TOWN OF EXETER, NEW HAMPSHIRE

10 FRONT STREET • EXETER, NH • 03833-3792 • (603) 778-0591 •FAX 772-4709
www.exeternh.gov

LEGAL NOTICE
EXETER PLANNING BOARD
AGENDA

The Exeter Planning Board will meet on Thursday, February 27, 2025 at 7:00 P.M. in the Nowak Room of the Town Office building located at 10 Front Street, Exeter, New Hampshire, to consider the following:

APPROVAL OF MINUTES: February 13, 2025

NEW BUSINESS: PUBLIC HEARINGS

The application of Willey Creek Company for site plan review, lot line adjustment and Wetlands and Shoreland conditional use permits for the proposed relocation of Building D of the Ray Farm Condominium development and associated site improvements off of Ray Farmstead Road. The subject properties are located in the C-3, Epping Road Highway Commercial zoning district and are identified as Tax Map Parcel #47-8 and #47-8.1. PB Case #22-3.

Continued public hearing on the application of Green & Company for site plan review and Wetlands Conditional Use Permit (CUP) for a proposed Mixed-Use Neighborhood Development (MUND) project consisting of a townhouse development (off Haven Lane) with thirty-two (32) three-bedroom units, a four-story mixed-use building on Portsmouth Avenue having 4,418 S.F. commercial use on the first floor and thirty-six (36) one-bedroom units above, and one separate duplex structure with three-bedroom units on Haven Lane, along with associated site improvements. The subject property is located at 76 Portsmouth Avenue, in the C-2, Highway Commercial zoning district, Tax Map Parcel #65-118. PB Case #24-8.

Continued public hearing on the application of StoneArch Development for site plan review of a proposal for the redevelopment of the property located at 112 Front Street. The proposal includes the demolition of the existing buildings and new construction of seventeen (17) townhouse style condominium units and associated site improvements. The subject property is located in the C-1, Central Area Commercial zoning district and identified as Tax Map Parcel #73-14. PB Case #24-17.

OTHER BUSINESS

- Master Plan Discussion
- Land Use Regulations Review
- Field Modifications
- Bond and/or Letter of Credit Reductions and Releases

EXETER PLANNING BOARD
Langdon J. Plumer, Chairman

Posted 02/14/25: Exeter Town Office and Town of Exeter website

TOWN OF EXETER
PLANNING BOARD
NOWAK ROOM
FEBRUARY 13, 2025
DRAFT MINUTES
7:00 PM

I. PRELIMINARIES:

BOARD MEMBERS PRESENT BY ROLL CALL: Chair Langdon Plumer, Clerk, John Grueter, Gwen English, Jennifer Martel, Nancy Belanger Select Board Representative, Alternate Mary Kennedy and Alternate Dean Hubbard

STAFF PRESENT: Town Planner Dave Sharples

II. CALL TO ORDER: Chair Plumer called the meeting to order at 7:00 PM and introduced the members.

III. OLD BUSINESS

APPROVAL OF MINUTES

January 9, 2025

Mr. Grueter motioned to approve the January 9, 2025 meeting minutes. Ms. Belanger seconded the motion. A vote was taken, all were in favor, the motion passed 5-0-0.

January 23, 2025

Mr. Grueter and Ms. English recommended edits.

Mr. Grueter motioned to approve the January 23, 2025 meeting minutes, as amended. Ms. Belanger seconded the motion. A vote was taken, all were in favor, the motion passed 5-0-0.

IV. NEW BUSINESS:

1. The application of StoneArch Development for site plan review of a proposal for the redevelopment of the property located at 112 Front Street. The proposal includes the demolition of the existing buildings and new construction of seventeen (17) townhouse style condominium units and associated site improvements.
C-1, Central Area Commercial zoning district
Tax Map Parcel #73-14
PB Case #24-17.

Chair Plumer indicated that the developer requested to continue to the February 27, 2025 meeting at 7:00 PM at the Nowak Room.

Ms. Belanger motioned to continue the application of StoneArch Development to the Planning Board's February 27, 2025 meeting at 7 PM at the Nowak Meeting Room. Mr. Grueter seconded the motion. A vote was taken, all were in favor, the motion passed 5-0-0.

2. Continued public hearing on the application of RiverWoods Company at Exeter for site plan review and Wetland CUP application for the demolition of the existing administrative building and the proposed construction of the new supportive living health center along with associated site improvement on the property located at 5 White Oak Drive.
R-1, Low Density Residential zoning district
Tax Map Parcel #97-23
PB Case #24-16.

Chair Plumer read out loud the Public Hearing Notice.

Town Planner Dave Sharples noted that the applicant had appeared on November 21, 2024 and December 19, 2024, and January 23, 2025, and there was a site walk on December 12, 2024. The applicant is seeking approval of a site plan and Wetlands Conditional Use Permit (CUP) application for the demolition of the existing administrative building and proposed new supportive living health center along with associated site improvement on the property. The applicant submitted revised plans and supporting documents dated January 15, 2025. The Board closed the hearing to the public at the January 23, 2025 meeting and voted to continue the discussion of the application to this meeting. The Town has received three separate correspondences from the public since the last meeting. If the Board wants to consider them it has the option of reopening the hearing to the public but in order to do so needs to re-notice the public and the abutters, at the town's cost, and then hold the hearing at a later date. The Board can limit the reopening to the issues raised in those letters, but everyone gets to comment on those issues.

By Roll Call, Mr. Grueter motioned to go into non-public session pursuant to 91-A:3(II)(l) consideration of advice from legal counsel. Ms. Belanger seconded the motion. A roll call vote was taken: Ms. Belanger voted aye, Ms. English voted aye, Chair Plumer voted aye, Mr. Grueter voted aye and Ms. Martel voted aye. The motion passed 5-0-0.

The meeting was closed to the public at 7:03 PM and the Board moved to another room.

Mr. Grueter motioned to come out of non-public session. Ms. Belanger seconded the motion. A vote was taken, all were in favor, the motion passed 5-0-0.

The meeting room was reopened to the public at 7:34 PM.

By Roll Call, Ms. Belanger motioned to seal the minutes of the non-public session. Mr. Grueter seconded the motion. A roll call vote was taken: Ms. Belanger voted aye, Ms. English voted aye, Chair Plumer voted aye, Mr. Grueter voted aye, and Ms. Martel voted aye. The motion passed 5-0-0.

Chair Plumer indicated that four letters were received since the hearing was closed to public comment so because the hearing was closed to the public the Board is not accepting them and will move into deliberations.

Chair Plumer activated Alternate Marty Kennedy.

Ms. English indicated that she wrote a letter concerning matters she felt should be addressed, or contemplated, before going forward. She noted correspondence was received after the hearing was closed to the public and she did not know if they contained critical information. She questioned the requirement for a special exception from the Zoning Board of Adjustment and proposed options such as granting the site plan approval with a condition that the applicant go to the ZBA for a special exception or set a date for a rehearing and re-notice abutters. She noted the approval could have significant impact on the neighbors and the community and thinks it important that the applicant follow the regulations.

Mr. Grueter questioned if another letter were to come in, in two weeks. Ms. English indicated she strongly felt the special exception requirement should be reviewed by the ZBA as the applicant had two before and she did not see why this was different. She indicated she believed the applicant may be violating the prior special exception granted to them already. She noted there was no documentation, no paperwork, that the special exception was not required and fears the ball was dropped.

Mr. Grueter asked Mr. Sharples to clarify, and Mr. Sharples stated that he could only reiterate what he said at the previous meeting when he recalled his discussions with Doug Eastman at the Technical Review Committee meeting when he said one was not needed.

Mr. Grueter asked Ms. English if she found something in the documents from their going to the ZBA for the Administration Building and she noted that then the building was to be 5,500 SF with 15 or 21 parking spaces and 20 employees, the size of the building allowed was a little bit bigger but now 10 times that size so why wouldn’t they need another special exception she questioned with 100 parking spaces and an undetermined number of employees.

Chair Plumer asked if there was a special exception for the Ridge and Boulders and Mr. Sharples indicated yes.

Ms. Belanger indicated that while she did not want to put words in his mouth, she felt Mr. Eastman would have spoken up and said it was needed .and we can move on. Ms. English stated that she feared if may have been overlooked, she didn’t know.

Mr. Kennedy stated that he was hearing staff say it was required, Mr. Sharples said it.

Mr. Sharples stated that he did not have anything in paper, but it was discussed, no one missed it, the ball was not dropped, it was discussed and decided. Ms. English noted she would like to know why it was deemed not necessary.

Ms. Martel questioned whether it could be reopened to request such a letter from Mr. Eastman. Ms. English noted that it would need to be re-noticed and continued, and she was concerned the application was on the clock. Chair Plumer indicated there would be no document by reopening the public hearing. Mr. Grueter questioned whether there was anything in the TRC minutes. Ms. Belanger did not believe so. Ms. Martel asked if she reviewed the previous ZBA minutes and questioned whether the ZBA could raise the issue. Ms. Martel noted the Board had already accepted the case as ready for review purposes. Ms. English noted there were other cases which were went back to the ZBA.

Ms. Belanger noted the clock ended at the last meeting and the applicant gave permission to extend to today for this hearing.

Ms. English motioned to grant the site plan approval with the condition that the applicant go to the ZBA for approval of the special exception. Mr. Grueter seconded the motion.

Mr. Grueter questioned how they could make the applicant get a special exception if they didn't need to. Ms. English indicated she did not believe it was reviewed by the ZBA. Mr. Grueter noted the Building Inspector said they don't need it. He asked Ms. English to re-read the motion.

Ms. English motioned that one of the conditions of approval for the project be that Riverwoods obtain a ZBA application on the special exception.

Mr. Sharples noted as a point of procedure that the motion as re-read was different and suggested putting it in writing.

Ms. English motioned to grant the site plan approval with the condition that Riverwoods obtain ZBA approval on the special exception.

Mr. Grueter recommended saying it was necessary.

Ms. Belanger raised a point of order that the previous motions be withdrawn.

Ms. Martel recommended the Board not start with granting the whole project to add one condition of approval.

Ms. English withdrew her previous motions and Mr. Grueter withdrew his seconds.

Ms. English motioned that the Board add this one condition of approval that Riverwoods obtain ZBA approval on the special exception.

Mr. Grueter recommended adding "if necessary."

Mr. Kennedy requested the motion be re-read.

Ms. Martel recommended amending the motion to say that ZBA review the application to determine if it needs a special exception.

Chair Plumer stated that he thinks this is putting the horse before the cart.

Ms. Belanger noted there is a motion on the table and amendment and no second.

Ms. English motioned to amend the motion to add one condition of approval that the ZBA review the application to see if a special exception is necessary. Mr. Kennedy seconded the motion.

Ms. Martel questioned whether the Board could take action if the ZBA says no. Chair Plumer stated that he did not think it works. Ms. Belanger agreed.

Mr. Grueter requested to move the question.

Chair Plumer questioned asking the Planning Office to ask if the special exception was done. Mr. Sharples noted the public hearing is closed and he can only reiterate what is in the record. Ms. Belanger noted that Mr. Sharples has stated so twice and said it was not needed, and someone would have spoke up.

Ms. English withdrew her motions and Mr. Kennedy withdrew his second.

Ms. English suggested the language that one of the conditions of approval is that Riverwoods obtains ZBA application on special exception if the ZBA determines a special exception is necessary. Mr. Hubbard submitted an amendment: that the Board ask Riverwoods to go before the ZBA to get a decision relative to the need for a special exception. Ms. English noted that it eliminates the conditions of approval process. Chair Plumer asked if that may be what we want to accomplish.

Ms. English motioned to ask Riverwoods to go before the ZBA relative to the need for a special exception. Mr. Grueter seconded the motion.

Ms. Martel stated that as this is not a condition of approval there is no asking them but a requirement. Ms. Belanger recommended amending the motion to say "shall" instead of "ask." Ms. English agreed to the amendment.

Ms. English re-read the motion substituting the word "shall." Mr. Grueter seconded the amendment.

Ms. Martel asked if the motion is not a condition of approval whether deliberations would stop, and the application would be continued. Chair Plumer indicated yes. Mr. Kennedy expressed concerns with the time frame. Chair Plumer noted it would continue the application about two months. Ms. Belanger noted the ZBA meets on March 18^{th} but could be booked.

Ms. English re-read the motion. ***A roll call vote was taken: Ms. Belanger voted no, Ms. English voted aye, Chair Plumer voted no, Mr. Grueter voted no, Mr. Kennedy voted no and Ms. Martel voted aye. The motion failed 4-2-0.***

Chair Plumer asked the Board how they felt about moving ahead and Mr. Grueter questioned why they wouldn't.

Mr. Sharples indicated he had the seven standard conditions of approval ready to read for the site plan approval and one condition of approval recommended by the Conservation Commission in their memo concerning the Wetland Conditional Use Permit (CUP) ***that there be a deed restriction or conservation easement of the 3.5-acre "Grinnell Parcel" executed prior to issuance of a certificate of occupancy, similar to the Southeast Land Trust or Town held easements.***

Ms. Belanger asked about traffic during construction and flaggers. Mr. Sharples indicated those are discussed at the pre-construction meeting.

Ms. English asked about seeding to minimize invasive plant encroachment. Ms. Martel noted it was added to the landscape plan already.

Chair Plumer recommended reviewing the CUP criteria:

Chair Plumer read the applicant's responses: that it is permitted in the zoning district, that Riverwoods owns over 200 acres which are constrained by conservation easements, gas line easements and buffer requirements. The applicant stated the use and size of building, were previously spread out over three campuses and would be consolidated and this was the only location for the proposed health center. The applicant referenced the wetland report done by Gove Environmental concerning impacts not detrimental to wetland and the lower value of the wetlands. The applicant referenced the minimum detrimental impact to the wetland and buffer and use of retaining walls, steep slopes and reduced amount of land area needed, a retention pond/rain garden to treat the quality of runoff. The applicant again referenced the value of the wetland being lower than other wetlands on the property. The applicant referenced the stormwater rates and treatment according to state and local regulations. The applicant noted some of the property is already protected and does propose restitution to the state aquatic mitigation fund (ARM) and 3.75 acres added to the conserved areas adjacent to the SELT easement. The applicant referenced 84 SF of temporary impact to remove the driveway culvert and erosion and sediment control for the duration of the project. The applicant noted the permits to be filed including AoT and discharge with NH Department of Environmental Services (DES).

Ms. Belanger asked if there was a designated time frame for execution and recording of the easement and Mr. Sharples re-read the Commission's memo that they requested "prior to a certificate of occupancy being issued."

Ms. Martel motioned that after reviewing the criteria for wetlands CUP the application of Riverwoods, Planning Board Case #24-16 for wetlands CUP be approved with the condition recommended by the

Conservation Commission that Mr. Sharples just read. Ms. Belanger seconded the motion. A vote was taken, all were in favor, the motion passed 6-0-0.

Ms. English discussed conditions of approval for the site plan approval. She questioned the impact of blasting should Ms. Hooten have structural damage and be compensated. Ms. Martel indicated they need a permit before blasting and this language is part of the permit. Ms. English indicated that puts her mind at rest.

Ms. English asked about electric vehicle charging stations and Mr. Sharples clarified the regulations require conduits be ready and recommended 2% of parking could be a condition. He stated EV readiness shall be provided as set forth in the regulations.

Ms. Belanger asked about flagging and Ms. Martel recommended signage but was not sure drivers would pay attention. Ms. Martel indicated construction happens all the time and Severino has done this before. Mr. Sharples indicated the pre-construction meeting schedule with DPW to discuss flagging and safety. Ms. Belanger requested signage at a minimum.

Chair Plumer asked if landscaping was okay, and Ms. Martel thanked the applicant for being responsive to the Board's concerns and noted she was quite satisfied with the plan.

Ms. English asked about removal of one or both of the Pickleball Courts to help with screening efforts. Mr. Grueter noted the applicant said it was the only place to put it. Ms. Belanger indicated she found that hard to accept. Mr. Grueter noted noise may irritate the residents and screening would have no effect on the noise. Other towns are prohibited because of the noise level.

Ms. English asked about parking on Pickpocket Road during construction. Ms. Belanger will bring up the issue with the Select Board, but Mr. Sharples noted if public parking is allowed, they could not single people out. There is nothing in the ordinance.

Ms. English asked about traffic on Timber Lane and notifying the delivery vendors to continue to use White Oak Drive during construction.

Ms. English asked about installing the screening which would not be damaged by construction so the process could get a head start where typically it would not be until construction is completed, along Route 11 by the old driveway where the house is taken out. Mr. Sharples asked what sequence, and she indicated the areas not affected by construction could start in the spring along 111 and near the Pickleball Courts.

Ms. English asked about vegetation planted for screening purposes being replaced in perpetuity if they die. Mr. Sharples read the standard condition of approval "as long as the site plan is valid."

Ms. English asked about construction ties and Mr. Sharples indicated 7 AM to 10 PM per the noise ordinance.

Ms. English asked about covering the trucks containing dirt and gravel. Chair Plumer indicated that is a state law.

Ms. English asked about parking at Boulders and Ridge and whether it would be adequate when the residential units go in where the medical facilities were, with extra residents. Chair Plumer noted it was out of the Board's purview concerning this proposal. Mr. Sharples indicated he could look at what was previously approved.

Ms. English asked about the pedestrian crossing. She noted the public hearing was closed but Riverwoods was asked about this at the last meeting. Chair Plumer indicated it is a state highway. Ms. Martel noted the applicant can share their concerns on the crosswalk on a state road but can't change it. She noted that grading, drainage, landscaping, lighting, architecture was all well considered.

Mr. Kennedy agreed that it was challenging to cross but the applicant has done what they can do by providing buses.

Mr. Sharples read the standard conditions of approval:

1. An electronic as-built plan with details acceptable to the Town shall be provided prior to the use of the parking lot. This plan must be in dwg or dxt file format and in NAD 1983 State Plane New Hampshire FIPS 2800 Feet coordinates;

2. A pre-construction meeting shall be arranged by the applicant and their contractor with the Town Engineer prior to any site work commencing. The following must be submitted for review and approval prior to the pre-construction meeting:

i. The SWPPP (storm water pollution prevention plan), if applicable, be submitted to and received for approval by DPW prior to the preconstruction meeting; and

ii. A project schedule and construction cost estimate.

3. Third party construction inspection fees shall be paid prior to scheduling the pre-construction meeting;

4. A completed inspection and maintenance manual checklist of the stormwater inspection and maintenance plan shall be submitted annually to the Town Engineer on or before January 31st of each year. This requirement shall be an ongoing condition of approval;

5. All applicable state permit approval numbers shall be noted on the final plans. All appropriate fees to be paid including but not limited to: sewer/water connection fees, impact fees, and inspection fees (including third party inspections) prior to issuance of a certificate of occupancy;

6. All landscaping shown on plans shall be maintained and any dead or dying vegetation shall be replaced, no later than the following growing season, as long as the site plan remains valid. This condition is not intended to circumvent the revocation procedures set forth in State statutes.

7. The applicant shall submit the land use and stormwater management information about the project using the PTAPP Online Municipal Tracking Tool. The PTAPP submittal must be accepted by DPW prior to the pre-construction meeting;

8. EV charging readiness shall be provided as set forth in Section 9.13.8 of the site plan review and subdivision regulations and details shall be shown on the final plans

9. Recommend signage on Route 111 for construction vehicles entering and exiting.

10. Landscape plantings that will not be disturbed by construction activities will be planted as soon as possible after the pre-construction meeting has taken place; and

11. Riverwoods shall remind vendors and other delivery vehicles to continue to use White Oak Drive.

Ms. Belanger motioned that the request of Riverwoods, Planning Board Case #24-16 for spite plan review be approved with the conditions stated by the Town Planner, Dave Sharples. Mr. Grueter seconded the motion. A roll call vote was taken: Ms. Belanger voted aye, Ms. English voted no, Chair Plumer voted aye, Mr. Grueter voted aye, Mr. Kennedy voted aye and Ms. Martel voted aye. The motion passed 5-1-0.

V. OTHER BUSINESS

- Master Plan Discussion

  Mr. Sharples noted that there is a Master Plan Oversight Committee meeting next Thursday at 8:15 AM and they will finalize the bike and pedestrian master plan then submit it to the Planning Board and Select Board. He noted Mr. Cameron has not been able to attend and there are usually three members including Mr. Grueter and Mr. Brown if someone would like to serve in the interim. Mr. Kennedy indicated he would be interested.

  Mr. Sharples noted they are kicking off the complete street study and the Select Board funded it with ARPA funds and contracted with Rockingham Planning Commission. He noted these were goals of the Master Plan. Chair Plumer noted the Committee is a sub-committee of the Planning Board and the Master Plan can be found online. Ms. Belanger noted the process was well executed.

- Field Modifications

Chair Plumer provided a history for the alternates of how approval of field modifications by the Town Planner came to be.

- Bond and/or Letter of Credit Reductions and Release

VII. TOWN PLANNER'S ITEMS

VIII. CHAIRPERSON'S ITEMS

IX. PB REPRESENTATIVE'S REPORT ON "OTHER COMMITTEE ACTIVITY"

X. ADJOURN

Ms. Belanger motioned to adjourn the meeting at 9:28 PM. Mr. Grueter seconded the motion. A vote was taken and passed unanimously.

Respectfully submitted.

Daniel Hoijer,
Recording Secretary (Via Exeter TV)

TOWN OF EXETER

Planning and Building Department

10 FRONT STREET • EXETER, NH • 03833-3792 • (603) 778-0591 •FAX 772-4709

www.exeternh.gov

Date: **February 21, 2025**

To: **Planning Board**

From: **Dave Sharples, Town Planner**

Re: **Willey Creek Company** **PB Case #22-3**

The Board may recall that the Applicant previously filed this application in May 2022 and subsequently, after several requests for continuance, requested at the August 25, 2022 meeting for the application to be tabled until further notice, noting that the Board had not yet taken jurisdiction to hear the application.

The Applicant re-submitted applications and plans for site plan review, lot line adjustment and Wetlands and Shoreland Conditional Use Permits along with supporting documents, dated 8/13/24, for the proposed relocation of Building D of the Ray Farm Condominium development on Willey Creek Road (off of Ray Farmstead Road). The subject properties are located in the C-3, Epping Road Highway Commercial zoning district and are identified as Tax Map Parcel #47-8-1 and #47-9.

The Applicant was originally scheduled to appear before the Board at the November 21st, 2024 meeting and subsequently requested a continuance to the February 27th, 2025 meeting. The attached email was received this morning requesting a continuance to the April 24th, 2025 meeting. I have no objection to the continuance at this time but at some point, the applicant needs to move forward with a hearing or withdraw until they are ready to resubmit and appear before the board.

Planning Board motions:

Request for Continuance motion: I move that the request of Willey Creek Company (PB Case #22-3) for a continuance of their application to the April 24th, 2025 Planning Board meeting at 7:00 PM in the Nowak Room of the Exeter Town Office building be APPROVED / APPROVED WITH THE FOLLOWING CONDITIONS / TABLED / DENIED.

Thank You.

Enclosures

Town of Exeter

Barbara Mcevoy <bmcevoy@exeternh.gov>

Re: CKT Assoc./Willey Creek -Continuance Planning Board scheduled for 11/21/24

1 message

David Sharples <dsharples@exeternh.gov> Fri, Feb 21, 2025 at 8:53 AM

To: Tim Phoenix <TPhoenix@hpgrlaw.com>

Cc: Barbara McEvoy <bmcevoy@exeternh.gov>, "Jon & Amy Shafmaster (jshafmaster@littlebaylobster.com)" <jshafmaster@littlebaylobster.com>, Bill Blackett <BBlackett@littlebaylobster.com>, "John E. Lyons (jlyons@lyonslaw.net)" <jlyons@lyonslaw.net>, "Russell F. Hilliard" <rhilliard@uptonhatfield.com>, Ed Ford <eford@fordlaw.com>, Michelle Whelan <MWhelan@hpgrlaw.com>, "Millennium Engineering, Inc. (hboyd@MEI-NH.com)" <hboyd@mei-nh.com>, Kat Morrill <KMorrill@mei-ma.com>, Eric Botterman <ebotterman@mei-ma.com>, Katy Ellis <Kellis@littlebaylobster.com>

Hi Tim,
Received, thank you. No need to have anyone attend. I can take care of it.
Thanks,
Dave

On Fri, Feb 21, 2025 at 8:37 AM Tim Phoenix <TPhoenix@hpgrlaw.com> wrote:

> Good morning, Barb and all;
>
> Barb, thanks again for the heads up and apologies for the delay in responding.
>
> We have been working upon updated plans for consideration by the Planning Poard but they are not quite ready. We believe that the updated plans will fully address the issues for consideration for approval of BB him dg. D and access to it. Accordingly, we request a continuance of the Planning Board hearing presently scheduled for Thursday, February 27, 2025 to be rescheduled for the April 24,2025 Planning Board hearing.
>
> Please let me know whether you need anything more formal, and/or whether someone needs to appear at the February 27 hearing to verbally request continuance. Thank you very much. Tim
>
> HOEFLE, PHOENIX, GORMLEY & ROBERTS, PLLC
> ATTORNEYS AT LAW

TOWN OF EXETER

Planning and Building Department

10 FRONT STREET • EXETER, NH • 03833-3792 • (603) 778-0591 •FAX 772-4709

www.exeternh.gov

Date: **February 20, 2025**

To: **Planning Board**

From: **Dave Sharples, Town Planner**

Re: **PB Case #24-8 Green & Company**

The Applicant has submitted applications for site plan review and a Wetlands Conditional Use Permit (CUP) for a proposed Mixed-Use Neighborhood Development (MUND) on the property located at 76 Portsmouth Avenue (the current site of the Federated Auto Parts building). The proposal originally consisted of a townhouse development off Haven Lane, a four-story mixed-use building on Portsmouth Avenue having commercial use on the first floor and residential units above, and one separate duplex structure on Haven Lane, along with associated site improvements. The subject property is located in the C-2, Highway Commercial zoning district and is identified as Tax Map Parcel #65-118.

The Applicant presented their proposal to the Planning Board at the December 19th, meeting where numerous comments and concerns were raised by the Board and abutters. A site walk was conducted on January 9, 2025 and the Applicant was scheduled to return to the Board at the January 23rd, 2025 meeting.

The Applicant appeared before the Conservation Commission at their January 14th meeting to present their Wetlands Conditional Use Permit, and after considerable discussion, they requested a continuance to a future meeting to provide them adequate time to reassess the project design, and to address the Commission's concerns. The Applicant subsequently requested a continuance of their application before the Planning Board to the February 27th, 2025 meeting to allow them to return to the ConCom in February.

The Applicant returned to the Conservation Commission at their February 11th, 2025 meeting and presented their redesigned plans. The Commission voted that they had no objection to the application and recommended two conditions of approval. Please see enclosed memo from CC Chairman Dave Short, dated 2/12/25, to the Board.

The Applicant is requesting two waivers from the Board's Site Plan Review & Subdivision Regulations, as outlined in the Waiver Request letter from Jones & Beach Engineers, dated 1/13/25, provided in previously received meeting materials.

The Applicant has submitted revised plans and supporting documents, dated 2/14/25, which are enclosed for your review. Staff is still in the process of reviewing the re-submittal and awaiting comments from UEI and Town departments. I will update the Board at the meeting and will be prepared with conditions of approval should the Board decide to act on the application.

Waiver Motions:

Grading within 5 feet of exterior property line waiver motion: After reviewing the criteria for granting waivers, I move that the request of Green & Company (PB Case #24-8) for a waiver from Section 9.3.6.4. of the Site Plan Review and Subdivision Regulations regarding grading within 5 feet of an exterior property line be APPROVED / APPROVED WITH THE FOLLOWING CONDITIONS / TABLED / DENIED.

Standard Specifications for Construction - Section E(III)(D)(1) - Curb Radius Intersections (DPW construction standards) motion: After reviewing the criteria for granting waivers, I move that the request of Green & Company (PB Case #24-8) for a waiver from the standard specifications for construction relative to curb radius be APPROVED / APPROVED WITH THE FOLLOWING CONDITIONS / TABLED / DENIED

Planning Board Motions:

Conditional Use Permit (Wetlands) Motion: After reviewing the criteria for a Wetlands Conditional Use permit, I move that the request of Green & Company (PB #24-8) for a Conditional Use Permit be APPROVED / APPROVED WITH THE FOLLOWING CONDITIONS / TABLED / DENIED.

Multi-Family Site Plan Motion: I move that the request of Green & Company (PB #24-8) for Multi-Family Site Plan approval be APPROVED / APPROVED WITH THE FOLLOWING CONDITIONS / TABLED / DENIED.

Thank you.
Enclosures

TOWN OF EXETER
CONSERVATION COMMISSION MEMORANDUM

Date: February 12, 2025
To: Exeter Planning Board
From: Dave Short, Chair of the Exeter Conservation Commission
Subject: Wetland CUP Application

Project Information:
Project Location: 76 Portsmouth Ave/Haven Lane, Exeter, NH
Map/Lot: Tax Map Parcels #65-118
CC Review Date: 1/14/26, 2/11/25
PB CASE: #24-8

The Conservation Commission reviewed the wetland conditional use permit application at their meetings on January 14th and revised plans on February 11th and voted 6:1:0 that they have reviewed the application and have no objection to the application and recommend the following conditions be added to the approval:

- The culvert between this project and the Thirsty Moose is upgraded as discussed.

- Prior to the issuance of a certificate of occupancy for the development, a deed restriction is executed permanently protecting the east side of the development as presented on the January 30th plan from further development with the exception of a passive recreation pedestrian trail.

ABUTTER AND/OR PUBLIC COMMENTS

January 16, 2025

Dear Exeter Planning Board,

I write this letter to you today to express my deep concerns with the proposed development of 76 Portsmouth Avenue which directly impacts Haven Lane.

I have lived on Haven Lane for 13 years. Haven Lane has been a true gift to my son and I. He learned to ride a bike on Haven Lane. We walked our first puppy on Haven Lane and he continues to play basketball on the shared basketball hoop on Haven Lane.

Haven Lane is a neighborhood tucked behind Portsmouth Avenue that is host to all kinds of beauty in nature; owls, hawks, eagles, turkey, deer, coyotes, fisher cats, bunnies, songbirds; to name a few. Despite its proximity to Portsmouth Avenue and downtown, Haven Lane is a hidden gem full of families and children and pets who share a love of quiet and safety and nature.

When the development of 76 Portsmouth Avenue was first proposed to the town by Green and Company, I was obviously bothered, but I understood that the land did not belong to us and it was their prerogative to build something in that space.

Being part of the process and learning about the roles of our town's conservation commission and planning board has been exponentially helpful, but I can't help but feel that Green and Company are now bending the rules of the MUND by claiming that 76 Portsmouth Avenue (Fisher Auto Parts) will remain what it is for the next "*5-10 years down the road*", but until then, they'd like to build the Haven Lane portion of their development. I also can't help but be bothered by the scope and size of the proposed development and how it will forever affect the character of our quaint neighborhood. The proposed townhouses will tower over our neighborhood, destroying our little piece of nature and I can't help but wonder HOW this proposal, leaving 76 Portsmouth Avenue untouched for an undetermined amount of time, can possibly follow the rules laid out by our local government. I don't blame Green and Company for wanting what they want. It's not their town and it's not their neighborhood. Their lives will not be forever changed by this decision.

What I ask of you today is to consider this…
If Green and Company want to be a part of our neighborhood, they should scale their structures and density to match the character of our neighborhood. If they wish to use MUND, they should be connected to Portsmouth Avenue and Portsmouth Avenue only.

Respectfully,
Jennifer & Zachary Thomas @ 28 Haven Lane Exeter

Town of Exeter

Barbara Mcevoy <bmcevoy@exeternh.gov>

Lilac Place AKA 76 Portsmouth Ave

1 message

---

just2now <just2now@aol.com> Wed, Feb 19, 2025 at 2:45 PM
To: bmcevoy@exeternh.gov

Dear Members of the board,

As of yet we have not seen the revised plans, so hopefully our concerns have been addressed.
So if parts of this letter seems redundant, apologies; yet still highlight our true concerns.
Our uneasiness persist regarding the water from the construction of numerous buildings.
Who will bear the responsibility if water issues arise? The project plans recognize 'poor drainage,' which exacerbates our concerns..
And why does the majority of plans fail to account for our home? Is this oversight intentional to prevent a thorough assessment of the plan's impact?.
The new residents may choose to remove or trim back the trees to expand their yards, thereby diminishing the buffer. Furthermore, there is a risk that they may use our yard as a shortcut.
Adding a tall fence, pine trees, and Lilac trees around the perimeter could augment a natural barrior of the area.
But it still does not deter from the fact that this proposal raises significant concerns regarding water damage, liability, privacy, noise, and buffer issues that we did not previously face.
They have announced that the top half of the wetlands at the end of Haven will be preserved, but notably, there is no mention of the left end, near Bonnie Drive.
Can I ask why the wetland behind our house is not protected?
Bonnie traffic will be most affected in accessing the new development, as the new residence will need to travel down this road to access Haven Lane.
But first we'll have to deal with construction vehicles travelling to the site, generating noise, pollution, and wear and tear on our quiet street and the cost we'll incur for maintaining our property and road.
Will construction activities be restricted to weekdays during regular business hours? This includes traveling to the site and operating heavy machinery.
Will generators be employed? If so, the noise pollution may significantly disrupt our sleep if not shut off at night.

As you consider this proposed development, ask yourself; can we harmoniously balance progress with the preservation of our small town' distinct charm and the protection of wildlife's limited habitats?
Does this project fit the true nature of MUND? After all, Article 3 never mentioned a development behind Portmouth Ave intruding upon a quiet neighborhood, adding traffic, pollution, noise, loss of privacy, and devaluation of homes. This is not what we voted for.
Would you want this in your backyard?
Would you want 2 streets, 72 plus residential vehicles circling your home?
This project is asking us to give up alot!
Again, we voted for a project ON Portmouth Ave., but it's not, it is in our backyard, with 34'

plus tall buildings hovering over our home sweet home.

Sincerely, and respectively,
Craig & Kathy Boudreau
And Noel Goyette @ 11 Bonnie

Sent from my Verizon, Samsung Galaxy smartphone

Town of Exeter

Barbara Mcevoy <bmcevoy@exeternh.gov>

Jady Hill Development

1 message

Rachael Gloss <rkegloss@gmail.com> Thu, Feb 20, 2025 at 9:26 AM
To: bmcevoy@exeternh.gov

Dear Planning Board Members,
I am a resident of the Jady Hill Neighborhood, and live at 9 Haven Lane. I am writing this letter because I am very concerned about the idea that a large housing development wants to be built at the bottom of our street.

I love our neighborhood, it is a well established neighborhood of ranches and capes- and people that want to build in our neighborhood are not even allowed to build high. I am concerned that large townhouses will be built that will change the character of the area. We are not a 3 story neighborhood- we are mostly capes and ranches. And if there is a subdivision, shouldn't they face the same height restrictions that we face here? If they want to link onto Haven Lane, shouldn't they also have our height restrictions, so they seamlessly join the neighborhood?

I am concerned that many more people will be driving down our quiet road. Kids play in the street here- many houses have basketball hoops with the nets set up for kids to play in the street. We don't have sidewalks- but the streets have been safe for runners. dog walkers and kids since the 1950s. People in this neighborhood hang out in their front yards- not their backyards and cars are all driving slow on our street.

I am also concerned about water- we spent $45,000 this fall because our foundation was cracking due to water damage caused by poor drainage. We are one of many houses in our neighborhood with this problem. This neighborhood does not have good drainage and getting rid of one of the places where the water goes cannot be good for our drainage problems.

Thank you,
Rachael Gloss
9 Haven Lane, Exeter NH
603 312 0789

Town of Exeter

Barbara Mcevoy <bmcevoy@exeternh.gov>

Jady Hill - Haven Lane

1 message

Joan Hayes <johayes@comcast.net> Thu, Feb 20, 2025 at 11:11 AM
To: "bmcevoy@exeternh.gov" <bmcevoy@exeternh.gov>

Member of the Planning Board

Concerns with said project:

* Building closeness to current property owners & heights
* Wetland - wildlife
* Wheelwright & Great Bay - what's being done to protect from pollution & drainage.

Thank you
Joan Ellen Hayes
37 Haven Lane

Town of Exeter

Barbara Mcevoy <bmcevoy@exeternh.gov>

76 Portsmouth Ave

1 message

DANIEL HEFFERNAN <dheffernan1@comcast.net> Thu, Feb 20, 2025 at 11:52 AM
To: "bmcevoy@exeternh.gov" <bmcevoy@exeternh.gov>

Dear members of the Town Planning Board,

As an abutter, I am writing to express my strong opposition to the proposed MUND development on Haven Lane. I believe that this project would have a detrimental impact on the Jady Hill residents. The development being proposed is simply not in keeping with the character of our neighborhood.

First and foremost, the proposed development is simply too large for the area. The increase in population density would put a strain on our already overburdened infrastructure, leading to increased traffic congestion, noise pollution, and strain on our public services. Additionally, the construction of this project would result in a significant environmental impact, drastically altering the aesthetic of our area by replacing the existing greenery with a high-density housing complex.

Furthermore, the MUND purpose is to increase housing in mixed-use properties in Exeter's commercial districts. I'd argue that phase 1 of this proposal is not mixed-use at all but rather builds a residential community on a commercial property with access from a residential street. I'd suggest that in order make this property comply with the intent of MUND that access to this property only be from the commercial street.

Finally, I am deeply concerned about the impact this development would have on property values in the surrounding area. The influx of additional noise and vehicle traffic could result in a decline in property values, making it difficult for current residents to sell their homes and move elsewhere.

In conclusion, I strongly urge you to reconsider this proposed housing development. While I recognize the need for additional housing in Exeter, I believe that this project is simply not the right fit for our neighborhood. Thank you for your attention to this matter.

Sincerely,

Dan Heffernan
32 Haven Lane
Exeter

Date: February 20, 2025

Re: 76 Portsmouth Avenue

Dear Planning Board,

My name is Ryan O'Brien and I live at 20 Haven Lane in the Jady Hill Neighborhood. I am opposed to allowing a Conditional Use Permit in the Wetlands Conservation Overlay District for 76 Portsmouth Ave because there is no hardship forcing Green & Company to place 13 of 34 units in the wetlands buffer in the first place. There is an easy and obvious alternative design to avoid building in the wetland setbacks, less units. This is a calculated systematic disregard for the wetland setbacks. It is a choice, not a requirement.

- I object to the complete destruction of 4+ acres of large trees and undergrowth and the destruction of good growing soils (not ideal for building), which together supports animals, connects the wetlands, provides canopy, takes decades to grow, and provides a natural buffer between the residential zone and the commercial zone.

- The Exeter 2011 Natural Resources Composite Map 8B lists this area as Highest Ranked Habitat in Region and includes it in the Wildlife Focus Area. The number and variety of animals we have documented coming and going through this area is in clear support of it's designation. Because of the bounding by 2 rivers, and 2 busy roadways, and the previous deforestation, and the proximity to fresh water in Wheelwright Creek, animals in this area have very little quality habitat left. See Exhibit B & C

- The act of building here is going to require a lot of digging, and they are going to run into a lot of water which will have to go somewhere during construction. They will need to relocate poor soils and bring in higher quality building soils. None of this is good for the adjacent wetlands or the animals living and passing through this area.

- Building in this area is in direct conflict with the Zoning Ordinance 9.1.1. Sections A, B, C, D, F, & G.

- Building in a natural depression which collects ground and storm water runoff in close proximity to wetlands, in an area with relatively poor draining soils (silt clay loom, Mr Gove himself said this is NOT a gravel pit), in an area known to have a high water table, known to already create water issues with local residents, creates future liabilities for the town, the builder, the land owner, and future residents of these structures. No one can know for sure until they start digging here just how bad the water issues will be, but one thing we can be certain of is, they are real, and they have legal bite to them. We can not sit idly by and allow future liabilities to be passed on to neighbors and tax payers. Building in this area is in direct conflict with the Zoning Ordinance 10.1.1. (D & F) See Exhibit C

- The use of MUND creates an unnecessary hardship to existing residents by allowing larger buildings and locating them closer to the property line which in turn casts a shadow on abutting homes for part of the year in violation of the Zoning Ordinance 10.1.1 (D), Zoning Ordinance 1.2 (to provide adequate light and air), and RSA 674:17 (d). See Exhibit D

- Phase one is not in keeping with the spirit of the MUND to enhance and concentrate development on Portsmouth Ave. It is taking advantage of the MUND to build a disconnected property.

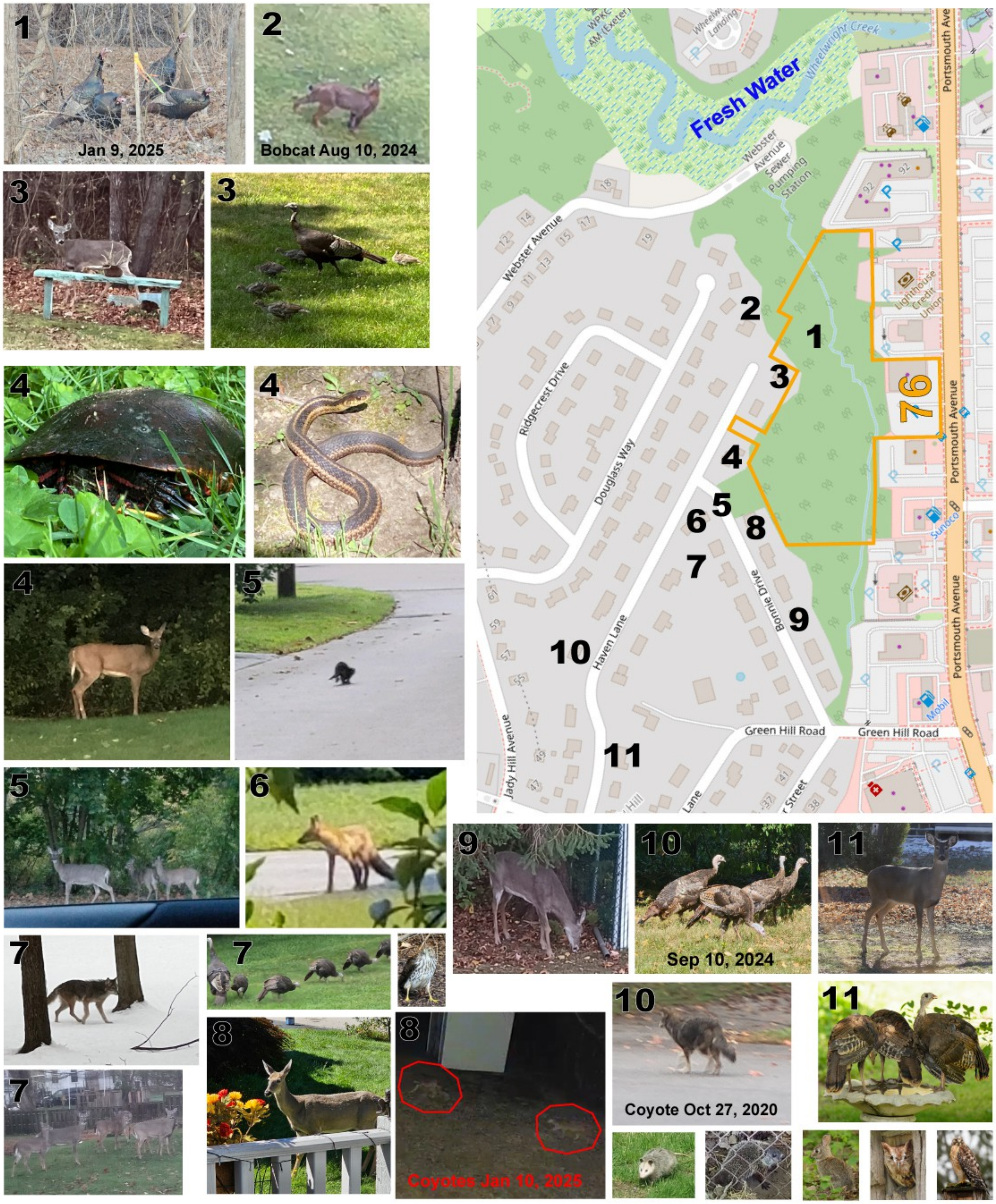
- Phase one is not in keeping with the spirit of the Master Plan to not build in less than ideal locations.

For these reasons, please deny the Wetlands Conditional Use Permit, and the Phase 1 project overall.

See Exhibits A-D Below

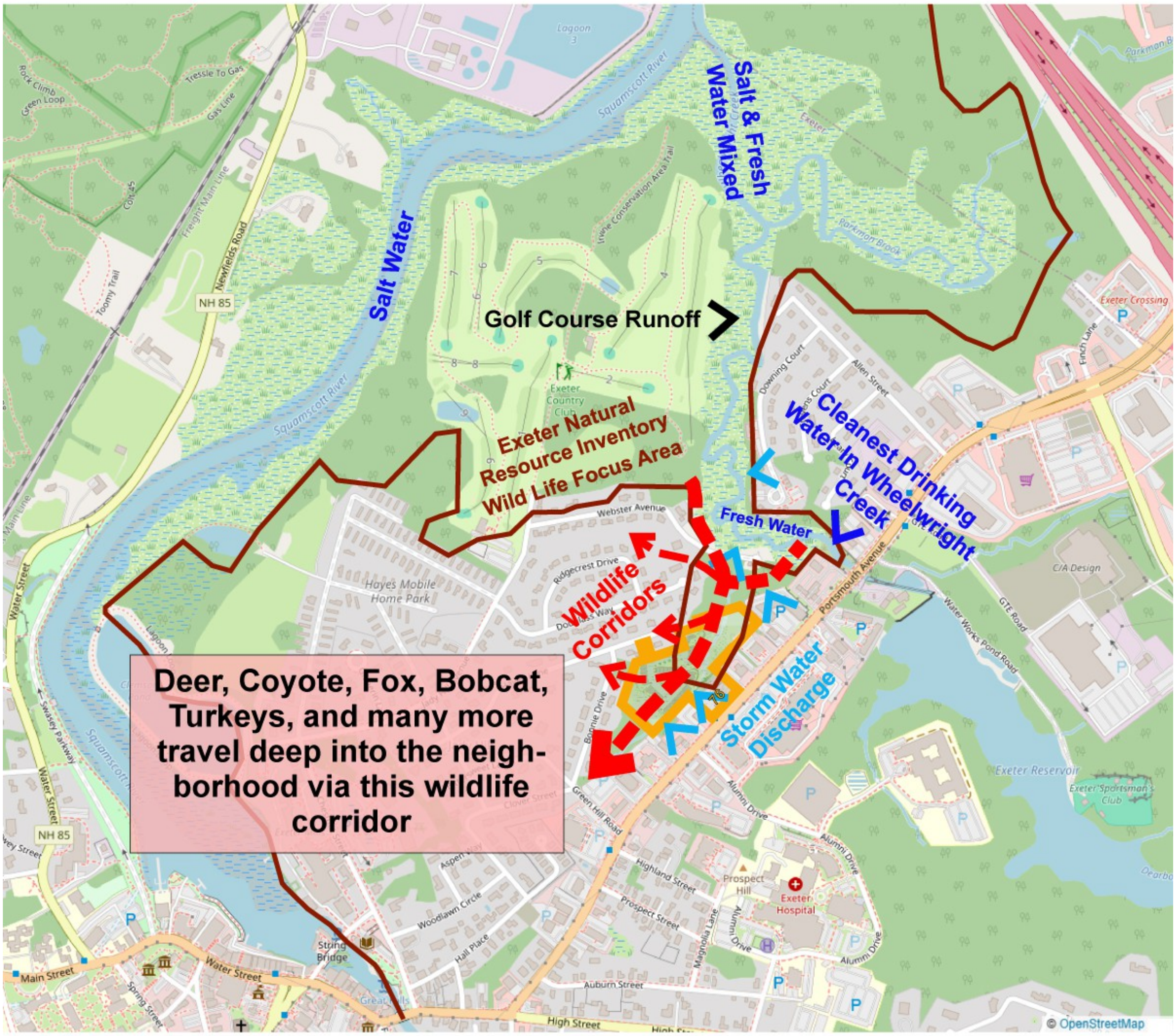
76 Portsmouth Ave - Exhibit A

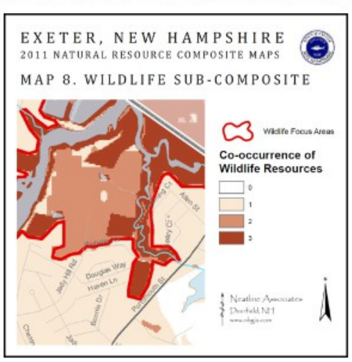
Recent Animal Sightings

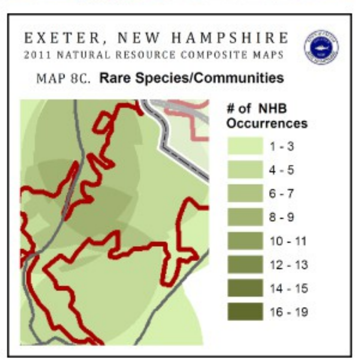


76 Portsmouth Ave - Exhibit B

Destruction of Wildlife, Habitat, & Corridors

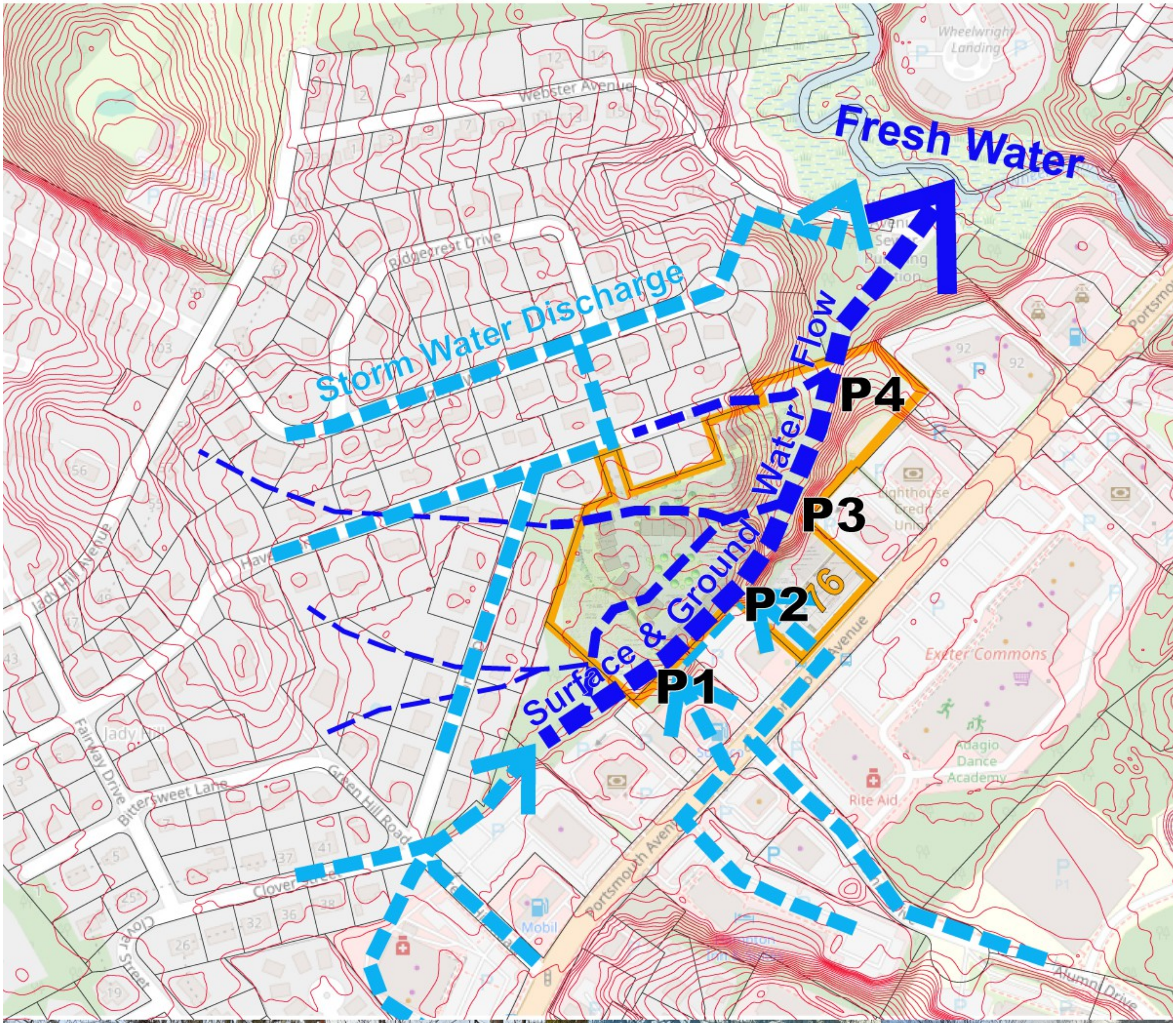






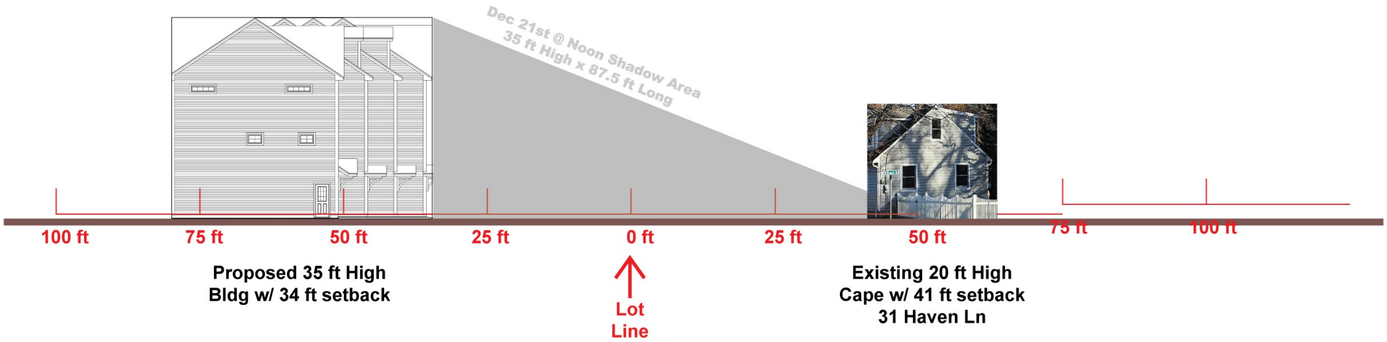
76 Portsmouth Ave - Exhibit C

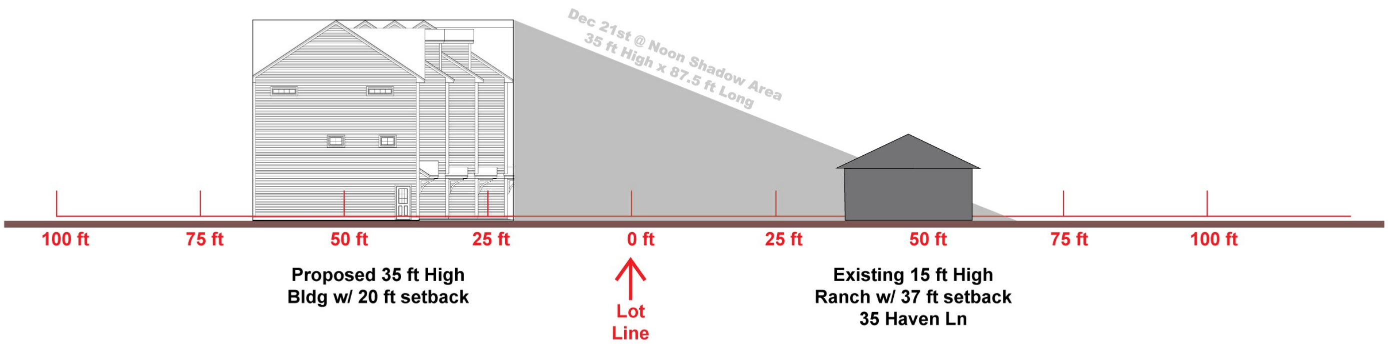
Existing Surface, Ground, & Storm Water Flow



76 Portsmouth Ave - Exhibit D

Inappropriate Scale, Setback, & Sun Shadowing





31 Haven Lane
Exeter, NH 03833
February 21, 2025

Exeter Planning Board
10 Front Street
Exeter, NH 03833

Dear Exeter Planning Board,

We live at 31 Haven Lane and abut the project site on 2 sides of our property. After reviewing all the site plan proposals over the past 7 months, we still have many concerns, many of which remain unaddressed after this month's Conservation meeting. **We want to stress to the Planning Board our urgency as abutters in having these issues addressed and incorporated into site plans before any approval is considered.**

First are our concerns about the proposed buffers. We are not requesting sufficient buffer to isolate our new neighbors from Jady Hill. No. We believe Jady Hill should be screened sufficiently to reduce the noise and light pollution from Route 101 and Portsmouth Ave as much as the existing forest does now. In addition, the buffer must be sufficient to account for the differences in height between the current homes in Jady Hill and the new townhouses. We request the developer provide a robust vegetative + physical wall that screens, including but not limited to:

- low growing plants to further absorb ambient noise, heat and ground water
- adequate fencing for privacy and noise reduction that matches the aesthetics of the existing neighborhood
- dense shrubbery that will grow tall and separate our homes from the development
- densely foliaged trees with a minimum caliper of 4" that will grow to a minimum of the building height of the townhouses at maturity
- verbiage in the condo docs that guarantees the maintenance, upkeep and care of all plantings and fencing on an ongoing basis

Next, we require written assurances from Green and Company as well as the Town of Exeter that the well-documented issues with water (pooling and flooding) in and around Jady Hill will be made no worse by the project. We request an established means of remedy for any flooding issues experienced by residents due to this new development. Whatever the remedy, it must require that the parties responsible for the development are liable for any financial burden required to repair Jady Hill homes and properties and restore them to their previous water shedding capacity.

With regards to construction if and when this project is approved by the town, we request the town impose specific days of the week and times of the day when active work is permitted on site. We have a petition signed by all abutting residents supporting the request. We ask for work requirements allowing site work:

- only be allowed 8AM to 6PM

- only permissible Monday through Friday
- not be permitted on weekends
- never be allowed on federal or local holidays

This is an established, quiet neighborhood of working-class people who report to their jobs around the clock: first, second **and** third shifts. Residents range in age from less than a year to over 90. **Ongoing, noisy construction for 2 years (per the builder), seven days a week, fifteen hours a day is an untenable burden**. We ask the board set this up on our behalf.

Finally, height. While Green and Jones Beech have kept the buildings height within the requirements of the zone, we have significant concerns over the oppressive height of the buildings closest to the abutting Jady Hill properties. The townhomes tower over all the houses in the neighborhood, dwarfing the homes that have been here for over 60 years. The effect is a negative impact on our quality of life and, we believe, our property values. The impact from the reduction in sunlight alone is measurable, most significantly in the homes that lie north of the new buildings – 31, 35, & 37 Haven Lane. We request the buildings:

- closest to the abutting properties be limited in height to a maximum of 30 feet
- be a minimum of 60 feet from abutting properties
- **OR** the preferred solution that the 2 units closest to the abutters are removed from the project entirely (see the northern most units in Buildings 1 & 9 of current plan)

This request is made explicitly per Exeter's Zoning Ordinances 1.2, 10.1.D which require that development "promote health and the general welfare [of residents]..provide adequate light and air" and that the Town "control its growth, size and nature to achieve the following objectives…to protect the health, safety convenience, property and general welfare of its inhabitants." Please see the ZO attachments provided. Loss of sunlight during a NH winter, decreased air circulation in a wet neighborhood, and looming 35'+ structures next to homes only 13-20' tall in NOT within the bounds of the ZO.

In closing, we request the Planning Board and Green & Co keep in mind how long the Jady Hill community has enjoyed the surrounding neighborhood and environment in its current state. Please understand how disruptive this new project is to all of our lives: construction for an estimated two full years, a doubling of traffic on two streets, loss of an active forest, etc. We appreciate Green & Company took time to meet with us to discuss our concerns. We understand their right to build. Please do not green light this project as is, resulting in a reduction in our quality of life and our property values. Please require the changes and parameters outlined above.

With thanks,

Michael Hauck & Danielle Frank

Article 1. AUTHORITY AND PURPOSE

1.1 SHORT TITLE

This ordinance may be referred to as the Exeter Zoning Ordinance.

1.2 PURPOSES

The purposes of the Exeter Zoning Ordinance are to lessen congestion in the streets; to secure safety from fires, panic and other dangers; to promote health and the general welfare; to provide adequate light and air; to prevent the overcrowding of land; to avoid undue concentration of population; and to facilitate the adequate provision of transportation, water, sewerage, schools, parks and other public requirements.

Exeter Zoning Ordinance – Amended March 2024

Article 10. GROWTH MANAGEMENT ORDINANCE

10.1 PREAMBLE

10.1.1 The Town of Exeter deems it desirable to control its growth, size and nature to achieve the following objectives:

A. To promote the development of an economically sound and environmentally stable "small town" residential community;

B. To preserve the scenic beauty and present aesthetic values of the Town;

C. To prevent scattered or premature development of the land;

D. To protect the health, safety, convenience, property and general welfare of its inhabitants;

E. To insure that the rate of growth of the Town does not unreasonably interfere with the Town's capacity for planned, orderly and sensible expansion of its services to accommodate such growth;

F. To promote development harmonious with land capabilities within the Town;

G. To prevent too rapid a pace of growth that tends to thwart the planning process and escalate too rapidly the growth and costs of municipal services, especially of schools;

H. To allow the shared goals, plans and objectives of the Town, its planning officials and its citizens to be realized in a comprehensive fashion as set forth in the Exeter Master Plan.

Kristina & William Tindle
12 Bonnie Dr.
Exeter, NH 03833
(978) 491-8802
Kristinagourley@sandiego.edu

February 20, 2025

Dave Sharples
Planning Board Director, Town of Exeter
10 Front St.
Exeter, NH 03833

Dear Exeter Planning Board (ATTN: Mr. Sharples),

We are writing as current residents of Bonnie Dr,, within eyesight of the pending development, "Lilac Place" and two houses from the newly proposed intersection on Haven Lane. We walk this neighborhood twice daily with our dog and two young children (ages one and three). Since we have lived in the neighborhood, the intersection of Bonnie Dr. and Haven Lane has been safe enough for local children and grandchildren of residents to participate in pickup basketball games, ride bikes, and walk safely home from the bus stop. This neighborhood is a destination for trick or treaters as the traffic is limited and the feeling of a safe, close community is clear.

On our daily dog walks, our family has observed that surrounding streets that act as a cut through to downtown (ie. Clover St, Green Hill Rd, Bittersweet Ln, Jady Hill Cir, and Woodlawn Cir) stand in stark contrast to this slow, safe pace. Drivers go far over the 25 MPH speed limit and go as far as tailgating drivers and pedestrians (including those with strollers!). My husband has been passed by an aggressive driver on Clover who ultimately drove across someone's yard to get around him at the stop sign. Another example of reckless driving is the car that ended up speeding and stuck on the stonewall in front of the home at 19 Clover St., causing property damage (*see attached photo). This drastic difference in traffic and vehicle speed is putting residents at risk and is our top concern with the pending increase in population density with the addition of residents at Lilac Place.

In order to keep our neighborhood safe for our residents and children, we are respectfully asking for the planning board add stop signs to the intersection of Haven Lane and Bonnie Dr as well as adding a stop sign at the intersection of Bonnie Dr and Greenhill Rd (having drivers stop on Greenhill headed toward Portsmouth Ave.) Additionally, to keep speeds reasonable, I am asking for the addition of two speed bumps on Bonnie Dr. I have seen this done on a residential street in Portsmouth (Banfield Rd) with a speed limit of 25, so I'm sure it is possible for plows and city vehicles to handle this. Lastly, I believe if there will be many more residents added and also walking the neighborhood, it would be appropriate to consider sidewalks for the roads connecting to downtown.

Thank you for taking the time to consider the safety of the neighborhood and its residents.

Sincerely,

Kristina and William Tindle

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

February 14, 2025

Exeter Planning Board
Attn. Langdon Plumer, Chair
10 Front Street
Exeter, NH 03833

RE: Planning Board Resubmission
76 Portsmouth Avenue, Exeter, NH
Tax Map 65, Lot 118
JBE Project No. 24029

Dear Mr. Plumer,

On behalf of our client, Green & Company, we respectfully submit revised plans in advance of the February 27th, 2025 Planning Board Meeting for the above-mentioned property, for which a Site Plan and Conditional Use Permit Application is currently pending.

Based on feedback received at the January 14th, 2025 Conservation Commission meeting, the plan was revised to address concerns that were raised regarding the proposed buffer impacts, providing a substantial reduction to the buffer impacts. The revisions included relocating buildings 2, 4,5,6, and 7 (previously buildings 2, 4, 5 and 6). Guest parking was relocated from in front of 3 of these buildings to across the proposed street, on the portion of the property that is not within the buffer. As a result, the buildings were able to be shifted further toward the road to reduce buffer impacts. Building 7 (previously building 5) was also relocated into the interior recreation space and recreation space is now proposed behind and adjacent to the mail house on the buffer side of the property.

Additionally, we have been in contact with the owner of the 72 Portsmouth Ave property (Thirsty Moose) and are collaborating with them to replace the failed culvert that crosses from their northwest property corner to their northeast property corner. This will improve the man-made drainage functionality between the Sunoco, Thirsty Moose, and Fisher Auto Parts properties. In order to better facilitate this culvert replacement as well as the phasing of the proposed project, we have relocated the proposed wetland crossing of Wetland "D" adjacent to Building 3, as well as the proposed sidewalk on the front part of the Fisher Auto Parts property to run along the property line between 72 and 76 Portsmouth Ave. This will allow us to have the least amount of impact to the current tenant on the property during Phase 1 construction.

The Conservation Commission reviewed this revised plan at their February 11th meeting and voted that they have no objections to the proposal with several conditions including

1. The wooded areas as shown on the plan adjacent to Wetland "B" be permanently conserved via a deed restriction or equivalent means, with the exception that recreational trails may be allowed, prior to Certificate of Occupancy.
2. The Thirsty Moose culvert replacement be addressed to the satisfaction of the Planning Board.

We look forward to discussing this project with you on February 27th. The following are included with this application:

1. Cover Letter.
2. Conservation Commission Resubmission Documents.
3. Revised Drainage Analysis.
4. Revised Plans.

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.

Paige Libbey, P.E.
Associate Principal

cc: Allison Rees, P.E., Underwood Engineers (via US Mail)
John Bosen, DTC Lawyers (via email)
Jenna Green, Green & Company (via email)
Michael Green, Green & Company (via email)
John O'Neill, Stonearch Development (via email)
Brenden McNamara, Stonearch Development (via email)
Jim Gove, Gove Environmental Services (via email)

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

January 31, 2025

Exeter Conservation Commission
Attn. David Short, Chair
10 Front Street
Exeter, NH 03833

RE: Conservation Commission Resubmission
76 Portsmouth Avenue, Exeter, NH
Tax Map 65, Lot 118
JBE Project No. 24029

Dear Mr. Short,

On behalf of our client, Green & Company, we respectfully submit revised plans in advance of the February 11th, 2025 Conservation Commission Meeting for the above-mentioned property, for which a Site Plan and Conditional Use Permit Application is currently pending before the Planning Board.

We attended the January 14th, 2025 Conservation Commission meeting where we received feedback on the proposed buffer impacts. The plan has since been revised to address some of the concerns that were raised during the meeting. The revisions included relocating buildings 2, 4,5,6, and 7 (previously buildings 2, 4, 5 and 6). Guest parking was relocated from in front of 3 of these buildings to across the proposed street, on the portion of the property that is not within the buffer. As a result, the buildings were able to be shifted further toward the road to reduce buffer impacts. Building 7 (previously building 5) was also relocated into the interior recreation space and recreation space is now proposed behind and adjacent to the mail house on the buffer side of the property. This results in only temporary disturbance in the buffer in this area instead of impervious surfaces. Based on the feedback received at the 1/14/25 meeting, our efforts focused on reducing most of the buffer impact within the limited use buffer, as it is our understanding that temporary disturbance is permitted within the 75' parking and structure setback. Additionally, it is our understanding that the easternmost wetland (Wetland "B") is of highest value to the Commission based on it's proximity to Wheelwright Creek. Therefore, we also focused our efforts on removing impervious surfaces as much as possible from the 75' parking and structure setback to Wetland "B". The proposed site plan as revised makes use of all of the available and accessible space outside of the buffer on the property for buildings and impervious surfaces which supports the avoidance and minimization criteria of the Conditional Use Permit.

Other concerns raised during the meeting were the man-made drainage functionality between the Sunoco, Thirsty Moose, and Fisher Auto Parts properties. We have since been in contact with the owner of the 72 Portsmouth Ave property (Thirsty Moose) and are collaborating with them to replace the failed culvert that crosses from their northwest property corner to their northeast property corner. This can be done with no work required on the Sunoco property. Additionally, in order to better facilitate this culvert replacement as well as the phasing of the proposed project, we have relocated the proposed wetland crossing of Wetland “D” adjacent to Building 3, as well as the proposed sidewalk on the front part of the Fisher Auto Parts property to run along the property line between 72 and 76 Portsmouth Ave. This will allow us to improve the drainage situation for all three of the aforementioned properties as well as have the least amount of impact to the current tenant on the property during Phase 1 construction. It also reduces the amount of overall direct wetland impact by 450 S.F.

Lastly, the Commission asked us to provide documentation from the wetland scientist of record that the property was reviewed for presence of vernal pools. The wetlands were delineated in February and April 2024 and the property was checked for vernal pools during the April visit and it was found that none were present. We are including letters from the wetland scientist detailing these delineations and the presence of vernal pools.

The below tables outline the currently proposed buffer impacts in comparison to what was proposed on the last plan revision.

Limited Use Wetland Buffer Impacts Table							
Total Buffer on Property = 82,800 S.F.							
Wetland Type	Surface Cover	1/13/25 Plan Area (S.F.)	%*	1/31/25 Plan Area (S.F.)	%*	Reduction (S.F.)	%*
VPD	PERMANENT	5,800	7.0%	2,000	2.4%	3,800	4.6%
VPD	TEMPORARY	5,800	7.0%	1,000	1.2%	4,800	5.8%
PD	PERMANENT	2,100	2.5%	800	1.0%	1,300	1.6%
PD	TEMPORARY	5,100	6.2%	2,550	3.1%	2,550	3.1%
TOTAL	PERMANENT	7,900	9.5%	2,800**	3.4%	5,100	6.2%
TOTAL	TEMPORARY	10,900	13.2%	3,550	4.3%	7,350	8.9%
VPD	TOTAL	11,600	14.0%	3,000	3.6%	8,600	10.4%
PD	TOTAL	7,200	8.7%	3,350	4.0%	3,850	4.6%
TOTAL		18,800	22.7%	6,350	7.7%	**12,450**	**15.0%**

*percentage of total buffer
** 710 S.F. is porous pavement, 569 S.F. is previously disturbed

Parking/Structure Wetland Buffer Impacts Table							
Total Buffer on Property = 37,000 S.F.							
Wetland Type	Surface Cover	1/13/25 Plan Area (S.F.)	%*	1/31/25 Plan Area (S.F.)	%*	Reduction (S.F.)	%*
VPD	PERMANENT	8,500	23.0%	5,150	13.9%	3,350	9.1%
VPD	TEMPORARY	3,200	8.6%	4,500	12.2%	-1,300	-3.5%
PD	PERMANENT	6,900	18.6%	7,350	19.9%	-450	-1.2%
PD	TEMPORARY	3,800	10.3%	2,950	8.0%	850	2.3%
TOTAL	PERMANENT	15,400	41.6%	12,500**	33.8%	2,900	7.8%
TOTAL	TEMPORARY	7,000	18.9%	7,450	20.1%	-450	-1.2%
VPD	TOTAL	11,700	31.6%	9,650	26.1%	2,050	5.5%
PD	TOTAL	10,700	28.9%	10,300	27.8%	400	1.1%
TOTAL BUFFER IMPACT		22,400	60.5%	19,950	53.9%	**2,450**	**6.6%**

*percentage of total buffer
** 1,550 S.F. is porous pavement, 2,461 S.F. is previously disturbed

There are several things that are important to note.

- Of the proposed disturbance, only 15,300 S.F. is permanent, and of the permanent disturbance, 2,260 S.F. is porous pavement and 3,030 S.F. is previously permanently disturbed area for the current Fisher Auto parts store. This leaves only 10,010 S.F. total newly proposed impervious surface in the buffer, and only 1,521 S.F. of newly proposed impervious surface in the limited use buffer specifically.
- Most of the impervious surface has been moved outside of the limited use buffer and is within the parking and structure setback instead. The impervious surface was
- Total disturbance has been reduced in the limited use buffer by 67%.

We look forward to discussing this project with you on February 11th. The following are included with this application:

1. Cover Letter.
2. Revised Application Form.
3. Addendum to Wetland Impact Evaluation/ Photo Location Map.
4. Wetland Delineation Letters.
5. One (1) Revised Full Size Plan.
6. One (1) Revised Half Size Plan.

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.

Paige Libbey, P.E.
Associate Principal

cc: Jenna Green, Green & Company (via email)
Michael Green, Green & Company (via email)
John O'Neill (via email)
Jim Gove, Gove Environmental Services (via email)

Town of Exeter
Planning Board Application
Conditional Use Permit: Wetland Conservation Overlay District

Detailed Proposal including intent, project description, and use of property: (Use additional sheet as needed)

See attached cover letter.

Wetland Conservation Overlay District Impact (in square footage):

	Wetland:	(SQ FT.)	Buffer:	(SQ FT.)
Temporary Impact	☐ Prime Wetlands		☐ Prime Wetlands	
	☐ Exemplary Wetlands		☐ Exemplary Wetlands	
	☐ Vernal Pools (>200SF)		☐ Vernal Pools (>200SF)	
	☐ VPD		☒ VPD	5,500
	☐ PD		☒ PD	5,500
	☐ Inland Stream		☐ Inland Stream	
Permanent Impact	☐ Prime Wetlands		☐ Prime Wetlands	
	☐ Exemplary Wetlands		☐ Exemplary Wetlands	
	☐ Vernal Pools (>200SF)		☐ Vernal Pools (>200SF)	
	☐ VPD		☒ VPD	7,150
	☒ PD	1,050	☒ PD	8,150
	☐ Inland Stream		☐ Inland Stream	

GOVE ENVIRONMENTAL SERVICES, INC.

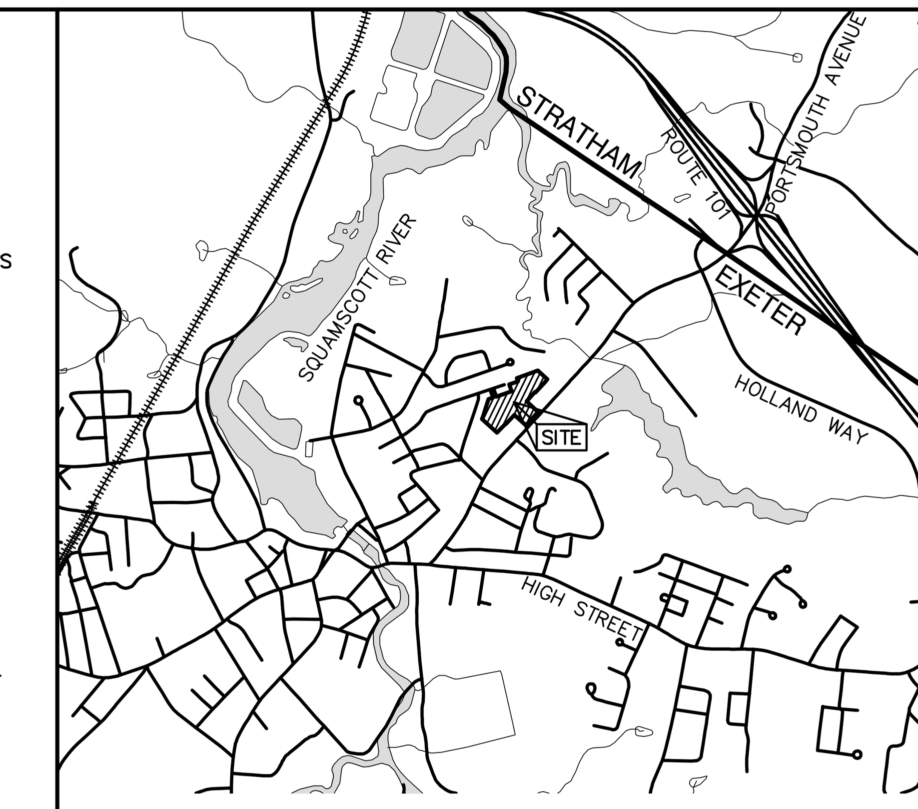
Addendum To November 2, 2024, Wetland Documentation Report and Supporting Information Mixed-Use Neighborhood Development, 76 Portsmouth Avenue, Exeter

Due to changes that have been brought about by the Town review of the proposed project, two small wetland impacts have been added to the plans. Both wetland areas have limited function and value. Wetland C will be crossed by a road. Given that the only function wetland C has is flood flow alteration (seasonal drainage), as long as the culvert is properly sized, there will be no reduction in the function or value of the wetland. Wetland D will be crossed by a pedestrian bridge. Again, the only function of this wetland is flood flow alteration (drainage from impervious surfaces). The crossing structure, if properly designed to not impact the volume of the runoff, will not reduce the function or value of Wetland D.

Therefore, the proposed crossings will not have detrimental impacts to the existing functions and values of both Wetland C and Wetland D.

Jim Gove, CWS #051
Gove Environmental Services, Inc.
January 10, 2025

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



LOCUS SCALE: 1"=2000'

NOTES:

1. THE INTENT OF THIS PLAN IS TO SHOW A MIXED USE NEIGHBORHOOD DEVELOPMENT (MUND) CONSISTING OF A TOWNHOUSE DEVELOPMENT OFF HAVEN LANE WITH (36) 3-BEDROOM UNITS AND A 4 STORY MIXED USE BUILDING ON PORTSMOUTH AVENUE HAVING COMMERCIAL USE ON THE FIRST FLOOR AND (36) ONE BEDROOM UNITS ABOVE, AND ONE SEPARATE DUPLEX WITH 3 BEDROOM UNITS ON HAVEN LANE.

2. ZONING DISTRICT: C2
   LOT AREA MINIMUM = 20,000 SF
   LOT WIDTH MINIMUM = 150'
   LOT DEPTH MINIMUM = 100'
   MINIMUM LOT AREA/ DWELLING UNIT = 5,000 S.F.
   BUILDING SETBACKS (MINIMUM):
   FRONT SETBACK = 50'
   SIDE SETBACK = 20' ON ONE SIDE, 40' ON THE OTHER
   REAR SETBACK = 50'
   MAX. BUILDING HEIGHT = 35'
   MAX. BUILDING COVERAGE = 30%
   MIN. OPEN SPACE = 15%
   TOWN WETLAND BUFFER = 40' LIMITED USE BUFFER TO P.D. SOILS, 75' PARKING AND STRUCTURE SETBACK

3. RECREATION AREA REQUIRED (SITE PLAN REGULATIONS SECTION 9.6.3.) = 10% OF PROPERTY (29,163 S.F.)
   RECREATION AREA PROVIDED = 29,400 S.F. (10.1%)

3. PARKING CALCULATIONS
   PORTSMOUTH AVENUE DEVELOPMENT:
   MIXED USE NEIGHBORHOOD DISTRICT (MUND) PARKING REQUIREMENTS = 1 SPACE/RESIDENTIAL UNIT + COMMERCIAL PARKING AT 50% OF TOWN OF EXETER SITE PLAN REGULATIONS
   REQUIRED PARKING = 1 SPACE/300 S.F. X 4,418 S.F. COMMERCIAL SPACE X 50% = 8 SPACES REQUIRED
   +1 SPACE/ RESIDENTIAL UNIT = 36 SPACES REQUIRED
   TOTAL REQUIRED PARKING = 44 SPACES
   PARKING PROVIDED = 43 SPACES
   TOWNHOUSE DEVELOPMENT:
   1 SPACE PER UNIT REQUIRED
   36 UNITS / 1 SPACE PER UNIT = 36 SPACES REQUIRED
   4 SPACES PER UNIT PROVIDED (2 IN GARAGE + 2 IN FRONT OF UNIT)
   PARKING PROVIDED = 144 PARKING SPACES

4. THE LIMITS OF JURISDICTIONAL WETLANDS WERE DELINEATED BY JOHN HAYES, DURING APRIL, 2024 IN ACCORDANCE WITH THE FOLLOWING GUIDANCE DOCUMENTS:
   a. THE CORPS OF ENGINEERS FEDERAL MANUAL FOR IDENTIFYING AND DELINEATING JURISDICTIONAL WETLANDS.
   b. THE NORTH CENTRAL & NORTHEAST REGIONAL SUPPLEMENT TO THE FEDERAL MANUAL.
   c. THE CURRENT VERSION OF THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, AS PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION AND/OR THE CURRENT VERSION OF THE FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, AS PUBLISHED BY THE USDA, NRCS, AS APPROPRIATE.
   d. THE CURRENT NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS, AS PUBLISHED BY THE US FISH AND WILDLIFE SERVICE.

5. ALL WATER, SEWER, ROAD AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 9.3 STORMWATER MANAGEMENT STANDARDS, STORWMATER MANAGEMENT PLAN, STORMWATER POLLUTION PREVENTION PLAN, AND EROSION AND SEDIMENT CONTROL STANDARDS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC UTILITIES IN EXETER, NEW HAMPSHIRE.

6. 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.

7. ALL CONSTRUCTION SHALL CONFORM TO TOWN STANDARDS AND REGULATIONS, AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.

8. THE SUBJECT PARCEL IS NOT LOCATED WITHIN AN AREA HAVING A SPECIAL FLOOD HAZARD ZONE DESIGNATION BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ON FLOOD INSURANCE RATE MAP NOs. 33015C0402E AND 33015C0406E, BOTH WITH EFFECTIVE DATE OF MAY 17, 2005.

9. LANDOWNERS ARE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WETLAND REGULATIONS, INCLUDING PERMITTING REQUIRED UNDER THESE REGULATIONS.

10. 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.

11. THE CONTRACTOR SHALL READ AND FOLLOW ALL RECOMMENDATIONS MADE IN THE SITE GEOTECHNICAL ENGINEER REPORT, PREPARED BY GEOTECHNICAL SERVICES, INC., DATED JULY 12, 2024.

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 PROPOSED SIGNAGE SHALL CONFORM WITH THE TOWN ZONING REGULATIONS, UNLESS A VARIANCE IS OTHERWISE REQUESTED.

14. 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.

15. ALL PARKING STALLS SHALL BE SEPARATED USING 4" WIDE SOLID STRIPES. STRIPING SHALL BE 100% ACRYLIC TYPE, LOW VOC, FAST DRYING, IN A COLOR OF WHITE.

16. ALL STOP BARS SHALL BE 18" IN WIDTH IN A COLOR OF WHITE; ALL TRAFFIC ARROWS SHALL BE PAINTED IN A COLOR OF WHITE.

17. ALL CURBING TO BE SLOPED GRANITE WITH A MINIMUM RADIUS OF 2', UNLESS OTHERWISE NOTED.

18. 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.

19. SNOW TO BE STORED AT EDGE OF PAVEMENT AND IN AREAS SHOWN ON THE PLANS, OR TRUCKED OFFSITE TO AN APPROVED SNOW DUMPING LOCATION.

20. ROOF TOP HEATING AND AIR CONDITIONING UNITS (RTU's) SHALL BE DESIGNED TO VENT UPWARDS AND AIR INTAKES SHALL BE DIRECTED AWAY FROM ABUTTING NEIGHBORS.

21. ALL ARCHITECTURAL BLOCK RETAINING WALLS ARE TO BE DESIGNED AND STAMPED BY THE MANUFACTURER'S STRUCTURAL ENGINEER. CONTRACTOR TO COORDINATE WITH APPROVED MANUFACTURER PRIOR TO INSTALLATION.

22. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.

23. ALL PRECAST CONCRETE PRODUCTS WILL BE SOURCED FROM MANUFACTURING FACILITIES IN COMPLIANCE WITH THE NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA) PLANT CERTIFICATION PROGRAM. EVIDENCE OF COMPLIANCE WILL BE PROVIDED FOR THE CURRENT CALENDAR YEAR THE PRODUCTS WERE MANUFACTURED WITHIN.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 feet

APPROVED – EXETER, NH
PLANNING BOARD

DATE:

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: MLS	Draft: GDR	Date: 3/15/24	
Checked: WGM	Scale: AS SHOWN	Project No.: 24029	
Drawing Name: 24029-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.

REV.	DATE	REVISION	BY
6	1/6/25	GRADING PLAN FOR COM COMM	DJM
5	11/22/24	MINOR REVISIONS	DJM
4	11/5/24	ISSUED PLAN SET FOR REVIEW	KDR
3	8/19/24	PLAN SET	KDR
2	7/29/24	CONCEPT 3	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: SITE PLAN
Project: "LILAC PLACE"
76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC
50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
C2
SHEET 4 OF 23
JBE PROJECT NO. 24029

John P. Hayes III CSS, CWS,
7 Limestone Way
North Hampton, NH 03862
603-205-4396
johnphayes@comcast.net

2/27/24
Michael Green **Job # 24-013**
Green and Company Real Estate
PO Box 1297
11 Lafayette Road
North Hampton, NH 03862

2/27/24
Wetland Delineation Report
Map 65 Lot 118
Portsmouth Avenue Exeter, NH

Dear Michael:

This letter reports the completion of a wetland delineation was conducted on the above referenced property by John P. Hayes III, on February 27, 2024. The parcel is located on the northwest side of Portsmouth Avenue, southeast of Bonnie Drive, and northeast of Green Hill Road, in Exeter, NH. The lot is approximately 6.7 acres in size. Only the upland area, in the central portion of the lot, was delineated. The purpose of the delineation is to assess any potential future site development options.

This was conducted in accordance with the 1987 Army Corps of Engineers Wetlands Delineation Manual using the Routine Determinations Method, as required by the New Hampshire Department of Environmental Services Wetlands Bureau and the US Army Corps of Engineers.

The following standards were used to determine jurisdiction under the manual and to classify the wetland systems on the site;

1) *Field Indicators for Identifying Hydric Soils in the United States* Version 7.0. 2010.

2) *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: North central and Northeast Region Version 2.0 2012*

3) *Field Indicators for Identifying Hydric Soils in New England* New England Hydric Soils Technical Committee. April 2004. 3rd Edition. NEIWPCC Lowell, MA. .

4) *National List of Plant Species That Occur in Wetlands: 2012 New Hampshire.* United States Department of the Interior. Fish and Wildlife Service. NERC-88/18.29.

5) *Corps of Engineers Wetlands Delineation Manual,* January 1987. Wetlands Research Program Technical Report Y-87-1.

6) *Classification of Wetlands and Deep water Habitats of the United States.* December 1979. US Department of the Interior. Fish and Wildlife Service. FWS/OBS-79/31.

This wetland delineation complies with the poorly, and very poorly drained soil criteria defined in SSSNNE Special Publication Field Indicators for Identifying Hydric Soils in New England New England Hydric Soils Technical Committee June 2019 Version 4. These soils meet the hydric soil criterion F2, and F3. The majority of the wetland soils in this area have textures of silt loam.

This wetland delineation does not differentiate between poorly and very poorly drained soil. Therefore it cannot be used to determine local setback requirements to very poorly drained soils.

The property was also given a preliminary examination for the presence, or any evidence, of any vernal pools. None were found to be present at this time on the site.

Wetland boundaries identified on the property are witnessed in the field with pink flagging tape for jurisdictional wetlands, and blue flagging tape for very poorly drained soils, hung periodically on vegetation using an alpha-numeric system as follows:

A1 to A29 (connect A29 to A34)
A34 to A 64 (stop)
B1 to B18 (stop)

A sketch of the approximate flagged line(s) with start and stop points was provided. This sketch is a general spatial representation of the location of the wetland boundary intended to aid your survey location of the wetland flags. There is no representation of its accuracy. It isstrongly recommended that the flagged line(s) be survey located as soon as possible and depicted on a base plan.

According to the "Classification of Wetlands and Deep water Habitats of the United States" (USFWS December 1979), the wetland areas delineated by wetland flags A5 to A17 and B12 to B18 are in a man made drainage swale, that would be classified as a Palustrine, Emergent Persistent system that is seasonally flooded and/or saturated. The wetland areas delineated by wetland flags A18 to A29, A34 to A40, and A57 to A64, are in drainage swales, that are, to some degree, influenced by excess water coming on to the lot from some of the surrounding perimeter drains, and sump pumps from the abutting lots. The wetland areas delineated by the C line, and wetland flags A1 to A4, A41 to A56, and B1 to B12, would be classified as a combination of a Palustrine, Forested, Broad Leaved Diciduous, and Emergent Persistent systems that are seasonally flooded and/or saturated with organic soils present, (PFO/EM1Eg).

The plant species located in or near the wetlands include, but are not limited to: Red maple *(Acer rubrum),* American elm (*Ulmus americana*) White pine *(Pinus strobes),* Eastern hemlock *(Tsuga canadensis),* White oak *(Quercus alba),* Glossy buckthorn *(Rhamnus frangula),* Highbush blueberry *(Vaccinium corymbosum),* Witchhazel *(Hamamelis virginiana),* Silky dogwood *(Cornus amomum),* Multiflora rose *(Rosa multiflora),* Honeysuckle *(Lonicera spp.),* Goldthread *(Coptis trifolia),* Cinquefoil *(Potentilla fruiticosa),* Tussock sedge *(Carex* stricta), Woolgrass, *(Scirpus cyperinus),* Cinnamon fern *(Osmunda cinnamomea),* Sensitive fern *(Onoclea sensibilis)*, and Broad leaved cattail *(Typha latifolia).*

Please contact me if you have any questions or if I can be of further assistance.

Sincerely

John P. Hayes III CWS, CSS

John P. Hayes III CSS, CWS,
7 Limestone Way
North Hampton, NH 03862
603-205-4396
johnphayes@comcast.net

4/8/24
Michael Green **Job # 24-013**
Green and Company Real Estate
PO Box 1297
11 Lafayette Road
North Hampton, NH 03862

4/8/24
Additional Wetland Delineation Report
Map 65 Lot 118
Portsmouth Avenue Exeter, NH

Dear Michael:

This letter reports the completion of additional wetland delineation, that was conducted on the above referenced property by John P. Hayes III, on April 8, 2024. The parcel is located on the northwest side of Portsmouth Avenue, southeast of Bonnie Drive, and northeast of Green Hill Road, in Exeter, NH. The lot is approximately 6.7 acres in size. The purpose of the delineation is to assess any potential future site development options.

This was conducted in accordance with the 1987 Army Corps of Engineers Wetlands Delineation Manual using the Routine Determinations Method, as required by the New Hampshire Department of Environmental Services Wetlands Bureau and the US Army Corps of Engineers.

The following standards were used to determine jurisdiction under the manual and to classify the wetland systems on the site;

1) *Field Indicators for Identifying Hydric Soils in the United States* Version 7.0. 2010.

2) *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: North central and Northeast Region Version 2.0 2012*

3) *Field Indicators for Identifying Hydric Soils in New England* New England Hydric Soils Technical Committee. April 2004. 3rd Edition. NEIWPCC Lowell, MA. .

4) *National List of Plant Species That Occur in Wetlands: 2012 New Hampshire.* United States Department of the Interior. Fish and Wildlife Service. NERC-88/18.29.

5) *Corps of Engineers Wetlands Delineation Manual,* January 1987. Wetlands Research Program Technical Report Y-87-1.

6) *Classification of Wetlands and Deep water Habitats of the United States.* December 1979. US Department of the Interior. Fish and Wildlife Service. FWS/OBS-79/31.

This wetland delineation complies with the poorly, and very poorly drained soil criteria defined in SSSNNE Special Publication Field Indicators for Identifying Hydric Soils in New England New England Hydric Soils Technical Committee June 2019 Version 4. These soils meet the hydric soil criterion F2, and F3. The majority of the wetland soils in this area have textures of silt loam.

This wetland delineation does not differentiate between poorly and very poorly drained soil. Therefore it cannot be used to determine local setback requirements to very poorly drained soils.

The property was also given a second examination for the presence, or any evidence, of any vernal pools. None were found to be present on the site.

Wetland boundaries identified on the property are witnessed in the field with pink flagging tape for jurisdictional wetlands, and blue flagging tape for very poorly drained soils, hung periodically on vegetation using an alpha-numeric system as follows:

C1 to C11 (stop)(connect C1 to A1)

A sketch of the approximate flagged line(s) with start and stop points was provided. This sketch is a general spatial representation of the location of the wetland boundary intended to aid your survey location of the wetland flags. There is no representation of its accuracy. It isstrongly recommended that the flagged line(s) be survey located as soon as possible and depicted on a base plan.

According to the "Classification of Wetlands and Deep water Habitats of the United States" (USFWS December 1979), the wetland areas delineated by the C line, would be classified as a combination of a Palustrine, Forested, Broad Leaved Diciduous, and Emergent Persistent systems that are seasonally flooded and/or saturated with organic soils present, (PFO/EM1Eg).

The plant species located in or near the wetlands include, but are not limited to: Red maple *(Acer rubrum),* American elm (*Ulmus americana*) White pine *(Pinus strobes),* Eastern hemlock *(Tsuga canadensis),* White oak *(Quercus alba),* Glossy buckthorn *(Rhamnus frangula),* Highbush blueberry *(Vaccinium corymbosum),* Witchhazel *(Hamamelis virginiana),* Silky dogwood *(Cornus amomum),* Multiflora rose *(Rosa multiflora),* Honeysuckle *(Lonicera spp.),* Goldthread *(Coptis trifolia),* Cinquefoil *(Potentilla fruiticosa),* Tussock sedge *(Carex* stricta), Woolgrass, *(Scirpus cyperinus),* Cinnamon fern *(Osmunda cinnamomea),* Sensitive fern *(Onoclea sensibilis)*, and Broad leaved cattail *(Typha latifolia).*

Please contact me if you have any questions or if I can be of further assistance.

Sincerely

John P. Hayes III CWS, CSS

John P. Hayes III CSS, CWS,
Environmental Consultant
7 Limestone Way
North Hampton, NH 03862
603-205-4396
johnphayes@comcast.net

1/21/25
Paige Libbey
Jones and Beach Engineers Inc.
PO Box 219
85 Portsmouth Avenue
Stratham NH 03885

Vernal Pool Assessment
Map 65 Lot 118
Portsmouth Avenue Exeter, NH

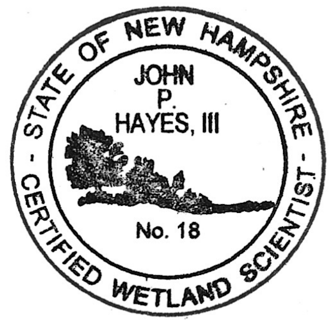
Dear Paige:

This letter reports the completion of an assessment for vernal pools on the above mentioned site by John P. Hayes III. The parcel is located on the northwest side of Portsmouth Avenue, southeast of Bonnie Drive, and northeast of Green Hill Road, in Exeter, NH. The lot is approximately 6.7 acres in size. The vernal pool assessment for this site consisted of two site visits. A preliminary examination for evidence of vernal pools on this property was conducted during the initial wetland delineation on Feburary 27, 2024. A second, followup exam was done, while doing some additional wetland delineation, on April 8, 2024. No vernal pools, or evidence of vernal pools was found during either of the examinations.

Please let me know if you have any questions, or need any more information on this project.

Sincerely:

John P. Hayes III



John P. Hayes III CSS, CWS

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

February 5, 2025

Exeter Conservation Commission
Attn. David Short, Chair
10 Front Street
Exeter, NH 03833

RE: Revised Conditional Use Permit Criteria
76 Portsmouth Avenue, Exeter, NH
Tax Map 65, Lot 118
JBE Project No. 24029

Dear Mr. Short,

On behalf of our client, Green & Company, we respectfully submit revised Conditional Use Permit criteria to supplement our application package that is currently pending before the Planning Board for the above-mentioned property. The criteria from the Zoning Ordinance are outlined below with our revised responses in bold based on the latest version of the plan, submitted to you on January 31, 2025.

9.1.6.B. Conditional Use Criteria:

1. That the proposed use is permitted in the underlying zoning district.
   RESPONSE: A mixed-use neighborhood development (MUND) is permitted in the C2 Zoning District.

2. No alternative design which does not impact a wetland or wetland buffer or which has less detrimental impact on the wetland or wetland buffer is feasible.
   RESPONSE: Alternative designs have been considered including the conceptual apartment-style building design that was presented at the July Conservation Commission and Planning Board meetings. That plan proposed the entirety of the wetlands "C" and "D" to be filled for large buildings. The plan was revised to a townhouse layout to be more in keeping with the surrounding neighborhood. The newly proposed townhouse layout proposes only 1 small wetland fill at the westernmost end of wetland "D" and 1 crossing of Wetland "C", both of which have limited to no functions. As discussed at the last Conservation Commission meeting, filling of these wetlands for this style of development would not be permitted by NHDES. It is also a benefit to the drainage on the property as well as the wetland connectivity to maintain these wetlands. Since the January 13th, 2025 version of the plan, the design has been revised as much as possible to make use of all of the available and accessible space outside of the buffer on the property for buildings and impervious surfaces. This has changed some of the impacts from permanent to

temporary, reducing impervious surface in the buffer, as well as substantially reducing the overall buffer impacts to be similar to what was proposed in the July conceptual design. No other alternative layout is feasible that would support this type of housing, which is the most suitable fit for the neighborhood. The remaining buffer impacts can be replicated with proposed vegetation in disturbed areas after construction is complete. Additionally, as outlined on the revised plans, only 7.7% of the limited use buffer on the property is proposed to be impacted, leaving a substantial amount of un-impacted buffer remaining.

3. A wetland scientist has provided an impact evaluation that includes the "functions and values" of the wetland(s), an assessment of the potential project-related impacts and concluded to the extent feasible, the proposed impact is not detrimental to the value and function of the wetland(s) or the greater hydrologic system.
   RESPONSE: A functions and values report has been provided by the wetland consultant and is attached. Overall, all of the wetland functions have been degraded by proximity to development and fragmentation. Generally, impacts to the wetland buffers will not have a measurable impact to the wetland functions. Wetland A's principle function is flood flow alteration, also known as stormwater storage. With no direct wetland impact, the principle function is not reduced by the development. Wetland B has more functions, but still has a principle function of flood flow alteration. With no direct impact, the principle function is not compromised. While other functions are present, the degradation caused by human proximity, water quality degradation, erosion of channel, and fragmentation, results in that the buffer impacts on the functions can be mitigated by buffer treatment. Wetland C and D are man-made, and have very limited to no wetland functions.

4. That the design, construction and maintenance of the proposed use will, to the extent feasible, minimize detrimental impact on the wetland or wetland buffer.
   RESPONSE: The proposed design and construction minimizes detrimental impacts to the wetlands as much as possible. The design has been altered in order to maintain connectivity of the wetlands and drainage. The buffers will be replicated via proposed vegetation. The wetlands will be protected during construction via silt barriers.

5. That the proposed use will not create a hazard to individual or public health, safety and welfare due to the loss of wetland, the contamination of groundwater, or other reasons.
   RESPONSE: The only direct wetland impacts proposed as part of this project are to man-made wetlands with very limited to no wetland functions. The impacts are minor and one will be a crossing so that drainage connectivity is maintained. Contamination of groundwater will not occur because stormwater will be treated in compliance with Town of Exeter Site plan regulations as well as NHDES Alteration of Terrain regulations for pollutant removal prior to discharging to the wetlands or groundwater. Peak flows in the proposed condition will be controlled to match existing for all required storm events so as not to increase flooding to neighboring properties. No other hazard to individual public, health, safety or welfare will occur as a result of the proposed wetland buffer impacts.

6. The applicant may propose an increase in wetland buffers elsewhere on the site that surrounds a wetland of equal or greater size, and of equal or greater functional value than the impacted wetland.

RESPONSE: The existing vegetated area on the east side of the site behind the commercial buildings on Portsmouth Avenue is to be permanently conserved as green space and to remain undeveloped as part of this project. This is a buffer to a commercial area that in many cases has stormwater directly sheet flowing to the wetland and is important to be conserved for filtration of stormwater. Additionally, as outlined on the revised plans, only 7.7% of the limited use buffer on the property is proposed to be impacted, leaving a substantial amount of un-impacted buffer remaining. Buffer plaques are proposed along the proposed treeline and there will be language in the condominium declarations to ensure that further disturbance of the buffer does not occur by homeowners.

7. In cases where the proposed use is temporary or where construction activity disturbs areas adjacent to the immediate use, the applicant has included a restoration proposal revegetating any disturbed area within the buffer with the goal to restore the site as nearly as possible to its original grade and condition following construction.
   RESPONSE: The included plan set proposes to restore all disturbed areas of the buffer that are not proposed to be permanently impacted with vegetation. See Sheet L1 of the plan set.

8. That all required permits shall be obtained from the New Hampshire Department of Environmental Services Water Supply and Pollution Control Division under NH RSA §485-A:17, the New Hampshire Wetlands Board under NH RSA §483-A, and the United States Army Corps of Engineers under Section 404 of the Clean Water Act.
   RESPONSE: All required state permits will be obtained for this project including NHDES Alteration of Terrain, NHDES Wastewater Connection and EPA CGP.

Please also see our resubmission package dated January 31, 2025 which outlines the revisions made to the plan in more detail. We look forward to discussing this project with you on February 11th. 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.

Paige Libbey, P.E.
Associate Principal

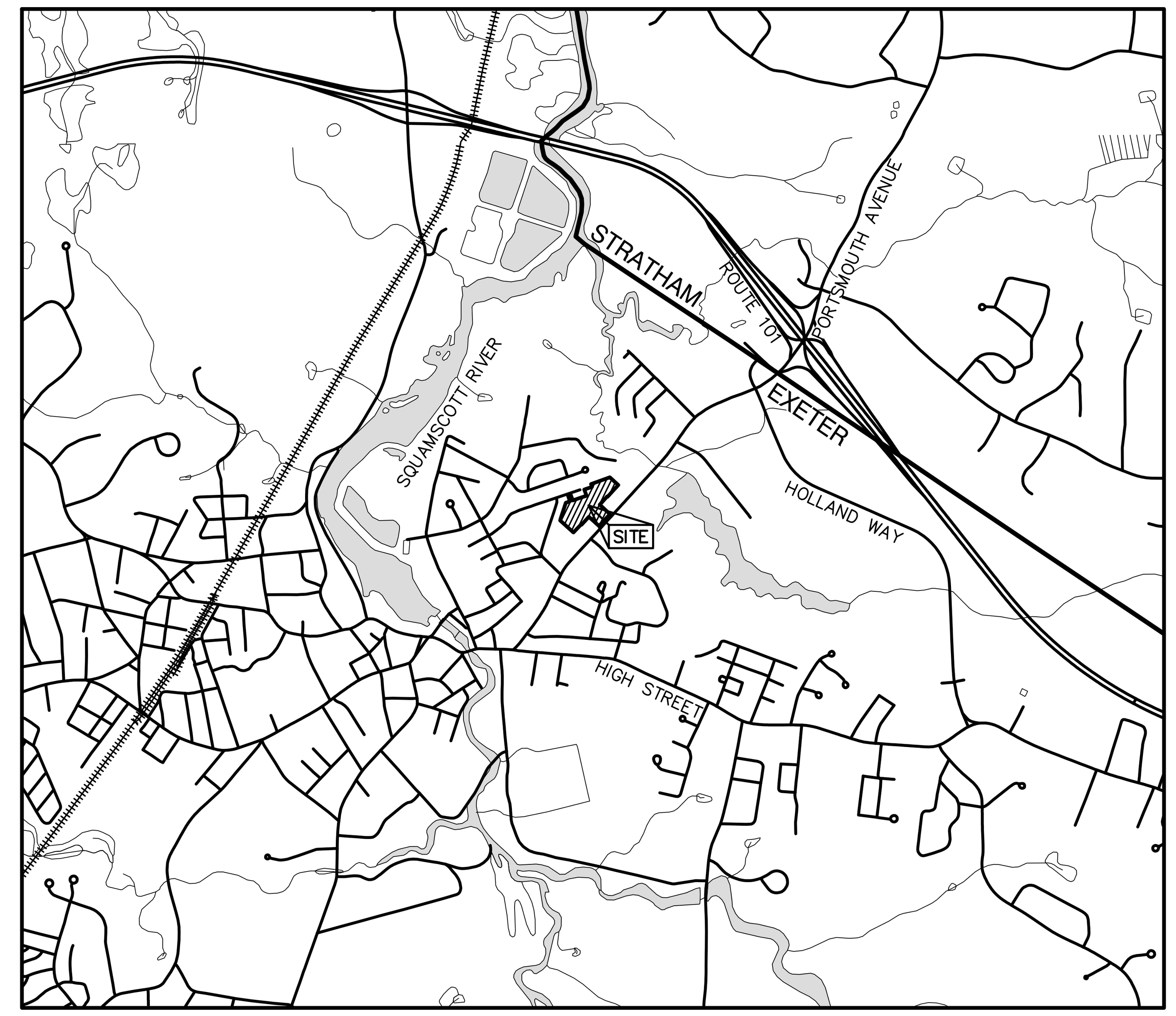
cc: Jenna Green, Green & Company (via email)
Michael Green, Green & Company (via email)
John O'Neill (via email)
Jim Gove, Gove Environmental Services (via email)

MIXED USE NEIGHBORHOOD DEVELOPMENT
"LILAC PLACE"
TAX MAP 65 LOT 118
76 PORTSMOUTH AVENUE, EXETER, NH

Know what's **below**
811 before you dig

GENERAL LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROPERTY LINES
		SETBACK LINES
		CENTERLINE
		FRESHWATER WETLANDS LINE
		STREAM CHANNEL
		TREE LINE
		STONEWALL
		FENCE
		STOCKADE FENCE
		SOIL BOUNDARY
		ZONELINE
		EASEMENT
100	100	MAJOR CONTOUR
98	98	MINOR CONTOUR
		EDGE OF PAVEMENT
VGC	VGC	VERTICAL GRANITE CURB
SGC	SGC	SLOPE GRANITE CURB
X	X	SILT FENCE
D		DRAINAGE LINE
S	S	SEWER LINE
FM	FM	SEWER FORCE MAIN
G	G	GAS LINE
W	W	WATER LINE
WS	WS	WATER SERVICE
OHE	OHE	OVERHEAD ELECTRIC
UGE	UGE	UNDERGROUND ELECTRIC
		GUARDRAIL
UD	UD	UNDERDRAIN
F	F	FIRE PROTECTION LINE
	W	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
TP1		TEST PIT
PT		PERC TEST
1		PHOTO LOCATION
		TREES AND BUSHES
		UTILITY POLE
		LIGHT POLES
		DRAIN MANHOLE
		SEWER MANHOLE
		HYDRANT
		WATER GATE
		WATER SHUT OFF
		REDUCER
		SINGLE GRATE CATCH BASIN
		DOUBLE GRATE CATCH BASIN
		TRANSFORMER
D		CULVERT W/WINGWALLS
D		CULVERT W/FLARED END SECTION
D		CULVERT W/STRAIGHT HEADWALL
		STONE CHECK DAM
		DRAINAGE FLOW DIRECTION
		WETLAND BUFFER IMPACT
		VEGETATED FILTER STRIP
		RIPRAP
		PAVEMENT HATCH
		OPEN WATER
		FRESHWATER WETLANDS
		STABILIZED CONSTRUCTION ENTRANCE
		CONCRETE
		GRAVEL
		SNOW STORAGE
		RETAINING WALL



LOCUS MAP
SCALE 1" = 2000'

SHEET INDEX

CS	COVER SHEET
C1	EXISTING CONDITIONS PLAN
D1	DEMOLITION PLAN
PH1	PHASING PLAN
OV1	OVERVIEW SITE PLAN
C2	SITE PLAN
C3	GRADING AND DRAINAGE PLAN
WB1	WETLAND AND BUFFER IMPACT PLAN
C4	UTILITY PLAN
L1	LANDSCAPE PLAN (BY LM LAND DESIGN, LLC)
L2	LANDSCAPE DETAIL PLAN
L3	LIGHTING PLAN
T1-T4	TRUCK TURNING PLAN
P1-P2	ROADWAY PLAN AND PROFILE
P3-P5	SEWER PLAN AND PROFILE
D1-D8	DETAIL SHEETS
E1-E2	EROSION AND SEDIMENT CONTROL DETAILS

PERMITS

TYPE OF PERMIT	STATUS
NHDES ALTERATION OF TERRAIN PERMIT:	SUBMITTED:
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES - WATER DIVISION	PERMIT NO.
29 HAZEN DRIVE, P.O. BOX 95 CONCORD, NEW HAMPSHIRE 03302-0095	DATED:
(603) 271-3503 RESPONSIBLE CONSULTANT: JONES & BEACH ENGINEERS, INC.	EXPIRATION:
NHDES WETLAND PERMIT:	SUBMITTED:
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES - WATER DIVISION	PERMIT NO.
29 HAZEN DRIVE, P.O. BOX 95 CONCORD, NEW HAMPSHIRE 03302-0095	DATED:
(603) 271-3503 RESPONSIBLE CONSULTANT: JONES & BEACH ENGINEERS, INC.	EXPIRATION:
NHDES WASTEWATER CONNECTION PERMIT:	SUBMITTED:
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES - WATER DIVISION	PERMIT NO.
29 HAZEN DRIVE, P.O. BOX 95 CONCORD, NEW HAMPSHIRE 03302-0095	DATED:
(603) 271-3503 RESPONSIBLE CONSULTANT:	EXPIRATION:

USEPA NPDES PHASE II CONSTRUCTION GENERAL PERMIT, NOTICE OF INTENT (NOI), AND NOTICE OF TERMINATION (NOT) TO BE FILED IN ACCORDANCE WITH FEDERAL AND LOCAL REGULATIONS PRIOR TO AND FOLLOWING CONSTRUCTION:
EPA STORMWATER NOTICE PROCESSING CENTER
MAIL CODE 4203M,
US EPA
1200 PENNSYLVANIA AVENUE, NW
WASHINGTON, DC 20460
RESPONSIBLE CONSULTANT:
JONES & BEACH ENGINEERS, INC.

CIVIL ENGINEER / SURVEYOR
JONES & BEACH ENGINEERS, INC.
85 PORTSMOUTH AVENUE
PO BOX 219
STRATHAM, NH 03885
(603) 772-4746
CONTACT: PAIGE LIBBEY, P.E.
E-MAIL: PLIBBEY@JONESANDBEACH.COM

TRAFFIC ENGINEER
TEPP LLC
93 STILES ROAD, SUITE 201
SALEM, NH 03079
(603) 212-9133
EMAIL: TEPP@TEPPLLC.COM
CONTACT: KIM HAZARVARTIAN, P.E.

SOILS CONSULTANT
GOVE ENVIRONMENTAL SERVICES
8 CONTINENTAL DRIVE, UNIT H
EXETER, NH 03833-7507
(603) 778-0644
CONTACT: JAMES GOVE

WETLAND CONSULTANT
JOHN HAYES
7 LIMESTONE WAY
NORTH HAMPTON, NH 03862
(603) 205-4396
EMAIL: JOHNPHAYES@COMCAST.NET

LANDSCAPE DESIGNER
LM LAND DESIGN, LLC
11 SOUTH ROAD
BRENTWOOD, NH 03833
(603) 770-7728
CONTACT: LISE MCNAUGHTON

WATER & SEWER
EXETER PUBLIC WORKS
13 NEWFIELDS ROAD
EXETER, NH 03833
(603) 773-6157

LIGHTING DESIGN
EXPOSURE LIGHTING
501 ISLINGTON STREET, UNIT 1A
PORTSMOUTH, NH 03801
(603) 601-8080
CONTACT: KEN SWEENEY

ELECTRIC
EVERSOURCE
265 CALEF HIGHWAY
EPPING, NH 03042
(800) 662-7764

TELEPHONE
CONSOLIDATED COMMUNICATIONS
1575 GREENLAND ROAD
GREENLAND, NH 03840
(603) 427-5525

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

APPROVED – EXETER, NH
PLANNING BOARD

DATE:

Design: DJM	Draft: KDR	Date: 3/15/24	
Checked: PSL	Scale: AS NOTED	Project No.: 24029	
Drawing Name: 24029-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.

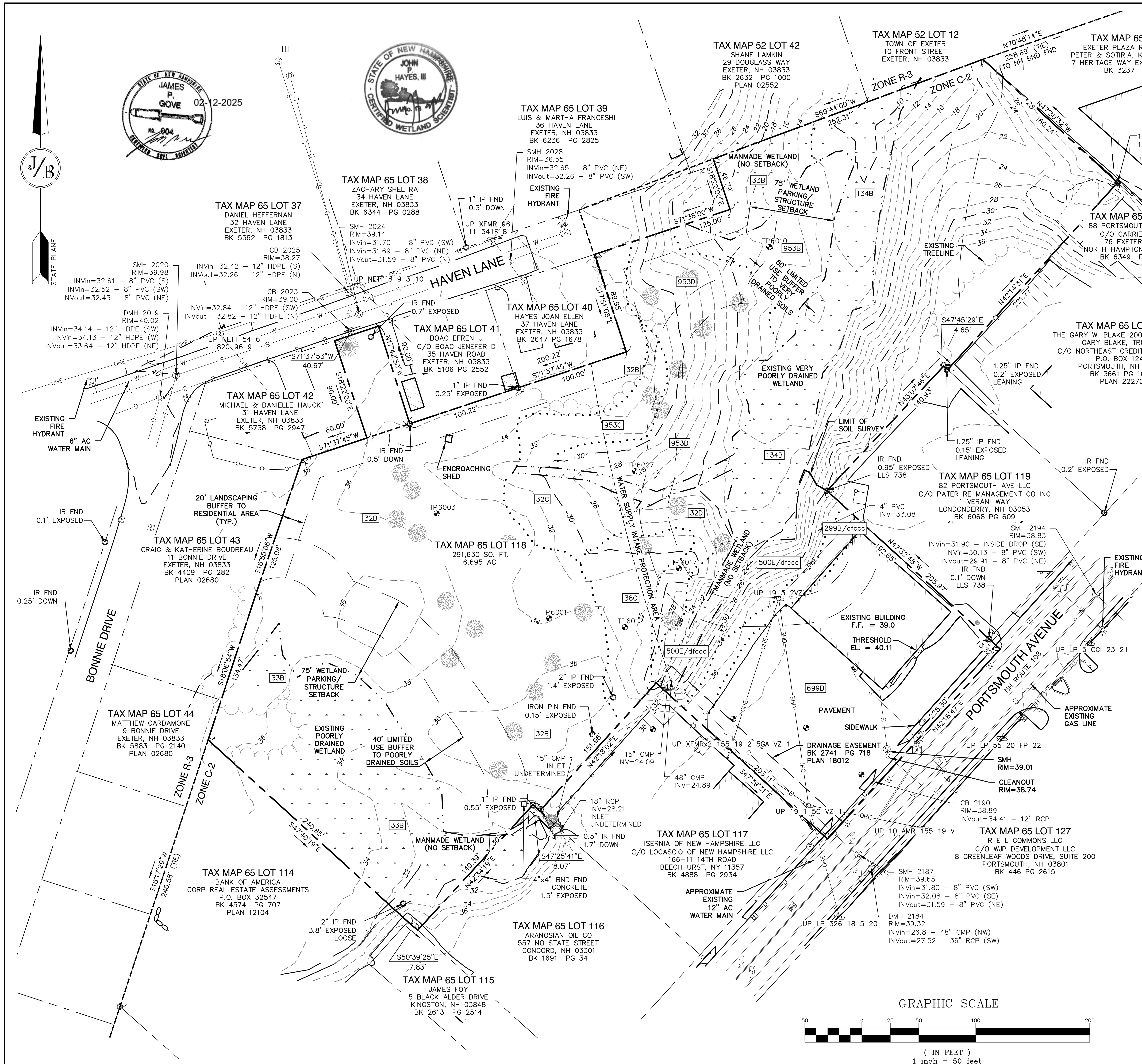
STATE OF NEW HAMPSHIRE
PAIGE S. LIBBEY
No.16670
LICENSED
PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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

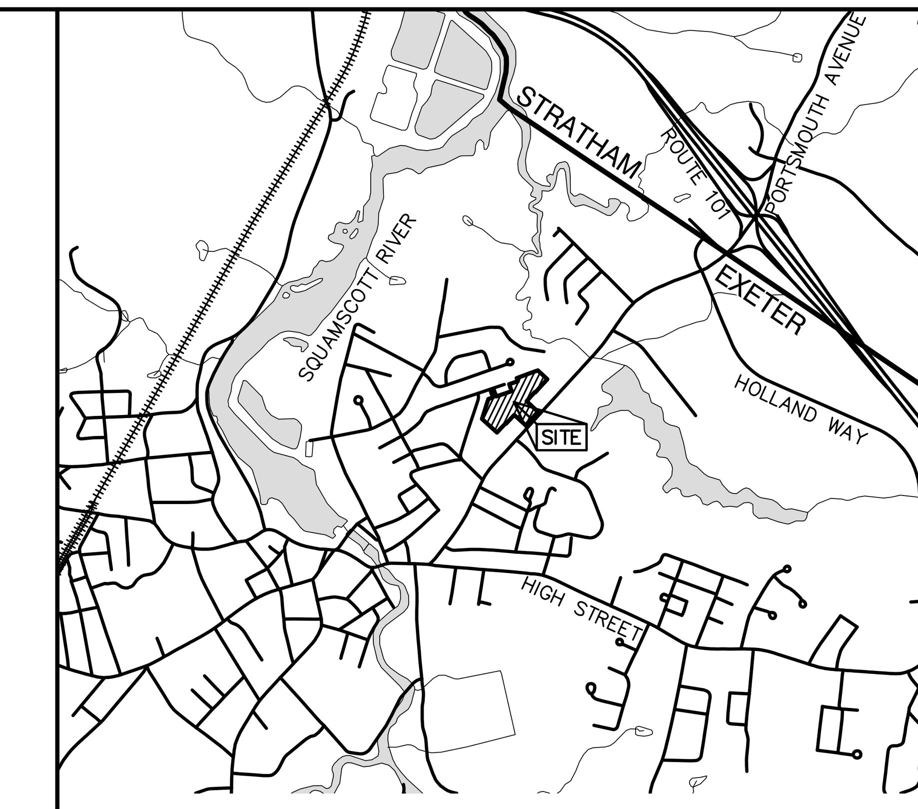
Plan Name:	COVER SHEET
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
CS
SHEET 1 OF 31
JBE PROJECT NO. 24029



PLAN REFERENCES

1. "PLAN OF DRAINAGE EASEMENT, EXETER, NH, PREPARED FOR EXETER HOSPITAL" BY KIMBALL CHASE, DATED MAY 23, 1988. R.C.R.D. PLAN 18012.
2. "LOT LINE CHANGE FOR GARY W. BLAKE, EXETER, NH" BY PARKER SURVEY ASSOC., INC., DATED JANUARY 12, 1984. R.C.R.D. PLAN 12104.
3. "SUBDIVISION OF LAND FOR JOHN W. FLYNN, EXETER, NH" BY KIMBALL CHASE COMPANY, INC., DATED FEBUARY 11, 1988. R.C.R.D. PLAN 17605.
4. "BOUNDARY AND TOPOGRAPHIC PLAN FOR STAR ENTERPRISE, EXETER, NH" BY STORCH ASSOCIATES, DATED JUNE 15, 1999. R.C.R.D. PLAN 22270.
5. "PLAN OF LAND FOR HENRY & ROBERTA A. SHEPARD AND CHARLES A. & EVA S. KOIRTH, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED JULY 17, 1963. R.C.R.D. PLAN 00108.
6. "PLAN OF LOTS, PROPERTY OF J. EVERETT TOWLE, EXETER, NH" BY ARTHUR W. DUDLEY, C.E., DATED 1924. R.C.R.D. PLAN 0671.
7. "A PORTION OF THE LAND OF JEAN AND SUE PULVER, EXETER, NH" BY LEACH AND HUNTER, DATED OCTOBER 4, 1949. R.C.R.D. PLAN 01721.
8. "PLOT OF LAND FOR CARROLS DEVELOPMENT CORP & CHICAGO TITLE COMPANY, EXETER, NH" BY UNITED SURVEYORS & ENGRS., DATED MARCH 20, 1970. R.C.R.D. PLAN 1726.
9. "PLAN OF LAND FOR JEAN A. & SUE E PULVER, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED AUGUST 1951. R.C.R.D. PLAN 01823.
10. "PLAN OF LAND FOR JEAN A. & SUE E. PULVER, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED AUGUST 1951. R.C.R.D. PLAN 02551.
11. "PART OF COUNTRY CLUB ESTATES, SCALE: 1 IN = 40 FT" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED AUGUST 4TH, 1955. R.C.R.D. PLAN 02552.
12. "PLOT PLAN FOR HENRY SHEPARD & CHARLES KOIRTH, EXETER, NH" BY T.A. NOWAK, DATED APRIL 1958. R.C.R.D. PLAN 02680.
13. "SUBDIVISION OF LAND, SIMONS TO ROCKINGHAM NATIONAL BANK, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED MAY 2, 1972. R.C.R.D. PLAN 2924.
14. "PLAN OF LAND IN EXETER, N.H. PREPARED FOR FRIENDLY ICE CREAM CORP." DATED AUGUST 12, 1974. PREPARED BY THOMAS F. MORAN INC. NOT RECORDED.
15. "PLAT OF LAND FOR M.H.K. REALTY IN EXETER, N.H." DATED NOVEMBER 1988. PREPARED BY PARKER SURVEY ASSOCIATES. NOT RECORDED.
16. STATE OF NEW HAMPSHIRE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS, PLANS OF PROPOSED FEDERAL AID PRIMARY PROJECT F 018-2(1) N.H. NO. P-2428. ON FILE WITH THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION.



LOCUS SCALE: 1"=2000'

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 10-22-2024, 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
32	BOXFORD SILT LOAM	353	C
33	SCITICO SILT LOAM	553	C
38	ELDRIDGE LOAMY SAND	343	C
134	MAYBID MUCKY SILT LOAM	653	D
953	BOXFORD SPD*	453	C
299/DFCCC	UDORTHENTS, SMOOTHED	363	C
500/DFCCC	UDORTHENTS, LOAMY	363	C
600/FFCCD	ENDOAQUENTS, LOAMY	563	D
699	URBAN LAND	N/A	N/A

* SPD = SOMEWHAT POORLY DRAINED

SLOPE PHASE:

0-8%	B	8-15%	C	15-25%	D
25%-50%	E	50%+	F		

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

MATTHEW J. SALVUCCI, LLS 1030 DATE:

ON BEHALF OF JONES & BEACH ENGINEERS, INC.

NOTES:

1. THE INTENT OF THIS PLAN IS TO SHOW THE BOUNDARY AND EXISTING CONDITIONS OF LOT 118 AS SHOWN ON TOWN OF EXETER TAX MAP 65.
2. ZONING DISTRICT: C2
   - LOT AREA MINIMUM = 20,000 SF
   - LOT WIDTH MINIMUM = 150'
   - LOT DEPTH MINIMUM = 100'
   - MINIMUM LOT AREA/ DWELLING UNIT = 5,000 S.F.
   - BUILDING SETBACKS (MINIMUM):
     - FRONT SETBACK = 50'
     - SIDE SETBACK = 20' ON ONE SIDE, 40' ON THE OTHER
     - REAR SETBACK = 50'
   - MAX. BUILDING HEIGHT = 35'
   - MAX. BUILDING COVERAGE = 30%
   - MIN. OPEN SPACE = 15%
   - TOWN WETLAND BUFFER = 40' LIMITED USE BUFFER TO P.D. SOILS, 75' PARKING AND STRUCTURE SETBACK
3. THE UTILITY LOCATIONS SHOWN HEREON WERE DETERMINED BY OBSERVED ABOVE GROUND EVIDENCE AND SHOULD BE CONSIDERED APPROXIMATE IN LOCATION ONLY. LOCATION, DEPTH, SIZE, TYPE, EXISTENCE OR NONEXISTENCE OF UNDERGROUND UTILITIES AND/OR UNDERGROUND STORAGE TANKS WAS NOT VERIFIED BY THIS SURVEY. ALL CONTRACTORS SHOULD NOTIFY IN WRITING ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO ANY EXCAVATION WORK OR CALL DIG-SAFE AT 1-888-DIG-SAFE.
4. THE SUBJECT PARCEL IS NOT LOCATED WITHIN AN AREA HAVING A SPECIAL FLOOD HAZARD ZONE DESIGNATION BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ON FLOOD INSURANCE RATE MAP NOs. 33015C0402E AND 33015C0406E, BOTH WITH EFFECTIVE DATE OF MAY 17, 2005.
5. BASIS OF BEARING: HORIZONTAL - NH STATE PLANE. VERTICAL - NAVD88.
6. ALL BOOK AND PAGE NUMBERS REFER TO THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
7. THE TAX MAP AND LOT NUMBERS ARE BASED ON THE TOWN OF EXETER TAX RECORDS AND ARE SUBJECT TO CHANGE.
8. 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.
9. ANY USE OF THIS PLAN AND OR ACCOMPANYING DESCRIPTIONS SHOULD BE DONE WITH LEGAL COUNSEL, TO BE CERTAIN THAT TITLES ARE CLEAR, THAT INFORMATION IS CURRENT, AND THAT ANY NECESSARY CERTIFICATES ARE IN PLACE FOR A PARTICULAR CONVEYANCE, OR OTHER USES.
10. THE LIMITS OF JURISDICTIONAL WETLANDS WERE DELINEATED BY JACK HAYES, APRIL 1, 2024 IN ACCORDANCE WITH THE FOLLOWING GUIDANCE DOCUMENTS:
    - A. THE CORPS OF ENGINEERS FEDERAL MANUAL FOR IDENTIFYING AND DELINEATING JURISDICTIONAL WETLANDS.
    - B. THE NORTH CENTRAL & NORTHEAST REGIONAL SUPPLEMENT TO THE FEDERAL MANUAL.
    - C. THE CURRENT VERSION OF THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, AS PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION AND/OR THE CURRENT VERSION OF THE FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, AS PUBLISHED BY THE USDA, NRCS, AS APPROPRIATE.
    - D. THE CURRENT NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS, AS PUBLISHED BY THE US FISH AND WILDLIFE SERVICE.
11. TEST PITS PERFORMED BY JAMES GOVE, GOVE ENVIRONMENTAL SERVICES, INC., 7/2/24.
12. SURVEY TIE LINES SHOWN HEREON ARE NOT BOUNDARY LINES. THEY SHOULD ONLY BE USED TO LOCATE THE PARCEL SURVEYED FROM THE FOUND MONUMENTS SHOWN AND LOCATED BY THIS SURVEY.
13. THE SURVEYED PROPERTY MAY BE SUBJECT TO EASEMENT IN BOOK 2096 PAGE 211. LOCATION IS UNABLE TO BE DETERMINED AT THIS TIME.

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24	
Checked: PSL	Scale: AS SHOWN	Project No.: 24029	
Drawing Name: 24029-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.

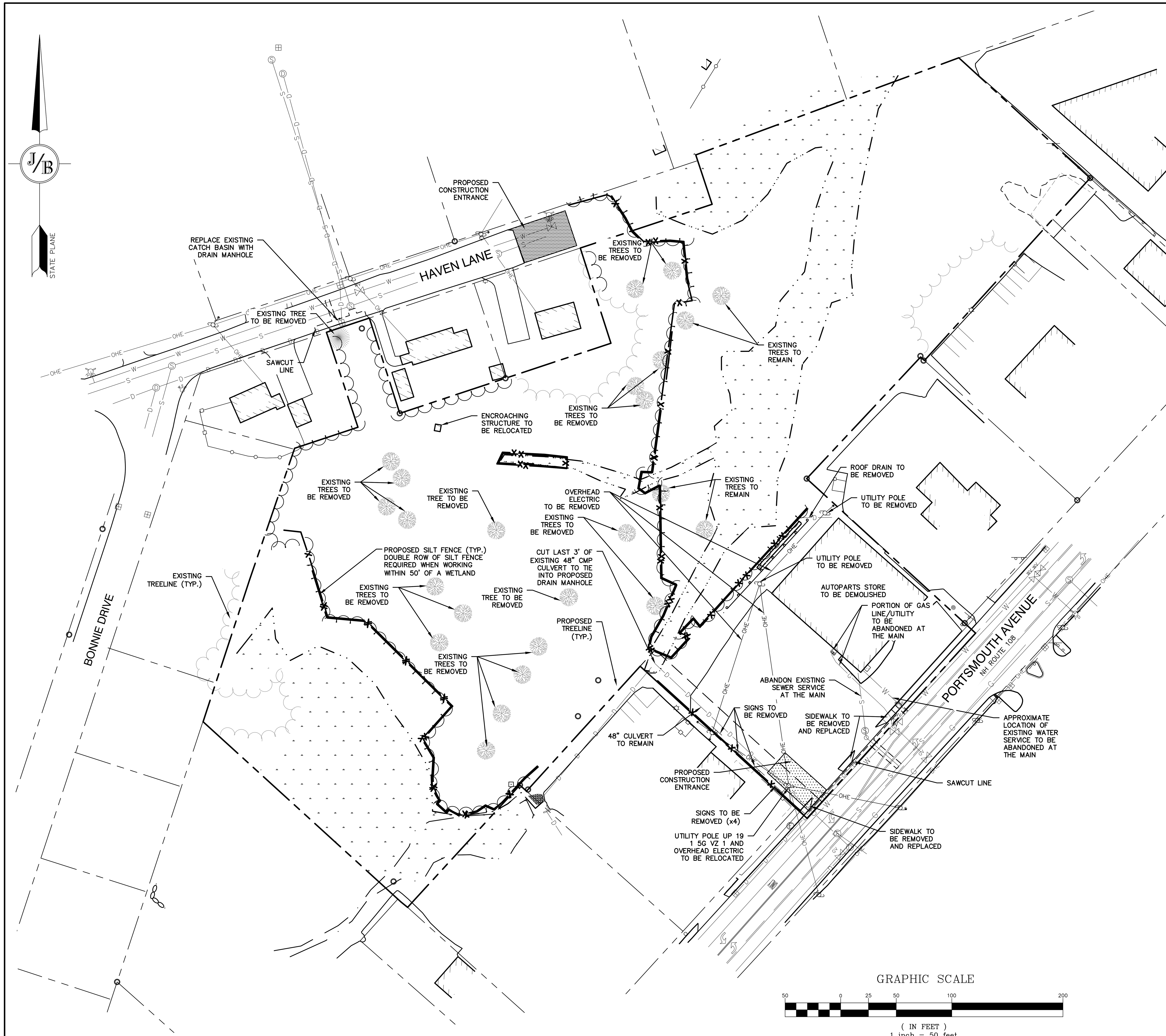
STATE OF NEW HAMPSHIRE PAIGE S. LIBBEY No.16670 LICENSED PROFESSIONAL ENGINEER 02/14/2025

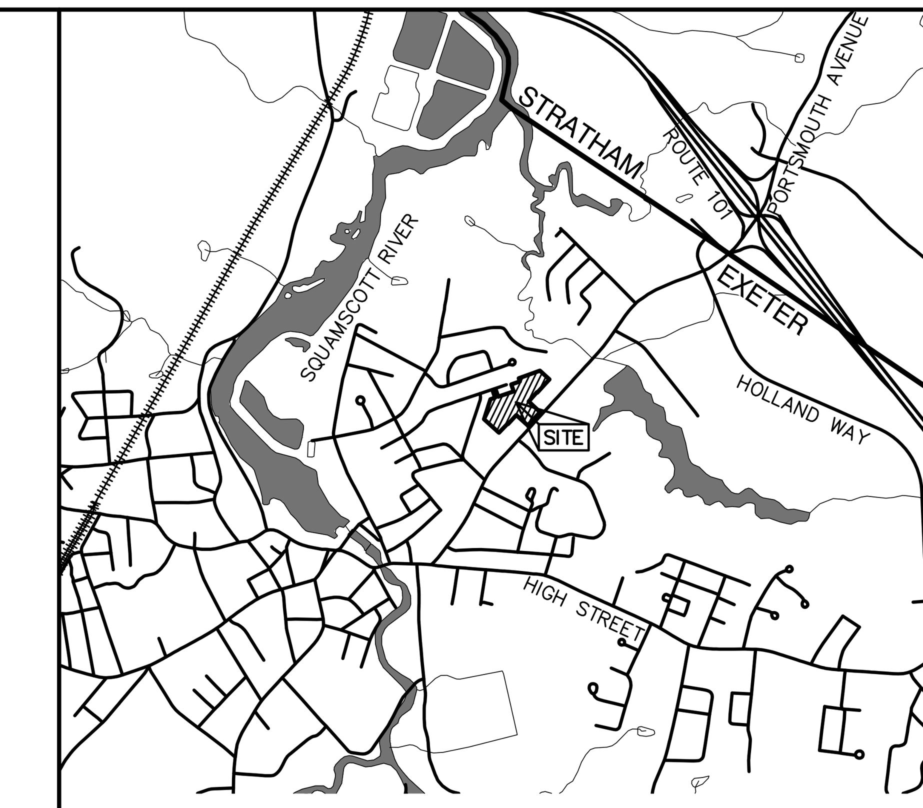
REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EXISTING CONDITIONS PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
C1
SHEET 2 OF 31
JBE PROJECT NO. 24029





LOCUS SCALE: 1"=2000'

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. CLEARING LIMITS ARE THE EDGE OF THE PROPERTY AND THE LIMITS OF WORK.
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. ALL EXISTING UTILITIES SHALL BE TERMINATED AT THE MAIN, UNLESS OTHERWISE NOTED ON THE PLANS, IN CONFORMANCE WITH LOCAL, STATE AND UTILITY COMPANY STANDARDS, SPECIFICATIONS AND DETAILS. THE CONTRACTOR SHALL COORDINATE UTILITY SERVICE DISCONNECTS WITH THE UTILITY REPRESENTATIVES PRIOR TO THE START OF WORK.
5. EXISTING WATER SERVICE TO BE REMOVED SHALL BE CAPPED AT EXISTING WATERMAIN.
6. EXISTING GAS SERVICE LINES TO BE PARTIALLY REMOVED AND REROUTED TO PROPOSED BUILDING.
7. 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).
8. 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.
9. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO CONSTRUCTION AND ANY EARTH MOVING OPERATIONS. SILT FENCE SHALL BE INSTALLED AT THE LIMITS OF IMPACT AREAS ACCORDING TO THE DETAILS SHOWN ON SHEET E1.
10. EXCAVATED MATERIALS WILL BE PLACED WITHIN UPLAND AREAS AS FILL MATERIAL OR HAULED OFF-SITE FOR DISPOSAL IN AN APPROPRIATE UPLAND LOCATION.

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-PLAN.dwg		

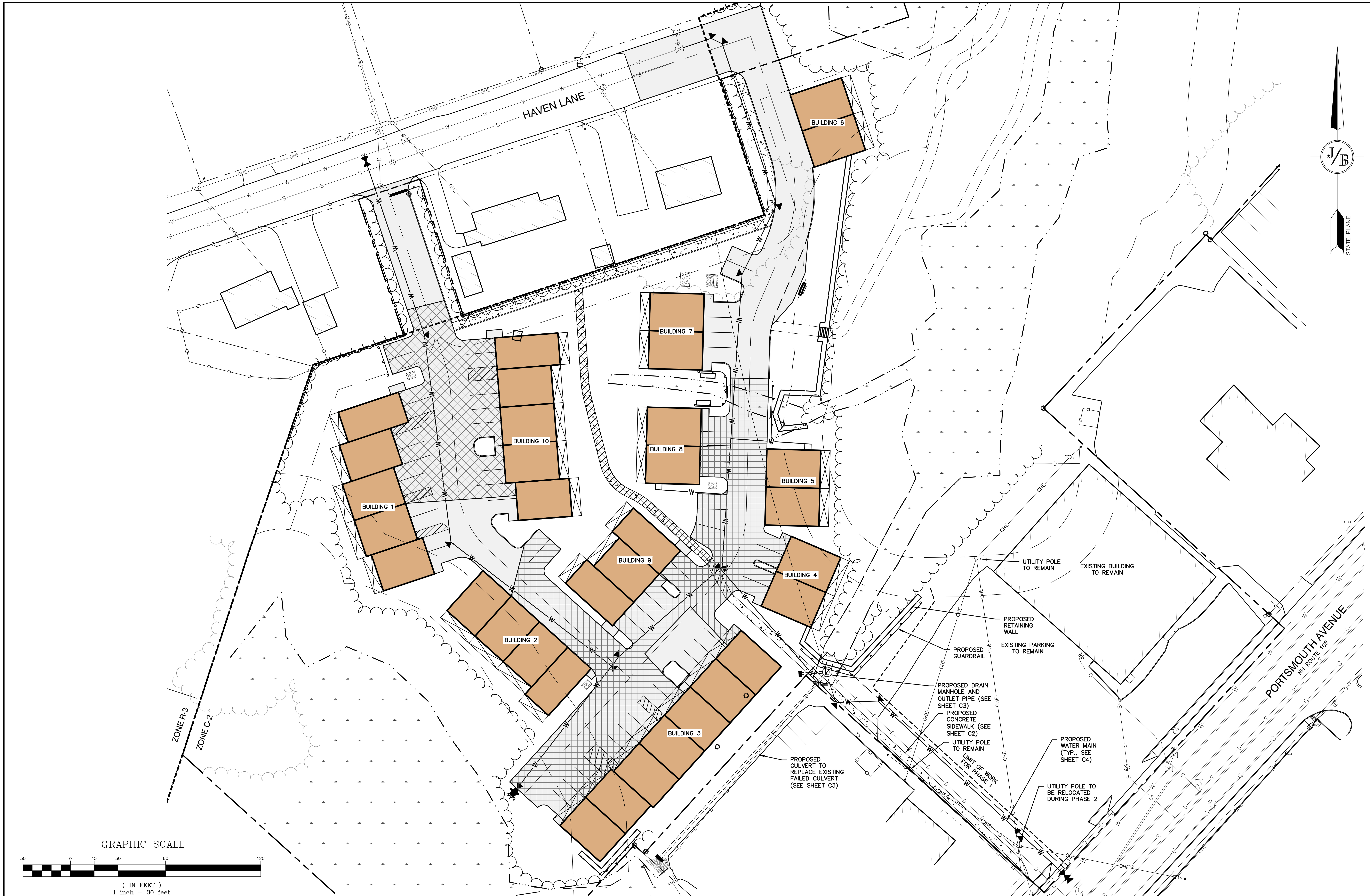
STATE OF NEW HAMPSHIRE
PAIGE S. LIBBEY No.16670
LICENSED PROFESSIONAL ENGINEER
02/14/2025

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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:	DEMOLITION PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
DM-1
SHEET 3 OF 31
JBE PROJECT NO. 24029



PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24	
Checked: PSL	Scale: AS SHOWN	Project No.: 24029	
Drawing Name: 24029-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.

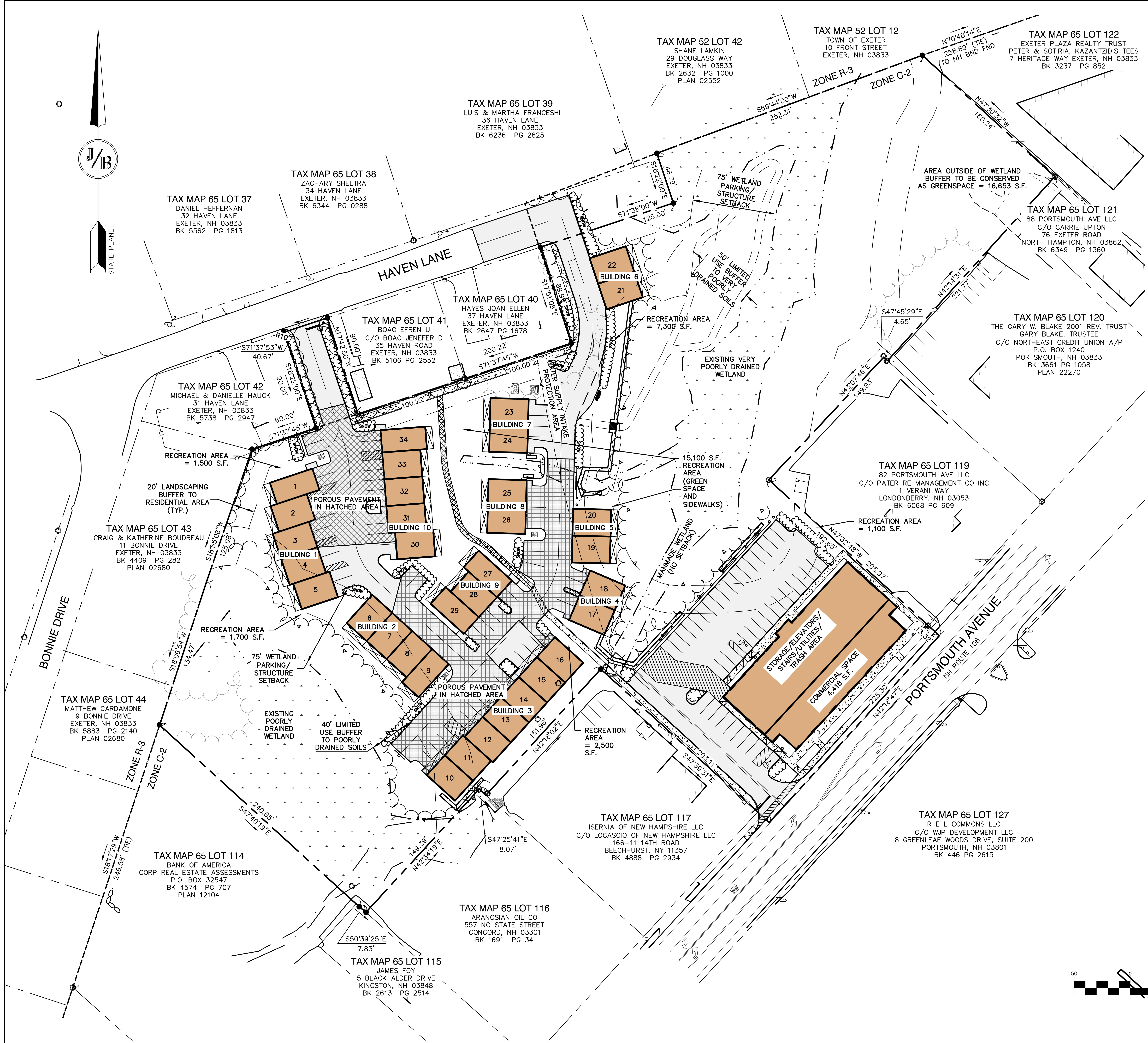
STATE OF NEW HAMPSHIRE
PAIGE S. LIBBEY
No.16670
LICENSED PROFESSIONAL ENGINEER
02/14/2025

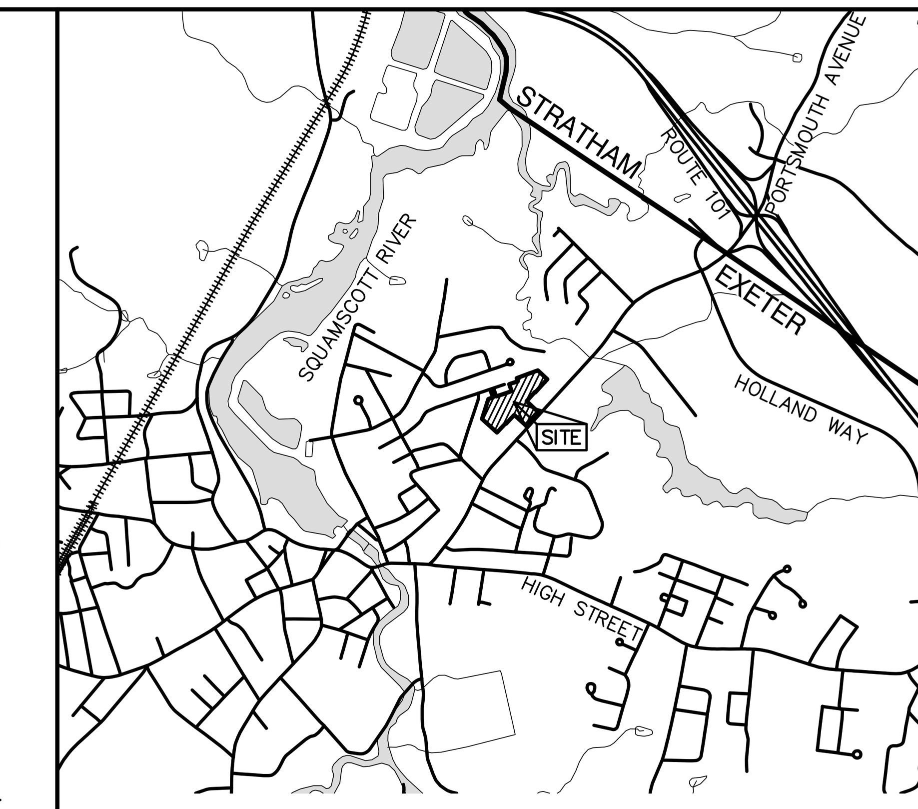
REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

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:	PHASE 1 PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
PH1
SHEET 4 OF 31
JBE PROJECT NO. 24029





LOCUS SCALE: 1"=2000'

NOTES:

1. THE INTENT OF THIS PLAN IS TO SHOW A MIXED USE NEIGHBORHOOD DEVELOPMENT (MUND) CONSISTING OF A TOWNHOUSE DEVELOPMENT OFF HAVEN LANE WITH (34) 3-BEDROOM UNITS AND A 4 STORY MIXED USE BUILDING ON PORTSMOUTH AVENUE HAVING COMMERCIAL USE ON THE FIRST FLOOR AND (36) ONE BEDROOM UNITS ABOVE.

2. ZONING DISTRICT: C2
   LOT AREA MINIMUM = 20,000 SF
   LOT WIDTH MINIMUM = 150'
   LOT DEPTH MINIMUM = 100'
   MINIMUM LOT AREA/ DWELLING UNIT = 5,000 S.F.
   BUILDING SETBACKS (MINIMUM):
   FRONT SETBACK = 50'
   SIDE SETBACK = 20' ON ONE SIDE, 40' ON THE OTHER
   REAR SETBACK = 50'
   MAX. BUILDING HEIGHT = 35'
   MAX. BUILDING COVERAGE = 30%; BUILDING COVERAGE PROVIDED = 44,170 S.F. (15.1%)
   MIN. OPEN SPACE = 15%; OPEN SPACE PROVIDED = 52,794 S.F. (18.1%)
   TOWN WETLAND BUFFER = 40' LIMITED USE BUFFER TO P.D. SOILS, 75' PARKING AND STRUCTURE SETBACK
   ZONING DISTRICT: MIXED USE NEIGHBORHOOD DEVELOPMENT (MUND)
   FRONT SETBACK = 0' MIN, 25' MAX
   MAXIMUM BUILDING HEIGHT = 50' OR FOUR STORIES
   AREA PER DWELLING UNIT REQUIREMENT SHALL NOT APPLY TO MUND APPLICATIONS

3. RECREATION AREA REQUIRED (SITE PLAN REGULATIONS SECTION 9.6.3.) = 10% OF PROPERTY (29,163 S.F.)
   RECREATION AREA PROVIDED = 30,300 S.F. (10.4%)

4. PARKING CALCULATIONS
   PORTSMOUTH AVENUE DEVELOPMENT:
   MIXED USE NEIGHBORHOOD DISTRICT (MUND) PARKING REQUIREMENTS = 1 SPACE/RESIDENTIAL UNIT + COMMERCIAL PARKING AT 50% OF TOWN OF EXETER SITE PLAN REGULATIONS
   REQUIRED PARKING = 1 SPACE/300 S.F. X 4,418 S.F. COMMERCIAL SPACE X 50% = 8 SPACES REQUIRED
   +1 SPACE/ RESIDENTIAL UNIT = 36 SPACES REQUIRED
   TOTAL REQUIRED PARKING = 44 SPACES
   PARKING PROVIDED = 43 SPACES
   TOWNHOUSE DEVELOPMENT:
   1 SPACE PER UNIT REQUIRED
   34 UNITS / 1 SPACE PER UNIT = 34 SPACES REQUIRED
   PARKING PROVIDED = 120 PARKING SPACES

5. THIS PROJECT IS TO BE CONSTRUCTED IN TWO PHASES. PHASE 1 IS TO BE BUILT FIRST WHICH WILL CONSIST OF ALL THE SIDEWALKS, UTILITIES & TOWNHOUSES ACCESSED OFF OF HAVEN LANE. PHASE 1 WILL ALSO INCLUDE THE WETLAND IMPACT/SIDEWALK AND WATERMAIN CONNECTION TO PORTSMOUTH AVENUE AND DRAINAGE IMPROVEMENTS TO EXISTING CULVERTS AT 72 AND 76 PORTSMOUTH AVENUE. PHASE 2 IS TO BE CONSTRUCTED LAST IS THE REMAINDER OF THE MIXED USE COMMERCIAL/RESIDENTIAL DEVELOPMENT ON PORTSMOUTH AVENUE. SEE SHEET PH1.

6. AFFORDABLE UNITS REQUIRED = 10% OF TOTAL PROPOSED UNITS.
   PHASE 1 TOTAL UNITS (36) * .1 = 3.6 ≈ 4
   4 UNITS REQUIRED, 4 UNITS PROPOSED
   PHASE 2 TOTAL UNITS (34) * .1 = 3.4 ≈ 4
   4 UNITS REQUIRED, 4 UNITS PROPOSED

7. REQUIRED LANDSCAPED AREA = 10% OF PARKING AREA
   PARKING AREA (16,005 S.F.) * .1 = 1,601 S.F. REQUIRED LANDSCAPE AREA
   2,623 S.F. OF LANDSCAPED AREA PROVIDED

8. THE LIMITS OF JURISDICTIONAL WETLANDS WERE DELINEATED BY JOHN HAYES, DURING APRIL, 2024 IN ACCORDANCE WITH THE FOLLOWING GUIDANCE DOCUMENTS:
   a. THE CORPS OF ENGINEERS FEDERAL MANUAL FOR IDENTIFYING AND DELINEATING JURISDICTIONAL WETLANDS.
   b. THE NORTH CENTRAL & NORTHEAST REGIONAL SUPPLEMENT TO THE FEDERAL MANUAL.
   c. THE CURRENT VERSION OF THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, AS PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION AND/OR THE CURRENT VERSION OF THE FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, AS PUBLISHED BY THE USDA, NRCS, AS APPROPRIATE.
   d. THE CURRENT NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS, AS PUBLISHED BY THE US FISH AND WILDLIFE SERVICE.

8. ALL WATER, SEWER, ROAD AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 9.3 STORMWATER MANAGEMENT STANDARDS, STORWMATER MANAGEMENT PLAN, STORMWATER POLLUTION PREVENTION PLAN, AND EROSION AND SEDIMENT CONTROL STANDARDS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC UTILITIES IN EXETER, NEW HAMPSHIRE.

9. 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.

10. ALL CONSTRUCTION SHALL CONFORM TO TOWN STANDARDS AND REGULATIONS, AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.

11. THE SUBJECT PARCEL IS NOT LOCATED WITHIN AN AREA HAVING A SPECIAL FLOOD HAZARD ZONE DESIGNATION BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ON FLOOD INSURANCE RATE MAP NOs. 33015C0402E AND 33015C0406E, BOTH WITH EFFECTIVE DATE OF MAY 17, 2005.

12. LANDOWNERS ARE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WETLAND REGULATIONS, INCLUDING PERMITTING REQUIRED UNDER THESE REGULATIONS.

13. 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.

14. THE CONTRACTOR SHALL READ AND FOLLOW ALL RECOMMENDATIONS MADE IN THE SITE GEOTECHNICAL ENGINEER REPORT, PREPARED BY GEOTECHNICAL SERVICES, INC., DATED JULY 12, 2024.

15. 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.

16. ALL PROPOSED SIGNAGE SHALL CONFORM WITH THE TOWN ZONING REGULATIONS, UNLESS A VARIANCE IS OTHERWISE REQUESTED.

17. 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.

18. ALL PARKING STALLS SHALL BE SEPARATED USING 4" WIDE SOLID STRIPES. STRIPING SHALL BE 100% ACRYLIC TYPE, LOW VOC, FAST DRYING, IN A COLOR OF WHITE.

19. ALL STOP BARS SHALL BE 18" IN WIDTH IN A COLOR OF WHITE; ALL TRAFFIC ARROWS SHALL BE PAINTED IN A COLOR OF WHITE.

20. ALL CURBING TO BE SLOPED GRANITE WITH A MINIMUM RADIUS OF 2', UNLESS OTHERWISE NOTED.

21. 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.

22. SNOW TO BE STORED AT EDGE OF PAVEMENT AND IN AREAS SHOWN ON THE PLANS, OR TRUCKED OFFSITE TO AN APPROVED SNOW DUMPING LOCATION.

23. ROOF TOP HEATING AND AIR CONDITIONING UNITS (RTU's ON THE MIXED USE BUILDING) SHALL BE DESIGNED TO VENT UPWARDS AND AIR INTAKES SHALL BE DIRECTED AWAY FROM ABUTTING NEIGHBORS. AND SHALL BE SCREENED FROM PUBLIC VIEW.

24. ALL ARCHITECTURAL BLOCK RETAINING WALLS ARE TO BE DESIGNED AND STAMPED BY THE MANUFACTURER'S STRUCTURAL ENGINEER. CONTRACTOR TO COORDINATE WITH APPROVED MANUFACTURER PRIOR TO INSTALLATION.

25. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.

26. ALL PRECAST CONCRETE PRODUCTS WILL BE SOURCED FROM MANUFACTURING FACILITIES IN COMPLIANCE WITH THE NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA) PLANT CERTIFICATION PROGRAM. EVIDENCE OF COMPLIANCE WILL BE PROVIDED FOR THE CURRENT CALENDAR YEAR THE PRODUCTS WERE MANUFACTURED WITHIN.

27. CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL TOWN TO APPROPRIATE TOWN DEPARTMENTS PRIOR TO COMMENCEMENT OF CONSTRUCTION.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 feet

APPROVED – EXETER, NH
PLANNING BOARD

DATE:

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM | Draft: KDR | Date: 3/15/24
Checked: PSL | Scale: AS SHOWN | Project No.: 24029
Drawing Name: 24029-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.

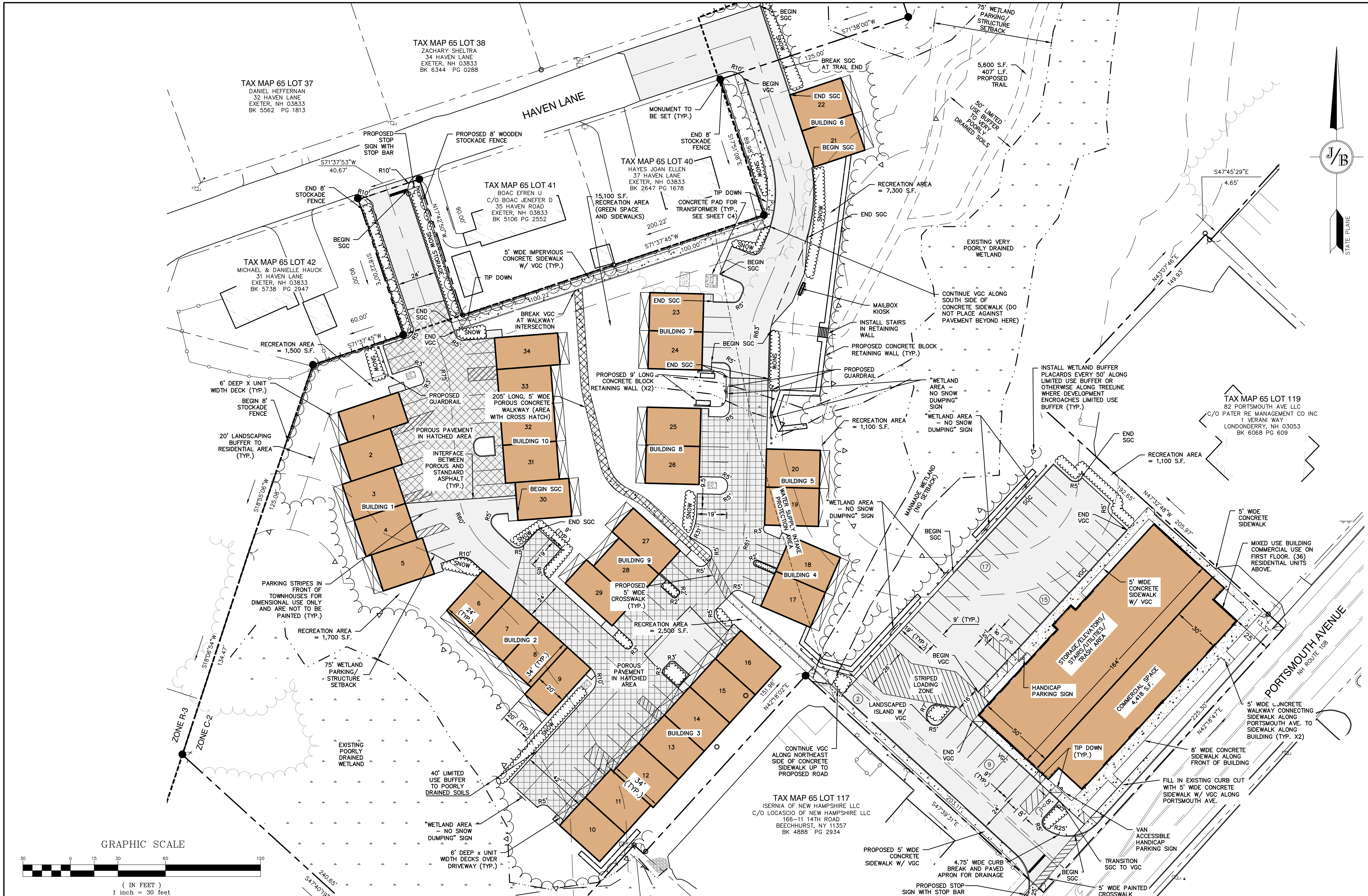
STATE OF NEW HAMPSHIRE – PAIGE S. LIBBEY No.16670 – LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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: OVERVIEW SITE PLAN
Project: "LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
OV1
SHEET 5 OF 31
JBE PROJECT NO. 24029



PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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.

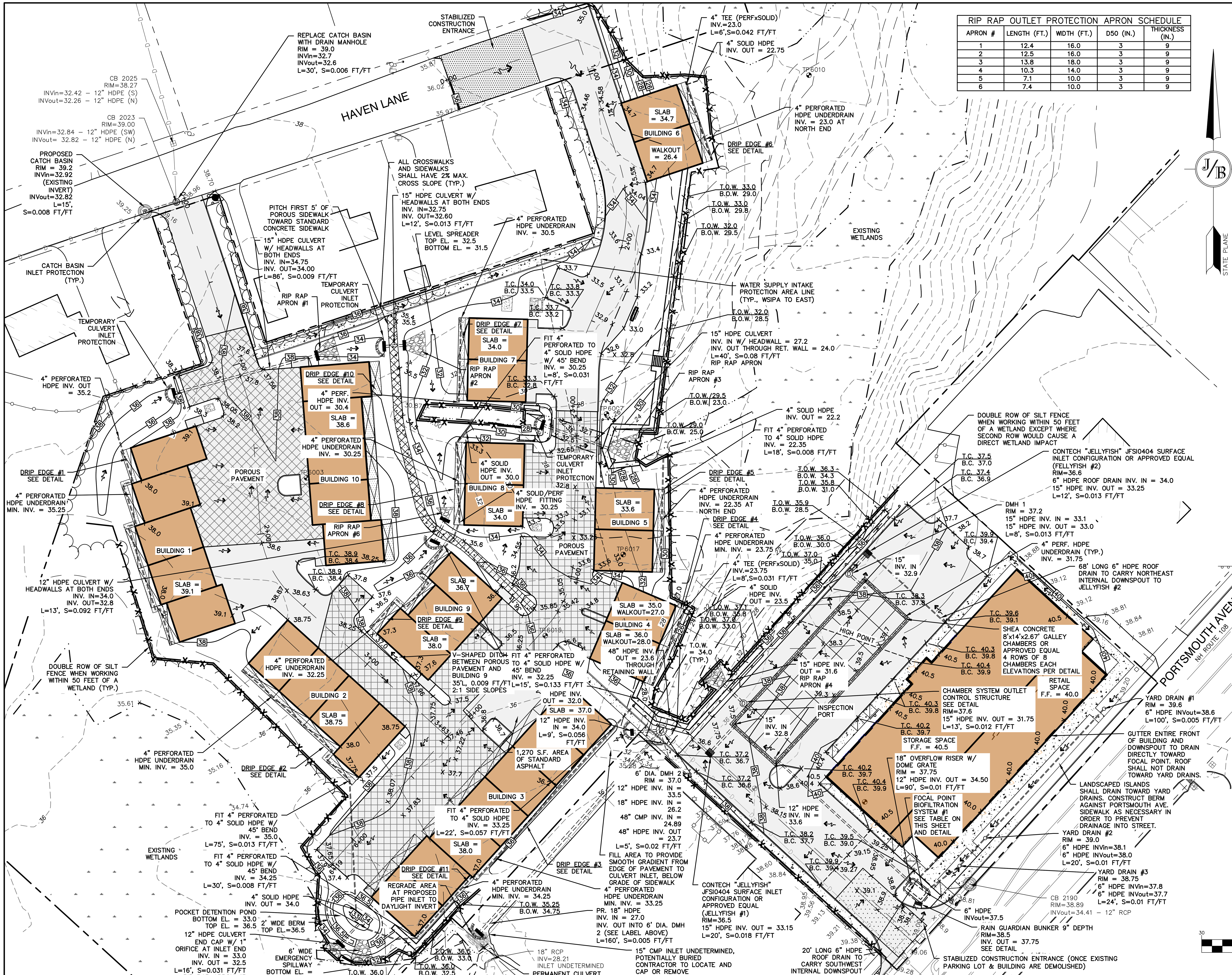
STATE OF NEW HAMPSHIRE — PAIGE S. LIBBEY No.16670 — LICENSED PROFESSIONAL ENGINEER — 03/18/2025

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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:	SITE PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
C2
SHEET 6 OF 31
JBE PROJECT NO. 24029



RIP RAP OUTLET PROTECTION APRON SCHEDULE				
APRON #	LENGTH (FT.)	WIDTH (FT.)	D50 (IN.)	THICKNESS (IN.)
1	12.4	16.0	3	9
2	12.5	16.0	3	9
3	13.8	18.0	3	9
4	10.3	14.0	3	9
5	7.1	10.0	3	9
6	7.4	10.0	3	9

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 SHOULD 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 EXTERIOR ROOF DOWNSPOUTS ARE TO BE INSTALLED WITH OVERFLOW DEVICES.
7. ALL SWALES AND DETENTION PONDS ARE TO BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
8. PROPOSED RIM ELEVATIONS OF DRAINAGE STRUCTURES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES.
9. ALL SWALES AND ANY SLOPES GREATER THAN 3:1 SHALL BE STABILIZED WITH NORTH AMERICAN GREEN SC150BN EROSION CONTROL BLANKETS (OR AN EQUIVALENT APPROVED IN WRITING BY THE ENGINEER), UNLESS OTHERWISE SPECIFIED.
10. ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS. CATCH BASINS SHALL HAVE 3' DEEP SUMPS WITH GREASE HOODS, UNLESS OTHERWISE NOTED.
11. ALL DRAINAGE STRUCTURES SHALL BE PRECAST, UNLESS OTHERWISE SPECIFIED. SEE DRAINAGE DETAILS ON DETAIL SHEETS.
12. ALL DRAINAGE STRUCTURES AND STORMWATER PIPES SHALL MEET HEAVY DUTY TRAFFIC H20 LOADING AND SHALL BE INSTALLED ACCORDINGLY.
13. IMMEDIATELY APPLY AND COMPACT STONE BASE FOR BUILDING PAD TO +/-½" PRIOR TO EXCAVATING INTERIOR AND PERIMETER FOOTINGS.
14. 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.
15. ALL DRAINAGE PIPE SHALL BE NON-PERFORATED ADS N-12 OR APPROVED EQUAL, UNLESS OTHERWISE NOTED.
16. STONE INLET PROTECTION SHALL BE PLACED AT ALL CATCH BASINS. SEE DETAIL WITHIN THE DETAIL SHEETS.
17. 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.
18. ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 3 DAYS OF FINAL GRADING AND ANYTIME CONSTRUCTION STOPS FOR LONGER THAN 3 DAYS.
19. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN EVENT OF 0.25" OR GREATER IN A 24 HOUR PERIOD AND AT LEAST ONCE A WEEK.
20. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE, AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
21. CONSTRUCTION VEHICLES SHALL UTILIZE THE STABILIZED CONSTRUCTION ENTRANCE TO THE EXTENT POSSIBLE THROUGHOUT CONSTRUCTION.
22. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
23. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
24. SEDIMENT SHALL BE REMOVED FROM ALL SEDIMENT BASINS BEFORE THEY ARE 25% FULL.
25. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
26. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED, IF DEEMED NECESSARY BY ON-SITE INSPECTION BY ENGINEER AND/OR REGULATORY OFFICIALS.
27. SEE ALSO EROSION AND SEDIMENT CONTROL SPECIFICATIONS ON SHEET E1.
28. TOTAL DISTURBANCE = 166,000 S.F.

FOCAL POINT SCHEDULE							
FOCAL POINT	BOTTOM SIZE	SIDE SLOPES	BERM EL.	TOP OF FILTER COURSE	BOTTOM OF FILTER COURSE	R-TANK UNDERDRAIN INVERT
1	5' X 10'	3:1	38.25	37.50	35.25	34.50

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM | Draft: KDR | Date: 3/15/24
Checked: PSL | Scale: AS SHOWN | Project No.: 24029
Drawing Name: 24029-PLAN.dwg

STATE OF NEW HAMPSHIRE — PAIGE S. LIBBEY No.16670 — LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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: GRADING AND DRAINAGE PLAN
Project: "LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC, 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
C3

LEGEND:

- LIMITED USE BUFFER TEMPORARY IMPACT = 3,550 S.F.
  (1,000 S.F. IN VERY POORLY DRAINED BUFFER; 2,550 S.F. IN POORLY DRAINED BUFFER)
- LIMITED USE BUFFER PERMANENT IMPACT = 2,800 S.F.
  (2,000 S.F. IN VERY POORLY DRAINED BUFFER; 800 S.F. IN POORLY DRAINED BUFFER INCLUDING 710 S.F. POROUS PAVEMENT)
- TEMPORARY IMPACT BETWEEN LIMITED USE BUFFER AND PARKING/STRUCTURE SETBACK LINE = 7,450 S.F.
  (4,500 S.F. IN VERY POORLY DRAINED BUFFER; 2,950 S.F. IN POORLY DRAINED BUFFER)
- PERMANENT IMPACT BETWEEN LIMITED USE BUFFER AND PARKING/STRUCTURE SETBACK LINE = 12,500 S.F.
  (5,150 S.F. IN VERY POORLY DRAINED BUFFER; 7,350 S.F. IN POORLY DRAINED BUFFER INCLUDING 1,550 S.F. POROUS PAVEMENT)
- DIRECT WETLAND IMPACT = 1,050 S.F.
  (300 S.F. POROUS PAVEMENT; 120 S.F. IMPERVIOUS SURFACE; 630 S.F. PERVIOUS SURFACE)

TOTAL AREA OF LIMITED USE BUFFER = 82,800 S.F.
6,350 S.F. = 7.7% IMPACTED

TOTAL AREA BETWEEN LIMITED USE BUFFER & PARKING/STRUCTURE SETBACK LINES = 37,000 S.F.
19,950 S.F. = 53.9% IMPACTED

STATE PLANE

GRAPHIC SCALE

(IN FEET)
1 inch = 30 feet

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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 – PAIGE S. LIBBEY No.16670 – LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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

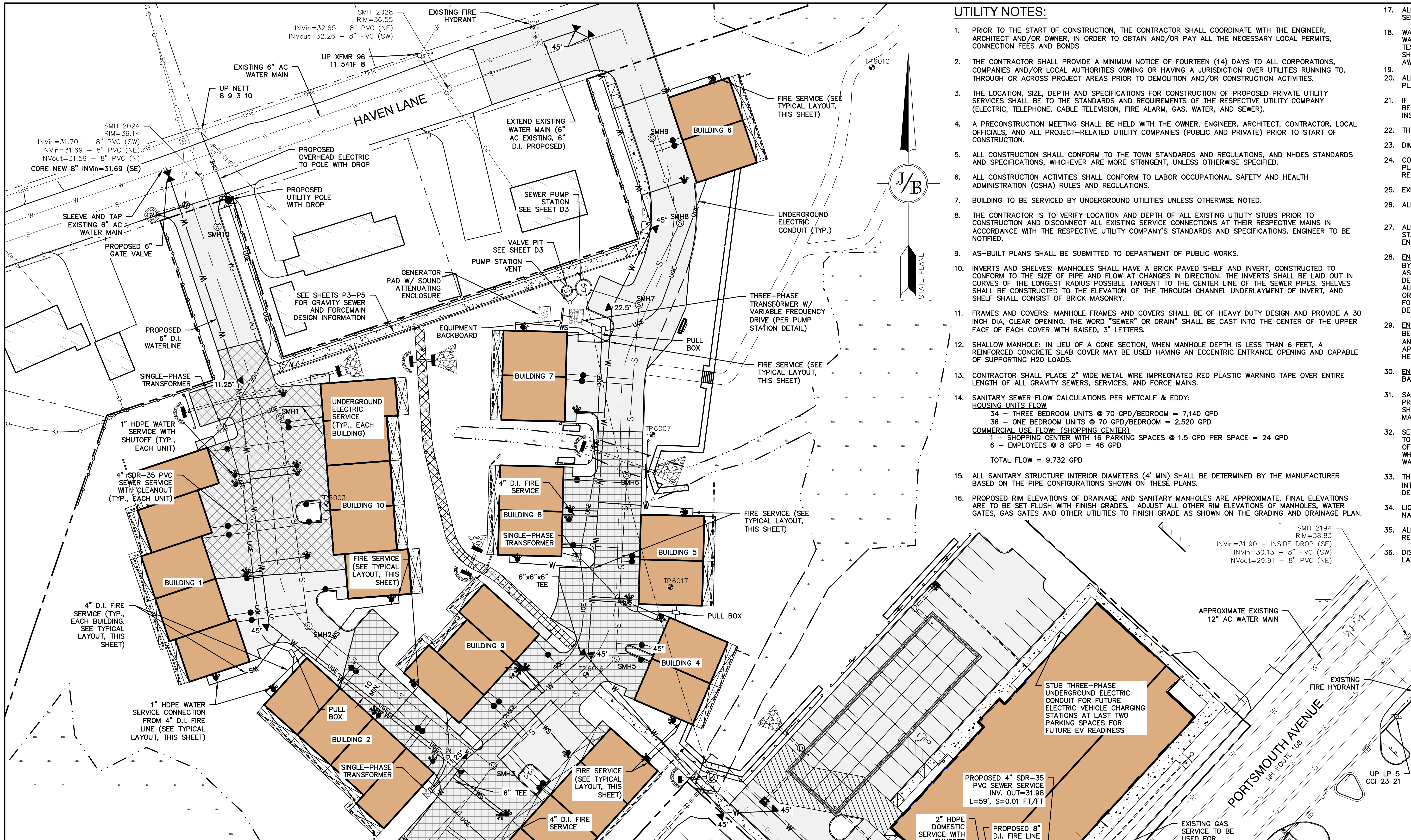
Plan Name: WETLAND AND BUFFER IMPACT PLAN

Project: "LILAC PLACE"
76 PORTSMOUTH AVE, EXETER, NH

Owner of Record: RAP REALTY MANCHESTER LLC
50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
WB1

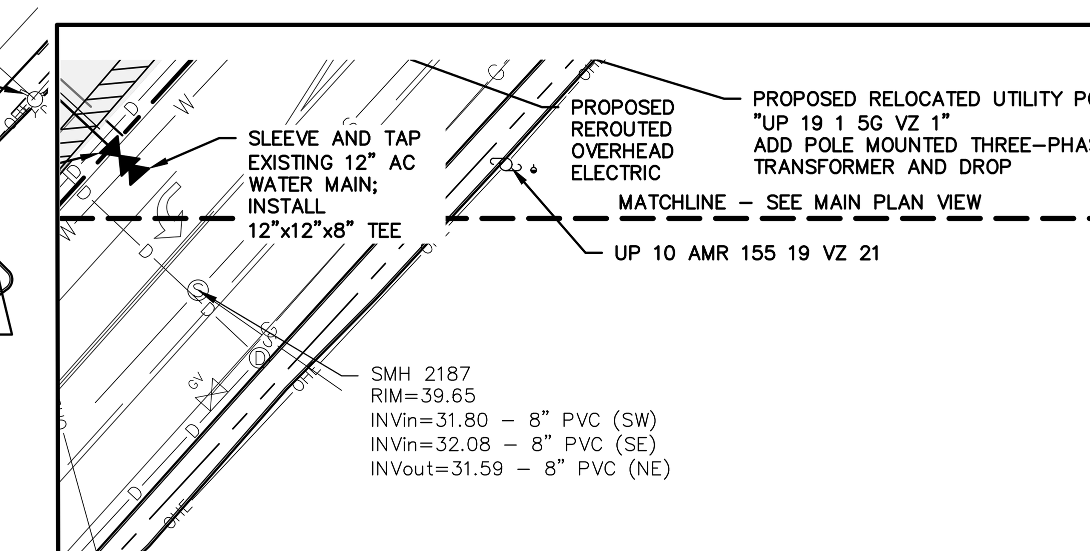
SHEET 8 OF 31
JBE PROJECT NO. 24029



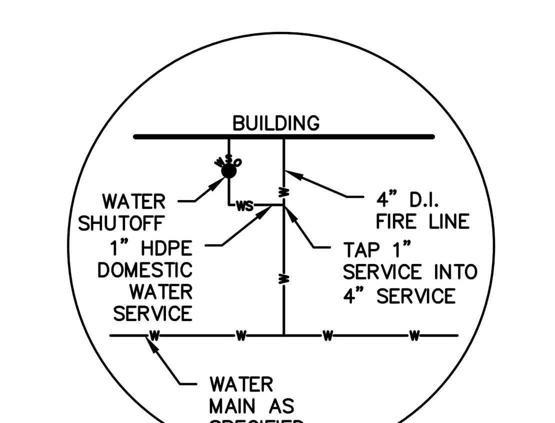
UTILITY NOTES:

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, FIRE ALARM, GAS, 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 TOWN 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. BUILDING TO BE SERVICED BY UNDERGROUND UTILITIES UNLESS OTHERWISE NOTED.
8. THE CONTRACTOR IS TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITY STUBS PRIOR TO CONSTRUCTION AND DISCONNECT ALL EXISTING SERVICE CONNECTIONS AT THEIR RESPECTIVE MAINS IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY'S STANDARDS AND SPECIFICATIONS. ENGINEER TO BE NOTIFIED.
9. AS–BUILT PLANS SHALL BE SUBMITTED TO DEPARTMENT OF PUBLIC WORKS.
10. 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.
11. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30 INCH DIA, CLEAR OPENING. THE WORD "SEWER" OR DRAIN" SHALL BE CAST INTO THE CENTER OF THE UPPER FACE OF EACH COVER WITH RAISED, 3" LETTERS.
12. 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.
13. CONTRACTOR SHALL PLACE 2" WIDE METAL WIRE IMPREGNATED RED PLASTIC WARNING TAPE OVER ENTIRE LENGTH OF ALL GRAVITY SEWERS, SERVICES, AND FORCE MAINS.
14. SANITARY SEWER FLOW CALCULATIONS PER METCALF & EDDY:
    HOUSING UNITS FLOW
    34 – THREE BEDROOM UNITS @ 70 GPD/BEDROOM = 7,140 GPD
    36 – ONE BEDROOM UNITS @ 70 GPD/BEDROOM = 2,520 GPD
    COMMERCIAL USE FLOW: (SHOPPING CENTER)
    1 – SHOPPING CENTER WITH 16 PARKING SPACES @ 1.5 GPD PER SPACE = 24 GPD
    6 – EMPLOYEES @ 8 GPD = 48 GPD

    TOTAL FLOW = 9,732 GPD
15. ALL SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS.
16. PROPOSED RIM ELEVATIONS OF DRAINAGE AND SANITARY MANHOLES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES. ADJUST ALL OTHER RIM ELEVATIONS OF MANHOLES, WATER GATES, GAS GATES AND OTHER UTILITIES TO FINISH GRADE AS SHOWN ON THE GRADING AND DRAINAGE PLAN.
17. 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.
18. 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.
19.
20. 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.
21. IF THE BUILDING IS REQUIRED TO HAVE A SPRINKLER SYSTEM, A PRECONSTRUCTION MEETING SHALL BE HELD BETWEEN THE CONTRACTOR, OWNER, ARCHITECT AND THE LOCAL FIRE DEPARTMENT PRIOR TO THE INSTALLATION.
22. THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS, TEES, MECHANICAL JOINTS AND FIRE HYDRANTS.
23. DIMENSIONS ARE SHOWN TO CENTERLINE OF PIPE OR FITTING.
24. 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.
25. EXISTING UTILITIES SHALL BE DIGSAFED BEFORE CONSTRUCTION.
26. ALL WATER LINES SHOULD HAVE TESTABLE BACKFLOW PREVENTERS AT THE ENTRANCE TO EACH BUILDING.
27. 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.
28. 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.
29. ENV–WQ 704.09 FORCE MAIN AND PRESSURE SEWER TESTING: FORCE MAINS AND PRESSURE SEWERS SHALL BE TESTED IN ACCORDANCE WITH SECTION 5 OF HTE AWWA C600, "INSTALLATION OF CAST IRON WATER MAINS AND THEIR APPURTENANCES" STANDARD IN EFFECT WHEN THE TEST IS CONDUCTED, AVAILABLE AS NOTED IN APPENDIX D, AT A PRESSURE EQUAL TO THE GREATER OF 150 PERCENT OF THE DESIGN OPERATING DYNAMIC HEAD OR AT LEAST 100 PSI
30. 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.
31. 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.
32. 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.
33. 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 TOWN SEWER DEPARTMENT.
34. LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRIC CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
35. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.
36. 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



INSET (1 INCH = 30 FEET)



FIRE SERVICE LAYOUT

NOT TO SCALE

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-PLAN.dwg		

STATE OF NEW HAMPSHIRE – PAIGE S. LIBBEY No.16670 – LICENSED PROFESSIONAL ENGINEER – 02/14/2025

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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:	UTILITY PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
C4

LILAC PLACE PLANT LIST

Plants

Quantity	Botanical Name		Common Name	Size
	TREES			
13	Acer rubrum 'October Glory'	**	OCTOBER GLORY RED MAPLE	3 Inch Caliper
6	Amelanchier x grandiflora 'Robin Hill'	**	ROBIN HILL SERVICEBERRY	15 Gallon
4	Cercidiphyllum japonicum		KATSURA TREE	2.5 Inch Caliper
5	Chionanthus virginicus 'Spring Fleecing'	**	WHITE FRINGE TREE	2 Inch Caliper
6	Cornus florida f. rubra	**	PINK FLOWERING DOGWOOD	2 Inch Caliper
2	Ginkgo biloba 'Spring Grove'		SPRING GROVE GINKGO	3 Inch Caliper
13	Juniperus scopulorum 'Wichita Blue'		WICHITA BLUE MT JUNIPER	7-8 Ft. Ht.
24	Juniperus virginiana 'Emerald Sentinel™'	**	EMERALD SENTINEL RED CEDAR	7-8 Ft. Ht.
11	Liquidambar styraciflua 'Slender Silhouette'	**	SILHOUETTE SWEETGUM	3 Inch Caliper
14	Liriodendron tulipifera	**	TULIP TREE	3 Inch Caliper
16	Malus x 'Prairifire'		PRAIRIFIRE CRABAPPLE	15 Gallon
10	Picea glauca	**	WHITE SPRUCE	8-10 Ft. Ht.
13	Thuja occidentalis 'Nigra'	**	DARK AMERICAN ARBORVITAE	7-8 Ft. Ht.
17	Thuja occidentalis 'Smaragd Emerald'	**	EMERALD GREEN ARBORVITAE	6-7 Ft. Ht.
3	Tilia americana	**	AMERICAN LINDEN	3 Inch Caliper
	SHRUBS			
3	Cephalanthus occidentalis	**	BUTTONBUSH	5 Gallon
6	Clethra alnifolia	**	SUMMER SWEET	5 Gallon
6	Hydrangea paniculata 'Bobo'		BOBO PANICLE HYDRANGEA	5 Gallon
15	Ilex glabra	**	GALLBERRY HOLLY	5 Gallon
6	Ilex glabra 'Shamrock'	**	SHAMROCK INKBERRY HOLLY	5 Gallon
2	Itea virginica 'Henry's Garnet'		HENRY'S GARNET SWEETSPIRE	5 Gallon
4	Kalmia latifolia 'Raspberry Glow'	**	RASPBERRY GLOW MT LAUREL	5 Gallon
12	Myrica gale	**	SWEET GALE	3 Gallon
4	Rhododendron 'Olga Mezitt'		OLGA MEZITT RHODODENDRON	5 Gallon
9	Syringa 'Penda'		BLOOMERANG PURPLE LILAC	5 Gallon
15	Vaccinium angustifolium	**	LOWBUSH BLUEBERRY	3 Gallon
3	Viburnum dentatum 'Autumn Jazz'	**	AUTUMN JAZZ VIBURNUM	5 Gallon
	PERENNIALS			
3	Aster novae-angliae 'Purple Dome'	**	PURPLE DOME NE ASTER	1 Gallon
43	Calamagrostis x acutiflora 'Karl Foerster'		KARL FOERSTER REED GRASS	2 Gallon
14	Hemerocallis 'Happy Returns'		HAPPY RETURNS DAYLILY	1 Gallon
1	Iris sibirica 'Caesar's Brother'		CAESAR'S BROTHER IRIS	1 Gallon
19	Miscanthus sinensis 'Morning Light'		MORNING LIGHT MAIDEN GRASS	2 Gallon
13	Panicum virgatum 'Heavy Metal'	**	HEAVY METAL SWITCH GRASS	2 Gallon
37	Pennisetum alopecuroides 'Hamelin'		HAMELIN FOUNTAIN GRASS	1 Gallon
2	Rudbeckia fulgida var. 'Goldsturm'		GOLDSTURM CONEFLOWER	1 Gallon
13	Sedum 'Autumn Joy'		AUTUMN JOY SEDUM	1 Gallon

Note ** Denotes plant species native to North East region.

PLANT CONTAINER SIZES AND VARIETIES MAY VARY BASE ON AVAILABILITY.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

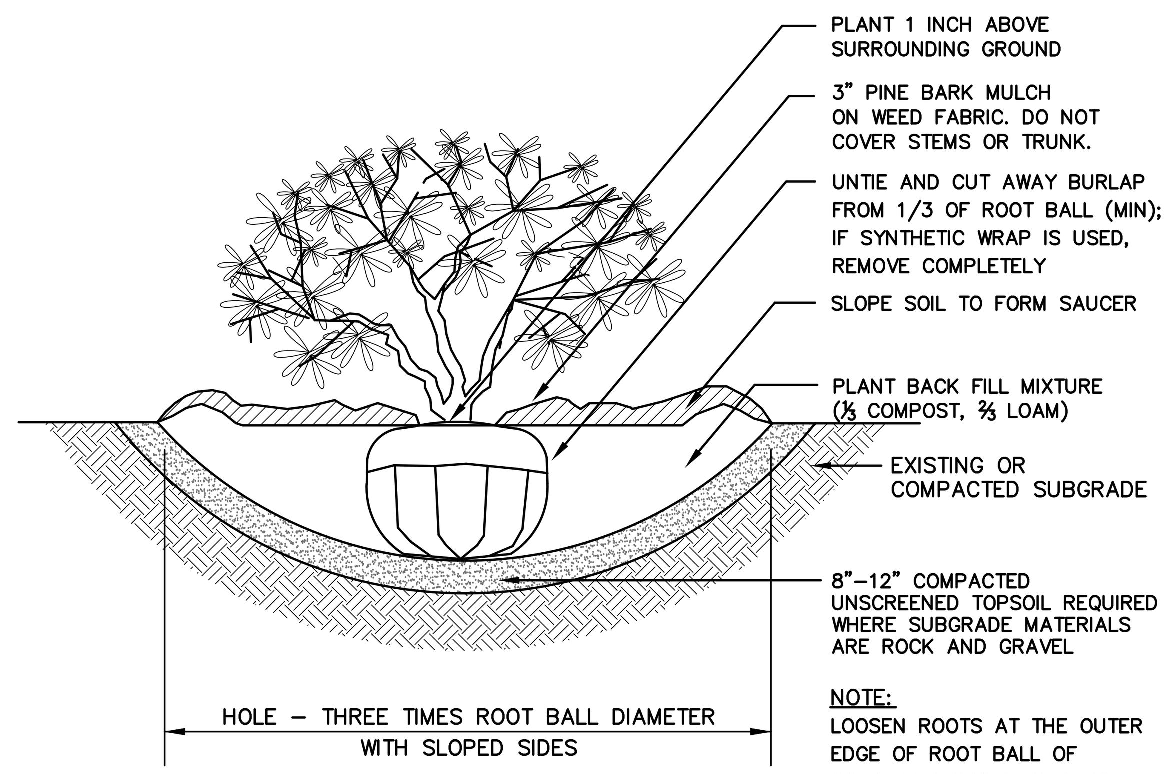
DESIGN: LMM	DRAFT: LMM	DATE: 11/ 5/ 2024
	SCALE: 1"=30'-0"	PROJECT NO: 24029
DRAWING NAME: 24029 LILAC PLACE L-1		

REV.	DATE	REVISION	BY
2	2/12/25	LANDSCAPE PLAN REVISED BUILDING LAYOUT & WALKWAY	
1	1/9/25	LANDSCAPE PLAN FOR COM COMM	LMM

LANDSCAPE DESIGN BY:
LM Land Design, LLC
11 South Road
Brentwood, NH 03833
LMLandDesign.com
Member APLD
AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS
603-770-7728

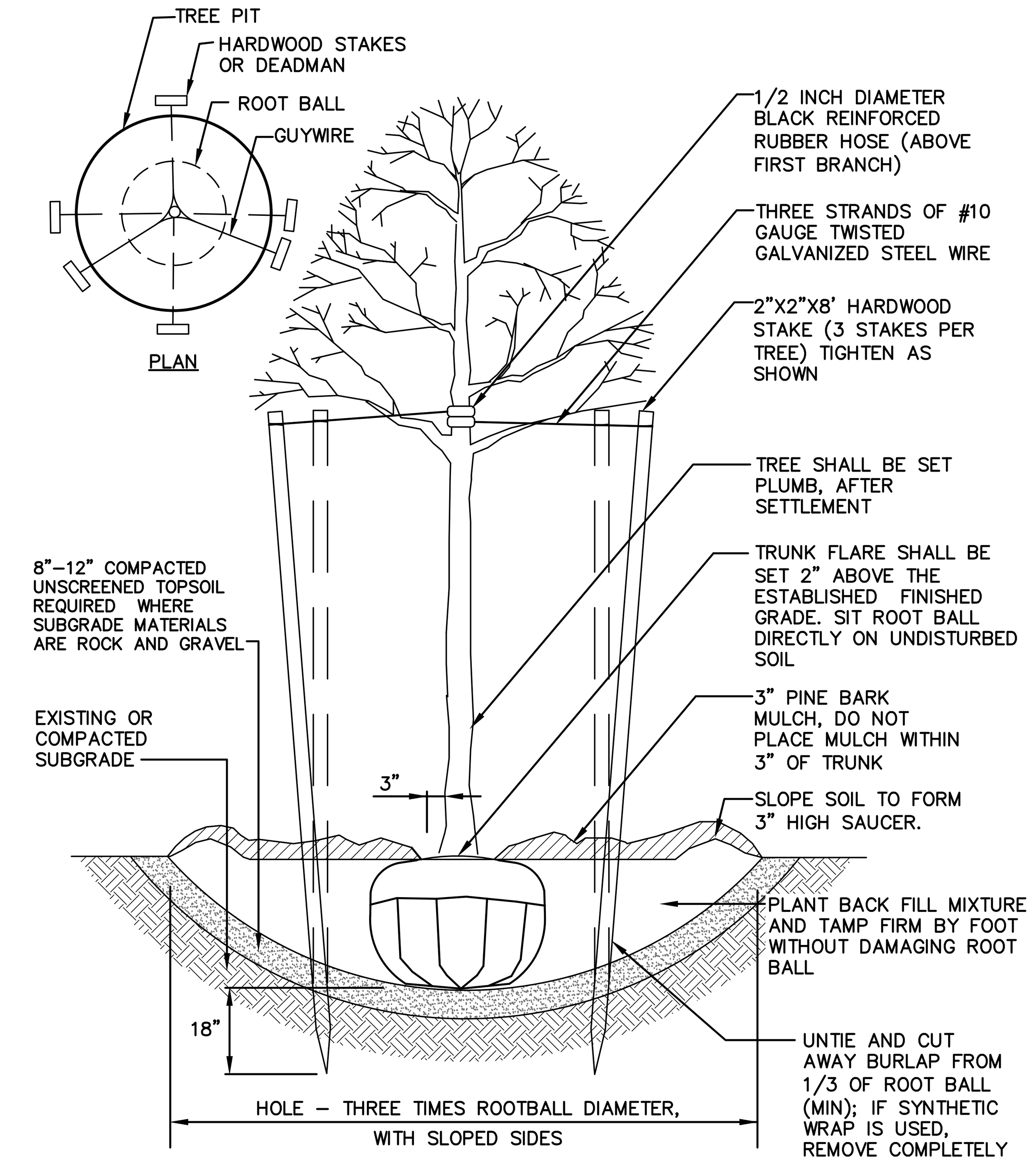
Plan Name: LANDSCAPE PLAN
Project: LILAC PLACE
76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC
50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
L-1
JBE PROJECT NO. 24029



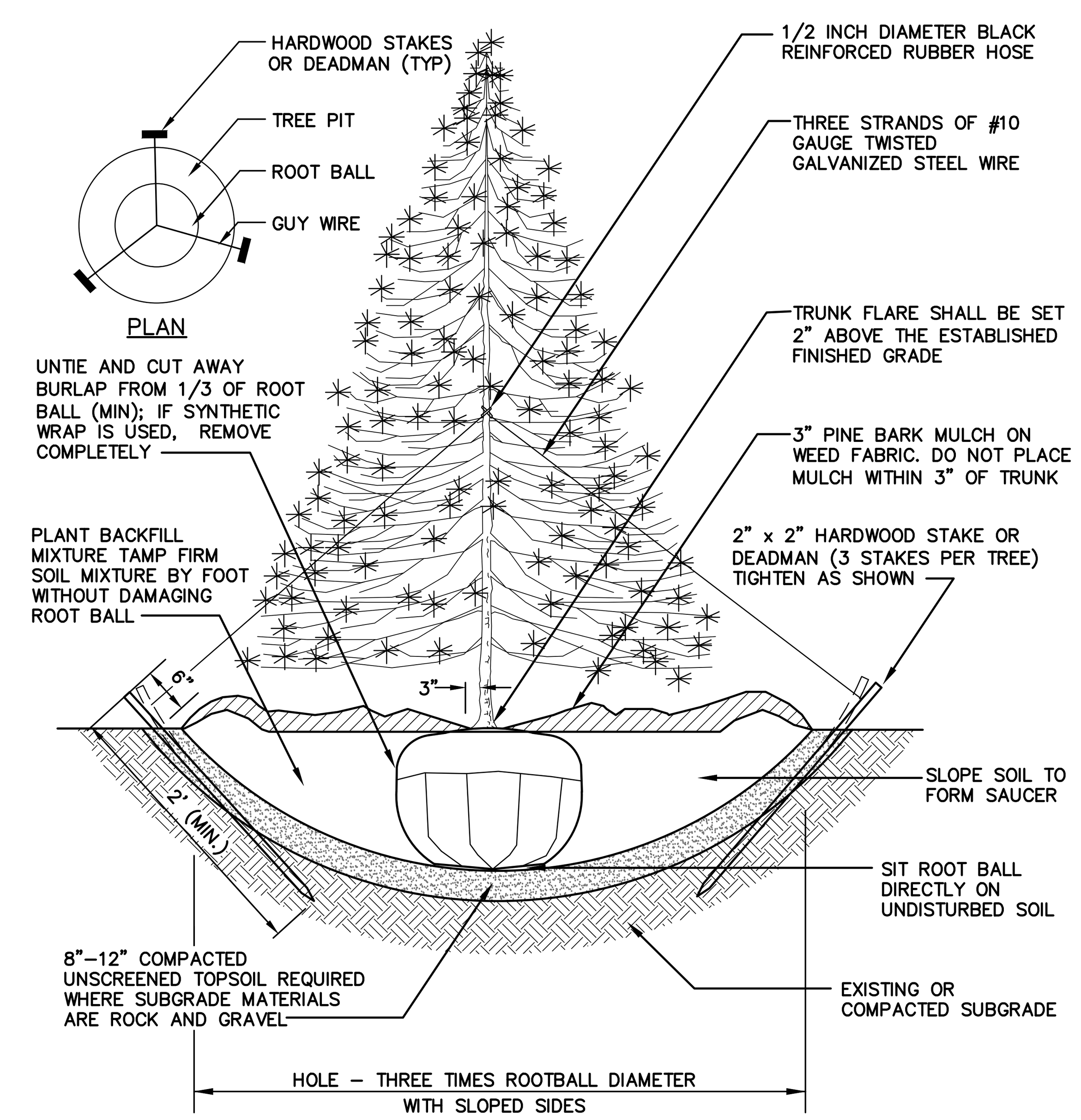
SHRUB PLANTING

NOT TO SCALE



TREE PLANTING (FOR TREES UNDER 4" CALIPER)

NOT TO SCALE



EVERGREEN PLANTING

NOT TO SCALE

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. ALL PLANT SUBSTITUTIONS MUST BE APPROVED THE LANDSCAPE ARCHITECT.
5. ALL PLANT MATERIALS SHALL BE EXACTLY AS SPECIFIED BY THE LANDSCAPE ARCHITECT. IF PLANT SPECIES CULTIVARS ARE FOUND TO VARY FROM THAT SPECIFIED AT ANY TIME DURING THE GUARANTEE PERIOD, THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO HAVE THE CONTRACTOR REPLACE THAT PLANT MATERIAL.
6. 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.
7. 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.
8. NO PLANT SHALL BE PUT IN THE GROUND BEFORE GRADING HAS BEEN FINISHED AND APPROVED BY THE LANDSCAPE ARCHITECT.
9. ALL WORK AND PLANTS SHALL BE DONE, INSTALLED AND DETAILED IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
10. 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.
11. ALL PLANTS SHALL BE GUARANTEED BY THE CONTRACTOR FOR NOT LESS THAN ONE FULL YEAR FROM THE TIME OF PROVISIONAL ACCEPTANCE. DURING THIS TIME, THE OWNER SHALL MAINTAIN ALL PLANT MATERIALS IN THE ABOVE MANNER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE PLANTS TO ENSURE PROPER CARE. IF THE CONTRACTOR IS DISSATISFIED WITH THE CARE GIVEN, HE SHALL IMMEDIATELY, AND IN SUFFICIENT TIME TO PERMIT THE CONDITION TO BE RECTIFIED, NOTIFY THE LANDSCAPE ARCHITECT IN WRITING OR OTHERWISE FORFEIT HIS CLAIM.
12. FINAL ACCEPTANCE BY THE LANDSCAPE ARCHITECT WILL BE MADE UPON THE CONTRACTOR'S REQUEST AFTER ALL CORRECTIVE WORK HAS BEEN COMPLETED.
13. BY THE END OF THE GUARANTEE PERIOD, THE CONTRACTOR SHALL HAVE REPLACED ANY PLANT MATERIAL THAT IS MISSING, NOT TRUE TO SIZE AS SPECIFIED, THAT HAS DIED, LOST NATURAL SHAPE DUE TO DEAD BRANCHES, EXCESSIVE PRUNING OR INADEQUATE OR IMPROPER CARE, OR THAT IS, IN THE OPINION OF THE LANDSCAPE ARCHITECT, IN UNHEALTHY OR UNSIGHTLY CONDITION.
14. 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.
15. FINISHED GRADES IN LANDSCAPED ISLANDS SHALL BE INSTALLED SO THAT THEY ARE 1" HIGHER THAN THE TOP OF THE SURROUNDING CURB.
16. ALL LANDSCAPING SHALL MEET THE TOWN STANDARDS AND REGULATIONS.
17. 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.
18. 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.
19. THIS PLAN IS INTENDED FOR LANDSCAPING PURPOSES ONLY. REFER TO CIVIL/SITE DRAWINGS FOR OTHER SITE CONSTRUCTION INFORMATION.
20. IRRIGATION PIPING SYSTEM SHALL BE REVIEWED AND APPROVED BY OWNER AND ENGINEER PRIOR TO INSTALLATION.
21. FOCAL POINT STORMWATER TREATMENT AREAS TO BE PLANTED WITH PERENNIAL GRASSES, CONEFLOWERS, DAYLILIES, BUTTERFLY MILKWEED, BEE BALM, BLUE FLAG IRIS, AND JOE PYE WEED. PLANT IN RANDOM GROUPINGS OF 10–12 PLANTS APPROXIMATELY 3 FEET ON CENTER.

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-PLAN.dwg		

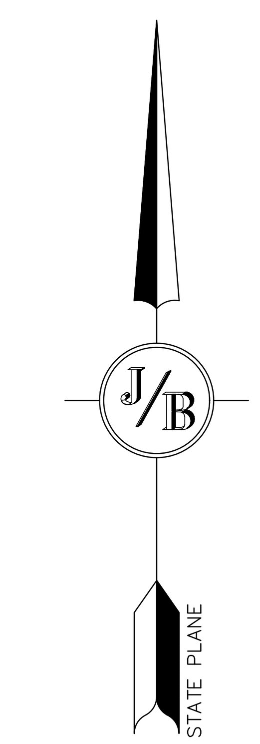
REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

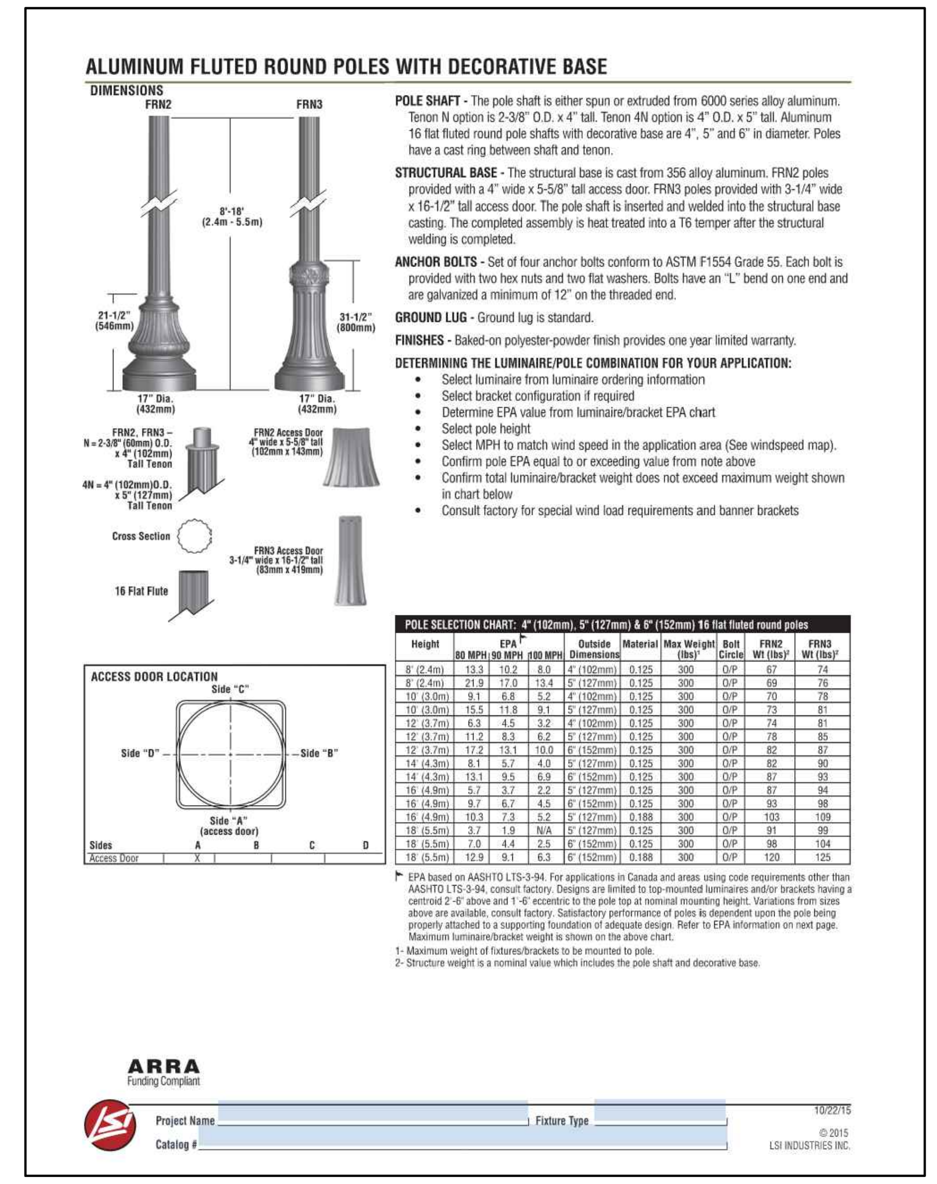
Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

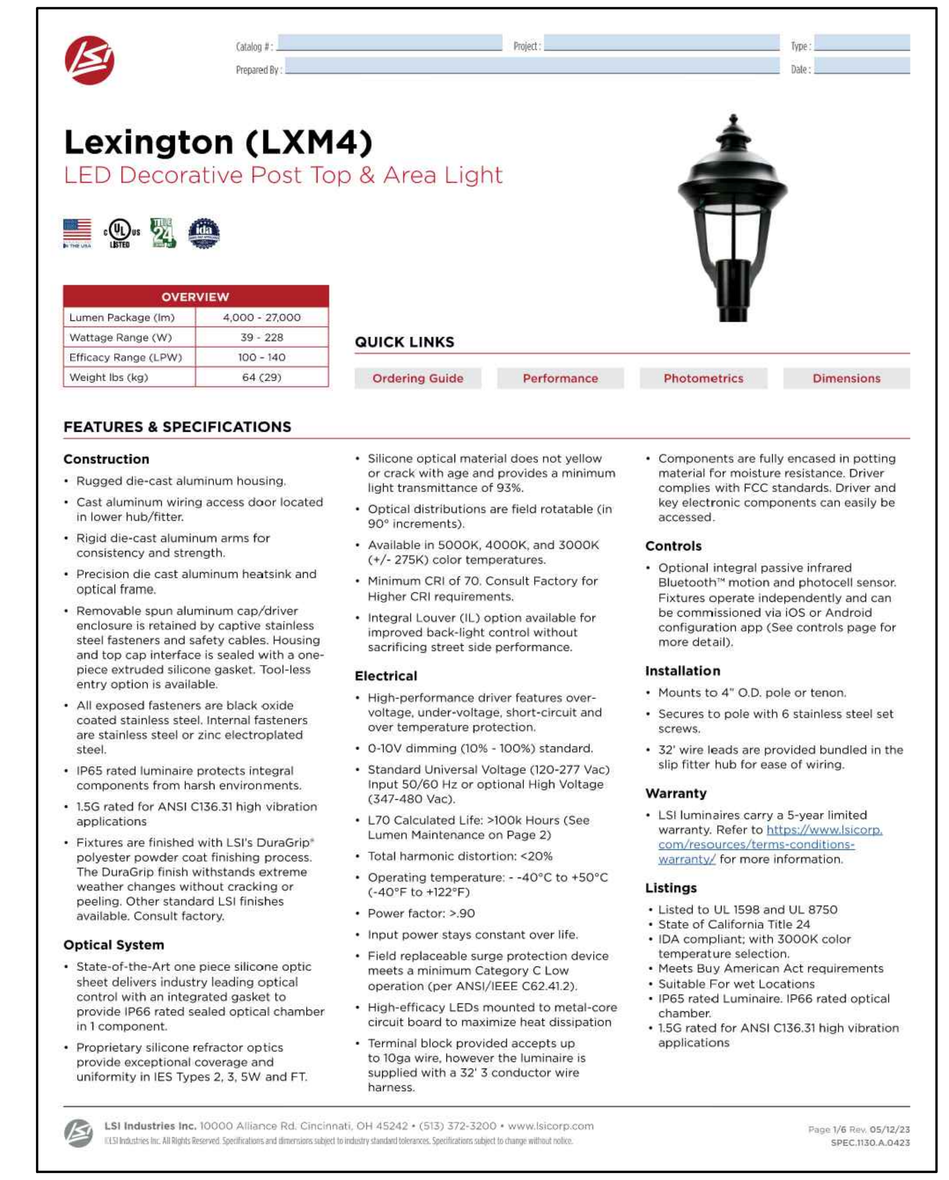
Plan Name:	LANDSCAPE PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

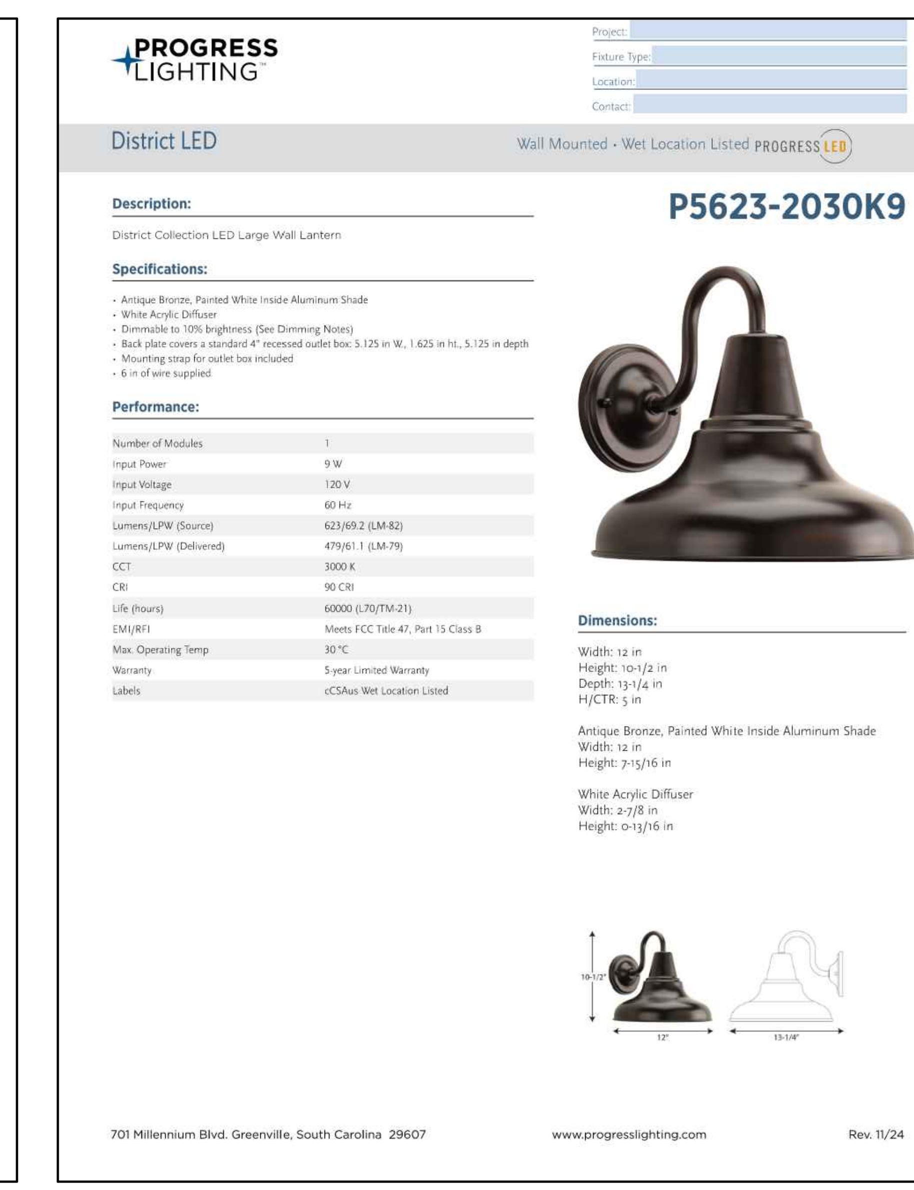
DRAWING No.

L2









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. NL INDICATES THAT THIS LUMINAIRE SHALL BE ON A NIGHT LIGHT CIRCUIT. FL INDICATES THAT THIS LUMINAIRE SHALL BE A FLOOD LIGHT FIXTURE. THESE DESIGNATIONS INDICATE WHAT PHASE LIGHTS ARE WIRED TO (TYP).
9. THE PROPOSED LIGHTING CALCULATIONS AND DESIGN WAS PERFORMED BY EXPOSURE LIGHTING, 501 ISLINGTON STREET, UNIT 1A, PORTSMOUTH, NH 03801, ATTENTION KEN SWEENEY. ALL LIGHTS SHOULD BE PURCHASED FROM THIS COMPANY, OR AN EQUAL LIGHTING DESIGN SHOULD BE SUBMITTED FOR REVIEW IF EQUAL SUBSTITUTIONS ARE PROPOSED BY THE CONTRACTOR OR OWNER.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 feet

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Description	Tag	[MANUFAC]
	6	C	Single	REL41120SRRWH-3500K	CANOPY MOUNTED, COMMERCIAL	NICOR,Inc.
	6	S3	Single	LXM4-PT-3-LED-10L-30-UNV-BLK-ALBCS1-IL / 4FRN2-A125-12-4N-BLK	12' POLE	LSI INDUSTRIES, INC.
	3	S4	Single	LXM4-PT-FT-LED-10L-30-UNV-BLK-ALBCS1-IL / 4FRN2-A125-12-4N-BLK	12' POLE	LSI INDUSTRIES, INC.
	65	W	Single	P5623-2030K9	WALL MOUNTED, RESIDENTIAL	PROGRESS
	3	W1	Single	XWS-LED-06L-SIL-FT-UNV-DIM-30-70CRI-ALBM1LR-BLK	WALL MOUNTED 12' AFG, COMMERCIAL	LSI INDUSTRIES, INC.
	1	W2	Single	XWS-LED-02L-SIL-2-UNV-DIM-30-70CRI-ALBMR1LR-BLK	WALL MOUNTED12' AFG, COMMERCIAL	LSI INDUSTRIES, INC.

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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 – PAIGE S. LIBBEY No.16670 – LICENSED PROFESSIONAL ENGINEER – 02/14/2025

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

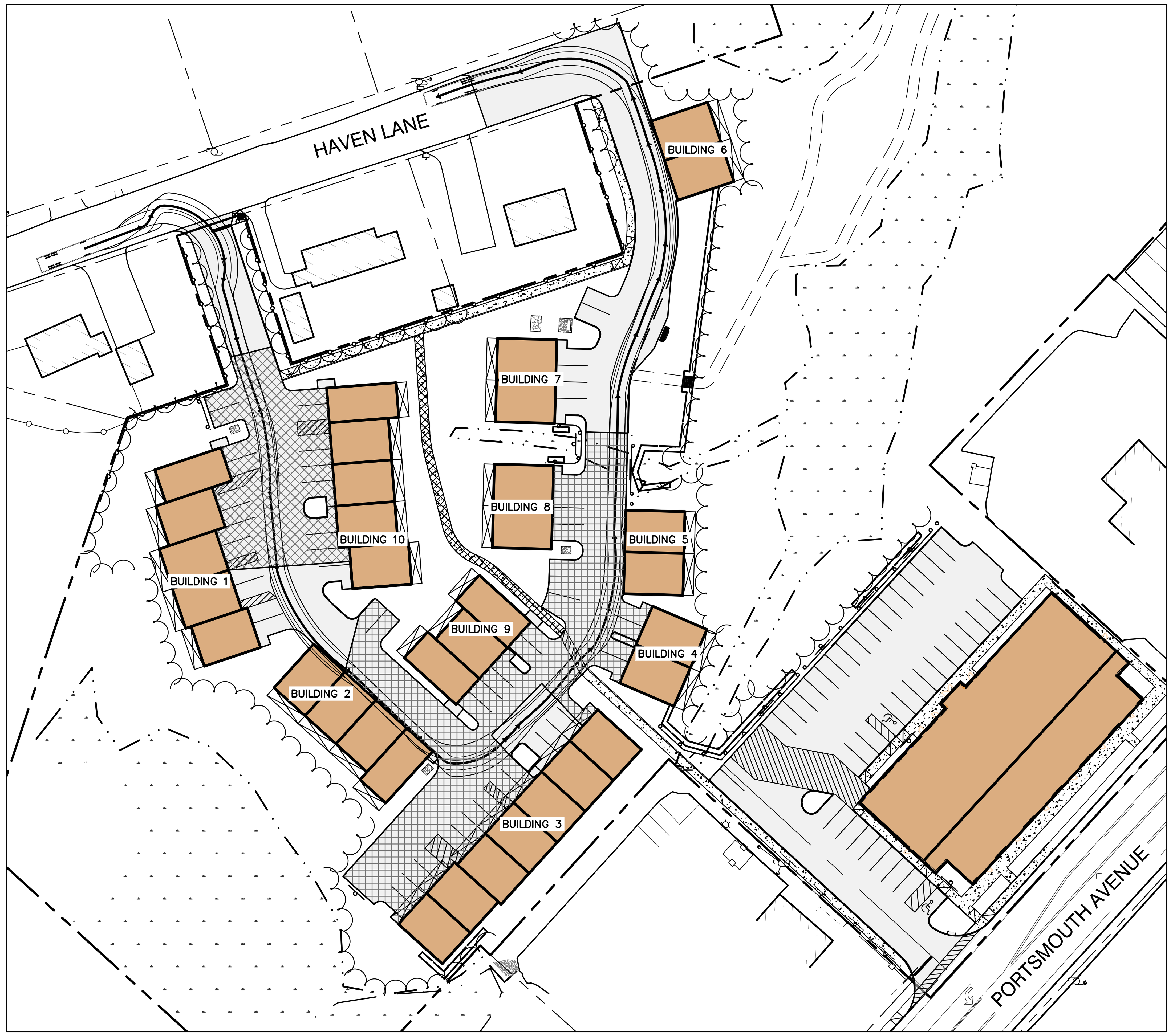
Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

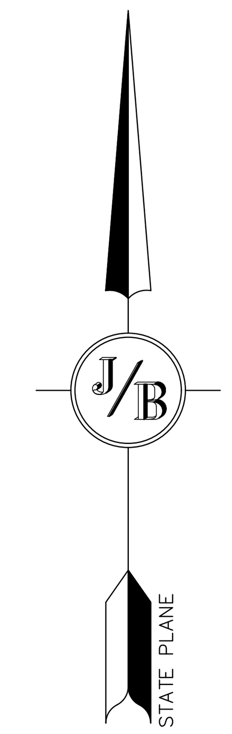
Plan Name: LIGHTING PLAN

Project: "LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH

Owner of Record: RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
L3
SHEET 12 OF 31
JBE PROJECT NO. 24029



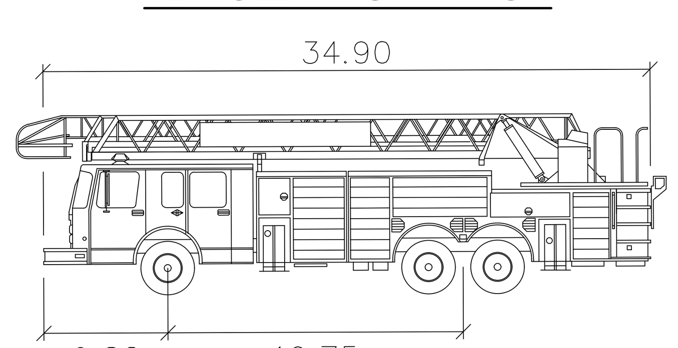


GRAPHIC SCALE

-50 0 25 50 100 200

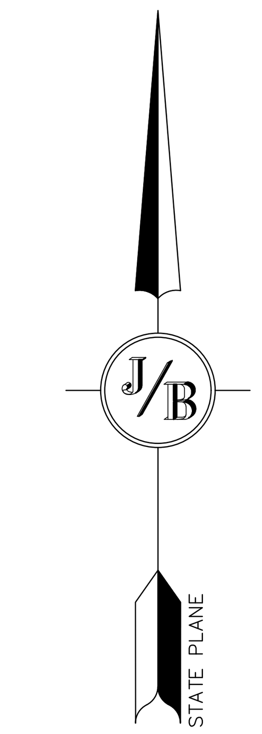
(IN FEET)
1" = 50'

VEHICLE INFORMATION



Exeter Fire Trucks

Width	: 8.50
Track	: 6.50
Lock to Lock Time	: 6.00
Steering Angle	: 33.90

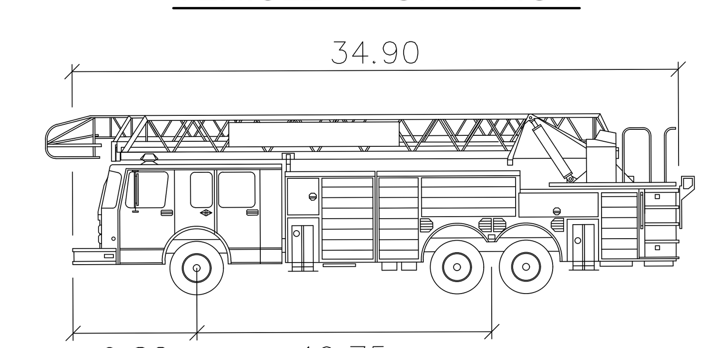


GRAPHIC SCALE

-50 0 25 50 100 200

(IN FEET)
1" = 50'

VEHICLE INFORMATION



Exeter Fire Trucks

Width : 8.50
Track : 6.50
Lock to Lock Time : 6.00
Steering Angle : 33.90

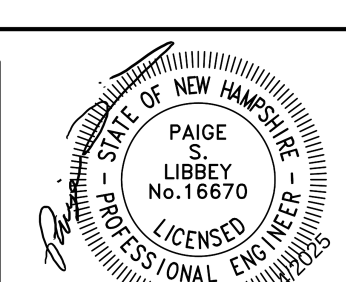
PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM | Draft: KDR | Date: 3/15/24
Checked: PSL | Scale: AS SHOWN | Project No.: 24029
Drawing Name: 24029-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.

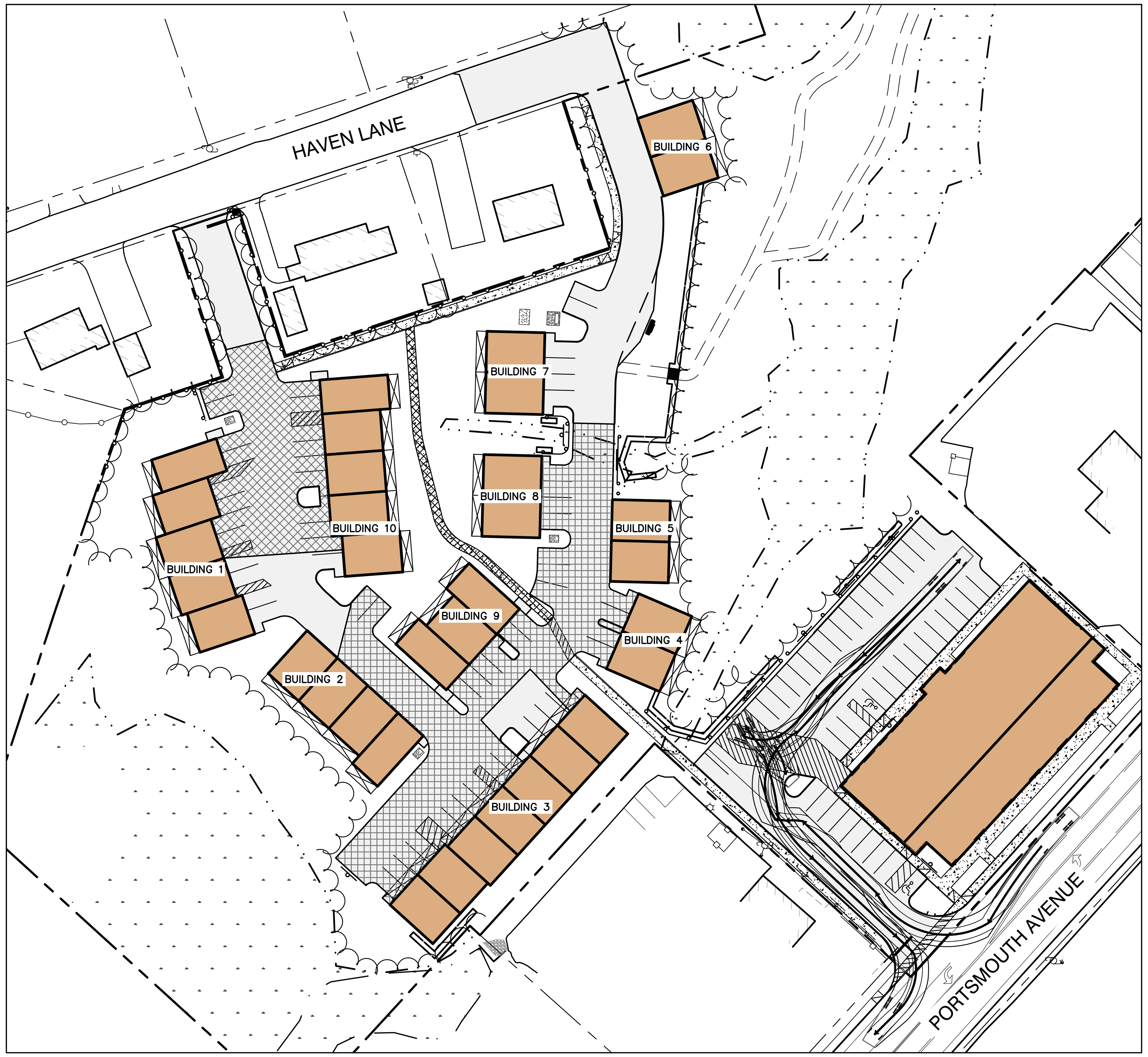


REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

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: TRUCK TURNING PLAN
Project: "LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC, 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
T1
SHEET 13 OF 31
JBE PROJECT NO. 24029

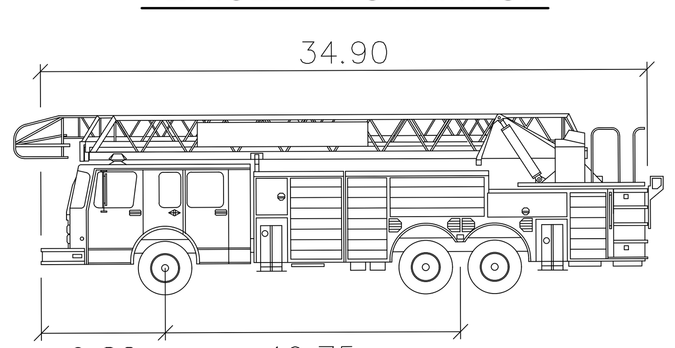


GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 feet

VEHICLE INFORMATION



Exeter Fire Trucks

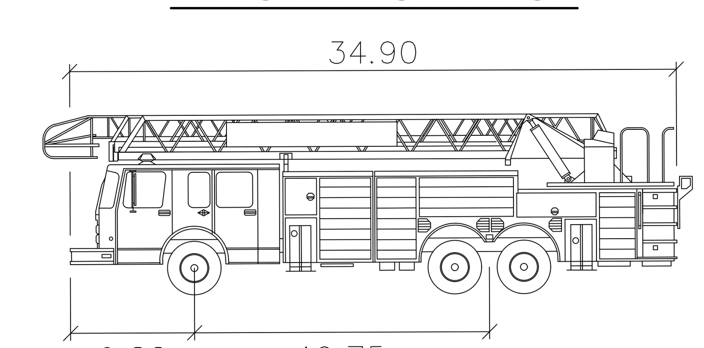
Width	:	8.50
Track	:	6.50
Lock to Lock Time	:	6.00
Steering Angle	:	33.90

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 feet

VEHICLE INFORMATION



Exeter Fire Trucks

Width	:	8.50
Track	:	6.50
Lock to Lock Time	:	6.00
Steering Angle	:	33.90

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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.

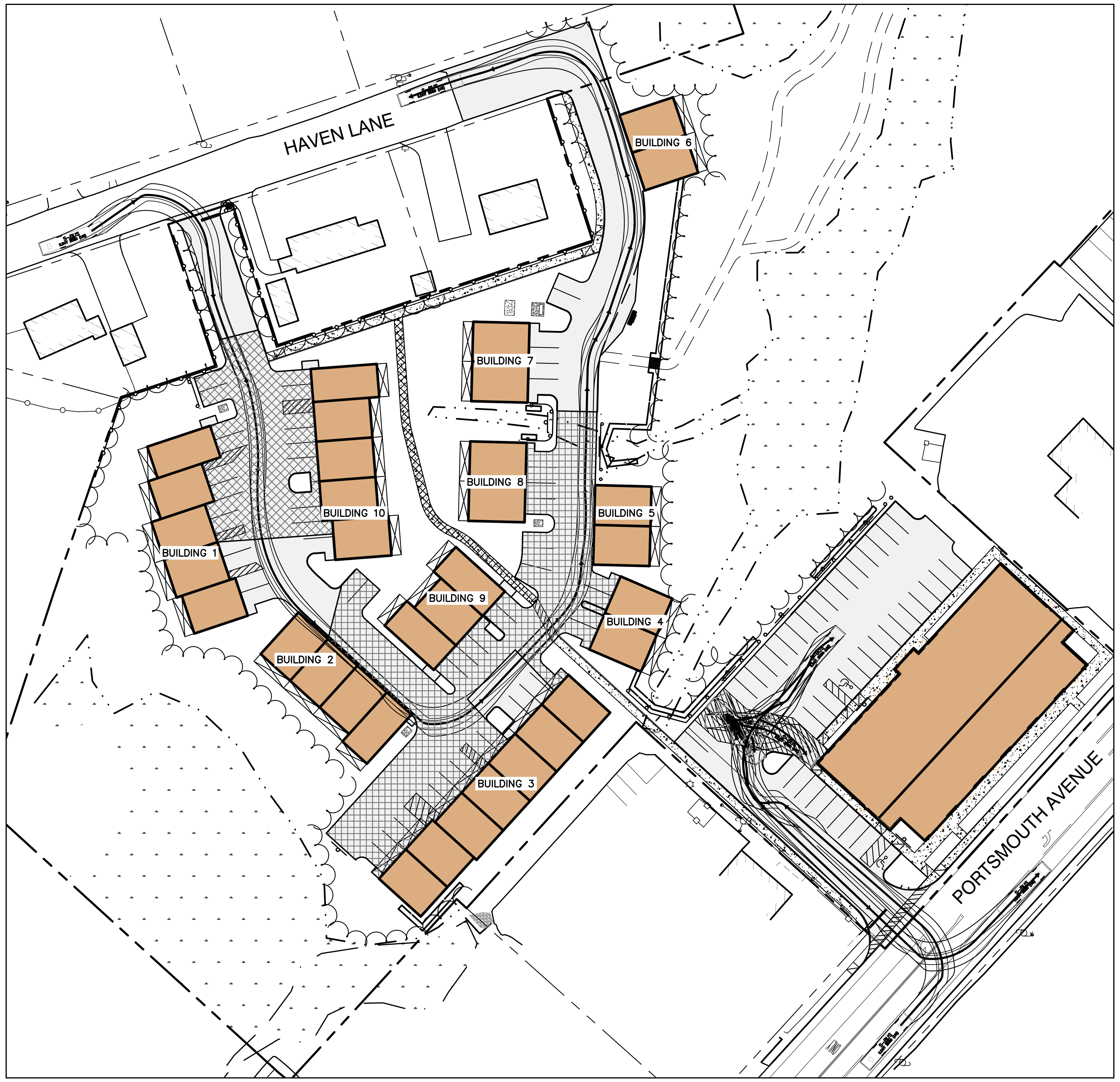
STATE OF NEW HAMPSHIRE
PAIGE S. LIBBEY
No.16670
LICENSED PROFESSIONAL ENGINEER
03/14/2025

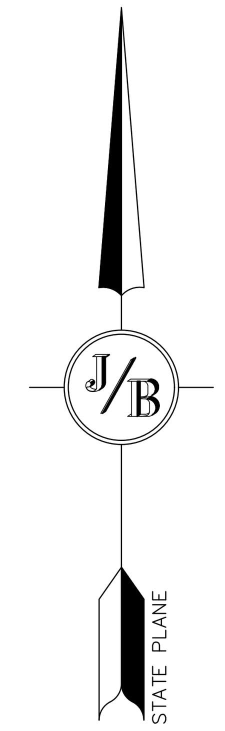
REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

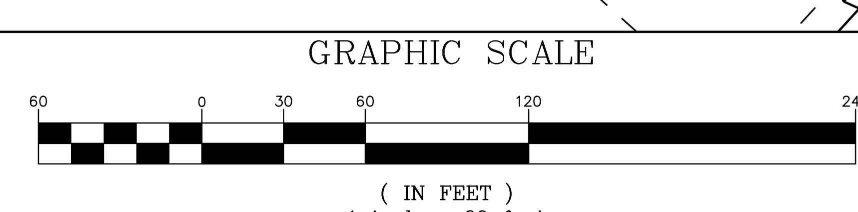
Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	TRUCK TURNING PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

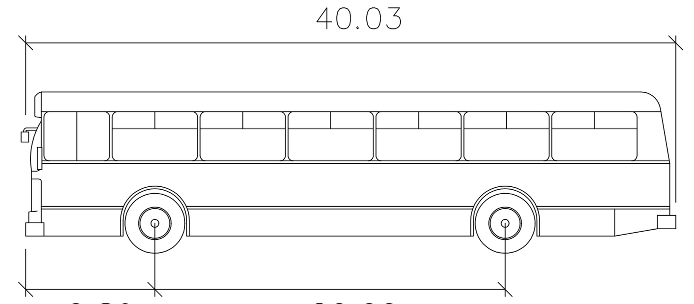
DRAWING No.
T2
SHEET 14 OF 31
JBE PROJECT NO. 24029





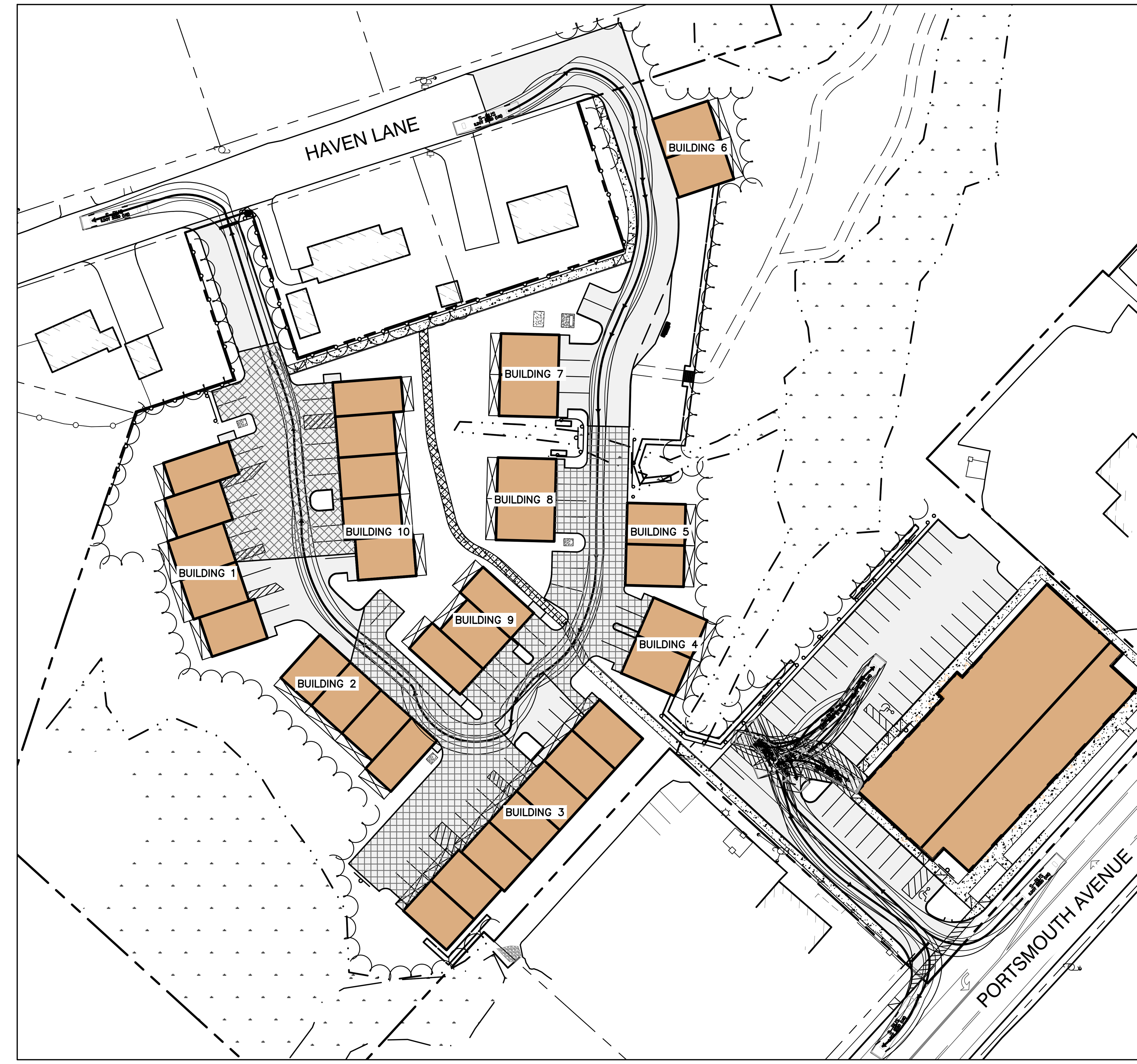


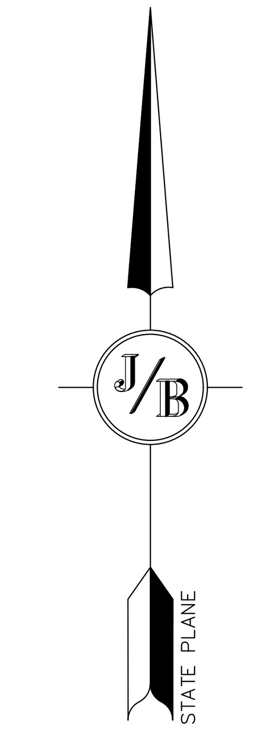
VEHICLE INFORMATION

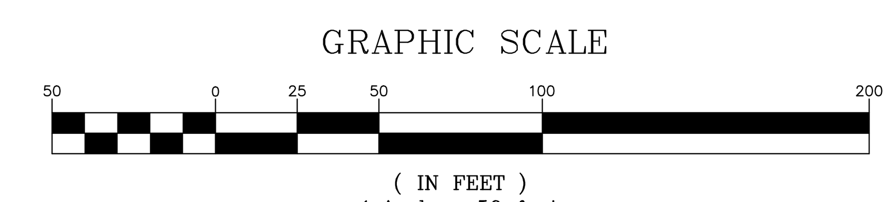


S-BUS
feet

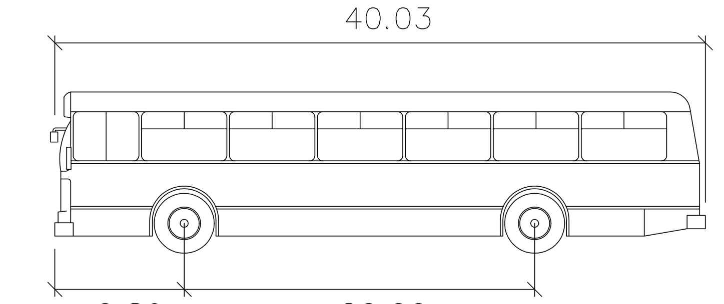
Width	: 7.87
Track	: 7.87
Lock to Lock Time	: 6.0
Steering Angle	: 33.7







VEHICLE INFORMATION



S-BUS
feet

Width	: 7.87
Track	: 7.87
Lock to Lock Time	: 6.0
Steering Angle	: 33.7

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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.

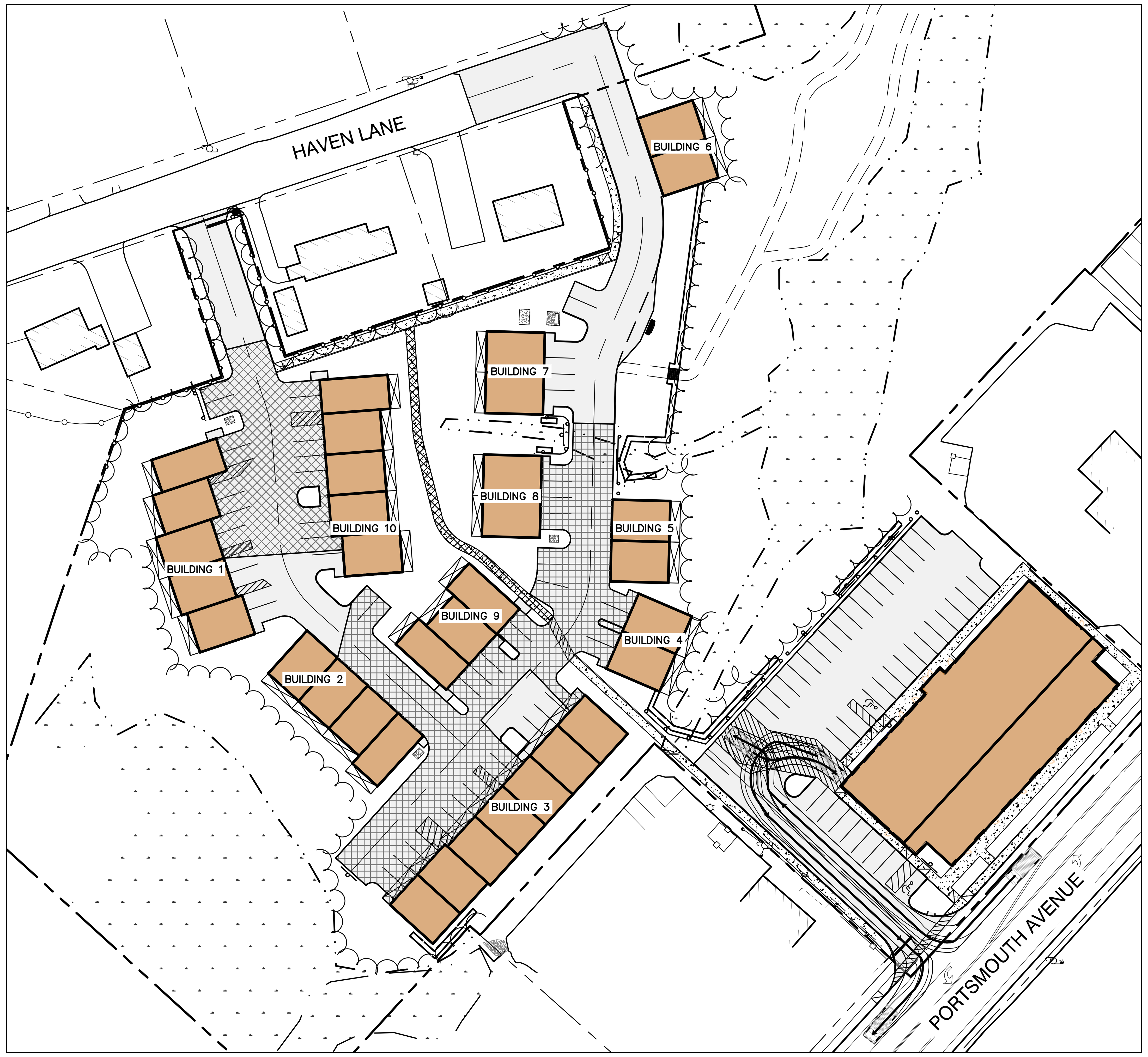
STATE OF NEW HAMPSHIRE
PAIGE S. LIBBEY
No.16670
LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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:	TRUCK TURNING PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
T3



GRAPHIC SCALE

(IN FEET)
1 inch = 60 feet

VEHICLE INFORMATION

23.00
4.00 15.00

DL-23

	feet
Width	: 8.50
Track	: 8.50
Lock to Lock Time	: 6.0
Steering Angle	: 40.4

GRAPHIC SCALE

(IN FEET)
1 inch = 50 feet

VEHICLE INFORMATION

23.00
4.00 15.00

DL-23

	feet
Width	: 8.50
Track	: 8.50
Lock to Lock Time	: 6.0
Steering Angle	: 40.4

19.00
2.99 10.99

Pickup Truck

	feet
Width	: 6.99
Track	: 6.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.6

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM | Draft: KDR | Date: 3/15/24
Checked: PSL | Scale: AS SHOWN | Project No.: 24029
Drawing Name: 24029-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 – PAIGE S. LIBBEY No.16670 – LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

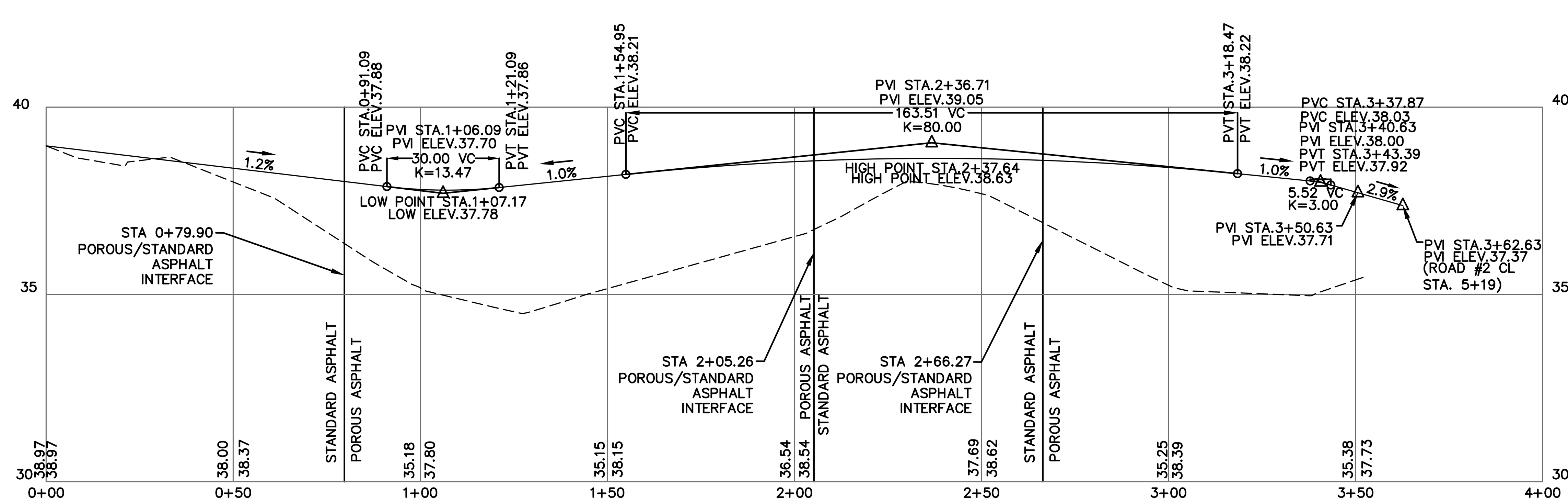
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

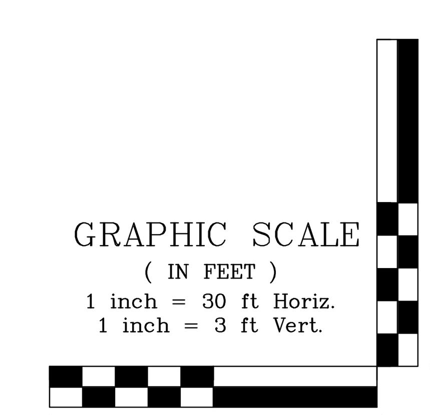
Plan Name: TRUCK TURNING PLAN
Project: "LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
T4
SHEET 16 OF 31
JBE PROJECT NO. 24029

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
   - A. 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 TOWN, AND NHDOT SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.
3. AS-BUILT PLANS TO BE SUBMITTED TO THE TOWN PRIOR TO ACCEPTANCE OF THE ROADWAY.
4. DEVELOPER IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WETLAND REGULATIONS, INCLUDING ANY PERMITTING AND SETBACK REQUIREMENTS REQUIRED UNDER THESE REGULATIONS.
5. CONTRACTOR TO COORDINATE AND COMPLETE ALL WORK REQUIRED FOR THE RELOCATION AND/OR INSTALLATION OF ELECTRIC, CATV, TELEPHONE, AND FIRE ALARM PER UTILITY DESIGN AND STANDARDS. LOCATIONS SHOWN ARE APPROXIMATE. LOW PROFILE STRUCTURES SHALL BE USED TO THE GREATEST EXTENT POSSIBLE.
6. 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.
7. 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.
8. ALL DISTURBED AREAS NOT STABILIZED BY NOVEMBER 1st SHALL BE COVERED WITH AN EROSION CONTROL BLANKET. PRODUCT TO BE SPECIFIED BY THE ENGINEER.
9. FINAL DRAINAGE, GRADING AND EROSION PROTECTION MEASURES SHALL CONFORM TO REGULATIONS OF THE PUBLIC WORKS DEPARTMENT.
10. CONTRACTOR TO VERIFY EXISTING UTILITIES AND TO NOTIFY ENGINEER OF ANY DISCREPANCY IMMEDIATELY.
11. ROADWAY INTERSECTIONS WITH SLOPE GRANITE CURB SHALL EXTEND AROUND RADIUS WITH 6' STRAIGHT PIECE ALONG TANGENT.
12. RETAINING WALLS SHALL BE DESIGNED AND STAMPED BY A LICENSED PROFESSIONAL ENGINEER. CONTRACTOR SHALL COORDINATE WITH MANUFACTURER PRIOR TO INSTALLATION.
13. CONTRACTOR MUST HAVE A VALID PIPE INSTALLER'S LICENSE FROM THE PUBLIC WORKS DEPARTMENT BEFORE WORKING ON ANY DRAINAGE AND/OR UTILITY CONSTRUCTION.
14. ALL DRAINAGE INFRASTRUCTURE SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING ANY RUNOFF TO IT.





Design: DJM	Draft: KDR	Date: 3/15/24	
Checked: PSL	Scale: AS SHOWN	Project No.: 24029	
Drawing Name: 24029-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.

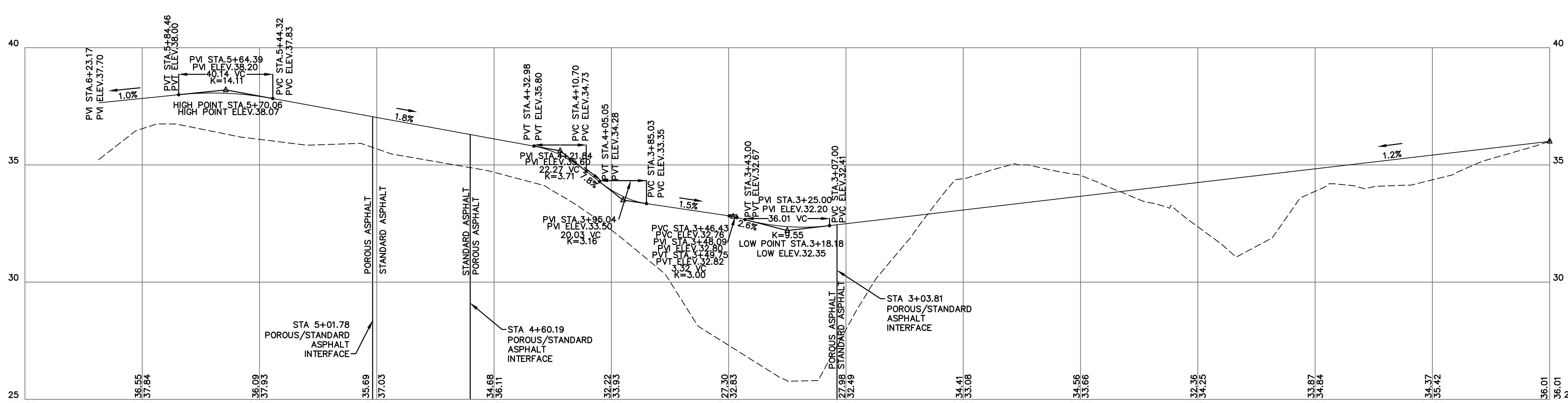
STATE OF NEW HAMPSHIRE
PAIGE S. LIBBEY
No.16670
LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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:	ROAD PROFILE
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
P1



GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft Horiz.
1 inch = 3 ft Vert.

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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.

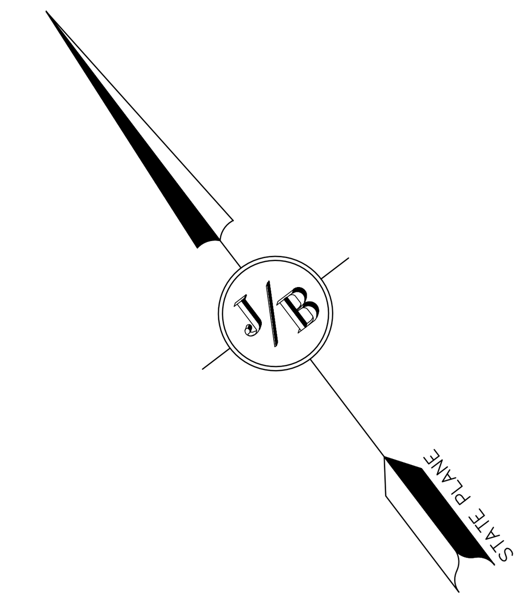
STATE OF NEW HAMPSHIRE
PAIGE S. LIBBEY
No.16670
LICENSED PROFESSIONAL ENGINEER

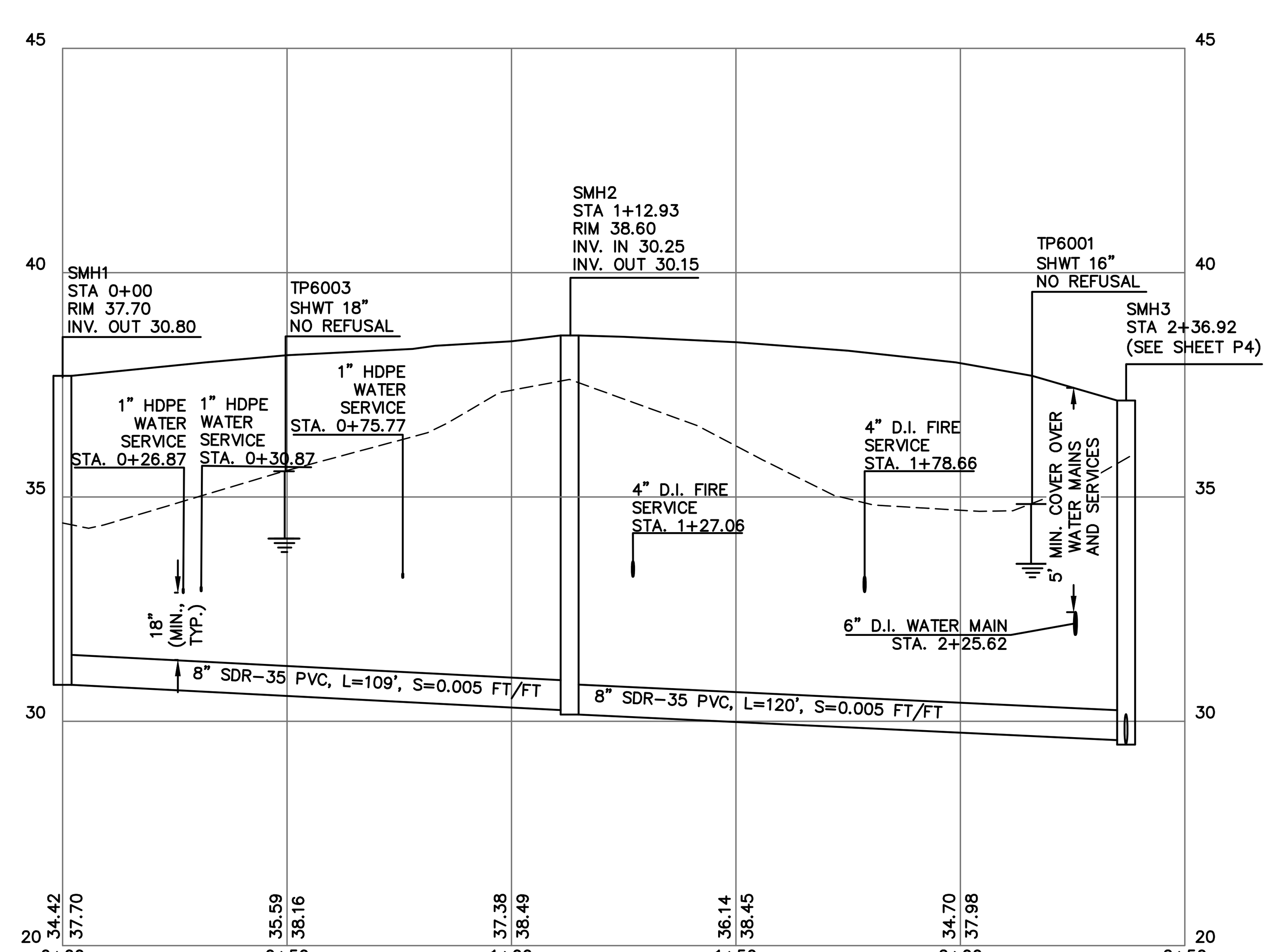
REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

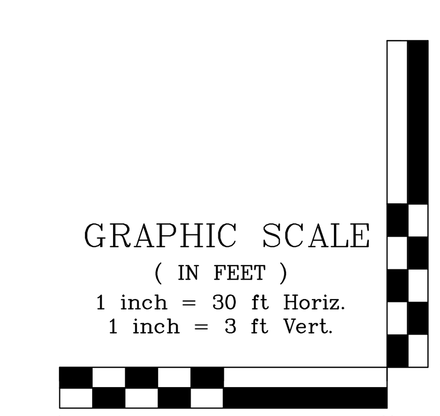
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	ROAD PROFILE
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
P2
SHEET 18 OF 31
JBE PROJECT NO. 24029







Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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
PAIGE S. LIBBEY
No.16670
LICENSED PROFESSIONAL ENGINEER
03/14/2025

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

Designed and Produced in NH

J/B Jones & Beach Engineers, Inc.

Civil Engineering Services

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

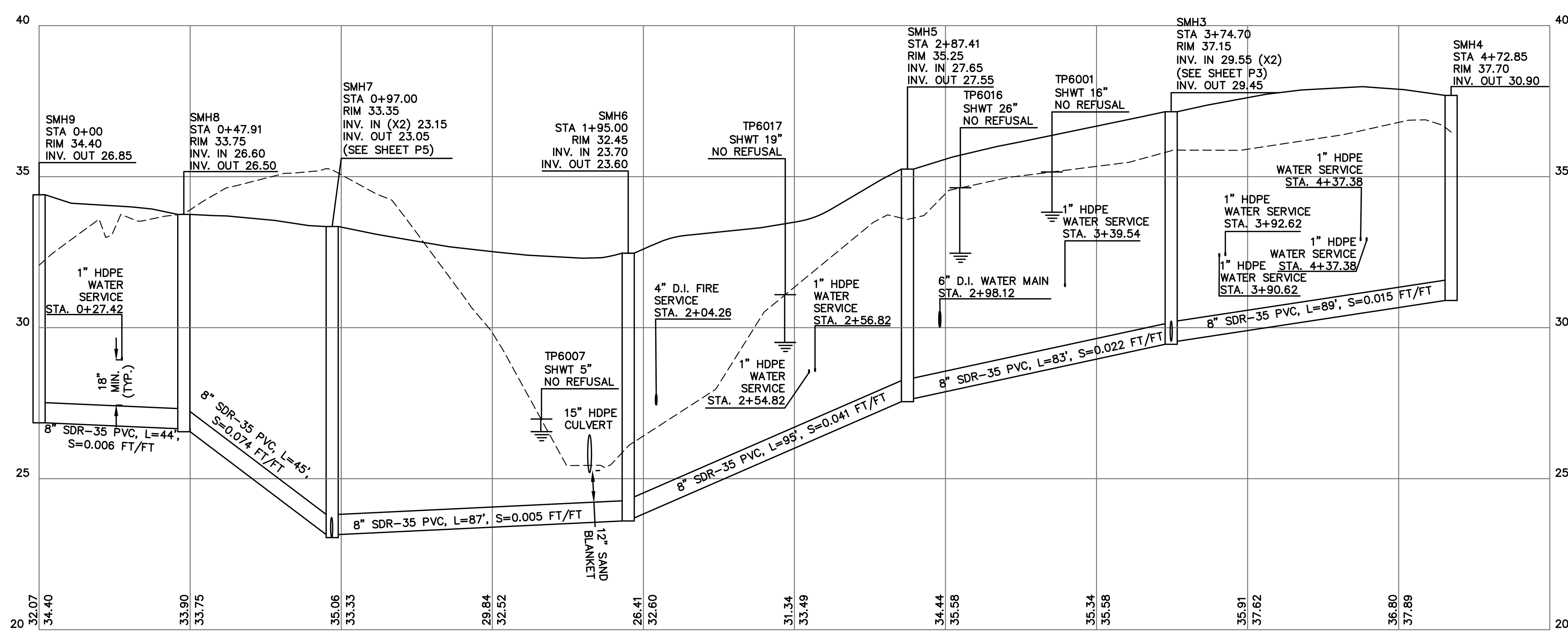
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	SEWER PLAN AND PROFILE
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.

P3

SHEET 19 OF 31
JBE PROJECT NO. 24029



GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft Horiz.
1 inch = 3 ft Vert.

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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.

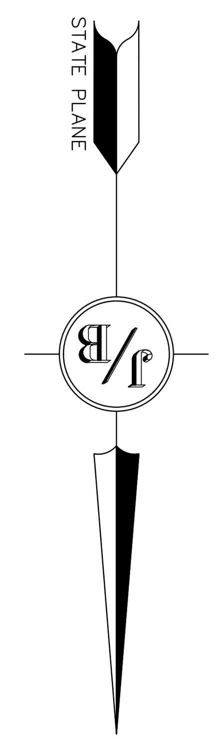
STATE OF NEW HAMPSHIRE — PAIGE S. LIBBEY No.16670 LICENSED PROFESSIONAL ENGINEER 03/14/2025

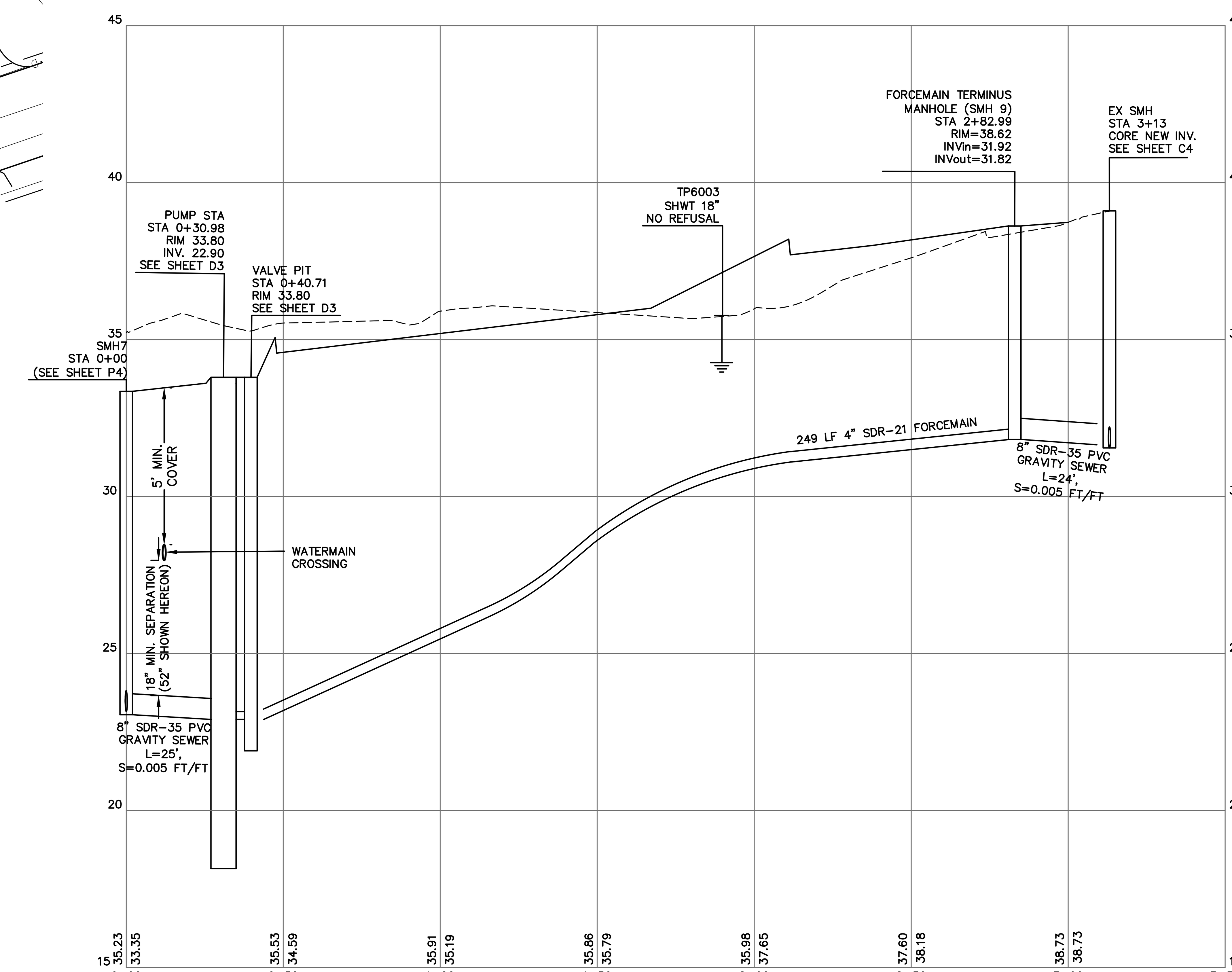
REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

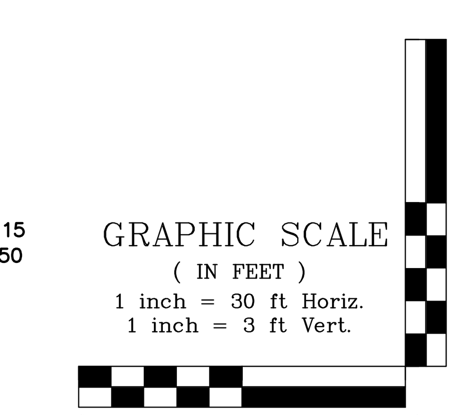
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	SEWER PLAN AND PROFILE
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
P4
SHEET 20 OF 31
JBE PROJECT NO. 24029

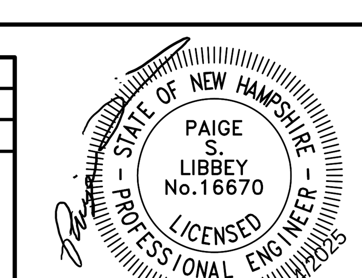






Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-PLAN.dwg		

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.



REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

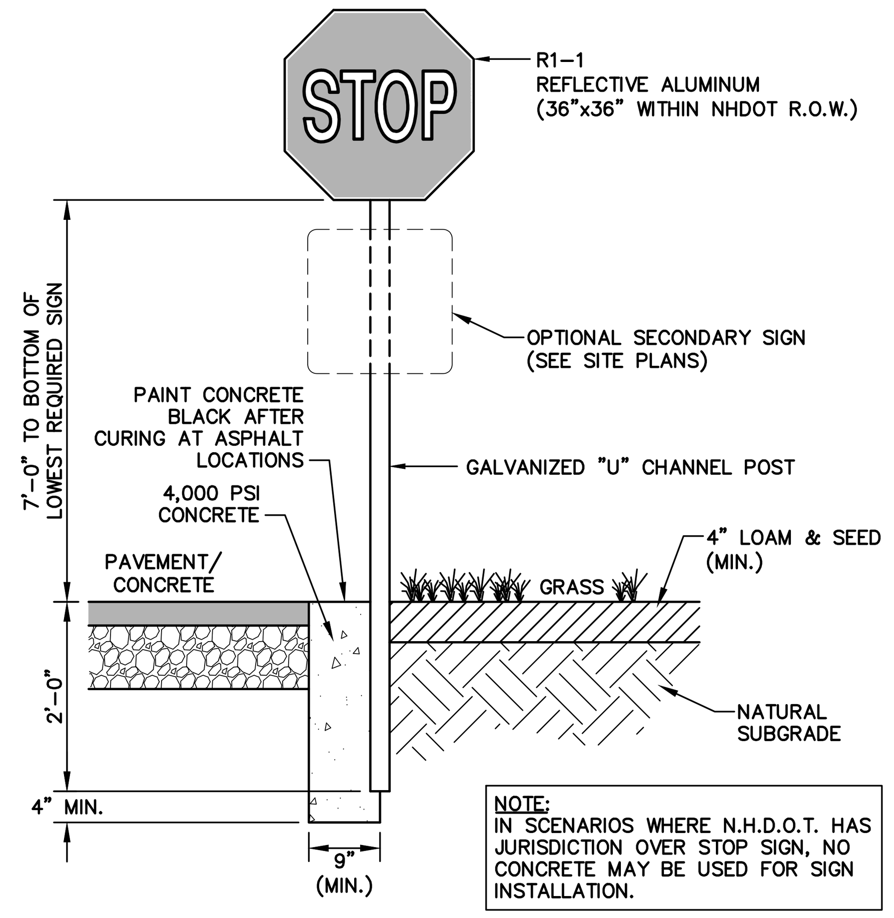
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	FORCEMAIN PLAN AND PROFILE
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.

P5

SHEET 21 OF 31
JBE PROJECT NO. 24029



NOTE:
IN SCENARIOS WHERE N.H.D.O.T. HAS JURISDICTION OVER STOP SIGN, NO CONCRETE MAY BE USED FOR SIGN INSTALLATION.

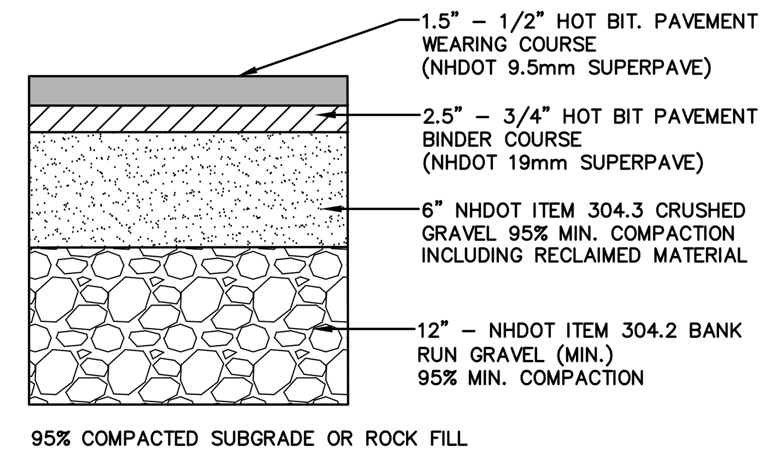
STOP SIGN (R1-1)

NOT TO SCALE

NOTES:
1. ALL STOP BARS TO BE SOLID WHITE REFLECTIVE TRAFFIC PAINT AS PER DIMENSIONS ABOVE.

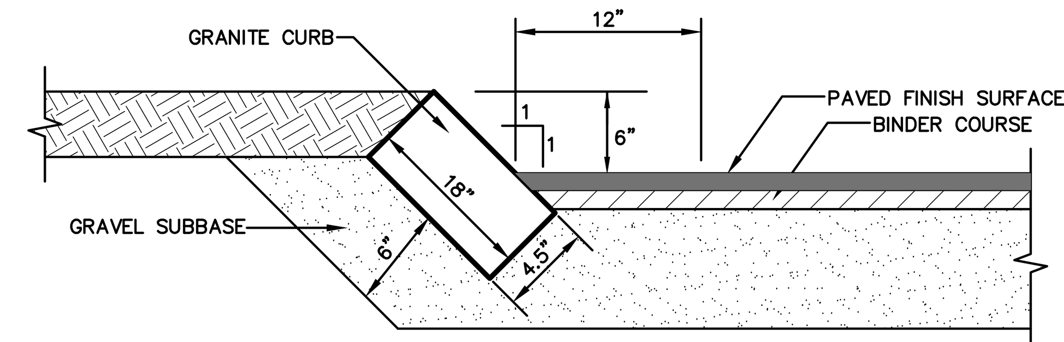
STOP BAR

NOT TO SCALE



TYPICAL BITUMINOUS PAVEMENT

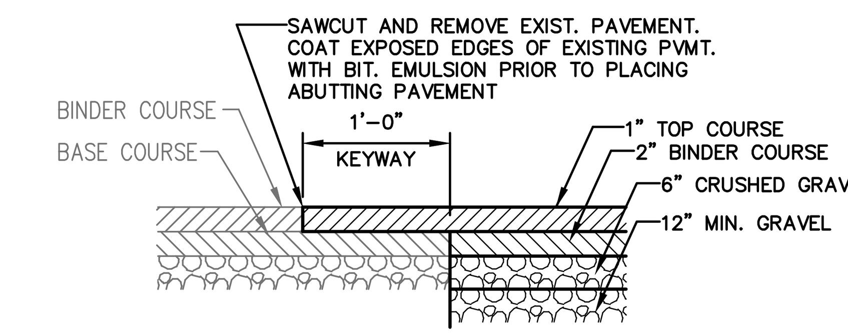
NOT TO SCALE



NOTES:
1. CURB TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.
2. JOINTS BETWEEN STONES SHALL BE MORTARED.

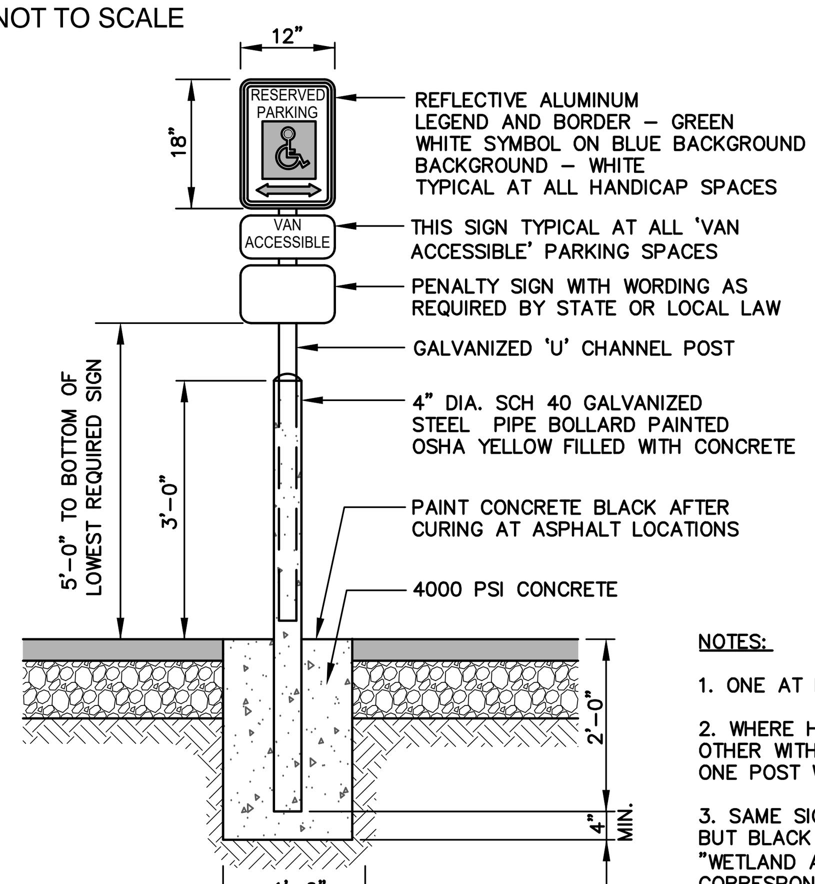
SLOPE GRANITE CURB

NOT TO SCALE



KEYWAY DETAIL FOR CONNECTION TO EXISTING PAVEMENT

NOT TO SCALE

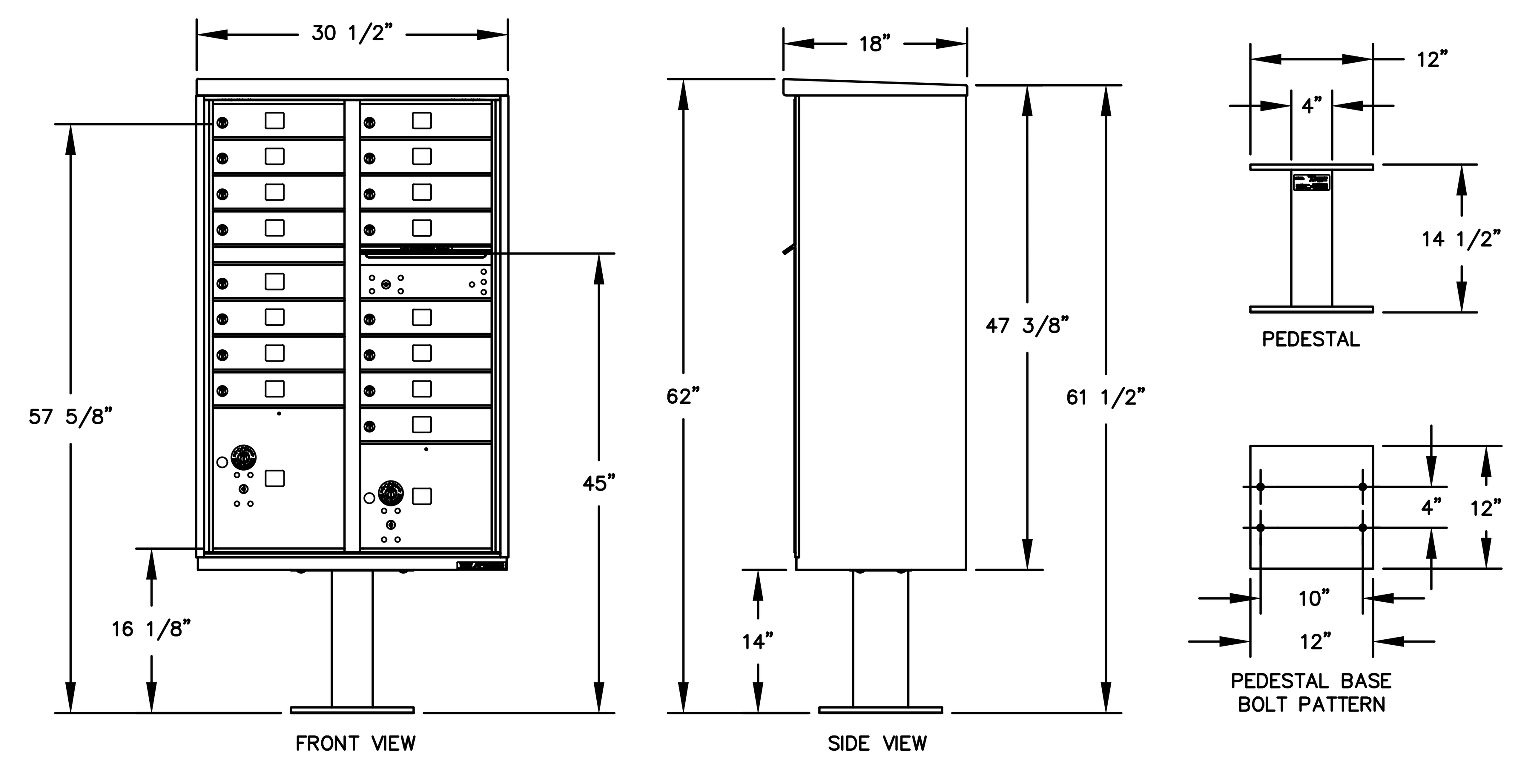


NOTES:
1. ONE AT EACH HANDICAP SPACE.
2. WHERE HANDICAP SPACES FACE EACH OTHER WITHOUT WALKWAY, THERE SHALL BE ONE POST WITH SIGNS MOUNTED BOTH SIDES.
3. SAME SIGNPOST AND PANEL SPECIFICATION BUT BLACK TEXT ON WHITE BACKGROUD TO READ "WETLAND AREA – NO SNOW DUMPING" ON CORRESPONDING SIGNS.

HANDICAP PARKING SIGN (R7-8)

NOT TO SCALE

vital™ Cluster Box Unit - Type III



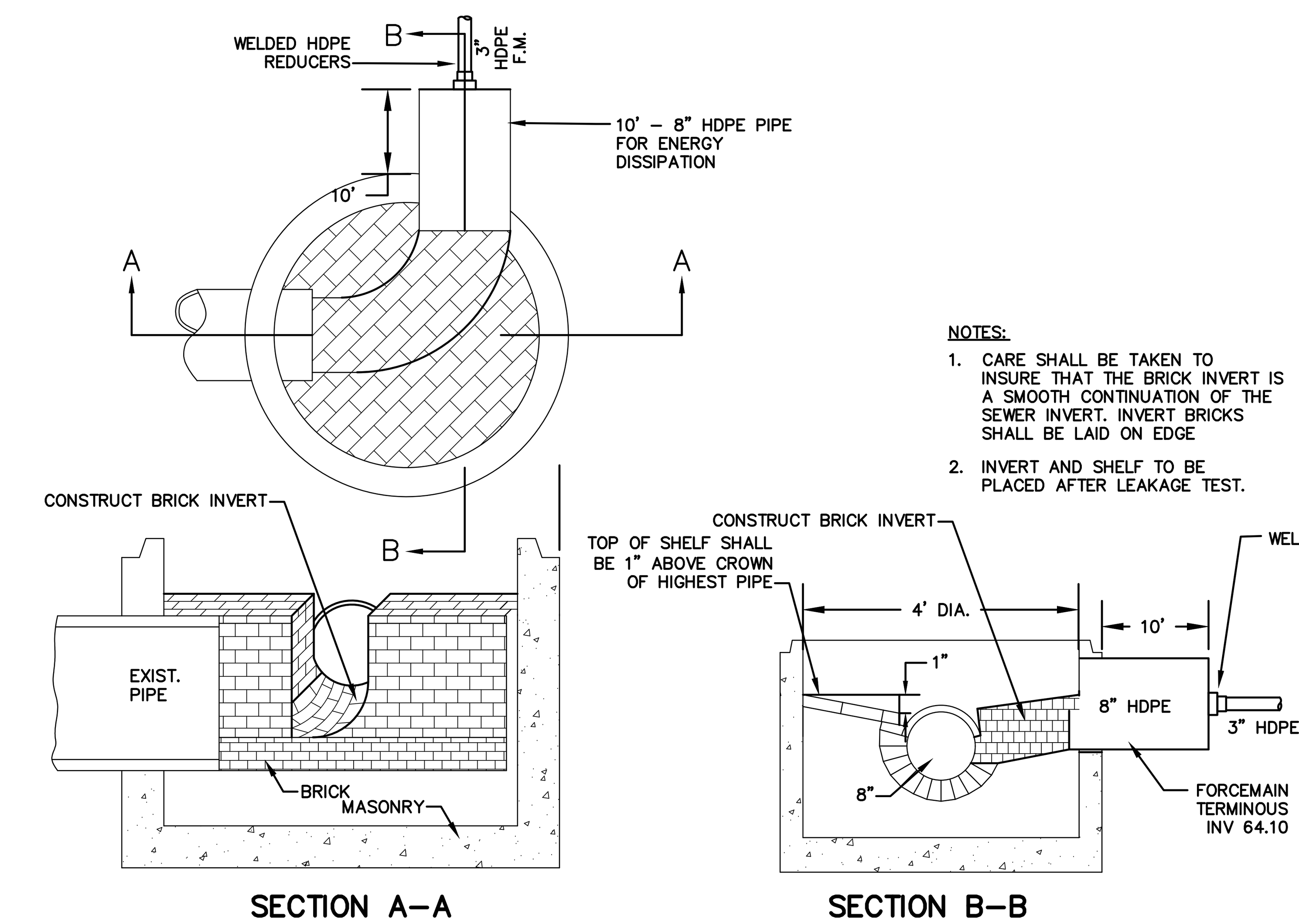
NOTES:
1. THIS UNIT IS APPROVED FOR USPS AND PRIVATE APPLICATIONS.
2. DECORATIVE MAILBOX ACCESSORIES SOLD SEPARATELY AND ARE USPS APPROVED PRODUCTS.
3. PEDESTAL SHOULD BE INSTALLED WITH INCLUDED RUBBER PAD; MOUNTING HARDWARE NOT INCLUDED, REFER TO INSTALLATION MANUAL FOR RECOMMENDATIONS.
4. FLORENCE "F" SERIES CBU IS OFFICIALLY LICENSED BY USPS: LICENSE#CDSEQ-08-B-0012

DOOR CHART

DOOR TYPE	DIMENSION (HEIGHT x WIDTH)
TENANT	3-3/8"x12-13/16"
10" PARCEL	10-1/4"x12-13/16"
13" PARCEL	13-3/4"x12-13/16"
OUTGOING SLOT	3/4"x11-3/4"

MAIL BOX KIOSK DETAIL - AF FLORENCE MANUFACTURING COMPANY (MODEL 1570-16)

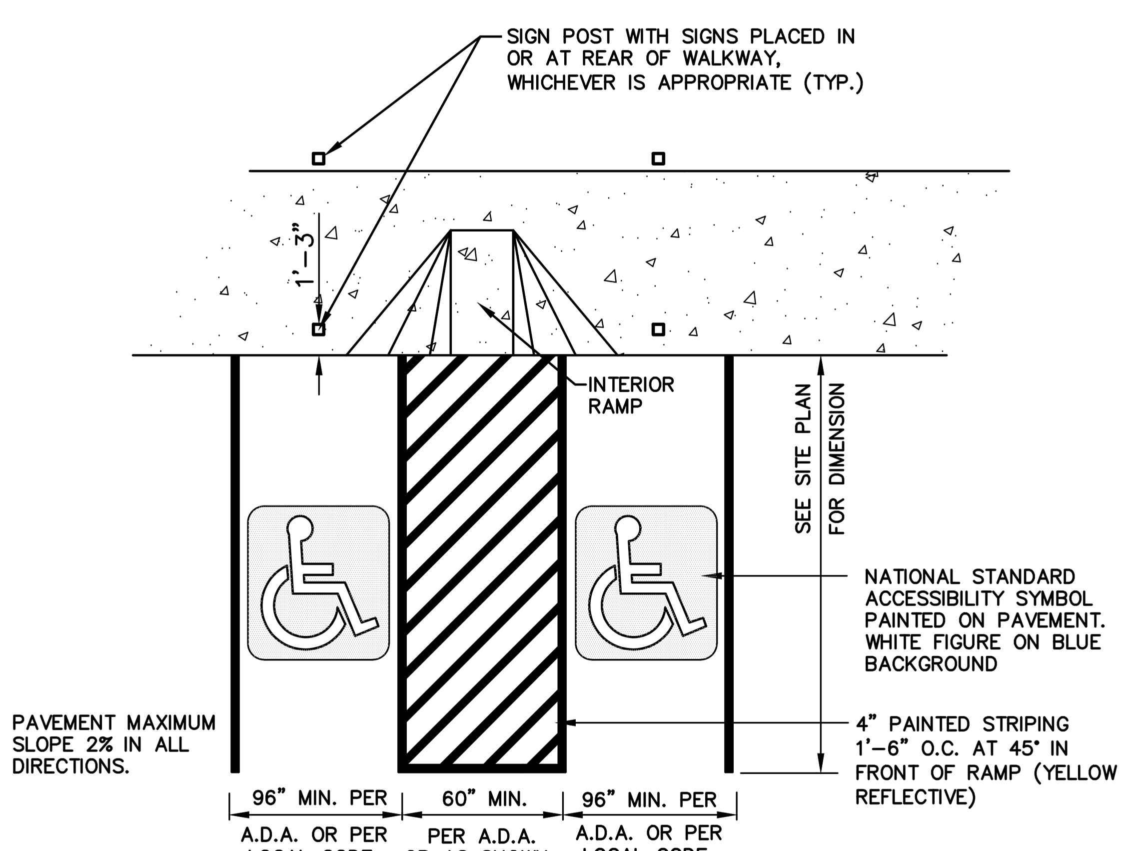
NOT TO SCALE



NOTES:
1. CARE SHALL BE TAKEN TO INSURE THAT THE BRICK INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT. INVERT BRICKS SHALL BE LAID ON EDGE
2. INVERT AND SHELF TO BE PLACED AFTER LEAKAGE TEST.

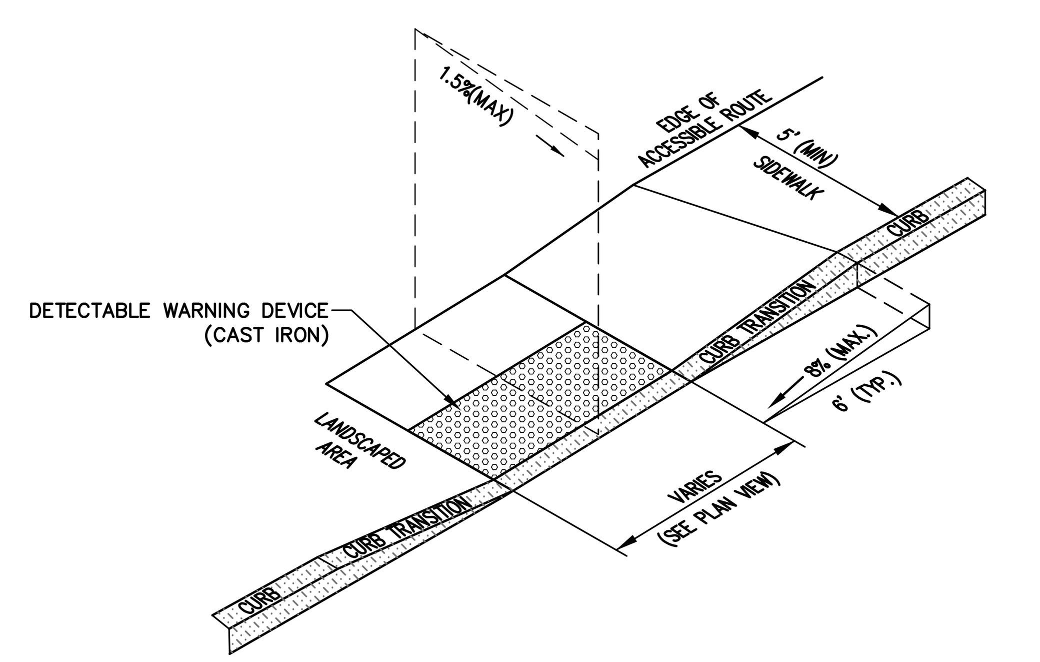
FORCEMAIN TERMINUS INTO NEW MANHOLE

NOT TO SCALE



HANDICAP PARKING LAYOUT

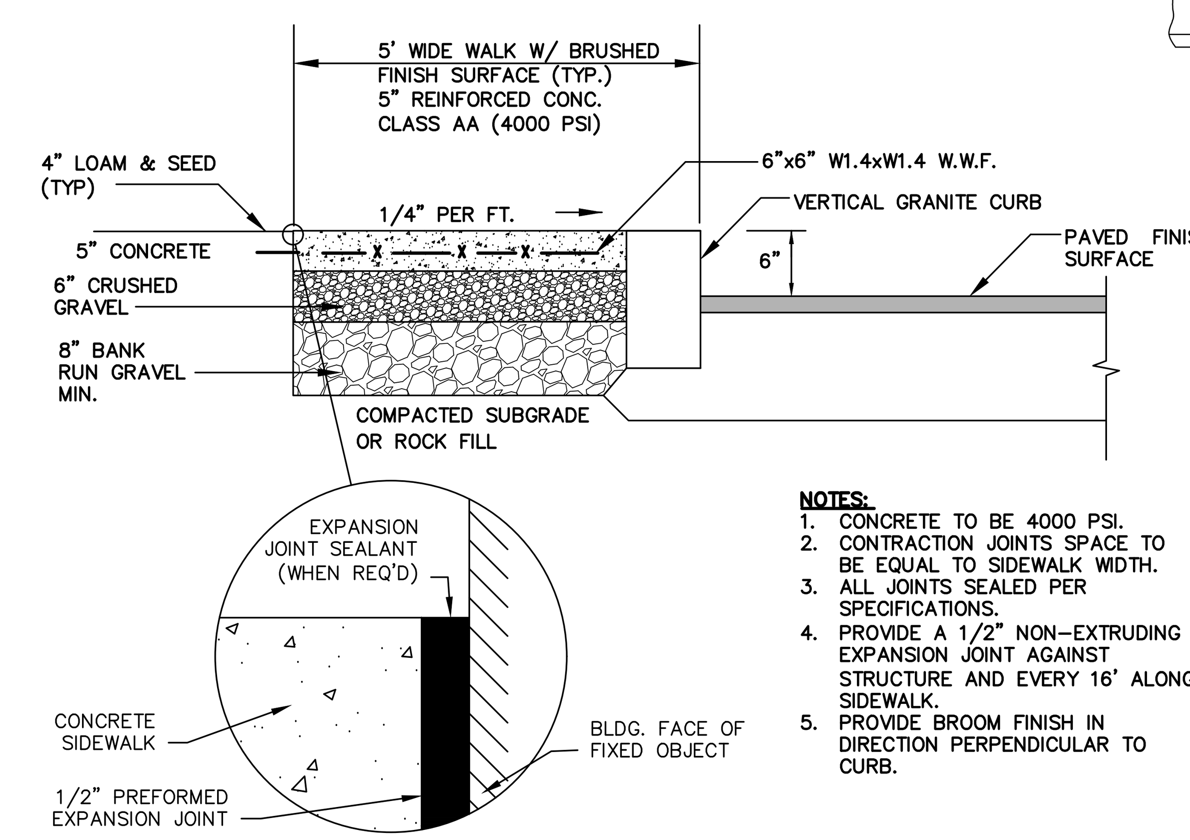
NOT TO SCALE



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 'I')

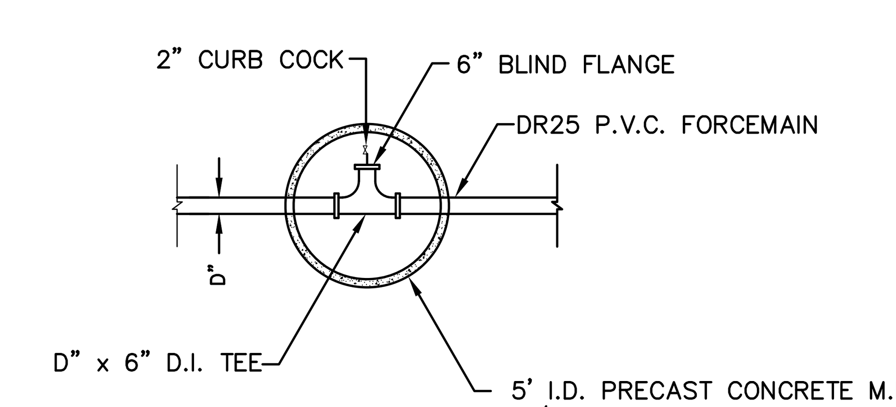
NOT TO SCALE



NOTES:
1. CONCRETE TO BE 4000 PSI.
2. CONTRACTION JOINTS SPACE TO BE EQUAL TO SIDEWALK WIDTH.
3. ALL JOINTS SEALED PER SPECIFICATIONS.
4. PROVIDE A 1/2" NON-EXTRUDING EXPANSION JOINT AGAINST STRUCTURE AND EVERY 16' ALONG SIDEWALK.
5. PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB.

CONCRETE SIDEWALK W/ VERTICAL GRANITE CURB

NOT TO SCALE



FORCEMAIN ACCESS MANHOLE

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 3/15/24	
Checked: PSL	Scale: AS NOTED	Project No.: 24029	
Drawing Name: 24029-PLAN.dwg			

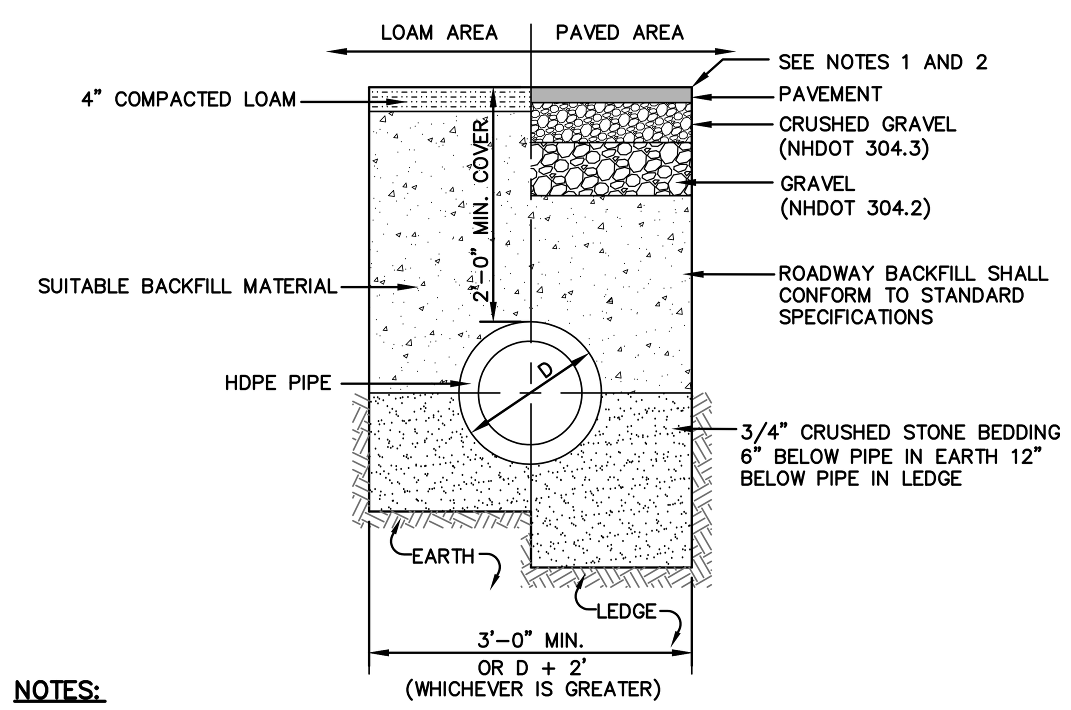
STATE OF NEW HAMPSHIRE
PAIGE S. LIBBEY No.16670 LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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:	DETAIL SHEET
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
D1

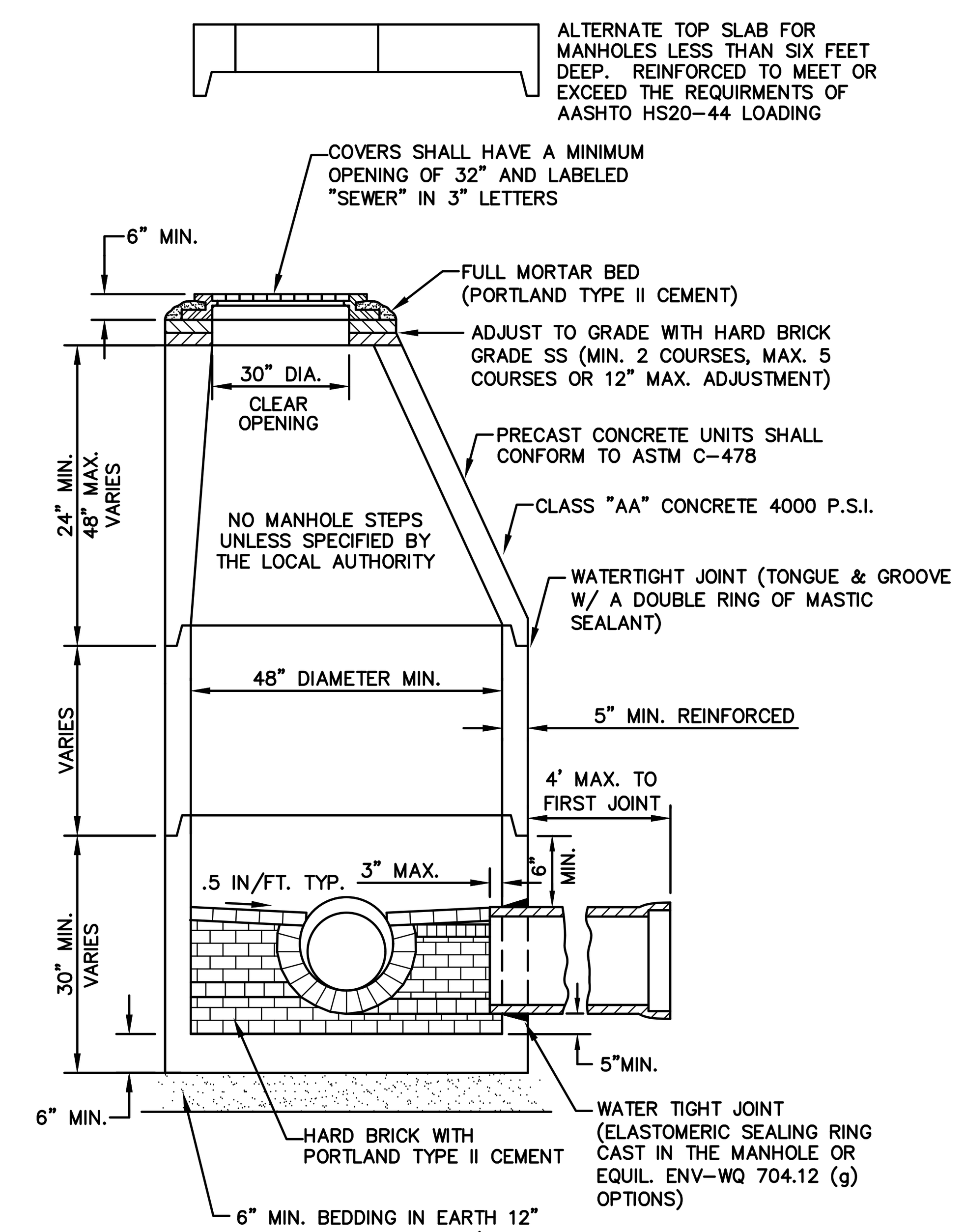


NOTES:

1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM WITH PROJECT AND TOWN SPECIFICATIONS.
3. ALL MATERIALS ARE TO BE COMPACTED TO 95% OF ASTM D-1557.

DRAINAGE TRENCH

NOT TO SCALE



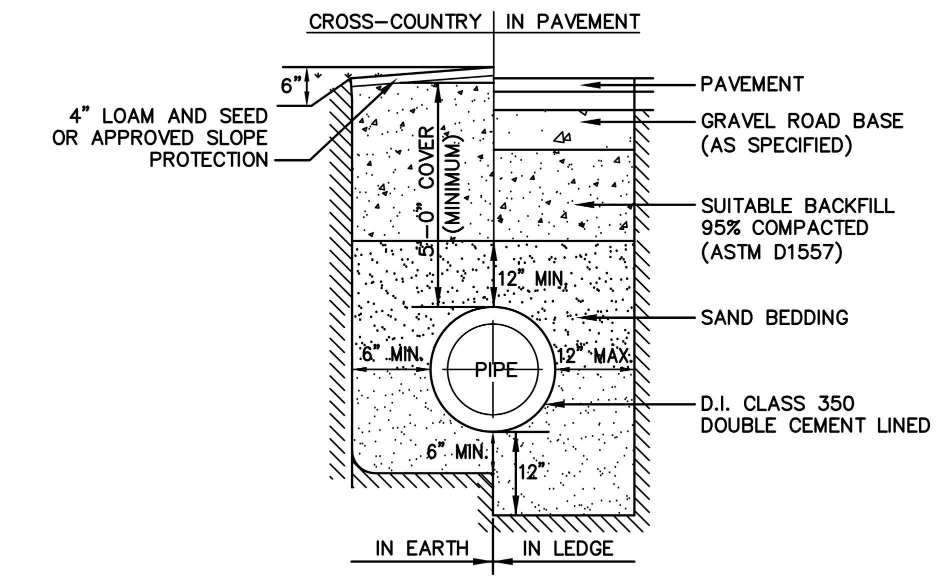
NOTES:

1. PER NHDES ENV-WQ 704.13(C), MORTAR USED IN MANHOLE CONSTRUCTION SHALL COMPLY WITH THE FOLLOWING:
   a. MORTAR SHALL BE COMPOSED OF TYPE II PORTLAND CEMENT AND SAND WITH OR WITHOUT HYDRATED LIME ADDITION
   b. PROPORTIONS IN MORTAR OF PARTS BY VOLUMES SHALL BE PER TABLE 704-4:
      (1) 4.5 PARTS SAND AND 1.5 PARTS CEMENT; OR
      (2) 4.5 PARTS SAND, ONE PART CEMENT AND 0.5 PART HYDRATED LIME;
   c. CEMENT SHALL BE TYPE II PORTLAND CEMENT THAT IS CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM C150/C150M STANDARD IN EFFECT AT THE TIME THE CEMENT WAS MANUFACTURED
   d. HYDRATED LIME SHALL BE TYPE S THAT IS CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM C207 STANDARD IN EFFECT AT THE TIME THE HYDRATED LIME WAS PROCESSED
   e. SAND SHALL CONSIST OF INERT NATURAL SAND THAT IS CERTIFIED BY ITS SUPPLIER AS CONFORMING TO THE ASTM C33 STANDARD IN EFFECT AT THE TIME THE SAND IS PROCESSED BY 'STANDARD SPECIFICATIONS FOR CONCRETE, FINE AGGREGATES
   f. CONCRETE FOR DROP SUPPORTS SHALL CONFORM TO THE REQUIREMENT FOR CLASS AAA CONCRETE OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S 'STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AS AVAILABLE AT:

   HTTP://WWW.NH.GOV/DOT/ORG/PROJECTDEVELOPMENT/HIGHWAYDESIGN/SPECIFICATIONS/INDEX.HTM
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 A48/48M WITH A CASTING EQUAL TO CLASS 30 IN ACCORDANCE WITH ENV-WQ 704.13 (a) (8).
5. ALL PRECAST SECTIONS SHALL BE COATED ON THE EXTERIOR WITH A BITUMINOUS DAMP-PROOFING COATING IN ACCORDANCE WITH ENV-WQ 704.12 (J).
6. ALL PRECAST SECTIONS AND BASES SHALL HAVE THE DATE OF MANUFACTURE AND THE NAME OR TRADEMARK OF THE MANUFACTURER IMPRESSED OR INDELIBLY MARKED ON THE INSIDE WALL PER ENV-WQ 704.12(I).
7. BRICK MASONRY SHALL CONFORM TO ASTM C32 (ENV-WQ 704.12(a)(9))

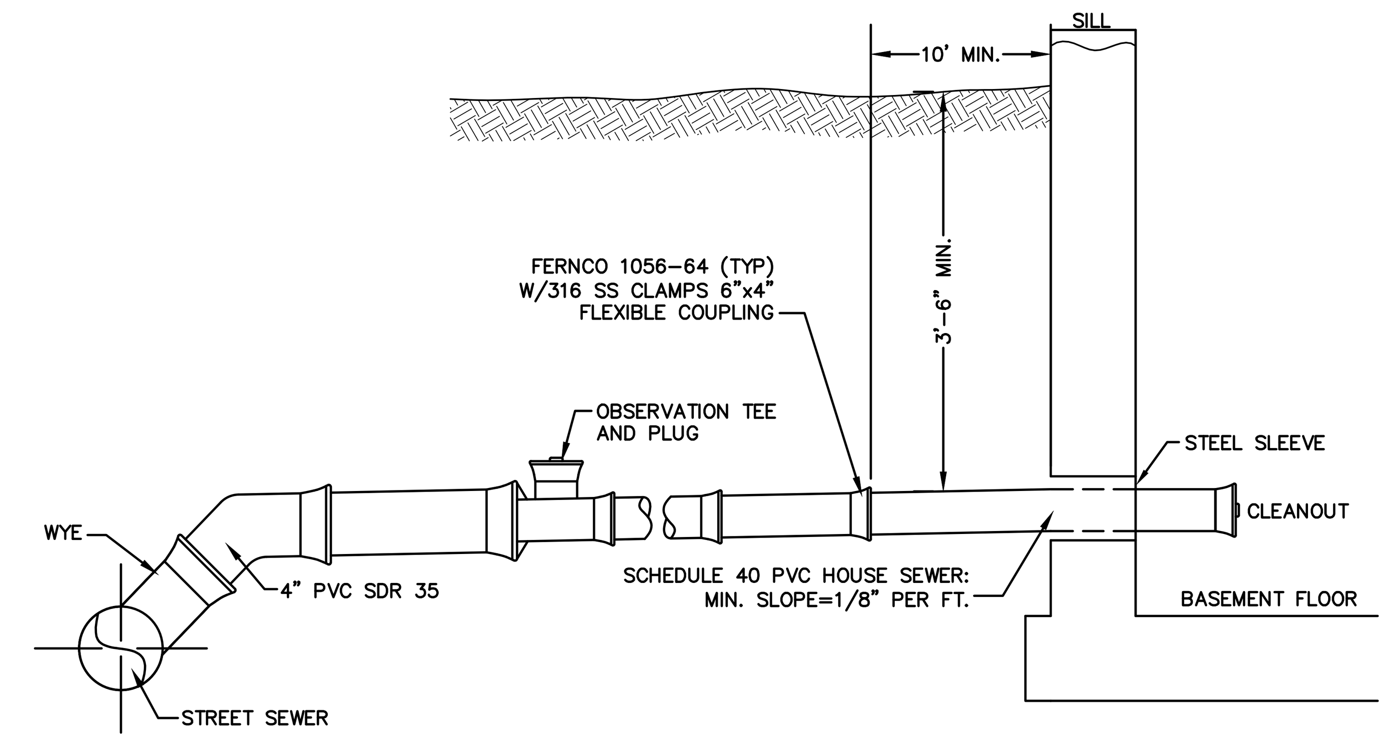
SEWER MANHOLE

NOT TO SCALE



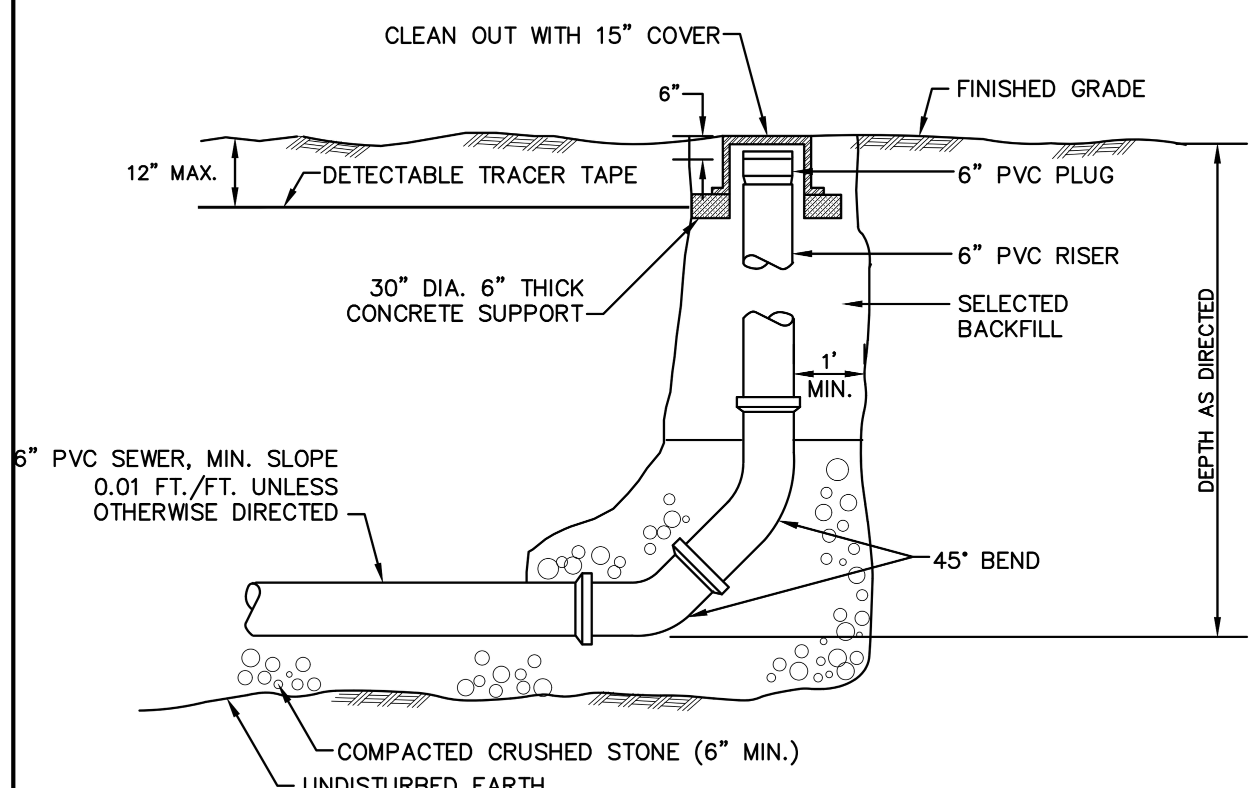
WATER SYSTEM TRENCH

NOT TO SCALE



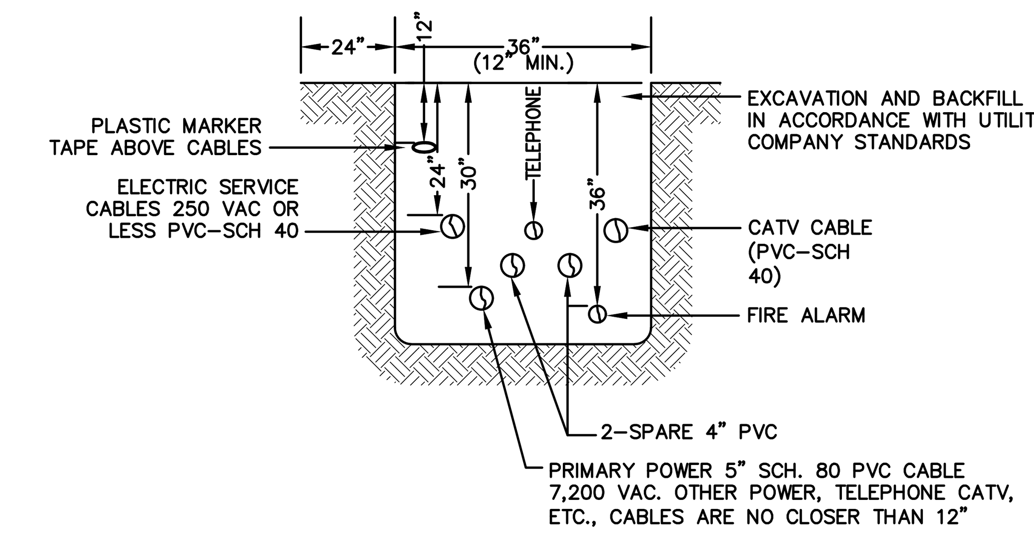
HOUSE SEWER SERVICE

NOT TO SCALE



SEWER CLEAN OUT

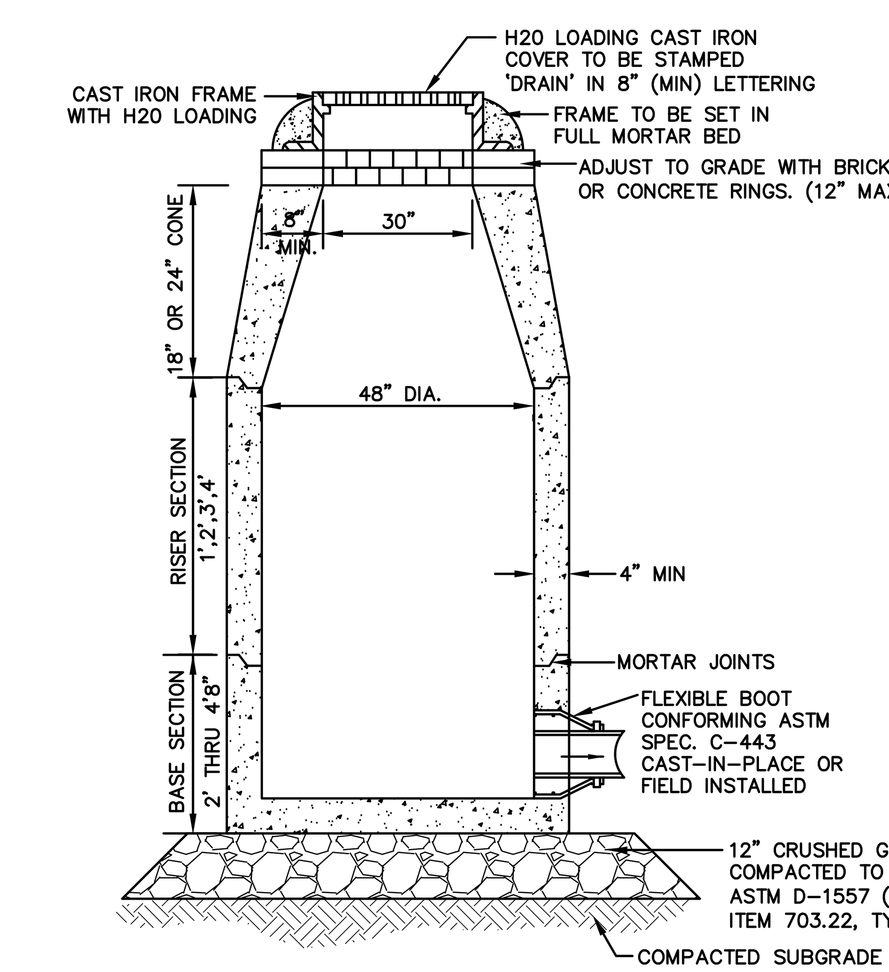
NOT TO SCALE



NOTE: ALL UTILITIES SHALL BE REVIEWED AND APPROVED BY APPROPRIATE UTILITY COMPANY.

UTILITY TRENCH

NOT TO SCALE

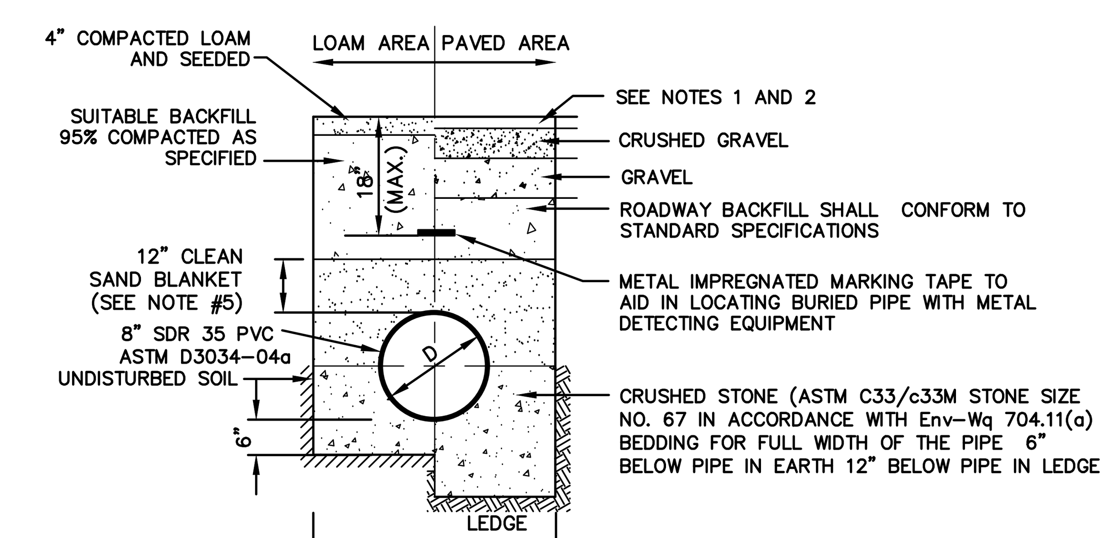


NOTES:

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. ALL DRAIN MANHOLE FRAMES AND GRATES SHALL BE NEENAH R-1798 OR APPROVED EQUAL (30" DIA. TYPICAL).
8. STANDARD FRAME(S) 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'.

DRAIN MANHOLE (4' DIAM.)

NOT TO SCALE

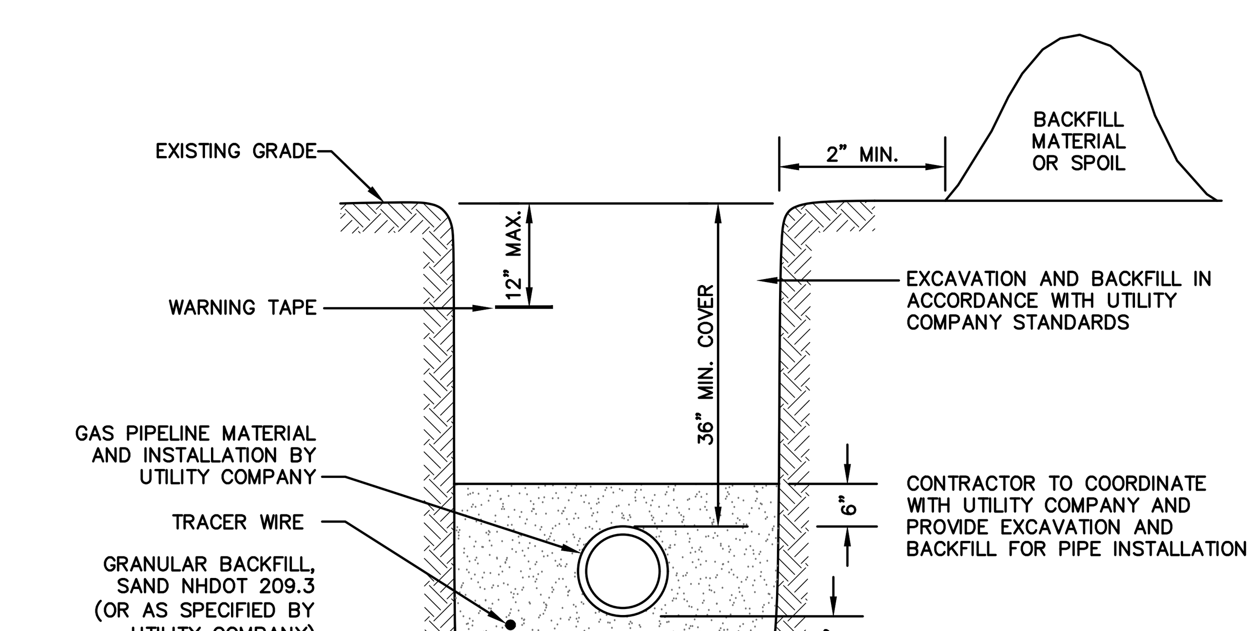


NOTES:

1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
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, W SHALL BE NO MORE THAN 36"; FOR PIPES GREATER THAN 15 INCHES NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE O.D. W 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 MANUFACTRED, AND SHALL BE PUSH-ON, BELL-AND-SPIGOT TYPE PER Env-Wq 704.05 (e).

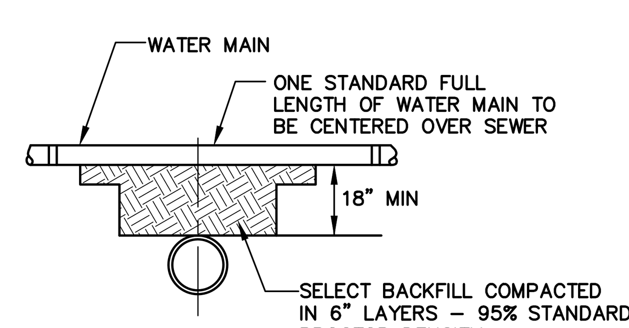
SEWER TRENCH

NOT TO SCALE



GAS TRENCH

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 HORIZONTALLY FROM THE WATER MAIN.

TYPICAL WATER / SEWER SEPARATION

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 3/15/24	
Checked: PSL	Scale: AS NOTED	Project No.: 24029	
Drawing Name: 24029-PLAN.dwg			

STATE OF NEW HAMPSHIRE — PAIGE S. LIBBEY No.16670 — LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

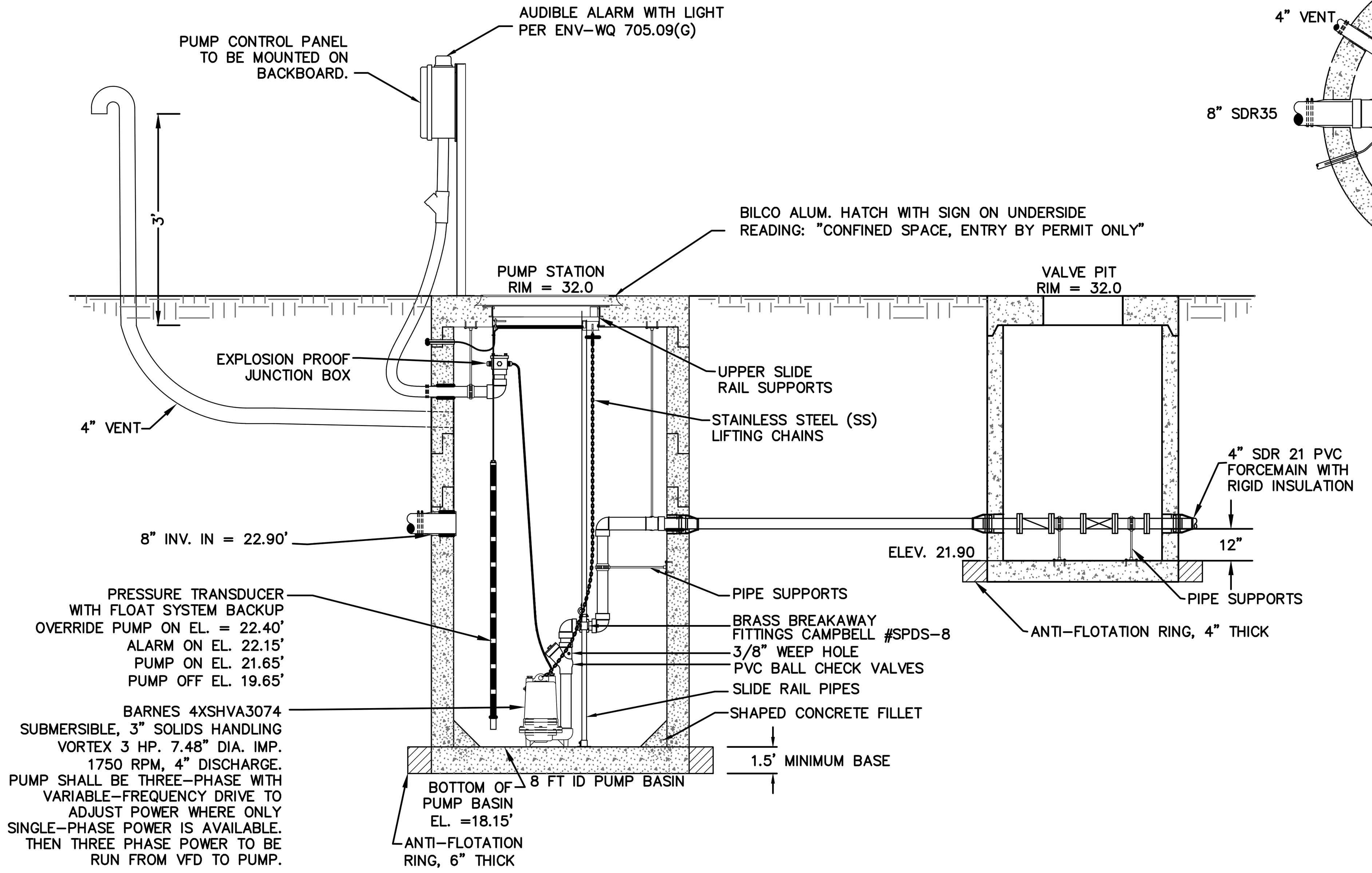
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

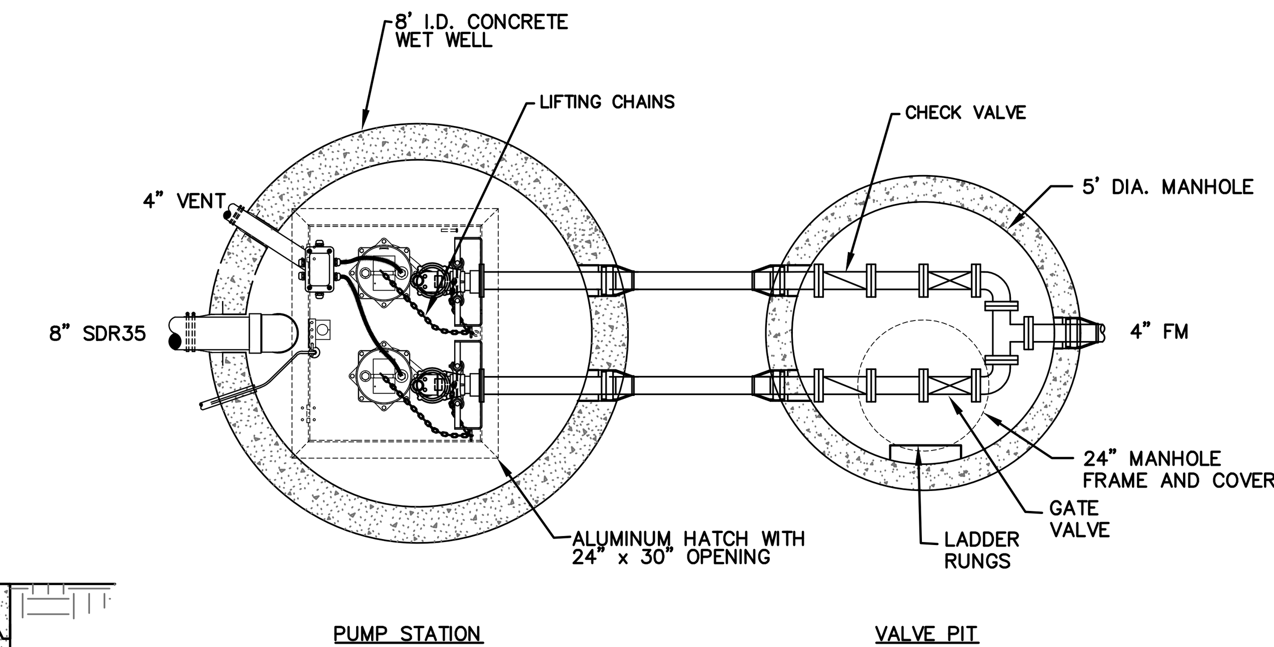
Plan Name:	DETAIL SHEET
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.

D2

SHEET 23 OF 31
JBE PROJECT NO. 24029





PUMP INFORMATION:

ELEV. HEAD:	12.27'
FRICTION HEAD:	3.21'
VELOCITY HEAD:	0.21'
TOTAL HEAD:	15.69'

DOSING INFORMATION:
DESIGN FLOW: 120 GPM
VOLUME OF DOSE = 752 GALLONS
NO. OF DOSES/PUMP = 9.5 DOSES/DAY
PUMPING TIME = 6.3 MINUTES
VELOCITY IN DISCHARGE LINES = 3.71 FPS
EACH PUMP TO MAINTAIN MIN. PUMP RATE OF 120 GPM

PUMP STATION NOTES:

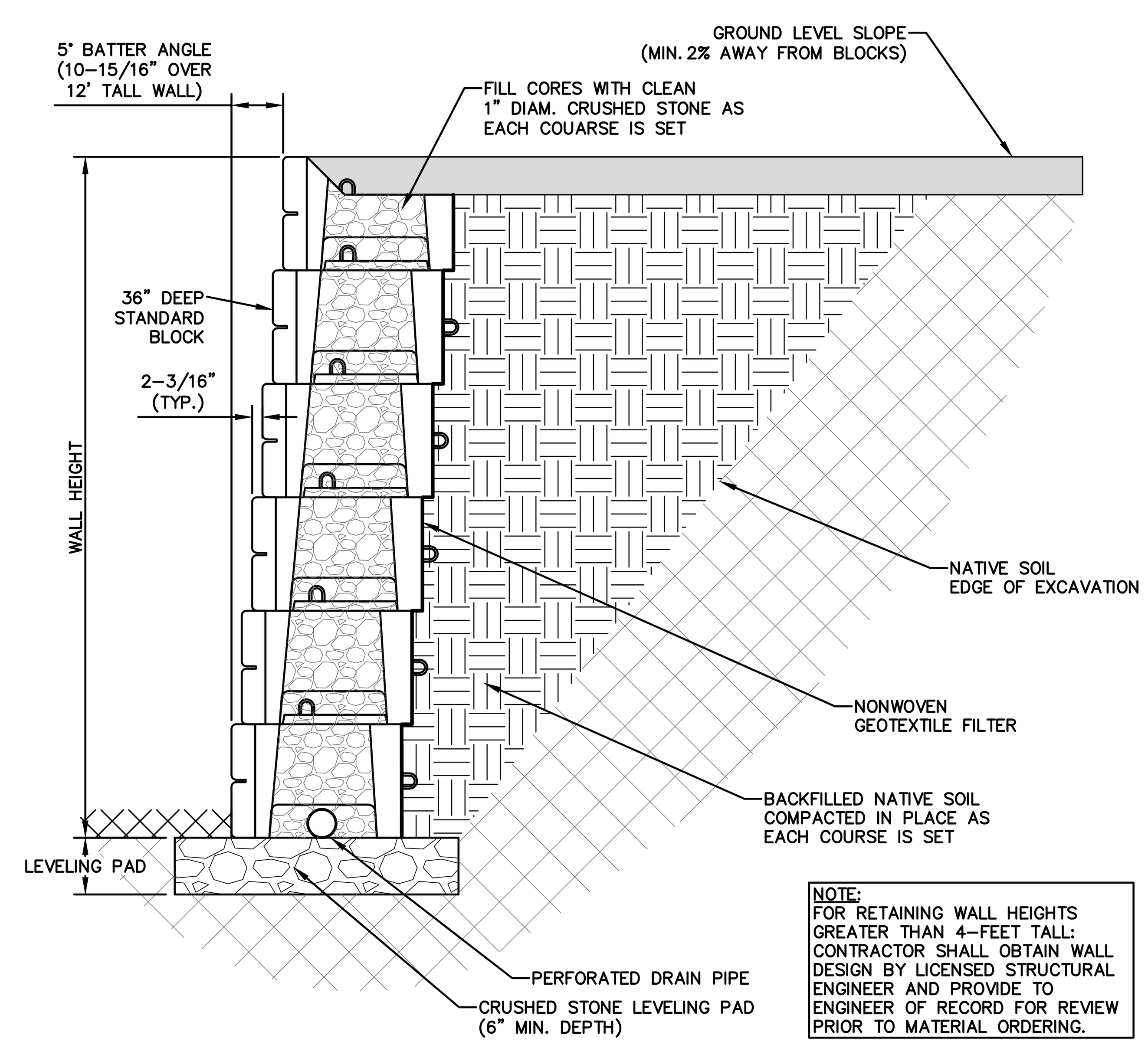
1. ALL JOINTS SHALL BE SEALED WITH A BUTYL JOINT SEALENT.
2. PUMPS TO BE WIRED TO DOSE AT ALTERNATING INTERVALS.
3. SEPARATE ELECTRICAL CIRCUITS SHALL BE PROVIDED FOR EACH OF THE PUMPS (SEPARATELY) AND ALARM SYSTEMS. ALL TO BE WIRED TO THE STAND-BY GENERATOR, AS REQUIRED.
4. RUN SINGLE-PHASE ELECTRIC CONDUIT TO A VARIABLE-FREQUENCY DRIVE, THEN THREE PHASE POWER TO BE RUN FROM VFD TO PUMP.

VERTICAL PUMP DETAIL

NOT TO SCALE

NOTES:

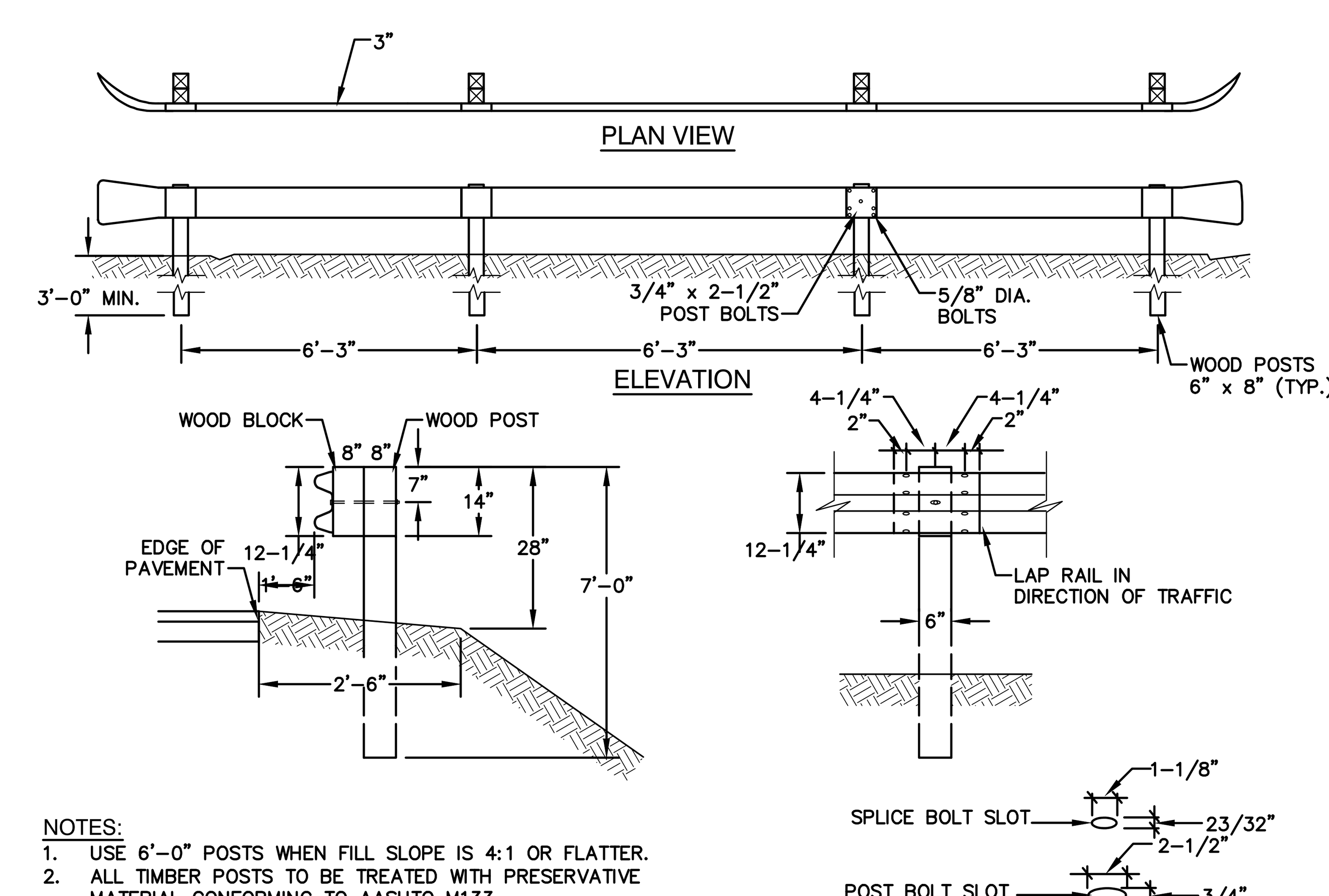
1. ALL COMPONENT PARTS OF MANHOLE STRUCTURES SHALL HAVE THE STRENGTH, LEAK RESISTANCE AND SPACE NECESSARY FOR THE INTENDED SERVICE.
2. THERE IS NO NEARBY BASE FLOOD ELEVATION FOR THE PROJECT. SEE SHEET OV-1, NOTE 9.
3. MANHOLE STRUCTURES SHALL HAVE A LIFE EXPECTANCY OF AT LEAST 25 YEARS.
4. MANHOLE STRUCTURES SHALL BE DESIGNED TO WITHSTAND HS-20 LOADING AND SHALL NOT LEAK IN EXCESS OF ONE GPD PER VERTICAL FOOT OF MANHOLE FOR THE LIFE OF THE STRUCTURE.
5. BASE SECTIONS SHALL BE OF MONOLITHIC CONSTRUCTION TO A POINT AT LEAST 6 INCHES ABOVE THE CROWN OF THE INCOMING PIPE.
6. HORIZONTAL JOINTS BETWEEN SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE OF AN OVERLAPPING TYPE SEALED FOR WATER TIGHTNESS USING A DOUBLE ROW OF AN ELASTOMERIC OR MASTIC-LIKE SEALANT.
7. PER NHDES ENV-WQ 704.13(C), MORTAR USED IN MANHOLE CONSTRUCTION SHALL COMPLY WITH THE FOLLOWING:
   (1) MORTAR SHALL BE COMPOSED OF TYPE II PORTLAND CEMENT AND SAND WITH OR WITHOUT HYDRATED LIME ADDITION
   (2) PROPORTIONS IN MORTAR OF PARTS BY VOLUMES SHALL BE PER TABLE 704-4:
   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;
   (1) CEMENT SHALL BE TYPE II PORTLAND CEMENT THAT IS CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM C150/C150M STANDARD IN EFFECT AT THE TIME THE CEMENT WAS MANUFACTURED
   (2) HYDRATED LIME SHALL BE TYPE S THAT IS CERTIFIED BY ITS MANUFACTURER AS CONFORMING TO THE ASTM C207 STANDARD IN EFFECT AT THE TIME THE HYDRATED LIME WAS PROCESSED
   (3) SAND SHALL CONSIST OF INERT NATURAL SAND THAT IS CERTIFIED BY ITS SUPPLIER AS CONFORMING TO THE ASTM C33 STANDARD IN EFFECT AT THE TIME THE SAND IS PROCESSED BY "STANDARD SPECIFICATIONS FOR CONCRETE, FINE AGGREGATES
   (4) CONCRETE FOR DROP SUPPORTS SHALL CONFORM TO THE REQUIREMENT FOR CLASS AAA CONCRETE OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AS AVAILABLE AT: HTTP://WWW.NH.GOV/DOT/ORG/PROJECTDEVELOPMENT/HIGHWAYDESIGN/SPECIFICATIONS/INDEX.HTM
7. ALL MANHOLES SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH ENV-WQ 704.17 (a) THROUGH (e). WET WELLS SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH ENV-WQ 705.02(i).
8. ALL PRECAST SECTIONS SHALL BE COATED ON THE EXTERIOR WITH A BITUMINOUS DAMP-PROOFING COATING IN ACCORDANCE WITH ENV-WQ 704.12 (J).
9. ALL PRECAST SECTIONS AND BASES SHALL HAVE THE DATE OF MANUFACTURE AND THE NAME OR TRADEMARK OF THE MANUFACTURER IMPRESSED OR INDELIBLY MARKED ON THE INSIDE WALL PER Env-Wq 704.12(i).
10. ALL PRESSURE PVC PIPES TO CONFORM TO ASTM D2241 PER ENV-WQ 704.08(C), AS APPLICABLE.
11. PUMPS AND ELECTRICAL COMPONENTS IN THE WET WELL SHALL BE DESIGNED FOR CLASS I DIVISION 1 LOCATIONS.
12. PUMP CONTROL PANEL TO HAVE INDIVIDUAL PUMP RUN METERS.
13. PUMP STATION ALARM CONDITIONS
   a. HIGH WATER ALARM
   b. LOW WATER ALARM
   c. PHASE LOSS
13. WITHIN 60 DAYS OF SUBSTANTIAL PROJECT COMPLETION AND A FINAL OWNER/OPERATOR IS DETERMINED, THE ENGINEER WILL SUBMIT AN EMERGENCY OPERATIONS PLAN AND PROCEDURES PER ENV-WQ 705.10.
14. A PERMANENT GENERATOR FOR BACK-UP POWER SUPPLY WITH A SOUND ATTENUATING ENCLOSURE SHALL BE INSTALLED.
15. SHOP DRAWINGS MUST BE SUBMITTED TO TOWN OF EXETER AND THE PROJECT'S THIRD PARTY INSPECTOR FOR REVIEW.



NOTE:
FOR RETAINING WALL HEIGHTS GREATER THAN 4-FEET TALL: CONTRACTOR SHALL OBTAIN WALL DESIGN BY LICENSED STRUCTURAL ENGINEER AND PROVIDE TO ENGINEER OF RECORD FOR REVIEW PRIOR TO MATERIAL ORDERING.

VERTI-BLOCK RETAINING WALL

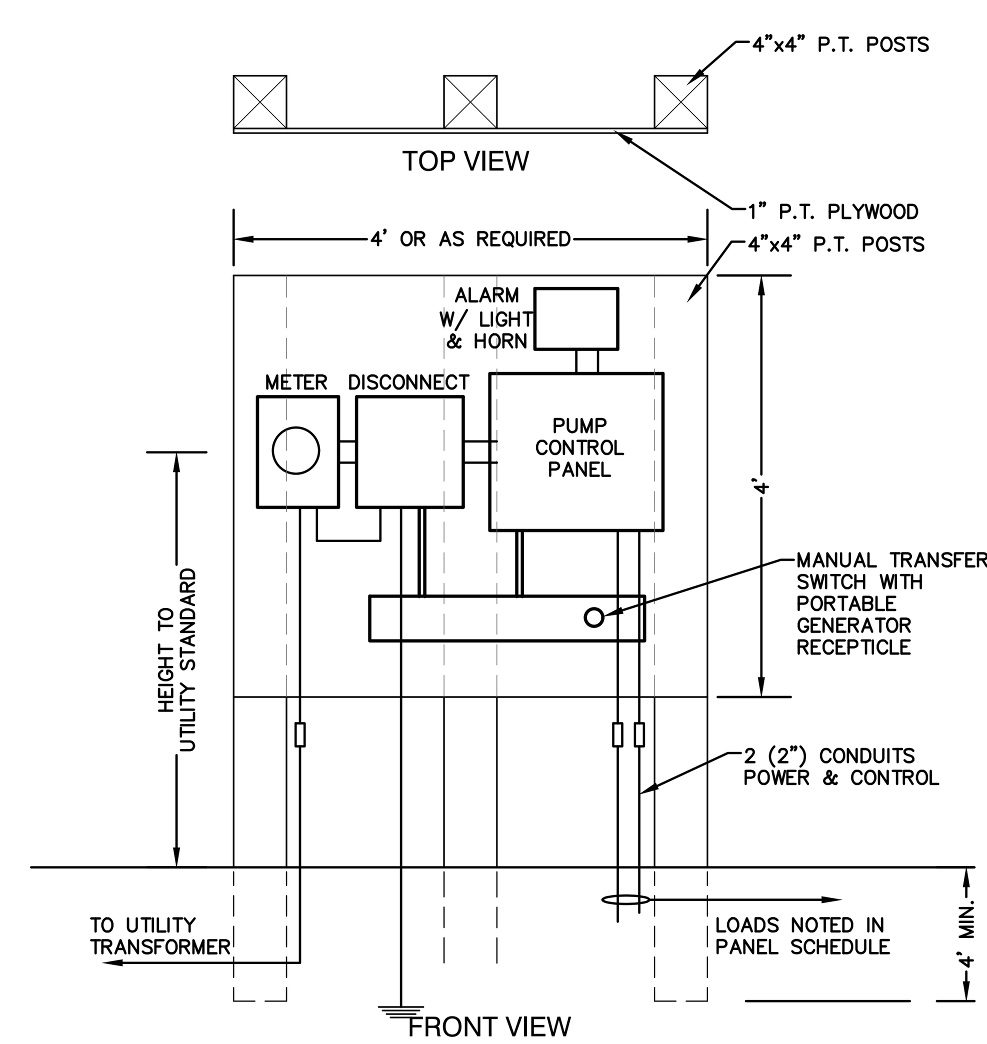
NOT TO SCALE



NOTES:
1. USE 6'-0" POSTS WHEN FILL SLOPE IS 4:1 OR FLATTER.
2. ALL TIMBER POSTS TO BE TREATED WITH PRESERVATIVE MATERIAL CONFORMING TO AASHTO M133.
3. POST BOLTS TO BE 18" W/MIN. 2½" THREAD LENGTH.

GUARD RAIL

NOT TO SCALE



EQUIPMENT BACKBOARD

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS NOTED	Project No.: 24029
Drawing Name: 24029-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.

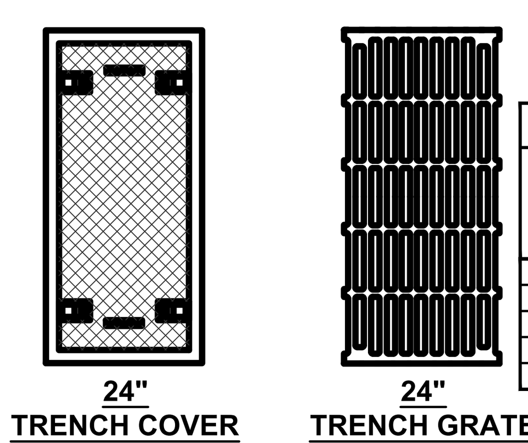
STATE OF NEW HAMPSHIRE — PAIGE S. LIBBEY No.16670 — LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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:	DETAIL SHEET
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
D3

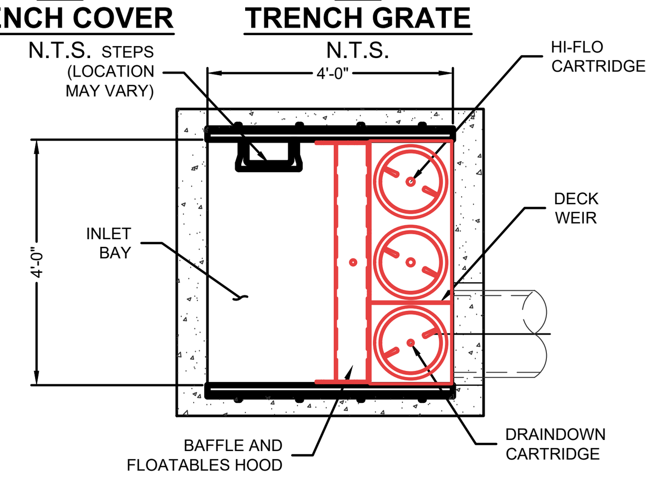


JELLYFISH DESIGN NOTES

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD SURFACE INLET STYLE WITH TRENCH GRATE AND COVER IS SHOWN. ALTERNATE CURB INLET OR PIPE INLET OPTIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD.

CARTRIDGE SELECTION

CARTRIDGE LENGTH	54"	40"	27"	15"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"	5'-4"	4'-3"	3'-3"
FLOW RATE HIGH-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089	0.133 / 0.067	0.089 / 0.045	0.049 / 0.025
MAX. TREATMENT (CFS)	0.45	0.33	0.22	0.12
OUTLET INVERT TO RIM (MIN) (B)	3'-4"	3'-4"	3'-4"	3'-4"



PLAN VIEW

(TOP SLAB NOT SHOWN FOR CLARITY)

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	#1	#2
WATER QUALITY FLOW RATE (cfs)	0.34	0.22
PEAK FLOW RATE (cfs)	2.72	1.84
RETURN PERIOD OF PEAK FLOW (yrs)	50	50
# OF CARTRIDGES REQUIRED (HF / DD)	2/1	2/1
CARTRIDGE LENGTH	40"	27"

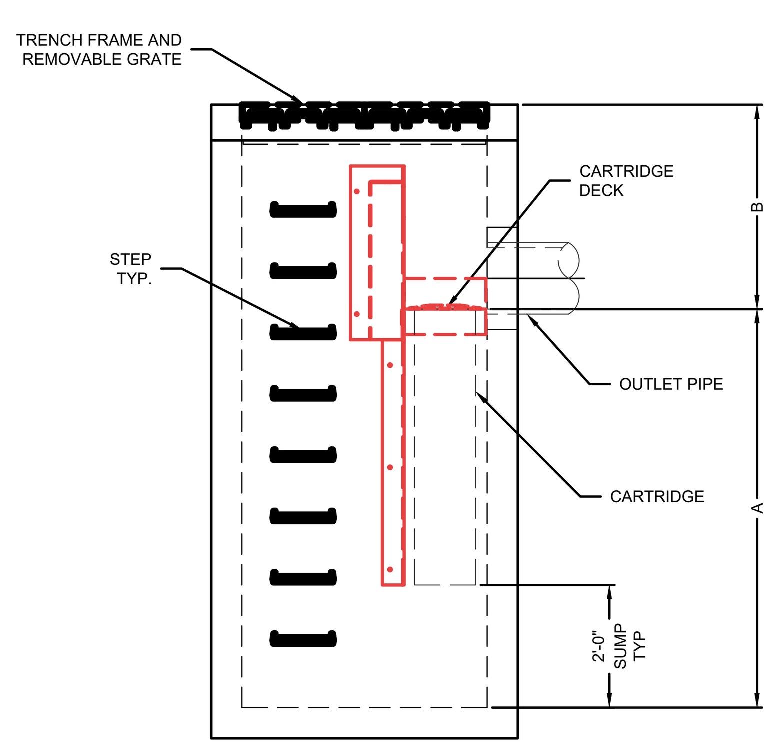
PIPE DATA: SEE GRADING AND DRAINAGE PLAN

SEE GENERAL NOTES 6-7 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.

RIM ELEVATION	SEEPLAN

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD



GENERAL NOTES:

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND AASHTO LOAD FACTOR DESIGN METHOD.
6. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDED TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE (WHERE APPLICABLE) AT EQUAL OR GREATER SLOPE.
8. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
D. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.

ELEVATION VIEW

Jellyfish® Filter

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING: U.S. PATENT NO. 8,287,726; 8,221,618; US 8,123,935; OTHER INTERNATIONAL PATENTS PENDING

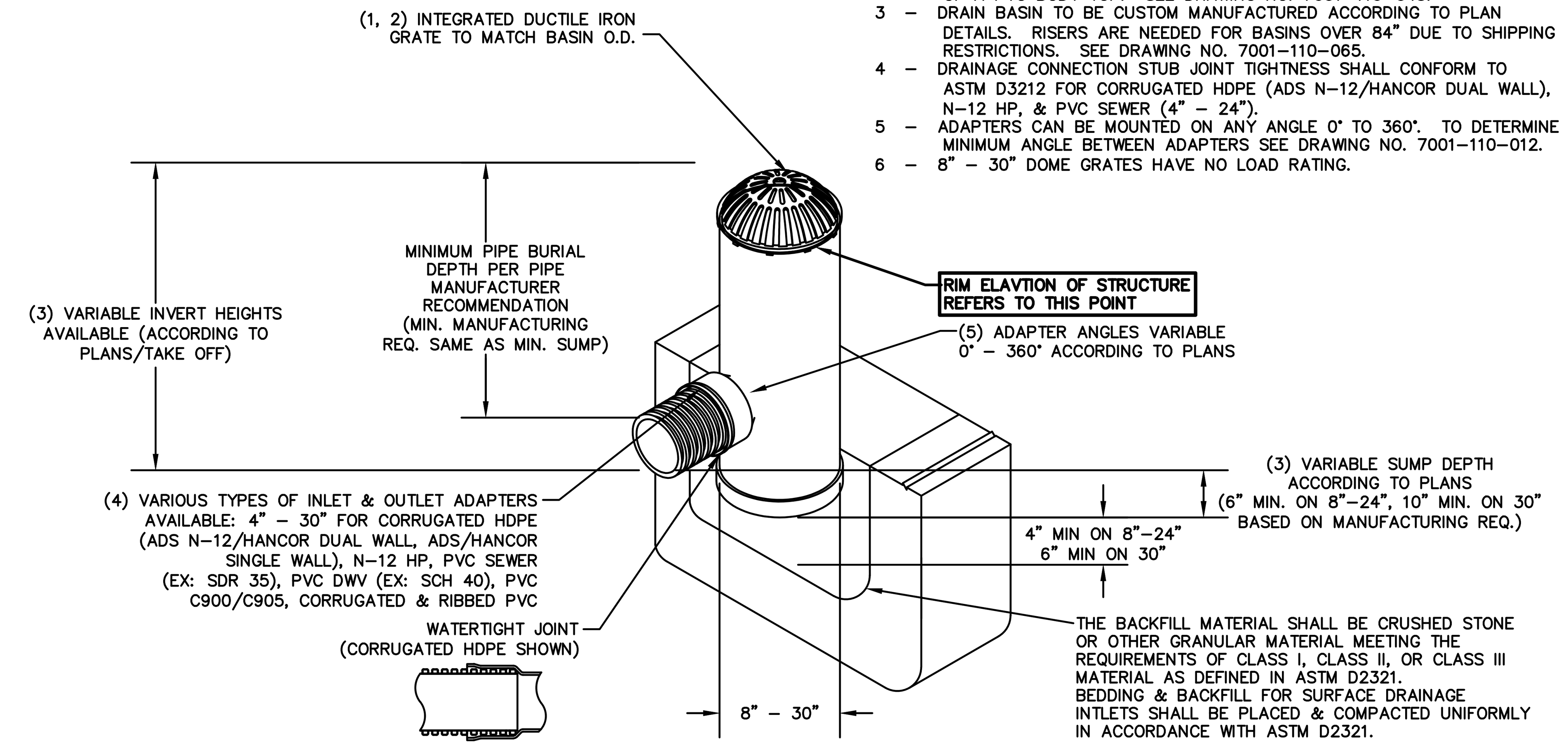
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH "JELLYFISH" JFSI0404 - SURFACE INLET CONFIGURATION DETAIL

NOT TO SCALE

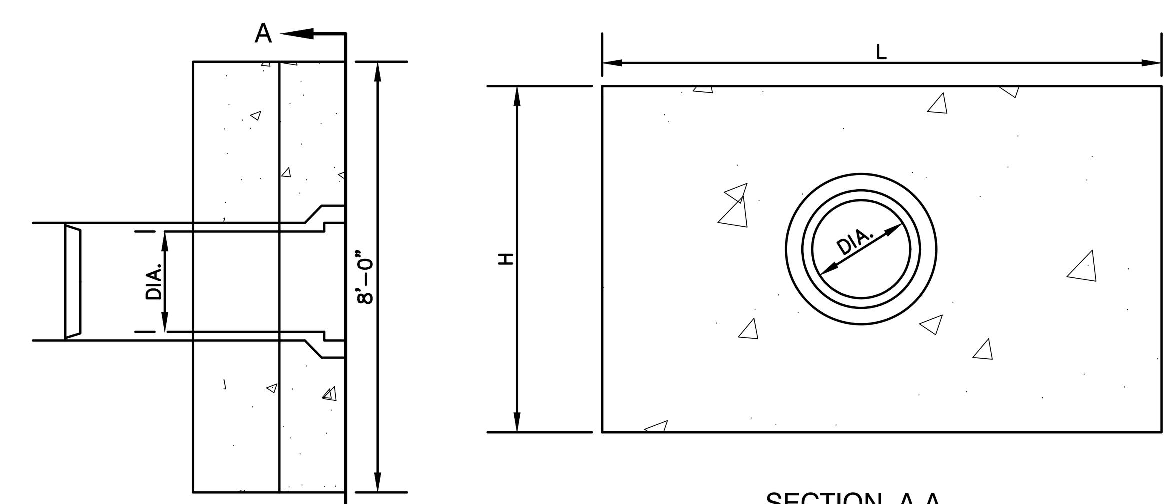
NOTES:

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.

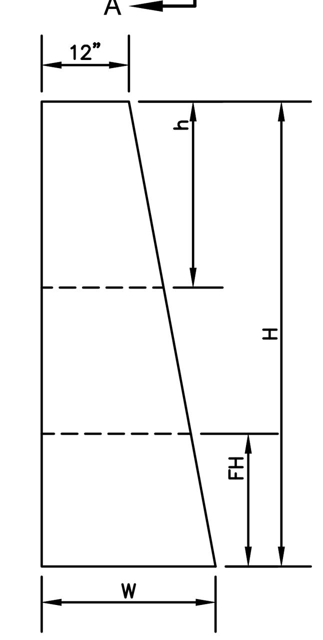


NYLOPLAST DRAIN BASIN W/ DOME GRATE (YARD DRAIN SPECIFICATION)

NOT TO SCALE



SECTION A-A



LONGITUDINAL SECTION

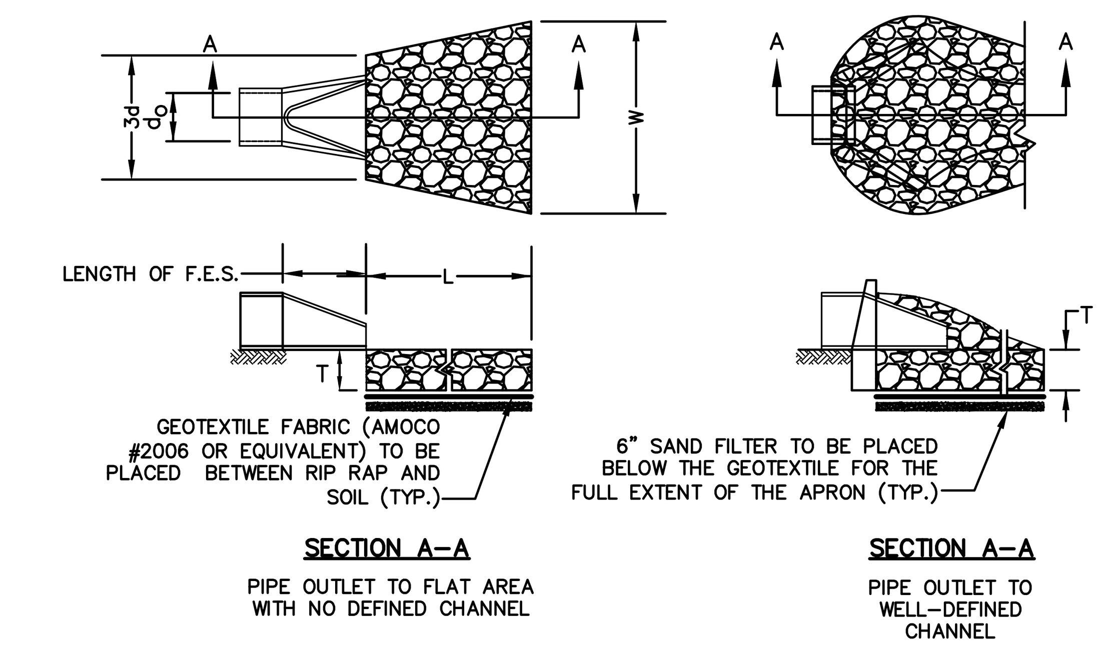
DIA.	HEADWALL LENGTH	HEADWALL HEIGHT	FILL HEIGHT	PIPE COVER	HEADWALL BOTTOM WIDTH
D	L	H	FH	h	W
12"	4'–2"	3'–9"	1'–6"	1'–3"	1'–11"
15"	5'–11"	4'–2"	1'–6"	1'–5"	2'–0"
18"	6'–11"	4'–5"	1'–6"	1'–5"	2'–1"
24"	8'–10"	4'–11"	1'–6"	1'–5"	2'–3"

NOTES:

1. ALL DIMENSIONS GIVEN IN FEET & INCHES.
2. PROVIDE BELL END AT INLET HEADWALL, AND SPIGOT END AT OUTLET END HEADWALL.
3. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS. CEMENT TO BE TYPE III PER ASTM C–150. REINFORCING TO MEET OR EXCEED ASTM A–615 GRADE 60 DEFORMED BARS.
4. 1" THREADED INSERTS PROVED FOR FINAL ATTACHMENT IN FIELD BY OTHERS.

PRECAST CONCRETE HEADWALL

NOT TO SCALE



SECTION A–A
PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL

SECTION A–A
PIPE OUTLET TO WELL–DEFINED CHANNEL

TABLE 7–24––RECOMMENDED RIP RAP GRADATION RANGES		
THICKNESS OF RIP RAP = 0.75 FEET		
d50 SIZE= 0.25 FEET 3 INCHES		
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	5	6
85%	4	5
50%	3	5
15%	1	2

TABLE 7–24––RECOMMENDED RIP RAP GRADATION RANGES		
THICKNESS OF RIP RAP = 1.5 FEET		
d50 SIZE= 0.5 FEET 6 INCHES		
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	9	12
85%	8	11
50%	6	9
15%	2	3

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: 3/15/24
Checked: PSL	Scale: AS NOTED	Project No.: 24029
Drawing Name: 24029-PLAN.dwg		

STATE OF NEW HAMPSHIRE – PAIGE S. LIBBEY No.16670 – LICENSED PROFESSIONAL ENGINEER – 02/14/2025

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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

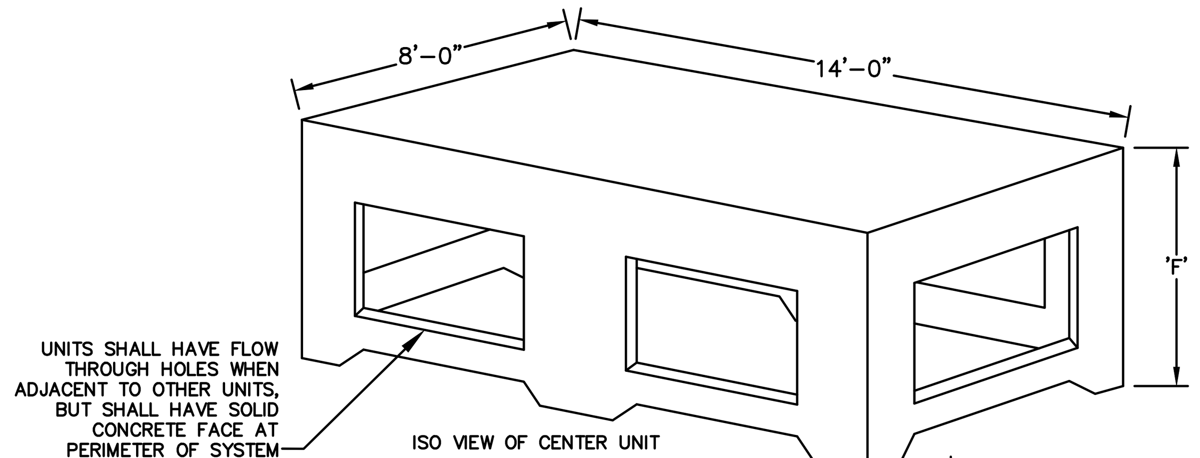
Plan Name:	DETAIL SHEET
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.

D4

CONTRACTOR ORDER SCHEDULE						
	FLOW-THROUGH HOLES ON ALL SIDES	NO FLOW-THROUGH HOLES ON ONE 8' SIDE	NO FLOW-THROUGH HOLES ON ONE 14' SIDE	NO FLOW-THROUGH HOLES ON ONE 8' AND ONE 14' SIDE	NO FLOW-THROUGH HOLES ON TWO 8' SIDES	NO FLOW-THROUGH HOLES ON TWO 8' AND ONE 14' SIDE
SYSTEM A	12	4	12	4	0	0

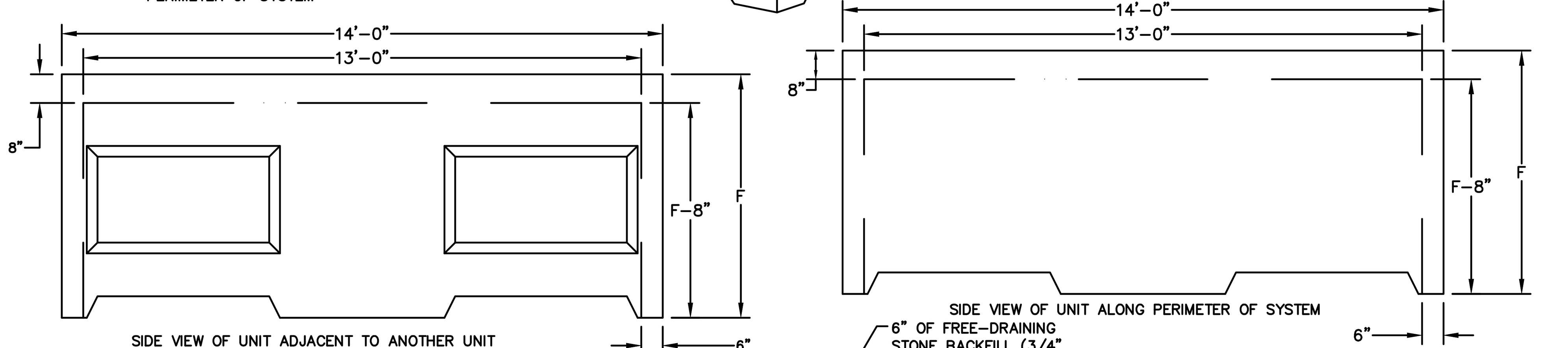
ELEVATION SCHEDULE						
	EL. A	EL. B	EL. C	EL. D	EL. E	F (HEIGHT)
SYSTEM A	>37.5	36.42	35.75	31.75	30.75	4.67'

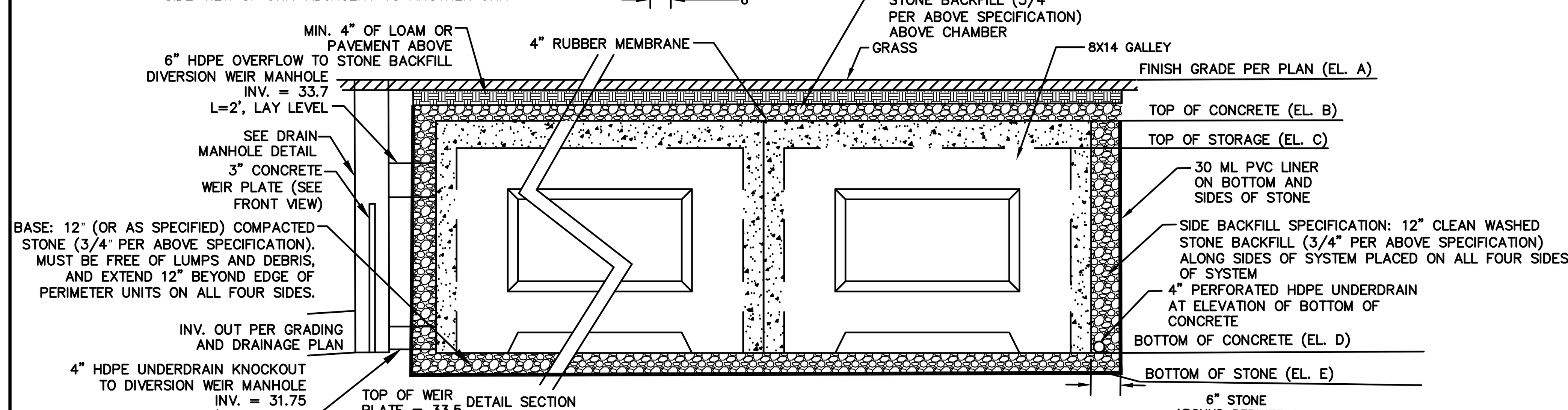


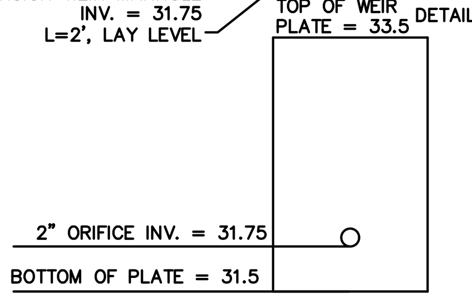
STONE BACKFILL SPECIFICATION

SIEVE SIZE	% BY WEIGHT
1"	100
3/4"	90-100
1/2"	40-90
#8	23-49
#200	2-8

HEIGHT(H)	VOLUME(EA)	WEIGHT
4'-8"	400CF	18,300#



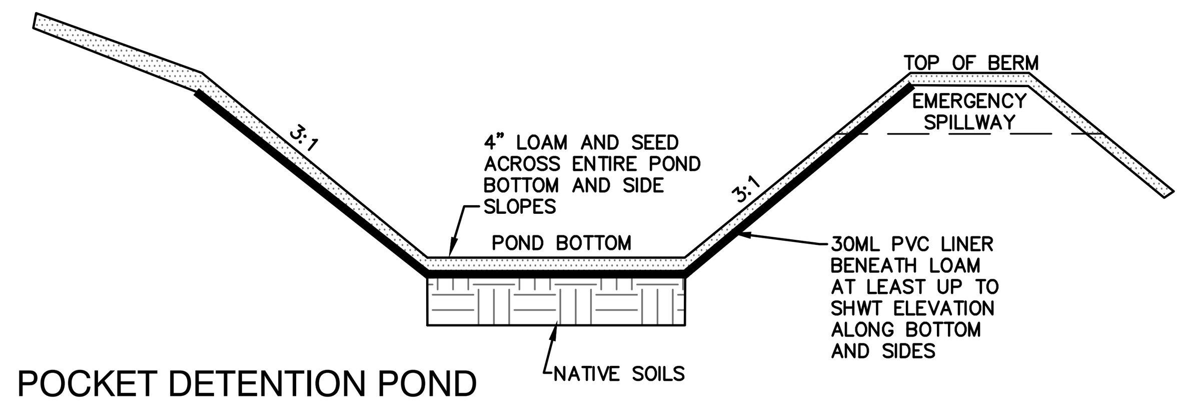




NOTES:
1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
2. DESIGNED FOR AASHTO HS-20 LOAD, 0 TO 5FT COVER. CAN BE DESIGNED FOR ADDITIONAL COVER IF REQUIRED.
3. STANDARD SLAB DESIGN WITHSTANDS 40KIP OUTRIGGER LOAD ON A 24" SQUARE PAD WITH 24" COVER OVER SLAB.
4. CORE HOLE FOR MORTAR JOINT AT INVERT IN LOCATION(S). PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS SO AS TO BE WATERTIGHT
5. COMPACT SUBGRADE TO A BEARING CAPACITY OF AT LEAST 2000 PSF PRIOR TO PLACEMENT OF SYSTEM.
6. GALLEY 8X14 UNITS THAT ARE ADJACENT TO OTHER GALLEY 8X14 UNITS ON ALL SIDES SHALL HAVE FLOW THROUGH HOLES ON ALL SIDES. UNITS THAT ARE NOT ADJACENT TO OTHER UNITS ON AT LEAST ONE SIDE SHALL HAVE A SOLID CONCRETE FACE ON THE SIDES ON THE UNIT THAT ARE NOT ADJACENT TO OTHER UNITS (ALONG PERIMETER OF SYSTEM).
7. SEE OUTLET PIPE SIZES, INVERTS, AND MATERIALS ON GRADING AND DRAINAGE PLAN.

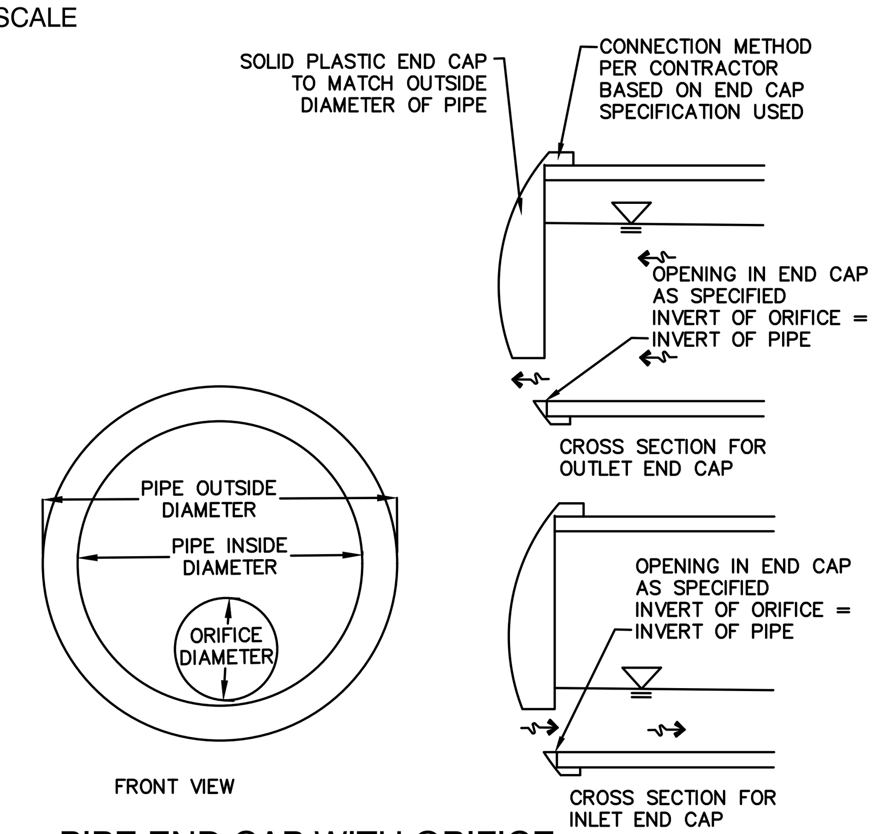
SHEA CONCRETE PRODUCTS "GALLEY 8x14"

NOT TO SCALE



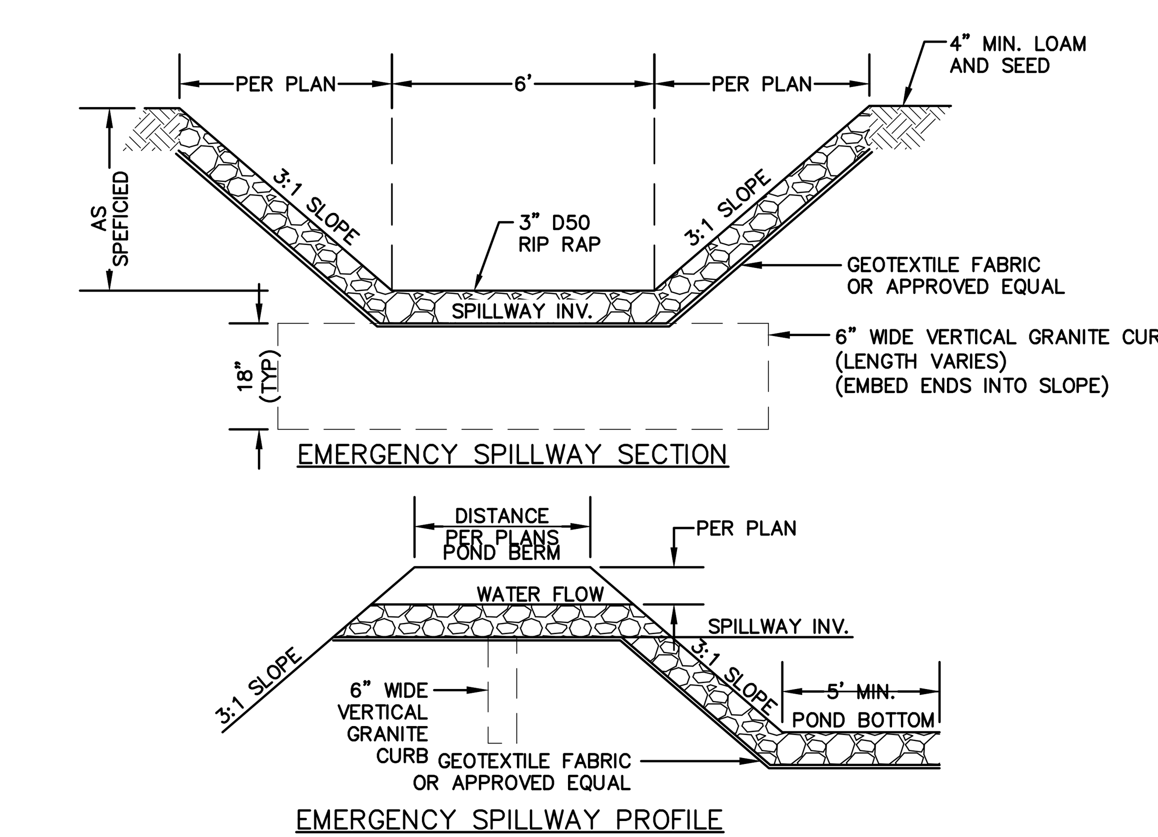
POCKET DETENTION POND

NOT TO SCALE



PIPE END CAP WITH ORIFICE

NOT TO SCALE

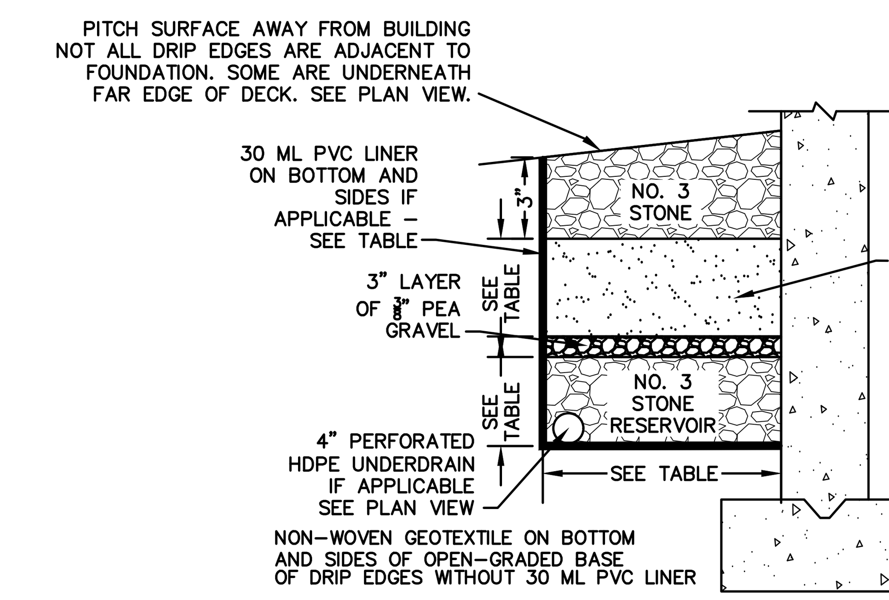


SPILLWAY ELEVATION NOTED ON GRADING AND DRAINAGE PLAN REFERS TO BOTTOM OF RIP RAP.

EMERGENCY SPILLWAY

NOT TO SCALE

DRIP EDGE SPECIFICATIONS SCHEDULE									
DRIP EDGE#	LENGTH (FT.)	WIDTH (FT.)	TOTAL DEPTH (FT.)	FILTER COURSE DEPTH (IN.)	STONE RESERVOIR DEPTH (IN.)	MIN. TOP EL.	MIN. BOTTOM EL.	STONE OR FILTRATION	LINED AND UNDERDRAINED?
1	131	3.25	2.75	18	9	38.0	35.25	FILTRATION	YES
2	98	3.5	2.75	18	9	37.75	35.0	FILTRATION	YES
3	120	3.0	2.75	18	9	36.0	33.25	FILTRATION	YES
4	48	3.5	3.25	24	9	27.0	23.75	FILTRATION	YES
5	48	3.5	3.25	24	9	25.6	22.35	FILTRATION	YES
6	48	3.5	3.25	24	9	26.25	23.00	FILTRATION	YES
7	48	3.75	2.75	18	9	33.25	30.50	FILTRATION	YES
8	48	3.75	2.75	18	9	33.0	30.25	FILTRATION	YES
9	76	3.5	2.75	18	9	35.0	32.25	FILTRATION	YES
10	116	5.5	2.25	N/A	N/A	37.5	35.25	STONE	NO
11	48	3.0	2.75	18	9	37.0	34.25	FILTRATION	YES



FILTER COURSE SPECIFICATIONS:
20-30% TOPSOIL, 20-30% MULCH,
50-55% SAND PER BELOW:

TOPSOIL SPECIFICATION
LOAMY SAND TOPSOIL WITH MINIMAL CLAY CONTENT AND BETWEEN 15 TO 25% FINES PASSING THE #200 SIEVE.

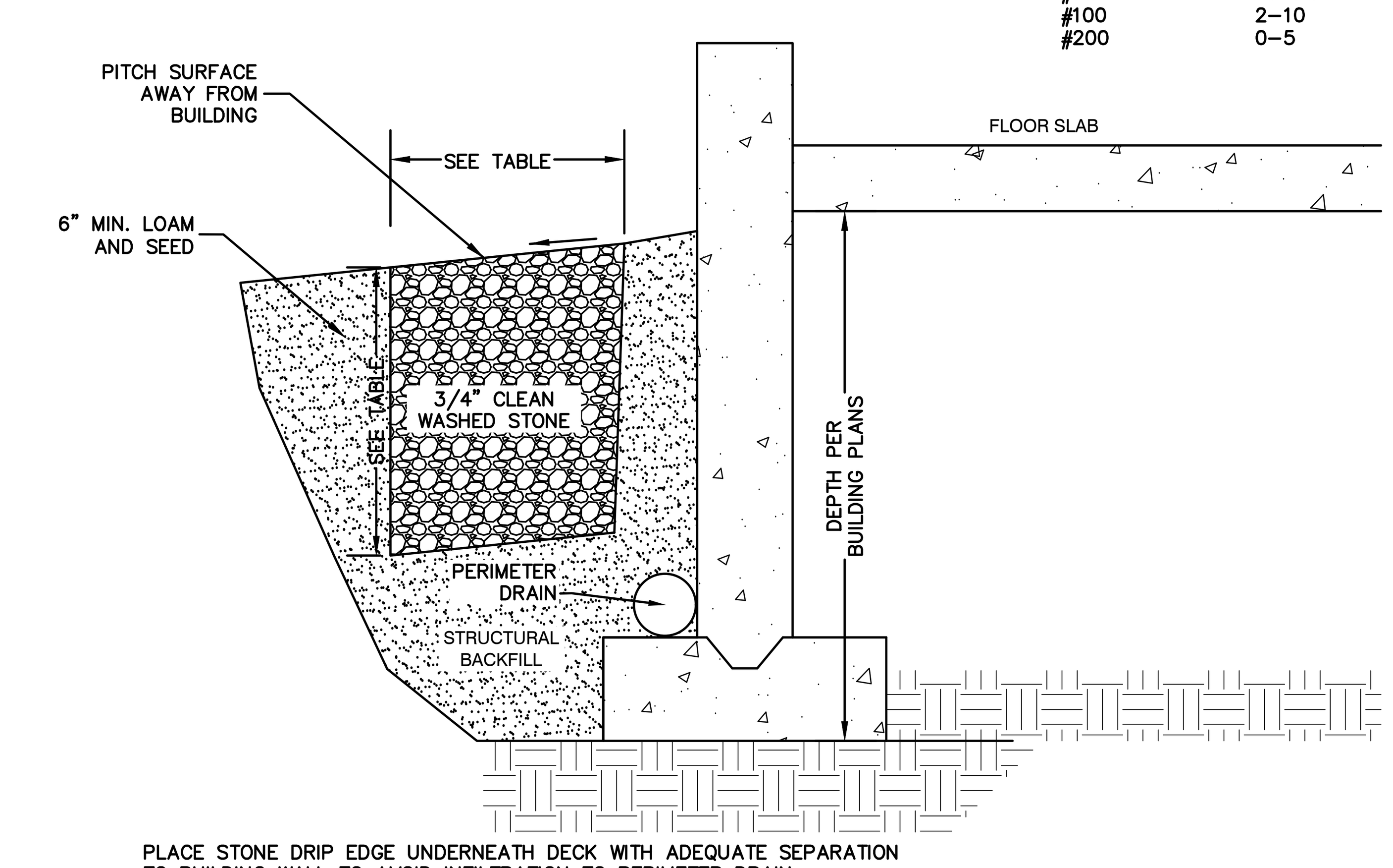
MULCH SPECIFICATION
MODERATELY FINE, SHREDDED BARK OR WOOD FIBER MULCH WITH LESS THAN 5% PASSING THE #200 SIEVE.

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

FILTRATION DRIP EDGE DETAIL

NOT TO SCALE



PLACE STONE DRIP EDGE UNDERNEATH DECK WITH ADEQUATE SEPARATION TO BUILDING WALL TO AVOID INFILTRATION TO PERIMETER DRAIN

STONE DRIP EDGE DETAIL

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS NOTED	Project No.: 24029
Drawing Name: 24029-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 – PAIGE S. LIBBEY No.16670 LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

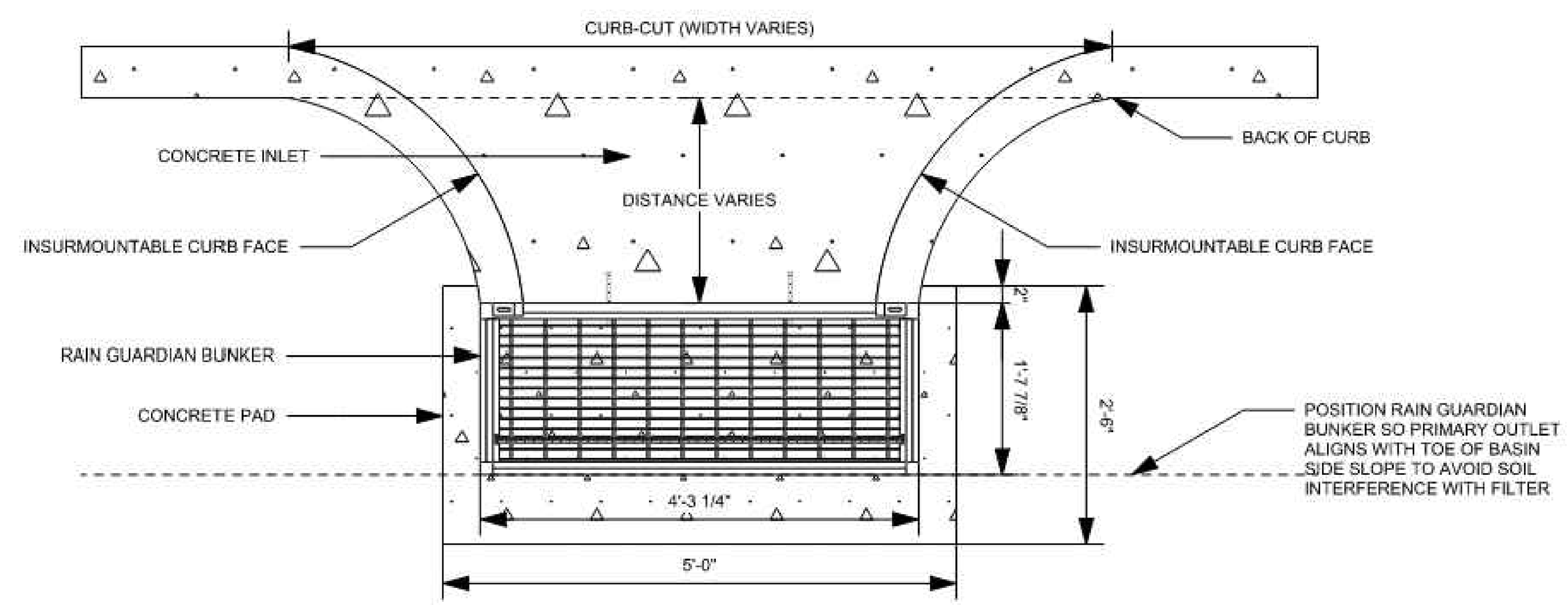
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.

D5

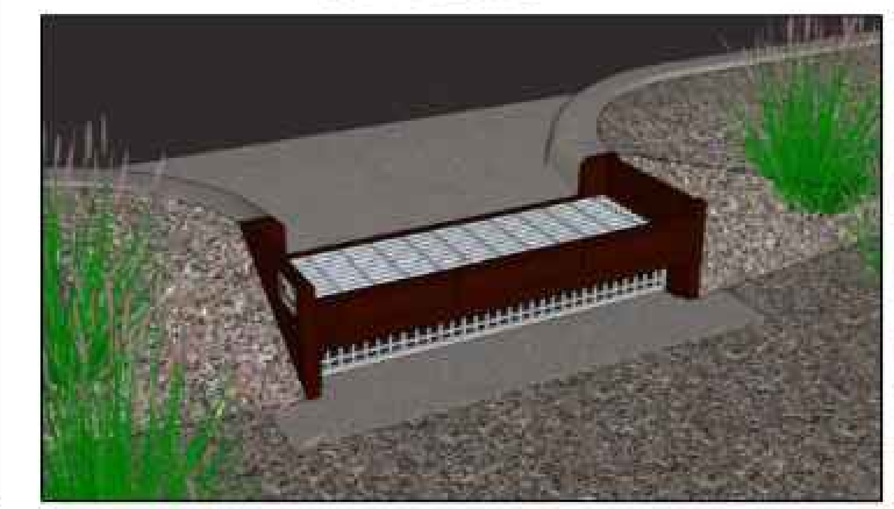
PLAN VIEW



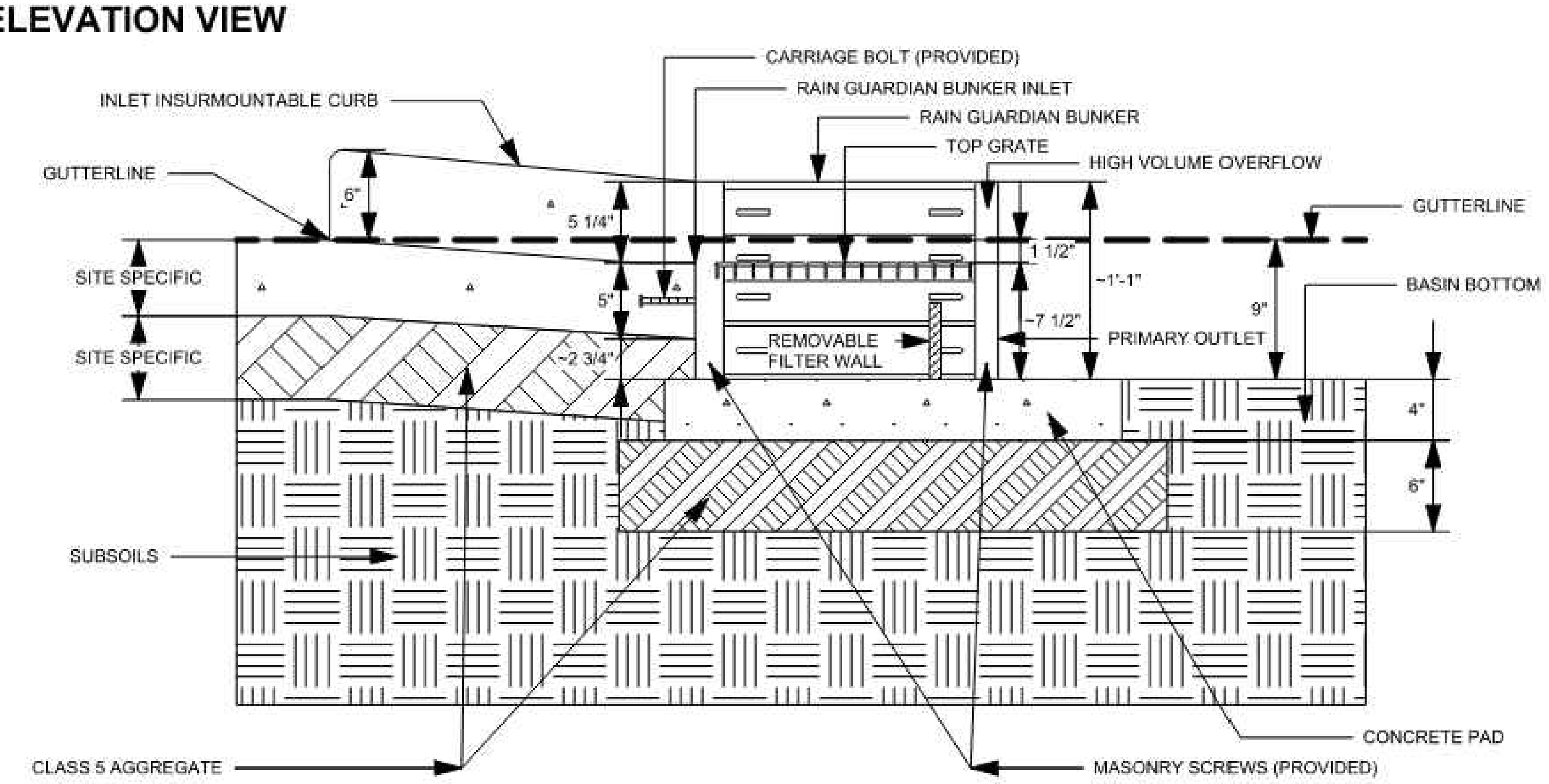
PLAN VIEW NOTES

1. INLET WIDTH AND DISTANCE BETWEEN BACK OF CURB AND RAIN GUARDIAN BUNKER MAY VARY WITH SITE CONDITIONS. INSTALLATION FLUSH WITH THE BACK OF THE CURB CAN ALSO BE COMPLETED WITH THE RAIN GUARDIAN BUNKER.
2. CONCRETE PAD EXTENDS BEYOND THE FILTER WALL OF THE RAIN GUARDIAN BUNKER TO SERVE AS A SPLASH DISSIPATOR.

3D VIEWS



ELEVATION VIEW



ELEVATION VIEW NOTES

1. THE TOP OF THE CLASS 5 BASE (COMPACTED TO 95% STANDARD PROCTOR) IS PRECISELY 1' 1" BELOW THE GUTTERLINE ELEVATION.
2. THE TOP OF THE CONCRETE PAD IS PRECISELY 9" BELOW THE GUTTERLINE.

SPECIFICATIONS

1. CHAMBER CONSTRUCTED OF RECYCLED PLASTIC LUMBER (95%+) MANUFACTURED AND DESIGNED TO ASTM C1028, D6108, D6109, D6111, D6117, AND D6341 (54 LBS).
2. TOP GALVANIZED METAL GRATE (35 LBS, 1" THICK) - 316 LB CONCENTRATED LOAD OR 158 LB/SQ-FT UNIFORM LOAD.

INSTALLATION NOTES

1. INSTALL THE CONCRETE PAD WITH A 1' 10" OFFSET FROM THE BACK OF THE CURB TO ACCOMMODATE THE CONCRETE INLET. THIS DISTANCE MAY VARY BASED ON SITE CONDITIONS, BUT CONSIDERATIONS SHOULD INCLUDE SLOPE OF THE INLET AND BASIN SIDE SLOPES ADJACENT TO THE RAIN GUARDIAN BUNKER. POSITION RAIN GUARDIAN BUNKER SO PRIMARY OUTLET ALIGNS WITH TOE OF BASIN SIDE SLOPE TO AVOID SOIL INTERFERENCE WITH REMOVABLE FILTER WALL. THE CONCRETE PAD SHOULD BE REINFORCED WITH REBAR.
2. EXCAVATE 1' 7" BELOW THE GUTTERLINE ELEVATION (I.E. THE BIORETENTION OVERFLOW ELEVATION) TO ACCOMMODATE THE 9" PONDING DEPTH, 6" CLASS 5 AGGREGATE, AND 4" CONCRETE PAD TO WHICH THE RAIN GUARDIAN BUNKER WILL BE SECURED. THEREFORE, THE TOP OF THE FINISHED CONCRETE PAD IS PRECISELY 9" BELOW THE GUTTERLINE ELEVATION. THE TOP OF THE RAIN GUARDIAN BUNKER METAL GRATE WILL BE 7-1/2" ABOVE THE TOP OF THE CONCRETE PAD AND 1-1/2" BELOW THE GUTTERLINE ELEVATION TO ACCOMMODATE A SLOPED INLET FROM THE GUTTER TO THE RAIN GUARDIAN BUNKER.
3. THE RAIN GUARDIAN BUNKER SHOULD BE POSITIONED 2" FROM THE EDGE OF THE CONCRETE PAD CLOSEST TO THE BACK OF THE CURB. THEREFORE, THE RAIN GUARDIAN BUNKER WILL BE 2' FROM THE BACK OF THE CURB.
4. USING THE PILOT HOLE IN EACH OF THE FOUR CORNER POSTS, PREDRILL 5/32" HOLES INTO THE CONCRETE PAD WITH A 4-1/2" MASONRY BIT AND HAMMER DRILL.
5. SECURE RAIN GUARDIAN BUNKER TO CONCRETE PAD WITH FOUR 3/16" X 2-3/4" MASONRY SCREWS (PROVIDED).
6. INSTALL FRAMING FOR INLET BETWEEN RAIN GUARDIAN BUNKER AND BACK OF CURB. TOP ELEVATIONS OF THE FRAMING SHOULD MATCH THE TOP OF THE CURB ON THE STREET SIDE AND THE TOP OF THE RAIN GUARDIAN BUNKER ON THE BIORETENTION SIDE.
7. WHEN POURING THE CONCRETE INLET, ENSURE THE CARRIAGE BOLTS ON THE RAIN GUARDIAN BUNKER ARE SURROUNDED BY AT LEAST 2" OF CONCRETE ON ALL SIDES.
8. SIDE CURBS OF THE POURED INLET MUST HAVE AN INSURMOUNTABLE PROFILE TO PREVENT WATER FLOW FROM OVERTOPPING THE DOWNSTREAM SIDE OF THE INLET.
9. WRAP CABLE THROUGH TOP METAL GRATE AND SECURE WITH PROVIDED CLAMP. ENSURE SUFFICIENT SLACK EXISTS IN CABLE TO ALLOW FOR GRATE REMOVAL AND PLACEMENT IN CONCRETE INLET DURING CLEANING. REMOVABLE FILTER WALL SHOULD BE INSTALLED WITH FILTER FABRIC FACING THE RAIN GUARDIAN BUNKER INLET.

RAIN GUARDIAN
U.S. PATENT NOS. 8,501,016 AND 8,858,804
PRETREATMENT FOR BIORETENTION
Rain Gardens • Swales • Filtration Basins • Infiltration Basins
www.RainGuardian.biz

NOTE: THE 9" RAIN GUARDIAN BUNKER IS A NON-STANDARD PRODUCT AND REQUIRES ADVANCED NOTICE WHEN ORDERING.

RAIN GUARDIAN BUNKER PRETREATMENT CHAMBER
BIORETENTION PONDING DEPTH: 9"
TYPICAL DETAIL

REVISION HISTORY

REV	BY	DATE	DESCRIPTION
A	MDH	02/22/2022	BUNKER - 9"
SCALE		VARIABLE	
U.S. PATENT NOS.		8,501,016 AND 8,858,804	

DEVELOPED/MANUFACTURED BY:
ANOKA CONSERVATION DISTRICT

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS NOTED	Project No.: 24029
Drawing Name: 24029-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 — PAIGE S. LIBBEY No.16670 — LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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:	DETAIL SHEET
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
D7
SHEET 27 OF 31
JBE PROJECT NO. 24029

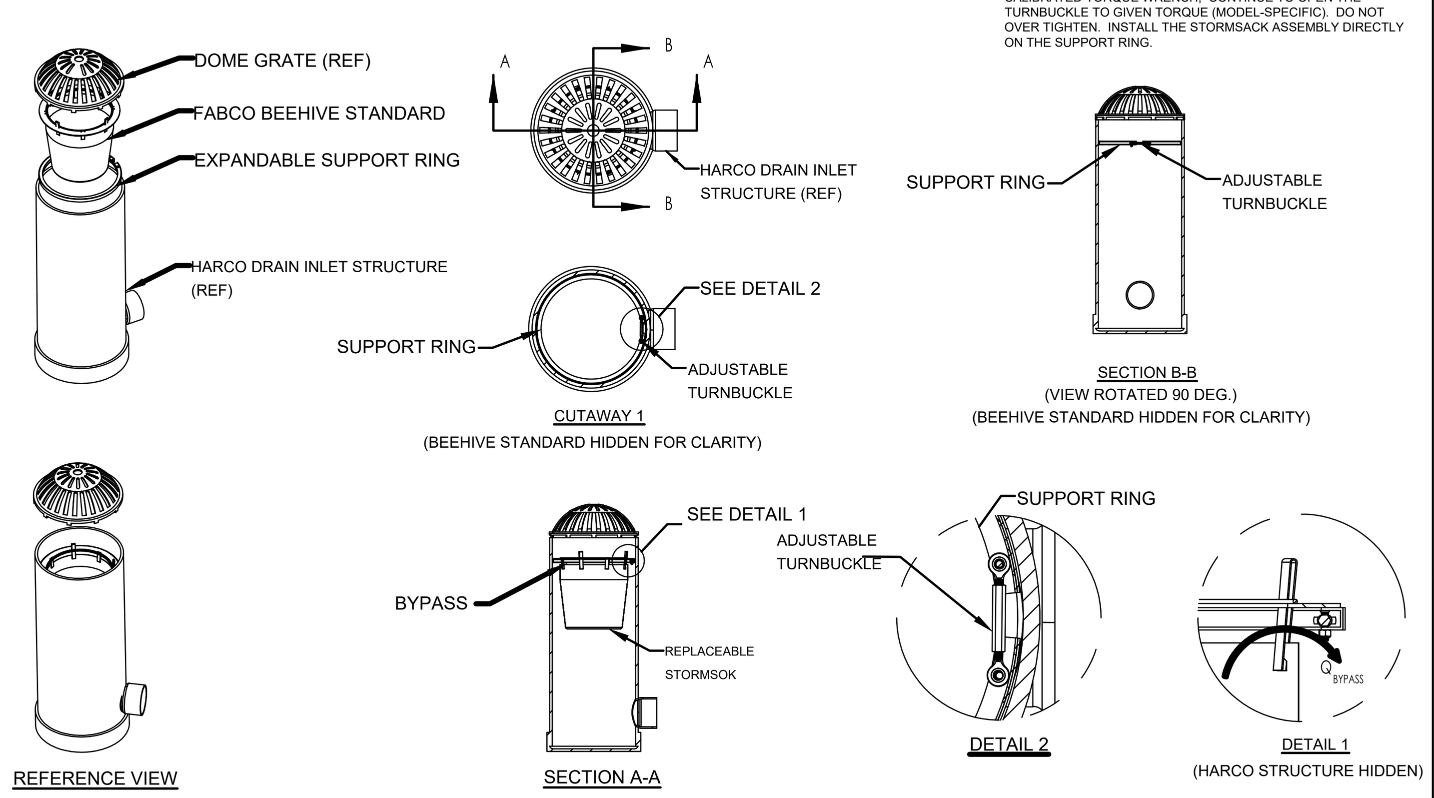
STRUCTURE DIAMETER (IN.)	DEBRIS CAPACITY (CU.FT)	FILTERED FLOWRATE (CFS)	BYPASS FLOWRATE (CFS)
12	0.66	1.7	1.0
15	1.0	2.1	1.3
18	1.2	2.3	1.4
24	2.8	3.9	2.2
30	2.8	3.9	2.2

NOTES:

1. MATERIAL:
   - A) SUPPORT FLANGE: ALUMINUM ALLOY PLATE, 5000 SERIES
   - B) STORMSOK: WOVEN POLYPROPYLENE GEOTEXTILE
   - C) EXPANSION RING: ALUMINUM ALLOY CHANNEL, 6000 SERIES
   - D) HARDWARE: STAINLESS STEEL
2. RECOMMENDED MINIMUM VAULT DEPTH: 2-IN BELOW STORMSOK
3. USE ONLY WITH FABCO REPLACEABLE STORMSOK

GENERAL INSTALLATION:

ADJUST THE TURNBUCKLE DOWN TO GIVE THE SMALLEST RING DIAMETER AND LOCATE THE EXPANSION RING INTO THE HARCO STRUCTURE MINIMUM OF 6-IN DOWN FROM THE TOP OPENING AS SHOWN. BEGIN OPENING THE TURNBUCKLE UNTIL THE EXPANSION RING IS SELF SUPPORTING, THEN VERIFY THE RING IS LEVEL AND PLUMB TO THE HARCO STRUCTURE. USING A CALIBRATED TORQUE WRENCH, CONTINUE TO OPEN THE TURNBUCKLE TO GIVEN TORQUE (MODEL-SPECIFIC). DO NOT OVER TIGHTEN. INSTALL THE STORMSACK ASSEMBLY DIRECTLY ON THE SUPPORT RING.



ACF BEEHIVE OVERFLOW FILTER STRUCTURE DETAILS

FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

REVISED AUG 2020

FOCALPOINT HP PERFORMANCE SPECIFICATION:

HIGH PERFORMANCE MEDIA

HIGH PERFORMANCE MEDIA MUST MEET A MINIMUM OF 100" PER HOUR INFILTRATION RATE.

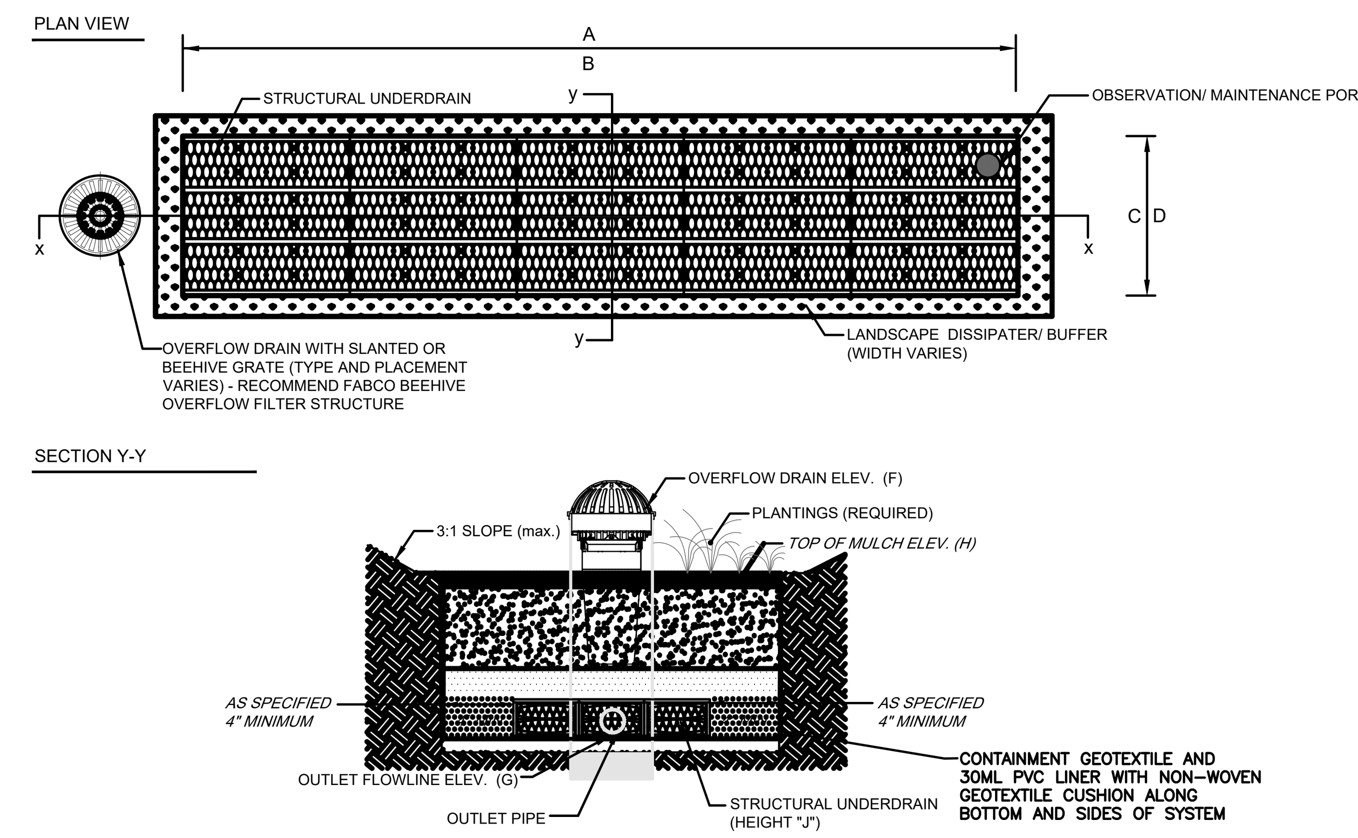
HIGH PERFORMANCE STRUCTURAL UNDERDRAIN

MUST HAVE A MINIMUM OF 19 SQUARE INCHES OF ORIFICE OPENING PER SQUARE FOOT.
MUST MEET H20 LOADING REQUIREMENTS.
MUST BE MODULAR IN NATURE AND ASSEMBLED ON SITE.
MUST HAVE MINIMUM 90% INTERIOR VOID SPACE.

PLANT COMPONENT

SUPPLIER SHALL PROVIDE LIST OF ACCEPTABLE PLANTS
IF PLANTS ARE NOT INCLUDED IN THE LANDSCAPE CONTRACT/PLANS. SITE CONTRACTOR SHALL PROVIDE PLANTS.
PLANTS SHALL BE INSTALLED AT THE TIME THE SYSTEM IS COMMISSIONED FOR USE. PLANTING OUTSIDE THIS TIME REQUIRES APPROVAL BY THE ENGINEER/LANDSCAPE ARCHITECT OF RECORD.
SEE FOCALPOINT INSTALLATION GUIDE FOR PLANT SPACING, PLANTING PROCEDURES ETC.

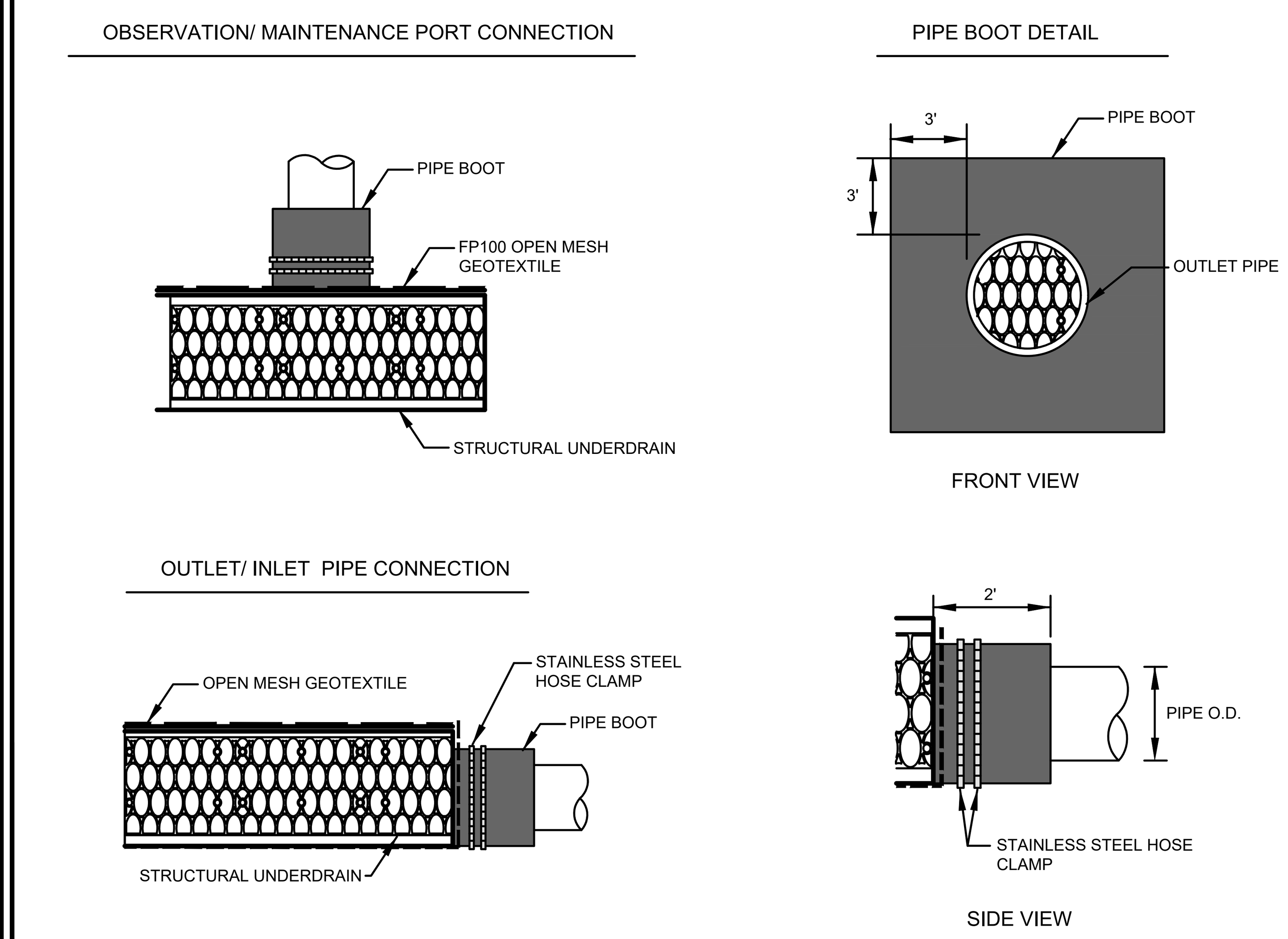
FOCALPOINT HP CONSTRUCTION GUIDE		
A	FOCALPOINT LENGTH	SEE PLANS
B	# UNDERDRAIN LONG	SEE PLANS
C	FOCALPOINT WIDTH	SEE PLANS
D	# UNDERDRAIN WIDE	SEE PLANS
E	WATER QUALITY VOLUME	VARIES
F	OVERFLOW ELEVATION	SEE PLANS
G	OUTLET FLOWLINE	SEE PLANS
H	TOP OF MULCH	SEE PLANS
I	TOP OF GABION (OPTIONAL)	NO GABION
J	UNDERDRAIN HEIGHT	SEE PLANS



FOCALPOINT HP CONSTRUCTION GUIDE

FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

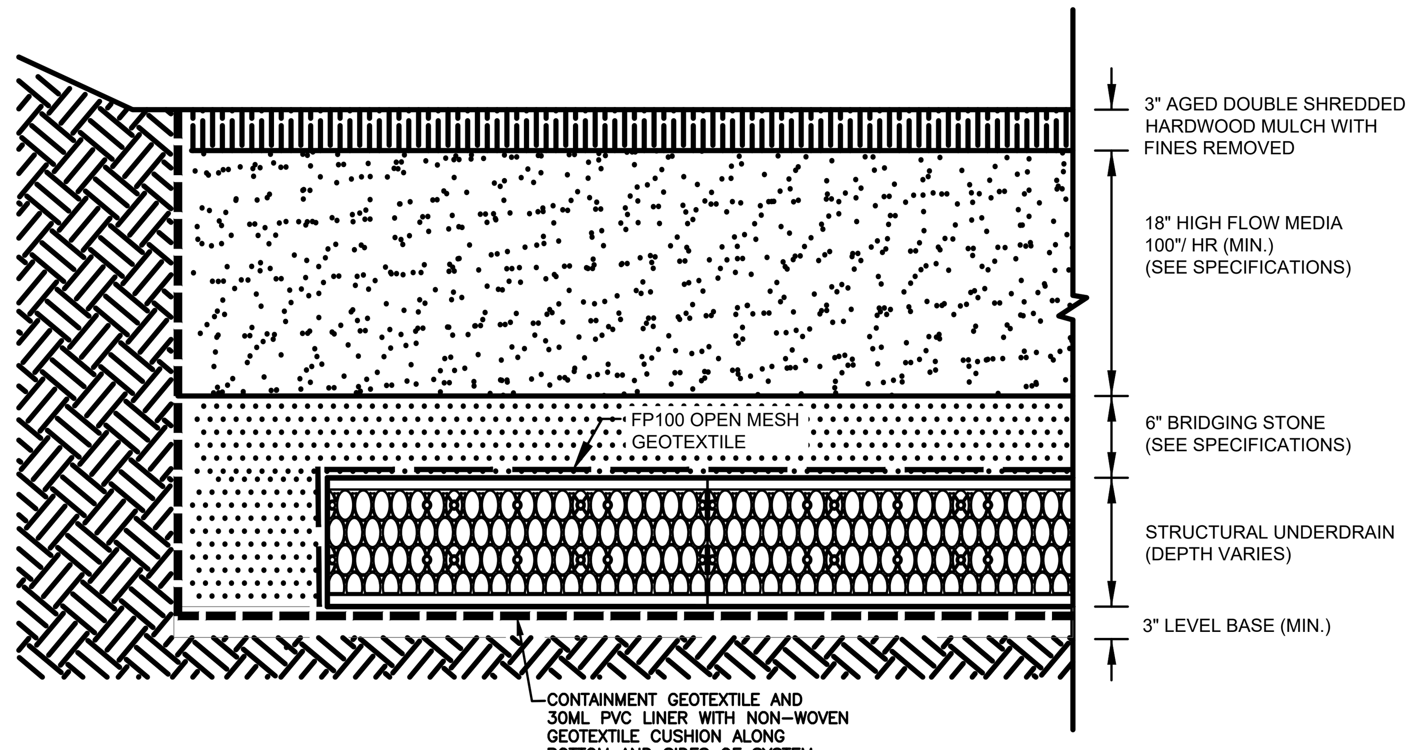
REVISED AUG 2020



FOCALPOINT PIPE CONNECTION

FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

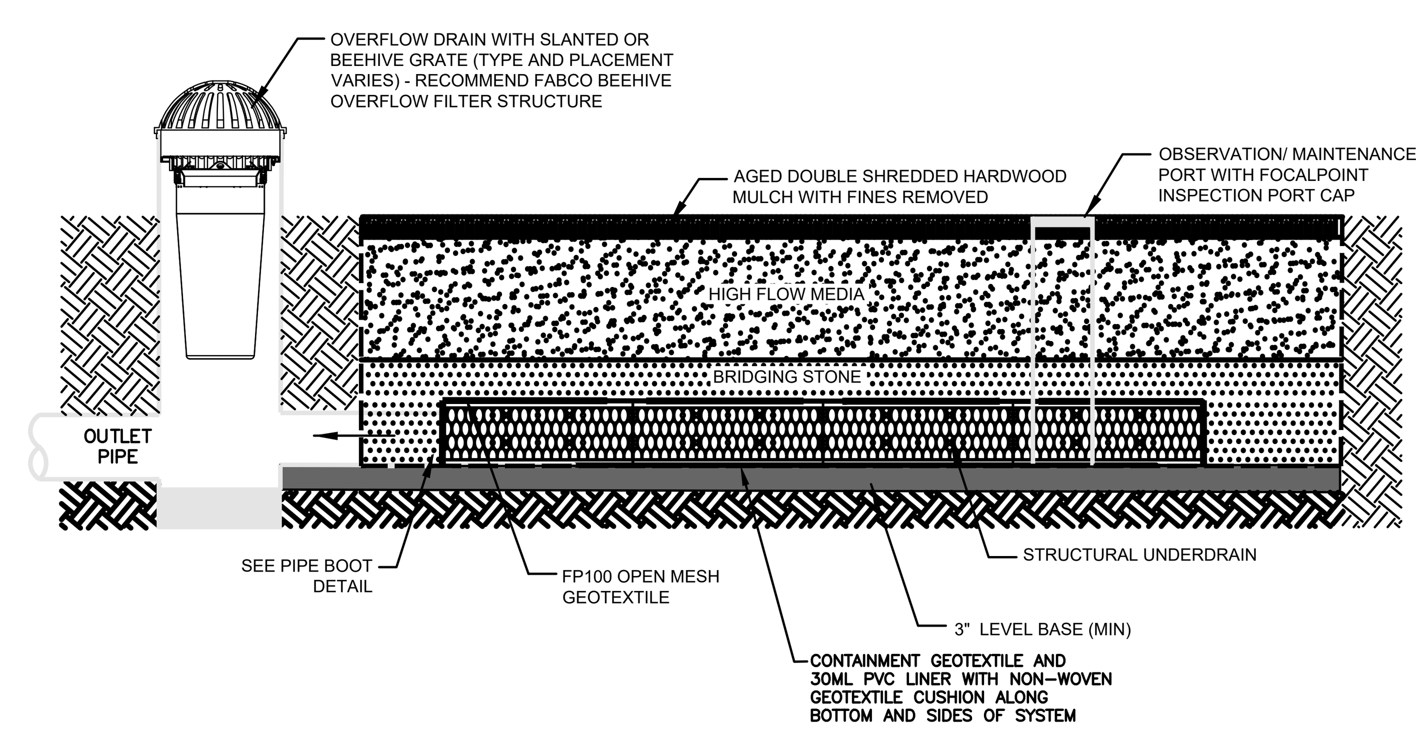
REVISED AUG 2020



FOCALPOINT HP DETAILED CROSS SECTION

FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

REVISED AUG 2020



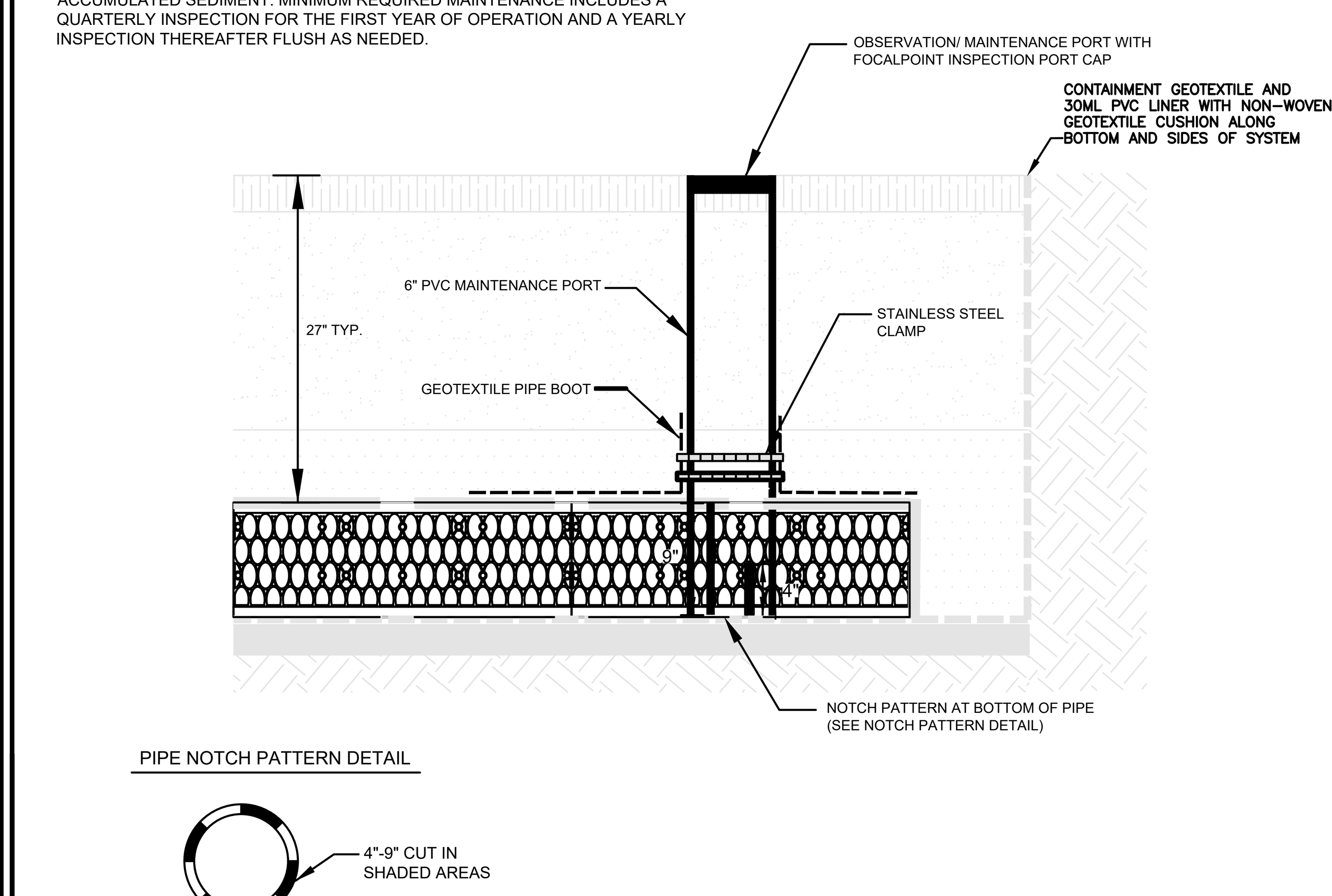
FOCALPOINT HP SECTION X-X

FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

REVISED AUG 2020

OBSERVATION/ MAINTENANCE PORT

PORT USED FOR INSPECTION PURPOSES AND FOR SYSTEM MAINTENANCE AS REQUIRED. WATER SHALL BE PUMPED INTO THE SYSTEM AND RESUSPEND ACCUMULATED SEDIMENT. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION FOR THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER FLUSH AS NEEDED.



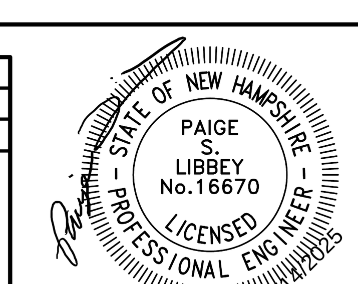
FOCALPOINT OBSERVATION/ MAINTENANCE PORT

FOR MORE INFORMATION CONTACT ACF ENVIRONMENTAL
WWW.ACFENVIRONMENTAL.COM
800.448.3636

REVISED AUG 2020

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS NOTED	Project No.: 24029
Drawing Name: 24029-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.



REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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:	DETAIL SHEET
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.

D7

SHEET 28 OF 31
JBE PROJECT NO. 24029

CONSTRUCTION SPECIFICATIONS FOR POROUS ASPHALT

REFERENCE DOCUMENT: UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS, UNH STORMWATER CENTER, FEBRUARY, 2014, REVISION SEPTEMBER, 2016

INSTALLATION RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS WILL HELP ASSURE THAT THE POROUS ASPHALT PAVEMENT IS PROPERLY INSTALLED.

1. THE FULL PAVEMENT SPECIFICATION MUST BE FOLLOWED CONSCIENTIOUSLY DURING CONSTRUCTION. IT IS BASED ON UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS. THE UNH SPECIFICATION INCLUDE NUMEROUS VITAL PROVISIONS FOR AGGREGATE AND BITUMINOUS MATERIALS, THEIR PLACEMENT, AND QUALITY CONTROL. AMONG ITS NOTABLE PROVISIONS ARE THE FOLLOWING EXAMPLES:
   - OPEN-GRADED AGGREGATE TO MAKE ALL PAVEMENT LAYERS POROUS AND PERMEABLE;
   - STIFF ASPHALT BINDER TO ADHERE TO THE AGGREGATE PARTICLES AND RESIST "DRAINDOWN" THROUGH THE PAVEMENT'S PORES, ENHANCING THE MATERIAL'S PERFORMANCE AND DURABILITY;
   - A SPECIFIC LIMIT ON ALLOWABLE DRAINDOWN, AND ADDITION OF A STYRENE-BUTADIENE-STYRENE (SBS) POLYMER ADDITIVE TO HELP MEET THAT REQUIREMENT;
   - THE POROUS PAVEMENT IS TO BE INSTALLED ONLY AFTER MAJOR CONSTRUCTION IS COMPLETED, SO THAT CONSTRUCTION TRAFFIC WILL NOT TRACK POTENTIALLY CLOGGING SEDIMENT ONTO THE PAVEMENT SURFACE. FOR CONSTRUCTION ACCESS, A TEMPORARY SURFACE WILL BE INSTALLED, SIMILAR IN CONSTRUCTION TO A STANDARD STABILIZED CONSTRUCTION ENTRANCE. THIS TYPE OF SURFACE CAN BEAR CONSTRUCTION TRAFFIC WITHOUT ERODING.
   - PROMINENT AND REPEATED STATEMENTS OF THE SPECIAL NATURE AND PURPOSE OF POROUS PAVEMENT, AND THE NECESSITY OF COMPLYING STRICTLY WITH THESE DISTINCTIVE SPECIFICATIONS.
   - PROTECTION OF THE FINISHED POROUS ASPHALT SURFACE FROM TRACKING OF CONSTRUCTION SEDIMENT.
2. THOROUGH COMMUNICATION WITH THE POROUS ASPHALT SUPPLIER AND PAVEMENT INSTALLER IS ESSENTIAL. THEY MUST UNDERSTAND THE POROUS PAVEMENT'S SPECIAL OBJECTIVES, THE SPECIAL MATERIALS AND PROCEDURES NECESSARY TO MAKE IT EFFECTIVE, AND WHY COMPLIANCE WITH SPECIFICATIONS IS ESSENTIAL. TO THIS END, THE SPECIFICATIONS STATE PROMINENTLY AND REPEATEDLY THE SPECIAL NATURE AND PURPOSE OF THE POROUS MATERIALS. IN ADDITION, THE PROJECT ENGINEER SHOULD MEET WITH THE CONTRACTORS IN PERSON TO REVIEW THE SPECIFICATIONS AND MAKE SURE THE CONTRACTORS UNDERSTAND THE OBJECTIVES. HE SHOULD OBSERVE THE CONTRACTORS ON-SITE FREQUENTLY, TO MAKE SURE THE OBJECTIVES ARE CARRIED OUT. HE SHOULD MAINTAIN A WRITTEN RECORD DOCUMENTING REVIEW AND APPROVAL AT CRITICAL PROJECT STAGES SUCH AS EXCAVATION OF THE SUB GRADE AND QUALITY CHECKS OF BASE AND SURFACE MATERIALS. HE SHOULD INSPECT THE SITE TO MAKE SURE CONSTRUCTION VEHICLES ARE NOT ALLOWED TO TRAVERSE EXCAVATED SUB GRADE OR THE PAVEMENT STRUCTURE AT ANY INAPPROPRIATE STAGE. HE SHOULD FORBID CONSTRUCTION TRAFFIC FROM TRACKING SOIL ONTO THE FINISHED PAVEMENT SURFACE.

INSTALLATION

A. PERCOLATION BEDS
1. OWNER SHALL BE NOTIFIED AT LEAST 24 HOURS PRIOR TO ALL PERCOLATION BED AND POROUS PAVING WORK.
2. SUB GRADE PREPARATION
   a. EXISTING SUB GRADE UNDER BED AREAS SHALL NOT BE COMPACTED OR SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO STONE BED PLACEMENT.
   b. WHERE EROSION OF SUB GRADE HAS CAUSED ACCUMULATION OF FINE MATERIALS AND/OR SURFACE PONDING, THIS MATERIAL SHALL BE REMOVED WITH LIGHT EQUIPMENT AND THE UNDERLYING SOILS SCARIFIED TO A MINIMUM DEPTH OF 6 INCHES WITH A YORK RAKE OR EQUIVALENT AND LIGHT TRACTOR.
   c. BRING SUB GRADE OF STONE PERCOLATION BED TO LINE, GRADE, AND ELEVATIONS INDICATED. FILL AND LIGHTLY REGRADE ANY AREAS DAMAGED BY EROSION, PONDING, OR TRAFFIC COMPACTION BEFORE THE PLACING OF STONE. ALL BED BOTTOMS ARE LEVEL GRADE.
   d. WHERE PARKING LOT BASE IS NOT LEVEL, INTERNAL DAMS ARE TO BE INSTALLED EVERY 100 YARDS ALONG CONTOUR LINES IN THE COARSE SUBBASE MATERIALS (CRUSHED STONE). A SUBDRAIN SHOULD BE LOCATED IMMEDIATELY UPSTREAM OF INTERNAL DAMS. DAMS ARE TO BE MADE OF OVERLYING FILTER COARSE OR MEDIUM TO FINE SAND EQUIVALENT.
3. RECHARGE BED INSTALLATION
   a. UPON COMPLETION OF SUB GRADE WORK, THE ENGINEER SHALL BE NOTIFIED AND SHALL INSPECT AT HIS DISCRETION BEFORE PROCEEDING WITH PERCOLATION BED INSTALLATION.
   b. PERCOLATION BED AGGREGATE SHALL BE PLACED IMMEDIATELY AFTER APPROVAL OF SUB GRADE PREPARATION. ANY ACCUMULATION OF DEBRIS OR SEDIMENT WHICH HAS TAKEN PLACE AFTER APPROVAL OF SUB GRADE SHALL BE REMOVED PRIOR TO INSTALLATION OF AGGREGATE AT NO EXTRA COST TO THE OWNER.
   c. INSTALL COARSE AGGREGATE (CRUSHED STONE) IN 8-INCH MAXIMUM LIFTS, TO A MAXIMUM OF 95% STANDARD PROCTOR COMPACTION, KEEPING EQUIPMENT MOVEMENT OVER STORAGE BED SUBGRADES TO A MINIMUM. INSTALL AGGREGATE TO GRADES INDICATED ON THE DRAWINGS.
   d. INSTALL FILTER COARSE (BANK RUN GRAVEL) IN 8-INCH MAXIMUM LIFTS, TO A MAXIMUM OF 95% STANDARD PROCTOR COMPACTION, KEEPING EQUIPMENT MOVEMENT OVER STORAGE BED SUBGRADES TO A MINIMUM. INSTALL AGGREGATE TO GRADES INDICATED ON THE DRAWINGS.
   e. INSTALL CHOKER BASE COURSE (SEE MATERIALS SECTION) AGGREGATE EVENLY OVER SURFACE OF STONE BED, SUFFICIENT TO ALLOW PLACEMENT OF PAVEMENT, AND NOTIFY ENGINEER FOR APPROVAL. CHOKER BASE COURSE SHALL BE SUFFICIENT TO ALLOW FOR EVEN PLACEMENT OF ASPHALT BUT NO LESS THAN 4-INCH IN DEPTH.
4. SURROUNDING AREAS
   a. BEFORE THE POROUS PAVEMENT IS INSTALLED, ADJACENT SOIL AREAS SHOULD BE SLOPED AWAY FROM ALL PAVEMENT EDGES, TO PREVENT POTENTIAL SEDIMENT FROM WASHING ONTO THE PAVEMENT SURFACE.
   b. TO ACCOMPLISH THIS, A SEQUENCE OF SWALES SHOULD BE EXCAVATED INTO ALL EARTHEN (UNPAVED) AREAS AT LEAST ON THE UPHILL SIDES OF THE PAVEMENT, AND WHERE NECESSARY, TO BELOW THE CURB OR PAVEMENT ELEVATION. ITS SHAPE AND PLANTINGS CAN BE INTEGRATED WITH THE PROJECT'S ARCHITECTURE AND LANDSCAPE, AND DESIGNED TO MAXIMIZE INFILTRATION. SWALE OVERFLOW, WHEN IT OCCURS, CAN BE DISCHARGED FROM ONE SWALE TO ANOTHER BY CONNECTING PIPES UNDER DRIVEWAYS.
   c. BUILDING BASEMENTS AND FOUNDATIONS SHOULD BE WATERPROOFED AS NECESSARY, WHERE THE POROUS PAVEMENT ABUTS BUILDINGS.

B. POROUS ASPHALT
1. TRANSPORTING MATERIAL
   a. TRANSPORTING OF MIX TO THE SITE SHALL BE IN VEHICLES WITH SMOOTH, CLEAN DUMP BEDS THAT HAVE BEEN SPRAYED WITH A NON-PETROLEUM RELEASE AGENT.
   b. THE MIX SHALL BE COVERED DURING TRANSPORT TO CONTROL COOLING.
2. POROUS BITUMINOUS ASPHALT SHALL NOT BE STORED IN EXCESS OF 90 MINUTES BEFORE PLACEMENT.
3. ASPHALT PLACEMENT
   a. THE POROUS BITUMINOUS SURFACE COURSE SHALL BE LAID IN ONE OR TWO LIFTS DIRECTLY OVER THE CHOKER COARSE, FILTER COARSE, AND CRUSHED STONE BASE COURSE TO DEPTH INDICATED. IF LAID IN TWO LIFTS THE PAVEMENT SHALL BE CLEANED AND INSPECTED BY THE ENGINEER BEFORE PLACEMENT OF THE SECOND LIFT.
   b. THE LAYING TEMPERATURE OF THE BITUMINOUS MIX SHALL BE BETWEEN 275 DEGREES FAHRENHEIT AND 325 DEGREES FAHRENHEIT (BASED ON THE RECOMMENDATIONS OF THE ASPHALT SUPPLIER).
   c. INSTALLATION SHALL TAKE PLACE WHEN AMBIENT TEMPERATURES ARE 55 DEGREES FAHRENHEIT OR ABOVE, WHEN MEASURED IN THE SHADE AWAY FROM ARTIFICIAL HEAT.
   d. THE USE OF A REMIXING MATERIAL TRANSFER DEVICE BETWEEN THE TRUCKS AND THE PAVER IS HIGHLY RECOMMENDED TO ELIMINATE COLD LUMPS IN THE MIX.
   e. THE POLYMER-MODIFIED ASPHALT IS VERY DIFFICULT TO RAKE, A WELL-HEATED SCREED SHOULD BE USED TO MINIMIZE THE NEED FOR RAKING.
   f. COMPACTION OF THE SURFACE COURSE SHALL TAKE PLACE WHEN THE SURFACE IS COOL ENOUGH TO RESIST AN 8-12-TON ROLLER. BREAKDOWN ROLLING SHALL OCCUR WHEN THE MIX TEMPERATURE IS BETWEEN 275 DEGREES FAHRENHEIT AND 325 DEGREES FAHRENHEIT. INTERMEDIATE ROLLING SHALL OCCUR WHEN THE MIX TEMPERATURE IS BETWEEN 150 DEGREES FAHRENHEIT AND 200 DEGREES FAHRENHEIT. THE CESSATION TEMPERATURE OCCURS AT APPROXIMATELY 175 DEGREES FAHRENHEIT, AT WHICH POINT THE MIX BECOMES RESISTANT TO COMPACTION. IF COMPACTION HAS NOT BEEN DONE AT TEMPERATURES GREATER THAN THE CESSATION TEMPERATURE, THE PAVEMENT WILL NOT ACHIEVE ADEQUATE DURABILITY.
4. IN THE EVENT CONSTRUCTION SEDIMENT IS INADVERTENTLY DEPOSITED ON THE FINISHED POROUS SURFACE, IT MUST BE IMMEDIATELY REMOVED BY VACUUMING.
5. AFTER FINAL ROLLING, NO VEHICULAR TRAFFIC OF ANY KIND SHALL BE PERMITTED ON THE SURFACE UNTIL COOLING AND HARDENING HAS TAKEN PLACE, AND IN NO CASE WITHIN THE FIRST 48 HOURS. PROVIDE BARRIERS AS NECESSARY AT NO EXTRA COST TO THE OWNER TO PREVENT VEHICULAR USE; REMOVE AT THE DISCRETION OF THE ENGINEER.
6. STRIPING PAINT FOR TRAFFIC LANES AND PARKING BAYS SHALL BE CHLORINATED RUBBER BASE, FACTORY MIXED, NON-BLEEDING, FAST DRYING, BEST QUALITY, WHITE TRAFFIC PAINT WITH A LIFE EXPECTANCY OF TWO YEARS UNDER NORMAL TRAFFIC USE.
   a. PAVEMENT-MARKING PAINT; LATEX, WATER-BASE EMULSION, READY-MIXED, COMPLYING WITH PS TT-P-1952.
   b. SWEEP AND CLEAN SURFACE TO ELIMINATE LOOSE MATERIAL AND DUST.
   c. PAINT 4 INCH WIDE PARKING STRIPING AND TRAFFIC LANE STRIPING IN ACCORDANCE WITH LAYOUTS OF PLAN. APPLY PAINT WITH MECHANICAL EQUIPMENT TO PRODUCE UNIFORM STRAIGHT EDGES. APPLY IN TWO COATS AT MANUFACTURER'S RECOMMENDED RATES. PROVIDE CLEAR, SHARP LINES USING WHITE TRAFFIC PAINT, INSTALLED IN ACCORDANCE WITH NHDOT SPECIFICATIONS.
6. WORK SHALL BE DONE EXPERTLY THROUGHOUT, WITHOUT STAINING OR INJURY TO OTHER WORK. TRANSITION TO ADJACENT IMPERVIOUS BITUMINOUS PAVING SHALL BE MERGED NEATLY WITH FLUSH, CLEAN LINE. FINISHED PAVING SHALL BE EVEN, WITHOUT POCKETS, AND GRADED TO ELEVATIONS SHOWN ON DRAWING.
7. POROUS PAVEMENT BEDS SHALL NOT BE USED FOR EQUIPMENT OR MATERIALS STORAGE DURING CONSTRUCTION, AND UNDER NO CIRCUMSTANCES SHALL VEHICLES BE ALLOWED TO DEPOSIT SOIL ON PAVED POROUS SURFACES.
8. REPAIR OF DAMAGED PAVING
   a. ANY EXISTING PAVING ON OR ADJACENT TO THE SITE THAT HAS BEEN DAMAGED AS A RESULT OF CONSTRUCTION WORK SHALL HE REPAIRED TO THE SATISFACTION OF THE OWNER WITHOUT ADDITIONAL COST TO THE OWNER.
9. FIELD QUALITY CONTROL
   a. THE FULL PERMEABILITY OF THE PAVEMENT SURFACE SHALL BE TESTED BY APPLICATION OF CLEAN WATER AT THE RATE OF AT LEAST 5 GPM OVER THE SURFACE, USING A HOSE OR OTHER DISTRIBUTION DEVISE. WATER USED FOR THE TEST SHALL BE CLEAN, FREE OF SUSPENDED SOLIDS AND DELETERIOUS LIQUIDS AND WILL BE PROVIDED AT NO EXTRA COST TO THE OWNER. ALL APPLIED WATER SHALL INFILTRATE DIRECTLY WITHOUT PUDDLE FORMATION OR SURFACE RUNOFF, AND SHALL BE OBSERVED BY THE ENGINEER AND OWNER.
   b. TEST IN-PLACE BASE AND SURFACE COURSE FOR COMPLIANCE WITH REQUIREMENTS FOR THICKNESS AND SURFACE SMOOTHNESS. REPAIR OR REMOVE AND REPLACE UNACCEPTABLE WORK AS DIRECTED BY THE OWNER.
   c. SURFACE SMOOTHNESS: TEST FINISHED SURFACE FOR SMOOTHNESS AND EVEN DRAINAGE, USING A TEN-FOOT TO CENTERLINE OF PAVED AREA. SURFACE WILL NOT BE ACCEPTED IF GAPS OR RIDGES EXCEED 3/16 OF AN INCH.

MAINTENANCE SPECIFICATIONS FOR POROUS ASPHALT

THE FOLLOWING RECOMMENDATIONS WILL HELP ASSURE THAT THE PAVEMENT IS MAINTAINED TO PRESERVE ITS HYDROLOGIC EFFECTIVENESS.

WINTER MAINTENANCE:

1. SANDING FOR WINTER TRACTION IS PROHIBITED. DEICING IS PERMITTED (NaCl, $MgCl_2$, OR EQUIVALENT). REDUCED SALT APPLICATION OF 50% OVER TRADITIONAL PAVEMENT APPLICATION RATES. NONTOXIC, ORGANIC DEICERS, APPLIED EITHER AS BLENDED, MAGNESIUM CHLORIDE-BASED LIQUID PRODUCTS OR AS PRETREATED SALT, ARE PREFERABLE.
2. PLOWING IS ALLOWED, BLADE SHOULD BE SLIGHTLY RAISED (ALTHOUGH NOT NECESSARY, THIS WILL PREVENT PAVEMENT SCARING). 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 ACCUMULATION.

ROUTINE MAINTENANCE:

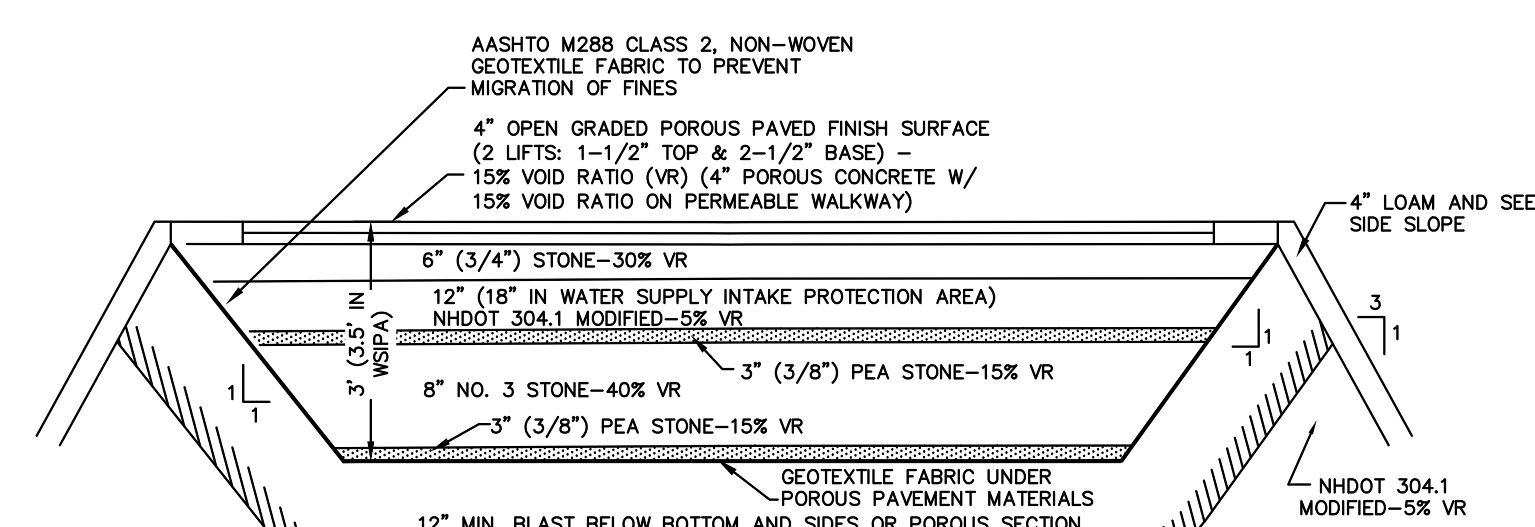
1. ASPHALT SEAL COATING MUST BE ABSOLUTELY FORBIDDEN. SURFACE SEAL COATING IS NOT REVERSIBLE.
2. THE PAVEMENT SURFACE SHOULD BE VACUUMED 2 TO 4 TIMES PER YEAR, ESPECIALLY AFTER WINTER AND FALL SEASONS, AND AT ANY ADDITIONAL TIMES SEDIMENT IS SPILLED, ERODED, OR TRACKED ONTO THE SURFACE.
3. PLANTED AREAS ADJACENT TO PERVIOUS PAVEMENT SHOULD BE WELL MAINTAINED TO PREVENT SOIL WASHOUT ONTO THE PAVEMENT. IF ANY BARE SPOTS OR ERODED AREAS ARE OBSERVED WITHIN THE PLANTED AREAS, THEY SHOULD BE REPLANTED AND/OR STABILIZED AT ONCE.
4. IMMEDIATELY CLEAN ANY SOIL DEPOSITED ON PAVEMENT. SUPERFICIAL DIRT DOES NOT NECESSARILY CLOG THE PAVEMENT VOIDS. HOWEVER, DIRT THAT IS GROUND IN REPEATEDLY BY TIRES CAN LEAD TO CLOGGING. THEREFORE, TRUCKS OR OTHER HEAVY VEHICLES SHOULD BE PREVENTED FROM TRACKING OR SPILLING DIRT ONTO THE PAVEMENT.
5. DO NOT ALLOW CONSTRUCTION STAGING, SOIL/MULCH STORAGE, ETC. ON UNPROTECTED PAVEMENT SURFACE
6. REPAIRS: FOR THE POROUS ASPHALT PARKING LOT, POTHOLES OF LESS THAN 50 SQUARE FEET CAN BE PATCHED BY ANY MEANS SUITABLE WITH STANDARD PAVEMENT OR A PERVIOUS MIX IS PREFERRED. FOR AREAS GREATER THAN 50 SQ. FT. IS IN NEED OF REPAIR, APPROVAL OF PATCH TYPE SHOULD BE SOUGHT FROM A QUALIFIED ENGINEER. ANY REQUIRED REPAIR OF DRAINAGE STRUCTURES SHOULD BE DONE PROMPTLY TO ENSURE CONTINUED PROPER FUNCTIONING OF THE SYSTEM. REPAIRS TO THE POROUS ASPHALT SIDEWALK SHALL BE MADE WITH A PERVIOUS MIX.
7. WRITTEN AND VERBAL COMMUNICATION TO THE POROUS PAVEMENT'S FUTURE OWNER SHOULD MAKE CLEAR THE PAVEMENT'S SPECIAL PURPOSE AND SPECIAL MAINTENANCE REQUIREMENTS SUCH AS THOSE LISTED HERE.
8. A PERMANENT SIGN SHOULD BE ADDED AT THE ENTRANCE AND END OF THE POROUS ASPHALT PARKING AREA TO INFORM RESIDENTS AND MAINTENANCE STAFF OF THE SPECIAL NATURE AND PURPOSE OF THE PAVEMENT, AND ITS SPECIAL MAINTENANCE REQUIREMENTS. SIGNS ARE NOT REQUIRED FOR THE POROUS SIDEWALKS.

MIX SUMMARY

1. POROUS ASPHALT PAVEMENT MIX PER THE CURRENT UNH STORM WATER CENTER DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS MANUAL.

2. NO WORK SHALL BE STARTED UNTIL THE CONTRACTOR HAS SUBMITTED AND THE ENGINEER HAS APPROVED A MIX DESIGN INCLUDING THE PERCENTAGE OF EACH INGREDIENT INCLUDING BINDER, POLYMER, AND THE JOB-MIX FORMULA FROM SUCH A COMBINATION. THE JOB-MIX FORMULA SHALL ESTABLISH A SINGLE PERCENTAGE OF AGGREGATE PASSING SIEVE AND A SINGLE PERCENTAGE OF BITUMINOUS MATERIAL TO BE ADDED TO THE AGGREGATE. NO CHANGE IN THE JOB-MIX FORMULA MAY BE MADE WITHOUT WRITTEN APPROVAL OF THE ENGINEER. THE JOB-MIX FORMULA MUST FALL WITH THE MASTER RANGE SPECIFIED IN COMPOSITION OF MIXTURE TABLE.

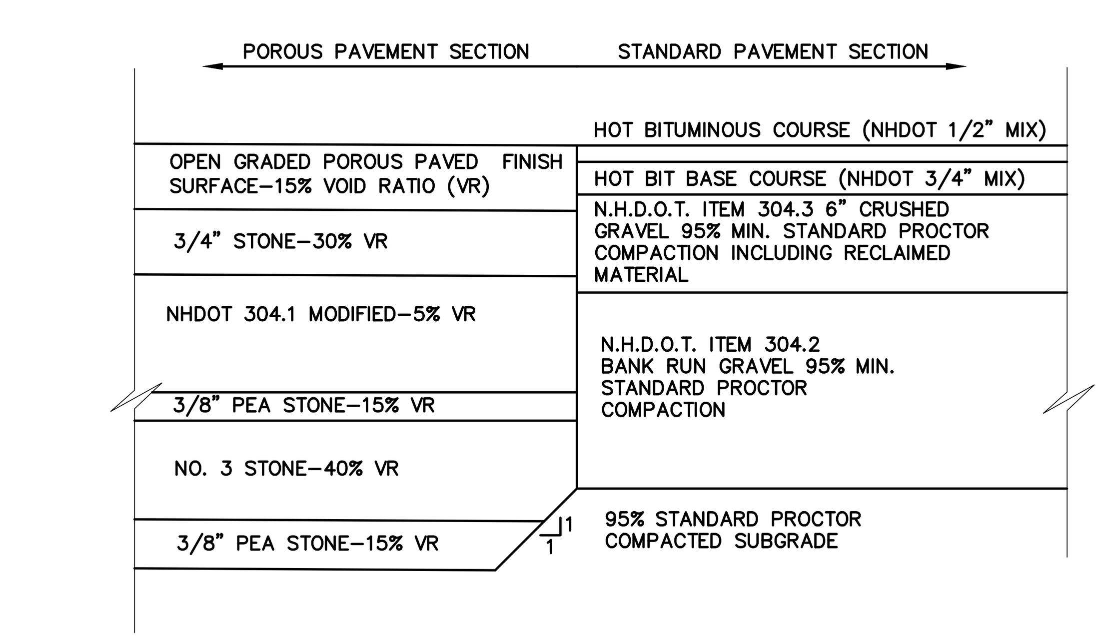
   TRANSPORTING MATERIAL: SEE CONSTRUCTION AND INSTALL SPECIFICATIONS



NOTES:
1. CONTRACTOR IS TO REMOVE THE EXISTING BURIED LAYER OF ORIGINAL LOAM DURING THE EXCAVATION OF THE GRAVELS FOR THE ROADWAY AND WHENEVER ENCOUNTERED IN TRENCHES.
2. DESIGN ENGINEER TO INSPECT SITE PREPARATION AND INSTALLATION OF POROUS PAVEMENT.
3. THE TOP LAYER (WEARING COURSE) SHOULD BE PRE-BLENDED PG 76-28 MODIFIED WITH SBS. THE BASE COURSE SHOULD BE, AT A MINIMUM, PG 64-28 WITH 5 POUNDS OF FIBER PER TON OF ASPHALT MIX. IF SUFFICIENT STAGING OR USE OF THE BASE COURSE SECTION WILL BE REQUIRED PRIOR TO THE APPLICATION OF THE WEARING COURSE, THE ENGINEER MAY DECIDE TO USE PRE-BLENDED PG 76-28 MODIFIED WITH SBS ON BOTH COURSES.
4. THE POROUS PAVEMENT SYSTEM SHALL BE LOCATED ONE FOOT ABOVE LEDGE AND THE SHWT.
5. INTERFACE FROM 12" FILTER COURSE TO 18" FILTER COURSE AT WATER SUPPLY INTAKE PROTECTION AREA (WSIPA) LINE AS SHOWN ON GRADING AND DRAINAGE PLAN.

TYPICAL POROUS ASPHALT PAVEMENT OR CONCRETE SECTION

NOT TO SCALE



POROUS TO STANDARD PAVEMENT INTERFACE DETAIL

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS NOTED	Project No.: 24029
Drawing Name: 24029-PLAN.dwg		

STATE OF NEW HAMPSHIRE - PAIGE S. LIBBEY No.16670 - LICENSED PROFESSIONAL ENGINEER - 02/14/2025

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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

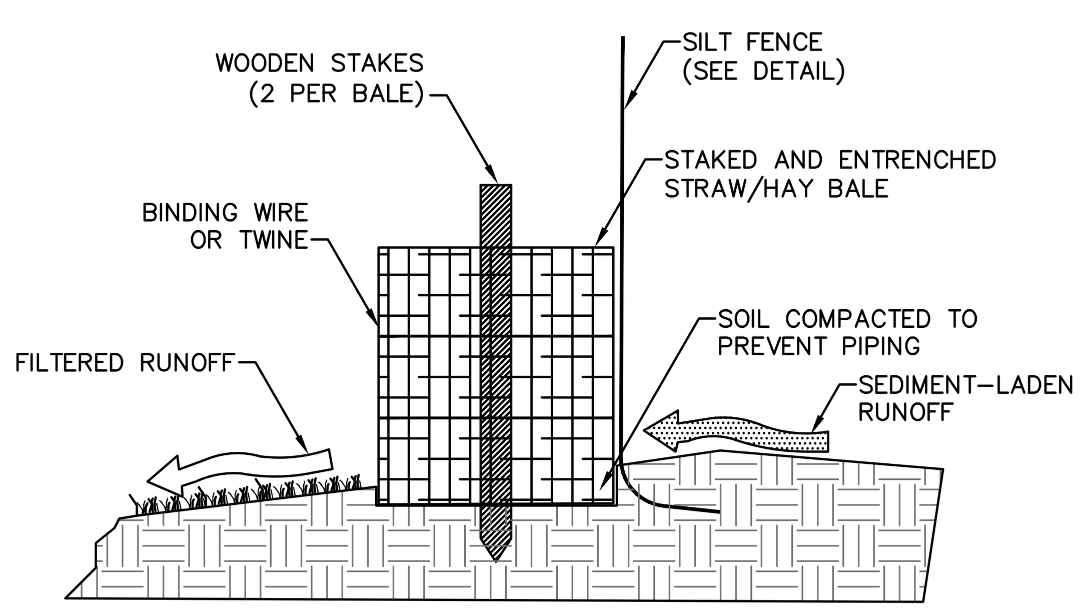
Plan Name:	DETAIL SHEET
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
D8

JBE PROJECT NO. 24029

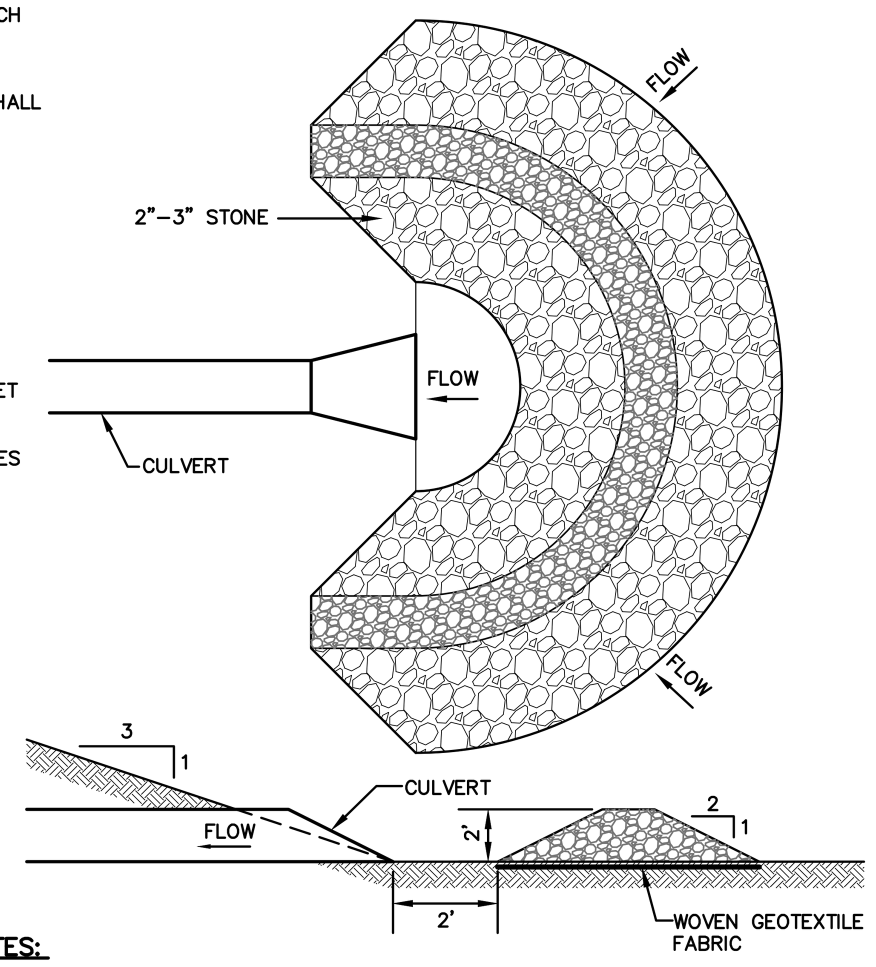
TEMPORARY EROSION CONTROL NOTES

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.
12. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR'S NAME, ADDRESS, AND PHONE NUMBER SHALL BE SUBMITTED TO DES VIA EMAIL (RIDGELY MAUCK AT RIDGELY.MAUCK@DES.NH.GOV).



HAYBALE DETAIL

NOT TO SCALE

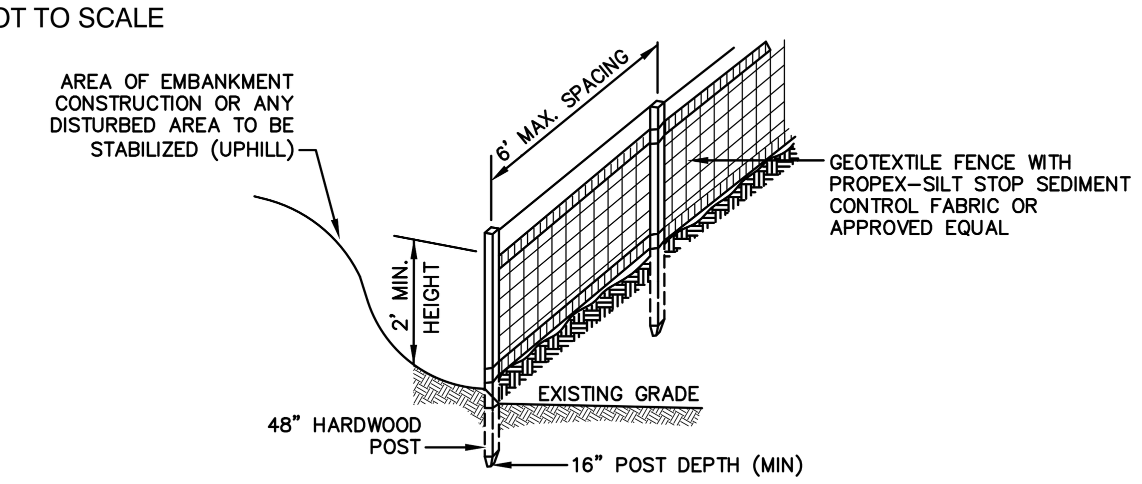


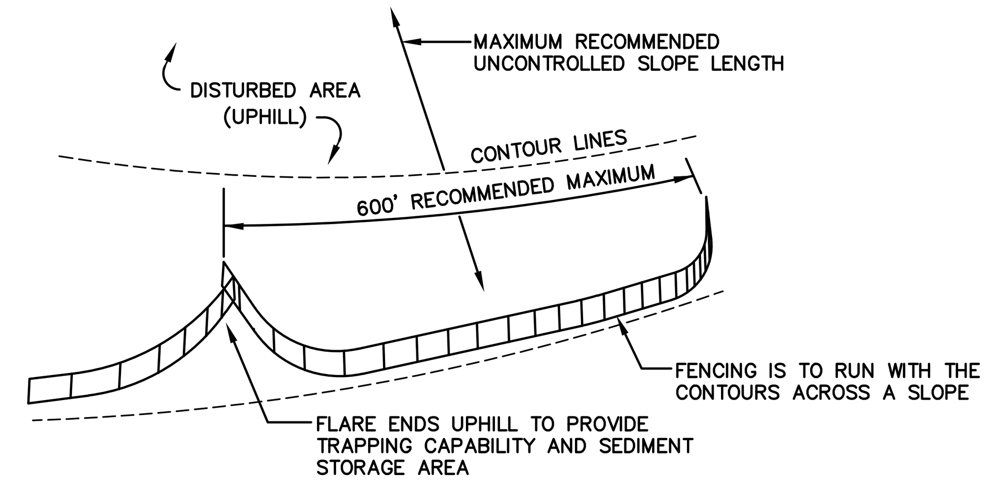
NOTES:

1. TEMPORARY CULVERT INLET PROTECTION CHECK DAMS SHALL BE CONSTRUCTED OF 2-3" STONE OVER WOVEN GEOTEXTILE FABRIC.
2. INLET PROTECTION MEASURES SHALL BE INSTALLED AT THE OPENINGS OF ALL EXISTING AND PROPOSED CULVERTS LOCATED BELOW (DOWNSTREAM) FROM AND WITHIN 100' OF THE PROJECT SITE.
3. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURE WHEN IT HAS ACCUMULATED TO ONE HALF THE ORIGINAL HEIGHT OF THE STRUCTURE.
4. STRUCTURES SHALL BE REMOVED WHEN THE SITE IS STABILIZED WITH VEGETATION AND THE CHANNEL SHALL BE SMOOTHED AND REVEGETATED.

TEMPORARY CULVERT INLET PROTECTION CHECK DAM

NOT TO SCALE





CONSTRUCTION SPECIFICATIONS:

1. WOVEN FABRIC FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. FILTER CLOTH SHALL BE FASTENED TO WOVEN WIRE EVERY 24" AT TOP, MID AND BOTTOM AND EMBEDDED IN THE GROUND A MINIMUM OF 8" AND THEN COVERED WITH SOIL.
2. THE FENCE POSTS SHALL BE A MINIMUM OF 48" LONG, SPACED A MAXIMUM 6' APART, AND DRIVEN A MINIMUM OF 16" INTO THE GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THE ENDS OF THE FABRIC SHALL BE OVERLAPPED 6", FOLDED AND STAPLED TO PREVENT SEDIMENT FROM BY-PASSING.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND SEDIMENT REMOVED AND PROPERLY DISPOSED OF WHEN IT IS 6" DEEP OR VISIBLE 'BULGES' DEVELOP IN THE SILT FENCE.
5. PLACE THE ENDS OF THE SILT FENCE UP CONTOUR TO PROVIDE FOR SEDIMENT STORAGE.
6. SILT FENCE SHALL REMAIN IN PLACE FOR 24 MONTHS.
7. SILT FENCES SHALL BE REMOVED WHEN NO LONGER NEEDED AND THE SEDIMENT COLLECTED SHALL BE DISPOSED AS DIRECTED BY THE ENGINEER. THE AREA DISTURBED BY THE REMOVAL SHALL BE SMOOTHED AND REVEGETATED.

MAINTENANCE:

1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE DONE IMMEDIATELY.
2. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER.
4. SEDIMENT DEPOSITS THAT ARE REMOVED, OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED, SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

SILT FENCE

NOT TO SCALE

SEEDING SPECIFICATIONS

1. GRADING AND SHAPING
   A. SLOPES SHALL NOT BE STEEPER THAN 2:1 WITHOUT APPROPRIATE EROSION CONTROL MEASURES AS SPECIFIED ON THE PLANS (3:1 SLOPES OR FLATTER ARE PREFERRED).
   B. WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.
2. SEEDBED PREPARATION
   A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
   B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDBED AND FERTILIZER AND LIME MIXED INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.
3. ESTABLISHING A STAND
   A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. TYPES AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
   AGRICULTURAL LIMESTONE, 2 TONS PER ACRE OR 100 LBS. PER 1,000 SQ.FT.
   NITROGEN(N), 50 LBS. PER ACRE OR 1.1 LBS. PER 1,000 SQ.FT.
   PHOSPHATE(P205), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
   POTASH(K20), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
   (NOTE: THIS IS THE EQUIVALENT OF 500 LBS. PER ACRE OF 10-20-20 FERTILIZER OR 1,000 LBS. PER ACRE OF 5-10-10.)
   B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING AND HYDROSEEDING. WHERE BROADCASTING IS USED, COVER SEED WITH .25 INCH OF SOIL OR LESS, BY CULTIPACKING OR RAKING.
   C. REFER TO THE 'SEEDING GUIDE' AND 'SEEDING RATES' TABLES ON THIS SHEET FOR APPROPRIATE SEED MIXTURES AND RATES OF SEEDING. ALL LEGUMES (CROWNVETCH, BIRDSFOOT, TREFOIL AND FLATPEA) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT PRIOR TO THEIR INTRODUCTION TO THE SITE.
   D. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20th OR FROM AUGUST 10th TO SEPTEMBER 1st.
4. MULCH
   A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.
   B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING. HAY OR STRAW MULCH SHALL BE PLACED AT A RATE OF 90 LBS PER 1000 S.F.
5. MAINTENANCE TO ESTABLISH A STAND
   A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.
   B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ONSITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE 2 TO 3 YEARS TO BECOME FULLY ESTABLISHED.
   C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, ANNUAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

USE	SEEDING MIXTURE 1/	DROUGHTY	WELL DRAINED	MODERATELY WELL DRAINED	POORLY DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A	FAIR	GOOD	GOOD	FAIR
	B	POOR	GOOD	FAIR	FAIR
	C	POOR	GOOD	EXCELLENT	GOOD
	D	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES.	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	FAIR	POOR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	E	FAIR	EXCELLENT	EXCELLENT	2/
	F	FAIR	EXCELLENT	EXCELLENT	2/

GRAVEL PIT, SEE NH-PM-24 IN APPENDIX FOR RECOMMENDATION REGARDING RECLAMATION OF SAND AND GRAVEL PITS.

1/ REFER TO SEEDING MIXTURES AND RATES IN TABLE BELOW.
2/ POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAYING AREA AND ATHLETIC FIELDS.

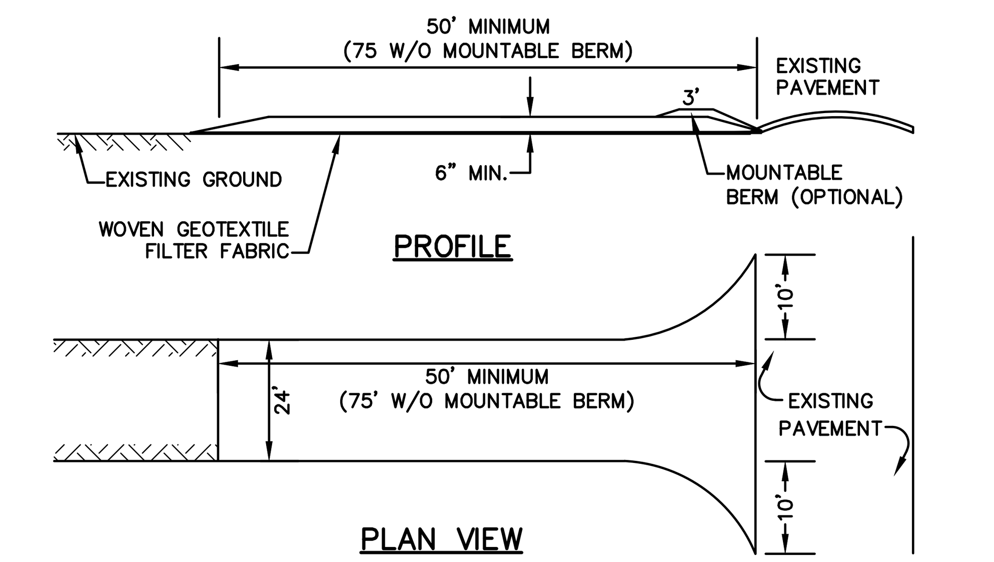
NOTE: TEMPORARY SEED MIX FOR STABILIZATION OF TURF SHALL BE WINTER RYE OR OATS AT A RATE OF 2.5 LBS. PER 1000 S.F. AND SHALL BE PLACED PRIOR TO OCTOBER 15th, IF PERMANENT SEEDING NOT YET COMPLETE.

SEEDING GUIDE

MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 Sq. Ft.
A. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
RED TOP	2	0.05
TOTAL	42	0.95
B. TALL FESCUE	15	0.35
CREEPING RED FESCUE	10	0.25
CROWN VETCH	15	0.35
OR		
FLAT PEA	30	0.75
TOTAL	40 OR 55	0.95 OR 1.35
* C. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
BIRDS FOOT TREFOIL	8	0.20
TOTAL	48	1.10
D. TALL FESCUE	20	0.45
FLAT PEA	30	0.75
TOTAL	50	1.20
E. CREEPING RED FESCUE 1/	50	1.15
KENTUCKY BLUEGRASS 1/	50	1.15
TOTAL	100	2.30
F. TALL FESCUE 1	150	3.60

1/ FOR HEAVY USE ATHLETIC FIELDS CONSULT THE UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION TURF SPECIALIST FOR CURRENT VARIETIES AND SEEDING RATES.

SEEDING RATES



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

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. WETLAND BOUNDARIES ARE TO BE CLEARLY MARKED PRIOR TO THE START OF CONSTRUCTION.
3. CUT AND REMOVE TREES IN CONSTRUCTION AREA AS REQUIRED OR DIRECTED.
4. INSTALL PERIMETER CONTROLS, 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.
5. INSTALL INLET PROTECTION AT ALL EXISTING CATCH BASINS AS SHOWN ON SHEET C3 IN ACCORDANCE WITH DETAILS.
6. CLEAR, CUT, GRUB AND DISPOSE OF DEBRIS IN APPROVED FACILITIES. THIS INCLUDES ANY REQUIRED DEMOLITION OF EXISTING STRUCTURES, UTILITIES, ETC.
7. 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.
8. STRIP LOAM AND PAVEMENT PER THE RECOMMENDATIONS OF THE PROJECT ENGINEER AND STOCKPILE EXCESS MATERIAL. STABILIZE STOCKPILE AS NECESSARY.
9. PERFORM PRELIMINARY SITE GRADING IN ACCORDANCE WITH THE PLANS, INCLUDING THE CONSTRUCTION OF ANY RETAINING WALLS AND SOUND WALLS.
10. PREPARE BUILDING PAD(S) TO ENABLE BUILDING CONSTRUCTION TO BEGIN.
11. 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.
12. ALL SWALES AND DRAINAGE STRUCTURES ARE TO BE CONSTRUCTED AND STABILIZED PRIOR TO HAVING RUN-OFF DIRECTED TO THEM.
13. 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.
14. PERFORM FINAL FINE GRADING, INCLUDING PLACEMENT OF 'SELECT' SUBGRADE MATERIALS.
15. PAVE ALL PARKING LOTS, DRIVEWAYS, AND ROADWAYS WITH INITIAL 'BASE COURSE'.
16. PERFORM ALL REMAINING SITE CONSTRUCTION (i.e. BUILDING, CURBING, UTILITY CONNECTIONS, ETC.).
17. LOAM AND SEED ALL DISTURBED AREAS AND INSTALL ANY REQUIRED SEDIMENT AND EROSION CONTROL FACILITIES (i.e. RIP RAP, EROSION CONTROL BLANKETS, ETC.).
18. FINISH PAVING ALL PARKING LOTS, DRIVEWAYS, AND ROADWAYS WITH 'FINISH' COURSE.
19. ALL PARKING LOTS, DRIVEWAYS, AND ROADWAYS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
20. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
21. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
22. 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.
23. CLEAN SITE AND ALL DRAINAGE STRUCTURES, PIPES AND SUMPS OF ALL SILT AND DEBRIS.
24. INSTALL ALL PAINTED PAVEMENT MARKINGS AND SIGNAGE PER THE PLANS AND DETAILS.
25. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY HALF-INCH OF RAINFALL.
26. 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: 3/15/24
Checked: PSL	Scale: AS NOTED	Project No.: 24029
Drawing Name: 24029-PLAN.dwg		

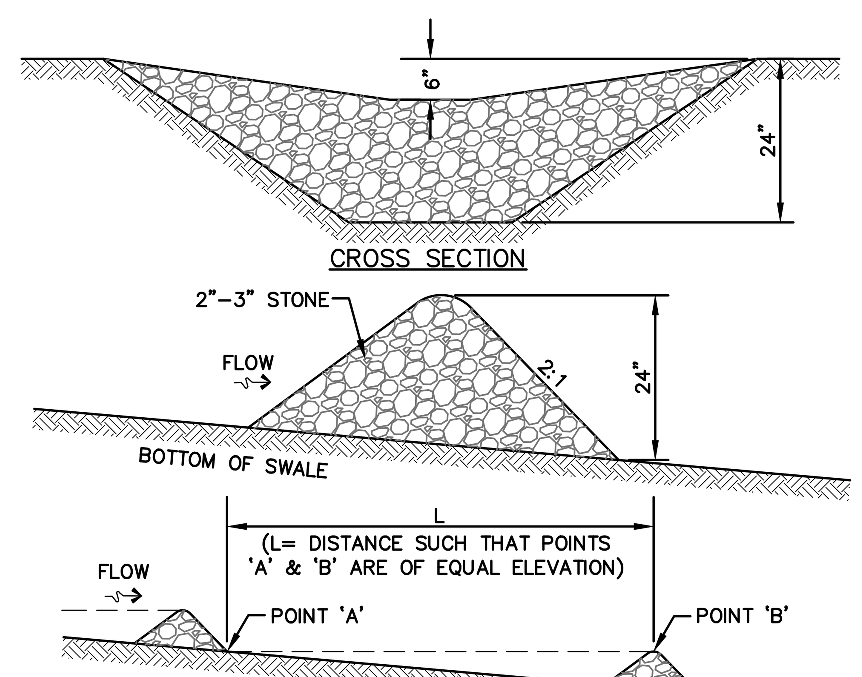
STATE OF NEW HAMPSHIRE
PAIGE S. LIBBEY
No.16670
LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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: EROSION AND SEDIMENT CONTROL DETAILS
Project: "LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No. E1
SHEET 30 OF 31
JBE PROJECT NO. 24029

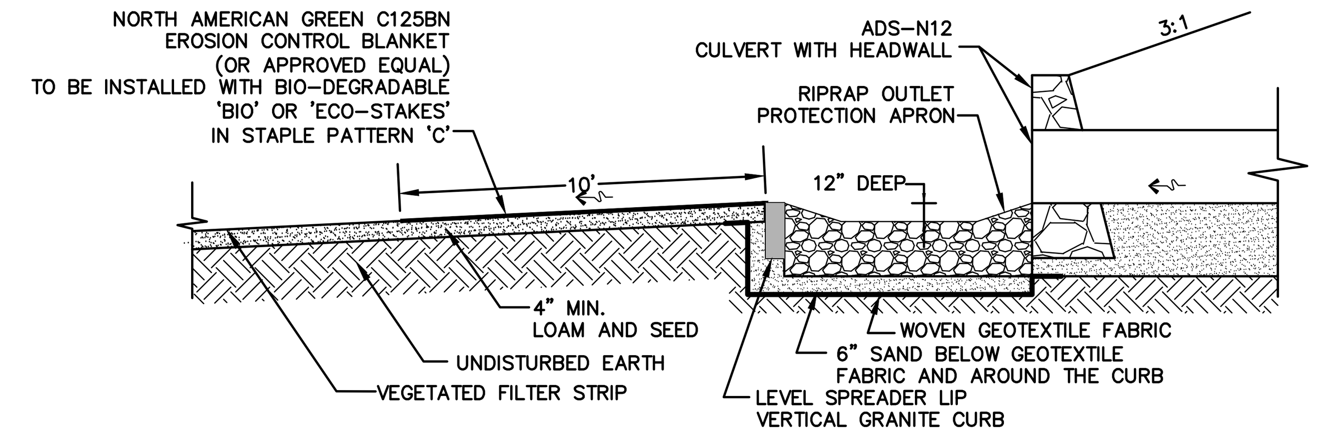


MAINTENANCE NOTE:

1. STONE CHECK DAMS SHOULD BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY NECESSARY REPAIRS SHOULD BE MADE IMMEDIATELY. PARTICULAR ATTENTION SHOULD BE GIVEN TO END RUN AND EROSION AT THE DOWNSTREAM TOE OF THE STRUCTURE. WHEN THE STRUCTURES ARE REMOVED, THE DISTURBED PORTION SHOULD BE BROUGHT TO THE EXISTING CHANNEL GRADE AND THE AREAS PREPARED, SEEDED AND MULCHED. WHILE THIS PRACTICE IS NOT INTENDED TO BE USED PRIMARILY FOR SEDIMENT TRAPPING, SOME SEDIMENT WILL ACCUMULATE BEHIND THE STRUCTURES. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURES WHEN IT HAS ACCUMULATED TO ONE HALF OF THE ORIGINAL HEIGHT OF THE STRUCTURE.

STONE CHECK DAM

NOT TO SCALE

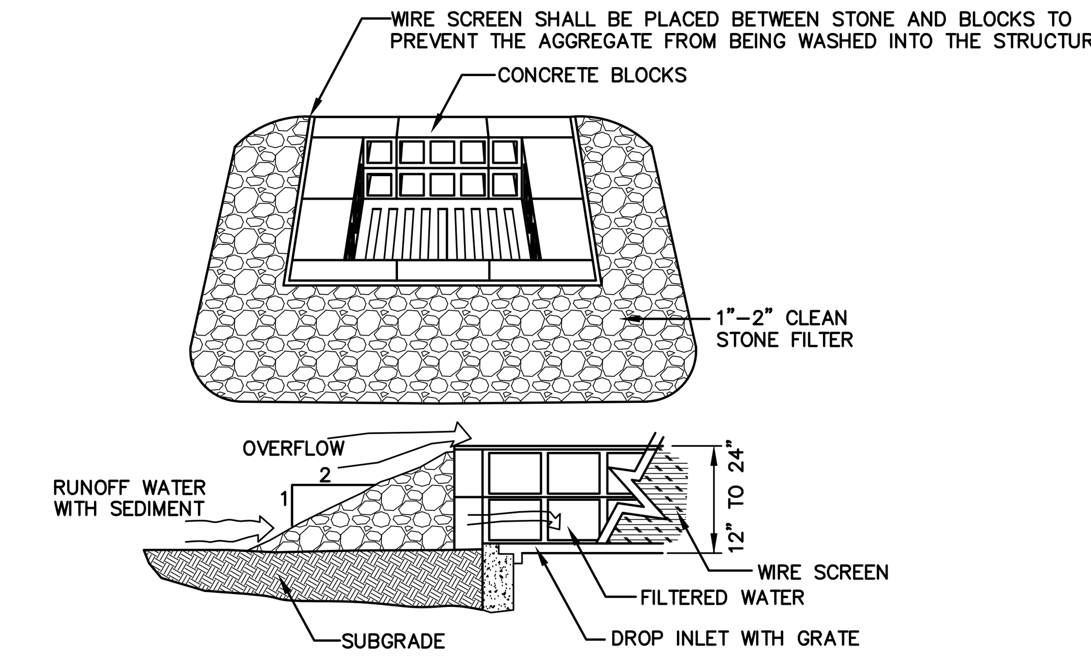


NOTES:

1. CONSTRUCT LEVEL SPREADER LIP ON ZERO PERCENT GRADE TO INSURE UNIFORM SPREADING OF RUNOFF.
2. VERTICAL GRANITE CURB SHALL BE PLACED A MINIMUM OF SIX INCHES DEEP AND EXTEND ENTIRE LENGTH OF LIP.
3. THE RIP RAP APRON PRIOR TO THE LEVEL SPREADER SHALL NOT EXCEED A 0 PERCENT GRADE.
4. THE FLOW FROM THE LEVEL SPREADER SHALL OUTLET ONTO STABILIZED AREAS. WATER MUST NOT RECONCENTRATE IMMEDIATELY BELOW THE SPREADER.
5. PERIODIC INSPECTION AND REQUIRED MAINTENANCE SHALL BE PERFORMED.
6. MAINTENANCE: LEVEL SPREADER SHOULD BE CHECKED PERIODICALLY AND AFTER EVERY MAJOR STORM TO DETERMINE IF THE SPREADER HAS BEEN DAMAGED. SEDIMENT DEEPER THAN FOUR INCHES ACCUMULATION SHOULD BE REMOVED. IF RILLING HAS TAKEN PLACE ON LIP, THEN DAMAGE SHOULD BE REPAIRED AND REVEGETATED. VEGETATION SHOULD BE MOWED OCCASIONALLY TO CONTROL WEEDS AND ENCROACHMENT OF WOODY VEGETATION. CLIPPINGS SHOULD BE REMOVED AND DISPOSED OF OUTSIDE SPREADER AND AWAY FROM OUTLET AREA. FERTILIZATION SHOULD BE DONE AS NECESSARY TO KEEP VEGETATION HEALTHY AND DENSE.

LEVEL SPREADER AT CULVERT OUTLET

NOT TO SCALE

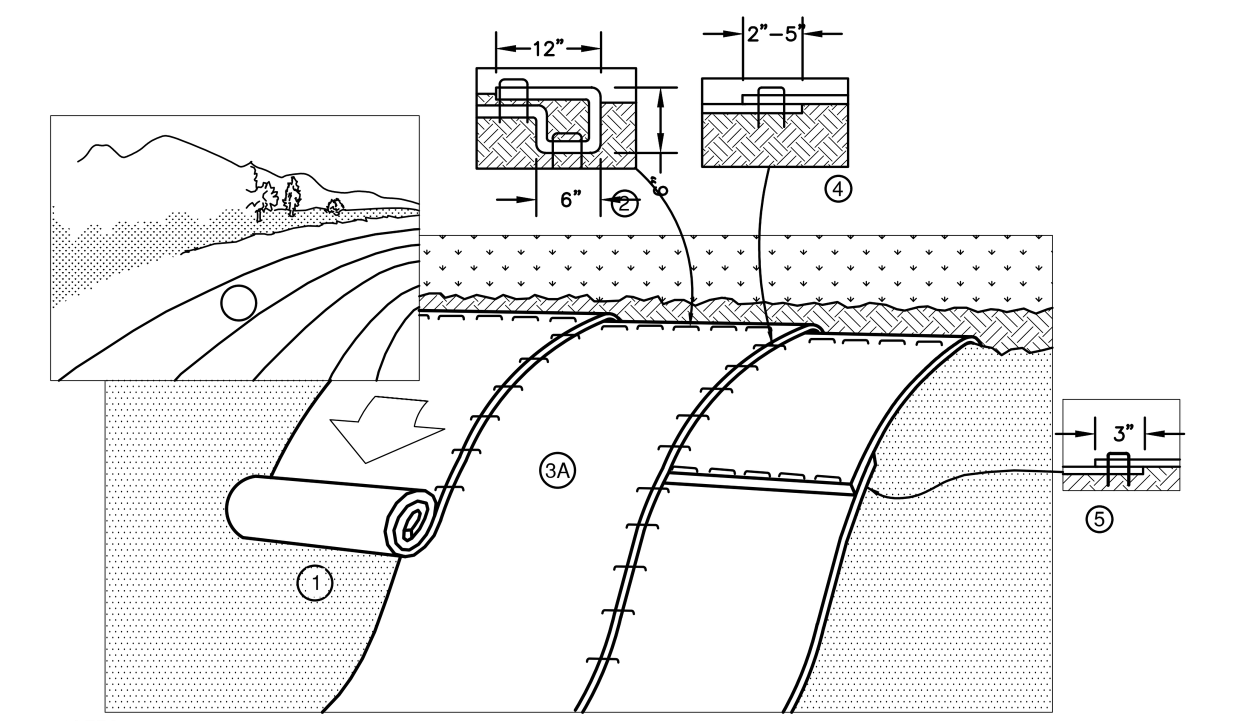


MAINTENANCE NOTE:

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



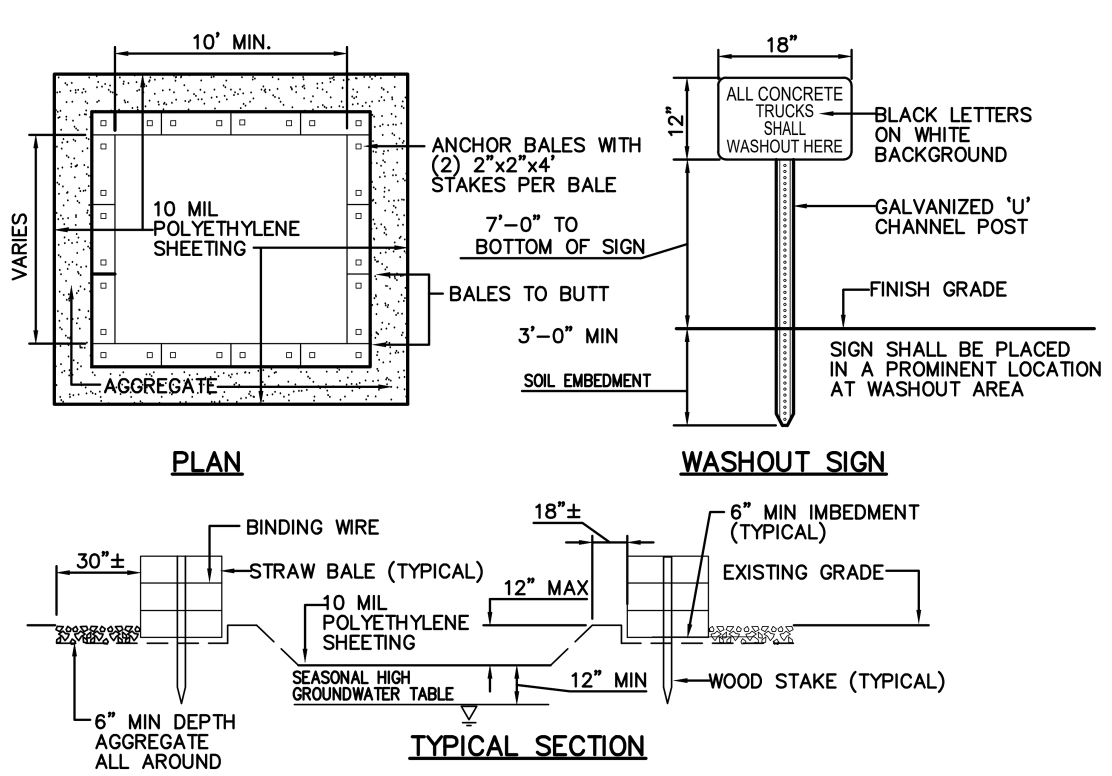
NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP BY 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. 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 STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM™, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH. NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

NORTH AMERICAN GREEN
14649 HIGHWAY 41 NORTH
EVANSVILLE, INDIANA 47725
1-800-772-2040

EROSION CONTROL BLANKET SLOPE INSTALLATION
(North American Green SC150BN)

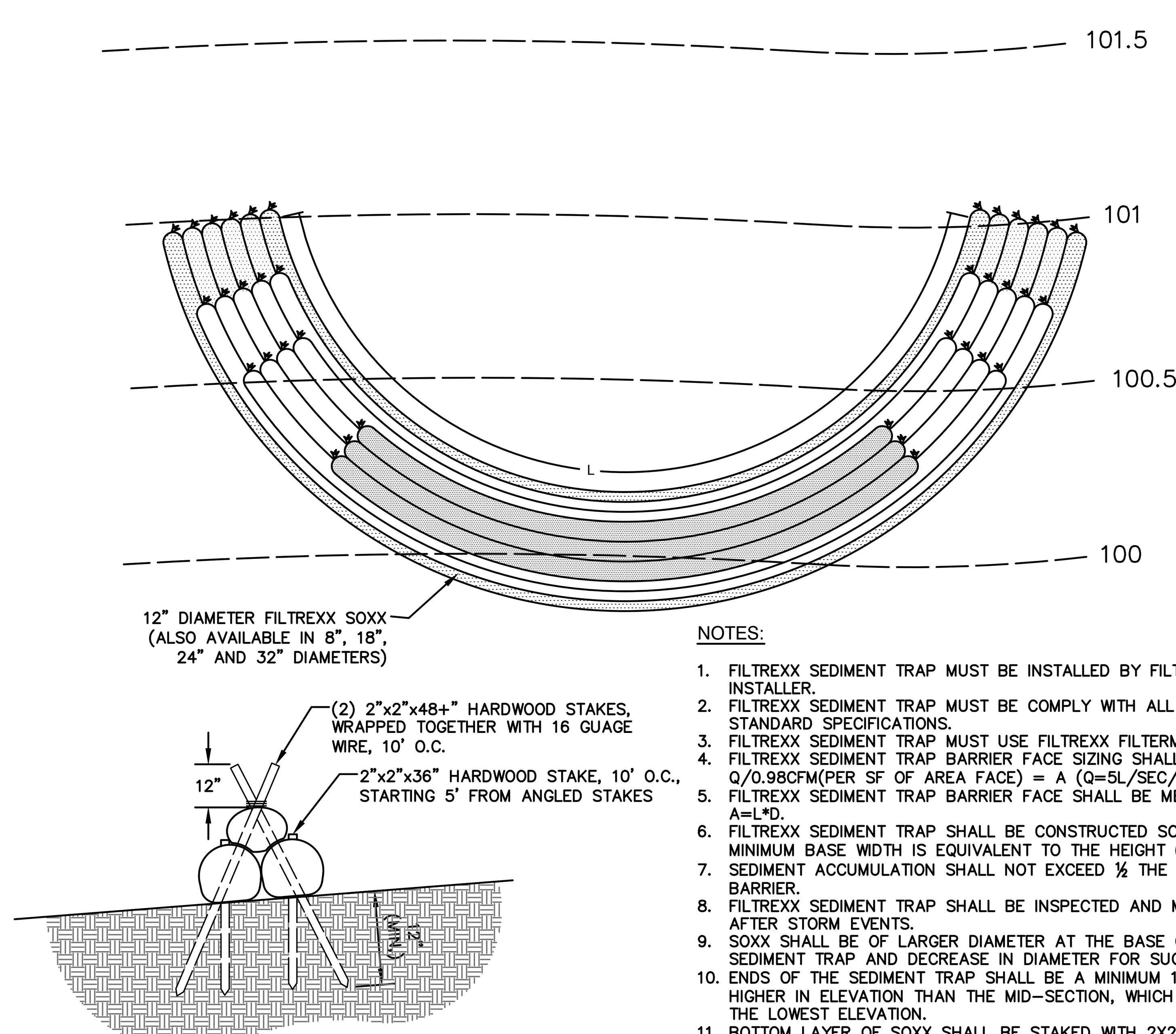
NOT TO SCALE



1. CONTAINMENT MUST BE STRUCTURALLY SOUND AND LEAK FREE AND CONTAIN ALL LIQUID WASTES.
2. CONTAINMENT DEVICES MUST BE OF SUFFICIENT QUANTITY OR VOLUME TO COMPLETELY CONTAIN THE LIQUID WASTES GENERATED.
3. WASHOUT MUST BE CLEANED OR NEW FACILITIES CONSTRUCTED AND READY TO USE ONCE WASHOUT IS 75% FULL.
4. WASHOUT AREA(S) SHALL BE INSTALLED IN A LOCATION EASILY ACCESSIBLE BY CONCRETE TRUCKS.
5. ONE OR MORE AREAS MAY BE INSTALLED ON THE CONSTRUCTION SITE AND MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
6. AT LEAST WEEKLY REMOVE ACCUMULATION OF SAND AND AGGREGATE AND DISPOSE OF PROPERLY.

CONCRETE WASHOUT AREA

NOT TO SCALE



GENERAL NOTES:

1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA OR SOURCE OF SEDIMENT AS POSSIBLE.
2. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE 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. THE SIDE SLOPES OF THE TRAP SHALL BE 3:1 OR FLATTER, AND SHALL BE STABILIZED IMMEDIATELY AFTER THEIR CONSTRUCTION.
5. THE OUTLET OF THE TRAP SHALL BE A MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP AND SHALL DISCHARGE TO A STABILIZED AREA.
6. THE TRAP SHALL BE CLEANED WHEN 50% OF THE ORIGINAL VOLUME IS FILLED.
7. THE MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OFF AND STABILIZED.

NOTES:

1. FILTREXX SEDIMENT TRAP MUST BE INSTALLED BY FILTREXX CERTIFIED INSTALLER.
2. FILTREXX SEDIMENT TRAP MUST BE COMPLY WITH ALL FILTREXX STANDARD SPECIFICATIONS.
3. FILTREXX SEDIMENT TRAP MUST USE FILTREXX FILTERMEDIA.
4. FILTREXX SEDIMENT TRAP BARRIER FACE SIZING SHALL USE Q/0.98CFM(PER SF OF AREA FACE) = A (Q=5L/SEC/SQ.M)
5. FILTREXX SEDIMENT TRAP BARRIER FACE SHALL BE MEASURED AS A=L*D.
6. FILTREXX SEDIMENT TRAP SHALL BE CONSTRUCTED SO THAT THE MINIMUM BASE WIDTH IS EQUIVALENT TO THE HEIGHT (1H:1V).
7. SEDIMENT ACCUMULATION SHALL NOT EXCEED ½ THE HEIGHT OF THE BARRIER.
8. FILTREXX SEDIMENT TRAP SHALL BE INSPECTED AND MAINTAINED AFTER STORM EVENTS.
9. SOXX SHALL BE OF LARGER DIAMETER AT THE BASE OF THE SEDIMENT TRAP AND DECREASE IN DIAMETER FOR SUCCESSIVE LAYERS.
10. ENDS OF THE SEDIMENT TRAP SHALL BE A MINIMUM 1 FT (30 CM) HIGHER IN ELEVATION THAN THE MID-SECTION, WHICH SHALL BE AT THE LOWEST ELEVATION.
11. BOTTOM LAYER OF SOXX SHALL BE STAKED WITH 2X2X36" WOODEN STAKES. SUCCESSIVE LAYERS SHALL BE STAKED WITH ½" REBAR AT A 45 DEGREE ANGLE.

FILTREXX SEDIMENT TRAP DETAIL

NOT TO SCALE

Design: DJM	Draft: KDR	Date: 3/15/24	
Checked: PSL	Scale: AS NOTED	Project No.: 24029	
Drawing Name: 24029-PLAN.dwg			

STATE OF NEW HAMPSHIRE – PAIGE S. LIBBEY No.16670 – LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	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: EROSION AND SEDIMENT CONTROL DETAILS
Project: "LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
E2

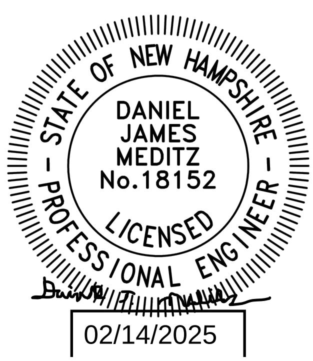
DRAINAGE ANALYSIS

SEDIMENT AND EROSION CONTROL PLAN

"Lilac Place"
76 Portsmouth Ave.
Exeter, NH 03833
Tax Map 137, Lots 4 & 75

Prepared for:

Green & Company
11 Lafayette Road
North Hampton, NH 03862



Prepared by:
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746
November 4, 2024
Revised January 13, 2025
Revised February 14, 2025
JBE Project No. 24029

EXECUTIVE SUMMARY

Green & Company proposes to construct a mixed-use commercial and residential development on the subject parcel as shown on the design plans with access from Portsmouth Ave. & Haven Lane in Exeter, NH.

In general, the Town of Exeter has similar stormwater regulations to the AOT Bureau, with the additional stipulation that runoff from impervious surfaces shall be treated to achieve at least 80% removal of total suspended solids and 60% removal of both total nitrogen and total phosphorous for all impervious surfaces. Through the use of several stormwater management devices including porous pavement, modified stone drip edges constructed with an internal filter course, focal points, Jellyfish systems, and underground detention chambers, we are able to meet all applicable Town and State stormwater regulations for this project.

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 so that the above-mentioned requirements could be met. Two models were compiled, one for this area in its existing (pre-construction) condition, and a second for the area in its proposed (post-construction) condition. The analysis was conducted using data for the 2 Year – 24 Hour (3.70"), 10 Year – 24 Hour (5.65"), 25 Year – 24 Hour (7.18"), and 50 Year – 24 Hour (8.61") storm events using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. These rainfall data were taken from the Extreme Precipitation Tables developed by the Northeast Regional Climate Center (NRCC) and the extreme precipitation estimates were increased by 15% due to the project's location in a Coastal/Great Bay Community. A summary of the existing and proposed conditions peak rates of runoff toward the six analysis points 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	15.86	15.84	26.83	26.81	35.64	35.57	43.88	43.31
Analysis Point #2	0.79	0.74	1.41	1.25	1.90	1.65	2.36	2.02
Analysis Point #3	10.87	10.65	19.20	18.79	25.75	25.20	31.85	31.46
Analysis Point #4	0.87	0.13	1.33	0.20	1.70	0.26	2.04	0.31
Analysis Point #5	0.37	0.02	0.57	0.03	0.73	0.05	0.87	0.06
Analysis Point #6	0.45	0.42	0.76	0.73	1.01	0.97	1.24	1.20

A similar summary of the existing and proposed conditions runoff volumes discharged over a 72-hour time span resultant to the modelled 24-hour storms toward the six analysis points in units of acre-feet (ac-ft) is as follows:

Analysis Point	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	2.458	2.356	4.600	4.277	6.371	5.852	8.064	7.353
Analysis Point #2	0.072	0.063	0.130	0.109	0.178	0.146	0.223	0.181
Analysis Point #3	1.291	1.284	2.312	2.296	3.141	3.117	3.926	3.895
Analysis Point #4	0.071	0.011	0.111	0.017	0.143	0.022	0.172	0.026
Analysis Point #5	0.030	0.001	0.048	0.002	0.061	0.003	0.074	0.005
Analysis Point #6	0.039	0.037	0.069	0.065	0.092	0.088	0.115	0.109

NHDES AOT Channel Protection requirements, which are additionally copied into the stormwater regulations of the Town of Exeter, are met if the 2-year 24-hour runoff volume toward a wetland or waterbody from a particular development is reduced or increased by less than 0.1 acre-feet post-construction. Per the above table, runoff volumes are reduced toward all analysis points during all analyzed storms post-construction and therefore this project meets and exceeds channel protection requirements. Analysis Points 2 and 3 are both upstream of Analysis Point 1, which represents a wetland just upstream of Wheelwright Creek that then drains toward the Squamscott River.

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

TABLE OF CONTENTS

1.0 RAINFALL CHARACTERISTICS

This drainage report includes an existing conditions analysis of the area involved in the proposed development, as well as a proposed condition, or post-construction analysis, of the same area. These analyses were accomplished using the USDA SCS TR-20 Method within the HydroCAD 10.20-3c Stormwater Modeling System and a time span of 0-72 hours was utilized. 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 the 2 Year – 24 Hour (3.70”), 10 Year – 24 Hour (5.65”), 25 Year – 24 Hour (7.18"), and 50 Year – 24 Hour (8.61") storm events using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. These rainfall data were taken from the Extreme Precipitation Tables developed by the Northeast Regional Climate Center (NRCC) and the extreme precipitation estimates were increased by 15% due to the project’s location in a Coastal/Great Bay Community.

Peak rates of runoff will be reduced from the existing condition and channel protection as well as groundwater recharge requirements will be met, thereby minimizing any potential for a negative impact on wetlands or 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 front of the site is developed and consists of an Auto Parts business while the rear of the site is wooded. A deep gully separates these two parts of the subject parcel. Runoff from the area of proposed development as well as upstream contributing watershed area, collectively referred to from this point forward as the “study area”, was considered in this analysis.

The existing topography as well as existing drainage features divide the study area into 6 subcatchments, draining toward six analysis points. Subcatchment 1S consists of the bulk of the existing auto parts store development, as well as the majority of on-site woods and some offsite contributing watershed. Runoff from Subcatchment 1S drains through on-site wetlands directly toward Analysis Point 1, which is the ultimate discharge point from most of the subject parcel toward the Wheelwright Creek which drains toward the Squamscott River.

Subcatchment 2S consists of the back parking lot and roof of the neighboring Thirsty Moose as well as some on-site wooded area. This subcatchment drains directly to Analysis Point 2. Analysis Point 2 is a stormwater collection point at the beginning of the aforementioned deep gully that separates the front, developed and the back, wooded sections of the subject parcel. This was modelled as an Analysis Point in order to ensure that runoff from the proposed development does not negatively impact the existing Thirsty Moose site. From Analysis Point 2, runoff follows a series of reaches, labelled as 2Ra, 2Rb, and 2Rc, toward downstream Analysis Point 1.

Subcatchment 3S consists of some wooded and wetland area in the southwestern periphery of the subject parcel as well as significant offsite contributing watershed area. This drains toward Analysis Point 3, which is modelled as a pond due to existing closed contours. Due to the existence of a 15” CMP outlet near AP2, it is assumed that a 15” CMP inlet exists as an outlet for the pond modelled as AP3 and is either buried or hidden. As noted on the project plans, the contractor shall uncover this inlet during construction and notify the engineer of record if it is not found. However, the culvert is modelled in the existing conditions drainage analysis as we assume that it does in fact exist. Discharge from the pond modelled as Analysis Point 3 is routed through the aforementioned culvert toward the same series of reaches (2Ra-2Rc) that ultimately drain toward Analysis Point 1 as previously mentioned in the paragraph describing Subcatchment 2S.

Subcatchment 4S represents the far front area of the existing Auto Parts site, which is mostly paved and drains directly into Portsmouth Avenue. The edge of pavement for Portsmouth Avenue is modelled as Analysis Point 3, downstream of Subcatchment 4S.

Subcatchment 5S consists of the northeastern half of the existing Auto Parts store roof, which drains on to the abutting Verani Realty business, modelled as Analysis Point 5. Runoff from Analysis Point 5 is routed toward Reach 2Rb and ultimately toward downstream Analysis Point 1.

Finally, Subcatchment 6S consists of a stretch of Haven Lane as well as existing abutting house lots that drain toward an existing catch basin, modelled as Analysis Point 6. This catch basin is scheduled to be relocated for the proposed development. The closed drainage system that this catch basin is a part of outlets far enough north of the development site that it will not impact the proposed development, but this subcatchment needed to be modelled in order to ensure that peak rates of runoff into the closed drainage system are being reduced and therefore the closed drainage system will not be negatively impacted by the proposed development.

Existing soil types were determined through a Site Specific Soil Survey conducted by a Certified Soil Scientist. Several different soil types were identified, with Hydrologic Soil Groups C and D. The soil types where infiltration systems are proposed are primarily Scitico silt loam (HSG C, SSSM symbol 33) and Boxford somewhat poorly drained (SSSM symbol 953). of Soil Scientists of Northern New England (SSSNNE), Scitico soils have a saturated hydraulic conductivity (Ksat) range of 0.0-0.2 inches per hour in both the B and C horizons, and Boxford soils have a Ksat range of 0.1-0.2 inches per hour in the B horizon and 0.00 to 0.2 inches per hour in the C horizon. Soil types per the Site-Specific Soil Survey were used for onsite areas and soil types per NRCS Web Soil Survey were used for offsite areas, which includes some areas represented as HSG B.

Ostensibly these values indicate little to no capacity for infiltration. For this reason, infiltration testing was performed on site using a Compact Constant Head Permeameter (CCHP, also known as an amoozemeter) on October 24, 2024 in order to verify the actual infiltration rate of the in-situ soils. An auger was used in order to dig test holes to the C horizon and three tests were performed in each of three locations throughout the subject parcel for a total of nine tests. These three locations corresponded with the locations of test pits 6001, 6007, and 6010.

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

One outlier was recorded – A much higher mean Ksat was recorded for the first test near test pit 6010 than on the other two. This occurred because the amoozemeter was perched on top of a 2-foot high bucket, so there was too much head differential between the amoozemeter and the bottom of the test hole. For the remainder of the tests, the amoozemeter was kept at or near grade, but the results of this one test were discarded from the mean Ksat calculation.

The results of the permeability testing are as summarized below:

Test	**Ksat (in/hr)**
TP 6010 – Test #1	*4.92 (discarded)*
TP 6010 – Test #2	1.50
TP 6010 – Test #3	2.54
TP 6010 – Mean Ksat	**2.0**
TP 6007 – Test #1	1.78
TP 6007 – Test #2	3.40
TP 6007 – Test #3	3.61
TP 6007 – Mean Ksat	**2.9**
TP 6001 – Test #1	3.41
TP 6001 – Test #2	3.07
TP 6001 – Test #3	3.48
TP 6001 – Mean Ksat	**3.3**

A further breakdown of the data used to arrive at the final Ksat values is included in the appendix of this report. Applying a factor of safety of two, this comes out to a saturated hydraulic conductivity of **1.0 in/hr** near test pit 6010, **1.45 in/hr** near test pit 6007, and **1.65 in/hr** near test pit 6001. Due to these results, an infiltration rate of 1.0 in/hr was used in general to design infiltration practices around the site, except for one stone drip edge near test pit 6007 for which an infiltration rate of 1.45 in/hr was utilized.

3.0 PROPOSED CONDITIONS ANALYSIS

The proposed development divides the subject parcel into 30 subcatchments, all draining toward the same six analysis points as previously described. Subcatchments 1S-6S are functionally the same as in the existing conditions analysis in terms of their hydrologic routing, but their outlines, areas, and surface covers are altered due to the grading associated with the proposed development.

Beyond this, pond node numbers have been assigned for each of the proposed stormwater management devices, and a corresponding subcatchment for the land that drains to it has been developed if applicable as well. The same reaches from the existing conditions analysis have been maintained in the proposed conditions analysis, and additional reaches have been added to model overland flow from the outfall points of proposed stormwater management devices toward existing reaches or analysis points.

The primary stormwater management methodology for the townhouse development section of the site consists of two porous pavement sections toward which the remainder of the impervious pavement and sidewalk areas would drain, as well as a drip edge on each of the ten townhouse buildings (two; drip edge #3 and drip edge #11; on building #3). Additionally, a stretch of sidewalk running through the center greenspace for the townhouse development is proposed to be constructed from pervious concrete. The porous pavement and concrete will be unlined and will not have underdrains; therefore, groundwater recharge will be achieved using these practices. Ten of the eleven drip edges will contain an internal filter course and function similarly to bioretention systems as filtration practices, while the drip edge used for Building #9 will have sufficient separation to the seasonal high water table to be designed as an infiltration practice. This one drip edge will not have a filter course and instead water will be treated through clean fill installed between existing grade and the bottom of the stone drip edge, and through native soils below that. There will be three feet between the SHWT and the bottom of this drip edge, as required. Due to high groundwater tables through most of the site, the filtration drip edges will all be lined and underdrained, and groundwater recharge will not be possible using these devices.

The stormwater management system for the front section of the site with a proposed mixed-use building will be separate from that of the proposed townhouse development and will consist of a Focal Point high flow biofiltration system and two Jellyfish filtration devices designed for treatment all upstream of a chamber system designed for peak flow attenuation.

There is a known flooding issue related to the pond modelled as AP3. Because of this, we have been given permission by the owners of the neighboring Thirsty Moose restaurant to replace the existing 15" CMP culvert, which runs through their property, with a new 18" HDPE culvert. This will reduce flood stages in the post construction condition during all analyzed storm events. This change will result in additional flow toward Analysis Point 1, but the aforementioned chamber system has been designed to offset this flow increase. At the very least, this will represent an improvement over the existing situation. A comparison in pre-development and post-development peak elevations within Pond AP3 during analyzed storm events, as modelled, is as follows:

Storm Event	Existing Peak Elevation in Pond AP3 (ft.)	Post-Construction Peak Elevation in Pond AP3 (ft.)
2-Year 24-Hour Storm	31.38	29.78
10-Year 24-Hour Storm	33.12	31.60
25-Year 24-Hour Storm	33.99	32.64
50-Year 24-Hour Storm	34.60	33.38

Additionally, a pedestrian passageway is proposed in order to connect the proposed townhouse development with the proposed mixed-use building. In order to avoid needing a box culvert and a larger wetland impact, this has been placed just at the beginning of the aforementioned wet gulley. However, in the existing condition two CMP culverts – one with a 15" diameter and one with a 48" diameter – outlet at the location where the retaining wall adjacent to the sidewalk would be proposed. For this reason, a 6' diameter drain manhole has been designed just to the northeast of the proposed sidewalk. The 48" CMP culvert will be cut back to outlet into the proposed drain manhole, and as previously explained, the 15" CMP culvert is being removed and replaced with an 18" HDPE culvert that will tie into the proposed drain manhole. Additionally, a 12" HDPE culvert is proposed in order to capture the water that would otherwise be impounded by the proposed sidewalk and convey it safely into the drain manhole as well. A 48" HDPE pipe is proposed at the outlet of this drain manhole in order to discharge the stormwater from these three pipes into the channel represented as Reach 2Ra, as was described in the existing conditions analysis.

The exact watershed of the existing 48" CMP culvert is unknown. There is a closed drainage system upstream of it which extends up Alumni Drive and down Portsmouth Avenue. However, by assuming that the CMP culvert is operating at peak flow we can verify that the 48" HDPE that we are proposing at the outlet of the proposed drain manhole downstream of the existing 48" CMP is capable of passing the flows directed toward it. A full-flow Manning's equation analysis of the existing and proposed 48" pipes is included in the appendix of this report, demonstrating that the proposed 48" HDPE culvert with a slope of 0.02 ft/ft is capable of simultaneously passing the full flow out of the existing 48" CMP culvert with a slope of 0.008 ft/ft as well as the 50-year 24-hour peak flow from the upstream 12" HDPE pipe from Analysis Point 2 and from the upstream 18" HDPE pipe from Analysis Point 3.

As a result of the implementation of this stormwater management system, peak flow rates are reduced toward all six analysis points during all analyzed storm events in the proposed condition as compared with the existing condition. Additionally, channel protection requirements of both the Town of Exeter and the AOT Bureau are met as explained in the executive summary. Groundwater recharge volume requirements are met as well. A GRV worksheet is available in the appendix of the report to demonstrate this. Each stormwater management device treats either the water quality volume or water quality flow of runoff directed toward it as required. All post-construction impervious surfaces on the subject parcel are directed toward a treatment device.

Additionally, the pollutant removal requirements of the Town of Exeter are met through the implementation of this stormwater management system. A breakdown of pollutant removal efficiencies for each BMP used as well as a spreadsheet containing pollutant removal calculations are included within the appendix of this report in order to demonstrate that at least 80% TSS removal and at least 60% removal of both TN and TP is achieved.

5.0 CONCLUSION

This proposed site development will have minimal adverse effect on abutting infrastructures, properties, and downstream wetlands by way of stormwater runoff or siltation. Appropriate steps will be taken to eliminate erosion and sedimentation; this will be accomplished through the construction of the aforementioned stormwater management system as well as site grading, rip rap, and temporary erosion control measures including but not limited to silt fence, erosion control blankets, culvert inlet protection check dams, and a stabilized construction entrance. Best Management Practices developed by the State of New Hampshire have been utilized in the design of this stormwater management system and their application will be enforced throughout the construction process.

This project results in more than 100,000 S.F. of disturbance and therefore it will require a NHDES Alteration of Terrain Permit.

Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.

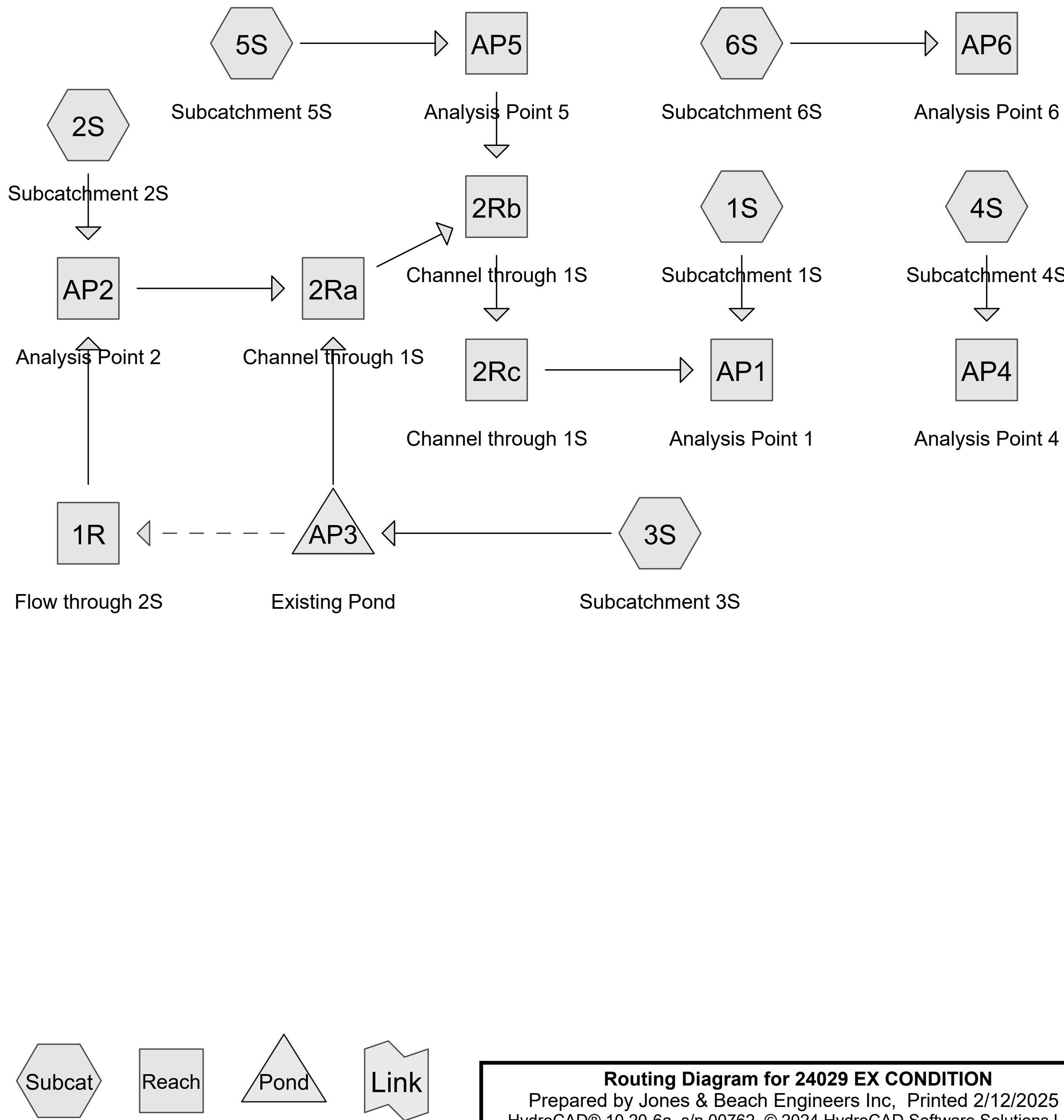
Daniel Meditz

Daniel Meditz, P.E
Project Engineer

APPENDIX I

EXISTING CONDITIONS DRAINAGE ANALYSIS

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



Routing Diagram for 24029 EX CONDITION
Prepared by Jones & Beach Engineers Inc, Printed 2/12/2025
HydroCAD® 10.20-6a s/n 00762 © 2024 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.616	83	1/4 acre lots, 38% imp, HSG C (1S, 3S)
0.549	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 6S)
0.247	98	Paved parking, HSG C (4S)
0.022	98	Paved roads w/curbs & sewers, HSG B (1S)
4.559	98	Paved roads w/curbs & sewers, HSG C (1S, 2S, 3S, 6S)
0.741	98	Roofs, HSG C (1S, 2S, 3S, 5S, 6S)
0.119	98	Water Surface, 0% imp, HSG D (3S)
0.076	55	Woods, Good, HSG B (1S)
6.712	70	Woods, Good, HSG C (1S, 2S, 3S)
0.841	77	Woods, Good, HSG D (1S, 3S)
15.480	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.098	HSG B	1S
14.423	HSG C	1S, 2S, 3S, 4S, 5S, 6S
0.959	HSG D	1S, 3S
0.000	Other	
15.480		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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=337,085 sf 26.17% Impervious Runoff Depth=1.65"
Flow Length=919' Tc=21.9 min CN=78 Runoff=9.58 cfs 1.065 af

Subcatchment2S: Subcatchment2S Runoff Area=17,152 sf 51.10% Impervious Runoff Depth=2.19"
Flow Length=142' Tc=13.6 min CN=85 Runoff=0.79 cfs 0.072 af

Subcatchment3S: Subcatchment3S Runoff Area=296,381 sf 51.37% Impervious Runoff Depth=2.28"
Flow Length=604' Tc=26.3 min CN=86 Runoff=10.87 cfs 1.291 af

Subcatchment4S: Subcatchment4S Runoff Area=10,753 sf 100.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.87 cfs 0.071 af

Subcatchment5S: Subcatchment5S Runoff Area=4,596 sf 100.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.37 cfs 0.030 af

Subcatchment6S: Subcatchment6S Runoff Area=8,360 sf 56.70% Impervious Runoff Depth=2.45"
Flow Length=173' Tc=12.2 min CN=88 Runoff=0.45 cfs 0.039 af

Reach 1R: Flow through 2S Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=236.0' S=0.0233 '/' Capacity=430.82 cfs Outflow=0.00 cfs 0.000 af

Reach 2Ra: Channel through 1S Avg. Flow Depth=0.54' Max Vel=3.24 fps Inflow=6.42 cfs 1.363 af
n=0.040 L=136.0' S=0.0294 '/' Capacity=1,586.21 cfs Outflow=6.42 cfs 1.363 af

Reach 2Rb: Channel through 1S Avg. Flow Depth=0.15' Max Vel=2.10 fps Inflow=6.49 cfs 1.393 af
n=0.040 L=153.0' S=0.0392 '/' Capacity=4,170.50 cfs Outflow=6.49 cfs 1.393 af

Reach 2Rc: Channel through 1S Avg. Flow Depth=0.20' Max Vel=1.60 fps Inflow=6.49 cfs 1.393 af
n=0.040 L=303.0' S=0.0165 '/' Capacity=2,705.34 cfs Outflow=6.49 cfs 1.393 af

Reach AP1: Analysis Point 1 Inflow=15.86 cfs 2.458 af
Outflow=15.86 cfs 2.458 af

Reach AP2: Analysis Point 2 Inflow=0.79 cfs 0.072 af
Outflow=0.79 cfs 0.072 af

Reach AP4: Analysis Point 4 Inflow=0.87 cfs 0.071 af
Outflow=0.87 cfs 0.071 af

Reach AP5: Analysis Point 5 Inflow=0.37 cfs 0.030 af
Outflow=0.37 cfs 0.030 af

Reach AP6: Analysis Point 6 Inflow=0.45 cfs 0.039 af
Outflow=0.45 cfs 0.039 af

Pond AP3: Existing Pond Peak Elev=31.38' Storage=6,873 cf Inflow=10.87 cfs 1.291 af
Primary=6.18 cfs 1.291 af Secondary=0.00 cfs 0.000 af Outflow=6.18 cfs 1.291 af

Total Runoff Area = 15.480 ac Runoff Volume = 2.568 af Average Runoff Depth = 1.99"
60.06% Pervious = 9.298 ac 39.94% Impervious = 6.183 ac

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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=337,085 sf 26.17% Impervious Runoff Depth=3.27"
Flow Length=919' Tc=21.9 min CN=78 Runoff=19.22 cfs 2.110 af

Subcatchment2S: Subcatchment2S Runoff Area=17,152 sf 51.10% Impervious Runoff Depth=3.97"
Flow Length=142' Tc=13.6 min CN=85 Runoff=1.41 cfs 0.130 af

Subcatchment3S: Subcatchment3S Runoff Area=296,381 sf 51.37% Impervious Runoff Depth=4.08"
Flow Length=604' Tc=26.3 min CN=86 Runoff=19.20 cfs 2.312 af

Subcatchment4S: Subcatchment4S Runoff Area=10,753 sf 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=1.33 cfs 0.111 af

Subcatchment5S: Subcatchment5S Runoff Area=4,596 sf 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.57 cfs 0.048 af

Subcatchment6S: Subcatchment6S Runoff Area=8,360 sf 56.70% Impervious Runoff Depth=4.29"
Flow Length=173' Tc=12.2 min CN=88 Runoff=0.76 cfs 0.069 af

Reach 1R: Flow through 2S Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=236.0' S=0.0233 '/' Capacity=430.82 cfs Outflow=0.00 cfs 0.000 af

Reach 2Ra: Channel through 1S Avg. Flow Depth=0.59' Max Vel=3.37 fps Inflow=7.42 cfs 2.442 af
n=0.040 L=136.0' S=0.0294 '/' Capacity=1,586.21 cfs Outflow=7.42 cfs 2.442 af

Reach 2Rb: Channel through 1S Avg. Flow Depth=0.17' Max Vel=2.22 fps Inflow=7.62 cfs 2.490 af
n=0.040 L=153.0' S=0.0392 '/' Capacity=4,170.50 cfs Outflow=7.62 cfs 2.490 af

Reach 2Rc: Channel through 1S Avg. Flow Depth=0.22' Max Vel=1.70 fps Inflow=7.62 cfs 2.490 af
n=0.040 L=303.0' S=0.0165 '/' Capacity=2,705.34 cfs Outflow=7.61 cfs 2.490 af

Reach AP1: Analysis Point 1 Inflow=26.83 cfs 4.600 af
Outflow=26.83 cfs 4.600 af

Reach AP2: Analysis Point 2 Inflow=1.41 cfs 0.130 af
Outflow=1.41 cfs 0.130 af

Reach AP4: Analysis Point 4 Inflow=1.33 cfs 0.111 af
Outflow=1.33 cfs 0.111 af

Reach AP5: Analysis Point 5 Inflow=0.57 cfs 0.048 af
Outflow=0.57 cfs 0.048 af

Reach AP6: Analysis Point 6 Inflow=0.76 cfs 0.069 af
Outflow=0.76 cfs 0.069 af

Pond AP3: Existing Pond Peak Elev=33.12' Storage=22,235 cf Inflow=19.20 cfs 2.312 af
Primary=7.01 cfs 2.312 af Secondary=0.00 cfs 0.000 af Outflow=7.01 cfs 2.312 af

Total Runoff Area = 15.480 ac Runoff Volume = 4.780 af Average Runoff Depth = 3.71"
60.06% Pervious = 9.298 ac 39.94% Impervious = 6.183 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 19.22 cfs @ 12.30 hrs, Volume= 2.110 af, Depth= 3.27"
Routed to Reach AP1 : Analysis Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
3,301	55	Woods, Good, HSG B
960	98	Paved roads w/curbs & sewers, HSG B
16,400	98	Roofs, HSG C
61,667	98	Paved roads w/curbs & sewers, HSG C
10,167	74	>75% Grass cover, Good, HSG C
199,491	70	Woods, Good, HSG C
24,168	83	1/4 acre lots, 38% imp, HSG C
20,931	77	Woods, Good, HSG D
337,085	78	Weighted Average
248,874		73.83% Pervious Area
88,211		26.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	50	0.0183	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
2.8	114	0.0183	0.68		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	88	0.0227	0.75		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	56	0.0357	0.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	73	0.0274	0.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	136	0.0735	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	99	0.0392	8.51	312.68	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=20.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=29.00' n= 0.040 Winding stream, pools & shoals
0.9	303	0.0165	5.52	202.86	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=20.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=29.00' n= 0.040 Winding stream, pools & shoals
21.9	919	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 1.41 cfs @ 12.19 hrs, Volume= 0.130 af, Depth= 3.97"
Routed to Reach AP2 : Analysis Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
7,339	98	Paved roads w/curbs & sewers, HSG C
1,425	98	Roofs, HSG C
923	74	>75% Grass cover, Good, HSG C
7,465	70	Woods, Good, HSG C
17,152	85	Weighted Average
8,388		48.90% Pervious Area
8,764		51.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0172	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.9	37	0.0172	0.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	19	0.1053	1.62		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	36	0.2222	2.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.6	142	Total			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 19.20 cfs @ 12.36 hrs, Volume= 2.312 af, Depth= 4.08"
Routed to Pond AP3 : Existing Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
125,302	98	Paved roads w/curbs & sewers, HSG C
9,379	98	Roofs, HSG C
9,203	74	>75% Grass cover, Good, HSG C
85,401	70	Woods, Good, HSG C
46,241	83	1/4 acre lots, 38% imp, HSG C
15,690	77	Woods, Good, HSG D
5,165	98	Water Surface, 0% imp, HSG D
296,381	86	Weighted Average
144,128		48.63% Pervious Area
152,253		51.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
3.5	119	0.0126	0.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	107	0.0187	0.68		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.7	180	0.0111	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.3	604	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 1.33 cfs @ 12.09 hrs, Volume= 0.111 af, Depth= 5.41"
Routed to Reach AP4 : Analysis Point 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
10,753	98	Paved parking, HSG C
10,753		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 minute minimum Tc per TR-55**

Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 0.57 cfs @ 12.09 hrs, Volume= 0.048 af, Depth= 5.41"
Routed to Reach AP5 : Analysis Point 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
4,596	98	Roofs, HSG C
4,596		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 minute minimum Tc per TR-55**

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 0.76 cfs @ 12.16 hrs, Volume= 0.069 af, Depth= 4.29"
Routed to Reach AP6 : Analysis Point 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
4,261	98	Paved roads w/curbs & sewers, HSG C
479	98	Roofs, HSG C
3,620	74	>75% Grass cover, Good, HSG C
8,360	88	Weighted Average
3,620		43.30% Pervious Area
4,740		56.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0041	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.7	47	0.0041	0.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	76	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.2	173	Total			

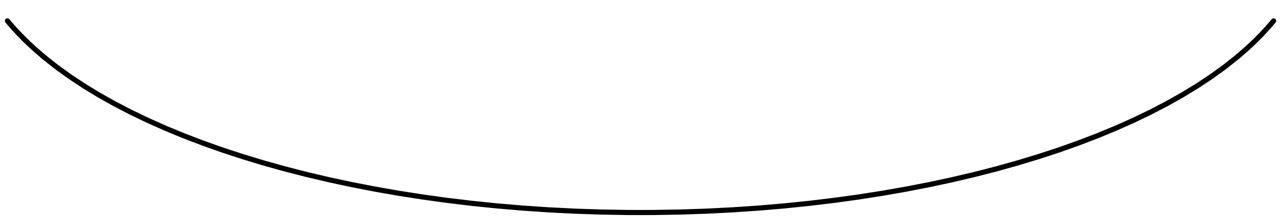
Summary for Reach 1R: Flow through 2S

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 AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 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= 74.7 sf, Capacity= 430.82 cfs

112.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 236.0' Slope= 0.0233 '/'
Inlet Invert= 35.50', Outlet Invert= 30.00'



‡

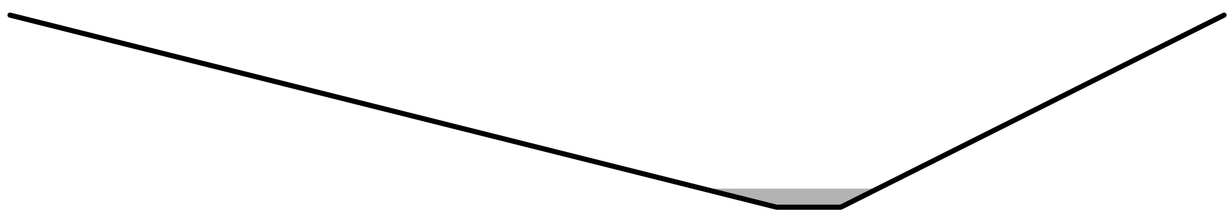
Summary for Reach 2Ra: Channel through 1S

Inflow Area = 7.198 ac, 51.36% Impervious, Inflow Depth = 4.07" for 10-Year Storm event
Inflow = 7.42 cfs @ 12.44 hrs, Volume= 2.442 af
Outflow = 7.42 cfs @ 12.45 hrs, Volume= 2.442 af, Atten= 0%, Lag= 0.5 min
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.37 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.77 fps, Avg. Travel Time= 1.3 min

Peak Storage= 299 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.59' , Surface Width= 5.51'
Bank-Full Depth= 6.00' Flow Area= 120.0 sf, Capacity= 1,586.21 cfs

2.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 38.00'
Length= 136.0' Slope= 0.0294 '/'
Inlet Invert= 24.00', Outlet Invert= 20.00'



Summary for Reach 2Rb: Channel through 1S

[61] Hint: Exceeded Reach 2Ra outlet invert by 0.17' @ 12.30 hrs

Inflow Area = 7.303 ac, 52.06% Impervious, Inflow Depth = 4.09" for 10-Year Storm event
Inflow = 7.62 cfs @ 12.27 hrs, Volume= 2.490 af
Outflow = 7.62 cfs @ 12.28 hrs, Volume= 2.490 af, Atten= 0%, Lag= 1.0 min
Routed to Reach 2Rc : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.22 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 2.0 min

Peak Storage= 525 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 21.00'
Bank-Full Depth= 6.00' Flow Area= 228.0 sf, Capacity= 4,170.50 cfs

20.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 56.00'
Length= 153.0' Slope= 0.0392 '/'
Inlet Invert= 20.00', Outlet Invert= 14.00'

Summary for Reach 2Rc: Channel through 1S

[62] Hint: Exceeded Reach 2Rb OUTLET depth by 0.06' @ 14.65 hrs

Inflow Area = 7.303 ac, 52.06% Impervious, Inflow Depth = 4.09" for 10-Year Storm event
Inflow = 7.62 cfs @ 12.28 hrs, Volume= 2.490 af
Outflow = 7.61 cfs @ 12.33 hrs, Volume= 2.490 af, Atten= 0%, Lag= 2.8 min
Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.70 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 5.9 min

Peak Storage= 1,357 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.22' , Surface Width= 21.30'
Bank-Full Depth= 6.00' Flow Area= 228.0 sf, Capacity= 2,705.34 cfs

20.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 56.00'
Length= 303.0' Slope= 0.0165 '/'
Inlet Invert= 14.00', Outlet Invert= 9.00'

Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 15.042 ac, 38.74% Impervious, Inflow Depth = 3.67" for 10-Year Storm event
Inflow = 26.83 cfs @ 12.31 hrs, Volume= 4.600 af
Outflow = 26.83 cfs @ 12.31 hrs, Volume= 4.600 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

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

Inflow Area = 0.394 ac, 51.10% Impervious, Inflow Depth = 3.97" for 10-Year Storm event
Inflow = 1.41 cfs @ 12.19 hrs, Volume= 0.130 af
Outflow = 1.41 cfs @ 12.19 hrs, Volume= 0.130 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP4: Analysis Point 4

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

Inflow Area = 0.247 ac,100.00% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.111 af
Outflow = 1.33 cfs @ 12.09 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP5: Analysis Point 5

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

Inflow Area = 0.106 ac,100.00% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.048 af
Outflow = 0.57 cfs @ 12.09 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP6: Analysis Point 6

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

Inflow Area = 0.192 ac, 56.70% Impervious, Inflow Depth = 4.29" for 10-Year Storm event
Inflow = 0.76 cfs @ 12.16 hrs, Volume= 0.069 af
Outflow = 0.76 cfs @ 12.16 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Pond AP3: Existing Pond

15" CMP culvert inlet is buried. Contractor to uncover culvert inlet and replace with 18" HDPE culvert.

---

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=8)

Inflow Area = 6.804 ac, 51.37% Impervious, Inflow Depth = 4.08" for 10-Year Storm event
Inflow = 19.20 cfs @ 12.36 hrs, Volume= 2.312 af
Outflow = 7.01 cfs @ 12.86 hrs, Volume= 2.312 af, Atten= 63%, Lag= 30.2 min
Primary = 7.01 cfs @ 12.86 hrs, Volume= 2.312 af
Routed to Reach 2Ra : Channel through 1S
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 1R : Flow through 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 33.12' @ 12.86 hrs Surf.Area= 13,498 sf Storage= 22,235 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 19.0 min (837.7 - 818.7)

Volume	Invert	Avail.Storage	Storage Description
#1	27.00'	104,428 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.00	20	5.7	0	0	20
28.00	37	24.0	28	28	66
30.00	2,236	218.0	1,707	1,735	3,810
32.00	7,294	444.0	9,046	10,781	15,734
34.00	19,719	933.0	26,004	36,785	69,335
35.50	43,192	1,107.0	46,047	82,832	97,623
36.00	43,192	1,107.0	21,596	104,428	98,177

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	**15.0" Round Culvert** L= 156.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 24.09' S= 0.0187 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf
#2	Secondary	35.50'	**24.0' long + 3.0 '/' SideZ x 24.0' 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=7.01 cfs @ 12.86 hrs HW=33.12' TW=24.58' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 7.01 cfs @ 5.71 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=27.00' TW=35.50' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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=337,085 sf 26.17% Impervious Runoff Depth=4.64"
Flow Length=919' Tc=21.9 min CN=78 Runoff=27.15 cfs 2.991 af

Subcatchment2S: Subcatchment2S Runoff Area=17,152 sf 51.10% Impervious Runoff Depth=5.42"
Flow Length=142' Tc=13.6 min CN=85 Runoff=1.90 cfs 0.178 af

Subcatchment3S: Subcatchment3S Runoff Area=296,381 sf 51.37% Impervious Runoff Depth=5.54"
Flow Length=604' Tc=26.3 min CN=86 Runoff=25.75 cfs 3.141 af

Subcatchment4S: Subcatchment4S Runoff Area=10,753 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=1.70 cfs 0.143 af

Subcatchment5S: Subcatchment5S Runoff Area=4,596 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.73 cfs 0.061 af

Subcatchment6S: Subcatchment6S Runoff Area=8,360 sf 56.70% Impervious Runoff Depth=5.77"
Flow Length=173' Tc=12.2 min CN=88 Runoff=1.01 cfs 0.092 af

Reach 1R: Flow through 2S Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=236.0' S=0.0233 '/' Capacity=430.82 cfs Outflow=0.00 cfs 0.000 af

Reach 2Ra: Channel through 1S Avg. Flow Depth=0.61' Max Vel=3.46 fps Inflow=8.17 cfs 3.319 af
n=0.040 L=136.0' S=0.0294 '/' Capacity=1,586.21 cfs Outflow=8.17 cfs 3.319 af

Reach 2Rb: Channel through 1S Avg. Flow Depth=0.18' Max Vel=2.30 fps Inflow=8.54 cfs 3.380 af
n=0.040 L=153.0' S=0.0392 '/' Capacity=4,170.50 cfs Outflow=8.53 cfs 3.380 af

Reach 2Rc: Channel through 1S Avg. Flow Depth=0.23' Max Vel=1.77 fps Inflow=8.53 cfs 3.380 af
n=0.040 L=303.0' S=0.0165 '/' Capacity=2,705.34 cfs Outflow=8.51 cfs 3.380 af

Reach AP1: Analysis Point 1 Inflow=35.64 cfs 6.371 af
Outflow=35.64 cfs 6.371 af

Reach AP2: Analysis Point 2 Inflow=1.90 cfs 0.178 af
Outflow=1.90 cfs 0.178 af

Reach AP4: Analysis Point 4 Inflow=1.70 cfs 0.143 af
Outflow=1.70 cfs 0.143 af

Reach AP5: Analysis Point 5 Inflow=0.73 cfs 0.061 af
Outflow=0.73 cfs 0.061 af

Reach AP6: Analysis Point 6 Inflow=1.01 cfs 0.092 af
Outflow=1.01 cfs 0.092 af

Pond AP3: Existing Pond Peak Elev=33.99' Storage=36,595 cf Inflow=25.75 cfs 3.141 af
Primary=7.39 cfs 3.141 af Secondary=0.00 cfs 0.000 af Outflow=7.39 cfs 3.141 af

Total Runoff Area = 15.480 ac Runoff Volume = 6.606 af Average Runoff Depth = 5.12"
60.06% Pervious = 9.298 ac 39.94% Impervious = 6.183 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 27.15 cfs @ 12.30 hrs, Volume= 2.991 af, Depth= 4.64"
Routed to Reach AP1 : Analysis Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
3,301	55	Woods, Good, HSG B
960	98	Paved roads w/curbs & sewers, HSG B
16,400	98	Roofs, HSG C
61,667	98	Paved roads w/curbs & sewers, HSG C
10,167	74	>75% Grass cover, Good, HSG C
199,491	70	Woods, Good, HSG C
24,168	83	1/4 acre lots, 38% imp, HSG C
20,931	77	Woods, Good, HSG D
337,085	78	Weighted Average
248,874		73.83% Pervious Area
88,211		26.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	50	0.0183	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
2.8	114	0.0183	0.68		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	88	0.0227	0.75		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	56	0.0357	0.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	73	0.0274	0.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	136	0.0735	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	99	0.0392	8.51	312.68	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=20.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=29.00' n= 0.040 Winding stream, pools & shoals
0.9	303	0.0165	5.52	202.86	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=20.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=29.00' n= 0.040 Winding stream, pools & shoals
21.9	919	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 1.90 cfs @ 12.18 hrs, Volume= 0.178 af, Depth= 5.42"
Routed to Reach AP2 : Analysis Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
7,339	98	Paved roads w/curbs & sewers, HSG C
1,425	98	Roofs, HSG C
923	74	>75% Grass cover, Good, HSG C
7,465	70	Woods, Good, HSG C
17,152	85	Weighted Average
8,388		48.90% Pervious Area
8,764		51.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0172	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.9	37	0.0172	0.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	19	0.1053	1.62		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	36	0.2222	2.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.6	142	Total			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 25.75 cfs @ 12.35 hrs, Volume= 3.141 af, Depth= 5.54"
Routed to Pond AP3 : Existing Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
125,302	98	Paved roads w/curbs & sewers, HSG C
9,379	98	Roofs, HSG C
9,203	74	>75% Grass cover, Good, HSG C
85,401	70	Woods, Good, HSG C
46,241	83	1/4 acre lots, 38% imp, HSG C
15,690	77	Woods, Good, HSG D
5,165	98	Water Surface, 0% imp, HSG D
296,381	86	Weighted Average
144,128		48.63% Pervious Area
152,253		51.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
3.5	119	0.0126	0.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	107	0.0187	0.68		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.7	180	0.0111	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.3	604	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 1.70 cfs @ 12.09 hrs, Volume= 0.143 af, Depth= 6.94"
Routed to Reach AP4 : Analysis Point 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
10,753	98	Paved parking, HSG C
10,753		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 minute minimum Tc per TR-55**

Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.061 af, Depth= 6.94"
Routed to Reach AP5 : Analysis Point 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
4,596	98	Roofs, HSG C
4,596		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 minute minimum Tc per TR-55**

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 1.01 cfs @ 12.16 hrs, Volume= 0.092 af, Depth= 5.77"
Routed to Reach AP6 : Analysis Point 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
4,261	98	Paved roads w/curbs & sewers, HSG C
479	98	Roofs, HSG C
3,620	74	>75% Grass cover, Good, HSG C
8,360	88	Weighted Average
3,620		43.30% Pervious Area
4,740		56.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0041	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.7	47	0.0041	0.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	76	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.2	173	Total			

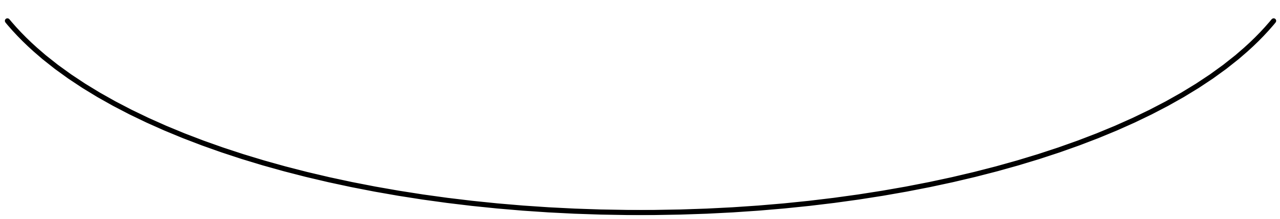
Summary for Reach 1R: Flow through 2S

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 AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 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= 74.7 sf, Capacity= 430.82 cfs

112.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 236.0' Slope= 0.0233 '/'
Inlet Invert= 35.50', Outlet Invert= 30.00'



‡

Summary for Reach 2Ra: Channel through 1S

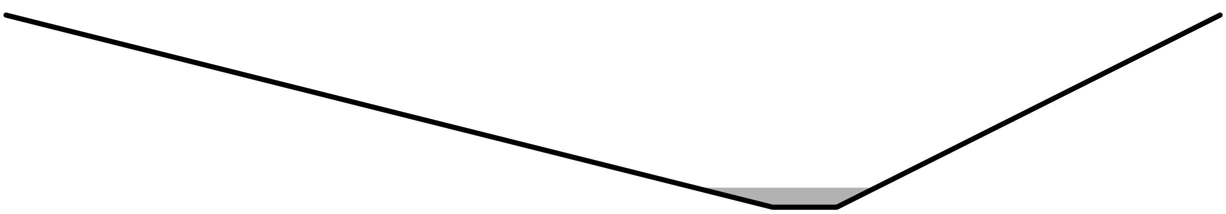
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 7.198 ac, 51.36% Impervious, Inflow Depth = 5.53" for 25-Year Storm event
Inflow = 8.17 cfs @ 12.25 hrs, Volume= 3.319 af
Outflow = 8.17 cfs @ 12.25 hrs, Volume= 3.319 af, Atten= 0%, Lag= 0.5 min
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.46 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.92 fps, Avg. Travel Time= 1.2 min

Peak Storage= 321 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.61' , Surface Width= 5.69'
Bank-Full Depth= 6.00' Flow Area= 120.0 sf, Capacity= 1,586.21 cfs

2.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 38.00'
Length= 136.0' Slope= 0.0294 '/'
Inlet Invert= 24.00', Outlet Invert= 20.00'



Summary for Reach 2Rb: Channel through 1S

[61] Hint: Exceeded Reach 2Ra outlet invert by 0.18' @ 12.25 hrs

Inflow Area = 7.303 ac, 52.06% Impervious, Inflow Depth = 5.55" for 25-Year Storm event
Inflow = 8.54 cfs @ 12.22 hrs, Volume= 3.380 af
Outflow = 8.53 cfs @ 12.24 hrs, Volume= 3.380 af, Atten= 0%, Lag= 1.0 min
Routed to Reach 2Rc : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.30 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 2.0 min

Peak Storage= 567 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.18' , Surface Width= 21.08'
Bank-Full Depth= 6.00' Flow Area= 228.0 sf, Capacity= 4,170.50 cfs

20.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 56.00'
Length= 153.0' Slope= 0.0392 '/'
Inlet Invert= 20.00', Outlet Invert= 14.00'

Summary for Reach 2Rc: Channel through 1S

[62] Hint: Exceeded Reach 2Rb OUTLET depth by 0.06' @ 15.65 hrs

Inflow Area = 7.303 ac, 52.06% Impervious, Inflow Depth = 5.55" for 25-Year Storm event
Inflow = 8.53 cfs @ 12.24 hrs, Volume= 3.380 af
Outflow = 8.51 cfs @ 12.27 hrs, Volume= 3.380 af, Atten= 0%, Lag= 2.1 min
Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.77 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 0.91 fps, Avg. Travel Time= 5.6 min

Peak Storage= 1,459 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 21.40'
Bank-Full Depth= 6.00' Flow Area= 228.0 sf, Capacity= 2,705.34 cfs

20.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 56.00'
Length= 303.0' Slope= 0.0165 '/'
Inlet Invert= 14.00', Outlet Invert= 9.00'

Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 15.042 ac, 38.74% Impervious, Inflow Depth = 5.08" for 25-Year Storm event
Inflow = 35.64 cfs @ 12.30 hrs, Volume= 6.371 af
Outflow = 35.64 cfs @ 12.30 hrs, Volume= 6.371 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

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

Inflow Area = 0.394 ac, 51.10% Impervious, Inflow Depth = 5.42" for 25-Year Storm event
Inflow = 1.90 cfs @ 12.18 hrs, Volume= 0.178 af
Outflow = 1.90 cfs @ 12.18 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP4: Analysis Point 4

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

Inflow Area = 0.247 ac,100.00% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 1.70 cfs @ 12.09 hrs, Volume= 0.143 af
Outflow = 1.70 cfs @ 12.09 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP5: Analysis Point 5

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

Inflow Area = 0.106 ac,100.00% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.73 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP6: Analysis Point 6

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

Inflow Area = 0.192 ac, 56.70% Impervious, Inflow Depth = 5.77" for 25-Year Storm event
Inflow = 1.01 cfs @ 12.16 hrs, Volume= 0.092 af
Outflow = 1.01 cfs @ 12.16 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Pond AP3: Existing Pond

15" CMP culvert inlet is buried. Contractor to uncover culvert inlet and replace with 18" HDPE culvert.

---

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=9)

Inflow Area = 6.804 ac, 51.37% Impervious, Inflow Depth = 5.54" for 25-Year Storm event
Inflow = 25.75 cfs @ 12.35 hrs, Volume= 3.141 af
Outflow = 7.39 cfs @ 12.95 hrs, Volume= 3.141 af, Atten= 71%, Lag= 36.1 min
Primary = 7.39 cfs @ 12.95 hrs, Volume= 3.141 af
Routed to Reach 2Ra : Channel through 1S
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 1R : Flow through 2S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 33.99' @ 12.95 hrs Surf.Area= 19,645 sf Storage= 36,595 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 32.0 min (842.3 - 810.2)

Volume	Invert	Avail.Storage	Storage Description
#1	27.00'	104,428 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.00	20	5.7	0	0	20
28.00	37	24.0	28	28	66
30.00	2,236	218.0	1,707	1,735	3,810
32.00	7,294	444.0	9,046	10,781	15,734
34.00	19,719	933.0	26,004	36,785	69,335
35.50	43,192	1,107.0	46,047	82,832	97,623
36.00	43,192	1,107.0	21,596	104,428	98,177

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	**15.0" Round Culvert** L= 156.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 24.09' S= 0.0187 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf
#2	Secondary	35.50'	**24.0' long + 3.0 '/' SideZ x 24.0' 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=7.39 cfs @ 12.95 hrs HW=33.99' TW=24.59' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 7.39 cfs @ 6.02 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=27.00' TW=35.50' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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=337,085 sf 26.17% Impervious Runoff Depth=4.64"
Flow Length=919' Tc=21.9 min CN=78 Runoff=27.15 cfs 2.991 af

Subcatchment2S: Subcatchment2S Runoff Area=17,152 sf 51.10% Impervious Runoff Depth=5.42"
Flow Length=142' Tc=13.6 min CN=85 Runoff=1.90 cfs 0.178 af

Subcatchment3S: Subcatchment3S Runoff Area=296,381 sf 51.37% Impervious Runoff Depth=5.54"
Flow Length=604' Tc=26.3 min CN=86 Runoff=25.75 cfs 3.141 af

Subcatchment4S: Subcatchment4S Runoff Area=10,753 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=1.70 cfs 0.143 af

Subcatchment5S: Subcatchment5S Runoff Area=4,596 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.73 cfs 0.061 af

Subcatchment6S: Subcatchment6S Runoff Area=8,360 sf 56.70% Impervious Runoff Depth=5.77"
Flow Length=173' Tc=12.2 min CN=88 Runoff=1.01 cfs 0.092 af

Reach 1R: Flow through 2S Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=236.0' S=0.0233 '/' Capacity=430.82 cfs Outflow=0.00 cfs 0.000 af

Reach 2Ra: Channel through 1S Avg. Flow Depth=0.61' Max Vel=3.46 fps Inflow=8.17 cfs 3.319 af
n=0.040 L=136.0' S=0.0294 '/' Capacity=1,586.21 cfs Outflow=8.17 cfs 3.319 af

Reach 2Rb: Channel through 1S Avg. Flow Depth=0.18' Max Vel=2.30 fps Inflow=8.54 cfs 3.380 af
n=0.040 L=153.0' S=0.0392 '/' Capacity=4,170.50 cfs Outflow=8.53 cfs 3.380 af

Reach 2Rc: Channel through 1S Avg. Flow Depth=0.23' Max Vel=1.77 fps Inflow=8.53 cfs 3.380 af
n=0.040 L=303.0' S=0.0165 '/' Capacity=2,705.34 cfs Outflow=8.51 cfs 3.380 af

Reach AP1: Analysis Point 1 Inflow=35.64 cfs 6.371 af
Outflow=35.64 cfs 6.371 af

Reach AP2: Analysis Point 2 Inflow=1.90 cfs 0.178 af
Outflow=1.90 cfs 0.178 af

Reach AP4: Analysis Point 4 Inflow=1.70 cfs 0.143 af
Outflow=1.70 cfs 0.143 af

Reach AP5: Analysis Point 5 Inflow=0.73 cfs 0.061 af
Outflow=0.73 cfs 0.061 af

Reach AP6: Analysis Point 6 Inflow=1.01 cfs 0.092 af
Outflow=1.01 cfs 0.092 af

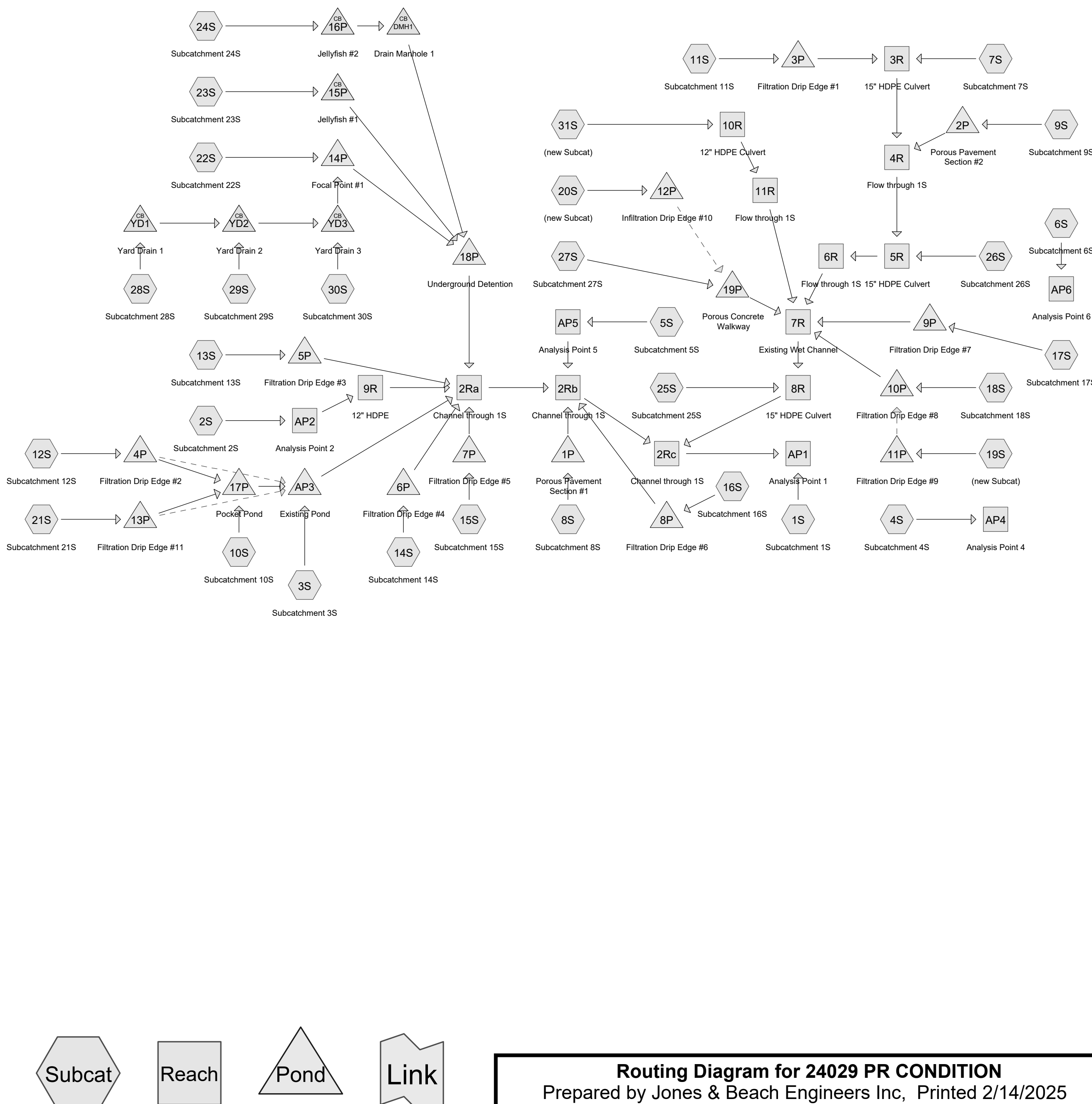
Pond AP3: Existing Pond Peak Elev=33.99' Storage=36,595 cf Inflow=25.75 cfs 3.141 af
Primary=7.39 cfs 3.141 af Secondary=0.00 cfs 0.000 af Outflow=7.39 cfs 3.141 af

Total Runoff Area = 15.480 ac Runoff Volume = 6.606 af Average Runoff Depth = 5.12"
60.06% Pervious = 9.298 ac 39.94% Impervious = 6.183 ac

APPENDIX II

PROPOSED CONDITIONS DRAINAGE ANALYSIS

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



Routing Diagram for 24029 PR CONDITION
Prepared by Jones & Beach Engineers Inc, Printed 2/14/2025
HydroCAD® 10.20-6a s/n 00762 © 2024 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.616	83	1/4 acre lots, 38% imp, HSG C (3S, 7S, 8S)
1.567	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 5S, 6S, 7S, 8S, 9S, 10S, 22S, 23S, 24S, 25S, 26S, 27S, 28S, 29S, 30S, 31S)
0.413	98	Paved parking, HSG C (4S, 22S, 23S, 28S, 29S, 30S)
0.022	98	Paved roads w/curbs & sewers, HSG B (1S)
5.262	98	Paved roads w/curbs & sewers, HSG C (1S, 2S, 3S, 6S, 7S, 8S, 9S, 24S, 27S)
1.532	98	Roofs, HSG C (1S, 2S, 3S, 6S, 8S, 9S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S)
0.013	98	Water Surface, 0% imp, HSG C (11S, 12S, 13S, 19S, 21S)
0.119	98	Water Surface, 0% imp, HSG D (3S)
0.076	55	Woods, Good, HSG B (1S)
4.019	70	Woods, Good, HSG C (1S, 2S, 3S, 7S)
0.841	77	Woods, Good, HSG D (1S, 3S)
15.480	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.098	HSG B	1S
14.423	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 25S, 26S, 27S, 28S, 29S, 30S, 31S
0.959	HSG D	1S, 3S
0.000	Other	
15.480		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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=179,640 sf 29.06% Impervious Runoff Depth=1.72"
Flow Length=577' Tc=13.9 min CN=79 Runoff=6.40 cfs 0.592 af

Subcatchment2S: Subcatchment2S Runoff Area=13,007 sf 67.38% Impervious Runoff Depth=2.54"
Flow Length=106' Tc=10.9 min CN=89 Runoff=0.74 cfs 0.063 af

Subcatchment3S: Subcatchment3S Runoff Area=289,535 sf 52.59% Impervious Runoff Depth=2.28"
Flow Length=604' Tc=26.3 min CN=86 Runoff=10.62 cfs 1.261 af

Subcatchment4S: Subcatchment4S Runoff Area=1,625 sf 100.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment5S: Subcatchment5S Runoff Area=430 sf 0.00% Impervious Runoff Depth=1.38"
Tc=6.0 min CN=74 Runoff=0.02 cfs 0.001 af

Subcatchment6S: Subcatchment6S Runoff Area=8,122 sf 55.43% Impervious Runoff Depth=2.36"
Flow Length=149' Tc=12.0 min CN=87 Runoff=0.42 cfs 0.037 af

Subcatchment7S: Subcatchment7S Runoff Area=29,318 sf 12.60% Impervious Runoff Depth=1.45"
Flow Length=200' Tc=15.8 min CN=75 Runoff=0.82 cfs 0.081 af

Subcatchment8S: Subcatchment8S Runoff Area=67,855 sf 73.60% Impervious Runoff Depth=2.83"
Tc=144.0 min CN=92 Runoff=1.13 cfs 0.367 af

Subcatchment9S: Subcatchment9S Runoff Area=16,130 sf 97.73% Impervious Runoff Depth=3.35"
Tc=144.0 min CN=97 Runoff=0.30 cfs 0.103 af

Subcatchment10S: Subcatchment10S Runoff Area=951 sf 0.00% Impervious Runoff Depth=1.38"
Tc=6.0 min CN=74 Runoff=0.03 cfs 0.003 af

Subcatchment11S: Subcatchment11S Runoff Area=2,774 sf 98.34% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment12S: Subcatchment12S Runoff Area=2,197 sf 99.04% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment13S: Subcatchment13S Runoff Area=2,400 sf 85.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.19 cfs 0.016 af

Subcatchment14S: Subcatchment14S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment15S: Subcatchment15S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment16S: Subcatchment16S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment17S: Subcatchment17S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment18S: Subcatchment18S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment19S: (new Subcat) Runoff Area=1,640 sf 97.07% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment20S: (new Subcat) Runoff Area=2,728 sf 100.00% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment21S: Subcatchment21S Runoff Area=912 sf 89.47% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment22S: Subcatchment22S Runoff Area=9,860 sf 94.21% Impervious Runoff Depth=3.35"
Tc=6.0 min CN=97 Runoff=0.79 cfs 0.063 af

Subcatchment23S: Subcatchment23S Runoff Area=14,386 sf 97.80% Impervious Runoff Depth=3.35"
Tc=6.0 min CN=97 Runoff=1.15 cfs 0.092 af

Subcatchment24S: Subcatchment24S Runoff Area=9,757 sf 95.92% Impervious Runoff Depth=3.35"
Tc=6.0 min CN=97 Runoff=0.78 cfs 0.063 af

Subcatchment25S: Subcatchment25S Runoff Area=6,419 sf 0.00% Impervious Runoff Depth=1.38"
Flow Length=158' Tc=6.4 min CN=74 Runoff=0.23 cfs 0.017 af

Subcatchment26S: Subcatchment26S Runoff Area=1,141 sf 0.00% Impervious Runoff Depth=1.38"
Tc=6.0 min CN=74 Runoff=0.04 cfs 0.003 af

Subcatchment27S: Subcatchment27S Runoff Area=3,030 sf 33.83% Impervious Runoff Depth=1.95"
Tc=144.0 min CN=82 Runoff=0.03 cfs 0.011 af

Subcatchment28S: Subcatchment28S Runoff Area=997 sf 55.57% Impervious Runoff Depth=2.36"
Tc=6.0 min CN=87 Runoff=0.06 cfs 0.005 af

Subcatchment29S: Subcatchment29S Runoff Area=1,632 sf 50.25% Impervious Runoff Depth=2.28"
Tc=6.0 min CN=86 Runoff=0.10 cfs 0.007 af

Subcatchment30S: Subcatchment30S Runoff Area=393 sf 53.18% Impervious Runoff Depth=2.36"
Tc=6.0 min CN=87 Runoff=0.02 cfs 0.002 af

Subcatchment31S: (new Subcat) Runoff Area=1,910 sf 0.00% Impervious Runoff Depth=1.38"
Flow Length=91' Tc=6.0 min CN=74 Runoff=0.07 cfs 0.005 af

Reach 2Ra: Channel through 1S Avg. Flow Depth=0.69' Max Vel=3.68 fps Inflow=10.25 cfs 1.606 af
n=0.040 L=136.0' S=0.0294 '/' Capacity=1,586.21 cfs Outflow=10.26 cfs 1.606 af

Reach 2Rb: Channel through 1S Avg. Flow Depth=0.20' Max Vel=2.49 fps Inflow=10.29 cfs 1.615 af
n=0.040 L=153.0' S=0.0392 '/' Capacity=4,170.50 cfs Outflow=10.28 cfs 1.615 af

Reach 2Rc: Channel through 1S Avg. Flow Depth=0.27' Max Vel=1.96 fps Inflow=11.12 cfs 1.764 af
n=0.040 L=303.0' S=0.0165 '/' Capacity=2,705.34 cfs Outflow=11.11 cfs 1.764 af

Reach 3R: 15" HDPE Culvert Avg. Flow Depth=0.33' Max Vel=3.82 fps Inflow=0.98 cfs 0.099 af
15.0" Round Pipe n=0.012 L=86.0' S=0.0087 '/' Capacity=6.54 cfs Outflow=0.98 cfs 0.099 af

Reach 4R: Flow through 1S Avg. Flow Depth=0.23' Max Vel=2.54 fps Inflow=0.98 cfs 0.099 af
n=0.030 L=40.0' S=0.0313 '/' Capacity=23.40 cfs Outflow=0.98 cfs 0.099 af

Reach 5R: 15" HDPE Culvert Avg. Flow Depth=0.30' Max Vel=4.37 fps Inflow=1.00 cfs 0.102 af
15.0" Round Pipe n=0.012 L=12.0' S=0.0125 '/' Capacity=7.82 cfs Outflow=1.01 cfs 0.102 af

Reach 6R: Flow through 1S Avg. Flow Depth=0.23' Max Vel=2.58 fps Inflow=1.01 cfs 0.102 af
n=0.030 L=53.0' S=0.0321 '/' Capacity=23.71 cfs Outflow=1.00 cfs 0.102 af

Reach 7R: Existing Wet Channel Avg. Flow Depth=0.14' Max Vel=2.40 fps Inflow=1.26 cfs 0.132 af
n=0.030 L=65.0' S=0.0554 '/' Capacity=88.27 cfs Outflow=1.26 cfs 0.132 af

Reach 8R: 15" HDPE Culvert Avg. Flow Depth=0.23' Max Vel=9.34 fps Inflow=1.41 cfs 0.149 af
15.0" Round Pipe n=0.012 L=40.0' S=0.0800 '/' Capacity=19.79 cfs Outflow=1.41 cfs 0.149 af

Reach 9R: 12" HDPE Avg. Flow Depth=0.20' Max Vel=6.59 fps Inflow=0.74 cfs 0.063 af
12.0" Round Pipe n=0.013 L=9.0' S=0.0556 '/' Capacity=8.40 cfs Outflow=0.74 cfs 0.063 af

Reach 10R: 12" HDPE Culvert Avg. Flow Depth=0.05' Max Vel=4.07 fps Inflow=0.07 cfs 0.005 af
12.0" Round Pipe n=0.012 L=13.0' S=0.0923 '/' Capacity=11.73 cfs Outflow=0.07 cfs 0.005 af

Reach 11R: Flow through 1S Avg. Flow Depth=0.05' Max Vel=1.11 fps Inflow=0.07 cfs 0.005 af
n=0.030 L=59.0' S=0.0305 '/' Capacity=23.12 cfs Outflow=0.07 cfs 0.005 af

Reach AP1: Analysis Point 1 Inflow=15.84 cfs 2.356 af
Outflow=15.84 cfs 2.356 af

Reach AP2: Analysis Point 2 Inflow=0.74 cfs 0.063 af
Outflow=0.74 cfs 0.063 af

Reach AP4: Analysis Point 4 Inflow=0.13 cfs 0.011 af
Outflow=0.13 cfs 0.011 af

Reach AP5: Analysis Point 5 Inflow=0.02 cfs 0.001 af
Outflow=0.02 cfs 0.001 af

Reach AP6: Analysis Point 6 Inflow=0.42 cfs 0.037 af
Outflow=0.42 cfs 0.037 af

Pond 1P: Porous Pavement Section #1 Peak Elev=33.36' Storage=2,299 cf Inflow=1.13 cfs 0.367 af
Discarded=0.80 cfs 0.367 af Primary=0.00 cfs 0.000 af Outflow=0.80 cfs 0.367 af

Pond 2P: Porous Pavement Section #2 Peak Elev=34.71' Storage=229 cf Inflow=0.30 cfs 0.103 af
Discarded=0.27 cfs 0.103 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.103 af

Pond 3P: Filtration Drip Edge #1 Peak Elev=35.61' Storage=0.001 af Inflow=0.22 cfs 0.018 af
Outflow=0.19 cfs 0.018 af

Pond 4P: Filtration Drip Edge #2 Peak Elev=35.36' Storage=0.001 af Inflow=0.18 cfs 0.015 af
Primary=0.15 cfs 0.015 af Secondary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.015 af

Pond 5P: Filtration Drip Edge #3 Peak Elev=33.64' Storage=0.001 af Inflow=0.19 cfs 0.016 af
Outflow=0.16 cfs 0.016 af

Pond 6P: Filtration Drip Edge #4 Peak Elev=24.69' Storage=0.001 af Inflow=0.09 cfs 0.007 af
Outflow=0.09 cfs 0.007 af

Pond 7P: Filtration Drip Edge #5 Peak Elev=24.69' Storage=0.002 af Inflow=0.09 cfs 0.007 af
Outflow=0.09 cfs 0.006 af

Pond 8P: Filtration Drip Edge #6 Peak Elev=23.23' Storage=0.000 af Inflow=0.09 cfs 0.007 af
Outflow=0.08 cfs 0.007 af

Pond 9P: Filtration Drip Edge #7 Peak Elev=30.97' Storage=0.001 af Inflow=0.09 cfs 0.007 af
Outflow=0.08 cfs 0.007 af

Pond 10P: Filtration Drip Edge #8 Peak Elev=31.29' Storage=0.001 af Inflow=0.20 cfs 0.018 af
Outflow=0.20 cfs 0.017 af

Pond 11P: Filtration Drip Edge #9 Peak Elev=32.54' Storage=0.001 af Inflow=0.13 cfs 0.011 af
Outflow=0.12 cfs 0.011 af

Pond 12P: Infiltration Drip Edge #10 Peak Elev=36.46' Storage=0.007 af Inflow=0.22 cfs 0.018 af
Discarded=0.02 cfs 0.018 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.018 af

Pond 13P: Filtration Drip Edge #11 Peak Elev=35.08' Storage=0.001 af Inflow=0.07 cfs 0.006 af
Primary=0.04 cfs 0.006 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.006 af

Pond 14P: Focal Point #1 Peak Elev=37.87' Storage=48 cf Inflow=0.97 cfs 0.077 af
Outflow=0.98 cfs 0.077 af

Pond 15P: Jellyfish #1 Peak Elev=33.73' Inflow=1.15 cfs 0.092 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0175 '/' Outflow=1.15 cfs 0.092 af

Pond 16P: Jellyfish #2 Peak Elev=33.74' Inflow=0.78 cfs 0.063 af
15.0" Round Culvert n=0.012 L=12.0' S=0.0125 '/' Outflow=0.78 cfs 0.063 af

Pond 17P: Pocket Pond Peak Elev=35.08' Storage=291 cf Inflow=0.21 cfs 0.023 af
Outflow=0.04 cfs 0.023 af

Pond 18P: Underground Detention Peak Elev=33.67' Storage=6,155 cf Inflow=2.90 cfs 0.232 af
Outflow=0.14 cfs 0.231 af

Pond 19P: Porous Concrete Walkway Peak Elev=31.58' Storage=14 cf Inflow=0.03 cfs 0.011 af
Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond AP3: Existing Pond Peak Elev=31.60' Storage=8,092 cf Inflow=18.79 cfs 2.296 af
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=13.31 cfs 2.296 af

Pond DMH1: Drain Manhole 1 Peak Elev=34.38' Inflow=1.20 cfs 0.099 af
15.0" Round Culvert n=0.012 L=8.0' S=0.0125 '/' Outflow=1.20 cfs 0.099 af

Pond YD1: Yard Drain 1 Peak Elev=38.86' Inflow=0.11 cfs 0.008 af
6.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/' Outflow=0.11 cfs 0.008 af

Pond YD2: Yard Drain 2 Peak Elev=38.41' Inflow=0.28 cfs 0.021 af
6.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.28 cfs 0.021 af

Pond YD3: Yard Drain 3 Peak Elev=38.18' Inflow=0.32 cfs 0.024 af
6.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/' Outflow=0.32 cfs 0.024 af

Total Runoff Area = 15.480 ac Runoff Volume = 5.190 af Average Runoff Depth = 4.02"
49.33% Pervious = 7.636 ac 50.67% Impervious = 7.844 ac

Pond AP3: Existing Pond Peak Elev=29.78' Storage=1,286 cf Inflow=10.65 cfs 1.284 af
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=9.72 cfs 1.284 af

Pond DMH1: Drain Manhole 1 Peak Elev=33.67' Inflow=0.78 cfs 0.063 af
15.0" Round Culvert n=0.012 L=8.0' S=0.0125 '/' Outflow=0.78 cfs 0.063 af

Pond YD1: Yard Drain 1 Peak Elev=38.78' Inflow=0.06 cfs 0.005 af
6.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/' Outflow=0.06 cfs 0.005 af

Pond YD2: Yard Drain 2 Peak Elev=38.28' Inflow=0.16 cfs 0.012 af
6.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.16 cfs 0.012 af

Pond YD3: Yard Drain 3 Peak Elev=38.05' Inflow=0.18 cfs 0.013 af
6.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/' Outflow=0.18 cfs 0.013 af

Total Runoff Area = 15.480 ac Runoff Volume = 2.907 af Average Runoff Depth = 2.25"
49.33% Pervious = 7.636 ac 50.67% Impervious = 7.844 ac

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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=179,640 sf 29.06% Impervious Runoff Depth=3.37"
Flow Length=577' Tc=13.9 min CN=79 Runoff=12.59 cfs 1.158 af

Subcatchment2S: Subcatchment2S Runoff Area=13,007 sf 67.38% Impervious Runoff Depth=4.40"
Flow Length=106' Tc=10.9 min CN=89 Runoff=1.25 cfs 0.109 af

Subcatchment3S: Subcatchment3S Runoff Area=289,535 sf 52.59% Impervious Runoff Depth=4.08"
Flow Length=604' Tc=26.3 min CN=86 Runoff=18.75 cfs 2.259 af

Subcatchment4S: Subcatchment4S Runoff Area=1,625 sf 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.20 cfs 0.017 af

Subcatchment5S: Subcatchment5S Runoff Area=430 sf 0.00% Impervious Runoff Depth=2.89"
Tc=6.0 min CN=74 Runoff=0.03 cfs 0.002 af

Subcatchment6S: Subcatchment6S Runoff Area=8,122 sf 55.43% Impervious Runoff Depth=4.18"
Flow Length=149' Tc=12.0 min CN=87 Runoff=0.73 cfs 0.065 af

Subcatchment7S: Subcatchment7S Runoff Area=29,318 sf 12.60% Impervious Runoff Depth=2.99"
Flow Length=200' Tc=15.8 min CN=75 Runoff=1.74 cfs 0.167 af

Subcatchment8S: Subcatchment8S Runoff Area=67,855 sf 73.60% Impervious Runoff Depth=4.73"
Tc=144.0 min CN=92 Runoff=1.85 cfs 0.613 af

Subcatchment9S: Subcatchment9S Runoff Area=16,130 sf 97.73% Impervious Runoff Depth=5.30"
Tc=144.0 min CN=97 Runoff=0.47 cfs 0.163 af

Subcatchment10S: Subcatchment10S Runoff Area=951 sf 0.00% Impervious Runoff Depth=2.89"
Tc=6.0 min CN=74 Runoff=0.07 cfs 0.005 af

Subcatchment11S: Subcatchment11S Runoff Area=2,774 sf 98.34% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.34 cfs 0.029 af

Subcatchment12S: Subcatchment12S Runoff Area=2,197 sf 99.04% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.27 cfs 0.023 af

Subcatchment13S: Subcatchment13S Runoff Area=2,400 sf 85.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.30 cfs 0.025 af

Subcatchment14S: Subcatchment14S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment15S: Subcatchment15S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment16S: Subcatchment16S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment17S: Subcatchment17S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment18S: Subcatchment18S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment19S: (new Subcat) Runoff Area=1,640 sf 97.07% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.20 cfs 0.017 af

Subcatchment20S: (new Subcat) Runoff Area=2,728 sf 100.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.34 cfs 0.028 af

Subcatchment21S: Subcatchment21S Runoff Area=912 sf 89.47% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=98 Runoff=0.11 cfs 0.009 af

Subcatchment22S: Subcatchment22S Runoff Area=9,860 sf 94.21% Impervious Runoff Depth=5.30"
Tc=6.0 min CN=97 Runoff=1.22 cfs 0.100 af

Subcatchment23S: Subcatchment23S Runoff Area=14,386 sf 97.80% Impervious Runoff Depth=5.30"
Tc=6.0 min CN=97 Runoff=1.77 cfs 0.146 af

Subcatchment24S: Subcatchment24S Runoff Area=9,757 sf 95.92% Impervious Runoff Depth=5.30"
Tc=6.0 min CN=97 Runoff=1.20 cfs 0.099 af

Subcatchment25S: Subcatchment25S Runoff Area=6,419 sf 0.00% Impervious Runoff Depth=2.89"
Flow Length=158' Tc=6.4 min CN=74 Runoff=0.48 cfs 0.036 af

Subcatchment26S: Subcatchment26S Runoff Area=1,141 sf 0.00% Impervious Runoff Depth=2.89"
Tc=6.0 min CN=74 Runoff=0.09 cfs 0.006 af

Subcatchment27S: Subcatchment27S Runoff Area=3,030 sf 33.83% Impervious Runoff Depth=3.67"
Tc=144.0 min CN=82 Runoff=0.07 cfs 0.021 af

Subcatchment28S: Subcatchment28S Runoff Area=997 sf 55.57% Impervious Runoff Depth=4.18"
Tc=6.0 min CN=87 Runoff=0.11 cfs 0.008 af

Subcatchment29S: Subcatchment29S Runoff Area=1,632 sf 50.25% Impervious Runoff Depth=4.08"
Tc=6.0 min CN=86 Runoff=0.17 cfs 0.013 af

Subcatchment30S: Subcatchment30S Runoff Area=393 sf 53.18% Impervious Runoff Depth=4.18"
Tc=6.0 min CN=87 Runoff=0.04 cfs 0.003 af

Subcatchment31S: (new Subcat) Runoff Area=1,910 sf 0.00% Impervious Runoff Depth=2.89"
Flow Length=91' Tc=6.0 min CN=74 Runoff=0.15 cfs 0.011 af

Reach 2Ra: Channel through 1S Avg. Flow Depth=0.81' Max Vel=4.03 fps Inflow=14.54 cfs 2.819 af
n=0.040 L=136.0' S=0.0294 '/' Capacity=1,586.21 cfs Outflow=14.54 cfs 2.819 af

Reach 2Rb: Channel through 1S Avg. Flow Depth=0.25' Max Vel=2.84 fps Inflow=14.58 cfs 2.832 af
n=0.040 L=153.0' S=0.0392 '/' Capacity=4,170.50 cfs Outflow=14.58 cfs 2.832 af

Reach 2Rc: Channel through 1S Avg. Flow Depth=0.34' Max Vel=2.25 fps Inflow=16.03 cfs 3.120 af
n=0.040 L=303.0' S=0.0165 '/' Capacity=2,705.34 cfs Outflow=16.02 cfs 3.120 af

Reach 3R: 15" HDPE Culvert Avg. Flow Depth=0.47' Max Vel=4.66 fps Inflow=1.99 cfs 0.196 af
15.0" Round Pipe n=0.012 L=86.0' S=0.0087 '/' Capacity=6.54 cfs Outflow=1.99 cfs 0.196 af

Reach 4R: Flow through 1S Avg. Flow Depth=0.33' Max Vel=3.09 fps Inflow=1.99 cfs 0.196 af
n=0.030 L=40.0' S=0.0313 '/' Capacity=23.40 cfs Outflow=1.99 cfs 0.196 af

Reach 5R: 15" HDPE Culvert Avg. Flow Depth=0.44' Max Vel=5.35 fps Inflow=2.04 cfs 0.203 af
15.0" Round Pipe n=0.012 L=12.0' S=0.0125 '/' Capacity=7.82 cfs Outflow=2.04 cfs 0.203 af

Reach 6R: Flow through 1S Avg. Flow Depth=0.33' Max Vel=3.14 fps Inflow=2.04 cfs 0.203 af
n=0.030 L=53.0' S=0.0321 '/' Capacity=23.71 cfs Outflow=2.04 cfs 0.203 af

Reach 7R: Existing Wet Channel Avg. Flow Depth=0.19' Max Vel=2.94 fps Inflow=2.45 cfs 0.252 af
n=0.030 L=65.0' S=0.0554 '/' Capacity=88.27 cfs Outflow=2.45 cfs 0.252 af

Reach 8R: 15" HDPE Culvert Avg. Flow Depth=0.32' Max Vel=11.36 fps Inflow=2.77 cfs 0.287 af
15.0" Round Pipe n=0.012 L=40.0' S=0.0800 '/' Capacity=19.79 cfs Outflow=2.77 cfs 0.287 af

Reach 9R: 12" HDPE Avg. Flow Depth=0.26' Max Vel=7.68 fps Inflow=1.25 cfs 0.109 af
12.0" Round Pipe n=0.013 L=9.0' S=0.0556 '/' Capacity=8.40 cfs Outflow=1.25 cfs 0.109 af

Reach 10R: 12" HDPE Culvert Avg. Flow Depth=0.08' Max Vel=5.12 fps Inflow=0.15 cfs 0.011 af
12.0" Round Pipe n=0.012 L=13.0' S=0.0923 '/' Capacity=11.73 cfs Outflow=0.15 cfs 0.011 af

Reach 11R: Flow through 1S Avg. Flow Depth=0.08' Max Vel=1.43 fps Inflow=0.15 cfs 0.011 af
n=0.030 L=59.0' S=0.0305 '/' Capacity=23.12 cfs Outflow=0.15 cfs 0.011 af

Reach AP1: Analysis Point 1 Inflow=26.81 cfs 4.277 af
Outflow=26.81 cfs 4.277 af

Reach AP2: Analysis Point 2 Inflow=1.25 cfs 0.109 af
Outflow=1.25 cfs 0.109 af

Reach AP4: Analysis Point 4 Inflow=0.20 cfs 0.017 af
Outflow=0.20 cfs 0.017 af

Reach AP5: Analysis Point 5 Inflow=0.03 cfs 0.002 af
Outflow=0.03 cfs 0.002 af

Reach AP6: Analysis Point 6 Inflow=0.73 cfs 0.065 af
Outflow=0.73 cfs 0.065 af

Pond 1P: Porous Pavement Section #1 Peak Elev=33.97' Storage=5,054 cf Inflow=1.85 cfs 0.613 af
Discarded=1.31 cfs 0.613 af Primary=0.00 cfs 0.000 af Outflow=1.31 cfs 0.613 af

Pond 2P: Porous Pavement Section #2 Peak Elev=34.89' Storage=699 cf Inflow=0.47 cfs 0.163 af
Discarded=0.37 cfs 0.163 af Primary=0.00 cfs 0.000 af Outflow=0.37 cfs 0.163 af

Pond 3P: Filtration Drip Edge #1 Peak Elev=35.82' Storage=0.002 af Inflow=0.34 cfs 0.029 af
Outflow=0.27 cfs 0.029 af

Pond 4P: Filtration Drip Edge #2 Peak Elev=35.74' Storage=0.002 af Inflow=0.27 cfs 0.023 af
Primary=0.16 cfs 0.023 af Secondary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.023 af

Pond 5P: Filtration Drip Edge #3 Peak Elev=33.87' Storage=0.002 af Inflow=0.30 cfs 0.025 af
Outflow=0.22 cfs 0.025 af

Pond 6P: Filtration Drip Edge #4 Peak Elev=24.85' Storage=0.001 af Inflow=0.14 cfs 0.011 af
Outflow=0.14 cfs 0.011 af

Pond 7P: Filtration Drip Edge #5 Peak Elev=24.84' Storage=0.002 af Inflow=0.14 cfs 0.011 af
Outflow=0.14 cfs 0.010 af

Pond 8P: Filtration Drip Edge #6 Peak Elev=23.31' Storage=0.000 af Inflow=0.14 cfs 0.011 af
Outflow=0.13 cfs 0.011 af

Pond 9P: Filtration Drip Edge #7 Peak Elev=31.06' Storage=0.001 af Inflow=0.14 cfs 0.011 af
Outflow=0.12 cfs 0.011 af

Pond 10P: Filtration Drip Edge #8 Peak Elev=31.78' Storage=0.002 af Inflow=0.30 cfs 0.028 af
Outflow=0.30 cfs 0.028 af

Pond 11P: Filtration Drip Edge #9 Peak Elev=32.68' Storage=0.001 af Inflow=0.20 cfs 0.017 af
Outflow=0.17 cfs 0.017 af

Pond 12P: Infiltration Drip Edge #10 Peak Elev=37.35' Storage=0.012 af Inflow=0.34 cfs 0.028 af
Discarded=0.03 cfs 0.028 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.028 af

Pond 13P: Filtration Drip Edge #11 Peak Elev=35.69' Storage=0.001 af Inflow=0.11 cfs 0.009 af
Primary=0.09 cfs 0.009 af Secondary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.009 af

Pond 14P: Focal Point #1 Peak Elev=37.93' Storage=54 cf Inflow=1.54 cfs 0.124 af
Outflow=1.54 cfs 0.124 af

Pond 15P: Jellyfish #1 Peak Elev=34.38' Inflow=1.77 cfs 0.146 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0175 '/' Outflow=1.77 cfs 0.146 af

Pond 16P: Jellyfish #2 Peak Elev=34.38' Inflow=1.20 cfs 0.099 af
15.0" Round Culvert n=0.012 L=12.0' S=0.0125 '/' Outflow=1.20 cfs 0.099 af

Pond 17P: Pocket Pond Peak Elev=35.69' Storage=516 cf Inflow=0.30 cfs 0.037 af
Outflow=0.04 cfs 0.037 af

Pond 18P: Underground Detention Peak Elev=34.38' Storage=8,417 cf Inflow=4.52 cfs 0.368 af
Outflow=0.79 cfs 0.367 af

Pond 19P: Porous Concrete Walkway Peak Elev=31.82' Storage=71 cf Inflow=0.07 cfs 0.021 af
Discarded=0.06 cfs 0.021 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.021 af

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 12.59 cfs @ 12.19 hrs, Volume= 1.158 af, Depth= 3.37"
Routed to Reach AP1 : Analysis Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
3,301	55	Woods, Good, HSG B
960	98	Paved roads w/curbs & sewers, HSG B
11,268	98	Roofs, HSG C
39,974	98	Paved roads w/curbs & sewers, HSG C
22,696	74	>75% Grass cover, Good, HSG C
80,510	70	Woods, Good, HSG C
20,931	77	Woods, Good, HSG D
179,640	79	Weighted Average
127,438		70.94% Pervious Area
52,202		29.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	39	0.0204	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
2.9	11	0.0294	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.4	23	0.0294	0.86		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	48	0.0294	5.69	55.51	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=2.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=11.00' n= 0.040 Winding stream, pools & shoals
0.3	153	0.0392	8.51	312.68	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=20.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=29.00' n= 0.040 Winding stream, pools & shoals
0.9	303	0.0165	5.52	202.86	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=20.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=29.00' n= 0.040 Winding stream, pools & shoals
13.9	577	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 1.25 cfs @ 12.15 hrs, Volume= 0.109 af, Depth= 4.40"
Routed to Reach AP2 : Analysis Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
7,339	98	Paved roads w/curbs & sewers, HSG C
1,425	98	Roofs, HSG C
1,455	74	>75% Grass cover, Good, HSG C
2,788	70	Woods, Good, HSG C
13,007	89	Weighted Average
4,243		32.62% Pervious Area
8,764		67.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	35	0.0225	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
1.9	15	0.0225	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.8	56	0.0274	1.16		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.9	106	Total			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 18.75 cfs @ 12.36 hrs, Volume= 2.259 af, Depth= 4.08"
Routed to Pond AP3 : Existing Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
125,302	98	Paved roads w/curbs & sewers, HSG C
9,379	98	Roofs, HSG C
13,398	74	>75% Grass cover, Good, HSG C
74,360	70	Woods, Good, HSG C
46,241	83	1/4 acre lots, 38% imp, HSG C
15,690	77	Woods, Good, HSG D
5,165	98	Water Surface, 0% imp, HSG D
289,535	86	Weighted Average
137,282		47.41% Pervious Area
152,253		52.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
3.5	119	0.0126	0.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	107	0.0187	0.68		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.7	180	0.0111	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.3	604	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 5.41"
Routed to Reach AP4 : Analysis Point 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,625	98	Paved parking, HSG C
1,625		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 minute minimum Tc per TR-55**

Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 0.03 cfs @ 12.09 hrs, Volume= 0.002 af, Depth= 2.89"
Routed to Reach AP5 : Analysis Point 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
430	74	>75% Grass cover, Good, HSG C
430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 minute minimum Tc per TR-55**

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 0.73 cfs @ 12.16 hrs, Volume= 0.065 af, Depth= 4.18"
Routed to Reach AP6 : Analysis Point 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
4,023	98	Paved roads w/curbs & sewers, HSG C
479	98	Roofs, HSG C
3,620	74	>75% Grass cover, Good, HSG C
8,122	87	Weighted Average
3,620		44.57% Pervious Area
4,502		55.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0041	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.7	47	0.0041	0.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	52	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.0	149	Total			

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 1.74 cfs @ 12.22 hrs, Volume= 0.167 af, Depth= 2.99"
Routed to Reach 3R : 15" HDPE Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,632	98	Paved roads w/curbs & sewers, HSG C
4,849	74	>75% Grass cover, Good, HSG C
17,413	70	Woods, Good, HSG C
5,424	83	1/4 acre lots, 38% imp, HSG C
29,318	75	Weighted Average
25,625		87.40% Pervious Area
3,693		12.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	50	0.0183	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.2	7	0.0183	0.68		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	91	0.0134	0.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	52	0.0134	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.8	200	Total			

Summary for Subcatchment 8S: Subcatchment 8S

Runoff = 1.85 cfs @ 13.88 hrs, Volume= 0.613 af, Depth= 4.73"
Routed to Pond 1P : Porous Pavement Section #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
33,067	98	Paved roads w/curbs & sewers, HSG C
6,311	74	>75% Grass cover, Good, HSG C
9,768	98	Roofs, HSG C
18,709	83	1/4 acre lots, 38% imp, HSG C
67,855	92	Weighted Average
17,911		26.40% Pervious Area
49,944		73.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
144.0					**Direct Entry, Assuming 5 in/hr through 12" filter course**

Summary for Subcatchment 9S: Subcatchment 9S

Runoff = 0.47 cfs @ 13.80 hrs, Volume= 0.163 af, Depth= 5.30"
Routed to Pond 2P : Porous Pavement Section #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
11,700	98	Paved roads w/curbs & sewers, HSG C
4,064	98	Roofs, HSG C
366	74	>75% Grass cover, Good, HSG C
16,130	97	Weighted Average
366		2.27% Pervious Area
15,764		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
144.0					**Direct Entry, Assuming 5 in/hr through 12" filter course**

Summary for Subcatchment 10S: Subcatchment 10S

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Depth= 2.89"
Routed to Pond 17P : Pocket Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
951	74	>75% Grass cover, Good, HSG C
951		100.00% Pervious Area

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

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 5.41"
Routed to Pond 3P : Filtration Drip Edge #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
2,728	98	Roofs, HSG C
46	98	Water Surface, 0% imp, HSG C
2,774	98	Weighted Average
46		1.66% Pervious Area
2,728		98.34% Impervious Area

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

Summary for Subcatchment 12S: Subcatchment 12S

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.023 af, Depth= 5.41"
Routed to Pond 4P : Filtration Drip Edge #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
2,176	98	Roofs, HSG C
21	98	Water Surface, 0% imp, HSG C
2,197	98	Weighted Average
21		0.96% Pervious Area
2,176		99.04% Impervious Area

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

Summary for Subcatchment 13S: Subcatchment 13S

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.025 af, Depth= 5.41"
Routed to Pond 5P : Filtration Drip Edge #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
2,040	98	Roofs, HSG C
360	98	Water Surface, 0% imp, HSG C
2,400	98	Weighted Average
360		15.00% Pervious Area
2,040		85.00% 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 = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 5.41"
Routed to Pond 6P : Filtration Drip Edge #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		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 = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 5.41"
Routed to Pond 7P : Filtration Drip Edge #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		100.00% Impervious Area

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

Summary for Subcatchment 16S: Subcatchment 16S

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 5.41"
Routed to Pond 8P : Filtration Drip Edge #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		100.00% Impervious Area

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

Summary for Subcatchment 17S: Subcatchment 17S

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 5.41"
Routed to Pond 9P : Filtration Drip Edge #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		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 = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 5.41"
Routed to Pond 10P : Filtration Drip Edge #8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		100.00% Impervious Area

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

Summary for Subcatchment 19S: (new Subcat)

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 5.41"
Routed to Pond 11P : Filtration Drip Edge #9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,592	98	Roofs, HSG C
48	98	Water Surface, 0% imp, HSG C
1,640	98	Weighted Average
48		2.93% Pervious Area
1,592		97.07% Impervious Area

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

Summary for Subcatchment 20S: (new Subcat)

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af, Depth= 5.41"
Routed to Pond 12P : Infiltration Drip Edge #10

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
2,728	98	Roofs, HSG C
2,728		100.00% Impervious Area

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

Summary for Subcatchment 21S: Subcatchment 21S

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af, Depth= 5.41"
Routed to Pond 13P : Filtration Drip Edge #11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
816	98	Roofs, HSG C
96	98	Water Surface, 0% imp, HSG C
912	98	Weighted Average
96		10.53% Pervious Area
816		89.47% Impervious Area

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

Summary for Subcatchment 22S: Subcatchment 22S

Runoff = 1.22 cfs @ 12.09 hrs, Volume= 0.100 af, Depth= 5.30"
Routed to Pond 14P : Focal Point #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
6,099	98	Roofs, HSG C
3,190	98	Paved parking, HSG C
571	74	>75% Grass cover, Good, HSG C
9,860	97	Weighted Average
571		5.79% Pervious Area
9,289		94.21% Impervious Area

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

Summary for Subcatchment 23S: Subcatchment 23S

Runoff = 1.77 cfs @ 12.09 hrs, Volume= 0.146 af, Depth= 5.30"
Routed to Pond 15P : Jellyfish #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
2,460	98	Roofs, HSG C
11,609	98	Paved parking, HSG C
317	74	>75% Grass cover, Good, HSG C
14,386	97	Weighted Average
317		2.20% Pervious Area
14,069		97.80% Impervious Area

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

Summary for Subcatchment 24S: Subcatchment 24S

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 0.099 af, Depth= 5.30"
Routed to Pond 16P : Jellyfish #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
398	74	>75% Grass cover, Good, HSG C
4,210	98	Roofs, HSG C
5,149	98	Paved roads w/curbs & sewers, HSG C
9,757	97	Weighted Average
398		4.08% Pervious Area
9,359		95.92% Impervious Area

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

Summary for Subcatchment 25S: Subcatchment 25S

Runoff = 0.48 cfs @ 12.10 hrs, Volume= 0.036 af, Depth= 2.89"
Routed to Reach 8R : 15" HDPE Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
6,419	74	>75% Grass cover, Good, HSG C
6,419		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	40	0.0250	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.2	10	0.0288	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.6	42	0.0288	1.19		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	20	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	46	0.0652	1.79		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.4	158	Total			

Summary for Subcatchment 26S: Subcatchment 26S

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 2.89"
Routed to Reach 5R : 15" HDPE Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,141	74	>75% Grass cover, Good, HSG C
1,141		100.00% Pervious Area

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

Summary for Subcatchment 27S: Subcatchment 27S

Runoff = 0.07 cfs @ 13.90 hrs, Volume= 0.021 af, Depth= 3.67"
Routed to Pond 19P : Porous Concrete Walkway

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,025	98	Paved roads w/curbs & sewers, HSG C
2,005	74	>75% Grass cover, Good, HSG C
3,030	82	Weighted Average
2,005		66.17% Pervious Area
1,025		33.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
144.0					**Direct Entry, Assuming 5 in/hr through 12" filter course**

Summary for Subcatchment 28S: Subcatchment 28S

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Depth= 4.18"
Routed to Pond YD1 : Yard Drain 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
443	74	>75% Grass cover, Good, HSG C
554	98	Paved parking, HSG C
997	87	Weighted Average
443		44.43% Pervious Area
554		55.57% Impervious Area

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

Summary for Subcatchment 29S: Subcatchment 29S

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 4.08"
Routed to Pond YD2 : Yard Drain 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
812	74	>75% Grass cover, Good, HSG C
820	98	Paved parking, HSG C
1,632	86	Weighted Average
812		49.75% Pervious Area
820		50.25% Impervious Area

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

Summary for Subcatchment 30S: Subcatchment 30S

Runoff = 0.04 cfs @ 12.09 hrs, Volume= 0.003 af, Depth= 4.18"
Routed to Pond YD3 : Yard Drain 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
184	74	>75% Grass cover, Good, HSG C
209	98	Paved parking, HSG C
393	87	Weighted Average
184		46.82% Pervious Area
209		53.18% Impervious Area

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

Summary for Subcatchment 31S: (new Subcat)

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 2.89"
Routed to Reach 10R : 12" HDPE Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=5.65"

Area (sf)	CN	Description
1,910	74	>75% Grass cover, Good, HSG C
1,910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	30	0.0133	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.3	20	0.1000	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.4	41	0.0488	1.55		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.8	91	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 2Ra: Channel through 1S

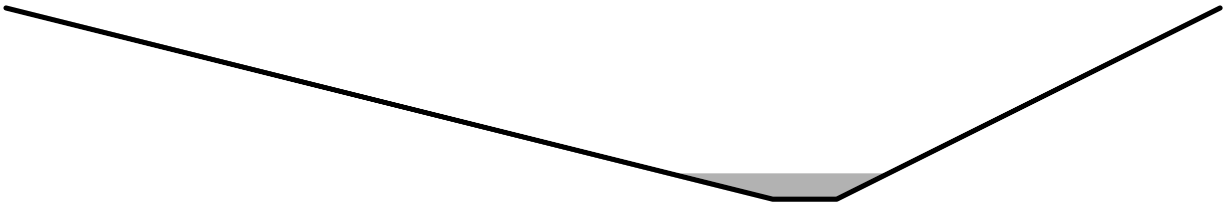
[80] Warning: Exceeded Pond 6P by 0.25' @ 0.00 hrs (0.09 cfs 0.044 af)
[80] Warning: Exceeded Pond 7P by 1.65' @ 0.00 hrs (0.40 cfs 0.477 af)

Inflow Area = 7.994 ac, 58.17% Impervious, Inflow Depth = 4.23" for 10-Year Storm event
Inflow = 14.54 cfs @ 12.54 hrs, Volume= 2.819 af
Outflow = 14.54 cfs @ 12.54 hrs, Volume= 2.819 af, Atten= 0%, Lag= 0.4 min
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 4.03 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 1.9 min

Peak Storage= 490 cf @ 12.54 hrs
Average Depth at Peak Storage= 0.81' , Surface Width= 6.87'
Bank-Full Depth= 6.00' Flow Area= 120.0 sf, Capacity= 1,586.21 cfs

2.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 38.00'
Length= 136.0' Slope= 0.0294 '/'
Inlet Invert= 24.00', Outlet Invert= 20.00'



Summary for Reach 2Rb: Channel through 1S

[61] Hint: Exceeded Reach 2Ra outlet invert by 0.25' @ 12.55 hrs

Inflow Area = 9.587 ac, 60.73% Impervious, Inflow Depth = 3.55" for 10-Year Storm event
Inflow = 14.58 cfs @ 12.54 hrs, Volume= 2.832 af
Outflow = 14.58 cfs @ 12.55 hrs, Volume= 2.832 af, Atten= 0%, Lag= 0.6 min
Routed to Reach 2Rc : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.84 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 2.2 min

Peak Storage= 786 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 21.49'
Bank-Full Depth= 6.00' Flow Area= 228.0 sf, Capacity= 4,170.50 cfs

20.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 56.00'
Length= 153.0' Slope= 0.0392 '/'
Inlet Invert= 20.00', Outlet Invert= 14.00'

‡

Summary for Reach 2Rc: Channel through 1S

[62] Hint: Exceeded Reach 2Rb OUTLET depth by 0.10' @ 12.25 hrs

Inflow Area = 11.032 ac, 58.06% Impervious, Inflow Depth = 3.39" for 10-Year Storm event
Inflow = 16.03 cfs @ 12.44 hrs, Volume= 3.120 af
Outflow = 16.02 cfs @ 12.46 hrs, Volume= 3.120 af, Atten= 0%, Lag= 1.4 min
Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.25 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.78 fps, Avg. Travel Time= 6.5 min

Peak Storage= 2,159 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.34' , Surface Width= 22.03'
Bank-Full Depth= 6.00' Flow Area= 228.0 sf, Capacity= 2,705.34 cfs

20.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 56.00'
Length= 303.0' Slope= 0.0165 '/'
Inlet Invert= 14.00', Outlet Invert= 9.00'

‡

Summary for Reach 3R: 15" HDPE Culvert

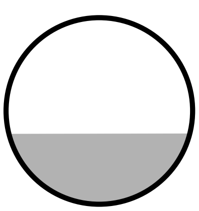
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.737 ac, 20.01% Impervious, Inflow Depth = 3.20" for 10-Year Storm event
Inflow = 1.99 cfs @ 12.21 hrs, Volume= 0.196 af
Outflow = 1.99 cfs @ 12.22 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.2 min
Routed to Reach 4R : Flow through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 4.66 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 1.0 min

Peak Storage= 37 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 1.21'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.54 cfs

15.0" Round Pipe
n= 0.012
Length= 86.0' Slope= 0.0087 '/'
Inlet Invert= 34.75', Outlet Invert= 34.00'



Summary for Reach 4R: Flow through 1S

[61] Hint: Exceeded Reach 3R outlet invert by 0.32' @ 12.20 hrs

Inflow Area = 1.107 ac, 46.01% Impervious, Inflow Depth = 2.13" for 10-Year Storm event
Inflow = 1.99 cfs @ 12.22 hrs, Volume= 0.196 af
Outflow = 1.99 cfs @ 12.22 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.1 min
Routed to Reach 5R : 15" HDPE Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.09 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 0.7 min

Peak Storage= 26 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 2.95'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.40 cfs

1.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 40.0' Slope= 0.0313 '/'
Inlet Invert= 34.00', Outlet Invert= 32.75'

Summary for Reach 5R: 15" HDPE Culvert

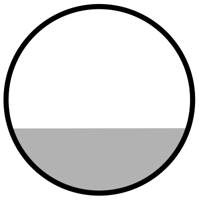
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.11' @ 12.20 hrs

Inflow Area = 1.133 ac, 44.94% Impervious, Inflow Depth = 2.14" for 10-Year Storm event
Inflow = 2.04 cfs @ 12.22 hrs, Volume= 0.203 af
Outflow = 2.04 cfs @ 12.22 hrs, Volume= 0.203 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Flow through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 5.35 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.44' , Surface Width= 1.19'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.82 cfs

15.0" Round Pipe
n= 0.012
Length= 12.0' Slope= 0.0125 '/'
Inlet Invert= 32.75', Outlet Invert= 32.60'



Summary for Reach 6R: Flow through 1S

[61] Hint: Exceeded Reach 5R outlet invert by 0.23' @ 12.20 hrs

Inflow Area = 1.133 ac, 44.94% Impervious, Inflow Depth = 2.14" for 10-Year Storm event
Inflow = 2.04 cfs @ 12.22 hrs, Volume= 0.203 af
Outflow = 2.04 cfs @ 12.22 hrs, Volume= 0.203 af, Atten= 0%, Lag= 0.2 min
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.14 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.91 fps, Avg. Travel Time= 1.0 min

Peak Storage= 34 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 2.96'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.71 cfs

1.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 53.0' Slope= 0.0321 '/'
Inlet Invert= 32.50', Outlet Invert= 30.80'

Summary for Reach 7R: Existing Wet Channel

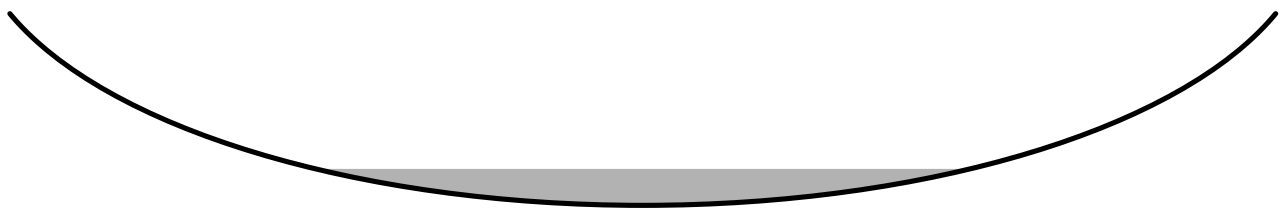
[62] Hint: Exceeded Reach 6R OUTLET depth by 0.01' @ 24.85 hrs
[80] Warning: Exceeded Pond 9P by 0.30' @ 0.00 hrs (0.15 cfs 0.177 af)
[80] Warning: Exceeded Pond 10P by 0.55' @ 0.00 hrs (0.21 cfs 0.085 af)

Inflow Area = 1.297 ac, 44.98% Impervious, Inflow Depth = 2.33" for 10-Year Storm event
Inflow = 2.45 cfs @ 12.20 hrs, Volume= 0.252 af
Outflow = 2.45 cfs @ 12.21 hrs, Volume= 0.252 af, Atten= 0%, Lag= 0.3 min
Routed to Reach 8R : 15" HDPE Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.94 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 1.3 min

Peak Storage= 54 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.19' , Surface Width= 6.55'
Bank-Full Depth= 1.00' Flow Area= 10.0 sf, Capacity= 88.27 cfs

15.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 65.0' Slope= 0.0554 '/'
Inlet Invert= 30.80', Outlet Invert= 27.20'



‡

Summary for Reach 8R: 15" HDPE Culvert

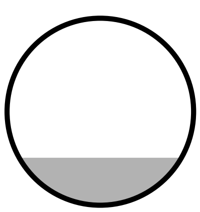
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.13' @ 12.15 hrs

Inflow Area = 1.445 ac, 40.39% Impervious, Inflow Depth = 2.38" for 10-Year Storm event
Inflow = 2.77 cfs @ 12.18 hrs, Volume= 0.287 af
Outflow = 2.77 cfs @ 12.18 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2Rc : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 11.36 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.53 fps, Avg. Travel Time= 0.2 min

Peak Storage= 10 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.32' , Surface Width= 1.09'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 19.79 cfs

15.0" Round Pipe
n= 0.012
Length= 40.0' Slope= 0.0800 '/'
Inlet Invert= 27.20', Outlet Invert= 24.00'



Summary for Reach 9R: 12" HDPE

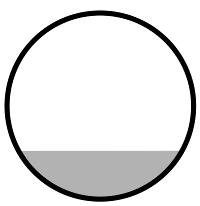
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.299 ac, 67.38% Impervious, Inflow Depth = 4.40" for 10-Year Storm event
Inflow = 1.25 cfs @ 12.15 hrs, Volume= 0.109 af
Outflow = 1.25 cfs @ 12.15 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 7.68 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.64 fps, Avg. Travel Time= 0.1 min

Peak Storage= 1 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 0.88'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.40 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 9.0' Slope= 0.0556 '/'
Inlet Invert= 34.00', Outlet Invert= 33.50'



Summary for Reach 10R: 12" HDPE Culvert

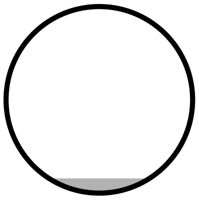
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.044 ac, 0.00% Impervious, Inflow Depth = 2.89" for 10-Year Storm event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : Flow through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 5.12 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.89 fps, Avg. Travel Time= 0.1 min

Peak Storage= 0 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 0.54'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 11.73 cfs

12.0" Round Pipe
n= 0.012
Length= 13.0' Slope= 0.0923 '/'
Inlet Invert= 34.00', Outlet Invert= 32.80'



Summary for Reach 11R: Flow through 1S

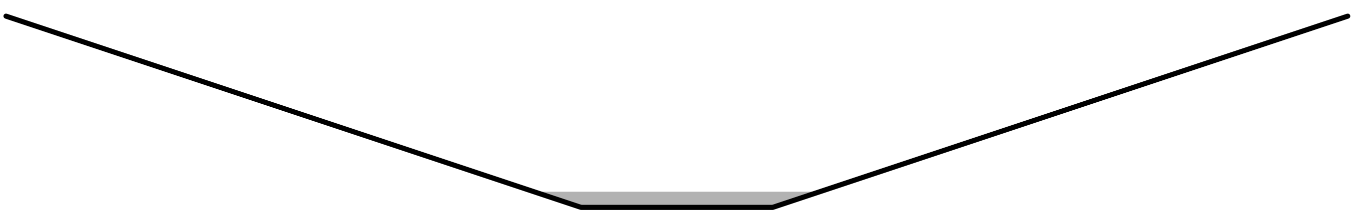
[61] Hint: Exceeded Reach 10R outlet invert by 0.08' @ 12.10 hrs

Inflow Area = 0.044 ac, 0.00% Impervious, Inflow Depth = 2.89" for 10-Year Storm event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.15 cfs @ 12.10 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.5 min
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.43 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 2.1 min

Peak Storage= 6 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 1.49'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.12 cfs

1.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 59.0' Slope= 0.0305 '/'
Inlet Invert= 32.80', Outlet Invert= 31.00'



Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 15.156 ac, 50.17% Impervious, Inflow Depth = 3.39" for 10-Year Storm event
Inflow = 26.81 cfs @ 12.22 hrs, Volume= 4.277 af
Outflow = 26.81 cfs @ 12.22 hrs, Volume= 4.277 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

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

Inflow Area = 0.299 ac, 67.38% Impervious, Inflow Depth = 4.40" for 10-Year Storm event
Inflow = 1.25 cfs @ 12.15 hrs, Volume= 0.109 af
Outflow = 1.25 cfs @ 12.15 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 9R : 12" HDPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP4: Analysis Point 4

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

Inflow Area = 0.037 ac,100.00% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP5: Analysis Point 5

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

Inflow Area = 0.010 ac, 0.00% Impervious, Inflow Depth = 2.89" for 10-Year Storm event
Inflow = 0.03 cfs @ 12.09 hrs, Volume= 0.002 af
Outflow = 0.03 cfs @ 12.09 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP6: Analysis Point 6

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

Inflow Area = 0.186 ac, 55.43% Impervious, Inflow Depth = 4.18" for 10-Year Storm event
Inflow = 0.73 cfs @ 12.16 hrs, Volume= 0.065 af
Outflow = 0.73 cfs @ 12.16 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Porous Pavement Section #1

Inflow Area = 1.558 ac, 73.60% Impervious, Inflow Depth = 4.73" for 10-Year Storm event
Inflow = 1.85 cfs @ 13.88 hrs, Volume= 0.613 af
Outflow = 1.31 cfs @ 14.77 hrs, Volume= 0.613 af, Atten= 29%, Lag= 53.4 min
Discarded = 1.31 cfs @ 14.77 hrs, Volume= 0.613 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 33.97' @ 14.77 hrs Surf.Area= 14,864 sf Storage= 5,054 cf

Plug-Flow detention time= 39.8 min calculated for 0.613 af (100% of inflow)
Center-of-Mass det. time= 39.8 min (946.7 - 906.9)

Volume	Invert	Avail.Storage	Storage Description
#1	32.82'	9,104 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
32.82	14,864	0.0	0	0
32.83	14,864	15.0	22	22
33.07	14,864	15.0	535	557
33.08	14,864	40.0	59	617
33.74	14,864	40.0	3,924	4,541
33.75	14,864	15.0	22	4,563
33.99	14,864	15.0	535	5,098
34.00	14,864	5.0	7	5,106
34.99	14,864	5.0	736	5,842
35.00	14,864	30.0	45	5,886
35.49	14,864	30.0	2,185	8,071
35.50	14,864	15.0	22	8,093
35.82	14,864	15.0	713	8,807
35.83	14,864	100.0	149	8,956
35.84	14,864	100.0	149	9,104

Device	Routing	Invert	Outlet Devices
#1	Primary	35.83'	**100.0' long x 50.0' 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
#2	Discarded	32.82'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 32.41' Phase-In= 0.01'

Discarded OutFlow Max=1.31 cfs @ 14.77 hrs HW=33.97' (Free Discharge)
└─**2=Exfiltration** (Controls 1.31 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=32.82' TW=20.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: Porous Pavement Section #2

Inflow Area = 0.370 ac, 97.73% Impervious, Inflow Depth = 5.30" for 10-Year Storm event
Inflow = 0.47 cfs @ 13.80 hrs, Volume= 0.163 af
Outflow = 0.37 cfs @ 14.58 hrs, Volume= 0.163 af, Atten= 21%, Lag= 46.8 min
Discarded = 0.37 cfs @ 14.58 hrs, Volume= 0.163 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 4R : Flow through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 34.89' @ 14.58 hrs Surf.Area= 7,076 sf Storage= 699 cf

Plug-Flow detention time= 13.5 min calculated for 0.163 af (100% of inflow)
Center-of-Mass det. time= 13.5 min (894.8 - 881.3)

Volume	Invert	Avail.Storage	Storage Description
#1	34.49'	4,334 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
34.49	7,076	0.0	0	0
34.50	7,076	15.0	11	11
34.74	7,076	15.0	255	265
34.75	7,076	40.0	28	294
35.41	7,076	40.0	1,868	2,162
35.42	7,076	15.0	11	2,172
35.66	7,076	15.0	255	2,427
35.67	7,076	5.0	4	2,431
36.66	7,076	5.0	350	2,781
36.67	7,076	30.0	21	2,802
37.16	7,076	30.0	1,040	3,842
37.17	7,076	15.0	11	3,853
37.49	7,076	15.0	340	4,193
37.50	7,076	100.0	71	4,263
37.51	7,076	100.0	71	4,334

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**100.0' long x 50.0' 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
#2	Discarded	34.49'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 34.17' Phase-In= 0.01'

Discarded OutFlow Max=0.37 cfs @ 14.58 hrs HW=34.89' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.37 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=34.49' TW=34.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Filtration Drip Edge #1

Inflow Area = 0.064 ac, 98.34% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.27 cfs @ 12.16 hrs, Volume= 0.029 af, Atten= 23%, Lag= 4.2 min
Primary = 0.27 cfs @ 12.16 hrs, Volume= 0.029 af
Routed to Reach 3R : 15" HDPE Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.82' @ 12.16 hrs Surf.Area= 0.010 ac Storage= 0.002 af

Plug-Flow detention time= 12.7 min calculated for 0.029 af (100% of inflow)

Center-of-Mass det. time= 13.0 min (759.1 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	37.75'	0.001 af	**3.25'W x 131.00'L x 0.25'H Prismatoid** 0.002 af Overall x 40.0% Voids
#2	36.25'	0.001 af	**3.25'W x 131.00'L x 1.50'H Prismatoid** 0.015 af Overall x 5.0% Voids
#3	36.00'	0.000 af	**3.25'W x 131.00'L x 0.25'H Prismatoid** 0.002 af Overall x 15.0% Voids
#4	35.25'	0.003 af	**3.25'W x 131.00'L x 0.75'H Prismatoid** 0.007 af Overall x 40.0% Voids
		0.005 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	38.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	35.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.26 cfs @ 12.16 hrs HW=35.81' TW=35.20' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.26 cfs @ 3.03 fps)

Summary for Pond 4P: Filtration Drip Edge #2

Inflow Area = 0.050 ac, 99.04% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.023 af
Outflow = 0.16 cfs @ 12.06 hrs, Volume= 0.023 af, Atten= 40%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.06 hrs, Volume= 0.023 af
Routed to Pond 17P : Pocket Pond
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond AP3 : Existing Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.74' @ 12.30 hrs Surf.Area= 0.008 ac Storage= 0.002 af

Plug-Flow detention time= 31.0 min calculated for 0.023 af (100% of inflow)
Center-of-Mass det. time= 30.3 min (776.4 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	37.50'	0.001 af	**3.50'W x 98.00'L x 0.25'H Prismatoid** 0.002 af Overall x 40.0% Voids
#2	36.00'	0.001 af	**3.50'W x 98.00'L x 1.50'H Prismatoid** 0.012 af Overall x 5.0% Voids
#3	35.75'	0.000 af	**3.50'W x 98.00'L x 0.25'H Prismatoid** 0.002 af Overall x 15.0% Voids
#4	35.00'	0.002 af	**3.50'W x 98.00'L x 0.75'H Prismatoid** 0.006 af Overall x 40.0% Voids
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Secondary	37.75'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	35.00'	**4.0" Round Culvert** L= 75.0' CPP, projecting, no headwall, Ke= 0.900

			Inlet / Outlet Invert= 35.00' / 34.00' S= 0.0133 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	35.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.16 cfs @ 12.06 hrs HW=35.44' TW=34.87' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.16 cfs @ 1.80 fps)
  └─**2=Orifice/Grate** (Passes 0.16 cfs of 0.22 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.00' TW=27.00' (Dynamic Tailwater)

Summary for Pond 5P: Filtration Drip Edge #3

Inflow Area = 0.055 ac, 85.00% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.30 cfs @ 12.09 hrs, Volume= 0.025 af
Outflow = 0.22 cfs @ 12.16 hrs, Volume= 0.025 af, Atten= 25%, Lag= 4.5 min
Primary = 0.22 cfs @ 12.16 hrs, Volume= 0.025 af
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 33.87' @ 12.16 hrs Surf.Area= 0.008 ac Storage= 0.002 af

Plug-Flow detention time= 14.2 min calculated for 0.025 af (100% of inflow)
Center-of-Mass det. time= 13.4 min (759.5 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	35.75'	0.001 af	**3.00'W x 120.00'L x 0.25'H Prismatoid**Impervious
			0.002 af Overall x 40.0% Voids
#2	34.25'	0.001 af	**3.00'W x 120.00'L x 1.50'H Prismatoid**Impervious
			0.012 af Overall x 5.0% Voids
#3	34.00'	0.000 af	**3.00'W x 120.00'L x 0.25'H Prismatoid**Impervious
			0.002 af Overall x 15.0% Voids
#4	33.25'	0.002 af	**3.00'W x 120.00'L x 0.75'H Prismatoid**
			0.006 af Overall x 40.0% Voids
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	36.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	33.25'	**4.0" Round Culvert**
			L= 22.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 33.25' / 32.00' S= 0.0568 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	33.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.22 cfs @ 12.16 hrs HW=33.86' TW=24.71' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.22 cfs @ 2.54 fps)
  └─**2=Orifice/Grate** (Passes 0.22 cfs of 0.28 cfs potential flow)

Summary for Pond 6P: Filtration Drip Edge #4

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=23)

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.7 min
Primary = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 24.85' @ 12.11 hrs Surf.Area= 0.012 ac Storage= 0.001 af

Plug-Flow detention time= 76.7 min calculated for 0.011 af (97% of inflow)
Center-of-Mass det. time= 57.1 min (803.1 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	26.75'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 40.0% Voids
#2	24.75'	0.000 af	**3.50'W x 48.00'L x 2.00'H Prismatoid** 0.008 af Overall x 5.0% Voids
#3	24.50'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 15.0% Voids
#4	23.75'	0.001 af	**3.50'W x 48.00'L x 0.75'H Prismatoid** 0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	27.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	23.75'	**4.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 23.75' / 23.50' S= 0.0313 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	23.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 12.10 hrs HW=24.84' TW=24.67' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.14 cfs @ 1.60 fps)
  └─**2=Orifice/Grate** (Passes 0.14 cfs of 0.18 cfs potential flow)

Summary for Pond 7P: Filtration Drip Edge #5

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=39)

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af, Atten= 1%, Lag= 0.4 min
Primary = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 24.84' @ 12.11 hrs Surf.Area= 0.012 ac Storage= 0.002 af

Plug-Flow detention time= 112.0 min calculated for 0.010 af (88% of inflow)
Center-of-Mass det. time= 55.2 min (801.3 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	25.35'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 40.0% Voids
#2	23.35'	0.000 af	**3.50'W x 48.00'L x 2.00'H Prismatoid**
			0.008 af Overall x 5.0% Voids
#3	23.10'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 15.0% Voids
#4	22.35'	0.001 af	**3.50'W x 48.00'L x 0.75'H Prismatoid**
			0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	25.60'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	22.35'	**4.0" Round Culvert**
			L= 18.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 22.35' / 22.20' S= 0.0083 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	22.35'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.13 cfs @ 12.09 hrs HW=24.82' TW=24.66' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.13 cfs @ 1.53 fps)
  ↑—**2=Orifice/Grate** (Passes 0.13 cfs of 0.17 cfs potential flow)

Summary for Pond 8P: Filtration Drip Edge #6

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.13 cfs @ 12.12 hrs, Volume= 0.011 af, Atten= 6%, Lag= 1.9 min
Primary = 0.13 cfs @ 12.12 hrs, Volume= 0.011 af
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 23.31' @ 12.12 hrs Surf.Area= 0.004 ac Storage= 0.000 af

Plug-Flow detention time= 8.5 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 8.7 min (754.8 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	26.00'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 40.0% Voids
#2	24.00'	0.000 af	**3.50'W x 48.00'L x 2.00'H Prismatoid**
			0.008 af Overall x 5.0% Voids
#3	23.75'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 15.0% Voids
#4	23.00'	0.001 af	**3.50'W x 48.00'L x 0.75'H Prismatoid**
			0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	26.25'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	23.00'	**4.0" Round Culvert**
			L= 6.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 23.00' / 22.75' S= 0.0417 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	23.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.13 cfs @ 12.12 hrs HW=23.31' TW=20.20' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.13 cfs @ 1.49 fps)
  ↑—**2=Orifice/Grate** (Passes 0.13 cfs of 0.16 cfs potential flow)

Summary for Pond 9P: Filtration Drip Edge #7

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.12 cfs @ 12.11 hrs, Volume= 0.011 af, Atten= 9%, Lag= 1.5 min
Primary = 0.12 cfs @ 12.11 hrs, Volume= 0.011 af
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 31.06' @ 12.13 hrs Surf.Area= 0.004 ac Storage= 0.001 af

Plug-Flow detention time= 56.1 min calculated for 0.011 af (96% of inflow)
Center-of-Mass det. time= 31.4 min (777.4 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	0.000 af	**3.75'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 40.0% Voids
#2	31.50'	0.000 af	**3.75'W x 48.00'L x 1.50'H Prismatoid**
			0.006 af Overall x 5.0% Voids
#3	31.25'	0.000 af	**3.75'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 15.0% Voids
#4	30.50'	0.001 af	**3.75'W x 48.00'L x 0.75'H Prismatoid**
			0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	33.25'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	30.50'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.12 cfs @ 12.11 hrs HW=31.06' TW=30.98' (Dynamic Tailwater)
└—**1=Orifice/Grate** (Orifice Controls 0.12 cfs @ 1.39 fps)

Summary for Pond 10P: Filtration Drip Edge #8

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=6)

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 13.45" for 10-Year Storm event
Inflow = 0.30 cfs @ 12.11 hrs, Volume= 0.028 af
Outflow = 0.30 cfs @ 12.12 hrs, Volume= 0.028 af, Atten= 1%, Lag= 0.8 min
Primary = 0.30 cfs @ 12.12 hrs, Volume= 0.028 af
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 31.78' @ 12.12 hrs Surf.Area= 0.012 ac Storage= 0.002 af

Plug-Flow detention time= 40.6 min calculated for 0.027 af (97% of inflow)
Center-of-Mass det. time= 20.5 min (773.5 - 753.0)

Volume	Invert	Avail.Storage	Storage Description
#1	32.75'	0.000 af	**3.75'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 40.0% Voids
#2	31.25'	0.000 af	**3.75'W x 48.00'L x 1.50'H Prismatoid** 0.006 af Overall x 5.0% Voids
#3	31.00'	0.000 af	**3.75'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 15.0% Voids
#4	30.25'	0.001 af	**3.75'W x 48.00'L x 0.75'H Prismatoid** 0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	33.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	30.25'	**4.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 30.25' / 30.00' S= 0.0313 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	30.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.29 cfs @ 12.12 hrs HW=31.74' TW=30.98' (Dynamic Tailwater)
└—**1=Culvert** (Inlet Controls 0.29 cfs @ 3.33 fps)
  └—**2=Orifice/Grate** (Passes 0.29 cfs of 0.37 cfs potential flow)

Summary for Pond 11P: Filtration Drip Edge #9

Inflow Area = 0.038 ac, 97.07% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.17 cfs @ 12.14 hrs, Volume= 0.017 af, Atten= 16%, Lag= 3.3 min
Secondary = 0.17 cfs @ 12.14 hrs, Volume= 0.017 af
Routed to Pond 10P : Filtration Drip Edge #8

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 32.68' @ 12.14 hrs Surf.Area= 0.006 ac Storage= 0.001 af

Plug-Flow detention time= 11.3 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 11.6 min (757.7 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	34.75'	0.001 af	**3.50'W x 76.00'L x 0.25'H Prismatoid** 0.002 af Overall x 40.0% Voids
#2	33.25'	0.000 af	**3.50'W x 76.00'L x 1.50'H Prismatoid** 0.009 af Overall x 5.0% Voids
#3	33.00'	0.000 af	**3.50'W x 76.00'L x 0.25'H Prismatoid** 0.002 af Overall x 15.0% Voids
#4	32.25'	0.002 af	**3.50'W x 76.00'L x 0.75'H Prismatoid** 0.005 af Overall x 40.0% Voids
		0.003 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Secondary	35.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Secondary	32.25'	**4.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 32.25' / 30.25' S= 0.1333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	32.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Secondary OutFlow Max=0.17 cfs @ 12.14 hrs HW=32.68' TW=31.74' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.17 cfs @ 1.94 fps)
  └─**2=Orifice/Grate** (Passes 0.17 cfs of 0.21 cfs potential flow)

Summary for Pond 12P: Infiltration Drip Edge #10

Inflow Area = 0.063 ac,100.00% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af
Outflow = 0.03 cfs @ 13.20 hrs, Volume= 0.028 af, Atten= 93%, Lag= 66.7 min
Discarded = 0.03 cfs @ 13.20 hrs, Volume= 0.028 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 19P : Porous Concrete Walkway

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 37.35' @ 13.20 hrs Surf.Area= 0.015 ac Storage= 0.012 af

Plug-Flow detention time= 201.4 min calculated for 0.028 af (100% of inflow)
Center-of-Mass det. time= 201.2 min (947.2 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	35.25'	0.013 af	**5.50'W x 116.00'L x 2.25'H Prismatoid** 0.033 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	37.50'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	35.25'	**1.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 32.25' Phase-In= 0.10'

Discarded OutFlow Max=0.03 cfs @ 13.20 hrs HW=37.35' (Free Discharge)
└─**1=Exfiltration** (Controls 0.03 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.25' TW=31.49' (Dynamic Tailwater)

Summary for Pond 13P: Filtration Drip Edge #11

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=35)

Inflow Area = 0.021 ac, 89.47% Impervious, Inflow Depth = 5.41" for 10-Year Storm event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af
Outflow = 0.09 cfs @ 12.15 hrs, Volume= 0.009 af, Atten= 23%, Lag= 3.5 min
Primary = 0.09 cfs @ 12.15 hrs, Volume= 0.009 af
Routed to Pond 17P : Pocket Pond
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond AP3 : Existing Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.69' @ 12.95 hrs Surf.Area= 0.010 ac Storage= 0.001 af

Plug-Flow detention time= 52.0 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 52.2 min (798.3 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	36.75'	0.000 af	**3.00'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 40.0% Voids
#2	35.25'	0.000 af	**3.00'W x 48.00'L x 1.50'H Prismatoid** 0.005 af Overall x 5.0% Voids
#3	35.00'	0.000 af	**3.00'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 15.0% Voids
#4	34.25'	0.001 af	**3.00'W x 48.00'L x 0.75'H Prismatoid** 0.002 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Secondary	37.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	34.25'	**4.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 34.25' / 34.00' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	34.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.09 cfs @ 12.15 hrs HW=35.22' TW=35.13' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.09 cfs @ 0.98 fps)
  └─**2=Orifice/Grate** (Passes 0.09 cfs of 0.12 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=34.25' TW=27.00' (Dynamic Tailwater)

Summary for Pond 14P: Focal Point #1

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=5)

Inflow Area = 0.296 ac, 84.40% Impervious, Inflow Depth = 5.02" for 10-Year Storm event
Inflow = 1.54 cfs @ 12.09 hrs, Volume= 0.124 af
Outflow = 1.54 cfs @ 12.09 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.2 min
Primary = 1.54 cfs @ 12.09 hrs, Volume= 0.124 af
Routed to Pond 18P : Underground Detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 37.93' @ 12.09 hrs Surf.Area= 145 sf Storage= 54 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.8 min (762.9 - 762.0)

Volume	Invert	Avail.Storage	Storage Description
#1	35.25'	23 cf	**5.00'W x 10.00'L x 2.25'H Focal Point** 113 cf Overall x 20.0% Voids
#2	37.50'	67 cf	**Surface Bowl (Prismatic)**Listed below (Recalc)
		90 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
37.50	50	0	0
38.00	102	38	38
38.25	133	29	67

Device	Routing	Invert	Outlet Devices
#1	Primary	34.50'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 34.50' / 33.60' S= 0.0082 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	35.25'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#3	Device 1	37.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.51 cfs @ 12.09 hrs HW=37.93' TW=33.64' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.51 cfs of 5.11 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.33 cfs)
  └─**3=Orifice/Grate** (Weir Controls 1.17 cfs @ 1.39 fps)

Summary for Pond 15P: Jellyfish #1

Inflow Area = 0.330 ac, 97.80% Impervious, Inflow Depth = 5.30" for 10-Year Storm event
Inflow = 1.77 cfs @ 12.09 hrs, Volume= 0.146 af
Outflow = 1.77 cfs @ 12.09 hrs, Volume= 0.146 af, Atten= 0%, Lag= 0.0 min
Primary = 1.77 cfs @ 12.09 hrs, Volume= 0.146 af
Routed to Pond 18P : Underground Detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.38' @ 12.54 hrs
Flood Elev= 36.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.15'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 33.15' / 32.80' S= 0.0175 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.76 cfs @ 12.09 hrs HW=33.95' TW=33.62' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.76 cfs @ 3.03 fps)

Summary for Pond 16P: Jellyfish #2

Inflow Area = 0.224 ac, 95.92% Impervious, Inflow Depth = 5.30" for 10-Year Storm event
Inflow = 1.20 cfs @ 12.09 hrs, Volume= 0.099 af
Outflow = 1.20 cfs @ 12.09 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min
Primary = 1.20 cfs @ 12.09 hrs, Volume= 0.099 af
Routed to Pond DMH1 : Drain Manhole 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.38' @ 12.54 hrs
Flood Elev= 36.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.25'	**15.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 33.25' / 33.10' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.18 cfs @ 12.09 hrs HW=33.96' TW=33.77' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.18 cfs @ 2.37 fps)

Summary for Pond 17P: Pocket Pond

Inflow Area = 0.093 ac, 73.69% Impervious, Inflow Depth = 4.82" for 10-Year Storm event
Inflow = 0.30 cfs @ 12.13 hrs, Volume= 0.037 af
Outflow = 0.04 cfs @ 12.96 hrs, Volume= 0.037 af, Atten= 86%, Lag= 50.2 min
Primary = 0.04 cfs @ 12.96 hrs, Volume= 0.037 af
Routed to Pond AP3 : Existing Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.69' @ 12.96 hrs Surf.Area= 437 sf Storage= 516 cf

Plug-Flow detention time= 106.2 min calculated for 0.037 af (100% of inflow)
Center-of-Mass det. time= 106.1 min (895.8 - 789.7)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	953 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
33.00	20	24.0	0	0	20
34.00	127	46.0	66	66	147
36.00	514	83.0	598	663	549
36.50	646	93.0	289	953	695

Device	Routing	Invert	Outlet Devices
#1	Primary	33.00'	**12.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 33.00' / 32.50' S= 0.0313 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	33.00'	**1.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	36.00'	**6.0' long + 3.0 '/' SideZ x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.04 cfs @ 12.96 hrs HW=35.69' TW=30.45' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.04 cfs of 4.42 cfs potential flow)
 └**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.89 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 18P: Underground Detention

[80] Warning: Exceeded Pond DMH1 by 0.14' @ 24.40 hrs (0.07 cfs 0.002 af)

Inflow Area = 0.850 ac, 92.64% Impervious, Inflow Depth = 5.20" for 10-Year Storm event
Inflow = 4.52 cfs @ 12.09 hrs, Volume= 0.368 af
Outflow = 0.79 cfs @ 12.56 hrs, Volume= 0.367 af, Atten= 83%, Lag= 28.0 min
Primary = 0.79 cfs @ 12.56 hrs, Volume= 0.367 af
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.38' @ 12.56 hrs Surf.Area= 3,584 sf Storage= 8,417 cf

Plug-Flow detention time= 439.3 min calculated for 0.367 af (100% of inflow)
Center-of-Mass det. time= 438.9 min (1,195.4 - 756.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	31.75'	0 cf	**32.00'W x 112.00'L x 4.67'H Field A** 16,737 cf Overall - 16,737 cf Embedded = 0 cf x 40.0% Voids
#2A	31.75'	12,800 cf	**Shea Leaching Chamber 8x14x4.7** x 32 Inside #1 Inside= 84.0"W x 48.0"H => 30.77 sf x 13.00'L = 400.0 cf Outside= 96.0"W x 56.0"H => 37.36 sf x 14.00'L = 523.0 cf 32 Chambers in 4 Rows
		12,800 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	31.75'	**15.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 31.75' / 31.60' S= 0.0115 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	31.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	31.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	33.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.79 cfs @ 12.56 hrs HW=34.38' TW=24.81' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.79 cfs of 6.61 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.68 fps)
  │ └─**3=Orifice/Grate** (Passes 0.17 cfs of 0.66 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 0.62 cfs @ 3.16 fps)

Summary for Pond 19P: Porous Concrete Walkway

Inflow Area = 0.070 ac, 33.83% Impervious, Inflow Depth = 3.67" for 10-Year Storm event
Inflow = 0.07 cfs @ 13.90 hrs, Volume= 0.021 af
Outflow = 0.06 cfs @ 14.51 hrs, Volume= 0.021 af, Atten= 15%, Lag= 36.3 min
Discarded = 0.06 cfs @ 14.51 hrs, Volume= 0.021 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 31.82' @ 14.51 hrs Surf.Area= 1,025 sf Storage= 71 cf

Plug-Flow detention time= 9.6 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 9.6 min (948.9 - 939.3)

Volume	Invert	Avail.Storage	Storage Description
#1	31.49'	628 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
31.49	1,025	0.0	0	0
31.50	1,025	15.0	2	2
31.74	1,025	15.0	37	38
31.75	1,025	40.0	4	43
32.41	1,025	40.0	271	313
32.42	1,025	15.0	2	315
32.66	1,025	15.0	37	352
32.67	1,025	5.0	1	352
33.66	1,025	5.0	51	403
33.67	1,025	30.0	3	406
34.16	1,025	30.0	151	557
34.17	1,025	15.0	2	558
34.49	1,025	15.0	49	607
34.50	1,025	100.0	10	618
34.51	1,025	100.0	10	628

Device	Routing	Invert	Outlet Devices
#1	Primary	34.50'	**100.0' long x 50.0' 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
#2	Discarded	31.49'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 31.25' Phase-In= 0.01'

Discarded OutFlow Max=0.06 cfs @ 14.51 hrs HW=31.82' (Free Discharge)
└─**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=31.49' TW=30.80' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond AP3: Existing Pond

15" CMP culvert inlet is buried. Contractor to uncover culvert inlet and replace with 18" HDPE.

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=6)

Inflow Area = 6.740 ac, 52.88% Impervious, Inflow Depth = 4.09" for 10-Year Storm event
Inflow = 18.79 cfs @ 12.36 hrs, Volume= 2.296 af
Outflow = 13.31 cfs @ 12.60 hrs, Volume= 2.296 af, Atten= 29%, Lag= 14.5 min
Primary = 13.31 cfs @ 12.60 hrs, Volume= 2.296 af
Routed to Reach 2RA : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 31.60' @ 12.60 hrs Surf.Area= 6,038 sf Storage= 8,092 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 3.0 min (823.0 - 820.0)

Volume	Invert	Avail.Storage	Storage Description
#1	27.00'	104,428 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.00	20	5.7	0	0	20
28.00	37	24.0	28	28	66
30.00	2,236	218.0	1,707	1,735	3,810
32.00	7,294	444.0	9,046	10,781	15,734
34.00	19,719	933.0	26,004	36,785	69,335
35.50	43,192	1,107.0	46,047	82,832	97,623
36.00	43,192	1,107.0	21,596	104,428	98,177

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	**18.0" Round Culvert** L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 27.00' / 26.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=13.30 cfs @ 12.60 hrs HW=31.59' TW=24.81' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 13.30 cfs @ 7.53 fps)

Summary for Pond DMH1: Drain Manhole 1

Inflow Area = 0.224 ac, 95.92% Impervious, Inflow Depth = 5.30" for 10-Year Storm event
Inflow = 1.20 cfs @ 12.09 hrs, Volume= 0.099 af
Outflow = 1.20 cfs @ 12.09 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min
Primary = 1.20 cfs @ 12.09 hrs, Volume= 0.099 af
Routed to Pond 18P : Underground Detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.38' @ 12.55 hrs
Flood Elev= 37.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.00'	**15.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 33.00' / 32.90' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.19 cfs @ 12.09 hrs HW=33.77' TW=33.62' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.19 cfs @ 1.50 fps)

Summary for Pond YD1: Yard Drain 1

Inflow Area = 0.023 ac, 55.57% Impervious, Inflow Depth = 4.18" for 10-Year Storm event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af
Outflow = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min
Primary = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af
Routed to Pond YD2 : Yard Drain 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 38.86' @ 12.09 hrs
Flood Elev= 39.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	38.60'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.60' / 38.10' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.10 cfs @ 12.09 hrs HW=38.85' TW=38.41' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.10 cfs @ 1.53 fps)

Summary for Pond YD2: Yard Drain 2

Inflow Area = 0.060 ac, 52.26% Impervious, Inflow Depth = 4.12" for 10-Year Storm event
Inflow = 0.28 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.28 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.09 hrs, Volume= 0.021 af
Routed to Pond YD3 : Yard Drain 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 38.41' @ 12.09 hrs
Flood Elev= 39.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	38.00'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.00' / 37.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.27 cfs @ 12.09 hrs HW=38.41' TW=38.17' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.27 cfs @ 2.17 fps)

Summary for Pond YD3: Yard Drain 3

Inflow Area = 0.069 ac, 52.38% Impervious, Inflow Depth = 4.13" for 10-Year Storm event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af
Outflow = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af
Routed to Pond 14P : Focal Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 38.18' @ 12.09 hrs
Flood Elev= 38.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	37.70'	**6.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.70' / 37.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.31 cfs @ 12.09 hrs HW=38.17' TW=37.93' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.31 cfs @ 2.13 fps)

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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=179,640 sf 29.06% Impervious Runoff Depth=4.75"
Flow Length=577' Tc=13.9 min CN=79 Runoff=17.65 cfs 1.632 af

Subcatchment2S: Subcatchment2S Runoff Area=13,007 sf 67.38% Impervious Runoff Depth=5.88"
Flow Length=106' Tc=10.9 min CN=89 Runoff=1.65 cfs 0.146 af

Subcatchment3S: Subcatchment3S Runoff Area=289,535 sf 52.59% Impervious Runoff Depth=5.54"
Flow Length=604' Tc=26.3 min CN=86 Runoff=25.16 cfs 3.068 af

Subcatchment4S: Subcatchment4S Runoff Area=1,625 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.022 af

Subcatchment5S: Subcatchment5S Runoff Area=430 sf 0.00% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=74 Runoff=0.05 cfs 0.003 af

Subcatchment6S: Subcatchment6S Runoff Area=8,122 sf 55.43% Impervious Runoff Depth=5.65"
Flow Length=149' Tc=12.0 min CN=87 Runoff=0.97 cfs 0.088 af

Subcatchment7S: Subcatchment7S Runoff Area=29,318 sf 12.60% Impervious Runoff Depth=4.31"
Flow Length=200' Tc=15.8 min CN=75 Runoff=2.51 cfs 0.242 af

Subcatchment8S: Subcatchment8S Runoff Area=67,855 sf 73.60% Impervious Runoff Depth=6.23"
Tc=144.0 min CN=92 Runoff=2.41 cfs 0.809 af

Subcatchment9S: Subcatchment9S Runoff Area=16,130 sf 97.73% Impervious Runoff Depth=6.82"
Tc=144.0 min CN=97 Runoff=0.60 cfs 0.211 af

Subcatchment10S: Subcatchment10S Runoff Area=951 sf 0.00% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=74 Runoff=0.11 cfs 0.008 af

Subcatchment11S: Subcatchment11S Runoff Area=2,774 sf 98.34% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.44 cfs 0.037 af

Subcatchment12S: Subcatchment12S Runoff Area=2,197 sf 99.04% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.35 cfs 0.029 af

Subcatchment13S: Subcatchment13S Runoff Area=2,400 sf 85.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.032 af

Subcatchment14S: Subcatchment14S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.015 af

Subcatchment15S: Subcatchment15S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.015 af

Subcatchment16S: Subcatchment16S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.015 af

Subcatchment17S: Subcatchment17S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.015 af

Subcatchment18S: Subcatchment18S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.015 af

Subcatchment19S: (new Subcat) Runoff Area=1,640 sf 97.07% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.022 af

Subcatchment20S: (new Subcat) Runoff Area=2,728 sf 100.00% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.43 cfs 0.036 af

Subcatchment21S: Subcatchment21S Runoff Area=912 sf 89.47% Impervious Runoff Depth=6.94"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.012 af

Subcatchment22S: Subcatchment22S Runoff Area=9,860 sf 94.21% Impervious Runoff Depth=6.82"
Tc=6.0 min CN=97 Runoff=1.55 cfs 0.129 af

Subcatchment23S: Subcatchment23S Runoff Area=14,386 sf 97.80% Impervious Runoff Depth=6.82"
Tc=6.0 min CN=97 Runoff=2.26 cfs 0.188 af

Subcatchment24S: Subcatchment24S Runoff Area=9,757 sf 95.92% Impervious Runoff Depth=6.82"
Tc=6.0 min CN=97 Runoff=1.54 cfs 0.127 af

Subcatchment25S: Subcatchment25S Runoff Area=6,419 sf 0.00% Impervious Runoff Depth=4.20"
Flow Length=158' Tc=6.4 min CN=74 Runoff=0.70 cfs 0.052 af

Subcatchment26S: Subcatchment26S Runoff Area=1,141 sf 0.00% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=74 Runoff=0.13 cfs 0.009 af

Subcatchment27S: Subcatchment27S Runoff Area=3,030 sf 33.83% Impervious Runoff Depth=5.09"
Tc=144.0 min CN=82 Runoff=0.09 cfs 0.029 af

Subcatchment28S: Subcatchment28S Runoff Area=997 sf 55.57% Impervious Runoff Depth=5.65"
Tc=6.0 min CN=87 Runoff=0.14 cfs 0.011 af

Subcatchment29S: Subcatchment29S Runoff Area=1,632 sf 50.25% Impervious Runoff Depth=5.54"
Tc=6.0 min CN=86 Runoff=0.23 cfs 0.017 af

Subcatchment30S: Subcatchment30S Runoff Area=393 sf 53.18% Impervious Runoff Depth=5.65"
Tc=6.0 min CN=87 Runoff=0.06 cfs 0.004 af

Subcatchment31S: (new Subcat) Runoff Area=1,910 sf 0.00% Impervious Runoff Depth=4.20"
Flow Length=91' Tc=6.0 min CN=74 Runoff=0.21 cfs 0.015 af

Reach 2Ra: Channel through 1S Avg. Flow Depth=0.87' Max Vel=4.18 fps Inflow=16.62 cfs 3.798 af
n=0.040 L=136.0' S=0.0294 '/' Capacity=1,586.21 cfs Outflow=16.62 cfs 3.798 af

Reach 2Rb: Channel through 1S Avg. Flow Depth=0.27' Max Vel=2.99 fps Inflow=16.67 cfs 3.816 af
n=0.040 L=153.0' S=0.0392 '/' Capacity=4,170.50 cfs Outflow=16.67 cfs 3.816 af

Reach 2Rc: Channel through 1S Avg. Flow Depth=0.37' Max Vel=2.39 fps Inflow=18.87 cfs 4.220 af
n=0.040 L=303.0' S=0.0165 '/' Capacity=2,705.34 cfs Outflow=18.86 cfs 4.220 af

Reach 3R: 15" HDPE Culvert Avg. Flow Depth=0.57' Max Vel=5.12 fps Inflow=2.82 cfs 0.278 af
15.0" Round Pipe n=0.012 L=86.0' S=0.0087 '/' Capacity=6.54 cfs Outflow=2.82 cfs 0.278 af

Reach 4R: Flow through 1S Avg. Flow Depth=0.39' Max Vel=3.39 fps Inflow=2.82 cfs 0.278 af
n=0.030 L=40.0' S=0.0313 '/' Capacity=23.40 cfs Outflow=2.82 cfs 0.278 af

Reach 5R: 15" HDPE Culvert Avg. Flow Depth=0.53' Max Vel=5.89 fps Inflow=2.89 cfs 0.288 af
15.0" Round Pipe n=0.012 L=12.0' S=0.0125 '/' Capacity=7.82 cfs Outflow=2.89 cfs 0.288 af

Reach 6R: Flow through 1S Avg. Flow Depth=0.39' Max Vel=3.45 fps Inflow=2.89 cfs 0.288 af
n=0.030 L=53.0' S=0.0321 '/' Capacity=23.71 cfs Outflow=2.89 cfs 0.288 af

Reach 7R: Existing Wet Channel Avg. Flow Depth=0.22' Max Vel=3.26 fps Inflow=3.43 cfs 0.353 af
n=0.030 L=65.0' S=0.0554 '/' Capacity=88.27 cfs Outflow=3.43 cfs 0.353 af

Reach 8R: 15" HDPE Culvert Avg. Flow Depth=0.38' Max Vel=12.52 fps Inflow=3.89 cfs 0.404 af
15.0" Round Pipe n=0.012 L=40.0' S=0.0800 '/' Capacity=19.79 cfs Outflow=3.89 cfs 0.404 af

Reach 9R: 12" HDPE Avg. Flow Depth=0.30' Max Vel=8.31 fps Inflow=1.65 cfs 0.146 af
12.0" Round Pipe n=0.013 L=9.0' S=0.0556 '/' Capacity=8.40 cfs Outflow=1.65 cfs 0.146 af

Reach 10R: 12" HDPE Culvert Avg. Flow Depth=0.09' Max Vel=5.73 fps Inflow=0.21 cfs 0.015 af
12.0" Round Pipe n=0.012 L=13.0' S=0.0923 '/' Capacity=11.73 cfs Outflow=0.21 cfs 0.015 af

Reach 11R: Flow through 1S Avg. Flow Depth=0.10' Max Vel=1.61 fps Inflow=0.21 cfs 0.015 af
n=0.030 L=59.0' S=0.0305 '/' Capacity=23.12 cfs Outflow=0.21 cfs 0.015 af

Reach AP1: Analysis Point 1 Inflow=35.57 cfs 5.852 af
Outflow=35.57 cfs 5.852 af

Reach AP2: Analysis Point 2 Inflow=1.65 cfs 0.146 af
Outflow=1.65 cfs 0.146 af

Reach AP4: Analysis Point 4 Inflow=0.26 cfs 0.022 af
Outflow=0.26 cfs 0.022 af

Reach AP5: Analysis Point 5 Inflow=0.05 cfs 0.003 af
Outflow=0.05 cfs 0.003 af

Reach AP6: Analysis Point 6 Inflow=0.97 cfs 0.088 af
Outflow=0.97 cfs 0.088 af

Pond 1P: Porous Pavement Section #1 Peak Elev=34.96' Storage=5,820 cf Inflow=2.41 cfs 0.809 af
Discarded=2.14 cfs 0.809 af Primary=0.00 cfs 0.000 af Outflow=2.14 cfs 0.809 af

Pond 2P: Porous Pavement Section #2 Peak Elev=35.05' Storage=1,142 cf Inflow=0.60 cfs 0.211 af
Discarded=0.45 cfs 0.211 af Primary=0.00 cfs 0.000 af Outflow=0.45 cfs 0.211 af

Pond 3P: Filtration Drip Edge #1 Peak Elev=36.02' Storage=0.003 af Inflow=0.44 cfs 0.037 af
Outflow=0.33 cfs 0.037 af

Pond 4P: Filtration Drip Edge #2 Peak Elev=37.12' Storage=0.003 af Inflow=0.35 cfs 0.029 af
Primary=0.25 cfs 0.029 af Secondary=0.00 cfs 0.000 af Outflow=0.25 cfs 0.029 af

Pond 5P: Filtration Drip Edge #3 Peak Elev=34.18' Storage=0.003 af Inflow=0.38 cfs 0.032 af
Outflow=0.29 cfs 0.032 af

Pond 6P: Filtration Drip Edge #4 Peak Elev=25.01' Storage=0.001 af Inflow=0.17 cfs 0.015 af
Outflow=0.17 cfs 0.014 af

Pond 7P: Filtration Drip Edge #5 Peak Elev=25.02' Storage=0.002 af Inflow=0.17 cfs 0.015 af
Outflow=0.17 cfs 0.013 af

Pond 8P: Filtration Drip Edge #6 Peak Elev=23.39' Storage=0.001 af Inflow=0.17 cfs 0.015 af
Outflow=0.16 cfs 0.015 af

Pond 9P: Filtration Drip Edge #7 Peak Elev=31.15' Storage=0.001 af Inflow=0.17 cfs 0.015 af
Outflow=0.16 cfs 0.014 af

Pond 10P: Filtration Drip Edge #8 Peak Elev=32.21' Storage=0.002 af Inflow=0.37 cfs 0.036 af
Outflow=0.37 cfs 0.036 af

Pond 11P: Filtration Drip Edge #9 Peak Elev=32.82' Storage=0.001 af Inflow=0.26 cfs 0.022 af
Outflow=0.21 cfs 0.022 af

Pond 12P: Infiltration Drip Edge #10 Peak Elev=37.50' Storage=0.013 af Inflow=0.43 cfs 0.036 af
Discarded=0.03 cfs 0.032 af Secondary=0.17 cfs 0.004 af Outflow=0.20 cfs 0.036 af

Pond 13P: Filtration Drip Edge #11 Peak Elev=36.05' Storage=0.001 af Inflow=0.14 cfs 0.012 af
Primary=0.14 cfs 0.012 af Secondary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.012 af

Pond 14P: Focal Point #1 Peak Elev=37.97' Storage=58 cf Inflow=1.98 cfs 0.161 af
Outflow=1.98 cfs 0.161 af

Pond 15P: Jellyfish #1 Peak Elev=35.03' Inflow=2.26 cfs 0.188 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0175 '/' Outflow=2.26 cfs 0.188 af

Pond 16P: Jellyfish #2 Peak Elev=35.03' Inflow=1.54 cfs 0.127 af
15.0" Round Culvert n=0.012 L=12.0' S=0.0125 '/' Outflow=1.54 cfs 0.127 af

Pond 17P: Pocket Pond Peak Elev=36.04' Storage=682 cf Inflow=0.44 cfs 0.049 af
Outflow=0.14 cfs 0.049 af

Pond 18P: Underground Detention Peak Elev=35.02' Storage=10,474 cf Inflow=5.78 cfs 0.476 af
Outflow=1.17 cfs 0.475 af

Pond 19P: Porous Concrete Walkway Peak Elev=32.05' Storage=164 cf Inflow=0.19 cfs 0.033 af
Discarded=0.08 cfs 0.033 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.033 af

Pond AP3: Existing Pond Peak Elev=32.64' Storage=16,435 cf Inflow=25.20 cfs 3.117 af
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=14.98 cfs 3.117 af

Pond DMH1: Drain Manhole 1 Peak Elev=35.03' Inflow=1.54 cfs 0.127 af
15.0" Round Culvert n=0.012 L=8.0' S=0.0125 '/' Outflow=1.54 cfs 0.127 af

Pond YD1: Yard Drain 1 Peak Elev=38.91' Inflow=0.14 cfs 0.011 af
6.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/' Outflow=0.14 cfs 0.011 af

Pond YD2: Yard Drain 2 Peak Elev=38.54' Inflow=0.37 cfs 0.028 af
6.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.37 cfs 0.028 af

Pond YD3: Yard Drain 3 Peak Elev=38.30' Inflow=0.43 cfs 0.032 af
6.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/' Outflow=0.43 cfs 0.032 af

Total Runoff Area = 15.480 ac Runoff Volume = 7.051 af Average Runoff Depth = 5.47"
49.33% Pervious = 7.636 ac 50.67% Impervious = 7.844 ac

Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 17.65 cfs @ 12.19 hrs, Volume= 1.632 af, Depth= 4.75"
Routed to Reach AP1 : Analysis Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
3,301	55	Woods, Good, HSG B
960	98	Paved roads w/curbs & sewers, HSG B
11,268	98	Roofs, HSG C
39,974	98	Paved roads w/curbs & sewers, HSG C
22,696	74	>75% Grass cover, Good, HSG C
80,510	70	Woods, Good, HSG C
20,931	77	Woods, Good, HSG D
179,640	79	Weighted Average
127,438		70.94% Pervious Area
52,202		29.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	39	0.0204	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
2.9	11	0.0294	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.4	23	0.0294	0.86		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	48	0.0294	5.69	55.51	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=2.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=11.00' n= 0.040 Winding stream, pools & shoals
0.3	153	0.0392	8.51	312.68	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=20.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=29.00' n= 0.040 Winding stream, pools & shoals
0.9	303	0.0165	5.52	202.86	**Trap/Vee/Rect Channel Flow, Assumed 1.5' flow depth - Channel** Bot.W=20.00' D=1.50' Z= 4.0 & 2.0 '/' Top.W=29.00' n= 0.040 Winding stream, pools & shoals
13.9	577	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 1.65 cfs @ 12.15 hrs, Volume= 0.146 af, Depth= 5.88"
Routed to Reach AP2 : Analysis Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
7,339	98	Paved roads w/curbs & sewers, HSG C
1,425	98	Roofs, HSG C
1,455	74	>75% Grass cover, Good, HSG C
2,788	70	Woods, Good, HSG C
13,007	89	Weighted Average
4,243		32.62% Pervious Area
8,764		67.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	35	0.0225	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
1.9	15	0.0225	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.8	56	0.0274	1.16		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.9	106	Total			

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 25.16 cfs @ 12.35 hrs, Volume= 3.068 af, Depth= 5.54"
Routed to Pond AP3 : Existing Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
125,302	98	Paved roads w/curbs & sewers, HSG C
9,379	98	Roofs, HSG C
13,398	74	>75% Grass cover, Good, HSG C
74,360	70	Woods, Good, HSG C
46,241	83	1/4 acre lots, 38% imp, HSG C
15,690	77	Woods, Good, HSG D
5,165	98	Water Surface, 0% imp, HSG D
289,535	86	Weighted Average
137,282		47.41% Pervious Area
152,253		52.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
3.5	119	0.0126	0.56		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	107	0.0187	0.68		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.7	180	0.0111	0.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.3	604	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 6.94"
Routed to Reach AP4 : Analysis Point 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,625	98	Paved parking, HSG C
1,625		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 minute minimum Tc per TR-55**

Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 0.003 af, Depth= 4.20"
Routed to Reach AP5 : Analysis Point 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
430	74	>75% Grass cover, Good, HSG C
430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 minute minimum Tc per TR-55**

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 0.97 cfs @ 12.16 hrs, Volume= 0.088 af, Depth= 5.65"
Routed to Reach AP6 : Analysis Point 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
4,023	98	Paved roads w/curbs & sewers, HSG C
479	98	Roofs, HSG C
3,620	74	>75% Grass cover, Good, HSG C
8,122	87	Weighted Average
3,620		44.57% Pervious Area
4,502		55.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0041	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.7	47	0.0041	0.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	52	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
12.0	149	Total			

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 2.51 cfs @ 12.22 hrs, Volume= 0.242 af, Depth= 4.31"
Routed to Reach 3R : 15" HDPE Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,632	98	Paved roads w/curbs & sewers, HSG C
4,849	74	>75% Grass cover, Good, HSG C
17,413	70	Woods, Good, HSG C
5,424	83	1/4 acre lots, 38% imp, HSG C
29,318	75	Weighted Average
25,625		87.40% Pervious Area
3,693		12.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	50	0.0183	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.70"
0.2	7	0.0183	0.68		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	91	0.0134	0.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	52	0.0134	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.8	200	Total			

Summary for Subcatchment 8S: Subcatchment 8S

Runoff = 2.41 cfs @ 13.88 hrs, Volume= 0.809 af, Depth= 6.23"
Routed to Pond 1P : Porous Pavement Section #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
33,067	98	Paved roads w/curbs & sewers, HSG C
6,311	74	>75% Grass cover, Good, HSG C
9,768	98	Roofs, HSG C
18,709	83	1/4 acre lots, 38% imp, HSG C
67,855	92	Weighted Average
17,911		26.40% Pervious Area
49,944		73.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
144.0					**Direct Entry, Assuming 5 in/hr through 12" filter course**

Summary for Subcatchment 9S: Subcatchment 9S

Runoff = 0.60 cfs @ 13.82 hrs, Volume= 0.211 af, Depth= 6.82"
Routed to Pond 2P : Porous Pavement Section #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
11,700	98	Paved roads w/curbs & sewers, HSG C
4,064	98	Roofs, HSG C
366	74	>75% Grass cover, Good, HSG C
16,130	97	Weighted Average
366		2.27% Pervious Area
15,764		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
144.0					**Direct Entry, Assuming 5 in/hr through 12" filter course**

Summary for Subcatchment 10S: Subcatchment 10S

Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Depth= 4.20"
Routed to Pond 17P : Pocket Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
951	74	>75% Grass cover, Good, HSG C
951		100.00% Pervious Area

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

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 6.94"
Routed to Pond 3P : Filtration Drip Edge #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
2,728	98	Roofs, HSG C
46	98	Water Surface, 0% imp, HSG C
2,774	98	Weighted Average
46		1.66% Pervious Area
2,728		98.34% Impervious Area

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

Summary for Subcatchment 12S: Subcatchment 12S

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 6.94"
Routed to Pond 4P : Filtration Drip Edge #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
2,176	98	Roofs, HSG C
21	98	Water Surface, 0% imp, HSG C
2,197	98	Weighted Average
21		0.96% Pervious Area
2,176		99.04% Impervious Area

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

Summary for Subcatchment 13S: Subcatchment 13S

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 0.032 af, Depth= 6.94"
Routed to Pond 5P : Filtration Drip Edge #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
2,040	98	Roofs, HSG C
360	98	Water Surface, 0% imp, HSG C
2,400	98	Weighted Average
360		15.00% Pervious Area
2,040		85.00% 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 = 0.17 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 6.94"
Routed to Pond 6P : Filtration Drip Edge #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		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 = 0.17 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 6.94"
Routed to Pond 7P : Filtration Drip Edge #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		100.00% Impervious Area

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

Summary for Subcatchment 16S: Subcatchment 16S

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 6.94"
Routed to Pond 8P : Filtration Drip Edge #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		100.00% Impervious Area

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

Summary for Subcatchment 17S: Subcatchment 17S

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 6.94"
Routed to Pond 9P : Filtration Drip Edge #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		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 = 0.17 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 6.94"
Routed to Pond 10P : Filtration Drip Edge #8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,104	98	Roofs, HSG C
1,104		100.00% Impervious Area

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

Summary for Subcatchment 19S: (new Subcat)

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 6.94"
Routed to Pond 11P : Filtration Drip Edge #9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,592	98	Roofs, HSG C
48	98	Water Surface, 0% imp, HSG C
1,640	98	Weighted Average
48		2.93% Pervious Area
1,592		97.07% Impervious Area

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

Summary for Subcatchment 20S: (new Subcat)

Runoff = 0.43 cfs @ 12.09 hrs, Volume= 0.036 af, Depth= 6.94"
Routed to Pond 12P : Infiltration Drip Edge #10

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
2,728	98	Roofs, HSG C
2,728		100.00% Impervious Area

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

Summary for Subcatchment 21S: Subcatchment 21S

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.012 af, Depth= 6.94"
Routed to Pond 13P : Filtration Drip Edge #11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
816	98	Roofs, HSG C
96	98	Water Surface, 0% imp, HSG C
912	98	Weighted Average
96		10.53% Pervious Area
816		89.47% Impervious Area

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

Summary for Subcatchment 22S: Subcatchment 22S

Runoff = 1.55 cfs @ 12.09 hrs, Volume= 0.129 af, Depth= 6.82"
Routed to Pond 14P : Focal Point #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
6,099	98	Roofs, HSG C
3,190	98	Paved parking, HSG C
571	74	>75% Grass cover, Good, HSG C
9,860	97	Weighted Average
571		5.79% Pervious Area
9,289		94.21% Impervious Area

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

Summary for Subcatchment 23S: Subcatchment 23S

Runoff = 2.26 cfs @ 12.09 hrs, Volume= 0.188 af, Depth= 6.82"
Routed to Pond 15P : Jellyfish #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
2,460	98	Roofs, HSG C
11,609	98	Paved parking, HSG C
317	74	>75% Grass cover, Good, HSG C
14,386	97	Weighted Average
317		2.20% Pervious Area
14,069		97.80% Impervious Area

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

Summary for Subcatchment 24S: Subcatchment 24S

Runoff = 1.54 cfs @ 12.09 hrs, Volume= 0.127 af, Depth= 6.82"
Routed to Pond 16P : Jellyfish #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
398	74	>75% Grass cover, Good, HSG C
4,210	98	Roofs, HSG C
5,149	98	Paved roads w/curbs & sewers, HSG C
9,757	97	Weighted Average
398		4.08% Pervious Area
9,359		95.92% Impervious Area

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

Summary for Subcatchment 25S: Subcatchment 25S

Runoff = 0.70 cfs @ 12.10 hrs, Volume= 0.052 af, Depth= 4.20"
Routed to Reach 8R : 15" HDPE Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
6,419	74	>75% Grass cover, Good, HSG C
6,419		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	40	0.0250	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.2	10	0.0288	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.6	42	0.0288	1.19		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	20	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	46	0.0652	1.79		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.4	158	Total			

Summary for Subcatchment 26S: Subcatchment 26S

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.009 af, Depth= 4.20"
Routed to Reach 5R : 15" HDPE Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,141	74	>75% Grass cover, Good, HSG C
1,141		100.00% Pervious Area

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

Summary for Subcatchment 27S: Subcatchment 27S

Runoff = 0.09 cfs @ 13.90 hrs, Volume= 0.029 af, Depth= 5.09"
Routed to Pond 19P : Porous Concrete Walkway

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,025	98	Paved roads w/curbs & sewers, HSG C
2,005	74	>75% Grass cover, Good, HSG C
3,030	82	Weighted Average
2,005		66.17% Pervious Area
1,025		33.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
144.0					**Direct Entry, Assuming 5 in/hr through 12" filter course**

Summary for Subcatchment 28S: Subcatchment 28S

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 5.65"
Routed to Pond YD1 : Yard Drain 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
443	74	>75% Grass cover, Good, HSG C
554	98	Paved parking, HSG C
997	87	Weighted Average
443		44.43% Pervious Area
554		55.57% Impervious Area

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

Summary for Subcatchment 29S: Subcatchment 29S

Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 5.54"
Routed to Pond YD2 : Yard Drain 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
812	74	>75% Grass cover, Good, HSG C
820	98	Paved parking, HSG C
1,632	86	Weighted Average
812		49.75% Pervious Area
820		50.25% Impervious Area

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

Summary for Subcatchment 30S: Subcatchment 30S

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 5.65"
Routed to Pond YD3 : Yard Drain 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
184	74	>75% Grass cover, Good, HSG C
209	98	Paved parking, HSG C
393	87	Weighted Average
184		46.82% Pervious Area
209		53.18% Impervious Area

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

Summary for Subcatchment 31S: (new Subcat)

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 4.20"
Routed to Reach 10R : 12" HDPE Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=7.18"

Area (sf)	CN	Description
1,910	74	>75% Grass cover, Good, HSG C
1,910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	30	0.0133	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
1.3	20	0.1000	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.70"
0.4	41	0.0488	1.55		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.8	91	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 2Ra: Channel through 1S

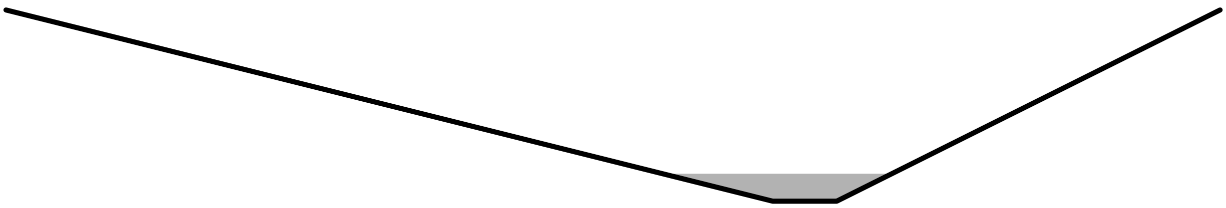
[80] Warning: Exceeded Pond 6P by 0.25' @ 0.00 hrs (0.09 cfs 0.038 af)
[80] Warning: Exceeded Pond 7P by 1.65' @ 0.00 hrs (0.40 cfs 0.443 af)

Inflow Area = 7.994 ac, 58.17% Impervious, Inflow Depth = 5.70" for 25-Year Storm event
Inflow = 16.62 cfs @ 12.55 hrs, Volume= 3.798 af
Outflow = 16.62 cfs @ 12.56 hrs, Volume= 3.798 af, Atten= 0%, Lag= 0.4 min
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 4.18 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 1.8 min

Peak Storage= 541 cf @ 12.56 hrs
Average Depth at Peak Storage= 0.87' , Surface Width= 7.19'
Bank-Full Depth= 6.00' Flow Area= 120.0 sf, Capacity= 1,586.21 cfs

2.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 38.00'
Length= 136.0' Slope= 0.0294 '/'
Inlet Invert= 24.00', Outlet Invert= 20.00'



Summary for Reach 2Rb: Channel through 1S

[61] Hint: Exceeded Reach 2Ra outlet invert by 0.27' @ 12.55 hrs

Inflow Area = 9.587 ac, 60.73% Impervious, Inflow Depth = 4.78" for 25-Year Storm event
Inflow = 16.67 cfs @ 12.55 hrs, Volume= 3.816 af
Outflow = 16.67 cfs @ 12.56 hrs, Volume= 3.816 af, Atten= 0%, Lag= 0.5 min
Routed to Reach 2Rc : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.99 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 2.2 min

Peak Storage= 853 cf @ 12.56 hrs
Average Depth at Peak Storage= 0.27' , Surface Width= 21.61'
Bank-Full Depth= 6.00' Flow Area= 228.0 sf, Capacity= 4,170.50 cfs

20.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 56.00'
Length= 153.0' Slope= 0.0392 '/'
Inlet Invert= 20.00', Outlet Invert= 14.00'

‡

Summary for Reach 2Rc: Channel through 1S

[62] Hint: Exceeded Reach 2Rb OUTLET depth by 0.12' @ 12.25 hrs

Inflow Area = 11.032 ac, 58.06% Impervious, Inflow Depth = 4.59" for 25-Year Storm event
Inflow = 18.87 cfs @ 12.36 hrs, Volume= 4.220 af
Outflow = 18.86 cfs @ 12.39 hrs, Volume= 4.220 af, Atten= 0%, Lag= 1.4 min
Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.39 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 6.3 min

Peak Storage= 2,392 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.37' , Surface Width= 22.24'
Bank-Full Depth= 6.00' Flow Area= 228.0 sf, Capacity= 2,705.34 cfs

20.00' x 6.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 2.0 '/' Top Width= 56.00'
Length= 303.0' Slope= 0.0165 '/'
Inlet Invert= 14.00', Outlet Invert= 9.00'

‡

Summary for Reach 3R: 15" HDPE Culvert

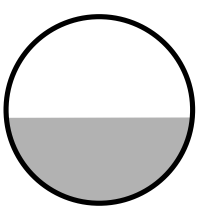
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.737 ac, 20.01% Impervious, Inflow Depth = 4.54" for 25-Year Storm event
Inflow = 2.82 cfs @ 12.21 hrs, Volume= 0.278 af
Outflow = 2.82 cfs @ 12.22 hrs, Volume= 0.278 af, Atten= 0%, Lag= 0.2 min
Routed to Reach 4R : Flow through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 5.12 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.52 fps, Avg. Travel Time= 0.9 min

Peak Storage= 47 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.57' , Surface Width= 1.25'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.54 cfs

15.0" Round Pipe
n= 0.012
Length= 86.0' Slope= 0.0087 '/'
Inlet Invert= 34.75', Outlet Invert= 34.00'



Summary for Reach 4R: Flow through 1S

[61] Hint: Exceeded Reach 3R outlet invert by 0.38' @ 12.20 hrs

Inflow Area = 1.107 ac, 46.01% Impervious, Inflow Depth = 3.02" for 25-Year Storm event
Inflow = 2.82 cfs @ 12.22 hrs, Volume= 0.278 af
Outflow = 2.82 cfs @ 12.22 hrs, Volume= 0.278 af, Atten= 0%, Lag= 0.1 min
Routed to Reach 5R : 15" HDPE Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.39 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 0.7 min

Peak Storage= 33 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 3.31'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.40 cfs

1.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 40.0' Slope= 0.0313 '/'
Inlet Invert= 34.00', Outlet Invert= 32.75'

Summary for Reach 5R: 15" HDPE Culvert

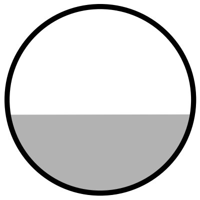
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.14' @ 12.20 hrs

Inflow Area = 1.133 ac, 44.94% Impervious, Inflow Depth = 3.05" for 25-Year Storm event
Inflow = 2.89 cfs @ 12.22 hrs, Volume= 0.288 af
Outflow = 2.89 cfs @ 12.22 hrs, Volume= 0.288 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 6R : Flow through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 5.89 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.76 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.53' , Surface Width= 1.23'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.82 cfs

15.0" Round Pipe
n= 0.012
Length= 12.0' Slope= 0.0125 '/'
Inlet Invert= 32.75', Outlet Invert= 32.60'



Summary for Reach 6R: Flow through 1S

[61] Hint: Exceeded Reach 5R outlet invert by 0.29' @ 12.20 hrs

Inflow Area = 1.133 ac, 44.94% Impervious, Inflow Depth = 3.05" for 25-Year Storm event
Inflow = 2.89 cfs @ 12.22 hrs, Volume= 0.288 af
Outflow = 2.89 cfs @ 12.22 hrs, Volume= 0.288 af, Atten= 0%, Lag= 0.2 min
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.45 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.00 fps, Avg. Travel Time= 0.9 min

Peak Storage= 44 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 3.32'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.71 cfs

1.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 53.0' Slope= 0.0321 '/'
Inlet Invert= 32.50', Outlet Invert= 30.80'

Summary for Reach 7R: Existing Wet Channel

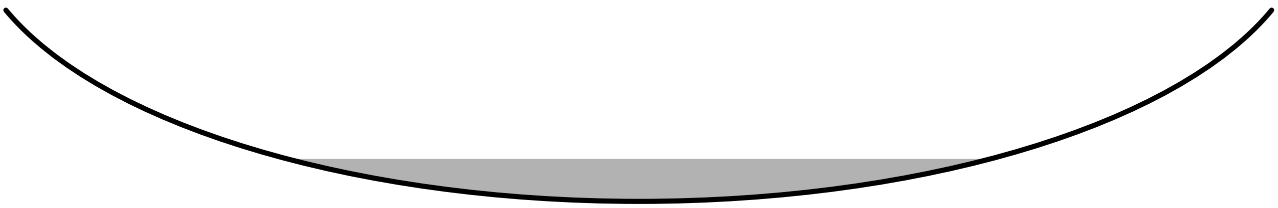
[62] Hint: Exceeded Reach 6R OUTLET depth by 0.01' @ 24.90 hrs
[61] Hint: Exceeded Reach 11R outlet invert by 0.02' @ 12.20 hrs
[80] Warning: Exceeded Pond 9P by 0.30' @ 0.00 hrs (0.15 cfs 0.165 af)
[80] Warning: Exceeded Pond 10P by 0.55' @ 0.00 hrs (0.21 cfs 0.071 af)

Inflow Area = 1.297 ac, 44.98% Impervious, Inflow Depth = 3.26" for 25-Year Storm event
Inflow = 3.43 cfs @ 12.20 hrs, Volume= 0.353 af
Outflow = 3.43 cfs @ 12.21 hrs, Volume= 0.353 af, Atten= 0%, Lag= 0.2 min
Routed to Reach 8R : 15" HDPE Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 3.26 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 1.2 min

Peak Storage= 68 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.22' , Surface Width= 7.08'
Bank-Full Depth= 1.00' Flow Area= 10.0 sf, Capacity= 88.27 cfs

15.00' x 1.00' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 65.0' Slope= 0.0554 '/'
Inlet Invert= 30.80', Outlet Invert= 27.20'



‡

Summary for Reach 8R: 15" HDPE Culvert

[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.16' @ 12.15 hrs

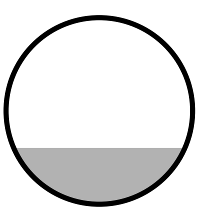
Inflow Area =	1.445 ac,	40.39% Impervious,	Inflow Depth = 3.36"	for 25-Year Storm event	
Inflow =	3.89 cfs @	12.18 hrs,	Volume=	0.404 af	
Outflow =	3.89 cfs @	12.18 hrs,	Volume=	0.404 af,	Atten= 0%, Lag= 0.0 min

Routed to Reach 2Rc : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 12.52 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.88 fps, Avg. Travel Time= 0.2 min

Peak Storage= 12 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 1.15'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 19.79 cfs

15.0" Round Pipe
n= 0.012
Length= 40.0' Slope= 0.0800 '/'
Inlet Invert= 27.20', Outlet Invert= 24.00'



Summary for Reach 9R: 12" HDPE

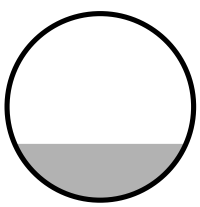
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.299 ac, 67.38% Impervious, Inflow Depth = 5.88" for 25-Year Storm event
Inflow = 1.65 cfs @ 12.15 hrs, Volume= 0.146 af
Outflow = 1.65 cfs @ 12.15 hrs, Volume= 0.146 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 8.31 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.84 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.30' , Surface Width= 0.92'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.40 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 9.0' Slope= 0.0556 '/'
Inlet Invert= 34.00', Outlet Invert= 33.50'



Summary for Reach 10R: 12" HDPE Culvert

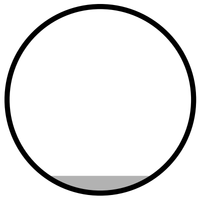
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.044 ac, 0.00% Impervious, Inflow Depth = 4.20" for 25-Year Storm event
Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : Flow through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 5.73 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.06 fps, Avg. Travel Time= 0.1 min

Peak Storage= 0 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.09' , Surface Width= 0.58'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 11.73 cfs

12.0" Round Pipe
n= 0.012
Length= 13.0' Slope= 0.0923 '/'
Inlet Invert= 34.00', Outlet Invert= 32.80'



Summary for Reach 11R: Flow through 1S

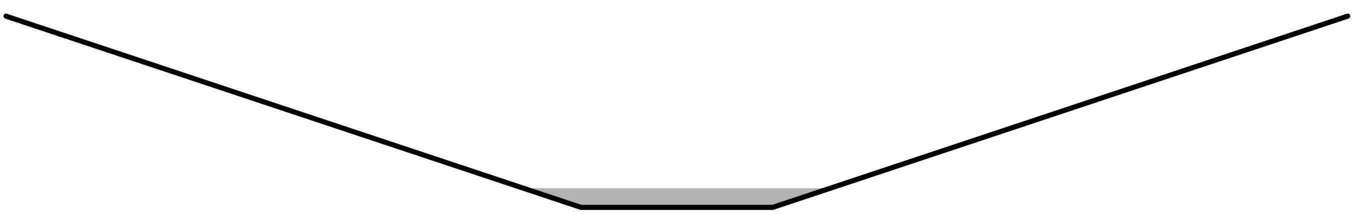
[62] Hint: Exceeded Reach 10R OUTLET depth by 0.01' @ 12.10 hrs

Inflow Area = 0.044 ac, 0.00% Impervious, Inflow Depth = 4.20" for 25-Year Storm event
Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.21 cfs @ 12.10 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.5 min
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.61 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 1.9 min

Peak Storage= 8 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 1.61'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 23.12 cfs

1.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 59.0' Slope= 0.0305 '/'
Inlet Invert= 32.80', Outlet Invert= 31.00'



Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 15.156 ac, 50.17% Impervious, Inflow Depth = 4.63" for 25-Year Storm event
Inflow = 35.57 cfs @ 12.21 hrs, Volume= 5.852 af
Outflow = 35.57 cfs @ 12.21 hrs, Volume= 5.852 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

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

```
Inflow Area =      0.299 ac, 67.38% Impervious, Inflow Depth =  5.88"   for 25-Year Storm event
Inflow      =      1.65 cfs @  12.15 hrs, Volume=        0.146 af
Outflow     =      1.65 cfs @  12.15 hrs, Volume=        0.146 af, Atten= 0%, Lag= 0.0 min
    Routed to Reach 9R : 12" HDPE
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP4: Analysis Point 4

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

```
Inflow Area =      0.037 ac,100.00% Impervious, Inflow Depth =  6.94"   for 25-Year Storm event
Inflow      =      0.26 cfs @  12.09 hrs, Volume=        0.022 af
Outflow     =      0.26 cfs @  12.09 hrs, Volume=        0.022 af, Atten= 0%, Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP5: Analysis Point 5

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

```
Inflow Area =      0.010 ac,  0.00% Impervious, Inflow Depth =  4.20"   for 25-Year Storm event
Inflow      =      0.05 cfs @  12.09 hrs, Volume=        0.003 af
Outflow     =      0.05 cfs @  12.09 hrs, Volume=        0.003 af, Atten= 0%, Lag= 0.0 min
    Routed to Reach 2Rb : Channel through 1S
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP6: Analysis Point 6

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

```
Inflow Area =      0.186 ac, 55.43% Impervious, Inflow Depth =  5.65"   for 25-Year Storm event
Inflow      =      0.97 cfs @  12.16 hrs, Volume=        0.088 af
Outflow     =      0.97 cfs @  12.16 hrs, Volume=        0.088 af, Atten= 0%, Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Porous Pavement Section #1

```
Inflow Area =      1.558 ac, 73.60% Impervious, Inflow Depth =  6.23"   for 25-Year Storm event
Inflow      =      2.41 cfs @  13.88 hrs, Volume=        0.809 af
Outflow     =      2.14 cfs @  14.35 hrs, Volume=        0.809 af, Atten= 11%, Lag= 28.3 min
Discarded   =      2.14 cfs @  14.35 hrs, Volume=        0.809 af
Primary     =      0.00 cfs @   0.00 hrs, Volume=        0.000 af
    Routed to Reach 2Rb : Channel through 1S
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.96' @ 14.35 hrs Surf.Area= 14,864 sf Storage= 5,820 cf

Plug-Flow detention time= 39.5 min calculated for 0.808 af (100% of inflow)
Center-of-Mass det. time= 39.5 min (939.4 - 900.0)

Volume	Invert	Avail.Storage	Storage Description
#1	32.82'	9,104 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
32.82	14,864	0.0	0	0
32.83	14,864	15.0	22	22
33.07	14,864	15.0	535	557
33.08	14,864	40.0	59	617
33.74	14,864	40.0	3,924	4,541
33.75	14,864	15.0	22	4,563
33.99	14,864	15.0	535	5,098
34.00	14,864	5.0	7	5,106
34.99	14,864	5.0	736	5,842
35.00	14,864	30.0	45	5,886
35.49	14,864	30.0	2,185	8,071
35.50	14,864	15.0	22	8,093
35.82	14,864	15.0	713	8,807
35.83	14,864	100.0	149	8,956
35.84	14,864	100.0	149	9,104

Device	Routing	Invert	Outlet Devices
#1	Primary	35.83'	**100.0' long x 50.0' 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
#2	Discarded	32.82'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 32.41' Phase-In= 0.01'

Discarded OutFlow Max=2.14 cfs @ 14.35 hrs HW=34.96' (Free Discharge)
└─**2=Exfiltration** (Controls 2.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=32.82' TW=20.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: Porous Pavement Section #2

Inflow Area = 0.370 ac, 97.73% Impervious, Inflow Depth = 6.82" for 25-Year Storm event
Inflow = 0.60 cfs @ 13.82 hrs, Volume= 0.211 af
Outflow = 0.45 cfs @ 14.66 hrs, Volume= 0.211 af, Atten= 25%, Lag= 50.3 min
Discarded = 0.45 cfs @ 14.66 hrs, Volume= 0.211 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 4R : Flow through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 35.05' @ 14.66 hrs Surf.Area= 7,076 sf Storage= 1,142 cf

Plug-Flow detention time= 19.7 min calculated for 0.210 af (100% of inflow)
Center-of-Mass det. time= 19.7 min (896.6 - 876.9)

Volume	Invert	Avail.Storage	Storage Description
#1	34.49'	4,334 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
34.49	7,076	0.0	0	0
34.50	7,076	15.0	11	11
34.74	7,076	15.0	255	265
34.75	7,076	40.0	28	294
35.41	7,076	40.0	1,868	2,162
35.42	7,076	15.0	11	2,172
35.66	7,076	15.0	255	2,427
35.67	7,076	5.0	4	2,431
36.66	7,076	5.0	350	2,781
36.67	7,076	30.0	21	2,802
37.16	7,076	30.0	1,040	3,842
37.17	7,076	15.0	11	3,853
37.49	7,076	15.0	340	4,193
37.50	7,076	100.0	71	4,263
37.51	7,076	100.0	71	4,334

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**100.0' long x 50.0' 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
#2	Discarded	34.49'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 34.17' Phase-In= 0.01'

Discarded OutFlow Max=0.45 cfs @ 14.66 hrs HW=35.05' (Free Discharge)
└─**2=Exfiltration** (Controls 0.45 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=34.49' TW=34.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Filtration Drip Edge #1

Inflow Area = 0.064 ac, 98.34% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.037 af
Outflow = 0.33 cfs @ 12.16 hrs, Volume= 0.037 af, Atten= 26%, Lag= 4.5 min
Primary = 0.33 cfs @ 12.16 hrs, Volume= 0.037 af
Routed to Reach 3R : 15" HDPE Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 36.02' @ 12.16 hrs Surf.Area= 0.020 ac Storage= 0.003 af

Plug-Flow detention time= 11.6 min calculated for 0.037 af (100% of inflow)

Center-of-Mass det. time= 11.9 min (754.5 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	37.75'	0.001 af	**3.25'W x 131.00'L x 0.25'H Prismatoid**
			0.002 af Overall x 40.0% Voids
#2	36.25'	0.001 af	**3.25'W x 131.00'L x 1.50'H Prismatoid**
			0.015 af Overall x 5.0% Voids
#3	36.00'	0.000 af	**3.25'W x 131.00'L x 0.25'H Prismatoid**
			0.002 af Overall x 15.0% Voids
#4	35.25'	0.003 af	**3.25'W x 131.00'L x 0.75'H Prismatoid**
			0.007 af Overall x 40.0% Voids
		0.005 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	38.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	35.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.32 cfs @ 12.16 hrs HW=36.00' TW=35.30' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.32 cfs @ 3.69 fps)

Summary for Pond 4P: Filtration Drip Edge #2

Inflow Area = 0.050 ac, 99.04% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.35 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.25 cfs @ 12.17 hrs, Volume= 0.029 af, Atten= 27%, Lag= 4.8 min
Primary = 0.25 cfs @ 12.17 hrs, Volume= 0.029 af
Routed to Pond 17P : Pocket Pond
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond AP3 : Existing Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 37.12' @ 12.17 hrs Surf.Area= 0.024 ac Storage= 0.003 af

Plug-Flow detention time= 36.9 min calculated for 0.029 af (100% of inflow)
Center-of-Mass det. time= 37.2 min (779.8 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	37.50'	0.001 af	**3.50'W x 98.00'L x 0.25'H Prismatoid**
			0.002 af Overall x 40.0% Voids
#2	36.00'	0.001 af	**3.50'W x 98.00'L x 1.50'H Prismatoid**
			0.012 af Overall x 5.0% Voids
#3	35.75'	0.000 af	**3.50'W x 98.00'L x 0.25'H Prismatoid**
			0.002 af Overall x 15.0% Voids
#4	35.00'	0.002 af	**3.50'W x 98.00'L x 0.75'H Prismatoid**
			0.006 af Overall x 40.0% Voids
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Secondary	37.75'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	35.00'	**4.0" Round Culvert**
			L= 75.0' CPP, projecting, no headwall, Ke= 0.900

			Inlet / Outlet Invert= 35.00' / 34.00' S= 0.0133 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	35.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.24 cfs @ 12.17 hrs HW=37.00' TW=35.56' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.24 cfs @ 2.77 fps)
  └─**2=Orifice/Grate** (Passes 0.24 cfs of 0.50 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.00' TW=27.00' (Dynamic Tailwater)

Summary for Pond 5P: Filtration Drip Edge #3

Inflow Area = 0.055 ac, 85.00% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.38 cfs @ 12.09 hrs, Volume= 0.032 af
Outflow = 0.29 cfs @ 12.16 hrs, Volume= 0.032 af, Atten= 24%, Lag= 4.5 min
Primary = 0.29 cfs @ 12.16 hrs, Volume= 0.032 af
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 34.18' @ 12.16 hrs Surf.Area= 0.008 ac Storage= 0.003 af

Plug-Flow detention time= 12.0 min calculated for 0.032 af (100% of inflow)
Center-of-Mass det. time= 12.3 min (754.9 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	35.75'	0.001 af	**3.00'W x 120.00'L x 0.25'H Prismatoid**Impervious
			0.002 af Overall x 40.0% Voids
#2	34.25'	0.001 af	**3.00'W x 120.00'L x 1.50'H Prismatoid**Impervious
			0.012 af Overall x 5.0% Voids
#3	34.00'	0.000 af	**3.00'W x 120.00'L x 0.25'H Prismatoid**Impervious
			0.002 af Overall x 15.0% Voids
#4	33.25'	0.002 af	**3.00'W x 120.00'L x 0.75'H Prismatoid**
			0.006 af Overall x 40.0% Voids
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	36.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	33.25'	**4.0" Round Culvert**
			L= 22.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 33.25' / 32.00' S= 0.0568 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	33.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.28 cfs @ 12.16 hrs HW=34.15' TW=24.79' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.28 cfs @ 3.26 fps)
  └─**2=Orifice/Grate** (Passes 0.28 cfs of 0.36 cfs potential flow)

Summary for Pond 6P: Filtration Drip Edge #4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=31)

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 0.014 af, Atten= 3%, Lag= 0.3 min
Primary = 0.17 cfs @ 12.09 hrs, Volume= 0.014 af
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 25.01' @ 12.11 hrs Surf.Area= 0.012 ac Storage= 0.001 af

Plug-Flow detention time= 65.8 min calculated for 0.014 af (97% of inflow)
Center-of-Mass det. time= 50.2 min (792.8 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	26.75'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 40.0% Voids
#2	24.75'	0.000 af	**3.50'W x 48.00'L x 2.00'H Prismatoid** 0.008 af Overall x 5.0% Voids
#3	24.50'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 15.0% Voids
#4	23.75'	0.001 af	**3.50'W x 48.00'L x 0.75'H Prismatoid** 0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	27.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	23.75'	**4.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 23.75' / 23.50' S= 0.0313 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	23.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.17 cfs @ 12.09 hrs HW=24.99' TW=24.74' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.17 cfs @ 1.92 fps)
↑—**2=Orifice/Grate** (Passes 0.17 cfs of 0.21 cfs potential flow)

Summary for Pond 7P: Filtration Drip Edge #5

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=68)

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 2%, Lag= 0.5 min
Primary = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 25.02' @ 12.11 hrs Surf.Area= 0.012 ac Storage= 0.002 af

Plug-Flow detention time= 97.3 min calculated for 0.013 af (90% of inflow)
Center-of-Mass det. time= 48.2 min (790.8 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	25.35'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 40.0% Voids
#2	23.35'	0.000 af	**3.50'W x 48.00'L x 2.00'H Prismatoid**
			0.008 af Overall x 5.0% Voids
#3	23.10'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 15.0% Voids
#4	22.35'	0.001 af	**3.50'W x 48.00'L x 0.75'H Prismatoid**
			0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	25.60'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	22.35'	**4.0" Round Culvert**
			L= 18.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 22.35' / 22.20' S= 0.0083 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	22.35'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.17 cfs @ 12.09 hrs HW=25.00' TW=24.74' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.17 cfs @ 1.94 fps)
↑—**2=Orifice/Grate** (Passes 0.17 cfs of 0.21 cfs potential flow)

Summary for Pond 8P: Filtration Drip Edge #6

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.16 cfs @ 12.12 hrs, Volume= 0.015 af, Atten= 10%, Lag= 2.3 min
Primary = 0.16 cfs @ 12.12 hrs, Volume= 0.015 af
Routed to Reach 2Rb : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 23.39' @ 12.12 hrs Surf.Area= 0.004 ac Storage= 0.001 af

Plug-Flow detention time= 7.7 min calculated for 0.015 af (100% of inflow)
Center-of-Mass det. time= 7.8 min (750.4 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	26.00'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 40.0% Voids
#2	24.00'	0.000 af	**3.50'W x 48.00'L x 2.00'H Prismatoid**
			0.008 af Overall x 5.0% Voids
#3	23.75'	0.000 af	**3.50'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 15.0% Voids
#4	23.00'	0.001 af	**3.50'W x 48.00'L x 0.75'H Prismatoid**
			0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	26.25'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	23.00'	**4.0" Round Culvert**
			L= 6.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 23.00' / 22.75' S= 0.0417 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	23.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 12.12 hrs HW=23.38' TW=20.23' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.15 cfs @ 1.77 fps)
  └─**2=Orifice/Grate** (Passes 0.15 cfs of 0.20 cfs potential flow)

Summary for Pond 9P: Filtration Drip Edge #7

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=11)

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.16 cfs @ 12.12 hrs, Volume= 0.014 af, Atten= 10%, Lag= 1.8 min
Primary = 0.16 cfs @ 12.12 hrs, Volume= 0.014 af
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 31.15' @ 12.13 hrs Surf.Area= 0.004 ac Storage= 0.001 af

Plug-Flow detention time= 46.9 min calculated for 0.014 af (97% of inflow)
Center-of-Mass det. time= 26.9 min (769.5 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	0.000 af	**3.75'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 40.0% Voids
#2	31.50'	0.000 af	**3.75'W x 48.00'L x 1.50'H Prismatoid**
			0.006 af Overall x 5.0% Voids
#3	31.25'	0.000 af	**3.75'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 15.0% Voids
#4	30.50'	0.001 af	**3.75'W x 48.00'L x 0.75'H Prismatoid**
			0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	33.25'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	30.50'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 12.12 hrs HW=31.14' TW=31.01' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.75 fps)

Summary for Pond 10P: Filtration Drip Edge #8

Inflow Area = 0.025 ac,100.00% Impervious, Inflow Depth = 17.25" for 25-Year Storm event
Inflow = 0.37 cfs @ 12.11 hrs, Volume= 0.036 af
Outflow = 0.37 cfs @ 12.12 hrs, Volume= 0.036 af, Atten= 2%, Lag= 1.0 min
Primary = 0.37 cfs @ 12.12 hrs, Volume= 0.036 af
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 32.21' @ 12.13 hrs Surf.Area= 0.012 ac Storage= 0.002 af

Plug-Flow detention time= 34.6 min calculated for 0.036 af (98% of inflow)
Center-of-Mass det. time= 17.4 min (766.2 - 748.9)

Volume	Invert	Avail.Storage	Storage Description
#1	32.75'	0.000 af	**3.75'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 40.0% Voids
#2	31.25'	0.000 af	**3.75'W x 48.00'L x 1.50'H Prismatoid**
			0.006 af Overall x 5.0% Voids
#3	31.00'	0.000 af	**3.75'W x 48.00'L x 0.25'H Prismatoid**
			0.001 af Overall x 15.0% Voids
#4	30.25'	0.001 af	**3.75'W x 48.00'L x 0.75'H Prismatoid**
			0.003 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	33.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	30.25'	**4.0" Round Culvert**
			L= 8.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 30.25' / 30.00' S= 0.0313 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	30.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.36 cfs @ 12.12 hrs HW=32.18' TW=31.01' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.36 cfs @ 4.11 fps)
  └─**2=Orifice/Grate** (Passes 0.36 cfs of 0.45 cfs potential flow)

Summary for Pond 11P: Filtration Drip Edge #9

Inflow Area = 0.038 ac, 97.07% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.21 cfs @ 12.15 hrs, Volume= 0.022 af, Atten= 19%, Lag= 3.7 min
Secondary = 0.21 cfs @ 12.15 hrs, Volume= 0.022 af
Routed to Pond 10P : Filtration Drip Edge #8

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 32.82' @ 12.15 hrs Surf.Area= 0.006 ac Storage= 0.001 af

Plug-Flow detention time= 10.2 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 10.5 min (753.1 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	34.75'	0.001 af	**3.50'W x 76.00'L x 0.25'H Prismatoid** 0.002 af Overall x 40.0% Voids
#2	33.25'	0.000 af	**3.50'W x 76.00'L x 1.50'H Prismatoid** 0.009 af Overall x 5.0% Voids
#3	33.00'	0.000 af	**3.50'W x 76.00'L x 0.25'H Prismatoid** 0.002 af Overall x 15.0% Voids
#4	32.25'	0.002 af	**3.50'W x 76.00'L x 0.75'H Prismatoid** 0.005 af Overall x 40.0% Voids
		0.003 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Secondary	35.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Secondary	32.25'	**4.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 32.25' / 30.25' S= 0.1333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	32.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Secondary OutFlow Max=0.21 cfs @ 12.15 hrs HW=32.82' TW=32.18' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.21 cfs @ 2.40 fps)
  └─**2=Orifice/Grate** (Passes 0.21 cfs of 0.27 cfs potential flow)

Summary for Pond 12P: Infiltration Drip Edge #10

Inflow Area = 0.063 ac,100.00% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.43 cfs @ 12.09 hrs, Volume= 0.036 af
Outflow = 0.20 cfs @ 12.32 hrs, Volume= 0.036 af, Atten= 55%, Lag= 13.8 min
Discarded = 0.03 cfs @ 12.25 hrs, Volume= 0.032 af
Secondary = 0.17 cfs @ 12.32 hrs, Volume= 0.004 af
Routed to Pond 19P : Porous Concrete Walkway

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 37.50' @ 12.25 hrs Surf.Area= 0.015 ac Storage= 0.013 af

Plug-Flow detention time= 193.9 min calculated for 0.036 af (100% of inflow)
Center-of-Mass det. time= 193.9 min (936.5 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	35.25'	0.013 af	**5.50'W x 116.00'L x 2.25'H Prismatoid** 0.033 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#0	Secondary	37.50'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	35.25'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 32.25' Phase-In= 0.10'

Discarded OutFlow Max=0.03 cfs @ 12.25 hrs HW=37.50' (Free Discharge)
└─**1=Exfiltration** (Controls 0.03 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.32 hrs HW=37.50' TW=31.66' (Dynamic Tailwater)

Summary for Pond 13P: Filtration Drip Edge #11

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=10)

Inflow Area = 0.021 ac, 89.47% Impervious, Inflow Depth = 6.94" for 25-Year Storm event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.14 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 4%, Lag= 0.5 min
Primary = 0.14 cfs @ 12.09 hrs, Volume= 0.012 af
Routed to Pond 17P : Pocket Pond
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond AP3 : Existing Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 36.05' @ 12.47 hrs Surf.Area= 0.010 ac Storage= 0.001 af

Plug-Flow detention time= 54.1 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 54.3 min (796.9 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	36.75'	0.000 af	**3.00'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 40.0% Voids
#2	35.25'	0.000 af	**3.00'W x 48.00'L x 1.50'H Prismatoid** 0.005 af Overall x 5.0% Voids
#3	35.00'	0.000 af	**3.00'W x 48.00'L x 0.25'H Prismatoid** 0.001 af Overall x 15.0% Voids
#4	34.25'	0.001 af	**3.00'W x 48.00'L x 0.75'H Prismatoid** 0.002 af Overall x 40.0% Voids
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Secondary	37.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	34.25'	**4.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 34.25' / 34.00' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	34.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 12.09 hrs HW=35.53' TW=35.30' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.14 cfs @ 1.56 fps)
  └─**2=Orifice/Grate** (Passes 0.14 cfs of 0.20 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=34.25' TW=27.00' (Dynamic Tailwater)

Summary for Pond 14P: Focal Point #1

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.296 ac, 84.40% Impervious, Inflow Depth = 6.53" for 25-Year Storm event
Inflow = 1.98 cfs @ 12.09 hrs, Volume= 0.161 af
Outflow = 1.98 cfs @ 12.09 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.2 min
Primary = 1.98 cfs @ 12.09 hrs, Volume= 0.161 af
Routed to Pond 18P : Underground Detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 37.97' @ 12.09 hrs Surf.Area= 149 sf Storage= 58 cf

Plug-Flow detention time= 0.9 min calculated for 0.161 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (758.1 - 757.2)

Volume	Invert	Avail.Storage	Storage Description
#1	35.25'	23 cf	**5.00'W x 10.00'L x 2.25'H Focal Point** 113 cf Overall x 20.0% Voids
#2	37.50'	67 cf	**Surface Bowl (Prismatic)** Listed below (Recalc)
		90 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
37.50	50	0	0
38.00	102	38	38
38.25	133	29	67

Device	Routing	Invert	Outlet Devices
#1	Primary	34.50'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 34.50' / 33.60' S= 0.0082 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	35.25'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#3	Device 1	37.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.94 cfs @ 12.09 hrs HW=37.97' TW=34.22' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.94 cfs of 5.15 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.34 cfs)
  └─**3=Orifice/Grate** (Weir Controls 1.59 cfs @ 1.53 fps)

Summary for Pond 15P: Jellyfish #1

Inflow Area = 0.330 ac, 97.80% Impervious, Inflow Depth = 6.82" for 25-Year Storm event
Inflow = 2.26 cfs @ 12.09 hrs, Volume= 0.188 af
Outflow = 2.26 cfs @ 12.09 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min
Primary = 2.26 cfs @ 12.09 hrs, Volume= 0.188 af
Routed to Pond 18P : Underground Detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.03' @ 12.50 hrs
Flood Elev= 36.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.15'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 33.15' / 32.80' S= 0.0175 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.25 cfs @ 12.09 hrs HW=34.43' TW=34.20' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.25 cfs @ 1.84 fps)

Summary for Pond 16P: Jellyfish #2

Inflow Area = 0.224 ac, 95.92% Impervious, Inflow Depth = 6.82" for 25-Year Storm event
Inflow = 1.54 cfs @ 12.09 hrs, Volume= 0.127 af
Outflow = 1.54 cfs @ 12.09 hrs, Volume= 0.127 af, Atten= 0%, Lag= 0.0 min
Primary = 1.54 cfs @ 12.09 hrs, Volume= 0.127 af
Routed to Pond DMH1 : Drain Manhole 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.03' @ 12.50 hrs
Flood Elev= 36.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.25'	**15.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 33.25' / 33.10' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.53 cfs @ 12.09 hrs HW=34.42' TW=34.30' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.53 cfs @ 1.28 fps)

Summary for Pond 17P: Pocket Pond

Inflow Area = 0.093 ac, 73.69% Impervious, Inflow Depth = 6.30" for 25-Year Storm event
Inflow = 0.44 cfs @ 12.14 hrs, Volume= 0.049 af
Outflow = 0.14 cfs @ 12.50 hrs, Volume= 0.049 af, Atten= 67%, Lag= 21.4 min
Primary = 0.14 cfs @ 12.50 hrs, Volume= 0.049 af
Routed to Pond AP3 : Existing Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 36.04' @ 12.50 hrs Surf.Area= 523 sf Storage= 682 cf

Plug-Flow detention time= 127.5 min calculated for 0.049 af (100% of inflow)
Center-of-Mass det. time= 127.4 min (917.9 - 790.4)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	953 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
33.00	20	24.0	0	0	20
34.00	127	46.0	66	66	147
36.00	514	83.0	598	663	549
36.50	646	93.0	289	953	695

Device	Routing	Invert	Outlet Devices
#1	Primary	33.00'	**12.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 33.00' / 32.50' S= 0.0313 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	33.00'	**1.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	36.00'	**6.0' long + 3.0 '/' SideZ x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.14 cfs @ 12.50 hrs HW=36.04' TW=32.43' (Dynamic Tailwater)
├─**1=Culvert** (Passes 0.05 cfs of 4.75 cfs potential flow)
│ └─**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 8.39 fps)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.10 cfs @ 0.45 fps)

Summary for Pond 18P: Underground Detention

[80] Warning: Exceeded Pond 15P by 0.11' @ 24.45 hrs (0.04 cfs 0.001 af)
[80] Warning: Exceeded Pond DMH1 by 0.28' @ 24.35 hrs (0.28 cfs 0.009 af)

Inflow Area = 0.850 ac, 92.64% Impervious, Inflow Depth = 6.72" for 25-Year Storm event
Inflow = 5.78 cfs @ 12.09 hrs, Volume= 0.476 af
Outflow = 1.17 cfs @ 12.51 hrs, Volume= 0.475 af, Atten= 80%, Lag= 25.5 min
Primary = 1.17 cfs @ 12.51 hrs, Volume= 0.475 af
Routed to Reach 2Ra : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.02' @ 12.51 hrs Surf.Area= 3,584 sf Storage= 10,474 cf

Plug-Flow detention time= 380.0 min calculated for 0.475 af (100% of inflow)
Center-of-Mass det. time= 380.0 min (1,132.0 - 752.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	31.75'	0 cf	**32.00'W x 112.00'L x 4.67'H Field A** 16,737 cf Overall - 16,737 cf Embedded = 0 cf x 40.0% Voids
#2A	31.75'	12,800 cf	**Shea Leaching Chamber 8x14x4.7**x 32 Inside #1 Inside= 84.0"W x 48.0"H => 30.77 sf x 13.00'L = 400.0 cf Outside= 96.0"W x 56.0"H => 37.36 sf x 14.00'L = 523.0 cf 32 Chambers in 4 Rows
		12,800 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	31.75'	**15.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 31.75' / 31.60' S= 0.0115 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	31.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	31.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	33.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.17 cfs @ 12.51 hrs HW=35.02' TW=24.86' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.17 cfs of 7.59 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.60 fps)
  │ └─**3=Orifice/Grate** (Passes 0.19 cfs of 0.74 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 0.98 cfs @ 4.98 fps)

Summary for Pond 19P: Porous Concrete Walkway

Inflow Area = 0.070 ac, 33.83% Impervious, Inflow Depth = 5.76" for 25-Year Storm event
Inflow = 0.19 cfs @ 12.32 hrs, Volume= 0.033 af
Outflow = 0.08 cfs @ 14.46 hrs, Volume= 0.033 af, Atten= 58%, Lag= 128.5 min
Discarded = 0.08 cfs @ 14.46 hrs, Volume= 0.033 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 7R : Existing Wet Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 32.05' @ 14.46 hrs Surf.Area= 1,025 sf Storage= 164 cf

Plug-Flow detention time= 20.3 min calculated for 0.033 af (100% of inflow)
Center-of-Mass det. time= 20.2 min (929.4 - 909.2)

Volume	Invert	Avail.Storage	Storage Description
#1	31.49'	628 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
31.49	1,025	0.0	0	0
31.50	1,025	15.0	2	2
31.74	1,025	15.0	37	38
31.75	1,025	40.0	4	43
32.41	1,025	40.0	271	313
32.42	1,025	15.0	2	315
32.66	1,025	15.0	37	352
32.67	1,025	5.0	1	352
33.66	1,025	5.0	51	403
33.67	1,025	30.0	3	406
34.16	1,025	30.0	151	557
34.17	1,025	15.0	2	558
34.49	1,025	15.0	49	607
34.50	1,025	100.0	10	618
34.51	1,025	100.0	10	628

Device	Routing	Invert	Outlet Devices
#1	Primary	34.50'	**100.0' long x 50.0' 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
#2	Discarded	31.49'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 31.25' Phase-In= 0.01'

Discarded OutFlow Max=0.08 cfs @ 14.46 hrs HW=32.05' (Free Discharge)
└─**2=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=31.49' TW=30.80' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond AP3: Existing Pond

15" CMP culvert inlet is buried. Contractor to uncover culvert inlet and replace with 18" HDPE.

---

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=8)

Inflow Area = 6.740 ac, 52.88% Impervious, Inflow Depth = 5.55" for 25-Year Storm event
Inflow = 25.20 cfs @ 12.35 hrs, Volume= 3.117 af
Outflow = 14.98 cfs @ 12.67 hrs, Volume= 3.117 af, Atten= 41%, Lag= 18.9 min
Primary = 14.98 cfs @ 12.67 hrs, Volume= 3.117 af
Routed to Reach 2RA : Channel through 1S

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 32.64' @ 12.67 hrs Surf.Area= 10,588 sf Storage= 16,435 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 5.7 min (817.6 - 811.9)

Volume	Invert	Avail.Storage	Storage Description
#1	27.00'	104,428 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.00	20	5.7	0	0	20
28.00	37	24.0	28	28	66
30.00	2,236	218.0	1,707	1,735	3,810
32.00	7,294	444.0	9,046	10,781	15,734
34.00	19,719	933.0	26,004	36,785	69,335
35.50	43,192	1,107.0	46,047	82,832	97,623
36.00	43,192	1,107.0	21,596	104,428	98,177

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	**18.0" Round Culvert** L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 27.00' / 26.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=14.97 cfs @ 12.67 hrs HW=32.63' TW=24.86' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 14.97 cfs @ 8.47 fps)

Summary for Pond DMH1: Drain Manhole 1

Inflow Area = 0.224 ac, 95.92% Impervious, Inflow Depth = 6.82" for 25-Year Storm event
Inflow = 1.54 cfs @ 12.09 hrs, Volume= 0.127 af
Outflow = 1.54 cfs @ 12.09 hrs, Volume= 0.127 af, Atten= 0%, Lag= 0.0 min
Primary = 1.54 cfs @ 12.09 hrs, Volume= 0.127 af
Routed to Pond 18P : Underground Detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 35.03' @ 12.51 hrs
Flood Elev= 37.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.00'	**15.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 33.00' / 32.90' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.52 cfs @ 12.09 hrs HW=34.30' TW=34.20' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.52 cfs @ 1.24 fps)

Summary for Pond YD1: Yard Drain 1

Inflow Area = 0.023 ac, 55.57% Impervious, Inflow Depth = 5.65" for 25-Year Storm event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af
Routed to Pond YD2 : Yard Drain 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 38.91' @ 12.09 hrs
Flood Elev= 39.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	38.60'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.60' / 38.10' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.14 cfs @ 12.09 hrs HW=38.91' TW=38.53' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.14 cfs @ 1.54 fps)

Summary for Pond YD2: Yard Drain 2

Inflow Area = 0.060 ac, 52.26% Impervious, Inflow Depth = 5.58" for 25-Year Storm event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.028 af
Outflow = 0.37 cfs @ 12.09 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Primary = 0.37 cfs @ 12.09 hrs, Volume= 0.028 af
Routed to Pond YD3 : Yard Drain 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 38.54' @ 12.09 hrs
Flood Elev= 39.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	38.00'	**6.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.00' / 37.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.37 cfs @ 12.09 hrs HW=38.53' TW=38.28' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.37 cfs @ 1.88 fps)

Summary for Pond YD3: Yard Drain 3

Inflow Area = 0.069 ac, 52.38% Impervious, Inflow Depth = 5.59" for 25-Year Storm event
Inflow = 0.43 cfs @ 12.09 hrs, Volume= 0.032 af
Outflow = 0.43 cfs @ 12.09 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.09 hrs, Volume= 0.032 af
Routed to Pond 14P : Focal Point #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 38.30' @ 12.09 hrs
Flood Elev= 38.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	37.70'	**6.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.70' / 37.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.42 cfs @ 12.09 hrs HW=38.28' TW=37.97' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.42 cfs @ 2.13 fps)

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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=179,640 sf 29.06% Impervious Runoff Depth=6.08"
Flow Length=577' Tc=13.9 min CN=79 Runoff=22.42 cfs 2.089 af

Subcatchment2S: Subcatchment2S Runoff Area=13,007 sf 67.38% Impervious Runoff Depth=7.29"
Flow Length=106' Tc=10.9 min CN=89 Runoff=2.02 cfs 0.181 af

Subcatchment3S: Subcatchment3S Runoff Area=289,535 sf 52.59% Impervious Runoff Depth=6.92"
Flow Length=604' Tc=26.3 min CN=86 Runoff=31.11 cfs 3.835 af

Subcatchment4S: Subcatchment4S Runoff Area=1,625 sf 100.00% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.31 cfs 0.026 af

Subcatchment5S: Subcatchment5S Runoff Area=430 sf 0.00% Impervious Runoff Depth=5.47"
Tc=6.0 min CN=74 Runoff=0.06 cfs 0.005 af

Subcatchment6S: Subcatchment6S Runoff Area=8,122 sf 55.43% Impervious Runoff Depth=7.04"
Flow Length=149' Tc=12.0 min CN=87 Runoff=1.20 cfs 0.109 af

Subcatchment7S: Subcatchment7S Runoff Area=29,318 sf 12.60% Impervious Runoff Depth=5.60"
Flow Length=200' Tc=15.8 min CN=75 Runoff=3.25 cfs 0.314 af

Subcatchment8S: Subcatchment8S Runoff Area=67,855 sf 73.60% Impervious Runoff Depth=7.65"
Tc=144.0 min CN=92 Runoff=2.93 cfs 0.993 af

Subcatchment9S: Subcatchment9S Runoff Area=16,130 sf 97.73% Impervious Runoff Depth=8.25"
Tc=144.0 min CN=97 Runoff=0.72 cfs 0.255 af

Subcatchment10S: Subcatchment10S Runoff Area=951 sf 0.00% Impervious Runoff Depth=5.47"
Tc=6.0 min CN=74 Runoff=0.14 cfs 0.010 af

Subcatchment11S: Subcatchment11S Runoff Area=2,774 sf 98.34% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.53 cfs 0.044 af

Subcatchment12S: Subcatchment12S Runoff Area=2,197 sf 99.04% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.42 cfs 0.035 af

Subcatchment13S: Subcatchment13S Runoff Area=2,400 sf 85.00% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.45 cfs 0.038 af

Subcatchment14S: Subcatchment14S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment15S: Subcatchment15S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment16S: Subcatchment16S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment17S: Subcatchment17S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment18S: Subcatchment18S Runoff Area=1,104 sf 100.00% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment19S: (new Subcat) Runoff Area=1,640 sf 97.07% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.31 cfs 0.026 af

Subcatchment20S: (new Subcat) Runoff Area=2,728 sf 100.00% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.52 cfs 0.044 af

Subcatchment21S: Subcatchment21S Runoff Area=912 sf 89.47% Impervious Runoff Depth=8.37"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.015 af

Subcatchment22S: Subcatchment22S Runoff Area=9,860 sf 94.21% Impervious Runoff Depth=8.25"
Tc=6.0 min CN=97 Runoff=1.86 cfs 0.156 af

Subcatchment23S: Subcatchment23S Runoff Area=14,386 sf 97.80% Impervious Runoff Depth=8.25"
Tc=6.0 min CN=97 Runoff=2.72 cfs 0.227 af

Subcatchment24S: Subcatchment24S Runoff Area=9,757 sf 95.92% Impervious Runoff Depth=8.25"
Tc=6.0 min CN=97 Runoff=1.84 cfs 0.154 af

Subcatchment25S: Subcatchment25S Runoff Area=6,419 sf 0.00% Impervious Runoff Depth=5.47"
Flow Length=158' Tc=6.4 min CN=74 Runoff=0.91 cfs 0.067 af

Subcatchment26S: Subcatchment26S Runoff Area=1,141 sf 0.00% Impervious Runoff Depth=5.47"
Tc=6.0 min CN=74 Runoff=0.16 cfs 0.012 af

Subcatchment27S: Subcatchment27S Runoff Area=3,030 sf 33.83% Impervious Runoff Depth=6.44"
Tc=144.0 min CN=82 Runoff=0.11 cfs 0.037 af

Subcatchment28S: Subcatchment28S Runoff Area=997 sf 55.57% Impervious Runoff Depth=7.04"
Tc=6.0 min CN=87 Runoff=0.18 cfs 0.013 af

Subcatchment29S: Subcatchment29S Runoff Area=1,632 sf 50.25% Impervious Runoff Depth=6.92"
Tc=6.0 min CN=86 Runoff=0.28 cfs 0.022 af

Subcatchment30S: Subcatchment30S Runoff Area=393 sf 53.18% Impervious Runoff Depth=7.04"
Tc=6.0 min CN=87 Runoff=0.07 cfs 0.005 af

Subcatchment31S: (new Subcat) Runoff Area=1,910 sf 0.00% Impervious Runoff Depth=5.47"
Flow Length=91' Tc=6.0 min CN=74 Runoff=0.27 cfs 0.020 af

Reach 2Ra: Channel through 1S Avg. Flow Depth=0.90' Max Vel=4.26 fps Inflow=18.03 cfs 4.724 af
n=0.040 L=136.0' S=0.0294 '/' Capacity=1,586.21 cfs Outflow=18.03 cfs 4.724 af

Reach 2Rb: Channel through 1S Avg. Flow Depth=0.28' Max Vel=3.08 fps Inflow=18.08 cfs 4.746 af
n=0.040 L=153.0' S=0.0392 '/' Capacity=4,170.50 cfs Outflow=18.08 cfs 4.746 af

Reach 2Rc: Channel through 1S Avg. Flow Depth=0.40' Max Vel=2.50 fps Inflow=21.34 cfs 5.264 af
n=0.040 L=303.0' S=0.0165 '/' Capacity=2,705.34 cfs Outflow=21.33 cfs 5.264 af

Reach 3R: 15" HDPE Culvert Avg. Flow Depth=0.66' Max Vel=5.46 fps Inflow=3.61 cfs 0.358 af
15.0" Round Pipe n=0.012 L=86.0' S=0.0087 '/' Capacity=6.54 cfs Outflow=3.61 cfs 0.358 af

Reach 4R: Flow through 1S Avg. Flow Depth=0.43' Max Vel=3.62 fps Inflow=3.61 cfs 0.358 af
n=0.030 L=40.0' S=0.0313 '/' Capacity=23.40 cfs Outflow=3.62 cfs 0.358 af

Reach 5R: 15" HDPE Culvert Avg. Flow Depth=0.61' Max Vel=6.29 fps Inflow=3.71 cfs 0.370 af
15.0" Round Pipe n=0.012 L=12.0' S=0.0125 '/' Capacity=7.82 cfs Outflow=3.71 cfs 0.370 af

Reach 6R: Flow through 1S Avg. Flow Depth=0.44' Max Vel=3.69 fps Inflow=3.71 cfs 0.370 af
n=0.030 L=53.0' S=0.0321 '/' Capacity=23.71 cfs Outflow=3.72 cfs 0.370 af

Reach 7R: Existing Wet Channel Avg. Flow Depth=0.25' Max Vel=3.52 fps Inflow=4.39 cfs 0.450 af
n=0.030 L=65.0' S=0.0554 '/' Capacity=88.27 cfs Outflow=4.39 cfs 0.450 af

Reach 8R: 15" HDPE Culvert Avg. Flow Depth=0.43' Max Vel=13.42 fps Inflow=4.99 cfs 0.518 af
15.0" Round Pipe n=0.012 L=40.0' S=0.0800 '/' Capacity=19.79 cfs Outflow=4.99 cfs 0.518 af

Reach 9R: 12" HDPE Avg. Flow Depth=0.33' Max Vel=8.80 fps Inflow=2.02 cfs 0.181 af
12.0" Round Pipe n=0.013 L=9.0' S=0.0556 '/' Capacity=8.40 cfs Outflow=2.02 cfs 0.181 af

Reach 10R: 12" HDPE Culvert Avg. Flow Depth=0.11' Max Vel=6.20 fps Inflow=0.27 cfs 0.020 af
12.0" Round Pipe n=0.012 L=13.0' S=0.0923 '/' Capacity=11.73 cfs Outflow=0.27 cfs 0.020 af

Reach 11R: Flow through 1S Avg. Flow Depth=0.12' Max Vel=1.75 fps Inflow=0.27 cfs 0.020 af
n=0.030 L=59.0' S=0.0305 '/' Capacity=23.12 cfs Outflow=0.27 cfs 0.020 af

Reach AP1: Analysis Point 1 Inflow=43.31 cfs 7.353 af
Outflow=43.31 cfs 7.353 af

Reach AP2: Analysis Point 2 Inflow=2.02 cfs 0.181 af
Outflow=2.02 cfs 0.181 af

Reach AP4: Analysis Point 4 Inflow=0.31 cfs 0.026 af
Outflow=0.31 cfs 0.026 af

Reach AP5: Analysis Point 5 Inflow=0.06 cfs 0.005 af
Outflow=0.06 cfs 0.005 af

Reach AP6: Analysis Point 6 Inflow=1.20 cfs 0.109 af
Outflow=1.20 cfs 0.109 af

Pond 1P: Porous Pavement Section #1 Peak Elev=35.26' Storage=7,053 cf Inflow=2.93 cfs 0.993 af
Discarded=2.39 cfs 0.993 af Primary=0.00 cfs 0.000 af Outflow=2.39 cfs 0.993 af

Pond 2P: Porous Pavement Section #2 Peak Elev=35.20' Storage=1,569 cf Inflow=0.72 cfs 0.255 af
Discarded=0.53 cfs 0.255 af Primary=0.00 cfs 0.000 af Outflow=0.53 cfs 0.255 af

Pond 3P: Filtration Drip Edge #1 Peak Elev=36.55' Storage=0.003 af Inflow=0.53 cfs 0.044 af
Outflow=0.45 cfs 0.044 af

Pond 4P: Filtration Drip Edge #2 Peak Elev=37.69' Storage=0.004 af Inflow=0.42 cfs 0.035 af
Primary=0.29 cfs 0.035 af Secondary=0.00 cfs 0.000 af Outflow=0.29 cfs 0.035 af

Pond 5P: Filtration Drip Edge #3 Peak Elev=34.83' Storage=0.003 af Inflow=0.45 cfs 0.038 af
Outflow=0.39 cfs 0.038 af

Pond 6P: Filtration Drip Edge #4 Peak Elev=25.19' Storage=0.001 af Inflow=0.21 cfs 0.018 af
Outflow=0.21 cfs 0.017 af

Pond 7P: Filtration Drip Edge #5 Peak Elev=25.19' Storage=0.002 af Inflow=0.21 cfs 0.018 af
Outflow=0.21 cfs 0.016 af

Pond 8P: Filtration Drip Edge #6 Peak Elev=23.48' Storage=0.001 af Inflow=0.21 cfs 0.018 af
Outflow=0.19 cfs 0.018 af

Pond 9P: Filtration Drip Edge #7 Peak Elev=31.23' Storage=0.001 af Inflow=0.21 cfs 0.018 af
Outflow=0.19 cfs 0.017 af

Pond 10P: Filtration Drip Edge #8 Peak Elev=32.63' Storage=0.002 af Inflow=0.43 cfs 0.044 af
Outflow=0.42 cfs 0.043 af

Pond 11P: Filtration Drip Edge #9 Peak Elev=33.00' Storage=0.002 af Inflow=0.31 cfs 0.026 af
Outflow=0.25 cfs 0.026 af

Pond 12P: Infiltration Drip Edge #10 Peak Elev=37.50' Storage=0.013 af Inflow=0.52 cfs 0.044 af
Discarded=0.03 cfs 0.035 af Secondary=0.33 cfs 0.009 af Outflow=0.35 cfs 0.044 af

Pond 13P: Filtration Drip Edge #11 Peak Elev=36.15' Storage=0.001 af Inflow=0.17 cfs 0.015 af
Primary=0.16 cfs 0.015 af Secondary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.015 af

Pond 14P: Focal Point #1 Peak Elev=38.01' Storage=62 cf Inflow=2.39 cfs 0.196 af
Outflow=2.40 cfs 0.196 af

Pond 15P: Jellyfish #1 Peak Elev=35.67' Inflow=2.72 cfs 0.227 af
15.0" Round Culvert n=0.012 L=20.0' S=0.0175 '/' Outflow=2.72 cfs 0.227 af

Pond 16P: Jellyfish #2 Peak Elev=35.67' Inflow=1.84 cfs 0.154 af
15.0" Round Culvert n=0.012 L=12.0' S=0.0125 '/' Outflow=1.84 cfs 0.154 af

Pond 17P: Pocket Pond Peak Elev=36.08' Storage=706 cf Inflow=0.58 cfs 0.060 af
Outflow=0.39 cfs 0.060 af

Pond 18P: Underground Detention Peak Elev=35.65' Storage=12,493 cf Inflow=6.96 cfs 0.577 af
Outflow=1.44 cfs 0.576 af

Pond 19P: Porous Concrete Walkway Peak Elev=32.31' Storage=274 cf Inflow=0.35 cfs 0.046 af
Discarded=0.11 cfs 0.046 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.046 af

Pond AP3: Existing Pond Peak Elev=33.38' Storage=25,951 cf Inflow=31.46 cfs 3.895 af
18.0" Round Culvert n=0.013 L=160.0' S=0.0050 '/' Outflow=16.06 cfs 3.895 af

Pond DMH1: Drain Manhole 1 Peak Elev=35.66' Inflow=1.84 cfs 0.154 af
15.0" Round Culvert n=0.012 L=8.0' S=0.0125 '/' Outflow=1.84 cfs 0.154 af

Pond YD1: Yard Drain 1 Peak Elev=39.05' Inflow=0.18 cfs 0.013 af
6.0" Round Culvert n=0.013 L=100.0' S=0.0050 '/' Outflow=0.18 cfs 0.013 af

Pond YD2: Yard Drain 2 Peak Elev=38.89' Inflow=0.46 cfs 0.035 af
6.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.46 cfs 0.035 af

Pond YD3: Yard Drain 3 Peak Elev=38.51' Inflow=0.53 cfs 0.040 af
6.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/' Outflow=0.53 cfs 0.040 af

Total Runoff Area = 15.480 ac Runoff Volume = 8.821 af Average Runoff Depth = 6.84"
49.33% Pervious = 7.636 ac 50.67% Impervious = 7.844 ac

APPENDIX III

Test Pit Logs

GOVE ENVIRONMENTAL SERVICES, INC.

TEST PIT DATA

Project 76 Portsmouth Ave, Exeter, NH
Client Green & Co.
GES Project No. 2024047
MM/DD/YY Staff 07-2-2024 James Gove, CSS#004

Test Pit No.	**6001**	Soils Series: Boxford
ESHWT::	16”	Landscape: Forested
Termination @	60”	Slope: B
Refusal:	No	Parent Material: Marine
Obs. Water:	None	Hydrologic Soil Group: C

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-7”	10YR3/2	silt loam	granular-friable-none
Bw 7-16”	10YR4/4	silt loam	granular-friable-none
Cd 16-60”	2.5Y5/3	silty clay loam	blocky-firm-5% Conc.

Test Pit No.	**6003**	Soils Series: Boxford
ESHWT::	18”	Landscape: Forested
Termination @	68”	Slope: B
Refusal:	No	Parent Material: Marine
Obs. Water:	None	Hydrologic Soil Group: C

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-7”	10YR3/2	silt loam	granular-friable-none
Bw 7-18”	10YR4/4	silt loam	granular-friable-none
Cd 18-68”	2.5Y5/3	silty clay loam	blocky-firm-5% Conc.

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.	**6007**	Soils Series: Scitico
ESHWT::	5”	Landscape: Forested
Termination @	60”	Slope: C
Refusal:	No	Parent Material: Marine
Obs. Water:	None	Hydrologic Soil Group: C

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-5”	10YR3/2	silt loam	blocky-friable-none
Cd 5-60”	2.5Y5/3	silty clay loam	blocky-firm-5% Conc.

Test Pit No.	**6010**	Soils Series: Scitico
ESHWT::	10”	Landscape: Forested
Termination @	40”	Slope: B
Refusal:	No	Parent Material: Marine
Obs. Water:	None	Hydrologic Soil Group: C

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-10”	10YR3/2	silt loam	granular-friable-none
Cd 10-40”	2.5Y5/32	silty clay loam	blocky-firm-5% Conc.

Test Pit No.	**6016**	Soils Series: Eldridge
ESHWT::	26”	Landscape: Forested
Termination @	60”	Slope: B
Refusal:	No	Parent Material: Marine
Obs. Water:	None	Hydrologic Soil Group: C

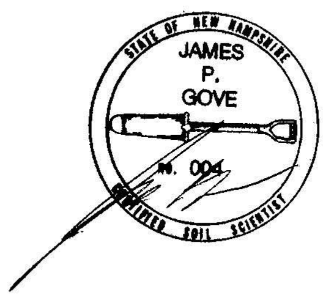
Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-9”	10YR3/2	sand	granular-friable-none
Bw1 9-26”	10YR5/8	sand	massive-friable-none
Bw1 26-31	10YR5/8	sand	massive-friable-10% Conc.
Cd 31-60”	2.5Y5/3	silty clay loam	blocky-firm-10% Conc.

Test Pit No.	**6017**	Soils Series: Eldridge
ESHWT::	19”	Landscape: Forested
Termination @	55”	Slope: B
Refusal:	No	Parent Material: Marine
Obs. Water:	None	Hydrologic Soil Group: C

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-6”	10YR3/2	loamy sand	granular-friable-none
Bw 6-19”	10YR4/4	loamy sand	granular-friable-none
Cd 19-55”	2.5Y5/3	silty clay loam	blocky-firm-5% Conc.

Test Pit No.	**SB**	Soils Series: Boxford
ESHWT::	20”	Landscape: Forested
Termination @	70”	Slope: B
Refusal:	No	Parent Material: Marine
Obs. Water:	None	Hydrologic Soil Group: C

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-6”	10YR3/2	silt loam	granular-friable-none
Bw 6-20”	10YR4/6	silt loam	granular-friable-none
Cd 20-70”	2.5Y5/3	silty clay loam	blocky-firm-10% Conc.


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

APPENDIX IV

Site Specific Soil Survey Report and Map

GOVE ENVIRONMENTAL SERVICES, INC

SITE-SPECIFIC SOIL SURVEY REPORT
For
79 Portsmouth Avenue, Exeter, NH
By
GES, Inc.
Project # 2024047
Date: 10-22-2024

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 10-22-2024; 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” = 50”

Contours Interval: 2 feet

2. LANDFORMS & EXISTING CONDITIONS:

The site is located on both developed areas and forested areas. The developed areas are virtually all pavement for building. The forested areas are relatively natural with the exception of old agricultural ditching, some of which are man-made wetlands. The largest wetlands are natural, a with the upland forest areas. All of the soils show signs of past agricultural activities, like plowing and the ditching noted above. At this point, the forested upland areas support a diverse mix of mature trees.

3. DATE SOIL MAP PRODUCED

Date(s) of on-site field work: 7-2-2024 (Wetlands flagged by others).

Date(s) of test pits: 7-2-2024

Test pits recorded by: James Gove, CSS#004

4. GEOGRAPHIC LOCATION AND SIZE OF SITE

City or town where soil mapping was conducted: Exeter

Location: Tax Map 65, Lot 118

Size of area: Approximately 6.7 acres

Was the map for the entire lot? No

If no, where was the mapping conducted on the parcel: On the development portion.

5. PURPOSE OF THE SOIL MAP

Was the map prepared to meet the requirement of Alteration of Terrain? Yes

If no, what was the purpose of the map? n/a

Who was the map prepared for? Jones and Beach Engineers, Inc.

6. SOIL IDENTIFICATION LEGEND

Map Unit Symbol	Map Unit Name	HISS Symbol	Hydrologic Soil Group
32	Boxford silt loam	353	C
33	Scitico silt loam	553	C
38	Eldridge loamy sand	343	C
134	Maybid mucky silt loam	653	D
953	Boxford SWPD	453	C
299/dfccc	Udorthents, smoothed	363	C
500/dfccc	Udorthents, loamy	363	C
600/ffccd	Endoaquents, loamy	563	D
699	Urban Land	n/a	n/a

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: 32

CORRELATED SOIL SERIES: Boxford

LANDSCAPE SETTING: Hill and hill side

CHARACTERISTIC SURFACE FEATURES: Smoothed, forested, ditched

DRAINAGE CLASS: Moderately well drained

PARENT MATERIAL: Marine Silt and Clay

NATURE OF DISSIMILAR INCLUSIONS: Somewhat poorly drained

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:

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-7”	10YR3/2	silt loam	granular-friable-none
Bw 7-18”	10YR4/4	silt loam	granular-friable-none
Cd 18-68”	2.5Y5/3	silty clay loam	blocky-firm-5% Conc. 5YR5/6

ESHWT = 18”, OBSWT = none, Coarse fragments = none, Water table = perched, Lithic contact = none

SITE-SPECIFIC MAP UNIT: 33

CORRELATED SOIL SERIES: Scitico

LANDSCAPE SETTING: Wetlands, depressions and drainages

CHARACTERISTIC SURFACE FEATURES: Forested, pit and mound

DRAINAGE CLASS: Poorly Drained

PARENT MATERIAL: Marine Silt and Clays

NATURE OF DISSIMILAR INCLUSIONS: Maybid

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:

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-5”	10YR3/2	silt loam	blocky-friable-none
Cd 5-60”	2.5Y5/2	silty clay loam	blocky-firm-5% Conc. 5YR5/6

ESHWT = 0”, OBSWT = none, Water table = perched, Coarse fragments = none,

Lithic contact = none

SITE-SPECIFIC MAP UNIT: 38

CORRELATED SOIL SERIES: Eldridge

LANDSCAPE SETTING: Hill top and side

CHARACTERISTIC SURFACE FEATURES: Forested, smoothed.

DRAINAGE CLASS: Moderately well drained

PARENT MATERIAL: Sand/loam over silt/clay

NATURE OF DISSIMILAR INCLUSIONS: Boxford

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:

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-9”	10YR3/2	sand	granular-friable-none
Bw1 9-26”	10YR5/8	sand	massive-friable-none
Bw1 26-31	10YR5/8	sand	massive-friable-10% Conc. 5YR5/6
Cd 31-60”	2.5Y5/3	silty clay loam	blocky-firm-10% Conc. 5YR5/6

ESHWT = 26”, OBSWT = none, Water table = perched, Coarse fragments = none, Lithic contact = none

SITE-SPECIFIC MAP UNIT: 134

CORRELATED SOIL SERIES: Maybid

LANDSCAPE SETTING: Low depression

CHARACTERISTIC SURFACE FEATURES: Pit and mound, small trees, soft soil

DRAINAGE CLASS: Very poorly drained

PARENT MATERIAL: Marine silt and clays

NATURE OF DISSIMILAR INCLUSIONS: Scitico

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:

Oa 0-5”, muck. 10YR2/1, massive, friable

A 5-10”, silt, 10YR2/1, massive, friable

C 10-20”, silty clay loam, 2.5Y5/1, massive, firm, redox 2.5YR5/8

ESHWT = 0”, OBSWT = 10”, Water table = perched, Coarse fragments = none, Lithic contact = none

SITE-SPECIFIC MAP UNIT: 953

CORRELATED SOIL SERIES: Boxford somewhat poorly drained

LANDSCAPE SETTING: Lower hill slopes

CHARACTERISTIC SURFACE FEATURES: Smoothed, forested

DRAINAGE CLASS: Somewhat poorly drained

PARENT MATERIAL: Marine silts and clays

NATURE OF DISSIMILAR INCLUSIONS: Boxford

ESTIMATED PERCENTAGE OF DISSIMILAR INCLUSIONS: 5%

8 Continental Dr Unit H, Exeter, NH 03833-7507
Ph (603) 778 0644 / *Fax* (603) 778 0654
www.gesinc.biz
info@gesinc.biz

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:

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-5”	10YR3/2	silt loam	blocky-friable-none
B/C 5-15”	2.5Y5/3	silt loam	blocky-friable- 5% Conc. 5YR5/6
Cd 15-60”	2.5Y5/2	silty clay loam	blocky-firm-5% Conc. %YR5/8

ESHWT = 5”, OBSWT = none, Water table – perched, Coarse fragments = none, Lithic contact = none

299/dfccc Udorhents, smoothed

Moderately well drained (d), marine silt and clay deposits (f), mineral restrictive layer of silty clay loam (c), estimated Ksat low (c), hydrologic soil group C (c), man-made land adjacent to urban land.

500/dfccc Udorthents, loamy

Moderately well drained (d), marine silt and clay deposits (f), mineral restrictive layer of silty clay loam (c), estimated Ksat low (c), hydrologic soil group C (c), man-made land – cut slope.

600/ffccd Endoaquents, loamy

Poorly drained (f), marine silt and clay deposits (f), mineral restrictive layer of silty clay loam and dense glacial till (c), estimated Ksat low (c), hydrologic soil group (d), man-made land – ditch.

699 Urban land --- pavement/building

8. RESPONSIBLE SOIL SCIENTIST

Name: James Gove

Certified Soil Scientist Number: 004

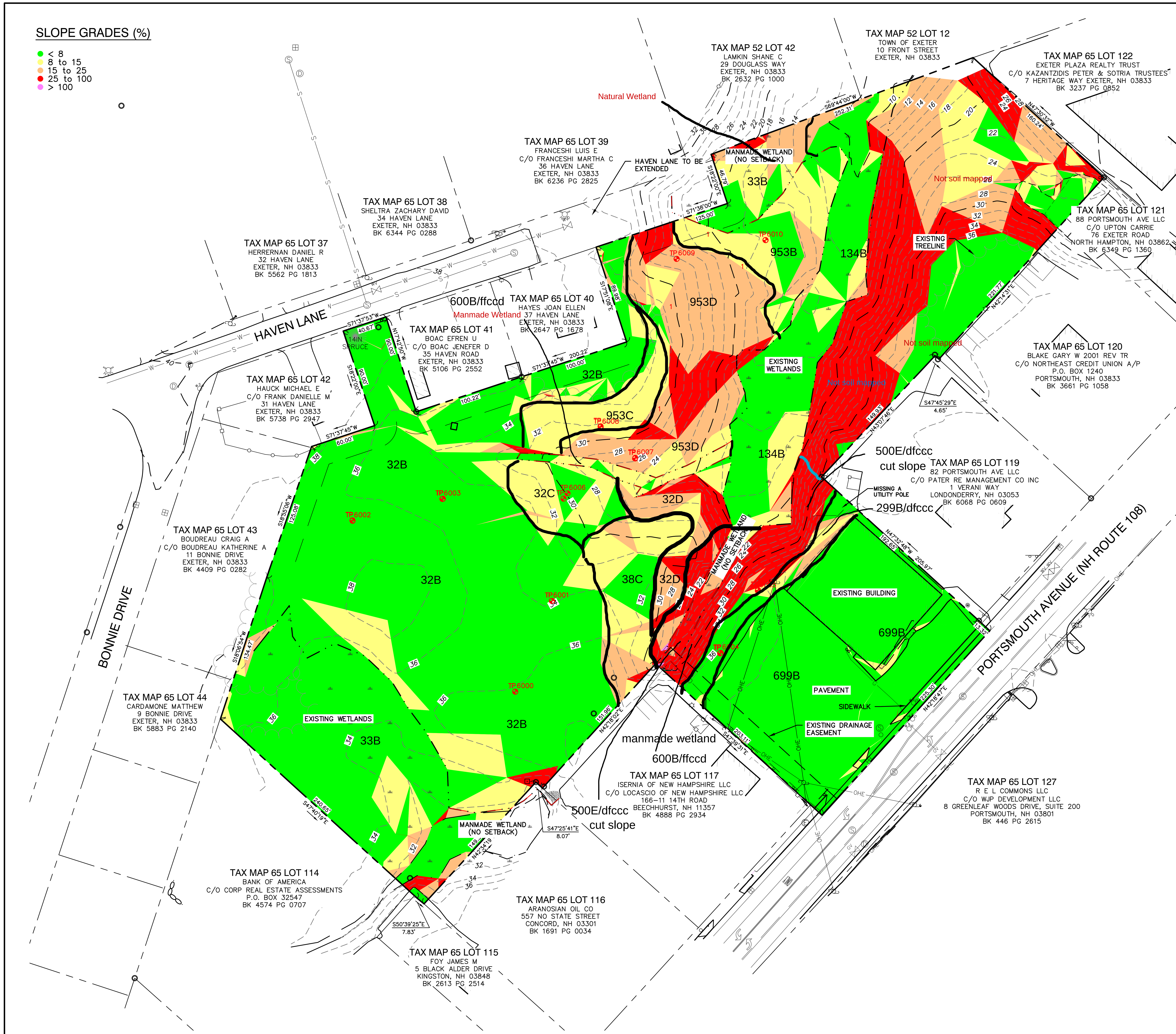
9. OTHER DISTINGUISHING FEATURES OF SITE

Old farmland that has developed into forest.

8 Continental Dr Unit H, Exeter, NH 03833-7507
Ph (603) 778 0644 / *Fax* (603) 778 0654
www.gesinc.biz
info@gesinc.biz

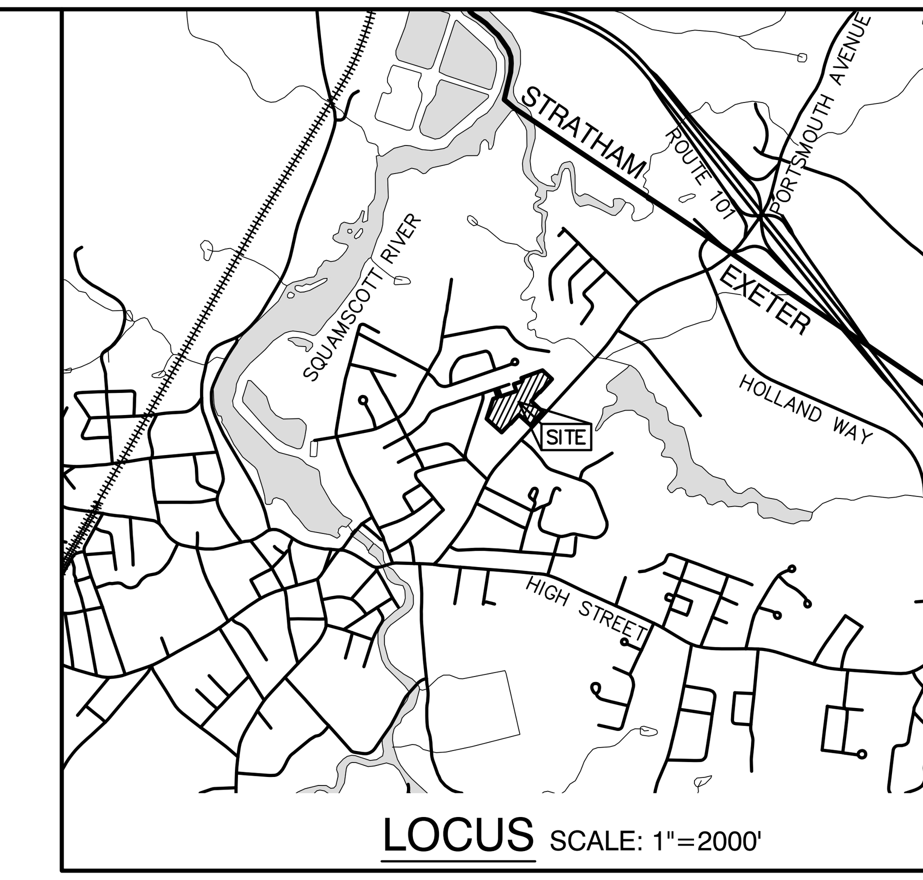
STATE OF NEW HAMPSHIRE
JAMES
P.
GOVE
No. 004
CERTIFIED SOIL SCIENTIST

10-22-2024



PLAN REFERENCES

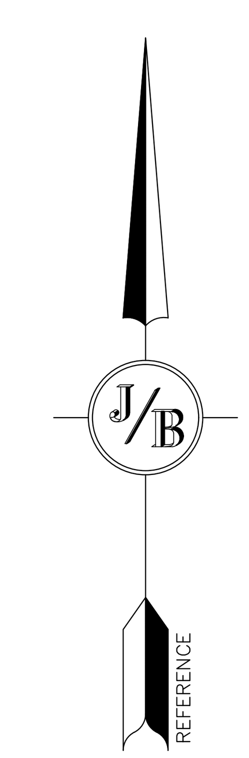
1. "PLAN OF DRAINAGE EASEMENT, EXETER, NH, PREPARED FOR EXETER HOSPITAL" BY KIMBALL CHASE, DATED MAY 23, 1988. R.C.R.D. PLAN #D-18012.
2. "LOT LINE CHANGE FOR GARY W. BLAKE, EXETER, NH" BY PARKER SURVEY ASSOC., INC., DATED JANUARY 12, 1984. R.C.R.D. PLAN #C-12104.
3. "SUBDIVISION OF LAND FOR JOHN W. FLYNN, EXETER, NH" BY KIMBALL CHASE COMPANY, INC., DATED FEBUARY 11, 1988. R.C.R.D. PLAN #D-17605.
4. "BOUNDARY AND TOPOGRAPHIC PLAN FOR STAR ENTERPRISE, EXETER, NH" BY STORCH ASSOCIATES, DATED JUNE 15, 1999. R.C.R.D. PLAN #D-22270.
5. "EASEMENT PLAN FOR COLLISHAW – FOY AGENCY INC., EXETER, NH" BY CORNERSTONE ASSOCIATES INC., DATED OCTOBER 31, 1995. R.C.R.D. PLAN #C-24287.
6. "PLAN OF LAND FOR HENRY & ROBERTA A. SHEPARD AND CHARLES A. & EVA S. KOIRTH, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED JULY 17, 1963. PLAN #108.
7. "PLAN OF LOTS, PROPERTY OF J. EVERETT TOWLE, EXETER, NH" BY ARTHUR W. DUDLEY, C.E., DATED 1924. PLAN #0671.
8. "PROPOSED SEWER EASEMENT, ACROSS LAND OF JEAN & SUE E. PULVER, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED JULY 1952. NR–PLAN.
9. "PLAN OF COUNTRY CLUB ESTATES FOR DOUGLAS E. HUNTER, EXETER, NH" BY CHESTER A. LEACH, C.E., DATED JUNE 14, 1950. NR–PLAN #01481.
10. "A PORTION OF THE LAND OF JEAN AND SUE PULVER, EXETER, NH" BY LEACH AND HUNTER, DATED OCTOBER 4, 1949. NR–PLAN #01721.
11. "PLOT OF LAND FOR CARROLS DEVELOPMENT CORP & CHICAGO TITLE COMPANY, EXETER, NH" BY UNITED SURVEYORS & ENGRS., DATED MARCH 20, 1970. R.C.R.D. PLAN #1726.
12. "PLAN OF LAND FOR JEAN A. & SUE E PULVER, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED AUGUST 1951. NR–PLAN #01823.
13. "PLAN OF LAND FOR JEAN A. & SUE E. PULVER, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED AUGUST 1951. NR–PLAN #02551.
14. "PART OF COUNTRY CLUB ESTATES, SCALE: 1 IN = 40 FT" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED AUGUST 4TH, 1955. NR–PLAN #02552.
15. "PLOT PLAN FOR HENRY SHEPARD & CHARLES KOIRTH, EXETER, NH" BY T.A. NOWAK, DATED APRIL 1958. NR–PLAN #02680.
16. "SUBDIVISION OF LAND, SIMONS TO ROCKINGHAM NATIONAL BANK, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED MAY 2, 1972. R.C.R.D. PLAN #D–2924.
17. "PLAN OF LOTS FOR JEAN A. & SUE E. PULVER, EXETER, NH" BY JOHN W. DURGIN CIVIL ENGINEERS, DATED MAY, 1950. NR–R.C.R.D. #10339.
18. "THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, RIGHT OF WAY PLANS, PROPOSED FEDERAL AID PROJECT, FEDERAL PROJECT NO.: STP–X–5153(005), NH PROJECT NO.10025B, NH ROUTE 108" BY NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION. NR–PLAN #3447.

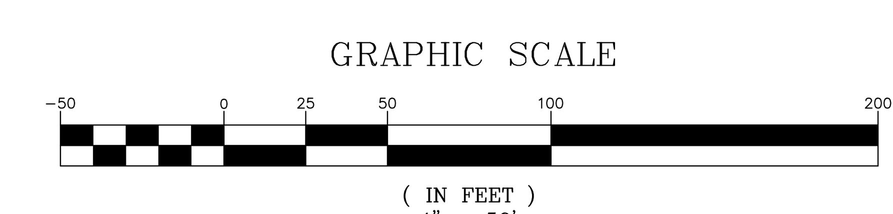


LOCUS SCALE: 1"=2000'

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 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 1–888–DIG–SAFE (1–888–344–7233).
2. VERTICAL DATUM: XXXXXX, HORIZONTAL DATUM: XXXXXX
3. BASE ELEVATION WAS ESTABLISHED THROUGH MULTIPLE GPS POST PROCESS OBSERVATIONS AND WAS REDUCED TO THE NAVD88 DATUM BY THE NATIONAL GEODETIC SURVEY OPUS SOFTWARE.
4. SUBJECT PROPERTY LOCATED WITHIN FEDERALLY DESIGNATED FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0406E, DATED 5/16/2005.
5. THE LIMITS OF JURISDICTIONAL WETLANDS WERE DELINEATED BY (FILL IN NAME)(ZZZ) DURING SPRING, 2010, USING (EQUIPMENT) AND IN ACCORDANCE WITH THE FOLLOWING GUIDANCE DOCUMENTS:
   a. THE CORPS OF ENGINEERS FEDERAL MANUAL FOR IDENTIFYING AND DELINEATING JURISDICTIONAL WETLANDS.
   b. THE NORTH CENTRAL & NORTHEAST REGIONAL SUPPLEMENT TO THE FEDERAL MANUAL.
   c. THE CURRENT VERSION OF THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, AS PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION AND/OR THE CURRENT VERSION OF THE FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, AS PUBLISHED BY THE USDA, NRCS, AS APPROPRIATE.
   d. THE CURRENT NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS, AS PUBLISHED BY THE US FISH AND WILDLIFE SERVICE.
7. HIGH INTENSITY SOIL MAPPING WAS PERFORMED BY (FILL IN NAME)(ZZZ) DURING SPRING, 2010, TO THE STANDARDS OF HIGH INTENSITY SOIL MAPS FOR NEW HAMPSHIRE: STANDARDS (2002: SOCIETY OF SOIL SCIENTISTS OF NORTHERN NEW ENGLAND).
8. SITE–SPECIFIC SOIL MAPPING WAS PERFORMED BY GOVE ENVIRONMENTAL SERVICES, INC. DURING SPRING, 2010, AND IS BASED ON THE STANDARDS OF SITE–SPECIFIC SOIL MAPPING STANDARDS FOR NEW HAMPSHIRE AND VERMONT, VERSION 2.0 (1999: SOCIETY OF SOIL SCIENTISTS OF NORTHERN NEW ENGLAND). THE MAP IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT INTENDED FOR THE USE(S) REQUIRING THE SITE SPECIFIC SOIL SURVEY AND IS PRODUCED BY A CERTIFIED SOIL SCIENTIST. IT IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. A NARRATIVE REPORT IS A COMPONENT OF THE MAP.
9. A TEMPORARY CULVERT AND ROADBED SHALL BE IN PLACE PRIOR TO ANY USE OF A WETLAND CROSSING.
10. WETLAND IMPACTS SHALL NOT OCCUR UNTIL ALL PERMITS HAVE BEEN ACQUIRED AND IMPACT MITIGATION REQUIREMENTS HAVE BEEN SATISFIED.
11. TEST PITS PERFORMED BY JAMES GOVE, GOVE ENVIRONMENTAL SERVICES, INC., 7/2/24.
12. WETLAND BOUNDARIES AND CONSTRUCTION LIMITS ARE TO BE CLEARLY MARKED PRIOR TO THE START OF CONSTRUCTION.





PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: MLS	Draft: GDR	Date: 3/15/24
Checked: WGM	Scale: 1"=50'	Project No.: 24029
Drawing Name: 24029-CONCEPT-6.dwg		

REV.	DATE	REVISION	BY
3	8/19/24	PLAN SET	KDR
2	7/29/24	CONCEPT 3	KDR
1	6/6/24	REVISED PER CLIENT	PSL
0	4/11/24	ISSUED FOR REVIEW	PSL

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

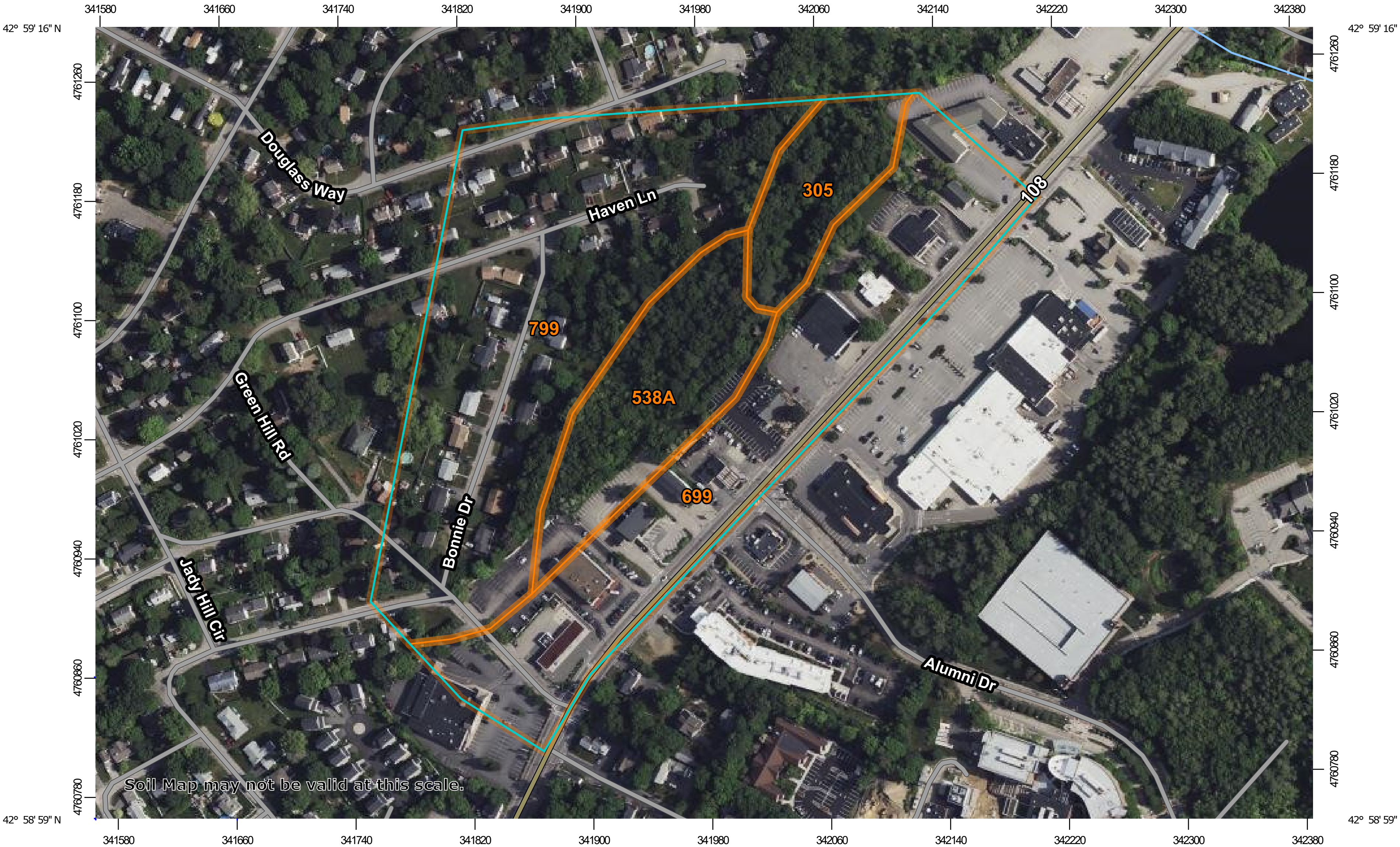
Plan Name: EXISTING CONDITIONS PLAN
Project: NAME OF PROJECT
76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC
50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
C1
SHEET 2 OF 12
JBE PROJECT NO. 24029

APPENDIX V

NRCS Soil Map

Soil Map—Rockingham County, New Hampshire
(24029 Web Soil Survey)



Map Scale: 1:3,740 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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 27, Sep 3, 2024

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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
305	Lim-Pootatuck complex	2.1	7.5%
538A	Squamscott fine sandy loam, 0 to 5 percent slopes	3.8	13.9%
699	Urban land	9.4	33.8%
799	Urban land-Canton complex, 3 to 15 percent slopes	12.4	44.8%
Totals for Area of Interest		**27.8**	**100.0%**

APPENDIX VI

Extreme Precipitation Estimates

Extreme Precipitation in New York & New England

An Interactive Web Tool for Extreme Precipitation Analysis

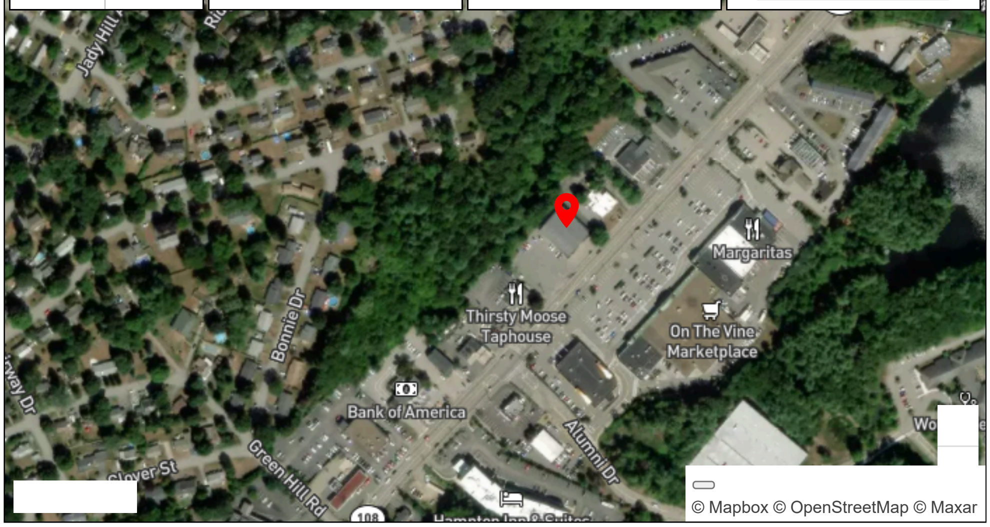
About this Project | **Data & Products** | Daily Monitoring | Documentation

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	76 Portsmouth Avenue, →	42.98(°N -70.93 °W →	



Select Options ?

Smoothing ?	Delivery ?
Yes	Popup

Submit ?

Version 2.0 Copyright 2010-2022

This project is a joint collaboration between:

Northeast Regional Climate Center (NRCC) Natural Resources Conservation Service (NRCS)

Contact: precip@cornell.edu

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point

Smoothing	Yes
State	
Location	
Latitude	42.986 degrees North
Longitude	70.937 degrees West
Elevation	10 feet
Date/Time	Tue Oct 22 2024 11:45:48 GMT-0400 (Eastern Daylight Time)

Added 15% to precipitation estimates due to location in Great Bay / Coastal Community
1 Year: 2.68*1.15 = 3.08 in
2 Year: 3.22*1.15 = 3.70 in
10 Year: 4.91*1.15 = 5.65 in
25 Year: 6.24*1.15 = 7.18 in
50 Year: 7.49*1.15 = 8.61 in

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7d
1yr	0.26	0.40	0.50	0.66	0.82	1.04	**1yr**	0.71	0.99	1.22	1.57	2.05	2.68	2.91	**1yr**	2.37	2.80	3.21	3.
2yr	0.32	0.50	0.62	0.82	1.02	1.30	**2yr**	0.88	1.18	1.52	1.94	2.49	3.22	3.57	**2yr**	2.85	3.43	3.94	4.
5yr	0.37	0.58	0.73	0.98	1.25	1.62	**5yr**	1.08	1.47	1.90	2.45	3.16	4.09	4.59	**5yr**	3.62	4.41	5.05	5.
10yr	0.41	0.65	0.83	1.12	1.46	1.90	**10yr**	1.26	1.73	2.25	2.92	3.78	4.91	5.56	**10yr**	4.34	5.34	6.09	7.
25yr	0.48	0.77	0.98	1.35	1.79	2.36	**25yr**	1.55	2.15	2.80	3.67	4.79	6.24	7.15	**25yr**	5.52	6.88	7.80	9.
50yr	0.54	0.87	1.11	1.56	2.10	2.79	**50yr**	1.81	2.54	3.33	4.38	5.74	7.49	8.66	**50yr**	6.63	8.33	9.42	11
100yr	0.61	0.98	1.27	1.80	2.45	3.30	**100yr**	2.12	3.00	3.96	5.24	6.88	9.00	10.49	**100yr**	7.96	10.09	11.37	13
200yr	0.69	1.12	1.45	2.08	2.87	3.90	**200yr**	2.48	3.55	4.70	6.24	8.23	10.81	12.71	**200yr**	9.56	12.23	13.73	16
500yr	0.82	1.34	1.75	2.54	3.55	4.86	**500yr**	3.06	4.43	5.88	7.87	10.44	13.77	16.39	**500yr**	12.19	15.76	17.62	20

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7d
1yr	0.24	0.37	0.45	0.60	0.74	0.89	**1yr**	0.64	0.87	0.95	1.26	1.55	2.28	2.54	**1yr**	2.02	2.44	2.89	3.
2yr	0.32	0.49	0.60	0.81	1.00	1.19	**2yr**	0.87	1.16	1.37	1.82	2.33	3.11	3.50	**2yr**	2.75	3.36	3.85	4.
5yr	0.36	0.55	0.68	0.93	1.19	1.42	**5yr**	1.03	1.39	1.62	2.12	2.74	3.82	4.28	**5yr**	3.38	4.11	4.72	5.
10yr	0.39	0.61	0.75	1.05	1.35	1.63	**10yr**	1.17	1.59	1.82	2.40	3.07	4.41	4.97	**10yr**	3.90	4.78	5.49	6.
25yr	0.45	0.69	0.86	1.23	1.61	1.95	**25yr**	1.39	1.90	2.12	2.78	3.58	4.90	6.06	**25yr**	4.34	5.82	6.68	7.
50yr	0.50	0.77	0.95	1.37	1.85	2.24	**50yr**	1.59	2.19	2.36	3.12	4.01	5.54	7.02	**50yr**	4.91	6.75	7.76	9.
100yr	0.57	0.85	1.07	1.55	2.12	2.57	**100yr**	1.83	2.51	2.65	3.48	4.48	6.25	8.12	**100yr**	5.53	7.81	9.00	10
200yr	0.63	0.95	1.20	1.74	2.43	2.95	**200yr**	2.10	2.88	2.95	3.88	4.99	7.01	9.65	**200yr**	6.21	9.28	10.45	12
500yr	0.74	1.11	1.42	2.07	2.94	3.56	**500yr**	2.54	3.48	3.42	4.48	5.80	8.14	11.77	**500yr**	7.20	11.32	12.71	14

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7d
1yr	0.28	0.44	0.54	0.72	0.89	1.08	**1yr**	0.76	1.06	1.26	1.71	2.17	2.97	3.10	**1yr**	2.63	2.98	3.57	4.
2yr	0.33	0.51	0.63	0.86	1.05	1.26	**2yr**	0.91	1.23	1.48	1.95	2.49	3.40	3.66	**2yr**	3.01	3.52	4.05	4.
5yr	0.40	0.62	0.77	1.05	1.34	1.61	**5yr**	1.16	1.58	1.87	2.49	3.17	4.37	4.92	**5yr**	3.87	4.73	5.40	6.
10yr	0.47	0.73	0.90	1.26	1.63	1.97	**10yr**	1.41	1.93	2.26	3.03	3.82	5.44	6.16	**10yr**	4.81	5.92	6.76	7.
25yr	0.59	0.89	1.11	1.58	2.08	2.56	**25yr**	1.80	2.50	2.93	3.93	4.90	7.66	8.32	**25yr**	6.78	8.00	9.07	10
50yr	0.68	1.04	1.30	1.86	2.51	3.11	**50yr**	2.17	3.04	3.56	4.79	5.94	9.60	10.45	**50yr**	8.49	10.05	11.36	13
100yr	0.81	1.22	1.53	2.21	3.02	3.78	**100yr**	2.61	3.69	4.33	5.86	7.21	12.03	13.14	**100yr**	10.65	12.64	14.21	16
200yr	0.95	1.42	1.80	2.61	3.64	4.60	**200yr**	3.14	4.50	5.28	7.17	8.73	15.14	16.17	**200yr**	13.40	15.55	17.81	20
500yr	1.18	1.75	2.25	3.27	4.65	5.96	**500yr**	4.01	5.83	6.86	9.37	11.28	20.53	21.82	**500yr**	18.17	20.98	23.97	27

APPENDIX VII

Manning's Full-Flow Equation for Existing 48" CMP and Proposed 48" HDPE

Using Manning's Qfull Equation to verify that the proposed 48" HDPE pipe is appropriately sized.
Where the flow through the existing upstream 48" CMP is unknown, it is assumed to be flowing at full capacity.

Manning's Qfull Equation (Existing 48" CMP)	Diameter (ft)	Slope (ft/ft)	Pipe Material	n value	Qfull (cfs)
Q=[(0.463D^(8/3))(S^1/2)]/n	4	0.008	CMP	0.025	66.78505

Q= flow in cfs
D= pipe diameter in feet
S= pipe slope in ft/ft
n= Manning's number for pipe material

Manning's Qfull Equation (Proposed 48" ADS-N12 HDPE)	Diameter (ft)	Slope (ft/ft)	Pipe Material	n value	Qfull (cfs)
Q=[(0.463D^(8/3))(S^1/2)]/n	4	0.02	ADS-N12 HDPE	0.013	203.0701

Q= flow in cfs
D= pipe diameter in feet
S= pipe slope in ft/ft
n= Manning's number for pipe material

50-Year Peak Flow from upstream 12" HDPE (9R in Post-Construction HydroCAD Model) = 2.02 cfs
50-Year Peak Flow from upstream 18" HDPE (AP3 in Post-Construction HydroCAD Model) = 16.06 cfs
Peak flow through proposed 48" HDPE pipe = 66.79+2.02+16.06 = **84.87 cfs < 203.07 cfs Qfull**

APPENDIX VIII

Rip Rap Design Calculations

RIP RAP CALCULATIONS
"Lilac Place"
76 Portsmouth Avenue
Exeter, NH

Jones & Beach Engineers, Inc.
P.O. Box 219
Stratham, NH 03885
11/2/2024 REVISED 1/10/2025 REVISED 2/12/2025

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.*
Aprons are sized for the 25-Year storm event.

TAILWATER < HALF THE D_o

$L_a = (1.8 \times Q) / D_0^{3/2} + (7 \times D_o)$

$W = L_a + (3 \times D_o)$ 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)
3R - 15" HDPE (#1)	0.57	2.82	1.25	12.4	16	0.11
5R - 15" HDPE (#2)	0.53	2.89	1.25	12.5	16	0.12
8R - 15" HDPE (#3)	0.38	3.89	1.25	13.8	18	0.26
18P - 15" HDPE (#4)	0.35	1.17	1.25	10.3	14	0.06
17P - 12" HDPE (#5) *	0.06	0.05	1	7.1	10	0.01
10R - 12" HDPE (#6)	0.09	0.21	1	7.4	10	0.03

Although the 25-year peak discharge from 17P is 0.14 cfs, 0.09 cfs outlets through the spillway and only 0.05 cfs outlets through the 12" HDPE pipe upstream of rip rap apron #5.

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)
				#DIV/0!	#DIV/0!	#DIV/0!

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 IX

BMP and GRV Worksheets

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION
(Env-Wq 1507.04)

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
1.66	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"
0.10	inches	Rd = Weighted groundwater recharge depth	
0.166	ac-in	GRV = AI * Rd	
603	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):

Porous Pavement Section #1: 8,807 cf GRV provided

Porous Pavement Section #2: 4,193 cf GRV provided

Porous Concrete Walkway: 607 cf GRV provided

8807+4193+607 = 13,607 cf GRV Provided >>> 603 cf GRV required.

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Porous Pavement Area #1 / 1P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
1.56	ac	A = Area draining to the practice	
1.15	ac	A_I = Impervious area draining to the practice	
0.74	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.71	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.11	ac-in	WQV= 1" x Rv x A	
4,029	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,007	cf	25% x WQV (check calc for sediment forebay volume)	
3,022	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Porous		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:			
14,864	sf	A_{SA} = Surface area of the practice	
1.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
N/A	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
3.3	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
34.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
N/A	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
32.83	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
30.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
#VALUE!	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
4.00	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.17	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
35.26	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
35.83	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 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	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
Porous Asphalt		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
0.3	acres	A_{SA} = Surface area of the pervious pavement	
4.6	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
12" *	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet	D8	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:

* Filter course thickness is 12" through most of the practice but is 18" for the small section that is in a WSIPA.

Point of interest (where top of pavement is closest to existing grade) is between buildings 3&4

Nearby TP 6016 reveals 26" depth to SHWT and dug to 60" depth without encountering bedrock

Existing grade = 35.0 so SHWT = 35.0-26/12 = 32.83

Lowest elevation of test pit = 35.0-5 = 30.0

Stage-Area-Storage for Pond 1P: Porous Pavement Section #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
32.82	**14,864**	0
32.87	14,864	111
32.92	14,864	223
32.97	14,864	334
33.02	14,864	446
33.07	14,864	557
33.12	14,864	855
33.17	14,864	1,152
33.22	14,864	1,449
33.27	14,864	1,747
33.32	14,864	2,044
33.37	14,864	2,341
33.42	14,864	2,638
33.47	14,864	2,936
33.52	14,864	3,233
33.57	14,864	3,530
33.62	14,864	3,827
33.67	14,864	4,125
33.72	14,864	4,422
33.77	14,864	4,608
33.82	14,864	4,719
33.87	14,864	4,831
33.92	14,864	4,942
33.97	14,864	5,054
34.02	14,864	5,121
34.07	14,864	5,158
34.12	14,864	5,195
34.17	14,864	5,232
34.22	14,864	5,269
34.27	14,864	5,306
34.32	14,864	5,344
34.37	14,864	5,381
34.42	14,864	5,418
34.47	14,864	5,455
34.52	14,864	5,492
34.57	14,864	5,529
34.62	14,864	5,567
34.67	14,864	5,604
34.72	14,864	5,641
34.77	14,864	5,678
34.82	14,864	5,715
34.87	14,864	5,752
34.92	14,864	5,790
34.97	14,864	5,827
35.02	14,864	5,975
35.07	14,864	6,198
35.12	14,864	6,421
35.17	14,864	6,644
35.22	14,864	6,867
35.27	14,864	7,090
35.32	14,864	7,313
35.37	14,864	7,536
35.42	14,864	7,759
35.47	14,864	7,982
35.52	14,864	8,138
35.57	14,864	8,250
35.62	14,864	8,361
35.67	14,864	8,472
35.72	14,864	8,584
35.77	14,864	8,695
35.82	14,864	**8,807**

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Porous Pavement Area #2 / 2P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.37	ac	A = Area draining to the practice	
0.36	ac	A_I = Impervious area draining to the practice	
0.98	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.93	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.34	ac-in	WQV= 1" x Rv x A	
1,248	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
312	cf	25% x WQV (check calc for sediment forebay volume)	
936	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Porous		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:			
7,076	sf	A_{SA} = Surface area of the practice	
1.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
N/A	Yes/No	(Use the calculations below)	
2.1	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
35.67	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
N/A	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
34.17	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
30.17	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
#VALUE!	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
5.50	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.50	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
35.33	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
37.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 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	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
Porous Asphalt		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
0.2	acres	A_{SA} = Surface area of the pervious pavement	
2.3	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
12.0	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet	D8	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:

Test pit 6003 used for SHWT determination.

Top of pavement = 37.5 so bottom of stone = 34.5

Ex. Grade = 35.67, 18" SHWT depth and 68" to bottom of test pit.

SHWT = 35.67-18/12 = 34.17, bottom of test pit = 35.67-5 = 30.17

Stage-Area-Storage for Pond 2P: Porous Pavement Section #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
34.49	**7,076**	0
34.54	7,076	53
34.59	7,076	106
34.64	7,076	159
34.69	7,076	212
34.74	7,076	265
34.79	7,076	407
34.84	7,076	548
34.89	7,076	690
34.94	7,076	831
34.99	7,076	973
35.04	7,076	1,114
35.09	7,076	1,256
35.14	7,076	1,398
35.19	7,076	1,539
35.24	7,076	1,681
35.29	7,076	1,822
35.34	7,076	1,964
35.39	7,076	2,105
35.44	7,076	2,194
35.49	7,076	2,247
35.54	7,076	2,300
35.59	7,076	2,353
35.64	7,076	2,406
35.69	7,076	2,438
35.74	7,076	2,455
35.79	7,076	2,473
35.84	7,076	2,491
35.89	7,076	2,508
35.94	7,076	2,526
35.99	7,076	2,544
36.04	7,076	2,562
36.09	7,076	2,579
36.14	7,076	2,597
36.19	7,076	2,615
36.24	7,076	2,632
36.29	7,076	2,650
36.34	7,076	2,668
36.39	7,076	2,685
36.44	7,076	2,703
36.49	7,076	2,721
36.54	7,076	2,738
36.59	7,076	2,756
36.64	7,076	2,774
36.69	7,076	2,845
36.74	7,076	2,951
36.79	7,076	3,057
36.84	7,076	3,163
36.89	7,076	3,269
36.94	7,076	3,375
36.99	7,076	3,481
37.04	7,076	3,588
37.09	7,076	3,694
37.14	7,076	3,800
37.19	7,076	3,874
37.24	7,076	3,927
37.29	7,076	3,980
37.34	7,076	4,033
37.39	7,076	4,086
37.44	7,076	4,139
37.49	7,076	**4,193**

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Porous Concrete Walkway / 19P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.07	ac	A = Area draining to the practice	
0.02	ac	A_I = Impervious area draining to the practice	
0.34	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.35	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.02	ac-in	WQV= 1" x Rv x A	
90	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
23	cf	25% x WQV (check calc for sediment forebay volume)	
68	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Porous		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:			
1,025	sf	A_{SA} = Surface area of the practice	
1.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
N/A	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below)	
1.1	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
32.67	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
N/A	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
31.50	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
28.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
#VALUE!	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
4.67	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.17	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
32.31	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
34.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 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	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
Porous Concrete		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
0.0	acres	A_{SA} = Surface area of the pervious pavement	
3.0	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
12.0	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA**
Sheet	D8	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:

Test pit 6003 used for SHWT determination.

Top of concrete = 34.5 so bottom of stone = 31.5

Ex. Grade = 33.0, 18" SHWT depth and 68" to bottom of test pit.

SHWT = 33.0-18/12 = 31.5, bottom of test pit = 33.0-5 = 28.0

SHWT cannot be modelled directl yat bottom of stone. Modelled 3" below to ensure that proximity of SHWT to bottom of stone is not yielding inaccurate results. SHWT modelled at el. 31.25

Stage-Area-Storage for Pond 19P: Porous Concrete Walkway

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
31.49	**1,025**	0
31.54	1,025	8
31.59	1,025	15
31.64	1,025	23
31.69	1,025	31
31.74	1,025	38
31.79	1,025	59
31.84	1,025	79
31.89	1,025	100
31.94	1,025	120
31.99	1,025	141
32.04	1,025	161
32.09	1,025	182
32.14	1,025	202
32.19	1,025	223
32.24	1,025	243
32.29	1,025	264
32.34	1,025	284
32.39	1,025	305
32.44	1,025	318
32.49	1,025	325
32.54	1,025	333
32.59	1,025	341
32.64	1,025	348
32.69	1,025	353
32.74	1,025	356
32.79	1,025	358
32.84	1,025	361
32.89	1,025	363
32.94	1,025	366
32.99	1,025	368
33.04	1,025	371
33.09	1,025	374
33.14	1,025	376
33.19	1,025	379
33.24	1,025	381
33.29	1,025	384
33.34	1,025	386
33.39	1,025	389
33.44	1,025	392
33.49	1,025	394
33.54	1,025	397
33.59	1,025	399
33.64	1,025	402
33.69	1,025	412
33.74	1,025	427
33.79	1,025	443
33.84	1,025	458
33.89	1,025	474
33.94	1,025	489
33.99	1,025	504
34.04	1,025	520
34.09	1,025	535
34.14	1,025	550
34.19	1,025	561
34.24	1,025	569
34.29	1,025	577
34.34	1,025	584
34.39	1,025	592
34.44	1,025	600
34.49	1,025	**607**

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #1 / 3P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.06	ac	A = Area draining to the practice	
0.06	ac	A_I = Impervious area draining to the practice	
0.98	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.94	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.06	ac-in	WQV= 1" x Rv x A	
217	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
54	cf	25% x WQV (check calc for sediment forebay volume)	
163	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff		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:			
37.99	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.67	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.18	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
36.25	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
35.25	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
36.55	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
38.00	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.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:				
YES	ac		Drainage Area no larger than 5 ac?	← yes
218	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		D5	Note what sheet in the plan set contains the filter course specification	
3.0	:1		Pond side slopes	≥ 3:1
Sheet		D5	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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3.25*131*0.75*.4 = 127.7 cf

Pea stone layer: 3.25*131*0.25*0.15 = 16.0 cf (Cumulative = 127.7+16.0 = 143.7 cf)

Filter course: 3.25*131*1.5*0.05 = 31.9 cf (Cumulative = 143.7+31.9 = 175.6 cf)

Top stone layer: 3.25*131*0.25*0.4 = 42.6 cf (Cumulative = 175.6+42.6 = 218.2 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 218.5-217 = 1.5 cf

1.5/(3.25*131*.4) = 0.01 ft

E(WQV) = 38-0.01 = 37.99

Stage-Area-Storage for Pond 3P: Filtration Drip Edge #1

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
35.25	0.000	36.29	0.003	37.33	0.004
35.27	0.000	36.31	0.003	37.35	0.004
35.29	0.000	36.33	0.003	37.37	0.004
35.31	0.000	36.35	0.003	37.39	0.004
35.33	0.000	36.37	0.003	37.41	0.004
35.35	0.000	36.39	0.003	37.43	0.004
35.37	0.000	36.41	0.003	37.45	0.004
35.39	0.001	36.43	0.003	37.47	0.004
35.41	0.001	36.45	0.003	37.49	0.004
35.43	0.001	36.47	0.003	37.51	0.004
35.45	0.001	36.49	0.003	37.53	0.004
35.47	0.001	36.51	0.003	37.55	0.004
35.49	0.001	36.53	0.003	37.57	0.004
35.51	0.001	36.55	0.003	37.59	0.004
35.53	0.001	36.57	0.003	37.61	0.004
35.55	0.001	36.59	0.003	37.63	0.004
35.57	0.001	36.61	0.003	37.65	0.004
35.59	0.001	36.63	0.003	37.67	0.004
35.61	0.001	36.65	0.003	37.69	0.004
35.63	0.001	36.67	0.004	37.71	0.004
35.65	0.002	36.69	0.004	37.73	0.004
35.67	0.002	36.71	0.004	37.75	0.004
35.69	0.002	36.73	0.004	37.77	0.004
35.71	0.002	36.75	0.004	37.79	0.004
35.73	0.002	36.77	0.004	37.81	0.004
35.75	0.002	36.79	0.004	37.83	0.004
35.77	0.002	36.81	0.004	37.85	0.004
35.79	0.002	36.83	0.004	37.87	0.005
35.81	0.002	36.85	0.004	37.89	0.005
35.83	0.002	36.87	0.004	37.91	0.005
35.85	0.002	36.89	0.004	37.93	0.005
35.87	0.002	36.91	0.004	37.95	0.005
35.89	0.003	36.93	0.004	37.97	0.005
35.91	0.003	36.95	0.004	37.99	**0.005**
35.93	0.003	36.97	0.004		
35.95	0.003	36.99	0.004		
35.97	0.003	37.01	0.004		
35.99	0.003	37.03	0.004		
36.01	0.003	37.05	0.004		
36.03	0.003	37.07	0.004		
36.05	0.003	37.09	0.004		
36.07	0.003	37.11	0.004		
36.09	0.003	37.13	0.004		
36.11	0.003	37.15	0.004		
36.13	0.003	37.17	0.004		
36.15	0.003	37.19	0.004		
36.17	0.003	37.21	0.004		
36.19	0.003	37.23	0.004		
36.21	0.003	37.25	0.004		
36.23	0.003	37.27	0.004		
36.25	0.003	37.29	0.004		
36.27	0.003	37.31	0.004		

See storage volume and
WQV elevation calculations
on BMP Worksheet
E(WQV)=37.99

Stage-Discharge for Pond 3P: Filtration Drip Edge #1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
35.25	0.00	36.29	0.39	37.33	0.58
35.27	0.00	36.31	0.40	37.35	0.58
35.29	0.00	36.33	0.40	37.37	0.59
35.31	0.01	36.35	0.41	37.39	0.59
35.33	0.02	36.37	0.41	37.41	0.59
35.35	0.02	36.39	0.41	37.43	0.60
35.37	0.03	36.41	0.42	37.45	0.60
35.39	0.04	36.43	0.42	37.47	0.60
35.41	0.06	36.45	0.43	37.49	0.61
35.43	0.07	36.47	0.43	37.51	0.61
35.45	0.08	36.49	0.44	37.53	0.61
35.47	0.10	36.51	0.44	37.55	0.61
35.49	0.11	36.53	0.44	37.57	0.62
35.51	0.13	36.55	0.45	37.59	0.62
35.53	0.14	36.57	0.45	37.61	0.62
35.55	0.15	36.59	0.46	37.63	0.63
35.57	0.17	36.61	0.46	37.65	0.63
35.59	0.17	36.63	0.46	37.67	0.63
35.61	0.18	36.65	0.47	37.69	0.63
35.63	0.19	36.67	0.47	37.71	0.64
35.65	0.20	36.69	0.47	37.73	0.64
35.67	0.21	36.71	0.48	37.75	0.64
35.69	0.22	36.73	0.48	37.77	0.64
35.71	0.23	36.75	0.49	37.79	0.65
35.73	0.24	36.77	0.49	37.81	0.65
35.75	0.24	36.79	0.49	37.83	0.65
35.77	0.25	36.81	0.50	37.85	0.66
35.79	0.26	36.83	0.50	37.87	0.66
35.81	0.26	36.85	0.50	37.89	0.66
35.83	0.27	36.87	0.51	37.91	0.66
35.85	0.28	36.89	0.51	37.93	0.67
35.87	0.28	36.91	0.51	37.95	0.67
35.89	0.29	36.93	0.52	37.97	0.67
35.91	0.30	36.95	0.52	37.99	**0.67**
35.93	0.30	36.97	0.52		
35.95	0.31	36.99	0.53		
35.97	0.31	37.01	0.53		
35.99	0.32	37.03	0.53		
36.01	0.32	37.05	0.54		
36.03	0.33	37.07	0.54		
36.05	0.33	37.09	0.54		
36.07	0.34	37.11	0.55		
36.09	0.34	37.13	0.55		
36.11	0.35	37.15	0.55		
36.13	0.35	37.17	0.56		
36.15	0.36	37.19	0.56		
36.17	0.36	37.21	0.56		
36.19	0.37	37.23	0.57		
36.21	0.37	37.25	0.57		
36.23	0.38	37.27	0.57		
36.25	0.38	37.29	0.58		
36.27	0.39	37.31	0.58		

E(WQV)=37.99
Q(WQV)=0.67 cfs

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #2 / 4P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.05	ac	A = Area draining to the practice	
0.05	ac	A_I = Impervious area draining to the practice	
0.99	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.94	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.05	ac-in	WQV= 1" x Rv x A	
172	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
43	cf	25% x WQV (check calc for sediment forebay volume)	
129	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff		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:			
37.73	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.37	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.26	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
36.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
35.00	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
37.69	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
37.75	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
176	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	D5	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet	D5	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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3.5*98*0.75*.4 = 102.9 cf

Pea stone layer: 3.5*98*0.25*0.15 = 12.9 cf (Cumulative = 102.9+12.9 = 115.8 cf)

Filter course: 3.5*98*1.5*0.05 = 25.7 cf (Cumulative = 115.8+25.7 = 141.5 cf)

Top stone layer: 3.5*98*0.25*0.4 = 34.3 cf (Cumulative = 141.5+34.3 = 175.8 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 175.8-172 = 3.3 cf

3.3/(3.5*98*.4) = 0.02 ft

E(WQV) = 37.75-0.02 = 37.73

Stage-Area-Storage for Pond 4P: Filtration Drip Edge #2

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
35.00	0.000	36.04	0.003	37.08	0.003
35.02	0.000	36.06	0.003	37.10	0.003
35.04	0.000	36.08	0.003	37.12	0.003
35.06	0.000	36.10	0.003	37.14	0.003
35.08	0.000	36.12	0.003	37.16	0.003
35.10	0.000	36.14	0.003	37.18	0.003
35.12	0.000	36.16	0.003	37.20	0.003
35.14	0.000	36.18	0.003	37.22	0.003
35.16	0.001	36.20	0.003	37.24	0.003
35.18	0.001	36.22	0.003	37.26	0.003
35.20	0.001	36.24	0.003	37.28	0.003
35.22	0.001	36.26	0.003	37.30	0.003
35.24	0.001	36.28	0.003	37.32	0.003
35.26	0.001	36.30	0.003	37.34	0.003
35.28	0.001	36.32	0.003	37.36	0.003
35.30	0.001	36.34	0.003	37.38	0.003
35.32	0.001	36.36	0.003	37.40	0.003
35.34	0.001	36.38	0.003	37.42	0.003
35.36	0.001	36.40	0.003	37.44	0.003
35.38	0.001	36.42	0.003	37.46	0.003
35.40	0.001	36.44	0.003	37.48	0.003
35.42	0.001	36.46	0.003	37.50	0.003
35.44	0.001	36.48	0.003	37.52	0.003
35.46	0.001	36.50	0.003	37.54	0.003
35.48	0.002	36.52	0.003	37.56	0.003
35.50	0.002	36.54	0.003	37.58	0.004
35.52	0.002	36.56	0.003	37.60	0.004
35.54	0.002	36.58	0.003	37.62	0.004
35.56	0.002	36.60	0.003	37.64	0.004
35.58	0.002	36.62	0.003	37.66	0.004
35.60	0.002	36.64	0.003	37.68	0.004
35.62	0.002	36.66	0.003	37.70	0.004
35.64	0.002	36.68	0.003	37.72	0.004
35.66	0.002	36.70	0.003	37.74	**0.004**
35.68	0.002	36.72	0.003		
35.70	0.002	36.74	0.003		
35.72	0.002	36.76	0.003		
35.74	0.002	36.78	0.003		
35.76	0.002	36.80	0.003		
35.78	0.002	36.82	0.003		
35.80	0.002	36.84	0.003		
35.82	0.002	36.86	0.003		
35.84	0.002	36.88	0.003		
35.86	0.002	36.90	0.003		
35.88	0.003	36.92	0.003		
35.90	0.003	36.94	0.003		
35.92	0.003	36.96	0.003		
35.94	0.003	36.98	0.003		
35.96	0.003	37.00	0.003		
35.98	0.003	37.02	0.003		
36.00	0.003	37.04	0.003		
36.02	0.003	37.06	0.003		

See storage volume & WQV
elevation calculations on
BMP Worksheet
E(WQV) = 37.73

Stage-Discharge for Pond 4P: Filtration Drip Edge #2

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
35.00	0.00	0.00	**0.00**
35.05	0.00	0.00	0.00
35.10	0.02	0.02	0.00
35.15	0.04	0.04	0.00
35.20	0.07	0.07	0.00
35.25	0.09	0.09	0.00
35.30	0.12	0.12	0.00
35.35	0.14	0.14	0.00
35.40	0.16	0.16	0.00
35.45	0.18	0.18	0.00
35.50	0.19	0.19	0.00
35.55	0.21	0.21	0.00
35.60	0.22	0.22	0.00
35.65	0.23	0.23	0.00
35.70	0.24	0.24	0.00
35.75	0.24	0.24	0.00
35.80	0.24	0.24	0.00
35.85	0.25	0.25	0.00
35.90	0.25	0.25	0.00
35.95	0.26	0.26	0.00
36.00	0.26	0.26	0.00
36.05	0.26	0.26	0.00
36.10	0.27	0.27	0.00
36.15	0.27	0.27	0.00
36.20	0.28	0.28	0.00
36.25	0.28	0.28	0.00
36.30	0.28	0.28	0.00
36.35	0.29	0.29	0.00
36.40	0.29	0.29	0.00
36.45	0.29	0.29	0.00
36.50	0.30	0.30	0.00
36.55	0.30	0.30	0.00
36.60	0.30	0.30	0.00
36.65	0.31	0.31	0.00
36.70	0.31	0.31	0.00
36.75	0.31	0.31	0.00
36.80	0.32	0.32	0.00
36.85	0.32	0.32	0.00
36.90	0.32	0.32	0.00
36.95	0.33	0.33	0.00
37.00	0.33	0.33	0.00
37.05	0.33	0.33	0.00
37.10	0.34	0.34	0.00
37.15	0.34	0.34	0.00
37.20	0.34	0.34	0.00
37.25	0.34	0.34	0.00
37.30	0.35	0.35	0.00
37.35	0.35	0.35	0.00
37.40	0.35	0.35	0.00
37.45	0.36	0.36	0.00
37.50	0.36	0.36	0.00
37.55	0.36	0.36	0.00
37.60	0.36	0.36	0.00
37.65	0.37	0.37	0.00
37.70	0.37	0.37	0.00
37.75	**0.37**	**0.37**	0.00

E(WQV) = 37.73
Q(WQV) = 0.37 cfs

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #3 / 5P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.06	ac	A = Area draining to the practice	
0.05	ac	A_I = Impervious area draining to the practice	
0.85	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.82	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.04	ac-in	WQV= 1" x Rv x A	
163	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
41	cf	25% x WQV (check calc for sediment forebay volume)	
122	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff		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:			
35.85	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.52	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.17	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
34.25	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
33.25	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
34.83	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
36.00	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.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	← yes
185	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	D5	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet	D5	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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3*120*0.75*.4 = 108 cf

Pea stone layer: 3*120*0.25*0.15 = 13.5 cf (Cumulative = 108+13.5 = 121.5 cf)

Filter course: 3*120*1.5*0.05 = 27.0 cf (Cumulative = 121.5+27.0 = 148.5 cf)

Top stone layer: 3*120*0.25*0.4 = 36.0 cf (Cumulative = 148.5+36.0 = 184.5 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 184.5-163 = 21.5 cf

21.5/(3*120*.4) = 0.15 ft

E(WQV) = 36.0-0.15 = 35.85

Stage-Area-Storage for Pond 5P: Filtration Drip Edge #3

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
33.25	0.000	34.29	0.003	35.33	0.003
33.27	0.000	34.31	0.003	35.35	0.003
33.29	0.000	34.33	0.003	35.37	0.003
33.31	0.000	34.35	0.003	35.39	0.003
33.33	0.000	34.37	0.003	35.41	0.003
33.35	0.000	34.39	0.003	35.43	0.003
33.37	0.000	34.41	0.003	35.45	0.003
33.39	0.000	34.43	0.003	35.47	0.003
33.41	0.001	34.45	0.003	35.49	0.003
33.43	0.001	34.47	0.003	35.51	0.003
33.45	0.001	34.49	0.003	35.53	0.003
33.47	0.001	34.51	0.003	35.55	0.003
33.49	0.001	34.53	0.003	35.57	0.003
33.51	0.001	34.55	0.003	35.59	0.003
33.53	0.001	34.57	0.003	35.61	0.003
33.55	0.001	34.59	0.003	35.63	0.003
33.57	0.001	34.61	0.003	35.65	0.003
33.59	0.001	34.63	0.003	35.67	0.003
33.61	0.001	34.65	0.003	35.69	0.003
33.63	0.001	34.67	0.003	35.71	0.003
33.65	0.001	34.69	0.003	35.73	0.003
33.67	0.001	34.71	0.003	35.75	0.003
33.69	0.001	34.73	0.003	35.77	0.003
33.71	0.002	34.75	0.003	35.79	0.004
33.73	0.002	34.77	0.003	35.81	0.004
33.75	0.002	34.79	0.003	35.83	0.004
33.77	0.002	34.81	0.003	35.85	0.004
33.79	0.002	34.83	0.003	35.87	0.004
33.81	0.002	34.85	0.003	35.89	0.004
33.83	0.002	34.87	0.003	35.91	0.004
33.85	0.002	34.89	0.003	35.93	0.004
33.87	0.002	34.91	0.003	35.95	0.004
33.89	0.002	34.93	0.003	35.97	0.004
33.91	0.002	34.95	0.003	35.99	**0.004**
33.93	0.002	34.97	0.003		
33.95	0.002	34.99	0.003		
33.97	0.002	35.01	0.003		
33.99	0.002	35.03	0.003		
34.01	0.002	35.05	0.003		
34.03	0.003	35.07	0.003		
34.05	0.003	35.09	0.003		
34.07	0.003	35.11	0.003		
34.09	0.003	35.13	0.003		
34.11	0.003	35.15	0.003		
34.13	0.003	35.17	0.003		
34.15	0.003	35.19	0.003		
34.17	0.003	35.21	0.003		
34.19	0.003	35.23	0.003		
34.21	0.003	35.25	0.003		
34.23	0.003	35.27	0.003		
34.25	0.003	35.29	0.003		
34.27	0.003	35.31	0.003		

See storage volume & WQV elevation calculations on BMP Worksheet
E(WQV) = 35.85

Stage-Discharge for Pond 5P: Filtration Drip Edge #3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
33.25	0.00	34.29	0.31	35.33	0.46
33.27	0.00	34.31	0.31	35.35	0.46
33.29	0.00	34.33	0.32	35.37	0.46
33.31	0.01	34.35	0.32	35.39	0.47
33.33	0.01	34.37	0.32	35.41	0.47
33.35	0.02	34.39	0.33	35.43	0.47
33.37	0.03	34.41	0.33	35.45	0.47
33.39	0.03	34.43	0.33	35.47	0.48
33.41	0.04	34.45	0.34	35.49	0.48
33.43	0.05	34.47	0.34	35.51	0.48
33.45	0.07	34.49	0.34	35.53	0.48
33.47	0.08	34.51	0.35	35.55	0.48
33.49	0.09	34.53	0.35	35.57	0.49
33.51	0.10	34.55	0.35	35.59	0.49
33.53	0.11	34.57	0.36	35.61	0.49
33.55	0.12	34.59	0.36	35.63	0.49
33.57	0.13	34.61	0.36	35.65	0.50
33.59	0.14	34.63	0.37	35.67	0.50
33.61	0.15	34.65	0.37	35.69	0.50
33.63	0.15	34.67	0.37	35.71	0.50
33.65	0.16	34.69	0.37	35.73	0.50
33.67	0.17	34.71	0.38	35.75	0.51
33.69	0.17	34.73	0.38	35.77	0.51
33.71	0.18	34.75	0.38	35.79	0.51
33.73	0.19	34.77	0.39	35.81	0.51
33.75	0.19	34.79	0.39	35.83	0.52
33.77	0.20	34.81	0.39	35.85	0.52
33.79	0.20	34.83	0.39	35.87	0.52
33.81	0.21	34.85	0.40	35.89	0.52
33.83	0.21	34.87	0.40	35.91	0.52
33.85	0.22	34.89	0.40	35.93	0.53
33.87	0.22	34.91	0.41	35.95	0.53
33.89	0.23	34.93	0.41	35.97	0.53
33.91	0.23	34.95	0.41	35.99	**0.53**
33.93	0.24	34.97	0.41		
33.95	0.24	34.99	0.42		
33.97	0.25	35.01	0.42		
33.99	0.25	35.03	0.42		
34.01	0.26	35.05	0.42		
34.03	0.26	35.07	0.43		
34.05	0.26	35.09	0.43		
34.07	0.27	35.11	0.43		
34.09	0.27	35.13	0.43		
34.11	0.28	35.15	0.44		
34.13	0.28	35.17	0.44		
34.15	0.28	35.19	0.44		
34.17	0.29	35.21	0.44		
34.19	0.29	35.23	0.45		
34.21	0.30	35.25	0.45		
34.23	0.30	35.27	0.45		
34.25	0.30	35.29	0.45		
34.27	0.31	35.31	0.46		

E(WQV) = 35.85
Q(WQV) = 0.52 cfs

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #4 / 6P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.03	ac	A = Area draining to the practice	
0.03	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.02	ac-in	WQV= 1" x Rv x A	
87	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
22	cf	25% x WQV (check calc for sediment forebay volume)	
66	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff		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:			
26.95	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.57	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.09	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
24.75	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
23.75	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
25.20	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
27.00	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.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	← yes
90	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ WQV
24.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet	D5	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet	D5	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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3.5*48*0.75*.4 = 50.4 cf

Pea stone layer: 3.5*48*0.25*0.15 = 6.3 cf (Cumulative = 50.4+6.3 = 56.7 cf)

Filter course: 3.5*48*2*0.05 = 16.8 cf (Cumulative = 56.7+16.8 = 73.5 cf)

Top stone layer: 3.5*48*0.25*0.4 = 16.8 cf (Cumulative = 73.5+16.8 = 90.3 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 90.3-87 = 3.3 cf

3.3/(3.5*48*0.4) = 0.05 ft

E(WQV) = 27.0-0.05 = 26.95

Stage-Area-Storage for Pond 6P: Filtration Drip Edge #4

Elevation (feet)	Storage (acre-feet)
23.75	0.000
23.80	0.000
23.85	0.000
23.90	0.000
23.95	0.000
24.00	0.000
24.05	0.000
24.10	0.001
24.15	0.001
24.20	0.001
24.25	0.001
24.30	0.001
24.35	0.001
24.40	0.001
24.45	0.001
24.50	0.001
24.55	0.001
24.60	0.001
24.65	0.001
24.70	0.001
24.75	0.001
24.80	0.001
24.85	0.001
24.90	0.001
24.95	0.001
25.00	0.001
25.05	0.001
25.10	0.001
25.15	0.001
25.20	0.001
25.25	0.001
25.30	0.001
25.35	0.001
25.40	0.001
25.45	0.001
25.50	0.001
25.55	0.001
25.60	0.001
25.65	0.001
25.70	0.001
25.75	0.001
25.80	0.002
25.85	0.002
25.90	0.002
25.95	0.002
26.00	0.002
26.05	0.002
26.10	0.002
26.15	0.002
26.20	0.002
26.25	0.002
26.30	0.002

Elevation (feet)	Storage (acre-feet)
26.35	0.002
26.40	0.002
26.45	0.002
26.50	0.002
26.55	0.002
26.60	0.002
26.65	0.002
26.70	0.002
26.75	0.002
26.80	0.002
26.85	0.002
26.90	0.002
26.95	0.002
27.00	**0.002**

See storage volume & WQV
elevation calculations on
BMP Worksheet
E(WQV) = 26.95

Stage-Discharge for Pond 6P: Filtration Drip Edge #4

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
23.75	0.00	24.79	0.29	25.83	0.45	26.87	0.56
23.77	0.00	24.81	0.30	25.85	0.45	26.89	0.56
23.79	0.00	24.83	0.30	25.87	0.45	26.91	0.57
23.81	0.00	24.85	0.31	25.89	0.46	26.93	0.57
23.83	0.00	24.87	0.31	25.91	0.46	26.95	0.57
23.85	0.00	24.89	0.31	25.93	0.46	26.97	0.57
23.87	0.00	24.91	0.32	25.95	0.46	26.99	**0.57**
23.89	0.00	24.93	0.32	25.97	0.47		
23.91	0.00	24.95	0.32	25.99	0.47		
23.93	0.00	24.97	0.33	26.01	0.47		
23.95	0.00	24.99	0.33	26.03	0.47		
23.97	0.00	25.01	0.33	26.05	0.47		
23.99	0.00	25.03	0.34	26.07	0.48		
24.01	0.03	25.05	0.34	26.09	0.48		
24.03	0.05	25.07	0.34	26.11	0.48		
24.05	0.07	25.09	0.35	26.13	0.48		
24.07	0.09	25.11	0.35	26.15	0.49		
24.09	0.10	25.13	0.35	26.17	0.49		
24.11	0.11	25.15	0.36	26.19	0.49		
24.13	0.12	25.17	0.36	26.21	0.49		
24.15	0.13	25.19	0.36	26.23	0.50		
24.17	0.14	25.21	0.36	26.25	0.50		
24.19	0.14	25.23	0.37	26.27	0.50		
24.21	0.15	25.25	0.37	26.29	0.50		
24.23	0.16	25.27	0.37	26.31	0.50		
24.25	0.17	25.29	0.38	26.33	0.51		
24.27	0.17	25.31	0.38	26.35	0.51		
24.29	0.18	25.33	0.38	26.37	0.51		
24.31	0.18	25.35	0.39	26.39	0.51		
24.33	0.19	25.37	0.39	26.41	0.51		
24.35	0.20	25.39	0.39	26.43	0.52		
24.37	0.20	25.41	0.39	26.45	0.52		
24.39	0.21	25.43	0.40	26.47	0.52		
24.41	0.21	25.45	0.40	26.49	0.52		
24.43	0.22	25.47	0.40	26.51	0.53		
24.45	0.22	25.49	0.40	26.53	0.53		
24.47	0.23	25.51	0.41	26.55	0.53		
24.49	0.23	25.53	0.41	26.57	0.53		
24.51	0.24	25.55	0.41	26.59	0.53		
24.53	0.24	25.57	0.42	26.61	0.54		
24.55	0.25	25.59	0.42	26.63	0.54		
24.57	0.25	25.61	0.42	26.65	0.54		
24.59	0.25	25.63	0.42	26.67	0.54		
24.61	0.26	25.65	0.43	26.69	0.54		
24.63	0.26	25.67	0.43	26.71	0.55		
24.65	0.27	25.69	0.43	26.73	0.55		
24.67	0.27	25.71	0.43	26.75	0.55		
24.69	0.28	25.73	0.44	26.77	0.55		
24.71	0.28	25.75	0.44	26.79	0.55		
24.73	0.28	25.77	0.44	26.81	0.56		
24.75	0.29	25.79	0.44	26.83	0.56		
24.77	0.29	25.81	0.45	26.85	0.56		

E(WQV) = 26.95
Q(WQV) = 0.57 cfs

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #5 / 7P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.03	ac	A = Area draining to the practice	
0.03	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.02	ac-in	WQV= 1" x Rv x A	
87	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
22	cf	25% x WQV (check calc for sediment forebay volume)	
66	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**$\geq$ 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})	**$\leq$ 72-hrs**
Calculate time to drain if system IS underdrained:			
25.55	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.41	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.12	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**$\leq$ 72-hrs**
23.60	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
22.60	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**$\geq$ 1'**
#VALUE!	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**$\geq$ 1'**
#VALUE!	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**$\geq$ 1'**
25.19	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
25.60	ft	Elevation of the top of the practice	
YES		50 peak elevation $\leq$ 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)	**$\geq$ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	← yes
90	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ WQV
24.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet	D5	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet	D5	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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3.5*48*0.75*.4 = 50.4 cf

Pea stone layer: 3.5*48*0.25*0.15 = 6.3 cf (Cumulative = 50.4+6.3 = 56.7 cf)

Filter course: 3.5*48*2*0.05 = 16.8 cf (Cumulative = 56.7+16.8 = 73.5 cf)

Top stone layer: 3.5*48*0.25*0.4 = 16.8 cf (Cumulative = 73.5+16.8 = 90.3 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 90.3-87 = 3.3 cf

3.3/(3.5*48*0.4) = 0.05 ft

E(WQV) = 25.6-0.05 = 25.55

Stage-Area-Storage for Pond 7P: Filtration Drip Edge #5

Elevation (feet)	Storage (acre-feet)
22.35	0.000
22.40	0.000
22.45	0.000
22.50	0.000
22.55	0.000
22.60	0.000
22.65	0.000
22.70	0.001
22.75	0.001
22.80	0.001
22.85	0.001
22.90	0.001
22.95	0.001
23.00	0.001
23.05	0.001
23.10	0.001
23.15	0.001
23.20	0.001
23.25	0.001
23.30	0.001
23.35	0.001
23.40	0.001
23.45	0.001
23.50	0.001
23.55	0.001
23.60	0.001
23.65	0.001
23.70	0.001
23.75	0.001
23.80	0.001
23.85	0.001
23.90	0.001
23.95	0.001
24.00	0.001
24.05	0.001
24.10	0.001
24.15	0.001
24.20	0.001
24.25	0.001
24.30	0.001
24.35	0.001
24.40	0.002
24.45	0.002
24.50	0.002
24.55	0.002
24.60	0.002
24.65	0.002
24.70	0.002
24.75	0.002
24.80	0.002
24.85	0.002
24.90	0.002
24.95	0.002
25.00	0.002
25.05	0.002
25.10	0.002
25.15	0.002
25.20	0.002
25.25	0.002
25.30	0.002
25.35	0.002
25.40	0.002
25.45	0.002
25.50	0.002
25.55	0.002
25.60	**0.002**

See storage volume & WQV
elevation calculations on
BMP Worksheet
E(WQV) = 25.55

Stage-Discharge for Pond 7P: Filtration Drip Edge #5

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
22.35	0.00	23.39	0.00	24.43	0.22	25.47	0.40
22.37	0.00	23.41	0.00	24.45	0.22	25.49	0.40
22.39	0.00	23.43	0.00	24.47	0.23	25.51	0.41
22.41	0.00	23.45	0.00	24.49	0.23	25.53	0.41
22.43	0.00	23.47	0.00	24.51	0.24	25.55	0.41
22.45	0.00	23.49	0.00	24.53	0.24	25.57	0.42
22.47	0.00	23.51	0.00	24.55	0.25	25.59	**0.42**
22.49	0.00	23.53	0.00	24.57	0.25		
22.51	0.00	23.55	0.00	24.59	0.25		
22.53	0.00	23.57	0.00	24.61	0.26		
22.55	0.00	23.59	0.00	24.63	0.26		
22.57	0.00	23.61	0.00	24.65	0.27		
22.59	0.00	23.63	0.00	24.67	0.27		
22.61	0.00	23.65	0.00	24.69	0.28		
22.63	0.00	23.67	0.00	24.71	0.28		
22.65	0.00	23.69	0.00	24.73	0.28		
22.67	0.00	23.71	0.00	24.75	0.29		
22.69	0.00	23.73	0.00	24.77	0.29		
22.71	0.00	23.75	0.00	24.79	0.29		
22.73	0.00	23.77	0.00	24.81	0.30		
22.75	0.00	23.79	0.00	24.83	0.30		
22.77	0.00	23.81	0.00	24.85	0.31		
22.79	0.00	23.83	0.00	24.87	0.31		
22.81	0.00	23.85	0.00	24.89	0.31		
22.83	0.00	23.87	0.00	24.91	0.32		
22.85	0.00	23.89	0.00	24.93	0.32		
22.87	0.00	23.91	0.00	24.95	0.32		
22.89	0.00	23.93	0.00	24.97	0.33		
22.91	0.00	23.95	0.00	24.99	0.33		
22.93	0.00	23.97	0.00	25.01	0.33		
22.95	0.00	23.99	0.00	25.03	0.34		
22.97	0.00	24.01	0.03	25.05	0.34		
22.99	0.00	24.03	0.06	25.07	0.34		
23.01	0.00	24.05	0.07	25.09	0.35		
23.03	0.00	24.07	0.09	25.11	0.35		
23.05	0.00	24.09	0.10	25.13	0.35		
23.07	0.00	24.11	0.11	25.15	0.36		
23.09	0.00	24.13	0.12	25.17	0.36		
23.11	0.00	24.15	0.13	25.19	0.36		
23.13	0.00	24.17	0.14	25.21	0.36		
23.15	0.00	24.19	0.14	25.23	0.37		
23.17	0.00	24.21	0.15	25.25	0.37		
23.19	0.00	24.23	0.16	25.27	0.37		
23.21	0.00	24.25	0.17	25.29	0.38		
23.23	0.00	24.27	0.17	25.31	0.38		
23.25	0.00	24.29	0.18	25.33	0.38		
23.27	0.00	24.31	0.18	25.35	0.39		
23.29	0.00	24.33	0.19	25.37	0.39		
23.31	0.00	24.35	0.20	25.39	0.39		
23.33	0.00	24.37	0.20	25.41	0.39		
23.35	0.00	24.39	0.21	25.43	0.40		
23.37	0.00	24.41	0.21	25.45	0.40		

E(WQV) = 25.55
Q(WQV) = 0.57 cfs

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #6 / 8P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.03	ac	A = Area draining to the practice	
0.03	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.02	ac-in	WQV= 1" x Rv x A	
87	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
22	cf	25% x WQV (check calc for sediment forebay volume)	
66	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff		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:			
26.20	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.58	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.08	hours	T_{DRAIN} = Drain time = $2WQV/Q_{WQV}$	**≤ 72-hrs**
24.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
23.00	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
23.48	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
26.25	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:				
YES	ac		Drainage Area no larger than 5 ac?	← yes
90	cf		V = Volume of storage[3] (attach a stage-storage table)	≥ WQV
24.0	inches		D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		D5	Note what sheet in the plan set contains the filter course specification	
3.0	:1		Pond side slopes	≥ 3:1
Sheet		D5	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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3.5*48*0.75*.4 = 50.4 cf

Pea stone layer: 3.5*48*0.25*0.15 = 6.3 cf (Cumulative = 50.4+6.3 = 56.7 cf)

Filter course: 3.5*48*2*0.05 = 16.8 cf (Cumulative = 56.7+16.8 = 73.5 cf)

Top stone layer: 3.5*48*0.25*0.4 = 16.8 cf (Cumulative = 73.5+16.8 = 90.3 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 90.3-87 = 3.3 cf

3.3/(3.5*48*0.4) = 0.05 ft

E(WQV) = 26.25-0.05 = 26.20

Stage-Area-Storage for Pond 8P: Filtration Drip Edge #6

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
23.00	0.000	25.60	0.002
23.05	0.000	25.65	0.002
23.10	0.000	25.70	0.002
23.15	0.000	25.75	0.002
23.20	0.000	25.80	0.002
23.25	0.000	25.85	0.002
23.30	0.000	25.90	0.002
23.35	0.001	25.95	0.002
23.40	0.001	26.00	0.002
23.45	0.001	26.05	0.002
23.50	0.001	26.10	0.002
23.55	0.001	26.15	0.002
23.60	0.001	26.20	0.002
23.65	0.001	26.25	**0.002**
23.70	0.001		
23.75	0.001		
23.80	0.001		
23.85	0.001		
23.90	0.001		
23.95	0.001		
24.00	0.001		
24.05	0.001		
24.10	0.001		
24.15	0.001		
24.20	0.001		
24.25	0.001		
24.30	0.001		
24.35	0.001		
24.40	0.001		
24.45	0.001		
24.50	0.001		
24.55	0.001		
24.60	0.001		
24.65	0.001		
24.70	0.001		
24.75	0.001		
24.80	0.001		
24.85	0.001		
24.90	0.001		
24.95	0.001		
25.00	0.001		
25.05	0.002		
25.10	0.002		
25.15	0.002		
25.20	0.002		
25.25	0.002		
25.30	0.002		
25.35	0.002		
25.40	0.002		
25.45	0.002		
25.50	0.002		
25.55	0.002		

See storage volume & WQV
elevation calculations on
BMP Worksheet
E(WQV) = 26.20

Stage-Discharge for Pond 8P: Filtration Drip Edge #6

Elevation (feet)	Primary (cfs)
23.00	0.00
23.02	0.00
23.04	0.00
23.06	0.01
23.08	0.01
23.10	0.02
23.12	0.03
23.14	0.03
23.16	0.04
23.18	0.05
23.20	0.07
23.22	0.08
23.24	0.09
23.26	0.10
23.28	0.11
23.30	0.12
23.32	0.13
23.34	0.14
23.36	0.15
23.38	0.15
23.40	0.16
23.42	0.17
23.44	0.17
23.46	0.18
23.48	0.19
23.50	0.19
23.52	0.20
23.54	0.20
23.56	0.21
23.58	0.21
23.60	0.22
23.62	0.22
23.64	0.23
23.66	0.23
23.68	0.24
23.70	0.24
23.72	0.25
23.74	0.25
23.76	0.26
23.78	0.26
23.80	0.26
23.82	0.27
23.84	0.27
23.86	0.28
23.88	0.28
23.90	0.28
23.92	0.29
23.94	0.29
23.96	0.30
23.98	0.30
24.00	0.30
24.02	0.31
24.04	0.31
24.06	0.31
24.08	0.32
24.10	0.32
24.12	0.32
24.14	0.33
24.16	0.33
24.18	0.33
24.20	0.34
24.22	0.34
24.24	0.34
24.26	0.35
24.28	0.35
24.30	0.35
24.32	0.36
24.34	0.36
24.36	0.36
24.38	0.37
24.40	0.37
24.42	0.37
24.44	0.37
24.46	0.38
24.48	0.38
24.50	0.38
24.52	0.39
24.54	0.39
24.56	0.39
24.58	0.39
24.60	0.40
24.62	0.40
24.64	0.40
24.66	0.41
24.68	0.41
24.70	0.41
24.72	0.41
24.74	0.42
24.76	0.42
24.78	0.42
24.80	0.42
24.82	0.43
24.84	0.43
24.86	0.43
24.88	0.43
24.90	0.44
24.92	0.44
24.94	0.44
24.96	0.44
24.98	0.45
25.00	0.45
25.02	0.45
25.04	0.45
25.06	0.46
25.08	0.46
25.10	0.46
25.12	0.46
25.14	0.47
25.16	0.47
25.18	0.47
25.20	0.47
25.22	0.48
25.24	0.48
25.26	0.48
25.28	0.48
25.30	0.48
25.32	0.49
25.34	0.49
25.36	0.49
25.38	0.49
25.40	0.50
25.42	0.50
25.44	0.50
25.46	0.50
25.48	0.50
25.50	0.51
25.52	0.51
25.54	0.51
25.56	0.51
25.58	0.52
25.60	0.52
25.62	0.52
25.64	0.52
25.66	0.52
25.68	0.53
25.70	0.53
25.72	0.53
25.74	0.53
25.76	0.53
25.78	0.54
25.80	0.54
25.82	0.54
25.84	0.54
25.86	0.54
25.88	0.55
25.90	0.55
25.92	0.55
25.94	0.55
25.96	0.55
25.98	0.56
26.00	0.56
26.02	0.56
26.04	0.56
26.06	0.56
26.08	0.57
26.10	0.57
26.12	0.57
26.14	0.57
26.16	0.57
26.18	0.58
26.20	0.58
26.22	0.58
26.24	**0.58**

E(WQV) = 26.20
Q(WQV) = 0.58 cfs

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #7 / 9P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.03	ac	A = Area draining to the practice	
0.03	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.02	ac-in	WQV= 1" x Rv x A	
87	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
22	cf	25% x WQV (check calc for sediment forebay volume)	
66	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff		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:			
33.18	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.65	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.07	hours	T_{DRAIN} = Drain time = $2WQV/Q_{WQV}$	**≤ 72-hrs**
31.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
30.50	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
31.22	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
33.25	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	← yes
92	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	D5	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet	D5	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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3.75*48*0.75*.4 = 54.0 cf

Pea stone layer: 3.75*48*0.25*0.15 = 6.8 cf (Cumulative = 54.0+6.8 = 60.8 cf)

Filter course: 3.75*48*1.5*0.05 = 13.5 cf (Cumulative = 60.8+13.5 = 74.3 cf)

Top stone layer: 3.75*48*0.25*0.4 = 18.0 cf (Cumulative = 74.3+18.0 = 92.3 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 92.3-87 = 5.3 cf

5.3/(3.75*48*0.4) = 0.07 ft

E(WQV) = 33.25-0.08 = 33.18

Stage-Area-Storage for Pond 9P: Filtration Drip Edge #7

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
30.50	0.000	31.54	0.001	32.58	0.002
30.52	0.000	31.56	0.001	32.60	0.002
30.54	0.000	31.58	0.001	32.62	0.002
30.56	0.000	31.60	0.001	32.64	0.002
30.58	0.000	31.62	0.001	32.66	0.002
30.60	0.000	31.64	0.001	32.68	0.002
30.62	0.000	31.66	0.001	32.70	0.002
30.64	0.000	31.68	0.001	32.72	0.002
30.66	0.000	31.70	0.001	32.74	0.002
30.68	0.000	31.72	0.001	32.76	0.002
30.70	0.000	31.74	0.001	32.78	0.002
30.72	0.000	31.76	0.001	32.80	0.002
30.74	0.000	31.78	0.001	32.82	0.002
30.76	0.000	31.80	0.001	32.84	0.002
30.78	0.000	31.82	0.001	32.86	0.002
30.80	0.000	31.84	0.001	32.88	0.002
30.82	0.001	31.86	0.001	32.90	0.002
30.84	0.001	31.88	0.001	32.92	0.002
30.86	0.001	31.90	0.001	32.94	0.002
30.88	0.001	31.92	0.001	32.96	0.002
30.90	0.001	31.94	0.001	32.98	0.002
30.92	0.001	31.96	0.001	33.00	0.002
30.94	0.001	31.98	0.001	33.02	0.002
30.96	0.001	32.00	0.001	33.04	0.002
30.98	0.001	32.02	0.002	33.06	0.002
31.00	0.001	32.04	0.002	33.08	0.002
31.02	0.001	32.06	0.002	33.10	0.002
31.04	0.001	32.08	0.002	33.12	0.002
31.06	0.001	32.10	0.002	33.14	0.002
31.08	0.001	32.12	0.002	33.16	0.002
31.10	0.001	32.14	0.002	33.18	0.002
31.12	0.001	32.16	0.002	33.20	0.002
31.14	0.001	32.18	0.002	33.22	0.002
31.16	0.001	32.20	0.002	33.24	**0.002**
31.18	0.001	32.22	0.002		
31.20	0.001	32.24	0.002		
31.22	0.001	32.26	0.002		
31.24	0.001	32.28	0.002		
31.26	0.001	32.30	0.002		
31.28	0.001	32.32	0.002		
31.30	0.001	32.34	0.002		
31.32	0.001	32.36	0.002		
31.34	0.001	32.38	0.002		
31.36	0.001	32.40	0.002		
31.38	0.001	32.42	0.002		
31.40	0.001	32.44	0.002		
31.42	0.001	32.46	0.002		
31.44	0.001	32.48	0.002		
31.46	0.001	32.50	0.002		
31.48	0.001	32.52	0.002		
31.50	0.001	32.54	0.002		
31.52	0.001	32.56	0.002		

See storage volume & WQV
elevation calculations on
BMP Worksheet
E(WQV) = 33.18

Stage-Discharge for Pond 9P: Filtration Drip Edge #7

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
30.50	0.00	31.54	0.36	32.58	0.56
30.52	0.00	31.56	0.37	32.60	0.56
30.54	0.00	31.58	0.37	32.62	0.57
30.56	0.00	31.60	0.38	32.64	0.57
30.58	0.00	31.62	0.38	32.66	0.57
30.60	0.00	31.64	0.39	32.68	0.58
30.62	0.00	31.66	0.39	32.70	0.58
30.64	0.00	31.68	0.39	32.72	0.58
30.66	0.00	31.70	0.40	32.74	0.59
30.68	0.00	31.72	0.40	32.76	0.59
30.70	0.00	31.74	0.41	32.78	0.59
30.72	0.00	31.76	0.41	32.80	0.59
30.74	0.00	31.78	0.42	32.82	0.60
30.76	0.00	31.80	0.42	32.84	0.60
30.78	0.00	31.82	0.42	32.86	0.60
30.80	0.00	31.84	0.43	32.88	0.61
30.82	0.06	31.86	0.43	32.90	0.61
30.84	0.08	31.88	0.44	32.92	0.61
30.86	0.10	31.90	0.44	32.94	0.61
30.88	0.12	31.92	0.44	32.96	0.62
30.90	0.13	31.94	0.45	32.98	0.62
30.92	0.15	31.96	0.45	33.00	0.62
30.94	0.16	31.98	0.46	33.02	0.63
30.96	0.17	32.00	0.46	33.04	0.63
30.98	0.18	32.02	0.46	33.06	0.63
31.00	0.19	32.04	0.47	33.08	0.63
31.02	0.20	32.06	0.47	33.10	0.64
31.04	0.21	32.08	0.48	33.12	0.64
31.06	0.21	32.10	0.48	33.14	0.64
31.08	0.22	32.12	0.48	33.16	0.65
31.10	0.23	32.14	0.49	33.18	0.65
31.12	0.24	32.16	0.49	33.20	0.65
31.14	0.25	32.18	0.49	33.22	0.65
31.16	0.25	32.20	0.50	33.24	**0.66**
31.18	0.26	32.22	0.50		
31.20	0.27	32.24	0.50		
31.22	0.27	32.26	0.51		
31.24	0.28	32.28	0.51		
31.26	0.28	32.30	0.51		
31.28	0.29	32.32	0.52		
31.30	0.30	32.34	0.52		
31.32	0.30	32.36	0.52		
31.34	0.31	32.38	0.53		
31.36	0.31	32.40	0.53		
31.38	0.32	32.42	0.53		
31.40	0.33	32.44	0.54		
31.42	0.33	32.46	0.54		
31.44	0.34	32.48	0.54		
31.46	0.34	32.50	0.55		
31.48	0.35	32.52	0.55		
31.50	0.35	32.54	0.55		
31.52	0.36	32.56	0.56		

E(WQV) = 33.18
Q(WQV) = 0.65 cfs

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #8 / 10P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.03	ac	A = Area draining to the practice	
0.03	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.02	ac-in	WQV= 1" x Rv x A	
87	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
22	cf	25% x WQV (check calc for sediment forebay volume)	
66	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff		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:			
32.93	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
31.25	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
30.25	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
32.63	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
33.00	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.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	← yes
92	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	D5	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet	D5	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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3.75*48*0.75*.4 = 54.0 cf

Pea stone layer: 3.75*48*0.25*0.15 = 6.8 cf (Cumulative = 54.0+6.8 = 60.8 cf)

Filter course: 3.75*48*1.5*0.05 = 13.5 cf (Cumulative = 60.8+13.5 = 74.3 cf)

Top stone layer: 3.75*48*0.25*0.4 = 18.0 cf (Cumulative = 74.3+18.0 = 92.3 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 92.3-87 = 5.3 cf

5.3/(3.75*48*0.4) = 0.07 ft

E(WQV) = 33.0-0.07 = 32.93

Stage-Area-Storage for Pond 10P: Filtration Drip Edge #8

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
30.25	0.000	31.29	0.001	32.33	0.002
30.27	0.000	31.31	0.001	32.35	0.002
30.29	0.000	31.33	0.001	32.37	0.002
30.31	0.000	31.35	0.001	32.39	0.002
30.33	0.000	31.37	0.001	32.41	0.002
30.35	0.000	31.39	0.001	32.43	0.002
30.37	0.000	31.41	0.001	32.45	0.002
30.39	0.000	31.43	0.001	32.47	0.002
30.41	0.000	31.45	0.001	32.49	0.002
30.43	0.000	31.47	0.001	32.51	0.002
30.45	0.000	31.49	0.001	32.53	0.002
30.47	0.000	31.51	0.001	32.55	0.002
30.49	0.000	31.53	0.001	32.57	0.002
30.51	0.000	31.55	0.001	32.59	0.002
30.53	0.000	31.57	0.001	32.61	0.002
30.55	0.000	31.59	0.001	32.63	0.002
30.57	0.001	31.61	0.001	32.65	0.002
30.59	0.001	31.63	0.001	32.67	0.002
30.61	0.001	31.65	0.001	32.69	0.002
30.63	0.001	31.67	0.001	32.71	0.002
30.65	0.001	31.69	0.001	32.73	0.002
30.67	0.001	31.71	0.001	32.75	0.002
30.69	0.001	31.73	0.001	32.77	0.002
30.71	0.001	31.75	0.001	32.79	0.002
30.73	0.001	31.77	0.002	32.81	0.002
30.75	0.001	31.79	0.002	32.83	0.002
30.77	0.001	31.81	0.002	32.85	0.002
30.79	0.001	31.83	0.002	32.87	0.002
30.81	0.001	31.85	0.002	32.89	0.002
30.83	0.001	31.87	0.002	32.91	0.002
30.85	0.001	31.89	0.002	32.93	0.002
30.87	0.001	31.91	0.002	32.95	0.002
30.89	0.001	31.93	0.002	32.97	0.002
30.91	0.001	31.95	0.002	32.99	**0.002**
30.93	0.001	31.97	0.002		
30.95	0.001	31.99	0.002		
30.97	0.001	32.01	0.002		
30.99	0.001	32.03	0.002		
31.01	0.001	32.05	0.002		
31.03	0.001	32.07	0.002		
31.05	0.001	32.09	0.002		
31.07	0.001	32.11	0.002		
31.09	0.001	32.13	0.002		
31.11	0.001	32.15	0.002		
31.13	0.001	32.17	0.002		
31.15	0.001	32.19	0.002		
31.17	0.001	32.21	0.002		
31.19	0.001	32.23	0.002		
31.21	0.001	32.25	0.002		
31.23	0.001	32.27	0.002		
31.25	0.001	32.29	0.002		
31.27	0.001	32.31	0.002		

See storage volume and
WQV elevation calculations
on BMP Worksheet
E(WQV)=32.93

Stage-Discharge for Pond 10P: Filtration Drip Edge #8

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
30.25	0.00	31.29	0.23	32.33	0.41
30.27	0.00	31.31	0.24	32.35	0.41
30.29	0.00	31.33	0.24	32.37	0.42
30.31	0.00	31.35	0.25	32.39	0.42
30.33	0.00	31.37	0.25	32.41	0.42
30.35	0.00	31.39	0.25	32.43	0.42
30.37	0.00	31.41	0.26	32.45	0.43
30.39	0.00	31.43	0.26	32.47	0.43
30.41	0.00	31.45	0.27	32.49	0.43
30.43	0.00	31.47	0.27	32.51	0.43
30.45	0.00	31.49	0.28	32.53	0.44
30.47	0.00	31.51	0.28	32.55	0.44
30.49	0.00	31.53	0.28	32.57	0.44
30.51	0.00	31.55	0.29	32.59	0.44
30.53	0.00	31.57	0.29	32.61	0.45
30.55	0.00	31.59	0.29	32.63	0.45
30.57	0.00	31.61	0.30	32.65	0.45
30.59	0.00	31.63	0.30	32.67	0.45
30.61	0.00	31.65	0.31	32.69	0.46
30.63	0.00	31.67	0.31	32.71	0.46
30.65	0.00	31.69	0.31	32.73	0.46
30.67	0.00	31.71	0.32	32.75	0.46
30.69	0.00	31.73	0.32	32.77	0.47
30.71	0.00	31.75	0.32	32.79	0.47
30.73	0.00	31.77	0.33	32.81	0.47
30.75	0.00	31.79	0.33	32.83	0.47
30.77	0.00	31.81	0.33	32.85	0.47
30.79	0.00	31.83	0.34	32.87	0.48
30.81	0.03	31.85	0.34	32.89	0.48
30.83	0.06	31.87	0.34	32.91	0.48
30.85	0.07	31.89	0.35	32.93	0.48
30.87	0.09	31.91	0.35	32.95	0.49
30.89	0.10	31.93	0.35	32.97	0.49
30.91	0.11	31.95	0.36	32.99	**0.49**
30.93	0.12	31.97	0.36		
30.95	0.13	31.99	0.36		
30.97	0.14	32.01	0.36		
30.99	0.14	32.03	0.37		
31.01	0.15	32.05	0.37		
31.03	0.16	32.07	0.37		
31.05	0.17	32.09	0.38		
31.07	0.17	32.11	0.38		
31.09	0.18	32.13	0.38		
31.11	0.18	32.15	0.39		
31.13	0.19	32.17	0.39		
31.15	0.20	32.19	0.39		
31.17	0.20	32.21	0.39		
31.19	0.21	32.23	0.40		
31.21	0.21	32.25	0.40		
31.23	0.22	32.27	0.40		
31.25	0.22	32.29	0.40		
31.27	0.23	32.31	0.41		

E(WQV)=32.93
Q(WQV)=0.48 cfs

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #9 / 11P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.04	ac	A = Area draining to the practice	
0.04	ac	A_I = Impervious area draining to the practice	
1.03	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.98	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.04	ac-in	WQV= 1" x Rv x A	
130	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
32	cf	25% x WQV (check calc for sediment forebay volume)	
97	cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff		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:			
34.94	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.53	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.14	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
33.25	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
32.25	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
#VALUE!	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
33.00	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
35.00	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.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	← yes
136	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		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet		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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3.5*76*0.75*.4 = 79.8 cf

Pea stone layer: 3.5*76*0.25*0.15 = 10.0 cf (Cumulative = 79.8+10.0 = 89.8 cf)

Filter course: 3.5*76*1.5*0.05 = 20.0 cf (Cumulative = 89.8+20.0 = 109.8 cf)

Top stone layer: 3.5*76*0.25*0.4 = 26.6 cf (Cumulative = 109.8+26.6 = 136.4 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 136.4-130 = 6.4 cf

6.4/(3.5*76*0.4) = 0.06 ft

E(WQV) = 35.0-0.06 = 34.94

Stage-Area-Storage for Pond 11P: Filtration Drip Edge #9

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
32.25	0.000	33.29	0.002	34.33	0.002
32.27	0.000	33.31	0.002	34.35	0.002
32.29	0.000	33.33	0.002	34.37	0.002
32.31	0.000	33.35	0.002	34.39	0.002
32.33	0.000	33.37	0.002	34.41	0.002
32.35	0.000	33.39	0.002	34.43	0.002
32.37	0.000	33.41	0.002	34.45	0.002
32.39	0.000	33.43	0.002	34.47	0.002
32.41	0.000	33.45	0.002	34.49	0.002
32.43	0.000	33.47	0.002	34.51	0.002
32.45	0.000	33.49	0.002	34.53	0.002
32.47	0.001	33.51	0.002	34.55	0.002
32.49	0.001	33.53	0.002	34.57	0.002
32.51	0.001	33.55	0.002	34.59	0.002
32.53	0.001	33.57	0.002	34.61	0.002
32.55	0.001	33.59	0.002	34.63	0.002
32.57	0.001	33.61	0.002	34.65	0.002
32.59	0.001	33.63	0.002	34.67	0.002
32.61	0.001	33.65	0.002	34.69	0.003
32.63	0.001	33.67	0.002	34.71	0.003
32.65	0.001	33.69	0.002	34.73	0.003
32.67	0.001	33.71	0.002	34.75	0.003
32.69	0.001	33.73	0.002	34.77	0.003
32.71	0.001	33.75	0.002	34.79	0.003
32.73	0.001	33.77	0.002	34.81	0.003
32.75	0.001	33.79	0.002	34.83	0.003
32.77	0.001	33.81	0.002	34.85	0.003
32.79	0.001	33.83	0.002	34.87	0.003
32.81	0.001	33.85	0.002	34.89	0.003
32.83	0.001	33.87	0.002	34.91	0.003
32.85	0.001	33.89	0.002	34.93	0.003
32.87	0.002	33.91	0.002	34.95	0.003
32.89	0.002	33.93	0.002	34.97	0.003
32.91	0.002	33.95	0.002	34.99	**0.003**
32.93	0.002	33.97	0.002		
32.95	0.002	33.99	0.002		
32.97	0.002	34.01	0.002		
32.99	0.002	34.03	0.002		
33.01	0.002	34.05	0.002		
33.03	0.002	34.07	0.002		
33.05	0.002	34.09	0.002		
33.07	0.002	34.11	0.002		
33.09	0.002	34.13	0.002		
33.11	0.002	34.15	0.002		
33.13	0.002	34.17	0.002		
33.15	0.002	34.19	0.002		
33.17	0.002	34.21	0.002		
33.19	0.002	34.23	0.002		
33.21	0.002	34.25	0.002		
33.23	0.002	34.27	0.002		
33.25	0.002	34.29	0.002		
33.27	0.002	34.31	0.002		

See storage volume and
WQV elevation calculations
on BMP Worksheet
E(WQV)=34.94

Stage-Discharge for Pond 11P: Filtration Drip Edge #9

Elevation (feet)	Secondary (cfs)	Elevation (feet)	Secondary (cfs)	Elevation (feet)	Secondary (cfs)
32.25	0.00	33.29	0.31	34.33	0.46
32.27	0.00	33.31	0.31	34.35	0.46
32.29	0.00	33.33	0.32	34.37	0.46
32.31	0.01	33.35	0.32	34.39	0.47
32.33	0.01	33.37	0.32	34.41	0.47
32.35	0.02	33.39	0.33	34.43	0.47
32.37	0.03	33.41	0.33	34.45	0.47
32.39	0.03	33.43	0.33	34.47	0.48
32.41	0.04	33.45	0.34	34.49	0.48
32.43	0.05	33.47	0.34	34.51	0.48
32.45	0.07	33.49	0.34	34.53	0.48
32.47	0.08	33.51	0.35	34.55	0.48
32.49	0.09	33.53	0.35	34.57	0.49
32.51	0.10	33.55	0.35	34.59	0.49
32.53	0.11	33.57	0.36	34.61	0.49
32.55	0.12	33.59	0.36	34.63	0.49
32.57	0.13	33.61	0.36	34.65	0.50
32.59	0.14	33.63	0.37	34.67	0.50
32.61	0.15	33.65	0.37	34.69	0.50
32.63	0.15	33.67	0.37	34.71	0.50
32.65	0.16	33.69	0.37	34.73	0.50
32.67	0.17	33.71	0.38	34.75	0.51
32.69	0.17	33.73	0.38	34.77	0.51
32.71	0.18	33.75	0.38	34.79	0.51
32.73	0.19	33.77	0.39	34.81	0.51
32.75	0.19	33.79	0.39	34.83	0.52
32.77	0.20	33.81	0.39	34.85	0.52
32.79	0.20	33.83	0.39	34.87	0.52
32.81	0.21	33.85	0.40	34.89	0.52
32.83	0.21	33.87	0.40	34.91	0.52
32.85	0.22	33.89	0.40	34.93	0.53
32.87	0.22	33.91	0.41	34.95	0.53
32.89	0.23	33.93	0.41	34.97	0.53
32.91	0.23	33.95	0.41	34.99	**0.53**
32.93	0.24	33.97	0.41		
32.95	0.24	33.99	0.42		
32.97	0.25	34.01	0.42		
32.99	0.25	34.03	0.42		
33.01	0.26	34.05	0.42		
33.03	0.26	34.07	0.43		
33.05	0.26	34.09	0.43		
33.07	0.27	34.11	0.43		
33.09	0.27	34.13	0.43		
33.11	0.28	34.15	0.44		
33.13	0.28	34.17	0.44		
33.15	0.28	34.19	0.44		
33.17	0.29	34.21	0.44		
33.19	0.29	34.23	0.45		
33.21	0.30	34.25	0.45		
33.23	0.30	34.27	0.45		
33.25	0.30	34.29	0.45		
33.27	0.31	34.31	0.46		

E(WQV)=34.94
Q(WQV)=0.53 cfs

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Stone Drip Edge #10 / 12P**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	**← yes**
0.06	ac	A = Area draining to the practice	
0.06	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.06	ac-in	WQV= 1" x Rv x A	
217	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
54	cf	25% x WQV (check calc for sediment forebay volume)	
N/A - Roof		Method of pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
574	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
638	sf	A_{SA} = Surface area of the bottom of the pond	
1.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
4.1	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
35.25	feet	E_{BTM} = Elevation of the bottom of the basin	
32.25	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
28.08	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.00	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
7.2	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
N/A	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**
N/A	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
N/A	:1	If a basin is proposed, pond side slopes.	**≥3:1**
37.35	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
37.50	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
37.50	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:

Assumed that stone drip edges need to infiltrate 10-year storm similarly to an infiltration trench.

5.5*116*2.25*0.4 = 574.2 cf storage provided

Stage-Area-Storage for Pond 12P: Infiltration Drip Edge #10

Elevation (feet)	Surface (acres)	Storage (acre-feet)
35.25	**0.015**	0.000
35.30	0.015	0.000
35.35	0.015	0.001
35.40	0.015	0.001
35.45	0.015	0.001
35.50	0.015	0.001
35.55	0.015	0.002
35.60	0.015	0.002
35.65	0.015	0.002
35.70	0.015	0.003
35.75	0.015	0.003
35.80	0.015	0.003
35.85	0.015	0.004
35.90	0.015	0.004
35.95	0.015	0.004
36.00	0.015	0.004
36.05	0.015	0.005
36.10	0.015	0.005
36.15	0.015	0.005
36.20	0.015	0.006
36.25	0.015	0.006
36.30	0.015	0.006
36.35	0.015	0.006
36.40	0.015	0.007
36.45	0.015	0.007
36.50	0.015	0.007
36.55	0.015	0.008
36.60	0.015	0.008
36.65	0.015	0.008
36.70	0.015	0.008
36.75	0.015	0.009
36.80	0.015	0.009
36.85	0.015	0.009
36.90	0.015	0.010
36.95	0.015	0.010
37.00	0.015	0.010
37.05	0.015	0.011
37.10	0.015	0.011
37.15	0.015	0.011
37.20	0.015	0.011
37.25	0.015	0.012
37.30	0.015	0.012
37.35	0.015	0.012
37.40	0.015	0.013
37.45	0.015	0.013
37.50	0.015	**0.013**

See storage volume
calculations on BMP Worksheet
574.2 cf storage provided

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Filtration Drip Edge #11 / 13P**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes	Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.02 ac	A = Area draining to the practice	
0.02 ac	A_I = Impervious area draining to the practice	
1.12 decimal	I = Percent impervious area draining to the practice, in decimal form	
1.06 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.02 ac-in	WQV= 1" x Rv x A	
72 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
18 cf	25% x WQV (check calc for sediment forebay volume)	
54 cf	75% x WQV (check calc for surface sand filter volume)	
N/A - Roof Runoff	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:		
36.97 ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.46 cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.09 hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
35.25 feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
34.25 feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
N/A feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
N/A feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00 feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
#VALUE! feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
#VALUE! feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
36.15 ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
37.00 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.	
Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
74	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		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet		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: Filtration Drip Edge is similar to bioretention system - See AOT-2662 approved documents

Coarse stone layer: 3*48*0.75*.4 = 43.2 cf

Pea stone layer: 3*48*0.25*0.15 = 5.4 cf (Cumulative = 43.2+5.4 = 48.6 cf)

Filter course: 3*48*1.5*0.05 = 10.8 cf (Cumulative = 48.6+10.8 = 59.4 cf)

Top stone layer: 3*48*0.25*0.4 = 14.4 cf (Cumulative = 59.4+14.4 = 73.8 cf)

Determination of WQV Elevation:

Total storage volume - Required WQV = 73.8-72 = 1.8 cf

1.8/(3*48*0.4) = 0.03 ft

E(WQV) = 37.0-0.03 = 36.97

Stage-Area-Storage for Pond 13P: Filtration Drip Edge #11

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
34.25	0.000	35.29	0.001	36.33	0.001
34.27	0.000	35.31	0.001	36.35	0.001
34.29	0.000	35.33	0.001	36.37	0.001
34.31	0.000	35.35	0.001	36.39	0.001
34.33	0.000	35.37	0.001	36.41	0.001
34.35	0.000	35.39	0.001	36.43	0.001
34.37	0.000	35.41	0.001	36.45	0.001
34.39	0.000	35.43	0.001	36.47	0.001
34.41	0.000	35.45	0.001	36.49	0.001
34.43	0.000	35.47	0.001	36.51	0.001
34.45	0.000	35.49	0.001	36.53	0.001
34.47	0.000	35.51	0.001	36.55	0.001
34.49	0.000	35.53	0.001	36.57	0.001
34.51	0.000	35.55	0.001	36.59	0.001
34.53	0.000	35.57	0.001	36.61	0.001
34.55	0.000	35.59	0.001	36.63	0.001
34.57	0.000	35.61	0.001	36.65	0.001
34.59	0.000	35.63	0.001	36.67	0.001
34.61	0.000	35.65	0.001	36.69	0.001
34.63	0.001	35.67	0.001	36.71	0.001
34.65	0.001	35.69	0.001	36.73	0.001
34.67	0.001	35.71	0.001	36.75	0.001
34.69	0.001	35.73	0.001	36.77	0.001
34.71	0.001	35.75	0.001	36.79	0.001
34.73	0.001	35.77	0.001	36.81	0.001
34.75	0.001	35.79	0.001	36.83	0.001
34.77	0.001	35.81	0.001	36.85	0.001
34.79	0.001	35.83	0.001	36.87	0.002
34.81	0.001	35.85	0.001	36.89	0.002
34.83	0.001	35.87	0.001	36.91	0.002
34.85	0.001	35.89	0.001	36.93	0.002
34.87	0.001	35.91	0.001	36.95	0.002
34.89	0.001	35.93	0.001	36.97	0.002
34.91	0.001	35.95	0.001	36.99	**0.002**
34.93	0.001	35.97	0.001		
34.95	0.001	35.99	0.001		
34.97	0.001	36.01	0.001		
34.99	0.001	36.03	0.001		
35.01	0.001	36.05	0.001		
35.03	0.001	36.07	0.001		
35.05	0.001	36.09	0.001		
35.07	0.001	36.11	0.001		
35.09	0.001	36.13	0.001		
35.11	0.001	36.15	0.001		
35.13	0.001	36.17	0.001		
35.15	0.001	36.19	0.001		
35.17	0.001	36.21	0.001		
35.19	0.001	36.23	0.001		
35.21	0.001	36.25	0.001		
35.23	0.001	36.27	0.001		
35.25	0.001	36.29	0.001		
35.27	0.001	36.31	0.001		

See storage volume & WQV elevation calculations on BMP Worksheet
E(WQV) = 36.97

Stage-Discharge for Pond 13P: Filtration Drip Edge #11

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
34.25	0.00	0.00	**0.00**
34.30	0.00	0.00	0.00
34.35	0.02	0.02	0.00
34.40	0.04	0.04	0.00
34.45	0.07	0.07	0.00
34.50	0.09	0.09	0.00
34.55	0.12	0.12	0.00
34.60	0.14	0.14	0.00
34.65	0.16	0.16	0.00
34.70	0.17	0.17	0.00
34.75	0.18	0.18	0.00
34.80	0.20	0.20	0.00
34.85	0.21	0.21	0.00
34.90	0.22	0.22	0.00
34.95	0.23	0.23	0.00
35.00	0.23	0.23	0.00
35.05	0.24	0.24	0.00
35.10	0.25	0.25	0.00
35.15	0.26	0.26	0.00
35.20	0.27	0.27	0.00
35.25	0.27	0.27	0.00
35.30	0.28	0.28	0.00
35.35	0.29	0.29	0.00
35.40	0.30	0.30	0.00
35.45	0.30	0.30	0.00
35.50	0.31	0.31	0.00
35.55	0.32	0.32	0.00
35.60	0.32	0.32	0.00
35.65	0.33	0.33	0.00
35.70	0.33	0.33	0.00
35.75	0.34	0.34	0.00
35.80	0.35	0.35	0.00
35.85	0.35	0.35	0.00
35.90	0.36	0.36	0.00
35.95	0.36	0.36	0.00
36.00	0.37	0.37	0.00
36.05	0.38	0.38	0.00
36.10	0.38	0.38	0.00
36.15	0.39	0.39	0.00
36.20	0.39	0.39	0.00
36.25	0.40	0.40	0.00
36.30	0.40	0.40	0.00
36.35	0.41	0.41	0.00
36.40	0.41	0.41	0.00
36.45	0.42	0.42	0.00
36.50	0.42	0.42	0.00
36.55	0.43	0.43	0.00
36.60	0.43	0.43	0.00
36.65	0.44	0.44	0.00
36.70	0.44	0.44	0.00
36.75	0.45	0.45	0.00
36.80	0.45	0.45	0.00
36.85	0.45	0.45	0.00
36.90	0.46	0.46	0.00
36.95	0.46	0.46	0.00
37.00	**0.47**	**0.47**	0.00

E(WQV) = 36.97
Q(WQV) = 0.46 cfs

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

GENERAL CALCULATIONS - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP **that does not fit into one of the specific worksheets already provided** (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.30	ac	A = Area draining to the practice
0.25	ac	A_I = Impervious area draining to the practice
0.84	decimal	I = Percent impervious area draining to the practice, in decimal form
0.81	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.24	ac-in	WQV= 1" x Rv x A
870	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.81	inches	Q = Water quality depth. Q = WQV/A
98	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)
0.2	inches	S = Potential maximum retention. S = (1000/CN) - 10
0.037	inches	Ia = Initial abstraction. Ia = 0.2S
6.0	minutes	T_c = Time of Concentration
700.0	cfs/mi^2/in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.262	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac.

Designer's Notes:

For sizing of Focal Point #1 (Pond 13P) in conjunction with Focal Point design worksheet

DESIGN WORKSHEET

FOCALPOINT

NEW HAMPSHIRE AOT PROJECTS

1. **Determine FocalPoint bed area (minimum 174 sf/acre of impervious area - ex: 0.2 acres = 35 sf) See step 2 to determine if minimum size is appropriate.**
   - Tributary impervious area: = 0.250 ac **(A)**
   - Tributary pervious area: = 0.046 ac **(B)**
   - Minimum FocalPoint bed area required: **= ((A x 1.0) + (B x 0.4)) * 174** = 46.7 sf
   - FocalPoint bed area provided: = 50 sf
   - Dimensions of proposed FocalPoint: = 5 ft x 10 ft

2. **Model a Type II & III 24-hr rainfall event that generates the water quality volume to demonstrate that the entire storm volume is treated prior to activation of the overflow (typically set at 6 - 12 in above the mulch). Note: a 1.2 - 1.3 in rainfall event usually generates 1.0 in of runoff.**
   Contact ACF for a sample HydroCAD node.
   - Water quality volume (WQv) goal: = 870 ft^3
   - Type II & III 24-hr rainfall depth to generate WQv: = 1.25 in
   - Temporary storage depth provided: = 3.0 in (typically 6 - 12 in)
   - Temporary storage volume provided at above depth: = 38 ft^3
   - Peak ponding depth from Type III 24-hr storm event: = 2.0 in

3. **Size the Harco PVC domed overflow riser.**
   Note: ACF recommends installation of a Fabco domed overflow filter kit for overflow protection.
   - Domed overflow riser diameter: = 18 in
   - Rim elevation of overflow riser: = 37.75 (typically 6 - 12 in above mulch surface)
   - 6 in invert in elevation from FocalPoint: = 34.75 (typically 3 ft below mulch surface)
   - 12 in invert out elevation: = 34.75

4. **Flood control - peak flow attenuation of major storms**
   The treated flow and bypass flow can be routed to a detention system such as an open pond or a subsurface solution like an expanded R-Tank system. (contact ACF for additional information on designing expanded R-Tank systems)

5. **Prepare a landscape plan for the FocalPoint bed area** ☑

6. **Design review and installation oversight by manufacturer's representative**
   - The design has been reviewed by ACF Environmental ☑
   - Engineer will coordinate installation inspection with ACF Environmental ☑

Contact Rob Woodman - Senior Stormwater Engineer
Cell: 207.272.4431 | Email: rwoodman@acfenv.com

DESIGNING WITH FOCALPOINT IN NEW HAMPSHIRE

The New Hampshire Department of Environmental Services has approved the FocalPoint (High Performance Modular Biofiltration System) for use on AoT site development projects in the State of New Hampshire.

SIZING CRITERIA SUMMARY

- The surface area of the media within FocalPoint must be a minimum of 174 sf per 1.0 acre of impervious area (26 sf per 0.15 acres). The thickness of the media is to be no less than 1.5 ft (18 in).
- The system must be modelled in HydroCAD (or similar TR-55 modeling software) to demonstrate that the entire volume of a 1.22 in Type II or III 24-hr storm is treated prior to activation of the bypass/overflow (typically set at 6 - 12 in above the mulch surface). Note: A 1.22 in rainfall event typically generates 1.0 in of runoff.
- The R-Tank modular underdrain can be expanded beyond the footprint of the FocalPoint media bed for expanded infiltration and peak flow attenuation/detention post treatment.

FOCALPOINT SYSTEMS:




FOCALPOINT ACCESSORIES:


Pretreatment - Rain Guardian Turret


Pretreatment - Rain Guardian Foxhole


Pretreatment - PreTx


Bypass protection - Domed overflow with filter insert

For additional information please visit: www.acfenvironmental.com

Contact Rob Woodman - Senior Stormwater Engineer
Cell: 207.272.4431 | Email: rwoodman@acfenv.com

Summary for Pond 14P: Focal Point #1

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=8)

Inflow Area = 0.296 ac, 84.40% Impervious, Inflow Depth = 0.80" for FP1 WQF event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af
Outflow = 0.28 cfs @ 12.12 hrs, Volume= 0.020 af, Atten= 0%, Lag= 1.8 min
Primary = 0.28 cfs @ 12.12 hrs, Volume= 0.020 af
Routed to Pond 18P : Underground Detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 37.67' @ 12.12 hrs Surf.Area= 118 sf Storage= 33 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.8 min (803.0 - 802.2)

Bottom of surface bowl = 37.50
WQF Storm peak el. = 37.67
Overflow el. = 37.75
2" ponding depth during WQF storm
3" storage provided

Volume	Invert	Avail.Storage	Storage Description
#1	35.25'	23 cf	**5.00'W x 10.00'L x 2.25'H Focal Point** 113 cf Overall x 20.0% Voids
#2	37.50'	67 cf	**Surface Bowl (Prismatic)**Listed below (Recalc)
		90 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
37.50	50	0	0
38.00	102	38	38
38.25	133	29	67

Device	Routing	Invert	Outlet Devices
#1	Primary	34.50'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 34.50' / 33.60' S= 0.0082 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	35.25'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#3	Device 1	37.75'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.26 cfs @ 12.12 hrs HW=37.62' TW=32.05' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.26 cfs of 4.83 cfs potential flow)
├**2=Exfiltration** (Exfiltration Controls 0.26 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 14P: Focal Point #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
35.25	50	0
35.30	50	0
35.35	50	1
35.40	50	1
35.45	50	2
35.50	50	3
35.55	50	3
35.60	50	4
35.65	50	4
35.70	50	5
35.75	50	5
35.80	50	5
35.85	50	6
35.90	50	6
35.95	50	7
36.00	50	8
36.05	50	8
36.10	50	9
36.15	50	9
36.20	50	10
36.25	50	10
36.30	50	10
36.35	50	11
36.40	50	11
36.45	50	12
36.50	50	13
36.55	50	13
36.60	50	14
36.65	50	14
36.70	50	15
36.75	50	15
36.80	50	15
36.85	50	16
36.90	50	16
36.95	50	17
37.00	50	18
37.05	50	18
37.10	50	19
37.15	50	19
37.20	50	20
37.25	50	20
37.30	50	20
37.35	50	21
37.40	50	21
37.45	50	22
37.50	100	23
37.55	105	25
37.60	110	28
37.65	116	31
37.70	121	35
37.75	126	38
37.80	131	42

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
37.85	136	46
37.90	142	51
37.95	147	56
38.00	152	61
38.05	158	66
38.10	164	71
38.15	171	77
38.20	177	83
38.25	**183**	**90**

Overflow el. = 37.75
Temporary storage
provided = 38 cf

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

GENERAL CALCULATIONS - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP **that does not fit into one of the specific worksheets already provided** (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.33	ac	A = Area draining to the practice
0.32	ac	A_I = Impervious area draining to the practice
0.98	decimal	I = Percent impervious area draining to the practice, in decimal form
0.93	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.31	ac-in	WQV= 1" x Rv x A
1,114	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.93	inches	Q = Water quality depth. Q = WQV/A
99	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P]$^{0.5}$)
0.1	inches	S = Potential maximum retention. S = (1000/CN) - 10
0.012	inches	Ia = Initial abstraction. Ia = 0.2S
6.0	minutes	T_c = Time of Concentration
700.0	cfs/mi^2/in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.336	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac.

Designer's Notes:

For sizing of Jellyfish #1 (15P). See detail sheet within plan set.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

GENERAL CALCULATIONS - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP **that does not fit into one of the specific worksheets already provided** (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.22	ac	A = Area draining to the practice
0.21	ac	A_I = Impervious area draining to the practice
0.96	decimal	I = Percent impervious area draining to the practice, in decimal form
0.91	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.20	ac-in	WQV= 1" x Rv x A
743	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.91	inches	Q = Water quality depth. Q = WQV/A
99	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)
0.1	inches	S = Potential maximum retention. S = (1000/CN) - 10
0.015	inches	Ia = Initial abstraction. Ia = 0.2S
6.0	minutes	T_c = Time of Concentration
700.0	cfs/mi^2/in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.224	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac.

Designer's Notes:

For sizing of Jellyfish #2 (16P). See detail sheet within plan set.

APPENDIX X

Infiltration Testing Data

AMOOZEMETER DATA SHEET

JONES&BEACH ENGINEERS, INC.

Project #: 24029
Test Pit #: 6010
Permeameter Test #: 1/3
Date: 12/24/24
Location: Exeter
Soil Map Unit Series: Scitico
Horizon: **B / C** (circled: C) (circle one)

Outflow Chamber(s) Used (circle one) :
Associated Conversion Factor:

Small ("1 on") (= 20.0cm²)   **Both ("2 on")** (= 105.0 cm^2) (circled: Both)

Used constant for one tube - '2 on' was producing unrealistic results (typ.)

Data Collection Interval (circle one) :

30 Sec.   **1 Min.** (circled)   **2 Min.**

Test hole profile:

Unit

0 "

10 "

(10" SHWT)

Calculation Formulas:

D = (AxB)/C

E = D x 0.001056

F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr

Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

AMOOZEMETER DATA SHEET

JONES & BEACH ENGINEERS INC.

Project #: 24029
Test Pit #: 6010
Permeameter Test #: 2/3
Date: 10/24/24
Location: Exeter
Soil Map Unit Series: Scitico
Horizon: B / C (circled: C) (circle one)

Outflow Chamber(s) Used (circle one) :
Associated Conversion Factor:

Small ("1 on")	Both ("2 on") (circled)
(= 20.0cm^2)	(= 105.0 cm^2)

Used constant for one tube - '2 on' was producing unrealistic results (typ.)

Data Collection Interval (circle one) :

30 Sec. | **1 Min.** (circled) | **2 Min.**

Test hole profile:

Unit

____ "

10 "

Calculation Formulas:

D = (AxB)/C

E = D x 0.001056

F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr

Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

AMOOZEMETER DATA SHEET

JONES&BEACH ENGINEERS INC.

Project #: 24029
Test Pit #: 601
Permeameter Test #: 3/3
Date: 10/24/24
Location: Exeter
Soil Map Unit Series: Sutton
Horizon: B / C (circle one)

Outflow Chamber(s) Used (circle one) : Associated Conversion Factor:

Small ("1 on") (= 20.0cm^2)   Both ("2 on") (= 105.0 cm^2)

Used constant for one tube - "2 on" was producing unrealistic results (typ.)

Data Collection Interval (circle one) :

30 Sec.   1 Min.   2 Min.

Test hole profile:

Unit

10 "

10 "

Calculation Formulas:

D = (AxB)/C

E = D x 0.001056

F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr

Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

AMOOZEMETER DATA SHEET

JONES & BEACH ENGINEERS, INC.

Project #: 24029
Test Pit #: 6007
Permeameter Test #: 1/3
Date: 10/29/24
Location: Exeter
Soil Map Unit Series: Scitico
Horizon: B / C (circle one)

Outflow Chamber(s) Used (circle one) : Associated Conversion Factor:

Small ("1 on") (= 20.0cm^2)   Both ("2 on") (= 105.0 cm^2)

Used constant for one tube - '2 on' was producing unrealistic results (typ.)

Data Collection Interval (circle one) :

30 Sec.   1 Min.   2 Min.

Test hole profile:

Unit

___"

6 "

Start with this one ↓

Calculation Formulas:

D = (AxB)/C

E = D x 0.001056

F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr

Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

AMOOZEMETER DATA SHEET

JONES&BEACH ENGINEERS INC

Project #: 24029
Test Pit #: 6007
Permeameter Test #: 2/3
Date: 10/24/24
Location: Exeter
Soil Map Unit Series: Boxford
Horizon: B / C (circle one)

Outflow Chamber(s) Used (circle one) :
Associated Conversion Factor:

Small ("1 on") (= 20.0cm^2)

Both ("2 on") (= 105.0 cm^2)

Used constant for one tube - "2 on" was producing unrealistic results (typ.)

Data Collection Interval (circle one) :

30 Sec. **1 Min.** **2 Min.**

Test hole profile:
Unit
___"
6"

Calculation Formulas:
D = (AxB)/C
E = D x 0.001056
F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

AMOOZEMETER DATA SHEET

JONES&BEACH ENGINEERS

Project #: 24029
Test Pit #: 6007
Permeameter Test #: 3/3
Date: 10/24/24
Location: Exeter
Soil Map Unit Series: Boxford
Horizon: B / C (circle one) — C circled

Outflow Chamber(s) Used (circle one) :
Associated Conversion Factor:

Small ("1 on") (= $20.0cm^2$)

Both ("2 on") (= 105.0 cm^2) — circled

Used constant for one tube - '2 on' was producing unrealistic results (typ.)

Data Collection Interval (circle one) :

30 Sec. (circled) **1 Min.** **2 Min.**

Test hole profile:

Unit

____"

6 "

Calculation Formulas:

D = (AxB)/C

E = D x 0.001056

F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr

Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

AMOOZEMETER DATA SHEET

JONES&B... ENGINEER... INC.

Project #: 24029

Test Pit #: 6001

Permeameter Test #: 1/3

Date: 10/24/24

Location: Field

Soil Map Unit Series: Boxford

Horizon: B / C (circled: C) (circle one)

Outflow Chamber(s) Used (circle one) :
Associated Conversion Factor:

Small ("1 on") (= 20.0cm^2)

Both ("2 on") (= 105.0 cm^2) (circled)

Used constant for one tube – "2 on" was producing unrealistic results (typ.)

Data Collection Interval (circle one) :

30 Sec. (circled) 1 Min. 2 Min.

Test hole profile:

Unit

___"

16"

Calculation Formulas:

D = (AxB)/C

E = D x 0.001056

F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr

Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

AMOOZEMETER DATA SHEET

JONES & BEACH ENGINEERS INC.

Project #: 24029
Test Pit #: 6001
Permeameter Test #: 2/3
Date: 10/24/24
Location: Exeter
Soil Map Unit Series: Boxford
Horizon: B / C (circle one) — C circled

Outflow Chamber(s) Used (circle one) :
Associated Conversion Factor:

Small ("1 on") (= 20.0cm^2)

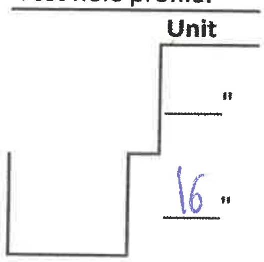
Both ("2 on") (= 105.0 cm^2)

Used constant for one tube – '2 on' was producing unrealistic results (typ.)

Data Collection Interval (circle one) :

30 Sec. (circled) **1 Min.** **2 Min.**

Test hole profile:



Calculation Formulas:

D = (AxB)/C

E = D x 0.001056

F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr
Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

AMOOZEMETER DATA SHEET

JONES & BEACH ENGINEERS INC.

Project #: 24029
Test Pit #: 6001
Permeameter Test #: 3/3
Date: 10/24/24
Location: Exeter
Soil Map Unit Series: Boxford
Horizon: B / C (circle one) — C circled

Outflow Chamber(s) Used (circle one) :
Associated Conversion Factor:

Small ("1 on") (= 20.0cm^2)

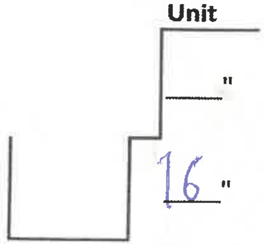
Both ("2 on") (= 105.0 cm^2)

Used constant for one tube - '2 on' was producing unrealistic results (typ.)

Data Collection Interval (circle one) :

30 Sec. (circled) **1 Min.** **2 Min.**

Test hole profile:



Calculation Formulas:

D = (AxB)/C

E = D x 0.001056

F = E / 2.54

Notes: Mulitply "D" by 0.001056 for a conversion from cm^3/hr to cm/hr

Multiply "E" by 0.393701 for conversion fro cm/hr to in/hr

TP 6010 - Test #1

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
12	20	1	0.016667	14400.0	15.2064	5.9868
19.2	20	2	0.033333	11520.0	12.1651	4.7894
24	20	3	0.05	9600.0	10.1376	3.9912

Outlier due to experimental error - Discard this test

Mean	**4.9225**
σ (Std. Dev.)	**0.8201**

Constant	20	cm^2
Glover Coefficient:	0.001056	$1/cm^2$

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Average of Tests 2&3 = 2.0 iph

With factor of safety of two = **1.0** iph

TP 6010 - Test #2

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
2.8	20	1	0.016667	3360.0	3.5482	1.3969
6.1	20	2	0.033333	3660.0	3.8650	1.5216
9.3	20	3	0.05	3720.0	3.9283	1.5466
12.4	20	4	0.066667	3720.0	3.9283	1.5466
15	20	5	0.083333	3600.0	3.8016	1.4967

Constant	20 cm^2
Glover Coefficient:	0.001056 1/cm^2

Mean	**1.5017**
σ (Std. Dev.)	**0.0655**

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Average of Tests 2&3 = 2.0 iph

With factor of safety of two = **1.0** iph

TP 6010 - Test 3

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
5.8	20	1	0.016667	6960.0	7.3498	2.8936
11.3	20	2	0.033333	6780.0	7.1597	2.8188
17.1	20	3	0.05	6840.0	7.2230	2.8437
21.4	20	4	0.066667	6420.0	6.7795	2.6691
15	20	5	0.083333	3600.0	3.8016	1.4967

Mean	**2.5444**
σ (Std. Dev.)	**0.0311**

Constant	20	cm^2
Glover Coefficient:	0.001056	$1/cm^2$

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Average of Tests 2&3 = 2.0 iph

With factor of safety of two = **1.0** iph

TP 6007 - Test 1

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
2	20	0.5	0.008333	4800.0	5.0688	1.9956
3.7	20	1	0.016667	4440.0	4.6886	1.8459
5.4	20	1.5	0.025	4320.0	4.5619	1.7960
6.6	20	2	0.033333	3960.0	4.1818	1.6464
8.1	20	2.5	0.041667	3888.0	4.1057	1.6164

Constant	20 cm^2
Glover Coefficient:	0.001056 $1/cm^2$

Mean	**1.7801**
σ (Std. Dev.)	**0.0848**

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Average mean Ksat = 2.9 iph

With factor of safety of two = **1.45** iph

TP 6007 - Test 2

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
3.8	20	0.5	0.008333	9120.0	9.6307	3.7916
7.5	20	1	0.016667	9000.0	9.5040	3.7417
9.8	20	1.5	0.025	7840.0	8.2790	3.2595
12.5	20	2	0.033333	7500.0	7.9200	3.1181
15.6	20	2.5	0.041667	7488.0	7.9073	3.1131

Mean	**3.4048**
σ (Std. Dev.)	**0.2400**

Constant	20	cm^2
Glover Coefficient:	0.001056	1/cm^2

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Average mean Ksat = 2.9 iph

With factor of safety of two = **1.45** iph

TP 6007 - Test 3

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
3.9	20	0.5	0.008333	9360.0	9.8842	3.8914
7.1	20	1	0.016667	8520.0	8.9971	3.5422
10.6	20	1.5	0.025	8480.0	8.9549	3.5255
14.4	20	2	0.033333	8640.0	9.1238	3.5921
17.5	20	2.5	0.041667	8400.0	8.8704	3.4923

Mean	**3.6087**
σ (Std. Dev.)	**0.1687**

Constant	20	cm^2
Glover Coefficient:	0.001056	1/cm^2

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Average mean Ksat = 2.9 iph

With factor of safety of two = **1.45** iph

TP 6001 - Test 1

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
3.9	20	0.5	0.008333	9360.0	9.8842	3.8914
6.7	20	1	0.016667	8040.0	8.4902	3.3426
9.8	20	1.5	0.025	7840.0	8.2790	3.2595
13.1	20	2	0.033333	7860.0	8.3002	3.2678
16.5	20	2.5	0.041667	7920.0	8.3635	3.2927

Mean	**3.4108**
σ (Std. Dev.)	**0.2804**

Constant	20	cm^2
Glover Coefficient:	0.001056	$1/cm^2$

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Average mean Ksat = 3.3 iph

With factor of safety of two = **1.65** iph

TP 6001 - Test 2

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
3	20	0.5	0.008333	7200.0	7.6032	2.9934
5.8	20	1	0.016667	6960.0	7.3498	2.8936
9.1	20	1.5	0.025	7280.0	7.6877	3.0266
13	20	2	0.033333	7800.0	8.2368	3.2428
16.1	20	2.5	0.041667	7728.0	8.1608	3.2129

Mean	**3.0739**
σ (Std. Dev.)	**0.0565**

Constant	20	cm^2
Glover Coefficient:	0.001056	$1/cm^2$

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Average mean Ksat = 3.3 iph

With factor of safety of two = **1.65** iph

TP 6001 - Test 3

Height	Constant	Time		Outflow	Rate (K_{sat})	
cm	cm^2	Minutes	Hours	cm^3/hr	cm/hr	in/hr
0						
3.8	20	0.5	0.008333	9120.0	9.6307	3.7916
6.8	20	1	0.016667	8160.0	8.6170	3.3925
10.1	20	1.5	0.025	8080.0	8.5325	3.3592
13.7	20	2	0.033333	8220.0	8.6803	3.4174
17.2	20	2.5	0.041667	8256.0	8.7183	3.4324

Mean	**3.4786**
σ (Std. Dev.)	**0.1965**

Constant	20	cm^2
Glover Coefficient:	0.001056	1/cm^2

Calculations:

Constant = 20 cm^2 for one tube, 105 cm^2 for two tubes (two tubes used)

Hours = Minutes / 60

Outflow = (Height*Constant)/Hours

Ksat = Outflow*Glover Coefficient

Average mean Ksat = 3.3 iph

With factor of safety of two = **1.65** iph

APPENDIX XI

BMP Pollutant Removal Efficiency Data and Calculations

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%

For standard stone drip edge

Drip edge with filter course is similar to a bioretention system for residential roof runoff

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%

REGION 1
BOSTON, MA 02109
Dated by Signature

MEMORANDUM

SUBJECT: FocalPoint Crediting Direction

FROM: Damien Houlihan, Stormwater Permits Section
Water Division

TO: Robert J. Woodman
Director - Engineering and Green Stormwater Infrastructure
Ferguson Waterworks

On June 7, 2021, Ferguson Waterworks (Ferguson) submitted a request to EPA Region 1 regarding the use of the FocalPoint biofiltration system (also known also as the High Performance Modular Biofiltration System, hereinafter "FocalPoint biofiltration system"). Based on the review of documents submitted by Ferguson, EPA Region 1 finds that entities wishing to deploy the FocalPoint biofiltration system may calculate phosphorus and nitrogen reductions under the 2016 Massachusetts Municipal Separate Storm Sewer Permit (MA MS4 Permit) and the 2017 New Hampshire Municipal Separate Storm Sewer Permit (NH MS4 Permit) using the performance quantification for Enhanced Biofiltration found on Table 3-20 and Figure 3-15 of Attachment 3 to Appendix F of the MA MS4 permit and Table 3-20 and Figure 3-15 of Attachment 3 to Appendix F of the NH MS4 permit (also attached to this document for reference) provided the following standard FocalPoint design requirements and other conditions are met:

1. Ferguson's FocalPoint biofiltration systems are to be designed with pretreatment to remove coarse sediment and debris before they reach and prematurely close the filter bed. Pretreatment measures must be designed to dissipate velocities and spread water out over a 2 to 4 ft width.
2. Ferguson's FocalPoint biofiltration systems are to be designed with a minimum and maximum surface ponding depths of 3 inches and 18 inches, respectively.
3. Ferguson's FocalPoint biofiltration systems are to be separated or otherwise isolated from the groundwater table to ensure that groundwater does not inundate the filter bed either using an impermeable liner or physical separation.
4. Ferguson's FocalPoint biofiltration systems are to be designed such that the system bed area is sized to be a minimum of 174 square feet per acre of tributary area. Stormwater modelling software shall be used to demonstrate that the runoff volume goal is treated prior to bypass.
5. System maintenance of Ferguson's FocalPoint biofiltration systems should occur once every 6 months, at a minimum, and filter media and pretreatment measures shall be replaced such that the performance of the systems are maintained as originally designed.

6. Stormwater quality monitoring must be used to ensure system performance has not declined over time. EPA recommends this monitoring commence once the filter bed media reaches two (2) years in age to ensure system performance has not declined. All monitoring data must be submitted to EPA by the entity claiming pollution reduction credit for the FocalPoint biofiltration system and filter media shall be replaced if monitoring data shows a decline in performance from original design.

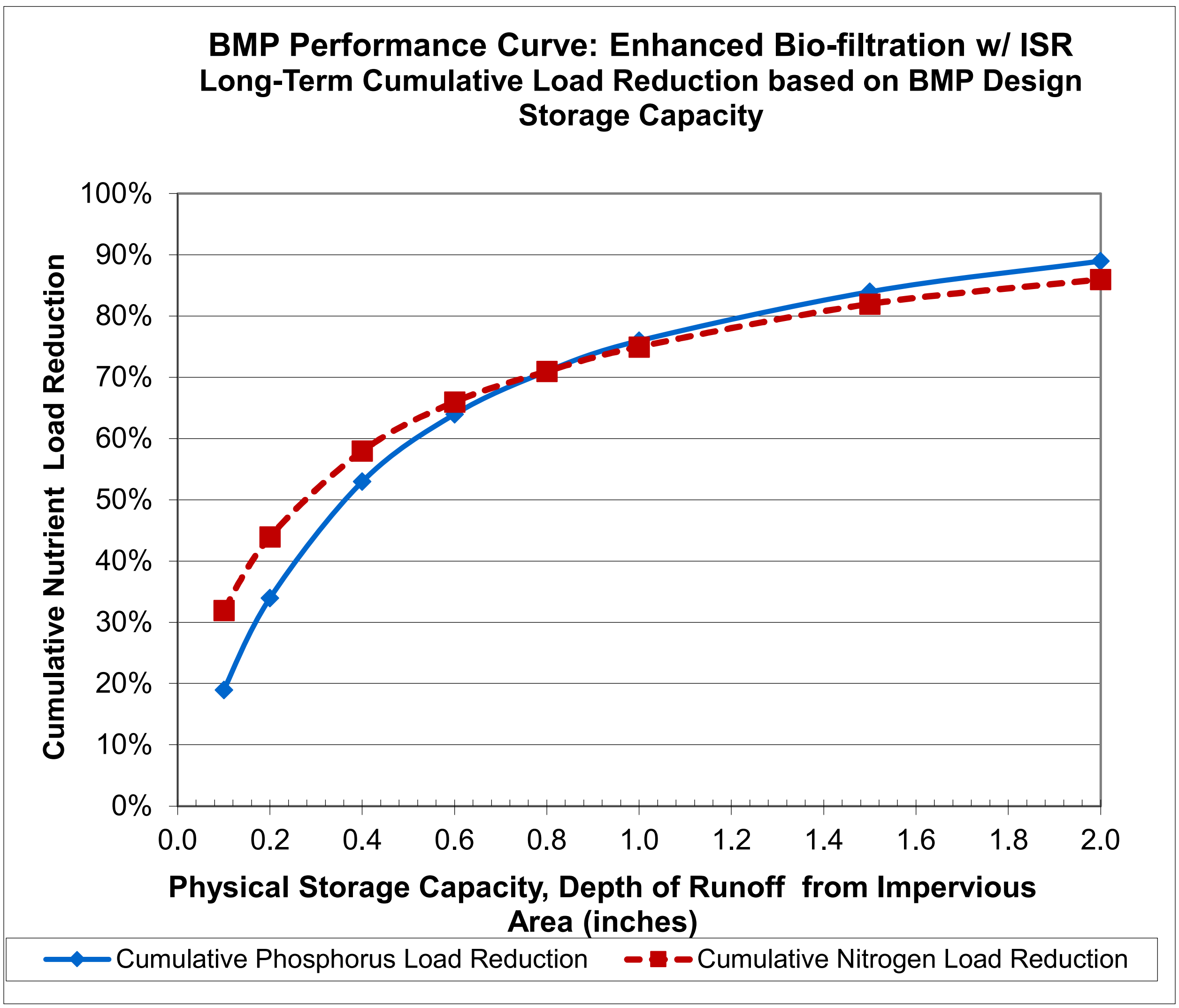
This pollution reduction crediting of the FocalPoint biofiltration system is consistent with the Alternative Methods request process contained in Attachment 3 to Appendix F in the MA MS4 Permit and Attachment 3 to Appendix F of the NH MS4 Permit and may be used unless EPA Region 1 requires an alternative pollution reduction crediting methodology based on new or additional modeling of high-flow-rate filtering systems in a future NPDES permit. All stormwater quality monitoring data shall be submitted to EPA consistent with the requirements of the MA MS4 Permit or the NH MS4 Permit.

Table 3- 20: Enhanced Bio-filtration* with Internal Storage Reservoir (ISR) BMP Performance Table

Enhanced Bio-filtration* w/ ISR BMP Performance Table: Long-Term Phosphorus & Nitrogen Load Reduction								
BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative Phosphorus Load Reduction	19%	34%	53%	64%	71%	76%	84%	89%
Cumulative Nitrogen Load Reduction	32%	44%	58%	66%	71%	75%	82%	86%

***Filter media augmented with phosphorus sorbing materials to enhance phosphorus removal.**

Figure 3-15: BMP Performance Curve: Enhanced Bio-filtration with Internal Storage Reservoir (ISR) BMP Performance Table



11. Data Quality Assessment

Data was analyzed using statistical methods in accordance with guidelines in the **TARP Protocol for Stormwater Best Management Practice Demonstrations**, and the **VTAP Guidance for Evaluating Stormwater Manufactured Treatment Devices**. Data was examined by statistical and regression analysis, ANOVA statistics, non-parametric analysis, correlations, probability distributions of data, normality testing, standards, and physical data replication.

Data integrity in the laboratory was addressed in a multi-level review process for all analyses conducted. The initial step in this review process was conducted by each lab analyst as tests were conducted. Calibration values and procedures were checked against previous tests to alert the analyst to in case of malfunction in equipment or test errors.

The second level of review was conducted by the lab director who collected results and entered these values into the tabular spreadsheets for each test. Each of the results was checked for accuracy of input as well as to appropriateness for the samples which were analyzed. All results were overseen or conducted personally by the lab manager. All preliminary calculations were reviewed.

The final level of review was conducted by the project manager who reviewed all results generated within the laboratory.

12. Conclusions

Field testing of an Imbrium Systems' Jellyfish® Filter model JF4-2-1 with second-generation filtration cartridges was conducted in accordance with the TARP and VTAP field test protocols. The physical modeling campaign was carried out on the University of Florida campus with the full-scale unit loaded by rainfall-runoff from a surface parking watershed. A total of 25 monitored storm events, with 15 inches of cumulative rainfall depth, were treated by the JF4 during this study. Of the 25 storms treated, two storms generated flows exceeding the maximum design flow of 200 gpm. No maintenance was required or conducted during the 13-month monitoring period from May 28, 2010 to June 27, 2011.

Treatment results generated median SSC and TSS removal efficiency results of 99% and 89%, respectively. Median removal efficiency was 59% for Total Phosphorus and 51% for Total Nitrogen. For Total Copper, Zinc, Lead and Chromium median removal efficiencies were 90, 70, 81, and 36%, respectively. The d_{50} for influent and effluent particle sizes were 82 and 3 μm, respectively. Median head loss never exceeded 8.4 inches (21.4 cm) for any event and across the entire monitoring campaign the median head loss was 3.3 inches (8.3 cm). Dry basis particulate matter (PM) recovered from the treatment unit totaled 166 pounds, and the JF4-2-1 had a volumetric capacity to retain a significantly larger mass of PM. Median and peak head losses were driven predominately by flow rate and to a much lesser degree by filter cartridge ripening which was muted. At the completion of the monitoring campaign, a 95% mass balance was obtained on particulate matter (PM) which validates the testing methods used throughout this study. This mass balance on PM is an independent requirement to validate the influent and effluent monitoring and validates the most rigorous unit operation and process physical modeling available. The results obtained in this field study demonstrate that the Jellyfish Filter's particulate removal performance is reasonably insensitive to incoming particle size distribution (PSD) and runoff event duration.

(JBE): 51% TN removal was observed in this study. Updated testing has resulted in a 75% TP removal efficiency for the Jellyfish as noted on Contech's website. No published TN removal value was available for the Jellyfish.

Jellyfish Filter Performance Testing Results

Pollutant of Concern	% Removal
Total Suspended Solids (TSS)	85%
Total Phosphorus (TP)	75%
Total Copper (TCu)	67%
Total Zinc (TZn)	60%

Source:

WA DOE TAPE Testing: https://fortress.wa.gov/ ecy/ezshare/wq/tape/use_designations/ JELLYFISHfilterIMBRIUMguld.pdf

Select Jellyfish Filter Certifications

- Washington State Department of Ecology (TAPE) GULD – Basic, Phosphorus
- New Jersey Corporation for Advanced Technology (NJCAT)
- Virginia Department of Environmental Quality (VA DEQ)
- Texas Commission on Environmental Quality (TCEQ)
- Canada ISO 14034 Environmental Management - Environmental Technology Verification (ETV)
- Philadelphia Water District (PWD)
- Maryland Department of the Environment (MD DOE)
- Virginia Department of Environmental Quality (VA DEQ)

Jellyfish Filter Configurations

The Jellyfish Filter can be can be configured in a variety of systems; manhole, catch basin, vault, or custom configuration. Typically, 18 inches (457 mm) of driving head is designed into the system. For low drop sites, the designed driving head can be less.

Jellyfish Filter Maintenance

- Jellyfish Filter cartridges are lightweight, easy to use, and reusable
- Maintenance of the filter cartridges is performed by removing, rinsing and reusing the cartridge tentacles.
- Vacuum extraction of captured pollutants in the sump is recommended at the same time.
- Full cartridge replacement intervals differ by site due to varying pollutant loading and type, and maintenance frequency. Replacement is anticipated every 2-5 years.
- Contech has created a network of **Certified Maintenance Providers** to provide maintenance on stormwater BMP's.

POLLUTANT REMOVAL CALCULATIONS

BMP	Filter Drip Edge	Porous	Focal Point	Jellyfish	Stone Drip Edge	Total	Required
Acres Impervious	0.341	1.532	0.250	0.538	0.063	2.723	
TSS Removal (%)	90%	90%	90%	85%	90%	**89%**	**80%**
TN Removal (%)	65%	60%	76%	51%	55%	**60%**	**60%**
TP Removal (%)	65%	65%	75%	75%	60%	**68%**	**60%**

Calculations are based on post-construction impervious surfaces on the subject parcels.
Pervious areas within the watersheds draining to stormwater features are excluded from these calculations.

Pollutant removal efficiencies are per the New Hampshire Stormwater Manual, Volume 2, or are otherwise based on proprietary information from the manufacturer.

TSS removal of 89% provided exceeds 80% requirement
TN removal of 60% provided meets 60% requirement
TP removal of 68% provided exceeds 60% requriement

APPENDIX XII

Stormwater Operations and Maintenance Manual

STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE MANUAL

"Lilac Place"
76 Portsmouth Ave.
Exeter, NH 03833
Tax Map 137, Lots 4 & 75

Prepared for:

Green & Company
11 Lafayette Road
North Hampton, NH 03862

<u>Prepared by:</u>
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746

November 4, 2024
Revised January 10, 2025
Revised February 12, 2025
JBE Project No. 24029

JONES&BEACH ENGINEERS INC.

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. The annual report and certification shall be submitted with three copies to the Town Planner by January 31st of each year.

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. Paved surfaces
   b. Vegetation and landscaping
   c. Porous Pavement
   d. Drain Manholes
   e. Drip Edges
   f. Culverts
   g. Rip-Rap Outlet Protection Aprons
   h. Yard Drains
   i. Pocket Pond
   j. Pre-Tx
   k. Focal Point
   l. Contech Jellyfish
   m. Underground Detention Chambers

2. Maintenance of permanent measures shall follow the following schedule:

   a. Normal winter pavement maintenance including plowing and snow removal. Pavement 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. Porous Asphalt:

      The following criteria will help assure that the pavement is maintained to preserve its hydrologic effectiveness.

      Winter maintenance:

      - Sanding for winter traction is prohibited. Deicing is permitted (NaCl, $MgCl_2$, 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.

- Plowing is allowed, blade should be set approximately 1" above road surface. Ice and light snow accumulation are generally not as problematic as for standard asphalt. Snow will accumulate during heavier storms and should be plowed. (more than usual, about an inch).

Routine maintenance:

- Asphalt seal coating is absolutely forbidden. Surface seal coating is not reversible.
- The pavement surface should be vacuumed 2 or 3 times per year, and at any additional times sediment is spilled, eroded, or tracked onto the surface.
- Planted areas adjacent to pervious pavement shall be well maintained to prevent soil washout onto the pavement. 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 pavement. Superficial dirt does not necessarily clog the pavement voids. However, dirt that is ground in repeatedly by tires can lead to clogging. Therefore, avoid tracking or spilling dirt onto the pavement with trucks or heavy equipment.
- Do not allow construction staging, soil/mulch storage, etc. on unprotected pavement surface. Contractor to laydown tarps, plywood or removable item and take care not to track material onto unprotected pavement.
- Repairs: potholes of less than 50 square feet can be patched by any means suitable with standard pavement or a pervious mix is preferred. For areas greater than 50 sq. ft. is in need of repair, approval of patch type shall be sought from a qualified engineer. Any required repair of drainage structures should be done promptly to ensure continued proper functioning of the system.
- Written and verbal communication to the porous pavement's future owner shall make clear the pavement's special purpose and special maintenance requirements such as those listed here.

d. **Annual inspection** of drain manholes to determine if they need to be cleaned. Manholes shall be cleaned of any material upon inspection. Manholes 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.

e. Roof drip edges:

The following course of action will help assure that the roof drip edges are maintained to preserve its effectiveness.

In the spring and fall, visually inspect the area around the edges and repair any erosion. Use small stones to stabilize erosion along drainage paths. Inspect stone area to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock shall be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation shall not be allowed to become established in stone areas, and/or any debris removed from the void spaces between the stones

f. **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.

g. 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

h. **Annual inspection** of yard drains to determine if they need to be cleaned. 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 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 yard drain, then it shall be cleaned on a weekly basis. The 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

i. Pocket Pond: Regularly mow this BMP. If the detention pond does not drain within 72 hours following a rainfall event, then a Professional Engineer shall assess the condition of the facility to determine measures required to restore function, including but not limited to removal of accumulated sediments or reconstruction of the basin.

j. Rain Guardian Bunker: See attached inspection and maintenance guidance document.

k. Focal Point: See attached inspection and maintenance guidance document.

l. Contech Jellyfish: See attached inspection and maintenance guidance document.

m. Underground Detention Chambers: Once annually, open the inspection ports and visually inspect the condition of the stone base. If more than 12” of sediment is observed, plug the outlet and flush the system thoroughly. Pump water into system until at least 1” of standing water covers the system bottom. Repeat at both inspection ports and pump out back-flush water. Capture sediment-laden water for proper disposal according to local state, and EPA regulation. Additionally, vacuum all adjacent manhole structures.

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. The annual report and certification shall be submitted with three copies to the Town Planner by January 31st of each year.

Construction Activity	**Date of Inspection**	**Who Inspected**	**Findings of Inspector**
Paved Surfaces			
Vegetation and Landscaping			
Porous Asphalt / Porous Concrete			
Drain Manhole #1			
Drain Manhole #2			
Drain Manhole #3			

Building #1 Drip Edge			
Building #2 Drip Edge			
Building #3 Drip Edge			
Building #4 Drip Edge			
Building #5 Drip Edge			
Building #6 Drip Edge			
Building #7 Drip Edge			

Building #8 Drip Edge			
Building #9 Drip Edge			
Building #10 Drip Edge			
Culvert inlet #1			
Culvert inlet #2			
Culvert inlet #3			
Culvert inlet #4			

Culvert inlet #5			
Culvert inlet #6			
Culvert inlet #7			
Culvert outlet #1 (All culvert outlet inspections include inspection of respective rip rap apron, if applicable.)			
Culvert outlet #2			
Culvert outlet #3			
Culvert outlet #4			

Culvert outlet #5			
Underdrain outlet #6			
Underdrain outlet #7			
Underdrain outlet #8			
Underdrain outlet #9			
Underdrain outlet #10			
Underdrain outlet #11			

Underdrain outlet #12			
Underdrain outlet #13			
Underdrain outlet #14			
Culvert outlet #15			
Roof drain outlet #16			
Culvert outlet #17			
Culvert outlet #18			

Culvert outlet #19			
Yard drain #1			
Yard drain #2			
Yard drain #3			
Pocket Pond			
Rain Guardian Bunker			
Focal Point			

Contech Jellyfish #1			
Contech Jellyfish #2			
Underground Detention Chambers			
Other (please note):			
Other (please note):			
Other (please note):			

Deicing Log

Date Applied	Type of Deicing Material	Amount Applied

RAIN GUARDIAN

U.S. PATENT NOS. 8,501,016 AND 8,858,804

PRETREATMENT FOR BIORETENTION

Rain Gardens • Swales • Filtration Basins • Infiltration Basins

TURRET

FOXHOLE

BUNKER

Maintenance Guide

Rain Guardian pretreatment chambers simplify bioretention maintenance by collecting sand, leaves, grass clippings, and other debris in an easy to clean, confined location. Regularly maintaining the Rain Guardian sustains its functionality by maximizing storage and filtration capacities. Maintenance frequency is variable and depends on many factors such as rainfall frequency, drainage area size and land use type, and season of the year. The general cleaning process is similar for all Rain Guardian models (i.e. Bunker, Foxhole, and Turret).

Following rain events, inspect the pretreatment chamber for debris on the top grate, within the chamber, and on the vertical, drop-in filter wall. The maintenance steps described below should be completed if areas of the top grate are clogged, the chamber is >75% full, or the vertical filter wall is clogged. Maintenance should be completed when stormwater has completely drained from the bioretention practice. The filter wall allows the chamber to dry between rain events, which further simplifies maintenance by ensuring removed debris is largely dry. Ensure all debris collected during cleaning of the chamber is completely removed from the site and properly disposed of according to local environmental rules. Once cleaning is complete, reinstall the filter wall with filter fabric facing the inside of the chamber and replace the top grate. For the Foxhole, reinstall the top lid, including optional lid anchor screws if equipped.

Clear Debris from Top Grate

- Foxhole only—remove top lid, including optional lid anchor screws if equipped
- Leaf litter and garbage commonly accumulate on the top grate
- Simply remove and dispose of debris by hand or with a shovel prior to removing top grate

Remove Debris from Inside Chamber

- Remove top grate and place on paved inlet to avoid damage to nearby plants
- Remove and dispose of accumulated debris within chamber using a shovel

Clean Filter Wall

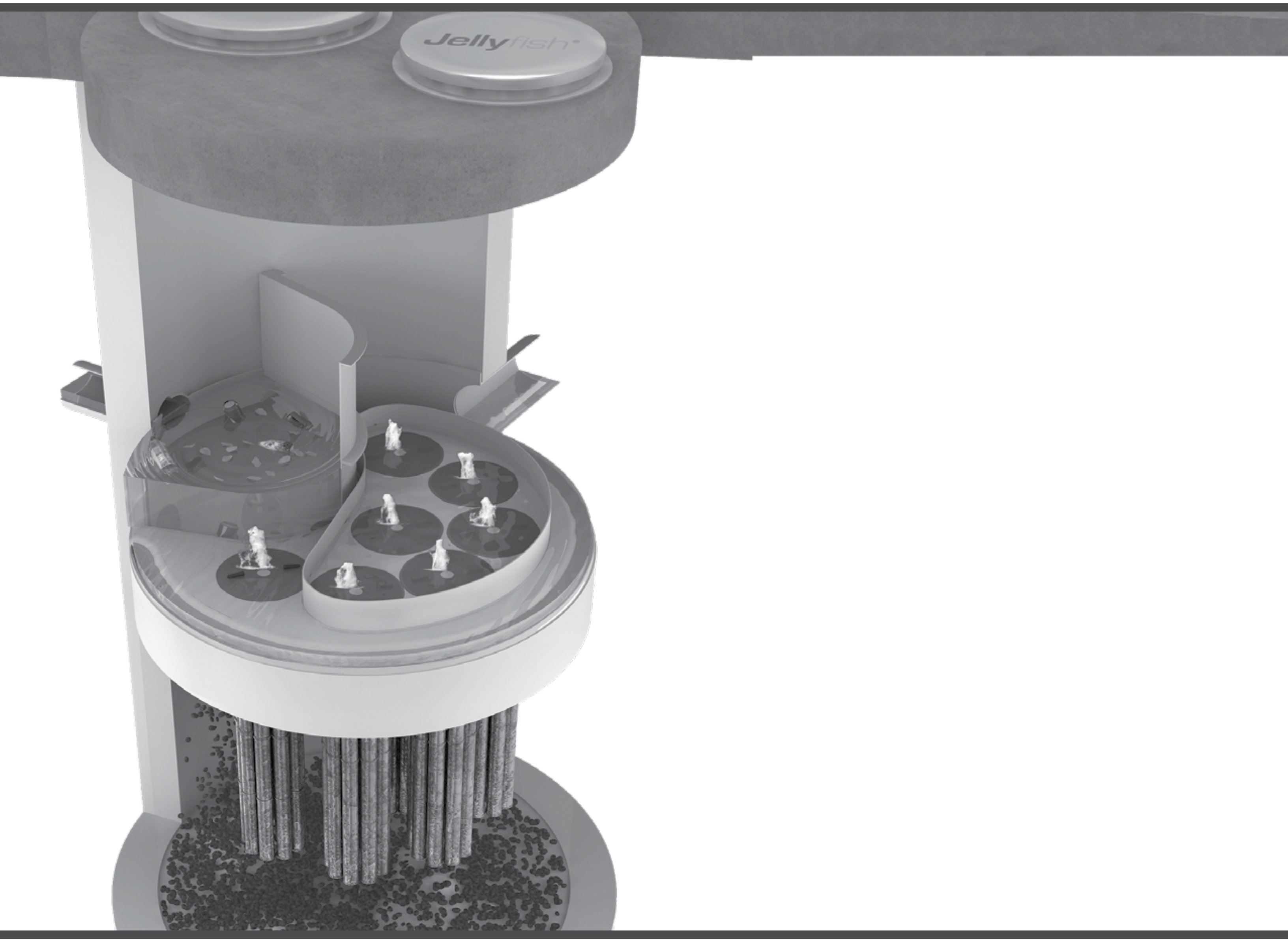
- Remove drop-in filter by lifting vertically
- Clean filter wall with a stiff bristled broom or rinse clean with pressurized water

www.RainGuardian.biz

ANOKA CONSERVATION DISTRICT
1318 McKay Dr. NE, Suite 300
Ham Lake, MN 55304
(763) 434-2030 (M-F 8:00-4:30)

CONTECH
ENGINEERED SOLUTIONS

Jellyfish® Filter Maintenance Guide



Jellyfish®

Jellyfish®

JELLYFISH® FILTER
INSPECTION & MAINTENANCE GUIDE

Jellyfish units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the Jellyfish filter to be successful, it is imperative that all other components be properly maintained. The maintenance and repair of upstream facilities should be carried out prior to Jellyfish maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

TABLE OF CONTENTS

1.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.

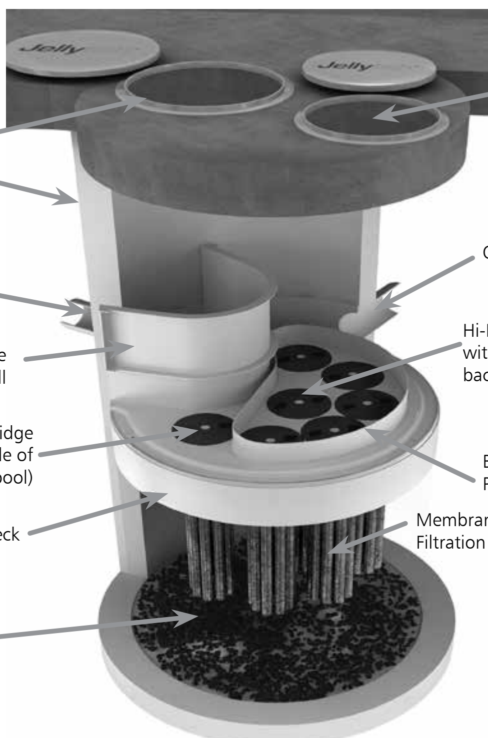
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed



Note: Separator Skirt not shown

2.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent*.

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

3.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

3.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.

Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment (≥1/16") accumulated on the deck surface should be removed.

3.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

4.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

5.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. ***Caution: Dropping objects onto the cartridge deck may cause damage***.
3. Perform Inspection Procedure prior to maintenance activity.
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

5.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. ***Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs***.
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

5.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.

Cartridge Removal & Lifting Device

2. Position tentacles in a container (or over the MAW), with the threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.
3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. ***Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane***.

4. Collected rinse water is typically removed by vacuum hose.
5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

5.3 Sediment and Flotables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.

Vacuuming Sump Through MAW

3. Pressure wash cartridge deck and receptacles to remove all sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.
4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.

Vacuuming Sump Through MAW

6. For larger diameter Jellyfish Filter manholes (≥8-ft) and some vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

5.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. ***Caution: Do not force the cartridge downward; damage may occur.***
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

5.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

5.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

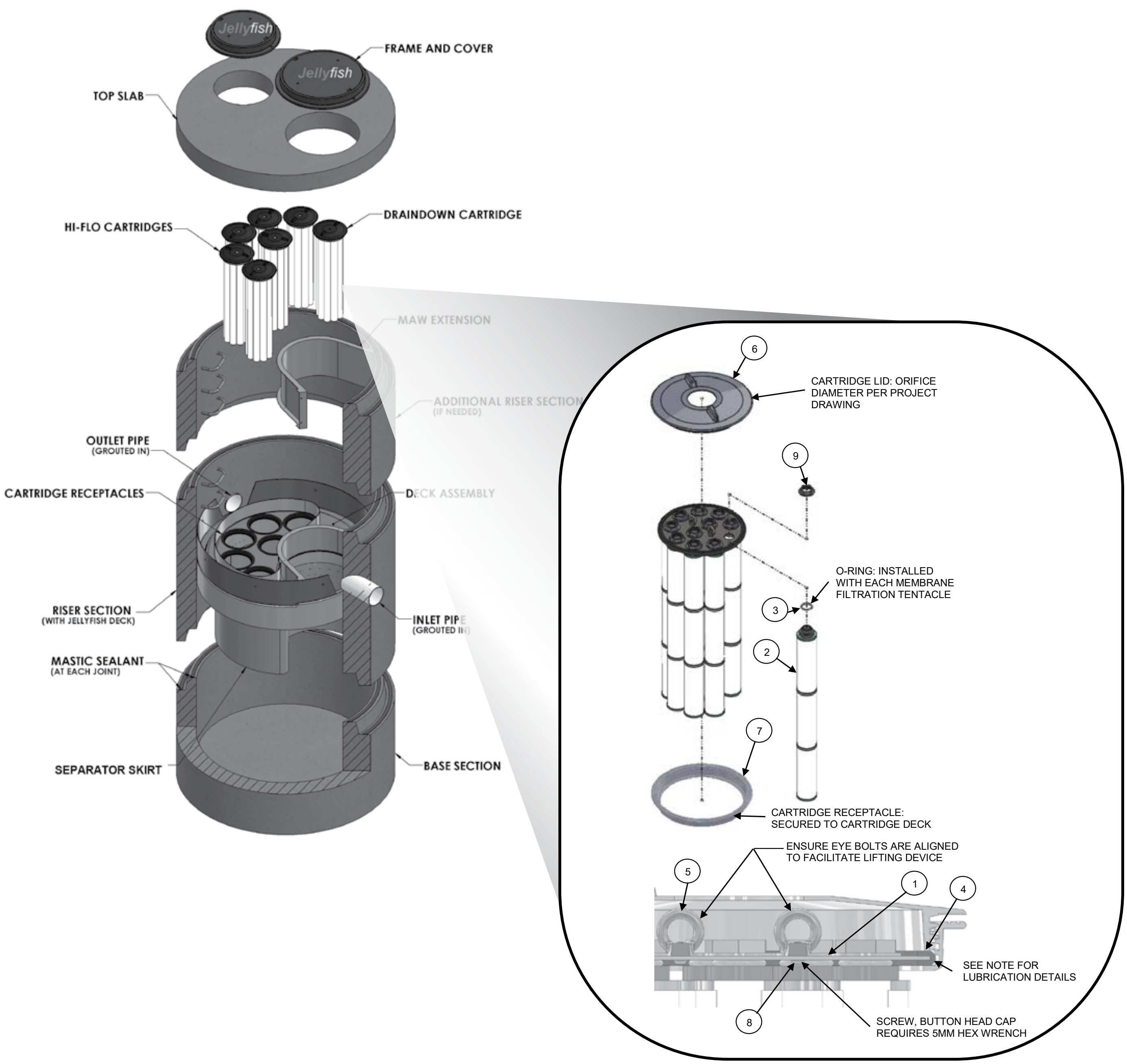


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

NOTES:

Head Plate Gasket Installation:
Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lide (ITem 6). Follow Lubricant manufacturer’s instructions.

Lid Assembly:
Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clock-wise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner:				Jellyfish Model No:		
Location:				GPS Coordinates:		
Land Use:	Commercial:		Industrial:		Service Station:	
	Roadway/Highway:		Airport:		Residential:	

Date/Time:						
Inspector:						
Maintenance Contractor:						
Visible Oil Present: (Y/N)						
Oil Quantity Removed:						
Floatable Debris Present: (Y/N)						
Floatable Debris Removed: (Y/N)						
Water Depth in Backwash Pool						
Draindown Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Draindown Cartridges: (Y/N)						
Hi-Flo Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Hi-Flo Cartridges: (Y/N)						
Sediment Depth Measured: (Y/N)						
Sediment Depth (inches or mm):						
Sediment Removed: (Y/N)						
Cartridge Lids intact: (Y/N)						
Observed Damage:						
Comments:						

Jellyfish®

CONTECH®
ENGINEERED SOLUTIONS

800.338.1122
www.ContechES.com

Support

- Drawings and specifications are available at www.conteches.com/jellyfish.
- Site-specific design support is available from Contech Engineered Solutions.
- Find a Certified Maintenance Provider at www.conteches.com/ccmp

FocalPoint

BIOFILTRATION SYSTEMS

HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS)

Operations & Maintenance

ACF ENVIRONMENTAL

Customer Focused, Environmentally Committed

GENERAL DESCRIPTION

The following general specifications describe the general operations and maintenance requirements for the FocalPoint® High Performance Modular Biofiltration System (HPMBS). The system utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The treatment system is a fully equipped, modular, constructed in place system designed to treat contaminated runoff.

Stormwater enters the FocalPoint® HPMBS, is filtered by the High Flow Biofiltration Media and passes through to the underdrain/storage system where the treated water is detained, retained or infiltrated to sub-soils, prior to discharge to the storm sewer system of any remaining flow.

Higher flows bypass the FocalPoint® HPMBS via a downstream inlet or other overflow conveyance. Maintenance is a simple, inexpensive and safe operation that does not require confined space entry, pumping or vacuum equipment, or specialized tools. Properly trained landscape personnel can effectively maintain FocalPoint® HPMBS by following instructions in this manual.

BASIC OPERATIONS

FocalPoint® is a modular, high performance biofiltration system that often works in tandem with other integrated management practices (IMP). Contaminated stormwater runoff enters the biofiltration bed through a conveyance swale, planter box, or directly through a curb cut or false inlet. Energy is dissipated by a rock or vegetative dissipation device and is absorbed by a 3-inch layer of aged, double shredded hardwood mulch, with fines removed, (when specified) on the surface of the biofiltration media.

As the water passes through the mulch layer, most of the larger sediment particles and heavy metals are removed through sedimentation and chemical reactions with the organic material in the mulch. Water passes through the biofiltration media where the finer particles are removed and numerous chemical reactions take place to immobilize and capture pollutants in the soil media.

The cleansed water passes into the underdrain/storage system and remaining flows are directed to a storm sewer system or other appropriate discharge point. Once the pollutants are in the soil, bacteria begin to break down and metabolize the materials and the plants begin to uptake and metabolize the pollutants. Some pollutants such as heavy metals, which are chemically bound to organic particles in the mulch, are released over time as the organic matter decomposes to release the metals to the feeder roots of the plants and the cells of the bacteria in the soil where they remain and are recycled. Other pollutants such as phosphorus are chemically bound to the soil particles and released slowly back to the plants and bacteria and used in their metabolic processes. Nitrogen goes through a variety of very complex biochemical processes where it can ultimately end up in the plant/bacteria biomass, turned to nitrogen gas or dissolves back into the water column as nitrates depending on soil temperature, pH and the availability of oxygen. The pollutants ultimately are retained in the mulch, soil and biomass with some passing out of the system into the air or back into the water.

DESIGN AND INSTALLATION

Each project presents different scopes for the use of FocalPoint® HPMBS. To ensure the safe and specified function of this stormwater BMP, Convergent Water Technologies and/or its Value Added Resellers (VAR) review each application before supply. Information and design assistance is available to the design engineer during the planning process. Correct FocalPoint® sizing is essential to optimum performance. The engineer shall submit calculations for approval by the local jurisdiction when required. The contractor and/or VAR is responsible for the correct installation of FocalPoint® HPMBS units as described in approved plans. A comprehensive installation manual is available at www.convergentwater.com.

MAINTENANCE

Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons for maintenance include:

- Avoid legal challenges from your jurisdiction's maintenance enforcement program.

- Prolong the lifespan of your FocalPoint® HPMBS.

- Avoid costly repairs.

- Help reduce pollutant loads leaving your property.

Simple maintenance of the FocalPoint® HPMBS is required to continue effective pollutant removal from stormwater runoff before any discharge into downstream waters. This procedure will also extend the longevity of the living biofiltration system. The unit will recycle and accumulate pollutants within the biomass, but may also subjected to other materials entering the surface of the system. This may include trash, silt and leaves etc. which will be contained above the mulch and/or biofiltration media layer. Too much silt may inhibit the FocalPoint's® HPMBS flow rate, which is a primary reason for system maintenance. Removal of accumulated silt/sediment and/or replacement of the mulch layer (when specified), is an important activity that prevents over accumulation of such silt/sediment.

When to Maintain?

Convergent Water Technologies and/or its VAR includes a 1-year maintenance plan with each system purchased. Annual included maintenance consists of two (2) scheduled maintenance visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated for full operation. Full operation is defined as when the site is appropriately stabilized, the unit is installed and activated (by VAR), i.e., when mulch (if specified) and plantings are added.

Activation should be avoided until the site is fully stabilized (full landscaping, grass cover, final paving and street sweeping completed). Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands. The fall visit helps the system by removing excessive leaf litter.

A first inspection to determine if maintenance is necessary should be performed at least twice annually after storm events of greater than (1) one inch total depth (subject to regional climate). Please refer to the maintenance checklist for specific conditions that indicate if maintenance is necessary.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required. Regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency.

Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the VAR/Maintenance contractor and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the VAR/Maintenance contractor of any damage to the plant(s), which constitute(s) an integral part of the biofiltration technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance of the FocalPoint® HPMBS to the VAR/Maintenance contractor (i.e. no pruning or fertilizing).

EXCLUSION OF SERVICES

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant(s) in the FocalPoint® HPMBS.

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the VAR/Maintenance contractor maintenance contract. Should a major contamination event occur, the Owner must block off the outlet pipe of the FocalPoint® (where the cleaned runoff drains to, such as drop-inlet) and block off the point where water enters of the FocalPoint® HPMBS. The VAR/Maintenance contractor should be informed immediately.

MAINTENANCE VISIT SUMMARY

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of FocalPoint® HPMBS and surrounding area

2. Removal of debris, trash and mulch

3. Mulch replacement

4. Plant health evaluation (including measurements) and pruning or replacement as necessary

5. Clean area around FocalPoint® HPMBS

6. Complete paperwork, including date stamped photos of the tasks listed above.

MAINTENANCE TOOLS, SAFETY EQUIPMENT AND SUPPLIES

Ideal tools include: camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working in close proximity to traffic and also safety hats and shoes.

MAINTENANCE VISIT PROCEDURE

Inspection of FocalPoint® HPMBS and surrounding area

Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

- Standing Water yes | no
- Is Bypass Inlet Clear? yes | no
- Damage to HPMBS System yes | no
- to Overflow conveyance yes | no

Removal of Silt / Sediment / Clay

Dig out silt (if any) and mulch and remove trash & foreign items.

- Silt / Clay Found? yes | no
- Cups / Bags Found? yes | no
- Leaves? yes | no
- Volume of material removed ________ (volume or weight)

Removal of debris, trash and mulch

After removal of mulch and debris, measure distance from the top of the FocalPoint® HPMBS engineered media soil to the flow line elevation of the adjacent overflow conveyance. If this distance is greater than that specified on the plans (typ. 6" - 12"), add media (not top soil or other) to recharge to the distance specified.

- Distance to media surface to flow line of overflow conveyance (inches) ____________
- # of Buckets of Media Added _________

Mulch Replacement

Most maintenance visits require only replacement mulch (if utilized) which must be, aged, double shredded hardwood mulch with fines removed. For smaller projects, one cubic foot of mulch will cover four square feet of biofiltration bed, and for larger projects, one cubic yard of mulch will cover 108 square feet of biofiltration bed. Some visits may require additional FocalPoint® HPMBS engineered soil media available from the VAR/Contractor.

- Add double shredded, aged hardwood mulch which has been screened to remove fines, evenly across the entire biofiltration media bed to a depth of 3".
- Clean accumulated sediment from energy dissipation system at the inlet to the FocalPoint® HPMBS to allow for entry of trash during a storm event.

Plant health evaluation and pruning or replacement as necessary

Examine the plant's health and replace if dead or dying.
Prune as necessary to encourage growth in the correct directions

- Height above Grate (feet) _______
- Width at Widest point (feet) _______
- Health alive | dead
- Damage to Plant yes | no

Clean area around FocalPoint® HPMBS

- Clean area around unit and remove all refuse to be disposed of appropriately.

Complete paperwork

- Deliver Maintenance Report and photographs as appropriate.
- Some jurisdictions may require submission of maintenance reports in accordance with approvals.
- It is the responsibility of the Owner to comply with local regulations.

FocalPoint BIOFILTRATION SYSTEM

FocalPoint Warranty

Seller warrants goods sold hereunder against defects in materials and workmanship only, for a period of (1) year from date the Seller activates the system into service. Seller makes no other warranties, express or implied.

Seller's liability hereunder shall be conditioned upon the Buyer's installation, maintenance, and service of the goods in strict compliance with the written instructions and specifications provided by the Seller. Any deviation from Seller's instructions and specifications or any abuse or neglect shall void warranties.

In the event of any claim upon Seller's warranty, the burden shall be upon the Buyer to prove strict compliance with all instructions and specifications provided by the Seller.

Seller's liability hereunder shall be limited only to the cost or replacement of the goods. Buyer agrees that Seller shall not be liable for any consequential losses arising from the purchase, installation, and/or use of the goods.

Maintenance Checklist

Element	Problem	What To Check	Should Exist	Action
Inlet	Excessive sediment or trash accumulation	Accumulation of sediment or trash impair free flow of water into FocalPoint	Inlet free of obstructions allowing free flow into FocalPoint System	Sediments or trash should be removed
Mulch Cover	Trash and floatable debris accumulation	Excessive trash or debris accumulation.	Minimal trash or other debris on mulch cover	Trash and debris should be removed and mulch cover raked level. Ensure that bark nugget
Mulch Cover	Ponding of water on mulch cover	Ponding in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils	Stormwater should drain freely and evenly over mulch cover.	Contact VAR for advice.
Plants	Plants not growing, or in poor condition	Soil/mulch too wet, evidence of spill. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact VAR for advice.
Plants	Plant growth excessive	Plants should be appropriate to the species and location of FocalPoint		Trim/prune plants in accordance with typical landscaping and

CONTROL OF INVASIVE PLANTS

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Background:

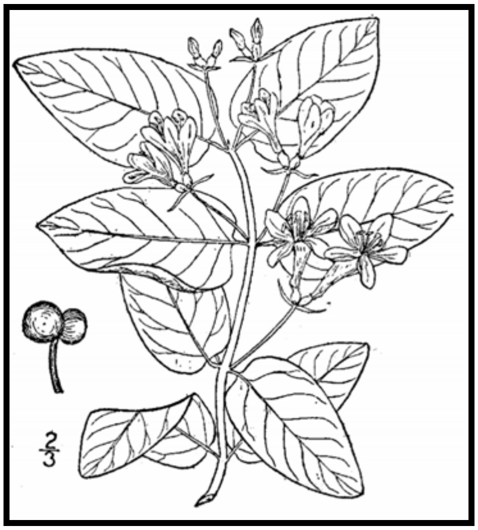
Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

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

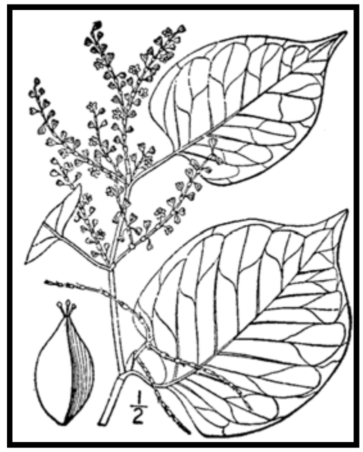
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

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.

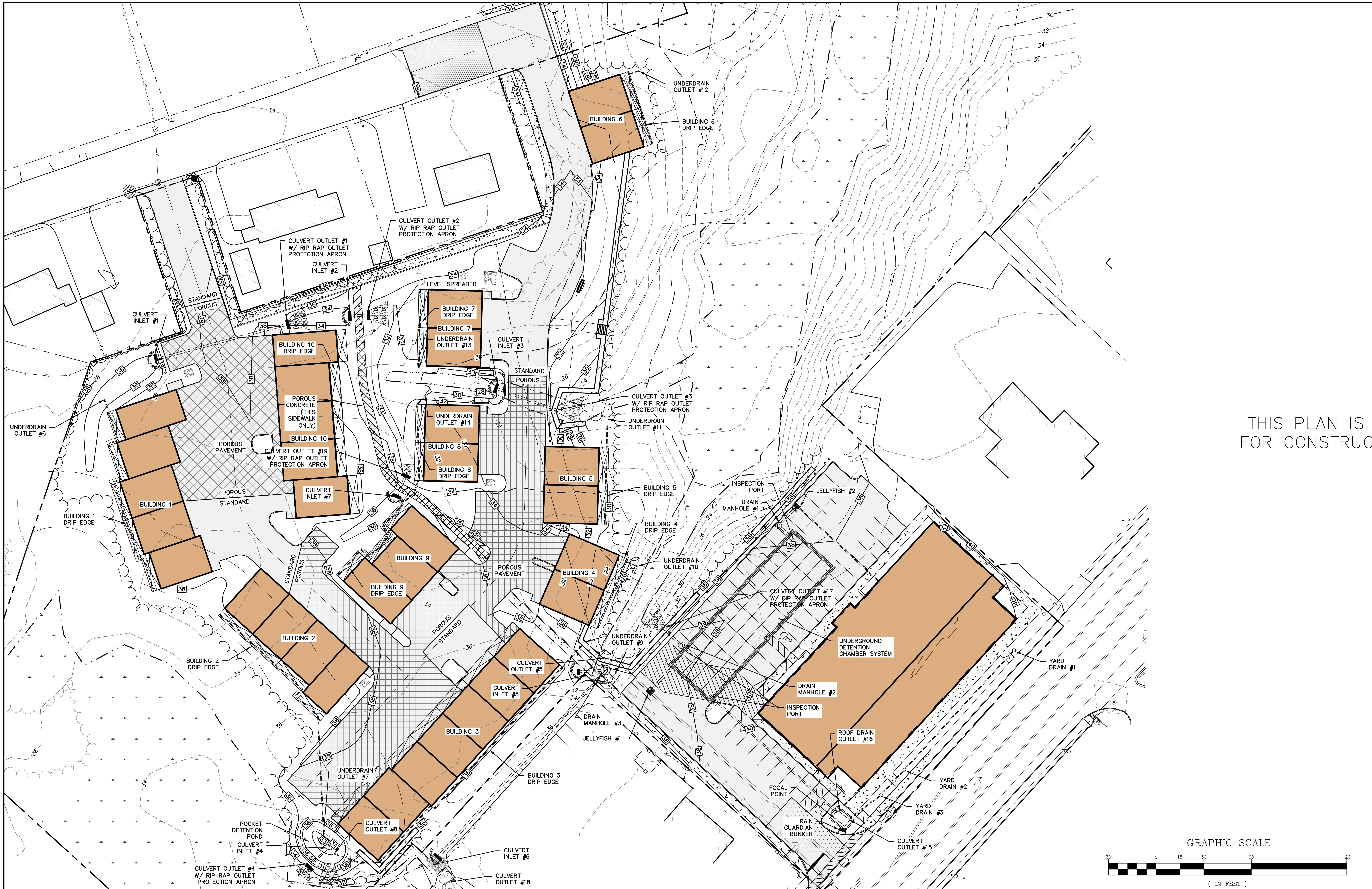
Suggested Disposal Methods for Non-Native Invasive Plants

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>

Non-Woody Plants	Method of Reproducing	Methods of Disposal
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)*	**Fruits and Seeds**	**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.
		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.
common reed (*Phragmites australis*) Japanese knotweed *(Polygonum cuspidatum)* Bohemian knotweed *(Polygonum x bohemicum)*	**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.	**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.

January 2010



PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: KDR	Date: 3/15/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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.

REV.	DATE	REVISION	BY
9	2/13/25	FULL DESIGN FOR REVISED LAYOUT	DJM
8	1/31/25	REVISED LAYOUT PER CONSERVATION COMMISSION	DJM
7	1/13/25	REVISED PER TOWN ENGINEER & TRC COMMENTS	DJM
6	1/6/25	GRADING PLAN FOR CONSERVATION COMMISSION	DJM
5	11/22/24	MINOR REVISIONS	DJM

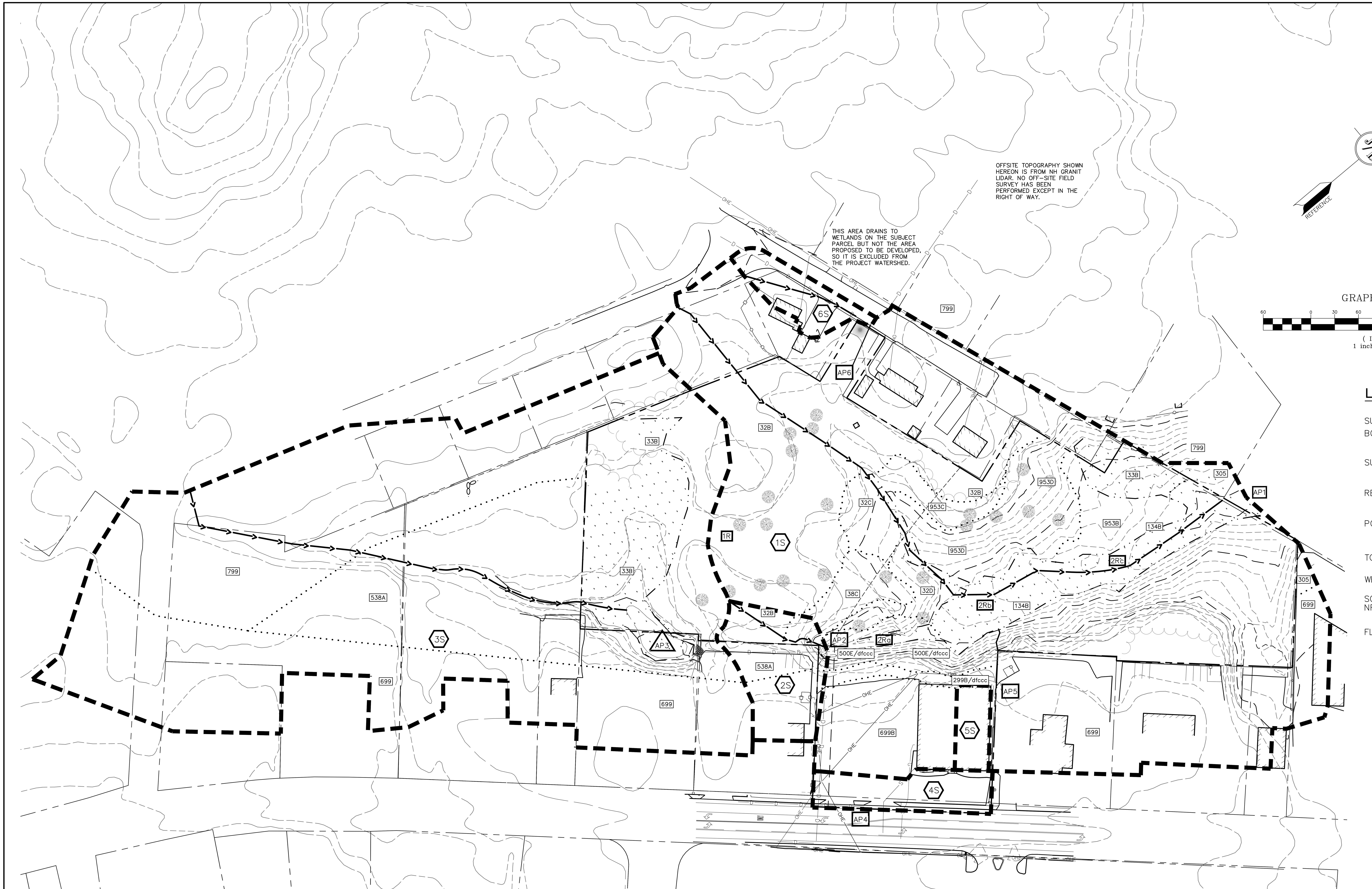
Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: INSPECTIONS & MAINTENANCE PLAN
Project: "LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record: RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
I&M
SHEET 1 OF 1
JBE PROJECT NO. 24029

APPENDIX XIII

Pre- and Post-Construction Watershed Plans



PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: DJM	Date: 10/21/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-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
02/14/2025

REV.	DATE	REVISION	BY
2	2/13/25	REVISED PER NEW SITE LAYOUT	DJM
1	1/13/25	REVISED PER TRC AND TOWN REVIEW ENGINEER COMMENTS	DJM
0	11/4/24	ISSUED FOR REVIEW	DJM

Designed and Produced in NH
Jones & Beach Engineers, Inc.
Civil Engineering Services
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EXISTING WATERSHED PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
W1
SHEET 1 OF 2
JBE PROJECT NO. 24029

PROJECT PARCEL
TOWN OF EXETER
TAX MAP 65, LOT 118

APPLICANT
GREEN & COMPANY
11 LAFAYETTE RD
PO BOX 1297
NORTH HAMPTON, NH 03862

TOTAL LOT AREA
291,630 SQ. FT.
6.7 ACRES

Design: DJM	Draft: DJM	Date: 10/21/24
Checked: PSL	Scale: AS SHOWN	Project No.: 24029
Drawing Name: 24029-WATERSHED.dwg		

STATE OF NEW HAMPSHIRE
DANIEL JAMES MEDITZ
No.18152
LICENSED PROFESSIONAL ENGINEER
02/14/2025

REV.	DATE	REVISION	BY
2	2/13/25	REVISED PER NEW SITE LAYOUT	DJM
1	1/13/25	REVISED PER TRC AND TOWN REVIEW ENGINEER COMMENTS	DJM
0	11/4/24	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:	PROPOSED WATERSHED PLAN
Project:	"LILAC PLACE" 76 PORTSMOUTH AVE, EXETER, NH
Owner of Record:	RAP REALTY MANCHESTER LLC 50 ATLANTIC AVE, SEABROOK, NH

DRAWING No.
W2

JBE PROJECT NO. 24029

TOWN OF EXETER

Planning and Building Department

10 FRONT STREET • EXETER, NH • 03833-3792 • (603) 778-0591 •FAX 772-4709

www.exeternh.gov

Date: **February 20, 2025**

To: **Planning Board**

From: **Dave Sharples, Town Planner**

Re: **StoneArch Development 112 Front Street PB Case #24-17**

The Applicant has submitted a multi-family site plan review application for the proposed redevelopment of the property located at 112 Front Street. The developer is proposing to demolish the existing buildings on the site and construct seventeen (17) townhouse-style residential condominiums and associated site improvements. The property is located in the C-1, Central Area Commercial zoning district and is identified as Tax Map Parcel #73-14.

The Applicant appeared before the Board at the January 23rd, 2025 meeting to present their plans for the redevelopment of the subject property. The public hearing was opened for public comment and a site walk was scheduled for Thursday, February 6th, 2025 at 8:00 AM. At the site walk, the applicant mentioned that they were developing a landscape plan that would be submitted prior to the 2/13/25 Planning Board, however it would not be completed in time to be included in the meeting packet. Subsequently, the Applicant requested a continuance to the 2/27/25 Planning Board meeting to allow them adequate time to address those issues raised during the site walk as well as Underwood Engineering (UEI comments).

The Applicant has submitted revised plans and supporting documents, dated 02/19/25, which are enclosed for your review. Staff is still in the process of reviewing the materials and I will update the Board at the meeting.

The Applicant is requesting three (3) waivers from the Board's Site Plan Review & Subdivision Regulations as outlined in the waiver request letters, dated 01/21/25 (previously mailed) and dated 2/19/25, included with the enclosed materials.

Numerous letters (and emails) have been received from abutters and/or residents in the neighborhood and were included in the meeting materials previously provided for the 2/13/25 PB meeting. Additional comments received since then are included for your review.

Waiver Motions:

Roadway and Fire Lanes Less than 24' Width waiver motion: After reviewing the criteria for granting waivers, I move that the request of StoneArch Development (PB Case #24-17) for a waiver from Section 9.14.9 of the Site Plan Review and Subdivision Regulations to permit proposed roadway and fire lanes to be less than 24' in width be APPROVED / APPROVED WITH THE FOLLOWING CONDITIONS / TABLED / DENIED.

Grading within 5 feet of exterior property line waiver motion: After reviewing the criteria for granting waivers, I move that the request of StoneArch Development (PB Case #24-17) for a waiver from Section 9.3.6.4. of the Site Plan Review and Subdivision Regulations regarding grading within 5 feet of an exterior property line be APPROVED / APPROVED WITH THE FOLLOWING CONDITIONS / TABLED / DENIED.

Stormwater Management for Redevelopment Standards waiver motion: After reviewing the criteria for granting waivers, I move that the request of StoneArch Development (PB Case #24-17) for a waiver from Section 9.3.2.7 of the Site Plan Review and Subdivision Regulations regarding stormwater management requirements for redevelopment be APPROVED / APPROVED WITH THE FOLLOWING CONDITIONS / TABLED / DENIED.

Planning Board Motions:

Multi-Family Site Plan Motion: I move that the request of StoneArch Development (PB Case #24-17) for Multi-Family Site Plan approval be APPROVED / APPROVED WITH THE FOLLOWING CONDITIONS / TABLED / DENIED.

Thank You.

Enclosures

BEALS · ASSOCIATES *PLLC*

70 Portsmouth Avenue
Stratham, New Hampshire
0388
603 – 583 - 4860
Fax: 583 - 4863

February 19, 2025

Chairman
Town of Exeter Planning Board
10 Front Street
Exeter, NH 03833

RE: Letter of Explanation
112 Front Street, LC.
Proposed 17-unit residential townhouse condominium
Tax Map 0073 Lot #: 0014

Dear Members of the Board:

The applicant is proposing to demolish the existing house and barn structures and remove the foundation/slabs. The redevelopment will consist of 17 residential townhouse condominium units (3-four-unit buildings, and 1-five-unit building) with a reconfigured private driveway, parking, utilities and drainage structures. Specifically, porous pavement and infiltration ponds are proposed for drainage along with underground water, sewer, gas, and electric/communications services.

The revised design is being submitted showing a shift in the driveway that relocates parking spaces previously located across the driveway from units E thru M to directly behind those units. All associated changes to lighting, improved landscaping, drainage, and grading have been incorporated.

Thank you for your consideration.

Very truly yours,
BEALS ASSOCIATES, PLLC

Christian O. Smith

Christian O. Smith P.E.
Principal

BA BEALS ASSOCIATES, PLLC
Land Planning • Civil Engineering
Landscape Architecture • Septic Design & Evaluation
Stratham, NH

February 19, 2025
Chairman
Town of Exeter Planning Board
10 Front Street
Exeter, NH 03833

RE: Proposed Residential Development at 112 Front Street – Additional Waiver Request
Tax Map 73 Lot #: 14

Dear Members of the Board:

In addition to two previously requested waivers, this is written to formalize a request for an additional waiver specific to the design for the referenced residential development application.

Your petitioner seeks the following relief:

3. We respectfully request a waiver to the Town of Exeter's Site Plan Review and Subdivision Regulations Section 9.3.2.7 which restricts redevelopment projects from discharging to a municipal stormwater system in volumes greater than discharged under existing conditions.

   We feel the waiver is justified as:

   13.7.1 The proposed connection to the municipal drainage system will have a de minimis impact on the municipal system as the increased flow to the system is 0.12 cubic feet per second and volume of 0.010 acre-feet (approximately 436 cubic feet) in a 50-year storm event. This direct connection to the municipal drainage system is a preferred option to allow stormwater to flow down the driveway and down the street to a catch basin 185 feet away. In discussing the proposed connection and increase in stormwater flow, the Department of Public Works agreed that this low increase in volume will not have an impact on the overall system. Therefore, granting of the waiver will not be detrimental to public safety, health, or welfare, nor could it be deemed injurious to other property.

   13.7.2 The conditions upon which this request is made expressly due to the fact that during the review and comment period, the driveway near the entrance was requested to be revised from porous to traditional pavement resulting in an increase in impervious area as the driveway is required to be widened as part of the proposed development. The existing curb cut is being utilized and widened and is unique to the parcel/proposal and not generally applicable to other properties.

   13.7.3 Due to the location of the curb cut for the existing driveway, the proposed driveway was placed in the same location, but is wider than the existing driveway.

Originally designed as porous pavement, this section of conventional pavement (requested by the Town's Engineering Consultant) is resulting in a minimal increase in peak flows and volume. A denial of the waiver request would result in a hardship requiring the increased flow/volume to be mitigated in another way. If not collected and directed to the municipal drainage system, the stormwater would simply flow into the Front Street right-of-way.

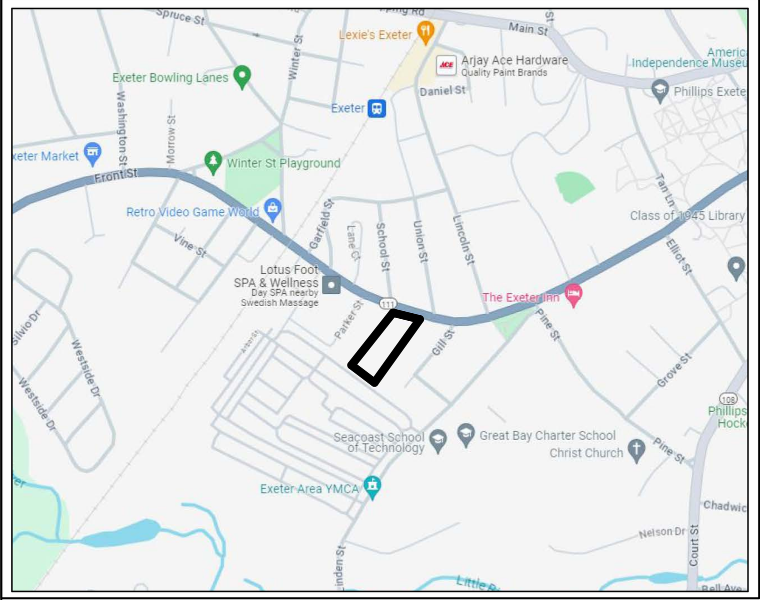
13.7.4 The waiver would not be contrary to the spirit and intent of the regulations as the proposed development and resulting increase in volume will not impact the current municipal drainage system, as agreed upon by the Department of Public Works.

13.7.5 The proposed waiver does not propose to vary the provisions of the Zoning Ordinance or Master Plan. This is demonstrated by the facts cited above, along with the absence of such language from the Zoning Ordinance or Master Plan.

Thank you for your consideration.
Very truly yours,
BEALS ASSOCIATES, PLLC

Christian O Smith

Christian O. Smith, PE
Principal



LOCATION MAP
1"=500'

TOWN NOTES

1. THE LANDOWNER IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL WETLANDS REGULATIONS, INCLUDING ANY PERMITTING AND SETBACK REQUIREMENTS REQUIRED UNDER THESE REGULATIONS.
2. THE APPLICANT HAS DESIGNED THIS SITE TO SAFELY ACCOMMODATE MAXIMUM SIZE VEHICLES AND TRUCKS, (DESIGN VEHICLE IS THE EXETER LADDER TRUCK OR 35' BOX TRUCK) EITHER DELIVERING TO, OR USING THE PROPERTY.
3. ALL SNOW SHALL BE STORED IN THE AREA(S) DEPICTED ON THIS PLAN AS SNOW STORAGE AREAS. IN THE EVENT THAT THE AREA(S) APPROVED FOR SNOW STORAGE BECOME FULL, THE OWNER SHALL REASONABLY REMOVE EXCESS SNOW FROM THE SITE, AND SHALL NOT ALLOW SNOW TO BE STORED WITHIN TRAVEL AISLES.
4. ALL WASTE MATERIALS AND RECYCLABLE SHALL BE CONTAINED WITHIN THE BUILDING(S) OR APPROVED STORAGE FACILITIES AND SHALL NOT BE OTHERWISE STORED ON THE PROPERTY. REFUSE COLLECTION WILL BE BY DUMPSTER AS NEEDED.
5. ALL WATER, SEWER, ROAD (INCLUDING PARKING LOT), AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 9.5 GRADING, DRAINAGE, AND EROSION & SEDIMENT CONTROL AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC UTILITIES IN EXETER, NEW HAMPSHIRE.

ZONING REQUIREMENTS:
ZONING DISTRICT – CENTRAL AREA (C1)
MINIMUM LOT SIZE – 5,000 S.F.
MINIMUM LOT WIDTH – 50 FT.
MINIMUM LOT DEPTH – 100 FT.
MINIMUM DWELLING UNIT – 3,500 S.F.

BUILDING SETBACKS
FRONT=10 FT.
SIDE=10 FT.
REAR=20 FT.
BUILDING HEIGHT=35 FT.
MAXIMUM BUILDING COVERAGE = 75%
MINIMUM OPEN SPACE = 5%

DENSITY CALCULATION:
PARCEL AREA – 69,349 SF
(–) DRIVEWAY AREA – 8,975 S.F.
= 60,374 S.F.
60,374/3500 (SF/UNIT) = 17.25 UNITS

PARKING CALCULATIONS:
TOTAL NUMBER OF UNITS=17
2 SPACES PER UNIT AND 1 SPACE PER 4 UNITS FOR VISITOR
TOTAL SPACES REQUIRED=41
17 UNITS HAVE 2 SPACES–34
PLUS 2–EXTERIOR VISITOR STALLS (WITHIN DRIVES UNITS E–M)
TOTAL SPACES PROVIDED=51

PREPARED FOR:
112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA
BEALS
ASSOCIATES, PLLC
70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863

NOTES:

1. THE PURPOSE OF THIS PLAN IS TO SHOW 17 TOWN HOUSE UNITS WITH ASSOCIATED PARKING SPACES.
2. ALL CONSTRUCTION SHALL CONFORM TO TOWN OF EXETER STANDARDS AND REGULATIONS.
3. ALL WATER, SEWER, ROAD (INCLUDING PARKING LOT), AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 9.3 STORMWATER MANAGEMENT STANDARDS, STORMWATER MANAGEMENT PLAN, STORMWATER POLLUTION PREVENTION PLAN, AND EROSION AND SEDIMENT CONTROL STANDARDS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC UTILITIES IN EXETER, NEW HAMPSHIRE". SEE SECTION 9.14 ROADWAYS, ACCESS POINTS, AND FIRE LANES AND SECTION 9.13 PARKING AREAS FOR EXCEPTIONS.
4. IN ACCORDANCE WITH SITE PLAN REVIEW & SUBDIVISION REGULATIONS SECTIONS 7.15.10 AND 9.3.4 THE APPLICANT SHALL PROVIDE THE TOWN WITH THREE COPIES OF THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND ALSO ENSURE THAT ONE COPY REMAINS ON SITE.
5. ALL PROPOSED SIGNAGE SHALL CONFORM WITH THE TOWN ZONING REGULATIONS UNLESS A VARIANCE IS OTHERWISE REQUESTED.
6. TOTAL PROPOSED DISTURBANCE FOR CONSTRUCTION = 1.3± ACRES.
7. UPON COMPLETION OF CONSTRUCTION AND PRIOR TO RELEASE OF BOND, THE APPLICANT SHALL SUBMIT A LETTER TO THE TOWN, SIGNED AND STAMPED BY THE DESIGN ENGINEER, WHO MUST BE A LICENSED PROFESSIONAL ENGINEER IN NH, STATING CONSTRUCTION HAS BEEN COMPLETED IN CONFORMANCE WITH THE APPROVED PLANS.
8. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN LOCATED FROM FIELD OBSERVATIONS AND THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. BEALS ASSOCIATES OR ANY OF THEIR EMPLOYEES TAKE NO 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 UTILITIES OR STRUCTURES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 1–888–DIG–SAFE.
9. THIS PLAN HAS BEEN PREPARED FOR MUNICIPAL 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. 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.
10. ALL BENCHMARKS AND TOPOGRAPHY SHOULD BE FIELD VERIFIED BY THE CONTRACTOR.
11. THIS SITE IS NOT LOCATED IN THE 100 YEAR FLOOD ZONE.
12. BEYOND THE ENTRANCE DRIVE, ALL PAVEMENT WILL BE POROUS PAVEMENT. SEE PLAN FOR LIMITS.
13. GARBAGE WILL BE STORED IN TOTER BINS WITHIN GARAGES FOR PRIVATE PICKUP.

GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

STATE OF NEW HAMPSHIRE
CHRISTIAN O. SMITH
No.9900
PROFESSIONAL ENGINEER

REVISIONS:	DATE:
REVISED PARKING LAYOUT	02/19/25
REVISED PER REVIEW COMMENTS	01/17/25

PRESENTATION PLAN

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	DEC 9, 2024	SCALE:	1" = 20'
PROJ. N0:	NH-1531	SHEET NO.	1

RESIDENTIAL SITE PLAN
112 FRONT STREET
(NH ROUTE 111)
TAX MAP 73, LOT 14

DECEMBER 9, 2024

NOT FOR CONSTRUCTION

CIVIL ENGINEERS:

BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863

STATE OF NEW HAMPSHIRE — CHRISTIAN O. SMITH No.9900 — LICENSED PROFESSIONAL ENGINEER

LAND SURVEYORS:

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825
603-332-2863

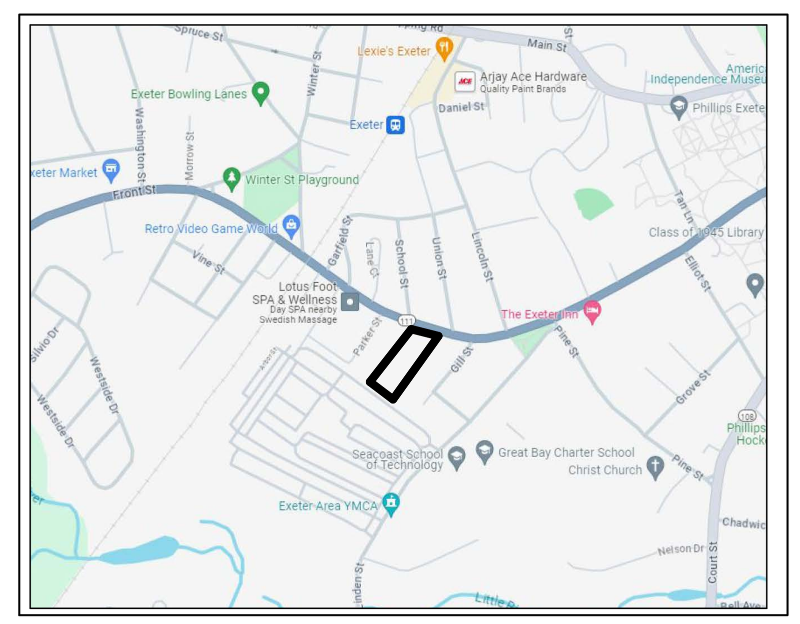
WETLAND/SOIL CONSULTANT:

GOVE ENVIRONMENTAL SERVICES INC.
8 CONTINENTAL DRIVE,
BLDG 2 UNIT H
EXETER, NH 03833
603-778-0644

STATE OF NEW HAMPSHIRE — JAMES P. GOVE No. 004 — SOIL SCIENTIST — 11-12-2024

STATE OF NEW HAMPSHIRE — JAMES P. GOVE No. 0051 — CERTIFIED WETLAND SCIENTIST — 11-12-2024

LOCATION MAP



SCALE: 1"=500'

DRAWING INDEX

RECORD OWNER/APPLICANT

112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NEW HAMPSHIRE

PLAN SET LEGEND

5/8" REBAR
DRILL HOLE
CONC. BOUND
UTILITY POLE
DRAIN MANHOLE
SEWER MANHOLE
EXISTING LIGHT POLE
EXISTING CATCH BASIN
PROPOSED CATCH BASIN
WATER GATE
WATER SHUT OFF
HYDRANT
PINES, ETC.
MAPLES, ETC.
EXIST. SPOT GRADE — 96x69
PROP. SPOT GRADE — 96x69
DOUBLE POST SIGN
SINGLE POST SIGN

VGC — VERTICAL GRANITE CURB
OVERHEAD ELEC. LINE
FENCING
DRAINAGE LINE
SEWER LINE
GAS LINE
WATER LINE
STONE WALL
TREE LINE
ABUT. PROPERTY LINES
EXIST. PROPERTY LINES
BUILDING SETBACK LINES
EXIST. CONTOUR — 100
PROP. CONTOUR — 100
SOIL LINES

WAIVERS REQUESTED:

1. SECTION 9.14.9 TO PROVIDE A 24-FOOT WIDE DRIVEWAY
2. SECTION 9.3.6.4 TO RESTRICT GRADING WITHIN 5 FEET OF A PROPERTY LINE

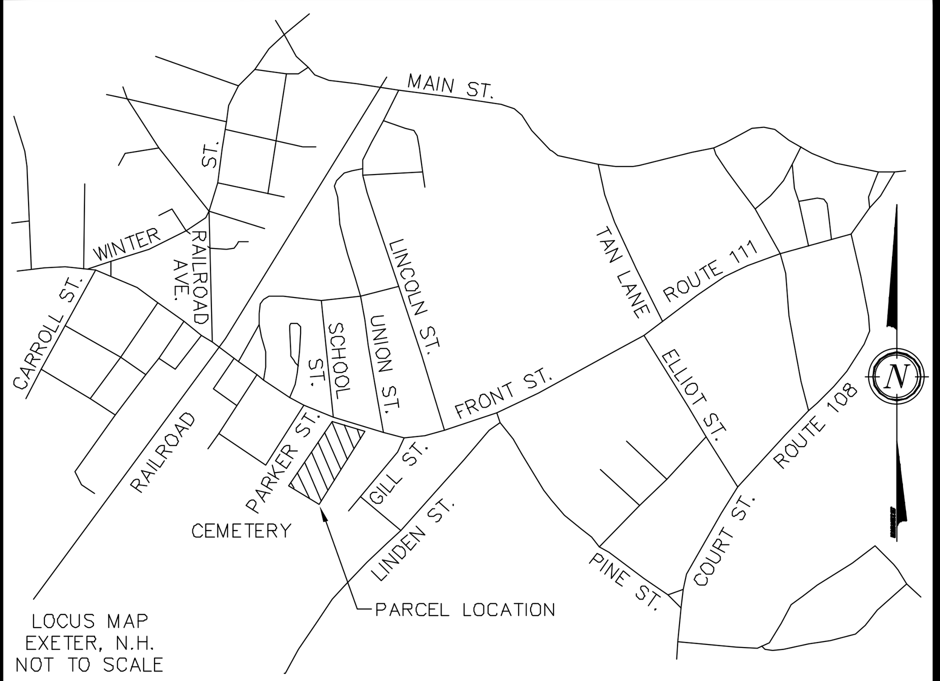
REQUIRED STATE & FEDERAL PERMITS

CONSTRUCTION GENERAL PERMIT
NHDES SEWER CONNECTION
NHDES WATER CONNECTION

PB CASE # TBD
CHAIRMAN SIGNATURE:

	REVISIONS:	DATE:
1	REVISED PER REVIEW COMMENTS	01/17/25
2	REVISED PARKING LAYOUT	02/19/25
3		
4		
5		

NH-1531 PROPOSED RESIDENTIAL PLAN



NOTES:

1.) OWNER: 112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

2.) TAX MAP 73, LOT 14

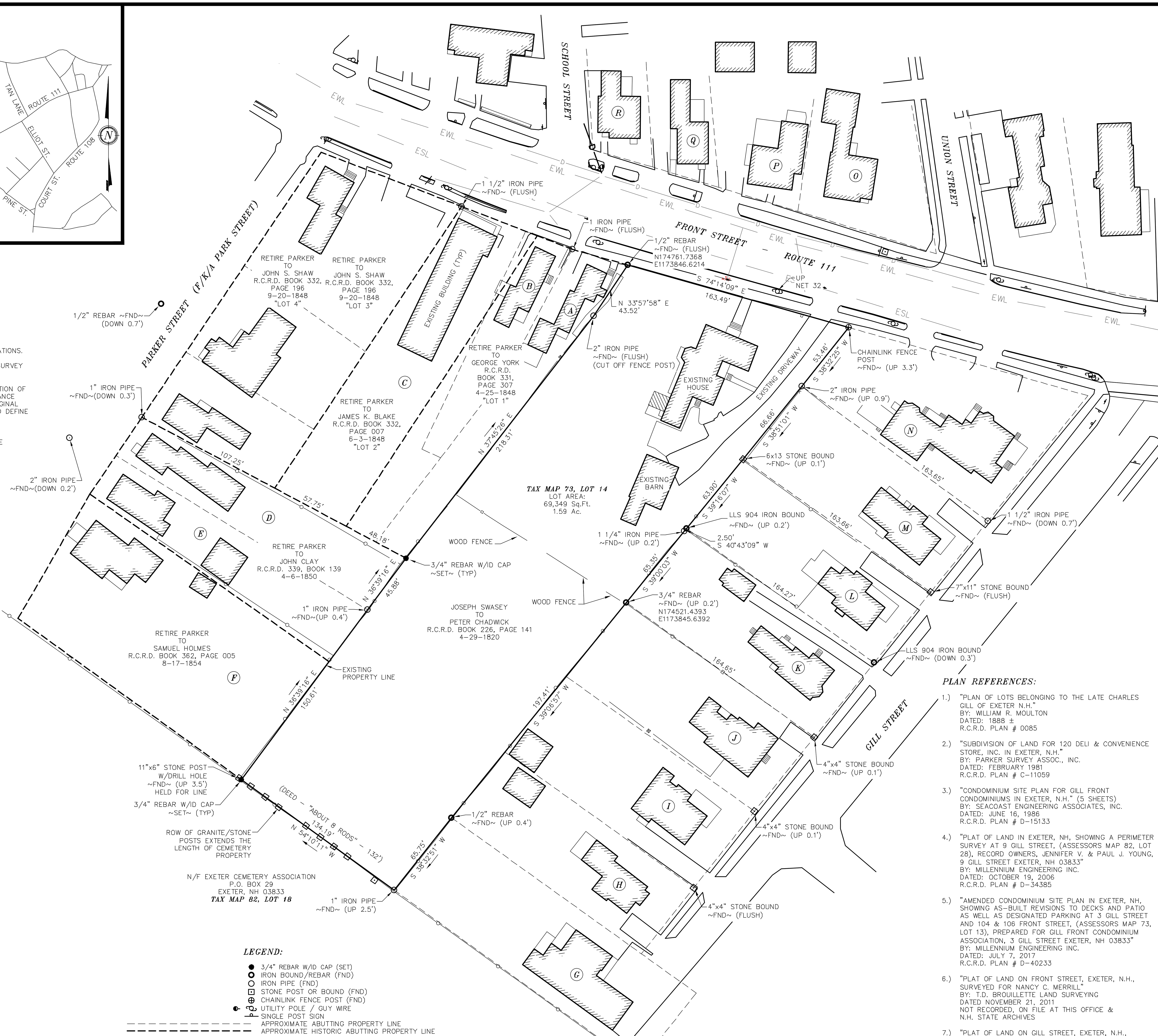
3.) R.C.R.D. BOOK 6571, PAGE 2507

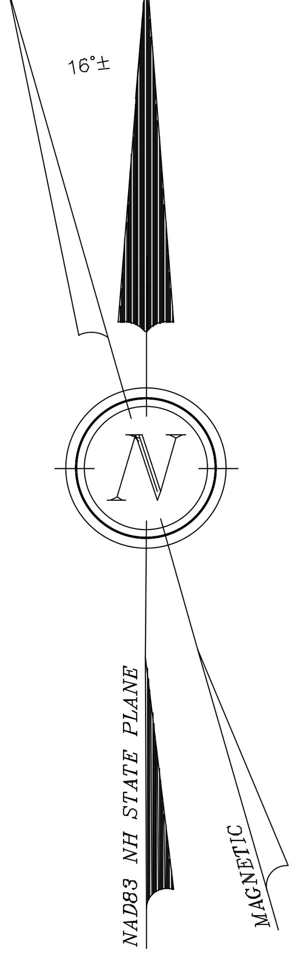
4.) LOT AREA: 69,349 Sq.Ft., 1.59 Ac.

5.) VERTICAL DATUM BASED ON USGS NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83, COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE LOCATION OF BOUNDARIES OF TAX MAP 73, LOT 14 IN ACCORDANCE WITH AND IN RELATION TO THE CURRENT AND ORIGINAL LEGAL DESCRIPTIONS, AND IS NOT AN ATTEMPT TO DEFINE UNWRITTEN RIGHTS, DETERMINE THE EXTENT OF OWNERSHIP, OR DEFINE THE LIMITS OF TITLE.

7.) NH STANDARD PROPERTY SURVEY WITH A CLOSURE BETTER THAN 1:10,000.





GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

LEGEND:

- ● 3/4" REBAR W/ID CAP (SET)
- ◉ IRON BOUND/REBAR (FND)
- ○ IRON PIPE (FND)
- ⊡ STONE POST OR BOUND (FND)
- ⊕ CHAINLINK FENCE POST (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- APPROXIMATE ABUTTING PROPERTY LINE
- APPROXIMATE HISTORIC ABUTTING PROPERTY LINE
- CHAIN LINK FENCE
- WOODEN FENCE
- VINYL FENCE
- METAL FENCE

FND FOUND
TYP TYPICAL
TBS TO BE SET
R.C.R.D. ROCKINGHAM COUNTY REGISTRY OF DEEDS

PLAN REFERENCES:

1.) "PLAN OF LOTS BELONGING TO THE LATE CHARLES GILL OF EXETER N.H."
BY: WILLIAM R. MOULTON
DATED: 1888 ±
R.C.R.D. PLAN # 0085

2.) "SUBDIVISION OF LAND FOR 120 DELI & CONVENIENCE STORE, INC. IN EXETER, N.H."
BY: PARKER SURVEY ASSOC., INC.
DATED: FEBRUARY 1981
R.C.R.D. PLAN # C-11059

3.) "CONDOMINIUM SITE PLAN FOR GILL FRONT CONDOMINIUMS IN EXETER, N.H." (5 SHEETS)
BY: SEACOAST ENGINEERING ASSOCIATES, INC.
DATED: JUNE 16, 1986
R.C.R.D. PLAN # D-15133

4.) "PLAT OF LAND IN EXETER, NH, SHOWING A PERIMETER SURVEY AT 9 GILL STREET, (ASSESSORS MAP 82, LOT 28), RECORD OWNERS, JENNIFER V. & PAUL J. YOUNG, 9 GILL STREET EXETER, NH 03833"
BY: MILLENNIUM ENGINEERING INC.
DATED: OCTOBER 19, 2006
R.C.R.D. PLAN # D-34385

5.) "AMENDED CONDOMINIUM SITE PLAN IN EXETER, NH, SHOWING AS-BUILT REVISIONS TO DECKS AND PATIO AS WELL AS DESIGNATED PARKING AT 3 GILL STREET AND 104 & 106 FRONT STREET, (ASSESSORS MAP 73, LOT 13), PREPARED FOR GILL FRONT CONDOMINIUM ASSOCIATION, 3 GILL STREET EXETER, NH 03833"
BY: MILLENNIUM ENGINEERING INC.
DATED: JULY 7, 2017
R.C.R.D. PLAN # D-40233

6.) "PLAT OF LAND ON FRONT STREET, EXETER, N.H., SURVEYED FOR NANCY C. MERRILL"
BY: T.D. BROUILLETTE LAND SURVEYING
DATED NOVEMBER 21, 2011
NOT RECORDED, ON FILE AT THIS OFFICE & N.H. STATE ARCHIVES

7.) "PLAT OF LAND ON GILL STREET, EXETER, N.H., PREPARED FOR SUSAN C. STAFFORD"
BY: T.D. BROUILLETTE LAND SURVEYING
DATED: OCTOBER 12, 2006
NOT RECORDED, ON FILE AT THIS OFFICE

8.) "PLAN OF LOT, NO.8 PARKER ST., EXETER, N.H."
BY: JOHN W. DURGIN
DATED: OCT. 1954
NOT RECORDED, ON FILE AT THIS OFFICE

ABUTTERS :

(A) N/F MICHELLE E. HARRITON REVOCABLE TRUST
HARRITON, MICHELLE E., TRUSTEE
& HARRITON, BENJAMIN MICHAEL
114 FRONT STREET
EXETER, NH 03833
TAX MAP 73, LOT 15
R.C.R.D. BOOK 6482, PAGE 2462

(B) N/F JOHN & TERESA TOOMEY FAMILY REVOCABLE TRUST
TOOMEY, JOHN & TERESA, TRUSTEES
2 NEWFIELDS ROAD
EXETER, NH 03833
TAX MAP 73, LOT 16
R.C.R.D. BOOK 6174, PAGE 602

(C) N/F ART UP FRONT STREET LLC
120 FRONT STREET
EXETER, NH 03833
TAX MAP 73, LOT 17
R.C.R.D. BOOK 5755, PAGE 1773

(D) N/F JEANETTE MORRISETTE TRUST
MORRISETTE, JEANETTE, TRUSTEE
12 PARKER STREET
EXETER, NH 03833
TAX MAP 73, LOT 21
R.C.R.D. BOOK 3468, PAGE 947

(E) N/F ROY E. MORRISETTE REVOCABLE TRUST
MORRISETTE, ROY E., TRUSTEE
14 PARKER STREET
EXETER, NH 03833
TAX MAP 73, LOT 22
R.C.R.D. BOOK 6496, PAGE 2880

(F) N/F MDMJ MILLER REVOCABLE TRUST
MILLER, DEBORAH J. & MARK A., TRUSTEES
16 PARKER STREET
EXETER, NH 03833
TAX MAP 73, LOT 23
R.C.R.D. BOOK 6530, PAGE 879

(G) N/F MAHATA HALL FAMILY TRUST
MAHATA, MINI & HALL, BRETT, TRUSTEES
17 GILL STREET
EXETER, NH 03833
TAX MAP 82, LOT 24
R.C.R.D. BOOK 6116, PAGE 1827

(H) N/F UNGER-DESMOND 2018 REVOCABLE TRUST
UNGER, NICHOLAS F. & DESMOND, BARBARA S., TRUSTEES
20 MAIN STREET
EXETER, NH 03833
TAX MAP 82, LOT 25
R.C.R.D. BOOK 5957, PAGE 081

(I) N/F POWERS, VINCENT & ANNMARIE
13 GILL STREET
EXETER, NH 03833
TAX MAP 82, LOT 26
R.C.R.D. BOOK 5580, PAGE 338

(J) N/F MASKWA, ERIC & EVAGELIA
11 GILL STREET
EXETER, NH 03833
TAX MAP 82, LOT 27
R.C.R.D. BOOK 6197, PAGE 2683

(K) N/F FRENCH, CHARLES ANDREW & GASTICH, DANA ERIN
9 GILL STREET
EXETER, NH 03833
TAX MAP 82, LOT 28
R.C.R.D. BOOK 6124, PAGE 164

(L) N/F SUSAN C. STAFFORD REVOCABLE TRUST
STAFFORD, SUSAN C., TRUSTEE
1301 SEAFARER CIRCLE 104
JUPITER, FL 33477
TAX MAP 73, LOT 11
R.C.R.D. BOOK 4879, PAGE 2548

(M) N/F NEALON FAMILY REVOCABLE TRUST
NEALON, JAMES D. & KRISTIN F., TRUSTEES
5 GILL STREET
EXETER, NH 03833
TAX MAP 73, LOT 12
R.C.R.D. BOOK 6449, PAGE 189

(N) N/F DALE A. ATKINS REVOCABLE TRUST
ATKINS, DALE A., TRUSTEE
104 FRONT STREET
EXETER, NH 03833
TAX MAP 73, LOT 13-1
R.C.R.D. BOOK 5983, PAGE 001

(N) N/F ELLEN WOLFF LIVING TRUST
WOLFF, ELLEN, TRUSTEE
3 GILL STREET
EXETER, NH 03833
TAX MAP 73, LOT 13-2
R.C.R.D. BOOK 6479, PAGE 440

(N) N/F RUSSMAN, BRETT M. & ROBERTSON, ADELE G. (LIFE ESTATE)
106 FRONT STREET
EXETER, NH 03833
TAX MAP 73, LOT 13-3
R.C.R.D. BOOK 5807, PAGE 1710

(O) N/F LINDE, ARTHUR & JEAN
109 FRONT STREET
EXETER, NH 03833
TAX MAP 73, LOT 239
R.C.R.D. BOOK 5400, PAGE 914

(P) N/F GARSTKA, JEFFREY STACI
P.O. BOX 154
PORTSMOUTH, NH 03802-0154
TAX MAP 73, LOT 238
R.C.R.D. BOOK 5013, PAGE 281

(Q) N/F DAVIS, JAMES M. & JODY W.
115 FRONT STREET
EXETER, NH 03833
TAX MAP 73, LOT 237
R.C.R.D. BOOK 3101, PAGE 870

(R) N/F WEBSTER, PAUL M. & ELIZABETH
117 FRONT STREET
EXETER, NH 03833
TAX MAP 73, LOT 236
R.C.R.D. BOOK 6489, PAGE 1994

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.

12-2-24

KENNETH A. BERRY L.L.S. 805 DATE

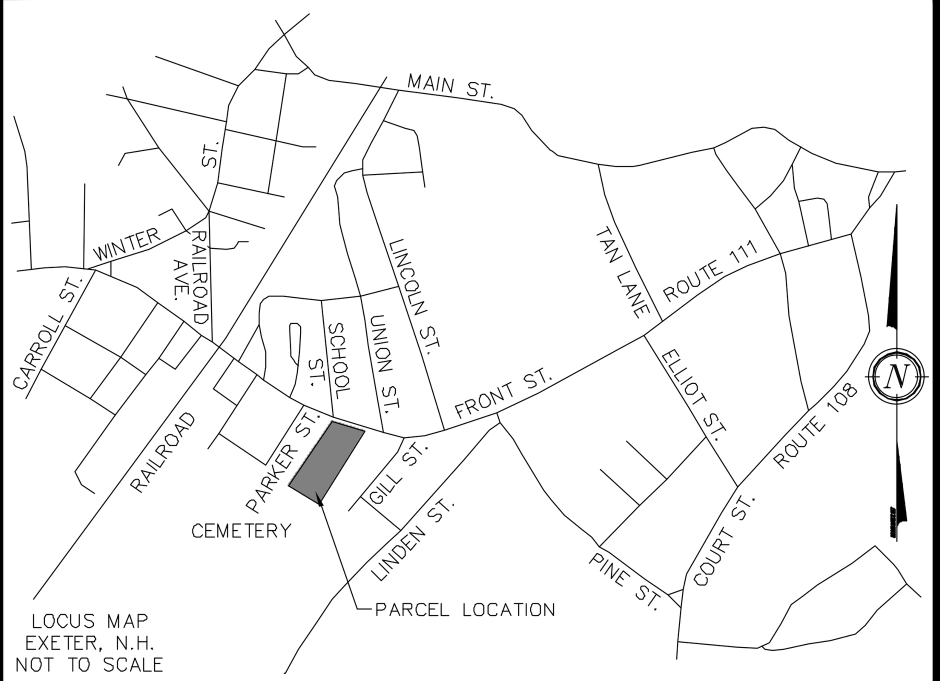
REVISION	DATE	DESCRIPTION
#2	12-2-24	UPDATE EX. CONDITIONS PLANS
#1	11-11-24	ADD BOUNDS SET

BOUNDARY PLAN
LAND OF
112 FRONT STREET, LLC
112 FRONT STREET
EXETER, N.H.
TAX MAP 73, LOT 14

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : SEPTEMBER 20, 2024
FILE NO. : DB 2024 - 100

STATE OF NEW HAMPSHIRE
No. 805
KENNETH A. BERRY
LICENSED LAND SURVEYOR
SIGNATURE



UTILITY NOTE:

THE UNDERGROUND UTILITIES SHOWN ON THIS PLAN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR NOR THE ENGINEER MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE.

PLAN REFERENCES:

1.) "PLAN OF LOTS BELONGING TO THE LATE CHARLES GILL OF EXETER N.H."
BY: WILLIAM R. MOULTON
DATED: UNKNOWN
R.C.R.D. PLAN # 0085

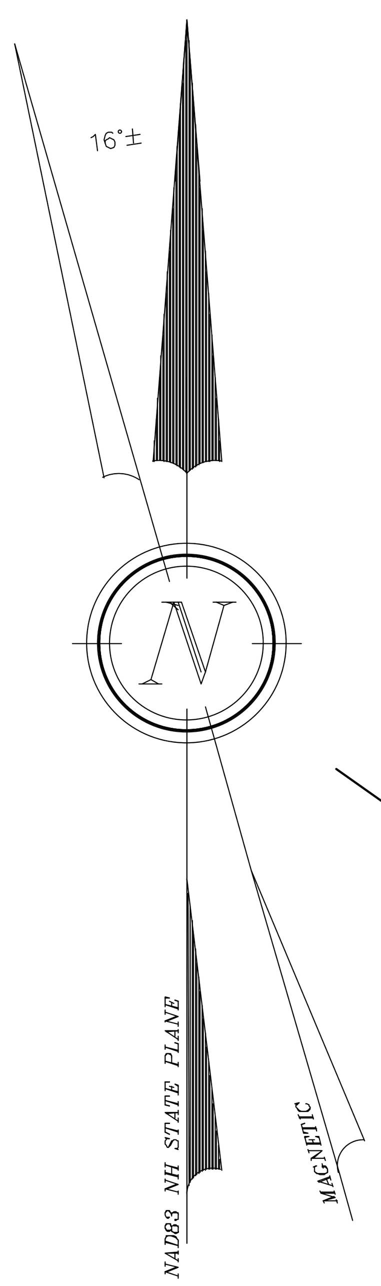
2.) "SUBDIVISION OF LAND FOR 120 DELI & CONVENIENCE STORE, INC. IN EXETER, N.H."
BY: PARKER SURVEY ASSOC., INC.
DATED: FEBRUARY 1981
R.C.R.D. PLAN # C-11059

3.) "CONDOMINIUM SITE PLAN FOR GILL FRONT CONDOMINIUMS IN EXETER, N.H." (5 SHEETS)
BY: SEACOAST ENGINEERING ASSOCIATES, INC.
DATED: JUNE 16, 1986
R.C.R.D. PLAN # D-15133

4.) "PLAT OF LAND IN EXETER, NH, SHOWING A PERIMETER SURVEY AT 9 GILL STREET, (ASSESSORS MAP 82, LOT 28), RECORD OWNERS, JENNIFER V. & PAUL J. YOUNG, 9 GILL STREET EXETER, NH 03833"
BY: MILLENNIUM ENGINEERING INC.
DATED: OCTOBER 19, 2006
R.C.R.D. PLAN # D-34385

5.) "AMENDED CONDOMINIUM SITE PLAN IN EXETER, NH, SHOWING AS-BUILT REVISIONS TO DESKS AND PATIO AS WELL AS DESIGNATED PARKING AT 3 GILL STREET AND 104 & 106 FRONT STREET, (ASSESSORS MAP 73, LOT 13), PREPARED FOR GILL FRONT CONDOMINIUM ASSOCIATION, 3 GILL STREET EXETER, NH 03833"
BY: MILLENNIUM ENGINEERING INC.
DATED: JULY 7, 2017
R.C.R.D. PLAN # D-40233

6.) "PLAT OF LAND ON FRONT STREET, EXETER, N.H., SURVEYED FOR NANCY C. MERRILL"
BY: T.D. BROUILLETTE
DATED NOVEMBER 21, 2011
NOT RECORDED, ON FILE AT THIS OFFICE



SOILS:

599 – URBAN LAND, HOOSIC COMPLEX, 3 TO 15 % SLOPES

SEE: USDA/NRCS WEBSOIL

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.

1-15-25

KENNETH A. BERRY L.L.S. 805 DATE

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NOTES:

1.) OWNER: 112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

2.) TAX MAP 73, LOT 14

3.) R.C.R.D. BOOK 6571, PAGE 2507

4.) LOT AREA: 69,349 Sq.Ft., 1.59 Ac.

5.) ZONING: C-1, CENTRAL AREA COMMERCIAL DISTRICT
MIN. LOT SIZE: 5,000
MIN. LOT WIDTH: 50'
MIN LOT DEPTH: 100'
MAX. BUILDING HEIGHT: 35'
FRONT BUILDING SETBACK: 10' OR THE AVERAGE OF THE BLOCK, WHICH EVER IS LESS
THE AVERAGE FRONT SETBACKOF THE BLOCK: 14.69'
SIDE BUILDING SETBACK: EQUAL TO THE SIDE YARD OF THE ABUTTING PROPERTY OR 10', WHICHEVER IS LESS.
RIGHT SIDE ABUTTING HOUSE: 1.43'
LEFT SIDE ABUTTING HOUSE: 63.59'
REAR BUILDING SETBACK: 20'
MAX. BUILDING COVERAGE: 75%
MIN. OPEN SPACE: 5%

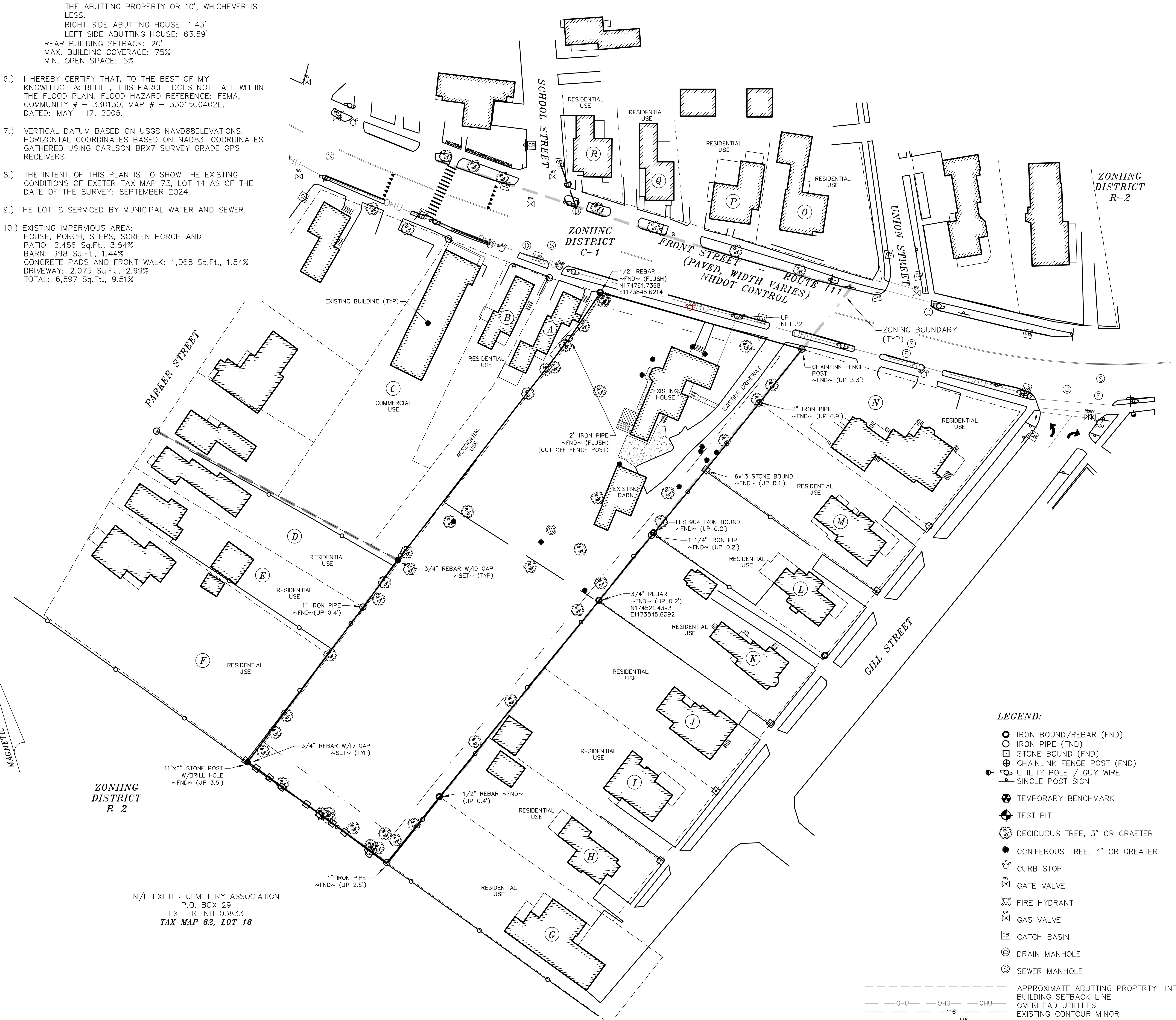
6.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, THIS PARCEL DOES NOT FALL WITHIN THE FLOOD PLAIN. FLOOD HAZARD REFERENCE: FEMA, COMMUNITY # – 330130, MAP # – 33015C0402E, DATED: MAY 17, 2005.

7.) VERTICAL DATUM BASED ON USGS NAVD88ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83, COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

8.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS OF EXETER TAX MAP 73, LOT 14 AS OF THE DATE OF THE SURVEY: SEPTEMBER 2024.

9.) THE LOT IS SERVICED BY MUNICIPAL WATER AND SEWER.

10.) EXISTING IMPERVIOUS AREA:
HOUSE, PORCH, STEPS, SCREEN PORCH AND PATIO: 2,456 Sq.Ft., 3.54%
BARN: 998 Sq.Ft., 1.44%
CONCRETE PADS AND FRONT WALK: 1,068 Sq.Ft., 1.54%
DRIVEWAY: 2,075 Sq.Ft., 2.99%
TOTAL: 6,597 Sq.Ft., 9.51%



LEGEND:

- IRON BOUND/REBAR (FND)
- IRON PIPE (FND)
- STONE BOUND (FND)
- CHAINLINK FENCE POST (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- TEMPORARY BENCHMARK
- TEST PIT
- DECIDUOUS TREE, 3" OR GRAETER
- CONIFEROUS TREE, 3" OR GREATER
- CURB STOP
- GATE VALVE
- FIRE HYDRANT
- GAS VALVE
- CATCH BASIN
- DRAIN MANHOLE
- SEWER MANHOLE
- APPROXIMATE ABUTTING PROPERTY LINE
- BUILDING SETBACK LINE
- OHU OVERHEAD UTILITIES
- 116 EXISTING CONTOUR MINOR
- 115 EXISTING CONTOUR MAJOR
- ZONING BOUNDARY
- FND FOUND
- TYP TYPICAL
- R.C.R.D. ROCKINGHAM COUNTY REGISTRY OF DEEDS

ABUTTERS :

N/F MICHELLE E. HARRITON REVOCABLE TRUST
HARRITON, MICHELLE E., TRUSTEE
& HARRITON, BENJAMIN MICHAEL
114 FRONT STREET
(A) EXETER, NH 03833
TAX MAP 73, LOT 15
R.C.R.D. BOOK 6482, PAGE 2462

N/F JOHN & TERESA TOOMEY FAMILY REVOCABLE TRUST
TOOMEY, JOHN & TERESA, TRUSTEES
2 NEWFIELDS ROAD
(B) EXETER, NH 03833
TAX MAP 73, LOT 16
R.C.R.D. BOOK 6174, PAGE 602

N/F ART UP FRONT STREET LLC
120 FRONT STREET
(C) EXETER, NH 03833
TAX MAP 73, LOT 17
R.C.R.D. BOOK 5755, PAGE 1773

N/F JEANETTE MORRISETTE TRUST
MORRISETTE, JEANETTE, TRUSTEE
12 PARKER STREET
(D) EXETER, NH 03833
TAX MAP 73, LOT 21
R.C.R.D. BOOK 3468, PAGE 947

N/F ROY E. MORRISETTE REVOCABLE TRUST
MORRISETTE, ROY E., TRUSTEE
14 PARKER STREET
(E) EXETER, NH 03833
TAX MAP 73, LOT 22
R.C.R.D. BOOK 6496, PAGE 2880

N/F MDMJ MILLER REVOCABLE TRUST
MILLER, DEBORAH J. & MARK A., TRUSTEES
16 PARKER STREET
(F) EXETER, NH 03833
TAX MAP 73, LOT 23
R.C.R.D. BOOK 6530, PAGE 879

N/F MAHATA HALL FAMILY TRUST
MAHATA, MINI & HALL, BRETT, TRUSTEES
17 GILL STREET
(G) EXETER, NH 03833
TAX MAP 82, LOT 24
R.C.R.D. BOOK 6116, PAGE 1827

N/F UNGER-DESMOND 2018 REVOCABLE TRUST
UNGER, NICHOLAS F. & DESMOND, BARBARA S., TRUSTEES
20 MAIN STREET
(H) EXETER, NH 03833
TAX MAP 82, LOT 25
R.C.R.D. BOOK 5957, PAGE 081

N/F POWERS, VINCENT & ANNMARIE
13 GILL STREET
(I) EXETER, NH 03833
TAX MAP 82, LOT 26
R.C.R.D. BOOK 5580, PAGE 338

N/F MASKWA, ERIC & EVAGELIA
11 GILL STREET
(J) EXETER, NH 03833
TAX MAP 82, LOT 27
R.C.R.D. BOOK 6197, PAGE 2683

N/F FRENCH, CHARLES ANDREW & GASTICH, DANA ERIN
9 GILL STREET
(K) EXETER, NH 03833
TAX MAP 82, LOT 28
R.C.R.D. BOOK 6124, PAGE 164

N/F SUSAN C. STAFFORD REVOCABLE TRUST
STAFFORD, SUSAN C., TRUSTEE
1301 SEAFARER CIRCLE 104
(L) JUPITER, FL 33477
TAX MAP 73, LOT 11
R.C.R.D. BOOK 4879, PAGE 2548

N/F NEALON FAMILY REVOCABLE TRUST
NEALON, JAMES D. & KRISTIN F., TRUSTEES
5 GILL STREET
(M) EXETER, NH 03833
TAX MAP 73, LOT 12
R.C.R.D. BOOK 6449, PAGE 189

N/F DALE A. ATKINS REVOCABLE TRUST
ATKINS, DALE A., TRUSTEE
104 FRONT STREET
(N) EXETER, NH 03833
TAX MAP 73, LOT 13-1
R.C.R.D. BOOK 5983, PAGE 001

N/F ELLEN WOLFF LIVING TRUST
WOLFF, ELLEN, TRUSTEE
3 GILL STREET
(N) EXETER, NH 03833
TAX MAP 73, LOT 13-2
R.C.R.D. BOOK 6479, PAGE 440

N/F RUSSMAN, BRETT M. & ROBERTSON, ADELE G. (LIFE ESTATE)
106 FRONT STREET
(N) EXETER, NH 03833
TAX MAP 73, LOT 13-3
R.C.R.D. BOOK 5807, PAGE 1710

N/F LINDE, ARTHUR & JEAN
109 FRONT STREET
(O) EXETER, NH 03833
TAX MAP 73, LOT 239
R.C.R.D. BOOK 5400, PAGE 914

N/F GARSTKA, JEFFREY STACI
P.O. BOX 154
(P) PORTSMOUTH, NH 03802-0154
TAX MAP 73, LOT 238
R.C.R.D. BOOK 5013, PAGE 281

N/F DAVIS, JAMES M. & JODY W.
115 FRONT STREET
(Q) EXETER, NH 03833
TAX MAP 73, LOT 237
R.C.R.D. BOOK 3101, PAGE 870

N/F WEBSTER, PAUL M. & ELIZABETH
117 FRONT STREET
(R) EXETER, NH 03833
TAX MAP 73, LOT 236
R.C.R.D. BOOK 6489, PAGE 1994

EXETER PLANNING BOARD CASE NUMBER:

REVISION	DATE	DESCRIPTION
#3	1-15-25	ADD CB 501 DATA & SEWER SERVICE INVERT & LOCATION
#2	12-2-24	UPDATE EX. CONDITIONS PLANS
#1	11-11-24	ADD BOUNDS SET

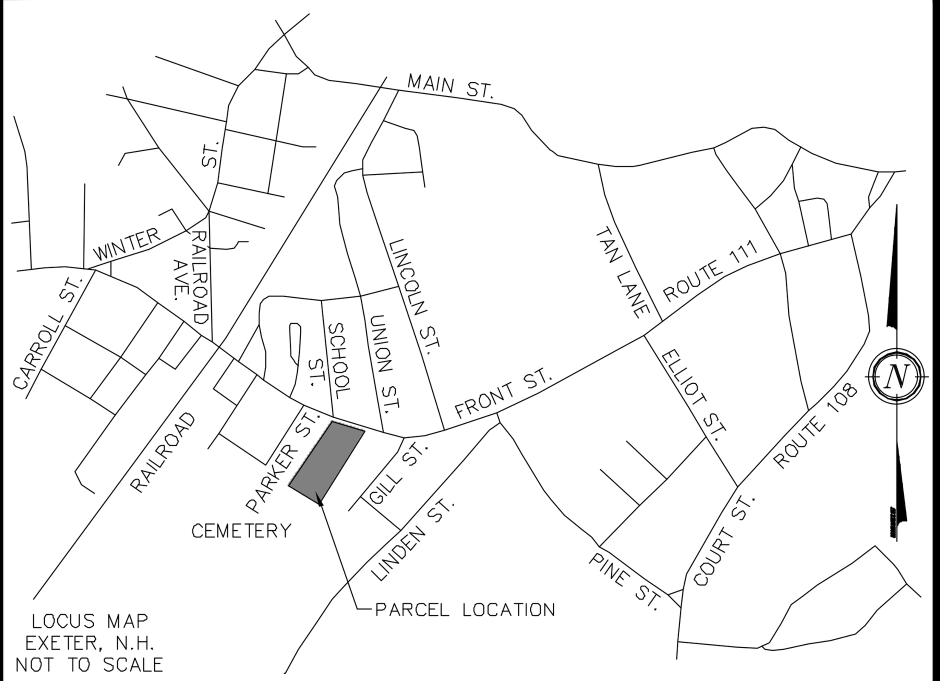
OVERVIEW EXISTING CONDITIONS PLAN
LAND OF
112 FRONT STREET, LLC
112 FRONT STREET
EXETER, N.H.
TAX MAP 73, LOT 14

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : SEPTEMBER 20, 2024
FILE NO. : DB 2024 - 100

STATE OF NEW HAMPSHIRE
No. 805
KENNETH A. BERRY
LICENSED LAND SURVEYOR
SIGNATURE

SHEET 1



NOTES:

1.) OWNER: 112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

2.) TAX MAP 73, LOT 14

3.) R.C.R.D. BOOK 6571, PAGE 2507

4.) LOT AREA: 69,349 Sq.Ft., 1.59 Ac.

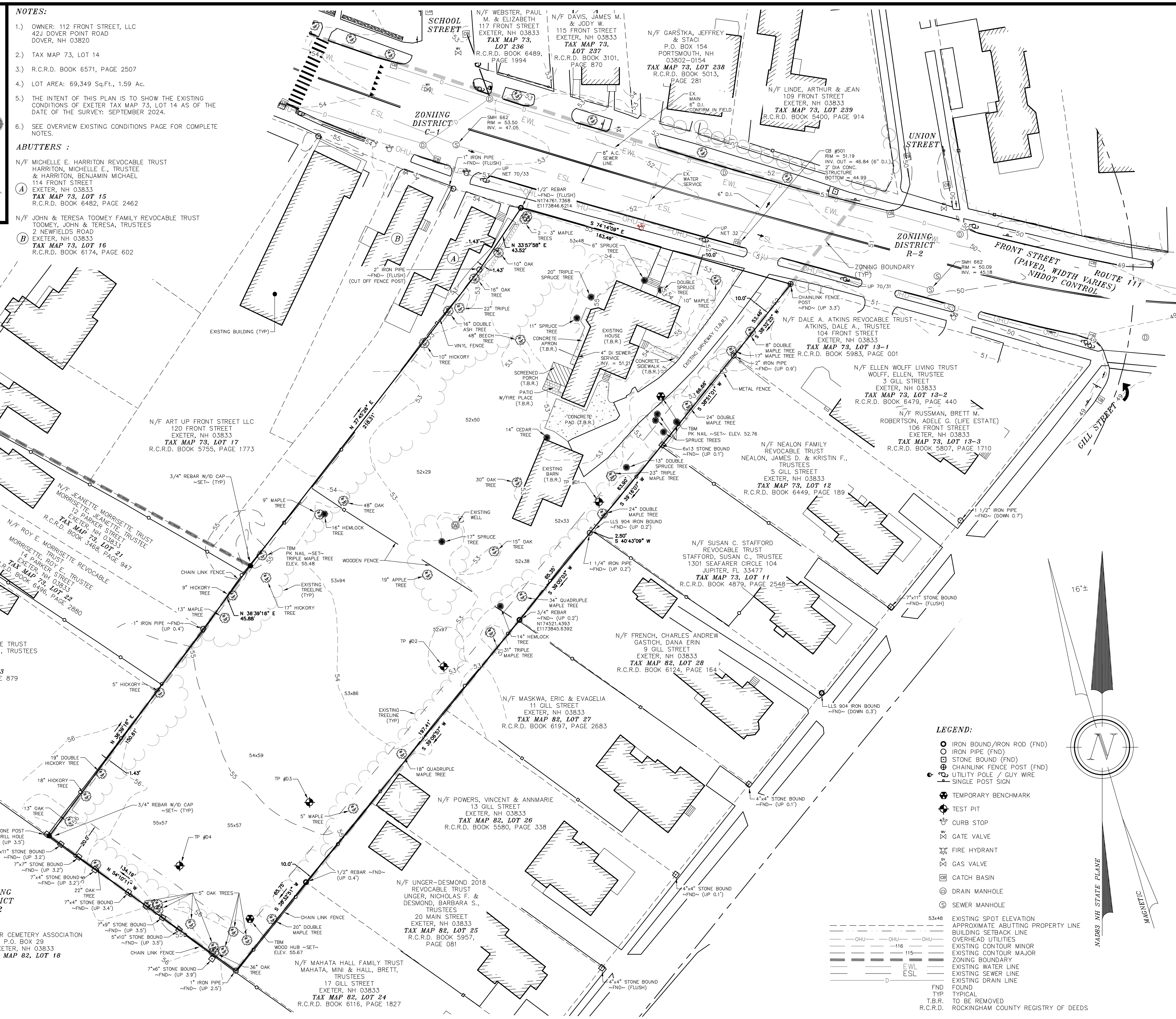
5.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS OF EXETER TAX MAP 73, LOT 14 AS OF THE DATE OF THE SURVEY: SEPTEMBER 2024.

6.) SEE OVERVIEW EXISTING CONDITIONS PAGE FOR COMPLETE NOTES.

ABUTTERS :

(A) N/F MICHELLE E. HARRITON REVOCABLE TRUST
HARRITON, MICHELLE E., TRUSTEE
& HARRITON, BENJAMIN MICHAEL
114 FRONT STREET
EXETER, NH 03833
TAX MAP 73, LOT 15
R.C.R.D. BOOK 6482, PAGE 2462

(B) N/F JOHN & TERESA TOOMEY FAMILY REVOCABLE TRUST
TOOMEY, JOHN & TERESA, TRUSTEES
2 NEWFIELDS ROAD
EXETER, NH 03833
TAX MAP 73, LOT 16
R.C.R.D. BOOK 6174, PAGE 602



LEGEND:

- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE BOUND (FND)
- CHAINLINK FENCE POST (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- TEMPORARY BENCHMARK
- TEST PIT
- CURB STOP
- GATE VALVE
- FIRE HYDRANT
- GAS VALVE
- CATCH BASIN
- DRAIN MANHOLE
- SEWER MANHOLE
- 53x48 EXISTING SPOT ELEVATION
- APPROXIMATE ABUTTING PROPERTY LINE
- BUILDING SETBACK LINE
- OHU OVERHEAD UTILITIES
- 116 EXISTING CONTOUR MINOR
- 115 EXISTING CONTOUR MAJOR
- ZONING BOUNDARY
- EWL EXISTING WATER LINE
- ESL EXISTING SEWER LINE
- D EXISTING DRAIN LINE
- FND FOUND
- TYP TYPICAL
- T.B.R. TO BE REMOVED
- R.C.R.D. ROCKINGHAM COUNTY REGISTRY OF DEEDS

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.

1-15-25

KENNETH A. BERRY L.L.S. 805 DATE

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

EXETER PLANNING BOARD CASE NUMBER:

REVISION	DATE	DESCRIPTION
#3	1-15-25	ADD CB 501 DATA & SEWER SERVICE INVERT & LOCATION
#2	12-2-24	UPDATE EX. CONDITIONS PLANS
#1	11-11-24	ADD BOUNDS SET

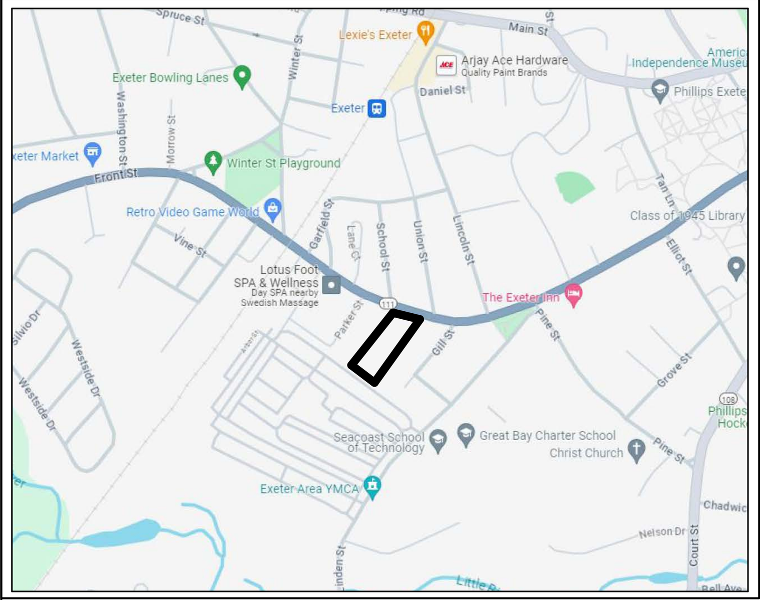
EXISTING CONDITIONS PLAN
LAND OF
112 FRONT STREET, LLC
112 FRONT STREET
EXETER, N.H.
TAX MAP 73, LOT 14

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : SEPTEMBER 20, 2024
FILE NO. : DB 2024 - 100

STATE OF NEW HAMPSHIRE No. 805 KENNETH A. BERRY LICENSED LAND SURVEYOR SIGNATURE

SHEET 2



LOCATION MAP
1"=500'

SITE DATA:

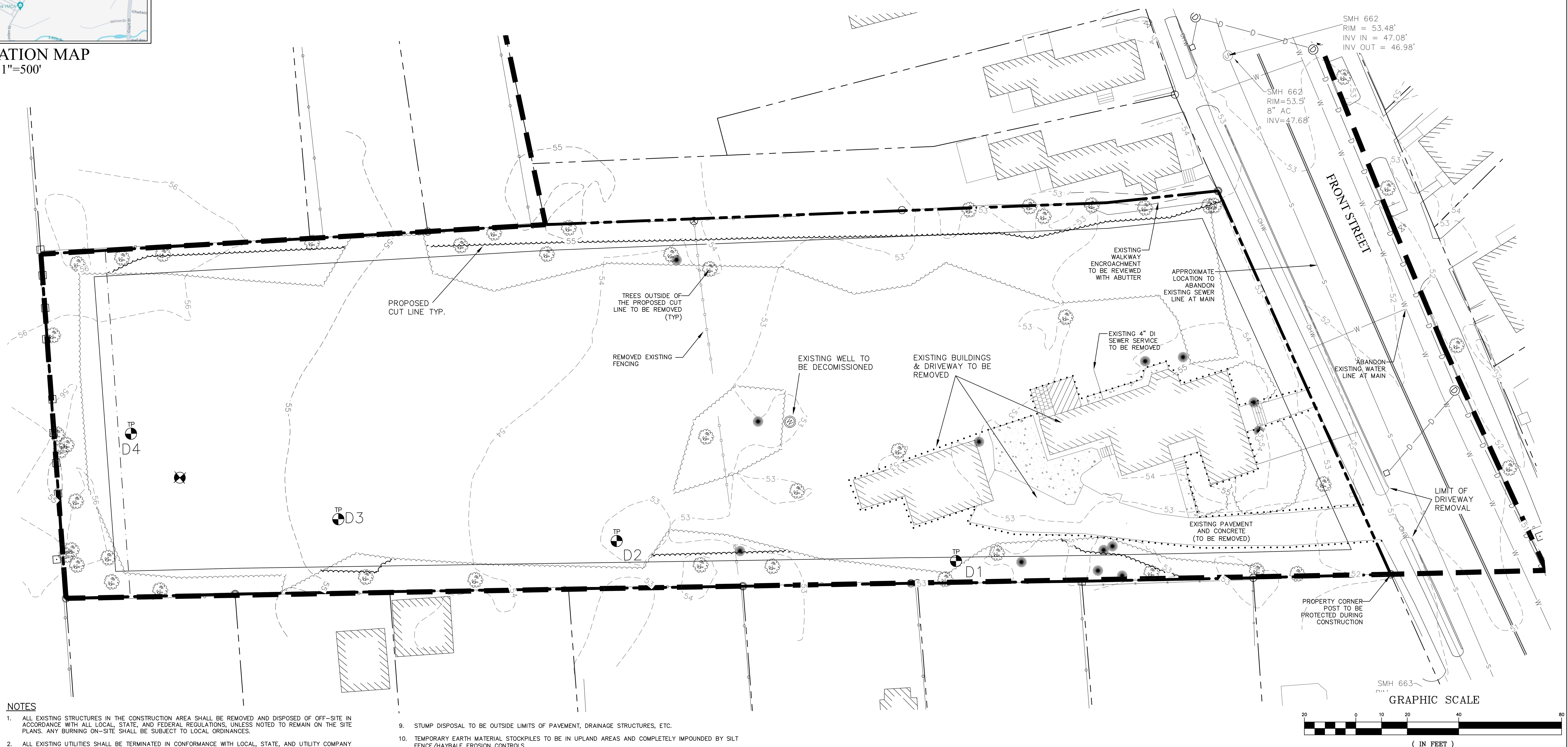
LOCATION:	112 FRONT STREET, EXETER, NEW HAMPSHIRE
ZONING DISTRICTS:	CENTRAL AREA COMMERCIAL (C-1)
EXISTING USE:	RESIDENTIAL HOME
PROPOSED USE:	17 TOWN HOUSE UNITS

JAMES P. GOVE 11-12-2024 No. 004

STATE OF NEW HAMPSHIRE JAMES P. GOVE 11-12-2024 No. 0051 CERTIFIED WETLAND SCIENTIST

PREPARED FOR:
112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863



NOTES

1. ALL EXISTING STRUCTURES IN THE CONSTRUCTION AREA SHALL BE REMOVED AND DISPOSED OF OFF-SITE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS, UNLESS NOTED TO REMAIN ON THE SITE PLANS. ANY BURNING ON-SITE SHALL BE SUBJECT TO LOCAL ORDINANCES.
2. ALL EXISTING UTILITIES SHALL BE TERMINATED IN CONFORMANCE WITH LOCAL, STATE, AND UTILITY COMPANY STANDARDS, SPECIFICATIONS, AND DETAILS. THE CONTRACTOR SHALL COORDINATE UTILITY SERVICE DISCONNECTS WITH THE UTILITY REPRESENTATIVES PRIOR TO THE START OF WORK. WATER AND SEWER SERVICES SHALL BE ABANDONED AT THE MAIN BY A CONTRACTOR LICENSED BY EXETER PUBLIC WORKS. CONTRACTOR SHALL COORDINATE TRAFFIC CONTROL WITH THE TOWN PRIOR TO COMMENCING WORK.
3. EROSION AND SEDIMENTATION CONTROLS ARE TO BE INSTALLED PRIOR TO ANY EARTH MOVING ACTIVITIES.
4. A TREE CLEARING PERMIT FROM LOCAL AND STATE AUTHORITIES MAY BE REQUIRED PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL STUMPS AND DEBRIS ARE TO BE REMOVED FROM SITE.
5. THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES.
6. EXISTING SEWER SERVICE AND APPURTENANCES TO BE REMOVED AND DISPOSED OF PER TOWN AND STATE REQUIREMENTS. NEW SERVICES FOR EACH UNIT TO BE INSTALLED & CONNECTED PER TOWN SPECIFICATIONS. SEQUENCING AND SCHEDULING: (SEE DETAIL SHEETS FOR COMPLETE CONSTRUCTION SEQUENCE AND EROSION CONTROL SPECIFICATION.)
7. DEMOLITION REQUIREMENTS: CONDUCT DEMOLITION TO MINIMIZE INTERFERENCE WITH THE ADJACENT AND OCCUPIED BUILDING AREAS, IN COMPLIANCE WITH THE GOVERNING LAWS. PRIME CONSIDERATION SHALL BE GIVEN TO THE SAFETY, PROTECTION AND CONVENIENCE OF THE PUBLIC AND OWNER'S PERSONNEL.
8. LEAVE SITE IN CLEAN CONDITION.
9. STUMP DISPOSAL TO BE OUTSIDE LIMITS OF PAVEMENT, DRAINAGE STRUCTURES, ETC.
10. TEMPORARY EARTH MATERIAL STOCKPILES TO BE IN UPLAND AREAS AND COMPLETELY IMPOUNDED BY SILT FENCE/HAYBALE EROSION CONTROLS.
11. THE LANDOWNER IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS, INCLUDING ANY PERMITTING AND SETBACK REQUIREMENTS REQUIRED UNDER THESE REGULATIONS.
12. WETLANDS WERE NOT FOUND ON SITE BY GOVE ENVIRONMENTAL SERVICES, INC. OF EXETER, NH STANDARDS UTILIZED: US ARMY CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL, TECHNICAL REPORT Y-87-1 (JAN 1987). AND REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0, JANUARY 2012 AND FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, VERSION 4, NEW ENGLAND HYDRIC SOILS TECHNICAL COMMITTEE. WETLANDS DELINEATED BY CWS JAMES GOVE, #004, FIELD WORK 9-11-2024.
13. ALL WATER, SEWER, ROAD (INCLUDING DRIVEWAY), AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 9.3 STORMWATER MANAGEMENT STANDARDS, STORMWATER MANAGEMENT PLAN, STORMWATER POLLUTION PREVENTION PLAN, AND EROSION AND SEDIMENT CONTROL STANDARDS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC UTILITIES IN EXETER, NEW HAMPSHIRE". SEE SECTION 9.14 ROADWAYS, ACCESS POINTS, AND FIRE LANES AND SECTION 9.13 PARKING AREAS FOR EXCEPTIONS.
14. THE CONTRACTOR MUST OBTAIN A VALID UTILITY PIPE INSTALLER'S LICENSE AND THE JOB SUPERVISOR OR FOREMAN MUST BE CERTIFIED BY THE TOWN PRIOR TO WORKING ON ANY WATER, SEWER, OR DRAINAGE PIPES THAT ARE IN A TOWN STREET OR RIGHT OF WAY, OR THAT WILL CONNECT OR MAY BE CONNECTED TO A TOWN WATER, SEWER, OR DRAINAGE SYSTEM. A LICENSED SUPERVISOR OR FOREMAN MUST BE PRESENT AT THE JOB SITE AT ALL TIMES DURING CONSTRUCTION OF THESE UTILITIES.

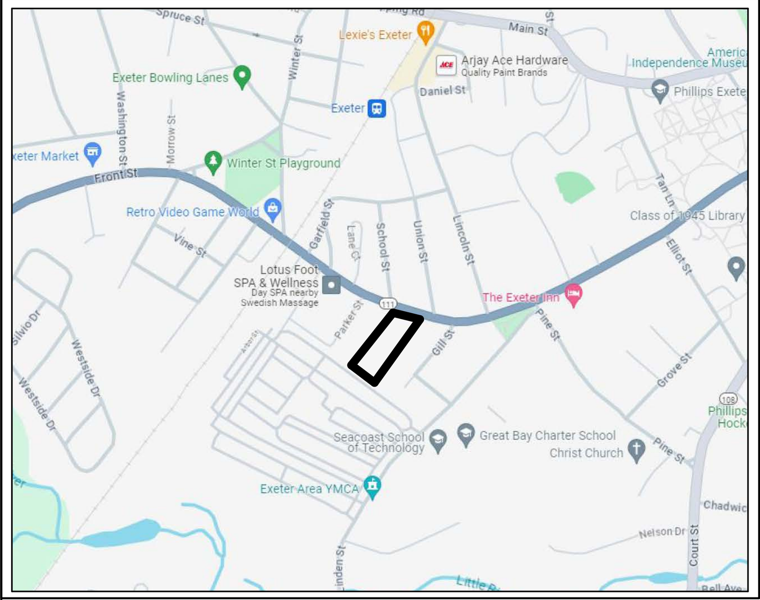
STATE OF NEW HAMPSHIRE CHRISTIAN O. SMITH No.9900 LICENSED PROFESSIONAL ENGINEER

REVISED PARKING LAYOUT	02/19/25
REVISED PER REVIEW COMMENTS	01/17/25
REVISIONS:	DATE:

DEMOLITION PLAN

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	DEC 9, 2024	SCALE:	1" = 20'
PROJ. N0:	NH-1531	SHEET NO.	4



LOCATION MAP
1"=500'

TOWN NOTES

1. THE LANDOWNER IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL WETLANDS REGULATIONS, INCLUDING ANY PERMITTING AND SETBACK REQUIREMENTS REQUIRED UNDER THESE REGULATIONS.
2. THE APPLICANT HAS DESIGNED THIS SITE TO SAFELY ACCOMMODATE MAXIMUM SIZE VEHICLES AND TRUCKS, (DESIGN VEHICLE IS THE EXETER LADDER TRUCK OR 35' BOX TRUCK) EITHER DELIVERING TO, OR USING THE PROPERTY.
3. ALL SNOW SHALL BE STORED IN THE AREA(S) DEPICTED ON THIS PLAN AS SNOW STORAGE AREAS. IN THE EVENT THAT THE AREA(S) APPROVED FOR SNOW STORAGE BECOME FULL, THE OWNER SHALL REASONABLY REMOVE EXCESS SNOW FROM THE SITE, AND SHALL NOT ALLOW SNOW TO BE STORED WITHIN TRAVEL AISLES.
4. ALL WASTE MATERIALS AND RECYCLABLE SHALL BE CONTAINED WITHIN THE BUILDING(S) OR APPROVED STORAGE FACILITIES AND SHALL NOT BE OTHERWISE STORED ON THE PROPERTY. REFUSE COLLECTION WILL BE BY DUMPSTER AS NEEDED.
5. ALL WATER, SEWER, ROAD (INCLUDING PARKING LOT), AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 9.5 GRADING, DRAINAGE, AND EROSION & SEDIMENT CONTROL AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC UTILITIES IN EXETER, NEW HAMPSHIRE.

ZONING REQUIREMENTS:
ZONING DISTRICT – CENTRAL AREA (C1)
MINIMUM LOT SIZE – 5,000 S.F.
MINIMUM LOT WIDTH – 50 FT.
MINIMUM LOT DEPTH – 100 FT.
MINIMUM DWELLING UNIT – 3,500 S.F.

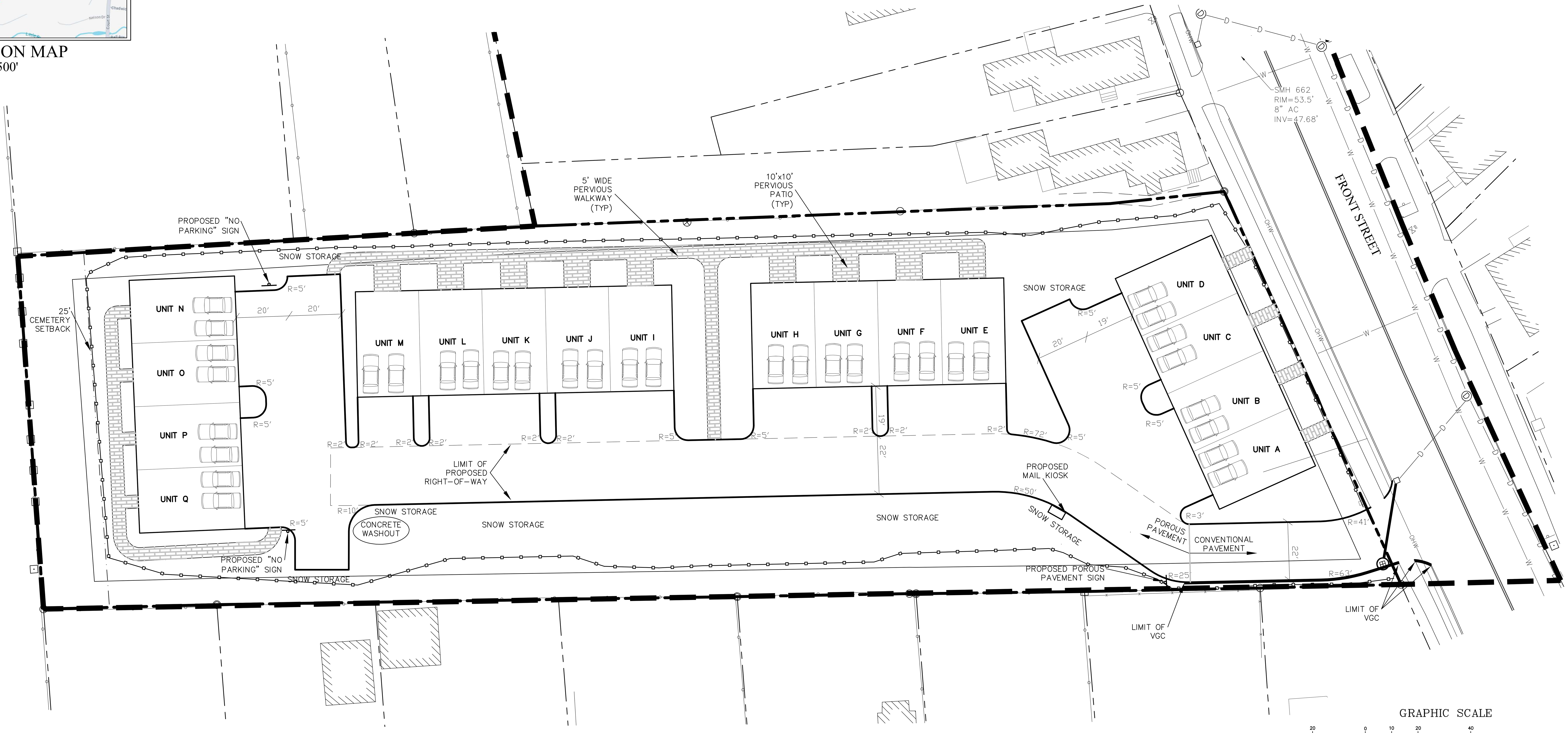
BUILDING SETBACKS
FRONT=10 FT.
SIDE=10 FT.
REAR=20 FT.
BUILDING HEIGHT=35 FT.
MAXIMUM BUILDING COVERAGE = 75%
MINIMUM OPEN SPACE = 5%

DENSITY CALCULATION:
PARCEL AREA – 69,349 SF
(–) DRIVEWAY AREA – 8,975 S.F.
= 60,374 S.F.
60,374/3500 (SF/UNIT) = 17.25 UNITS

PARKING CALCULATIONS:
TOTAL NUMBER OF UNITS=17
2 SPACES PER UNIT AND 1 SPACE PER 4 UNITS FOR VISITOR
TOTAL SPACES REQUIRED=41
17 UNITS HAVE 2 SPACES–34
PLUS 2–EXTERIOR VISITOR STALLS (WITHIN DRIVES UNITS E–M)
TOTAL SPACES PROVIDED=51

PREPARED FOR:
112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863



GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

NOTES:

1. THE PURPOSE OF THIS PLAN IS TO SHOW 17 TOWN HOUSE UNITS WITH ASSOCIATED PARKING SPACES.
2. ALL CONSTRUCTION SHALL CONFORM TO TOWN OF EXETER STANDARDS AND REGULATIONS.
3. ALL WATER, SEWER, ROAD (INCLUDING PARKING LOT), AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 9.3 STORMWATER MANAGEMENT STANDARDS, STORMWATER MANAGEMENT PLAN, STORMWATER POLLUTION PREVENTION PLAN, AND EROSION AND SEDIMENT CONTROL STANDARDS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC UTILITIES IN EXETER, NEW HAMPSHIRE". SEE SECTION 9.14 ROADWAYS, ACCESS POINTS, AND FIRE LANES AND SECTION 9.13 PARKING AREAS FOR EXCEPTIONS.
4. IN ACCORDANCE WITH SITE PLAN REVIEW & SUBDIVISION REGULATIONS SECTIONS 7.15.10 AND 9.3.4 THE APPLICANT SHALL PROVIDE THE TOWN WITH THREE COPIES OF THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND ALSO ENSURE THAT ONE COPY REMAINS ON SITE.
5. ALL PROPOSED SIGNAGE SHALL CONFORM WITH THE TOWN ZONING REGULATIONS UNLESS A VARIANCE IS OTHERWISE REQUESTED.
6. TOTAL PROPOSED DISTURBANCE FOR CONSTRUCTION = 1.3± ACRES.
7. UPON COMPLETION OF CONSTRUCTION AND PRIOR TO RELEASE OF BOND, THE APPLICANT SHALL SUBMIT A LETTER TO THE TOWN, SIGNED AND STAMPED BY THE DESIGN ENGINEER, WHO MUST BE A LICENSED PROFESSIONAL ENGINEER IN NH, STATING CONSTRUCTION HAS BEEN COMPLETED IN CONFORMANCE WITH THE APPROVED PLANS.
8. UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN LOCATED FROM FIELD OBSERVATIONS AND THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. BEALS ASSOCIATES OR ANY OF THEIR EMPLOYEES TAKE NO 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 UTILITIES OR STRUCTURES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 1–888–DIG–SAFE.
9. THIS PLAN HAS BEEN PREPARED FOR MUNICIPAL 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. 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.
10. ALL BENCHMARKS AND TOPOGRAPHY SHOULD BE FIELD VERIFIED BY THE CONTRACTOR.
11. THIS SITE IS NOT LOCATED IN THE 100 YEAR FLOOD ZONE.
12. BEYOND THE ENTRANCE DRIVE, ALL PAVEMENT WILL BE POROUS PAVEMENT. SEE PLAN FOR LIMITS.
13. GARBAGE WILL BE STORED IN TOTER BINS WITHIN GARAGES FOR PRIVATE PICKUP.

STATE OF NEW HAMPSHIRE
CHRISTIAN O. SMITH
No.9900
PROFESSIONAL ENGINEER

REVISIONS:	DATE:
REVISED PARKING LAYOUT	02/19/25
REVISED PER REVIEW COMMENTS	01/17/25

PARKING & PAVEMENT PLAN

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	DEC 9, 2024	SCALE:	1" = 20'
PROJ. N0:	NH-1531	SHEET NO.	5

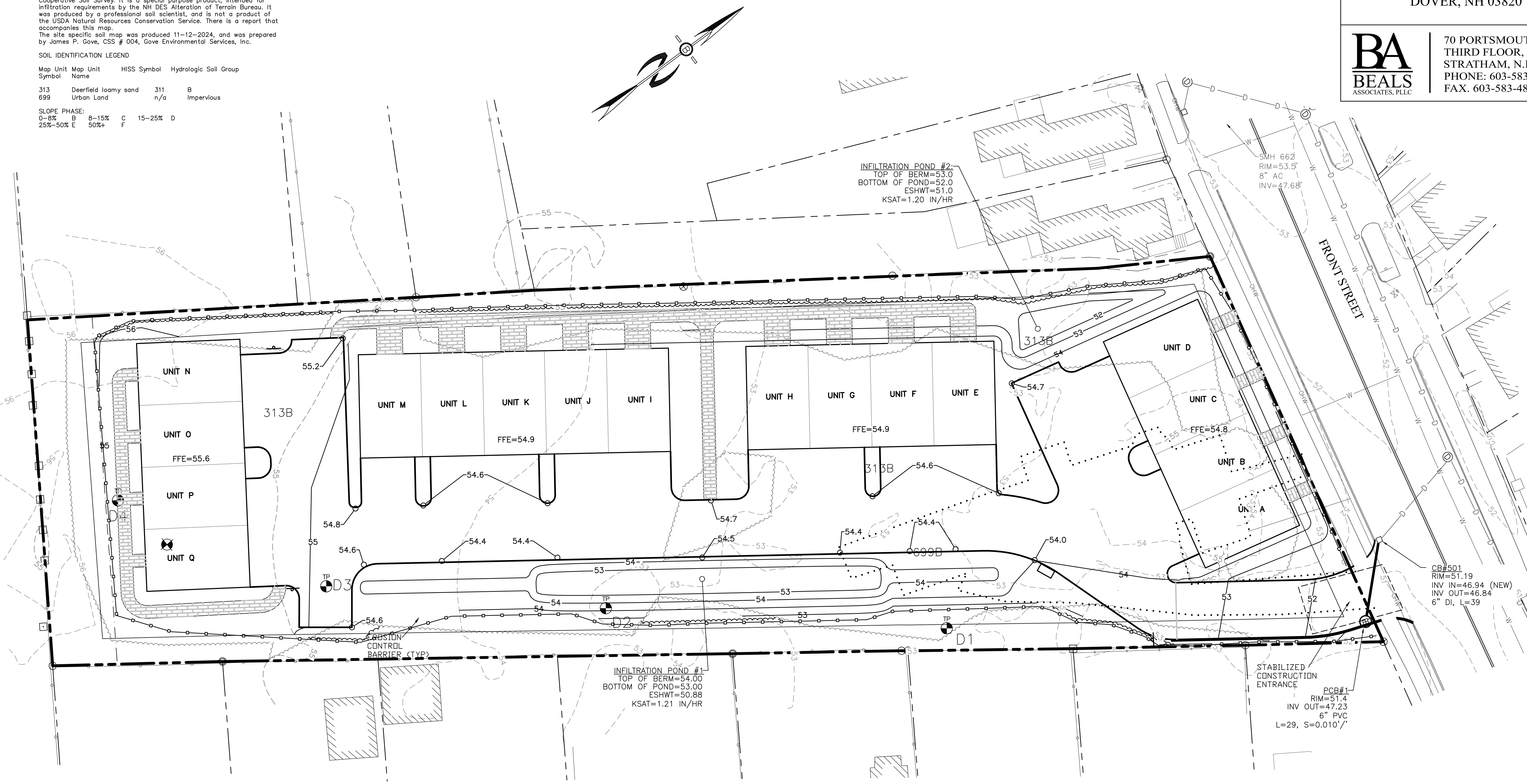
This map product is within the technical standards of the National Cooperative Soil Survey. It is a special purpose product, intended for infiltration requirements by the NH DES Alteration of Terrain Bureau. It was produced by a professional soil scientist, and is not a product of the USDA Natural Resources Conservation Service. There is a report that accompanies this map.
The site specific soil map was produced 11-12-2024, 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
313	Deerfield loamy sand	311	B
699	Urban Land	n/a	Impervious

SLOPE PHASE:

0-8%	B	8-15%	C	15-25%	D
25%-50%	E	50%+	F		



UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER BEALS ASSOCIATES, 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) AND EXETER DPW (603) 773-6157.

NOTES:

1. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER SO THAT EROSION AND AIR AND WATER POLLUTION WILL BE MINIMIZED.
2. STRAW BALES SHALL BE ANCHORED INTO THE SOIL USING 2" X 2" STAKES DRIVEN THROUGH THE BALES AND AT LEAST 18 INCHES IN TO THE SOIL.
3. SEEDING, FERTILIZING, AND MULCHING SHALL CONFORM TO THE RECOMMENDATIONS IN THE APPROPRIATED VEGETATIVE BMP.
4. THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES THE CONTRACTOR SHALL TAKE PRECAUTIONS AND INSTRUCTIONS FROM THE PLANNING DEPARTMENT IN ORDER TO PREVENT, ABATE AND CONTROL THE EMISSION OF FUGITIVE DUST INCLUDING BUT NOT LIMITED TO WETTING, COVERING, SHIELDING, OR VACUUMING.
5. THE NH COMMISSIONER OF AGRICULTURE PROHIBITS THE COLLECTION, POSSESSION, IMPORTATION, TRANSPORTATION, SALE, PROPAGATION, TRANSPLANTATION, OR CULTIVATION OF PLANTS BANNED BY NH LAW RSA 430:53 AND NH CODE ADMINISTRATIVE RULES AGR 3800. THE PROJECT SHALL MEET ALL REQUIREMENTS AND THE INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES.
6. THE CONSTRUCTION SITE OPERATOR AND OWNER SHALL SUBMIT A NOTICE OF INTENT (NOI) TO USEPA, WASHINGTON, DC, STORMWATER NOTICE PROCESSING CENTER AT LEAST FORTEEN DAYS PRIOR TO COMMENCEMENT OF WORK ON SITE. EPA WILL POST THE NOI AT http://cfpubl.epa.gov/npdes/stormwater/noi/noisearch.cfm. AUTHORIZATION IS GRANTED UNDER THE PERMIT ONCE THE NOI IS SHOWN IN "ACTIVE STATUS".
7. ALL DRAINAGE STRUCTURES AND SWALES SHALL BE BUILT AND STABILIZED PRIOR TO HAVING RUNOFF DIRECTED TO THEM.
8. ALL ROOF RUNOFF SHALL BE DIRECTED UNDERGROUND TO THE RESERVOIR COURSE BELOW THE POROUS PAVEMENT.

STATE OF NEW HAMPSHIRE
CHRISTIAN O. SMITH
No.9900
LICENSED PROFESSIONAL ENGINEER

PREPARED FOR:

112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

REVISED PARKING LAYOUT	02/19/25
REVISED PER REVIEW COMMENTS	01/17/25
REVISIONS:	DATE:

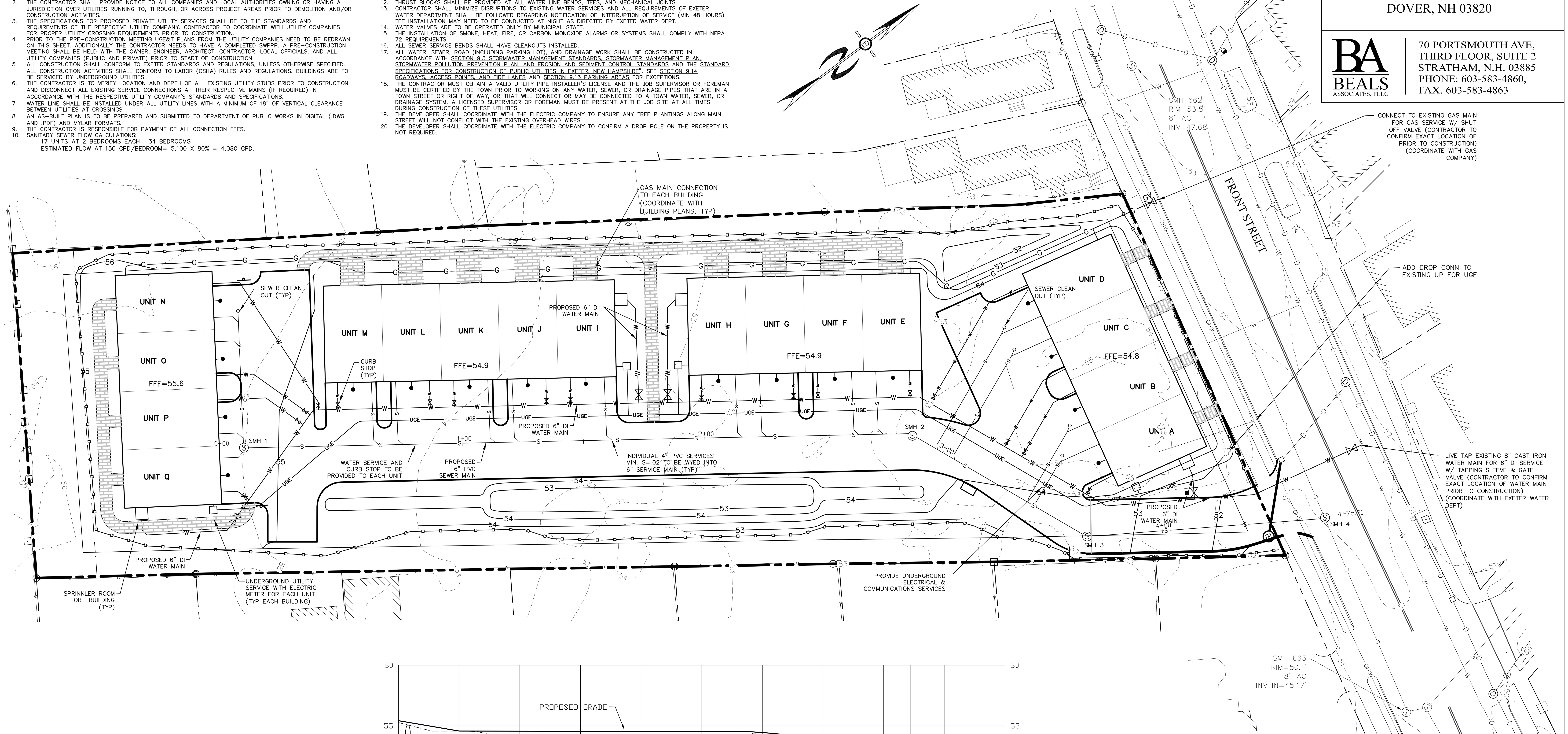
GRADING, DRAINAGE, & EROSION CONTROL PLAN

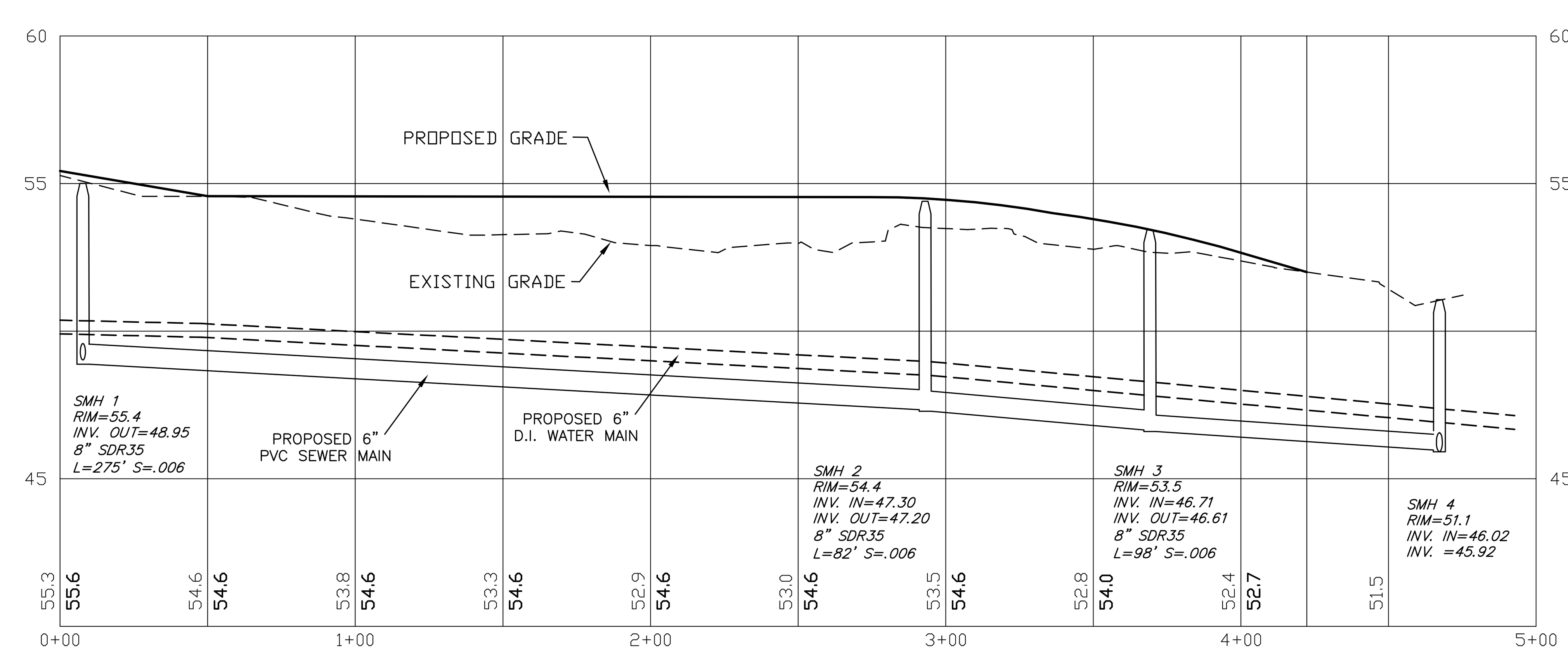
RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	DEC 9, 2024	SCALE:	1" = 20'
PROJ. N0:	NH-1531	SHEET NO.	6

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, FEES, AND BONDS.
2. THE CONTRACTOR SHALL PROVIDE NOTICE TO ALL COMPANIES AND 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 SPECIFICATIONS FOR PROPOSED PRIVATE UTILITY SERVICES SHALL BE TO THE STANDARDS AND REQUIREMENTS OF THE RESPECTIVE UTILITY COMPANY. CONTRACTOR TO COORDINATE WITH UTILITY COMPANIES FOR PROPER UTILITY CROSSING REQUIREMENTS PRIOR TO CONSTRUCTION.
4. PRIOR TO THE PRE-CONSTRUCTION MEETING UGE&T PLANS FROM THE UTILITY COMPANIES NEED TO BE REDRAWN ON THIS SHEET. ADDITIONALLY THE CONTRACTOR NEEDS TO HAVE A COMPLETED SWPPP. A PRE-CONSTRUCTION MEETING SHALL BE HELD WITH THE OWNER, ENGINEER, ARCHITECT, CONTRACTOR, LOCAL OFFICIALS, AND ALL UTILITY COMPANIES (PUBLIC AND PRIVATE) PRIOR TO START OF CONSTRUCTION.
5. ALL CONSTRUCTION SHALL CONFORM TO EXETER STANDARDS AND REGULATIONS, UNLESS OTHERWISE SPECIFIED. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR (OSHA) RULES AND REGULATIONS. BUILDINGS ARE TO BE SERVICED BY UNDERGROUND UTILITIES.
6. THE CONTRACTOR IS TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITY STUBS PRIOR TO CONSTRUCTION AND DISCONNECT ALL EXISTING SERVICE CONNECTIONS AT THEIR RESPECTIVE MAINS (IF REQUIRED) IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY'S STANDARDS AND SPECIFICATIONS.
7. WATER LINE SHALL BE INSTALLED UNDER ALL UTILITY LINES WITH A MINIMUM OF 18" OF VERTICAL CLEARANCE BETWEEN UTILITIES AT CROSSINGS.
8. AN AS-BUILT PLAN IS TO BE PREPARED AND SUBMITTED TO DEPARTMENT OF PUBLIC WORKS IN DIGITAL (.DWG AND .PDF) AND MYLAR FORMATS.
9. THE CONTRACTOR IS RESPONSIBLE FOR PAYMENT OF ALL CONNECTION FEES.
10. SANITARY SEWER FLOW CALCULATIONS:
    17 UNITS AT 2 BEDROOMS EACH= 34 BEDROOMS
    ESTIMATED FLOW AT 150 GPD/BEDROOM= 5,100 X 80% = 4,080 GPD.
11. ALL WATER AND SANITARY LEADS TO BUILDING SHALL END 5' OUTSIDE THE BUILDING LIMITS AS SHOWN ON PLANS AND SHALL BE PROVIDED WITH A TEMPORARY CAP AND WITNESS AT END.
12. THRUST BLOCKS SHALL BE PROVIDED AT ALL WATER LINE BENDS, TEES, AND MECHANICAL JOINTS.
13. CONTRACTOR SHALL MINIMIZE DISRUPTIONS TO EXISTING WATER SERVICES AND ALL REQUIREMENTS OF EXETER WATER DEPARTMENT SHALL BE FOLLOWED REGARDING NOTIFICATION OF INTERRUPTION OF SERVICE (MIN 48 HOURS). TEE INSTALLATION MAY NEED TO BE CONDUCTED AT NIGHT AS DIRECTED BY EXETER WATER DEPT.
14. WATER VALVES ARE TO BE OPERATED ONLY BY MUNICIPAL STAFF.
15. THE INSTALLATION OF SMOKE, HEAT, FIRE, OR CARBON MONOXIDE ALARMS OR SYSTEMS SHALL COMPLY WITH NFPA 72 REQUIREMENTS.
16. ALL SEWER SERVICE BENDS SHALL HAVE CLEANOUTS INSTALLED.
17. ALL WATER, SEWER, ROAD (INCLUDING PARKING LOT), AND DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 9.3 STORMWATER MANAGEMENT STANDARDS, STORMWATER MANAGEMENT PLAN, STORMWATER POLLUTION PREVENTION PLAN, AND EROSION AND SEDIMENT CONTROL STANDARDS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC UTILITIES IN EXETER, NEW HAMPSHIRE". SEE SECTION 9.14 ROADWAYS, ACCESS POINTS, AND FIRE LANES AND SECTION 9.13 PARKING AREAS FOR EXCEPTIONS.
18. THE CONTRACTOR MUST OBTAIN A VALID UTILITY PIPE INSTALLER'S LICENSE AND THE JOB SUPERVISOR OR FOREMAN MUST BE CERTIFIED BY THE TOWN PRIOR TO WORKING ON ANY WATER, SEWER, OR DRAINAGE PIPES THAT ARE IN A TOWN STREET OR RIGHT OF WAY, OR THAT WILL CONNECT OR MAY BE CONNECTED TO A TOWN WATER, SEWER, OR DRAINAGE SYSTEM. A LICENSED SUPERVISOR OR FOREMAN MUST BE PRESENT AT THE JOB SITE AT ALL TIMES DURING CONSTRUCTION OF THESE UTILITIES.
19. THE DEVELOPER SHALL COORDINATE WITH THE ELECTRIC COMPANY TO ENSURE ANY TREE PLANTINGS ALONG MAIN STREET WILL NOT CONFLICT WITH THE EXISTING OVERHEAD WIRES.
20. THE DEVELOPER SHALL COORDINATE WITH THE ELECTRIC COMPANY TO CONFIRM A DROP POLE ON THE PROPERTY IS NOT REQUIRED.





UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER BEALS ASSOCIATES, 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) AND EXETER DPW (603) 773-6157.

PREPARED FOR:

112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE, THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

STATE OF NEW HAMPSHIRE
CHRISTIAN O. SMITH No.9900
PROFESSIONAL ENGINEER

REVISIONS:	DATE:
REVISED PARKING LAYOUT	02/19/25
REVISED PER REVIEW COMMENTS	01/17/25

UTILITY PLAN

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	DEC 9, 2024	SCALE:	1" = 20'
PROJ. N0:	NH-1531	SHEET NO.	7

LIGHT POST

WALL MOUNT

Luminaire Schedule							
Symbol	Qty	Label	Arrangement	Description	Tag	LLF	Luminaire Lumens
	1	P3	Single	PEMCO: PMJOET1C130W3KU3-CXX	MOUNTED ON 10' PEMCO POLE: PLB132410S125T300N-CXX	0.900	3427
	2	P4	Single	PEMCO: PMJOET1C130W3KU4-CXX	MOUNTED ON 10' PEMCO POLE: PLB132410S125T300N-CXX	0.900	3422
	17	W1	Single	TMS: 33W-O-15LED-30K-VXX-WM-CXX-DIML	WALL MTD 10' AFG	0.900	1109

Calculation Summary						
Label	Units	Avg	Max	Min	Avg/Min	Max/Min
ENTIRE AREA	Fc	0.18	9.6	0.0	N.A.	N.A.

LIGHTING NOTES:

1. ALL OUTDOOR LIGHTING SHALL BE SO DIRECTED & SHIELDED THAT NO GLARE WILL SPILL OUT ONTO RESIDENTIALLY ZONED ABUTTERS

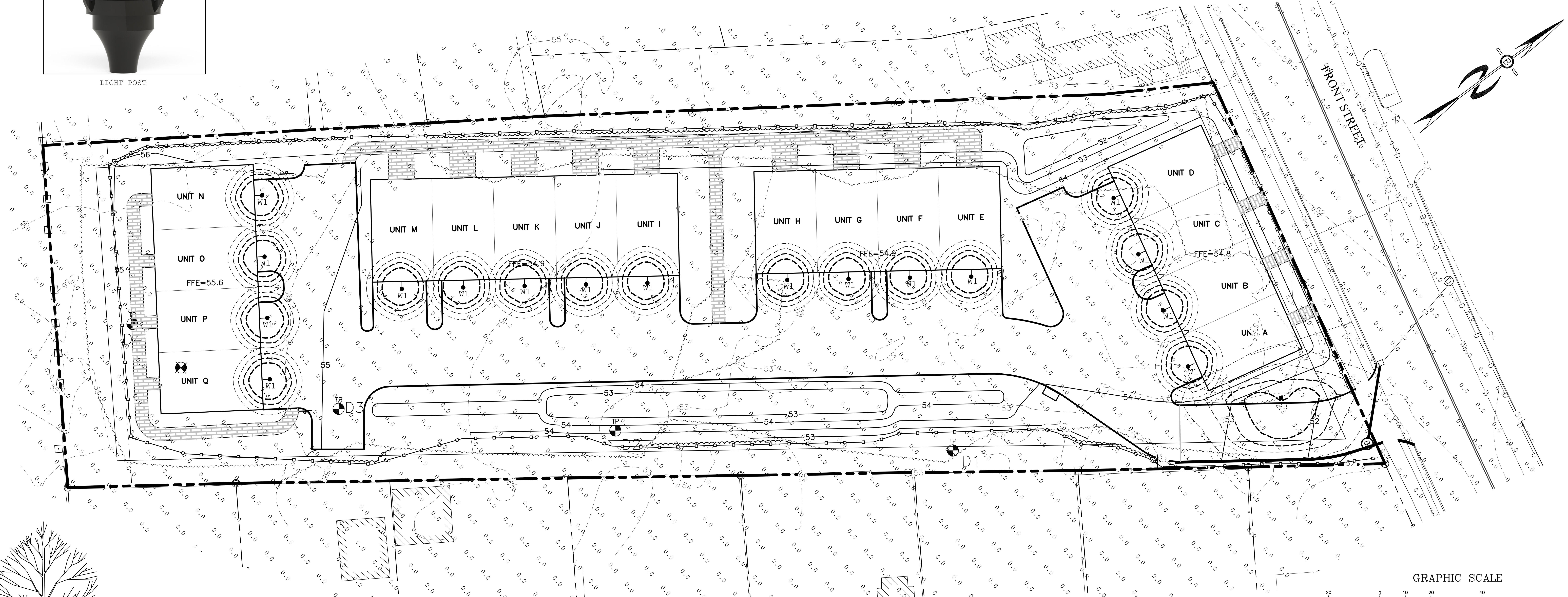
2. AFTER 10:00 PM ONLY THAT AMOUNT OF LIGHT NECESSARY FOR THE SECURITY OF THE PREMISES SHALL BE PERMITTED.

PREPARED FOR:

112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA BEALS ASSOCIATES, PLLC

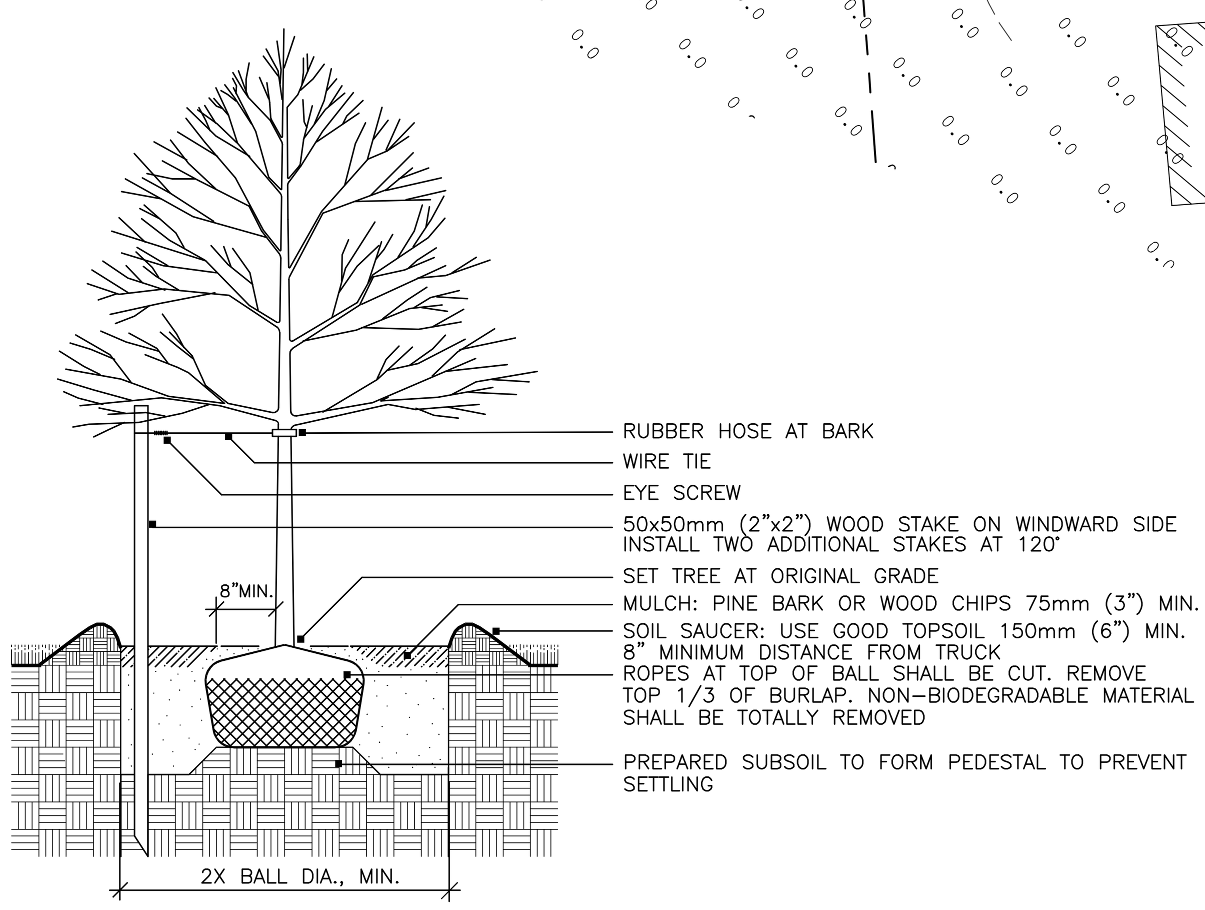
70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863



GRAPHIC SCALE

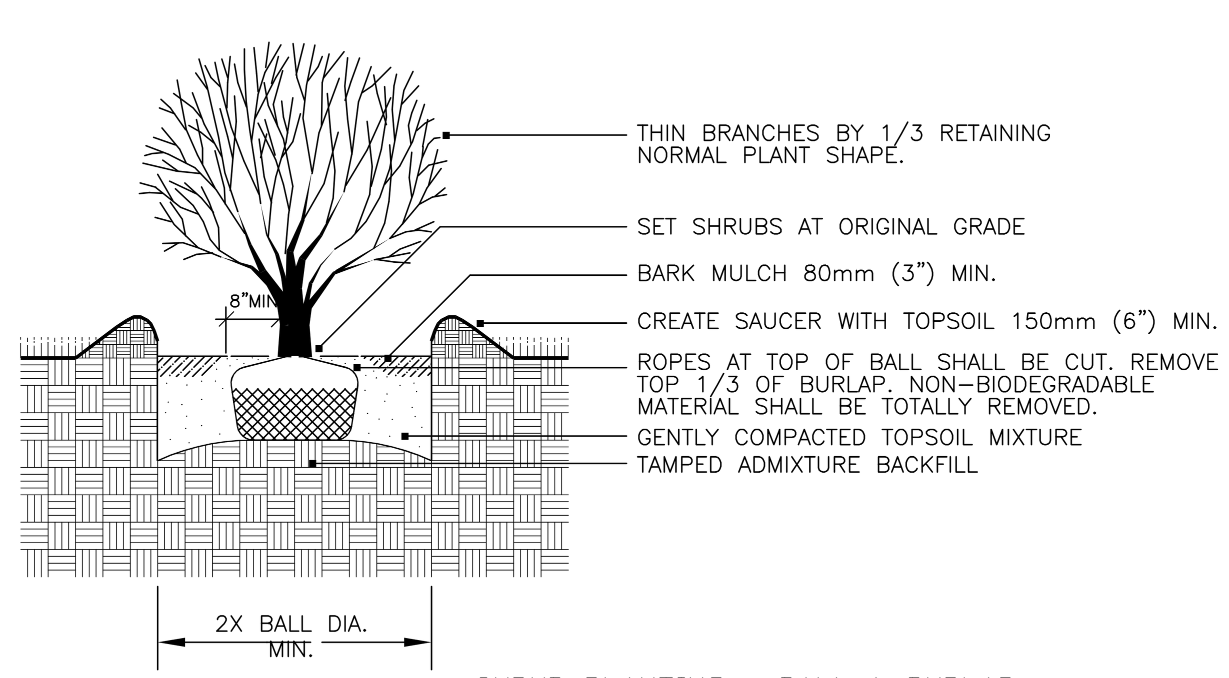
20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.



DECIDUOUS TREE PLANTING WITH STAKE AND WIRE TIE - HEAVY DUTY

NOTE: STAKING TO BE USED IN PARKING ISLANDS AND OTHER CONFINED AREAS AS NECESSARY TO AVOID CONFLICTS WITH PEDESTRIANS



SHRUB PLANTING - BALL & BURLAP

NOT TO SCALE

REVISED PARKING LAYOUT	02/19/25
REVISED PER REVIEW COMMENTS	01/17/25
REVISIONS:	DATE:

LIGHTING & PLANTING DETAIL PLAN

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	DEC 9, 2024	SCALE:	1" = 20'
PROJ. N0:	NH-1531	SHEET NO.	8

PREPARED FOR:

112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

LM Land Design, LLC
11 South Road
Brentwood, NH 03833
LMLandDesign.com

AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS

PLANT LIST - 112 FRONT ST.

Plants

Quantity	Botanical Name	Common Name	Size
1	Acer palmatum 'Bloodgood'	BLOODGOOD JAPANESE MAPLE	2" Caliper B&B
4	Acer rubrum 'October Glory'	OCTOBER GLORY RED MAPLE	3" Caliper B&B
5	Amelanchier x grandiflora 'Robin Hill'	ROBIN HILL SERVICEBERRY	2" Caliper B&B
8	Liquidambar styraciflua 'Slender Silhouette'	SILHOUETTE SWEETGUM	2.5" Caliper B&B
6	Magnolia soulangiana	SAUCER MAGNOLIA	2.5" Caliper B&B
8	Malus x 'Prairifire'	PRAIRIFIRE CRABAPPLE	2.5" Caliper B&B
6	Nyssa sylvatica 'Wildfire'	WILDFIRE TUPELO	2.5" Caliper B&B
11	Picea abies	NORWAY SPRUCE	9-10 ft. ht. B&B
9	Picea glauca	WHITE SPRUCE	8-9 ft. ht. B&B
5	Syringa reticulata 'Ivory Silk'	IVORY SILK LILAC	2.5" Caliper B&B
15	Taxus x media 'Hicksii'	HICKSII UPRIGHT YEW	6-7 ft. ht. B&B
9	Thuja occidentalis 'Holmstrup'	HOLMSTRUP ARBORVITAE	6-7 ft. ht. B&B
24	Thuja plicata 'Green Giant'	GREEN GIANT ARBORVITAE	9-10 ft. ht. B&B
18	Azalea 'Girards Hotshot'	HOTSHOT AZALEA	5 Gallon
2	Buxus microphylla 'Winter Gem'	WINTER GEM BOXWOOD	5 Gallon
5	Chamaecyparis pisifera 'Mop'	MOP GOLD THREAD CYPRESS	5 Gallon
2	Hydrangea arborescens 'NCHA7'	MINI MAUVETTE HYDRANGEA	3 Gallon
10	Hydrangea macrophylla 'Endless Summer'	ENDLESS SUMMER HYDRANGEA	5 Gallon
2	Hydrangea paniculata 'Pinky Winky™'	PINKY WINKY HYDRANGEA	7 Gallon
37	Ilex crenata 'Sky Pencil'	SKY PENCIL HOLLY	5 Gallon
2	Ilex crenata 'Steeds'	STEEDS JAPANESE HOLLY	7 Gallon
17	Itea virginica 'Sprich Little Henry'	LITTLE HENRY SWEETSPIRE	3 Gallon
9	Physocarpus opulifolius 'Mindia'	COPPERTINA NINEBARK	5 Gallon
24	Pinus mugo 'Mops'	MOPS MUGO PINE	3 Gallon
2	Rhododendron 'PJM'	PJM RHODODENDRON	5 Gallon
12	Spiraea japonica 'Goldflame'	GOLDFLAME SPIREA	3 Gallon
11	Vaccinium x 'Blue Jay'	BLUE JAY BLUEBERRY	5 Gallon
10	Vaccinium x 'Duke'	DUKE BLUEBERRY	5 Gallon
2	Viburnum dentatum 'Christom'	BLUE MUFFIN VIBURNUM	5 Gallon
19	Aster novae-angliae 'Purple Dome'	PURPLE DOME NE ASTER	1 Gallon
19	Astilbe chinensis 'Pumila'	PUMILA PINK ASTILBE	1 Gallon
42	Calamagrostis x acutiflora 'Karl Foerster'	KARL FOERSTER REED GRASS	2 Gallon
16	Coreopsis 'Tequila Sunrise'	TEQUILA SUNRISE TICKSEED	1 Gallon
22	Hemerocallis 'Happy Returns'	HAPPY RETURNS DAYLILY	1 Gallon
37	Miscanthus sinensis 'Purpurascens'	PURPURASCENS MAIDEN GRASS	2 Gallon
16	Perovskia atriplicifolia 'Little Spire'	LITTLE SPIRE RUSSIAN SAGE	1 Gallon
22	Sedum 'Autumn Joy'	AUTUMN JOY SEDUM	1 Gallon

PLANT LIST - NEIGHBOR AT 106 FRONT ST.

Plants

Quantity	Botanical Name	Common Name	Size
2	Chamaecyparis obtusa 'Gracilis'	GRACILIS HINOKI FALSE CYPRESS	6-7 ft. ht. B&B
2	Juniperus virginiana 'Emerald Sentinel™'	EMERALD SENTINEL RED CEDAR	8-9 ft. ht. B&B
6	Thuja occidentalis 'Holmstrup'	HOLMSTRUP ARBORVITAE	6-7 ft. ht. B&B

NOTES: PLANT VARIETY AND SIZE MAY VARY BASED ON AVAILABILITY. SUBSTITUTIONS SHALL BE APPROVED BY OWNER OR DESIGNER.

REFER TO SHEET 8 FOR PLANTING NOTES, SPECIFICATIONS AND DETAILS.

PROPOSED FENCE SECTIONS TO PROVIDE VISUAL BUFFER ARE NOTED ON PLAN. STYLE TO BE SOLID VINYL FOR LONGEVITY. FENCE AT ENTRY DRIVE SHALL BE SIMTEK VINYL FENCE WITH SOUND DEAFENING COMPONENT OF 98%, COLOR OF GREY.

GRAPHIC SCALE

0 5 10 20 30 50 100

(IN FEET)
1 INCH = 20 FEET

REVISIONS: DATE:

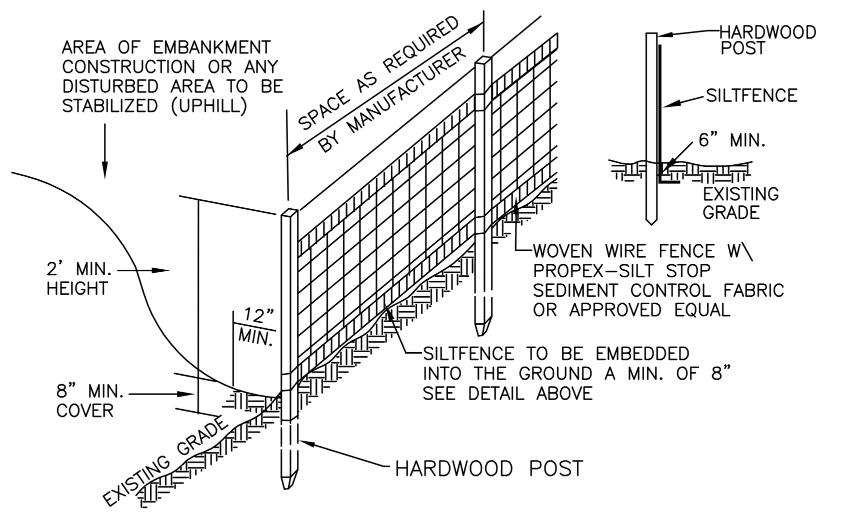
PLANTING PLAN

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	FEB 18, 2025	SCALE:	1" = 20'
PROJ. NO:	NH-1531	SHEET NO.	8b

CONSTRUCTION SEQUENCE

1. CUT AND REMOVE TREES IN CONSTRUCTION AREAS AS REQUIRED OR DIRECTED.
2. CONSTRUCT AND/OR INSTALL TEMPORARY AND PERMANENT SEDIMENT EROSION AND DETENTION CONTROL FACILITIES AS REQUIRED. EROSION, SEDIMENT AND DETENTION CONTROL FACILITIES SHALL BE INSTALLED AND STABILIZED PRIOR TO ANY EARTH MOVING OPERATION AND PRIOR TO DIRECTING RUNOFF TO THEM.
3. CLEAR, CUT, GRUB AND DISPOSE OF DEBRIS IN APPROVED FACILITIES. STUMPS AND DEBRIS ARE TO BE REMOVED FROM SITE AND DISPOSED OF PER STATE AND LOCAL REGULATIONS.
4. EXCAVATE AND STOCKPILE TOPSOIL /LOAM. ALL AREAS SHALL BE STABILIZED IMMEDIATELY AFTER GRADING.
5. CONSTRUCT TEMPORARY CULVERTS AS REQUIRED OR DIRECTED.
6. CONSTRUCT THE ROADWAY AND ITS ASSOCIATED DRAINAGE STRUCTURES.
7. INSTALL PIPE AND CONSTRUCTION ASSOCIATED APPURTENANCES AS REQUIRED OR DIRECTED. ALL DISTURBED AREAS SHALL STABILIZED IMMEDIATELY AFTER GRADING.
8. BEGIN PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES AND DISTURBED AREAS SHALL BE SEEDED OR MULCHED AS REQUIRED, OR DIRECTED.
9. DAILY OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINAGE CHECK DAMS, DITCHES, SEDIMENT TRAPS, ETC. TO PREVENT EROSION ON THE SITE AND PREVENT ANY SILTATION OF ABUTTING WATERS OR PROPERTY.
10. INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION
11. COMPLETE PERMANENT SEEDING AND LANDSCAPING
12. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEDING AREAS HAVE ESTABLISHED THEMSELVES AND SITE IMPROVEMENTS ARE COMPLETE. SMOOTH AND RE-VEGETATE ALL DISTURBED AREAS.
13. ALL SWALES AND DRAINAGE STRUCTURES WILL BE CONSTRUCTED AND STABILIZED PRIOR TO HAVING RUNOFF DIRECTED TO THEM.
14. FINISH PAVING ALL DRIVEWAYS



SILT FENCE CONSTRUCTION SPECIFICATIONS

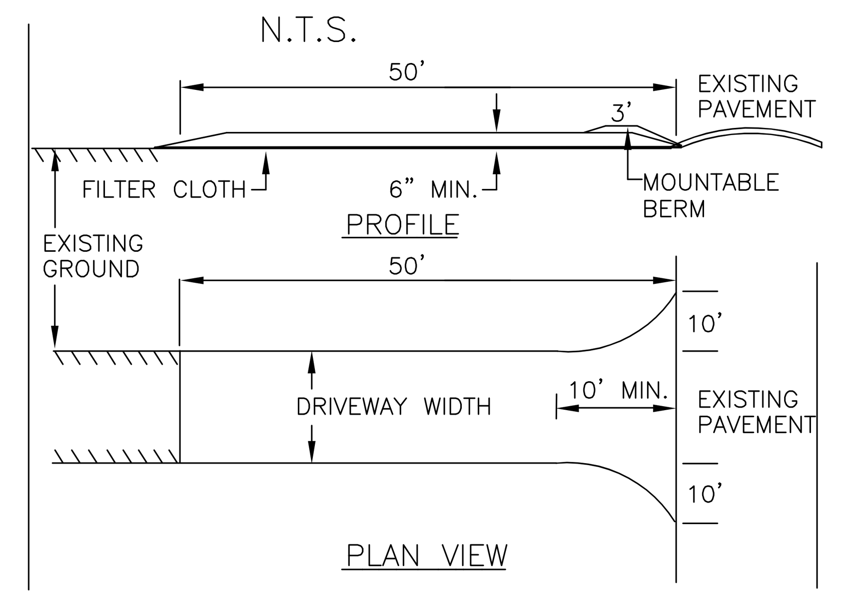
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES AND FILTER CLOTH SHALL BE FASTENED TO WOVEN WIRE EVERY 24" AT TOP MID AND BOTTOM SECTIONS AND BE EMBEDDED INTO GROUND A MINIMUM OF 8" THE FENCE POSTS SHALL BE A MINIMUM 48" LONG, SPACED A
2. MAXIMUM 10' APART, AND DRIVEN A MINIMUM OF 16" INTO THE GROUND WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER,
3. THE ENDS OF THE FABRIC SHALL BE OVERLAPPED BY SIX INCHES, FOLDED AND STAPLED TO PREVENT SEDIMENT FROM BYPASSING MAINTENANCE SHALL BE PERFORMED AS NEEDED AND SEDIMENT
4. REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE AND PROPERLY DISPOSED OF PLACE THE ENDS OF THE SILT FENCE UP CONTOUR TO PROVIDE
5. FOR SEDIMENT STORAGE SILT FENCES SHALL BE REMOVED WHEN NO LONGER NEEDED AND
6. THE SEDIMENT COLLECTED SHALL BE DISPOSED AS DIRECTED BY THE ENGINEER. THE AREA DISTURBED BY THE REMOVAL SHALL BE SMOOTHED AND RE-VEGETATED

SILT FENCE MAINTENANCE

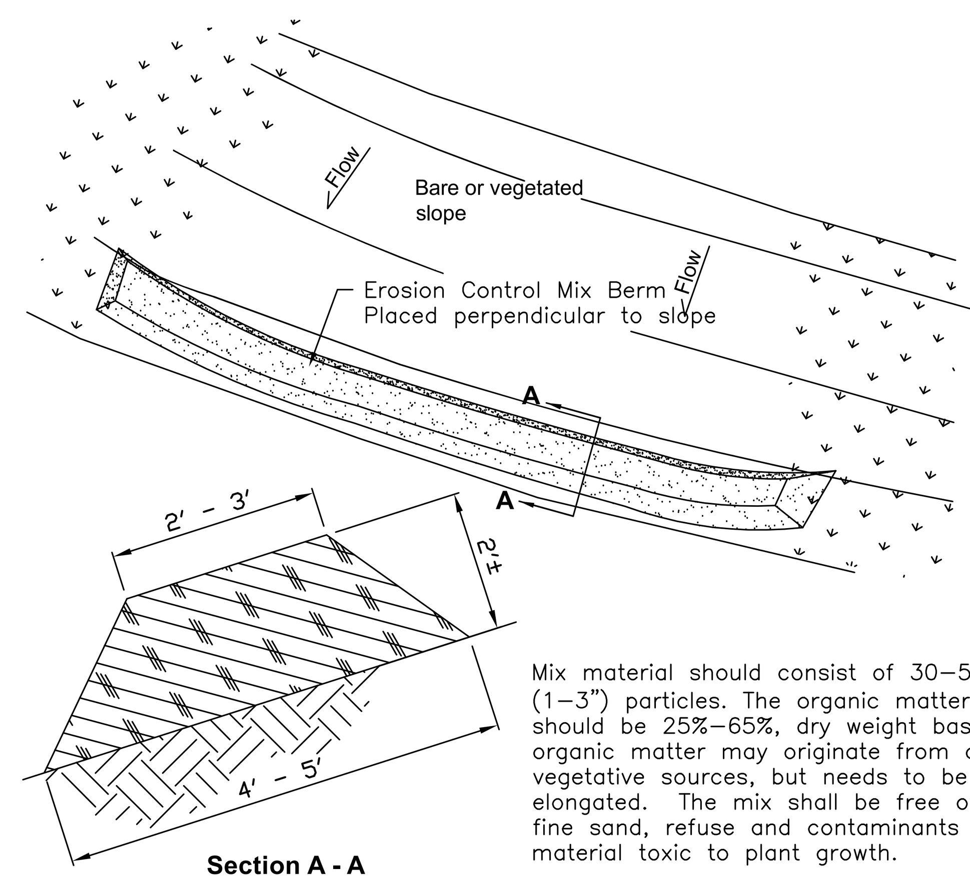
1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE MADE IMMEDIATELY IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME
2. INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY. SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT.
3. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER. SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER THE
4. FABRIC HAS BEEN REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

STABILIZED CONSTRUCTION ENTRANCE

N.T.S.



1. STONE FOR A 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.
3. THE 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, WHICH EVER IS GREATER.
5. GEOTEXTILE FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE.
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 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 PUBLIC RIGHTS-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 PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.



Mix material should consist of 30-50% large (1-3") particles. The organic matter content should be 25%-65%, dry weight basis. The organic matter may originate from a variety of vegetative sources, but needs to be fibrous and elongated. The mix shall be free of silt, clay, fine sand, refuse and contaminants or any material toxic to plant growth.

Erosion Control Mix berms are effective filters for overland flow conditions and should not be used to filter concentrated flow such as that found in drainage ditchs, streams, etc.

Erosion Control Mix Berm

SEEDING RATES

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

TEMPORARY EROSION CONTROL MEASURES

1. NO MORE THAN 1.58 ACRES OF LAND SHALL BE EXPOSED AT ANY ONE TIME.
2. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND AT LOCATIONS AS REQUIRED OR DIRECTED BY THE ENGINEER ALL DISTURBED AREAS SHALL BE RETURNED TO ORIGINAL GRADES AND ELEVATIONS.
3. DISTURBED AREAS SHALL BE LOAMED WITH A MINIMUM OF 4" OF LOAM AND SEEDED WITH NOT LESS THAN 1.10 POUNDS OF SEED PER 1000 SQUARE FEET OF AREA. (48 POUNDS PER ACRE) SEE SEED SPECIFICATIONS THIS SHEET.
4. SILT FENCES AND OTHER EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY RAIN EVENT GREATER THAN 0.5" DURING THE LIFE OF THE PROJECT. ALL DAMAGED AREAS SHALL BE REPAIRED, SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED OF.
5. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED AND THE AREA DISTURBED BY THE REMOVAL SMOOTHED AND RE-VEGETATED.
6. AREAS MUST BE SEEDED AND MULCHED WITHIN 3 DAYS OF FINAL GRADING, PERMANENTLY STABILIZED WITHIN 15 DAYS OF FINAL GRADING, OR TEMPORARILY STABILIZED WITHIN 30 DAYS OF INITIAL DISTURBANCE OF SOIL.

WINTER MAINTENANCE

1. ALL DISTURBED AREAS THAT DO NOT HAVE AT LEAST 85% VEGETATIVE COVERAGE PRIOR TO OCTOBER 15TH, SHALL BE STABILIZED BY APPLYING MULCH AT A RATE OF 3-4 TONS PER ACRE. ALL SIDE SLOPES, STEEPER THAN 4:1, THAT ARE NOT DIRECTED TO SWALES OR DETENTION BASINS, SHALL BE LINED WITH BIODEGRADABLE/PHOTODEGRADABLE "JUTE MATTING" (EXCELSIOR'S CURLEX II OR EQUAL). ALL OTHER SLOPES SHALL BE MULCHED AND TACKED AT A RATE OF 3-4 TONS PER ACRE. THE APPLICATION OF MULCH AND/OR JUTE MATTING SHALL NOT OCCUR OVER EXISTING SNOW COVER. IF THE SITE IS ACTIVE AFTER OCTOBER 15TH, ANY SNOW THAT ACCUMULATES ON DISTURBED AREAS SHALL BE REMOVED. PRIOR TO SPRING THAW ALL AREAS WILL BE STABILIZED, AS DIRECTED ABOVE.

2. ALL SWALES THAT DO NOT HAVE FULLY ESTABLISHED VEGETATION SHALL BE EITHER LINED WITH TEMPORARY JUTE MATTING OR TEMPORARY STONE CHECK DAMS (APPROPRIATELY SPACED). STONE CHECK DAMS WILL BE MAINTAINED THROUGHOUT THE WINTER MONTHS. IF THE SWALES ARE TO BE MATTED WITH PERMANENT LINERS OR RIPRAP WITH ENGINEERING FABRIC, THIS SHALL BE COMPLETED PRIOR TO WINTER SHUTDOWN OR AS SOON AS THEY ARE PROPERLY GRADED AND SHAPED.

3. PRIOR TO OCT. 15TH ALL ROADWAY AND PARKING AREAS SHALL BE BROUGHT UP TO AND THROUGH THE BANK RUN GRAVEL APPLICATION. IF THESE AREAS' ELEVATIONS ARE PROPOSED TO REMAIN BELOW THE PROPOSED SUBGRADE ELEVATION, THE SUBGRADE MATERIAL SHALL BE ROUGHLY CROWNED AND A 3" LAYER OF CRUSHED GRAVEL SHALL BE PLACED AND COMPACTED. THIS WILL ALLOW THE SUBGRADE TO SHED RUNOFF AND WILL REDUCE ROADWAY EROSION. THIS CRUSHED GRAVEL DOES NOT HAVE TO CONFORM TO NH DOT 304.3, BUT SHALL HAVE BETWEEN 15-25% PASSING THE #200 SIEVE AND THE LARGEST STONE SIZE SHALL BE 2". IF THE SITE IS ACTIVE AFTER NOVEMBER 15TH, ANY ACCUMULATED SNOW SHALL BE REMOVED FROM ALL ROADWAY AND PARKING AREAS.

4. AFTER OCTOBER 15TH, THE END OF NEW HAMPSHIRE'S AVERAGE GROWING SEASON, NO ADDITIONAL LOAM SHALL BE SPREAD ON SIDE SLOPES AND SWALES. THE STOCKPILES THAT WILL BE LEFT UNDISTURBED UNTIL SPRING SHALL BE SEEDED BY THIS DATE. AFTER OCTOBER 15TH, ANY NEW OR DISTURBED PILES SHALL BE MULCHED AT A RATE OF 3-4 TONS PER ACRE. ALL STOCKPILES THAT WILL REMAIN THROUGHOUT THE WINTER SHALL BE SURROUNDED WITH SILT FENCING.

SEEDING GUIDE

USE	SEEDING MIXTURE*	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	FAIR	GOOD	EXCELLENT
	E	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
	D	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
	D	FAIR	GOOD	GOOD	EXCELLENT
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	F	FAIR	EXCELLENT	EXCELLENT	**
	G	FAIR	EXCELLENT	EXCELLENT	**

RECOMMENDED

GRAVEL PIT, SEE NH-PM-24 IN APPENDIX FOR RECOMMENDATION REGARDING RECLAMATION OF SAND AND GRAVEL PITS.

* REFER TO SEEDING MIXTURES AND RATES IN TABLE 7-36.
** POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAY AREAS OR 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 OCT. 15, IF PERMANENT SEEDING NOT YET COMPLETE.

SEEDING SPECIFICATIONS

1. GRADING AND SHAPING
   A. SLOPES SHALL NOT BE STEEPER THAN 2:1;3:1 SLOPES OR FLATTER ARE PREFERRED. 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 MIX FERTILIZER AND LIME INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN 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 KINDS 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 TABLE(G-E1 THIS SHEET) FOR APPROPRIATE SEED MIXTURES AND TABLE(H-E1 THIS SHEET) FOR RATES OF SEEDING. ALL LEGUMES (CROWN VETCH, BIRDS FOOT TREFOIL, AND FLAT PEA) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT.
   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 20 OR FROM AUGUST 10 TO SEPTEMBER 1.
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 SQ. FT.
5. MAINTENANCE TO ESTABLISH A STAND
   A. PLANTED AREA 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 PERENNIAL STAKE 2 TO 3 YEARS TO BECOME ESTABLISHED.
   C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, OCCASIONAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

PREPARED FOR:

112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

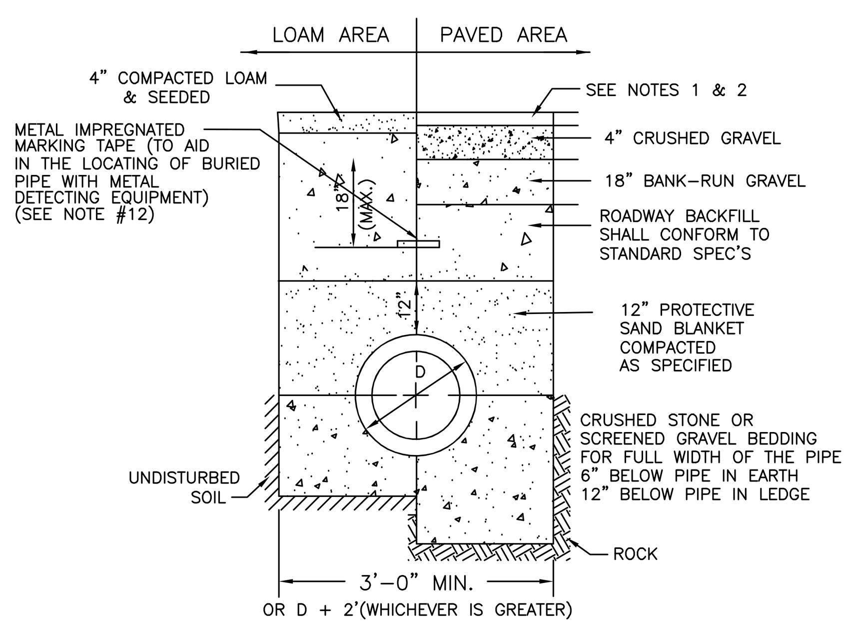
BA
BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863

REVISIONS:	DATE:
REVISED PER REVIEW COMMENTS	01/17/25

EROSION & SEDIMENT CONTROL DETAILS

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	DEC 9, 2024	SCALE:	NTS'
PROJ. N0:	NH-1531	SHEET NO.	9

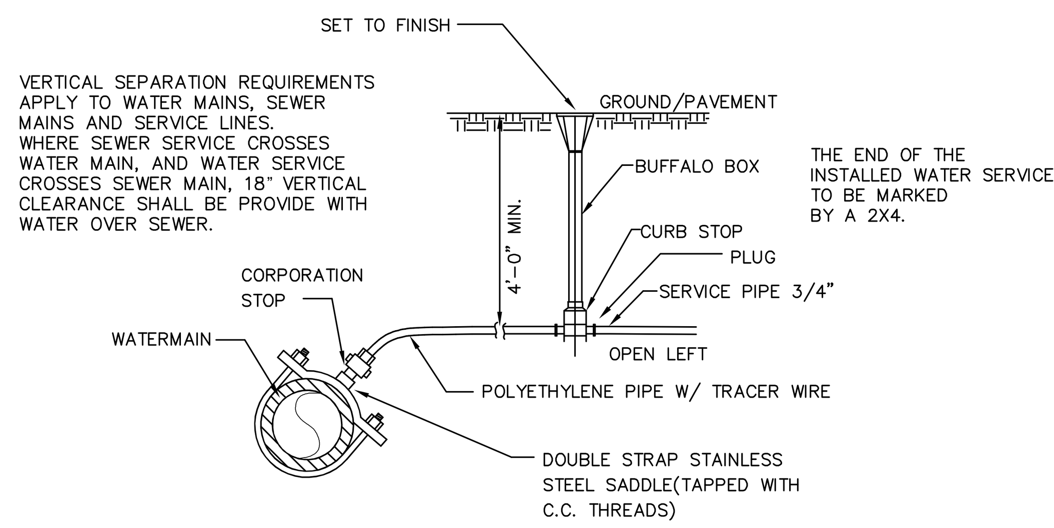


NOTE:
1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO SUBDIVISION SPEC'S.

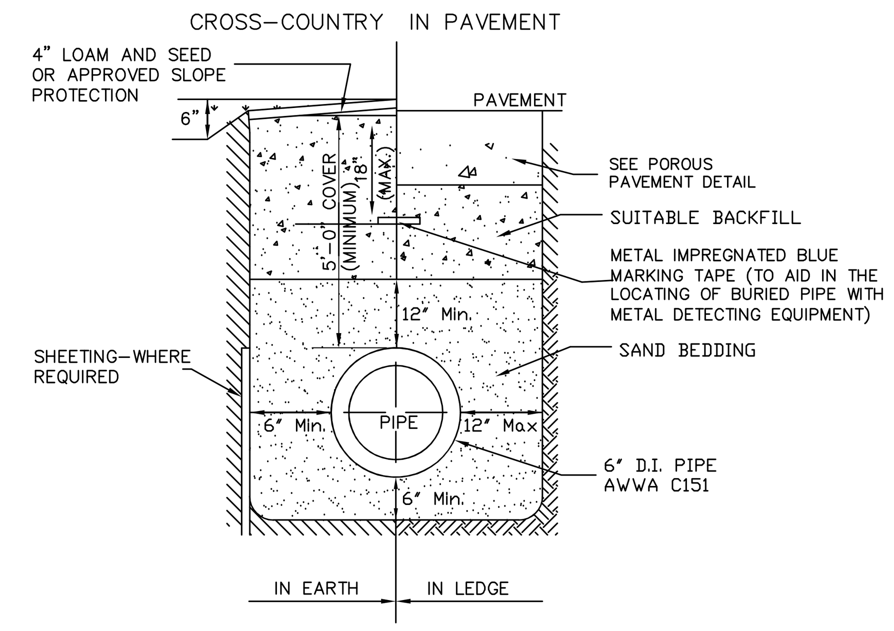
TYPICAL SEWER TRENCH DETAIL

NOT TO SCALE

VERTICAL SEPARATION REQUIREMENTS APPLY TO WATER MAINS, SEWER MAINS AND SERVICE LINES. WHERE SEWER SERVICE CROSSES WATER MAIN, AND WATER SERVICE CROSSES SEWER MAIN, 18" VERTICAL CLEARANCE SHALL BE PROVIDE WITH WATER OVER SEWER.

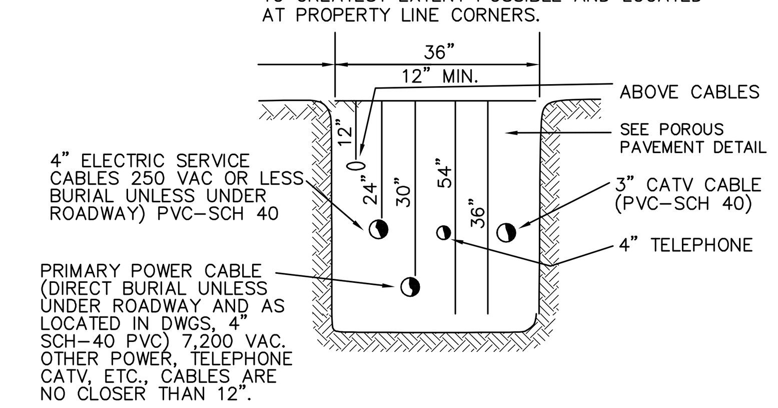


TYPICAL WATER SERVICE CONNECTION

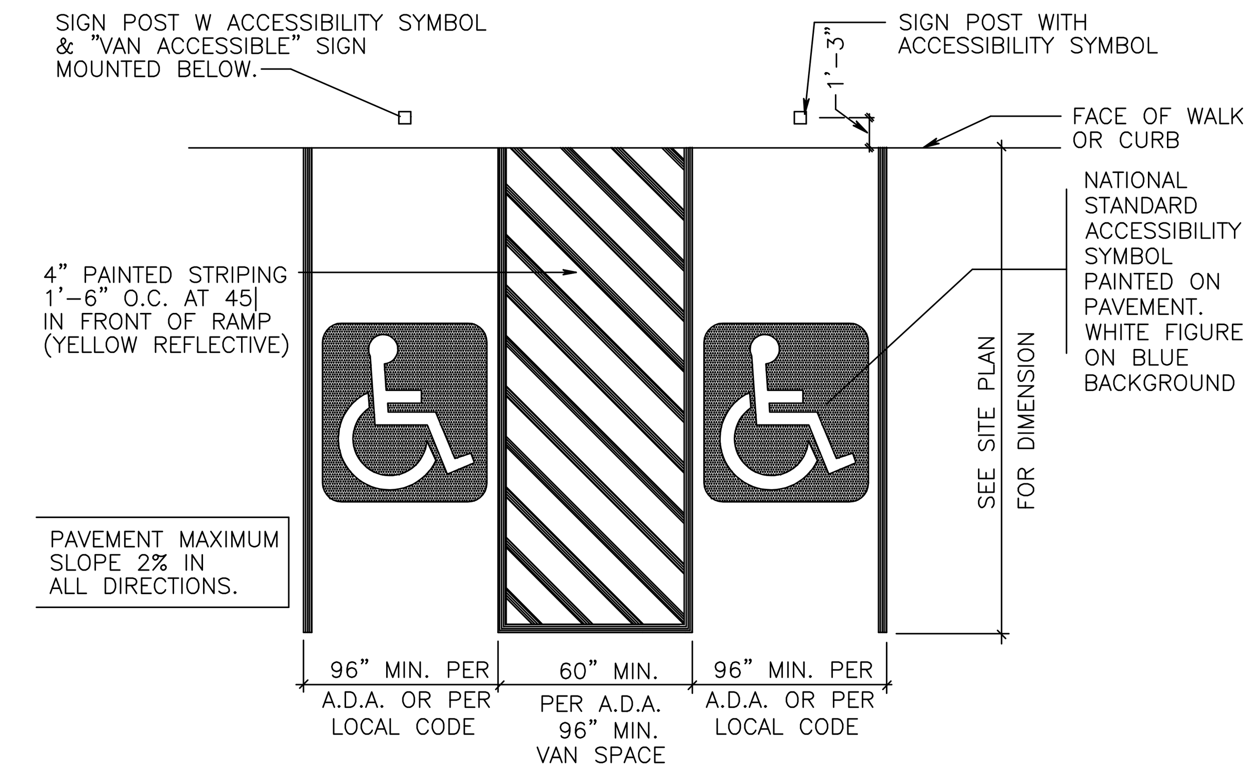


TYPICAL TRENCH DETAIL FOR WATER SYSTEM

NOTE: ALL UTILITIES SHALL BE REVIEWED AND APPROVED BY APPROPRIATE UTILITY COMPANY. SERVICE BOX CONNECTIONS SHALL BE "FLUSH MOUNT" TO GREATEST EXTENT POSSIBLE AND LOCATED AT PROPERTY LINE CORNERS.



UTILITY TRENCH DETAIL

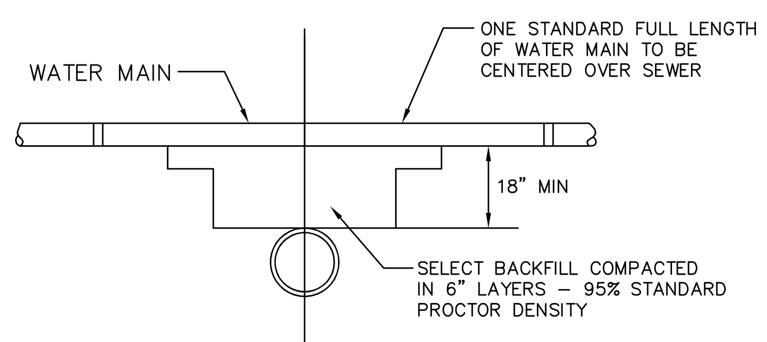


PARKING STALL FOR THE PHYSICALLY CHALLENGED

NOT TO SCALE DEC. 15, 1991

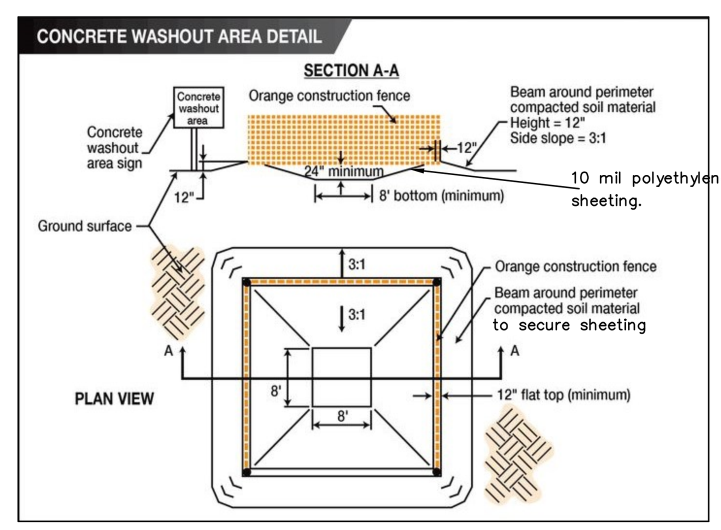
SEPARATION NOTES:

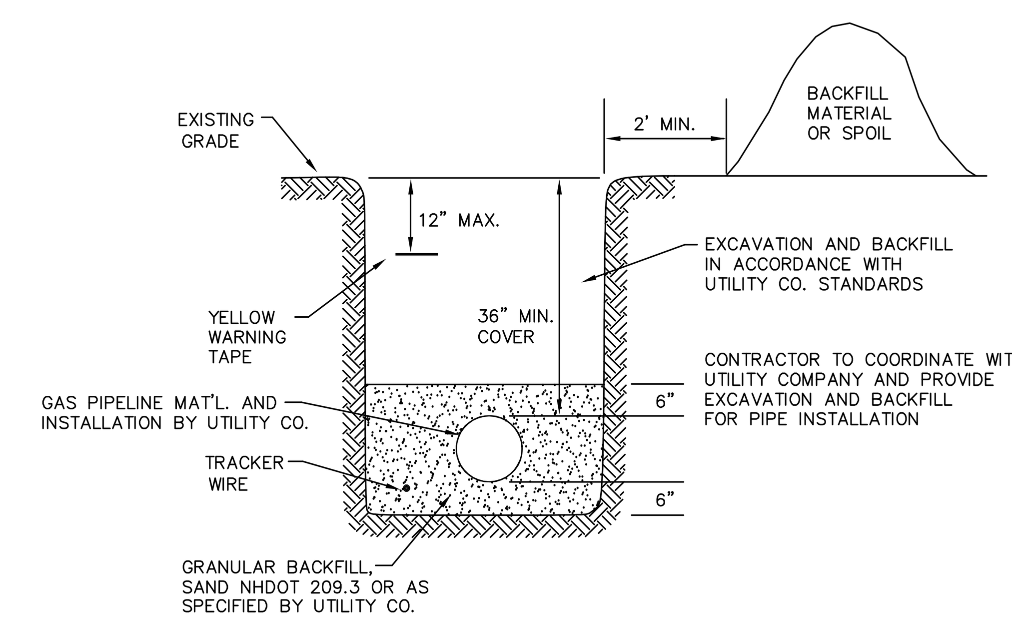
SEWERS CROSSING WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES (460 MM) BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. THIS SHALL BE THE CASE WHERE THE WATER MAIN IS EITHER ABOVE OR BELOW THE SEWER. THE CROSSING SHALL BE ARRANGED SO THAT THE SEWER JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS. WHERE A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO MAINTAIN LINE AND GRADE.



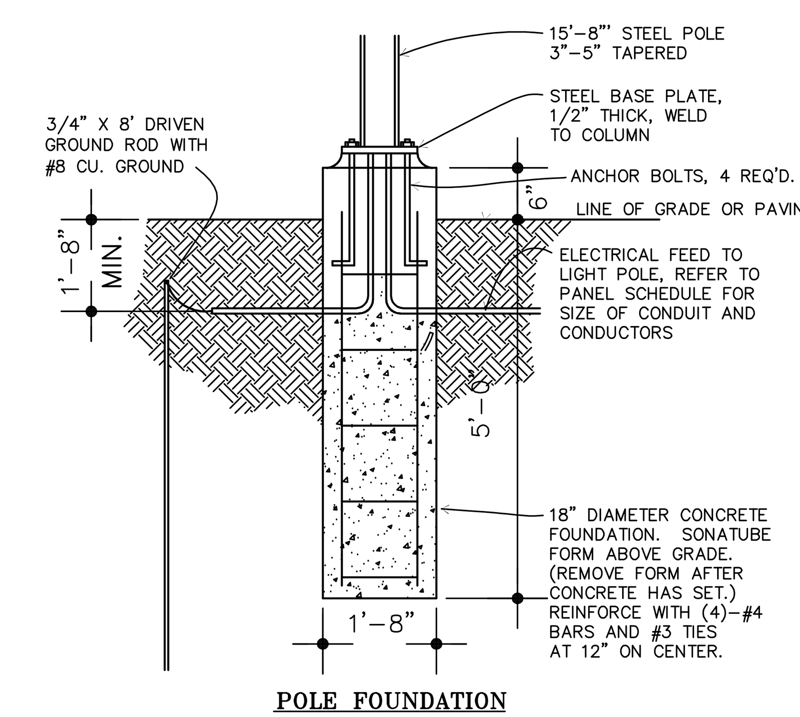
WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN PIPES. WATER MAIN JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER JOINTS

WATER/SEWER MAIN CROSSING



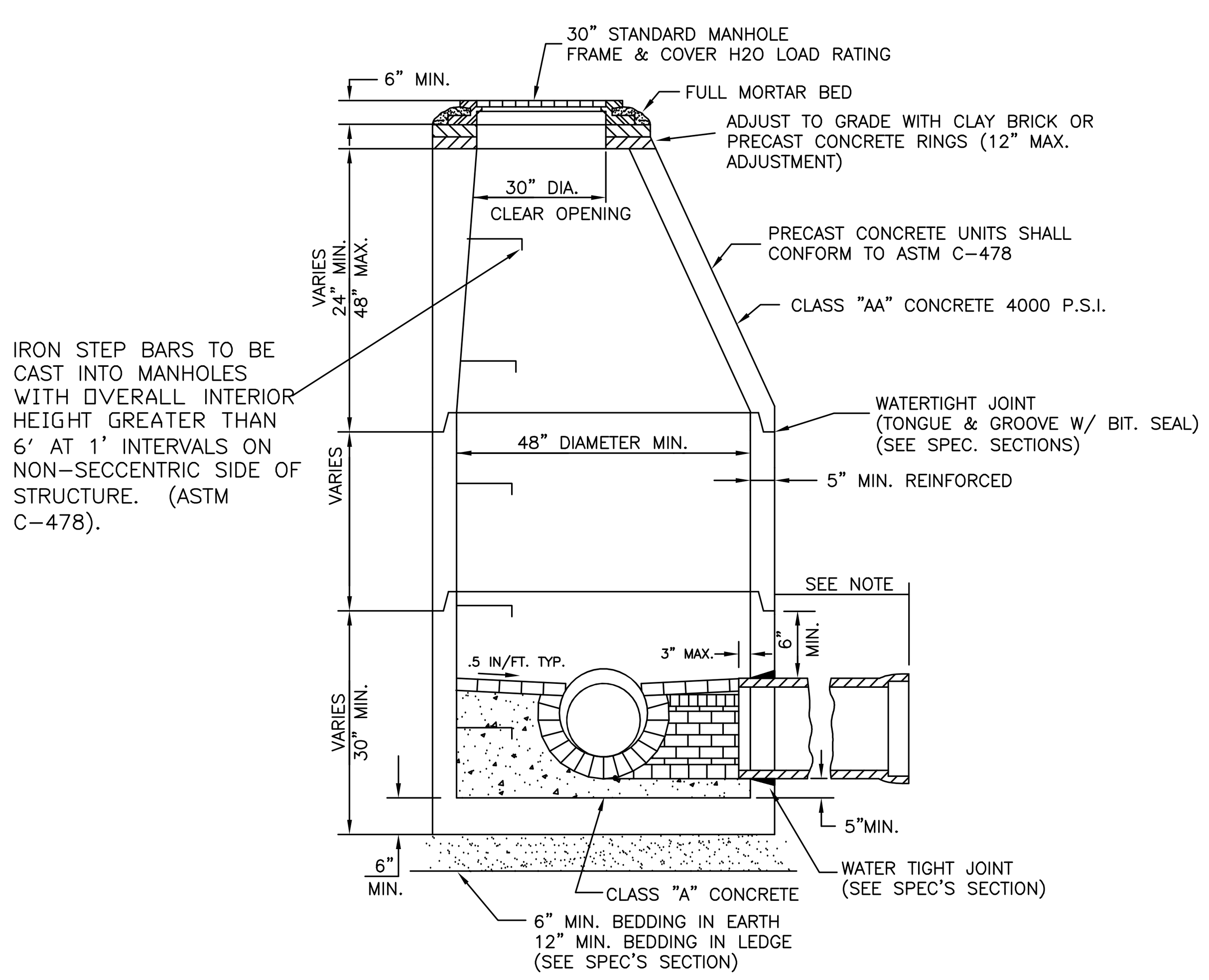


GAS TRENCH DETAIL



LIGHT BASE DETAIL

SCALE: NONE



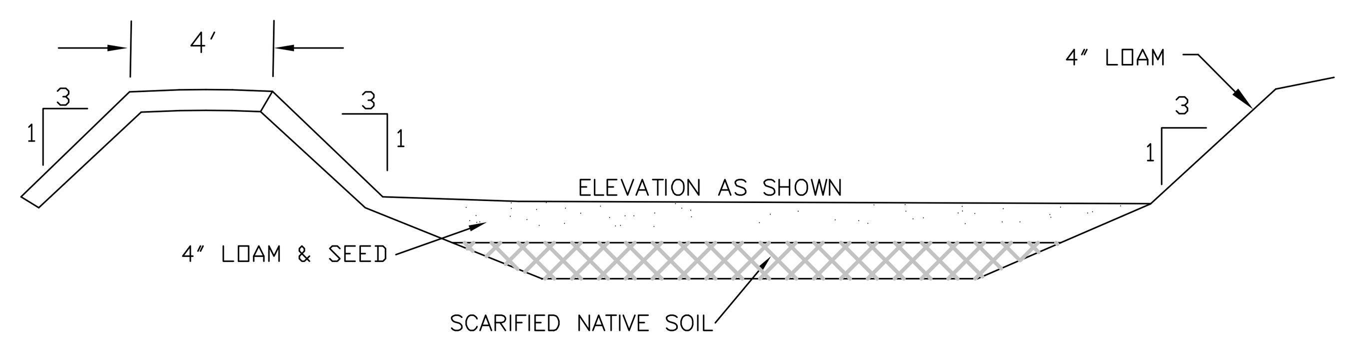
NOTE:

TYPE OF PIPE	SIZE	MAX. DISTANCE TO FIRST JOINT
R.C.P. C.I.	ALL	48"
V.C.	0-12"	18"
V.C.	> 12"	36"

SEWER MANHOLE

TYPICAL SECTION

NOT TO SCALE

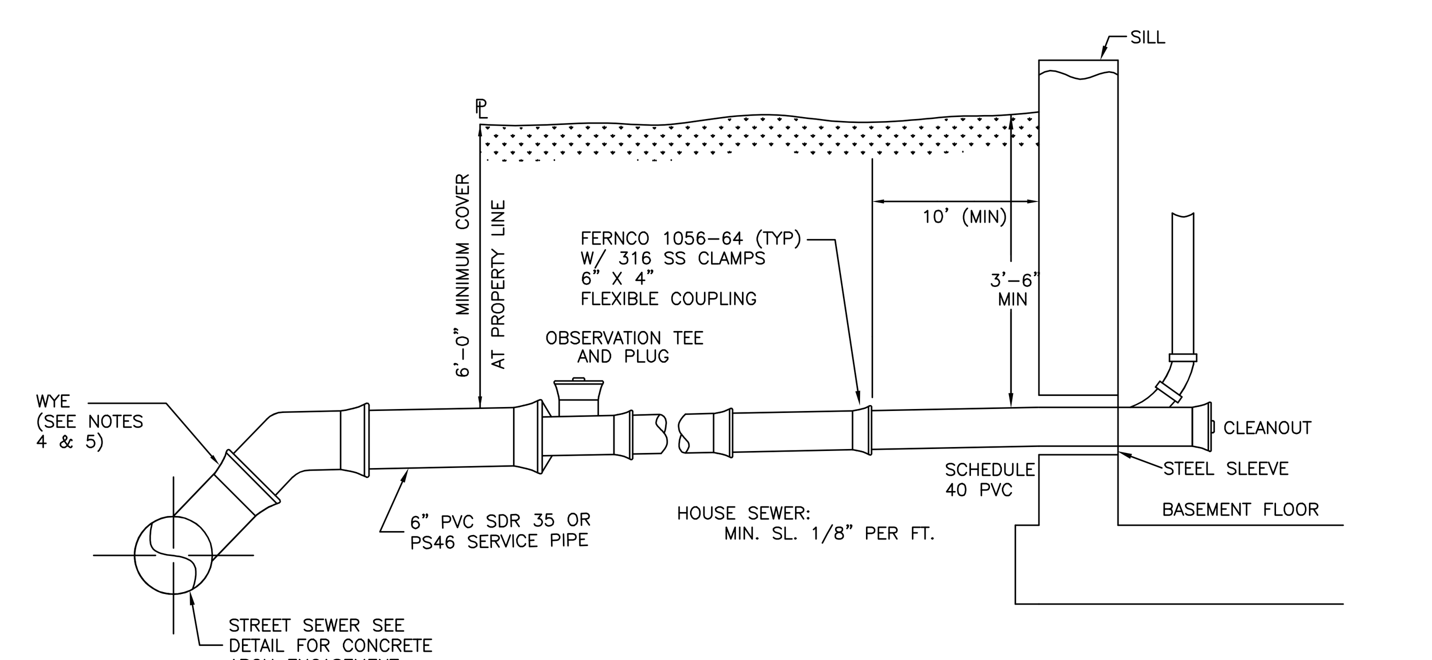


INFILTRATION POND NOTES:

1. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATION WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION SYSTEM.
2. 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.
3. DO NOT PLACE INFILTRATION SYSTEM INTO SERVICE UNTIL THE CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.

INFILTRATION POND DETAIL

NOT TO SCALE



DETAIL OF HOUSE SEWER SERVICE

NOTES:
1) SEWER SERVICE FROM PROPERTY LINE TO 10' OUTSIDE OF BUILDING SHALL BE INSTALLED UNDER THIS CONTRACT ONLY WHEN OUTSIDE THE TRENCH DEWATERING OR LEDGE EXCAVATION IS REQUIRED.
2) PIPE DEPTH AT HOUSE SHALL BE ABOVE THE SEASONAL GROUND WATER LEVEL.
3) SEWER SHALL BE BELOW SLAB ONLY WHEN BASEMENT TOILETS EXIST.
4) JOINTS SHALL BE DEPENDENT UPON A NEOPRENE OR ELASTOMERIC GASKET FOR WATER TIGHTNESS. ALL JOINTS SHALL BE PROPERLY MATCHED WITH THE PIPE MATERIALS USED. WHERE DIFFERING MATERIALS ARE TO BE CONNECTED, AST AT THE STREET SEWER WYE OR, AT THE FOUNDATION WALL, APPROPRIATE MANUFACTURED ADAPTERS SHALL BE USED
5) WYES: WHERE WYE IS NOT AVAILABLE IN THE EXISTING STREET SEWER, AN APPROPRIATE CONNECTION SHALL BE MADE FOLLOWING MANUFACTURERS INSTRUCTIONS USING A BOLTED, CLAMPED, OR EPOXY-CEMENTED SADDLE, TAPPED INTO A SMOOTHLY DRILLED OR SAWN OPENING IN THE SEWER.

PREPARED FOR:

112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE, THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863

REVISIONS:	DATE:
REVISED PER REVIEW COMMENTS	01/17/25

CONSTRUCTION DETAILS

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	DEC 9, 2024	SCALE:	NTS
PROJ. N0:	NH-1531	SHEET NO.	10

CONSTRUCTION SPECIFICATIONS FOR POROUS ASPHALT
THE UNH STORM WATER CENTER
INSTALLATION RECOMMENDATIONS

INSTALLATION
A. PERCOLATION BEDS (REFERS TO NO 57 STONE)
I. OWNER SHALL BE NOTIFIED AT LEAST 24 HOURS PRIOR TO ALL PERCOLATION BED AND POROUS PAVING WORK.
2. SUB GRADE PREPARATION
A. EXISTING SUB GRADE UNDER BED AREAS SHALL NOT BE COMPACTED OR SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO STONE BED PLACEMENT.
B. WHERE EROSION OF SUB GRADE HAS CAUSED ACCUMULATION OF FINE MATERIALS AND/OR SURFACE PONDING, THIS MATERIAL SHALL BE REMOVED WITH LIGHT EQUIPMENT AND THE UNDERLYING SOILS SCARIFIED TO A MINIMUM DEPTH OF 6 INCHES WITH A YORK RAKE OR EQUIVALENT AND LIGHT TRACTOR.
C. BRING SUB GRADE OF STONE PERCOLATION BED TO LINE, GRADE, AND ELEVATIONS INDICATED. FILL AND LIGHTLY REGRADE ANY AREAS DAMAGED BY EROSION, PONDING, OR TRAFFIC COMPACTION BEFORE THE PLACING OF STONE. ALL BED BOTTOMS ARE LEVEL GRADE.
3. RECHARGE BED INSTALLATION (REFERS TO NO 3 STONE)
A. UPON COMPLETION OF SUB GRADE WORK, THE ENGINEER SHALL BE NOTIFIED AND SHALL INSPECT AT HIS DISCRETION BEFORE PROCEEDING WITH PERCOLATION BED INSTALLATION.
B. PERCOLATION BED AGGREGATE SHALL BE PLACED IMMEDIATELY AFTER APPROVAL OF SUB GRADE PREPARATION. ANY ACCUMULATION OF DEBRIS OR SEDIMENT WHICH HAS TAKEN PLACE AFTER APPROVAL OF SUB GRADE SHALL BE REMOVED PRIOR TO INSTALLATION OF AGGREGATE AT NO EXTRA COST TO THE OWNER.
C. INSTALL COARSE AGGREGATE NO. 3 (1 1/2" STONE) IN 8-INCH MAXIMUM LIFTS. LIGHTLY COMPACT EACH LAYER WITH EQUIPMENT, KEEPING EQUIPMENT MOVEMENT OVER STORAGE BED SUBGRADES TO A MINIMUM. INSTALL AGGREGATE TO GRADES INDICATED ON THE DRAWINGS.
D. INSTALL 3" LIFT PEA GRAVEL LAYER TO PREVENT MIGRATION OF FINES FROM THE FILTER COARSE (NHDOT 304.1)
E. INSTALL FILTER COARSE (NHDOT 304.1 SAND LESS THAN 2% FINES) IN 2, 4" LIFTS. LIGHTLY COMPACT EACH LAYER WITH EQUIPMENT, KEEPING EQUIPMENT MOVEMENT OVER STORAGE BED SUBGRADES TO A MINIMUM. INSTALL AGGREGATE TO GRADES INDICATED ON THE DRAWINGS.
F. INSTALL CHOKER BASE COURSE (AASHTO # 57 STONE) AGGREGATE EVENLY OVER SURFACE OF STONE BED, SUFFICIENT TO ALLOW PLACEMENT OF PAVEMENT, AND NOTIFY ENGINEER FOR APPROVAL. CHOKER BASE COURSE SHALL BE SUFFICIENT TO ALLOW FOR EVEN PLACEMENT OF ASPHALT BUT NO THICKER THAN 4-INCH IN DEPTH.
4. SURROUNDING AREAS
A. BEFORE THE POROUS PAVEMENT IS INSTALLED, ADJACENT SOIL AREAS SHOULD BE SLOPED AWAY FROM ALL PAVEMENT EDGES, TO PREVENT POTENTIAL SEDIMENT FROM WASHING ONTO THE PAVEMENT SURFACE.
B. TO ACCOMPLISH THIS, A SEQUENCE OF SWALES SHOULD BE EXCAVATED INTO ALL EARTHEN (UNPAVED) AREAS AT LEAST ON THE UPHILL SIDES OF THE PAVEMENT, AND WHERE NECESSARY, TO BELOW THE CURB OR PAVEMENT ELEVATION. ITS SHAPE AND PAINTINGS CAN BE INTEGRATED WITH THE PROJECT'S ARCHITECTURE AND LANDSCAPE, AND DESIGNED TO MAXIMIZE INFILTRATION. SWALE OVERFLOW, WHEN IT OCCURS, CAN BE DISCHARGED FROM ONE SWALE TO ANOTHER BY CONNECTING PIPES UNDER DRIVEWAYS.
C. BUILDING BASEMENTS AND FOUNDATIONS SHOULD BE WATERPROOFED AS NECESSARY, WHERE THE POROUS PAVEMENT ABUTS BUILDINGS.
B. POROUS ASPHALT
1. TRANSPORTING MATERIAL
A. TRANSPORTING OF MIX TO THE SITE SHALL BE IN VEHICLES WITH SMOOTH, CLEAN DUMP BEDS THAT HAVE BEEN SPRAYED WITH A NON-PETROLEUM RELEASE AGENT.
B. THE MIX SHALL BE COVERED DURING TRANSPORT TO CONTROL COOLING.
2. POROUS BITUMINOUS ASPHALT SHALL NOT BE STORED IN EXCESS OF 90 MINUTES BEFORE PLACEMENT.
3. ASPHALT PLACEMENT
A. THE POROUS BITUMINOUS SURFACE COURSE SHALL BE LAID IN ONE LIFT DIRECTLY OVER THE CHOKER COARSE, FILTER COARSE, AND CRUSHED STONE BASE COURSE TO A 4-INCH FINISHED THICKNESS. THE SURFACE CAN BE LAID IN TWO LIFTS IF SECOND LIFT IS DONE WITHIN 10 BUSINESS DAYS
AND THE INITIAL COURSE IS CLEAN AND FREE OF SEDIMENT.
B. THE LAYING TEMPERATURE OF THE BITUMINOUS MIX SHALL BE BETWEEN 300 DEGREES FAHRENHEIT AND 350 DEGREES FAHRENHEIT (BASED ON THE RECOMMENDATIONS OF THE ASPHALT SUPPLIER).
C. INSTALLATION SHALL TAKE PLACE WHEN AMBIENT TEMPERATURES ARE 55 DEGREES FAHRENHEIT OR ABOVE, WHEN MEASURED IN THE SHADE AWAY FROM ARTIFICIAL HEAT.
D. THE USE OF A REMIXING MATERIAL TRANSFER DEVICE BETWEEN THE TRUCKS AND THE PAVER IS HIGHLY RECOMMENDED TO ELIMINATE COLD LUMPS IN THE MIX.
E. THE POLYMER-MODIFIED ASPHALT IS VERY DIFFICULT TO RAKE, A WELL-HEATED SCREED SHOULD BE USED TO MINIMIZE THE NEED FOR RAKING.
F. COMPACTION OF THE SURFACE COURSE SHALL TAKE PLACE WHEN THE SURFACE IS COOL ENOUGH TO RESIST A 10-TON ROLLER. (140°F. SURFACE TEMPERATURE) ONE OR TWO PASSES IS ALL THAT IS REQUIRED FOR PROPER COMPACTION. MORE ROLLING COULD CAUSE A REDUCTION IN THE SURFACE POROSITY WHICH IS UNACCEPTABLE.
4. IN THE EVENT CONSTRUCTION SEDIMENT IS INADVERTENTLY DEPOSITED ON THE FINISHED POROUS SURFACE, IT MUST BE IMMEDIATELY REMOVED BY VACUUMING.
5. AFTER FINAL ROLLING, NO VEHICULAR TRAFFIC OF ANY KIND SHALL BE PERMITTED ON THE SURFACE UNTIL COOLING AND HARDENING HAS TAKEN PLACE, AND IN NO CASE WITHIN THE FIRST 48 HOURS. PROVIDE BARRIERS AS NECESSARY AT NO EXTRA COST TO THE OWNER TO PREVENT VEHICULAR USE; REMOVE AT THE DISCRETION OF THE ENGINEER.
6. STRIPING PAINT FOR TRAFFIC LANES AND PARKING BAYS SHALL BE CHLORINATED RUBBER BASE, FACTORY MIXED, NON-BLEEDING, FAST DRYING, BEST QUALITY, WHITE TRAFFIC PAINT WITH A LIFE EXPECTANCY OF TWO YEARS UNDER NORMAL TRAFFIC USE.
A. PAVEMENT-MARKING PAINT; LATEX, WATER-BASE EMULSION, READY-MIXED, COMPLYING WITH PS TT-P-1952.
B. SWEEP AND CLEAN SURFACE TO ELIMINATE LOOSE MATERIAL AND DUST.
C. PAINT 4 INCH WIDE TRAFFIC LANE STRIPING IN ACCORDANCE WITH LAYOUTS OF PLAN. APPLY PAINT WITH MECHANICAL EQUIPMENT TO PRODUCE UNIFORM STRAIGHT EDGES. APPLY IN TWO COATS AT MANUFACTURER'S RECOMMENDED RATES. PROVIDE CLEAR, SHARP LINES USING WHITE TRAFFIC PAINT, INSTALLED IN ACCORDANCE WITH NHDOT SPECIFICATIONS.
6. WORK SHALL BE DONE EXPERTLY THROUGHOUT, WITHOUT STAINING OR INJURY TO OTHER WORK.
TRANSITION TO ADJACENT IMPERVIOUS BITUMINOUS PAVING SHALL BE MERGED NEATLY WITH FLUSH, CLEAN LINE. FINISHED PAVING SHALL BE EVEN, WITHOUT POCKETS, AND GRADED TO ELEVATIONS SHOWN ON DRAWING.
7. POROUS PAVEMENT BEDS SHALL NOT BE USED FOR EQUIPMENT OR MATERIALS STORAGE DURING CONSTRUCTION, AND UNDER NO CIRCUMSTANCES SHALL VEHICLES BE ALLOWED TO DEPOSIT SOIL ON PAVED POROUS SURFACES.
8. REPAIR OF DAMAGED PAVING
A. ANY EXISTING PAVING ON OR ADJACENT TO THE SITE THAT HAS BEEN DAMAGED AS A RESULT OF CONSTRUCTION WORK SHALL HE REPAIRED TO THE SATISFACTION OF THE OWNER WITHOUT ADDITIONAL COST TO THE OWNER.
9. FIELD QUALITY CONTROL
A. THE FULL PERMEABILITY OF THE PAVEMENT SURFACE SHALL BE TESTED BY APPLICATION OF CLEAN WATER AT THE RATE OF AT LEAST 5 GPM OVER THE SURFACE, USING A HOSE OR OTHER DISTRIBUTION DEVISE. WATER USED FOR THE TEST SHALL BE CLEAN, FREE OF SUSPENDED SOLIDS AND DELETERIOUS LIQUIDS AND WILL BE PROVIDED AT NO EXTRA COST TO THE OWNER. ALL APPLIED WATER SHALL INFILTRATE DIRECTLY WITHOUT PUDDLE FORMATION OR SURFACE RUNOFF, AND SHALL BE OBSERVED BY THE ENGINEER AND OWNER.
B. TEST IN-PLACE BASE AND SURFACE COURSE FOR COMPLIANCE WITH REQUIREMENTS FOR THICKNESS AND SURFACE SMOOTHNESS. REPAIR OR REMOVE AND REPLACE UNACCEPTABLE WORK AS DIRECTED BY THE OWNER.
C. SURFACE SMOOTHNESS: TEST FINISHED SURFACE FOR SMOOTHNESS AND EVEN DRAINAGE, USING A TEN-FOOT TO CENTERLINE OF PAVED AREA. SURFACE WILL NOT BE ACCEPTED IF GAPS OR RIDGES EXCEED 3116 OF AN INCH.

MINIMUM COMPACTION REQUIREMENTS

COMPACTION SHALL BE PERFORMED TO NOT LESS THAN NINETY-FIVE PERCENT (95%) MAXIMUM DENSITY AS DETERMINED IN A LABORATORY COMPACTION TEST, PERFORMED UNDER THE SPECIFICATIONS OF ASTM D1557-64T, METHOD "A", (BACK FILL MATERIAL OF A STONY NATURE SHALL BE TESTED UNDER METHOD "C" OR "D" OF THE SAME ASTM DESIGNATION) OR OTHER APPROVED ASTM OR AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) SPECIFICATIONS. SUCH TEXT SHALL ALSO BE USED FOR ESTABLISHING THE OPTIMUM MOISTURE CONTENT OF THE MATERIALS. THE IN-PLACE DRY UNIT WEIGHT OF THE COMPACTED MATERIALS SHALL BE DETERMINED BY METHODS SPECIFIED UNDER ASTM "D" 1556-58T OR OTHER APPROVED ASTM OR AASHTO SPECIFICATIONS. THE IN-PLACE COMPACTION TEST TO BE CONSISTENT WITH THE APPROVED LABORATORY COMPACTION TEST.

TABLE 5. POROUS ASPHALT MIX DESIGN CRITERIA.

SIEVE SIZE (INCH/MM)	PERCENT PASSING (%)
0.75/19	100
0.50/12.5	85-100
0.375/9.5	55-75
NO.4/4.75	10-25
NO.8/2.36	5-10
NO.200/0.075 (#200)	2-4
BINDER CONTENT (AASHTO T164)	6.0-6.5%
AIR VOID CONTENT BY CORELOK (ASTM D6752)*	16.0-20.0%
AIR VOID CONTENT BY PARAFFIN WAX (AASHTO T275)*	18.0-22.0%
DRAINDOWN (ASTM D6390)**	<= 0.3 %
RETAINED TENSILE STRENGTH (AASHTO 283)***	>= 80 %

* EITHER METHOD IS ACCEPTABLE
**CELLULOSE OR MINERAL FIBERS MAY BE USED TO REDUCE DRAINDOWN.
***IF THE TSR (RETAINED TENSILE STRENGTH) VALUES FALL BELOW 80% WHEN TESTED PER NAPA IS 131 (WITH A SINGLE FREEZE THAW CYCLE RATHER THAN 5). STEP 4, THE CONTRACTOR SHALL EMPLOY AN ANTISTRIP ADDITIVE, SUCH AS HYDRATED LIME (ASTM C977) OR A FATTY AMINE, TO RAISE THE TSR VALUE ABOVE 80%.

MIX SUMMARY
POROUS ASPHALT PAVEMENT MIX
THE UNH STORM WATER CENTER

POROUS ASPHALT SHALL BE FOUR INCHES THICK WITH A BITUMINOUS MIX OF 6% TO 6.5% BY WEIGHT DRY AGGREGATE AND AIR VOIDS OF 18-22%. IN ACCORDANCE WITH ASTM D6390, DRAIN DOWN OF THE BINDER SHALL BE NO GREATER THAN 0.3%. IF MORE ABSORPTIVE AGGREGATES, SUCH AS LIMESTONE, ARE USED IN THE MIX, THEN THE AMOUNT OF BITUMEN IS TO BE BASED ON THE TESTING PROCEDURES OUTLINED IN THE NATIONAL ASPHALT PAVEMENT ASSOCIATION'S INFORMATION SERIES 131 - "PERVIOUS ASPHALT PAVEMENTS" (2003) OR NHDOT EQUIVALENT. MIX SUPPLIERS MAY HAVE A SUITABLE IN-HOUSE SPECIFICATION FOR OPEN GRADED FRICTION COURSE (OGFC) THAT CAN BE USED.

USE NEAT ASPHALT BINDER MODIFIED WITH AN ELASTOMERIC POLYMER TO PRODUCE A BINDER MEETING THE REQUIREMENTS OF PG 76-22 AS SPECIFIED IN AASHTO MP- I. THE ELASTOMER POLYMER SHALL BE STYRENE-BUTADIENE-STYRENE (SBS), OR APPROVED EQUAL, APPLIED AT A RATE OF 3% BY WEIGHT OF THE TOTAL BINDER. THE COMPOSITE MATERIALS SHALL BE THOROUGHLY BLENDED AT THE ASPHALT REFINERY OR TERMINAL PRIOR TO BEING LOADED INTO THE TRANSPORT VEHICLE. THE POLYMER MODIFIED ASPHALT BINDER SHALL BE HEAT AND STORAGE STABLE.

AGGREGATE SHALL BE MINIMUM 90% CRUSHED MATERIAL AND HAVE A GRADATION OF:

COMPOSITION OF MIXTURE
SIEVE SIZE (INCH/MM)PERCENT PASSING0.75/191000.50/12.585-1000.375/9.555-75NO.4/4.7510-25NO.8/2.365-10NO.200/0.0752-4TOTAL AGGREGATE93-.5-94% ASPHALT OF TOTAL MIX6-6.5
ADD HYDRATED LIME AT A DOSAGE RATE OF 1.0% BY WEIGHT OF THE TOTAL DRY AGGREGATE TO MIXES CONTAINING GRANITE. HYDRATED LIME SHALL MEET THE REQUIREMENTS OF ASTM C 977. THE ADDITIVE MUST BE ABLE TO PREVENT THE SEPARATION OF THE ASPHALT BINDER FROM THE AGGREGATE AND ACHIEVE A REQUIRED TENSILE STRENGTH RATIO (TSR) OF AT LEAST 80% ON THE ASPHALT MIX WHEN TESTED IN ACCORDANCE WITH AASHTO T 283. THE ASPHALTIC MIX SHALL BE TESTED FOR ITS RESISTANCE TO STRIPPING BY WATER IN ACCORDANCE WITH ASTM D-1664. IF THE ESTIMATED COATING AREA IS NOT ABOVE 95 PERCENT, ANTI-STRIPPING AGENTS SHALL BE ADDED TO THE ASPHALT.

NO WORK SHALL BE STARTED UNTIL THE CONTRACTOR HAS SUBMITTED AND THE ENGINEER HAS APPROVED A MIX DESIGN INCLUDING THE PERCENTAGE OF EACH INGREDIENT INCLUDING BINDER, POLYMER, AND THE JOB-MIX FORMULA FROM SUCH A COMBINATION. THE JOB-MIX FORMULA SHALL ESTABLISH A SINGLE PERCENTAGE OF AGGREGATE PASSING SIEVE AND A SINGLE PERCENTAGE OF BITUMINOUS MATERIAL TO BE ADDED TO THE AGGREGATE. NO CHANGE IN THE JOB-MIX FORMULA MAY BE MADE WITHOUT WRITTEN APPROVAL OF THE ENGINEER. THE JOB-MIX FORMULA MUST FALL WIT H THE MASTER RANGE SPECIFIED IN COMPOSITION OF MIXTURE TABLE.

TRANSPORTING MATERIAL: SEE CONSTRUCTION AND INSTALL SPECIFICATIONS

FOR QUESTIONS ON MIX SPECIFICATIONS CONTACT ROBERT ROSEEN, PHD, AT THE UNH STORM WATER CENTER. 603-862-4024.

MAINTENANCE SPECIFICATIONS FOR POROUS ASPHALT PARKING LOT AREAS AND LOW VOLUME ROADS
THE UNH STORM WATER CENTER

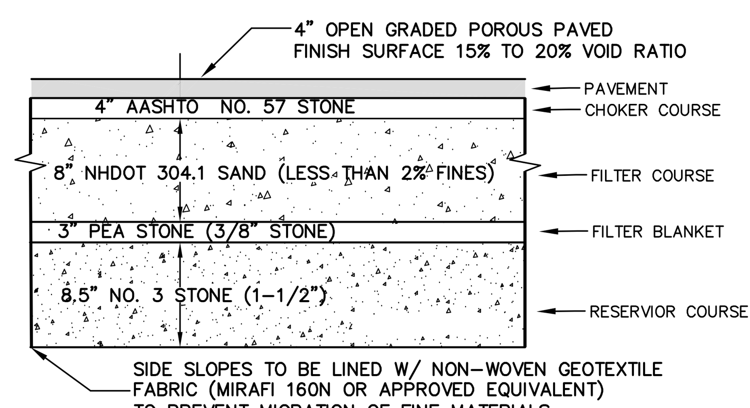
THE FOLLOWING RECOMMENDATIONS WILL HELP ASSURE THAT THE PAVEMENT IS MAINTAINED TO PRESERVE ITS HYDROLOGIC EFFECTIVENESS.

WINTER MAINTENANCE:

1. SANDING FOR WINTER TRACTION IS PROHIBITED. DEICING IS PERMITTED (NAC1, MGC12, 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.
2. PLOWING IS ALLOWED, BLADE SHOULD BE SET APPROXIMATELY 1" ABOVE ROAD SURFACE. ICE AND LIGHT SNOW ACCUMULATION ARE GENERALLY NOT AS PROBLEMATIC AS FOR STANDARD ASPHALT. SNOW WILL ACCUMULATE DURING HEAVIER STORMS AND SHOULD BE PLOWED.

ROUTINE MAINTENANCE;

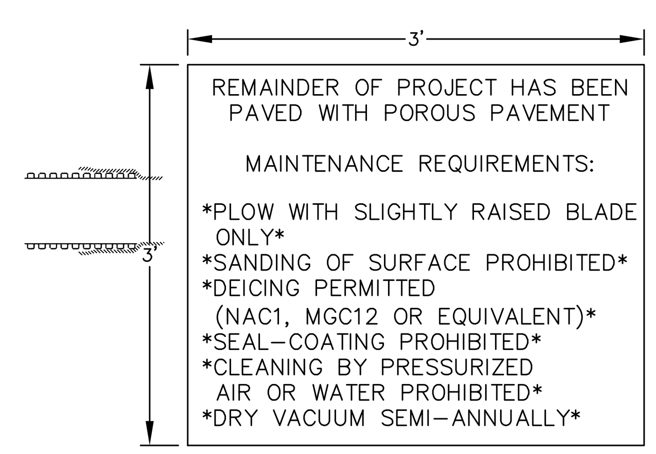
1. ASPHALT SEAL COATING MUST BE ABSOLUTELY FORBIDDEN. SURFACE SEAL COATING IS NOT REVERSIBLE.
2. THE PAVEMENT SURFACE SHOULD BE VACUUMED 1 OR 2 TIMES PER YEAR, AND AT ANY ADDITIONAL TIMES SEDIMENT IS SPILLED, ERODED, OR TRACKED ONTO THE SURFACE.
3. PLANTED AREAS ADJACENT TO PERVIOUS PAVEMENT SHOULD BE WELL MAINTAINED TO PREVENT SOIL WASHOUT ONTO THE PAVEMENT. IF ANY BARE SPOTS OR ERODED AREAS ARE OBSERVED WITHIN THE PLANTED AREAS, THEY SHOULD BE REPLANTED AND/OR STABILIZED AT ONCE.
4. IMMEDIATELY CLEAN ANY SOIL DEPOSITED ON PAVEMENT. SUPERFICIAL DIRT DOES NOT NECESSARILY CLOG THE PAVEMENT VOIDS. HOWEVER, DIRT THAT IS GROUND IN REPEATEDLY BY TIRES CAN LEAD TO CLOGGING. THEREFORE, TRUCKS OR OTHER HEAVY VEHICLES SHOULD BE PREVENTED FROM TRACKING OR SPILLING DIRT ONTO THE PAVEMENT.
5. DO NOT ALLOW CONSTRUCTION STAGING, SOIL/MULCH STORAGE, ETC. ON UNPROTECTED PAVEMENT SURFACE
6. REPAIRS: POTHOLES OF LESS THAN 50 SQUARE FEET CAN BE PATCHED BY ANY MEANS SUITABLE WITH STANDARD PAVEMENT OR A PERVIOUS MIX IS PREFERRED. FOR AREAS GREATER THAN 50 SQ. FT. IN NEED OF REPAIR, APPROVAL OF PATCH TYPE SHOULD BE SOUGHT FROM A QUALIFIED ENGINEER. ANY REQUIRED REPAIR OF DRAINAGE STRUCTURES SHOULD BE DONE PROMPTLY TO ENSURE CONTINUED PROPER FUNCTIONING OF THE SYSTEM.
7. WRITTEN AND VERBAL COMMUNICATION TO THE POROUS PAVEMENT'S FUTURE OWNER SHOULD MAKE CLEAR THE PAVEMENT'S SPECIAL PURPOSE AND SPECIAL MAINTENANCE REQUIREMENTS SUCH AS THOSE LISTED HERE.
8. A PERMANENT SIGN SHOULD BE ADDED AT THE ENTRANCE AND END OF THE POROUS ASPHALT AREA TO INFORM RESIDENTS AND MAINTENANCE STAFF OF THE SPECIAL NATURE AND PURPOSE OF THE PAVEMENT, AND ITS SPECIAL MAINTENANCE REQUIREMENTS.



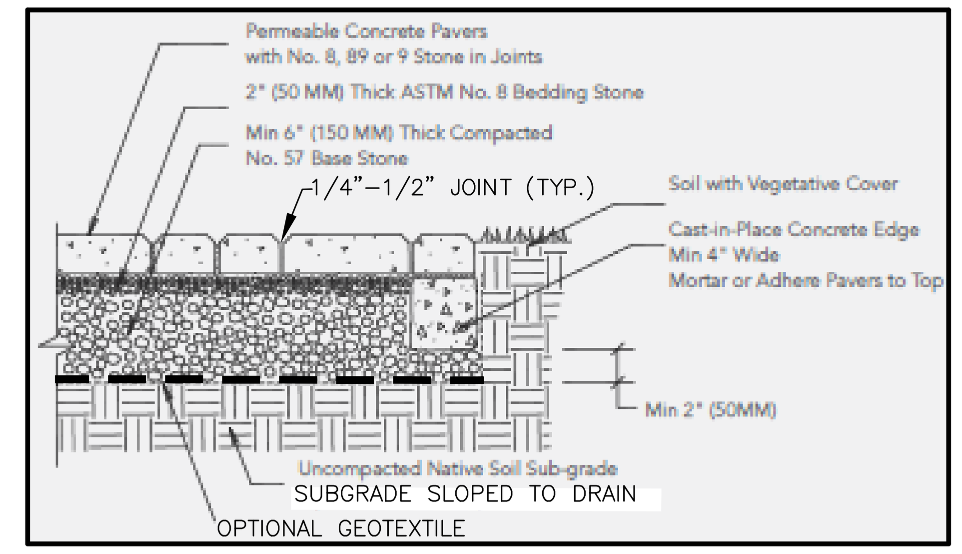
NOTES:

1. 4" FRICTION COARSE CONSISTS OF COARSER AGGREGATE AND STIFFER BINDER. SEE TABLE
2. A WORKING COURSE 4" THICK CONSISTS OF AASHTO NO. 57 STONE.
3. TOP COAT SHOULD BE VACUUMED A MINIMUM OF TWICE A YEAR.
5. ADJACENT AREAS TO POROUS PAVEMENT SHOULD BE GRADED AWAY FROM PAVEMENT TO PREVENT SEDIMENT FROM RUNNING ONTO POROUS AREA AND CLOGGING PORES. ROOF RUNOFF TO BE DIRECTED INTO SUBBASE MATERIAL.

POROUS PAVEMENT
NOT TO SCALE



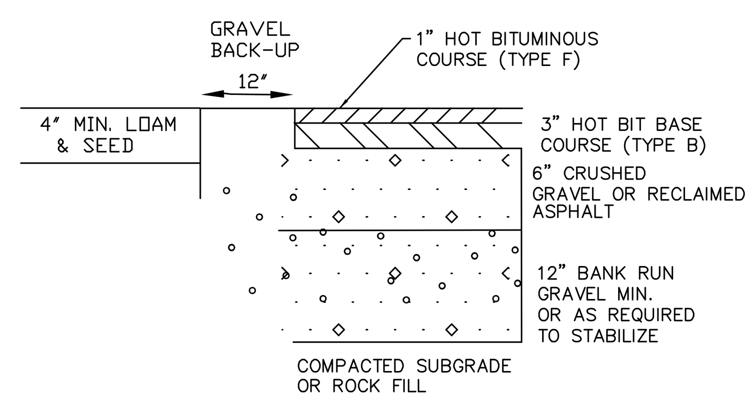
POROUS PAVEMENT SIGN DETAIL
NOT TO SCALE



ROUTINE MAINTENANCE: VISUAL INSPECTION OF THE PERVIOUS PAVERS TO ENSURE THAT THEY ARE CLEAN OF DEBRIS AND SEDIMENTS. ROUTINE CLEANING PROCEDURES WOULD INCLUDE BLOWING (WITH LEAF BLOWER OR SIMILAR) IN FALL, TRUCK-SWEEPING AND/OR DRY VACUUMING. ADD STONE TO REFILL JOINT SPACE AFTER SWEEPING/VACUUMING IF NEEDED.

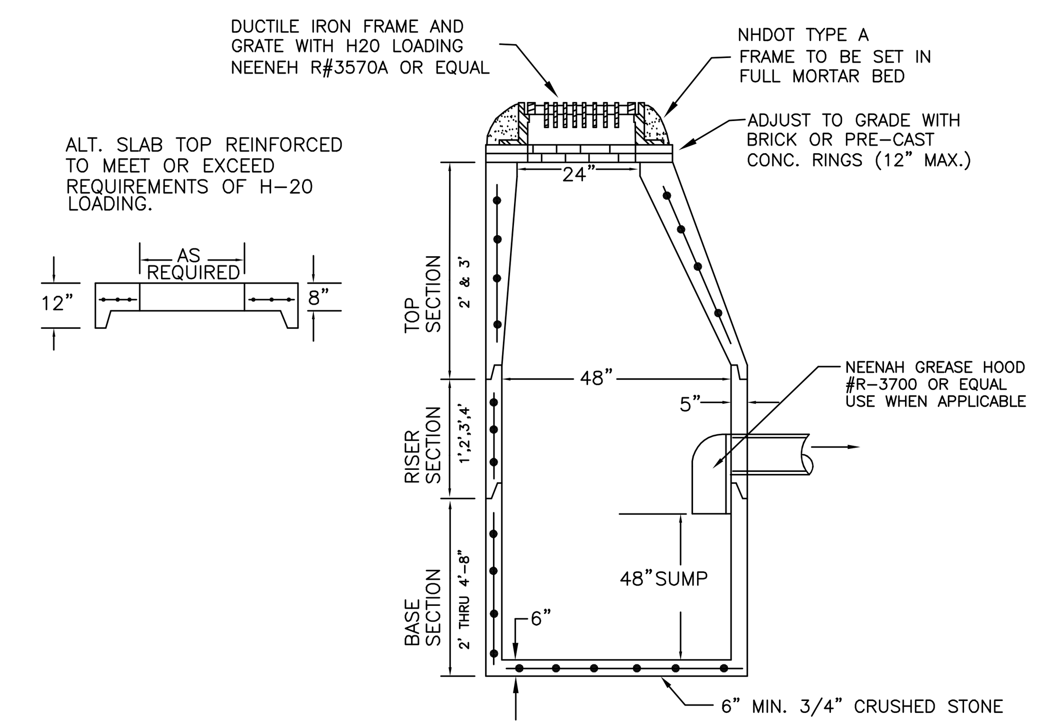
PERVIOUS PAVER DETAIL
TO BE "TREMRON" OR APPROVED EQUAL

NOT TO SCALE

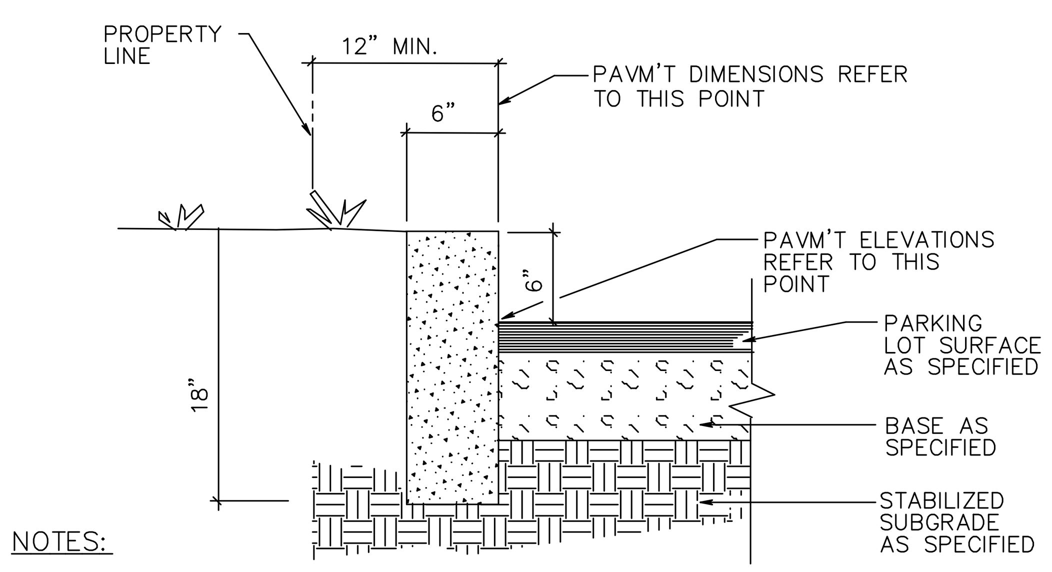


NOTES: * IN AREAS OF BEDROCK, MINIMUM 24" SEPARATION FROM BANK RUN GRAVEL
* PAVEMENT TRENCH PATCH SHALL MATCH EXISTING PAVEMENT DEPTHS.

TYPICAL PAVEMENT SECTION
NEW ASPHALT



PRECAST CATCH BASIN
NOT TO SCALE



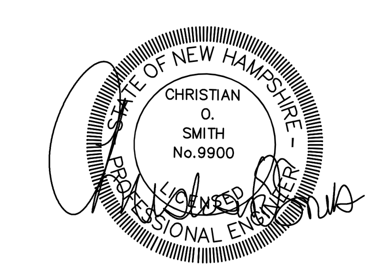
NOTES:

1. EDGING TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.
2. JOINTS BETWEEN STONES SHALL BE MORTARED.

6" VERTICAL GRANITE CURB
NOT TO SCALE

PREPARED FOR:
112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE, THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863



REVISED PER REVIEW COMMENTS	01/17/25
REVISIONS:	DATE:

CONSTRUCTION DETAILS

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

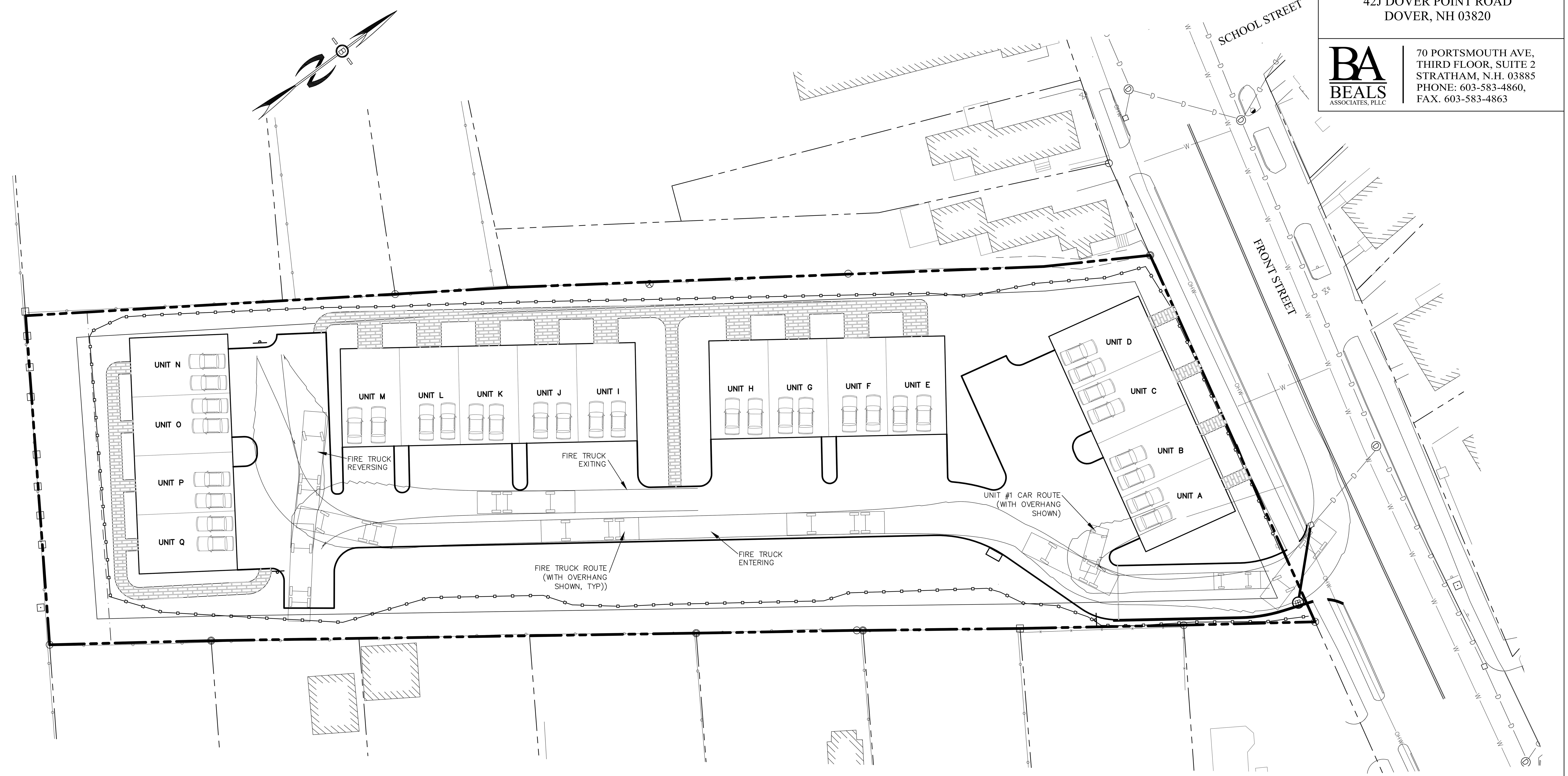
DATE:	DEC 9, 2024	SCALE:	NTS
PROJ. N0:	NH-1531	SHEET NO.	11

PREPARED FOR:

112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA
BEALS
ASSOCIATES, PLLC

70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863

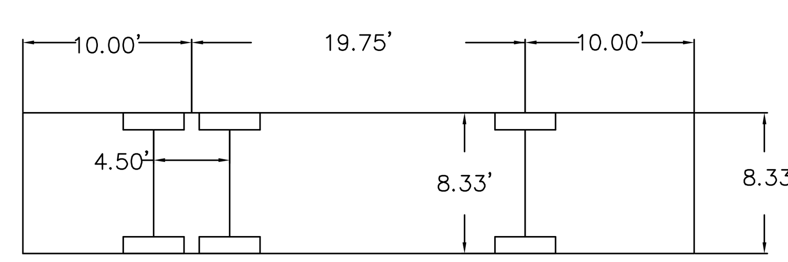


GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

Exeter Aerial Ladder Truck



Tire Diameter: 3.6 FEET

STATE OF NEW HAMPSHIRE
CHRISTIAN O. SMITH No.9900
PROFESSIONAL ENGINEER

EXETER LADDER TRUCK MANEUVERING PLAN

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

REVISED PARKING LAYOUT	02/19/25
REVISED PER REVIEW COMMENTS	01/17/25
REVISIONS:	DATE:

DATE:	DEC 9, 2024	SCALE:	1" = 20'
PROJ. N0:	NH-1531	SHEET NO.	12

ABUTTER AND/OR PUBLIC COMMENTS

Town of Exeter

Barbara Mcevoy <bmcevoy@exeternh.gov>

Letter Opposing Waiver for 112 Front Street

1 message

Jim Nealon <momo_22101@yahoo.com> Sun, Feb 16, 2025 at 3:01 PM
Reply-To: Jim Nealon <momo_22101@yahoo.com>
To: Barbara McEvoy <bmcevoy@exeternh.gov>, "deastman@exeternh.gov" <deastman@exeternh.gov>
Cc: Doug Eastman <deastman@exeternh.gov>, Evagelia Maskwa <egeorgakilas@gmail.com>, Nealon Kristin <nealonkristin@yahoo.com>, Atkins Dale Ann <atkins.dale@gmail.com>, Robertson A <agr27@yahoo.com>, AnnMarie Powers <annmariepowers@hotmail.com>, Vince Powers <vppowers@hotmail.com>, MINI MAHATA <mmahata1@gmail.com>, Briselden Don J <briseldens@live.com>, Mary Jo briselden <mjbriselden@outlook.com>, Charlie French <cfrench.planner@gmail.com>, Dana Gastich French <dana.gastich@gmail.com>, Kristin new X <momo_22101@yahoo.com>

Barbara, Doug:

Now that we have seen and had time to study the packet regarding the property at 112 Front Street, my wife Kristin and I want to go on record opposing the waiver to allow the driveway to footprint to abut our property. Please make sure the Board receives this letter before the February 27 meeting. Thank you.

To the Planning Board:

My name is James Nealon. My wife and I live at 5 Gill Street which abuts the property at 112 Front St.

Now that abutters have had the opportunity to see and study the packet regarding 112 Front Street, we are very concerned about the developer's request for a waiver to move the driveway footprint so that it directly abuts our property line. The requested waiver calls for "grading within five feet of exterior property line". In fact during the February 6 walk-through of the property the developer said he wanted to move the driveway to within 3 feet of our property. He had no plan for screening.

As the Board is aware, at that point the driveway will be asphalt and pitched towards our property, ensuring that rain, snow runoff, salt and perhaps pesticides and other chemicals will run off into our yard.

The developer's request says in part: " Due to the location of the curb cut for the existing driveway, the proposed driveway was placed in the same location, but is obviously wider than the existing driveway. The western edge of the existing driveway was held and the expansion grew towards the east, causing grading within 5 feet of the property line. This would result in a hardship if the strict letter of the regulations is carried out as it would be illogical to move the drive westerly off the existing drive location. Care will be taken to ensure no disturbance to the abutting property, and adequate screening will be maintained to the extent possible."

Note that the developer finds it "illogical" to move the drive "westerly off the existing drive location", towards his own property, but perfectly logical to move the drive easterly to abut our property. We don't find this logical at all but rather the developer asking for a waiver for his own convenience without regard to our property.

We also note that it will be impossible not to disturb our property during the construction phase, and that "adequate screening ... to the extent possible" commits him to nothing.

The drawing on page 83 of the packet shows the driveway exactly flush with our property line and no room for adequate screening of any kind. The drawing also shows room to angle the driveway to the west.

We request that the Board disapprove the waiver request.

Respectfully,

James and Kristin Nealon

Erik and Sarah Nelson
8 Gill Street
Exeter, NH. 03833

February 7, 2025

Exeter Planning Board
Town of Exeter
10 Front Street
Exeter, NH 03833

Dear Mr. Eastman, Ms. McEvoy, and members of the Exeter Planning Committee,

We are residents of 8 Gill Street, and are writing to express our concerns about the proposed demolition of the historic home in our neighborhood at 112 Front Street, and the high density development presented to take its place.

As you know, this part of our town is comprised of well-maintained 19th century homes that are uniform in scale and character. The Linden-Gill-Union-Parker Street area contains predominantly single family dwellings with small yards and driveways and a limited number of people and cars. To trade one of these homes for a 17 (!) unit development with 36 parking spaces would forever alter the essential qualities of this residential area. And along with it a core green space abutting the historic cemetery will be irretrievably lost.

With the current pace of these changes across our community, we are rapidly losing the very qualities that once made Exeter a special and desirable place to live. These changes cannot be undone, and should not be undertaken lightly. They are in stark contradiction to the promised stewardship in the Planning Board's Master Plan.

Already, there is widespread dissatisfaction among town residents with traffic, noise, and risks to pedestrians and children. This is of particular importance in our neighborhood, with kids walking and biking to six schools, commuters walking to the train, and churchgoers walking to St. Michael's. The first step is to recognize where high population densities and car traffic are appropriate, and where they are not. It is far easier to plan growth in a sensible way, than to try to react to the changes it unleashes. The scale of this particular development, in this neighborhood, makes no sense.

As a resident of Gill Street, we will be directly impacted by noise, increased car traffic, lines of sight into our home, light pollution, water runoff, maintenance crews, and the constant activities of 17 new households in what has historically been a quiet, small residential neighborhood. The loss of our property's value, being suddenly moved from the edge of the historic district to the zone of mixed use, is also no small concern.

You have an opportunity to uphold Exeter's "historic setting, and rich culture as the foundation for shaping our future," We urge you to reconsider the impact of this particular development in this location.

Respectfully,

Erik and Sarah Nelson
8 Gill Street

Town of Exeter

Barbara Mcevoy <bmcevoy@exeternh.gov>

112 Front Street

1 message

Agr 27 <agr27@yahoo.com>
To: deastman@exeternh.gov, bmcevoy@exeternh.gov

Sat, Feb 8, 2025 at 11:54 AM

To the Planning Board:

I am Adele Robertson, an abutter to 112 Front Street, and I live at 106 Front Street. I attended the walk-through of the property on February 6, 2025. I came away deeply concerned about the developer's request for an exemption to extend the driveway to within 3 feet of my property.

If the exemption is granted, the proposed driveway will be placed way too close to my property. Let's not forget that the given specific section of driveway will be asphalt and subject to runoff of water, snow and salt. My property which aligns the proposed driveway, is filled with perennial flowers and shrubbery that I've been working on since 2017. I'm also very concerned that the snow and ice melt will get plowed onto my property which could damage their growth.

Second, without an appropriate fence, the property value of both myself and my neighbors home's will be less desirable and the home's value could decrease. I am requesting a composite 8 foot fence for my privacy and environmental concerns. The proposed fence would border the singular entrance to 112 Front Street. This single entrance has a direct line of sight to my home for the proposed 17 units, which includes all of the 17 units vehicles exiting from their two car garages, including all of their guests and others that would enter and exit daily from Front Street.

I am proposing the SimTek composite 8 foot fence for the properties of Robertson, 106 Front Street, Exeter NH, 03833, Nealon, 5 Gill Street, Exeter, NH 03833 and Stafford, 1301 Seafarer Circle 104, Jupiter, FL 33477 abutters. The SimTek fence has a lifetime warranty with a minimum of 25 -30 years with little to no maintenance. The SimTek fence is also able to block up to 98% of the direct sound from cars entering the proposed property. A simple Cedar fence would require sealing, staining or repainting for all parties who share this fence and the lifetime of that Cedar fence is only 5 to 7 years. The remaining fencing surrounding the homes on Gill and Parker Streets can be determined after consulting with their abutters.

I am also concerned that there is no formal process to get the developer to put things in writing with specific details. I ask the Board to assist us in making that happen before granting final approval.

Lastly, being legally blind, my world has become more diminished each passing year. The impact of this proposed project, forces me to alter my property of 38 years to keep any kind of personal privacy and prevent future damage to my property. Once again, my world gets closed off and smaller, but not by health, old age or my own doing.

Adele Robertson

Town of Exeter

Barbara Mcevoy <bmcevoy@exeternh.gov>

Regarding Development of 112 Front Street ADDENDUM FOR BOARD PACKAGE

1 message

Jim Nealon <momo_22101@yahoo.com> Fri, Feb 7, 2025 at 2:43 PM
Reply-To: Jim Nealon <momo_22101@yahoo.com>
To: "deastman@exeternh.gov" <deastman@exeternh.gov>, "bmcevoy@exeternh.gov" <bmcevoy@exeternh.gov>, Jim Nealon <momo_22101@yahoo.com>, Kristin new X <nealonkristin@yahoo.com>

Please add to the package for the upcoming Planning Board meeting on February 13. Thank you.
James Nealon

To the Planning Board:

I participated in the walk-through of the property at 112 Front Street on February 6. While it was very difficult to get specific information from the developer, I did learn that he wants an Exception to run the proposed driveway three feet from my property line (I live at 5 Gill Street). We oppose the granting of an exception for a three-foot setback. I was told that the driveway at that point will be asphalt, and I am concerned about runoff, snow plowing and storage, and the proximity of bringing a busy driveway (43 parking spaces planned) right up to our property line. Further, the developer did not specify if he planned to try to cram screening between the driveway and our fence line. I would appreciate the assistance of the Board in 1) not granting the exception for the setback, and 2) providing adequate screening between the driveway and our property. Thank you, James and Kristin Nealon, 5 Gill St.

On Thursday, January 30, 2025 at 09:21:42 PM EST, Jim Nealon <momo_22101@yahoo.com> wrote:

(previously sent & included in PB 2/13/25 meeting packet.)

Please ensure that this letter is included in the package for the Planning Board. Thank you.

Dear Mr. Eastman, Ms. McEvoy and the Exeter Planning Board:

My name is James Nealon and I live at 5 Gill St. Our property abuts 112 Front Street, where a developer has proposed knocking down a 160 year old building and replacing it with a 17 unit, high-density development.

I have scrutinized the Planning Board's website and read again, with great interest, the Master Plan. I was gratified to be reminded that the Master Plan lays out a clear vision for the town:

"Our community will continue to see our natural landscapes, historic setting, and rich culture as the foundation for shaping our future. Our local government, residents, and business owners will act as stewards of our precious resources and we will work to connect these special places in a way that fosters enjoyment and healthy living. Our community will continue to grow so that we can maintain its vibrancy for future generations, and development will occur in a way that bolsters the local economy, provides options for good homes, and respects the natural and cultural setting that is central to our identity."

DRAINAGE ANALYSIS & SEDIMENT AND EROSION CONTROL PLAN

Prepared for:
112 FRONT STREET, LLC
RESIDENTIAL DEVELOPMENT

Prepared by:

BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVENUE
STRATHAM, NH 03885

Project Number:
NH-1531
112 Front Street
Exeter, New Hampshire
December 9, 2024
Revised February 14, 2025

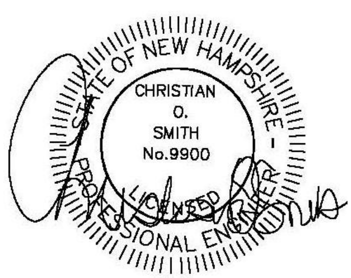


Table of Contents

1.0 ANALYSIS SUMMARY

112 Front Street, LLC proposes to construct a residential development to establish 17 residential units on a 1.6+/-acre parcel located at 112 Front Street in Exeter, New Hampshire. A drainage analysis of 1.6 acres of the proposed site improvement was conducted for the purpose of estimating the peak rate of stormwater run-off 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 Extreme Precipitation data provided by Cornell University for the following 24-hour duration storm events:

Storm Event	Rainfall Depth (inches)
WQV	1.00
2-Year	3.21
10-Year	4.89
25-Year	6.23
50-Year	7.48

These storm events use the USDA NRCS TR-20 method within the HydroCAD Stormwater Modeling System environment to model the rainfall and predict stormwater runoff flows and volumes. A Type III storm pattern was used in the model. The purpose of this analysis is to estimate the peak rates of run-off from the site for detention adequacy purposes, and to compare the peak rate of run-off between the existing and proposed conditions.

Peak Rate of Discharge

		Component Peak Rate of Discharge (CFS)				
Analysis Point # Analysis Point Description	Condition	WQV	2-Year	10-Year	25-Year	50-Year
Reach #100 Southeast	Existing Proposed	0.00 0.00	0.13 0.04	0.55 0.17	0.98 0.31	1.44 0.46
Reach #200 East	Existing Proposed	0.06 0.00	0.34 0.01	1.00 0.08	1.65 0.16	2.32 0.24
Reach #300 East	Existing Proposed	0.03 0.00	0.12 0.00	0.21 0.01	0.29 0.02	0.37 0.03
Reach #400 North	Existing Proposed	0.01 0.00	0.06 0.01	0.16 0.04	0.26 0.07	0.36 0.10
Reach #500 Northeast	Existing Proposed	0.02 0.03	0.06 0.12	0.13 0.21	0.19 0.28	0.24 0.36

Channel Protection

Analysis Point # Analysis Point Description	Condition	2-Year Storm Volume (Acre-Feet)
Reach #100 Southeast	Existing Proposed	0.021 0.007

Reach #200 East	Existing Proposed	0.041 0.002
Reach #300 East	Existing Proposed	0.010 0.000
Reach #400 North	Existing Proposed	0.006 0.001
Reach #500 Northeast	Existing Proposed	0.005 0.010

The proposed residential development includes a driveway off of Front Road at the same location as the existing driveway along with parking and maneuvering areas on site. The proposed improvement area includes five different sub-catchments. The peak rate of run-off and channel protection volumes in the proposed conditions are decreased from that of the existing conditions, due to the addition of infiltration basins and a porous pavement system, except for Reach #500 where there is a slight increase due to the conventional pavement placed along the driveway entrance. All roadway runoff, except the conventional pavement at the entrance, receives treatment from the porous pavement system including a sand filter course prior to infiltrating into the ground below. In addition, the potential for increased erosion and sedimentation is handled by way of silt barrier surrounding the disturbed areas. The use of Best Management Practices per the Rockingham Conservation District / DES Handbook have been applied to the design of these structures and will be observed during all stages of construction. All land disturbed during construction will be stabilized within 30 days of groundbreaking. Existing wetlands and abutters will suffer no adverse effects resulting from this proposed development.

2.0 EXISTING CONDITIONS ANALYSIS

The existing property is located on a parcel consisting of a single-family residence with a gravel driveway, trees and woodlands, and lawn areas. The existing topography is such that the site analysis is divided into five sub-catchments within the area proposed to be improved. Final Reach #100 flows to the southeast of the proposed improvement area, Reaches #200 and #300 flow to east, Reach #400 flows north towards Front Street, and Reach #500 flows into a catch basin in Front Street.

Classified by Site-Specific Soil Mapping, the land is composed of flat slopes and soils categorized into the Hydrologic Soil Group (HSG) B (See appendix for Hiss/HSG designations).

3.0 PROPOSED CONDITIONS ANALYSIS

The addition of the impervious area, clearing of trees, and grading of slopes causes an increase in the curve number (Cn) and a decrease in the time of concentration (Tc) which results in a potential increase in peak rates of run-off from the site. To reduce these flows to pre-development conditions, various stormwater management systems will be proposed. Porous pavement is proposed in lieu of traditional impervious pavement for the majority of the site along with two infiltration ponds. The proposed development divides the site into five different post-construction sub-catchments. The run-off is directed to the pervious pavement or infiltration ponds through HydroCAD "reaches" and "ponds".

In an effort to prevent the sedimentation of abutting properties, the majority of the roofs will be directed via pipe to the underground reservoir course of the porous pavement system, pavement areas will directly infiltrate into the porous pavement system, and other areas will be directed towards infiltration ponds. During construction, appropriate Best Management Practices (BMP's) will be applied so as to negate the potential for sediment-laden run-off to discharge towards abutting properties prior to the final stabilization of the proposed grading. The structures outlined in this proposal provide for adequate treatment of stormwater run-off for sediment control. Based on NHDES pollutant removal efficiencies, each of the infiltration ponds and permeable pavement system will result in a reduction of Total Suspended Solids (TSS) of 90%, Total Nitrogen (TN) of 60%, and Total Phosphorous (TP) of 65%.

4.0 SEDIMENT & EROSION CONTROL PLANS BEST MANAGEMENT PRACTICES (BMP's)

The proposed site development is protected from erosion and the roadways and abutting properties are protected from sediment by the use of Best Management Practices as outlined in the New Hampshire Stormwater Manual. Any area disturbed by construction will be re-stabilized within 30 days, and abutting properties and wetlands will not be adversely affected by this development. All swales and drainage structures will be constructed and stabilized prior to having run-off directed to them.

4.1 Silt Barrier / Construction Fence

The plan set demonstrates the location of silt barriers for sediment control. The Erosion and Sediment Control Details sheet has the specifications for installation and maintenance of the silt barriers selected for the site. In areas where the limits of construction need to be emphasized to operators, construction fence for added visibility will be installed. Orange construction fence will be VISI Perimeter Fence by Conwed Plastic Fencing, or approved equal. The four-foot construction fencing is to be installed using six-foot posts buried at least two feet into the ground spaced six to eight feet apart.

4.2 Vegetated Stabilization

All areas that are disturbed during construction will be stabilized with vegetated material within 30 days of disturbance. Construction will be managed in such a manner that erosion is prevented and that no abutter's property will be subjected to any siltation, unless otherwise permitted. All areas to be planted with grass for long-term cover will follow the specifications on Sheet E-1 using the seeding mixture below:

Mixture C	Pounds per Acre	Pounds per 1,000 sf
Tall Fescue	20	0.45
Creeping Red Fescue	20	0.45
Birdsfoot Trefoil	8	0.20
Total	**48**	**1.10**

4.3 Stabilized Construction Entrance/Exit

A temporary gravel construction entrance/exit provides an area where mud can be dislodged from tires before the vehicle leaves the construction site to reduce the amount of mud and sediment transported onto paved municipal and state roads. The stone size for the gravel pad should be between 1- and 2-inch coarse aggregate and the pad itself constructed to a minimum length of 50' for the full width of the access road. The aggregate should be placed at least six inches thick. The Erosion and Sediment Control Details sheet has the plan and profile view details.

4.2 Drainage Swales / Stormwater Conveyance Channels
Drainage swales will be stabilized with vegetation for long term cover as outlined below using seed mixture C. As a general rule, velocities in the swale should not exceed 3.0 feet per second for a vegetated swale although velocities as high as 4.5 FPS are allowed under certain soil conditions.

4.5 Level Spreaders
Level spreaders enable any run-off directed towards them to be spread evenly into sheet flow prior to discharge into wetlands or treatment by a filter strip, thus allowing for better filter strip efficiency and a lesser potential for erosion.

4.6 Vegetated Buffers
Vegetated buffers are areas of land with natural or planted vegetation designed to receive sheet run-off from upgradient development. These natural areas, preferably wooded, are effective in removing sediment and sediment-laden pollutants from such run-off, although their effectiveness is severely diminished when forced to deal with concentrated flow and must therefore be equipped with a level-spreading device. Vegetated buffers should not have a slope exceeding fifteen percent and have a minimum length of seventy-five feet.

4.6 Filter Strips
Filter strips are areas of land with natural or planted vegetation designed to receive sheet run-off from upgradient development. These natural areas, preferably wooded, are effective in removing sediment and sediment-laden pollutants from such run-off, although their effectiveness is severely diminished when forced to deal with concentrated flow and must therefore be equipped with a level-spreading device. Filter strips should not have a slope exceeding fifteen percent and have a minimum length of seventy-five feet.

4.4 Environmental Dust Control

Dust will be controlled on the site using multiple Best Management Practices. Mulching and temporary seeding will be the first line of protection to be utilized where problems occur. If dust problems are not solved by these applications, the use of water and calcium chloride can be applied. Calcium chloride will be applied at a rate that will keep the surface moist but not cause pollution.

4.5 Construction Sequence

1. Cut and remove trees in construction areas as directed or required.

2. Construct and/or install temporary and permanent sediment erosion and detention control facilities, as required. Erosion, sediment, and facilities shall be installed and stabilized prior to any earth moving operation, and prior to directing run-off to them.

3. Clear, cut, grub, and dispose of debris in approved facilities.

4. Excavate and stockpile topsoil / loam. All disturbed areas shall be stabilized immediately after grading.

5. Construct the paved area, drainage, and buildings.

6. Begin permanent and temporary seeding and mulching. All cut and fill slopes and disturbed areas shall be seeded and mulched as required or directed.

7. Daily, or as required, construct temporary berms, drainage ditches, sediment traps, etc. to prevent erosion on the site and prevent any siltation of abutting waters or property.

8. Inspect and maintain all erosion and sediment control measures during construction.

9. Complete permanent seeding and landscaping.

10. Remove temporary erosion control measures after seeding areas have established themselves and site improvements are complete. Smooth and re-vegetate all disturbed areas.

11. All swales and drainage structures will be constructed and stabilized prior to having run-off being directed to them.

4.6 Temporary Erosion Control Measures

1. The smallest practical area of land shall be exposed at any one time.

2. Erosion and sediment control measures shall be installed as shown on the plans and at locations as required, or directed by the engineer.

3. All disturbed areas shall be returned to original grades and elevations. Disturbed areas shall be loamed with a minimum of 4" of loam and seeded with not less than 1.10 pound of seed per 1,000 square feet (48 pounds per acre) of area.

4. Silt barriers shall be inspected periodically and after every rainstorm during the life of the project. All damaged areas shall be repaired and sediment deposits shall periodically be removed and properly disposed of.

5. After all disturbed areas have been stabilized, the temporary erosion control measures are to be removed and the area disturbed by the removal smoothed and revegetated.

6. Areas must be seeded and mulched within 5 days of final grading, permanently stabilized within 15 days of final grading, or temporarily stabilized within 30 days of initial disturbance of soil.

4.7 Inspection and Maintenance Schedule

Silt barriers shall be inspected during and after storm events to ensure that the fence still has integrity and is not allowing sediment to pass.

5.0 CONCLUSION

This proposed site development off of Front Street in Exeter, NH will have no adverse effect on the abutting property owners by way of stormwater run-off or siltation. The post-construction peak rates of run-off from the site towards abutters will be lower than the existing conditions for the storm events, as shown in the tables above. Appropriate steps will be taken to eliminate erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of porous pavement and infiltration ponds. The Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and these applications will be enforced throughout the construction process.

An Alteration of Terrain Permit (RSA 485: A-17) is not required for this project due to the area of disturbance being less than 100,000 square feet.

Respectfully Submitted,

BEALS ASSOCIATES, *PLLC*.

Christian O. Smith

Christian O Smith, PE
Principal

Appendix I

Existing Conditions Analysis

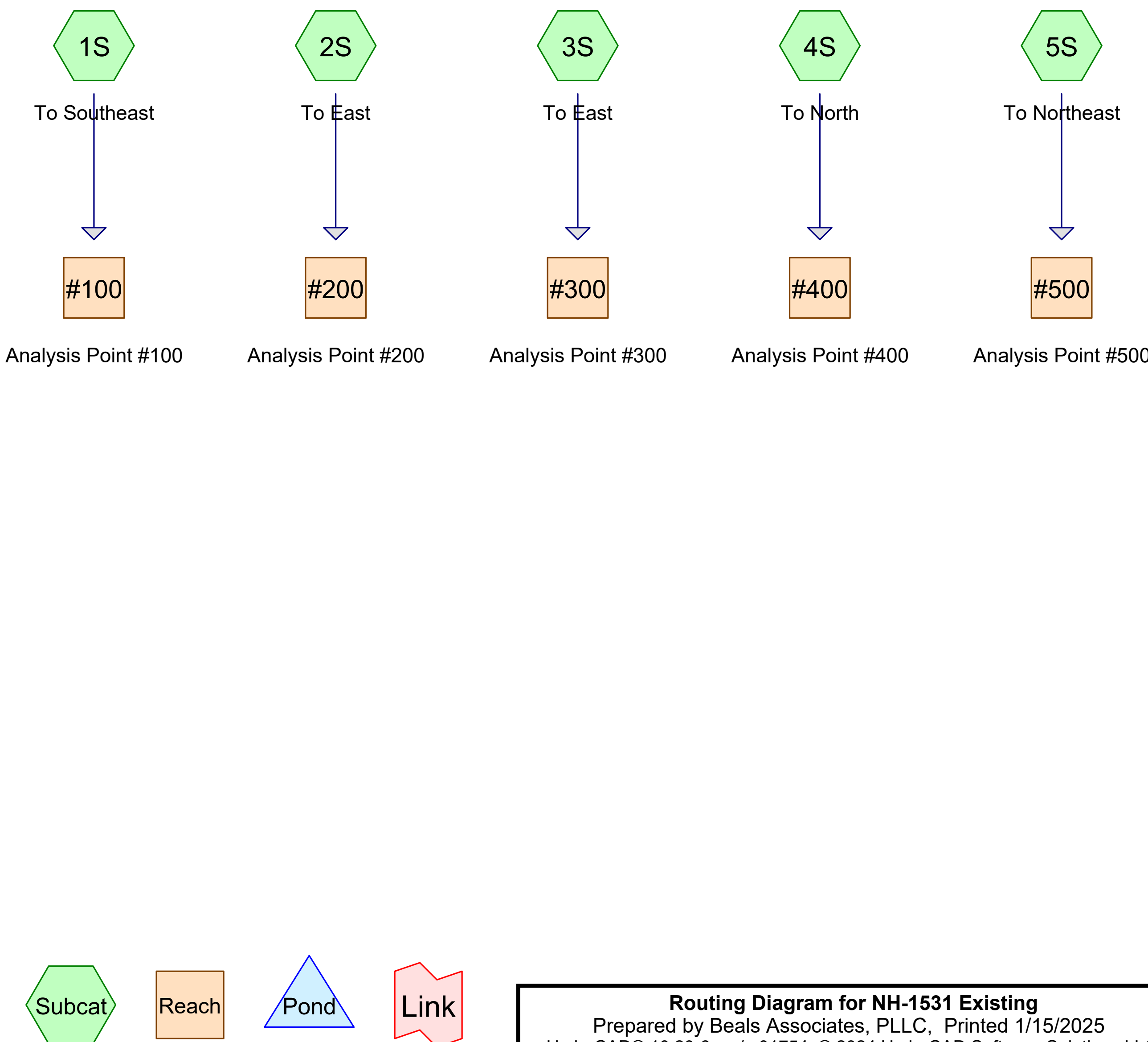
WQV 24-Hour Summary

2-Year 24-Hour Summary

10-Year 24-Hour Complete

25-Year 24-Hour Complete

50-Year 24-Hour Summary



Routing Diagram for NH-1531 Existing
Prepared by Beals Associates, PLLC, Printed 1/15/2025

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.072	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S, 5S)
0.074	98	Paved parking, HSG B (2S, 3S, 4S, 5S)
0.073	98	Roofs, HSG B (2S, 3S, 4S)
0.355	55	Woods, Good, HSG B (1S, 2S, 3S, 4S, 5S)
1.574	**63**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.574	HSG B	1S, 2S, 3S, 4S, 5S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.574		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: To Southeast Runoff Area=26,874 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=261' Tc=18.6 min CN=WQ Runoff=0.00 cfs 0.000 af

Subcatchment2S: To East Runoff Area=32,169 sf 11.01% Impervious Runoff Depth=0.09"
Flow Length=216' Tc=10.9 min CN=WQ Runoff=0.06 cfs 0.005 af

Subcatchment3S: To East Runoff Area=3,132 sf 48.60% Impervious Runoff Depth=0.38"
Tc=6.0 min CN=WQ Runoff=0.03 cfs 0.002 af

Subcatchment4S: To North Runoff Area=4,156 sf 14.73% Impervious Runoff Depth=0.12"
Tc=6.0 min CN=WQ Runoff=0.01 cfs 0.001 af

Subcatchment5S: To Northeast Runoff Area=2,251 sf 33.05% Impervious Runoff Depth=0.26"
Tc=6.0 min CN=WQ Runoff=0.02 cfs 0.001 af

Reach #100: Analysis Point #100 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach #200: Analysis Point #200 Inflow=0.06 cfs 0.005 af
Outflow=0.06 cfs 0.005 af

Reach #300: Analysis Point #300 Inflow=0.03 cfs 0.002 af
Outflow=0.03 cfs 0.002 af

Reach #400: Analysis Point #400 Inflow=0.01 cfs 0.001 af
Outflow=0.01 cfs 0.001 af

Reach #500: Analysis Point #500 Inflow=0.02 cfs 0.001 af
Outflow=0.02 cfs 0.001 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.010 af Average Runoff Depth = 0.07"
90.64% Pervious = 1.427 ac 9.36% Impervious = 0.147 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: To Southeast Runoff Area=26,874 sf 0.00% Impervious Runoff Depth=0.42"
Flow Length=261' Tc=18.6 min CN=WQ Runoff=0.13 cfs 0.021 af

Subcatchment2S: To East Runoff Area=32,169 sf 11.01% Impervious Runoff Depth=0.67"
Flow Length=216' Tc=10.9 min CN=WQ Runoff=0.34 cfs 0.041 af

Subcatchment3S: To East Runoff Area=3,132 sf 48.60% Impervious Runoff Depth=1.64"
Tc=6.0 min CN=WQ Runoff=0.12 cfs 0.010 af

Subcatchment4S: To North Runoff Area=4,156 sf 14.73% Impervious Runoff Depth=0.76"
Tc=6.0 min CN=WQ Runoff=0.06 cfs 0.006 af

Subcatchment5S: To Northeast Runoff Area=2,251 sf 33.05% Impervious Runoff Depth=1.28"
Tc=6.0 min CN=WQ Runoff=0.06 cfs 0.005 af

Reach #100: Analysis Point #100 Inflow=0.13 cfs 0.021 af
Outflow=0.13 cfs 0.021 af

Reach #200: Analysis Point #200 Inflow=0.34 cfs 0.041 af
Outflow=0.34 cfs 0.041 af

Reach #300: Analysis Point #300 Inflow=0.12 cfs 0.010 af
Outflow=0.12 cfs 0.010 af

Reach #400: Analysis Point #400 Inflow=0.06 cfs 0.006 af
Outflow=0.06 cfs 0.006 af

Reach #500: Analysis Point #500 Inflow=0.06 cfs 0.005 af
Outflow=0.06 cfs 0.005 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.084 af Average Runoff Depth = 0.64"
90.64% Pervious = 1.427 ac 9.36% Impervious = 0.147 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: To Southeast Runoff Area=26,874 sf 0.00% Impervious Runoff Depth=1.24"
Flow Length=261' Tc=18.6 min CN=WQ Runoff=0.55 cfs 0.064 af

Subcatchment 2S: To East Runoff Area=32,169 sf 11.01% Impervious Runoff Depth=1.57"
Flow Length=216' Tc=10.9 min CN=WQ Runoff=1.00 cfs 0.096 af

Subcatchment 3S: To East Runoff Area=3,132 sf 48.60% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=WQ Runoff=0.21 cfs 0.017 af

Subcatchment 4S: To North Runoff Area=4,156 sf 14.73% Impervious Runoff Depth=1.68"
Tc=6.0 min CN=WQ Runoff=0.16 cfs 0.013 af

Subcatchment 5S: To Northeast Runoff Area=2,251 sf 33.05% Impervious Runoff Depth=2.39"
Tc=6.0 min CN=WQ Runoff=0.13 cfs 0.010 af

Reach #100: Analysis Point #100 Inflow=0.55 cfs 0.064 af
Outflow=0.55 cfs 0.064 af

Reach #200: Analysis Point #200 Inflow=1.00 cfs 0.096 af
Outflow=1.00 cfs 0.096 af

Reach #300: Analysis Point #300 Inflow=0.21 cfs 0.017 af
Outflow=0.21 cfs 0.017 af

Reach #400: Analysis Point #400 Inflow=0.16 cfs 0.013 af
Outflow=0.16 cfs 0.013 af

Reach #500: Analysis Point #500 Inflow=0.13 cfs 0.010 af
Outflow=0.13 cfs 0.010 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.201 af Average Runoff Depth = 1.53"
90.64% Pervious = 1.427 ac 9.36% Impervious = 0.147 ac

Summary for Subcatchment 1S: To Southeast

Runoff = 0.55 cfs @ 12.29 hrs, Volume= 0.064 af, Depth= 1.24"
Routed to Reach #100 : Analysis Point #100

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
4,475	55	Woods, Good, HSG B
22,399	61	>75% Grass cover, Good, HSG B
0	98	Paved parking, HSG B
0	98	Roofs, HSG B
26,874		Weighted Average
26,874		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	21	0.0070	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.92"
4.4	29	0.0139	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.92"
4.1	196	0.0128	0.79		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	15	0.0267	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.6	261	Total			

Summary for Subcatchment 2S: To East

Runoff = 1.00 cfs @ 12.16 hrs, Volume= 0.096 af, Depth= 1.57"
Routed to Reach #200 : Analysis Point #200

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
8,913	55	Woods, Good, HSG B
19,715	61	>75% Grass cover, Good, HSG B
1,767	98	Paved parking, HSG B
1,774	98	Roofs, HSG B
32,169		Weighted Average
28,628		88.99% Pervious Area
3,541		11.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	50	0.0360	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.92"
5.9	157	0.0040	0.44		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	9	0.0060	0.54		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.9	216	Total			

Summary for Subcatchment 3S: To East

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 2.85"
Routed to Reach #300 : Analysis Point #300

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
645	55	Woods, Good, HSG B
965	61	>75% Grass cover, Good, HSG B
486	98	Paved parking, HSG B
1,036	98	Roofs, HSG B
3,132		Weighted Average
1,610		51.40% Pervious Area
1,522		48.60% Impervious Area

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

Summary for Subcatchment 4S: To North

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 1.68"
Routed to Reach #400 : Analysis Point #400

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
1,340	55	Woods, Good, HSG B
2,204	61	>75% Grass cover, Good, HSG B
231	98	Paved parking, HSG B
381	98	Roofs, HSG B
4,156		Weighted Average
3,544		85.27% Pervious Area
612		14.73% Impervious Area

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

Summary for Subcatchment 5S: To Northeast

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 2.39"
Routed to Reach #500 : Analysis Point #500

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
104	55	Woods, Good, HSG B
1,403	61	>75% Grass cover, Good, HSG B
744	98	Paved parking, HSG B
0	98	Roofs, HSG B
2,251		Weighted Average
1,507		66.95% Pervious Area
744		33.05% Impervious Area

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

Summary for Reach #100: Analysis Point #100

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

Inflow Area = 0.617 ac, 0.00% Impervious, Inflow Depth = 1.24" for 10-YR event
Inflow = 0.55 cfs @ 12.29 hrs, Volume= 0.064 af
Outflow = 0.55 cfs @ 12.29 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach #200: Analysis Point #200

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

Inflow Area = 0.738 ac, 11.01% Impervious, Inflow Depth = 1.57" for 10-YR event
Inflow = 1.00 cfs @ 12.16 hrs, Volume= 0.096 af
Outflow = 1.00 cfs @ 12.16 hrs, Volume= 0.096 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach #300: Analysis Point #300

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

Inflow Area = 0.072 ac, 48.60% Impervious, Inflow Depth = 2.85" for 10-YR event
Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach #400: Analysis Point #400

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

Inflow Area = 0.095 ac, 14.73% Impervious, Inflow Depth = 1.68" for 10-YR event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.013 af
Outflow = 0.16 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach #500: Analysis Point #500

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

Inflow Area = 0.052 ac, 33.05% Impervious, Inflow Depth = 2.39" for 10-YR event
Inflow = 0.13 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.13 cfs @ 12.09 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: To Southeast Runoff Area=26,874 sf 0.00% Impervious Runoff Depth=2.08"
Flow Length=261' Tc=18.6 min CN=WQ Runoff=0.98 cfs 0.107 af

Subcatchment2S: To East Runoff Area=32,169 sf 11.01% Impervious Runoff Depth=2.44"
Flow Length=216' Tc=10.9 min CN=WQ Runoff=1.65 cfs 0.150 af

Subcatchment3S: To East Runoff Area=3,132 sf 48.60% Impervious Runoff Depth=3.92"
Tc=6.0 min CN=WQ Runoff=0.29 cfs 0.023 af

Subcatchment4S: To North Runoff Area=4,156 sf 14.73% Impervious Runoff Depth=2.56"
Tc=6.0 min CN=WQ Runoff=0.26 cfs 0.020 af

Subcatchment5S: To Northeast Runoff Area=2,251 sf 33.05% Impervious Runoff Depth=3.40"
Tc=6.0 min CN=WQ Runoff=0.19 cfs 0.015 af

Reach #100: Analysis Point #100 Inflow=0.98 cfs 0.107 af
Outflow=0.98 cfs 0.107 af

Reach #200: Analysis Point #200 Inflow=1.65 cfs 0.150 af
Outflow=1.65 cfs 0.150 af

Reach #300: Analysis Point #300 Inflow=0.29 cfs 0.023 af
Outflow=0.29 cfs 0.023 af

Reach #400: Analysis Point #400 Inflow=0.26 cfs 0.020 af
Outflow=0.26 cfs 0.020 af

Reach #500: Analysis Point #500 Inflow=0.19 cfs 0.015 af
Outflow=0.19 cfs 0.015 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.315 af Average Runoff Depth = 2.40"
90.64% Pervious = 1.427 ac 9.36% Impervious = 0.147 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: To Southeast Runoff Area=26,874 sf 0.00% Impervious Runoff Depth=2.95"
Flow Length=261' Tc=18.6 min CN=WQ Runoff=1.44 cfs 0.152 af

Subcatchment2S: To East Runoff Area=32,169 sf 11.01% Impervious Runoff Depth=3.34"
Flow Length=216' Tc=10.9 min CN=WQ Runoff=2.32 cfs 0.206 af

Subcatchment3S: To East Runoff Area=3,132 sf 48.60% Impervious Runoff Depth=4.96"
Tc=6.0 min CN=WQ Runoff=0.37 cfs 0.030 af

Subcatchment4S: To North Runoff Area=4,156 sf 14.73% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=WQ Runoff=0.36 cfs 0.028 af

Subcatchment5S: To Northeast Runoff Area=2,251 sf 33.05% Impervious Runoff Depth=4.41"
Tc=6.0 min CN=WQ Runoff=0.24 cfs 0.019 af

Reach #100: Analysis Point #100 Inflow=1.44 cfs 0.152 af
Outflow=1.44 cfs 0.152 af

Reach #200: Analysis Point #200 Inflow=2.32 cfs 0.206 af
Outflow=2.32 cfs 0.206 af

Reach #300: Analysis Point #300 Inflow=0.37 cfs 0.030 af
Outflow=0.37 cfs 0.030 af

Reach #400: Analysis Point #400 Inflow=0.36 cfs 0.028 af
Outflow=0.36 cfs 0.028 af

Reach #500: Analysis Point #500 Inflow=0.24 cfs 0.019 af
Outflow=0.24 cfs 0.019 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.434 af Average Runoff Depth = 3.31"
90.64% Pervious = 1.427 ac 9.36% Impervious = 0.147 ac

Appendix II

Proposed Conditions Analysis

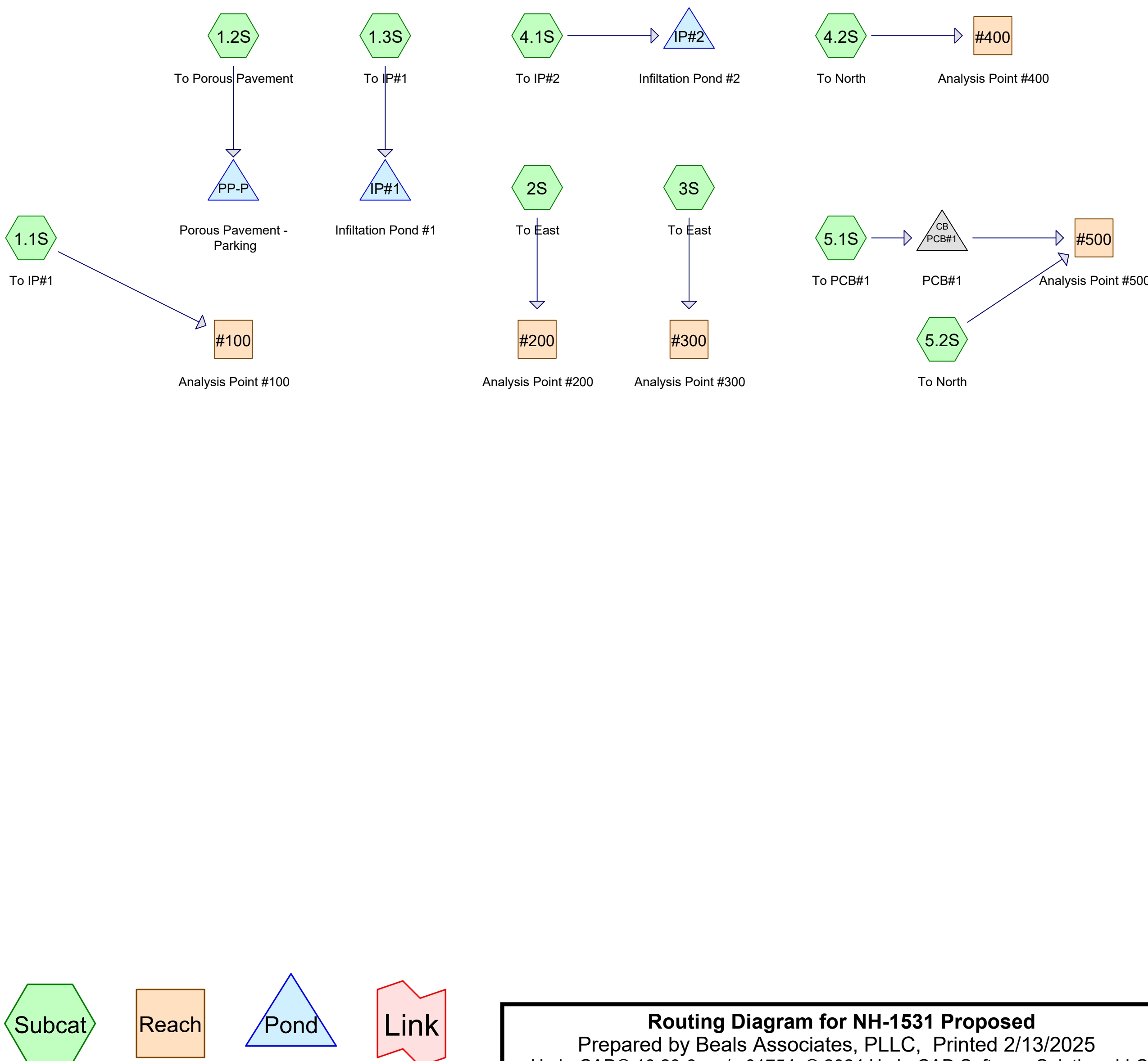
WQV 24-Hour Summary

2-Year 24-Hour Summary

10-Year 24-Hour Complete

25-Year 24-Hour Complete

50-Year 24-Hour Summary



Routing Diagram for NH-1531 Proposed
Prepared by Beals Associates, PLLC, Printed 2/13/2025
HydroCAD® 10.20-6a s/n 01754 © 2024 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.571	61	>75% Grass cover, Good, HSG B (1.1S, 1.2S, 1.3S, 2S, 3S, 4.1S, 4.2S, 5.1S, 5.2S)
0.443	98	Paved parking, HSG B (1.2S, 5.1S)
0.375	98	Roofs, HSG B (1.2S)
0.186	55	Woods, Good, HSG B (1.1S, 2S, 3S, 4.1S)
1.574	**80**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.574	HSG B	1.1S, 1.2S, 1.3S, 2S, 3S, 4.1S, 4.2S, 5.1S, 5.2S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.574		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.1S: To IP#1 Runoff Area=9,277 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=313' Tc=19.6 min CN=WQ Runoff=0.00 cfs 0.000 af

Subcatchment1.2S: To Porous Pavement Runoff Area=37,890 sf 89.79% Impervious Runoff Depth=0.71"
Flow Length=26' Slope=0.0100 '/' Tc=64.6 min CN=WQ Runoff=0.27 cfs 0.051 af

Subcatchment1.3S: To IP#1 Runoff Area=4,313 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=WQ Runoff=0.00 cfs 0.000 af

Subcatchment2S: To East Runoff Area=3,435 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=WQ Runoff=0.00 cfs 0.000 af

Subcatchment3S: To East Runoff Area=500 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=WQ Runoff=0.00 cfs 0.000 af

Subcatchment4.1S: To IP#2 Runoff Area=9,290 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=WQ Runoff=0.00 cfs 0.000 af

Subcatchment4.2S: To North Runoff Area=1,190 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=WQ Runoff=0.00 cfs 0.000 af

Subcatchment5.1S: To PCB#1 Runoff Area=2,507 sf 63.90% Impervious Runoff Depth=0.51"
Tc=6.0 min CN=WQ Runoff=0.03 cfs 0.002 af

Subcatchment5.2S: To North Runoff Area=183 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=WQ Runoff=0.00 cfs 0.000 af

Reach #100: Analysis Point #100 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach #200: Analysis Point #200 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach #300: Analysis Point #300 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach #400: Analysis Point #400 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach #500: Analysis Point #500 Inflow=0.03 cfs 0.002 af
Outflow=0.03 cfs 0.002 af

Pond IP#1: Infiltation Pond #1 Peak Elev=53.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond IP#2: Infiltation Pond #2 Peak Elev=52.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond PCB#1: PCB#1 Peak Elev=47.33' Inflow=0.03 cfs 0.002 af
8.0" Round Culvert n=0.010 L=29.0' S=0.0100 '/' Outflow=0.03 cfs 0.002 af

Pond PP-P: Porous Pavement - Parking Peak Elev=53.00' Storage=0 cf Inflow=0.27 cfs 0.051 af
Outflow=0.27 cfs 0.051 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.054 af Average Runoff Depth = 0.41"
48.06% Pervious = 0.757 ac 51.94% Impervious = 0.818 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.1S: To IP#1 Runoff Area=9,277 sf 0.00% Impervious Runoff Depth=0.38"
Flow Length=313' Tc=19.6 min CN=WQ Runoff=0.04 cfs 0.007 af

Subcatchment1.2S: To Porous Pavement Runoff Area=37,890 sf 89.79% Impervious Runoff Depth=2.72"
Flow Length=26' Slope=0.0100 '/' Tc=64.6 min CN=WQ Runoff=0.95 cfs 0.197 af

Subcatchment1.3S: To IP#1 Runoff Area=4,313 sf 0.00% Impervious Runoff Depth=0.45"
Tc=6.0 min CN=WQ Runoff=0.03 cfs 0.004 af

Subcatchment2S: To East Runoff Area=3,435 sf 0.00% Impervious Runoff Depth=0.33"
Tc=6.0 min CN=WQ Runoff=0.01 cfs 0.002 af

Subcatchment3S: To East Runoff Area=500 sf 0.00% Impervious Runoff Depth=0.33"
Tc=6.0 min CN=WQ Runoff=0.00 cfs 0.000 af

Subcatchment4.1S: To IP#2 Runoff Area=9,290 sf 0.00% Impervious Runoff Depth=0.40"
Tc=6.0 min CN=WQ Runoff=0.06 cfs 0.007 af

Subcatchment4.2S: To North Runoff Area=1,190 sf 0.00% Impervious Runoff Depth=0.45"
Tc=6.0 min CN=WQ Runoff=0.01 cfs 0.001 af

Subcatchment5.1S: To PCB#1 Runoff Area=2,507 sf 63.90% Impervious Runoff Depth=2.06"
Tc=6.0 min CN=WQ Runoff=0.12 cfs 0.010 af

Subcatchment5.2S: To North Runoff Area=183 sf 0.00% Impervious Runoff Depth=0.45"
Tc=6.0 min CN=WQ Runoff=0.00 cfs 0.000 af

Reach #100: Analysis Point #100 Inflow=0.04 cfs 0.007 af
Outflow=0.04 cfs 0.007 af

Reach #200: Analysis Point #200 Inflow=0.01 cfs 0.002 af
Outflow=0.01 cfs 0.002 af

Reach #300: Analysis Point #300 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach #400: Analysis Point #400 Inflow=0.01 cfs 0.001 af
Outflow=0.01 cfs 0.001 af

Reach #500: Analysis Point #500 Inflow=0.12 cfs 0.010 af
Outflow=0.12 cfs 0.010 af

Pond IP#1: Infiltation Pond #1 Peak Elev=53.01' Storage=9 cf Inflow=0.03 cfs 0.004 af
Outflow=0.02 cfs 0.004 af

Pond IP#2: Infiltation Pond #2 Peak Elev=52.14' Storage=60 cf Inflow=0.06 cfs 0.007 af
Outflow=0.01 cfs 0.007 af

Pond PCB#1: PCB#1 Peak Elev=47.42' Inflow=0.12 cfs 0.010 af
8.0" Round Culvert n=0.010 L=29.0' S=0.0100 '/' Outflow=0.12 cfs 0.010 af

Pond PP-P: Porous Pavement - Parking Peak Elev=53.06' Storage=395 cf Inflow=0.95 cfs 0.197 af
Outflow=0.84 cfs 0.197 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.228 af Average Runoff Depth = 1.74"
48.06% Pervious = 0.757 ac 51.94% Impervious = 0.818 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.1S: To IP#1 Runoff Area=9,277 sf 0.00% Impervious Runoff Depth=1.17"
Flow Length=313' Tc=19.6 min CN=WQ Runoff=0.17 cfs 0.021 af

Subcatchment1.2S: To Porous Pavement Runoff Area=37,890 sf 89.79% Impervious Runoff Depth=4.31"
Flow Length=26' Slope=0.0100 '/' Tc=64.6 min CN=WQ Runoff=1.49 cfs 0.313 af

Subcatchment1.3S: To IP#1 Runoff Area=4,313 sf 0.00% Impervious Runoff Depth=1.30"
Tc=6.0 min CN=WQ Runoff=0.14 cfs 0.011 af

Subcatchment2S: To East Runoff Area=3,435 sf 0.00% Impervious Runoff Depth=1.08"
Tc=6.0 min CN=WQ Runoff=0.08 cfs 0.007 af

Subcatchment3S: To East Runoff Area=500 sf 0.00% Impervious Runoff Depth=1.08"
Tc=6.0 min CN=WQ Runoff=0.01 cfs 0.001 af

Subcatchment4.1S: To IP#2 Runoff Area=9,290 sf 0.00% Impervious Runoff Depth=1.20"
Tc=6.0 min CN=WQ Runoff=0.26 cfs 0.021 af

Subcatchment4.2S: To North Runoff Area=1,190 sf 0.00% Impervious Runoff Depth=1.30"
Tc=6.0 min CN=WQ Runoff=0.04 cfs 0.003 af

Subcatchment5.1S: To PCB#1 Runoff Area=2,507 sf 63.90% Impervious Runoff Depth=3.44"
Tc=6.0 min CN=WQ Runoff=0.20 cfs 0.017 af

Subcatchment5.2S: To North Runoff Area=183 sf 0.00% Impervious Runoff Depth=1.30"
Tc=6.0 min CN=WQ Runoff=0.01 cfs 0.000 af

Reach #100: Analysis Point #100 Inflow=0.17 cfs 0.021 af
Outflow=0.17 cfs 0.021 af

Reach #200: Analysis Point #200 Inflow=0.08 cfs 0.007 af
Outflow=0.08 cfs 0.007 af

Reach #300: Analysis Point #300 Inflow=0.01 cfs 0.001 af
Outflow=0.01 cfs 0.001 af

Reach #400: Analysis Point #400 Inflow=0.04 cfs 0.003 af
Outflow=0.04 cfs 0.003 af

Reach #500: Analysis Point #500 Inflow=0.21 cfs 0.017 af
Outflow=0.21 cfs 0.017 af

Pond IP#1: Infiltation Pond #1 Peak Elev=53.07' Storage=97 cf Inflow=0.14 cfs 0.011 af
Outflow=0.04 cfs 0.011 af

Pond IP#2: Infiltation Pond #2 Peak Elev=52.53' Storage=348 cf Inflow=0.26 cfs 0.021 af
Outflow=0.03 cfs 0.021 af

Pond PCB#1: PCB#1 Peak Elev=47.48' Inflow=0.20 cfs 0.017 af
8.0" Round Culvert n=0.010 L=29.0' S=0.0100 '/' Outflow=0.20 cfs 0.017 af

Pond PP-P: Porous Pavement - Parking Peak Elev=53.13' Storage=916 cf Inflow=1.49 cfs 0.313 af
Outflow=1.30 cfs 0.313 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.393 af Average Runoff Depth = 3.00"
48.06% Pervious = 0.757 ac 51.94% Impervious = 0.818 ac

Summary for Subcatchment 1.1S: To IP#1

Runoff = 0.17 cfs @ 12.31 hrs, Volume= 0.021 af, Depth= 1.17"
Routed to Reach #100 : Analysis Point #100

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
3,274	55	Woods, Good, HSG B
6,003	61	>75% Grass cover, Good, HSG B
9,277		Weighted Average
9,277		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	21	0.0070	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.92"
4.4	29	0.0139	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.92"
5.1	248	0.0133	0.81		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	15	0.0267	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.6	313	Total			

Summary for Subcatchment 1.2S: To Porous Pavement

Runoff = 1.49 cfs @ 12.85 hrs, Volume= 0.313 af, Depth= 4.31"
Routed to Pond PP-P : Porous Pavement - Parking

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
0	55	Woods, Good, HSG B
3,869	61	>75% Grass cover, Good, HSG B
17,701	98	Paved parking, HSG B
16,320	98	Roofs, HSG B
37,890		Weighted Average
3,869		10.21% Pervious Area
34,021		89.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	26	0.0100	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.92"
60.0					**Direct Entry, Flow Thru Selects**
64.6	26	Total			

Summary for Subcatchment 1.3S: To IP#1

Runoff = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af, Depth= 1.30"
Routed to Pond IP#1 : Infiltation Pond #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
0	55	Woods, Good, HSG B
4,313	61	>75% Grass cover, Good, HSG B
0	98	Roofs, HSG B
4,313		Weighted Average
4,313		100.00% Pervious Area

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

Summary for Subcatchment 2S: To East

Runoff = 0.08 cfs @ 12.10 hrs, Volume= 0.007 af, Depth= 1.08"
Routed to Reach #200 : Analysis Point #200

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
2,077	55	Woods, Good, HSG B
1,358	61	>75% Grass cover, Good, HSG B
3,435		Weighted Average
3,435		100.00% Pervious Area

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

Summary for Subcatchment 3S: To East

Runoff = 0.01 cfs @ 12.10 hrs, Volume= 0.001 af, Depth= 1.08"
Routed to Reach #300 : Analysis Point #300

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
293	55	Woods, Good, HSG B
207	61	>75% Grass cover, Good, HSG B
500		Weighted Average
500		100.00% Pervious Area

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

Summary for Subcatchment 4.1S: To IP#2

Runoff = 0.26 cfs @ 12.10 hrs, Volume= 0.021 af, Depth= 1.20"
Routed to Pond IP#2 : Infiltation Pond #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
2,456	55	Woods, Good, HSG B
6,834	61	>75% Grass cover, Good, HSG B
0	98	Roofs, HSG B
9,290		Weighted Average
9,290		100.00% Pervious Area

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

Summary for Subcatchment 4.2S: To North

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Depth= 1.30"
Routed to Reach #400 : Analysis Point #400

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
0	55	Woods, Good, HSG B
1,190	61	>75% Grass cover, Good, HSG B
1,190		Weighted Average
1,190		100.00% Pervious Area

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

Summary for Subcatchment 5.1S: To PCB#1

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 3.44"
Routed to Pond PCB#1 : PCB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
1,602	98	Paved parking, HSG B
905	61	>75% Grass cover, Good, HSG B
2,507		Weighted Average
905		36.10% Pervious Area
1,602		63.90% Impervious Area

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

Summary for Subcatchment 5.2S: To North

Runoff = 0.01 cfs @ 12.10 hrs, Volume= 0.000 af, Depth= 1.30"
Routed to Reach #500 : Analysis Point #500

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.89"

Area (sf)	CN	Description
0	55	Woods, Good, HSG B
183	61	>75% Grass cover, Good, HSG B
183		Weighted Average
183		100.00% Pervious Area

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

Summary for Reach #100: Analysis Point #100

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

Inflow Area = 0.213 ac, 0.00% Impervious, Inflow Depth = 1.17" for 10-YR event
Inflow = 0.17 cfs @ 12.31 hrs, Volume= 0.021 af
Outflow = 0.17 cfs @ 12.31 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach #200: Analysis Point #200

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

Inflow Area = 0.079 ac, 0.00% Impervious, Inflow Depth = 1.08" for 10-YR event
Inflow = 0.08 cfs @ 12.10 hrs, Volume= 0.007 af
Outflow = 0.08 cfs @ 12.10 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach #300: Analysis Point #300

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

Inflow Area = 0.011 ac, 0.00% Impervious, Inflow Depth = 1.08" for 10-YR event
Inflow = 0.01 cfs @ 12.10 hrs, Volume= 0.001 af
Outflow = 0.01 cfs @ 12.10 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach #400: Analysis Point #400

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

Inflow Area = 0.027 ac, 0.00% Impervious, Inflow Depth = 1.30" for 10-YR event
Inflow = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af
Outflow = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach #500: Analysis Point #500

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

Inflow Area = 0.062 ac, 59.55% Impervious, Inflow Depth = 3.30" for 10-YR event
Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Pond IP#1: Infiltation Pond #1

Inflow Area = 0.099 ac, 0.00% Impervious, Inflow Depth = 1.30" for 10-YR event
Inflow = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af
Outflow = 0.04 cfs @ 12.52 hrs, Volume= 0.011 af, Atten= 72%, Lag= 25.5 min
Discarded = 0.04 cfs @ 12.52 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 53.07' @ 12.52 hrs Surf.Area= 1,349 sf Storage= 97 cf
Flood Elev= 54.00' Surf.Area= 2,708 sf Storage= 1,938 cf

Plug-Flow detention time= 17.4 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 17.4 min (891.4 - 873.9)

Volume	Invert	Avail.Storage	Storage Description
#1	53.00'	1,938 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
53.00	1,260	0	0	1,260
54.00	2,708	1,938	1,938	2,716

Device	Routing	Invert	Outlet Devices
#1	Discarded	53.00'	**1.210 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 12.52 hrs HW=53.07' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Summary for Pond IP#2: Infiltation Pond #2

Inflow Area = 0.213 ac, 0.00% Impervious, Inflow Depth = 1.20" for 10-YR event
Inflow = 0.26 cfs @ 12.10 hrs, Volume= 0.021 af
Outflow = 0.03 cfs @ 13.71 hrs, Volume= 0.021 af, Atten= 89%, Lag= 96.8 min
Discarded = 0.03 cfs @ 13.71 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 52.53' @ 13.71 hrs Surf.Area= 1,020 sf Storage= 348 cf
Flood Elev= 60.00' Surf.Area= 1,929 sf Storage= 1,050 cf

Plug-Flow detention time= 150.6 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 150.6 min (1,028.8 - 878.2)

Volume	Invert	Avail.Storage	Storage Description
#1	52.00'	1,050 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
52.00	359	0	0	359
53.01	1,929	1,050	1,050	1,933

Device	Routing	Invert	Outlet Devices
#1	Discarded	52.00'	**1.200 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 13.71 hrs HW=52.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Summary for Pond PCB#1: PCB#1

Inflow Area = 0.058 ac, 63.90% Impervious, Inflow Depth = 3.44" for 10-YR event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min
Primary = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af
Routed to Reach #500 : Analysis Point #500

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 47.48' @ 12.09 hrs
Flood Elev= 51.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.23'	**8.0" Round Culvert** L= 29.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.23' / 46.94' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.20 cfs @ 12.09 hrs HW=47.48' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.20 cfs @ 1.70 fps)

Summary for Pond PP-P: Porous Pavement - Parking

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=568)

Inflow Area = 0.870 ac, 89.79% Impervious, Inflow Depth = 4.31" for 10-YR event
Inflow = 1.49 cfs @ 12.85 hrs, Volume= 0.313 af
Outflow = 1.30 cfs @ 13.10 hrs, Volume= 0.313 af, Atten= 13%, Lag= 14.9 min
Discarded = 1.30 cfs @ 13.10 hrs, Volume= 0.313 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 53.13' @ 13.10 hrs Surf.Area= 17,701 sf Storage= 916 cf
Flood Elev= 55.75' Surf.Area= 17,701 sf Storage= 15,828 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.3 min (810.9 - 806.6)

Volume	Invert	Avail.Storage	Storage Description
#1	53.00'	15,828 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
53.00	17,701	0.0	0	0
54.00	17,701	40.0	7,080	7,080
54.25	17,701	40.0	1,770	8,851
54.92	17,701	30.0	3,558	12,408
55.25	17,701	40.0	2,337	14,745
55.59	17,701	18.0	1,083	15,828

Device	Routing	Invert	Outlet Devices
#1	Discarded	53.00'	**1.211 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 52.92'

Discarded OutFlow Max=1.30 cfs @ 13.10 hrs HW=53.13' (Free Discharge)
└─**1=Exfiltration** (Controls 1.30 cfs)

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.1S: To IP#1 Runoff Area=9,277 sf 0.00% Impervious Runoff Depth=1.98"
Flow Length=313' Tc=19.6 min CN=WQ Runoff=0.31 cfs 0.035 af

Subcatchment1.2S: To Porous Pavement Runoff Area=37,890 sf 89.79% Impervious Runoff Depth=5.60"
Flow Length=26' Slope=0.0100 '/' Tc=64.6 min CN=WQ Runoff=1.93 cfs 0.406 af

Subcatchment1.3S: To IP#1 Runoff Area=4,313 sf 0.00% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=WQ Runoff=0.24 cfs 0.018 af

Subcatchment2S: To East Runoff Area=3,435 sf 0.00% Impervious Runoff Depth=1.85"
Tc=6.0 min CN=WQ Runoff=0.16 cfs 0.012 af

Subcatchment3S: To East Runoff Area=500 sf 0.00% Impervious Runoff Depth=1.86"
Tc=6.0 min CN=WQ Runoff=0.02 cfs 0.002 af

Subcatchment4.1S: To IP#2 Runoff Area=9,290 sf 0.00% Impervious Runoff Depth=2.03"
Tc=6.0 min CN=WQ Runoff=0.48 cfs 0.036 af

Subcatchment4.2S: To North Runoff Area=1,190 sf 0.00% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=WQ Runoff=0.07 cfs 0.005 af

Subcatchment5.1S: To PCB#1 Runoff Area=2,507 sf 63.90% Impervious Runoff Depth=4.61"
Tc=6.0 min CN=WQ Runoff=0.27 cfs 0.022 af

Subcatchment5.2S: To North Runoff Area=183 sf 0.00% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=WQ Runoff=0.01 cfs 0.001 af

Reach #100: Analysis Point #100 Inflow=0.31 cfs 0.035 af
Outflow=0.31 cfs 0.035 af

Reach #200: Analysis Point #200 Inflow=0.16 cfs 0.012 af
Outflow=0.16 cfs 0.012 af

Reach #300: Analysis Point #300 Inflow=0.02 cfs 0.002 af
Outflow=0.02 cfs 0.002 af

Reach #400: Analysis Point #400 Inflow=0.07 cfs 0.005 af
Outflow=0.07 cfs 0.005 af

Reach #500: Analysis Point #500 Inflow=0.28 cfs 0.023 af
Outflow=0.28 cfs 0.023 af

Pond IP#1: Infiltation Pond #1 Peak Elev=53.17' Storage=227 cf Inflow=0.24 cfs 0.018 af
Outflow=0.04 cfs 0.018 af

Pond IP#2: Infiltation Pond #2 Peak Elev=52.79' Storage=679 cf Inflow=0.48 cfs 0.036 af
Outflow=0.04 cfs 0.036 af

Pond PCB#1: PCB#1 Peak Elev=47.52' Inflow=0.27 cfs 0.022 af
8.0" Round Culvert n=0.010 L=29.0' S=0.0100 '/' Outflow=0.27 cfs 0.022 af

Pond PP-P: Porous Pavement - Parking Peak Elev=53.19' Storage=1,342 cf Inflow=1.93 cfs 0.406 af
Outflow=1.67 cfs 0.406 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.537 af Average Runoff Depth = 4.09"
48.06% Pervious = 0.757 ac 51.94% Impervious = 0.818 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.1S: To IP#1 Runoff Area=9,277 sf 0.00% Impervious Runoff Depth=2.84"
Flow Length=313' Tc=19.6 min CN=WQ Runoff=0.46 cfs 0.050 af

Subcatchment1.2S: To Porous Pavement Runoff Area=37,890 sf 89.79% Impervious Runoff Depth=6.81"
Flow Length=26' Slope=0.0100 '/' Tc=64.6 min CN=WQ Runoff=2.34 cfs 0.494 af

Subcatchment1.3S: To IP#1 Runoff Area=4,313 sf 0.00% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=WQ Runoff=0.35 cfs 0.025 af

Subcatchment2S: To East Runoff Area=3,435 sf 0.00% Impervious Runoff Depth=2.68"
Tc=6.0 min CN=WQ Runoff=0.24 cfs 0.018 af

Subcatchment3S: To East Runoff Area=500 sf 0.00% Impervious Runoff Depth=2.69"
Tc=6.0 min CN=WQ Runoff=0.03 cfs 0.003 af

Subcatchment4.1S: To IP#2 Runoff Area=9,290 sf 0.00% Impervious Runoff Depth=2.89"
Tc=6.0 min CN=WQ Runoff=0.70 cfs 0.051 af

Subcatchment4.2S: To North Runoff Area=1,190 sf 0.00% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=WQ Runoff=0.10 cfs 0.007 af

Subcatchment5.1S: To PCB#1 Runoff Area=2,507 sf 63.90% Impervious Runoff Depth=5.73"
Tc=6.0 min CN=WQ Runoff=0.34 cfs 0.027 af

Subcatchment5.2S: To North Runoff Area=183 sf 0.00% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=WQ Runoff=0.01 cfs 0.001 af

Reach #100: Analysis Point #100 Inflow=0.46 cfs 0.050 af
Outflow=0.46 cfs 0.050 af

Reach #200: Analysis Point #200 Inflow=0.24 cfs 0.018 af
Outflow=0.24 cfs 0.018 af

Reach #300: Analysis Point #300 Inflow=0.03 cfs 0.003 af
Outflow=0.03 cfs 0.003 af

Reach #400: Analysis Point #400 Inflow=0.10 cfs 0.007 af
Outflow=0.10 cfs 0.007 af

Reach #500: Analysis Point #500 Inflow=0.36 cfs 0.029 af
Outflow=0.36 cfs 0.029 af

Pond IP#1: Infiltation Pond #1 Peak Elev=53.27' Storage=377 cf Inflow=0.35 cfs 0.025 af
Outflow=0.04 cfs 0.025 af

Pond IP#2: Infiltation Pond #2 Peak Elev=53.01' Storage=1,047 cf Inflow=0.70 cfs 0.051 af
Outflow=0.05 cfs 0.051 af

Pond PCB#1: PCB#1 Peak Elev=47.56' Inflow=0.34 cfs 0.027 af
8.0" Round Culvert n=0.010 L=29.0' S=0.0100 '/' Outflow=0.34 cfs 0.027 af

Pond PP-P: Porous Pavement - Parking Peak Elev=53.25' Storage=1,745 cf Inflow=2.34 cfs 0.494 af
Outflow=2.03 cfs 0.494 af

Total Runoff Area = 1.574 ac Runoff Volume = 0.676 af Average Runoff Depth = 5.16"
48.06% Pervious = 0.757 ac 51.94% Impervious = 0.818 ac

Appendix III

Charts, Graphs, and Calculations

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	New Hampshire
Location	New Hampshire, United States
Latitude	42.977 degrees North
Longitude	70.958 degrees West
Elevation	10 feet
Date/Time	Mon Nov 18 2024 14:30:25 GMT-0500 (Eastern Standard Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day
1yr	0.26	0.40	0.50	0.66	0.82	1.04	**1yr**	0.71	0.99	1.22	1.57	2.04	2.68	2.89	**1yr**	2.37	2.78	3.19	3.90
2yr	0.32	0.50	0.62	0.82	1.02	1.30	**2yr**	0.88	1.18	1.52	1.94	2.49	3.21	3.55	**2yr**	2.84	3.42	3.93	4.66
5yr	0.38	0.58	0.73	0.98	1.26	1.62	**5yr**	1.08	1.47	1.90	2.44	3.15	4.08	4.57	**5yr**	3.61	4.40	5.03	5.96
10yr	0.42	0.66	0.83	1.13	1.46	1.91	**10yr**	1.26	1.73	2.25	2.92	3.78	4.89	5.54	**10yr**	4.33	5.32	6.06	7.17
25yr	0.49	0.77	0.98	1.35	1.80	2.37	**25yr**	1.55	2.16	2.81	3.67	4.79	6.23	7.13	**25yr**	5.51	6.86	7.76	9.18
50yr	0.55	0.88	1.12	1.57	2.11	2.80	**50yr**	1.82	2.55	3.34	4.39	5.74	7.48	8.64	**50yr**	6.62	8.31	9.36	11.07
100yr	0.61	0.99	1.27	1.81	2.47	3.32	**100yr**	2.13	3.01	3.98	5.25	6.88	8.98	10.47	**100yr**	7.95	10.07	11.30	13.35
200yr	0.69	1.13	1.46	2.10	2.89	3.93	**200yr**	2.50	3.56	4.72	6.26	8.24	10.79	12.69	**200yr**	9.55	12.20	13.63	16.11
500yr	0.82	1.34	1.75	2.55	3.58	4.91	**500yr**	3.09	4.45	5.93	7.92	10.47	13.76	16.37	**500yr**	12.18	15.74	17.48	20.68

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day
1yr	0.24	0.37	0.45	0.61	0.75	0.89	**1yr**	0.65	0.87	0.96	1.24	1.52	2.29	2.53	**1yr**	2.02	2.44	2.89	3.45
2yr	0.32	0.49	0.60	0.82	1.01	1.19	**2yr**	0.87	1.16	1.37	1.81	2.33	3.11	3.47	**2yr**	2.75	3.33	3.83	4.54
5yr	0.36	0.55	0.68	0.94	1.19	1.42	**5yr**	1.03	1.39	1.62	2.12	2.73	3.79	4.22	**5yr**	3.35	4.06	4.66	5.60
10yr	0.40	0.61	0.75	1.05	1.36	1.63	**10yr**	1.18	1.59	1.82	2.40	3.07	4.35	4.88	**10yr**	3.85	4.70	5.39	6.53
25yr	0.46	0.69	0.86	1.23	1.62	1.96	**25yr**	1.40	1.91	2.12	2.78	3.58	4.94	5.92	**25yr**	4.37	5.69	6.53	7.99
50yr	0.51	0.77	0.96	1.38	1.86	2.25	**50yr**	1.60	2.20	2.36	3.12	4.02	5.58	6.83	**50yr**	4.94	6.57	7.53	9.32
100yr	0.57	0.86	1.08	1.56	2.14	2.59	**100yr**	1.85	2.53	2.65	3.49	4.49	6.30	7.86	**100yr**	5.57	7.56	8.70	10.85
200yr	0.64	0.96	1.22	1.76	2.46	2.97	**200yr**	2.12	2.91	2.95	3.90	5.02	7.07	9.73	**200yr**	6.25	9.36	10.05	12.64
500yr	0.75	1.12	1.44	2.09	2.97	3.60	**500yr**	2.56	3.52	3.41	4.50	5.85	8.19	11.93	**500yr**	7.25	11.47	12.15	15.45

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day
1yr	0.28	0.44	0.53	0.72	0.88	1.08	**1yr**	0.76	1.05	1.26	1.70	2.16	2.95	3.13	**1yr**	2.61	3.01	3.55	4.25
2yr	0.33	0.51	0.63	0.85	1.05	1.26	**2yr**	0.91	1.23	1.48	1.94	2.48	3.38	3.67	**2yr**	2.99	3.53	4.06	4.84
5yr	0.40	0.62	0.77	1.06	1.34	1.61	**5yr**	1.16	1.58	1.87	2.47	3.16	4.39	4.95	**5yr**	3.88	4.76	5.43	6.33
10yr	0.48	0.73	0.91	1.27	1.64	1.97	**10yr**	1.41	1.93	2.26	3.01	3.79	5.46	6.22	**10yr**	4.84	5.98	6.82	7.85
25yr	0.59	0.90	1.12	1.59	2.10	2.56	**25yr**	1.81	2.50	2.92	3.90	4.85	7.58	8.46	**25yr**	6.71	8.14	9.17	10.45
50yr	0.69	1.05	1.31	1.88	2.53	3.11	**50yr**	2.19	3.04	3.56	4.75	5.87	9.50	10.69	**50yr**	8.41	10.28	11.52	12.98
100yr	0.82	1.23	1.54	2.23	3.06	3.78	**100yr**	2.64	3.69	4.33	5.80	7.10	11.92	13.51	**100yr**	10.55	12.99	14.45	16.16
200yr	0.96	1.44	1.83	2.65	3.69	4.61	**200yr**	3.18	4.50	5.29	7.07	8.58	15.00	15.97	**200yr**	13.27	15.36	18.16	20.10
500yr	1.19	1.78	2.28	3.32	4.72	5.96	**500yr**	4.07	5.83	6.87	9.23	11.05	20.35	21.49	**500yr**	18.01	20.67	24.53	26.86

Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis

Best Management Practice (BMP) removal efficiencies for pollutant loading analysis for total suspended solids (TSS), total nitrogen (TN), and total phosphorus (TP) are presented in the table below. These removal efficiencies were developed by reviewing various literature sources and using best professional judgment based on literature values and general expectation of how values for different BMPS should relate to one another. The intent is to update this information and add BMPs and removal efficiencies for other parameters as more information/data becomes available in the future.

NHDES will consider other BMP removal efficiencies if sufficient documentation is provided.

Please note that all BMPs must be designed in accordance with the specifications in the Alteration of Terrain (AoT) Program Administrative Rules (Env-Wq 1500). If BMPs are not designed in accordance with the AoT Rules, NHDES may require lower removal efficiencies to be used in the analysis.

BMP in Series: When BMPs are placed in series, the BMP with the highest removal efficiency shall be the efficiency used in the model for computing annual loadings. Adding efficiencies together is generally not allowed because removals typically decrease rapidly with decreasing influent concentration and, in the case of primary BMPs (i.e., stormwater ponds, infiltration and filtering practices), pre-treatment is usually part of the design and is therefore, most likely already accounted for in the efficiencies cited for these BMPs.

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%

GOVE ENVIRONMENTAL SERVICES, INC

SITE-SPECIFIC SOIL SURVEY REPORT
For
112 Front Street, Exeter, NH
By
GES, Inc.
Project # 2024085
Date: 11-12-2024

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 11-12-2024; 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 a broad outwash sand plain that is entirely developed. The site is located in the urban area of Exeter and is virtually surrounded by housing. There is building and pavement adjacent Front Street, but the rear of the lot is undeveloped and natural. There are a few trees, but mostly mowed field.

3. DATE SOIL MAP PRODUCED

Date(s) of on-site field work: 9-11-2024 (Included test pits and wetland determination.)

Test pits recorded by: James Gove, CSS#004

4. GEOGRAPHIC LOCATION AND SIZE OF SITE

City or town where soil mapping was conducted: Exeter

Location: Tax Map 73, Lot 14

Size of area: Approximately 1.6 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? Yes

If no, what was the purpose of the map? n/a

Who was the map prepared for? Beals Associates

6. SOIL IDENTIFICATION LEGEND

Map Unit Symbol	Map Unit Name	HISS Symbol	Hydrologic Soil Group
313	Deerfield, loamy sand	311	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: 313

CORRELATED SOIL SERIES: Deerfield

LANDSCAPE SETTING: Flat plain

CHARACTERISTIC SURFACE FEATURES: Flat, mowed

DRAINAGE CLASS: Moderately well drained

PARENT MATERIAL: Glaciofluvial (Outwash Sands)

NATURE OF DISSIMILAR INCLUSIONS: Windsor and Udorthents

ESTIMATED PERCENTAGE OF DISSIMILAR INCLUSIONS: 5%

8 Continental Dr Unit H, Exeter, NH 03833-7507
Ph (603) 778 0644 / *Fax* (603) 778 0654
www.gesinc.biz
info@gesinc.biz

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 D1 is representative of all four pits dug on the site.

Test Pit No.	**D1**	Soils Series:	Deerfield
ESHWT::	25”	Landscape:	Flat
Termination @	No	Slope:	A
Refusal:	No	Parent Material:	Outwash
Obs. Water:	None	Hydrologic Soil Group:	B

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-15”	10YR3/3	Loamy Sand	granular-friable-none
B 15-25”	10YR4/6	Loamy Sand	massive-friable-none
C 25-60”	2.5Y5/3	Sandy	single grain- loose-

30% Redox 5YR5/6, ESHWT =25”, no OBSWT, apparent water table, no lithic contact, less than 5% coarse fragments.

699 Urban Land – impervious surfaces - buildings, pavement.

8. RESPONSIBLE SOIL SCIENTIST

Name: James Gove

Certified Soil Scientist Number: 004

9. OTHER DISTINGUISHING FEATURES OF SITE

Must have been in agriculture due to the deep plow layer of the surface horizon.

TEST PIT DATA

Project 112 Front Street, Exeter, NH
Client John O'Neil
GES Project No. 2024085
09-11-2024 James Gove, CSS#004, Aspynn Kutz

Test Pit No.	**D1**	Soils Series:	Deerfield
ESHWT::	25"	Landscape:	Flat
Termination @	No	Slope:	A
Refusal:	No	Parent Material:	Outwash
Obs. Water:	None	Hydrologic Soil Group:	B

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-15"	10YR3/3	Loamy Sand	granular-friable-none
B 15-25"	10YR4/6	Loamy Sand	massive-friable-none
C 25-60"	2.5Y5/3	Sandy	single grain- loose-30% Redox

Test Pit No.	**D2**	Soils Series:	Deerfield
ESHWT::	24"	Landscape:	Falt
Termination @	No	Slope:	A
Refusal:	No	Parent Material:	Outwash
Obs. Water:	None	Hydrologic Soil Group:	B

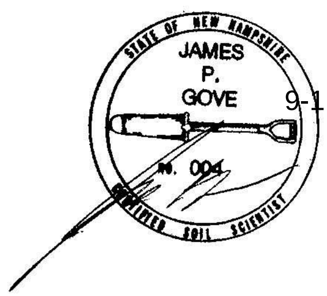
Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-8"	10YR3/2	Loamy Sand	granular-friable-none
B 8-24"	10YR5/6	Loamy Sand	massive-friable-none
C 24-66"	2.5Y5/2	Sandy	single grain- loose-20% Redox

Test Pit No.	**D3**	Soils Series:	Deerfield
ESHWT::	31"	Landscape:	Flat
Termination @	No	Slope:	A
Refusal:	No	Parent Material:	Outwash
Obs. Water:	None	Hydrologic Soil Group:	B

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-10"	10YR3/2	Loamy Sand	granular-friable-none
B 10-31"	10YR4/6	Loamy Sand	massive-friable-none
C 31-60"	2.5Y5/3	Sandy	single grain- loose-10% Redox

Test Pit No.	**D4**	Soils Series:	Deerfield
ESHWT::	38”	Landscape:	Flat
Termination @	No	Slope:	A
Refusal:	No	Parent Material:	Outwash
Obs. Water:	None	Hydrologic Soil Group:	B

Horizon	Color (Munsell)	Texture	Structure-Consistence-Redox
A 0-8”	10YR3/3	Loamy Sand	granular-friable-none
B 8-38”	10YR4/4	Loamy Sand	massive-friable-none
C 38-120”	2.5Y5/3	Sandy	single grain- loose-10% Redox


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

9-11-24

Amoozemeter Data Sheet

Site: 112 Front Street, Exeter , NH
GES Project: 2024085
Date: 11/15/2024
Performed by: Brenden Quigley

Air Temp: 60 F
Water Source: Tap

Test Location: D2-1

Soil Series:
Soil Moisture Content %:
Horizon: 27 cm
Outflow Chamber(s): Small (1on)___ ($20.0 cm^2$) Both (2on) X ($105.0 cm^2$)

Water Depth in Hole
Initial: 15.1 cm
Final: 15 cm

Minutes	cm dropped	Chamber	min/hr	Q	H (cm)	A	Ksat (cm/hr)	Ksat (in/hr)
1.00	0.8	105	0.01667	5038.992202	15	0.001056	5.3212	2.0950
2.00	0.9	105	0.01667	5668.866227	15	0.001056	5.9863	2.3568
3.00	0.6	105	0.01667	3779.244151	15	0.001056	3.9909	1.5712
4.00	0.7	105	0.01667	4409.118176	15	0.001056	4.6560	1.8331
5.00	0.8	105	0.01667	5038.992202	15	0.001056	5.3212	2.0950
6.00	0.7	105	0.01667	4409.118176	15	0.001056	4.6560	1.8331
						Mean Ksat	4.9886	1.9640
						Std Deviation	0.8587	0.3381

D2-1
1 min

Test Location: D2-2

Soil Series:
Soil Moisture Content %:
Horizon: 31 cm
Outflow Chamber(s): Small (1on)___ (20.0cm^2) Both (2on) X (105.0cm^2)

Water Depth in Hole
Initial: 15.1 cm
Final: 15.3 cm

Minutes	cm dropped	Chamber	min/hr	Q	H (cm)	A	Ksat (cm/hr)	Ksat (in/hr)
1.00	1.1	105	0.01667	6928.614277	15	0.001056	7.3166	2.8806
2.00	1	105	0.01667	6298.740252	15	0.001056	6.6515	2.6187
3.00	1	105	0.01667	6298.740252	15	0.001056	6.6515	2.6187
4.00	1	105	0.01667	6298.740252	15	0.001056	6.6515	2.6187
5.00	1.1	105	0.01667	6928.614277	15	0.001056	7.3166	2.8806
						Mean Ksat	6.8178	2.6842
						Std Deviation	0.3326	0.1309

D2-2
1min

Test Location: D2-3

Soil Series:
Soil Moisture Content %:
Horizon: 28 cm
Outflow Chamber(s): Small (1on)___ (20.0cm^2) Both (2on) X (105.0cm^2)

Water Depth in Hole
Initial: 15.2 cm
Final: 15.3 cm

Minutes	cm dropped	Chamber	min/hr	Q	H (cm)	A	Ksat (cm/hr)	Ksat (in/hr)
1.00	1.1	105	0.01667	6928.614277	15	0.001056	7.3166	2.8806
2.00	1	105	0.01667	6298.740252	15	0.001056	6.6515	2.6187
3.00	0.9	105	0.01667	5668.866227	15	0.001056	5.9863	2.3568
4.00	1	105	0.01667	6298.740252	15	0.001056	6.6515	2.6187
5.00	0.9	105	0.01667	5668.866227	15	0.001056	5.9863	2.3568
						Mean Ksat	6.6515	2.6187
						Std Deviation	0.5431	0.2138

D2-3
1min
5

D4-1
1min
5

Test Location: D4-1

Soil Series:
Soil Moisture Content %:
Horizon: 48 cm
Outflow Chamber(s): Small (1on)___ (20.0cm^2)   Both (2on) X (105.0cm^2)

Water Depth in Hole
Initial: 15 cm
Final: 14.9 cm

Minutes	cm dropped	Chamber	min/hr	Q	H (cm)	A	Ksat (cm/hr)	Ksat (in/hr)
1.00	1.3	105	0.01667	8188.362328	15	0.001056	8.6469	3.4043
2.00	1.4	105	0.01667	8818.236353	15	0.001056	9.3121	3.6662
3.00	1.4	105	0.01667	8818.236353	15	0.001056	9.3121	3.6662
4.00	1.4	105	0.01667	8818.236353	15	0.001056	9.3121	3.6662
5.00	1.4	105	0.01667	8818.236353	15	0.001056	9.3121	3.6662
						Mean Ksat	9.1790	3.6138
						Std Deviation	0.2975	0.1171

D4-2
1min
5

Test Location: D4-2

Soil Series:
Soil Moisture Content %:
Horizon: 48 cm
Outflow Chamber(s): Small (1on)___ (20.0cm^2)   Both (2on) X (105.0cm^2)

Water Depth in Hole
Initial: 14.8 cm
Final: 14.9 cm

Minutes	cm dropped	Chamber	min/hr	Q	H (cm)	A	Ksat (cm/hr)	Ksat (in/hr)
1.00	2.4	105	0.01667	15116.9766	15	0.001056	15.9635	6.2849
2.00	2.5	105	0.01667	15746.85063	15	0.001056	16.6287	6.5467
3.00	2.5	105	0.01667	15746.85063	15	0.001056	16.6287	6.5467
4.00	2.5	105	0.01667	15746.85063	15	0.001056	16.6287	6.5467
5.00	2.4	105	0.01667	15116.9766	15	0.001056	15.9635	6.2849
						Mean Ksat	16.4624	6.4813
						Std Deviation	0.3326	0.1309

Test Location: D4-3

Soil Series:
Soil Moisture Content %:
Horizon: 49 cm
Outflow Chamber(s): Small (1on)__ (20.0cm^2) Both (2on) X (105.0cm^2)

Water Depth in Hole
Initial: 15.3 cm
Final: 15.5 cm

Minutes	cm dropped	Chamber	min/hr	Q	H (cm)	A	Ksat (cm/hr)	Ksat (in/hr)
1.00	2	105	0.01667	12597.4805	15	0.001056	13.3029	5.2374
2.00	2	105	0.01667	12597.4805	15	0.001056	13.3029	5.2374
3.00	2	105	0.01667	12597.4805	15	0.001056	13.3029	5.2374
4.00	2	105	0.01667	12597.4805	15	0.001056	13.3029	5.2374
5.00	1.9	105	0.01667	11967.60648	15	0.001056	12.6378	4.9755
						Mean Ksat	13.3029	5.2374
						Std Deviation	0.0000	0.0000

Infiltration Rate Calculations

Prepared For:
112 Front Street, LLC
Residential Development

Prepated By:
Beals Associates, PLLC
70 Portsmouth Avenue
Stratham, NH 03885

Project: NH-1531
112 Front Street, Exeter, NH

Test Location D2	**Ksat (in/hr)**
Test 1	1.9640
Test 2	2.6842
Test 3	2.6187
Average =	2.4223
Design (Average x 0.5)	**1.2112**

Test Location D4	**Ksat (in/hr)**
Test 1	3.6138
Test 2	6.4813
Test 3	5.2374
Average =	5.1108
Design (Average x 0.5)	**2.5554**

STORMWATER MANAGEMENT / BMP INSPECTION & MAINTENANCE PLAN

112 FRONT STREET, LLC
RESIDENTIAL DEVELOPMENT

NH-1531
December 2024

Proper construction, inspections, maintenance, and repairs are key elements in maintaining a successful stormwater management program on a developed property. Routine inspections ensure permit compliance and reduce the potential for deterioration of infrastructure or reduced water quality.

For the purpose of this Stormwater Management Program, a significant rainfall event is considered an event of three (3) inches or more in a 24-hour period or at least 0.5 inches in a one-hour period. During construction, inspections should be conducted every two weeks or after a 0.25” rainfall event in a 24-hour period per the EPA NPDES Phase II SWPPP, until the entire disturbed area is fully restabilized. Upon full stabilization of the project and filing of an NOI, inspections need only be conducted after a significant rainfall event as described above or as described in the maintenance guidelines below.

During construction activities 112 Front Street, LLC with an address of 42J Dover Point Road, Dover, NH 03820 and a phone of (978) 375-3153 or their heirs and/or assigns, shall be responsible for inspections and maintenance activities for the above project site. 112 Front Street, LLC shall be responsible for *ongoing inspection and maintenance* of the BMP drainage structures and treatment areas.

The owner is responsible to ensure that any subsequent owner has copies of the Log Form and Annual Report records and fully understands the responsibilities of this plan. The grantor owner(s) will ensure this document is provided to the grantee owner(s) by duplicating the Ownership Responsibility Sheet which is found toward the back of this document, which will be maintained with the Inspection & Maintenance Logs and provided to the Town of Exeter upon request.

Documentation:
A maintenance log (i.e., report) will be kept summarizing inspections, maintenance, and any corrective actions taken. The log will include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task (see Stormwater System Operation and Maintenance Plan Inspection & Maintenance Manual Checklist attached). If a maintenance task requires the clean-out of any sediments or debris, the location where the sediment and debris was disposed after removal shall be indicated.

Best Management Practices (BMP) Maintenance Guidelines
The following provides a list of recommendations and guidelines for managing the Stormwater facilities. The cited areas, facilities, and measures will be inspected and the identified deficiencies will be corrected. Clean-out must include the removal and legal disposal of any accumulated sediments and debris.

DURING CONSTRUCTION

1. Stabilized Construction Entrance

A temporary gravel construction entrance provides an area where mud can be dislodged from tires before the vehicle leaves the construction site to reduce the amount of mud and sediment transported onto paved municipal and state roads. The stone size for the pad should be between 1 and 2-inch coarse aggregate, and the pad itself constructed to a minimum length of 50' for the full width of the access road. The aggregate should be placed at least six inches thick. A plan view and profile are shown on the Sediment and Erosion Control Detail Plan.

2. Dust Control

Dust will be controlled on the site using multiple BMPs. Mulching and temporary seeding will be the first line of protection to be utilized where problems occur. If dust problems are not solved by these applications, the use of water and calcium chloride can be applied. Calcium chloride will be applied at a rate that will keep the surface moist but not cause pollution.

3. Temporary Erosion and Sediment Control Devices / Barriers

Function – Temporary erosion and sediment control devices are utilized during construction period to divert, store and filter stormwater from non-stabilized surfaces. These devices include, but are not limited to: silt fences, hay bales, filters, sediment traps, stone check dams, mulch and erosion control blankets.

Maintenance – Temporary erosion and sediment control devices shall be inspected and maintained on a weekly basis and following a significant storm event (>0.5-inch rain event) throughout the construction period to ensure that they still have integrity and are not allowing sediment to pass. Sediment build-up in swales will be removed if it is deeper than six inches. Sediment is to be removed from sumps in the catch basin semi-annually. Refer to the Site Plan drawings for the maintenance of temporary erosion and sediment control devices.

4. Invasive Species

THE NH COMMISSIONER OF AGRICULTURE PROHIBITS THE COLLECTION, POSSESSION, IMPORTATION, TRANSPORTATION, SALE, PROPAGATION, TRANSPLANTATION, OR CULTIVATION OF PLANTS BANNED BY NH LAW RSA 430:53 AND NH CODE ADMINISTRATIVE RULES AGR 3800. THE PROJECT SHALL MEET ALL REQUIREMENTS AND THE INTENT OF. RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES.

POST CONSTRUCTION / LONG TERM MAINTENANCE:

5. Vegetated Areas

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

6. Roadways and Paved Surfaces

Clear accumulations of winter sand along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader.

7. Winter Maintenance

The plowing and application of de-icing materials shall be conducted by a certified Green Snow Pro contractor trained in best management practices for road salt/deicing at the expense of the owner. No snow dump shall be allowed onsite. In the event that snow storage areas are inundated in any given winter, snow will be trucked offsite and disposed of in a legal fashion.

8. Stormwater Infiltration Facilities

- Inspect all upstream pre-treatment measures for sediment and floatables accumulation. Remove and dispose of sediments or debris as needed.
- The infiltration facility will be inspected within the first three months after construction.
- After the initial three months, the infiltration facility will be inspected 2 times per year to ensure that the filter is draining within 72 hours of a rain event equivalent to 1/2” or more.
- Failure to drain in 72 hours will require part or all of the top 3 inches of the infiltration area to be removed and replaced with new like material. If the infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore infiltration function.
- Vegetated infiltration ponds or swales will be mowed at least annually or otherwise maintained to control the growth of woody vegetation and to control the accumulation of

sediments in order to maintain the water quality volume. Any woody vegetation or accumulated sediment must be removed.

- The facilities will be inspected after major storms and any identified deficiencies will be corrected.

9. Porous Pavement

- Check for standing water remaining on the surface of the pavement after a precipitation event within 30 minutes.
- 1-2 times per year, use a vacuum sweeper to remove sediment from porous pavement. Use of a power washer or compressed air blower at an angle of 30 degrees or less can be effective.
- As part of vacuuming, inspect adjacent vegetated areas to verify no signs of erosion and run-on to permeable pavement. Repair or replace any damaged structural parts if required.
- Check for debris accumulation, particularly in the winter.
- Loose debris such as leaves or trash can be removed using a power/leaf blower or gutter broom.
- Fall and spring cleanup should be accompanied by pavement vacuuming.
- Accumulation of sediment and organic debris on the pavement surface.
- Repairs to damaged pavement should be repaired as they are identified.

10. Invasive Species

Background

Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- Becoming weedy and overgrown;
- Killing established shade trees;
- Obstructing pipes and drainage systems;
- Forming dense beds in water;
- Lowering water levels in lakes, streams, and wetlands;
- Destroying natural communities;
- Promoting erosion on stream banks and hillsides; and
- Resisting control except by hazardous chemical.

During maintenance activities, check for the presence of invasive plants and remove in a safe manner. They should be controlled as described on the following fact sheet prepared by the University of New Hampshire Cooperative Extension entitled Methods for Disposing Non-Native Invasive Plant dated January 2010.

In the event that invasive species are noticed growing in any of the stormwater management practices, the invasive vegetation shall be removed completely to include root matter and disposed of properly. Prior to disposal, the vegetation shall be placed on and completely cover with a plastic tarp for a period of two – three weeks until plants are completely dead. If necessary or to expedite the process, spray only the invasive vegetation and roots with a systemic nonselective herbicide after placement on the tarp (to prevent chemical migration) and then cover.

Annual Report

Description: The owner is responsible to keep an **Inspection & Maintenance Activity Log** that documents inspection, maintenance, and repairs to the storm water management system, and a **Deicing Log** to track the amount and type of deicing material applied to the site. The original owner is responsible to ensure that any subsequent owner (s) have copies of the Stormwater System Operation and Maintenance Plan & Inspection and Maintenance Manual, copies of past logs and check lists. This includes any owner association for potential condominium conversion of the property. The Annual Report will be prepared and submitted to the Town of Exeter DPW upon request.

Disposal Requirements

Disposal of debris, trash, sediment, and other waste materials should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.

STORMWATER SYSTEM OPERATION AND MAINTENANCE PLAN

Inspection & Maintenance Manual Checklist
Residential Development
112 Front Street, LLC
112 Front Street, Exeter, NH

BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
Stabilized Construction Entrance	Weekly	Inspect adjacent roadway for sediment tracking Inspect stone for sediment accumulation	Sweep adjacent roadways as soon as sediment is tracked Top dress with additional stone when necessary to prevent tracking
Sediment Control Devices / Barriers	Weekly	Inspect accumulated sediment level, rips, and tears	Repair or replace damaged lengths Remove and dispose of accumulated sediment once level reaches 1/3 of barrier height
Pavement Sweeping	Spring and Fall	Removal of sand and litter from impervious areas	N/A
Litter/Trash Removal	Routinely	Inspect dumpsters, outdoor waste receptacles area, and yard areas, as well as ponds and swale areas.	Site will be free of litter/trash.
Deicing Agents	N/A	N/A	Use salt as the primary agent for roadway safety during winter.
Landscaping	Maintained as required and mulched each Spring	N/A	Trash/debris and weed removal
Infiltration Basin	Spring and Fall and after every 2.5” of rain or greater in a 24-hour period	Monitoring and evaluation of wetland vegetation, inspection of sediment on pond surface, inlet/outlet and appurtenance structure	Remove dead & diseased vegetation along with all debris; take corrective measures, reseed and repair inlet/outlet structures and

		evaluation. 72-Hour drawdown time evaluation and vegetation evaluation. Photograph each infiltration basin.	appurtenances if required. Mow embankments and remove woody vegetation. Restore infiltration by removing accumulated sediments and reconstruction of the infiltration basin as necessary.
Porous Pavement	Spring and Fall	Check for standing water. Check for damaged pavement.	Remove debris from porous pavement and adjacent areas. Vacuum sweep pavement. Repair damaged pavement.
Annual Report	1 time per year	Submit Annual Report to Town of Exeter Inspector upon request	

Inspection Notes:

STORMWATER SYSTEM OPERATION AND MAINTENANCE PLAN

Inspection & Maintenance Manual Log Form

Residential Development

112 Front Street, LLC

112 Front Street, Exeter, NH

BMP / System	Date Inspected	Inspected By	Cleaning/Repair (List Items & Comments)	Date Repaired	Repairs Performed By

INSPECTION CHECKLIST AND MAINTENANCE GUIDANCE

INFILTRATION POND - INSPECTION CHECKLIST

Location: ____

Owner Change Since Last Inspection? Y N

Owner Name, Address, Phone: ____

Date:__________Time:_____________Site Conditions: ____________________________

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
Sand Filter Inspection List		
Complete drainage of the filter in about 40 hours after a rain event?		
Clogging of filter surface?		
Clogging of inlet/outlet structures?		
Clogging of filter fabric?		
Clear of debris and functional?		
Leaks or seeps in filter?		
Obstructions of spillway(s)?		
Animal burrows in filter?		
Sediment accumulation in filter bed (less than 50% is acceptable)?		
Cracking, spalling, bulging or deterioration of concrete?		
Erosion in area draining to sand filter?		
Erosion around inlets, filter bed, or outlets?		
Pipes and other structures in good		
Undesirable vegetation growth?		
Other (describe)?		
Hazards		
Have there been complaints from residents?		
Public hazards noted?		

If any of the above inspection items are **UNSATISFACTORY**, list corrective actions and the corresponding completion dates below:

Corrective Action Needed	Due Date

Inspector Signature:___________________________

Inspector Name (printed):______________________

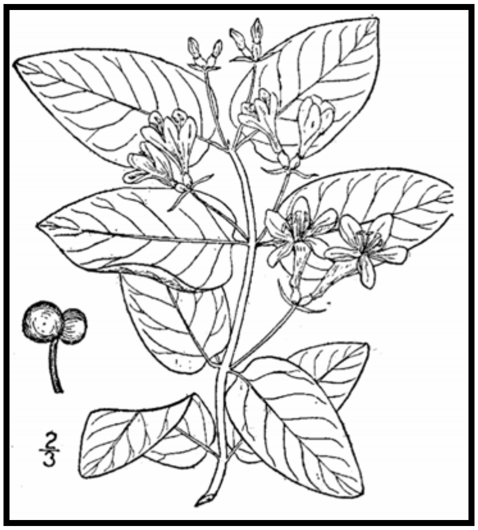
Date:_______________________

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:				

Methods for Disposing Non-Native Invasive Plants

University of New Hampshire Cooperative Extension

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

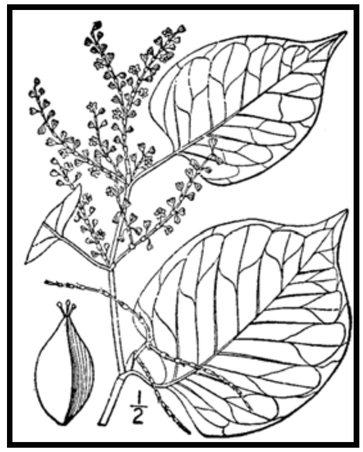
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

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.

Woody Plants	Method of Reproducing	Methods of Disposal
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)*	**Fruit and Seeds**	**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. **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.
oriental bittersweet *(Celastrus orbiculatus)* multiflora rose *(Rosa multiflora)*	**Fruits, Seeds, Plant Fragments**	**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. **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.

Non-Woody Plants	Method of Reproducing	Methods of Disposal
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)*	**Fruits and Seeds**	**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.
		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.
common reed (*Phragmites australis*) Japanese knotweed *(Polygonum cuspidatum)* Bohemian knotweed *(Polygonum x bohemicum)*	**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.	**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.

January 2010

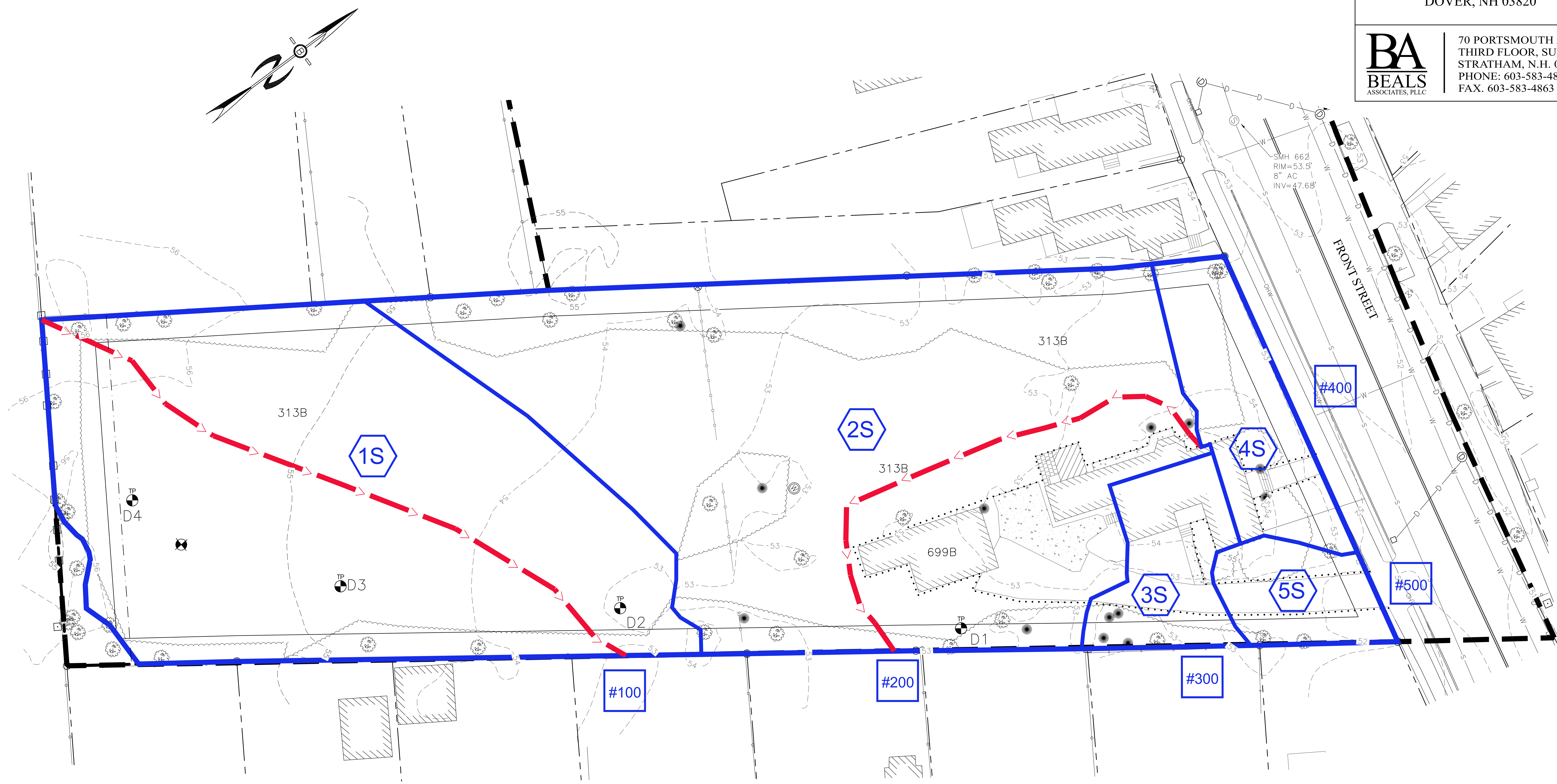
Appendix IV

Plans

PREPARED FOR:

112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863



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 11-12-2024, 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
313	Deerfield loamy sand	311	B
699	Urban Land	n/a	Impervious

SLOPE PHASE:
0–8% B, 8–15% C, 15–25% D
25%–50% E, 50%+ F

STATE OF NEW HAMPSHIRE
CHRISTIAN O. SMITH
No.9900
PROFESSIONAL ENGINEER

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

EXISTING WATERSHED PLAN

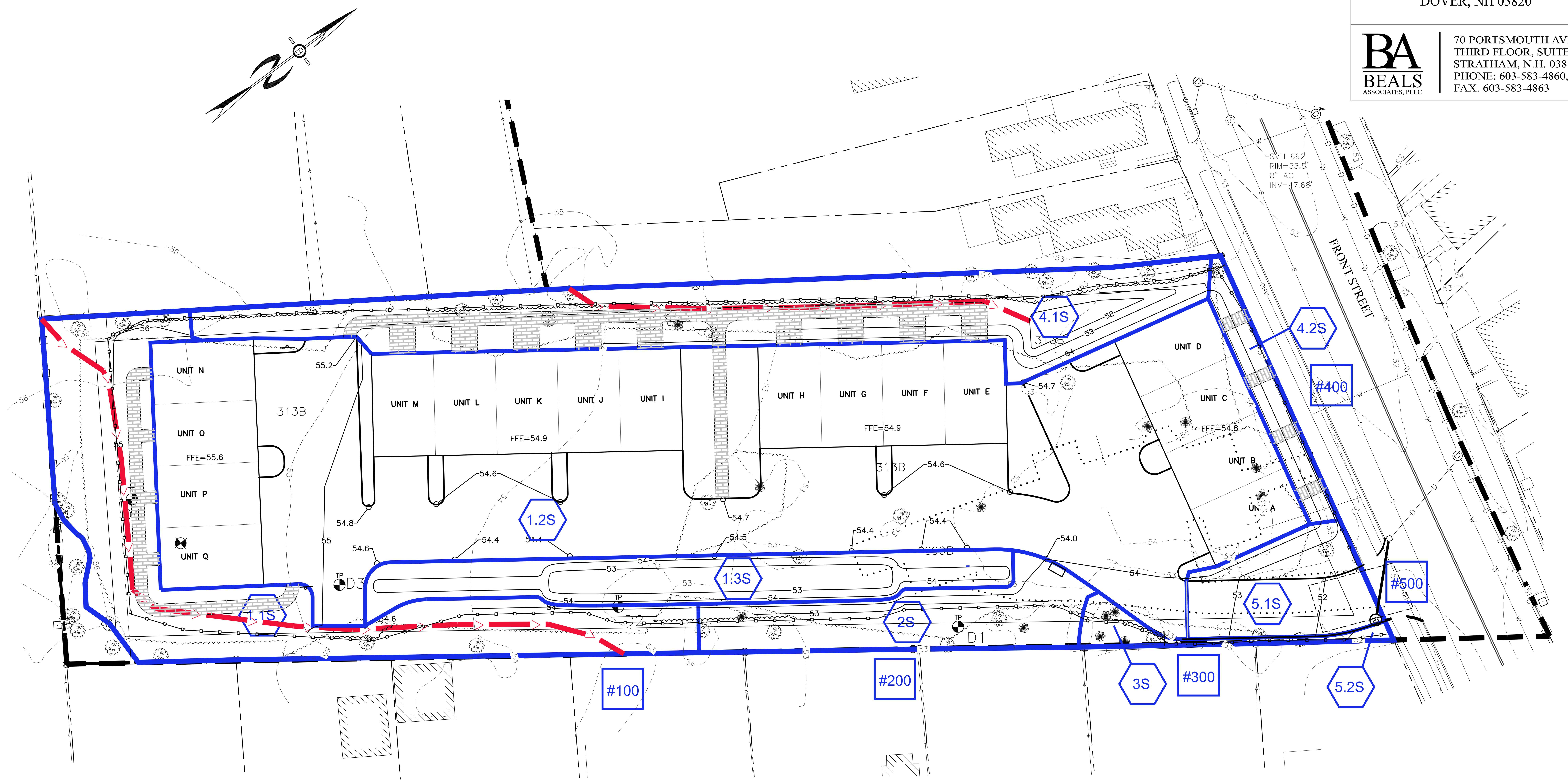
RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

REVISED PER REVIEW COMMENTS	01/17/25
REVISIONS:	DATE:

DATE:	DEC 9, 2024	SCALE:	1" = 20'
PROJ. NO:	NH-1531	SHEET NO.	W1

PREPARED FOR:
112 FRONT STREET, LLC
42J DOVER POINT ROAD
DOVER, NH 03820

BA BEALS ASSOCIATES, PLLC
70 PORTSMOUTH AVE,
THIRD FLOOR, SUITE 2
STRATHAM, N.H. 03885
PHONE: 603-583-4860,
FAX. 603-583-4863



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 11-12-2024, 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
313	Deerfield loamy sand	311	B
699	Urban Land	n/a	Impervious

SLOPE PHASE:
0-8% B, 8-15% C, 15-25% D
25%-50% E, 50%+ F

STATE OF NEW HAMPSHIRE
CHRISTIAN O. SMITH
No.9900
PROFESSIONAL ENGINEER

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

REVISIONS:	DATE:
REVISED PARKING LAYOUT	02/14/25
REVISED PER REVIEW COMMENTS	01/17/25

PROPOSED WATERSHED PLAN

RESIDENTIAL DEVELOPMENT
112 FRONT STREET
EXETER, NH
TAX MAP 73, LOT 14

DATE:	DEC 9, 2024	SCALE:	1" = 20'
PROJ. NO:	NH-1531	SHEET NO.	W2