SITE PLAN REVIEW TECHNICAL ADVISORY COMMITTEE
PORTSMOUTH, NEW HAMPSHIRE

CONFERENCE ROOM A
CITY HALL, MUNICIPAL COMPLEX, 1 JUNKINS AVENUE

Members of the public also have the option to join the meeting over Zoom
*(See below for more details)**

2:00 PM **June 4, 2024**

AGENDA

I. APPROVAL OF MINUTES

A. Approval of minutes from the May 7, 2024 Site Plan Review Technical Advisory Committee Meeting.

II. OLD BUSINESS

A. The request of **RIGZ Enterprises LLC (Owner),** for property located at **806 us Route 1 Bypass** requesting an Amended Site Plan Approval and a second 1-year extension of the previously approved site plan approval granted on June 23, 2022. Said property is located on Assessor Map 161 Lot 43 and lies within the Business (B) District. (LU-22-81)

B. The request of **635 Sagamore Development LLC (Owner),** For property located at **635 Sagamore Avenue** requesting Site Plan approval for the removal of the existing structures and construction of 4 single-family dwellings on one lot with associated site improvements. Said property is located on Assessor Map 222 Lot 19 and lies within the Single Residence A (SRA) District. (LU-22-209)

C. **REQUEST TO POSTPONE** The request of **Oak Street Real Estate Capital (Owner), 100 Durgin Lane Owner, LLC (Applicant),** for property located at **100 Durgin Lane** requesting Subdivision approval of a lot line adjustment and Site Plan Review approval for the demolition of the existing buildings and the construction of 360 rental housing units in a mix of 3-story and 4-story buildings with associated site improvements including parking, pedestrian access, community spaces, utilities, stormwater management, lighting, and landscaping. Said property is located on Assessor Map 239 Lot 18 and lies within the Gateway Corridor (G1) District. (LU-24-62) **REQUEST TO POSTPONE**

III. NEW BUISINESS

A. The request of **Christ Church Parish, (Owner), Portsmouth Housing Authority (Applicant),** for property located at **1035 Lafayette Road** seeking Conditional Use Permits from Section 10.5B41.10 for a Development Site, from Section 10.5B72 for density bonus incentive for increased dwelling units per building and a Conditional Use Permit from Section 10.1112.14 to provide less than the required parking and Site Plan Review Approval for construction of a 4-story, 44-unit multi-family residential building to the south of the existing church building, conversion of the first-floor of the existing church into office space and construction of a 7-unit transitional housing addition. The lower level of the existing church will be renovated for the daycare and the church will be relocated to the existing rectory building on the site. The project will include associated site improvements such as parking, pedestrian connections, access to public transportation, utilities, stormwater management, lighting, and landscaping. Said property is located on Assessor Map 246 Lot 1 and lies within the Gateway Center (G2) District. (LU-24-92)

B. The request of **Lonza Biologics (Owner),** for property located at **5 Technology Drive (***Formerly 70 Corporate Drive***)** requesting Amended Site Plan approval for the addition of Phase Photovoltaic Cell (PV) Solar canopies over the previously approved temporary surface parking lot. Said property is located on Assessor Map 305 Lot 6 and lies within the Airport Business Commercial (ABC) District. (LU-23-108)

IV. ADJOURNMENT

**Members of the public also have the option to join this meeting over Zoom, a unique meeting ID and password will be provided once you register. To register, click on the link below or copy and paste this into your web browser:*

https://us06web.zoom.us/webinar/register/WN_M2P-hnHSRcysYNP_l75zhw

SITE PLAN REVIEW TECHNICAL ADVISORY COMMITTEE
PORTSMOUTH, NEW HAMPSHIRE

CONFERENCE ROOM A
CITY HALL, MUNICIPAL COMPLEX, 1 JUNKINS AVENUE

2:00 PM **May 7, 2024**

MINUTES

MEMBERS PRESENT: Peter Stith, Chairperson, Planning Manager; David Desfosses, Construction Technician Supervisor; Chad Putney, Fire Prevention Officer; Shanti Wolph, Chief Building Inspector; Peter Britz, Director of Planning & Sustainability; Zachary Cronin, Assistant City Engineer, Eric Eby, Parking and Transportation Engineer; Mike Maloney; Deputy Police Chief, Vincent Hayes; Land Use Compliance Agent/Associate Planner

MEMBERS ABSENT: Patrick Howe, Deputy Fire Chief

ADDITIONAL STAFF PRESENT: Stefanie Casella, Planner II; Kate Homet, Associate Environmental Planner

[3:56] Chairman Stith opened the meeting.

I. APPROVAL OF MINUTES

A. Approval of minutes from the April 2, 2024 Site Plan Review Technical Advisory Committee Meeting.

[4:116] S. Wolph made a motion to approve the minutes as presented. Z. Cronin seconded the motion. The motion passed unanimously.

II. OLD BUSINESS

A. REQUEST TO POSTPONE The request of **635 Sagamore Development LLC (Owner),** For property located at **635 Sagamore Avenue** requesting Site Plan approval for the removal of the existing structures and construction of 4 single-family dwellings on one lot with associated site improvements. Said property is located on Assessor Map 222 Lot 19 and lies within the Single Residence A (SRA) District. (LU-22-209) **REQUEST TO POSTPONE**

[4:26] Chairman Stith noted the applicants had requested to postpone as they are still working on third party reviews.

III. NEW BUISINESS

a. The request of **Friends of Lafayette House (Owner)**, for property located at **413 Lafayette Road** requesting Site Plan Review Approval for a 635 square foot addition with associated site improvements. Said property is located on Assessor Map 230 Lot 23A and lies within the Single Residence B (SRB) District. (LU-24-61)

[4:37] Chairman Stith introduced this application.

SPEAKING TO THE APPLICATION

[4:57] Joe Coronati of Jones & Beach Engineering, came to present this application. He noted that the last time he was before the Committee, it was requested that the utilities be located, which has been done. There will be no utilities in the way of the new addition, it will all be interior. The newest site plan set has been submitted which has their requests for waivers in it. They will provide a green building statement and they will request the two waivers as noted by the staff comments.

[7:30] C. Putney noted that the applicant will have to extend the sprinkler and fire alarm system. Mr. Coronati agreed.

PUBLIC HEARING

[7:38] Chairman Stith opened the public hearing. No one spoke. The hearing was closed.

DISCUSSION AND DECISION OF THE BOARD

[7:59] D. Desfosses made a motion to send this application to the Planning Board. P. Britz seconded the motion. The motion passed unanimously.

b. The request of **Oak Street Real Estate Capital (Owner) 100 Durgin Lane Owner, LLC (Applicant)**, for property located at **100 Durgin Lane** requesting Subdivision approval of a lot line adjustment and Site Plan Review approval for the demolition of the existing buildings and the construction of 360 rental housing units in a mix of 3-story and 4-story buildings with associated site improvements including parking, pedestrian access, community spaces, utilities, stormwater management, lighting, and landscaping. Said property is located on Assessor Map 239 Lot 18 and lies within the Gateway Corridor (G1) District. (LU-24-62)

[9:29] Chairman Stith introduced this application.

SPEAKING TO THE APPLICATION

[10:14] Brett Benson (architect), Patrick Crimmins (engineer), Andrew Hayes (owner representative), and Nick Aceto (landscape architect) came to present this application. Mr. Benson proceeded to explain the proposed development with a slideshow. This highlighted the project objectives and project summary, which detailed the proposed 360 residential apartments, a clubhouse building, 567 parking spaces and three acres of community space. He also reviewed the main points heard at their previous Planning Board, TAC and Conservation Commission work sessions.

[14:05] Mr. Crimmins listed the required permits the project would need to meet, including a lot line revision, a site plan review permit, a conditional use permit for site development standards, a conditional use permit for noise and a wetland conditional use permit. He went into the existing conditions on site and how the lots are proposed to be rearranged with easements relocated. He proceeded to go through different sections of zoning requirements that this project complies with and how the site reduces existing impervious surfaces and attempts to reduce wetland buffer impacts. A fire truck turning plan was shown as well as a grading and drainage plan for the proposed site which describes the stormwater and sewer plans in greater detail. The buildings will be heated with electricity, which should reduce their demand for natural gas.

[24:48] Mr. Aceto went on to describe the community space exhibit, layout and materials, the proposed planting plan, and the photometric plan.

[28:57] Mr. Benson addressed previous wayfinding comments, EV parking, the noise overlay district, potential solar locations, and the proposed floor plans.

[34:54] P. Britz asked if they had considered doing more of a townhouse design for the buildings. Mr. Benson responded that some of the buildings are centered around an entry courtyard but in discussions with the team, they want the sidewalks to feel public and bustling and open to the public to feel like a neighborhood. This pointed them towards feeling as if they needed to create layers of semi-private and semi-public spaces so that it does not feel like a front door is right on top of a busy sidewalk.

[37:45] Chairman Stith asked the six parking spaces that are in the shared community space. The committee will need to look at that more closely to make sure it still meets the definition of a community space. Mr. Hayes responded that their intention with those parking spaces was the ability to program that space for the community at large, for example hosting food trucks. From a traditional parking perspective, they would be open to limiting the use of those spaces there.

[38:50] P. Britz noted that he could not see the full outline of the lot depicted on any plans. Mr. Crimmins responded that it was not depicted in these exhibits, but it would be a part of the lot line revision plan coming up. P. Britz asked if they were counting their frontage off Gosling Road for this project. Mr. Crimmins responded that they were using their Durgin Lane frontage. P. Britz asked if they would build out the proposed circle shown on the plans. Mr. Crimmins noted that it was there due to a staff comment about needing a truck turnaround. They had looked into it but the lot lines constrain it to half a cul de sac, and not a full cul de sac. The implementation of a turnaround there would also mean more impervious surface in the wetland buffer. They would be open to installing it if the staff feels like they will need one. P. Britz asked about trash would be delivered and circulated through the site. Mr. Benson mentioned that they were still working on this but they imagined that a trash truck or the staff will collect trash from each building. Package delivery will be delivered to a central location within the community building and delivery vans will have designated parking nearby. Mr. Hayes mentioned that they are evaluating a potential partnership with a trash valet system which would be localized to each building.

[42:09] P. Britz asked if the intention of the solar canopy was to reduce noise. Mr. Benson responded that they are continuing to study the covered parking (two sided facing the west and south) and how it could help with the acoustics.

[42:59] E. Eby asked bout the parking spaces on the main street, the head-in parking and parallel parking. He wanted to know if they intended to flip those as the current configuration constrains which direction cars need to come from to park. Mr. Aceto noted that they considered this configuration to reduce headlights into the windows on buildings.

[44:33] Chairman Stith noted that the applicants would need a wetland third party review, a traffic third party and stormwater third party analysis.

PUBLIC HEARING

[45:13] Chairman Stith opened the public comment.

[45:35] Liz Bratter of 159 McDonough Street came to speak. Ms. Bratter voiced her concern about the sound barriers, the need for more signs and not circles, the narrow roadway that currently exists on the way to Motel 6, the proximity of the dog park to wetlands and storm drains, the proximity of buildings to the wetlands, and the height of the proposed light poles.

[53:07] Chairman Stith closed the public hearing.

DISCUSSION AND DECISION OF THE BOARD

[53:22] Chairman Stith noted that he would entertain a motion to postpone.

[53:26] D. Desfosses made a motion to postpone. Z. Cronin seconded the motion. The motion passed unanimously.

IV. ADJOURNMENT

[53:45] Z. Cronin made a motion to adjourn. D. Desfosses seconded the motion. The motion passed unanimously.

The meeting adjourned at 2:50 p.m.

Respectfully submitted,

Kate E. Homet
Secretary for the Technical Advisory Committee

Ross Engineering, LLC
Civil / Structural Engineering
909 Islington Street **603-433-7560**
Portsmouth, NH 03801 **alexross@comcast.net**

806 US Route 1 Bypass
Project Description

May 17, 2024

806 US Rte. 1 bypass is the current location for the City Tobacco business. 822 US Rte. 1 bypass is a vacant gas station, and was just approved for the new City Tobacco business last night at the Planning Board meeting. The City Tobacco business will be moved to 822 after a new building is constructed.

We are requesting administration approval for the minor changes to the 806 site plan, which is necessary because of the drainage and site design for 822. 822 Rte. 1 By-Pass was just approved by the planning board last night, and the drainage configuration has been revised on 806 to match. We are also requesting the second extension to the original approval, since that deadline is fast approaching. 822 has existing drainage that needed extensive design to re-configure and this took extra time, which is why we need the extension for 806.

Project History

- The Technical Advisory Committee voted to recommend approval to the Planning Board at their May 3, 2022 meeting.
- The Planning Board granted Site Plan approval at the June 23, 2022 meeting.
- At the June 15, 2023 Planning Board meeting a 1-year extension of the Site Plan Approval granted on June 23, 2022 was approved so that the extension goes to June 23, 2024.

Revisions include:

Drawing 1 – Existing Conditions Plan

- Revised existing catch basin elevations

- Added note 6 outlining PB approval and extension of approval.

Drawing 2 – Site Plan

- Landscaping removed in NHDOT right of way, as per NHDOT request. This is shown on drawings 2-4.

- Drainage has been changed to depict new proposed drainage system. New drainage system is depicted to match proposed drainage on lot 29, which is connected to drainage system on lot 43. This is shown on drawings 2 & 3.

- Revised lighting callouts on the plan.

Ross Engineering, LLC
Civil / Structural Engineering
909 Islington Street **603-433-7560**
Portsmouth, NH 03801 **alexross@comcast.net**

Drawing 3 – Utility Plan

- Landscaping removed in NHDOT right of way, as per NHDOT request. This is shown on drawings 2-4.

- Drainage has been changed to depict new proposed drainage system. New drainage system is depicted to match proposed drainage on lot 29, which is connected to drainage system on lot 43.

- Stormwater notes for drainage system on drawing 3 "Utility Plan".

- Revised existing and proposed drainage structure elevations on drawing 3 "Utility Plan".

- Revised lighting on drawing 3. Note 3 and the Lighting Specification Table have been revised. Lighting notes on the plan have been revised and are shown on drawings 2 & 3.

Drawing 4 – Landscape Plan

- Landscaping removed in NHDOT right of way as per NHDOT request.

- Drawing 4 "Landscape Plan" has been changed to depict new proposed manhole and catch basin locations.

- Planting notes have been changed to reflect landscaping that has been changed to reflect landscaping that has been removed in the NHDOT right of way.

Drawing 5 –Easement Plan

- Easement Plan has been added as drawing 5 showing a drainage easement across Lot 43.

Drawing 6 – Notes & Details

- Revised manhole & catch basin details.

These minor amendments along with the improvements on the abutting property are an improvement from the previous proposed drainage system.

Sincerely,

Alex Ross, P.E.

Site Plan

806 Route 1 Bypass

Portsmouth, New Hampshire

PREPARED FOR:

RIGZ ENTERPRISES LLC

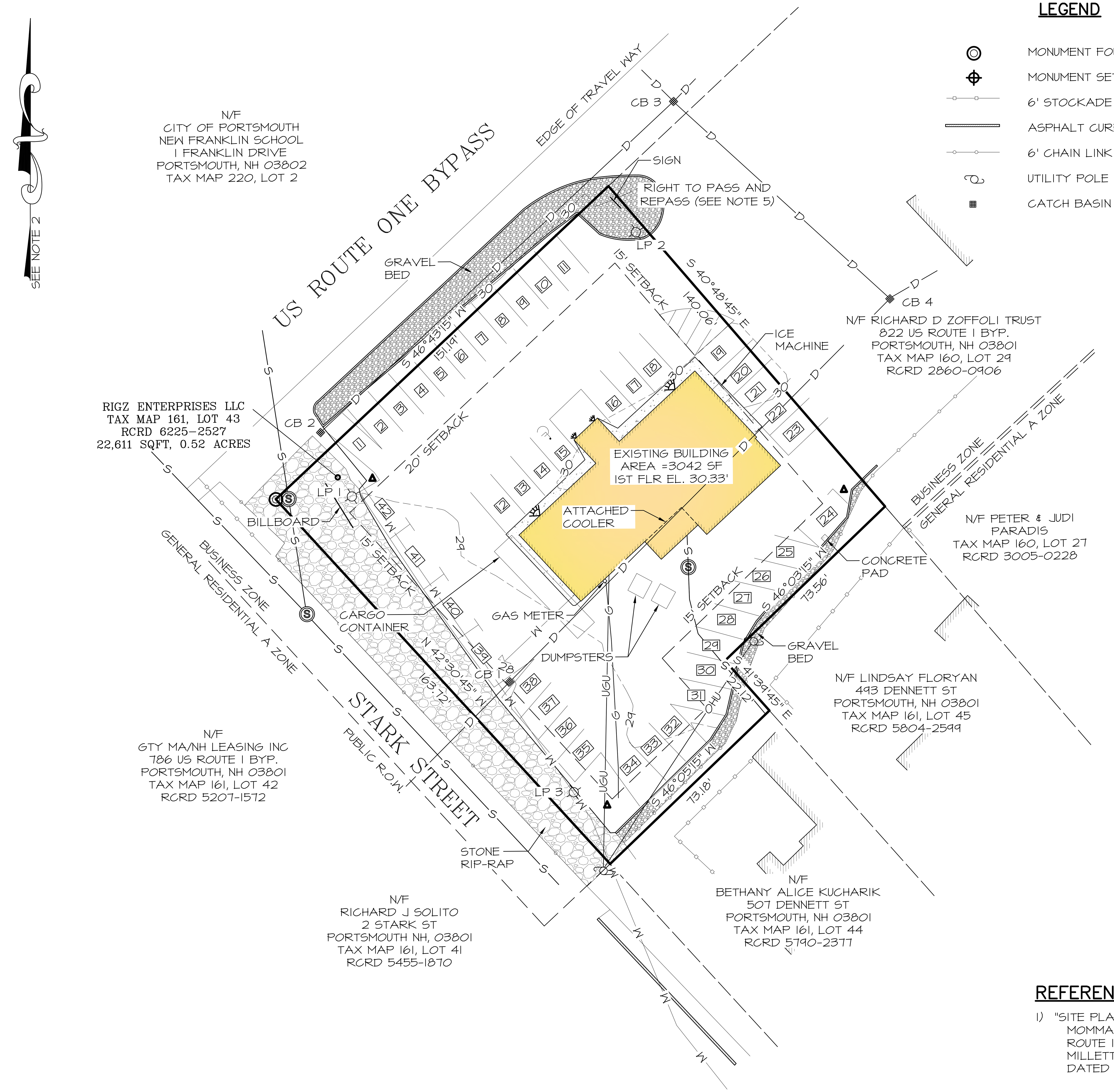
PREPARED BY:

ROSS ENGINEERING, LLC
Civil/Structural Engineering
& Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

LIST OF PROJECT PLANS:

SITE PLAN SET

May 17, 2024



LEGEND

- MONUMENT FOUND
- MONUMENT SET
- 6' STOCKADE FENCE
- ASPHALT CURB
- 6' CHAIN LINK FENCE
- UTILITY POLE
- CATCH BASIN

NOTES

1) OWNER OF RECORD:
RIGZ ENTERPRISES
18 DIXON LANE
DERRY, NH 03038

TAX MAP 161, LOT 43
806 US ROUTE 1 BYPASS
PORTSMOUTH, NH 03801
RCRD: 6225-2527
AREA: 22,611 SF, 0.52 ACRES

2) BASIS OF BEARING HELD FROM PLAN REFERENCE #1.

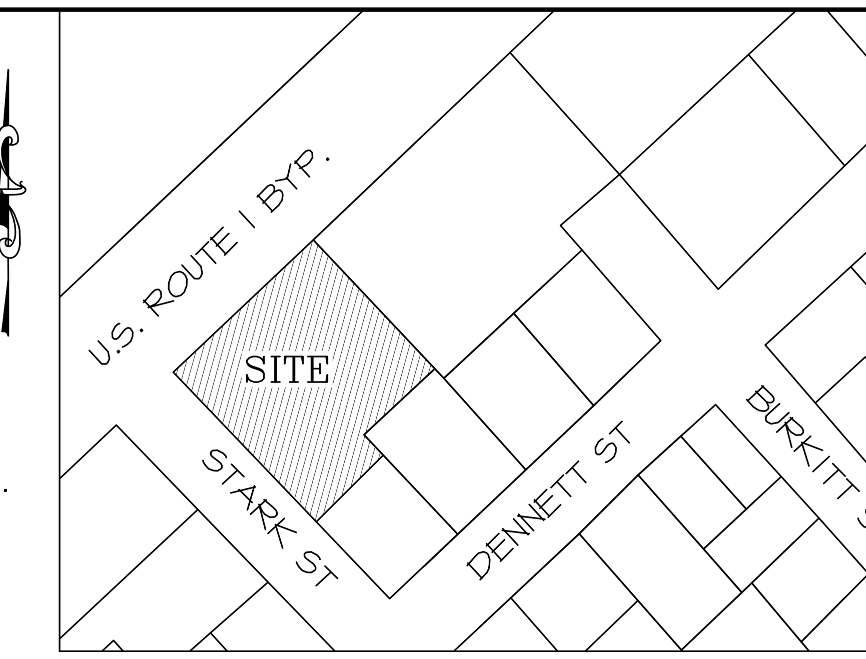
3) PARCEL IS IN BUSINESS ZONE (B):
MINIMUM LOT AREA....20,000 SF
MIN. LOT AREA PER DWELLING UNIT....2,500 SF
MINIMUM FRONTAGE....100 FT
MINIMUM DEPTH....80 FT
SETBACKS:
FRONT....20 FT
SIDE....15 FT
REAR....15 FT
MAXIMUM BUILDING HEIGHT....50 FT
MAXIMUM BUILDING COVERAGE....35%
MINIMUM OPEN SPACE....15%

4) THE PARCEL IS NOT WITHIN A FEMA FLOOD ZONE, AS PER FLOOD INSURANCE RATE MAP #33015C0259F, PANEL 259 OF 681, DATED JANUARY 29, 2021. VERTICAL DATUM IS NAVD 1988.

5) A RIGHT TO PASS AND REPASS FROM THE INTERSTATE HIGHWAY USING THE EXITS IN COMMON WITH OTHERS LOCATED ON LAND FORMERLY OF D. RICHARD ZOFFOLI FOR PURPOSES OF PASSING AND REPASSING TO THE INTERSTATE HIGHWAY EXISTS TO THE BENEFIT OF LOT 43 OVER LAND OF LOT 29. SEE RCRD 2781-1490.

6

6) THE CITY PLANNING BOARD GRANTED SITE PLAN APPROVAL FOR THIS PROPERTY ON JUNE 23, 2022. A ONE YEAR EXTENSION WAS GRANTED AT THE JUNE 15, 2023 PLANNING BOARD MEETING. (LU-22-81)



LOCUS PLAN
N.T.S.

6

EXISTING STRUCTURES
CATCH BASIN

CB 1
RIM EL. 27.93
INV. IN 21.61 (±20" PIPE) SW
INV. OUT 20.58 (±20" PIPE) NE

CB 2
RIM EL. 29.46
INV. OUT 25.81 (12" CMP) SE

CB 3
RIM EL. 29.19
INV. IN 22.84 (12" CMP) SW
INV. IN 22.74 (12" CMP) NE
INV. IN 22.83 (24" RCP) NW
INV. OUT 22.66 (24" RCP) SE

CB 4
RIM EL. 30.48
INV. IN 18.20 (±20") SW
INV. IN 18.20 (24" RCP) NW
INV. OUT 18.15 (24") NE

AMENDMENTS

- **REVISED CATCH BASIN ELEVATIONS**
- **ADDED NOTE 6 TO OUTLINE PB APPROVAL AND EXTENSION OF THIS PROJECT.**

6 - **ISSUE 6 AMENDMENTS**

ISS.	DATE	DESCRIPTION OF ISSUE
6	5/17/2024	REVISIONS
5	5/22/2023	REVISIONS
4	5/25/2022	FOR PB
3	4/26/2022	FOR TAC
2	4/19/2022	FOR TAC

SCALE 1" = 20'
CHECKED A.ROSS
DRAWN I.C.A.
CHECKED

ROSS ENGINEERING, LLC
Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

CLIENT
RIGZ ENTERPRISES LLC
18 DIXON LANE
DERRY, NH 03038

TITLE
EXISTING CONDITIONS PLAN
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

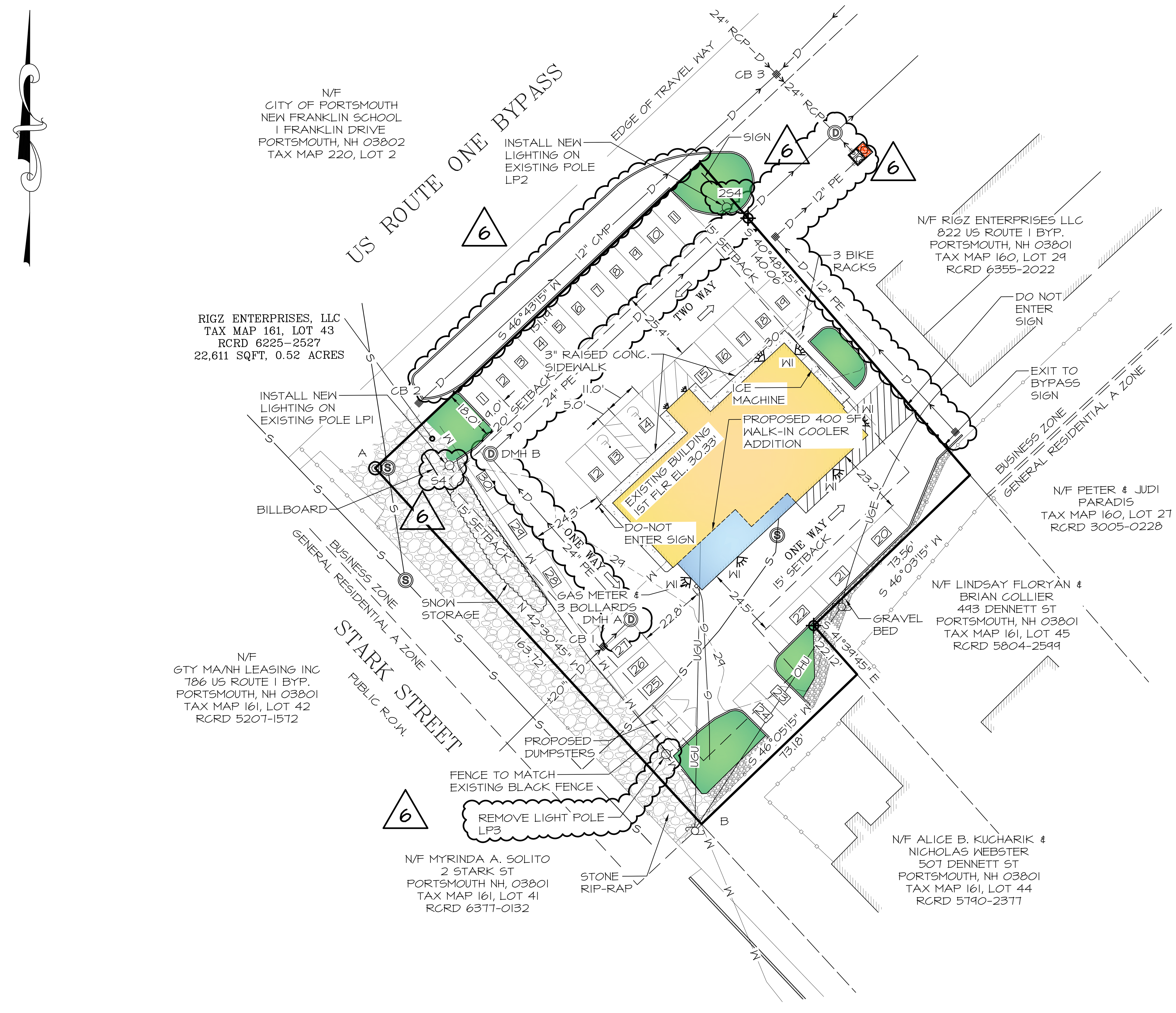
JOB NUMBER	DWG. NO.	ISSUE
21-072	1 OF 7	6

REFERENCE PLANS

1) "SITE PLAN FOR HENRY S. DUTKOWSKI MOMMA D'S CASA DI PASTA, 806 US ROUTE 1 BYPASS & STARK STREET" BY MILLETTE, SPRAGUE & COLWELL, INC. DATED JULY 15, 2004.

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
SCALE: 1" = 20'

STATE OF NEW HAMPSHIRE
R. ALEX ROSS
No. 9409
LICENSED
PROFESSIONAL ENGINEER



ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
SCALE: 1" = 20'

AMENDED SITE PLAN

- **LANDSCAPING REMOVED IN NHDOT RIGHT OF WAY AS PER NHDOT REQUEST.**
- **DRAINAGE HAS BEEN CHANGED TO DEPICT NEW PROPOSED DRAINAGE SYSTEM. NEW DRAINAGE SYSTEM IS DEPICTED TO MATCH PROPOSED DRAINAGE ON LOT 29, WHICH IS CONNECTED TO DRAINAGE SYSTEM ON LOT 43.**
- **REVISED LIGHTING CALLOUTS ON THE PLAN.**

NOTES

1) OWNER OF RECORD:
RIGZ ENTERPRISES
18 DIXON LANE
DERRY, NH 03038

TAX MAP 161, LOT 43
806 US ROUTE 1 BYPASS
PORTSMOUTH, NH 03801
RCRD: 6225-2527
AREA: 22,611 SF, 0.52 ACRES

2) PARCEL IS IN BUSINESS ZONE (B):
MINIMUM LOT AREA........20,000 SF
MIN. LOT AREA PER DWELLING UNIT........2,500 SF
MINIMUM FRONTAGE........100 FT
MINIMUM DEPTH........80 FT
SETBACKS:
FRONT........20 FT
SIDE........15 FT
REAR........15 FT
MAXIMUM BUILDING HEIGHT........50 FT
MAXIMUM BUILDING COVERAGE........35%
MINIMUM OPEN SPACE........15%

3) COVERAGES:
BUILDING COVERAGE
EXISTING BUILDING COVERAGE
BUILDING & COOLER 3,042 SF
EXISTING STRUCTURE 3,042 SF
BUILDING COVERAGE= 3,042 / 22,611 = 13.5%

PROPOSED BUILDING COVERAGE
BUILDING & COOLER 3,442 SF
BUILDING COVERAGE 3,442 / 22,611 = 15.2%

OPEN SPACE
EXISTING OPEN SPACE
BUILDING COVERAGE........3,042 SF
CONCRETE SIDEWALK........455 SF
ASPHALT PARKING........15,958 SF
ASPHALT CURB........83 SF
CONCRETE PAD 3 SF
TOTAL LOT COVERAGE 19,541 SF
EXISTING OPEN SPACE= 22,611-19,541 = 3,070 SF
EXISTING OPEN SPACE= 3,070 / 22,611 = 13.6%

PROPOSED OPEN SPACE
BUILDING COVERAGE........3,442 SF
CONCRETE SIDEWALK........457 SF
ASPHALT PARKING........14,500 SF
ASPHALT CURB 171 SF
TOTAL LOT COVERAGE 18,570 SF
PROPOSED OPEN SPACE=22,611-18,570= 4,041 SF
PROPOSED OPEN SPACE = 4,041 / 22,611 = 17.9%

4) PARKING SPACES:
AS PER PORTSMOUTH ZONING ORDINANCE 10.1112.321, PARKING SPACES FOR RETAIL USE SHALL BE 1 SPACE PER 300 SF GROSS FLOOR AREA.

3,442 SF / 300 SF/SPACE = 11.47 = 12 SPACES
12 SPACES REQUIRED
30 SPACES PROVIDED

5) THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.

6) 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.

7) ALL PROPOSED CURBING TO BE ASPHALT AND MATCH EXISTING. MINIMUM 5" REVEAL.

8) GIS COORDINATES OF TWO LOT CORNERS

	NORTHING	EASTING
A - NW CORNER	211322.113	1222327.652
B - SW CORNER	211202.419	1222439.356

LEGEND

- MONUMENT FOUND
- MONUMENT SET
- 6' STOCKADE FENCE
- ASPHALT CURB
- 6' CHAIN LINK FENCE
- UTILITY POLE
- CATCH BASIN
- WATER VALVE
- SEWER MANHOLE
- LAMP POST
- —UGU— UNDERGROUND UTILITIES
- —G— GAS LINE
- —D— DRAIN LINE
- —W— WATER LINE
- —S— SEWER LINE
- LIGHT
- CLEANOUT

WAIVERS

1) A WAIVER WAS GRANTED BY THE PORTSMOUTH PLANNING BOARD ON JUNE 23, 2022 FROM THE CITY OF PORTSMOUTH SITE PLAN REVIEW REGULATIONS SECTION 9.3.5, TO LOCATE A DUMPSTER 12.2' FROM THE WESTERN PROPERTY LINE WHERE 20' IS REQUIRED.

ISS.	DATE	DESCRIPTION OF ISSUE
6	5/17/2024	REVISIONS
5	5/22/2023	REVISIONS
4	5/25/2022	FOR PB
3	4/26/2022	FOR TAC
2	4/19/2022	FOR TAC

SCALE 1" = 20'
CHECKED A.ROSS
DRAWN D.D.D.
CHECKED

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON DATE

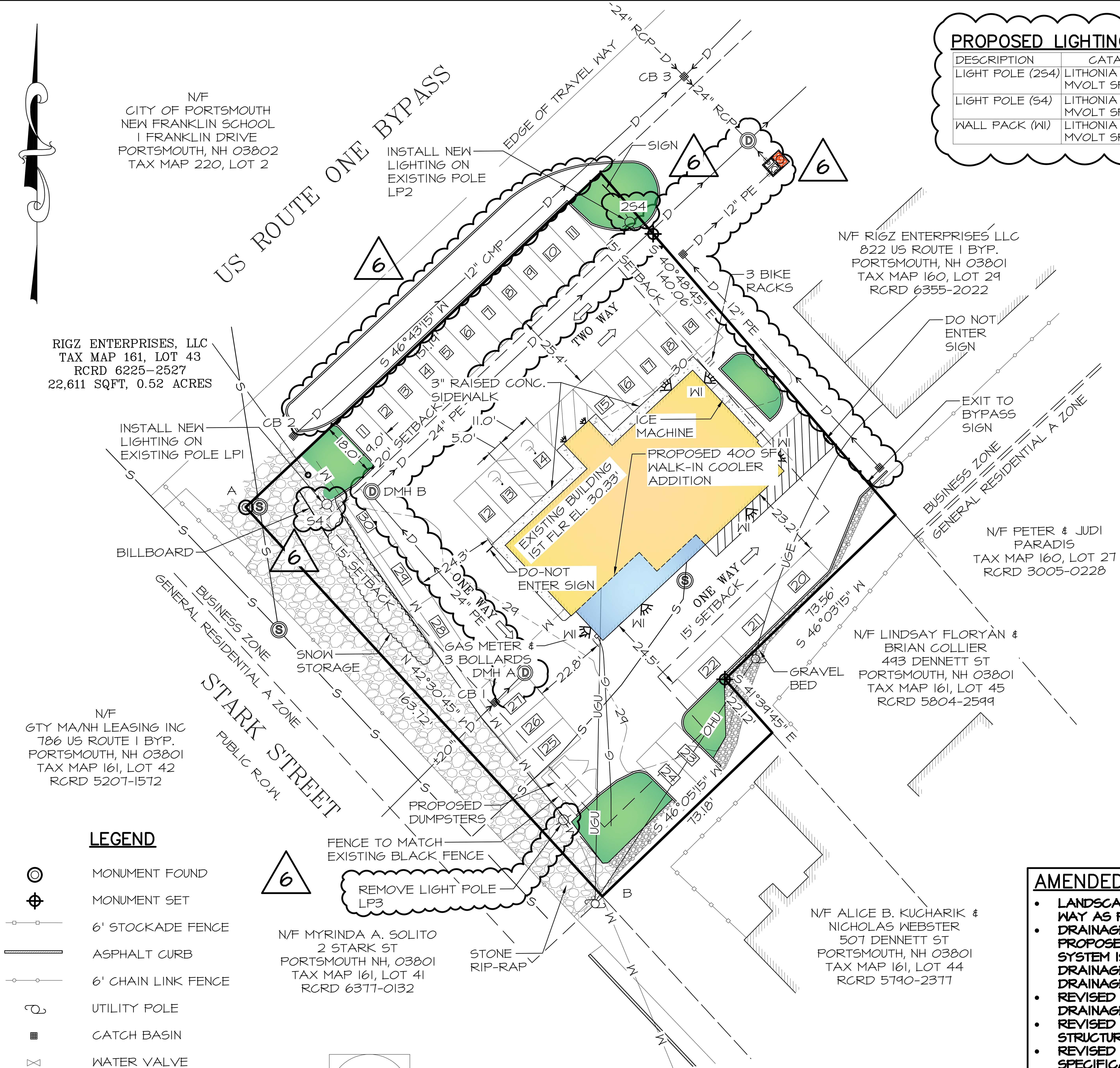
STATE OF NEW HAMPSHIRE R. ALEX ROSS No. 9409 LICENSED PROFESSIONAL ENGINEER

ROSS ENGINEERING, LLC
Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

CLIENT
RIGZ ENTERPRISES LLC
18 DIXON LANE
DERRY, NH 03038

TITLE
SITE PLAN
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

JOB NUMBER 21-072 | DWG. NO. 2 OF 7 | ISSUE 6



PROPOSED LIGHTING

DESCRIPTION	CATALOG NUMBER	QTY
LIGHT POLE (2S4)	LITHONIA LIGHTING - DSXO LED P4 30K 80CRI TFTM MVOLT SPA DDBXC WITH SSS 18 4C DM29AS DDBXD	1
LIGHT POLE (S4)	LITHONIA LIGHTING - DSXO LED P4 30K 80CRI TFTM MVOLT SPA DDBXD WITH SSS 18 4C DM19AS DDBXD	1
WALL PACK (W1)	LITHONIA LIGHTING - WDGE1 LED P1 30K 80CRI VM MVOLT SRM DDBXD	6

6

UTILITIES:

CONTACT LIST:

GAS: UNITIL: SUSAN L. DUPLISEA....................603-294-5147
WATER: PORTSMOUTH DPW: 603-427-1530
SEWER: PORTSMOUTH DPW: 603-427-1530
STORMWATER: PORTSMOUTH DPW: 603-427-1530
ELECTRIC: EVERSOURCE: CASEY MCDONALD....................603-436-7708 EXT 5641

PROPOSED UTILITIES:

1. STORMWATER:
   EXISTING DRAINAGE LINE UNDER THE BUILDING TO BE TAKEN OUT OF SERVICE AND FILLED WITH FLOWABLE FILL CONCRETE.

   INSTALL DMH A & DMH B WITH 24" PE PIPING CONNECTING CB 1 TO THE DRAINAGE IMPROVEMENTS ON LOT 29.

   SILTSACKS TO BE INSTALLED ON CATCH BASINS 1 & 4 PRIOR TO CONSTRUCTION. SILTSACKS TO REMAIN IN PLACE UNTIL DRAINAGE SYSTEM IS FULLY OPERATIONAL.

   3 NEW CATCH BASINS TO BE INSTALLED ON 822 US ROUTE 1 BYPASS AS PART OF DRAINAGE IMPROVEMENTS. SILTSACKS TO BE INSTALLED ON THESE CATCH BASINS DURRING CONTRUCTION UNTILL DRAINAGE SYSTEM IS FULLY OPERATIONAL..
2. GAS:
   A NEW METER WILL BE INSTALLED ON THE SIDE OF THE WALK-IN COOLER. THE EXISTING GAS LINE WILL BE RE-ROUTED TO THE NEW METER.
3. LIGHTING:
   INSTALL THE LIGHTS SHOWN ON THE PROPOSED LIGHTING TABLE ONTO EXISTING POLES LP1 AND LP2.
   REMOVE EXISTING LIGHT POLE LP3.
4. SEWER:
   ACCORDING TO DPW, THE EXISTING SEWER LINE TRAVELS TOWARDS DENNETT STREET. A NEW SEWER LINE SHALL BE INSTALLED TO THE LATERAL BY PARKING SPACE 25. PROPER SIZE, TYPE, AND CONNECTION AS PER CITY DPW.

6

6

EXISTING STRUCTURES

CATCH BASIN

CB 1
RIM EL. 27.93
INV. IN 21.61 (±20" PIPE) SW
INV. OUT 20.58 (±20" PIPE) NE

CB 2
RIM EL. 29.46
INV. OUT 25.81 (12" CMP) SE

CB 3
RIM EL. 29.19
INV. IN 23.84 (12" CMP) SW
INV. IN 22.74 (12" CMP) NE
INV. IN 22.83 (24" RCP) NW
INV. OUT 22.66 (24" RCP) SE

CB 4
RIM EL. 30.48
INV. IN 18.20 (±20") SW
INV. IN 18.20 (24" RCP) NW
INV. OUT 18.15 (24") NE

6

PROPOSED STRUCTURES

CATCH BASIN

CB 1
RIM EL. 27.93
INV. IN 21.61 (±20" PIPE) SW
INV. OUT 21.50 (24" PE) NE - PROPOSED LINE

DRAIN MANHOLE

DMH A
RIM EL. 28.50
INV. IN 21.44 (24" PE) SW
INV. OUT 21.40 (24" PE) NW
STRUCTURE: 5' Ø CONCRETE BASIN

DMH B
RIM EL. 29.17
INV. IN 21.00 (24" PE) SE
INV. OUT 20.96 (24" PE) NE
STRUCTURE: 5' Ø CONCRETE BASIN

LEGEND

◎	MONUMENT FOUND
⊕	MONUMENT SET
	6' STOCKADE FENCE
	ASPHALT CURB
	6' CHAIN LINK FENCE
	UTILITY POLE
■	CATCH BASIN
⋈	WATER VALVE
Ⓢ	SEWER MANHOLE
	LAMP POST
—UGU—	UNDERGROUND UTILITIES
—G—	GAS LINE
—D—	DRAIN LINE
—W—	WATER LINE
—S—	SEWER LINE
	LIGHT

6

DO NOT ENTER — R5-1 30"x30" RED & WHITE

EXIT TO BYPASS — CUSTOM 20"x20" BLACK & WHITE

SIGN DETAILS

SCALE: NTS

GENERAL NOTES

1) CONTRACTOR TO REVIEW ALL SURFACING TYPES, AND MATERIAL SPECIFICATIONS WITH COMMISSIONER OF PUBLIC WORKS.
2) ALL NECESSARY NHDOT, NHDES & TOWN PERMITS MUST BE OBTAINED.
3) ALL CONSTRUCTION SHALL BE PER NH-DOT, STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION. LATEST REVISION.
4) CONTRACTOR SHALL MEET STATE AND TOWN REQUIREMENTS. TO ASSURE TYPE, SEPARATION, COVER, ETC. ALWAYS CALL DIGSAFE PRIOR TO DIGGING. UTILITIES SHOWN ARE APPROXIMATE AND MUST BE VERIFIED.
5) SIZE ALL LINES AS PER REQUIREMENTS AND ASSURE THAT PROPOSED LOADING AND PRESSURE DEMANDS WILL BE MET.

AMENDED UTILITY PLAN

- **LANDSCAPING REMOVED IN NHDOT RIGHT OF WAY AS PER NHDOT REQUEST**
- **DRAINAGE HAS BEEN CHANGED TO DEPICT NEW PROPOSED DRAINAGE SYSTEM. NEW DRAINAGE SYSTEM IS DEPICTED TO MATCH PROPOSED DRAINAGE ON LOT 29. WHICH IS CONNECTED TO DRAINAGE SYSTEM ON LOT 43.**
- **REVISED STORMWATER NOTES & FOR DRAINAGE SYSTEM.**
- **REVISED EXISTING AND PROPOSED DRAINAGE STRUCTURE ELEVATIONS.**
- **REVISED LIGHTING NOTE 3, LIGHTING SPECIFICATION TABLE AND LIGHTING CALL OUTS ON THE PLAN.**

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
SCALE: 1" = 20'

EXISTING LIGHT POLE HEIGHTS

LP 1 - 19.6'
LP 2 - 28.41'
LP 3 - 27.9'

PROPOSED LIGHTING

DESCRIPTION	CATALOG NUMBER	QUANTITY
WALL LIGHT (LP4)	KT-WPLED60-M2-8XX-VDIM	3
LIGHT POLE (LP1-LP3)	KT-ALED140-M1-X-NM-8XX-VDIM	3

STATE OF NEW HAMPSHIRE · R. ALEX ROSS No. 9409 · LICENSED · PROFESSIONAL ENGINEER

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SCALE 1" = 20'
CHECKED A.ROSS
DRAWN D.D.D.
CHECKED

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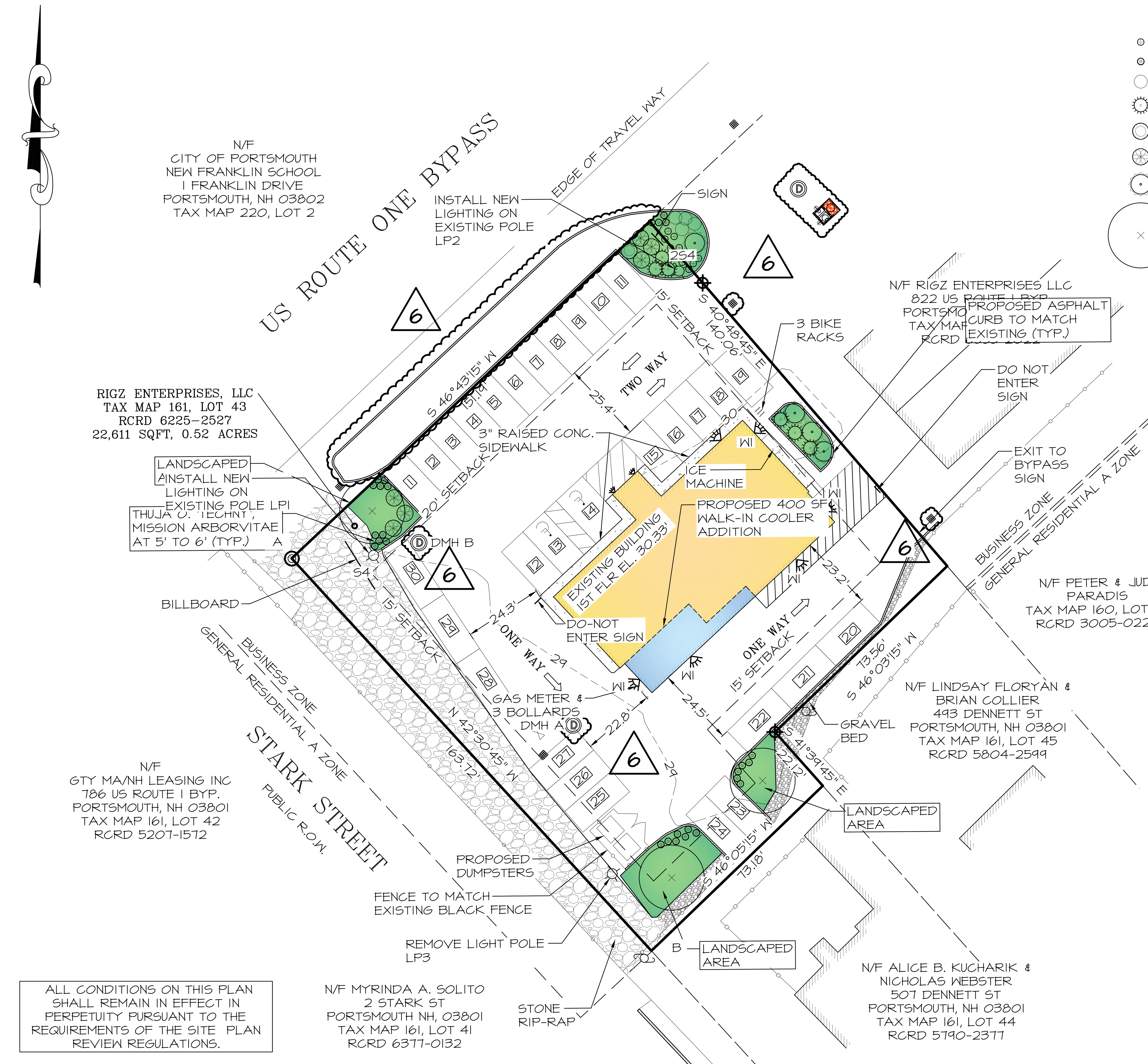
Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

CLIENT
RIGZ ENTERPRISES LLC
18 DIXON LANE
DERRY, NH 03038

TITLE
UTILITY PLAN
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

JOB NUMBER	DWG. NO.	ISSUE
21-072	3 OF 7	6



ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.

BOTANICAL NAME	COMMON NAME	SIZE	QTY:
SEDUM 'AUTUMN JOY'	STONECROP	1 QT	11
HEMEROCALLIS 'ROSY RETURNS'	REBLOOMING DAYLILY	1 QT	27
ARCTOSTAPHYLOS UVA-URSI 'BEARBERRY'	BEAR BERRY	1 GAL	4
CALAMAGROSTIS ACUTIFLORA 'KARL FOERSTER'	FEATHER REED GRASS	1 GAL	6
ROSA RUGOSA	SALT SPRAY ROSE	1 GAL	1
SYRINGA MEYERI 'PALIBIN'	DWARF KOREAN LILAC	2 GAL	6
JUNIPERUS HORIZONTALIS 'BAR HARBOR'	'BAR HARBOR' GROUND-COVER JUNIPER	1 GAL	4
GLEDITSIA T.I. 'STREET KEEPER'	'STREET KEEPER' HONEY LOCUST TREE	2-3" C	3

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
SCALE: 1" = 20'

LEGEND

- SEDUM 'AUTUMN JOY'
- HEMEROCALLIS
- ARCTOSTAPHYLOS UVA-URSI
- CALAMAGROSTIS
- ROSA RUGOSA
- SYRINGA MEYERI 'PALIBIN'
- JUNIPERUS HORIZONTALIS
- GLEDITSIA

AMENDED LANDSCAPE PLAN

- **LANDSCAPING REMOVED IN NHDOT RIGHT OF WAY AS PER NHDOT REQUEST.**
- **LANDSCAPE PLAN HAS HAS BEEN CHANGED TO DEPICT NEW PROPOSED MANHOLE AND CATCH BASINS LOCATIONS.**
- **PLANTING NOTES HAVE BEEN CHANGED TO REFLECT LANDSCAPING THAT HAS BEEN REMOVED IN THE NHDOT RIGHT OF WAY.**

NOTES

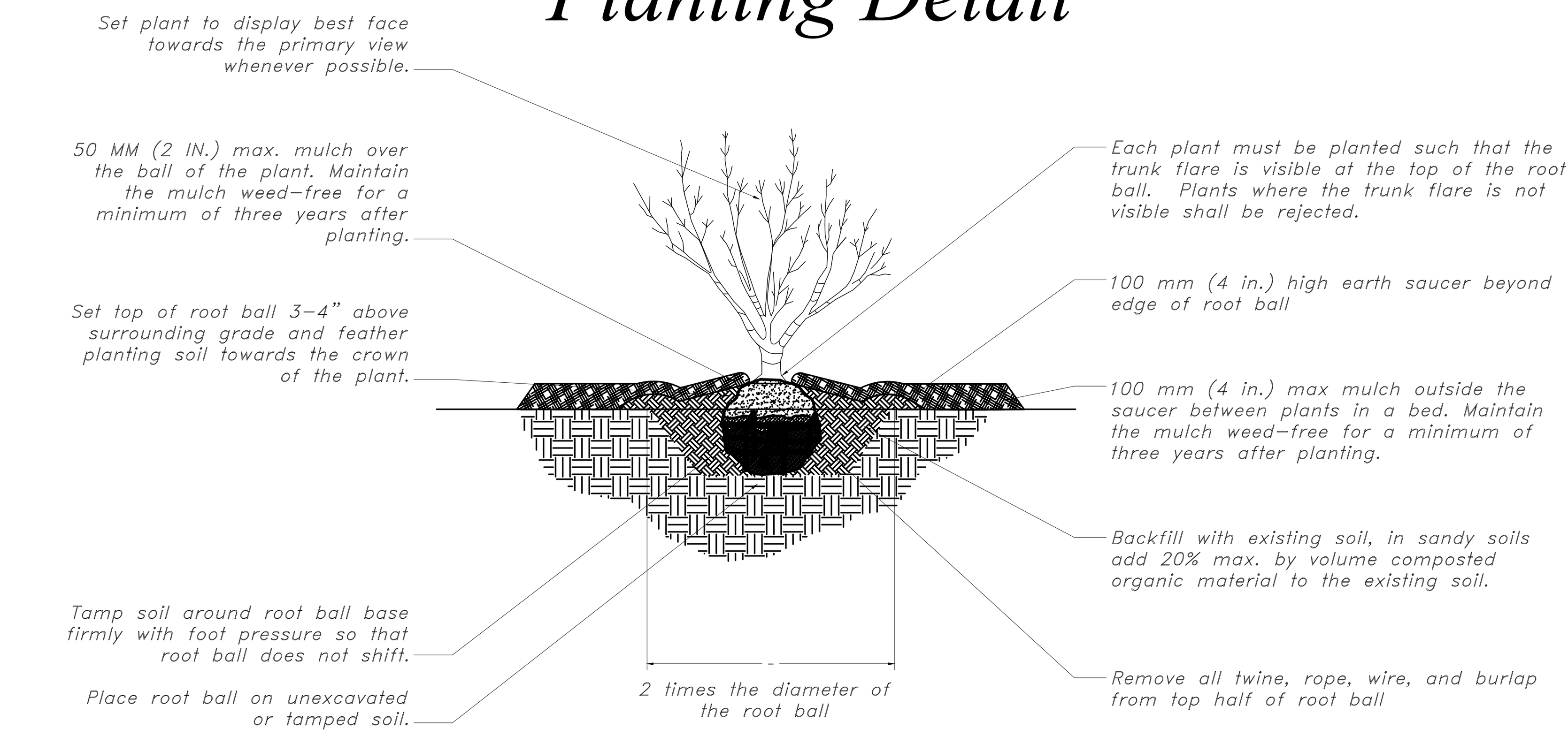
1) THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.

2) 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.

INSTALLATION REQUIREMENTS:

1. THE INSTALLATION OF A DRIP IRRIGATION SYSTEM IS RECOMMENDED TO ASSURE WELL GROWN PLANTS.
2. IN CASE OF DROUGHT (DEFINED AS TWO WEEK PERIOD WITHOUT RAIN) ALL NEW PLANTS SHALL BE WATERED THROUGH NOVEMBER 1ST DURING THE FIRST SEASON IN WHICH THE ARE INSTALLED. THEY SHALL BE WATERED ONE TIME PER DAY FOR THE FIRST WEEK AFTER INSTALLATION AND THREE TIMES PER WEEK FOR THE REMAINDER OF THE SEASON. AFTER THE FIRST SEASON WHEN THE ROOTS OF THE PLANTS ARE ESTABLISHED THEY WILL NOT REQUIRE WATERING.
3. SOAKER HOSES WOUND THROUGH THE BED NEAR THE BASE OF EACH PLANT ARE THE RECOMMENDED METHOD OF WATERING DURING THE FIRST SEASON. THESE CA BE REMOVED AFTER NOVEMBER 30TH WHEN THE PLANTS ARE ESTABLISHED.

Planting Detail



PLANTING NOTES

1. ALL PLANT MATERIALS SHALL BE FIRST QUALITY NURSERY GROWN STOCK.
2. ALL PLANTS SHALL BE PLANTED IN ACCORDANCE WITH NEW HAMPSHIRE LANDSCAPE ASSOCIATION STANDARDS AND GUARANTEED FOR ONE YEAR BY THE LANDSCAPE CONTRACTOR.
3. AFTER PLANTING, ALL PLANTS SHALL BE FLOODED AT THE BASE WITH WATER FROM A SLOW-RUNNING HOSE FOR 5 MINUTES EACH.
4. ALL PLANTS SHALL BE INSTALLED BEFORE ANY GRASS IS SEEDED.
5. ALL SHRUBS AND PLANTING BEDS SHALL BE MULCHED WITH 3" OF DARK BROWN AGED BARK MULCH AS A FINAL STEP. MULCH MUST BE KEPT 2" AWAY FROM BASE OF EACH PLANT.
6. THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND REPLACEMENT OF ALL REQUIRED SCREENING AND LANDSCAPE MATERIALS.
7. 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.
8. 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.
9. MULCH USED WILL BE NON-COMBUSTIBLE OR APPROVED BY THE PORTSMOUTH FIRE DEPARTMENT.

LEGEND

- MONUMENT FOUND
- MONUMENT SET
- 6' STOCKADE FENCE
- ASPHALT CURB
- 6' CHAIN LINK FENCE
- UTILITY POLE
- CATCH BASIN
- WATER VALVE

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON DATE

STATE OF NEW HAMPSHIRE R. ALEX ROSS No. 9409 LICENSED PROFESSIONAL ENGINEER

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SCALE 1" = 20'
CHECKED A.ROSS
DRAWN D.D.D.
CHECKED

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Civil/Structural Engineering & Surveying
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Portsmouth, NH 03801
(603) 433-7560

CLIENT
RIGZ ENTERPRISES LLC
18 DIXON LANE
DERRY, NH 03038

TITLE
LANDSCAPE PLAN
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

JOB NUMBER	DWG. NO.	ISSUE
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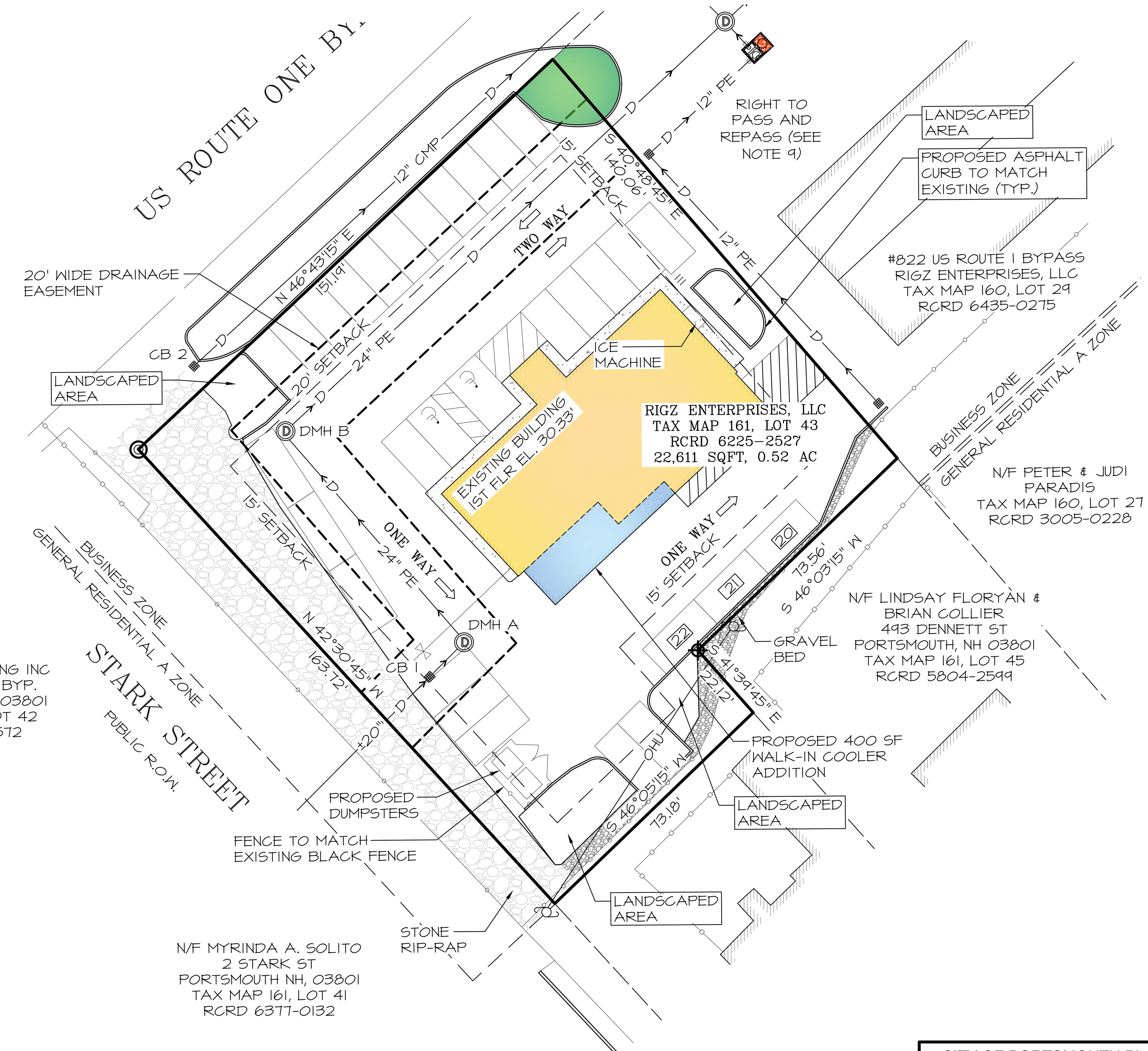
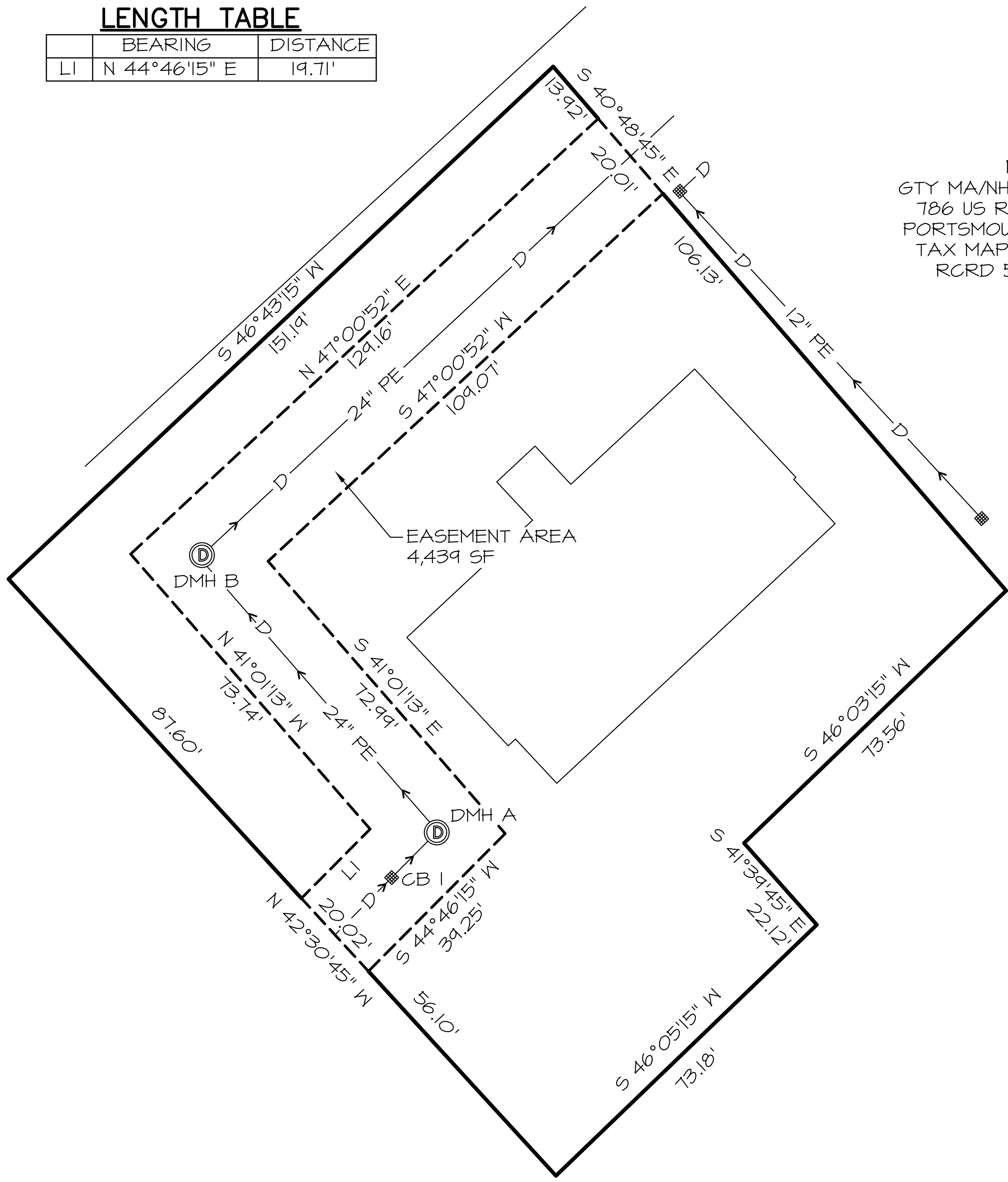
AMENDED EASEMENT PLAN

- EASEMENT PLAN ADDED SHOWING DRAINAGE EASEMENT ACROSS LOT 43.



LENGTH TABLE

	BEARING	DISTANCE
L1	N 44°46'15" E	19.71'



EASEMENT PLAN

LEGEND

- MONUMENT FOUND
- MONUMENT SET
- 6' STOCKADE FENCE
- VERTICAL GRANITE CURB
- 6' CHAIN LINK FENCE
- UTILITY POLE
- CATCH BASIN
- DRAIN MANHOLE
- DRAIN LINE

NOTES

1) OWNER OF RECORD:
RIGZ ENTERPRISES, LLC
18 DIXON LANE
DERRY, NH 03038

SITE INFORMATION:
TAX MAP 161, LOT 43
806 US ROUTE 1 BYPASS
PORTSMOUTH, NH 03801
RCRD: 6225-2527
AREA: 22,611 SF, 0.52 ACRES

2) THE PURPOSE OF THIS PLAN IS TO DEPICT A 4,439 SF DRAINAGE EASEMENT ACROSS LOT 43 TO THE BENEFIT OF THE CITY OF PORTSMOUTH FOR PURPOSES OF INSTALLING, MAINTAINING, INSPECTING, REMOVING, REPAIRING THE DRAINAGE PIPE & DRAINAGE STRUCTURES THAT DRAIN FROM OFF-SITE THROUGH LOT 43 TO LOT 29 TO BURKITT ST. EASEMENT TO BE 20' WIDE, CENTERED ON THE CENTERLINE OF THE PROPOSED DRAINAGE PIPE.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
SCALE: 1" = 20'

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON DATE

I ALEX ROSS, HEREBY CERTIFY:

A) THAT THIS SURVEY PLAT WAS PREPARED BY ME OR THOSE UNDER MY DIRECT SUPERVISION.

B) THIS PLAN IS A RESULT OF FIELD SURVEY PERFORMED BY DDD, & ICA DURING JULY OF 2022. THE ERROR OF CLOSURE IS BETTER THAN 1/15,000. SURVEY PER NHLSA STANDARDS; CATEGORY 1, CONDITION 1.

R. ALEX ROSS DATE

STATE OF NEW HAMPSHIRE · R. ALEX ROSS No. 9409 · LICENSED · PROFESSIONAL ENGINEER

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SCALE 1" = 20'
CHECKED A.ROSS
DRAWN D.D.D.
CHECKED

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EASEMENT PLAN
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

JOB NUMBER	DWG. NO.	ISSUE
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TRENCH NOTES - STORM DRAIN:

1) BEDDING: BEDDING FOR PIPES SHALL CONSIST OF PREPARING THE BOTTOM OF THE TRENCH TO SUPPORT THE ENTIRE LENGTH OF THE PIPE AT A UNIFORM SLOPE AND ALIGNMENT. CRUSHED STONE SHALL BE USED TO BED THE PIPE TO THE ELEVATION SHOWN ON THE DRAWINGS. NORMAL PIPE BEDDING IS CRUSHED STONE TO THE HAUNCH OF THE PIPE AND SAND BEDDING 6" ABOVE THE CROWN. IF THE TOP OF THE PIPE IS LESS THAN 30" FROM FINISH GRADE, BED PIPE COMPLETELY IN STONE UP TO 6" ABOVE PIPE CROWN. UNDERDRAIN TO HAVE 4" MIN' OF STONE OVER PIPE OR AS NECESSARY TO BE IN CONTACT WITH GRAVEL LAYER OF SELECTS ABOVE. FILTER FABRIC TO BE PLACED IN BETWEEN ALL STONE BEDDING MATERIAL AND SUBSEQUENT LAYERS OF FILL MATERIAL.

2) COMPACTION: ALL BACKFILL SHALL BE COMPACTED AT OR NEAR OPTIMUM MOISTURE CONTENT BY PNEUMATIC TAMPERS, VIBRATORY COMPACTORS OR OTHER APPROVED MEANS. BACKFILL BENEATH PAVED SURFACES SHALL BE COZMPACTED TO NOT LESS THAN 95 PERCENT OF AASHTO T99, METHOD C.

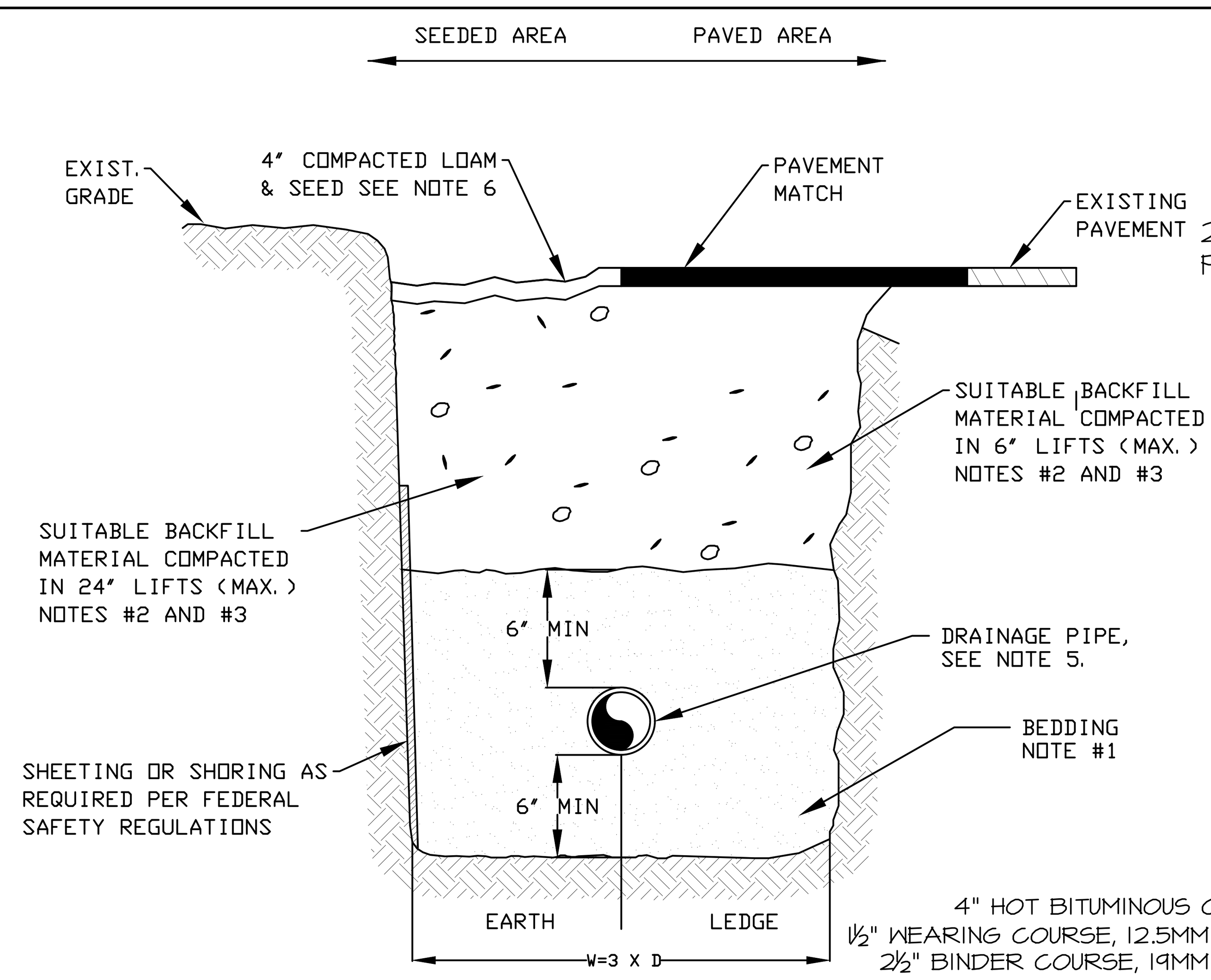
3) SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS; PIECES OF PAVEMENT; ORGANIC MATTER; TOP SOIL; ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ROCKS OVER 6 INCHES IN LARGEST DIMENSION; FROZEN EARTH AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION.

   IN SEEDED AREAS, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAD, ROCKS UNDER 12", FROZEN EARTH OR CLAY, IF HE/SHE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EAST ACCESS TO THE PIPE WILL BE PRESERVED.

4) BASE COURSE AND PAVEMENT: SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES - DIVISIONS 300 AND 400 RESPECTIVELY.

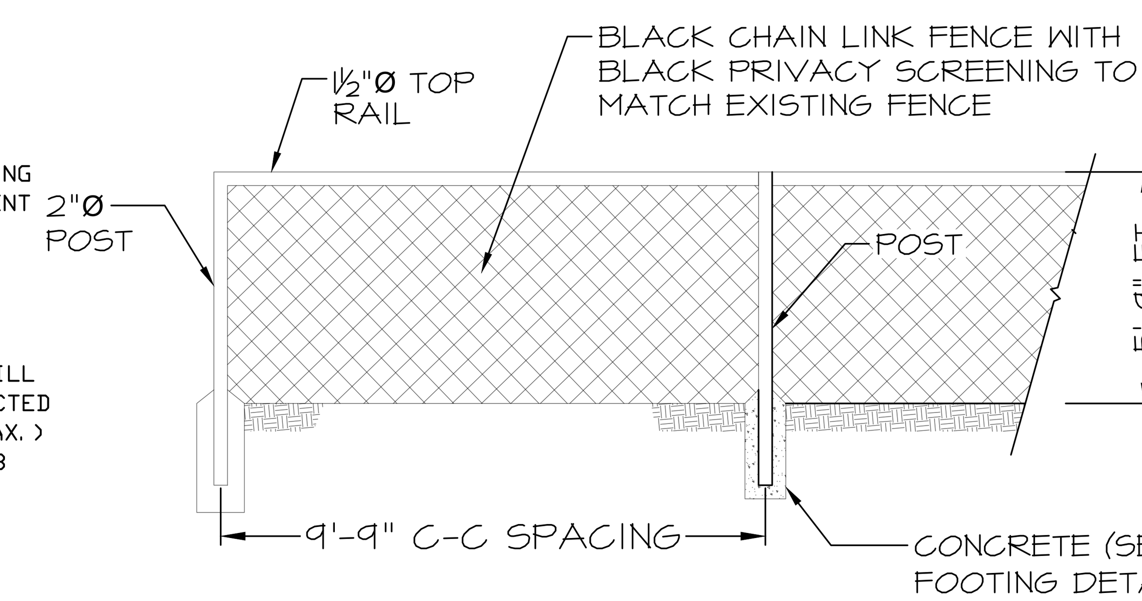
5) DRAINAGE PIPE: PIPE MATERIALS SHALL BE POLYETHYLENE (SEE SPECIFICATIONS).

6) W=MAXIMUM ALLOWABLE TRENCH WIDTH: W SHALL BE THE MAXIMUM PAYMENT WIDTH FOR ROCK EXCAVATION (TRENCH) AND FOR ORDERED EXCAVATION BELOW GRADE.



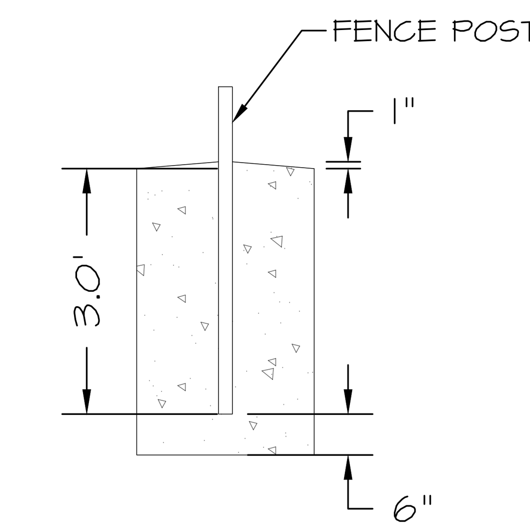
TRENCH DETAIL-STORM DRAIN

Scale : N.T.S.



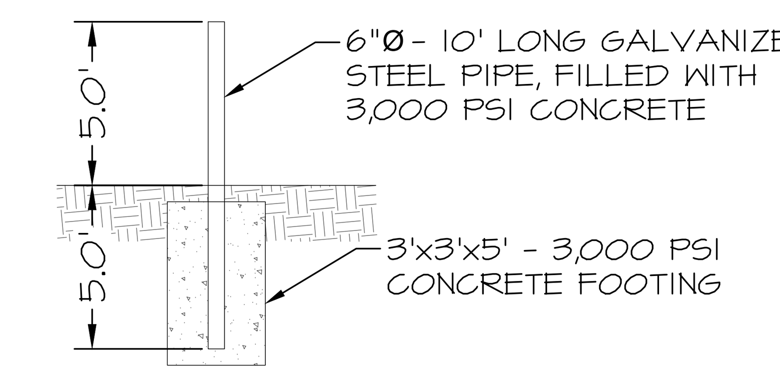
CHAIN LINK FENCE DETAIL

SCALE: NTS



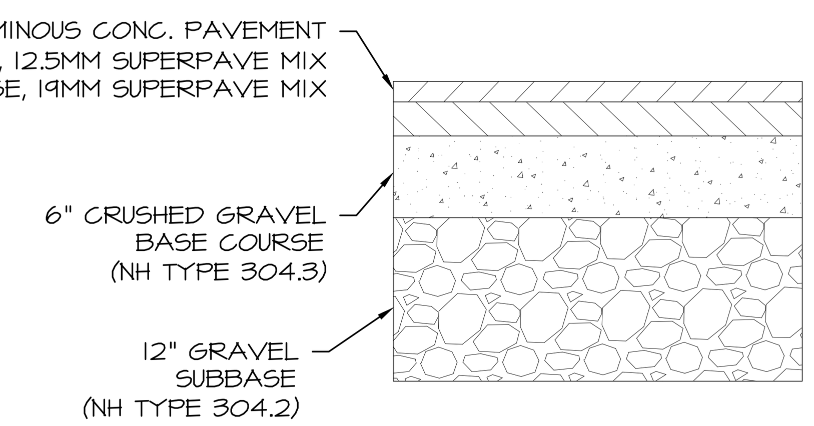
FENCE FOOTING DETAIL

SCALE: NTS



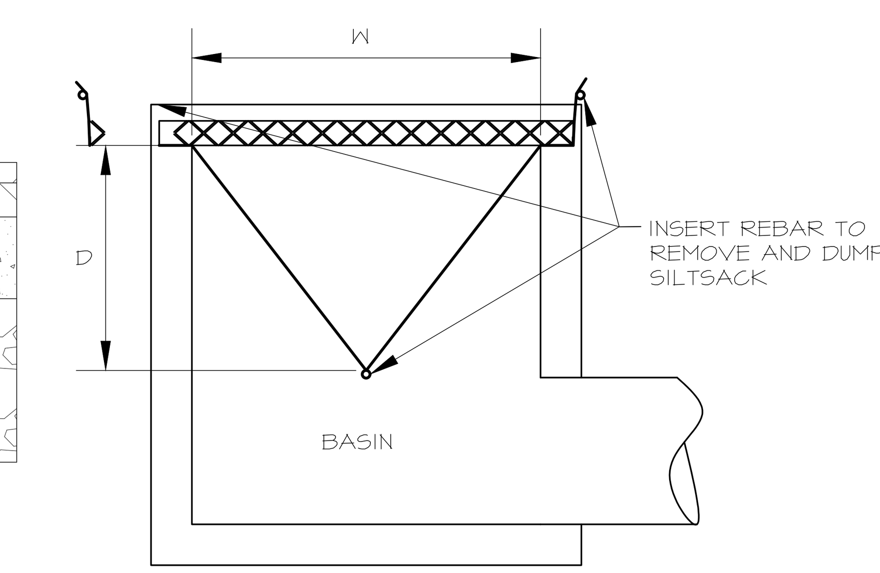
BOLLARD DETAIL

SCALE: NTS



ASPHALT PAVEMENT DETAIL

Scale : N.T.S.



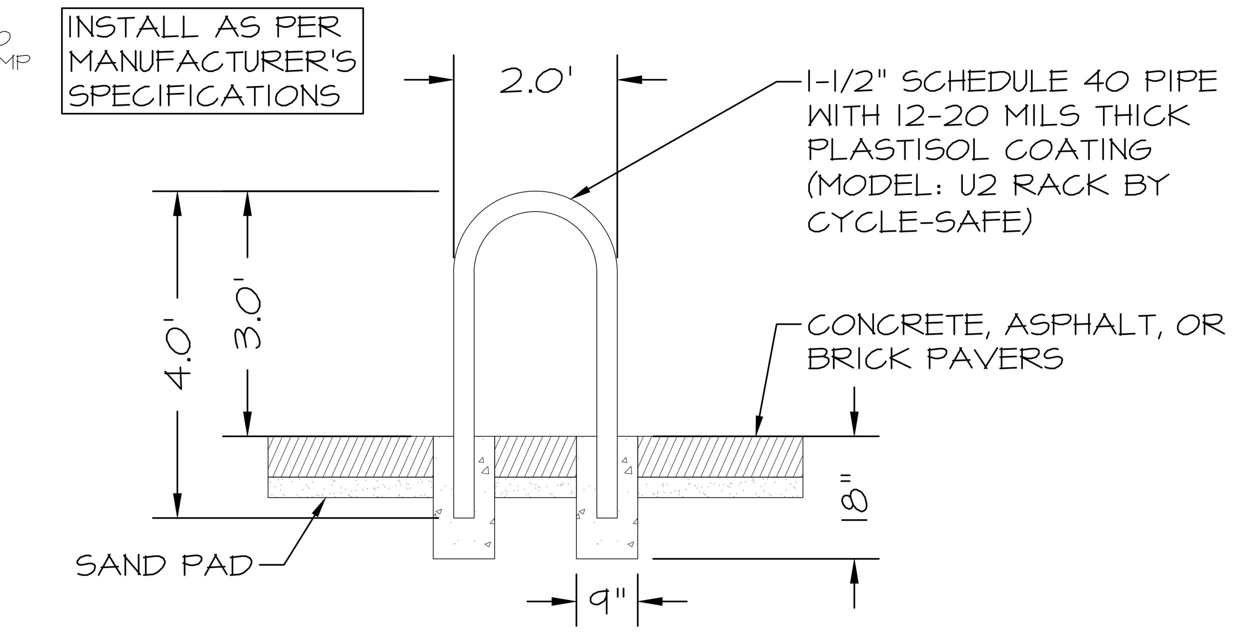
SILTSACK IS TO BE SECURED BY WEIGHT OF BASIN GRATE TO PREVENT SEDIMENT FROM ENTERING THE DRAIN LINE

INSTALL SILTSACK TO CATCH BASINS 1 & 4 PRIOR TO CONSTRUCTION & TO CATCH BASINS A, B, & C DURING CONSTRUCTION. DO NOT REMOVE SILTSACK UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE LINE IS FULLY OPERATIONAL (SEE SHEET 3)

Siltsack

N.T.S.

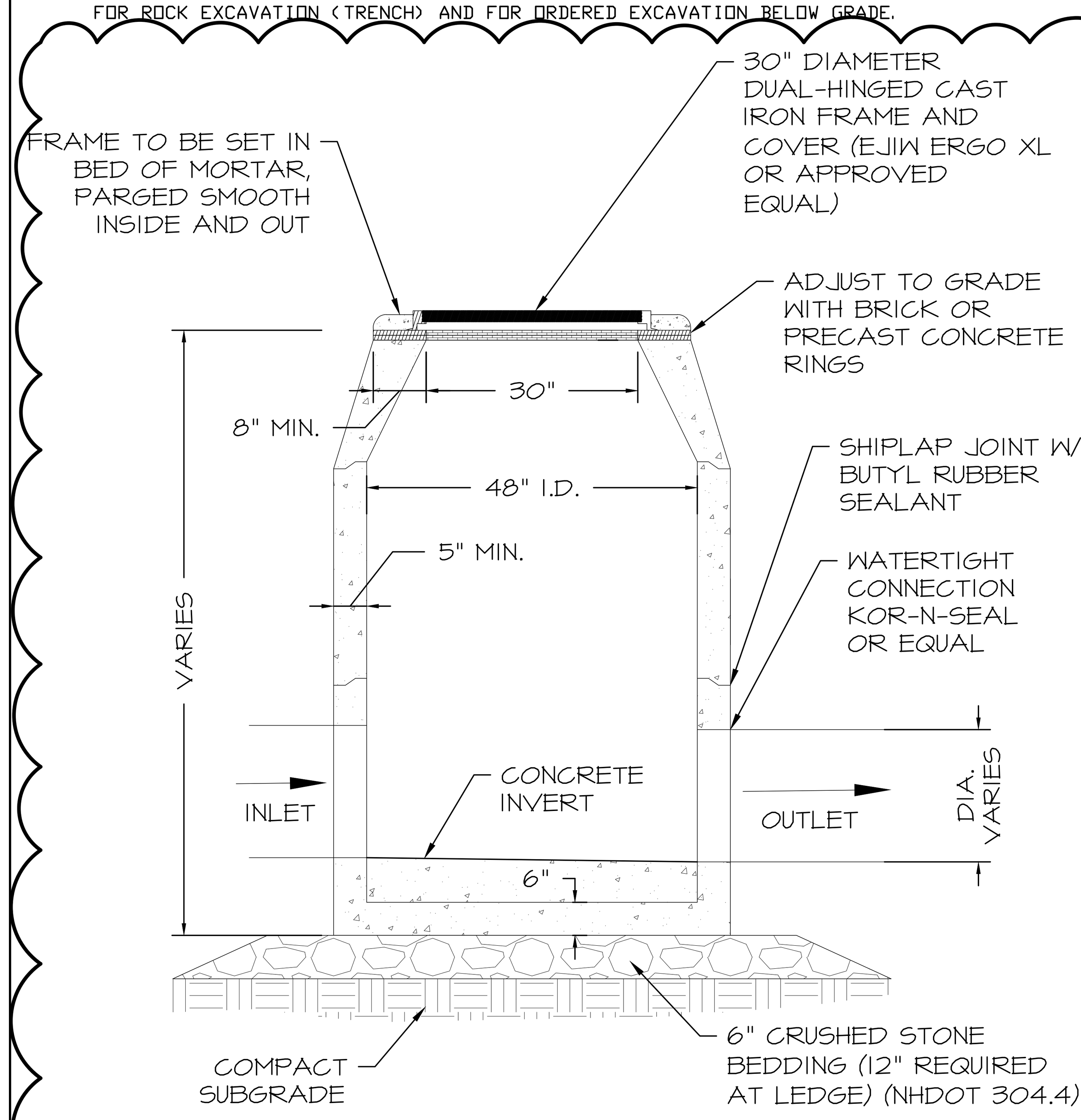
INSTALL AS PER MANUFACTURER'S SPECIFICATIONS



UPTURNED "U" BICYCLE RACK

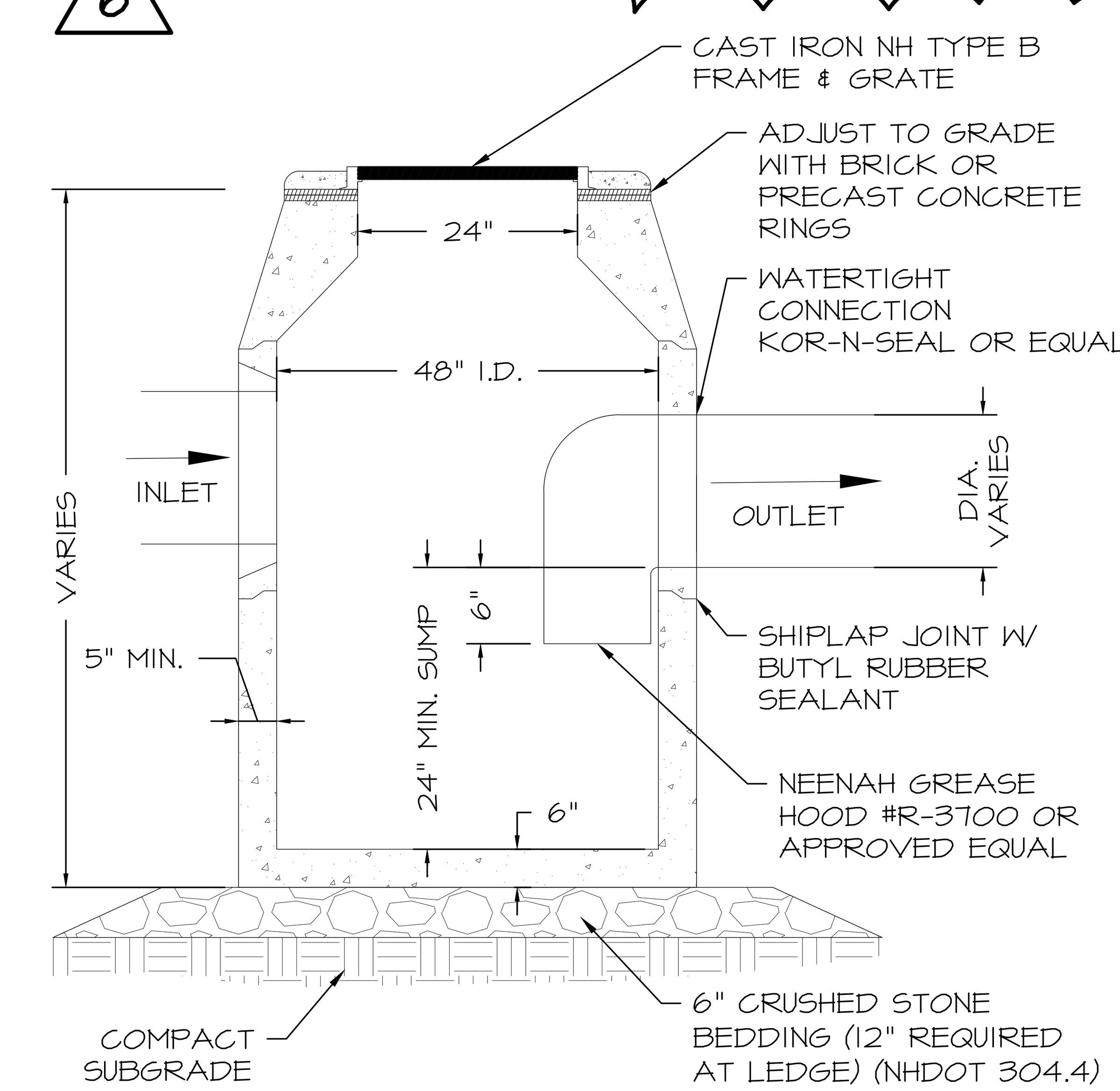
SCALE: NTS

6



PROPOSED DRAIN MANHOLE (TYP)

N.T.S.



PROPOSED CATCH BASIN (TYP)

N.T.S.

NOTES

1) ALL SECTIONS SHALL BE DESIGNED FOR H20 LOADING.

2) CONCRETE SHALL BE COMPRESSIVE STRENGTH 4000 PSI, TYPE II CEMENT.

3) JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.

4) CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQ. IN PER LINEAR FT. IN ALL SECTIONS & SHALL BE PLACED IN THE CENTER THIRD OF WALL.

5) THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ IN PER LINEAR FT.

6) EACH CASTING TO HAVE LIFTING HOLES CAST IN.

NOTES

1) ALL SECTIONS SHALL BE DESIGNED FOR H20 LOADING.

2) CONCRETE SHALL BE COMPRESSIVE STRENGTH 4000 PSI, TYPE II CEMENT.

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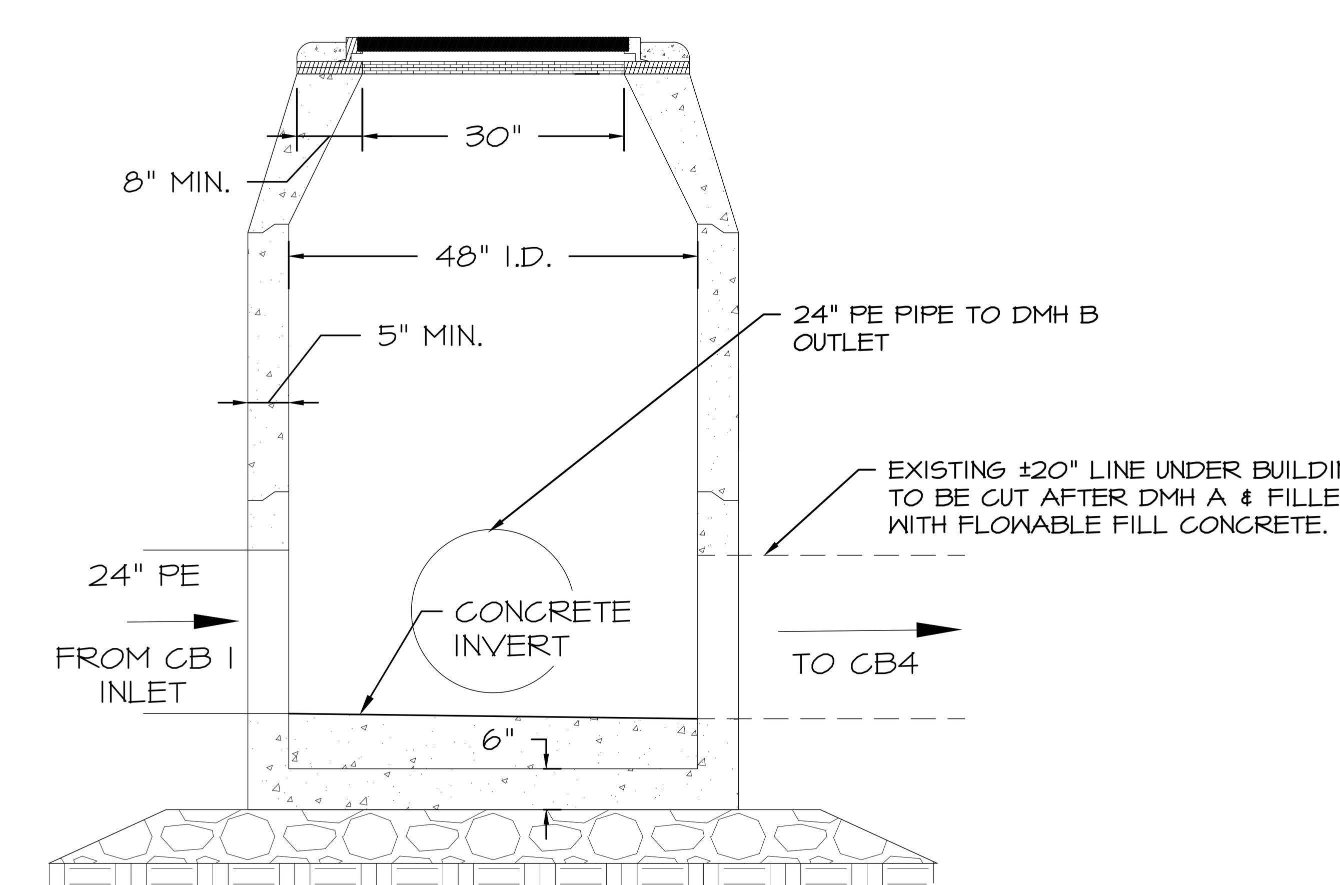
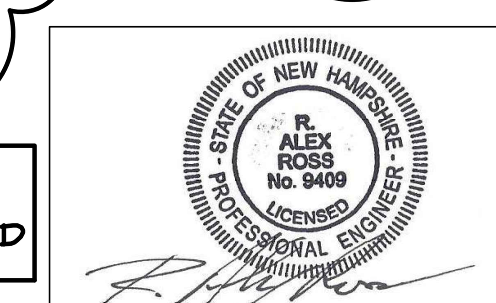


DRAIN MANHOLE A DETAIL

N.T.S.

AMENDED DETAILS PLAN

- MANHOLE & CATCH BASIN DETAILS REVISED



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SCALE 1" = 20'

CHECKED A.ROSS

DRAWN D.D.D.

CHECKED

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TITLE

NOTES & DETAILS

806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

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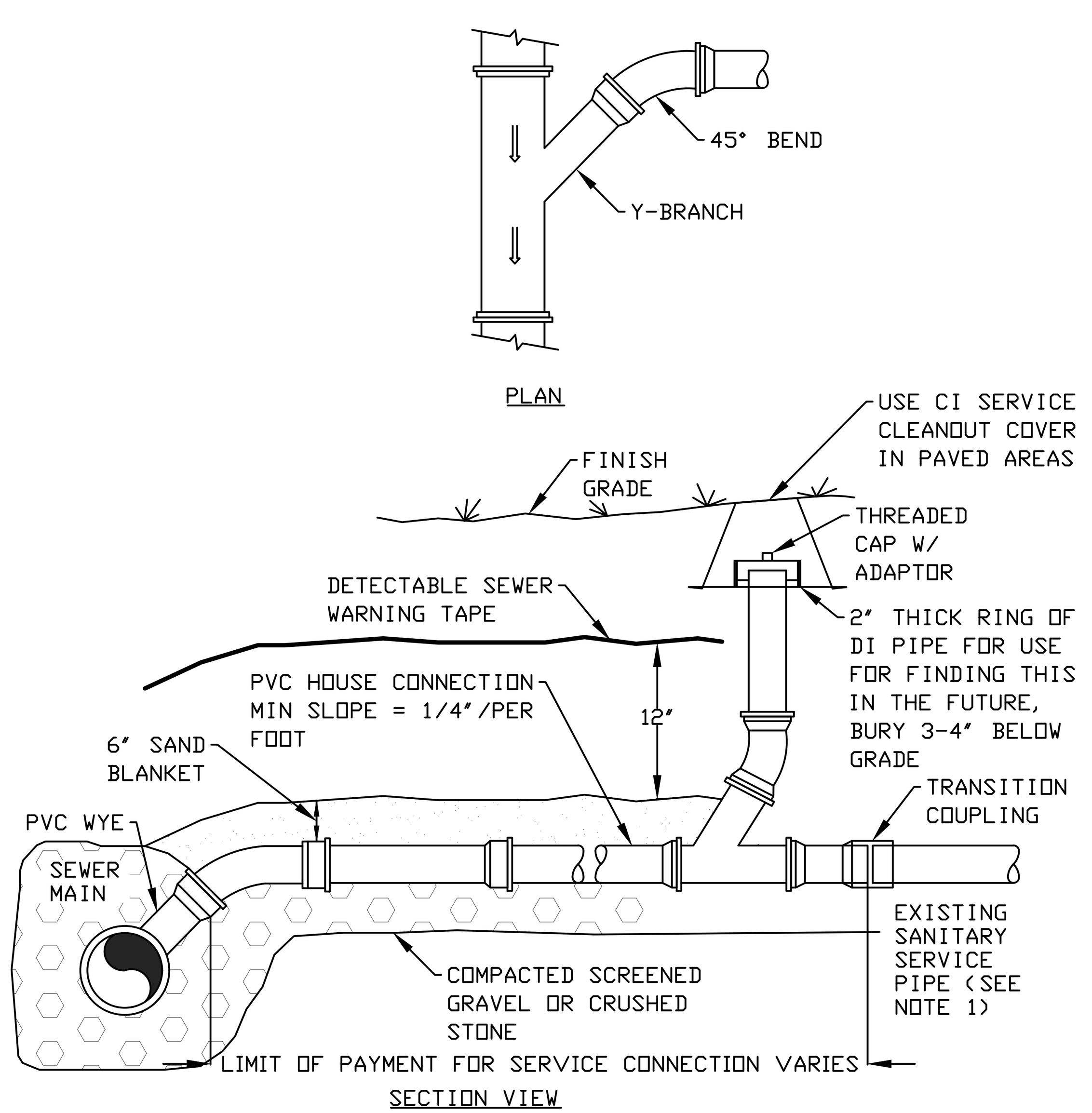
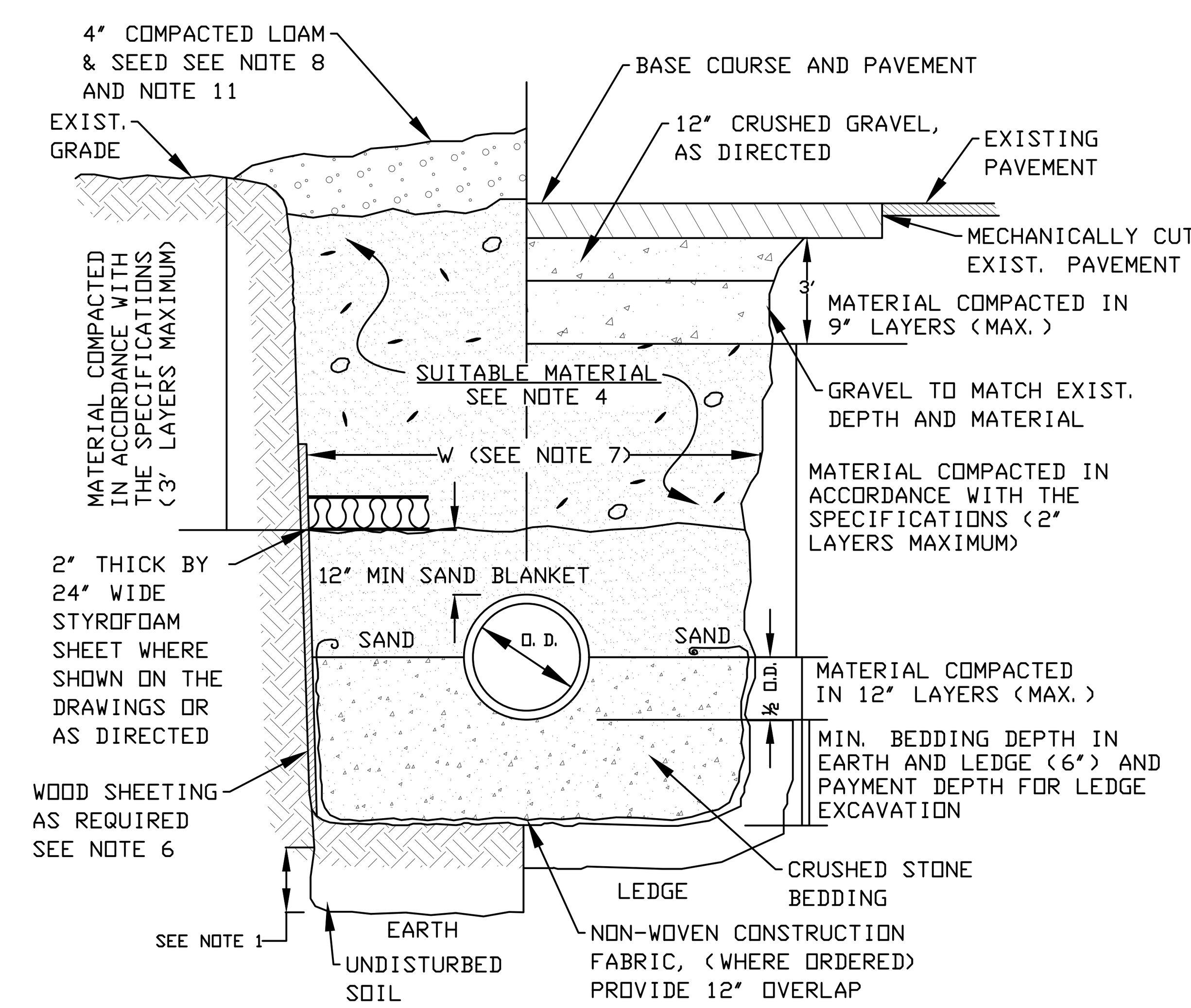


TYPICAL SERVICE CONNECTION

Scale : N.T.S.



TRENCH DETAIL- GRAVITY SEWER

Scale : N.T.S.

GRAVITY SEWER TRENCH NOTES:

1) ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE: BACKFILL AS STATED IN THE TECHNICAL SPECIFICATIONS OR AS SHOWN ON THE DRAWINGS.

2) BEDDING: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATTER AND MEETING ASTM C33. STONE SIZE NO. 67.
   100% PASSING 1 INCH SCREEN
   0-10% PASSING #4 SIEVE
   90-100% PASSING 3/4 INCH SCREEN
   0-5% PASSING #8 SIEVE
   20-55% PASSING 3/8 INCH SCREEN
   WHERE ORDERED BY THE ENGINEER TO STABILIZE THE BASE, SCREENED GRAVEL OR CRUSHED STONE 1-1/2 INCH TO 1/2 INCH SHALL BE USED.

3) SAND BLANKET: CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 90-100% PASSES A 1/2 INCH SIEVE AND NOT MORE THAN 15% WILL PASS A #200 SIEVE. NO STONE LARGER THAN 2" SHOULD BE IN CONTACT WITH THE PIPE.

4) SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS; PIECES OF PAVEMENT; ORGANIC MATTER; TOP SOIL; ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ALL ROCKS OVER 6 INCHES IN LARGEST DIMENSION; AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. IN CROSS-COUNTRY CONSTRUCTION, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK, OR PEAT, IF HE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE SEWER FOR MAINTENANCE AND POSSIBLY RECONSTRUCTION, WILL BE PRESERVED.

5) BASE COURSE AND PAVEMENT SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES - DIVISIONS 300 AND 400 RESPECTIVELY AND LOCAL REGULATION.

6) WOOD SHEATHING, IF REQUIRED: WHERE SHEETING IS PLACED ALONGSIDE THE PIPE AND EXTENDS BELOW MID-DIAMETER, IT SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION 1 FOOT ABOVE THE TOP OF PIPE. WHERE SHEETING IS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE, IT SHALL BE CUT OFF AT LEAST 3 FEET BELOW FINISHED GRADE, NUT NOT LESS THAN 1 FOOT ABOVE THE TOP OF THE PIPE.

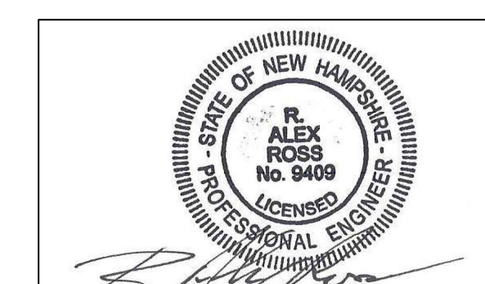
7) W = MAXIMUM ALLOWABLE TRENCH PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 12 INCHES IN NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE OUTSIDE DIAMETER (O. D.) ALSO, W SHALL BE THE PAYMENT WIDTH.

8) FOR CROSS COUNTRY CONSTRUCTION, BACKFILL OR FILL SHALL BE MOUNDED TO A HEIGHT OF 6 INCHES ABOVE THE ORIGINAL GROUND SURFACE.

9) CONCRETE FOR ENCASEMENT SHALL CONFORM TO THE REQUIREMENTS OF SECTION 520, (NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.

10) CONCRETE FULL ENCASEMENT: IF FULL ENCASEMENT IS UTILIZED, DEPTH OF CONCRETE BELOW PIPE SHALL BE 1/4 I. D. (4" MINIMUM). BLOCK SUPPORT SHALL BE SOLID CONCRETE BLOCKS.

11) GRAVEL DRIVEWAY AND SHOULDER RESTORATION: CRUSHED GRAVEL IN DRIVEWAYS AND ROAD SHOULDERS SHALL MATCH EXISTING WITH A MINIMUM OF 12". GRAVEL REPLACEMENT SHALL BE SUBSIDIARY TO SEWER CONSTRUCTION AND WILL NOT BE MEASURED FOR PAYMENT.



ISS.	DATE	DESCRIPTION OF ISSUE
6	5/17/2024	REVISIONS
5	5/22/2023	REVISIONS
4	5/25/2022	FOR PB
3	4/26/2022	FOR TAC
2	4/19/2022	FOR TAC

SCALE 1" = 20'
CHECKED A.ROSS
DRAWN D.D.D.
CHECKED

ROSS ENGINEERING, LLC
Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

CLIENT
RIGZ ENTERPRISES LLC
18 DIXON LANE
DERRY, NH 03038

TITLE
SEWER NOTES
806 US-1 BYP.
PORTSMOUTH, NH 03801
TAX MAP 161, LOT 43

JOB NUMBER	DWG. NO.	ISSUE
21-072	7 OF 7	6

CITY OF PORTSMOUTH

Planning Department
1 Junkins Avenue
Portsmouth, New
Hampshire 03801
(603) 610-7216

TECHNICAL ADVISORY COMMITTEE

May 9, 2022

RIGZ Enterprises LLC
18 Dixon Lane
Derry, New Hampshire 03801

RE: Site Review request for property located at 806 US Route 1 Bypass (LU-22-81)

Dear Property Owner:

The Technical Advisory Committee, at its regularly scheduled meeting of Tuesday, May 3, 2022, considered your application for Site Plan Review for construction of 400 square feet of additional commercial space and site improvements. Said property is shown on Assessor Map 161 Lot 43 and lies within the Business (B) District. As a result of said consideration, the Committee voted to **recommend approval** to the Planning Board with the following stipulations:

Items to be addressed prior to Planning Board approval:

1. Dumpsters will be relocated to parking spaces 24 and 23 with a 20 foot setback from rear lot line and at least 10 feet from side lot line. Applicant will request a waiver from the Planning Board for Section 9.3 of the Site Plan regulations to have the dumpsters located within 20' of the side lot line.

2. A note will be added to the plans regarding the use of non-combustible mulch.

3. Applicant will work with DPW to correct the sewer lateral connection and location.

4. Applicant will work with DPW staff (Eric Eby) to reconfigure handicap parking and accessibility (two spaces needed).

5. Applicant will extend landscaping and curbing at the front lot line.

6. Parking spaces 18 and 19 will be relocated and be replaced with landscaping and 3 bike racks.

7. Entryway will be striped.

8. Raised sidewalk will be extended to connect to front entryway.

9. Light Pole 3 (LP3) located at the rear of the building shall be limited to a height of 16' with cut off shields.

10. Lighting on the rear wall will not exceed a height of 9'.

11. Curbing is added to proposed landscape islands.

This matter will be placed on the agenda for the Planning Board meeting scheduled for **Thursday, June 16, 2022**. One (1) hard copy of all plans and supporting reports and exhibits as well as an updated electronic file (in a PDF format) must be filed in the Planning Department and uploaded to the online permit system no later than **Wednesday, May 25, 2022**.

Per Section 2.5 of the Site Plan Regulations, a site plan review application to the Planning Board must include all applicable information and supporting materials including but not limited to the following items:

- *Full updated plan set*
- *Draft Easements*
- *Drainage Analysis*
- *Traffic Studies*
- *Etc.*

All comments, corrections, and conditions identified as "Items to be addressed before Planning Board submittal' must be resolved/corrected for the Planning Board application submittal to be deemed complete.

The minutes and audio recording of this meeting are available by contacting the Planning Department.

Very truly yours,

Beverly Mesa-Zendt

Beverly Mesa-Zendt,
Planning Director

cc:

Alex Ross, Ross Engineering

CITY OF PORTSMOUTH

Planning Department
1 Junkins Avenue
Portsmouth, New
Hampshire 03801

(603) 610-7216

PLANNING BOARD

June 29, 2022

RIGZ Enterprises LLC
18 Dixon Lane
Derry, New Hampshire 03801

RE: Site Review request for property located at 806 US Route 1 Bypass (LU-22-81)

Dear Property Owner:

The Planning Board, at its regularly scheduled meeting of **Thursday, June 23, 2022**, considered your application for Site Plan Review for construction of 400 square feet of additional commercial space and site improvements Said property is shown on Assessor Map 161 Lot 43 and lies within the Business (B) District. As a result of said consideration, the Board voted 1) to determine the requested waiver does not nullify the spirit and intent of the City's Master Plan of the Site Plan Regulations and to grant the following waiver: *Waiver of Site Plan Review regulations* section 4.3.5 to locate a dumpster 12.2 feet from the property line where 20 feet is required; and 2) to **grant** Site Plan approval with the following stipulations:

Conditions to be satisfied subsequent to final approval of site plan but prior to commencement of any site work or construction activity:
2.1 The site plan and any easement plans and deeds shall be recorded at the Registry of Deeds by the City or as deemed appropriate by the Planning Department.
2.2 Associated recording fees shall be paid to the City prior to recordation.
2.3 Light pole labels on the utility plan will be correct to reflect appropriate numbering and include LP3 and LP5 consistent with stipulation requiring light Pole 3 (LP3) located at the rear of the building to be limited to a height of 16' with cut off shields.

The Board's decision may be appealed up to thirty (30) days after the vote. Any action taken by the applicant pursuant to the Board's decision during this appeal period shall be at the applicant's risk. Please contact the Planning Department for more details about the appeals process.

This site plan approval shall not be effective until a site plan review agreement has been signed satisfying the requirements of Section 2.12 of the City's Site Review Approval Regulations.

Unless otherwise indicated above, applicant is responsible for applying for and securing a building permit from the Inspection Department prior to starting any project work.

The Planning Director must certify that all outstanding stipulations of approval have been completed prior to issuance of a building permit unless otherwise indicated above.

This site plan approval shall expire unless a building permit is issued within a period of one (1) year from the date granted by the Planning Board unless an extension is granted by the Planning Board in accordance with Section 2.14 of the Site Review Regulations.

The minutes and audio recording of this meeting are available by contacting the Planning Department.

Very truly yours,

Rick Chellman

Rick Chellman, Chairman of the Planning Board

cc: Shanti Wolph, Chief Building Inspector
Rosann Maurice-Lentz, City Assessor

Peter H. Rice, Director of Public Works

Alex Ross, Ross Engineering

CITY OF PORTSMOUTH

Planning Department
1 Junkins Avenue
Portsmouth, New Hampshire
03801

(603) 610-7216

PLANNING BOARD

June 22, 2023

RIGZ Enterprises LLC
18 Dixon Lane
Derry, New Hampshire 03801

RE: 1-Year Extension request for Site Plan and CUP approvals for property located at 806 US Route 1 Bypass (LU-22-81)

Dear Property Owner:

The Planning Board, at its meeting of Thursday, June 15, 2023, considered your request for

a 1-Year Extension of the Site Plan Approval granted on **June 23, 2022.**

As a result of said consideration, the Board voted

to **grant** a one-year extension to the Planning Board Approval of the Site Plan and Conditional Use Permits to **June 23, 2024**.

The Board's decision may be appealed up to thirty (30) days after the vote. Any action taken by the applicant pursuant to the Board's decision during this appeal period shall be at the applicant's risk. Please contact the Planning Department for more details about the appeals process.

The minutes and audio recording of this meeting are available by contacting the Planning Department.

Very truly yours,

Rick

Rick Chellman, Chairman of the Planning Board

cc: Shanti Wolph, Chief Building Inspector
Rosann Maurice-Lentz, City Assessor

Alex Ross, Ross Engineering

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

April 19, 2024

Portsmouth Technical Advisory Committee
Attn: Board Members
1 Junkins Avenue, Suite 3rd Floor
Portsmouth, NH 03801

RE: Response Letter - LU-22-209
635 Sagamore Ave, Portsmouth, NH
Tax Map 222, Lot 19
JBE Project No. 18134.1

Dear Board Members,

We are in receipt of comments from the Technical Advisory Committee, provided by Stefanie Casella, City Planner, dated March 29, 2024. Review comments are listed below with our responses in bold.

1. *The city is finalizing roadway improvement design. City to work with applicant on CB location in relation to new sidewalk location.*
   RESPONSE: No response necessary at this time.

2. *Sight lines at driveway are slightly shorter than required based on existing roadway profile. Sight lines will need to be rechecked once the City's roadway design is finalized. Possible mitigation measures needed if sight lines remain below minimums.*
   RESPONSE: Prior to the initial TAC submission, we had discussed the sight lines with Eric Eby. It was understood that we were under the minimum stopping sight distance and that mitigation measures would be necessary, such as a "blind driveway" warning sight or 25 MPH posted speed limit over the crest of the hill to the south as Mr. Eby suggested via email on February 23, 2024.

3. *Water work needs to be out of right of way prior to Sagamore road work. This includes extending new water to property and cut & cap of the previous water.*
   RESPONSE: A water line stub will be extended to the right of way line prior to the Sagamore Ave road work.

4. *Move water to driveway location.*
   RESPONSE: Water has been moved to the driveway location.

5. *Remove label for 4" water main on far side of Sagamore Road. 4" water main has been abandoned.*
   RESPONSE: The word "Abandoned" has been added to the label for the 4" water main on Sheets C1 and C4.

6. *Are there plans to extend gas to the site? Stub gas main label on overhead wires south of site.' Sheet C4 Utility Plan.*
RESPONSE: We are not planning to extend the gas main to the site. The units will have propane tanks as shown on Sheet C4. The "stub gas main" label was a holdover from when natural gas service was being considered and has been removed.

7. *How will this site deal with trash pickup?*
RESPONSE: The owner of each unit shall store trash in their garage. Trash will be picked up by a private hauler. Seet Note #21 on Sheet C2.

8. *Remove stop bar and stop sign leaving site. This is not a road it is a driveway.*
RESPONSE: The stop sign and stop bar have been removed from the plan.

9. *Change SMH2 inlet to a drop manhole connection to flatten out sewer run.*
RESPONSE: The sewer layout has been revised so this is no longer necessary. Previously, a drop inlet would have been helpful in order to flatten the sewer run and reduce the depth of the trench, but we have rearranged the sewer layout to eliminate the drainage crossing that made this sewer manhole necessary in the first place. Therefore, we now have only three sewer manholes proposed rather than four and we are placing a flatter 3.2% run between SMH 1 and SMH 2, which more nearly follows proposed grade than what was previously proposed and requires a shallower trench.

10. *Drainage Concerns:*

    - *The drainage study needs to be revisited. We do not agree that these are type B soils due to the shallow ledge. The study also uses very long time of concentration sheet flow lengths that are inaccurate due to the steepness and type of terrain. Because of this, we believe that the runoff generation calculations are not accurate.*
    RESPONSE: See attached letter from the soil scientist. The soils on site are represented as HSG B because Chatfield, which is classified as HSG B, is the dominant soil type within the Chatfield-Hollis-Canton soil complex that makes up most of the subject parcel. Modelling the site as HSG B rather than C or D is a conservative approach. The addition of impervious surface causes more of a change to the curve number (CN) with the site represented as HSG B than with the site represented as HSG C or D and therefore this provides a safety factor for the requirement to reduce off-site peak flows to below the existing.

      Tc paths are taken from the most hydraulically distant point and this is what we did. Each modelled Tc path is broken into several different sections to analyze each slope and land cover segment separately. We have double checked to make sure that we are modelling the correct slopes and land covers. Furthermore, modelling a long Tc path in the existing conditions is a conservative approach as this increases the difference in peak flows that needs to be attenuated.

- *We also believe that the applicant should have added the 3S and 4S hydrographs together in both the pre and post conditions because they combine along the Tidewatch road about 130' past AP3. There is evidence that there is in fact historic flooding or at a minimum, poor drainage conditions, in this location at the base of the hill adjacent to the Tidewatch road in the predevelopment condition so we are suspect of the calculations.*
  RESPONSE: Subcatchments 3S and 4S need to be separate. 3S represents the runoff that reaches the ditch along the Tidewatch Condominium road while 4S represents the runoff that directly enters the catch basin adjacent to the Tidewatch Condominium mailbox structure, modelled as AP3. However, we agree that both subcatchments ultimately drain toward one analysis point; therefore, we have removed AP4 from the analysis and AP3 represents the catch basin on the Tidewatch Condominium property that the runoff from 3S and 4S ultimately drains into in the existing condition. 3S and 4S both ultimately drain toward Analysis Point 3, but 3S drains toward a shallow drainage ditch on the Tidewatch property before reaching AP3 while 4S drains directly over land to the analysis point.

- *We also feel that perhaps the engineer should explore moving the outlet of Bioretention Pond #1 southeast so that the flow leaving the pond is closest to its ultimate discharge point but this must be vetted during the calculations.*
  RESPONSE: We are no longer proposing a bioretention pond where Pond #1 was previously proposed. All site runoff is now directed toward a single pond, now referred to as Bioretention Pond #1, where Bioretention Pond #2 was previously. The area where this pond is proposed is the only part of the site with enough depth to ledge to allow infiltration according to the results of test pits 8 and 10. Small infiltration practices are also proposed adjacent to units 3&4 where ledge is shallower, but we are providing enough fill at these locations to facilitate infiltration. The discharge from this pond will be directed over land toward the existing drainage ditch on the Tidewatch Condominium property, from where it will be directed to the ultimate discharge point (Analysis Point 3). Having the discharge flow through the ditch first rather than being outletted directly on to the Tidewatch property downstream of the ditch will help to better maintain or improve upon existing hydrologic patterns and prevent an increase in flooding at the ultimate discharge point. The swale has been modelled to ensure that an increase in runoff is not proposed to flow to it and the peak elevation stays the same or decreases.

- *An off-site drainage improvement on Tidewatch property may be necessary to shed the stormwater via a new culvert under the private Tidewatch road and into one of the Tidewatch wetland areas directly as the flow from this development seems to be directed toward a single catch basin located near Tidewatch's mailbox structure.*
  RESPONSE: We are not opposed to this, however we would need permission from Tidewatch and would need more survey detail as well. If a culvert is added it should be cored into the catch basin that the runoff from the subject parcel is draining toward in the existing condition rather than across the street into the wetland, in order to mimic existing drainage patterns and not increase peak rates of runoff upon the wetland.

- *We are therefore recommending a third-party Engineer review the design and the stormwater report.*
  RESPONSE: John Chagnon of Haley Ward is already reviewing the design on behalf of Tidewatch Condominium, however we understand that the City will also be sending the plans and drainage report to their own review consultant.

11. *Please demonstrate how you can reduce flow entering into AP3 to meet or be reduced by pre-development numbers [Section 6.1 (d) and Section 7.6 in Site Plan Review Regs]. While there is ledge across the site, please provide a low impact development method for reducing flow in this area as infiltration does not appear to be viable.*
    RESPONSE: The peak flow was already being reduced with the previous design, however the volume of runoff directed toward Analysis Point 3 was being slightly increased as we acknowledged in our drainage report due to the lack of infiltration at the former pond location. With the increased infiltration capacity in the revised design, post-development runoff volumes will be less than pre-development runoff volumes toward all analysis points during the 2-, 10-, 25-, and 50-Year 24 Hour storms.

12. *Please demonstrate how this project will conserve stormwater on site and practice low impact development stormwater practices (drip edges, rain barrels, stormwater filtration with vegetation, etc.). [Section 6.3, Section 6.6 and Section 7.1]*
    RESPONSE: All of the stormwater management devices that we are proposing are Low Impact Development (LID) devices. Rain gardens are listed as an example of an LID device in Section 7.1 of the Site Plan Review Regulations and pre-treatment is achieved through the use of deep sump catch basins rather than a sediment forebay. Where practicable, roof runoff is being captured and directly infiltrated through the use of stone drip edges and a permeable paver patio. These devices are only being proposed where the basement slab will be above the groundwater table.

13. *Please provide a green statement that addresses the sustainable and energy efficient practices that you intend to pursue in this development. [Section 2.5.3 (b)]*
    RESPONSE: A green building statement is included with this submission.

14. *Please update landscaping plans to acknowledge planting requirements [Section 6.2.2 (d-f), and Section 6.4] and to demonstrate adherence to Section 6.3 in the Site Plan Review Regulations.*
    RESPONSE: The landscape designer has denoted on the planting schedule on Sheet L2 which plants are tolerant of urban conditions and also added Notes 19 and 20 to this sheet stipulating the requirements that need to be followed.

15. *Please include in stormwater management operations and maintenance manual that an annual report will be submitted to the City of Portsmouth Department of Public Works.*
    RESPONSE: This requirement has been added to Section A.1 of the O&M Manual.

16. *Please indicate if, and/or where, snow storage will be located on site. If located on site, please demonstrate compliance with Section 7.6.1 (10).*
    RESPONSE: Snow storage is shown on Sheet C2. The snow storage locations have been revised so that it is only shown in areas where snowmelt will drain toward a treatment BMP in accordance with the cited requirement.

17. *Please provide a condo plan.*
RESPONSE: A draft condominium site plan has been added as Sheet CS1 of the plan set.

18. *How high are the buildings from the existing grade vs the proposed grade?*
RESPONSE: See below table. In accordance with the definition of "building height" provided in Article 15 of the Zoning Ordinance, we measured the height of each building from average existing grade or average finished grade, whichever is lower, to the midpoint between the level of the roof eaves and the highest point of the roof. Based on this definition, all units are under the maximum height of 35' per the Zoning Regulations.

	Unit 1	**Unit 2**	**Unit 3**	**Unit 4**
Finished Floor elevation	**73.5**	**74.0**	**74.5**	**75.0**
FF to midpoint of ridge (ft.)	**27.67**	**27.67**	**23.89**	**23.89**
Ridge midpoint elevation	**101.17**	**101.67**	**98.39**	**98.89**
Average existing grade elevation	**71.0**	**72.0**	**65.5**	**66.0**
Average finished grade elevation	**72.0**	**73.0**	**69.0**	**68.0**
Building Height (ft.) based on lower of average existing and proposed grade	**30.17**	**29.67**	**32.89**	**32.89**

Included with this response letter are the following:

1. One (1) Full Size Plan Set (Folded).
2. One (1) Drainage Analysis.
3. One (1) Stormwater Operations & Maintenance Manual.
4. One (1) Green Building Statement.
5. Letter from Soil Scientist.

If you have any questions or need any additional information, please feel free to contact our office. Thank you very much for your time.

Very truly yours,
JONES & BEACH ENGINEERS, INC.

Joseph Coronati

Joseph A. Coronati
Vice President

cc: Michael Garrepy (via email)
Christopher Ward (via email)
John Chagnon, P.E., Haley Hard (reviewer on behalf of Tidewatch Condominium, via email and U.S. Mail.)
Eric Weinrieb, Altus Engineering (via email & Hard Copy Delivered)

We GSD Studios
Architecture | Planning
22 Jady Hill Avenue
Exeter, NH 03833
207.347.1504

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

April 1, 2024

Dear Mr. Stith,

The residential units proposed for the project at 635 Sagamore Avenue are being designed to meet or exceed the applicable green building standards as set forth in the 2018 set of Codes adopted by the State of New Hampshire, along with associated amendments codified by the City of Portsmouth.

In an effort promote the buildings' efficiency, longevity, and health of their occupants, close attention shall be given to the following building categories:

- Tight building enclosures
  - Watertightness (though moisture barriers)
  - Vapor permeability
  - Airtightness
  - Aire quality, environmental controls, and whole-house ventilation
- Thermal control for reduced energy usage
  - Enhanced envelope assembly R-Values and window/door U-Values
  - Solar Heat Gain Coefficient and orientation of windows and doors
- High-efficiency water heating & HVAC equipment
- ENERGY STAR appliances
- High-efficiency lighting
- Low-flow water fixtures

Assemblies and systems for the proposed residences shall be specified during the Building Permit Application phase.

Thank you,

Margaret Randolph, RA, NCARB, AIA, LEED AP ND

635 Sagamore Avenue (LU-24-34) Staff Comments for TAC Meeting

"not type B soils due to shallow ledge"

The dominant soil unit mapped on the site was 41- a complex of soil types so intermixed that no one soil can be separated into a single consociation or soil type. The complex is named Chatfield-Hollis-Rock Outcrop. Based upon the test pits (3 Hollis, 6 Chatfield (Chatfield well drained and Chatfield moderately well drained) and one deep soil), the percentage of each soil type was 50% Chatfield, 25% Hollis, and 25% Rock Outcrop. The standard protocol is to utilize the dominant soil type for Hydrologic Soil Group, which is Chatfield (well drained and moderately well drained) with a Hydrologic Soil Group of B. Chatfield has a depth of 20 to 40 inches to bedrock. The Hydrologic Soil Groups are assigned to soil units by Publication Number 5 of the Society of Soil Scientists of Northern New England and adopted by NH DES Alteration of Terrain.

Hollis has a soil depth of 10 to 20 inches to bedrock. It also has a combined Hydrologic Soil Group of C/D. Rock Outcrop is any area that has surface exposed bedrock to 10 inches deep.

Typically for drainage analysis, the dominant hydrologic soil group is used, in this case B. Conversely, a weighted average could be used to mimic the complex: 50% B, 25% C/D, and 25% D-virtually impervious.

Complexes are difficult to interpret given that multiple soil types are present and randomly intermixed. It becomes even more difficult when the multiple soil types have differing characteristics.

Jim Gove, CSS #004

4-1-2024

DRAINAGE ANALYSIS

SEDIMENT AND EROSION CONTROL PLAN

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

Prepared for:

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

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER –
DANIEL JAMES MEDITZ No.18152
LICENSED
04/19/2024

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

EXECUTIVE SUMMARY

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

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

Analysis Point	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	0.75	0.35	1.33	0.67	1.78	0.93	2.21	1.17
Analysis Point #2	0.20	0.02	0.44	0.08	0.65	0.12	0.84	0.17
Analysis Point #3	0.91	0.71	2.86	2.12	4.73	3.47	6.61	5.03
Reach #1R	0.51	0.48	1.75	1.47	2.94	2.41	4.17	3.98

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	0.054	0.025	0.098	0.048	0.133	0.068	0.167	0.087
Analysis Point #2	0.015	0.002	0.032	0.006	0.047	0.009	0.061	0.013
Analysis Point #3	0.118	0.118	0.302	0.279	0.477	0.436	0.656	0.629
Reach #1R	0.069	0.086	0.187	0.200	0.300	0.312	0.418	0.460

Although the volume of runoff directed toward Reach 1R is slightly increasing, the flow toward this reach is being reduced and the peak elevation will remain the same or be decreased in the proposed condition and the volume of runoff directed toward the downstream analysis point (AP3) is being reduced as well. A comparison of the peak elevations within the ditch pre- to post-construction is below:

Peak Elevation	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Reach #1R	0.18'	0.18'	0.34'	0.32'	0.44'	0.40'	0.52'	0.51'

Peak flows and volumes are being reduced in the post-construction condition toward all analysis points during all analyzed storm events. The subject parcel is located in the Single Residence A (SRA) Zoning District. The subject parcel currently consists of the aforementioned former commercial site which is proposed to be demolished. Despite impervious surface existing on the subject parcel now, the proposed development results in an increase in impervious surface on the subject parcel. The addition of the proposed impervious surfaces causes an increase in the curve number (C_n) and a decrease in the time of concentration (T_c), and if a stormwater management system were not implemented, the net result of this would be a potential increase in peak rates of runoff from the site. In order to avoid this potential, a stormwater management system has been designed, consisting of a bioretention system with deep sump catch basins for pre-treatment of runoff, and stone drip edges. Due to the use of these stormwater management features, the peak flow and volume of runoff will be reduced toward all analysis points during all analyzed storm events in the proposed condition as compared to the existing condition, and the treatment requirements of the City of Portsmouth are met. Additionally, the NHDES Alteration of Terrain Bureau's groundwater recharge volume and channel protection requirements are met with the proposed development. **The stormwater management system as designed meets all requirements of the City of Portsmouth stormwater regulations per Section 7.1 and 7.4-7.6 of the Site Plan Review Regulations. Additionally, the stormwater management system as designed meets all requirements of the NHDES Alteration of Terrain (AOT) Bureau, even though an AOT permit is not necessary for this project due to the area of disturbance.**

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

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

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

2.0 EXISTING CONDITIONS ANALYSIS

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

The existing topography and roof ridges divide the subject parcel and offsite contributing watershed areas into four subcatchments, draining toward three analysis points. Subcatchment 1 represents the front of the subject parcel as well as a stretch of the northbound lane of Sagamore Avenue. This subcatchment is entirely developed in the existing condition, and it drains directly into the Sagamore Ave. right of way, modelled as Analysis Point 1.

Subcatchment 2S represents a small section of the developed portion of the property which drains to the north and on to abutting Tax Map 222, Lot 20, modelled as Analysis Point 2. It is very important that peak flows and volumes draining toward Analysis Points 1 and 2 are reduced in the post-construction condition, as these two analysis points represent a highway and a house lot, respectively.

The largest subcatchment is Subcatchment 3S. Subcatchment 3S is roughly the western quarter of the property and it consists primarily of woodland with large ledge outcrops. Subcatchment 3S drains toward an existing drainage ditch alongside and below the grade of the Tidewatch Condominium private roadway, which is curbed so that no runoff from the roadway itself enters the ditch. This drainage ditch is modelled as Reach 1R and it drains toward Analysis Point 3. Analysis Point 3 is an existing catch basin adjacent to the community mailbox structure for Tidewatch Condominiums.

Finally, a section of both developed and undeveloped land in the western end of the property drains into abutting woodland on the Tidewatch Condominium property and ultimately toward the aformemntioned catch basin that is modelled as Analysis Point 3.

Existing soil types were determined through a Site Specific Soil Survey conducted by a Certified Soil Scientist. The pervious soils are categorized into Hydrologic Soil Group (HSG) B while the impervious areas of the subject parcel are categorized as Urban Land (SSS Symbol 699). The pervious sections of the property are represented as Chatfield-Hollis-Rock Outcrop complex and Chatfield Variant (moderately well drained). According to "Ksat Values for New Hampshire Soils," Special Publication No. 5 sponsored by the Society of Soil Scientists of Northern New England (SSSNNE), Chatfield, Chatfield Variant, and Hollis soils all have identical saturated hydraulic conductivity ranges in the B and C horizons. The saturated hydraulic conductivity (Ksat) value for these soils ranges from 0.6 to 6.0 inches/hour within both the B and C horizons. Therefore, in accordance with standard engineering practice, the lowest published Ksat of 0.6 in/hr for these soils types was divided by two in order to determine an appropriate Ksat of **0.3 in/hr** to use for design.

3.0 PROPOSED CONDITIONS ANALYSIS

The addition of the proposed impervious surfaces causes an increase in the curve number (C_n) and a decrease in the time of concentration (T_c), and if a stormwater management system were not implemented, the net result of this would be a potential increase in peak rates of runoff from the site. A stormwater management system was designed in order to avoid this potential. The proposed development, consisting of the aforementioned four (4) residential units with associated paved roadway and driveways as well as stormwater management features divide the subject parcel into fifteen (15) subcatchments. Subcatchments 1S, 2S, and 4S drain directly toward Analysis Points 1-3, respectively, as previously outlined. Subcatchment 3S drains toward the existing drainage ditch on the Tidewatch Condominium property, modelled as Reach 1R, which ultimately outlets toward AP3, the same as in the existing condition. Subcatchment 5S has been removed from the drainage analysis as it was the subcatchment associated with a stormwater pond that has since been removed from the drainage design. Subcatchments 6S-9S drain through deep sump catch basins into a closed drainage system which outlets toward a bioretention pond modelled as Pond 1P. The deep sump catch basins provide pre-treatment of runoff reaching the bioretention pond in lieu of a sediment forebay. The bioretention pond is designed to treat and infiltrate runoff directed toward it during smaller storms, or in larger storms, infiltrate as much as possible and attenuate and slowly discharge outflow. Any discharge from Pond 1P follows a path through Subcatchment 3S represented as Reach 4R, toward Reach 1R, the existing ditch on the Tidewatch condominium property leading to Analysis Point 3.

Subcatchments 10S-12S consist of lawn and roof areas that drain toward yard drains 1-3, respectively. The runoff that is caught by these yard drains additionally enters the previously described closed drainage system that outlets toward Pond 1P.

Subcatchments 13S, 14S, and 15S represent roof and deck areas on Units 3-4 which are routed toward infiltration systems adjacent to the units such as stone drip edges and stone underneath a deck. These devices are only featured in areas where the basement grade will be above the seasonal high water table and the top of ledge. These devices are modelled as Ponds 2P-4P.

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

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

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

According to the NH Stormwater Manual, bioretention systems provide a pollutant removal efficiency of 90% for TSS and 65% for nitrogen, and drip edges provide a removal efficiency of 90% for TSS and 55% for nitrogen. The City of Portsmouth Site Plan Review Regulations stipulate that stormwater BMPs shall either be designed for 80% TSS removal and 50% nitrogen removal of stormwater runoff from impervious surfaces. This plan exceeds the requirements for pollutant removal because appropriate treatment / groundwater recharge systems are proposed and the Water Quality Volume is retained and treated. A breakdown of pollutant removal efficiencies for the entire site is contained within the appendix of this report.

5.0 CONCLUSION

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

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

Respectfully Submitted,
JONES & BEACH ENGINEERS. INC.

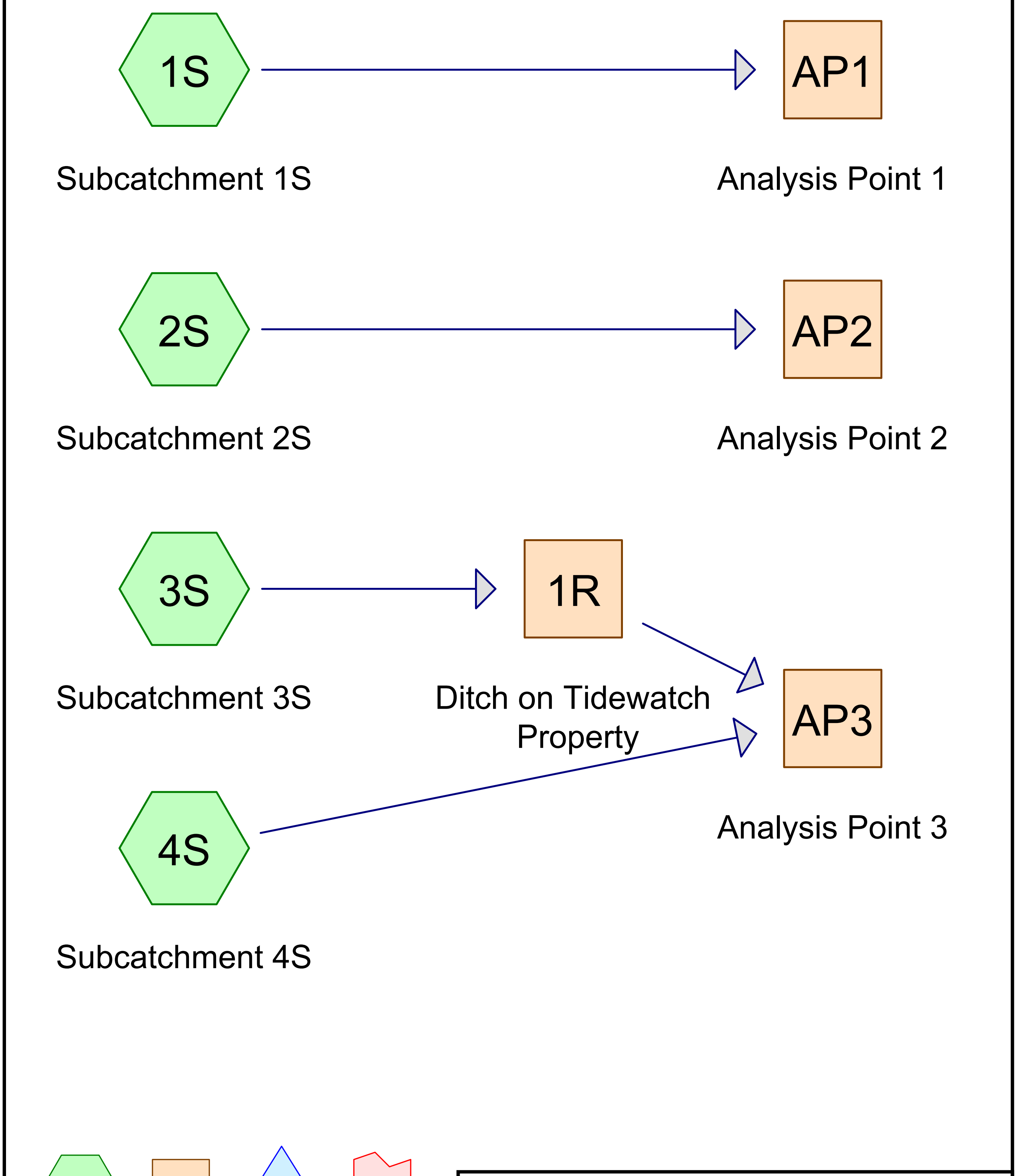
Daniel Meditz

Daniel Meditz, P.E
Project Engineer

APPENDIX I

EXISTING CONDITIONS DRAINAGE ANALYSIS

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



Routing Diagram for 18134-EXISTING
Prepared by Jones & Beach Engineers Inc, Printed 4/19/2024
HydroCAD® 10.20-3c s/n 00762 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.547	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S)
0.230	98	Paved parking, HSG B (1S, 2S, 4S)
0.114	98	Roofs, HSG B (1S, 2S, 3S, 4S)
1.538	60	Woods, Fair, HSG B (2S, 3S, 4S)
2.429	**66**	**TOTAL AREA**

Soil Listing (all nodes)

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

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

Subcatchment1S: Subcatchment1S Runoff Area=13,001 sf 64.94% Impervious Runoff Depth>2.19"
Flow Length=187' Tc=6.0 min CN=85 Runoff=0.75 cfs 0.054 af

Subcatchment2S: Subcatchment2S Runoff Area=6,082 sf 32.08% Impervious Runoff Depth>1.31"
Flow Length=114' Tc=6.0 min CN=73 Runoff=0.20 cfs 0.015 af

Subcatchment3S: Subcatchment3S Runoff Area=58,629 sf 0.32% Impervious Runoff Depth>0.62"
Flow Length=291' Tc=17.0 min CN=60 Runoff=0.51 cfs 0.069 af

Subcatchment4S: Subcatchment4S Runoff Area=28,091 sf 15.59% Impervious Runoff Depth>0.91"
Flow Length=216' Tc=11.5 min CN=66 Runoff=0.49 cfs 0.049 af

Reach 1R: Ditch on Tidewatch Property Avg. Flow Depth=0.18' Max Vel=1.77 fps Inflow=0.51 cfs 0.069 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=0.51 cfs 0.069 af

Reach AP1: Analysis Point 1 Inflow=0.75 cfs 0.054 af
Outflow=0.75 cfs 0.054 af

Reach AP2: Analysis Point 2 Inflow=0.20 cfs 0.015 af
Outflow=0.20 cfs 0.015 af

Reach AP3: Analysis Point 3 Inflow=0.91 cfs 0.118 af
Outflow=0.91 cfs 0.118 af

Total Runoff Area = 2.429 ac Runoff Volume = 0.188 af Average Runoff Depth = 0.93"
85.86% Pervious = 2.085 ac 14.14% Impervious = 0.343 ac

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

Subcatchment1S: Subcatchment1S Runoff Area=13,001 sf 64.94% Impervious Runoff Depth>3.93"
Flow Length=187' Tc=6.0 min CN=85 Runoff=1.33 cfs 0.098 af

Subcatchment2S: Subcatchment2S Runoff Area=6,082 sf 32.08% Impervious Runoff Depth>2.77"
Flow Length=114' Tc=6.0 min CN=73 Runoff=0.44 cfs 0.032 af

Subcatchment3S: Subcatchment3S Runoff Area=58,629 sf 0.32% Impervious Runoff Depth>1.66"
Flow Length=291' Tc=17.0 min CN=60 Runoff=1.75 cfs 0.187 af

Subcatchment4S: Subcatchment4S Runoff Area=28,091 sf 15.59% Impervious Runoff Depth>2.15"
Flow Length=216' Tc=11.5 min CN=66 Runoff=1.31 cfs 0.116 af

Reach 1R: Ditch on Tidewatch Property Avg. Flow Depth=0.34' Max Vel=2.48 fps Inflow=1.75 cfs 0.187 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=1.74 cfs 0.186 af

Reach AP1: Analysis Point 1 Inflow=1.33 cfs 0.098 af
Outflow=1.33 cfs 0.098 af

Reach AP2: Analysis Point 2 Inflow=0.44 cfs 0.032 af
Outflow=0.44 cfs 0.032 af

Reach AP3: Analysis Point 3 Inflow=2.86 cfs 0.302 af
Outflow=2.86 cfs 0.302 af

Total Runoff Area = 2.429 ac Runoff Volume = 0.432 af Average Runoff Depth = 2.14"
85.86% Pervious = 2.085 ac 14.14% Impervious = 0.343 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 1.33 cfs @ 12.09 hrs, Volume= 0.098 af, Depth> 3.93"
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 +15% Rainfall=5.61"

Area (sf)	CN	Description
1,476	98	Roofs, HSG B
6,967	98	Paved parking, HSG B
4,558	61	>75% Grass cover, Good, HSG B
13,001	85	Weighted Average
4,558		35.06% Pervious Area
8,443		64.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	46	0.1090	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.4	45	0.0670	2.04		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.70"
0.4	96	0.0360	3.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.3	187	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.032 af, Depth> 2.77"
Routed to Reach AP2 : Analysis Point 2

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

Area (sf)	CN	Description
482	98	Roofs, HSG B
1,469	98	Paved parking, HSG B
3,981	61	>75% Grass cover, Good, HSG B
150	60	Woods, Fair, HSG B
6,082	73	Weighted Average
4,131		67.92% Pervious Area
1,951		32.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	53	0.0200	1.30		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.70"
2.8	47	0.0810	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.1	14	0.2100	3.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	114	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 1.75 cfs @ 12.26 hrs, Volume= 0.187 af, Depth> 1.66"
Routed to Reach 1R : Ditch on Tidewatch Property

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

Area (sf)	CN	Description
187	98	Roofs, HSG B
9,391	61	>75% Grass cover, Good, HSG B
49,051	60	Woods, Fair, HSG B
58,629	60	Weighted Average
58,442		99.68% Pervious Area
187		0.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	53	0.0415	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
5.8	47	0.0968	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.2	15	0.0968	1.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	54	0.0741	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	122	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.0	291	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 1.31 cfs @ 12.17 hrs, Volume= 0.116 af, Depth> 2.15"
Routed to Reach AP3 : Analysis Point 3

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

Area (sf)	CN	Description
2,809	98	Roofs, HSG B
1,571	98	Paved parking, HSG B
5,912	61	>75% Grass cover, Good, HSG B
17,799	60	Woods, Fair, HSG B
28,091	66	Weighted Average
23,711		84.41% Pervious Area
4,380		15.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	14	0.0210	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
8.4	86	0.1280	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
1.0	87	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	29	0.2860	2.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	216	Total			

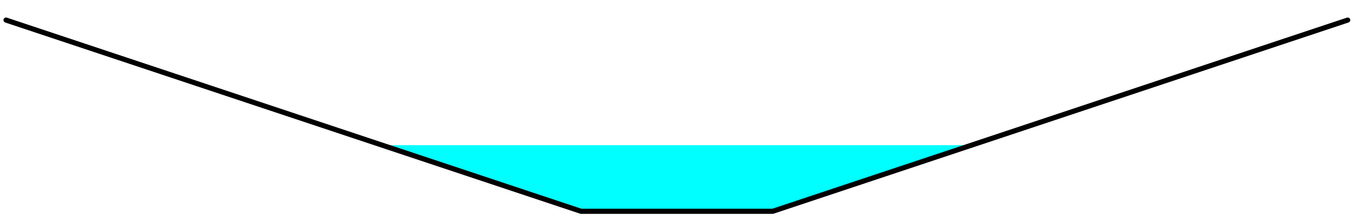
Summary for Reach 1R: Ditch on Tidewatch Property

Inflow Area = 1.346 ac, 0.32% Impervious, Inflow Depth > 1.66" for 10 Yr 24 Hr +15% event
Inflow = 1.75 cfs @ 12.26 hrs, Volume= 0.187 af
Outflow = 1.74 cfs @ 12.27 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.7 min
Routed to Reach AP3 : Analysis Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.48 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 2.4 min

Peak Storage= 112 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.34' , Surface Width= 3.07'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 18.18 cfs

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



Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 0.298 ac, 64.94% Impervious, Inflow Depth > 3.93" for 10 Yr 24 Hr +15% event
Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.098 af
Outflow = 1.33 cfs @ 12.09 hrs, Volume= 0.098 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 = 0.140 ac, 32.08% Impervious, Inflow Depth > 2.77" for 10 Yr 24 Hr +15% event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.032 af
Outflow = 0.44 cfs @ 12.09 hrs, Volume= 0.032 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 = 1.991 ac, 5.27% Impervious, Inflow Depth > 1.82" for 10 Yr 24 Hr +15% event
Inflow = 2.86 cfs @ 12.23 hrs, Volume= 0.302 af
Outflow = 2.86 cfs @ 12.23 hrs, Volume= 0.302 af, Atten= 0%, Lag= 0.0 min

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

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

Subcatchment1S: Subcatchment1S Runoff Area=13,001 sf 64.94% Impervious Runoff Depth>5.36"
Flow Length=187' Tc=6.0 min CN=85 Runoff=1.78 cfs 0.133 af

Subcatchment2S: Subcatchment2S Runoff Area=6,082 sf 32.08% Impervious Runoff Depth>4.04"
Flow Length=114' Tc=6.0 min CN=73 Runoff=0.65 cfs 0.047 af

Subcatchment3S: Subcatchment3S Runoff Area=58,629 sf 0.32% Impervious Runoff Depth>2.68"
Flow Length=291' Tc=17.0 min CN=60 Runoff=2.94 cfs 0.300 af

Subcatchment4S: Subcatchment4S Runoff Area=28,091 sf 15.59% Impervious Runoff Depth>3.29"
Flow Length=216' Tc=11.5 min CN=66 Runoff=2.05 cfs 0.177 af

Reach 1R: Ditch on Tidewatch Property Avg. Flow Depth=0.44' Max Vel=2.85 fps Inflow=2.94 cfs 0.300 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=2.94 cfs 0.300 af

Reach AP1: Analysis Point 1 Inflow=1.78 cfs 0.133 af
Outflow=1.78 cfs 0.133 af

Reach AP2: Analysis Point 2 Inflow=0.65 cfs 0.047 af
Outflow=0.65 cfs 0.047 af

Reach AP3: Analysis Point 3 Inflow=4.73 cfs 0.477 af
Outflow=4.73 cfs 0.477 af

Total Runoff Area = 2.429 ac Runoff Volume = 0.658 af Average Runoff Depth = 3.25"
85.86% Pervious = 2.085 ac 14.14% Impervious = 0.343 ac

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

Subcatchment1S: Subcatchment1S Runoff Area=13,001 sf 64.94% Impervious Runoff Depth>6.72"
Flow Length=187' Tc=6.0 min CN=85 Runoff=2.21 cfs 0.167 af

Subcatchment2S: Subcatchment2S Runoff Area=6,082 sf 32.08% Impervious Runoff Depth>5.28"
Flow Length=114' Tc=6.0 min CN=73 Runoff=0.84 cfs 0.061 af

Subcatchment3S: Subcatchment3S Runoff Area=58,629 sf 0.32% Impervious Runoff Depth>3.72"
Flow Length=291' Tc=17.0 min CN=60 Runoff=4.17 cfs 0.418 af

Subcatchment4S: Subcatchment4S Runoff Area=28,091 sf 15.59% Impervious Runoff Depth>4.44"
Flow Length=216' Tc=11.5 min CN=66 Runoff=2.78 cfs 0.238 af

Reach 1R: Ditch on Tidewatch Property Avg. Flow Depth=0.52' Max Vel=3.12 fps Inflow=4.17 cfs 0.418 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=4.17 cfs 0.417 af

Reach AP1: Analysis Point 1 Inflow=2.21 cfs 0.167 af
Outflow=2.21 cfs 0.167 af

Reach AP2: Analysis Point 2 Inflow=0.84 cfs 0.061 af
Outflow=0.84 cfs 0.061 af

Reach AP3: Analysis Point 3 Inflow=6.61 cfs 0.656 af
Outflow=6.61 cfs 0.656 af

Total Runoff Area = 2.429 ac Runoff Volume = 0.884 af Average Runoff Depth = 4.37"
85.86% Pervious = 2.085 ac 14.14% Impervious = 0.343 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 2.21 cfs @ 12.09 hrs, Volume= 0.167 af, Depth> 6.72"
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 +15% Rainfall=8.53"

Area (sf)	CN	Description
1,476	98	Roofs, HSG B
6,967	98	Paved parking, HSG B
4,558	61	>75% Grass cover, Good, HSG B
13,001	85	Weighted Average
4,558		35.06% Pervious Area
8,443		64.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	46	0.1090	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.4	45	0.0670	2.04		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.70"
0.4	96	0.0360	3.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.3	187	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Depth> 5.28"
Routed to Reach AP2 : Analysis Point 2

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

Area (sf)	CN	Description
482	98	Roofs, HSG B
1,469	98	Paved parking, HSG B
3,981	61	>75% Grass cover, Good, HSG B
150	60	Woods, Fair, HSG B
6,082	73	Weighted Average
4,131		67.92% Pervious Area
1,951		32.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	53	0.0200	1.30		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.70"
2.8	47	0.0810	0.28		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.1	14	0.2100	3.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	114	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 4.17 cfs @ 12.24 hrs, Volume= 0.418 af, Depth> 3.72"
Routed to Reach 1R : Ditch on Tidewatch Property

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

Area (sf)	CN	Description
187	98	Roofs, HSG B
9,391	61	>75% Grass cover, Good, HSG B
49,051	60	Woods, Fair, HSG B
58,629	60	Weighted Average
58,442		99.68% Pervious Area
187		0.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	53	0.0415	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
5.8	47	0.0968	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.2	15	0.0968	1.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	54	0.0741	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	122	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.0	291	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 2.78 cfs @ 12.16 hrs, Volume= 0.238 af, Depth> 4.44"
Routed to Reach AP3 : Analysis Point 3

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

Area (sf)	CN	Description
2,809	98	Roofs, HSG B
1,571	98	Paved parking, HSG B
5,912	61	>75% Grass cover, Good, HSG B
17,799	60	Woods, Fair, HSG B
28,091	66	Weighted Average
23,711		84.41% Pervious Area
4,380		15.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	14	0.0210	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
8.4	86	0.1280	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
1.0	87	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	29	0.2860	2.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	216	Total			

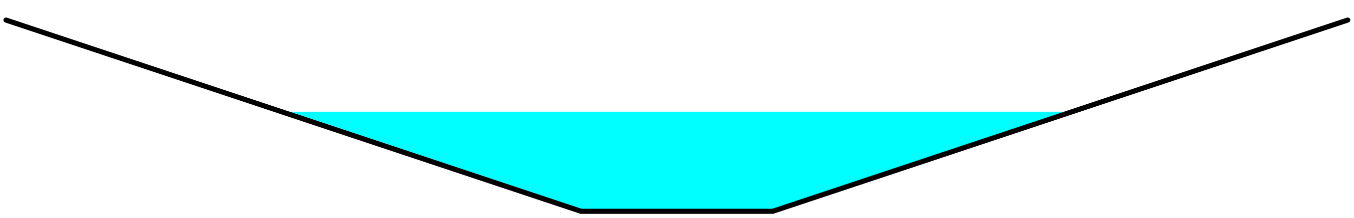
Summary for Reach 1R: Ditch on Tidewatch Property

Inflow Area = 1.346 ac, 0.32% Impervious, Inflow Depth > 3.72" for 50 Yr 24 Hr +15% event
Inflow = 4.17 cfs @ 12.24 hrs, Volume= 0.418 af
Outflow = 4.17 cfs @ 12.26 hrs, Volume= 0.417 af, Atten= 0%, Lag= 0.7 min
Routed to Reach AP3 : Analysis Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.12 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 2.0 min

Peak Storage= 212 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.52' , Surface Width= 4.12'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 18.18 cfs

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



Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 0.298 ac, 64.94% Impervious, Inflow Depth > 6.72" for 50 Yr 24 Hr +15% event
Inflow = 2.21 cfs @ 12.09 hrs, Volume= 0.167 af
Outflow = 2.21 cfs @ 12.09 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach AP2: Analysis Point 2

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

Inflow Area = 0.140 ac, 32.08% Impervious, Inflow Depth > 5.28" for 50 Yr 24 Hr +15% event
Inflow = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.84 cfs @ 12.09 hrs, Volume= 0.061 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)

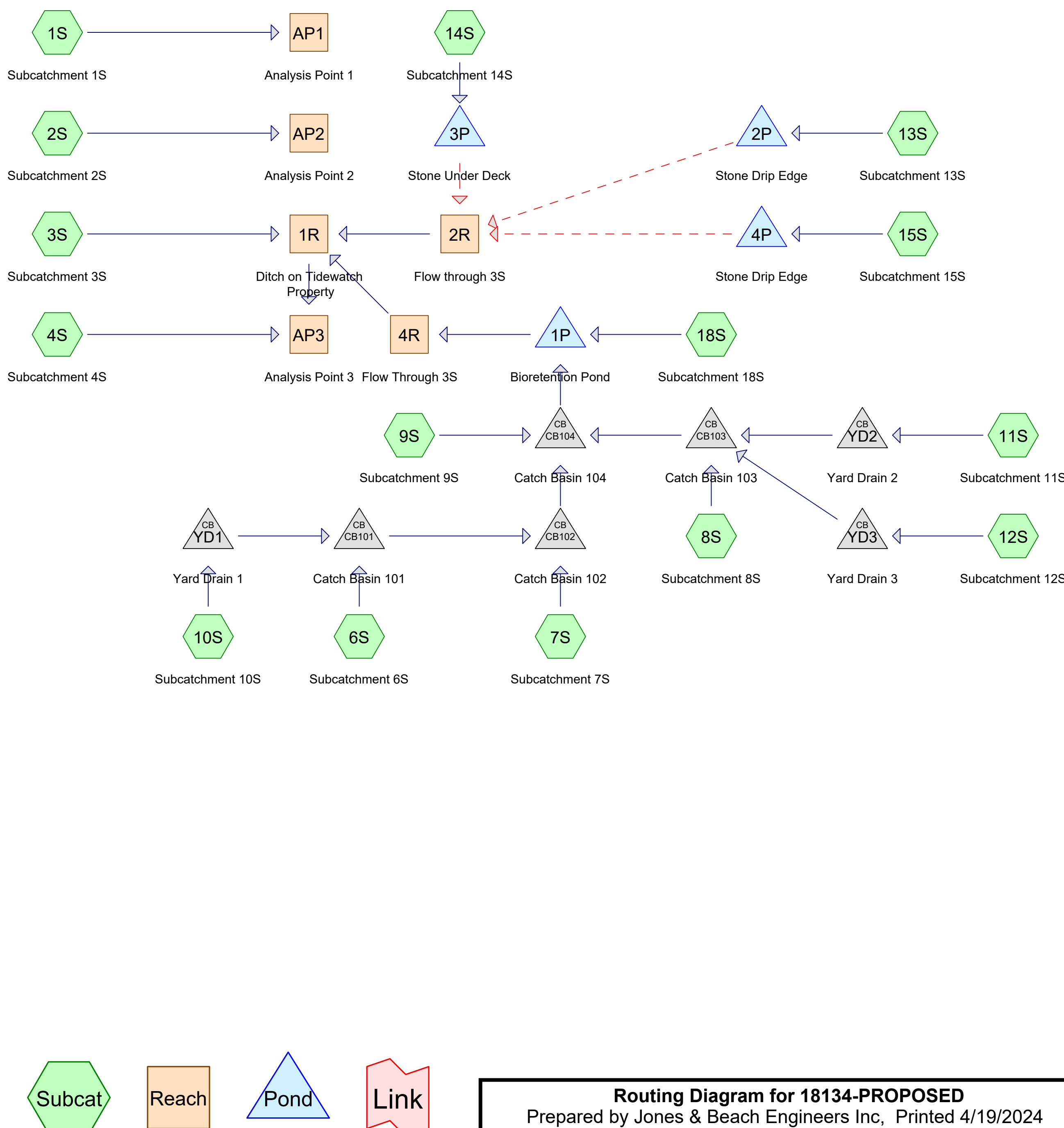
Inflow Area = 1.991 ac, 5.27% Impervious, Inflow Depth > 3.95" for 50 Yr 24 Hr +15% event
Inflow = 6.61 cfs @ 12.22 hrs, Volume= 0.656 af
Outflow = 6.61 cfs @ 12.22 hrs, Volume= 0.656 af, Atten= 0%, Lag= 0.0 min

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

APPENDIX II

PROPOSED CONDITIONS DRAINAGE ANALYSIS

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



Routing Diagram for 18134-PROPOSED

Prepared by Jones & Beach Engineers Inc, Printed 4/19/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.116	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S, 10S, 11S, 12S, 18S)
0.253	98	Paved parking, HSG B (1S, 6S, 7S, 8S, 9S, 10S, 11S, 18S)
0.226	98	Roofs, HSG B (3S, 4S, 8S, 10S, 11S, 12S, 13S, 14S, 15S, 18S)
0.008	98	Water Surface, HSG B (13S, 15S)
0.826	60	Woods, Fair, HSG B (3S, 4S)
2.429	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.429	HSG B	1S, 2S, 3S, 4S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 18S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.429		**TOTAL AREA**

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

Subcatchment1S: Subcatchment1S Runoff Area=7,392 sf 50.61% Impervious Runoff Depth>1.79"
Flow Length=186' Tc=6.0 min CN=80 Runoff=0.35 cfs 0.025 af

Subcatchment2S: Subcatchment2S Runoff Area=1,728 sf 0.00% Impervious Runoff Depth>0.66"
Flow Length=20' Slope=0.0500 '/' Tc=6.0 min CN=61 Runoff=0.02 cfs 0.002 af

Subcatchment3S: Subcatchment3S Runoff Area=45,177 sf 1.54% Impervious Runoff Depth>0.66"
Flow Length=291' Tc=17.0 min CN=61 Runoff=0.44 cfs 0.057 af

Subcatchment4S: Subcatchment4S Runoff Area=20,991 sf 8.04% Impervious Runoff Depth>0.81"
Flow Length=210' Tc=7.9 min CN=64 Runoff=0.35 cfs 0.032 af

Subcatchment6S: Subcatchment6S Runoff Area=1,952 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af

Subcatchment7S: Subcatchment7S Runoff Area=1,516 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

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

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

Subcatchment10S: Subcatchment10S Runoff Area=3,630 sf 29.12% Impervious Runoff Depth>1.25"
Flow Length=142' Tc=6.3 min CN=72 Runoff=0.11 cfs 0.009 af

Subcatchment11S: Subcatchment11S Runoff Area=4,571 sf 49.42% Impervious Runoff Depth>1.72"
Flow Length=77' Slope=0.0396 '/' Tc=6.0 min CN=79 Runoff=0.21 cfs 0.015 af

Subcatchment12S: Subcatchment12S Runoff Area=3,734 sf 35.30% Impervious Runoff Depth>1.38"
Flow Length=51' Slope=0.0320 '/' Tc=6.0 min CN=74 Runoff=0.13 cfs 0.010 af

Subcatchment13S: Subcatchment13S Runoff Area=876 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

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

Subcatchment15S: Subcatchment15S Runoff Area=876 sf 100.00% Impervious Runoff Depth>3.46"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment18S: Subcatchment18S Runoff Area=9,474 sf 14.12% Impervious Runoff Depth>0.91"
Flow Length=58' Tc=6.0 min CN=66 Runoff=0.20 cfs 0.016 af

Reach 1R: Ditch on Tidewatch Property Avg. Flow Depth=0.18' Max Vel=1.74 fps Inflow=0.48 cfs 0.086 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=0.48 cfs 0.086 af

Reach 2R: Flow through 3S Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=81.0' S=0.3457 '/' Capacity=740.30 cfs Outflow=0.00 cfs 0.000 af

Reach 4R: Flow Through 3S Avg. Flow Depth=0.01' Max Vel=0.94 fps Inflow=0.04 cfs 0.029 af
n=0.030 L=220.0' S=0.0909 '/' Capacity=66.79 cfs Outflow=0.04 cfs 0.029 af

Reach AP1: Analysis Point 1 Inflow=0.35 cfs 0.025 af
Outflow=0.35 cfs 0.025 af

Reach AP2: Analysis Point 2 Inflow=0.02 cfs 0.002 af
Outflow=0.02 cfs 0.002 af

Reach AP3: Analysis Point 3 Inflow=0.71 cfs 0.118 af
Outflow=0.71 cfs 0.118 af

Pond 1P: Bioretention Pond Peak Elev=61.42' Storage=1,704 cf Inflow=1.20 cfs 0.095 af
Discarded=0.08 cfs 0.063 af Primary=0.04 cfs 0.029 af Outflow=0.12 cfs 0.092 af

Pond 2P: Stone Drip Edge Peak Elev=64.62' Storage=0.004 af Inflow=0.07 cfs 0.006 af
Discarded=0.00 cfs 0.003 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.003 af

Pond 3P: Stone Under Deck Peak Elev=65.44' Storage=0.002 af Inflow=0.05 cfs 0.004 af
Discarded=0.00 cfs 0.003 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.003 af

Pond 4P: Stone Drip Edge Peak Elev=63.39' Storage=0.003 af Inflow=0.07 cfs 0.006 af
Discarded=0.00 cfs 0.004 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.004 af

Pond CB101: Catch Basin 101 Peak Elev=62.62' Inflow=0.27 cfs 0.022 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0053 '/' Outflow=0.27 cfs 0.022 af

Pond CB102: Catch Basin 102 Peak Elev=62.47' Inflow=0.39 cfs 0.032 af
12.0" Round Culvert n=0.012 L=147.0' S=0.0054 '/' Outflow=0.39 cfs 0.032 af

Pond CB103: Catch Basin 103 Peak Elev=66.74' Inflow=0.58 cfs 0.045 af
12.0" Round Culvert n=0.012 L=43.0' S=0.0070 '/' Outflow=0.58 cfs 0.045 af

Pond CB104: Catch Basin 104 Peak Elev=61.79' Inflow=1.00 cfs 0.079 af
12.0" Round Culvert n=0.012 L=45.0' S=0.0067 '/' Outflow=1.00 cfs 0.079 af

Pond YD1: Yard Drain 1 Peak Elev=63.01' Inflow=0.11 cfs 0.009 af
8.0" Round Culvert n=0.012 L=9.0' S=0.0189 '/' Outflow=0.11 cfs 0.009 af

Pond YD2: Yard Drain 2 Peak Elev=67.39' Inflow=0.21 cfs 0.015 af
8.0" Round Culvert n=0.012 L=52.0' S=0.0058 '/' Outflow=0.21 cfs 0.015 af

Pond YD3: Yard Drain 3 Peak Elev=68.23' Inflow=0.13 cfs 0.010 af
8.0" Round Culvert n=0.012 L=13.0' S=0.0923 '/' Outflow=0.13 cfs 0.010 af

Total Runoff Area = 2.429 ac Runoff Volume = 0.228 af Average Runoff Depth = 1.12"
79.95% Pervious = 1.942 ac 20.05% Impervious = 0.487 ac

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

Subcatchment1S: Subcatchment1S Runoff Area=7,392 sf 50.61% Impervious Runoff Depth>3.43"
Flow Length=186' Tc=6.0 min CN=80 Runoff=0.67 cfs 0.048 af

Subcatchment2S: Subcatchment2S Runoff Area=1,728 sf 0.00% Impervious Runoff Depth>1.75"
Flow Length=20' Slope=0.0500 '/' Tc=6.0 min CN=61 Runoff=0.08 cfs 0.006 af

Subcatchment3S: Subcatchment3S Runoff Area=45,177 sf 1.54% Impervious Runoff Depth>1.74"
Flow Length=291' Tc=17.0 min CN=61 Runoff=1.42 cfs 0.151 af

Subcatchment4S: Subcatchment4S Runoff Area=20,991 sf 8.04% Impervious Runoff Depth>1.99"
Flow Length=210' Tc=7.9 min CN=64 Runoff=1.00 cfs 0.080 af

Subcatchment6S: Subcatchment6S Runoff Area=1,952 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.24 cfs 0.020 af

Subcatchment7S: Subcatchment7S Runoff Area=1,516 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.19 cfs 0.016 af

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

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

Subcatchment10S: Subcatchment10S Runoff Area=3,630 sf 29.12% Impervious Runoff Depth>2.67"
Flow Length=142' Tc=6.3 min CN=72 Runoff=0.25 cfs 0.019 af

Subcatchment11S: Subcatchment11S Runoff Area=4,571 sf 49.42% Impervious Runoff Depth>3.33"
Flow Length=77' Slope=0.0396 '/' Tc=6.0 min CN=79 Runoff=0.40 cfs 0.029 af

Subcatchment12S: Subcatchment12S Runoff Area=3,734 sf 35.30% Impervious Runoff Depth>2.86"
Flow Length=51' Slope=0.0320 '/' Tc=6.0 min CN=74 Runoff=0.28 cfs 0.020 af

Subcatchment13S: Subcatchment13S Runoff Area=876 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

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

Subcatchment15S: Subcatchment15S Runoff Area=876 sf 100.00% Impervious Runoff Depth>5.37"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Subcatchment18S: Subcatchment18S Runoff Area=9,474 sf 14.12% Impervious Runoff Depth>2.15"
Flow Length=58' Tc=6.0 min CN=66 Runoff=0.53 cfs 0.039 af

Reach 1R: Ditch on Tidewatch Property Avg. Flow Depth=0.32' Max Vel=2.37 fps Inflow=1.47 cfs 0.200 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=1.47 cfs 0.199 af

Reach 2R: Flow through 3S Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=81.0' S=0.3457 '/' Capacity=740.30 cfs Outflow=0.00 cfs 0.000 af

Reach 4R: Flow Through 3S Avg. Flow Depth=0.02' Max Vel=0.98 fps Inflow=0.05 cfs 0.049 af
n=0.030 L=220.0' S=0.0909 '/' Capacity=66.79 cfs Outflow=0.05 cfs 0.049 af

Reach AP1: Analysis Point 1 Inflow=0.67 cfs 0.048 af
Outflow=0.67 cfs 0.048 af

Reach AP2: Analysis Point 2 Inflow=0.08 cfs 0.006 af
Outflow=0.08 cfs 0.006 af

Reach AP3: Analysis Point 3 Inflow=2.12 cfs 0.279 af
Outflow=2.12 cfs 0.279 af

Pond 1P: Bioretention Pond Peak Elev=62.21' Storage=3,721 cf Inflow=2.30 cfs 0.177 af
Discarded=0.10 cfs 0.106 af Primary=0.05 cfs 0.049 af Outflow=0.15 cfs 0.155 af

Pond 2P: Stone Drip Edge Peak Elev=65.98' Storage=0.006 af Inflow=0.11 cfs 0.009 af
Discarded=0.00 cfs 0.004 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.004 af

Pond 3P: Stone Under Deck Peak Elev=65.97' Storage=0.003 af Inflow=0.07 cfs 0.006 af
Discarded=0.00 cfs 0.004 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.004 af

Pond 4P: Stone Drip Edge Peak Elev=64.56' Storage=0.005 af Inflow=0.11 cfs 0.009 af
Discarded=0.01 cfs 0.006 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af

Pond CB101: Catch Basin 101 Peak Elev=62.78' Inflow=0.49 cfs 0.039 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0053 '/' Outflow=0.49 cfs 0.039 af

Pond CB102: Catch Basin 102 Peak Elev=62.63' Inflow=0.68 cfs 0.054 af
12.0" Round Culvert n=0.012 L=147.0' S=0.0054 '/' Outflow=0.68 cfs 0.054 af

Pond CB103: Catch Basin 103 Peak Elev=66.91' Inflow=1.05 cfs 0.080 af
12.0" Round Culvert n=0.012 L=43.0' S=0.0070 '/' Outflow=1.05 cfs 0.080 af

Pond CB104: Catch Basin 104 Peak Elev=62.21' Inflow=1.77 cfs 0.138 af
12.0" Round Culvert n=0.012 L=45.0' S=0.0067 '/' Outflow=1.77 cfs 0.138 af

Pond YD1: Yard Drain 1 Peak Elev=63.12' Inflow=0.25 cfs 0.019 af
8.0" Round Culvert n=0.012 L=9.0' S=0.0189 '/' Outflow=0.25 cfs 0.019 af

Pond YD2: Yard Drain 2 Peak Elev=67.52' Inflow=0.40 cfs 0.029 af
8.0" Round Culvert n=0.012 L=52.0' S=0.0058 '/' Outflow=0.40 cfs 0.029 af

Pond YD3: Yard Drain 3 Peak Elev=68.34' Inflow=0.28 cfs 0.020 af
8.0" Round Culvert n=0.012 L=13.0' S=0.0923 '/' Outflow=0.28 cfs 0.020 af

Total Runoff Area = 2.429 ac Runoff Volume = 0.485 af Average Runoff Depth = 2.40"
79.95% Pervious = 1.942 ac 20.05% Impervious = 0.487 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.048 af, Depth> 3.43"
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 +15% Rainfall=5.61"

Area (sf)	CN	Description
3,741	98	Paved parking, HSG B
3,651	61	>75% Grass cover, Good, HSG B
7,392	80	Weighted Average
3,651		49.39% Pervious Area
3,741		50.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	56	0.1250	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
2.1	30	0.0670	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.2	14	0.0360	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.70"
0.4	86	0.0360	3.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	186	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.08 cfs @ 12.10 hrs, Volume= 0.006 af, Depth> 1.75"
Routed to Reach AP2 : Analysis Point 2

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

Area (sf)	CN	Description
1,728	61	>75% Grass cover, Good, HSG B
1,728		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	20	0.0500	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.7	20	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 1.42 cfs @ 12.26 hrs, Volume= 0.151 af, Depth> 1.74"
Routed to Reach 1R : Ditch on Tidewatch Property

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

Area (sf)	CN	Description
695	98	Roofs, HSG B
16,659	61	>75% Grass cover, Good, HSG B
27,823	60	Woods, Fair, HSG B
45,177	61	Weighted Average
44,482		98.46% Pervious Area
695		1.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	53	0.0415	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
5.8	47	0.0968	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.2	15	0.0968	1.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	54	0.0741	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	122	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.0	291	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 1.00 cfs @ 12.12 hrs, Volume= 0.080 af, Depth> 1.99"
Routed to Reach AP3 : Analysis Point 3

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

Area (sf)	CN	Description
11,135	61	>75% Grass cover, Good, HSG B
8,169	60	Woods, Fair, HSG B
1,687	98	Roofs, HSG B
20,991	64	Weighted Average
19,304		91.96% Pervious Area
1,687		8.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	14	0.0357	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.9	14	0.1429	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
3.3	72	0.1333	0.37		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.0	80	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2667	2.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.9	210	Total			

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.020 af, Depth> 5.37"
Routed to Pond CB101 : Catch Basin 101

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

Area (sf)	CN	Description
1,952	98	Paved parking, HSG B
1,952		100.00% Impervious Area

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

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.016 af, Depth> 5.37"
Routed to Pond CB102 : Catch Basin 102

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

Area (sf)	CN	Description
1,516	98	Paved parking, HSG B
1,516		100.00% Impervious Area

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

Summary for Subcatchment 8S: Subcatchment 8S

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

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

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

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

Summary for Subcatchment 9S: Subcatchment 9S

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

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

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

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

Summary for Subcatchment 10S: Subcatchment 10S

Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af, Depth> 2.67"
Routed to Pond YD1 : Yard Drain 1

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

Area (sf)	CN	Description
796	98	Roofs, HSG B
2,573	61	>75% Grass cover, Good, HSG B
261	98	Paved parking, HSG B
3,630	72	Weighted Average
2,573		70.88% Pervious Area
1,057		29.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	42	0.1190	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
3.7	58	0.0650	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.4	42	0.0650	1.78		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	142	Total			

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 3.33"
Routed to Pond YD2 : Yard Drain 2

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

Area (sf)	CN	Description
1,998	98	Roofs, HSG B
2,312	61	>75% Grass cover, Good, HSG B
261	98	Paved parking, HSG B
4,571	79	Weighted Average
2,312		50.58% Pervious Area
2,259		49.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	77	0.0396	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
5.6	77	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 12S: Subcatchment 12S

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.020 af, Depth> 2.86"
Routed to Pond YD3 : Yard Drain 3

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

Area (sf)	CN	Description
1,318	98	Roofs, HSG B
2,416	61	>75% Grass cover, Good, HSG B
3,734	74	Weighted Average
2,416		64.70% Pervious Area
1,318		35.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	51	0.0320	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
4.4	51	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 13S: Subcatchment 13S

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 5.37"
Routed to Pond 2P : Stone Drip Edge

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

Area (sf)	CN	Description
696	98	Roofs, HSG B
180	98	Water Surface, HSG B
876	98	Weighted Average
876		100.00% Impervious Area

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

Summary for Subcatchment 14S: Subcatchment 14S

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

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

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

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

Summary for Subcatchment 15S: Subcatchment 15S

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 5.37"
Routed to Pond 4P : Stone Drip Edge

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

Area (sf)	CN	Description
696	98	Roofs, HSG B
180	98	Water Surface, HSG B
876	98	Weighted Average
876		100.00% Impervious Area

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

Summary for Subcatchment 18S: Subcatchment 18S

Runoff = 0.53 cfs @ 12.10 hrs, Volume= 0.039 af, Depth> 2.15"
Routed to Pond 1P : Bioretention Pond

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

Area (sf)	CN	Description
8,136	61	>75% Grass cover, Good, HSG B
938	98	Roofs, HSG B
400	98	Paved parking, HSG B
9,474	66	Weighted Average
8,136		85.88% Pervious Area
1,338		14.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	43	0.0930	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.6	15	0.3333	0.39		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
3.1	58	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: Ditch on Tidewatch Property

[62] Hint: Exceeded Reach 2R OUTLET depth by 0.32' @ 12.25 hrs
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.30' @ 12.25 hrs

Inflow Area = 1.685 ac, 18.36% Impervious, Inflow Depth > 1.42" for 10 Yr 24 Hr +15% event
Inflow = 1.47 cfs @ 12.26 hrs, Volume= 0.200 af
Outflow = 1.47 cfs @ 12.27 hrs, Volume= 0.199 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= 2.37 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.12 fps, Avg. Travel Time= 2.4 min

Peak Storage= 98 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.32' , Surface Width= 2.90'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 18.18 cfs

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

Summary for Reach 2R: Flow through 3S

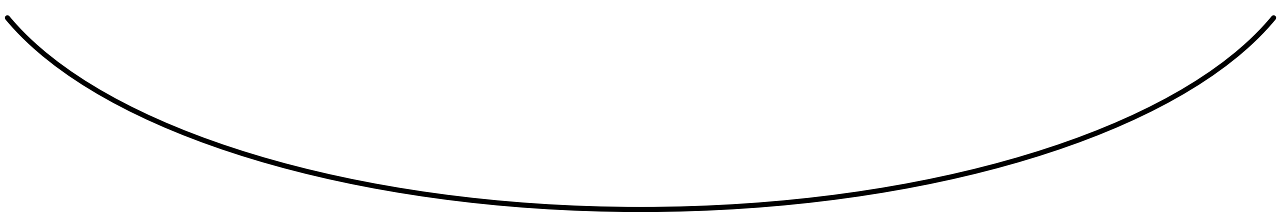
Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 1R : Ditch on Tidewatch Property

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 33.3 sf, Capacity= 740.30 cfs

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



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Summary for Reach 4R: Flow Through 3S

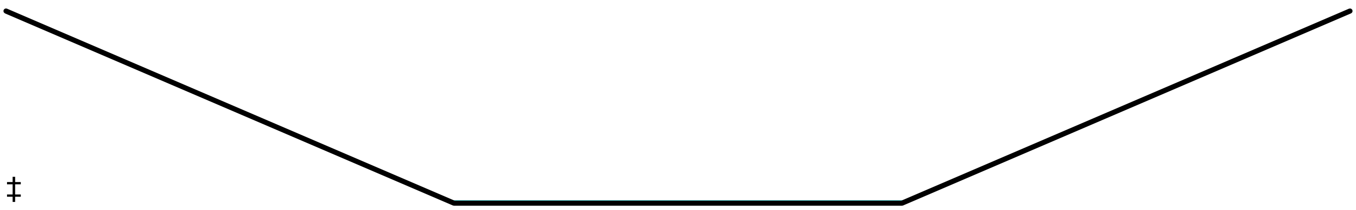
Inflow Area =		0.648 ac, 45.28% Impervious, Inflow Depth > 0.92" for 10 Yr 24 Hr +15% event		
Inflow	=	0.05 cfs @	13.96 hrs, Volume=	0.049 af
Outflow	=	0.05 cfs @	14.00 hrs, Volume=	0.049 af, Atten= 0%, Lag= 2.5 min

Routed to Reach 1R : Ditch on Tidewatch Property

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.98 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 4.0 min

Peak Storage= 11 cf @ 14.00 hrs
Average Depth at Peak Storage= 0.02' , Surface Width= 3.10'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 66.79 cfs

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



Summary for Reach AP1: Analysis Point 1

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

Inflow Area =	0.170 ac, 50.61% Impervious, Inflow Depth > 3.43"	for 10 Yr 24 Hr +15% event
Inflow =	0.67 cfs @ 12.09 hrs, Volume=	0.048 af
Outflow =	0.67 cfs @ 12.09 hrs, Volume=	0.048 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach AP2: Analysis Point 2

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

Inflow Area =	0.040 ac, 0.00% Impervious, Inflow Depth > 1.75"	for 10 Yr 24 Hr +15% event
Inflow =	0.08 cfs @ 12.10 hrs, Volume=	0.006 af
Outflow =	0.08 cfs @ 12.10 hrs, Volume=	0.006 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 =	2.167 ac, 16.06% Impervious, Inflow Depth > 1.55"	for 10 Yr 24 Hr +15% event
Inflow =	2.12 cfs @ 12.22 hrs, Volume=	0.279 af
Outflow =	2.12 cfs @ 12.22 hrs, Volume=	0.279 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: Bioretention Pond

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

Inflow Area = 0.648 ac, 45.28% Impervious, Inflow Depth > 3.28" for 10 Yr 24 Hr +15% event
Inflow = 2.30 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 0.15 cfs @ 13.96 hrs, Volume= 0.155 af, Atten= 93%, Lag= 111.9 min
Discarded = 0.10 cfs @ 13.96 hrs, Volume= 0.106 af
Primary = 0.05 cfs @ 13.96 hrs, Volume= 0.049 af
Routed to Reach 4R : Flow Through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 62.21' @ 13.96 hrs Surf.Area= 2,793 sf Storage= 3,721 cf

Plug-Flow detention time= 260.5 min calculated for 0.155 af (88% of inflow)
Center-of-Mass det. time= 203.0 min (1,003.3 - 800.3)

Volume	Invert	Avail.Storage	Storage Description
#1	58.09'	6,166 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.09	466	106.0	0.0	0	0	466
58.10	466	106.0	40.0	2	2	467
59.09	466	106.0	40.0	185	186	572
59.10	466	106.0	15.0	1	187	573
60.59	466	106.0	15.0	104	291	731
60.60	466	106.0	100.0	5	296	732
61.00	2,114	176.0	100.0	476	772	2,304
62.00	2,672	195.0	100.0	2,388	3,160	2,895
63.00	3,285	215.0	100.0	2,973	6,133	3,579
63.01	3,285	215.0	100.0	33	6,166	3,581

Device	Routing	Invert	Outlet Devices
#1	Primary	58.60'	**12.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.60' / 58.00' S= 0.0333 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	58.90'	**1.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	62.65'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	58.09'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 57.92' Phase-In= 0.10'

Discarded OutFlow Max=0.10 cfs @ 13.96 hrs HW=62.21' (Free Discharge)
└─**4=Exfiltration** (Controls 0.10 cfs)

Primary OutFlow Max=0.05 cfs @ 13.96 hrs HW=62.21' TW=58.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.05 cfs of 5.26 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 8.70 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 2P: Stone Drip Edge

Ledge surface modelled 15" below original grade based on TP 1 and TP 4. Proposed grade is approximately 4' above existing grade and therefore 5.25' above ledge.

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth > 5.37" for 10 Yr 24 Hr +15% event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af
Outflow = 0.00 cfs @ 15.49 hrs, Volume= 0.004 af, Atten= 97%, Lag= 204.3 min
Discarded = 0.00 cfs @ 15.49 hrs, Volume= 0.004 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
  Routed to Reach 2R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 65.98' @ 15.49 hrs Surf.Area= 0.004 ac Storage= 0.006 af

Plug-Flow detention time= 332.3 min calculated for 0.004 af (50% of inflow)
Center-of-Mass det. time= 201.5 min (947.3 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	62.50'	0.006 af	**3.00'W x 60.00'L x 3.51'H Prismatoid**
			0.015 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	66.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	62.50'	**0.300 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 60.75' Phase-In= 0.10'

Discarded OutFlow Max=0.00 cfs @ 15.49 hrs HW=65.98' (Free Discharge)
└─**1=Exfiltration** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=62.50' TW=66.00' (Dynamic Tailwater)

Summary for Pond 3P: Stone Under Deck

Ledge surface modelled 15" below original grade based on TP 1 and TP 4. Proposed grade is approximately 3.2' above existing grade and therefore 4.45' above ledge.

Inflow Area = 0.013 ac,100.00% Impervious, Inflow Depth > 5.37" for 10 Yr 24 Hr +15% event
Inflow = 0.07 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.00 cfs @ 15.02 hrs, Volume= 0.004 af, Atten= 96%, Lag= 176.3 min
Discarded = 0.00 cfs @ 15.02 hrs, Volume= 0.004 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 65.97' @ 15.02 hrs Surf.Area= 0.006 ac Storage= 0.003 af

Plug-Flow detention time= 294.9 min calculated for 0.004 af (62% of inflow)
Center-of-Mass det. time= 187.7 min (933.4 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	64.70'	0.004 af	**14.00'W x 20.00'L x 1.50'H Prismatoid** 0.010 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	66.20'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	64.70'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 61.75' Phase-In= 0.10'

Discarded OutFlow Max=0.00 cfs @ 15.02 hrs HW=65.97' (Free Discharge)
└─**1=Exfiltration** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=64.70' TW=66.00' (Dynamic Tailwater)

Summary for Pond 4P: Stone Drip Edge

Ledge surface modelled 15" below original grade based on TP 1 and TP 4. Proposed grade is approximately 4' above existing grade and therefore 5.25' above ledge.

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth > 5.37" for 10 Yr 24 Hr +15% event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af
Outflow = 0.01 cfs @ 13.80 hrs, Volume= 0.006 af, Atten= 94%, Lag= 103.0 min
Discarded = 0.01 cfs @ 13.80 hrs, Volume= 0.006 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 64.56' @ 13.80 hrs Surf.Area= 0.004 ac Storage= 0.005 af

Plug-Flow detention time= 301.8 min calculated for 0.006 af (71% of inflow)
Center-of-Mass det. time= 209.5 min (955.2 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	61.50'	0.007 af	**3.00'W x 60.00'L x 4.51'H Prismatoid** 0.019 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	66.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	61.50'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 60.75' Phase-In= 0.10'

Discarded OutFlow Max=0.01 cfs @ 13.80 hrs HW=64.56' (Free Discharge)
└─**1=Exfiltration** (Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=61.50' TW=66.00' (Dynamic Tailwater)

Summary for Pond CB101: Catch Basin 101

Inflow Area = 0.128 ac, 53.91% Impervious, Inflow Depth > 3.62" for 10 Yr 24 Hr +15% event
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 0.039 af
Outflow = 0.49 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.09 hrs, Volume= 0.039 af
Routed to Pond CB102 : Catch Basin 102

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 62.78' @ 12.09 hrs
Flood Elev= 65.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.30'	**12.0" Round Culvert** L= 19.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.30' / 62.20' S= 0.0053 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.09 hrs HW=62.77' TW=62.62' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.48 cfs @ 1.94 fps)

Summary for Pond CB102: Catch Basin 102

Inflow Area = 0.163 ac, 63.75% Impervious, Inflow Depth > 3.99" for 10 Yr 24 Hr +15% event
Inflow = 0.68 cfs @ 12.09 hrs, Volume= 0.054 af
Outflow = 0.68 cfs @ 12.09 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.68 cfs @ 12.09 hrs, Volume= 0.054 af
Routed to Pond CB104 : Catch Basin 104

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 62.63' @ 12.09 hrs
Flood Elev= 65.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.10'	**12.0" Round Culvert** L= 147.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.10' / 61.30' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.67 cfs @ 12.09 hrs HW=62.62' TW=62.04' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.67 cfs @ 2.34 fps)

Summary for Pond CB103: Catch Basin 103

Inflow Area = 0.260 ac, 58.22% Impervious, Inflow Depth > 3.72" for 10 Yr 24 Hr +15% event
Inflow = 1.05 cfs @ 12.09 hrs, Volume= 0.080 af
Outflow = 1.05 cfs @ 12.09 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min
Primary = 1.05 cfs @ 12.09 hrs, Volume= 0.080 af
Routed to Pond CB104 : Catch Basin 104

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.91' @ 12.09 hrs
Flood Elev= 73.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.30'	**12.0" Round Culvert** L= 43.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.30' / 66.00' S= 0.0070 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.03 cfs @ 12.09 hrs HW=66.90' TW=62.04' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.03 cfs @ 2.09 fps)

Summary for Pond CB104: Catch Basin 104

Inflow Area = 0.430 ac, 61.04% Impervious, Inflow Depth > 3.85" for 10 Yr 24 Hr +15% event
Inflow = 1.77 cfs @ 12.09 hrs, Volume= 0.138 af
Outflow = 1.77 cfs @ 12.09 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min
Primary = 1.77 cfs @ 12.09 hrs, Volume= 0.138 af
Routed to Pond 1P : Bioretention Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 62.21' @ 13.94 hrs
Flood Elev= 70.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	61.20'	**12.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.20' / 60.90' S= 0.0067 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.74 cfs @ 12.09 hrs HW=62.04' TW=61.45' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.74 cfs @ 2.46 fps)

Summary for Pond YD1: Yard Drain 1

Inflow Area = 0.083 ac, 29.12% Impervious, Inflow Depth > 2.67" for 10 Yr 24 Hr +15% event
Inflow = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af
Outflow = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min
Primary = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af
Routed to Pond CB101 : Catch Basin 101

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

Peak Elev= 63.12' @ 12.10 hrs
Flood Elev= 65.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.80'	**8.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.80' / 62.63' S= 0.0189 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.25 cfs @ 12.10 hrs HW=63.12' TW=62.78' (Dynamic Tailwater)
└—**1=Culvert** (Inlet Controls 0.25 cfs @ 1.52 fps)

Summary for Pond YD2: Yard Drain 2

Inflow Area = 0.105 ac, 49.42% Impervious, Inflow Depth > 3.33" for 10 Yr 24 Hr +15% event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af
Routed to Pond CB103 : Catch Basin 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.52' @ 12.09 hrs
Flood Elev= 69.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.10'	**8.0" Round Culvert** L= 52.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.10' / 66.80' S= 0.0058 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.39 cfs @ 12.09 hrs HW=67.52' TW=66.90' (Dynamic Tailwater)
└—**1=Culvert** (Barrel Controls 0.39 cfs @ 2.43 fps)

Summary for Pond YD3: Yard Drain 3

Inflow Area = 0.086 ac, 35.30% Impervious, Inflow Depth > 2.86" for 10 Yr 24 Hr +15% event
Inflow = 0.28 cfs @ 12.09 hrs, Volume= 0.020 af
Outflow = 0.28 cfs @ 12.09 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.09 hrs, Volume= 0.020 af
Routed to Pond CB103 : Catch Basin 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 68.34' @ 12.09 hrs
Flood Elev= 70.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**8.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.00' / 66.80' S= 0.0923 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.28 cfs @ 12.09 hrs HW=68.34' TW=66.90' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.28 cfs @ 1.56 fps)

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

Subcatchment1S: Subcatchment1S Runoff Area=7,392 sf 50.61% Impervious Runoff Depth>4.80"
Flow Length=186' Tc=6.0 min CN=80 Runoff=0.93 cfs 0.068 af

Subcatchment2S: Subcatchment2S Runoff Area=1,728 sf 0.00% Impervious Runoff Depth>2.79"
Flow Length=20' Slope=0.0500 '/' Tc=6.0 min CN=61 Runoff=0.12 cfs 0.009 af

Subcatchment3S: Subcatchment3S Runoff Area=45,177 sf 1.54% Impervious Runoff Depth>2.78"
Flow Length=291' Tc=17.0 min CN=61 Runoff=2.36 cfs 0.240 af

Subcatchment4S: Subcatchment4S Runoff Area=20,991 sf 8.04% Impervious Runoff Depth>3.09"
Flow Length=210' Tc=7.9 min CN=64 Runoff=1.60 cfs 0.124 af

Subcatchment6S: Subcatchment6S Runoff Area=1,952 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.31 cfs 0.026 af

Subcatchment7S: Subcatchment7S Runoff Area=1,516 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.24 cfs 0.020 af

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

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

Subcatchment10S: Subcatchment10S Runoff Area=3,630 sf 29.12% Impervious Runoff Depth>3.93"
Flow Length=142' Tc=6.3 min CN=72 Runoff=0.37 cfs 0.027 af

Subcatchment11S: Subcatchment11S Runoff Area=4,571 sf 49.42% Impervious Runoff Depth>4.69"
Flow Length=77' Slope=0.0396 '/' Tc=6.0 min CN=79 Runoff=0.56 cfs 0.041 af

Subcatchment12S: Subcatchment12S Runoff Area=3,734 sf 35.30% Impervious Runoff Depth>4.14"
Flow Length=51' Slope=0.0320 '/' Tc=6.0 min CN=74 Runoff=0.41 cfs 0.030 af

Subcatchment13S: Subcatchment13S Runoff Area=876 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.012 af

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

Subcatchment15S: Subcatchment15S Runoff Area=876 sf 100.00% Impervious Runoff Depth>6.88"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.012 af

Subcatchment18S: Subcatchment18S Runoff Area=9,474 sf 14.12% Impervious Runoff Depth>3.30"
Flow Length=58' Tc=6.0 min CN=66 Runoff=0.82 cfs 0.060 af

Reach 1R: Ditch on Tidewatch Property Avg. Flow Depth=0.40' Max Vel=2.71 fps Inflow=2.41 cfs 0.312 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=2.41 cfs 0.312 af

Reach 2R: Flow through 3S Avg. Flow Depth=0.01' Max Vel=1.19 fps Inflow=0.05 cfs 0.003 af
n=0.030 L=81.0' S=0.3457 '/' Capacity=740.30 cfs Outflow=0.05 cfs 0.003 af

Reach 4R: Flow Through 3S Avg. Flow Depth=0.04' Max Vel=1.69 fps Inflow=0.21 cfs 0.070 af
n=0.030 L=220.0' S=0.0909 '/' Capacity=66.79 cfs Outflow=0.21 cfs 0.070 af

Reach AP1: Analysis Point 1 Inflow=0.93 cfs 0.068 af
Outflow=0.93 cfs 0.068 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=3.47 cfs 0.436 af
Outflow=3.47 cfs 0.436 af

Pond 1P: Bioretention Pond Peak Elev=62.70' Storage=5,186 cf Inflow=3.23 cfs 0.247 af
Discarded=0.12 cfs 0.125 af Primary=0.21 cfs 0.070 af Outflow=0.33 cfs 0.195 af

Pond 2P: Stone Drip Edge Peak Elev=66.01' Storage=0.006 af Inflow=0.14 cfs 0.012 af
Discarded=0.00 cfs 0.005 af Secondary=0.05 cfs 0.002 af Outflow=0.05 cfs 0.007 af

Pond 3P: Stone Under Deck Peak Elev=66.20' Storage=0.004 af Inflow=0.09 cfs 0.007 af
Discarded=0.00 cfs 0.004 af Secondary=0.01 cfs 0.001 af Outflow=0.01 cfs 0.005 af

Pond 4P: Stone Drip Edge Peak Elev=65.51' Storage=0.007 af Inflow=0.14 cfs 0.012 af
Discarded=0.01 cfs 0.008 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.008 af

Pond CB101: Catch Basin 101 Peak Elev=62.92' Inflow=0.68 cfs 0.053 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0053 '/' Outflow=0.68 cfs 0.053 af

Pond CB102: Catch Basin 102 Peak Elev=62.85' Inflow=0.92 cfs 0.073 af
12.0" Round Culvert n=0.012 L=147.0' S=0.0054 '/' Outflow=0.92 cfs 0.073 af

Pond CB103: Catch Basin 103 Peak Elev=67.04' Inflow=1.44 cfs 0.110 af
12.0" Round Culvert n=0.012 L=43.0' S=0.0070 '/' Outflow=1.44 cfs 0.110 af

Pond CB104: Catch Basin 104 Peak Elev=62.71' Inflow=2.41 cfs 0.187 af
12.0" Round Culvert n=0.012 L=45.0' S=0.0067 '/' Outflow=2.41 cfs 0.187 af

Pond YD1: Yard Drain 1 Peak Elev=63.20' Inflow=0.37 cfs 0.027 af
8.0" Round Culvert n=0.012 L=9.0' S=0.0189 '/' Outflow=0.37 cfs 0.027 af

Pond YD2: Yard Drain 2 Peak Elev=67.62' Inflow=0.56 cfs 0.041 af
8.0" Round Culvert n=0.012 L=52.0' S=0.0058 '/' Outflow=0.56 cfs 0.041 af

Pond YD3: Yard Drain 3 Peak Elev=68.42' Inflow=0.41 cfs 0.030 af
8.0" Round Culvert n=0.012 L=13.0' S=0.0923 '/' Outflow=0.41 cfs 0.030 af

Total Runoff Area = 2.429 ac Runoff Volume = 0.719 af Average Runoff Depth = 3.55"
79.95% Pervious = 1.942 ac 20.05% Impervious = 0.487 ac

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

Subcatchment1S: Subcatchment1S Runoff Area=7,392 sf 50.61% Impervious Runoff Depth>6.12"
Flow Length=186' Tc=6.0 min CN=80 Runoff=1.17 cfs 0.087 af

Subcatchment2S: Subcatchment2S Runoff Area=1,728 sf 0.00% Impervious Runoff Depth>3.85"
Flow Length=20' Slope=0.0500 '/' Tc=6.0 min CN=61 Runoff=0.17 cfs 0.013 af

Subcatchment3S: Subcatchment3S Runoff Area=45,177 sf 1.54% Impervious Runoff Depth>3.84"
Flow Length=291' Tc=17.0 min CN=61 Runoff=3.32 cfs 0.332 af

Subcatchment4S: Subcatchment4S Runoff Area=20,991 sf 8.04% Impervious Runoff Depth>4.20"
Flow Length=210' Tc=7.9 min CN=64 Runoff=2.19 cfs 0.169 af

Subcatchment6S: Subcatchment6S Runoff Area=1,952 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.37 cfs 0.031 af

Subcatchment7S: Subcatchment7S Runoff Area=1,516 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.28 cfs 0.024 af

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

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

Subcatchment10S: Subcatchment10S Runoff Area=3,630 sf 29.12% Impervious Runoff Depth>5.16"
Flow Length=142' Tc=6.3 min CN=72 Runoff=0.49 cfs 0.036 af

Subcatchment11S: Subcatchment11S Runoff Area=4,571 sf 49.42% Impervious Runoff Depth>6.00"
Flow Length=77' Slope=0.0396 '/' Tc=6.0 min CN=79 Runoff=0.71 cfs 0.052 af

Subcatchment12S: Subcatchment12S Runoff Area=3,734 sf 35.30% Impervious Runoff Depth>5.40"
Flow Length=51' Slope=0.0320 '/' Tc=6.0 min CN=74 Runoff=0.53 cfs 0.039 af

Subcatchment13S: Subcatchment13S Runoff Area=876 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.014 af

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

Subcatchment15S: Subcatchment15S Runoff Area=876 sf 100.00% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.014 af

Subcatchment18S: Subcatchment18S Runoff Area=9,474 sf 14.12% Impervious Runoff Depth>4.44"
Flow Length=58' Tc=6.0 min CN=66 Runoff=1.11 cfs 0.081 af

Reach 1R: Ditch on Tidewatch Property Avg. Flow Depth=0.51' Max Vel=3.08 fps Inflow=3.98 cfs 0.460 af
n=0.030 L=159.0' S=0.0189 '/' Capacity=18.18 cfs Outflow=3.98 cfs 0.460 af

Reach 2R: Flow through 3S Avg. Flow Depth=0.02' Max Vel=1.55 fps Inflow=0.12 cfs 0.006 af
n=0.030 L=81.0' S=0.3457 '/' Capacity=740.30 cfs Outflow=0.12 cfs 0.006 af

Reach 4R: Flow Through 3S Avg. Flow Depth=0.11' Max Vel=3.19 fps Inflow=1.18 cfs 0.122 af
n=0.030 L=220.0' S=0.0909 '/' Capacity=66.79 cfs Outflow=1.17 cfs 0.122 af

Reach AP1: Analysis Point 1 Inflow=1.17 cfs 0.087 af
Outflow=1.17 cfs 0.087 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=5.03 cfs 0.629 af
Outflow=5.03 cfs 0.629 af

Pond 1P: Bioretention Pond Peak Elev=62.85' Storage=5,639 cf Inflow=4.12 cfs 0.315 af
Discarded=0.12 cfs 0.132 af Primary=1.18 cfs 0.122 af Outflow=1.30 cfs 0.254 af

Pond 2P: Stone Drip Edge Peak Elev=66.01' Storage=0.006 af Inflow=0.16 cfs 0.014 af
Discarded=0.00 cfs 0.005 af Secondary=0.11 cfs 0.004 af Outflow=0.11 cfs 0.009 af

Pond 3P: Stone Under Deck Peak Elev=66.20' Storage=0.004 af Inflow=0.11 cfs 0.009 af
Discarded=0.00 cfs 0.004 af Secondary=0.04 cfs 0.002 af Outflow=0.05 cfs 0.006 af

Pond 4P: Stone Drip Edge Peak Elev=66.01' Storage=0.007 af Inflow=0.16 cfs 0.014 af
Discarded=0.01 cfs 0.009 af Secondary=0.02 cfs 0.001 af Outflow=0.03 cfs 0.010 af

Pond CB101: Catch Basin 101 Peak Elev=63.28' Inflow=0.86 cfs 0.067 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0053 '/' Outflow=0.86 cfs 0.067 af

Pond CB102: Catch Basin 102 Peak Elev=63.42' Inflow=1.14 cfs 0.091 af
12.0" Round Culvert n=0.012 L=147.0' S=0.0054 '/' Outflow=1.14 cfs 0.091 af

Pond CB103: Catch Basin 103 Peak Elev=67.16' Inflow=1.81 cfs 0.139 af
12.0" Round Culvert n=0.012 L=43.0' S=0.0070 '/' Outflow=1.81 cfs 0.139 af

Pond CB104: Catch Basin 104 Peak Elev=63.25' Inflow=3.01 cfs 0.235 af
12.0" Round Culvert n=0.012 L=45.0' S=0.0067 '/' Outflow=3.01 cfs 0.235 af

Pond YD1: Yard Drain 1 Peak Elev=63.50' Inflow=0.49 cfs 0.036 af
8.0" Round Culvert n=0.012 L=9.0' S=0.0189 '/' Outflow=0.49 cfs 0.036 af

Pond YD2: Yard Drain 2 Peak Elev=67.72' Inflow=0.71 cfs 0.052 af
8.0" Round Culvert n=0.012 L=52.0' S=0.0058 '/' Outflow=0.71 cfs 0.052 af

Pond YD3: Yard Drain 3 Peak Elev=68.50' Inflow=0.53 cfs 0.039 af
8.0" Round Culvert n=0.012 L=13.0' S=0.0923 '/' Outflow=0.53 cfs 0.039 af

Total Runoff Area = 2.429 ac Runoff Volume = 0.952 af Average Runoff Depth = 4.70"
79.95% Pervious = 1.942 ac 20.05% Impervious = 0.487 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 1.17 cfs @ 12.09 hrs, Volume= 0.087 af, Depth> 6.12"
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 +15% Rainfall=8.53"

Area (sf)	CN	Description
3,741	98	Paved parking, HSG B
3,651	61	>75% Grass cover, Good, HSG B
7,392	80	Weighted Average
3,651		49.39% Pervious Area
3,741		50.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	56	0.1250	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
2.1	30	0.0670	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.2	14	0.0360	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.70"
0.4	86	0.0360	3.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	186	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 0.17 cfs @ 12.10 hrs, Volume= 0.013 af, Depth> 3.85"
Routed to Reach AP2 : Analysis Point 2

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

Area (sf)	CN	Description
1,728	61	>75% Grass cover, Good, HSG B
1,728		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	20	0.0500	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.7	20	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 3.32 cfs @ 12.24 hrs, Volume= 0.332 af, Depth> 3.84"
Routed to Reach 1R : Ditch on Tidewatch Property

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

Area (sf)	CN	Description
695	98	Roofs, HSG B
16,659	61	>75% Grass cover, Good, HSG B
27,823	60	Woods, Fair, HSG B
45,177	61	Weighted Average
44,482		98.46% Pervious Area
695		1.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	53	0.0415	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
5.8	47	0.0968	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.2	15	0.0968	1.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	54	0.0741	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	122	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.0	291	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 2.19 cfs @ 12.12 hrs, Volume= 0.169 af, Depth> 4.20"
Routed to Reach AP3 : Analysis Point 3

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

Area (sf)	CN	Description
11,135	61	>75% Grass cover, Good, HSG B
8,169	60	Woods, Fair, HSG B
1,687	98	Roofs, HSG B
20,991	64	Weighted Average
19,304		91.96% Pervious Area
1,687		8.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	14	0.0357	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.9	14	0.1429	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
3.3	72	0.1333	0.37		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.0	80	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2667	2.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.9	210	Total			

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 0.37 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 8.28"
Routed to Pond CB101 : Catch Basin 101

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

Area (sf)	CN	Description
1,952	98	Paved parking, HSG B
1,952		100.00% Impervious Area

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

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.024 af, Depth> 8.28"
Routed to Pond CB102 : Catch Basin 102

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

Area (sf)	CN	Description
1,516	98	Paved parking, HSG B
1,516		100.00% Impervious Area

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

Summary for Subcatchment 8S: Subcatchment 8S

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

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

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

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

Summary for Subcatchment 9S: Subcatchment 9S

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

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

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

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

Summary for Subcatchment 10S: Subcatchment 10S

Runoff = 0.49 cfs @ 12.10 hrs, Volume= 0.036 af, Depth> 5.16"
Routed to Pond YD1 : Yard Drain 1

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

Area (sf)	CN	Description
796	98	Roofs, HSG B
2,573	61	>75% Grass cover, Good, HSG B
261	98	Paved parking, HSG B
3,630	72	Weighted Average
2,573		70.88% Pervious Area
1,057		29.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	42	0.1190	0.31		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
3.7	58	0.0650	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.4	42	0.0650	1.78		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	142	Total			

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 0.052 af, Depth> 6.00"
Routed to Pond YD2 : Yard Drain 2

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

Area (sf)	CN	Description
1,998	98	Roofs, HSG B
2,312	61	>75% Grass cover, Good, HSG B
261	98	Paved parking, HSG B
4,571	79	Weighted Average
2,312		50.58% Pervious Area
2,259		49.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	77	0.0396	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
5.6	77	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 12S: Subcatchment 12S

Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.039 af, Depth> 5.40"
Routed to Pond YD3 : Yard Drain 3

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

Area (sf)	CN	Description
1,318	98	Roofs, HSG B
2,416	61	>75% Grass cover, Good, HSG B
3,734	74	Weighted Average
2,416		64.70% Pervious Area
1,318		35.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	51	0.0320	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
4.4	51	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 13S: Subcatchment 13S

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af, Depth> 8.28"
Routed to Pond 2P : Stone Drip Edge

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

Area (sf)	CN	Description
696	98	Roofs, HSG B
180	98	Water Surface, HSG B
876	98	Weighted Average
876		100.00% Impervious Area

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

Summary for Subcatchment 14S: Subcatchment 14S

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

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

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

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

Summary for Subcatchment 15S: Subcatchment 15S

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af, Depth> 8.28"
Routed to Pond 4P : Stone Drip Edge

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

Area (sf)	CN	Description
696	98	Roofs, HSG B
180	98	Water Surface, HSG B
876	98	Weighted Average
876		100.00% Impervious Area

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

Summary for Subcatchment 18S: Subcatchment 18S

Runoff = 1.11 cfs @ 12.09 hrs, Volume= 0.081 af, Depth> 4.44"
Routed to Pond 1P : Bioretention Pond

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

Area (sf)	CN	Description
8,136	61	>75% Grass cover, Good, HSG B
938	98	Roofs, HSG B
400	98	Paved parking, HSG B
9,474	66	Weighted Average
8,136		85.88% Pervious Area
1,338		14.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	43	0.0930	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.6	15	0.3333	0.39		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
3.1	58	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: Ditch on Tidewatch Property

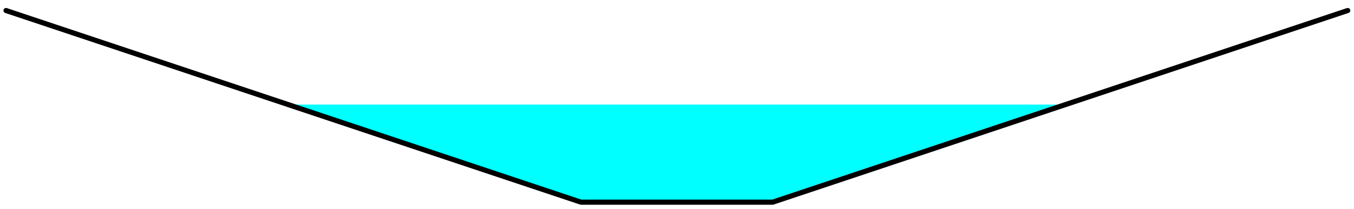
[62] Hint: Exceeded Reach 2R OUTLET depth by 0.49' @ 12.35 hrs
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.45' @ 12.20 hrs

Inflow Area = 1.685 ac, 18.36% Impervious, Inflow Depth > 3.28" for 50 Yr 24 Hr +15% event
Inflow = 3.98 cfs @ 12.34 hrs, Volume= 0.460 af
Outflow = 3.98 cfs @ 12.35 hrs, Volume= 0.460 af, Atten= 0%, Lag= 0.7 min
Routed to Reach AP3 : Analysis Point 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.08 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 2.0 min

Peak Storage= 205 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.51' , Surface Width= 4.06'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 18.18 cfs

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



Summary for Reach 2R: Flow through 3S

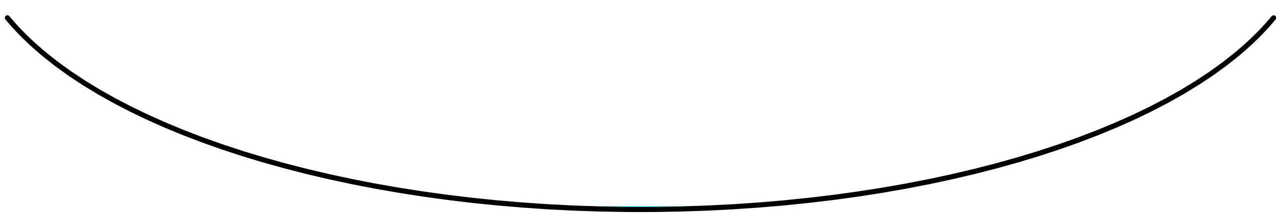
Inflow	=	0.12 cfs @	12.26 hrs, Volume=	0.006 af	
Outflow	=	0.12 cfs @	12.20 hrs, Volume=	0.006 af,	Atten= 0%, Lag= 0.0 min

Routed to Reach 1R : Ditch on Tidewatch Property

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.55 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 1.3 min

Peak Storage= 6 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.02' , Surface Width= 6.47'
Bank-Full Depth= 1.00' Flow Area= 33.3 sf, Capacity= 740.30 cfs

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



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Summary for Reach 4R: Flow Through 3S

Inflow Area =		0.648 ac,	45.28% Impervious, Inflow Depth > 2.27"	for 50 Yr 24 Hr +15% event	
Inflow	=	1.18 cfs @	12.42 hrs, Volume=	0.122 af	
Outflow	=	1.17 cfs @	12.43 hrs, Volume=	0.122 af,	Atten= 1%, Lag= 0.8 min

Routed to Reach 1R : Ditch on Tidewatch Property

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.19 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 3.4 min

Peak Storage= 81 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 3.66'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 66.79 cfs

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

‡

Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 0.170 ac, 50.61% Impervious, Inflow Depth > 6.12" for 50 Yr 24 Hr +15% event
Inflow = 1.17 cfs @ 12.09 hrs, Volume= 0.087 af
Outflow = 1.17 cfs @ 12.09 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach AP2: Analysis Point 2

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

Inflow Area = 0.040 ac, 0.00% Impervious, Inflow Depth > 3.85" for 50 Yr 24 Hr +15% event
Inflow = 0.17 cfs @ 12.10 hrs, Volume= 0.013 af
Outflow = 0.17 cfs @ 12.10 hrs, Volume= 0.013 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 = 2.167 ac, 16.06% Impervious, Inflow Depth > 3.48" for 50 Yr 24 Hr +15% event
Inflow = 5.03 cfs @ 12.33 hrs, Volume= 0.629 af
Outflow = 5.03 cfs @ 12.33 hrs, Volume= 0.629 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 1P: Bioretention Pond

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

Inflow Area = 0.648 ac, 45.28% Impervious, Inflow Depth > 5.84" for 50 Yr 24 Hr +15% event
Inflow = 4.12 cfs @ 12.09 hrs, Volume= 0.315 af
Outflow = 1.30 cfs @ 12.42 hrs, Volume= 0.254 af, Atten= 68%, Lag= 19.6 min
Discarded = 0.12 cfs @ 12.42 hrs, Volume= 0.132 af
Primary = 1.18 cfs @ 12.42 hrs, Volume= 0.122 af
Routed to Reach 4R : Flow Through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 62.85' @ 12.42 hrs Surf.Area= 3,187 sf Storage= 5,639 cf

Plug-Flow detention time= 216.2 min calculated for 0.254 af (81% of inflow)
Center-of-Mass det. time= 139.8 min (930.8 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	58.09'	6,166 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.09	466	106.0	0.0	0	0	466
58.10	466	106.0	40.0	2	2	467
59.09	466	106.0	40.0	185	186	572
59.10	466	106.0	15.0	1	187	573
60.59	466	106.0	15.0	104	291	731
60.60	466	106.0	100.0	5	296	732
61.00	2,114	176.0	100.0	476	772	2,304
62.00	2,672	195.0	100.0	2,388	3,160	2,895
63.00	3,285	215.0	100.0	2,973	6,133	3,579
63.01	3,285	215.0	100.0	33	6,166	3,581

Device	Routing	Invert	Outlet Devices
#1	Primary	58.60'	**12.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.60' / 58.00' S= 0.0333 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	58.90'	**1.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	62.65'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	58.09'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 57.92' Phase-In= 0.10'

Discarded OutFlow Max=0.12 cfs @ 12.42 hrs HW=62.85' (Free Discharge)
└—**4=Exfiltration** (Controls 0.12 cfs)

Primary OutFlow Max=1.16 cfs @ 12.42 hrs HW=62.85' TW=58.11' (Dynamic Tailwater)
└—**1=Culvert** (Passes 1.16 cfs of 5.78 cfs potential flow)
  ├—**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 9.51 fps)
  └—**3=Orifice/Grate** (Weir Controls 1.11 cfs @ 1.45 fps)

Summary for Pond 2P: Stone Drip Edge

Ledge surface modelled 15" below original grade based on TP 1 and TP 4. Proposed grade is approximately 4' above existing grade and therefore 5.25' above ledge.

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth > 8.28" for 50 Yr 24 Hr +15% event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.11 cfs @ 12.20 hrs, Volume= 0.009 af, Atten= 32%, Lag= 6.6 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.005 af
Secondary = 0.11 cfs @ 12.20 hrs, Volume= 0.004 af
Routed to Reach 2R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.01' @ 12.15 hrs Surf.Area= 0.004 ac Storage= 0.006 af

Plug-Flow detention time= 220.2 min calculated for 0.009 af (64% of inflow)
Center-of-Mass det. time= 113.7 min (853.7 - 740.0)

Volume	Invert	Avail.Storage	Storage Description
#1	62.50'	0.006 af	**3.00'W x 60.00'L x 3.51'H Prismatoid** 0.015 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	66.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	62.50'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 60.75' Phase-In= 0.10'

Discarded OutFlow Max=0.00 cfs @ 12.15 hrs HW=66.01' (Free Discharge)
└—**1=Exfiltration** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.20 hrs HW=66.01' TW=66.02' (Dynamic Tailwater)

Summary for Pond 3P: Stone Under Deck

Ledge surface modelled 15" below original grade based on TP 1 and TP 4. Proposed grade is approximately 3.2' above existing grade and therefore 4.45' above ledge.

Inflow Area = 0.013 ac,100.00% Impervious, Inflow Depth > 8.28" for 50 Yr 24 Hr +15% event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af
Outflow = 0.05 cfs @ 12.30 hrs, Volume= 0.006 af, Atten= 56%, Lag= 13.1 min
Discarded = 0.00 cfs @ 12.25 hrs, Volume= 0.004 af
Secondary = 0.04 cfs @ 12.30 hrs, Volume= 0.002 af
Routed to Reach 2R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.20' @ 12.25 hrs Surf.Area= 0.006 ac Storage= 0.004 af

Plug-Flow detention time= 224.3 min calculated for 0.006 af (66% of inflow)
Center-of-Mass det. time= 122.1 min (862.1 - 740.0)

Volume	Invert	Avail.Storage	Storage Description
#1	64.70'	0.004 af	**14.00'W x 20.00'L x 1.50'H Prismatoid** 0.010 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	66.20'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	64.70'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 61.75' Phase-In= 0.10'

Discarded OutFlow Max=0.00 cfs @ 12.25 hrs HW=66.20' (Free Discharge)
└─**1=Exfiltration** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.30 hrs HW=66.20' TW=66.02' (Dynamic Tailwater)

Summary for Pond 4P: Stone Drip Edge

Ledge surface modelled 15" below original grade based on TP 1 and TP 4. Proposed grade is approximately 4' above existing grade and therefore 5.25' above ledge.

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth > 8.28" for 50 Yr 24 Hr +15% event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.03 cfs @ 12.55 hrs, Volume= 0.010 af, Atten= 81%, Lag= 27.8 min
Discarded = 0.01 cfs @ 12.50 hrs, Volume= 0.009 af
Secondary = 0.02 cfs @ 12.55 hrs, Volume= 0.001 af
Routed to Reach 2R : Flow through 3S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 66.01' @ 12.50 hrs Surf.Area= 0.004 ac Storage= 0.007 af

Plug-Flow detention time= 297.2 min calculated for 0.010 af (70% of inflow)
Center-of-Mass det. time= 201.2 min (941.2 - 740.0)

Volume	Invert	Avail.Storage	Storage Description
#1	61.50'	0.007 af	**3.00'W x 60.00'L x 4.51'H Prismatoid** 0.019 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	66.01'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	61.50'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 60.75' Phase-In= 0.10'

Discarded OutFlow Max=0.01 cfs @ 12.50 hrs HW=66.01' (Free Discharge)
└─**1=Exfiltration** (Controls 0.01 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.55 hrs HW=66.01' TW=66.01' (Dynamic Tailwater)

Summary for Pond CB101: Catch Basin 101

Inflow Area = 0.128 ac, 53.91% Impervious, Inflow Depth > 6.25" for 50 Yr 24 Hr +15% event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.067 af
Outflow = 0.86 cfs @ 12.09 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.09 hrs, Volume= 0.067 af
Routed to Pond CB102 : Catch Basin 102

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 63.28' @ 12.10 hrs
Flood Elev= 65.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.30'	**12.0" Round Culvert** L= 19.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.30' / 62.20' S= 0.0053 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=63.24' TW=63.35' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB102: Catch Basin 102

[80] Warning: Exceeded Pond CB101 by 0.14' @ 12.10 hrs (1.10 cfs 0.017 af)

Inflow Area = 0.163 ac, 63.75% Impervious, Inflow Depth > 6.69" for 50 Yr 24 Hr +15% event
Inflow = 1.14 cfs @ 12.09 hrs, Volume= 0.091 af
Outflow = 1.14 cfs @ 12.09 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min
Primary = 1.14 cfs @ 12.09 hrs, Volume= 0.091 af
Routed to Pond CB104 : Catch Basin 104

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 63.42' @ 12.11 hrs
Flood Elev= 65.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.10'	**12.0" Round Culvert** L= 147.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.10' / 61.30' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.17 cfs @ 12.09 hrs HW=63.34' TW=63.16' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.17 cfs @ 1.54 fps)

Summary for Pond CB103: Catch Basin 103

Inflow Area = 0.260 ac, 58.22% Impervious, Inflow Depth > 6.41" for 50 Yr 24 Hr +15% event
Inflow = 1.81 cfs @ 12.09 hrs, Volume= 0.139 af
Outflow = 1.81 cfs @ 12.09 hrs, Volume= 0.139 af, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.09 hrs, Volume= 0.139 af
Routed to Pond CB104 : Catch Basin 104

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.16' @ 12.09 hrs
Flood Elev= 73.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.30'	**12.0" Round Culvert** L= 43.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.30' / 66.00' S= 0.0070 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.76 cfs @ 12.09 hrs HW=67.15' TW=63.15' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.76 cfs @ 2.48 fps)

Summary for Pond CB104: Catch Basin 104

Inflow Area = 0.430 ac, 61.04% Impervious, Inflow Depth > 6.55" for 50 Yr 24 Hr +15% event
Inflow = 3.01 cfs @ 12.09 hrs, Volume= 0.235 af
Outflow = 3.01 cfs @ 12.09 hrs, Volume= 0.235 af, Atten= 0%, Lag= 0.0 min
Primary = 3.01 cfs @ 12.09 hrs, Volume= 0.235 af
Routed to Pond 1P : Bioretention Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 63.25' @ 12.11 hrs
Flood Elev= 70.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	61.20'	**12.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.20' / 60.90' S= 0.0067 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.94 cfs @ 12.09 hrs HW=63.15' TW=62.18' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.94 cfs @ 3.74 fps)

Summary for Pond YD1: Yard Drain 1

Inflow Area = 0.083 ac, 29.12% Impervious, Inflow Depth > 5.16" for 50 Yr 24 Hr +15% event
Inflow = 0.49 cfs @ 12.10 hrs, Volume= 0.036 af
Outflow = 0.49 cfs @ 12.10 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.10 hrs, Volume= 0.036 af
Routed to Pond CB101 : Catch Basin 101

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 63.50' @ 12.15 hrs
Flood Elev= 65.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.80'	**8.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.80' / 62.63' S= 0.0189 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.34 cfs @ 12.10 hrs HW=63.34' TW=63.25' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.34 cfs @ 1.12 fps)

Summary for Pond YD2: Yard Drain 2

Inflow Area = 0.105 ac, 49.42% Impervious, Inflow Depth > 6.00" for 50 Yr 24 Hr +15% event
Inflow = 0.71 cfs @ 12.09 hrs, Volume= 0.052 af
Outflow = 0.71 cfs @ 12.09 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min
Primary = 0.71 cfs @ 12.09 hrs, Volume= 0.052 af
Routed to Pond CB103 : Catch Basin 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 67.72' @ 12.09 hrs
Flood Elev= 69.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.10'	**8.0" Round Culvert** L= 52.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.10' / 66.80' S= 0.0058 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.70 cfs @ 12.09 hrs HW=67.71' TW=67.15' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.70 cfs @ 2.09 fps)

Summary for Pond YD3: Yard Drain 3

Inflow Area = 0.086 ac, 35.30% Impervious, Inflow Depth > 5.40" for 50 Yr 24 Hr +15% event
Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.039 af
Outflow = 0.53 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.53 cfs @ 12.09 hrs, Volume= 0.039 af
Routed to Pond CB103 : Catch Basin 103

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

Peak Elev= 68.50' @ 12.09 hrs
Flood Elev= 70.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**8.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.00' / 66.80' S= 0.0923 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Primary OutFlow Max=0.52 cfs @ 12.09 hrs HW=68.49' TW=67.15' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.52 cfs @ 1.88 fps)

APPENDIX III

Test Pit Logs

GOVE ENVIRONMENTAL SERVICES, INC.

TEST PIT DATA

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

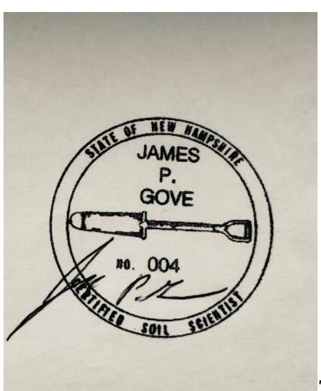
Depth	Color	Texture	Structure	Consistence	Redox; Quantity/Contrast
0–6”	10YR 3/2	FSL	GR	FR	NONE
6–35”	10YR 5/6	FSL	GR	FR	NONE
35–40”	2.5Y 5/3	FSL	OM	FI	10% Distinct

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

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

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

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



3-21-2022

Legend:

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

APPENDIX IV

Site Specific Soil Survey Report and Map

SITE-SPECIFIC SOIL SURVEY REPORT
For
635 Sagamore Avenue, Portsmouth, NH
By
GES, Inc.
Project # 2021308
Date: 02-20-2024

1. MAPPING STANDARDS

Site-Specific Soil Mapping Standards for New Hampshire and Vermont. SSSNNE Special Publication No. 3, Version 7.0, July, 2021.

This map product is within the technical standards of the National Cooperative Soil Survey. It is a special purpose product, intended for infiltration requirements by the NH DES Alteration of Terrain Bureau. The soil map was produced by a professional soil scientist and is not a product of the USDA Natural Resources Conservation Service. This report accompanies the soil map.

The site-specific soil map (SSSM) was produced 2-20-2024; prepared by JP Gove, CSS #004, GES, Inc.

Soils were identified with the New Hampshire State-wide Numerical Soils Legend, USDA NRCS, Durham, NH. Issue # 10, January 2011.

Hydrologic Soil Group was determined using SSSNNE Special Publication No. 5, Ksat Values for New Hampshire Soils, September 2009.

High Intensity Soil Map symbols, based upon SSSNNE Special Publication 1, December 2017, were added to the Soil Legend.

Scale of soil map: Approximately 1" = 20'.

Contours Interval: 2 feet

2. LANDFORMS & EXISTING CONDITIONS:

The site is located on sloping hillside that is bedrock controlled. Rock outcrops are numerous. At the top of the hill, adjacent Sagamore Avenue, is an existing commercial building and paved areas. Behind the impervious areas to the south, the hillside slopes downward. The area is forested in white pines. There are no wetlands on the site.

3. DATE SOIL MAP PRODUCED

Date(s) of on-site field work: 3-18-2022

Date(s) of test pits: 3-18-2922

Test pits recorded by: JP Gove, CSS # 004

4. GEOGRAPHIC LOCATION AND SIZE OF SITE

City or town where soil mapping was conducted: Portsmouth, NH

Location: Tax Map 222 Lot 19

Size of area: Approximately 2 acres

Was the map for the entire lot? Yes

If no, where was the mapping conducted on the parcel: n/a

5. PURPOSE OF THE SOIL MAP

Was the map prepared to meet the requirement of Alteration of Terrain? No

If no, what was the purpose of the map? City of Portsmouth requirements

Who was the map prepared for? Jones & Beach Engineers, Inc.

6. SOIL IDENTIFICATION LEGEND

Map Unit Symbol	Map Unit Name	HISS Symbol	Hydrologic Soil Group
41	Chatfield-Hollis-Rock Outcrop complex	228	B
289	Chatfield Variant (moderately well drained)	327	B
699	Urban Land	n/a	Impervious

SLOPE PHASE:

0-8%	B	8-15%	C	15-25%	D
25%-50%	E	50%+	F		

7. NARRATIVE MAP UNIT DESCRIPTIONS

SITE-SPECIFIC MAP UNIT: 41

CORRELATED SOIL SERIES: Chatfield-Hollis-Rock Outcrop complex

LANDSCAPE SETTING: Sloping to very steep hillside.

CHARACTERISTIC SURFACE FEATURES: Numerous rock outcrops

DRAINAGE CLASS: Well drained

PARENT MATERIAL: Glacial Till

NATURE OF DISSIMILAR INCLUSIONS: With a complex, several similar soils are present. While the major soil is the moderately deep Chatfield, the shallow Hollis and the exposed ledge of the Rock Outcrop, are large minor components. Chatfield is 50%, Hollis is 25%, and Rock Outcrop is 25%. A few deeper soil areas are present in hollow in the bedrock.

ESTIMATED PERCENTAGE OF DISSIMILAR INCLUSIONS: less than 5%.

SOIL PROFILE DESCRIPTIONS- horizon designation, depth, soil texture, Munsell color notation, Munsell color of redox features, soil structure, soil consistence, estimated coarse fragments, estimated seasonal high water table (ESHWT), observed water table (OBSWT), kind of water table (perched, apparent, or both), depth to lithic or paralithic contact:

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

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

No OBSWT, no ESHWT, lithic contact at 25”, 20% rock fragments.

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

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

No OBSWT, no ESHWT, lithic contact at 15”, 20% rock fragments.

SITE-SPECIFIC MAP UNIT: 289

CORRELATED SOIL SERIES: Chatfield Variant (moderately well drained)

LANDSCAPE SETTING: At the top of the slope, a slightly deeper soil area on the northwest corner of the site.

CHARACTERISTIC SURFACE FEATURES: Fewer outcrops than the rest of the site.

DRAINAGE CLASS: Moderately well drained.

PARENT MATERIAL: Glacial till.

NATURE OF DISSIMILAR INCLUSIONS: Scituate soils with a hard pan above the bedrock,

ESTIMATED PERCENTAGE OF DISSIMILAR INCLUSIONS: 5%

SOIL PROFILE DESCRIPTIONS- horizon designation, depth, soil texture, Munsell color notation, Munsell color of redox features, soil structure, soil consistence, estimated coarse fragments, estimated seasonal high water table (ESHWT), observed water table (OBSWT), kind of water table (perched, apparent, or both), depth to lithic or paralithic contact:

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

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

ESHWT is 30”, no OBSWT, lithic contact at 36”, 20% rock fragments.

SITE-SPECIFIC MAP UNIT: 699

CORRELATED SOIL SERIES: Urban land

LANDSCAPE SETTING: Top of slope adjacent to Sagamore Avenue.

CHARACTERISTIC SURFACE FEATURES: Impervious.

DRAINAGE CLASS: N/A

PARENT MATERIAL: N/A

NATURE OF DISSIMILAR INCLUSIONS: N/A

ESTIMATED PERCENTAGE OF DISSIMILAR INCLUSIONS: N/A

SOIL PROFILE DESCRIPTIONS- horizon designation, depth, soil texture, Munsell color notation, Munsell color of redox features, soil structure, soil consistence, estimated coarse fragments, estimated seasonal high water table (ESHWT), observed water table (OBSWT), kind of water table (perched, apparent, or both), depth to lithic or paralithic contact:

N/A ---- Pavement and buildings.

8. RESPONSIBLE SOIL SCIENTIST

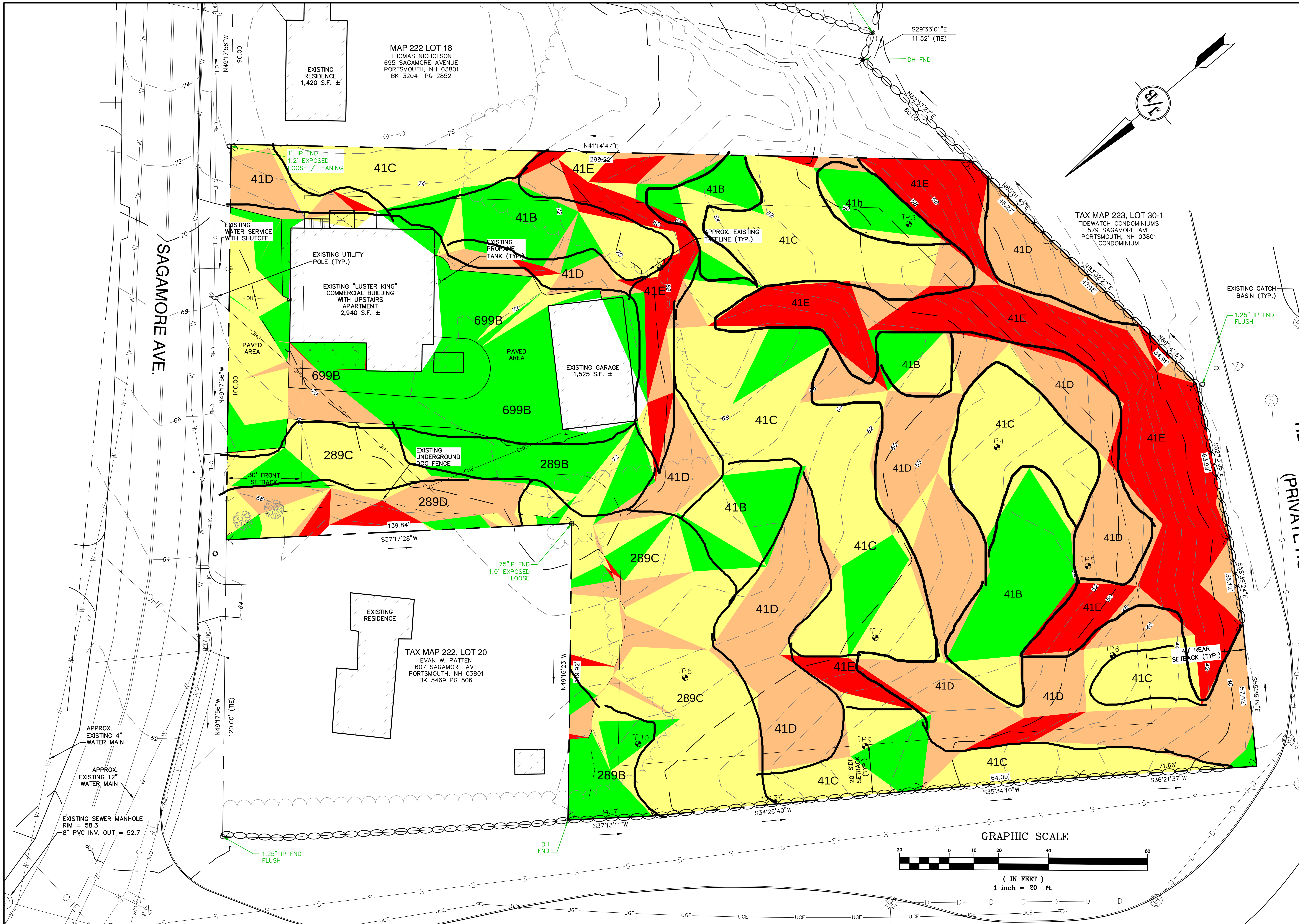
Name: James Gove

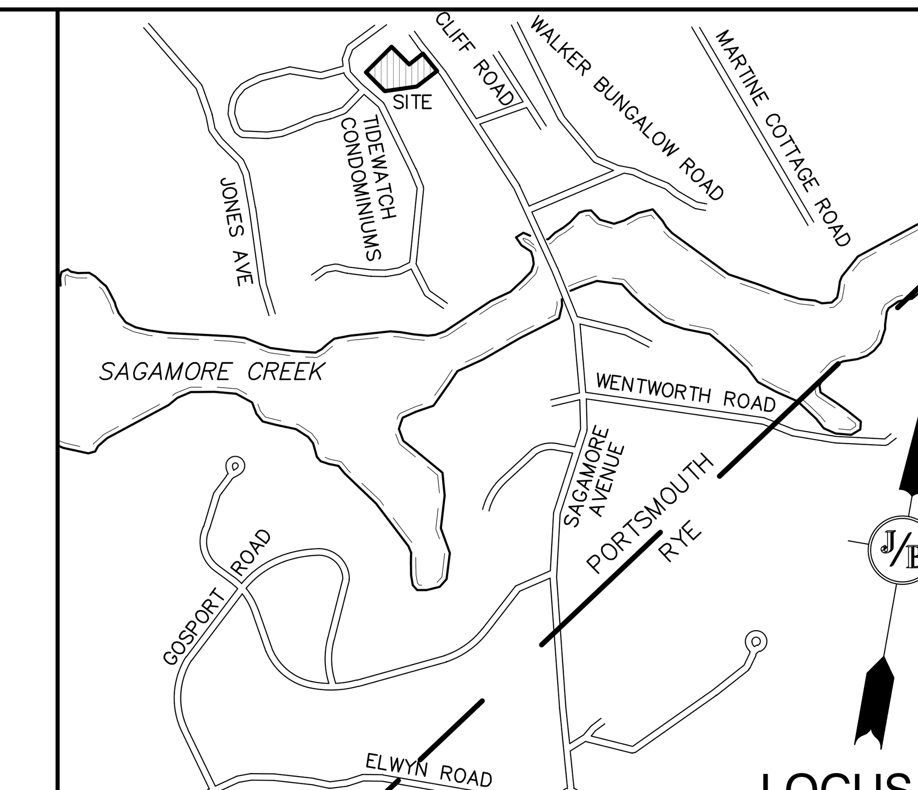
Certified Soil Scientist Number: 004

9. OTHER DISTINGUISHING FEATURES OF SITE

Is the site in a natural condition? Yes, with exception of existing development.

8 Continental Dr Unit H, Exeter, NH 03833-7507
Ph (603) 778 0644 / *Fax* (603) 778 0654
www.gesinc.biz
info@gesinc.biz





LOCUS
SCALE: 1"=1000'

ABUTTERS ACROSS SAGAMORE AVE.:

TAX MAP 222, LOT 14
JOHN O'SULLIVAN
DENISE BROWN
692 SAGAMORE AVE
PORTSMOUTH, NH 03801
BK 2350 PG 181

TAX MAP 222, LOT 14-1
BROWN FAMILY REV. TRUST
VINCENT A. & LINDA M. BROWN, TRUSTEES
DENISE BROWN
650 SAGAMORE AVE
PORTSMOUTH, NH 03801
BK 6074 PG 238

EXISTING CONDITIONS NOTES:

1. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 1-888-DIG-SAFE (1-888-344-7233).
2. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING FEATURES LOCATED ON CITY OF PORTSMOUTH TAX MAP 222, LOT 19.
3. SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
4. NO WETLANDS WERE OBSERVED WITHIN 100' OF THE PROPERTY BOUNDARY. SEE LETTER FROM GOVE ENVIRONMENTAL SERVICES, INC.

SLOPE ZONE LEGEND

- < 8%
- 8% TO 15%
- 15% TO 25%
- 25% TO 100%
- > 100%

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: JAC	Draft: DJM	Date: 12/07/2021
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134-CONCEPT-8.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

REV.	DATE	REVISION	BY
11	1/31/24	MINOR REVISIONS TO SIGHT DISTANCE PLAN AND PROFILE	DJM
10	10/27/23	MINOR REVISIONS	DJM
9	10/20/23	MINOR REVISIONS	DJM
8	9/27/23	REVISED PER TAC COMMENTS	DJM
7	9/5/23	ISSUED TO TAC	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING CONDITIONS PLAN

Project: 4-UNIT RESIDENTIAL SITE
635 SAGAMORE AVE., PORTSMOUTH, NH

Owner of Record: 635 SAGAMORE DEVELOPMENT, LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

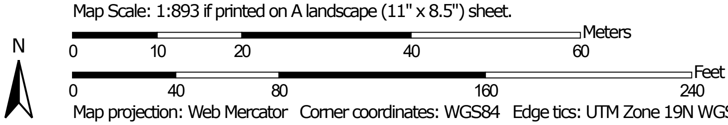
DRAWING No.
C1
SHEET 2 OF 8
JBE PROJECT NO. 18134.1

APPENDIX V

NRCS Soil Map

Soil Map—Rockingham County, New Hampshire
(635 Sagamore Ave.)

Map Scale: 1:893 if printed on A landscape (11" x 8.5") sheet.



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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 26, Aug 22, 2023

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	0.7	30.5%
140D	Chatfield-Hollis-Canton complex, 15 to 35 percent slopes, rocky	1.6	69.5%
Totals for Area of Interest		**2.3**	**100.0%**

APPENDIX VI

Extreme Precipitation Estimates

Extreme Precipitation in New York & New England

An Interactive Web Tool for Extreme Precipitation Analysis

About this Project | Data & Products | Daily Monitoring | Documentation

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 map to place a marker, or enter address or latitude/longitude.*

Hybrid	Map	Locate by Address ?	Locate by Lat/Lon ?	Locate by State/County ?
Satellite	Terrain	635 Sagamore Avenue, →	43.057 °N -70.75 °W →	

Select Options ?

Smoothing ?	Delivery ?
Yes	Popup

Submit ?

This project is a joint collaboration between:

Northeast Regional Climate Center (NRCC) **Natural Resources Conservation Service (NRCS)**

Powered by ACIS Northeast Regional Climate Center NCDC Cornell University USDA NRCS

Contact: precip@cornell.edu

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point	
Smoothing	Yes
State	
Location	
Latitude	43.058 degrees North
Longitude	70.753 degrees West
Elevation	10 feet
Date/Time	Wed Feb 21 2024 09:41:54 GMT-0500 (Eastern Standard Time)

+15% due to location in Coastal/Great Bay Region
2yr: 3.22*1.15 = 3.70 in
10yr: 4.88*1.15 = 5.16 in
25yr: 6.19*1.15 = 7.12 in
50yr: 7.42*1.15 = 8.53 in

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day
1yr	0.26	0.40	0.50	0.65	0.82	1.04	**1yr**	0.70	0.98	1.21	1.56	2.03	2.67	2.94	**1yr**	2.36	2.82	3.24	3.96	4.57
2yr	0.32	0.50	0.62	0.82	1.03	1.30	**2yr**	0.89	1.18	1.52	1.94	2.49	3.22	3.58	**2yr**	2.85	3.45	3.95	4.70	5.35
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.44	3.15	4.08	4.60	**5yr**	3.61	4.42	5.07	5.96	6.73
10yr	0.41	0.65	0.82	1.12	1.46	1.90	**10yr**	1.26	1.73	2.24	2.90	3.76	4.88	5.55	**10yr**	4.32	5.34	6.12	7.14	8.01
25yr	0.48	0.76	0.97	1.34	1.78	2.35	**25yr**	1.54	2.15	2.79	3.65	4.76	6.19	7.13	**25yr**	5.48	6.86	7.85	9.07	10.09
50yr	0.54	0.86	1.11	1.55	2.08	2.77	**50yr**	1.80	2.54	3.31	4.35	5.69	7.42	8.62	**50yr**	6.57	8.29	9.48	10.87	12.02
100yr	0.60	0.97	1.25	1.78	2.43	3.28	**100yr**	2.10	2.99	3.93	5.19	6.80	8.89	10.42	**100yr**	7.87	10.02	11.46	13.04	14.33
200yr	0.68	1.11	1.44	2.06	2.85	3.86	**200yr**	2.46	3.54	4.65	6.17	8.12	10.65	12.60	**200yr**	9.43	12.12	13.85	15.64	17.09
500yr	0.81	1.33	1.73	2.51	3.51	4.80	**500yr**	3.03	4.41	5.81	7.76	10.28	13.54	16.21	**500yr**	11.98	15.59	17.81	19.90	21.58

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day
1yr	0.23	0.36	0.44	0.59	0.72	0.88	**1yr**	0.62	0.86	0.93	1.33	1.69	2.26	2.51	**1yr**	2.00	2.41	2.88	3.20	3.93
2yr	0.32	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.82	2.33	3.07	3.47	**2yr**	2.72	3.33	3.84	4.56	5.11
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.11	2.73	3.80	4.21	**5yr**	3.36	4.05	4.74	5.56	6.27
10yr	0.39	0.59	0.74	1.03	1.33	1.60	**10yr**	1.15	1.57	1.81	2.38	3.05	4.39	4.88	**10yr**	3.88	4.70	5.48	6.45	7.23
25yr	0.44	0.67	0.83	1.19	1.57	1.90	**25yr**	1.35	1.86	2.10	2.74	3.52	4.77	5.92	**25yr**	4.22	5.70	6.70	7.85	8.73
50yr	0.48	0.73	0.92	1.32	1.77	2.17	**50yr**	1.53	2.12	2.35	3.06	3.91	5.40	6.84	**50yr**	4.78	6.58	7.79	9.11	10.08
100yr	0.54	0.81	1.02	1.47	2.02	2.47	**100yr**	1.74	2.42	2.63	3.39	4.33	6.08	7.90	**100yr**	5.38	7.60	9.07	10.60	11.64
200yr	0.59	0.89	1.13	1.64	2.29	2.82	**200yr**	1.97	2.75	2.94	3.75	4.76	6.83	9.12	**200yr**	6.05	8.77	10.54	12.34	13.47
500yr	0.69	1.02	1.32	1.92	2.72	3.37	**500yr**	2.35	3.29	3.42	4.28	5.41	7.97	11.03	**500yr**	7.06	10.61	12.87	15.13	16.32

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day
1yr	0.29	0.44	0.54	0.72	0.89	1.08	**1yr**	0.77	1.06	1.26	1.74	2.20	2.99	3.18	**1yr**	2.64	3.05	3.59	4.38	5.06
2yr	0.34	0.52	0.64	0.87	1.07	1.27	**2yr**	0.92	1.24	1.48	1.96	2.51	3.43	3.72	**2yr**	3.03	3.57	4.10	4.86	5.64
5yr	0.40	0.62	0.77	1.05	1.34	1.63	**5yr**	1.16	1.59	1.89	2.54	3.25	4.36	4.98	**5yr**	3.85	4.79	5.40	6.40	7.18
10yr	0.47	0.72	0.89	1.25	1.61	1.98	**10yr**	1.39	1.94	2.29	3.11	3.96	5.36	6.22	**10yr**	4.74	5.98	6.84	7.87	8.78
25yr	0.58	0.88	1.09	1.56	2.06	2.58	**25yr**	1.77	2.52	2.96	4.08	5.17	7.77	8.36	**25yr**	6.87	8.04	9.18	10.37	11.44
50yr	0.67	1.03	1.28	1.84	2.48	3.15	**50yr**	2.14	3.08	3.61	5.01	6.35	9.71	10.48	**50yr**	8.60	10.08	11.48	12.76	14.00
100yr	0.80	1.20	1.51	2.17	2.98	3.83	**100yr**	2.57	3.75	4.39	6.18	7.80	12.14	13.13	**100yr**	10.74	12.62	14.35	15.74	17.13
200yr	0.93	1.40	1.78	2.57	3.58	4.69	**200yr**	3.09	4.58	5.36	7.61	9.60	15.22	16.46	**200yr**	13.47	15.83	17.96	19.40	20.96
500yr	1.16	1.72	2.22	3.22	4.58	6.09	**500yr**	3.95	5.95	6.96	10.07	12.65	20.54	22.22	**500yr**	18.18	21.36	24.18	25.57	27.38

APPENDIX VII

Rip Rap Calculations

RIP RAP CALCULATIONS
"Luster Cluster"
635 Sagamore Ave.
Portsmouth, NH

Jones & Beach Engineers, Inc.
P.O. Box 219
Stratham, NH 03885
3/14/2024 REVISED 4/19/2024

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.*
Aprons are sized for the 10-Year storm event.

TAILWATER < HALF THE D_o

$L_a = (1.8 \times Q) / D_0^{3/2} + (7 \times D_o)$

$W = L_a + (3 \times D_o)$ or defined channel width

$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)
1P Outlet Pipe	0.12	0.21	1	7.4	10	0.02

TAILWATER > HALF THE D_o

$L_a = (3.0 \times Q) / D_0^{3/2} + (7 \times D_o)$

$W = (0.4 \times L_a) + (3 \times D_o)$ or defined channel width

$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)
CB4 Outlet Pipe	0.66	2.41	1	14.2	9	0.10

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d_{50} Size =	0.25	Feet	3	Inches
% of Weight Smaller			Size of Stone (Inches)	
Than the Given d_{50} Size		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			Size of Stone (Inches)	
Than the Given d_{50} Size		From		To
100%		9		12
85%		8		11
50%		6		9
15%		2		3

APPENDIX VIII

BMP Worksheets

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Bioretention Pond (1P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Value	Unit	Description	Criteria
		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.65	ac	A = Area draining to the practice	
0.29	ac	A_I = Impervious area draining to the practice	
0.45	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.46	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.30	ac-in	WQV= 1" x Rv x A	
1,076	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
269	cf	25% x WQV (check calc for sediment forebay volume)	
807	cf	75% x WQV (check calc for surface sand filter volume)	
Deep Sump CBs		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
61.15	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.11	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
5.44	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
59.10	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
58.60	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
58.08	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
55.83	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
0.50	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
3.27	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.02	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
62.85	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
63.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
8	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
4,806	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	D4	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet	D4	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course spec.	**mod. 304.1 (see spec)**

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

SHWT elevation at high contour is only 0.01' below the bottom of the stone. However, we modelled it 2" lower in the HydroCAD calculations as a factor of safety. Modelling such a small separation from the bottom of the stone to the SHWT causes an unrealistically high amount of exfiltration to appear in the results.

Stage-Area-Storage for Pond 1P: Bioretention Pond

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.09	466	0
58.14	466	9
58.19	466	19
58.24	466	28
58.29	466	37
58.34	466	47
58.39	466	56
58.44	466	65
58.49	466	75
58.54	466	84
58.59	466	93
58.64	466	103
58.69	466	112
58.74	466	121
58.79	466	130
58.84	466	140
58.89	466	149
58.94	466	158
58.99	466	168
59.04	466	177
59.09	466	186
59.14	466	190
59.19	466	193
59.24	466	197
59.29	466	200
59.34	466	204
59.39	466	207
59.44	466	211
59.49	466	214
59.54	466	218
59.59	466	221
59.64	466	225
59.69	466	228
59.74	466	232
59.79	466	235
59.84	466	239
59.89	466	242
59.94	466	246
59.99	466	249
60.04	466	253
60.09	466	256
60.14	466	260
60.19	466	263
60.24	466	267
60.29	466	270
60.34	466	274
60.39	466	277
60.44	466	281
60.49	466	284
60.54	466	288
60.59	466	291
60.64	577	317
60.69	733	349
60.74	907	390
60.79	1,100	440
60.84	1,312	501
60.89	1,542	572
60.94	1,791	655
60.99	2,058	751
61.04	2,135	857
61.09	2,162	965
61.14	2,188	1,073
61.19	2,215	1,183
61.24	2,242	1,295
61.29	2,269	1,408
61.34	2,296	1,522
61.39	2,324	1,637
61.44	2,351	1,754
61.49	2,379	1,872
61.54	2,407	1,992
61.59	2,435	2,113
61.64	2,464	2,236
61.69	2,492	2,360
61.74	2,521	2,485
61.79	2,549	2,612
61.84	2,578	2,740
61.89	2,607	2,869
61.94	2,637	3,001
61.99	2,666	3,133
62.04	2,695	3,267
62.09	2,725	3,403
62.14	2,754	3,540
62.19	2,784	3,678
62.24	2,813	3,818
62.29	2,843	3,959
62.34	2,873	4,102
62.39	2,904	4,247
62.44	2,934	4,393
62.49	2,964	4,540
62.54	2,995	4,689
62.59	3,026	4,840
62.64	3,057	4,992
62.69	3,088	5,145
62.74	3,120	5,301
62.79	3,151	5,457
62.84	3,183	5,616
62.89	3,214	5,776
62.94	3,246	5,937
62.99	**3,279**	**6,100**

End cap invert

WQV El.

Overflow

End cap inv. = 58.9
Vol. below = 149 cf for GRV calculation

WQV Required = 1,076 cf
WQV El. = 61.15

Overflow el. = 62.65
Vol. below = 4,992 cf

Bottom of filter course el. = 59.1

4992-186 = 4,806 cf

<u>WQV Provided = 4,806 cf >> 1,076 cf</u>

Stage-Discharge for Pond 1P: Bioretention Pond

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
58.09	0.00	0.00	0.00
58.14	0.00	0.00	0.00
58.19	0.01	0.01	0.00
58.24	0.01	0.01	0.00
58.29	0.01	0.01	0.00
58.34	0.01	0.01	0.00
58.39	0.01	0.01	0.00
58.44	0.01	0.01	0.00
58.49	0.01	0.01	0.00
58.54	0.01	0.01	0.00
58.59	0.01	0.01	0.00
58.64	0.01	0.01	0.00
58.69	0.01	0.01	0.00
58.74	0.02	0.02	0.00
58.79	0.02	0.02	0.00
58.84	0.02	0.02	0.00
58.89	0.02	0.02	0.00
58.94	0.02	0.02	0.00
58.99	0.03	0.02	0.01
59.04	0.03	0.02	0.01
59.09	0.03	0.02	0.01
59.14	0.03	0.02	0.01
59.19	0.04	0.02	0.01
59.24	0.04	0.03	0.01
59.29	0.04	0.03	0.02
59.34	0.04	0.03	0.02
59.39	0.05	0.03	0.02
59.44	0.05	0.03	0.02
59.49	0.05	0.03	0.02
59.54	0.05	0.03	0.02
59.59	0.05	0.03	0.02
59.64	0.05	0.03	0.02
59.69	0.06	0.03	0.02
59.74	0.06	0.03	0.02
59.79	0.06	0.04	0.02
59.84	0.06	0.04	0.02
59.89	0.06	0.04	0.03
59.94	0.06	0.04	0.03
59.99	0.07	0.04	0.03
60.04	0.07	0.04	0.03
60.09	0.07	0.04	0.03
60.14	0.07	0.04	0.03
60.19	0.07	0.04	0.03
60.24	0.07	0.04	0.03
60.29	0.08	0.05	0.03
60.34	0.08	0.05	0.03
60.39	0.08	0.05	0.03
60.44	0.08	0.05	0.03
60.49	0.08	0.05	0.03
60.54	0.08	0.05	0.03
60.59	0.08	0.05	0.03
60.64	0.09	0.05	0.03

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	
60.69	0.09	0.05	0.03	
60.74	0.09	0.06	0.04	
60.79	0.09	0.06	0.04	
60.84	0.10	0.06	0.04	
60.89	0.10	0.06	0.04	
60.94	0.10	0.07	0.04	
60.99	0.11	0.07	0.04	
61.04	0.11	0.07	0.04	
61.09	0.11	0.07	0.04	
61.14	0.11	0.07	0.04	WQV El. = 61.15
61.19	0.12	0.08	0.04	Q(WQV) = 0.11 cfs
61.24	0.12	0.08	0.04	
61.29	0.12	0.08	0.04	
61.34	0.12	0.08	0.04	
61.39	0.12	0.08	0.04	
61.44	0.12	0.08	0.04	
61.49	0.13	0.08	0.04	
61.54	0.13	0.09	0.04	
61.59	0.13	0.09	0.04	
61.64	0.13	0.09	0.04	
61.69	0.13	0.09	0.04	
61.74	0.13	0.09	0.04	
61.79	0.14	0.09	0.04	
61.84	0.14	0.09	0.04	
61.89	0.14	0.09	0.05	
61.94	0.14	0.10	0.05	
61.99	0.14	0.10	0.05	
62.04	0.15	0.10	0.05	
62.09	0.15	0.10	0.05	
62.14	0.15	0.10	0.05	
62.19	0.15	0.10	0.05	
62.24	0.15	0.10	0.05	
62.29	0.15	0.11	0.05	
62.34	0.16	0.11	0.05	
62.39	0.16	0.11	0.05	
62.44	0.16	0.11	0.05	
62.49	0.16	0.11	0.05	
62.54	0.16	0.11	0.05	
62.59	0.16	0.11	0.05	
62.64	0.17	0.12	0.05	
62.69	0.27	0.12	0.15	
62.74	0.52	0.12	0.40	
62.79	0.84	0.12	0.72	
62.84	1.24	0.12	1.12	
62.89	1.69	0.12	1.56	
62.94	2.18	0.13	2.06	
62.99	**2.73**	**0.13**	**2.60**	

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION
(Env-Wq 1507.04)

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.12	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.25	inches	Rd = Weighted groundwater recharge depth	
0.031	ac-in	GRV = AI * Rd	
113	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

Stone Drip Edges, 40% Stone Voids:

((3 ft * 60 ft * 3.5 ft)+(3 ft * 60 ft * 4.5 ft)+)*0.4 = 576 cf

Eco Paver, 40% Voids: (13 ft * 17 ft * 1 ft)*0.4 = 88 cf

Stone Beneath Deck: (14 ft * 20 ft *1.5 ft)*0.4 = 168 cf

Bioretention: 149 cf GRV provided below UD end cap orifice per stage storage table

GRV Provided = 576+88+168+149 = 981 cf >> 113 cf

APPENDIX IX

Pollutant Removal Calculations

POLLUTANT REMOVAL CALCULATIONS

BMP	Drip Edge	Bioretention	None	Total	Required
Acres Impervious	0.032	0.293	0.036	0.361	
TSS Removal (%)	90%	90%	0%	**81%**	**80%**
TN Removal (%)	55%	65%	0%	**68%**	**50%**

Calculations are based on post-construction impervious surfaces on the subject parcel.
TSS removal of 86% provided exceeds 80% requirement
TN removal of 65% provided exceeds 50% requirement

Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Stormwater Ponds	Wet Pond		B, F	70%	35%	45%
	Wet Extended Detention Pond		A, B	80%	55%	68%
	Micropool Extended Detention Pond	TBA				
	Multiple Pond System	TBA				
	Pocket Pond	TBA				
Stormwater Wetlands	Shallow Wetland		A, B, F, I	80%	55%	45%
	Extended Detention Wetland		A, B, F, I	80%	55%	45%
	Pond/Wetland System	TBA				
	Gravel Wetland		H	95%	85%	64%
Infiltration Practices	Infiltration Trench (≥75 ft from surface water)		B, D, I	90%	55%	60%
	Infiltration Trench (<75 ft from surface water)		B, D, I	90%	10%	60%
	Infiltration Basin (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Infiltration Basin (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Dry Wells			90%	55%	60%
	Drip Edges			90%	55%	60%
Filtering Practices	Aboveground or Underground Sand Filter that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Aboveground or Underground Sand Filter that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Aboveground or Underground Sand Filter with underdrain		A, I, F, G, H	85%	10%	45%
	Tree Box Filter	TBA				
	Bioretention System		I, G, H	90%	65%	65%
	Permeable Pavement that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Permeable Pavement that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Permeable Pavement with underdrain		Use TN and TP values for sand filter w/ underdrain and outlet pipe	90%	10%	45%

Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Treatment Swales	Flow Through Treatment Swale	TBA				
Vegetated Buffers	Vegetated Buffers		A, B, I	73%	40%	45%
Pre-Treatment Practices	Sediment Forebay	TBA				
	Vegetated Filter Strip		A, B, I	73%	40%	45%
	Vegetated Swale		A, B, C, F, H, I	65%	20%	25%
	Flow-Through Device - Hydrodynamic Separator		A, B, G, H	35%	10%	5%
	Flow-Through Device - ADS Underground Multichamber Water Quality Unit (WQU)		G, H	72%	10%	9%
	Other Flow-Through Devices	TBA				
	Off-line Deep Sump Catch Basin		J, K, L, M	15%	5%	5%

APPENDIX X

Stormwater Operations and Maintenance Manual

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

STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE MANUAL

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

Prepared for:

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

Prepared by:
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746
March 18, 2024
Revised April 15, 2024
JBE Project No. 18134.1

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. The Condominium Association, future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. The Association, future owners and assigns shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form and shall submit an Operations and Maintenance report on a yearly basis to the Portsmouth Planning Department by December 31st.

B. General Inspection and Maintenance Requirements

1. Permanent stormwater and sediment and erosion control facilities to be maintained on the site include, but are not limited to, the following:

    a. Roadway and driveways
    b. Vegetation and landscaping
    c. Bioretention systems
    d. Catch Basins & Yard Drains
    e. Permeable Paver Patio
    f. Stone Drip Edges
    g. Culverts
    h. Rip-Rap Outlet Protection Aprons
    i. Swale

2. Maintenance of permanent measures shall follow the following schedule:

    a. Normal winter roadway maintenance including plowing and snow removal. Road sweeping at the end of every winter, preferably before the start of the spring rain season.

    b. **Annual inspection** of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately. **Annual inspection** of site's vegetation and landscaping. Any areas that are bare shall be reseeded and mulched with hay or, if the case is extreme, loamed and seeded or sodded to ensure adequate vegetative cover. Landscape specimens shall be replaced in kind, if they are found to be dead or dying.

    c. Bioretention Systems:

        - Visually inspect monthly and repair erosion. Use small stones to stabilize erosion along drainage paths.
        - Check the pH once a year if grass is not surviving. Apply an alkaline product, such as limestone, if needed.
        - Re-seed any bare areas by hand as needed.

- Immediately after the completion of cell construction, water grass for 14 consecutive days unless there is sufficient natural rainfall.
- Once a month (more frequently in the summer), the land owner or Association shall visually inspect vegetation for disease or pest problems and treat as required.
- During times of extended drought, look for physical features of stress. Water in the early morning as needed.
- Weed regularly, if needed.
- After rainstorms, inspect the cell and make sure that drainage paths are clear and that ponding water dissipates over 4-6 hours. (Water may pond for longer times during the winter and early spring.)
- Twice annually, inspect the outlet control structures to ensure that they are not clogged and correct any clogging found as needed.
- Any debris and sediment accumulations shall be removed from the outlet structures, overflow risers, and emergency spillways and disposed of properly.
- Inspect outlet structure for deterioration and or clogging.
- If erosion is evident on the berm or emergency spillway, stabilize the affected area by seeding. Trees must not be allowed to grow in these areas.
- KEEP IN MIND, THE BIORETENTION CELL IS NOT A POND. IT SHALL NOT PROVIDE A BREEDING GROUND FOR MOSQUITOES. MOSQUITOES NEED AT LEAST FOUR (4) DAYS OF STANDING WATER TO DEVELOP AS LARVA.

d. **Annual inspection** of catch basins and yard drains to determine if they need to be cleaned. Catch basins and yard drains are to be cleaned if the depth of deposits is greater than one-half the depth from the basin bottom to the invert of the lowest pipe or opening into or out of the basin. If a catch basin or yard drain significantly exceeds the one-half depth standard during the inspection, then it shall be cleaned more frequently. If woody debris or trash accumulates in the catch basin or yard drain, then it shall be cleaned on a weekly basis. The catch basin or yard drain can be cleaned either manually or by specially designed equipment including, but not limited to, bucket loaders and vacuum pumps. Before any materials can be disposed, it is necessary to perform a detailed chemical analysis to determine if the materials meet the EPA criteria for hazardous waste. This will help determine how the materials shall be stored, treated, and disposed. Grease hoods are to be wiped clean and the rags disposed of properly. Debris obscuring the grate inlet shall also be removed.

e. Permeable Paver Patio:

Units 4 features a permeable paver patio for stormwater management while Units 1-3 feature standard paver patios. The following course of action will help assure that the pavers are maintained to preserve its hydrologic effectiveness for their special purpose.

Winter maintenance:

- Sanding for winter traction is prohibited. Deicing is permitted (NaCl, $MgCl_2$, 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.
- Plow after each storm. Special plow blades may be used to prevent scarring. Do not raise blade of plow. Ice and light snow accumulation are generally not as problematic as for standard asphalt. Snow will accumulate during heavier storms and should be plowed after 2 to 4 inches of snow accumulate. Alternatively, snow may be blown or shoveled off of paver surface

Routine maintenance:

- Seal coating is absolutely forbidden. Surface seal coating is not reversible.
- The paver surface shall 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 shall be well maintained to prevent soil washout onto the pavers. If any bare spots or eroded areas are observed within the planted areas, they shall 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 shall 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 shall be done promptly to ensure continued proper functioning of the system.
- Written and verbal communication to the future owner shall make clear the pavers' special purpose and special maintenance requirements such as those listed here.

f. Stone Drip Edges:

In the spring and fall, visually inspect the area around the edges and repair any erosion. Use small stones to stabilize erosion along drainage paths. Inspect stone area to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock shall be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation shall not be allowed to become established in stone areas, and/or any debris removed from the void spaces between the stones.

g. **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.

h. Rock riprap shall be **inspected annually** in order to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock shall be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation must not be allowed to become established in riprap areas, and/or any debris removed from the void spaces between the rocks. If the riprap is adjacent to a stream or other waterbody, the water shall be kept clear of obstructions, debris, and sediment deposits

i. 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

See attached sample forms as a guideline.

Any inquiries in regards to the design, function, and/or maintenance of any one of the above-mentioned facilities or tasks shall be directed to the project engineer:

Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885

T#: (603) 772-4746
F#: (603) 772-0227

Commitment to maintenance requirements

I agree to complete and/or observe all of the required maintenance practices and their respective schedules as outlined above.

____
Signature

____
Print Name

____
Title

____
Date

Annual Operations and Maintenance Report

The Condominium Association, future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. The Association, future owners and assigns shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form and shall submit an Operations and Maintenance report on a yearly basis to the Portsmouth Planning Department by December 31st.

Construction Activity	**Date of Inspection**	**Who Inspected**	**Findings of Inspector**
Roadway and Driveways			
Vegetation and Landscaping			
Bioretention #1			
Bioretention #2			
Catch Basins & Yard Drains			

Permeable Paver Patios (Unit 4)			
Stone Drip Edge			
Culverts			
Rip Rap Outlet Protection			
Swales			
Other (please note):			

Regular Inspection and Maintenance Guidance for Bioretention Systems / Tree Filters

Maintenance of bioretention systems and tree filters can typically be performed as part of standard landscaping. Regular inspection and maintenance is critical to the effective operation of bioretention systems and tree filters to insure they remain clear of leaves and debris and free draining. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, overly wet or dry (I.E., drought), regional hydrologic conditions, and the upstream land use.

ACTIVITIES

The most common maintenance activity is the removal of leaves from the system and bypass structure. Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Mulch and/or vegetation coverage is integral to the performance of the system, including infiltration rate and nutrient uptake. Vegetation care is important to system productivity and health.

ACTIVITY	FREQUENCY
A record should be kept of the time to drain for the system completely after a storm event. The system should drain completely within 72 hours.	After every major storm in the first few months, then biannually.
Check to insure the filter surface remains well draining after storm event. **Remedy**: If filter bed is clogged, draining poorly, or standing water covers more than 15% of the surface 48 hours after a precipitation event, then remove top few inches of discolored material. Till or rake remaining material as needed.	
Check inlets and outlets for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet and overflow if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
Check for animal burrows and short circuiting in the system **Remedy**: Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted.	
Check to insure the filter bed does not contain more than 2 inches accumulated material **Remedy**: Remove sediment as necessary. If 2 inches or more of filter bed has been removed, replace media with either mulch or a (50% sand, 20% woodchips, 20% compost, 10% soil) mixture.	
During extended periods without rainfall, inspect plants for signs of distress. **Remedy**: Plants should be watered until established (typical only for first few months) or as needed thereafter.	
Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy**: Repair or replace any damaged structural parts, inlets, outlets, sidewalls.	Annually
Check for robust vegetation coverage throughout the system. **Remedy**: If at least 50% vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
Check for dead or dying plants, and general long term plant health. **Remedy**: This vegetation should be cut and removed from the system. If woody vegetation is present, care should be taken to remove dead or decaying plant Material. Separation of Herbaceous vegetation rootstock should occur when overcrowding is observed.	As needed

CHECKLIST FOR INSPECTION OF BIORETENTION SYSTEM / TREE FILTERS

Location: Inspector:

Date: Time: Site Conditions:

Date Since Last Rain Event:

Inspection Items	Satisfactory (S) or Unsatisfactory (U)		Comments/Corrective Action
1. Initial Inspection After Planting and Mulching			
Plants are stable, roots not exposed	S	U	
Surface is at design level, typically 4” below overpass	S	U	
Overflow bypass / inlet (if available) is functional	S	U	
2. Debris Cleanup (2 times a year minimum, Spring & Fall)			
Litter, leaves, and dead vegetation removed from the system	S	U	
Prune perennial vegetation	S	U	
3. Standing Water (1 time a year, After large storm events)			
No evidence of standing water after 72 hours	S	U	
4. Short Circuiting & Erosion (1 time a year, After large storm events)			
No evidence of animal burrows or other holes	S	U	
No evidence of erosion	S	U	
5. Drought Conditions (As needed)			
Water plants as needed	S	U	
Dead or dying plants			
6. Overflow Bypass / Inlet Inspection (1 time a year, After large storm events)			
No evidence of blockage or accumulated leaves	S	U	
Good condition, no need for repair	S	U	
7. Vegetation Coverage (once a year)			
50% coverage established throughout system by first year	S	U	
Robust coverage by year 2 or later	S	U	
8. Mulch Depth (if applicable)(once every 2 years)			
Mulch at original design depth after tilling or replacement	S	U	
9. Vegetation Health (once every 3 years)			
Dead or decaying plants removed from the system	S	U	
10. Tree Pruning (once every 3 years)			
Prune dead, diseased, or crossing branches	S	U	
Corrective Action Needed			**Due Date**
1.			
2.			
3.			

1/15/2011, University of New Hampshire Stormwater Center

APPENDIX XI

Pre- and Post-Construction Watershed Plans

Design: DJM	Draft: DJM	Date: 2/26/2024	
Checked: PSL	Scale: AS NOTED	Project No.: 18134.1	
Drawing Name: 18134-WATERSHED.dwg			

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/8/24	ISSUED FOR REVIEW	DJM

Designed and Produced in NH

J/B Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

603-772-4746

E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING WATERSHED PLAN

Project: "LUSTER CLUSTER" 635 SAGAMORE AVE., PORTSMOUTH, NH

Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

W1

SHEET 1 OF 2
JBE PROJECT NO. 18134.1

Design: DJM	Draft: DJM	Date: 2/26/2024
Checked: PSL	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134-WATERSHED.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/8/24	ISSUED FOR REVIEW	DJM

Designed and Produced in NH

Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

603-772-4746

E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: PROPOSED WATERSHED PLAN

Project: "LUSTER CLUSTER" 635 SAGAMORE AVE., PORTSMOUTH, NH

Owner of Record: 635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

W2

SHEET 2 OF 2

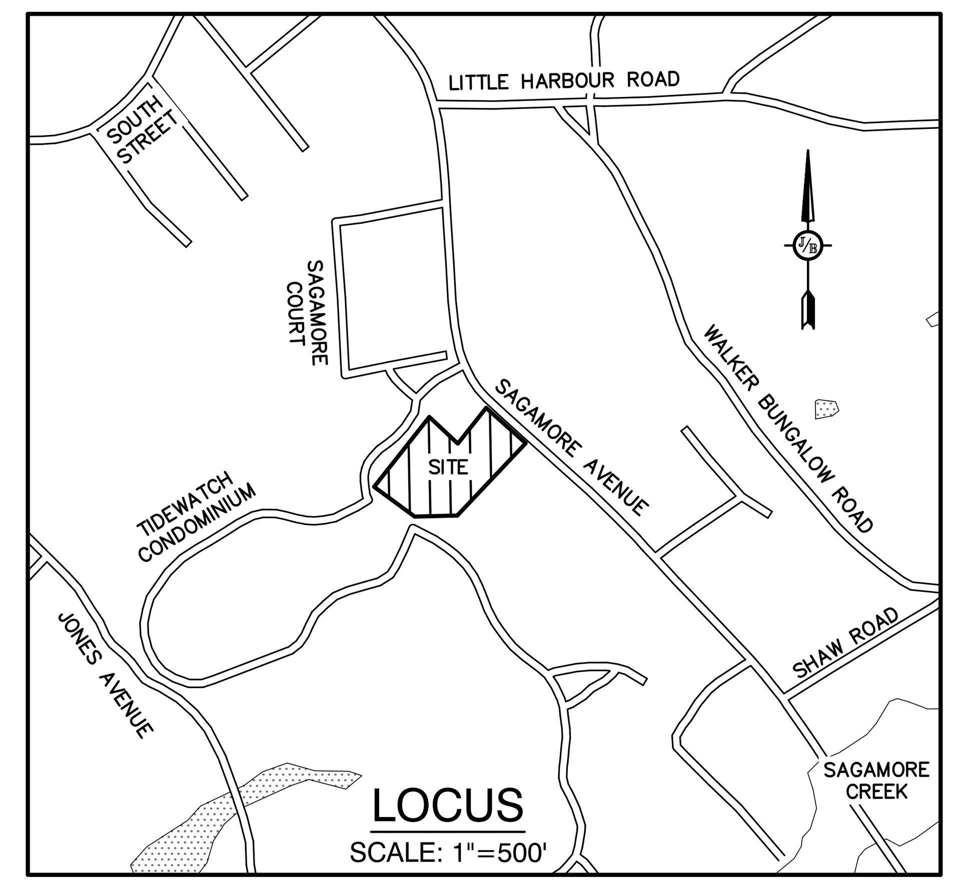
JBE PROJECT NO. 18134.1

SINGLE FAMILY CONDOMINIUM
"LUSTER CLUSTER"
TAX MAP 222, LOT 19
635 SAGAMORE AVE., PORTSMOUTH, NH

811
Know what's **below**
811 before you dig

GENERAL LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROPERTY LINES
		SETBACK LINES
		CENTERLINE
		TREE LINE
		STONEWALL
		BARBED WIRE
		FENCE
		SOIL BOUNDARY
		EASEMENT
100	100	MAJOR CONTOUR
98	98	MINOR CONTOUR
		EDGE OF PAVEMENT
VGC	VGC	VERTICAL GRANITE CURB
SGC	SGC	SLOPE GRANITE CURB
		FIBER BERM
		DRAINAGE LINE
		SEWER LINE
		SEWER FORCE MAIN
		GAS LINE
		WATER LINE
		WATER SERVICE
		OVERHEAD ELECTRIC
		UNDERGROUND ELECTRIC
		UNDERDRAIN
		THRUST BLOCK
		IRON PIPE/IRON ROD
		DRILL HOLE
		IRON ROD/DRILL HOLE
		STONE/GRANITE BOUND
100x0	100x0	SPOT GRADE
100.00	100.00	PAVEMENT SPOT GRADE
100.00 / 99.50	100.00 / 99.50	CURB SPOT GRADE
		BENCHMARK (TBM)
		DOUBLE POST SIGN
		SINGLE POST SIGN
		WELL
		TEST PIT
		TREES AND BUSHES
		UTILITY POLE
		DRAIN MANHOLE
		SEWER MANHOLE
		HYDRANT
		WATER GATE VALVE
		WATER SHUT OFF
		REDUCER
		SINGLE GRATE CATCH BASIN
		TRANSFORMER
		CULVERT W/FLARED END SECTION
		CULVERT W/STRAIGHT HEADWALL
		STONE CHECK DAM
		DRAINAGE FLOW DIRECTION
		RIPRAP
		PAVEMENT HATCH
		STABILIZED CONSTRUCTION ENTRANCE
		CONCRETE
		GRAVEL
		SNOW STORAGE
		RETAINING WALL



LOCUS
SCALE: 1"=500'

SHEET INDEX

CIVIL ENGINEER / SURVEYOR
JONES & BEACH ENGINEERS, INC.
85 PORTSMOUTH AVENUE
PO BOX 219
STRATHAM, NH 03885
(603) 772-4746
CONTACT: JOSEPH CORONATI
EMAIL: JCORONATI@JONESANDBEACH.COM

TRAFFIC ENGINEER
STEPHEN G. PERNAW & COMPANY, INC.
P.O. BOX 1721
CONCORD, NH 03302
(603) 731-8500
CONTACT: STEPHEN PERNAW

SOILS CONSULTANT
GOVE ENVIRONMENTAL SERVICES, INC.
8 CONTINENTAL DRIVE, BLDG 2, UNIT H
EXETER, NH 03833-7507
(603) 418-7260
CONTACT: JAMES GOVE
EMAIL: JGOVE@GESINC.BIZ

LANDSCAPE DESIGNER
LM LAND DESIGN, LLC
11 SOUTH ROAD
BRENTWOOD, NH 03833
(603) 770-7728
CONTACT: LISE MCNAUGHTON

WATER
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS
WATER DIVISION
680 PEVERLY HILL ROAD
PORTSMOUTH, NH 03801
(603) 427-1530

SEWER
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS
SEWER DIVISION
680 PEVERLY HILL ROAD
PORTSMOUTH, NH 03801
(603) 766-1421

LIGHTING DESIGN
EXPOSURE LIGHTING
501 ISLINGTON STREET,UNIT 1A
PORTSMOUTH, NH 03801
CONTACT: KEN SWEENEY

ELECTRIC
EVERSOURCE
1700 LAFAYETTE ROAD
PORTSMOUTH, NH 03801
(800) 662-7764

TELEPHONE
CONSOLIDATED COMMUNICATIONS
1575 GREENLAND ROAD
GREENLAND, NH 03840
(800) 427-5525

CABLE TV
COMCAST COMMUNICATION CORPORATION
334-B CALEF HIGHWAY
EPPING, NH 03042-2325
(603) 679-5695

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON DATE

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

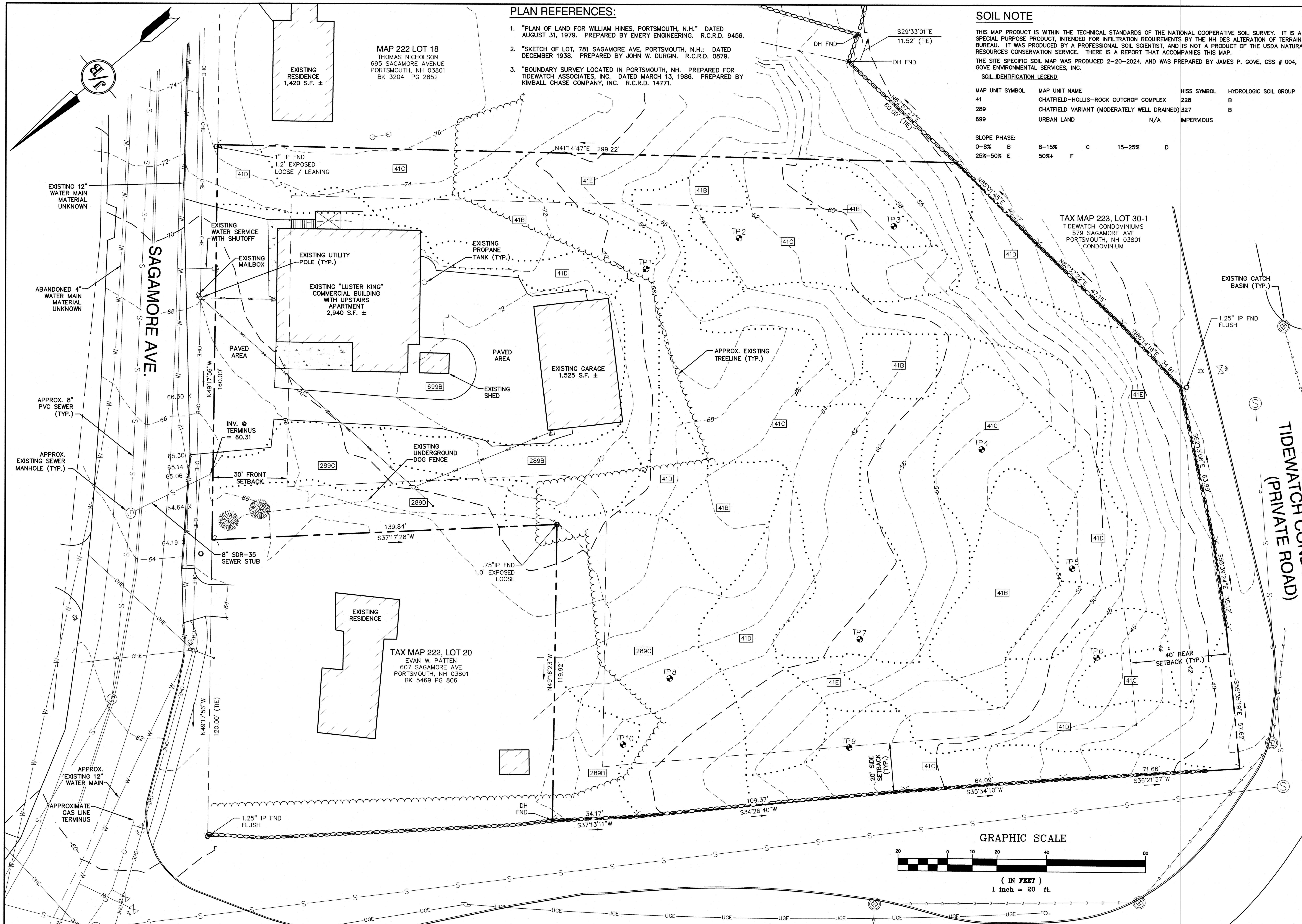
Plan Name:	COVER SHEET
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
CS
SHEET 1 OF20
JBE PROJECT NO. 18134.1

635 SAGAMORE AVE, PORTSMOUTH, NH
JBE # 18134.1 REVISION 1, 4/19/24

PLAN REFERENCES:

1. "PLAN OF LAND FOR WILLIAM HINES, PORTSMOUTH, N.H." DATED AUGUST 31, 1979. PREPARED BY EMERY ENGINEERING. R.C.R.D. 9456.
2. "SKETCH OF LOT, 781 SAGAMORE AVE, PORTSMOUTH, N.H.: DATED DECEMBER 1938. PREPARED BY JOHN W. DURGIN. R.C.R.D. 0879.
3. "BOUNDARY SURVEY LOCATED IN PORTSMOUTH, NH. PREPARED FOR TIDEWATCH ASSOCIATES, INC. DATED MARCH 13, 1986. PREPARED BY KIMBALL CHASE COMPANY, INC. R.C.R.D. 14771.



SOIL NOTE

THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR INFILTRATION REQUIREMENTS BY THE NH DES ALTERATION OF TERRAIN BUREAU. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP.

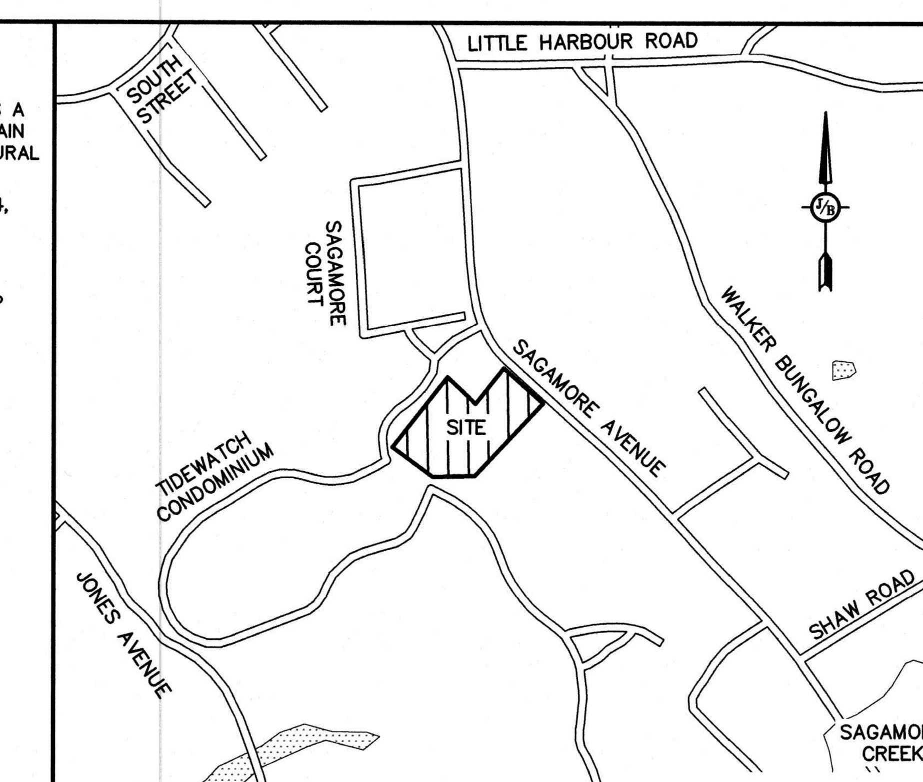
THE SITE SPECIFIC SOIL MAP WAS PRODUCED 2-20-2024, AND WAS PREPARED BY JAMES P. GOVE, CSS # 004, GOVE ENVIRONMENTAL SERVICES, INC.

SOIL IDENTIFICATION LEGEND

MAP UNIT SYMBOL	MAP UNIT NAME	HISS SYMBOL	HYDROLOGIC SOIL GROUP
41	CHATFIELD-HOLLIS-ROCK OUTCROP COMPLEX	228	B
289	CHATFIELD VARIANT (MODERATELY WELL DRAINED)	327	B
699	URBAN LAND	N/A	IMPERVIOUS

SLOPE PHASE:

0-8%	B	8-15%	C	15-25%	D
25%-50%	E	50%+	F		



LOCUS

SCALE: 1"=500'

ABUTTERS ACROSS 635 SAGAMORE AVE.:

TAX MAP 222, LOT 14
JOHN O'SULLIVAN
DENISE BROWN
692 SAGAMORE AVE
PORTSMOUTH, NH 03801
BK 2350 PG 181

TAX MAP 222, LOT 14-1
BROWN FAMILY REV. TRUST
VINCENT A. & LINDA M. BROWN, TRUSTEES
DENISE BROWN
650 SAGAMORE AVE
PORTSMOUTH, NH 03801
BK 6074 PG 238

EXISTING CONDITIONS NOTES:

1. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 1-888-DIG-SAFE (1-888-344-7233).
2. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING FEATURES LOCATED ON CITY OF PORTSMOUTH TAX MAP 222, LOT 19.
3. VERTICAL DATUM: NAVD88. HORIZONTAL DATUM: NH STATE PLANE
4. SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
5. NO WETLANDS WERE OBSERVED WITHIN 100' OF THE PROPERTY BOUNDARY. SEE LETTER FROM GOVE ENVIRONMENTAL SERVICES, INC.
6. SURVEY TIE LINES SHOWN HEREON ARE NOT BOUNDARY LINES. THEY SHOULD ONLY BE USED TO LOCATE THE PARCEL SURVEYED FROM THE FOUND MONUMENTS SHOWN AND LOCATED BY THIS SURVEY.

CERTIFICATION:

PURSUANT TO RSA 676:18-III AND RSA 672:14

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

I CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN UNADJUSTED LINEAR ERROR OF CLOSURE THAT EXCEED BOTH THE MINIMUM OF 1:10,000 AS DEFINED IN SECTION 503.04 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES AND THE MINIMUM OF 1:15,000 AS DEFINED IN SECTION 4.2 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

THIS SURVEY CONFORMS TO A CATEGORY 1 CONDITION 1 SURVEY AS DEFINED IN SECTION 4.1 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

STATE OF NEW HAMPSHIRE
No. 1030
MATTHEW J. SALVUCCI
LICENSED LAND SURVEYOR
SIGNATURE

4/22/24

MATTHEW J. SALVUCCI, LLS 1030 DATE:
ON BEHALF OF JONES & BEACH ENGINEERS, INC.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

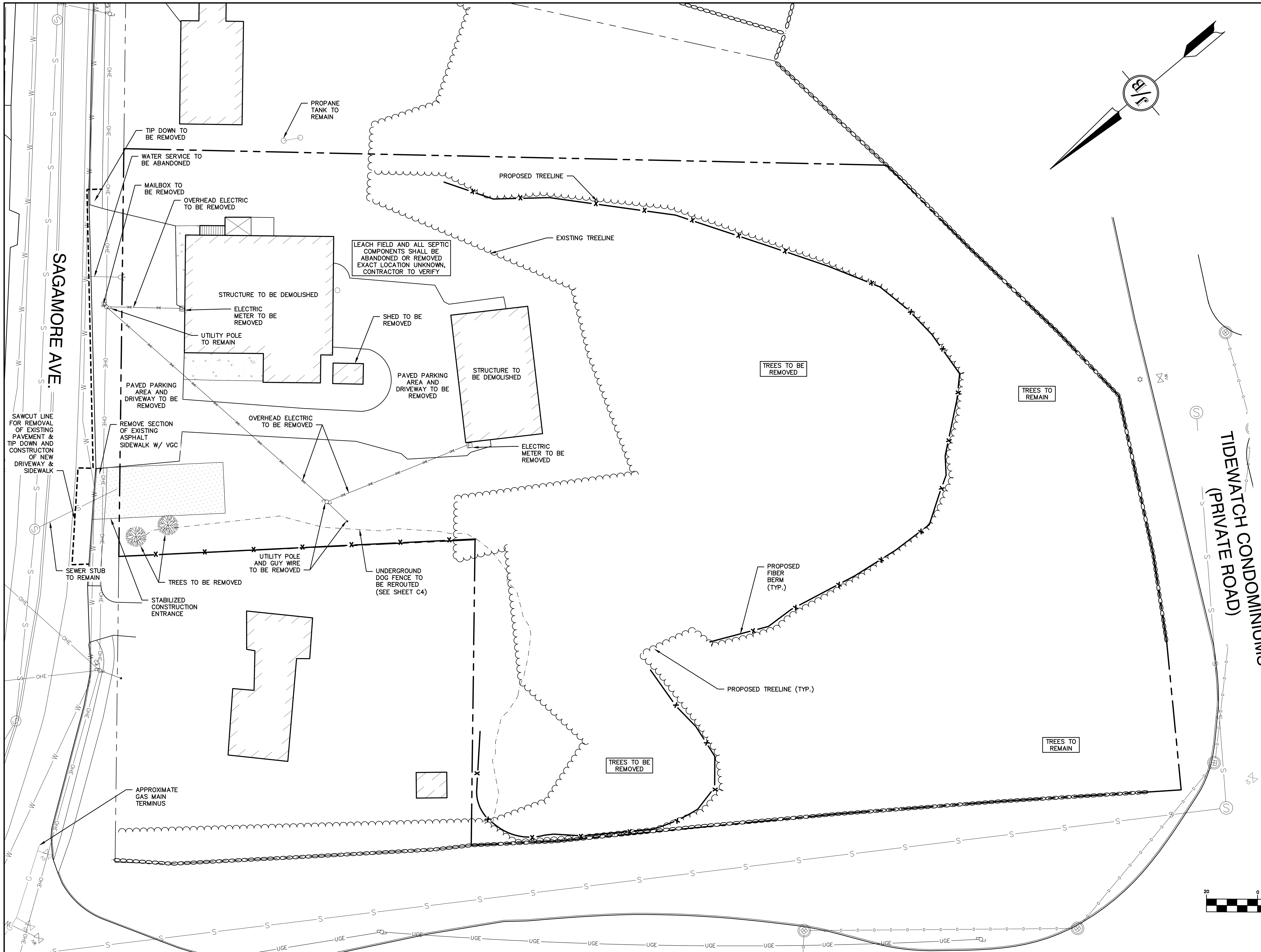
STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

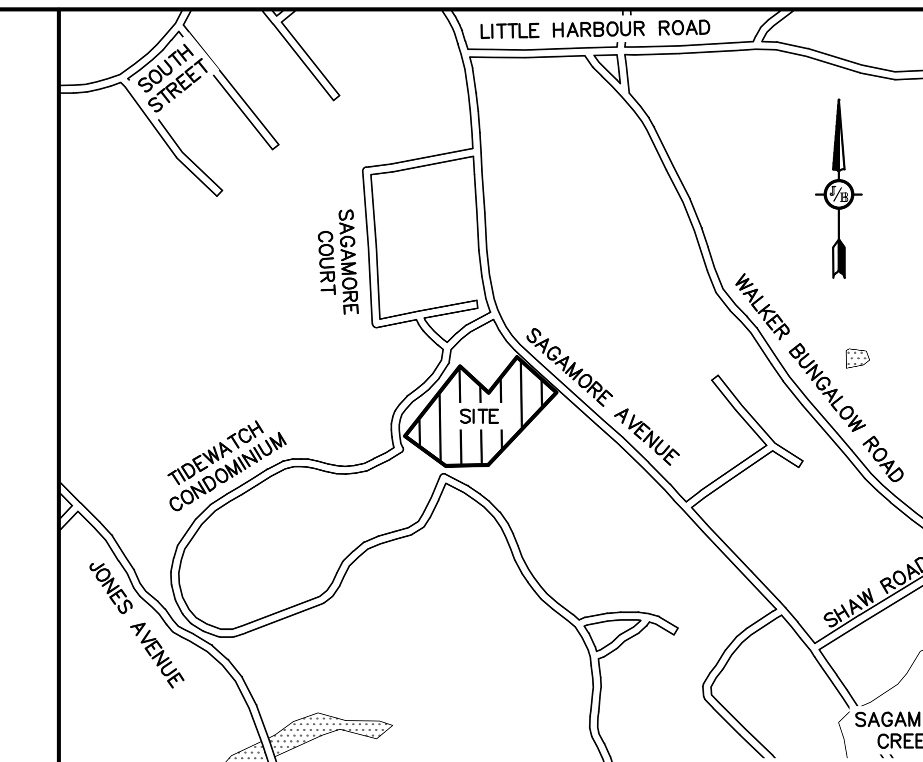
REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EXISTING CONDITIONS PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
C1
SHEET 2 OF 20
JBE PROJECT NO. 18134.1





LOCUS
SCALE: 1"=500'

DEMOLITION NOTES:

1. THIS PLAN IS INTENDED TO PROVIDE MINIMUM GUIDELINES FOR SITE DEMOLITION. IT SHOULD BE NOTED THAT ALL MANMADE FEATURES, PAVEMENT, SIGNS, POLES, CURBING, CONCRETE WALKS, UTILITIES, ETC., SHALL BE REMOVED AS NECESSARY TO CONSTRUCT WORK, UNLESS OTHERWISE NOTED TO REMAIN. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCIES FROM DATA AS SHOWN ON DESIGN PLANS. THIS INCLUDES ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS OF THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED.
2. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO HAVE THE PROJECT LAND SURVEYOR STAKE OR FLAG CLEARING LIMITS. A MINIMUM OF 48 HOURS NOTICE IS REQUIRED.
3. ALL EXISTING STRUCTURES WITHIN THE CONSTRUCTION AREA, UNLESS OTHERWISE NOTED TO REMAIN, SHALL BE REMOVED AND DISPOSED OF OFF-SITE IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL GUIDELINES. ANY BURNING ON-SITE SHALL BE SUBJECT TO LOCAL ORDINANCES.
4. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL CONTAMINATED MATERIAL LOCATED IN THE AREA OF EXISTING LEACHFIELDS IN ACCORDANCE WITH LOCAL AND STATE REGULATIONS.
5. ALL CURBING, CONCRETE, PAVEMENT, BUILDINGS AND SUBBASE MATERIALS LOCATED WITHIN PROPOSED LANDSCAPED AREAS SHALL BE REMOVED AND REPLACED WITH LOAM MATERIALS SUITABLE FOR LANDSCAPING IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS. (SEE ALSO LANDSCAPE PLAN).
6. THE CONTRACTOR SHALL OBTAIN TREE CLEARING PERMIT FROM LOCAL AND STATE AUTHORITIES PRIOR TO START OF CONSTRUCTION (IF REQUIRED).
7. IN AREAS WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED.
8. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO CONSTRUCTION AND ANY EARTH MOVING OPERATIONS. FIBER BERM SHALL BE INSTALLED AT THE LIMITS OF IMPACT AREAS ACCORDING TO THE DETAILS SHOWN ON SHEET E1.
9. EXCAVATED MATERIALS WILL BE PLACED WITHIN UPLAND AREAS AS FILL MATERIAL OR HAULED OFF-SITE FOR DISPOSAL IN AN APPROPRIATE UPLAND LOCATION.

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
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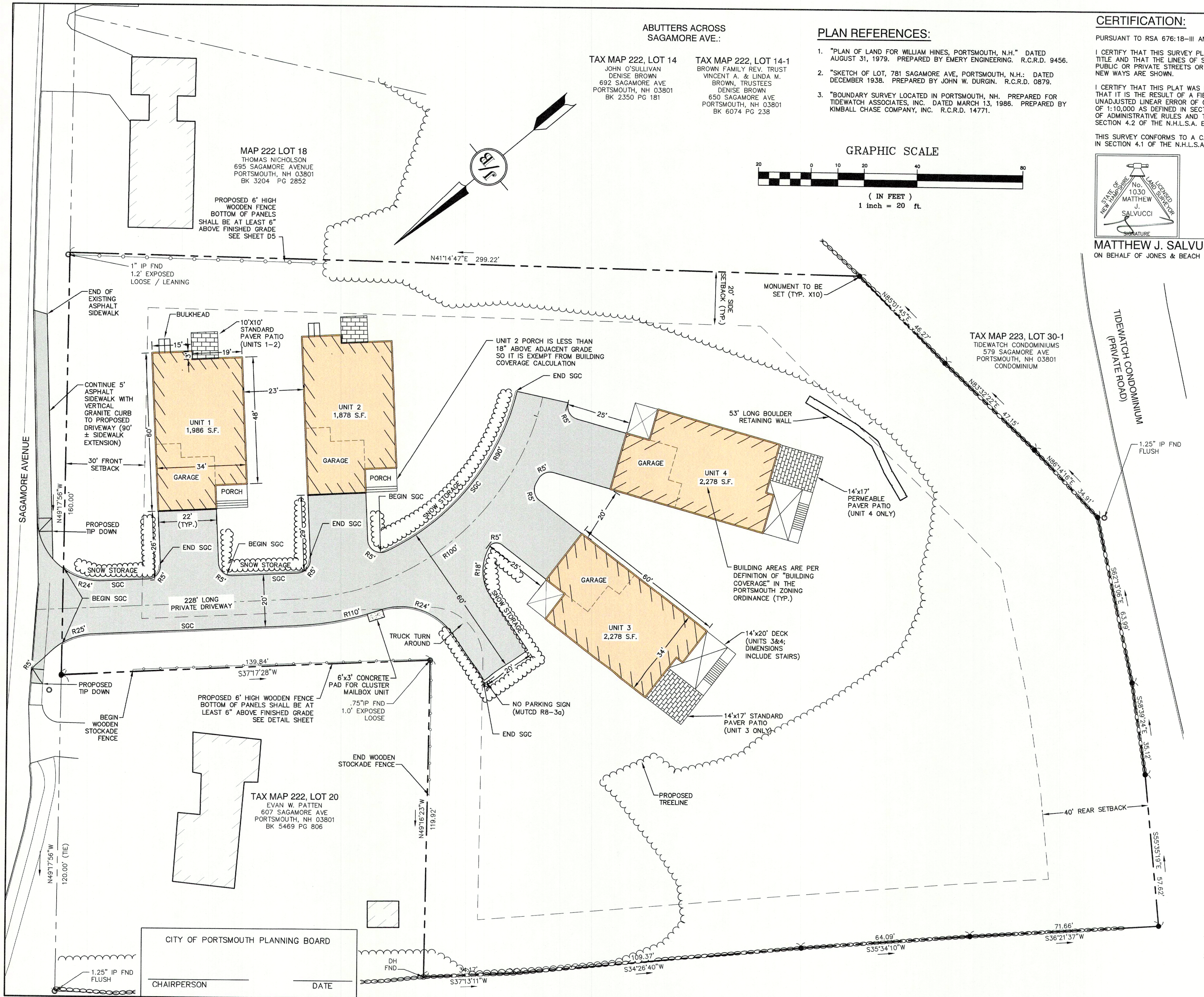
STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED
PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DEMOLITION PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
DM-1
SHEET 3 OF20
JBE PROJECT NO. 18134.1



PLAN REFERENCES:

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3. "BOUNDARY SURVEY LOCATED IN PORTSMOUTH, NH. PREPARED FOR TIDEWATCH ASSOCIATES, INC. DATED MARCH 13, 1986. PREPARED BY KIMBALL CHASE COMPANY, INC. R.C.R.D. 14771.

GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

CERTIFICATION:

PURSUANT TO RSA 676:18-III AND RSA 672:14

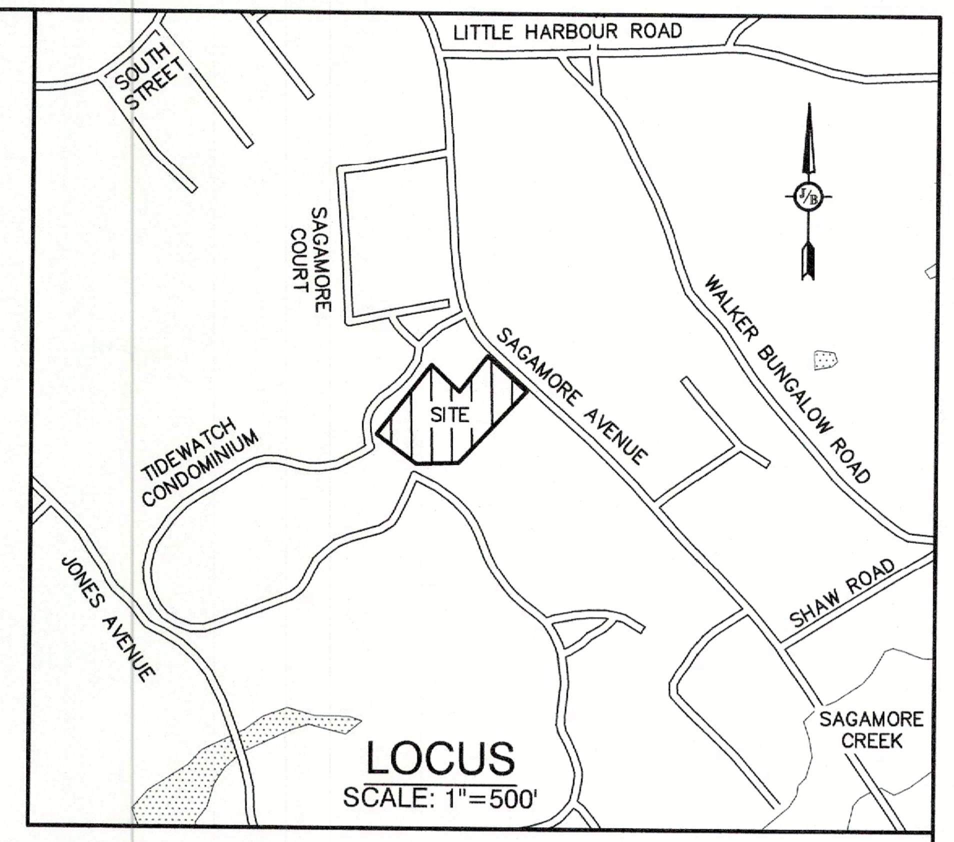
I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

I CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN UNADJUSTED LINEAR ERROR OF CLOSURE THAT EXCEED BOTH THE MINIMUM OF 1:10,000 AS DEFINED IN SECTION 503.04 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES AND THE MINIMUM OF 1:15,000 AS DEFINED IN SECTION 4.2 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

THIS SURVEY CONFORMS TO A CATEGORY 1 CONDITION 1 SURVEY AS DEFINED IN SECTION 4.1 OF THE N.H.L.S.A. ETHICS AND STANDARDS.

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 1030 MATTHEW J. SALVUCCI
SIGNATURE

MATTHEW J. SALVUCCI, LLS 1030 — DATE: 4/22/24
ON BEHALF OF JONES & BEACH ENGINEERS, INC.



SITE NOTES:

1. THE INTENT OF THIS PLAN IS TO REMOVE EXISTING STRUCTURES AND CONSTRUCT A 4-UNIT MULTI-FAMILY RESIDENTIAL DEVELOPMENT.
2. ZONING DISTRICT: SINGLE RESIDENCE A (SRA)
   LOT AREA MINIMUM = 1 ACRE
   LOT FRONTAGE MINIMUM = 150'
   LOT DEPTH MINIMUM = 200'
   BUILDING SETBACKS (MINIMUM):
   - FRONT SETBACK = 30'
   - SIDE SETBACK = 20'
   - REAR SETBACK = 40'
   - WETLAND SETBACK = 100' FROM WETLANDS GREATER THAN 10,000 S.F.

   MAX. BUILDING HEIGHT = 35' FOR SLOPED ROOF; 30' FOR FLAT ROOF
   MAX. BUILDING COVERAGE = 10%
   BUILDING COVERAGE PROPOSED = 8,420 S.F. = 9.9%
   MAX. DENSITY = 1 DWELLING UNIT / ACRE
   DENSITY PROPOSED = 4 DWELLING UNITS / 1.947 AC. = 2.05 UNITS / ACRE
   (1 UNIT / 21,248 S.F.)
   MIN. OPEN SPACE = 50%
   OPEN SPACE PROPOSED = 68,700 S.F. = 80.0%
3. PARKING CALCULATIONS:
   DWELLING UNIT FLOOR AREA OVER 750 S.F. – 1.3 SPACES REQUIRED PER UNIT
   1.3 * 4 DWELLING UNITS = 5.2 SPACES REQUIRED
   2 SPACES IN GARAGE + 2 SPACES IN DRIVEWAY PER UNIT = 4 SPACES PER UNIT * 4 UNITS
   16 SPACES PROVIDED
   ONE BICYCLE SPACE PROVIDED IN EACH GARAGE (1 REQUIRED FOR EVERY 5 DWELLING UNITS PER ZONING)
4. ON MAY 23, 2023, THE PORTSMOUTH, NH ZONING BOARD OF ADJUSTMENT VOTED TO APPROVE VARIANCES FROM THE FOLLOWING SECTIONS OF THE ZONING ORDINANCE:
   A) SECTION 10.513 – TO PERMIT MORE THAN ONE FREE-STANDING DWELLING ON A LOT
   B) SECTION 10.521 – TO PERMIT LESS THAN ONE ACRE PER DWELLING UNIT
5. NHDES SEWER CONNECTION PERMIT NO. , DATED .
6. NO WETLANDS WERE OBSERVED WITHIN 100' OF THE PROPERTY BOUNDARY. SEE LETTER FROM GOVE ENVIRONMENTAL SERVICES, INC.
7. THIS PLAN SET HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC., FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON-SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA AS SHOWN ON THE DESIGN PLANS, INCLUDING ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS ON THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS, MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED. CONTRACTOR TO ALWAYS CONTACT DIG SAFE PRIOR TO DIGGING ONSITE OR OFFSITE TO ENSURE SAFETY AND OBEY THE LAW.
8. ALL CONSTRUCTION SHALL CONFORM TO TOWN STANDARDS AND REGULATIONS, AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.
9. SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
10. LANDOWNERS ARE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WETLAND REGULATIONS, INCLUDING PERMITTING REQUIRED UNDER THESE REGULATIONS.
11. ALL CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (S.W.P.P.P.). THIS DOCUMENT IS TO BE KEPT ONSITE AT ALL TIMES AND UPDATED AS REQUIRED.
12. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, FEES AND BONDS.
13. ALL SIGNAGE AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) AND NHDOT STANDARDS AND SPECIFICATIONS (NON-REFLECTORIZED PAVEMENT MARKINGS), UNLESS OTHERWISE NOTED.
14. ALL BUILDING DIMENSIONS SHALL BE VERIFIED WITH THE ARCHITECTURAL AND STRUCTURAL PLANS PROVIDED BY THE OWNER. ANY DISCREPANCIES SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND OWNER PRIOR TO THE START OF CONSTRUCTION. BUILDING DIMENSIONS AND AREAS TO BE TO OUTSIDE OF MASONRY, UNLESS OTHERWISE NOTED.
15. SNOW TO BE STORED AT EDGE OF PAVEMENT AND IN AREAS SHOWN ON THE PLANS, OR TRUCKED OFFSITE TO AN APPROVED SNOW DUMPING LOCATION.
16. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
17. AN ACCESS EASEMENT SHALL BE GRANTED TO THE CITY OF PORTSMOUTH FOR ACCESS AND LEAK DETECTION OF THE WATER MAIN, SHUTOFFS, AND METERS ON THE PROPERTY. EASEMENT DESCRIPTION MUST BE APPROVED BY THE CITY'S LEGAL DEPARTMENT AND ACCEPTED BY THE CITY COUNCIL.
18. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THE SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
19. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
20. ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
21. THE OWNER OF EACH UNIT SHALL STORE TRASH IN THEIR GARAGE. TRASH WILL BE PICKED UP BY A PRIVATE HAULER.
22. THE SUBJECT PARCEL IS NOT LOCATED WITHIN A WELLHEAD PROTECTION OR AQUIFER PROTECTION AREA PER NHDES ONESTOP DATA.
23. SIDEWALK WORK IN SAGAMORE AVE. RIGHT OF WAY SHALL BE DONE BY THE CITY AND COORDINATED WITH THIS DEVELOPMENT.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
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STATE OF NEW HAMPSHIRE — DANIEL JAMES MEDITZ No.18152 — LICENSED PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

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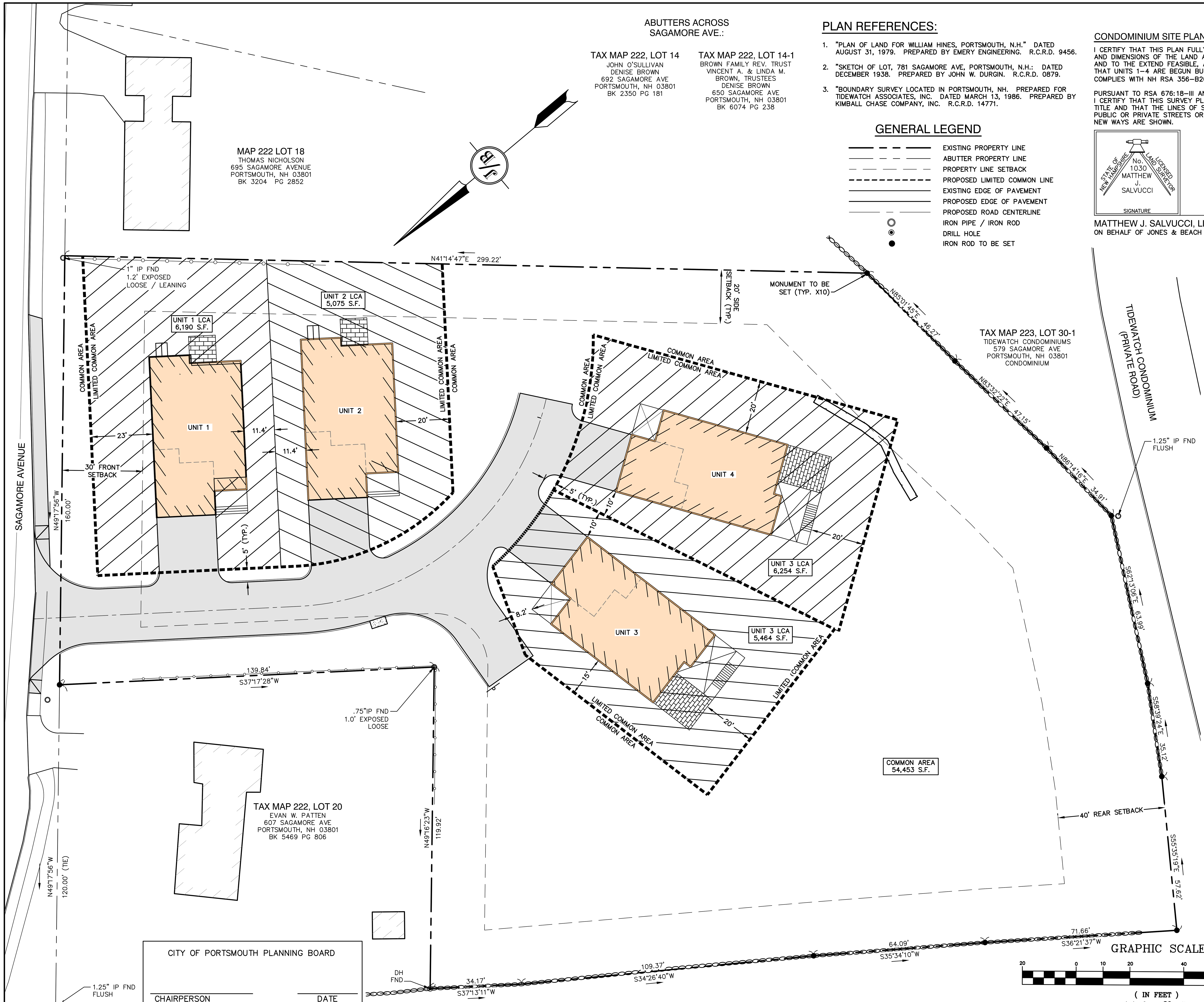
Plan Name:	SITE PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
C2
SHEET 4 OF 20
JBE PROJECT NO. 18134.1



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3. "BOUNDARY SURVEY LOCATED IN PORTSMOUTH, NH. PREPARED FOR TIDEWATCH ASSOCIATES, INC. DATED MARCH 13, 1986. PREPARED BY KIMBALL CHASE COMPANY, INC. R.C.R.D. 14771.

GENERAL LEGEND

- EXISTING PROPERTY LINE
- ABUTTER PROPERTY LINE
- PROPERTY LINE SETBACK
- PROPOSED LIMITED COMMON LINE
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- PROPOSED ROAD CENTERLINE
- IRON PIPE / IRON ROD
- DRILL HOLE
- IRON ROD TO BE SET

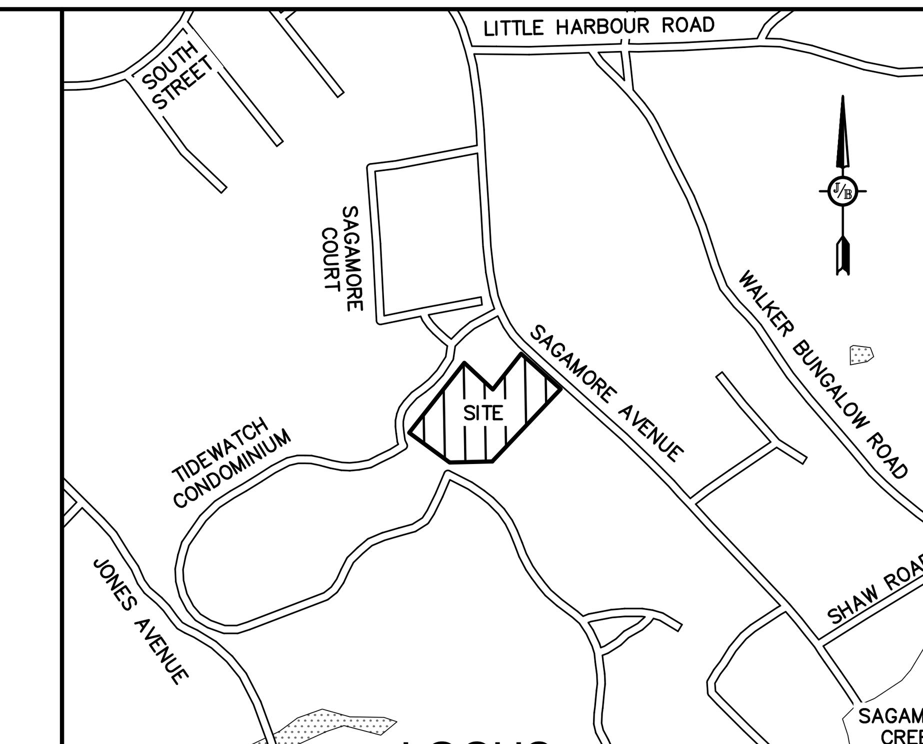
CONDOMINIUM SITE PLAN CERTIFICATION:

I CERTIFY THAT THIS PLAN FULLY AND ACCURATELY DEPICTS THE LOCATION AND DIMENSIONS OF THE LAND AND EXISTING IMPROVEMENTS SHOWN THEREON AND TO THE EXTEND FEASIBLE, ALL EASEMENTS APPURTENANT THERETO, THAT UNITS 1-4 ARE BEGUN BUT NOT YET COMPLETE, AND THAT THIS PLAN COMPLIES WITH NH RSA 356-B20 (1).

PURSUANT TO RSA 676:18-III AND RSA 672:14
I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

STATE OF NEW HAMPSHIRE
No. 1030
MATTHEW J. SALVUCCI
LICENSED LAND SURVEYOR
SIGNATURE

MATTHEW J. SALVUCCI, LLS 1030 DATE:
ON BEHALF OF JONES & BEACH ENGINEERS, INC.



LOCUS
SCALE: 1"=500'

SITE NOTES:

1. THE INTENT OF THIS PLAN IS TO REMOVE EXISTING STRUCTURES AND CONSTRUCT A 4-UNIT MULTI-FAMILY RESIDENTIAL DEVELOPMENT.
2. ZONING DISTRICT: SINGLE RESIDENCE A (SRA)
   LOT AREA MINIMUM = 1 ACRE
   LOT FRONTAGE MINIMUM = 150'
   LOT DEPTH MINIMUM = 200'
   BUILDING SETBACKS (MINIMUM):
   - FRONT SETBACK = 30'
   - SIDE SETBACK = 20'
   - REAR SETBACK = 40'
   - WETLAND SETBACK = 100' FROM WETLANDS GREATER THAN 10,000 S.F.

   MAX. BUILDING HEIGHT = 35' FOR SLOPED ROOF; 30' FOR FLAT ROOF
   MAX. BUILDING COVERAGE = 10%
   BUILDING COVERAGE PROPOSED = 8,476 S.F. = JUST UNDER 10%
   MAX. DENSITY = 1 DWELLING UNIT / ACRE
   DENSITY PROPOSED = 4 DWELLING UNITS / 1.947 AC. = 2.05 UNITS / ACRE
   (1 UNIT / 21,248 S.F.)
   MIN. OPEN SPACE = 50%
   OPEN SPACE PROPOSED = 68,700 S.F. = 80.0%
3. PARKING CALCULATIONS:
   DWELLING UNIT FLOOR AREA OVER 750 S.F. - 1.3 SPACES REQUIRED PER UNIT
   1.3 * 4 DWELLING UNITS = 5.2 SPACES REQUIRED
   2 SPACES IN GARAGE + 2 SPACES IN DRIVEWAY PER UNIT = 4 SPACES PER UNIT * 4 UNITS
   16 SPACES PROVIDED
   ONE BICYCLE SPACE PROVIDED IN EACH GARAGE (1 REQUIRED FOR EVERY 5 DWELLING UNITS PER ZONING)
4. ON MAY 23, 2023, THE PORTSMOUTH, NH ZONING BOARD OF ADJUSTMENT VOTED TO APPROVE VARIANCES FROM THE FOLLOWING SECTIONS OF THE ZONING ORDINANCE:
   A) SECTION 10.513 - TO PERMIT MORE THAN ONE FREE-STANDING DWELLING ON A LOT
   B) SECTION 10.521 - TO PERMIT LESS THAN ONE ACRE PER DWELLING UNIT
5. NHDES SEWER CONNECTION PERMIT NO. , DATED .
6. AS-BUILT CONDOMINIUM SITE AND FLOOR PLANS SHALL BE RECORDED.
7. NO WETLANDS WERE OBSERVED WITHIN 100' OF THE PROPERTY BOUNDARY. SEE LETTER FROM GOVE ENVIRONMENTAL SERVICES, INC.
8. BASIS OF BEARING:
   HORIZONTAL - NH STATE PLANE. VERTICAL - NAVD88.
9. ALL BOOK AND PAGE NUMBERS REFER TO THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
10. THE TAX MAP AND LOT NUMBERS ARE BASED ON THE CITY OF PORTSMOUTH TAX RECORDS AND ARE SUBJECT TO CHANGE.
11. ALL LAND WITHIN THE LCA LINES WITH THE EXCEPTION OF THE BUILDING INTERIORS SHALL BE LIMITED COMMON AREA. LIMITED COMMON AREAS MAY BE ACCESSED BY THE ASSOCIATION FOR ANY WORK ASSOCIATED WITH UTILITIES, DRAINAGE, AND LANDSCAPING THAT IS DEEMED NECESSARY.
12. 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.
13. 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
14. THIS PLAN SET HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC., FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON-SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA AS SHOWN ON THE DESIGN PLANS, INCLUDING ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS ON THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS, MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED. CONTRACTOR TO ALWAYS CONTACT DIG SAFE PRIOR TO DIGGING ONSITE OR OFFSITE TO ENSURE SAFETY AND OBEY THE LAW.
15. THIS PLAN IS THE RESULT OF A CLOSED TRAVERSE WITH A RAW, UNADJUSTED LINEAR ERROR OF CLOSURE GREATER THAN 1 IN 15,000
16. SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED 100 YEAR FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
17. AN ACCESS EASEMENT SHALL BE GRANTED TO THE CITY OF PORTSMOUTH FOR ACCESS AND LEAK DETECTION OF THE WATER MAIN, SHUTOFFS, AND METERS ON THE PROPERTY. EASEMENT DESCRIPTION MUST BE APPROVED BY THE CITY'S LEGAL DEPARTMENT AND ACCEPTED BY THE CITY COUNCIL.
18. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THE SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
19. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
20. ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
21. THE OWNER OF EACH UNIT SHALL STORE TRASH IN THEIR GARAGE. TRASH WILL BE PICKED UP BY A PRIVATE HAULER.
22. THE SUBJECT PARCEL IS NOT LOCATED WITHIN A WELLHEAD PROTECTION OR AQUIFER PROTECTION AREA PER NHDES ONESTOP DATA.
23. THE IMPROVEMENTS SHOWN HEREON HAVE NOT YET BEEN CONSTRUCTED.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON DATE

Design: DJM	Draft: KDR	Date: 2/26/2024	
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1	
Drawing Name: 18134.1-PLAN.dwg			

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STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
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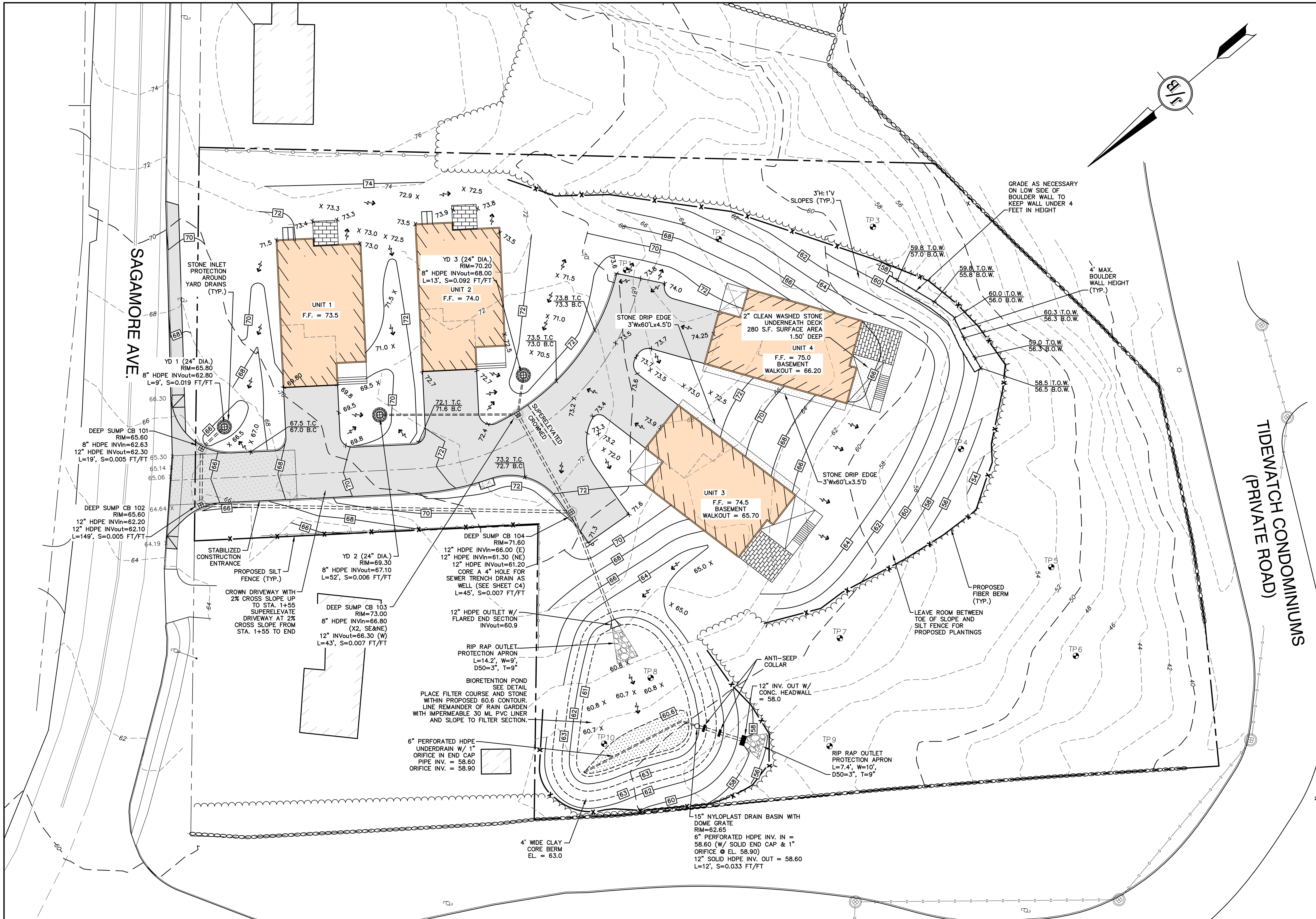
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	CONDOMINIUM SITE PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
CS1
SHEET 5 OF 20
JBE PROJECT NO. 18134.1



GRADING AND DRAINAGE NOTES:

1. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES AND/OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 888-DIG-SAFE (888-344-7233).
2. VERTICAL DATUM: NAVD88.
3. ALL BENCHMARKS AND TOPOGRAPHY SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
4. SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED. SEE CONSTRUCTION SEQUENCE ON SHEET E1.
5. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO HAVE THE PROJECT'S LAND SURVEYOR STAKE OR FLAG CLEARING LIMITS. A MINIMUM OF 48 HOURS NOTICE IS REQUIRED.
6. ALL SWALES AND STORMWATER PONDS SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
7. PROPOSED RIM ELEVATIONS OF DRAINAGE STRUCTURES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES.
8. ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS. CATCH BASINS SHALL HAVE 4' DEEP SUMPS WITH GREASE HOODS, UNLESS OTHERWISE NOTED.
9. ALL DRAINAGE STRUCTURES SHALL BE PRECAST, UNLESS OTHERWISE SPECIFIED. SEE DETAIL SHEETS FOR DRAINAGE DETAILS.
10. ALL DRAINAGE STRUCTURES AND STORMWATER PIPES SHALL MEET HEAVY DUTY TRAFFIC H20 LOADING AND SHALL BE INSTALLED ACCORDINGLY.
11. IN AREAS WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED.
12. ALL DRAINAGE PIPE SHALL BE NON-PERFORATED ADS N-12 OR APPROVED EQUAL.
13. STONE INLET PROTECTION SHALL BE PLACED AT ALL CATCH BASINS AND YARD DRAINS. SEE DETAIL WITHIN THE DETAIL SHEETS.
14. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY ALL GOVERNING AUTHORITIES. THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE EPA SWPPP DURING CONSTRUCTION OPERATIONS.
15. ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 3 DAYS OF FINAL GRADING AND ANYTIME CONSTRUCTION STOPS FOR LONGER THAN 3 DAYS.
16. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN EVENT OF 0.25" OR GREATER IN A 24 HOUR PERIOD AND AT LEAST ONCE A WEEK.
17. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE, AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
18. CONSTRUCTION VEHICLES SHALL UTILIZE THE STABILIZED CONSTRUCTION ENTRANCE TO THE EXTENT POSSIBLE THROUGHOUT CONSTRUCTION.
19. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
20. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
21. SEDIMENT SHALL BE REMOVED FROM ALL SEDIMENT BASINS BEFORE THEY ARE 25% FULL.
22. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
23. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED, IF DEEMED NECESSARY BY ON-SITE INSPECTION BY ENGINEER AND/OR REGULATORY OFFICIALS.
24. SEE ALSO EROSION AND SEDIMENT CONTROL SPECIFICATIONS ON SHEET E1.
25. CB = CATCH BASIN, YD = YARD DRAIN

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
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Drawing Name: 18134.1-PLAN.dwg		

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STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
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PO Box 219
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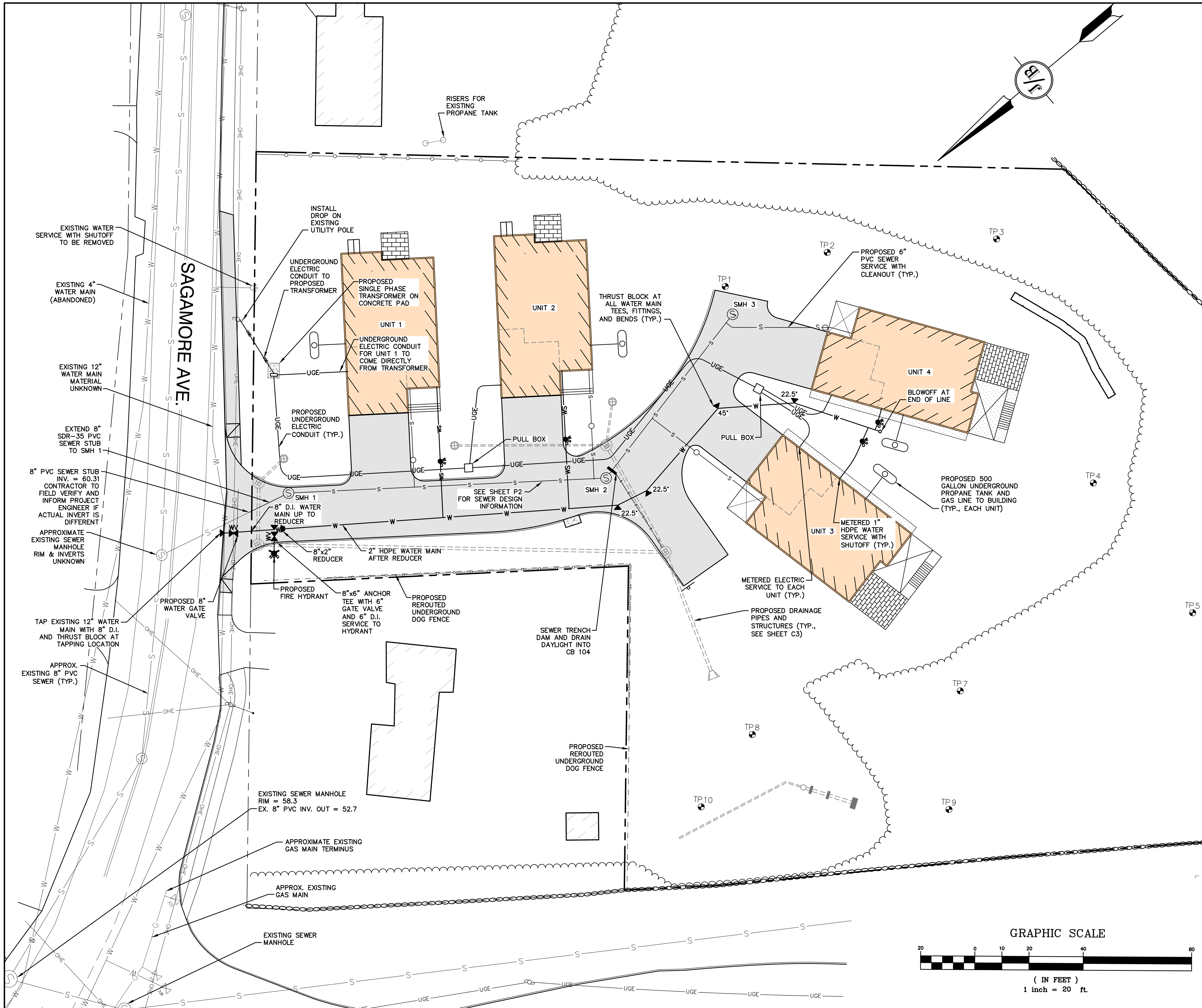
Plan Name: GRADING AND DRAINAGE PLAN

Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH

Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
C3
SHEET 6 OF 20
JBE PROJECT NO. 18134.1



UTILITY NOTES:

1. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, CONNECTION FEES AND BONDS.
2. THE CONTRACTOR SHALL PROVIDE A MINIMUM NOTICE OF FOURTEEN (14) DAYS TO ALL CORPORATIONS, COMPANIES AND/OR LOCAL AUTHORITIES OWNING OR HAVING A JURISDICTION OVER UTILITIES RUNNING TO, THROUGH OR ACROSS PROJECT AREAS PRIOR TO DEMOLITION AND/OR CONSTRUCTION ACTIVITIES.
3. THE LOCATION, SIZE, DEPTH AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE TO THE STANDARDS AND REQUIREMENTS OF THE RESPECTIVE UTILITY COMPANY (ELECTRIC, TELEPHONE, CABLE TELEVISION, WATER, AND SEWER).
4. A PRECONSTRUCTION MEETING SHALL BE HELD WITH THE OWNER, ENGINEER, ARCHITECT, CONTRACTOR, LOCAL OFFICIALS, AND ALL PROJECT-RELATED UTILITY COMPANIES (PUBLIC AND PRIVATE) PRIOR TO START OF CONSTRUCTION.
5. ALL CONSTRUCTION SHALL CONFORM TO THE CITY STANDARDS AND REGULATIONS, AND NHDES STANDARDS AND SPECIFICATIONS, WHICHEVER ARE MORE STRINGENT, UNLESS OTHERWISE SPECIFIED.
6. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
7. BUILDINGS TO BE SERVICED BY UNDERGROUND UTILITIES UNLESS OTHERWISE NOTED.
8. AS-BUILT PLANS SHALL BE SUBMITTED TO DEPARTMENT OF PUBLIC WORKS.
9. INVERTS AND SHELVES: MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW AT CHANGES IN DIRECTION. THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE THROUGH CHANNEL UNDERLAYMENT OF INVERT, AND SHELF SHALL CONSIST OF BRICK MASONRY.
10. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30 INCH DIA, CLEAR OPENING. THE WORD "SEWER" SHALL BE CAST INTO THE CENTER OF THE UPPER FACE OF EACH COVER WITH RAISED, 3" LETTERS.
11. SHALLOW MANHOLE: IN LIEU OF A CONE SECTION, WHEN MANHOLE DEPTH IS LESS THAN 6 FEET, A REINFORCED CONCRETE SLAB COVER MAY BE USED HAVING AN ECCENTRIC ENTRANCE OPENING AND CAPABLE OF SUPPORTING H20 LOADS. (THIS APPLIES TO SMH 1)
12. CONTRACTOR SHALL PLACE 2" WIDE METAL WIRE IMPREGNATED RED PLASTIC WARNING TAPE OVER ENTIRE LENGTH OF ALL GRAVITY SEWERS, SERVICES, AND FORCE MAINS.
13. SANITARY SEWER FLOW CALCULATIONS:
    4 – FOUR BEDROOM UNITS. ASSUME 5 PEOPLE IN 4-BEDROOM UNITS.
    PER METCALF & EDDY TABLE 3-2: 61 GPD/PERSON IN 5 PERSON HOUSE
    (61 GPD * 5 PEOPLE * 4) = 1,220 GPD. SEE SHEET 2 FOR BEDROOM NUMBER DESIGNATION.
14. ALL SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS.
15. PROPOSED RIM ELEVATIONS OF DRAINAGE AND SANITARY MANHOLES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES. ADJUST ALL OTHER RIM ELEVATIONS OF MANHOLES, WATER GATES, AND OTHER UTILITIES TO FINISH GRADE AS SHOWN ON THE GRADING AND DRAINAGE PLAN.
16. ALL WATER MAINS AND SERVICE PIPES SHALL HAVE A MINIMUM 12" VERTICAL AND 24" HORIZONTAL SEPARATION TO MANHOLES, OR CONTRACTOR SHALL INSTALL BOARD INSULATION FOR FREEZING PROTECTION.
17. WATER MAINS SHALL BE HYDROSTATICALLY PRESSURE TESTED FOR LEAKAGE PRIOR TO ACCEPTANCE. WATERMAINS SHALL BE TESTED AT 1.5 TIMES THE WORKING PRESSURE OR 150 PSI, WHICH EVER IS GREATER. TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 4 OF AWWA STANDARD C 600. WATERMAINS SHALL BE DISINFECTED AFTER THE ACCEPTANCE OF THE PRESSURE AND LEAKAGE TESTS ACCORDING TO AWWA STANDARD C 651.
18. ALL WATER AND SANITARY LEADS TO BUILDING(S) SHALL END 5' OUTSIDE THE BUILDING LIMITS AS SHOWN ON PLANS AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT END.
19. THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS, TEES, MECHANICAL JOINTS AND FIRE HYDRANTS.
20. DIMENSIONS ARE SHOWN TO CENTERLINE OF PIPE OR FITTING.
21. CONTRACTOR TO FURNISH SHOP DRAWINGS FOR UTILITY RELATED ITEMS TO ENSURE CONFORMANCE WITH THE PLANS AND SPECIFICATIONS. SHOP DRAWINGS SHOULD BE SENT IN TRIPLICATE TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
22. EXISTING UTILITIES SHALL BE DIGSAFED BEFORE CONSTRUCTION.
23. ALL WATER LINES SHALL HAVE TESTABLE BACKFLOW PREVENTERS AT THE ENTRANCE TO EACH BUILDING.
24. ALL GRAVITY SEWER PIPE, MANHOLES, AND FORCE MAINS SHALL BE TESTED ACCORDING TO NHDES STANDARDS OF DESIGN AND CONSTRUCTION FOR SEWAGE AND WASTEWATER TREATMENT FACILITIES, CHAPTER ENV-WQ 700. ADOPTED ON 10-15-14.
25. ENV-WQ 704.06 GRAVITY SEWER PIPE TESTING: GRAVITY SEWERS SHALL BE TESTED FOR WATER TIGHTNESS BY USE OF LOW-PRESSURE AIR TESTS CONFORMING WITH ASTM F1417-92(2005) OR UNI-BELL PVC PIPE ASSOCIATION UNI-B-6. LINES SHALL BE CLEANED AND VISUALLY INSPECTED AND TRUE TO LINE AND GRADE. DEFLECTION TESTS SHALL TAKE PLACE AFTER 30 DAYS FOLLOWING INSTALLATION AND THE MAXIMUM ALLOWABLE DEFLECTION OF FLEXIBLE SEWER PIPE SHALL BE 5% OF AVERAGE INSIDE DIAMETER. A RIGID BALL OR MANDREL WITH A DIAMETER OF AT LEAST 95% OF THE AVERAGE INSIDE PIPE DIAMETER SHALL BE USED FOR TESTING PIPE DEFLECTION. THE DEFLECTION TEST SHALL BE CONDUCTED WITHOUT MECHANICAL PULLING DEVICES.
26. ENV-WQ 704.17 SEWER MANHOLE TESTING: SHALL BE TESTED FOR LEAKAGE USING A VACUUM TEST PRIOR TO BACKFILLING AND PLACEMENT OF SHELVES AND INVERTS.
27. SANITARY SEWER LINES SHALL BE LOCATED AT LEAST TEN (10) FEET HORIZONTALLY FROM AN EXISTING OR PROPOSED WATER LINE. WHEN A SEWER LINE CROSSES UNDER A WATER LINE, THE SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 6 FEET HORIZONTALLY FROM THE WATERMAIN. THE SEWER LINE SHALL ALSO MAINTAIN A VERTICAL SEPARATION OF NOT LESS THAN 18 INCHES.
28. SEWERS SHALL BE BURIED TO A MINIMUM DEPTH OF 6 FEET BELOW GRADE IN ALL ROADWAY LOCATIONS, AND TO A MINIMUM DEPTH OF 4 FEET BELOW GRADE IN ALL CROSS-COUNTRY LOCATIONS. PROVIDE TWO-INCHES OF R-10 FOAM BOARD INSULATION 2-FOOT WIDE TO BE INSTALLED 6-INCHES OVER SEWER PIPE IN AREAS WHERE DEPTH IS NOT ACHIEVED. A WAIVER FROM THE DEPARTMENT OF ENVIRONMENTAL SERVICES WASTEWATER ENGINEERING BUREAU IS REQUIRED PRIOR TO INSTALLING SEWER AT LESS THAN MINIMUM COVER.
29. THE CONTRACTOR SHALL MINIMIZE THE DISRUPTIONS TO THE EXISTING SEWER FLOWS AND THOSE INTERRUPTIONS SHALL BE LIMITED TO FOUR (4) HOURS OR LESS AS DESIGNATED BY THE CITY SEWER DEPARTMENT.
30. LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRIC CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
31. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.
32. DISINFECTION OF WATER MAINS SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH AWWA STANDARD C651, LATEST EDITION. THE BASIC PROCEDURE TO BE FOLLOWED FOR DISINFECTING WATER MAINS IS AS FOLLOWS:
    a. PREVENT CONTAMINATING MATERIALS FROM ENTERING THE WATER MAIN DURING STORAGE, CONSTRUCTION, OR REPAIR.
    b. REMOVE, BY FLUSHING OR OTHER MEANS, THOSE MATERIALS THAT MAY HAVE ENTERED THE WATER MAINS.
    c. CHLORINATE ANY RESIDUAL CONTAMINATION THAT MAY REMAIN, AND FLUSH THE CHLORINATED WATER FROM THE MAIN.
    d. PROTECT THE EXISTING DISTRIBUTION SYSTEM FROM BACKFLOW DUE TO HYDROSTATIC PRESSURE TEST AND DISINFECTION PROCEDURES.
    e. DETERMINE THE BACTERIOLOGICAL QUALITY BY LABORATORY TEST AFTER DISINFECTION.
    f. MAKE FINAL CONNECTION OF THE APPROVED NEW WATER MAIN TO THE ACTIVE DISTRIBUTION SYSTEM
33. DOMESTIC SHUTOFFS & VALVES SHALL BE PAINTED BLUE. FIRE SERVICE SHUTOFFS & VALVES SHALL BE PAINTED RED. COORDINATE WITH CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS FOR EXACT COLORS.
34. SEWER TRENCH DAMS SHALL BE INSTALLED EVERY 75' ALONG GRAVITY SEWER PIPE.
35. IF IRRIGATION IS TO BE USED, THE PIPING SYSTEM SHALL BE REVIEWED AND APPROVED BY THE PORTSMOUTH CITY PLANNER, CITY ENGINEER, AND THE WATER DEPARTMENT PRIOR TO INSTALLATION.
36. WATER LINE TO BE CONSTRUCTED PER CITY OF PORTSMOUTH SPECIFICATIONS.
37. AN AS-BUILT PLAN OF THE WATER LINE IS TO BE PREPARED AND SUBMITTED TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

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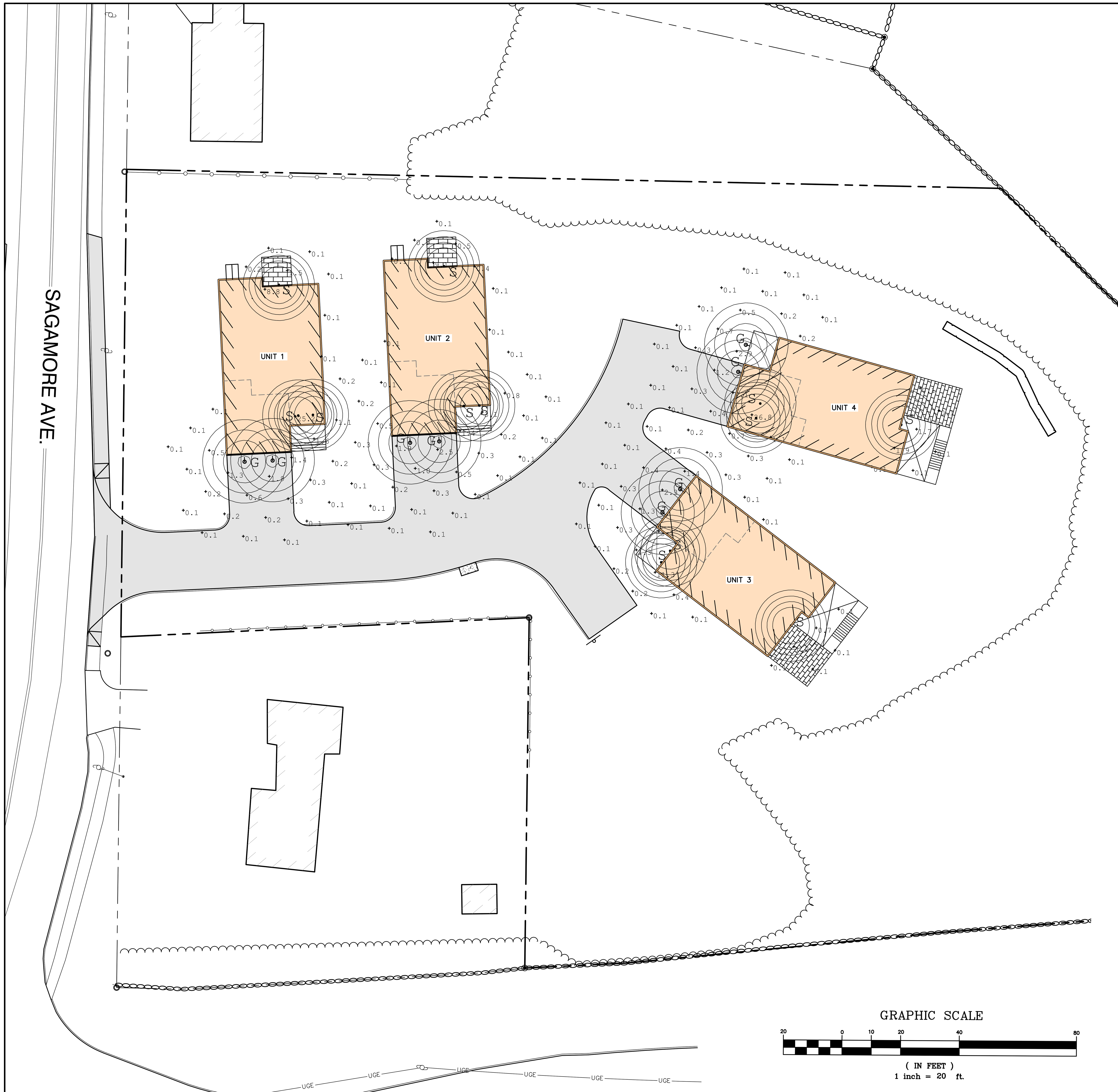
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	UTILITY PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
C4

JBE PROJECT NO. 18134.1



LIGHTING AND ELECTRICAL NOTES:

1. SITE ELECTRICAL CONTRACTOR SHALL COORDINATE LOCATION OF EASEMENTS, UNDERGROUND UTILITIES AND DRAINAGE BEFORE DRILLING POLE BASES.
2. CONTRACTOR SHALL INSTALL PROPOSED LIGHT POLES ACCORDING TO TOWN REGULATIONS.
3. ALL OUTDOOR LIGHTING SYSTEMS SHALL BE EQUIPPED WITH TIMERS TO REDUCE ILLUMINATION LEVELS TO NON-OPERATIONAL VALUES PER TOWN REGULATIONS.
4. LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRICAL CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
5. ILLUMINATION READINGS SHOWN ARE BASED ON A TOTAL LLF OF 0.75 AT GRADE. ILLUMINATION READINGS SHOWN ARE IN UNITS OF FOOT-CANDLES.
6. LIGHTING CALCULATIONS SHOWN ARE NOT A SUBSTITUTE FOR INDEPENDENT ENGINEERING ANALYSIS OF LIGHTING SYSTEM AND SAFETY.
7. ALL LIGHTING FIXTURES SHALL BE FULL CUT-OFF DARK-SKY COMPLIANT, UNLESS OTHERWISE NOTED.
8. THE PROPOSED LIGHTING CALCULATIONS AND DESIGN WAS PERFORMED BY EXPOSURE LIGHTING, 501 ISLINGTON ST, UNIT 1A, PORTSMOUTH, NH 03801, ATTENTION KEN SWEENEY. ALL LIGHTS SHOULD BE PURCHASED FROM THIS COMPANY, OR AN EQUAL LIGHTING DESIGN SHALL BE SUBMITTED FOR REVIEW IF EQUAL SUBSTITUTIONS ARE PROPOSED BY THE CONTRACTOR OR OWNER.

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Description	Tag	[MANUFAC]
	8	G	Single	UAA-30146-29W-2-1-W27-01	MOUNTED OVER GARAGE DOORS	LIGMAN
	12	S	Single	UCI-30131-21W-VW-W27-01	MOUNTED AT HOUSE DOORS	LIGMAN

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
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1.95 ACRES

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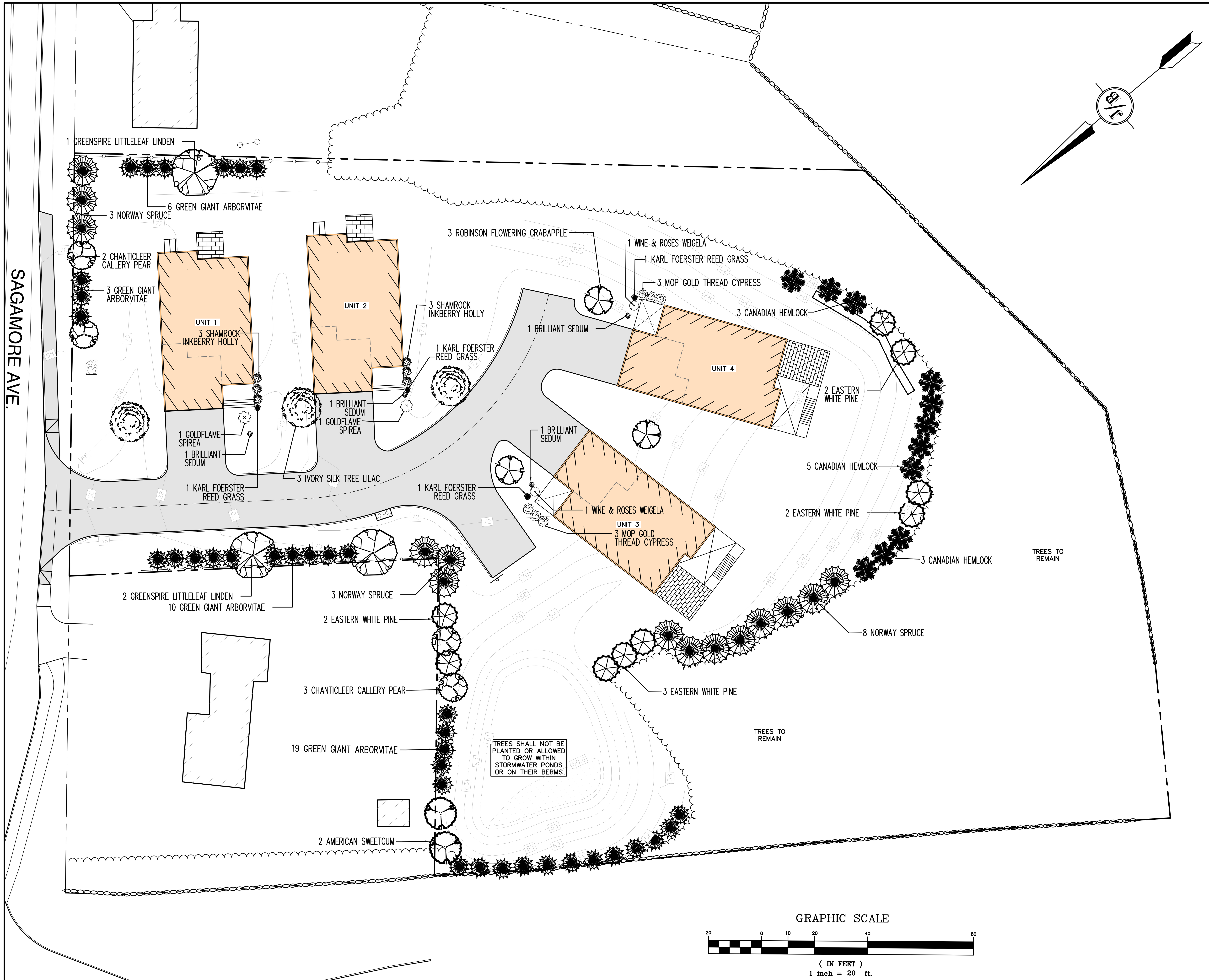
STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: LIGHTING PLAN
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
L1
SHEET 8 OF 20
JBE PROJECT NO. 18134.1



LANDSCAPE NOTES:

1. THE CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO STARTING WORK.
2. THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTINGS SHOWN ON THE DRAWINGS.
3. ALL MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
4. PLANTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL AT THE PLACE OF GROWTH, UPON DELIVERY OR AT THE JOB SITE WHILE WORK IS ON-GOING FOR CONFORMITY TO SPECIFIED QUALITY, SIZE AND VARIETY.
5. PLANTS FURNISHED IN CONTAINERS SHALL HAVE THE ROOTS WELL ESTABLISHED IN THE SOIL MASS AND SHALL HAVE AT LEAST ONE (1) GROWING SEASON. ROOT-BOUND PLANTS OR INADEQUATELY SIZED CONTAINERS TO SUPPORT THE PLANT MAY BE DEEMED UNACCEPTABLE.
6. NO PLANT SHALL BE PUT IN THE GROUND BEFORE GRADING HAS BEEN COMPLETED.
7. ALL WORK AND PLANTS SHALL BE DONE, INSTALLED AND DETAILED IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
8. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24-HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL BE WATERED WEEKLY, OR MORE OFTEN IF NECESSARY, DURING THE FIRST GROWING SEASON.
9. ALL LANDSCAPE AREAS TO BE GRASS COMMON TO REGION, EXCEPT FOR INTERIOR LANDSCAPED ISLANDS OR WHERE OTHER PLANT MATERIAL IS SPECIFIED.
10. ALL TREES AND SHRUBS SHALL BE PLANTED IN MULCH BEDS WITH EDGE STRIPS TO SEPARATE TURF GRASS AREAS.
11. THE CONTRACTOR SHALL REMOVE WEEDS, ROCKS, CONSTRUCTION ITEMS, ETC. FROM ANY LANDSCAPE AREA SO DESIGNATED TO REMAIN, WHETHER ON OR OFF-SITE. GRASS SEED OR PINE BARK MULCH SHALL BE APPLIED AS DEPICTED ON PLANS.
12. EXISTING TREES TO REMAIN SHALL BE PROTECTED WITH TEMPORARY SNOW FENCING AT THE DRIPLINE OF THE TREE. THE CONTRACTOR SHALL NOT STORE VEHICLES OR MATERIALS WITHIN THE LANDSCAPED AREAS. ANY DAMAGE TO EXISTING TREES, SHRUBS OR LAWN SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
13. ALL MULCH AREAS SHALL RECEIVE A 3" LAYER OF SHREDDED PINE BARK MULCH OVER A 10 MIL WEED MAT EQUAL TO "WEEDBLOCK" BY EASY GARDENER OR DEWITT WEED BARRIER.
14. ALL LANDSCAPED AREAS SHALL HAVE SELECT MATERIALS REMOVED TO A DEPTH OF AT LEAST 9" BELOW FINISH GRADE. THE RESULTING VOID IS TO BE FILLED WITH A MINIMUM OF 9" HIGH-QUALITY SCREENED LOAM AMENDED WITH 3" OF AGED ORGANIC COMPOST.
15. THIS PLAN IS INTENDED FOR LANDSCAPING PURPOSES ONLY. REFER TO CIVIL/SITE DRAWINGS FOR OTHER SITE CONSTRUCTION INFORMATION.
16. IRRIGATION PIPING SYSTEM SHALL BE REVIEWED AND APPROVED BY OWNER AND ENGINEER PRIOR TO INSTALLATION.
17. WITH AUTHORIZATION OF THE PROJECT ENGINEER, PROPOSED TREES ALONG EDGE OF WOODED BUFFER SHALL BE PLACED WHEREVER NECESSARY IN ORDER TO COVER GAPS IN EXISTING WOODED BUFFER IN ORDER TO BLOCK VISIBILITY FROM TIDEWATCH CONDOMINIUM PROPERTY.
18. TREES SHALL NOT BE PLANTED ON BERMS OF STORMWATER PONDS.
19. ALL PLANTING SHALL ADHERE TO THE GENERAL REQUIREMENTS OUTLINED IN SECTION 6.3 AND THE PLANTING REQUIREMENTS OUTLINED IN SECTION 6.4 OF THE PORTSMOUTH SITE PLAN REVIEW REGULATIONS.
20. ALL PLANTING SHALL FOLLOW THE ANSI A300 PART 6 STANDARD PRACTICES FOR PLANTING AND TRANSPLANTING (AS AMENDED).

Quantity	Botanical Name	Common Name	Size
4	Calamagrostis x acutiflora 'Karl Foerster'	KARL FOERSTER REED GRASS **	2 Gallon
6	Chamaecyparis pisifera 'Mop'	MOP GOLD THREAD CYPRESS **	5 Gallon
6	Ilex glabra 'Shamrock'	SHAMROCK INKBERRY HOLLY **	5 Gallon
2	Liquidambar styraciflua	AMERICAN SWEETGUM **	3" Caliper
3	Malus x 'Robinson'	ROBINSON FLOWERING CRABAPPLE **	2" Caliper
14	Picea abies	NORWAY SPRUCE	8-9 Ft. Ht.
9	Pinus strobus	EASTERN WHITE PINE	8-9 Ft. Ht.
4	Pyrus calleryana 'Chanticleer'	CHANTICLEER CALLERY PEAR **	2.5" Caliper
4	Sedum spectabile 'Brilliant'	BRILLIANT SEDUM **	1 Gallon
2	Spiraea japonica 'Goldflame'	GOLDFLAME SPIREA **	5 Gallon
3	Syringa reticulata 'Ivory Silk'	IVORY SILK TREE LILAC	2" Caliper
38	Thuja plicata 'Green Giant'	GREEN GIANT ARBORVITAE **	7-8 Ft. Ht.
3	Tilia cordata 'Greenspire'	GREENSPIRE LITTLELEAF LINDEN **	3" Caliper
11	Tsuga canadensis	CANADIAN HEMLOCK	8-9 Ft. Ht.
2	Weigela florida 'Alexandra'	WINE & ROSES WEIGELA	5 Gallon
**	Denotes plants that are tolerant of urban conditions including road salt, soil compaction, drought, heat, and air pollution.		

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

Design: DJM	Draft: KDR	Date: 2/26/2024	
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1	
Drawing Name: 18134.1-PLAN.dwg			

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85 Portsmouth Ave.
PO Box 219
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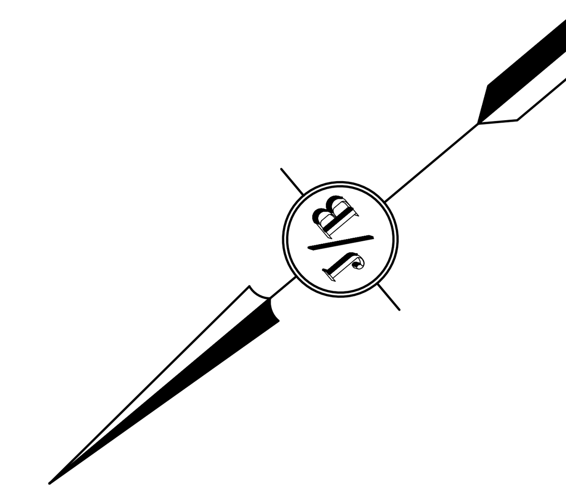
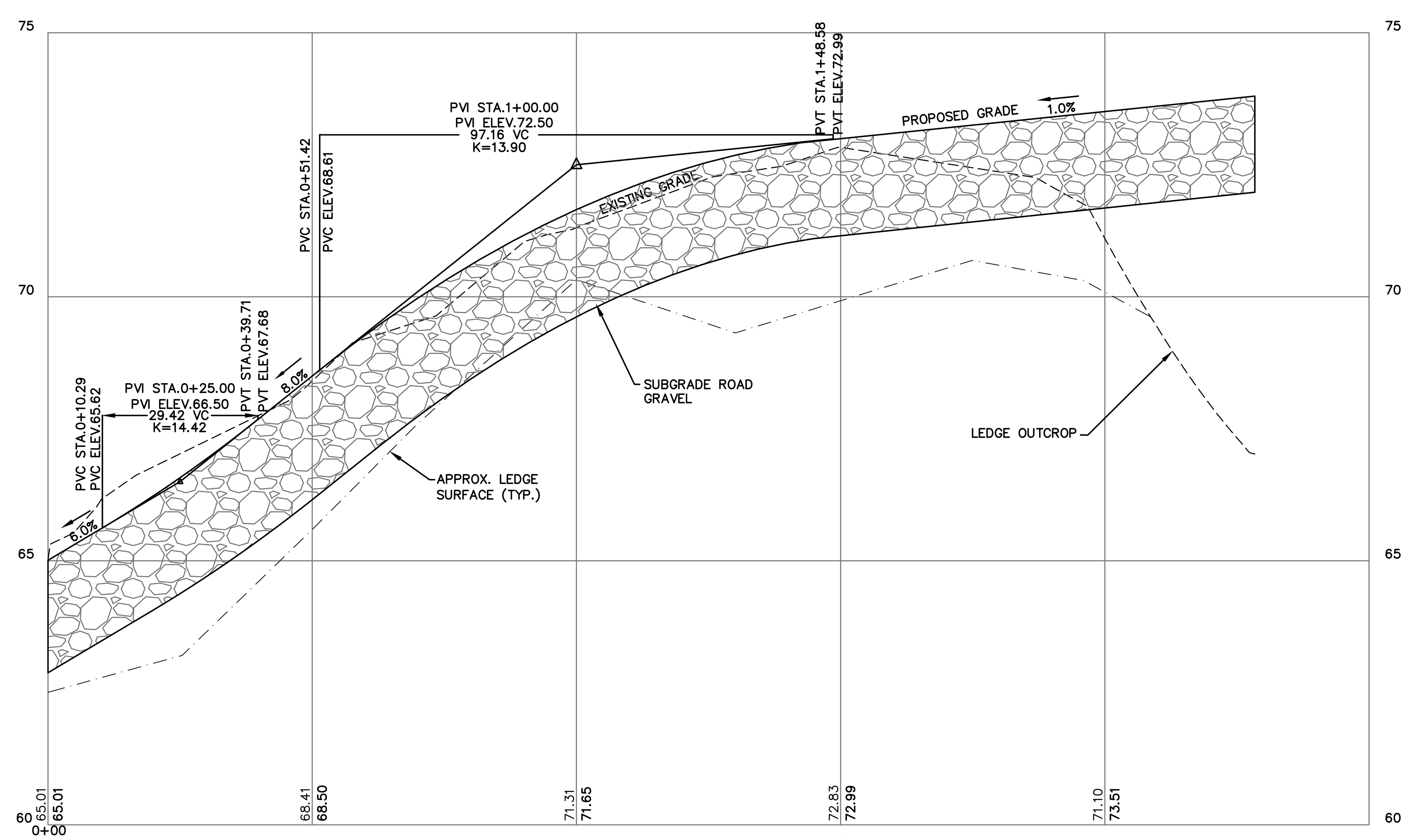
Plan Name: LANDSCAPE PLAN
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

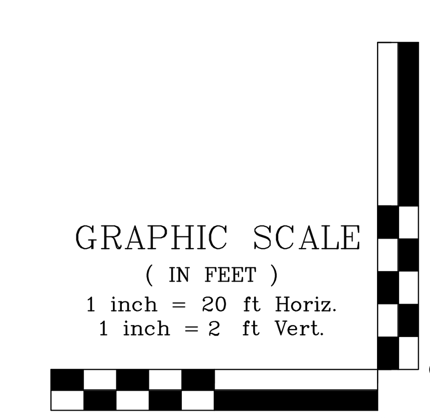
DRAWING No.
L1
SHEET 9 OF 20
JBE PROJECT NO. 18134.1



NOTES:

1. THIS SITE WILL REQUIRE A USEPA NPDES PERMIT FOR STORMWATER DISCHARGE FOR THE CONSTRUCTION SITE. THE CONSTRUCTION SITE OPERATOR SHALL DEVELOP AND IMPLEMENT A CONSTRUCTION STORM WATER POLLUTION PREVENTION PLAN (SWPPP), WHICH SHALL REMAIN ON SITE AND BE MADE ACCESSIBLE TO THE PUBLIC. THE CONSTRUCTION SITE OPERATOR SHALL SUBMIT A NOTICE OF INTENT (NOI) TO THE EPA REGIONAL OFFICE SEVEN DAYS PRIOR TO COMMENCEMENT OF ANY WORK ON SITE. EPA WILL POST THE NOI AT HTTP://CFPUB1.EPA.GOV/NPDES/STORMWATER/NOI/NOISEARCH.CFM. AUTHORIZATION IS GRANTED UNDER THE PERMIT ONCE THE NOI IS SHOWN IN "ACTIVE" STATUS ON THIS WEBSITE. A COMPLETED NOTICE OF TERMINATION SHALL BE SUBMITTED TO THE NPDES PERMITTING AUTHORITY WITHIN 30 DAYS AFTER EITHER OF THE FOLLOWING CONDITIONS HAVE BEEN MET:
   A. FINAL STABILIZATION HAS BEEN ACHIEVED ON ALL PORTIONS OF THE SITE FOR WHICH THE PERMITTEE IS RESPONSIBLE; OR
   B. ANOTHER OPERATOR/PERMITTEE HAS ASSUMED CONTROL OVER ALL AREAS OF THE SITE THAT HAVE NOT BEEN FINALLY STABILIZED. PROVIDE DPW WITH A COPY OF THE NOTICE OF TERMINATION (NOT).
2. ALL ROAD AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR THE CITY, AND NHDOT SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.
3. AS-BUILT PLANS TO BE SUBMITTED TO THE CITY PRIOR TO ACCEPTANCE OF THE ROADWAY.
4. CONTRACTOR TO COORDINATE AND COMPLETE ALL WORK REQUIRED FOR THE RELOCATION AND/OR INSTALLATION OF ELECTRIC, CATV, TELEPHONE, PER UTILITY DESIGN AND STANDARDS. LOCATIONS SHOWN ARE APPROXIMATE. LOW PROFILE STRUCTURES SHALL BE USED TO THE GREATEST EXTENT POSSIBLE.
5. THIS PLAN HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC. FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON-SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA SHOWN ON THE DESIGN PLANS. THIS INCLUDES ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS OF THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED.
6. SILTATION AND EROSION CONTROLS SHALL BE INSTALLED PRIOR TO CONSTRUCTION, SHALL BE MAINTAINED DURING CONSTRUCTION, AND SHALL REMAIN UNTIL SITE HAS BEEN STABILIZED WITH PERMANENT VEGETATION. SEE DETAIL SHEET E1 FOR ADDITIONAL NOTES ON EROSION CONTROL.
7. ALL DISTURBED AREAS NOT STABILIZED BY OCTOBER 15TH SHALL BE COVERED WITH AN EROSION CONTROL BLANKET. PRODUCT TO BE SPECIFIED BY THE ENGINEER.
8. FINAL DRAINAGE, GRADING AND EROSION PROTECTION MEASURES SHALL CONFORM TO REGULATIONS OF THE PUBLIC WORKS DEPARTMENT.
9. CONTRACTOR TO VERIFY EXISTING UTILITIES AND TO NOTIFY ENGINEER OF ANY DISCREPANCY IMMEDIATELY.
10. DRAINAGE INSPECTION AND MAINTENANCE SCHEDULE: SILT FENCING WILL BE INSPECTED DURING AND AFTER STORM EVENTS TO ENSURE THAT THE FENCE STILL HAS INTEGRITY AND IS NOT ALLOWING SEDIMENT TO PASS. SEDIMENT BUILD UP IN SWALES WILL BE REMOVED IF IT IS DEEPER THAN SIX INCHES, AND IS TO BE REMOVED FROM SUMPS BELOW THE INLET OF CULVERTS SEMIANNUALLY, AS WELL AS FROM CATCH BASINS. FOLLOWING MAJOR STORM EVENTS, THE STAGE DISCHARGE OUTLET STRUCTURES ARE TO BE INSPECTED AND ANY DEBRIS REMOVED FROM THE ORIFICE, TRASH TRACK AND EMERGENCY SPILL WAY. INFREQUENTLY, SEDIMENT MAY ALSO HAVE TO BE REMOVED FROM THE SUMP OF THE STRUCTURE.
11. ALL DRAINAGE INFRASTRUCTURE SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING ANY RUNOFF TO IT.
12. BIORETENTION PONDS REQUIRE TIMELY MAINTENANCE AND SHOULD BE INSPECTED AFTER EVERY MAJOR STORM EVENT, AS WELL AS FREQUENTLY DURING THE FIRST YEAR OF OPERATION, AND ANNUALLY THEREAFTER. EVERY FIVE YEARS, THE SERVICES OF A PROFESSIONAL ENGINEER SHOULD BE RETAINED TO PERFORM A THOROUGH INSPECTION OF THE BIORETENTION POND AND ITS INFRASTRUCTURE. ANY DEBRIS AND SEDIMENT ACCUMULATIONS SHOULD BE REMOVED FROM THE OUTLET STRUCTURE(S) AND EMERGENCY SPILLWAY(S) AND DISPOSED OF PROPERLY. BIORETENTION POND BERMS SHOULD BE MOWED AT LEAST ONCE ANNUALLY SO AS TO PREVENT THE ESTABLISHMENT OF WOODY VEGETATION. TREES SHOULD NEVER BE ALLOWED TO GROW ON A BIORETENTION POND BERM, AS THEY MAY DESTABILIZE THE STRUCTURE AND INCREASE THE POTENTIAL FOR FAILURE. AREAS SHOWING SIGNS OF EROSION OR THIN OR DYING VEGETATION SHOULD BE REPAIRED IMMEDIATELY BY WHATEVER MEANS NECESSARY, WITH THE EXCEPTION OF FERTILIZER. RODENT BORROWS SHOULD BE REPAIRED IMMEDIATELY AND THE ANIMALS SHOULD BE TRAPPED AND RELOCATED IF THE PROBLEM PERSISTS.
13. IN THOSE AREAS WHERE THE BERMS OF THE BIORETENTION SYSTEMS MUST BE CONSTRUCTED BY THE PLACEMENT OF FILL, THE ENTIRE EMBANKMENT AREA OF THE BIORETENTION PONDS SHALL BE EXCAVATED TO PROPOSED GRADE, STRIPPED OF ALL ORGANIC MATERIALS, COMPACTED TO AT LEAST 95% AND SCARIFIED PRIOR TO THE PLACEMENT OF THE EMBANKMENT MATERIAL. IN THE EVENT THE FOUNDATION MATERIAL EXPOSED DOES NOT ALLOW THE SPECIFIED COMPACTION, AN ADDITIONAL ONE FOOT (1') OF EXCAVATION AND THE PLACEMENT OF A ONE FOOT (1') THICK, TWELVE FOOT (12') WIDE PAD OF THE MATERIAL DESCRIBED IN THE NOTE BELOW, COMPACTED TO 95% OF ASTM D-1557 MAY BE NECESSARY. PLACEMENT AND COMPACTION SHOULD OCCUR AT A MOISTURE CONTENT OF OPTIMUM PLUS OR MINUS 3%, AND NO FROZEN OR ORGANIC MATERIAL SHOULD BE PLACED WITHIN FOR ANY REASON.
14. EMBANKMENT IS TO HAVE 3:1 SIDE SLOPES (MAX.) AND IS TO BE BROUGHT TO SPECIFIED GRADES PRIOR TO THE ADDITION OF LOAM (4" MINIMUM) SO AS TO ALLOW FOR THE COMPACTION OF THE STRUCTURE OVER TIME WHILE MAINTAINING THE PROPER BERM ELEVATION.
15. COMPACTION TESTING SERVICES (I.E. NUCLEAR DENSITY TESTS) ARE TO BE PERFORMED BY AN INDEPENDENT GEOTECHNICAL ENGINEER RETAINED BY THE CONTRACTOR FOR ROADWAY CONSTRUCTION, AND ON THE FOUNDATION OF THE BERM AND ON EVERY LIFT OF NEWLY PLACED MATERIAL.





Design: DJM	Draft: KDR	Date: 2/26/2024	
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1	
Drawing Name: 18134.1-PLAN.dwg			

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STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

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Designed and Produced in NH
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Stratham, NH 03885
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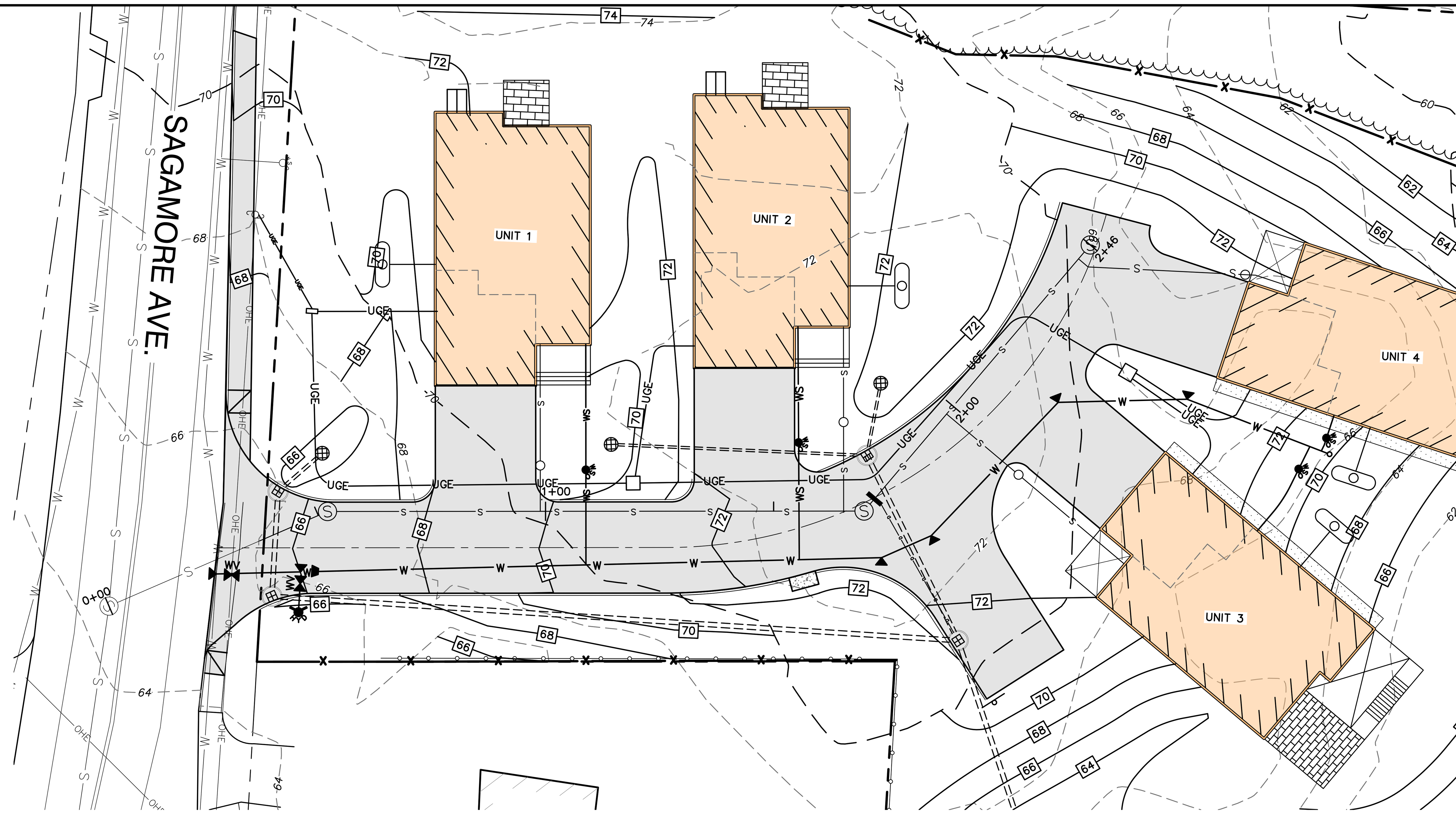
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

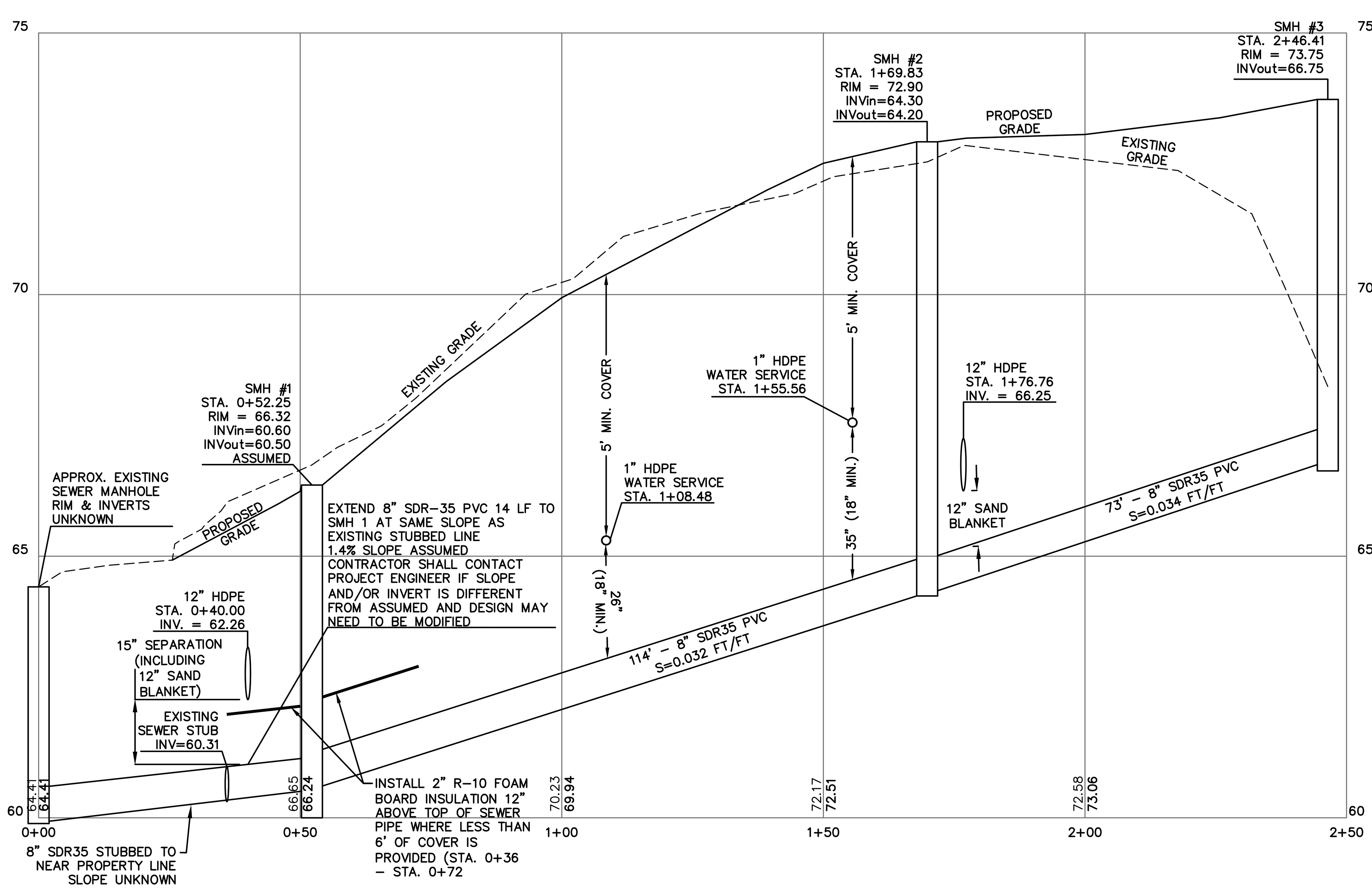
Plan Name:	DRIVEWAY PLAN AND PROFILE
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

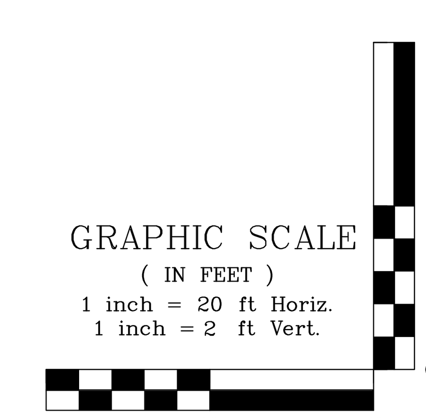
DRAWING No.
P1
SHEET 10 OF 20
JBE PROJECT NO. 18134.1



NOTES:

1. PROPOSED GRADES SHOWN HEREON ARE APPROXIMATE. REFER TO SHEETS C3 AND P1 FOR GRADING OF SITE AND DRIVEWAY. SET RIM ELEVATIONS OF SEWER STRUCTURES FLUSH WITH PROPOSED GRADE.
2. STATIONS REFER TO CENTERLINE OF SEWER STRUCTURE OR CROSSING DRAINAGE/WATER PIPE.
3. CONTRACTOR TO CONFIRM ACTUAL EXISTING INVERT OF STUB IN THE FIELD AND NOTIFY ENGINEER IF IT IS MORE THAN 0.1' DIFFERENT FROM THE STATED INVERT.





Design: DJM	Draft: KDR	Date: 2/26/2024	
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1	
Drawing Name: 18134.1-PLAN.dwg			

STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

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85 Portsmouth Ave.
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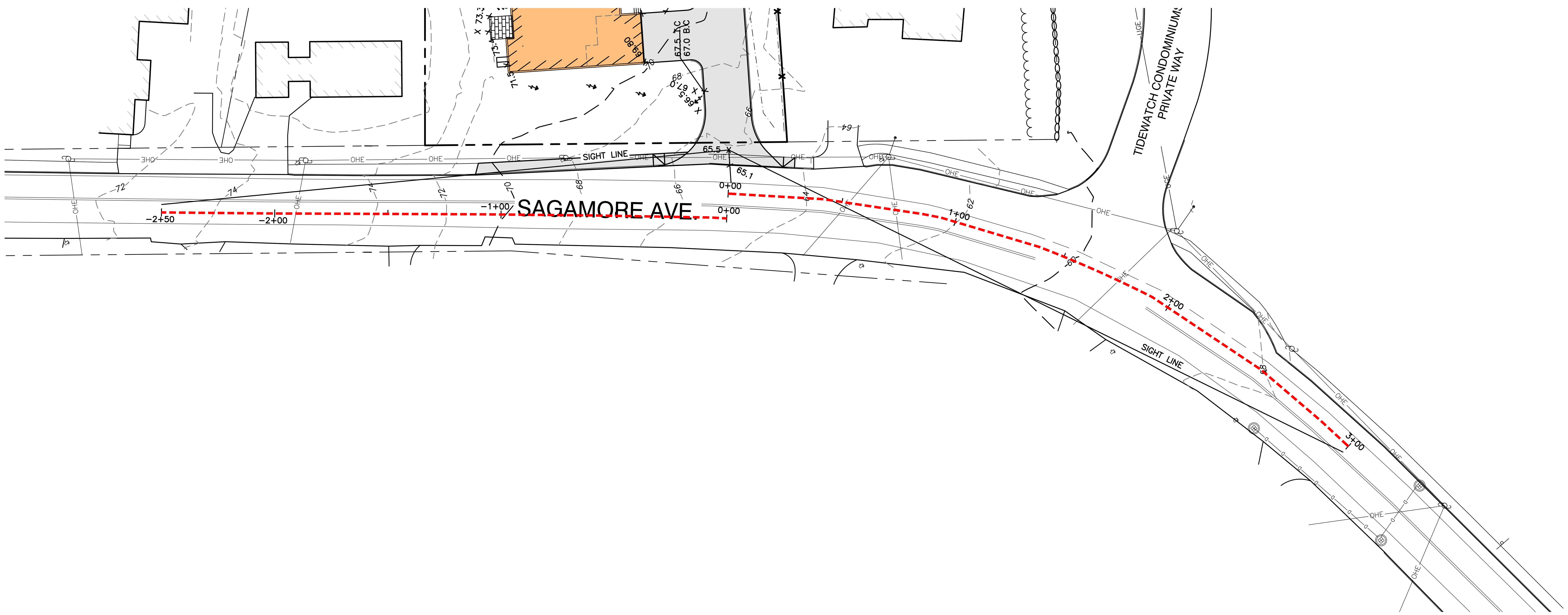
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: SEWER PLAN AND PROFILE

Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH

Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
P2
SHEET 11 OF 20
JBE PROJECT NO. 18134.1



$$S = 1.47V(2.5) + \frac{V^2}{30\left[0.347826 \pm \left(\frac{G}{100}\right)\right]}$$

Where:

S = Stopping sight distance on grade (ft)
V = Design speed (mph)
G = Grade (%)

Stopping Sight Distance on Grades
Exhibit 1260-3

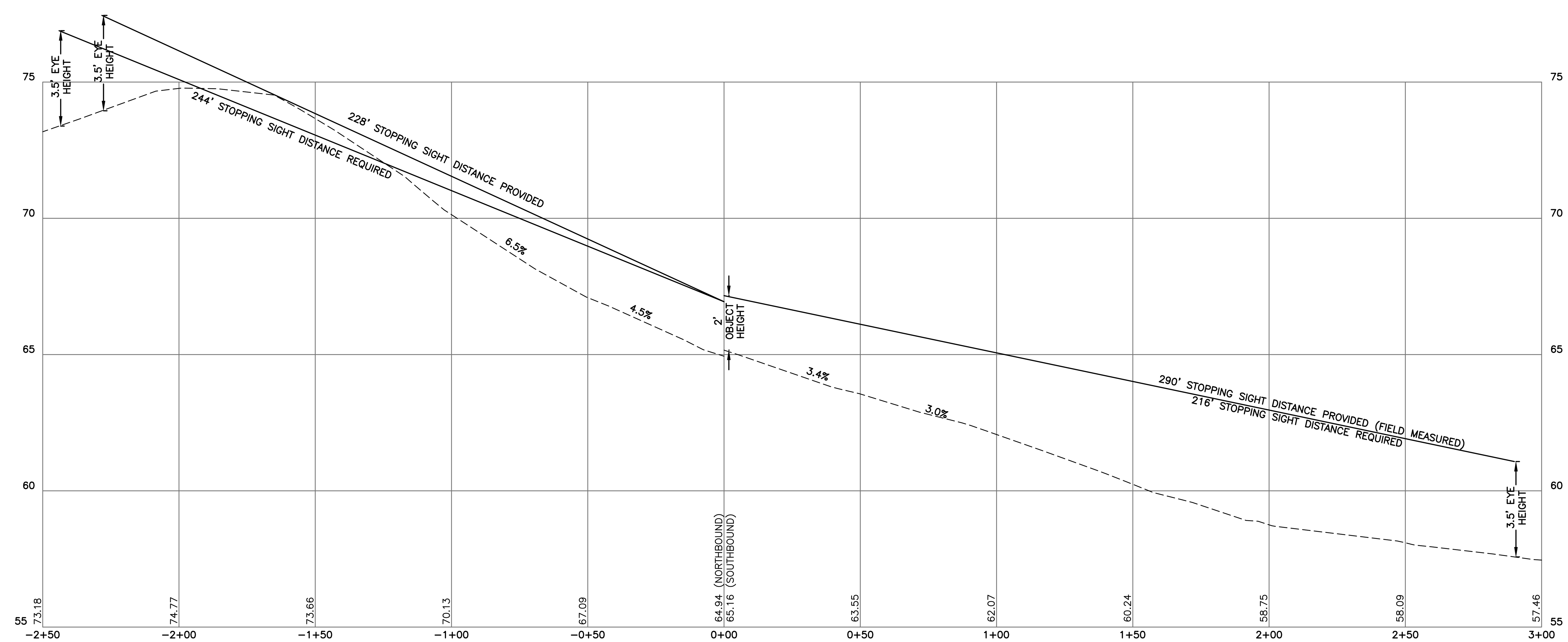
PER AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS:

NORTHBOUND APPROACH
DESIGN SPEED: 33 MPH
AVERAGE ROAD GRADE OVER FIRST 100 FEET: −5.2% (5.2' DROP OVER 100 FEET)
REQUIRED SIGHT DISTANCE:
1.47(33)(2.5)+((33)^2/(30*(0.347826−(5.2/100)))) = 244' SIGHT DISTANCE REQUIRED

SOUTHBOUND APPROACH
DESIGN SPEED: 33 MPH
AVERAGE ROAD GRADE OVER FIRST 100 FEET: 3.3% (3.3' GAIN OVER 100 FEET)
REQUIRED SIGHT DISTANCE:
1.47(33)(2.5)+((33)^2/(30*(0.347826+(3.3/100)))) = 216' SIGHT DISTANCE REQUIRED

PORTSMOUTH SITE PLAN REVIEW REGULATIONS SECTION 3.3.2.1

ACCESSWAYS AND DRIVEWAYS SHALL, WHERE PRACTICAL, HAVE AN ALL−SEASON SAFE SIGHT DISTANCE (ACCORDING TO AASHTO STANDARDS) IN BOTH DIRECTIONS ALONG THE PUBLIC STREET. WHERE ONLY A LESSER SIGHT DISTANCE IS OBTAINABLE, NO MORE THAN ONE ACCESSWAY PER SINGLE PARCEL SHALL BE ALLOWED.



STOPPING SIGHT DISTANCE PLAN & PROFILE

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft Horiz.
1 inch = 3 ft Vert.

Design: DJM	Draft: KDR	Date: 2/26/2024
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04/19/2024

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Plan Name:	HIGHWAY ACCESS PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
H1
SHEET 12 OF 20
JBE PROJECT NO. 18134.1

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J/B Jones & Beach Engineers, Inc.

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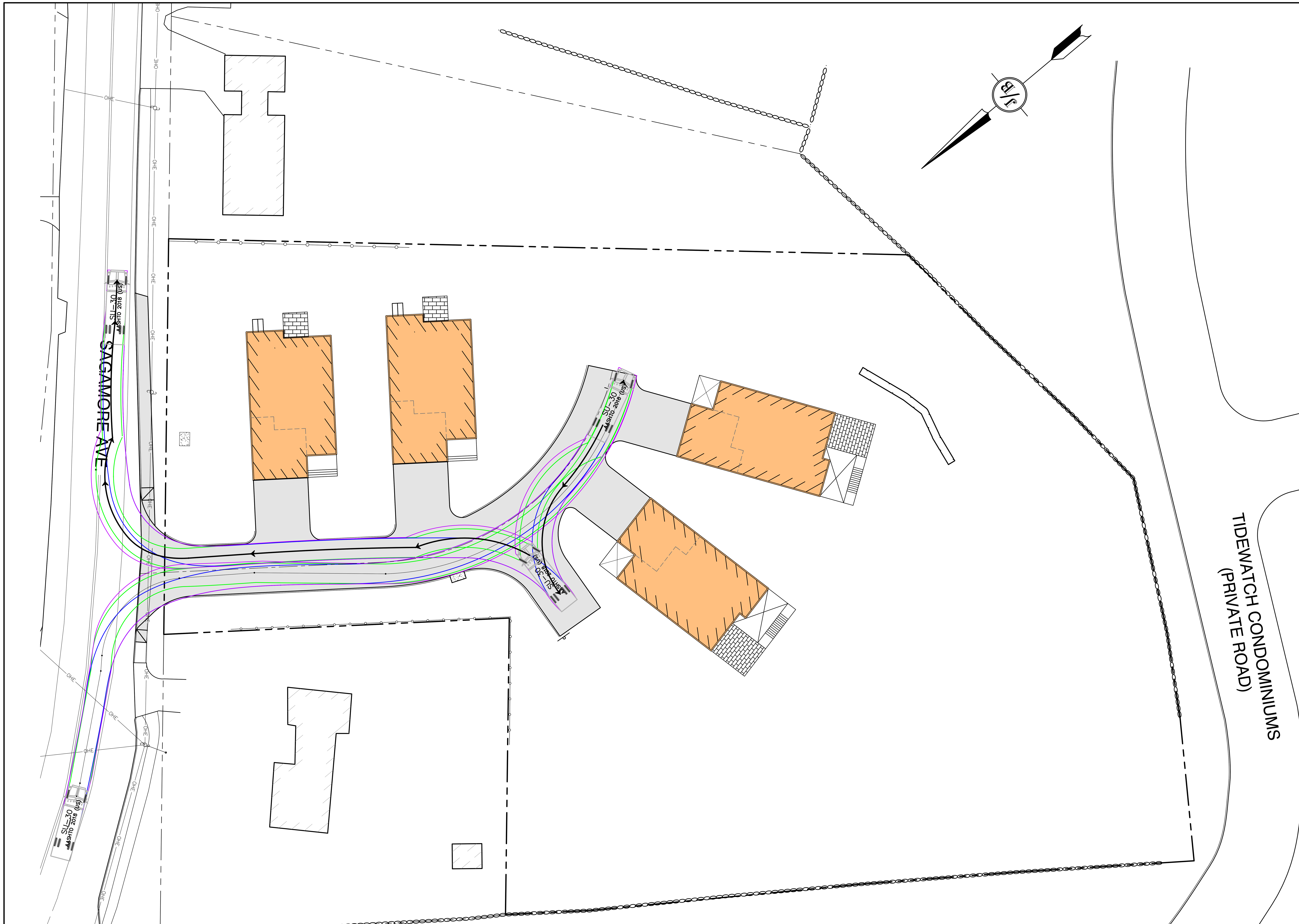
E-MAIL: JBE@JONESANDBEACH.COM

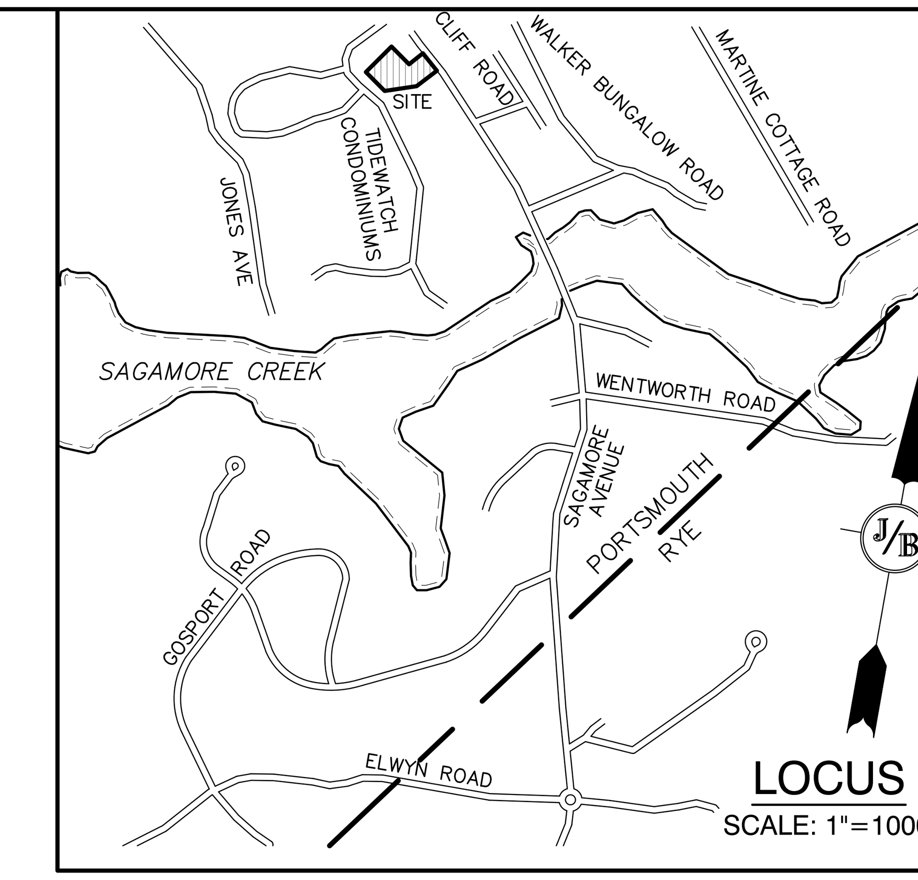
Plan Name:	TRUCK TURNING PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

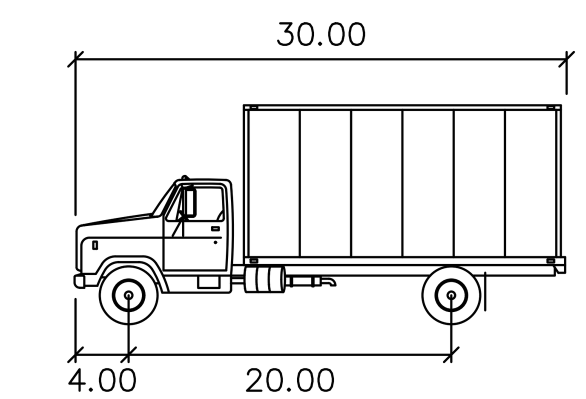
DRAWING No.

T1

SHEET 13 OF 20
JBE PROJECT NO. 18134.1







SU-30

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

PROJECT PARCEL
CITY OF PORTSMOUTH
TAX MAP 222, LOT 19

TOTAL LOT AREA
84,795 SQ. FT.
1.95 ACRES

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0	3/18/24	ISSUED FOR REVIEW	KDR

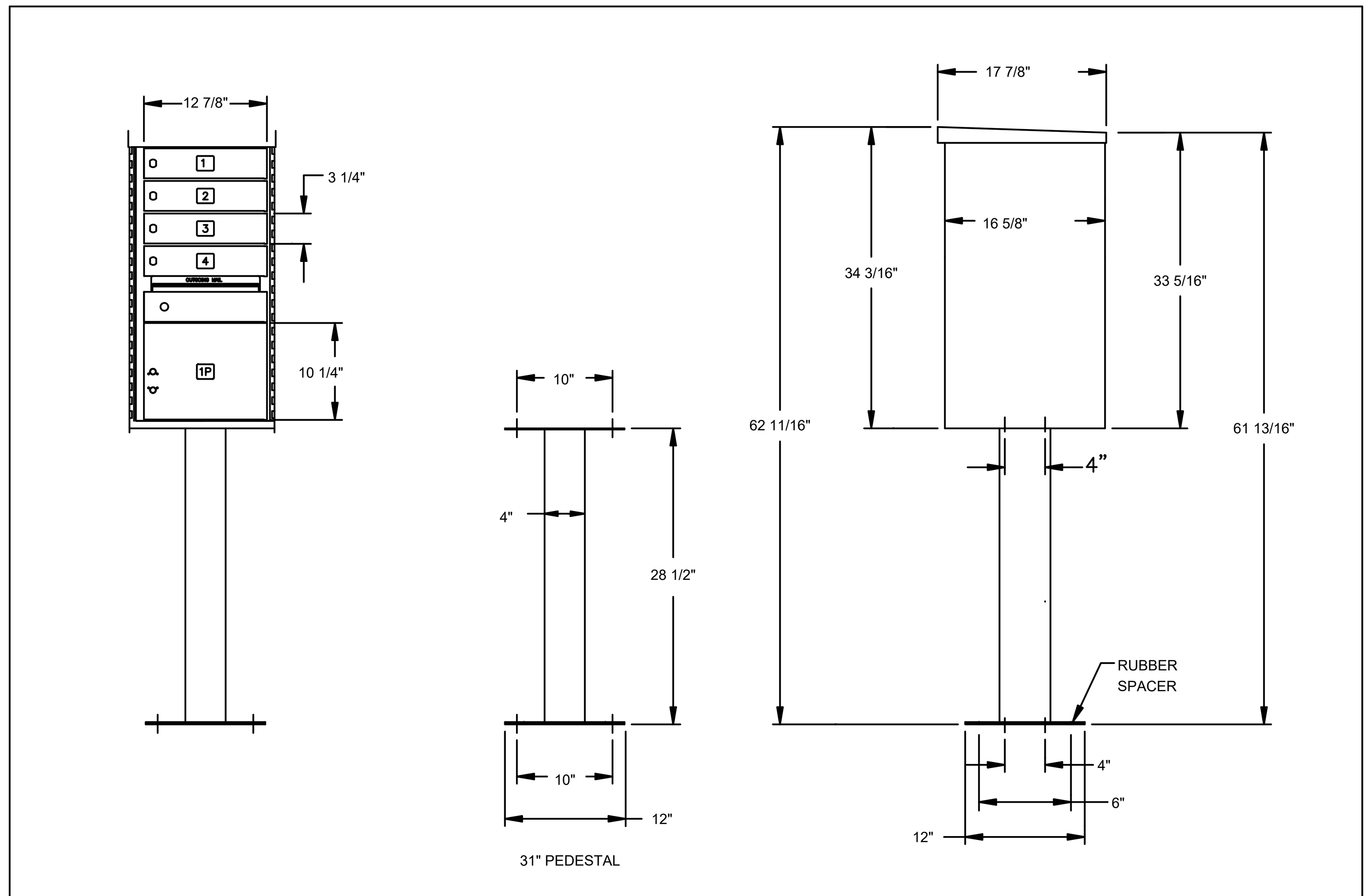
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	TRUCK TURNING PLAN
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

T2

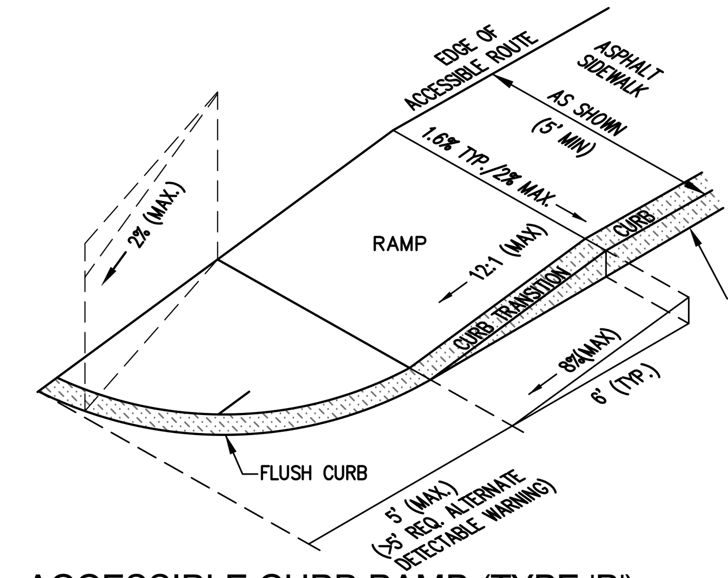
SHEET 14 OF 20
JBE PROJECT NO. 18134.1



POSTAL PRODUCTS UNLIMITED, INC.™ A Division of American Postal Manufacturing, Inc. Phone. 1-800-229-4500 500 W. Oklahoma Ave. Milwaukee, WI 53207-2649	Product: Type II CBU with Pedestal – Front Loading – N1027875			
	Distribution: USPS Approved		Finish: Powder Coat	
	Mounting: Pedestal		Total Mailboxes: 12 Doors – 1 Locker	
	Date: 02/02/06	Scale: NONE	Drawn By: CDO	Checked By: AJK

CLUSTER MAILBOX UNIT DETAIL

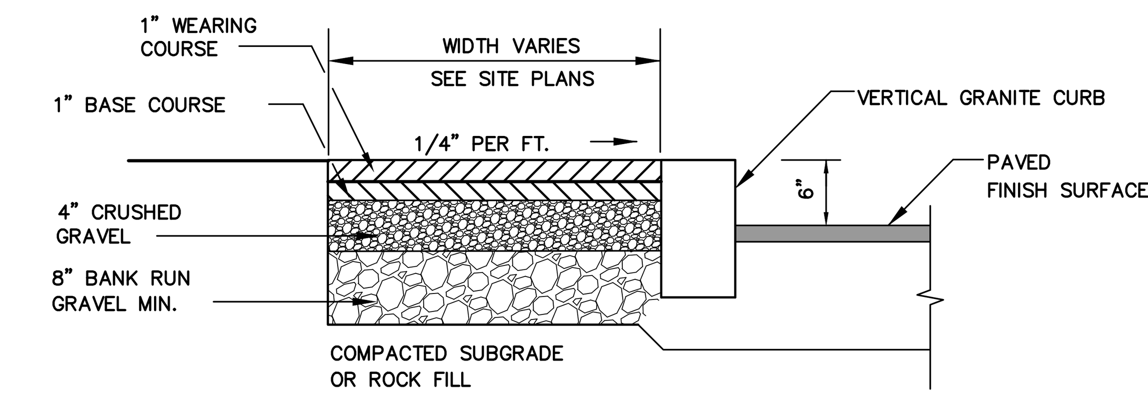
NOT TO SCALE



NOTES:
1. THE MAXIMUM ALLOWABLE CROSS SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) AND CURB SHALL BE 1.5%.
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) CURB RAMPS SHALL BE 8%.
4. A MINIMUM OF 4 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (i.e., HYDRANTS, 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.

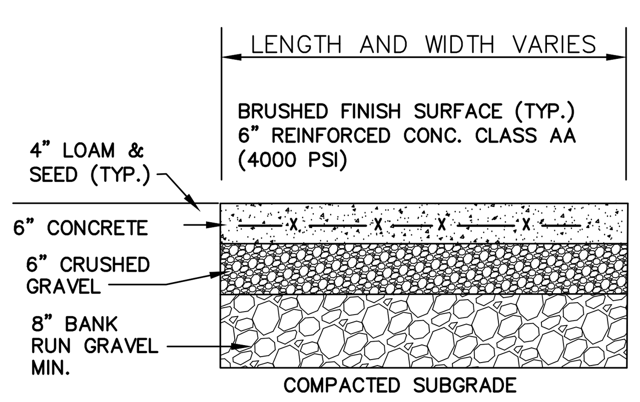
ACCESSIBLE CURB RAMP (TYPE 'B')

NOT TO SCALE



BIT. SIDEWALK W/ VERTICAL GRANITE CURB

NOT TO SCALE



CONCRETE PAD DETAIL

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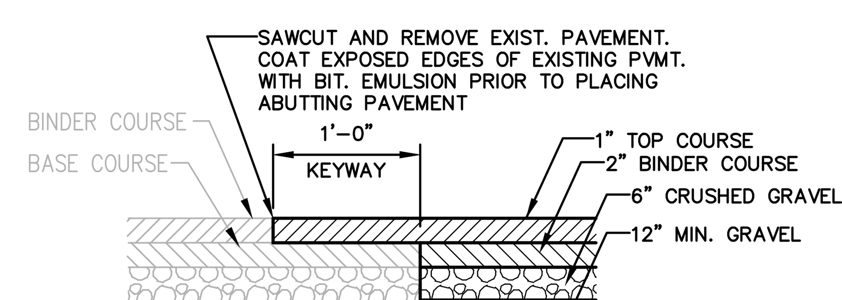
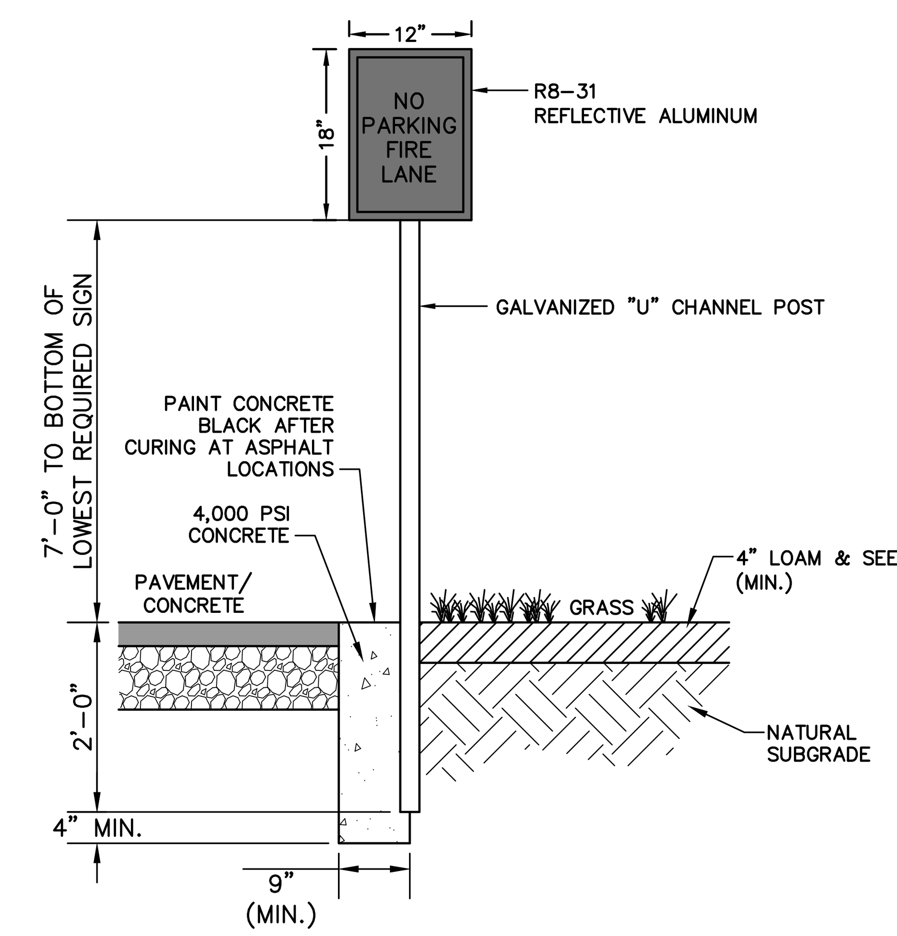


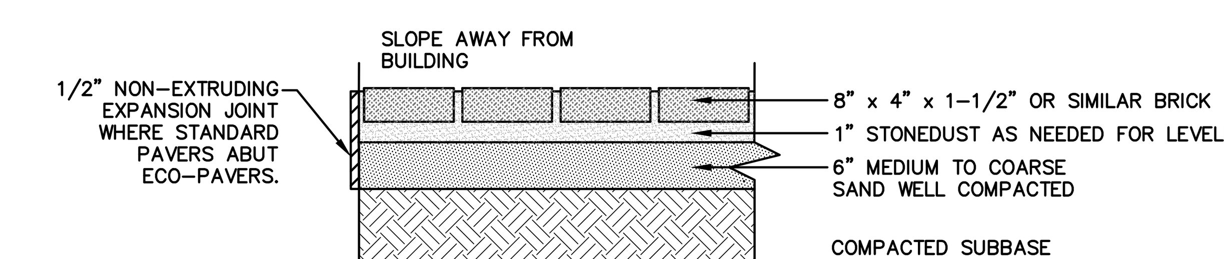
KEYWAY DETAIL FOR CONNECTION TO EXISTING PAVEMENT

NOT TO SCALE



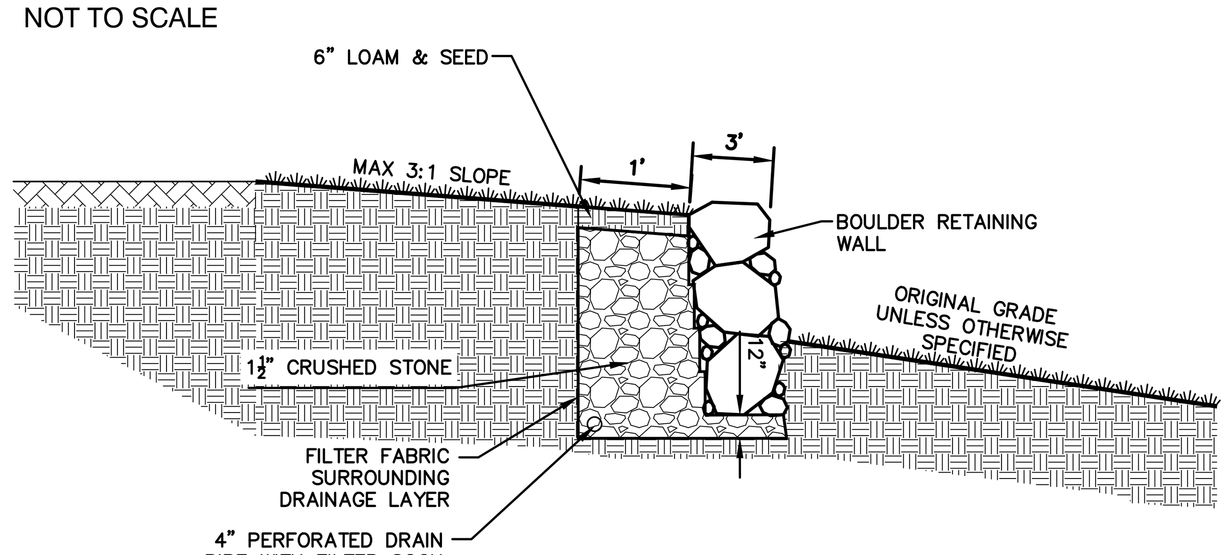
"NO PARKING" SIGN (MUTCD R8-31)

NOT TO SCALE



STANDARD BRICK PAVER

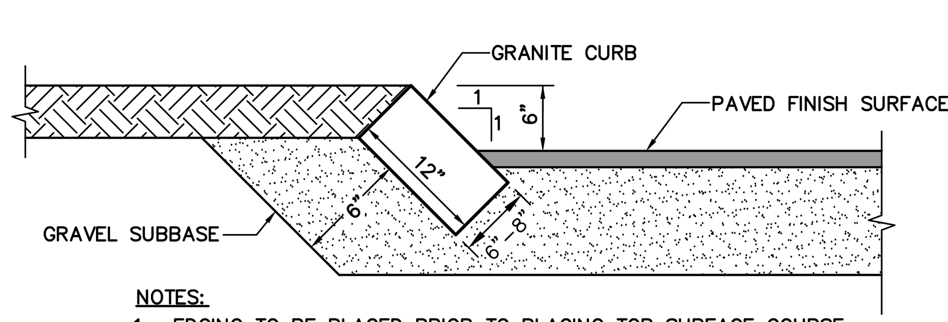
NOT TO SCALE



THE CONTRACTOR IS RESPONSIBLE FOR RETAINING THE SERVICES OF A STRUCTURAL ENGINEER LISENCED IN THE STATE OF NEW HAMPSHIRE TO DESIGN ANY WALL THAT HAS A HEIGHT OVER 4.0'. JONES & BEACH ENGINEERS, INC. DOES NOT ACCEPT ANY LIABILITY FOR THE STRUCTURAL DESIGN AND/OR INSTALLATION OF ANY RETAINING WALL OF ANY TYPE ABOVE THIS HEIGHT. THIS DETAIL IS INTENDED TO PROVIDE AN EXAMPLE OF THE RETAINING WALL FOR PLANNING PURPOSES ONLY AND IS SPECIFICALLY NOT INTENDED FOR USE BY THE CONTRACTOR IN ANY CONSTRUCTION-RELATED ACTIVITY FOR A WALL GREATER THAN 4.0' IN HEIGHT.

BOULDER RETAINING WALL CROSS SECTION

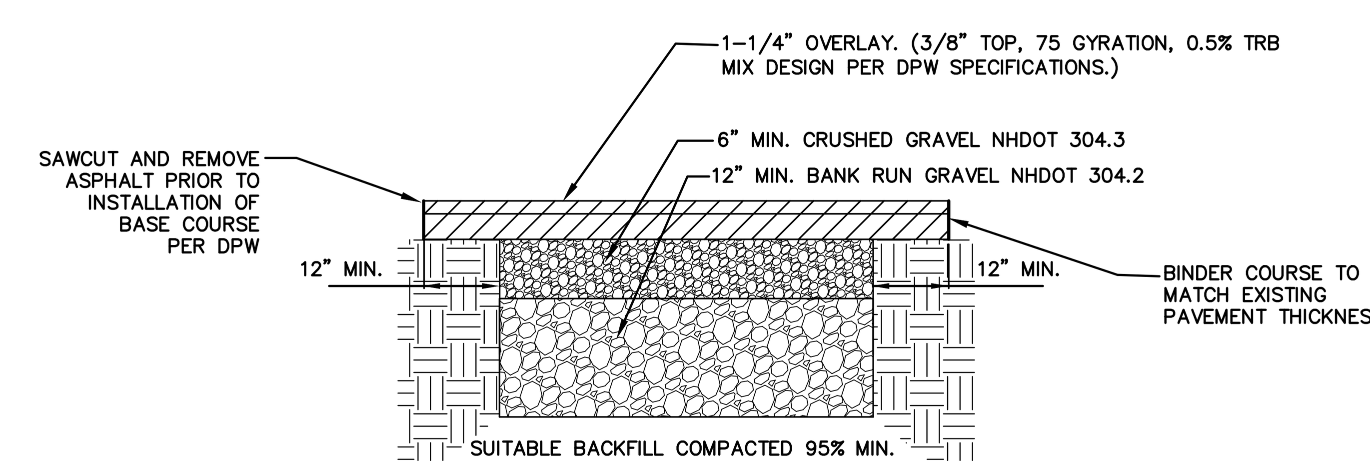
NOT TO SCALE



NOTES:
1. EDGING TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.
2. JOINTS BETWEEN STONES SHALL BE MORTARED.
3. SALVAGE GRANITE CURBS ON-SITE AND RESET TO THE EXTENT POSSIBLE.

SLOPED GRANITE CURB

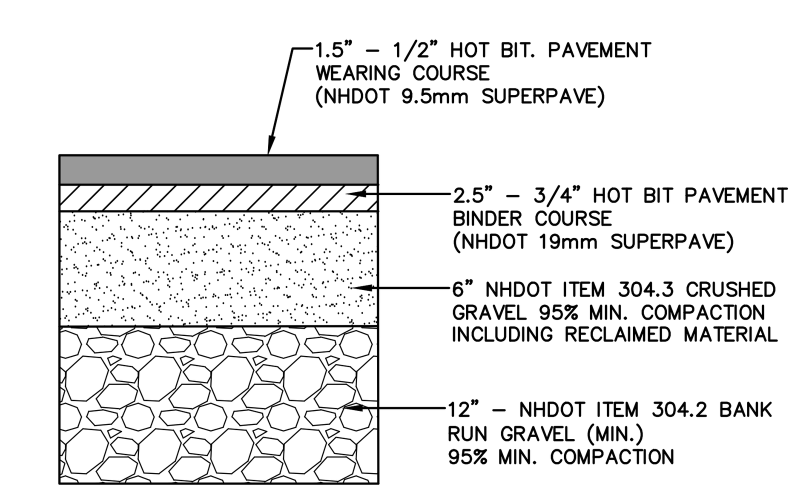
NOT TO SCALE



1. AFTER PROPER BACKFILLING AND COMPACTION, ADJACENT PAVEMENT MUST BE "SAW CUT" (STRAIGHT CUTS) A MINIMUM OF ONE FOOT (1') AROUND THE PERIMETER OF THE EXCAVATION. PAVEMENT MUST BE REMOVED.
2. INSTALL BASE COURSE LEAVING A REVEAL FOR SURFACE COURSE.
3. INSTALL SURFACE COURSE OF ASPHALT PAVING.
4. APPLY EMULSION SEALANT AT PERIMETER OF JOINT OVERLAPPING BASE COURSE. INSTALL WEARING COURSE OF ASPHALT TO GRADE. APPLY LIGHT SAND TO ABSORB EXCESS JOINT SEALANT.
5. GRAVEL COMPACTIONS TO MEET 95% MINIMUM.

TYPICAL PAVEMENT REPAIR DETAIL

NOT TO SCALE



TYPICAL BITUMINOUS PAVEMENT

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

STATE OF NEW HAMPSHIRE DANIEL JAMES MEDITZ No.18152 LICENSED PROFESSIONAL ENGINEER 04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

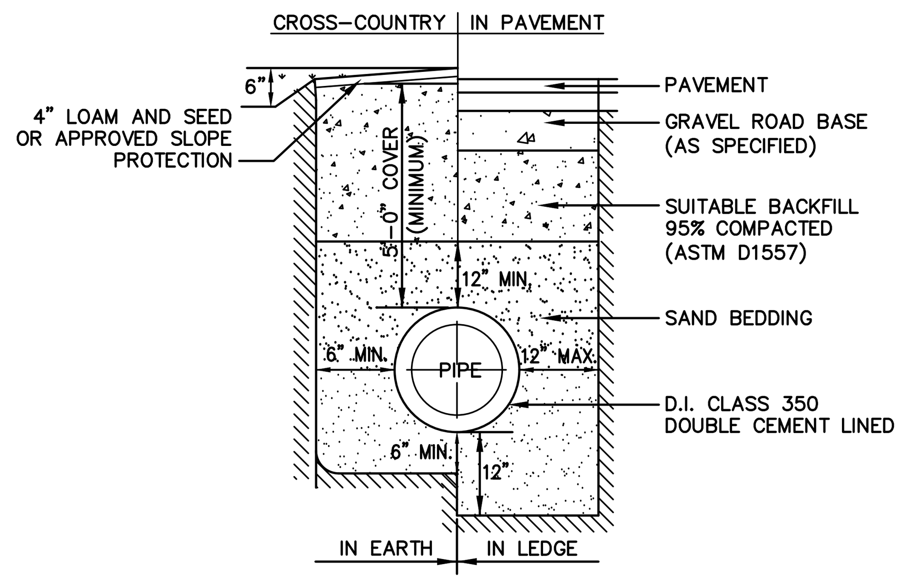
Plan Name:	DETAIL SHEET
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

D1

SHEET 15 OF 20

JBE PROJECT NO. 18134.1



WATER SYSTEM TRENCH

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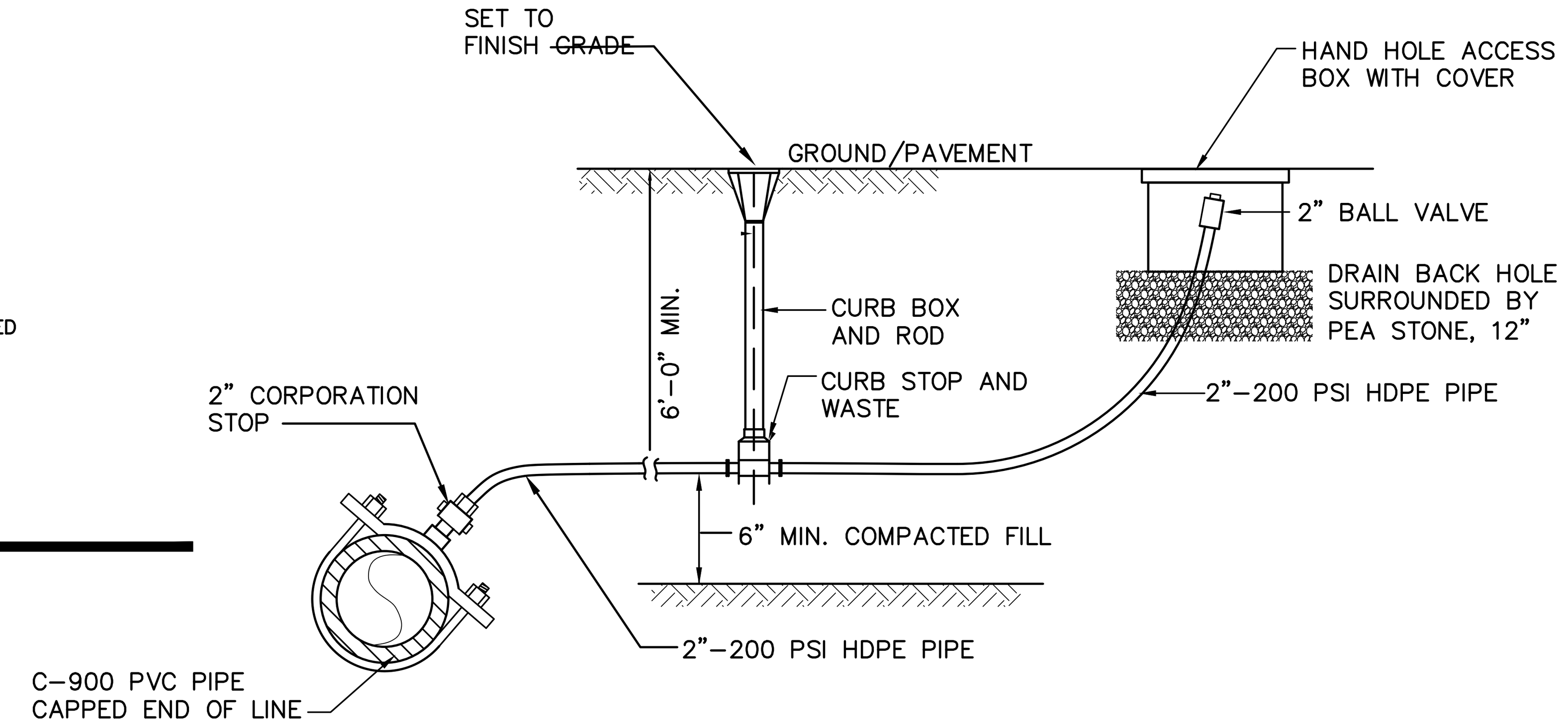
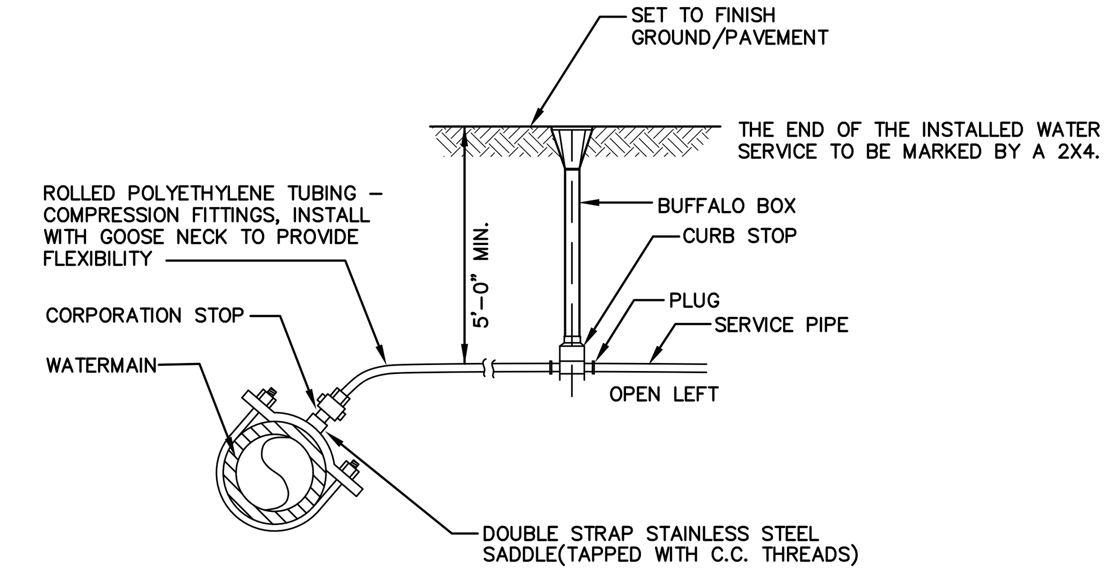


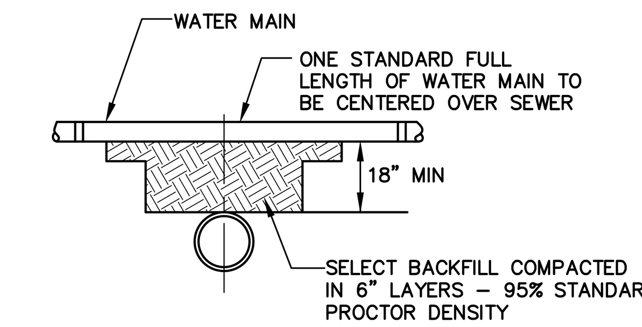
TYPICAL WATER MAIN BLOWOFF

NOT TO SCALE



WATER SERVICE CONNECTION-POLYETHYLENE

NOT TO SCALE

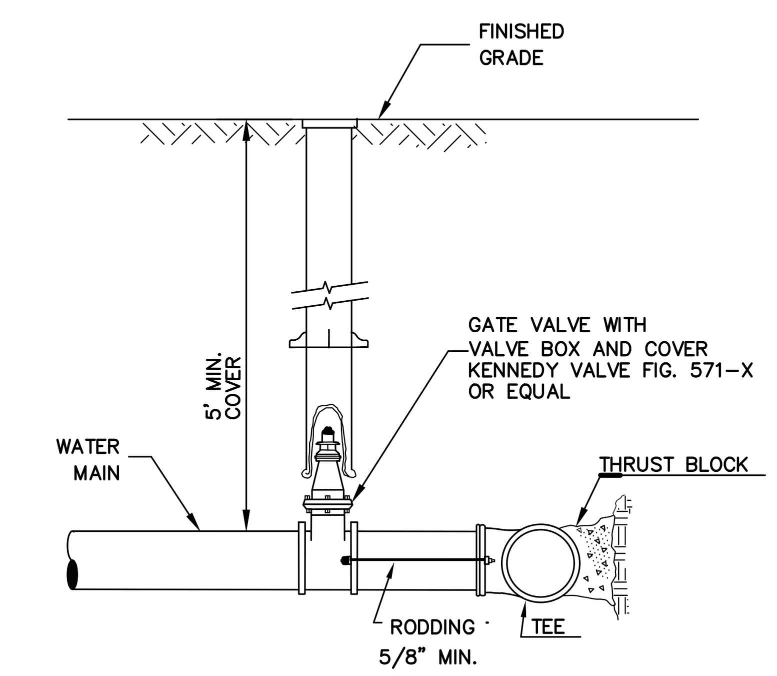


SEPARATION NOTES:

1. WATER MAINS SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED SEWERS. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE.
2. WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN PIPES. SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 6 FEET HORIZONTALLLY FROM THE WATER MAIN.

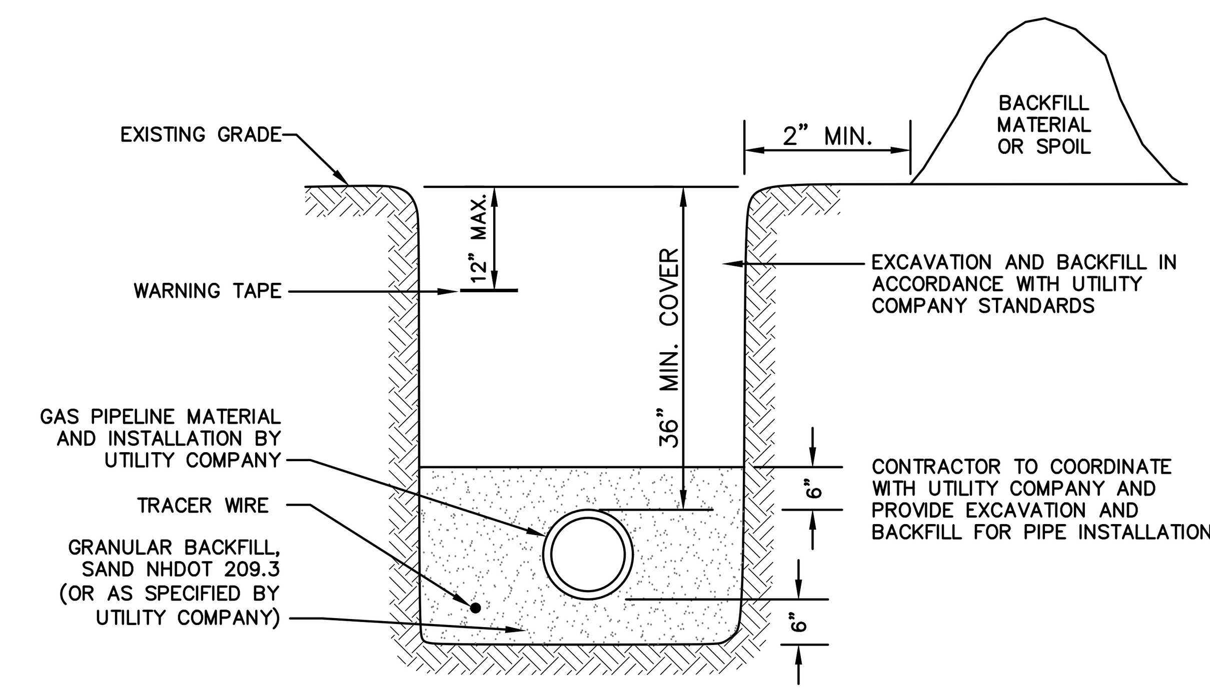
TYPICAL WATER / SEWER SEPARATION

NOT TO SCALE



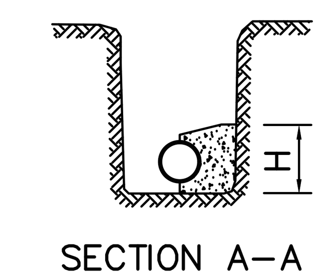
BURIED GATE VALVE DETAIL

NOT TO SCALE



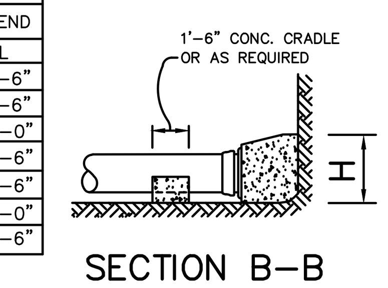
GAS TRENCH

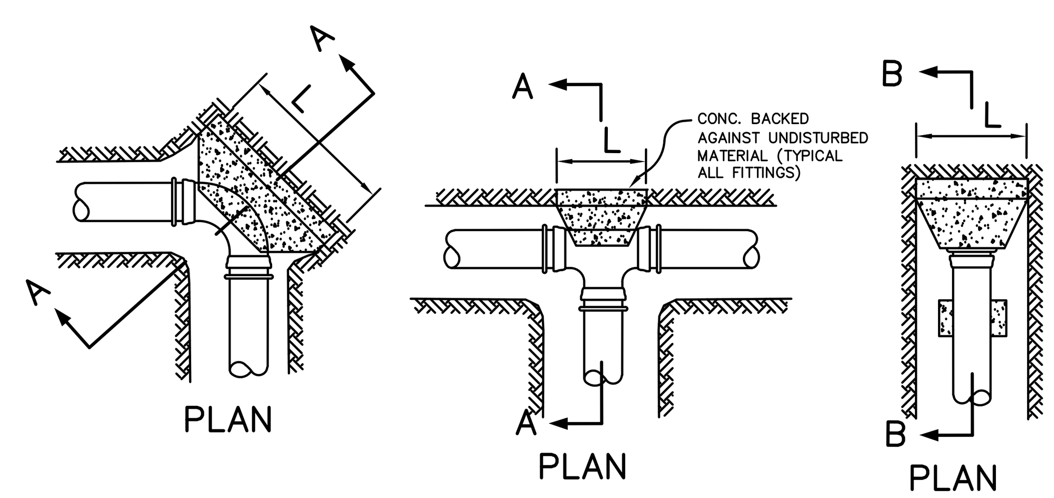
NOT TO SCALE



CONCRETE THRUST BLOCK DIMENSIONS								
PIPE DIA. (IN.)	TEE		90° BEND OR STUB		45° BEND		22.5° BEND	
	H	L	H	L	H	L	H	L
4"/6"	1'-6"	1'-6"	1'-6"	2'-0"	1'-6"	1'-6"	1'-6"	1'-6"
8"	2'-0"	2'-0"	2'-0"	3'-0"	1'-6"	2'-0"	1'-6"	1'-6"
10"	2'-0"	3'-0"	2'-6"	3'-6"	2'-0"	2'-6"	1'-6"	2'-0"
12"	2'-6"	3'-6"	3'-0"	4'-0"	2'-0"	3'-6"	1'-6"	2'-6"
15"	3'-0"	4'-6"	3'-6"	5'-6"	3'-0"	3'-6"	2'-0"	2'-6"
18"	4'-0"	5'-0"	4'-6"	6'-0"	3'-6"	4'-0"	2'-6"	3'-0"
24"	5'-0"	7'-0"	6'-0"	8'-0"	4'-0"	6'-0"	3'-0"	4'-6"

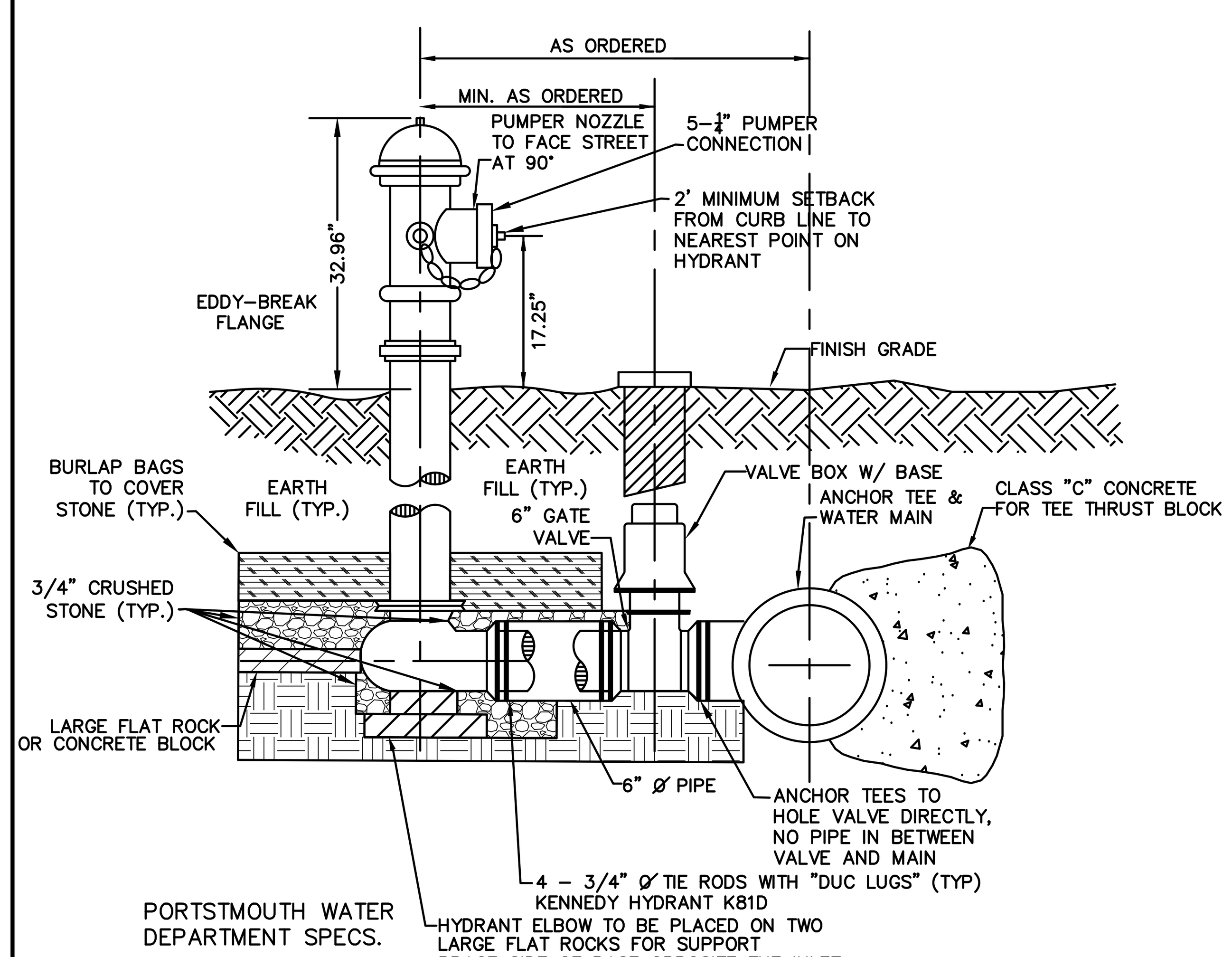
PIPING W/ MECHANICAL JOINT FITTINGS SHALL HAVE RETAINING GLANDS





THRUST BLOCK DETAILS

NOT TO SCALE



NOTES

1. ALL PIPE FITTINGS TO BE D.I. PRESSURE CLASS 350, THICKNESS CLASS 52.
2. HYDRANT TO BE PAINTED RED WITH WHITE "REFLECTOR" PAINT ON BONNET.
3. MECHANICAL JOINTS SHALL HAVE MEGALUG RETAINING GLANDS AS MADE BY EBBA OR APPROVED EQUAL.
4. NATIONAL STANDARD THREAD.
5. HYDRANT AND ALL VALVES SHALL OPEN RIGHT
6. ANCHOR TEES SHALL HOLD VALVE DIRECTLY WITH NO PIPE IN BETWEEN VALVE AND MAIN.

HYDRANT INSTALLATION

NOT TO SCALE

SUBMITTALS

SHOP DRAWINGS, INCLUDING SPECIFICATIONS, CATALOG CUTS, DATA SHEETS, DRAWINGS AND OTHER DESCRIPTIVE MATERIAL SHALL BE SUPPLIED TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION. A CERTIFICATE OF COMPLIANCE FROM THE MANUFACTURER INDICATING CONFORMANCE WITH THE SPECIFIED REQUIREMENTS FOR DUCTILE IRON PIPE SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

DELIVERY, HANDLING, AND STORAGE

ALL PIPE AND APPURTENANCES ARE SUBJECT TO INSPECTION BY THE ENGINEER AT THE POINT OF DELIVERY. MATERIAL FOUND TO BE DEFECTIVE DUE TO MANUFACTURE OR DAMAGE IN SHIPMENT SHALL BE REJECTED OR RECORDED ON THE BILL OF LADING AND REMOVED FROM THE JOB SITE. ALL MATERIALS, IF STORED, SHALL BE KEPT SAFE FROM ANY POTENTIAL DAMAGE.

SAND BEDDING

SAND BLANKET SHALL CONSIST OF CLEAN SAND THAT IS FREE FROM ORGANIC MATTER AND GRADED SO THAT 90-100% PASSES A 1/2" SIEVE AND NOT MORE THAN 15% WILL PASS A #200 SIEVE.

BACKFILL

SUITABLE MATERIAL FOR BACKFILL IN ROADS, ROAD SHOULDERS, AND WALKWAYS SHALL BE THE NATURAL MATERIAL REMOVED DURING THE COURSE OF TRENCH EXCAVATION, BUT SHALL EXCLUDE ANY DEBRIS, PAVEMENT, ORGANIC MATTER, LOAM, WET OR SOFT MUCK, PEAT, OR CLAY. BACKFILL MATERIAL SHALL BE PLACED IN 6" LIFTS AND SHALL BE COMPACTED TO 95% OF ASTM-1557 AT OPTIMUM MOISTURE CONTENT.

DUCTILE IRON PIPE-CLASS 52

JOINTS SHALL BE OF "PUSH-ON" TYPE UNLESS OTHERWISE SPECIFIED. PIPE SHALL HAVE A DOUBLE CEMENT LINING WITH SEAL COATING INSIDE AND BITUMINOUS COATING OUTSIDE THAT MEETS OR EXCEEDS THE REQUIREMENTS OF AWWA/ANSI C104/A21.4. GASKETS FOR DUCTILE IRON PIPE SHALL BE OIL-RESISTANT RUBBER WHICH MEETS OR EXCEEDS THE REQUIREMENTS OF AWWA/ANSI C111/A21.11. PIPE SHALL BE FURNISHED COMPLETE WITH ALL GASKETS AND LUBRICANT.

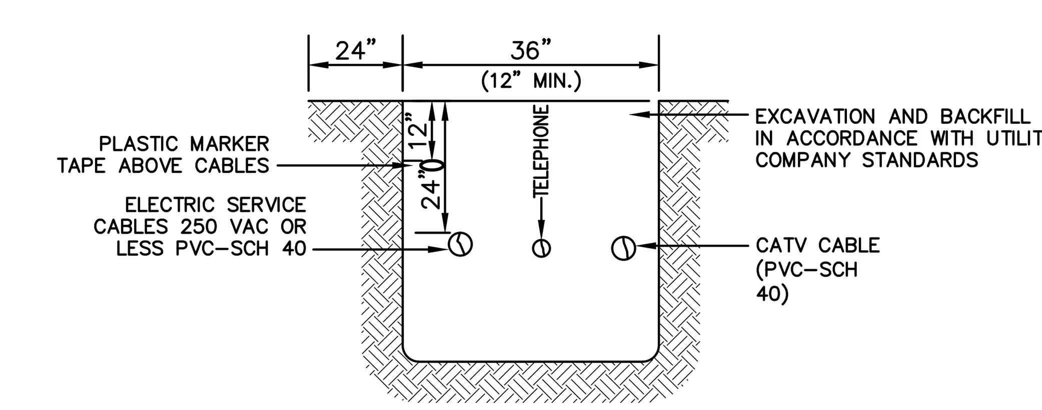
WATERMAIN TESTING

ALL WATER MAINS WILL BE CLEANED AND HYDROSTATICALLY TESTED AT A MINIMUM PRESSURE OF 150psi AT THE HIGHEST POINT ALONG THE TEST SECTION. THE HYDROSTATIC TEST SHALL BE CONDUCTED FOR A MINIMUM OF TWO HOURS DURING WHICH TEST PRESSURE SHALL NOT VARY MORE THAN ±5psi. LEAKAGE CALCULATIONS WILL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN WATER WORKS ASSOCIATION. DISINFECTION WILL BE REQUIRED PER THE SPECIFICATIONS OF ANSI/AWWA C651. WITHIN 24 HOURS OF DISINFECTION, ALL NEWLY INSTALLED MAINS SHALL BE FLUSHED.

WATER LINE TECHNICAL SPECIFICATIONS

NOTES

1. CONTRACTOR TO INSTALL 2" RIGID INSULATION BETWEEN THE PROPOSED WATERMAIN(S) AND DRAINAGE LINES IN ALL AREAS WHERE SEPARATION IS TO BE IN 4' OR LESS.
2. ALL PIPE, FITTINGS, HYDRANTS, AND WORKMANSHIP SHALL BE INSPECTED AND APPROVED BY THE MUNICIPAL WATER/SEWER DEPARTMENT.
4. ALL CONSTRUCTION AND TESTING SHALL COMPLY WITH THE REGULATIONS OF THE MUNICIPAL, THE STATE, AND THE AMERICAN WATER WORKS ASSOCIATION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND DETERMINING THE LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UNFORESEEN UTILITY FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION. ANY APPROPRIATE REMEDIAL ACTION MUST BE AGREED TO BY THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING "DIG-SAFE" AT 1-888-344-7233 AT LEAST 72 HOURS BEFORE DIGGING.
6. ALL CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF NOT LESS THAN 2000 PSI AFTER 28 DAYS.
7. CONTRACTOR TO INSTALL CORPORATION FITTINGS AT EACH CONNECTION TO THE WATER MAIN FOR TESTING PURPOSES. CORPORATIONS SHALL BE REMOVED AND PLUGGED AT THE COMPLETION OF TESTING.
8. CONTRACTOR TO OBSERVE ALL APPROPRIATE BEST MANAGEMENT PRACTICES.
9. ALL GATE VALVES TO BE MUELLER RESILIENT WEDGE (OPEN RIGHT).
10. ALL TEES TO BE ANCHOR TEES.
11. THE TERMINAL 36' OF ALL "DEAD END" WATERMAINS AND ALL BENDS AND TEES ARE TO BE FITTED WITH MECHANICAL RESTRAINING JOINTS, "MEGALUG" OR APPROVED EQUAL AND THRUST BLOCKS.
12. INSTALL THRUST BLOCKS AT ALL TEES, BENDS, AND FITTINGS.



NOTE: ALL UTILITIES SHALL BE REVIEWED AND APPROVED BY APPROPRIATE UTILITY COMPANY.

UTILITY TRENCH

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

STATE OF NEW HAMPSHIRE - DANIEL JAMES MEDITZ No.18152 LICENSED - PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
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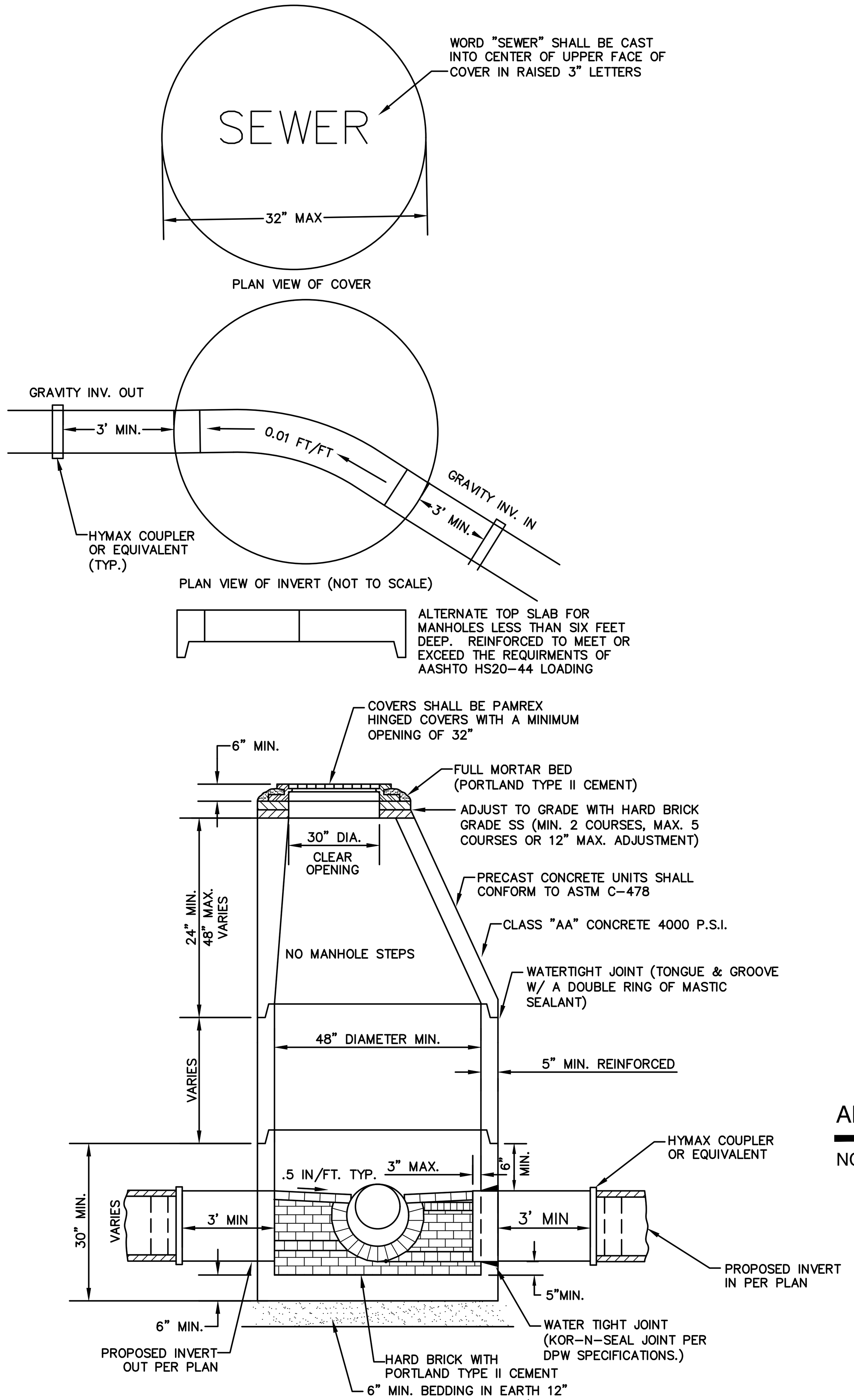
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record:	635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.

D2

JBE PROJECT NO. 18134.1

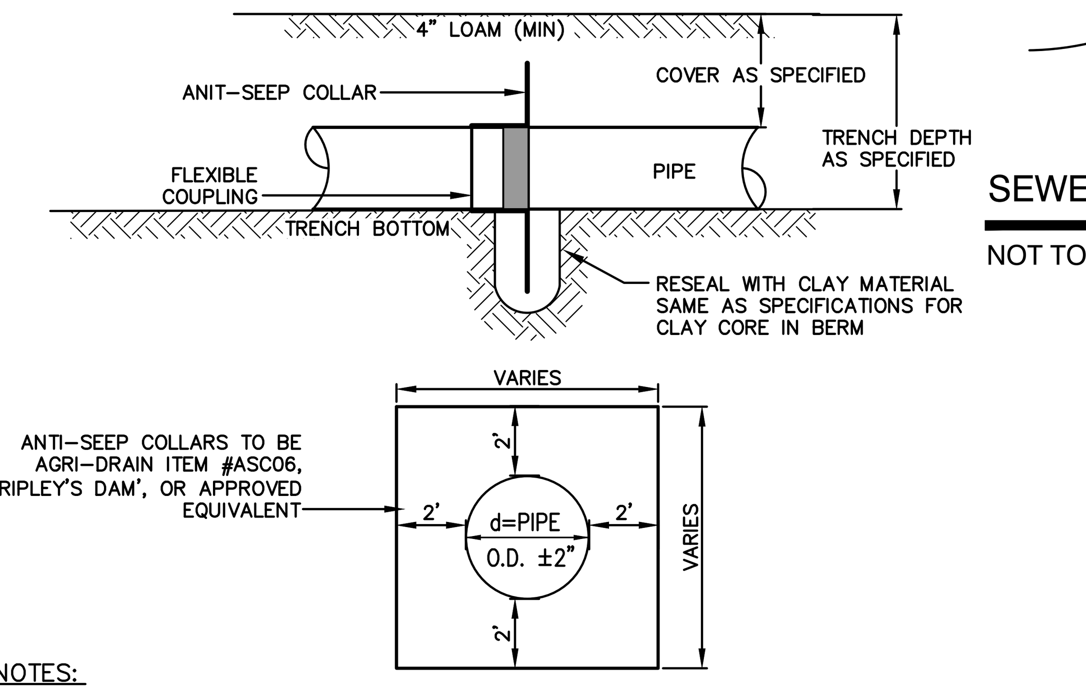


NOTES:

1. PER NHDES ENV-WQ 704.13(C), THE MORTAR SPECIFICATION SHALL BE AS FOLLOWS:
   1. MORTAR SHALL BE COMPOSED OF PORTLAND CEMENT AND SAND WITH OR WITHOUT HYDRATED LIME ADDITION;
   2. PROPORTIONS IN MORTAR OF PARTS BY VOLUMES SHALL BE:
      A. 4.5 PARTS SAND AND 1.5 PARTS CEMENT; OR
      B. 4.5 PARTS SAND, ONE PART CEMENT AND 0.5 PART HYDRATED LIME;
   3. CEMENT SHALL BE TYPE II PORTLAND CEMENT CONFORMING TO ASTM C150-05;
   4. HYDRATED LIME SHALL BE TYPE S CONFORMING TO THE ASTM C207-06 "STANDARD SPECIFICATIONS FOR HYDRATED LIME FOR MASONRY PURPOSES";
   5. SAND SHALL CONSIST OF INERT NATURAL SAND CONFORMING TO THE ASTM C33-03 "STANDARD SPECIFICATIONS FOR CONCRETE, FINE AGGREGATES";
2. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPED TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL IN ACCORDANCE WITH ENV-WQ 704.12 (K).
3. ALL MANHOLES SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH ENV-WQ 704.17 (a) THROUGH (e).
4. SEWER MANHOLE COVERS SHALL CONFORM TO ASTM A48 WITH A CASTING EQUAL TO CLASS 30 IN ACCORDANCE WITH ENV-WQ 704.13 (a).
5. ALL ASBESTOS CONTAINING WASTE MATERIALS MUST BE PROPERLY IDENTIFIED, PACKAGED AND DELIVERED TO A LANDFILL LICENCED BY THE NHDES SOLID WASTE MANAGEMENT PROGRAM FOR DISPOSAL. CALL (603) 271-2925 FOR MORE INFORMATION.
6. PORTSMOUTH STANDARD SEWER MANHOLE SHALL BE USED.
7. CONTRACTOR TO PURCHASE SEWER MANHOLE COVERS FROM THE CITY OF PORTSMOUTH DIRECTLY.
8. MANHOLE BASE SECTIONS SHALL BE MONOLITHIC TO A POINT AT LEAST 6" ABOVE THE HIGHEST INCOMING SEWER PIPE PER ENV-WQ 704.12 (e).
9. MANHOLE CASTINGS SHALL CONFORM TO ASTM A48 PER ENV-WQ 704.13 (a) (8).

PORTSMOUTH SEWER MANHOLE

NOT TO SCALE

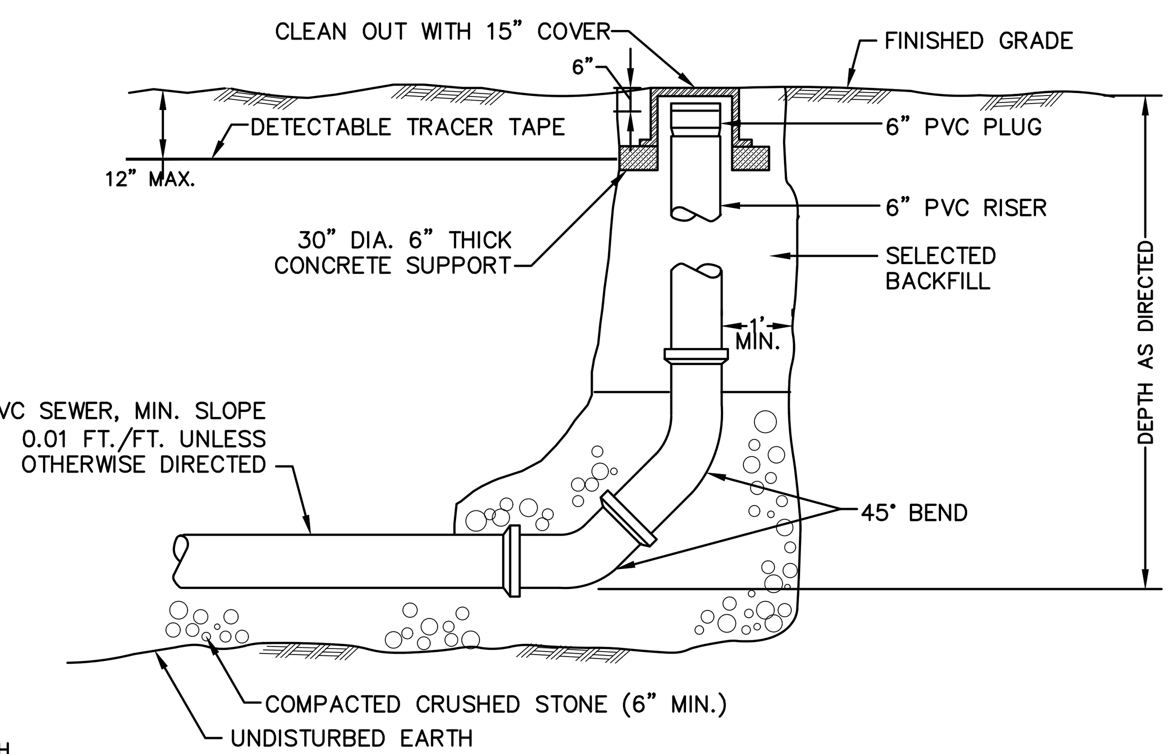


NOTES:

1. CONTRACTOR SHALL INSTALL COLLAR(S) PER MANUFACTURER'S SPECIFICATIONS.
2. CONTRACTOR SHALL ENSURE A WATERTIGHT SEAL BETWEEN THE COLLAR(S) AND PIPE(S).
3. ANTI-SEEP COLLARS SHALL BE PLACED ±15' AND ±25' DOWNSTREAM OF THE CULVERT INLETS, UNLESS OTHERWISE SPECIFIED. WHEN A CLAY CORE IS SPECIFIED, A COLLAR SHALL BE INSTALLED ON BOTH SIDES OF THE CORE.

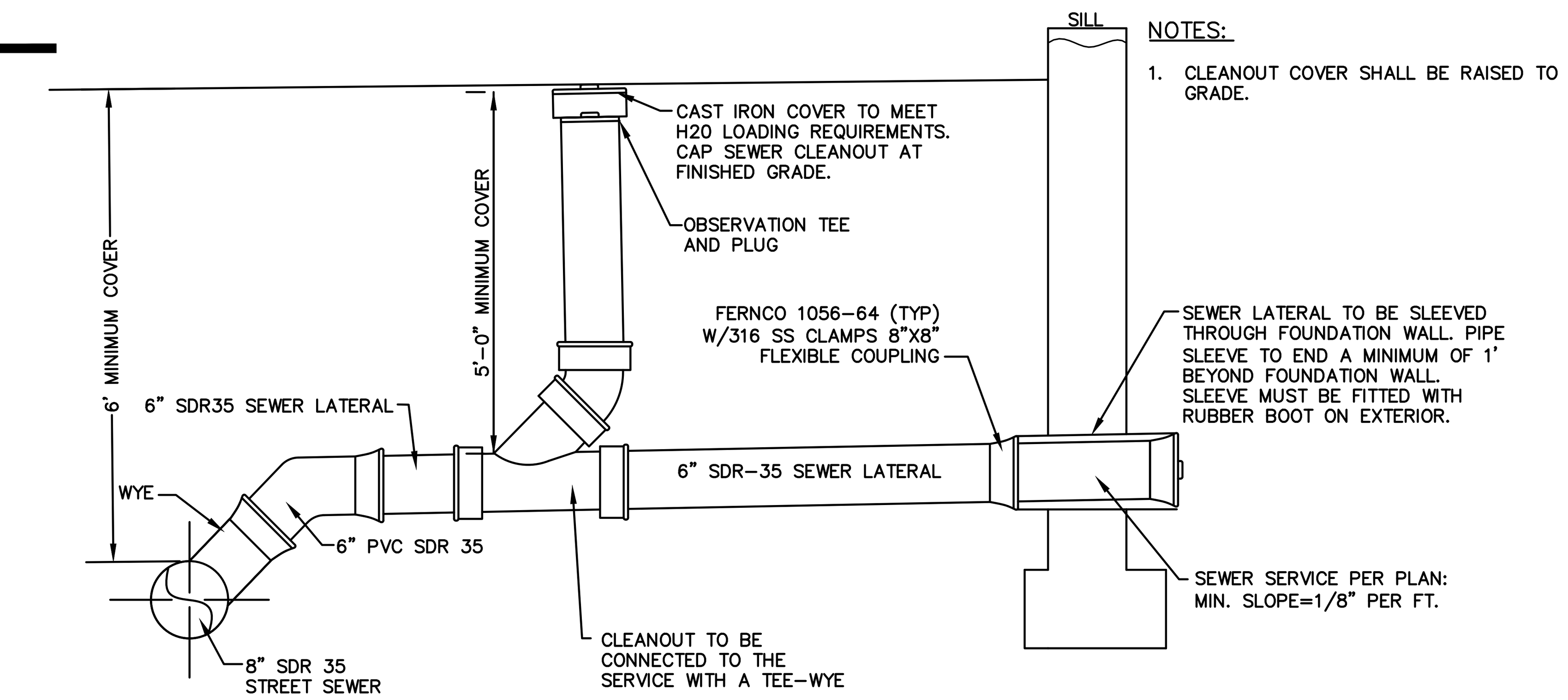
ANTI-SEEP COLLAR

NOT TO SCALE



SEWER CLEAN OUT

NOT TO SCALE

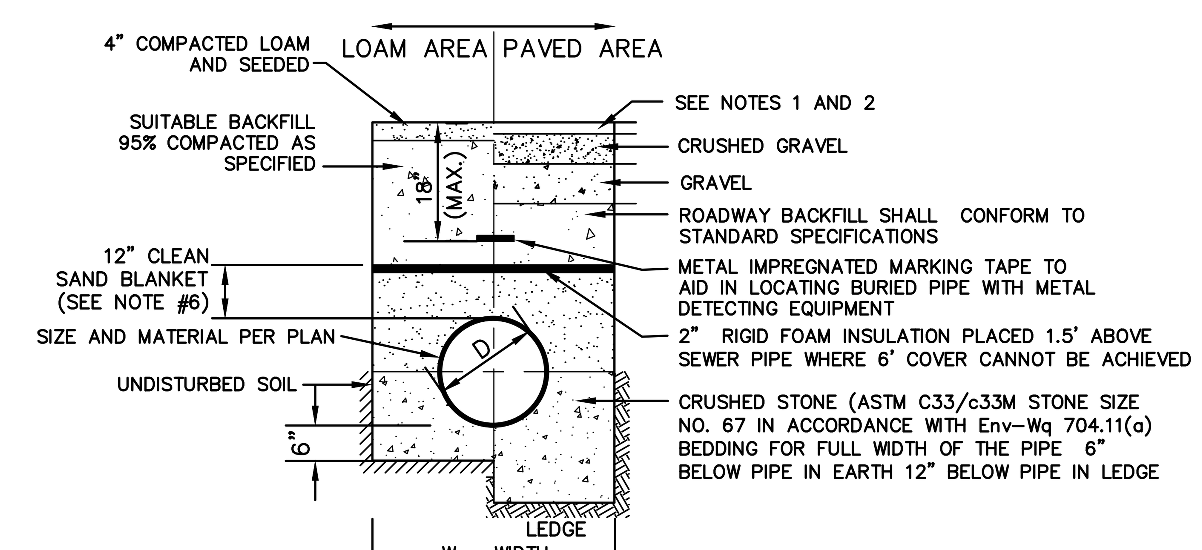


NOTES:

1. CLEANOUT COVER SHALL BE RAISED TO GRADE.

HOUSE SEWER SERVICE

NOT TO SCALE

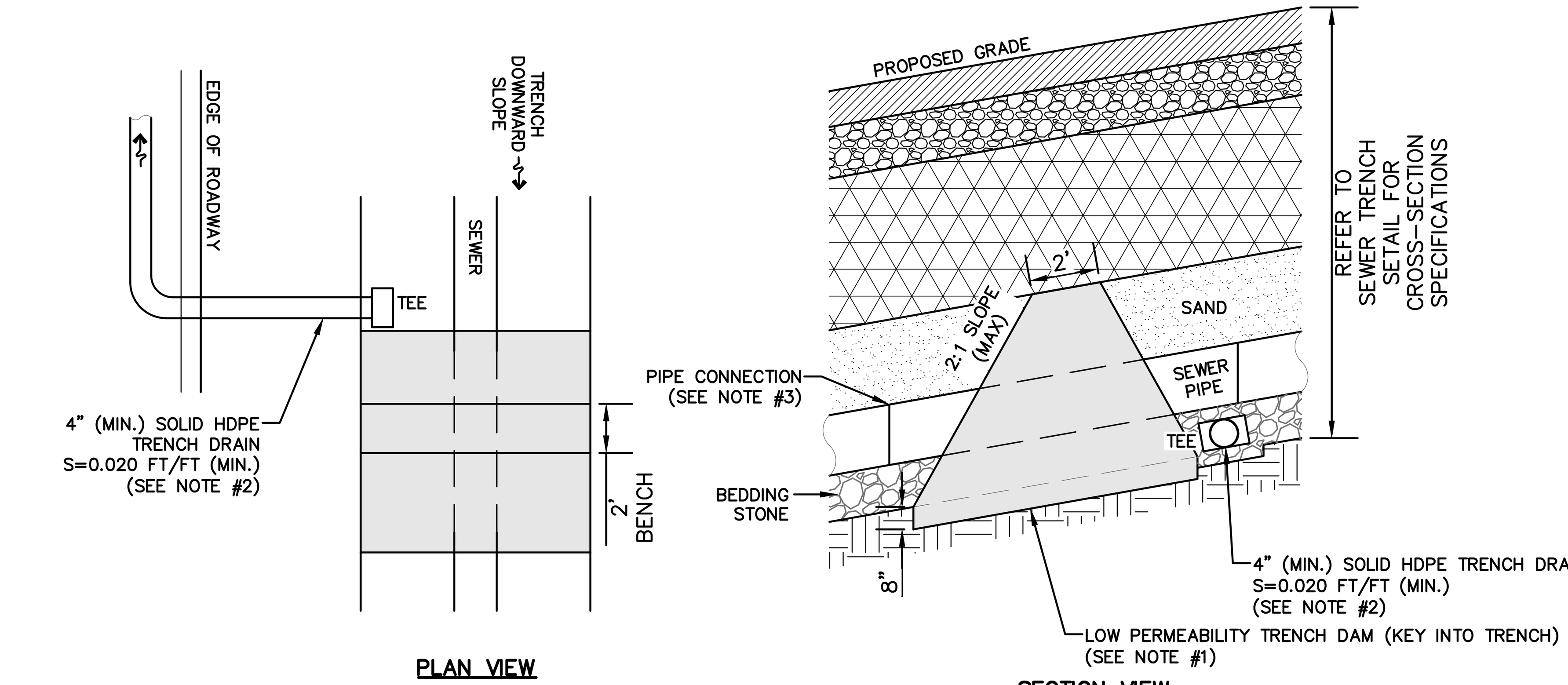


NOTES:

1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO PAVEMENT DETAILS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO SUBDIVISION SPECIFICATIONS.
3. TRENCH BACKFILL SHALL CONFORM WITH ENV. Wq 704.11(h) AND BE FREE OF DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, WET OR SOFT MUCK, PEAT OR CLAY, EXCAVATED LEDGE OR ROCKS OVER SIX INCHES.
4. W= MAXIMUM ALLOWABLE TRENCH WIDTH TO A PLANE 12" INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, WIDTH SHALL BE NO MORE THAN 36"; FOR PIPES GREATER THAN 15 INCHES NOMINAL DIAMETER, WIDTH SHALL BE 24 INCHES PLUS PIPE O.D. WIDTH SHALL ALSO BE THE PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE.
5. RIGID FOAM INSULATION TO BE PROVIDED WHERE COVER IN THE ROADWAY IS LESS THAN 6' AND CROSS COUNTRY IS LESS THAN 4', PURSUANT TO DES WAIVER BEING ISSUED.
6. PIPE SAND BLANKET MATERIAL SHALL BE GRADED SAND, FREE FROM ORGANIC MATERIALS, GRADED SUCH THAT 100% PASSES A 1/2 " SIEVE AND A MAXIMUM OF 15% PASSES A #200 SIEVE IN ACCORDANCE WITH Env-Wq 704.11(b).
7. JOINT SEALS FOR PVC PIPE SHALL BE OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL AND CERTIFIED BY THE MANUFACTURER AS CONFORMING TO THE ASTM D3212 STANDARD IN EFFECT WHEN THE JOINT SEALS WERE MANUFACTURED, AND SHALL BE PUSH-ON, BELL-AND-SPIGOT TYPE PER Env-Wq 704.05 (e).
8. PVC PIPE SHALL CONFORM WITH ASTM D3034 AND ASTM D2412.

GRAVITY SEWER TRENCH

NOT TO SCALE



NOTES:

1. LOW PERMEABILITY SOIL USED FOR TRENCH DAM SHALL MEET THE FOLLOWING SPECIFICATION: CLAYEY SOIL – MIN. 15% PASSING THE #200 SEIVE AND A MIN. PERMEABILITY OF $1x10^{-5}$ CM/SEC
2. DRAINS SHALL DAYLIGHT TO NEAREST AT-GRADE POINT, TIE INTO A DRAINAGE STRUCTURE, OR INTO A NETWORK OR TRENCH DRAINS.
3. CONTRACTOR SHALL NOT LOCATE A PIPE CONNECTION WITHIN THE LIMITS OF THE TRENCH DAM. A 2' SEPARATION BETWEEN LIMIT OF TRENCH DAM AND CONNECTION IS RECOMMENDED.
4. CONTRACTOR SHALL INSTALL DAMS & DRAINS AT A MAXIMUM. 75' SPACING. REFER TO PROJECT PLANS.

SEWER TRENCH DAM & DRAIN

NOT TO SCALE

Design: DJM | Draft: KDR | Date: 2/26/2024
Checked: JAC | Scale: AS NOTED | Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg

STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED
PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
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Plan Name: DETAIL SHEET
Project: LUSTER CLUSTER 635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
D3
SHEET 17 OF 20
JBE PROJECT NO. 18134.1

BIORETENTION SYSTEM ELEVATIONS	
ELEVATION	SYSTEM #1
A	63.00
B	60.60
C	59.10
D	58.85
E	58.10
BOTTOM SURFACE AREA (S.F.)	466

SAND SPECIFICATION

SIEVE SIZE	% BY WEIGHT
3/8"	100
#4	95–100
#8	80–100
#16	50–85
#30	25–60
#60	10–30
#100	2–10
#200	0–5

TOPSOIL SPECIFICATION
LOAMY SAND TOPSOIL WITH MINIMAL CLAY CONTENT AND BETWEEN 15 TO 25% FINES PASSING THE #200 SIEVE.

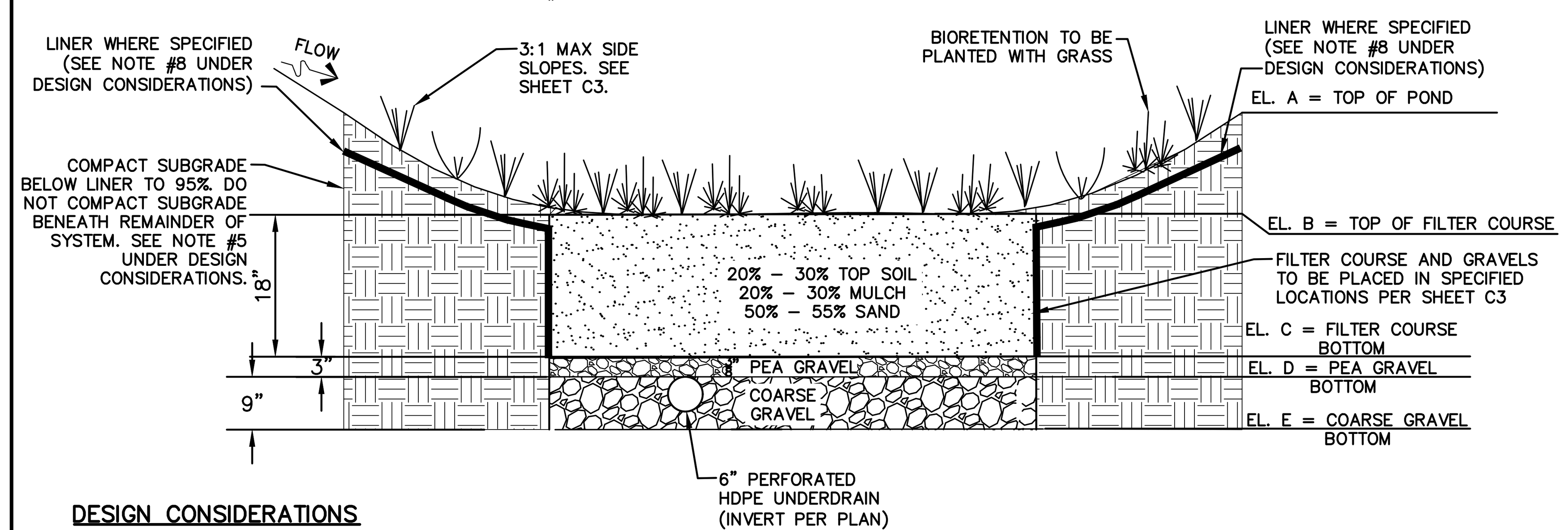
MULCH SPECIFICATION
MODERATELY FINE, SHREDDED BARK OR WOOD FIBER MULCH WITH LESS THAN 5% PASSING THE #200 SIEVE.

PEA GRAVEL SPECIFICATION

SIEVE SIZE	% BY WEIGHT
1/2"	100
3/8"	85–100
#4	10–30
#8	0–10
#16	0–15

COARSE GRAVEL SPECIFICATION

SIEVE SIZE	% BY WEIGHT
1"	90–100
1/2"	75–100
#4	50–100
#20	15–80
#50	0–15
#200	0–5



DESIGN CONSIDERATIONS

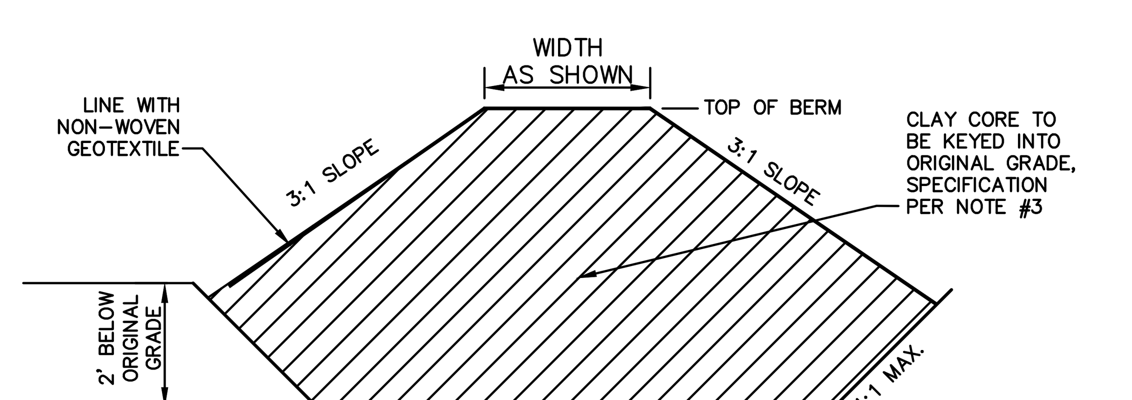
1. DO NOT PLACE BIORETENTION SYSTEMS INTO SERVICE UNTIL THE BMP HAS BEEN SEEDED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
2. DO NOT DISCHARGE SEDIMENT–LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUN–OFF, WATER FROM EXCAVATIONS) TO THE BIORETENTION AREA DURING ANY STAGE OF CONSTRUCTION.
3. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.
4. REMOVE LEDGE TO AT LEAST 6" BELOW BOTTOM OF COARSE GRAVEL LAYER IF ENCOUNTERED.
5. IN ADDITION TO DESIGN CRITERIA LISTED HERE, REFER TO GUIDELINES LISTED IN UNIVERSITY OF NEW HAMPSHIRE (UNH) STORMWATER CENTER BIORETENTION SOIL SPECIFICATION.
7. UPSTREAM DEEP SUMP CATCH BASINS PROVIDE PRE–TREATMENT IN LIEU OF A SEDIMENT FOREBAY.
8. ONLY PLACE FILTER MEDIA AND STONE BENEATH DOTTED HATCH AREA ON SHEET C3. REMAINDER OF POND TO BE LINED WITH 30ML LINER 6" BELOW SURFACE. FILTER MEDIA AND STONE SECTIONS ARE NOT TO BE LINED. LINER SHALL CONTINUE DOWN THE SIDES OF THE FILTER COURSE BUT MUST NOT BE PLACED ON THE SIDES OF THE PEA GRAVEL OR COARSE GRAVEL OR PLACED BENEATH THE FILTER COURSE AND/OR GRAVELS.
9. THE EXISTING NATIVE SUBGRADE MATERIAL SHALL NOT BE COMPACTED OR SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO STONE PLACEMENT. IF SOIL MEDIA OR SUBGRADE IS OVER COMPACTED, DISTURBED, OR CONTAMINATED BY FOREIGN OR DELETERIOUS MATERIALS OR LIQUIDS, REMOVE THE SOIL MEDIA AND CONTAMINATION; RESTORE THE SUBGRADE AS DIRECTED BY ENGINEER AND REPLACE CONTAMINATED SOIL MEDIA WITH NEW SOIL MEDIA

MAINTENANCE REQUIREMENTS:

1. SYSTEMS SHALL BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EVENT EXCEEDING 2.5 INCHES IN A 24 HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.
5. PRETREATMENT MEASURES SHALL BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.
6. TRASH AND DEBRIS SHALL BE REMOVED AT EACH INSPECTION.
7. AT LEAST ONCE ANNUALLY, SYSTEM SHALL BE INSPECTED FOR DRAWDOWN TIME. IF BIORETENTION SYSTEM DOES NOT DRAIN WITHIN 72 HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHALL ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION, INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER MEDIA.
8. VEGETATION SHALL BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING PRUNING, REMOVAL AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.
9. COMPACTION AND MATERIALS TESTING SERVICES SHALL BE PERFORMED BY AN INDEPENDENT GEOTECHNICAL ENGINEER RETAINED BY THE OWNER.

BIORETENTION SYSTEM WITH UNDERDRAIN

NOT TO SCALE



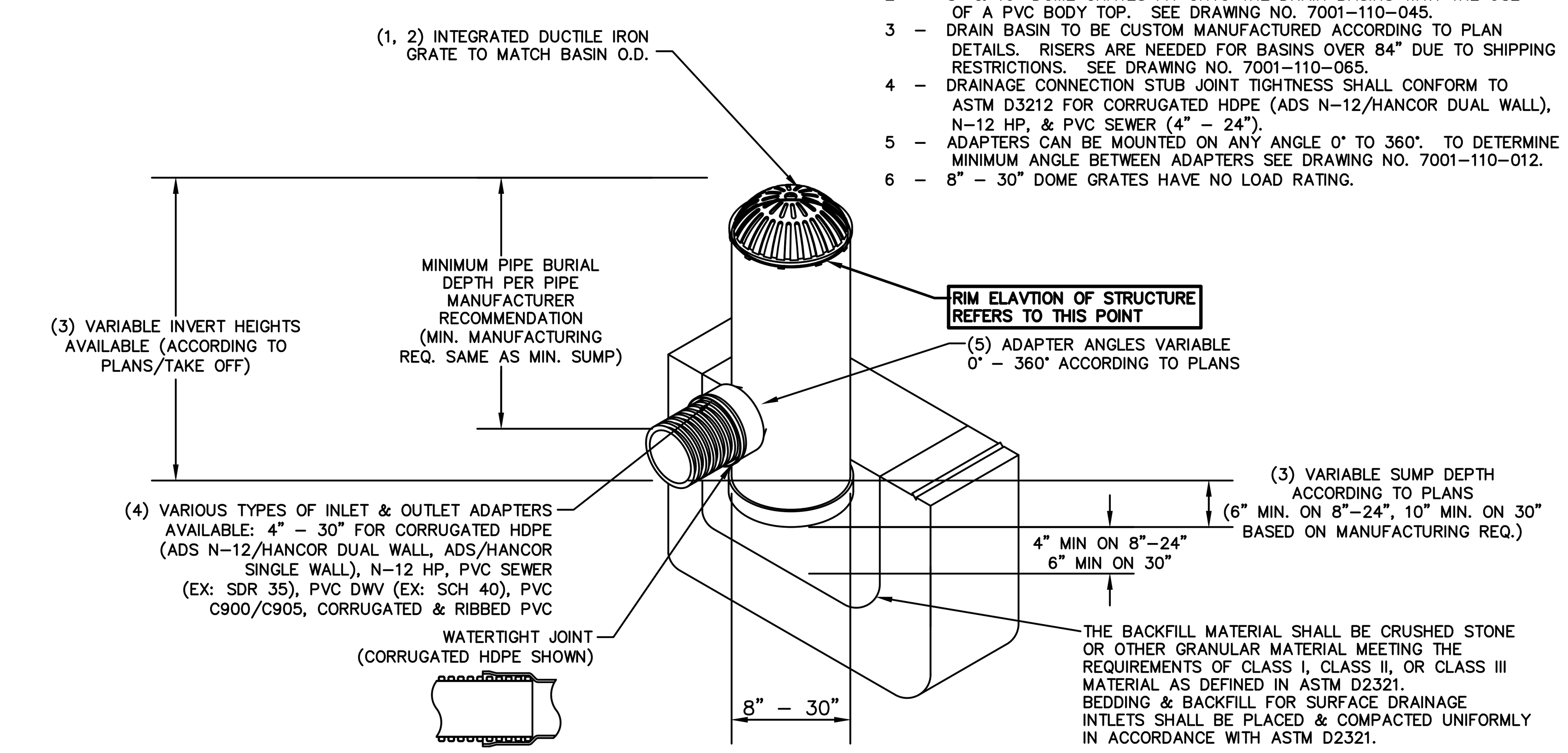
NOTES:

1. BERM SHALL BE CONSTRUCTED WITH A CLAY CORE TO BE KEYED INTO ORIGINAL GRADE, AS WELL AS A FINE GEOTEXTILE, TO AVOID WATER SEEPAGE AND SOIL PIPING THROUGH THE EARTHEN DIVIDER
2. THE ENTIRE EMBANKMENT AREA OF THE BIORETENTION AREA SHALL BE EXCAVATED A MINIMUM 2' BELOW THE ORIGINAL GRADE, STRIPPED OF ALL ORGANIC MATERIALS, COMPACTED TO AT LEAST 92% OF ASTM D–1557, AND SCARIFIED PRIOR TO THE PLACEMENT OF THE EMBANKMENT MATERIAL. PLACEMENT AND COMPACTION SHOULD OCCUR AT A MOISTURE CONTENT OF OPTIMUM PLUS OR MINUS 3%, AND NO FROZEN OR ORGANIC MATERIAL SHALL BE PLACED FOR ANY REASON.
3. CLAY CORE MATERIAL SHALL BE CLEAN SILTY–CLAY BORROW FREE OF ROOTS, ORGANIC MATTER, AND OTHER DELETERIOUS SUBSTANCES, AND SHALL CONTAIN NO ROCKS OR LUMPS OVER THREE INCHES (3") IN DIAMETER. THIS MATERIAL SHALL BE INSTALLED IN 6" LIFTS COMPACTED TO 92% OF ASTM D–1557, AND SHALL MEET THE FOLLOWING SPECIFICATIONS: 6" PASSING 100%, #4 SIEVE 95–100%, #40 SIEVE 60–90%, #100 SIEVE 40–60%, #200 SIEVE 25–45% (OF THE FRACTION PASSING THE #4 SIEVE). THE CLAY COMPONENT SHALL HAVE A PLASTICITY INDEX OF AT LEAST 8 AND A HYDRAULIC CONDUCTIVITY OF 10 TO THE –6 CM/SEC.
4. COMPACTION AND MATERIALS TESTING SERVICES SHALL BE PERFORMED BY AN INDEPENDENT GEOTECHNICAL ENGINEER RETAINED BY THE OWNER.

CLAY CORE BERM

NOT TO SCALE

NOTES:
1 – 8" – 30" DOME GRATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70–50–05.
2 – 8" & 10" DOME GRATES FIT ONTO THE DRAIN BASINS WITH THE USE OF A PVC BODY TOP. SEE DRAWING NO. 7001–110–045.
3 – DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001–110–065.
4 – DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N–12/HANCOR DUAL WALL), N–12 HP, & PVC SEWER (4" – 24").
5 – ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001–110–012.
6 – 8" – 30" DOME GRATES HAVE NO LOAD RATING.



24" DIA. NYLOPLAST DRAIN BASIN (YARD DRAIN & POND OUTLET STRUCTURE SPECIFICATION)

NOT TO SCALE

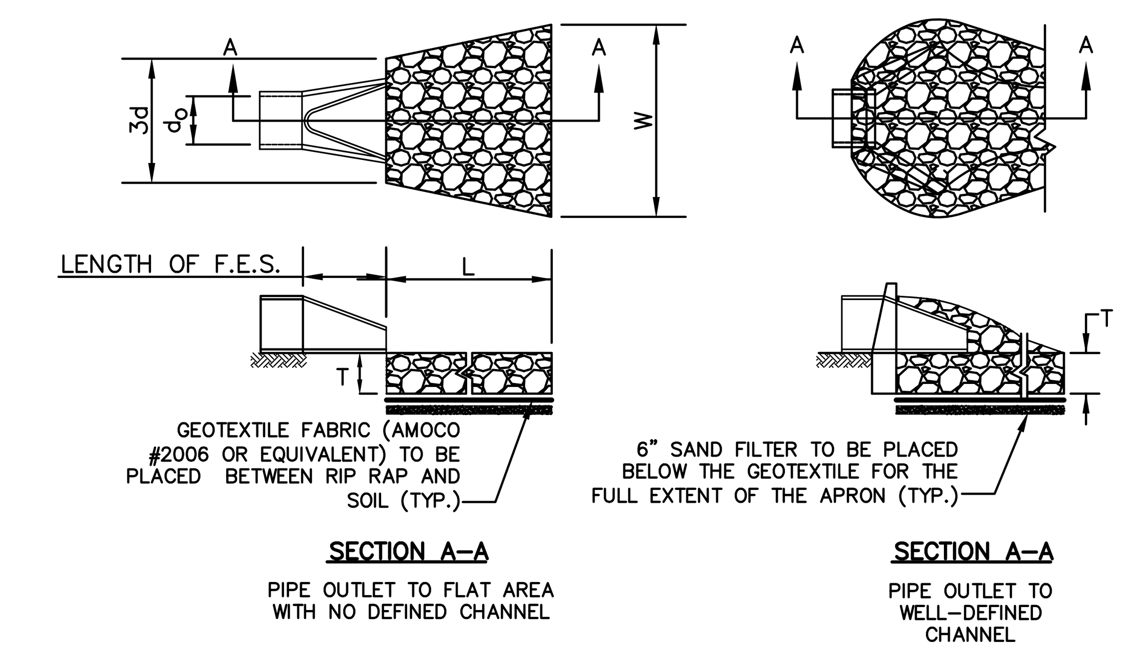


TABLE 7–24––RECOMMENDED RIP RAP GRADATION RANGES		
THICKNESS OF RIP RAP = 1.5 FEET		
d50 SIZE= 0.25 FEET 3 INCHES		
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	5	6
85%	4	5
50%	3	5
15%	1	2

NOTES:

1. THE SUBGRADE FOR THE GEOTEXTILE FABRIC AND RIP RAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE RIP RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.
5. OUTLETS TO A DEFINED CHANNEL SHALL HAVE 2:1 OR FLATTER SIDE SLOPES AND SHOULD BEGIN AT THE TOP OF THE CULVERT AND TAPER DOWN TO THE CHANNEL BOTTOM THROUGH THE LENGTH OF THE APRON.
6. MAINTENANCE: THE OUTLET PROTECTION SHOULD BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIP RAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHOULD BE REPAIRED IMMEDIATELY. THE CHANNEL IMMEDIATELY BELOW THE OUTLET SHOULD BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO OUTLET PROTECTION.

RIP RAP OUTLET PROTECTION APRON

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

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STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

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Plan Name: DETAIL SHEET

Project: LUSTER CLUSTER
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Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
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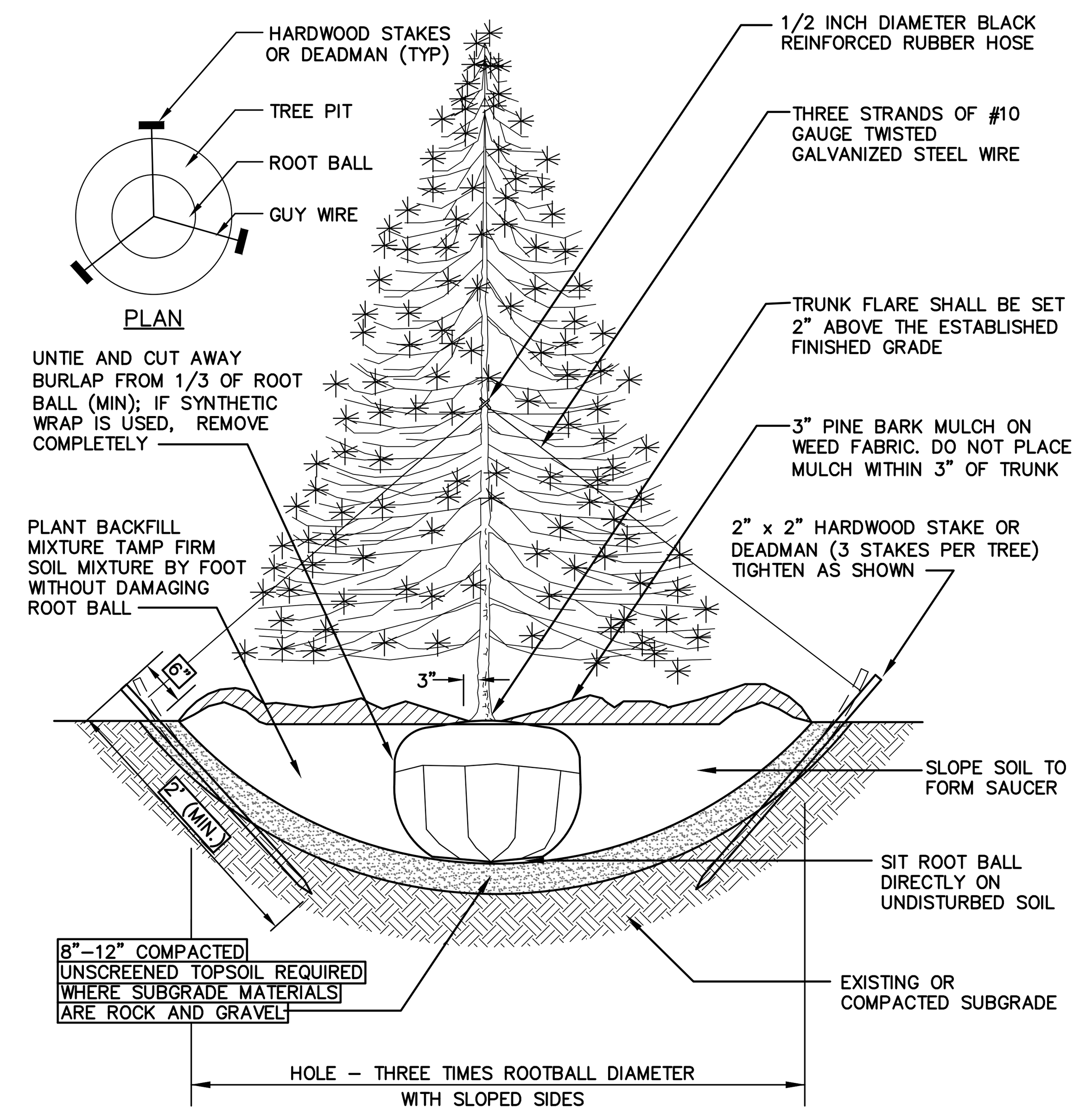
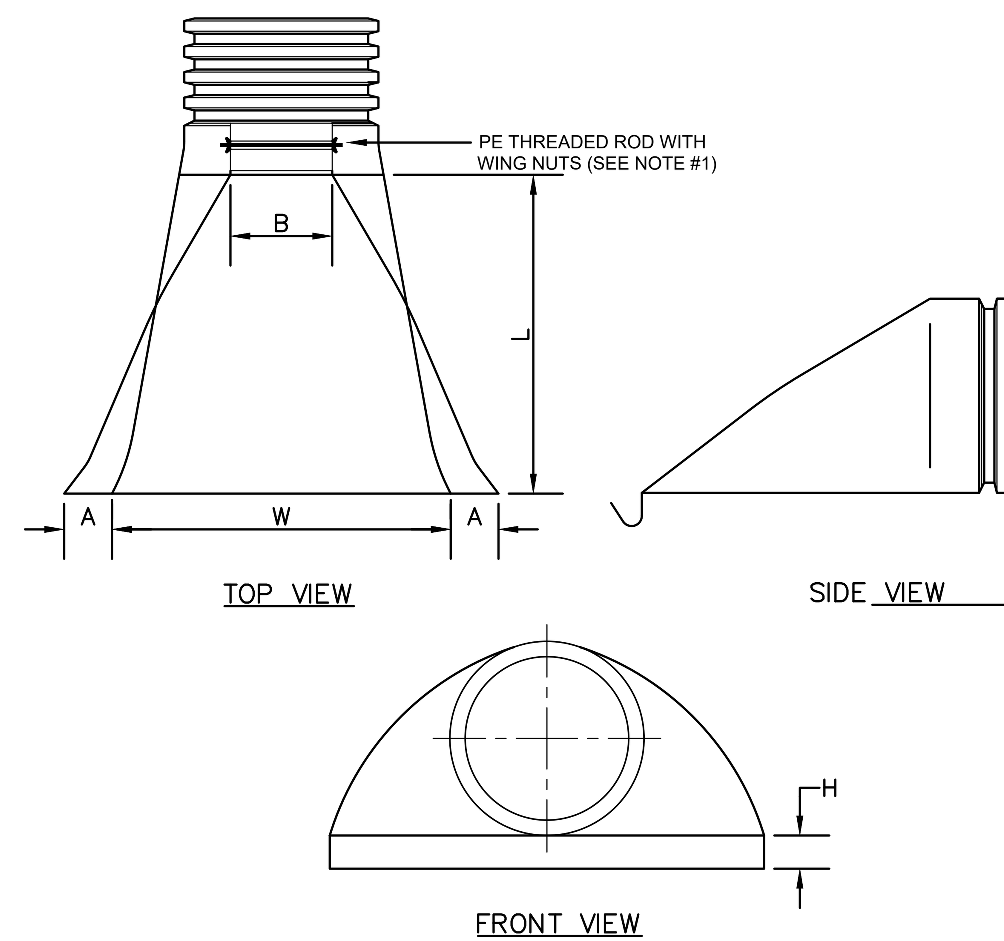
DRAWING No.
D4

SHEET 18 OF 20
JBE PROJECT NO. 18134.1



EVERGREEN PLANTING

NOT TO SCALE



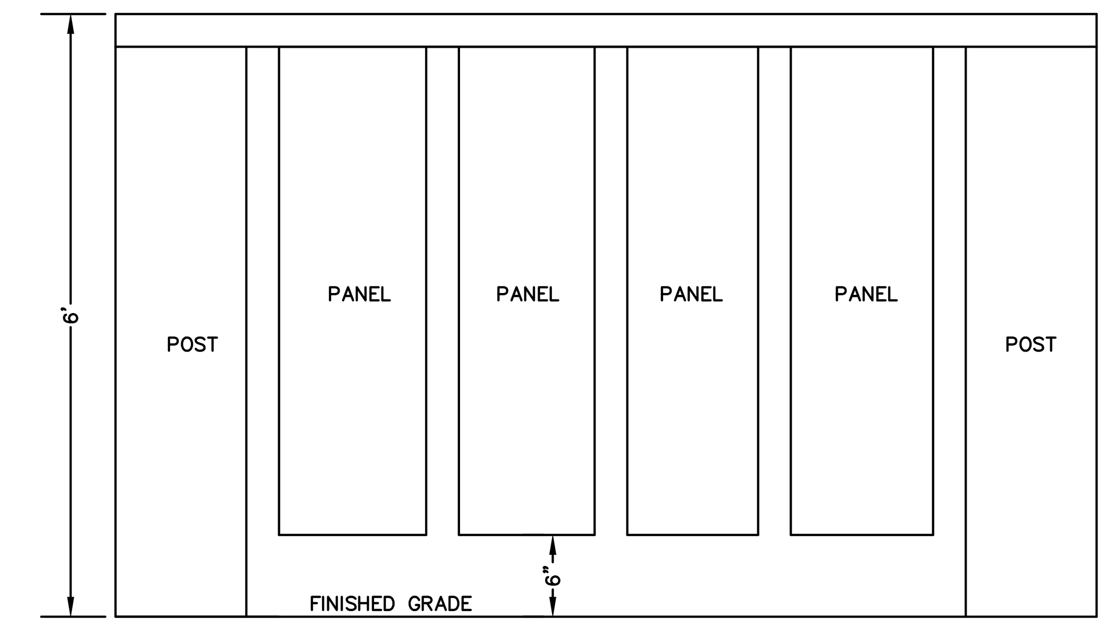
PART NO.	PIPE SIZE	A	B (MAX)	H	L	W
1210–NP	12"	6.5"	10"	6.5"	25"	29"
1510–NP	15"	6.5"	10"	6.5"	25"	29"
1810–NP	18"	7.5"	15"	6.5"	32"	35"
2410–NP	24"	7.5"	18"	6.5"	36"	45"
3010–NP	30"	10.5"	N/A	7.0"	53"	68"
3610–NP	36"	10.5"	N/A	7.0"	53"	68"

NOTES:

1. PE THREADED ROD WITH WING NUTS PROVIDED FOR END SECTIONS 12"–24". 30" AND 36" END SECTIONS TO BE WELDED PER MANUFACTURER'S RECOMMENDATIONS.
2. ALL DIMENSIONS ARE NOMINAL.

ADS N-12 FLARED END SECTION

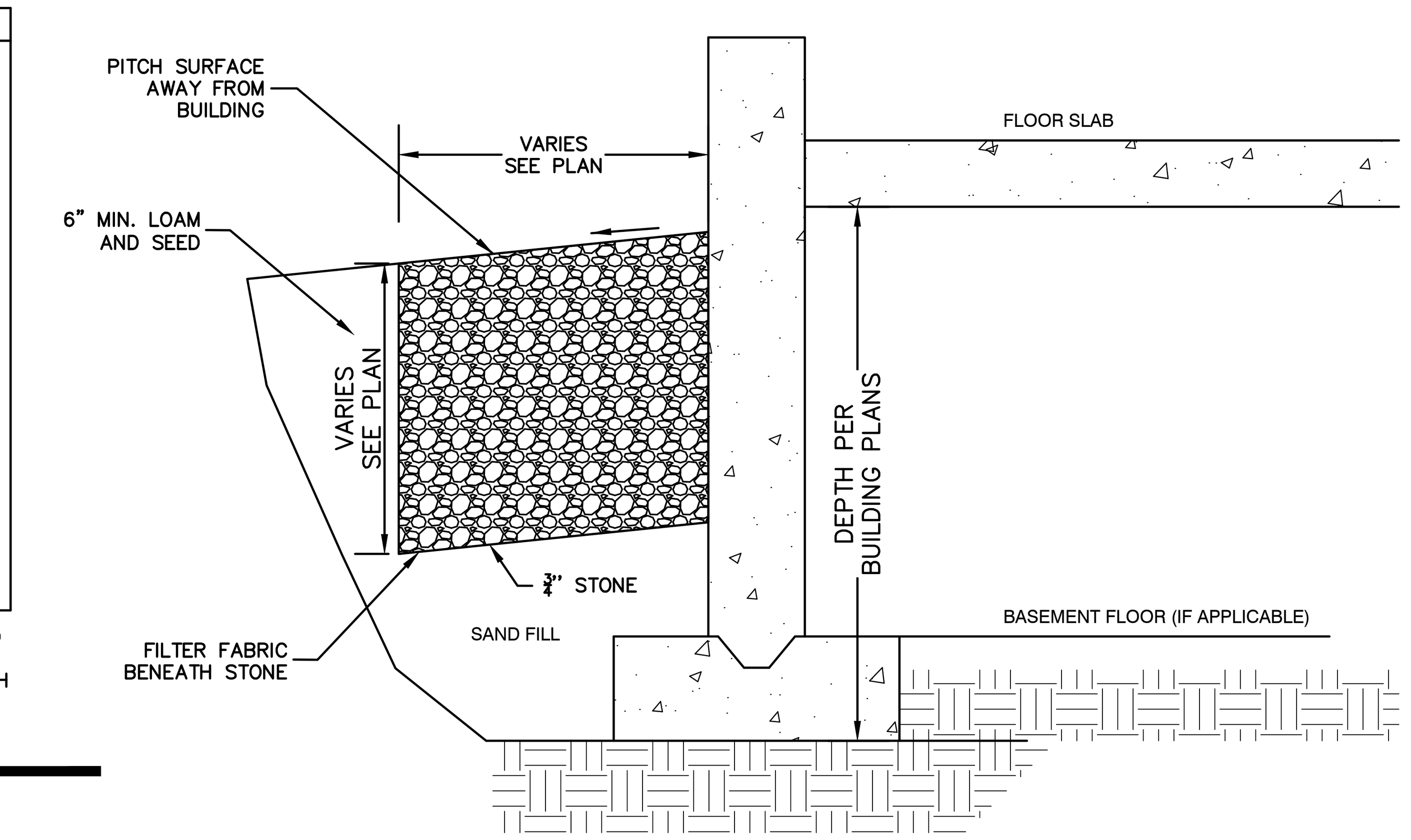
NOT TO SCALE



1. THE INTENT OF THIS DETAIL IS TO SHOW THE REQUIRED CLEARANCE FROM FINISHED GRADE TO THE BOTTOM OF THE WOODEN PANELS ON THE PROPOSED FENCE. THIS DETAIL SHALL NOT CONSTRUE A REQUIREMENT WITH REGARDS TO POST OR PANEL PLACEMENT ALONG THE LENGTH OF THE FENCE.

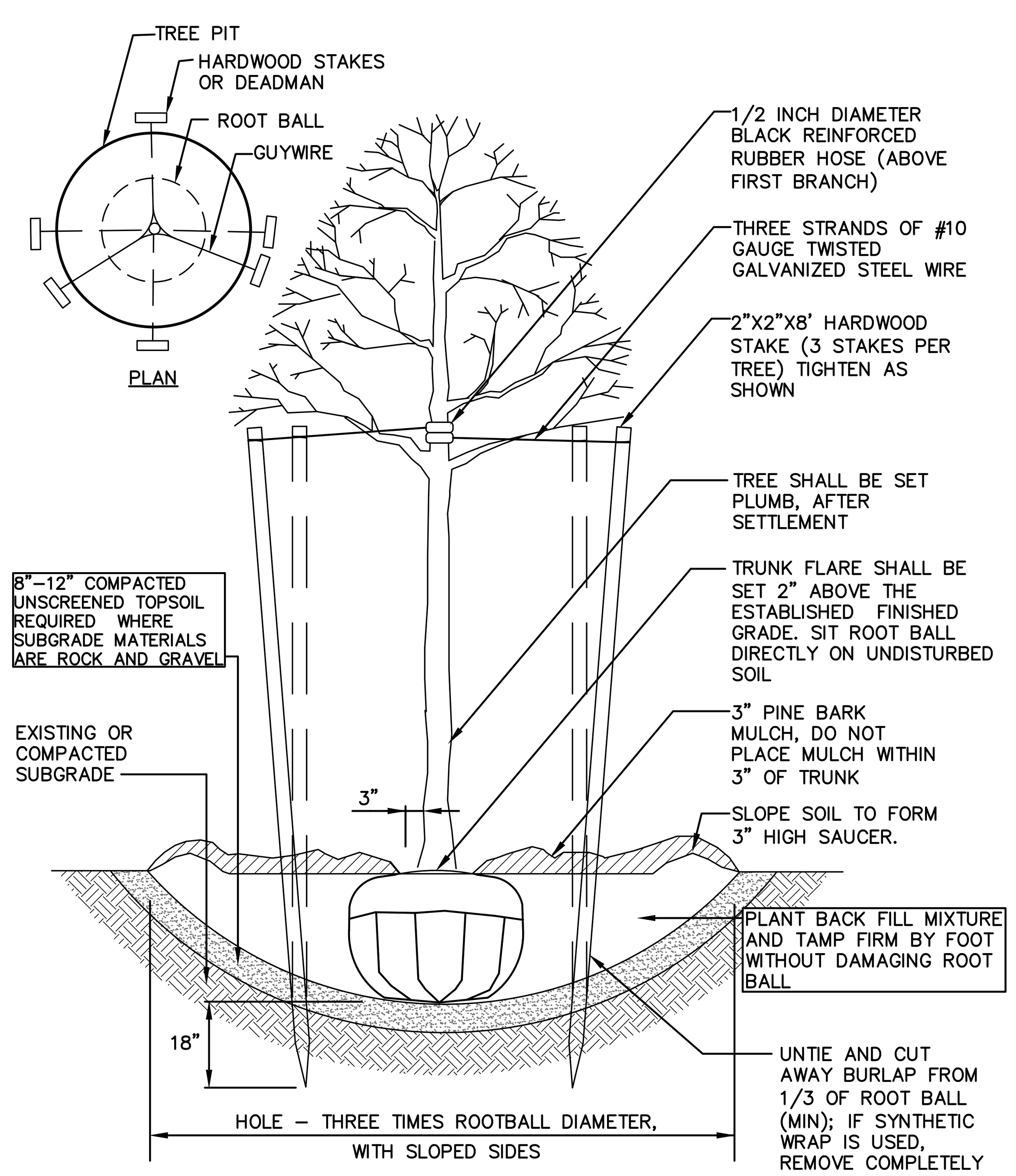
6' HIGH WOODEN STOCKADE FENCE DETAIL

NOT TO SCALE



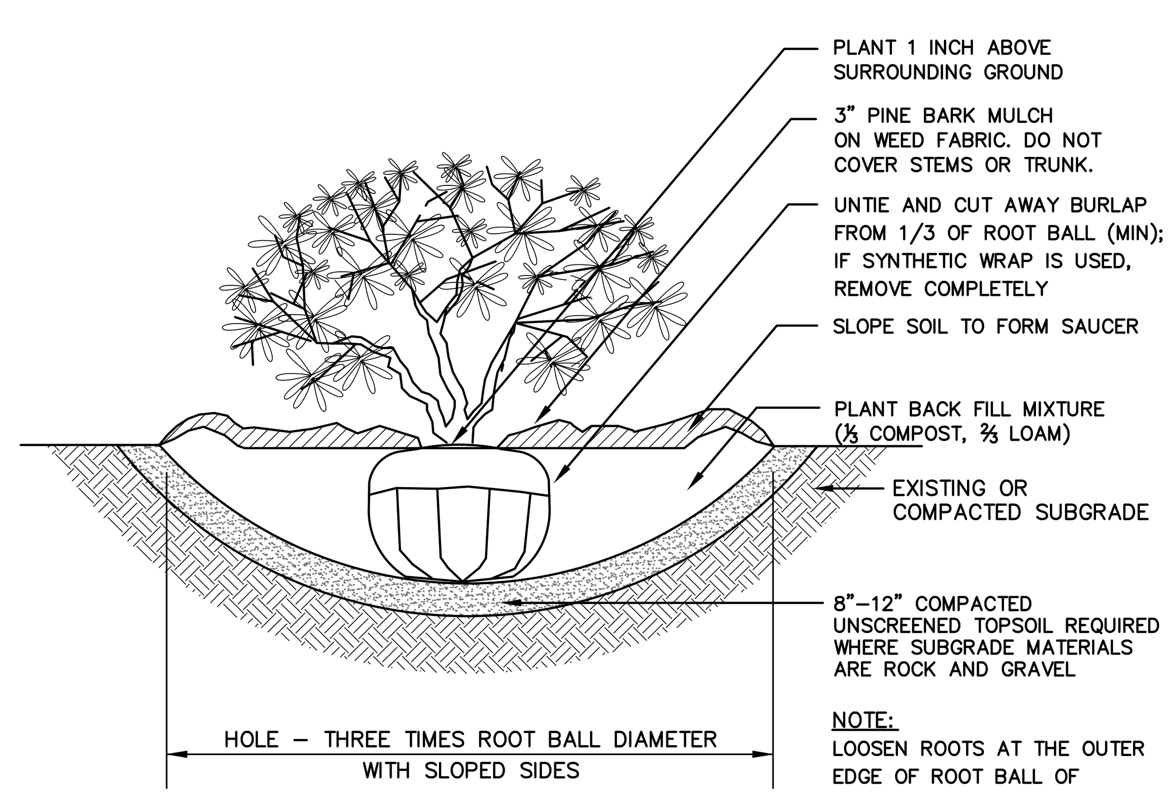
STONE DRIP EDGE DETAIL

NOT TO SCALE



TREE PLANTING (FOR TREES UNDER 4" CALIPER)

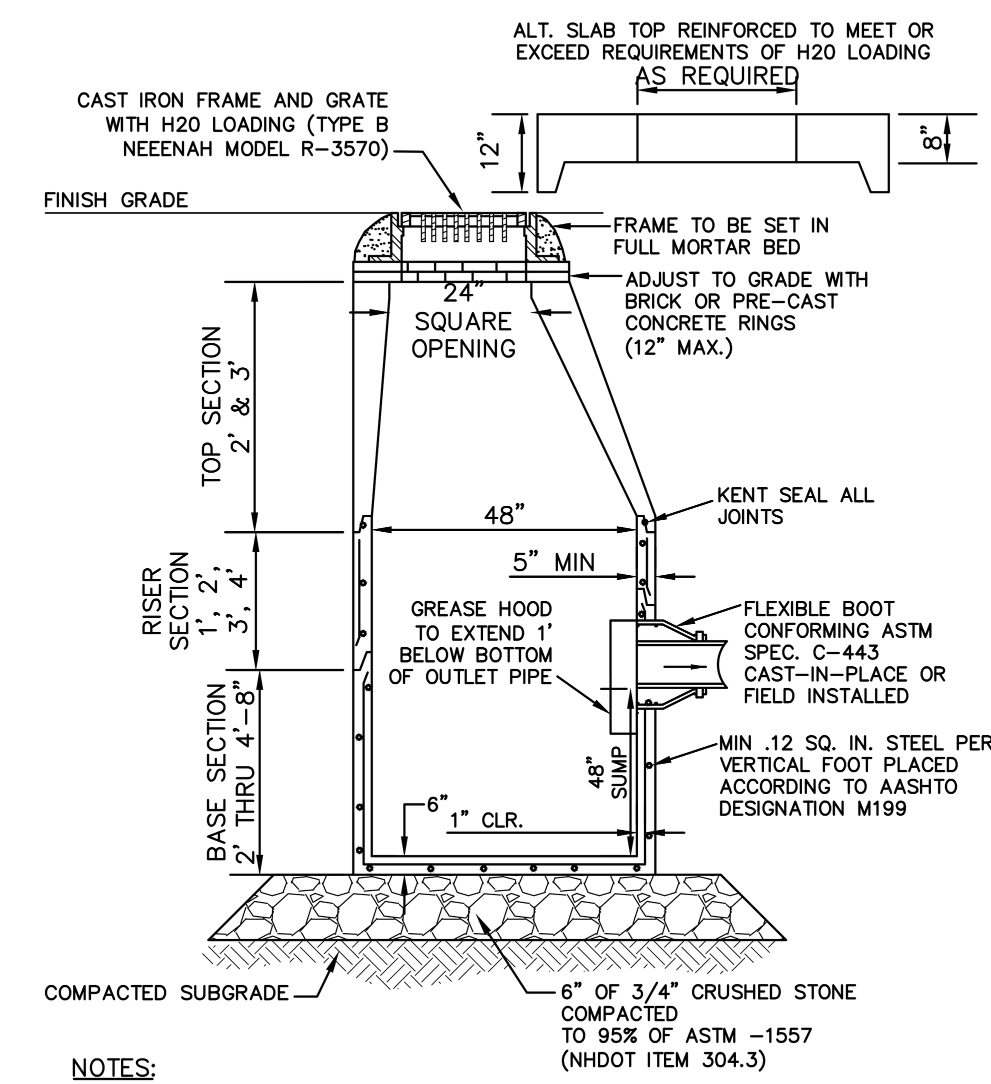
NOT TO SCALE



NOTE:
LOOSEN ROOTS AT THE OUTER EDGE OF ROOT BALL OF CONTAINER GROWN SHRUBS.

SHRUB PLANTING

NOT TO SCALE

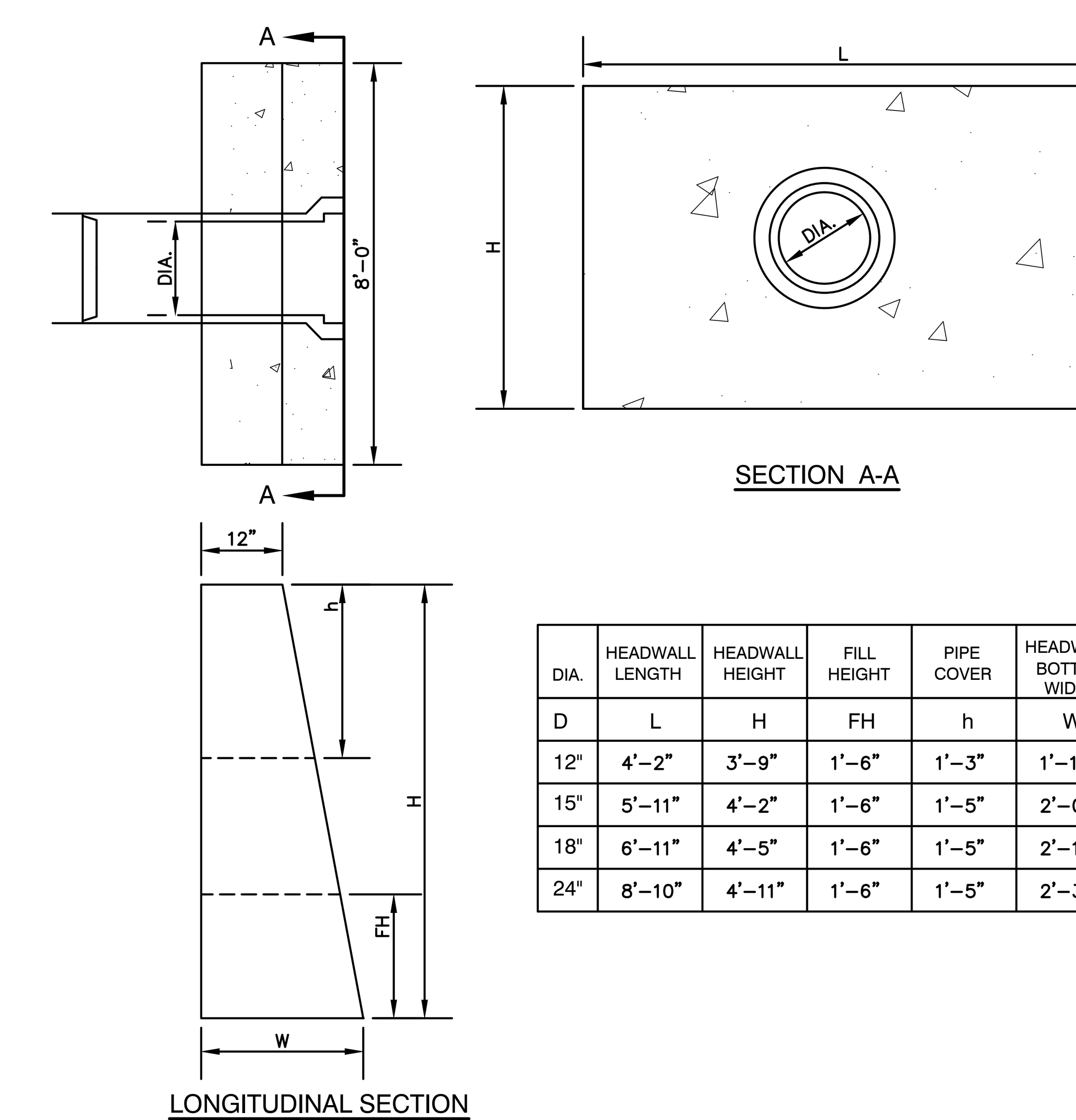


NOTES:

1. BASE SECTION SHALL BE MONOLITHIC WITH 48" INSIDE DIAMETER.
2. ALL SECTIONS SHALL BE DESIGNED FOR H20 LOADING.
3. CONCRETE SHALL BE COMPRESSIVE STRENGTH 4000 PSI, TYPE II CEMENT.
4. FRAMES AND GRATES SHALL BE HEAVY DUTY AND DESIGNED FOR H20 LOADING
5. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS SO AS TO BE WATERTIGHT.
6. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
7. STANDARD CATCH BASIN FRAME AND GRATE(S) SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM, BUT NO MORE THAN 12"), OR PRECAST CONCRETE 'DONUTS'.
8. CATCH BASINS SHALL HAVE A 48" SUMP AS SHOWN.

CATCH BASIN

NOT TO SCALE



DIA.	HEADWALL LENGTH	HEADWALL HEIGHT	FILL HEIGHT	PIPE COVER	HEADWALL BOTTOM WIDTH
D	L	H	FH	h	W
12"	4'–2"	3'–9"	1'–6"	1'–3"	1'–11"
15"	5'–11"	4'–2"	1'–6"	1'–5"	2'–0"
18"	6'–11"	4'–5"	1'–6"	1'–5"	2'–1"
24"	8'–10"	4'–11"	1'–6"	1'–5"	2'–3"

NOTES:

1. ALL DIMENSIONS GIVEN IN FEET & INCHES.
2. PROVIDE BELL END AT INLET HEADWALL, AND SPIGOT END AT OUTLET END HEADWALL.
3. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS. CEMENT TO BE TYPE III PER ASTM C–150. REINFORCING TO MEET OR EXCEED ASTM A–615 GRADE 60 DEFORMED BARS.
4. 1" THREADED INSERTS PROVED FOR FINAL ATTACHMENT IN FIELD BY OTHERS.

PRECAST CONCRETE HEADWALL

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

STATE OF NEW HAMPSHIRE – DANIEL JAMES MEDITZ No.18152 LICENSED – PROFESSIONAL ENGINEER –
04/19/2024

REV.	DATE	REVISION	BY
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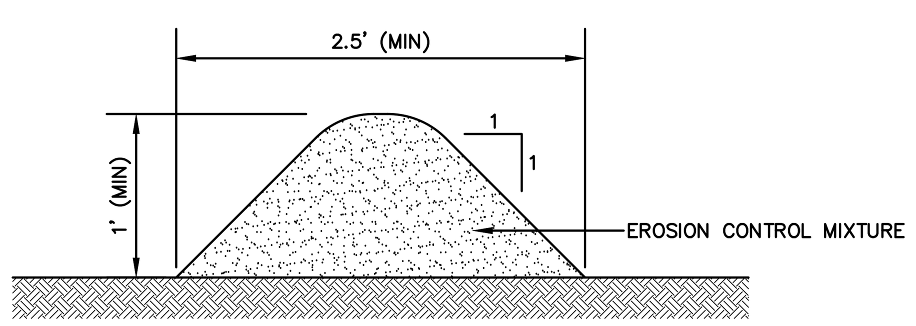
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC 3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
D5
SHEET 19 OF 20
JBE PROJECT NO. 18134.1

TEMPORARY EROSION CONTROL NOTES

1. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME. AT NO TIME SHALL AN AREA IN EXCESS OF 5 ACRES BE EXPOSED AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND AT LOCATIONS AS REQUIRED, DIRECTED BY THE ENGINEER.
3. ALL DISTURBED AREAS (INCLUDING POND AREAS BELOW THE PROPOSED WATERLINE) SHALL BE RETURNED TO PROPOSED GRADES AND ELEVATIONS. DISTURBED AREAS SHALL BE LOAMED WITH A MINIMUM OF 6" OF SCREENED ORGANIC LOAM AND SEEDED WITH SEED MIXTURE 'C' AT A RATE NOT LESS THAN 1.10 POUNDS OF SEED PER 1,000 S.F. OF AREA (48 LBS. / ACRE).
4. SILT FENCES AND OTHER BARRIERS SHALL BE INSPECTED EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 0.5" OR GREATER. ALL DAMAGED AREAS SHALL BE REPAIRED, AND SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED OF.
5. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED AND THE AREA DISTURBED BY THE REMOVAL SMOOTHED AND RE-VEGETATED.
6. AREAS MUST BE SEEDED AND MULCHED OR OTHERWISE PERMANENTLY STABILIZED WITHIN 3 DAYS OF FINAL GRADING, OR TEMPORARILY STABILIZED WITHIN 14 DAYS OF THE INITIAL DISTURBANCE OF SOIL. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
7. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING NORTH AMERICAN GREEN S75 EROSION CONTROL BLANKETS (OR AN EQUIVALENT APPROVED IN WRITING BY THE ENGINEER) ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
8. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
9. AFTER OCTOBER 15th, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3" OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.
10. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    a. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
    b. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
    c. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH STONE OR RIPRAP HAS BEEN INSTALLED; OR
    d. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
11. FUGITIVE DUST CONTROL IS REQUIRED TO BE CONTROLLED IN ACCORDANCE WITH ENV-A 1000, AND THE PROJECT IS TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES.

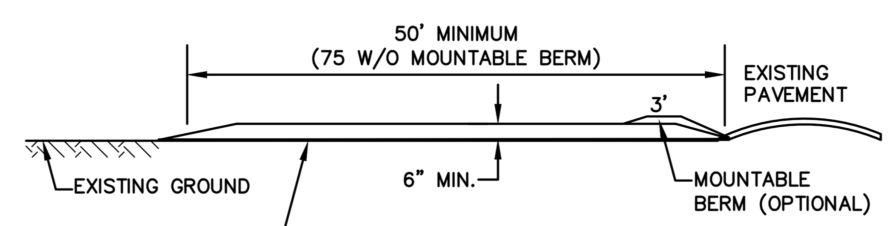


NOTES:

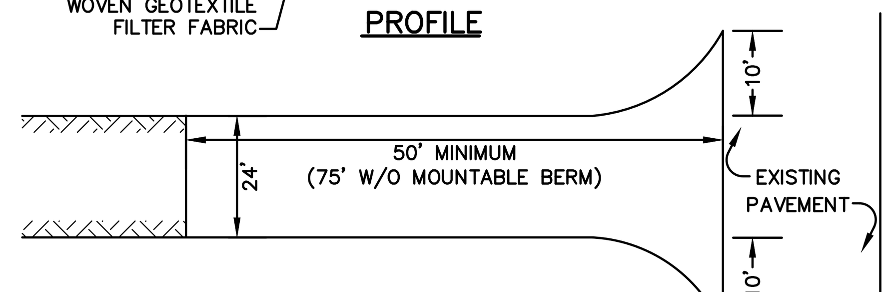
1. ORGANIC FILTER BERMS SHALL BE UTILIZED IN LIEU OF SILT FENCE.
2. THE EROSION CONTROL MIX USED IN THE FILTER BERMS SHALL BE A WELL-GRADED MIXTURE OF PARTICLE SIZES, MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER, STUMP GRINDINGS, SHREDDED OR COMPOSTED BARK, OR ACCEPTABEL MANUFACTURED PRODUCTS, AND SHALL BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH, AND SHALL MEET THE FOLLOWING STANDARDS:
   a) THE ORGANIC CONTENT SHALL BE 25-65% OF DRY WEIGHT.
   b) PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 3" SCREEN, 90-100% PASSING A 1" SCREEN, 70-100& PASSING A 0.75" SCREEN, AND 30-75% PASSING A 0.25" SCREEN.
   c) THE ORGANIC PORTION SHALL BE FIBROUS AND ELONGATED.
   d) LARGE PORTIONS OF SILTS, CLAYS, OR FINE SANDS SHALL NOT BE INCLUDED IN THE MIXTURE.
   e) SOLUBLE SALTS CONTENT SHALL BE >4.0mmhos/cm.
   f) THE pH SHALL BE BETWEEN 5.0 AND 8.0.
3. ORGANIC FILTER BERMS SHALL BE INSTALLED ALONG A RELATIVELY LEVEL CONTOUR. IT MAY BE NECESSARY TO CUT TALL GRASSES OR WOODY VEGETATION TO AVOID CREATING VOIDS AND BRIDGES THAT WOULD ENABLE FINES TO WASH UNDER THE BERM.
4. ON SLOPES LESS THAN 5%, OR AT THE BOTTOM OF SLOPES STEEPER THAN 3:1, UP TO 20' LONG, THE BERM SHALL BE A MINIMUM OF 12" HIGH (AS MEASURED ON THE UPHILL SIDE), AND A MINIMUM OF 36" WIDE. ON LONGER OR STEEPER SLOPES, THE BERM SHALL BE WIDER TO ACCOMMODATE THE POTENTIAL ADDITIONAL RUNOFF.
5. FROZEN GROUND, OUTCROPS OF BEDROCK, AND VERY ROOTED FORESTED AREAS PRESENT THE MOST PRACTICAL AND EFFECTIVE LOCATIONS FOR ORGANIC FILTER BERMS. OTHER BMP'S SHOULD BE USED AT LOW POINTS OF CONCENTRATED RUNOFF, BELOW CULVERT OUTLET APRONS, AROUND CATCH BASINS, AND AT THE BOTTOM OF STEEP PERIMETER SLOPES THAT HAVE A LARGE CONTRIBUTING AREA.
6. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURES WHEN IT HAS ACCUMULATED TO ONE HALF THE ORIGINAL HEIGHT OF THE STRUCTURE.
7. STRUCTURES MAY BE LEFT IN PLACE ONCE THE SITE IS STABILIZED.

ORGANIC FILTER BERM / FIBER BERM

NOT TO SCALE



PROFILE



PLAN VIEW

NOTES:

1. STONE FOR STABILIZED CONSTRUCTION ENTRANCE SHALL BE 3 INCH STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET, 75' WITHOUT A MOUNTABLE BERM, AND EXCEPT FOR A SINGLE RESIDENTIAL LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4. THE WIDTH OF THE ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS, OR 10 FEET, WHICHEVER IS GREATER.
5. GEOTEXTILE FILTER FABRIC SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE. FILTER FABRIC IS NOT REQUIRED FOR A SINGLE FAMILY RESIDENTIAL LOT.
6. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A STONE BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO THE PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

SEEDING SPECIFICATIONS

1. GRADING AND SHAPING
   A. SLOPES SHALL NOT BE STEEPER THAN 2:1 WITHOUT APPROPRIATE EROSION CONTROL MEASURES AS SPECIFIED ON THE PLANS (3:1 SLOPES OR FLATTER ARE PREFERRED).
   B. WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.
2. SEEDBED PREPARATION
   A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
   B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDBED AND FERTILIZER AND LIME MIXED INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.
3. ESTABLISHING A STAND
   A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. TYPES AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
      AGRICULTURAL LIMESTONE, 2 TONS PER ACRE OR 100 LBS. PER 1,000 SQ.FT.
      NITROGEN(N), 50 LBS. PER ACRE OR 1.1 LBS. PER 1,000 SQ.FT.
      PHOSPHATE(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 (CROWNVETCH, BIRDSFOOT, TREFOIL AND FLATPEA) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT PRIOR TO THEIR INTRODUCTION TO THE SITE.
   D. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20th OR FROM AUGUST 10th TO SEPTEMBER 1st.
4. MULCH
   A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.
   B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING. HAY OR STRAW MULCH SHALL BE PLACED AT A RATE OF 90 LBS PER 1000 S.F.
5. MAINTENANCE TO ESTABLISH A STAND
   A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.
   B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ONSITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE 2 TO 3 YEARS TO BECOME FULLY ESTABLISHED.
   C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, ANNUAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

USE	SEEDING MIXTURE 1/	DROUGHTY	WELL DRAINED	MODERATELY WELL DRAINED	POORLY DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A	FAIR	GOOD	GOOD	FAIR
	B	POOR	GOOD	FAIR	FAIR
	C	POOR	GOOD	EXCELLENT	GOOD
	D	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES.	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	FAIR	POOR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	E	FAIR	EXCELLENT	EXCELLENT	2/
	F	FAIR	EXCELLENT	EXCELLENT	2/

GRAVEL PIT, SEE NH-PM-24 IN APPENDIX FOR RECOMMENDATION REGARDING RECLAMATION OF SAND AND GRAVEL PITS.

1/ REFER TO SEEDING MIXTURES AND RATES IN TABLE BELOW.
2/ POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAYING AREA AND ATHLETIC FIELDS.

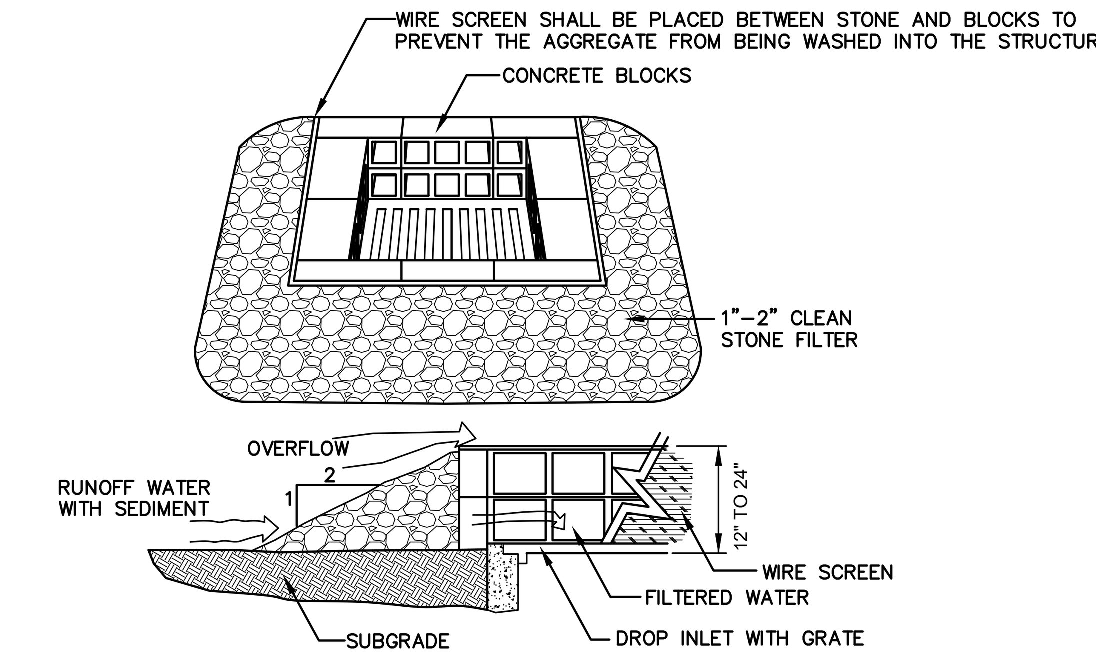
NOTE: TEMPORARY SEED MIX FOR STABILIZATION OF TURF SHALL BE WINTER RYE OR OATS AT A RATE OF 2.5 LBS. PER 1000 S.F. AND SHALL BE PLACED PRIOR TO OCTOBER 15th, IF PERMANENT SEEDING NOT YET COMPLETE.

SEEDING GUIDE

MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 Sq. Ft.
A. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
RED TOP	2	0.05
TOTAL	42	0.95
B. TALL FESCUE	15	0.35
CREEPING RED FESCUE	10	0.25
CROWN VETCH	15	0.35
OR		
FLAT PEA	30	0.75
TOTAL	40 OR 55	0.95 OR 1.35
* C. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
BIRDS FOOT TREFOIL	8	0.20
TOTAL	48	1.10
D. TALL FESCUE	20	0.45
FLAT PEA	30	0.75
TOTAL	50	1.20
E. CREEPING RED FESCUE 1/	50	1.15
KENTUCKY BLUEGRASS 1/	50	1.15
TOTAL	100	2.30
F. TALL FESCUE 1	150	3.60

1/ FOR HEAVY USE ATHLETIC FIELDS CONSULT THE UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION TURF SPECIALIST FOR CURRENT VARIETIES AND SEEDING RATES.

SEEDING RATES



MAINTENANCE NOTE:

1. ALL STRUCTURES SHOULD BE INSPECTED AFTER EVERY RAINFALL AND REPAIRS MADE AS NECESSARY. SEDIMENT SHOULD BE REMOVED FROM TRAPPING DEVICES AFTER THE SEDIMENT HAS REACHED A MAXIMUM OF ONE HALF THE DEPTH OF THE TRAP. THE SEDIMENT SHOULD BE DISPOSED IN A SUITABLE UPLAND AREA AND PROTECTED FROM EROSION BY EITHER STRUCTURE OR VEGETATIVE MEANS. THE TEMPORARY TRAPS SHOULD BE REMOVED AND THE AREA REPAIRED AS SOON AS THE CONTRIBUTING DRAINAGE AREA TO THE INLET HAS BEEN COMPLETELY STABILIZED.

TEMPORARY CATCH BASIN INLET PROTECTION
(Block and Gravel Drop Inlet Sediment Filter)

NOT TO SCALE

CONSTRUCTION SEQUENCE

1. PRIOR TO THE START OF ANY ACTIVITY, IT IS THE RESPONSIBILITY OF THE SITE'S SITE DEVELOPER (OR OWNER) TO FILE A NOTICE OF INTENT (NOI) FORM WITH THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN ORDER TO GAIN COVERAGE UNDER THE NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES. A PRE CONSTRUCTION MEETING IS TO BE HELD WITH ALL DEPARTMENT HEADS PRIOR TO THE START OF CONSTRUCTION.
2. CUT AND REMOVE TREES IN CONSTRUCTION AREA AS REQUIRED OR DIRECTED.
3. INSTALL FIBER BERM, HAY BALES AND CONSTRUCTION ENTRANCES PRIOR TO THE START OF CONSTRUCTION. THESE ARE TO BE MAINTAINED UNTIL THE FINAL PAVEMENT SURFACING AND LANDSCAPING AREAS ARE ESTABLISHED.
4. CLEAR, CUT, GRUB AND DISPOSE OF DEBRIS IN APPROVED FACILITIES. THIS INCLUDES ANY REQUIRED DEMOLITION OF EXISTING STRUCTURES, UTILITIES, ETC.
5. CONSTRUCT AND/OR INSTALL TEMPORARY OR PERMANENT SEDIMENT AND/OR DETENTION BASIN(S) AS REQUIRED. THESE FACILITIES SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING RUN-OFF TO THEM.
6. STRIP LOAM AND PAVEMENT PER THE RECOMMENDATIONS OF THE PROJECT ENGINEER AND STOCKPILE EXCESS MATERIAL. STABILIZE STOCKPILE AS NECESSARY.
7. PERFORM PRELIMINARY SITE GRADING IN ACCORDANCE WITH THE PLANS.
8. INSTALL THE SEWER AND DRAINAGE SYSTEMS FIRST, THEN ANY OTHER UTILITIES IN ACCORDANCE WITH THE PLAN AND DETAILS. ANY CONFLICTS BETWEEN UTILITIES ARE TO BE RESOLVED WITH THE INVOLVEMENT AND APPROVAL OF THE ENGINEER.
9. INSTALL INLET PROTECTION AT ALL CATCH BASINS AS THEY ARE CONSTRUCTED IN ACCORDANCE WITH DETAILS.
10. ALL SWALES AND DRAINAGE STRUCTURES ARE TO BE CONSTRUCTED AND STABILIZED PRIOR TO HAVING RUN-OFF DIRECTED TO THEM.
11. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINAGE DITCHES, CHECK DAMS, SEDIMENT TRAPS, ETC., TO PREVENT EROSION ON THE SITE AND PREVENT ANY SILTATION OF ABUTTING WATERS AND/OR PROPERTY.
12. PERFORM FINAL FINE GRADING, INCLUDING PLACEMENT OF 'SELECT' SUBGRADE MATERIALS.
13. PAVE ROADWAY AND DRIVEWAYS WITH INITIAL 'BASE COURSE'.
14. PERFORM ALL REMAINING SITE CONSTRUCTION (i.e. BUILDING, CURBING, UTILITY CONNECTIONS, ETC.).
15. LOAM AND SEED ALL DISTURBED AREAS AND INSTALL ANY REQUIRED SEDIMENT AND EROSION CONTROL FACILITIES (i.e. RIP RAP, EROSION CONTROL BLANKETS, ETC.).
16. FINISH PAVING ROADWAY AND DRIVEWAYS WITH 'FINISH' COURSE.
17. ROADWAY AND DRIVEWAYS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
18. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
19. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
20. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEDING AREAS HAVE BEEN 75%-85% ESTABLISHED AND SITE IMPROVEMENTS ARE COMPLETE. SMOOTH AND RE-VEGETATE ALL DISTURBED AREAS.
21. CLEAN SITE AND ALL DRAINAGE STRUCTURES, PIPES AND SUMPS OF ALL SILT AND DEBRIS.
22. INSTALL ALL PAINTED PAVEMENT MARKINGS AND SIGNAGE PER THE PLANS AND DETAILS.
23. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY QUARTER-INCH OF RAINFALL.
24. UPON COMPLETION OF CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ANY RELEVANT PERMITTING AGENCIES THAT THE CONSTRUCTION HAS BEEN FINISHED IN A SATISFACTORY MANNER.

Design: DJM	Draft: KDR	Date: 2/26/2024
Checked: JAC	Scale: AS NOTED	Project No.: 18134.1
Drawing Name: 18134.1-PLAN.dwg		

STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED
PROFESSIONAL ENGINEER
04/19/2024

REV.	DATE	REVISION	BY
1	4/19/24	REVISED PER TAC COMMENTS	DJM
0	3/18/24	ISSUED FOR REVIEW	KDR

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

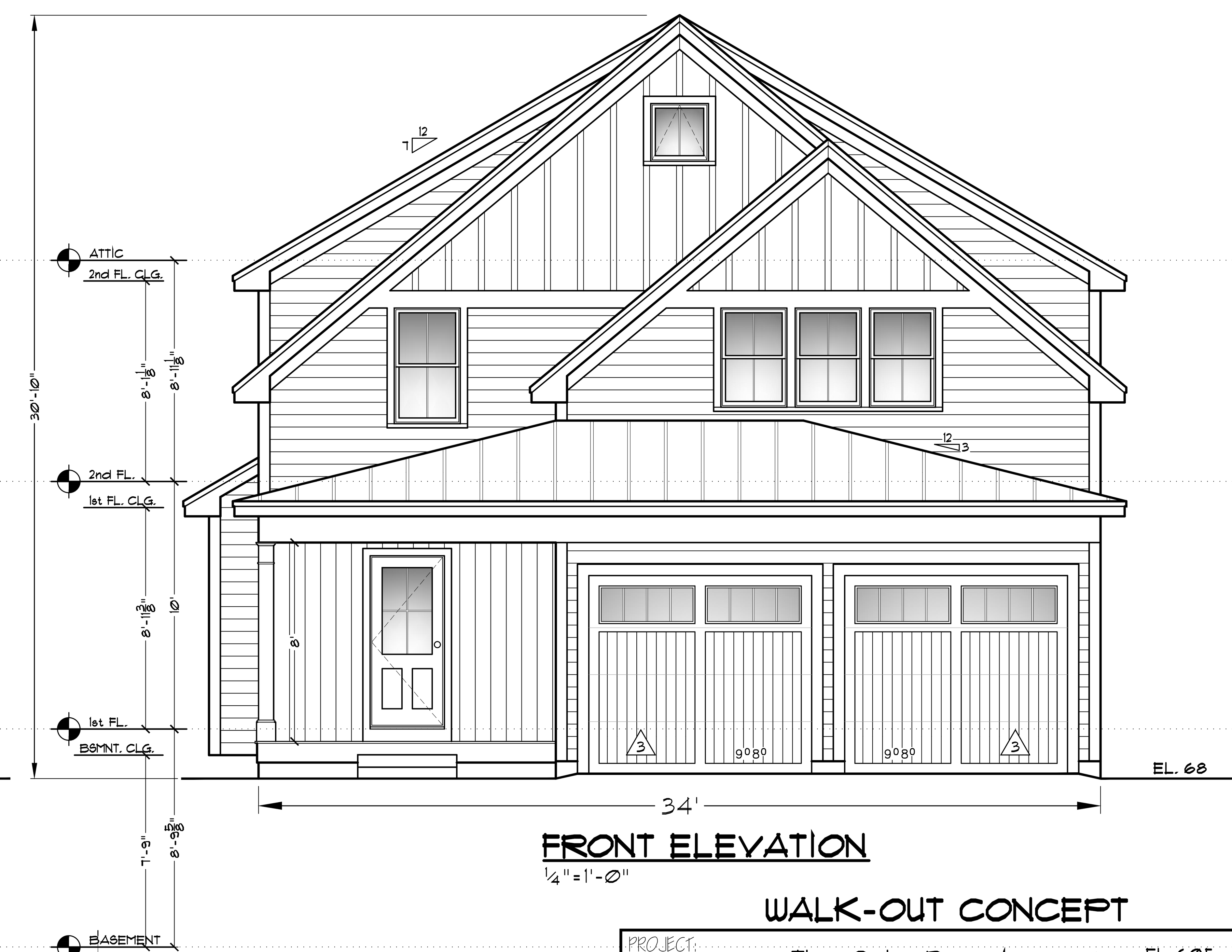
Plan Name: EROSION AND SEDIMENT CONTROL DETAILS
Project: LUSTER CLUSTER
635 SAGAMORE AVE., PORTSMOUTH, NH
Owner of Record: 635 SAGAMORE DEVELOPMENT LLC
3612 LAFAYETTE RD., DEPT 4, PORTSMOUTH, NH 03801 BK 6332 PG 1158

DRAWING No.
E1
SHEET 20 OF 20
JBE PROJECT NO. 18134.1

RIGHT SIDE ELEVATION
¼"=1'-0"

REAR ELEVATION
¼"=1'-0"

LEFT SIDE ELEVATION
¼"=1'-0"



FRONT ELEVATION
¼"=1'-0"

WALK-OUT CONCEPT

PROJECT: The Oaks Development EL. 603
635 Sagamore Road, Portsmouth, NH 03801

E-mail: tech-1112@comcast.net
Phone: 603-964-1300
Fax: 603-580-1414
Technical Illustrations
ARCHITECTURAL DRAFTING SERVICE
136 Bunker Hill Ave. Stratham, NH 03885

DATE: 1-30-24
REVISED:
DWG. NO. 1

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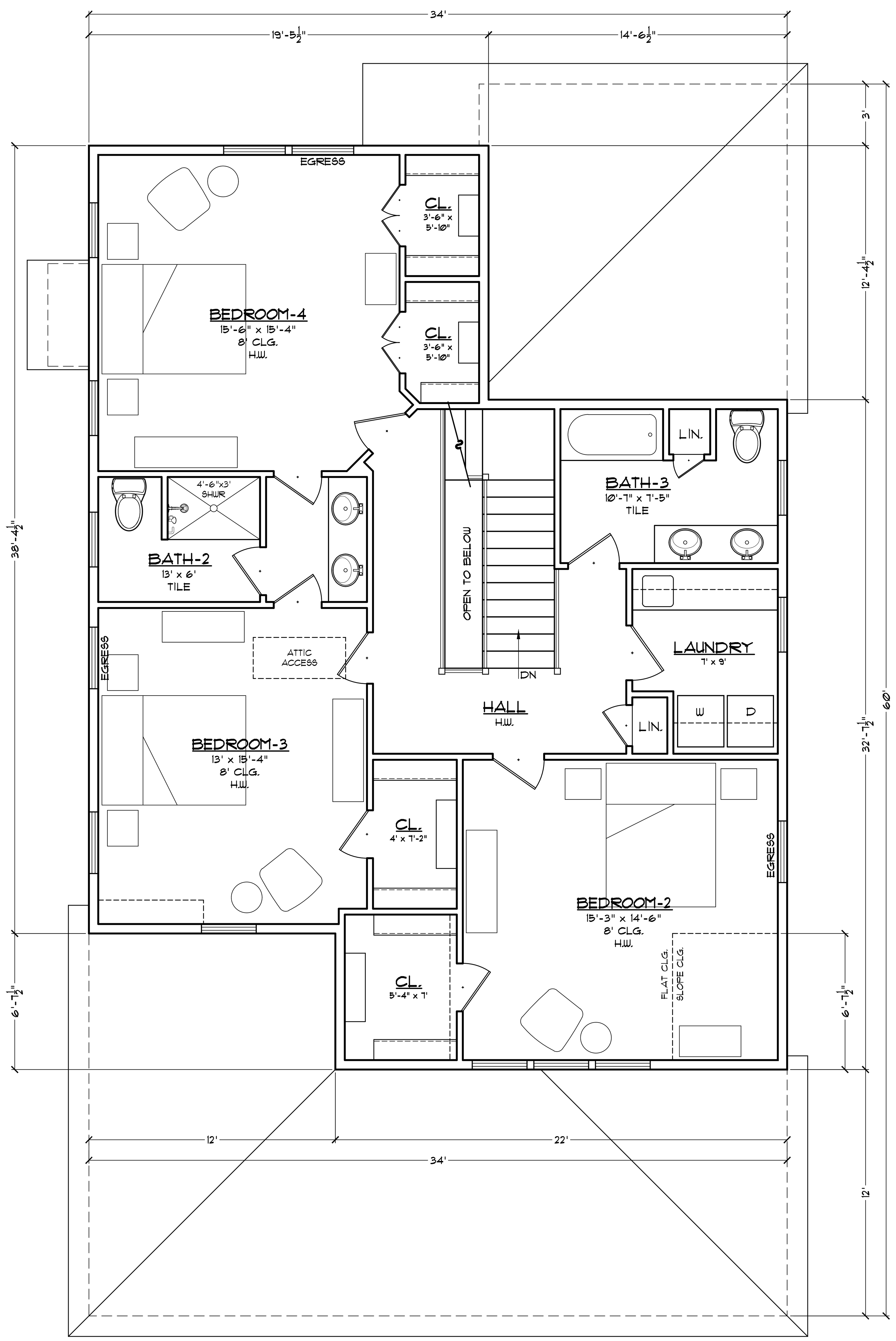
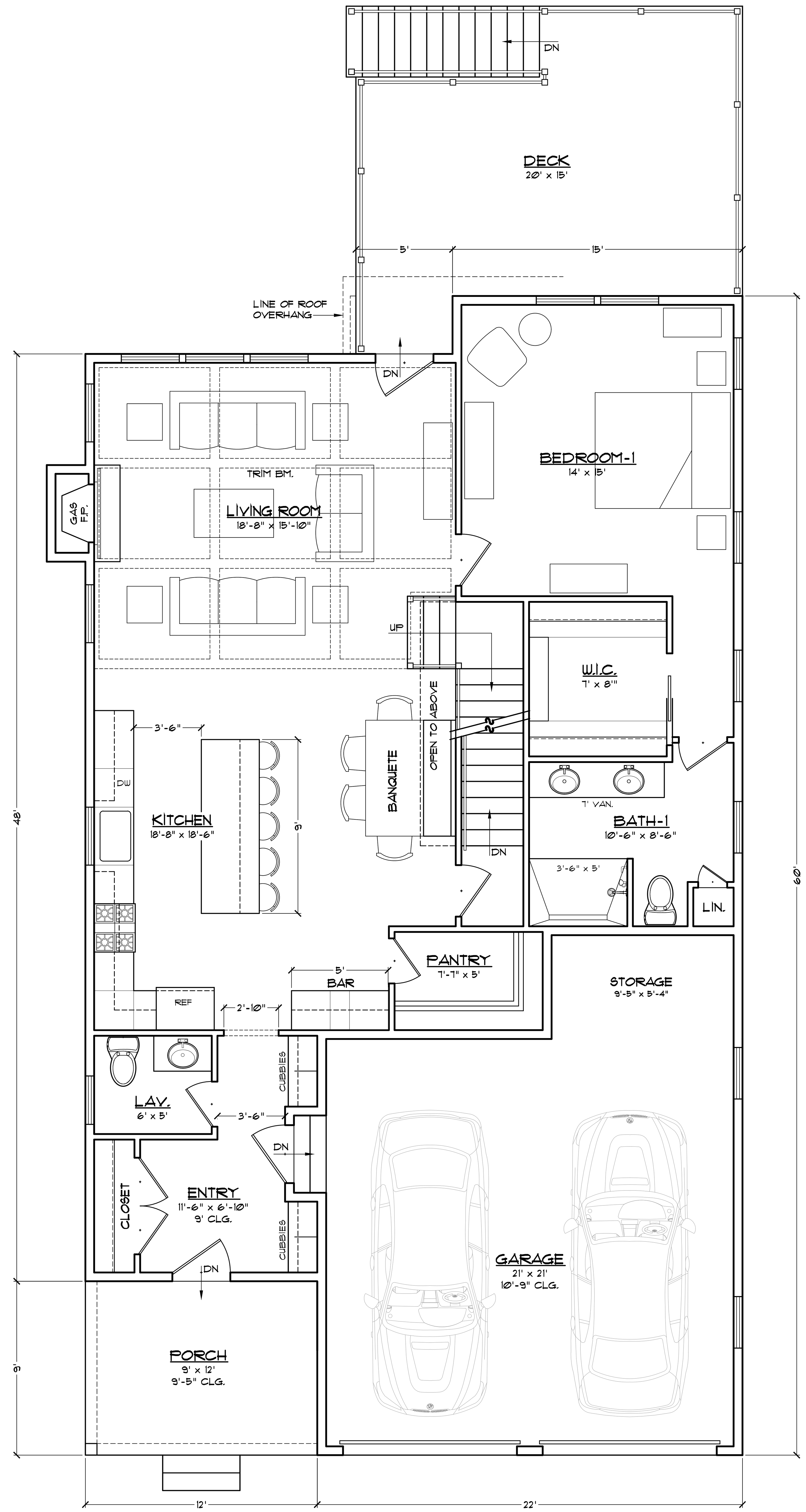


SECOND FLOOR PLAN

¼"=1'-0"

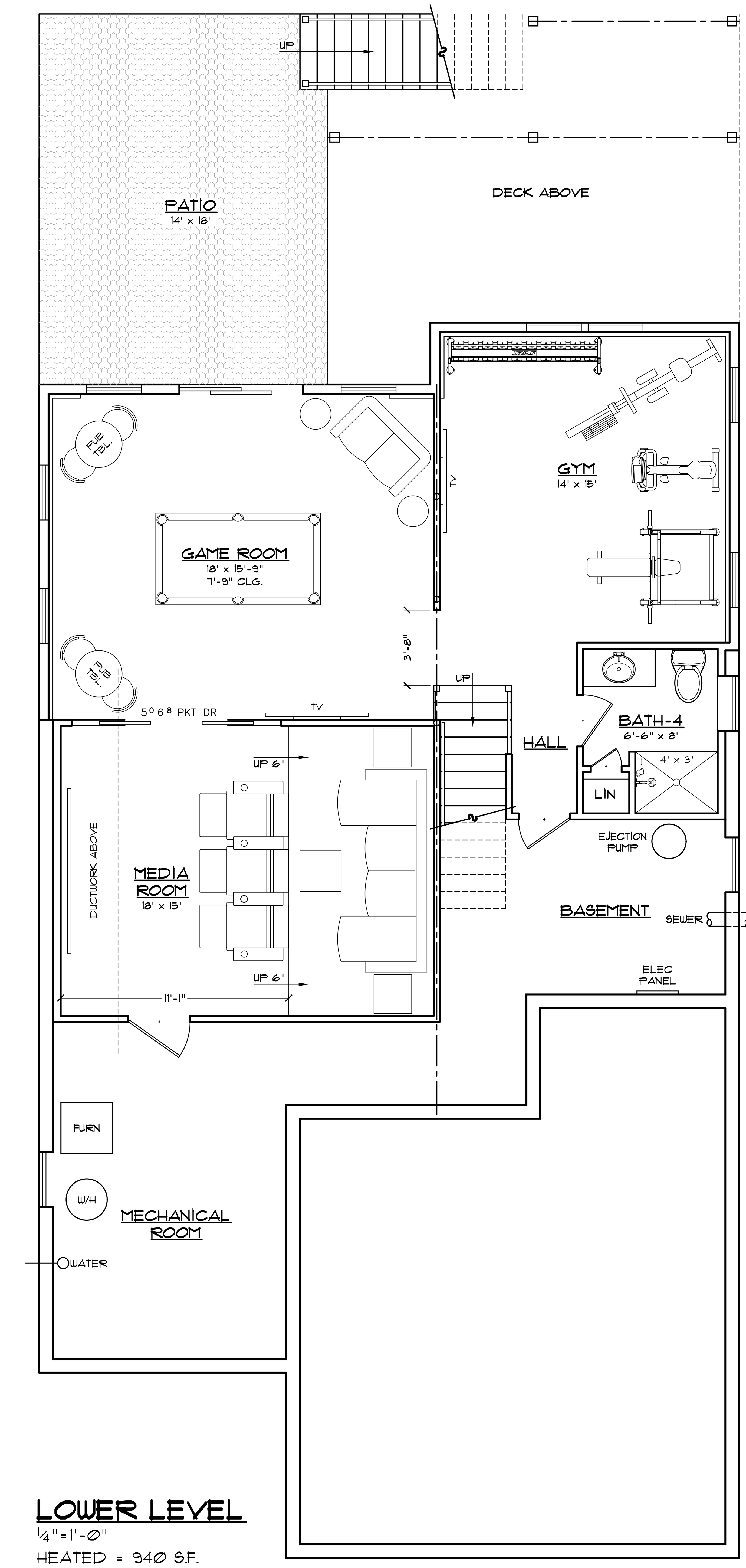
HEATED = 1270 S.F.
(INCLUDES 67 S.F. OF STAIRWELL)



FIRST FLOOR PLAN

¼"=1'-0"

HEATED = 1,347 S.F.
GARAGE = 528 S.F.
FRONT PORCH = 108 S.F.
DECK = 280 S.F.
TOTAL HEATED =3,557 S.F.



LOWER LEVEL

¼"=1'-0"

HEATED = 940 S.F.
PATIO = 248 S.F.

Finished basements and walkouts on Units 3 & 4 only

WALK-OUT CONCEPT

PROJECT:
The Oaks Development
635 Sagamore Road, Portsmouth, NH 03801

E-mail: tech-1112@comcast.net
Phone: 603-964-1300
Fax: 603-580-1414
Technical Illustrations
ARCHITECTURAL DRAFTING SERVICE
136 Bunker Hill Ave. Stratham, NH 03885

DATE: 1-30-24
REVISED:
DWG. NO. 3

C:\TI-INC\2024\Oaks Walk-Out80

Tighe&Bond

P5118-001
May 20, 2024

Mr. Peter Britz, Director of Planning & Sustainability
City of Portsmouth Planning & Sustainability Department
1 Junkins Avenue
Portsmouth NH, 03801
Portsmouth, New Hampshire 03801

Re: Request for Site Plan Review & Conditional Use Permits Review
Proposed Mixed-Use Development, 1035 Lafayette Road, Portsmouth, NH

Dear Peter:

On behalf of Christ Church Parish (Owner), and Portsmouth Housing Authority (Applicant), we are pleased to submit one (1) set of hard copies of the following information to support a request for a Site Review Permit for the above referenced project:

- One (1) full size & one (1) half size copy of the Site Plan Set, dated May 20, 2024;
- Owner Authorization, dated March 25, 2024;
- Applicant Authorization, dated March 24, 2024;
- Parking Conditional Use Permit Request, dated May 20, 2024;
- Drainage Analysis, dated May 20, 2024;
- Long-Term Operation & Maintenance Plan, dated May 20, 2024;
- Truck Turning Exhibit, dated May 20, 2024;
- Trip Generation Memorandum, dated May 20, 2024;
- Site Review Checklist, dated May 20, 2024;
- Application fee calculation form for the Site Review Permit;

PROJECT SUMMARY

Existing Conditions

The proposed project is located at 1035 Lafayette Road on a parcel of land identified as Map 246 Lot 1 on the City of Portsmouth Tax Maps and is located in the Gateway Neighborhood Mixed Use Corridor, G2 District. The existing parcel is approximately 3.5 acres and is bound to the west by Route 1 and to the North, East, and South by a State of New Hampshire Conservation Urban Forestry Center parcel. The sites current uses include the Christ Episcopal Church and Little Blessings Child Care Center. The site is accessed by two driveways on Route 1, a right in / right out at the center of the property and a signalized intersection at Mirona Road on the north side of property.

Proposed Redevelopment

For the proposed project, the Portsmouth Housing Authority will construct a 4-story, 44-unit multi-family residential building to the south of the existing church building. In addition, HAVEN will convert and renovate the first-floor of the existing church into office space and will construct a 7-unit transitional housing addition to the north of their new office. The lower level of the existing church will be renovated for Little Blessings Child Care Center. The Christ Episcopal Church will be relocated to the existing rectory building on the southern portion of the site. The project will include associated site improvements such as parking, pedestrian connections, access to public transportation, utilities, stormwater management, lighting, and landscaping. The site will continue to be accessed via the existing driveways on Route 1.

LAND USE PERMIT APPLICATIONS

The proposed project will require the following site-related approvals from the Planning Board:

- Site Plan Review Permit
- Conditional Use Permit for Development Site
- Conditional Use Permit for Density Bonus Incentives
- Conditional Use Permit for Parking

The applicant met with the Planning Board on April 18, 2024, for conceptual consultation. The enclosed information which has been prepared to address comments and feedback received to date from this meeting.

The project will also require the following approvals from the New Hampshire Department of Environmental Services (NHDES):

- Alteration of Terrain Permit
- Shoreland Permit
- Sewer Connection Permit

Site Plan Review Permit

The project will require a Site Plan Review Permit for the site improvements described above in the project summary. The project has previously met with the Planning Board for Conceptual Consultation.

Traffic Impact Study

A Traffic Impact Study is currently being prepared for the development project and will be completed and submitted for review by NHDOT once the NHDOT continuous count station data from April is available. Enclosed in this package is a Trip Generation Memorandum showing the net tips for the proposed uses.

CONDITIONAL USE PERMITS

Development Site Conditional Use Permit

Under Section 10.5B41.10 Development Site Standards are "allowed by Conditional Use Permit approval from the Planning Board, a development site is any lot or group of contiguous lots owned or controlled by the same person or entity, assembled for the purpose of a single development and including more than one principal building or building type". The proposed project meets the definition of a Development Site, as such a CUP to allow the use of the Development Site Standards is being requested for this proposed project.

Conditional Use Permit Criteria

Based on the above-described and enclosed materials, the following addresses how the Project warrants the granting of a Conditional Use Permit for a Development Site by satisfying the following four (4) criteria for approval in Section 10.5B43.10 of the Zoning Ordinance:

(1) The development project is consistent with the Portsmouth Master Plan.

The Project along with the existing site as a whole is consistent with several goals identified in the Master Plan.

- Goal 1.2 is to encourage walkable mixed-use development along existing commercial corridors. The proposed project has been designed to promote alternative modes of transportation such as walking, bicycling, and public transportation by incorporating bicycle storage spaces on-site, pedestrian connections to Lafayette Rd, and the applicant is working with COAST for the addition of an on-site COAST bus stop.
- Goal 2.1 is to ensure that new development complements and enhances its surroundings. The proposed residential, office and day care uses of the proposed development will further enhance the commercial, retail, and restaurants located at the Lafayette Plaza Shopping Centers to the West and North of the property.
- Goal 3.1 and Goal 3.2 are to adapt housing stock to accommodate changing demographics and to accommodate the housing needs of low- and moderate-income residents. The Project will add 51 residential units to the local housing stock all of which 44 will be workforce housing and 7 will be transitional housing units.

(2) The development project has been designed to allow uses that are appropriate for its context and consistent with City's planning goals and objectives for the area.

The Project has been designed to be consistent with the surrounding uses already in the neighborhood. Residential buildings are an allowed use with the zone and the addition of housing stock and workforce housing is consistent with goals laid out in the City's Master Plan as described in criteria item 1.

(3) The project includes measures to mitigate or eliminate anticipated impacts on traffic safety and circulation, demand on municipal services, stormwater runoff, natural resources, and adjacent neighborhood character.

The Project will have a minimal impact on traffic due to the existing large traffic volumes on Lafayette Road. A traffic study will be prepared and submitted to NHDOT for review.

The development site has been designed to mitigate stormwater runoff with the use of a surface Bioretention Internal Storage Reservoir (ISR) and an infiltration basin stormwater treatment practices. The proposed project is a significant improvement over existing conditions as there is no stormwater treatment on site.

(4) The project is consistent with the purpose and intent set forth in Section 10.5B11.

Section 10.5B11.10 states that *"The purpose of Article 5B is to implement and support the goals of the City's Master Plan and Housing Policy to encourage walkable mixed-use development and continued economic vitality in the City's primary gateway areas, ensure that new development complements and enhances its surroundings, provide housing stock that is suited for changing demographics, and accommodate the housing needs of the City's current and future workforce."*

The Project meets the standards outlined in Section 10.5B11.20 which are to:

a. ***Promote development that is consistent with the goals of the Master Plan to create vibrant, authentic, diverse, connected and resilient neighborhoods;*** Criteria 1 details that the proposed project is consistent with the goals of the Master Plan.

b. ***Encourage high quality housing for a variety of household types and income ranges.*** All of the proposed units will be workforce and transitional housing units ensuring that the Project will provide high quality housing for a variety of income ranges.

c. ***Guide the physical character of development by providing a menu of building and site development types that are based on established community design principles;*** *The proposed project maintains the existing church building on site with the addition of a new code compliant modern building on site which will* enhance the parcel.

d. ***Create quality places by allowing for whole site development with meaningful public spaces and neighborhood centers.*** The Project will enhance the whole-site development approach by maintaining and enhancing the existing historic features which include the addition of the Memorial and Cemetery Fence surrounding the existing burial grounds.

Density Bonus Conditional Use Permit

Under Section 10.5B72 Density Bonus Incentives "A conditional use permit may be granted by the Planning Board for increased housing density or for increased building height. Such conditional use permit shall be contingent upon satisfying the requirements of Section 10.5B73". The Project is requesting a CUP for increased dwelling units per building allowed under Section 10.5B72.10.

Conditional Use Permit Criteria

Based on the above-described and enclosed materials, the following addresses how the Project warrants the granting of a Conditional Use Permit for a Development Site by satisfying the following requirements for approval in Section 10.5B73.10 of the Zoning Ordinance:

10.5B73.10 Workforce Housing Requirement: At least 20% of the dwelling units in the development, but no less than three units, shall be workforce housing units for sale or rent complying with the following criteria:

1) For sale units shall be at least the average gross floor area of the proposed units in the building or 1,000 sq. ft., whichever is greater.

All the proposed dwelling units will be for rent units.

2) Rental units shall be at least the average gross floor area of the proposed units in the building or 800 sq. ft., whichever is greater.

All the proposed dwelling units will be for rent units which will be at least the average gross floor area of the proposed units in the building.

3) The workforce housing units shall be distributed throughout the building wherever dwelling units are located.

All the proposed units will be workforce housing units therefore will be distributed throughout the building.

Parking Conditional Use Permit

Under Section 10.1112.14 Number of Required Parking Spaces "The Planning Board may grant a conditional use permit to allow a building or use to provide less than the minimum number of off-street parking spaces required by Section 10.1112.30, Section 10.1112.61 or Section 10.1115.20, as applicable." The project is requesting a CUP for a reduction in off-street parking spaces. A Parking Conditional Use Permit Request has been included in the package.

CONCLUSION

We respectfully request to be placed on the TAC meeting agenda for June 4, 2024. If you have any questions or need any additional information, please contact me by phone at (603) 294-9213 or by email at NAHansen@tighebond.com.

Sincerely,

TIGHE & BOND, INC.

Patrick M. Crimmins, PE
Vice President

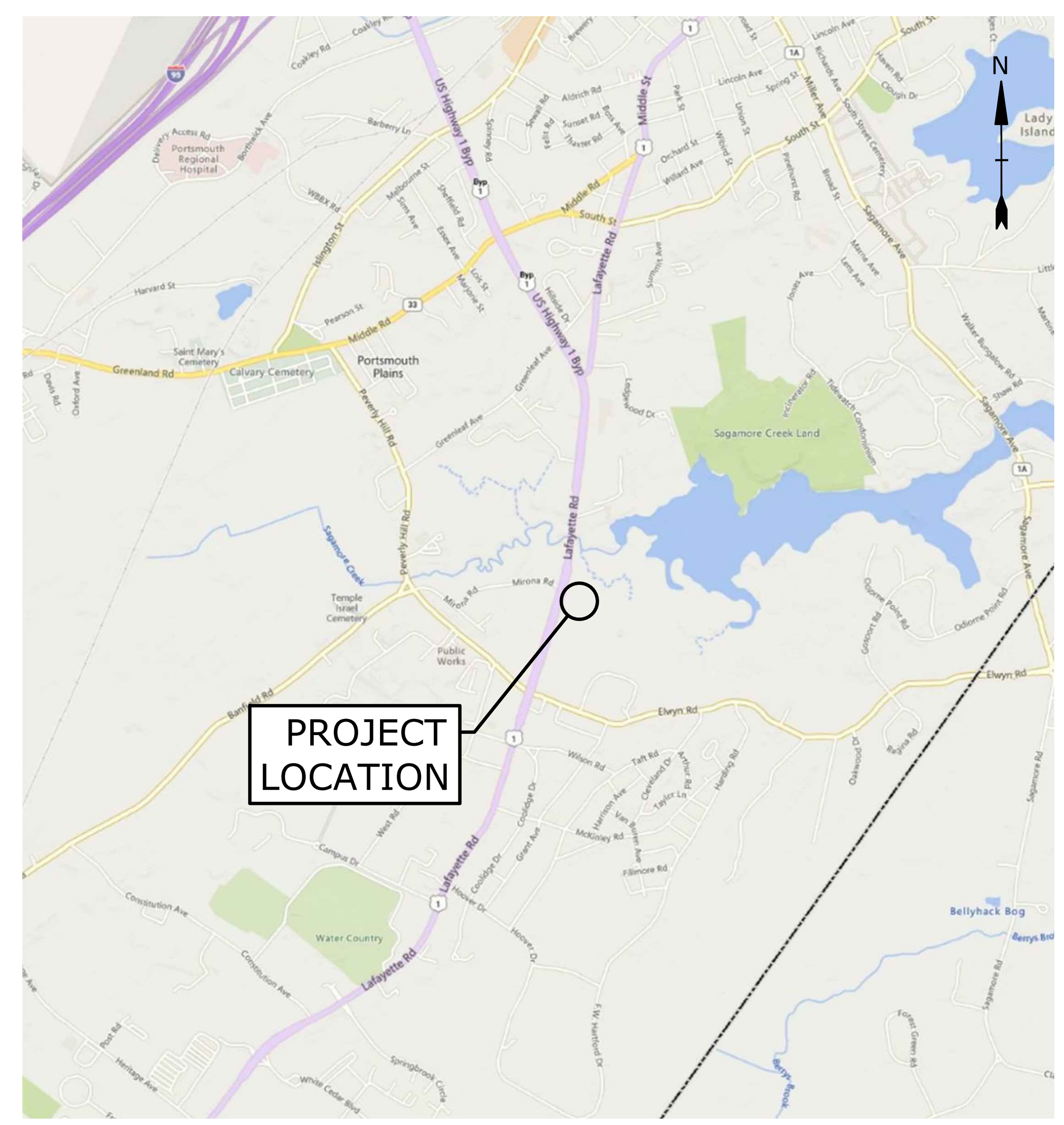
Neil A. Hansen, PE
Project Manager

Cc: Portsmouth Housing Authority
Christ Church Parish

1035 LAFAYETTE ROAD
PROPOSED MULTI-FAMILY DEVELOPMENT
PORTSMOUTH, NEW HAMPSHIRE
DATE: May 20, 2024

LIST OF DRAWINGS		
SHEET NO.	SHEET TITLE	LAST REVISED
	COVER SHEET	5/20/2024
1 OF 1	TOPOGRAPHIC PLAN	4/2/2024
G-100	GENERAL NOTES AND LEGEND	5/20/2024
C-101	EXISTING CONDITIONS & DEMOLITION PLAN	5/20/2024
C-102	SITE PLAN	5/20/2024
C-103	GRADING, DRAINAGE, & EROSION CONTROL PLAN	5/20/2024
C-104	UTILITY PLAN	5/20/2024
C-105	PHOTOMETRIC PLAN	5/20/2024
C-501	EROSION CONTROL NOTES AND DETAILS SHEET	5/20/2024
C-502	DETAILS SHEET	5/20/2024
C-503	DETAILS SHEET	5/20/2024
C-504	DETAILS SHEET	5/20/2024
C-505	DETAILS SHEET	5/20/2024
C-506	DETAILS SHEET	5/20/2024
C-507	DETAILS SHEET	5/20/2024
L-1	LANDSCAPE PLAN	5/20/2024
TAC-01	COVER SHEET	5/20/2024
LS-01	CODE SEARCH AND LIFE SAFETY DRAWINGS	5/20/2024
TAC-02	FIRST FLOOR PLAN	5/20/2024
TAC-03	SECOND FLOOR PLAN	5/20/2024
TAC-04	THIRD FLOOR PLAN	5/20/2024
TAC-05	FOURTH FLOOR PLAN	5/20/2024
TAC-06	ROOF PLAN	5/20/2024
TAC-07	EXTERIOR ELEVATIONS	5/20/2024
TAC-08	EXTERIOR ELEVATIONS	5/20/2024
PR1.01	LEVEL 1 FLOOR PLAN	5/20/2024
PR1.04	NORTH AND WEST ELEVATION	5/20/2024
PR1.05	EAST AND SOUTH ELEVATION	5/20/2024

LIST OF PERMITS		
LOCAL	STATUS	DATE
SITE PLAN REVIEW PERMIT	PENDING	
CONDITIONAL USE PERMIT - DEVELOPMENT SITE	PENDING	
CONDITIONAL USE PERMIT - DENSITY BONUS	PENDING	
CONDITIONAL USE PERMIT - PARKING	PENDING	
STATE		
NHDES - SEWER CONNECTION PERMIT	PENDING	
NHDES - ALTERATION OF TERRAIN PERMIT	PENDING	
NHDES - SHORELAND PERMIT	PENDING	
FEDERAL		
NPDES - CONSTRUCTION GENERAL PERMIT	PENDING	



LOCATION MAP
SCALE: 1" = 2000'

CONSTRUCTION NOTES:
1. THE CONTRACTOR SHALL NOT RELY ON SCALED DIMENSIONS AND SHALL CONTACT THE ENGINEER FOR CLARIFICATION IF A REQUIRED DIMENSION IS NOT PROVIDED ON THE PLANS.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS AND METHODS, AND FOR SITE CONDITIONS THROUGHOUT CONSTRUCTION. NEITHER THE PLANS NOR THE SEAL OF THE ENGINEER AFFIXED HEREON EXTEND TO OR INCLUDE SYSTEMS REQUIRED FOR THE SAFETY OF THE CONTRACTOR, THEIR EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING AND IMPLEMENTING SAFETY PROCEDURES AND SYSTEMS AS REQUIRED BY THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), AND ANY STATE OR LOCAL SAFETY REGULATIONS.

3. TIGHE & BOND ASSUMES NO RESPONSIBILITY FOR ANY ISSUES LEGAL OR OTHERWISE, RESULTING FROM CHANGES MADE TO THESE DRAWINGS WITHOUT WRITTEN AUTHORIZATION OF TIGHE & BOND.

PREPARED BY:
Tighe&Bond
177 CORPORATE DRIVE
PORTSMOUTH, NH 03801
603-433-8818

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER 5/20/2024

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER 5/20/2024

APPLICANT:
PORTSMOUTH HOUSING AUTHORITY
245 Middle Street
Portsmouth, NH 03801

OWNER:
CHRIST CHURCH PARISH
1035 Lafayette Rd
Portsmouth, NH 03801

LANDSCAPE ARCHITECT:
WOODBURN & COMPANY
103 Kent Place
Newmarket, NH 03857

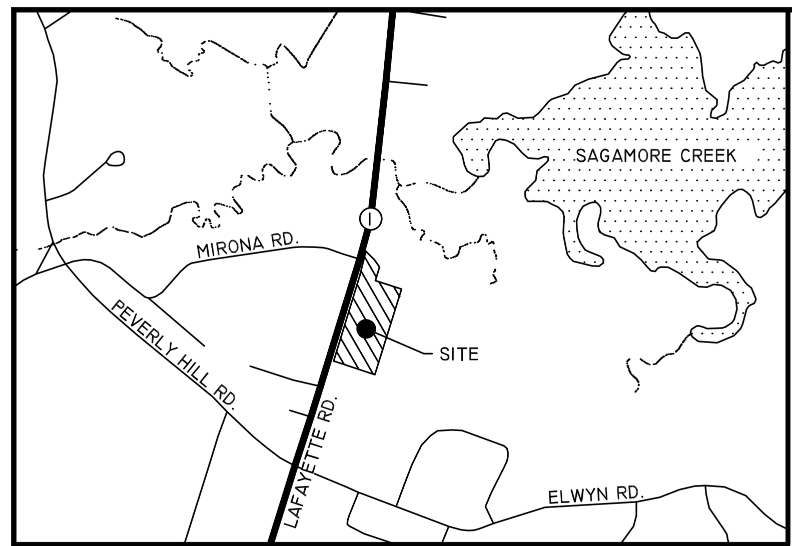
ARCHITECT:
JSA DESIGN
273 Corporate Dr Suite 100
Portsmouth, NH 03801

LASSEL ARCHITECTS
370 Main St
South Berwick, ME 03908

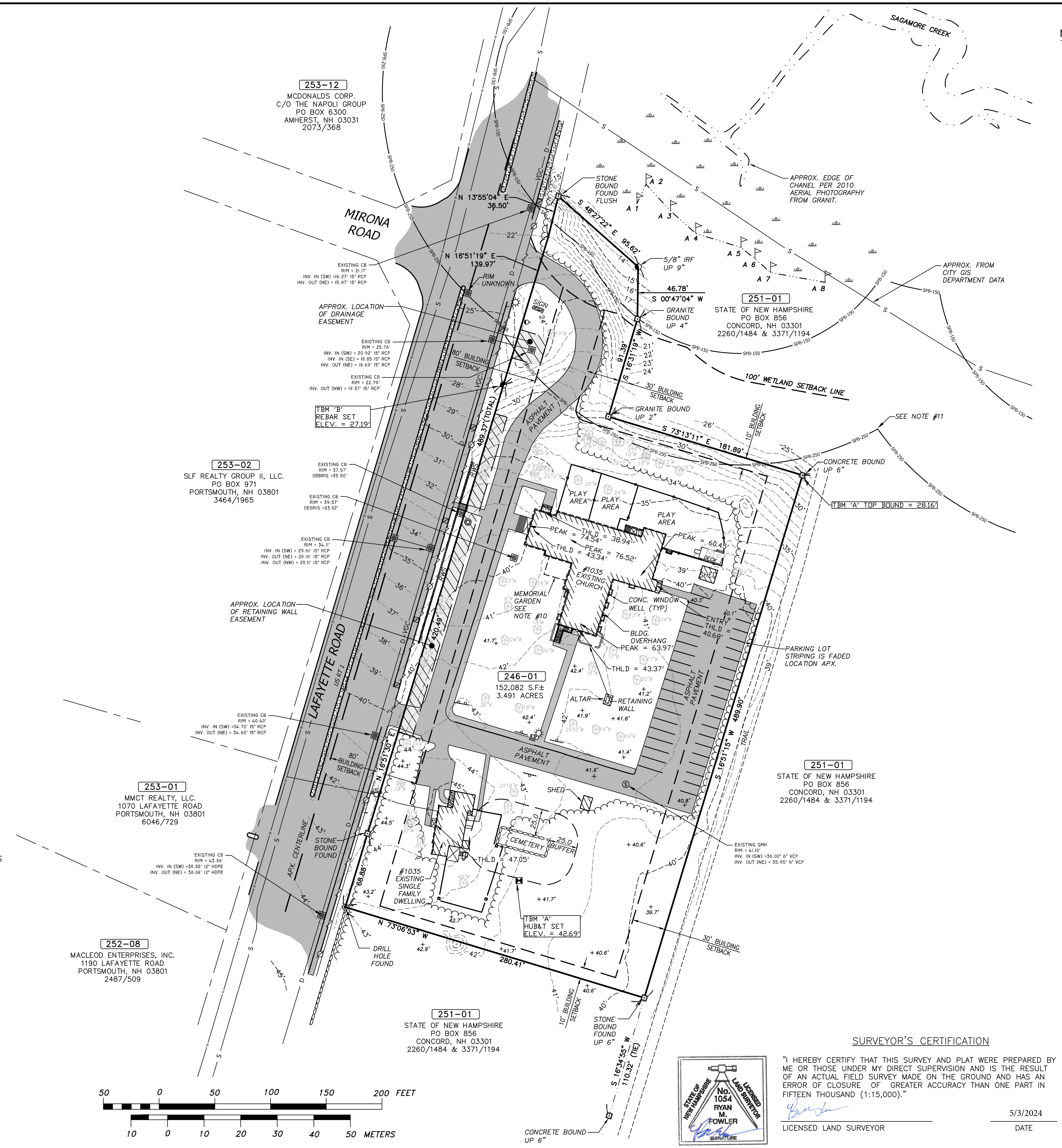
SURVEYOR:
JAMES VERRA & ASSOCIATES, INC.
101 Shattuck Way, Suite 8
Newington, NH 03801

811 DigSafe MA·ME·NH·RI·VT

TAC SUBMISSION
COMPLETE SET 28 SHEETS



LOCUS
(N.T.S.)



LEGEND:

- DRILL HOLE FOUND
- BOUND FOUND (AS NOTED)
- CHAIN LINK FENCE
- WOOD FENCE
- UTILITY POLE
- UTILITY POLE W/TRANSFORMER
- GUY
- —OHW— OVERHEAD WIRES
- SIGN
- DOUBLE POST SIGN
- FLAGPOLE
- RCRD ROCKINGHAM COUNTY REGISTRY OF DEEDS
- 246-01 TAX SHEET / LOT NO.
- EOP EDGE OF PAVEMENT
- LA LANDSCAPED AREA
- RWS STONE RETAINING WALL
- VGC VERTICAL FACED GRANITE CURB
- CATCH BASIN
- DRAIN MANHOLE
- SEWER MANHOLE
- TREE LINE/BRUSHLINE
- ELECTRICAL BOX
- LIGHT POLE
- MAILBOX
- WETLAND FLAG
- SPB-150 150' SHORELAND PROTECTION BUFFER
- SPB-250 250' SHORELAND PROTECTION BUFFER
- ASPHALT
- RAISED ASPHALT WALK
- CONCRETE
- CONCRETE PAVERS
- + 41.6' SPOT ELEVATION
- THLD THRESHOLD

NOTES:

1. OWNER OF RECORD..................THE PARISH OF CHRIST CHURCH IN PORTSMOUTH
   ADDRESS...................................1035 LAFAYETTE ROAD, PORTSMOUTH, NH 03801
   DEED REFERENCE......................1720/453 & 3371/1195
   TAX SHEET / LOT.....................246-01
2. ZONED: ....SINGLE RESIDENCE B (SRB)

   MINIMUM LOT AREA ..15,000 S.F. — FRONT YARD SETBACK .....30'*
   FRONTAGE ....100' — SIDE YARD SETBACK ....10'
   REAR YARD SETBACK ......30'

   * SEE PORTSMOUTH ZONING SECTION 10.533 FOR SPECIAL YARD REQUIREMENTS ON LAFAYETTE ROAD. (80' FROM CENTERLINE OF LAFAYETTE ROAD.)
3. THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS OF THE SUBJECT PARCEL AND THE IMPROVEMENTS THEREON FOR FUTURE SITE REDEVELOPMENT.
4. THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND ARE BASED UPON THE FIELD LOCATION OF ALL VISIBLE STRUCTURES (IE CATCH BASINS, MANHOLES, WATER GATES ETC.) AND INFORMATION COMPILED FROM PLANS PROVIDED BY UTILITY COMPANIES AND GOVERNMENTAL AGENCIES. ALL CONTRACTORS SHOULD NOTIFY, IN WRITING, SAID AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG-SAFE @ 1-888-DIG-SAFE.
5. HORIZONTAL DATUM: NAD83, VERTICAL DATUM: NAVD88. ESTABLISHED BY SURVEY GRADE GPS OBSERVATION AND PROCESSED BY OPUS. UNITS: US SURVEY FOOT.
6. THE PLAN IS BASED UPON A FIELD SURVEY COMPLETED IN JULY - AUGUST OF 2023 & MARCH 2024 WITH TRIMBLE S5 ROBOTIC TOTAL STATION, CARLSON BRX7 RTK GPS UNITS, PANASONIC FZ-M1/TRIMBLE TSC7 DATA COLLECTORS.
7. THE PARCEL SHOWN HEREON LIES WITHIN ZONE X (AREA OF MINIMAL FLOOD HAZARD) AS IDENTIFIED ON FLOOD INSURANCE RATE MAP, ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0270F, EFFECTIVE DATE 1/29/2021 BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
8. WETLANDS WERE DELINEATED BY JOSEPH NOEL, CWS #86 ON 6/22/2023 AND WERE FIELD LOCATED BY JVA.
9. CONTRACTOR TO VERIFY SITE BENCHMARKS BY LEVELING BETWEEN 2 BENCHMARKS PRIOR TO THE ESTABLISHMENT OF ANY GRADES OR ELEVATIONS. DISCREPANCIES ARE TO BE REPORTED TO JAMES VERRA AND ASSOCIATES, INC.
10. IT IS BELIEVED THAT THE "MEMORIAL GARDEN" DOES NOT HAVE ANY REMAINS OR URNS BURIED THERE BASED ON INFORMATION PROVIDED BY REPRESENTATIVES AT THE EPISCOPAL CHURCH OF NEW HAMPSHIRE. THERE IS A POSSIBILITY THAT ASHES HAVE BEEN SPRINKLED IN THE GARDEN. BASED ON THE INFORMATION PROVIDED THE MEMORIAL GARDEN MAY NOT BE CONSIDERED A CEMETERY AND WOULD NOT BE SUBJECT TO THE 25' BUFFER. FURTHER EXPLORATION SHOULD BE CONDUCTED TO CONFIRM NO HUMAN REMAINS ARE LOCATED IN THE GARDEN, EXTREME CAUTION SHOULD BE USED IN ANY EXCAVATION WITHIN 25' OF THE MEMORIAL GARDEN.
11. SHORELAND PROTECTION BUFFER SHOWN IS BASED ON THE CHANNEL LOCATION TAKEN FROM AERIAL PHOTOGRAPHY.

REFERENCE PLANS:

1. "PLAN OF LAND, PORTSMOUTH, N.H., FOR CHRIST EPSICOPOL CHURCH." REVISED SEPT. 1964, AND PREPARED BY JOHN W. DURGIN (JWD). JWD FILE NO. 2320S, PLAN NO. 8393. NOT RECORDED AND ON FILE WITH THIS OFFICE.
2. "LOT LINE ADJUSTMENT OF THE LANDS OF: D.R.E.D. & THE PARISH OF CHRIST CHURCH." LAST REVISED JUNE 22, 1999 AND PREPARED BY RICHARD D. BARTLETT & ASSOCIATES, INC. NOT RECORDED, AND ON FILE WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF NATURAL & CULTURAL RESOURCES, DIVISION OF FORESTS & LANDS. BARTLET JOB #298.111.
3. "STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION, RIGHT-OF-WAY, PLANS OF PROPOSED FEDERAL AID PROJECT, STP-X-T-001-1(90), N.H. PROJECT NO. 11855, US ROUTE 1 OVER SAGAMORE CREEK." DATED MARCH 14, 2000 AND PREPARED BY NHDOT & KIMBALL CHASE. RCRD PLAN #D-28308.

SURVEYOR'S CERTIFICATION

"I HEREBY CERTIFY THAT THIS SURVEY AND PLAT WERE PREPARED BY ME OR THOSE UNDER MY DIRECT SUPERVISION AND IS THE RESULT OF AN ACTUAL FIELD SURVEY MADE ON THE GROUND AND HAS AN ERROR OF CLOSURE OF GREATER ACCURACY THAN ONE PART IN FIFTEEN THOUSAND (1:15,000)."

LICENSED LAND SURVEYOR — 5/3/2024 DATE

STATE OF NEW HAMPSHIRE — No. 1054 RYAN M. FOWLER — LICENSED LAND SURVEYOR

REV. NO.	DATE	DESCRIPTION	APPR'D
#1	5/3/24	COMMENTS PER PHAN & TEAM	RMF

TOPOGRAPHIC PLAN
1035 LAFAYETTE ROAD
PORTSMOUTH, NEW HAMPSHIRE
TAX MAP #246-01

LAND OF:
THE PARISH OF CHRIST CHURCH IN PORTSMOUTH
PREPARED FOR:
PORTSMOUTH HOUSING AUTHORITY

JVA — JAMES VERRA & ASSOCIATES, INC.
101 SHATTUCK WAY, SUITE 8, NEWINGTON, N.H., 03801-7876 603-436-3557

DRAWN BY: RMF
PROJECT MGR: RMF

DATE:	4/2/2024
JOB NO:	24-2012
SCALE:	1" = 50'
DWG NAME:	24-2012_EX
PLAN NO:	24-2012
SHEET:	1 of 1

J:\2024 PROJECTS\24-2012 PHA 1035 LAFAYETTE RD PORTSMOUTH NH\24-2012\DWG\24-2012_EXCON_2.dwg 2024-05-03

GENERAL NOTES:

1. THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
2. COORDINATE ALL WORK WITHIN PUBLIC RIGHT OF WAYS WITH THE CITY OF PORTSMOUTH.
3. THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED LAND SURVEYOR TO DETERMINE ALL LINES AND GRADES.
4. THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES. CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES AND COMPLY WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
6. THE CONTRACTOR SHALL OBTAIN AND PAY FOR AND COMPLY WITH ADDITIONAL PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
7. THE CONTRACTOR SHALL PHASE DEMOLITION AND CONSTRUCTION AS REQUIRED TO PROVIDE CONTINUOUS SERVICE TO EXISTING BUSINESSES AND HOMES THROUGHOUT THE CONSTRUCTION PERIOD. EXISTING BUSINESS AND HOME SERVICES INCLUDE, BUT ARE NOT LIMITED TO ELECTRICAL, COMMUNICATION, FIRE PROTECTION, DOMESTIC WATER AND SEWER SERVICES. TEMPORARY SERVICES, IF REQUIRED, SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL AND UTILITY COMPANY STANDARDS. CONTRACTOR SHALL PROVIDE DETAILED CONSTRUCTION SCHEDULE TO OWNER PRIOR TO ANY DEMOLITION/CONSTRUCTION ACTIVITIES AND SHALL COORDINATE TEMPORARY SERVICES TO ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED ABUTTER.
8. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES & SPECIFICATIONS.
9. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION.
10. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
11. CONTRACTOR SHALL THOROUGHLY CLEAN ALL CATCH BASINS AND DRAIN LINES, WITHIN THE LIMIT OF WORK, OF SEDIMENT IMMEDIATELY UPON COMPLETION OF CONSTRUCTION.
12. SEE EXISTING CONDITIONS PLAN FOR BENCH MARK INFORMATION.

DEMOLITION NOTES:

1. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.
2. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES.
3. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
4. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/ DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
5. SAW CUT AND REMOVE PAVEMENT ONE (1) FOOT OFF PROPOSED EDGE OF PAVEMENT OR EXISTING CURB LINE IN ALL AREAS WHERE PAVEMENT TO BE REMOVED ABUTS EXISTING PAVEMENT OR CONCRETE TO REMAIN.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS.
7. UTILITIES SHALL BE TERMINATED AT THE MAIN LINE PER UTILITY COMPANY AND CITY OF PORTSMOUTH STANDARDS. THE CONTRACTOR SHALL REMOVE ALL ABANDONED UTILITIES LOCATED WITHIN THE LIMITS OF WORK UNLESS OTHERWISE NOTED.
8. CONTRACTOR SHALL VERIFY ORIGIN OF ALL DRAINS AND UTILITIES PRIOR TO REMOVAL/TERMINATION TO DETERMINE IF DRAINS OR UTILITY IS ACTIVE, AND SERVICES ANY ON OR OFF-SITE STRUCTURE TO REMAIN. THE CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY SUCH UTILITY FOUND AND SHALL MAINTAIN THESE UTILITIES UNTIL PERMANENT SOLUTION IS IN PLACE.
9. PAVEMENT REMOVAL LIMITS ARE SHOWN FOR CONTRACTOR'S CONVENIENCE. ADDITIONAL PAVEMENT REMOVAL MAY BE REQUIRED DEPENDING ON THE CONTRACTOR'S OPERATION. CONTRACTOR TO VERIFY FULL LIMITS OF PAVEMENT REMOVAL PRIOR TO BID.
10. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE PADS, UTILITIES AND PAVEMENT WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ITEMS TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO: CONCRETE, PAVEMENT, CURBS, LIGHTING, MANHOLES, CATCH BASINS, UNDER GROUND PIPING, POLES, STAIRS, SIGNS, FENCES, RAMPS, WALLS, BOLLARDS, BUILDING SLABS, FOUNDATION, TREES AND LANDSCAPING.
11. REMOVE TREES AND BRUSH AS REQUIRED FOR COMPLETION OF WORK. CONTRACTOR SHALL GRUB AND REMOVE ALL STUMPS WITHIN LIMITS OF WORK AND DISPOSE OF OFF SITE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
12. CONTRACTOR SHALL PROTECT ALL PROPERTY MONUMENTATION THROUGHOUT DEMOLITION AND CONSTRUCTION OPERATIONS. SHOULD ANY MONUMENTATION BE DISTURBED BY THE CONTRACTOR, THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED SURVEYOR TO REPLACE DISTURBED MONUMENTS.
13. PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS/CURB INLETS WITHIN CONSTRUCTION LIMITS AS WELL AS CATCH BASINS/CURB INLETS THAT RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. INLET PROTECTION BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE "HIGH FLOW SILT SACK" BY ACF ENVIRONMENTAL OR EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN EVENT OF 0.25 INCHES OR GREATER. CONTRACTOR SHALL COMPLETE A MAINTENANCE INSPECTION REPORT AFTER EACH INSPECTION. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED OR SEDIMENT HAS ACCUMULATED TO 1/3 THE DESIGN DEPTH OF THE BARRIER.
15. THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFETY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.
16. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL UTILITIES TO BE REMOVED AND PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.

SITE NOTES:

1. PAVEMENT MARKINGS SHALL BE INSTALLED AS SHOWN, INCLUDING PARKING SPACES, STOP BARS, ADA SYMBOLS, PAINTED ISLANDS, FIRE LANES, CROSS WALKS, ARROWS, LEGENDS AND CENTERLINES. ALL MARKINGS EXCEPT CENTERLINE AND MEDIAN ISLANDS TO BE CONSTRUCTED USING WHITE PAVEMENT MARKINGS. ALL THERMOPLASTIC PAVEMENT MARKINGS INCLUDING LEGENDS, ARROWS, CROSSWALKS AND STOP BARS SHALL MEET THE REQUIREMENTS OF AASHTO M249. ALL PAINTED PAVEMENT MARKINGS INCLUDING CENTERLINES, LANE LINES AND PAINTED MEDIANS SHALL MEET THE REQUIREMENTS OF AASHTO M248 TYPE "F".
2. ALL PAVEMENT MARKINGS AND SIGNS TO CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS, LATEST EDITIONS.
3. SEE DETAILS FOR PAVEMENT MARKINGS, ADA SYMBOLS, SIGNS AND SIGN POSTS.
4. CENTERLINES SHALL BE FOUR (4) INCH WIDE YELLOW LINES.
5. PAINTED ISLANDS SHALL BE FOUR (4) INCH WIDE DIAGONAL LINES AT 3'-0" O.C. BORDERED BY FOUR (4) INCH WIDE LINES.
6. STOP BARS SHALL BE EIGHTEEN (18) INCHES WIDE, WHITE THERMOPLASTIC AND CONFORM TO CURRENT MUTCD STANDARDS.
7. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAW CUT LINE WITH RS-1 EMULSION IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
8. SEE ARCHITECTURAL/BUILDING DRAWINGS FOR ALL CONCRETE PADS & SIDEWALKS ADJACENT TO BUILDING.
10. CONTRACTOR TO PROVIDE BACKFILL AND COMPACTION AT CURB LINE AFTER CONCRETE FORMS FOR SIDEWALKS AND PADS HAVE BEEN STRIPPED. COORDINATE WITH BUILDING CONTRACTOR.
11. COORDINATE ALL WORK ADJACENT TO BUILDING WITH BUILDING CONTRACTOR.
12. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
13. THE PROPERTY MANAGER WILL BE RESPONSIBLE FOR TIMELY SNOW REMOVAL FROM ALL PRIVATE SIDEWALKS, DRIVEWAYS, AND PARKING AREAS. SNOW REMOVAL WILL BE HAULED OFF-SITE AND LEGALLY DISPOSED OF WHEN SNOW BANKS EXCEED 6 FEET IN HEIGHT.

GRADING AND DRAINAGE NOTES:

1. COMPACTION REQUIREMENTS:

BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL	95%
BELOW LOAM AND SEED AREAS	90%

* ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557, METHOD C FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH ASTM D-1556 OR ASTM-2922.

2. ALL STORM DRAINAGE PIPES SHALL BE HIGH DENSITY POLYETHYLENE (HANCOR HI-Q, ADS N-12 OR EQUAL) OR RCP CLASS IV, UNLESS OTHERWISE SPECIFIED.
3. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
4. CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE AND LAWN AREAS FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCES, EXITS, RAMPS AND LOADING DOCK AREAS ADJACENT TO THE BUILDING.
5. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED FERTILIZER AND MULCH.
6. ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NHDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION.
7. ALL PROPOSED CATCH BASINS SHALL BE EQUIPPED WITH OIL/GAS SEPARATOR HOODS AND 4' SUMPS.

EROSION CONTROL NOTES:

1. SEE SHEET C-501 FOR GENERAL EROSION CONTROL NOTES AND DETAILS.

UTILITY NOTES:

1. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
   - NATURAL GAS - UNITIL
   - WATER - CITY OF PORTSMOUTH
   - SEWER - CITY OF PORTSMOUTH
   - ELECTRIC - EVERSOURCE
   - COMMUNICATIONS - CONSOLIDATED COMM/FAIRPOINT/COMCAST
2. ALL WATER MAIN INSTALLATIONS SHALL BE CLASS 52, CEMENT LINED DUCTILE IRON PIPE.
3. ALL WATER MAIN INSTALLATIONS SHALL BE PRESSURE TESTED AND CHLORINATED AFTER CONSTRUCTION PRIOR TO ACTIVATING THE SYSTEM. CONTRACTOR SHALL COORDINATE CHLORINATION AND TESTING WITH THE CITY OF PORTSMOUTH WATER DEPARTMENT.
4. ALL SEWER PIPE SHALL BE PVC SDR 35 UNLESS OTHERWISE STATED.
5. CONNECTION TO EXISTING WATER MAIN SHALL BE CONSTRUCTED TO CITY OF PORTSMOUTH DPW STANDARDS.
6. EXISTING UTILITIES TO BE REMOVED SHALL BE CAPPED AT THE MAIN AND MEET THE DEPARTMENT OF PUBLIC WORKS STANDARDS FOR CAPPING OF WATER AND SEWER SERVICES.
7. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
8. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE APPLICABLE UTILITY COMPANIES.
9. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
10. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
11. CONTRACTOR SHALL PROVIDE EXCAVATION, BEDDING, BACKFILL AND COMPACTION FOR NATURAL GAS SERVICES.
12. A 10-FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18-INCH MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER/SANITARY SEWER CROSSINGS.
13. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN
14. HYDRANTS, GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF THE CITY OF PORTSMOUTH.
15. COORDINATE TESTING OF SEWER CONSTRUCTION WITH THE CITY OF PORTSMOUTH.
16. ALL SEWER PIPE WITH LESS THAN 6' OF COVER IN PAVED AREAS OR LESS THAT 4' OF COVER IN UNPAVED AREAS SHALL BE INSULATED.
17. CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, UTILITY POLE CONSTRUCTION, OVERHEAD WIRE RELOCATION, AND TRANSFORMER CONSTRUCTION WITH POWER COMPANY.
18. SITE LIGHTING SPECIFICATIONS, CONDUIT LAYOUT AND CIRCUITRY FOR PROPOSED SITE LIGHTING AND SIGN ILLUMINATION SHALL BE PROVIDED BY THE PROJECT ELECTRICAL ENGINEER.
19. CONTRACTOR SHALL CONSTRUCT ALL UTILITIES AND DRAINS TO WITHIN 10' OF THE FOUNDATION WALLS AND CONNECT THESE TO SERVICE STUBS FROM THE BUILDING.
20. CONTRACTOR SHALL FIELD VERIFY EXISTING SEWER LINE LOCATION, INVERT AND DIAMETER PRIOR TO CONSTRUCTION AND SHALL SUBMIT FIELD INFORMATION TO ENGINEER FOR REVIEW. MODIFICATIONS TO THE NEW SEWER CONNECTION LOCATION AND ELEVATION MAY BE NECESSARY BASED ON THE OBSERVED EXISTING CONDITIONS.
21. EACH UTILITY CONNECTION WITHIN THE LAFAYETTE ROAD RIGHT OF WAY WILL REQUIRE A NHDOT RIGHT OF WAY ACTIVITIES PERMIT.
22. EXISTING SEWER LINE IS ASSUMED TO BE ASBESTOS CEMENT PIPE. CONSTRICTOR SHALL UTILIZE A LICENSED ASBESTOS SPECIALIST FOR THE REMOVAL OF ANY ASBESTOS PIPE.

EXISTING CONDITIONS PLAN NOTES:

1. EXISTING CONDITIONS ARE BASED ON A FIELD SURVEY BY JAMES VERRA & ASSOCIATES, INC. DATED 5/3/2024.

LEGEND

- APPROXIMATE LIMIT OF SAWCUT
- LIMIT OF WORK
- APPROXIMATE LIMIT OF PAVEMENT & CONCRETE TO BE REMOVED
- EXISTING TREES TO BE REMOVED
- EXISTING BUILDING TO BE REMOVED
- APPROXIMATE LIMIT OF PAVEMENT TO RECEIVE MILL & OVERLAY
- LOCATION OF PROPOSED BUILDING
- PROPERTY LINE
- PROPOSED EDGE OF PAVEMENT
- PROPOSED CURB
- PROPOSED GRAVEL PAVEMENT SECTION
- PROPOSED PAVEMENT SECTION
- PROPOSED CONCRETE
- PROPOSED MAJOR CONTOUR LINE
- PROPOSED MINOR CONTOUR LINE
- D — EXISTING STORM DRAIN
- EXISTING DRAIN CATCH BASIN
- XS — APPROXIMATE SANITARY SEWER
- W — EXISTING WATER
- G — EXISTING GAS
- OHW — EXISTING OVERHEAD UTILITY
- EXISTING APPROXIMATE SEWER MANHOLE
- EXISTING SEWER MANHOLE
- EXISTING HYDRANT
- EXISTING UTILITY POLE
- PROPOSED DRAIN MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED INLET PROTECTION BARRIER
- PROPOSED DRAINLINE
- PROPOSED SEWER MANHOLE
- PS — PROPOSED SEWER LINE
- G — PROPOSED GAS LINE
- PW — PROPOSED WATER LINE
- PROPOSED WATER VALVE
- PROPOSED THRUST BLOCK
- PE — PROPOSED UNDERGROUND ELECTRIC LINE
- T — PROPOSED TRANSFORMER
- 100' WETLAND BUFFER
- 50' LIMITED CUT BUFFER
- 25' VEGETATIVE BUFFER
- 250' TIDAL BUFFER
- 150' WOODLAND BUFFER
- 100' TIDAL BUFFER
- 50' TIDAL BUFFER

ABBREVIATIONS

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS	LF	LINEAR FEET
AC	ACRES	MAX	MAXIMUM
ADA	AMERICANS WITH DISABILITIES ACT	MIN	MINIMUM
AGGR	AGGREGATE	OC	ON CENTER
BLDG	BUILDING	PCB	PROPOSED CATCH BASIN
BC	BOTTOM OF CURB	PDMH	PROPOSED DRAINAGE MANHOLE
CB	CATCH BASIN	POS	PROPOSED OUTLET STRUCTURE
CONST	CONSTRUCT	PROP	PROPOSED
COORD	COORDINATE	PSMH	PROPOSED SEWER MANHOLE
DIA	DIAMETER	PVC	POLYVINYL CHLORIDE
DIP	DUCTILE IRON PIPE	PVMT	PAVEMENT
DMH	DRAINAGE MANHOLE	R	RADIUS
DWG	DRAWING	RCP	REINFORCED CONCRETE PIPE
ELEV	ELEVATION	ROW	RIGHT OF WAY
EP	EDGE OF PAVEMENT	SGC	SLOPED GRANITE CURB
EV	ELECTRIC VEHICLE	SF	SQUARE FEET
FF	FINISHED FLOOR	STD	STANDARD
FGC	FLUSH GRANITE CURB	TBR	TO BE REMOVED
HDPE	HIGH DENSITY POLYETHYLENE	TC	TOP OF CURB
HMA	HOT MIX ASPHALT	TYP	TYPICAL
HYD	HYDRANT	UD	UNDERDRAIN
ID	INSIDE DIAMETER	W	WIDTH
INV	INVERT	W/	WITH
L	LENGTH	YD	YARD DRAIN

Tighe&Bond

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
5/20/2024

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
5/20/2024

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DSGN.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

GENERAL NOTES

SCALE: AS SHOWN

G-100

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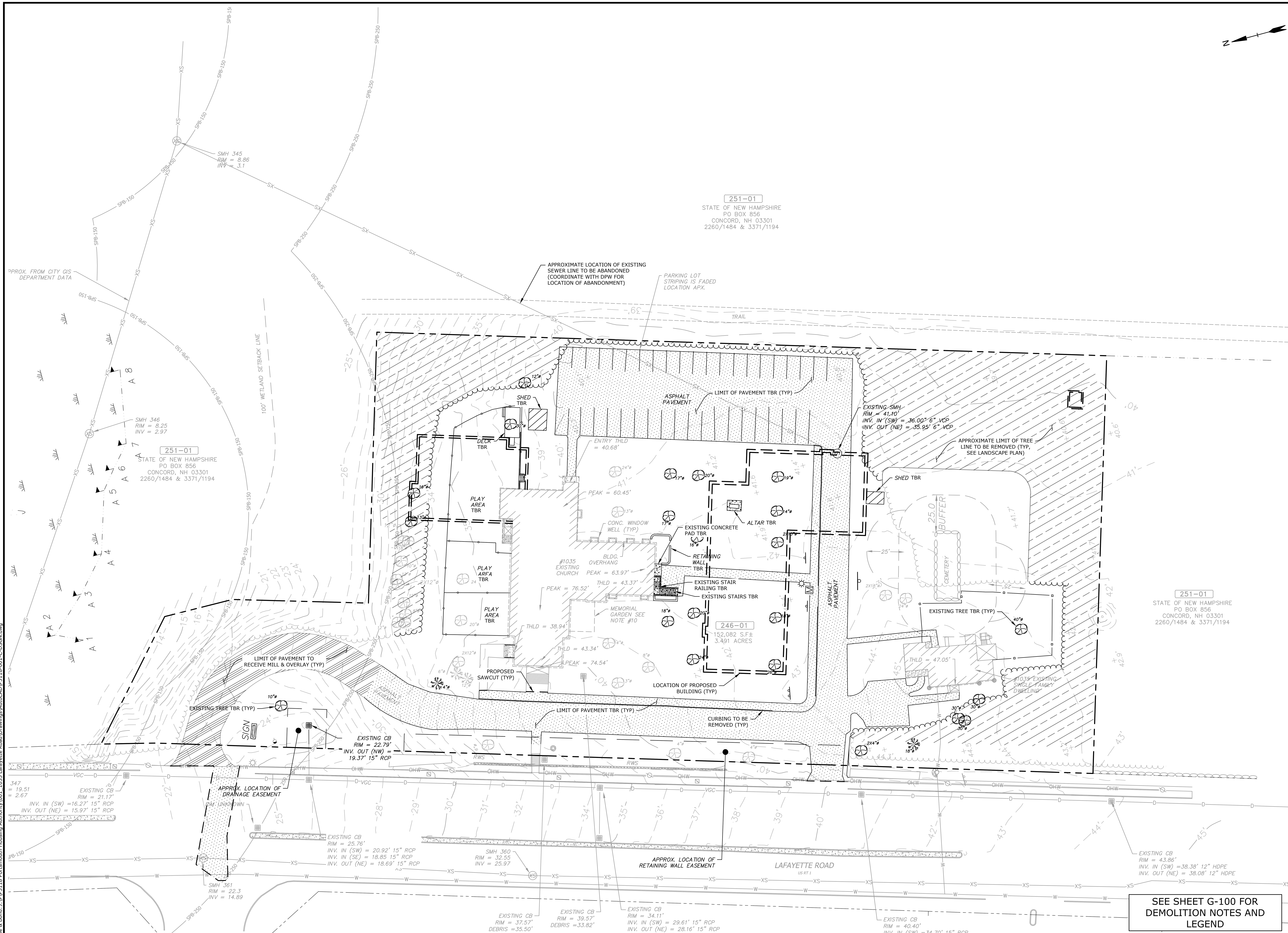

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Tighe&Bond

STATE OF NEW HAMPSHIRE — NEIL A. HANSEN No. 15227 — LICENSED PROFESSIONAL ENGINEER
5/20/2024

STATE OF NEW HAMPSHIRE — PATRICK CRIMMINS No. 12378 — LICENSED PROFESSIONAL ENGINEER
5/20/2024

0 30' 60'
GRAPHIC SCALE

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EXISTING CONDITIONS & DEMOLITION PLAN

SCALE: AS SHOWN

C-101

SITE DATA:

LOCATION: TAX MAP 273, LOT 3

OWNER: THE PARISH OF CHIRST CHURCH IN PORTSMOUTH
1035 LAFAYETT RD
PORTSMOUTH, NH 03801

ZONING DISTRICT: GATEWAY CORRIDOR (G2)
PROPOSED USE: MIXED USE
MULTIFAMILY
PROPOSED LOT SIZE: ±3.491 ACRES (±152,082 SF)

BUILDING PLACEMENT & LOT STANDARDS

APARTMENT BUILDING STANDARDS:	REQUIRED	PROPOSED
MINIMUM LOT DEPTH:	100 FT	±208 FT
MINIMUM STREET FRONTAGE:	50 FT	±666 FT
FRONT YARD SETBACK:		
LAFAYETTE ROAD SETBACK	70-90 FT	± 110 FT(1)
MINIMUM SIDE BUILDING SETBACK:	15 FT	± 25 FT
MINIMUM REAR BUILDING SETBACK:	20 FT	± 68 FT
MINIMUM OPEN SPACE COVERAGE:	20%	±72%
FRONT LOT LINE BUILDOUT:	75%	48%(1)
BUILDING DESIGN STANDARDS:		
MAXIMUM BUILDING HEIGHT:	4 STORIES	4 STORIES
	50 FT	<50 FT
MINIMUM STREET FACING FACADE HEIGHT:	24 FT	>24 FT
MAXIMUM FINISHED FLOOR SURFACE OF GROUND FLOOR ABOVE SIDEWALK GRADE:	36 IN	<36 IN
MAXIMUM BUILDING FOOTPRINT:	20,000 SF	10,900 SF
MAXIMUM FACADE MODULATION LENGTH:	50 FT	<50 FT
MINIMUM STREET FACING FACADE GLAZING:	20% GROUND FLOOR	>20%
DEVELOPMENT SITE STANDARDS:(3)		
MINIMUM DEVELOPMENT SITE AREA:	20,000 SF	±152,082 SF
MINIMUM SITE WIDTH:	100 FT	±666 FT
MINIMUM SITE DEPTH:	100 FT	±280 FT
MINIMUM PERIMETER BUFFER FROM RESIDENTIAL, MIXED RESIDENTIAL, OR CD4-L1 DISTRICTS:	75 FT	N/A
MAXIMUM DEVELOPMENT BLOCK DIMENSIONS:		
BLOCK LENGTH:	800 FT	N/A
ERIMETER:	200 FT	N/A
MAXIMUM BUILDING COVERAGE:	70%	14
MINIMUM OPEN SPACE COVERAGE:	20%	±72
FRONT LOT LINE BUILDOUT:	75%	48%(1)
DENSITY THRESHOLDS AND BONUSES:		
DWELLING UNITS PER ACRE:	16 UNITS	14.6 UNITS
DWELLING UNITS PER BUILDING:	36 UNITS	44 UNITS(2)(3)

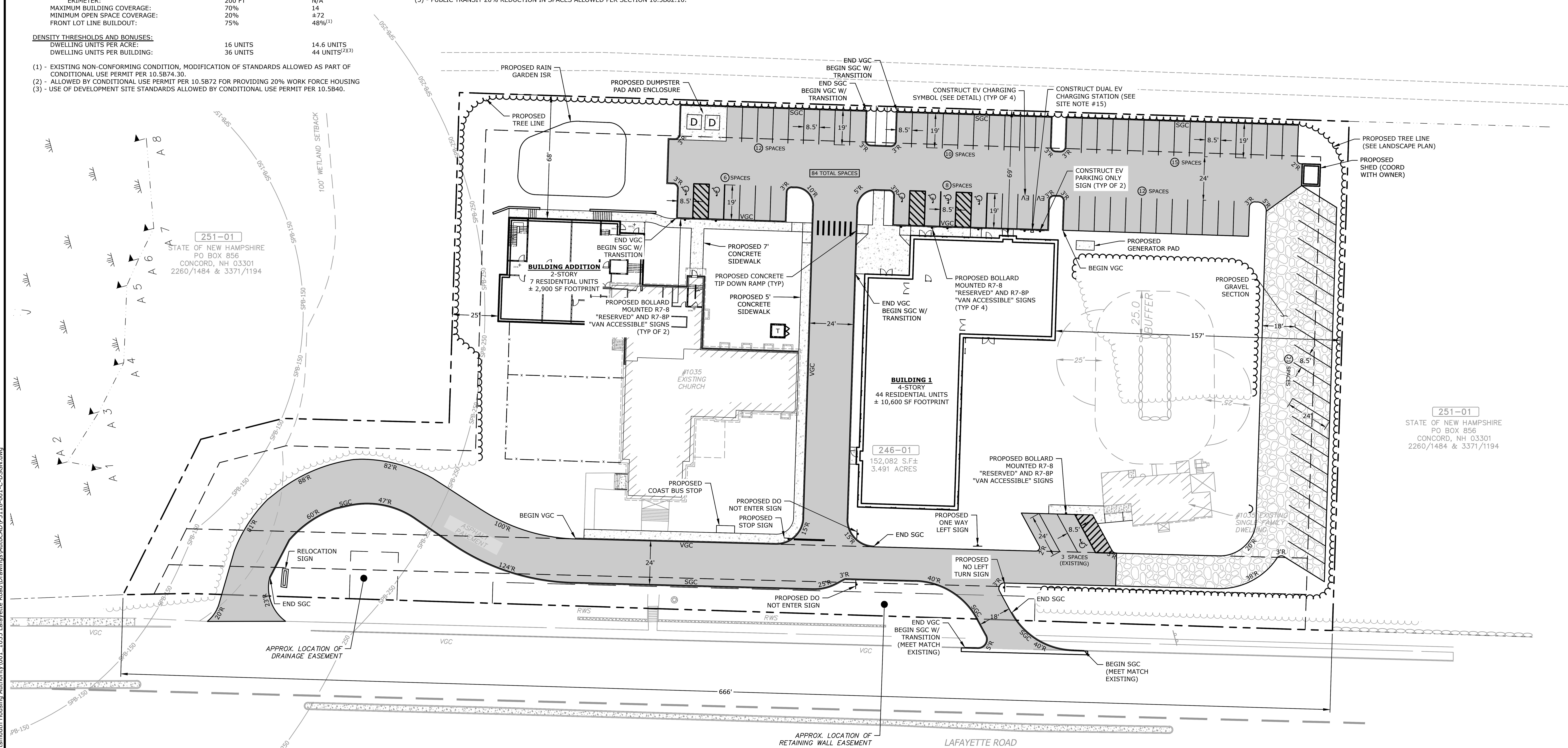
(1) - EXISTING NON-CONFORMING CONDITION, MODIFICATION OF STANDARDS ALLOWED AS PART OF CONDITIONAL USE PERMIT PER 10.5B74.30.
(2) - ALLOWED BY CONDITIONAL USE PERMIT PER 10.5B72 FOR PROVIDING 20% WORK FORCE HOUSING
(3) - USE OF DEVELOPMENT SITE STANDARDS ALLOWED BY CONDITIONAL USE PERMIT PER 10.5B40.

PARKING CALCULATIONS:

PARKING SPACE REQUIREMENTS:	
ZONING REQUIRED PARKING SPACES	
OFFICE:	
1 PER 350 SF GFA x 6,900 SF	= 20 SPACES
RESIDENTIAL:	
1.0 SPACES PER UNIT (500-750 SF) x 11UNITS	= 11 SPACES
1.3 SPACES PER UNIT (>750 SF) x 40 UNITS	= 52 SPACES
+1 VISITOR PER 5 UNITS X 51 UNITS	= 11 SPACES
GROUP DAY CARE:	
0.5 PER STUDENT x 71 STUDENTS	= 36 SPACES
PLACE OF WORSHIP:	
1 PER PERSON MAX CAPACITY (40 PERSON)	= 10 SPACES
TOTAL REQUIRED PARKING	= 140 SPACES
TOTAL REQUIRED PER SHARED PARKING ANALYSIS(4)	= 103 SPACES
REQUIRED PARKING SPACES ON A PUBLIC TRANSIT(5) ZONING REQUIREMENTS x 80%	**= 83 SPACES**
PROVIDED PARKING SPACES	
TOTAL PROVIDED SPACES:	**= 84 SPACES**

	REQUIRED	PROPOSED
ACCESSIBLE PARKING SPACES:	4	6
DIMENSIONAL REQUIREMENTS:		
STANDARD 90° PARKING STALL :		
WIDTH	8.5 FT	8.5 FT
LENGTH	19 FT MIN	19 FT
DRIVE AISLE WIDTH:		
90° (2-WAY TRAFFIC)	24 FT	24 FT

(4) - SHARED PARKING ANALYSIS ALLOWED THROUGH A CONDITIONAL USE PERMIT PER SECTION 10.1112.61.
(5) - PUBLIC TRANSIT 20% REDUCTION IN SPACES ALLOWED PER SECTION 10.5B82.10.



SITE RECORDING NOTES:

1. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
2. 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.
3. THIS IS NOT A BOUNDARY SURVEY AND SHALL NOT BE USED AS SUCH.

SEE SHEET G-100 FOR SITE NOTES AND LEGEND

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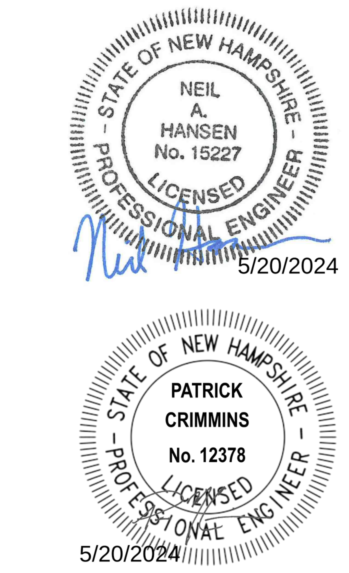

GRAPHIC SCALE

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

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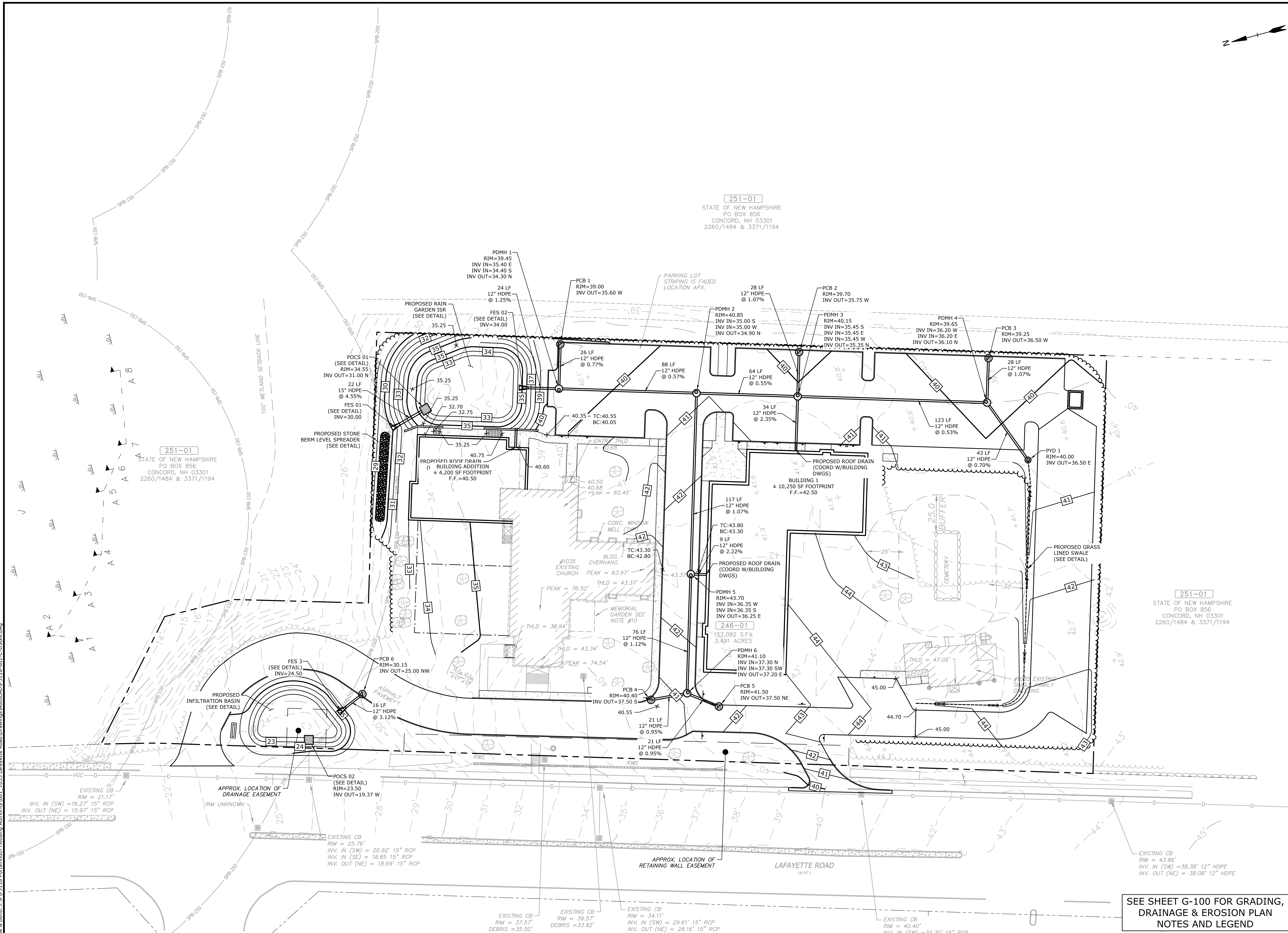
SITE PLAN

SCALE: AS SHOWN

C-102



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NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER — STATE OF NEW HAMPSHIRE

5/20/2024

PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER — STATE OF NEW HAMPSHIRE

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GRADING, DRAINAGE & EROSION CONTROL PLAN

SCALE: AS SHOWN

C-103

SEE SHEET G-100 FOR GRADING, DRAINAGE & EROSION PLAN NOTES AND LEGEND

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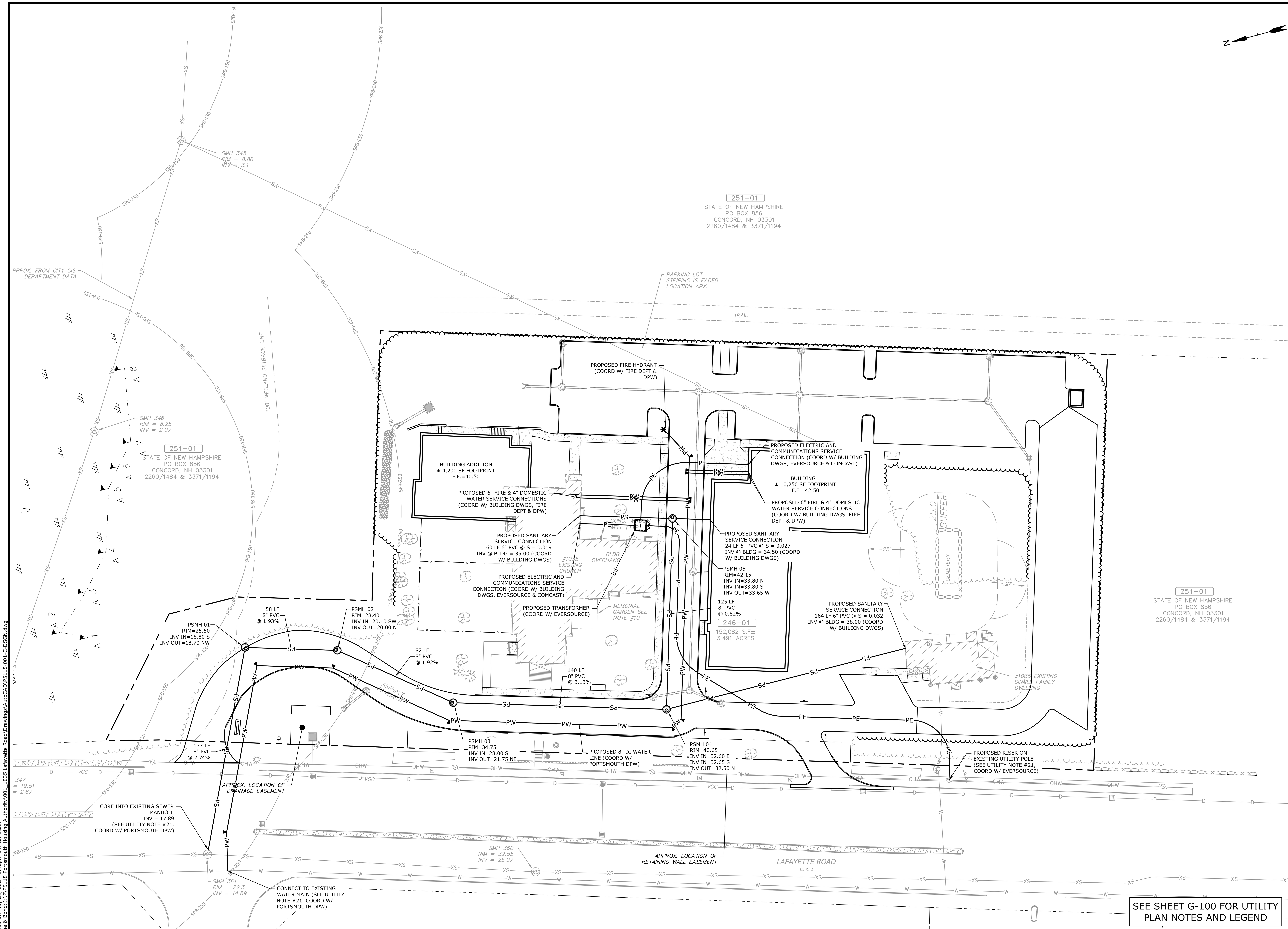

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STATE OF NEW HAMPSHIRE — NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER — 5/20/2024

STATE OF NEW HAMPSHIRE — PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER — 5/20/2024

0 30' 60'
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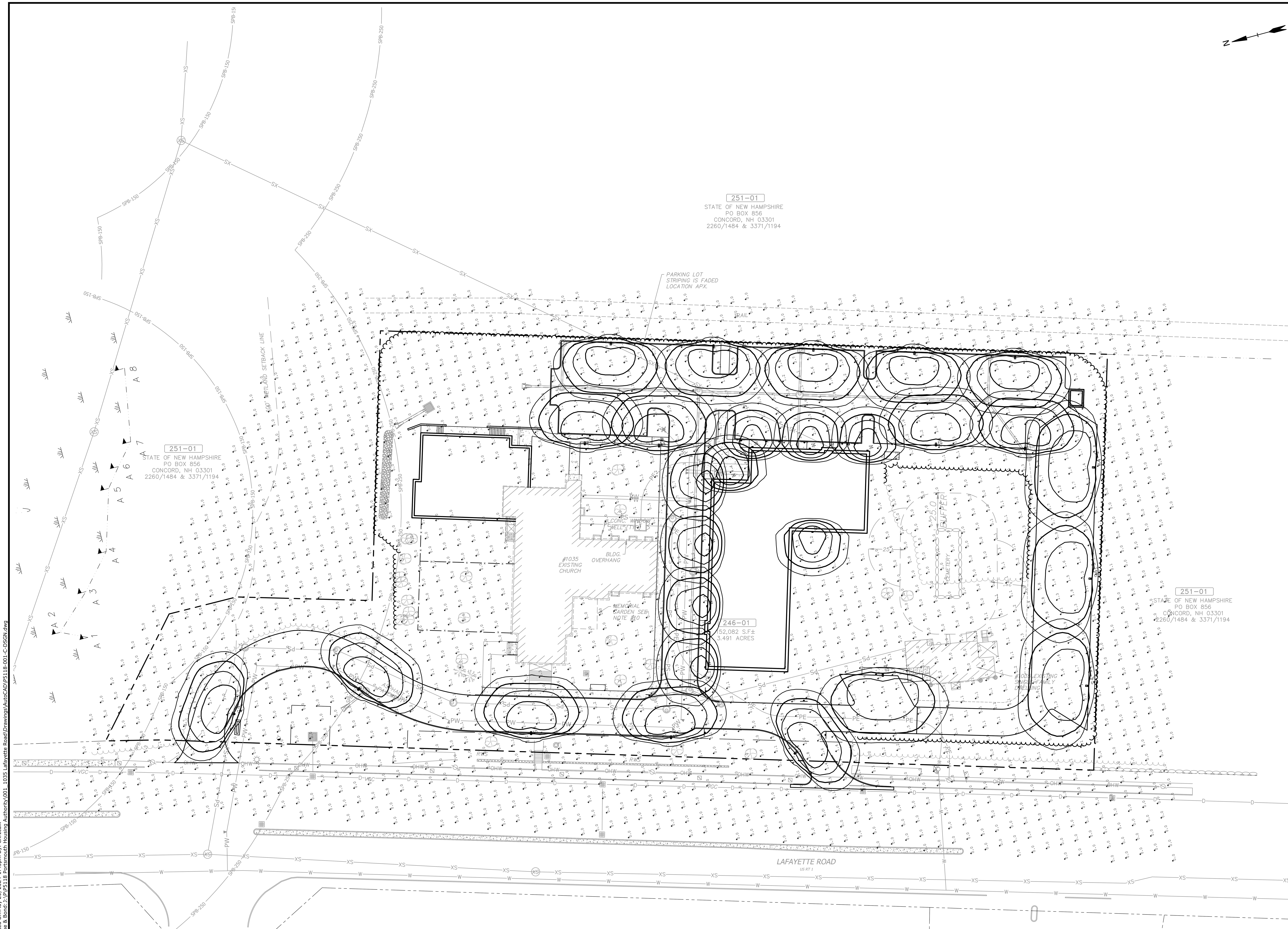
UTILITY PLAN

SCALE: AS SHOWN

C-104



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NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE 5/20/2024

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PHOTOMETRIC PLAN

SCALE: AS SHOWN

C-105

Last Saved: 5/20/2024
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GENERAL PROJECT INFORMATION
PROJECT APPLICANT: PORTSMOUTH HOUSING AUTHORITY
PROJECT NAME: PROPOSED MIXED USED DEVELOPMENT
PROJECT ADDRESS: 1035 LAFAYETTE ROAD, PORTSMOUTH NH
PROJECT MAP / LOT: TAX MAP 246, LOT 1
PROJECT LATITUDE: 42°-03'-53"N
PROJECT LONGITUDE: 70°-46'-15"W

PROJECT DESCRIPTION
THE PROPOSED PROJECT CONSISTS OF RENOVATING THE PORTION OF THE EXISTING CHURCH TO REMAIN, CONSTRUCTING A NEW ADDITION TO THE NORTH SIDE OF THE EXISTING CHURCH, AS WELL AS A FOUR STORY APARTMENT BUILDING IN THE CENTRAL PORTION OF THE SITE.

DISTURBED AREA
THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 3.0 ACRES.

SOIL CHARACTERISTICS
BASED ON THE NRCS WEB SOIL SURVEY FOR STRAFFORD COUNTY - NEW HAMPSHIRE, THE SOILS ON SITE CONSIST OF URBAN LAND-CANTON GRAVELLY FINE SANDY LOAM SOILS WHICH HAVE A FAST INFILTRATION RATE WHEN THOROUGHLY WET. THESE SOILS HAVE A HYDROLOGIC SOIL GROUP RATING OF D.

NAME OF RECEIVING WATERS
THE STORM WATER RUNOFF WILL ULTIMATELY DISCHARGE INTO THE SAGAMORE CREEK TO THE SOUTH OF THE SITE.

CONSTRUCTION SEQUENCE OF MAJOR ACTIVITIES:
1. CUT AND CLEAR TREES.
2. CONSTRUCT TEMPORARY AND PERMANENT SEDIMENT, EROSION AND DETENTION CONTROL FACILITIES. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING OPERATIONS THAT WILL INFLUENCE STORMWATER RUNOFF SUCH AS:
   - NEW CONSTRUCTION
   - CONTROL OF DUST
   - NEARNESS OF CONSTRUCTION SITE TO RECEIVING WATERS
   - CONSTRUCTION DURING LATE WINTER AND EARLY SPRING
3. ALL PERMANENT DITCHES, SWALES, DETENTION, RETENTION AND SEDIMENTATION BASINS TO BE STABILIZED USING THE VEGETATIVE AND NON-STRUCTURAL BMPS PRIOR TO DIRECTING RUNOFF TO THEM.
4. CLEAR AND DISPOSE OF DEBRIS.
5. CONSTRUCT TEMPORARY CULVERTS AND DIVERSION CHANNELS AS REQUIRED.
6. GRADE AND GRAVEL ROADWAYS AND PARKING AREAS - ALL ROADS AND PARKING AREA SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
7. BEGIN PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED AND MULCHED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
8. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, PERIMETER EROSION CONTROL MEASURES, SEDIMENT TRAPS, ETC., MULCH AND SEED AS REQUIRED.
9. SEDIMENT TRAPS AND/OR BASINS SHALL BE USED AS NECESSARY TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.
10. FINISH PAVING ALL ROADWAYS AND PARKING LOTS.
11. INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES.
12. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
13. REMOVE TRAPPED SEDIMENTS FROM COLLECTOR DEVICES AS APPROPRIATE AND THEN REMOVE TEMPORARY EROSION CONTROL MEASURES.

SPECIAL CONSTRUCTION NOTES:
1. THE CONSTRUCTION SEQUENCE MUST LIMIT THE DURATION AND AREA OF DISTURBANCE.
2. THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

EROSION CONTROL NOTES:
1. ALL EROSION CONTROL MEASURES AND PRACTICES SHALL CONFORM TO THE "NEW HAMPSHIRE STORMWATER MANUAL VOLUME 3: EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION" PREPARED BY THE NHDES.
2. PRIOR TO ANY WORK OR SOIL DISTURBANCE, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EROSION CONTROL MEASURES AS REQUIRED IN THE PROJECT MANUAL.
3. CONTRACTOR SHALL INSTALL TEMPORARY EROSION CONTROL BARRIERS, INCLUDING HAY BALES, SILT FENCES, MULCH BERMS, SILT SACKS AND SILT SOCKS AS SHOWN IN THESE DRAWINGS AS THE FIRST ORDER OF WORK.
4. SILT SACK INLET PROTECTION SHALL BE INSTALLED IN ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS AND BE MAINTAINED FOR THE DURATION OF THE PROJECT.
5. PERIMETER CONTROLS INCLUDING SILT FENCES, MULCH BERM, SILT SOCK, AND/OR HAY BALE BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT UNTIL NON-PAVED AREAS HAVE BEEN STABILIZED.
6. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
7. ALL DISTURBED AREAS NOT OTHERWISE BEING TREATED SHALL RECEIVE 6" LOAM, SEED AND FERTILIZER.
8. INSPECT ALL INLET PROTECTION AND PERIMETER CONTROLS WEEKLY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
9. CONSTRUCT EROSION CONTROL BLANKETS ON ALL SLOPES STEEPER THAN 3:1.

STABILIZATION:
1. AN AREA SHALL BE CONSIDERED STABLE WHEN 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 AS STONE OR RIPRAP HAS BEEN INSTALLED;
   D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.;
   E. IN AREAS TO BE PAVED, "STABLE" MEANS THAT BASE COURSE GRAVELS MEETING THE REQUIREMENTS OF NHDOT STANDARD FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM 304.2 HAVE BEEN INSTALLED.
2. WINTER STABILIZATION PRACTICES:
   A. 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 EROSION CONTROL BLANKETS 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;
   B. 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;
   C. AFTER OCTOBER 15, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT;
3. STABILIZATION SHALL BE INITIATED ON ALL LOAM STOCKPILES, AND DISTURBED AREAS, WHERE CONSTRUCTION ACTIVITY SHALL NOT OCCUR FOR MORE THAN TWENTY-ONE (21) CALENDAR DAYS BY THE FOURTEENTH (14TH) DAY AFTER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED IN THAT AREA. STABILIZATION MEASURES TO BE USED INCLUDE:
   A. TEMPORARY SEEDING;
   B. MULCHING.
4. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
5. WHEN CONSTRUCTION ACTIVITY PERMANENTLY OR TEMPORARILY CEASES WITHIN 100 FEET OF NEARBY SURFACE WATERS OR DELINEATED WETLANDS, THE AREA SHALL BE STABILIZED WITHIN SEVEN (7) DAYS OR PRIOR TO A RAIN EVENT. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN THESE AREAS, SILT FENCES, MULCH BERMS, HAY BALE BARRIERS AND ANY EARTH/DIKES SHALL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED.
6. DURING CONSTRUCTION, RUNOFF WILL BE DIVERTED AROUND THE SITE WITH EARTH DIKES, PIPING OR STABILIZED CHANNELS WHERE POSSIBLE. SHEET RUNOFF FROM THE SITE WILL BE FILTERED THROUGH SILT FENCES, MULCH BERMS, HAY BALE BARRIERS, OR SILT SOCKS. ALL STORM DRAIN BASIN INLETS SHALL BE PROVIDED WITH FLARED END SECTIONS AND TRASH RACKS. THE SITE SHALL BE STABILIZED FOR THE WINTER BY NOVEMBER 15.

DUST CONTROL:
1. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST THROUGHOUT THE CONSTRUCTION PERIOD.
2. DUST CONTROL METHODS SHALL INCLUDE, BUT BE NOT LIMITED TO SPRINKLING WATER ON EXPOSED AREAS, COVERING LOADED DUMP TRUCKS LEAVING THE SITE, AND TEMPORARY MULCHING.
3. DUST CONTROL MEASURES SHALL BE UTILIZED SO AS TO PREVENT THE MIGRATION OF DUST FROM THE SITE TO ABUTTING AREAS.

STOCKPILES:
1. LOCATE STOCKPILES A MINIMUM OF 50 FEET AWAY FROM CATCH BASINS, SWALES, AND CULVERTS.
2. ALL STOCKPILES SHOULD BE SURROUNDED WITH TEMPORARY EROSION CONTROL MEASURES PRIOR TO THE ONSET OF PRECIPITATION.
3. PERIMETER BARRIERS SHOULD BE MAINTAINED AT ALL TIMES, AND ADJUSTED AS NEEDED TO ACCOMMODATE THE DELIVERY AND REMOVAL OF MATERIALS FROM THE STOCKPILE. THE INTEGRITY OF THE BARRIER SHOULD BE INSPECTED AT THE END OF EACH WORKING DAY.
4. PROTECT ALL STOCKPILES FROM STORMWATER RUN-OFF USING TEMPORARY EROSION CONTROL MEASURES SUCH AS BERMS, SILT SOCK, OR OTHER APPROVED PRACTICE TO PREVENT MIGRATION OF MATERIAL BEYOND THE IMMEDIATE CONFINES OF THE STOCKPILES.

OFF SITE VEHICLE TRACKING:
1. THE CONTRACTOR SHALL CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE(S) PRIOR TO ANY EXCAVATION ACTIVITIES.

VEGETATION:
1. TEMPORARY GRASS COVER:
   A. SEEDBED PREPARATION:
      a. APPLY FERTILIZER AT THE RATE OF 600 POUNDS PER ACRE OF 10-10-10. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF THREE (3) TONS PER ACRE;
   B. SEEDING:
      a. UTILIZE ANNUAL RYE GRASS AT A RATE OF 40 LBS/ACRE;
      b. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF TWO (2) INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED;
      c. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER). HYDROSEEDINGS, WHICH INCLUDE MULCH, MAY BE LEFT ON SOIL SURFACE. SEEDING RATES MUST BE INCREASED 10% WHEN HYDROSEEDING;
   C. MAINTENANCE:
      a. TEMPORARY SEEDING SHALL BE PERIODICALLY INSPECTED. AT A MINIMUM, 95% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER BARRIERS, CHECK DAMS, ETC.).
2. VEGETATIVE PRACTICE:
   A. FOR PERMANENT MEASURES AND PLANTINGS:
      a. LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF THREE (3) TONS PER ACRE IN ORDER TO PROVIDE A PH VALUE OF 5.5 TO 7.6;
      b. FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 800 POUNDS PER ACRE OF 10-20-20 FERTILIZER;
      c. SOIL CONDITIONERS AND FERTILIZER SHALL BE APPLIED AT THE RECOMMENDED RATES AND SHALL BE THOROUGHLY WORKED INTO THE LOAM. LOAM SHALL BE RAKED UNTIL THE SURFACE IS FINELY PULVERIZED, SMOOTH AND EVEN, AND THEN COMPACTED TO AN EVEN SURFACE CONFORMING TO THE REQUIRED LINES AND GRADES WITH APPROVED ROLLERS WEIGHING BETWEEN 4-1/2 POUNDS AND 5-1/2 POUNDS PER INCH OF WIDTH;
      d. SEED SHALL BE SOWN AT THE RATE SHOWN BELOW. SOWING SHALL BE DONE ON A CALM, DRY DAY, PREFERABLY BY MACHINE, BUT IF BY HAND, ONLY BY EXPERIENCED WORKMEN. IMMEDIATELY BEFORE SEEDING, THE SOIL SHALL BE LIGHTLY RAKED. ONE HALF THE SEED SHALL BE SOWN IN ONE DIRECTION AND THE OTHER HALF AT RIGHT ANGLES TO THE ORIGINAL DIRECTION. IT SHALL BE LIGHTLY RAKED INTO THE SOIL TO A DEPTH NOT OVER 1/4 INCH AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH;
      e. HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AS INDICATED ABOVE;
      f. THE SURFACE SHALL BE WATERED AND KEPT MOIST WITH A FINE SPRAY AS REQUIRED, WITHOUT WASHING AWAY THE SOIL, UNTIL THE GRASS IS WELL ESTABLISHED. ANY AREAS WHICH ARE NOT SATISFACTORILY COVERED WITH GRASS SHALL BE RESEEDED, AND ALL NOXIOUS WEEDS REMOVED;
      g. THE CONTRACTOR SHALL PROTECT AND MAINTAIN THE SEEDED AREAS UNTIL ACCEPTED;
      h. A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE APPLIED AT THE INDICATED RATE:

SEED MIX	APPLICATION RATE
CREEPING RED FESCUE	20 LBS/ACRE
TALL FESCUE	20 LBS/ACRE
REDTOP	2 LBS/ACRE

IN NO CASE SHALL THE WEED CONTENT EXCEED ONE (1) PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH STATE AND FEDERAL SEED LAWS. SEEDING SHALL BE DONE NO LATER THAN SEPTEMBER 15. IN NO CASE SHALL SEEDING TAKE PLACE OVER SNOW.
3. DORMANT SEEDING (SEPTEMBER 15 TO FIRST SNOWFALL):
   A. FOLLOW PERMANENT MEASURES SLOPE, LIME, FERTILIZER AND GRADING REQUIREMENTS. APPLY SEED MIXTURE AT TWICE THE INDICATED RATE. APPLY MULCH AS INDICATED FOR PERMANENT MEASURES.

CONCRETE WASHOUT AREA:
1. THE FOLLOWING ARE THE ONLY NON-STORMWATER DISCHARGES ALLOWED. ALL OTHER NON-STORMWATER DISCHARGES ARE PROHIBITED ON SITE:
   A. THE CONCRETE DELIVERY TRUCKS SHALL, WHENEVER POSSIBLE, USE WASHOUT FACILITIES AT THEIR OWN PLANT OR DISPATCH FACILITY;
   B. IF IT IS NECESSARY, SITE CONTRACTOR SHALL DESIGNATE SPECIFIC WASHOUT AREAS AND DESIGN FACILITIES TO HANDLE ANTICIPATED WASHOUT WATER;
   C. CONTRACTOR SHALL LOCATE WASHOUT AREAS AT LEAST 150 FEET AWAY FROM STORM DRAINS, SWALES AND SURFACE WATERS OR DELINEATED WETLANDS;
   D. INSPECT WASHOUT FACILITIES DAILY TO DETECT LEAKS OR TEARS AND TO IDENTIFY WHEN MATERIALS NEED TO BE REMOVED.

ALLOWABLE NON-STORMWATER DISCHARGES:
1. FIRE-FIGHTING ACTIVITIES;
2. FIRE HYDRANT FLUSHING;
3. WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED;
4. WATER USED TO CONTROL DUST;
5. POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHING;
6. ROUTINE EXTERNAL BUILDING WASH DOWN WHERE DETERGENTS ARE NOT USED;
7. PAVEMENT WASH WATERS WHERE DETERGENTS ARE NOT USED;
8. UNCONTAMINATED AIR CONDITIONING/COMPRESSOR CONDENSATION;
9. UNCONTAMINATED GROUND WATER OR SPRING WATER;
10. FOUNDATION OR FOOTING DRAINS WHICH ARE UNCONTAMINATED;
11. LANDSCAPE IRRIGATION.

WASTE DISPOSAL:
1. WASTE MATERIAL:
   A. ALL WASTE MATERIALS SHALL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE SHALL BE DEPOSITED IN A DUMPSTER;
   B. NO CONSTRUCTION WASTE MATERIALS SHALL BE BURIED ON SITE;
   C. ALL PERSONNEL SHALL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
2. HAZARDOUS WASTE:
   A. ALL HAZARDOUS WASTE MATERIALS SHALL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER;
   B. SITE PERSONNEL SHALL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
3. SANITARY WASTE:
   A. ALL SANITARY WASTE SHALL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

SPILL PREVENTION:
1. CONTRACTOR SHALL BE FAMILIAR WITH SPILL PREVENTION MEASURES REQUIRED BY LOCAL, STATE AND FEDERAL AGENCIES. AT A MINIMUM, CONTRACTOR SHALL FOLLOW THE BEST MANAGEMENT SPILL PREVENTION PRACTICES OUTLINED BELOW.
2. THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:
   A. GOOD HOUSEKEEPING - THE FOLLOWING GOOD HOUSEKEEPING PRACTICE SHALL BE FOLLOWED ON SITE DURING CONSTRUCTION:
      a. ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB SHALL BE STORED ON SITE;
      b. ALL MATERIALS STORED ON SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE;
      c. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED;
      d. THE SITE SUPERINTENDENT SHALL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS;
      e. SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER;
      f. WHENEVER POSSIBLE ALL OF A PRODUCT SHALL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
   B. HAZARDOUS PRODUCTS - THE FOLLOWING PRACTICES SHALL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
      g. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE;
      h. ORIGINAL LABELS AND MATERIAL SAFETY DATA SHALL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION;
      i. SURPLUS PRODUCT THAT MUST BE DISPOSED OF SHALL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.
   C. PRODUCT SPECIFIC PRACTICES - THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ON SITE:
      a. PETROLEUM PRODUCTS:
         - ALL ON SITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE LEAKAGE;
         - PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
      b. FERTILIZERS:
         - FERTILIZERS USED SHALL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS;
         - ONCE APPLIED FERTILIZER SHALL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER;
         - STORAGE SHALL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER SHALL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
      c. PAINTS:
         - ALL CONTAINERS SHALL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE;
         - EXCESS PAINT SHALL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM;
         - EXCESS PAINT SHALL BE DISPOSED OF PROPERLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
   D. SPILL CONTROL PRACTICES - IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION, THE FOLLOWING PRACTICES SHALL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
      a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED AND SITE PERSONNEL SHALL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES;
      b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS SHALL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE;
      c. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY AND REPORTED TO PEASE DEVELOPMENT AUTHORITY;
      d. THE SPILL AREA SHALL BE KEPT WELL VENTILATED AND PERSONNEL SHALL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE;
      e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL SHALL BE REPORTED TO THE APPROPRIATE LOCAL, STATE OR FEDERAL AGENCIES AS REQUIRED;
      f. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS SHALL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.
   E. VEHICLE FUELING AND MAINTENANCE PRACTICE:
      a. CONTRACTOR SHALL MAKE AN EFFORT TO PERFORM EQUIPMENT/VEHICLE FUELING AND MAINTENANCE AT AN OFF-SITE FACILITY;
      b. CONTRACTOR SHALL PROVIDE AN ON-SITE FUELING AND MAINTENANCE AREA THAT IS CLEAN AND DRY;
      c. IF POSSIBLE THE CONTRACTOR SHALL KEEP AREA COVERED;
      d. CONTRACTOR SHALL KEEP A SPILL KIT AT THE FUELING AND MAINTENANCE AREA;
      e. CONTRACTOR SHALL REGULARLY INSPECT VEHICLES FOR LEAKS AND DAMAGE;
      f. CONTRACTOR SHALL USE DRIP PANS, DRIP CLOTHS, OR ABSORBENT PADS WHEN REPLACING SPENT FLUID.

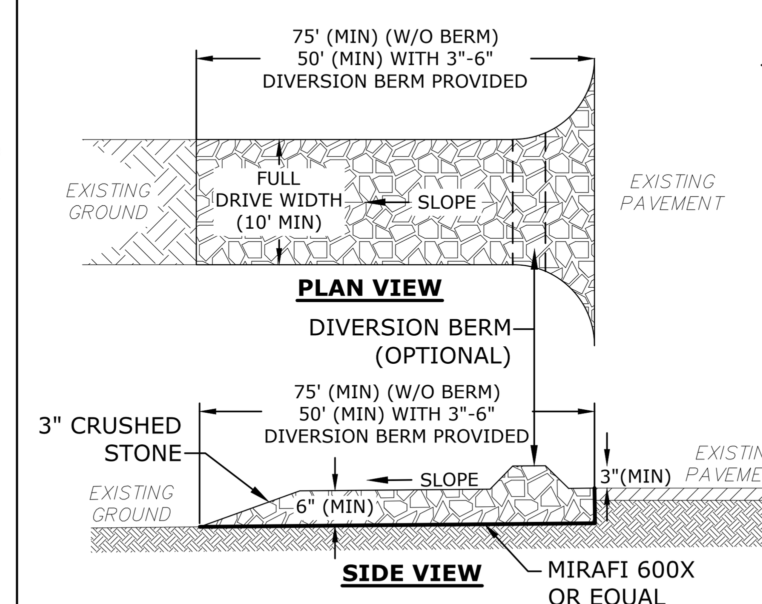
EROSION CONTROL OBSERVATIONS AND MAINTENANCE PRACTICES
THIS PROJECT EXCEEDS ONE (1) ACRE OF DISTURBANCE AND THUS REQUIRES A SWPPP.

THE FOLLOWING REPRESENTS THE GENERAL OBSERVATION AND REPORTING PRACTICES THAT SHALL BE FOLLOWED AS PART OF THIS PROJECT:
1. AN OBSERVATION REPORT SHALL BE MADE AFTER EACH OBSERVATION AND DISTRIBUTED TO THE ENGINEER, THE OWNER, AND THE CONTRACTOR;
2. A REPRESENTATIVE OF THE SITE CONTRACTOR, SHALL BE RESPONSIBLE FOR MAINTENANCE AND REPAIR ACTIVITIES;
3. IF A REPAIR IS NECESSARY, IT SHALL BE INITIATED WITHIN 24 HOURS OF REPORT;
4. AN NPDES NOTICE OF INTENT SHALL BE SUBMITTED.

CITY OF PORTSMOUTH BUFFER VEGETATION NOTES
1. REMOVAL OR CUTTING OF VEGETATION
   1.1. CHEMICAL CONTROL OF VEGETATION IS PROHIBITED IN ALL AREAS OF A WETLAND OR WETLAND BUFFER.
   1.2. THE REMOVAL OR CUTTING OF VEGETATION IS PROHIBITED IN A WETLAND OR VEGETATED BUFFER STRIP, EXCEPT THAT NON-CHEMICAL CONTROL OF PLANTS DESIGNATED BY THE STATE OF NEW HAMPSHIRE AS "NEW HAMPSHIRE PROHIBITED INVASIVE SPECIES" IS PERMITTED.
   1.3. THE REMOVAL OF MORE THAN 50% OF TREES GREATER THAN 6" DIAMETER AT BREAST HEIGHT (DBH) IS PROHIBITED IN THE LIMITED CUT AREA.
2. FERTILIZERS
   2.1. THE USE OF ANY FERTILIZER IS PROHIBITED IN A WETLAND, VEGETATED BUFFER STRIP OR LIMITED CUT AREA.
   2.2. THE USE OF FERTILIZERS OTHER THAN LOW PHOSPHATE AND SLOW RELEASE NITROGEN FERTILIZERS IS PROHIBITED IN ANY PART OF A WETLAND BUFFER.
3. PESTICIDES AND HERBICIDES
   3.1. THE USE OF PESTICIDES OR HERBICIDES IS PROHIBITED IN A WETLAND OR WETLAND BUFFER, EXCEPT THAT APPLICATION OF PESTICIDES BY A PUBLIC AGENCY FOR PUBLIC HEALTH PURPOSES IS PERMITTED.

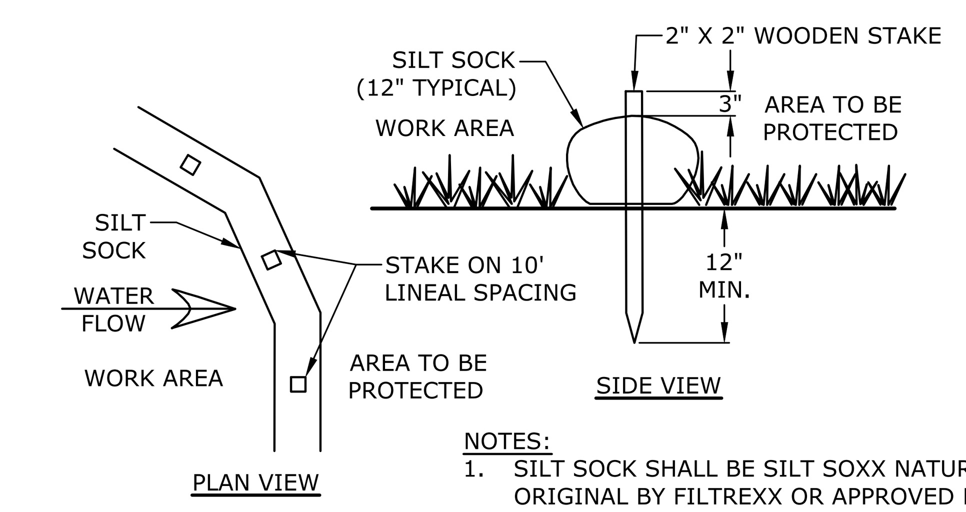
NOTES:
1. CONCRETE WASHOUT SHALL BE "JESCRAFT" STACKABLE CONCRETE WASHOUT PAN (72"x72"x14") OR APPROVED EQUAL.
2. INSTALL AND MAINTAIN CONCRETE WASHOUT IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. CONCRETE WASHOUT SHALL NOT BE PLACED WITHIN 100' WETLAND BUFFER.

CONCRETE WASHOUT DETAIL
NO SCALE



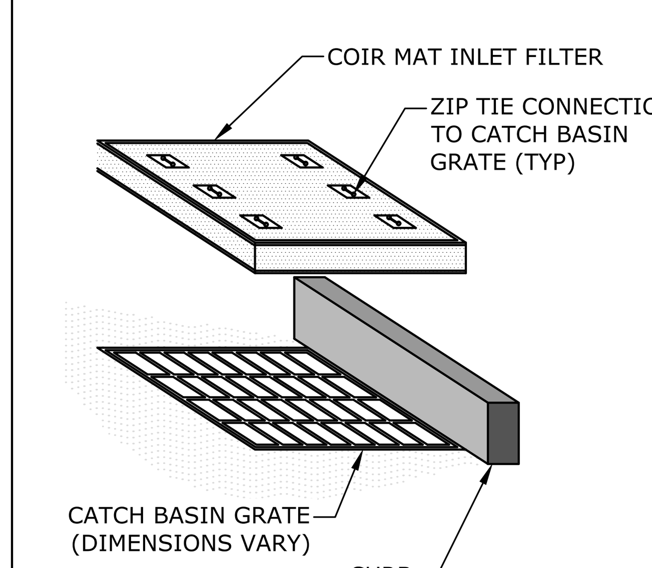
NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT FROM THE SITE. WHEN WASHING IS REQUIRED, IT SHALL BE DONE SO RUNOFF DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS

STABILIZED CONSTRUCTION EXIT
NO SCALE



NOTES:
1. SILT SOCK SHALL BE SILT SOXX NATURAL ORIGINAL BY FILTREXX OR APPROVED EQUAL.
2. INSTALL SILT SOCK IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

SILT SOCK
NO SCALE



NOTES:
1. COIR MAT INLET FILTER SHALL BE STORM WATER INLET FILTER BY BLOCKSOM & CO. OR APPROVED EQUAL.
2. INSTALL AND MAINTAIN INLET PROTECTION IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

INLET PROTECTION
NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
5/20/2024

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
5/20/2024

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION

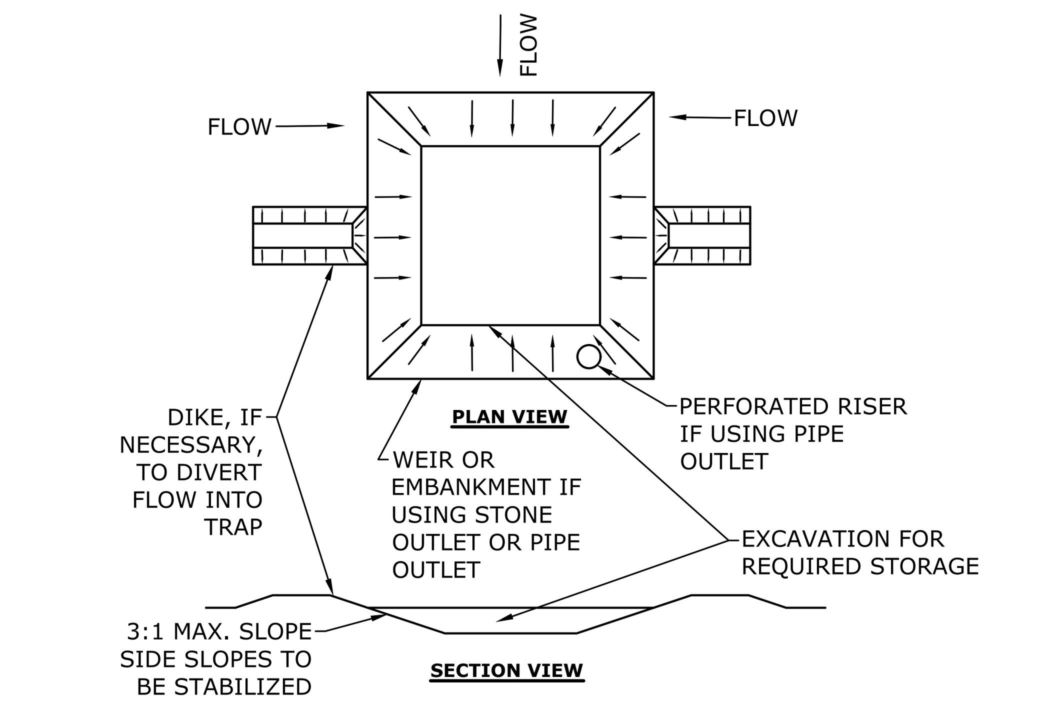
PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

EROSION CONTROL NOTES & DETAILS

SCALE: AS SHOWN

C-501

Last Saved: 5/20/2024
Plotted On:May 20, 2024-12:17pm By: CKrzcuik
Tighe & Bond:J:\P\P5118 Portsmouth Housing Authority\001 1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DTLS.dwg

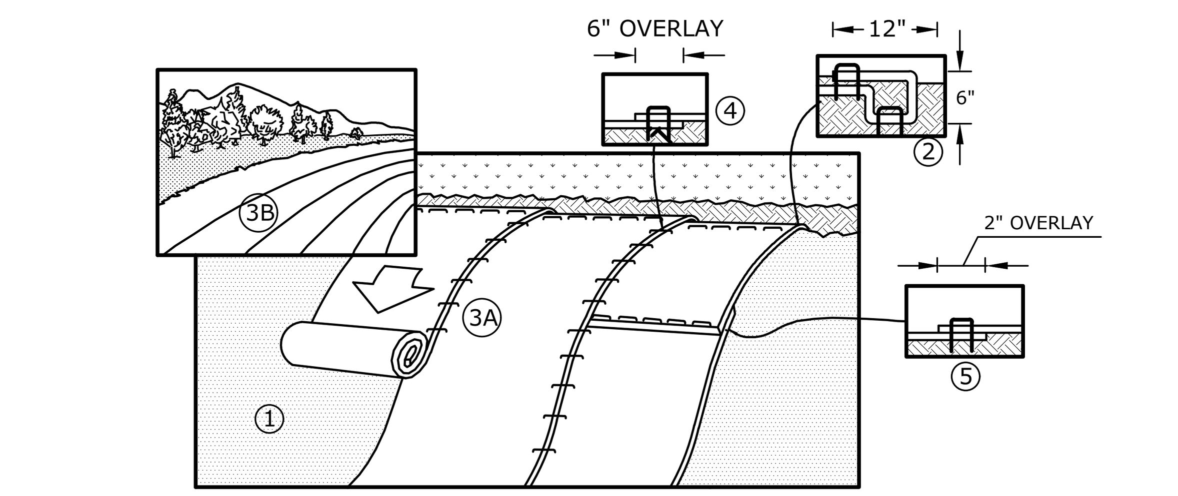


NOTES:

1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA AS POSSIBLE.
2. THE MAXIMUM CONTRIBUTING AREA TO A SINGLE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. TRAP OUTLET SHALL BE MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP.
5. TRAP SHALL DISCHARGE TO A STABILIZED AREA.
6. TRAP SHALL BE CLEANED WHEN 50 PERCENT OF THE ORIGINAL VOLUME IS FILLED.
7. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.
8. SEDIMENT TRAPS MUST BE USED AS NEEDED TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.

SEDIMENT TRAP

NO SCALE

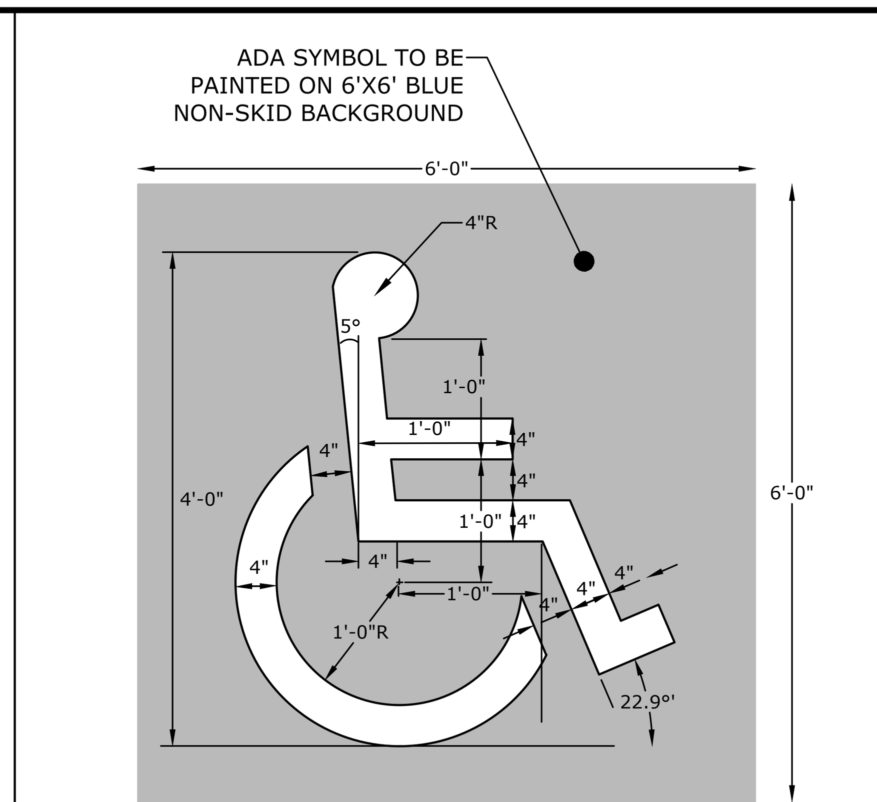


NOTES:

1. EROSION CONTROL BLANKET SHALL BE AN ALL NATURAL PRODUCT WITH NO PHOTO DEGRADABLE COMPONENTS, NORTH AMERICAN GREEN SC150BN OR APPROVED EQUAL.
2. STAKES SHALL BE BIODEGRADABLE BIOSTAKES OR ALL NATURAL WOOD ECOSTAKES OR APPROVED EQUAL. THE LENGTH OF STAKES SHALL BE BASED OFF OF THE MANUFACTURERS RECOMMENDATION.
3. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, COMPOST AND SEED.
4. BEGIN AT THE TOP OF THE SLOPE, 36" OVER THE GRADE BREAK, BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UPSLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAKES IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAKING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAKES ACROSS THE WIDTH OF THE BLANKET.
5. ROLL THE BLANKETS DOWN THE SLOPE. ALL BLANKETS MUST BE SECURELY FASTENED TO THE SOIL SURFACE BY PLACING STAKES IN APPROPRIATE LOCATIONS AS SHOWN ON THE MANUFACTURERS PATTERN GUIDE.
6. THERE SHALL BE NO PLASTIC, OR MULTI-FILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH WITH AN OPENING SIZE OF GREATER THAN 1/8 INCHES MATERIAL UTILIZED.

EROSION CONTROL BLANKET

NO SCALE

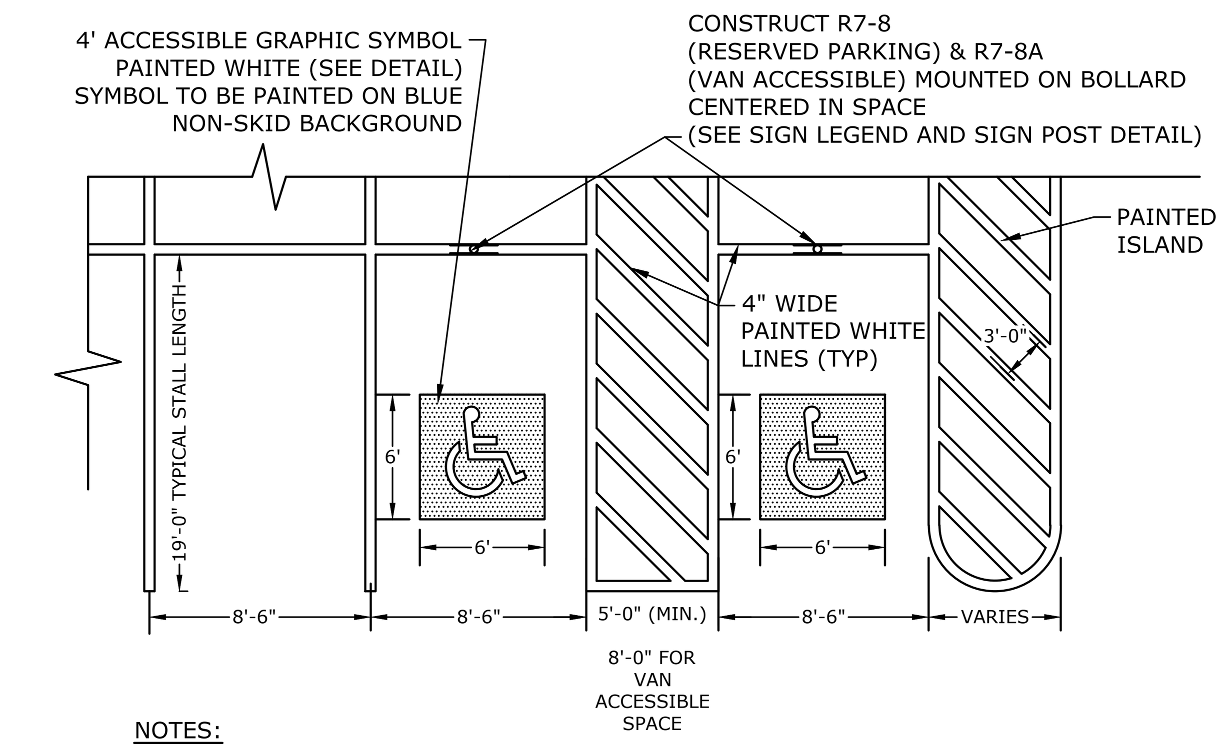


NOTES:

1. SYMBOL SHALL BE CONSTRUCTED IN ALL ACCESSIBLE SPACES USING FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST ADA, STATE AND LOCAL REQUIREMENTS.

ACCESSIBLE SYMBOL

NO SCALE

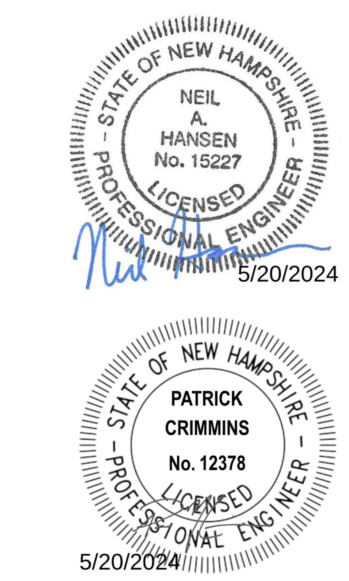


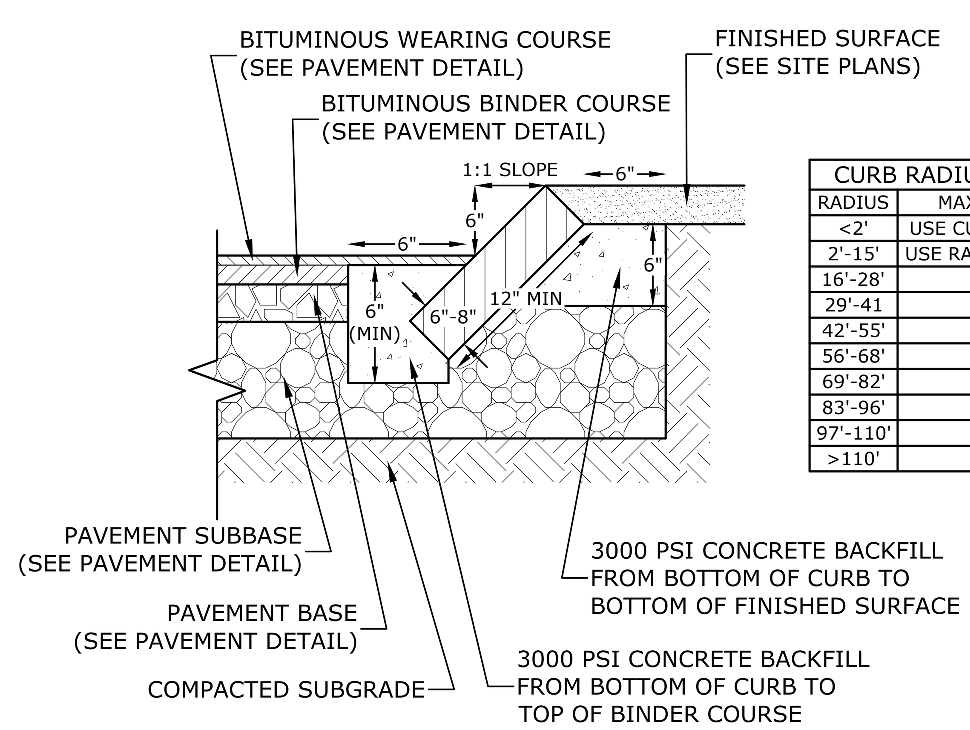
NOTES:

1. ALL PAINT SHALL BE FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOLS & PARKING STALLS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
3. FINISH PAVEMENT GRADES AT ALL HANDICAP ACCESSIBLE STALLS AND PAINTED ACCESS AISLES SHALL NOT EXCEED 2% IN ANY DIRECTION.

PARKING STALL/PAINTED ISLAND STRIPING

NO SCALE





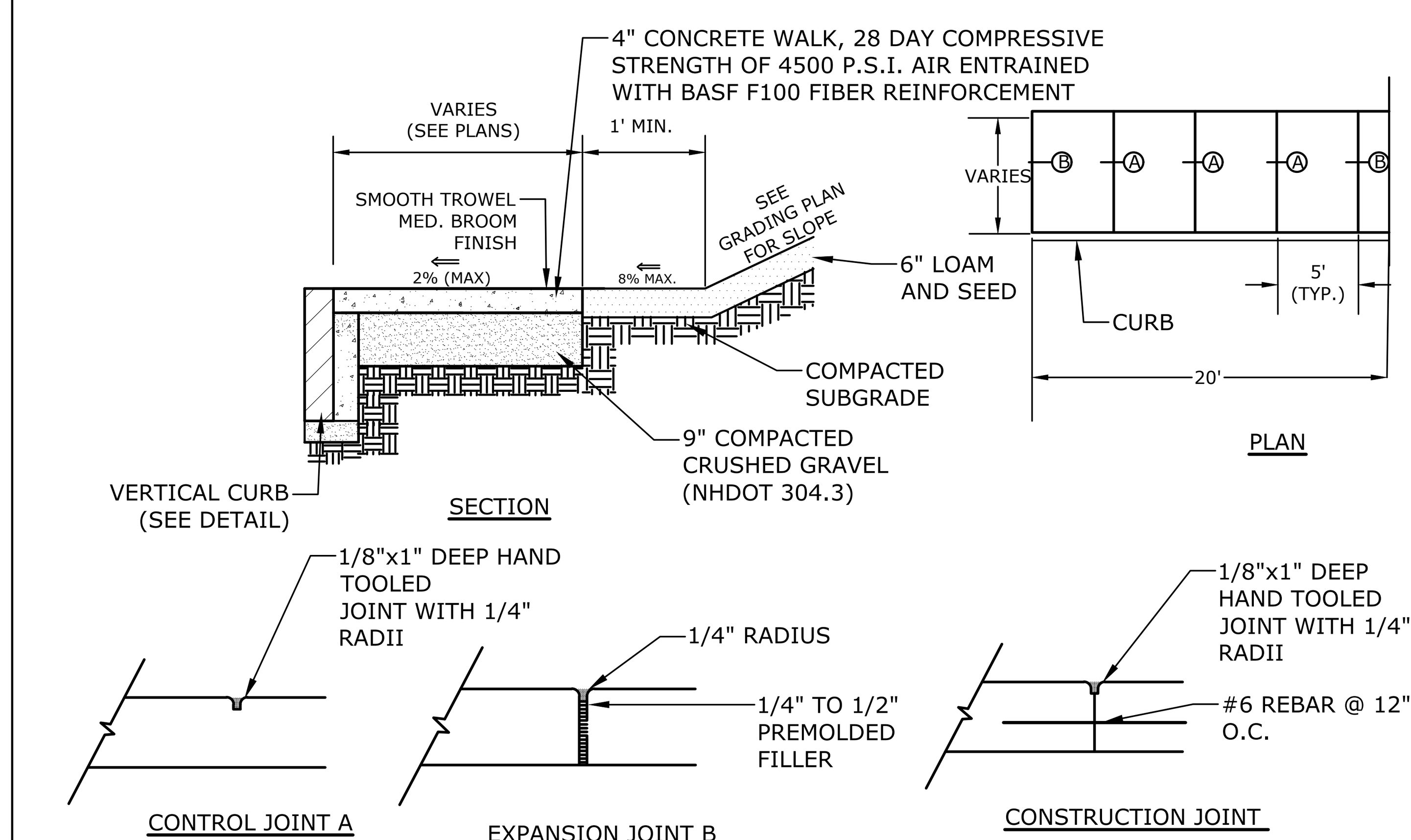
CURB RADIUS TABLE	
RADIUS	MAX LENGTH
<2'	USE CURVED CURB
2'-15'	USE RADIAL JOINTS
16'-28'	1'-6"
29'-41	2'
42'-55'	3'
56'-68'	4'
69'-82'	5'
83'-96'	6'
97'-110'	7'
>110'	8'

NOTES:

1. SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 18"
4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 8'
5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
6. JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

SLOPED GRANITE CURB

NO SCALE

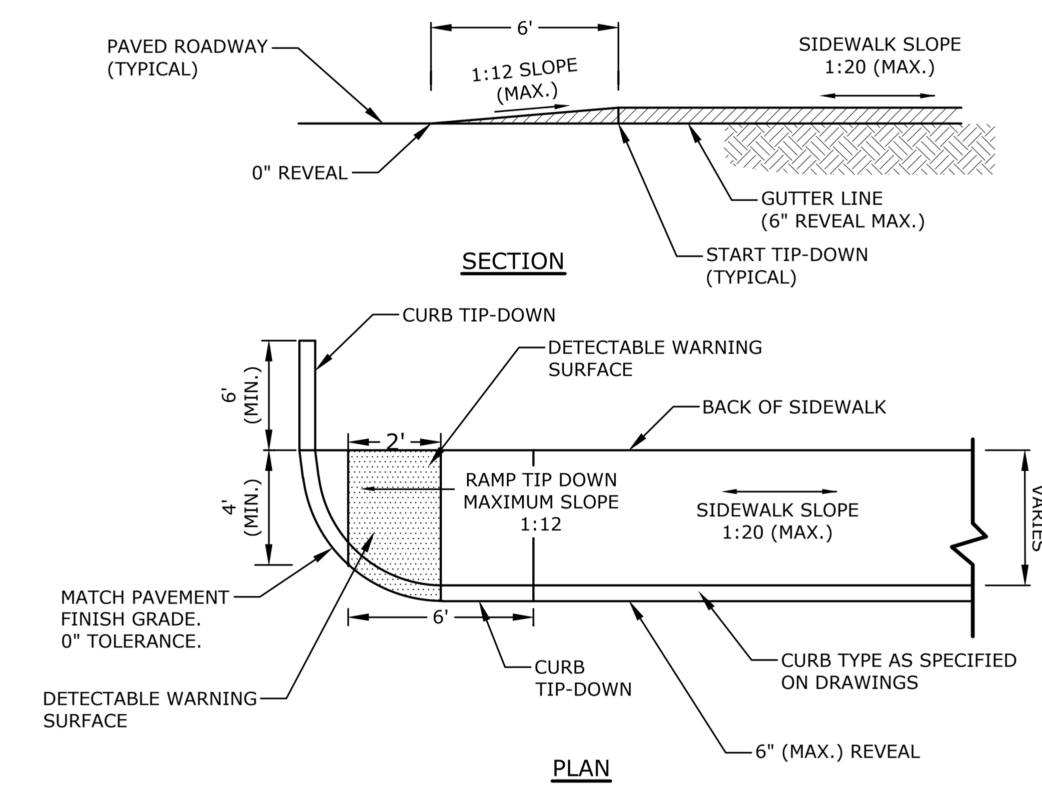


NOTES:

1. SIDEWALK SHALL BE CONSTRUCTED TO CITY OF PORTSMOUTH STANDARDS

CONCRETE SIDEWALK WITH GRANITE CURB

NO SCALE

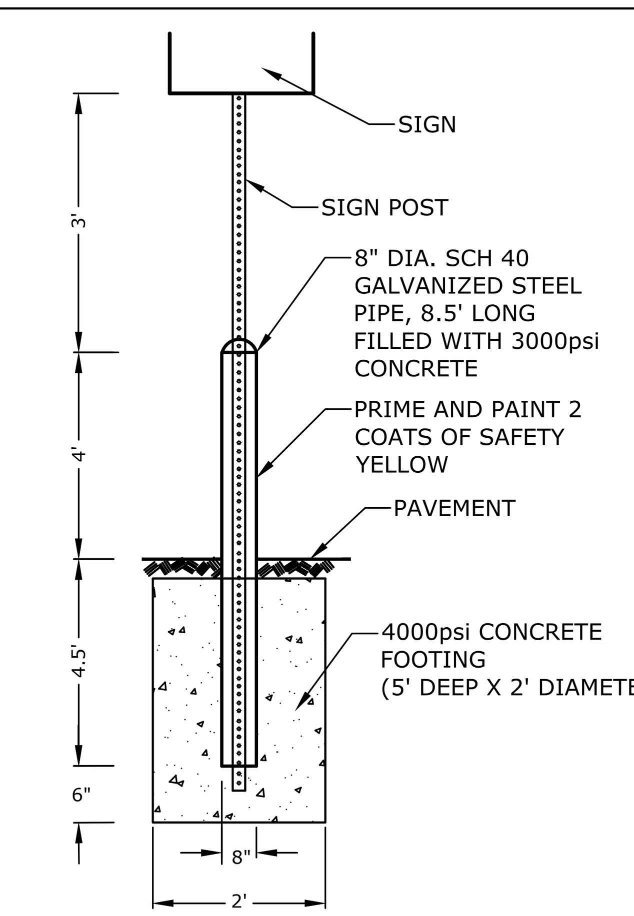


NOTES:

1. RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
2. PROVIDE 6" COMPACTED CRUSHED GRAVEL BASE BENEATH RAMPS.
3. DETECTABLE WARNING STRIP SHALL BE ADA SOLUTIONS, INC. CAST IN PLACE RAMP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

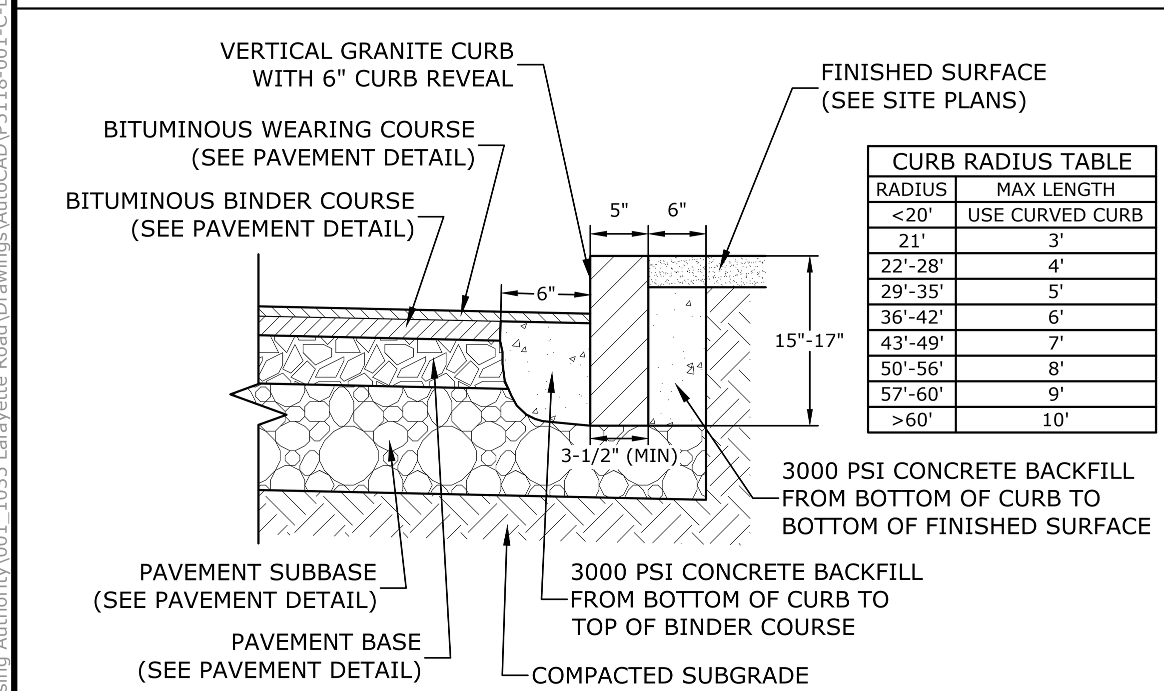
CONCRETE SIDEWALK TIP-DOWN RAMP

NO SCALE



BOLLARD MOUNTED SIGN DETAIL

NO SCALE



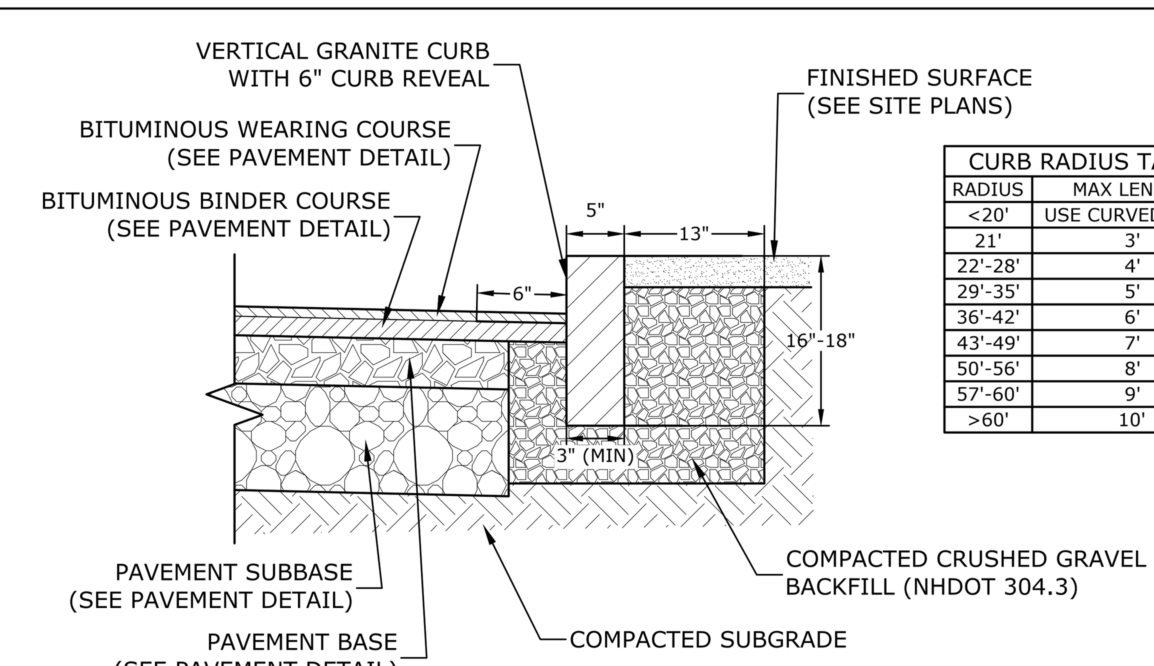
CURB RADIUS TABLE	
RADIUS	MAX LENGTH
<20'	USE CURVED CURB
21'	3'
22'-28'	4'
29'-35'	5'
36'-42'	6'
43'-49'	7'
50'-56'	8'
57'-60'	9'
>60'	10'

NOTES:

1. SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 3'
4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 10'
5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
6. ALL RADII 20 FEET AND SMALLER SHALL BE CONSTRUCTED USING CURVED SECTIONS.
7. JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

VERTICAL GRANITE CURB

NO SCALE



CURB RADIUS TABLE	
RADIUS	MAX LENGTH
<20'	USE CURVED CURB
21'	3'
22'-28'	4'
29'-35'	5'
36'-42'	6'
43'-49'	7'
50'-56'	8'
57'-60'	9'
>60'	10'

NOTES:

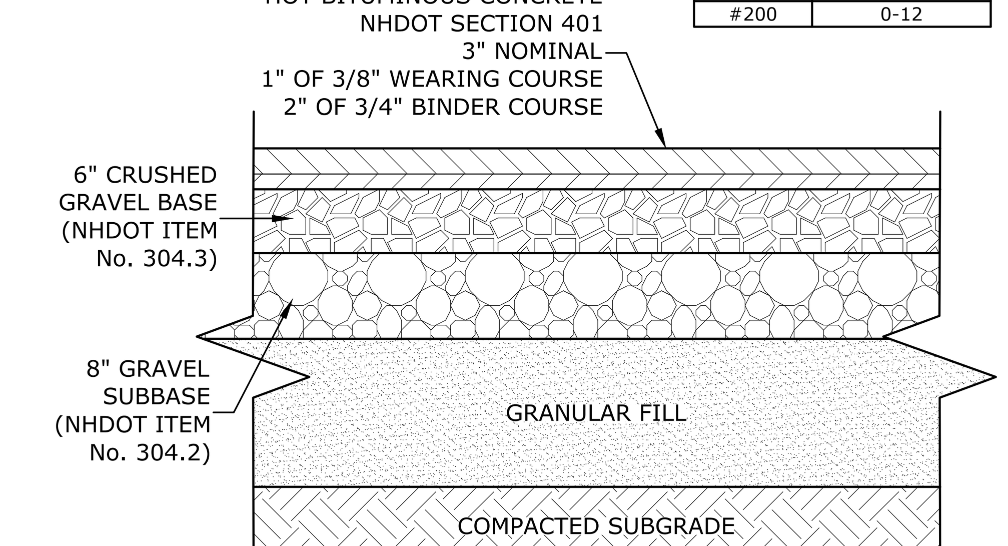
1. SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 3'
4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 10'
5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
6. ALL RADII 20 FEET AND SMALLER SHALL BE CONSTRUCTED USING CURVED SECTIONS.
7. JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

VERTICAL GRANITE CURB WITHIN DOT R.O.W.

NO SCALE

NHDOT ITEM No. 304.2 (GRAVEL)	
SIEVE SIZE	% PASSING
6"	100
#4	25-70
#200	0-12

NHDOT ITEM No. 304.3 (CRUSHED GRAVEL)	
SIEVE SIZE	% PASSING
3"	100
2"	95-100
1"	55-85
#4	27-52
#200	0-12

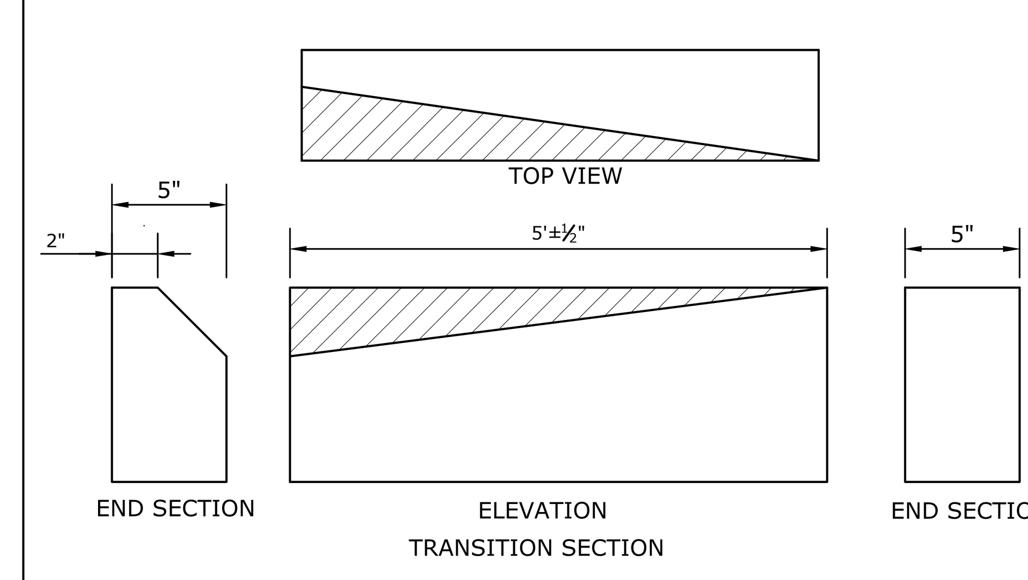


NOTES:

1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
3. A TACK COAT SHALL BE PLACED ON TOP OF BINDER COURSE PAVEMENT PRIOR TO PLACING WEARING COURSE.

TYPICAL PAVEMENT SECTION

NO SCALE



MOUNTABLE VERTICAL GRANITE CURB TO VERTICAL GRANITE CURB

NOTES:

1. THE INTENT OF THIS ITEM IS TO PROVIDE A SMOOTH TRANSITION BETWEEN VERTICAL GRANITE CURB AND MOUNTABLE VERTICAL GRANITE CURB WITHOUT REQUIRING FIELD CHIPPING DURING INSTALLATION. THE MOUNTABLE VERTICAL GRANITE CURB MAY REQUIRE ADJUSTMENTS TO MEET THE TRANSITION PIECE HEIGHT. TRANSITION SLOPE CURB TO STANDARD REVEAL AS QUICKLY AS POSSIBLE TO PROVIDE FOR THIS SMOOTH TRANSITION.

CURB TRANSITION

NO SCALE

Tighe&Bond

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

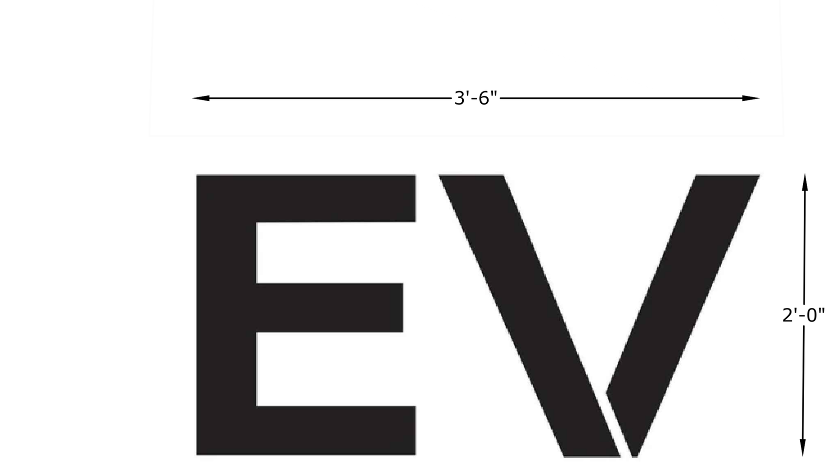
MARK	DATE	DESCRIPTION

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

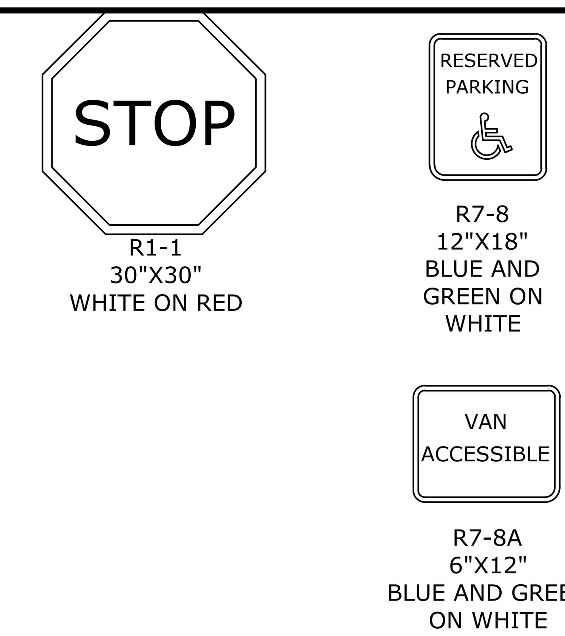
SCALE: AS SHOWN

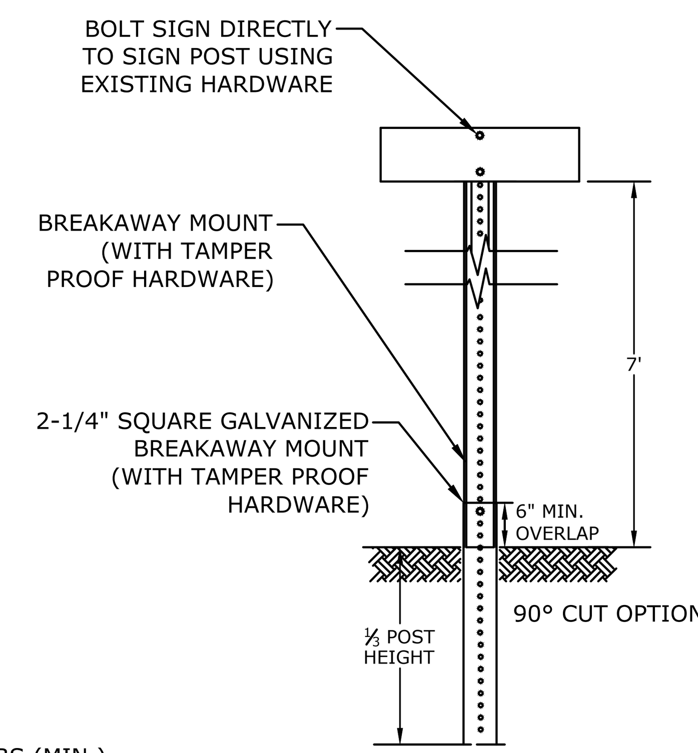
C-502



NOTES:
1. SYMBOL SHALL BE CONSTRUCTED IN ALL ELECTRIC VEHICLE SPACES USING FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST STATE AND LOCAL REQUIREMENTS.

EV CHARGING SYMBOL
NO SCALE



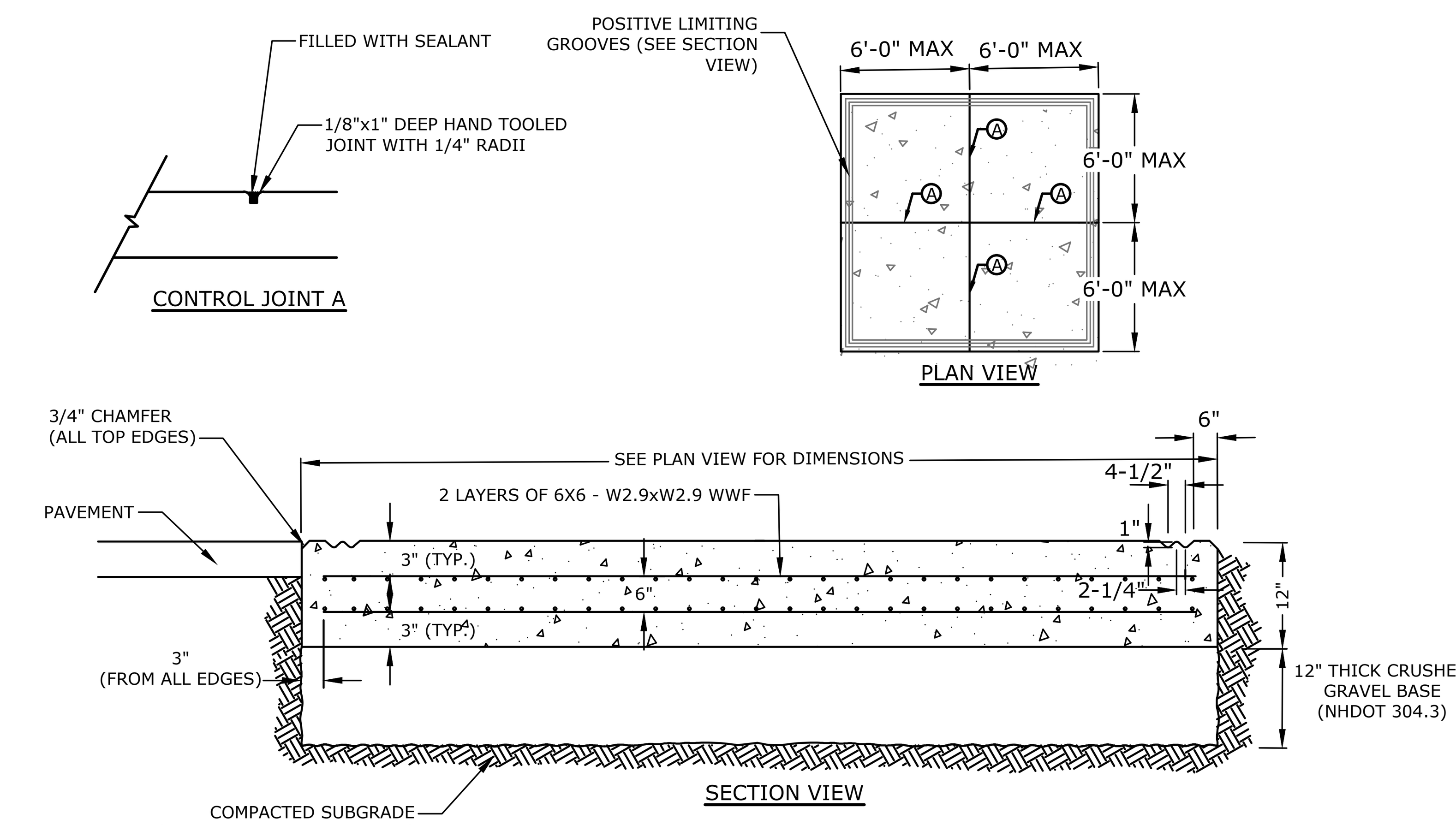


LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 7/16" DIAMETER, 1" C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASTM A-576 (GRADE 1070 - 1080)
FINISH: STREET SIGNS - GALVANIZED STEEL ALL OTHER - SHALL BE PAINTED WITH TWO COATS OF AN APPROVED MEDIUM GREEN BAKED ON OR DRIED, PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.

* IN LEDGE DRILL & GROUT TO A MIN OF 2'

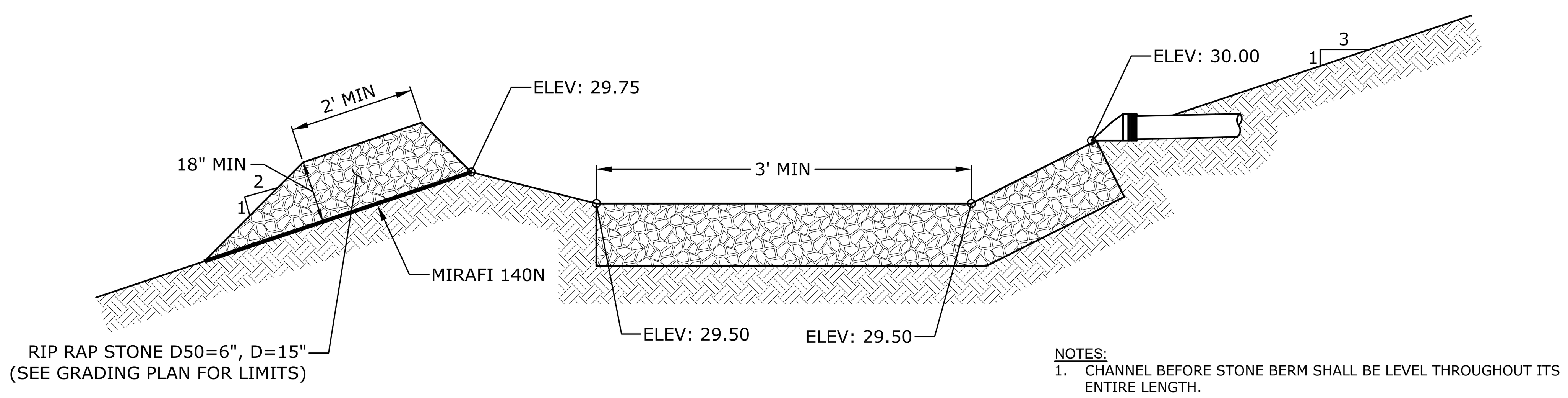
NOTES:
ALL SIGNS TO BE CONSTRUCTED PER THE LATEST EDITION OF THE FHWA STANDARD HIGHWAY SIGNS MANUAL AND INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.

SIGN LEGEND & SIGN POST
NO SCALE



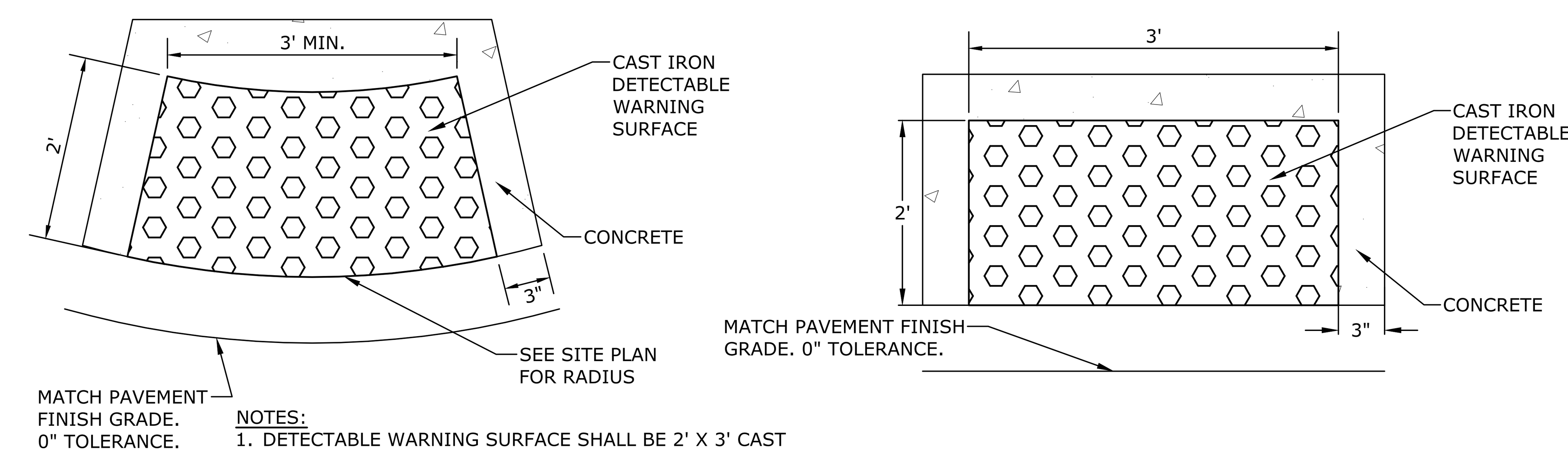
NOTES:
1. CONCRETE TO BE 4500 PSI, 7% AIR ENTRAINED
2. STANDARD BROOM FINISH.

DUMPSTER PAD
NO SCALE



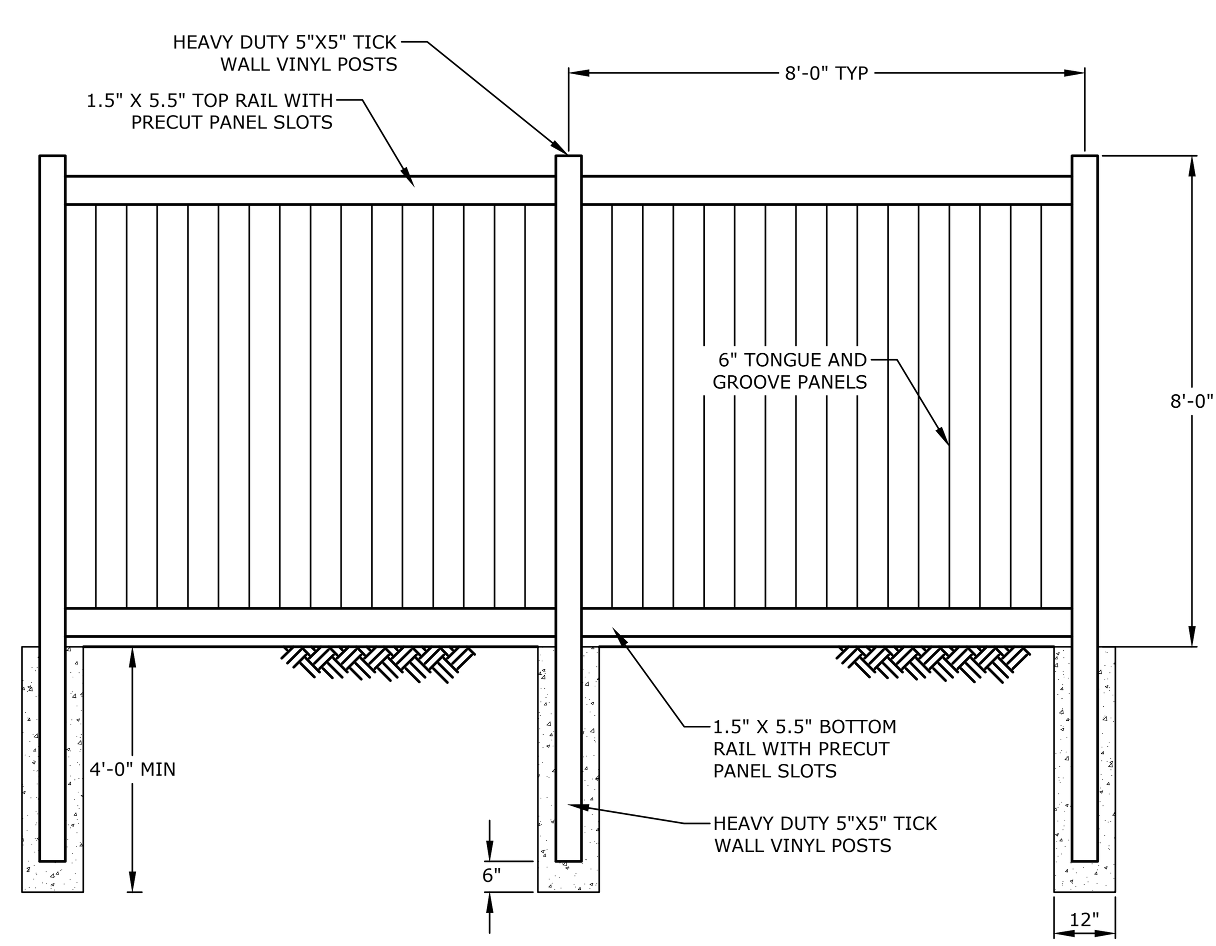
NOTES:
1. CHANNEL BEFORE STONE BERM SHALL BE LEVEL THROUGHOUT ITS ENTIRE LENGTH.

STONE BERM LEVEL SPREADER DETAIL
NO SCALE



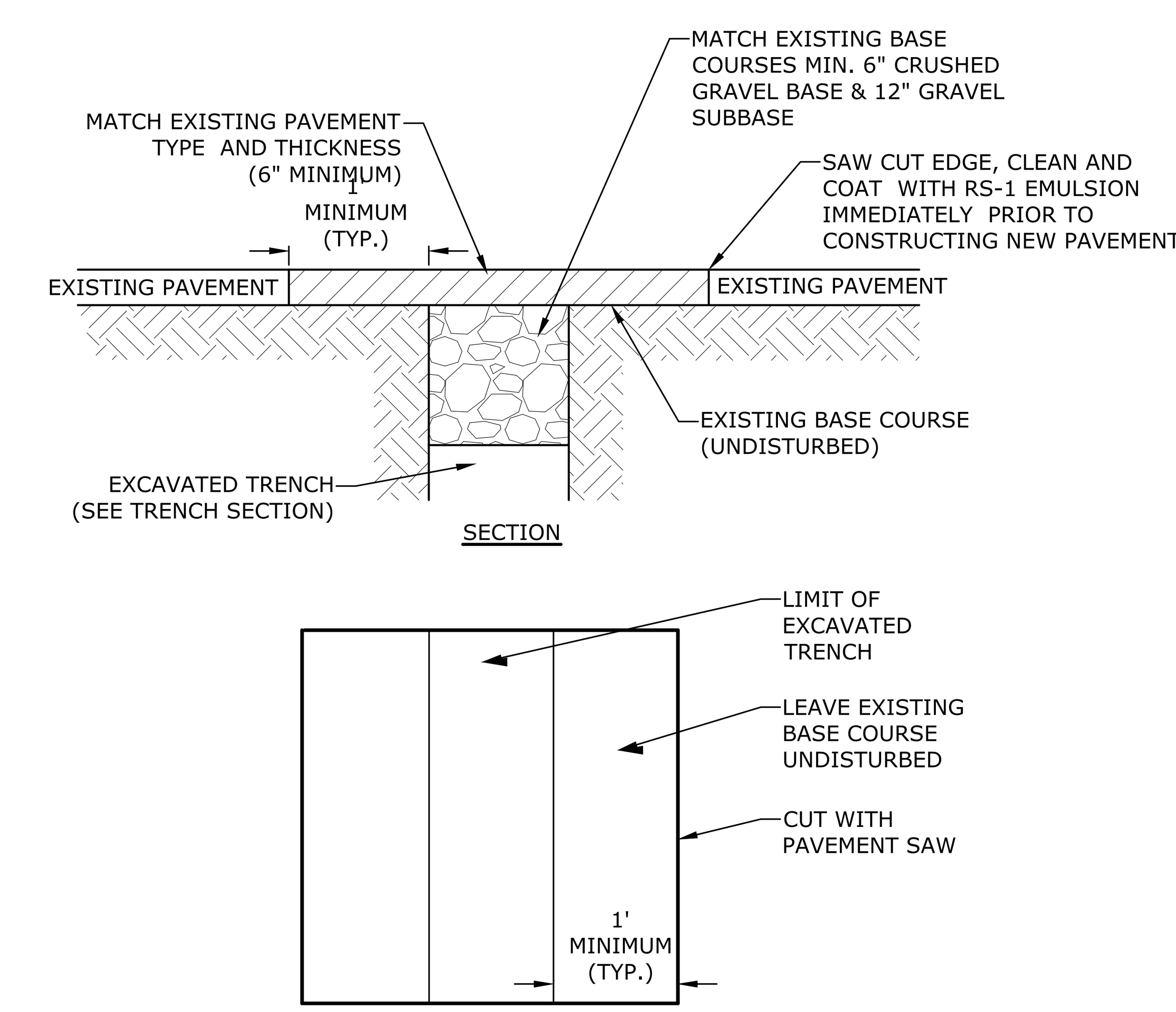
NOTES:
1. DETECTABLE WARNING SURFACE SHALL BE 2' X 3' CAST IRON PANEL SET IN CONCRETE.
2. DETECTABLE WARNING SURFACE SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

CAST IRON DETECTABLE WARNING SURFACE
NO SCALE



NOTES:
1. VINYL DUMPSTER ENCLOSE SHALL BE INSTALLED PER MANUFACTURER SPECIFICATIONS.
2. COORDINATE FINAL COLOR AND STYLE WITH OWNER PRIOR TO CONSTRUCTION.

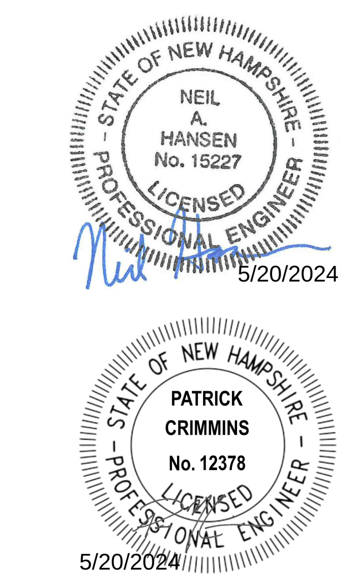
DUMPSTER PAD ENCLOSURE
NO SCALE



NOTE:
1. COORDINATE AND OBTAIN APPROVAL FOR ALL TRENCHING AND PATCHING WITHIN CITY RIGHT OF WAY WITH CITY OF PORTSMOUTH DPW PRIOR TO COMMENCING WORK.

ROADWAY TRENCH PATCH
NO SCALE

Tighe&Bond



Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION

PROJECT NO:	P5118-001
DATE:	May 20, 2024
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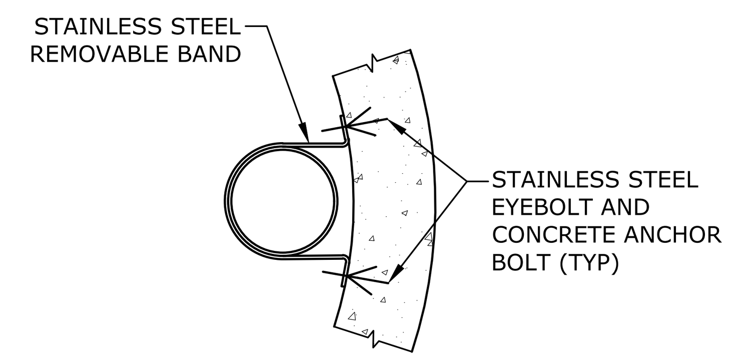
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

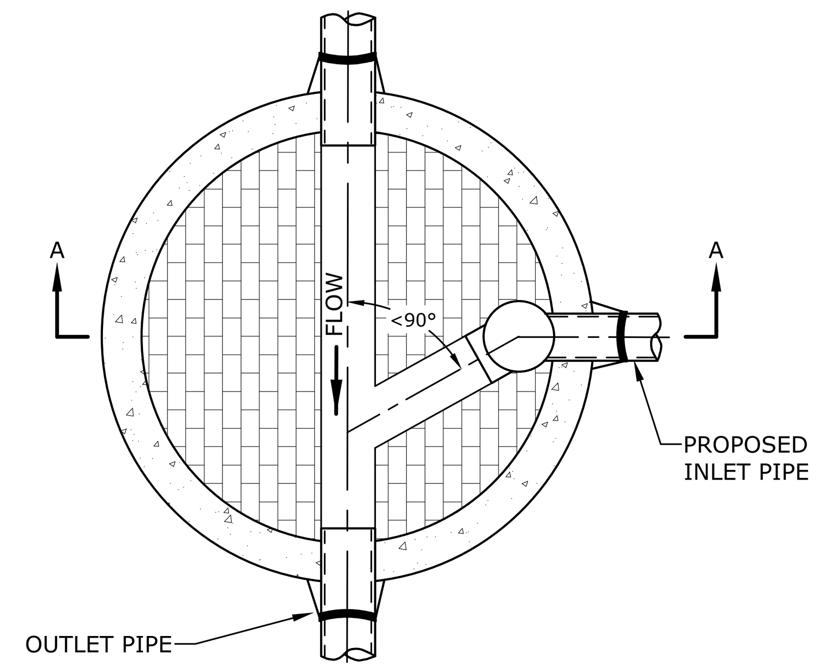
SCALE: AS SHOWN

C-503

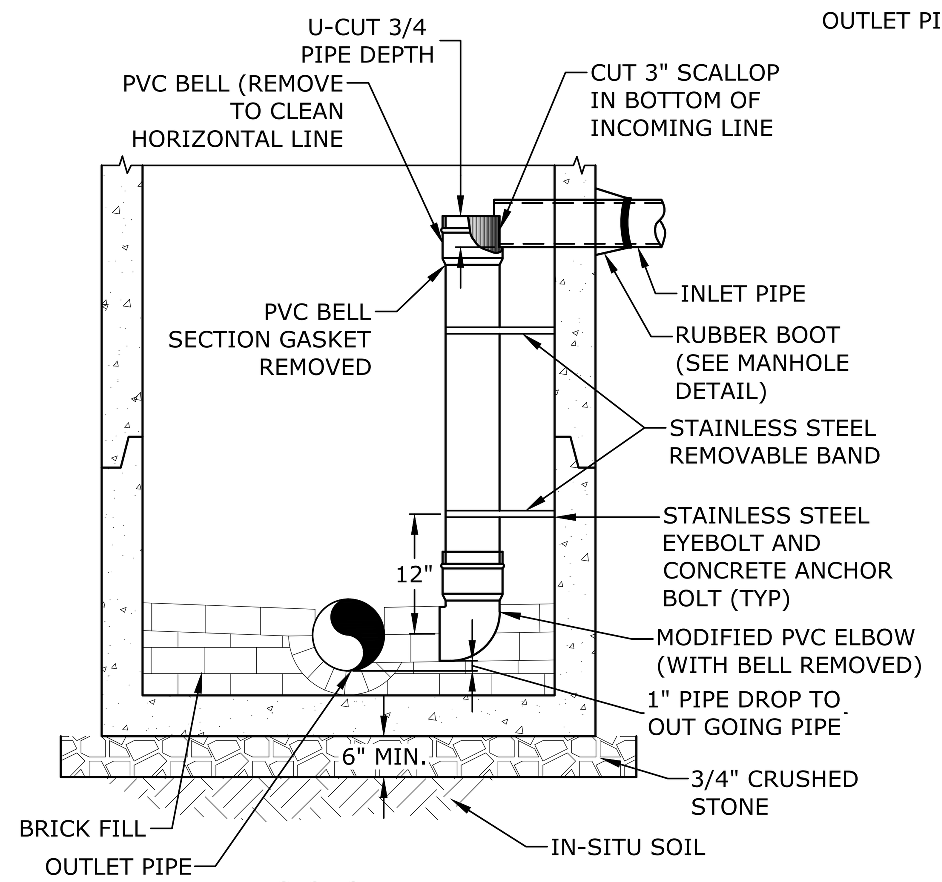
Tighe&Bond



PIPE STRAP DETAIL



PLAN

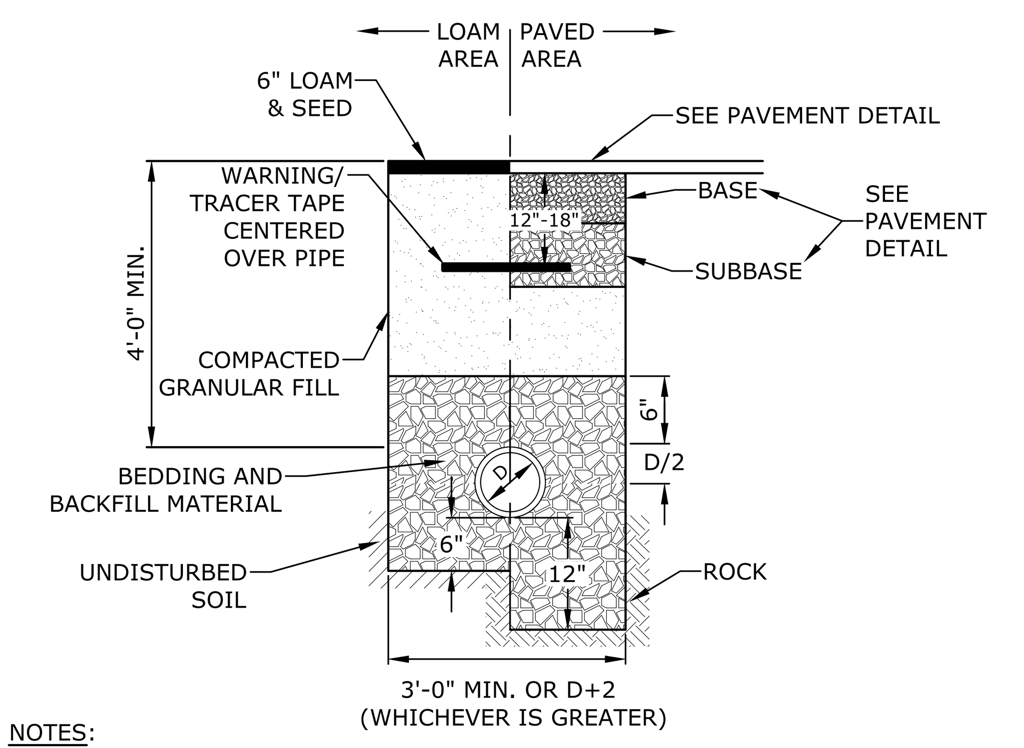


SECTION A-A

NOTES:
1. RISER PIPE AND FITTINGS SHALL BE THE SAME DIAMETER AS THE INLET PIPE AND SHALL BE CONSTRUCTED OF SDR35 PVC PIPE.
2. SANITARY SEWER SHALL BE INSTALLED PER THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS STANDARDS.
3. COORDINATE ALL INSTALLATIONS WITH THE CITY OF PORTSMOUTH.

INSIDE DROP MANHOLE

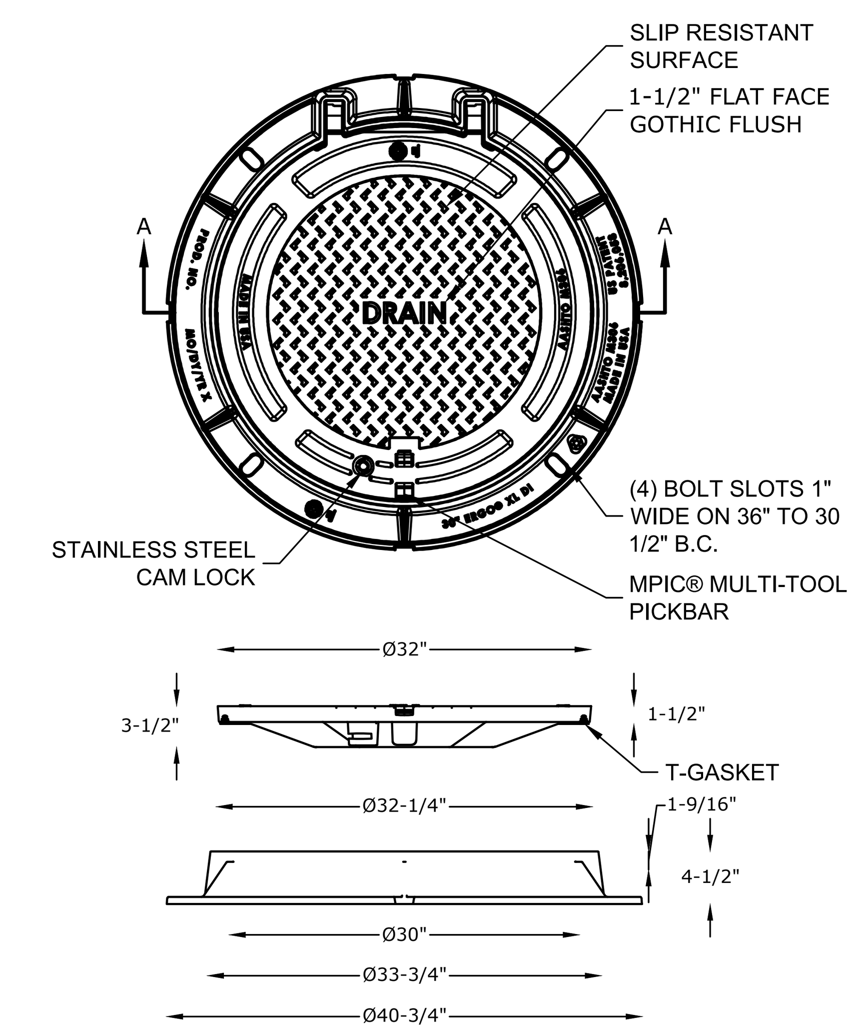
NO SCALE



NOTES:
1. CRUSHED STONE BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 6" ABOVE TOP OF PIPE.
2. ALL UTILITIES SHALL BE INSTALLED PER THE INDIVIDUAL UTILITY COMPANY STANDARDS. COORDINATE ALL INSTALLATIONS WITH INDIVIDUAL UTILITY COMPANIES AND THE CITY OF PORTSMOUTH.
3. DRAIN LINE SHALL BE INSULATED WHERE THERE IS LESS THAN 6' OF COVER IN PAVED AREAS AND LESS THAN 4' OF COVER IN NON-PAVED AREAS.

STORM DRAIN TRENCH

NO SCALE

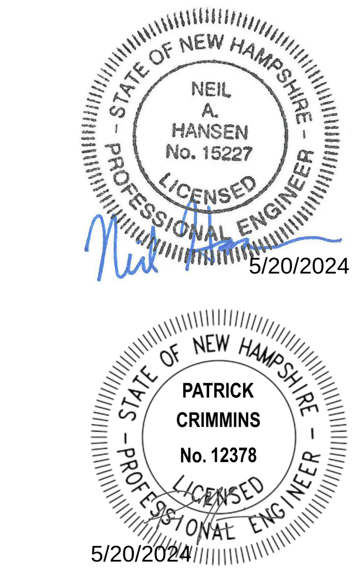


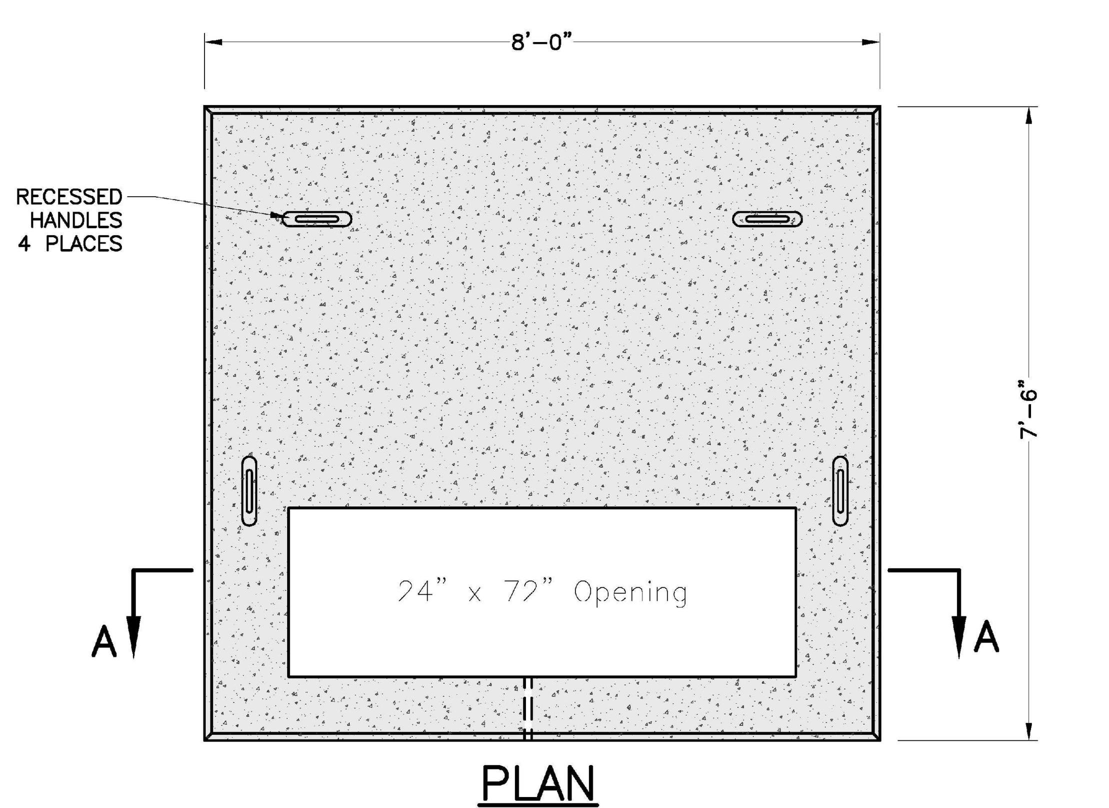
SECTION A-A

NOTES:
1. MANHOLE FRAME AND COVER SHALL BE 32" HINGED ERGO XL BY EJ CO.
2. ALL DIMENSIONS ARE NOMINAL.
3. FRAMES USING NARROWER DIMENSIONS FOR THICKNESS ARE ALLOWED PROVIDED:
   A. THE FRAMES MEET OR EXCEED THE SPECIFIED LOAD RATING.
   B. THE INTERIOR PERIMETER (SEAT AREA) DIMENSIONS OF THE FRAMES REMAIN THE SAME TO ALLOW CONTINUED USE OF EXISTING GRATES/COVERS AS THE EXISTING FRAMES ALLOW, WITHOUT SHIMS OR OTHER MODIFICATIONS OR ACCOMMODATIONS.
   C. ALL OTHER PERTINENT REQUIREMENTS OF THE SPECIFICATIONS ARE MET.
4. LABEL TYPE OF MANHOLE WITH 3" HIGH LETTERS IN HE CENTER OF THE COVER.

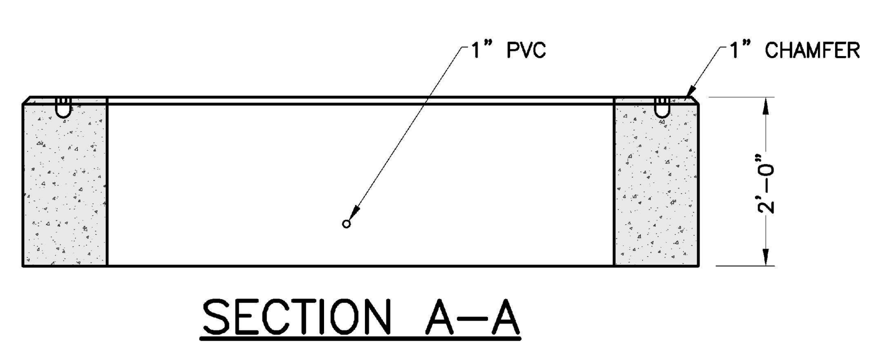
DRAIN MANHOLE FRAME & COVER

NO SCALE





PLAN

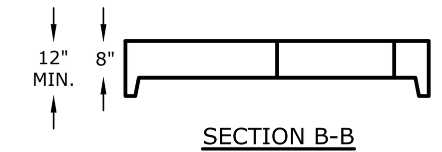


SECTION A–A

NOTES:
1. DIMENSIONS SHOWN REPRESENT TYPICAL REQUIREMENTS. MANHOLE LOCATIONS AND REQUIREMENTS SHALL BE COORDINATED WITH EVERSOURCE PRIOR TO CONSTRUCTION
2. CONCRETE MINIMUM STRENGTH - 4,000 PSI @ 28 DAYS
3. STEEL REINFORCEMENT - ASTM A615, GRADE 60
4. PAD MEETS OR EXCEEDS EVERSOURCE SPECIFICATIONS
5. TRANSFORMER PAD SHALL BE REVIEWED AND APPROVED BY EVERSOURCE PRIOR TO CONSTRUCTION.

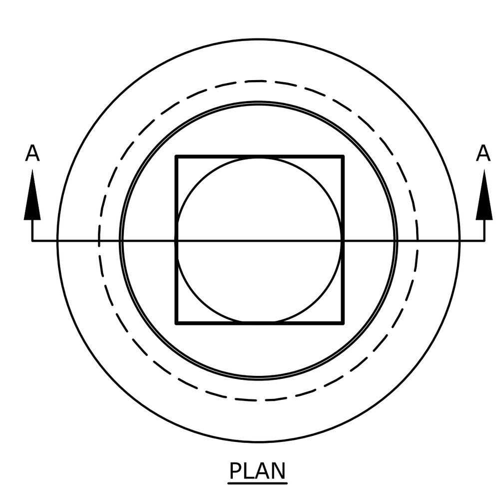
TRANSFORMER PAD DETAIL

NO SCALE

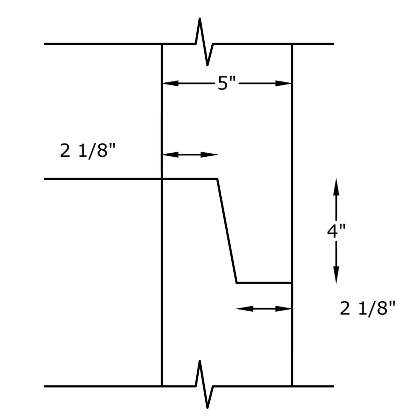


SECTION B-B

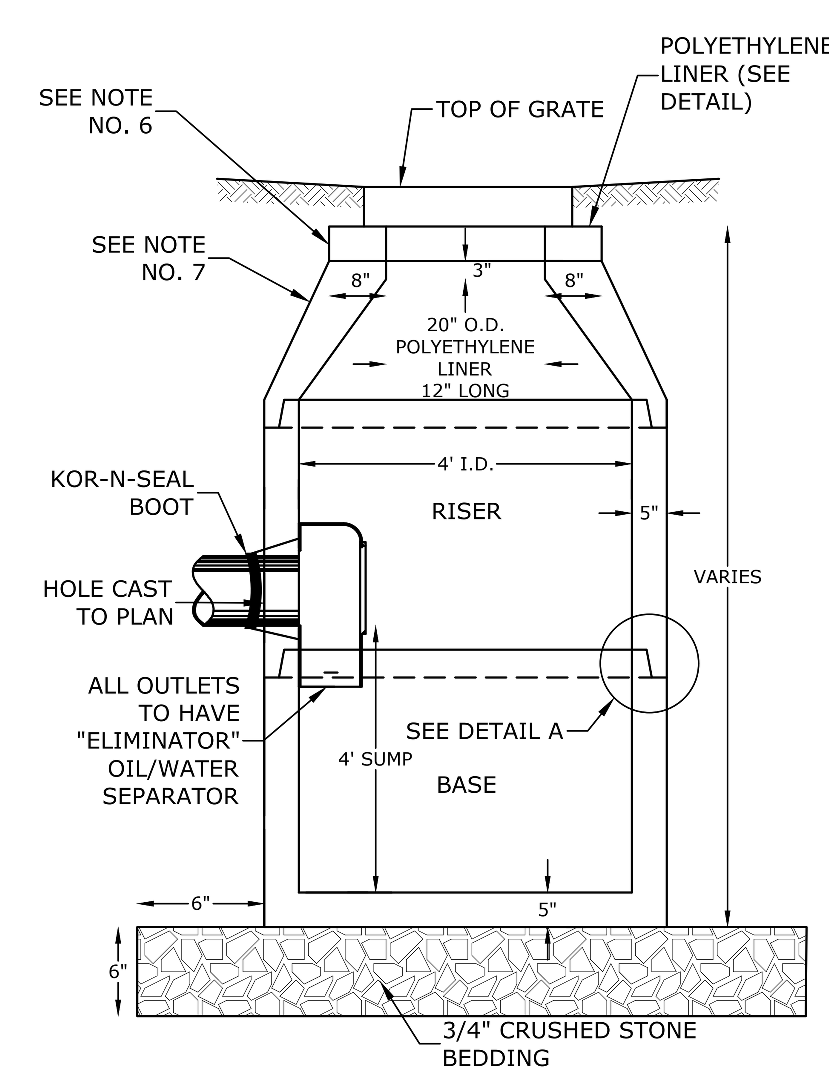
FLAT SLAB TOP



PLAN



DETAIL A
(TONGUE AND GROOVE JOINT)



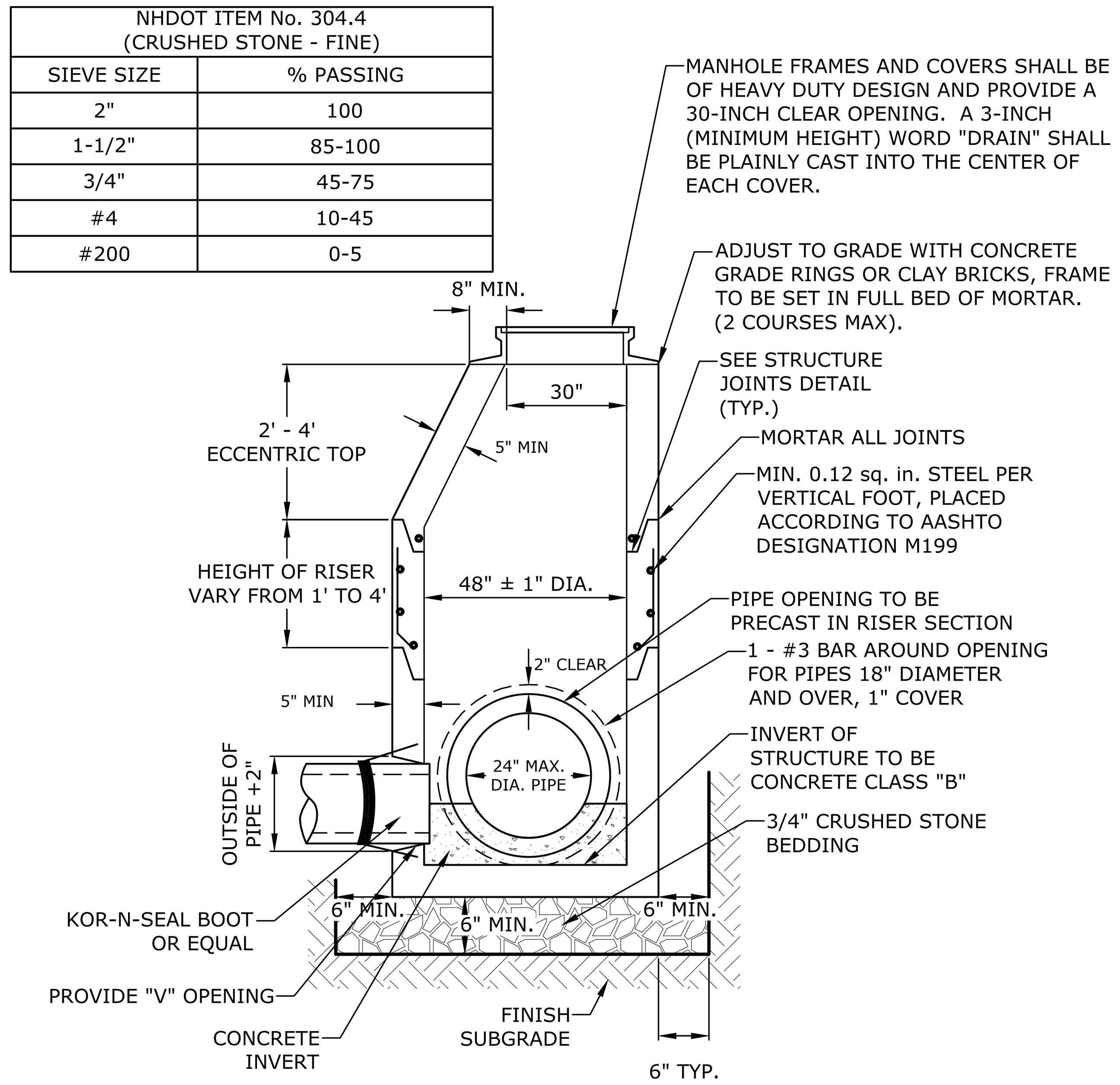
SECTION A-A

NOTES:
1. ALL SECTIONS SHALL BE CONCRETE CLASS AA(4000 psi).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQ.IN. PER LINEAR FT. IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE AND GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ. IN. PER LINEAR FT.
4. RISERS OF 1', 2', 3' & 4' CAN BE USED TO REACH DESIRED DEPTH.
5. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
6. FITTING FRAME TO GRADE MAY BE DONE WITH PREFABRICATED ADJUSTMENT RINGS OR CLAY BRICKS (2 COURSES MAX.).
7. CONE SECTIONS MAY BE EITHER CONCENTRIC OR ECCENTRIC, OR FLAT SLAB TOPS MAY BE USED WHERE PIPE WOULD OTHERWISE ENTER INTO THE CONE SECTION OF THE STRUCTURE AND WHERE PERMITTED.
8. PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
9. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
10. PRECAST SECTIONS SHALL HAVE A TONGUE AND GROOVE JOINT 4" HIGH AT AN 11° ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.
11. THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
12. "ELIMINATOR" OIL/WATER SEPARATOR SHALL BE INSTALLED TIGHT TO INSIDE OF CATCHBASIN.

4' DIAMETER CATCHBASIN

NO SCALE

NHDOT ITEM No. 304.4 (CRUSHED STONE - FINE)	
SIEVE SIZE	% PASSING
2"	100
1-1/2"	85-100
3/4"	45-75
#4	10-45
#200	0-5



NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE.
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE AND THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. CONSTRUCT CRUSHED STONE BEDDING AND BACKFILL UNDER (6" MINIMUM THICKNESS)
6. THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
7. PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
8. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
9. PRECAST SECTIONS SHALL HAVE A TONGUE AND GROOVE JOINT 4" HIGH AT AN 11° ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.
10. ALL STRUCTURES WITH MULTIPLE PIPES SHALL HAVE A MINIMUM OF 12" OF INSIDE SURFACE BETWEEN HOLES, NO MORE THAN 75% OF A HORIZNTAL CROSS SECTION SHALL BE HOLES, AND THERE SHALL BE NO HOLES CLOSER THAN 3" TO JOINTS.

4' DIAMETER DRAIN MANHOLE

NO SCALE

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Portsmouth Housing Authority

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Portsmouth, NH

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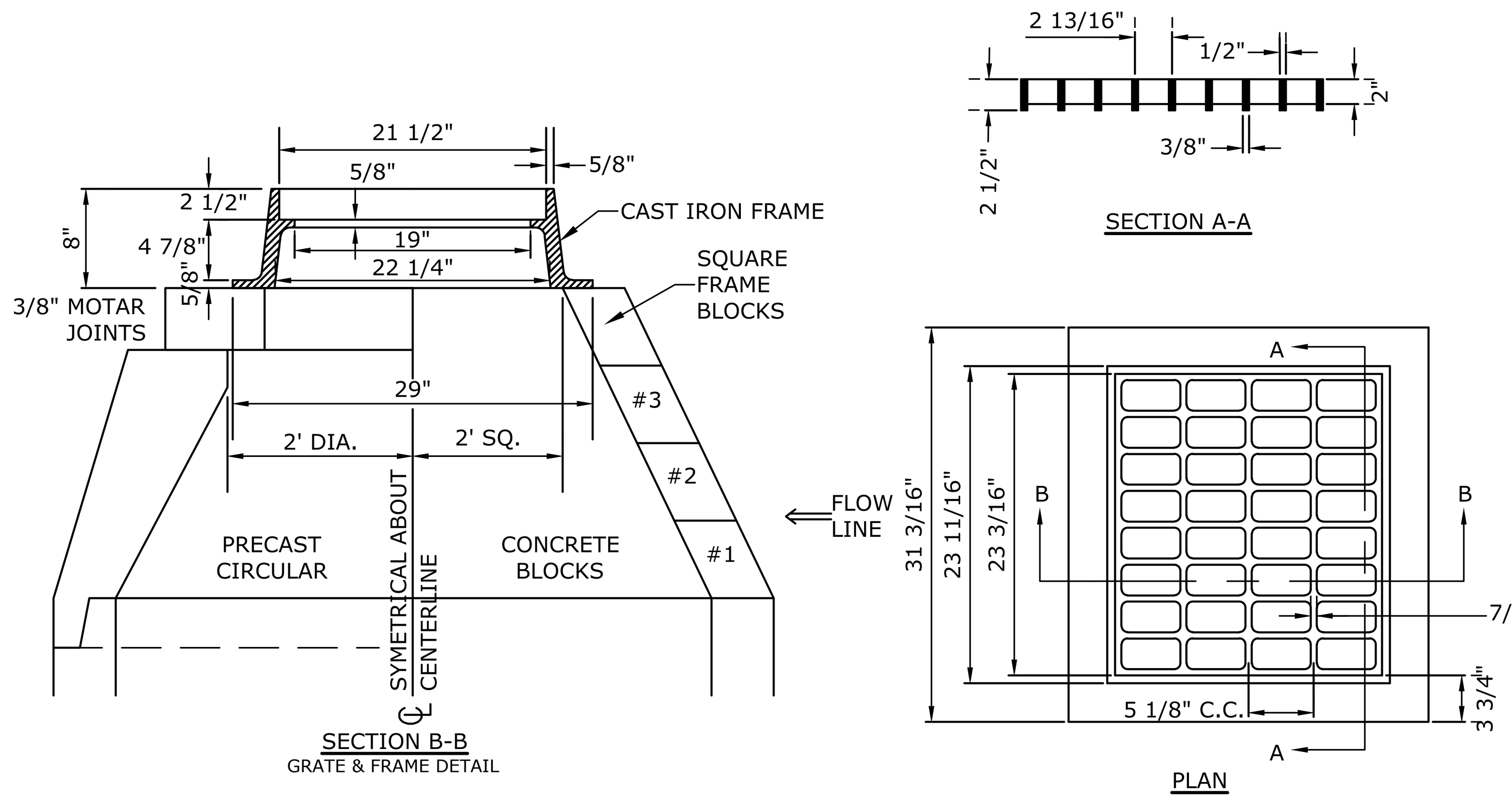
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

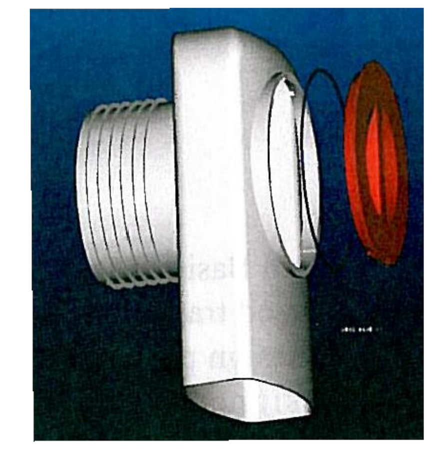
SCALE: AS SHOWN

C-504



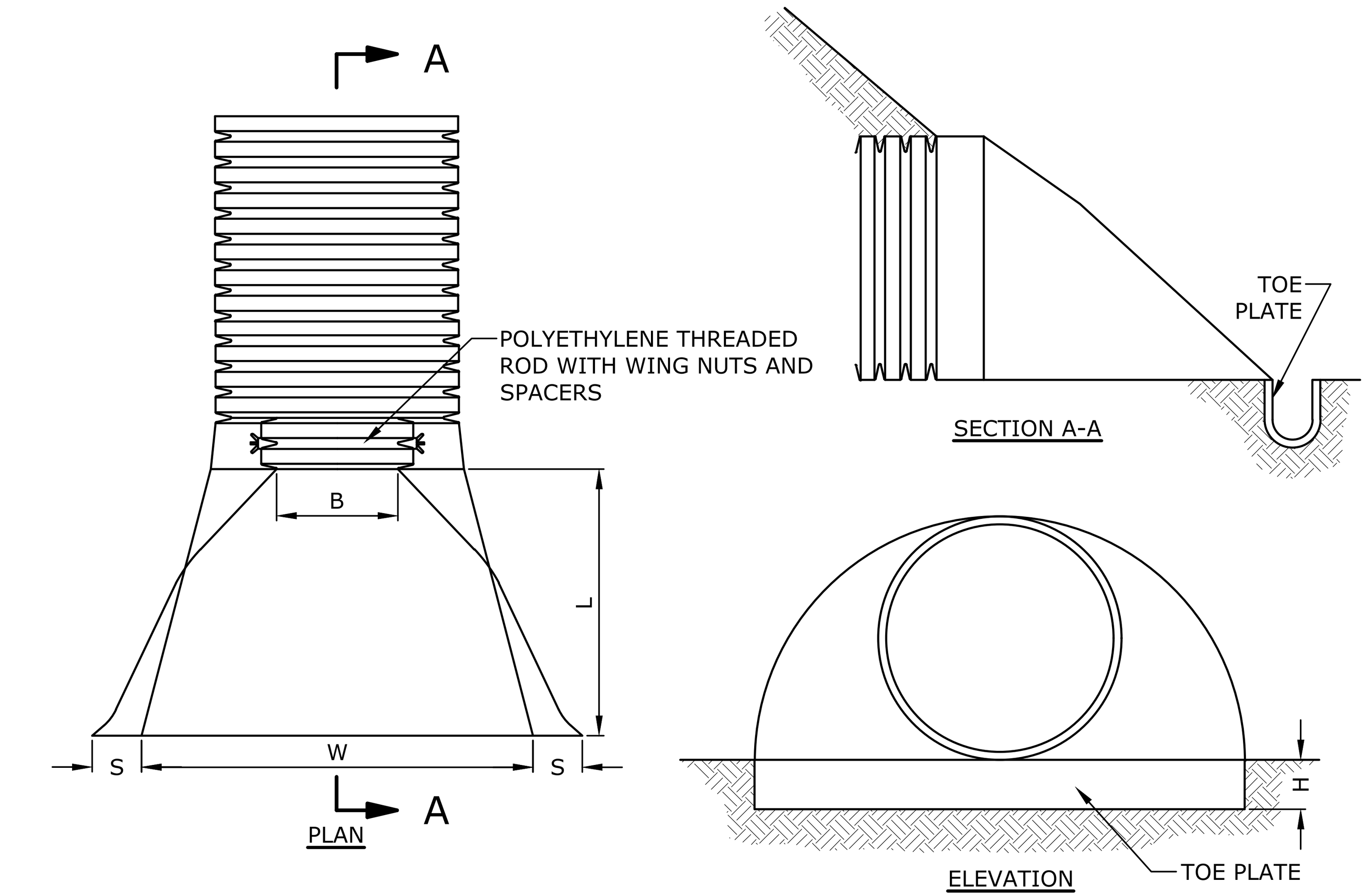
NOTES:
1. GRATE TO BE CAST IRON (NHDOT TYPE B ALTERNATE 1)
2. FRAME AND GRATE TO BE MANUFACTURED IN THE USA

CATCH BASIN FRAME & GRATE
NO SCALE



NOTES:
1. ALL CATCH BASIN OUTLETS TO HAVE "ELIMINATOR" OIL AND FLOATING DEBRIS TRAP MANUFACTURED BY KLEANSTREAM (NO EQUAL)
2. INSTALL DEBRIS TRAP TIGHT TO INSIDE OF STRUCTURE.
3. 1/4" HOLE SHALL BE DRILLED IN TOP OF DEBRIS TRAP

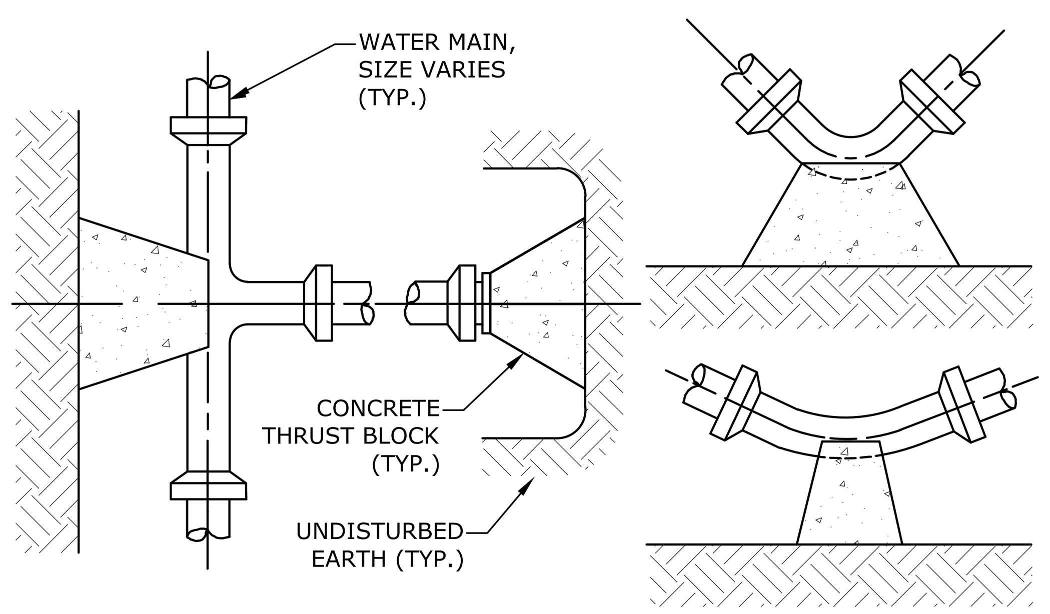
"ELIMINATOR" OIL FLOATING DEBRIS TRAP
NO SCALE



PIPE DIA.	S	B	H	L	W
12"	6.5"	10"	6.5"	25"	29"
15"	6.5"	10"	6.5"	25"	29"
18"	7.5"	15"	6.5"	32"	35"
24"	7.5"	18"	6.5"	36"	45"
30"	7.5"	12"	8.6"	58"	63"
36"	7.5"	25"	8.6"	58"	63"

NOTE:
1. END SECTIONS MANUFACTURED BY ADVANCED DRAINAGE SYSTEMS, COLUMBUS, OHIO. END SECTIONS TO BE WELDED TO PIPE AS PER MANUFACTURER'S RECOMMENDATIONS.

HDPE END SECTION
NO SCALE



TEST PRESSURE = 200psi

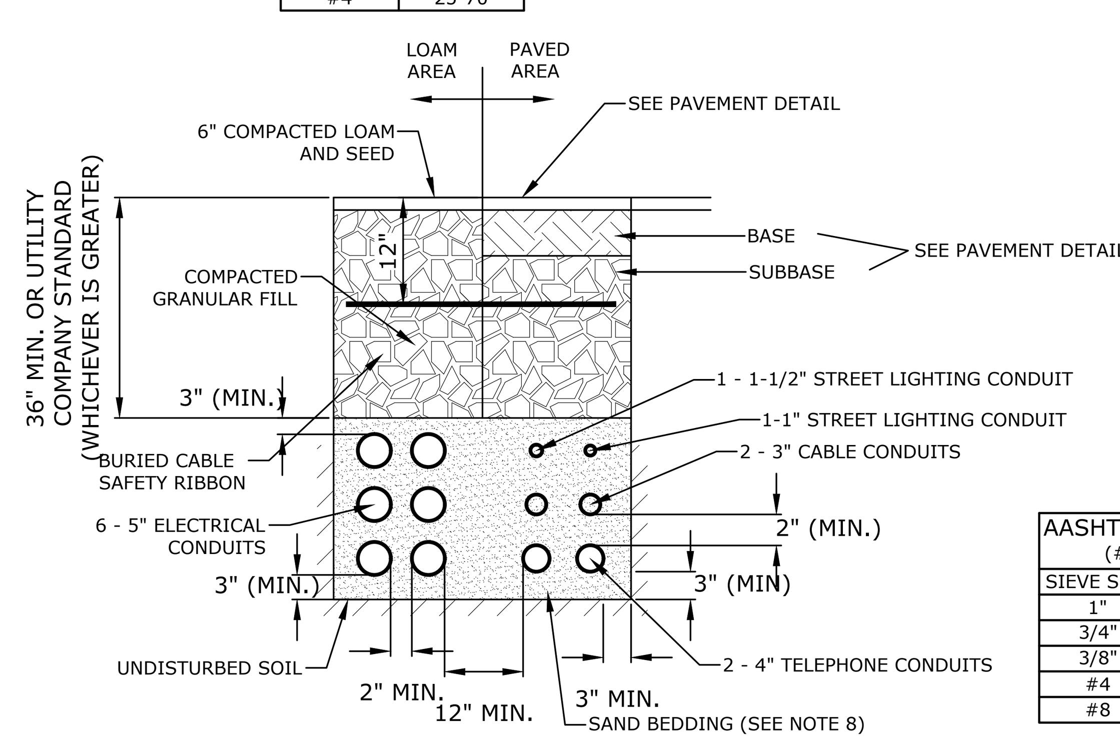
SQUARE FEET OF CONCRETE THRUST BLOCKING BEARING ON UNDISTURBED MATERIAL					
REACTION TYPE	PIPE SIZE				
	4"	6"	8"	10"	12"
A 90°	0.89	2.19	3.82	11.14	17.24
B 180°	0.65	1.55	2.78	8.38	12.00
C 45°	0.48	1.19	2.12	6.02	9.32
D 22-1/2°	0.25	0.60	1.06	3.08	4.74
E 11-1/4°	0.13	0.30	0.54	1.54	2.38

NOTES:
1. POUR THRUST BLOCKS AGAINST UNDISTURBED MATERIAL, WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE LOOSE MATERIAL AND EXTEND THRUST BLOCK TO UNDISTURBED MATERIAL. NO JOINTS SHALL BE COVERED WITH CONCRETE.
2. ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH OF FITTING.
3. PLACE BOARD IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS.
4. WHERE M.J. PIPE IS USED, M.J. PLUG WITH RETAINER GLAND MAY BE SUBSTITUTED FOR END BLOCKINGS.
5. INSTALLATION AND STANDARD DIMENSIONAL REQUIREMENTS SHALL BE WITH CITY OF PORTSMOUTH WATER DEPARTMENT STANDARDS.

THRUST BLOCKING DETAIL
NO SCALE

GRANULAR FILL (GRAVEL)	
SIEVE SIZE	% PASSING
3"	95-100
#4	25-70

SAND BLANKET	
SIEVE SIZE	% PASSING
1/2"	100
#200	15 MAX

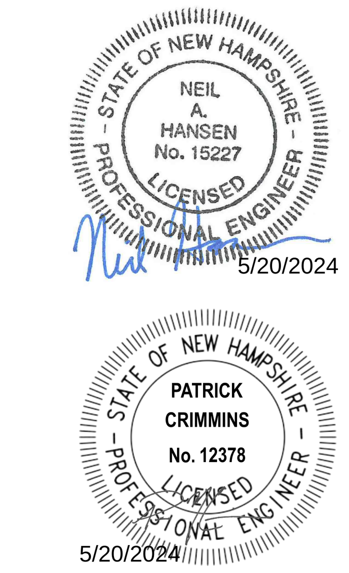


AASHTO #67 STONE (#4 to 3/4")	
SIEVE SIZE	% PASSING
1"	100
3/4"	90-100
3/8"	20-55
#4	0-10
#8	0-5

NOTES:
1. NUMBER, MATERIAL, AND SIZE OF UTILITY CONDUITS TO BE DETERMINED BY LOCAL UTILITY OR AS SHOWN ON ELECTRICAL DRAWINGS. CONTRACTOR TO PROVIDE ONE SPARE CONDUIT FOR EACH UTILITY TO BUILDING.
2. DIMENSIONS SHOWN REPRESENT OWNERS MINIMUM REQUIREMENTS. ACTUAL DIMENSIONS MAY BE GREATER BASED ON UTILITY COMPANY STANDARDS, BUT SHALL NOT BE LESS THAN THOSE SHOWN.
3. NO CONDUIT RUN SHALL EXCEED 360 DEGREES IN TOTAL BENDS.
4. A SUITABLE PULLING STRING, CAPABLE OF 200 POUNDS OF PULL, MUST BE INSTALLED IN THE CONDUIT BEFORE UTILITY COMPANY IS NOTIFIED TO INSTALL CABLE. THE STRING SHOULD BE BLOWN INTO THE CONDUIT AFTER THE RUN IS ASSEMBLED TO AVOID BONDING THE STRING TO THE CONDUIT.
5. UTILITY COMPANY MUST BE GIVEN THE OPPORTUNITY TO INSPECT THE CONDUIT PRIOR TO BACKFILL. THE CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS SHOULD THE UTILITY COMPANY BE UNABLE TO INSTALL ITS CABLE IN A SUITABLE MANNER.
6. ALL CONDUIT INSTALLATIONS MUST CONFORM TO THE CURRENT EDITION OF THE NATIONAL ELECTRIC SAFETY CODE, STATE AND LOCAL CODES AND ORDINANCES, AND, WHERE APPLICABLE, THE NATIONAL ELECTRIC CODE.
7. ALL 90° SWEEPS WILL BE MADE USING RIGID GALVANIZED STEEL. SWEEPS WITH A 36 TO 48 INCH RADIUS.
8. SAND BEDDING TO BE REPLACED WITH CONCRETE ENCASEMENT WHERE COVER IS LESS THAN 3 FEET, WHEN LOCATED BELOW PAVEMENT, OR WHERE REQUIRED BY EVERSOURCE.

ELECTRICAL AND COMMUNICATION CONDUIT TRENCH
NO SCALE

Tighe&Bond



Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

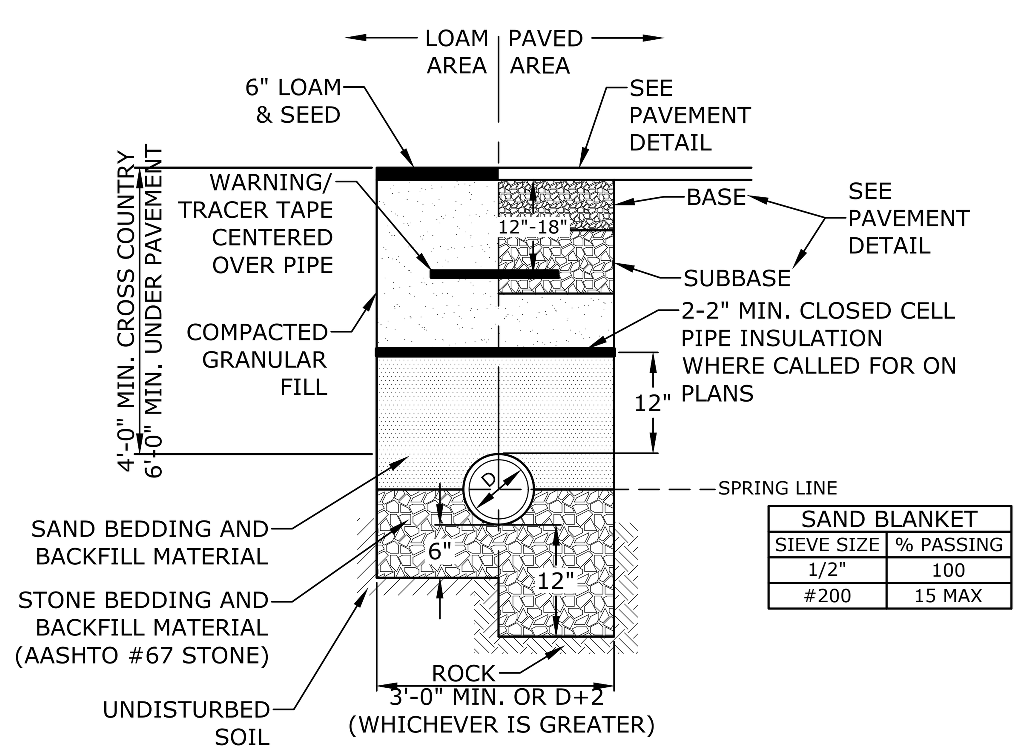
MARK	DATE	DESCRIPTION

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

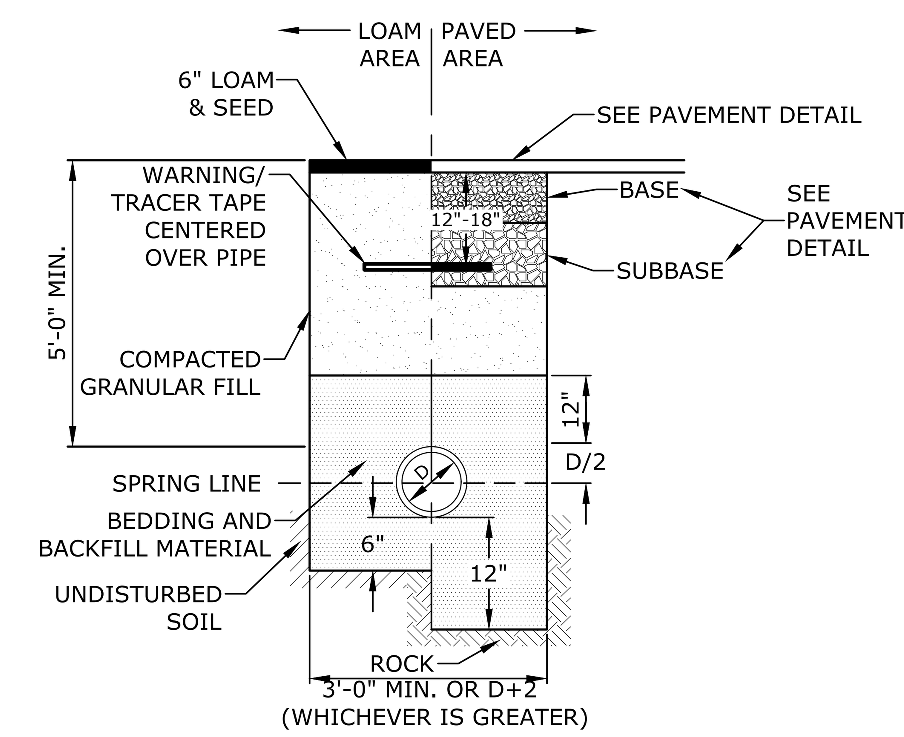
SCALE: AS SHOWN

C-505



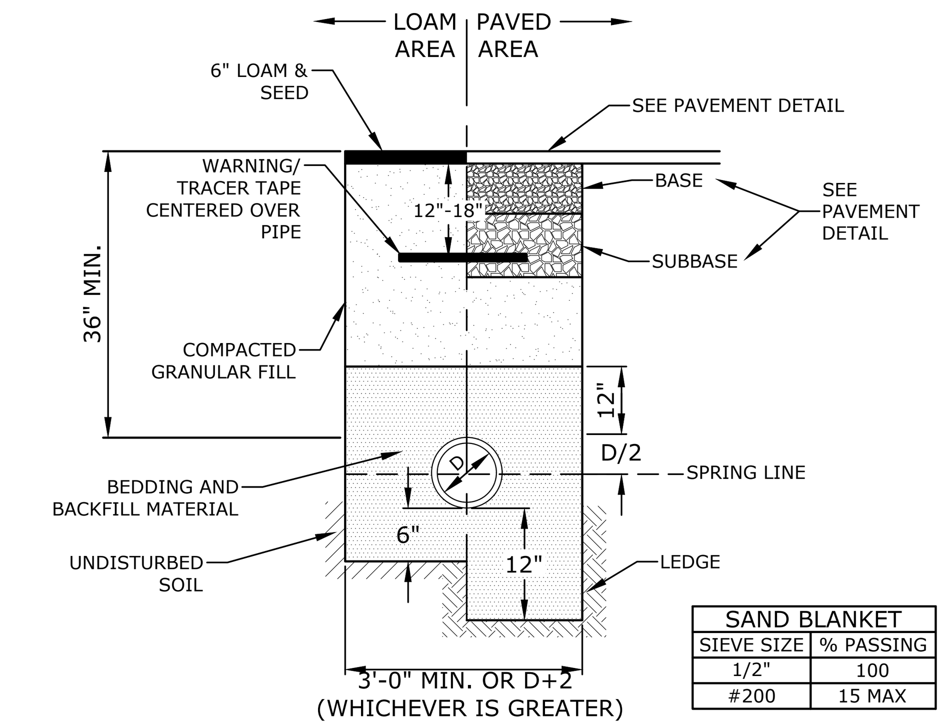
NOTE:
1. BEDDING FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK. BEDDING SHALL ALSO COMPLETELY ENCASE THE PIPE AND COVER THE PIPE TO A GRADE 12" OVER THE TOP OF THE PIPE FOR THE ENTIRE WIDTH OF THE TRENCH.
2. COORDINATE ALL INSTALLATIONS WITH THE CITY OF PORTSMOUTH.

SEWER SERVICE TRENCH
NO SCALE



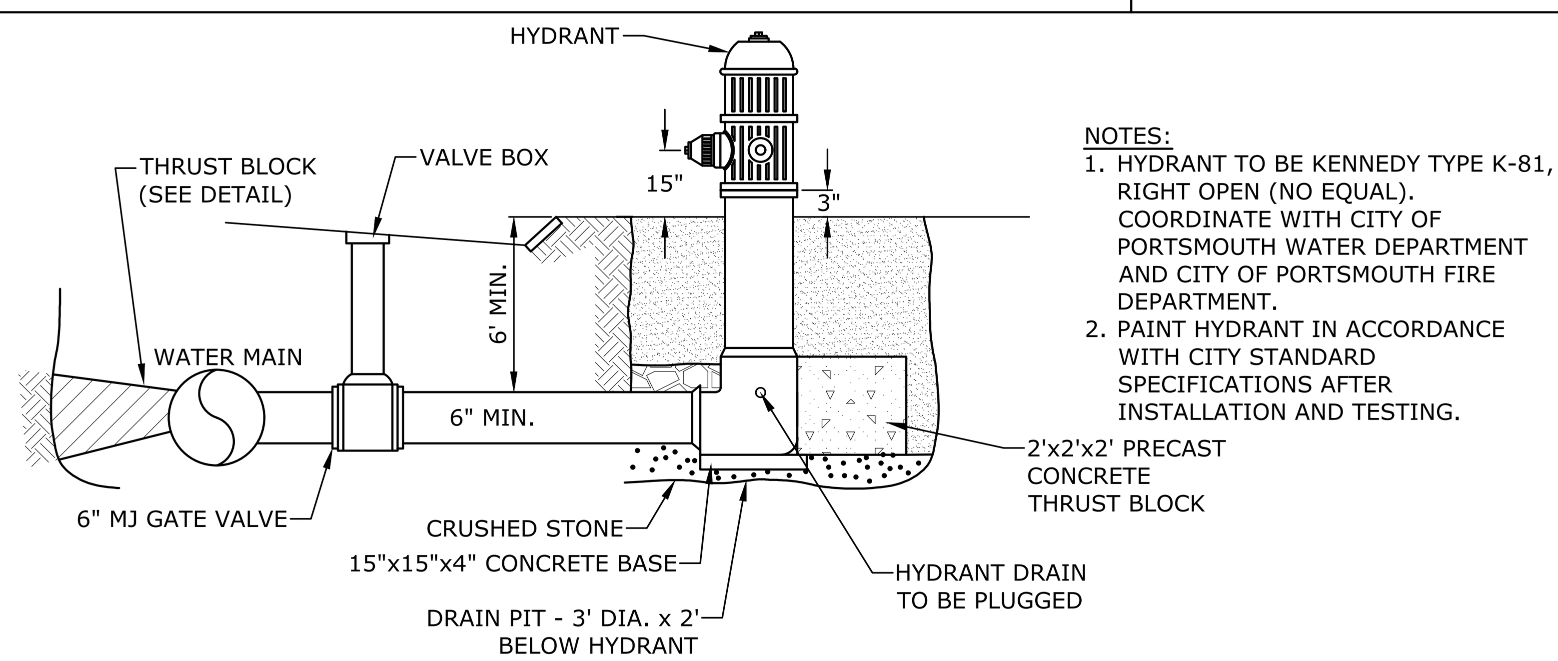
NOTES:
1. SAND BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 12" ABOVE TOP OF PIPE.
2. WATER MAIN SHALL BE INSTALLED PER CITY OF PORTSMOUTH STANDARDS. COORDINATE ALL INSTALLATIONS WITH THE CITY OF PORTSMOUTH.

WATER TRENCH
NO SCALE



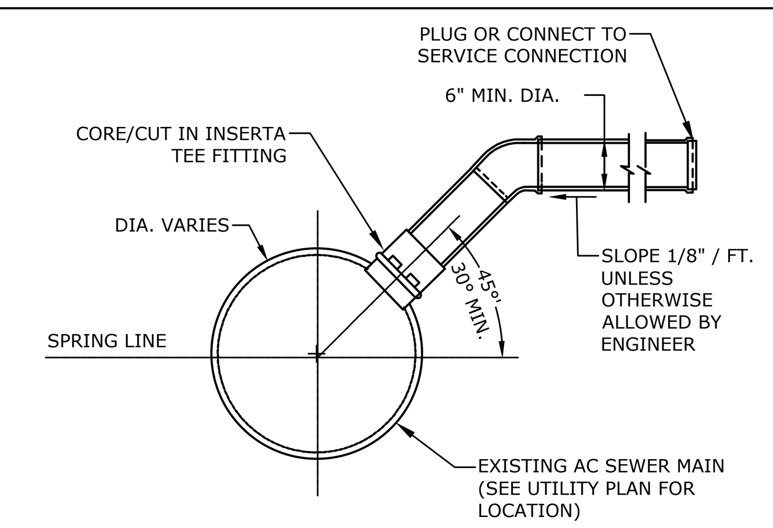
NOTES:
1. SAND BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 12" ABOVE TOP OF PIPE.
2. GAS LINE SHALL BE INSTALLED PER THE INDIVIDUAL UTILITY COMPANY STANDARDS. COORDINATE ALL INSTALLATIONS WITH INDIVIDUAL UTILITY COMPANIES AND THE CITY OF PORTSMOUTH.

GAS TRENCH
NO SCALE



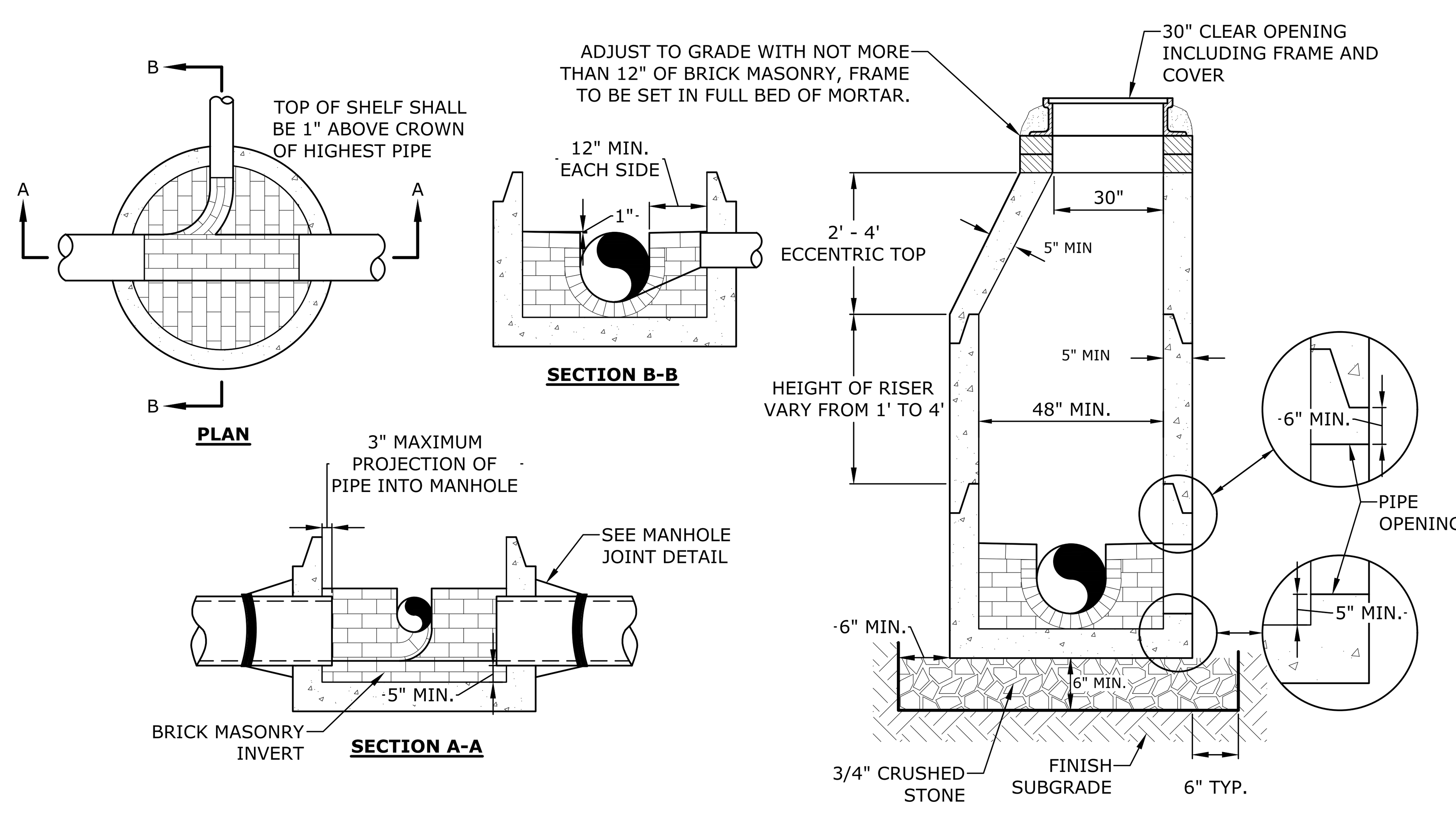
NOTES:
1. HYDRANT TO BE KENNEDY TYPE K-81, RIGHT OPEN (NO EQUAL). COORDINATE WITH CITY OF PORTSMOUTH WATER DEPARTMENT AND CITY OF PORTSMOUTH FIRE DEPARTMENT.
2. PAINT HYDRANT IN ACCORDANCE WITH CITY STANDARD SPECIFICATIONS AFTER INSTALLATION AND TESTING.

FIRE HYDRANT
NO SCALE



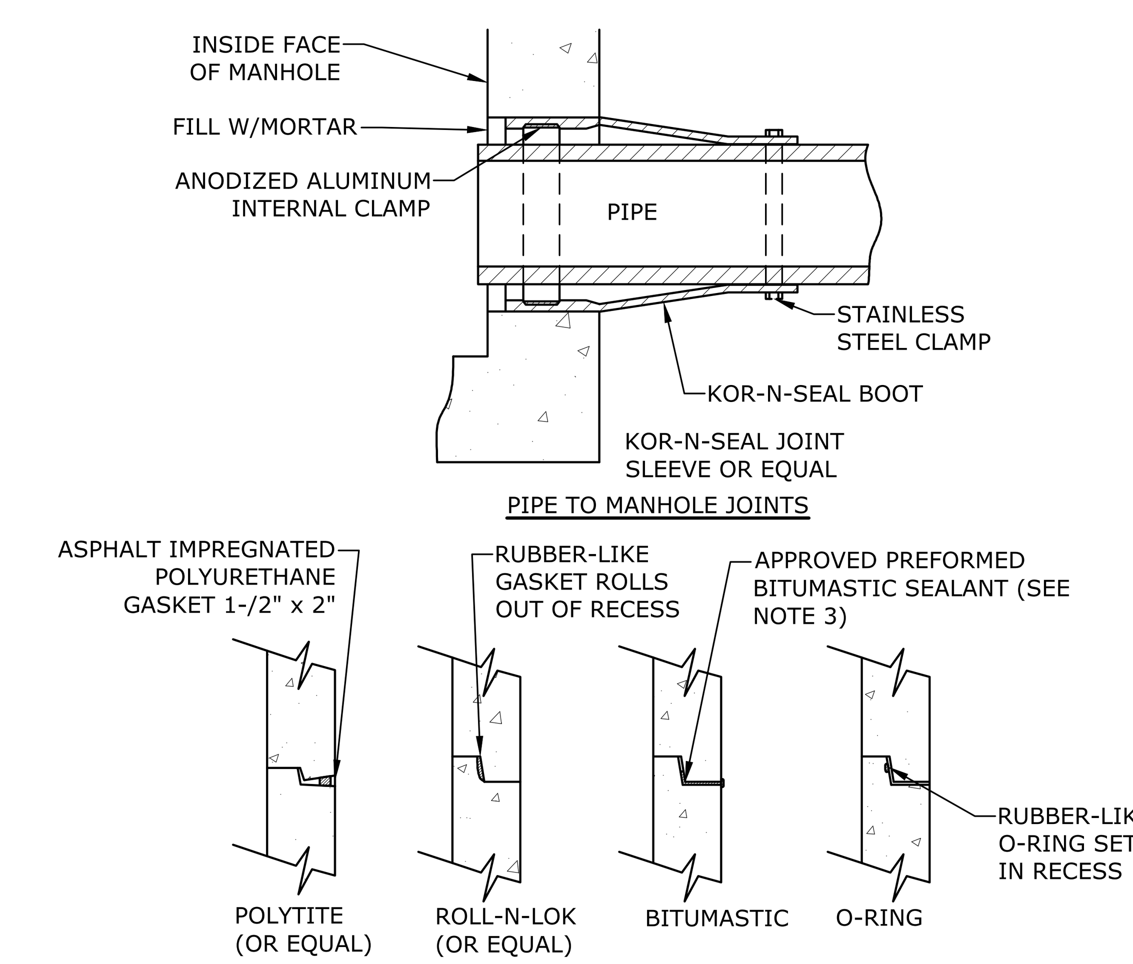
NOTES:
1. INSERTA TEE CONNECTION TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
2. SERVICE LATERAL CONNECTIONS SHALL BE INSTALLED IN ACCORDANCE WITH THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS.
3. THE EXISTING SEWER MAIN IS BELIEVED TO BE ASBESTOS CEMENT PIPE.

INSERTA-TEE LATERAL SERVICE CONNECTION
NO SCALE



NOTES:
1. INVERT AND SHELF TO BE PLACED AFTER EACH LEAKAGE TEST.
2. CARE SHALL BE TAKEN TO INSURE THAT THE BRICK INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT.
3. INVERT BRICKS SHALL BE LAID ON EDGE.
4. TWO (2) COATS OF BITUMINOUS WATERPROOF COATING SHALL BE APPLIED TO ENTIRE EXTERIOR OF MANHOLE.
5. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS WITHIN CITY RIGHT OF WAY SHALL BE CITY STANDARD HINGE COVERS MANUFACTURED BY EJ. FRAMES AND COVERS WILL BE PURCHASED FROM THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS. ALL OTHER MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30-INCH CLEAR OPENING. A 3-INCH (MINIMUM HEIGHT) WORD "SEWER" SHALL BE PLAINLY CAST INTO THE CENTER OF EACH COVER.
6. HORIZONTAL JOINTS SHALL BE SEALED FOR WATER TIGHTNESS USING A DOUBLE ROW OF ELASTOMERIC OR MASTIC-LIKE SEALANT.
7. BARREL AND CONE SECTIONS SHALL BE PRECAST REINFORCED CONCRETE DESIGNED FOR H20 LOADING, AND CONFORMING TO ASTM C478-06.

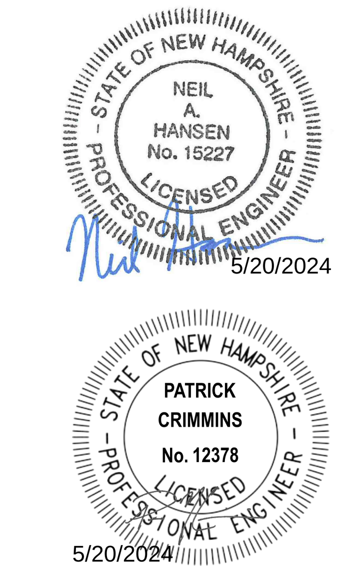
SEWER MANHOLE
NO SCALE



NOTES:
1. HORIZONTAL JOINTS BETWEEN THE SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE PER CITY OF PORTSMOUTH DPW STANDARD AND SHALL BE SEALED FOR WATERTIGHTNESS USING A DOUBLE ROW ELASTOMERIC OR MASTIC-LIKE GASKET.
2. PIPE TO MANHOLE JOINTS SHALL BE PER CITY OF PORTSMOUTH STANDARD.
3. FOR BITUMASTIC TYPE JOINTS THE AMOUNT OF SEALANT SHALL BE SUFFICIENT TO FILL AT LEAST 75% OF THE JOINT CAVITY.
4. ALL GASKETS, SEALANTS, MORTAR, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS.

MANHOLE JOINTS
NO SCALE

Tighe&Bond



Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION

PROJECT NO:	P5118-001
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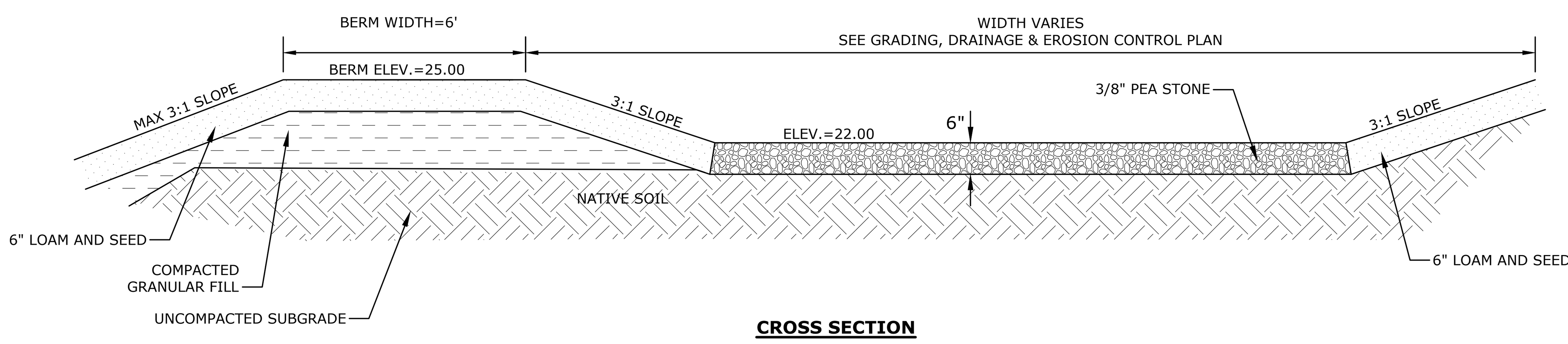
FILE:	P5118-001-C-DTLS.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

DETAILS

SCALE: AS SHOWN

C-506

Last Saved: 5/20/2024
Plotted On:May 20, 2024-12:19pm By: CKrzcuik
Tighe & Bond:J:\P\P5118 Portsmouth Housing Authority\001 1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DTLS.dwg



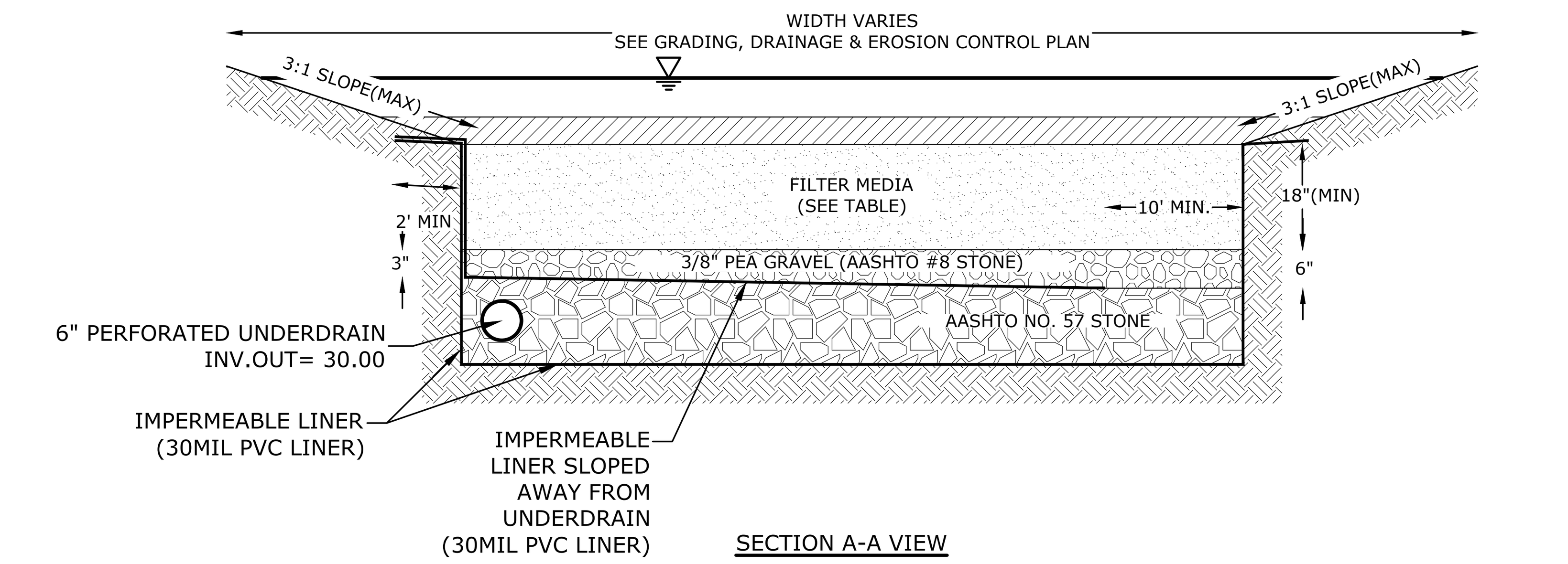
CROSS SECTION

NOTES:

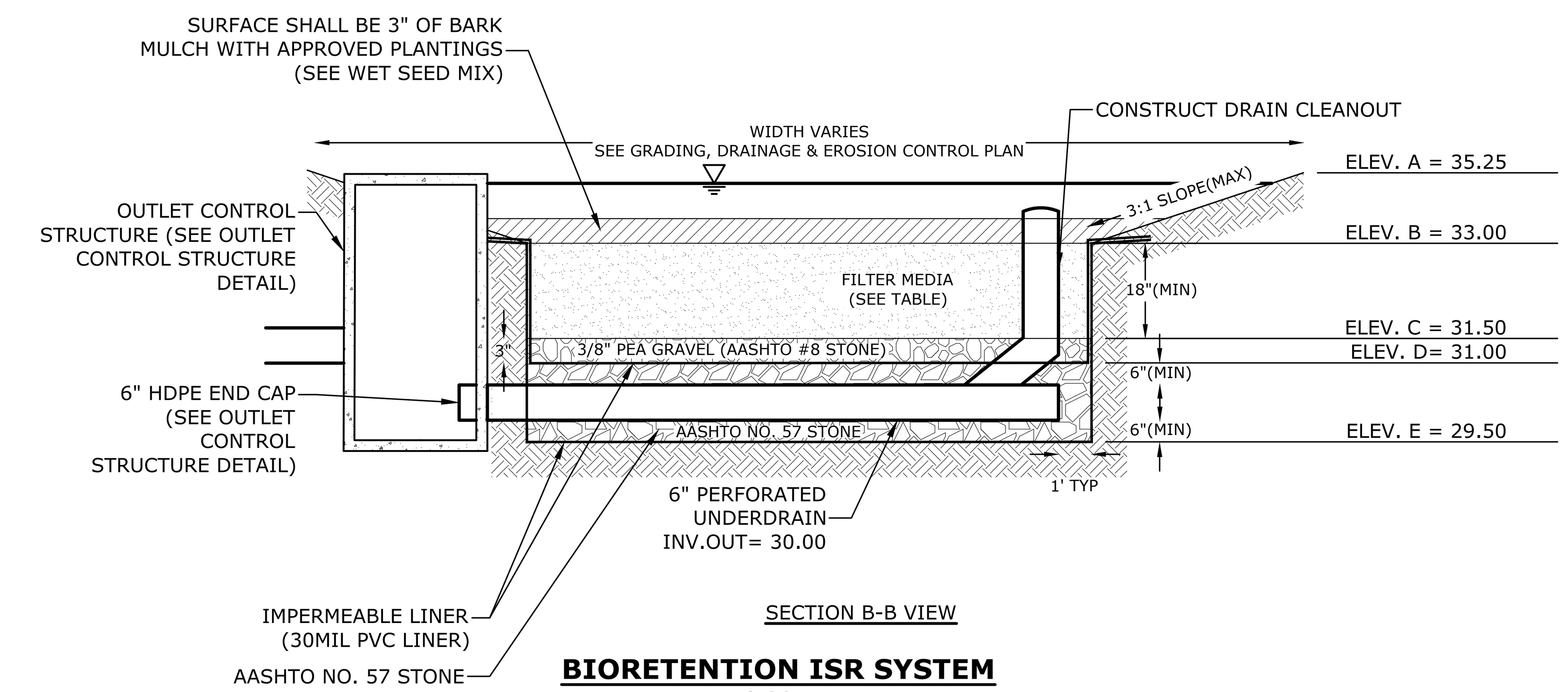
1. SUBSOIL SHALL BE LEFT IN PLACE TO THE MAXIMUM EXTENT PRACTICAL AND SHALL NOT BE COMPACTED.
2. SUBSOIL SHALL BE SCARIFIED WITH TEETH OF EXCAVATOR PRIOR TO PLACING LOAM. SCARIFY PARALLEL WITH CONTOURS WORKING FROM THE CENTER OUTWARD. SOIL MUST BE DRY PRIOR TO PREPARATION.
3. EQUIPMENT SHALL NOT BE DRIVEN ON SCARIFIED SOIL SURFACE.
4. LOAM SHALL BE PUSHED ONTO PREPARED SURFACE FROM THE SIDE.
5. SEED ON SIDE SLOPES OF INFILTRATION BASIN SHALL BE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES OR EQUAL.
6. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION SYSTEM.
7. AFTER THE INFILTRATION SYSTEM AREA IS EXCAVATED TO THE FINAL DESIGN ELEVATION, THE FLOOR SHOULD BE DEEPLY TILLED WITH A ROTARY TILLER OR DISC HARROW TO RESTORE INFILTRATION RATES, FOLLOWED BY A PASS WITH A LEVELING DRAG.
8. DO NOT PLACE INFILTRATION SYSTEMS INTO SERVICE UNTIL THE CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.

INFILTRATION BASIN

NO SCALE



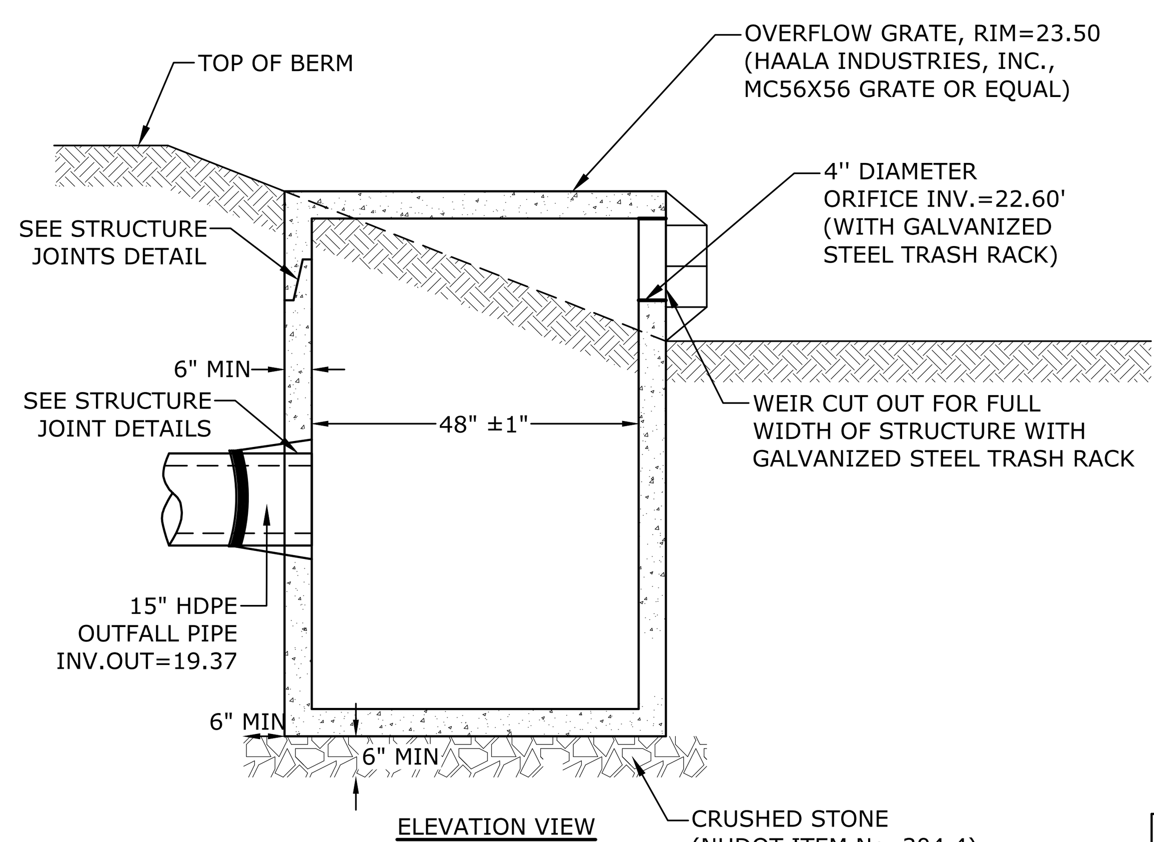
SECTION A-A VIEW



SECTION B-B VIEW

BIORETENTION ISR SYSTEM

NO SCALE



ELEVATION VIEW

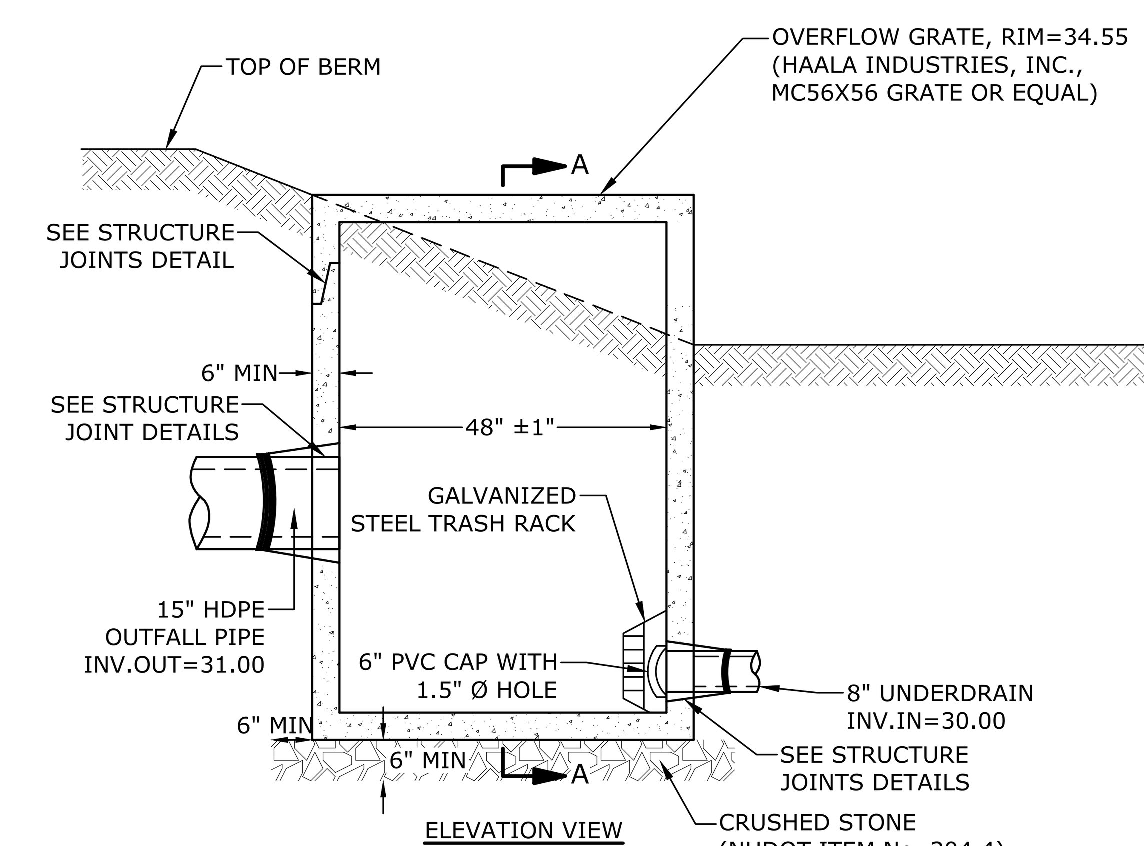
SECTION A-A

NHDOT ITEM No. 304.4 (CRUSHED STONE - FINE)	
SIEVE SIZE	% PASSING
2"	100
1-1/2"	85-100
3/4"	45-75
#4	10-45
#200	0-5

NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER OF THE THIRDE WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

OUTLET STRUCTURE (POS 02)

NO SCALE



ELEVATION VIEW

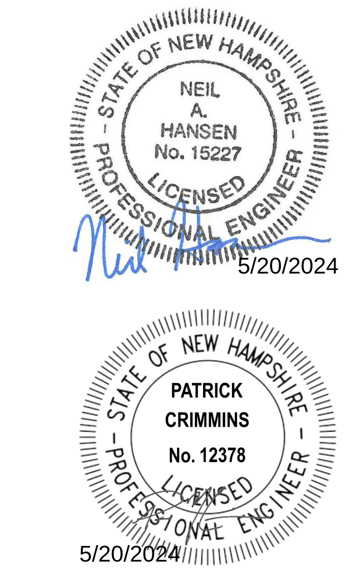
NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER OF THE THIRDE WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

NHDOT ITEM No. 304.4 (CRUSHED STONE - FINE)	
SIEVE SIZE	% PASSING
2"	100
1-1/2"	85-100
3/4"	45-75
#4	10-45
#200	0-5

OUTLET STRUCTURE (POS 01)

NO SCALE

Tighe&Bond



Proposed Mixed-Use Development

Portsmouth Housing Authority

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DETAILS

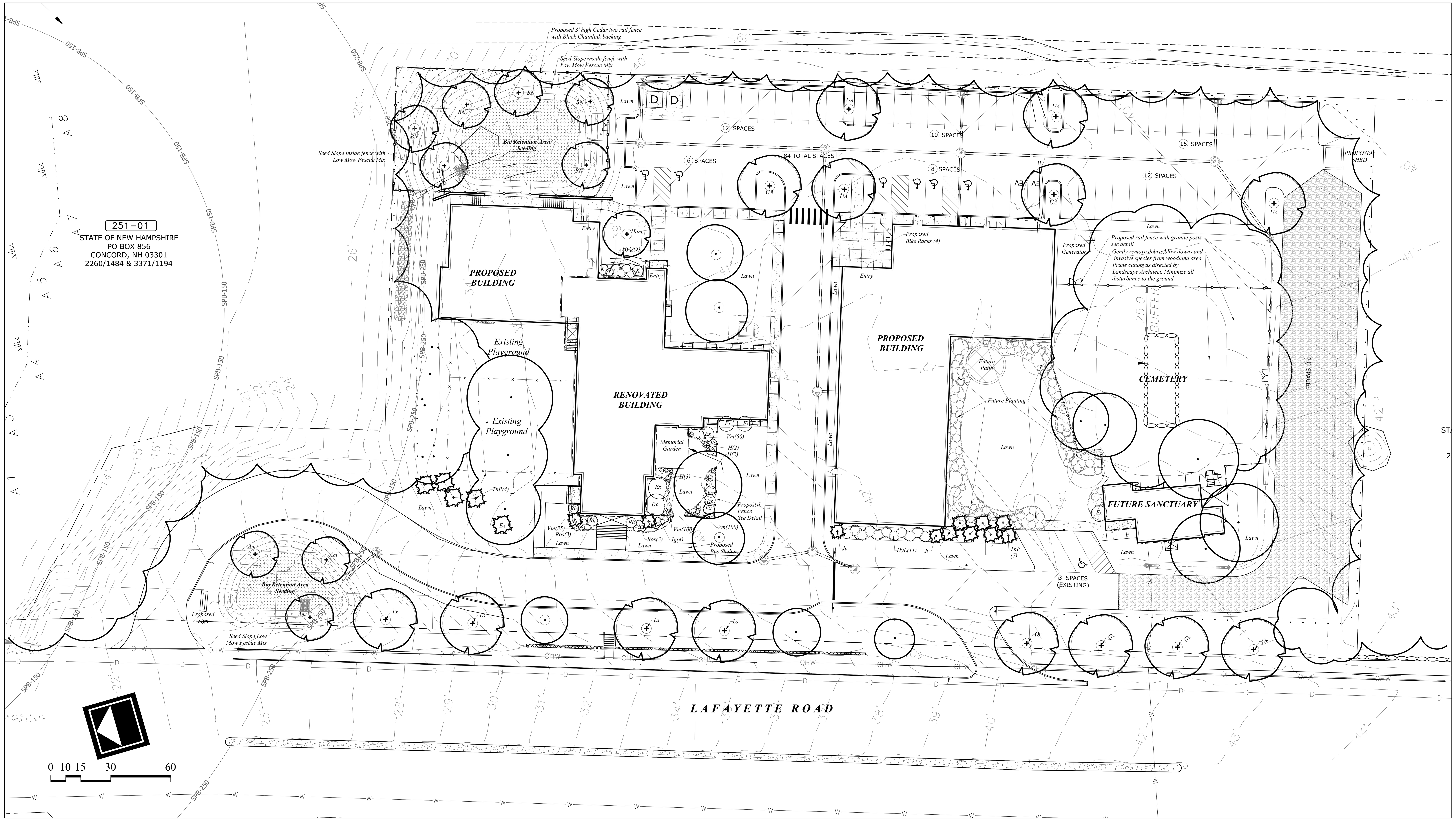
SCALE: AS SHOWN

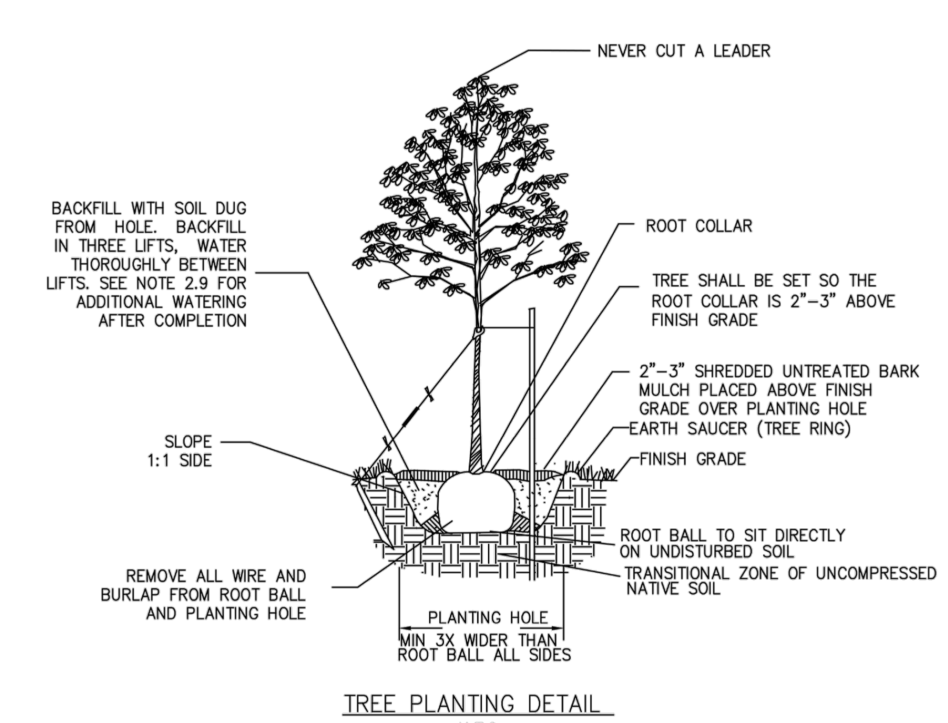
C-507

Last Saved: 5/20/2024
Plotted On:May 20, 2024-12:19pm By: CKrzcuik
Tighe & Bond:J:\P\P5118 Portsmouth Housing Authority\001 1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DTLS.dwg

Landscape Notes

1. Design is based on drawings by Tighe & Bond Engineering dated 2024-05-13 and Lassel Architects dated 2024-05-14 and may require adjustment due to actual field conditions.
2. The contractor shall follow best management practices during construction and shall take all means necessary to stabilize and protect the site from erosion.
3. Erosion Control shall be in place prior to construction.
4. Erosion Control shall be as illustrated in the Engineer's drawings
5. The Contractor shall verify layout and grades and inform the Landscape Architect or Client's Representative of any discrepancies or changes in layout and/or grade relationships prior to construction.
6. It is the contractor's responsibility to verify drawings provided are to the correct scale prior to any bid, estimate or installation. A graphic scale bar has been provided on each sheet for this purpose. If it is determined that the scale of the drawing is incorrect, the landscape architect will provide a set of drawings at the correct scale, at the request of the contractor.
7. Trees to Remain within the construction zone shall be protected from damage for the duration of the project by snow fence or other suitable means of protection to be approved by Landscape Architect or Client's Representative. Snow fence shall be located at the drip line at a minimum and shall include any and all surface roots. Do not fill or mulch on the trunk flare. Do not disturb roots. In order to protect the integrity of the roots, branches, trunk and bark of the tree(s) no vehicles or construction equipment shall drive or park in or on the area within the drip line(s) of the tree(s). Do not store any refuse or construction materials or portalets within the tree protection area.
8. This plan is for review purposes only, NOT for Construction. Construction Documents will be provided upon request.
9. Location, support, protection, and restoration of all existing utilities and appurtenances shall be the responsibility of the Contractor.
10. The Contractor shall verify exact location and elevation of all utilities with the respective utility owners prior to construction. Call DIGSAFE at 811 or 888-DIG-SAFE.
11. The Contractor shall procure any required permits prior to construction.
12. Prior to any landscape construction activities Contractor shall test all existing loam and loam from off-site intended to be used for lawns and plant beds using a thorough sampling throughout the supply. Soil testing shall indicate levels of pH, nitrates, macro and micro nutrients, texture, soluble salts, and organic matter. Contractor shall provide Landscape Architect with test results and recommendations from the testing facility along with soil amendment plans as necessary for the proposed plantings to thrive. All loam to be used on site shall be amended as approved by the Landscape Architect prior to placement.
13. Contractor shall notify landscape architect or owner's representative immediately if at any point during demolition or construction a site condition is discovered which may negatively impact the completed project. This includes, but is not limited to, unforeseen drainage problems, unknown subsurface conditions, and discrepancies between the plan and the site. If a Contractor is aware of a potential issue and does not bring it to the attention of the Landscape Architect or Owner's Representative immediately, they may be responsible for the labor and materials associated with correcting the problem.
14. The Contractor shall furnish and plant all plants shown on the drawings and listed thereon. All plants shall be nursery-grown under climatic conditions similar to those in the locality of the project. Plants shall conform to the botanical names and standards of size, culture, and quality for the highest grades and standards as adopted by the American Association of Nurserymen, Inc. in the American Standard of Nursery Stock, American Standards Institute, Inc. 230 Southern Building, Washington, D.C. 20005.
15. A complete list of plants, including a schedule of sizes, quantities, and other requirements is shown on the drawings. In the event that quantity discrepancies or material omissions occur in the plant materials list, the planting plans shall govern.
16. All plants shall be legibly tagged with proper botanical name.
17. The Contractor shall guarantee all plants including seeding, for not less than one year from time of acceptance.
18. Owner or Owner's Representative will inspect plants upon delivery for conformity to Specification requirements. Such approval shall not affect the right of inspection and rejection during or after the progress of the work. The Owner reserves the right to inspect and/or select all trees at the place of growth and reserves the right to approve a representative sample of each type of shrub, herbaceous perennial, annual, and ground cover at the place of growth. Such sample will serve as a minimum standard for all plants of the same species used in this work.
19. No substitutions of plants may be made without prior approval of the Owner or the Owner's Representative for any reason.
20. All landscaping shall be provided with the following:
    a. Outside hose attachments spaced a maximum of 150 feet apart, and
    b. An underground irrigation system, or
    c. A temporary irrigation system designed for a two-year period of plant establishment.
21. If an automatic irrigation system is installed, all irrigation valve boxes shall be located within planting bed areas.
22. The contractor is responsible for all plant material from the time their work commences until final acceptance. This includes but is not limited to maintaining all plants in good condition, the security of the plant material once delivered to the site, watering of plants, including seeding and weeding. Plants shall be appropriately watered prior to, during, and after planting. It is the Contractor's responsibility to provide clean water suitable for plant health from off site, should it not be available on site.
23. All disturbed areas will be dressed with 6" of loam and planted as noted on the plans or seeded except plant beds. Plant beds shall be prepared to a depth of 12" with 75% loam and 25% compost.
24. Trees, ground cover, and shrub beds shall be mulched to a depth of 2" with one-year-old, well-composted, shredded native bark not longer than 4" in length and ½" in width, free of woodchips and sawdust. Mulch for ferns and herbaceous perennials shall be no longer than 1" in length. Trees in lawn areas shall be mulched in a 5' diameter min. saucer. Color of mulch shall be dark brown.
25. Drip strip/Maintenance Strip shall extend to 6" beyond roof overhang and shall be edged with 3/16" thick black metal edger.
26. In no case shall mulch touch the stem of a plant nor shall mulch ever be more than 3" thick total (including previously applied mulch) over the root ball of any plant.
27. Secondary lateral branches of deciduous trees overhanging vehicular and pedestrian travel ways shall be pruned up to a height of 6' to allow clear and safe passage of vehicles and pedestrians under tree canopy. Within the sight distance triangles at vehicle intersections the canopies shall be raised to 8' min.
28. Snow shall be stored a minimum of 5' from shrubs and trunks of trees.
29. Landscape Architect is not responsible for the means and methods of the Contractor.





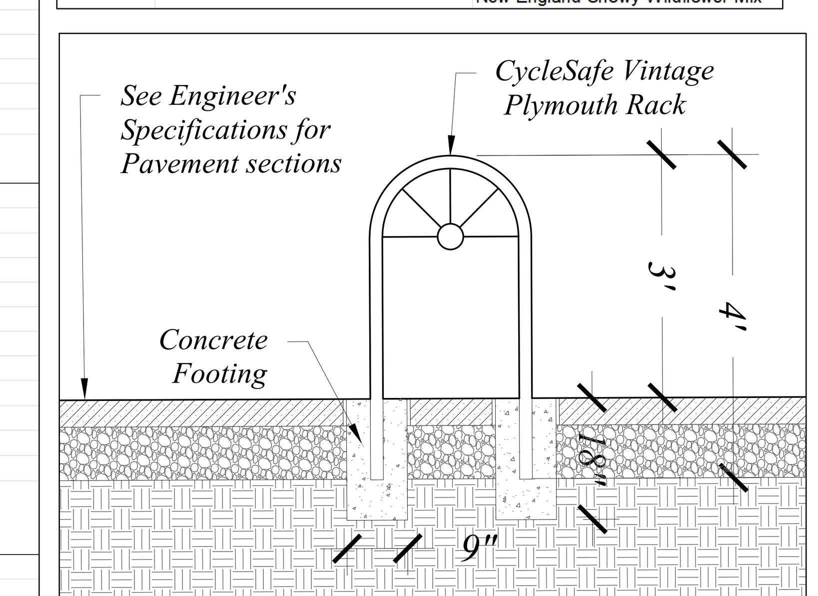
City of Portsmouth
Standard Tree Planting Detail

Proposed Memorial and Cemetery Fence - 8x8 granite posts with 2.5"diameter metal rails.

Plant List

Symbol	Botanical Name	Common Name	Native	Current Plan Quantity	Future Planting Quatity	Size	Comments
TREES							
Am	*Amelanchier granidflora 'Autumn Brilliance'*	Autumn Brilliance Serviceberry	Y	3	2	8-10' ht.	multi-stemmed BB
Bn	*Betula nigra 'Dura Heat'*	Dura Heat River Birch	Y	6	2	10-12' ht.	multi-stemmed BB
Ham	*Hamamelis intermedia 'Arnold Promise'*	Arnold Promise Witch Hazel	Y	1	0	7-8' ht	multi-stemmed BB
Jv1	*Juniperus virginiana 'Manhattan Blue'*	Manhattan Blue Eastern Red Cedar	Y	4	0	7-8' ht.	BB
Ls	*Liquidambar styraciflua*	Sweet Gum	Y	4	0	3.5" cal.	BB
Qr	*Quercus rubra*	Northern Red Oak	Y	4	0	3.5" cal.	BB
Th	*Thuja plicata 'Green Giant'*	Green Giant Western Red Cedar		11	0	8-10' ht.	BB
Ua	*Ulmus americana 'Princeton'*	Princeton Elm	Y	6	0	3.5" cal.	BB
SHRUBS							
Symbol	Botanical Name	Common Name	Native	Quantity		Size	Comments
Cf	*Calycanthus floridus 'Aphrodite'*	Aphrodite Sweetshrub	Y	0	2	7 gal.	
HyL	*Hydrangea paniculata 'Little Lime'*	Little Lime Hydrangea		11	11	3 gal.	
HyQ	*Hydrangea Little Quick Fire'*	Little Quick Fire Hydrangea		7	18	3 gal.	
Ig	*Ilex glabra 'Shamrock'*	Shamrock Inkberry	Y	4	20	3 gal.	
K	*Kalmia latifolia 'Olympic Fire'*	Olympic Fire Mountain Laurel	Y	2	0	2.5'3' ht	BB
Rh	*Rhododendron 'Roseum Pink'*	Roseum Pink Rhododendron		3	0	3-4' ht.	BB
Pros	*Rosa 'Apricot Drift'*	Apricot Drift Rose		6	0	3 gal.	
Rhus	*Rhus aromatica 'Grow Low'*	Grow Low Sumac	Y	0	23	3 gal.	
PERENNIALS, GROUNDCOVERS, VINES and ANNUALS							
Symbol	Botanical Name	Common Name	Native	Current Plan Quantity	Future Planting Quatity	Size	Comments
H	*HOSTA VARIETIES*						
	Hosta 'Frances Williams'	Frances Williams Hosta		3	5	1 gal.	
	Hosta sieboldiana 'Elegans'	Elegans Hosta		3	5	1 gal.	
	Hosta 'Sum and Substance'	Sum and Substance Hosta		3	0	1 gal.	
	Hosta 'Guacamole'	Guacamole Hosta		0	5	1 gal.	
Vm	*Vinca minor 'Bowles'*	Bowles Periwinkle		285	380	2.5" Pots	

SEED MIXES - Prep and Install per manufacturer's installation guides.	
LAWN AREAS	Penningtons Smart Seed Sun/Shade mix or approved equal
BIORETENTION SLOPES	Prairie Nursery No Mow Fescue or approved equal
BIORETENTION BASIN	50% New England Wetland Plants Erosion Control/Restoration Mix for Detention Basins and Moist Sites
	50% New England Wetland Plants New England Showy Wildflower Mix



Bike Rack nts

woodburn & company
LANDSCAPE ARCHITECTURE
103 Kent Place Newmarket, New Hampshire Phone: 603.659.5949

Proposed Mixed Use Development
LANDSCAPE PLAN
1035 Lafayette Road Portsmouth, New Hampshire

Drawn By:	RW
Checked By:	RW
Scale:	scale
Date:	2024-05-20 TAC Submission
Revisions:	

L-1

Sheet 1 of 1

LASSEL
ARCHITECTS
370 MAIN STREET
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207 384 2049
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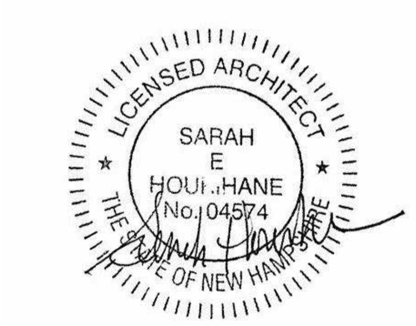

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV:	DATE:	NOTES:

<u>OVERALL SF BREAKDOWN</u>

FIRST FLOOR:	10,556
SECOND FLOOR:	11,413
THIRD FLOOR:	11,413
<u>FOURTH FLOOR:</u>	<u>10,173</u>
TOTAL:	43,555

<u>OVERALL APARTMENT BREAKDOWN</u>

FIRST FLOOR:	7
SECOND FLOOR:	14
THIRD FLOOR:	14
<u>FOURTH FLOOR:</u>	<u>9</u>
TOTAL:	44

PROJECT NUMBER: 23.30
DATE: MAY 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
COVER SHEET

GRAPHIC SCALE
0' 4' 8' 16' 32'

DRAWING NUMBER:
TAC - 01

TAC SUBMISSION

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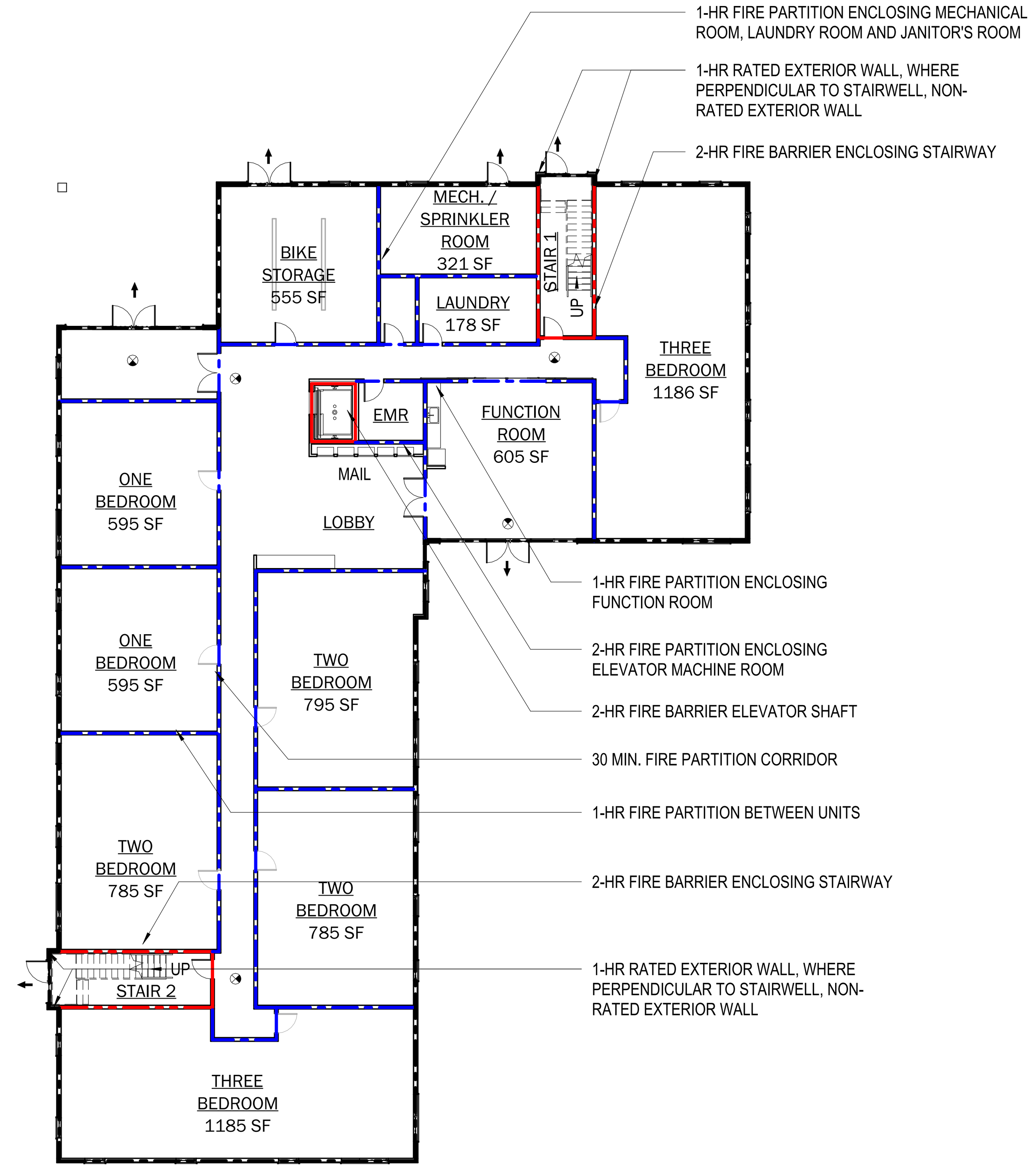
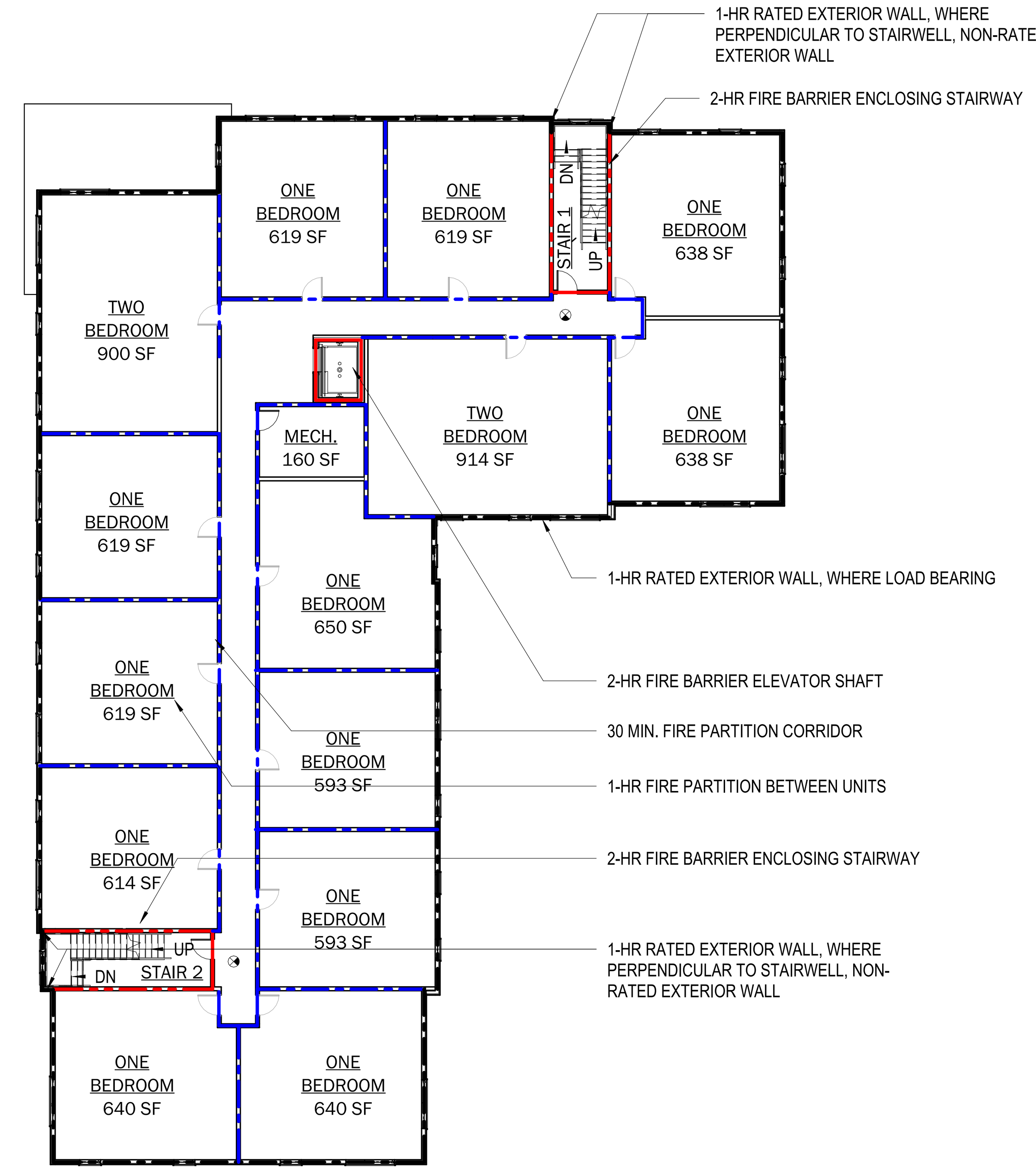
LIFE SAFETY LEGEND

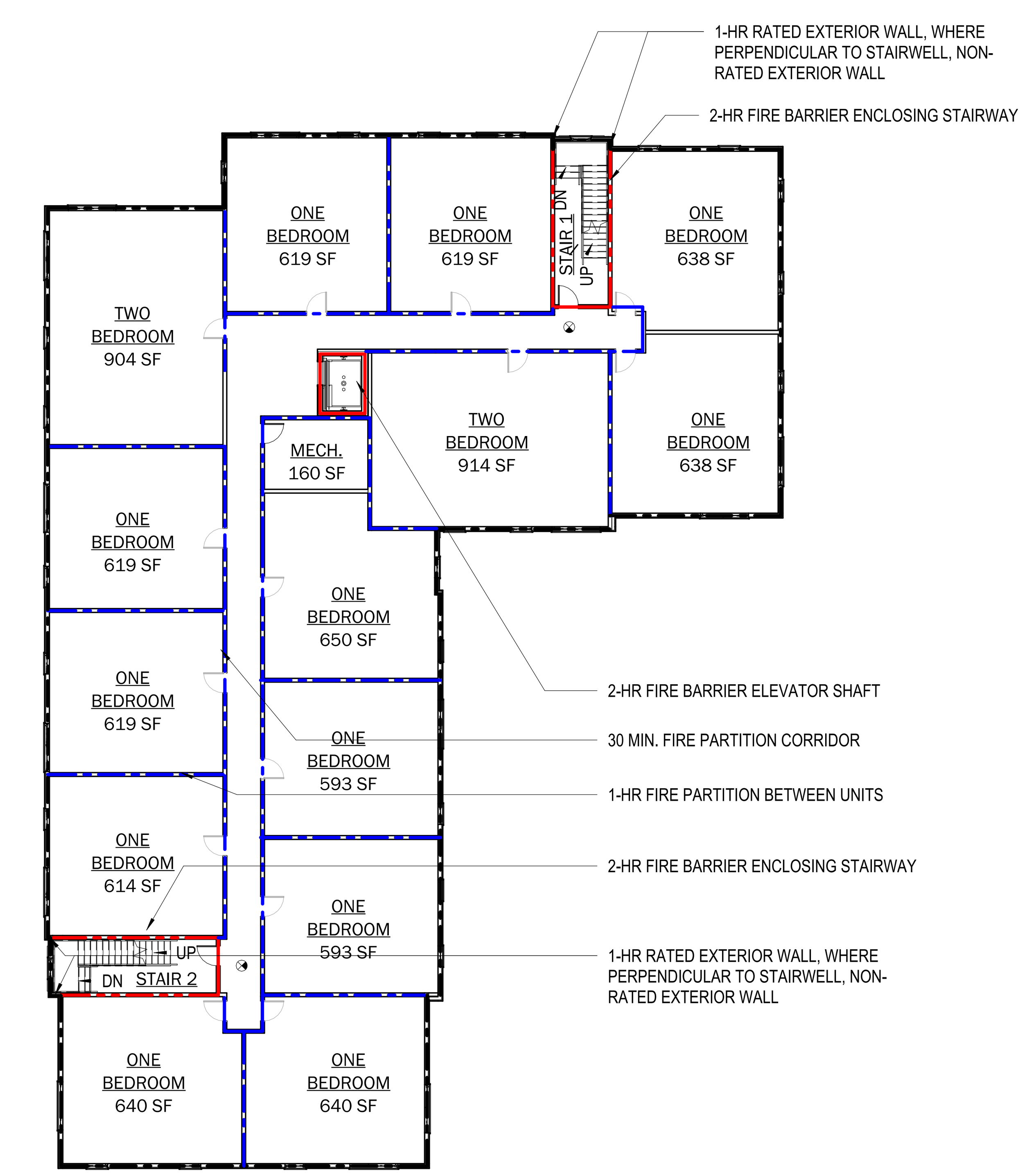
(blue dashed line)	FIRE PARTITION
(red dashed line)	FIRE BARRIER
(black dashed line)	SMOKE BARRIER
←	BUILDING EXIT LOCATION
FEC	FIRE EXTINGUISHER CABINET
	EXIT SIGNS
SD	SMOKE DETECTORS
	EMERGENCY LIGHTING



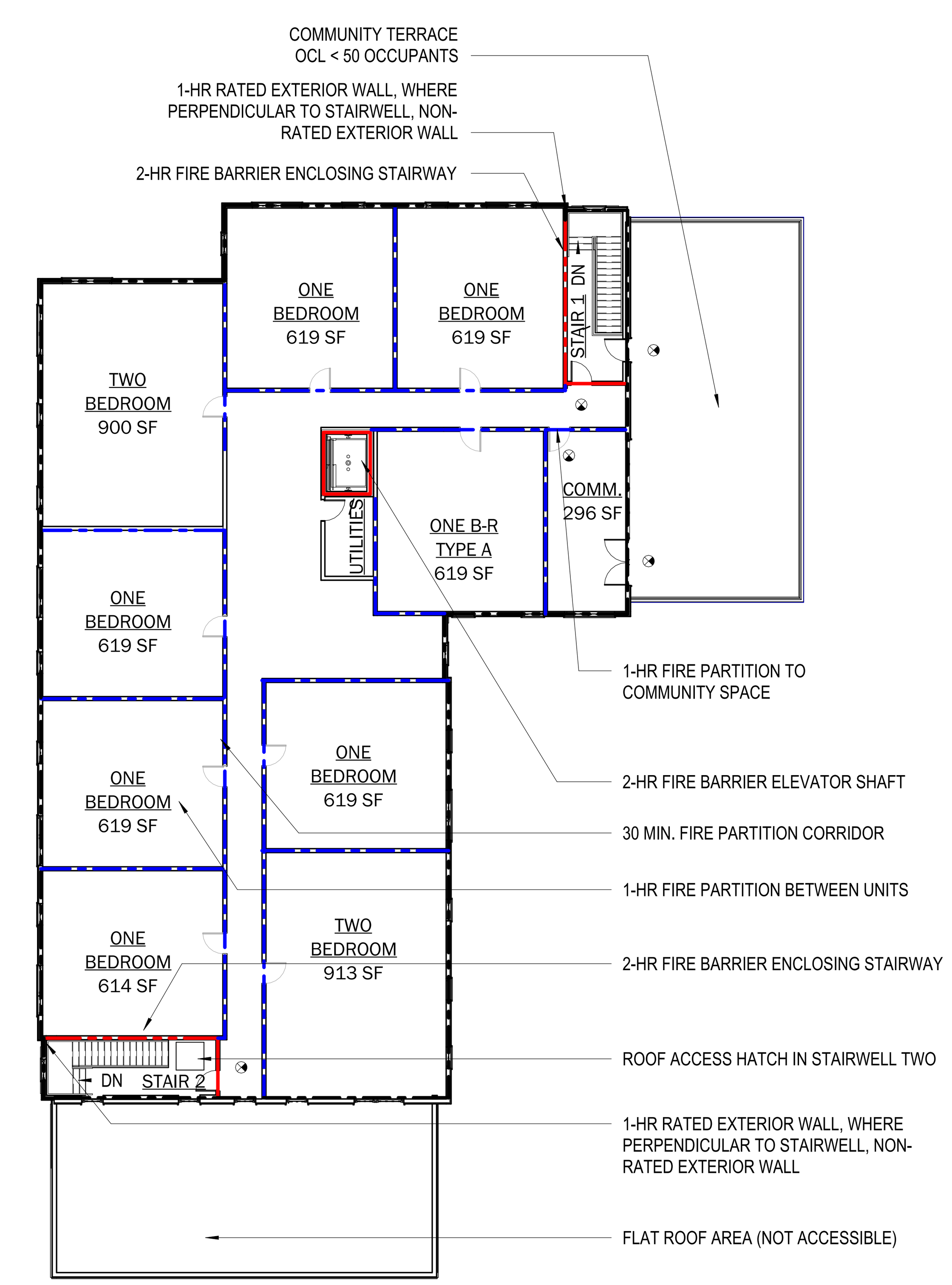
1 FIRST FLOOR - LIFE SAFETY
1" = 20'-0"



2 SECOND FLOOR - LIFE SAFETY
1" = 20'-0"



3 THIRD FLOOR PLAN - LIFE SAFETY
1" = 20'-0"



4 FOURTH FLOOR - LIFE SAFETY
1" = 20'-0"

CODE SUMMARY :

Applicable Codes

The following codes currently apply:

- City Of Portsmouth Zoning Ordinance
- International Building Code 2018
- International Energy Conservation Code 2018
- International Mechanical Code 2018
- International Plumbing Code 2018
- National Electrical Code 2020
- 2010 Americans with Disabilities Act Standards for Accessible Design (ADASAD)
- NFPA 101 - 2018

Classifications (IBC Chapter 3 / NFPA 101 chapter 6 & 30)

The building is a New Construction Residential (occupancy group R-2) uniform across all four floors

• Resulting building height	48 FT; (four stories)
• Resulting building area	
1st floor	10 546 SQ.FT.
2nd floor	11 574 SQ.FT.
3rd floor	11 574 SQ.FT.
4th floor	10 173 SQ.FT.
Total	43 875 SQ.FT.
• Sprinklers	**YES, NFPA 13 R**
• Fire Alarm	YES, A MANUAL FIRE ALARM WITH AUTOMATIC SPRINKLER SYSTEM AND SMOKE DETECTORS CONNECTED
• Construction type	**V-A**

Calculations (IBC chapter 5)
With design premise of four story building, sprinklered throughout per NFPA 13R system, and per construction type V A

• Allowable height in feet	60 FT.	-	REQ. MET
• Allowable height in stories	FOUR STORIES	-	REQ. MET
• Allowable area per floor	12 000 SQ. FT.	-	REQ. MET

Occupant Load (IBC table 1004.5 / NFPA 101 chapter 7)

Total building occupancy load, calculated per IBC table 1004.5, is **271 occupants**

• **First Floor:**		**88 occupants**
Residential	OLF: 200 gross (Residential)	8 899 s.f. / 200 = 40
community areas	OLF: 15 net (Assembly Unconsecrated)	603 s.f. / 15 = 40
utilities	OLF: 300 gross (Accessory storage and mech.)	1054 s.f. / 300 = 4
• **Seccond Floor:**		**58 occupants**
Residential	OLF: 200 gross (Residential)	11 414 s.f. / 200 = 57
utilities	OLF: 300 gross (Accessory storage and mech.)	160 s.f. / 300 = 1
• **Third Floor:**		**58 occupants**
Residential	OLF: 200 gross (Residential)	11 414 s.f. / 200 = 57
utilities	OLF: 300 gross (Accessory storage and mech.)	160 s.f. / 300 = 1
• **Fourth Floor:**		**68 occupants**
Residential	OLF: 200 gross (Residential)	9735 s.f. / 200 = 49
community areas	OLF: 15 net (Assembly Unconsecrated)	279 s.f. / 15 = 19
utilities	OLF: 300 gross (Accessory storage and mech.)	160 s.f. / 300 = 1

Egress (IBC chapter 10 / NFPA 101 chapter 7)

Stairwells, per 1005.3.1 and 1011.2:

• capacity factor	0.3	
• number of stairways	2	
• stairway's occupant load:	(Second floor + third floor + fourth floor) / 2 stairwells = (58 + 58 + 68) / 2	**92 OCCUPANTS**
• stair's width	92 x 0.3 = 27.6	
	Per requirements of 1011.2, when OCL over 50, minimum 44" required:	**44" WIDE STAIRS PROVIDED**

Maximum common path of egress travel distance — 75 FT

Maximum exit access travel distance — 250 FT

Barriers to Fire and Smoke Spread (IBC Table 508.4; Table 509 and Table 601 / NFPA 101 chapter 8)

- Primary structural frame (columns, floor beams and roof decking)
  Construction type V A, 1HR RATING REQUIRED
- Exterior walls - load bearing
  Construction type V A, 1HR RATING REQUIRED
- Exterior walls - non-load bearing
  Exterior walls have a fire separation distance of more than 20 feet therefore openings are unlimited in size.
  Fire separation distance is measured to the lot line, or to the centerline of the public way.
  Exterior walls will be rated within 10' horizontally off the corners of stairways, where required per IBC 1023.7 - where exposed by other parts of the building at an angle less than 180 degrees - **EXTERIOR WALL OF STAIRWELL SHALL BE RATED, WHERE ADJACENT TO BUILDING INSIDE CORNERS**
- Interior walls - load bearing
  Construction type V A, 1HR RATING REQUIRED
- Floor construction and associated secondary structural members
  Construction type V A, 1HR RATING REQUIRED
- Roof construction and associated secondary structural members
  Construction type V A, 1HR RATING REQUIRED
- Fire Barriers per 707
  2 Hour fire barriers shall be provided for stairwell and elevator enclosure, and all shafts connecting four stories
  Fire Barriers will be continuous to underside of floor or roof decking.

Required separation of occupancies Per 420.2:

- Separation of occupancy groups R-2 and R-2
  shall be provided 30 minute Fire Partition

Required rating of the corridor Per table 1020.1:

- Corridor in occupancy group R,
  shall be provided 1 hour Fire Partition

INTERIOR FINISH CLASS REQUIREMENTS

• Corridors and enclosure for exit access stairways and ramps	class C
• Rooms and enclosed spaces	class C

TAC SUBMISSION

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207 384 2049
lasselarchitects.com

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
DATE: MAY 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
CODE SEARCH AND LIFE SAFETY DRAWINGS

DRAWING NUMBER:
LS - 01

GENERAL PLAN NOTES:

- PUBLIC ACCESSIBLE ENTRANCES TO HAVE ADA DOOR OPERATOR AND PUSH BUTTON
- ALL STAIRWELLS TO BE 2 HOUR FIRE RATED
- ALL EGRESS DOORS TO HAVE PANIC HARDWARE
- BUILDING TO MEET ALL APPLICABLE BUILDING CODES AT TIME OF CONSTRUCTION

EGRESS AND SEPARATION REGULATIONS:

- MINIMUM NUMBER OF EXITS FROM EACH STORY: 2
- MAX TRAVEL DISTANCE: 250'
- DEAD END CORRIDOR DISTANCE: 20'
- FIRE SEPARATION BETWEEN OCCUPANCY GROUPS TO MEET IBC AND NFPA REQUIREMENTS

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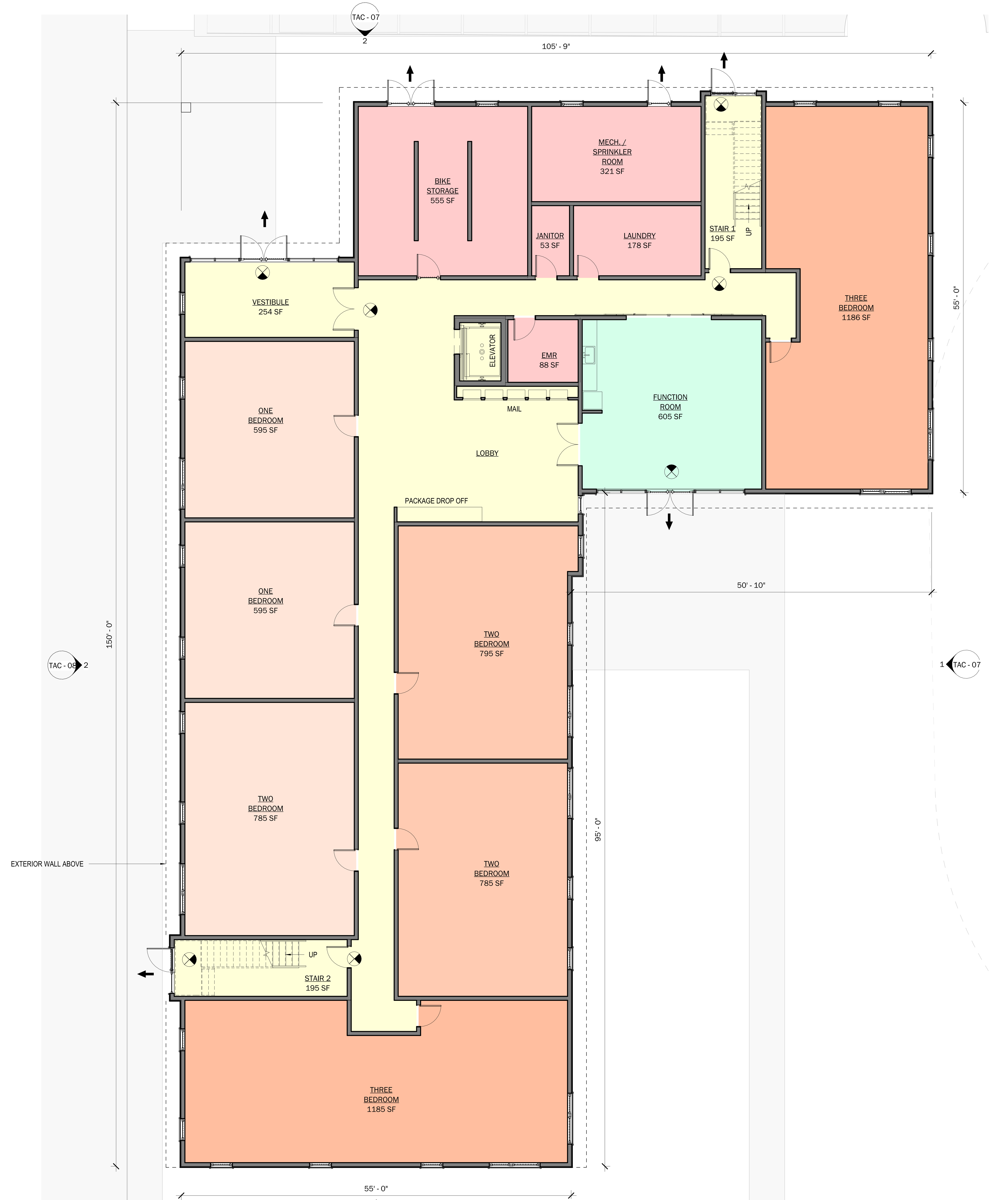

1 FIRST FLOOR PLAN
1/8" = 1'-0"

EXIT SIGNS

SF BREAKDOWN: FIRST FLOOR

APARTMENTS:	6,710
MECHANICAL / UTILITIES:	1,054
CIRCULATION:	2,189
COMMUNITY SPACES:	603
TOTAL:	10,556

APARTMENT BREAKDOWN: FIRST FLOOR

ONE BEDROOM:	2
TWO BEDROOM:	3
THREE BEDROOM:	2
TOTAL:	7

GRAPHIC SCALE

0' 4' 8' 16' 32'

TAC SUBMISSION

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
NORTH:
DATE: MAY 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
FIRST FLOOR PLAN

DRAWING NUMBER:
TAC - 02

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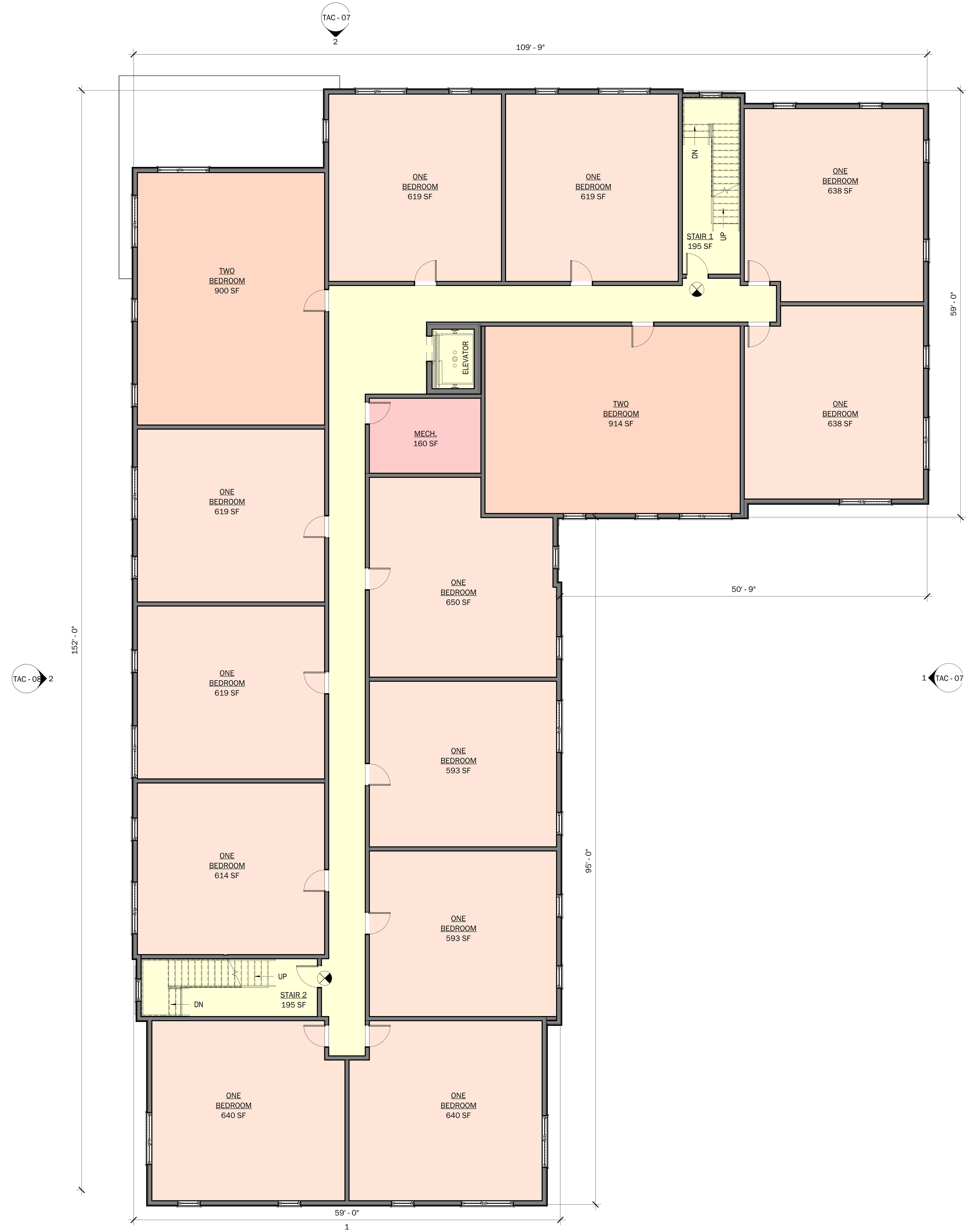

1 SECOND FLOOR PLAN
1/8" = 1'-0"

GENERAL PLAN NOTES:

- PUBLIC ACCESSIBLE ENTRANCES TO HAVE ADA DOOR OPERATOR AND PUSH BUTTON
- ALL STAIRWELLS TO BE 2 HOUR FIRE RATED
- ALL EGRESS DOORS TO HAVE PANIC HARDWARE
- BUILDING TO MEET ALL APPLICABLE BUILDING CODES AT TIME OF CONSTRUCTION

EGRESS AND SEPARATION REGULATIONS:

- MINIMUM NUMBER OF EXITS FROM EACH STORY: 2
- MAX TRAVEL DISTANCE: 250'
- DEAD END CORRIDOR DISTANCE: 20'
- FIRE SEPARATION BETWEEN OCCUPANCY GROUPS TO MEET IBC AND NFPA REQUIREMENTS

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EXIT SIGNS

SF BREAKDOWN: SECOND FLOOR

APARTMENTS:	10,012
MECHANICAL / UTILITIES:	160
CIRCULATION:	1,401
COMMUNITY SPACES:	0
TOTAL:	11,413

APARTMENT BREAKDOWN: SECOND FLOOR

ONE BEDROOM:	12
TWO BEDROOM:	2
THREE BEDROOM:	0
TOTAL:	14

GRAPHIC SCALE

0' 4' 8' 16' 32'

TAC SUBMISSION

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
NORTH:
DATE: MAY 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
SECOND FLOOR PLAN

DRAWING NUMBER:
TAC - 03

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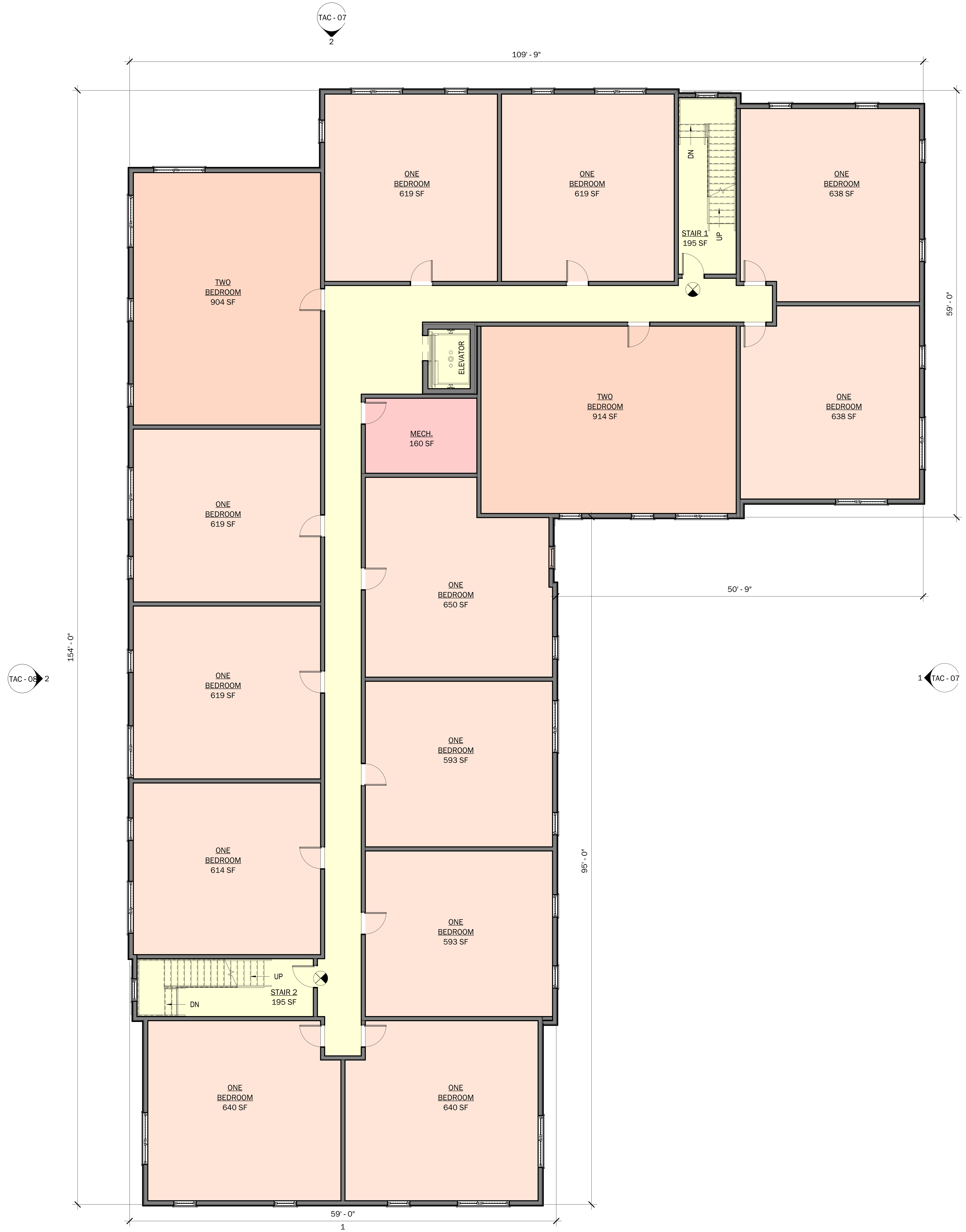

1 THIRD FLOOR PLAN
1/8" = 1'-0"

GENERAL PLAN NOTES:

- PUBLIC ACCESSIBLE ENTRANCES TO HAVE ADA DOOR OPERATOR AND PUSH BUTTON
- ALL STAIRWELLS TO BE 2 HOUR FIRE RATED
- ALL EGRESS DOORS TO HAVE PANIC HARDWARE
- BUILDING TO MEET ALL APPLICABLE BUILDING CODES AT TIME OF CONSTRUCTION

EGRESS AND SEPARATION REGULATIONS:

- MINIMUM NUMBER OF EXITS FROM EACH STORY: 2
- MAX TRAVEL DISTANCE: 250'
- DEAD END CORRIDOR DISTANCE: 20'
- FIRE SEPARATION BETWEEN OCCUPANCY GROUPS TO MEET IBC AND NFPA REQUIREMENTS

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LICENSED ARCHITECT
SARAH
E
HOULIHANE
No. 04574
STATE OF NEW HAMPSHIRE

EXIT SIGNS

SF BREAKDOWN: THIRD FLOOR

APARTMENTS:	10,012
MECHANICAL / UTILITIES:	160
CIRCULATION:	1,401
COMMUNITY SPACES:	0
TOTAL:	11,413

APARTMENT BREAKDOWN: THIRD FLOOR

ONE BEDROOM:	12
TWO BEDROOM:	2
THREE BEDROOM:	0
TOTAL:	14

GRAPHIC SCALE

0' 4' 8' 16' 32'

TAC SUBMISSION

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
NORTH:
DATE: MAY 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
THIRD FLOOR PLAN

DRAWING NUMBER:
TAC - 04

1 FOURTH FLOOR
1/8" = 1'-0"

GENERAL PLAN NOTES:

- PUBLIC ACCESSIBLE ENTRANCES TO HAVE ADA DOOR OPERATOR AND PUSH BUTTON
- ALL STAIRWELLS TO BE 2 HOUR FIRE RATED
- ALL EGRESS DOORS TO HAVE PANIC HARDWARE
- BUILDING TO MEET ALL APPLICABLE BUILDING CODES AT TIME OF CONSTRUCTION

EGRESS AND SEPARATION REGULATIONS:

- MINIMUM NUMBER OF EXITS FROM EACH STORY: 2
- MAX TRAVEL DISTANCE: 250'
- DEAD END CORRIDOR DISTANCE: 20'
- FIRE SEPARATION BETWEEN OCCUPANCY GROUPS TO MEET IBC AND NFPA REQUIREMENTS

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EXIT SIGNS

SF BREAKDOWN: FOURTH FLOOR

APARTMENTS:	6,495
MECHANICAL / UTILITIES:	160
CIRCULATION:	1,862
COMMUNITY SPACES:	1,656
TOTAL:	10,173

APARTMENT BREAKDOWN: FOURTH FLOOR

ONE BEDROOM:	7
TWO BEDROOM:	2
THREE BEDROOM:	0
TOTAL:	9

GRAPHIC SCALE

0' 4' 8' 16' 32'

TAC SUBMISSION

PROJECT: PROPOSED MIXED-USE DEVELOPMENT

ADDRESS: 1035 LAFAYETTE ROAD

CLIENT: PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30

NORTH:

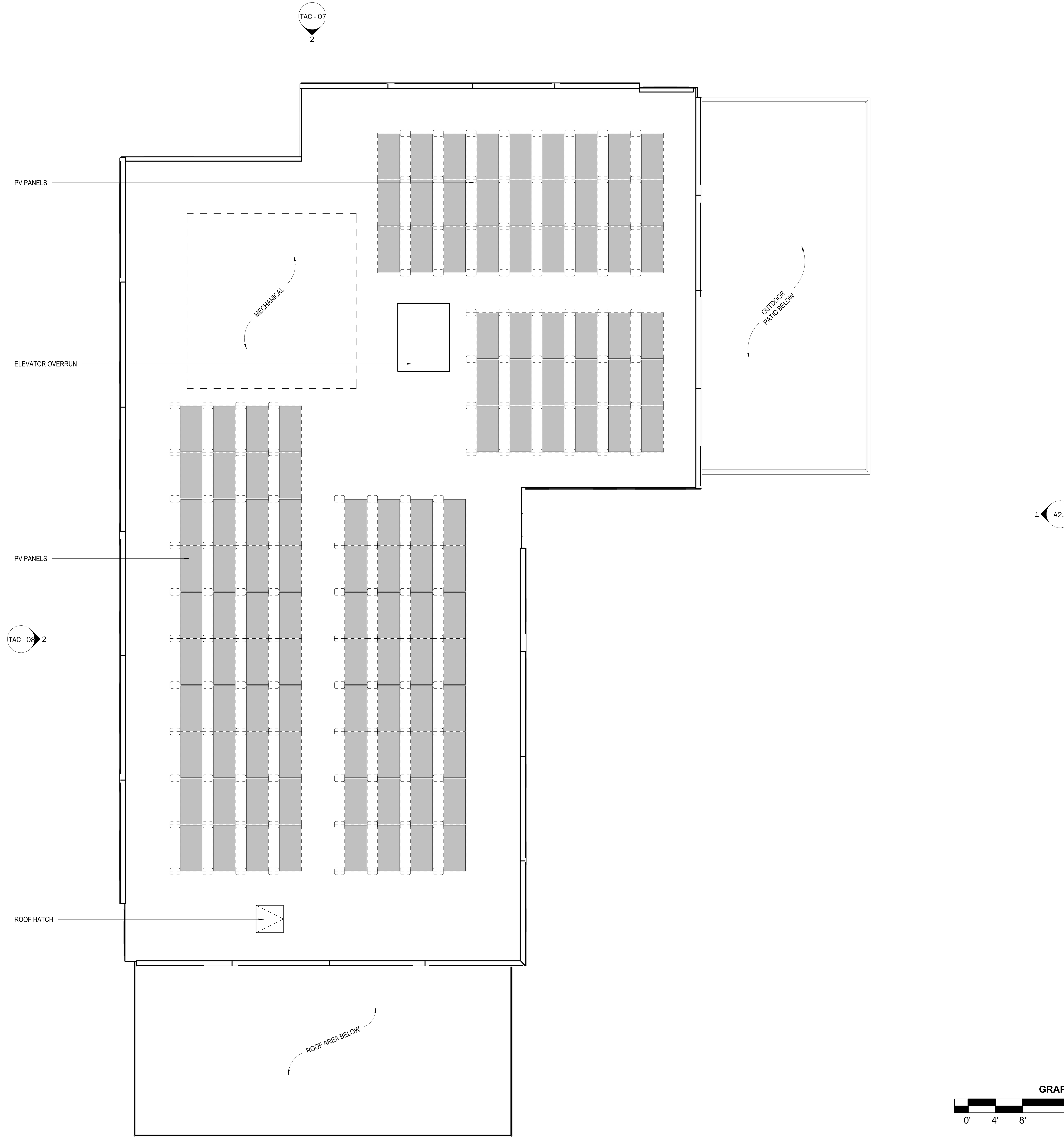
DATE: MAY 2024

SCALE: AS NOTED

REVISION:

DRAWING NAME: FOURTH FLOOR PLAN

DRAWING NUMBER: TAC - 05



1 ROOF PLAN
1/8" = 1'-0"

GRAPHIC SCALE
0' 4' 8' 16' 32'

TAC SUBMISSION

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LICENSED ARCHITECT
SARAH E HOULIHANE
No. 04574
THE STATE OF NEW HAMPSHIRE

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
NORTH:
DATE: MAY 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
ROOF PLAN

DRAWING NUMBER:
TAC - 06

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1 WEST ELEVATION
1/8" = 1'-0"

2 SOUTH ELEVATION
1/8" = 1'-0"

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ARCHITECTS
370 MAIN STREET
SOUTH BERWICK, ME 03908
207 384 2049
lasselarchitects.com

PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

REV: DATE: NOTES:

PROJECT NUMBER: 23.30
DATE: MAY 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
EXTERIOR ELEVATIONS

DRAWING NUMBER:
TAC - 07

TAC SUBMISSION

② EAST ELEVATION
1/8" = 1'-0"

① NORTH ELEVATION
1/8" = 1'-0"

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PROJECT:
PROPOSED MIXED-USE DEVELOPMENT

ADDRESS:
1035 LAFAYETTE ROAD

CLIENT:
PORTSMOUTH HOUSING AUTHORITY

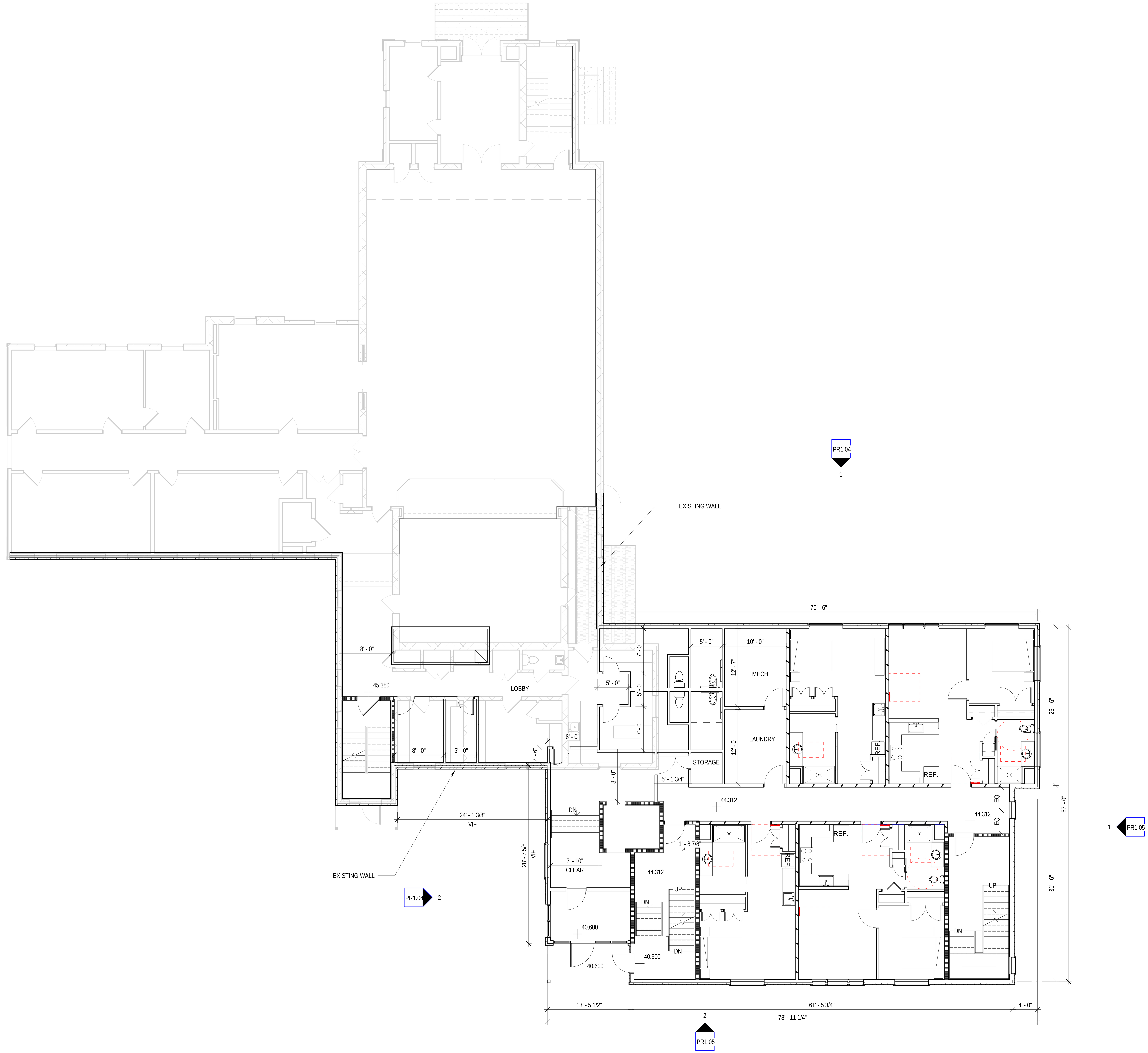
REV: DATE: NOTES:

PROJECT NUMBER: 23.30
DATE: MAY 2024
SCALE: AS NOTED
REVISION:

DRAWING NAME:
EXTERIOR ELEVATIONS

DRAWING NUMBER:
TAC - 08

TAC SUBMISSION



1 LEVEL 1 - Overall Plan - Presentation
1/8" = 1'-0"

JSA
ARCHITECTS
INTERIORS
PLANNERS

273 CORPORATE DRIVE
PORTSMOUTH, NH 03801
T 603.436.2551
www.jsainc.com

CIVIL ENGINEER & LAND SURVEYOR
TIGHE & BOND
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(603) 433 - 8818

LANDSCAPE ARCHITECT
WOODBURN & COMPANY
130 KENT PLACE
NEWMARKET, NH 03857

STRUCTURAL ENGINEER

MECHANICAL, ELECTRICAL, PLUMBING &
FIRE PROTECTION ENGINEERS

HAVEN

273 CORPORATE DRIVE
PORTSMOUTH, NH, 03801

JSA DESIGN

Scale:	1/8" = 1'-0"
Date:	05/20/2024
Project Number:	24064.00

PROGRESS PRINT

LEVEL 1 FLOOR PLAN

PR1.01

2 WEST ELEVATION
1/8" = 1'-0"

1 NORTH ELEVATION
1/8" = 1'-0"

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HAVEN

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PORTSMOUTH, NH, 03801

JSA DESIGN

Scale:	1/8" = 1'-0"
Date:	05/20/2024
Project Number:	24064.00

PROGRESS PRINT

NORTH AND WEST ELEVATION

PR1.04

2 SOUTH ELEVATION
1/8" = 1'-0"

1 EAST ELEVATION
1/8" = 1'-0"

JSA
ARCHITECTS
INTERIORS
PLANNERS

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LANDSCAPE ARCHITECT
WOODBURN & COMPANY
130 KENT PLACE
NEWMARKET, NH 03857

STRUCTURAL ENGINEER

MECHANICAL, ELECTRICAL, PLUMBING &
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HAVEN

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PORTSMOUTH, NH, 03801

JSA DESIGN

Scale:	1/8" = 1'-0"
Date:	05/20/2024
Project Number:	24064.00

PROGRESS PRINT

EAST AND SOUTH ELEVATION

PR1.05

Owner Letter of Authorization

This letter is to authorize Portsmouth Housing Authority (Applicant), to represent the interest of Christ Church Parish (Owner), in all site design and permitting matters for the proposed redevelopment project located at 1035 Lafayette Road in Portsmouth, New Hampshire on parcel of land identified as Map 246 Lot 1. This project includes the construction of multifamily buildings, repurposing of an existing church for office and daycare uses, and associated on-site improvements. This authorization shall relate to those activities that are required for local, state and federal permitting for the above project and include any required signatures for those applications.

	Benge Ambrogi, CFO	3/25/24
Signature	Print Name	Date
	Episcopal Diocese of NH	

(P5118-001 (owner auth form).docx)

Agent Letter of Authorization

This letter is to authorize Tighe & Bond, Inc. (Civil Engineer), to represent and submit on behalf of Portsmouth Housing Authority (Applicant), applications and materials in all site design and permitting matters for the proposed redevelopment project located at 1035 Lafayette Road in Portsmouth, New Hampshire on parcel of land identified as Map 246 Lot 1. This project includes the construction of multifamily buildings, repurposing of an existing church for office and daycare uses, and associated on-site improvements. This authorization shall relate to those activities that are required for local, state and federal permitting for the above project and include any required signatures for those applications.

[signature]	Craig W. Welch	3/24/24
Signature	Print Name	Date

(P5118-001 (eng auth form).docx)

Tighe&Bond

P5118-001
May 20, 2024

Mr. Peter Britz, Director of Planning & Sustainability
City of Portsmouth Planning & Sustainability Department
1 Junkins Avenue
Portsmouth NH, 03801
Portsmouth, New Hampshire 03801

Re: **Parking Conditional Use Permit Request**
Proposed Mixed-Use Development, 1035 Lafayette Road, Portsmouth, NH

Dear Peter:

On behalf of Christ Church Parish (Owner), and Portsmouth Housing Authority (Applicant), we are pleased to submit the following information relative to a request for a Conditional Use Permit (CUP) to provide less than the minimum number of off-street parking spaces for the above-referenced project:

- One (1) copy of the Parking Demand Analysis, dated May 20, 2024;

Pursuant Section 10.1112.14, the applicant is respectfully requesting that a CUP be granted by the Planning Board to allow the Project to provide less than the minimum off-street parking spaces required by Section 10.1112.30 or Section 10.1112.61:

- Section 10.1112.141 – The enclosed Parking Demand Analysis has been provided as required by this section. The Parking Demand Analysis demonstrates the off-street parking provided by the Project is sufficient for its Uses.

- Section 10.1112.142 – This section indicates an application for a CUP shall identify permanent evidence-based measures to reduce parking demand. As described in the enclosed Parking Demand Analysis, the Project provides measures that promotes alternative modes of transportation such as walking, bicycling, and public transportation.

We trust the enclosed information is sufficient to support a Request for a CUP. As per Section 10.1112.141 the City's Technical Advisory Committee (TAC) shall review the Parking Demand Analysis prior to submission to the Planning Board. We respectfully request to be placed on the TAC meeting agenda for June 4, 2024. If you have any questions, please feel free to contact me by phone at (603) 433-8818 or by email at NAHansen@tighebond.com.

Sincerely,

TIGHE & BOND, INC.

Patrick M. Crimmins, PE
Vice President

Neil A. Hansen, PE
Project Manager

Cc: Portsmouth Housing Authority

1035 Lafayette Rd Redevelopment – Parking Demand Memo

TO: City of Portsmouth Planning Board

FROM: Patrick M. Crimmins, PE
Neil A. Hansen, PE

COPY: Portsmouth Housing Authority

DATE: May 20, 2024

Tighe & Bond, Inc. (Tighe & Bond) has prepared this Parking Demand Memo to summarize the parking demand calculations related to the proposed redevelopment of the parcel located at 1035 Lafayette Road (Route 1) in Portsmouth, New Hampshire.

The proposed project includes 4 proposed uses consisting of residential, office space, daycare facility, and a place of worship. The residential building and addition to the existing church include 51 total units consisting of a mix of 500-750 SF and >750 SF units. The existing Church is proposed to be converted to 6,900 SF of first-floor office space and 6,900 SF of lower-level daycare which has a max licensed enrollment capacity of 71 students. The existing single-family dwelling located in the southern portion of the lot would be converted to a chapel and place of assembly with an anticipated maximum occupancy of 40 people. This chapel has been calculated utilizing the place of assembly use identified as Use No. 3.10 from Portsmouth Zoning Ordinance Section 10.1112.32.

To calculate the project's parking requirement, parking demand was first calculated by the minimum parking requirements defined in the City of Portsmouth Zoning Ordinance Section 10.1112.30.

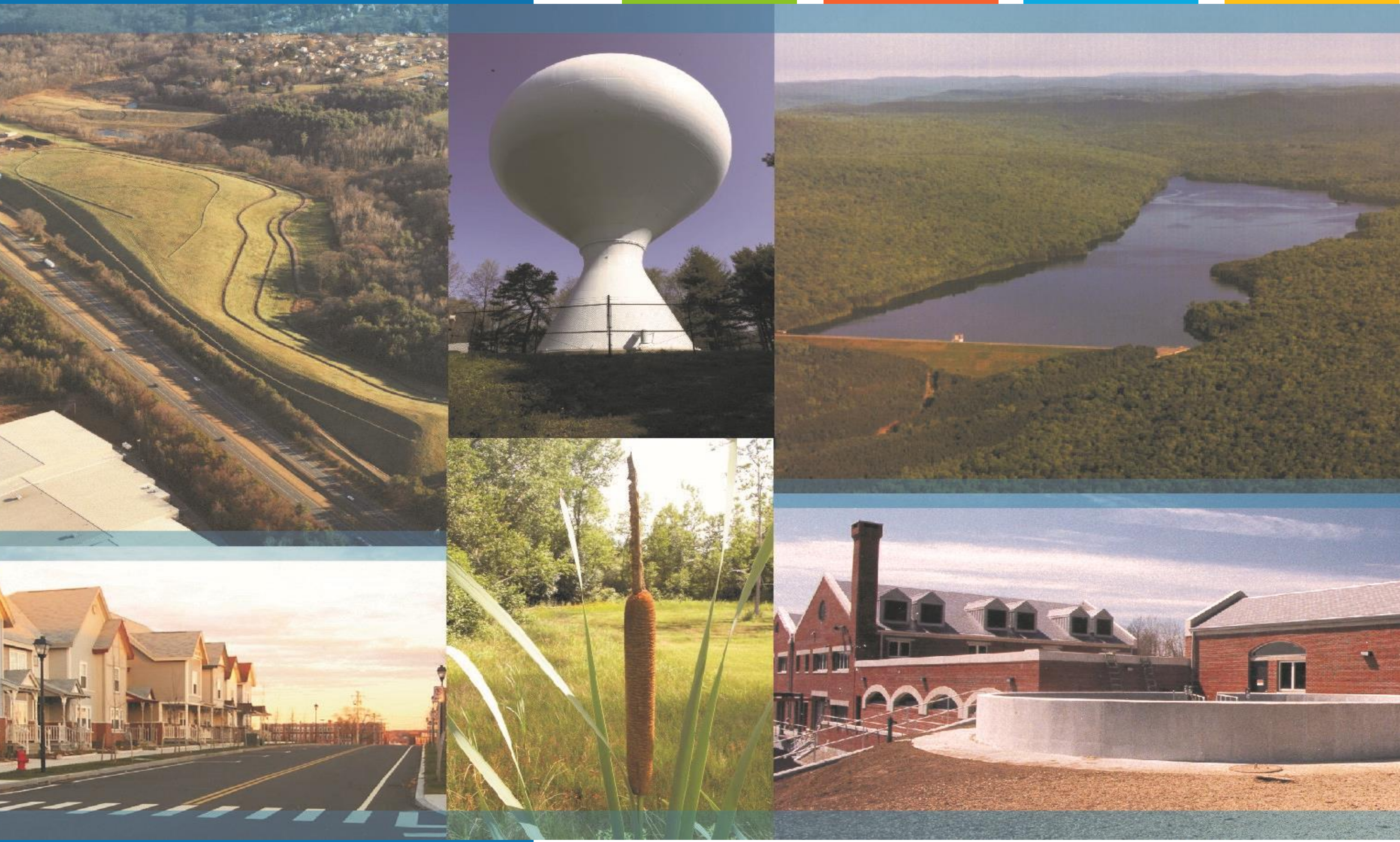
Due to the mix in uses, a shared parking calculation was then applied as allowed by Section 10.1112.61 of the Zoning Ordinance. The shared parking occupancy rate for the residential, office space, and place of worship proposed uses have utilized the standard rates identified in section 10.1112.61. The daycare parking occupancy rates have been modified from the standard Retail/Service Use to better reflect the anticipated working hours of the proposed daycare of Monday through Friday 8 AM to 5PM. We have modified the weekday daytime rate to be 100%, weekday evening to be 10% and weekend and nighttime rates to be 0%.

Lastly, a 20% reduction was applied to the parking requirement calculation as allowed by Section 10.5B82.10 of the Zoning Ordinance when public transportation is within a ¼-mile of the property. The public transit reduction requirement states that "*For developments located on a public transit route with year-round, 5-days-per-week, fixed-route service and where at least 50% of the building(s) are within ¼ mile of a transit stop, the minimum offstreet parking required for motor vehicles shall be reduced by 20% of the total required for all uses.*" The proposed parcel is located along the COAST route 41, Portsmouth-Lafayette Trolley, that runs along Lafayette Rd from Downtown Portsmouth to the Lafayette Road Residence Association at Bluefish Blvd. The applicant is currently working with COAST to provide a bus stop onsite along this route which would allow the project to utilize the 20% reduction.

Based on the above-described zoning requirements, the minimum required parking for the project is calculated at 83 spaces. The proposed project provides 84 spaces, which exceeds the minimum parking requirement. In addition, the project is promoting alternative modes of transportation such as walking, bicycling, and public transportation by incorporating pedestrian connections, bicycle storage, and a bus stop.

Use	Type of Use	Weekday Daytime (8:00 AM – 5:00 PM)	Weekday Evening (6:00 PM– Midnight)	Weekend Daytime (8:00 AM– 5:00 PM)	Weekend Evening (6:00 PM– Midnight)	Nighttime (Midnight– 6:00 AM)
	MINIMUM PARKING REQUIRED PER CITY ZONING ORDINANCE					
	Residential	**60%**	**100%**	**80%**	**100%**	**100%**
	Daycare[1]	**100%**	**10%**	**0%**	**0%**	**0%**
	Office Space	**100%**	**20%**	**10%**	**5%**	**5%**
	Place of Worship	**10%**	**5%**	**100%**	**50%**	**5%**
Use	**Required Spaces per Section 10.1112.30**	**Required Shared Spaces per Section 10.1112.61**				
PROPOSED RESIDENTIAL UNITS < 500 SF	0	0	0	0	0	0
PROPOSED RESIDENTIAL UNITS 500 - 750 SF	11	7	11	9	11	11
PROPOSED RESIDENTIAL UNITS >750 SF	52	32	52	42	52	52
SPACES FOR RESIDENTIAL VISITORS	11	7	11	9	11	11
PROPOSED OFFICE	20	20	4	2	1	1
PROPOSED DAYCARE	36	36	4	0	0	0
RELOCATED EXISTING CHAPEL	10	1	1	10	5	1
	Total Required Shared Spaces:	**103**	**83**	**72**	**80**	**76**
	Public Transit 20% Reduction Spaces: (Per Section 10.5B82.10)	**83**	**67**	**58**	**64**	**61**
	Total Provided:	**84**				

[1] Daycare has been modified from the Retail/Service use based on conservative estimates of the business hours (M-F 8 am-5 pm) of the proposed daycare.



Proposed Multi-Family Development
1035 Lafayette Road
Portsmouth, NH

Drainage Analysis

Portsmouth Housing Authority

May 20, 2024

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Tighe&Bond

Section 1
Project Description

The project is located at 1035 Lafayette Road identified as Map 246 Lot 1 on the City of Portsmouth Tax Maps. The existing property is approximately 3.5 acres in size and is bound to the west by Route 1, the north by Sagamore Creek, and east & south by conservation land.

The proposed project consists of converting the existing church on site to office/day care space, converting an existing single family dwelling unit to a chapel and constructing two (2) additional buildings on site. The first proposed building (Building 1) will be a 4-story, 44-unit residential building. The second proposed building on site (Building 2) will be a 2-story, 7-unit residential building that will be connected to the existing church. The project will include associated site improvements such as parking, pedestrian access, utilities, stormwater management, lighting, and landscaping.

1.1 On-Site Soil Description

The project site consists of terrain that is sloping in all directions due to the center of the site consisting of the higher elevations. The site has an approximate high point of elevation 45 located at the location of the existing single family dwelling unit.

A web soil survey was completed for the project and can be found in Appendix A of this report. Based on the soil survey, the runoff analyzed within this study has been modeled using Hydrologic Soil Group A soils.

1.2 Pre- and Post-Development Comparison

The pre-development and post-development watershed areas have been analyzed using four (4) distinct points of analysis (PA-1, PA-2, PA-2.1 & PA-3.) While the points of analysis have remained unchanged, the contributing sub-catchment areas varied between pre-development and post-development conditions. These adjustments were made to reflect the differences in drainage patterns between the existing and proposed conditions. The overall area analyzed as part of this drainage analysis was held constant. PA-1 is located just off site to the south of the development. This area is undisturbed conservation land and will remain undisturbed throughout construction. PA-2 is also located just off site to the west of the development at Lafayette Road - US-Route 1. PA-2.1 is located just off site and is defined as the point where the existing catch basin between the sites northern most entrance and US-Route 1 discharges into the closed drainage system under Lafayette Road - US-Route 1. The last point of analysis, PA-3, is located off site to the north of the development at the Sagamore Creek, which is a tidal body of water.

The peak discharge rates at these points of analysis were determined by analyzing Type III, 24-hour storm events. The rainfall data for these storm events were obtained from the data published by the Northeast Regional Climate Center at Cornell University, which can be found in Appendix B.

Furthermore, the site is located within a Coastal and Great Bay Community, therefore an added factor of safety of 15% was included as required by Env-Wq 1503.08(l).

1.3 Calculation Methods

The design storms analyzed in this study are the 2-year, 10-year, 25-year and 50-year 24-hour duration storm events. The stormwater modeling system, HydroCAD 10.0 was utilized to predict the peak runoff rates from these storm events. The peak discharge rates were determined by analyzing Type III 24-hour storm events. The rainfall data for these storm events were obtained from the data published by the Northeast Regional Climate Center at Cornell University, with an additional 15% added factor of safety as required by Env-Wq 1503.08(l).

The time of concentration was computed using the TR-55 Method, which provides a means of determining the time for an entire watershed to contribute runoff to a specific location via sheet flows, shallow concentrated flow, and channel flow. Runoff curve numbers were calculated by estimating the coverage areas and then summing the curve number for the coverage area as a percent of the entire watershed.

<u>References:</u>

1. HydroCAD Stormwater Modeling System, by HydroCAD Software Solutions LLC, Chocorua, New Hampshire.
2. New Hampshire Stormwater Management Manual, Volume 2, Post-Construction Best Management Practices Selection and Design, December 2008.
3. "Extreme Precipitation in New York & New England." Extreme Precipitation in New York & New England by Northeast Regional Climate Center (NRCC), 26 June 2012.

Section 2
Pre-Development Conditions

To analyze the pre-development condition, the site has been modeled utilizing (4) distinct points of analysis (PA-1, PA-2, PA-2.1 & PA-3.) These points of analysis and watershed areas are depicted on the plan entitled "Pre-Development Watershed Plan", Sheet C-801.

The points of analysis and their contributing watershed areas are described below:

Point of Analysis (PA-1)

Point of analysis 1 (PA-1) is comprised of one subcatchment area (PRE 1.0). This subcatchment is comprised of mostly impervious surfaces, grass, and woods with a small portion of roof area made up by an existing shed and existing single-family dwelling. Runoff from this subcatchment sheet flows untreated stormwater directly into the conservation lands abutting the southern and eastern portions of the site.

Point of Analysis (PA-2)

Point of analysis 2 (PA-2) is also comprised of one subcatchment area (PRE 2.0). This subcatchment is comprised of mostly impervious surfaces, grass, and a small portion of roof area made up by a small portion of both the existing single-family dwelling and church on site. Runoff from this watershed sheet flows untreated stormwater directly onto Lafayette Road - US-Route 1.

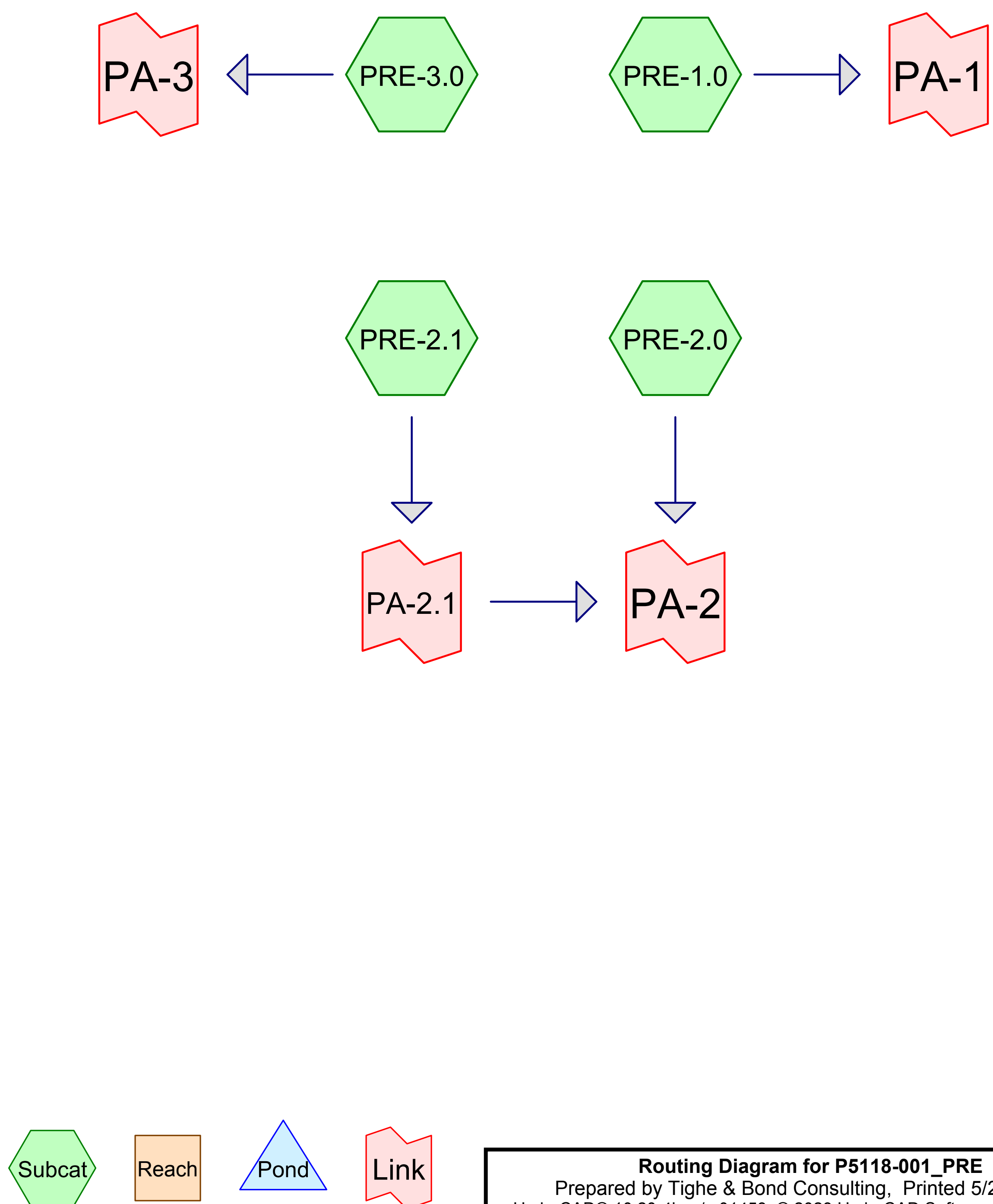
Point of Analysis (PA-2.1)

Point of analysis 2.1 (PA-2.1) is also comprised of one subcatchment area (PRE 2.1). This subcatchment is comprised of mostly grass with a small portion of impervious surface. Runoff from this watershed sheet flows stormwater directly into an existing catch basin on site, which ties into a closed drainage system along US-Route 1. The point at which the pipe connected to the catch basin on site discharges into the closed drainage system under Lafayette Road - US-Route 1 is depicted on the plans as PA-2.1. This catch basin has an existing DOT Drainage Easement that will remain.

Point of Analysis (PA-3)

Point of analysis 3 (PA-3) is the last point of analysis and is also comprised of one subcatchment area (PRE 3.0). This subcatchment is comprised of mostly impervious surfaces, grass, woods, and roof made up by an existing shed and the majority of the existing Church on site. Runoff from this watershed sheet flows untreated stormwater directly into Sagamore Creek and ultimately to the Piscataqua River.

2.1 Pre-Development Calculations



Routing Diagram for P5118-001_PRE
Prepared by Tighe & Bond Consulting, Printed 5/20/2024
HydroCAD® 10.20-4b s/n 01453 © 2023 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
63,435	39	>75% Grass cover, Good, HSG A (PRE-1.0, PRE-2.0, PRE-2.1, PRE-3.0)
32,277	98	Paved parking, HSG A (PRE-1.0, PRE-2.0, PRE-2.1, PRE-3.0)
9,187	98	Unconnected roofs, HSG A (PRE-1.0, PRE-2.0, PRE-3.0)
47,183	30	Woods, Good, HSG A (PRE-1.0, PRE-2.0, PRE-3.0)
152,082	**52**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
152,082	HSG A	PRE-1.0, PRE-2.0, PRE-2.1, PRE-3.0
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
152,082		**TOTAL AREA**

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

SubcatchmentPRE-1.0:	Runoff Area=61,649 sf 17.89% Impervious Runoff Depth>0.12" Flow Length=218' Tc=8.6 min CN=45 Runoff=0.02 cfs 598 cf
SubcatchmentPRE-2.0:	Runoff Area=24,290 sf 39.91% Impervious Runoff Depth>0.71" Flow Length=266' Tc=7.3 min CN=62 Runoff=0.34 cfs 1,438 cf
SubcatchmentPRE-2.1:	Runoff Area=7,081 sf 22.82% Impervious Runoff Depth>0.31" Flow Length=213' Tc=5.0 min CN=52 Runoff=0.02 cfs 183 cf
SubcatchmentPRE-3.0:	Runoff Area=59,062 sf 32.39% Impervious Runoff Depth>0.45" Flow Length=237' Tc=7.3 min CN=56 Runoff=0.38 cfs 2,228 cf
Link PA-1:	Inflow=0.02 cfs 598 cf Primary=0.02 cfs 598 cf
Link PA-2:	Inflow=0.36 cfs 1,620 cf Primary=0.36 cfs 1,620 cf
Link PA-2.1:	Inflow=0.02 cfs 183 cf Primary=0.02 cfs 183 cf
Link PA-3:	Inflow=0.38 cfs 2,228 cf Primary=0.38 cfs 2,228 cf

Total Runoff Area = 152,082 sf Runoff Volume = 4,446 cf Average Runoff Depth = 0.35"
72.74% Pervious = 110,618 sf 27.26% Impervious = 41,464 sf

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

SubcatchmentPRE-1.0:	Runoff Area=61,649 sf 17.89% Impervious Runoff Depth>0.65" Flow Length=218' Tc=8.6 min CN=45 Runoff=0.51 cfs 3,355 cf
SubcatchmentPRE-2.0:	Runoff Area=24,290 sf 39.91% Impervious Runoff Depth>1.83" Flow Length=266' Tc=7.3 min CN=62 Runoff=1.07 cfs 3,708 cf
SubcatchmentPRE-2.1:	Runoff Area=7,081 sf 22.82% Impervious Runoff Depth>1.09" Flow Length=213' Tc=5.0 min CN=52 Runoff=0.17 cfs 645 cf
SubcatchmentPRE-3.0:	Runoff Area=59,062 sf 32.39% Impervious Runoff Depth>1.37" Flow Length=237' Tc=7.3 min CN=56 Runoff=1.81 cfs 6,764 cf
Link PA-1:	Inflow=0.51 cfs 3,355 cf Primary=0.51 cfs 3,355 cf
Link PA-2:	Inflow=1.24 cfs 4,354 cf Primary=1.24 cfs 4,354 cf
Link PA-2.1:	Inflow=0.17 cfs 645 cf Primary=0.17 cfs 645 cf
Link PA-3:	Inflow=1.81 cfs 6,764 cf Primary=1.81 cfs 6,764 cf

Total Runoff Area = 152,082 sf Runoff Volume = 14,473 cf Average Runoff Depth = 1.14"
72.74% Pervious = 110,618 sf 27.26% Impervious = 41,464 sf

Summary for Subcatchment PRE-1.0:

Runoff = 0.51 cfs @ 12.21 hrs, Volume= 3,355 cf, Depth> 0.65"
Routed to Link PA-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 Rainfall=5.62"

Area (sf)	CN	Description
1,523	98	Unconnected roofs, HSG A
9,504	98	Paved parking, HSG A
29,181	30	Woods, Good, HSG A
21,441	39	>75% Grass cover, Good, HSG A
61,649	45	Weighted Average
50,622		82.11% Pervious Area
11,027		17.89% Impervious Area
1,523		13.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0300	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.3	15	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.8	153	0.0180	0.67		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.6	218	Total			

Summary for Subcatchment PRE-2.0:

Runoff = 1.07 cfs @ 12.12 hrs, Volume= 3,708 cf, Depth> 1.83"
Routed to Link PA-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 Rainfall=5.62"

Area (sf)	CN	Description
2,697	98	Unconnected roofs, HSG A
6,996	98	Paved parking, HSG A
933	30	Woods, Good, HSG A
13,664	39	>75% Grass cover, Good, HSG A
24,290	62	Weighted Average
14,597		60.09% Pervious Area
9,693		39.91% Impervious Area
2,697		27.82% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.7	103	0.0220	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	63	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	50	0.1150	2.37		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	266	Total			

Summary for Subcatchment PRE-2.1:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.17 cfs @ 12.10 hrs, Volume= 645 cf, Depth> 1.09"
Routed to Link PA-2.1 :

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 Rainfall=5.62"

Area (sf)	CN	Description
0	98	Unconnected roofs, HSG A
1,616	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
5,465	39	>75% Grass cover, Good, HSG A
7,081	52	Weighted Average
5,465		77.18% Pervious Area
1,616		22.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	97	0.0618	2.30		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.6	83	0.1200	2.42		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	33	0.0150	7.62	9.35	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
1.4	213	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment PRE-3.0:

Runoff = 1.81 cfs @ 12.12 hrs, Volume= 6,764 cf, Depth> 1.37"
Routed to Link PA-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 Rainfall=5.62"

Area (sf)	CN	Description
4,967	98	Unconnected roofs, HSG A
14,161	98	Paved parking, HSG A
17,069	30	Woods, Good, HSG A
22,865	39	>75% Grass cover, Good, HSG A
59,062	56	Weighted Average
39,934		67.61% Pervious Area
19,128		32.39% Impervious Area
4,967		25.97% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.0220	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.2	89	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	60	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	38	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.3	237	Total			

Summary for Link PA-1:

Inflow Area = 61,649 sf, 17.89% Impervious, Inflow Depth > 0.65" for 10-Yr event
Inflow = 0.51 cfs @ 12.21 hrs, Volume= 3,355 cf
Primary = 0.51 cfs @ 12.21 hrs, Volume= 3,355 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 31,371 sf, 36.05% Impervious, Inflow Depth > 1.67" for 10-Yr event
Inflow = 1.24 cfs @ 12.11 hrs, Volume= 4,354 cf
Primary = 1.24 cfs @ 12.11 hrs, Volume= 4,354 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2.1:

Inflow Area = 7,081 sf, 22.82% Impervious, Inflow Depth > 1.09" for 10-Yr event
Inflow = 0.17 cfs @ 12.10 hrs, Volume= 645 cf
Primary = 0.17 cfs @ 12.10 hrs, Volume= 645 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PA-2 :

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-3:

Inflow Area =	59,062 sf, 32.39% Impervious,	Inflow Depth > 1.37"	for 10-Yr event
Inflow =	1.81 cfs @ 12.12 hrs, Volume=	6,764 cf	
Primary =	1.81 cfs @ 12.12 hrs, Volume=	6,764 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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

SubcatchmentPRE-1.0:	Runoff Area=61,649 sf 17.89% Impervious Runoff Depth>1.30" Flow Length=218' Tc=8.6 min CN=45 Runoff=1.48 cfs 6,655 cf
SubcatchmentPRE-2.0:	Runoff Area=24,290 sf 39.91% Impervious Runoff Depth>2.89" Flow Length=266' Tc=7.3 min CN=62 Runoff=1.75 cfs 5,856 cf
SubcatchmentPRE-2.1:	Runoff Area=7,081 sf 22.82% Impervious Runoff Depth>1.92" Flow Length=213' Tc=5.0 min CN=52 Runoff=0.34 cfs 1,134 cf
SubcatchmentPRE-3.0:	Runoff Area=59,062 sf 32.39% Impervious Runoff Depth>2.30" Flow Length=237' Tc=7.3 min CN=56 Runoff=3.27 cfs 11,318 cf
Link PA-1:	Inflow=1.48 cfs 6,655 cf Primary=1.48 cfs 6,655 cf
Link PA-2:	Inflow=2.08 cfs 6,990 cf Primary=2.08 cfs 6,990 cf
Link PA-2.1:	Inflow=0.34 cfs 1,134 cf Primary=0.34 cfs 1,134 cf
Link PA-3:	Inflow=3.27 cfs 11,318 cf Primary=3.27 cfs 11,318 cf

Total Runoff Area = 152,082 sf Runoff Volume = 24,963 cf Average Runoff Depth = 1.97"
72.74% Pervious = 110,618 sf 27.26% Impervious = 41,464 sf

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

SubcatchmentPRE-1.0: Runoff Area=61,649 sf 17.89% Impervious Runoff Depth>2.02"
Flow Length=218' Tc=8.6 min CN=45 Runoff=2.61 cfs 10,370 cf

SubcatchmentPRE-2.0: Runoff Area=24,290 sf 39.91% Impervious Runoff Depth>3.97"
Flow Length=266' Tc=7.3 min CN=62 Runoff=2.44 cfs 8,029 cf

SubcatchmentPRE-2.1: Runoff Area=7,081 sf 22.82% Impervious Runoff Depth>2.80"
Flow Length=213' Tc=5.0 min CN=52 Runoff=0.51 cfs 1,655 cf

SubcatchmentPRE-3.0: Runoff Area=59,062 sf 32.39% Impervious Runoff Depth>3.26"
Flow Length=237' Tc=7.3 min CN=56 Runoff=4.78 cfs 16,063 cf

Link PA-1: Inflow=2.61 cfs 10,370 cf
Primary=2.61 cfs 10,370 cf

Link PA-2: Inflow=2.94 cfs 9,684 cf
Primary=2.94 cfs 9,684 cf

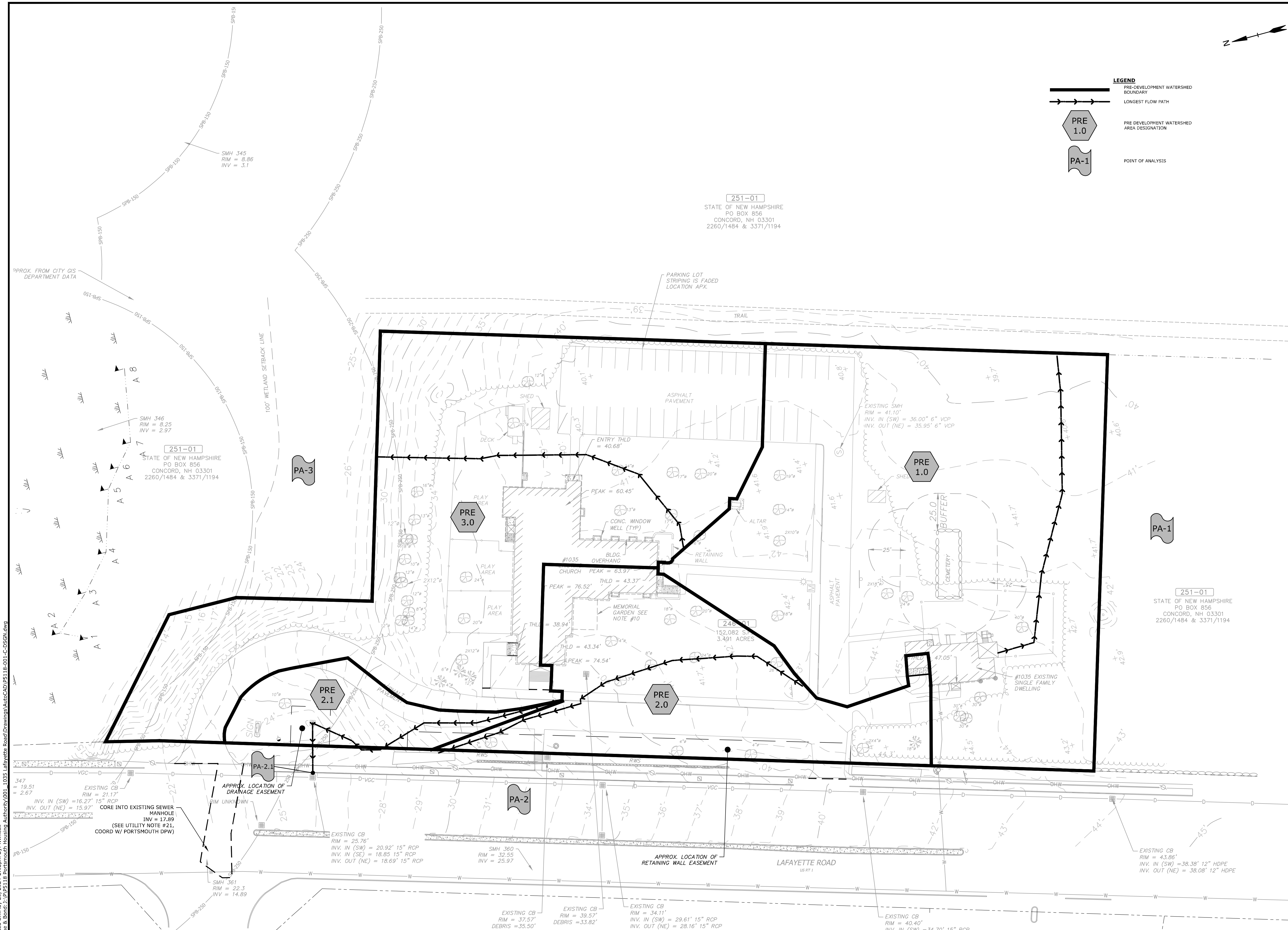
Link PA-2.1: Inflow=0.51 cfs 1,655 cf
Primary=0.51 cfs 1,655 cf

Link PA-3: Inflow=4.78 cfs 16,063 cf
Primary=4.78 cfs 16,063 cf

Total Runoff Area = 152,082 sf Runoff Volume = 36,117 cf Average Runoff Depth = 2.85"
72.74% Pervious = 110,618 sf 27.26% Impervious = 41,464 sf

2.2 Pre-Development Watershed Plan

Tighe&Bond



Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DSGN.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

PRE-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-801

Last Saved: 5/20/2024
Plotted On:May 20, 2024-2:02pm By: NWilcox
Tighe & Bond:J:\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DSGN.dwg

Section 3
Post-Development Conditions

The post-development condition was analyzed by using the same points of analysis (PA-1, PA-2, PA-2.1 & PA-3.) In the post-development conditions, the total watersheds increased with six (6) total watershed areas. Stormwater runoff from these sub-catchment areas flow via sheet flow to Lafayette Road - US-Route 1, the conservation lands, Sagamore Creek or through the subsurface drainage systems prior to discharging into the proposed surface stormwater systems before ultimately discharging off site.

The point of analysis and its sub-catchment areas are depicted on the plan entitled "Post-Development Watershed Plan," Sheet C-802. The point of analysis and it's contributing watershed areas are described below:

Point of Analysis (PA-1)

Point of analysis 1 (PA-1) includes one (1) Post-Development Watershed Area (POST 1.0). The POST 1.0 area has significantly decreased and is only comprised of a small strip of land to the south of the proposed pavement section. The area is composed of grass and wooded areas.

Point of Analysis (PA-2)

Point of analysis 2 (PA-2) includes two (2) Post-Development Watershed Areas, both depicted as POST 2.0 on the plans. The first POST 2.0 area is abutting Lafayette Road - US-Route 1 and comprised of a small strip of land. This area is mainly composed of grass and wooded area with a small section of pavement.

The second POST 2.0 area is comprised of an area of land located centrally on site. This area is composed of grassed area along with a roof section from the existing church building on site.

Point of Analysis (PA-2.1)

Point of analysis 2.1 (PA-2.1) includes one (1) Post-Development Watershed Area (POST 2.1). POST 2.1 is mainly composed of impervious and grass area.

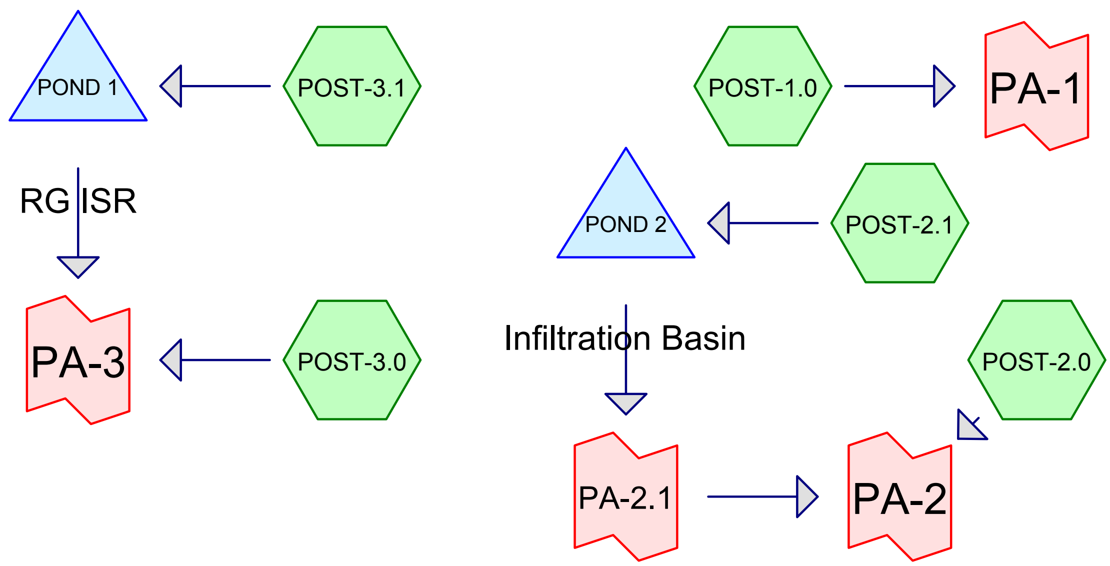
As stated in Section 2, this subcatchment area includes an existing catch basin within the DOT Drainage easement. In order to decrease flows entering this point of analysis, the area around the catch basin will be converted to an Infiltration Basin and the existing catch basin will be removed and an outlet control structure will be constructed in its place.

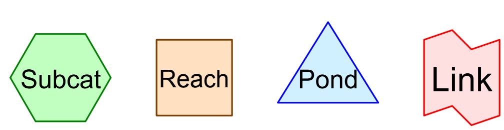
Point of Analysis (PA-3)

Point of analysis 3 (PA-3) includes two (2) Post-Development Watershed Areas (POST 3.0 & POST 3.1). POST 3.0 is primarily grass and woods area with small sections of existing pavement and roof from the existing Church building. The majority of this subcatchment area will remain undisturbed with no additional impervious surfaces being added. Runoff from this watershed sheet flows stormwater directly into Sagamore Creek and ultimately into the Piscataqua River.

POST 3.1 is the last and largest subcatchment on site and is composed of both the proposed buildings and a section of the existing church building. In addition to the proposed buildings, the remainder of the area is comprised of impervious pavement, concrete, and grassed area. All stormwater will sheet flow into the closed drainage system where it will be discharged into the Bioretention ISR located within the subcatchment, on the Northeastern corner of the development before ultimately discharging into Sagamore Creek, defined as PA-3.

3.1 Post-Development Calculations





Routing Diagram for P5118-001_POST
Prepared by Tighe & Bond Consulting, Printed 5/20/2024
HydroCAD® 10.20-4b s/n 01453 © 2023 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
69,136	39	>75% Grass cover, Good, HSG A (POST-1.0, POST-2.0, POST-2.1, POST-3.0, POST-3.1)
9,321	96	Gravel surface, HSG A (POST-3.1)
41,579	98	Paved parking, HSG A (POST-2.0, POST-2.1, POST-3.0, POST-3.1)
22,249	98	Unconnected roofs, HSG A (POST-2.0, POST-3.0, POST-3.1)
9,797	30	Woods, Good, HSG A (POST-1.0, POST-3.0)
152,082	**67**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
152,082	HSG A	POST-1.0, POST-2.0, POST-2.1, POST-3.0, POST-3.1
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
152,082		**TOTAL AREA**

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

Subcatchment POST-1.0: Runoff Area=2,180 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=211' Slope=0.0140 '/' Tc=9.3 min CN=32 Runoff=0.00 cfs 0 cf

Subcatchment POST-2.0: Runoff Area=11,987 sf 25.27% Impervious Runoff Depth>0.19"
Flow Length=84' Tc=5.0 min UI Adjusted CN=48 Runoff=0.01 cfs 190 cf

Subcatchment POST-2.1: Runoff Area=11,781 sf 53.68% Impervious Runoff Depth>1.19"
Flow Length=327' Tc=5.0 min CN=71 Runoff=0.36 cfs 1,170 cf

Subcatchment POST-3.0: Runoff Area=27,648 sf 26.07% Impervious Runoff Depth>0.22"
Flow Length=230' Tc=5.0 min UI Adjusted CN=49 Runoff=0.05 cfs 501 cf

Subcatchment POST-3.1: Runoff Area=98,486 sf 47.99% Impervious Runoff Depth>1.31"
Flow Length=580' Tc=9.7 min CN=73 Runoff=2.92 cfs 10,778 cf

Pond 2P: Infiltration Basin Peak Elev=22.67' Storage=903 cf Inflow=0.36 cfs 1,170 cf
Outflow=0.01 cfs 294 cf

Pond 3P: RG 2.0 Peak Elev=34.56' Storage=5,840 cf Inflow=2.92 cfs 10,778 cf
Outflow=0.39 cfs 5,085 cf

Link PA-1: Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Link PA-2: Inflow=0.02 cfs 484 cf
Primary=0.02 cfs 484 cf

Link PA-2.1: Inflow=0.01 cfs 294 cf
Primary=0.01 cfs 294 cf

Link PA-3: Inflow=0.41 cfs 5,586 cf
Primary=0.41 cfs 5,586 cf

Total Runoff Area = 152,082 sf Runoff Volume = 12,639 cf Average Runoff Depth = 1.00"
58.03% Pervious = 88,254 sf 41.97% Impervious = 63,828 sf

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

SubcatchmentPOST-1.0: Runoff Area=2,180 sf 0.00% Impervious Runoff Depth>0.08"
Flow Length=211' Slope=0.0140 '/' Tc=9.3 min CN=32 Runoff=0.00 cfs 15 cf

SubcatchmentPOST-2.0: Runoff Area=11,987 sf 25.27% Impervious Runoff Depth>0.83"
Flow Length=84' Tc=5.0 min UI Adjusted CN=48 Runoff=0.18 cfs 833 cf

SubcatchmentPOST-2.1: Runoff Area=11,781 sf 53.68% Impervious Runoff Depth>2.59"
Flow Length=327' Tc=5.0 min CN=71 Runoff=0.82 cfs 2,546 cf

SubcatchmentPOST-3.0: Runoff Area=27,648 sf 26.07% Impervious Runoff Depth>0.90"
Flow Length=230' Tc=5.0 min UI Adjusted CN=49 Runoff=0.48 cfs 2,066 cf

SubcatchmentPOST-3.1: Runoff Area=98,486 sf 47.99% Impervious Runoff Depth>2.77"
Flow Length=580' Tc=9.7 min CN=73 Runoff=6.38 cfs 22,745 cf

Pond 2P: Infiltration Basin Peak Elev=22.86' Storage=1,204 cf Inflow=0.82 cfs 2,546 cf
Outflow=0.13 cfs 1,643 cf

Pond 3P: RG 2.0 Peak Elev=34.62' Storage=6,023 cf Inflow=6.38 cfs 22,745 cf
Outflow=7.87 cfs 16,924 cf

Link PA-1: Inflow=0.00 cfs 15 cf
Primary=0.00 cfs 15 cf

Link PA-2: Inflow=0.21 cfs 2,476 cf
Primary=0.21 cfs 2,476 cf

Link PA-2.1: Inflow=0.13 cfs 1,643 cf
Primary=0.13 cfs 1,643 cf

Link PA-3: Inflow=8.22 cfs 18,990 cf
Primary=8.22 cfs 18,990 cf

Total Runoff Area = 152,082 sf Runoff Volume = 28,205 cf Average Runoff Depth = 2.23"
58.03% Pervious = 88,254 sf 41.97% Impervious = 63,828 sf

Summary for Subcatchment POST-1.0:

Runoff = 0.00 cfs @ 15.32 hrs, Volume= 15 cf, Depth> 0.08"
Routed to Link PA-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 Rainfall=5.62"

Area (sf)	CN	Description
0	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
1,764	30	Woods, Good, HSG A
416	39	>75% Grass cover, Good, HSG A
2,180	32	Weighted Average
2,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.0140	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
3.2	161	0.0140	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.3	211	Total			

Summary for Subcatchment POST-2.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.18 cfs @ 12.11 hrs, Volume= 833 cf, Depth> 0.83"
Routed to Link PA-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 Rainfall=5.62"

Area (sf)	CN	Adj	Description
2,461	98		Unconnected roofs, HSG A
568	98		Paved parking, HSG A
0	30		Woods, Good, HSG A
8,958	39		>75% Grass cover, Good, HSG A
11,987	54	48	Weighted Average, UI Adjusted
8,958			74.73% Pervious Area
3,029			25.27% Impervious Area
2,461			81.25% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	31	0.0050	0.67		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.7	53	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	84	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment POST-2.1:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.82 cfs @ 12.08 hrs, Volume= 2,546 cf, Depth> 2.59"
Routed to Pond 2P : Infiltration Basin

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 Rainfall=5.62"

Area (sf)	CN	Description
0	98	Unconnected roofs, HSG A
6,324	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
5,457	39	>75% Grass cover, Good, HSG A
11,781	71	Weighted Average
5,457		46.32% Pervious Area
6,324		53.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	100	0.0360	1.87		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.9	209	0.0360	3.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	18	0.0250	8.48	6.66	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011
1.8	327	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment POST-3.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.48 cfs @ 12.11 hrs, Volume= 2,066 cf, Depth> 0.90"
Routed to Link PA-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 Rainfall=5.62"

Area (sf)	CN	Adj	Description
2,345	98		Unconnected roofs, HSG A
4,862	98		Paved parking, HSG A
8,033	30		Woods, Good, HSG A
12,408	39		>75% Grass cover, Good, HSG A
27,648	52	49	Weighted Average, UI Adjusted
20,441			73.93% Pervious Area
7,207			26.07% Impervious Area
2,345			32.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	21	0.0050	0.62		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.6	209	0.0960	2.17		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.2	230	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment POST-3.1:

[47] Hint: Peak is 214% of capacity of segment #3

Runoff = 6.38 cfs @ 12.14 hrs, Volume= 22,745 cf, Depth> 2.77"
Routed to Pond 3P : RG 2.0

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 Rainfall=5.62"

Area (sf)	CN	Description
17,443	98	Unconnected roofs, HSG A
29,825	98	Paved parking, HSG A
9,321	96	Gravel surface, HSG A
41,897	39	>75% Grass cover, Good, HSG A
98,486	73	Weighted Average
51,218		52.01% Pervious Area
47,268		47.99% Impervious Area
17,443		36.90% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0200	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
2.9	170	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	360	0.0050	3.79	2.98	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011
9.7	580	Total			

Summary for Pond 2P: Infiltration Basin

Inflow Area = 11,781 sf, 53.68% Impervious, Inflow Depth > 2.59" for 10-Yr event
Inflow = 0.82 cfs @ 12.08 hrs, Volume= 2,546 cf
Outflow = 0.13 cfs @ 12.61 hrs, Volume= 1,643 cf, Atten= 84%, Lag= 31.7 min
Primary = 0.13 cfs @ 12.61 hrs, Volume= 1,643 cf
Routed to Link PA-2.1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 22.86' @ 12.61 hrs Surf.Area= 1,609 sf Storage= 1,204 cf
Flood Elev= 25.00' Surf.Area= 2,668 sf Storage= 5,775 cf

Plug-Flow detention time= 211.4 min calculated for 1,640 cf (64% of inflow)
Center-of-Mass det. time= 105.7 min (943.4 - 837.7)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	5,775 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
22.00	1,182	0	0
25.00	2,668	5,775	5,775

Device	Routing	Invert	Outlet Devices
#1	Primary	19.37'	**15.0" Round Culvert** L= 27.0' Ke= 0.500 Inlet / Outlet Invert= 19.37' / 18.85' S= 0.0193 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	22.60'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	23.50'	**4.0" W x 4.0" H Vert. Orifice/Grate X 104.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.13 cfs @ 12.61 hrs HW=22.86' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.13 cfs of 10.01 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 1.75 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: RG 2.0

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 98,486 sf, 47.99% Impervious, Inflow Depth > 2.77" for 10-Yr event
Inflow = 6.38 cfs @ 12.14 hrs, Volume= 22,745 cf
Outflow = 7.87 cfs @ 12.20 hrs, Volume= 16,924 cf, Atten= 0%, Lag= 3.5 min
Primary = 7.87 cfs @ 12.20 hrs, Volume= 16,924 cf
Routed to Link PA-3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 34.62' @ 12.20 hrs Surf.Area= 3,120 sf Storage= 6,023 cf
Flood Elev= 35.25' Surf.Area= 3,344 sf Storage= 7,263 cf

Plug-Flow detention time= 135.7 min calculated for 16,889 cf (74% of inflow)

Center-of-Mass det. time= 47.1 min (883.7 - 836.6)

Volume	Invert	Avail.Storage	Storage Description
#1	29.50'	7,263 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.50	2,177	0.0	0	0
31.00	2,177	40.0	1,306	1,306
33.00	2,177	10.0	435	1,742
35.00	3,344	100.0	5,521	7,263

Device	Routing	Invert	Outlet Devices
#1	Primary	31.00'	**15.0" Round Culvert** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 31.00' / 30.50' S= 0.0167 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	30.00'	**1.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	33.00'	**10.000 in/hr Exfiltration over Surface area above 33.00'** Excluded Surface area = 2,177 sf
#4	Device 1	34.55'	**4.0" x 4.0" Horiz. Orifice/Grate X 104.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.77 cfs @ 12.20 hrs HW=34.62' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 7.77 cfs of 10.22 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 9.16 fps)
  │ └─**3=Exfiltration** (Passes 0.07 cfs of 0.22 cfs potential flow)
  └─**4=Orifice/Grate** (Weir Controls 7.69 cfs @ 0.84 fps)

Summary for Link PA-1:

Inflow Area = 2,180 sf, 0.00% Impervious, Inflow Depth > 0.08" for 10-Yr event
Inflow = 0.00 cfs @ 15.32 hrs, Volume= 15 cf
Primary = 0.00 cfs @ 15.32 hrs, Volume= 15 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 23,768 sf, 39.35% Impervious, Inflow Depth > 1.25" for 10-Yr event
Inflow = 0.21 cfs @ 12.42 hrs, Volume= 2,476 cf
Primary = 0.21 cfs @ 12.42 hrs, Volume= 2,476 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2.1:

Inflow Area = 11,781 sf, 53.68% Impervious, Inflow Depth > 1.67" for 10-Yr event
Inflow = 0.13 cfs @ 12.61 hrs, Volume= 1,643 cf
Primary = 0.13 cfs @ 12.61 hrs, Volume= 1,643 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PA-2 :

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-3:

Inflow Area =	126,134 sf, 43.19% Impervious,	Inflow Depth > 1.81"	for 10-Yr event
Inflow =	8.22 cfs @ 12.20 hrs, Volume=	18,990 cf	
Primary =	8.22 cfs @ 12.20 hrs, Volume=	18,990 cf, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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

SubcatchmentPOST-1.0: Runoff Area=2,180 sf 0.00% Impervious Runoff Depth>0.34"
Flow Length=211' Slope=0.0140 '/' Tc=9.3 min CN=32 Runoff=0.00 cfs 62 cf

SubcatchmentPOST-2.0: Runoff Area=11,987 sf 25.27% Impervious Runoff Depth>1.56"
Flow Length=84' Tc=5.0 min UI Adjusted CN=48 Runoff=0.43 cfs 1,556 cf

SubcatchmentPOST-2.1: Runoff Area=11,781 sf 53.68% Impervious Runoff Depth>3.83"
Flow Length=327' Tc=5.0 min CN=71 Runoff=1.22 cfs 3,761 cf

SubcatchmentPOST-3.0: Runoff Area=27,648 sf 26.07% Impervious Runoff Depth>1.65"
Flow Length=230' Tc=5.0 min UI Adjusted CN=49 Runoff=1.07 cfs 3,795 cf

SubcatchmentPOST-3.1: Runoff Area=98,486 sf 47.99% Impervious Runoff Depth>4.04"
Flow Length=580' Tc=9.7 min CN=73 Runoff=9.33 cfs 33,165 cf

Pond 2P: Infiltration Basin Peak Elev=23.14' Storage=1,677 cf Inflow=1.22 cfs 3,761 cf
Outflow=0.26 cfs 2,840 cf

Pond 3P: RG 2.0 Peak Elev=34.63' Storage=6,059 cf Inflow=9.33 cfs 33,165 cf
Outflow=9.97 cfs 27,341 cf

Link PA-1: Inflow=0.00 cfs 62 cf
Primary=0.00 cfs 62 cf

Link PA-2: Inflow=0.56 cfs 4,396 cf
Primary=0.56 cfs 4,396 cf

Link PA-2.1: Inflow=0.26 cfs 2,840 cf
Primary=0.26 cfs 2,840 cf

Link PA-3: Inflow=10.84 cfs 31,136 cf
Primary=10.84 cfs 31,136 cf

Total Runoff Area = 152,082 sf Runoff Volume = 42,339 cf Average Runoff Depth = 3.34"
58.03% Pervious = 88,254 sf 41.97% Impervious = 63,828 sf

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

SubcatchmentPOST-1.0: Runoff Area=2,180 sf 0.00% Impervious Runoff Depth>0.71"
Flow Length=211' Slope=0.0140 '/' Tc=9.3 min CN=32 Runoff=0.02 cfs 130 cf

SubcatchmentPOST-2.0: Runoff Area=11,987 sf 25.27% Impervious Runoff Depth>2.35"
Flow Length=84' Tc=5.0 min UI Adjusted CN=48 Runoff=0.70 cfs 2,350 cf

SubcatchmentPOST-2.1: Runoff Area=11,781 sf 53.68% Impervious Runoff Depth>5.04"
Flow Length=327' Tc=5.0 min CN=71 Runoff=1.60 cfs 4,947 cf

SubcatchmentPOST-3.0: Runoff Area=27,648 sf 26.07% Impervious Runoff Depth>2.46"
Flow Length=230' Tc=5.0 min UI Adjusted CN=49 Runoff=1.71 cfs 5,678 cf

SubcatchmentPOST-3.1: Runoff Area=98,486 sf 47.99% Impervious Runoff Depth>5.27"
Flow Length=580' Tc=9.7 min CN=73 Runoff=12.15 cfs 43,286 cf

Pond 2P: Infiltration Basin Peak Elev=23.44' Storage=2,209 cf Inflow=1.60 cfs 4,947 cf
Outflow=0.34 cfs 4,013 cf

Pond 3P: RG 2.0 Peak Elev=34.79' Storage=6,557 cf Inflow=12.15 cfs 43,286 cf
Outflow=10.50 cfs 37,459 cf

Link PA-1: Inflow=0.02 cfs 130 cf
Primary=0.02 cfs 130 cf

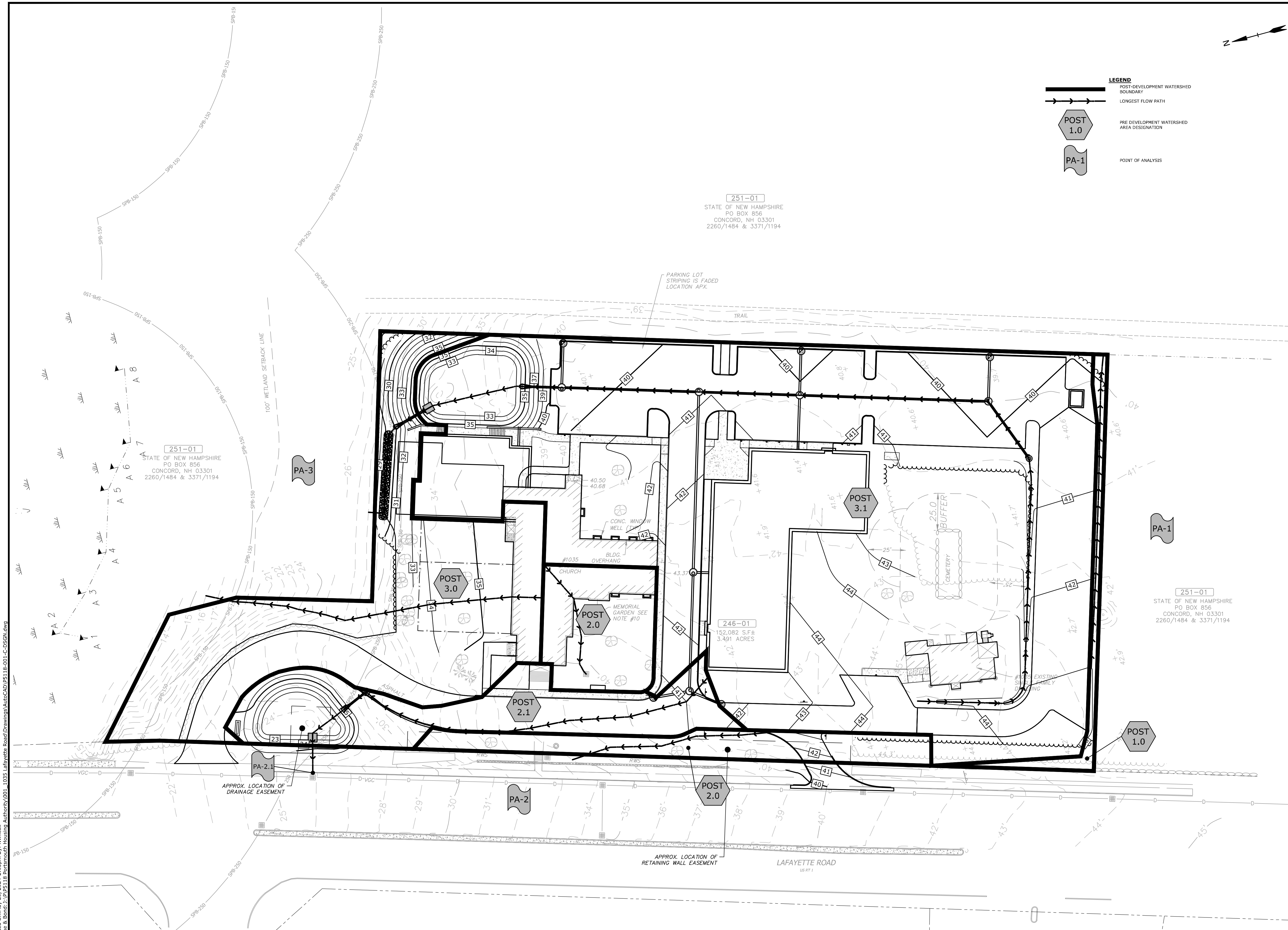
Link PA-2: Inflow=0.94 cfs 6,362 cf
Primary=0.94 cfs 6,362 cf

Link PA-2.1: Inflow=0.34 cfs 4,013 cf
Primary=0.34 cfs 4,013 cf

Link PA-3: Inflow=12.15 cfs 43,137 cf
Primary=12.15 cfs 43,137 cf

Total Runoff Area = 152,082 sf Runoff Volume = 56,391 cf Average Runoff Depth = 4.45"
58.03% Pervious = 88,254 sf 41.97% Impervious = 63,828 sf

3.2 Post-Development Watershed Plan



Tighe&Bond

GRAPHIC SCALE 0 30' 60'

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DSGN.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

POST-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-802

Last Saved: 5/20/2024
Plotted On: May 20, 2024-2:03pm By: NWilcox
Tighe & Bond: J:\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DSGN.dwg

Section 4
Peak Rate Comparison

The following table summarizes and compares the pre- and post-development peak runoff rates from the 2-year, 10-year, 25-year and 50-year storm events at the point of analysis.

Table 4.1
Comparison of Pre- and Post-Development Flows (CFS)

	2-Year Storm	10-Year Storm	25-Year Storm	50-Year Storm
Pre-Development Watershed				
PA-1	0.02	0.51	1.48	2.61
PA-2	0.36	1.24	2.08	2.94
PA-2.1	0.02	0.17	0.34	0.51
PA-3	0.38	1.81	3.27	4.78
Post-Development Watershed				
PA-1	0.00	0.00	0.00	0.02
PA-2	0.02	0.21	0.56	0.94
PA-2.1	0.01	0.13	0.26	0.34
PA-3	0.41	8.22	10.84	12.15

The Peak Runoff Control Requirements of Env-Wq 1507.06 are not required to be met for point of analysis 3 (PA-3) per NHDES Alteration of Terrain regulation Env-Wq 1507.06(d).

Section 5
Mitigation Description

The stormwater management system has been designed to provide stormwater treatment as required by the City of Portsmouth Site Review Regulations and NHDES AoT Regulations (Env-Wq 1500).

5.1 Pre-Treatment Methods for Protecting Water Quality

Pre-treatment for the stormwater filtration systems consists of off-line deep sump catch basins.

5.2 Treatment Methods for Protecting Water Quality.

The runoff from proposed impervious areas will be treated using a Bioretention ISR and an Infiltration Basin. These BMPs are sized to treat the Water Quality Flow of their respective subcatchment areas. The systems are outfitted with an outlet control structure to bypass the peak flows away from treatment. The BMP worksheet for this treatment practice has been included in Section 6 of this report.

The proposed stormwater management system is required to remove 80% of the annual Total Suspended Soils (TSS) loads and 50% of the annual Total Nitrogen (TN) loads per the City of Portsmouth's Site Plan regulations, Section 7.6.2.1.a.i. As shown in table 5.1 the pollutant removal efficiencies for the proposed treatment system exceeds the City of Portsmouth's removal requirements.

Table 5.1 – Pollutant Removal Efficiencies

BMP	Total Suspended Solids	Total Nitrogen	Total Phosphorus
Bioretention ISR[1]	90%	65%	65%

Table 5.2 – Pollutant Removal Efficiencies

BMP	Total Suspended Solids	Total Nitrogen	Total Phosphorus
Infiltration Basin[1]	90%	60%	65%

1. Pollutant removal calculations for Bioretention ISR and Infiltration Basin with deep sump catchbasin pretreatment are shown in Table 5.3 & 5.4.

Table 5.3 – Pollutant Removal Calculations				
Bioretention ISR				
BMP	TSS Removal Rate	Starting TSS Load	TSS Removed	Remaining TSS Load
Deep Sump Catchbasin w/Hood[1]	0.15	1.00	0.15	0.85
Bioretention ISR[2]	0.90	0.85	0.77	0.08
	Total Suspended Solids Removed:			**92%**
	TN Removal Rate	Starting TN Load	TN Removed	Remaining TN Load
Deep Sump Catchbasin w/Hood[1]	0.05	1.00	0.05	0.95
Bioretention ISR[2]	0.65	0.95	0.62	0.33
	Total Nitrogen Removed:			**67%**
	TP Removal Rate	Starting TP Load	TP Removed	Remaining TP Load
Deep Sump Catchbasin w/Hood[1]	0.05	1.00	0.05	0.95
Bioretention ISR[2]	0.65	0.95	0.62	0.33
	Total Phosphorus Removed:			**67%**

Table 5.4 – Pollutant Removal Calculations				
Infiltration Basin				
BMP	TSS Removal Rate	Starting TSS Load	TSS Removed	Remaining TSS Load
Deep Sump Catchbasin w/Hood[1]	0.15	1.00	0.15	0.85
Infiltration Basin[3]	0.90	0.85	0.77	0.08
	Total Suspended Solids Removed:			**92%**
	TN Removal Rate	Starting TN Load	TN Removed	Remaining TN Load
Deep Sump Catchbasin w/Hood[1]	0.05	1.00	0.05	0.95
Infiltration Basin[3]	0.60	0.95	0.57	0.38
	Total Nitrogen Removed:			**62%**
	TP Removal Rate	Starting TP Load	TP Removed	Remaining TP Load
Deep Sump Catchbasin w/Hood[1]	0.05	1.00	0.05	0.95
Infiltration Basin[3]	0.65	0.95	0.62	0.33
	Total Phosphorus Removed:			**67%**

1. Pollutant removal efficiencies from NH Stormwater Manual Volume 2, Appendix B.
2. Pollutant removal efficiencies from NH Stormwater Manual Volume 2, Appendix B.
3. Pollutant removal efficiencies from NH Stormwater Manual Volume 2, Appendix B.

Section 6
BMP Worksheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Rain Garden ISR**

Enter the node name in the drainage analysis if applicable.

2.26	ac	A = Area draining to the practice	
1.08	ac	A_I = Impervious area draining to the practice	
0.48	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.48	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.09	ac-in	WQV= 1" x Rv x A	
3,939	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
394	cf	10% x WQV (check calc for sediment forebay)	
985	cf	25% x WQV (check calc for water stored in saturated zone)	
Offline Deep Sump		Method of Pretreatment	
N/A	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
4,075	cf	Volume below lowest orifice[1]	**≥ 100%WQV**
1,306	cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.09	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
34.55	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.07	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
31.26	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	**≥ 24-hrs**
18.00	in	Depth of Filter Media	**≥ 18"**
3.00	:1	Pond side slopes	**≥ 3:1**
Trash Rack		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
34.79	ft	Peak elevation of the 50-year storm event (E_{50})	
35.25	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes:

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Type/Node Name: **Infiltration Basin #1**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	← yes
0.27	ac	A = Area draining to the practice	
0.15	ac	A_I = Impervious area draining to the practice	
0.56	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.55	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.15	ac-in	WQV= 1" x Rv x A	
539	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
135	cf	25% x WQV (check calc for sediment forebay volume)	
Deep Sump CB		Method of pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
2,525	cf	V = Volume[1] (attach a stage-storage table)	≥ WQV
1,182	sf	A_{SA} = Surface area of the bottom of the pond	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
22.00	feet	E_{BTM} = Elevation of the bottom of the basin	
	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
22.00	feet	D_{SHWT} = Separation from SHWT	≥ *[3]
22.0	feet	D_{ROCK} = Separation from bedrock	≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	≥ 24"
	ft	D_T = Depth of trench, if trench proposed	4 - 10 ft
N/A	Yes/No	If a trench or underground system is proposed, has observation well been provided?	←yes
N/A		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	← yes
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
3.0	:1	If a basin is proposed, pond side slopes.	≥3:1
22.86	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
23.44	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
25.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Stage-Area-Storage for Pond 2P: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
22.00	1,182	0
22.05	1,207	60
22.10	1,232	121
22.15	1,256	183
22.20	1,281	246
22.25	1,306	311
22.30	1,331	377
22.35	1,355	444
22.40	1,380	512
22.45	1,405	582
22.50	1,430	653
22.55	1,454	725
22.60	1,479	798
22.65	1,504	873
22.70	1,529	949
22.75	1,554	1,026
22.80	1,578	1,104
22.85	1,603	1,184
22.90	1,628	1,264
22.95	1,653	1,346
23.00	1,677	1,430
23.05	1,702	1,514
23.10	1,727	1,600
23.15	1,752	1,687
23.20	1,776	1,775
23.25	1,801	1,864
23.30	1,826	1,955
23.35	1,851	2,047
23.40	1,875	2,140
23.45	1,900	2,235
23.50	1,925	2,330
23.55	1,950	2,427
23.60	1,975	2,525
23.65	1,999	2,625
23.70	2,024	2,725
23.75	2,049	2,827
23.80	2,074	2,930
23.85	2,098	3,034
23.90	2,123	3,140
23.95	2,148	3,247
24.00	2,173	3,355
24.05	2,197	3,464
24.10	2,222	3,574
24.15	2,247	3,686
24.20	2,272	3,799
24.25	2,297	3,913
24.30	2,321	4,029
24.35	2,346	4,145
24.40	2,371	4,263
24.45	2,396	4,383
24.50	2,420	4,503
24.55	2,445	4,625
24.60	2,470	4,747
24.65	2,495	4,872
24.70	2,519	4,997
24.75	2,544	5,123
24.80	2,569	5,251
24.85	2,594	5,380
24.90	2,618	5,511
24.95	2,643	5,642
25.00	**2,668**	**5,775**

STORAGE BELOW LOWEST
INVERT OF OUTLET
CONTROL STRUCTURE

APPENDIX A

United States Department of Agriculture

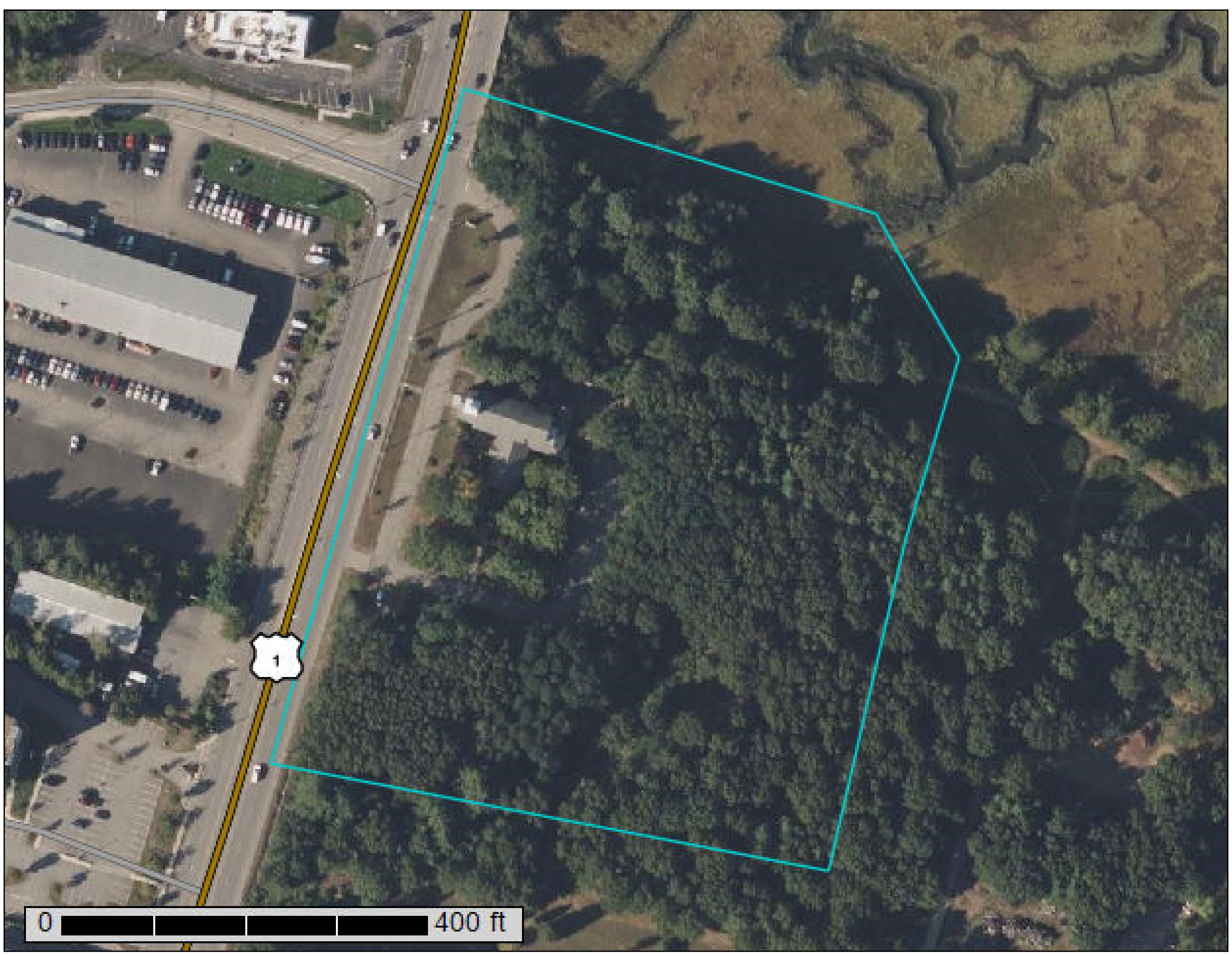
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Rockingham County, New Hampshire



April 23, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


70° 46' 19" W
70° 46' 7" W
43° 2' 59" N
43° 2' 47" N
355700
355740
355780
355820
355860
355900
355940
4767860
4767820
4767780
4767740
4767700
4767660
4767620
4767580
4767540
4767500
Lafayette Rd
1
597
26C
699
510B
26A
Soil Map may not be valid at this scale.
Map Scale: 1:1,770 if printed on A portrait (8.5" x 11") sheet.
Meters
0
25
50
100
150
Feet
0
50
100
200
300
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 26, Aug 22, 2023

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
26A	Windsor loamy sand, 0 to 3 percent slopes	4.5	45.0%
26C	Windsor loamy sand, 8 to 15 percent slopes	2.8	28.2%
510B	Hoosic gravelly fine sandy loam, 3 to 8 percent slopes	0.0	0.0%
597	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded	0.0	0.3%
699	Urban land	2.6	26.5%
Totals for Area of Interest		**10.0**	**100.0%**

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Rockingham County, New Hampshire

26A—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkg
Elevation: 0 to 990 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent
Landform: Outwash plains, eskers, kames, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

26C—Windsor loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svkq
Elevation: 0 to 1,260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Windsor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: — error in exists on —
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

Ap - 1 to 11 inches: loamy sand
Bw - 11 to 31 inches: loamy sand
C - 31 to 65 inches: sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 10 percent
Landform: Outwash plains, eskers, kames, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Deerfield

Percent of map unit: 5 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

510B—Hoosic gravelly fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9cp4
Elevation: 100 to 1,100 feet
Mean annual precipitation: 30 to 50 inches

Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 190 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hoosic and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hoosic

Setting

Parent material: Outwash

Typical profile

H1 - 0 to 8 inches: gravelly fine sandy loam
H2 - 8 to 15 inches: very gravelly fine sandy loam
H3 - 15 to 60 inches: very gravelly coarse sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 10 percent
Hydric soil rating: No

597—Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded

Map Unit Setting

National map unit symbol: 2tyqf
Elevation: 0 to 10 feet
Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Westbrook and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Westbrook

Setting

Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Partly-decomposed herbaceous organic material over loamy mineral material

Typical profile

Oe - 0 to 19 inches: mucky peat
Cg - 19 to 59 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to strongly saline (0.7 to 111.6 mmhos/cm)
Sodium adsorption ratio, maximum: 33.0
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Ecological site: R144AY002CT - Tidal Salt High Marsh mesic very frequently flooded, R144AY001CT - Tidal Salt Low Marsh mesic very frequently flooded
Hydric soil rating: Yes

Minor Components

Ipswich

Percent of map unit: 5 percent
Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R144AY002CT - Tidal Salt High Marsh mesic very frequently flooded, R144AY001CT - Tidal Salt Low Marsh mesic very frequently flooded
Hydric soil rating: Yes

Pawcatuck

Percent of map unit: 5 percent
Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R144AY002CT - Tidal Salt High Marsh mesic very frequently flooded, R144AY001CT - Tidal Salt Low Marsh mesic very frequently flooded
Hydric soil rating: Yes

699—Urban land

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Not named

Percent of map unit: 15 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

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

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

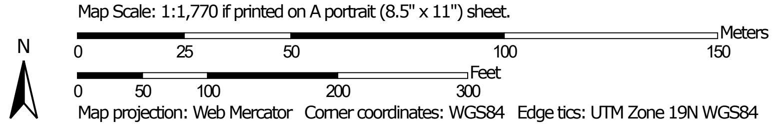
Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

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

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

Custom Soil Resource Report
Map—Hydrologic Soil Group

Map Scale: 1:1,770 if printed on A portrait (8.5" x 11") sheet.



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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 26, Aug 22, 2023

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
26A	Windsor loamy sand, 0 to 3 percent slopes	A	4.5	45.0%
26C	Windsor loamy sand, 8 to 15 percent slopes	A	2.8	28.2%
510B	Hoosic gravelly fine sandy loam, 3 to 8 percent slopes	A	0.0	0.0%
597	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded	B/D	0.0	0.3%
699	Urban land		2.6	26.5%
Totals for Area of Interest			**10.0**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX B

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point

Smoothing	Yes
State	
Location	
Latitude	43.052 degrees North
Longitude	70.768 degrees West
Elevation	0 feet
Date/Time	Tue Oct 10 2023 16:27:23 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.82	1.04	**1yr**	0.70	0.98	1.21	1.57	2.04	2.67	2.93	**1yr**	2.36	2.82	3.23	3.96	4.57	**1yr**
2yr	0.32	0.50	0.62	0.82	1.02	1.30	**2yr**	0.88	1.18	1.52	1.94	2.50	3.22	3.58	**2yr**	2.85	3.45	3.95	4.70	5.35	**2yr**
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.44	3.15	4.08	4.60	**5yr**	3.61	4.42	5.06	5.96	6.73	**5yr**
10yr	0.41	0.65	0.82	1.12	1.45	1.89	**10yr**	1.25	1.73	2.24	2.90	3.76	4.89	5.55	**10yr**	4.33	5.34	6.11	7.14	8.01	**10yr**
25yr	0.48	0.76	0.97	1.34	1.78	2.34	**25yr**	1.53	2.15	2.78	3.64	4.76	6.20	7.13	**25yr**	5.49	6.86	7.85	9.07	10.10	**25yr**
50yr	0.54	0.86	1.10	1.54	2.08	2.76	**50yr**	1.79	2.53	3.30	4.34	5.68	7.42	8.62	**50yr**	6.57	8.29	9.48	10.87	12.03	**50yr**
100yr	0.60	0.97	1.25	1.78	2.42	3.27	**100yr**	2.09	2.99	3.92	5.18	6.80	8.90	10.43	**100yr**	7.87	10.03	11.46	13.04	14.35	**100yr**
200yr	0.68	1.10	1.43	2.05	2.83	3.85	**200yr**	2.45	3.53	4.63	6.15	8.12	10.66	12.61	**200yr**	9.44	12.13	13.85	15.64	17.11	**200yr**
500yr	0.80	1.32	1.72	2.49	3.49	4.78	**500yr**	3.01	4.39	5.79	7.74	10.27	13.55	16.22	**500yr**	11.99	15.60	17.81	19.91	21.61	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.72	0.88	**1yr**	0.63	0.87	0.92	1.33	1.68	2.25	2.53	**1yr**	1.99	2.43	2.88	3.18	3.91	**1yr**
2yr	0.32	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.82	2.34	3.07	3.47	**2yr**	2.72	3.34	3.84	4.57	5.10	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.12	2.73	3.81	4.22	**5yr**	3.37	4.06	4.74	5.57	6.28	**5yr**
10yr	0.39	0.59	0.74	1.03	1.33	1.60	**10yr**	1.15	1.57	1.81	2.39	3.06	4.40	4.90	**10yr**	3.89	4.71	5.49	6.46	7.24	**10yr**
25yr	0.44	0.67	0.83	1.19	1.57	1.90	**25yr**	1.35	1.86	2.10	2.75	3.53	4.75	5.95	**25yr**	4.20	5.72	6.72	7.87	8.75	**25yr**
50yr	0.48	0.74	0.92	1.32	1.77	2.17	**50yr**	1.53	2.12	2.35	3.07	3.93	5.37	6.88	**50yr**	4.75	6.61	7.83	9.14	10.11	**50yr**
100yr	0.54	0.81	1.02	1.47	2.02	2.47	**100yr**	1.74	2.42	2.63	3.41	4.35	6.04	7.95	**100yr**	5.35	7.65	9.12	10.64	11.68	**100yr**
200yr	0.60	0.90	1.14	1.64	2.29	2.82	**200yr**	1.98	2.76	2.94	3.77	4.79	6.78	9.19	**200yr**	6.00	8.84	10.63	12.40	13.51	**200yr**
500yr	0.69	1.03	1.32	1.92	2.73	3.37	**500yr**	2.36	3.30	3.42	4.30	5.45	7.90	11.13	**500yr**	7.00	10.70	13.00	15.20	16.37	**500yr**

Coastal and Great Bay Region Precipitation Increase		
	24-hr Storm Event (in.)	24-hr Storm Event + 15% (in.)
1 Year	2.67	3.07
2 Year	3.22	3.70
10 Year	4.89	5.62
25 Year	6.20	7.13
50 Year	7.42	8.53

www.tighebond.com

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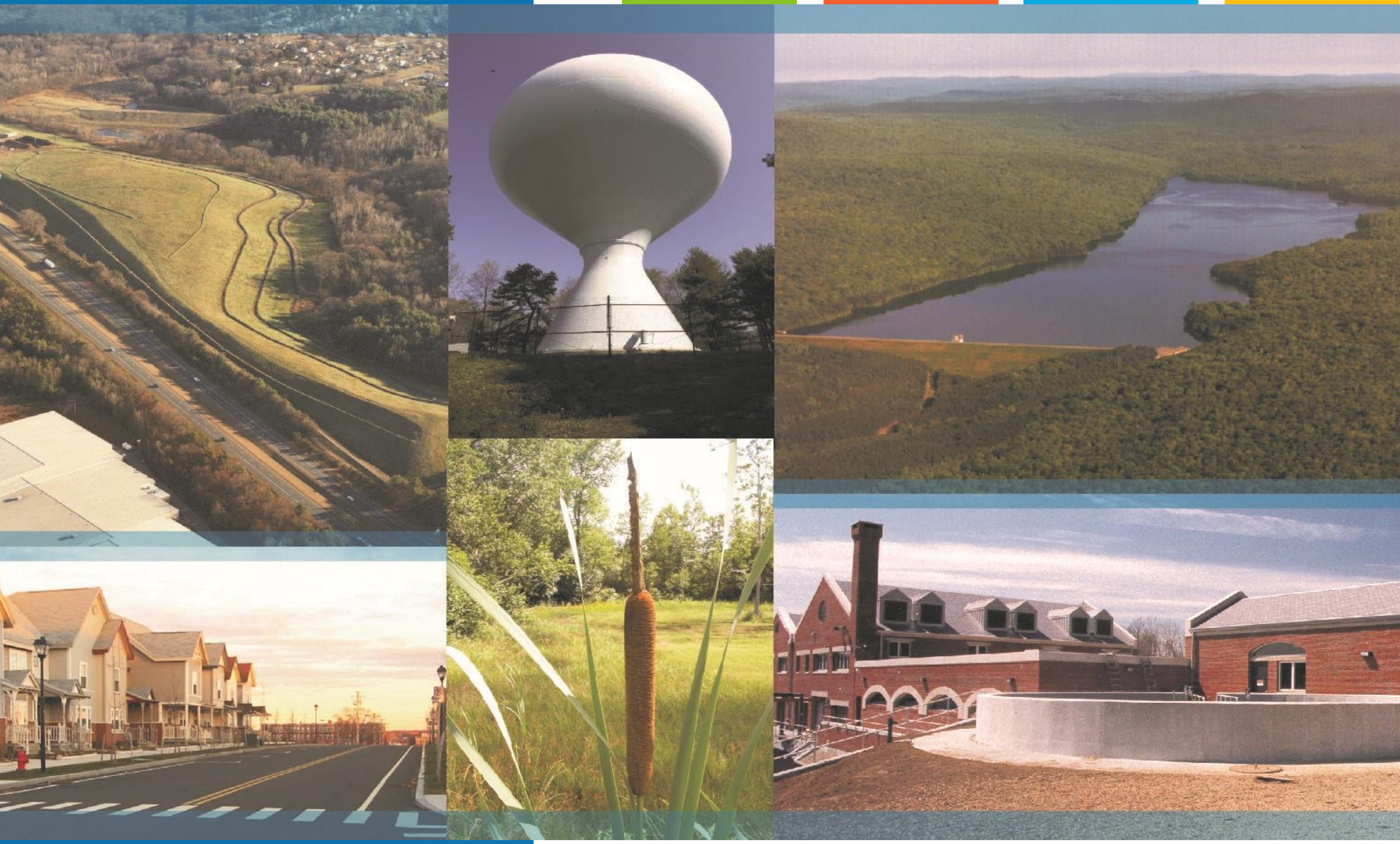

Proposed Mixed Use Development
1035 Lafayette Rd
Portsmouth, NH

Long-Term Operation & Maintenance Plan

Portsmouth Housing Authority

May 20, 2024

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Section 1
Long-Term Operation & Maintenance Plan

It is the intent of this Operation and Maintenance Plan to identify the areas of this site that need special attention and consideration, as well as implement a plan to assure routine maintenance. By identifying the areas of concern as well as implementing a frequent and routine maintenance schedule the site will maintain a high-quality stormwater runoff.

1.1 Contact/Responsible Party

Portsmouth Housing Authority
245 Middle Street
Portsmouth, NH 03801

(Note: The contact information for the Contact/Responsible Party shall be kept current. If ownership changes, the Operation and Maintenance Plan must be transferred to the new party.)

1.2 Maintenance Items

Maintenance of the following items shall be recorded:

- Litter/Debris Removal
- Landscaping
- Catchbasin Cleaning
- Pavement Sweeping
- Bioretention ISR Maintenance
- Sediment Basin Maintenance
- Infiltration Basin

The following maintenance items and schedule represent the minimum action required. Periodic site inspections shall be conducted, and all measures must be maintained in effective operating condition. The following items shall be observed during site inspection and maintenance:

- Inspect vegetated areas, particularly slopes and embankments for areas of erosion. Replant and restore as necessary
- Inspect catch basins for sediment buildup
- Inspect site for trash and debris

1.3 Overall Site Operation & Maintenance Schedule

Maintenance Item	Frequency of Maintenance
Litter/Debris Removal	Weekly
Pavement Sweeping - Sweep impervious areas to remove sand and litter.	Annually
Landscaping - Landscaped islands to be maintained and mulched.	Maintained as required and mulched each Spring
Catch Basin (CB) Cleaning - CB to be cleaned of solids and oils.	Annually
Bioretention ISR	Two (2) times annually and following any rainfall event exceeding 2.5 inches in a 24-hour period
Infiltration Basin	Two (2) times annually and following any rainfall event exceeding 2.5 inches in a 24-hour period
Stone Berm Level Spreader	Annually

1.3.1 Disposal Requirements

Disposal of debris, trash, sediment and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.

1.4 Bioretention System Requirements

Underground Detention System Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Pretreatment measure	Two (2) times annually	- Removal of accumulated sediment - No less than once annually
Drawdown Time	Once annually	- Removal of accumulated sediments or reconstruction of filter media if system does not drain within 72-hours following a rain event
Vegetation	Once annually	- Vegetation maintained in healthy condition - Pruning - Replacement of dead or diseased vegetation - Removal of invasive species

1.5 Infiltration Basin Requirements

Infiltration Basin Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Monitor to ensure that Basins function effectively after storms	Two (2) times annually and after any rainfall event exceeding 2.5" in a 24-hr period	- Trash and debris to be removed - Any required maintenance shall be addressed
Inspect Vegetation	Annually	- Inspect the condition of all Basin vegetation - Prune back overgrowth - Replace dead vegetation - Remove any invasive species
Inspect Drawdown Time - The system shall drawdown within 48-hours following a rainfall event.	Annually	- Assess the condition of the facility to determine measures required to restore the filtration function, including but not limited to removal of accumulated sediments or reconstruction of the filter.

1.6 Stone Berm Level Spreader

Stone Berm Level Spreader Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Visual Inspection	Annually	- Visually inspect for damage and deterioration - Repair damages immediately

1.7 Snow & Ice Management for Standard Asphalt and Walkways

Snow storage areas shall be located such that no direct untreated discharges are possible to receiving waters from the storage site (snow storage areas have been shown on the Site Plan). The property manager will be responsible for timely snow removal from all private sidewalks, driveways, and parking areas. Any snow accumulation beyond a height of 3’ in the snow storage areas will be hauled off-site and legally disposed of. Salt storage areas shall be covered or located such that no direct untreated discharges are possible to receiving waters from the storage site. Salt and sand shall be used to the minimum extent practical (refer to the attached for de-icing application rate guideline from the New Hampshire Stormwater Management Manual, Volume 2,).

Deicing Application Rate Guidelines

24' of pavement (typcial two-lane road)

These rates are not fixed values, but rather the middle of a range to be selected and adjusted by an agency according to its local conditions and experience.

			Pounds per two-lane mile			
Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Salt Prewetted / Pretreated with Salt Brine	Salt Prewetted / Pretreated with Other Blends	Dry Salt*	Winter Sand (abrasives)
> 30° ↑	Snow	Plow, treat intersections only	80	70	100*	Not recommended
	Freezing Rain	Apply Chemical	80 - 160	70 - 140	100 - 200*	Not recommended
30° ↓	Snow	Plow and apply chemical	80 - 160	70 - 140	100 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↑	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↓	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↑	Snow or Freezing Rain	Plow and apply chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↓	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↑	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↓	Snow or Freezing Rain	Plow and apply chemical	240 - 320	210 - 280	300 - 400*	500 for freezing rain
0° - 15° ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300 - 400	Not recommended	500 - 750 spot treatment as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	400 - 600**	Not recommended	500 - 750 spot treatment as needed

* Dry salt is not recommended. It is likely to blow off the road before it melts ice.

** A blend of 6 - 8 gal/ton $MgCl_2$ or $CaCl_2$ added to NaCl can melt ice as low as -10°.

Anti-icing Route Data Form				
Truck Station:				
Date:				
Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky
Reason for applying:				
Route:				
Chemical:				
Application Time:				
Application Amount:				
Observation (first day):				
Observation (after event):				
Observation (before next application):				
Name:				

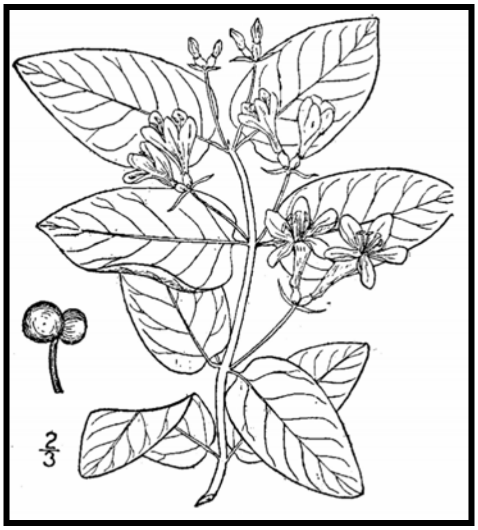
Section 2
Invasive Species

With respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem is classified as an invasive species. Refer to the following fact sheet prepared by the University of New Hampshire Cooperative Extension entitled Methods for Disposing Non-Native Invasive Plants for recommended methods to dispose of invasive plant species.

UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions.* Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

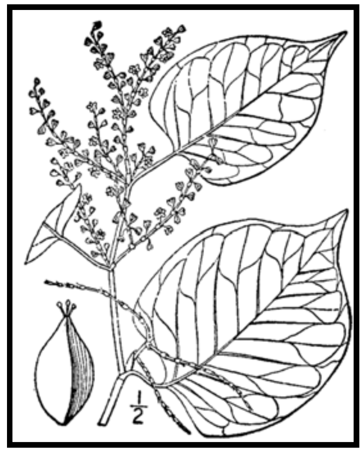
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions.* Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds</td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">Fruits, Seeds, Plant Fragments</td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

<table>
<tr><th>Non-Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">garlic mustard
(Alliaria petiolata)
spotted knapweed
(Centaurea maculosa)
▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling.
black swallow-wort
(Cynanchum nigrum)
▪ May cause skin rash. Wear gloves and long sleeves when handling.
pale swallow-wort
(Cynanchum rossicum)
giant hogweed
(Heracleum mantegazzianum)
▪ Can cause major skin rash. Wear gloves and long sleeves when handling.
dame's rocket
(Hesperis matronalis)
perennial pepperweed
(Lepidium latifolium)
purple loosestrife
(Lythrum salicaria)
Japanese stilt grass
(Microstegium vimineum)
mile-a-minute weed
(Polygonum perfoliatum)</td><td rowspan="2">**Fruits and Seeds**</td><td>**Prior to flowering**
Depends on scale of infestation
Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>**During and following flowering**
Do nothing until the following year or remove flowering heads and bag and let rot.

Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>common reed
(*Phragmites australis*)
Japanese knotweed
(Polygonum cuspidatum)
Bohemian knotweed
(Polygonum x bohemicum)</td><td>**Fruits, Seeds, Plant Fragments**
Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.</td><td>**Small infestation**
▪ Bag all plant material and let rot.
▪ Never pile and use resulting material as compost.
▪ Burn.

Large infestation
▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile.
▪ Monitor and remove any sprouting material.
▪ Pile, let dry, and burn.</td></tr>
</table>

January 2010

Managing Invasive Plants
Methods of Control

by Christopher Mattrick

They're out there. The problem of invasive plants is as close as your own backyard.

Maybe a favorite dogwood tree is struggling in the clutches of an Oriental bittersweet vine. Clawlike canes of multiflora rose are scratching at the side of your house. That handsome burning bush you planted few years ago has become a whole clump in practically no time … but what happened to the azalea that used to grow right next to it?

If you think controlling or managing invasive plants on your property is a daunting task, you're not alone. Though this topic is getting lots of attention from federal, state, and local government agencies, as well as the media, the basic question for most homeowners is simply, "How do I get rid of the invasive plants in my own landscape?" Fortunately, the best place to begin to tackle this complex issue is in our own backyards and on local conservation lands. We hope the information provided here will help you take back your yard. We won't kid you—there's some work involved, but the payoff in beauty, wildlife habitat, and peace of mind makes it all worthwhile.

PLAN OF ATTACK

Three broad categories cover most invasive plant control: mechanical, chemical, and biological. Mechanical control means physically removing plants from the environment through cutting or pulling. Chemical control uses herbicides to kill plants and inhibit regrowth. Techniques and chemicals used will vary depending on the species. Biological controls use plant diseases or insect predators, typically from the targeted species' home range. Several techniques may be effective in controlling a single species, but there is usually one preferred method—the one that is most resource efficient with minimal impact on non-target species and the environment.

Spraying chemicals to control invasive plants.

MECHANICAL CONTROL METHODS

Mechanical treatments are usually the first ones to look at when evaluating an invasive plant removal project. These procedures do not require special licensing or introduce chemicals into the environment. They do require permits in some situations, such as wetland zones. [See sidebar on page 23.] Mechanical removal is highly labor intensive and creates a significant amount of site disturbance, which can lead to rapid reinvasion if not handled properly.

Pulling and digging

Many herbaceous plants and some woody species (up to about one inch in diameter), if present in limited quantities, can be pulled out or dug up. It's important to remove as much of the root system as possible; even a small portion can restart the infestation. Pull plants by hand or use a digging fork, as shovels can shear off portions of the root system, allowing for regrowth. To remove larger woody stems (up to about three inches in diameter), use a Weed Wrench,™ Root Jack, or Root Talon. These tools, available from several manufacturers, are designed to remove the aboveground portion of the plant as well as the entire root system. It's easiest to undertake this type of control in the spring or early summer when soils are moist and plants come out more easily.

Using tools to remove woody stems.

Volunteers hand pulling invasive plants.

Suffocation

Try suffocating small seedlings and herbaceous plants. Place double or triple layers of thick UV-stabilized plastic sheeting, either clear or black (personally I like clear), over the infestation and secure the plastic with stakes or weights. Make sure the plastic extends at least five feet past the edge of infestation on all sides. Leave the plastic in place for at least two years. This technique will kill everything beneath the plastic—invasive and non-invasive plants alike. Once the plastic is removed, sow a cover crop such as annual rye to prevent new invasions.

Cutting or mowing

This technique is best suited for locations you can visit and treat often. To be effective, you will need to mow or cut infested areas three or four times a year for up to five years. The goal is to interrupt the plant's ability to photosynthesize by removing as much leafy material as possible. Cut the plants at ground level and remove all resulting debris from the site. With this treatment, the infestation may actually appear to get worse at first, so you will need to be as persistent as the invasive plants themselves. Each time you cut the plants back, the root system gets slightly larger, but must also rely on its energy reserves to push up new growth. Eventually, you will exhaust these reserves and the plants will die. This may take many years, so you have to remain committed to this process once you start; otherwise the treatment can backfire, making the problem worse.

CHEMICAL CONTROL METHODS

Herbicides are among the most effective and resource-efficient tools to treat invasive species. Most of the commonly known invasive plants can be treated using only two herbicides—glyphosate (the active ingredient in Roundup™ and Rodeo™) and triclopyr (the active ingredient in Brush-B-Gone™ and Garlon™). Glyphosate is non-selective, meaning it kills everything it contacts. Triclopyr is selective and does not injure monocots (grasses, orchids, lilies, etc.). Please read labels and follow directions precisely for both environmental and personal safety. These are relatively benign herbicides, but improperly used they can still cause both short- and long-term health and environmental problems. Special aquatic formulations are required when working in wetland zones. You are required to have a state-issued pesticide applicator license when applying these chemicals on land you do not own. To learn more about the pesticide regulations in your state, visit or call your state's pesticide control division, usually part of the state's Department of Agriculture. In wetland areas, additional permits are usually required by the Wetlands Protection Act. [See sidebar on page 23.]

Foliar applications

When problems are on a small scale, this type of treatment is usually applied with a backpack sprayer or even a small handheld spray bottle. It is an excellent way to treat large monocultures of herbaceous plants, or to spot-treat individual plants that are difficult to remove mechanically, such as goutweed, swallowwort, or purple loosestrife. It is also an effective treatment for some woody species, such as Japanese barberry, multiflora rose, Japanese honeysuckle, and Oriental bittersweet that grow in dense masses or large numbers over many acres. The herbicide mixture should contain no more than five percent of the active ingredient, but it is important to follow the instructions on the product label. This treatment is most effective when the plants are actively growing, ideally when they are flowering or beginning to form fruit. It has been shown that plants are often more susceptible to this type of treatment if the existing stems are cut off and the regrowth is treated. This is especially true for Japanese knotweed. The target plants should be thoroughly wetted with the herbicide on a day when there is no rain in the forecast for the next 24 to 48 hours.

Cut stem treatments

There are several different types of cut stem treatments, but here we will review only the one most commonly used. All treatments of this type require a higher concentration of the active ingredient than is used in foliar applications. A 25 to 35 percent solution of the active ingredient should be used for cut stem treatments, but read and follow all label instructions. In most cases, the appropriate herbicide is glyphosate, except for Oriental bittersweet, on which triclopyr should be used. This treatment can be used on all woody stems, as well as phragmites and Japanese knotweed.

For woody stems, treatments are most effective when applied in the late summer and autumn—between late August and November. Stems should be cut close to the ground, but not so close that you will lose track of them. Apply herbicide directly to the cut surface as soon as possible after cutting. Delaying the application will reduce the effectiveness of the treatment. The herbicide can be applied with a sponge, paintbrush, or spray bottle.

Cut stem treatment tools.

For phragmites and Japanese knotweed, treatment is the same, but the timing and equipment are different. Plants should be treated anytime from mid-July through September, but the hottest, most humid days of the summer are best for this method. Cut the stems halfway between two leaf nodes at a comfortable height. Inject (or squirt) herbicide into the exposed hollow stem. All stems in an infestation should be treated. A wash bottle is the most effective application tool, but you can also use an eyedropper, spray bottle, or one of the recently developed high-tech injection systems.

It is helpful to mix a dye in with the herbicide solution. The dye will stain the treated surface and mark the areas that have been treated, preventing unnecessary reapplication. You can buy a specially formulated herbicide dye, or use food coloring or laundry dye.

There is not enough space in this article to describe all the possible ways to control invasive plants. You can find other treatments, along with more details on the above-described methods, and species-specific recommendations on The Nature Conservancy Web site (tncweeds.ucdavis.edu). An upcoming posting on the Invasive Plant Atlas of New England (www.ipane.org) and the New England Wild Flower Society (www.newfs.org) Web sites will also provide further details.

Hollow stem injection tools.

Biological controls—still on the horizon

Biological controls are moving into the forefront of control methodology, but currently the only widely available and applied biocontrol relates to purple loosestrife. More information on purple loosestrife and other biological control projects can be found at www.invasiveplants.net.

DISPOSAL OF INVASIVE PLANTS

Proper disposal of removed invasive plant material is critical to the control process. Leftover plant material can cause new infestations or reinfest the existing project area. There are many appropriate ways to dispose of invasive plant debris. I've listed them here in order of preference.

1. **Burn it**—Make a brush pile and burn the material following local safety regulations and restrictions, or haul it to your town's landfill and place it in their burn pile.

2. **Pile it**—Make a pile of the woody debris. This technique will provide shelter for wildlife as well.

3. **Compost it**—Place all your herbaceous invasive plant debris in a pile and process as compost. Watch the pile closely for resprouts and remove as necessary. Do not use the resulting compost in your garden. The pile is for invasive plants only.

Injecting herbicide into the hollow stem of phragmites.

4. Dry it/cook it—Place woody debris out on your driveway or any asphalt surface and let it dry out for a month. Place herbaceous material in a doubled-up black trash bag and let it cook in the sun for one month. At the end of the month, the material should be non-viable and you can dump it or dispose of it with the trash. The method assumes there is no viable seed mixed in with the removed material.

Care should be taken in the disposal of all invasive plants, but several species need extra attention. These are the ones that have the ability to sprout vigorously from plant fragments and should ideally be burned or dried prior to disposal: Oriental bittersweet, multiflora rose, Japanese honeysuckle, phragmites, and Japanese knotweed.

Christopher Mattrick is the former Senior Conservation Programs Manager for New England Wild Flower Society, where he managed conservation volunteer and invasive and rare plant management programs. Today, Chris and his family work and play in the White Mountains of New Hampshire, where he is the Forest Botanist and Invasive Species Coordinator for the White Mountain National Forest.

Controlling Invasive Plants in Wetlands

Special concerns; special precautions

Control of invasive plants in or around wetlands or bodies of water requires a unique set of considerations. Removal projects in wetland zones can be legal and effective if handled appropriately. In many cases, herbicides may be the least disruptive tools with which to remove invasive plants. You will need a state-issued pesticide license to apply herbicide on someone else's property, but all projects in wetland or aquatic systems fall under the jurisdiction of the Wetlands Protection Act and therefore require a permit. ***Yes, even hand-pulling that colony of glossy buckthorn plants from your own swampland requires a permit.*** Getting a permit for legal removal is fairly painless if you plan your project carefully.

1. Investigate and understand the required permits and learn how to obtain them. The entity charged with the enforcement of the Wetlands Protection Act varies from state to state. For more information in your state, contact:

ME: Department of Environmental Protection
www.state.me.us/dep/blwq/docstand/nrpapage.htm

NH: Department of Environmental Services
www.des.state.nh.us/wetlands/

VT: Department of Environmental Conservation
www.anr.state.vt.us/dec/waterq/permits/htm/pm_cud.htm

MA: Consult your local town conservation commission

RI: Department of Environmental Management
www.dem.ri.gov/programs/benviron/water/permits/fresh/index.htm

CT: Consult your local town Inland Wetland and Conservation Commission

2. Consult an individual or organization with experience in this area. Firsthand experience in conducting projects in wetland zones and navigating the permitting process is priceless. Most states have wetland scientist societies whose members are experienced in working in wetlands and navigating the regulations affecting them. A simple Web search will reveal the contact point for these societies. Additionally, most environmental consulting firms and some nonprofit organizations have skills in this area.

3. Develop a well-written and thorough project plan. You are more likely to be successful in obtaining a permit for your project if you submit a project plan along with your permit application. The plan should include the reasons for the project, your objectives in completing the project, how you plan to reach those objectives, and how you will monitor the outcome.

4. Ensure that the herbicides you plan to use are approved for aquatic use. Experts consider most herbicides harmful to water quality or aquatic organisms, but rate some formulations as safe for aquatic use. Do the research and select an approved herbicide, and then closely follow the instructions on the label.

5. If you are unsure—research, study, and most of all, ask for help. Follow the rules. The damage caused to aquatic systems by the use of an inappropriate herbicide or the misapplication of an appropriate herbicide not only damages the environment, but also may reduce public support for safe, well-planned projects.

Section 3
Annual Updates and Log Requirements

The Owner and/or Contact/Responsible Party shall review this Operation and Maintenance Plan once per year for its effectiveness and adjust the plan and deed as necessary.

A log of all preventative and corrective measures for the stormwater system shall be kept on-site and be made available upon request by any public entity with administrative, health environmental or safety authority over the site including NHDES.

Copies of the Stormwater Maintenance report shall be submitted to the City of Portsmouth on an annual basis.

Stormwater Management Report						
Proposed Mixed-Use Development		**1035 Lafayette Road – Tax Map 246 Lot 1**				
BMP Description	**Date of Inspection**	**Inspector**	**BMP Installed and Operating Properly?**	**Cleaning / Corrective Action Needed**	**Date of Cleaning / Repair**	**Performed By**
Deep Sump CB's			❑Yes ❑No			
Bioretention ISR			❑Yes ❑No			
Infiltration Basin			❑Yes ❑No			
Stone Berm Level Spreader			❑Yes ❑No			

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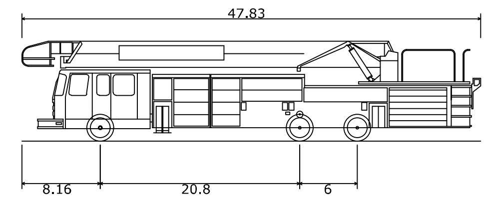
PROPOSED MIXED-USE DEVELOPMENT PORTSMOUTH, NH

FIRE TRUCK TURNING EXHIBIT

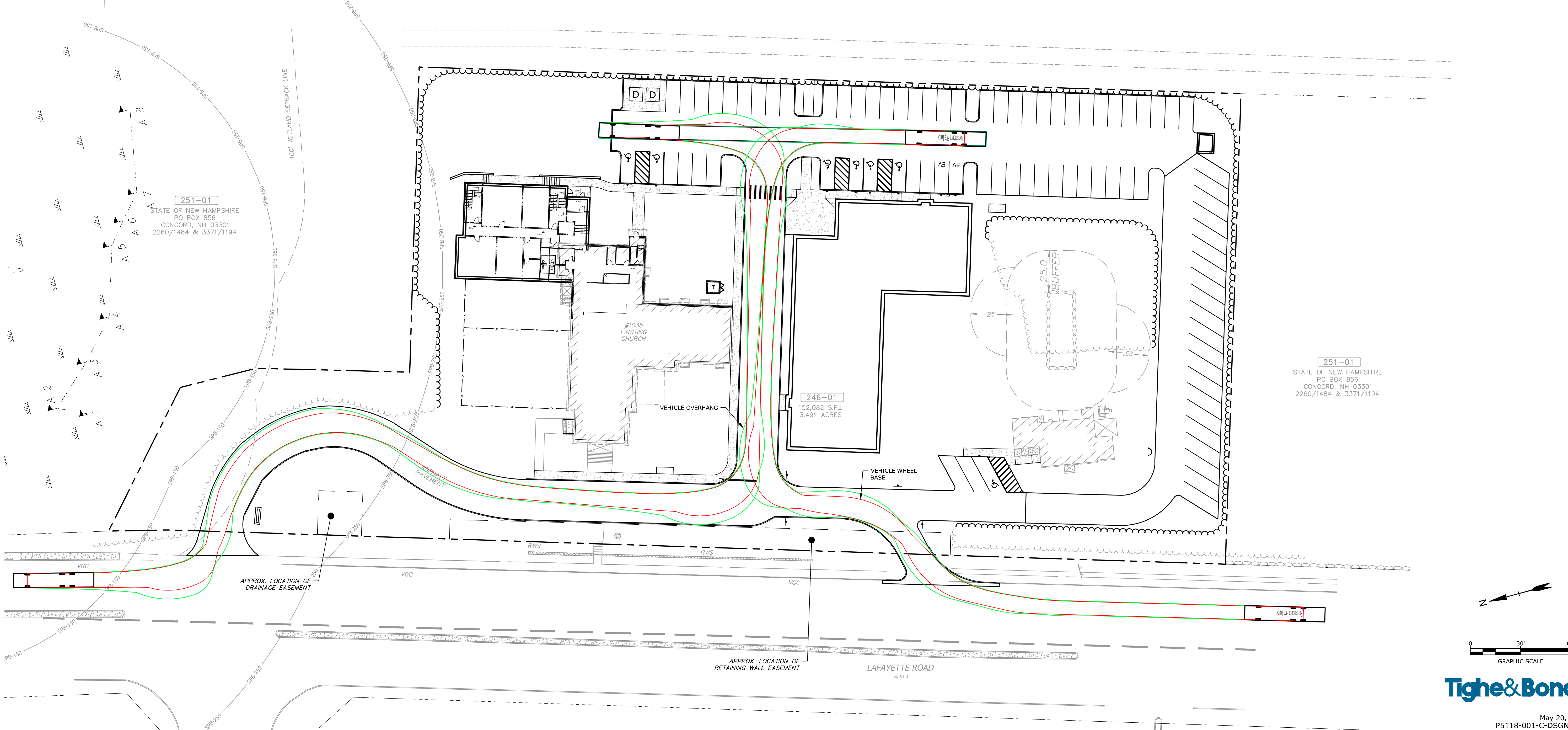


Portsmouth Fire Truck

Overall Length	47.830ft
Overall Width	8.500ft
Overall Body Height	10.432ft
Min Body Ground Clearance	0.862ft
Track Width	8.000ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	38.00°

LEGEND

- FORWARD VEHICLE WHEEL BASE
- FORWARD VEHICLE OVERHANG
- REVERSE VEHICLE WHEEL BASE
- REVERSE VEHICLE OVERHANG



Tighe&Bond

May 20, 2024
P5118-001-C-DSGN.dwg

Last Save Date: May 20, 2024 1:44 PM By: CKRZCUIK
Plot Date: Monday, May 20, 2024 Plotted By: Colter Krzcuik
T&B File Location: J:\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\P5118-001-C-DSGN.dwg Layout Tab: TRUCK

Tighe&Bond

P5118-001
May 20, 2024

Mr. Peter Britz, Director of Planning & Sustainability
City of Portsmouth Planning & Sustainability Department
1 Junkins Avenue
Portsmouth, New Hampshire 03801

Re: **Trip Generation Memorandum**
1035 Lafayette Road Development
Portsmouth, New Hampshire

Dear Peter:

Tighe & Bond has prepared a trip generation memorandum to outline the anticipated study area of the Traffic Impact Assessment (TIA) for the proposed mixed-use development located at 1035 Lafayette Road (US Route 1) in Portsmouth, NH. The site is bounded by Lafayette Road (US Route 1) to the west and by Sagamore Creek and Headlands Park to the north, east, and south. With the project, the Portsmouth Housing Authority proposes to construct residential units and office space, and repurpose a portion of the existing building at 1035 Lafayette Road. as part of the project, while a portion of the existing church will be renovated to remain. The project consists of a proposed seven-unit transitional housing area, and a separate three- to four-story apartment building consisting of 44 units. The existing daycare, with a current enrollment of 40 students, is currently housed in the basement of the existing church and will remain as part of the project but has the potential to expand enrollment up to 71 students. On-site parking will be provided by surface parking lots on site. Two existing site access driveways to Lafayette Road will remain, with the northern full-access driveway forming an existing signalized intersection with Lafayette Road opposite Mirona Road, and the southern driveway located approximately 400 feet south of Mirona Road. Lafayette Road is median divided at the southern driveway, prohibiting left turns entering or exiting the site from this driveway. The project will include site, access drive, stormwater management, utilities, lighting, and landscaping improvements. The trip generation estimate for the proposed development presented herein will serve as the basis for the traffic impact assessment.

Study Area

Based on a preliminary review of expected trip generation and distribution for the surrounding area, the following intersections have been identified to be included in the study area:

- US Route 1 (Lafayette Road) at North Site Driveway/Minora Road (signalized)
- US Route 1 (Lafayette Road) at South Site Driveway (unsignalized)

Turning movement count (TMC) data were collected during the weekday morning (7:00-9:00 AM) and weekday afternoon (3:00-6:00 PM) peak periods on Thursday April 18, 2024 and Saturday midday peak period (11:00 AM-1:00 PM) on Saturday April 20, 2024 at the study intersections. An automatic traffic recorder (ATR) count was collected on US Route 1 (Lafayette Road) in the vicinity of the site driveways to collect directional traffic volume flows and vehicular travel speeds. Summarized and adjusted volumes will be presented in a future full Traffic Impact Study (TIS) supporting the project.

Trip Generation

Trips expected to be generated by the proposed development were estimated using the Institute of Transportation Engineers (ITE) Trip Generation, 11th Edition, 2021. Multifamily Housing (Low-Rise) (LUC-220) was used to estimate vehicle trips for the proposed 44-unit three- to four-story apartment building and seven units of transitional housing. General Office Building (LUC-710) was used to estimate the office trips based on the proposed 6,900 SF building. Small Office Building (LUC-712) was considered given the size of the office component, but LUC 710 was utilized to represent a conservative estimate. The trip generation estimate for the proposed daycare was developed based on a rate established using the April 2024 turning movement counts.

Since the proposed daycare will replace the existing daycare, a credit was applied to account for the existing daycare trips and are subtracted from the proposed site trips to determine the total proposed net trips. ITE LUC 565 (Day Care Center) was considered to estimate both existing and proposed daycare trips. The existing turning movement counts were found to be lower than the ITE data in the morning peak period and higher in the afternoon peak period. The April 2024 turning movement counts were used as the basis for the proposed day care trip generation estimate to present a conservative estimate in the afternoon peak period and to align with the existing daycare operations. Credit for the existing daycare was only applied to the weekday morning and afternoon peak hour trips as the daycare is closed on the weekend. The existing church trips are negligible since the church is only in session on Sunday, outside of the analysis time periods.

Based on the ITE data and after applying the existing daycare trip credit, the proposed development is estimated to generate 77 trips (38 entering, 39 exiting) during the weekday morning peak hour, 92 trips (42 entering, 50 exiting) during the weekday afternoon peak hour, and 21 trips (10 entering, 11 exiting) during the Saturday midday peak hour. Table 1 provides a detailed summary of the trip generation.

Trip Distribution

The distribution of the proposed traffic entering and exiting the site expected to be generated by the mixed-use development was reviewed based on U.S. Census journey-to-work data for people residing in Portsmouth for the residential uses and based on existing travel patterns and anticipated travel patterns for the office and daycare uses. The following arrival/departure distributions are anticipated for the residential uses:

- 30% to/ from the North to Portsmouth Center via US Route 1
- 25% to/ from the South via US Route 1 (Lafayette Road)
- 20% to/ from the West to US Route 4 (Spaulding Turnpike) via US Route 1 Bypass
- 15% to/ from the South to I-95 South via Route 33
- 5% to/ from the West via Route 33
- 5% to/ from the North to I-95 North via US Route 1 Bypass

Based on the residential regional distribution, it is estimated that 55% will access the site to/ from the north via US Route 1, 25% will access the site to/ from the south via US Route 1, and 20% will access the site to/ from the west via Mirona Road.

The following arrival/ departure distribution is anticipated for the office and daycare uses:

- 40% to/ from the North to Portsmouth Center via US Route 1

- 25% to/ from the South via US Route 1 (Lafayette Road)
- 20% to/ from the West to US Route 4 (Spaulding Turnpike) via US Route 1 Bypass
- 5% to/ from the South to I-95 South via Route 33
- 5% to/ from the West via Route 33
- 5% to/ from the North to I-95 North via US Route 1 Bypass

Based on the office/ daycare regional distribution, it is estimated that 65% will access the site to/ from the north via US Route 1, 25% will access the site to/ from the south via US Route 1, and 10% will access the site to/ from the west via Mirona Road.

Figure 1 presents the anticipated regional site traffic distributions of the traffic through the study area roadways. Distribution percentages for the office and daycare uses may be updated in development of the TIA based on collected traffic volume data.

Conclusion

The proposed mixed-use development includes 51 residential units, a daycare with enrollment of up to 71 students, and 6,900 SF of office space. Based on the estimated trip generation and trip distribution, the TIA will analyze traffic operations at two intersections during the weekday morning, weekday afternoon, and Saturday midday peak periods.

Sincerely,

TIGHE & BOND, INC.

Greg E Lucas

Greg Lucas, PE, PTOE, RSP1
Senior Project Manager

Copy: Mark Lentz, Portsmouth Housing Authority

Enclosures: Study Area Map (Figure 1)
Site-Generated Traffic Summary (Table 1)
Conceptual Site Layout Plan

\\tighebond.com\data\Data\Projects\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Report_Evaluation\Reports\Trip Generation Memo\P5118-001 1035 Lafayette Rd Trip Gen Memo.docx

TABLE 1
Site-Generated Traffic Summary

Existing Daycare - 40 Students			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	18	10	28
Weekday Afternoon	15	25	40
Satruday Midday	NO DATA	NO DATA	NO DATA
Weekday	NO DATA	NO DATA	NO DATA
Saturday	NO DATA	NO DATA	NO DATA

Proposed - 51 Units Apartment			**LUC 220**
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	9	30	39
Weekday Afternoon	27	15	42
Saturday Midday	11	10	21
Weekday	201	201	402
Saturday	116	116	232

Proposed Daycare - 71 Students			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	32	18	50
Weekday Afternoon	27	44	71
Saturday Midday	NO DATA	NO DATA	NO DATA
Weekday	NO DATA	NO DATA	NO DATA
Saturday	NO DATA	NO DATA	NO DATA

Proposed - 6,900 SF Office Building			**LUC 710**
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	15	2	17
Weekday Afternoon	3	15	18
Saturday Midday	NO DATA	NO DATA	NO DATA
Weekday	57	56	113
Saturday	NO DATA	NO DATA	NO DATA

Proposed Total Trips			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	**56**	**49**	**105**
Weekday Afternoon	**57**	**75**	**132**
Saturday Midday	**11**	**10**	**21**
Weekday	**258**	**258**	**516**
Saturday	**116**	**116**	**232**

Net Vehicular Trips (Proposed minus Existing Daycare Trips)			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	**38**	**39**	**77**
Weekday Afternoon	**42**	**50**	**92**
Saturday Midday	**11**	**10**	**21**
Weekday	**258**	**258**	**516**
Saturday	**116**	**116**	**232**

Source: Institute of Transportation Engineers, Trip Generation, 11th Edition, 2021
Land Use - 220 [Multifamily Housing (Low-Rise)]
221 [Residential - Multifamily House (Mid-Rise)]
710 [General Office Building]

1035 LAFAYETTE ROAD
PORTSMOUTH, NH

STUDY AREA

DATE: 03/08/2024
SCALE: 1" = 2000'
FIGURE: 1

Tighe&Bond

Mar 07, 2024-3:39pm Plotted By: MBlair
Tighe & Bond, Inc. J:\P\P5118 Portsmouth Housing Authority\001_1035 Lafayette Road\Drawings\AutoCAD\Figures\P5118-001 Traffic Study Area Figure.dwg

SITE DATA:

LOCATION: TAX MAP 273, LOT 3

OWNER: THE PARISH OF CHIRST CHURCH IN PORTSMOUTH
1035 LAFAYETT RD
PORTSMOUTH, NH 03801

ZONING DISTRICT: GATEWAY CORRIDOR (G2)
PROPOSED USE: MIXED USE
MULTIFAMILY
PROPOSED LOT SIZE: ±3.491 ACRES (±152,082 SF)

BUILDING PLACEMENT & LOT STANDARDS

APARTMENT BUILDING STANDARDS:	REQUIRED	PROPOSED
MINIMUM LOT DEPTH:	100 FT	±208 FT
MINIMUM STREET FRONTAGE:	50 FT	±666 FT
FRONT YARD SETBACK:		
LAFAYETTE ROAD SETBACK	70-90 FT	± 110 FT(1)
MINIMUM SIDE BUILDING SETBACK:	15 FT	± 25 FT
MINIMUM REAR BUILDING SETBACK:	20 FT	± 68 FT
MINIMUM OPEN SPACE COVERAGE:	20%	±72%
FRONT LOT LINE BUILDOUT:	75%	48%(1)
BUILDING DESIGN STANDARDS:		
MAXIMUM BUILDING HEIGHT:	4 STORIES	4 STORIES
	50 FT	<50 FT
MINIMUM STREET FACING FACADE HEIGHT:	24 FT	>24 FT
MAXIMUM FINISHED FLOOR SURFACE OF GROUND FLOOR ABOVE SIDEWALK GRADE:	36 IN	<36 IN
MAXIMUM BUILDING FOOTPRINT:	20,000 SF	10,900 SF
MAXIMUM FACADE MODULATION LENGTH:	50 FT	<50 FT
MINIMUM STREET FACING FACADE GLAZING:	20% GROUND FLOOR	>20%
DEVELOPMENT SITE STANDARDS:(3)		
MINIMUM DEVELOPMENT SITE AREA:	20,000 SF	±152,082 SF
MINIMUM SITE WIDTH:	100 FT	±666 FT
MINIMUM SITE DEPTH:	100 FT	±280 FT
MINIMUM PERIMETER BUFFER FROM RESIDENTIAL, MIXED RESIDENTIAL, OR CD4-L1 DISTRICTS:	75 FT	N/A
MAXIMUM DEVELOPMENT BLOCK DIMENSIONS:		
BLOCK LENGTH:	800 FT	N/A
ERIMETER:	200 FT	N/A
MAXIMUM BUILDING COVERAGE:	70%	14
MINIMUM OPEN SPACE COVERAGE:	20%	±72
FRONT LOT LINE BUILDOUT:	75%	48%(1)
DENSITY THRESHOLDS AND BONUSES:		
DWELLING UNITS PER ACRE:	16 UNITS	14.6 UNITS
DWELLING UNITS PER BUILDING:	36 UNITS	44 UNITS(2)(3)

(1) - EXISTING NON-CONFORMING CONDITION, MODIFICATION OF STANDARDS ALLOWED AS PART OF CONDITIONAL USE PERMIT PER 10.5B74.30.
(2) - ALLOWED BY CONDITIONAL USE PERMIT PER 10.5B72 FOR PROVIDING 20% WORK FORCE HOUSING
(3) - USE OF DEVELOPMENT SITE STANDARDS ALLOWED BY CONDITIONAL USE PERMIT PER 10.5B40.

PARKING CALCULATIONS:

PARKING SPACE REQUIREMENTS:
ZONING REQUIRED PARKING SPACES
OFFICE:
1 PER 350 SF GFA x 6,900 SF = 20 SPACES
RESIDENTIAL:
1.0 SPACES PER UNIT (500-750 SF) x 11UNITS = 11 SPACES
1.3 SPACES PER UNIT (>750 SF) x 40 UNITS = 52 SPACES
+1 VISITOR PER 5 UNITS X 51 UNITS = 11 SPACES
GROUP DAY CARE:
0.5 PER STUDENT x 71 STUDENTS = 36 SPACES
PLACE OF WORSHIP:
1 PER PERSON MAX CAPACITY (40 PERSON) = 10 SPACES
TOTAL REQUIRED PARKING = 140 SPACES

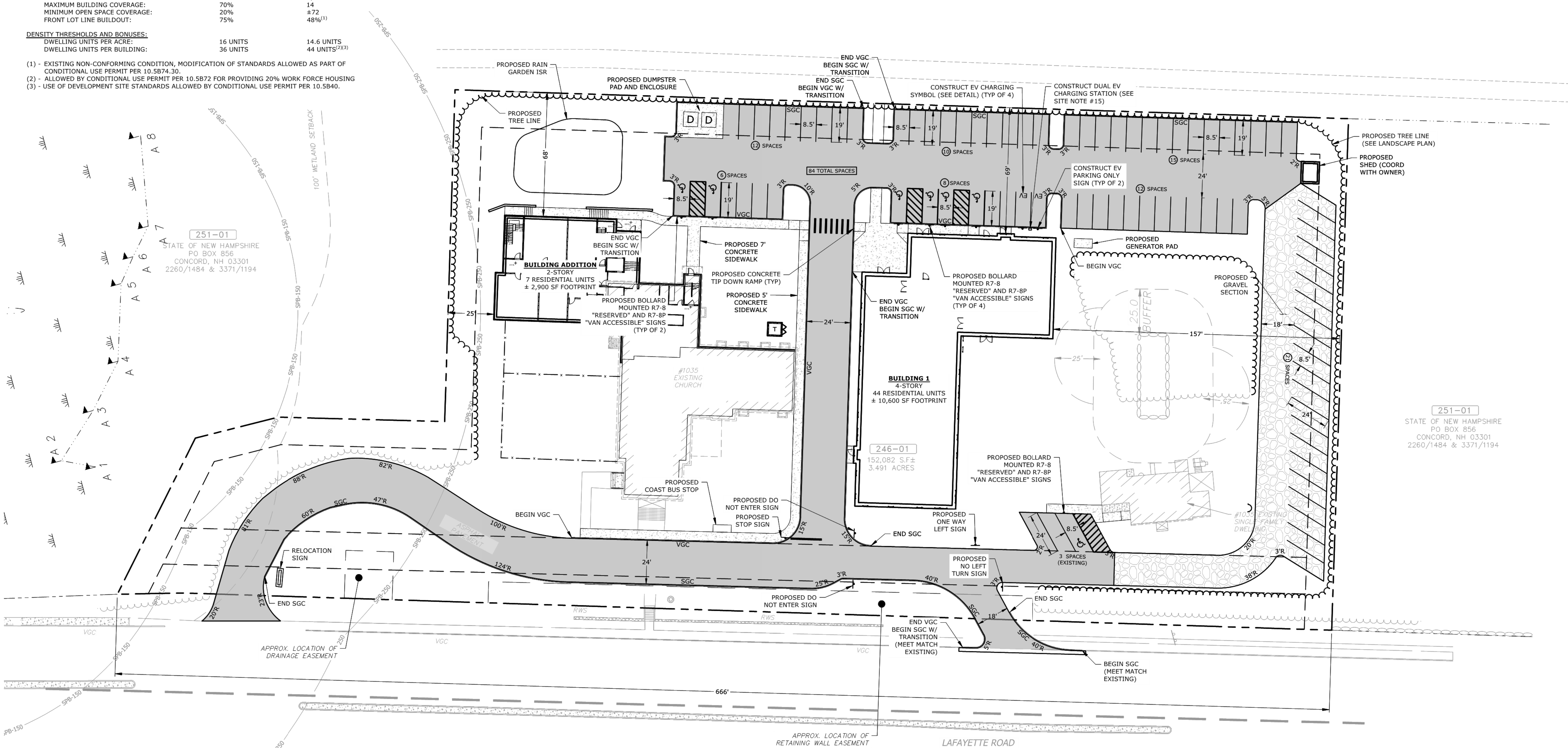
TOTAL REQUIRED PER SHARED PARKING ANALYSIS(4) = 103 SPACES

REQUIRED PARKING SPACES ON A PUBLIC TRANSIT(5)
ZONING REQUIREMENTS x 80% **= 83 SPACES**

PROVIDED PARKING SPACES
TOTAL PROVIDED SPACES: **= 84 SPACES**

	REQUIRED	PROPOSED
ACCESSIBLE PARKING SPACES:	4	6
DIMENSIONAL REQUIREMENTS:		
STANDARD 90° PARKING STALL :		
WIDTH	8.5 FT	8.5 FT
LENGTH	19 FT MIN	19 FT
DRIVE AISLE WIDTH:		
90° (2-WAY TRAFFIC)	24 FT	24 FT

(4) - SHARED PARKING ANALYSIS ALLOWED THROUGH A CONDITIONAL USE PERMIT PER SECTION 10.1112.61.
(5) - PUBLIC TRANSIT 20% REDUCTION IN SPACES ALLOWED PER SECTION 10.5B82.10.



SITE RECORDING NOTES:
1. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
2. 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.
3. THIS IS NOT A BOUNDARY SURVEY AND SHALL NOT BE USED AS SUCH.

SEE SHEET G-100 FOR SITE NOTES AND LEGEND

Tighe&Bond

GRAPHIC SCALE 0 30' 60'

Proposed Mixed-Use Development

Portsmouth Housing Authority

1035 Lafayette Rd
Portsmouth, NH

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION

PROJECT NO:	P5118-001
DATE:	May 20, 2024
FILE:	P5118-001-C-DSGN.DWG
DRAWN BY:	CJK/NHW
CHECKED:	NAH
APPROVED:	PMC

SITE PLAN

SCALE: AS SHOWN

C-102

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: Portsmouth Housing Authority Date Submitted: May 20, 2024

Application # (in City's online permitting): LU 23-

Site Address: 1035 Lafayette Rd Map: 246 Lot: Lot 1

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

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	Statement that lists and describes "green" building components and systems. **(2.5.3.1B)**		
☑	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)**	Site Plan Sheet C-102	N/A
☑	Tax map and lot number, and current zoning of all parcels under Site Plan Review. **(2.5.3.1D)**	Site Plan Sheet C-102	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. **(2.5.3.1E)**	Enclosed Cover Sheet	N/A
☑	Names and addresses (including Tax Map and Lot number and zoning districts) of all direct abutting property owners (including properties located across abutting streets) and holders of existing conservation, preservation or agricultural preservation restrictions affecting the subject property. **(2.5.3.1F)**	Existing Conditions Plan Sheets	N/A
☑	Names, addresses and telephone numbers of all professionals involved in the site plan design. **(2.5.3.1G)**	Cover Sheet	N/A
☑	List of reference plans. **(2.5.3.1H)**	General Notes Sheet G-100 & Existing Conditions Plan Sheets	N/A
☑	List of names and contact information of all public or private utilities servicing the site. **(2.5.3.1I)**	General Notes Sheet G-100	N/A

Site Plan Specifications			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	Full size plans shall not be larger than 22 inches by 34 inches with match lines as required, unless approved by the Planning Director.. **(2.5.4.1A)**	Required on all plan sheets	N/A
☑	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. **(2.5.4.1B)**	Required on all plan sheets	N/A
☑	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. **(2.5.4.1C)**	Existing Conditions Plan Sheets	N/A
☑	Plans shall be drawn to scale and stamped by a NH licensed civil engineer. **(2.5.4.1D)**	Required on all plan sheets	N/A
☑	Wetlands shall be delineated by a NH certified wetlands scientist and so stamped. **(2.5.4.1E)**	Existing Conditions Plan Sheet	N/A
☑	Title (name of development project), north point, scale, legend. **(2.5.4.2A)**	Required on all plan sheets	N/A
☑	Date plans first submitted, date and explanation of revisions. **(2.5.4.2B)**	Required on all plan sheets	N/A
☑	Individual plan sheet title that clearly describes the information that is displayed. **(2.5.4.2C)**	Required on all plan sheets	N/A
☑	Source and date of data displayed on the plan. **(2.5.4.2D)**	Required on all plan sheets	N/A

Site Plan Specifications – Required Exhibits and Data			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	**1. Existing Conditions: (2.5.4.3A)** • Surveyed plan of site showing existing natural and built features; • Existing building footprints and gross floor area; • Existing parking areas and number of parking spaces provided; • Zoning district boundaries; • Existing, required, and proposed dimensional zoning requirements including building and open space coverage, yards and/or setbacks, and dwelling units per acre; • Existing impervious and disturbed areas; • Limits and type of existing vegetation; • Wetland delineation, wetland function and value assessment (including vernal pools); • SFHA, 100-year flood elevation line and BFE data, as required.	Existing Conditions Plan Sheets	
☑	**2. Buildings and Structures: (2.5.4.3B)** • Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation; • Elevations: Height, massing, placement, materials, lighting, façade treatments; • Total Floor Area; • Number of Usable Floors; • Gross floor area by floor and use.	Architectural Plan Sheets	
☑	**3. Access and Circulation: (2.5.4.3C)** • Location/width of access ways within site; • Location of curbing, right of ways, edge of pavement and sidewalks; • Location, type, size and design of traffic signing (pavement markings); • Names/layout of existing abutting streets; • Driveway curb cuts for abutting prop. and public roads; • If subdivision; Names of all roads, right of way lines and easements noted; • AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).	Site Plan Sheet C-102	
☑	**4. Parking and Loading: (2.5.4.3D)** • Location of off street parking/loading areas, landscaped areas/buffers; • Parking Calculations (# required and the # provided).	Site Plan Sheet C-102	
☑	**5. Water Infrastructure: (2.5.4.3E)** • Size, type and location of water mains, shut-offs, hydrants & Engineering data; • Location of wells and monitoring wells (include protective radii).	Utilities Plan Sheet C-104	
☑	**6. Sewer Infrastructure: (2.5.4.3F)** • Size, type and location of sanitary sewage facilities & Engineering data, including any onsite temporary facilities during construction period.	Utilities Plan Sheet C-104	

☑	**7. Utilities: (2.5.4.3G)** • The size, type and location of all above & below ground utilities; • Size type and location of generator pads, transformers and other fixtures.	Utilities Plan Sheet C-104	
☑	**8. Solid Waste Facilities: (2.5.4.3H)**		
	• The size, type and location of solid waste facilities.	Site Plan Sheet C-102	
☑	**9. Storm water Management: (2.5.4.3I)** • The location, elevation and layout of all storm-water drainage. • The location of onsite snow storage areas and/or proposed off-site snow removal provisions. • Location and containment measures for any salt storage facilities • Location of proposed temporary and permanent material storage locations and distance from wetlands, water bodies, and stormwater structures.	Grading and Drainage Plan Sheet C-103	
☑	**10. Outdoor Lighting: (2.5.4.3J)** • Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and photometric plan.	Photometrics Plan	
☑	**11.** Indicate where dark sky friendly lighting measures have been implemented. **(10.1)**	Photometrics Plan	
☑	**12. Landscaping: (2.5.4.3K)** • Identify all undisturbed area, existing vegetation and that which is to be retained; • Location of any irrigation system and water source.	Landscape Plan Sheet	
☑	**13. Contours and Elevation: (2.5.4.3L)** • Existing/Proposed contours (2 foot minimum) and finished grade elevations.	Grading and Drainage Plan Sheet C-103	
☑	**14. Open Space: (2.5.4.3M)** • Type, extent and location of all existing/proposed open space.	Site Plan Sheet C-102	
☑	**15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)**	Existing Conditions Plan Sheets	
☑	**16. Character/Civic District (All following information shall be included): (2.5.4.3P)** • Applicable Building Height (10.5A21.20 & 10.5A43.30); • Applicable Special Requirements (10.5A21.30); • Proposed building form/type (10.5A43); • Proposed community space (10.5A46).	Site Plan Sheet C-102	
☑	**17. Special Flood Hazard Areas (2.5.4.3Q)** • The proposed development is consistent with the need to minimize flood damage; • All public utilities and facilities are located and construction to minimize or eliminate flood damage; • Adequate drainage is provided so as to reduce exposure to flood hazards.	N/A	

Other Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	Traffic Impact Study or Trip Generation Report, as required. **(3.2.1-2)**	Enclosed	
☑	Indicate where Low Impact Development Design practices have been incorporated. **(7.1)**	Grading and Drainage Plan Sheet C-103	
☑	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	
☑	Stormwater Management and Erosion Control Plan. **(7.4)**	Enclosed	
☑	Inspection and Maintenance Plan **(7.6.5)**	Enclosed	

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	All local approvals, permits, easements and licenses required, including but not limited to: • Waivers; • Driveway permits; • Special exceptions; • Variances granted; • Easements; • Licenses. **(2.5.3.2A)**	Cover Sheet	
☑	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: • Calculations relating to stormwater runoff; • Information on composition and quantity of water demand and wastewater generated; • Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; • Estimates of traffic generation and counts pre- and post-construction; • Estimates of noise generation; • A Stormwater Management and Erosion Control Plan; • Endangered species and archaeological / historical studies; • Wetland and water body (coastal and inland) delineations; • Environmental impact studies. **(2.5.3.2B)**	Enclosed	
☑	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)**	The applicant is currently working with Eversource to get a will serve letter.	

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☑	A list of any required state and federal permit applications required for the project and the status of same. **(2.5.3.2E)**	Cover Sheet	
☑	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 Sheet C-102	N/A
☑	For site plans that involve land designated as "Special Flood Hazard Areas" (SFHA) by the National Flood Insurance Program (NFIP) confirmation that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334. **(2.5.4.2F)**	N/A	
☑	Plan sheets submitted for recording shall include the following notes: a. "This Site Plan shall be recorded in the Rockingham County Registry of Deeds." b. "All improvements shown on this Site Plan shall be constructed and maintained in accordance with the Plan by the property owner and all future property owners. No changes shall be made to this Site Plan without the express approval of the Portsmouth Planning Director." **(2.13.3)**	Site Plan Sheet C-102	N/A

Applicant's Signature: ______________________ **Date:** 5/20/2024

Site Plan Review Application Fee

Project: 1035 Lafayette Rd **Map/Lot:** Map 246 Lot 1

Applicant: Portsmouth Housing Authority

All development

Base fee $600			$600.00
Plus $5.00 per $1,000 of site costs			
Site costs	$1,000,000	+	$5,000.00
Plus $10.00 per 1,000 S.F. of site development area			
Site development area	142,460 S.F.	+	$1,424.60
		Fee	**$7,024.60**

Maximum fee: $20,000.00

Fee received by: ______________________________ Date: ________________

Note: Initial application fee may be based on the applicant's estimates of site costs and site development area. Following site plan approval, the application fee will be recalculated based on the approved site plan and site engineer's corresponding site cost estimate as approved by the Department of Public Works, and any additional fee shall be paid prior to the issuance of a building permit.

Tighe&Bond

L0700-026C
May 20, 2024

Mr. Peter Britz, Director of Planning & Sustainability
City of Portsmouth Planning & Sustainability Department
1 Junkins Avenue
Portsmouth NH, 03801

Re: **Lonza Biologics – Proposed PV Solar Carports**
Amended Site Plan Review Application LU-23-108

Dear Peter:

On behalf of Lonza Biologics, Inc. (Lonza), we are pleased to submit one (1) set of hard copies and one electronic file (.pdf) of the following information to support a request to the Planning Board for a recommendation for approval to the Pease Development Authority (PDA) for Amended Site Plan Review for a proposed industrial development located at 5 Technology Way, (Formerly 70 Corporate Drive) on Pease International Tradeport:

- PDA Application for Site Review, dated May 20, 2024;
- Site Plan Set, last revised May 20, 2024;
- Drainage Memo, dated May 20, 2024;
- Glare Study Results, dated February 22, 2024;

PROJECT SUMMARY

Background

The existing project was granted Site Plan approval on January 17, 2019, and amended by administrative approvals on September 27, 2019, January 27, 2023, and Amended Site Plan Approval on November 16, 2023.

Existing Condition

The project is located on the portion of Lonza's 46-acre parcel refered to as the Iron Parcel. The following summarizes the work currently approved through the November 16, 2023 Amended Site Plan Approval:

- Daylighting of Hodgson Brook on the Iron Parcel
- Removal of the existing Hodgson Brook culvert
- Construction of the sidewalk and landscaping along Corporate Drive
- Completion of Soils Management Plan
- Construction of Building #1
- Construction of the Central Utility Building
- Construction site improvements for Building #1 such as drive aisles, fire lanes, utilities, lighting, sidewalks and stormwater management.
- Construction of a temporary 150-space surface parking lot, sidewalks and stormwater management.

Amended Site Plan

The requested Site Plan amendment includes the construction of Photovoltaic Cell (PV) Solar canopies over the previously approved temporary surface parking lot. The addition of these Solar Canopies is being requested to support Lonza Biologics green infrastructure and sustainability initiatives. The addition of these Solar canopies will not result in any dimensional changes to the previously approved parking lot. There is a slight increase in impervious surfaces (~672 SF) which will not cause any adverse impact to the previously approved Phase 2 Drainage design as outlined in the Drainage Memorandum.

The proposed PV Solar system will require additional electrical infrastructure and modifications to the photometric lighting design as depicted in the enclosed Site Plan Set. The proposed system will not be connected to the larger electrical grid network but has been designed to supplement and reduce the proposed project's electrical demand.

We respectfully request to be placed on the Technical Advisory Committee (TAC) meeting agenda for June 4, 2024. If you have any questions or need any additional information, please contact Neil Hansen by phone at (603) 294-9213 or by email at nahansen@tighebond.com.

Sincerely,

TIGHE & BOND, INC.

Neil A. Hansen, PE
Project Manager

Patrick M. Crimmins, PE
Vice President

Copy: Lonza Biologics (via email)
Pease Development Authority

J:\L\L0700 Lonza Biologics Expansion was 1576F\026_Project Albacore\Report_Evaluations\Applications\PDA\Solar\PDA Submission\L0700-026C_TAC Cover Letter.docx

Pease Development Authority
55 International Drive, Portsmouth, NH 03801, (603) 433-6088

PEASE INTERNATIONAL TRADEPORT PORTSMOUTH, NH

Application for Site Review

For PDA Use Only			
Date Submitted:___________	Municipal Review:________	Fee:________	
Application Complete:________	Date Forwarded:________	Paid:________	Check #:________

Applicant Information

Applicant: Lonza Biologics, Inc.	Agent: Tighe & Bond, Inc.
Address: 101 International Drive Portsmouth, NH 03801	Address: 177 Corporate Drive Portsmouth, NH 03801
Business Phone: 603-570-3625	Business Phone: 603-433-8818
Mobile Phone:	Mobile Phone:
Fax:	Fax:

Site Information

Portsmouth Tax Map: 305	Lot #: 006	Zone: Airport, Business, Commercial
Site Address / Location : 101 International Drive, Portsmouth, NH 03801		
Site Address / Location :		Area of On-site Wetlands: 4,087 SF

Activity Information

Change of Use: **Yes [ ]** **No [X]**

Existing Use: Office/Research/Manufacturing

Proposed Use: Office/Research/Manufacturing

Description of Project:

The requested Site Plan amendment includes the construction of Photovoltaic Cell (PV) Solar canopies over the previously approved temporary surface parking lot.

All above information shall be shown on a site plan submitted with this application. Provide 3 full size hard copies and one PDF copy of all application materials as well as one half-size set of drawings to PDA. Applicant shall supply additional copies as may be required by applicable municipality. Refer to Chapter 400 of PDA land Use Controls for additional information.

Certification

I hereby certify under the penalties of perjury that the foregoing information and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I hereby apply for Site Review and acknowledge I will comply with all regulations and any conditions established by the Review Committee(s) and PDA Board in the development and construction of this project.

____________________ 20 May 24
Signature of Applicant Date

Michael Feeney
Printed Name

N:\Engineer\ ApplicationforSiteReview.xlsx

IRON PARCEL DEVELOPMENT - SOLAR

5 TECHNOLOGY WAY

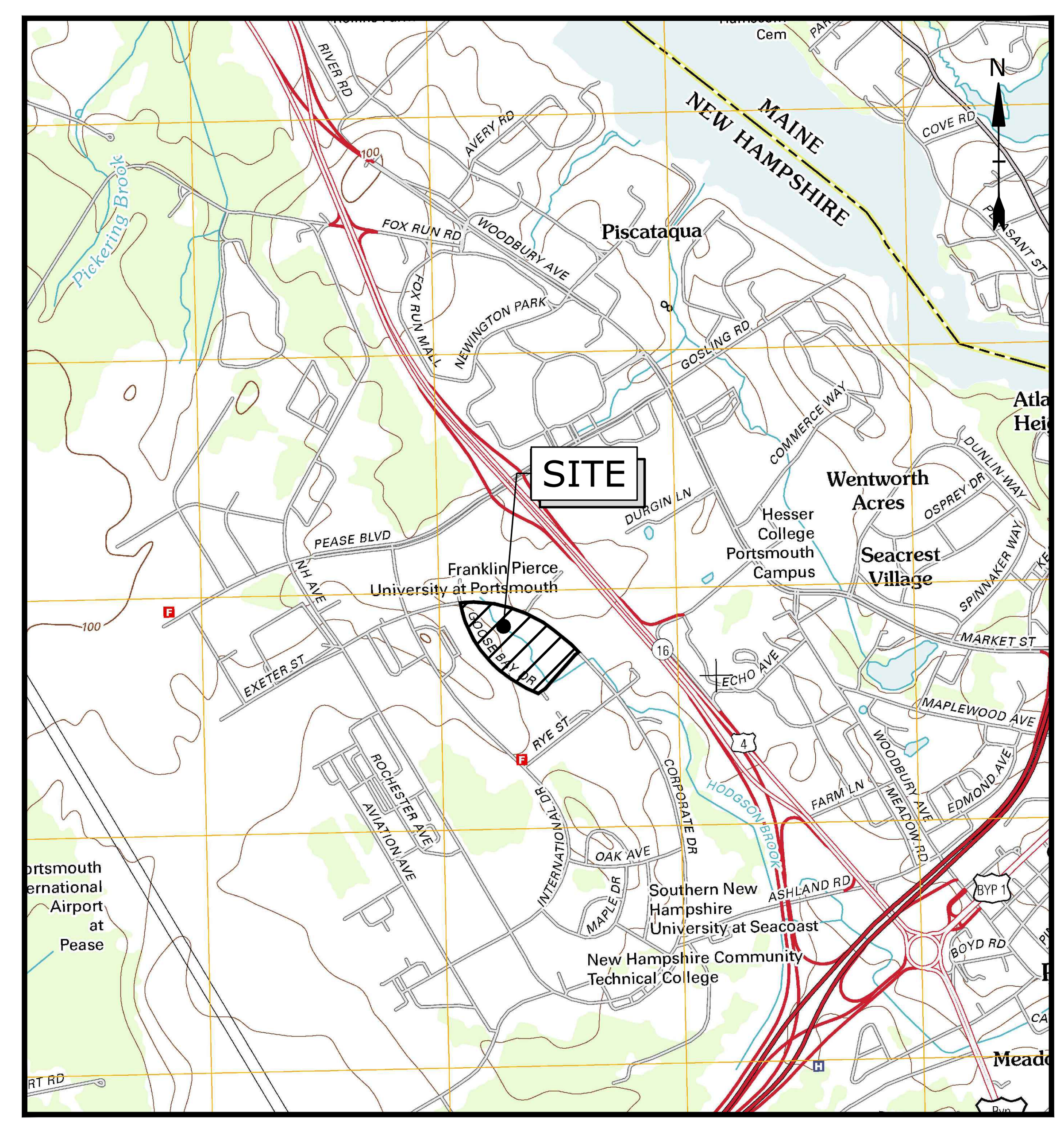
(FORMERLY 70 CORPORATE DRIVE)

PORTSMOUTH, NEW HAMPSHIRE

PROJECT NO: L-0700-26

MAY 20, 2024

LIST OF DRAWINGS		
SHEET NO.	SHEET TITLE	LAST REVISED
	COVER SHEET	5/20/2024
C-161	PHASE 2 DEMOLITION PLAN	5/20/2024
C-164	PHASE 2 OVERALL SITE PLAN	5/20/2024
C-165	PHASE 2 SITE PLAN	5/20/2024
C-168	PHASE 2 GRADING, DRAINAGE & EROSION CONTROL PLAN	5/20/2024
C-171	PHASE 2 UTILITIES PLAN	5/20/2024
C-174	PHASE 2 LANDSCAPE PLAN	5/20/2024
C-177	PHASE 2 PHOTOMETRIC LIGHTING PLAN	5/20/2024
C-501	EROSION CONTROL NOTES & DETAILS SHEET	5/20/2024
C-503	DETAILS SHEET	5/20/2024
8-046-3	SOLAR CANOPY DETAILS	5/20/2024



LOCATION MAP

SCALE: 1" = 2,000'

LESSOR: PEASE DEVELOPMENT AUTHORITY
55 INTERNATIONAL DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801

CLIENT: LONZA BIOLOGICS
101 INTERNATIONAL DRIVE
PORTSMOUTH, NH 03801

CIVIL ENGINEER: Tighe&Bond
177 CORPORATE DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801

SURVEYOR: DOUCET SURVEY, INC.
102 KENT PLACE
NEWMARKET, NEW HAMPSHIRE 03857

WETLAND SCIENTIST: GOVE ENVIRONMENTAL SERVICES, INC.
8 CONTINENTAL DRIVE, UNIT H
EXETER, NEW HAMPSHIRE 03833

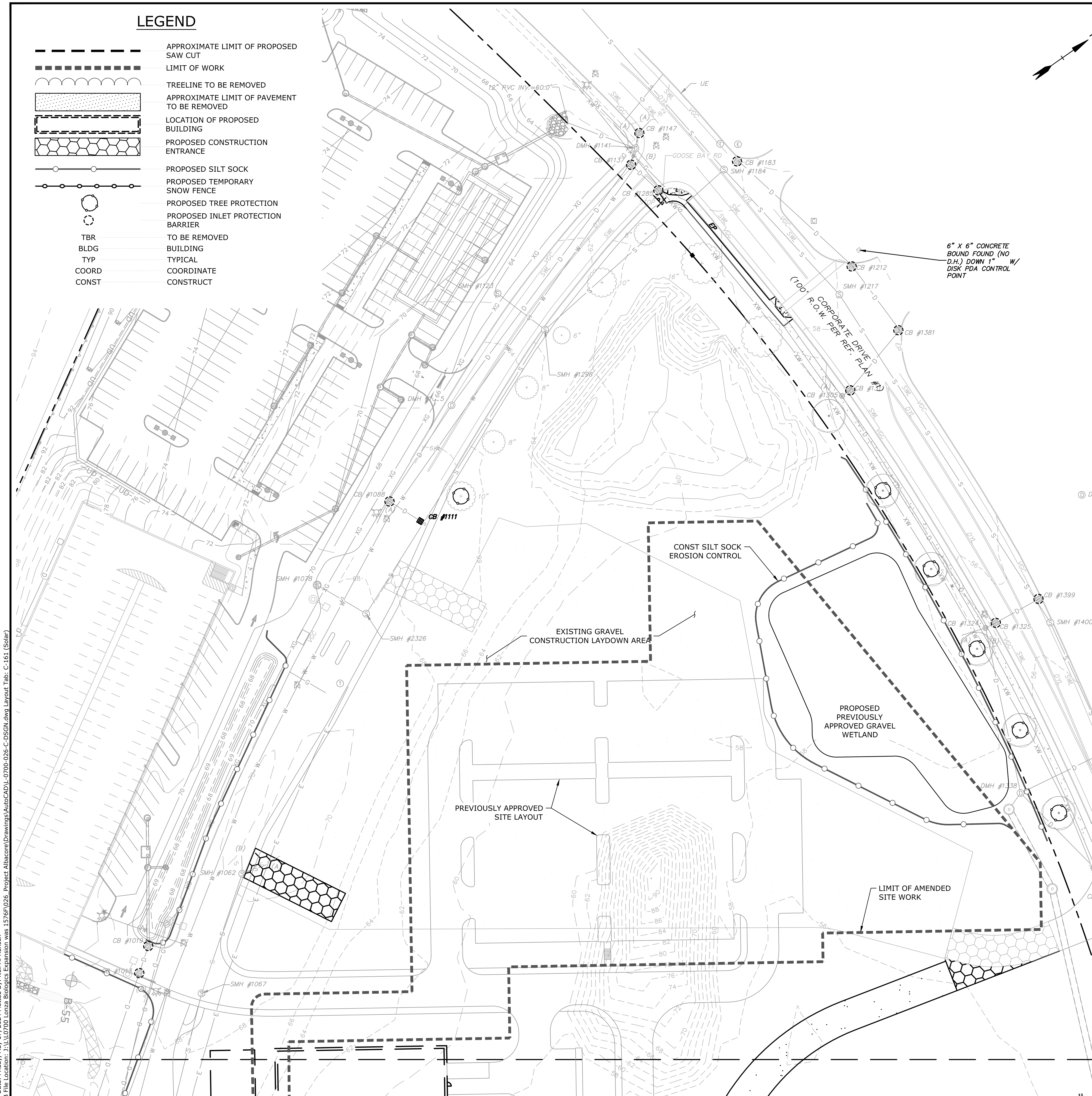
LIST OF PERMITS		
LOCAL	STATUS	DATE
SITE PLAN REVIEW PERMIT	APPROVED	1/17/2019
AMENDED SITE PLAN REVIEW PERMIT	APPROVED	11/16/2023
AMENDED SITE PLAN REVIEW PERMIT - SOLAR		
STATE		
NHDES - ALTERATION OF TERRAIN PERMIT	ISSUED: AOT-1498	10/02/2018
NHDES - WETLANDS PERMIT	ISSUED: #2018-01731	12/21/2018
FEDERAL		
EPA - NPDES CGP (SWPPP)	ACTIVE: NHR1001SK	7/7/2023

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER 05/20/2024

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER 5/20/24

ISSUED FOR AMENDED SITE REVIEW
COMPLETE SET 11 SHEETS

Last Save Date: May 16, 2024 5:59 PM By: NAHANSEN
Plot Date: Friday, May 17, 2024 Plotted By: Neil A. Hansen
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576F\026_Project Albacore\Drawings\AutoCAD_Solar\L-0700-026C-C-COVR.dwg Layout Tab: DSGN-CS-P2 (Solar)



DEMOLITION NOTES:

1. THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
2. THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES. CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
3. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES EXCEPT AS SPECIFIED IN NOTE #25.
4. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
5. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/ DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
6. SAW CUT AND REMOVE PAVEMENT ONE (1) FOOT OFF PROPOSED EDGE OF PAVEMENT OR EXISTING CURB LINE IN ALL AREAS WHERE PAVEMENT TO BE REMOVED ABUTS EXISTING PAVEMENT OR CONCRETE TO REMAIN.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
8. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ADDITIONAL PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS AND AS SPECIFIED IN NOTE #25.
10. UTILITIES SHALL BE TERMINATED AT THE MAIN LINE PER UTILITY COMPANY AND THE CITY OF PORTSMOUTH STANDARDS. THE CONTRACTOR SHALL REMOVE ALL ABANDONED UTILITIES LOCATED WITHIN THE LIMITS OF WORK.
11. CONTRACTOR SHALL VERIFY ORIGIN OF ALL DRAINS AND UTILITIES PRIOR TO REMOVAL/TERMINATION TO DETERMINE IF DRAINS OR UTILITY IS ACTIVE, AND SERVICES ANY ON OR OFF-SITE STRUCTURE TO REMAIN. THE CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY SUCH UTILITY FOUND AND SHALL MAINTAIN THESE UTILITIES UNTIL PERMANENT SOLUTION IS IN PLACE.
12. PAVEMENT REMOVAL LIMITS ARE SHOWN FOR CONTRACTOR'S CONVENIENCE. ADDITIONAL PAVEMENT REMOVAL MAY BE REQUIRED DEPENDING ON THE CONTRACTOR'S OPERATION. CONTRACTOR TO VERIFY FULL LIMITS OF PAVEMENT REMOVAL PRIOR TO BID.
13. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE PADS, UTILITIES AND PAVEMENT WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ITEMS TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO: CONCRETE, PAVEMENT, CURBS, LIGHTING, MANHOLES, CATCH BASINS, UNDER GROUND PIPING, POLES, STAIRS, SIGNS, FENCES, RAMPS, WALLS, BOLLARDS, BUILDING SLABS, FOUNDATION, TREES AND LANDSCAPING.
14. COORDINATE ALL WORK WITHIN THE PUBLIC RIGHT OF WAYS WITH THE CITY OF PORTSMOUTH AND PEASE DEVELOPMENT AUTHORITY.
15. REMOVE TREES AND BRUSH AS REQUIRED FOR COMPLETION OF WORK. CONTRACTOR SHALL GRUB AND REMOVE ALL STUMPS WITHIN LIMITS OF WORK AND DISPOSE OF OFF SITE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
16. CONTRACTOR SHALL PROTECT ALL PROPERTY MONUMENTATION THROUGHOUT DEMOLITION AND CONSTRUCTION OPERATIONS. SHOULD ANY MONUMENTATION BE DISTURBED BY BY THE CONTRACTOR, THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED SURVEYOR TO REPLACE DISTURBED MONUMENTS.
17. PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS/CURB INLETS WITHIN CONSTRUCTION LIMITS AS WELL AS CATCH BASINS/CURB INLETS THAT MAY RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. INLET PROTECTION BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE "HIGH FLOW SILT SACK" BY ACF ENVIRONMENTAL OR EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN EVENT OF 0.25 INCHES OR GREATER. CONTRACTOR SHALL COMPLETE A MAINTENANCE INSPECTION REPORT AFTER EACH INSPECTION. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED OR SEDIMENT HAS ACCUMULATED TO 1/3 THE DESIGN DEPTH OF THE BARRIER.
18. THE CONTRACTOR SHALL PHASE DEMOLITION AND CONSTRUCTION AS REQUIRED TO PROVIDE CONTINUOUS SERVICE TO EXISTING BUSINESSES THROUGHOUT THE CONSTRUCTION PERIOD. EXISTING BUSINESS SERVICES INCLUDE, BUT ARE NOT LIMITED TO ELECTRICAL, COMMUNICATION, FIRE PROTECTION, DOMESTIC WATER AND SEWER SERVICES. TEMPORARY SERVICES, IF REQUIRED, SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL AND UTILITY COMPANY STANDARDS. CONTRACTOR SHALL PROVIDE DETAILED CONSTRUCTION SCHEDULE TO OWNER PRIOR TO ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
19. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.
20. THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFETY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.
21. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL UTILITIES TO BE REMOVED AND PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
22. THE CONTRACTOR SHALL ACQUIRE A PDA DIG PERMIT BEFORE ANY EARTH DISTURBANCE CAN TAKE PLACE. ALLOW 7 CALENDAR DAYS FOR PROCESSING.
23. ALL MONITORING WELLS WITHIN LIMIT OF WORK SHALL BE PROTECTED DURING CONSTRUCTION. IF ANY MONITORING WELL NEEDS TO BE REMOVED OR ADJUSTED THIS WORK SHALL BE COORDINATED WITH THE PEASE DEVELOPMENT AUTHORITY.
24. CONTRACTOR SHALL COORDINATE WITH THE PROJECT SURVEYOR FOR BENCHMARK AND CONTROL POINTS PRIOR TO CONSTRUCTION.
25. ALL EXCESS SOIL RESULTING FROM THE CONSTRUCTION SHALL REMAIN ON SITE. COORDINATE WITH OWNER AND PEASE DEVELOPMENT AUTHORITY ON FINAL LOCATION OF EXCESS MATERIALS.
26. BEFORE ANY DEWATERING IS PERFORMED, COORDINATION BETWEEN THE OWNER, CONTRACTOR, PDA, NHDES AND THE AIR FORCE IS REQUIRED TO DETERMINE PROPER PROCEDURES AND PERMITTING REQUIRED. AT A MINIMUM A NHDES TEMPORARY DISCHARGE PERMIT IS REQUIRED.

Tighe&Bond

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
5/20/24

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
05/20/2024

SCALE IN FEET
0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

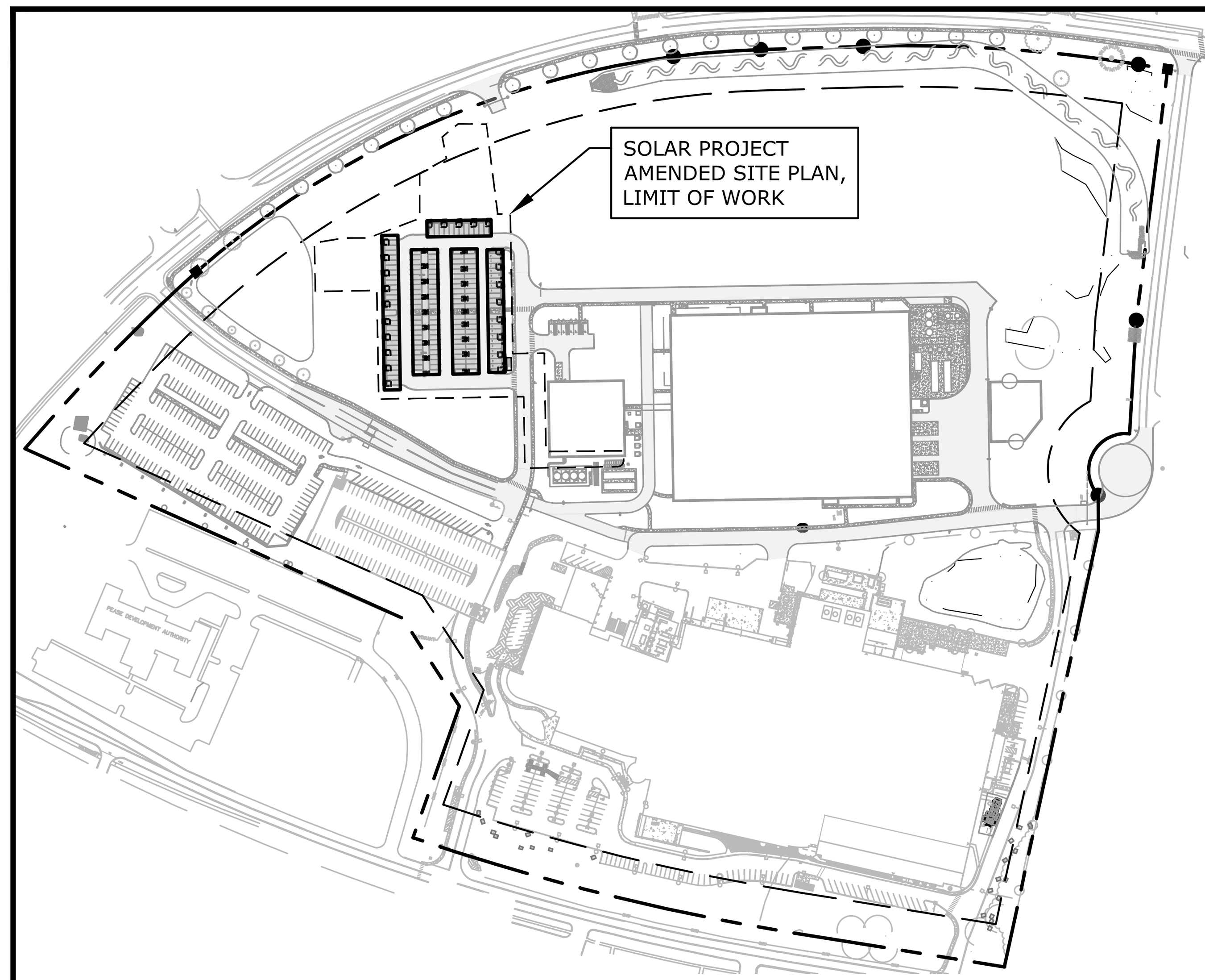
PROJECT NO: L-0700-013
DATE: 04/03/2018
FILE: L-0700-026-C-DSGN.dwg
DRAWN BY: CJK
CHECKED: NAH
APPROVED: PMC

PHASE 2
DEMOLITION PLAN

SCALE: AS SHOWN

C-161

Last Save Date: May 17, 2024 3:51 PM By: NAHANSEN
Plot Date: Friday, May 17, 2024 Plotted By: Neil A. Hansen
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-161 (Solar)



OVERALL LOT AREA PLAN
SCALE : 1" = 250'

SITE DATA

LOCATION: TAX MAP 305, LOTS 1 & 2, 70 & 80 CORPORATE DRIVE, PORTSMOUTH, NH — TAX MAP 305, LOT 6, 101 INTERNATIONAL DRIVE, PORTSMOUTH, NH

ZONING DISTRICT: AIRPORT, BUSINESS & COMMERCIAL (ABC)

DIMENSIONAL REQUIREMENTS:

	REQUIRED	PROVIDED
MINIMUM LOT AREA:	5 AC	43.4± AC
MINIMUM STREET FRONTAGE:	200 FT	1,038 FT
MINIMUM FRONT YARD SETBACK:	70 FT	70 FT
SIDE SETBACK	30 FT	30 FT
REAR SETBACK	50 FT	51 FT
MINIMUM OPEN SPACE	25 %	59.9± %

MAXIMUM STRUCTURE HEIGHT SHALL NOT EXCEED FAA CRITERIA.

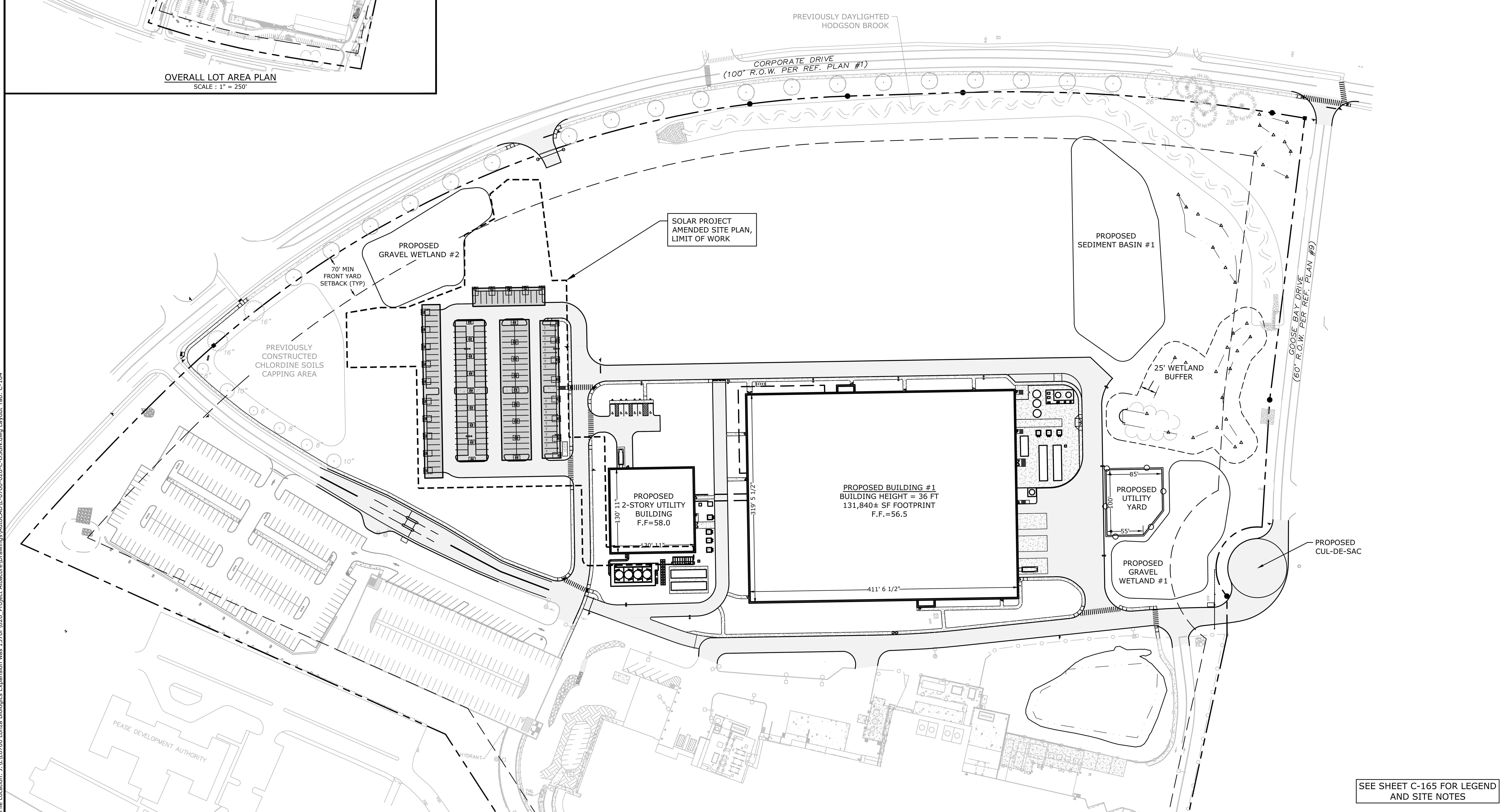
PARKING REQUIREMENTS:

REQUIRED PARKING
2 SPACES PER 3 EMPLOYEES ON LARGEST SHIFT

990 EXISTING EMPLOYEES	660 SPACES
180 ANTICIPATED EMPLOYEES	120 SPACES
TOTAL REQUIRED:	880 SPACES

PARKING PROVIDED

EXISTING SPACES:	801 SPACES
PROPOSED SURFACE PARKING:	156 SPACES
TOTAL:	957 SPACES



SEE SHEET C-165 FOR LEGEND AND SITE NOTES

SCALE IN FEET
0 80' 160'
GRAPHIC SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
5/20/24

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

Proposed Industrial Development

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

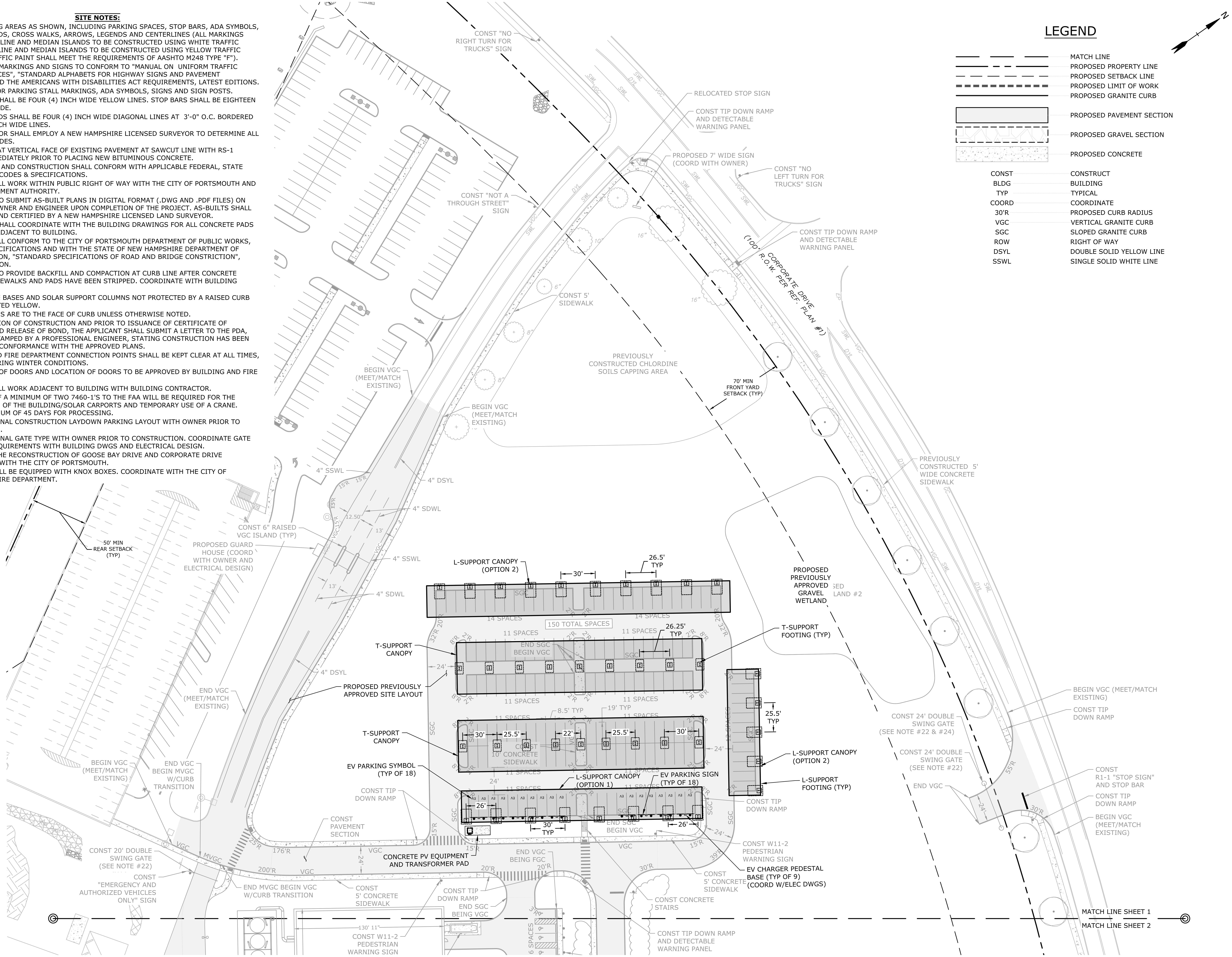
PHASE 2 OVERALL
SITE PLAN

SCALE: AS SHOWN

C-164

SITE NOTES:

1. STRIPE PARKING AREAS AS SHOWN, INCLUDING PARKING SPACES, STOP BARS, ADA SYMBOLS, PAINTED ISLANDS, CROSS WALKS, ARROWS, LEGENDS AND CENTERLINES (ALL MARKINGS EXCEPT CENTERLINE AND MEDIAN ISLANDS TO BE CONSTRUCTED USING WHITE TRAFFIC PAINT. CENTERLINE AND MEDIAN ISLANDS TO BE CONSTRUCTED USING YELLOW TRAFFIC PAINT. ALL TRAFFIC PAINT SHALL MEET THE REQUIREMENTS OF AASHTO M248 TYPE "F").
2. ALL PAVEMENT MARKINGS AND SIGNS TO CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS, LATEST EDITIONS.
3. SEE DETAILS FOR PARKING STALL MARKINGS, ADA SYMBOLS, SIGNS AND SIGN POSTS.
4. CENTERLINES SHALL BE FOUR (4) INCH WIDE YELLOW LINES. STOP BARS SHALL BE EIGHTEEN (18) INCHES WIDE.
5. PAINTED ISLANDS SHALL BE FOUR (4) INCH WIDE DIAGONAL LINES AT 3'-0" O.C. BORDERED BY FOUR (4) INCH WIDE LINES.
6. THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED SURVEYOR TO DETERMINE ALL LINES AND GRADES.
7. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAWCUT LINE WITH RS-1 EMULSION IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
8. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE AND/OR TOWN CODES & SPECIFICATIONS.
9. COORDINATE ALL WORK WITHIN PUBLIC RIGHT OF WAY WITH THE CITY OF PORTSMOUTH AND PEASE DEVELOPMENT AUTHORITY.
10. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
11. CONTRACTOR SHALL COORDINATE WITH THE BUILDING DRAWINGS FOR ALL CONCRETE PADS & SIDEWALKS ADJACENT TO BUILDING.
12. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRICTION", CURRENT EDITION.
13. CONTRACTOR TO PROVIDE BACKFILL AND COMPACTION AT CURB LINE AFTER CONCRETE FORMS FOR SIDEWALKS AND PADS HAVE BEEN STRIPPED. COORDINATE WITH BUILDING CONTRACTOR.
14. ALL LIGHT POLE BASES AND SOLAR SUPPORT COLUMNS NOT PROTECTED BY A RAISED CURB SHALL BE PAINTED YELLOW.
15. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
16. UPON COMPLETION OF CONSTRUCTION AND PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY AND RELEASE OF BOND, THE APPLICANT SHALL SUBMIT A LETTER TO THE PDA, SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, STATING CONSTRUCTION HAS BEEN COMPLETED IN CONFORMANCE WITH THE APPROVED PLANS.
17. FIRE LANES AND FIRE DEPARTMENT CONNECTION POINTS SHALL BE KEPT CLEAR AT ALL TIMES, INCLUDING DURING WINTER CONDITIONS.
18. FINAL NUMBER OF DOORS AND LOCATION OF DOORS TO BE APPROVED BY BUILDING AND FIRE DEPARTMENTS.
19. COORDINATE ALL WORK ADJACENT TO BUILDING WITH BUILDING CONTRACTOR.
20. SUBMISSION OF A MINIMUM OF TWO 7460-1'S TO THE FAA WILL BE REQUIRED FOR THE CONSTRUCTION OF THE BUILDING/SOLAR CARPORTS AND TEMPORARY USE OF A CRANE. ALLOW A MINIMUM OF 45 DAYS FOR PROCESSING.
21. COORDINATE FINAL CONSTRUCTION LAYDOWN PARKING LAYOUT WITH OWNER PRIOR TO CONSTRUCTION.
22. COORDINATE FINAL GATE TYPE WITH OWNER PRIOR TO CONSTRUCTION. COORDINATE GATE ELECTRICAL REQUIREMENTS WITH BUILDING DWGS AND ELECTRICAL DESIGN.
23. COORDINATE THE RECONSTRUCTION OF GOOSE BAY DRIVE AND CORPORATE DRIVE INTERSECTION WITH THE CITY OF PORTSMOUTH.
24. ALL GATES SHALL BE EQUIPPED WITH KNOX BOXES. COORDINATE WITH THE CITY OF PORTSMOUTH FIRE DEPARTMENT.



LEGEND

(symbol)	MATCH LINE
(symbol)	PROPOSED PROPERTY LINE
(symbol)	PROPOSED SETBACK LINE
(symbol)	PROPOSED LIMIT OF WORK
(symbol)	PROPOSED GRANITE CURB
(symbol)	PROPOSED PAVEMENT SECTION
(symbol)	PROPOSED GRAVEL SECTION
(symbol)	PROPOSED CONCRETE
CONST	CONSTRUCT
BLDG	BUILDING
TYP	TYPICAL
COORD	COORDINATE
30'R	PROPOSED CURB RADIUS
VGC	VERTICAL GRANITE CURB
SGC	SLOPED GRANITE CURB
ROW	RIGHT OF WAY
DSYL	DOUBLE SOLID YELLOW LINE
SSWL	SINGLE SOLID WHITE LINE

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER 5/20/24

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER 05/20/2024

SCALE IN FEET 0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2
SITE PLAN

SCALE: AS SHOWN

C-165

Last Save Date: May 17, 2024 3:51 PM By: NAHANSEN
Plot Date: Friday, May 17, 2024 Plotted By: Neil A. Hansen
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-165

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INV.OUT=43.85 SW

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RIM=50.30
INV.OUT=45.70 W

PCB102
RIM=51.20
INV.OUT=47.50 SW

PCB103
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INV.OUT=48.90 SE

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INV.OUT=49.80 SW

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PCB109
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PCB111
RIM=56.80
INV.OUT=52.65 SE

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INV.OUT=43.15 NE

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INV.OUT=51.90 NE

PCB203
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INV.OUT=52.40 SE

PCB204
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PCB205
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PCB207
RIM=49.30
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INV.OUT=46.10 SE

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INV.OUT=48.25 SE

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PDMH114
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INV.OUT=46.40 SE

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INV.IN=52.55 NE
INV.OUT=52.45 NE

PDMH116
RIM=56.40
INV.IN=47.05 NW
INV.IN=53.00 NE
INV.IN=49.25 N
INV.IN=51.10 NE
INV.OUT=46.95 SE

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RIM=59.10
INV.IN=50.85 SW
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POS101
RIM=47.00
INV.OUT=41.35 E

POS102
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INV.OUT=42.75 S

POS200
RIM=56.50
INV.OUT=49.85 E

PYD100
RIM=56.00
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INV.IN=50.35 NE
INV.OUT=50.25 SW

PYD101
RIM=55.00
INV.IN=49.30 NE
INV.IN=50.00 NW
INV.OUT=49.20 SW

PYD102
RIM=55.50
INV.IN=47.70 NW
INV.OUT=47.60 SE

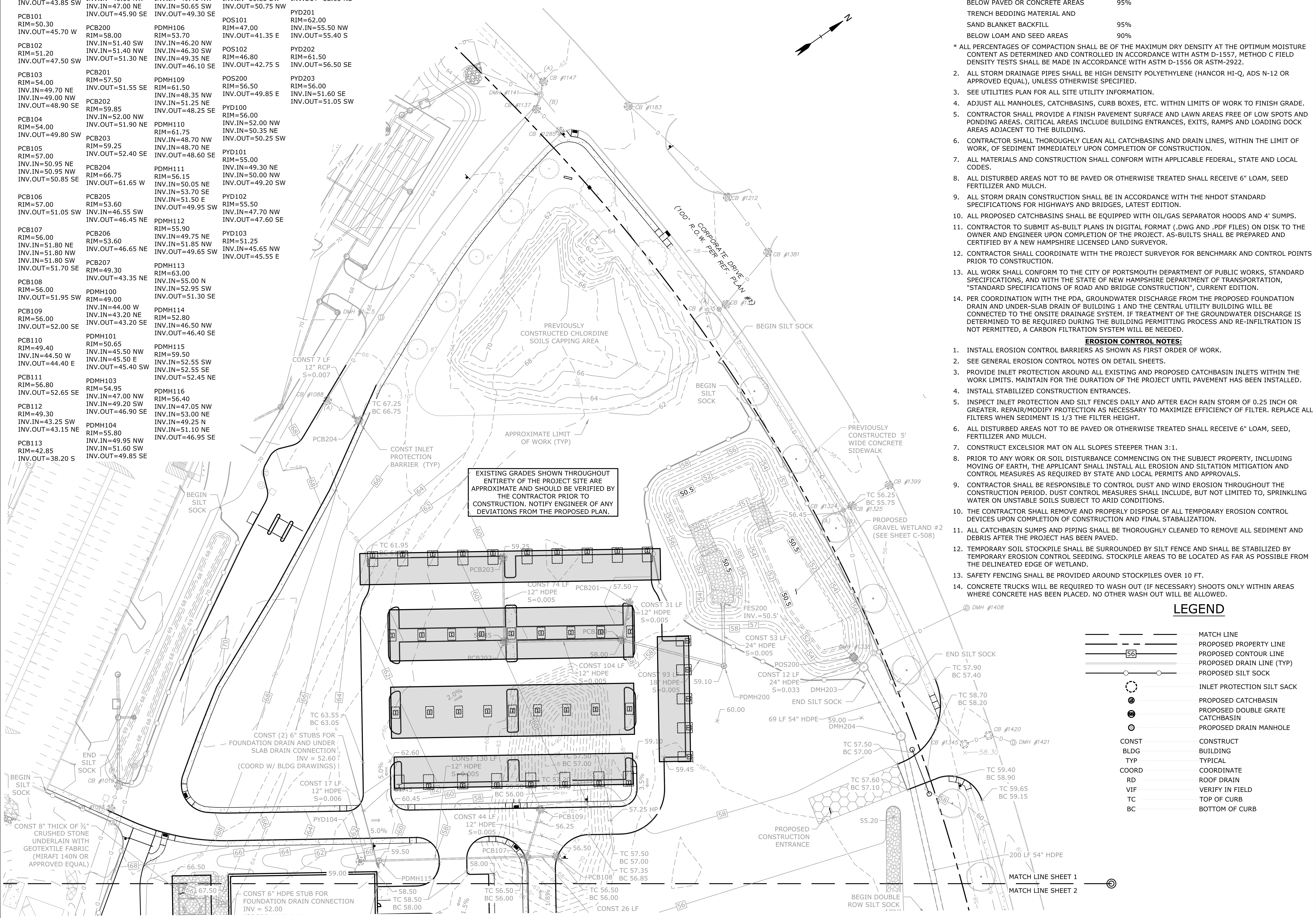
PYD103
RIM=51.25
INV.IN=45.65 NW
INV.OUT=45.55 E

PYD104
RIM=59.00
INV.OUT=52.65 NE

PYD201
RIM=62.00
INV.IN=55.50 NW
INV.OUT=55.40 S

PYD202
RIM=61.50
INV.OUT=56.50 SE

PYD203
RIM=56.00
INV.IN=51.60 SE
INV.OUT=51.05 SW



GRADING AND DRAINAGE NOTES:

1. COMPACTION REQUIREMENTS:

BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL	95%
BELOW LOAM AND SEED AREAS	90%

* ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557, METHOD C FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH ASTM D-1556 OR ASTM-2922.

2. ALL STORM DRAINAGE PIPES SHALL BE HIGH DENSITY POLYETHYLENE (HANCOR HI-Q, ADS N-12 OR APPROVED EQUAL), UNLESS OTHERWISE SPECIFIED.
3. SEE UTILITIES PLAN FOR ALL SITE UTILITY INFORMATION.
4. ADJUST ALL MANHOLES, CATCHBASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
5. CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE AND LAWN AREAS FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCES, EXITS, RAMPS AND LOADING DOCK AREAS ADJACENT TO THE BUILDING.
6. CONTRACTOR SHALL THOROUGHLY CLEAN ALL CATCHBASINS AND DRAIN LINES, WITHIN THE LIMIT OF WORK, OF SEDIMENT IMMEDIATELY UPON COMPLETION OF CONSTRUCTION.
7. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE AND LOCAL CODES.
8. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED FERTILIZER AND MULCH.
9. ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NHDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION.
10. ALL PROPOSED CATCHBASINS SHALL BE EQUIPPED WITH OIL/GAS SEPARATOR HOODS AND 4' SUMPS.
11. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
12. CONTRACTOR SHALL COORDINATE WITH THE PROJECT SURVEYOR FOR BENCHMARK AND CONTROL POINTS PRIOR TO CONSTRUCTION.
13. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS, AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION.
14. PER COORDINATION WITH THE PDA, GROUNDWATER DISCHARGE FROM THE PROPOSED FOUNDATION DRAIN AND UNDER-SLAB DRAIN OF BUILDING 1 AND THE CENTRAL UTILITY BUILDING WILL BE CONNECTED TO THE ONSITE DRAINAGE SYSTEM. IF TREATMENT OF THE GROUNDWATER DISCHARGE IS DETERMINED TO BE REQUIRED DURING THE BUILDING PERMITTING PROCESS AND RE-INFILTRATION IS NOT PERMITTED, A CARBON FILTRATION SYSTEM WILL BE NEEDED.

EROSION CONTROL NOTES:

1. INSTALL EROSION CONTROL BARRIERS AS SHOWN AS FIRST ORDER OF WORK.
2. SEE GENERAL EROSION CONTROL NOTES ON DETAIL SHEETS.
3. PROVIDE INLET PROTECTION AROUND ALL EXISTING AND PROPOSED CATCHBASIN INLETS WITHIN THE WORK LIMITS. MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED.
4. INSTALL STABILIZED CONSTRUCTION ENTRANCES.
5. INSPECT INLET PROTECTION AND SILT FENCES DAILY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
6. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED, FERTILIZER AND MULCH.
7. CONSTRUCT EXCELSIOR MAT ON ALL SLOPES STEEPER THAN 3:1.
8. PRIOR TO ANY WORK OR SOIL DISTURBANCE COMMENCING ON THE SUBJECT PROPERTY, INCLUDING MOVING OF EARTH, THE APPLICANT SHALL INSTALL ALL EROSION AND SILTATION MITIGATION AND CONTROL MEASURES AS REQUIRED BY STATE AND LOCAL PERMITS AND APPROVALS.
9. CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST AND WIND EROSION THROUGHOUT THE CONSTRUCTION PERIOD. DUST CONTROL MEASURES SHALL INCLUDE, BUT NOT LIMITED TO, SPRINKLING WATER ON UNSTABLE SOILS SUBJECT TO ARID CONDITIONS.
10. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION AND FINAL STABALIZATION.
11. ALL CATCHBASIN SUMPS AND PIPING SHALL BE THOROUGHLY CLEANED TO REMOVE ALL SEDIMENT AND DEBRIS AFTER THE PROJECT HAS BEEN PAVED.
12. TEMPORARY SOIL STOCKPILE SHALL BE SURROUNDED BY SILT FENCE AND SHALL BE STABILIZED BY TEMPORARY EROSION CONTROL SEEDING. STOCKPILE AREAS TO BE LOCATED AS FAR AS POSSIBLE FROM THE DELINEATED EDGE OF WETLAND.
13. SAFETY FENCING SHALL BE PROVIDED AROUND STOCKPILES OVER 10 FT.
14. CONCRETE TRUCKS WILL BE REQUIRED TO WASH OUT (IF NECESSARY) SHOOTS ONLY WITHIN AREAS WHERE CONCRETE HAS BEEN PLACED. NO OTHER WASH OUT WILL BE ALLOWED.

LEGEND

	MATCH LINE
	PROPOSED PROPERTY LINE
56	PROPOSED CONTOUR LINE
	PROPOSED DRAIN LINE (TYP)
	PROPOSED SILT SOCK
	INLET PROTECTION SILT SACK
	PROPOSED CATCHBASIN
	PROPOSED DOUBLE GRATE CATCHBASIN
	PROPOSED DRAIN MANHOLE
CONST	CONSTRUCT
BLDG	BUILDING
TYP	TYPICAL
COORD	COORDINATE
RD	ROOF DRAIN
VIF	VERIFY IN FIELD
TC	TOP OF CURB
BC	BOTTOM OF CURB

Tighe&Bond

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
5/20/24

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
05/20/2024

SCALE IN FEET
0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
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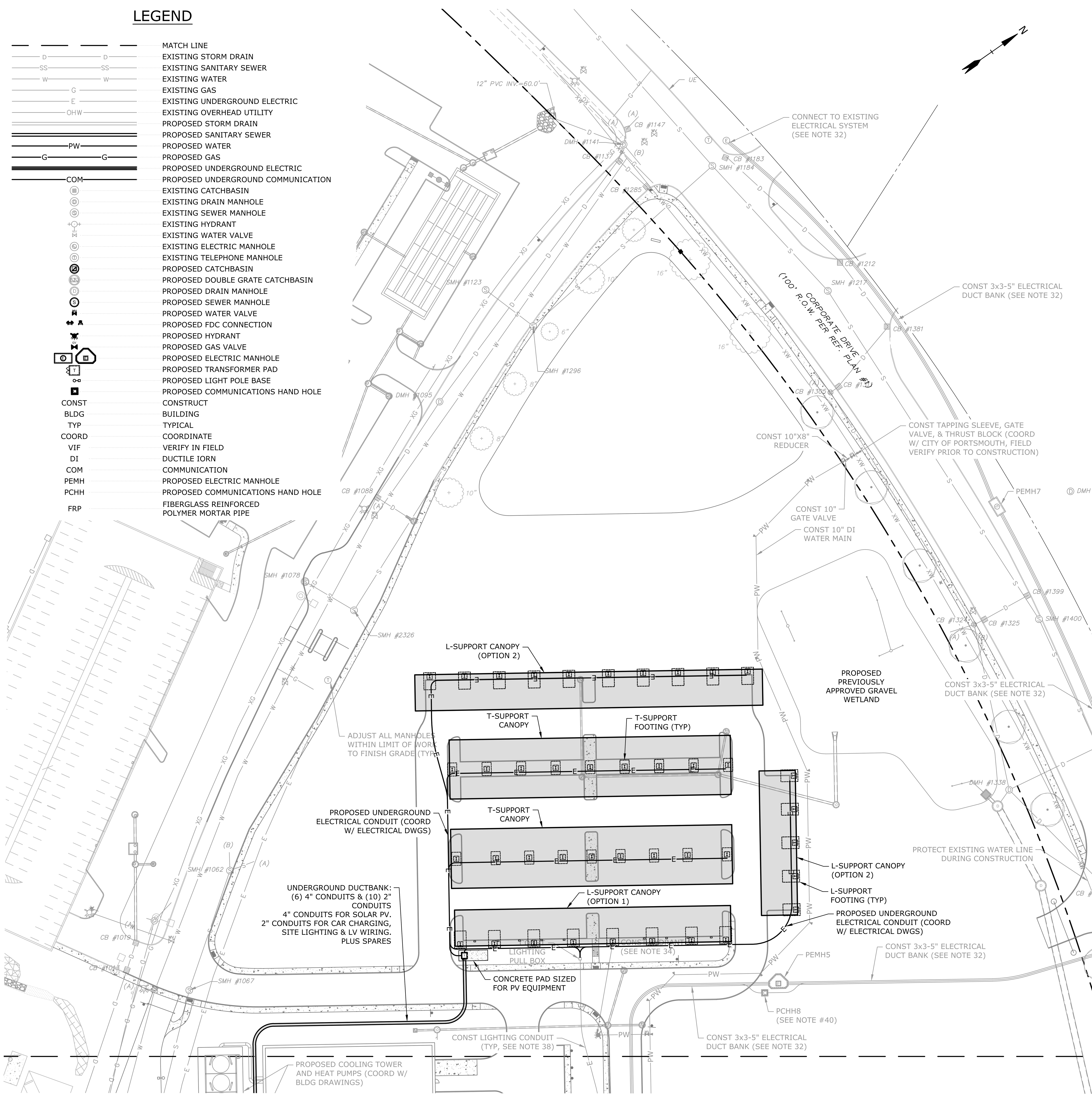
PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2 GRADING, DRAINAGE & EROSION CONTROL PLAN

SCALE: AS SHOWN

C-168



UTILITY NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES, AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.
2. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
   NATURAL GAS - UNITIL
   WATER - CITY OF PORTSMOUTH DPW
   SEWER - CITY OF PORTSMOUTH DPW
   ELECTRIC - EVERSOURCE
   COMMUNICATIONS - FAIRPOINT, COMCAST, FIRSTLIGHT
3. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION.
4. SEE GRADING, DRAINAGE & EROSION CONTROL PLAN FOR PROPOSED GRADING AND EROSION CONTROL MEASURES.
5. ALL WATER MAIN INSTALLATIONS SHALL BE CLASS 52, CEMENT LINED DUCTILE IRON PIPE.
6. ALL WATER MAIN INSTALLATIONS SHALL BE PRESSURE TESTED AND CHLORINATED AFTER CONSTRUCTION PRIOR TO ACTIVATING THE SYSTEM. CONTRACTOR SHALL COORDINATE CHLORINATION AND TESTING WITH THE CITY OF PORTSMOUTH WATER DEPARTMENT.
7. ALL SEWER PIPE SHALL BE FIBERGLASS REINFORCED POLYMER MORTAR (FRP) PIPE UNLESS OTHERWISE STATED.
8. ALL WORK WITHIN PORTSMOUTH ROWS SHALL BE COORDINATED WITH CITY OF PORTSMOUTH AND THE PEASE DEVELOPMENT AUTHORITY.
9. CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ABUTTING PROPERTIES THROUGHOUT CONSTRUCTION.
10. CONNECTIONS TO EXISTING WATER MAIN SHALL BE CONSTRUCTED TO CITY OF PORTSMOUTH STANDARDS.
11. EXISTING UTILITIES TO BE REMOVED SHALL BE CAPPED AT THE MAIN AND MEET THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS STANDARDS FOR CAPPING OF WATER AND SEWER SERVICES.
12. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
13. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE UTILITY COMPANIES.
14. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
15. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
16. THE CONTRACTOR SHALL OBTAIN, PAY FOR, AND COMPLY WITH ALL REQUIRED PERMITS, ARRANGE FOR ALL INSPECTIONS, AND SUBMIT COPIES OF ACCEPTANCE CERTIFICATES TO THE OWNER PRIOR TO THE COMPLETION OF THIS PROJECT.
17. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
18. CONTRACTOR SHALL PROVIDE EXCAVATION, BEDDING, BACKFILL AND COMPACTION FOR NATURAL GAS SERVICES.
19. A 10-FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18-INCH MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER/SANITARY SEWER CROSSINGS.
20. THE CONTRACTOR SHALL CONTACT "DIG-SAFE" 72 HOURS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL HAVE THE "DIG-SAFE" NUMBER ON SITE AT ALL TIMES.
21. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
22. SAWCUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
23. HYDRANTS, GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF THE CITY OF PORTSMOUTH AND THE PEASE DEVELOPMENT AUTHORITY.
24. COORDINATE TESTING OF SEWER CONSTRUCTION WITH THE CITY OF PORTSMOUTH.
25. ALL SEWER PIPE WITH LESS THAN 6' OF COVER IN PAVED AREAS OR LESS THAN 4' OF COVER IN UNPAVED AREAS SHALL BE INSULATED.
26. CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, UTILITY POLE CONSTRUCTION, OVERHEAD WIRE RELOCATION, AND TRANSFORMER CONSTRUCTION WITH POWER COMPANY.
27. CONTRACTOR SHALL PHASE UTILITY CONSTRUCTION, PARTICULARLY WATER MAIN AND GAS MAIN CONSTRUCTION, AS TO MAINTAIN CONTINUOUS SERVICE TO ABUTTING PROPERTIES. CONTRACTOR SHALL COORDINATE TEMPORARY SERVICES TO ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED ABUTTER.
28. SITE LIGHTING SPECIFICATIONS, CONDUIT LAYOUT AND CIRCUITRY FOR PROPOSED SITE LIGHTING AND SIGN ILLUMINATION SHALL BE PROVIDED BY THE PROJECT ELECTRICAL ENGINEER.
29. CONTRACTOR SHALL CONSTRUCT ALL UTILITIES AND DRAINS TO WITHIN 10' OF THE FOUNDATION WALLS AND CONNECT THESE TO SERVICE STUBS FROM THE BUILDING.
30. EXISTING SEWER MAIN AND STRUCTURES IN GOOSE BAY DRIVE ARE BASED ON A PROPOSED DESIGN BY UNDERWOOD ENGINEERS, DATED JULY 28, 2017, AND WAS CONSTRUCTED IN SUMMER 2018. THE PROPOSED ON-SITE SEWER DESIGN ELEVATIONS ARE BASED ON THE UNDERWOOD PLAN DURING CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE SEWER CONSTRUCTION WITH THE CITY OF PORTSMOUTH, AND VERIFY ALL INVERTS PRIOR TO CONSTRUCTION.
31. LOCATION SHOWN IS APPROXIMATE ONLY. FINAL DESIGN OF NATURAL GAS SERVICE TO BE COMPLETED BY UNITIL. WORK IN CORPORATE DRIVE MAY NEED TO BE COMPLETED IN CONJUNCTION WITH FUTURE RECONSTRUCTION OF CORPORATE DRIVE. COORDINATE WITH CITY OF PORTSMOUTH AND UNITIL.
32. LOCATION AND TYPE SHOWN IS APPROXIMATE ONLY. FINAL DESIGN OF ELECTRIC SERVICE AND ASSOCIATED INFRASTRUCTURE TO BE COMPLETED BY EVERSOURCE. WORK IN CORPORATE DRIVE MAY NEED TO BE COMPLETED IN CONJUNCTION WITH FUTURE RECONSTRUCTION OF CORPORATE DRIVE. COORDINATE WITH CITY OF PORTSMOUTH AND EVERSOURCE.
33. FINAL LOCATION OF ALL WATER METER AND VALVES SHALL BE COORDINATED WITH THE CITY OF PORTSMOUTH DPW PRIOR TO CONSTRUCTION.
34. FINAL LOCATION OF FIRE HYDRANTS, FIRE DEPARTMENT CONNECTIONS AND DRY STAND PIPES WILL BE COORDINATED WITH THE BUILDING DRAWINGS AND APPROVED BY THE PORTSMOUTH FIRE DEPARTMENT PRIOR TO CONSTRUCTION.
35. THE APPLICANT SHALL HAVE A SITE SURVEY CONDUCTED BY A RADIO COMMUNICATIONS CARRIER APPROVED BY THE CITY'S COMMUNICATIONS DIVISION. THE RADIO COMMUNICATIONS CARRIER MUST BE FAMILIAR AND CONVERSANT WITH THE POLICE AND RADIO CONFIGURATION. IF THE SITE SURVEY INDICATES IT IS NECESSARY TO INSTALL A SIGNAL REPEATER EITHER ON OR NEAR THE PROPOSED PROJECT, THOSE COSTS SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER. THE OWNER SHALL COORDINATE WITH THE SUPERVISOR OF RADIO COMMUNICATIONS FOR THE CITY.
36. CONTRACTOR SHALL PERFORM TEST PITS TO VERIFY INVERT ELEVATIONS IN FIELD PRIOR TO CONSTRUCTION AND SHALL NOTIFY ENGINEER IF ELEVATION DIFFERS FROM PLAN.
37. CONTRACTOR SHALL DISPOSE OF ASBESTOS CEMENT PIPES IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS SHOULD ANY BE FOUND DURING CONSTRUCTION.
38. COORDINATE LIGHTING CONDUIT QUANTITY AND SIZE REQUIREMENTS WITH ELECTRICAL DESIGNS.
39. ABANDON EXISTING SEWERS, WHERE NOTED ON DRAWINGS ONCE PROPOSED SEWERS HAVE BEEN INSTALLED, TESTED, AND ACCEPTED BY THE CITY. EXISTING SEWERS LESS THAN 24" DIAMETER SHALL BE ABANDONED BY PLACING CONCRETE PLUGS IN THE OPEN ENDS, IN ACCORDANCE WITH SPECIFICATION SECTION 02280.
40. CONTRACTOR SHALL COORDINATE FINAL COMMUNICATIONS HAND HOLD LOCATIONS, CONDUIT SIZE AND QUANTITY WITH COMMUNICATIONS COMPANIES PRIOR TO CONSTRUCTION.

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED PROFESSIONAL ENGINEER
5/20/24

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED PROFESSIONAL ENGINEER
05/20/2024

SCALE IN FEET
0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
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PROJECT NO:	L-0700-013
DATE:	04/03/2018
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DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

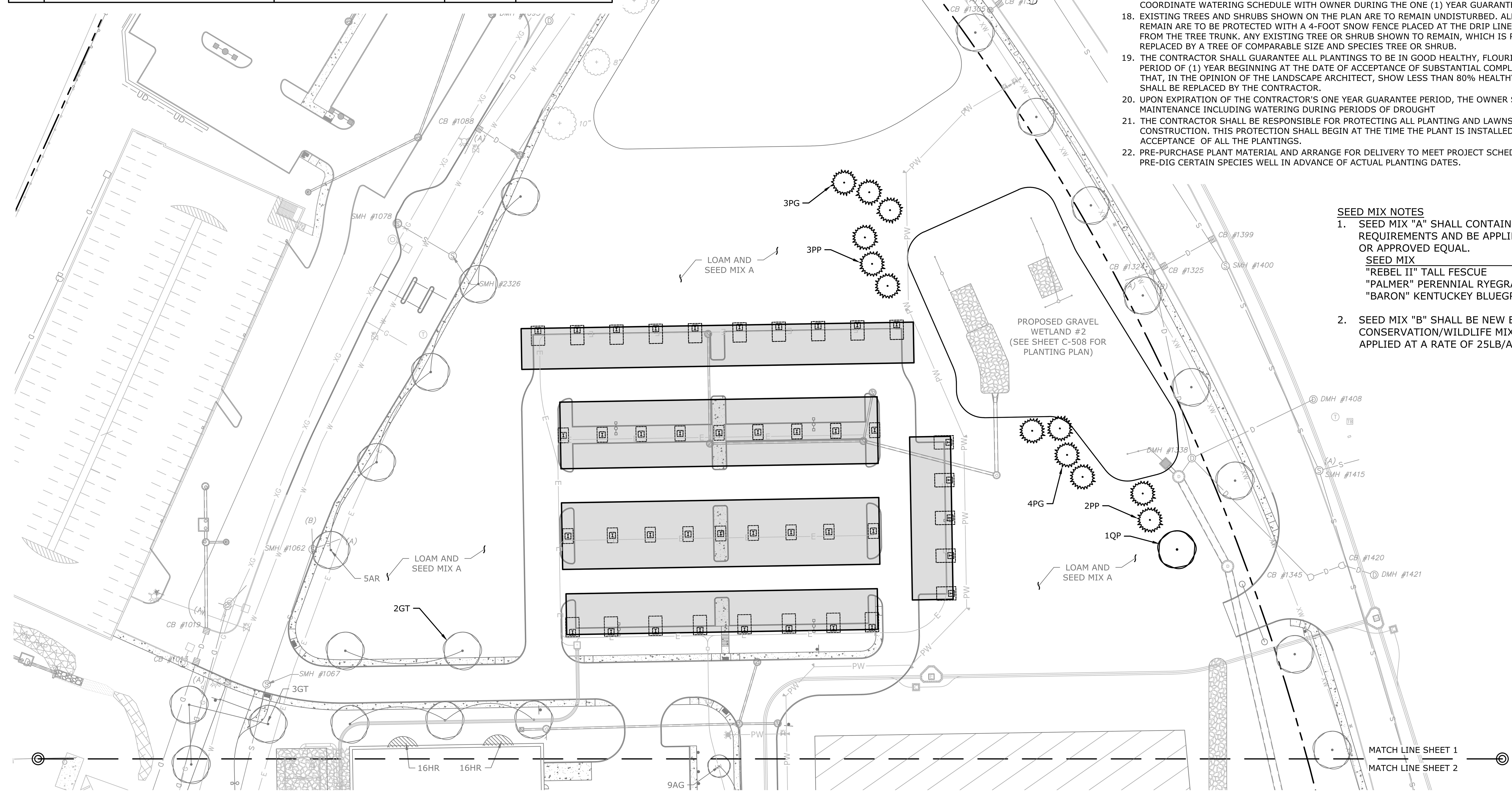
PHASE 2
UTILITIES PLAN

SCALE: AS SHOWN

C-171

Last Save Date: May 17, 2024 3:51 PM By: NAHANSEN
Plot Date: Friday, May 17, 2024 Plotted By: Neil A. Hansen
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-171

PLANT SCHEDULE				
CODE	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
TREES				
UA	ULMUS AMERICANA 'PRINCETON'	PRINCETON AMERICAN ELM	2½ - 3" CALIPER	B & B
QP	QUERCUS PULUSTRIS	PIN OAK	2½ - 3" CALIPER	B & B
GT	GLEIDITSIA TRIACANTHOS 'SKYLINE'	SKYLINE HONEYLOCUST	2½ - 3" CALIPER	B & B
AR	ACER RUBRUM 'REDPOINTE'	REDPOINTE RED MAPLE	2½ - 3" CALIPER	B & B
AC	AESCULUS CARNEA ' FORT MCNAIR'	FORT MCNAIR HORSECHESTNUT	2½ - 3" CALIPER	B & B
PC	PYRUS CHANTICLEER	CHANTICLEER PEAR	2 - 2½" CALIPER	B & B
AG	AMELANCHIER GRANDIFLORA 'AUTUMN BRILLIANCE'	AUTUMN BRILLIANCE SERVICEBERRY	2 - 2½" CALIPER	B & B (SINGLE STEM)
BN	BETULA NIGRA 'HERITAGE'	HERITAGE RIVER BIRCH	12 - 14' HT.	B & B (MULTISTEM)
PG	PICEA GLAUCA	WHITE SPRUCE	8 - 10' HT.	B & B
PP	PICEA PUNGENS	COLORADO SPRUCE	8 - 10' HT.	B & B
PA	PICEA ABIES	NORWAY SPRUCE	8 - 10' HT.	B & B
SHRUBS				
VC	VIBURNUM CASSINOIDES	WITHEROD VIBURNUM	2½ - 3' HT.	B & B
RE	RHODODENDRON 'ENGLISH ROSEUM'	ENGLISH ROSEUM RHODODENDRON	2½ - 3' HT.	B & B
CA	CLETHERA ALNIFOLIA	SUMMERSWEET CLETHERA	7 GALLON	CONTAINER
HQ	HYDRANGEA QUERCIFOLIA 'SNOW QUEEN'	SNOW QUEEN OAKLEAF HYDRANGEA	2½ - 3' HT.	B & B
GROUNDCOVERS & PERENNIALS				
DL	HEMEROCALLIS 'STELLA DORO'	STELLA DORO DAYLILY	2 GALLON	CONTAINER
HR	HOSTA 'ROYAL STANDARD'	ROYAL STANDARD HOSTA	2 GALLON	CONTAINER
AS	ASTILBE 'VISIONS IN PINK'	VISIONS IN PINK ASTILBE	2 GALLON	CONTAINER
CAL	CALAMAGROSTIS 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS	3 GALLON	CONTAINER



LANDSCAPE NOTES:

1. LANDSCAPE NOTES ON THIS PLAN APPLY ONLY TO THOSE PLANTINGS OUTSIDE OF THE HODGSON BROOK RESTORATION AREA. PLANTING REQUIREMENTS FOR THE HODGSON BROOK RESTORATION AREA CAN BE FOUND ON PLAN SHEETS C-701 THROUGH C-714 AND IN APPENDIX D OF THE TECHNICAL SPECIFICATIONS.
2. THE CONTRACTOR SHALL FURNISH AND PLANT ALL PLANTS IN QUANTITIES AS SHOWN ON THIS PLAN. NO SUBSTITUTIONS WILL BE PERMITTED UNLESS APPROVED BY OWNER. ALL PLANTS SHALL BE NURSERY GROWN.
3. ALL PLANTS SHALL BE NURSERY GROWN AND PLANTS AND WORKMANSHIP SHALL CONFORM TO THE AMERICAN ASSOCIATION OF NURSERYMEN STANDARDS, INCLUDING BUT NOT LIMITED TO SIZE, HEALTH, SHAPE, ETC., AND SHALL BE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO ARRIVAL ON-SITE AND AFTER PLANTING.
4. PLANT STOCK SHALL BE GROWN WITHIN THE HARDINESS ZONES 4 THRU 7 ESTABLISHED BY THE PLANT HARDINESS ZONE MAP, MISCELLANEOUS PUBLICATIONS NO. 814, AGRICULTURAL RESEARCH SERVICE, UNITED STATES DEPARTMENT AGRICULTURE, LATEST REVISION.
5. PLANT MATERIAL SHALL BARE THE SAME RELATIONSHIP TO FINISHED GRADE AS TO THE ORIGINAL PLANTING GRADE PRIOR TO DIGGING.
6. THE NUMBER OF EACH INDIVIDUAL PLANT TYPE AND SIZE PROVIDED IN THE PLANT LIST OR ON THE PLAN IS FOR THE CONTRACTOR'S CONVENIENCE ONLY. IF A DISCREPANCY EXISTS BETWEEN THE NUMBER OF PLANTS ON THE LABEL AND THE NUMBER OF SYMBOLS SHOWN ON THE DRAWINGS, THE GREATER NUMBER SHALL APPLY.
7. NO SUBSTITUTION OF PLANT MATERIALS WILL BE ALLOWED WITHOUT THE PRIOR WRITTEN APPROVAL OF THE OWNER'S REPRESENTATIVE.
8. THE CONTRACTOR SHALL LOCATE, VERIFY AND MARK ALL EXISTING AND NEWLY INSTALLED UNDERGROUND UTILITIES PRIOR TO ANY LAWN WORK OR PLANTING. ANY CONFLICTS WHICH MIGHT OCCUR BETWEEN PLANTING AND UTILITIES SHALL IMMEDIATELY BE REPORTED TO THE OWNER SO THAT ALTERNATE PLANTING LOCATIONS CAN BE DETERMINED.
9. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED, SHALL RECEIVE SIX (6) INCHES OF LOAM AND SEED. NO FILL SHALL BE PLACED IN ANY WETLAND AREA.
10. THREE (3) INCH BARK MULCH IS TO BE USED AROUND THE TREE AND SHRUB PLANTING AS SPECIFIED IN THE DETAILS. WHERE BARK MULCH IS TO BE USED IN A CURBED ISLAND THE BARK MULCH SHALL MEET THE TOP INSIDE EDGE OF THE CURB. ALL OTHER AREAS SHALL RECEIVE SIX (6) INCHES OF LOAM AND SEED.
11. LANDSCAPING SHALL BE LOCATED WITHIN 150 FT OF EXTERIOR HOSE ATTACHMENT OR SHALL BE PROVIDED WITH AN IRRIGATION SYSTEM.
12. SEE PLANTING DETAILS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
13. TREE STAKES SHALL REMAIN IN PLACE FOR NO LESS THAN 6 MONTHS AND NO MORE THAN 1 YEAR.
14. PLANTING SHALL BE COMPLETED FROM APRIL 15TH THROUGH OCTOBER 1ST. NO PLANTING DURING JULY AND AUGUST UNLESS SPECIAL PROVISIONS ARE MADE FOR DROUGHT.
15. PARKING AREA PLANTED ISLANDS TO HAVE MINIMUM OF 1'-0" TOPSOIL PLACED TO WITHIN 3 INCHES OF THE TOP OF CURB ELEVATION REMOVE ALL CONSTRUCTION DEBRIS BEFORE PLACING TOPSOIL.
16. TREES SHALL BE PRUNED IN ACCORDANCE WITH THE LATEST EDITION OF ANSI A300 'TREES, SHRUBS AND OTHER WOOD PLANT MAINTENANCE STANDARD PRACTICES.
17. 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. LANDSCAPE CONTRACTOR SHALL COORDINATE WATERING SCHEDULE WITH OWNER DURING THE ONE (1) YEAR GUARANTEE PERIOD.
18. EXISTING TREES AND SHRUBS SHOWN ON THE PLAN ARE TO REMAIN UNDISTURBED. ALL EXISTING TREES AND SHRUBS SHOWN TO REMAIN ARE TO BE PROTECTED WITH A 4-FOOT SNOW FENCE PLACED AT THE DRIP LINE OF THE BRANCHES OR AT 8 FEET MINIMUM FROM THE TREE TRUNK. ANY EXISTING TREE OR SHRUB SHOWN TO REMAIN, WHICH IS REMOVED DURING CONSTRUCTION, SHALL BE REPLACED BY A TREE OF COMPARABLE SIZE AND SPECIES TREE OR SHRUB.
19. THE CONTRACTOR SHALL GUARANTEE ALL PLANTINGS TO BE IN GOOD HEALTHY, FLOURISHING AND ACCEPTABLE CONDITION FOR A PERIOD OF (1) YEAR BEGINNING AT THE DATE OF ACCEPTANCE OF SUBSTANTIAL COMPLETION. ALL GRASSES, TREES AND SHRUBS THAT, IN THE OPINION OF THE LANDSCAPE ARCHITECT, SHOW LESS THAN 80% HEALTHY GROWTH AT THE END OF ONE YEAR PERIOD SHALL BE REPLACED BY THE CONTRACTOR.
20. UPON EXPIRATION OF THE CONTRACTOR'S ONE YEAR GUARANTEE PERIOD, THE OWNER SHALL BE RESPONSIBLE FOR LANDSCAPE MAINTENANCE INCLUDING WATERING DURING PERIODS OF DROUGHT
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL PLANTING AND LAWNS AGAINST DAMAGE FROM ONGOING CONSTRUCTION. THIS PROTECTION SHALL BEGIN AT THE TIME THE PLANT IS INSTALLED AND CONTINUE UNTIL THE FORMAL ACCEPTANCE OF ALL THE PLANTINGS.
22. PRE-PURCHASE PLANT MATERIAL AND ARRANGE FOR DELIVERY TO MEET PROJECT SCHEDULE AS REQUIRED IT MAY BE NECESSARY TO PRE-DIG CERTAIN SPECIES WELL IN ADVANCE OF ACTUAL PLANTING DATES.

SEED MIX NOTES

1. SEED MIX "A" SHALL CONTAIN THE FOLLOWING SEED REQUIREMENTS AND BE APPLIED AT A RATE OF 40LB/AC OR APPROVED EQUAL.

SEED MIX	% BY WEIGHT
"REBEL II" TALL FESCUE	70%
"PALMER" PERENNIAL RYEGRASS	20%
"BARON" KENTUCKEY BLUEGRASS	10%

2. SEED MIX "B" SHALL BE NEW ENGLAND CONSERVATION/WILDLIFE MIX OR APPROVED EQUAL APPLIED AT A RATE OF 25LB/AC.

SEE SHEET C-176 FOR PLANT SCHEDULE

Tighe&Bond

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PHASE 2
LANDSCAPE PLAN

SCALE: AS SHOWN

C-174

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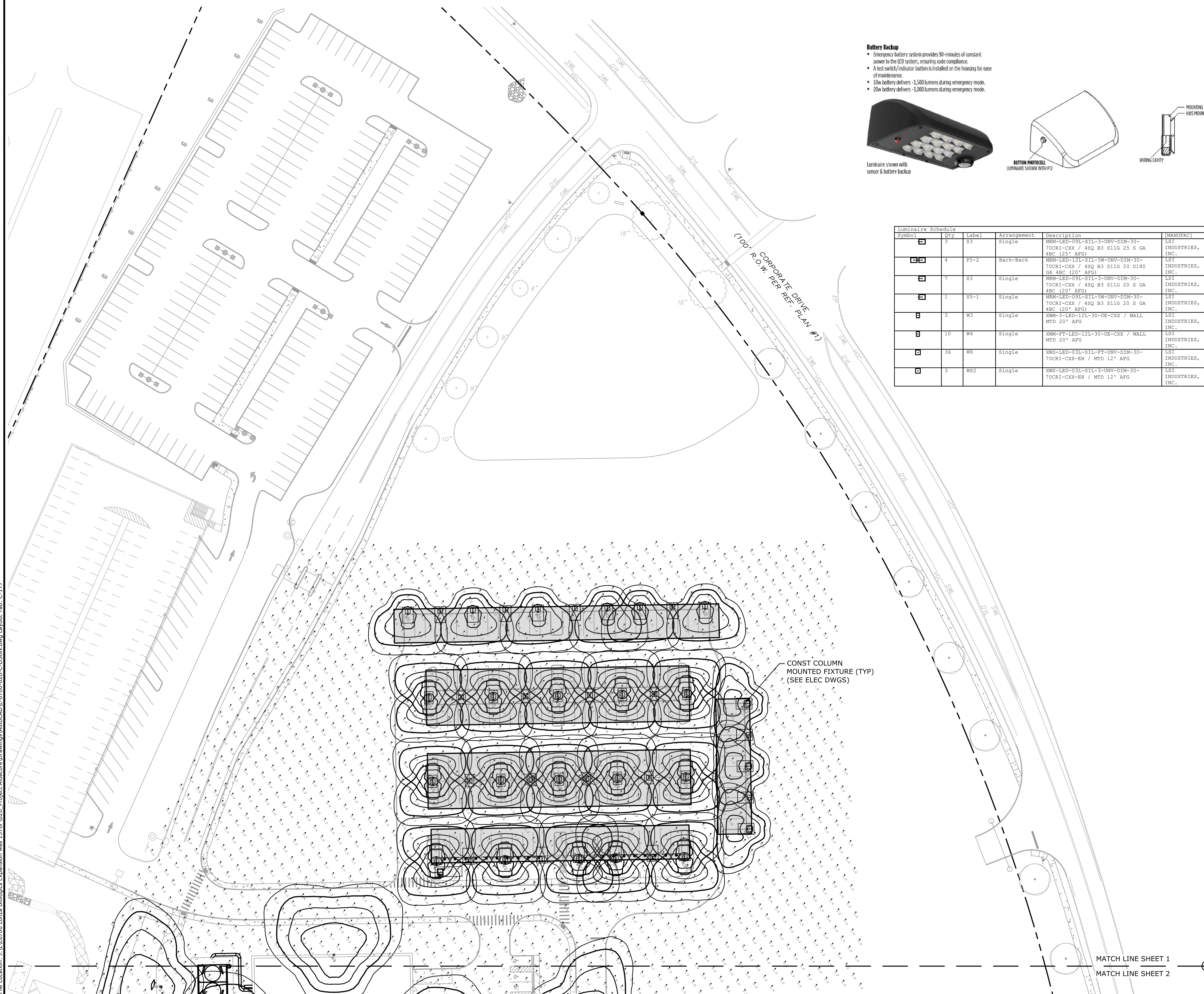

Battery Backup
- Emergency battery system provides 90-minutes of constant power to the LED system, ensuring code compliance.
- A test switch/indicator button is installed on the housing for ease of maintenance.
- 10w battery delivers ~1,500 lumens during emergency mode.
- 20w battery delivers ~3,000 lumens during emergency mode.

Luminaire shown with sensor & battery backup

BUTTON PHOTOCELL
LUMINAIRE SHOWN WITH PCI

MOUNTING BRACKET
XWS MOUNTING BRACKET
WIRING CAVITY

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Description	[MANUFAC]
	3	S3	Single	MRM-LED-09L-SIL-3-UNV-DIM-30-70CRI-CXX / 4SQ B3 S11G 25 S GA 4BC (25' AFG)	LSI INDUSTRIES, INC.
	4	P5-2	Back-Back	MRM-LED-12L-SIL-5W-UNV-DIM-30-70CRI-CXX / 4SQ B3 S11G 20 D180 GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	7	S3	Single	MRM-LED-09L-SIL-3-UNV-DIM-30-70CRI-CXX / 4SQ B3 S11G 20 S GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	1	S5-1	Single	MRM-LED-09L-SIL-5W-UNV-DIM-30-70CRI-CXX / 4SQ B3 S11G 20 S GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	3	W3	Single	XWM-3-LED-12L-30-UE-CXX / WALL MTD 20' AFG	LSI INDUSTRIES, INC.
	10	W4	Single	XWM-FT-LED-12L-30-UE-CXX / WALL MTD 20' AFG	LSI INDUSTRIES, INC.
	36	WS	Single	XWS-LED-03L-SIL-FT-UNV-DIM-30-70CRI-CXX-EH / MTD 12' AFG	LSI INDUSTRIES, INC.
	3	WS2	Single	XWS-LED-03L-SIL-3-UNV-DIM-30-70CRI-CXX-EH / MTD 12' AFG	LSI INDUSTRIES, INC.

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CHECKED: NAH
APPROVED: PMC

PHASE 2 PHOTOMETRIC LIGHTING PLAN

SCALE: AS SHOWN

C-177

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GENERAL PROJECT INFORMATION

PROJECT LESSOR:	PEASE DEVELOPMENT AUTHORITY 55 INTERNATIONAL DRIVE PORTSMOUTH, NH 03801
PROJECT OWNER/ APPLICANT:	LONZA BIOLOGICS 101 INTERNATIONAL DRIVE PORTSMOUTH, NH 03801
PROJECT ADDRESS:	70 & 80 CORPORATE DRIVE PORTSMOUTH, NH 03801
PROJECT LATITUDE:	43°-04'-59.0"N
PROJECT LONGITUDE:	71°-48'-09.7"W

PROJECT DESCRIPTION
THE PROJECT CONSISTS OF THE EXPANSION OF LONZA BIOLOGICS, WHICH INCLUDES THE CONSTRUCTION OF 4 PROPOSED BUILDINGS, 1 PARKING GARAGE, AND ASSOCIATED SITE IMPROVEMENTS.

DISTURBED AREA
THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 21.3 ACRES.

SOIL CHARACTERISTICS
BASED ON THE HIGH INTENSITY SOIL SURVEY PREPARED BY GOVE ENVIRONMENTAL SERVICES, INC. IN DECEMBER 2015, THE SITE SOILS VARY FROM WELL DRAINED TO VERY POORLY DRAINED AND PRIMARILY CONSIST OF SOMEWHAT POORLY DRAINED SOILS.

NAME OF RECEIVING WATERS
THE STORM WATER RUNOFF WILL ULTIMATELY DISCHARGE INTO HODGSON BROOK

CONSTRUCTION SEQUENCE OF MAJOR ACTIVITIES:
1. CUT AND CLEAR TREES.
2. CONSTRUCT TEMPORARY AND PERMANENT SEDIMENT, EROSION AND DETENTION CONTROL FACILITIES. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING OPERATIONS THAT WILL INFLUENCE STORMWATER RUNOFF SUCH AS:
   - NEW CONSTRUCTION
   - CONTROL OF DUST
   - NEARNESS OF CONSTRUCTION SITE TO RECEIVING WATERS
   - CONSTRUCTION DURING LATE WINTER AND EARLY SPRING
3. ALL PERMANENT DITCHES, SWALES, DETENTION, RETENTION AND SEDIMENTATION BASINS TO BE STABILIZED USING THE VEGETATIVE AND NON-STRUCTURAL BMPS PRIOR TO DIRECTING RUNOFF TO THEM.
4. CLEAR AND DISPOSE OF DEBRIS.
5. CONSTRUCT TEMPORARY CULVERTS AND DIVERSION CHANNELS AS REQUIRED.
6. GRADE AND GRAVEL ROADWAYS AND PARKING AREAS - ALL ROADS AND PARKING AREA SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
7. BEGIN PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED AND MULCHED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
8. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, PERIMETER EROSION CONTROL MEASURES, SEDIMENT TRAPS, ETC., MULCH AND SEED AS REQUIRED.
9. SEDIMENT TRAPS AND/OR BASINS SHALL BE USED AS NECESSARY TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.
10. FINISH PAVING ALL ROADWAYS AND PARKING LOTS.
11. INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES.
12. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
13. REMOVE TRAPPED SEDIMENTS FROM COLLECTOR DEVICES AS APPROPRIATE AND THEN REMOVE TEMPORARY EROSION CONTROL MEASURES.

SPECIAL CONSTRUCTION NOTES:
1. THE CONSTRUCTION SEQUENCE MUST LIMIT THE DURATION AND AREA OF DISTURBANCE.
2. THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

EROSION CONTROL NOTES:
1. ALL EROSION CONTROL MEASURES AND PRACTICES SHALL CONFORM TO THE "NEW HAMPSHIRE STORMWATER MANUAL VOLUME 3: EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION" PREPARED BY THE NHDES.
2. PRIOR TO ANY WORK OR SOIL DISTURBANCE, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EROSION CONTROL MEASURES AS REQUIRED IN THE PROJECT MANUAL.
3. CONTRACTOR SHALL INSTALL TEMPORARY EROSION CONTROL BARRIERS, INCLUDING HAY BALES, SILT FENCES, MULCH BERMS, SILT SACKS AND SILT SOCKS AS SHOWN IN THESE DRAWINGS AS THE FIRST ORDER OF WORK.
4. SILT SACK INLET PROTECTION SHALL BE INSTALLED IN ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS AND BE MAINTAINED FOR THE DURATION OF THE PROJECT.
5. PERIMETER CONTROLS INCLUDING SILT FENCES, MULCH BERM, SILT SOCK, AND/OR HAY BALE BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT UNTIL NON-PAVED AREAS HAVE BEEN STABILIZED.
6. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
7. ALL DISTURBED AREAS NOT OTHERWISE BEING TREATED SHALL RECEIVE 6" LOAM, SEED AND FERTILIZER.
8. INSPECT ALL INLET PROTECTION AND PERIMETER CONTROLS WEEKLY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
9. CONSTRUCT EROSION CONTROL BLANKETS ON ALL SLOPES STEEPER THAN 3:1.

STABILIZATION:
1. AN AREA SHALL BE CONSIDERED STABLE WHEN 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 AS STONE OR RIPRAP HAS BEEN INSTALLED;
   D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.;
   E. IN AREAS TO BE PAVED, "STABLE" MEANS THAT BASE COURSE GRAVELS MEETING THE REQUIREMENTS OF NHDOT STANDARD FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM 304.2 HAVE BEEN INSTALLED.
2. WINTER STABILIZATION PRACTICES:
   A. 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 EROSION CONTROL BLANKETS 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;
   B. 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;
   C. AFTER NOVEMBER 15, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT;
3. STABILIZATION SHALL BE INITIATED ON ALL LOAM STOCKPILES, AND DISTURBED AREAS, WHERE CONSTRUCTION ACTIVITY SHALL NOT OCCUR FOR MORE THAN TWENTY-ONE (21) CALENDAR DAYS BY THE FOURTEENTH (14TH) DAY AFTER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED IN THAT AREA. STABILIZATION MEASURES TO BE USED INCLUDE:
   A. TEMPORARY SEEDING;
   B. MULCHING.
4. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
5. WHEN CONSTRUCTION ACTIVITY PERMANENTLY OR TEMPORARILY CEASES WITHIN 100 FEET OF NEARBY SURFACE WATERS OR DELINEATED WETLANDS, THE AREA SHALL BE STABILIZED WITHIN SEVEN (7) DAYS OR PRIOR TO A RAIN EVENT. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN THESE AREAS, SILT FENCES, MULCH BERMS, HAY BALE BARRIERS AND ANY EARTH/DIKES SHALL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED.
6. DURING CONSTRUCTION, RUNOFF WILL BE DIVERTED AROUND THE SITE WITH EARTH DIKES, PIPING OR STABILIZED CHANNELS WHERE POSSIBLE. SHEET RUNOFF FROM THE SITE WILL BE FILTERED THROUGH SILT FENCES, MULCH BERMS, HAY BALE BARRIERS, OR SILT SOCKS. ALL STORM DRAIN BASIN INLETS SHALL BE PROVIDED WITH FLARED END SECTIONS AND TRASH RACKS. THE SITE SHALL BE STABILIZED FOR THE WINTER BY NOVEMBER 15.

DUST CONTROL:
1. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST THROUGHOUT THE CONSTRUCTION PERIOD.
2. DUST CONTROL METHODS SHALL INCLUDE, BUT BE NOT LIMITED TO SPRINKLING WATER ON EXPOSED AREAS, COVERING LOADED DUMP TRUCKS LEAVING THE SITE, AND TEMPORARY MULCHING.
3. DUST CONTROL MEASURES SHALL BE UTILIZED SO AS TO PREVENT THE MIGRATION OF DUST FROM THE SITE TO ABUTTING AREAS.

STOCKPILES:
1. LOCATE STOCKPILES A MINIMUM OF 50 FEET AWAY FROM CATCH BASINS, SWALES, AND CULVERTS.
2. ALL STOCKPILES SHOULD BE SURROUNDED WITH TEMPORARY EROSION CONTROL MEASURES PRIOR TO THE ONSET OF PRECIPITATION.
3. PERIMETER BARRIERS SHOULD BE MAINTAINED AT ALL TIMES, AND ADJUSTED AS NEEDED TO ACCOMMODATE THE DELIVERY AND REMOVAL OF MATERIALS FROM THE STOCKPILE. THE INTEGRITY OF THE BARRIER SHOULD BE INSPECTED AT THE END OF EACH WORKING DAY.
4. PROTECT ALL STOCKPILES FROM STORMWATER RUN-OFF USING TEMPORARY EROSION CONTROL MEASURES SUCH AS BERMS, SILT SOCK, OR OTHER APPROVED PRACTICE TO PREVENT MIGRATION OF MATERIAL BEYOND THE IMMEDIATE CONFINES OF THE STOCKPILES.

OFF SITE VEHICLE TRACKING:
1. THE CONTRACTOR SHALL CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE(S) PRIOR TO ANY EXCAVATION ACTIVITIES.

VEGETATION:
1. TEMPORARY GRASS COVER:
   A. SEEDBED PREPARATION:
      a. APPLY FERTILIZER AT THE RATE OF 600 POUNDS PER ACRE OF 10-10-10. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF THREE (3) TONS PER ACRE;
   B. SEEDING:
      a. UTILIZE ANNUAL RYE GRASS AT A RATE OF 40 LBS/ACRE;
      b. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF TWO (2) INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED;
      c. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER). HYDROSEEDINGS, WHICH INCLUDE MULCH, MAY BE LEFT ON SOIL SURFACE. SEEDING RATES MUST BE INCREASED 10% WHEN HYDROSEEDING;
   C. MAINTENANCE:
      a. TEMPORARY SEEDING SHALL BE PERIODICALLY INSPECTED. AT A MINIMUM, 95% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER BARRIERS, CHECK DAMS, ETC.).
2. VEGETATIVE PRACTICE:
   A. FOR PERMANENT MEASURES AND PLANTINGS:
      a. LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF THREE (3) TONS PER ACRE IN ORDER TO PROVIDE A PH VALUE OF 5.5 TO 6.5;
      b. FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 800 POUNDS PER ACRE OF 10-20-20 FERTILIZER;
      c. SOIL CONDITIONERS AND FERTILIZER SHALL BE APPLIED AT THE RECOMMENDED RATES AND SHALL BE THOROUGHLY WORKED INTO THE LOAM. LOAM SHALL BE RAKED UNTIL THE SURFACE IS FINELY PULVERIZED, SMOOTH AND EVEN, AND THEN COMPACTED TO AN EVEN SURFACE CONFORMING TO THE REQUIRED LINES AND GRADES WITH APPROVED ROLLERS WEIGHING BETWEEN 4-1/2 POUNDS AND 5-1/2 POUNDS PER INCH OF WIDTH;
      d. SEED SHALL BE SOWN AT THE RATE SHOWN BELOW. SOWING SHALL BE DONE ON A CALM, DRY DAY, PREFERABLY BY MACHINE, BUT IF BY HAND, ONLY BY EXPERIENCED WORKMEN. IMMEDIATELY BEFORE SEEDING, THE SOIL SHALL BE LIGHTLY RAKED. ONE HALF THE SEED SHALL BE SOWN IN ONE DIRECTION AND THE OTHER HALF AT RIGHT ANGLES TO THE ORIGINAL DIRECTION. IT SHALL BE LIGHTLY RAKED INTO THE SOIL TO A DEPTH NOT OVER 1/4 INCH AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH;
      e. HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AS INDICATED ABOVE;
      f. THE SURFACE SHALL BE WATERED AND KEPT MOIST WITH A FINE SPRAY AS REQUIRED, WITHOUT WASHING AWAY THE SOIL, UNTIL THE GRASS IS WELL ESTABLISHED. ANY AREAS WHICH ARE NOT SATISFACTORILY COVERED WITH GRASS SHALL BE RESEEDED, AND ALL NOXIOUS WEEDS REMOVED;
      g. THE CONTRACTOR SHALL PROTECT AND MAINTAIN THE SEEDED AREAS UNTIL ACCEPTED;
      h. A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE APPLIED AT A RATE OF 40 LB/AC OR APPROVED EUQAL:

SEED MIX	APPLICATION RATE
"REBEL II" TALL FESCUE	70%
"PALMER" PERENNIAL RYEGRASS	20%
"BARON" KENTUCKEY BLUEGRASS	10%

IN NO CASE SHALL THE WEED CONTENT EXCEED ONE (1) PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH STATE AND FEDERAL SEED LAWS. SEEDING SHALL BE DONE NO LATER THAN SEPTEMBER 15. IN NO CASE SHALL SEEDING TAKE PLACE OVER SNOW.

3. DORMANT SEEDING (SEPTEMBER 15 TO FIRST SNOWFALL):
   A. FOLLOW PERMANENT MEASURES SLOPE, LIME, FERTILIZER AND GRADING REQUIREMENTS. APPLY SEED MIXTURE AT TWICE THE INDICATED RATE. APPLY MULCH AS INDICATED FOR PERMANENT MEASURES.

CONCRETE WASHOUT AREA:
1. THE CONCRETE DELIVERY TRUCKS SHALL, WHENEVER POSSIBLE, USE WASHOUT FACILITIES AT THEIR OWN PLANT OR DISPATCH FACILITY;
2. IF IT IS NECESSARY, SITE CONTRACTOR SHALL DESIGNATE SPECIFIC WASHOUT AREAS AND DESIGN FACILITIES TO HANDLE ANTICIPATED WASHOUT WATER;
3. CONTRACTOR SHALL LOCATE WASHOUT AREAS AT LEAST 150 FEET AWAY FROM STORM DRAINS, SWALES AND SURFACE WATERS OR DELINEATED WETLANDS;
4. INSPECT WASHOUT FACILITIES DAILY TO DETECT LEAKS OR TEARS AND TO IDENTIFY WHEN MATERIALS NEED TO BE REMOVED.

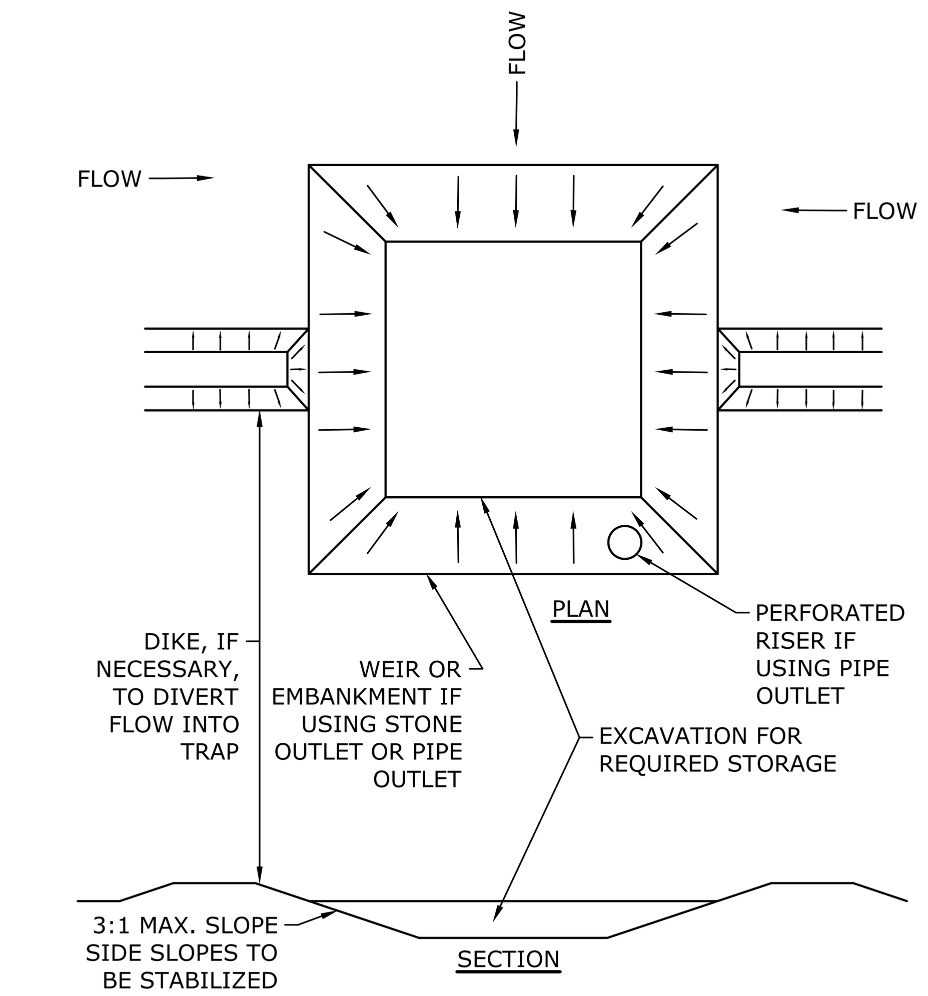
ALLOWABLE NON-STORMWATER DISCHARGES:
1. THE FOLLOWING ARE THE ONLY NON-STORMWATER DISCHARGES ALLOWED. ALL OTHER NON-STORMWATER DISCHARGES ARE PROHIBITED ON SITE:
   A. FIRE-FIGHTING ACTIVITIES;
   B. FIRE HYDRANT FLUSHING;
   C. WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED;
   D. WATER USED TO CONTROL DUST;
   E. POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHING;
   F. ROUTINE EXTERNAL BUILDING WASH DOWN WHERE DETERGENTS ARE NOT USED;
   G. PAVEMENT WASH WATERS WHERE DETERGENTS ARE NOT USED;
   H. UNCONTAMINATED AIR CONDITIONING/COMPRESSOR CONDENSATION;
   I. UNCONTAMINATED GROUND WATER OR SPRING WATER;
   J. FOUNDATION OR FOOTING DRAINS WHICH ARE UNCONTAMINATED;
   K. LANDSCAPE IRRIGATION.

WASTE DISPOSAL:
1. WASTE MATERIAL:
   A. ALL WASTE MATERIALS SHALL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE SHALL BE DEPOSITED IN A DUMPSTER;
   B. NO CONSTRUCTION WASTE MATERIALS SHALL BE BURIED ON SITE;
   C. ALL PERSONNEL SHALL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
2. HAZARDOUS WASTE:
   A. ALL HAZARDOUS WASTE MATERIALS SHALL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER;
   B. SITE PERSONNEL SHALL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
3. SANITARY WASTE:
   A. ALL SANITARY WASTE SHALL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

SPILL PREVENTION:
1. CONTRACTOR SHALL BE FAMILIAR WITH SPILL PREVENTION MEASURES REQUIRED BY LOCAL, STATE AND FEDERAL AGENCIES. AT A MINIMUM, CONTRACTOR SHALL FOLLOW THE BEST MANAGEMENT SPILL PREVENTION PRACTICES OUTLINED BELOW.
2. THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:
   A. GOOD HOUSEKEEPING - THE FOLLOWING GOOD HOUSEKEEPING PRACTICE SHALL BE FOLLOWED ON SITE DURING CONSTRUCTION:
      a. ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB SHALL BE STORED ON SITE;
      b. ALL MATERIALS STORED ON SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE;
      c. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED;
      d. THE SITE SUPERINTENDENT SHALL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS;
      e. SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER;
      f. WHENEVER POSSIBLE ALL OF A PRODUCT SHALL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
   B. HAZARDOUS PRODUCTS - THE FOLLOWING PRACTICES SHALL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
      g. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE;
      h. ORIGINAL LABELS AND MATERIAL SAFETY DATA SHALL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION;
      i. SURPLUS PRODUCT THAT MUST BE DISPOSED OF SHALL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.
   C. PRODUCT SPECIFIC PRACTICES - THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ON SITE:
      a. PETROLEUM PRODUCTS:
         - ALL ON SITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE LEAKAGE;
         - PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
      b. FERTILIZERS:
         - FERTILIZERS USED SHALL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS;
         - ONCE APPLIED FERTILIZER SHALL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER;
         - STORAGE SHALL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER SHALL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
      c. PAINTS:
         - ALL CONTAINERS SHALL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE;
         - EXCESS PAINT SHALL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM;
         - EXCESS PAINT SHALL BE DISPOSED OF PROPERLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
   D. SPILL CONTROL PRACTICES - IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION, THE FOLLOWING PRACTICES SHALL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
      a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED AND SITE PERSONNEL SHALL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES;
      b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS SHALL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE;
      c. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY;
      d. THE SPILL AREA SHALL BE KEPT WELL VENTILATED AND PERSONNEL SHALL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE;
      e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL SHALL BE REPORTED TO THE APPROPRIATE LOCAL, STATE OR FEDERAL AGENCIES AS REQUIRED;
      f. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS SHALL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.
   E. VEHICLE FUELING AND MAINTENANCE PRACTICE:
      a. CONTRACTOR SHALL MAKE AN EFFORT TO PERFORM EQUIPTMENT/VEHICAL FUELING AND MAINTENANCE AT AN OFF-SITE FACILITY;
      b. CONTRACTOR SHALL PROVIDE AN ON-SITE FUELING AND MAINTENANCE AREA THAT IS CLEAN AND DRY;
      c. IF POSSIBLE THE CONTRACTOR SHALL KEEP AREA COVERED;
      d. CONTRACTOR SHALL KEEP A SPILL KIT AT THE FUELING AND MAINTENANCE AREA;
      e. CONTRACTOR SHALL REGULARLY INSPECT VEHICLES FOR LEAKS AND DAMAGE;
      f. CONTRACTOR SHALL USE DRIP PANS, DRIP CLOTHS, OR ABSORBENT PADS WHEN REPLACING SPENT FLUID.

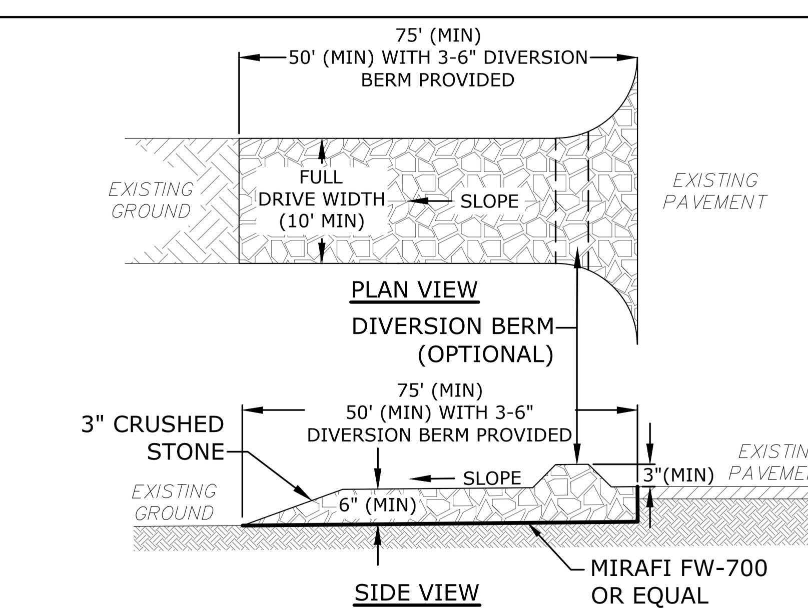
EROSION CONTROL OBSERVATIONS AND MAINTENANCE PRACTICES
THIS PROJECT EXCEEDS ONE (1) ACRE OF DISTURBANCE AND THUS REQUIRES A SWPPP. THE SWPPP SHALL BE PREPARED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE FAMILIAR WITH THE SWPPP AND KEEP AN UPDATED COPY OF THE SWPPP ONSITE AT ALL TIMES.

THE FOLLOWING REPRESENTS THE GENERAL OBSERVATION AND REPORTING PRACTICES THAT SHALL BE FOLLOWED AS PART OF THIS PROJECT:
1. OBSERVATIONS OF THE PROJECT FOR COMPLIANCE WITH THE SWPPP SHALL BE MADE BY THE CONTRACTOR AT LEAST ONCE A WEEK OR WITHIN 24 HOURS OF A STORM 0.25 INCHES OR GREATER;
2. AN OBSERVATION REPORT SHALL BE MADE AFTER EACH OBSERVATION AND DISTRIBUTED TO THE ENGINEER, THE OWNER, AND THE CONTRACTOR;
3. A REPRESENTATIVE OF THE SITE CONTRACTOR, SHALL BE RESPONSIBLE FOR MAINTENANCE AND REPAIR ACTIVITIES;
4. IF A REPAIR IS NECESSARY, IT SHALL BE INITIATED WITHIN 24 HOURS OF REPORT.



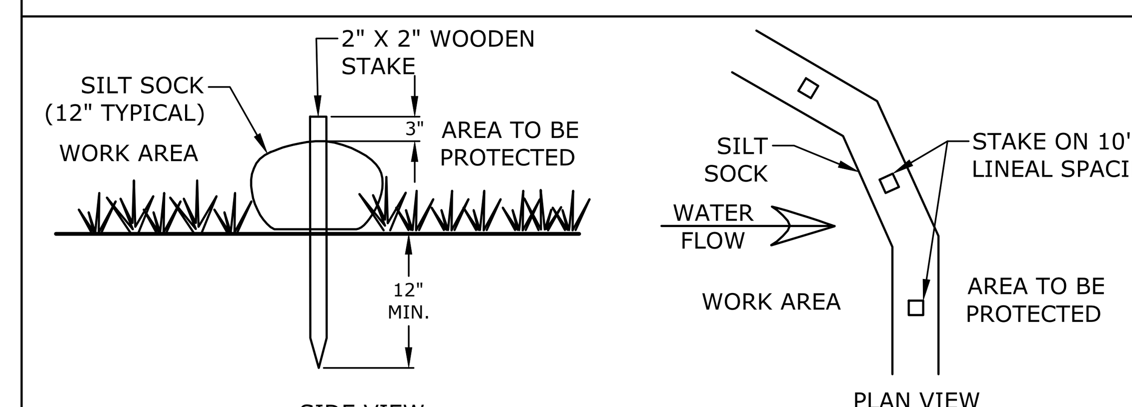
NOTES:
1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA AS POSSIBLE.
2. THE MAXIMUM CONTRIBUTING AREA TO A SINGLE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. TRAP OUTLET SHALL BE MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP.
5. TRAP SHALL DISCHARGE TO A STABILIZED AREA.
6. TRAP SHALL BE CLEANED WHEN 50 PERCENT OF THE ORIGINAL VOLUME IS FILLED.
7. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

SEDIMENT TRAP
NO SCALE



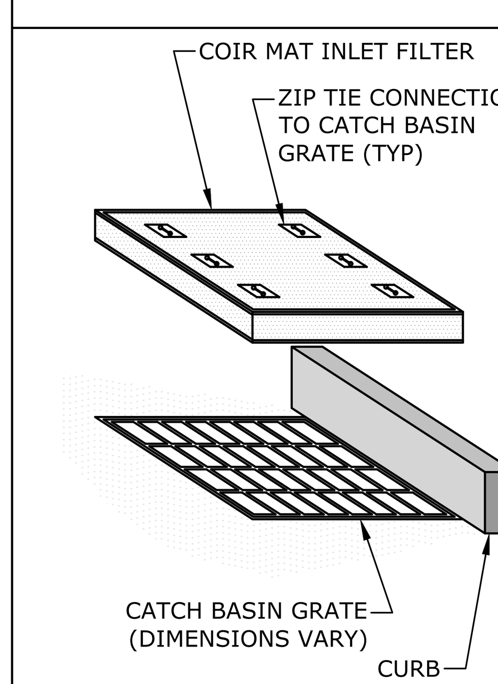
NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT FROM THE SITE. WHEN WASHING IS REQUIRED, IT SHALL BE DONE SO RUNOFF DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS

STABILIZED CONSTRUCTION ENTRANCE
NO SCALE



NOTES:
1. SILT SOCK SHALL BE SILT SOXX NATURAL ORIGINAL BY FILTREXX OR APPROVED EQUAL.
2. INSTALL SILT SOCK IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

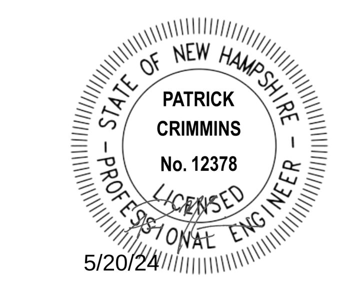
SILT SOCK
NO SCALE

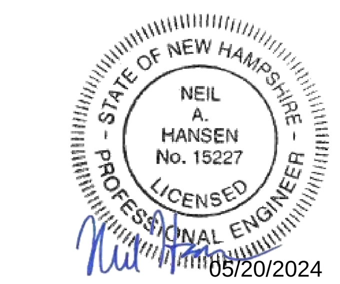


NOTES:
1. COIR MAT INLET FILTER SHALL BE STORM WATER INLET FILTER BY BLOCKSOM & CO. OR APPROVED EQUAL.
2. INSTALL AND MAINTAIN INLET PROTECTION IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

INLET PROTECTION
NO SCALE

Tighe&Bond





Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

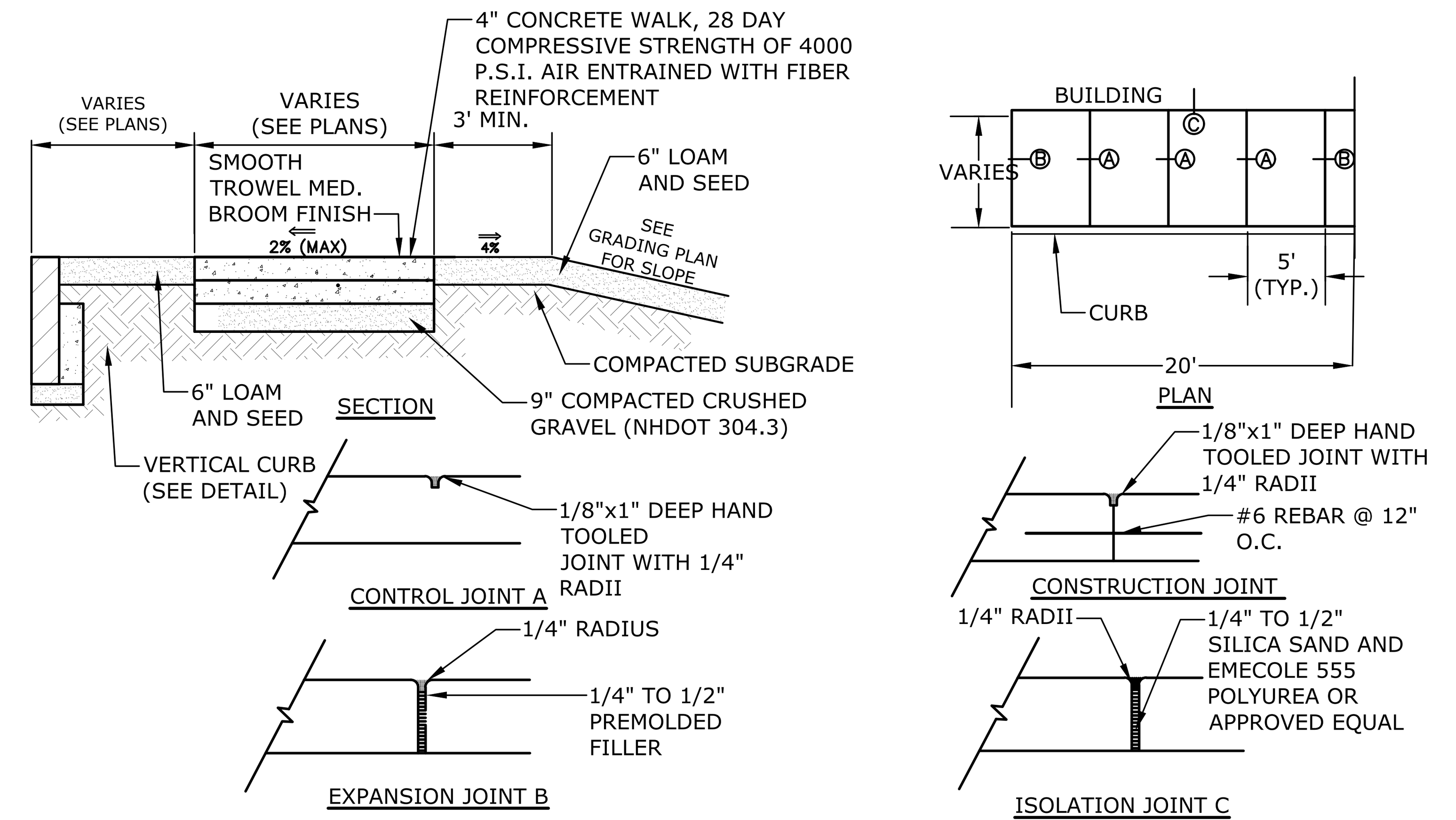
MARK	DATE	DESCRIPTION
Q	3/4/2024	Amended Site Plan Review
P	1/29/2024	Ph2 Updated Drainage
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid
J	5/23/2022	Third Party Rev. Comments

PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026C-C-DTLS.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

EROSION CONTROL NOTES & DETAILS SHEET

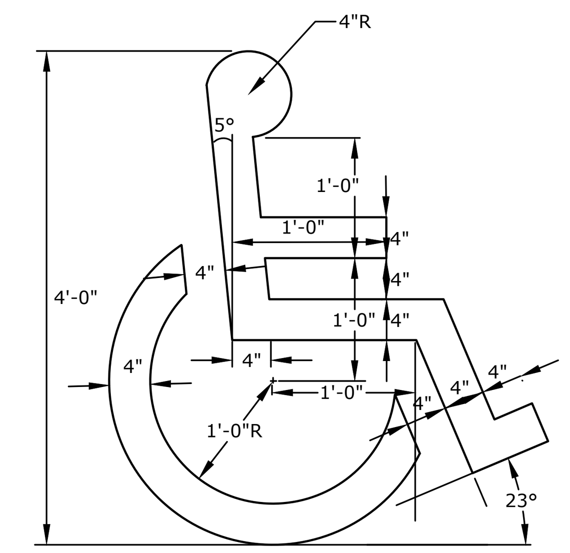
SCALE: AS SHOWN

C-501



CONCRETE SIDEWALK WITH GRANITE CURB ALONG CORPORATE DRIVE

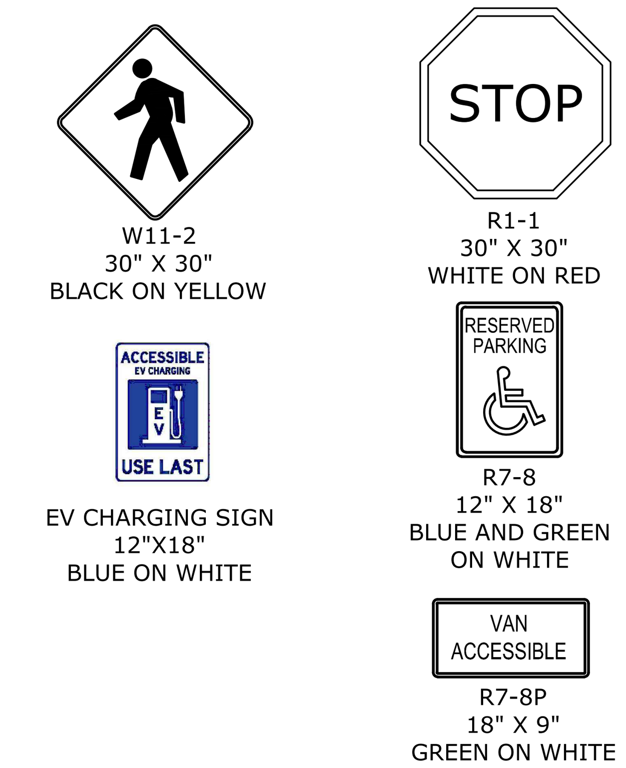
NO SCALE

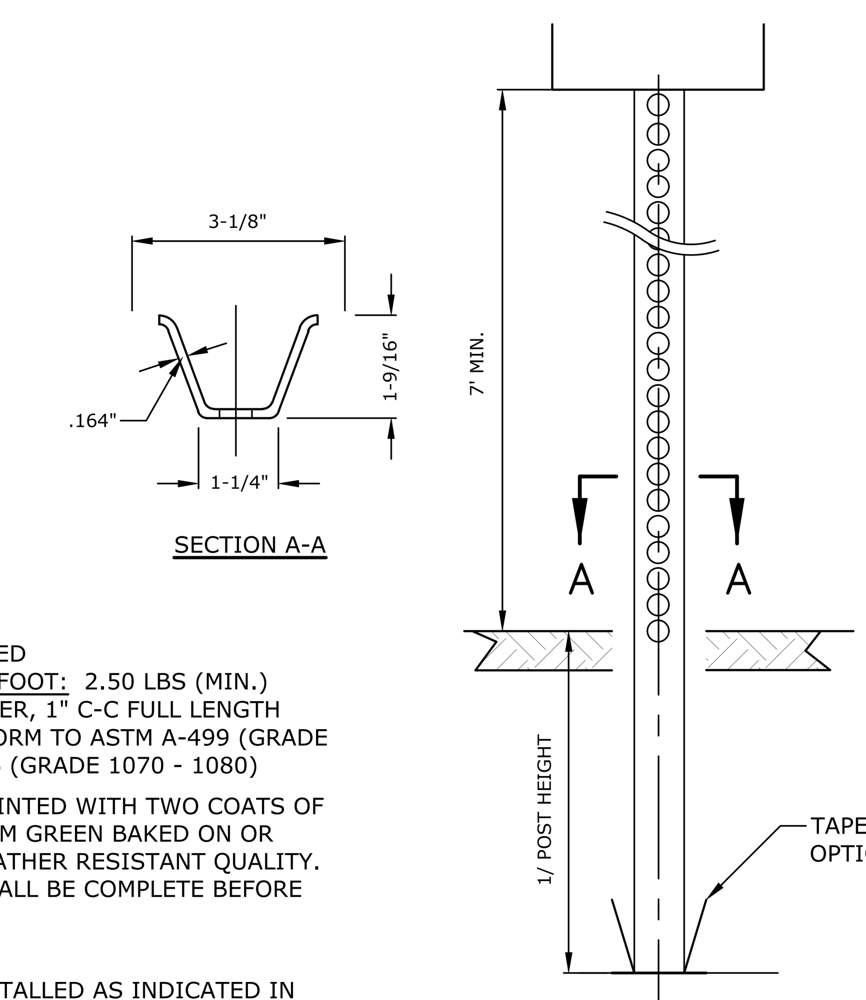


NOTES:
1. SYMBOL SHALL BE CONSTRUCTED IN ALL ACCESSIBLE SPACES USING WHITE THERMOPLASTIC, REFLECTORIZED PAVEMENT PARKING MATERAL MEETING THE REQUIREMENTS OF ASTM D 4505.
2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST ADA, STATE AND LOCAL REQUIREMENTS.

ACCESSIBLE SYMBOL

NO SCALE





LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 3/8" DIAMETER, 1" C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASSTM A-576 (GRADE 1070 - 1080)

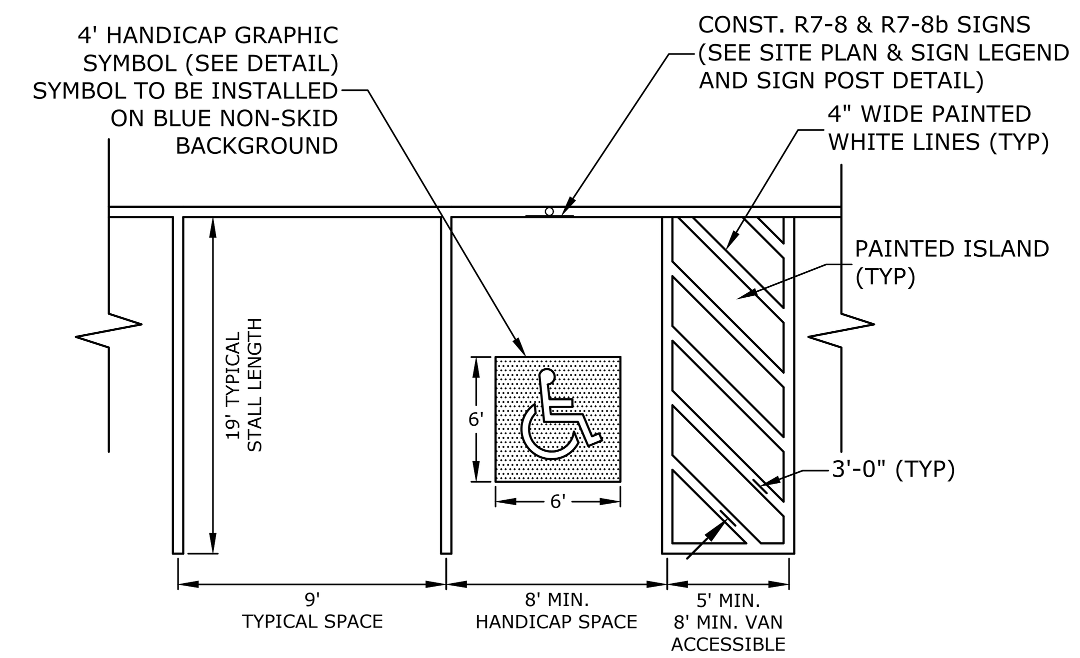
FINISH: SHALL BE PAINTED WITH TWO COATS OF AN APPROVED MEDIUM GREEN BAKED ON OR DRIED, PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.

NOTE:
ALL SIGNS TO BE INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.

* IN LEDGE DRILL & GROUT TO A MIN OF 2'

SIGN LEGEND & SIGN POST

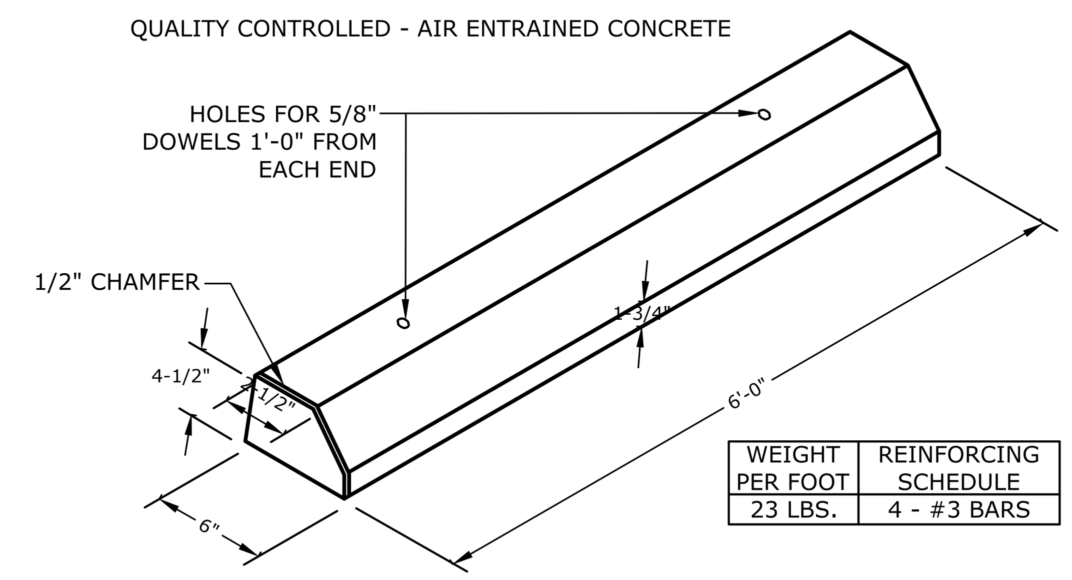
NO SCALE



NOTE:
1. ALL PAINT SHALL BE FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOLS & PARKING STALLS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
3. FINISH PAVEMENT GRADES AT ALL HANDICAP ACCESSIBLE STALLS AND PAINTED ACCESS AISLES SHALL NOT EXCEED 2% IN ANY DIRECTION.

STALL STRIPING-SINGLE STRIPE

NO SCALE

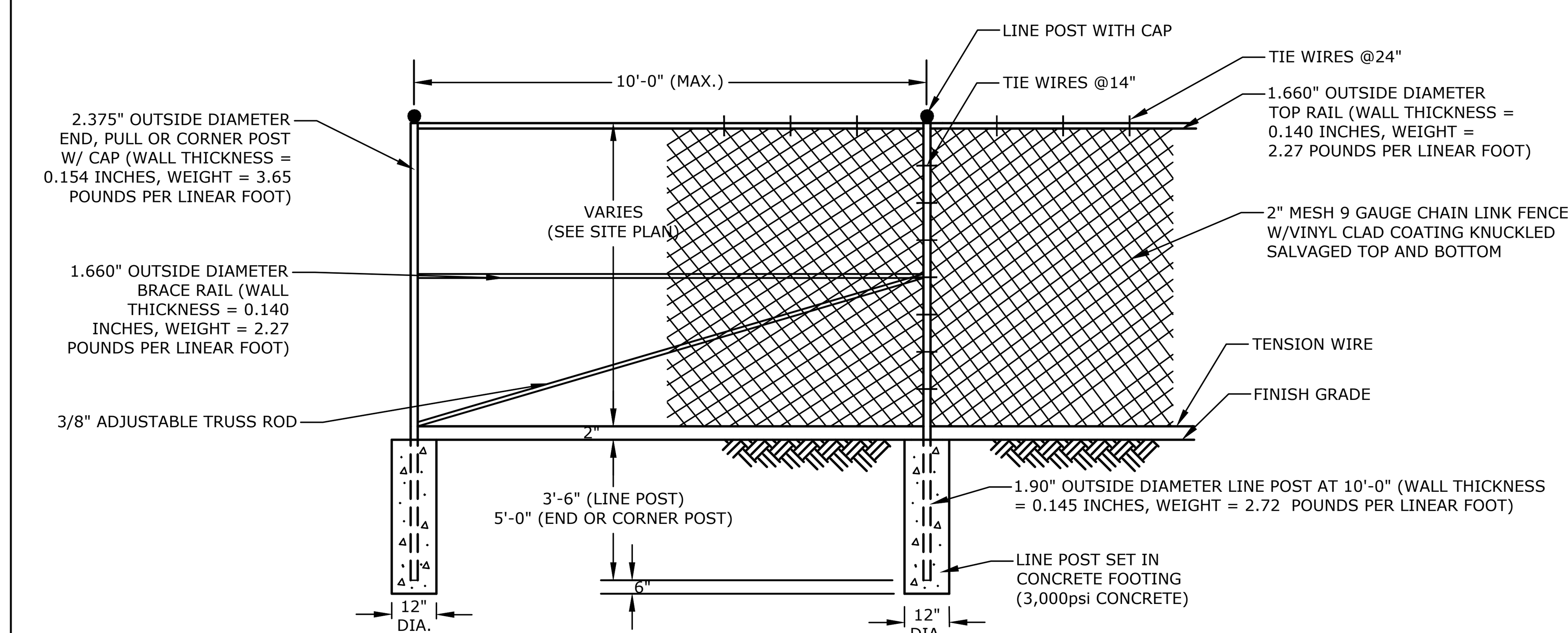


WEIGHT PER FOOT	REINFORCING SCHEDULE
23 LBS.	4 - #3 BARS

NOTE:
1. CURBING TO BE PINNED THROUGH ASPHALT PAVEMENT.

CONCRETE WHEEL STOP

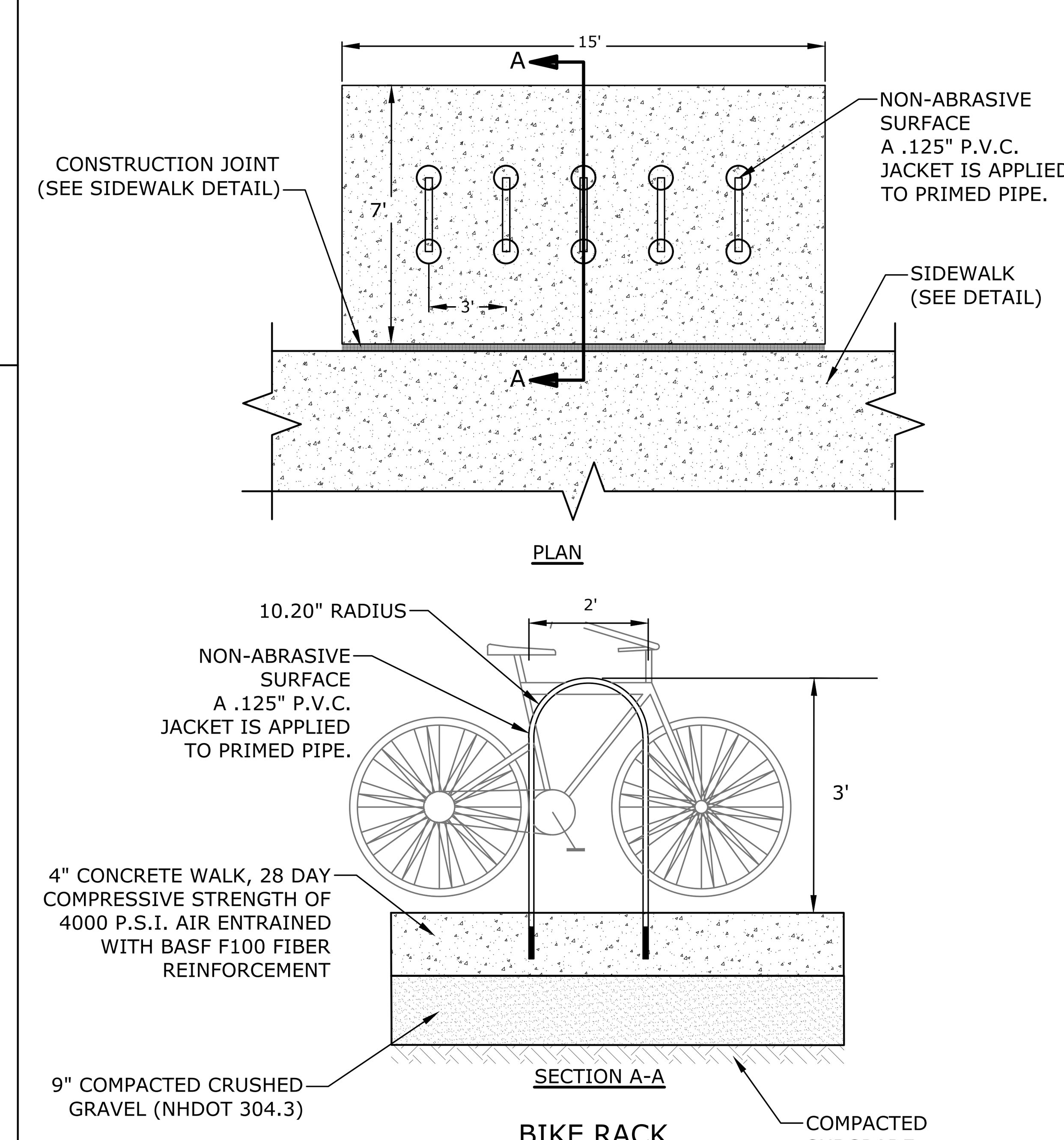
NO SCALE



NOTES:
1. CORNER POSTS SHALL BE USED AT SHARP BREAKS IN GRADE AND CHANGES IN HORIZONTAL ALIGNMENT OF 15' OR MORE.
2. POSTS, RAILS & BRACES SHALL BE TYPE I, SCHEDULE 40 BLACK VINYL COATED PIPE.
3. FABRIC TO BE BLACK VINYL COATED.
4. TIE WIRES SHALL BE 9 GAUGE GALVANIZED STEEL WIRE FOR ATTACHMENT OF FABRIC TO LINE POSTS.
5. TIE WIRES SHALL BE 13 GAUGE GALVANIZED STEEL WIRE FOR ATTACHMENT OF FABRIC TO RAILS AND BRACES.
6. HOG RING TIES SHALL BE 12- 1/2 GAUGE GALVANIZED STEEL WIRE FOR ATTACHMENT OF FABRIC TO TENSION WIRE.
7. COORDINATE FINAL CHAIN LINK FENCE DESIGN WITH BUILDING DRAWINGS AND UTILITY YARD CONCRETE SLAB DESIGN.

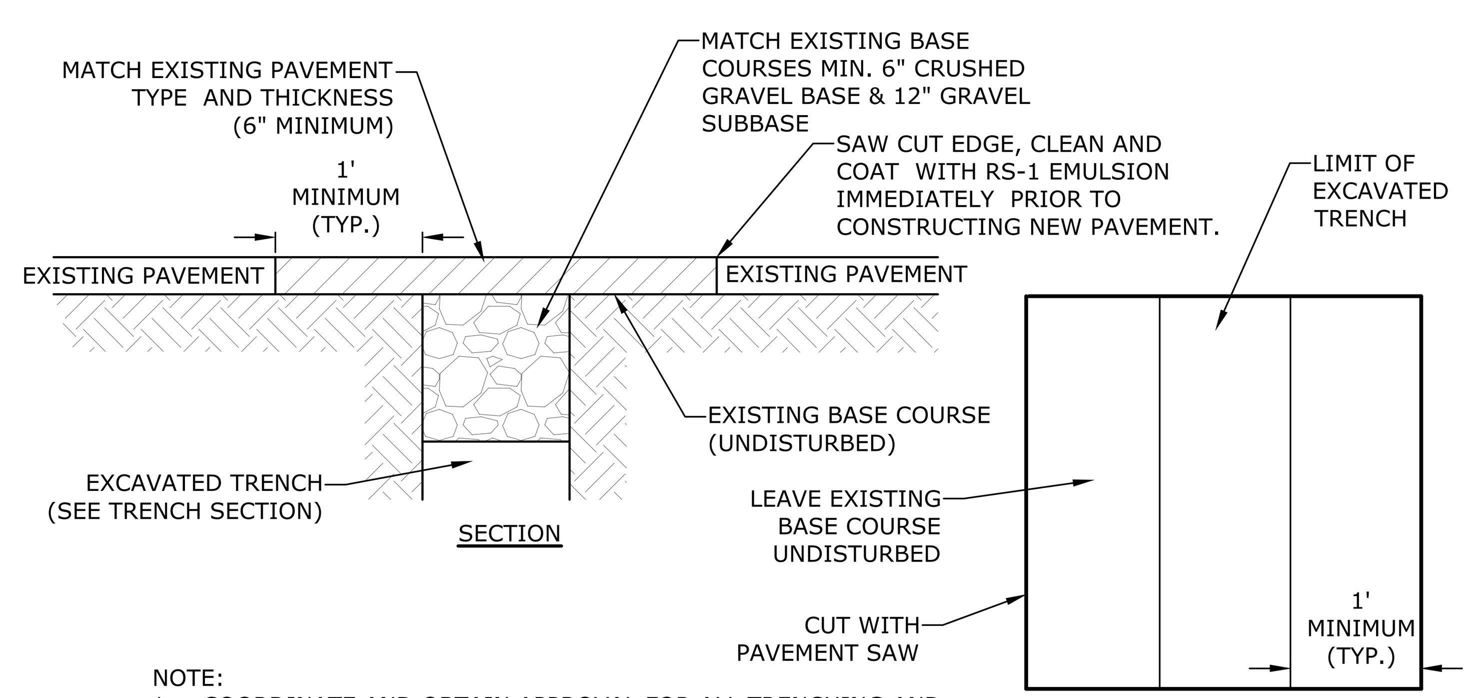
CHAIN LINK FENCE

NO SCALE



BIKE RACK

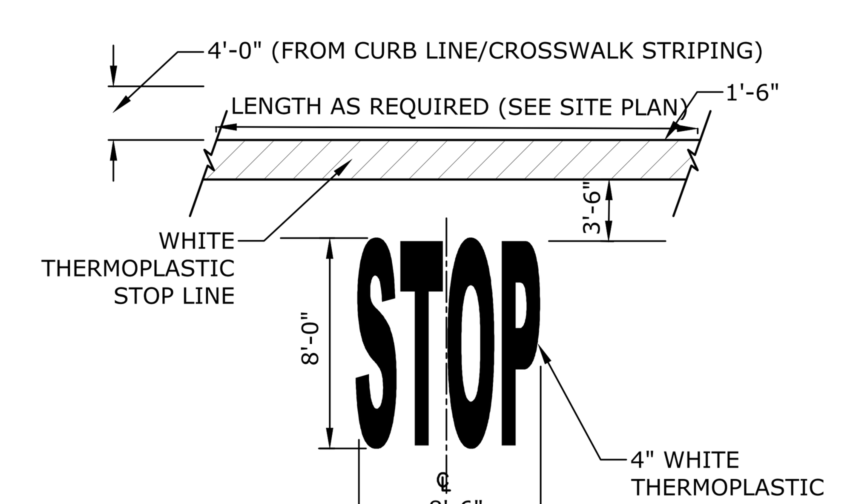
NO SCALE



NOTE:
1. COORDINATE AND OBTAIN APPROVAL FOR ALL TRENCHING AND PATCHING WITHIN CITY RIGHT OF WAY WITH CITY OF PORTSMOUTH DPW PRIOR TO COMMENCING WORK.

ROADWAY TRENCH PATCH

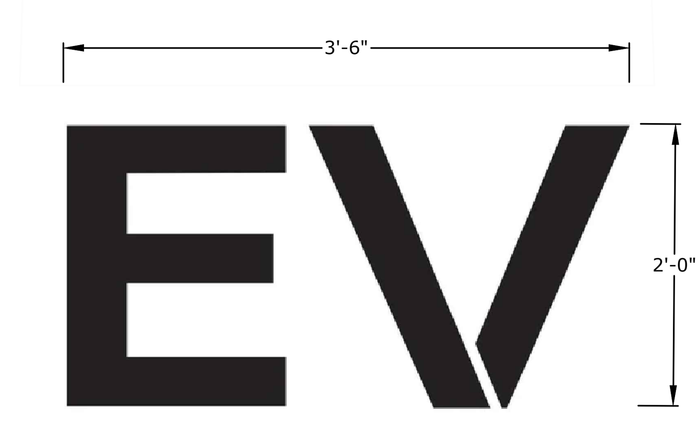
NO SCALE



NOTE:
1. PAVEMENT MARKINGS TO BE INSTALLED IN LOCATIONS AS SHOWN ON SITE PLAN.
2. STRIPING SHALL BE CONSTRUCTED USING WHITE THERMO PLASTIC, REFLECTERIZED PAVEMENT MARKING MATERIAL MEETING THE REQUIREMENTS OF ASTM D 4505

STOP BAR AND LEGEND

NO SCALE

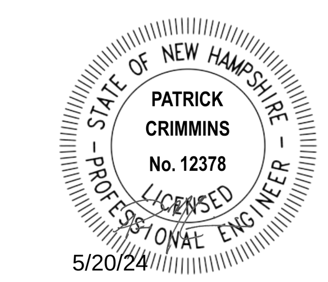


NOTES:
1. SYMBOL SHALL BE CONSTRUCTED IN ALL ELECTRIC VEHICLE SPACES USING FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST STATE AND LOCAL REQUIREMENTS.

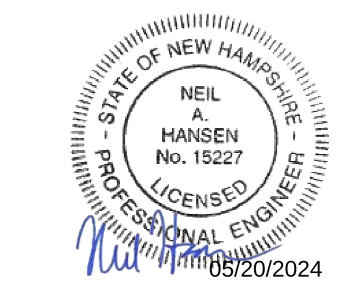
EV CHARGING SYMBOL

NO SCALE

Tighe&Bond



5/20/24



05/20/2024

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

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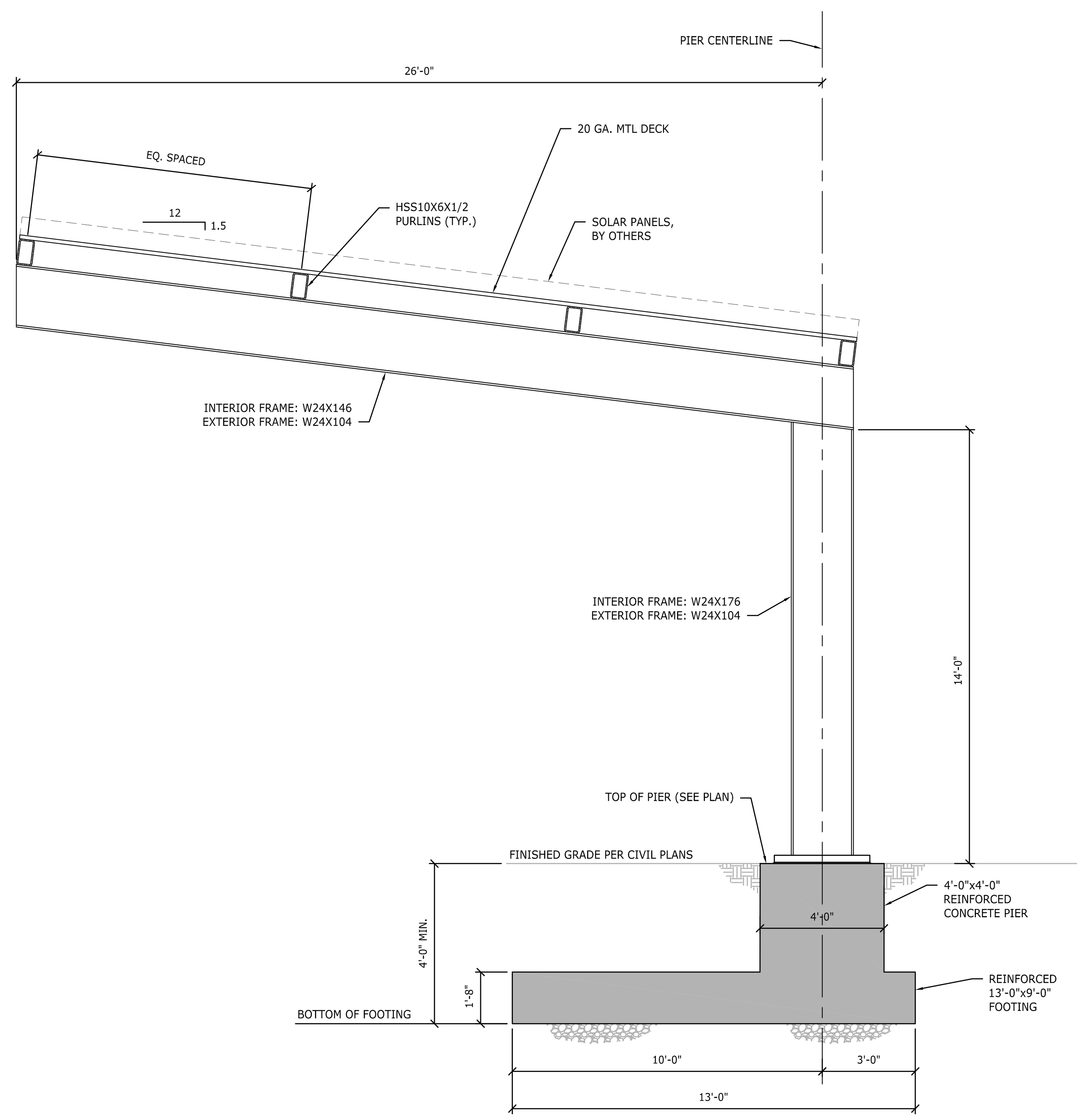
DATE:	04/03/2018
FILE: L-0700-026C-C-DTLS.dwg	
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

DETAILS SHEET

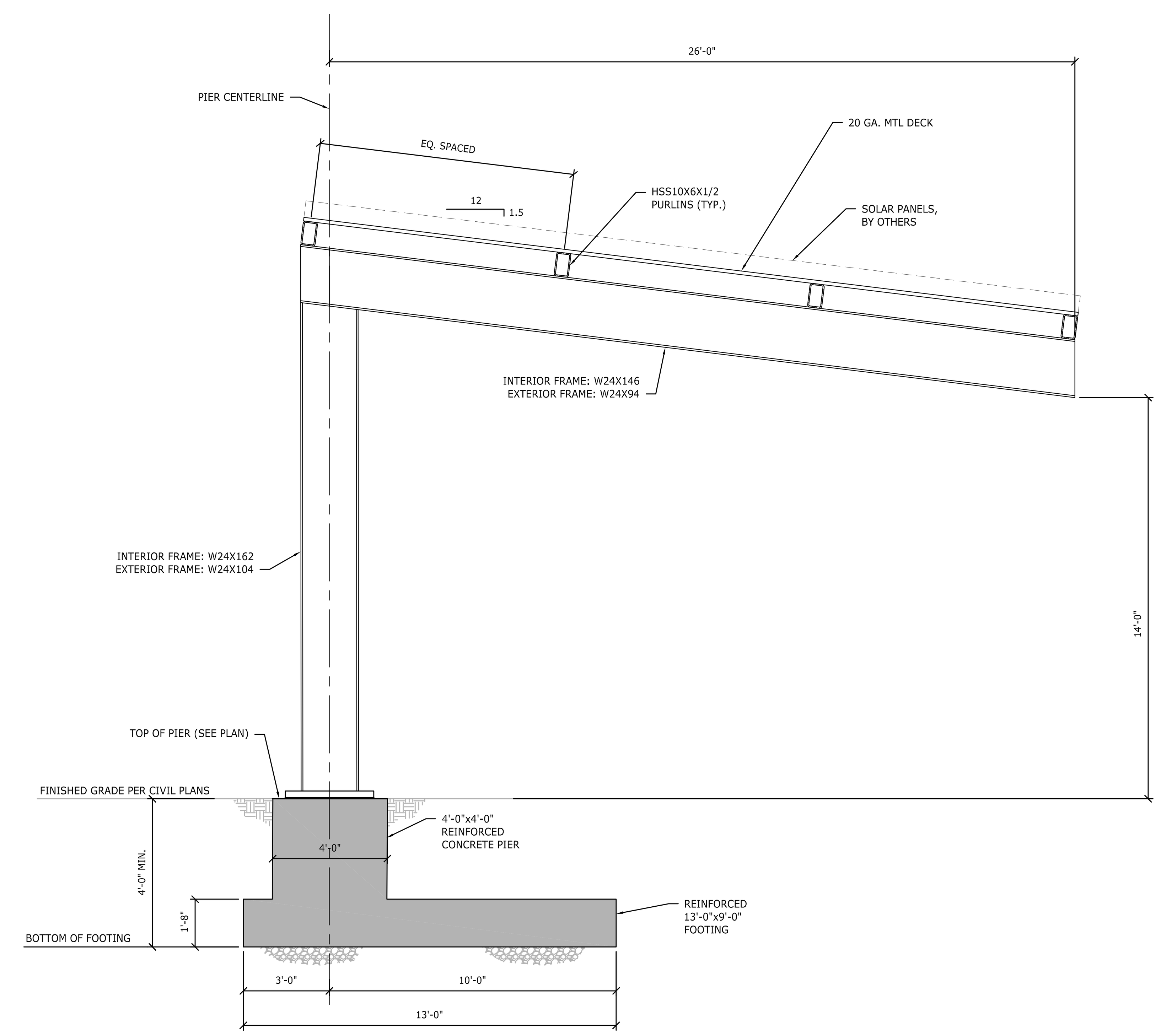
SCALE: AS SHOWN

C-503

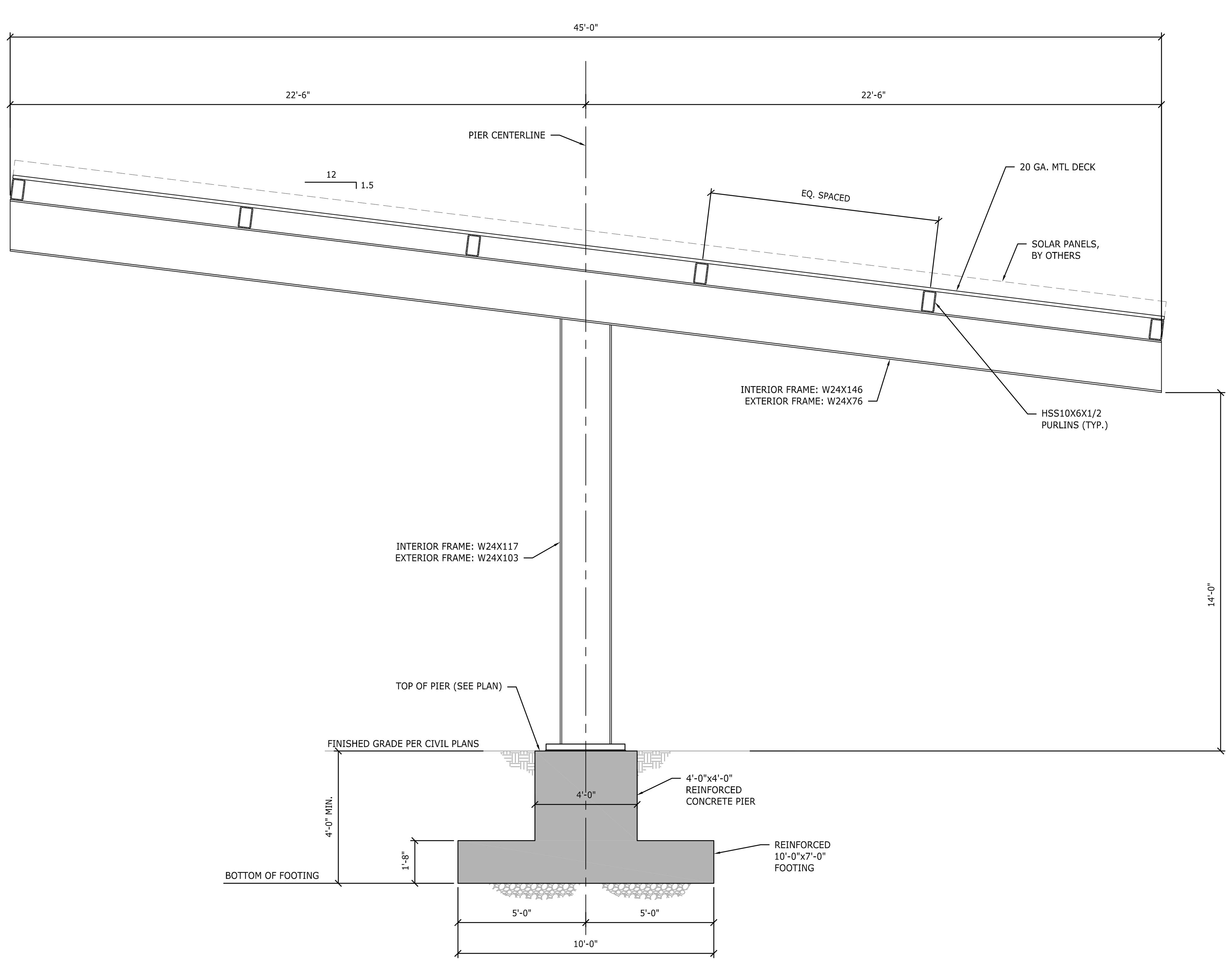
Last Save Date: March 1, 2024 11:29 AM By: CKRZCUIK
Plot Date: Friday, May 17, 2024 Plotted By: Neil A. Hansen
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576\026_Project Albacore\Drawings\AutoCAD_Solar\L-0700-026C-C-DTLS.dwg Layout Tab: C-503



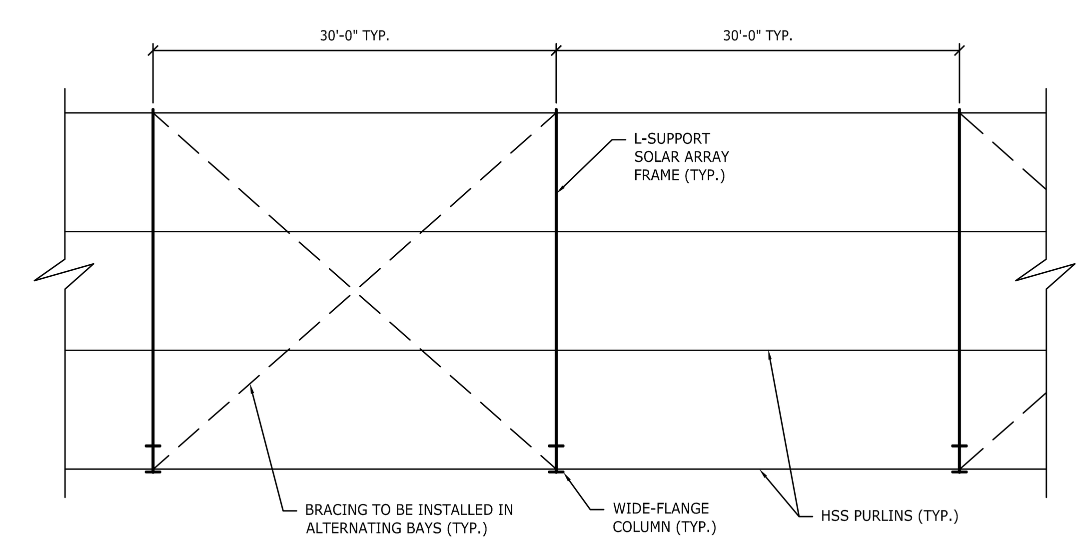
1 L-SUPPORT CANOPY FRAME SECTION - OPTION 1
8-018-3-2120 3/8" = 1'-0"



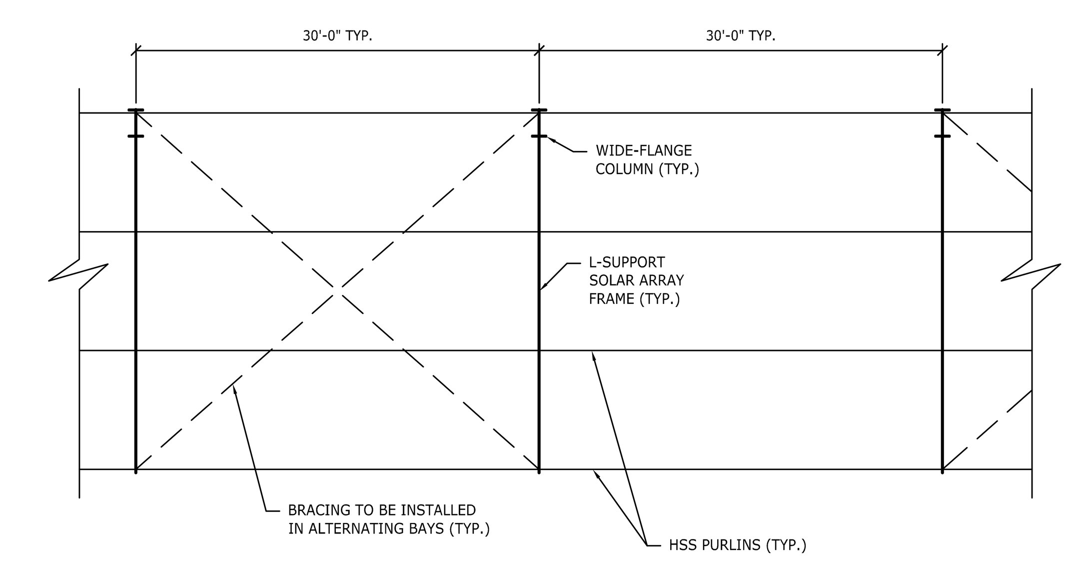
2 L-SUPPORT CANOPY FRAME SECTION - OPTION 2
8-018-3-2120 3/8" = 1'-0"



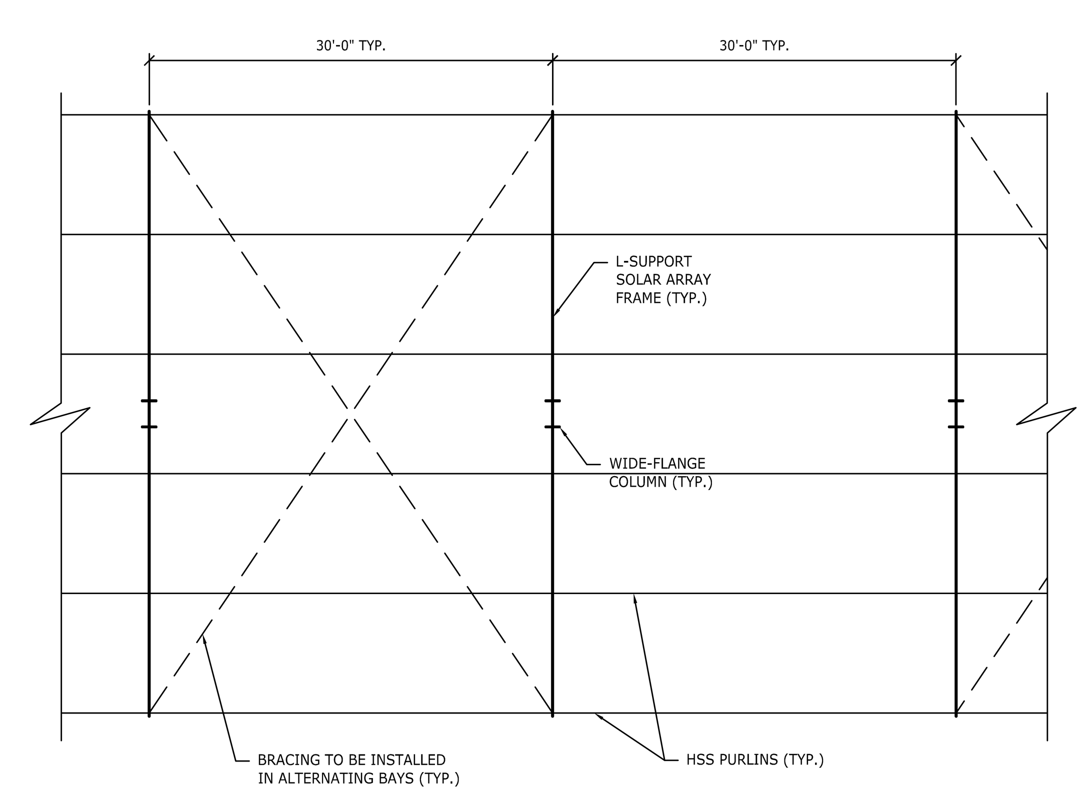
3 T-SUPPORT CANOPY FRAME SECTION
8-018-3-2120 3/8" = 1'-0"



4 L-SUPPORT CANOPY FRAME PLAN - OPTION 1
8-018-3-2120 3/8" = 1'-0"



5 L-SUPPORT CANOPY FRAME PLAN - OPTION 2
8-018-3-2120 3/8" = 1'-0"



6 T-SUPPORT CANOPY FRAME PLAN
8-018-3-2120 3/8" = 1'-0"

SOLAR CANOPY NOTES:

1. CONCEPTUAL FRAME IS DESIGNED FOR MAX SPACING OF 30'-0" O.C. BETWEEN SUPPORTS.
2. OVERALL CANOPY DIMENSIONS SHOWN ARE APPROXIMATE. NEW HSS PURLINS TO BE POSITIVELY ATTACHED ON TOP FLANGE OF CANOPY FRAMES WITH MAX SPACING OF 8'-0".
3. 20 GA. ROOF DECK AND TO BE INSTALLED SPANNING OVER PURLINS, SOLAR PANELS TO BE PROVIDED BY OTHERS.

PRELIMINARY NOT FOR CONSTRUCTION

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IPS Professional Engineers and Architects, PC

REVISION	DATE	DESCRIPTION	BY
A	23-FEB-24	PV BID ISSUE	MGM
B	20-MAY-24	PV BID ISSUE	MGM

CLIENT

LONZA

ALBACORE PROJECT

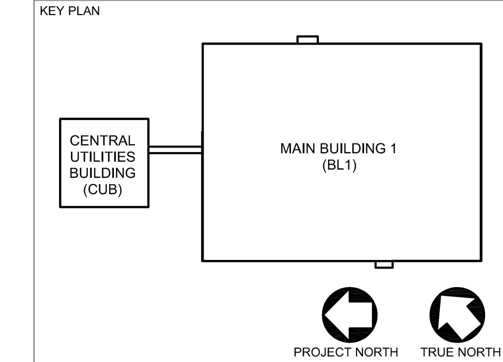
SCALE

CONFIDENTIAL

XREF FILE(S)
ENGINEER
ARCHITECT
DESIGNER

PARE

KEY PLAN



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DATE:

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T: 1 (603) 334-6100
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www.lonza.com

DRAWING TITLE

SOLAR CANOPY CONCEPT DETAILS

Tags

Drawn By	Date Drawn	Project Number	P&ID Number	DWG Filename	Revision
JDB	02-23-24	MAD23047.03			B
Checked By	Date Checked	Scale	Drawing Number		
MGM	05-20-24	AS NOTED	8-018-3-2120		

Drainage Memorandum

TO: Pease Development Authority (PDA)

FROM: Neil A. Hansen, PE
Patrick M. Crimmins, PE

COPY: Lonza Biologics

DATE: May 20, 2024

1.0 Project Description

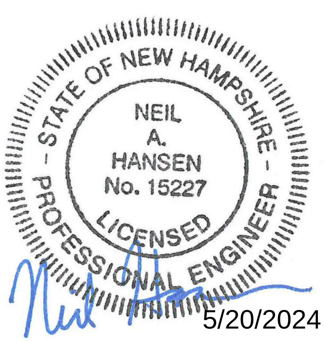
The proposed work includes the addition of Solar Canopies over the previously approved 150-space surface parking lot associated with Phase 2 of the Iron Parcel Development project. These Solar Canopies are planned to be removed along with the 150-space parking lot before the execution of the Master Plan, therefore there will be no changes to the Master Plan Drainage Design.

The Phase 2 drainage analysis has been updated and revised to include the 4′x4′ concrete footings and 8′x22′ concrete equipment pad. The proposed change includes the addition of approximately 672 SF of impervious surfaces. Although the addition of this area is very minimal in perspective to the whole watershed area (1,376,888 SF), we have prepared this technical memo to confirm that the previously approved Phase 2 drainage design and gravel wetlands are sized appropriately to accommodate this slight increase in impervious area.

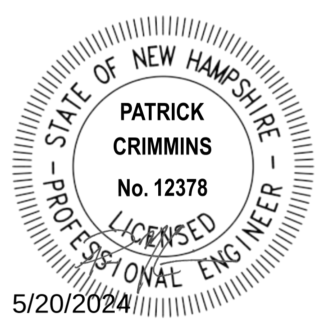
2.0 Drainage Analysis

The previously approved Phase 2 Drainage Calculation has been updated to analyze the slight increase in impervious area and can be found in Attachment A. Subcatchment 1.0 has been updated to convert 304 SF of the previously grass surface to impervious surface. This additional 304 SF is approximately 0.09% of the total impervious area (314,795 SF) for this watershed.

Subcatchment 1.1 has been updated to convert 368 SF of the previously grass surface to impervious surface. This addition of 368 SF is approximately 0.7% of the total impervious area (48,674 SF) for this watershed.



5/20/2024



5/20/2024

2.1 Peak Rate Comparisons

The following table summarizes and compares the Phase-2 2023 Approved, proposed Phase-2 2024 Amendment, and Master Plan pre- and post-development peak runoff rates for the 2-year, 10-year, 25-year and 50-year storm events at each point of analysis. These points of analysis remain unchanged from the previously prepared and approved drainage analysis.

Table 2.1 – Peak Flow Rate Comparison

Point of Analysis	Phase	Pre 1-Year Storm (cfs)	Pre/**Post** 2-Year Storm (cfs)	Pre/**Post** 10-Year Storm (cfs)	Pre/**Post** 25-Year Storm (cfs)	Pre/**Post** 50-Year Storm (cfs)
PA1	Phase 2 (2023 Approval)	16.58	24.86/**9.25**	52.70/**31.22**	76.06/**56.26**	98.56/**74.09**
	Phase 2 (2024 Amendment)	16.58	24.86/**9.25**	52.70/**31.22**	76.06/**56.26**	98.56/**74.09**
	Master	16.58	24.86/**9.41**	52.70/**39.92**	76.06/**66.14**	98.56/**83.35**
PA2	Phase 2 (2023 Approval)	3.38	4.41/**3.10**	7.49/**5.36**	9.90/**7.12**	12.13/**8.76**
	Phase 2 (2024 Amendment)	3.38	4.41/**3.10**	7.49/**5.36**	9.90/**7.12**	12.13/**8.76**
	Master	3.38	4.41/**3.72**	7.49/**5.94**	9.90/**7.66**	12.13/**9.25**

2.2 Stormwater Treatment

Runoff from the newly created impervious surfaces will be directed to either of the previously approved Gravel Wetland 1 (POND 1.0) or Gravel Wetland 2 (POND 1.1). The following sections outline the treatment capacities of both gravel wetlands.

Gravel Wetland 1

Gravel Wetland 1 has a design capacity to treat 333,950 SF of impervious area for its 462,599 SF watershed area. The proposed change is to add 304 SF of impervious surface to the previously approved 314,491 SF of impervious surface for an amended total of 314,795 SF of impervious surface. This 314,795 SF is well within the gravel wetland design capacity of 333,950 SF of impervious surface.

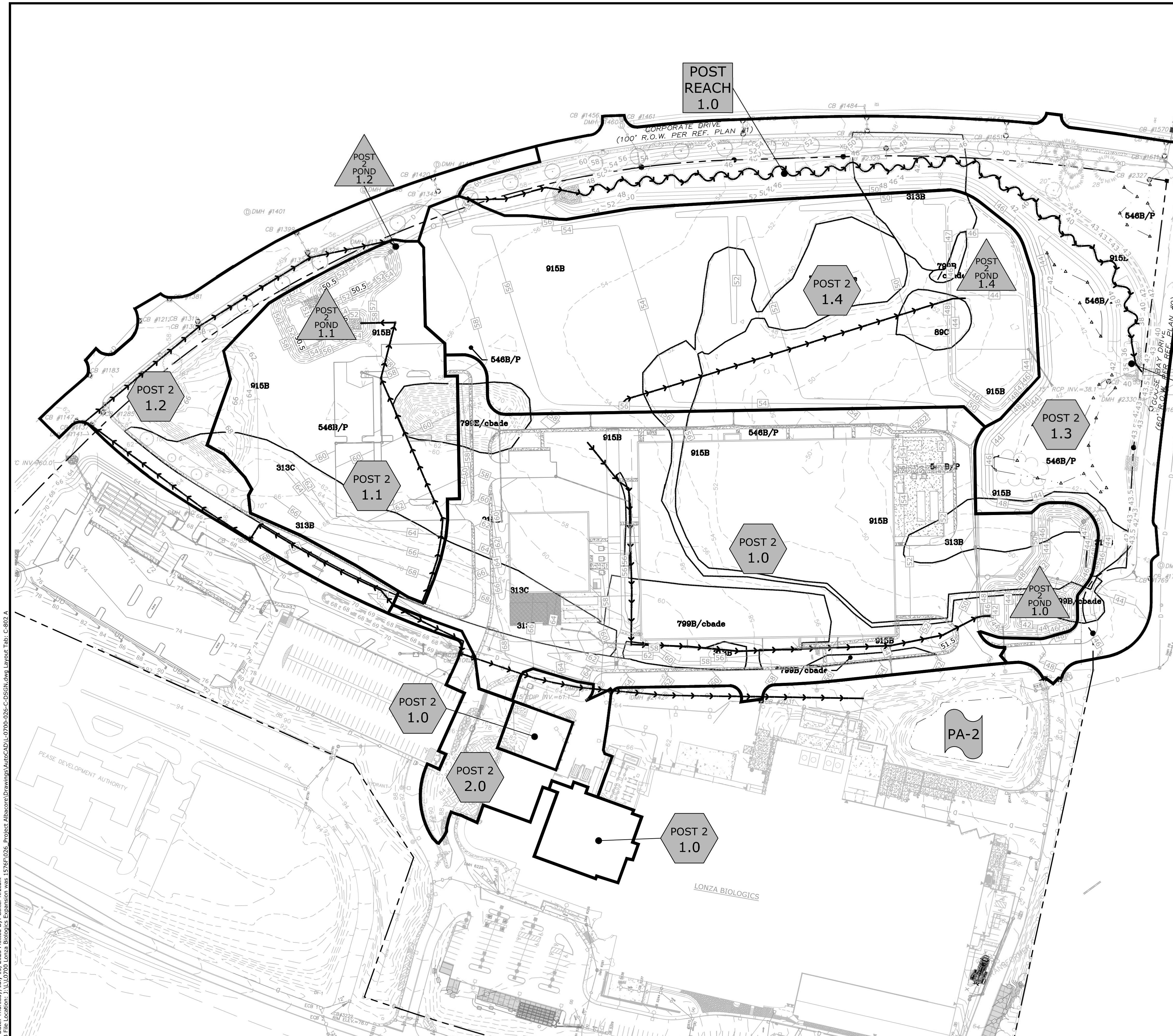
Gravel Wetland 2

Gravel Wetland 2 has a design capacity to treat 142,418 SF of impervious area for its 242,496 SF watershed area. The proposed change is to add 368 SF of impervious surface to the previously approved 48,306 SF of impervious surface for an amended total of 48,674 SF of impervious surface. This 48,674 SF is well within the gravel wetland design capacity of 142,418 SF of impervious surface.

3.0 Conclusion

The proposed amendment will result in no change to the previously approved post-development peak runoff rates for Phase 2 and does not affect the Master Plan Drainage design. The net increase in impervious areas resulting from the proposed work will be directed to either Gravel Wetland 1 or Gravel Wetland 2 which both have the capacity to treat the slight increase in impervious surfaces.

Phase 2 (2023 Approval) Post-Development Calculations



LEGEND

POST-DEVELOPMENT WATERSHED BOUNDARY

SOIL SURVEY BOUNDARIES

LONGEST FLOW PATH

POST 2 1.0 — POST-DEVELOPMENT WATERSHED AREA DESIGNATION

POST 2 POND 1.0 — POST-DEVELOPMENT POND DESIGNATION

PA-1 — POINT OF ANALYSIS

POST REACH 1.0 — POST-DEVELOPMENT REACH DESIGNATION

NOTES:

1. SOIL SURVEY WAS PERFORMED BY GOVE ENVIRONMENTAL SERVICES.

SOIL IDENTIFICATION LEGEND

SYMBOL	SOIL TAXONOMIC NAME, SLOPE RATING
89C	CHATFIELD, 8 TO 15 PERCENT SLOPES
313B	DEERFIELD, 0 TO 8 PERCENT SLOPES
313C	DEERFIELD, 8 TO 15 PERCENT SLOPES
915B	DEERFIELD VARIANT, 0 TO 8 PERCENT SLOPES
546B/P	WALPOLE POORLY DRAINED, 0 TO 8 PERCENT SLOPES
799B	UDORTHENTS URBAN LAND, 0 TO 8 PERCENT SLOPES
799E	UDORTHENTS URBAN LAND, >25 PERCENT SLOPES

Tighe&Bond

SCALE IN FEET

0 80' 160'

GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
L	7/17/2023	Amended Site Plan Review
K	5/5/2023	Phase 1B Issued for Bid
J	3/15/2023	Phase 1B Issued for Preliminary Pricing
I	1/9/2023	Admin. Approval Submission
H	12/10/2021	Planning Board Stipulation
G	8/19/2019	Admin. Approval Submission
F	11/6/2018	P.B. Submission

PROJECT NO: L-0700-013

DATE: 04/03/2018

FILE: L-0700-026-C-DSGN.dwg

DRAWN BY: CJK

CHECKED: NAH

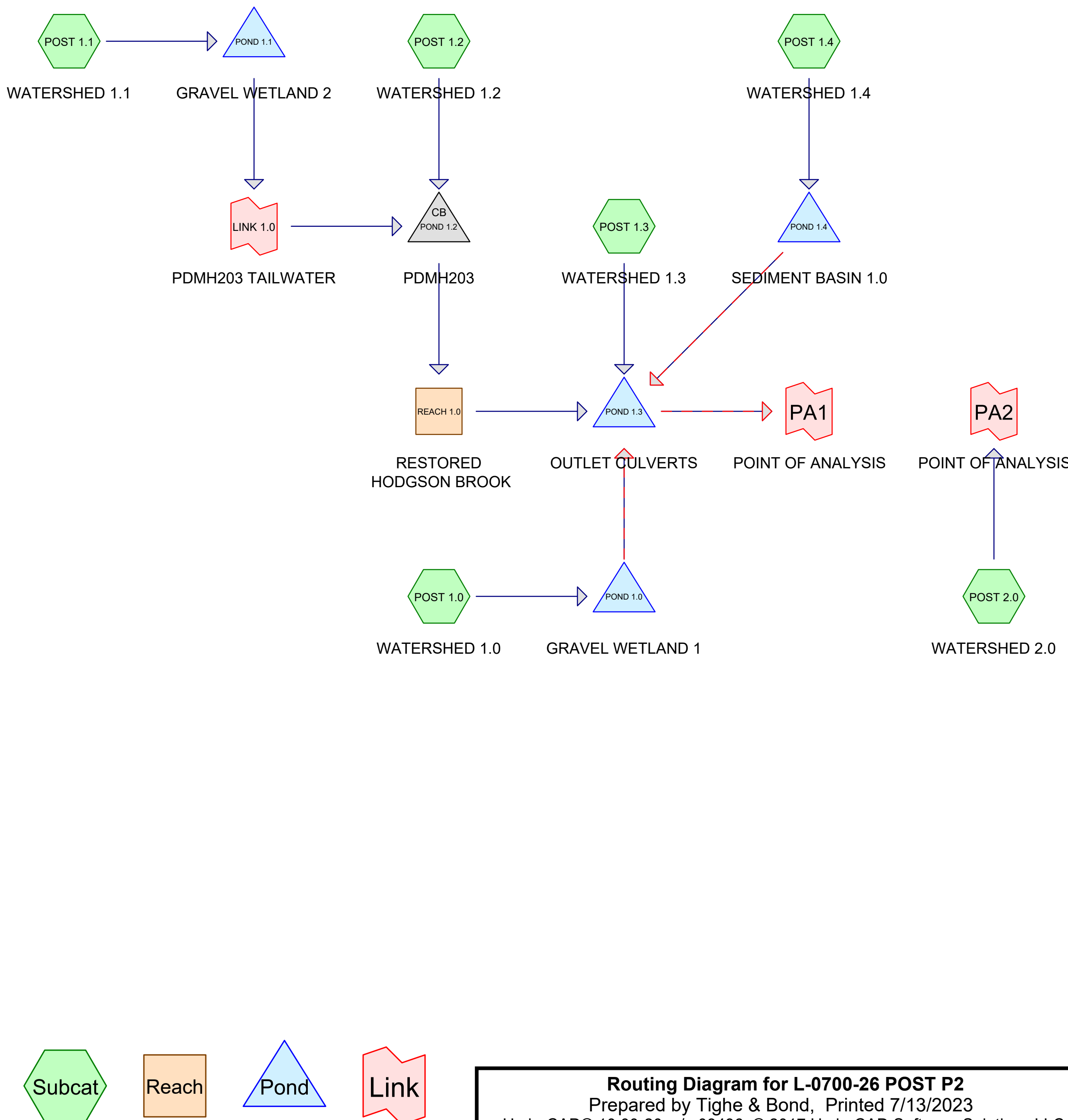
APPROVED: PMC

PHASE 2
POST-DEVELOPMENT
WATERSHED AREA PLAN

SCALE: AS SHOWN

C-802 A

Last Save Date: July 13, 2023 3:42 PM By: CKRZCUIK
Plot Date: Thursday, July 13, 2023 Plotted By: Colter Krzcuik
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-802 A



Routing Diagram for L-0700-26 POST P2
Prepared by Tighe & Bond, Printed 7/13/2023
HydroCAD® 10.00-20 s/n 03436 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.312	61	>75% Grass cover, Good, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4)
13.558	74	>75% Grass cover, Good, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
1.467	80	>75% Grass cover, Good, HSG D (POST 1.0, POST 1.3, POST 1.4)
0.514	58	Meadow, non-grazed, HSG B (POST 1.3)
1.662	71	Meadow, non-grazed, HSG C (POST 1.3)
0.639	98	Paved parking, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3)
6.959	98	Paved parking, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
0.137	98	Paved parking, HSG D (POST 1.0, POST 1.3)
0.120	98	Roofs, HSG B (POST 1.0)
3.526	98	Roofs, HSG C (POST 1.0, POST 2.0)
0.714	98	Roofs, HSG D (POST 1.0)
31.609	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.586	HSG B	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4
25.705	HSG C	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0
2.318	HSG D	POST 1.0, POST 1.3, POST 1.4
0.000	Other	
31.609		**TOTAL AREA**

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

SubcatchmentPOST 1.0: WATERSHED Runoff Area=440,332 sf 71.42% Impervious Runoff Depth>2.61"
Flow Length=933' Tc=11.4 min CN=90 Runoff=25.38 cfs 2.201 af

SubcatchmentPOST 1.1: WATERSHED Runoff Area=157,428 sf 30.68% Impervious Runoff Depth>1.63"
Flow Length=464' Tc=8.3 min CN=78 Runoff=6.25 cfs 0.492 af

SubcatchmentPOST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>2.34"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=6.94 cfs 0.511 af

SubcatchmentPOST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>1.62"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=5.96 cfs 0.929 af

SubcatchmentPOST 1.4: WATERSHED1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>1.36"
Flow Length=585' Tc=13.5 min CN=74 Runoff=8.76 cfs 0.822 af

SubcatchmentPOST 2.0: WATERSHED2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>2.34"
Flow Length=758' Tc=5.0 min CN=87 Runoff=3.10 cfs 0.221 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.63' Max Vel=2.08 fps Inflow=6.94 cfs 0.511 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=4.97 cfs 0.507 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.02' Storage=67,987 cf Inflow=25.38 cfs 2.201 af
Primary=0.96 cfs 0.874 af Secondary=0.00 cfs 0.000 af Outflow=0.96 cfs 0.874 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=52.38' Storage=21,415 cf Inflow=6.25 cfs 0.492 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.38' Inflow=6.94 cfs 0.511 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=6.94 cfs 0.511 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.16' Storage=8,981 cf Inflow=9.25 cfs 3.060 af
Primary=9.25 cfs 2.856 af Secondary=0.00 cfs 0.000 af Outflow=9.25 cfs 2.856 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=44.62' Storage=21,007 cf Inflow=8.76 cfs 0.822 af
Primary=0.51 cfs 0.751 af Secondary=0.00 cfs 0.000 af Outflow=0.51 cfs 0.751 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=9.25 cfs 2.856 af
Primary=9.25 cfs 2.856 af

Link PA2: POINT OF ANALYSIS Inflow=3.10 cfs 0.221 af
Primary=3.10 cfs 0.221 af

Total Runoff Area = 31.609 ac Runoff Volume = 5.176 af Average Runoff Depth = 1.96"
61.73% Pervious = 19.513 ac 38.27% Impervious = 12.096 ac

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

SubcatchmentPOST 1.0: WATERSHED Runoff Area=440,332 sf 71.42% Impervious Runoff Depth>4.43"
Flow Length=933' Tc=11.4 min CN=90 Runoff=42.01 cfs 3.732 af

SubcatchmentPOST 1.1: WATERSHED Runoff Area=157,428 sf 30.68% Impervious Runoff Depth>3.21"
Flow Length=464' Tc=8.3 min CN=78 Runoff=12.40 cfs 0.966 af

SubcatchmentPOST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>4.11"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=11.94 cfs 0.897 af

SubcatchmentPOST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>3.18"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=11.87 cfs 1.826 af

SubcatchmentPOST 1.4: WATERSHED1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>2.83"
Flow Length=585' Tc=13.5 min CN=74 Runoff=18.77 cfs 1.708 af

SubcatchmentPOST 2.0: WATERSHED2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>4.11"
Flow Length=758' Tc=5.0 min CN=87 Runoff=5.36 cfs 0.388 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.82' Max Vel=2.20 fps Inflow=11.94 cfs 0.897 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=6.12 cfs 0.891 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.78' Storage=83,438 cf Inflow=42.01 cfs 3.732 af
Primary=9.22 cfs 2.105 af Secondary=5.86 cfs 0.170 af Outflow=15.08 cfs 2.275 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=54.11' Storage=42,049 cf Inflow=12.40 cfs 0.966 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.72' Inflow=11.94 cfs 0.897 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=11.94 cfs 0.897 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.77' Storage=13,560 cf Inflow=31.34 cfs 5.942 af
Primary=31.22 cfs 5.655 af Secondary=0.00 cfs 0.000 af Outflow=31.22 cfs 5.655 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=45.79' Storage=50,580 cf Inflow=18.77 cfs 1.708 af
Primary=0.68 cfs 0.950 af Secondary=0.00 cfs 0.000 af Outflow=0.68 cfs 0.950 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=31.22 cfs 5.655 af
Primary=31.22 cfs 5.655 af

Link PA2: POINT OF ANALYSIS Inflow=5.36 cfs 0.388 af
Primary=5.36 cfs 0.388 af

Total Runoff Area = 31.609 ac Runoff Volume = 9.517 af Average Runoff Depth = 3.61"
61.73% Pervious = 19.513 ac 38.27% Impervious = 12.096 ac

Summary for Subcatchment POST 1.0: WATERSHED 1.0

Runoff = 42.01 cfs @ 12.16 hrs, Volume= 3.732 af, Depth> 4.43"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
5,235	98	Roofs, HSG B
29,148	61	>75% Grass cover, Good, HSG B
18,966	98	Paved parking, HSG B
143,455	98	Roofs, HSG C
82,022	74	>75% Grass cover, Good, HSG C
110,236	98	Paved parking, HSG C
31,119	98	Roofs, HSG D
14,671	80	>75% Grass cover, Good, HSG D
5,480	98	Paved parking, HSG D
440,332	90	Weighted Average
125,841		28.58% Pervious Area
314,491		71.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.2	32	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	19	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	162	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.4	84	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.5	113	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
1.2	299	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.4	94	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.1	46	0.0240	11.16	35.05	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.0	5	0.0800	7.16	0.98	**Pipe Channel,** 5.0" Round Area= 0.1 sf Perim= 1.3' r= 0.10' n= 0.013
0.0	9	0.0110	9.90	69.95	**Pipe Channel,**

36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
n= 0.013

11.4	933	Total

Summary for Subcatchment POST 1.1: WATERSHED 1.1

Runoff = 12.40 cfs @ 12.12 hrs, Volume= 0.966 af, Depth> 3.21"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
36,403	61	>75% Grass cover, Good, HSG B
3,210	98	Paved parking, HSG B
72,719	74	>75% Grass cover, Good, HSG C
45,096	98	Paved parking, HSG C
157,428	78	Weighted Average
109,122		69.32% Pervious Area
48,306		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	100	0.0625	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
2.2	312	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	33	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	19	0.3300	8.62		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.3	464	Total			

Summary for Subcatchment POST 1.2: WATERSHED 1.2

Runoff = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af, Depth> 4.11"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
9,848	61	>75% Grass cover, Good, HSG B
4,784	98	Paved parking, HSG B
37,701	74	>75% Grass cover, Good, HSG C
61,646	98	Paved parking, HSG C
113,979	87	Weighted Average
47,549		41.72% Pervious Area
66,430		58.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0100	1.12		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.0	153	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	343	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	13	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.8	453	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	129	0.0050	5.91	29.00	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior
6.4	1,191	Total			

Summary for Subcatchment POST 1.3: WATERSHED 1.3

Runoff = 11.87 cfs @ 12.63 hrs, Volume= 1.826 af, Depth> 3.18"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
1,830	61	>75% Grass cover, Good, HSG B
22,404	58	Meadow, non-grazed, HSG B
896	98	Paved parking, HSG B
131,991	74	>75% Grass cover, Good, HSG C
68,446	98	Paved parking, HSG C
72,396	71	Meadow, non-grazed, HSG C
1,638	80	>75% Grass cover, Good, HSG D
499	98	Paved parking, HSG D
300,100	78	Weighted Average
230,259		76.73% Pervious Area
69,841		23.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0130	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.1	52	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	27	0.2720	7.82		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
33.8	1,346	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
45.9	1,525	Total			

Summary for Subcatchment POST 1.4: WATERSHED 1.4

Runoff = 18.77 cfs @ 12.19 hrs, Volume= 1.708 af, Depth> 2.83"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
23,477	61	>75% Grass cover, Good, HSG B
243,330	74	>75% Grass cover, Good, HSG C
1,334	98	Paved parking, HSG C
47,586	80	>75% Grass cover, Good, HSG D
0	96	Gravel surface, HSG D
315,727	74	Weighted Average
314,393		99.58% Pervious Area
1,334		0.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0245	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
5.1	465	0.0103	1.52		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	20	0.3300	8.62		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.5	585	Total			

Summary for Subcatchment POST 2.0: WATERSHED 2.0

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af, Depth> 4.11"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
10,145	98	Roofs, HSG C
22,815	74	>75% Grass cover, Good, HSG C
16,376	98	Paved parking, HSG C
49,336	87	Weighted Average
22,815		46.24% Pervious Area
26,521		53.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0164	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.3	48	0.0164	2.60		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	130	0.0140	7.03	12.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.5	70	0.0250	2.37		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.3	410	0.0050	5.09	16.00	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
3.6	758	Total, Increased to minimum Tc = 5.0 min			

Summary for Reach REACH 1.0: RESTORED HODGSON BROOK

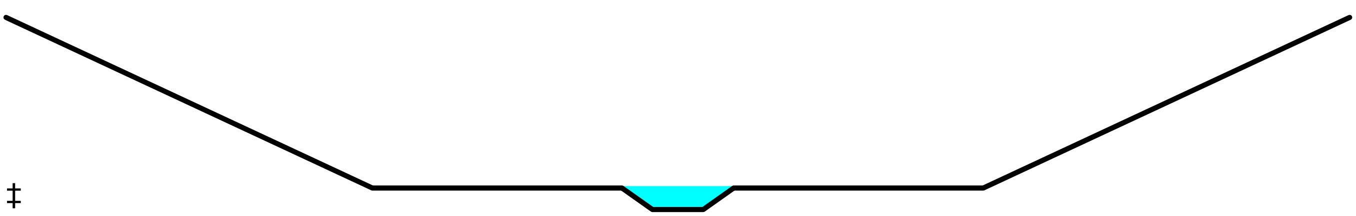
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area = 6.231 ac, 42.27% Impervious, Inflow Depth > 1.73" for 10 Year event
Inflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Outflow = 6.12 cfs @ 12.86 hrs, Volume= 0.891 af, Atten= 49%, Lag= 45.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 9.9 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 25.6 min

Peak Storage= 6,846 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.82'
Bank-Full Depth= 6.75' Flow Area= 291.0 sf, Capacity= 2,720.29 cfs

Custom cross-section, Length= 1,309.0' Slope= 0.0092 '/' (101 Elevation Intervals)
Constant n= 0.040 Winding stream, pools & shoals
Inlet Invert= 48.00', Outlet Invert= 36.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	12.00	0.00
18.00	6.00	6.00
30.25	6.00	6.00
31.75	5.25	6.75
34.25	5.25	6.75
35.75	6.00	6.00
48.00	6.00	6.00
66.00	12.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	2.5	0	0.00
0.75	3.0	30.4	3,927	2.28
6.75	291.0	68.3	380,919	2,720.29

Summary for Pond POND 1.0: GRAVEL WETLAND 1

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 10.109 ac, 71.42% Impervious, Inflow Depth > 4.43" for 10 Year event
Inflow = 42.01 cfs @ 12.16 hrs, Volume= 3.732 af
Outflow = 15.08 cfs @ 12.50 hrs, Volume= 2.275 af, Atten= 64%, Lag= 20.8 min
Primary = 9.22 cfs @ 12.50 hrs, Volume= 2.105 af
Secondary = 5.86 cfs @ 12.50 hrs, Volume= 0.170 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 46.78' @ 12.50 hrs Surf.Area= 21,240 sf Storage= 83,438 cf
Flood Elev= 48.00' Surf.Area= 23,557 sf Storage= 110,845 cf

Plug-Flow detention time= 226.3 min calculated for 2.275 af (61% of inflow)
Center-of-Mass det. time= 125.2 min (916.2 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	39.05'	110,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
39.05	9,855	0.0	0	0
41.35	9,855	30.0	6,800	6,800
42.00	9,855	45.0	2,883	9,683
43.00	11,943	100.0	10,899	20,582
44.00	14,202	100.0	13,073	33,654
45.00	16,891	100.0	15,547	49,201
46.00	19,752	100.0	18,322	67,522
47.00	21,668	100.0	20,710	88,232
48.00	23,557	100.0	22,613	110,845

Device	Routing	Invert	Outlet Devices
#1	Primary	41.35'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.35' / 41.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	41.35'	**3.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	45.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	46.00'	**4.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#5	Device 1	47.00'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads
#6	Secondary	46.50'	**15.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9.22 cfs @ 12.50 hrs HW=46.78' TW=38.77' (Dynamic Tailwater)
└─**1=Culvert** (Passes 9.22 cfs of 18.40 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.74 cfs @ 11.06 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.30 cfs @ 6.19 fps)
  ├─**4=Sharp-Crested Rectangular Weir** (Orifice Controls 8.17 cfs @ 4.19 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=5.85 cfs @ 12.50 hrs HW=46.78' TW=38.77' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 5.85 cfs @ 1.41 fps)

Summary for Pond POND 1.1: GRAVEL WETLAND 2

Inflow Area = 3.614 ac, 30.68% Impervious, Inflow Depth > 3.21" for 10 Year event
Inflow = 12.40 cfs @ 12.12 hrs, Volume= 0.966 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 54.11' @ 24.00 hrs Surf.Area= 14,115 sf Storage= 42,049 cf
Flood Elev= 57.00' Surf.Area= 21,643 sf Storage= 94,743 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	47.55'	117,304 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.55	6,269	0.0	0	0
49.85	6,269	30.0	4,326	4,326
50.50	6,269	45.0	1,834	6,159
51.00	7,199	100.0	3,367	9,526
52.00	9,187	100.0	8,193	17,719
53.00	11,345	100.0	10,266	27,985
54.00	13,814	100.0	12,580	40,565
55.00	16,645	100.0	15,230	55,794
56.00	19,805	100.0	18,225	74,019
58.00	23,480	100.0	43,285	117,304

Device	Routing	Invert	Outlet Devices
#1	Primary	49.85'	**24.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.85' / 49.45' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	49.85'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	53.50'	**4.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	56.50'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.55' TW=55.07' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond POND 1.2: PDMH203

Inflow Area = 6.231 ac, 42.27% Impervious, Inflow Depth > 1.73" for 10 Year event
Inflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Outflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af, Atten= 0%, Lag= 0.0 min
Primary = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 50.72' @ 12.09 hrs
Flood Elev= 57.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.35'	**48.0" Round Culvert** L= 269.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 49.35' / 48.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=11.76 cfs @ 12.09 hrs HW=50.71' TW=48.76' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 11.76 cfs @ 3.13 fps)

Summary for Pond POND 1.3: OUTLET CULVERTS

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=12)
[62] Hint: Exceeded Reach REACH 1.0 OUTLET depth by 2.58' @ 23.95 hrs

Inflow Area = 30.477 ac, 37.69% Impervious, Inflow Depth > 2.34" for 10 Year event
Inflow = 31.34 cfs @ 12.51 hrs, Volume= 5.942 af
Outflow = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af, Atten= 0%, Lag= 1.3 min
Primary = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 38.77' @ 12.53 hrs Surf.Area= 8,870 sf Storage= 13,560 cf
Flood Elev= 43.50' Surf.Area= 95,977 sf Storage= 236,017 cf

Plug-Flow detention time= 56.2 min calculated for 5.642 af (95% of inflow)
Center-of-Mass det. time= 29.8 min (900.3 - 870.4)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	236,017 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.00	960	0	0
36.00	1,428	1,194	1,194
38.00	5,418	6,846	8,040
40.00	14,354	19,772	27,812
42.00	66,884	81,238	109,050
43.00	92,707	79,796	188,846
43.50	95,977	47,171	236,017

Device	Routing	Invert	Outlet Devices
#1	Primary	35.60'	**42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch CMP_Arch_1/2 42x29 X 3.00** L= 68.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.60' / 35.30' S= 0.0044 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf
#2	Secondary	43.00'	**143.1 deg x 18.0' long x 0.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=31.11 cfs @ 12.53 hrs HW=38.77' TW=38.65' (Dynamic Tailwater)
↑—**1=CMP_Arch_1/2 42x29** (Outlet Controls 31.11 cfs @ 1.55 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.04' TW=38.65' (Dynamic Tailwater)
↑—**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond POND 1.4: SEDIMENT BASIN 1.0

Inflow Area = 7.248 ac, 0.42% Impervious, Inflow Depth > 2.83" for 10 Year event
Inflow = 18.77 cfs @ 12.19 hrs, Volume= 1.708 af
Outflow = 0.68 cfs @ 17.24 hrs, Volume= 0.950 af, Atten= 96%, Lag= 303.1 min
Primary = 0.68 cfs @ 17.24 hrs, Volume= 0.950 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 44.15' Surf.Area= 18,132 sf Storage= 11,702 cf
Peak Elev= 45.79' @ 17.24 hrs Surf.Area= 29,244 sf Storage= 50,580 cf (38,878 cf above start)
Flood Elev= 48.50' Surf.Area= 38,802 sf Storage= 127,441 cf (115,739 cf above start)

Plug-Flow detention time= 356.9 min calculated for 0.681 af (40% of inflow)
Center-of-Mass det. time= 9.2 min (846.8 - 837.5)

Volume	Invert	Avail.Storage	Storage Description
#1	43.00'	127,441 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	1,000	0	0
44.00	17,117	9,059	9,059
46.00	30,657	47,774	56,833
47.00	35,879	33,268	90,101
48.00	38,802	37,341	127,441

Device	Routing	Invert	Outlet Devices
#1	Primary	42.75'	**12.0" Round Culvert** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 42.75' / 42.40' S= 0.0053 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	43.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	46.80'	**10.0" x 17.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	47.40'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.10 Width (feet) 8.00 14.60

Primary OutFlow Max=0.68 cfs @ 17.24 hrs HW=45.79' TW=38.65' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.68 cfs of 5.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.68 cfs @ 7.80 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=44.15' TW=35.04' (Dynamic Tailwater)
└─**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Summary for Link LINK 1.0: PDMH203 TAILWATER

This link takes into account the tailwater condition in PDMH203 which the outlet of gravel wetland 2 connects. The purpose of this is to determine the effects of any surcharging caused by the tailwater of Hodgson Brook entering the structure. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.1 by 7.52' @ 0.00 hrs (23.95 cfs 41.618 af)

Inflow Area = 3.614 ac, 30.68% Impervious, Inflow Depth = 0.00" for 10 Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 25 Point manual elevation table, To= 0.00 hrs, dt= 1.00 hrs, feet =

55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07		

Summary for Link PA1: POINT OF ANALYSIS

This link takes into account the tailwater condition in roadside swale along Goose Bay Drive which the existing culverts discharge into. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.3 by 3.61' @ 0.00 hrs (92.51 cfs 60.023 af)

Inflow Area = 30.477 ac, 37.69% Impervious, Inflow Depth > 2.23" for 10 Year event
Inflow = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af
Primary = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 2 Point manual elevation table, To= 0.00 hrs, dt= 24.00 hrs, feet =
38.65 38.65

Summary for Link PA2: POINT OF ANALYSIS

Inflow Area = 1.133 ac, 53.76% Impervious, Inflow Depth > 4.11" for 10 Year event
Inflow = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af
Primary = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.42% Impervious Runoff Depth>5.88"
Flow Length=933' Tc=11.4 min CN=90 Runoff=54.93 cfs 4.956 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.68% Impervious Runoff Depth>4.53"
Flow Length=464' Tc=8.3 min CN=78 Runoff=17.44 cfs 1.365 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>5.54"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=15.85 cfs 1.209 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>4.50"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=16.75 cfs 2.583 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>4.09"
Flow Length=585' Tc=13.5 min CN=74 Runoff=27.23 cfs 2.472 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>5.54"
Flow Length=758' Tc=5.0 min CN=87 Runoff=7.12 cfs 0.523 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.87' Max Vel=2.22 fps Inflow=15.85 cfs 1.209 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=8.65 cfs 1.202 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.10' Storage=90,424 cf Inflow=54.93 cfs 4.956 af
Primary=19.03 cfs 2.766 af Secondary=18.86 cfs 0.671 af Outflow=37.88 cfs 3.437 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=55.22' Storage=59,446 cf Inflow=17.44 cfs 1.365 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.94' Inflow=15.85 cfs 1.209 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=15.85 cfs 1.209 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.17' Storage=17,433 cf Inflow=57.33 cfs 8.292 af
Primary=56.26 cfs 7.985 af Secondary=0.00 cfs 0.000 af Outflow=56.26 cfs 7.985 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=46.65' Storage=77,792 cf Inflow=27.23 cfs 2.472 af
Primary=0.78 cfs 1.070 af Secondary=0.00 cfs 0.000 af Outflow=0.78 cfs 1.070 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=56.26 cfs 7.985 af
Primary=56.26 cfs 7.985 af

Link PA2: POINT OF ANALYSIS Inflow=7.12 cfs 0.523 af
Primary=7.12 cfs 0.523 af

Total Runoff Area = 31.609 ac Runoff Volume = 13.108 af Average Runoff Depth = 4.98"
61.73% Pervious = 19.513 ac 38.27% Impervious = 12.096 ac

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

SubcatchmentPOST 1.0: WATERSHED Runoff Area=440,332 sf 71.42% Impervious Runoff Depth>7.25"
Flow Length=933' Tc=11.4 min CN=90 Runoff=66.89 cfs 6.105 af

SubcatchmentPOST 1.1: WATERSHED Runoff Area=157,428 sf 30.68% Impervious Runoff Depth>5.81"
Flow Length=464' Tc=8.3 min CN=78 Runoff=22.21 cfs 1.750 af

SubcatchmentPOST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>6.89"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=19.47 cfs 1.503 af

SubcatchmentPOST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>5.77"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=21.37 cfs 3.312 af

SubcatchmentPOST 1.4: WATERSHED1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>5.33"
Flow Length=585' Tc=13.5 min CN=74 Runoff=35.32 cfs 3.218 af

SubcatchmentPOST 2.0: WATERSHED2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>6.89"
Flow Length=758' Tc=5.0 min CN=87 Runoff=8.76 cfs 0.651 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.92' Max Vel=2.24 fps Inflow=19.47 cfs 1.503 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=11.76 cfs 1.495 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.39' Storage=96,897 cf Inflow=66.89 cfs 6.105 af
Primary=19.58 cfs 3.347 af Secondary=33.37 cfs 1.209 af Outflow=52.94 cfs 4.556 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=56.11' Storage=76,209 cf Inflow=22.21 cfs 1.750 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=51.13' Inflow=19.47 cfs 1.503 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=19.47 cfs 1.503 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.58' Storage=22,150 cf Inflow=76.91 cfs 10.982 af
Primary=74.09 cfs 10.655 af Secondary=0.00 cfs 0.000 af Outflow=74.09 cfs 10.655 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=47.02' Storage=90,878 cf Inflow=35.32 cfs 3.218 af
Primary=2.39 cfs 1.619 af Secondary=0.00 cfs 0.000 af Outflow=2.39 cfs 1.619 af

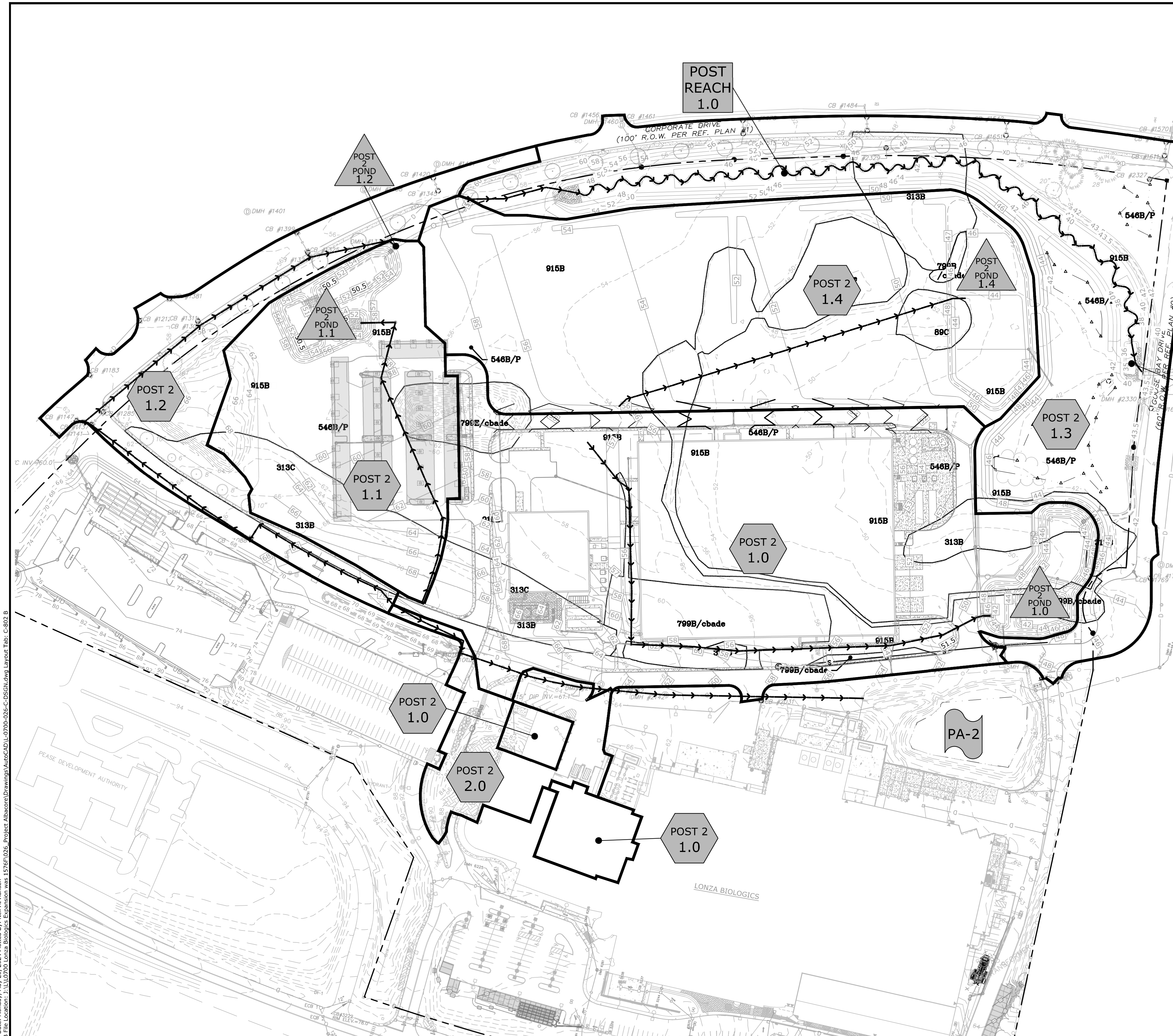
Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=74.09 cfs 10.655 af
Primary=74.09 cfs 10.655 af

Link PA2: POINT OF ANALYSIS Inflow=8.76 cfs 0.651 af
Primary=8.76 cfs 0.651 af

Total Runoff Area = 31.609 ac Runoff Volume = 16.539 af Average Runoff Depth = 6.28"
61.73% Pervious = 19.513 ac 38.27% Impervious = 12.096 ac

Phase 2 (2024 Amended) Post-Development Calculations



LEGEND

(heavy line)	POST-DEVELOPMENT WATERSHED BOUNDARY
(thin line)	SOIL SURVEY BOUNDARIES
(arrowed line)	LONGEST FLOW PATH
POST 2 1.0	POST-DEVELOPMENT WATERSHED AREA DESIGNATION
POST 2 POND 1.0	POST-DEVELOPMENT POND DESIGNATION
PA-1	POINT OF ANALYSIS
POST REACH 1.0	POST-DEVELOPMENT REACH DESIGNATION

NOTES:

1. SOIL SURVEY WAS PERFORMED BY GOVE ENVIRONMENTAL SERVICES.

SOIL IDENTIFICATION LEGEND

SYMBOL	SOIL TAXONOMIC NAME, SLOPE RATING
89C	CHATFIELD, 8 TO 15 PERCENT SLOPES
313B	DEERFIELD, 0 TO 8 PERCENT SLOPES
313C	DEERFIELD, 8 TO 15 PERCENT SLOPES
915B	DEERFIELD VARIANT, 0 TO 8 PERCENT SLOPES
546B/P	WALPOLE POORLY DRAINED, 0 TO 8 PERCENT SLOPES
799B	UDORTHENTS URBAN LAND, 0 TO 8 PERCENT SLOPES
799E	UDORTHENTS URBAN LAND, >25 PERCENT SLOPES

Tighe&Bond

SCALE IN FEET

0 80' 160'

GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

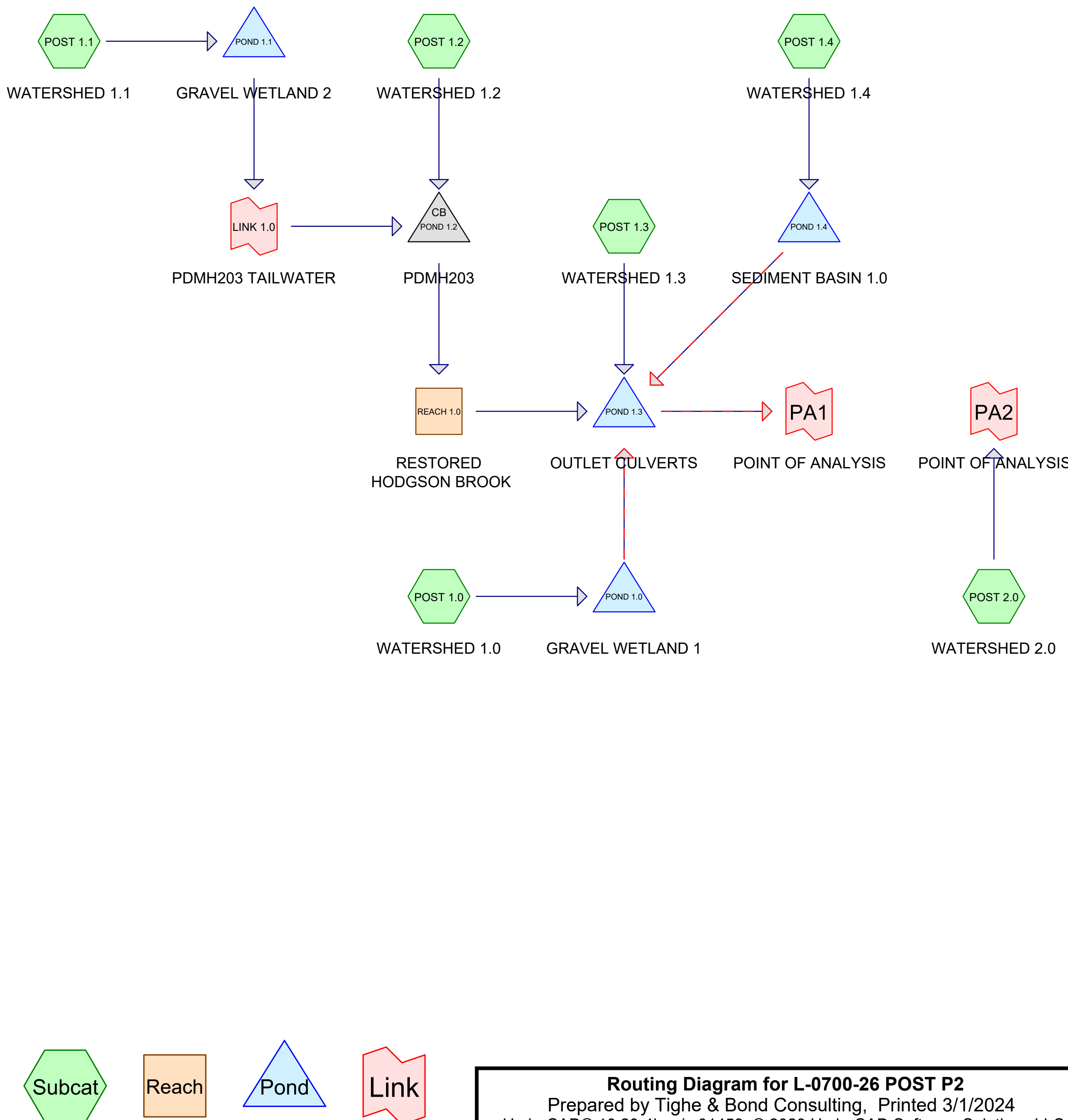
PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2
POST-DEVELOPMENT
WATERSHED AREA PLAN

SCALE: AS SHOWN

C-802 B

Last Save Date: May 17, 2024 4:43 PM By: NAHANSEN
Plot Date: Monday, May 20, 2024 Plotted By: Neil A. Hansen
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-802 B



Routing Diagram for L-0700-26 POST P2
Prepared by Tighe & Bond Consulting, Printed 3/1/2024
HydroCAD® 10.20-4b s/n 01453 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.312	61	>75% Grass cover, Good, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4)
13.542	74	>75% Grass cover, Good, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
1.467	80	>75% Grass cover, Good, HSG D (POST 1.0, POST 1.3, POST 1.4)
0.514	58	Meadow, non-grazed, HSG B (POST 1.3)
1.662	71	Meadow, non-grazed, HSG C (POST 1.3)
0.639	98	Paved parking, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3)
6.974	98	Paved parking, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
0.137	98	Paved parking, HSG D (POST 1.0, POST 1.3)
0.120	98	Roofs, HSG B (POST 1.0)
3.526	98	Roofs, HSG C (POST 1.0, POST 2.0)
0.714	98	Roofs, HSG D (POST 1.0)
31.609	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.586	HSG B	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4
25.705	HSG C	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0
2.318	HSG D	POST 1.0, POST 1.3, POST 1.4
0.000	Other	
31.609		**TOTAL AREA**

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

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.49% Impervious Runoff Depth>2.61"
Flow Length=933' Tc=11.4 min CN=90 Runoff=25.38 cfs 2.201 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.92% Impervious Runoff Depth>1.63"
Flow Length=464' Tc=8.3 min CN=78 Runoff=6.25 cfs 0.492 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>2.34"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=6.94 cfs 0.511 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>1.62"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=5.96 cfs 0.929 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>1.36"
Flow Length=585' Tc=13.5 min CN=74 Runoff=8.76 cfs 0.822 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>2.34"
Flow Length=758' Tc=5.0 min CN=87 Runoff=3.10 cfs 0.221 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.63' Max Vel=2.08 fps Inflow=6.94 cfs 0.511 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=4.97 cfs 0.507 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.02' Storage=67,987 cf Inflow=25.38 cfs 2.201 af
Primary=0.96 cfs 0.874 af Secondary=0.00 cfs 0.000 af Outflow=0.96 cfs 0.874 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=52.38' Storage=21,415 cf Inflow=6.25 cfs 0.492 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.38' Inflow=6.94 cfs 0.511 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=6.94 cfs 0.511 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.16' Storage=8,981 cf Inflow=9.25 cfs 3.060 af
Primary=9.25 cfs 2.856 af Secondary=0.00 cfs 0.000 af Outflow=9.25 cfs 2.856 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=44.62' Storage=21,007 cf Inflow=8.76 cfs 0.822 af
Primary=0.51 cfs 0.751 af Secondary=0.00 cfs 0.000 af Outflow=0.51 cfs 0.751 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=9.25 cfs 2.856 af
Primary=9.25 cfs 2.856 af

Link PA2: POINT OF ANALYSIS Inflow=3.10 cfs 0.221 af
Primary=3.10 cfs 0.221 af

Total Runoff Area = 31.609 ac Runoff Volume = 5.176 af Average Runoff Depth = 1.96"
61.68% Pervious = 19.497 ac 38.32% Impervious = 12.112 ac

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

SubcatchmentPOST 1.0: WATERSHED Runoff Area=440,332 sf 71.49% Impervious Runoff Depth>4.43"
Flow Length=933' Tc=11.4 min CN=90 Runoff=42.01 cfs 3.732 af

SubcatchmentPOST 1.1: WATERSHED Runoff Area=157,428 sf 30.92% Impervious Runoff Depth>3.21"
Flow Length=464' Tc=8.3 min CN=78 Runoff=12.40 cfs 0.966 af

SubcatchmentPOST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>4.11"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=11.94 cfs 0.897 af

SubcatchmentPOST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>3.18"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=11.87 cfs 1.826 af

SubcatchmentPOST 1.4: WATERSHED1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>2.83"
Flow Length=585' Tc=13.5 min CN=74 Runoff=18.77 cfs 1.708 af

SubcatchmentPOST 2.0: WATERSHED2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>4.11"
Flow Length=758' Tc=5.0 min CN=87 Runoff=5.36 cfs 0.388 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.82' Max Vel=2.20 fps Inflow=11.94 cfs 0.897 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=6.12 cfs 0.891 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.78' Storage=83,438 cf Inflow=42.01 cfs 3.732 af
Primary=9.22 cfs 2.105 af Secondary=5.86 cfs 0.170 af Outflow=15.08 cfs 2.275 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=54.11' Storage=42,049 cf Inflow=12.40 cfs 0.966 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.72' Inflow=11.94 cfs 0.897 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=11.94 cfs 0.897 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.77' Storage=13,560 cf Inflow=31.34 cfs 5.942 af
Primary=31.22 cfs 5.655 af Secondary=0.00 cfs 0.000 af Outflow=31.22 cfs 5.655 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=45.79' Storage=50,580 cf Inflow=18.77 cfs 1.708 af
Primary=0.68 cfs 0.950 af Secondary=0.00 cfs 0.000 af Outflow=0.68 cfs 0.950 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=31.22 cfs 5.655 af
Primary=31.22 cfs 5.655 af

Link PA2: POINT OF ANALYSIS Inflow=5.36 cfs 0.388 af
Primary=5.36 cfs 0.388 af

Total Runoff Area = 31.609 ac Runoff Volume = 9.517 af Average Runoff Depth = 3.61"
61.68% Pervious = 19.497 ac 38.32% Impervious = 12.112 ac

Summary for Subcatchment POST 1.0: WATERSHED 1.0

[47] Hint: Peak is 1668% of capacity of segment #4
[47] Hint: Peak is 1668% of capacity of segment #5
[47] Hint: Peak is 920% of capacity of segment #6
[47] Hint: Peak is 566% of capacity of segment #7
[47] Hint: Peak is 566% of capacity of segment #8
[47] Hint: Peak is 120% of capacity of segment #9
[47] Hint: Peak is 4305% of capacity of segment #10

Runoff = 42.01 cfs @ 12.16 hrs, Volume= 3.732 af, Depth> 4.43"
Routed to Pond POND 1.0 : GRAVEL WETLAND 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 Year Rainfall=5.58"

Area (sf)	CN	Description
5,235	98	Roofs, HSG B
29,148	61	>75% Grass cover, Good, HSG B
18,966	98	Paved parking, HSG B
143,455	98	Roofs, HSG C
81,718	74	>75% Grass cover, Good, HSG C
110,540	98	Paved parking, HSG C
31,119	98	Roofs, HSG D
14,671	80	>75% Grass cover, Good, HSG D
5,480	98	Paved parking, HSG D
440,332	90	Weighted Average
125,537		28.51% Pervious Area
314,795		71.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.2	32	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	19	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	162	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.4	84	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.5	113	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
1.2	299	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.4	94	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.1	46	0.0240	11.16	35.05	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.0	5	0.0800	7.16	0.98	**Pipe Channel,** 5.0" Round Area= 0.1 sf Perim= 1.3' r= 0.10' n= 0.013
0.0	9	0.0110	9.90	69.95	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
11.4	933	Total			

Summary for Subcatchment POST 1.1: WATERSHED 1.1

Runoff = 12.40 cfs @ 12.12 hrs, Volume= 0.966 af, Depth> 3.21"
Routed to Pond POND 1.1 : GRAVEL WETLAND 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 Year Rainfall=5.58"

Area (sf)	CN	Description
36,403	61	>75% Grass cover, Good, HSG B
3,210	98	Paved parking, HSG B
72,351	74	>75% Grass cover, Good, HSG C
45,464	98	Paved parking, HSG C
157,428	78	Weighted Average
108,754		69.08% Pervious Area
48,674		30.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	100	0.0625	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
2.2	312	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	33	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	19	0.3300	8.62		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.3	464	Total			

Summary for Subcatchment POST 1.2: WATERSHED 1.2

[47] Hint: Peak is 437% of capacity of segment #3
[47] Hint: Peak is 261% of capacity of segment #4
[47] Hint: Peak is 161% of capacity of segment #5

Runoff = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af, Depth> 4.11"
Routed to Pond POND 1.2 : PDMH203

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 Year Rainfall=5.58"

Area (sf)	CN	Description
9,848	61	>75% Grass cover, Good, HSG B
4,784	98	Paved parking, HSG B
37,701	74	>75% Grass cover, Good, HSG C
61,646	98	Paved parking, HSG C
113,979	87	Weighted Average
47,549		41.72% Pervious Area
66,430		58.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0100	1.12		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.0	153	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	343	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	13	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.8	453	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	129	0.0050	5.91	29.00	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior

6.4	1,191	Total

Summary for Subcatchment POST 1.3: WATERSHED 1.3

Runoff = 11.87 cfs @ 12.63 hrs, Volume= 1.826 af, Depth> 3.18"
Routed to Pond POND 1.3 : OUTLET CULVERTS

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 Year Rainfall=5.58"

Area (sf)	CN	Description
1,830	61	>75% Grass cover, Good, HSG B
22,404	58	Meadow, non-grazed, HSG B
896	98	Paved parking, HSG B
131,991	74	>75% Grass cover, Good, HSG C
68,446	98	Paved parking, HSG C
72,396	71	Meadow, non-grazed, HSG C
1,638	80	>75% Grass cover, Good, HSG D
499	98	Paved parking, HSG D
300,100	78	Weighted Average
230,259		76.73% Pervious Area
69,841		23.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0130	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.1	52	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	27	0.2720	7.82		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
33.8	1,346	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
45.9	1,525	Total			

Summary for Subcatchment POST 1.4: WATERSHED 1.4

Runoff = 18.77 cfs @ 12.19 hrs, Volume= 1.708 af, Depth> 2.83"
Routed to Pond POND 1.4 : SEDIMENT BASIN 1.0

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 Year Rainfall=5.58"

Area (sf)	CN	Description
23,477	61	>75% Grass cover, Good, HSG B
243,330	74	>75% Grass cover, Good, HSG C
1,334	98	Paved parking, HSG C
47,586	80	>75% Grass cover, Good, HSG D
0	96	Gravel surface, HSG D
315,727	74	Weighted Average
314,393		99.58% Pervious Area
1,334		0.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0245	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
5.1	465	0.0103	1.52		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	20	0.3300	8.62		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.5	585	Total			

Summary for Subcatchment POST 2.0: WATERSHED 2.0

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af, Depth> 4.11"
Routed to Link PA2 : POINT OF ANALYSIS

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 Year Rainfall=5.58"

Area (sf)	CN	Description
10,145	98	Roofs, HSG C
22,815	74	>75% Grass cover, Good, HSG C
16,376	98	Paved parking, HSG C
49,336	87	Weighted Average
22,815		46.24% Pervious Area
26,521		53.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0164	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.3	48	0.0164	2.60		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	130	0.0140	7.03	12.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.5	70	0.0250	2.37		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.3	410	0.0050	5.09	16.00	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'

n= 0.013
3.6 758 Total, Increased to minimum Tc = 5.0 min

Summary for Reach REACH 1.0: RESTORED HODGSON BROOK

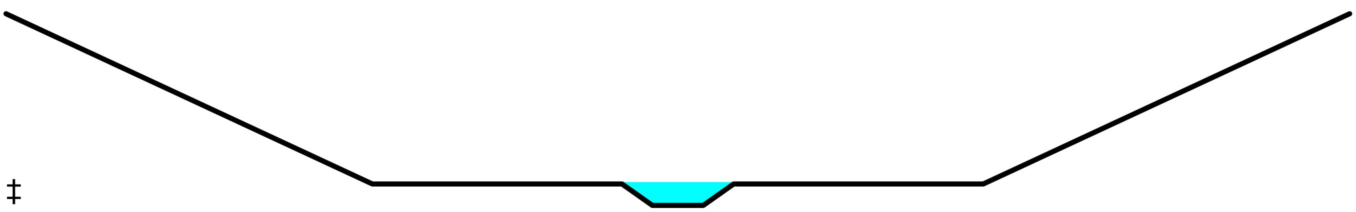
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area = 6.231 ac, 42.41% Impervious, Inflow Depth > 1.73" for 10 Year event
Inflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Outflow = 6.12 cfs @ 12.86 hrs, Volume= 0.891 af, Atten= 49%, Lag= 45.9 min
Routed to Pond POND 1.3 : OUTLET CULVERTS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 9.9 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 25.6 min

Peak Storage= 6,846 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.82' , Surface Width= 30.44'
Bank-Full Depth= 6.75' Flow Area= 291.0 sf, Capacity= 2,720.29 cfs

Custom cross-section, Length= 1,309.0' Slope= 0.0092 '/' (101 Elevation Intervals)
Constant n= 0.040 Winding stream, pools & shoals
Inlet Invert= 48.00', Outlet Invert= 36.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	12.00	0.00
18.00	6.00	6.00
30.25	6.00	6.00
31.75	5.25	6.75
34.25	5.25	6.75
35.75	6.00	6.00
48.00	6.00	6.00
66.00	12.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	2.5	0.0	0	0.00
0.75	3.0	30.4	30.0	3,927	2.28
6.75	291.0	68.3	66.0	380,919	2,720.29

Summary for Pond POND 1.0: GRAVEL WETLAND 1

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 10.109 ac, 71.49% Impervious, Inflow Depth > 4.43" for 10 Year event
Inflow = 42.01 cfs @ 12.16 hrs, Volume= 3.732 af
Outflow = 15.08 cfs @ 12.50 hrs, Volume= 2.275 af, Atten= 64%, Lag= 20.8 min
Primary = 9.22 cfs @ 12.50 hrs, Volume= 2.105 af
Routed to Pond POND 1.3 : OUTLET CULVERTS
Secondary = 5.86 cfs @ 12.50 hrs, Volume= 0.170 af
Routed to Pond POND 1.3 : OUTLET CULVERTS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 46.78' @ 12.50 hrs Surf.Area= 21,240 sf Storage= 83,438 cf
Flood Elev= 48.00' Surf.Area= 23,557 sf Storage= 110,845 cf

Plug-Flow detention time= 226.3 min calculated for 2.275 af (61% of inflow)
Center-of-Mass det. time= 125.2 min (916.2 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	39.05'	110,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
39.05	9,855	0.0	0	0
41.35	9,855	30.0	6,800	6,800
42.00	9,855	45.0	2,883	9,683
43.00	11,943	100.0	10,899	20,582
44.00	14,202	100.0	13,073	33,654
45.00	16,891	100.0	15,547	49,201
46.00	19,752	100.0	18,322	67,522
47.00	21,668	100.0	20,710	88,232
48.00	23,557	100.0	22,613	110,845

Device	Routing	Invert	Outlet Devices
#1	Primary	41.35'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.35' / 41.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	41.35'	**3.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	46.00'	**4.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#5	Device 1	47.00'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads
#6	Secondary	46.50'	**15.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9.22 cfs @ 12.50 hrs HW=46.78' TW=38.77' (Dynamic Tailwater)
└─**1=Culvert** (Passes 9.22 cfs of 18.40 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.74 cfs @ 11.06 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.30 cfs @ 6.19 fps)
  ├─**4=Sharp-Crested Rectangular Weir** (Orifice Controls 8.17 cfs @ 4.19 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=5.85 cfs @ 12.50 hrs HW=46.78' TW=38.77' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 5.85 cfs @ 1.41 fps)

Summary for Pond POND 1.1: GRAVEL WETLAND 2

Inflow Area = 3.614 ac, 30.92% Impervious, Inflow Depth > 3.21" for 10 Year event
Inflow = 12.40 cfs @ 12.12 hrs, Volume= 0.966 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link LINK 1.0 : PDMH203 TAILWATER

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 54.11' @ 24.00 hrs Surf.Area= 14,115 sf Storage= 42,049 cf
Flood Elev= 57.00' Surf.Area= 21,643 sf Storage= 94,743 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	47.55'	117,304 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.55	6,269	0.0	0	0
49.85	6,269	30.0	4,326	4,326
50.50	6,269	45.0	1,834	6,159
51.00	7,199	100.0	3,367	9,526
52.00	9,187	100.0	8,193	17,719
53.00	11,345	100.0	10,266	27,985
54.00	13,814	100.0	12,580	40,565
55.00	16,645	100.0	15,230	55,794
56.00	19,805	100.0	18,225	74,019
58.00	23,480	100.0	43,285	117,304

Device	Routing	Invert	Outlet Devices
#1	Primary	49.85'	**24.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.85' / 49.45' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	49.85'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	53.50'	**4.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	56.50'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600

Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.55' TW=55.07' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond POND 1.2: PDMH203

Inflow Area = 6.231 ac, 42.41% Impervious, Inflow Depth > 1.73" for 10 Year event
Inflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Outflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af, Atten= 0%, Lag= 0.0 min
Primary = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Routed to Reach REACH 1.0 : RESTORED HODGSON BROOK

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 50.72' @ 12.09 hrs
Flood Elev= 57.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.35'	**48.0" Round Culvert** L= 269.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 49.35' / 48.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=11.76 cfs @ 12.09 hrs HW=50.71' TW=48.76' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 11.76 cfs @ 3.13 fps)

Summary for Pond POND 1.3: OUTLET CULVERTS

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=12)
[62] Hint: Exceeded Reach REACH 1.0 OUTLET depth by 2.58' @ 23.95 hrs

Inflow Area = 30.477 ac, 37.74% Impervious, Inflow Depth > 2.34" for 10 Year event
Inflow = 31.34 cfs @ 12.51 hrs, Volume= 5.942 af
Outflow = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af, Atten= 0%, Lag= 1.3 min
Primary = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af
Routed to Link PA1 : POINT OF ANALYSIS
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link PA1 : POINT OF ANALYSIS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 38.77' @ 12.53 hrs Surf.Area= 8,870 sf Storage= 13,560 cf
Flood Elev= 43.50' Surf.Area= 95,977 sf Storage= 236,017 cf

Plug-Flow detention time= 56.2 min calculated for 5.642 af (95% of inflow)
Center-of-Mass det. time= 29.8 min (900.3 - 870.4)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	236,017 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.00	960	0	0
36.00	1,428	1,194	1,194
38.00	5,418	6,846	8,040
40.00	14,354	19,772	27,812
42.00	66,884	81,238	109,050
43.00	92,707	79,796	188,846
43.50	95,977	47,171	236,017

Device	Routing	Invert	Outlet Devices
#1	Primary	35.60'	**42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch CMP_Arch_1/2 42x29 X 3.00** L= 68.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.60' / 35.30' S= 0.0044 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf
#2	Secondary	43.00'	**143.1 deg x 18.0' long x 0.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=31.11 cfs @ 12.53 hrs HW=38.77' TW=38.65' (Dynamic Tailwater)
└─**1=CMP_Arch_1/2 42x29** (Outlet Controls 31.11 cfs @ 1.55 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.04' TW=38.65' (Dynamic Tailwater)
└─**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond POND 1.4: SEDIMENT BASIN 1.0

Inflow Area = 7.248 ac, 0.42% Impervious, Inflow Depth > 2.83" for 10 Year event
Inflow = 18.77 cfs @ 12.19 hrs, Volume= 1.708 af
Outflow = 0.68 cfs @ 17.24 hrs, Volume= 0.950 af, Atten= 96%, Lag= 303.1 min
Primary = 0.68 cfs @ 17.24 hrs, Volume= 0.950 af
Routed to Pond POND 1.3 : OUTLET CULVERTS
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond POND 1.3 : OUTLET CULVERTS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 44.15' Surf.Area= 18,132 sf Storage= 11,702 cf
Peak Elev= 45.79' @ 17.24 hrs Surf.Area= 29,244 sf Storage= 50,580 cf (38,878 cf above start)
Flood Elev= 48.50' Surf.Area= 38,802 sf Storage= 127,441 cf (115,739 cf above start)

Plug-Flow detention time= 356.2 min calculated for 0.680 af (40% of inflow)
Center-of-Mass det. time= 9.2 min (846.8 - 837.5)

Volume	Invert	Avail.Storage	Storage Description
#1	43.00'	127,441 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	1,000	0	0
44.00	17,117	9,059	9,059
46.00	30,657	47,774	56,833
47.00	35,879	33,268	90,101
48.00	38,802	37,341	127,441

Device	Routing	Invert	Outlet Devices
#1	Primary	42.75'	**12.0" Round Culvert** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 42.75' / 42.40' S= 0.0053 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	43.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	46.80'	**10.0" x 17.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	47.40'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.10 Width (feet) 8.00 14.60

Primary OutFlow Max=0.68 cfs @ 17.24 hrs HW=45.79' TW=38.65' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.68 cfs of 5.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.68 cfs @ 7.80 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=44.15' TW=35.04' (Dynamic Tailwater)
└─**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Summary for Link LINK 1.0: PDMH203 TAILWATER

This link takes into account the tailwater condition in PDMH203 which the outlet of gravel wetland 2 connects. The purpose of this is to determine the effects of any surcharging caused by the tailwater of Hodgson Brook entering the structure. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

[80] Warning: Exceeded Pond POND 1.1 by 7.52' @ 0.00 hrs (23.95 cfs 41.618 af)

Inflow Area = 3.614 ac, 30.92% Impervious, Inflow Depth = 0.00" for 10 Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Pond POND 1.2 : PDMH203

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 25 Point manual elevation table, To= 0.00 hrs, dt= 1.00 hrs, feet =

55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07		

Summary for Link PA1: POINT OF ANALYSIS

This link takes into account the tailwater condition in roadside swale along Goose Bay Drive which the existing culverts discharge into. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.3 by 3.61' @ 0.00 hrs (92.51 cfs 60.023 af)

Inflow Area = 30.477 ac, 37.74% Impervious, Inflow Depth > 2.23" for 10 Year event
Inflow = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af
Primary = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 2 Point manual elevation table, To= 0.00 hrs, dt= 24.00 hrs, feet =
38.65 38.65

Summary for Link PA2: POINT OF ANALYSIS

Inflow Area = 1.133 ac, 53.76% Impervious, Inflow Depth > 4.11" for 10 Year event
Inflow = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af
Primary = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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

SubcatchmentPOST 1.0: WATERSHED Runoff Area=440,332 sf 71.49% Impervious Runoff Depth>5.88"
Flow Length=933' Tc=11.4 min CN=90 Runoff=54.93 cfs 4.956 af

SubcatchmentPOST 1.1: WATERSHED Runoff Area=157,428 sf 30.92% Impervious Runoff Depth>4.53"
Flow Length=464' Tc=8.3 min CN=78 Runoff=17.44 cfs 1.365 af

SubcatchmentPOST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>5.54"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=15.85 cfs 1.209 af

SubcatchmentPOST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>4.50"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=16.75 cfs 2.583 af

SubcatchmentPOST 1.4: WATERSHED1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>4.09"
Flow Length=585' Tc=13.5 min CN=74 Runoff=27.23 cfs 2.472 af

SubcatchmentPOST 2.0: WATERSHED2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>5.54"
Flow Length=758' Tc=5.0 min CN=87 Runoff=7.12 cfs 0.523 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.87' Max Vel=2.22 fps Inflow=15.85 cfs 1.209 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=8.65 cfs 1.202 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.10' Storage=90,424 cf Inflow=54.93 cfs 4.956 af
Primary=19.03 cfs 2.766 af Secondary=18.86 cfs 0.671 af Outflow=37.88 cfs 3.437 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=55.22' Storage=59,446 cf Inflow=17.44 cfs 1.365 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.94' Inflow=15.85 cfs 1.209 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=15.85 cfs 1.209 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.17' Storage=17,433 cf Inflow=57.33 cfs 8.292 af
Primary=56.26 cfs 7.985 af Secondary=0.00 cfs 0.000 af Outflow=56.26 cfs 7.985 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=46.65' Storage=77,792 cf Inflow=27.23 cfs 2.472 af
Primary=0.78 cfs 1.070 af Secondary=0.00 cfs 0.000 af Outflow=0.78 cfs 1.070 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=56.26 cfs 7.985 af
Primary=56.26 cfs 7.985 af

Link PA2: POINT OF ANALYSIS Inflow=7.12 cfs 0.523 af
Primary=7.12 cfs 0.523 af

Total Runoff Area = 31.609 ac Runoff Volume = 13.108 af Average Runoff Depth = 4.98"
61.68% Pervious = 19.497 ac 38.32% Impervious = 12.112 ac

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

SubcatchmentPOST 1.0: WATERSHED Runoff Area=440,332 sf 71.49% Impervious Runoff Depth>7.25"
Flow Length=933' Tc=11.4 min CN=90 Runoff=66.89 cfs 6.105 af

SubcatchmentPOST 1.1: WATERSHED Runoff Area=157,428 sf 30.92% Impervious Runoff Depth>5.81"
Flow Length=464' Tc=8.3 min CN=78 Runoff=22.21 cfs 1.750 af

SubcatchmentPOST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>6.89"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=19.47 cfs 1.503 af

SubcatchmentPOST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>5.77"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=21.37 cfs 3.312 af

SubcatchmentPOST 1.4: WATERSHED1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>5.33"
Flow Length=585' Tc=13.5 min CN=74 Runoff=35.32 cfs 3.218 af

SubcatchmentPOST 2.0: WATERSHED2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>6.89"
Flow Length=758' Tc=5.0 min CN=87 Runoff=8.76 cfs 0.651 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.92' Max Vel=2.24 fps Inflow=19.47 cfs 1.503 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=11.76 cfs 1.495 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.39' Storage=96,897 cf Inflow=66.89 cfs 6.105 af
Primary=19.58 cfs 3.347 af Secondary=33.37 cfs 1.209 af Outflow=52.94 cfs 4.556 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=56.11' Storage=76,209 cf Inflow=22.21 cfs 1.750 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=51.13' Inflow=19.47 cfs 1.503 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=19.47 cfs 1.503 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.58' Storage=22,150 cf Inflow=76.91 cfs 10.982 af
Primary=74.09 cfs 10.655 af Secondary=0.00 cfs 0.000 af Outflow=74.09 cfs 10.655 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=47.02' Storage=90,878 cf Inflow=35.32 cfs 3.218 af
Primary=2.39 cfs 1.619 af Secondary=0.00 cfs 0.000 af Outflow=2.39 cfs 1.619 af

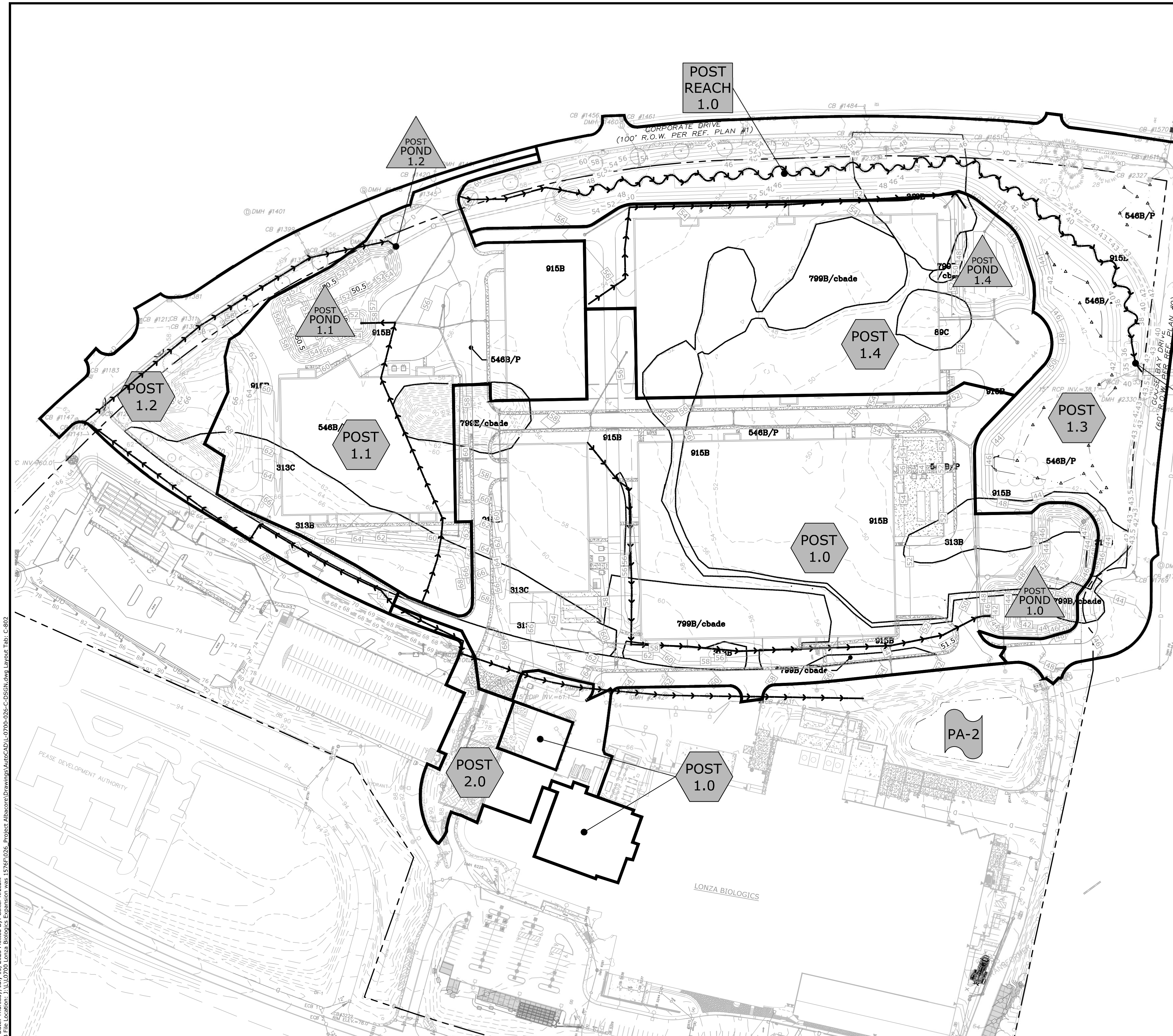
Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=74.09 cfs 10.655 af
Primary=74.09 cfs 10.655 af

Link PA2: POINT OF ANALYSIS Inflow=8.76 cfs 0.651 af
Primary=8.76 cfs 0.651 af

Total Runoff Area = 31.609 ac Runoff Volume = 16.539 af Average Runoff Depth = 6.28"
61.68% Pervious = 19.497 ac 38.32% Impervious = 12.112 ac

Master Post-Development Calculations



LEGEND

- POST-DEVELOPMENT WATERSHED BOUNDARY
- SOIL SURVEY BOUNDARIES
- LONGEST FLOW PATH
- POST 1.0 — POST-DEVELOPMENT WATERSHED AREA DESIGNATION
- POST POND 1 — POST-DEVELOPMENT POND DESIGNATION
- PA-1 — POINT OF ANALYSIS
- POST REACH 1 — POST-DEVELOPMENT REACH DESIGNATION

NOTES:

1. SOIL SURVEY WAS PERFORMED BY GOVE ENVIRONMENTAL SERVICES.

SOIL IDENTIFICATION LEGEND

SYMBOL	SOIL TAXONOMIC NAME, SLOPE RATING
89C	CHATFIELD, 8 TO 15 PERCENT SLOPES
313B	DEERFIELD, 0 TO 8 PERCENT SLOPES
313C	DEERFIELD, 8 TO 15 PERCENT SLOPES
915B	DEERFIELD VARIANT, 0 TO 8 PERCENT SLOPES
546B/P	WALPOLE POORLY DRAINED, 0 TO 8 PERCENT SLOPES
799B	UDORTHENTS URBAN LAND, 0 TO 8 PERCENT SLOPES
799E	UDORTHENTS URBAN LAND, >25 PERCENT SLOPES

Tighe&Bond

Proposed Industrial Development

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
L	7/17/2023	Amended Site Plan Review
K	5/5/2023	Phase 1B Issued for Bid
J	3/15/2023	Phase 1B Issued for Preliminary Pricing
I	1/9/2023	Admin. Approval Submission
H	12/10/2021	Planning Board Stipulation
G	8/19/2019	Admin. Approval Submission
F	11/6/2018	P.B. Submission

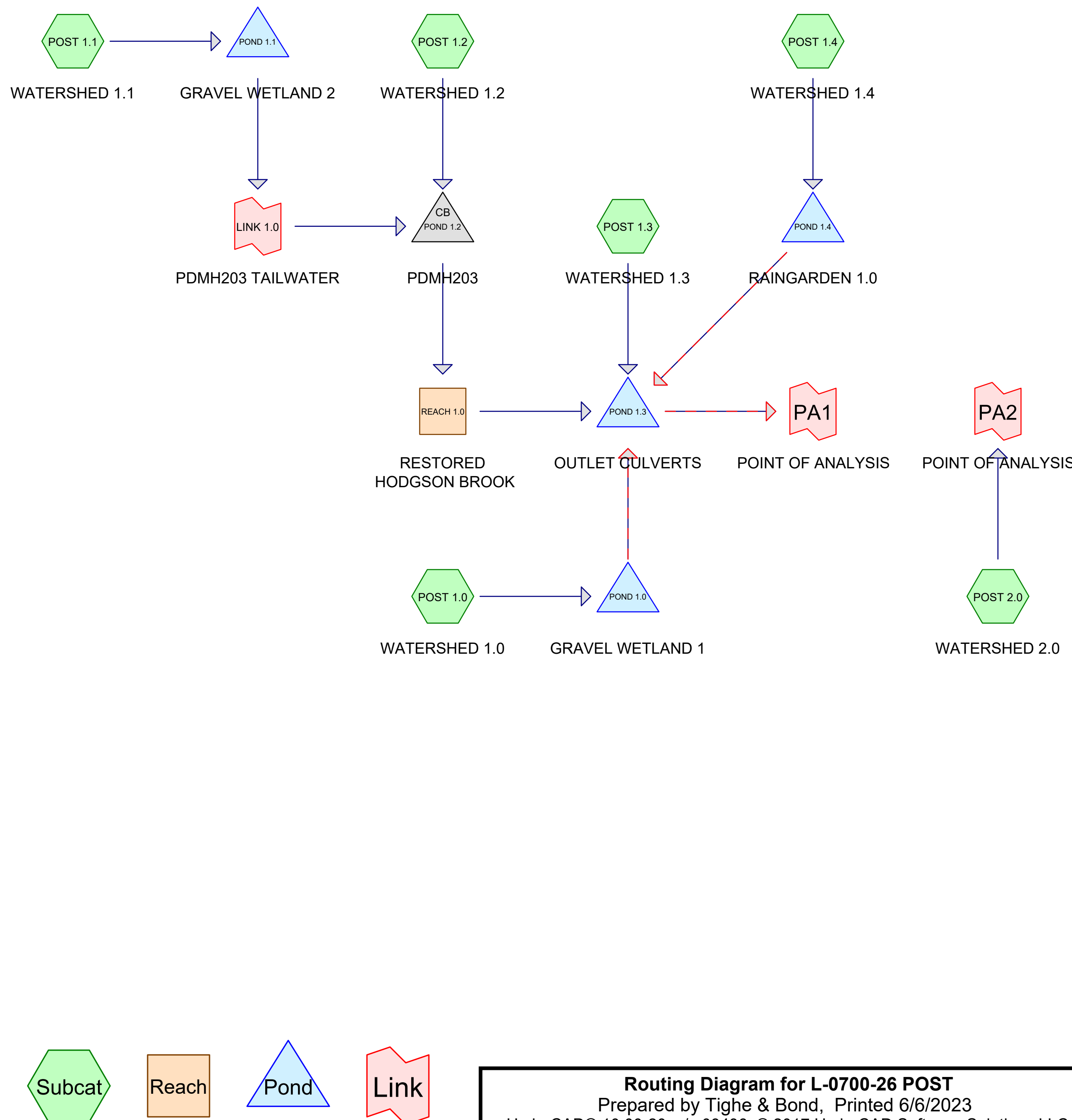
PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

POST-DEVELOPMENT WATERSHED AREA PLAN

SCALE: AS SHOWN

C-802

Last Save Date: July 13, 2023 3:42 PM By: CKRZCUIK
Plot Date: Thursday, July 13, 2023 Plotted By: Colter Krzcuik
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-802



Routing Diagram for L-0700-26 POST
Prepared by Tighe & Bond, Printed 6/6/2023
HydroCAD® 10.00-20 s/n 03436 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.776	61	>75% Grass cover, Good, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4)
6.801	74	>75% Grass cover, Good, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
0.436	80	>75% Grass cover, Good, HSG D (POST 1.0, POST 1.3, POST 1.4)
0.323	58	Meadow, non-grazed, HSG B (POST 1.3)
3.143	71	Meadow, non-grazed, HSG C (POST 1.3)
0.799	98	Paved parking, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4)
7.546	98	Paved parking, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
0.146	98	Paved parking, HSG D (POST 1.0, POST 1.3, POST 1.4)
0.688	98	Roofs, HSG B (POST 1.0, POST 1.1, POST 1.4)
8.166	98	Roofs, HSG C (POST 1.0, POST 1.1, POST 1.4, POST 2.0)
1.737	98	Roofs, HSG D (POST 1.0, POST 1.4)
0.049	76	Woods/grass comb., Fair, HSG C (POST 1.3)
31.609	**87**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.586	HSG B	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4
25.705	HSG C	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0
2.318	HSG D	POST 1.0, POST 1.3, POST 1.4
0.000	Other	
31.609		**TOTAL AREA**

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

Subcatchment POST 1.0: WATERSHED Runoff Area=462,599 sf 72.19% Impervious Runoff Depth>2.71"
Flow Length=933' Tc=11.4 min CN=91 Runoff=27.46 cfs 2.396 af

Subcatchment POST 1.1: WATERSHED Runoff Area=242,496 sf 58.73% Impervious Runoff Depth>2.25"
Flow Length=750' Tc=10.3 min CN=86 Runoff=12.60 cfs 1.046 af

Subcatchment POST 1.2: WATERSHED Runoff Area=101,204 sf 62.15% Impervious Runoff Depth>2.43"
Flow Length=1,191' Tc=6.4 min CN=88 Runoff=6.37 cfs 0.471 af

Subcatchment POST 1.3: WATERSHED Runoff Area=306,549 sf 22.64% Impervious Runoff Depth>1.55"
Flow Length=1,525' Tc=45.9 min CN=77 Runoff=5.81 cfs 0.908 af

Subcatchment POST 1.4: WATERSHED Runoff Area=214,764 sf 85.05% Impervious Runoff Depth>3.01"
Flow Length=717' Tc=7.5 min CN=94 Runoff=15.51 cfs 1.236 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,290 sf 80.99% Impervious Runoff Depth>2.91"
Flow Length=758' Tc=5.0 min CN=93 Runoff=3.72 cfs 0.274 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.60' Max Vel=2.03 fps Inflow=6.37 cfs 0.617 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=4.54 cfs 0.608 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.16' Storage=70,734 cf Inflow=27.46 cfs 2.396 af
Primary=1.57 cfs 1.041 af Secondary=0.00 cfs 0.000 af Outflow=1.57 cfs 1.041 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=53.90' Storage=39,230 cf Inflow=12.60 cfs 1.046 af
Outflow=0.40 cfs 0.146 af

Pond POND 1.2: PDMH203 Peak Elev=50.33' Inflow=6.37 cfs 0.617 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=6.37 cfs 0.617 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.16' Storage=8,984 cf Inflow=9.25 cfs 3.255 af
Primary=9.41 cfs 3.050 af Secondary=0.00 cfs 0.000 af Outflow=9.41 cfs 3.050 af

Pond POND 1.4: RAINGARDEN 1.0 Peak Elev=47.27' Storage=34,235 cf Inflow=15.51 cfs 1.236 af
Primary=1.31 cfs 0.699 af Secondary=0.00 cfs 0.000 af Outflow=1.31 cfs 0.699 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.40 cfs 0.146 af
Primary=0.40 cfs 0.146 af

Link PA1: POINT OF ANALYSIS Inflow=9.41 cfs 3.050 af
Primary=9.41 cfs 3.050 af

Link PA2: POINT OF ANALYSIS Inflow=3.72 cfs 0.274 af
Primary=3.72 cfs 0.274 af

Total Runoff Area = 31.609 ac Runoff Volume = 6.331 af Average Runoff Depth = 2.40"
39.63% Pervious = 12.527 ac 60.37% Impervious = 19.083 ac

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

SubcatchmentPOST 1.0: WATERSHED Runoff Area=462,599 sf 72.19% Impervious Runoff Depth>4.54"
Flow Length=933' Tc=11.4 min CN=91 Runoff=44.88 cfs 4.017 af

SubcatchmentPOST 1.1: WATERSHED Runoff Area=242,496 sf 58.73% Impervious Runoff Depth>4.01"
Flow Length=750' Tc=10.3 min CN=86 Runoff=22.02 cfs 1.858 af

SubcatchmentPOST 1.2: WATERSHED Runoff Area=101,204 sf 62.15% Impervious Runoff Depth>4.22"
Flow Length=1,191' Tc=6.4 min CN=88 Runoff=10.81 cfs 0.817 af

SubcatchmentPOST 1.3: WATERSHED Runoff Area=306,549 sf 22.64% Impervious Runoff Depth>3.09"
Flow Length=1,525' Tc=45.9 min CN=77 Runoff=11.76 cfs 1.810 af

SubcatchmentPOST 1.4: WATERSHED Runoff Area=214,764 sf 85.05% Impervious Runoff Depth>4.88"
Flow Length=717' Tc=7.5 min CN=94 Runoff=24.45 cfs 2.004 af

SubcatchmentPOST 2.0: WATERSHED2.0 Runoff Area=49,290 sf 80.99% Impervious Runoff Depth>4.77"
Flow Length=758' Tc=5.0 min CN=93 Runoff=5.94 cfs 0.449 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.81' Max Vel=2.20 fps Inflow=10.81 cfs 1.367 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=6.07 cfs 1.355 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.94' Storage=86,832 cf Inflow=44.88 cfs 4.017 af
Primary=7.09 cfs 2.106 af Secondary=11.63 cfs 0.435 af Outflow=18.72 cfs 2.541 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=55.08' Storage=57,197 cf Inflow=22.02 cfs 1.858 af
Outflow=1.76 cfs 0.550 af

Pond POND 1.2: PDMH203 Peak Elev=50.65' Inflow=10.81 cfs 1.367 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=10.81 cfs 1.367 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.86' Storage=14,364 cf Inflow=40.12 cfs 7.107 af
Primary=39.92 cfs 6.819 af Secondary=0.00 cfs 0.000 af Outflow=39.92 cfs 6.819 af

Pond POND 1.4: RAINGARDEN1.0 Peak Elev=48.07' Storage=45,635 cf Inflow=24.45 cfs 2.004 af
Primary=6.60 cfs 1.401 af Secondary=0.00 cfs 0.000 af Outflow=6.60 cfs 1.401 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=1.76 cfs 0.550 af
Primary=1.76 cfs 0.550 af

Link PA1: POINT OF ANALYSIS Inflow=39.92 cfs 6.819 af
Primary=39.92 cfs 6.819 af

Link PA2: POINT OF ANALYSIS Inflow=5.94 cfs 0.449 af
Primary=5.94 cfs 0.449 af

Total Runoff Area = 31.609 ac Runoff Volume = 10.955 af Average Runoff Depth = 4.16"
39.63% Pervious = 12.527 ac 60.37% Impervious = 19.083 ac

Summary for Subcatchment POST 1.0: WATERSHED 1.0

Runoff = 44.88 cfs @ 12.15 hrs, Volume= 4.017 af, Depth> 4.54"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
5,235	98	Roofs, HSG B
22,410	61	>75% Grass cover, Good, HSG B
19,146	98	Paved parking, HSG B
157,967	98	Roofs, HSG C
90,117	74	>75% Grass cover, Good, HSG C
114,873	98	Paved parking, HSG C
31,357	98	Roofs, HSG D
16,138	80	>75% Grass cover, Good, HSG D
5,356	98	Paved parking, HSG D
462,599	91	Weighted Average
128,665		27.81% Pervious Area
333,934		72.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.2	32	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	19	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	162	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.4	84	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.5	113	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
1.2	299	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.4	94	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.1	46	0.0240	11.16	35.05	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.0	5	0.0800	7.16	0.98	**Pipe Channel,** 5.0" Round Area= 0.1 sf Perim= 1.3' r= 0.10' n= 0.013
0.0	9	0.0110	9.90	69.95	**Pipe Channel,**

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
11.4	933	Total			

Summary for Subcatchment POST 1.1: WATERSHED 1.1

Runoff = 22.02 cfs @ 12.14 hrs, Volume= 1.858 af, Depth> 4.01"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
13,692	98	Roofs, HSG B
32,710	61	>75% Grass cover, Good, HSG B
2,729	98	Paved parking, HSG B
88,019	98	Roofs, HSG C
67,375	74	>75% Grass cover, Good, HSG C
37,971	98	Paved parking, HSG C
242,496	86	Weighted Average
100,085		41.27% Pervious Area
142,411		58.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0380	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.2	163	0.0245	2.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.5	283	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.1	81	0.0240	9.21	16.27	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.4	123	0.0050	5.09	16.00	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
10.3	750	Total			

Summary for Subcatchment POST 1.2: WATERSHED 1.2

Runoff = 10.81 cfs @ 12.09 hrs, Volume= 0.817 af, Depth> 4.22"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
6,874	61	>75% Grass cover, Good, HSG B
4,785	98	Paved parking, HSG B
31,436	74	>75% Grass cover, Good, HSG C
58,109	98	Paved parking, HSG C
101,204	88	Weighted Average
38,310		37.85% Pervious Area
62,894		62.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0100	1.12		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.0	153	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	343	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	13	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.8	453	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	129	0.0050	5.91	29.00	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior
6.4	1,191	Total			

Summary for Subcatchment POST 1.3: WATERSHED 1.3

Runoff = 11.76 cfs @ 12.63 hrs, Volume= 1.810 af, Depth> 3.09"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
11,450	61	>75% Grass cover, Good, HSG B
14,068	58	Meadow, non-grazed, HSG B
908	98	Paved parking, HSG B
70,956	74	>75% Grass cover, Good, HSG C
136,905	71	Meadow, non-grazed, HSG C
2,120	76	Woods/grass comb., Fair, HSG C
68,005	98	Paved parking, HSG C
1,638	80	>75% Grass cover, Good, HSG D
499	98	Paved parking, HSG D
306,549	77	Weighted Average
237,137		77.36% Pervious Area
69,412		22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0130	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.1	52	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	27	0.2720	7.82		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
33.8	1,346	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
45.9	1,525	Total			

Summary for Subcatchment POST 1.4: WATERSHED 1.4

Runoff = 24.45 cfs @ 12.10 hrs, Volume= 2.004 af, Depth> 4.88"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
11,051	98	Roofs, HSG B
3,902	61	>75% Grass cover, Good, HSG B
7,241	98	Paved parking, HSG B
86,748	98	Roofs, HSG C
26,995	74	>75% Grass cover, Good, HSG C
32,822	98	Paved parking, HSG C
44,300	98	Roofs, HSG D
1,206	80	>75% Grass cover, Good, HSG D
499	98	Paved parking, HSG D
214,764	94	Weighted Average
32,103		14.95% Pervious Area
182,661		85.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	40	0.0150	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.3	53	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	65	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.4	115	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.7	140	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.9	275	0.0070	4.97	8.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013

0.0	29	0.0550	13.94	24.63	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
7.5	717	Total			

Summary for Subcatchment POST 2.0: WATERSHED 2.0

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.94 cfs @ 12.07 hrs, Volume= 0.449 af, Depth> 4.77"

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 Year Rainfall=5.58"

Area (sf)	CN	Description
22,995	98	Roofs, HSG C
9,368	74	>75% Grass cover, Good, HSG C
16,927	98	Paved parking, HSG C
49,290	93	Weighted Average
9,368		19.01% Pervious Area
39,922		80.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0164	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.3	48	0.0164	2.60		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	130	0.0140	7.03	12.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.5	70	0.0250	2.37		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.3	410	0.0050	5.09	16.00	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
3.6	758	Total, Increased to minimum Tc = 5.0 min			

Summary for Reach REACH 1.0: RESTORED HODGSON BROOK

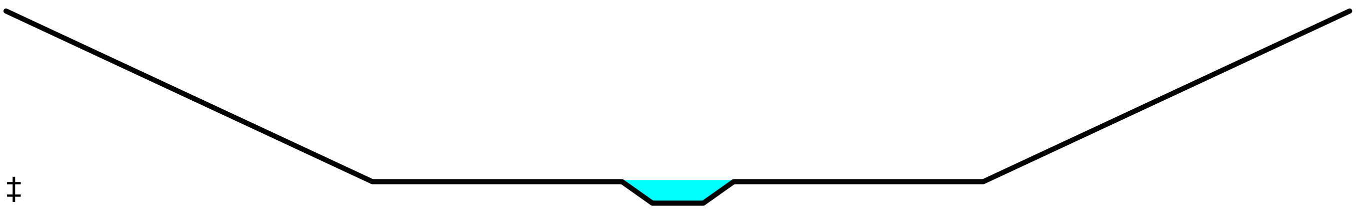
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area = 7.890 ac, 59.73% Impervious, Inflow Depth > 2.08" for 10 Year event
Inflow = 10.81 cfs @ 12.09 hrs, Volume= 1.367 af
Outflow = 6.07 cfs @ 12.81 hrs, Volume= 1.355 af, Atten= 44%, Lag= 42.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 9.9 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 21.0 min

Peak Storage= 6,364 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 6.75' Flow Area= 291.0 sf, Capacity= 2,720.29 cfs

Custom cross-section, Length= 1,309.0' Slope= 0.0092 '/' (101 Elevation Intervals)
Constant n= 0.040 Winding stream, pools & shoals
Inlet Invert= 48.00', Outlet Invert= 36.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	12.00	0.00
18.00	6.00	6.00
30.25	6.00	6.00
31.75	5.25	6.75
34.25	5.25	6.75
35.75	6.00	6.00
48.00	6.00	6.00
66.00	12.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	2.5	0	0.00
0.75	3.0	30.4	3,927	2.28
6.75	291.0	68.3	380,919	2,720.29

Summary for Pond POND 1.0: GRAVEL WETLAND 1

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 10.620 ac, 72.19% Impervious, Inflow Depth > 4.54" for 10 Year event
Inflow = 44.88 cfs @ 12.15 hrs, Volume= 4.017 af
Outflow = 18.72 cfs @ 12.45 hrs, Volume= 2.541 af, Atten= 58%, Lag= 18.0 min
Primary = 7.09 cfs @ 12.45 hrs, Volume= 2.106 af
Secondary = 11.63 cfs @ 12.45 hrs, Volume= 0.435 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 46.94' @ 12.45 hrs Surf.Area= 21,544 sf Storage= 86,832 cf
Flood Elev= 48.00' Surf.Area= 23,557 sf Storage= 110,845 cf

Plug-Flow detention time= 216.6 min calculated for 2.536 af (63% of inflow)
Center-of-Mass det. time= 118.8 min (906.1 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1	39.05'	110,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
39.05	9,855	0.0	0	0
41.35	9,855	30.0	6,800	6,800
42.00	9,855	45.0	2,883	9,683
43.00	11,943	100.0	10,899	20,582
44.00	14,202	100.0	13,073	33,654
45.00	16,891	100.0	15,547	49,201
46.00	19,752	100.0	18,322	67,522
47.00	21,668	100.0	20,710	88,232
48.00	23,557	100.0	22,613	110,845

Device	Routing	Invert	Outlet Devices
#1	Primary	41.35'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.35' / 41.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	41.35'	**3.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	45.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	46.00'	**3.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 4.0' Crest Height
#5	Device 1	47.00'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads
#6	Secondary	46.50'	**15.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=7.09 cfs @ 12.45 hrs HW=46.93' TW=38.85' (Dynamic Tailwater)
└─**1=Culvert** (Passes 7.09 cfs of 18.71 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.75 cfs @ 11.23 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.48 fps)
  ├─**4=Sharp-Crested Rectangular Weir** (Orifice Controls 6.02 cfs @ 4.15 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=11.59 cfs @ 12.45 hrs HW=46.93' TW=38.85' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 11.59 cfs @ 1.78 fps)

Summary for Pond POND 1.1: GRAVEL WETLAND 2

Inflow Area = 5.567 ac, 58.73% Impervious, Inflow Depth > 4.01" for 10 Year event
Inflow = 22.02 cfs @ 12.14 hrs, Volume= 1.858 af
Outflow = 1.76 cfs @ 13.65 hrs, Volume= 0.550 af, Atten= 92%, Lag= 90.5 min
Primary = 1.76 cfs @ 13.65 hrs, Volume= 0.550 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 55.08' @ 13.65 hrs Surf.Area= 16,909 sf Storage= 57,197 cf
Flood Elev= 57.00' Surf.Area= 21,643 sf Storage= 94,743 cf

Plug-Flow detention time= 357.2 min calculated for 0.550 af (30% of inflow)
Center-of-Mass det. time= 218.3 min (1,021.7 - 803.4)

Volume	Invert	Avail.Storage	Storage Description
#1	47.55'	117,304 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.55	6,269	0.0	0	0
49.85	6,269	30.0	4,326	4,326
50.50	6,269	45.0	1,834	6,159
51.00	7,199	100.0	3,367	9,526
52.00	9,187	100.0	8,193	17,719
53.00	11,345	100.0	10,266	27,985
54.00	13,814	100.0	12,580	40,565
55.00	16,645	100.0	15,230	55,794
56.00	19,805	100.0	18,225	74,019
58.00	23,480	100.0	43,285	117,304

Device	Routing	Invert	Outlet Devices
#1	Primary	49.85'	**24.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.85' / 49.45' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	49.85'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	53.50'	**4.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	56.50'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.76 cfs @ 13.65 hrs HW=55.08' TW=55.07' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.76 cfs @ 0.56 fps)
2=Orifice/Grate (Passes < 0.01 cfs potential flow)
3=Sharp-Crested Rectangular Weir (Passes < 3.33 cfs potential flow)
4=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond POND 1.2: PDMH203

Inflow Area = 7.890 ac, 59.73% Impervious, Inflow Depth > 2.08" for 10 Year event
Inflow = 10.81 cfs @ 12.09 hrs, Volume= 1.367 af
Outflow = 10.81 cfs @ 12.09 hrs, Volume= 1.367 af, Atten= 0%, Lag= 0.0 min
Primary = 10.81 cfs @ 12.09 hrs, Volume= 1.367 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 50.65' @ 12.09 hrs
Flood Elev= 57.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.35'	**48.0" Round Culvert** L= 269.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 49.35' / 48.00' S= 0.0050 '/' Cc= 0.900

n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=10.64 cfs @ 12.09 hrs HW=50.64' TW=48.75' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.64 cfs @ 3.05 fps)

Summary for Pond POND 1.3: OUTLET CULVERTS

[62] Hint: Exceeded Reach REACH 1.0 OUTLET depth by 2.50' @ 23.95 hrs

Inflow Area = 30.478 ac, 59.60% Impervious, Inflow Depth > 2.80" for 10 Year event
Inflow = 40.12 cfs @ 12.47 hrs, Volume= 7.107 af
Outflow = 39.92 cfs @ 12.50 hrs, Volume= 6.819 af, Atten= 0%, Lag= 1.8 min
Primary = 39.92 cfs @ 12.50 hrs, Volume= 6.819 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 38.86' @ 12.50 hrs Surf.Area= 9,266 sf Storage= 14,364 cf
Flood Elev= 43.50' Surf.Area= 95,977 sf Storage= 236,017 cf

Plug-Flow detention time= 32.3 min calculated for 6.819 af (96% of inflow)
Center-of-Mass det. time= 11.6 min (905.1 - 893.5)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	236,017 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.00	960	0	0
36.00	1,428	1,194	1,194
38.00	5,418	6,846	8,040
40.00	14,354	19,772	27,812
42.00	66,884	81,238	109,050
43.00	92,707	79,796	188,846
43.50	95,977	47,171	236,017

Device	Routing	Invert	Outlet Devices
#1	Primary	35.60'	**42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch CMP_Arch_1/2 42x29 X 3.00** L= 68.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.60' / 35.30' S= 0.0044 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf
#2	Secondary	43.00'	**143.1 deg x 18.0' long x 0.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=39.88 cfs @ 12.50 hrs HW=38.86' TW=38.65' (Dynamic Tailwater)
└─**1=CMP_Arch_1/2 42x29** (Outlet Controls 39.88 cfs @ 1.98 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.00' TW=38.65' (Dynamic Tailwater)
└─**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond POND 1.4: RAINGARDEN 1.0

Inflow Area = 4.930 ac, 85.05% Impervious, Inflow Depth > 4.88" for 10 Year event
Inflow = 24.45 cfs @ 12.10 hrs, Volume= 2.004 af
Outflow = 6.60 cfs @ 12.48 hrs, Volume= 1.401 af, Atten= 73%, Lag= 22.2 min
Primary = 6.60 cfs @ 12.48 hrs, Volume= 1.401 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 48.07' @ 12.48 hrs Surf.Area= 14,774 sf Storage= 45,635 cf
Flood Elev= 50.00' Surf.Area= 17,790 sf Storage= 77,050 cf

Plug-Flow detention time= 233.7 min calculated for 1.398 af (70% of inflow)
Center-of-Mass det. time= 143.1 min (914.3 - 771.2)

Volume	Invert	Avail.Storage	Storage Description
#1	42.17'	77,050 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.17	10,418	0.0	0	0
43.50	10,418	40.0	5,542	5,542
45.00	10,418	10.0	1,563	7,105
46.00	11,745	100.0	11,082	18,187
48.00	14,664	100.0	26,409	44,596
50.00	17,790	100.0	32,454	77,050

Device	Routing	Invert	Outlet Devices
#1	Primary	42.42'	**12.0" Round Culvert** L= 48.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.42' / 42.20' S= 0.0046 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	42.42'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	45.00'	**10.000 in/hr Exfiltration over Surface area above 45.00'** Excluded Surface area = 10,418 sf
#4	Device 1	47.15'	**13.2" x 13.2" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	49.35'	**7.0' long x 8.9' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69

Primary OutFlow Max=6.59 cfs @ 12.48 hrs HW=48.07' TW=38.86' (Dynamic Tailwater)
└─**1=Culvert** (Passes 6.59 cfs of 6.77 cfs potential flow)
  ├─**2=Orifice/Grate** (Passes 1.01 cfs of 2.20 cfs potential flow)
  │ └─**3=Exfiltration** (Exfiltration Controls 1.01 cfs)
  └─**4=Orifice/Grate** (Orifice Controls 5.58 cfs @ 4.62 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=42.17' TW=35.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link LINK 1.0: PDMH203 TAILWATER

This link takes into account the tailwater condition in PDMH203 which the outlet of gravel wetland 2 connects. The purpose of this is to determine the effects of any surcharging caused by the tailwater of Hodgson Brook entering the structure. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.1 by 7.52' @ 0.00 hrs (23.95 cfs 25.099 af)

Inflow Area = 5.567 ac, 58.73% Impervious, Inflow Depth > 1.19" for 10 Year event
Inflow = 1.76 cfs @ 13.65 hrs, Volume= 0.550 af
Primary = 1.76 cfs @ 13.65 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 25 Point manual elevation table, To= 0.00 hrs, dt= 1.00 hrs, feet =

55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07		

Summary for Link PA1: POINT OF ANALYSIS

This link takes into account the tailwater condition in roadside swale along Goose Bay Drive which the existing culverts discharge into. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.3 by 3.65' @ 0.00 hrs (92.51 cfs 86.028 af)

Inflow Area = 30.478 ac, 59.60% Impervious, Inflow Depth > 2.69" for 10 Year event
Inflow = 39.92 cfs @ 12.50 hrs, Volume= 6.819 af
Primary = 39.92 cfs @ 12.50 hrs, Volume= 6.819 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 2 Point manual elevation table, To= 0.00 hrs, dt= 24.00 hrs, feet =
38.65 38.65

Summary for Link PA2: POINT OF ANALYSIS

Inflow Area = 1.132 ac, 80.99% Impervious, Inflow Depth > 4.77" for 10 Year event
Inflow = 5.94 cfs @ 12.07 hrs, Volume= 0.449 af
Primary = 5.94 cfs @ 12.07 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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

SubcatchmentPOST 1.0: WATERSHED Runoff Area=462,599 sf 72.19% Impervious Runoff Depth>6.00"
Flow Length=933' Tc=11.4 min CN=91 Runoff=58.40 cfs 5.309 af

SubcatchmentPOST 1.1: WATERSHED Runoff Area=242,496 sf 58.73% Impervious Runoff Depth>5.43"
Flow Length=750' Tc=10.3 min CN=86 Runoff=29.42 cfs 2.517 af

SubcatchmentPOST 1.2: WATERSHED Runoff Area=101,204 sf 62.15% Impervious Runoff Depth>5.66"
Flow Length=1,191' Tc=6.4 min CN=88 Runoff=14.27 cfs 1.095 af

SubcatchmentPOST 1.3: WATERSHED Runoff Area=306,549 sf 22.64% Impervious Runoff Depth>4.39"
Flow Length=1,525' Tc=45.9 min CN=77 Runoff=16.72 cfs 2.574 af

SubcatchmentPOST 1.4: WATERSHED Runoff Area=214,764 sf 85.05% Impervious Runoff Depth>6.35"
Flow Length=717' Tc=7.5 min CN=94 Runoff=31.40 cfs 2.610 af

SubcatchmentPOST 2.0: WATERSHED2.0 Runoff Area=49,290 sf 80.99% Impervious Runoff Depth>6.24"
Flow Length=758' Tc=5.0 min CN=93 Runoff=7.66 cfs 0.588 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.86' Max Vel=2.20 fps Inflow=14.27 cfs 2.076 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=7.67 cfs 2.061 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.21' Storage=92,932 cf Inflow=58.40 cfs 5.309 af
Primary=19.23 cfs 2.787 af Secondary=24.16 cfs 0.988 af Outflow=43.41 cfs 3.776 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=55.71' Storage=68,356 cf Inflow=29.42 cfs 2.517 af
Outflow=4.20 cfs 0.981 af

Pond POND 1.2: PDMH203 Peak Elev=50.86' Inflow=14.27 cfs 2.076 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=14.27 cfs 2.076 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.33' Storage=19,198 cf Inflow=67.56 cfs 10.378 af
Primary=66.14 cfs 10.071 af Secondary=0.00 cfs 0.000 af Outflow=66.14 cfs 10.071 af

Pond POND 1.4: RAINGARDEN1.0 Peak Elev=48.89' Storage=58,248 cf Inflow=31.40 cfs 2.610 af
Primary=7.29 cfs 1.966 af Secondary=0.00 cfs 0.000 af Outflow=7.29 cfs 1.966 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=4.20 cfs 0.981 af
Primary=4.20 cfs 0.981 af

Link PA1: POINT OF ANALYSIS Inflow=66.14 cfs 10.071 af
Primary=66.14 cfs 10.071 af

Link PA2: POINT OF ANALYSIS Inflow=7.66 cfs 0.588 af
Primary=7.66 cfs 0.588 af

Total Runoff Area = 31.609 ac Runoff Volume = 14.693 af Average Runoff Depth = 5.58"
39.63% Pervious = 12.527 ac 60.37% Impervious = 19.083 ac

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

SubcatchmentPOST 1.0: WATERSHED Runoff Area=462,599 sf 72.19% Impervious Runoff Depth>7.37"
Flow Length=933' Tc=11.4 min CN=91 Runoff=70.91 cfs 6.521 af

SubcatchmentPOST 1.1: WATERSHED Runoff Area=242,496 sf 58.73% Impervious Runoff Depth>6.77"
Flow Length=750' Tc=10.3 min CN=86 Runoff=36.28 cfs 3.140 af

SubcatchmentPOST 1.2: WATERSHED Runoff Area=101,204 sf 62.15% Impervious Runoff Depth>7.01"
Flow Length=1,191' Tc=6.4 min CN=88 Runoff=17.48 cfs 1.358 af

SubcatchmentPOST 1.3: WATERSHED Runoff Area=306,549 sf 22.64% Impervious Runoff Depth>5.65"
Flow Length=1,525' Tc=45.9 min CN=77 Runoff=21.42 cfs 3.313 af

SubcatchmentPOST 1.4: WATERSHED Runoff Area=214,764 sf 85.05% Impervious Runoff Depth>7.73"
Flow Length=717' Tc=7.5 min CN=94 Runoff=37.84 cfs 3.177 af

SubcatchmentPOST 2.0: WATERSHED2.0 Runoff Area=49,290 sf 80.99% Impervious Runoff Depth>7.62"
Flow Length=758' Tc=5.0 min CN=93 Runoff=9.25 cfs 0.718 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.90' Max Vel=2.19 fps Inflow=17.48 cfs 2.679 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=10.33 cfs 2.662 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.48' Storage=98,793 cf Inflow=70.91 cfs 6.521 af
Primary=19.73 cfs 3.345 af Secondary=38.14 cfs 1.616 af Outflow=57.87 cfs 4.961 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=56.45' Storage=83,107 cf Inflow=36.28 cfs 3.140 af
Outflow=6.58 cfs 1.321 af

Pond POND 1.2: PDMH203 Peak Elev=51.03' Inflow=17.48 cfs 2.679 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=17.48 cfs 2.679 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.77' Storage=24,643 cf Inflow=87.04 cfs 13.437 af
Primary=83.35 cfs 13.109 af Secondary=0.00 cfs 0.000 af Outflow=83.35 cfs 13.109 af

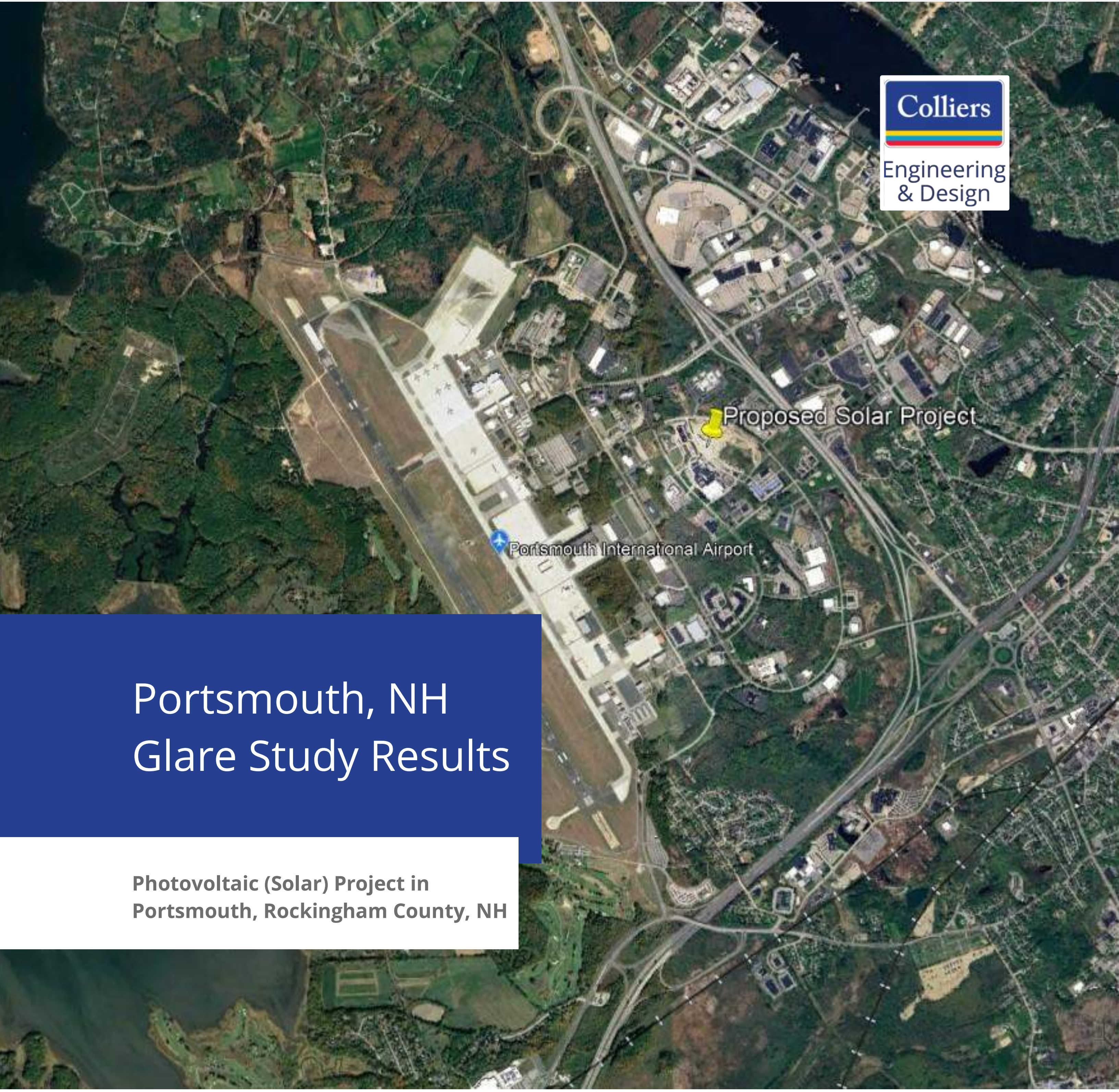
Pond POND 1.4: RAINGARDEN1.0 Peak Elev=49.56' Storage=69,290 cf Inflow=37.84 cfs 3.177 af
Primary=7.69 cfs 2.462 af Secondary=1.60 cfs 0.039 af Outflow=9.29 cfs 2.500 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=6.58 cfs 1.321 af
Primary=6.58 cfs 1.321 af

Link PA1: POINT OF ANALYSIS Inflow=83.35 cfs 13.109 af
Primary=83.35 cfs 13.109 af

Link PA2: POINT OF ANALYSIS Inflow=9.25 cfs 0.718 af
Primary=9.25 cfs 0.718 af

Total Runoff Area = 31.609 ac Runoff Volume = 18.227 af Average Runoff Depth = 6.92"
39.63% Pervious = 12.527 ac 60.37% Impervious = 19.083 ac



Colliers Engineering & Design

Portsmouth, NH Glare Study Results

Photovoltaic (Solar) Project in Portsmouth, Rockingham County, NH

February 22, 2024

Prepared for:

IPS - Integrated Project Services, LLC
721 Arbor Way, Suite 100
Blue Bell, PA 19422

Prepared by:

Elizabeth C. Myers, PMP
Certified Glare Analyst

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Table of Contents

Conclusion

Collier's Engineering & Design (CED) performed an analysis on the array areas of the proposed rooftop and carport solar project site in Portsmouth, Rockingham County, NH.

Through extensive cross-checking, it was found that at a 5-degree resting angle or above for the rooftop system panels, there is no predicted glare throughout the entire project area. Small amounts of green glare predicted from the carports onto a route directly next to the proposed project are easily mitigated.

The study area is presented in the graphic below. Red Markers represent Observation Points, Turquoise Lines are the roads in and around the proposed project area, and Brown Lines represent the existing foliage in the area and/or the proposed landscaping lines. The Brown Lines around the rooftop systems represent the parapets that run the entire perimeter of the buildings.

A closer view of the immediate project area:

The triangulation of the proposed project in relation to Portsmouth International Airport is provided below. Because of the proximity to the airport and the Air Traffic Control Tower, the client specifically requested a full study to be certain that no glare of any kind would affect the Tower.

To establish a worst-case scenario baseline, a 15-degree angle for the proposed rooftop system facing 214 degrees (azimuth) was programmed on the rooftops of two buildings. For the proposed carports, four array areas were programmed facing 124 degrees (azimuth) and one carport was programmed facing 214 degrees (azimuth). The project was modeled without local foliage lines and other large buildings between the proposed project and the ATCT in the area programmed.

The Air Traffic Control Tower was modeled at a dual height of 130 feet and 120 feet to cover broader possibilities of the proposed project's sightline to anyone in the tower structure.

With the above settings, the modelling predicts ZERO minutes of YELLOW glare over the course of an entire year and ~4,474 minutes of GREEN glare over the course of an entire year. The glare results include ~1,863 minutes of GREEN glare on the Air Traffic Control Tower at Portsmouth International Airport from Carports 1, 3 and 4. **No glare whatsoever is predicted from the rooftop systems onto the ATCT or onto any other point in the study.**

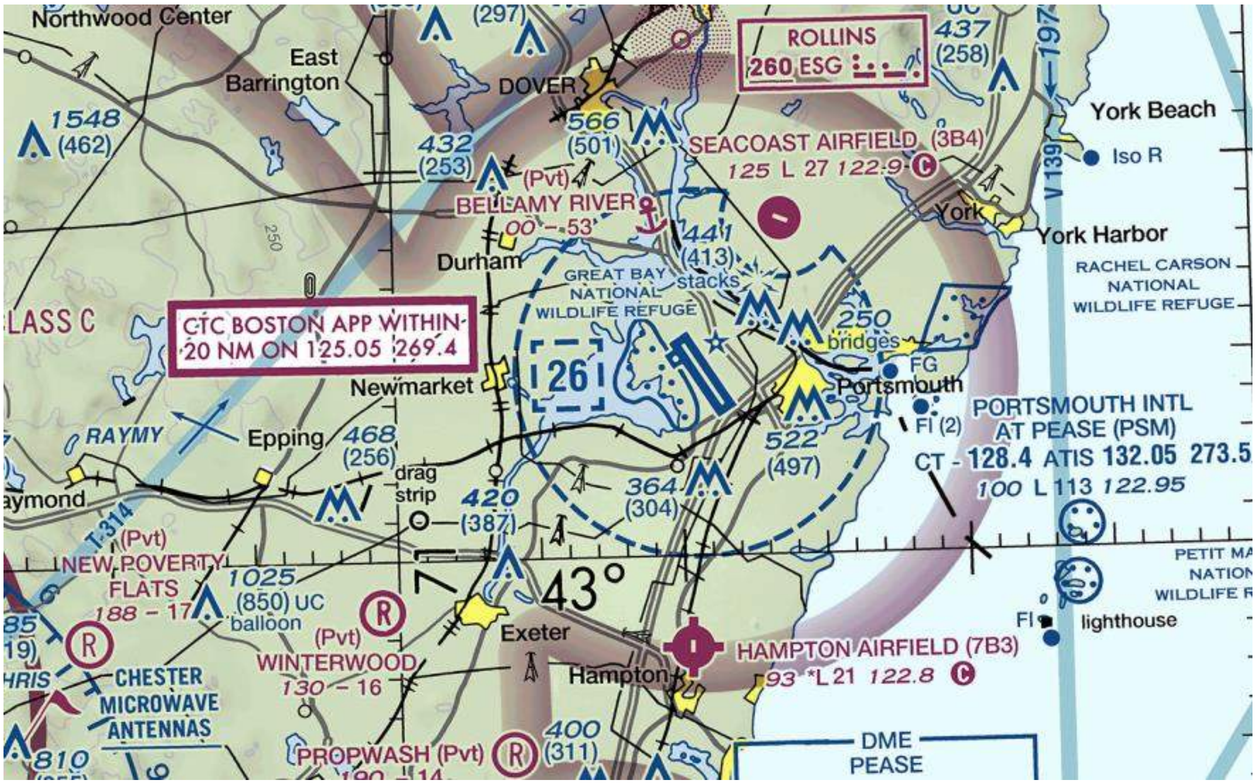
At the proposed working settings of a 5-degree racking tilt on the rooftop systems, and the same settings for the carports components, but WITH all local area foliage, buildings and other obstructions, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

At the proposed working settings of a 10-degree racking tilt on the rooftop systems, and the same settings for the carports components, but WITH all local area foliage, buildings and other obstructions, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

At the proposed working settings of a 13-degree racking tilt on the rooftop systems, and the same settings for the carports components, but WITH all local area foliage, buildings and other obstructions, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

At the proposed working settings of a 15-degree racking tilt on the rooftop systems, and the same settings for the carports components, but WITH all local area foliage, buildings and other obstructions, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

A review of the Federal Aviation Administration's (FAA) New York area Visual Flight Rules (VFR) charts shows no restricted airspace in or around the proposed project area.



A review of Military Training Route (MTR) charts was performed utilizing an additional online resource and the proposed project falls entirely **OUTSIDE** of known training route areas.

The above conclusion is arrived at by utilizing the worst-case scenario results provided by the *ForgeSolar* software, and then manually layering back into each modeling scenario all real-world factors in the area of the proposed site location.

Full technical reporting output by the *ForgeSolar* program is included in the Appendix of this report.

Sincerely,

Colliers Engineering & Design, Inc.
(DBA Maser Consulting)

Elizabeth Claire Myers, PMP
Project Manager, Electrical Engineering
Certified Glare Analyst through Sims Industries

cc: Lee Hill, PE, Colliers Engineering & Design (via email)

R:\Projects\2024\24000681A_IPS_Portsmouth\24000681A_IPS_PortsmouthNH_GlareStudy_DRAFTREPORT.docx

Resources

Federal Aviation Administration – Publicly Available Visual Flight Rules (VFR) Charts
https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/vfr/

- Utilized to obtain FAA-approved VFR charts of the project area for inclusion and consideration in this study.

U.S. Military Training Routes (MTRs) and buffers - May 4, 2018 (Last modified Oct 6, 2021)
Uploaded by South Atlantic Blueprint
https://salcc.databasin.org/datasets/4c81852be18444b997f8f860ee568c54/

- Utilized to obtain detail and graphic of US-wide Military Training Routes and location specific data for this study.

Ho, C. K., Ghanbari, C. M., and Diver, R. B., 2011, **Methodology to Assess Potential Glint and Glare Hazards From Concentrating Solar Power Plants: Analytical Models and Experimental Validation**, *ASME J. Sol. Energy Eng., 133*.

Solar Glare Hazard Analysis Tool (SGHAT) Technical Reference Manual

Details of Glare Study

Methodology

(Source Information: https://forgesolar.com/help/#intro)

Collier's Engineering & Design (CED) offers staff specifically trained on glare analyses utilizing *ForgeSolar*, a web-based interactive software that provides a quantified assessment of (1) when and where glare is predicted to occur throughout the year for a prescribed solar installation, and (2) potential effects on the human eye at locations where glare is predicted to occur. *ForgeSolar* is based on the Solar Glare Hazard Analysis Tool ("SGHAT") licensed from Sandia National Laboratories.

These tools meet the FAA standards for glare analysis.

Determination of glare occurrence requires knowledge of the following: sun position, observer location, and the tilt, orientation, location, extent, and optical properties of the modules in the solar array. Vector algebra is then used to determine if glare is likely to be visible from the prescribed observation points.

If glare is predicted, the software calculates the retinal irradiance and subtended angle (size/distance) of the glare source to predict potential ocular hazards ranging from temporary after-image to more severe possible retinal damage. These results are presented in a simple, easy-to-interpret plot that specifies when glare is predicted to occur throughout the year, with color codes indicating the potential ocular hazard.

Background Information

Glint is typically defined as a momentary flash of bright light, often caused by a reflection off a moving source. A typical example of glint is a momentary solar reflection from a moving car, or "catching" something bright out of the corner of your eye.

Glare is defined as a continuous source of bright light. Glare is generally associated with stationary objects, which, due to the slow relative movement of the sun, reflect sunlight for a longer duration.

The difference between glint and glare is duration. Industry-standard glare analysis tools evaluate the occurrence of glare on a minute-by-minute basis; accordingly, they generally refer to solar hazards as 'glare.'

The ocular impact of solar glare is quantified into three categories (Ho, 2011):

1. Green – Unproblematic shine. Low potential to cause after-image. This type of glare can be compared to noticing something shiny in the distance.

2. Yellow - Potential to cause temporary after-image (flash blindness). This type of glare is much like sunrise and sunset glare for drivers who struggle to find the perfect angle for car visors so they can continue to operate their vehicle safely while traveling through areas of such glare.
   a. Standard levels of yellow glare can, for the most part, be handled with relative ease utilizing slatted fencing or local-foliage landscape mitigation measures.
   b. Only extremely high levels of this type of glare (in the area of the chart to the right labeled as "direct viewing of the sun" which is uncommon to find with PV installations) would be considered an insurmountable hurdle to a PV installation of any size.
   c. High levels/intensities and long durations are different factors.

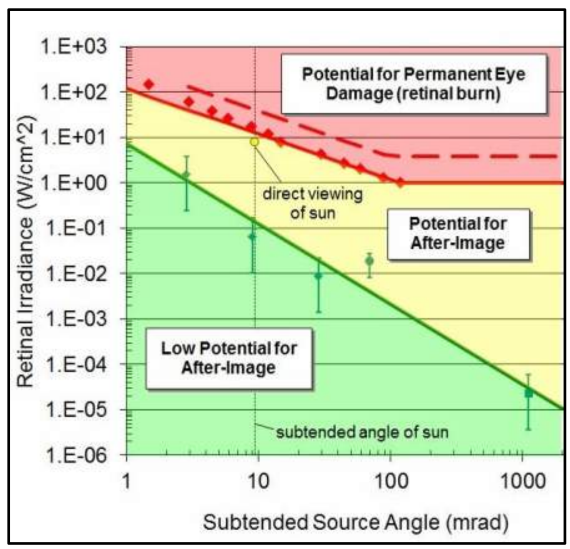


Figure 1 – From *ForgeSolar* website (sample glare hazard plot defining ocular impact as function of retinal irradiance and subtended source angle *(Ho, 2011)*)

3. Red - Potential to cause retinal burn (permanent eye damage). PV modules do not focus reflected sunlight and therefore retinal burn (RED glare) is typically not possible.
   d. This is the ONLY type of glare that would be considered an insurmountable hurdle to a PV installation of any size.

These categories assume a typical blink response in the observer.

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Note that retinal burn is typically not possible for PV glare since PV modules do not focus reflected sunlight. They are, in fact, designed to absorb as much sunlight as possible.

To further put glare into perspective, the following is presented.

YELLOW glare such as in the graphic to the right could only be seen when standing directly next to project panels at the perfect angle when the sun is in a perfect place—indeed the point of a photographer standing directly by these panels and waiting for the perfect moment to capture this image. It is also possible that the panels in the picture shown do not have an anti-reflective coating.

Solar panel showing solar glare

GREEN glare, as illustrated directly to the right, is the more common occurrence with solar projects—a noticeable shiny area (in the northwest area) as compared to panels where the sun is not quite in perfect alignment yet.

Even so, the effect of this noticeable shine to certain areas of the project area is still seen from a relatively close up vantage point and at the optimal height this image was captured, possibly by a drone. A similarly sized project in the distance, closer to the horizon of the photo would be unlikely to show even the levels of green glare that the system in the foreground reflects.

Executive Summary

The purpose of the glare study requested by IPS – Integrated Project Service, LLC (IPS) and their client is to closely examine a proposed solar project in Portsmouth, Rockingham County, NH and to provide feedback regarding areas that may warrant closer examination in order to mitigate possible problematic predicted glare to the businesses, residences, and roads surrounding the project area.

Information was provided by IPS and their client in order to complete this study. The project's rooftop PV systems were programmed to a 15-degree tilt axis facing 214 degrees at a height of 88 feet for the smaller structure and 93.83 feet for the larger building. The parapets for these buildings were programmed at heights of 93.21 feet and 99.3 feet respectively.

Four of the projects five carport systems were programmed with two top heights (20.17 feet and 22.48 feet) and a lower edge of 14 feet, facing 124 degrees southeast. A final carport was programmed with a 20.17 foot high edge, a 14 foot lower edge and facing 214 degrees.

It was further assumed that the panels used throughout the proposed project are constructed of Smooth Glass with an Anti-Reflective coating.

Seven (7) Observation Points were placed at different points around the site and programmed to an average height of 5 and a half (5.5) feet to model someone standing in these spots, and to a height of 15 to 20 feet to model a 5.5-foot person standing on the second floor of a home/business with 8-foot ceilings and a 1.5-foot plenum space.

The building directly southwest of the proposed project is industrial in nature, and an examination of the portion that will be facing the project shows that it is industrial in nature with very few windows. One OP was programmed here at a height of 40 feet.

Two Observation Points representing the Air Traffic Control Tower at Portsmouth International Airport were programmed to heights of 130 feet and 120 feet.

Six (6) Route Receptors were programmed for two-way traffic to heights of 4.5 feet and 8.5 feet, effectively representing the eyeline of an average person sitting on/in any vehicle from a bike to a motorcycle, a standard car or SUV, through to the approximated seated height in the cab of an 18-wheeler truck.

While it is impossible to study every possible point and/or angle surrounding a photovoltaic (solar) project, Collier's Engineering & Design (CED) has modeled the project and surrounding areas as best as possible with the most likely points of concern.

PV modules do not focus reflected sunlight and therefore retinal burn is typically not possible. They are, in fact, designed to absorb as much sunlight as possible. Modern photovoltaic panels actually cause less glare than standard home window glass; and research has shown that they reflect less light than snow, white concrete and energy-efficient white rooftops.

The YELLOW glare we are looking to identified with this study is much like sunrise and sunset glare for drivers who struggle to find the perfect angle for car visors so they can continue to operate their vehicle safely while traveling through areas of such glare. In general, photovoltaic panel systems of any size produce some glare predominately during early sunrise and sunset throughout the Spring through Fall months—although glare is possible throughout each day as well as throughout the entire year.

ForgeSolar now allows the programming of obstructions. It was utilized in this study to model in existing treelines, local warehouses and other buildings and the parapets of the proposed new buildsings for this project with estimated heights. Local foliage lines were modeled at a conservative height of 17 to 30 feet in height. Local warehouses were modeled conservatively at 20 to 30 feet high.

After examining each point and then factoring in additionally recommended foliage, distance, and elevation changes, points where predicted glare is blocked by natural obstructions were removed from the listing of points to be examined more closely. Finally, if any glare continues to be predicted in any area, this analyst will address the areas that present the <u>most</u> possibility for likely glare.

<u>ASSUMPTIONS</u>

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.*
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.

Results of this Study

WORST CASE SCENARIO without Local Foliage - RESULTS at 15 Degree Resting Angle

To establish a worst-case scenario baseline, the project was modeled without any local foliage lines or building obstructions between the proposed project and the Air Traffic Control Tower at the Portsmouth International Airport. The modelling predicts ZERO minutes of YELLOW glare over the course of an entire year and ~4,474 minutes of GREEN glare over the course of an entire year. The glare results include ~1,855 minutes of GREEN glare on the Air Traffic Control Tower at Portsmouth International Airport from Carports 1, 3 and 4. No glare whatsoever is predicted from the rooftop systems onto the ATCT or onto any other point in the study.

RESULTS at 5 Degree Angle

At the proposed working settings of a 5-degree racking tilt on the rooftop systems, and the same settings for the carports components, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

RESULTS at 10 Degree Resting Angle

At the proposed working settings of a 10-degree racking tilt on the rooftop systems, and the same settings for the carports components, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

RESULTS at 13 Degree Resting Angle

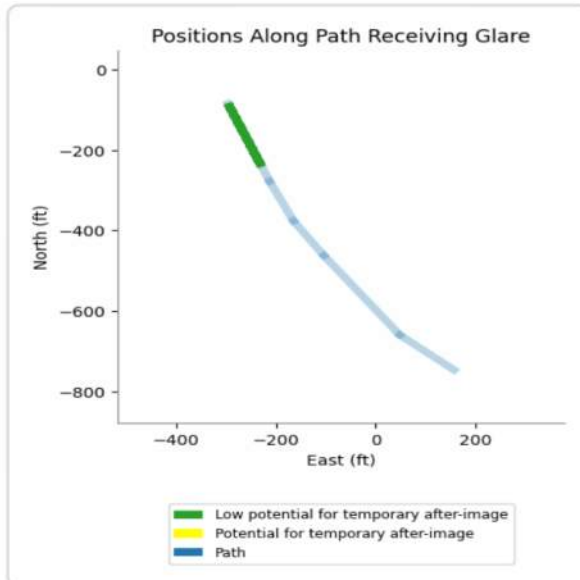
At the proposed working settings of a 13-degree racking tilt on the rooftop systems, and the same settings for the carports components, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

RESULTS at 15 Degree Resting Angle

At the proposed working settings of a 15-degree racking tilt on the rooftop systems, and the same settings for the carports components, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

AREAS OF GLARE

In ALL results, the areas of glare from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.



A final run scenario with a small planting of trees at the area marked in green in the "Positions Along Path Receiving Glare" shows that a screen of 9 feet at initial planting will completely mitigate any glare shown.

Summary of Results No glare predicted!

PV Name	Tilt deg	Orientation deg	"Green" Glare min
CRPRT1	0.0	124.0	0
CRPRT2	0.0	124.0	0
CRPRT3	0.0	124.0	0
CRPRT4	0.0	124.0	0
CRPRT5	0.0	214.0	0
LGBLDG	10.0	214.0	0
SMBLDG	10.0	214.0	0

Summary of FAA-Level Flight Path Screening Results

Portsmouth International Airport sits under 1mile away from the project on the western side. All obstructions were kept in place for the FAA screening and the project was modeled at the 10 degree rooftop PV system tilt.

FEDERAL AVIATION ADMINISTRATION (FAA) SCREENS

An FAA-level glare analysis was performed and a report specific to this request can be found in Appendix A of this report. The Air Traffic Control Tower at Portsmouth International Airport is modeled for this study at its height of 130 feet. Additionally, a second point was modeled at 120 feet to be certain of the glare study results.

Per the FAA's most recent 2021 policy regarding solar around airports, this project PASSES.

Project: **ALBACORE, Portsmouth, NH**
Site configuration: **Albacore_10DegreeTilt_124Carports_ATCT_FAAReport**

Created 22 Feb, 2024
Updated 22 Feb, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Site ID 112738.19298

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Glare Policy Adherence

The following table estimates the policy adherence of this glare analysis according to the **2021** U.S. Federal Aviation Administration Policy:

Review of Solar Energy System Projects on Federally-Obligated Airports

This policy may require the following criteria be met for solar energy systems on airport property:

- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics, including 1-minute time step.

ForgeSolar is not affiliated with the U.S. FAA and does not represent or speak officially for the U.S. FAA. ForgeSolar cannot approve or deny projects - results are informational only. Contact the relevant airport and FAA district office for information on policy and requirements.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
ATCT(s)	PASS	Receptor(s) marked as ATCT do not receive glare

The complete updated FAA Policy can be read at: https://www.federalregister.gov/d/2021-09862

NOTE: ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

On May 26, 2021, the Federal Aviation Administration updated their policies regarding the installation of solar on and/or near regulated airports/airstrips.

While this policy of the Federal Aviation Administeration does not apply to solar energy systems on airports that do not have an Air Traffic Control Tower (ATCT), airports that are not federally-obligated, or solar energy systems not located on airport property—it does provide a high benchmark to meet to ensure that proposed solar installations do not create glare that poses any sort of safety hazard for pilots.

The brief of this FAA policy update states:

"The Federal Aviation Administration (FAA) published a final policy aimed at ensuring that airport solar projects don't create hazardous glare. The policy requires airports to measure the visual impact of such projects on pilots and air traffic control personnel.

The policy applies to proposed solar energy systems at federally obligated airports with control towers. Federally obligated airports are public airports that have accepted federal assistance either in the form of grants of property conveyances

As more airports invests in this technology for environmental and economic benefits, the FAA wants to make sure that the reflection from the systems' glass surfaces do not create a glare that poses a safety hazard for pilots and air traffic controllers.

Under the final policy, airports are no longer required to submit the results of an ocular analysis to FAA. Instead, the airport must file a Notice of Proposed Construction or Alteration Form 7460-1 that includes a statement that the project will not cause any visual impact. The airport submits the form to the FAA for review and approval.

The FAA relies on the airport to confirm via the form that it has sufficiently analyzed the potential for glint and glare and determined there is no potential for ocular impact to the airport traffic control tower cab. If any impacts are discovered after construction, the airport must mitigate the impact at its expense. The airport may also face compliance action for failure to address visual impacts that create aviation safety hazards. As such, the agency encourages an airport to conduct sufficient analysis before installing a solar energy system.

The FAA is also withdrawing the recommended tool for measuring the ocular impact of potential glint and glare effects on pilots and air traffic controllers."

Additionally:
"Initially, FAA believed that solar energy systems could introduce a novel glint and glare effect to pilots on final approach. FAA has subsequently concluded that in most cases, the glint and glare from solar energy systems to pilots on final approach is similar to glint and glare pilots routinely experience from water bodies, glass-façade buildings, parking lots, and similar features. However, FAA has continued to receive reports of potential glint and glare from on-airport solar energy systems on personnel working in ATCT cabs. Therefore, FAA has determined the scope of agency policy should be focused on the impact of on-airport solar energy systems to federally-obligated towered airports, specifically the airport's ATCT cab."

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Appendix

Appendix A | Detailed Glare Study Result Reports

The following pages are the full reporting results delivered directly from *ForgeSolar*.

FORGESOLAR GLARE ANALYSIS

Project: **ALBACORE, Portsmouth, NH**
Site configuration: **Albacore_10DegreeTilt_124Carports_ATCT_FAAReport**

Client: Lonza

Created 22 Feb, 2024
Updated 22 Feb, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Site ID 112738.19298

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
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ForgeSolar is not affiliated with the U.S. FAA and does not represent or speak officially for the U.S. FAA. ForgeSolar cannot approve or deny projects - results are informational only. Contact the relevant airport and FAA district office for information on policy and requirements.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
ATCT(s)	PASS	Receptor(s) marked as ATCT do not receive glare

The referenced policy can be read at https://www.federalregister.gov/d/2021-09862

Component Data

This report includes results for PV arrays and Observation Point ("OP") receptors marked as ATCTs. Components that are not pertinent to the policy, such as routes, flight paths, and vertical surfaces, are excluded.

PV Arrays

Name: CRPRT1
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 124.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 124.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 124.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 124.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 214.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 214.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 214.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Observation Point ATCT Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
1-ATCT	1	43.084384	-70.818882	89.93	130.00
6-ATCT	6	43.084349	-70.818856	89.97	120.00

Map image of 1-ATCT

Map image of 6-ATCT

Obstruction Components

Name: BLDG1
Top height: 12.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084600	-70.810084	76.71
2	43.084703	-70.809846	77.63
3	43.084534	-70.809702	77.38
4	43.084428	-70.809944	77.34
5	43.084600	-70.810084	76.71

Name: BLDG2
Top height: 20.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Top height: 22.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

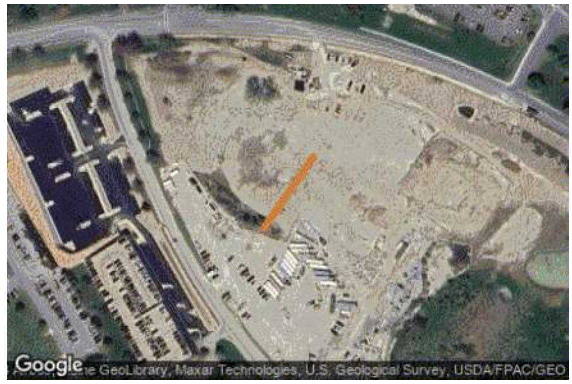
Name: HighEdge2
Top height: 22.5 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Top height: 22.5 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Top height: 20.2 ft



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Top height: 93.2 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Top height: 99.3 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Top height: 35.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees
Top height: 17.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees1
Top height: 40.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Top height: 60.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Top height: 100.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Top height: 45.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Top height: 20.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
CRPRT1	0.0	124.0	0	0.0	0	0.0	-
CRPRT2	0.0	124.0	0	0.0	0	0.0	-
CRPRT3	0.0	124.0	0	0.0	0	0.0	-
CRPRT4	0.0	124.0	0	0.0	0	0.0	-
CRPRT5	0.0	214.0	0	0.0	0	0.0	-
LGBLDG	10.0	214.0	0	0.0	0	0.0	-
SMBLDG	10.0	214.0	0	0.0	0	0.0	-

Total annual glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

PV: CRPRT1

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT1 and 1-ATCT

Receptor type: ATCT Observation Point

No glare found

CRPRT1 and 6-ATCT

Receptor type: ATCT Observation Point

No glare found

PV: CRPRT2

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT2 and 1-ATCT

Receptor type: ATCT Observation Point

No glare found

CRPRT2 and 6-ATCT

Receptor type: ATCT Observation Point

No glare found

PV: CRPRT3

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT3 and 1-ATCT

Receptor type: ATCT Observation Point

No glare found

CRPRT3 and 6-ATCT

Receptor type: ATCT Observation Point

No glare found

PV: CRPRT4

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT4 and 1-ATCT

Receptor type: ATCT Observation Point

No glare found

CRPRT4 and 6-ATCT

Receptor type: ATCT Observation Point

No glare found

PV: CRPRT5

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT5 and 1-ATCT

Receptor type: ATCT Observation Point

No glare found

CRPRT5 and 6-ATCT

Receptor type: ATCT Observation Point

No glare found

PV: LGBLDG

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

LGBLDG and 1-ATCT

Receptor type: ATCT Observation Point

No glare found

LGBLDG and 6-ATCT

Receptor type: ATCT Observation Point

No glare found

PV: SMBLDG

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

SMBLDG and 1-ATCT

Receptor type: ATCT Observation Point

No glare found

SMBLDG and 6-ATCT

Receptor type: ATCT Observation Point

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

ALBACORE, Portsmouth, NH

Albacore_10DegreeTilt_124Carports_ATCT_FAAReport

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112738.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	0	0	-
CRPRT4	0.0	124.0	0	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	10.0	214.0	0	0	-
SMBLDG	10.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG1
Upper edge height: 12.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084600	-70.810084	76.71
2	43.084703	-70.809846	77.63
3	43.084534	-70.809702	77.38
4	43.084428	-70.809944	77.34
5	43.084600	-70.810084	76.71

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	0	0	-	-
CRPRT4	0.0	124.0	0	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	10.0	214.0	0	0	-	-
SMBLDG	10.0	214.0	0	0	-	-

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

CRPRT3 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

CRPRT4 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ForgeSolar

ALBACORE, Portsmouth, NH

ALBCR_15Tilt_124Carports_NOObstrctns_2ATCT_AddOP

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112714.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results

Glare with low potential for temporary after-image predicted

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh
CRPRT1	0.0	124.0	1,543	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	1,314	0	-
CRPRT4	0.0	124.0	1,617	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	15.0	214.0	0	0	-
SMBLDG	15.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 15.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 15.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083312	-70.803940	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
CRPRT1	0.0	124.0	1,543	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	1,314	0	-	-
CRPRT4	0.0	124.0	1,617	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	15.0	214.0	0	0	-	-
SMBLDG	15.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt1 (green)	0	0	105	292	0	0	0	81	319	0	0	0
crprt1 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt3 (green)	0	88	142	137	0	0	0	1	281	86	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	219	103	0	0	0	0	273	187	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

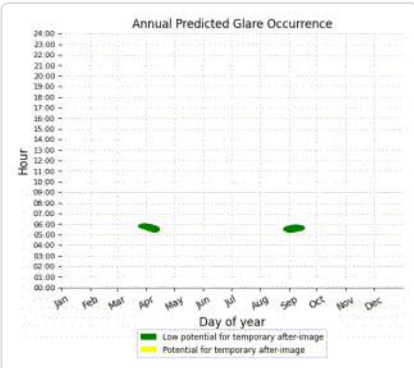
CRPRT1 low potential for temporary after-image

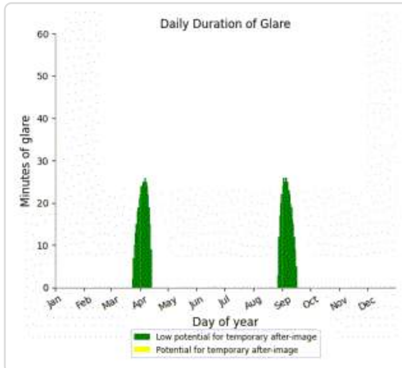
Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	783	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	760	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

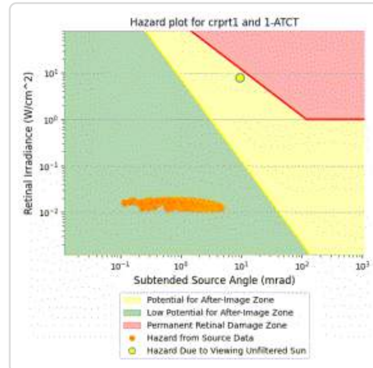
CRPRT1: 1-ATCT

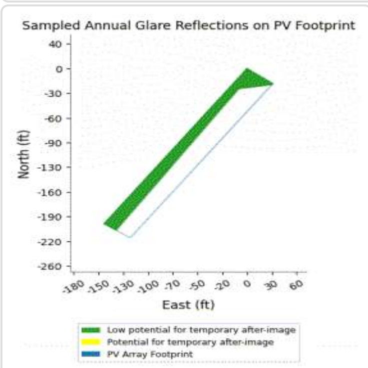
PV array is expected to produce the following glare for this receptor:

- 783 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT1: OP 2

No glare found

CRPRT1: OP 3

No glare found

CRPRT1: OP 4

No glare found

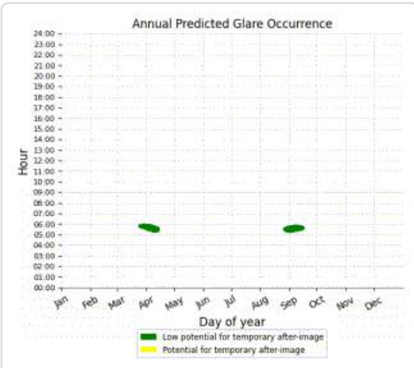
CRPRT1: OP 5

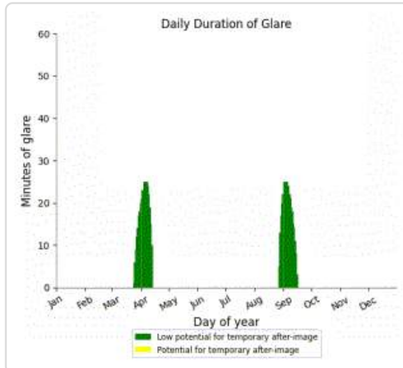
No glare found

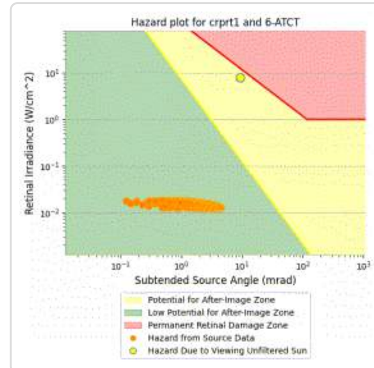
CRPRT1: 6-ATCT

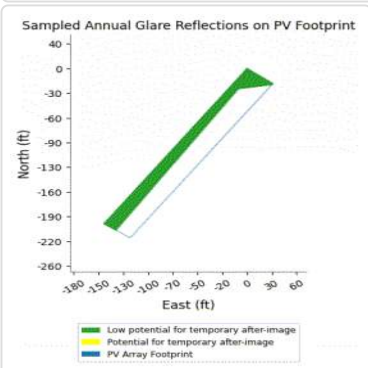
PV array is expected to produce the following glare for this receptor:

- 760 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT1: OP 7

No glare found

CRPRT1: Route 1

No glare found

CRPRT1: Route 2

No glare found

CRPRT1: Route 3

No glare found

CRPRT1: Route 4

No glare found

CRPRT1: Route 5

No glare found

CRPRT1: Route 6

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

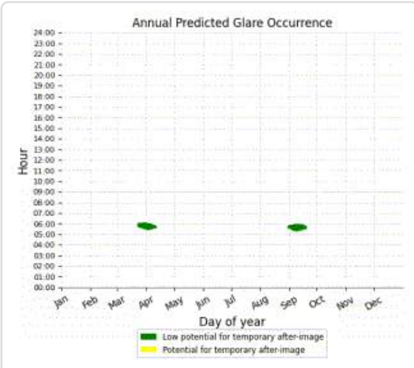
CRPRT3 low potential for temporary after-image

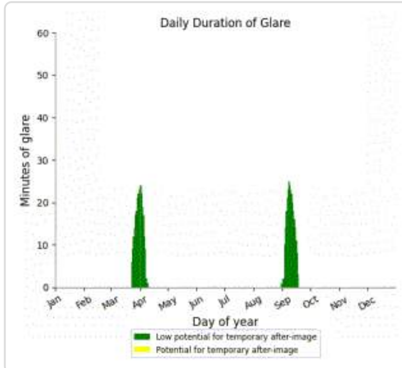
Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	548	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	530	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	78	0
Route: Route 4	158	0
Route: Route 5	0	0
Route: Route 6	0	0

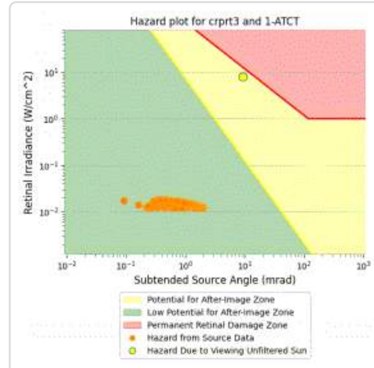
CRPRT3: 1-ATCT

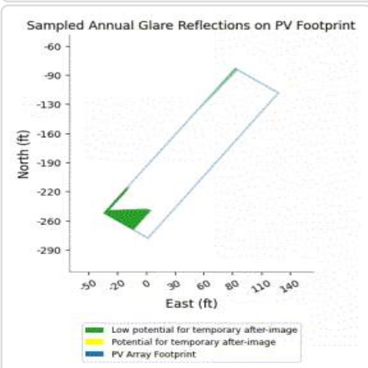
PV array is expected to produce the following glare for this receptor:

- 548 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

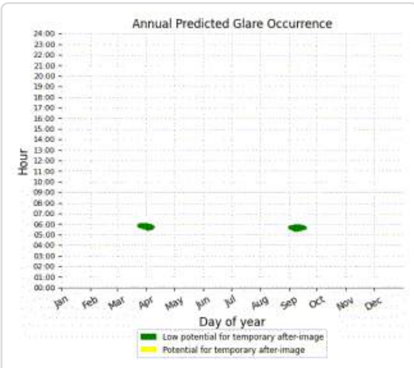
No glare found

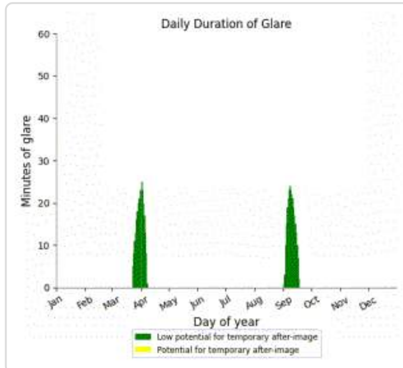
CRPRT3: OP 5

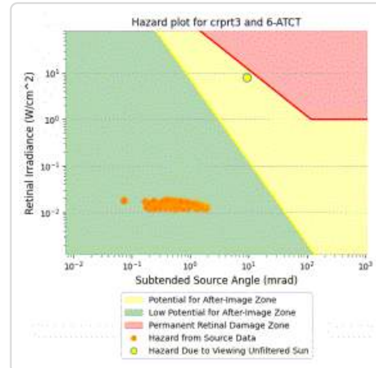
No glare found

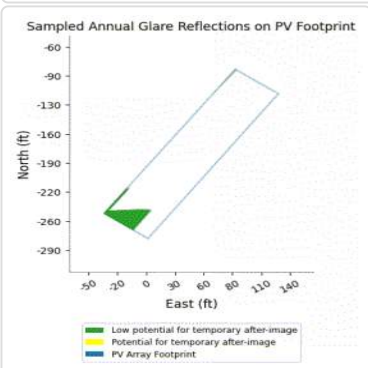
CRPRT3: 6-ATCT

PV array is expected to produce the following glare for this receptor:
- 530 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

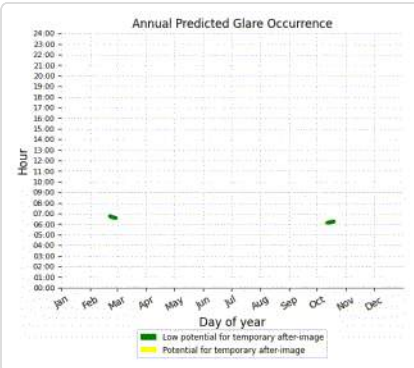
CRPRT3: Route 2

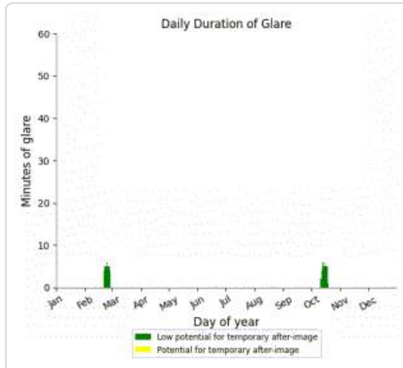
No glare found

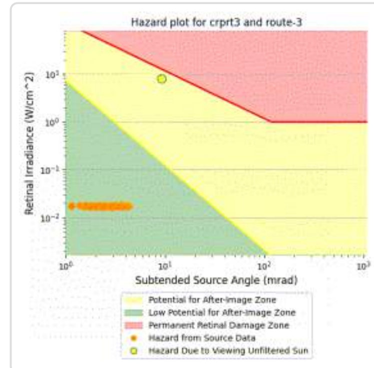
CRPRT3: Route 3

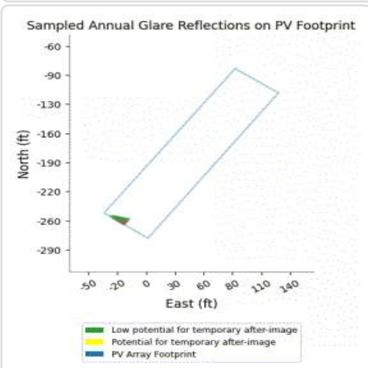
PV array is expected to produce the following glare for this receptor:

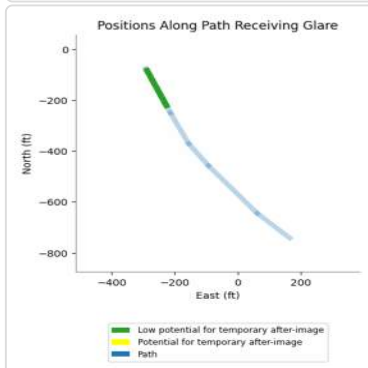
- 78 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







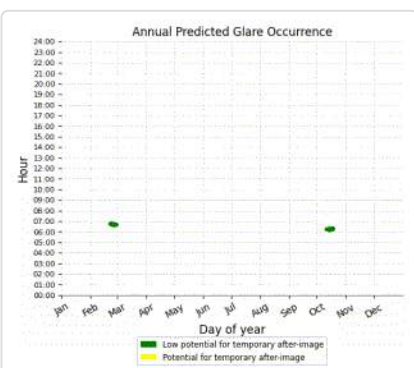


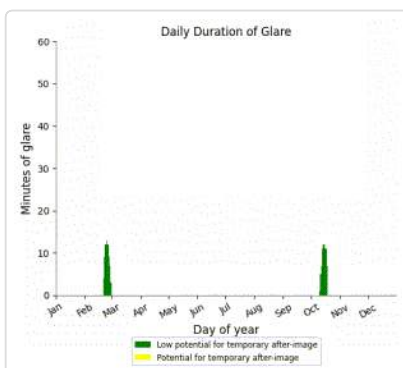


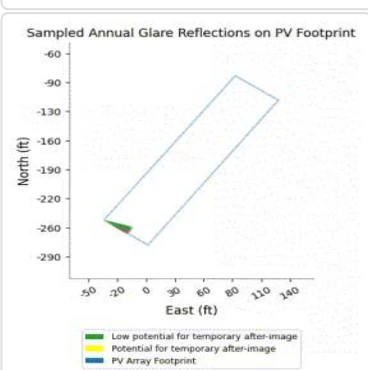
CRPRT3: Route 4

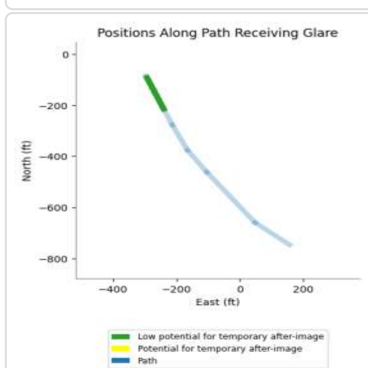
PV array is expected to produce the following glare for this receptor:

- 158 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

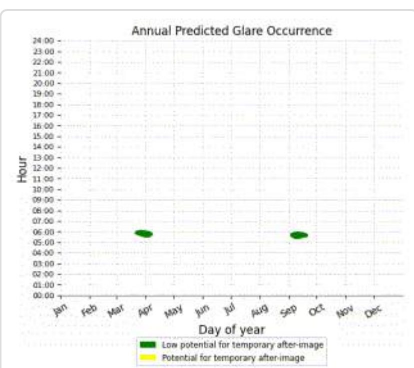
CRPRT4 low potential for temporary after-image

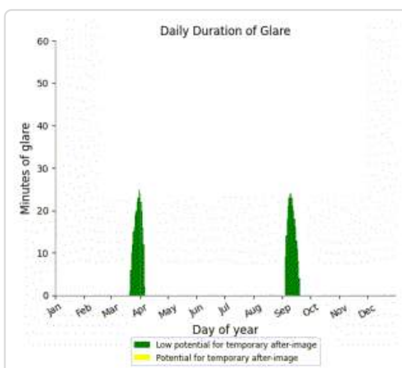
Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	532	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	514	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	314	0
Route: Route 4	257	0
Route: Route 5	0	0
Route: Route 6	0	0

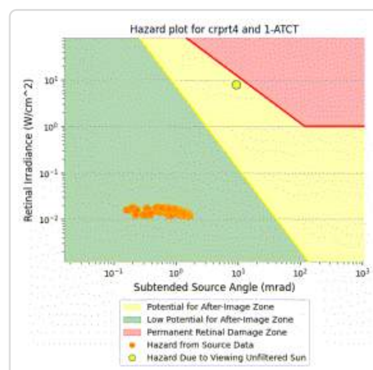
CRPRT4: 1-ATCT

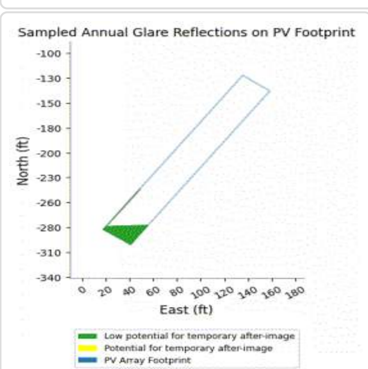
PV array is expected to produce the following glare for this receptor:

- 532 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT4: OP 2

No glare found

CRPRT4: OP 3

No glare found

CRPRT4: OP 4

No glare found

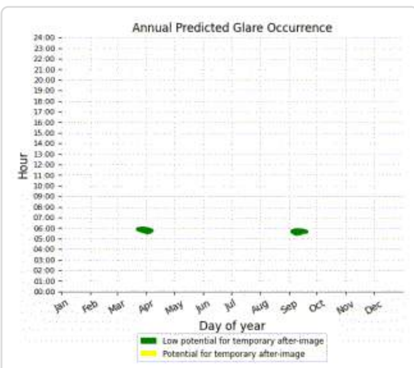
CRPRT4: OP 5

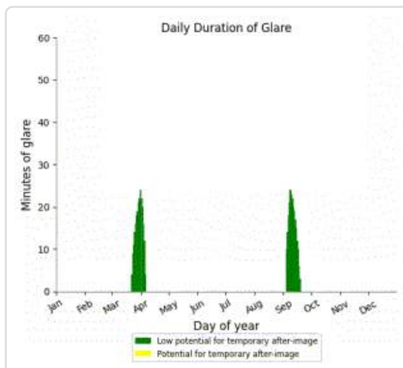
No glare found

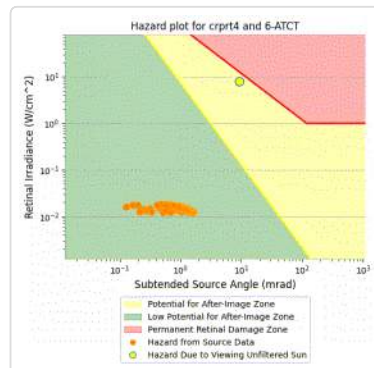
CRPRT4: 6-ATCT

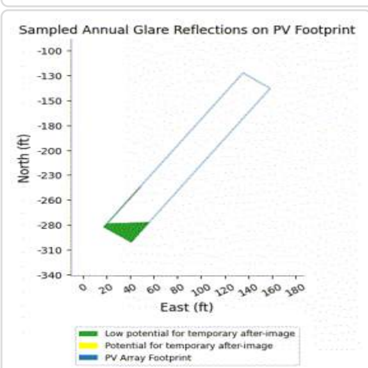
PV array is expected to produce the following glare for this receptor:

- 514 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT4: OP 7

No glare found

CRPRT4: Route 1

No glare found

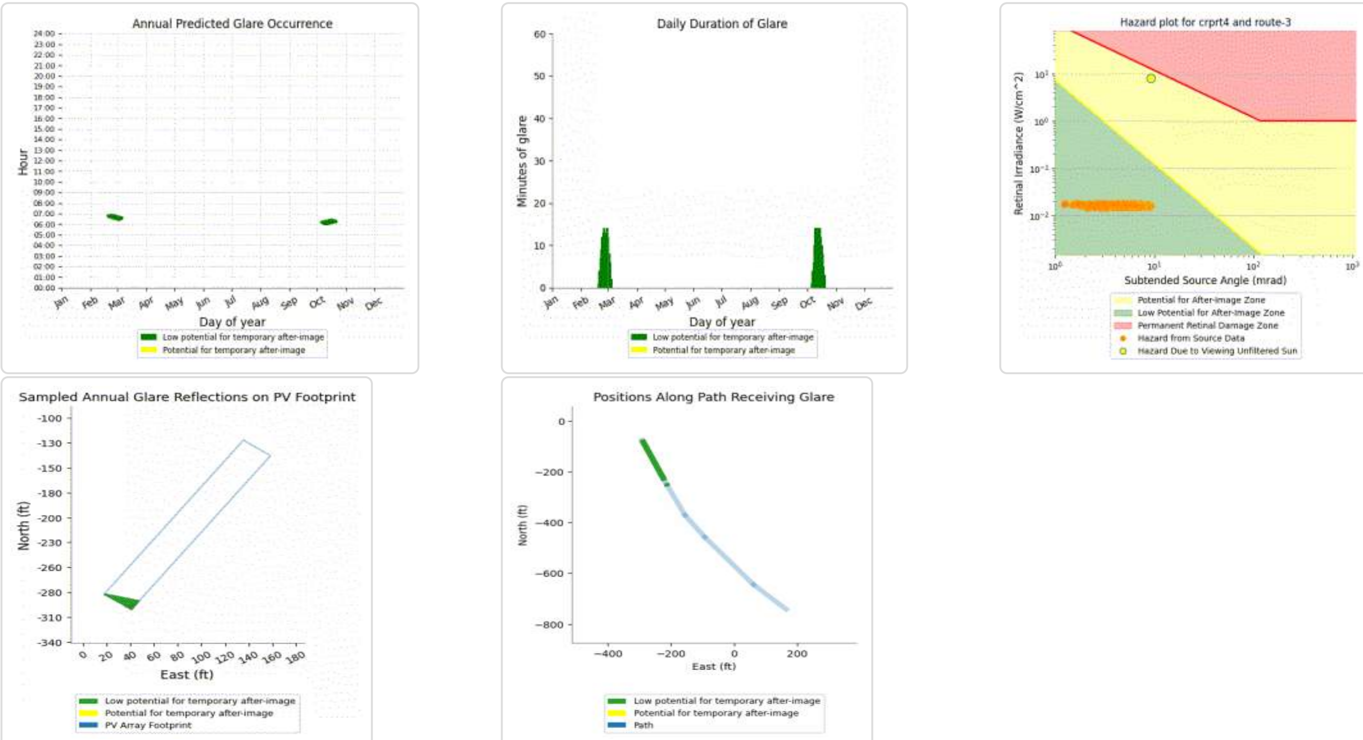
CRPRT4: Route 2

No glare found

CRPRT4: Route 3

PV array is expected to produce the following glare for this receptor:

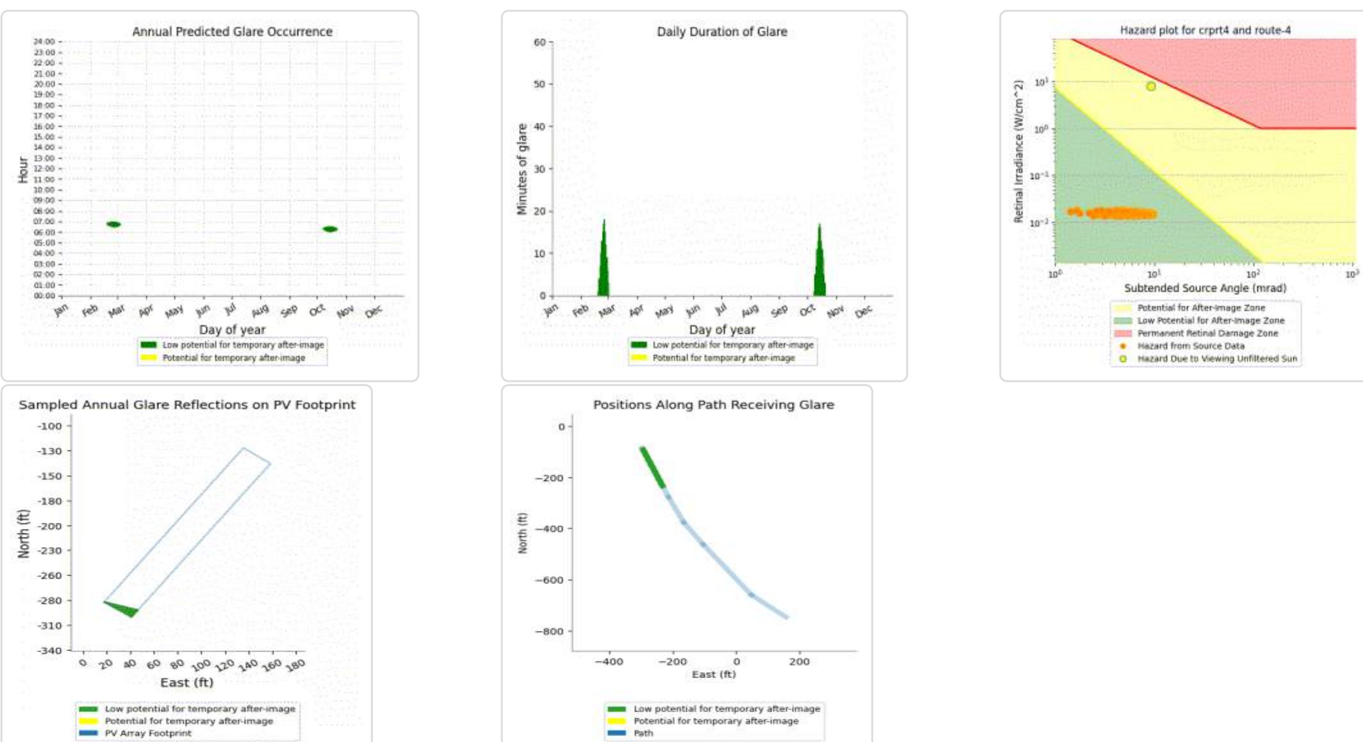
- 314 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.



CRPRT4: Route 4

PV array is expected to produce the following glare for this receptor:

- 257 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.



CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_10Tilt_124Carports_Obstrctns_2ATCT_AddOP

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112715.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	0	0	-
CRPRT4	0.0	124.0	0	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	10.0	214.0	0	0	-
SMBLDG	10.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PLANTING
Upper edge height: 9.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085446	-70.804721	64.24
2	43.084717	-70.804268	69.47
3	43.084592	-70.804158	69.46

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	0	0	-	-
CRPRT4	0.0	124.0	0	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	10.0	214.0	0	0	-	-
SMBLDG	10.0	214.0	0	0	-	-

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT4 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.

- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_5Tilt_124Carports_Obstrctns_2ATCT_NoPlant

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112718.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results Glare with low potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	236	0	-
CRPRT4	0.0	124.0	566	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	5.0	214.0	0	0	-
SMBLDG	5.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 5.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 5.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	236	0	-	-
CRPRT4	0.0	124.0	566	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	5.0	214.0	0	0	-	-
SMBLDG	5.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt3 (green)	0	87	0	0	0	0	0	0	0	85	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	48	0	0	0	0	0	0	186	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	79	0
Route: Route 4	157	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT3: 1-ATCT

No glare found

CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

No glare found

CRPRT3: OP 5

No glare found

CRPRT3: 6-ATCT

No glare found

CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

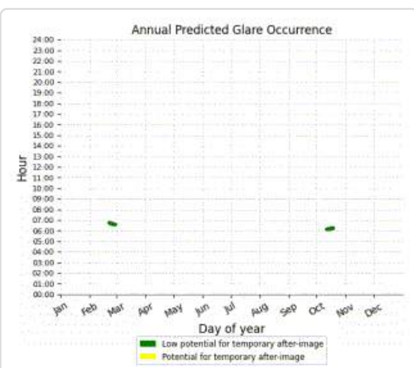
CRPRT3: Route 2

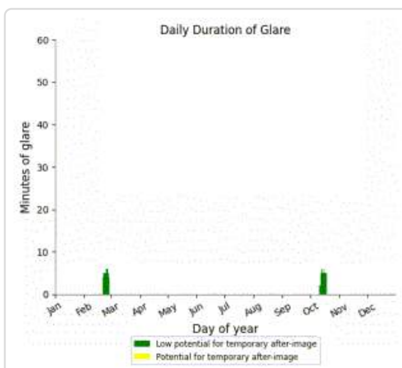
No glare found

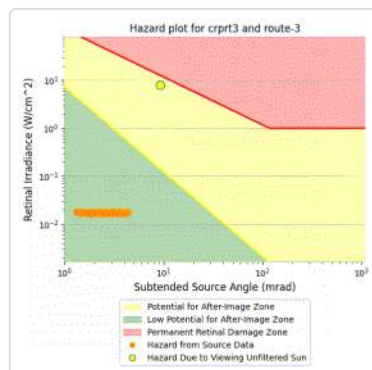
CRPRT3: Route 3

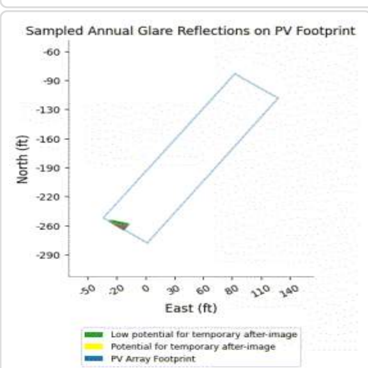
PV array is expected to produce the following glare for this receptor:

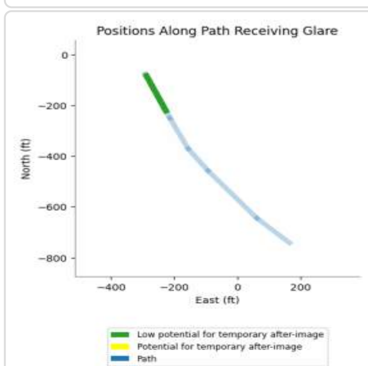
- 79 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







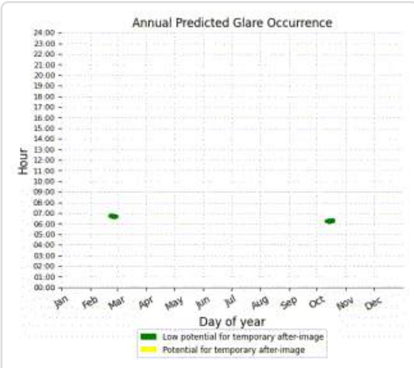


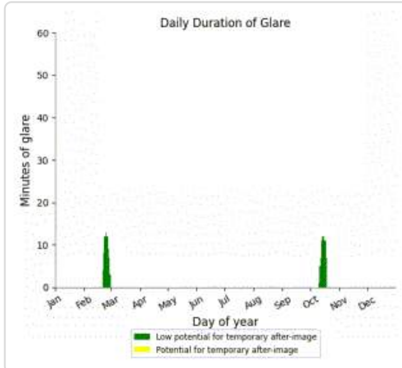


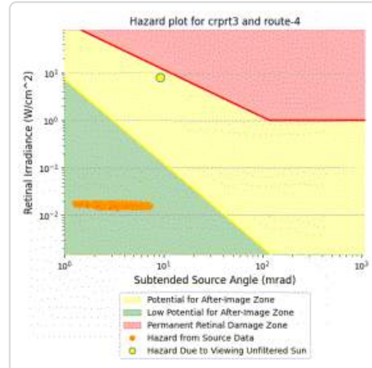
CRPRT3: Route 4

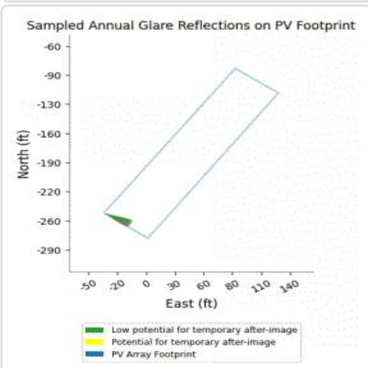
PV array is expected to produce the following glare for this receptor:

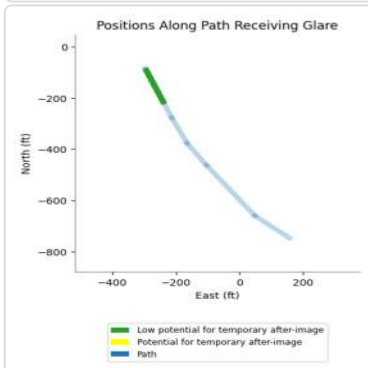
- 157 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

CRPRT4 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	311	0
Route: Route 4	255	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT4: 1-ATCT
No glare found

CRPRT4: OP 2
No glare found

CRPRT4: OP 3
No glare found

CRPRT4: OP 4
No glare found

CRPRT4: OP 5
No glare found

CRPRT4: 6-ATCT
No glare found

CRPRT4: OP 7
No glare found

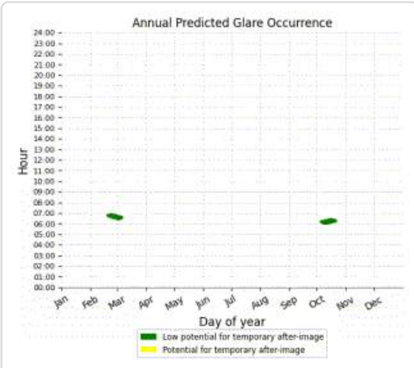
CRPRT4: Route 1
No glare found

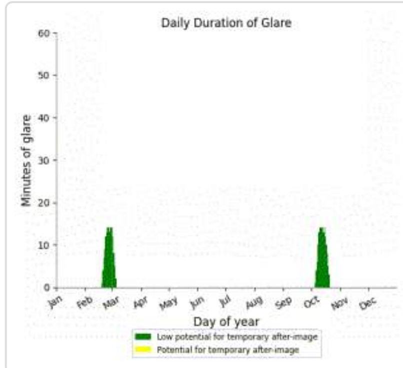
CRPRT4: Route 2
No glare found

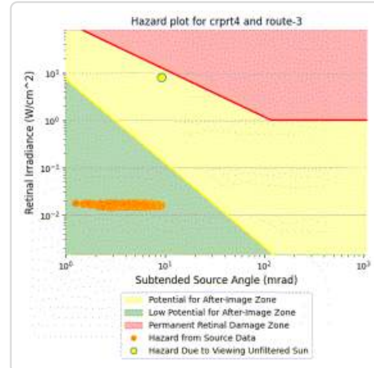
CRPRT4: Route 3

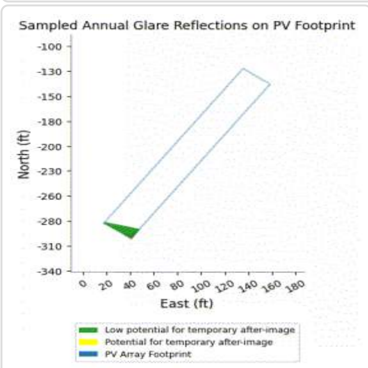
PV array is expected to produce the following glare for this receptor:

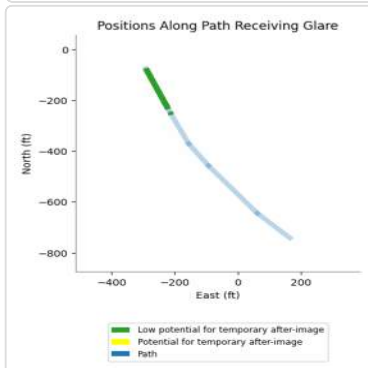
- 311 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







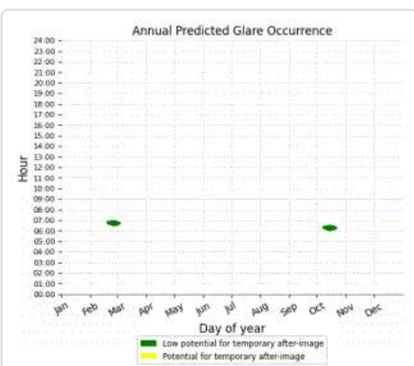


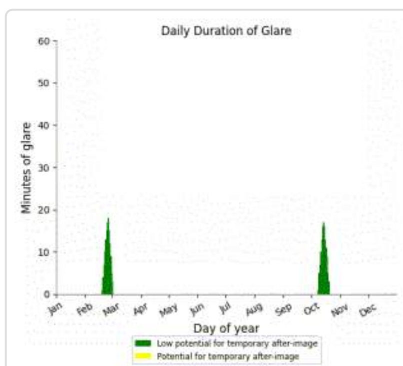


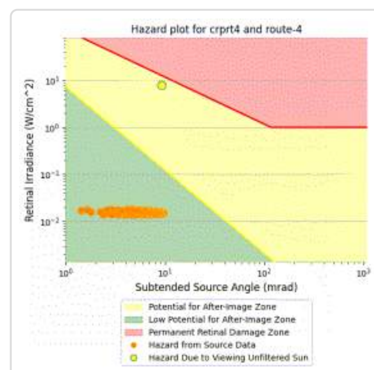
CRPRT4: Route 4

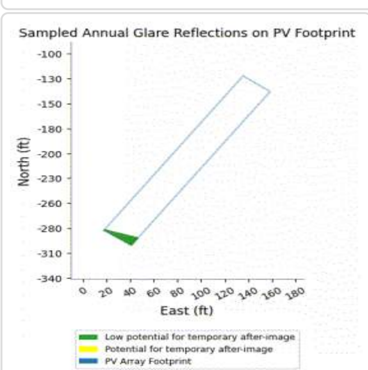
PV array is expected to produce the following glare for this receptor:

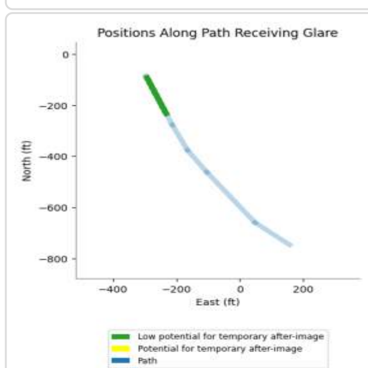
- 255 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_10Tilt_124Carports_Obstrctns_2ATCT_NoPlant

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112717.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results

Glare with low potential for temporary after-image predicted

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	236	0	-
CRPRT4	0.0	124.0	566	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	10.0	214.0	0	0	-
SMBLDG	10.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	236	0	-	-
CRPRT4	0.0	124.0	566	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	10.0	214.0	0	0	-	-
SMBLDG	10.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt3 (green)	0	87	0	0	0	0	0	0	0	85	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	48	0	0	0	0	0	0	186	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	79	0
Route: Route 4	157	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT3: 1-ATCT

No glare found

CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

No glare found

CRPRT3: OP 5

No glare found

CRPRT3: 6-ATCT

No glare found

CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

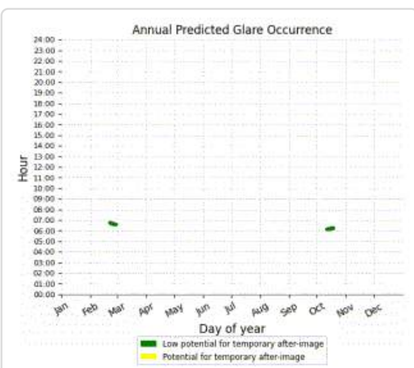
CRPRT3: Route 2

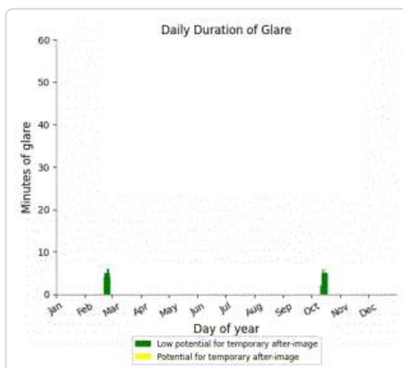
No glare found

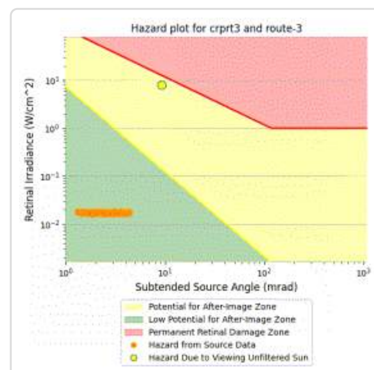
CRPRT3: Route 3

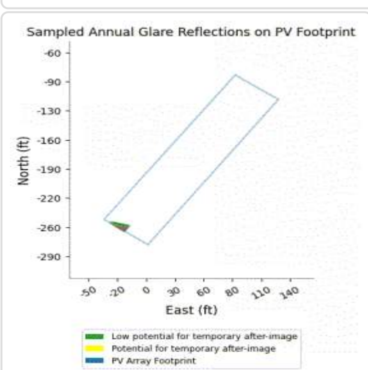
PV array is expected to produce the following glare for this receptor:

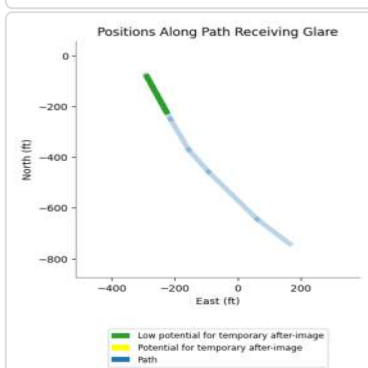
- 79 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







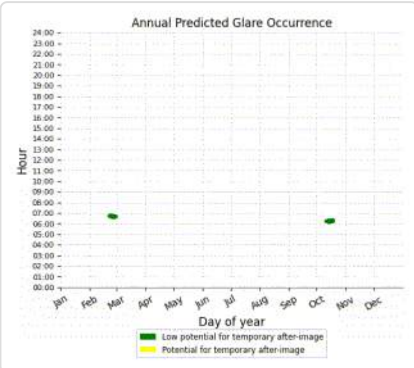


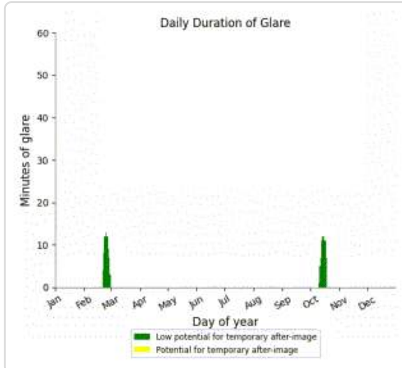


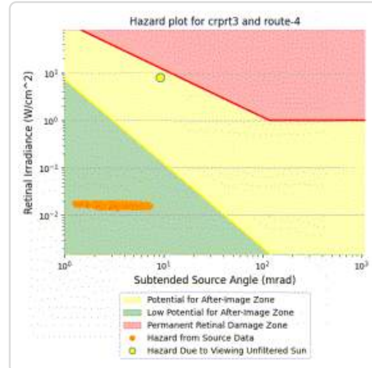
CRPRT3: Route 4

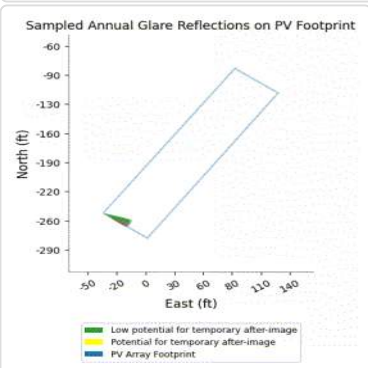
PV array is expected to produce the following glare for this receptor:

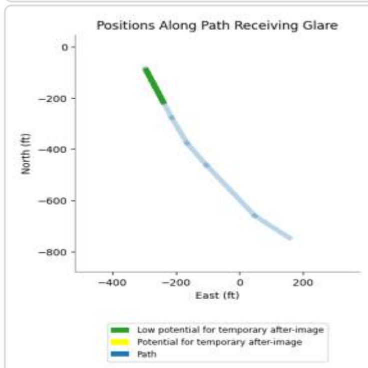
- 157 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

CRPRT4 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	311	0
Route: Route 4	255	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT4: 1-ATCT
No glare found

CRPRT4: OP 2
No glare found

CRPRT4: OP 3
No glare found

CRPRT4: OP 4
No glare found

CRPRT4: OP 5
No glare found

CRPRT4: 6-ATCT
No glare found

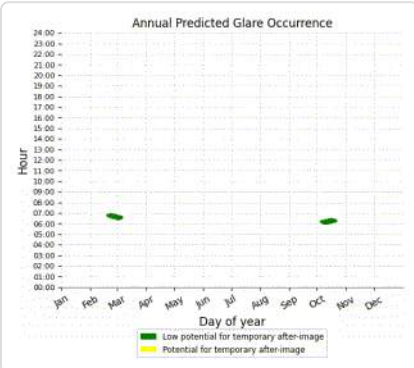
CRPRT4: OP 7
No glare found

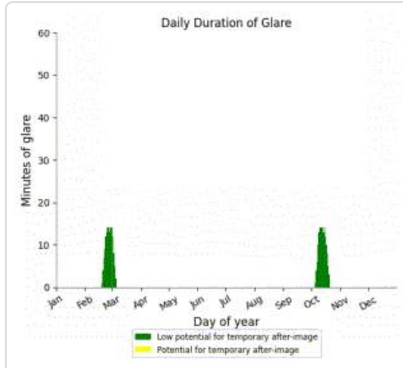
CRPRT4: Route 1
No glare found

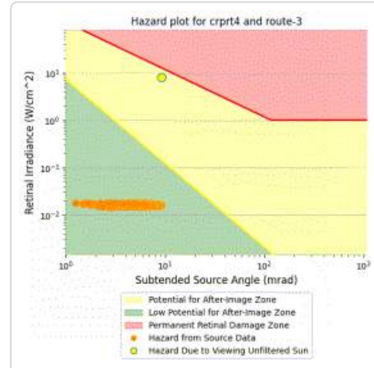
CRPRT4: Route 2
No glare found

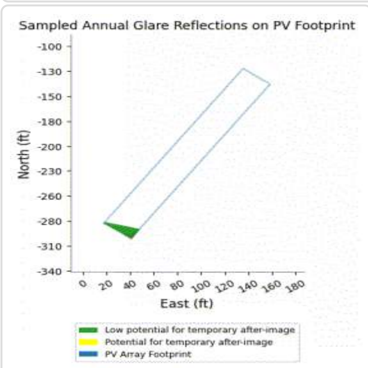
CRPRT4: Route 3

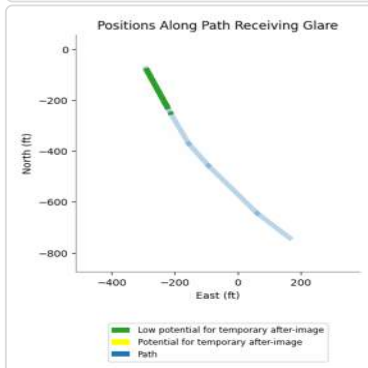
PV array is expected to produce the following glare for this receptor:
- 311 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.





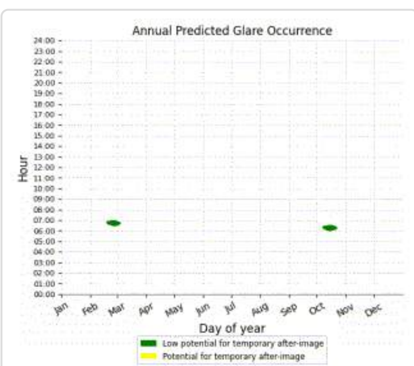


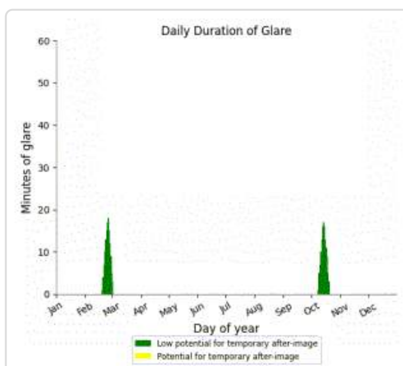


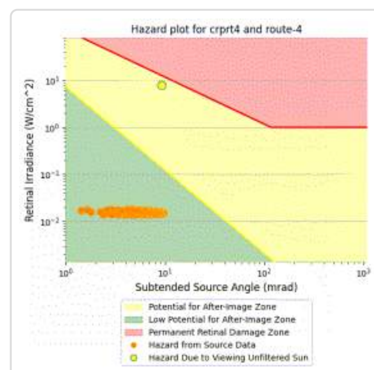


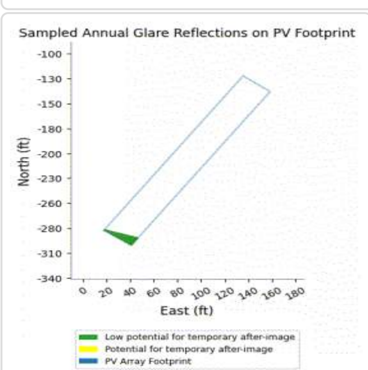
CRPRT4: Route 4

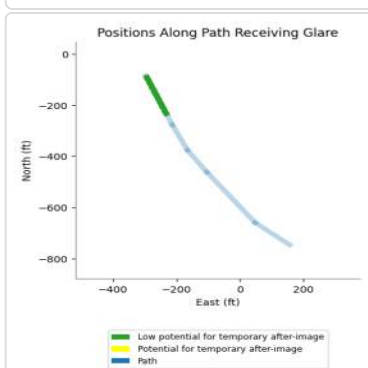
PV array is expected to produce the following glare for this receptor:
- 255 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_13Tilt_124Carports_Obstrctns_2ATCT_NoPlant

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112727.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results

Glare with low potential for temporary after-image predicted

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	236	0	-
CRPRT4	0.0	124.0	566	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	13.0	214.0	0	0	-
SMBLDG	13.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 13.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 13.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	236	0	-	-
CRPRT4	0.0	124.0	566	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	13.0	214.0	0	0	-	-
SMBLDG	13.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt3 (green)	0	87	0	0	0	0	0	0	0	85	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	48	0	0	0	0	0	0	186	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	79	0
Route: Route 4	157	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT3: 1-ATCT

No glare found

CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

No glare found

CRPRT3: OP 5

No glare found

CRPRT3: 6-ATCT

No glare found

CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

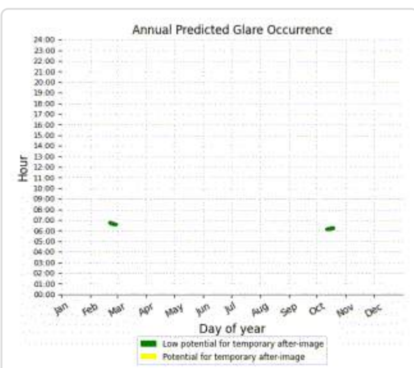
CRPRT3: Route 2

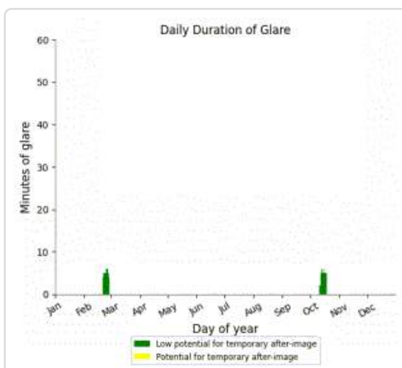
No glare found

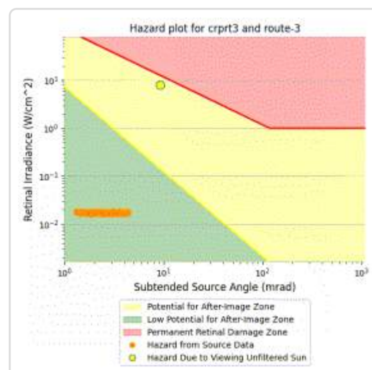
CRPRT3: Route 3

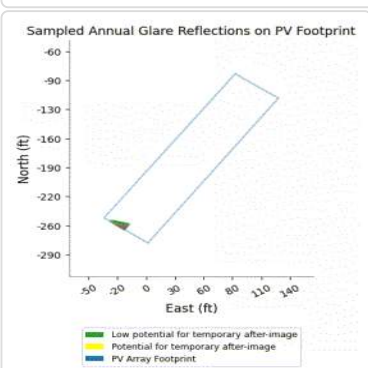
PV array is expected to produce the following glare for this receptor:

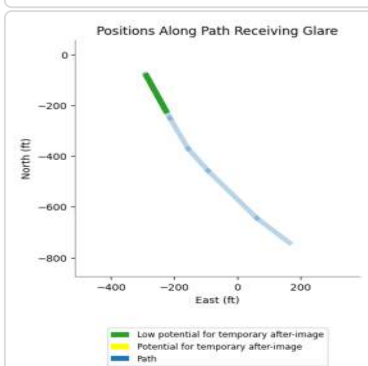
- 79 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







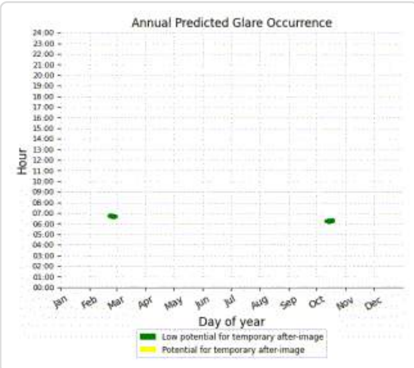


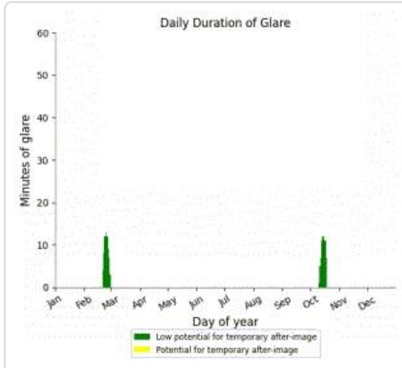


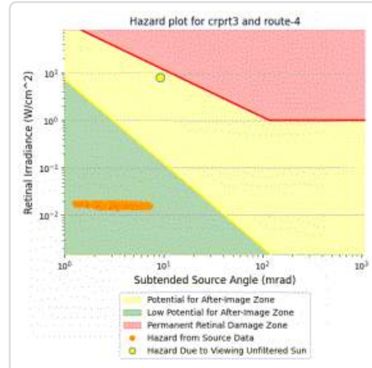
CRPRT3: Route 4

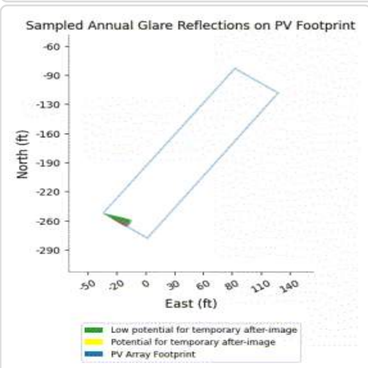
PV array is expected to produce the following glare for this receptor:

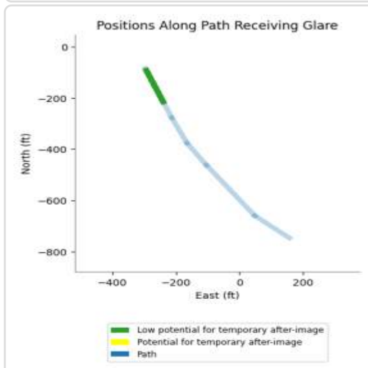
- 157 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

CRPRT4 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	311	0
Route: Route 4	255	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT4: 1-ATCT

No glare found

CRPRT4: OP 2

No glare found

CRPRT4: OP 3

No glare found

CRPRT4: OP 4

No glare found

CRPRT4: OP 5

No glare found

CRPRT4: 6-ATCT

No glare found

CRPRT4: OP 7

No glare found

CRPRT4: Route 1

No glare found

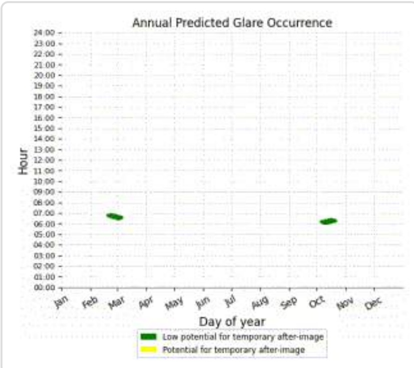
CRPRT4: Route 2

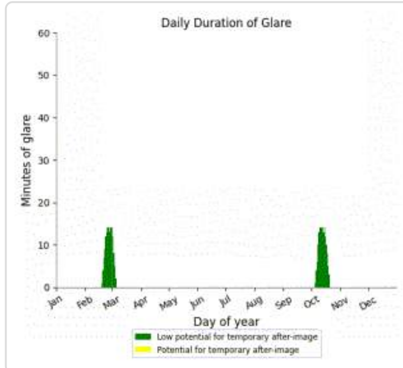
No glare found

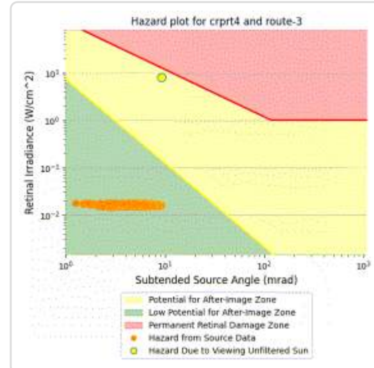
CRPRT4: Route 3

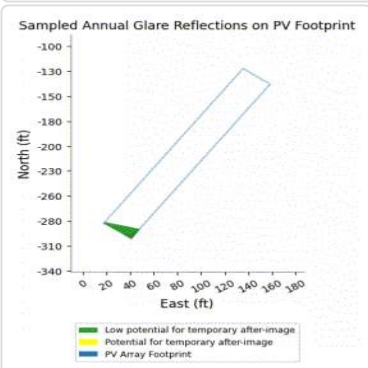
PV array is expected to produce the following glare for this receptor:

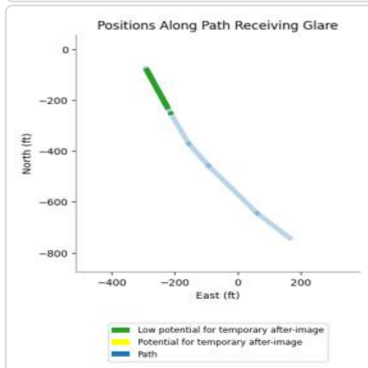
- 311 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







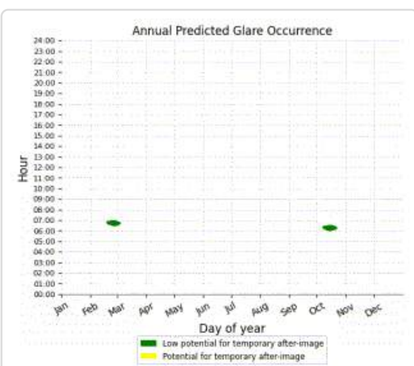


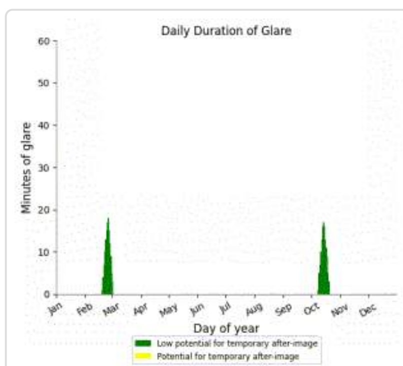


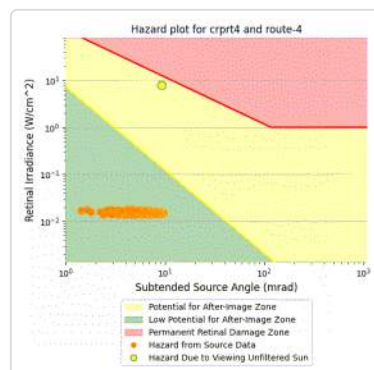
CRPRT4: Route 4

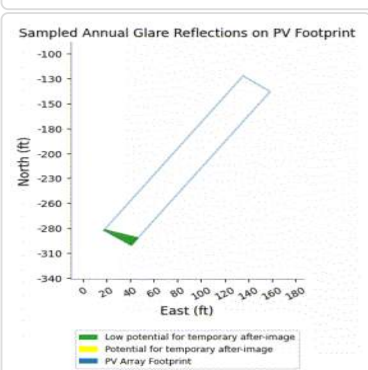
PV array is expected to produce the following glare for this receptor:

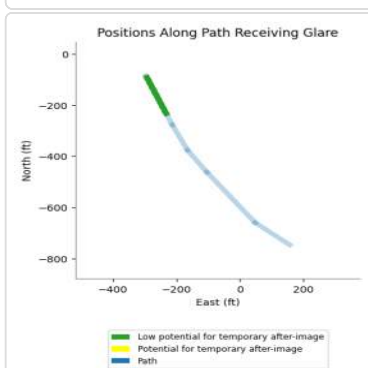
- 255 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_15Tilt_124Carports_Obstrctns_2ATCT_NoPlant

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112723.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results Glare with low potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	236	0	-
CRPRT4	0.0	124.0	566	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	15.0	214.0	0	0	-
SMBLDG	15.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 15.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 15.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude deg	Longitude deg	Ground elevation ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	236	0	-	-
CRPRT4	0.0	124.0	566	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	15.0	214.0	0	0	-	-
SMBLDG	15.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt3 (green)	0	87	0	0	0	0	0	0	0	85	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	48	0	0	0	0	0	0	186	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	79	0
Route: Route 4	157	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT3: 1-ATCT

No glare found

CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

No glare found

CRPRT3: OP 5

No glare found

CRPRT3: 6-ATCT

No glare found

CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

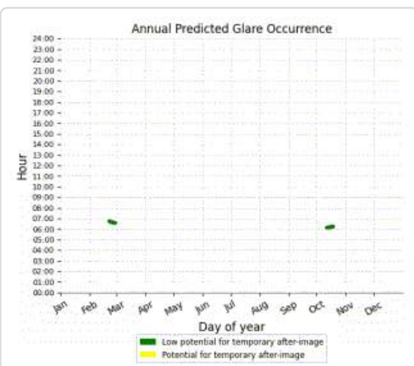
CRPRT3: Route 2

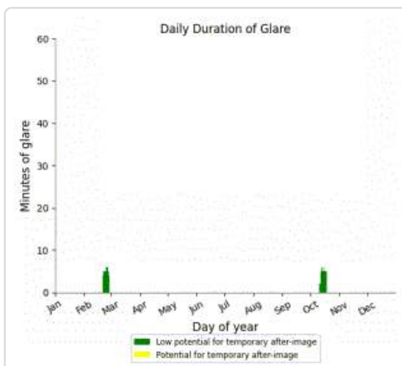
No glare found

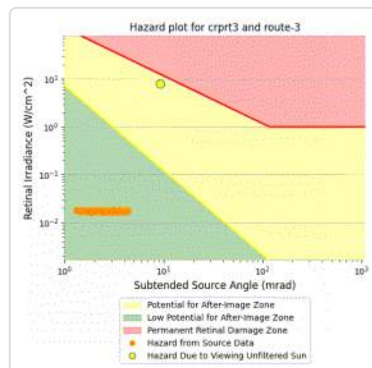
CRPRT3: Route 3

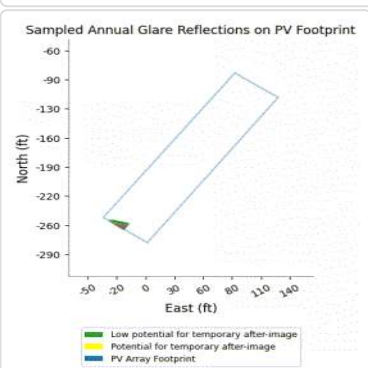
PV array is expected to produce the following glare for this receptor:

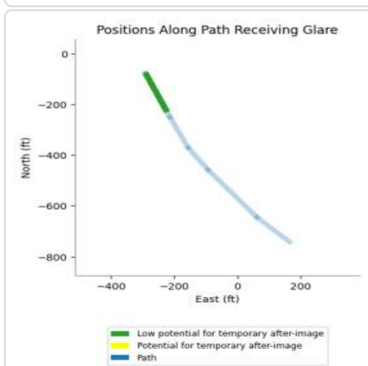
- 79 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







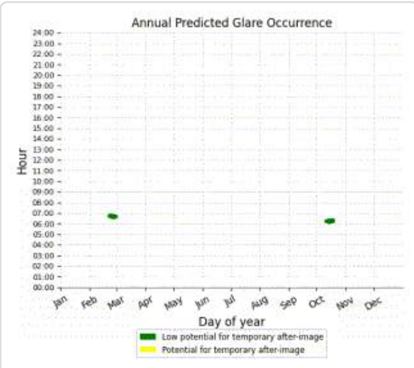


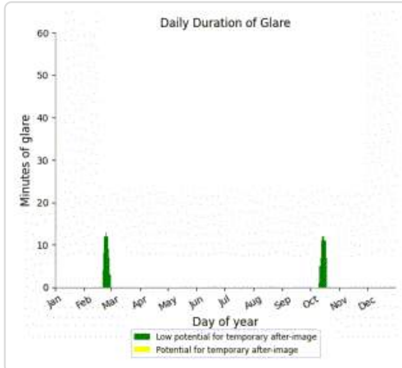


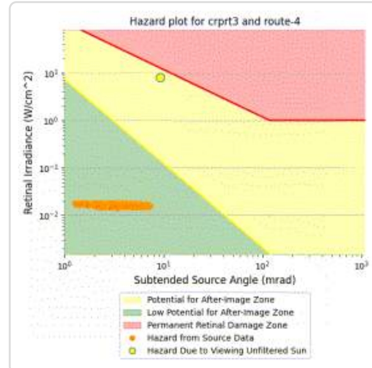
CRPRT3: Route 4

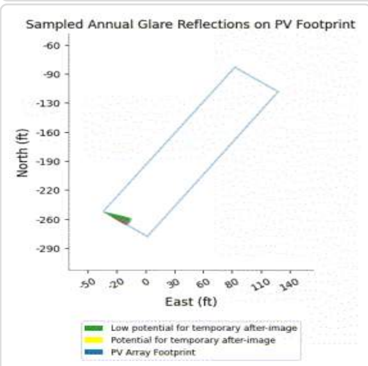
PV array is expected to produce the following glare for this receptor:

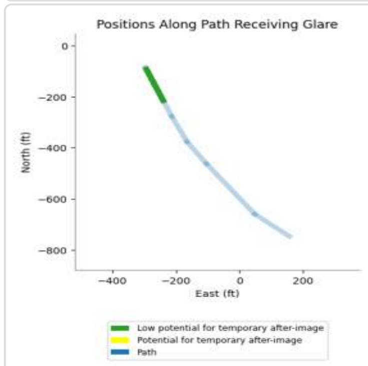
- 157 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

CRPRT4 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	311	0
Route: Route 4	255	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT4: 1-ATCT
No glare found

CRPRT4: OP 2
No glare found

CRPRT4: OP 3
No glare found

CRPRT4: OP 4
No glare found

CRPRT4: OP 5
No glare found

CRPRT4: 6-ATCT
No glare found

CRPRT4: OP 7
No glare found

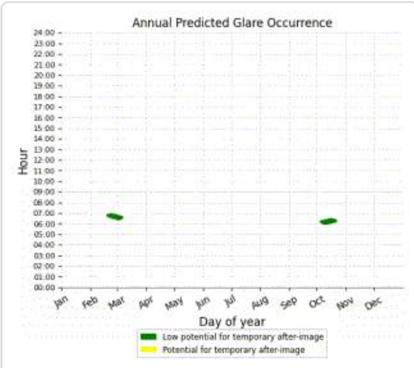
CRPRT4: Route 1
No glare found

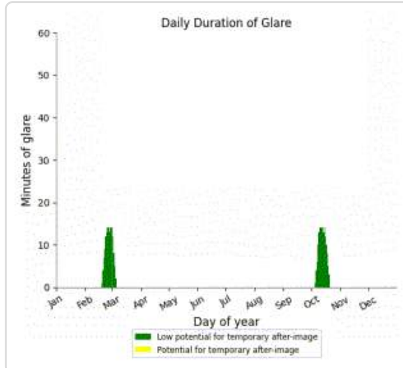
CRPRT4: Route 2
No glare found

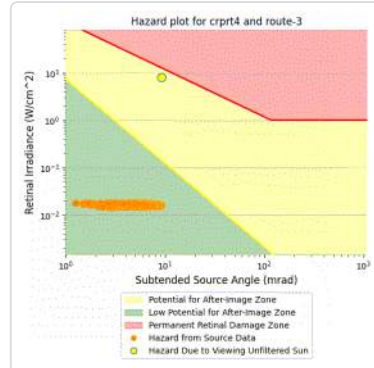
CRPRT4: Route 3

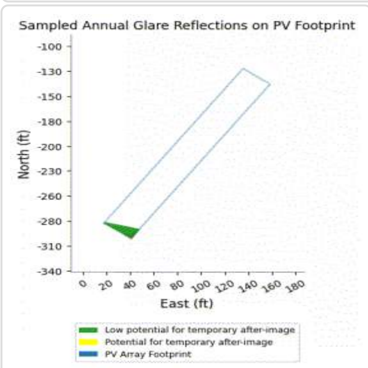
PV array is expected to produce the following glare for this receptor:

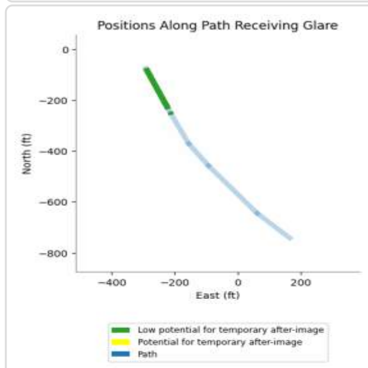
- 311 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







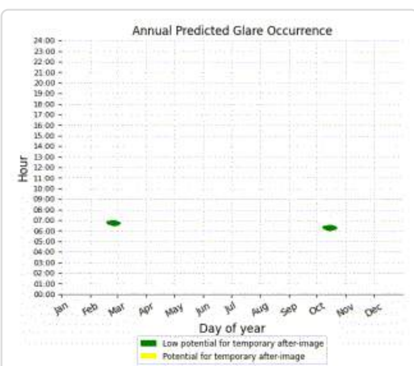


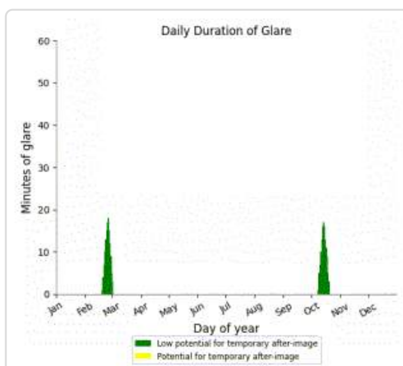


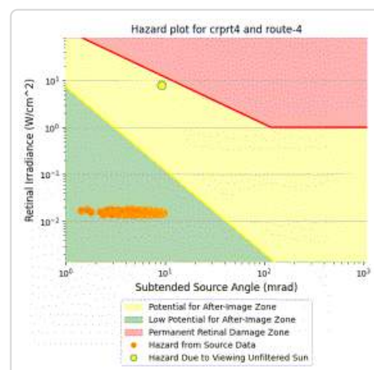
CRPRT4: Route 4

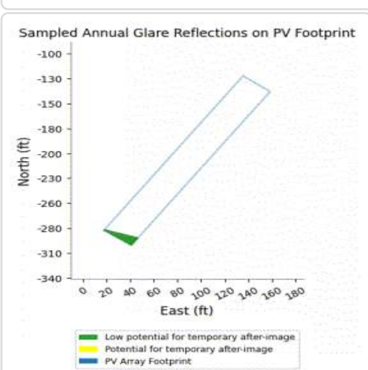
PV array is expected to produce the following glare for this receptor:

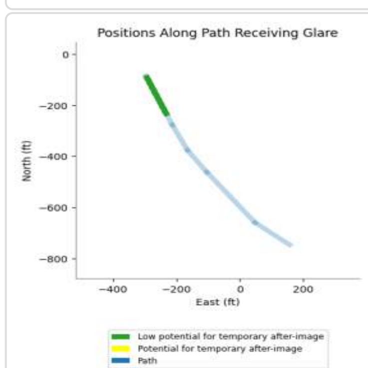
- 255 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

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