPPLICATE TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
- EXISTING UTILITIES SHALL BE DISGAGED BEFORE CONSTRUCTION.
- ALL WATER LINES SHOULD HAVE TESTABLE BACKFLOW PREVENTERS AT THE ENTRANCE TO EACH BUILDING.
- 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.
- 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 TESTING PIPE DEFLECTION. THE DEFLECTION TEST SHALL BE CONDUCTED WITHOUT MECHANICAL PULLING DEVICES.
- 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.
- 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.
- 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.
- 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 DEPARTMENT OF PUBLIC WORKS.
- LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRIC CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
- AN AS-BUILT PLAN OF THE WATER LINE IS TO BE PREPARED AND SUBMITTED TO THE CITY OF PORTSMOUTH WATER DEPARTMENT.
- WATER LINE TO BE CONSTRUCTED PER CITY OF PORTSMOUTH SPECIFICATIONS.
- SHOP DRAWINGS TO BE SUBMITTED TO CITY OF PORTSMOUTH FOR REVIEW AND APPROVAL.
- NEW DUCTILE IRON WATER LINE SHALL BE WRAPPED WITH A WATER TIGHT PROTECTIVE WRAPPING FOR THE FULL LENGTH. ALL WATER LINE JOINTS SHALL HAVE THREE (3) BRASS WEDGES PER JOINT. CONTRACTOR SHALL CONTACT CITY OF PORTSMOUTH WATER DEPARTMENT (JIM TOW AT 603-766-1439) PRIOR TO WATER LINE INSTALLATION.
- 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.
- 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:
  - PREVENT CONTAMINATING MATERIALS FROM ENTERING THE WATER MAIN DURING STORAGE, CONSTRUCTION, OR REPAIR.
  - REMOVE, BY FLUSHING OR OTHER MEANS, THOSE MATERIALS THAT MAY HAVE ENTERED THE WATER MAINS.
  - CHLORINATE ANY RESIDUAL CONTAMINATION THAT MAY REMAIN, AND FLUSH THE CHLORINATED WATER FROM THE MAIN.
  - PROTECT THE EXISTING DISTRIBUTION SYSTEM FROM BACKFLOW DUE TO HYDROSTATIC PRESSURE TEST AND DISINFECTION PROCEDURES.
  - DETERMINE THE BACTERIOLOGICAL QUALITY BY LABORATORY TEST AFTER DISINFECTION.
  - MAKE FINAL CONNECTION OF THE APPROVED NEW WATER MAIN TO THE ACTIVE DISTRIBUTION SYSTEM
- 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.
- SEWER TRENCH DAMS SHALL BE UTILIZED EVERY 75' ALONG GRAVITY SEWER PIPE. REFER TO DETAIL ON SHEET D3.

GRAPHIC SCALE



Design: JAC	Draft: DJM	Date: 01/05/22
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Drawing Name: 21254-PLAN.dwg		
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4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

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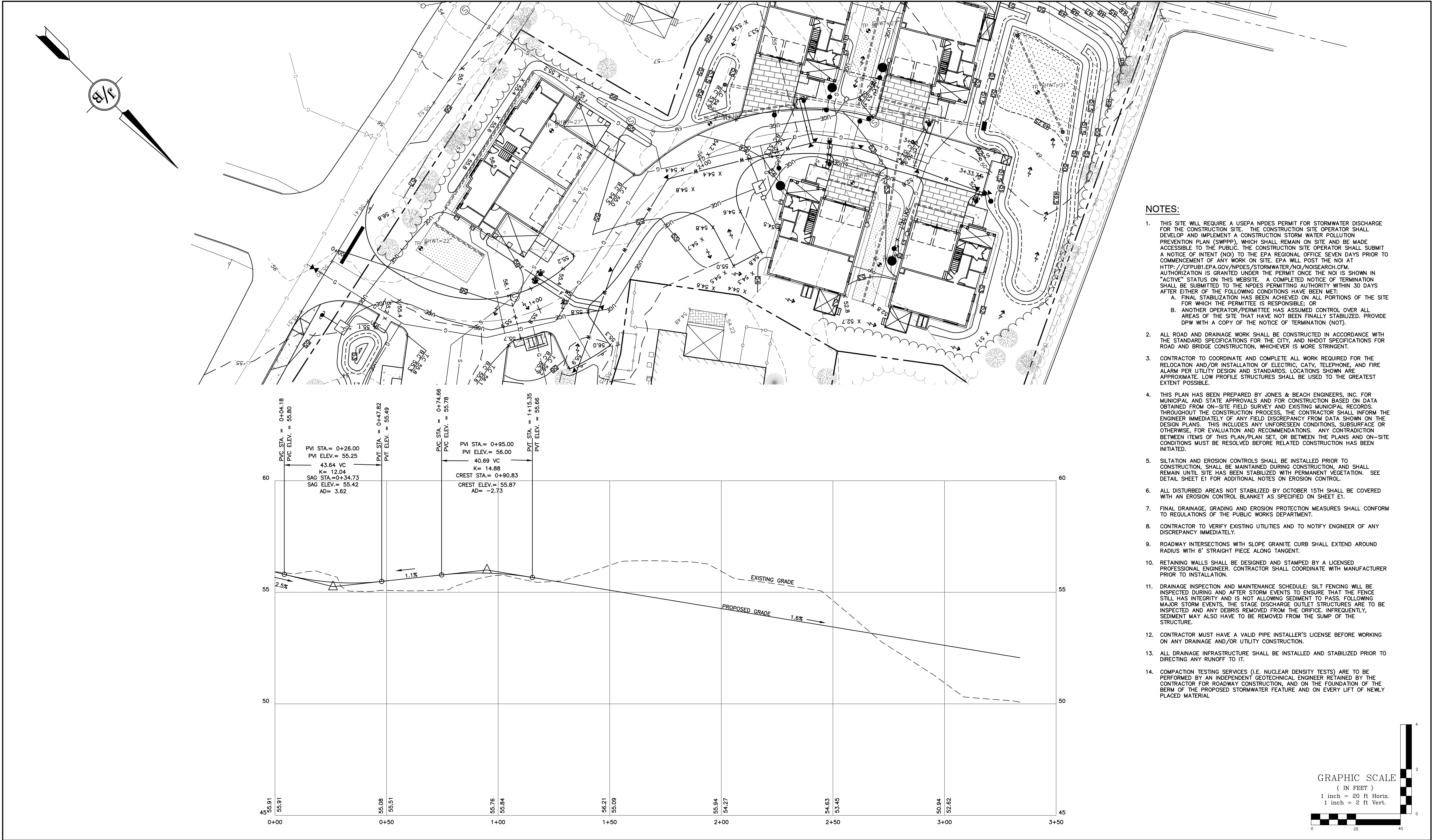
Plan Name:	UTILITY PLAN	
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801	
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

DRAWING No.

C4

SHEET 7 OF 23  
JBE PROJECT NO. 21254

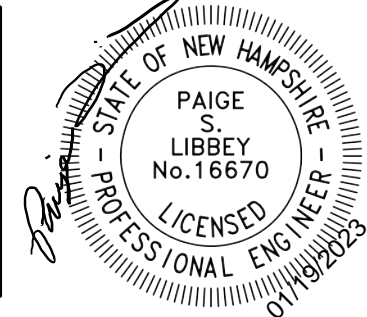




- NOTES:**
- THIS SITE WILL REQUIRE A USEPA NPDES PERMIT FOR STORMWATER DISCHARGE FOR THE CONSTRUCTION SITE. THE CONSTRUCTION SITE OPERATOR SHALL DEVELOP AND IMPLEMENT A CONSTRUCTION STORM WATER POLLUTION PREVENTION PLAN (SWPPP), WHICH SHALL REMAIN ON SITE AND BE MADE ACCESSIBLE TO THE PUBLIC. THE CONSTRUCTION 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](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).
  - 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.
  - CONTRACTOR TO COORDINATE AND COMPLETE ALL WORK REQUIRED FOR THE RELOCATION AND/OR INSTALLATION OF ELECTRIC, CATV, TELEPHONE, AND FIRE ALARM PER UTILITY DESIGN AND STANDARDS. LOCATIONS SHOWN ARE APPROXIMATE. LOW PROFILE STRUCTURES SHALL BE USED TO THE GREATEST EXTENT POSSIBLE.
  - 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.
  - 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.
  - ALL DISTURBED AREAS NOT STABILIZED BY OCTOBER 15TH SHALL BE COVERED WITH AN EROSION CONTROL BLANKET AS SPECIFIED ON SHEET E1.
  - FINAL DRAINAGE, GRADING AND EROSION PROTECTION MEASURES SHALL CONFORM TO REGULATIONS OF THE PUBLIC WORKS DEPARTMENT.
  - CONTRACTOR TO VERIFY EXISTING UTILITIES AND TO NOTIFY ENGINEER OF ANY DISCREPANCY IMMEDIATELY.
  - ROADWAY INTERSECTIONS WITH SLOPE GRANITE CURB SHALL EXTEND AROUND RADIUS WITH 6' STRAIGHT PIECE ALONG TANGENT.
  - RETAINING WALLS SHALL BE DESIGNED AND STAMPED BY A LICENSED PROFESSIONAL ENGINEER. CONTRACTOR SHALL COORDINATE WITH MANUFACTURER PRIOR TO INSTALLATION.
  - 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. FOLLOWING MAJOR STORM EVENTS, THE STAGE DISCHARGE OUTLET STRUCTURES ARE TO BE INSPECTED AND ANY DEBRIS REMOVED FROM THE ORIFICE. INFREQUENTLY, SEDIMENT MAY ALSO HAVE TO BE REMOVED FROM THE SUMP OF THE STRUCTURE.
  - CONTRACTOR MUST HAVE A VALID PIPE INSTALLER'S LICENSE BEFORE WORKING ON ANY DRAINAGE AND/OR UTILITY CONSTRUCTION.
  - ALL DRAINAGE INFRASTRUCTURE SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING ANY RUNOFF TO IT.
  - 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 OF THE PROPOSED STORMWATER FEATURE AND ON EVERY LIFT OF NEWLY PLACED MATERIAL.

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Drawing Name: 21254-PLAN.dwg		

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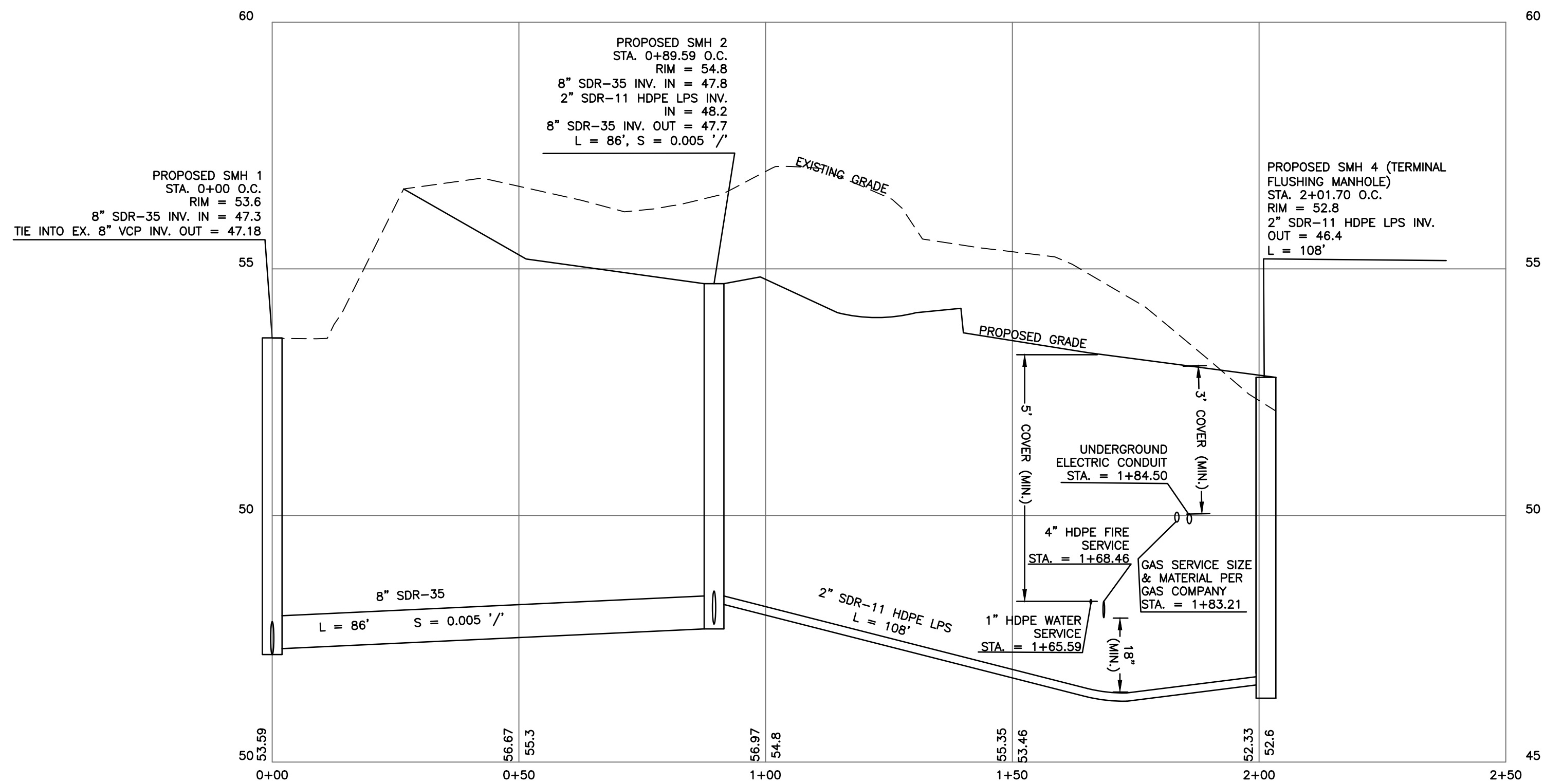
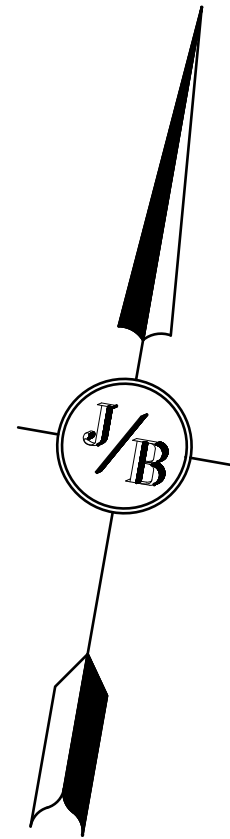
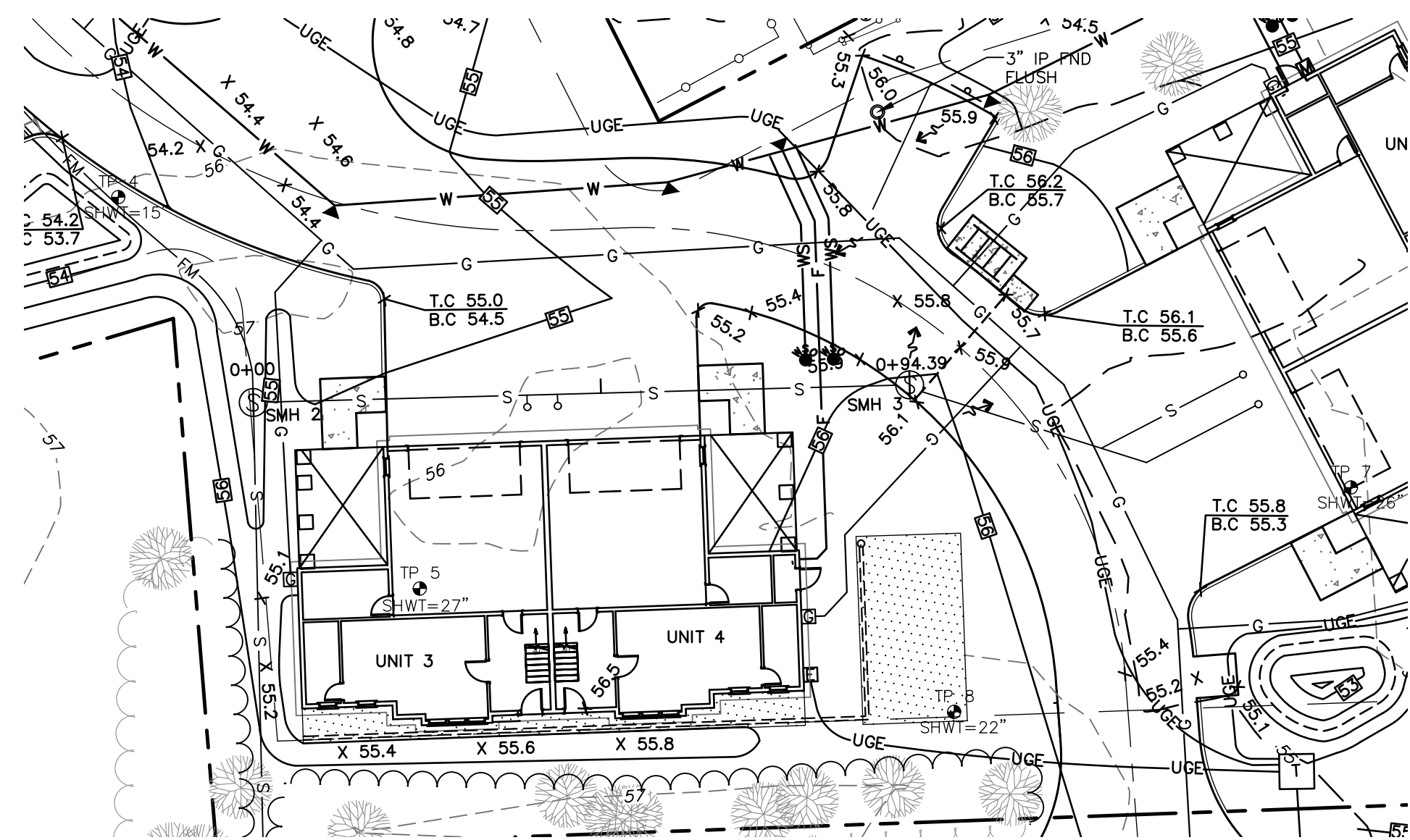
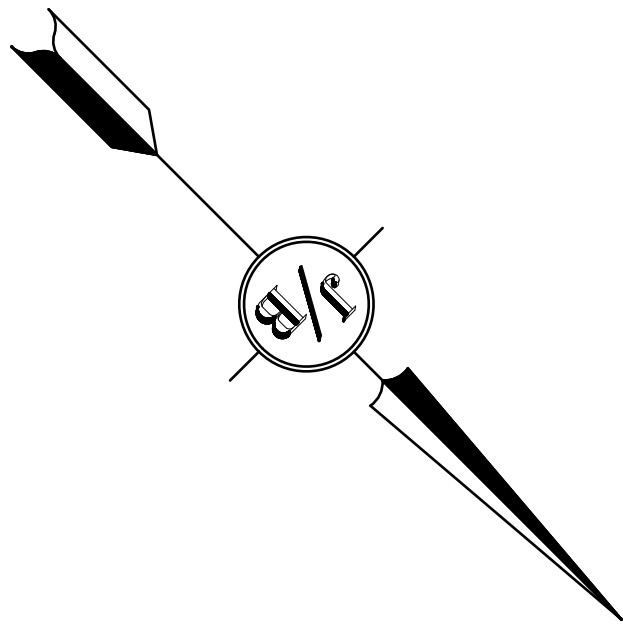
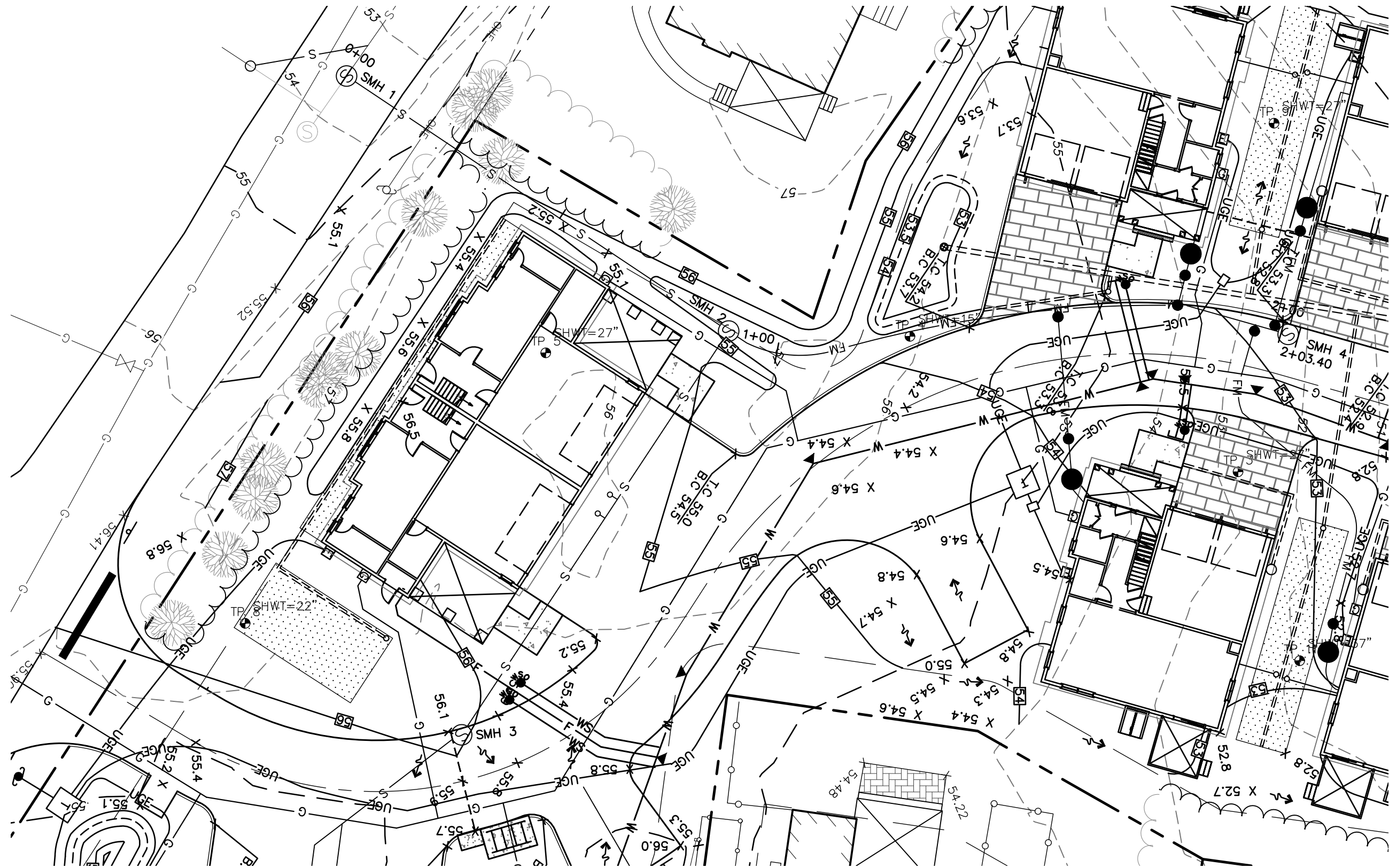
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*Civil Engineering Services*  
603-772-4746  
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Plan Name:	PLAN AND ROAD PROFILE
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894 LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

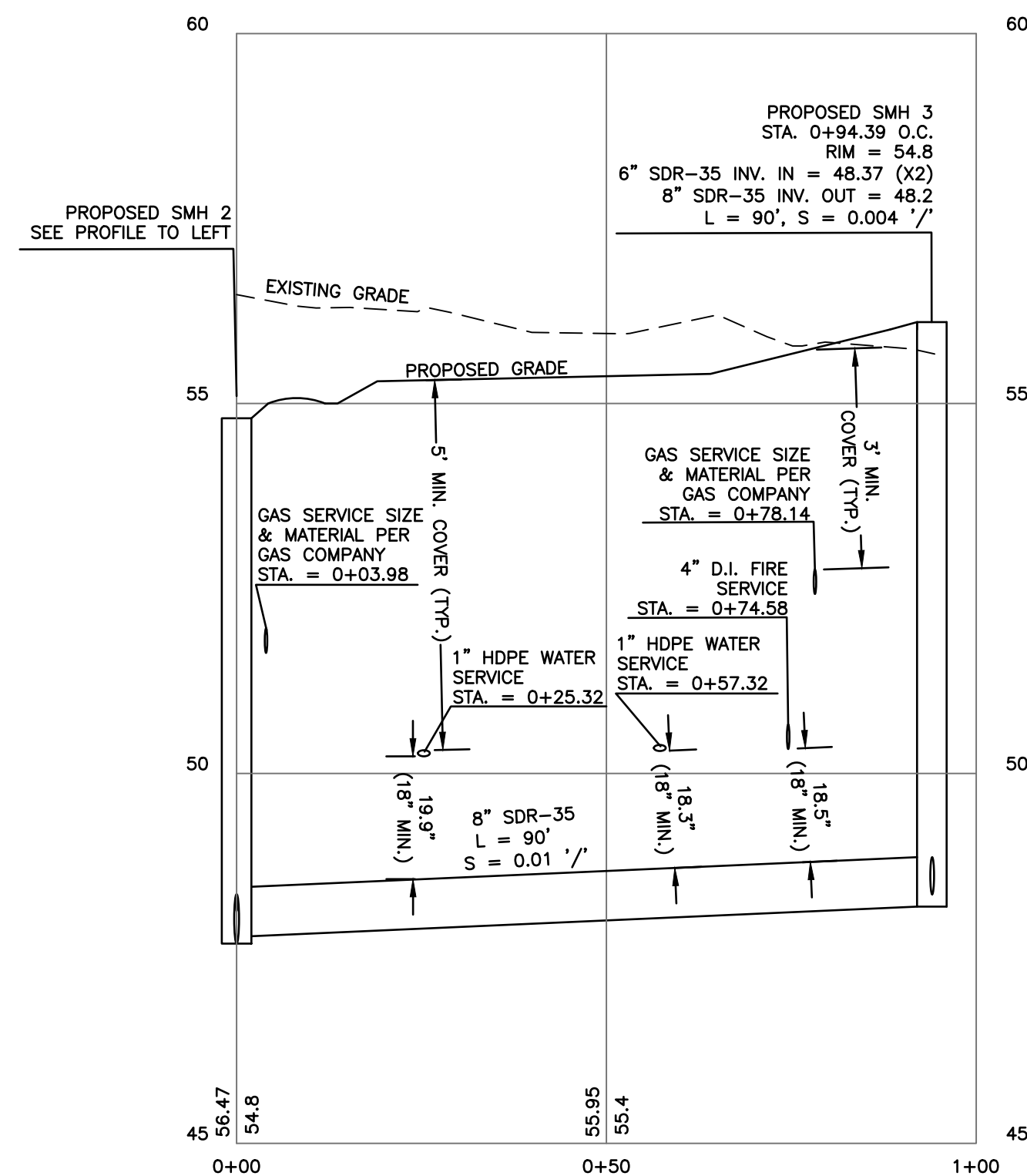
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P1

SHEET 8 OF 23  
JBE PROJECT NO. 21254



MAIN SEWER THROUGH SITE

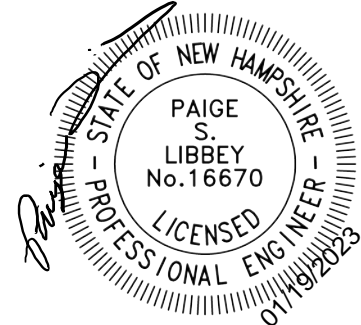


SEWER MAIN SERVICING UNITS 1-2

GRAPHIC SCALE  
( IN FEET )

1 inch = 20 ft Horiz.  
1 inch = 2 ft Vert.

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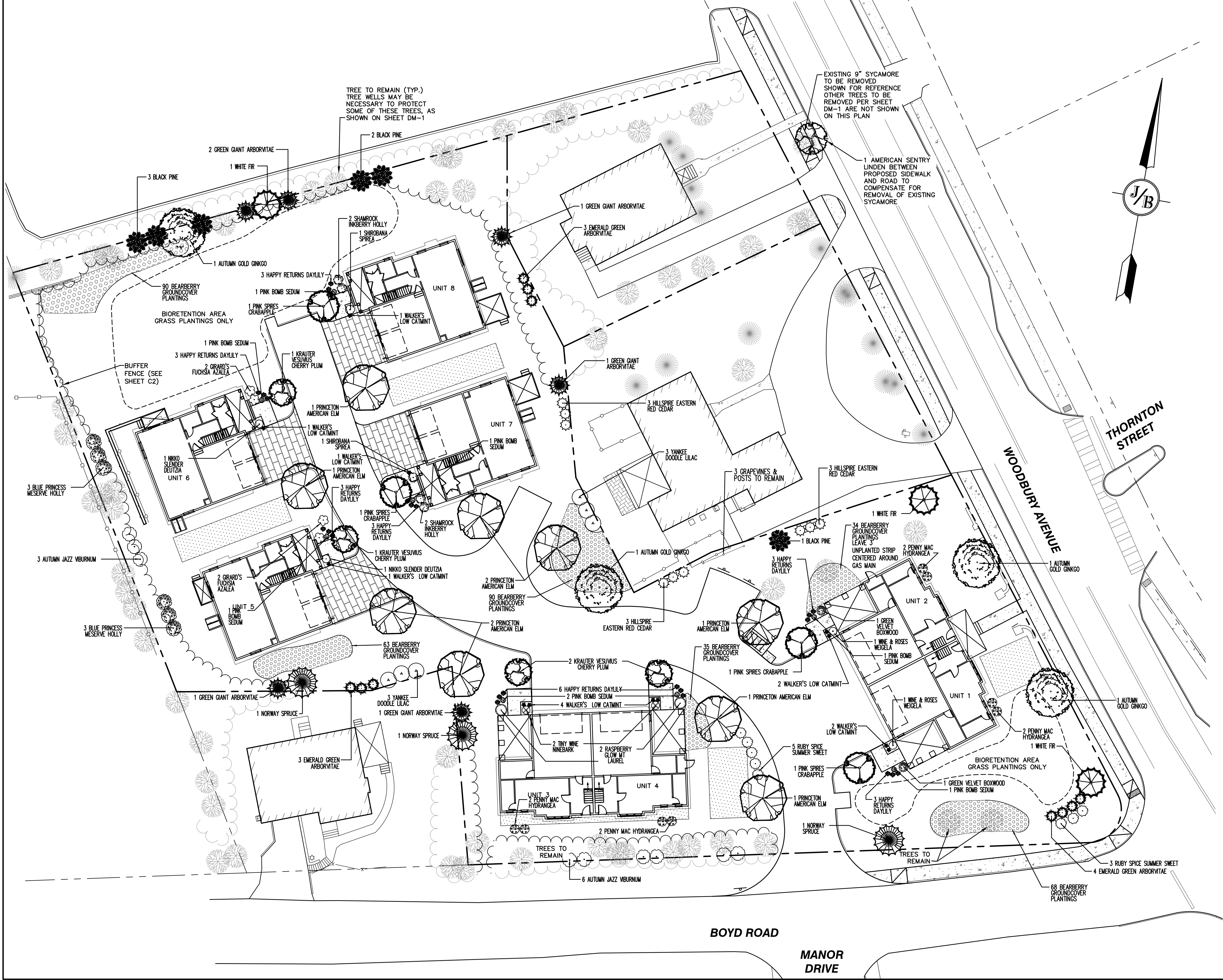
Plan Name: **PLAN AND SEWER PROFILE**  
Project: "GRAPEVINE RUN"  
212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801  
Owner of Record: FREDERICK J. BAILEY III & JOYCE S. NELSON  
4 SHORE RD., WOLFEBORO, NH 03894  
LOT 1: BK 4708 PG 979  
LOT 2: BK 4582 PG 888  
LOT 3: BK 3919 PG 1345

DRAWING No.

**P2**

SHEET 9 OF 23  
JBE PROJECT NO. 21254



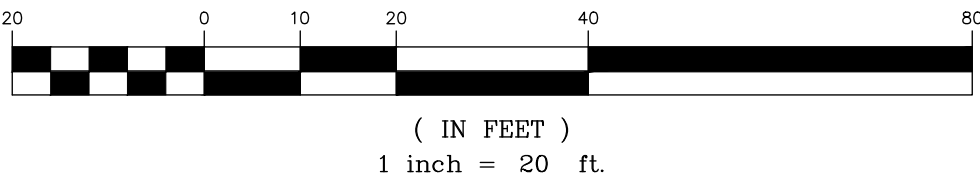


LANDSCAPE NOTES:

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 NURSEYMEN.
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. ALL WORK AND PLANTS SHALL BE DONE, INSTALLED AND DETAILED IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
7. 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. IRRIGATION SHALL BE UTILIZED FOR AT LEAST THE FIRST TWO YEARS OF PLANT GROWTH.
8. ALL LANDSCAPE AREAS TO BE GRASS COMMON TO REGION, EXCEPT FOR INTERIOR LANDSCAPED ISLANDS OR WHERE OTHER PLANT MATERIAL IS SPECIFIED.
9. ALL TREES AND SHRUBS SHALL BE PLANTED IN MULCH BEDS WITH EDGE STRIPS TO SEPARATE TURF GRASS AREAS.
10. 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.
11. FINISHED GRADES IN LANDSCAPED ISLANDS SHALL BE INSTALLED SO THAT THEY ARE 1" HIGHER THAN THE TOP OF THE SURROUNDING CURB.
12. ALL LANDSCAPING SHALL MEET THE CITY OF PORTSMOUTH STANDARDS AND REGULATIONS.
13. 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.
14. 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.
15. ALL LANDSCAPED AREAS SHALL HAVE SELECT MATERIALS REMOVED TO A DEPTH OF AT LEAST 12" 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.
16. THIS PLAN IS INTENDED FOR LANDSCAPING PURPOSES ONLY. REFER TO CIVIL/SITE DRAWINGS FOR OTHER SITE CONSTRUCTION INFORMATION.
17. IRRIGATION PIPING SYSTEM SHALL BE REVIEWED AND APPROVED BY OWNER AND ENGINEER PRIOR TO INSTALLATION.
18. THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND REPLACEMENT OF ALL REQUIRED SCREENING AND LANDSCAPE MATERIALS.
19. ALL REQUIRED PLANT MATERIALS SHALL BE TENDED AND MAINTAINED IN A HEALTHY GROWING CONDITION, REPLACED WHEN NECESSARY, AND KEPT FREE OF REFUSE AND DEBRIS. ALL REQUIRED FENCES AND WALLS SHALL BE MAINTAINED IN GOOD REPAIR.
20. THE PROPERTY OWNER SHALL BE RESPONSIBLE TO REMOVE AND REPLACE DEAD OR DISEASED PLANT MATERIALS IMMEDIATELY WITH THE SAME TYPE, SIZE, AND QUANTITY OF PLANT MATERIALS AS ORIGINALLY INSTALLED, UNLESS ALTERNATIVE PLANTINGS ARE REQUESTED, JUSTIFIED, AND APPROVED BY THE PLANNING BOARD OR PLANNING DIRECTOR.
21. SEE TYPICAL PLANTING DETAILS ON SHEET D5.
22. IF TREES SCHEDULED TO REMAIN NEED TO BE REMOVED OR BECOME UNHEALTHY, ADDITIONAL TREES WILL NEED TO BE PLANTED TO THE SATISFACTION OF THE PLANNING DEPARTMENT.
23. NO LOAM OR OTHER TOPSOIL SHALL BE REMOVED FROM THE SITE AS PART OF SITE DEVELOPMENT. TOPSOIL SHALL BE APPROPRIATELY STOCKPILED AND STABILIZED FOR REDISTRIBUTION WITHIN NEW PLANTING AREAS.
24. NEW PLANTINGS SHALL BE MONITORED AND MAINTAINED FOR AT LEAST TWO YEARS. IF AFTER ONE YEAR THE PLANTINGS DO NOT HAVE AT LEAST AN 80% SUCCESS RATE, REPLANTING WILL BE REQUIRED.
25. "SMART CONTROLLERS" SHALL BE UTILIZED FOR THE PLANNED IRRIGATION OF LANDSCAPED AREAS FOR MORE EFFICIENT USE OF WATER RESOURCES. USE RECYCLED WATER WHENEVER POSSIBLE FOR IRRIGATION NEEDS.

Quantity	Botanical Name	Common Name	Size
<b>TREES</b>			
3	Abies concolor	WHITE FIR	7-8 FT. HT.
4	Ginkgo biloba 'Autumn Gold'	AUTUMN GOLD GINKGO	3" CALIPER
9	Juniperus virginiana 'Hillspire'	HILLSPIRE EASTERN RED CEDAR	7-8 FT. HT.
4	Malus x 'Pink Spires'	PINK SPIRES CRABAPPLE	2" CALIPER
3	Picea abies	NORWAY SPRUCE	8-9 FT. HT.
6	Pinus nigra	BLACK PINE	7-8 FT. HT.
4	Prunus cerasifera 'Krauter Vesuvius'	KRAUTER VESUVIUS CHERRY PLUM	2" CALIPER
10	Thuja occidentalis 'Smaragd Emerald'	EMERALD GREEN ARBORVITAE	5-6 FT. HT.
6	Thuja plicata 'Green Giant'	GREEN GIANT ARBORVITAE	7-8 FT. HT.
1	Tilia americana	AMERICAN SENTRY LINDEN	3" CALIPER
9	Ulmus americana 'Princeton'	PRINCETON AMERICAN ELM	3" CALIPER
<b>SHRUBS</b>			
4	Azalea 'Girard's Fuchsia'	GIRARD'S FUCHSIA AZALEA	5 GALLON
2	Buxus 'Green Velvet'	GREEN VELVET BOXWOOD	5 GALLON
8	Clethra alnifolia 'Ruby Spice'	RUBY SPICE SUMMER SWEET	3 GALLON
2	Deutzia gracilis 'Nikko'	NIKKO SLENDER DEUTZIA	3 GALLON
8	Hydrangea macrophylla 'Penny Mac'	PENNY MAC HYDRANGEA	5 GALLON
4	Ilex glabra 'Shamrock'	SHAMROCK INKBERRY HOLLY	3 GALLON
6	Ilex x meserveae 'Blue Princess'	BLUE PRINCESS MESERVE HOLLY	7 GALLON
2	Kalmia latifolia 'Raspberry Glow'	RASPBERRY GLOW MT LAUREL	3 GALLON
2	Physocarpus opulifolius 'SMNPOTW'	TINY WINE NINEBARK	3 GALLON
2	Spiraea japonica 'Shirobana'	SHIROBANA SPIREA	3 GALLON
6	Syringa vulgaris 'Yankee Doodle'	YANKEE DOODLE LILAC	5 GALLON
9	Viburnum dentatum 'Autumn Jazz'	AUTUMN JAZZ VIBURNUM	5 GALLON
2	Weigela florida 'Alexandra'	WINE & ROSES WEIGELA	3 GALLON
<b>PERENNIALS</b>			
374	Arctostaphylos uva-ursi	BEARBERRY	4" POTS
24	Hemerocallis 'Happy Returns'	HAPPY RETURNS DAYLILY	1 GALLON
12	Nepeta x faassenii 'Walker's Low'	WALKER'S LOW CATMINT	1 GALLON
8	Sedum 'Pink Bomb'	PINK BOMB SEDUM	1 GALLON

GRAPHIC SCALE



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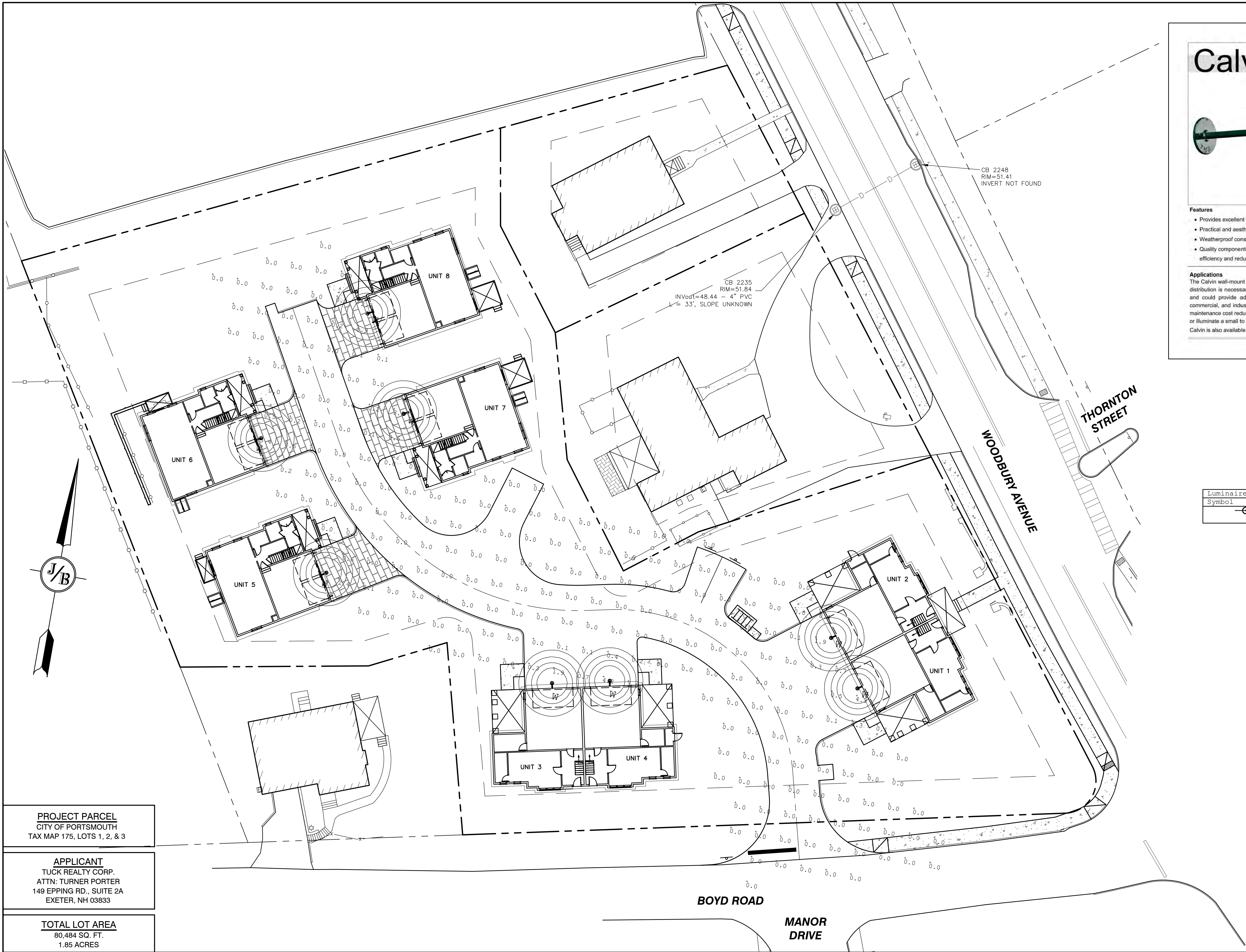
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Plan Name:	LANDSCAPE PLAN
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894 LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

DRAWING No.	L1
SHEET 10 OF 23	JBE PROJECT NO. 21254





## Calvin Wall



### Features

- Provides excellent coverage and uniformity with cut-off
- Practical and aesthetic options for application and design flexibility
- Weatherproof construction to withstand the elements
- Quality components combined with the most current technology for high efficiency and reduced lighting costs

### Applications

The Calvin wall-mount luminaire is ideal for illuminating areas where localized distribution is necessary, such as doorways and entrances, laneways, patios and could provide adequate night time security lighting. It lends itself to commercial, and industrial applications that could benefit from materials and maintenance cost reductions. Calvin could either augment the existing lighting, or illuminate a small to medium-sized area.  
Calvin is also available as a pendant-style model.

TMSLIGHTING

ESTABLISHED 1922

### Construction

High grade spun aluminum, brushed solid copper, or brushed 316L stainless steel reflector, with stainless steel mounting hardware, for indoor and outdoor applications.

### Lamp

Operates with Cree™ LED (19W max.), compact fluorescent (42W max.), metal halide (100W max.), or incandescent (150W max.). Specify 3000K, 3500K or 4000K CCT for LED systems. A dimmable, screw-type, 17W LED lamp is also available (PAR 38, E26 base, 120V, 4000K CCT).

Note: LED systems are available with 120-277V supply voltage only.

LED modules do not require a socket, and are wired directly to the integral driver. Incandescent and metal halide systems, and those using the 17W LED PAR 38 lamp, use a medium base socket (E26).

### Diffuser

Globe: clear and prismatic, elongated, glass globes are available.

Lens: the clear, flat lens provides slight diffusion, and protects any components located in the reflector.

Note: G3 is used with 100in, 32CF, and 15LED max.

Only prismatic globes are compatible with LED systems.

Globes are not available with the 17W LED PAR 38 lamps.

### Option

Wire Guard: a steel, chrome-plated wire guard is available for lamp protection against light projectiles, wildlife, and serves as a vandal deterrent.

### Ballast/LED Driver

Ballasts are efficient with a high power factor greater than 90%, and quiet with an "A" sound rating.

The LED source is controlled by an advanced electronic driver that delivers consistent power.

Ballast and LED drivers are electronic, and available for integral and remote mounting, indoor or outdoor.

UL LISTED CE IP23

Luminaire Schedule				
Symbol	Qty	Label	Arrangement	Description
	8	W	Single	2W-O-15LED-30K-120-WM-CXX / WALL MTD 9" AFG

### GRAPHIC SCALE



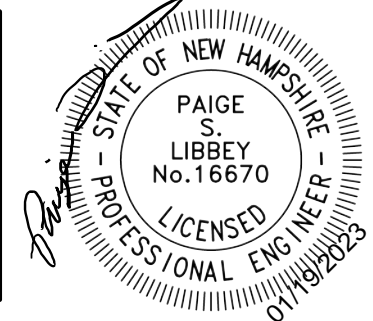
( IN FEET )

1 inch = 20 ft.

### LIGHTING AND ELECTRICAL NOTES:

- ALL OUTDOOR LIGHTING SYSTEMS SHALL BE EQUIPPED WITH TIMERS TO REDUCE ILLUMINATION LEVELS TO NON-OPERATIONAL VALUES PER CITY REGULATIONS.
- LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRICAL CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
- ILLUMINATION READINGS SHOWN ARE BASED ON A TOTAL LLF OF 0.75 AT GRADE. ILLUMINATION READINGS SHOWN ARE IN UNITS OF FOOT-CANDLES.
- LIGHTING CALCULATIONS SHOWN ARE NOT A SUBSTITUTE FOR INDEPENDENT ENGINEERING ANALYSIS OF LIGHTING SYSTEM AND SAFETY.
- ALL LIGHTING FIXTURES SHALL BE FULL CUT-OFF DARK-SKY COMPLIANT, UNLESS OTHERWISE NOTED.
- THE PROPOSED LIGHTING CALCULATIONS AND DESIGN WAS PERFORMED BY CHARRON, INC., P.O. BOX 4550, MANCHESTER, NH 03108. ALL LIGHTS SHOULD BE PURCHASED FROM THIS COMPANY, OR AN EQUAL LIGHTING DESIGN SHOULD BE SUBMITTED FOR REVIEW IF EQUAL SUBSTITUTIONS ARE PROPOSED BY THE CONTRACTOR OR OWNER.

Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: 1"=20'	Project No.: 21254
Drawing Name: 21254-PLAN.dwg		
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5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

J/B

Jones & Beach Engineers, Inc.

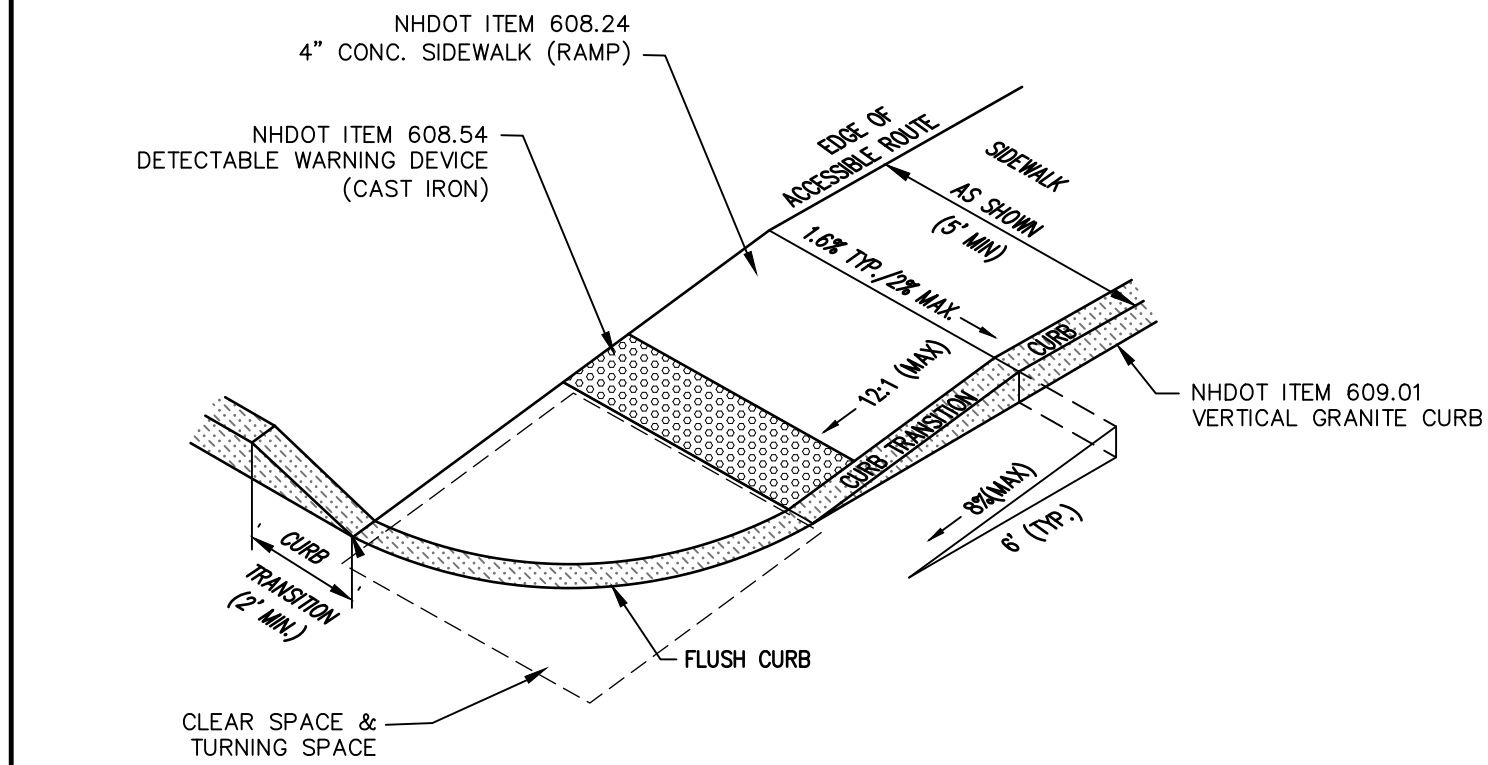
85 Portsmouth Ave.  
PO Box 219  
Stratham, NH 03885

Designed and Produced in NH  
*Civil Engineering Services*  
603-772-4746  
FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	LIGHTING PLAN
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894

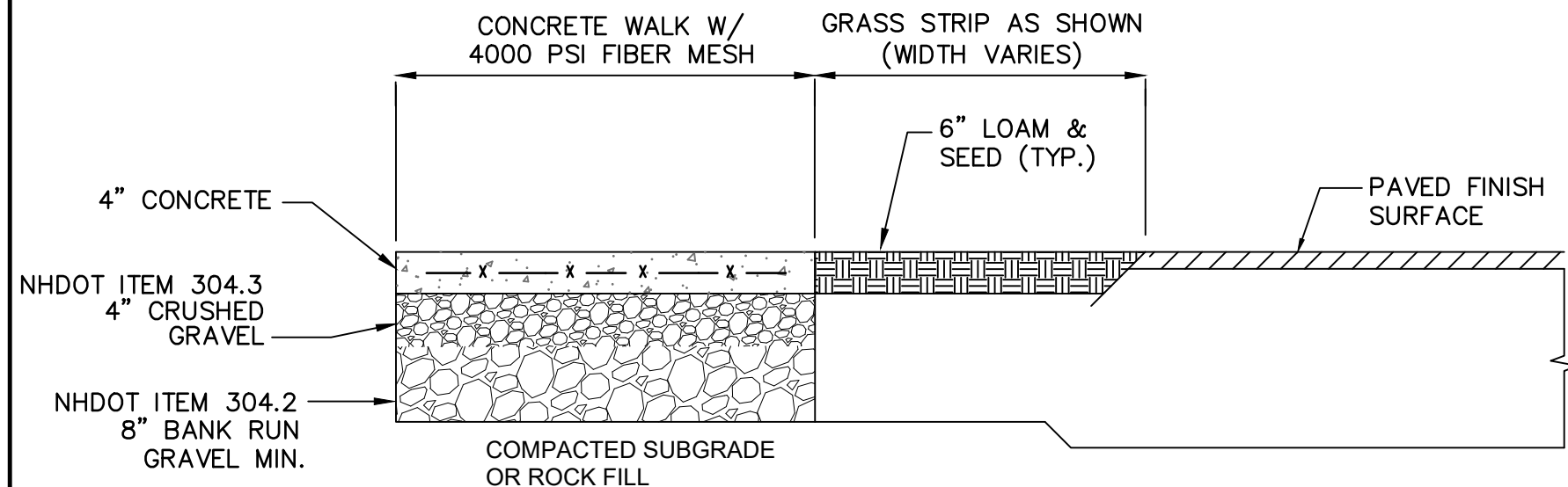
DRAWING No.
L2
SHEET 11 OF 23 JBE PROJECT NO. 21254





ACCESSIBLE CURB RAMP (NHDOT TYPE 1)

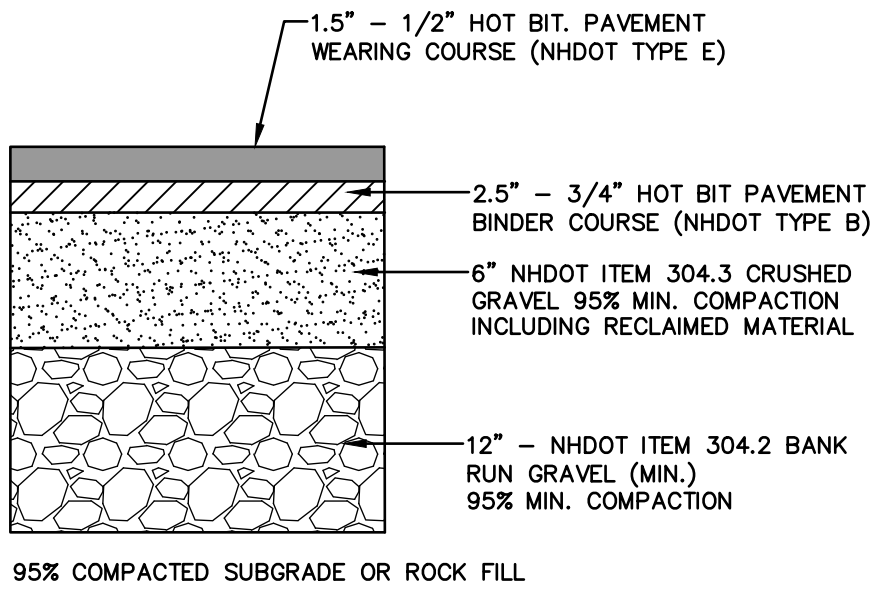
NOT TO SCALE



- NOTES:
1. CONCRETE TO BE 4000 PSI.
  2. CONTRACTION JOINTS SPACE TO BE EQUAL TO SIDEWALK WIDTH.
  3. ALL JOINTS SEALED PER SPECIFICATIONS.
  4. PROVIDE A 1/2" NON-EXTRUDING EXPANSION JOINT EVERY 16' ALONG SIDEWALK.

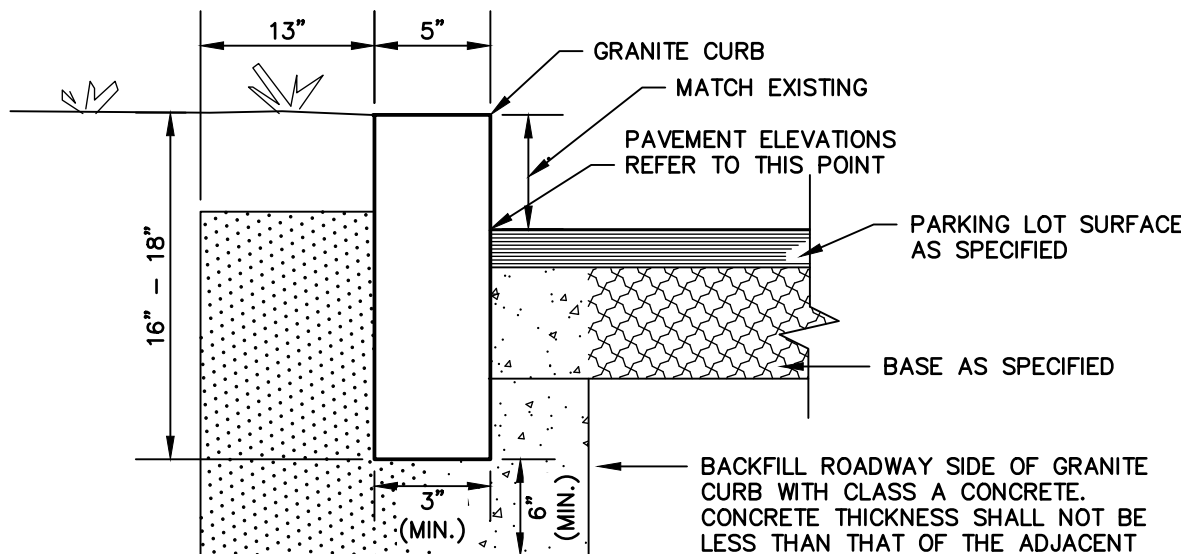
CONCRETE SIDEWALK WITH GRASS STRIP

NOT TO SCALE



TYPICAL BITUMINOUS PAVEMENT

NOT TO SCALE

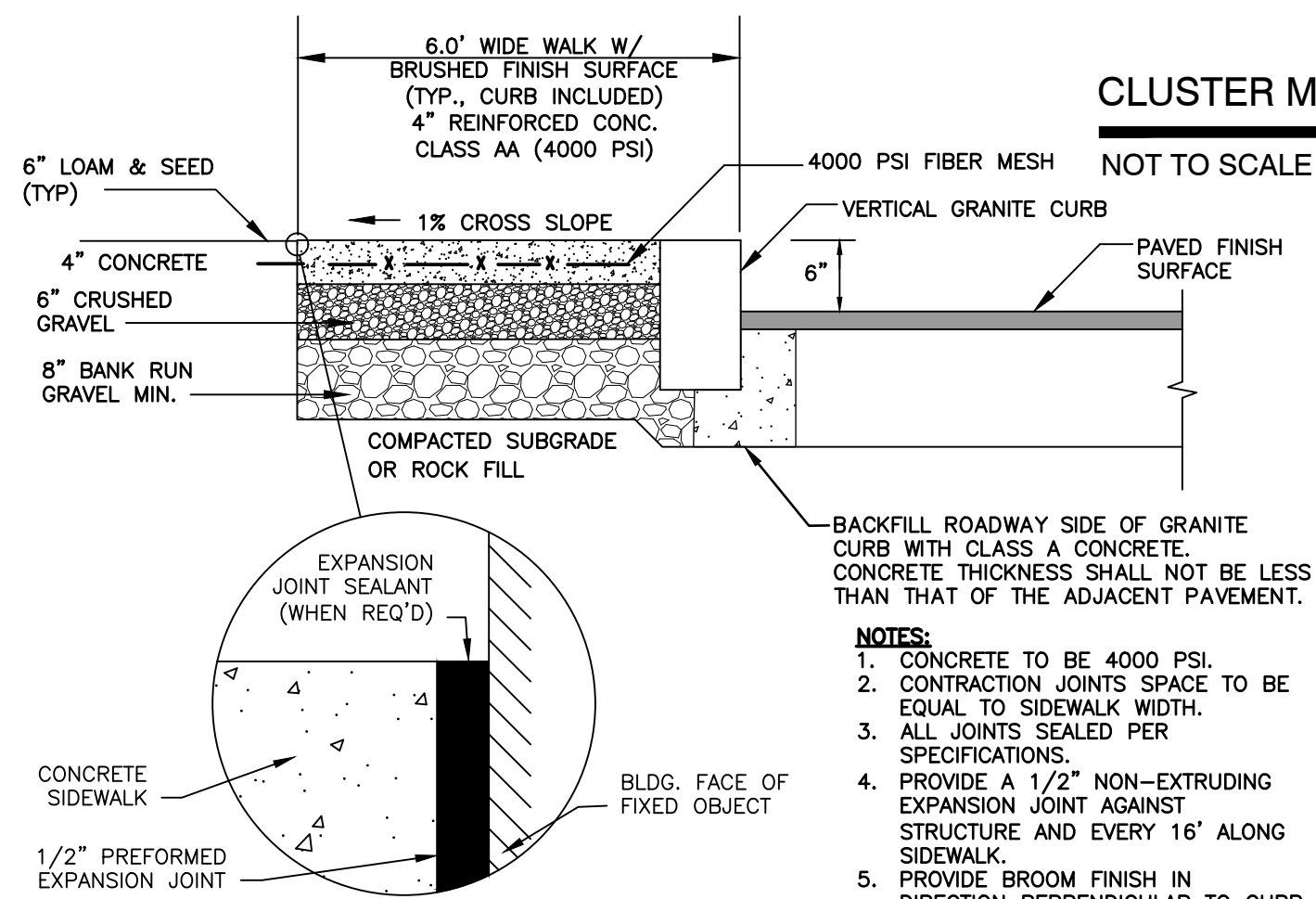


- NOTES:
1. EDGING TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.
  2. JOINTS BETWEEN STONES SHALL BE MORTARED.
  3. PROPOSED VERTICAL GRANITE CURB ALONG WOODBURY AVE. AT CURB CUT TO BE REMOVED SHALL MEET THE REQUIREMENTS OF NHDOT STANDARD SPECIFICATIONS SECTION 609.

VERTICAL GRANITE CURB

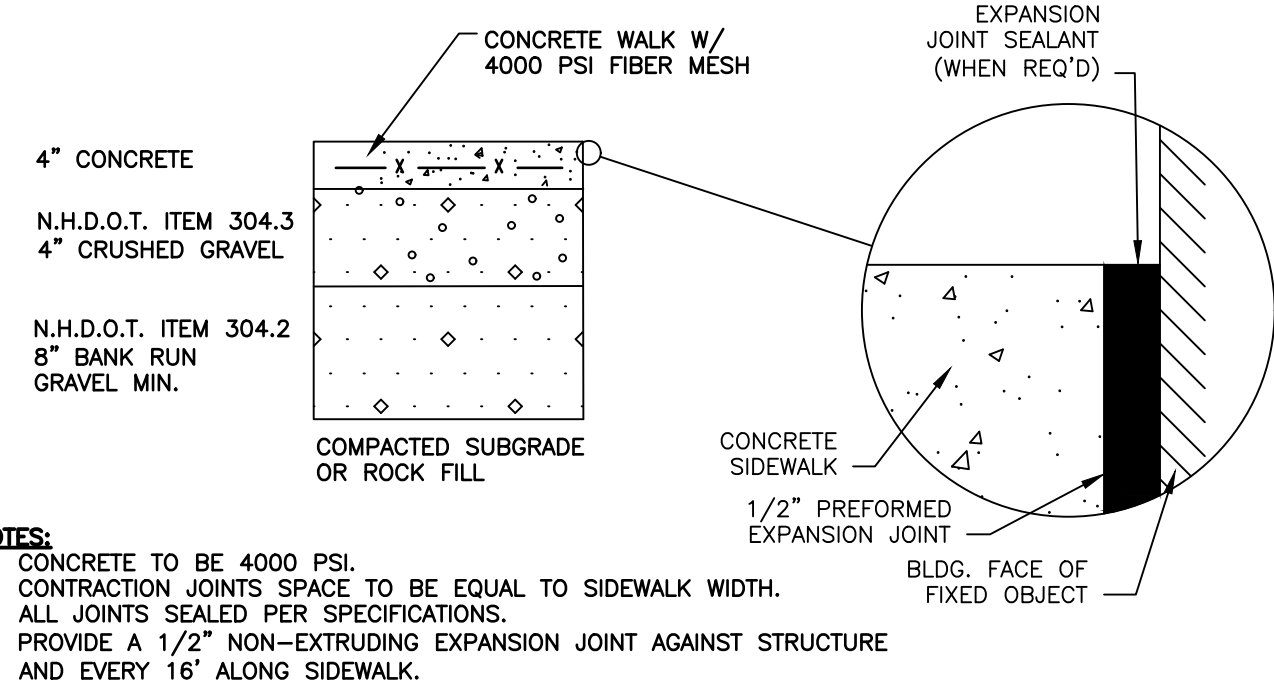
NOT TO SCALE

- 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 8.3%.
  4. A MINIMUM OF 4 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (i.e., HYDRANTS, UTILITY 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.
  8. WHERE A CHANGE IN DIRECTION IS REQUIRED TO UTILIZE A CURB RAMP, A TURNING SPACE SHALL BE PROVIDED AT THE BASE AND/OR THE TOP OF THE CURB RAMP. TURNING SPACES SHALL BE PERMITTED TO OVERLAP CLEAR SPACES.
  9. TURNING SPACE MAXIMUM CROSS SLOPE IS 2% IN ANY DIRECTION.
  10. BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE OF 4'x4' MINIMUM SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN CROSSWALK, AND OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE. THE CLEAR SPACE MAY OVERLAP TURNING SPACES, DETECTABLE WARNING SURFACES AND DROP CURBS.



CONCRETE SIDEWALK W/ VERTICAL GRANITE CURB

NOT TO SCALE



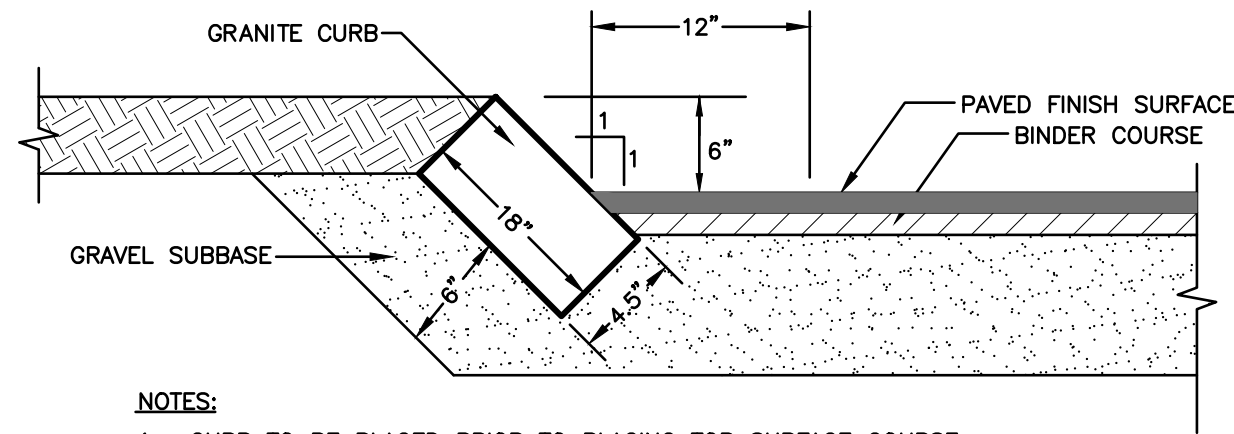
- NOTES:
1. CONCRETE TO BE 4000 PSI.
  2. CONTRACTION JOINTS SPACE TO BE EQUAL TO SIDEWALK WIDTH.
  3. ALL JOINTS SEALED PER SPECIFICATIONS.
  4. PROVIDE A 1/2" NON-EXTRUDING EXPANSION JOINT AGAINST STRUCTURE AND EVERY 16' ALONG SIDEWALK.

CONCRETE SIDEWALK

NOT TO SCALE

CLUSTER MAILBOX UNIT DETAIL

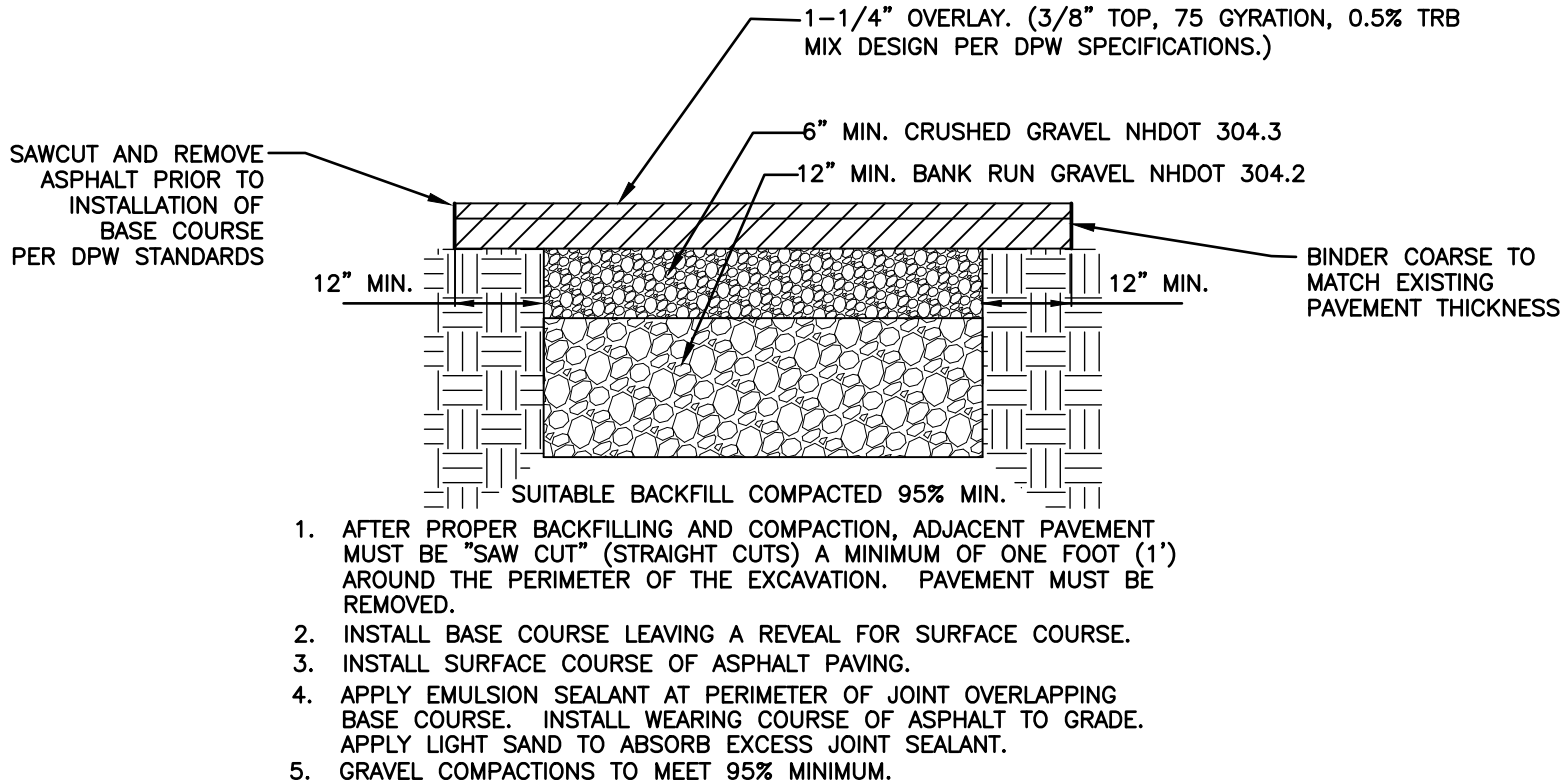
NOT TO SCALE



- NOTES:
1. CURB TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.
  2. JOINTS BETWEEN STONES SHALL BE MORTARED.

SLOPED GRANITE CURB

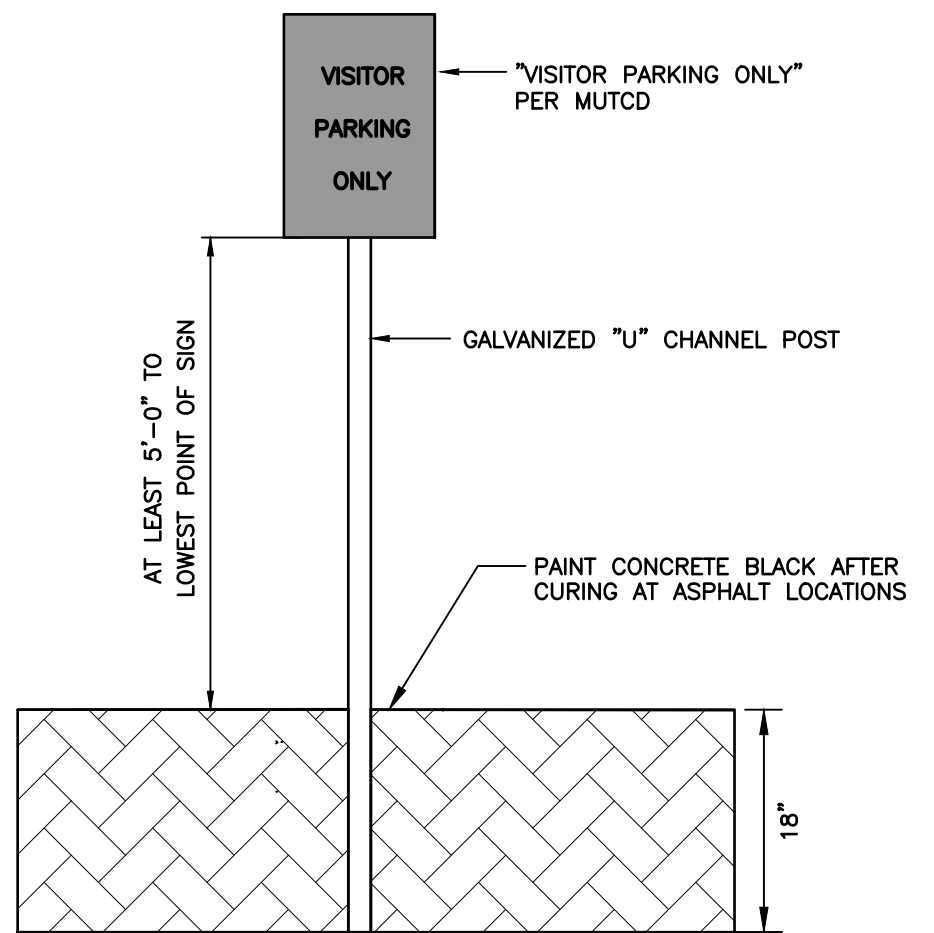
NOT TO SCALE



- NOTES:
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.

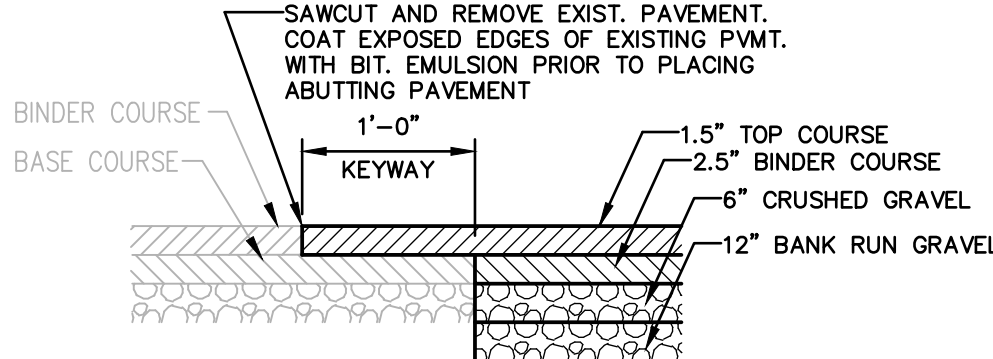
TYPICAL PAVEMENT REPAIR DETAIL

NOT TO SCALE



VISITOR PARKING SIGN

NOT TO SCALE



KEYWAY DETAIL FOR CONNECTION TO EXISTING PAVEMENT

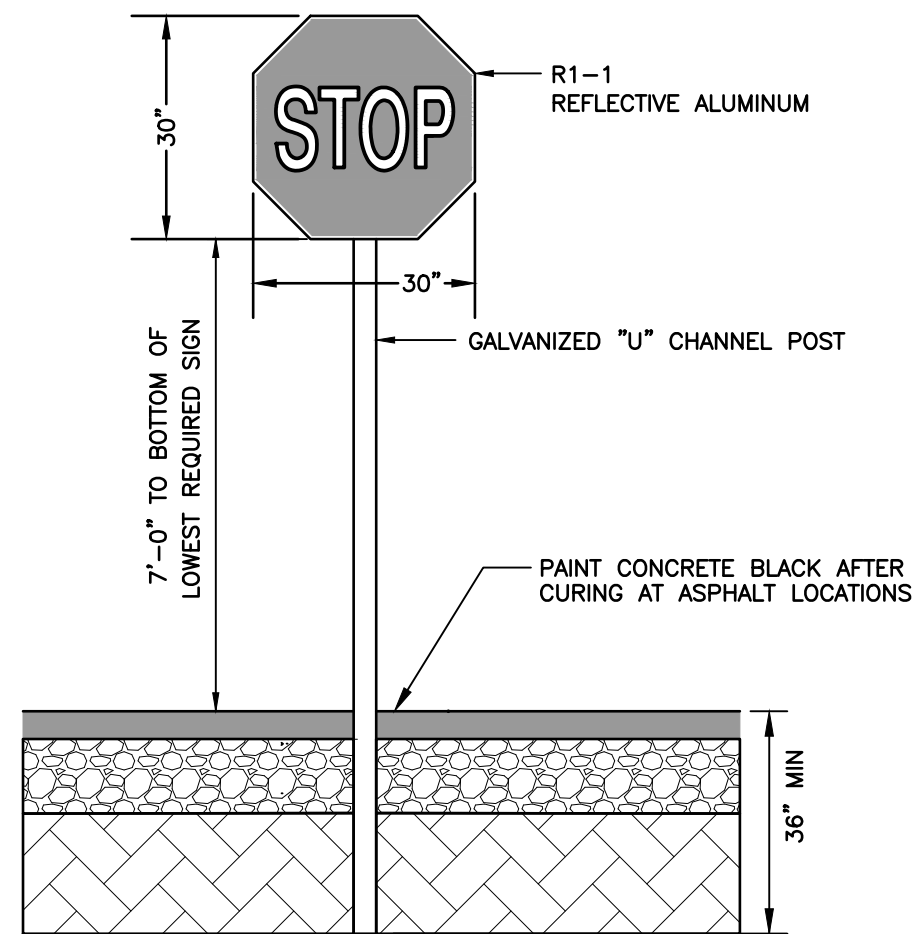
NOT TO SCALE



- NOTES:
1. ALL STOP BARS TO BE SOLID WHITE REFLECTIVE TRAFFIC PAINT AS PER DIMENSIONS ABOVE.

STOP BAR

NOT TO SCALE



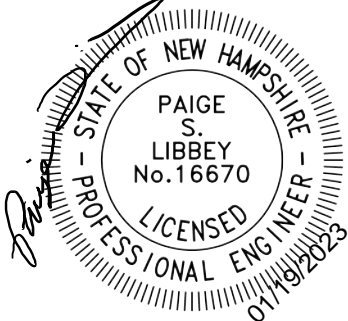
NOTES:

1. ALL SIGNAGE SHALL BE TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) STANDARDS AND NHDOT STANDARDS.
2. SIGN, HARDWARE, AND INSTALLATION TO CONFORM TO 2016 NHDOT STANDARD SPECIFICATION, SECTION 615 - TRAFFIC SIGNS.
3. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS/CATALOG CUTS TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ERECTING SIGNS.
4. THE LOCATION OF THE SIGNS SHALL BE AS INDICATED ON THE DRAWINGS AND/OR AS DIRECTED BY THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS.

STOP SIGN (R1-1)

NOT TO SCALE

Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: AS NOTED	Project No.: 21254
Drawing Name: 21254-PLAN.dwg		
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4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
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Civil Engineering Services

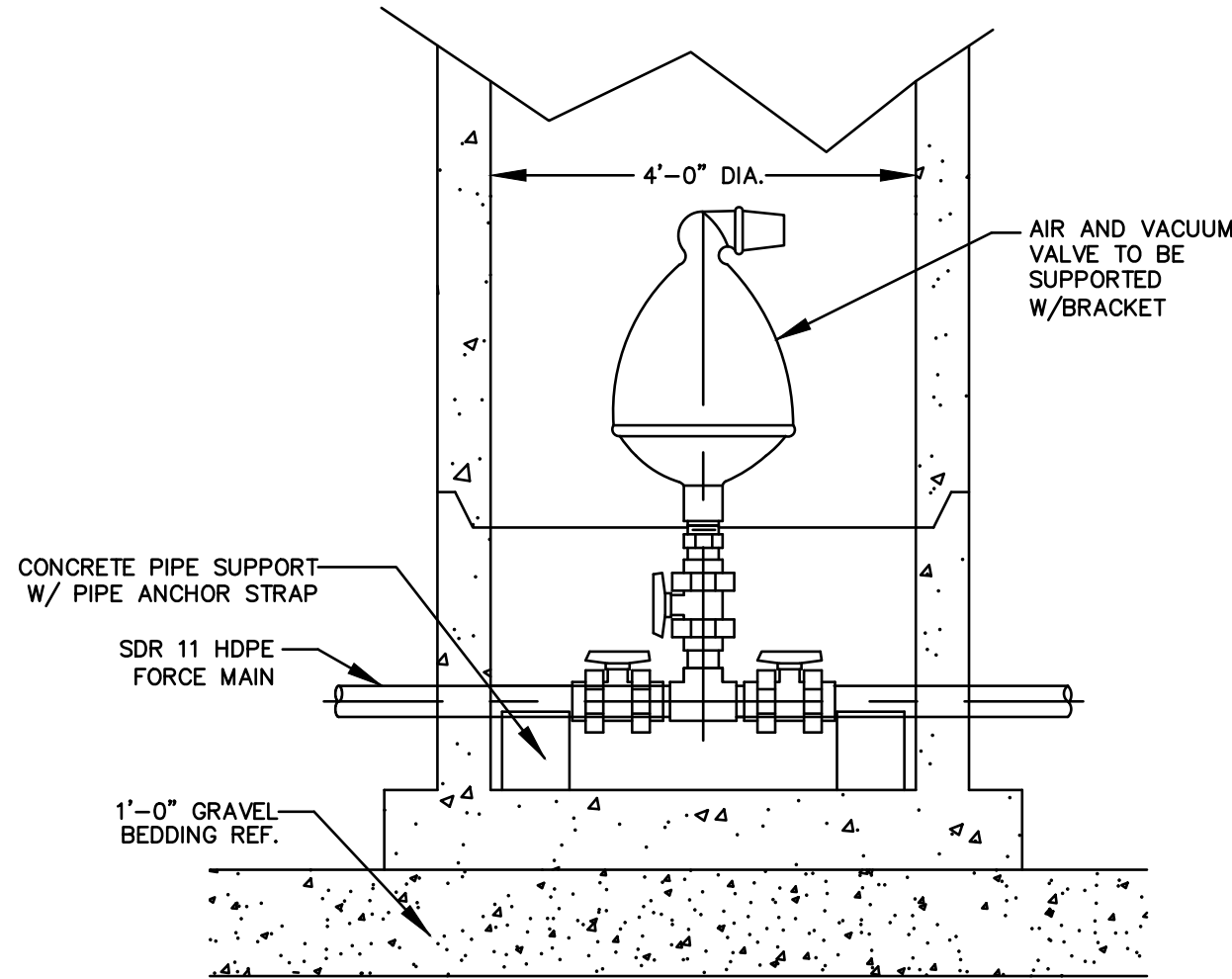
603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894
	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

DRAWING No.
D1
SHEET 12 OF 23 JBE PROJECT NO. 21254

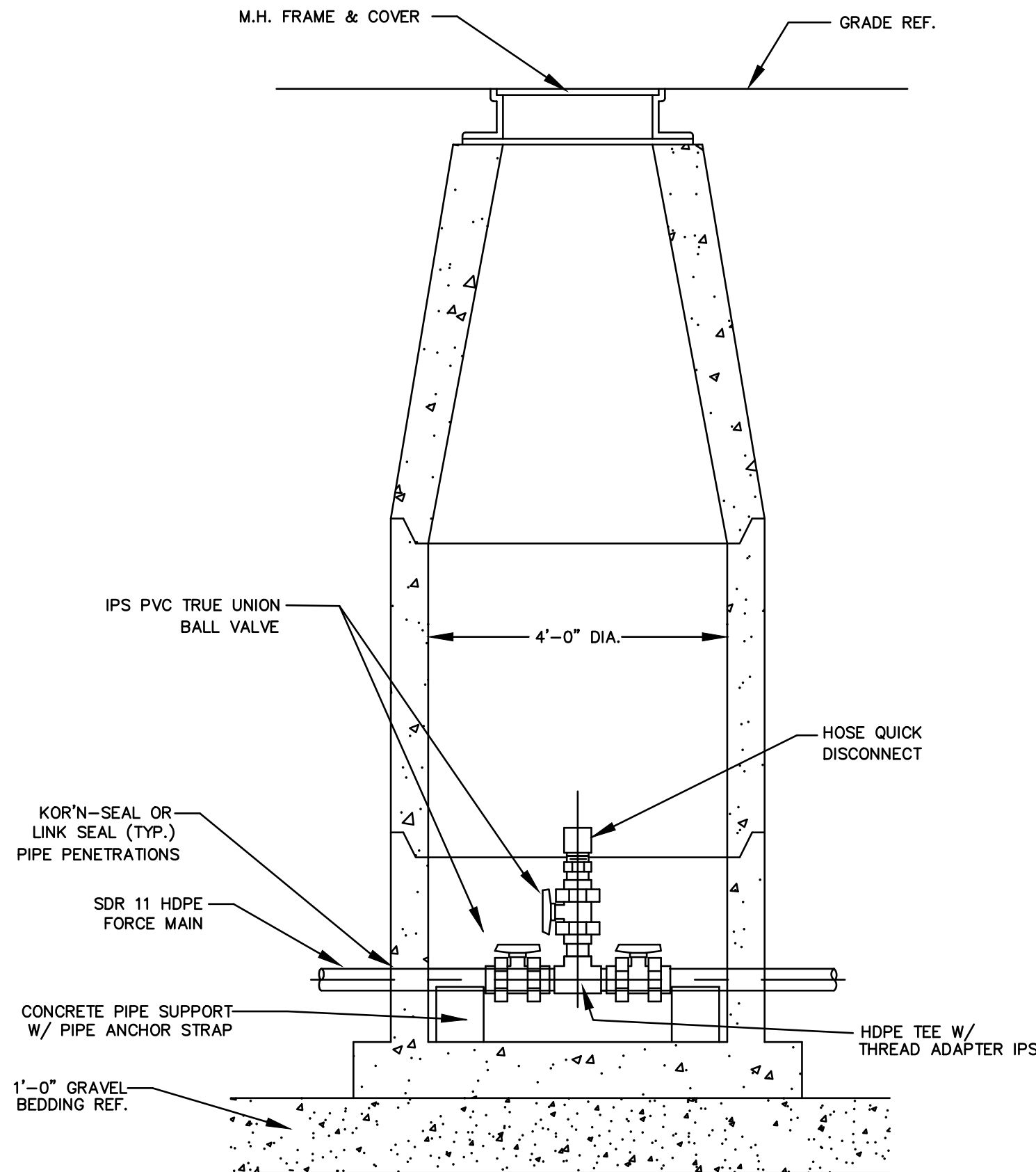






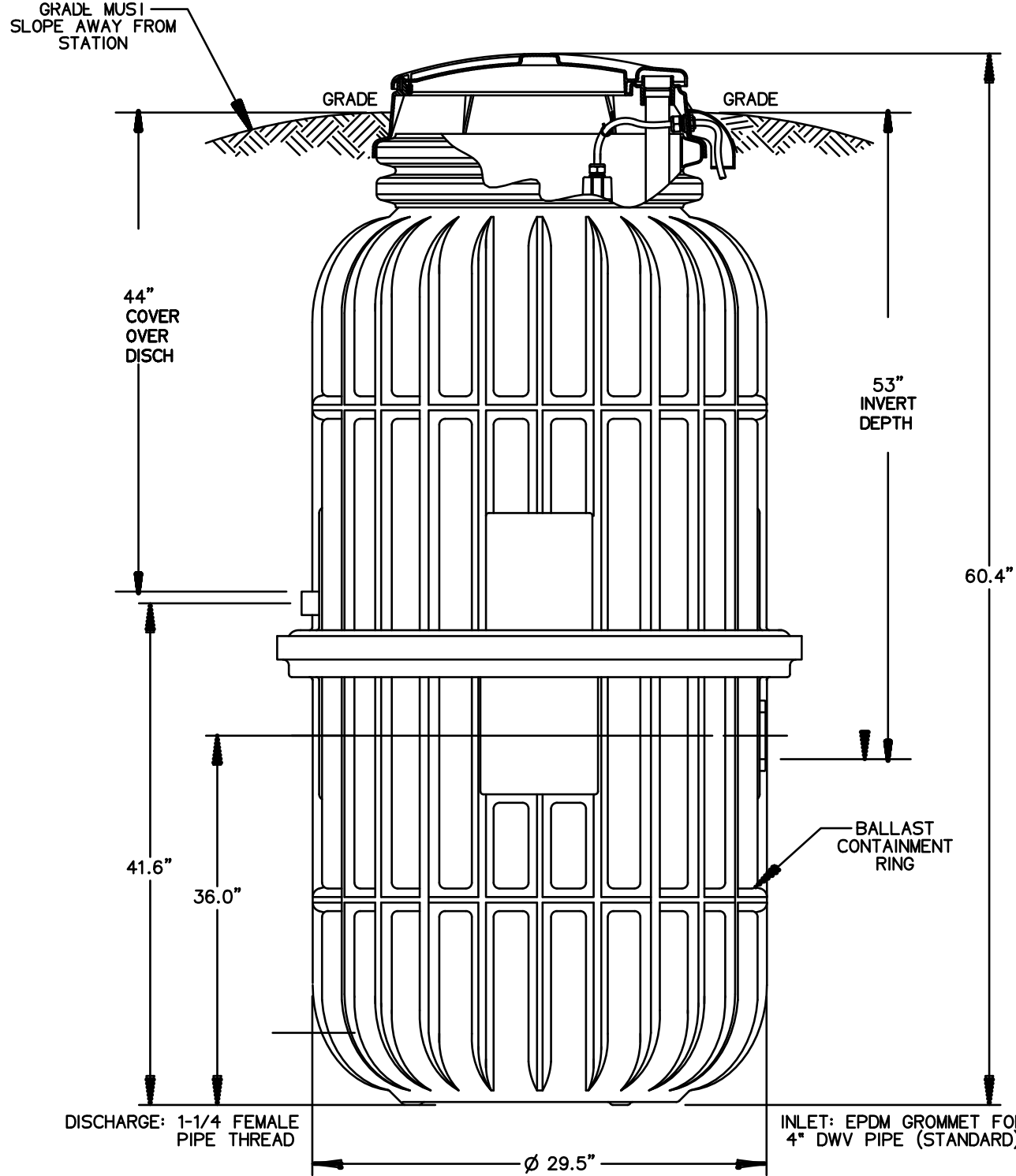
TERMINAL FLUSHING MANHOLE - OPTIONAL ELEV. VIEW

NOT TO SCALE



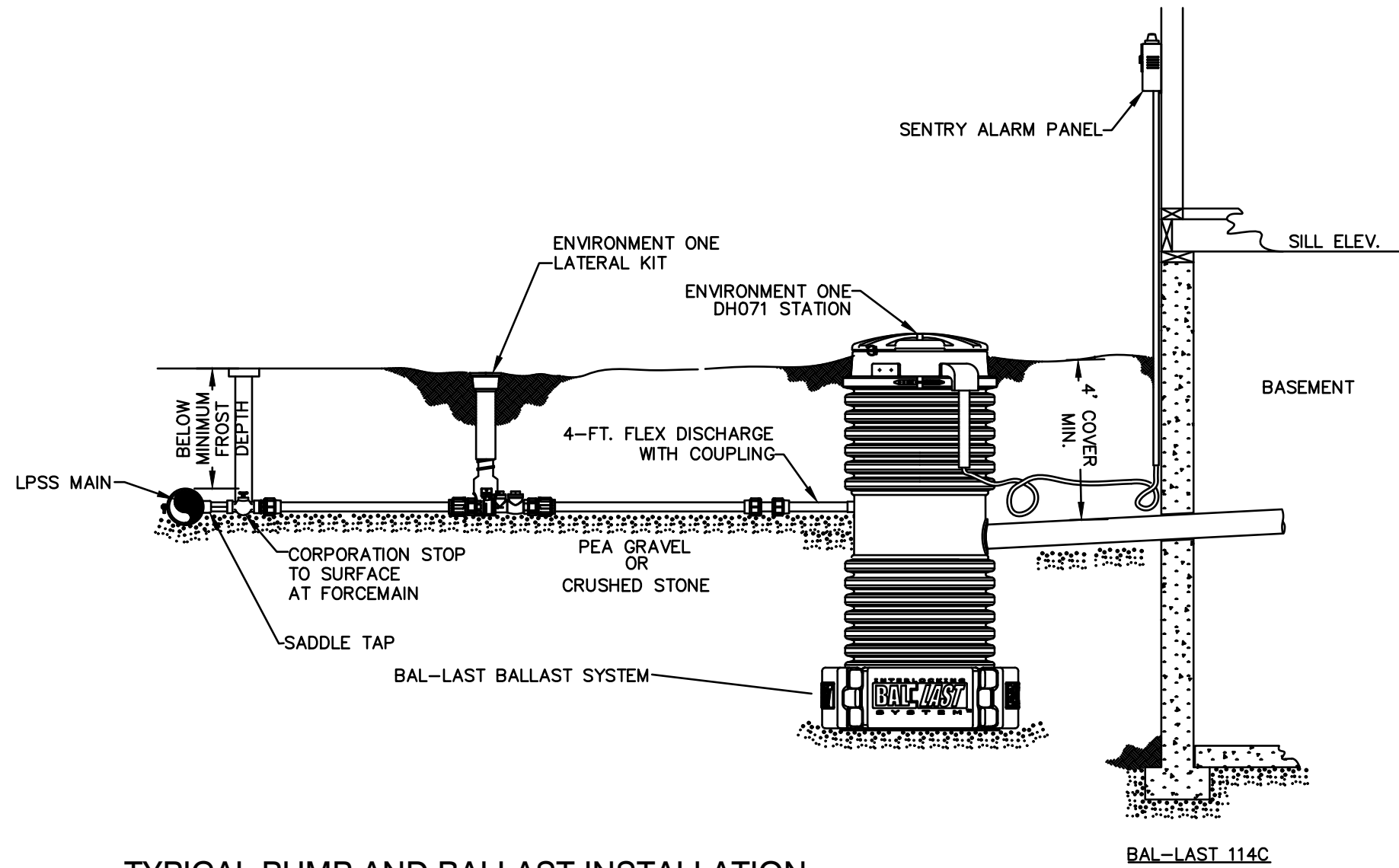
TERMINAL FLUSHING MANHOLE

NOT TO SCALE



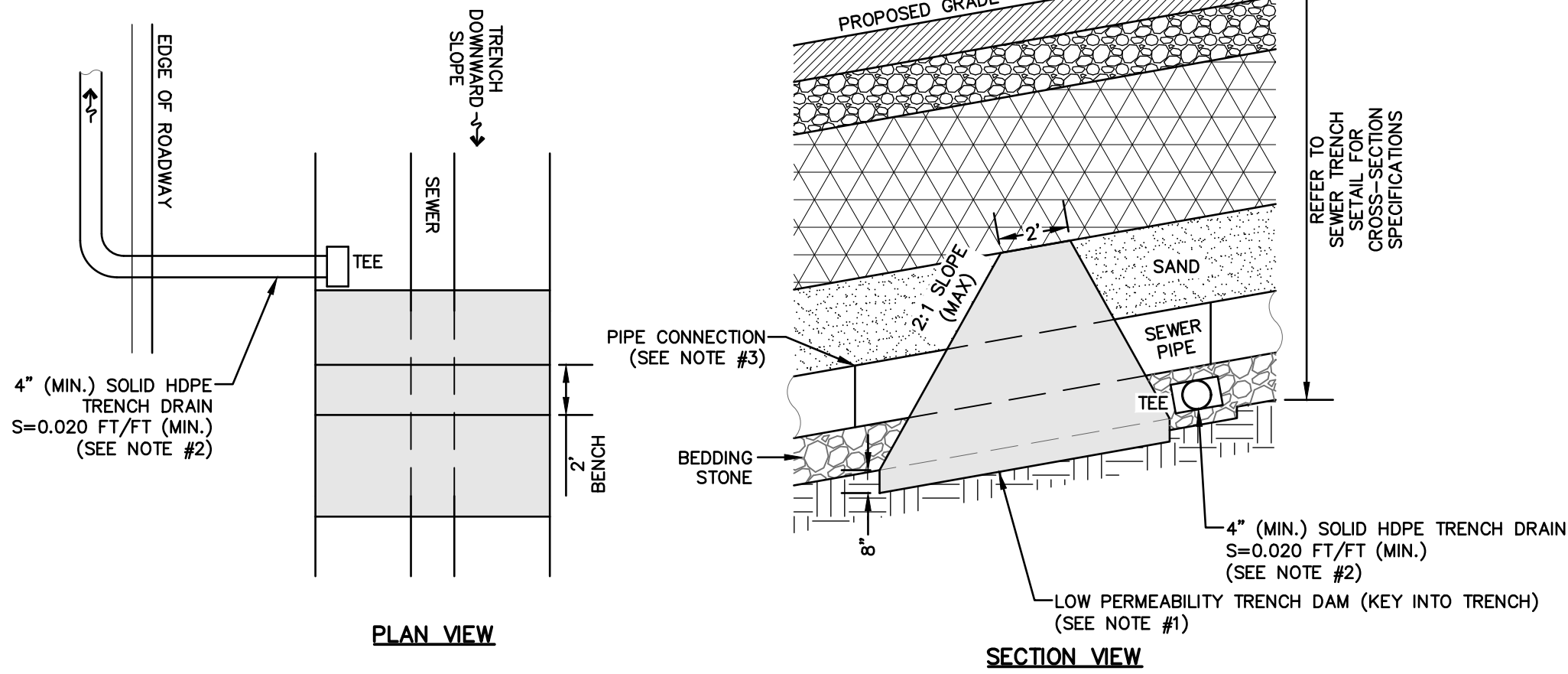
DH071-93 GRINDER PUMP STATION

NOT TO SCALE



TYPICAL PUMP AND BALLAST INSTALLATION

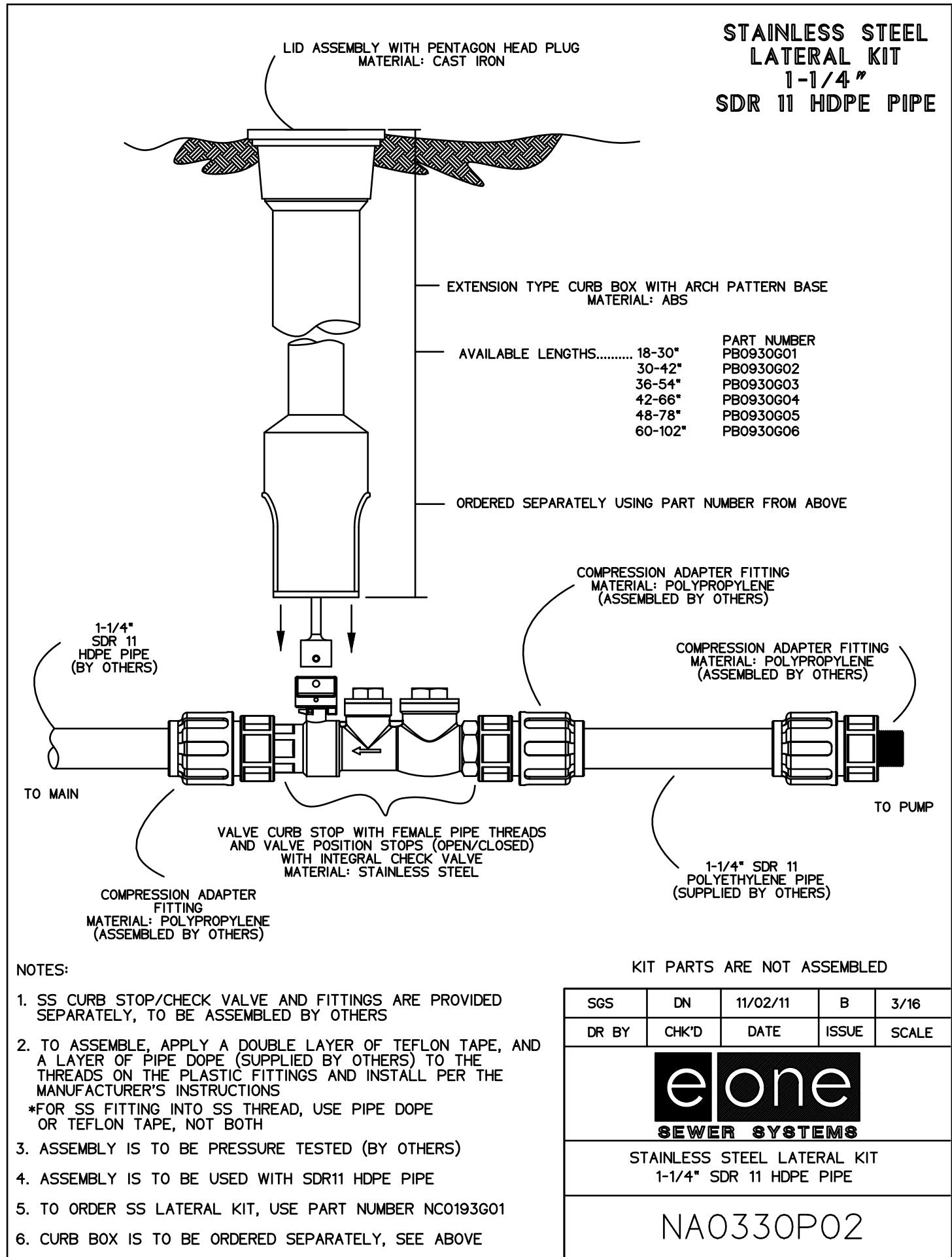
NOT TO SCALE



- NOTES:**
1. LOW PERMEABILITY SOIL USED FOR TRENCH DAM SHALL MEET THE FOLLOWING SPECIFICATION: CLAYEY SOIL – MIN. 15% PASSING THE #200 SIEVE AND A MIN. PERMEABILITY OF  $1 \times 10^{-5}$  CM/SEC
  2. REFER TO PROJECT SITE PLANS FOR LOCATION OF TRENCH DRAINS AND OUTLET ROUTING. 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. IF TRENCH DAMS & DRAINS ARE SPECIFIED ON THE PROJECT, THE CONTRACTOR SHALL INSTALL DAMS & DRAINS AT A MAXIMUM. 75' SPACING. REFER TO PROJECT PLANS FOR DESIGN SPACING.

SEWER TRENCH DAM & DRAIN

NOT TO SCALE



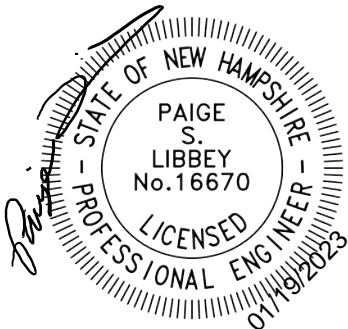
- NOTES:**
1. SS CURB STOP/CHECK VALVE AND FITTINGS ARE PROVIDED SEPARATELY, TO BE ASSEMBLED BY OTHERS
  2. TO ASSEMBLE, APPLY A DOUBLE LAYER OF TEFLON TAPE, AND A LAYER OF PIPE DOPE (SUPPLIED BY OTHERS) TO THE THREADS ON THE PLASTIC FITTINGS AND INSTALL PER THE MANUFACTURER'S INSTRUCTIONS  
\*FOR SS FITTING INTO SS THREAD, USE PIPE DOPE OR TEFLON TAPE, NOT BOTH
  3. ASSEMBLY IS TO BE PRESSURE TESTED (BY OTHERS)
  4. ASSEMBLY IS TO BE USED WITH SDR11 HDPE PIPE
  5. TO ORDER SS LATERAL KIT, USE PART NUMBER NC0193G01
  6. CURB BOX IS TO BE ORDERED SEPARATELY, SEE ABOVE

KIT PARTS ARE NOT ASSEMBLED					
SGS	DN	11/02/11	B	3/16	
DR BY	CHK'D	DATE	ISSUE	SCALE	
<div> <div>eone</div> <div>SEWER SYSTEMS</div> </div>					
STAINLESS STEEL LATERAL KIT 1-1/4" SDR 11 HDPE PIPE					
NA0330P02					

STAINLESS STEEL LATERAL KIT

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Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: AS NOTED	Project No.: 21254
Drawing Name: 21254-PLAN.dwg		
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REV.	DATE	REVISION	BY

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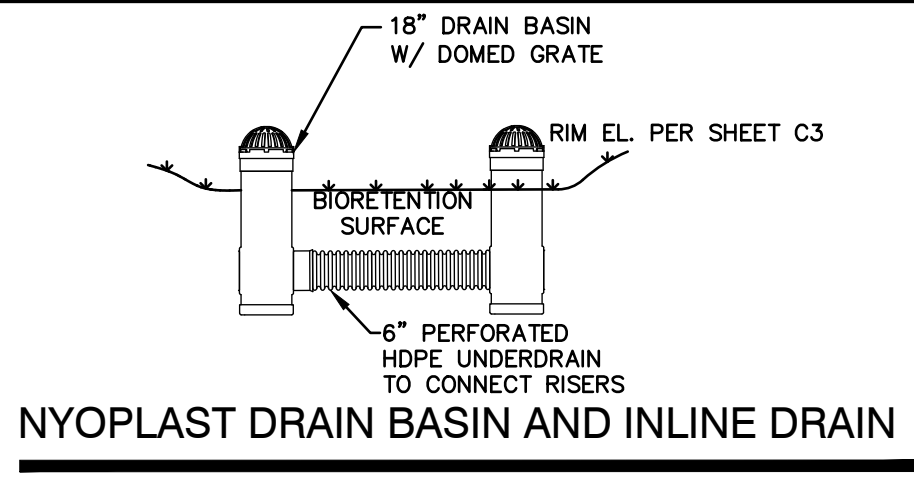
*Civil Engineering Services*

603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

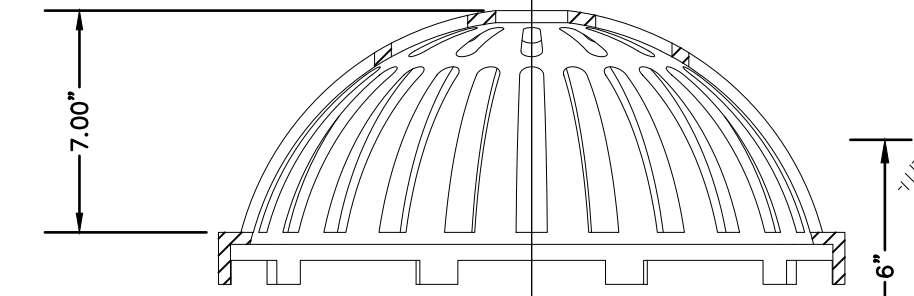
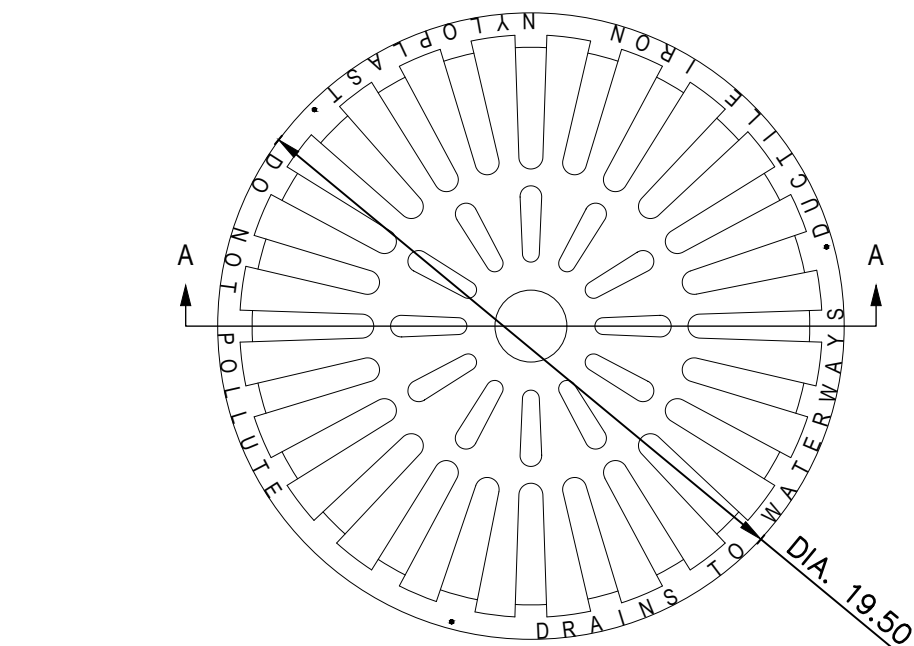
Plan Name:	DETAIL SHEET
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894

LOT 1: BK 4708 PG 979  
LOT 2: BK 4582 PG 888  
LOT 3: BK 3919 PG 1345

DRAWING No.
<b>D3</b>
SHEET 14 OF 23 JBE PROJECT NO. 21254



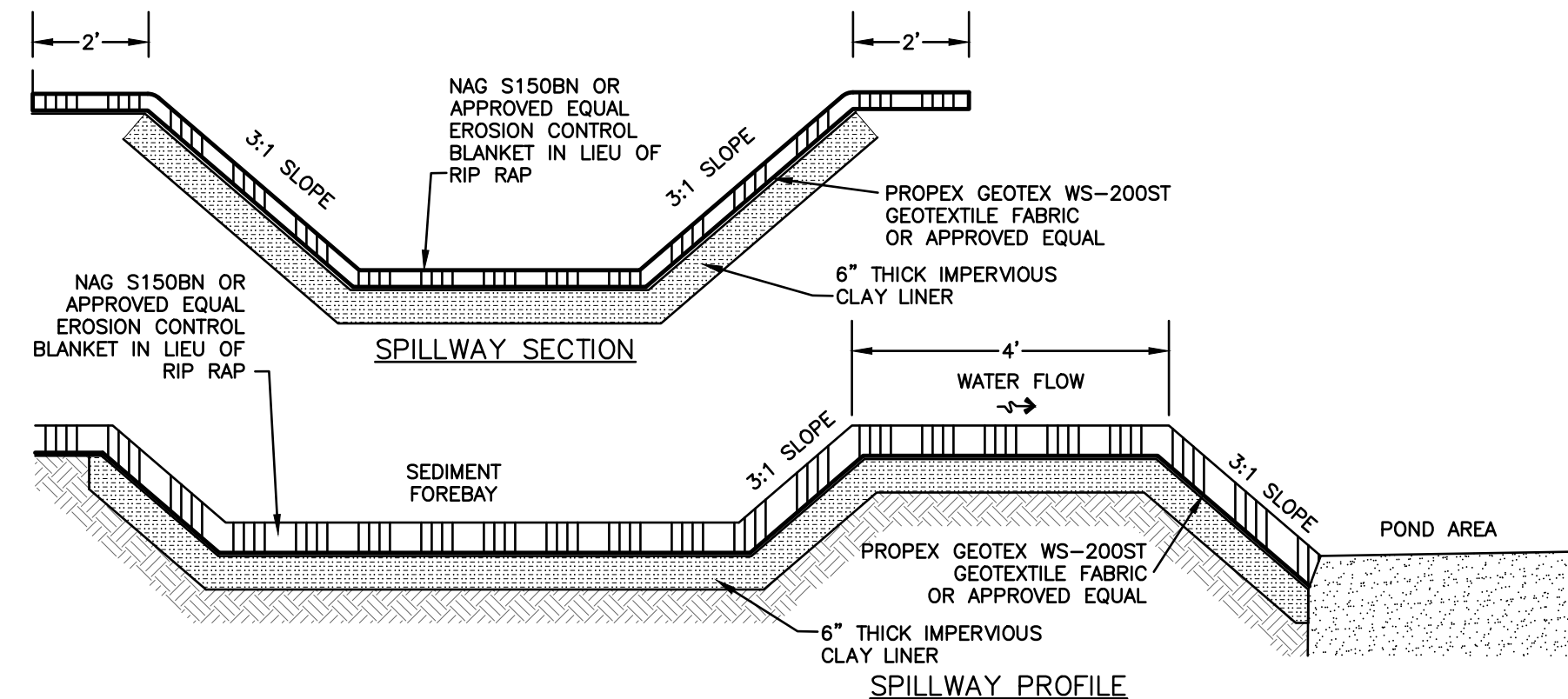
1899CGD  
APPROX. DRAIN AREA = 175.59  
SQ IN  
APPROX. WEIGHT = 32.00 LBS



- NOTES:
- DIMENSIONS ARE FOR REFERENCE ONLY
  - ACTUAL DIMENSIONS MAY VARY
  - DIMENSIONS ARE IN INCHES
  - QUALITY MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05
  - PAIN: CASTINGS ARE FURNISHED WITH A BLACK PAINT
  - LOOKING DEVICE AVAILABLE UPON REQUEST

#### 18" NYLOPLAST DOME GRATE

NOT TO SCALE

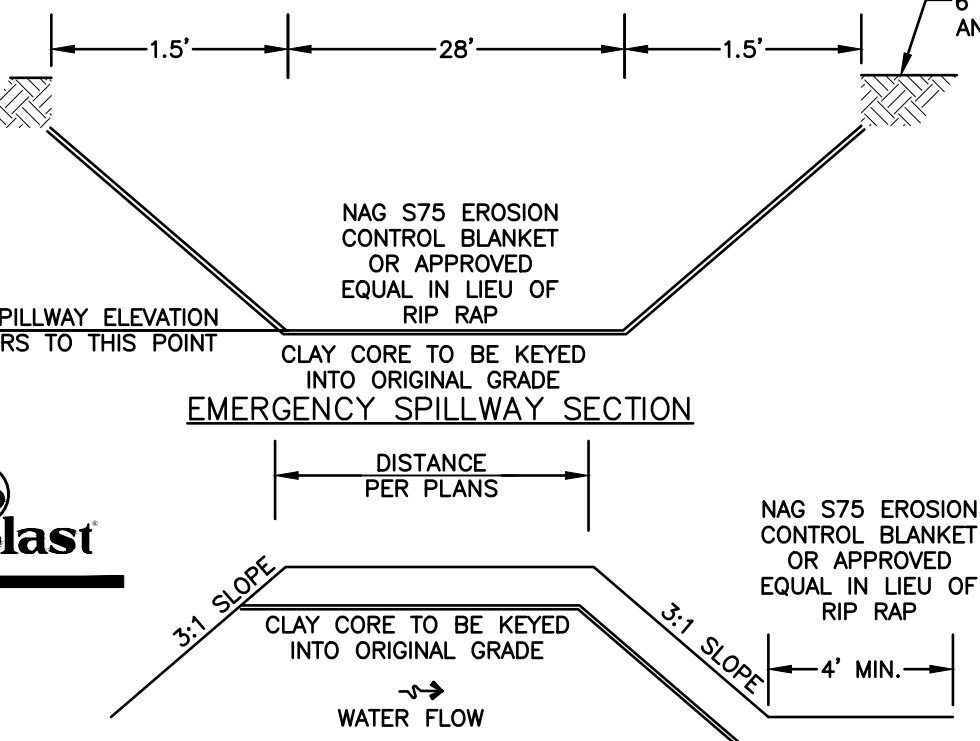


#### SEDIMENT FOREBAY SPILLWAY

NOT TO SCALE

#### NYLOPLAST DRAIN BASIN (W/ DOME GRATE) (BIORETENTION RISER & YARD DRAIN SPECIFICATION)

NOT TO SCALE



#### EMERGENCY SPILLWAY PROFILE

#### EMERGENCY SPILLWAY

NOT TO SCALE

#### NOTES:

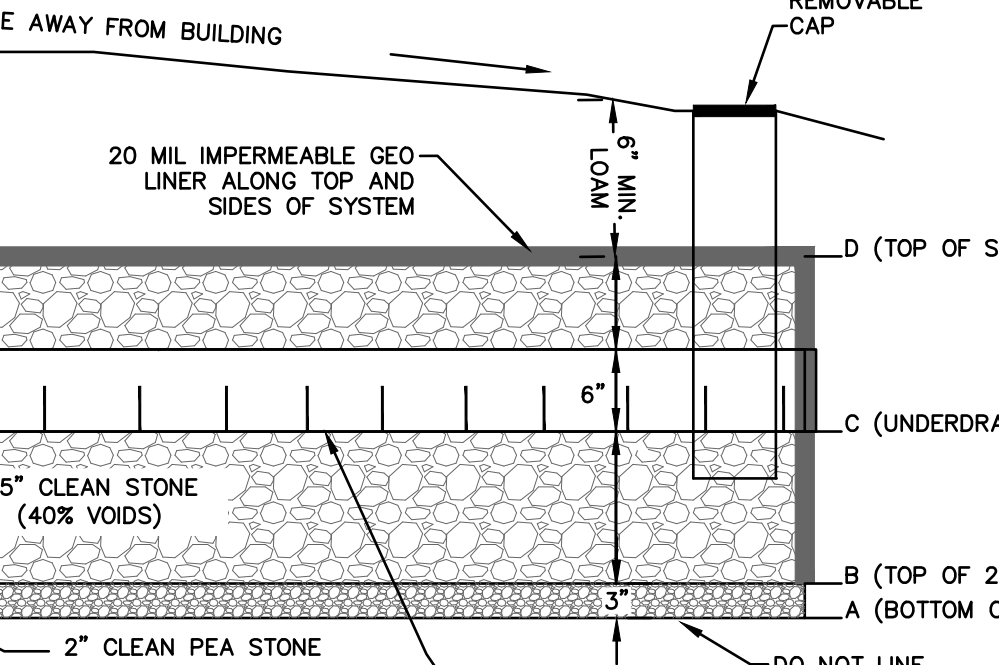
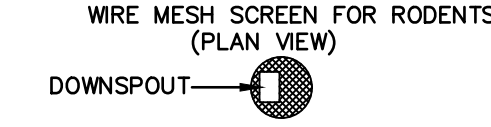
- 8" - 30" DOME GRATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- 8" & 10" DOME GRATES FIT ONTO THE DRAIN BASINS WITH THE USE OF A PVC BODY TOP. SEE DRAWING NO. 7001-110-045.
- DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
- 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").
- ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.
- 8" - 30" DOME GRATES HAVE NO LOAD RATING.

#### RIM ELEVATION OF STRUCTURE REFERS TO THIS POINT

- (5) ADAPTER ANGLES VARIABLE 0° - 360° ACCORDING TO PLANS

- (3) VARIABLE SUMP DEPTH ACCORDING TO PLANS (6" MIN. ON 8"-24", 10" MIN. ON 30" BASED ON MANUFACTURING REQ.)
- 4" MIN ON 8"-24"  
6" MIN ON 30"
- THE BACKFILL MATERIAL SHALL BE CRUSHED STONE OR OTHER GRANULAR MATERIAL MEETING THE REQUIREMENTS OF CLASS I, CLASS II, OR CLASS III MATERIAL AS DEFINED IN ASTM D2321. BEDDING & BACKFILL FOR SURFACE DRAINAGE INTLETS SHALL BE PLACED & COMPACTED UNIFORMLY IN ACCORDANCE WITH ASTM D2321.

INFILTRATION SYSTEM ELEVATIONS				
SYSTEM #	ELEV. A	ELEV. B	ELEV. C	ELEV. D
1	54.60	54.85	54.96	55.60
2	51.30	51.55	51.90	53.50
3	50.80	51.05	51.60	52.20
4	49.20	49.45	50.70	51.40

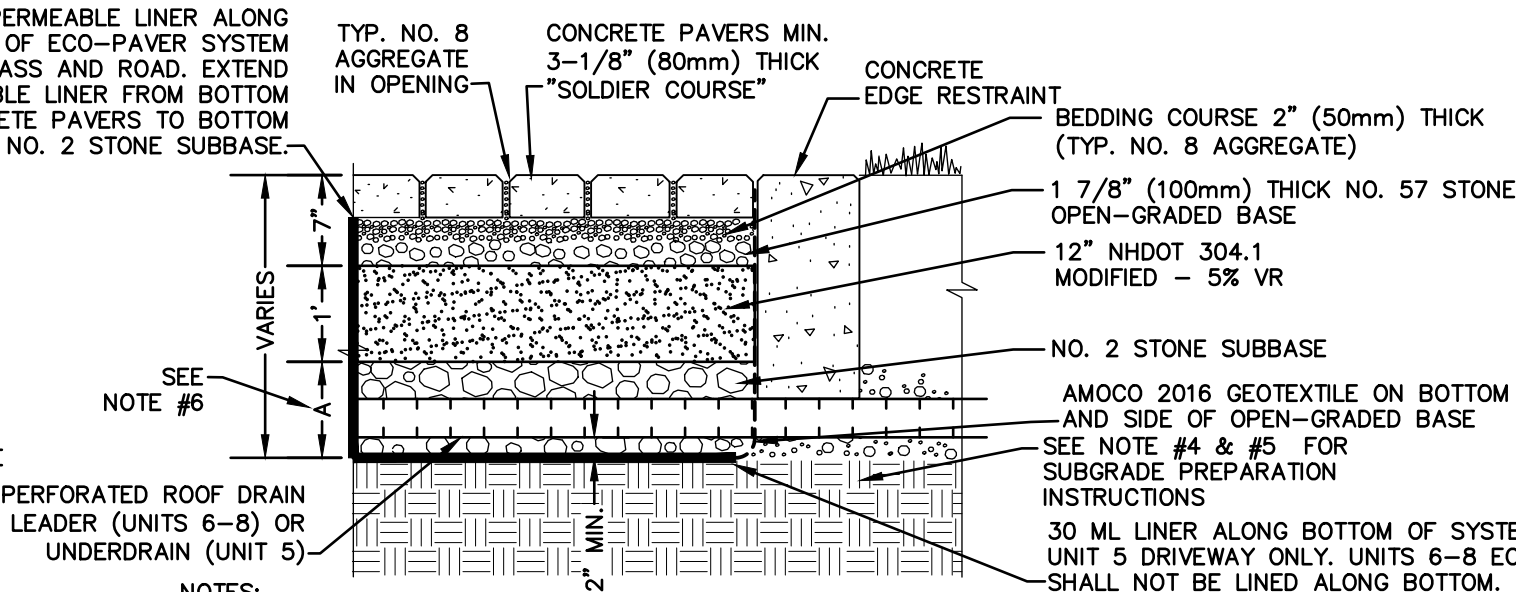


#### NOTES:

- ONCE THE SYSTEM HAS BEEN CONSTRUCTED, IT SHOULD BE TESTED BY INSERTING A GARDEN HOSE INTO THE INLET AND ALLOWING THE WATER TO RUN FOR A MINIMUM OF ONE (1) HOUR. THE WATER SHOULD STAY UNDERGROUND WITHIN THE GRAVEL. IF WATER COMES OUT OF THE OVERFLOW, THE SYSTEM SHOULD BE FURTHER INSPECTED AND POSSIBLY REPLACED. THIS PROCEDURE SHOULD BE PERFORMED EVERY YEAR DURING THE FALL INSPECTION.
- IN THE SPRING AND FALL, VISUALLY INSPECT THE AREA AROUND THE SYSTEM AND REPAIR ANY EROSION. USE SMALL STONES TO STABILIZE EROSION ALONG DRAINAGE PATHS. RE-MULCH ANY VOID AREAS BY HAND AS NEEDED. ALSO INSPECT THE ROOF COLLECTION AND PIPING AND CLEAN AND REPAIR AS NECESSARY.
- KEEP HEAVY VEHICLES FROM DRIVING OR PARKING OVER THE SYSTEM.
- FOR ALL DEPTHS OF COVER LESS THAN TWO (2) FEET, PIPE MUST BE SCHEDULE 40 PVC. FOR DEPTHS OF COVER GREATER THAN TWO (2) FEET, FLEXIBLE PIPE MAY BE USED. REFER TO SPECIFICATIONS FOR ALLOWABLE PIPE TYPES.
- A WATERTIGHT CONNECTION SHALL BE MAINTAINED WITH ANY TRANSITION FROM SCHEDULE 40 PVC PIPE TO ANY OTHER PIPE TYPE.
- THE DOWNSPOUT DRAIN LEADING INTO THE INFILTRATION PRACTICE AS WELL AS THE PERFORATED PVC UNDERDRAIN SHALL BE INSTALLED BEFORE THE DOWNSPOUTS ARE INSTALLED ON THE BUILDINGS. SITEWORK CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK INCLUDING THE RODENT SCREEN. BUILDING CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONNECTION AT THE POINT OF THE RODENT SCREEN.
- OVERFLOWS ARE TO BE INSTALLED ON EXTERIOR DOWNSPOUT LEADERS ONLY.
- THE EXISTING NATIVE SUBGRADE MATERIAL UNDER ALL BED AREAS SHALL NOT BE COMPACTED OR SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO STONE BED PLACEMENT. WHERE EROSION OF THE NATIVE MATERIAL SUBGRADE HAS CAUSED ACCUMULATION OF FINE MATERIALS AND/OR SURFACE PONDING AT THE BASE OF THE EXCAVATION, THIS MATERIAL SHALL BE REMOVED WITH LIGHT EQUIPMENT AND THE UNDERLYING SOILS SCARIFIED TO A MINIMUM DEPTH OF 6 INCHES (15 CM) WITH A YORK RAKE OR EQUIVALENT AND LIGHT TRACTOR.
- BRING SUBGRADE OF STONE POROUS MEDIA TO LINE, GRADE, AND ELEVATIONS INDICATED. FILL AND LIGHTLY REGRADE ANY AREAS DAMAGED BY EROSION, PONDING, OR TRAFFIC COMPACTION BEFORE PLACING OF THE STONE. THE BOTTOM OF EXCAVATION SHALL BE LEVEL PRIOR TO INSTALLATION OF THE POROUS STONE MEDIA.
- UNITS 3&4: STONE INFILTRATION IS FOR ROOF WATER ONLY. UNITS 5-8: STONE INFILTRATION IS FOR FOUNDATION DRAINAGE ONLY. DO NOT TIE THE ROOF LEADERS FROM UNITS 5-8 INTO THESE SYSTEMS.

#### SUBSURFACE STONE INFILTRATION BED DETAIL

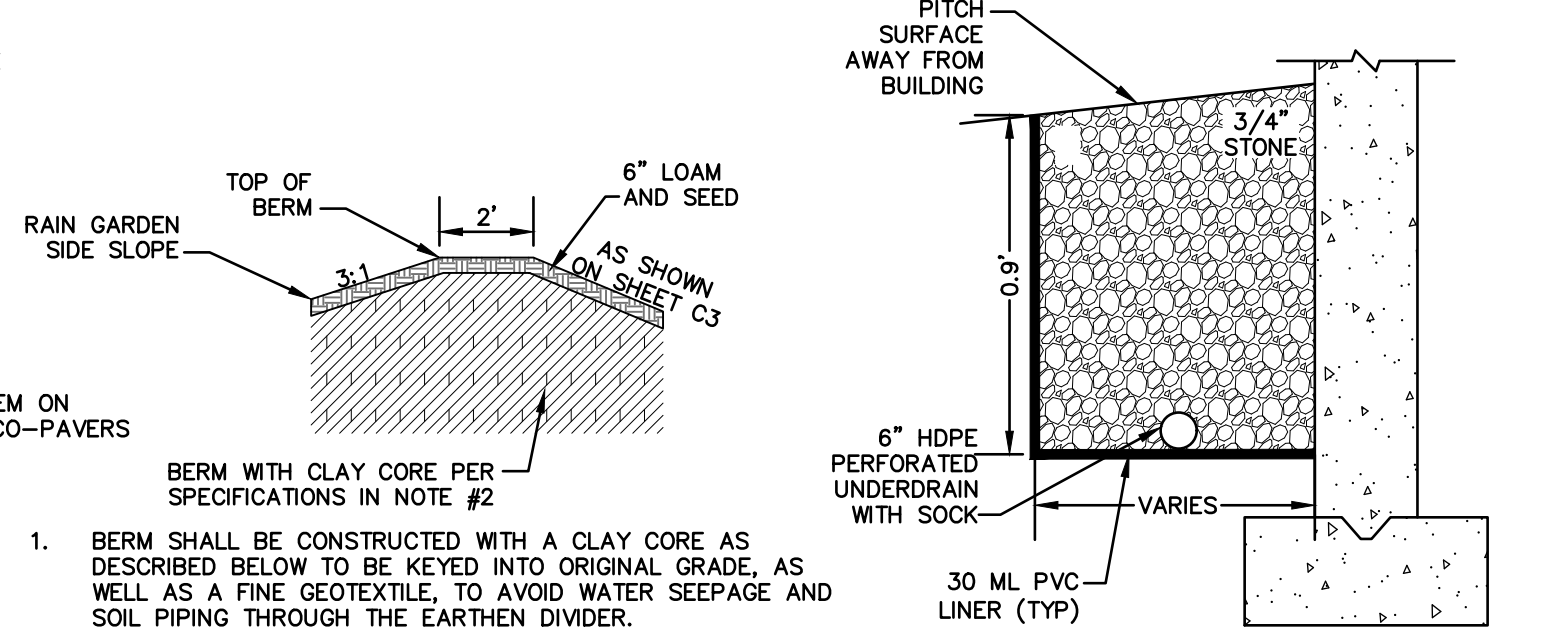
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- NOTES:
- 2 3/8" (60 MM) THICK PAVERS MAY BE USED IN PEDESTRIAN APPLICATIONS.
  - NO. 2 STONE SUBBASE THICKNESS VARIES WITH DESIGN. CONSULT ICPI PERMEABLE INTERLOCKING CONCRETE PAVEMENT MANUAL.
  - INSTALLATION TO BE PERFORMED TO MANUFACTURER'S GUIDELINES AND THE PERMEABLE INTERLOCKING CONCRETE PAVEMENT SPECIFICATIONS.
  - THE EXISTING NATIVE SUBGRADE MATERIAL UNDER ALL BED AREAS SHALL NOT BE COMPACTED OR SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO STONE BED PLACEMENT. WHERE EROSION OF THE NATIVE MATERIAL SUBGRADE HAS CAUSED ACCUMULATION OF FINE MATERIALS AND/OR SURFACE PONDING AT THE BASE OF THE EXCAVATION, THIS MATERIAL SHALL BE REMOVED WITH LIGHT EQUIPMENT AND THE UNDERLYING SOILS SCARIFIED TO A MINIMUM DEPTH OF 6 INCHES (15 CM) WITH A YORK RAKE OR EQUIVALENT AND LIGHT TRACTOR.
  - BRING SUBGRADE OF STONE POROUS MEDIA TO LINE, GRADE, AND ELEVATIONS INDICATED. FILL AND LIGHTLY REGRADE ANY AREAS DAMAGED BY EROSION, PONDING, OR TRAFFIC COMPACTION BEFORE PLACING OF THE STONE. THE SLOPE OF THE BOTTOM OF EXCAVATION SHALL PARALLEL THAT OF THE PROPOSED DRIVEWAY SURFACE.
  - UNIT 5: A=14"; UNIT 6: A=10"; UNIT 7: A=7"; UNIT 8: A=19"

#### PERMEABLE CONCRETE PAVER DETAIL ("ECO-PAVER")

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#### LINED DRIP EDGE DETAIL

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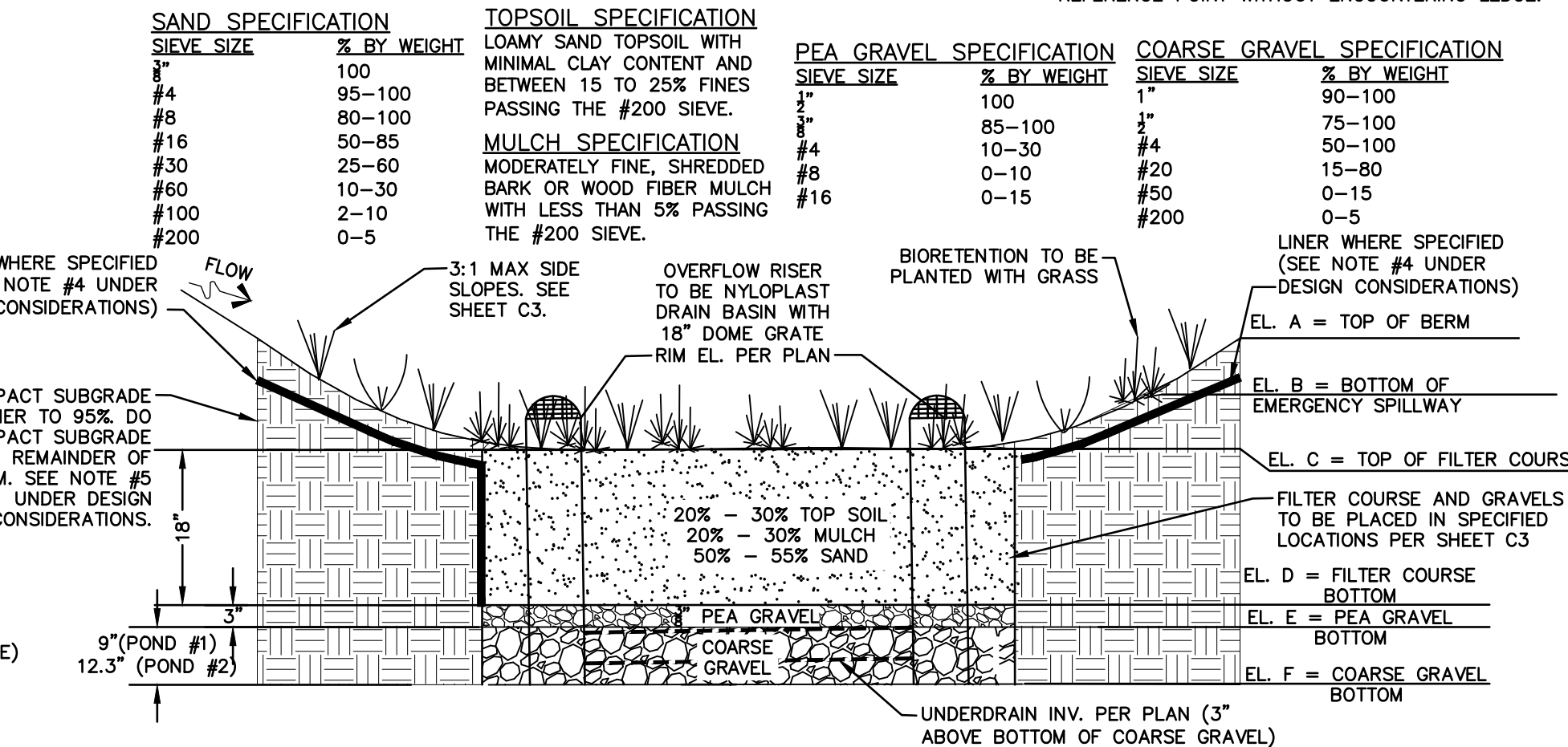
- NOTES:
- BERM SHALL BE CONSTRUCTED WITH A CLAY CORE AS DESCRIBED BELOW TO BE KEYED INTO ORIGINAL GRADE, AS WELL AS A FINE GEOTEXTILE, TO AVOID WATER SEEPAGE AND SOIL PIPING THROUGH THE EARTHEN DIVIDER.
  - MATERIAL FOR CLAY CORE SHALL BE CLEAN SILTY-CLAY BORROW FREE OF ROOTS, ORGANIC MATTER, AND OTHER 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 60-80%, #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

#### BIORETENTION BERM SECTION

NOT TO SCALE

BIORETENTION SYSTEM ELEVATIONS									
BIORETENTION	SIZE OF BOTTOM (S.F.)	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E	ELEV. F	SHWT	LEDGE
1	502	55.0	N/A	53.75	52.25	52.0	51.25	51.13	< 49.55 *
2	1,080	51.5	51.0	49.25	47.75	47.5	46.42	46.25	< 44.42 *

\* TEST PITS TERMINATED AT THESE DEPTHS BELOW REFERENCE POINT WITHOUT ENCOUNTERING LEDGE.



#### DESIGN CONSIDERATIONS

- DO NOT DIRECT RUNOFF TO THE BIORETENTION SYSTEMS UNTIL IT HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
- DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUN-OFF, WATER FROM EXCAVATIONS) TO THE BIORETENTION AREA DURING ANY STAGE OF CONSTRUCTION.
- 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.
- 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.
- 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 CONTRAMINATED 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.
- IN ADDITION TO DESIGN CRITERIA LISTED HERE, REFER TO GUIDELINES LISTED IN UNIVERSITY OF NEW HAMPSHIRE (UNH) STORMWATER CENTER BIORETENTION SOIL SPECIFICATION.
- BIORETENTION SYSTEM #1 HAS A SEDIMENT FOREBAYS FOR PRE-TREATMENT AND BIORETENTION SYSTEM #2 HAS A PRETX CURB INLET STRUCTURE FOR PRE-TREATMENT.

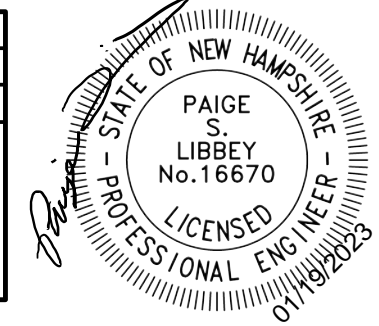
#### BIORETENTION SYSTEM

NOT TO SCALE

#### MAINTENANCE REQUIREMENTS:

- SYSTEMS SHOULD 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.
- TRASH AND DEBRIS SHOULD BE REMOVED AT EACH INSPECTION.
- AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF BIORETENTION SYSTEM DOES NOT DRAIN WITHIN 72 HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION OR INFILTRATION FUNCTION (AS APPLICABLE), INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER MEDIA.
- VEGETATION SHOULD 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.

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5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
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**J/B Jones & Beach Engineers, Inc.**

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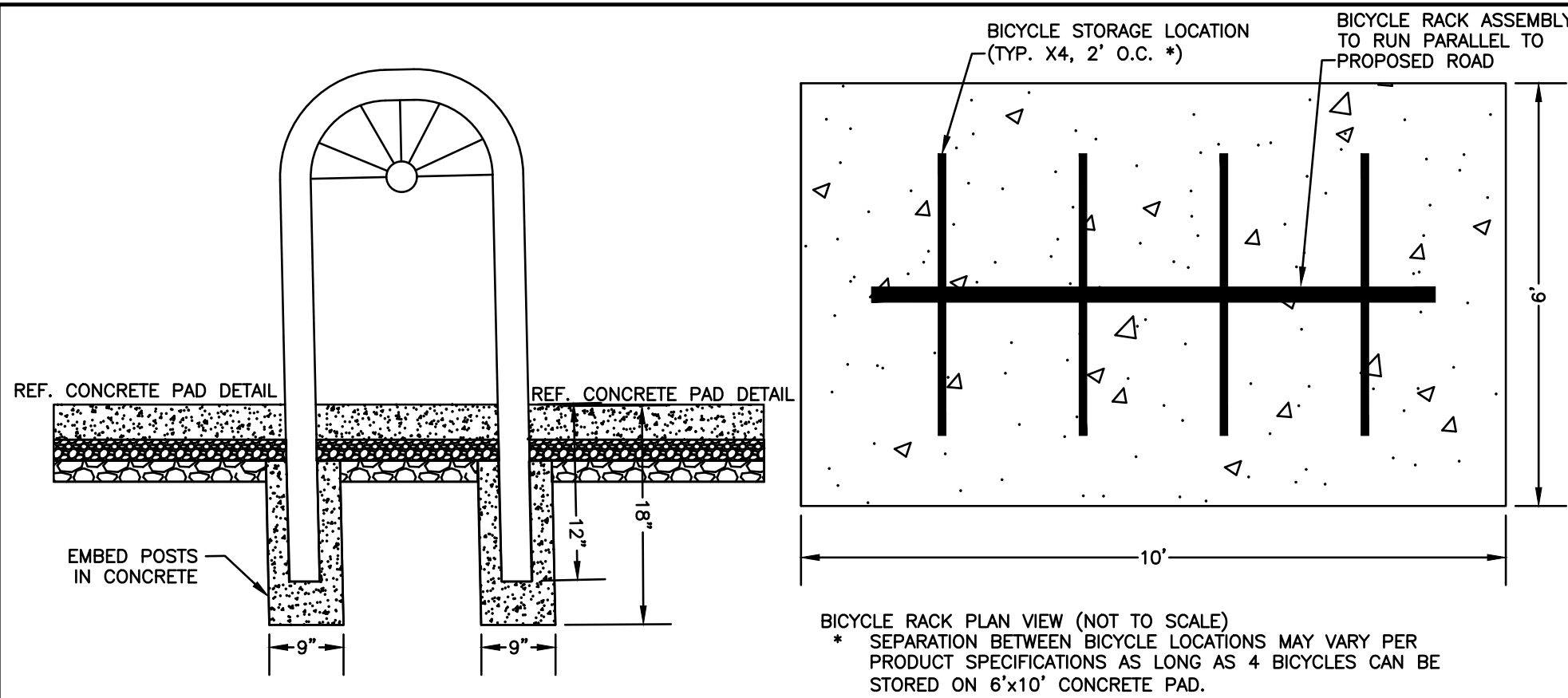
Civil Engineering Services

603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	"GRAPEVINE RUN"
Owner of Record:	212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801 FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894
	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

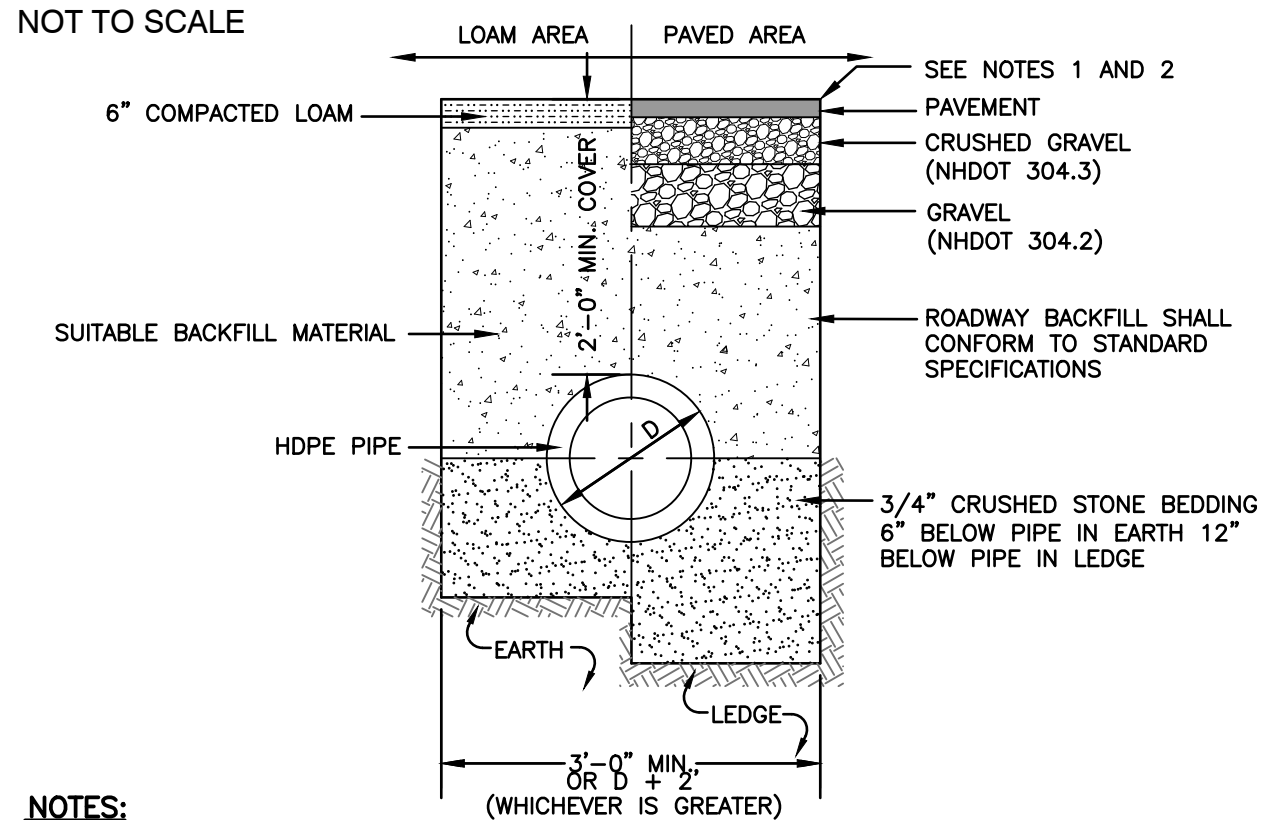
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SHEET 15 OF 23	JBE PROJECT NO. 21254





### BICYCLE RACK

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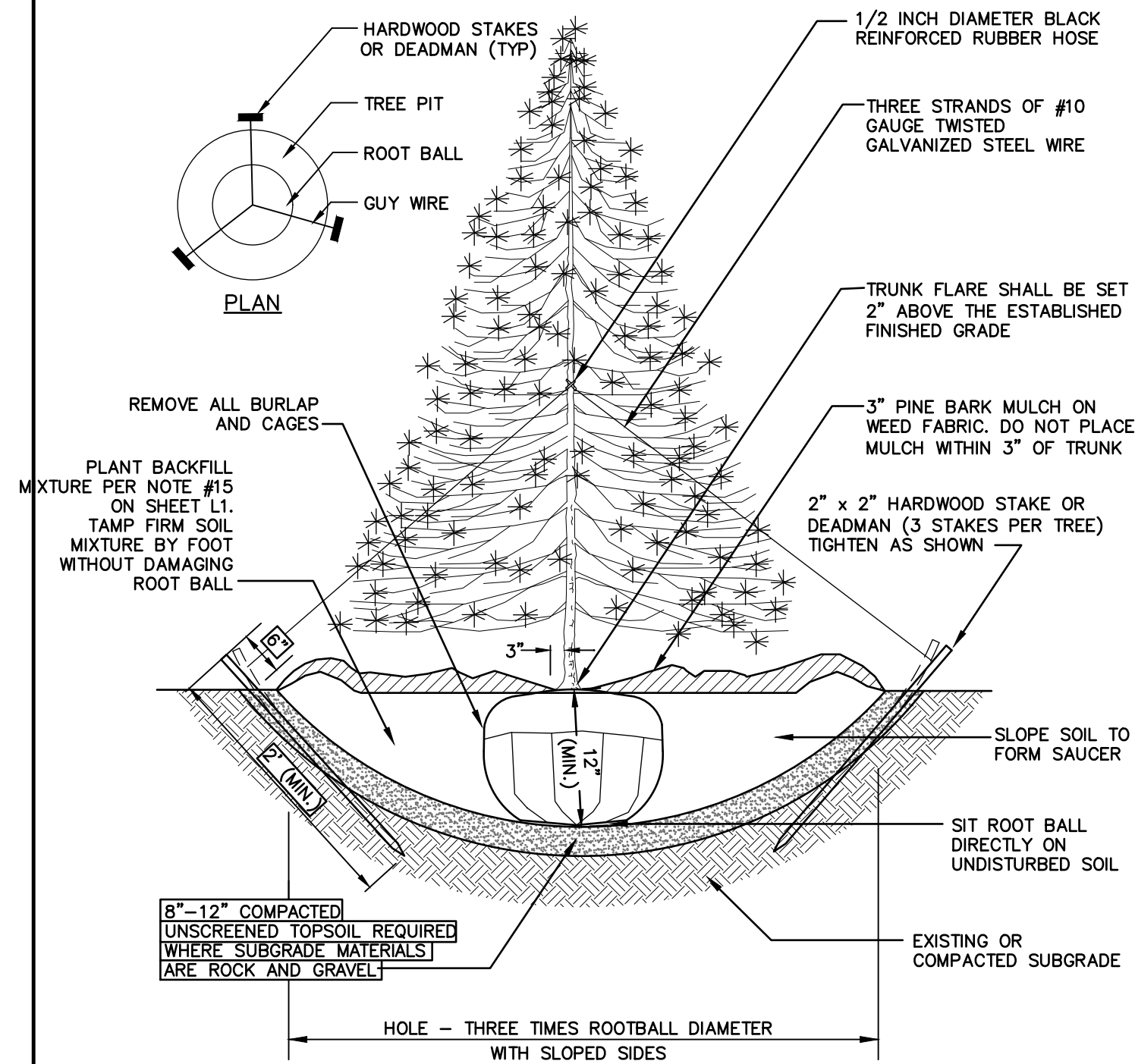


#### NOTES:

- PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
- NEW ROADWAY CONSTRUCTION SHALL CONFORM WITH PROJECT AND TOWN SPECIFICATIONS.
- ALL MATERIALS ARE TO BE COMPACTED TO 95% OF ASTM D-1557.

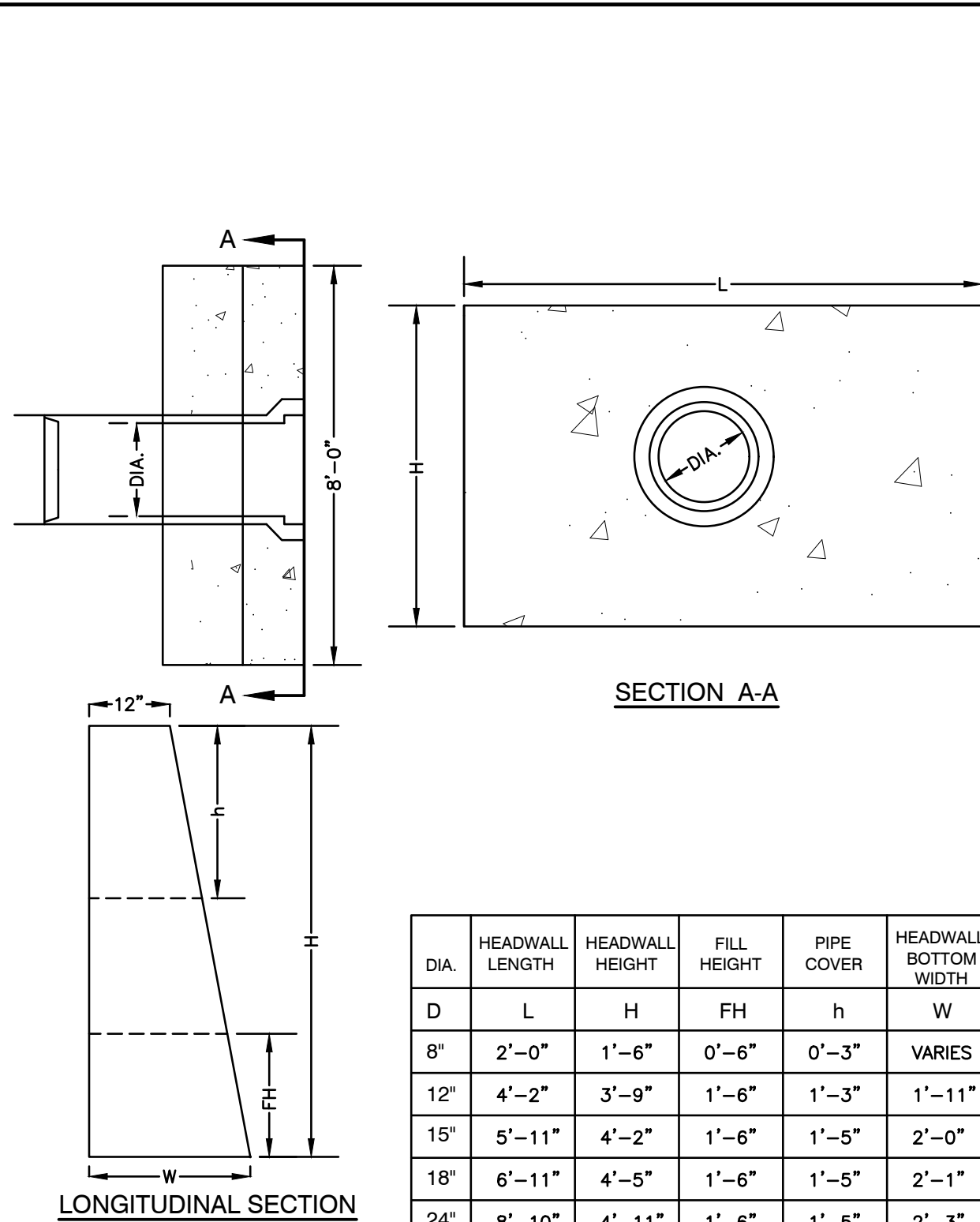
### DRAINAGE TRENCH

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### EVERGREEN PLANTING

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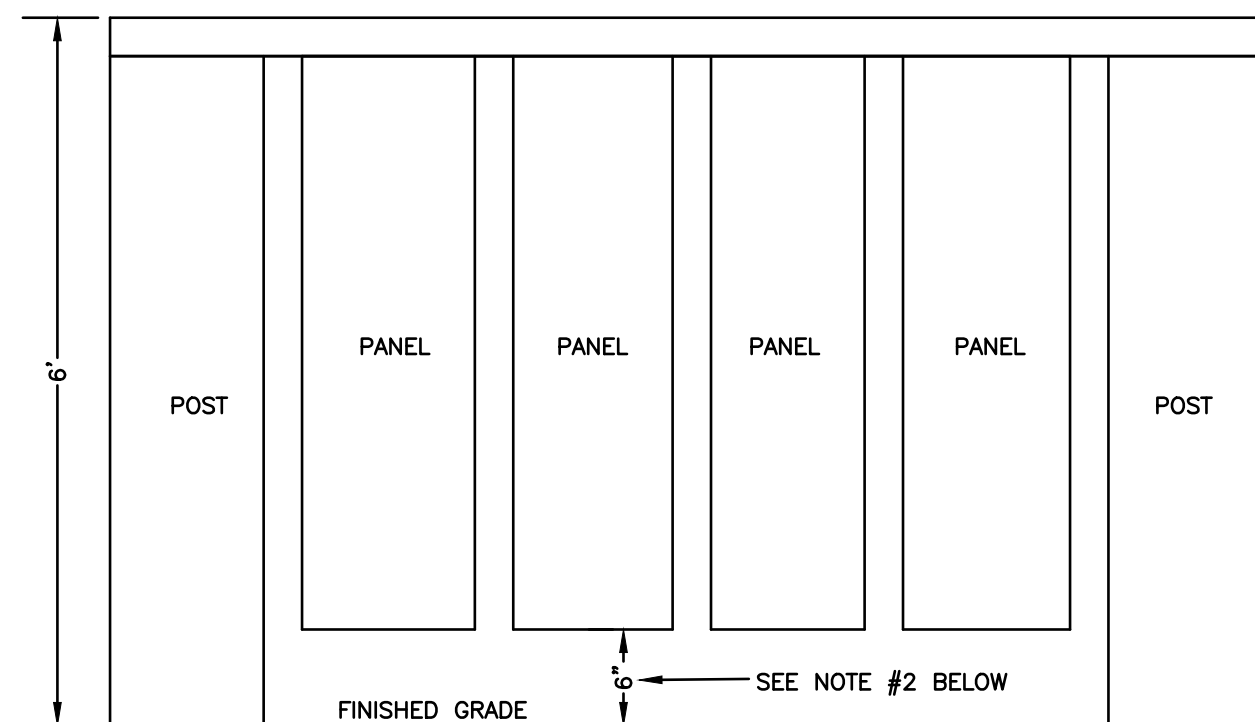


#### NOTES:

- ALL DIMENSIONS GIVEN IN FEET & INCHES.
- PROVIDE BELL END AT INLET HEADWALL, AND SPIGOT END AT OUTLET END HEADWALL.
- 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.
- 1" TREADED INSERTS PROVIDED FOR FINAL ATTACHMENT IN FIELD BY OTHERS.

### PRECAST CONCRETE HEADWALL

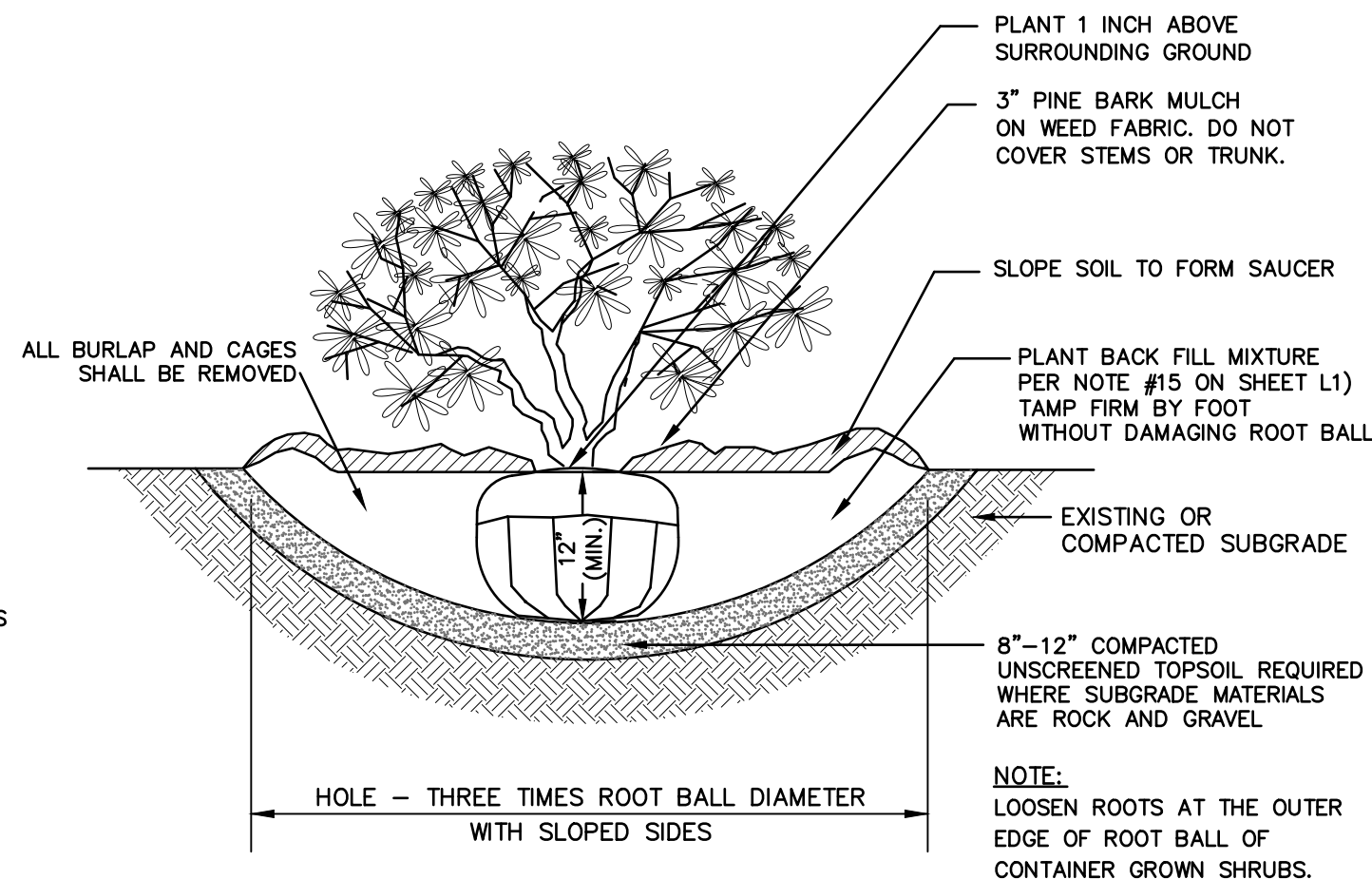
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- THE INTENT OF THIS DETAIL IS TO SHOW THE REQUIRED CLEARANCE FROM FINISHED GRADE TO THE BOTTOM OF THE WOODEN PANELS ON THE PROPOSED FENCE. THIS DETAIL SHALL NOT CONSTITUTE A REQUIREMENT WITH REGARDS TO POST OR PANEL PLACEMENT ALONG THE LENGTH OF THE FENCE.
- A 6" CLEARANCE MUST BE PROVIDED BETWEEN FINISHED GRADE AND THE BOTTOM OF WOODEN PANELS ON THE FENCE BEHIND BIORETENTION #2 EMERGENCY SPILLWAY. HOWEVER, 6" CLEARANCE IS NOT NECESSARY FOR THE FENCE ATOP THE RETAINING WALL BEHIND UNIT 6.

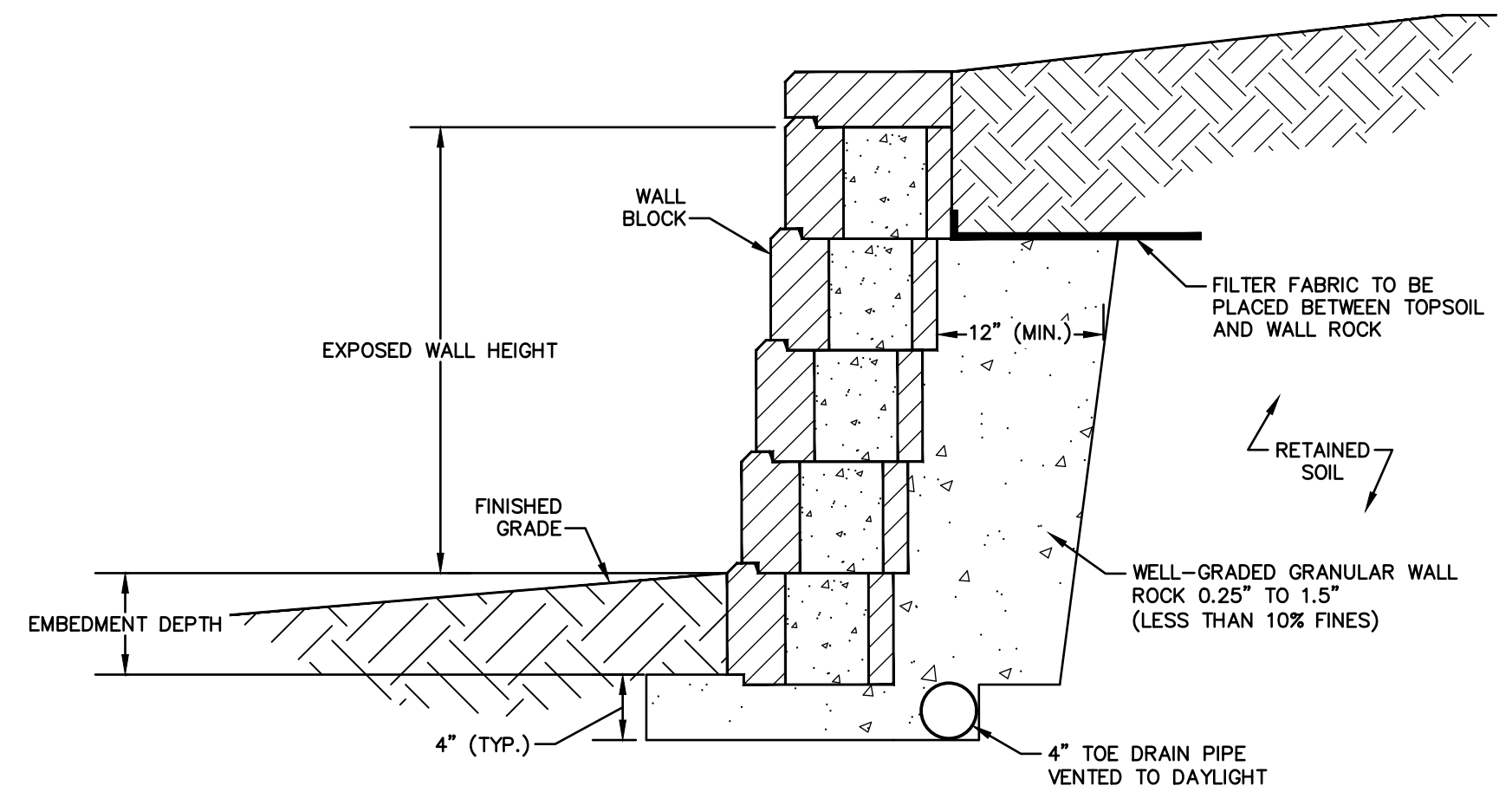
### 6' HIGH WOODEN FENCE DETAIL

NOT TO SCALE



### SHRUB PLANTING

NOT TO SCALE



THE CONTRACTOR IS RESPONSIBLE FOR RETAINING THE SERVICES OF A STRUCTURAL ENGINEER LICENSED IN THE STATE OF NEW HAMPSHIRE TO DESIGN THE PROPOSED RETAINING WALL. JONES & BEACH ENGINEERS, INC. DOES NOT ACCEPT ANY LIABILITY FOR THE STRUCTURAL DESIGN AND/OR INSTALLATION OF THE WALL. 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.

### TYPICAL GRAVITY WALL DETAIL

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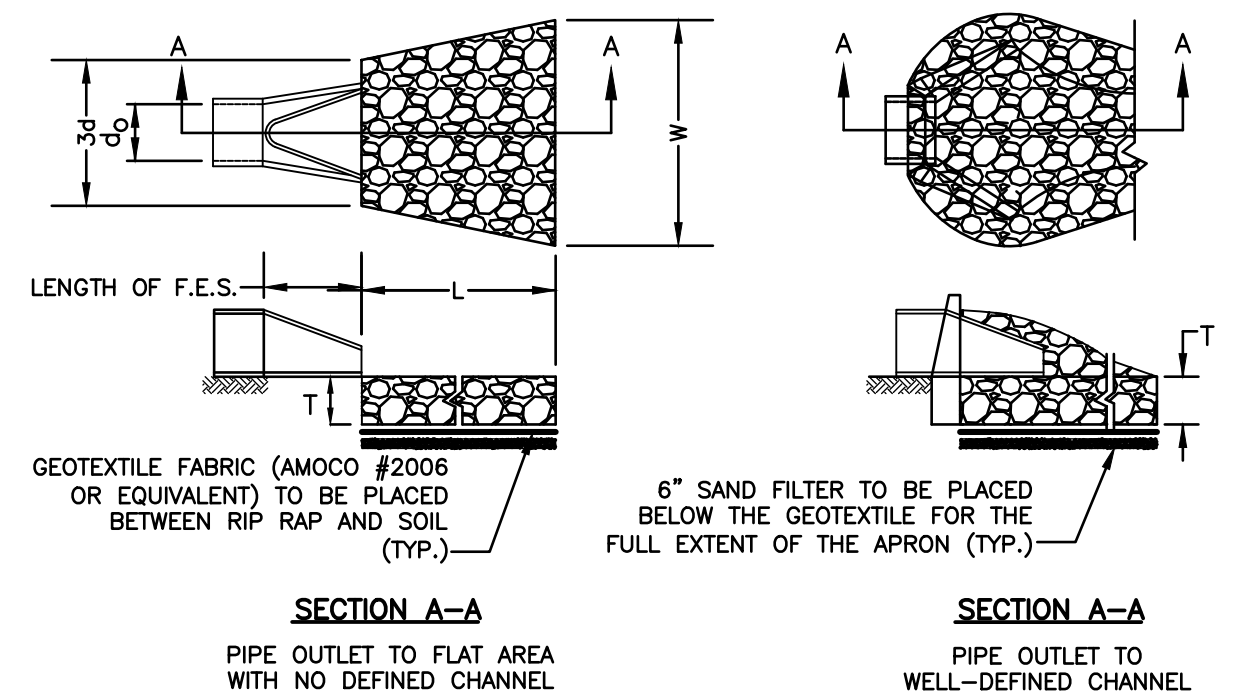


TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES			
THICKNESS OF RIP RAP = 1.5 FEET			
d50 SIZE=	0.25	FEET	3 INCHES
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM TO		
100%	5	6	
85%	4	5	
50%	3	5	
15%	1	2	

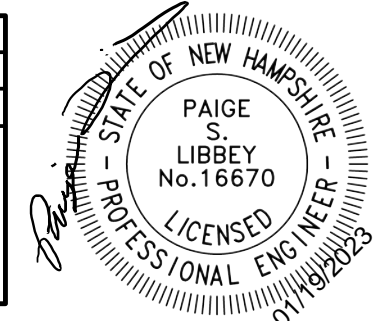
#### NOTES:

- THE SUBGRADE FOR THE GEOTEXTILE FABRIC AND RIP RAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
- THE RIP RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
- 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.
- 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.
- 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.
- 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

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5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

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<b>J/B Jones &amp; Beach Engineers, Inc.</b>		
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885	Civil Engineering Services	603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894
	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

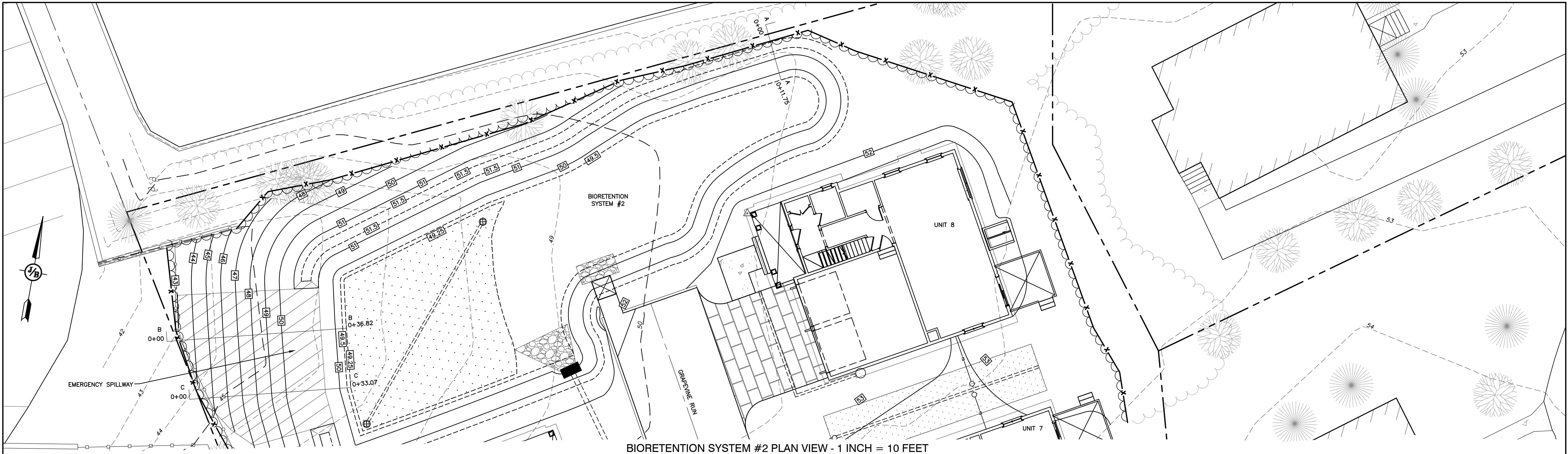
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<b>D5</b>
SHEET 16 OF 23 JBE PROJECT NO. 21254

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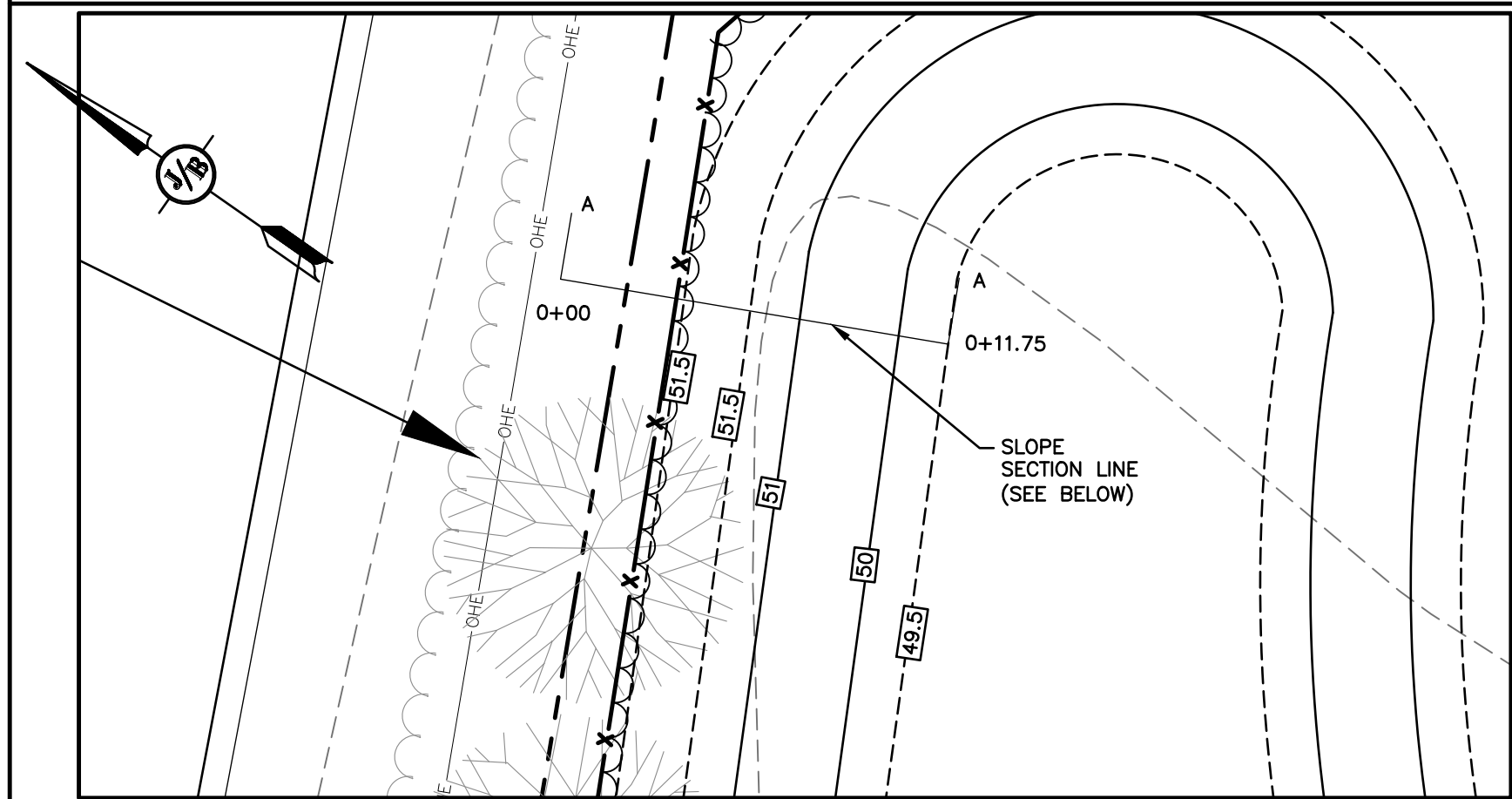
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SHEET 17 OF 23  
JBE PROJECT NO. 21254



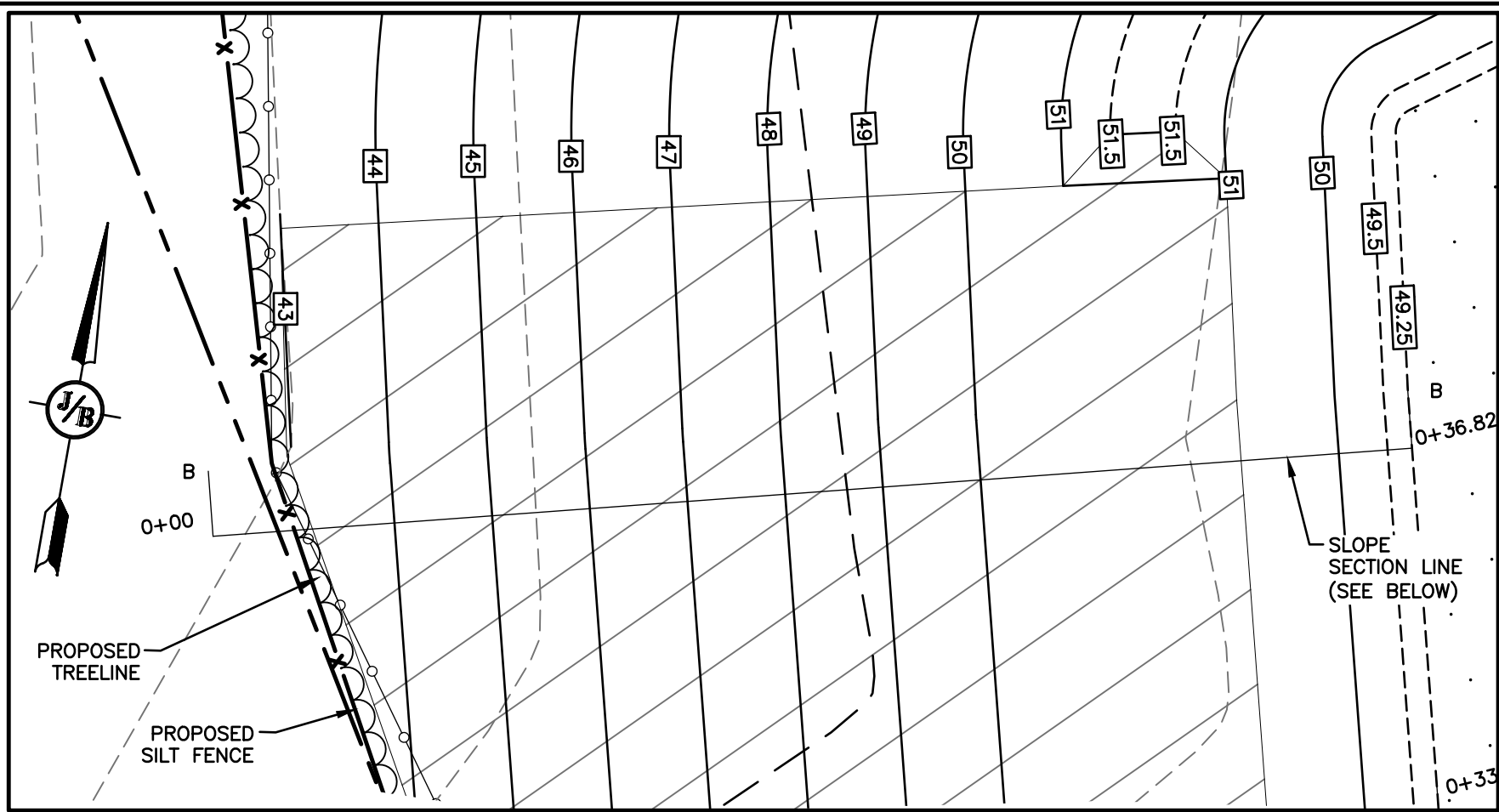


BIORETENTION SYSTEM #2 PLAN VIEW - 1 INCH = 10 FEET



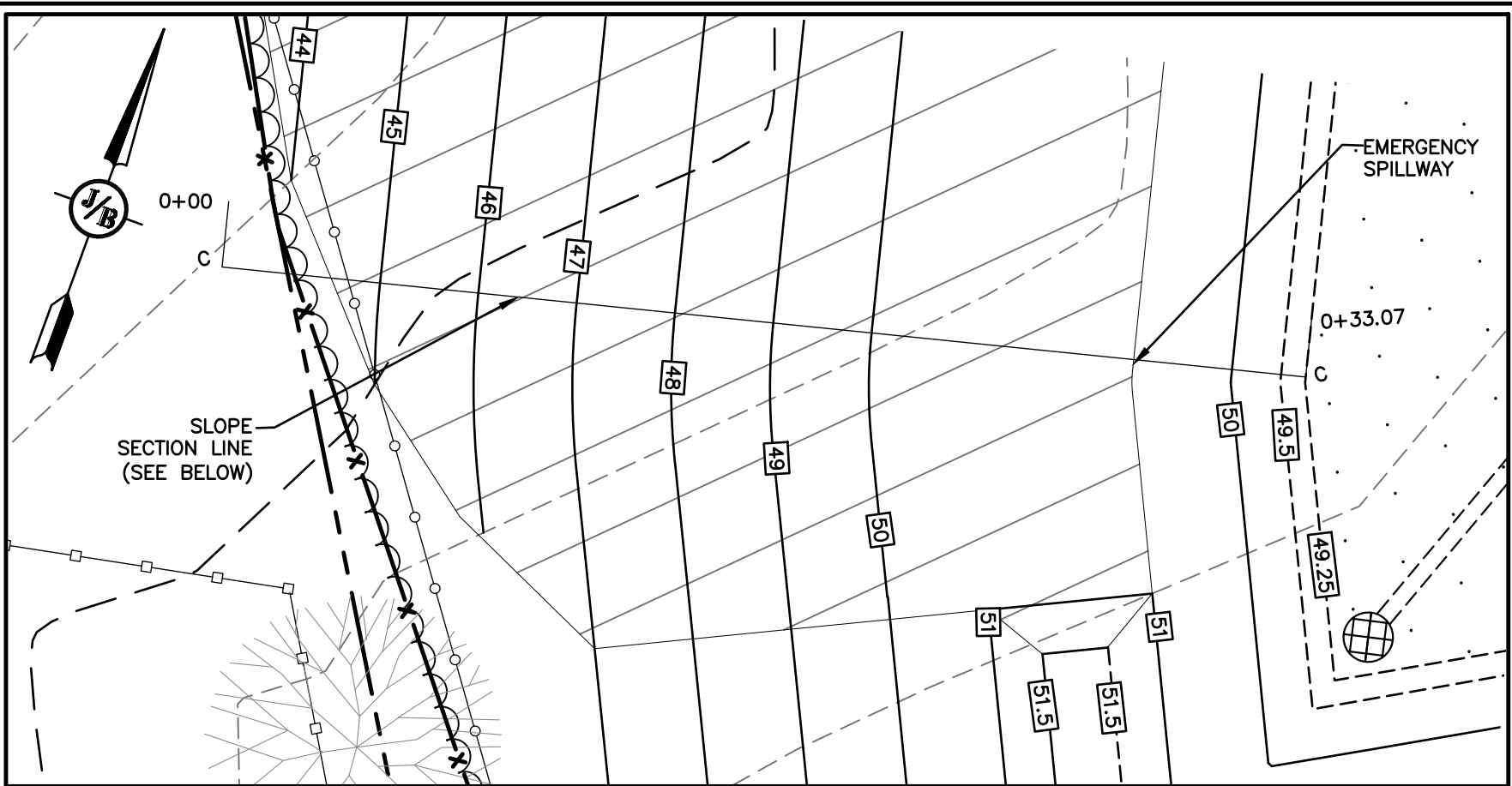
CROSS SECTION A-A - NORTHERN SIDE OF BIORETENTION #2

1 INCH = 5 FEET



CROSS SECTION B-B - SECTION THROUGH EMERGENCY SPILLWAY

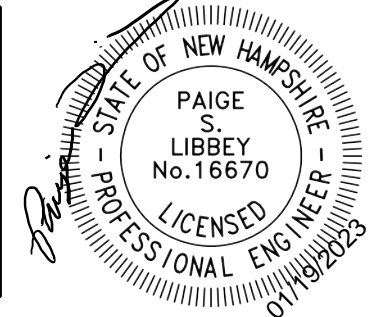
1 INCH = 5 FEET



CROSS SECTION C-C - SECTION THROUGH EMERGENCY SPILLWAY

1 INCH = 5 FEET

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Plan Name:	SLOPE CROSS SECTIONS	
Project:	212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801	
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

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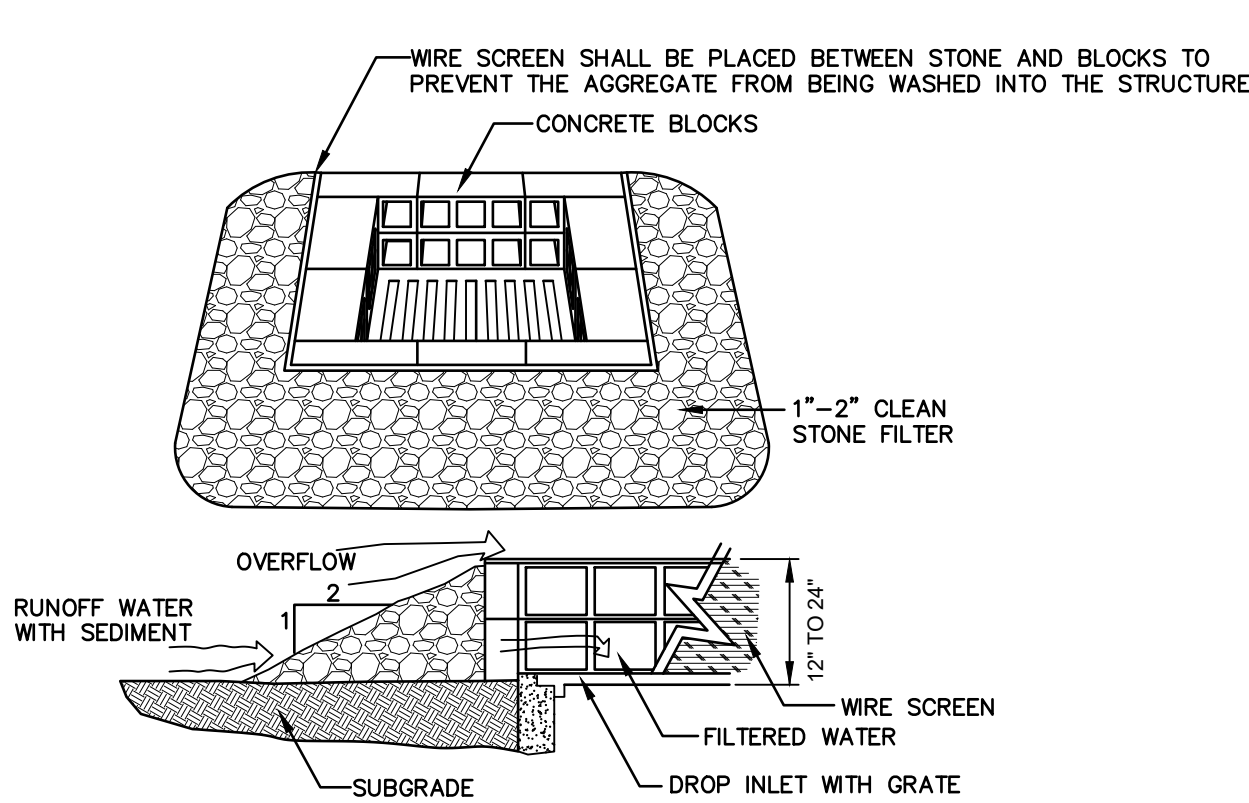
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SHEET 18 OF 23  
JBE PROJECT NO. 21254



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 OR 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 S150 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.

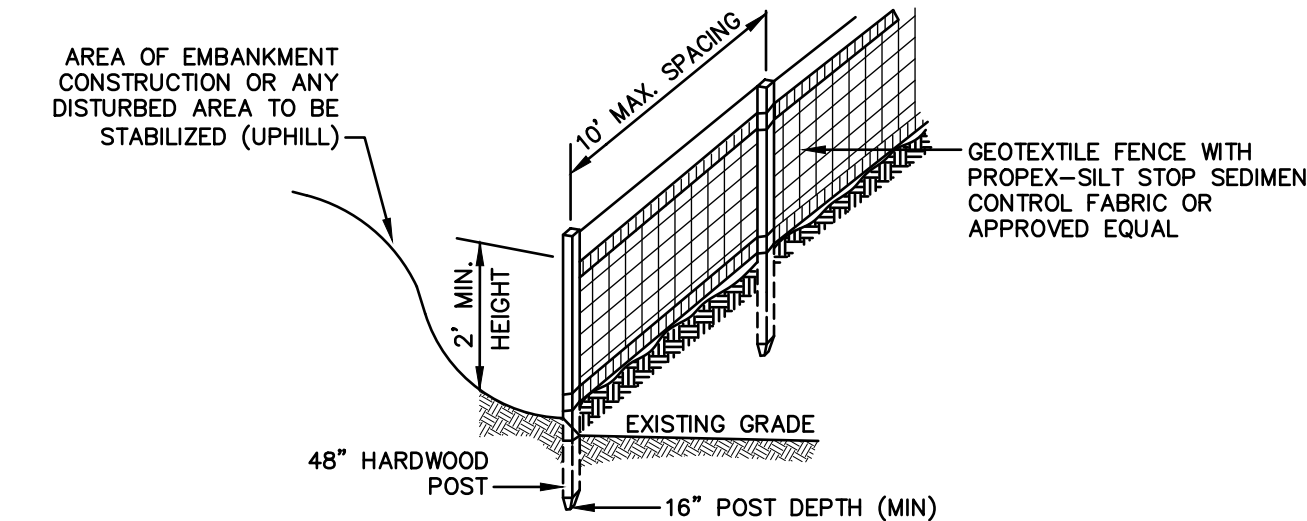


MAINTENANCE NOTE:

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

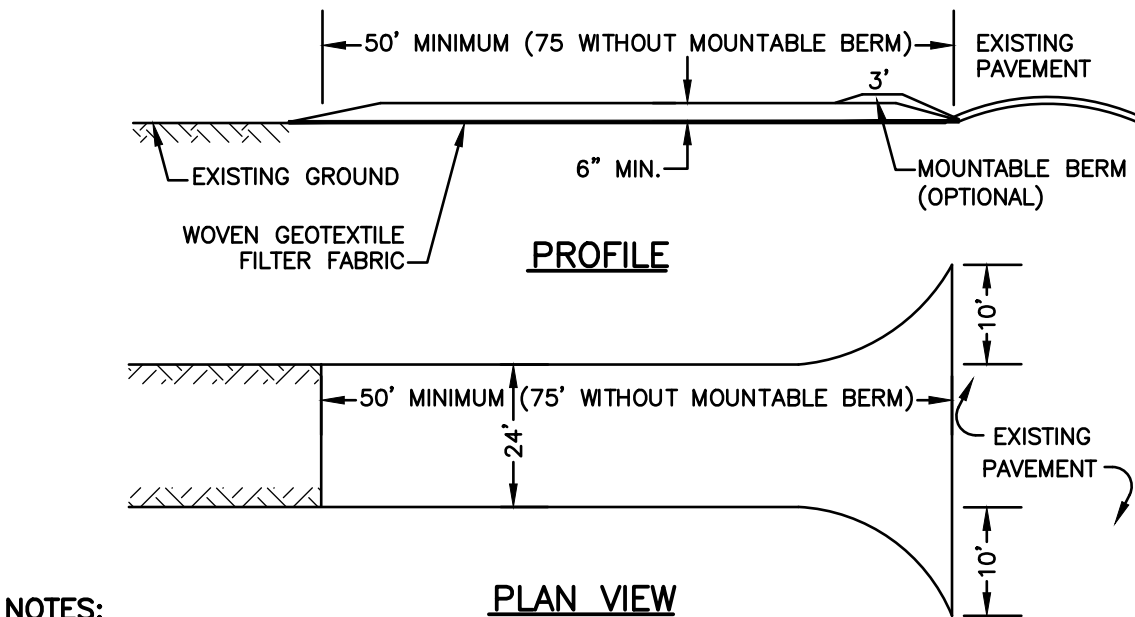


CONSTRUCTION SPECIFICATIONS:

1. WOVEN FABRIC FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. FILTER CLOTH SHALL BE FASTENED TO WOVEN WIRE EVERY 24" AT TOP, MID AND BOTTOM AND EMBEDDED IN THE GROUND A MINIMUM OF 8" AND THEN COVERED WITH SOIL.
2. THE FENCE POSTS SHALL BE A MINIMUM OF 48" LONG, SPACED A MAXIMUM 10' APART, AND DRIVEN A MINIMUM OF 16" INTO THE GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THE ENDS OF THE FABRIC SHALL BE OVERLAPPED 6", FOLDED AND STAPLED TO PREVENT SEDIMENT FROM BY-PASSING.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND SEDIMENT REMOVED AND PROPERLY DISPOSED OF WHEN IT IS 6" DEEP OR VISIBLE 'BULGES' DEVELOP IN THE SILT FENCE.
5. PLACE THE ENDS OF THE SILT FENCE UP CONTOUR TO PROVIDE FOR SEDIMENT STORAGE.
6. SILT FENCE SHALL REMAIN IN PLACE FOR 24 MONTHS.

SILT FENCE

NOT TO SCALE

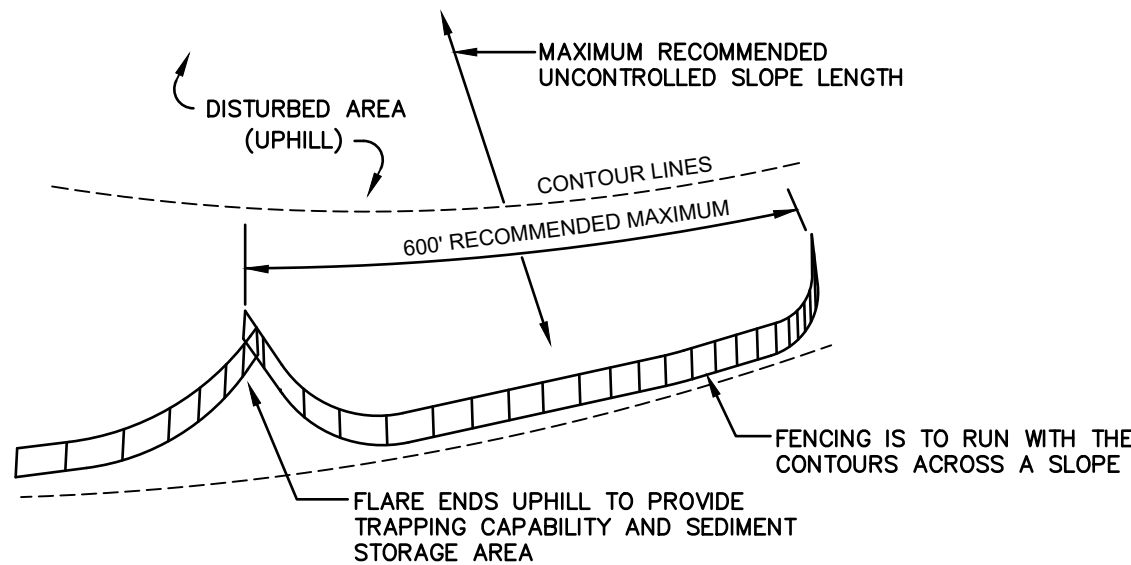


NOTES:

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



7. SILT FENCES SHALL BE REMOVED WHEN NO LONGER NEEDED AND THE SEDIMENT COLLECTED SHALL BE DISPOSED AS DIRECTED BY THE ENGINEER. THE AREA DISTURBED BY THE REMOVAL SHALL BE SMOOTHED AND REVEGETATED.

MAINTENANCE:

1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE DONE IMMEDIATELY.
2. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER.
4. SEDIMENT DEPOSITS THAT ARE REMOVED, OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED, SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

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(P2O5), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.  
POTASH(K2O), 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 (CROWN VETCH, 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. LIME, 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
	B	GOOD	EXCELLENT	EXCELLENT	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.	E	FAIR	EXCELLENT	EXCELLENT	2/
	F	FAIR	EXCELLENT	EXCELLENT	2/
GRVEL 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 QATS 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.

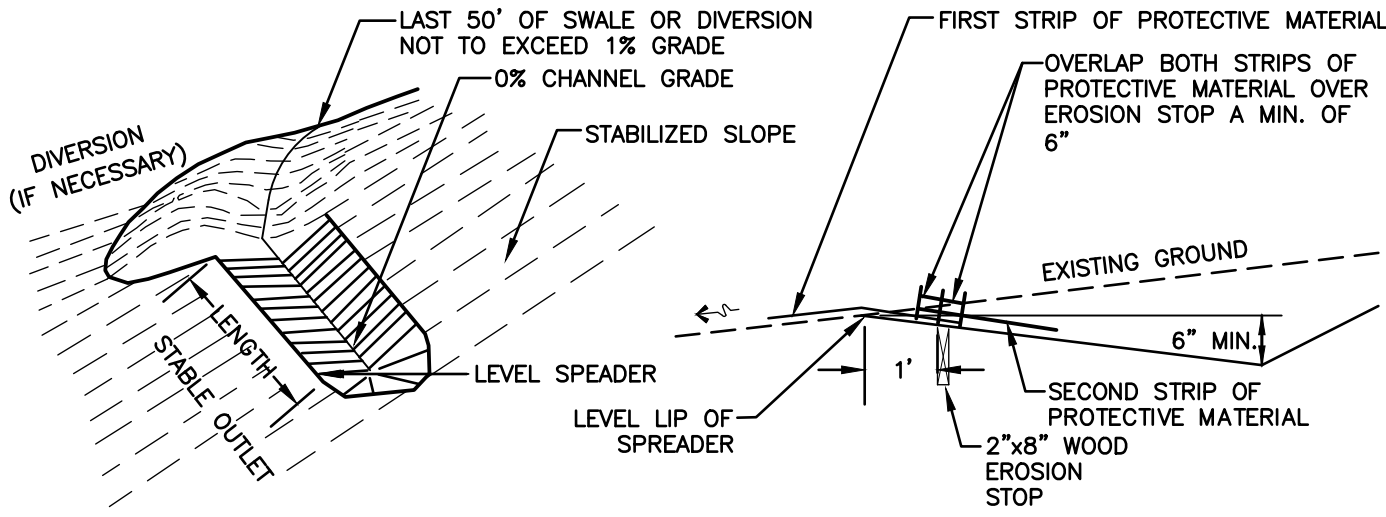
SEEDING GUIDE

MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 Sq. Ft.
A. TALL FESCUE CREEPING RED FESCUE RED TOP TOTAL	20	0.45
	20	0.45
	2	0.05
	42	0.95
B. TALL FESCUE CREEPING RED FESCUE CROWN VETCH OR FLAT PEA TOTAL	15	0.35
	10	0.25
	15	0.35
	30	0.75
	40 OR 55	0.95 OR 1.35
C. TALL FESCUE CREEPING RED FESCUE BIRDS FOOT TREFOIL TOTAL	20	0.45
	20	0.45
	8	0.20
	48	1.10
D. TALL FESCUE FLAT PEA TOTAL	20	0.45
	30	0.75
	50	1.20
E. CREEPING RED FESCUE 1/ KENTUCKY BLUEGRASS 1/ TOTAL	50	1.15
	50	1.15
	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



NOTES:

1. CONSTRUCT THE LEVEL SPREADER LIP ON A ZERO PERCENT GRADE TO ENSURE UNIFORM SPREADING OF RUNOFF.
2. LEVEL SPREADER SHALL BE CONSTRUCTED ON UNDISTURBED SOIL AND NOT ON FILL.
3. AN EROSION STOP SHALL BE PLACED VERTICALLY A MINIMUM OF SIX INCHES DEEP IN A SLIT TRENCH ONE FOOT BACK OF THE LEVEL LIP AND PARALLEL TO THE LIP. THE EROSION STOP SHALL EXTEND THE ENTIRE LENGTH OF THE LEVEL LIP.
4. ENTIRE LEVEL LIP AREA SHALL BE PROTECTED BY PLACING TWO STRIPS OF JUTE OR EXCELSIOR MATTING ALONG THE LIP. EACH STRIP SHALL OVERLAP THE EROSION STOP BY AT LEAST SIX INCHES.
5. ENTRANCE CHANNEL TO THE LEVEL SPREADER SHALL NOT EXCEED A 1 PERCENT GRADE FOR AT LEAST 50 FEET BEFORE ENTERING THE SPREADER.
6. THE FLOW FROM THE LEVEL SPREADER SHALL OUTLET ONTO STABILIZED AREAS. WATER MUST NOT RECONCENTRATE IMMEDIATELY BELOW THE SPREADER.
7. PERIODIC INSPECTION AND REQUIRED MAINTENANCE SHALL BE PERFORMED.
8. MAINTENANCE: THE LEVEL SPREADER SHOULD BE CHECKED PERIODICALLY AND AFTER EVERY MAJOR STORM TO DETERMINE IF THE SPREADER HAS BEEN DAMAGED. SEDIMENT DEEPER THAN 4" ACCUMULATION SHOULD BE REMOVED. IF RILLING HAS TAKEN PLACE ON THE LIP, THEN THE DAMAGE SHOULD BE REPAIRED AND REVEGETATED. THE VEGETATION SHOULD BE MOWED OCCASIONALLY TO CONTROL WEEDS AND THE ENCROACHMENT OF WOODY VEGETATION. CLIPPINGS SHOULD BE REMOVED AND DISPOSED OF OUTSIDE THE SPREADER AND AWAY FROM OUTLET AREA. FERTILIZATION SHOULD BE DONE AS NECESSARY TO KEEP THE VEGETATION HEALTHY AND DENSE.

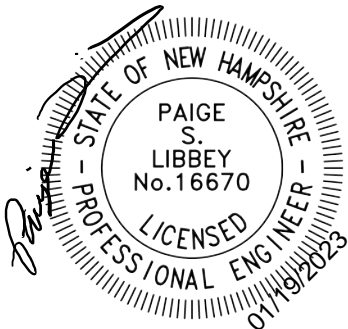
LEVEL SPREADER

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 SILT FENCING, 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, OR RECLAIM EXISTING PAVEMENT WITHIN LIMITS OF WORK 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. PREPARE BUILDING PAD(S) TO ENABLE BUILDING CONSTRUCTION TO BEGIN.
9. 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.
10. INSTALL INLET PROTECTION AT ALL CATCH BASINS AS THEY ARE CONSTRUCTED IN ACCORDANCE WITH DETAILS.
11. ALL SWALES AND DRAINAGE STRUCTURES ARE TO BE CONSTRUCTED AND STABILIZED PRIOR TO HAVING RUN-OFF DIRECTED TO THEM.
12. 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 ADJUTING WATERS AND/OR PROPERTY.
13. PERFORM FINAL FINE GRADING, INCLUDING PLACEMENT OF 'SELECT' SUBGRADE MATERIALS.
14. PAVE ROADWAY AND DRIVEWAYS WITH INITIAL 'BASE COURSE'.
15. PERFORM ALL REMAINING SITE CONSTRUCTION (i.e. BUILDING, CURBING, UTILITY CONNECTIONS, ETC.).
16. LOAM AND SEED ALL DISTURBED AREAS AND INSTALL ANY REQUIRED SEDIMENT AND EROSION CONTROL FACILITIES (i.e. RIP RAP, EROSION CONTROL BLANKETS, ETC.).
17. FINISH PAVING ROADWAY AND DRIVEWAYS WITH 'FINISH' COURSE.
18. ROADWAY AND DRIVEWAYS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
19. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
20. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
21. 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.
22. CLEAN SITE AND ALL DRAINAGE STRUCTURES, PIPES AND SUMPS OF ALL SILT AND DEBRIS.
23. INSTALL ALL PAINTED PAVEMENT MARKINGS AND SIGNAGE PER THE PLANS AND DETAILS.
24. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY HALF-INCH OF RAINFALL.
25. 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: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: AS NOTED	Project No.: 21254
Drawing Name: 21254-PLAN.dwg		
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8	1/19/23	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
7	12/20/22	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
6	10/18/22	REVISED PER REVIEW ENGINEER AND TAC COMMENTS	DJM
5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

J/B Jones & Beach Engineers, Inc.

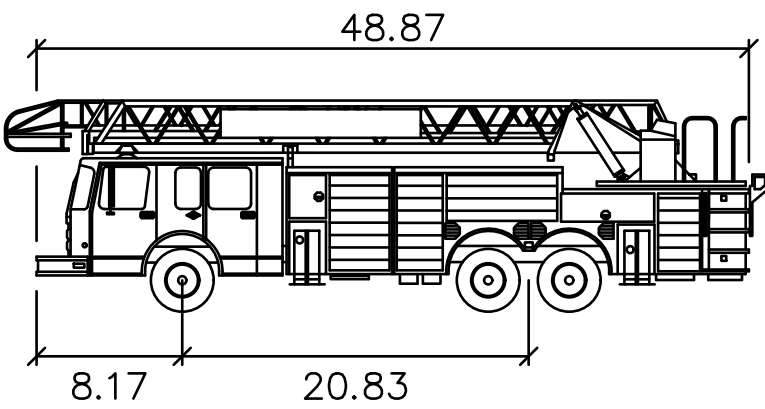
85 Portsmouth Ave.  
PO Box 219  
Stratham, NH 03885

Designed and Produced in NH  
Civil Engineering Services  
603-772-4746  
FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EROSION AND SEDIMENT CONTROL DETAILS
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894 LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

DRAWING No.  
E1  
SHEET 19 OF 23  
JBE PROJECT NO. 21254





Portsmouth Fire Truck

	feet
Width	: 8.50
Track	: 6.91
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

LEGEND:

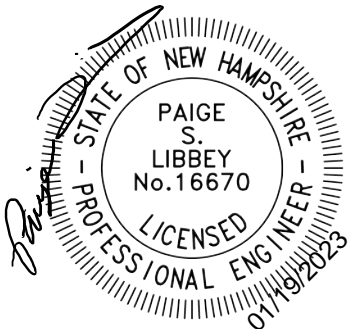
	=	VEHICLE BODY
	=	FRONT WHEELS
	=	REAR WHEELS

PROJECT PARCEL  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1, 2, & 3

APPLICANT  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
149 EPPING RD., SUITE 2A  
EXETER, NH 03833

TOTAL LOT AREA  
80,484 SQ. FT.  
1.85 ACRES

Design: JAC	Draft: DJM	Date: 01/05/22
Checked: JAC	Scale: 1"=20'	Project No.: 21254
Drawing Name: 21254-PLAN.dwg		
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5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

J/B Jones & Beach Engineers, Inc.

Designed and Produced in NH

85 Portsmouth Ave.  
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Stratham, NH 03885

Civil Engineering Services

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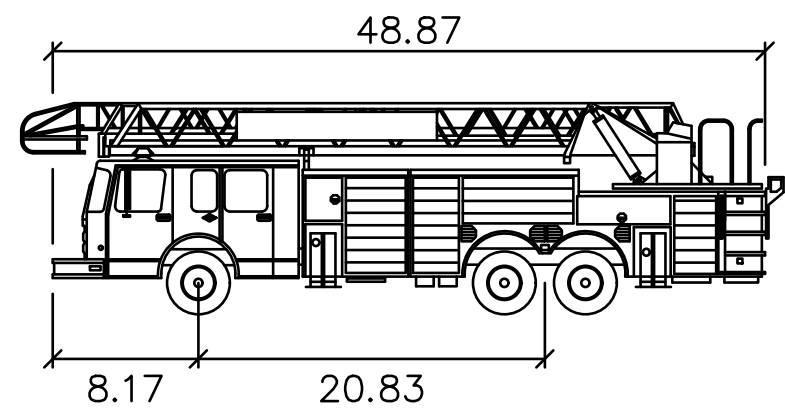
Plan Name:	TRUCK TURNING PLAN
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owners of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894
	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345

DRAWING No.

T1

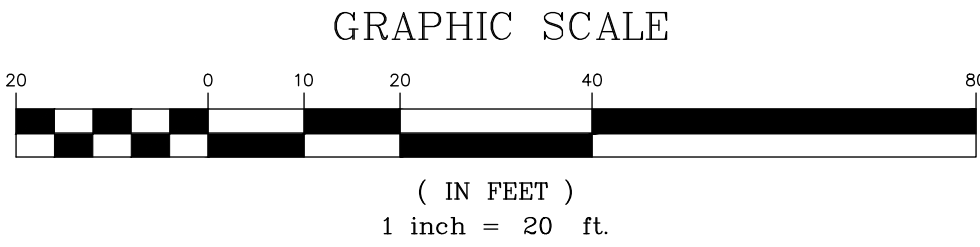
SHEET 20 OF 23  
JBE PROJECT NO. 21254





Portsmouth Fire Truck	
	feet
Width	: 8.50
Track	: 6.91
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

LEGEND:	
<span style="color: purple;">—</span>	= VEHICLE BODY
<span style="color: green;">—</span>	= FRONT WHEELS
<span style="color: blue;">—</span>	= REAR WHEELS



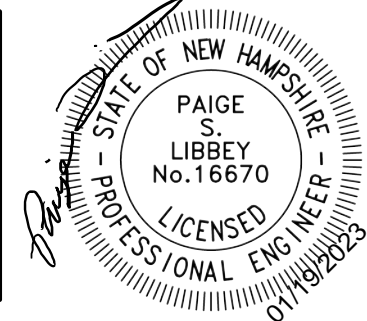
PROJECT PARCEL  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1, 2, & 3

APPLICANT  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
149 EPPING RD., SUITE 2A  
EXETER, NH 03833

TOTAL LOT AREA  
80,484 SQ. FT.  
1.85 ACRES

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REV.	DATE	REVISION	BY

J/B

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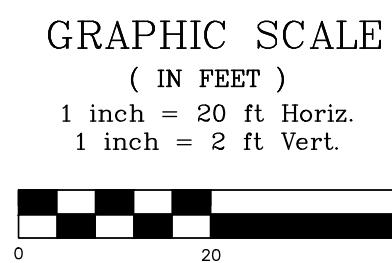
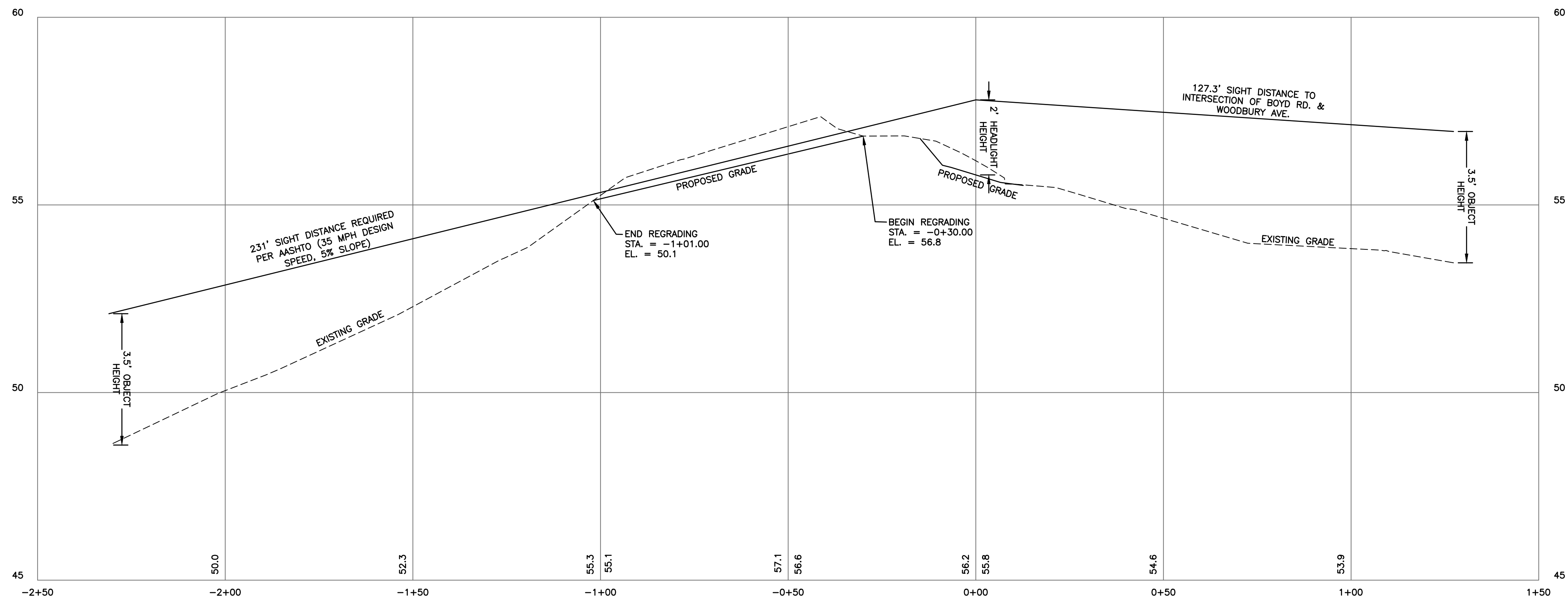
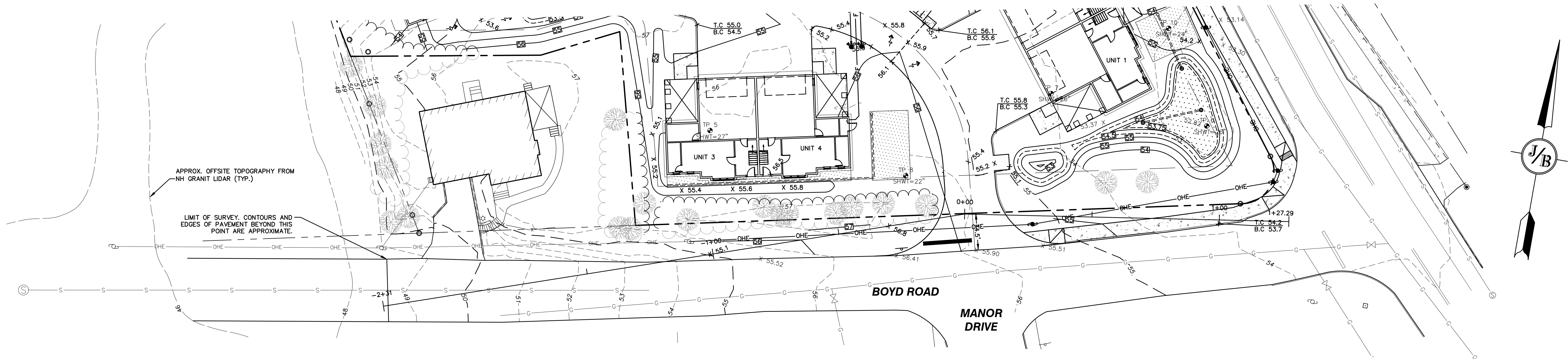
Plan Name:	TRUCK TURNING PLAN
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owners of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894

DRAWING No.

T2

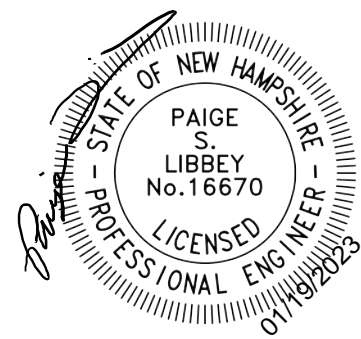
SHEET 21 OF 23  
JBE PROJECT NO. 21254





Design: JAC    Draft: DJM    Date: 01/05/22  
Checked: JAC    Scale: 1"=20'    Project No.: 21254  
Drawing Name: 21254-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.



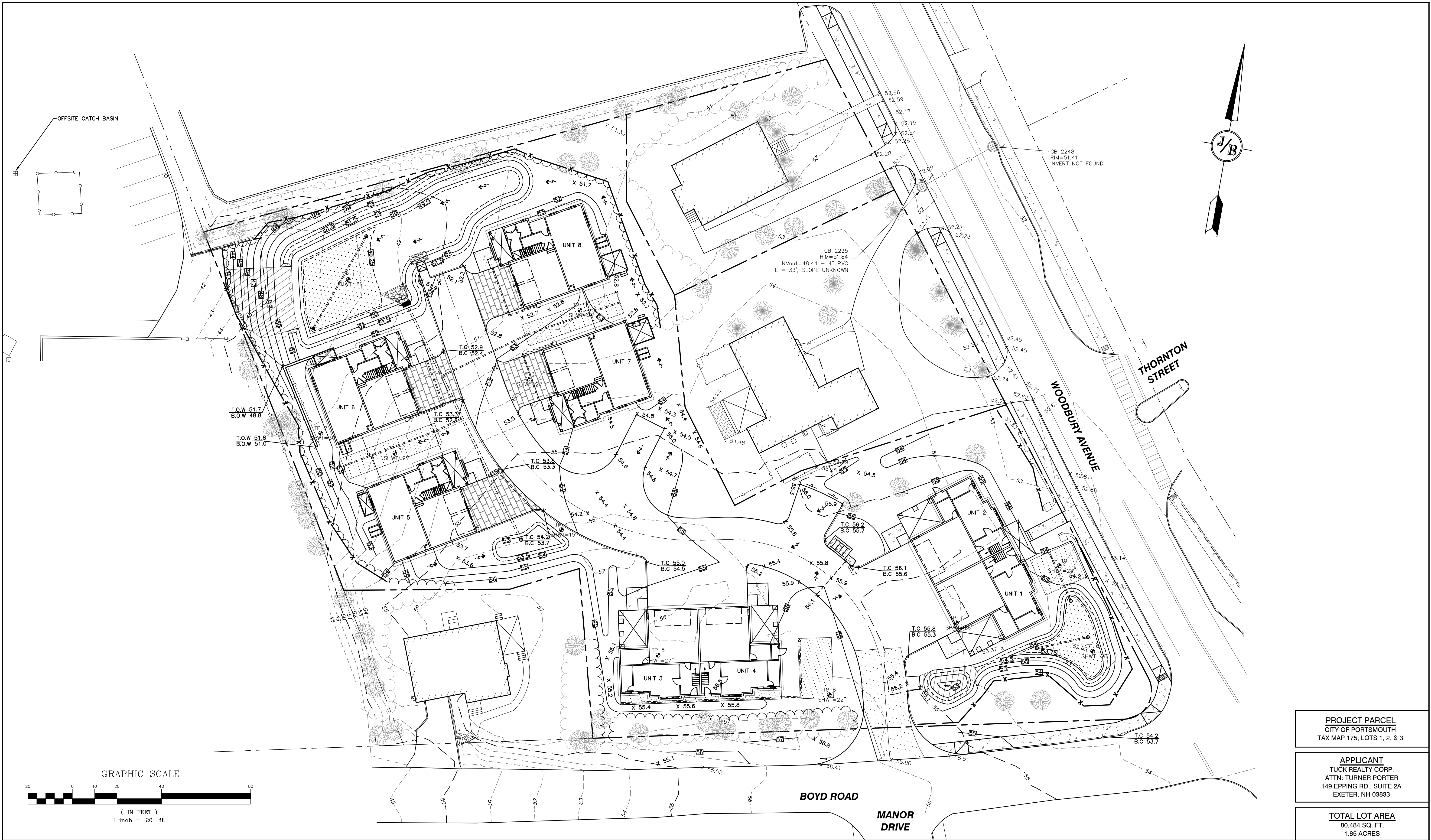
8	1/19/23	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
7	12/20/22	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
6	10/18/22	REVISED PER REVIEW ENGINEER AND TAC COMMENTS	DJM
5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

**J/B Jones & Beach Engineers, Inc.**  
85 Portsmouth Ave.    Civil Engineering Services    603-772-4746  
PO Box 219    Stratham, NH 03885    FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	<b>HIGHWAY ACCESS PLAN</b>		
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801		
Owners of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894	LOT 1: BK 4708 PG 979 LOT 2: BK 4582 PG 888 LOT 3: BK 3919 PG 1345	

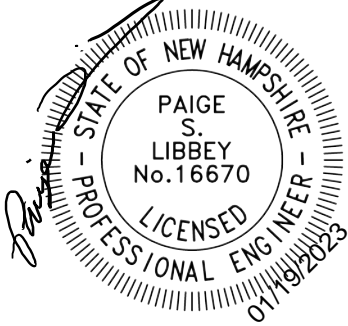
DRAWING No.  
**H1**  
SHEET 22 OF 23  
JBE PROJECT NO. 21254





Design: JAC    Draft: DJM    Date: 01/05/22  
Checked: JAC    Scale: 1"=20'    Project No.: 21254  
Drawing Name: 21254-PLAN.dwg

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8	1/19/23	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
7	12/20/22	REVISED PER REVIEW ENGINEER AND CITY COMMENTS	DJM
6	10/18/22	REVISED PER REVIEW ENGINEER AND TAC COMMENTS	DJM
5	9/23/22	REVISED PER UTILITY COMPANY	DJM
4	9/20/22	REVISED PER REVIEW ENGINEER COMMENTS	DJM
REV.	DATE	REVISION	BY

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

Designed and Produced in NH

Plan Name:	OFFSITE DRAINAGE PLAN
Project:	"GRAPEVINE RUN" 212, 214, & 216 WOODBURY AVE. PORTSMOUTH, NH 03801
Owner of Record:	FREDERICK J. BAILEY III & JOYCE S. NELSON 4 SHORE RD., WOLFEBORO, NH 03894

DRAWING No.

DR1

SHEET 23 OF 23  
JBE PROJECT NO. 21254

PROJECT PARCEL  
CITY OF PORTSMOUTH  
TAX MAP 175, LOTS 1, 2, & 3

APPLICANT  
TUCK REALTY CORP.  
ATTN: TURNER PORTER  
149 EPPING RD., SUITE 2A  
EXETER, NH 03833

TOTAL LOT AREA  
80,484 SQ. FT.  
1.85 ACRES