MACTHOMPSON SITE PLAN

SP# 12-21

STAFF REPORT

October 27, 2021

SITE: 48 Lowell Road; Tax Map 190 Lot 191-000

ZONING: Business (B)

PURPOSE OF PLAN: Redevelop the site and continue to utilize the parcel as mixed use commercial site with a 12,000 sq. ft. building with associated site improvements, with uses to include business or professional office, retail business and personal service establishment, and eating & drinking establishment. Staff believes the primary intention of this application is to have a restaurant permitted.

PLAN UNDER REVIEW: Macthompson Site Plan, 48 Lowell Road, Tax Map 190 Lot 191, Hudson, New Hampshire; prepared by Benchmark LLC, 1F Commons Drive, Suite 35, Londonderry, New Hampshire 03053; prepared for owner Macthompson Realty, Inc., 3 Marmon Drive, Nashua, New Hampshire 03060; consisting of 10 sheets with General Notes 1-27 on Sheet 3; dated August 3, 2021.

ATTACHMENTS:

A. Peer Review Comments, by Fuss & O'Neill, dated September 30, 2021
B. Department Comments
C. Stormwater Management & Erosion Control Report, prepared by Benchmark Engineering (Provided Digitally Only)

APPLICATION TRACKING:

- September 3, 2021 – Application received.
- October 27, 2021 – Public hearing scheduled.

COMMENTS & RECOMMENDS:

BACKGROUND

There are two existing commercial buildings on the lot, close to Lowell Road. One of them currently houses KG Barbershop. The other building is currently used as residential but was the power station for the trolley line at one point in time. The rest of the lot is almost entirely paved for parking/storing automobiles, except for the landscaped area on the side and rear setbacks. A driveway by the commercial buildings provide access between Lowell Road and the parking lot.

The lot has a wedge shape, with the narrower side located along the street frontage, which is existing nonconforming at 118-feet where 150-feet is required.

The Applicant is proposing to demolish the existing buildings and construct a new 2-story commercial building. Two existing underground drainage systems will remain, while a third is proposed to mitigate any increase. The existing parking lot and driveway will be redesigned to accommodate the required number of parking spaces.

The first floor of the new building, alongside an outside seating area, will accommodate a restaurant. The second floor appears to be proposed as accessory uses to the restaurant, such as offices and function hall space, however the Applicant should clarify.

STAFF COMMENTS

1. **Waiver Requested:**

   275-8.C.(4) – Parking Space Dimensions
   The Applicant is requesting the Board's permission to install 9'x20 parking spaces rather than 10'x20' feet.

   275-8.C.(7)(a) – Parking Lot Interior Landscaping
   275-11.1.B.(22) – Front Green Area Setback
   276-11.1.B.(24)(a) – Open Space
   276-11.1.B.(25) – No Parking & Travelway within Setbacks

   These waiver requests primarily relate to the Applicant's attempt to provide the maximum number of parking spaces using the most intense rate in the land use regulations for the entire square footage of the building: eating and drinking establishments (with a bar) – one space per 75 sf of gross leasable area. Upon clarifying the intended use of the second floor, less parking may be necessary, thus allowing the Applicant to meet these landscape regulations. Note that the outdoor seating area should also be contemplated in the parking plan.

   The Applicant states that the minimum required landscape plantings will be provided however it is unclear on the lighting & landscape plan (Sheet 5). Furthermore, staff request the Applicant provide a clear landscape plan separate from the lighting plan.

   Again, to maximize the parking count, the Applicant is requesting waivers from open space requirement (35%), landscape requirements in setbacks, and the green area front setback. Given this is a redevelopment project, the Applicant should identify the amount of open space currently provided.

   These requirements are intended to provide sufficient buffer and screening, as well as moderating development density; the Applicant can mitigate the hardship noted in the waiver requests by reducing the size or use of the proposed commercial building and, in turn, the number of parking spaces required.

   275-8.C.(6) – Off-street Loading Space

For this waiver request, staff suggest the Board ensure deliveries would not interfere with parking during business hours, such as requiring the Applicant to add delivery hour restrictions as a note to the plan and/or including such restrictions as a condition to site plan approval.

2. **Use (§ 334-21):** The proposed uses, categorized as "Personal services establishment, per definition provided in § 334-6" (D.3), "Restaurant" (D.15), "Business or professional office" (D.17), and "General retail" (D.29) are all permitted in the Business district.

   Existing uses include "Motor vehicle, motorcycle, trailer, snowmobile, or boat sales and rental" (D.9), "Business or professional office" (D.17), and "General retail" (D.29) – all are permitted in the Business district.

3. **Dimensional Requirements (§ 334-27):** The existing lot is non-conforming with a frontage of 118' (150' required). The proposed sign location does not meet the dimensional requirement.

4. **Green Area Buffer [§ 276-11.1.B(22)]:** A 35' green area is required between the right-of-way line and any pavement, gravel, or structure.

   As noted in Staff Comment #1, the Applicant is requesting a waiver for this requirement. The submitted plan has parking spaces within the green area buffer.

5. **Open Space Requirement [§ 276-11.1.B(24)(b)]:** 32.8% is proposed where 35% is required.

   As noted in Staff Comment #1, the Applicant is requesting a waiver for this requirement. The submitted plan provides only 32.8% of open space and does not meet the 35% requirement.

6. **Parking**

   a. **Parking Calculations [§ 275-8.C(2)]:** The parking calculation is correct – 160 spaces are required. The submitted plan is proposing 163 spaces, including the 6 required ADA spaces.

   b. **Off-street Loading Space:** One 60' x 12' loading space is required.

      As note in Staff Comment #1, the Applicant is requesting a waiver for this requirement. The submitted plan provides no loading space.

   c. **Parking Lot Landscaping Requirements [§ 275-8.C(7)]:** Staff find the submitted landscaping and lighting plan with overlapping details difficult to read. Staff suggest the Applicant separate the plans as two separate sheets.

      As note in Staff Comment #1, the Applicant is requesting a waiver for the interior landscaping requirement. The submitted plan provides only 6% out of the 10% required interior landscaping.

d. **Parking Lot intruding Green Area Buffer, Side Setbacks, and Right-of-Way:** The parking lot in the submitted plan intrudes these areas, which is not allowed. As noted in Staff Comment #1, the Applicant is requesting a waiver for the requirement prohibiting parking within the green area buffer and side setbacks.

   However, the Right-of-Way would be dictated by its existing easement. The Applicant should provide the easement document for review.

7. **Note on Signage:** Please revise General Note 17 on Sheet 3 to "All signs are subject to approval by the Hudson Zoning Administrator prior to installation thereof."

   Further, the location of the proposed sign on the site plan does not match the location shown in the rendering found on Sheet 10. The Applicant should be aware that the proposed sign is required to be setback 25-feet from the property line.

8. **Other Departments** – See **Attachment B** for staff comments from other Town departments**.** Included are concerns from the Engineering Department regarding utilities, some of which echo the comments from Peer Review. The Fire Department requires an additional fire hydrant, and code compliant fire lane markings.

PEER REVIEW COMMENTS & APPLICANT'S RESPONSE

The Town's peer reviewer (see **Attachment A**) had identified a list of issues to be addressed in the peer review comments, including design considerations and missing information.

DRAFT MOTIONS

ACCEPT the site plan:

I move to accept the application for the MacThompson Site Plan at 48 Lowell Road, Tax Map 190 Lot 191-000.

Motion by: _____Second: _____Carried/Failed: _____

To GRANT a waiver:

I move to grant a waiver from § 275-8:C(4), to allow for 9-foot by 20-foot parking spaces, based on the Board's discussion, the testimony of the Applicant's representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____Second: _____Carried/Failed: _____

To GRANT a waiver:

I move to grant a waiver from § 275-8:C(6), to not require a dedicated loading space, based on the Board's discussion, the testimony of the Applicant's representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____Second: _____Carried/Failed: _____

To GRANT a waiver:

I move to grant a waiver from § 275-8:C(7)(a), to allow less than 10% of the interior of a parking lot to be landscaped, based on the Board's discussion, the testimony of the Applicant's representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____Second: _____Carried/Failed: _____

To GRANT a waiver:

I move to grant a waiver from § 276-11.1(B)(22), to not require the minimum 35-foot green area along the frontage, based on the Board's discussion, the testimony of the Applicant's representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____Second: _____Carried/Failed: _____

To GRANT a waiver:

I move to grant a waiver from § 276-11.1(B)(24)(a), to allow a reduction in the required amount of open space, based on the Board's discussion, the testimony of the Applicant's representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____Second: _____Carried/Failed: _____

To GRANT a waiver:

I move to grant a waiver from § 276-11.1(B)(25), to allow a reduction in the required amount of open space, based on the Board's discussion, the testimony of the Applicant's representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: _____Second: _____Carried/Failed: _____

Staff recommends the Planning Board & Applicant consider these waiver requests in light of the intended use and parking required. Clarification and/or revision to the plans may eliminate the need for waivers. Staff recommends continuation of this application so the Applicant may process feedback from staff and the Planning Board.

CONTINUE the public hearing to a date certain:

I move to continue the public hearing for the application for the MacThompson Site Plan at 48 Lowell Road, Tax Map 190 Lot 191-000 to date certain, _____.

Motion by: _____Second: _____Carried/Failed: _____

SITE PLAN NARRATIVE

The development site (Tax Map 190 Lot 191) containing 2.59 acres of developed land on the easterly side of Lowell Road/ Route 3A. The front portion of the site along Lowell Road contains an existing commercial building (Building-A), an office building (Building-B) and an existing storage building (Building-C). In 2017 this site received approval to redevelop the parcel into a multi-use commercial site and constructed a fenced outdoor vehicle storage area to the rear of the site.

The purpose of this plan is to redevelop the site and continue to utilize the parcel as mixed use commercial site. Proposed uses include Business or Professional Office; Retail Business & Personal Service Establishment; and Eating & Drinking Establishment.

Improvements include construction of a 12,000 sq. ft. building, new parking in the front and reworking the fenced outdoor vehicle storage area at the rear into a parking area. The two existing underground drainage systems will remain and a third underground system will be installed at the front of the site to mitigate any increase in runoff from these improvements. The existing structures will be razed.

SITE PLAN APPLICATION

Date of Application: **9/3/21** Tax Map #: **190** Lot #: **191**

Site Address: **48 Lowell Road**

Name of Project: **MacThompson Site Plan**

Zoning District: **"B" Business** General SP#: 12-21
(For Town Use Only)

Z.B.A. Action: _____

PROPERTY OWNER:

Name: **MacThompson Realty, Inc**

Address: **3 Marmon Drive**

Address: **Nashua, NH 03060**

Telephone # **(603) 888-1121**

Email: _____

DEVELOPER:

(same as owner)

PROJECT ENGINEER:

Name: **Benchmark, LLC**

Address: **1F Commons Dr, Unit 35**

Address: **Londonderry, NH 03053**

Telephone # **(603) 437-5000**

Email: **nick@benchmark-engineering.com**

SURVEYOR:

Rangeway Land Surveying & Design, Inc.

252 Daniel Plummer Road

Goffstown, NH 03045

(603) 624-1602

PURPOSE OF PLAN:

A) To Re-develop the site as a multi use commercial site per Zoning Sec. 334-10B.
Uses to include: Business or Professional Office; Retail business and personal service establishment; and Eating & drinking establishment.
B) To show the 12,000 sq.ft. building with associated site improvements.

(For Town Use Only)

Routing Date: 9/16/21 Deadline Date: 9/30/21 Meeting Date: TBD

_____ I have no comments _____ I have comments (attach to form)

_____ Title: _____ Date: _____
(Initials)

Department:

Zoning: ___ Engineering: ___ Assessor: ___ Police: ___Fire: ___ DPW: ___ Consultant: ___

SITE DATA SHEET

PLAN NAME: **MacThompson Site Plan**

PLAN TYPE: SITE PLAN

LEGAL DESCRIPTION: MAP **191** LOT **190**

DATE: **9/3/21**

Location by Street:	**48 Lowell Road**
Zoning:	**"B" Business**
Proposed Land Use:	**Commercial**
Existing Use:	**Commercial**
Surrounding Land Use(s):	**Commercial**
Number of Lots Occupied:	**1**
Existing Area Covered by Building:	**3,650 sq. ft.**
Existing Buildings to be removed:	**All - 3,650 sq. ft.**
Proposed Area Covered by Building:	**6,000 sq. ft.**
Open Space Proposed:	**37,000 sq. ft. (32.8%)**
Open Space Required:	**39,450 sq. ft. (35%)**
Total Area:	S.F.: **112,675** Acres: **2.59**
Area in Wetland:	**0** Area Steep Slopes: **0 sq.ft.**
Required Lot Size:	**30,000 sq.ft.**
Existing Frontage:	**118 feet**
Required Frontage:	**150 feet**

Building Setbacks:	Required*	Proposed
Front:	**50 feet**	**140 feet**
Side:	**15 feet**	**17 feet**
Rear:	**15 feet**	**280 feet**

SITE DATA SHEET
(Continued)

Flood Zone Reference:	**Panel # 330092-0518D**
Width of Driveways:	**24'**
Number of Curb Cuts:	**1**
Proposed Parking Spaces:	**163**
Required Parking Spaces:	**160**
Basis of Required Parking (Use):	**Restaurant w/ Bar**
Dates/Case #/Description/Stipulations of ZBA, Conservation Commission, NH Wetlands Board Actions: (Attach stipulations on separate sheet)	**None**

Waiver Requests

Town Code Reference:	*Regulation Description:*
275-8.C.(4)	PARKING SPACE DIMENSIONS
275-8.C.(6)	OFF STREET LOADING SPACE
275-8.C.(7)(a)	INTERIOR LANDSCAPING
276-11.1.(B)(22)	FRONT GREEN AREA SETBACK
276-11.1.(B)(24)(a)	OPEN SPACE
276-11.1.(B)(25)	PARKING AND TRAVELWAY SETBACK

(For Town Use Only)

Data Sheets Checked By: _____ Date: _____

SITE PLAN APPLICATION AUTHORIZATION

I hereby apply for *Site Plan* Review and acknowledge I will comply with all of the Ordinances of the Town of Hudson, New Hampshire State Laws, as well as any stipulations of the Planning Board, in development and construction of this project. I understand that if any of the items listed under the *Site Plan* specifications or application form are incomplete, the application will be considered rejected.

Pursuant to RSA 674:1-IV, the owner(s) by the filing of this application as indicated above, hereby given permission for any member of the Hudson Planning Board, the Town Planner, the Town Engineer, and such agents or employees of the Town or other persons as the Planning Board may authorize, to enter upon the property which is the subject of this application at all reasonable times for the purpose of such examinations, surveys, tests and inspections as may be appropriate. The owner(s) release(s) any claim to or right he/she (they) may now or hereafter possess against any of the above individuals as a result of any examinations, surveys, tests and/or inspections conducted on his/her (their) property in connection with this applications.

Signature of Owner: _____ Date: 08/25/21

Print Name of Owner: Jeffrey Thompson

- If other than an individual, indicate name of organization and its principal owner, partners, or corporate officers.

Signature of Developer: _____ Date: 08/25/21

Print Name of Developer: Jeffrey Thompson

- The developer/individual in charge must have control over all project work and be available to the Code Enforcement Officer/Building Inspector during the construction phase of the project. The individual in charge of the project must notify the Code Enforcement Officer/Building Inspector within two (2) working days of any change.

SCHEDULE OF FEES

A. REVIEW FEES:

1. Site Plan Use	Project Size/Fee	
Multi-Family	$105.00/unit for 3-50 units $78.50/unit for each additional unit over 50	$_____
Commercial/Semi Public/Civic or Recreational	$157.00/1,000 sq. ft. for first 100,000 sq.ft. (bldg. area): **6 x 157** $78.50/1,000 sq.ft. thereafter.	$ **942**
Industrial	$150.00/1,000 sq.ft for first 100,000 sq.ft. (bldg. area); $78.50/1,000 sq.ft thereafter.	$_____
No Buildings	$30.00 per 1,000 sq.ft. of proposed developed area	$_____

CONSULTANT REVIEW FEE: (Separate Check)

Total **2.59** acres @ $600.00 per acre, or $1,250.00, whichever is greater. $ **1,560 - check #1**

Consultant fee on separate check

This is an estimate for cost of consultant review. The fee is expected to cover the amount. A complex project may require additional funds. A simple project may result in a refund.

LEGAL FEE:

The applicant shall be charged attorney costs billed to the Town for the Town's attorney review of any application plan set documents.

(continued on next page)

SCHEDULE OF FEES
(Continued)

B. POSTAGE:

11	Direct Abutters @$4.15 (or Current Certified Mail Rate)	$ 45.65
5	Indirect Abutters (property owners within 200 feet) @$0.55 (or Current First Class Rate)	$ 2.75

C. ON SITE SIGNAGE: $ 15.00

E. TAX MAP UPDATING FEE: (FLAT FEE) $ 275.00

TOTAL $ 1,280.40-check#2

(For Town Use)

AMOUNT RECEIVED: $ 2840.40 DATE RECEIVED: 9/3/21

656,182

RECEIPT NO.: 656,540 RECEIVED BY: BROOKE

NOTE: fees below apply only upon plan approval, not collected at time of application.

F. RECORDING FEES:

The applicant shall pay the costs of recording the final site plan layout prior to final site plan approval, in accordance with fees established by the County. Recording fees must be paid prior to recording.

Recording of Plan @ $24.00/sheet + $2.00/surcharge plan
Land & Community Heritage Investment Program (LCHIP) fee @ $25.00
Easements/Agreements @$10.00/first sheet, $4.00/each sheet thereafter + $2.00/surcharge/doc. + First Class return postage rate

G. COST ALLOCATION PROCEDURE AMOUNT CONTRIBUTION AND OTHER IMPACT FEE PAYMENTS:

To be determined by the Planning Board at time of plan approval and shall be paid by the applicant at the time of submittal of the Certificate of Occupancy Permit requests.

*****The applicant shall be responsible for all fees incurred by the town for processing and review of the applicant's application, plan and related materials.*****

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: **MacThompson Site Plan**

Street Address: **48 Lowell Road**

I **Nicholas Loring** hereby request that the Planning Board waive the requirements of item **275-8.C.(4). Parking Space Dimensions** of the Subdivision/Site Plan Checklist in reference to a plan presented by **Benchmark, LLC** (name of surveyor and engineer) dated **August 3, 2021** for property tax map(s) **190** and lot(s) **191** in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

The lot shape requires additional travel isles and in order to provide the required parking a reduction in parking space is necessary to provide an adequate number of parking spaces.

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

The provided 9 x 20 parking space is a typical size and will allow adequate space for parking.

Signed: Agent

Applicant or Authorized Agent

Planning Board Action:

Waiver Granted _____

Waiver Not Granted _____

Rev Feb. 2012

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: **MacThompson Site Plan**

Street Address: **48 Lowell Road**

I **Nicholas Loring** hereby request that the Planning Board waive the requirements of item **275-8.C.(6). Off Street Loading Space** of the Subdivision/Site Plan Checklist in reference to a plan presented by **Benchmark, LLC** (name of surveyor and engineer) dated **August 3, 2021** for property tax map(s) **190** and lot(s) **191** in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):
There is no room in the front portion of the site for an off street loading space.

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

The site is currently be used with a commercial use. Deliveries can be scheduled for off hour times when the parking area is less used. We feel the 24' travel isle to the east of the proposed building will provide adequate space for loading and still allow enough room for vehicles to pass.

Signed: Agent

Applicant or Authorized Agent

Planning Board Action:

Waiver Granted _____

Waiver Not Granted _____

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: **MacThompson Site Plan**

Street Address: **48 Lowell Road**

I **Nicholas Loring** hereby request that the Planning Board waive the requirements of item **275-8.C.(7).(a) Interior Landscaping** of the Subdivision/Site Plan Checklist in reference to a plan presented by **Benchmark, LLC** (name of surveyor and engineer) dated **August 3, 2021** for property tax map(s) **190** and lot(s) **191** in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

The shape of the lot requires more isle space to provide the required number of parking spaces for the proposed building.

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

The site will provide 6% vs the required 10% interior green space. The minimum required landscape plantings will be provided.

Signed: Agent

Applicant or Authorized Agent

Planning Board Action:

Waiver Granted _____

Waiver Not Granted _____

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: **MacThompson Site Plan**

Street Address: **48 Lowell Road**

I **Nicholas Loring** hereby request that the Planning Board waive the requirements of item **276-11.1.B.(22) Front Green Area Setback** of the Subdivision/Site Plan Checklist in reference to a plan presented by **Benchmark, LLC** (name of surveyor and engineer) dated **August 3, 2021** for property tax map(s) **190** and lot(s) **191** in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

Due to the narrow shape of the lot we are trying to keep as much parking as possible near the proposed building.

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

The front parking will be in the same location as the existing building and parking.

Signed: Nick Loring Agent

Applicant or Authorized Agent

Planning Board Action:

Waiver Granted _____

Waiver Not Granted _____

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: **MacThompson Site Plan**

Street Address: **48 Lowell Road**

I **Nicholas Loring** hereby request that the Planning Board waive the requirements of item **276-11.1.B.(24)(a) Open Space** of the Subdivision/Site Plan Checklist in reference to a plan presented by **Benchmark, LLC** (name of surveyor and engineer) dated **August 3, 2021** for property tax map(s) **190** and lot(s) **191** in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

Due to the narrow shape of the lot additional travel ways are necessary to provide adequate parking spaces for the proposed building.

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

The site is currently being used with a commercial use. Open space is provided around the perimeter of the site with landscaping.

Signed: Nic Gay Agent

Applicant or Authorized Agent

Planning Board Action:

Waiver Granted _____

Waiver Not Granted _____

SUBDIVISION/SITE PLAN WAIVER REQUEST FORM
Town of Hudson, New Hampshire

Name of Subdivision/Site Plan: **MacThompson Site Plan**

Street Address: **48 Lowell Road**

I **Nicholas Loring** hereby request that the Planning Board waive the requirements of item **276-11.1.B.(25) Parking & Travelway** of the Subdivision/Site Plan Checklist in reference to a plan presented by **Benchmark, LLC** (name of surveyor and engineer) dated **August 3, 2021** for property tax map(s) **190** and lot(s) **191** in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e. (For Subdivisions) and RSA 674:44, III (e) (For Site-Plans). Without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Subdivision/Site Plan regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

Due to the narrow shape of the lot the easterly parking and side travel way around the proposed building encroaches into the 15' side setback.

Reason(s) for granting this waiver, relative to not being contrary to the Spirit and Intent of the Subdivision/Site Plan regulations: (if additional space is needed please attach the appropriate documentation hereto):

The parking is located in the area of the existing building and parking. All parking to the rear of the building meets the required setback.

Signed: Agent

Applicant or Authorized Agent

Planning Board Action:

Waiver Granted _____

Waiver Not Granted _____

FUSS & O'NEILL

MEMORANDUM

TO: File

FROM: Steven W. Reichert PE

DATE: September 30, 2021

RE: Town of Hudson Planning Board Review
MacThompson Site Plan, 48 Lowell Road
Tax Map 190, Lot 191; Acct. #1350-979
Fuss & O'Neill Reference No. 20030249.2090

The following list itemizes the set of documents reviewed related to the MacThompson Site Plan, located at 48 Lowell Road in Hudson, New Hampshire.

- Email correspondence between the Town of Hudson and Fuss & O'Neill, dated between September 14 and September 17, 2021.

- Letter from Benchmark, LLC, dated September 14, 2021 and received by Fuss & O'Neill on September 17, 2021, including the following:

  1. Copy of *Site Plan Narrative*, not dated.
  2. Copy of *Town of Hudson, Site Plan Application*, dated September 3, 2021.
  3. Copy of *Subdivision/Site Plan Waiver Request Forms*, not dated.
  4. Copy of *Abutter List*, dated August 16, 2021.
  5. Copy of *Stormwater Management & Erosion Control Report,* prepared by Benchmark Engineering, Inc., dated August 12, 2021.
  6. Copy of *MacThompson Site Plan, 48 Lowell Road, Tax Map 190 Lots 191; Hudson, New Hampshire*, prepared by Benchmark, LLC, dated August 3, 2021, with no revisions noted, including the following:
     a. *Cover Plan*, Sheet 1 of 10.
     b. *Existing Conditions Plan*, Sheet 2 of 10.
     c. *Site Plan*, Sheet 3 of 10.
     d. *Grading, Utility, Drainage & Erosion Control Plan*, Sheet 4 of 10.
     e. *Lighting & Landscaping Plan*, Sheet 5 of 10.
     f. *Drainage Detail Sheet*, Sheets 6 through 8 of 10.
     g. *Construction Detail Sheet*, Sheet 9 of 10.
     h. *Sight Distance & Detail Sheet,* Sheet 10 of 10.

SWR:elc

cc: Brian Groth – Town of Hudson
Town of Hudson Engineering Division – File

FUSS & O'NEILL

September 30, 2021

Mr. Brian Groth
Town Planner
Town of Hudson
12 School Street
Hudson, NH 03051

Re: Town of Hudson Planning Board Review
MacThompson Site Plan, 48 Lowell Road
Tax Map 190 Lot 191; Acct. #1350-979
Reference No. 20030249.2090

Dear Mr. Groth:

Fuss & O'Neill (F&O) has reviewed the first submission of materials received on September 17, 2021, related to the above-referenced project. Authorization to proceed was received on September 14, 2021. A list of items reviewed is enclosed. The scope of our review is based on the Site Plan Review Codes, Stormwater Codes, Driveway Review Codes, Sewer Use Ordinance 77, Zoning Regulations, and criteria outlined in the CLD Consulting Engineers Proposal approved September 16, 2003, revised September 20, 2004, June 4, 2007, September 3, 2008, and October 2015.

We have included a copy of Fuss & O'Neill's evaluation of the checklist for your reference. We note that several items could not be verified by Fuss & O'Neill and require action by the Town.

The project appears to consist of the redevelopment of an existing multi-use site. The existing site contains three buildings with commercial, office and storage uses. The proposed improvements will include a new building with the construction of a new driveway, parking areas, drainage improvements, landscaping, lighting, and other associated site improvements. The proposed buildings will be serviced by public water and sewer.

The following items are noted:

1. **Site Plan Review Codes (HR 275)**
   a. Hudson Regulation (HR) 275-6.I. The scope of this review does not include the adequacy of any fire protection provisions for the proposed building. No fire service connections to the proposed building are shown.
   b. HR 275-8.C.(2) and Zoning Ordinance (ZO) 334-15.A. The applicant has provided parking calculations on the plan set. The applicant has noted that 160 parking spaces are required for the 12,000 square foot facility and that 163 spaces are provided. The required parking space total was calculated using the highest parking requirement of the proposed uses.
   c. HR 275-8.C.(2). It appears that the applicant has not taken the outdoor seating area into account with regards to required parking spaces. The applicant should evaluate anticipated seating and parking needs for this area and their impact on the proposed parking space

50 Commercial Street
Manchester, NH
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t 603.668.8223
800.286.2469

www.fando.com

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Connecticut
Maine
Massachusetts
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Rhode Island
Vermont

total.

d. HR 275-8.C.(4). The applicant has requested a waiver to reduce the parking spaces to 9 feet wide instead of the standard 10 feet.

e. HR 275-8.C.(6). The applicant has requested a waiver from the loading space requirement. The applicant feels that deliveries can be scheduled at off-peak hours and use the aisle widths to accommodate trucks and still allow vehicles to pass.

f. HR 275-9.C.(11). The applicant has provided six handicap spaces for the site which meets the six spaces required. We recommend that the applicant add spot grades and ramp locations to the parking lot and sidewalk area to ensure that they are constructed as intended.

g. HR 275-9.C.(11). The applicant has not shown curb ramps, detectable pavers, or signs at the proposed sidewalks adjacent to the handicapped parking spaces on the site plans. Curb ramp and sign details are included in the plans.

h. HR 275-9.F. The applicant did not provide copies of any easements or deeds as part of the package received for review. "20' ROW" with registry information is shown on the west side of the site. We note that several items including a catch basin, chain link fence and a portion of an existing underground drainage chamber are located within that 20' Right-of-Way. The applicant is proposing a portion of the new parking lot, adjacent sidewalk, and drainage features to be located within that 20' Right-of-Way.

2. Administrative Review Codes (HR 276)

a. HR 276-11.1.B.(6). The applicant has provided a space for the owner to sign the plan set. We note that the plan received for review was not signed.

b. HR 276-11.1.B.(13). & ZO 334-60. The applicant has provided the location and a photo of the proposed site sign. We note that details and dimensions have not been provided. The applicant has included a note stating that, "All signs are subject to approval by the Hudson Planning Board prior to installation."

c. HR 276-11.1.B.(20). The applicant had not provided the height of the existing buildings on the plan set. The existing buildings are going to be raised as part of the project.

d. HR 276-11.1.B.(22).The applicant has requested a waiver from the 35-foot green area requirement. The applicant has shown the parking lot approximately 10 feet from the right-of-way.

e. HR 276-11.1.B.(23). The applicant has not noted any pertinent highway projects on the plan set.

f. HR 276-11.1.B.(24).(a). The applicant has requested a waiver from the open space requirement. The applicant provided under 33 percent of open space on the lot per their note.

g. HR 276-11.1.B.(25). The applicant as requested a waiver to allow the parking lots within the side and rear setback lines.

3. Driveway Review Codes (HR 275-8.B. (34)/Chapter 193)

a. HR 193.10.E. The applicant has provided 205 feet of sight distances for the proposed

driveway location on the plan set.

b. HR 193.H. The applicant has proposed to keep the driveway location in the same spot as the existing driveway. We note that it appears the driveway will be widened slightly to the south to meet the 24-foot aisle width requirement. We note that this location is within the side setback of the property.
c. The applicant should provide additional details and show more specific information on the plan set about the relocation of the existing sidewalk ramp within the Town Right-of-Way located at the southern edge of the driveway to accommodate the wider drive.
d. We note that WB-50 and smaller trucks are able to negotiate the site as designed. The applicant should confirm that WB-65 trucks are not anticipated to need access to the site.

4. Traffic

a. HR 275-9.B. The applicant has not provided any traffic information as part of their review package.

5. Utility Design/Conflicts

a. Engineering Technical Guideline & Typical Details (ETGTD) Section 720.8.3. The applicant has not provided a cleanout for the proposed sewer service. This should be located at the property line.
b. HR 276-13. The applicant has shown the new sewer connection tying into an existing sewer service. We note that this service is not shown on the existing conditions plan. The applicant should provide additional information about this service location.
c. HR 276-13. The applicant has shown a new water service location on the plan set. We note that this service does not include a water shut off as required. We also note that the applicant has left the existing water shutoff on the plan set. The applicant should clarify the intent.
d. HR 276-13. The applicant should advise if they have taken the outdoor seating area into account with their sewer loading calculations.
e. HR 276-13. The applicant has not shown the existing water and sewer main locations within Lowell Road or provided any additional information about tying in the proposed services. The applicant should show the approximate location and size of these utilities.
f. HR 276-13. The applicant should provide water and sewer connection details on the plan set.
g. The applicant has shown two water shutoffs at the west corner of the lot at Lowell Road but has not shown any connections for these shutoffs or noted if they are to remain or be abandoned.
h. The applicant has not provided any water or sewer service construction details. Also, the plans do not identify the size and material types for the water and sewer service piping.
i. The applicant has noted a restaurant use for the site. If the proposed restaurant will include an on-site brewery, additional permitting for industrial pretreatment discharging will be required per the Hudson Sewer Use Ordinance.

6. Drainage Design/Stormwater Management (HR 275-9.A./Chapter 290)

a. HR 275-9.A.(3). & 290-5.A.(4). The applicant should illustrate the location of the test pit(s) upon the plan set, as well as provide the test pit information. The applicant should also illustrate the location of the proposed test pit(s) within the footprint of the proposed underground chamber system upon the plan set.

b. HR 290-5.A.(1). & 290-5.A.(3). The applicant should provide language in the Drainage Analysis Report stating if and how low impact development (LID) strategies for stormwater runoff were evaluated for this project.

c. HR 290-5.A.(9). The applicant should provide test pit logs (illustrating ESHWT) for the proposed infiltration basin areas, as well as previously utilized test pit information for the two existing systems.

d. HR 290-5.A.(10). We note the drainage report notes the use of haybales. If this practice is utilized the applicant should provide details and locations upon the plan set.

e. HR 290-5.A.(12). The applicant should provide the Long-Term Maintenance Plan (LTMP), including but not limited to: maintaining parties, schedule, tasks, reporting, etc. This will ensure the intended long-term lifespan of the stormwater practices are maintained.

f. HR 290-5.A.(12). The applicant should note on the plans and LTMP that the existing systems should be inspected and cleaned to ensure proper operation, prior to certification of occupancy being issued for the site.

g. HR 290-6.A.(8). The applicant should add a note on the plans requiring the coordination of a pre-construction meeting with the Town Engineer.

h. HR 290-6.A.(9). The applicant should revise Erosion Control and Turf Establishment Notes on Plan Sheet #10 to state "not to exceed 30 days, and temporary stabilization within 5 days of initial disturbance".

i. HR 290-6.A.(12). The applicant should provide the winter stabilization notes to the plan set.

j. HR 290-7. The applicant should add additional spot grade elevations at EOP, corners, and islands for the parking lot located northeast of the proposed building.

k. HR 290-7. The applicant should add the tree line along the northern property line to all plan sheets, as it is only located upon the pre and post development plans.

l. HR 290-7.A.(6). The applicant should provide information as to how the stormwater system is designed to account for frozen ground conditions.

m. HR 290-10.A. Per the area scaled from the PDF plans provided, it appears the disturbed area may be close to or over 100,000 sf of disturbance, triggering the requirement of an NHDES Alteration of Terrain permit. The entire lot is 112,675sf (2.59 acres) while the disturbed area is nearly the entire lot. The applicant should provide the limit of disturbance line upon the plan set as well as note the total disturbed area. We note that a disturbed area/limit of disturbance line illustrated upon a plan set is not always observed by a contractor in the field. If this disturbed area is close to the 100,000 sf threshold, the installation of an orange construction fence staked out by a surveyor noting the proposed limit of disturbance is encouraged. We note if it is discovered during construction that the disturbed area exceeds the NHDES AoT threshold, an after the fact AoT permit will be required, and may halt/hold-up the construction process.

n. HR 290-10.B. The applicant should note the requirement for a SWPPP on the plan.

o. Engineering Technical Guideline & Typical Details (ETGTD) ETGTD 920.4.1. & 920.4.2. The applicant should show stockpile and equipment storage locations on the plan set.

p ETGTD 920.4.18. & 920.4.11. The applicant should state on the plan that the responsibility of maintaining the stormwater features is solely the owners.

q. ETGTD 930.3. The applicant should provide additional information on the drainage manhole detail provided upon Detail Plan Sheet #7. We note all DMH's on the plans are listed as "existing" as well as no sump is provided for the DMH.

r. ETGTD 930.3. The applicant should coordinate the weir width of the Special OS#3 Detail on Plan Sheet #7 with the HydroCAD (2.0" vs 2.5").

s. ETGTD 930.4. We note that the majority of the stormwater design utilizes pipe slopes of less than the required 2.0%. The applicant should review these pipe slopes and provide calculations showing that the drain line velocities are self-cleaning.

t. On the Grading, Utility, and Drainage plan sheet the applicant has shown two short lines extending from the west corner of the building onto/past the 15" ADS drain line at this location. The applicant should clarify the intent for these lines and if they are to connect to the proposed drain.

u. The invert out of existing CB-A appears to be lower than the invert in to the downstream DMH1. The applicant should confirm these grades and evaluate if this storage condition would impact the drainage design.

u. The applicant will be required to comply with all provisions of the Town of Hudson's MS4 permit, including but not limited to annual reporting requirements, construction site stormwater runoff control, and record keeping requirements.

v. Please note that this review was carried out in accordance with applicable regulations and standards in place in New Hampshire at this time. Note that conditions at the site, including average weather conditions, patterns and trends, and design storm characteristics, may change in the future. In addition, future changes in federal, state, or local laws, rules, or regulations, or in generally accepted scientific or industry information concerning environmental, atmospheric, and geotechnical conditions and developments may affect the information and conclusions set forth in this review. In no way shall Fuss & O'Neill be liable for any of these changed conditions that may impact the review, regardless of the source of or reason for such changed conditions. Other than as described herein, no other investigation or analysis has been requested by the Client or performed by Fuss & O'Neill in preparing this review.

7. Zoning (ZO 334)

a. ZO 334-14.A. The applicant has not provided the proposed building height on the plan set.

b. ZO 334-17 & 334-21. The applicant has noted that the subject parcel is located within the Business (B) zoning district. The proposed uses, which include Business or Professional Office, Retail Business & Personal Service Establishment, and Eating & Drinking Establishment, are all permitted by the Ordinance within the Business district.

c. ZO-334-27.1.D. The existing lot has a frontage of 118.5' where 150' is required by the Ordinance. The applicant has noted this on the plans.

d. ZO 334-33. The applicant has not shown any wetlands on the plan set.

e. ZO 334-60.C. The applicant has located a proposed sign 23' from the front property line, where the Ordinance requires that the sign be located at not less than 50% of the front setback, which would be 25'. Details and dimensions for the sign were not included in the plans.

f. ZO 334-83 and HR 218-4.E. The applicant has noted that the site is not located within a designated flood hazard area.

8. Erosion Control/Wetland Impacts

a. HR 290-5.A.(10). The applicant should provide labels for proposed locations of erosion and sediment control practices on the plans; including but not limited to silt fence, CB inlet protection, construction entrance, and any other details illustrated in the detail sheets.

b. The Town of Hudson should reserve the right to require any additional erosion control measures as needed. The applicant has noted this on the plans.

9. Landscaping (HR 275-8.C.(7) & 276-11.1.B.(20)) and Lighting (HR 276-11.1.B.(14))

a. HR 275-8.C.(7).(a). The applicant has requested a waiver for the 10% landscaping requirement and stated that 6% would be provided. The applicant should show landscaping calculation on the plan set for review.

b. HR 275-8.C.(7).(c). The applicant has noted that 40 shade trees are required. The applicant should provide calculations showing this number. We also note that the applicant has stated 36 trees are existing from a previous approval. We note that some of those trees appear to be in the proposed parking lot area. The applicant should clearly label existing trees to remain or trees to relocate.

c. HR 275-8.C.(7).(d). The applicant has stated that 320 shrubs are required and that 272 were previously planted with prior approval. The applicant should provide calculations for this requirement for review. We note that the applicant has shown 42 shrubs onsite but has not shown any of the previously planted locations and if the shrubs still exist.

d. The applicant should provide an index on the landscaping plan showing the symbols and the corresponding tree and shrub variety. We also recommend the applicant move the landscaping on its own sheet to clarify overwriting between the landscape and the lighting.

e. HR 276-11.1.B.(14). The applicant has shown lighting fixture locations on the plans with details and photometric information.

f. HR 276-11.1.B.(14). The applicant has noted that lighting will be utilized from dusk to dawn.

10. State and Local Permits (HR 275-9.G.)

a. HR 275-9.G. The applicant has listed required permits and statuses on the plan set.

b. HR 275-9.G. The applicant did not provide copies of any applicable Town, State or Federal approvals or permits in the review package.

c. Additional local and state permitting may be required.

11. Other

a. The applicant has proposed retaining walls adjacent to the building. The applicant has not provided a typical detail for the walls or shown any grading that would show the height or intent of the walls. The applicant should provide detailed design drawings for the proposed wall, stamped by an Engineer licensed in the State of New Hampshire, for Town review prior to construction.
b. ETGTD Section 565.1.1. The applicant is reminded of Town of Hudson requirements for the importing of off-site fill materials for use in constructing this project. It is recommended that these requirements be stated on the plans for the Contractors attention.
c. The applicant should provide a detail for the dumpster pad and enclosure on the plan set.
d. The applicant has not provided a detail or other information on how the outside seating area will be constructed.
e. The applicant should provide a detail for the site sidewalks, including material types and dimensions.

Please feel free to call if you have any questions.

Very truly yours,

Steven W. Reichert, P.E.

SWR:

Enclosure

cc: Town of Hudson Engineering Division – File
Benchmark, LLC - nick@benchmark-engineering.com

TOWN OF HUDSON

FIRE DEPARTMENT

39 FERRY STREET, HUDSON, NEW HAMPSHIRE 03051

Emergency 911
Business 603-886-6021
Fax 603-594-1164

Robert M. Buxton
Chief of Department

TO: Brian Groth
Town Planner

FR: Robert M. Buxton
Fire Chief

DT: September 17, 2021

RE: MacThompson Site Plan

The following is a list of site plan concerns for this project. This review was completed utilizing plans submitted by Benchmark, LLC dated August 3, 2021.

1. Please provide the markings for fire apparatus access in accordance with **NFPA 1**.
2. The project shall obtain site addressing from the Hudson Fire Department.
3. One additional hydrant shall be added to the site to support the fire sprinkler system.

****The following life safety and fire protection concerns provided are for informational purposes to the applicant and Planning Board for this project. Final determinations on these issues occur after further review of the project.**

A. The proposed building will require an approved sprinkler system. The Hudson Fire Department upon review of the building plans shall conduct this review. This requirement is in accordance with the **International Building Code (IBC)** and **Hudson Town Code (HTC), current revision, Chapter 210, Article VI**. Any fire protection system shall be monitored by an approved fire alarm system.

B. The fire alarm system shall be connected to the Hudson Fire Department's municipal fire alarm system or a substantially equivalent system in accordance with the **Hudson Town Code, Chapter 210**. A site plan detailing the aerial or underground layout to the municipal fire alarm connection must be provided before the utilities are completed for this project.

C. Any required fire alarm system component must remain accessible and visible at all times.

D. A blasting permit will be required for any blasting on the site in accordance with the **Hudson Town Code, Chapter 202**.

cc: Project Engineer
File

Dubowik, Brooke

From: Dhima, Elvis
Sent: Monday, October 4, 2021 3:18 PM
To: Dubowik, Brooke
Cc: Groth, Brian
Subject: RE: SP#12-21 MacThompson Site Plan Sign Off

Brooke

Please see below

1. Applicant shall provide a sewer manhole / access manhole at the property line
2. Applicant shall provide water service line size
3. Applicant shall provide sewer profile.
4. Applicant shall provide drainage profiles.
5. Applicant shall provide information regarding the existing water services at the site.
6. Applicant shall provide information regarding the existing sewer lateral. Applicant should try to use the existing lateral, if possible and avoid another sewer main hookup.
7. Catch basins shall be equipped with mechanical / oil separators

Thanks

E

Elvis Dhima, P.E.
Town Engineer

12 School Street
Hudson, NH 03051
Phone: (603) 886-6008
Mobile: (603) 318-8286
Town of Hudson
NEW HAMPSHIRE 03051

From: Dubowik, Brooke <bdubowik@hudsonnh.gov>
Sent: Thursday, September 16, 2021 10:18 AM
To: Bianchi, Dave <dbianchi@hudsonnh.gov>; Buttrick, Bruce <bbuttrick@hudsonnh.gov>; Buxton, Robert <RBuxton@hudsonnh.gov>; Caleb Chang <calebc@nashuarpc.org>; Dhima, Elvis <edhima@hudsonnh.gov>; Kirkland, Donald <dkirkland@hudsonnh.gov>; Forrence, Jess <jforrence@hudsonnh.gov>; Groth, Brian <bgroth@hudsonnh.gov>; Michaud, Jim <jmichaud@hudsonnh.gov>
Subject: SP#12-21 MacThompson Site Plan Sign Off

Good morning,
Attached is a Site Plan Application to redevelop 48 Lowell Road.
Please let me know if you have any questions.

P.S…Friendly Red's Tavern is coming to Hudson!! ☺

STORMWATER MANAGEMENT & EROSION CONTROL REPORT

MACTHOMPSON SITE PLAN

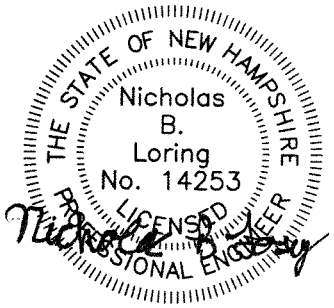
TAX MAP 190
LOT 191

48 LOWELL ROAD
(NH ROUTE 3A)

HUDSON, NH

Prepared by:
Benchmark Engineering, Inc.
1F Commons Drive, Suite 35
Londonderry, NH 03053
(603)437- 5000

August 12, 2021



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APPENDIX – A: INFILTRATION CALCULATIONS

ATTACHED: PRE-DEVELOPMENT DRAINAGE WORKSHEET (1 SHEET)
POST-DEVELOPMENT DRAINAGE WORKSHEET (1 SHEET)

METHODOLOGY

All drainage calculations in this report were completed with the aid of HydroCAD computer software. The SCS (TR-20) Method was used to calculate volumes and peak rates of runoff utilized in the drainage design. All storm drains were sized using the 25-year storm event.

DESIGN OBJECTIVE

It is recognized and understood that the impact on drainage due to development of any site will be the increase in the volume and the rate of runoff caused by paving of driveways and parking lots, which will result in a reduction in ground infiltration and increased quantities and velocities of flow.

The objective of this study is to determine the quantity of this additional runoff, the impact of a possible increase on abutting property and any existing drainage facilities, and if necessary, to design a stormwater treatment system to reduce or eliminate such impacts.

This report will demonstrate (a) that the post-development runoff at critical points throughout the watershed will not increase during a 2, 10, 25 and 50 year storm events; (b) that there will be no negative impact on abutters or the existing drainage facilities and (c) how the Town of Hudson requirements are met.

DESIGN PARAMETERS

For this report, the design and analysis of the site has been performed for a 2, 10, 25 and 50-year, 24-hour return frequency storms.

Soils within this site fall within the Hydrologic Group A classification. Therefore, a CN of 30 was used for woods (good condition), 39 for newly developed areas such as grass/landscaped areas, and 98 for impermeable surfaces such as roofs and pavement.

The time of concentration, Tc, is based on the TR-55 methodology (sheet, shallow concentrated and channel flow). A Tc of 6 minutes was used as a minimum.

The existing conditions scenario was taken directly from the post development conditions of the previously approved drainage report done by Benchmark Engineering dated February 14, 2017 and last revised on March 20, 2017. Hudson drainage regulations have been updated to require the use of the Northeast Regional Climate Center (NRCC) Precipitation Tables verses the 1992 Rockingham County Rainfall Events used in the previous report. The NRCC precipitation events are larger and this accounts for the increase in this report's pre development numbers versus the post development from the previous drainage report. All other information used from the previous report's post development scenario remains the same.

SITE DESCRIPTION

The development site consists of one parcel identified as Tax Map 190 Lot 191 containing approximately 2.63 acres of developed land on the easterly side of Lowell Road/ NH Route 3A, Hudson, New Hampshire. The western side of the site along Lowell Road contains two existing office buildings and a storage building. The east side of the site was developed in 2017 as a parking and vehicle storage lot. The tract is bordered by Lowell Road and several parcels with frontage along Lowell Road on the south and west, a utility easement to the east and Map 191 Lot 132 and Able Street to the north.

Topography of the terrain is mostly B and C slopes. Terrain rises generally from Lowell Road to a high point at the middle of the site, then downhill to an onsite depression at the rear. This area drains to Chamber System #1. No wetlands are located on site. Soils throughout this site are generally well drained with water tables in excess of 10 feet. Based on observed test pits and NRCS Soil Map information, the soils within this site fall predominantly within SCS Group A.

PROPOSED DEVELOPMENT

This site plan proposes to construct a 12,000 sq.ft. commercial building for a restaurant and retail use. The existing structures on site will be razed and parking at the front of the lot will be expanded. Drainage improvements and improvements at the rear of the site will remain.

DRAINAGE DESCRIPTION

This study encompasses a total of 2.9 acres of mostly on-site land. We have identified 6 pre development subcatchments, 8 post development subcatchments and 4 individual design points. Two additional post development subacatchments (SC 7 & SC 8) were created for the proposed drainage improvement. These are discussed in detail below.

SUBCATCHMENTS 1, 5, 6, 7 & 8 "TOTAL TO LOWELL ROAD" **(DESIGN POINT #1)**

Pre-development

A 2.5 acre watershed **(SC 1, 5 & 6)** situated along the southerly border of the subject parcel. All existing development on the site is located within this subcatchment. Flows originate to the north and flow south towards existing storm drains along Lowell Road. This design point includes the two (2) previously approved underground chamber systems. (Design Point # 1).

Post-development

In post development the area draining to Design Point-1 includes the addition of subcatchments **[SC 7 & SC 8]**. Proposed development within the area of Design Point-1 will consist of a 12,000 sq. ft. commercial building with parking areas. This development, if unmitigated, will result in an increase in the rate of runoff off-site. Mitigation and treatment for this area is provided by an underground chamber system **[Pond 3P]** with an isolator row.

Chamber System #3 will utilize 3.75' tall arch chambers in stone with an available storage volume of 3,200 cubic feet. Catch Basin #3 **[SC 7P]** and roof drain from the proposed

building **[SC 8]** are used to get runoff into the chamber system. Outflow from the system will be controlled by a weir cast in O.S.#3 with a weir cast in the basin and a 15" pipe tied into EX.CB-A.

The post development drainage area to Design Point-1 consists of subcatchments **[SC 1, SC 5, SC 6, SC 7 & SC 8].** The outflow from Chamber System #1, Chamber System #2, Chamber System #3 and the remaining portion of Subcatchments #1 flow toward Design Point #1. Below is the flow summary table for
Design Point #1.

DESIGN POINT #1 "TOTAL TO LOWELL RD"	2-YR	10-YR	25-YR	50-YR
PRE *{Link 1LA}*	0.05	0.31	2.08	6.40
POST *[Link 1L]*	0.03	0.13	0.76	4.48
INC/ (DEC) CFS	(0.02)	(0.18)	(1.32)	(1.92)
INC/ DEC %	*-40.0%*	*-58.1%*	*-63.5%*	*-30.0%*

There will be no increase in the post-development peak rate of runoff at Lowell Road in the 2, 10, 25 and 50 year return frequency storms.

SUBCATCHMENT 2 "TOTAL WEST TO LOT 189" **(DESIGN POINT #2)**

Pre-development

Subcatchment #2 **(SC 2)** is a 0.116 acre watershed located in the middle of the subject parcel along abutting Lot 189. Flows originate from the east side of the subject parcel and drain northwest towards the abutting lot. The subcatchment includes the side slopes of the existing parking area.

Post-development

No improvements are proposed within Subcatchment #2. The post development area for Subcatchment #2 increases slightly with the as-built location of the parking lot from the previous site plan. The parking lot was built slightly smaller which increased the side slope in this area. A summary table of the peak rates of runoff at this design point follows.

Design Point #2 "TOTAL WEST TO LOT 189"	2-YR	10-YR	25-YR	50-YR
PRE *{Link 2LA}*	0.00	0.00	0.01	0.03
POST *[Link 2L]*	0.00	0.00	0.01	0.03
INC/ (DEC) CFS	0.00	0.00	0.00	0.00
INC/ DEC %	*0.0%*	*0.0%*	*0.0%*	*0.0%*

There will be no increase in the post-development peak rate of runoff at abutting Lot 189 in the 2, 10, 25 and 50 year return frequency storms.

SUBCATCHMENT 3 "TOTAL NORTH" **(DESIGN POINT #3)**

Pre-development

Subcatchment #3 **(SC 3)** is a 0.225 acre watershed located at the north of the subject parcel along abutting Lot 132 and Able Street. The subcatchment includes the grassed side slopes of the parking area and wooded areas on the abutting lot.

Post-development

No improvements are proposed within Subcatchment #3. The post development area for Subcatchment #3 increases slightly with the as-built location of the parking lot from the previous site plan. The parking lot was built slightly smaller which increased the side slope in this area. A summary table of the peak rates of runoff at this design point follows.

Design Point #3 "TOTAL NORTH"	2-YR	10-YR	25-YR	50-YR
PRE *{Link 3LA}*	0.00	0.00	0.00	0.02
POST *[Link 3L]*	0.00	0.00	0.00	0.02
INC/ (DEC) CFS	0.00	0.00	0.00	0.00
INC/ DEC %	*0.0%*	*0.0%*	*0.0%*	*0.0%*

There will be no increase in the post-development peak rate of runoff at abutting Lot 132 in the 2, 10, 25 and 50 year return frequency storms.

SUBCATCHMENT 4 "TOTAL EAST TO LOT 130" **(DESIGN POINT #4)**

Pre-development

Subcatchment #4 **(SC 4)** is a 0.012 acre watershed located in the middle of the subject parcel along abutting Lot 130. Flows originate from the east side of the subject parcel and drain northwest towards the abutting lot. The subcatchment includes mostly open grassed areas along the utility easement.

Post-development

No improvements are proposed within this watershed. A summary table of the peak rates of runoff at this design point follows.

Design Point #4 "TOTAL EAST TO LOT 130"	2-YR	10-YR	25-YR	50-YR
PRE *{Link 4LA}*	0.00	0.00	0.00	0.00
POST *[Link 4L]*	0.00	0.00	0.00	0.00
INC/ (DEC) CFS	0.00	0.00	0.00	0.00
INC/ DEC %	*0.0%*	*0.0%*	*0.0%*	*0.0%*

There will be no increase in the post-development peak rate of runoff at abutting Lot 189 in the 2, 10, 25 and 50 year return frequency storms.

DISCUSSION AND SUMMARY

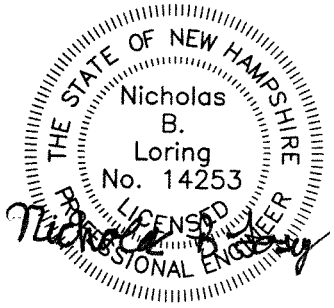
Development of the **MacThompson Site Plan** will be done in an environmentally sensitive manner. We will be constructing an underground chamber system in addition to the two exiting underground chamber systems to buffer the drainage impact from our development. These systems will attenuate peak rates of runoff from the development to those of pre-development levels while providing sedimentation, treatment and groundwater recharge from the paved areas.

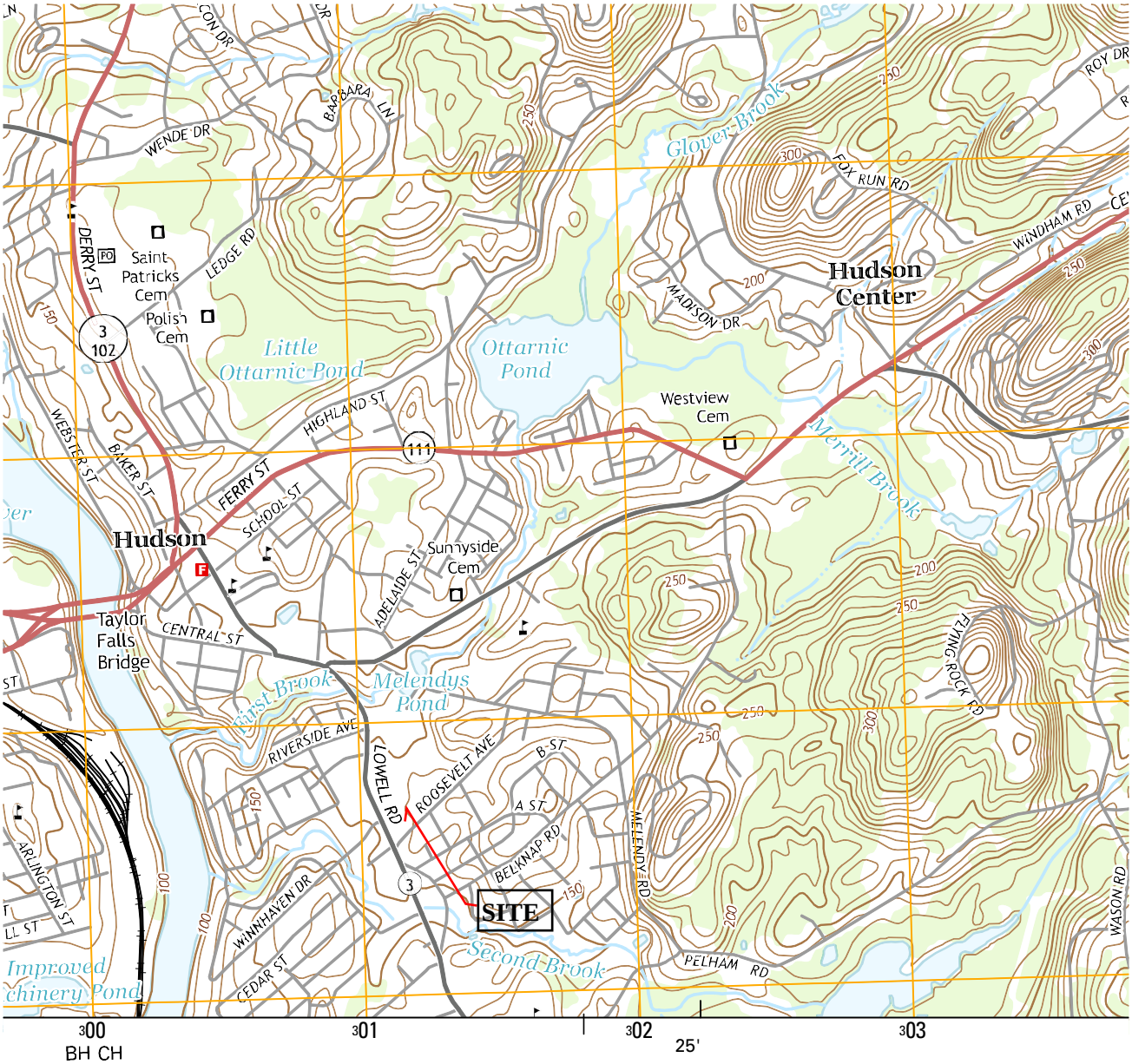
Throughout this report we have utilized conservative assumptions. This included conservative CN values. Detention, retention and infiltration capabilities of numerous depressions were disregarded. Therefore, we anticipate that the actual flows will be smaller than predicted in this report.

CONCLUSIONS:

Many erosion control measures and best management practices including underground chamber systems with isolator rows, silt fence, catch basin inlet protection, hay bales and other BMP's were incorporated into this design and will be used during construction. The construction sequence in the MacThompson Site Plans dated August 3, 2021 was developed to ensure that the erosion control measures above are constructed and established before major disturbance takes place on site and associated potential for soil erosion. This will protect the surrounding storm drain systems and downstream properties from uncontrolled runoff and erosion.

Development of the MacThompson Site Plan will not adversely affect the abutters or any existing drainage facilities.





SCALE 1:24 000

0 KILOMETERS 1 2

0 METERS 1000 2000

0.5 0 1

MILES

2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET

NEW HAMPSHIRE

QUADRANGLE LOCATION

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

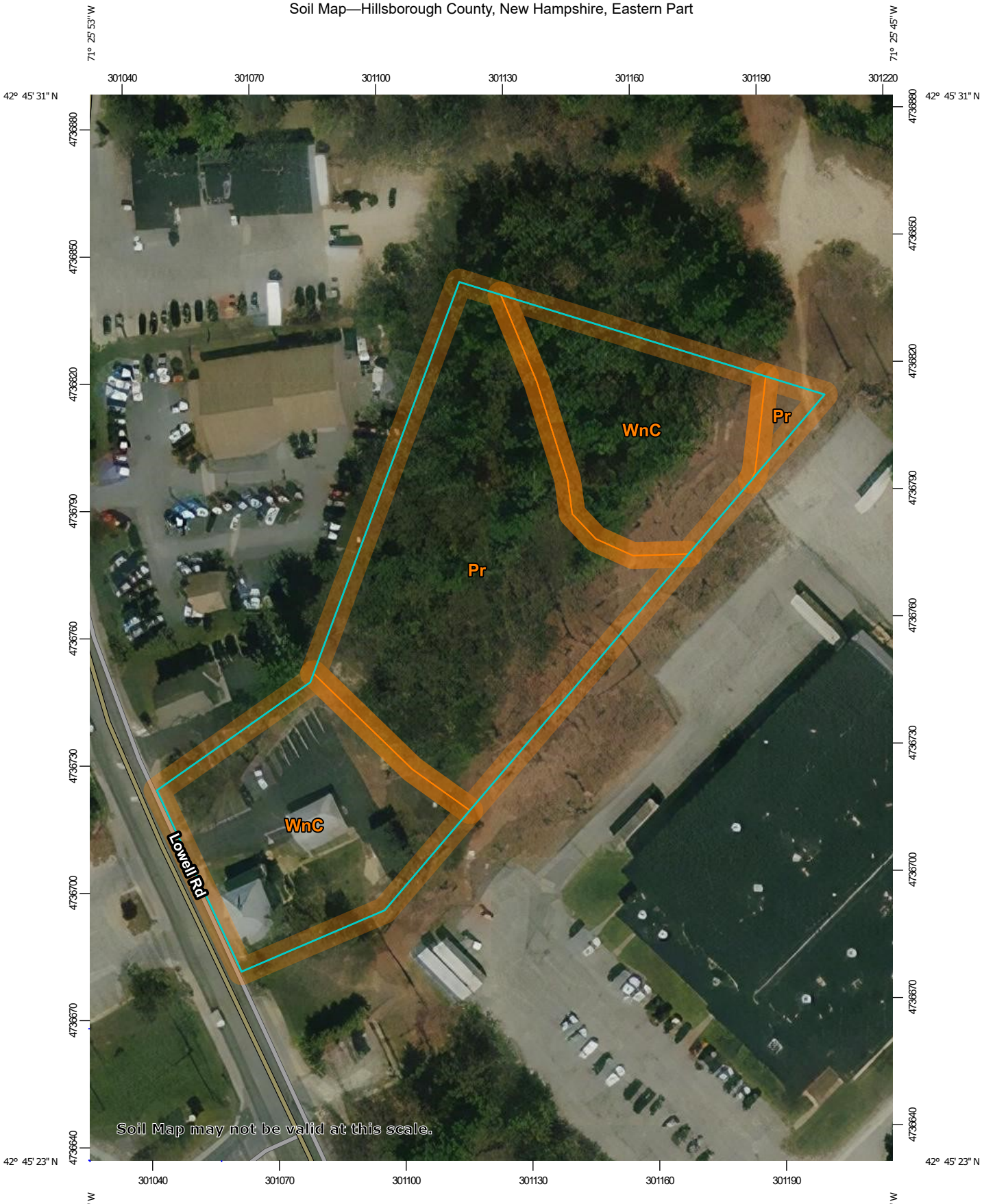
This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
netadata file associated with this product is draft version 0.6.18

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES

1 Pinardville
2 Manchester South
3 Derry
4 South Merrimack
5 Windham
6 Pepperell
7 Nashua South
8 Lowell

USGS MAP
48 LOWELL ROAD
HUDSON, NH



Map Scale: 1:1,220 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

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 1:20,000.

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: Hillsborough County, New Hampshire, Eastern Part
Survey Area Data: Version 22, May 29, 2020

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

Date(s) aerial images were photographed: May 22, 2015—Jun 14, 2017

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
Pr	Pits, gravel	1.3	51.1%
WnC	Windsor-Urban land complex, 3 to 15 percent slopes	1.3	48.9%
Totals for Area of Interest		**2.6**	**100.0%**

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	71.430 degrees West
Latitude	42.758 degrees North
Elevation	0 feet
Date/Time	Fri, 16 Jul 2021 09:34:30 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.27	0.42	0.52	0.68	0.85	1.07	**1yr**	0.74	1.01	1.24	1.56	1.96	2.48	2.72	**1yr**	2.19	2.61	3.05	3.73	4.35	**1yr**
2yr	0.33	0.51	0.64	0.84	1.06	1.33	**2yr**	0.91	1.22	1.53	1.91	2.38	2.96	3.29	**2yr**	2.62	3.16	3.67	4.39	4.99	**2yr**
5yr	0.39	0.61	0.77	1.03	1.32	1.67	**5yr**	1.14	1.52	1.94	2.42	3.01	3.74	4.18	**5yr**	3.31	4.02	4.65	5.52	6.24	**5yr**
10yr	0.44	0.70	0.88	1.20	1.56	1.99	**10yr**	1.34	1.80	2.32	2.90	3.61	4.46	5.02	**10yr**	3.95	4.82	5.57	6.56	7.39	**10yr**
25yr	0.53	0.84	1.06	1.47	1.94	2.51	**25yr**	1.68	2.25	2.93	3.68	4.58	5.64	6.39	**25yr**	4.99	6.14	7.06	8.24	9.24	**25yr**
50yr	0.59	0.95	1.22	1.71	2.31	3.01	**50yr**	1.99	2.67	3.52	4.43	5.49	6.74	7.68	**50yr**	5.96	7.38	8.46	9.80	10.96	**50yr**
100yr	0.68	1.10	1.42	2.01	2.73	3.59	**100yr**	2.36	3.16	4.21	5.30	6.57	8.06	9.22	**100yr**	7.13	8.87	10.14	11.67	12.99	**100yr**
200yr	0.77	1.26	1.64	2.35	3.24	4.28	**200yr**	2.80	3.75	5.04	6.35	7.87	9.64	11.09	**200yr**	8.53	10.67	12.16	13.89	15.41	**200yr**
500yr	0.93	1.53	2.00	2.90	4.07	5.42	**500yr**	3.51	4.71	6.39	8.07	10.00	12.22	14.16	**500yr**	10.81	13.62	15.46	17.49	19.31	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.35	0.42	0.57	0.70	0.80	**1yr**	0.61	0.79	1.06	1.32	1.68	2.28	2.56	**1yr**	2.02	2.46	2.71	3.01	3.76	**1yr**
2yr	0.32	0.49	0.60	0.81	1.00	1.20	**2yr**	0.87	1.17	1.37	1.79	2.30	2.89	3.21	**2yr**	2.56	3.08	3.57	4.28	4.88	**2yr**
5yr	0.36	0.56	0.69	0.95	1.20	1.42	**5yr**	1.04	1.39	1.63	2.11	2.70	3.51	3.89	**5yr**	3.10	3.74	4.29	5.15	5.83	**5yr**
10yr	0.40	0.61	0.75	1.05	1.36	1.61	**10yr**	1.17	1.57	1.82	2.39	3.05	4.05	4.51	**10yr**	3.59	4.33	4.93	5.90	6.67	**10yr**
25yr	0.45	0.68	0.85	1.22	1.60	1.88	**25yr**	1.38	1.84	2.14	2.81	3.55	4.90	5.49	**25yr**	4.34	5.28	5.91	7.07	7.94	**25yr**
50yr	0.49	0.75	0.93	1.33	1.80	2.13	**50yr**	1.55	2.09	2.42	3.20	3.99	5.68	6.39	**50yr**	5.03	6.14	6.81	8.11	9.05	**50yr**
100yr	0.54	0.81	1.01	1.46	2.01	2.41	**100yr**	1.73	2.36	2.73	3.50	4.49	6.46	7.46	**100yr**	5.72	7.18	7.85	9.32	10.30	**100yr**
200yr	0.59	0.89	1.12	1.62	2.27	2.73	**200yr**	1.96	2.67	3.07	3.96	5.09	7.47	8.73	**200yr**	6.61	8.40	9.06	10.70	11.75	**200yr**
500yr	0.67	0.99	1.28	1.86	2.64	3.23	**500yr**	2.28	3.16	3.62	4.67	6.02	9.07	10.80	**500yr**	8.03	10.38	10.93	12.86	13.97	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.58	0.78	0.96	1.12	**1yr**	0.83	1.10	1.27	1.66	2.10	2.64	2.88	**1yr**	2.34	2.77	3.43	4.21	4.78	**1yr**
2yr	0.35	0.54	0.67	0.91	1.12	1.31	**2yr**	0.97	1.28	1.49	1.93	2.48	3.06	3.40	**2yr**	2.70	3.27	3.78	4.51	5.15	**2yr**
5yr	0.44	0.67	0.83	1.14	1.46	1.67	**5yr**	1.26	1.64	1.90	2.43	3.06	4.02	4.54	**5yr**	3.56	4.36	5.01	5.93	6.66	**5yr**
10yr	0.53	0.81	1.00	1.40	1.81	2.04	**10yr**	1.56	2.00	2.31	2.91	3.63	4.98	5.65	**10yr**	4.40	5.43	6.21	7.28	8.13	**10yr**
25yr	0.68	1.03	1.28	1.83	2.41	2.65	**25yr**	2.08	2.59	2.99	3.69	4.53	6.59	7.54	**25yr**	5.83	7.25	8.27	9.57	10.61	**25yr**
50yr	0.82	1.25	1.55	2.23	3.01	3.24	**50yr**	2.60	3.16	3.64	4.42	5.36	8.16	9.39	**50yr**	7.22	9.03	10.25	11.77	12.99	**50yr**
100yr	1.00	1.51	1.89	2.73	3.75	3.95	**100yr**	3.24	3.86	4.43	5.46	6.35	10.26	11.67	**100yr**	9.08	11.22	12.72	14.50	15.92	**100yr**
200yr	1.22	1.83	2.32	3.36	4.68	4.82	**200yr**	4.04	4.71	5.39	6.57	7.53	12.73	14.51	**200yr**	11.27	13.95	15.78	17.86	19.51	**200yr**
500yr	1.59	2.36	3.04	4.41	6.28	6.26	**500yr**	5.42	6.12	6.99	8.40	9.42	16.95	19.30	**500yr**	15.00	18.56	21.01	23.53	25.55	**500yr**

Powered by ACIS Northeast Regional Climate Center

AERIAL PHOTO

Property Information

Property ID	190-191|6680|229
Location	48A&B LOWELL RD
Owner	MACTHOMPSON REALTY, INC.

NRPC
Nashua Regional Planning Commission

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Nashua Regional Planning Commission makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 11/16/2018
Data updated 10/25/2018

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

#1219 - MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NH
8/13/2021

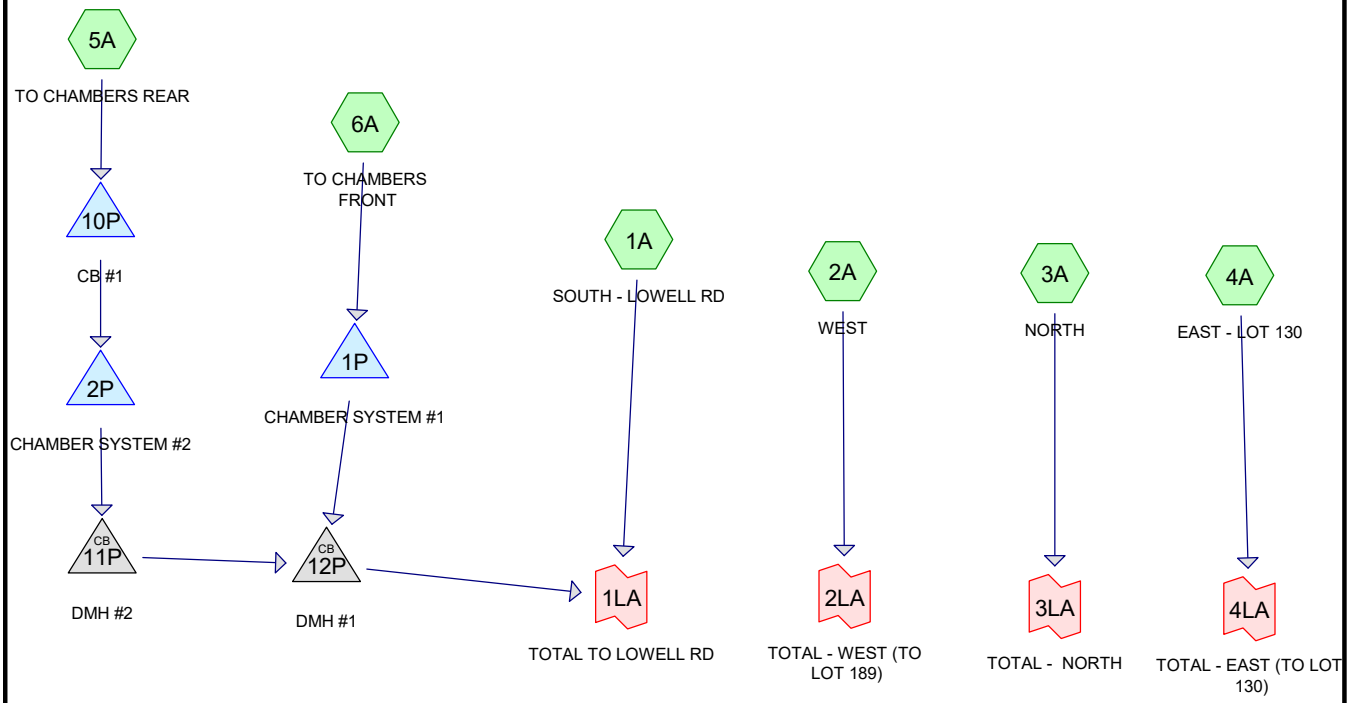
CURVE NUMBER (CN) TABLE

PRE-DEVELOPMENT (POST FROM PREVIOUSLY APPROVED DESIGN)

HYD # (HydroCAD)	SC #	DESC	AREA (SQ. FT.)	AREA (AC)	PVMT/ ROOFS *(SQ. FT.)* **98**	GRASS/ LANDSC *(SQ. FT.)* **39**	WOODS *(SQ. FT.)* **30**	GRAVEL *(SQ. FT.)* **76**	SC AREA (ACAD)	SC AREA (ACAD)	COMP CN
1A	1	South - Lowell Rd	17,901	**0.411**	6,030	10,935	936		17,901	0.411	**58**
2A	2	West - Lot 189	5,055	**0.116**		4,550	505		5,055	0.116	**38**
3A	3	North - Able St	9,786	**0.225**		4,084	5,702		9,786	0.225	**34**
4A	4A	East - Lot 130	538	**0.012**		538			538	0.012	**39**
5A	5	To Chambers - Rear	73,999	**1.699**	52,900	21,099			73,999	1.699	**81**
6A	6	To Chambers - Front	18,598	**0.427**	8,939	8,694	965		18,598	0.427	**67**
TOTAL			**125,877**	**2.890**	**67,869**	**49,900**	**8,108**	**0**	**125,877**	**2.890**	

POST-DEVELOPMENT

HYD # (HydroCAD)	SC #	DESC	AREA (SQ. FT.)	AREA (AC)	PVMT/ ROOFS *(SQ. FT.)* **98**	GRASS/ LANDSC *(SQ. FT.)* **39**	WOODS *(SQ. FT.)* **30**	GRAVEL *(SQ. FT.)* **76**	SC AREA (ACAD)	SC AREA (ACAD)	COMP CN
1S	1	South - Lowell Rd	4,639	**0.106**	1,849	2,790	0		4,639	0.106	**63**
2S	2	West - Lot 189	5,485	**0.126**		4,980	505		5,485	0.126	**38**
3S	3	North - Able St	9,866	**0.226**		4,164	5,702		9,866	0.226	**34**
4S	4A	East - Lot 130	538	**0.012**		538			538	0.012	**39**
5S	5	To Ex.Chambers - Rear	66,249	**1.521**	48,475	17,774			66,249	1.521	**82**
6S	6	To Ex. Chambers - Front	12,290	**0.282**	8,565	3,725			12,290	0.282	**80**
7S	7	To Chamber System #3	20,810	**0.478**	11,365	9,445			20,810	0.478	**71**
8S	8	Prop. Building	6,000	**0.138**	6,000				6,000	0.138	**98**
TOTAL			**125,877**	**2.890**	**76,254**	**43,416**	**6,207**	**0**	**125,877**	**2.890**	



PRE DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 1219 48 Lowell Rd-Rev2
Prepared by Benchmark LLC, Printed 8/13/2021

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
49,900	39	>75% Grass cover, Good, HSG A (1A, 2A, 3A, 4A, 5A, 6A)
61,839	98	Paved parking, HSG A (5A, 6A)
6,030	98	Pavement/Roof, HSG A (1A)
8,108	30	Woods, Good, HSG A (1A, 2A, 3A, 6A)
125,877	**70**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
125,877	HSG A	1A, 2A, 3A, 4A, 5A, 6A
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
125,877		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: SOUTH - LOWELL RD Runoff Area=17,901 sf 33.69% Impervious Runoff Depth>0.26"
Flow Length=235' Tc=9.1 min CN=58 Runoff=0.05 cfs 388 cf

Subcatchment 2A: WEST Runoff Area=5,055 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=38 Runoff=0.00 cfs 0 cf

Subcatchment 3A: NORTH Runoff Area=9,786 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=34 Runoff=0.00 cfs 0 cf

Subcatchment 4A: EAST - LOT 130 Runoff Area=538 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0 cf

Subcatchment 5A: TO CHAMBERS REAR Runoff Area=73,999 sf 71.49% Impervious Runoff Depth>1.28"
Flow Length=250' Tc=6.4 min CN=81 Runoff=2.49 cfs 7,899 cf

Subcatchment 6A: TO CHAMBERS FRONT Runoff Area=18,598 sf 48.06% Impervious Runoff Depth>0.56"
Tc=6.0 min CN=67 Runoff=0.22 cfs 874 cf

Pond 1P: CHAMBER SYSTEM #1 Peak Elev=145.21' Storage=184 cf Inflow=0.22 cfs 874 cf
Discarded=0.06 cfs 873 cf Primary=0.00 cfs 0 cf Outflow=0.06 cfs 873 cf

Pond 2P: CHAMBER SYSTEM #2 Peak Elev=146.64' Storage=2,984 cf Inflow=2.48 cfs 7,898 cf
Discarded=0.28 cfs 7,885 cf Primary=0.00 cfs 0 cf Outflow=0.28 cfs 7,885 cf

Pond 10P: CB #1 Peak Elev=152.92' Storage=57 cf Inflow=2.49 cfs 7,899 cf
Outflow=2.48 cfs 7,898 cf

Pond 11P: DMH #2 Peak Elev=147.00' Inflow=0.00 cfs 0 cf
15.0" Round Culvert n=0.013 L=111.0' S=0.0050 '/' Outflow=0.00 cfs 0 cf

Pond 12P: DMH #1 Peak Elev=146.35' Inflow=0.00 cfs 0 cf
15.0" Round Culvert n=0.013 L=95.0' S=0.0053 '/' Outflow=0.00 cfs 0 cf

Link 1LA: TOTAL TO LOWELL RD Inflow=0.05 cfs 388 cf
Primary=0.05 cfs 388 cf

Link 2LA: TOTAL - WEST (TO LOT 189) Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Link 3LA: TOTAL - NORTH Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Link 4LA: TOTAL - EAST (TO LOT 130) Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 125,877 sf Runoff Volume = 9,162 cf Average Runoff Depth = 0.87"
46.08% Pervious = 58,008 sf 53.92% Impervious = 67,869 sf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: SOUTH - LOWELL RD Runoff Area=17,901 sf 33.69% Impervious Runoff Depth>0.88"
Flow Length=235' Tc=9.1 min CN=58 Runoff=0.31 cfs 1,316 cf

Subcatchment 2A: WEST Runoff Area=5,055 sf 0.00% Impervious Runoff Depth>0.08"
Tc=6.0 min CN=38 Runoff=0.00 cfs 34 cf

Subcatchment 3A: NORTH Runoff Area=9,786 sf 0.00% Impervious Runoff Depth>0.02"
Tc=6.0 min CN=34 Runoff=0.00 cfs 13 cf

Subcatchment 4A: EAST - LOT 130 Runoff Area=538 sf 0.00% Impervious Runoff Depth>0.10"
Tc=6.0 min CN=39 Runoff=0.00 cfs 5 cf

Subcatchment 5A: TO CHAMBERS REAR Runoff Area=73,999 sf 71.49% Impervious Runoff Depth>2.51"
Flow Length=250' Tc=6.4 min CN=81 Runoff=4.94 cfs 15,481 cf

Subcatchment 6A: TO CHAMBERS FRONT Runoff Area=18,598 sf 48.06% Impervious Runoff Depth>1.44"
Tc=6.0 min CN=67 Runoff=0.68 cfs 2,224 cf

Pond 1P: CHAMBER SYSTEM #1 Peak Elev=146.72' Storage=731 cf Inflow=0.68 cfs 2,224 cf
Discarded=0.11 cfs 2,222 cf Primary=0.00 cfs 0 cf Outflow=0.11 cfs 2,222 cf

Pond 2P: CHAMBER SYSTEM #2 Peak Elev=148.76' Storage=6,873 cf Inflow=4.91 cfs 15,479 cf
Discarded=0.42 cfs 15,098 cf Primary=0.00 cfs 0 cf Outflow=0.42 cfs 15,098 cf

Pond 10P: CB #1 Peak Elev=153.02' Storage=127 cf Inflow=4.94 cfs 15,481 cf
Outflow=4.91 cfs 15,479 cf

Pond 11P: DMH #2 Peak Elev=147.00' Inflow=0.00 cfs 0 cf
15.0" Round Culvert n=0.013 L=111.0' S=0.0050 '/' Outflow=0.00 cfs 0 cf

Pond 12P: DMH #1 Peak Elev=146.35' Inflow=0.00 cfs 0 cf
15.0" Round Culvert n=0.013 L=95.0' S=0.0053 '/' Outflow=0.00 cfs 0 cf

Link 1LA: TOTAL TO LOWELL RD Inflow=0.31 cfs 1,316 cf
Primary=0.31 cfs 1,316 cf

Link 2LA: TOTAL - WEST (TO LOT 189) Inflow=0.00 cfs 34 cf
Primary=0.00 cfs 34 cf

Link 3LA: TOTAL - NORTH Inflow=0.00 cfs 13 cf
Primary=0.00 cfs 13 cf

Link 4LA: TOTAL - EAST (TO LOT 130) Inflow=0.00 cfs 5 cf
Primary=0.00 cfs 5 cf

Total Runoff Area = 125,877 sf Runoff Volume = 19,073 cf Average Runoff Depth = 1.82"
46.08% Pervious = 58,008 sf 53.92% Impervious = 67,869 sf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: SOUTH - LOWELL RD Runoff Area=17,901 sf 33.69% Impervious Runoff Depth>1.53"
Flow Length=235' Tc=9.1 min CN=58 Runoff=0.60 cfs 2,287 cf

Subcatchment 2A: WEST Runoff Area=5,055 sf 0.00% Impervious Runoff Depth>0.30"
Tc=6.0 min CN=38 Runoff=0.01 cfs 127 cf

Subcatchment 3A: NORTH Runoff Area=9,786 sf 0.00% Impervious Runoff Depth>0.15"
Tc=6.0 min CN=34 Runoff=0.00 cfs 118 cf

Subcatchment 4A: EAST - LOT 130 Runoff Area=538 sf 0.00% Impervious Runoff Depth>0.35"
Tc=6.0 min CN=39 Runoff=0.00 cfs 16 cf

Subcatchment 5A: TO CHAMBERS REAR Runoff Area=73,999 sf 71.49% Impervious Runoff Depth>3.55"
Flow Length=250' Tc=6.4 min CN=81 Runoff=6.96 cfs 21,911 cf

Subcatchment 6A: TO CHAMBERS FRONT Runoff Area=18,598 sf 48.06% Impervious Runoff Depth>2.26"
Tc=6.0 min CN=67 Runoff=1.11 cfs 3,501 cf

Pond 1P: CHAMBER SYSTEM #1 Peak Elev=147.43' Storage=922 cf Inflow=1.11 cfs 3,501 cf
Discarded=0.14 cfs 2,992 cf Primary=0.41 cfs 506 cf Outflow=0.55 cfs 3,497 cf

Pond 2P: CHAMBER SYSTEM #2 Peak Elev=150.24' Storage=8,976 cf Inflow=6.90 cfs 21,908 cf
Discarded=0.52 cfs 18,573 cf Primary=1.52 cfs 1,716 cf Outflow=2.05 cfs 20,290 cf

Pond 10P: CB #1 Peak Elev=153.09' Storage=192 cf Inflow=6.96 cfs 21,911 cf
Outflow=6.90 cfs 21,908 cf

Pond 11P: DMH #2 Peak Elev=147.70' Inflow=1.52 cfs 1,716 cf
15.0" Round Culvert n=0.013 L=111.0' S=0.0050 '/' Outflow=1.52 cfs 1,716 cf

Pond 12P: DMH #1 Peak Elev=147.12' Inflow=1.79 cfs 2,222 cf
15.0" Round Culvert n=0.013 L=95.0' S=0.0053 '/' Outflow=1.79 cfs 2,222 cf

Link 1LA: TOTAL TO LOWELL RD Inflow=2.08 cfs 4,509 cf
Primary=2.08 cfs 4,509 cf

Link 2LA: TOTAL - WEST (TO LOT 189) Inflow=0.01 cfs 127 cf
Primary=0.01 cfs 127 cf

Link 3LA: TOTAL - NORTH Inflow=0.00 cfs 118 cf
Primary=0.00 cfs 118 cf

Link 4LA: TOTAL - EAST (TO LOT 130) Inflow=0.00 cfs 16 cf
Primary=0.00 cfs 16 cf

Total Runoff Area = 125,877 sf Runoff Volume = 27,959 cf Average Runoff Depth = 2.67"
46.08% Pervious = 58,008 sf 53.92% Impervious = 67,869 sf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: SOUTH - LOWELL RD Runoff Area=17,901 sf 33.69% Impervious Runoff Depth>2.23"
Flow Length=235' Tc=9.1 min CN=58 Runoff=0.92 cfs 3,325 cf

Subcatchment 2A: WEST Runoff Area=5,055 sf 0.00% Impervious Runoff Depth>0.61"
Tc=6.0 min CN=38 Runoff=0.03 cfs 257 cf

Subcatchment 3A: NORTH Runoff Area=9,786 sf 0.00% Impervious Runoff Depth>0.37"
Tc=6.0 min CN=34 Runoff=0.02 cfs 298 cf

Subcatchment 4A: EAST - LOT 130 Runoff Area=538 sf 0.00% Impervious Runoff Depth>0.68"
Tc=6.0 min CN=39 Runoff=0.00 cfs 30 cf

Subcatchment 5A: TO CHAMBERS REAR Runoff Area=73,999 sf 71.49% Impervious Runoff Depth>4.56"
Flow Length=250' Tc=6.4 min CN=81 Runoff=8.87 cfs 28,112 cf

Subcatchment 6A: TO CHAMBERS FRONT Runoff Area=18,598 sf 48.06% Impervious Runoff Depth>3.10"
Tc=6.0 min CN=67 Runoff=1.54 cfs 4,800 cf

Pond 1P: CHAMBER SYSTEM #1 Peak Elev=147.88' Storage=1,014 cf Inflow=1.54 cfs 4,800 cf
Discarded=0.15 cfs 3,539 cf Primary=0.98 cfs 1,257 cf Outflow=1.13 cfs 4,796 cf

Pond 2P: CHAMBER SYSTEM #2 Peak Elev=150.52' Storage=9,253 cf Inflow=8.36 cfs 28,109 cf
Discarded=0.54 cfs 20,022 cf Primary=4.73 cfs 5,814 cf Outflow=5.28 cfs 25,837 cf

Pond 10P: CB #1 Peak Elev=153.24' Storage=385 cf Inflow=8.87 cfs 28,112 cf
Outflow=8.36 cfs 28,109 cf

Pond 11P: DMH #2 Peak Elev=148.75' Inflow=4.73 cfs 5,814 cf
15.0" Round Culvert n=0.013 L=111.0' S=0.0050 '/' Outflow=4.73 cfs 5,814 cf

Pond 12P: DMH #1 Peak Elev=148.45' Inflow=5.64 cfs 7,071 cf
15.0" Round Culvert n=0.013 L=95.0' S=0.0053 '/' Outflow=5.64 cfs 7,071 cf

Link 1LA: TOTAL TO LOWELL RD Inflow=6.40 cfs 10,396 cf
Primary=6.40 cfs 10,396 cf

Link 2LA: TOTAL - WEST (TO LOT 189) Inflow=0.03 cfs 257 cf
Primary=0.03 cfs 257 cf

Link 3LA: TOTAL - NORTH Inflow=0.02 cfs 298 cf
Primary=0.02 cfs 298 cf

Link 4LA: TOTAL - EAST (TO LOT 130) Inflow=0.00 cfs 30 cf
Primary=0.00 cfs 30 cf

Total Runoff Area = 125,877 sf Runoff Volume = 36,822 cf Average Runoff Depth = 3.51"
46.08% Pervious = 58,008 sf 53.92% Impervious = 67,869 sf

Summary for Subcatchment 1A: SOUTH - LOWELL RD

Runoff = 0.60 cfs @ 12.14 hrs, Volume= 2,287 cf, Depth> 1.53"
Routed to Link 1LA : TOTAL TO LOWELL RD

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

	Area (sf)	CN	Description
*	6,030	98	Pavement/Roof, HSG A
	10,935	39	>75% Grass cover, Good, HSG A
	936	30	Woods, Good, HSG A
	17,901	58	Weighted Average
	11,871		66.31% Pervious Area
	6,030		33.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	30	0.2200	0.13		**Sheet Flow, SHEET-1** Woods: Light underbrush n= 0.400 P2= 2.10"
4.5	70	0.1140	0.26		**Sheet Flow, SHEET-2** Grass: Short n= 0.150 P2= 2.10"
0.7	135	0.0350	3.01		**Shallow Concentrated Flow, SHALLOW-1** Unpaved Kv= 16.1 fps
9.1	235	Total			

Summary for Subcatchment 2A: WEST

Runoff = 0.01 cfs @ 12.41 hrs, Volume= 127 cf, Depth> 0.30"
Routed to Link 2LA : TOTAL - WEST (TO LOT 189)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

	Area (sf)	CN	Description
*	0	98	Pavement/Roof, HSG B
	4,550	39	>75% Grass cover, Good, HSG A
	505	30	Woods, Good, HSG A
	5,055	38	Weighted Average
	5,055		100.00% Pervious Area

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

Summary for Subcatchment 3A: NORTH

Runoff = 0.00 cfs @ 14.66 hrs, Volume= 118 cf, Depth> 0.15"
Routed to Link 3LA : TOTAL - NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

	Area (sf)	CN	Description
*	0	98	Pavement/Roof, HSG B
	4,084	39	>75% Grass cover, Good, HSG A
	5,702	30	Woods, Good, HSG A
	9,786	34	Weighted Average
	9,786		100.00% Pervious Area

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

Summary for Subcatchment 4A: EAST - LOT 130

Runoff = 0.00 cfs @ 12.38 hrs, Volume= 16 cf, Depth> 0.35"
Routed to Link 4LA : TOTAL - EAST (TO LOT 130)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

	Area (sf)	CN	Description
*	0	98	Pavement/Roof, HSG B
	538	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	538	39	Weighted Average
	538		100.00% Pervious Area

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

Summary for Subcatchment 5A: TO CHAMBERS REAR

Runoff = 6.96 cfs @ 12.09 hrs, Volume= 21,911 cf, Depth> 3.55"
Routed to Pond 10P : CB #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

Area (sf)	CN	Description
52,900	98	Paved parking, HSG A
21,099	39	>75% Grass cover, Good, HSG A
0	30	Woods, Good, HSG A
73,999	81	Weighted Average
21,099		28.51% Pervious Area
52,900		71.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0600	0.19		**Sheet Flow, SHEET-1** Grass: Short n= 0.150 P2= 2.10"
0.9	50	0.0160	0.89		**Sheet Flow, SHEET-2** Smooth surfaces n= 0.011 P2= 2.10"
1.0	150	0.0150	2.49		**Shallow Concentrated Flow, SHALLOW-1** Paved Kv= 20.3 fps
6.4	250	Total			

Summary for Subcatchment 6A: TO CHAMBERS FRONT

Runoff = 1.11 cfs @ 12.09 hrs, Volume= 3,501 cf, Depth> 2.26"
Routed to Pond 1P : CHAMBER SYSTEM #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

Area (sf)	CN	Description
8,939	98	Paved parking, HSG A
8,694	39	>75% Grass cover, Good, HSG A
965	30	Woods, Good, HSG A
18,598	67	Weighted Average
9,659		51.94% Pervious Area
8,939		48.06% Impervious Area

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

Summary for Pond 1P: CHAMBER SYSTEM #1

Inflow Area = 18,598 sf, 48.06% Impervious, Inflow Depth > 2.26" for 25-YR event
Inflow = 1.11 cfs @ 12.09 hrs, Volume= 3,501 cf
Outflow = 0.55 cfs @ 12.28 hrs, Volume= 3,497 cf, Atten= 51%, Lag= 11.3 min
Discarded = 0.14 cfs @ 12.28 hrs, Volume= 2,992 cf
Primary = 0.41 cfs @ 12.28 hrs, Volume= 506 cf
Routed to Pond 12P : DMH #1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 147.43' @ 12.28 hrs Surf.Area= 506 sf Storage= 922 cf

Plug-Flow detention time= 68.5 min calculated for 3,497 cf (100% of inflow)
Center-of-Mass det. time= 68.0 min (915.9 - 847.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	144.50'	487 cf	**15.75'W x 32.10'L x 3.50'H Field A** 1,769 cf Overall - 551 cf Embedded = 1,218 cf x 40.0% Voids
#2A	145.00'	551 cf	**ADS_StormTech SC-740 +Cap** x 12 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 12 Chambers in 3 Rows
		1,038 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	147.00'	**8.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 146.00' / 147.00' S= -0.2000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Discarded	144.50'	**3.000 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 143.00'

Discarded OutFlow Max=0.14 cfs @ 12.28 hrs HW=147.43' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.41 cfs @ 12.28 hrs HW=147.43' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.41 cfs @ 1.76 fps)

Summary for Pond 2P: CHAMBER SYSTEM #2

Inflow Area = 73,999 sf, 71.49% Impervious, Inflow Depth > 3.55" for 25-YR event
Inflow = 6.90 cfs @ 12.10 hrs, Volume= 21,908 cf
Outflow = 2.05 cfs @ 12.45 hrs, Volume= 20,290 cf, Atten= 70%, Lag= 20.9 min
Discarded = 0.52 cfs @ 12.45 hrs, Volume= 18,573 cf
Primary = 1.52 cfs @ 12.45 hrs, Volume= 1,716 cf
Routed to Pond 11P : DMH #2

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 150.24' @ 12.45 hrs Surf.Area= 2,385 sf Storage= 8,976 cf

Plug-Flow detention time= 193.5 min calculated for 20,290 cf (93% of inflow)
Center-of-Mass det. time= 155.4 min (969.4 - 814.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	144.75'	3,941 cf	**37.58'W x 63.47'L x 6.75'H Field A** 16,101 cf Overall - 6,249 cf Embedded = 9,852 cf x 40.0% Voids
#2A	145.50'	6,249 cf	**ADS_StormTech MC-4500 +Cap** x 56 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 56 Chambers in 4 Rows Cap Storage= 35.7 cf x 2 x 4 rows = 285.6 cf
		10,190 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	148.50'	**15.0" Round Culvert** L= 261.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 148.50' / 147.10' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	150.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	144.75'	**3.000 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 141.00'

Discarded OutFlow Max=0.52 cfs @ 12.45 hrs HW=150.24' (Free Discharge)
↑└**3=Exfiltration** (Controls 0.52 cfs)

Primary OutFlow Max=1.52 cfs @ 12.45 hrs HW=150.24' (Free Discharge)
↑└**1=Culvert** (Passes 1.52 cfs of 4.79 cfs potential flow)
↑└**2=Sharp-Crested Rectangular Weir** (Weir Controls 1.52 cfs @ 1.60 fps)

Summary for Pond 10P: CB #1

[44] Hint: Outlet device #2 is below defined storage

Inflow Area = 73,999 sf, 71.49% Impervious, Inflow Depth > 3.55" for 25-YR event
Inflow = 6.96 cfs @ 12.09 hrs, Volume= 21,911 cf
Outflow = 6.90 cfs @ 12.10 hrs, Volume= 21,908 cf, Atten= 1%, Lag= 0.6 min
Primary = 6.90 cfs @ 12.10 hrs, Volume= 21,908 cf
Routed to Pond 2P : CHAMBER SYSTEM #2

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 153.09' @ 12.10 hrs Surf.Area= 1,043 sf Storage= 192 cf

Plug-Flow detention time= 0.4 min calculated for 21,908 cf (100% of inflow)
Center-of-Mass det. time= 0.3 min (814.0 - 813.7)

Volume	Invert	Avail.Storage	Storage Description
#1	152.75'	400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
152.75	100	0	0
153.25	1,500	400	400

Device	Routing	Invert	Outlet Devices
#1	Primary	152.75'	**2.2" x 4.5" Horiz. Orifice/Grate X 16.00 columns** X 4 rows C= 0.600 in 42.0" x 23.0" Grate (66% open area) Limited to weir flow at low heads
#2	Device 1	145.70'	**24.0" Round Culvert** L= 4.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 145.70' / 145.70' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.91 cfs @ 12.10 hrs HW=153.09' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 6.91 cfs @ 1.90 fps)
└**2=Culvert** (Passes 6.91 cfs of 6.93 cfs potential flow)

Summary for Pond 11P: DMH #2

[57] Hint: Peaked at 147.70' (Flood elevation advised)
[79] Warning: Submerged Pond 2P Primary device # 1 OUTLET by 0.60'

Inflow Area = 73,999 sf, 71.49% Impervious, Inflow Depth = 0.28" for 25-YR event
Inflow = 1.52 cfs @ 12.45 hrs, Volume= 1,716 cf
Outflow = 1.52 cfs @ 12.45 hrs, Volume= 1,716 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.52 cfs @ 12.45 hrs, Volume= 1,716 cf
Routed to Pond 12P : DMH #1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 147.70' @ 12.45 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	147.00'	**15.0" Round Culvert** L= 111.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 147.00' / 146.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.52 cfs @ 12.45 hrs HW=147.70' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.52 cfs @ 3.08 fps)

Summary for Pond 12P: DMH #1

[57] Hint: Peaked at 147.12' (Flood elevation advised)
[79] Warning: Submerged Pond 1P Primary device # 1 by 0.12'
[79] Warning: Submerged Pond 11P Primary device # 1 INLET by 0.12'

Inflow Area = 92,597 sf, 66.78% Impervious, Inflow Depth = 0.29" for 25-YR event
Inflow = 1.79 cfs @ 12.45 hrs, Volume= 2,222 cf
Outflow = 1.79 cfs @ 12.45 hrs, Volume= 2,222 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.79 cfs @ 12.45 hrs, Volume= 2,222 cf
Routed to Link 1LA : TOTAL TO LOWELL RD

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 147.12' @ 12.45 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	146.35'	**15.0" Round Culvert** L= 95.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 146.35' / 145.85' S= 0.0053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.79 cfs @ 12.45 hrs HW=147.12' (Free Discharge)
1=Culvert (Barrel Controls 1.79 cfs @ 3.23 fps)

Summary for Link 1LA: TOTAL TO LOWELL RD

Inflow Area = 110,498 sf, 61.42% Impervious, Inflow Depth > 0.49" for 25-YR event
Inflow = 2.08 cfs @ 12.44 hrs, Volume= 4,509 cf
Primary = 2.08 cfs @ 12.44 hrs, Volume= 4,509 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2LA: TOTAL - WEST (TO LOT 189)

Inflow Area = 5,055 sf, 0.00% Impervious, Inflow Depth > 0.30" for 25-YR event
Inflow = 0.01 cfs @ 12.41 hrs, Volume= 127 cf
Primary = 0.01 cfs @ 12.41 hrs, Volume= 127 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3LA: TOTAL - NORTH

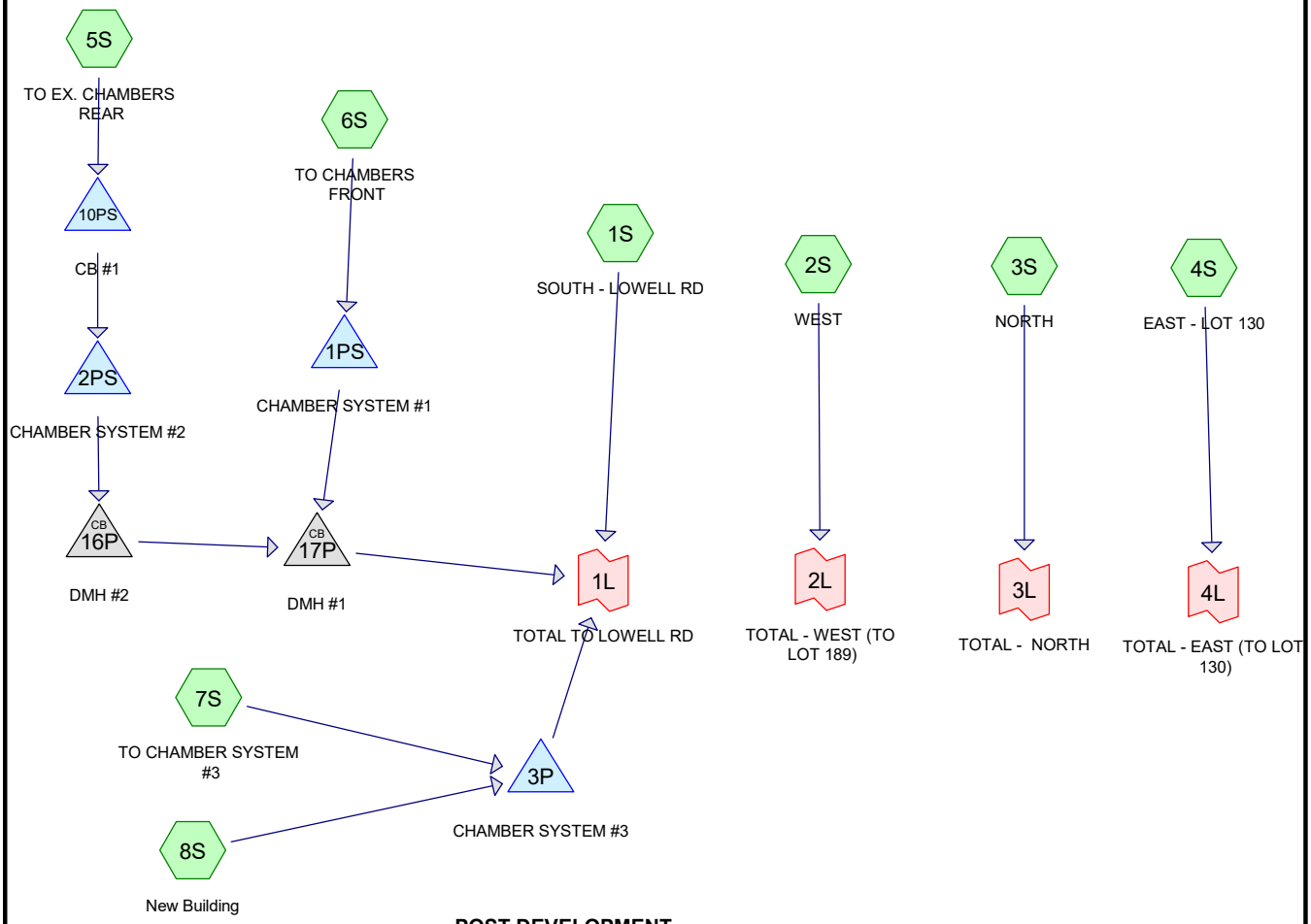
Inflow Area = 9,786 sf, 0.00% Impervious, Inflow Depth > 0.15" for 25-YR event
Inflow = 0.00 cfs @ 14.66 hrs, Volume= 118 cf
Primary = 0.00 cfs @ 14.66 hrs, Volume= 118 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4LA: TOTAL - EAST (TO LOT 130)

Inflow Area = 538 sf, 0.00% Impervious, Inflow Depth > 0.35" for 25-YR event
Inflow = 0.00 cfs @ 12.38 hrs, Volume= 16 cf
Primary = 0.00 cfs @ 12.38 hrs, Volume= 16 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



POST DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 1219 48 Lowell Rd-Rev2
Prepared by Benchmark LLC, Printed 8/13/2021

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type III 24-hr		Default	24.00	1	2.96	2
2	10-YR	Type III 24-hr		Default	24.00	1	4.46	2
3	25-YR	Type III 24-hr		Default	24.00	1	5.64	2
4	50-YR	Type III 24-hr		Default	24.00	1	6.74	2

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
43,416	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 7S)
6,000	98	New Building (8S)
68,405	98	Paved parking, HSG A (5S, 6S, 7S)
1,849	98	Pavement/Roof, HSG A (1S)
6,207	30	Woods, Good, HSG A (2S, 3S)
125,877	**74**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
119,877	HSG A	1S, 2S, 3S, 4S, 5S, 6S, 7S
0	HSG B	
0	HSG C	
0	HSG D	
6,000	Other	8S
125,877		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SOUTH - LOWELL RD Runoff Area=4,639 sf 39.86% Impervious Runoff Depth>0.42"
Tc=6.0 min CN=63 Runoff=0.03 cfs 161 cf

Subcatchment 2S: WEST Runoff Area=5,485 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=38 Runoff=0.00 cfs 0 cf

Subcatchment 3S: NORTH Runoff Area=9,866 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=34 Runoff=0.00 cfs 0 cf

Subcatchment 4S: EAST - LOT 130 Runoff Area=538 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0 cf

Subcatchment 5S: TO EX. CHAMBERS Runoff Area=66,249 sf 73.17% Impervious Runoff Depth>1.35"
Flow Length=250' Tc=6.4 min CN=82 Runoff=2.35 cfs 7,429 cf

Subcatchment 6S: TO CHAMBERS FRONT Runoff Area=12,290 sf 69.69% Impervious Runoff Depth>1.22"
Tc=6.0 min CN=80 Runoff=0.40 cfs 1,248 cf

Subcatchment 7S: TO CHAMBER SYSTEM Runoff Area=20,810 sf 54.61% Impervious Runoff Depth>0.74"
Flow Length=190' Tc=7.1 min CN=71 Runoff=0.35 cfs 1,276 cf

Subcatchment 8S: New Building Runoff Area=6,000 sf 100.00% Impervious Runoff Depth>2.73"
Tc=6.0 min CN=98 Runoff=0.39 cfs 1,363 cf

Pond 1PS: CHAMBER SYSTEM #1 Peak Elev=145.72' Storage=380 cf Inflow=0.40 cfs 1,248 cf
Discarded=0.07 cfs 1,247 cf Primary=0.00 cfs 0 cf Outflow=0.07 cfs 1,247 cf

Pond 2PS: CHAMBER SYSTEM #2 Peak Elev=146.53' Storage=2,771 cf Inflow=2.34 cfs 7,428 cf
Discarded=0.27 cfs 7,417 cf Primary=0.00 cfs 0 cf Outflow=0.27 cfs 7,417 cf

Pond 3P: CHAMBER SYSTEM #3 Peak Elev=143.92' Storage=716 cf Inflow=0.73 cfs 2,639 cf
Discarded=0.14 cfs 2,636 cf Primary=0.00 cfs 0 cf Outflow=0.14 cfs 2,636 cf

Pond 10PS: CB #1 Peak Elev=152.91' Storage=54 cf Inflow=2.35 cfs 7,429 cf
Outflow=2.34 cfs 7,428 cf

Pond 16P: DMH #2 Peak Elev=147.00' Inflow=0.00 cfs 0 cf
15.0" Round Culvert n=0.013 L=111.0' S=0.0050 '/' Outflow=0.00 cfs 0 cf

Pond 17P: DMH #1 Peak Elev=146.35' Inflow=0.00 cfs 0 cf
15.0" Round Culvert n=0.013 L=95.0' S=0.0053 '/' Outflow=0.00 cfs 0 cf

Link 1L: TOTAL TO LOWELL RD Inflow=0.03 cfs 161 cf
Primary=0.03 cfs 161 cf

Link 2L: TOTAL - WEST (TO LOT 189) Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Link 3L: TOTAL - NORTH Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Link 4L: TOTAL - EAST (TO LOT 130) Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 125,877 sf Runoff Volume = 11,477 cf Average Runoff Depth = 1.09"
39.42% Pervious = 49,623 sf 60.58% Impervious = 76,254 sf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SOUTH - LOWELL RD Runoff Area=4,639 sf 39.86% Impervious Runoff Depth>1.18"
Tc=6.0 min CN=63 Runoff=0.13 cfs 455 cf

Subcatchment 2S: WEST Runoff Area=5,485 sf 0.00% Impervious Runoff Depth>0.08"
Tc=6.0 min CN=38 Runoff=0.00 cfs 37 cf

Subcatchment 3S: NORTH Runoff Area=9,866 sf 0.00% Impervious Runoff Depth>0.02"
Tc=6.0 min CN=34 Runoff=0.00 cfs 14 cf

Subcatchment 4S: EAST - LOT 130 Runoff Area=538 sf 0.00% Impervious Runoff Depth>0.10"
Tc=6.0 min CN=39 Runoff=0.00 cfs 5 cf

Subcatchment 5S: TO EX. CHAMBERS Runoff Area=66,249 sf 73.17% Impervious Runoff Depth>2.60"
Flow Length=250' Tc=6.4 min CN=82 Runoff=4.57 cfs 14,342 cf

Subcatchment 6S: TO CHAMBERS FRONT Runoff Area=12,290 sf 69.69% Impervious Runoff Depth>2.42"
Tc=6.0 min CN=80 Runoff=0.80 cfs 2,483 cf

Subcatchment 7S: TO CHAMBER SYSTEM Runoff Area=20,810 sf 54.61% Impervious Runoff Depth>1.71"
Flow Length=190' Tc=7.1 min CN=71 Runoff=0.90 cfs 2,973 cf

Subcatchment 8S: New Building Runoff Area=6,000 sf 100.00% Impervious Runoff Depth>4.22"
Tc=6.0 min CN=98 Runoff=0.60 cfs 2,110 cf

Pond 1PS: CHAMBER SYSTEM #1 Peak Elev=147.16' Storage=861 cf Inflow=0.80 cfs 2,483 cf
Discarded=0.13 cfs 2,422 cf Primary=0.07 cfs 59 cf Outflow=0.20 cfs 2,481 cf

Pond 2PS: CHAMBER SYSTEM #2 Peak Elev=148.41' Storage=6,289 cf Inflow=4.55 cfs 14,341 cf
Discarded=0.40 cfs 14,296 cf Primary=0.00 cfs 0 cf Outflow=0.40 cfs 14,296 cf

Pond 3P: CHAMBER SYSTEM #3 Peak Elev=145.10' Storage=1,749 cf Inflow=1.49 cfs 5,084 cf
Discarded=0.21 cfs 5,078 cf Primary=0.00 cfs 0 cf Outflow=0.21 cfs 5,078 cf

Pond 10PS: CB #1 Peak Elev=153.00' Storage=116 cf Inflow=4.57 cfs 14,342 cf
Outflow=4.55 cfs 14,341 cf

Pond 16P: DMH #2 Peak Elev=147.00' Inflow=0.00 cfs 0 cf
15.0" Round Culvert n=0.013 L=111.0' S=0.0050 '/' Outflow=0.00 cfs 0 cf

Pond 17P: DMH #1 Peak Elev=146.50' Inflow=0.07 cfs 59 cf
15.0" Round Culvert n=0.013 L=95.0' S=0.0053 '/' Outflow=0.07 cfs 59 cf

Link 1L: TOTAL TO LOWELL RD Inflow=0.13 cfs 514 cf
Primary=0.13 cfs 514 cf

Link 2L: TOTAL - WEST (TO LOT 189) Inflow=0.00 cfs 37 cf
Primary=0.00 cfs 37 cf

Link 3L: TOTAL - NORTH Inflow=0.00 cfs 14 cf
Primary=0.00 cfs 14 cf

Link 4L: TOTAL - EAST (TO LOT 130) Inflow=0.00 cfs 5 cf
Primary=0.00 cfs 5 cf

Total Runoff Area = 125,877 sf Runoff Volume = 22,420 cf Average Runoff Depth = 2.14"
39.42% Pervious = 49,623 sf 60.58% Impervious = 76,254 sf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SOUTH - LOWELL RD Runoff Area=4,639 sf 39.86% Impervious Runoff Depth>1.93"
Tc=6.0 min CN=63 Runoff=0.23 cfs 744 cf

Subcatchment 2S: WEST Runoff Area=5,485 sf 0.00% Impervious Runoff Depth>0.30"
Tc=6.0 min CN=38 Runoff=0.01 cfs 138 cf

Subcatchment 3S: NORTH Runoff Area=9,866 sf 0.00% Impervious Runoff Depth>0.15"
Tc=6.0 min CN=34 Runoff=0.00 cfs 119 cf

Subcatchment 4S: EAST - LOT 130 Runoff Area=538 sf 0.00% Impervious Runoff Depth>0.35"
Tc=6.0 min CN=39 Runoff=0.00 cfs 16 cf

Subcatchment 5S: TO EX. CHAMBERS Runoff Area=66,249 sf 73.17% Impervious Runoff Depth>3.65"
Flow Length=250' Tc=6.4 min CN=82 Runoff=6.39 cfs 20,168 cf

Subcatchment 6S: TO CHAMBERS FRONT Runoff Area=12,290 sf 69.69% Impervious Runoff Depth>3.45"
Tc=6.0 min CN=80 Runoff=1.14 cfs 3,538 cf

Subcatchment 7S: TO CHAMBER SYSTEM Runoff Area=20,810 sf 54.61% Impervious Runoff Depth>2.61"
Flow Length=190' Tc=7.1 min CN=71 Runoff=1.40 cfs 4,522 cf

Subcatchment 8S: New Building Runoff Area=6,000 sf 100.00% Impervious Runoff Depth>5.40"
Tc=6.0 min CN=98 Runoff=0.76 cfs 2,699 cf

Pond 1PS: CHAMBER SYSTEM #1 Peak Elev=147.50' Storage=938 cf Inflow=1.14 cfs 3,538 cf
Discarded=0.14 cfs 2,951 cf Primary=0.54 cfs 585 cf Outflow=0.67 cfs 3,535 cf

Pond 2PS: CHAMBER SYSTEM #2 Peak Elev=150.12' Storage=8,846 cf Inflow=6.35 cfs 20,167 cf
Discarded=0.52 cfs 18,174 cf Primary=0.54 cfs 663 cf Outflow=1.06 cfs 18,837 cf

Pond 3P: CHAMBER SYSTEM #3 Peak Elev=146.26' Storage=2,658 cf Inflow=2.14 cfs 7,221 cf
Discarded=0.29 cfs 7,117 cf Primary=0.06 cfs 96 cf Outflow=0.35 cfs 7,213 cf

Pond 10PS: CB #1 Peak Elev=153.07' Storage=173 cf Inflow=6.39 cfs 20,168 cf
Outflow=6.35 cfs 20,167 cf

Pond 16P: DMH #2 Peak Elev=147.40' Inflow=0.54 cfs 663 cf
15.0" Round Culvert n=0.013 L=111.0' S=0.0050 '/' Outflow=0.54 cfs 663 cf

Pond 17P: DMH #1 Peak Elev=146.79' Inflow=0.65 cfs 1,247 cf
15.0" Round Culvert n=0.013 L=95.0' S=0.0053 '/' Outflow=0.65 cfs 1,247 cf

Link 1L: TOTAL TO LOWELL RD Inflow=0.76 cfs 2,088 cf
Primary=0.76 cfs 2,088 cf

Link 2L: TOTAL - WEST (TO LOT 189) Inflow=0.01 cfs 138 cf
Primary=0.01 cfs 138 cf

Link 3L: TOTAL - NORTH Inflow=0.00 cfs 119 cf
Primary=0.00 cfs 119 cf

Link 4L: TOTAL - EAST (TO LOT 130) Inflow=0.00 cfs 16 cf
Primary=0.00 cfs 16 cf

Total Runoff Area = 125,877 sf Runoff Volume = 31,944 cf Average Runoff Depth = 3.05"
39.42% Pervious = 49,623 sf 60.58% Impervious = 76,254 sf

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SOUTH - LOWELL RD Runoff Area=4,639 sf 39.86% Impervious Runoff Depth>2.70"
Tc=6.0 min CN=63 Runoff=0.33 cfs 1,045 cf

Subcatchment 2S: WEST Runoff Area=5,485 sf 0.00% Impervious Runoff Depth>0.61"
Tc=6.0 min CN=38 Runoff=0.03 cfs 278 cf

Subcatchment 3S: NORTH Runoff Area=9,866 sf 0.00% Impervious Runoff Depth>0.37"
Tc=6.0 min CN=34 Runoff=0.02 cfs 300 cf

Subcatchment 4S: EAST - LOT 130 Runoff Area=538 sf 0.00% Impervious Runoff Depth>0.68"
Tc=6.0 min CN=39 Runoff=0.00 cfs 30 cf

Subcatchment 5S: TO EX. CHAMBERS Runoff Area=66,249 sf 73.17% Impervious Runoff Depth>4.67"
Flow Length=250' Tc=6.4 min CN=82 Runoff=8.10 cfs 25,771 cf

Subcatchment 6S: TO CHAMBERS FRONT Runoff Area=12,290 sf 69.69% Impervious Runoff Depth>4.45"
Tc=6.0 min CN=80 Runoff=1.46 cfs 4,558 cf

Subcatchment 7S: TO CHAMBER SYSTEM Runoff Area=20,810 sf 54.61% Impervious Runoff Depth>3.50"
Flow Length=190' Tc=7.1 min CN=71 Runoff=1.89 cfs 6,071 cf

Subcatchment 8S: New Building Runoff Area=6,000 sf 100.00% Impervious Runoff Depth>6.50"
Tc=6.0 min CN=98 Runoff=0.91 cfs 3,248 cf

Pond 1PS: CHAMBER SYSTEM #1 Peak Elev=147.91' Storage=1,020 cf Inflow=1.46 cfs 4,558 cf
Discarded=0.15 cfs 3,405 cf Primary=1.01 cfs 1,150 cf Outflow=1.16 cfs 4,555 cf

Pond 2PS: CHAMBER SYSTEM #2 Peak Elev=150.41' Storage=9,145 cf Inflow=7.77 cfs 25,768 cf
Discarded=0.54 cfs 19,610 cf Primary=3.33 cfs 4,215 cf Outflow=3.86 cfs 23,826 cf

Pond 3P: CHAMBER SYSTEM #3 Peak Elev=146.97' Storage=3,106 cf Inflow=2.78 cfs 9,319 cf
Discarded=0.33 cfs 8,226 cf Primary=0.59 cfs 1,083 cf Outflow=0.93 cfs 9,309 cf

Pond 10PS: CB #1 Peak Elev=153.17' Storage=293 cf Inflow=8.10 cfs 25,771 cf
Outflow=7.77 cfs 25,768 cf

Pond 16P: DMH #2 Peak Elev=148.15' Inflow=3.33 cfs 4,215 cf
15.0" Round Culvert n=0.013 L=111.0' S=0.0050 '/' Outflow=3.33 cfs 4,215 cf

Pond 17P: DMH #1 Peak Elev=147.70' Inflow=3.98 cfs 5,365 cf
15.0" Round Culvert n=0.013 L=95.0' S=0.0053 '/' Outflow=3.98 cfs 5,365 cf

Link 1L: TOTAL TO LOWELL RD Inflow=4.48 cfs 7,494 cf
Primary=4.48 cfs 7,494 cf

Link 2L: TOTAL - WEST (TO LOT 189) Inflow=0.03 cfs 278 cf
Primary=0.03 cfs 278 cf

Link 3L: TOTAL - NORTH Inflow=0.02 cfs 300 cf
Primary=0.02 cfs 300 cf

Link 4L: TOTAL - EAST (TO LOT 130) Inflow=0.00 cfs 30 cf
Primary=0.00 cfs 30 cf

Total Runoff Area = 125,877 sf Runoff Volume = 41,302 cf Average Runoff Depth = 3.94"
39.42% Pervious = 49,623 sf 60.58% Impervious = 76,254 sf

Summary for Subcatchment 1S: SOUTH - LOWELL RD

Runoff = 0.23 cfs @ 12.09 hrs, Volume= 744 cf, Depth> 1.93"
Routed to Link 1L : TOTAL TO LOWELL RD

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

	Area (sf)	CN	Description
*	1,849	98	Pavement/Roof, HSG A
	2,790	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	4,639	63	Weighted Average
	2,790		60.14% Pervious Area
	1,849		39.86% Impervious Area

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

Summary for Subcatchment 2S: WEST

Runoff = 0.01 cfs @ 12.41 hrs, Volume= 138 cf, Depth> 0.30"
Routed to Link 2L : TOTAL - WEST (TO LOT 189)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

	Area (sf)	CN	Description
*	0	98	Pavement/Roof, HSG B
	4,980	39	>75% Grass cover, Good, HSG A
	505	30	Woods, Good, HSG A
	5,485	38	Weighted Average
	5,485		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: NORTH

Runoff = 0.00 cfs @ 14.66 hrs, Volume= 119 cf, Depth> 0.15"
Routed to Link 3L : TOTAL - NORTH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

	Area (sf)	CN	Description
*	0	98	Pavement/Roof, HSG B
	4,164	39	>75% Grass cover, Good, HSG A
	5,702	30	Woods, Good, HSG A
	9,866	34	Weighted Average
	9,866		100.00% Pervious Area

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

Summary for Subcatchment 4S: EAST - LOT 130

Runoff = 0.00 cfs @ 12.38 hrs, Volume= 16 cf, Depth> 0.35"
Routed to Link 4L : TOTAL - EAST (TO LOT 130)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

	Area (sf)	CN	Description
*	0	98	Pavement/Roof, HSG B
	538	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	538	39	Weighted Average
	538		100.00% Pervious Area

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

Summary for Subcatchment 5S: TO EX. CHAMBERS REAR

Runoff = 6.39 cfs @ 12.09 hrs, Volume= 20,168 cf, Depth> 3.65"
Routed to Pond 10PS : CB #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

Area (sf)	CN	Description
48,475	98	Paved parking, HSG A
17,774	39	>75% Grass cover, Good, HSG A
0	30	Woods, Good, HSG A
66,249	82	Weighted Average
17,774		26.83% Pervious Area
48,475		73.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0600	0.19		**Sheet Flow, SHEET-1** Grass: Short n= 0.150 P2= 2.10"
0.9	50	0.0160	0.89		**Sheet Flow, SHEET-2** Smooth surfaces n= 0.011 P2= 2.10"
1.0	150	0.0150	2.49		**Shallow Concentrated Flow, SHALLOW-1** Paved Kv= 20.3 fps
6.4	250	Total			

Summary for Subcatchment 6S: TO CHAMBERS FRONT

Runoff = 1.14 cfs @ 12.09 hrs, Volume= 3,538 cf, Depth> 3.45"
Routed to Pond 1PS : CHAMBER SYSTEM #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

Area (sf)	CN	Description
8,565	98	Paved parking, HSG A
3,725	39	>75% Grass cover, Good, HSG A
0	30	Woods, Good, HSG A
12,290	80	Weighted Average
3,725		30.31% Pervious Area
8,565		69.69% Impervious Area

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

Summary for Subcatchment 7S: TO CHAMBER SYSTEM #3

Runoff = 1.40 cfs @ 12.11 hrs, Volume= 4,522 cf, Depth> 2.61"
Routed to Pond 3P : CHAMBER SYSTEM #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

Area (sf)	CN	Description
11,365	98	Paved parking, HSG A
9,445	39	>75% Grass cover, Good, HSG A
0	30	Woods, Good, HSG A
20,810	71	Weighted Average
9,445		45.39% Pervious Area
11,365		54.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	100	0.0900	0.25		**Sheet Flow, SHEET-1** Grass: Short n= 0.150 P2= 2.10"
0.5	90	0.0200	2.87		**Shallow Concentrated Flow, SHEET-1** Paved Kv= 20.3 fps
7.1	190	Total			

Summary for Subcatchment 8S: New Building

Runoff = 0.76 cfs @ 12.08 hrs, Volume= 2,699 cf, Depth> 5.40"
Routed to Pond 3P : CHAMBER SYSTEM #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.64"

	Area (sf)	CN	Description
*	6,000	98	New Building
	6,000		100.00% Impervious Area

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

Summary for Pond 1PS: CHAMBER SYSTEM #1

Inflow Area = 12,290 sf, 69.69% Impervious, Inflow Depth > 3.45" for 25-YR event
Inflow = 1.14 cfs @ 12.09 hrs, Volume= 3,538 cf
Outflow = 0.67 cfs @ 12.20 hrs, Volume= 3,535 cf, Atten= 41%, Lag= 6.7 min
Discarded = 0.14 cfs @ 12.20 hrs, Volume= 2,951 cf
Primary = 0.54 cfs @ 12.20 hrs, Volume= 585 cf
Routed to Pond 17P : DMH #1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 147.50' @ 12.20 hrs Surf.Area= 506 sf Storage= 938 cf

Plug-Flow detention time= 62.2 min calculated for 3,535 cf (100% of inflow)
Center-of-Mass det. time= 61.7 min (877.7 - 816.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	144.50'	487 cf	**15.75'W x 32.10'L x 3.50'H Field A** 1,769 cf Overall - 551 cf Embedded = 1,218 cf x 40.0% Voids
#2A	145.00'	551 cf	**ADS_StormTech SC-740 +Cap** x 12 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 12 Chambers in 3 Rows
		1,038 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	147.00'	**8.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 146.00' / 147.00' S= -0.2000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Discarded	144.50'	**3.000 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 143.00'

Discarded OutFlow Max=0.14 cfs @ 12.20 hrs HW=147.50' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.54 cfs @ 12.20 hrs HW=147.50' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.54 cfs @ 1.90 fps)

Summary for Pond 2PS: CHAMBER SYSTEM #2

Inflow Area = 66,249 sf, 73.17% Impervious, Inflow Depth > 3.65" for 25-YR event
Inflow = 6.35 cfs @ 12.10 hrs, Volume= 20,167 cf
Outflow = 1.06 cfs @ 12.59 hrs, Volume= 18,837 cf, Atten= 83%, Lag= 29.0 min
Discarded = 0.52 cfs @ 12.59 hrs, Volume= 18,174 cf
Primary = 0.54 cfs @ 12.59 hrs, Volume= 663 cf
Routed to Pond 16P : DMH #2

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 150.12' @ 12.59 hrs Surf.Area= 2,385 sf Storage= 8,846 cf

Plug-Flow detention time= 201.7 min calculated for 18,829 cf (93% of inflow)
Center-of-Mass det. time= 167.0 min (978.4 - 811.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	144.75'	3,941 cf	**37.58'W x 63.47'L x 6.75'H Field A** 16,101 cf Overall - 6,249 cf Embedded = 9,852 cf x 40.0% Voids
#2A	145.50'	6,249 cf	**ADS_StormTech MC-4500 +Cap** x 56 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 56 Chambers in 4 Rows Cap Storage= 35.7 cf x 2 x 4 rows = 285.6 cf
		10,190 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	148.50'	**15.0" Round Culvert** L= 261.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 148.50' / 147.10' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	150.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	144.75'	**3.000 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 141.00'

Discarded OutFlow Max=0.52 cfs @ 12.59 hrs HW=150.12' (Free Discharge)
└**3=Exfiltration** (Controls 0.52 cfs)

Primary OutFlow Max=0.52 cfs @ 12.59 hrs HW=150.12' (Free Discharge)
└**1=Culvert** (Passes 0.52 cfs of 4.65 cfs potential flow)
└**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.52 cfs @ 1.12 fps)

Summary for Pond 3P: CHAMBER SYSTEM #3

Inflow Area = 26,810 sf, 64.77% Impervious, Inflow Depth > 3.23" for 25-YR event
Inflow = 2.14 cfs @ 12.10 hrs, Volume= 7,221 cf
Outflow = 0.35 cfs @ 12.61 hrs, Volume= 7,213 cf, Atten= 84%, Lag= 30.6 min
Discarded = 0.29 cfs @ 12.61 hrs, Volume= 7,117 cf
Primary = 0.06 cfs @ 12.61 hrs, Volume= 96 cf
Routed to Link 1L : TOTAL TO LOWELL RD

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 146.26' @ 12.61 hrs Surf.Area= 1,108 sf Storage= 2,658 cf

Plug-Flow detention time= 96.0 min calculated for 7,210 cf (100% of inflow)
Center-of-Mass det. time= 95.3 min (899.4 - 804.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	142.75'	1,611 cf	**22.75'W x 48.72'L x 5.50'H Field A** 6,096 cf Overall - 2,069 cf Embedded = 4,028 cf x 40.0% Voids
#2A	143.50'	2,069 cf	**ADS_StormTech MC-3500 d +Cap** x 18 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 18 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		3,680 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	146.05'	**15.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 146.05' / 145.85' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	146.05'	**2.5" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	147.05'	**42.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Discarded	142.75'	**3.000 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 141.00'

Discarded OutFlow Max=0.29 cfs @ 12.61 hrs HW=146.26' (Free Discharge)
└**4=Exfiltration** (Controls 0.29 cfs)

Primary OutFlow Max=0.06 cfs @ 12.61 hrs HW=146.26' (Free Discharge)
└**1=Culvert** (Passes 0.06 cfs of 0.16 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.46 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 10PS: CB #1

[44] Hint: Outlet device #2 is below defined storage

Inflow Area = 66,249 sf, 73.17% Impervious, Inflow Depth > 3.65" for 25-YR event
Inflow = 6.39 cfs @ 12.09 hrs, Volume= 20,168 cf
Outflow = 6.35 cfs @ 12.10 hrs, Volume= 20,167 cf, Atten= 1%, Lag= 0.6 min
Primary = 6.35 cfs @ 12.10 hrs, Volume= 20,167 cf
Routed to Pond 2PS : CHAMBER SYSTEM #2

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 153.07' @ 12.10 hrs Surf.Area= 990 sf Storage= 173 cf

Plug-Flow detention time= 0.4 min calculated for 20,167 cf (100% of inflow)
Center-of-Mass det. time= 0.3 min (811.4 - 811.0)

Volume	Invert	Avail.Storage	Storage Description
#1	152.75'	400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
152.75	100	0	0
153.25	1,500	400	400

Device	Routing	Invert	Outlet Devices
#1	Primary	152.75'	**2.2" x 4.5" Horiz. Orifice/Grate X 16.00 columns** X 4 rows C= 0.600 in 42.0" x 23.0" Grate (66% open area) Limited to weir flow at low heads
#2	Device 1	145.70'	**24.0" Round Culvert** L= 4.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 145.70' / 145.70' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.35 cfs @ 12.10 hrs HW=153.07' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 6.35 cfs @ 1.84 fps)
└**2=Culvert** (Passes 6.35 cfs of 6.73 cfs potential flow)

Summary for Pond 16P: DMH #2

[57] Hint: Peaked at 147.40' (Flood elevation advised)
[79] Warning: Submerged Pond 2PS Primary device # 1 OUTLET by 0.30'

Inflow Area = 66,249 sf, 73.17% Impervious, Inflow Depth = 0.12" for 25-YR event
Inflow = 0.54 cfs @ 12.59 hrs, Volume= 663 cf
Outflow = 0.54 cfs @ 12.59 hrs, Volume= 663 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.54 cfs @ 12.59 hrs, Volume= 663 cf
Routed to Pond 17P : DMH #1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 147.40' @ 12.59 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	147.00'	**15.0" Round Culvert** L= 111.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 147.00' / 146.45' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.54 cfs @ 12.59 hrs HW=147.40' (Free Discharge)
1=Culvert (Barrel Controls 0.54 cfs @ 2.38 fps)

Summary for Pond 17P: DMH #1

[57] Hint: Peaked at 146.79' (Flood elevation advised)
[79] Warning: Submerged Pond 16P Primary device # 1 OUTLET by 0.34'

Inflow Area = 78,539 sf, 72.63% Impervious, Inflow Depth = 0.19" for 25-YR event
Inflow = 0.65 cfs @ 12.58 hrs, Volume= 1,247 cf
Outflow = 0.65 cfs @ 12.58 hrs, Volume= 1,247 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.65 cfs @ 12.58 hrs, Volume= 1,247 cf
Routed to Link 1L : TOTAL TO LOWELL RD

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 146.79' @ 12.58 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	146.35'	**15.0" Round Culvert** L= 95.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 146.35' / 145.85' S= 0.0053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.65 cfs @ 12.58 hrs HW=146.79' (Free Discharge)
1=Culvert (Barrel Controls 0.65 cfs @ 2.52 fps)

Summary for Link 1L: TOTAL TO LOWELL RD

Inflow Area = 109,988 sf, 69.33% Impervious, Inflow Depth > 0.23" for 25-YR event
Inflow = 0.76 cfs @ 12.58 hrs, Volume= 2,088 cf
Primary = 0.76 cfs @ 12.58 hrs, Volume= 2,088 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: TOTAL - WEST (TO LOT 189)

Inflow Area = 5,485 sf, 0.00% Impervious, Inflow Depth > 0.30" for 25-YR event
Inflow = 0.01 cfs @ 12.41 hrs, Volume= 138 cf
Primary = 0.01 cfs @ 12.41 hrs, Volume= 138 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: TOTAL - NORTH

Inflow Area = 9,866 sf, 0.00% Impervious, Inflow Depth > 0.15" for 25-YR event
Inflow = 0.00 cfs @ 14.66 hrs, Volume= 119 cf
Primary = 0.00 cfs @ 14.66 hrs, Volume= 119 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4L: TOTAL - EAST (TO LOT 130)

Inflow Area = 538 sf, 0.00% Impervious, Inflow Depth > 0.35" for 25-YR event
Inflow = 0.00 cfs @ 12.38 hrs, Volume= 16 cf
Primary = 0.00 cfs @ 12.38 hrs, Volume= 16 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **CHAMBER SYSTEM #3**

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**
0.62	ac	A = Area draining to the practice	
0.40	ac	A_I = Impervious area draining to the practice	
0.65	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.63	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.39	ac-in	WQV= 1" x Rv x A	
1,414	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
354	cf	25% x WQV (check calc for sediment forebay volume)	
Isolator ROW		Method of pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ **25%WQV**
2,507	cf	V = Volume[1] (attach a stage-storage table)	≥ **WQV**
1,100	sf	A_{SA} = Surface area of the bottom of the pond	
3.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
5.1	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ **72-hrs**
142.75	feet	E_{BTM} = Elevation of the bottom of the basin	
138.75	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
138.75	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
4.00	feet	D_{SHWT} = Separation from SHWT	≥ *[3]
4.0	feet	D_{ROCK} = Separation from bedrock	≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	≥ **24"**
	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
Yes	Yes/No	If a trench or underground system is proposed, has observation well been provided?	←**yes**
		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	← **yes**
	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← **yes**
	:1	If a basin is proposed, pond side slopes.	≥**3:1**
145.10	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
146.97	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
147.25	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:

ELEVATION OF TOP OF PRACTICE ABOVE = TOP OF CHAMBERS

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION (Env-Wq 1507.04)

0.27	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"
	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"
0.40	inches	Rd = Weighted groundwater recharge depth	
0.108	ac-in	GRV = AI * Rd	
392	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	

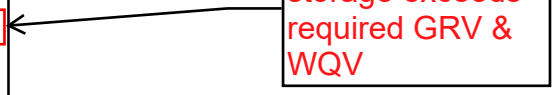
Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

11,733 sq. ft. new impervious

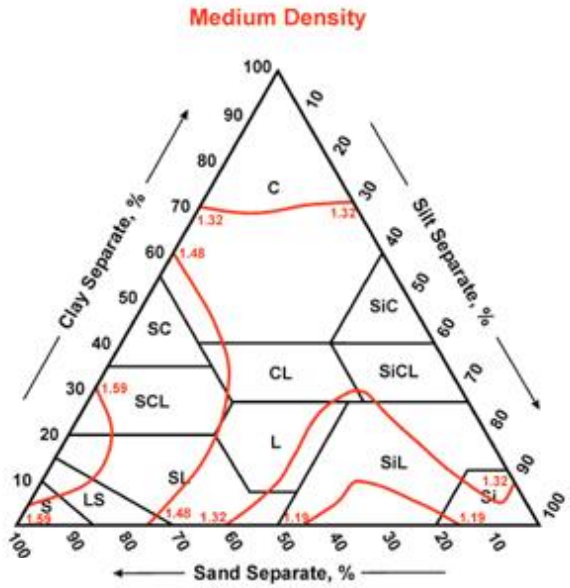
TOTAL INFILTRATION OF CHAMBER SYSTEM #2 EXCEEEDS MINIMUM GRV ABOVE

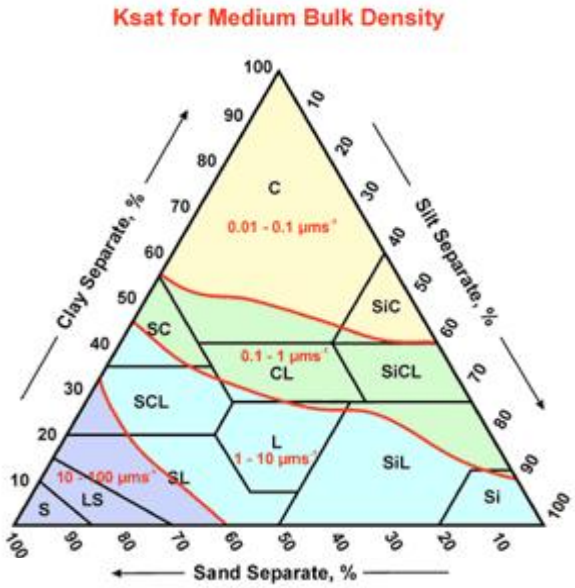
Stage-Area-Storage for Pond 3P: CHAMBER SYSTEM #3

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
142.75	1,108	0
142.85	1,123	44
142.95	1,137	89
143.05	1,151	133
143.15	1,166	177
143.25	1,180	222
143.35	1,194	266
143.45	1,208	310
143.55	1,223	378
143.65	1,237	470
143.75	1,251	561
143.85	1,266	652
143.95	1,280	743
144.05	1,294	833
144.15	1,308	922
144.25	1,323	1,012
144.35	1,337	1,101
144.45	1,351	1,189
144.55	1,366	1,277
144.65	1,380	1,364
144.75	1,394	1,451
144.85	1,409	1,537
144.95	1,423	1,623
145.05	1,437	1,708
145.15	1,451	1,792
145.25	1,466	1,875
145.35	1,480	1,958
145.45	1,494	2,039
145.55	1,509	2,120
145.65	1,523	2,200
145.75	1,537	2,279
145.85	1,551	2,356
145.95	1,566	2,432
146.05	1,580	2,507
146.15	1,594	2,581
146.25	1,609	2,653
146.35	1,623	2,724
146.45	1,637	2,792
146.55	1,652	2,859
146.65	1,666	2,923
146.75	1,680	2,984
146.85	1,694	3,042
146.95	1,709	3,094
147.05	1,723	3,144
147.15	1,737	3,191
147.25	1,752	3,236
147.35	1,766	3,281
147.45	1,780	3,325
147.55	1,794	3,369
147.65	1,809	3,414
147.75	1,823	3,458
147.85	1,837	3,502
147.95	1,852	3,547
148.05	1,866	3,591
148.15	1,880	3,635
148.25	**1,895**	**3,680**



K_{sat} VALUES
FOR
NEW HAMPSHIRE SOILS
(Including Hydrologic and DES Soil Lot Sizing Groups)





From: Guide for Estimating Ksat from Soil Properties (**Exhibit 618-9**). (http://soils.usda.gov/technical/handbook/contents/part618ex.html)

Sponsored by the Society of Soil Scientists of Northern New England
SSSNNE Special Publication No. 5
September, 2009

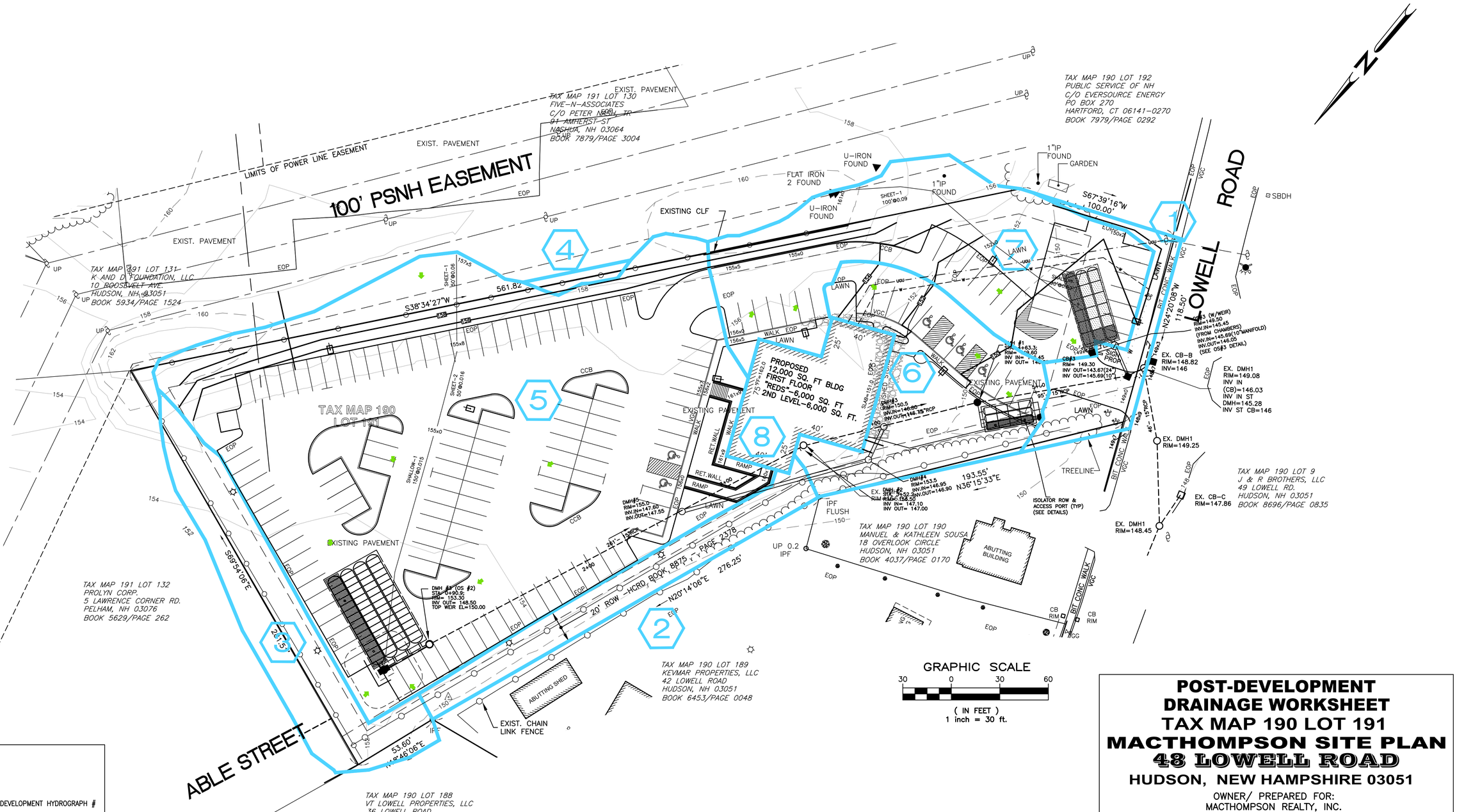
Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep

no longer recognized organic materials

SUMMARY OF FIELD TESTING DATA USED TO DETERMINE THE INFILTRATION RATE

The chamber systems are located within the native material identified on the NRCS Soil Survey as Windsor (WnC) (SCS hydrologic Group A).
The infiltration rate was determined using the default values as described in EnvWq 1504.13 utilizing the manual entitled "Ksat Values for New Hampshire Soils, Society of Soil Scientists of Northern New England, Special Publication No. 5, September 2009". **The default Ksat value for this soil is 6 to 20 inches per hour**.

After applying a factor of safety, the design rate used in the drainage calculations is 3.0 inch per hour.



GRAPHIC SCALE

30 0 30 60

(IN FEET)
1 inch = 30 ft.

LEGEND

- 2 — POST-DEVELOPMENT HYDROGRAPH #
- POST-DEVELOPMENT WATERSHED BOUNDARY
- DIRECTION OF SURFACE RUNOFF FLOW
- DP1 — DESIGN POINT (TYP)

POST-DEVELOPMENT DRAINAGE WORKSHEET
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

SCALE: 1"=30' SHEET 2 OF 2 JULY 22, 2021

REVISIONS	DATE

THE STATE OF NEW HAMPSHIRE
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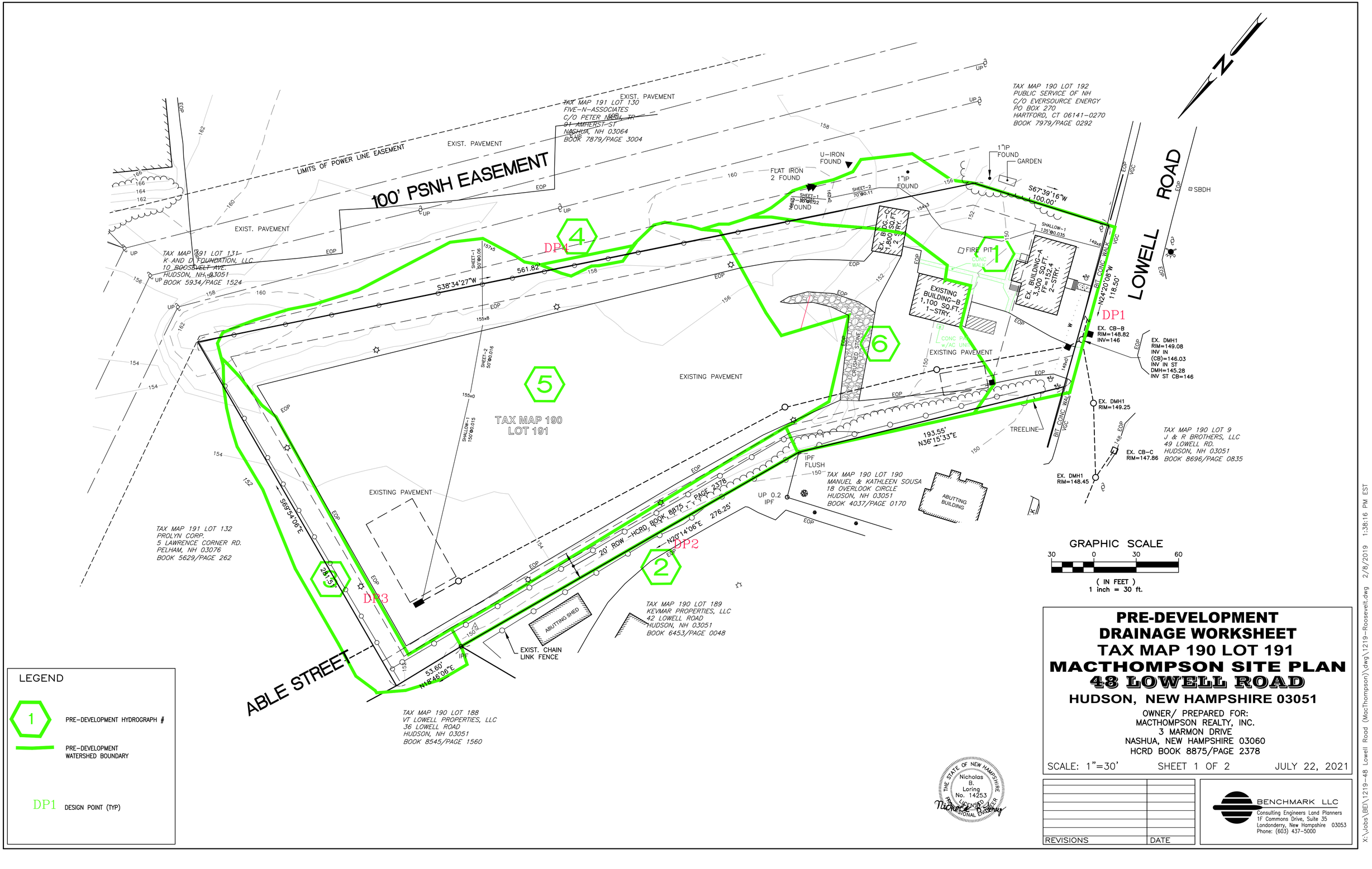
Phone: (603) 437-5000

X:\Jobs\BEN\1219-48 Lowell Road (MacThompson)\dwg\1219-Roosevelt.dwg 2/8/2019 1:38:16 PM EST



LEGEND

1 — PRE-DEVELOPMENT HYDROGRAPH #

PRE-DEVELOPMENT WATERSHED BOUNDARY

DP1 — DESIGN POINT (TYP)

PRE-DEVELOPMENT DRAINAGE WORKSHEET
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

SCALE: 1"=30' SHEET 1 OF 2 JULY 22, 2021

REVISIONS	DATE

THE STATE OF NEW HAMPSHIRE — Nicholas B. Loring No. 14253 — LICENSED PROFESSIONAL ENGINEER

BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 35
Londonderry, New Hampshire 03053
Phone: (603) 437-5000

X:\Jobs\BEN\1219-48 Lowell Road (MacThompson)\dwg\1219-Roosevelt.dwg 2/8/2019 1:38:16 PM EST

PLAN REFERENCES:
HCRD PLAN 05402
HCRD PLAN 13935
HCRD PLAN 08189
HCRD PLAN 35827
HCRD PLAN 20323
HCRD PLAN 18042
HCRD PLAN 36484
HCRD PLAN 23911
HCRD PLAN 28722

DEED REFERENCES
HCRD BOOK 8875 PAGE 2378
HCRD BOOK 7957 PAGE 0474
HCRD BOOK 4037 PAGE 170
HCRD BOOK 7879 PAGE 3004
HCRD BOOK 1226 PAGE 249
HCRD BOOK 1232 PAGE 77

TAX MAP 190 LOT 2
KENNETH E. ZIEHM, TR &
SANDRA L. ZIEHM, TR.
2 WINNHAVEN DR.
HUDSON, NH 03051
BOOK 8418/PAGE 2932

TAX MAP 190 LOT 7
ST. MARY'S BANK
ATTN: ACCOUNTS PAYABLE
200 MCGREGOR ST.
MANCHESTER, NH 03102
BOOK 7493/PAGE 2872

TAX MAP 190 LOT 7-1
NORTHERN N.E. TELEPHONE LLC
CONSOLIDATED COMMUNICATIONS-NN
770 ELM ST.
MANCHESTER, NH 03101
BOOK 7493/PAGE 2872

TAX MAP 190 LOT 9
J & R BROTHERS, LLC
49 LOWELL RD.
HUDSON, NH 03051
BOOK 8696/PAGE 0835

TAX MAP 190 LOT 10
ENTERPRISE BANK AND TRUST CO.
222 MERRIMACK ST.
LOWELL, MA 01852
BOOK 8206/PAGE 2884

TAX MAP 190 LOT 8
(NO OWNER INFORMATION
AVAILABLE FROM ASSESSOR)

TAX MAP 190 LOT 187
MANUEL & KATHLEEN SOUSA
18 OVERLOOK CIRCLE
HUDSON, NH 03051
BOOK 5928/PAGE 1842

TAX MAP 190 LOT 188
VT LOWELL PROPERTIES, LLC
36 LOWELL ROAD
HUDSON, NH 03051
BOOK 8545/PAGE 1560

TAX MAP 190 LOT 189
KEVMAR PROPERTIES, LLC
42 LOWELL ROAD
HUDSON, NH 03051
BOOK 6453/PAGE 0048

TAX MAP 190 LOT 190
MANUEL & KATHLEEN SOUSA
18 OVERLOOK CIRCLE
HUDSON, NH 03051
BOOK 4037/PAGE 0170

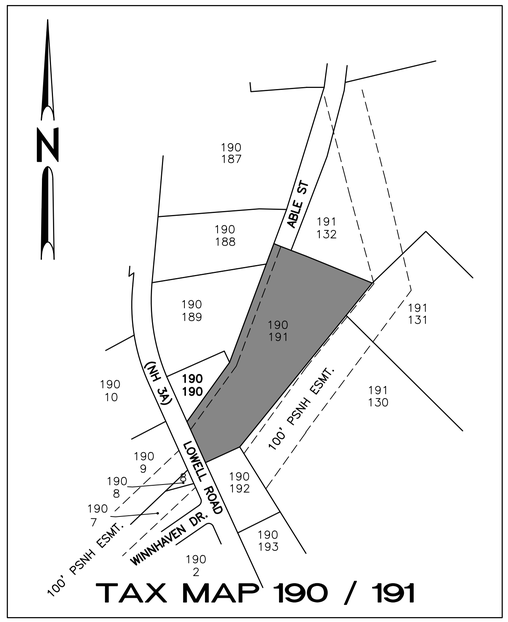
TAX MAP 190 LOT 192
PUBLIC SERVICE OF NH
C/O EVERSOURCE ENERGY
PO BOX 270
HARTFORD, CT 06141-0270
BOOK 7979/PAGE 0292

TAX MAP 190 LOT 193
ROBERT J. GAGNE LIFE ESTATE &
NORMA GAGNE LIFE ESTATE
436 OSGOOD RD.
MILFORD, NH 03055
BOOK 7927/PAGE 0367

TAX MAP 191 LOT 130
FIVE-N-ASSOCIATES
C/O PETER NASH, TR
91 AMHERST ST
NASHUA, NH 03064
BOOK 7879/PAGE 3004

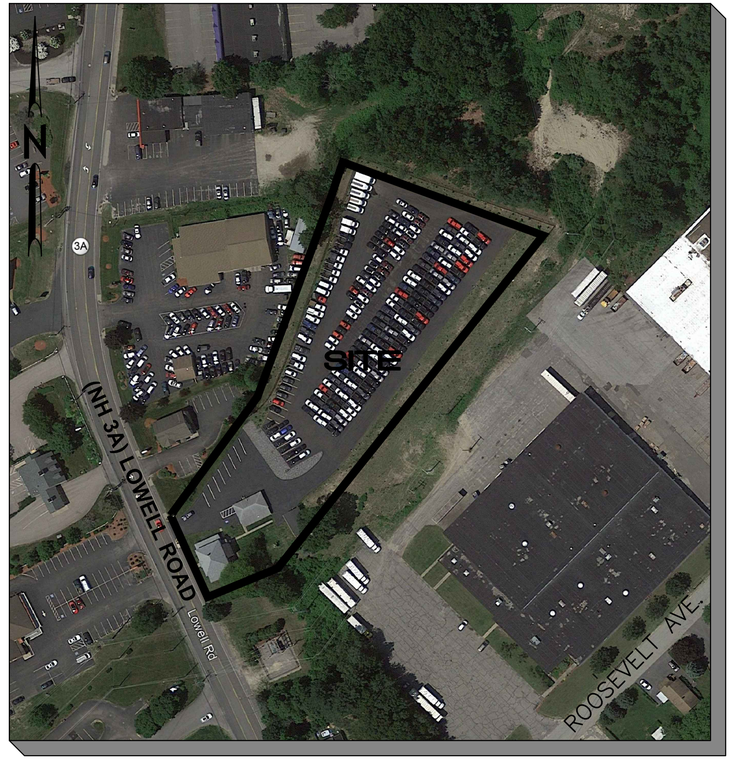
TAX MAP 191 LOT 131
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NH 03060
BOOK 9131/PAGE 2308

TAX MAP 191 LOT 132
PROLYN CORP.
5 LAWRENCE CORNER RD.
PELHAM, NH 03076
BOOK 5629/PAGE 262



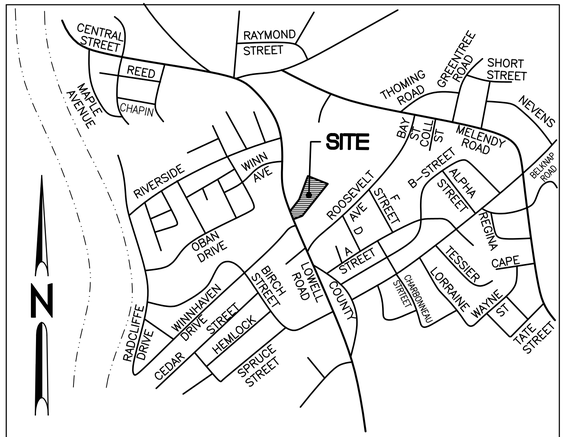
TAX MAP 190 / 191

GRAPHIC SCALE
200 0 200 400
(IN FEET)
1 inch = 200 ft.±



AERIAL IMAGE

GRAPHIC SCALE
100 0 100 200
(IN FEET)
1 inch = 100 ft.±



VICINITY MAP

GRAPHIC SCALE
1000 0 1000 2000
(IN FEET)
1 inch = 1000 ft.±

SHEET INDEX:

SHEET 1..... COVER PLAN
SHEET 2..... EXISTING CONDITIONS PLAN
SHEET 3..... SITE PLAN
SHEET 4..... GRADING, UTILITY, DRAINAGE & EROSION CONTROL PLAN
SHEET 5..... LIGHTING & LANDSCAPE PLAN
SHEET 6..... CHAMBER DETAILS
SHEET 7..... CHAMBER DETAILS
SHEET 8..... DRAINAGE DETAIL SHEET
SHEET 9..... CONSTRUCTION DETAIL SHEET
SHEET 10..... SIGHT DISTANCE & DETAIL SHEET

MACTHOMPSON SITE PLAN
48 LOWELL ROAD
TAX MAP 190 LOT 191
HUDSON, NEW HAMPSHIRE

PURSUANT TO THE SITE PLAN REVIEW REGULATIONS OF THE HUDSON PLANNING BOARD, THE SITE PLAN APPROVAL GRANTED HEREIN EXPIRES ONE YEAR FROM DATE OF APPROVAL.

APPROVED BY THE HUDSON, NH PLANNING BOARD
DATE OF MEETING: _____

SIGNATURE _____ **SIGNATURE DATE** _____

SIGNATURE _____ **SIGNATURE DATE** _____

SITE PLANS ARE VALID FOR ONE (1) YEAR FROM THE DATE OF PLANNING BOARD MEETING FINAL APPROVAL. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.

ABBREVIATIONS:

EOG	EDGE OF GRAVEL	UP	UTILITY POLE
EOP	EDGE OF PAVEMENT	OHW	OVERHEAD WIRES
EOC	EDGE OF CONCRETE	CONC	CONCRETE
VGC	VERTICAL GRANITE CURB	EXIST	EXISTING
SWL	SOLID WHITE LINE	R.O.W.	RIGHT OF WAY
SYL	SOLID YELLOW LINE	EASMT	EASEMENT
DYCL	DOUBLE YELLOW CENTER LINE	CLF	CHAIN LINK FENCE
BIT CONC	BITUMINOUS CONCRETE	MW	MONITORING WELL
TYP	TYPICAL		

DIG-SAFE
UTILITIES UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM
RI-ME-MA-NH-VT-NY 1-888-344-7233 CALL TOLL FREE

COVER PLAN
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

SCALE: AS NOTED SHEET 1 OF 10 AUGUST 3, 2021

REVISIONS	DATE

BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 35
Londonderry, New Hampshire 03053
Phone: (603) 437-5000

GENERAL NOTES:

1) THE PURPOSE OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS ON TAX MAP 191 LOT 190
2) BOUNDARY SURVEY COMPLETED BY:
   RANGEWAY LAND SURVEY AND DESIGN
   252 DANIEL PLUMMER ROAD
   GOFFSTOWN, NEW HAMPSHIRE 03045
   PHONE: (603) 624-1602
3) SEE SHEET-3 FOR ADDITIONAL NOTES.

LEGEND:

- IRON PIPE/ REBAR FOUND
- BOUND FOUND
- DRILL HOLE FOUND
- DRILL HOLE/ REBAR SET
- BOUND SET MONUMENT TO BE SET
- TBM/ BENCHMARK
- CATCH BASIN
- FLOW DIRECTION
- 274X0 SPOT ELEVATION
- EXISTING UTILITY POLE
- OVERHEAD UTILITIES
- EXISTING TREELINE
- PROPOSED TREELINE
- SILT FENCE
- WATER LINE
- WATER SHUTOFF
- PROPERTY LINE
- BUILDING SETBACK LINE
- EDGE OF GRAVEL
- FENCE
- EXISTING STRUCTURE
- STONEWALL
- PROPOSED PARKING LOT STRIPING
- EXISTING CONTOUR (MAJOR)
- EXISTING CONTOUR (MINOR)
- LIGHTS

TAX MAP 191 LOT 131
MACTHOMPSON REALTY, INC.
13 MARMON DRIVE
NASHUA, NH 03060
BOOK 9131/PAGE 2308

TAX MAP 191 LOT 130
FIVE-N-ASSOCIATES
C/O PETER NASH, TR
91 AMHERST ST
NASHUA, NH 03064
BOOK 7879/PAGE 3004

TAX MAP 190 LOT 192
PUBLIC SERVICE OF NH
C/O EVERSOURCE ENERGY
PO BOX 270
HARTFORD, CT 06141-0270
BOOK 7979/PAGE 0292

LOWELL RD. (NH RTE. 3A)
(PUBLIC- CLASS IV ROAD - 50'± ROW)

ABUTTING BUILDING

LIMITS OF POWER LINE EASEMENT

100' PSNH EASEMENT

50' UTILITY EASMT

EXIST. PAVEMENT

15' BUILDING SETBACK

TBM
TAC IN STUMP
EL=187.36

TBM
SPIKE SET
EL=160.71

S38°34'27"W 561.82'

FENCE IN STUMP

OLD FENCE

U-IRON FOUND

FLAT IRON 2 FOUND

1"IP FOUND

ROW ARBORVITAE

GARDEN

TREELINE

S67°39'16"W 100.00'

EX. BLDG. G.F. 1,800 SQ.FT. 2 STRY.

FIRE PIT

CONC WALK

LAWN

EXISTING BUILDING-B 1,100 SQ.FT. 1-STRY.

EX. BUILDING-A 3,300 SQ.FT. FF=152.4 2-STRY.

BIT CONC WALK

N24°20'08"W 118.50'

SBDH

EX. CB-B
RIM=148.82
INV=146

EX. DMH1
RIM=149.08
INV IN
(CB)=146.03
INV IN ST
DMH=145.28
INV ST CB=146

CONC PAD w/AC UNIT

EXISTING PAVEMENT

EX. CB-A
RIM=148.50
INV=145.75

EX. DMH #1

EX. CB #1

TBM
MNS
EL=148.71

25'

EX. DMH1
RIM=149.25

EX. CB-C
RIM=147.86

EX. DMH1
RIM=148.45

TAX MAP 190 LOT 9
J & R BROTHERS, LLC
49 LOWELL RD.
HUDSON, NH 03051
BOOK 8696/PAGE 0835

TAX MAP 190
LOT 191
112,675 SQ. FT.
2.59 ACRES

EXISTING PAVEMENT

EX. DMH #2
RIM=156.53

TBM
TOP OF IPF
EL=11.83

TBM
SPIKE SET
EL=150.08

193.55'
N36°15'33"E

EXISTING UNDERGROUND DRAINAGE CHAMBERS

BUILDING SETBACK

CRUSHED STONE

IPF FLUSH

UP 0.2 IPF

TAX MAP 190 LOT 190
MANUEL D. & KATHLEEN M. SOUSA
18 OVERLOOK CIRCLE
HUDSON, NH 03051
BOOK 4037/PAGE 0170

ABUTTING BUILDING

15' BUILDING SETBACK

20' ROW - HCRD BOOK 8875 PAGE 2378

N20°14'06"E 276.25'

TAX MAP 190 LOT 189
KEVMAR PROPERTIES, LLC
42 LOWELL ROAD
HUDSON, NH 03051
BOOK 6453/PAGE 0048

EXIST. PAVEMENT

ABUTTING BUILDING

CB RIM

CB RIM

GG

BIT CONC WALK

(NH 3A)

TAX MAP 191 LOT 132
PROLYN CORP.
5 LAWRENCE CORNER RD.
PELHAM, NH 03076
BOOK 5629/PAGE 262

S69°54'06"E 281.51'

EXISTING PAVEMENT

EXISTING UNDERGROUND DRAINAGE CHAMBERS

EX. DMH #3
RIM=153.40

EX. (DOUBLE) CB #2
RIM=152.77

ABUTTING SHED

EXIST. CHAIN LINK FENCE

IPF

N18°46'06"E 53.60'

ABUTTING BUILDING "BRADLEY MOTORS"

ABLE STREET

TAX MAP 190 LOT 188
VT LOWELL PROPERTIES, LLC
36 LOWELL ROAD
HUDSON, NH 03051
BOOK 8545/PAGE 1560

GRAPHIC SCALE

30 0 30 60

(IN FEET)
1 inch = 30 ft.

PURSUANT TO THE SITE PLAN REVIEW REGULATIONS OF THE HUDSON PLANNING BOARD, THE SITE PLAN APPROVAL GRANTED HEREIN EXPIRES ONE YEAR FROM DATE OF APPROVAL.

APPROVED BY THE HUDSON, NH PLANNING BOARD
DATE OF MEETING: _____

SIGNATURE _____ SIGNATURE DATE _____

SIGNATURE _____ SIGNATURE DATE _____

SITE PLANS ARE VALID FOR ONE (1) YEAR FROM THE DATE OF PLANNING BOARD MEETING FINAL APPROVAL. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.

I HEREBY CERTIFY THAT THE WORK PERFORMED IN THE PREPARATION OF THIS PLAN HAS AN ERROR OF CLOSURE OF 1:10,000 OR BETTER.

RANGEWAY LAND SURVEYING & DESIGN, INC. DATE
BY: PAUL W. ZARNOWSKI LLS.

STATE OF NEW HAMPSHIRE No. 0709 PAUL W. ZARNOWSKI LICENSED LAND SURVEYOR
SIGNATURE

EXISTING CONDITIONS PLAN
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

SCALE: 1"=30' SHEET 2 OF 10 AUGUST 3, 2021

REVISIONS	DATE

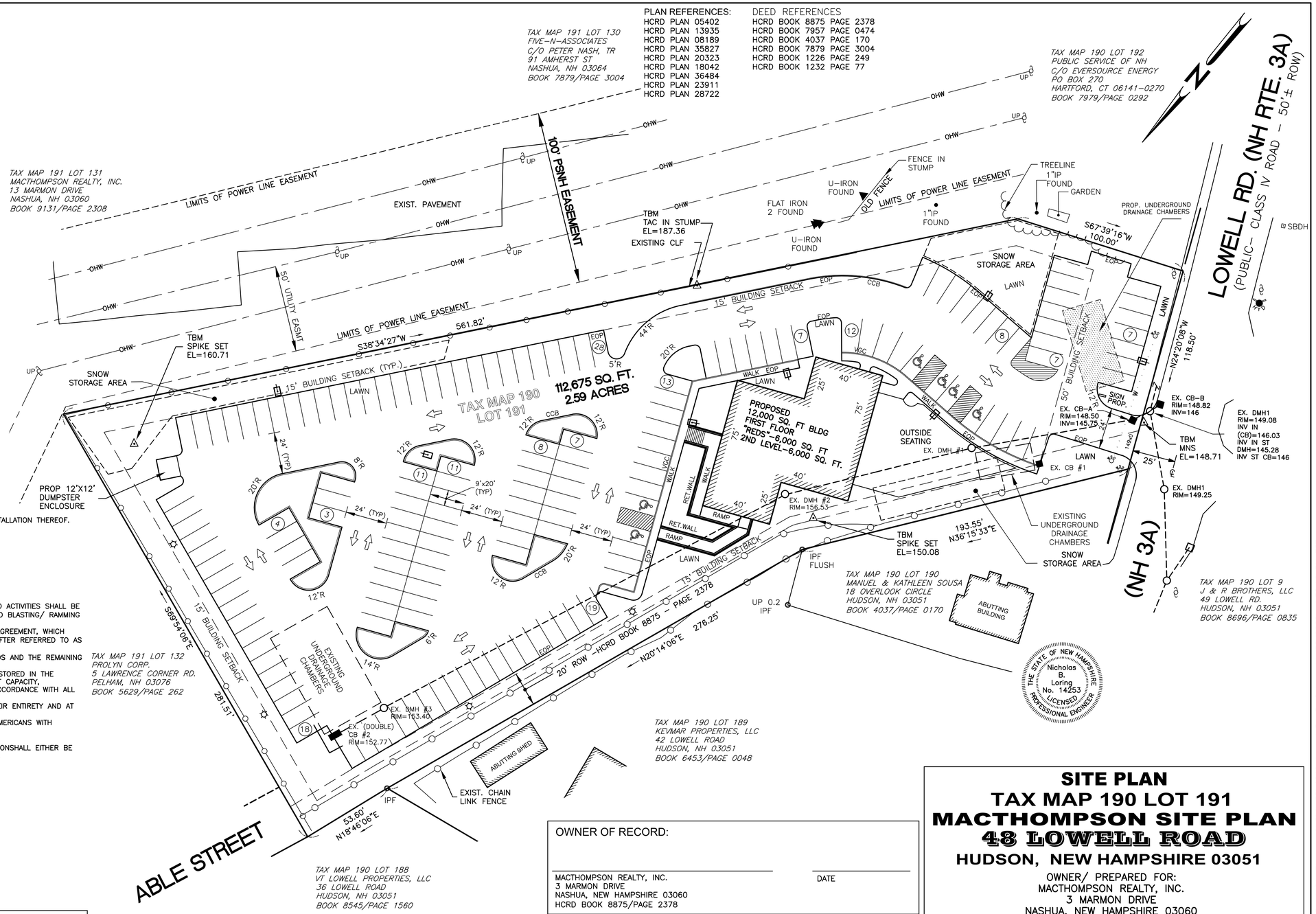
BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 35
Londonderry, New Hampshire 03053
Phone: (603) 437-5000

GENERAL NOTES:

1) **THE PURPOSE OF THIS PLAN IS:**
   - A) TO RE-DEVELOP TAX MAP 190 LOT 191 AS A MULTI USE COMMERCIAL SITE PER TOWN OF HUDSON ZONING ORDINANCE SECTION 334-10 B. USES SHALL INCLUDE:
     - i. BUSINESS OR PROFESSIONAL OFFICE
     - ii. RETAIL BUSINESS AND PERSONAL SERVICE ESTABLISHMENT
     - iii. EATING & DRINKING ESTABLISHMENT
   - B) TO SHOW THE 12,000 SQ.FT. BUILDING WITH ASSOCIATED SITE IMPROVEMENTS.
2) PARCEL ID: TAX MAP 190 LOT 191
3) PARCEL AREA = 112,675 S.F. = 2.59 ACRES
4) PARCEL ZONE: "B" BUSINESS
2) BOUNDARY SURVEY COMPLETED BY:
   RANGEWAY LAND SURVEY AND DESIGN
   252 DANIEL PLUMMER ROAD, GOFFSTOWN, NH 03045
   PHONE: (603) 624-1602
3) NO WETLANDS ENCOUNTERED ON SITE.
   WETLAND INFORMATION PROVIDED BY:
   PAUL W. ZARNOWSKI C.W.S.#40, RANGEWAY LAND SURVEY AND DESIGN
   252 DANIEL PLUMMER ROAD, GOFFSTOWN, NEW HAMPSHIRE 03045
7) TOPOGRAPHIC INFORMATION IS BASED ON THE ACTUAL TOPOGRAPHIC AND LOCATION SURVEY BY BENCHMARK ENGINEERING, INC. IN JULY 2016.
   VERTICAL DATUM NVGD 29 FROM GPS SURVEY
   HORIZONTAL DATUM NAD 83 FROM GPS SURVEY
8) PREDOMINANT SCS SOILS GROUP ON THIS LOT IS WdB
   WINDSOR LOAMY SAND AS SHOWN ON THE SCS SOILS MAP FOR THE TOWN OF HUDSON, NEW HAMPSHIRE.
9) THIS PROPERTY IS LOCATED OUTSIDE OF THE ESTABLISHED 100-YEAR FLOOD HAZARD ZONE AS SHOWN ON THE FEDERAL FLOOD INSURANCE MAPS (F.I.R.M.) FOR HUDSON, NH, COMMUNITY PANEL #330092-0518D (EFFECTIVE SEPTEMBER 25, 2009).
10) LOCATIONS OF UTILITIES WERE COMPILED FROM THE FIELD SURVEY AND INFORMATION OF RECORD. THESE LOCATIONS ARE APPROXIMATE ONLY. PRIOR TO ANY EXCAVATION ON SITE THE CONTRACTOR SHALL CALL DIG-SAFE AT 1 888 344-7233.
11) MINIMUM REQUIREMENTS: LOT AREA = 30,000 SQ. FT.
    BUILDING SETBACKS: FRONT = 50'
    SIDE/REAR = 15'
    MINIMUM FRONTAGE: 150' REQUIRED (118' EXISTING)
12) EXISTING USE:
    BUILDINGS A & B:
    BUSINESS OR PROFESSIONAL OFFICE, GENERAL RETAIL & MOTOR VEHICLE SALES AND RENTAL = 4,400 SQ. FT.
    BUILDING-C: STORAGE = 1,800 SQ. FT.
13) PROPOSED USES:
    BUSINESS OR PROFESSIONAL OFFICE &
    RETAIL BUSINESS AND PERSONAL SERVICE ESTABLISHMENT &
    EATING & DRINKING ESTABLISHMENT W/ BAR = 12,000 SQ. FT.
    (PER TOWN OF HUDSON ZONING ORDINANCE: SECTION 334-10 B MULTIPLE COMMERCIAL USES AND ACTIVITIES DEVELOPED AS PART OF A SINGLE SITE PLAN ARE CONSIDERED A SINGLE PRINCIPAL USE.)
14) PARKING REQUIREMENTS:
    EATING & DRINKING ESTABLISHMENT W/ BAR = 1 SPACE/75 SQ. FT.
    12,000 SQ. FT. * 1 SPACE/75 SQ. FT. = 160 SPACES
    (USE WITH HIGHER PARKING REQUIREMENT USED)
    TOTAL REQUIRED PARKING = 160 SPACES
    TOTAL PARKING PROVIDED = 163 SPACES
    (6 ADA PARKING SPACES PROVIDED PER ADA REGULATIONS)
15) OPEN SPACE CALCULATIONS (35% REQUIRED):
    37,000 SQ. FT. +/- OPEN SPACE/112,675 SQ. FT. = 32.8% PROVIDED
16) THE BUILDING IS SERVICED BY MUNICIPAL WATER AND MUNICIPAL SEWER.
17) ALL SIGNS ARE SUBJECT TO APPROVAL BY THE HUDSON PLANNING BOARD PRIOR TO INSTALLATION THEREOF.
18) PLANNING BOARD WAIVERS:
    275-8.C.(4) PARKING SPACE DIMENSIONS
    275-8.C.(6) OFF STREET LOADING SPACE
    275-8.C.(7)(a) INTERIOR LANDSCAPING
    276-11.1.(B)(22) FRONT GREEN AREA SETBACK
    276-11.1.(B)(24)(a) OPEN SPACE
    276-11.1.(B)(25) PARKING AND TRAVELWAY SETBACK
19) NOISE FROM THE PROPOSED ACTIVITIES WITHIN THE SITE SHALL MEET THE MINIMUM STANDARDS AS SET BY THE TOWN OF HUDSON, NH SECTION 249
20) IF LOT DEVELOPMENT INVOLVES BLASTING AND/OR RAMMING OF BEDROCK MATERIALS, SAID ACTIVITIES SHALL BE LIMITED TO THE HOURS OF 7:00 AM AND 5:00 PM MONDAY THROUGH FRIDAY ONLY. SAID BLASTING/ RAMMING ACTIVITIES SHALL BE PROHIBITED ON WEEKENDS.
21) ALL STIPULATIONS OF THE APPROVAL SHALL BE INCORPORATED INTO THE DEVELOPMENT AGREEMENT, WHICH SHALL BE RECORDED AT THE HCRD, TOGETHER WITH THE SITE PLAN-OF-RECORD (HEREAFTER REFERRED TO AS THE PLAN)
22) SHEET 3 OF 10 SHALL BE RECORDED AT THE HILLSBOROUGH COUNTY REGISTRY OF DEEDS AND THE REMAINING SHEETS SHALL BE ON FILE AT THE TOWN OF HUDSON PLANNING DEPARTMENT.
23) PLOWED SNOW FROM THE FACILITIES, DRIVEWAY, WALKWAYS AND PARKING LOT SHALL BE STORED IN THE DESIGNATED AREAS SHOWN IN THIS PLAN SET. WHEN THE SNOW STORAGE AREAS ARE AT CAPACITY, SUBSEQUENT SNOW SHALL BE HAULED OFF SITE AND DISPOSED OF PROPERLY AND IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.
24) ALL IMPROVEMENTS SHOWN ON THE SITE PLAN OF RECORD SHALL BE COMPLETED IN THEIR ENTIRETY AND AT THE EXPENSE OF THE APPLICANT.
25) SITE IMPROVEMENTS SHOWN ON THE PLAN SET SHALL CONFORM WITH TITLE III OF THE AMERICANS WITH DISABILITIES ACT WITH REGARD TO DIMENSION AND GRADE.
26) INTENDED HOURS OF OPERATION: NO RESTRICTIONS ARE PROPOSED WITH THIS PLAN.
27) NATURAL WOOD AND STUMP WASTE GENERATED FOR THE CONSTRUCTION OF NEW HOMES ONSHALL EITHER BE GROUND UP AND RE-USED ON-SITE FOR EROSION CONTROL OR DISPOSED OF OFF-SITE.

PLAN REFERENCES:
- HCRD PLAN 05402
- HCRD PLAN 13935
- HCRD PLAN 08189
- HCRD PLAN 35827
- HCRD PLAN 20323
- HCRD PLAN 18042
- HCRD PLAN 36484
- HCRD PLAN 23911
- HCRD PLAN 28722

DEED REFERENCES
- HCRD BOOK 8875 PAGE 2378
- HCRD BOOK 7957 PAGE 0474
- HCRD BOOK 4037 PAGE 170
- HCRD BOOK 7879 PAGE 3004
- HCRD BOOK 1226 PAGE 249
- HCRD BOOK 1232 PAGE 77



GRAPHIC SCALE

30 0 30 60

(IN FEET)
1 inch = 30 ft.

PURSUANT TO THE SITE PLAN REVIEW REGULATIONS OF THE HUDSON PLANNING BOARD, THE SITE PLAN APPROVAL GRANTED HEREIN EXPIRES ONE YEAR FROM DATE OF APPROVAL.

APPROVED BY THE HUDSON, NH PLANNING BOARD
DATE OF MEETING: _____

SIGNATURE _____ **SIGNATURE DATE** _____

SIGNATURE _____ **SIGNATURE DATE** _____

SITE PLANS ARE VALID FOR ONE (1) YEAR FROM THE DATE OF PLANNING BOARD MEETING FINAL APPROVAL. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.

STATE OF NEW HAMPSHIRE PAUL W. ZARNOWSKI No. 040 CERTIFIED WETLAND SCIENTIST

OWNER OF RECORD:

_____ _____

MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

DATE

I HEREBY CERTIFY THAT THE WORK PERFORMED IN THE PREPARATION OF THIS PLAN HAS AN ERROR OF CLOSURE OF 1:10,000 OR BETTER.

_____

RANGEWAY LAND SURVEYING & DESIGN, INC. DATE
BY: PAUL W. ZARNOWSKI LLS.

STATE OF NEW HAMPSHIRE No. 0709 PAUL W. ZARNOWSKI LICENSED LAND SURVEYOR SIGNATURE

THE STATE OF NEW HAMPSHIRE Nicholas B. Loring No. 14253 LICENSED PROFESSIONAL ENGINEER

SITE PLAN
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

SCALE: 1"=30' SHEET 3 OF 10 AUGUST 3, 2021

REVISIONS	DATE

BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 35
Londonderry, New Hampshire 03053
Phone: (603) 437-5000

X:\Jobs\BEN\1219-48 Lowell Road (MacThompson)\Civil_3D\1219-Lowell Rd-Rev2.dwg 11/30/2020 1:38:16 PM EST

GENERAL NOTES:
1) SEE SHEET-3 FOR ADDITIONAL NOTES.
2) CONTRACTOR SHALL VERIFY THE WATER LINE INVERT IN THE VICINITY OF EXISTING CATCH BASIN-A PRIOR TO CONSTRUCTION OF THE DRAINAGE IMPROVEMENTS. ANY DISCREPANCIES SHALL BE REPORTED TO BENCHMARK, LLC.

TAX MAP 191 LOT 130
FIVE-N-ASSOCIATES
C/O PETER NASH, TR
91 AMHERST ST
NASHUA, NH 03064
BOOK 7879/PAGE 3004
TAX MAP 191 LOT 131
K AND D FOUNDATION, LLC
10 ROOSEVELT AVE.
HUDSON, NH 03051
BOOK 5934/PAGE 1524
EXIST. PAVEMENT
TBM
TAC IN STUMP
EL=187.36
EXISTING CLF
U-IRON FOUND
FLAT IRON 2 FOUND
FENCE IN STUMP
OLD FENCE
1"IP FOUND
GARDEN
TAX MAP 190 LOT 192
PUBLIC SERVICE OF NH
C/O EVERSOURCE ENERGY
PO BOX 270
HARTFORD, CT 06141-0270
BOOK 7979/PAGE 0292
S67°39'16"W
100.00'
TREELINE
15' BUILDING SETBACK
PROPOSED 24' WIDE ACCESS DRIVE
S38°34'27"W
561.82'
15' BUILDING SETBACK (TYP.)
TBM
SPIKE SET
EL=160.71
PROP 10'X10' DUMPSTER ENCLOSURE
TAX MAP 190
LOT 191
112,675 SQ. FT.
2.59 ACRES
24' (TYP)
9'x20' (TYP)
DRAINAGE TO BE REMOVED
PROPOSED
12,000 SQ. FT BLDG
FIRST FLOOR
"REDS"-6,000 SQ. FT
2ND LEVEL-6,000 SQ. FT.
FF=151.0
RET. WALL
RAMP
WALK
LAWN
2,500 GAL. GREASE TRAP
1,500 GAL. GREASE TRAP
150'-8" ADS ROOF DRAIN
TIE TO EXISTING SEWER SERVICE
OUTSIDE SEATING
UNDERGROUND CHAMBER SYSTEM #3 (SEE DETAILS)
TEST PIT-E
50' BUILDING SETBACK
EX. CB-A
RIM=148.50
INV=145.75
EX. CB-B
RIM=148.82
INV=146
SIGN PROP
N24°20'08"W
118.50'
EX. DMH1
RIM=149.08
INV IN (CB)=146.03
INV IN ST DMH=145.28
INV ST CB=146
DMH#3
RIM=150.5
INV.IN=146.80
INV.OUT=146.75
EX. DMH #1
EX. CB #1
EX. DMH #2
RIM=156.53
TEST PIT-D
DMH#4
RIM=153.5
INV.IN=146.95
INV.OUT=146.90
193.55'
N36°15'33"E
TBM
SPIKE SET
EL=150.08
TBM
MNS
EL=148.71
EX. DMH1
RIM=149.25
EXISTING UNDERGROUND DRAINAGE CHAMBERS
BIT CONC WALK
LOWELL ROAD
(NH 3A)
EX. DMH1
RIM=148.45
DMH#5
RIM=155.0
INV.IN=147.60
INV.OUT=147.55
TEST PIT-B
EXISTING PAVEMENT
IPF FLUSH
UP 0.2 IPF
TBM
TOP OF IPF
EL=11.83
TAX MAP 190 LOT 190
MANUEL & KATHLEEN SOUSA
18 OVERLOOK CIRCLE
HUDSON, NH 03051
BOOK 4037/PAGE 0170
ABUTTING BUILDING
TAX MAP 190 LOT 9
J & R BROTHERS, LLC
49 LOWELL RD.
HUDSON, NH 03051
BOOK 8696/PAGE 0835
THE STATE OF NEW HAMPSHIRE
Nicholas B. Loring
No. 14253
LICENSED PROFESSIONAL ENGINEER
TAX MAP 191 LOT 132
PROLYN CORP.
5 LAWRENCE CORNER RD.
PELHAM, NH 03076
BOOK 5629/PAGE 262
S69°54'06"E
281.51'
15' BUILDING SETBACK
20' ROW -HCRD BOOK 8875 - PAGE 2378
N20°14'06"E 276.25'
EXISTING UNDERGROUND DRAINAGE CHAMBERS
TEST PIT-C
EX. DMH #3
RIM=153.40
EX. (DOUBLE) CB #2
RIM=152.77
TAX MAP 190 LOT 189
KEVMAR PROPERTIES, LLC
42 LOWELL ROAD
HUDSON, NH 03051
BOOK 6453/PAGE 0048
ABUTTING SHED
EXIST. CHAIN LINK FENCE
IPF
53.60'
N18°46'06"E
ABLE ST
TAX MAP 190 LOT 188
VT LOWELL PROPERTIES, LLC
36 LOWELL ROAD
HUDSON, NH 03051
BOOK 8545/PAGE 1560
MATCH LINE
INSERT A
SCALE: 1"=40'
GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

PURSUANT TO THE SITE PLAN REVIEW REGULATIONS OF THE HUDSON PLANNING BOARD, THE SITE PLAN APPROVAL GRANTED HEREIN EXPIRES ONE YEAR FROM DATE OF APPROVAL.

APPROVED BY THE HUDSON, NH PLANNING BOARD

DATE OF MEETING: ____________

SIGNATURE ____________ SIGNATURE DATE ____________

SIGNATURE ____________ SIGNATURE DATE ____________

SITE PLANS ARE VALID FOR ONE (1) YEAR FROM THE DATE OF PLANNING BOARD MEETING FINAL APPROVAL. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.

GRADING, UTILITY, DRAINAGE & EROSION CONTROL PLAN
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

SCALE: 1"=20' SHEET 4 OF 10 AUGUST 3, 2021

REVISIONS	DATE

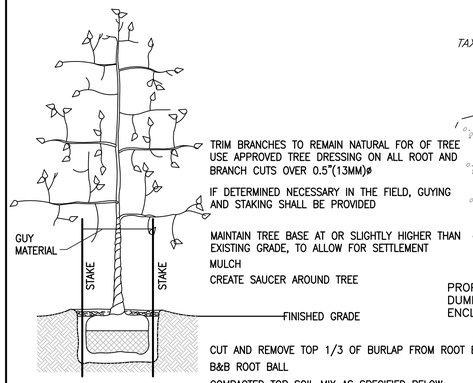
BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 35
Londonderry, New Hampshire 03053
Phone: (603) 437-5000

X:\Jobs\BE\1219-48 Lowell Road (MacThompson)\Civil_3D\1219-Lowell Rd-Rev2.dwg 11/30/2020 1:38:16 PM EST

Luminaire Schedule								
Symbol	Qty	Label	Arrangement	Description	Tag	Luminaire Lumens	Luminaire Watts	Total Watts
	5	EX4	Single	GLEON-SA2C-740-U-SL4 / EXISTING FIXTURES ON 20' POLE	EXISTING	13751	113	565
	2	S3	Single	GLEON-SA2C-740-U-SL3/ SSS4A20SFN1 (20' AFG)	NEW	14474	113	226
	3	S4	Single	GLEON-SA2C-740-U-SL4 / SSS4A20SFN1 (20' AFG)	NEW	13751	113	339
	1	S5	Single	GLEON-SA2C-740-U-5MQ/ SSS4A20SFN1 (20' AFG)	NEW	15203	113	113

LIGHTING NOTES:

1. ALL LIGHTING SHALL CONFORM TO THE TOWN OF HUDSON ZONING ORDINANCE AND SITE PLAN REGULATIONS.
2. ALL LIGHTING TO BE DARK SKY COMPLIANT.
3. LIGHTING PROVIDED BY:
   CHARRON INC.
   40 LONDONDERRY TURNPIKE, SUITE 1
   HOOKSETT, NH 03106
   PHONE (603) 624-4827
4. LIGHT FIXTURES MAY BE SUBSTITUTED WITH AN EQUIVALENT TYPE OF FIXTURE PROVIDING THE FOOT CANDLES REMAIN THE SAME AS THE EXAMPLES SHOWN
5. ALL LIGHTS WILL BE EQUIPED WITH DUSK TO DAWN PHOTOCELL SENSORS. LIGHTING WILL BE UTILIZED FROM DUSK TO DAWN.



SPECIFICATIONS:
1. TOPSOIL MIX, SEE SPEC..
2. DO NOT DAMAGE MAIN ROOTS OR DESTROY ROOT BALL WHEN INSTALLING TREE STAKE.
3. WATER THOROUGHLY AFTER INSTALLATION.
4. REMOVE TREE RINGS AND STAKES TWO YEARS AFTER INSTALLATIONS
5. PROVIDED DRAINAGE FOR PLANTING PIT IN IMPERMEABLE SOIL.

DECIDUOUS TREE DETAIL

SSS SQUARE STRAIGHT STEEL

LIGHT POST DETAIL

McGraw-Edison

GLEON Galleon

Area / Site Luminaire

Typical Applications

Outdoor • Parking Lots • Walkways • Roadways • Building Areas

"S" LIGHT FIXTURE

PURSUANT TO THE SITE PLAN REVIEW REGULATIONS OF THE HUDSON PLANNING BOARD, THE SITE PLAN APPROVAL GRANTED HEREIN EXPIRES ONE YEAR FROM DATE OF APPROVAL.

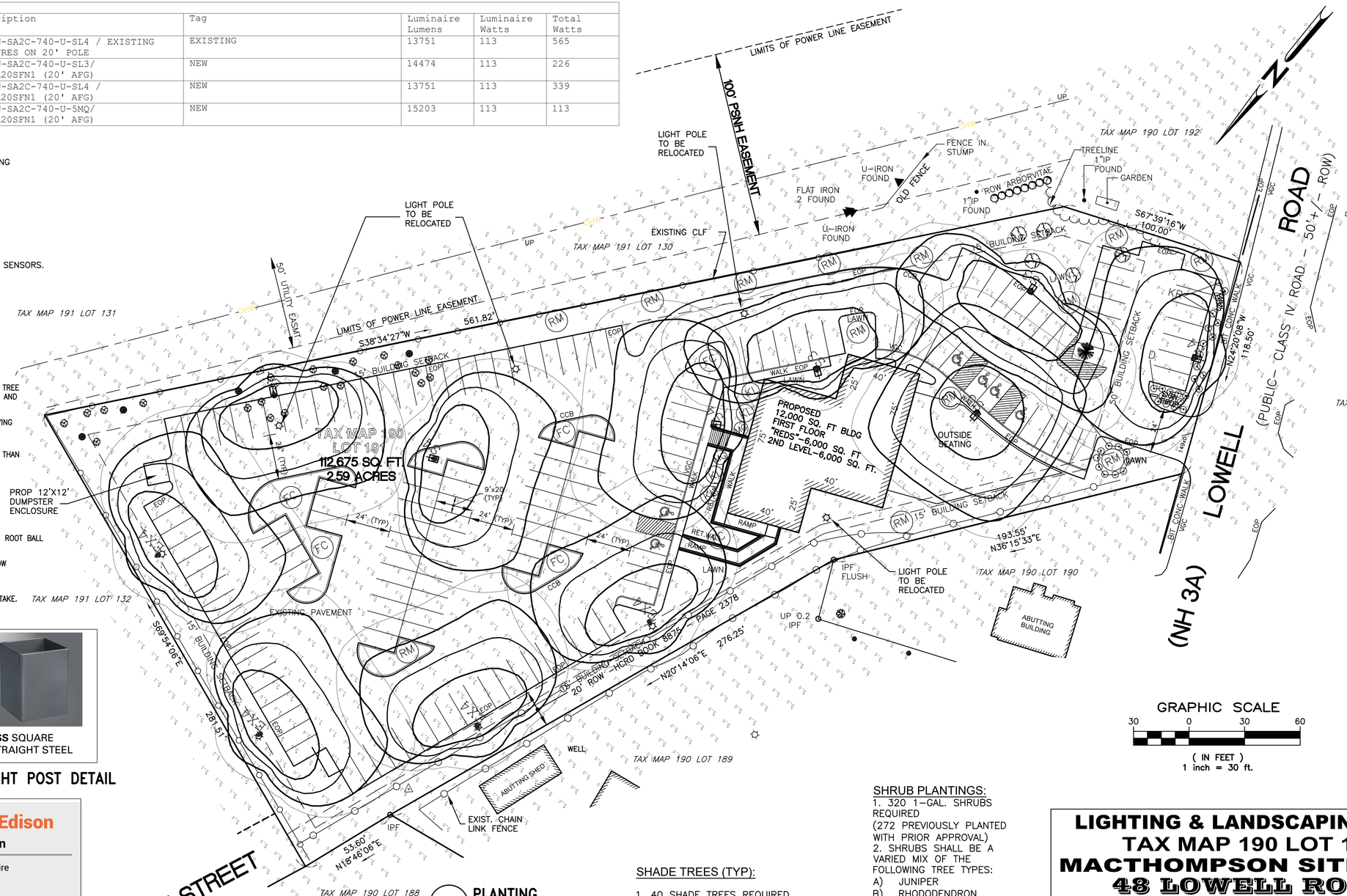
APPROVED BY THE HUDSON, NH PLANNING BOARD

DATE OF MEETING

SIGNATURE — DATE

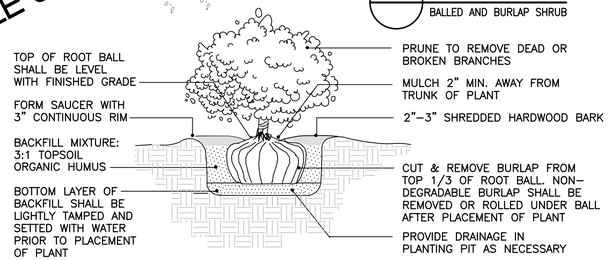
SIGNATURE — DATE

SITE PLANS ARE VALID FOR ONE (1) YEAR FROM THE DATE OF PLANNING BOARD MEETING. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.



PLANTING

BALLED AND BURLAP SHRUB



SHADE TREES (TYP):

1. 40 SHADE TREES REQUIRED (36 PLANTED WITH PRIOR APPROVAL)
2. SHADE TREES SHALL BE A VARIED MIX OF THE FOLLOWING TREE TYPES:
   A) RED MAPLE
   B) RED OAK
   C) FLOWERING PEAR
   D) JAPANEZE YEW
   E) FLOWERING CHERRY

SHRUB PLANTINGS:

1. 320 1-GAL. SHRUBS REQUIRED (272 PREVIOUSLY PLANTED WITH PRIOR APPROVAL)
2. SHRUBS SHALL BE A VARIED MIX OF THE FOLLOWING TREE TYPES:
   A) JUNIPER
   B) RHODODENDRON
   C) AZALEA
   D) LILAC
   E) ROSASHARON
   F) DAYLILLY
   G) KNOCKOUT ROSE
   H) KOREAN LILAC
   I) MAIDEN GRASS
   J) NINEBARK
   K) PANICLE HYDRANGEA
   L) ROSE

ALL PLANT MATERIAL SHALL HAVE A MINIMUM WINTER HARDINESS FOR ZONE 5B AS DETERMINED BY THE AMERICAN STANDARDS FOR NURSERY STOCK.

OWNER RESERVES THE RIGHT TO SUBSTITUE PLANTING BASED ON AVALABLE NURSERY STOCK

GRAPHIC SCALE

30 0 30 60

(IN FEET)
1 inch = 30 ft.

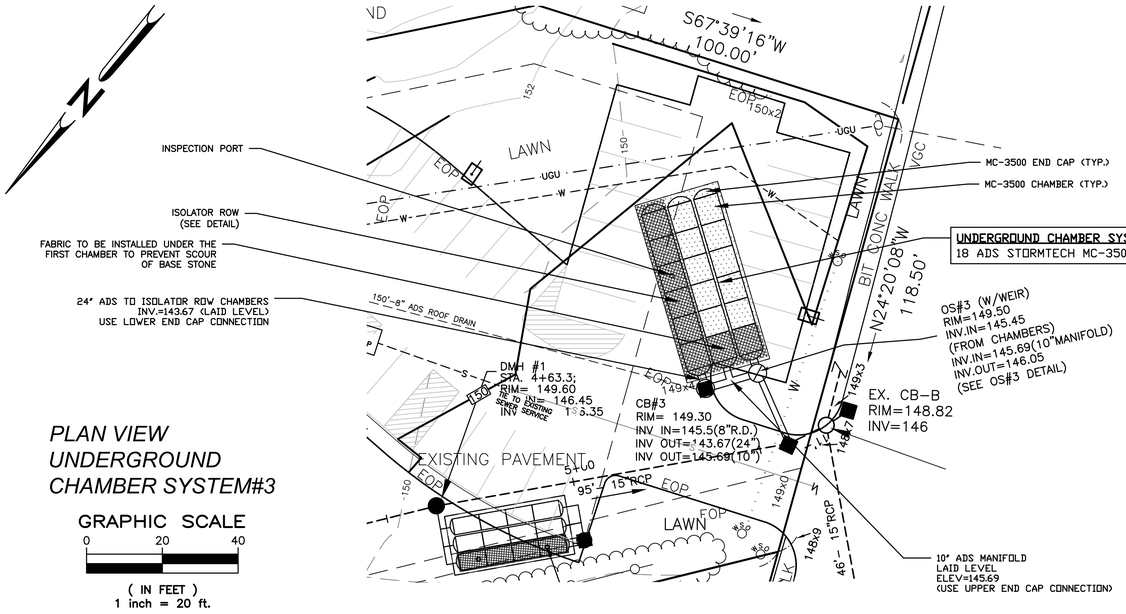
LIGHTING & LANDSCAPING PLAN
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

SCALE: 1"=30' SHEET 5 OF 10 AUGUST 3, 2021

REVISIONS	DATE

BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 35
Londonderry, New Hampshire 03053
Phone: (603) 437-5000



PLAN VIEW
UNDERGROUND
CHAMBER SYSTEM#3

GRAPHIC SCALE
0 20 40
(IN FEET)
1 inch = 20 ft.

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS.
   STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM – SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

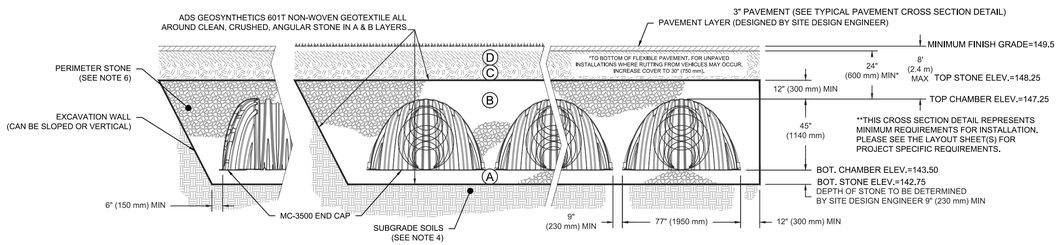
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED, COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3,11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60,8 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0,42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" (152 mm) STONE BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

ADS® ADVANCED DRAINAGE SYSTEMS, INC.

SiteASSIST by STORMTECH
FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

THE STATE OF NEW HAMPSHIRE
Nicholas B. Loring
No. 14253
LICENSED PROFESSIONAL ENGINEER

DRAINAGE DETAIL SHEET
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

SCALE: AS NOTED SHEET 6 OF 10 AUGUST 3, 2021

REVISIONS	DATE

BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 3S
Londonderry, New Hampshire 03053
Phone: (603) 437-5000

X:\Jobs\BEN\1219-48 Lowell Road (MacThompson)\Civil_3D\1219-Lowell Rd-Rev2.dwg 11/30/2020 1:38:16 PM EST

2 MC-3500 TECHNICAL SPECIFICATIONS

1 MC-3500 CROSS SECTION DETAIL

ON-SITE DRAINAGE
OPERATIONS AND MAINTENANCE SCHEDULE

CATCH BASIN - MAINTENANCE PROCEDURES:

STEP 1) INSPECT CATCH BASIN UPSTREAM SEMIANNUALLY FOR SEDIMENT
STEP 2) REMOVE GRATES AND COVERS
STEP 3) SKIM OFF OILS AND FLOATABLES.
STEP 4) MEASURE THE DEPTH OF SEDIMENT
STEP 5) IF SEDIMENT IS AT A DEPTH GREATER THAN 6" PROCEED TO STEP 6, IF NOT PROCEED TO STEP 7
STEP 6) VACUUM OR MANUALLY REMOVE SEDIMENT
STEP 7) REPLACE GRATES OR COVERS
STEP 8) RECORD OBSERVATION, DEPTH & DATE AND SCHEDULE NEXT INSPECTION.

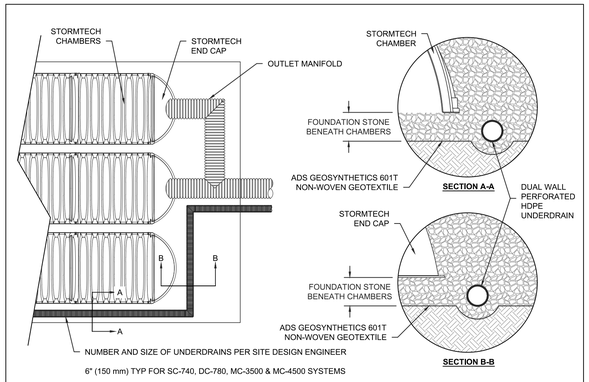
OUTLET STRUCTURE
MAINTENANCE PROCEDURES:

STEP 1) INSPECT OUTLET STRUCTURE ON A SEMIANNUAL BASIS
STEP 2) INSPECTION FORMS INCLUDED IN THE LONG TERM INSPECTION AND MAINTENANCE MANUAL FOR THIS SITE.
STEP 3) INSPECT SLOTTED WEIRS. IF SEDIMENT OR DEBRIS IS CLOGGING WEIR ORIFICES GO TO STEP 3, OTHERWISE GO TO STEP 5.
STEP 4) REMOVE ALL TRASH, DEBRIS AND SEDIMENT OUTSIDE THE OUTLET STRUCTURE MANUALLY OR USING LOW IMPACT EQUIPMENT.
STEP 5) REMOVE GRATES OR COVERS
STEP 6) VACUUM OR MANUALLY REMOVE TRASH, SEDIMENT OR DEBRIS
STEP 7) VACUUM OILS AND FLOATABLES
STEP 8) REPLACE GRATES AND COVERS
STEP 9) RECORD OBSERVATION AND DEPTH OF SEDIMENT, PROTECTION BAR MAINTENANCE AND SCHEDULE NEXT INSPECTION.

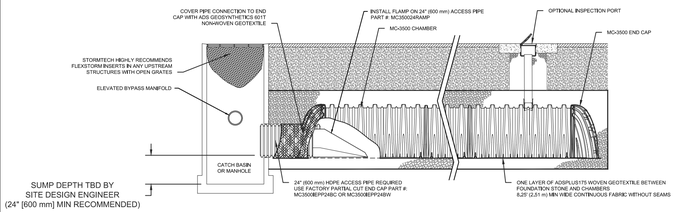
SEE ISOLATOR ROW INSPECTION NOTES TO LEFT

INSPECTION & MAINTENANCE LOGS

STORM WATER INSPECTION & MAINTENANCE REPORTS (SEE INSPECTION & MAINTENANCE MANUEL BY BENCHMARK, LLC) SUMMARIZING ALL OF THE ABOVE SHALL BE KEPT ON FILE BY THE OWNER AND PROVIDED TO THE TOWN UPON REQUEST.



5 UNDERDRAIN DETAIL



INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
A. INSPECTION PORTS (IF PRESENT)
A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
B. ALL ISOLATOR PLUS ROWS
B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
C. VACUUM STRUCTURE SUMP AS REQUIRED

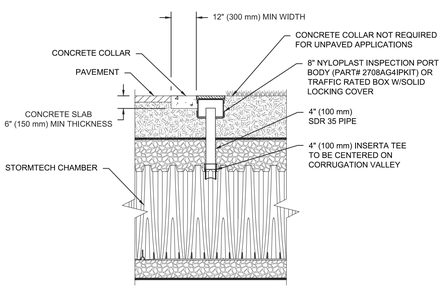
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

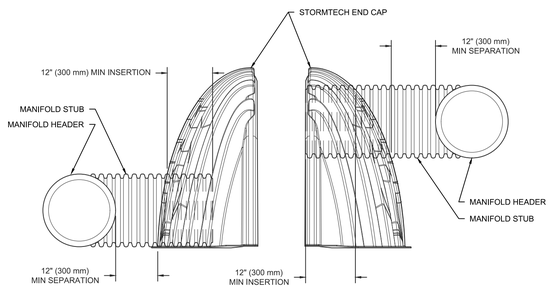
1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

3 MC-3500 ISOLATOR ROW PLUS DETAIL



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

4 4" PVC INSPECTION PORT DETAIL (MC SERIES CHAMBER)



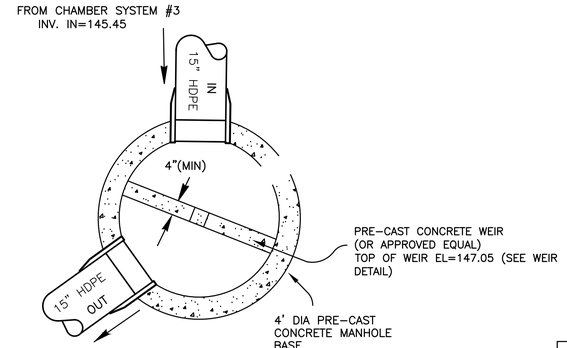
NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

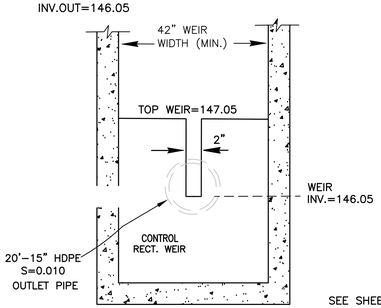
7 MC-SERIES END CAP INSERTION DETAIL

MC-3500 STANDARD DETAILS

StormTech
70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
ADS ADVANCED DRAINAGE SYSTEMS, INC.





WEIR ELEVATION
(NO SCALE)

SEE SHEETS 4 & 6 FOR PLAN VIEW

SPECIAL O.S.#3 DETAIL
(NO SCALE)

THE STATE OF NEW HAMPSHIRE
Nicholas B. Loring
No. 14253
LICENSED PROFESSIONAL ENGINEER

DRAINAGE DETAIL SHEET
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

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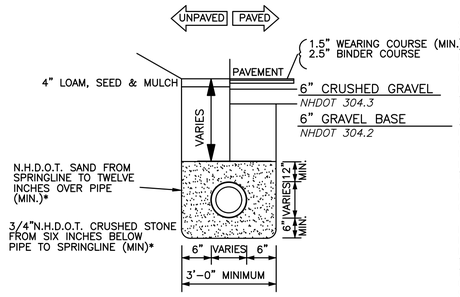
SCALE: AS NOTED SHEET 7 OF 10 AUGUST 3, 2021

REVISIONS	DATE

BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 35
Londonderry, New Hampshire 03053
Phone: (603) 437-5000

X:\Jobs\BE\1219-48 Lowell Road (MacThompson)\Civil_3D\1219-Lowell Rd-Rev2.dwg 11/30/2020 1:38:16 PM EST

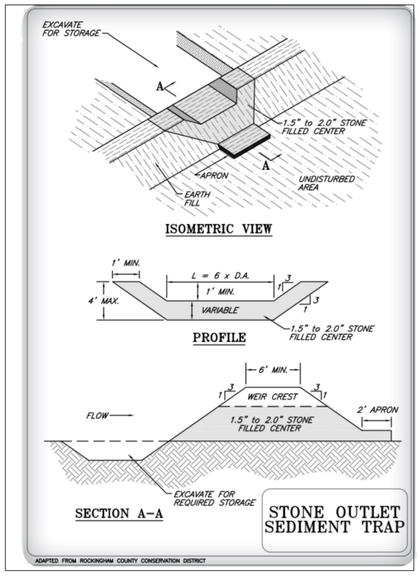


TYPICAL DRAIN TRENCH DETAIL

(NO SCALE)

SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOPSOIL, ALL WET OR SOFT MUCK, PEAT OR CLAY, ALL EXCAVATED LEDGE MATERIAL, AND ALL ROCKS OVER SIX INCHES IN THE LARGEST DIMENSION, OR ANY MATERIAL WHICH, AS DETERMINED BY THE TOWN OF HUDSON TOWN ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. SUITABLE MATERIAL SHALL BE PLACED IN 12" LIFTS AND THOROUGHLY COMPACTED TO 95% OR BETTER COMPACTION.

IN CROSS-COUNTRY CONSTRUCTION, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE TOWN OF HUDSON TOWN ENGINEER MAY PERMIT THE USE OF TOPSOIL, LOAM OR PEAT, IF SATISFIED THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE STRUCTURES FOR MAINTENANCE AND RECONSTRUCTION (WHEN NECESSARY) WILL BE PRESERVED. SUITABLE MATERIAL SHALL BE PLACED IN 18" LIFTS AND THOROUGHLY COMPACTED TO 92% OR BETTER COMPACTION IN ACCORDANCE WITH NHDOT STANDARD SPECIFICATIONS, SECTION 304.

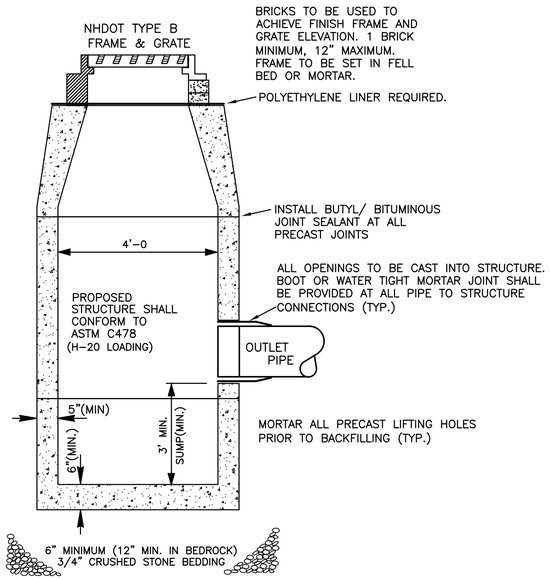


SEDIMENT TRAP DETAIL

(NO SCALE)

CONSTRUCTION SPECIFICATIONS

1. MINIMUM STONE SIZE FOR WEIR AND APRON SHALL BE 1 ½ INCH CRUSHED STONE
2. SEE PLAN VIEW FOR SIZING REQUIREMENTS
3. THE TRAP SHALL BE CLEANED WHEN 50% OF THE ORIGINAL VOLUME IS FILLED
4. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED



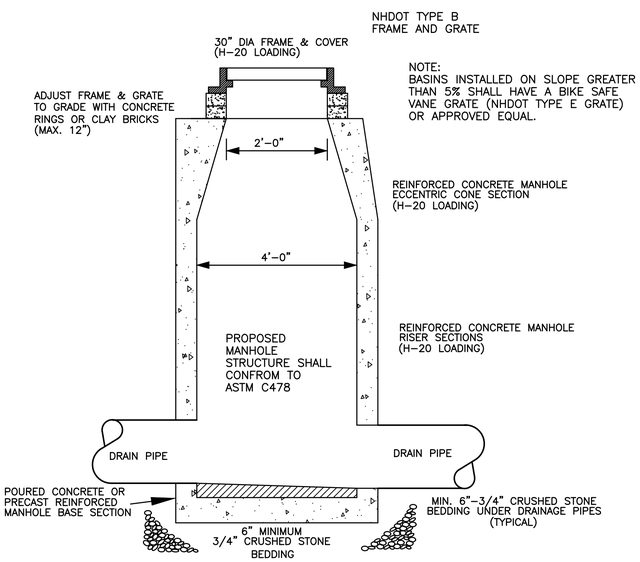
CATCH BASIN DETAIL

(NO SCALE)

POLYETHYLENE LINER NOTES:

ALL CATCH BASINS TO BE OUTFITTED WITH A POLYETHYLENE LINER DOWNSPOUT. POLYETHYLENE LINER (NHDOT ITEM 604.0007) SHALL BE FABRICATED AT THE SHOP. DOWNSPOUT SHALL BE EXTRUSION FILLET WELDED TO THE POLYETHYLENE SHEET. PLACE A CONTINUOUS BEAD OF AN APPROVED SILICONE SEALANT BETWEEN THE FRAME AND POLYETHYLENE SHEET.

PLACE CLASS AA CONCRETE TO 2" BELOW THE TOP OF GRATE ELEVATION (SUBSIDIARY TO DRAINAGE STRUCTURE) TRIM POLYETHYLENE SHEET A MAXIMUM OF 4" OUTSIDE THE FLANGE ON THE FRAME FOR THE CATCH BASIN BEFORE PLACING CONCRETE. (EXCEPT AS SHOWN WHEN USED WITH CURB). CENTER OF THE GRATE AND FRAME MAY BE SHIFTED A MAXIMUM OF 3" FROM THE CENTER OF THE DOWNSPOUT IN ANY DIRECTION.



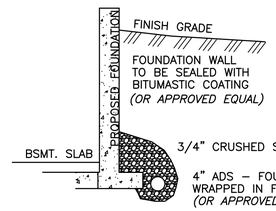
DRAINAGE MANHOLE DETAIL

(NO SCALE)

ON-SITE DRAINAGE OPERATIONS AND MAINTENANCE SCHEDULE

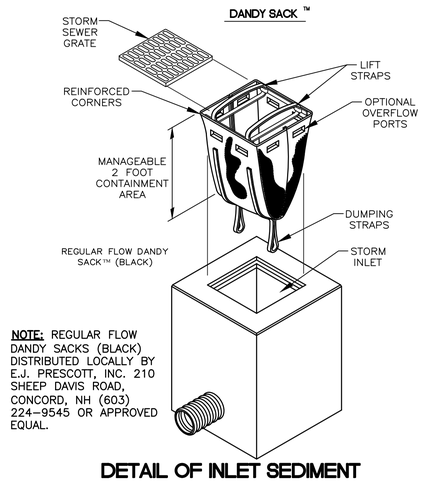
CATCH BASIN – MAINTENANCE PROCEDURES:

STEP 1) INSPECT CATCH BASIN UPSTREAM SEMIANNUALLY FOR SEDIMENT
STEP 2) REMOVE GRATES AND COVERS
STEP 3) SKIM OFF OILS AND FLOATABLES.
STEP 4) USING A STADIA ROD, MEASURE THE DEPTH OF SEDIMENT
STEP 5) IS SEDIMENT IS AT A DEPTH GREATER THAN 6" PROCEED TO STEP 6, IF NOT PROCEED TO STEP 7
STEP 6) VACUUM OR MANUALLY REMOVE SEDIMENT
STEP 7) REPLACE GRATES OR COVERS
STEP 8) RECORD OBSERVATION, DEPTH & DATE AND SCHEDULE NEXT INSPECTION.



TYPICAL FOUNDATION DRAIN TRENCH DETAIL

(NOT TO SCALE)



NOTE: REGULAR FLOW DANDY SACKS (BLACK) DISTRIBUTED LOCALLY BY E.J. PRESCOTT, INC. 210 SHEEP DAVIS ROAD, CONCORD, NH (603) 224-9545 OR APPROVED EQUAL.

DETAIL OF INLET SEDIMENT CONTROL DEVICE

(NOT TO SCALE)

THE STATE OF NEW HAMPSHIRE
Nicholas B. Loring
No. 14253
LICENSED PROFESSIONAL ENGINEER

PURSUANT TO THE SITE PLAN REVIEW REGULATIONS OF THE HUDSON PLANNING BOARD, THE SITE PLAN APPROVAL GRANTED HEREIN EXPIRES ONE YEAR FROM DATE OF APPROVAL.

APPROVED BY THE HUDSON, NH PLANNING BOARD
DATE OF MEETING: _____

SIGNATURE _____ **SIGNATURE DATE** _____

SIGNATURE _____ **SIGNATURE DATE** _____

SITE PLANS ARE VALID FOR ONE (1) YEAR FROM THE DATE OF PLANNING BOARD MEETING FINAL APPROVAL. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.

DRAINAGE DETAIL SHEET
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
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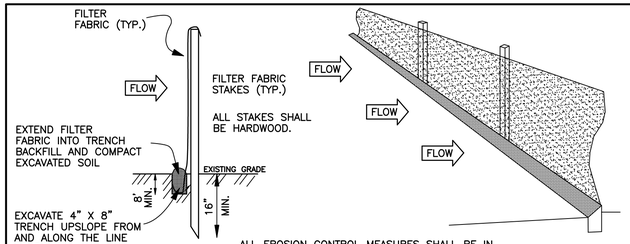
HCRD BOOK 8875/PAGE 2378

SCALE: AS NOTED SHEET 8 OF 10 AUGUST 3, 2021

REVISIONS	DATE

BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 35
Londonderry, New Hampshire 03053
Phone: (603) 437-5000



ALL EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE BMP *(BEST MANAGEMENT PRACTICES)* AS SPECIFIED IN THE "STORMWATER MANAGEMENT AND SEDIMENT CONTROL HANDBOOK FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE" AS PREPARED BY THE ROCKINGHAM COUNTY CONSERVATION DISTRICT.

SILT FENCE DETAIL

(NO SCALE)

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.
2. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE 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.

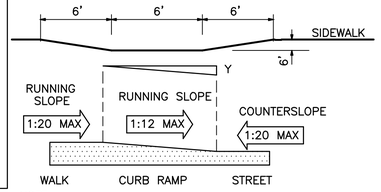
CONSTRUCTION SPECIFICATIONS

1. THE GEOTEXTILE FABRIC SHALL MEET THE DESIGN CRITERIA FOR SILT FENCES.
2. THE FABRIC SHALL BE EMBEDDED A MINIMUM OF 8 INCHES INTO THE GROUND AND THE SOIL COMPACTED OVER THE EMBEDDED FABRIC.
3. WOVEN WIRE FENCE SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIES OR STAPLES.
4. FILTER CLOTH SHALL BE FASTENED SECURELY TO THE WOVEN WIRE FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP, MIDSECTION AND BOTTOM.
5. WHEN 2 SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED.
6. FENCE POSTS SHALL BE A MINIMUM OF 36 INCHES LONG AND DRIVEN A MINIMUM OF 16 INCHES INTO THE GROUND. THE MAXIMUM SPACING BETWEEN STAKES SHALL BE 10 FEET. WOOD POSTS SHALL BE OF SOUND QUALITY HARDWOOD AND SHALL HAVE A MINIMUM CROSS SECTIONAL AREA OF 3.0 SQUARE INCHES.
7. MAINTENANCE SHALL BE PERFORMED AS NEEDED TO PREVENT BULGES IN THE SILT FENCE DUE TO DEPOSITION OF SEDIMENT.

SIDEWALK NOTES:

SIDEWALK ALONG PROPOSED ROADWAYS SHALL TIP DOWN AT THE PROPOSED DRIVEWAYS AND INTERSECTIONS. TAPERS AND CONSTRUCTION METHODS FOR "TIP–DOWNS" SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE AMERICANS WITH DISABILITIES ACT (ADA) AND ANY ADDITIONAL REQUIREMENTS OF THE TOWN OF HUDSON, NEW HAMPSHIRE.

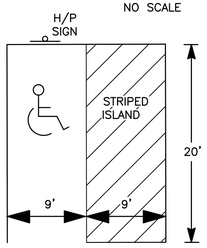
ADA CURB RAMP TO COMPLY WITH THE CURRENT STANDARDS PER THE AMERICANS WITH DISABILITIES ACT STANDARDS FOR ACCESSIBLE DESIGN (HTTP://WWW.ADA.GOV)



NOTE:
(1) SLOPE = Y/X, WHERE X IS A LEVEL PLANE
(2) COUNTERSLOPE SHALL NOT EXCEED 1:20

HANDICAP RAMP IN SIDEWALK DETAIL

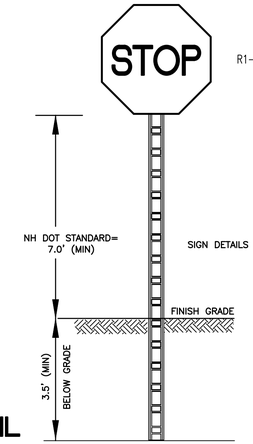
NO SCALE



HANDICAP PARKING DETAIL

(NO SCALE)

HANDICAP PARKING SIGN
(NO SCALE)
(SIGNS TO BE MUTCD R7–8 & R7–8P AND TO BE MOUNTED AT A MINIMUM OF 60" IN HEIGHT)



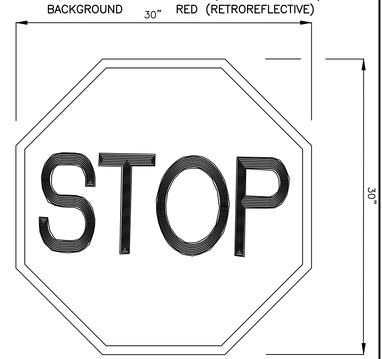
1. HOLES SHALL BE 3/8" DIA. C–C FULL LENGTH
2. STEEL SHALL CONFORM TO ASTM A–499 (GRADE 60) OR ASTM A–6791 (GRADE 1070–1080)
3. FINISH SHALL BE PAINTED WITH 2 COATS OF APPROVED MEDIUM GREEN, BAKED ON OR AIR DRIED, PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.

TYPICAL SIGN DETAIL

(NO SCALE)

INSTALL MUTCD R1–1 STOP SIGN AT SITE DRIVEWAY

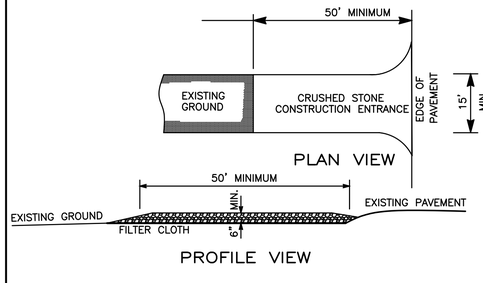
COLORS:
LEGEND WHITE (RETROREFLECTIVE)
BACKGROUND RED (RETROREFLECTIVE)



R1–1

TRAFFIC SIGNS:
ALL TRAFFIC SIGNS & PAVEMENT MARKINGS SHALL BE PER "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), LATEST EDITION.

STOP SIGN DETAILS



STABILIZED CONSTRUCTION ENTRANCE

TO BE CONSTRUCTED AT THE START OF THE NEW DRIVEWAY BEHIND BUILDING B
(NO SCALE)

CONSTRUCTION SPECIFICATIONS

STONE FOR A STABILIZED CONSTRUCTION ENTRANCE SHALL BE 1 3/4 INCH STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.

THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET, EXCEPT FOR A SINGLE RESIDENTIAL LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.

THE THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.

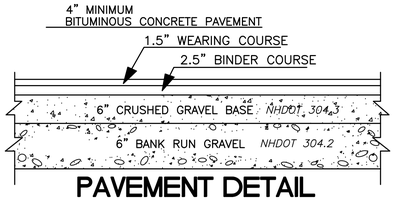
THE WIDTH OF THE CONSTRUCTION ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS OR 10 FEET, WHICH EVER IS GREATER.

GEOTEXTILE FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE. FILTER CLOTH IS NOT REQUIRED FOR A SINGLE FAMILY RESIDENTIAL LOT.

ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARDS 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.

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 TOPDRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REAPIR AND/OR CLEANOUT ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO PUBLICK RIGHT OF WAY MUST BE REMOVED PROMPTLY.

WHEELS SHALL BE CLEANED TO REMOVE MUD PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.



PAVEMENT DETAIL

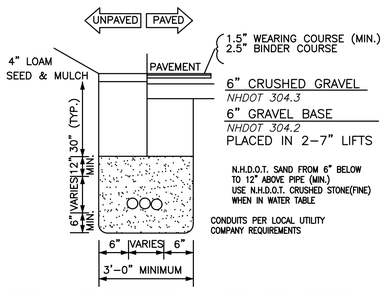
NO SCALE

CONSTRUCTION SEQUENCE:

1. CUT AND CLEAR TREES.
2. INSTALL EROSION CONTROL MEASURES (PRIOR TO STUMPING).
3. STUMP AND GRUB ALL CLEARED AREAS.
4. STRIP AND STOCKPILE LOAM
5. CONSTRUCT UNDERGROUND STORMWATER CHAMBERS SYSTEMS AND STORM SEWER SYSTEM AS SHOWN ON PLANS.
6. INSTALL TEMPORARY EROSION AND SILTATION CONTROL MEASURES TO PROTECT STORMWATER CHAMBER SYSTEMS FROM SILTATION DURING CONSTRUCTION.
7. PROTECT CATCH BASINS FROM SILTATION BY CONSTRUCTING TEMPORARY STORM DRAINAGE INLET PROTECTION AROUND ALL CATCH BASINS (SEE DETAILS)
8. EXCAVATE AND INSTALL BUILDING FOUNDATION.
9. CUT AND FILL PARKING LOT TO SUBGRADE.
10. INSTALL UNDERGROUND UTILITIES WITHIN PARKING LOT AND TO BUILDING
11. ALL AREAS OUTSIDE PROPOSED PAVEMENT TO BE LOAM AND SEED.
12. INSTALL SELECT MATERIALS (BANK RUN & PROCESSED GRAVEL) WITHIN PARKING LOT
13. PAVE PARKING LOT TO BINDER
14. AS EARLY AS PRACTICAL, LOAM, FERTILIZE, SEED AND MULCH ALL DISTURBED AREAS, EXCEPT UNDER THE PROPOSED PAVEMENT (MIN. 4" LOAM)
15. STEEP SLOPES SHALL BE HYDROSEEDED. USE OF EROSION CONTROL MATS IS HIGHLY RECOMMENDED.
15. EROSION CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER EVERY 0.5" RAINFALL.
16. WEEKLY OR AS NEEDED, MAINTAIN AND/OR REPAIR EROSION CONTROL MEASURES: FILL, REPAIR, LOAM & SEED ANY ERODED EMBANKMENTS.
17. EARTH PILES SHALL BE STABILIZED TO PREVENT EROSION BY SEEDING AND/OR MULCHING.
18. CONSTRUCTION ACCESS TO THE SITE SHALL BE FROM LOWELL ROAD.
19. APPROXIMATE AREA TO BE DISTURBED FOR PARKING LOT CONSTRUCTION AND DRAINAGE IMPROVEMENTS = 0.8 ACRES.

SEWER LOADING CALCULATION:

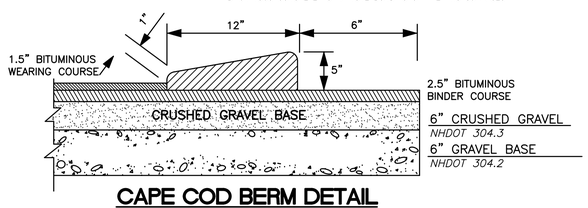
120 SEATS X 40 GPD / SEAT	= 4,800 GPD
15 EMPLOYEES X 20 GPD / EMPLOYEE	= 300 GPD
TOTAL SEWER LOADING	= 5,100 GPD



TYPICAL ELECTRICAL, TELEPHONE, CABLE TRENCH DETAIL

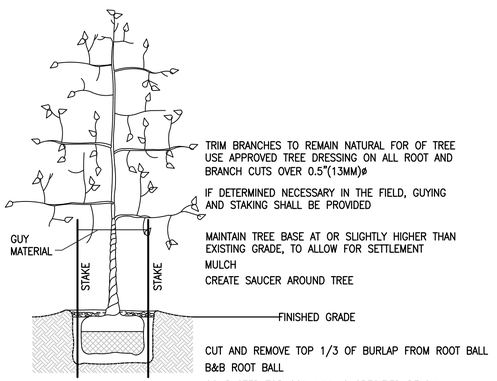
(NO SCALE)

NOTE (INSTALLATION OF CAPE COD BERM):
A TACK COAT OF EMULSION SHALL BE INSTALLED ON THE BINDER COURSE IMMEDIATELY PRIOR TO PLACEMENT OF CAPE COD BERM ON THE BINDER BITUMINOUS CONCRETE TO IMPROVE BONDING OF THE TWO SURFACES.



CAPE COD BERM DETAIL

(NO SCALE)



SPECIFICATIONS:
1. TOPSOIL MIX, SEE SPEC..
2. DO NOT DAMAGE MAIN ROOTS OR DESTROY ROOT BALL WHEN INSTALLING TREE STAKE.
3. WATER THOROUGHLY AFTER INSTALLATION.
4. REMOVE TREE RINGS AND STAKES TWO YEARS AFTER INSTALLATIONS
5. PROVIDED DRAINAGE FOR PLANTING PIT IN IMPERMEABLE SOIL.

DECIDUOUS TREE DETAIL

PURSUANT TO THE SITE PLAN REVIEW REGULATIONS OF THE HUDSON PLANNING BOARD, THE SITE PLAN APPROVAL GRANTED HEREIN EXPIRES ONE YEAR FROM DATE OF APPROVAL.

APPROVED BY THE HUDSON, NH PLANNING BOARD
DATE OF MEETING: _____

SIGNATURE _____ SIGNATURE DATE _____

SIGNATURE _____ SIGNATURE DATE _____

SITE PLANS ARE VALID FOR ONE (1) YEAR FROM THE DATE OF PLANNING BOARD MEETING FINAL APPROVAL. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.

CONSTRUCTION DETAIL SHEET
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

OWNER/ PREPARED FOR:
MACTHOMPSON REALTY, INC.
3 MARMON DRIVE
NASHUA, NEW HAMPSHIRE 03060
HCRD BOOK 8875/PAGE 2378

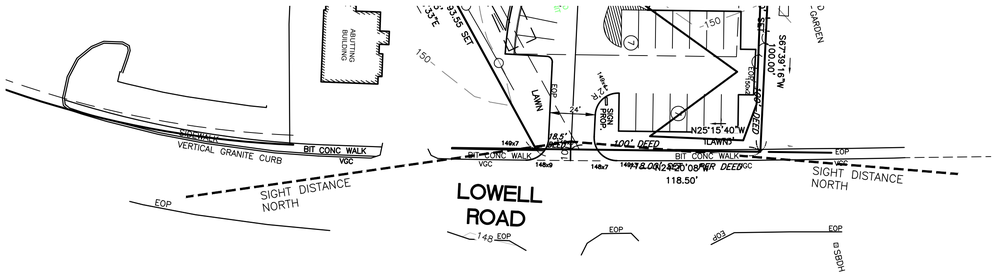
SCALE: AS NOTED SHEET 9 OF 10 AUGUST 3, 2021

THE STATE OF NEW HAMPSHIRE
Nicholas B. Loring
No. 14253
LICENSED PROFESSIONAL ENGINEER

REVISIONS	DATE

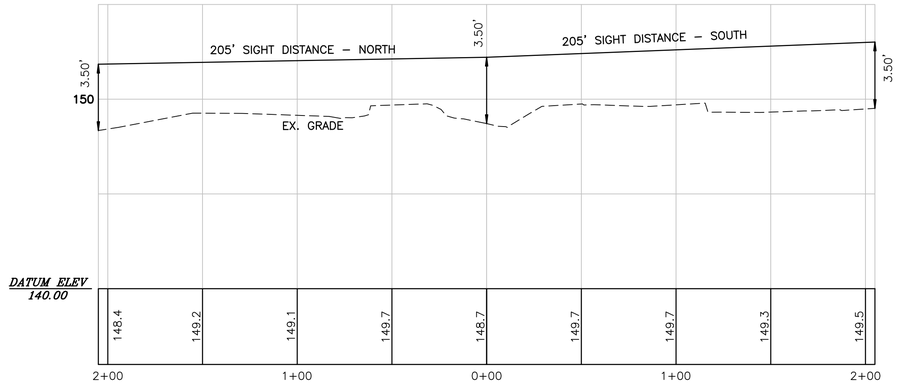
BENCHMARK LLC
Consulting Engineers Land Planners
1F Commons Drive, Suite 35
Londonderry, New Hampshire 03053
Phone: (603) 437–5000

X:\Jobs\BEN\1219–48 Lowell Road (MacThompson)\Civil_3D\1219–Lowell Rd–Rev2.dwg 11/30/2020 1:38:16 PM EST



SIGHT DISTANCE PLAN

SCALE: 1"=40'



SIGHT DISTANCE PROFILE

SCALE: 1"=40' (HORIZ.)
1"=4' (VERT.)

GRAPHIC SCALE
40 0 40 80
(IN FEET)
1 inch = 40 ft.

SIGN DETAIL

(NO SCALE)

NOTE: SEE SHEET–3 FOR ACTUAL SIGN LOCATION

I HEREBY CERTIFY THAT THE DRIVEWAY ALL SEASON SAFE SIGHT DISTANCE, FOR A 30 MPH SPEED LIMIT, REQUIRED BY AASHTO STANDARDS WILL BE ACHIEVED UPON COMPLETION OF THE IMPROVEMENTS PROPOSED WITH THESE PLANS.

NICHOLAS B. LORING, PE — DATE
BENCHMARK ENGINEERING, INC.

STATE OF NEW HAMPSHIRE — Nicholas B. Loring — No. 14253 — LICENSED PROFESSIONAL ENGINEER

PURSUANT TO THE SITE PLAN REVIEW REGULATIONS OF THE HUDSON PLANNING BOARD, THE SITE PLAN APPROVAL GRANTED HEREIN EXPIRES ONE YEAR FROM DATE OF APPROVAL.

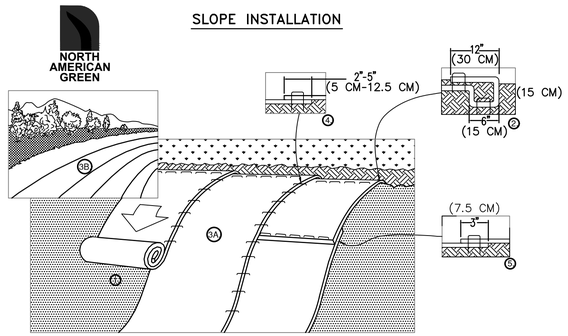
APPROVED BY THE HUDSON, NH PLANNING BOARD
DATE OF MEETING: _____

SIGNATURE _____ SIGNATURE DATE _____

SIGNATURE _____ SIGNATURE DATE _____

SITE PLANS ARE VALID FOR ONE (1) YEAR FROM THE DATE OF PLANNING BOARD MEETING FINAL APPROVAL. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.

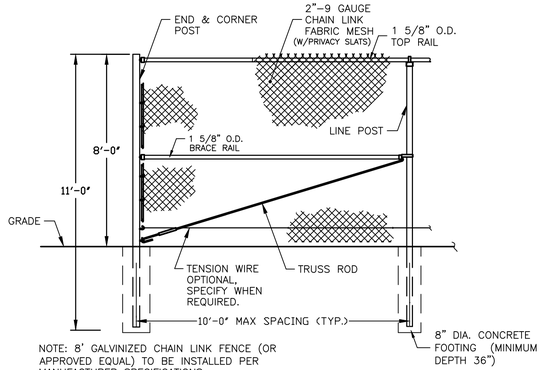
SLOPE INSTALLATION



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" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) 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 THE 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" (5 CM – 12.5 CM) OVERLAP DEPENDING ON BLANKET TYPE.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE BLANKET WIDTH.
   NOTE:
   *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.
6. USE BioD MAT 40 EROSION CONTROL BLANKET (OR APPROVED EQUAL) BY US CONSTRUCTION FABRICS, LLC 8 LEDGE ROAD PO BOX 505 WINDHAM, NH 03087 PHONE: (603) 893–5480

EROSION CONTROL BLANKET

(NO SCALE)



NOTE: 8' GALVINIZED CHAIN LINK FENCE (OR APPROVED EQUAL) TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS.

CHAIN LINK FENCE DETAIL

(NO SCALE)

USE AS PRIVACY FENCE AROUND DUMPSTER

EROSION CONTROL & TURF ESTABLISHMENT NOTES:

- NO MORE THAN 5 ACRES MAY BE DISTURBED AND LEFT UNSTABILIZED AT ANY ONE TIME.
- ALL DISTURBED AREAS SHALL BE FULLY STABILIZED WITHIN 90 DAYS.
- DISTURBED AREAS ANTICIPATED TO BE LEFT ON SITE IN EXCESS OF 90 DAYS SHALL BE TEMPORARILY STABILIZED BY LOAMING, SEEDING AND MULCHING AS PROVIDED FOR BELOW.
- UPON COMPLETION OF FINISH GRADING, ALL DISTURBED AREAS SHALL BE LOAMED, FERTILIZED AND SEEDED WITHIN 72 HOURS.
- ALL STEEP SLOPES SHALL BE HYDROSEEDED. USE OF EROSION CONTROL MATS IS HIGHLY RECOMMENDED.
  STABILIZATION SHALL BE ACCOMPLISHED BY LOAMING, FERTILIZING, SEEDING AND MULCHING ALL DISTURBED AREAS (OTHER THAN UNDER THE PAVEMENT)
- AS FOLLOWS:
  A. LOAM – SCREENED LOAM WITH A MINIMUM DEPTH OF 4".
  B. LIME AND FERTILIZER SHALL BE APPLIED PRIOR TO, OR AT THE TIME OF, PERMANENT SEEDING AND INCORPORATED INTO THE SOIL AT THE FOLLOWING RATES:
     LIMESTONE (AGRICULTURAL) 3,000 LBS/ ACRE
     COMMERCIAL TURF STARTER FERTILIZER (10–18–10) 150 LBS/ ACRE
     SUCH AS "GREEN GOLD RENEW" (FOR ESTABLISHMENT ONLY)
  C. SEED SELECTION (OR EQUIVALENT) & SEEDING RATES:
     TEMPORARY : ANNUAL RYE GRASS 50 LBS/ ACRE
     PERMANENT: "ROCKINGHAM SOIL CONSERVATION MIX" 150 LBS/ ACRE
     CONTAINING: CREEPING RED FESCUE 35%; TALL FESCUE 25%; ANNUAL RYE GRASS 15%; PERENNIAL RYE GRASS 12%; KENTUCKY BLUE GRASS 10%; WHITE CLOVER (LEGUME) 3%
  D. MULCHING SHALL BE APPLIED (FROM MAY TO SEPTEMBER ONLY) AT THE RATE OF 1 1/2 – 2 TONS/ ACRE.
  E. THE RECOMMENDED GRASS MIXTURES AND FERTILIZERS SPECIFIED HEREIN ARE AVAILABLE AT BLUE SEAL FEEDS, NASHUA, NH (603 883– 9531).
- EARTH PILES SHALL BE STABILIZED TO PREVENT EROSION BY SEEDING & MULCHING.

SIGHT DISTANCE & DETAIL SHEET
TAX MAP 190 LOT 191
MACTHOMPSON SITE PLAN
48 LOWELL ROAD
HUDSON, NEW HAMPSHIRE 03051

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SCALE: AS NOTED SHEET 10 OF 10 AUGUST 3, 2021

REVISIONS	DATE

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