GRAZ Engineering, L.L.C.

323 West Lake Road • Fitzwilliam, NH 03447 • Telephone (603) 585-6959 • Fax (603) 585-6960

Transmittal

To: Planning Board
Company: Town of Leicester
Address: 3 Washburn Square
City/State: Leicester, MA 01524

Subject: Revised Parker Street (North) Definitive Plans
Date: August 24, 2021
Transmitted: ☐ **Mail** ☑ **Email** ☑ **Hand**

☑ **For Your Approval**	☑ **Which You requested**
☑ **For Your Review**	☐ **Approved**
☐ **For Your Signature**	☐ **Approved As Noted**
☑ **For Your Information**	☐ **Revise And Resubmit**
☐ **For Your Files**	☐ **Not Approved**

3	copies	**Parker Street (North) - Definitive Subdivision Revision Letter dated 8/24/21**
2	copies	**Parker Street (North) - Revised Definitive Subdivision Plans, 8/24/21 (Full Size Plans)**
2	copies	**Parker Street (North) - Revised Definitive Subdivision Plans, 8/24/21 (11 x 17 Plans)**
3	copies	**Parker Street (North) - Revised Stormwater & Hydrology Documents, 8/24/21**
3	copies	**AASHTO Document Excerpt**
1	email	**Revised PDF Digital Copy of Submittal Materials, 8/24/21**
	copies	
	copies	

Comments: Enclosed are the revised plans and associated documentation for the Parker Street (North) Definitive Subdivision located off from Pine Street.

Should you have any questions or require any additional information, please call my cell at 508-769-9084.

Respectfully yours,
GRAZ Engineering, L.L.C.

Brian MacEwen, PLS, BSCE
Project Manager

cc: Matt Schold, Applicant/Owner

GRAZ Engineering, L.L.C.

323 West Lake Road • Fitzwilliam, NH 03447 • Telephone (603) 585-6959 • Fax (603) 585-6960

August 24, 2021

Michelle Buck, Planner
Leicester Planning Board
3 Washburn Square
Leicester, MA 01524

Subject: Parker Street (North)
Definitive Subdivision Revision 1

Dear Ms. Buck:

GRAZ Engineering, L.L.C. (GRAZ) has received and reviewed the following letters regarding technical review and comments of the proposed Parker Street (North) Definitive Subdivision to be located off Pine Street.

- Leicester Police Department, not dated, received via email June 9, 2021 by Officier Derrick Ruth
- Leicester Highway Department, received via email on June 11, 2021, by Dennis Griffin
- Quinn Engineering, Inc. (QEI), dated July 6, 2021, received via email by Mr. Kevin Quinn, P.E.
- State Forester, received via email on June 29, 2021 by Chris Capone
- Leicester Planning Department, received via email on August 16, 2021 by Michelle Buck, AICP

On behalf of Schold Development, LLC (Matt Schold) and in response to the above noted letters and subsequent comments received during the Leicester Planning Board (LPB) public hearing to date, GRAZ submits the following item-by-item responses and the revised subdivision plans for final review and approval of the LPB. For simplicity, GRAZ will provide comment on only the items for which revisions have been made for this submittal.

Quinn Engineering, Inc. Letter

Waiver Requests:

5. *Waive VI, E, which requires underground CATV, electric, telephone/communications wiring, to permit overhead utilities.*

   As noted in the initial public hearing, the Applicant proposes to install underground utilities from the last existing utility pole located on the east of Parker Street near the Y.W.C.A. The plans have been revised to note that accordingly.

6. *Waive §VI,L: To waive the installation of street trees.*

   As noted in the initial public hearing, the Applicant proposes to install street trees as required to supplement the existing vegetation along the proposed roadway that is to remain. The plans will be revised to depict the estimated locations, quantity, and types of proposed street trees to be installed.

7. *Waive §V, C, 4, which limits the design velocity of flow in storm systems to between 2 and 10 feet per second, to permit drainage velocity of 15 feet per second.*

   This waiver request has been removed.

8. *Waive §VI,E,(3): To waive the installation of required street lights.*

   As noted at the initial public hearing, the Applicant proposes to install lot/street lights on the individual lots near the intersection of the proposed driveways with the proposed roadway. A note has been added to the plans (Sheet 6) to indicate this accordingly.

Comments:

1. *The proposed cul-de-sac cuts into a hillside grade, in an area where groundwater appears to be active. A sub-drain must be called out around the cul-de-sac in all cut areas, to control and remove groundwater from the base gravel.*

   The plans have been revised to depict the locations, elevations, and details of the proposed sub-drain accordingly.

2. *Leicester Planning Board may wish to request an area be set aside for Open Space for passive or active recreation. (REF: §V, E).*

   Due to the scale of the development, the Applicant does not propose any dedicated Open Space.

3. *From STA 16+50 to STA 21+50 +/-, a substantial fill slope is proposed on the west side of the roadway. In this area, the engineer should review the Massachusetts Department of Transportation warrant for guardrail, to evaluate whether guardrail should be installed.*

   Our assessment of the embankment on the westerly side of the proposed roadway between STA 16+50 to STA 21+50 based on a review of the MassDOT guidelines indicates that guardrails are not required. See attached AASHTO documentation.

Hydrology & Stormwater:

4. *The Hydrology and Stormwater Report should provide a topographic plan which outlines subcatchment areas, design points, and runoff flow routes for both the pre-development model and post-development model. We cannot evaluate the stormwater analysis in the absence of this information.*

   The Hydrology Report has been revised to include the pre & post development watershed plans complete with existing and proposed topography accordingly.

5. *The Hydrology and Stormwater Report documents that at Design Points 2 and 3, the post-development rates of runoff are increased over the pre-development rates for all storms. The Applicant states that the stormwater system was designed to conform to standards to the "maximum extent practicable". Although the Massachusetts Stormwater Management Policy states that projects which propose between five and nine homes may be designed to the greatest extent practicable, historically, the Massachusetts Department of Environmental Protection, Wetland Division, has held that no increase in post-development runoff is permitted, except for the 100 year storm. For that storm, it must be shown that no negative impact results downstream from an increase in the out flow.*

   The Hydrology Report has been revised such that there are just two (2) Analysis Points for the proposed stormwater discharge, namely the wetlands to the northeast of the site and Stiles Lake to the west. Subsequently, the proposed peak rates of run-off for these two analysis points have been attenuated to less than or equal to the pre-development run-off rates.

6. *In Infiltration Basin #2P, no evidence of soils testing is found. Per Massachusetts Stormwater Management Policy, soils testing must be performed within the perimeter of infiltration basins.*

   The Hydrology Report has been revised to include the deep hole soil testing data that was performed on August 12, 2021 in the sedimentation forebay (SF1) and the Infiltration Basin (B1) accordingly.

7. *The Stormwater Basin Cross Section, Sheet 8 of 8, calls for planting a row of thorny rose bushes ("Rosa Rugosa") along the outside crest of the stormwater basin berm (Infiltration Basin #2P), as a deterrent to entry. The roses cannot be planted on either the gravel access road, nor the Emergency Spillway. Some other means of restricting access over those areas must be developed.*

   The plans have been revised to depicted two (2) means of entry deterrent to the stormwater basin (B1). Chain link fencing will be used at the entry point with the proposed roadway as well as across the top of the basin spillway weir. The remainder of the perimeter shall have the "Rosa Rugosa" plantings installed as depicted on the plans accordingly.

Town Planner Comments Relative to Preliminary Plan Approval Conditions:

2. *The Applicant shall provide a fire cistern on the Definitive Plan if required by the Fire Department (it is understood that the Applicant will be seeking a waiver because of the limited number of lots and proximity to Stiles Reservoir).* ***Did you receive a waiver from the Fire Department?***

   The Applicant has discussed the installation of a dry hydrant near the Parker Street bridge over Bartons Brook should the development exceed 4 or more houses. The Fire Department appears to be agreeable to this solution in lieu of installing a underground cistern for fire protection. The Applicant will obtain a letter from the Fire Departments stating the same.

3. The Applicant shall coordinate with the Leicester Post Office and incorporate their preferences with mailbox locations into the Definitive Plan. ***What is your plan for mail delivery, and have you coordinated with the Post Office?***

   The Applicant is coordinating with the Post Office to determine the method of mail delivery. It is anticipated that the delivery will be to the individual houses. The Applicant will obtain a letter from the Post Office to state the final method of mail delivery.

4. *The Definitive Plan application shall include an analysis of the full development potential along Parker Street from Pine Street to the end of the new roadway cul-de-sac.* ***This isn't included in your application.***

   Our analysis of the full development potential is as follows:

   - **For the existing improved portion of Parker Street which extends just to the south of the bridge at Bartons Brook, the Y.W.C.A. lands appear to have sufficient frontage and area to support four (4) building lots.**
   - **For the portion of Parker Street to be improved under this project which extends from just to the south of bridge at Bartons Brook, the Y.W.C.A. lands appear to have sufficient frontage and area to support three (3) additional building lots.**
   - **And finally, for that of Parker Street that shall be improved under this project which extends from the southerly property lines of the Y.W.C.A. lands to the terminus of the proposed cul-de-sac, the Applicant's lands have sufficient frontage and area to allow a maximum of five (5) building lots.**

   Thus, the full conceptual potential for buildable lots, without accounting for enviromental or constructability issues, once this project has been completed and the Town accepts the roadway would be twelve (12) lots.

5. *The Definitive Plan application shall include proposed deed restrictions or other options to limit development in perpetuity so that the total number of lots served by the new roadway shall not exceed five (5), and to prohibit any further extension of (or new roadways off of) the Parker Street extension proposed by this application.* ***What is proposed to limit development?***

   Sheet 3 of the plans has been revised to include notations as to what the Applicant understands to be the minimum restrictions for the build-out of the lands that is being developed under this project. These notes are as follows:

   - In perpetuity, the subdivision of the lands of the applicant and currently depicted on Assessor's Map 42 as lots A1.0 & B1.0 adjacent to the proposed roadway and associated right-of-way as depicted hereon shall be limited to a maximum of five (5) building lots.
   - In perpetuity, the proposed roadway and associated right-of-way cannot be extended beyond the limits as depicted hereon and there can be no additional new roadways developed off from said proposed roadway.
   - any further subdivision of the remaining lands of the applicant shall require further approval of the Leicester planning board pursuant to the subdivision control regulations.

I trust that this information will assist the Planning Board in their finalization of the "Decision" and "Conditions of Approval" of the Applicant's application for "Definitive Subdivision Approval". Should you have any other questions or require additional information prior to the next meeting please call me as soon as possible.

Respectfully yours,
GRAZ Engineering, L.L.C.

Brian MacEwen, PLS, BSCE
Project Manager

Paul Grasewicz, PE, PLS

BCM/PFG/bcm

cc: Matt Schold, Schold Development, LLC
Paul Grasewicz, GRAZ Engineering, LLC

attachment: AASHTO Document Excerpt

c) For roadways with low volumes, it may not be practical to apply even the minimum values found in Table 3-1. Refer to Chapter 12 for additional considerations for low-volume roadways and Chapter 10 for additional guidance for urban applications.

d) When design speeds are greater than the values provided, the designer may provide clear-zone distances greater than those shown in Table 3-1.

U.S. Customary Units

Design Speed (mph)	Design ADT	Foreslopes			Backslopes		
		1V:6H or flatter	1V:5H to 1V:4H	1V:3H	1V:3H	1V:5H to 1V:4H	1V:6H or flatter
≤40	UNDER 750[c]	7–10	7–10	[b]	7–10	7–10	7–10
	750–1500	10–12	12–14	[b]	10–12	10–12	10–12
	1500–6000	12–14	14–16	[b]	12–14	12–14	12–14
	OVER 6000	14–16	16–18	[b]	14–16	14–16	14–16
45–50	UNDER 750[c]	10–12	12–14	[b]	8–10	8–10	10–12
	750–1500	14–16	16–20	[b]	10–12	12–14	14–16
	1500–6000	16–18	20–26	[b]	12–14	14–16	16–18
	OVER 6000	20–22	24–28	[b]	14–16	18–20	20–22
55	UNDER 750[c]	12–14	14–18	[b]	8–10	10–12	10–12
	750–1500	16–18	20–24	[b]	10–12	14–16	16–18
	1500–6000	20–22	24–30	[b]	14–16	16–18	20–22
	OVER 6000	22–24	26–32[a]	[b]	16–18	20–22	22–24
60	UNDER 750[c]	16–18	20–24	[b]	10–12	12–14	14–16
	750–1500	20–24	26–32[a]	[b]	12–14	16–18	20–22
	1500–6000	26–30	32–40[a]	[b]	14–18	18–22	24–26
	OVER 6000	30–32[a]	36–44[a]	[b]	20–22	24–26	26–28
65–70[d]	UNDER 750[c]	18–20	20–26	[b]	10–12	14–16	14–16
	750–1500	24–26	28–36[a]	[b]	12–16	18–20	20–22
	1500–6000	28–32[a]	34–42[a]	[b]	16–20	22–24	26–28
	OVER 6000	30–34[a]	38–46[a]	[b]	22–24	26–30	28–30

Notes:

a) When a site-specific investigation indicates a high probability of continuing crashes or when such occurrences are indicated by crash history, the designer may provide clear-zone distances greater than the clear zone shown in Table 3-1. Clear zones may be limited to 30 ft for practicality and to provide a consistent roadway template if previous experience with similar projects or designs indicates satisfactory performance.

b) Because recovery is less likely on the unshielded, traversable 1V:3H fill slopes, fixed objects should not be present in the vicinity of the toe of these slopes. Recovery of high-speed vehicles that encroach beyond the edge of the shoulder may be expected to occur beyond the toe of slope. Determination of the width of the recovery area at the toe of slope should consider right-of-way availability, environmental concerns, economic factors, safety needs, and crash histories. Also, the distance between the edge of the through traveled lane and the beginning of the 1V:3H slope should influence the recovery area provided at the toe of slope. While the application may be limited by several factors, the foreslope parameters that may enter into determining a maximum desirable recovery area are illustrated in Figure 3-2. A 10-ft recovery area at the toe of slope should be provided for all traversable, non recoverable fill slopes.

c) For roadways with low volumes it may not be practical to apply even the minimum values found in Table 3-1. Refer to Chapter 12 for additional considerations for low-volume roadways and Chapter 10 for additional guidance for urban applications.

d) When design speeds are greater than the values provided, the designer may provide clear-zone distances greater than those shown in Table 3-1.

The designer may choose to modify the clear-zone distances in Table 3-1 with adjustment factors to account for horizontal curvature, as shown in Table 3-2. These modifications normally are considered only when crash histories indicate such a need, when a specific site investigation shows a definitive crash potential that could be significantly lessened by increasing the clear zone width, and when such increases are cost-effective. Horizontal curves, particularly for high-speed facilities, are usually superelevated to increase safety and provide a more comfortable ride. Increased banking on curves where the superelevation is inadequate is an alternate method of increasing roadway safety within a horizontal curve, except where snow and ice conditions limit the use of increased superelevation.

For relatively flat and level roadsides, the clear-zone concept is simple to apply. However, it is less clear when the roadway is in a fill or cut section where roadside slopes may be positive, negative, or variable, or where a drainage channel exists near the through traveled way. Consequently, these features should be discussed before a full understanding of the clear zone concept is possible.

Table 3-2. Horizontal Curve Adjustment Factor

Radius, m [ft]	Design Speed km/h [mph]					
	60 [40]	70 [45]	80 [50]	90 [55]	100 [65]	110 [70]
900 [2,950]	1.1	1.1	1.1	1.2	1.2	1.2
700 [2,300]	1.1	1.1	1.2	1.2	1.2	1.3
600 [1,970]	1.1	1.2	1.2	1.2	1.3	1.4
500 [1,640]	1.1	1.2	1.2	1.3	1.3	1.4
450 [1,475]	1.2	1.2	1.3	1.3	1.4	1.5
400 [1,315]	1.2	1.2	1.3	1.3	1.4	—
350 [1,150]	1.2	1.2	1.3	1.4	1.5	—
300 [985]	1.2	1.3	1.4	1.5	1.5	—
250 [820]	1.3	1.3	1.4	1.5	—	—
200 [660]	1.3	1.4	1.5	—	—	—
150 [495]	1.4	1.5	—	—	—	—
100 [330]	1.5	—	—	—	—	—

$CZ_c = (L_c)*(K_{cz})$

where:

CZ_c = Clear zone on outside of curvature, meters [feet]

L_c = Clear zone distance, meters [feet] (see Table 3-1)

K_{cz} = Curve correction factor

Note: The clear-zone correction factor is applied to the outside of curves only. Corrections are typically made only to curves less than 900-m [2,950-ft] radius.

3.2 ROADSIDE GEOMETRY

If a roadside is not flat, a motorist leaving the roadway will encounter a foreslope, a backslope, a transverse slope, or a drainage channel, as shown in Figure 3-1. Each of these features has an effect on a vehicle's lateral encroachment and trajectory as discussed in the following sections.

3.2.1 Foreslopes

Foreslopes parallel to the flow of traffic may be identified as recoverable, non-recoverable, or critical. Recoverable foreslopes are 1V:4H or flatter *(14)*. If such slopes are relatively smooth and traversable, the suggested clear-zone distance may be taken directly from Table 3-1. Motorists who encroach on recoverable foreslopes generally can stop their vehicles or slow them enough to return to the roadway safely. Fixed obstacles such as culvert headwalls normally will not extend above the foreslope within the clear-zone distance. Examples of suggested roadside design practices for recoverable foreslopes and the application of the clear-zone concept are in Section 3.3.

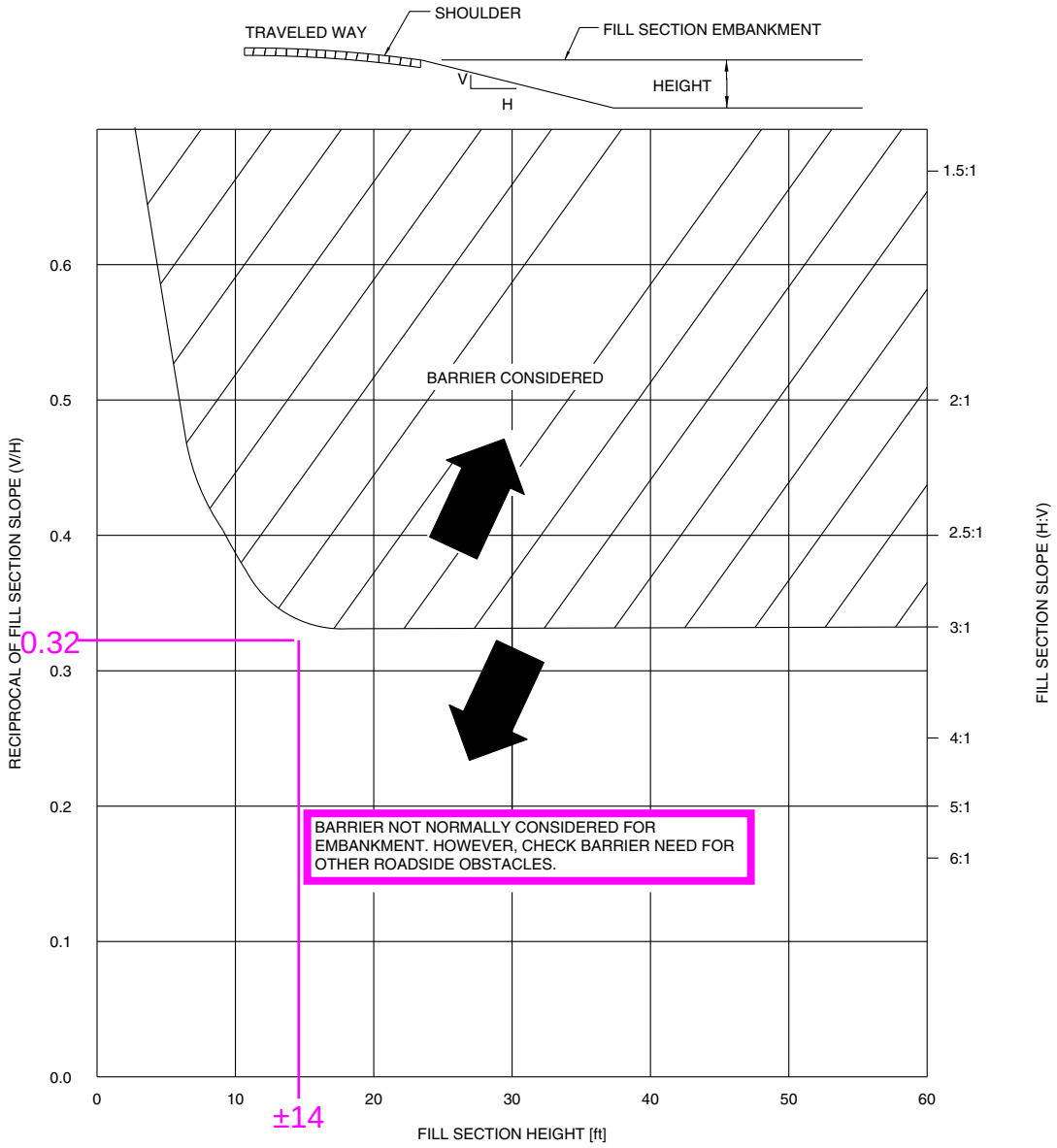


Figure 5-1(b). Comparative Barrier Consideration for Embankments (U.S. Customary Units) ***(15)***

Proposed
PARKER STREET
DEFINITIVE SUBDIVISION

Off Pine Street
Leicester, Massachusetts

HYDROLOGY &
STORMWATER REPORT

For Leicester Planning Board Definitive Subdivision Approval
Leicester Conservation Commission Notice of Intent
Submittals

June 8, 2021
Revised August 24, 2021

PREPARED FOR:

Schold Development, LLC
77 Chickering Road
Spencer, MA 01562

PREPARED BY:

GRAZ Engineering, L.L.C.
323 West Lake Road
Fitzwilliam, NH 03447

Proposed
PARKER STREET
DEFINITIVE SUBDIVISION

Off Pine Street, Leicester, MA

TABLE OF CONTENTS

June 8, 2021
Revised August 24, 2021

STORMWATER REPORT SUMMARY

Project Overview

In accordance with the preliminary subdivision plan approval by the Leicester Planning Board on August 4, 2020 of the "Preliminary Plan – Parker Street (North)" dated June 30, 2020 and in compliance with the Board's conditions of approval, the current Town of Leicester "Rules & Regulations Governing the Subdivision of Land", and the "Zoning Bylaws" the Applicant and Owner, Schold Development, LLC proposes a three (3) lot subdivision of the land located on Parker Street along the existing way which is currently comprised of a gravel and dirt road that is an extension to the south of the existing portion of Parker Street that was improved and laid out by the Town of Leicester in 2004 as depicted in Worcester District Registry of Deeds Plan Book 807, Plan 10. This portion of Parker Street is located off the southerly side of Pine Street.

Existing Site Conditions

The existing property is a ±72.7 acre undeveloped woodland currently divided by a gravel and dirt cart road (right-of-way status unknown) named Parker Street that extends southerly from the southerly sideline of Pine Street to the northerly sideline of Baldwin Street.

The project site is the land described as recorded in the Worcester District Registry of Deeds (WDRD) in Book 60004, Page 48, and depicted as Parcels A and C in Plan Book 800, Plan 29. The entire project site is located in the Suburban/Agriculture (SA) zoning district.

The northerly boundary of the project site is bounded by lands owned by the Y.W.C.A., the easterly & southerly boundaries are bounded by multiple private owners, and the westerly boundary is bounded by the easterly edge of Stiles Lake. The site consists of a mix of oak, maple, and pine trees along with various mixed hard and soft woods as well as mountain laurel. The site generally slopes uphill in a south to southeasterly direction from the southerly end of the improved portion of Parker Street near the Stiles Lake spillway. There are several Bordering Vegetated Wetlands (BVW) located adjacent to and within portions of the project site. The site is bounded on the west by the shoreline of Stiles Lake, the north by undeveloped lands currently owned by the Y.W.C.A., the east by undeveloped lands of Larson & Mutual Builders, and south by several existing residential lots bordering on the southerly portion of Parker Street, Baldwin Street, and Salminen Avenue.

A review of the NCRS Soil Survey mappings indicates that the site soils are comprised of "C" soils for the majority of the upland areas while the portions of the adjacent wetlands are classified as "D" soils. Field investigation of the soils has not been performed to date.

Portions of the proposed roadway improvement work and the stormwater for the roadway and site development are within the 100-foot buffer zone of the said wetlands. Therefore the project is under the under the jurisdiction of the MADEP Wetlands Protection Act and the Leicester Conservation Commission local wetlands regulations. A Notice of Intent for the project will be submitted separately.

Proposed Site Conditions

The proposed lot sites will be provided with private septic systems & domestic water wells with overhead electrical and communication services from the existing public utilities located in improved northerly portion of Parker Street. In addition to those utilities a proposed "country drainage" stormwater system has been designed to provide control and treatment to the maximum feasible extent of the Massachusetts DEP Stormwater Management Standards. The existing graveled/dirt travelled way currently known as Parker Street shall be laid out into a dead-end cul-de-sac (±1,480') right-of-way and the roadway shall be improved such that it shall meet the minimum requirements as set forth by the LPB for acceptance as a public way upon completion.

The majority of the remaining land lot shall remain as a wooded upland. As depicted on the plans, ground cover for the majority of the proposed developed lot sites shall be residential lawns with the remainder being covered by the proposed dwellings, driveways, roadway, and undisturbed woodlands.

The proposed site has been designed to the maximum feasible extent to mimic as close as possible the existing conditions stormwater flows utilizing a "country minimum of stormwater management practices and to minimize releases and to treat runoff, thereby minimizing environmental impact. Several techniques were utilized from the Massachusetts Department of Environmental Protections' (DEP) revised Stormwater Management handbooks to help maintain and provide better water quality, minimize runoff, and to provide groundwater recharge. These techniques include the "country drainage" swale with stone check dams intermittently spaced along its length, sediment forebay, and detention/infiltration basin with rip-rapped outlet aprons.

Standard 1: No Untreated Discharges or Erosion to Wetlands

All discharges from the proposed site have been treated to the maximum feasible extent given the nature of the existing gravel roadway and right-of-way width limitations and availability for additional drainage mitigation infrastructure on the adjacent privately owned lands. We would note that the level of treatment for the improved roadway portion of the project is consistent and exceeds the level of stormwater management that was provided for the most northerly section of the Parker Street as improved under by the Town of Leicester in 2004. Calculations for water quality have been provided under Standard 4.

Note that the majority of the proposed roadway improvement area will be collected via the "country drainage" swale located on the easterly side of the roadway and discharged to a combination sediment forebay and detention/infiltration basin to be located on the lands of the Y.W.C.A. The discharge from the detention/infiltration basin is to the adjacent wetland area similar to the current untreated gravel roadway runoff discharge point. Outlets have been lined with riprap and sizes based on a reference from the Erosion and Sediment Control Handbook, Fig 7.45, Design of riprap outlet protection from a round pipe flowing full; minimum tailwater conditions.

Standard 2: Peak Rate Attenuation

The analyses were made using SCS hydrological groups C soils of sandy clay loam and silty clay loam using HydroCAD Software Solutions system for modeling the hydrology and hydraulics of stormwater runoff. The stormwater management system is designed to attenuate the 2 and 10-year frequency storms as required by the DEP Stormwater Management Guidelines, Standard 2. The 25-year storm has also been evaluated as required by the Town of Leicester for the design of the drainage pipe network. In addition, the 100-year frequency storm was analyzed and determined to have no adverse off-site impacts.

For the purpose of analyzing pre- and post-development stormwater peak rates of runoff, two (2) analysis points (AP-1, Wetlands to the Northeast) and (AP-2, Stiles Lake) have been selected based on existing topographic conditions which were used for both the pre- and the post-peak rate calculations. The following table summarizes the pre versus post peak runoff rates for the above cited storm events for the various discharge points from the site with the respective HydroCAD node listings.

Table No. 1 - Analysis Point 1 (AP-1): Wetlands to the Northeast

Storm Event	*Pre-Development (cfs)*	*Post Development (cfs)*	*Net Change (cfs)*
2	*9.85*	*7.84*	*-2.01*
10	*23.60*	*22.42*	*-1.18*
25	*35.83*	*33.72*	*-2.11*
100	*62.54*	*52.87*	*-9.67*

Table No. 2 - Analysis Point 2 (AP-2): Stiles Lake

Storm Event	*Pre-Development (cfs)*	*Post Development (cfs)*	*Net Change (cfs)*
2	*8.32*	*7.54*	*-0.78*
10	*19.53*	*17.25*	*-2.28*
25	*29.40*	*29.33*	*-0.07*
100	*50.79*	*51.00*	*0.21*

Standard 3: Recharge

Prior to visiting the site a review of the NRCS Soil Survey was made to identify the soils and hydrologic groups. The majority of the upland site is mapped as Montauk fine sandy loam (C soils) with the wetland area along the northerly side of Baldwin Street being Whitman fine sandy loam (D soils). As the proposed storm water management basin is proposed adjacent to wetlands, the soil conditions have been evaluated by on-site deep hole soil testing to determine the estimated seasonal high groundwater table elevation. Using the "Static Method" the required storage volumes of the infiltration basin (Pond B1) as determined for the additional impervious areas proposed by this project. The recharge volume provided by Pond B1 along with the proposed roof runoff drywells exceeds the required recharge volume for the entire developed site. A mounding analysis has been provided for Pond B1. The calculations for the proposed recharge volume including the drawdown time calculation for Pond B1 have been included with this report.

Site Recharge to Groundwater ***"Static Method"***

Soil type: C Rawls Rate: 0.27 In./Hr.
Impervious Area (A1): 55,072 s.f.

Hydrologic Group	Target Depth Factor (F)	
A	0.60	inches
B	0.35	inches
C	0.25	inches
D	0.1	inches

Determine the required recharge volume:

Rv = F x impervious area

Rv = Required Recharge Volume
F = Target Depth Factor

$$Rv = \frac{F"HSGC" \times A1}{12 \text{ in. / ft.}} = \frac{13{,}768}{12} = 1{,}147 \text{ Cu.Ft.}$$

From Hydrocad determine the elevation that will hold back the required recharge volume:

Below is a excerpt from the stage storage table of Infiltration Pond B1.
Required Site Rv= 1,147 Cu.Ft., the minimum low level outlet required = 857.21

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)	
856.5	0	0	
856.7	884	88	
856.9	1,769	354	
857.1	2,749	801	857.21 El. At Rv Min.
857.3	3,825	1,458	1,458 Rv at LLO
857.5	4,902	2,331	

The Low Level Outlet (LLO) has been designed at elevation: 857.30

Determine if the infiltration BMP will drain completely within 72 hours:

$$\text{Time drawdown} = \frac{Rv}{(K)\ (\text{Bottom Area})}$$

Rv = Storage Volume at Low Level Outlet (LLO) Elevation
K = Saturated Hydraulic Conductivity (Rawls Rate)
Bottom area = Bottom surface area not including sidewall

$$\text{Time drawdown} = \frac{857.21}{\frac{0.27}{12 \text{ in. / ft.}} * 2{,}211} = 17 \text{ hours}$$

Result is satisfactory for design purposes 17 hrs. < 72 hrs.

Standard 4: Water Quality

The sediment forebay (SF1) has been sized based on calculations using a ½-inch of runoff times the total impervious area of the post development project site. Calculations for the water quality volume and total suspended solids removal are provided.

The total site impervious area is 55,072 s.f., therefore the amount of volume to be treated for water quality is 2,295 c.f. The total supplied water quality volume from the sediment forebay is 2,378 c.f. which is greater than the requirement for the project.

Stormwater runoff volumes to be treated for water quality

- Stormwater Policy Standard 4: 1/2-inch of runoff x total impervious area of post-development site

Sediment Forebay 1P

Required Water Quality Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 0.5 in runoff (Cu.Ft.)	
P1.1	36,982		
P1.2	14,157		
P2.1	3,933		
	55,072	**2,295**	**Required W.Q.V.**

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

Below is a excerpt from the stage storage table of Sediment Forebay (SF1).
From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

2,295 Cu.Ft., the min. W.Q.V. storage elevation required = 860.26

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Cum. Storage (Cu. Ft.)		
857.8	0	0		
858	416	42		
859	804	652		
860	1,588	1,848	860.26	El. At Req. W.Q.V
861	2,784	4,034	860.3	W.Q.V.at Weir El.
861.5	3,456	5,594		

The Weir Elevation has been designed at elevation: 860.30

Supplied Water Quality Volume: 2,378 Cu.Ft.

STORMWATER MANAGEMENT

Weighted 80% TSS REMOVAL

BMP'S			***% Removal***
- CB's = Catch Basin w/ 4' sump and outlet tee			25%
- SF/DB = Detention Basin with Sediment Forebay			80%
- SF/IB = Infiltration Basin with Sediment Forebay			80%
- GSW = Grassed Swale with stone check dams @ 20' O.C.			70%
- N = No treatment			0%
AREAS	***BMP***	***IMP. AREA (SF)***	***TSS Removal***
P1.1	GSW, SF/DB	36,982	94.0%
P1.2	GSW	14,157	70.0%
P2.1	N	3,933	0.0%
TOTAL IMPERVIOUS AREA (SF)		***55,072***	
TOTAL WEIGHTED TSS REMOVAL			***81.1%***

Standard 8: Construction Period Pollution Prevention and Erosion & Sedimentation Control

System

The proposed Parker Street Subdivision drainage system consists of a drainage network that collects and attenuates peak flows that will be generated from the proposed site development to the maximum extent possible. The network includes "country drainage" swales; sediment forebay; and a detention/infiltration basin. Ultimately the flow discharges toward both Stile Lake to the west and the wetlands located to the north and east of the site.

Responsible Parties

The proposed roadway stormwater management system shall be operated and maintained by the developer during construction. Once the development is complete and the town accepts the roadway, the Town of Leicester will take responsibility for the roadway drainage system.

Construction Operation and Maintenance

Sedimentation and erosion controls, such as haybales, siltfence, and the stabilized construction entrance shall be installed prior to the commencement of construction. The maintenance of the sedimentation and erosion controls during the construction and until the site is fully stabilized shall be the responsibility of the Owner through the site contractor.

Sedimentation and erosion controls shall be inspected on an ongoing basis and repaired and/or replaced as necessary throughout construction. Upon completion of construction, the sedimentation and erosion controls shall be maintained until the disturbed areas of the construction site are fully stabilized.

The stabilized construction entrance shall be maintained to prevent tracking and washing of sediment onto existing paved surfaces until the installation of the roadway bituminous concrete binder course. The entrance shall be top dressed with additional stone or length extended as necessary. Roads adjacent to the site shall be left clean at the end of each day by the removal of any sediment spilled, tracked, or washed onto the existing pavement.

All site runoff shall be routed through permanent drainage facilities where available. Temporary sediment basins shall be constructed to control disturbed area runoff where the permanent system is not in place. The controls shall be constructed and maintained to minimize erosion and sediment transport. Maintenance shall be weekly or as necessary.

Modified rock check dams shall be added to the drainage channels at 20’ intervals during construction. They shall be inspected on an ongoing basis and repaired and/or replaced as necessary throughout construction. As part of the mosquito prevention they shall be inspected 72 hours after storms for standing water ponding behind them. Take corrective action if standing water is found.

The infiltration basins shall not be used as temporary sediment traps. The sediment forebay shall be excavated to one-foot above finish grade until the site has become fully stabilized. After the site is stabilized the basin shall be excavated to the finished grade.

The Contractor shall control airborne dust with the use of sprayed water as required minimize the impacts to neighboring properties. The use of calcium chloride or other chemicals are prohibited.

Mosquito Control**:** During construction the contractor is responsible for maintenance to see that larvicides are applied as necessary to the following stormwater treatment practices, which include but are not limited to: catch basins, drainage channels with check dams, sediment forebays, and infiltration basins. larvicides shall be applied by a licensed pesticide applicator in full compliance with all pesticide label requirements and any requirements that the Town of Leicester may have including types of larvicides and times of application.

Construction Period Pollution Prevention Measures

The Construction Period Pollution Prevention measures implemented under the Construction Erosion and Sedimentation Control will focus on developing, implementing, and enforcing a program that will reduce or eliminate the impacts of storm water runoff from the construction site. They focus predominately on temporary pollution prevention practices and address long-term or permanent pollution prevention measures that are implemented during the construction phase.

As described previously, sedimentation and erosion controls, such as straw wattles, siltfence, and stabilized construction entrances will be installed prior to the commencement of construction. Temporary sediment traps and detention basins will be installed as required. Check dams have been added to the drainage channels to help prevent erosion and help with the water quality. Inspections and maintenance of these controls have been well documented in the Operation and Maintenance Plan. With the addition of the Construction Inspection and Maintenance Log Form the contractor can incorporate a regimented schedule that will aid in the prevention of sedimentation pollution throughout the construction phase.

Standard 9: Operation and Maintenance Plan

Long Term Operation and Long Term Maintenance

Riprap Outlets: Riprap outlets shall be inspected annually to determine if high flows have caused scour beneath the riprap and/or filter fabric or dislodged any of the riprap or filter fabric materials. Replace riprap and/or repair/replace filter fabric as required. Any tree growth or accumulated sediments shall be removed.

Check Dams: Inspect check dams after every significant rainfall event. Repair damage and remove sediment as needed. Coordinate inspections with the drainage channel cycle.

Drainage Channels and Culvert inlets and outlets: Initially, the drainage channel should be inspected after the first few months to make sure there is no rilling or gullying, and that vegetation in the channels is adequate. Thereafter, inspect the channel twice a year for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding, and sediment accumulation. Regular maintenance includes mowing, fertilizing, liming, watering, pruning, weeding, and pest control. Mow channels at least once annually. Grass heights shall be no greater than 6 inches and mower blade depth shall be no lower than 3 to 4 inches. Excessive mowing may cause an increase in the design flow velocity. Remove all trash and debris at least once per year. Re-seed periodically to maintain the dense growth of grass vegetation.

Sediment Forebay: Sediments and associated pollutants are removed only when sediment forebays are actually cleaned out, so regular maintenance is essential. Sediment markers have been added as a quick reference. Frequently removing accumulated sediments will make it less likely that sediments will be resuspended. Inspect and clean sediment forebays at least twice per year. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments. When mowing grasses, keep the grass height no greater than 6 inches. Set mower blades no lower than 3 to 4 inches. Check for signs of rilling and gullying and repair as needed. After removing the sediment, replace any vegetation damaged during the clean-out by either reseeding or resodding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay, while the seeds germinate and develop roots.

Infiltration/Detention Basin: An important part of the maintenance of the infiltration basin is the maintenance of the sediment forebay. The infiltration basin shall be inspected and maintained at least twice a year, and after every time drainage discharges through the high outlet orifice. Once the basin is in use, inspect it after every major storm for the first few months to ensure it is stabilized and functioning properly and if necessary take corrective action. Note how long water remains standing in the basin after a storm; standing water within the basin 48 to 72 hours after a storm indicates that the infiltration capacity may have been overestimated. If the ponding is due to clogging, immediately address the reasons for the clogging (such as upland sediment erosion, excessive compaction of soils, or low spots). Dewatering trench valves are located in the outlet control on each infiltration basin. Sediment markers have also been added as a quick reference. Thereafter, inspect the infiltration basin at least twice per year. Important items to check during the inspection include: Signs of differential settlement; Cracking; Erosion; Leakage in the embankments; Tree growth on the embankments; Condition of riprap; Sediment accumulation and the health of the turf. At least twice a year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces, and revegetate immediately. Remove sediment from the basin as necessary, but wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer so as to not compact the underlying soil. Deeply till the remaining soil, and revegetate as soon as possible. Inspect and clean pretreatment devices associated with basins at least twice a year, and ideally every other month.

Public Safety Features: Fencing will be provided around all basins to limit access to these areas. The basins have been designed to preclude standing water which will be a deterrent to mosquito breeding.

Standard 10: Prohibition of Illicit Discharges

Long-Term Period Pollution Prevention Plan

As part of an effort to reduce or eliminate the negative impacts of stormwater runoff, Long-Term Period Pollution Prevention measures must be implemented. A long term Operation and Maintenance Plan has been described under Standard 9 for ongoing inspection and maintenance. In addition, an Operation and Maintenance Log Form was created to assist the owner. in a specific maintenance schedule.

Long-Term Period Pollution Prevention Plan

As part of an effort to reduce or eliminate the negative impacts of stormwater runoff, Long-Term Period Pollution Prevention measures must be implemented. A long term Operation and Maintenance Plan has been described under Standard 9 for ongoing inspection and maintenance. In addition, an Operation and Maintenance Log Form was created to assist the owner in a specific maintenance schedule.

Many people are not aware of Nonpoint-Source Pollution (NPS) and the effect it has on the environment. The owner will receive this report and be made aware of this information about NPS pollution prevention.

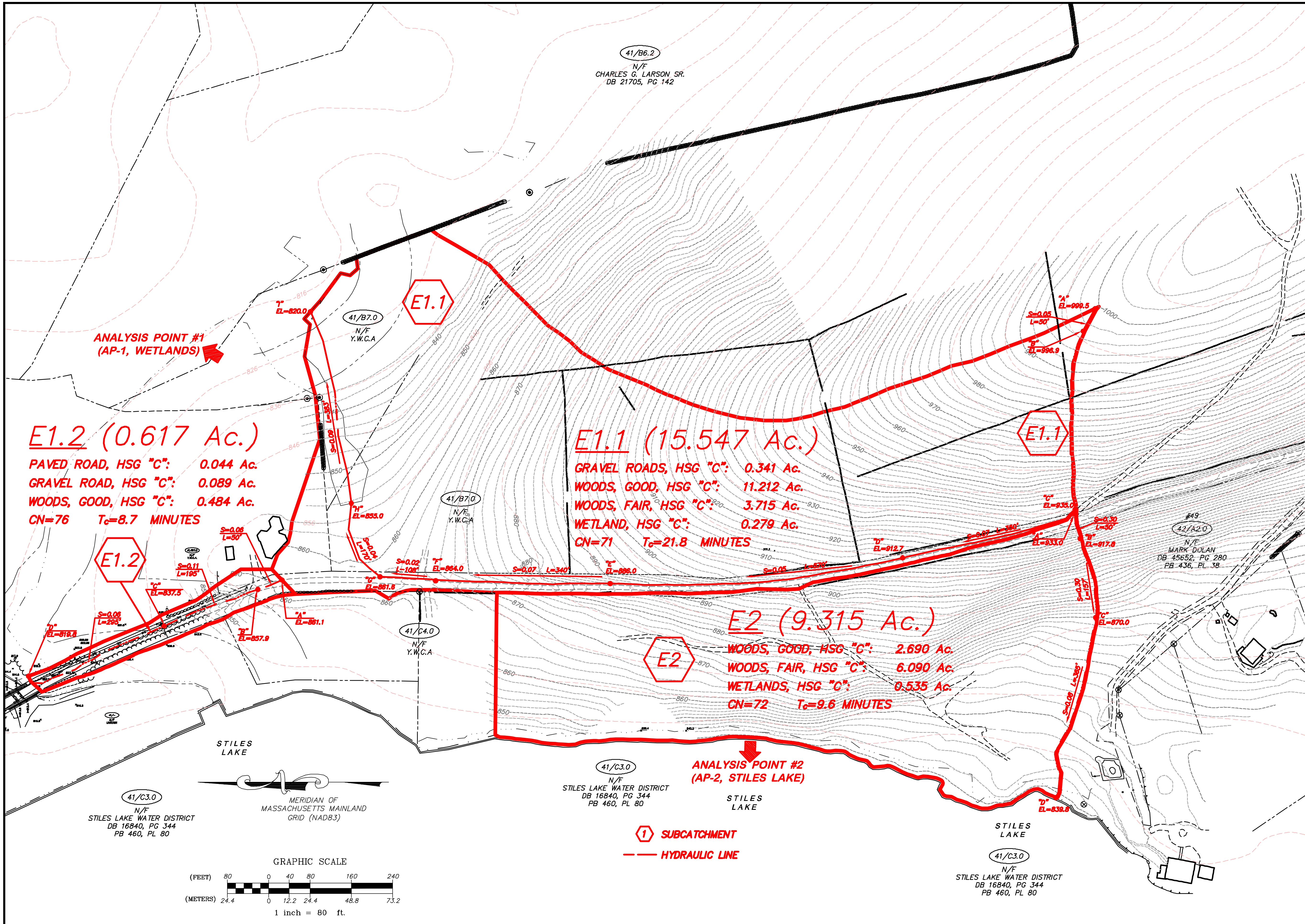
What you can do to prevent NPS pollution

Urban Stormwater Runoff

- Keep litter, pet wastes, leaves, and debris out of street gutters and storm drains--these outlets drain directly to lake, streams, rivers, and wetlands.
- Apply lawn and garden chemicals sparingly and according to directions.
- Dispose of used oil, antifreeze, paints, and other household chemicals properly, not in storm sewers or drains. If your community does not already have a program for collecting household hazardous wastes, ask your local government to establish one.
- Clean up spilled brake fluid, oil, grease, and antifreeze. Do not hose them into the street or parking lot where they can eventually reach local streams and lakes.
- Control soil erosion on your property by planting ground cover and stabilizing erosion-prone areas.

- Encourage local government officials to develop construction erosion/sediment control ordinances in your community.
- Purchase detergents and cleaners that are low in phosphorous to reduce the amount of nutrients discharged into our lakes, streams and coastal waters.

PRE-DEVELOPMENT ANALYSIS



GRAZ Engineering, L.L.C.
323 West Lake Road, Fitzwilliam, NH 03447
Phone: (603) 585-6959 Fax: (603) 585-6960

PARKKER STREET (NORTH) - DEFINITIVE SUBDIVISION
LEICESTER, MASSACHUSETTS

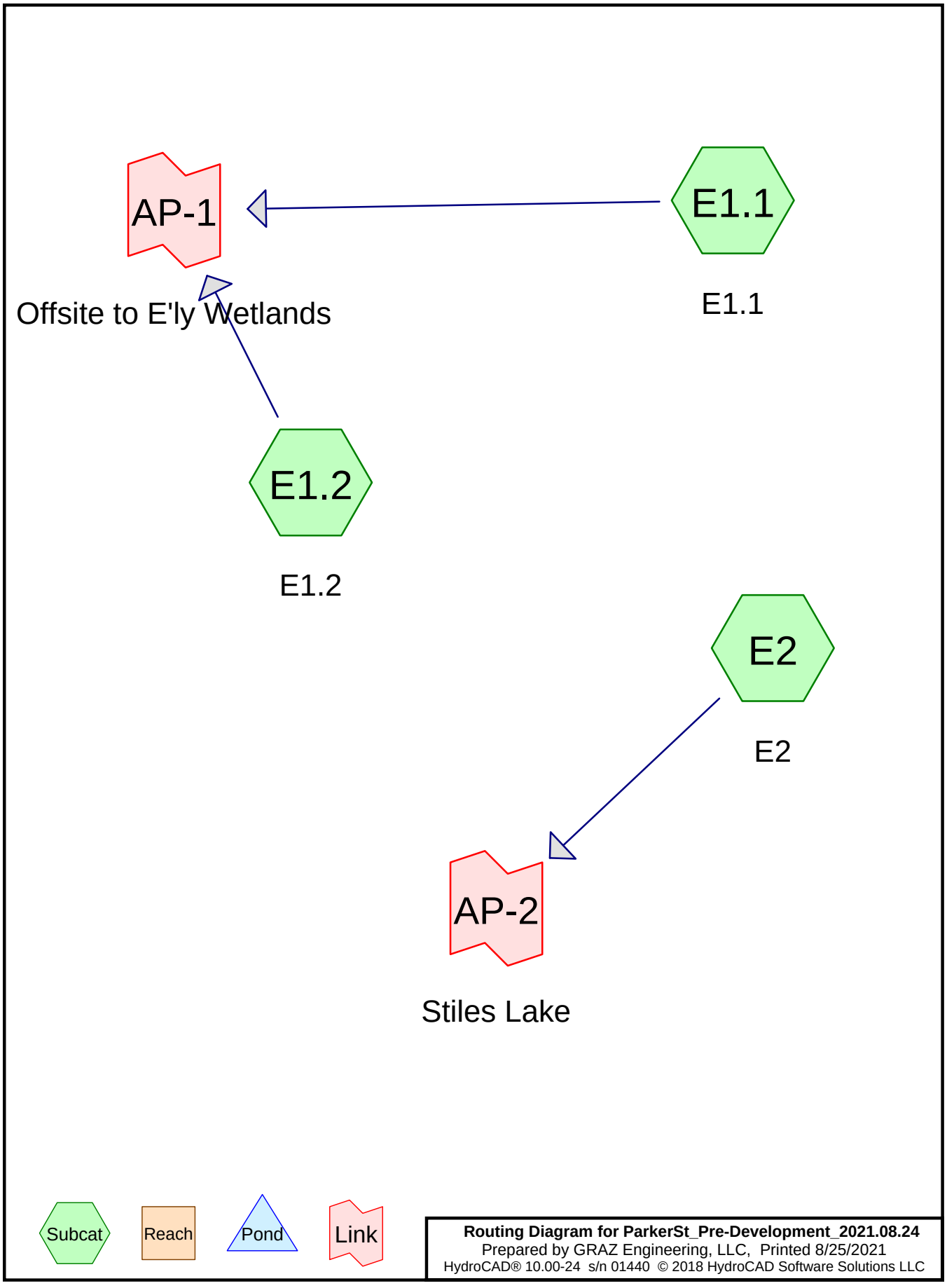
PRE DEVELOPMENT WATERSHED PLAN

PREPARED FOR: SCHOLD DEVELOPMENT, LLC (OWNER/APPLICANT)
77 CHICKERING ROAD, SPENCER, MA 01562

SCALE: AS NOTED | DRAWN: BCM | CHECKED: PFG & BCM | PLAN DATE: JUNE 8, 2021

REV.	DATE	DESCRIPTION	BY
1	8/24/21	REVS PER QUINN ENG. TECH. REVIEW & LPB	BCM

SHEET 1 OF 1



Routing Diagram for ParkerSt_Pre-Development_2021.08.24
Prepared by GRAZ Engineering, LLC, Printed 8/25/2021

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
18,731	96	Gravel surface, HSG C (E1.1, E1.2)
1,917	98	Roadway, HSG C (E1.2)
35,458	77	Wooded Wetlands, HSG C (E1.1, E2)
427,106	73	Woods, Fair, HSG C (E1.1, E2)
626,654	70	Woods, Good, HSG C (E1.1, E1.2, E2)

Summary for Subcatchment E1.1: E1.1

Runoff = 9.49 cfs @ 12.33 hrs, Volume= 49,579 cf, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.21"

	Area (ac)	CN	Description
	0.341	96	Gravel surface, HSG C
	11.212	70	Woods, Good, HSG C
	3.715	73	Woods, Fair, HSG C
*	0.279	77	Wooded Wetlands, HSG C
	15.547	71	Weighted Average
	15.547		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	350	0.1800	2.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.7	325	0.0700	7.75	23.26	**Channel Flow, C-D, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
1.4	570	0.0500	6.55	19.66	**Channel Flow, D-E, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
0.7	340	0.0700	7.75	23.26	**Channel Flow, E-F, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
0.4	108	0.0200	4.14	12.43	**Channel Flow, F-G, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
2.8	170	0.0400	1.00		**Shallow Concentrated Flow, G-H** Woodland Kv= 5.0 fps
4.3	383	0.0900	1.50		**Shallow Concentrated Flow, H-I** Woodland Kv= 5.0 fps
21.8	2,296	Total			

Summary for Subcatchment E1.2: E1.2

Runoff = 0.84 cfs @ 12.08 hrs, Volume= 2,593 cf, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.21"

	Area (ac)	CN	Description
*	0.044	98	Roadway, HSG C
	0.089	96	Gravel surface, HSG C
	0.484	70	Woods, Good, HSG C
	0.617	76	Weighted Average
	0.573		92.87% Pervious Area
	0.044		7.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	650		2.17		**Direct Entry, Minimum Tc**

Summary for Subcatchment E2: E2

Runoff = 8.32 cfs @ 12.15 hrs, Volume= 31,562 cf, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.21"

	Area (ac)	CN	Description
	2.690	70	Woods, Good, HSG C
	6.090	73	Woods, Fair, HSG C
*	0.535	77	Wooded Wetlands, HSG C
	9.315	72	Weighted Average
	9.315		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	157	0.3000	2.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.3	365	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
9.6	572	Total			

Summary for Link AP-1: Offsite to E'ly Wetlands

Inflow Area = 704,104 sf, 0.27% Impervious, Inflow Depth > 0.89" for 2 yr event
Inflow = 9.85 cfs @ 12.33 hrs, Volume= 52,172 cf
Primary = 9.85 cfs @ 12.33 hrs, Volume= 52,172 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: Stiles Lake

Inflow Area = 405,761 sf, 0.00% Impervious, Inflow Depth > 0.93" for 2 yr event
Inflow = 8.32 cfs @ 12.15 hrs, Volume= 31,562 cf
Primary = 8.32 cfs @ 12.15 hrs, Volume= 31,562 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment E1.1: E1.1

Runoff = 22.88 cfs @ 12.32 hrs, Volume= 110,816 cf, Depth> 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.81"

	Area (ac)	CN	Description
	0.341	96	Gravel surface, HSG C
	11.212	70	Woods, Good, HSG C
	3.715	73	Woods, Fair, HSG C
*	0.279	77	Wooded Wetlands, HSG C
	15.547	71	Weighted Average
	15.547		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	350	0.1800	2.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.7	325	0.0700	7.75	23.26	**Channel Flow, C-D, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
1.4	570	0.0500	6.55	19.66	**Channel Flow, D-E, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
0.7	340	0.0700	7.75	23.26	**Channel Flow, E-F, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
0.4	108	0.0200	4.14	12.43	**Channel Flow, F-G, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
2.8	170	0.0400	1.00		**Shallow Concentrated Flow, G-H** Woodland Kv= 5.0 fps
4.3	383	0.0900	1.50		**Shallow Concentrated Flow, H-I** Woodland Kv= 5.0 fps
21.8	2,296	Total			

Summary for Subcatchment E1.2: E1.2

Runoff = 1.78 cfs @ 12.08 hrs, Volume= 5,325 cf, Depth> 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.81"

	Area (ac)	CN	Description
*	0.044	98	Roadway, HSG C
	0.089	96	Gravel surface, HSG C
	0.484	70	Woods, Good, HSG C
	0.617	76	Weighted Average
	0.573		92.87% Pervious Area
	0.044		7.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	650		2.17		**Direct Entry, Minimum Tc**

Summary for Subcatchment E2: E2

Runoff = 19.53 cfs @ 12.14 hrs, Volume= 69,253 cf, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.81"

	Area (ac)	CN	Description
	2.690	70	Woods, Good, HSG C
	6.090	73	Woods, Fair, HSG C
*	0.535	77	Wooded Wetlands, HSG C
	9.315	72	Weighted Average
	9.315		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	157	0.3000	2.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.3	365	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
9.6	572	Total			

Summary for Link AP-1: Offsite to E'ly Wetlands

Inflow Area = 704,104 sf, 0.27% Impervious, Inflow Depth > 1.98" for 10 yr event
Inflow = 23.60 cfs @ 12.31 hrs, Volume= 116,141 cf
Primary = 23.60 cfs @ 12.31 hrs, Volume= 116,141 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: Stiles Lake

Inflow Area = 405,761 sf, 0.00% Impervious, Inflow Depth > 2.05" for 10 yr event
Inflow = 19.53 cfs @ 12.14 hrs, Volume= 69,253 cf
Primary = 19.53 cfs @ 12.14 hrs, Volume= 69,253 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment E1.1: E1.1

Runoff = 34.81 cfs @ 12.31 hrs, Volume= 165,979 cf, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.07"

	Area (ac)	CN	Description
	0.341	96	Gravel surface, HSG C
	11.212	70	Woods, Good, HSG C
	3.715	73	Woods, Fair, HSG C
*	0.279	77	Wooded Wetlands, HSG C
	15.547	71	Weighted Average
	15.547		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	350	0.1800	2.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.7	325	0.0700	7.75	23.26	**Channel Flow, C-D, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
1.4	570	0.0500	6.55	19.66	**Channel Flow, D-E, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
0.7	340	0.0700	7.75	23.26	**Channel Flow, E-F, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
0.4	108	0.0200	4.14	12.43	**Channel Flow, F-G, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
2.8	170	0.0400	1.00		**Shallow Concentrated Flow, G-H** Woodland Kv= 5.0 fps
4.3	383	0.0900	1.50		**Shallow Concentrated Flow, H-I** Woodland Kv= 5.0 fps
21.8	2,296	Total			

Summary for Subcatchment E1.2: E1.2

Runoff = 2.58 cfs @ 12.07 hrs, Volume= 7,699 cf, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.07"

	Area (ac)	CN	Description
*	0.044	98	Roadway, HSG C
	0.089	96	Gravel surface, HSG C
	0.484	70	Woods, Good, HSG C
	0.617	76	Weighted Average
	0.573		92.87% Pervious Area
	0.044		7.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	650		2.17		**Direct Entry, Minimum Tc**

Summary for Subcatchment E2: E2

Runoff = 29.40 cfs @ 12.14 hrs, Volume= 102,943 cf, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.07"

	Area (ac)	CN	Description
	2.690	70	Woods, Good, HSG C
	6.090	73	Woods, Fair, HSG C
*	0.535	77	Wooded Wetlands, HSG C
	9.315	72	Weighted Average
	9.315		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	157	0.3000	2.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.3	365	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
9.6	572	Total			

Summary for Link AP-1: Offsite to E'ly Wetlands

Inflow Area = 704,104 sf, 0.27% Impervious, Inflow Depth > 2.96" for 25 yr event
Inflow = 35.83 cfs @ 12.30 hrs, Volume= 173,678 cf
Primary = 35.83 cfs @ 12.30 hrs, Volume= 173,678 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: Stiles Lake

Inflow Area = 405,761 sf, 0.00% Impervious, Inflow Depth > 3.04" for 25 yr event
Inflow = 29.40 cfs @ 12.14 hrs, Volume= 102,943 cf
Primary = 29.40 cfs @ 12.14 hrs, Volume= 102,943 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment E1.1: E1.1

Runoff = 60.87 cfs @ 12.30 hrs, Volume= 288,813 cf, Depth> 5.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.64"

	Area (ac)	CN	Description
	0.341	96	Gravel surface, HSG C
	11.212	70	Woods, Good, HSG C
	3.715	73	Woods, Fair, HSG C
*	0.279	77	Wooded Wetlands, HSG C
	15.547	71	Weighted Average
	15.547		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	350	0.1800	2.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.7	325	0.0700	7.75	23.26	**Channel Flow, C-D, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
1.4	570	0.0500	6.55	19.66	**Channel Flow, D-E, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
0.7	340	0.0700	7.75	23.26	**Channel Flow, E-F, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
0.4	108	0.0200	4.14	12.43	**Channel Flow, F-G, Ditch** Area= 3.0 sf Perim= 10.5' r= 0.29' n= 0.022 Earth, clean & straight
2.8	170	0.0400	1.00		**Shallow Concentrated Flow, G-H** Woodland Kv= 5.0 fps
4.3	383	0.0900	1.50		**Shallow Concentrated Flow, H-I** Woodland Kv= 5.0 fps
21.8	2,296	Total			

Summary for Subcatchment E1.2: E1.2

Runoff = 4.27 cfs @ 12.07 hrs, Volume= 12,853 cf, Depth> 5.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.64"

	Area (ac)	CN	Description
*	0.044	98	Roadway, HSG C
	0.089	96	Gravel surface, HSG C
	0.484	70	Woods, Good, HSG C
	0.617	76	Weighted Average
	0.573		92.87% Pervious Area
	0.044		7.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	650		2.17		**Direct Entry, Minimum Tc**

Summary for Subcatchment E2: E2

Runoff = 50.79 cfs @ 12.13 hrs, Volume= 177,549 cf, Depth> 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.64"

	Area (ac)	CN	Description
	2.690	70	Woods, Good, HSG C
	6.090	73	Woods, Fair, HSG C
*	0.535	77	Wooded Wetlands, HSG C
	9.315	72	Weighted Average
	9.315		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	157	0.3000	2.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.3	365	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
9.6	572	Total			

Summary for Link AP-1: Offsite to E'ly Wetlands

Inflow Area = 704,104 sf, 0.27% Impervious, Inflow Depth > 5.14" for 100 yr event
Inflow = 62.54 cfs @ 12.29 hrs, Volume= 301,666 cf
Primary = 62.54 cfs @ 12.29 hrs, Volume= 301,666 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: Stiles Lake

Inflow Area = 405,761 sf, 0.00% Impervious, Inflow Depth > 5.25" for 100 yr event
Inflow = 50.79 cfs @ 12.13 hrs, Volume= 177,549 cf
Primary = 50.79 cfs @ 12.13 hrs, Volume= 177,549 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

POST-DEVELOPMENT ANALYSIS

41/B6.2
N/F
CHARLES G. LARSON SR.
DB 21705, PG 142

P1.1 (15.423 Ac.)

IMPERVIOUS – ROAD, DRIVES, & ROOFS, HSG "C":	0.849 Ac.
GRAVEL – NO ROW, HSG "C":	0.229 Ac.
GRASS, GOOD, HSG "C":	3.764 Ac.
WOODS, GOOD, HSG "C":	7.843 Ac.
WOODS, FAIR, HSG "C":	2.459 Ac.
WETLAND, WOODED, HSG "C":	0.279 Ac.

CN=74 T_c=24.3 MINUTES

P1.2 (0.863 Ac.)

IMPERVIOUS – ROAD, HSG "C": 0.325 Ac.
GRASS, GOOD, HSG "C": 0.538 Ac.
CN=83 T_c=5 MINUTES (DIRECT ENTRY)

P2.1 (6.259 Ac.)

IMPERVIOUS – ROAD, DRIVES, & ROOFS, HSG "C":	0.205 Ac.
GRASS, GOOD, HSG "C":	2.494 Ac.
WOODS, GOOD, HSG "C":	1.131 Ac.
WOODS, FAIR, HSG "C":	2.072 Ac.
WETLAND, WOODED, HSG "C":	0.357 Ac.

CN=74 T_c=10.5 MINUTES

P2.2 (1.556 Ac.)

WOODS, GOOD, HSG "C":	0.953
WOODS, FAIR, HSG "C":	0.468
WETLAND, WOODED, HSG "C":	0.135

CN=72 T_c=10.8 MINUTES

P2.3 (1.478 Ac.)

GRAVEL ROAD, HSG "C":	0.044 Ac.
WOODS, FAIR, HSG "C":	1.434 Ac.

CN=74 T_c=6.1 MINUTES

ANALYSIS POINT #1
(AP-1, WETLANDS)

ANALYSIS POINT #2
(AP-2, STILES LAKE)

REMAINING LAND

LOT 1

LOT 2

RESERVED FOR LAKE ACCESS

STILES LAKE

41/B7.0
N/F
Y.W.C.A

41/C4.0
N/F
Y.W.C.A

41/C3.0
N/F
STILES LAKE WATER DISTRICT
DB 16840, PG 344
PB 460, PL 80

#49
42/A2.0
N/F
MARK DOLAN
DB 45652, PG 280
PB 436, PL 38

MERIDIAN OF
MASSACHUSETTS MAINLAND
GRID (NAD83)

1 SUBCATCHMENT
POND
REACH
HYDRAULIC LINE

GRAPHIC SCALE
(FEET) 80 0 40 80 160 240
(METERS) 24.4 0 12.2 24.4 48.8 73.2
1 inch = 80 ft.

GRAZ Engineering, L.L.C.
323 West Lake Road, Tilton, NH 03447
Phone: (603) 585-4959 Fax: (603) 585-4960

PARKKER STREET (NORTH) - DEFINITIVE SUBDIVISION
LEICESTER, MASSACHUSETTS

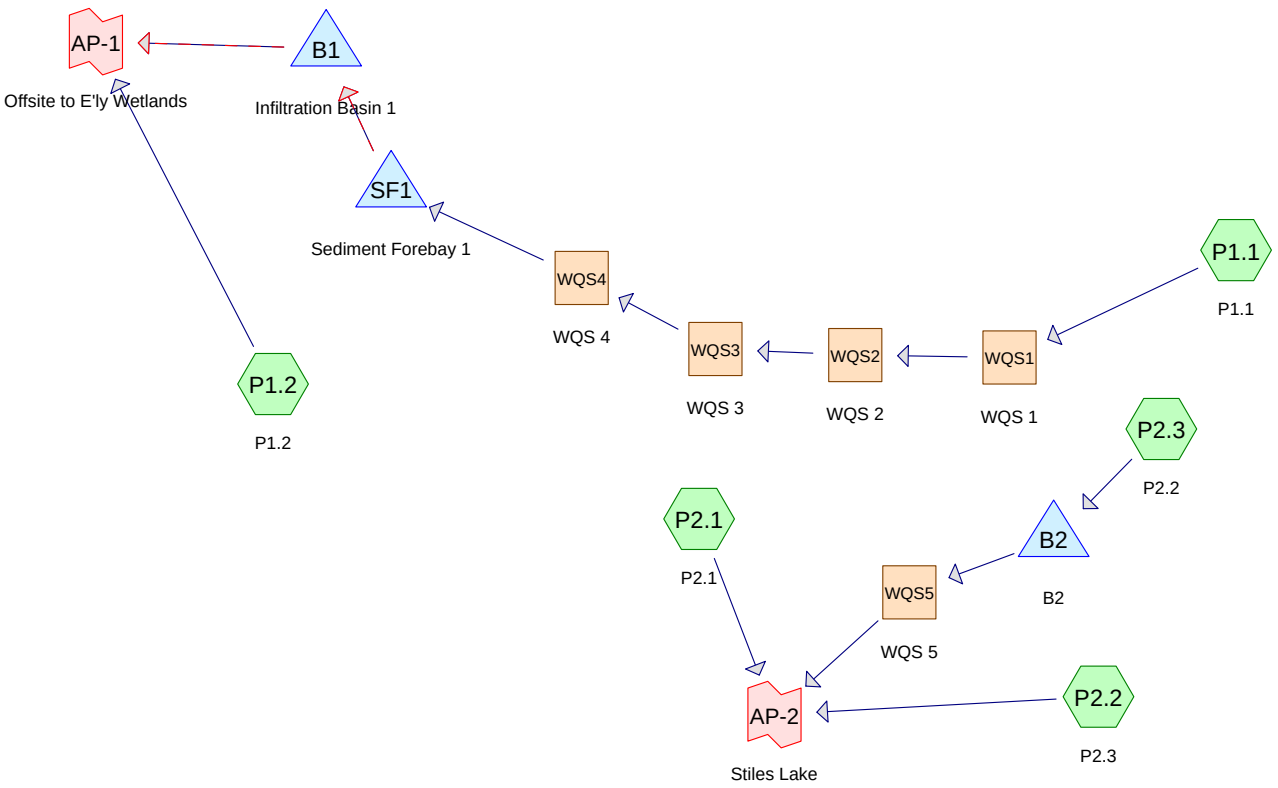
POST DEVELOPMENT WATERSHED PLAN
PREPARED FOR: SCHOLD DEVELOPMENT, LLC (OWNER/APPLICANT)
77 CHICKERING ROAD, SPENCER, MA 01562

REV	DATE	DESCRIPTION	BY
1	8/24/21	REVS PER QUINN, ENG. TECH. REVIEW & LPB	BCM

SCALE: AS NOTED
DRAWN: BCM
CHECKED: PFG & BCM
PLAN DATE: JUNE 8, 2021

PAUL F. GRASSIEWICZ
No. 9746
REGISTERED PROFESSIONAL ENGINEER

SHEET 1 OF 1



Subcat Reach Pond Link

Routing Diagram for ParkerSt_Post-Development_2021.08.24
Prepared by GRAZ Engineering, LLC, Printed 8/25/2021

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
296,034	74	>75% Grass cover, Good, HSG C (P1.1, P1.2, P2.1)
1,917	96	Gravel road, HSG C (P2.3)
9,975	96	Gravel surface, HSG C (P1.1)
14,157	98	Paved Roadway, HSG C (P1.2)
45,912	98	Pavement & Roofs, HSG C (P1.1, P2.1)
33,585	77	Wooded Wetlands, HSG C (P1.1, P2.1, P2.2)
280,221	73	Woods, Fair, HSG C (P1.1, P2.1, P2.2, P2.3)
432,420	70	Woods, Good, HSG C (P1.1, P2.1, P2.2)

Summary for Subcatchment P1.1: P1.1

Runoff = 11.05 cfs @ 12.37 hrs, Volume= 58,456 cf, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.21"

	Area (ac)	CN	Description
*	0.849	98	Pavement & Roofs, HSG C
	0.229	96	Gravel surface, HSG C
	3.764	74	>75% Grass cover, Good, HSG C
	7.843	70	Woods, Good, HSG C
	2.459	73	Woods, Fair, HSG C
*	0.279	77	Wooded Wetlands, HSG C
	15.423	74	Weighted Average
	14.574		94.50% Pervious Area
	0.849		5.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	92	0.0400	0.10		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	702	0.1000	9.33	27.98	**Channel Flow, B-C, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.7	325	0.0600	7.22	21.67	**Channel Flow, C-D, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.7	250	0.0400	5.90	17.69	**Channel Flow, D-E, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.5	211	0.0300	6.71	73.82	**Channel Flow, E-F, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.025 Earth, clean & winding
0.7	462	0.0700	11.65	128.15	**Channel Flow, F-G, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.022 Earth, clean & straight
0.3	135	0.0400	8.81	96.87	**Channel Flow, G-H, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.022 Earth, clean & straight
4.4	372	0.0800	1.41		**Shallow Concentrated Flow, J-K, Wetland** Woodland Kv= 5.0 fps
24.3	2,549	Total			

Summary for Subcatchment P1.2: P1.2

Runoff = 1.63 cfs @ 12.09 hrs, Volume= 5,067 cf, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.21"

	Area (ac)	CN	Description
*	0.325	98	Paved Roadway, HSG C
	0.538	74	>75% Grass cover, Good, HSG C
	0.863	83	Weighted Average
	0.538		62.34% Pervious Area
	0.325		37.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	650		1.81		**Direct Entry, Minimum Tc**

Summary for Subcatchment P2.1: P2.1

Runoff = 6.21 cfs @ 12.16 hrs, Volume= 23,723 cf, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.21"

	Area (sf)	CN	Description
*	8,930	98	Pavement & Roofs, HSG C
	108,639	74	>75% Grass cover, Good, HSG C
	49,266	70	Woods, Good, HSG C
	90,256	73	Woods, Fair, HSG C
*	15,551	77	Wooded Wetlands, HSG C
	272,642	74	Weighted Average
	263,712		96.72% Pervious Area
	8,930		3.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	178	0.2000	2.24		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.4	70	0.3100	2.78		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
2.1	181	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	479	Total			

Summary for Subcatchment P2.2: P2.3

Runoff = 1.34 cfs @ 12.16 hrs, Volume= 5,286 cf, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.21"

	Area (ac)	CN	Description
	0.953	70	Woods, Good, HSG C
	0.468	73	Woods, Fair, HSG C
*	0.135	77	Wooded Wetlands, HSG C
	1.556	72	Weighted Average
	1.556		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0800	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	300	0.0800	1.41		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
10.8	350	Total			

Summary for Subcatchment P2.3: P2.2

Runoff = 1.71 cfs @ 12.10 hrs, Volume= 5,602 cf, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.21"

	Area (ac)	CN	Description
*	0.044	96	Gravel road, HSG C
	1.434	73	Woods, Fair, HSG C
	1.478	74	Weighted Average
	1.478		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	157	0.3000	2.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.8	65	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
6.1	272	Total			

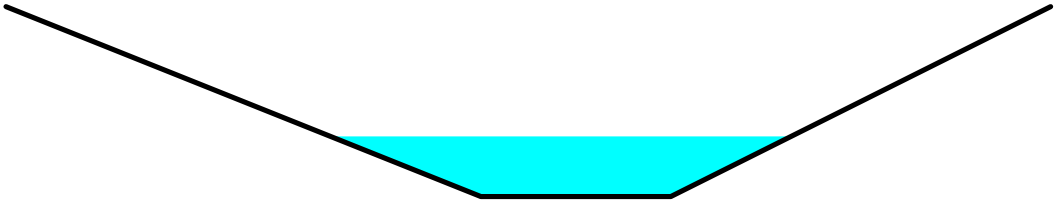
Summary for Reach WQS1: WQS 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 1.04" for 2 yr event
Inflow = 11.05 cfs @ 12.37 hrs, Volume= 58,456 cf
Outflow = 11.04 cfs @ 12.37 hrs, Volume= 58,456 cf, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.09 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 1.7 min

Peak Storage= 458 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.63'
Defined Flood Depth= 898.00' Flow Area= 9,828.7 sf, Capacity= 125,865.46 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 124.71 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 211.0' Slope= 0.0332 '/'
Inlet Invert= 903.00', Outlet Invert= 896.00'



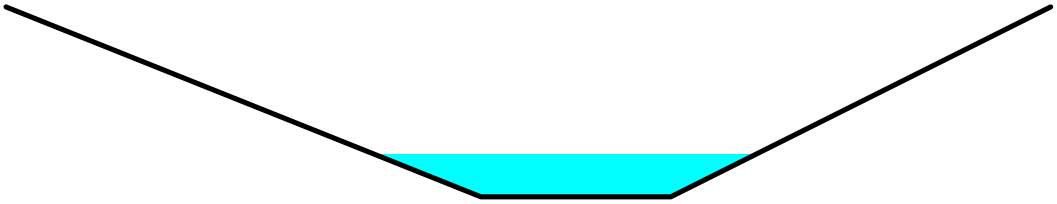
Summary for Reach WQS2: WQS 2

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 1.04" for 2 yr event
Inflow = 11.04 cfs @ 12.37 hrs, Volume= 58,456 cf
Outflow = 11.03 cfs @ 12.39 hrs, Volume= 58,456 cf, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.10 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 3.26 fps, Avg. Travel Time= 2.4 min

Peak Storage= 630 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.45'
Defined Flood Depth= 868.00' Flow Area= 9,500.0 sf, Capacity= 232,092.86 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 237.91 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 462.0' Slope= 0.0649 '/'
Inlet Invert= 896.00', Outlet Invert= 866.00'



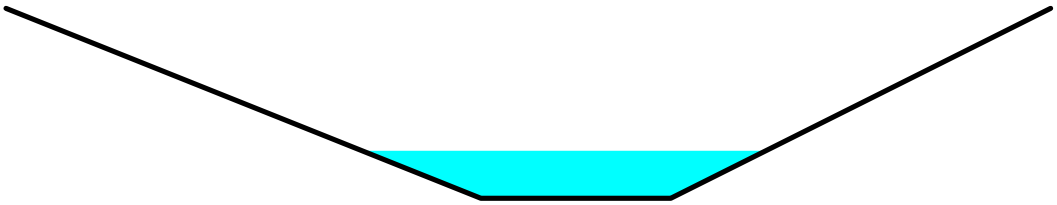
Summary for Reach WQS3: WQS 3

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 1.04" for 2 yr event
Inflow = 11.03 cfs @ 12.39 hrs, Volume= 58,456 cf
Outflow = 11.03 cfs @ 12.39 hrs, Volume= 58,456 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.07 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.86 fps, Avg. Travel Time= 0.8 min

Peak Storage= 211 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.50'
Defined Flood Depth= 862.00' Flow Area= 9,434.3 sf, Capacity= 190,684.13 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 196.83 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 135.0' Slope= 0.0444 '/'
Inlet Invert= 866.00', Outlet Invert= 860.00'



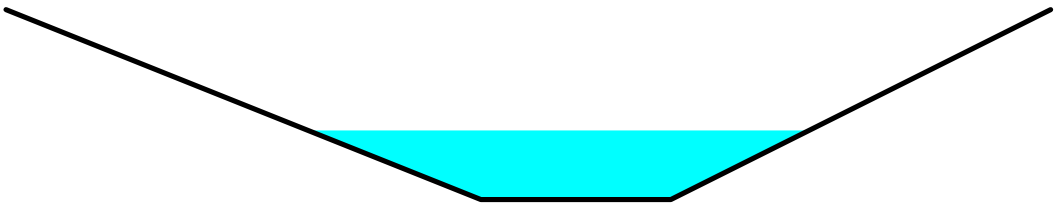
Summary for Reach WQS4: WQS 4

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 1.04" for 2 yr event
Inflow = 11.03 cfs @ 12.39 hrs, Volume= 58,456 cf
Outflow = 11.03 cfs @ 12.40 hrs, Volume= 58,456 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.17 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.74 fps, Avg. Travel Time= 0.9 min

Peak Storage= 257 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.73'
Defined Flood Depth= 861.00' Flow Area= 9,423.3 sf, Capacity= 91,730.80 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 94.80 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 97.0' Slope= 0.0103 '/'
Inlet Invert= 860.00', Outlet Invert= 859.00'



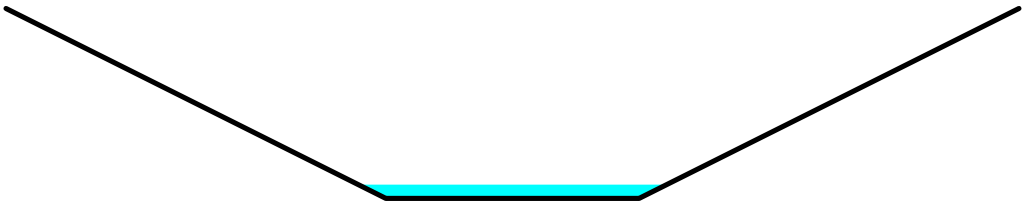
Summary for Reach WQS5: WQS 5

Inflow Area = 64,382 sf, 0.00% Impervious, Inflow Depth = 0.27" for 2 yr event
Inflow = 0.10 cfs @ 14.54 hrs, Volume= 1,436 cf
Outflow = 0.10 cfs @ 14.57 hrs, Volume= 1,436 cf, Atten= 0%, Lag= 2.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.73 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 1.08 fps, Avg. Travel Time= 4.6 min

Peak Storage= 18 cf @ 14.57 hrs
Average Depth at Peak Storage= 0.05'
Defined Flood Depth= 898.00' Flow Area= 3,577.4 sf, Capacity= 35,446.98 cfs
Bank-Full Depth= 0.75' Flow Area= 1.9 sf, Capacity= 13.84 cfs

1.00' x 0.75' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 4.00'
Length= 300.0' Slope= 0.0683 '/'
Inlet Invert= 860.00', Outlet Invert= 839.50'



Summary for Pond B1: Infiltration Basin 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 1.00" for 2 yr event
Inflow = 10.99 cfs @ 12.42 hrs, Volume= 56,079 cf
Outflow = 7.67 cfs @ 12.69 hrs, Volume= 54,597 cf, Atten= 30%, Lag= 16.1 min
Discarded = 0.05 cfs @ 12.69 hrs, Volume= 2,612 cf
Primary = 7.62 cfs @ 12.69 hrs, Volume= 51,985 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 858.66' @ 12.69 hrs Surf.Area= 8,637 sf Storage= 10,812 cf
Flood Elev= 862.30' Surf.Area= 30,981 sf Storage= 57,262 cf

Plug-Flow detention time= 65.5 min calculated for 54,597 cf (97% of inflow)
Center-of-Mass det. time= 50.7 min (944.1 - 893.3)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	57,262 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	0	0	0
857.00	2,211	553	553
858.00	7,592	4,902	5,454
859.00	9,175	8,384	13,838
860.00	10,816	9,996	23,833
861.00	12,512	11,664	35,497
862.00	16,710	14,611	50,108
862.30	30,981	7,154	57,262

Device	Routing	Invert	Outlet Devices
#1	Primary	851.20'	**24.0" Round Culvert** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 851.20' / 850.00' S= 0.0162 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	857.30'	**70.0 deg x 2.30' rise Sharp-Crested Vee/Trap Weir X 2.00** Cv= 2.52 (C= 3.15)
#3	Device 1	860.60'	**1.2" x 7.3" Horiz. Orifice/Grate X 3.00 columns** X 11 rows C= 0.600 in 25.7" x 25.7" Grate (44% open area) Limited to weir flow at low heads
#4	Secondary	860.60'	**170.5 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.46 (C= 3.08)
#5	Discarded	856.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.05 cfs @ 12.69 hrs HW=858.66' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=7.61 cfs @ 12.69 hrs HW=858.66' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 7.61 cfs of 38.45 cfs potential flow)
  ├**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 7.61 cfs @ 2.94 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=856.50' TW=0.00' (Dynamic Tailwater)
└**4=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond B2: B2

Inflow Area = 64,382 sf, 0.00% Impervious, Inflow Depth = 1.04" for 2 yr event
Inflow = 1.71 cfs @ 12.10 hrs, Volume= 5,602 cf
Outflow = 0.12 cfs @ 14.54 hrs, Volume= 2,801 cf, Atten= 93%, Lag= 146.6 min
Discarded = 0.02 cfs @ 14.54 hrs, Volume= 1,365 cf
Primary = 0.10 cfs @ 14.54 hrs, Volume= 1,436 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 861.44' @ 14.54 hrs Surf.Area= 3,109 sf Storage= 3,420 cf
Flood Elev= 862.50' Surf.Area= 4,538 sf Storage= 7,477 cf

Plug-Flow detention time= 433.7 min calculated for 2,801 cf (50% of inflow)
Center-of-Mass det. time= 302.8 min (1,164.7 - 862.0)

Volume	Invert	Avail.Storage	Storage Description
#1	859.50'	7,477 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
859.50	0	0	0
860.00	1,226	307	307
862.00	3,848	5,074	5,381
862.50	4,538	2,097	7,477

Device	Routing	Invert	Outlet Devices
#1	Primary	861.40'	**6.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	859.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 14.54 hrs HW=861.44' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.10 cfs @ 14.54 hrs HW=861.44' TW=860.05' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.10 cfs @ 0.48 fps)

Summary for Pond SF1: Sediment Forebay 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 1.04" for 2 yr event
Inflow = 11.03 cfs @ 12.40 hrs, Volume= 58,456 cf
Outflow = 10.99 cfs @ 12.42 hrs, Volume= 56,079 cf, Atten= 0%, Lag= 1.3 min
Primary = 10.99 cfs @ 12.42 hrs, Volume= 56,079 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 860.83' @ 12.42 hrs Surf.Area= 2,579 sf Storage= 3,573 cf
Flood Elev= 862.00' Surf.Area= 4,327 sf Storage= 7,539 cf

Plug-Flow detention time= 32.5 min calculated for 56,060 cf (96% of inflow)
Center-of-Mass det. time= 10.4 min (893.3 - 882.9)

Volume	Invert	Avail.Storage	Storage Description
#1	857.80'	7,539 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
857.80	0	0	0
858.00	416	42	42
859.00	804	610	652
860.00	1,588	1,196	1,848
861.00	2,784	2,186	4,034
861.50	3,456	1,560	5,594
862.00	4,327	1,946	7,539

Device	Routing	Invert	Outlet Devices
#1	Primary	860.30'	**143.1 deg x 8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)
#2	Secondary	861.30'	**12.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=10.99 cfs @ 12.42 hrs HW=860.83' TW=858.27' (Dynamic Tailwater)
└**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 10.99 cfs @ 2.17 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=857.80' TW=856.50' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link AP-1: Offsite to E'ly Wetlands

Inflow Area = 709,418 sf, 7.21% Impervious, Inflow Depth = 0.97" for 2 yr event
Inflow = 7.84 cfs @ 12.68 hrs, Volume= 57,052 cf
Primary = 7.84 cfs @ 12.68 hrs, Volume= 57,052 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: Stiles Lake

Inflow Area = 404,803 sf, 2.21% Impervious, Inflow Depth = 0.90" for 2 yr event
Inflow = 7.54 cfs @ 12.16 hrs, Volume= 30,445 cf
Primary = 7.54 cfs @ 12.16 hrs, Volume= 30,445 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P1.1: P1.1

Runoff = 24.66 cfs @ 12.34 hrs, Volume= 123,933 cf, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.81"

	Area (ac)	CN	Description
*	0.849	98	Pavement & Roofs, HSG C
	0.229	96	Gravel surface, HSG C
	3.764	74	>75% Grass cover, Good, HSG C
	7.843	70	Woods, Good, HSG C
	2.459	73	Woods, Fair, HSG C
*	0.279	77	Wooded Wetlands, HSG C
	15.423	74	Weighted Average
	14.574		94.50% Pervious Area
	0.849		5.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	92	0.0400	0.10		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	702	0.1000	9.33	27.98	**Channel Flow, B-C, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.7	325	0.0600	7.22	21.67	**Channel Flow, C-D, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.7	250	0.0400	5.90	17.69	**Channel Flow, D-E, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.5	211	0.0300	6.71	73.82	**Channel Flow, E-F, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.025 Earth, clean & winding
0.7	462	0.0700	11.65	128.15	**Channel Flow, F-G, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.022 Earth, clean & straight
0.3	135	0.0400	8.81	96.87	**Channel Flow, G-H, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.022 Earth, clean & straight
4.4	372	0.0800	1.41		**Shallow Concentrated Flow, J-K, Wetland** Woodland Kv= 5.0 fps
24.3	2,549	Total			

Summary for Subcatchment P1.2: P1.2

Runoff = 3.03 cfs @ 12.09 hrs, Volume= 9,407 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.81"

	Area (ac)	CN	Description
*	0.325	98	Paved Roadway, HSG C
	0.538	74	>75% Grass cover, Good, HSG C
	0.863	83	Weighted Average
	0.538		62.34% Pervious Area
	0.325		37.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	650		1.81		**Direct Entry, Minimum Tc**

Summary for Subcatchment P2.1: P2.1

Runoff = 13.85 cfs @ 12.15 hrs, Volume= 50,295 cf, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.81"

	Area (sf)	CN	Description
*	8,930	98	Pavement & Roofs, HSG C
	108,639	74	>75% Grass cover, Good, HSG C
	49,266	70	Woods, Good, HSG C
	90,256	73	Woods, Fair, HSG C
*	15,551	77	Wooded Wetlands, HSG C
	272,642	74	Weighted Average
	263,712		96.72% Pervious Area
	8,930		3.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	178	0.2000	2.24		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.4	70	0.3100	2.78		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
2.1	181	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	479	Total			

Summary for Subcatchment P2.2: P2.3

Runoff = 3.14 cfs @ 12.16 hrs, Volume= 11,594 cf, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.81"

	Area (ac)	CN	Description
	0.953	70	Woods, Good, HSG C
	0.468	73	Woods, Fair, HSG C
*	0.135	77	Wooded Wetlands, HSG C
	1.556	72	Weighted Average
	1.556		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0800	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	300	0.0800	1.41		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
10.8	350	Total			

Summary for Subcatchment P2.3: P2.2

Runoff = 3.80 cfs @ 12.09 hrs, Volume= 11,877 cf, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.81"

	Area (ac)	CN	Description
*	0.044	96	Gravel road, HSG C
	1.434	73	Woods, Fair, HSG C
	1.478	74	Weighted Average
	1.478		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	157	0.3000	2.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.8	65	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
6.1	272	Total			

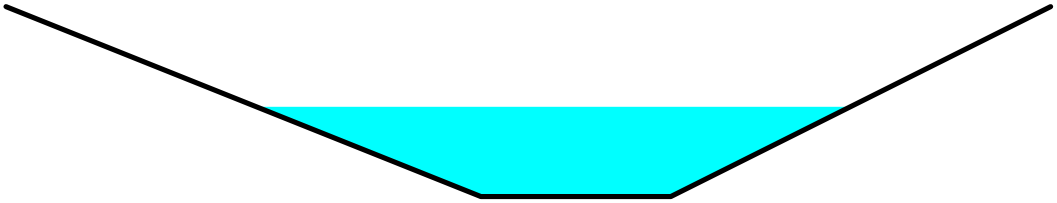
Summary for Reach WQS1: WQS 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 2.21" for 10 yr event
Inflow = 24.66 cfs @ 12.34 hrs, Volume= 123,933 cf
Outflow = 24.63 cfs @ 12.35 hrs, Volume= 123,933 cf, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.32 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.55 fps, Avg. Travel Time= 1.4 min

Peak Storage= 823 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.94'
Defined Flood Depth= 898.00' Flow Area= 9,828.7 sf, Capacity= 125,865.46 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 124.71 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 211.0' Slope= 0.0332 '/'
Inlet Invert= 903.00', Outlet Invert= 896.00'



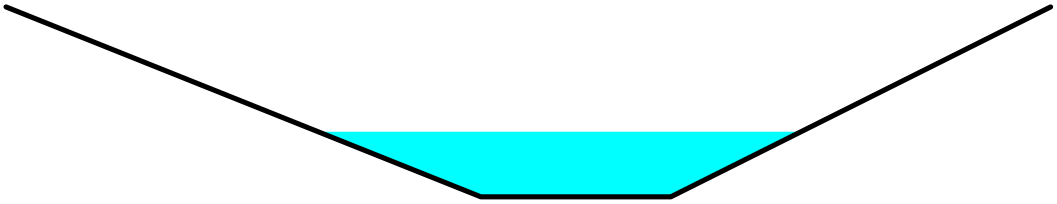
Summary for Reach WQS2: WQS 2

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 2.21" for 10 yr event
Inflow = 24.63 cfs @ 12.35 hrs, Volume= 123,933 cf
Outflow = 24.60 cfs @ 12.36 hrs, Volume= 123,933 cf, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.13 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 3.94 fps, Avg. Travel Time= 2.0 min

Peak Storage= 1,122 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.69'
Defined Flood Depth= 868.00' Flow Area= 9,500.0 sf, Capacity= 232,092.86 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 237.91 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 462.0' Slope= 0.0649 '/'
Inlet Invert= 896.00', Outlet Invert= 866.00'



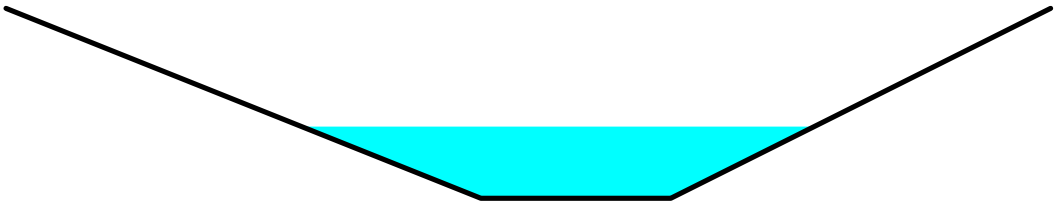
Summary for Reach WQS3: WQS 3

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 2.21" for 10 yr event
Inflow = 24.60 cfs @ 12.36 hrs, Volume= 123,933 cf
Outflow = 24.60 cfs @ 12.36 hrs, Volume= 123,933 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.82 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.46 fps, Avg. Travel Time= 0.7 min

Peak Storage= 376 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.75'
Defined Flood Depth= 862.00' Flow Area= 9,434.3 sf, Capacity= 190,684.13 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 196.83 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 135.0' Slope= 0.0444 '/'
Inlet Invert= 866.00', Outlet Invert= 860.00'



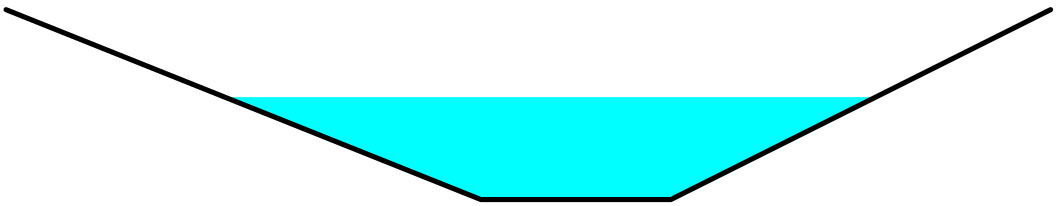
Summary for Reach WQS4: WQS 4

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 2.21" for 10 yr event
Inflow = 24.60 cfs @ 12.36 hrs, Volume= 123,933 cf
Outflow = 24.59 cfs @ 12.37 hrs, Volume= 123,933 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.16 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.08 fps, Avg. Travel Time= 0.8 min

Peak Storage= 462 cf @ 12.37 hrs
Average Depth at Peak Storage= 1.08'
Defined Flood Depth= 861.00' Flow Area= 9,423.3 sf, Capacity= 91,730.80 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 94.80 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 97.0' Slope= 0.0103 '/'
Inlet Invert= 860.00', Outlet Invert= 859.00'



Summary for Reach WQS5: WQS 5

Inflow Area = 64,382 sf, 0.00% Impervious, Inflow Depth = 1.42" for 10 yr event
Inflow = 1.75 cfs @ 12.30 hrs, Volume= 7,630 cf
Outflow = 1.74 cfs @ 12.31 hrs, Volume= 7,630 cf, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.24 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 3.0 min

Peak Storage= 123 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.27'
Defined Flood Depth= 898.00' Flow Area= 3,577.4 sf, Capacity= 35,446.98 cfs
Bank-Full Depth= 0.75' Flow Area= 1.9 sf, Capacity= 13.84 cfs

1.00' x 0.75' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 4.00'
Length= 300.0' Slope= 0.0683 '/'
Inlet Invert= 860.00', Outlet Invert= 839.50'

Summary for Pond B1: Infiltration Basin 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 2.17" for 10 yr event
Inflow = 24.51 cfs @ 12.39 hrs, Volume= 121,555 cf
Outflow = 21.81 cfs @ 12.51 hrs, Volume= 120,041 cf, Atten= 11%, Lag= 7.6 min
Discarded = 0.06 cfs @ 12.51 hrs, Volume= 2,912 cf
Primary = 21.75 cfs @ 12.51 hrs, Volume= 117,129 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 859.37' @ 12.51 hrs Surf.Area= 9,782 sf Storage= 17,342 cf
Flood Elev= 862.30' Surf.Area= 30,981 sf Storage= 57,262 cf

Plug-Flow detention time= 40.2 min calculated for 120,041 cf (99% of inflow)
Center-of-Mass det. time= 32.8 min (899.2 - 866.4)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	57,262 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	0	0	0
857.00	2,211	553	553
858.00	7,592	4,902	5,454
859.00	9,175	8,384	13,838
860.00	10,816	9,996	23,833
861.00	12,512	11,664	35,497
862.00	16,710	14,611	50,108
862.30	30,981	7,154	57,262

Device	Routing	Invert	Outlet Devices
#1	Primary	851.20'	**24.0" Round Culvert** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 851.20' / 850.00' S= 0.0162 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	857.30'	**70.0 deg x 2.30' rise Sharp-Crested Vee/Trap Weir X 2.00** Cv= 2.52 (C= 3.15)
#3	Device 1	860.60'	**1.2" x 7.3" Horiz. Orifice/Grate X 3.00 columns** X 11 rows C= 0.600 in 25.7" x 25.7" Grate (44% open area) Limited to weir flow at low heads
#4	Secondary	860.60'	**170.5 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.46 (C= 3.08)
#5	Discarded	856.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 12.51 hrs HW=859.37' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=21.75 cfs @ 12.51 hrs HW=859.37' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 21.75 cfs of 40.50 cfs potential flow)
  ├**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 21.75 cfs @ 3.63 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=856.50' TW=0.00' (Dynamic Tailwater)
└**4=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond B2: B2

Inflow Area = 64,382 sf, 0.00% Impervious, Inflow Depth = 2.21" for 10 yr event
Inflow = 3.80 cfs @ 12.09 hrs, Volume= 11,877 cf
Outflow = 1.77 cfs @ 12.30 hrs, Volume= 9,062 cf, Atten= 53%, Lag= 12.2 min
Discarded = 0.02 cfs @ 12.30 hrs, Volume= 1,432 cf
Primary = 1.75 cfs @ 12.30 hrs, Volume= 7,630 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 861.64' @ 12.30 hrs Surf.Area= 3,374 sf Storage= 4,074 cf
Flood Elev= 862.50' Surf.Area= 4,538 sf Storage= 7,477 cf

Plug-Flow detention time= 193.6 min calculated for 9,060 cf (76% of inflow)
Center-of-Mass det. time= 106.3 min (945.8 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	859.50'	7,477 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
859.50	0	0	0
860.00	1,226	307	307
862.00	3,848	5,074	5,381
862.50	4,538	2,097	7,477

Device	Routing	Invert	Outlet Devices
#1	Primary	861.40'	**6.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	859.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 12.30 hrs HW=861.64' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.75 cfs @ 12.30 hrs HW=861.64' TW=860.27' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 1.75 cfs @ 1.22 fps)

Summary for Pond SF1: Sediment Forebay 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 2.21" for 10 yr event
Inflow = 24.59 cfs @ 12.37 hrs, Volume= 123,933 cf
Outflow = 24.51 cfs @ 12.39 hrs, Volume= 121,555 cf, Atten= 0%, Lag= 1.1 min
Primary = 24.51 cfs @ 12.39 hrs, Volume= 121,555 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 861.15' @ 12.39 hrs Surf.Area= 2,992 sf Storage= 4,480 cf
Flood Elev= 862.00' Surf.Area= 4,327 sf Storage= 7,539 cf

Plug-Flow detention time= 17.9 min calculated for 121,516 cf (98% of inflow)
Center-of-Mass det. time= 6.8 min (866.4 - 859.6)

Volume	Invert	Avail.Storage	Storage Description
#1	857.80'	7,539 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
857.80	0	0	0
858.00	416	42	42
859.00	804	610	652
860.00	1,588	1,196	1,848
861.00	2,784	2,186	4,034
861.50	3,456	1,560	5,594
862.00	4,327	1,946	7,539

Device	Routing	Invert	Outlet Devices
#1	Primary	860.30'	**143.1 deg x 8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)
#2	Secondary	861.30'	**12.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=24.51 cfs @ 12.39 hrs HW=861.15' TW=859.24' (Dynamic Tailwater)
└**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 24.51 cfs @ 2.72 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=857.80' TW=856.50' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link AP-1: Offsite to E'ly Wetlands

Inflow Area = 709,418 sf, 7.21% Impervious, Inflow Depth = 2.14" for 10 yr event
Inflow = 22.42 cfs @ 12.50 hrs, Volume= 126,536 cf
Primary = 22.42 cfs @ 12.50 hrs, Volume= 126,536 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: Stiles Lake

Inflow Area = 404,803 sf, 2.21% Impervious, Inflow Depth = 2.06" for 10 yr event
Inflow = 17.25 cfs @ 12.17 hrs, Volume= 69,519 cf
Primary = 17.25 cfs @ 12.17 hrs, Volume= 69,519 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P1.1: P1.1

Runoff = 36.45 cfs @ 12.34 hrs, Volume= 181,608 cf, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.07"

	Area (ac)	CN	Description
*	0.849	98	Pavement & Roofs, HSG C
	0.229	96	Gravel surface, HSG C
	3.764	74	>75% Grass cover, Good, HSG C
	7.843	70	Woods, Good, HSG C
	2.459	73	Woods, Fair, HSG C
*	0.279	77	Wooded Wetlands, HSG C
	15.423	74	Weighted Average
	14.574		94.50% Pervious Area
	0.849		5.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	92	0.0400	0.10		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	702	0.1000	9.33	27.98	**Channel Flow, B-C, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.7	325	0.0600	7.22	21.67	**Channel Flow, C-D, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.7	250	0.0400	5.90	17.69	**Channel Flow, D-E, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.5	211	0.0300	6.71	73.82	**Channel Flow, E-F, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.025 Earth, clean & winding
0.7	462	0.0700	11.65	128.15	**Channel Flow, F-G, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.022 Earth, clean & straight
0.3	135	0.0400	8.81	96.87	**Channel Flow, G-H, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.022 Earth, clean & straight
4.4	372	0.0800	1.41		**Shallow Concentrated Flow, J-K, Wetland** Woodland Kv= 5.0 fps
24.3	2,549	Total			

Summary for Subcatchment P1.2: P1.2

Runoff = 4.15 cfs @ 12.09 hrs, Volume= 13,021 cf, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.07"

	Area (ac)	CN	Description
*	0.325	98	Paved Roadway, HSG C
	0.538	74	>75% Grass cover, Good, HSG C
	0.863	83	Weighted Average
	0.538		62.34% Pervious Area
	0.325		37.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	650		1.81		**Direct Entry, Minimum Tc**

Summary for Subcatchment P2.1: P2.1

Runoff = 20.46 cfs @ 12.15 hrs, Volume= 73,700 cf, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.07"

	Area (sf)	CN	Description
*	8,930	98	Pavement & Roofs, HSG C
	108,639	74	>75% Grass cover, Good, HSG C
	49,266	70	Woods, Good, HSG C
	90,256	73	Woods, Fair, HSG C
*	15,551	77	Wooded Wetlands, HSG C
	272,642	74	Weighted Average
	263,712		96.72% Pervious Area
	8,930		3.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	178	0.2000	2.24		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.4	70	0.3100	2.78		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
2.1	181	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	479	Total			

Summary for Subcatchment P2.2: P2.3

Runoff = 4.73 cfs @ 12.15 hrs, Volume= 17,230 cf, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.07"

	Area (ac)	CN	Description
	0.953	70	Woods, Good, HSG C
	0.468	73	Woods, Fair, HSG C
*	0.135	77	Wooded Wetlands, HSG C
	1.556	72	Weighted Average
	1.556		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0800	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	300	0.0800	1.41		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
10.8	350	Total			

Summary for Subcatchment P2.3: P2.2

Runoff = 5.60 cfs @ 12.09 hrs, Volume= 17,404 cf, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.07"

	Area (ac)	CN	Description
*	0.044	96	Gravel road, HSG C
	1.434	73	Woods, Fair, HSG C
	1.478	74	Weighted Average
	1.478		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	157	0.3000	2.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.8	65	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
6.1	272	Total			

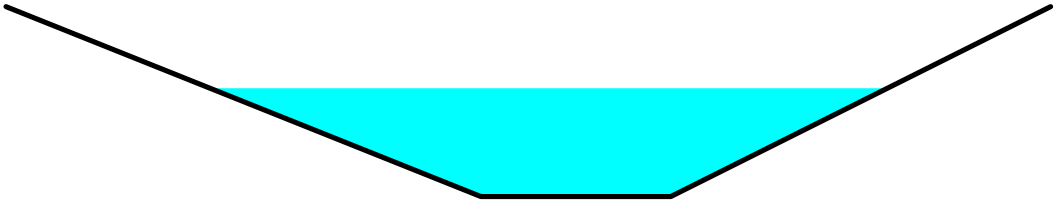
Summary for Reach WQS1: WQS 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 3.24" for 25 yr event
Inflow = 36.45 cfs @ 12.34 hrs, Volume= 181,608 cf
Outflow = 36.41 cfs @ 12.35 hrs, Volume= 181,608 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.00 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.79 fps, Avg. Travel Time= 1.3 min

Peak Storage= 1,098 cf @ 12.35 hrs
Average Depth at Peak Storage= 1.14'
Defined Flood Depth= 898.00' Flow Area= 9,828.7 sf, Capacity= 125,865.46 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 124.71 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 211.0' Slope= 0.0332 '/'
Inlet Invert= 903.00', Outlet Invert= 896.00'



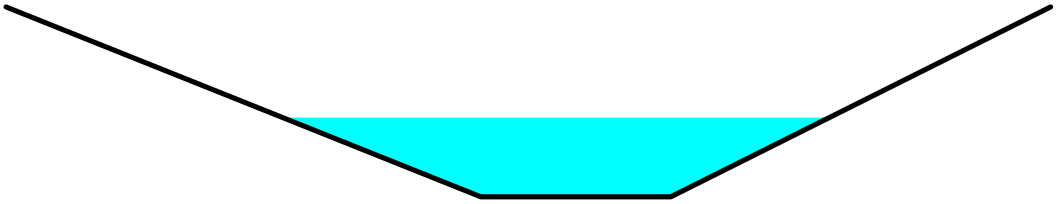
Summary for Reach WQS2: WQS 2

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 3.24" for 25 yr event
Inflow = 36.41 cfs @ 12.35 hrs, Volume= 181,608 cf
Outflow = 36.37 cfs @ 12.35 hrs, Volume= 181,608 cf, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.26 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 4.33 fps, Avg. Travel Time= 1.8 min

Peak Storage= 1,493 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.83'
Defined Flood Depth= 868.00' Flow Area= 9,500.0 sf, Capacity= 232,092.86 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 237.91 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 462.0' Slope= 0.0649 '/'
Inlet Invert= 896.00', Outlet Invert= 866.00'



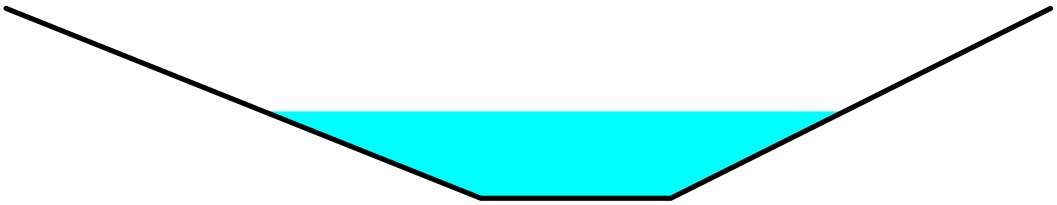
Summary for Reach WQS3: WQS 3

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 3.24" for 25 yr event
Inflow = 36.37 cfs @ 12.35 hrs, Volume= 181,608 cf
Outflow = 36.37 cfs @ 12.36 hrs, Volume= 181,608 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.79 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.80 fps, Avg. Travel Time= 0.6 min

Peak Storage= 501 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.91'
Defined Flood Depth= 862.00' Flow Area= 9,434.3 sf, Capacity= 190,684.13 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 196.83 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 135.0' Slope= 0.0444 '/'
Inlet Invert= 866.00', Outlet Invert= 860.00'



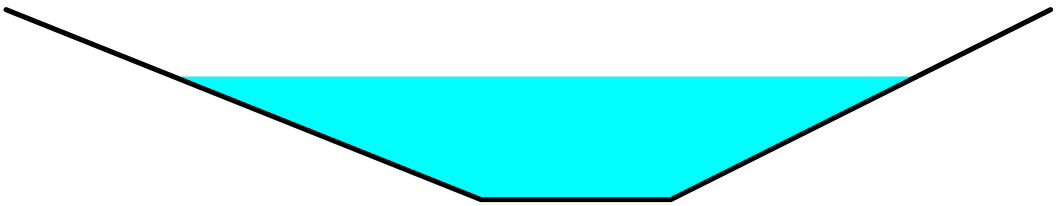
Summary for Reach WQS4: WQS 4

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 3.24" for 25 yr event
Inflow = 36.37 cfs @ 12.36 hrs, Volume= 181,608 cf
Outflow = 36.36 cfs @ 12.36 hrs, Volume= 181,608 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.71 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.28 fps, Avg. Travel Time= 0.7 min

Peak Storage= 618 cf @ 12.36 hrs
Average Depth at Peak Storage= 1.30'
Defined Flood Depth= 861.00' Flow Area= 9,423.3 sf, Capacity= 91,730.80 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 94.80 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 97.0' Slope= 0.0103 '/'
Inlet Invert= 860.00', Outlet Invert= 859.00'



Summary for Reach WQS5: WQS 5

Inflow Area = 64,382 sf, 0.00% Impervious, Inflow Depth = 2.44" for 25 yr event
Inflow = 4.28 cfs @ 12.16 hrs, Volume= 13,106 cf
Outflow = 4.25 cfs @ 12.17 hrs, Volume= 13,106 cf, Atten= 1%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.42 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.93 fps, Avg. Travel Time= 2.6 min

Peak Storage= 235 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.42'
Defined Flood Depth= 898.00' Flow Area= 3,577.4 sf, Capacity= 35,446.98 cfs
Bank-Full Depth= 0.75' Flow Area= 1.9 sf, Capacity= 13.84 cfs

1.00' x 0.75' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 4.00'
Length= 300.0' Slope= 0.0683 '/'
Inlet Invert= 860.00', Outlet Invert= 839.50'

Summary for Pond B1: Infiltration Basin 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 3.20" for 25 yr event
Inflow = 36.29 cfs @ 12.37 hrs, Volume= 179,230 cf
Outflow = 32.79 cfs @ 12.49 hrs, Volume= 177,701 cf, Atten= 10%, Lag= 6.9 min
Discarded = 0.07 cfs @ 12.49 hrs, Volume= 3,145 cf
Primary = 32.72 cfs @ 12.49 hrs, Volume= 174,556 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 859.79' @ 12.49 hrs Surf.Area= 10,466 sf Storage= 21,565 cf
Flood Elev= 862.30' Surf.Area= 30,981 sf Storage= 57,262 cf

Plug-Flow detention time= 32.6 min calculated for 177,701 cf (99% of inflow)
Center-of-Mass det. time= 27.4 min (881.3 - 853.9)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	57,262 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	0	0	0
857.00	2,211	553	553
858.00	7,592	4,902	5,454
859.00	9,175	8,384	13,838
860.00	10,816	9,996	23,833
861.00	12,512	11,664	35,497
862.00	16,710	14,611	50,108
862.30	30,981	7,154	57,262

Device	Routing	Invert	Outlet Devices
#1	Primary	851.20'	**24.0" Round Culvert** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 851.20' / 850.00' S= 0.0162 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	857.30'	**70.0 deg x 2.30' rise Sharp-Crested Vee/Trap Weir X 2.00** Cv= 2.52 (C= 3.15)
#3	Device 1	860.60'	**1.2" x 7.3" Horiz. Orifice/Grate X 3.00 columns** X 11 rows C= 0.600 in 25.7" x 25.7" Grate (44% open area) Limited to weir flow at low heads
#4	Secondary	860.60'	**170.5 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.46 (C= 3.08)
#5	Discarded	856.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.07 cfs @ 12.49 hrs HW=859.79' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=32.72 cfs @ 12.49 hrs HW=859.79' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 32.72 cfs of 41.66 cfs potential flow)
  ├**2=Sharp-Crested Vee/Trap Weir** (Orifice Controls 32.72 cfs @ 4.42 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=856.50' TW=0.00' (Dynamic Tailwater)
└**4=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond B2: B2

Inflow Area = 64,382 sf, 0.00% Impervious, Inflow Depth = 3.24" for 25 yr event
Inflow = 5.60 cfs @ 12.09 hrs, Volume= 17,404 cf
Outflow = 4.30 cfs @ 12.16 hrs, Volume= 14,584 cf, Atten= 23%, Lag= 4.1 min
Discarded = 0.02 cfs @ 12.16 hrs, Volume= 1,478 cf
Primary = 4.28 cfs @ 12.16 hrs, Volume= 13,106 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 861.82' @ 12.16 hrs Surf.Area= 3,618 sf Storage= 4,725 cf
Flood Elev= 862.50' Surf.Area= 4,538 sf Storage= 7,477 cf

Plug-Flow detention time= 139.7 min calculated for 14,579 cf (84% of inflow)
Center-of-Mass det. time= 71.5 min (899.8 - 828.4)

Volume	Invert	Avail.Storage	Storage Description
#1	859.50'	7,477 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
859.50	0	0	0
860.00	1,226	307	307
862.00	3,848	5,074	5,381
862.50	4,538	2,097	7,477

Device	Routing	Invert	Outlet Devices
#1	Primary	861.40'	**6.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	859.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 12.16 hrs HW=861.82' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=4.27 cfs @ 12.16 hrs HW=861.82' TW=860.42' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 4.27 cfs @ 1.68 fps)

Summary for Pond SF1: Sediment Forebay 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 3.24" for 25 yr event
Inflow = 36.36 cfs @ 12.36 hrs, Volume= 181,608 cf
Outflow = 36.29 cfs @ 12.37 hrs, Volume= 179,230 cf, Atten= 0%, Lag= 0.8 min
Primary = 35.77 cfs @ 12.37 hrs, Volume= 178,977 cf
Secondary = 0.53 cfs @ 12.37 hrs, Volume= 252 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 861.36' @ 12.37 hrs Surf.Area= 3,273 sf Storage= 5,137 cf
Flood Elev= 862.00' Surf.Area= 4,327 sf Storage= 7,539 cf

Plug-Flow detention time= 13.5 min calculated for 179,172 cf (99% of inflow)
Center-of-Mass det. time= 5.7 min (853.9 - 848.2)

Volume	Invert	Avail.Storage	Storage Description
#1	857.80'	7,539 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
857.80	0	0	0
858.00	416	42	42
859.00	804	610	652
860.00	1,588	1,196	1,848
861.00	2,784	2,186	4,034
861.50	3,456	1,560	5,594
862.00	4,327	1,946	7,539

Device	Routing	Invert	Outlet Devices
#1	Primary	860.30'	**143.1 deg x 8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)
#2	Secondary	861.30'	**12.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=35.76 cfs @ 12.37 hrs HW=861.36' TW=859.66' (Dynamic Tailwater)
└**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 35.76 cfs @ 3.00 fps)

Secondary OutFlow Max=0.52 cfs @ 12.37 hrs HW=861.36' TW=859.66' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.52 cfs @ 0.68 fps)

Summary for Link AP-1: Offsite to E'ly Wetlands

Inflow Area = 709,418 sf, 7.21% Impervious, Inflow Depth = 3.17" for 25 yr event
Inflow = 33.72 cfs @ 12.48 hrs, Volume= 187,577 cf
Primary = 33.72 cfs @ 12.48 hrs, Volume= 187,577 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: Stiles Lake

Inflow Area = 404,803 sf, 2.21% Impervious, Inflow Depth = 3.08" for 25 yr event
Inflow = 29.33 cfs @ 12.15 hrs, Volume= 104,037 cf
Primary = 29.33 cfs @ 12.15 hrs, Volume= 104,037 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P1.1: P1.1

Runoff = 61.69 cfs @ 12.34 hrs, Volume= 308,024 cf, Depth= 5.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.64"

	Area (ac)	CN	Description
*	0.849	98	Pavement & Roofs, HSG C
	0.229	96	Gravel surface, HSG C
	3.764	74	>75% Grass cover, Good, HSG C
	7.843	70	Woods, Good, HSG C
	2.459	73	Woods, Fair, HSG C
*	0.279	77	Wooded Wetlands, HSG C
	15.423	74	Weighted Average
	14.574		94.50% Pervious Area
	0.849		5.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	92	0.0400	0.10		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	702	0.1000	9.33	27.98	**Channel Flow, B-C, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.7	325	0.0600	7.22	21.67	**Channel Flow, C-D, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.7	250	0.0400	5.90	17.69	**Channel Flow, D-E, Ditch** Area= 3.0 sf Perim= 10.4' r= 0.29' n= 0.022 Earth, clean & straight
0.5	211	0.0300	6.71	73.82	**Channel Flow, E-F, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.025 Earth, clean & winding
0.7	462	0.0700	11.65	128.15	**Channel Flow, F-G, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.022 Earth, clean & straight
0.3	135	0.0400	8.81	96.87	**Channel Flow, G-H, Swale** Area= 11.0 sf Perim= 20.9' r= 0.53' n= 0.022 Earth, clean & straight
4.4	372	0.0800	1.41		**Shallow Concentrated Flow, J-K, Wetland** Woodland Kv= 5.0 fps
24.3	2,549	Total			

Summary for Subcatchment P1.2: P1.2

Runoff = 6.46 cfs @ 12.09 hrs, Volume= 20,645 cf, Depth= 6.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.64"

	Area (ac)	CN	Description
*	0.325	98	Paved Roadway, HSG C
	0.538	74	>75% Grass cover, Good, HSG C
	0.863	83	Weighted Average
	0.538		62.34% Pervious Area
	0.325		37.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	650		1.81		**Direct Entry, Minimum Tc**

Summary for Subcatchment P2.1: P2.1

Runoff = 34.60 cfs @ 12.14 hrs, Volume= 125,003 cf, Depth= 5.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.64"

	Area (sf)	CN	Description
*	8,930	98	Pavement & Roofs, HSG C
	108,639	74	>75% Grass cover, Good, HSG C
	49,266	70	Woods, Good, HSG C
	90,256	73	Woods, Fair, HSG C
*	15,551	77	Wooded Wetlands, HSG C
	272,642	74	Weighted Average
	263,712		96.72% Pervious Area
	8,930		3.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	178	0.2000	2.24		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.4	70	0.3100	2.78		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
2.1	181	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.5	479	Total			

Summary for Subcatchment P2.2: P2.3

Runoff = 8.16 cfs @ 12.15 hrs, Volume= 29,712 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.64"

	Area (ac)	CN	Description
	0.953	70	Woods, Good, HSG C
	0.468	73	Woods, Fair, HSG C
*	0.135	77	Wooded Wetlands, HSG C
	1.556	72	Weighted Average
	1.556		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0800	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	300	0.0800	1.41		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
10.8	350	Total			

Summary for Subcatchment P2.3: P2.2

Runoff = 9.46 cfs @ 12.09 hrs, Volume= 29,518 cf, Depth= 5.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.64"

	Area (ac)	CN	Description
*	0.044	96	Gravel road, HSG C
	1.434	73	Woods, Fair, HSG C
	1.478	74	Weighted Average
	1.478		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	157	0.3000	2.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.8	65	0.0800	1.41		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
6.1	272	Total			

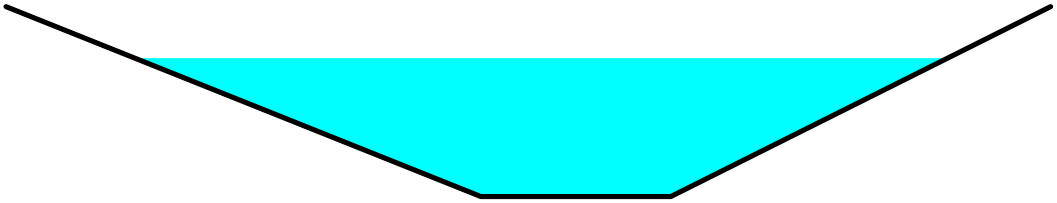
Summary for Reach WQS1: WQS 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 5.50" for 100 yr event
Inflow = 61.69 cfs @ 12.34 hrs, Volume= 308,024 cf
Outflow = 61.64 cfs @ 12.34 hrs, Volume= 308,024 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.02 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.15 fps, Avg. Travel Time= 1.1 min

Peak Storage= 1,622 cf @ 12.34 hrs
Average Depth at Peak Storage= 1.46'
Defined Flood Depth= 898.00' Flow Area= 9,828.7 sf, Capacity= 125,865.46 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 124.71 cfs

2.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 211.0' Slope= 0.0332 '/'
Inlet Invert= 903.00', Outlet Invert= 896.00'



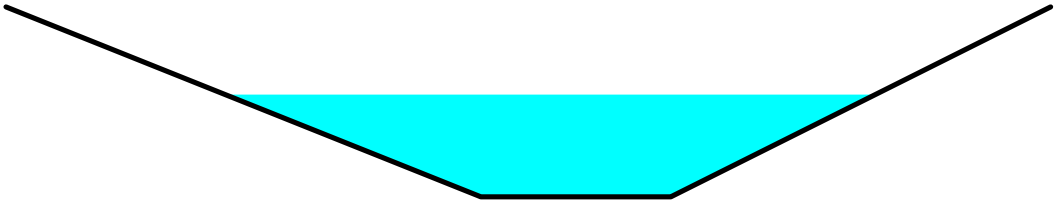
Summary for Reach WQS2: WQS 2

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 5.50" for 100 yr event
Inflow = 61.64 cfs @ 12.34 hrs, Volume= 308,024 cf
Outflow = 61.60 cfs @ 12.35 hrs, Volume= 308,024 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 12.94 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 4.92 fps, Avg. Travel Time= 1.6 min

Peak Storage= 2,200 cf @ 12.35 hrs
Average Depth at Peak Storage= 1.08'
Defined Flood Depth= 868.00' Flow Area= 9,500.0 sf, Capacity= 232,092.86 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 237.91 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 462.0' Slope= 0.0649 '/'
Inlet Invert= 896.00', Outlet Invert= 866.00'



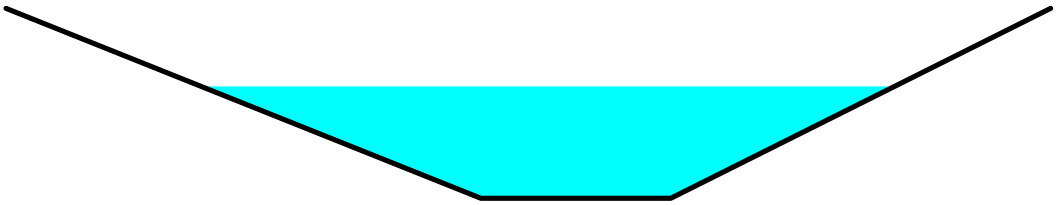
Summary for Reach WQS3: WQS 3

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 5.50" for 100 yr event
Inflow = 61.60 cfs @ 12.35 hrs, Volume= 308,024 cf
Outflow = 61.59 cfs @ 12.35 hrs, Volume= 308,024 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.24 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.31 fps, Avg. Travel Time= 0.5 min

Peak Storage= 739 cf @ 12.35 hrs
Average Depth at Peak Storage= 1.18'
Defined Flood Depth= 862.00' Flow Area= 9,434.3 sf, Capacity= 190,684.13 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 196.83 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 135.0' Slope= 0.0444 '/'
Inlet Invert= 866.00', Outlet Invert= 860.00'



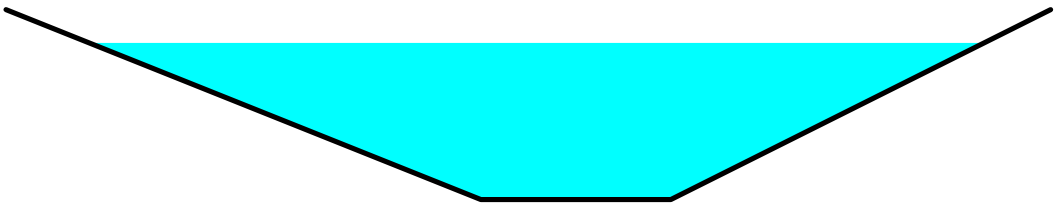
Summary for Reach WQS4: WQS 4

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 5.50" for 100 yr event
Inflow = 61.59 cfs @ 12.35 hrs, Volume= 308,024 cf
Outflow = 61.58 cfs @ 12.35 hrs, Volume= 308,024 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.53 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.57 fps, Avg. Travel Time= 0.6 min

Peak Storage= 914 cf @ 12.35 hrs
Average Depth at Peak Storage= 1.65'
Defined Flood Depth= 861.00' Flow Area= 9,423.3 sf, Capacity= 91,730.80 cfs
Bank-Full Depth= 2.00' Flow Area= 13.0 sf, Capacity= 94.80 cfs

2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.5 2.0 '/' Top Width= 11.00'
Length= 97.0' Slope= 0.0103 '/'
Inlet Invert= 860.00', Outlet Invert= 859.00'



Summary for Reach WQS5: WQS 5

Inflow Area = 64,382 sf, 0.00% Impervious, Inflow Depth = 4.68" for 100 yr event
Inflow = 8.28 cfs @ 12.13 hrs, Volume= 25,122 cf
Outflow = 8.24 cfs @ 12.14 hrs, Volume= 25,122 cf, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.46 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 2.30 fps, Avg. Travel Time= 2.2 min

Peak Storage= 383 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.59'
Defined Flood Depth= 898.00' Flow Area= 3,577.4 sf, Capacity= 35,446.98 cfs
Bank-Full Depth= 0.75' Flow Area= 1.9 sf, Capacity= 13.84 cfs

1.00' x 0.75' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 4.00'
Length= 300.0' Slope= 0.0683 '/'
Inlet Invert= 860.00', Outlet Invert= 839.50'

Summary for Pond B1: Infiltration Basin 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 5.46" for 100 yr event
Inflow = 61.42 cfs @ 12.36 hrs, Volume= 305,646 cf
Outflow = 51.61 cfs @ 12.51 hrs, Volume= 304,100 cf, Atten= 16%, Lag= 9.2 min
Discarded = 0.08 cfs @ 12.51 hrs, Volume= 3,539 cf
Primary = 44.86 cfs @ 12.51 hrs, Volume= 295,930 cf
Secondary = 6.67 cfs @ 12.51 hrs, Volume= 4,631 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 860.99' @ 12.51 hrs Surf.Area= 12,501 sf Storage= 35,416 cf
Flood Elev= 862.30' Surf.Area= 30,981 sf Storage= 57,262 cf

Plug-Flow detention time= 25.6 min calculated for 304,100 cf (99% of inflow)
Center-of-Mass det. time= 22.5 min (859.6 - 837.2)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	57,262 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	0	0	0
857.00	2,211	553	553
858.00	7,592	4,902	5,454
859.00	9,175	8,384	13,838
860.00	10,816	9,996	23,833
861.00	12,512	11,664	35,497
862.00	16,710	14,611	50,108
862.30	30,981	7,154	57,262

Device	Routing	Invert	Outlet Devices
#1	Primary	851.20'	**24.0" Round Culvert** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 851.20' / 850.00' S= 0.0162 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	857.30'	**70.0 deg x 2.30' rise Sharp-Crested Vee/Trap Weir X 2.00** Cv= 2.52 (C= 3.15)
#3	Device 1	860.60'	**1.2" x 7.3" Horiz. Orifice/Grate X 3.00 columns** X 11 rows C= 0.600 in 25.7" x 25.7" Grate (44% open area) Limited to weir flow at low heads
#4	Secondary	860.60'	**170.5 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.46 (C= 3.08)
#5	Discarded	856.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 12.51 hrs HW=860.99' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=44.86 cfs @ 12.51 hrs HW=860.99' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 44.86 cfs @ 14.28 fps)
  ├**2=Sharp-Crested Vee/Trap Weir** (Passes < 51.05 cfs potential flow)
  └**3=Orifice/Grate** (Passes < 6.06 cfs potential flow)

Secondary OutFlow Max=6.67 cfs @ 12.51 hrs HW=860.99' TW=0.00' (Dynamic Tailwater)
└**4=Sharp-Crested Vee/Trap Weir** (Weir Controls 6.67 cfs @ 1.74 fps)

Summary for Pond B2: B2

Inflow Area = 64,382 sf, 0.00% Impervious, Inflow Depth = 5.50" for 100 yr event
Inflow = 9.46 cfs @ 12.09 hrs, Volume= 29,518 cf
Outflow = 8.30 cfs @ 12.13 hrs, Volume= 26,692 cf, Atten= 12%, Lag= 2.7 min
Discarded = 0.02 cfs @ 12.13 hrs, Volume= 1,570 cf
Primary = 8.28 cfs @ 12.13 hrs, Volume= 25,122 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 862.04' @ 12.13 hrs Surf.Area= 3,902 sf Storage= 5,533 cf
Flood Elev= 862.50' Surf.Area= 4,538 sf Storage= 7,477 cf

Plug-Flow detention time= 94.0 min calculated for 26,684 cf (90% of inflow)
Center-of-Mass det. time= 47.2 min (860.5 - 813.2)

Volume	Invert	Avail.Storage	Storage Description
#1	859.50'	7,477 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
859.50	0	0	0
860.00	1,226	307	307
862.00	3,848	5,074	5,381
862.50	4,538	2,097	7,477

Device	Routing	Invert	Outlet Devices
#1	Primary	861.40'	**6.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	859.50'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 12.13 hrs HW=862.04' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=8.27 cfs @ 12.13 hrs HW=862.04' TW=860.59' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 8.27 cfs @ 2.16 fps)

Summary for Pond SF1: Sediment Forebay 1

Inflow Area = 671,826 sf, 5.50% Impervious, Inflow Depth = 5.50" for 100 yr event
Inflow = 61.58 cfs @ 12.35 hrs, Volume= 308,024 cf
Outflow = 61.42 cfs @ 12.36 hrs, Volume= 305,646 cf, Atten= 0%, Lag= 0.4 min
Primary = 54.55 cfs @ 12.36 hrs, Volume= 297,008 cf
Secondary = 6.89 cfs @ 12.37 hrs, Volume= 8,639 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Peak Elev= 861.66' @ 12.37 hrs Surf.Area= 3,726 sf Storage= 6,151 cf
Flood Elev= 862.00' Surf.Area= 4,327 sf Storage= 7,539 cf

Plug-Flow detention time= 9.3 min calculated for 305,548 cf (99% of inflow)
Center-of-Mass det. time= 4.5 min (837.2 - 832.7)

Volume	Invert	Avail.Storage	Storage Description
#1	857.80'	7,539 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
857.80	0	0	0
858.00	416	42	42
859.00	804	610	652
860.00	1,588	1,196	1,848
861.00	2,784	2,186	4,034
861.50	3,456	1,560	5,594
862.00	4,327	1,946	7,539

Device	Routing	Invert	Outlet Devices
#1	Primary	860.30'	**143.1 deg x 8.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)
#2	Secondary	861.30'	**12.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=54.41 cfs @ 12.36 hrs HW=861.65' TW=860.54' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 54.41 cfs @ 3.33 fps)

Secondary OutFlow Max=6.89 cfs @ 12.37 hrs HW=861.66' TW=860.63' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 6.89 cfs @ 1.62 fps)

Summary for Link AP-1: Offsite to E'ly Wetlands

Inflow Area = 709,418 sf, 7.21% Impervious, Inflow Depth = 5.43" for 100 yr event
Inflow = 52.87 cfs @ 12.51 hrs, Volume= 321,206 cf
Primary = 52.87 cfs @ 12.51 hrs, Volume= 321,206 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: Stiles Lake

Inflow Area = 404,803 sf, 2.21% Impervious, Inflow Depth = 5.33" for 100 yr event
Inflow = 51.00 cfs @ 12.14 hrs, Volume= 179,837 cf
Primary = 51.00 cfs @ 12.14 hrs, Volume= 179,837 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs

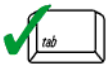
APPENDIX A
MA - DEP Stormwater Checklist

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

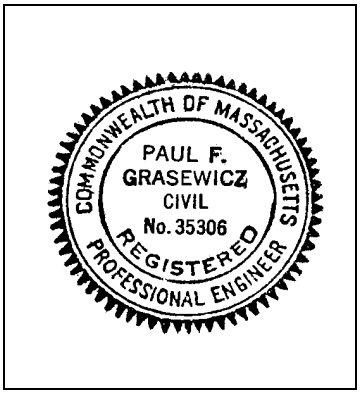
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



8/24/21
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- [X] No disturbance to any Wetland Resource Areas
- [ ] Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- [ ] Reduced Impervious Area (Redevelopment Only)
- [X] Minimizing disturbance to existing trees and shrubs
- [ ] LID Site Design Credit Requested:
  - [ ] Credit 1
  - [ ] Credit 2
  - [ ] Credit 3
- [X] Use of "country drainage" versus curb and gutter conveyance and pipe
- [ ] Bioretention Cells (includes Rain Gardens)
- [ ] Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- [ ] Treebox Filter
- [X] Water Quality Swale
- [ ] Grass Channel
- [ ] Green Roof
- [ ] Other (describe): _____

Standard 1: No New Untreated Discharges

- [X] No new untreated discharges
- [X] Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- [X] Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☒ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☒ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

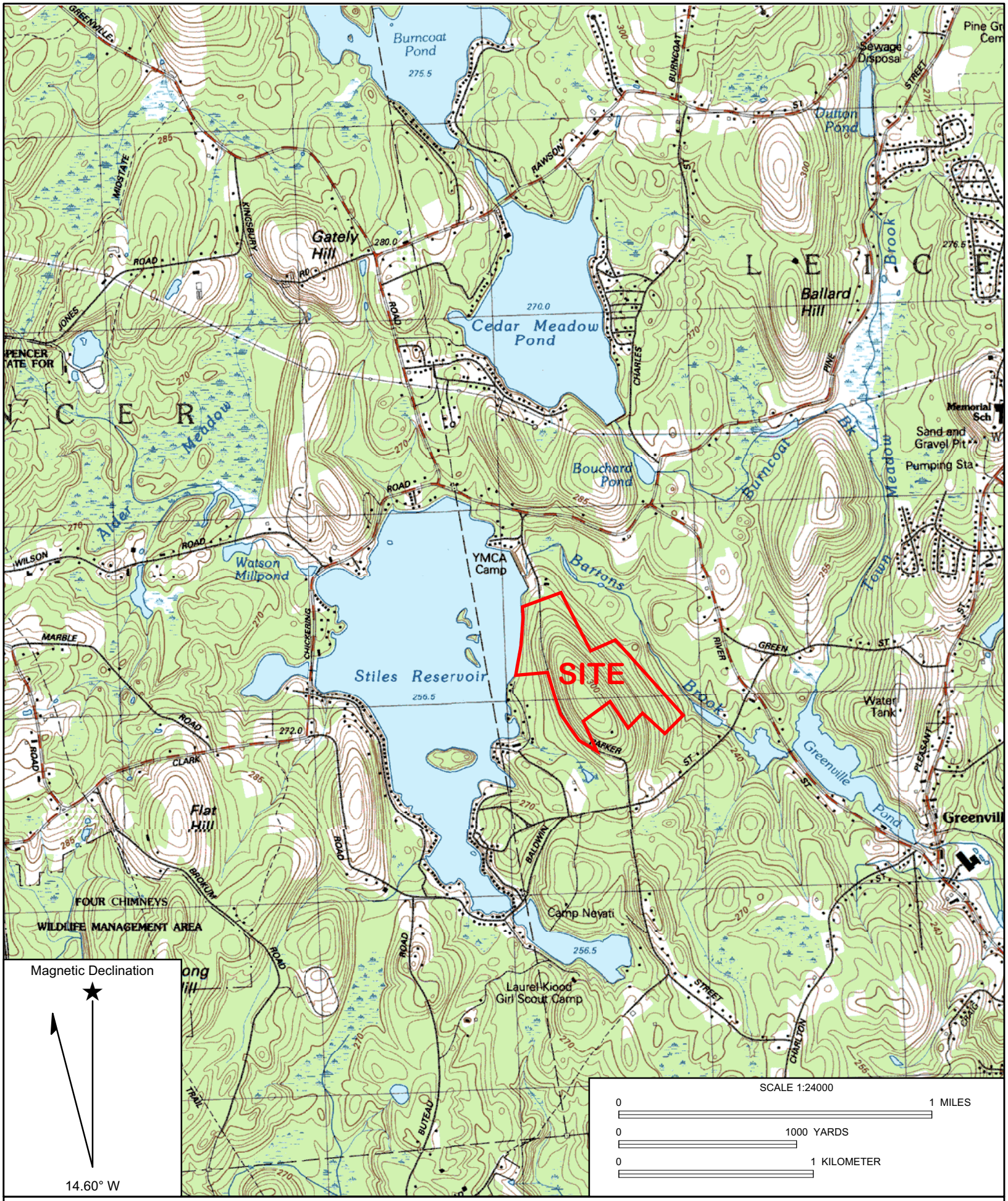
Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX B
USGS MAP



Name: WORCESTER SOUTH
Date: 8/25/2021
Scale: 1 inch equals 2000 feet

Location: 2903367 ft. N 536085 ft. E NAD83
Caption: Parker Street, Leicester, MA

APPENDIX C
FEMA Flood Map

National Flood Hazard Layer FIRMette

FEMA

71°56'44"W 42°13'2"N

71°56'7"W 42°12'35"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/25/2021 at 9:10 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX D
Soil Test Pit Data

PARKER STREET (NORTH) - LEICESTER, MA

TABLE OF SOIL TEST PIT DATA

Testing Date: 08/16/21

Performed by: Brian MacEwen, SE#1430, GRAZ Engineering, LLC

TP#	LOCATION	DEPTH	HORIZON	TEXTURE	ESHWT	NOTES
		(inches)			(inches)	
1	B1	0-5	A	F.S.L.		
		5-22	Bc	F.S.L.		
		22-48	Cd	F.S.L.	28	Moist, No Refusal
2	B1	0-7	A	F.S.L.		
		7-21	Bc	F.S.L.		
		21-46	Cd	F.S.L.	34	Moist, No Refusal
3	SF1	0-6	A	F.S.L.		
		6-26	Bc	F.S.L.		
		26-40	Cd	F.S.L.	32	Moist, No Refusal

APPENDIX E

NRCS Soils Map Overlay
&
NRCC Cornell Extreme Precipitation Table

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	Massachusetts
Location	Parker Street, Leicester, MA
Longitude	71.941 degrees West
Latitude	42.213 degrees North
Elevation	0 feet
Date/Time	Sun, 22 Aug 2021 14:51:00 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.69	0.87	1.09	**1yr**	0.75	1.06	1.27	1.61	2.05	2.62	2.90	**1yr**	2.32	2.79	3.19	3.86	4.48	**1yr**
2yr	0.35	0.53	0.66	0.87	1.10	1.39	**2yr**	0.95	1.26	1.61	2.02	2.54	3.21	3.49	**2yr**	2.84	3.36	3.87	4.58	5.21	**2yr**
5yr	0.41	0.63	0.80	1.06	1.36	1.74	**5yr**	1.18	1.57	2.02	2.55	3.21	4.04	4.45	**5yr**	3.58	4.28	4.90	5.74	6.46	**5yr**
10yr	0.46	0.72	0.91	1.23	1.60	2.06	**10yr**	1.38	1.84	2.41	3.05	3.84	4.81	5.35	**10yr**	4.26	5.14	5.86	6.81	7.59	**10yr**
25yr	0.54	0.86	1.09	1.50	1.99	2.58	**25yr**	1.72	2.28	3.03	3.85	4.85	6.07	6.83	**25yr**	5.37	6.56	7.43	8.55	9.41	**25yr**
50yr	0.60	0.97	1.24	1.74	2.35	3.08	**50yr**	2.02	2.69	3.63	4.61	5.80	7.24	8.22	**50yr**	6.41	7.91	8.90	10.16	11.08	**50yr**
100yr	0.69	1.12	1.44	2.03	2.77	3.66	**100yr**	2.39	3.17	4.32	5.50	6.93	8.64	9.91	**100yr**	7.65	9.53	10.66	12.07	13.04	**100yr**
200yr	0.78	1.27	1.65	2.37	3.27	4.35	**200yr**	2.82	3.73	5.15	6.58	8.28	10.32	11.96	**200yr**	9.13	11.50	12.78	14.36	15.35	**200yr**
500yr	0.93	1.53	2.00	2.91	4.08	5.47	**500yr**	3.52	4.64	6.50	8.32	10.49	13.07	15.36	**500yr**	11.56	14.77	16.25	18.06	19.07	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.22	0.34	0.41	0.55	0.68	0.98	**1yr**	0.59	0.95	1.12	1.48	1.91	2.32	2.31	**1yr**	2.06	2.23	2.80	3.23	3.94	**1yr**
2yr	0.34	0.52	0.64	0.87	1.07	1.25	**2yr**	0.92	1.23	1.43	1.89	2.43	3.12	3.39	**2yr**	2.76	3.26	3.76	4.43	5.04	**2yr**
5yr	0.38	0.59	0.73	1.00	1.28	1.49	**5yr**	1.10	1.46	1.71	2.23	2.85	3.77	4.04	**5yr**	3.34	3.89	4.49	5.23	5.90	**5yr**
10yr	0.42	0.65	0.81	1.13	1.46	1.70	**10yr**	1.26	1.67	1.94	2.52	3.19	4.35	4.58	**10yr**	3.85	4.41	5.10	5.87	6.59	**10yr**
25yr	0.49	0.75	0.93	1.33	1.74	2.03	**25yr**	1.51	1.98	2.30	2.98	3.72	5.28	5.95	**25yr**	4.68	5.72	6.04	7.24	7.81	**25yr**
50yr	0.54	0.83	1.03	1.48	2.00	2.31	**50yr**	1.72	2.26	2.62	3.39	4.19	6.13	6.97	**50yr**	5.43	6.70	6.85	8.31	8.80	**50yr**
100yr	0.61	0.93	1.16	1.67	2.30	2.64	**100yr**	1.98	2.58	2.98	3.85	4.71	7.13	8.21	**100yr**	6.31	7.90	7.74	9.56	9.91	**100yr**
200yr	0.68	1.03	1.31	1.89	2.64	3.03	**200yr**	2.28	2.96	3.40	4.40	5.31	8.30	9.72	**200yr**	7.34	9.35	8.75	10.97	11.16	**200yr**
500yr	0.81	1.21	1.55	2.26	3.21	3.63	**500yr**	2.77	3.55	4.06	5.25	6.24	10.16	12.17	**500yr**	8.99	11.70	12.40	13.25	13.06	**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	1.18	**1yr**	0.83	1.15	1.37	1.75	2.33	2.85	3.22	**1yr**	2.53	3.09	3.52	4.17	4.92	**1yr**
2yr	0.36	0.55	0.68	0.92	1.14	1.33	**2yr**	0.98	1.30	1.54	2.00	2.58	3.32	3.63	**2yr**	2.94	3.49	4.03	4.76	5.51	**2yr**
5yr	0.43	0.67	0.83	1.14	1.44	1.72	**5yr**	1.25	1.68	1.97	2.54	3.21	4.34	4.87	**5yr**	3.84	4.68	5.33	6.31	7.08	**5yr**
10yr	0.50	0.77	0.96	1.34	1.73	2.08	**10yr**	1.50	2.03	2.40	3.05	3.81	5.32	6.00	**10yr**	4.71	5.77	6.61	7.81	8.70	**10yr**
25yr	0.62	0.95	1.18	1.68	2.21	2.68	**25yr**	1.91	2.62	3.11	3.88	4.78	6.97	7.86	**25yr**	6.17	7.55	8.84	9.96	11.03	**25yr**
50yr	0.73	1.11	1.38	1.98	2.67	3.25	**50yr**	2.30	3.18	3.79	4.66	5.68	8.54	9.70	**50yr**	7.56	9.33	11.01	12.20	13.43	**50yr**
100yr	0.86	1.30	1.62	2.35	3.22	3.94	**100yr**	2.78	3.86	4.61	5.59	6.74	10.45	12.00	**100yr**	9.25	11.53	13.72	14.94	16.35	**100yr**
200yr	1.01	1.52	1.92	2.78	3.88	4.79	**200yr**	3.35	4.68	5.62	6.70	8.00	12.81	14.83	**200yr**	11.33	14.26	17.11	18.28	19.91	**200yr**
500yr	1.27	1.88	2.43	3.52	5.01	6.19	**500yr**	4.32	6.05	7.30	8.53	10.03	16.74	19.59	**500yr**	14.81	18.83	20.94	23.86	25.83	**500yr**

Powered by ACIS Northeast Regional Climate Center

317B
(C-SOILS)

73A
(D-SOILS)

310B
(C/D-SOILS)

41/B6.2
N/F
CHARLES G. LARSON SR.
DB 21705, PG 142

307E
(C-SOILS)

HYDROLOGIC SOIL GROUP (HSG) DIVISION LINE

307C
(C-SOILS)

REMAINING LAND

307B
(C-SOILS)

41/B7.0
N/F
Y.W.C.A

307E
(C-SOILS)

73A
(D-SOILS)

307C
(C-SOILS)

300B
(C-SOILS)

41/B7.0
N/F
Y.W.C.A

LOT 2

#49
42/A2.0
N/F
MARK DOLAN
DB 45652, PG 280
PB 436, PL 38

41/B7.0
N/F
Y.W.C.A

41/C4.0
N/F
Y.W.C.A

RESERVED FOR LAKE ACCESS

LOT 1

307E
(C-SOILS)

41/–
N/F
UNKOWN

STILES LAKE

41/C3.0
N/F
STILES LAKE WATER DISTRICT
DB 16840, PG 344
PB 460, PL 80

MERIDIAN OF
MASSACHUSETTS MAINLAND
GRID (NAD83)

41/C3.0
N/F
STILES LAKE WATER DISTRICT
DB 16840, PG 344
PB 460, PL 80

312B
(C/D-SOILS)

STILES LAKE

41/C3.0
N/F
STILES LAKE WATER DISTRICT
DB 16840, PG 344
PB 460, PL 80

GRAPHIC SCALE

(FEET) 80 0 40 80 160 240

(METERS) 24.4 0 12.2 24.4 48.8 73.2

1 inch = 80 ft.

NOTE

1) THE NRCS HYDROLOGIC SOIL GROUP DELINEATION LINES DEPICTED HEREON ARE BASED ON THE SHAPEFILES OBTAINED FROM THE THE MASS GIS OLIVER ONLINE MAPPING WEBSITE.

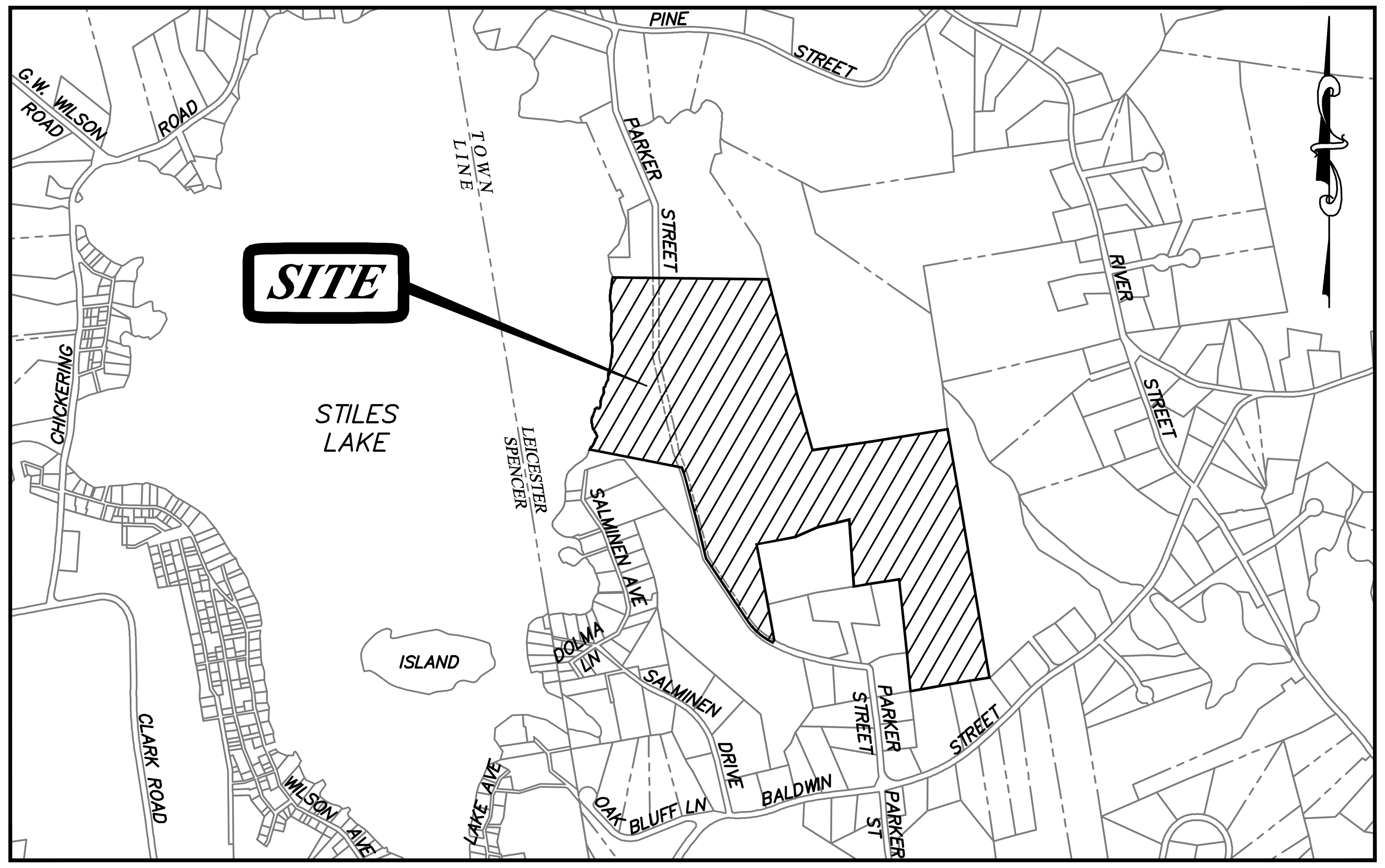
GRAZ Engineering, L.L.C.
323 West Lake Road, Fitzwilliam, NH 03447
Phone: (603) 585-4959 Fax: (603) 585-4960

PARKKER STREET (NORTH) - DEFINITIVE SUBDIVISION
LEICESTER, MASSACHUSETTS

NRCS SOILS MAP OVERLAY
PREPARED FOR: SCHOLD DEVELOPMENT, LLC (OWNER/APPLICANT)
77 CHICKERING ROAD, SPENCER, MA 01562

SCALE: AS NOTED	DRAWN: BCM	CHECKED: PPG & BCM	PLAN DATE: JUNE 6, 2021	BY
REV.	DATE	DESCRIPTION		
1	8/23/21	REVS. PER QUINN ENG. TECH. REVIEW & LPB		BCM

SHEET 1 OF 1



LOCUS PLAN

SCALE: 1" = 750'

PARKER STREET (NORTH)
DEFINITIVE SUBDIVISION
LEICESTER, MASSACHUSETTS

APPLICANT & OWNER:
SCHOLD DEVELOPMENT, LLC, 77 CHICKERING ROAD, SPENCER, MA 01562

ENGINEER & SURVEYOR:
GRAZ ENGINEERING, L.L.C., 323 WEST LAKE ROAD, FITZWILLIAM, NH 03447

ENVIRONMENTAL CONSULTANT
EBT ENVIRONMENTAL CONSULTING, 2 WELLINGTON ROAD, OXFORD, MA 01540

GENERAL PROPERTY DATA

LEICESTER PROPERTY

ASSESSORS PARCELS:	MAP 42, PARCELS A1.0 & B1.0
LOT ADDRESS:	PARKER STREET & 89 PARKER STREET
OWNER OF RECORD:	SCHOLD DEVELOPMENT, LLC
LOCUS DEED:	BOOK 60004, PAGE 48
PLAN REFERENCE:	PLAN BOOK 800, PLAN 29 - PARCELS A & C

PROJECT ZONING REQUIREMENTS

	LEICESTER SUBURBAN-AGRICULTURAL (SA)
LOT AREA	80,000 SQ. FT
FRONTAGE & WIDTH	200 FT
FRONT SETBACK	40 FT
SIDE SETBACK	40 FT
REAR SETBACK	40 FT
MAX. BLDG. HEIGHT	35 FT.
MAX. NO. STORIES	2-1/2
MAX. LOT COVERAGE	30%

ZONING DISTRICT SOURCES:

TOWN OF LEICESTER ZONING BYLAWS AS ACCEPTED ON MAY 12, 1986 AND AMENDED THROUGH JUNE 2, 2020.

PROJECT STATISTICS

- TOTAL LAND AREA: ± 3,195,623 SQ. FT. (± 73.36141 ACRES)
- TOTAL LOT AREA: ± 243,802 SQ. FT. (± 5.59693 ACRES)
- REMAINING LAND: ± 2,912,178 SQ. FT. (± 66.85441 ACRES)
- RIGHT-OF-WAY AREA: ± 50,322 SQ. FT. (± 1.15523 ACRES)
- EASEMENT AREA: ± 72,776 SQ. FT. (± 1.67071 ACRES)

LIST OF DRAWINGS

LEICESTER PLANNING BOARD WAIVERS REQUESTED

SECTION V.A.2.a & SECTION VI.A.2 – MINIMUM WIDTH OF TRAVELLED WAY, 28' MIN. REQUIRED:
TO ALLOW A TRAVELLED WAY WIDTH OF 20'.

SECTION V.A.4.a – MAXIMUM LENGTH OF DEAD–END CUL–DE–SAC, 500' MIN. REQUIRED:
TO ALLOW DEAD–END STREET LENGTH OF 22+05.33' &
RIGHT–OF–WAY LENGTH OF 22+15.33'
BOTH AS MEASURED FROM SOUTHERLY EDGE OF PINE STREET.

SECTION VI.E.3 – STREET LIGHTING SHALL BE REQUIRED.
TO ALLOW STREET LIGHTING TO BE INSTALLED AS STIPULATED IN THE WRITTEN PLANNING BOARD DECISION AND AS DEPICTED ON THE FINAL APPROVED PLANS.

SECTION VI.G.1 – SIDEWALKS SHALL BE INSTALLED ON BOTH SIDES OF THE ROADWAY.
TO ALLOW FOR NO SIDEWALKS INSTALLATION.

SECTION VI.L – STREET SHADE TREES SHALL BE INSTALLED ON BOTH SIDES OF THE ROADWAY.
TO ALLOW FOR STREET TREE PLANTINGS TO BE INSTALLED AS STIPULATED IN THE WRITTEN PLANNING BOARD DECISION AND AS DEPICTED ON THE FINAL APPROVED PLANS.

FOR REGISTRY USE ONLY

THE CERTIFICATIONS SHOWN HEREON ARE INTENDED TO MEET THE REGISTRY OF DEEDS REQUIREMENTS AND ARE NOT A CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO THE CURRENT TOWNS OF LEICESTER & SPENCER ASSESSOR'S RECORDS.

I CERTIFY THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

COMMONWEALTH OF MASSACHUSETTS BRIAN C. MAKINEN No. 37133 PROFESSIONAL LAND SURVEYOR

CONDITIONS OF APPROVAL ARE CONTAINED IN THE WRITTEN DECISION OF THE PLANNING BOARD ENTITLED, "CERTIFICATE OF APPROVAL OF A DEFINITIVE SUBDIVISION PLAN", DATED __________, 2019 AND RECORDED IN THE WORCESTER DISTRICT REGISTRY OF DEEDS IN BOOK ______, PAGE ____.

THE CONSTRUCTION OF WAYS AND INSTALLATION OF SERVICES SHOWN ON THIS PLAN ARE SECURED BY WAY OF A COVENANT, DATED ______________ TO BE RECORDED HEREWITH.

APPROVAL OF THE LEICESTER PLANNING BOARD IS FOR ___ YEARS ONLY. IN THE EVENT THE WAYS AND SERVICES SHOWN ON THIS PLAN ARE NOT CONSTRUCTED AND INSTALLED WITHIN ___ YEARS FROM THE DATE OF ENDORSEMENT, THE BOARD'S APPROVAL IS RESCINDED, AND THIS PLAN IS AND SHALL BE NULL AND VOID.

CERTIFICATE OF NO APPEAL

THIS IS TO CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE LEICESTER PLANNING BOARD WAS RECEIVED AND RECORDED AT THIS OFFICE ON ______________ AT ______ AND NO APPEAL WAS RECEIVED DURING THE 20 DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

TOWN CLERK – LEICESTER

DATE ______________

APPROVED UNDER THE SUBDIVISION CONTROL LAW PLANNING BOARD OF LEICESTER

DATE: ______________

SCALE: AS NOTED	DRAWN: BCM	CHECKED: PFG & BCM	PLAN DATE: JUNE 8, 2021

REV.	DATE	DESCRIPTION	BY
1	8/24/21	REVS PER QUINN ENG. TECH. REVIEW & LPB	BCM

COMMONWEALTH OF MASSACHUSETTS PAUL F. GRASEWICZ CIVIL No. 35306 REGISTERED PROFESSIONAL ENGINEER

SHEET 1 OF 8
REGISTRY SHEET 1 OF 3

GENERAL NOTES

1) THE EXISTING TOPOGRAPHY, SITE FEATURES, AND UTILITIES DEPICTED HEREON ARE BASED ON AERIAL PHOTOGRAMMETRY PREPARED BY COL–EAST, INC. FROM AERIAL PHOTOGRAPHS TAKEN IN 2004.

2) THE EXISTING BOUNDARY LINES AND THE AERIAL PHOTOGRAMMETRY INFORMATION DEPICTED HEREON ARE THE RESULT OF THE RESULT OF AN ACTUAL ON THE GROUND FIELD SURVEY PERFORMED BY THE BSC GROUP, INC. IN JUNE THROUGH JULY 2005 AND MARCH 2005 AND COMPILATION OF THE DEEDS AND PLANS OF RECORD CITED HEREON.

3) THE HORIZONTAL AND VERTICAL DATUMS WERE ESTABLISHED BY NETWORK–RTK GNSS GPS PERFORMED AT THE SITE.

HORIZONTAL DATUM & BEARING BASIS = MASSACHUSETTS MAINLAND GRID (NAD83)

VERTICAL DATUM = NAVD88 (REFER TO PLAN FOR LOCATION OF BENCHMARKS SET DURING SURVEY)

NOTE: THE NGVD 1929 DATUM IS 0.68 FEET HIGHER THAN THE NAVD 1988 DATUM. 1929 NGVD DATUM ELEV = 378.49'

4) THE TOWN LINE DEPICTED HEREON WAS DETERMINED BY NETWORK RTK–GNSS LOCATION OF THE TOWN BOUNDS (MASSACHUSETTS MAINLAND GRID, NAD 83).

5) THE WETLANDS WERE FIELD DELINEATED BY EBT ENVIRONMENTAL CONSULTING, INC. IN OCTOBER 2005 AND WERE LOCATED BY THE FIELD SURVEY CITED ABOVE.

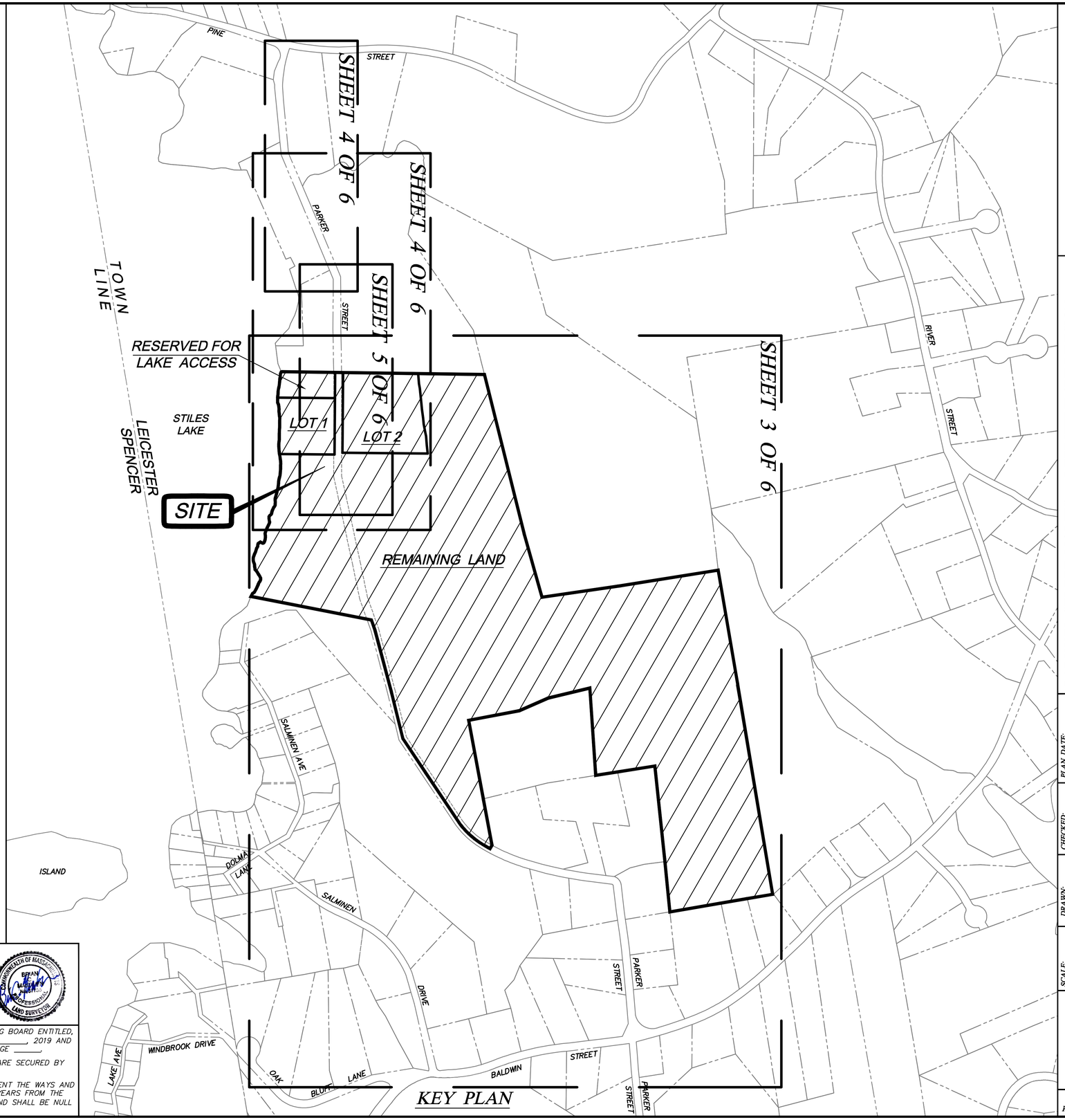
6) THE PORTION OF THE SITE ADJOINING THE EASTERLY SIDE OF STILES LAKE LIES WITHIN ZONE A, SPECIAL FLOOD HAZARD AREA WITH NO ELEVATIONS DETERMINED AS SET FORTH ON THE NATIONAL FLOOD INSURANCE PROGRAM FLOOE INSURANCE RATE MAP (FIRM) 25027C0780E WITH THE REMAINDER OF THE SITE BEING IN ZONE X, MINIMAL FLOOD HAZARD AS SET FORTH ON THE FIRM 25027C0783E, BOTH MAPS BEARING EFFECTIVE DATES OF JULY 4, 2011.

7) THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON, ARE APPROXIMATE AND ARE BASED ON THE FIELD LOCATION OF THE OBSERVABLE STRUCTURES SUCH AS CATCH BASINS, MANHOLES, WATER GATES, ETC. AND THE COMPILATION OF INFORMATION OBTAINED FROM VARIOUS UTILITY COMPANIES, AND GOVERNMENT AGENCIES. THE ENGINEER DOES NOT GUARANTEE THAT ALL UTILITIES AND SUB–SURFACE STRUCTURES ARE SHOWN. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION, AND INVERT ELEVATIONS OF THE UTILITIES AND STRUCTURES, AS REQUIRED PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY DISCREPANCIES ARE OBSERVED BETWEEN THE EXISTING CONDITIONS DEPICTED HEREON AND THE ACTUAL CONDITIONS.

8) IN ACCORDANCE WITH CHAPTER 82, SECTION 40, INCLUDING AMENDMENTS, ALL CONTRACTORS SHALL NOTIFY IN WRITING ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG–SAFE AT 1–888–344–7233 72 HOURS BEFORE ANY EXCAVATION.

9) A FIFTEEN FOOT (15') WIDE TEMPORARY SLOPE AND CONSTRUCTION EASEMENT SHALL BE PROVIDED PARALLEL AND ALONG THE ENTIRE PROPOSED RIGHT–OF–WAY ACROSS THE FRONTAGE OF EACH LOT. THE TEMPORARY SLOPE AND CONSTRUCTION EASEMENT SHALL BE EXTINGUISHED UPON ACCEPTANCE OF THE ROADWAY BY THE TOWN OF LEICESTER.

10) THE DRAINAGE AND UTILITY EASEMENTS DEPICTED HEREON ARE REQUIRED BY THE TOWN OF LEICESTER DEPARTMENT OF PUBLIC WORKS IN ORDER TO MAINTAIN THE DRAINAGE INFRASTRUCTURE (SWALES, PONDS, ETC.) AND SHALL BE GRANTED TO THE TOWN OF LEICESTER.



MERIDIAN OF MASSACHUSETTS MAINLAND GRID (NAD83)

GRAPHIC SCALE

(FEET) 250 0 125 250 500 750

(METERS) 76.2 0 38.1 76.2 152.4 228.6

1 inch = 250 ft.

APPROVED UNDER THE SUBDIVISION CONTROL LAW PLANNING BOARD OF LEICESTER

_____

_____

_____

_____

_____

_____

DATE: _____

CERTIFICATE OF NO APPEAL

THIS IS TO CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE LEICESTER PLANNING BOARD WAS RECEIVED AND RECORDED AT THIS OFFICE ON _____ AT _____ AND NO APPEAL WAS RECEIVED DURING THE 20 DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

_____

TOWN CLERK – LEICESTER

DATE _____

FOR REGISTRY USE ONLY

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I CERTIFY THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

COMMONWEALTH OF MASSACHUSETTS BRIAN C. MAY PROFESSIONAL LAND SURVEYOR

CONDITIONS OF APPROVAL ARE CONTAINED IN THE WRITTEN DECISION OF THE PLANNING BOARD ENTITLED, "CERTIFICATE OF APPROVAL OF A DEFINITIVE SUBDIVISION PLAN", DATED _____, 2019 AND RECORDED IN THE WORCESTER DISTRICT REGISTRY OF DEEDS IN BOOK _____, PAGE _____.

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GRAZ Engineering, L.L.C.
323 West Lake Road, Fitzwilliam, NH 03447
Phone: (603) 585-6959 Fax: (603) 585-6960

PARKKER STREET (NORTH) - DEFINITIVE SUBDIVISION
LEICESTER, MASSACHUSETTS

PREPARED FOR: SCHOLD DEVELOPMENT, LLC (OWNER/APPLICANT)
77 CHICKERING ROAD, SPENCER, MA 01562

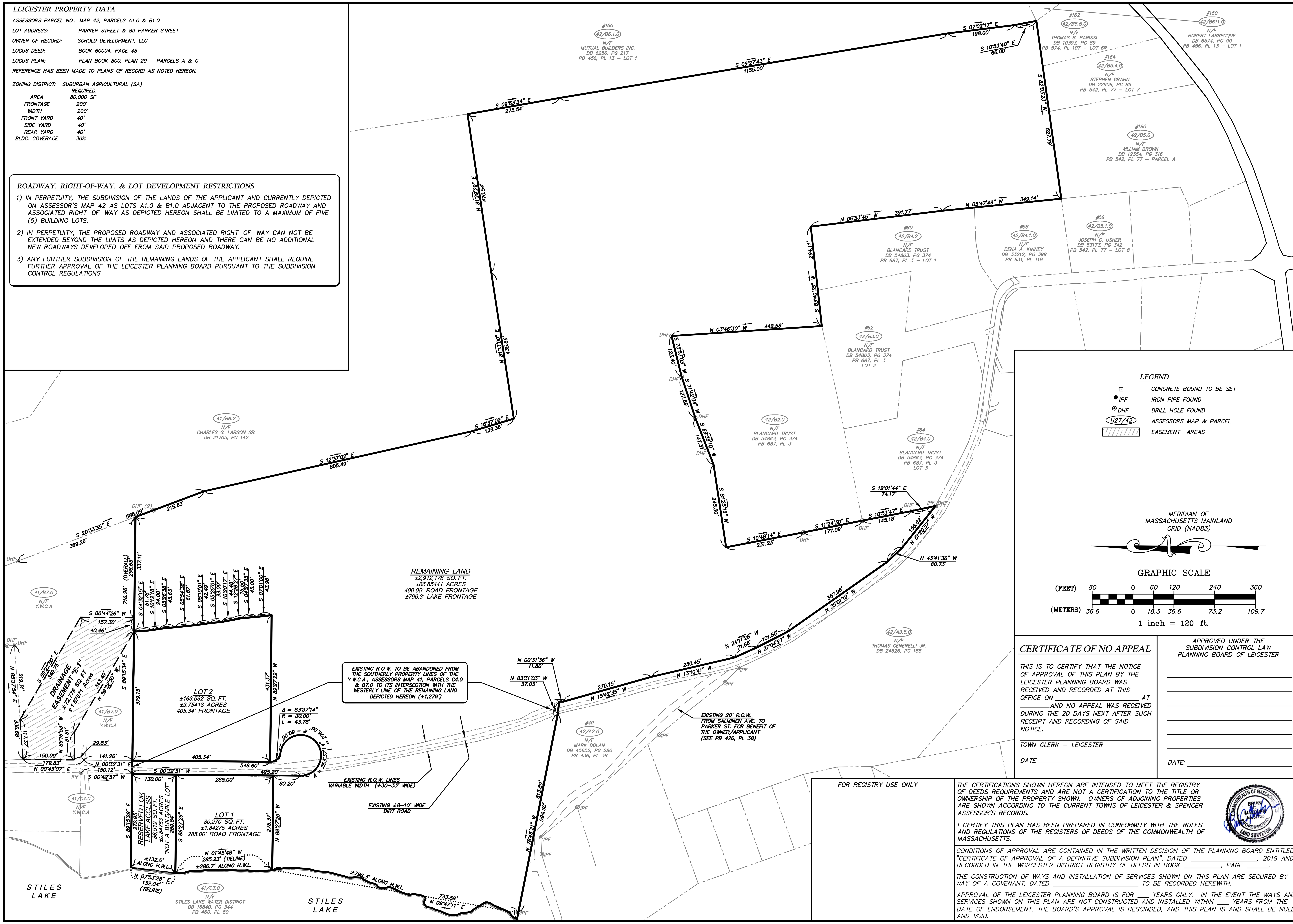
KEY PLAN & NOTES

SCALE: AS NOTED
DRAWN: BCM
CHECKED: PTG & BCM
PLAN DATE: JUNE 8, 2021

REV.	DATE	DESCRIPTION	BY
1	8/24/21	REVS PER QUINN ENG. TECH. REVIEW & LPB	BCM

COMMONWEALTH OF MASSACHUSETTS PAUL F. GRASEWICZ No. 36146 PROFESSIONAL ENGINEER

SHEET 2 OF 8
REGISTRY SHEET 2 OF 3



LEICESTER PROPERTY DATA

ASSESSORS PARCEL NO.: MAP 42, PARCELS A1.0 & B1.0
LOT ADDRESS: PARKER STREET & 89 PARKER STREET
OWNER OF RECORD: SCHOLD DEVELOPMENT, LLC
LOCUS DEED: BOOK 60004, PAGE 48
LOCUS PLAN: PLAN BOOK 800, PLAN 29 – PARCELS A & C
REFERENCE HAS BEEN MADE TO PLANS OF RECORD AS NOTED HEREON.

ZONING DISTRICT: SUBURBAN AGRICULTURAL (SA)

	REQUIRED
AREA	80,000 SF
FRONTAGE	200'
WIDTH	200'
FRONT YARD	40'
SIDE YARD	40'
REAR YARD	40'
BLDG. COVERAGE	30%

ROADWAY, RIGHT-OF-WAY, & LOT DEVELOPMENT RESTRICTIONS

1) IN PERPETUITY, THE SUBDIVISION OF THE LANDS OF THE APPLICANT AND CURRENTLY DEPICTED ON ASSESSOR'S MAP 42 AS LOTS A1.0 & B1.0 ADJACENT TO THE PROPOSED ROADWAY AND ASSOCIATED RIGHT-OF-WAY AS DEPICTED HEREON SHALL BE LIMITED TO A MAXIMUM OF FIVE (5) BUILDING LOTS.
2) IN PERPETUITY, THE PROPOSED ROADWAY AND ASSOCIATED RIGHT-OF-WAY CAN NOT BE EXTENDED BEYOND THE LIMITS AS DEPICTED HEREON AND THERE CAN BE NO ADDITIONAL NEW ROADWAYS DEVELOPED OFF FROM SAID PROPOSED ROADWAY.
3) ANY FURTHER SUBDIVISION OF THE REMAINING LANDS OF THE APPLICANT SHALL REQUIRE FURTHER APPROVAL OF THE LEICESTER PLANNING BOARD PURSUANT TO THE SUBDIVISION CONTROL REGULATIONS.

CERTIFICATE OF NO APPEAL

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____
TOWN CLERK – LEICESTER

DATE ______________

APPROVED UNDER THE SUBDIVISION CONTROL LAW
PLANNING BOARD OF LEICESTER

____
____
____
____
____
____

DATE: ______________

FOR REGISTRY USE ONLY

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I CERTIFY THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

COMMONWEALTH OF MASSACHUSETTS – BRIAN C. MADDEN – No. 37736 – PROFESSIONAL LAND SURVEYOR

CONDITIONS OF APPROVAL ARE CONTAINED IN THE WRITTEN DECISION OF THE PLANNING BOARD ENTITLED, "CERTIFICATE OF APPROVAL OF A DEFINITIVE SUBDIVISION PLAN", DATED ____________, 2019 AND RECORDED IN THE WORCESTER DISTRICT REGISTRY OF DEEDS IN BOOK ________, PAGE ______.

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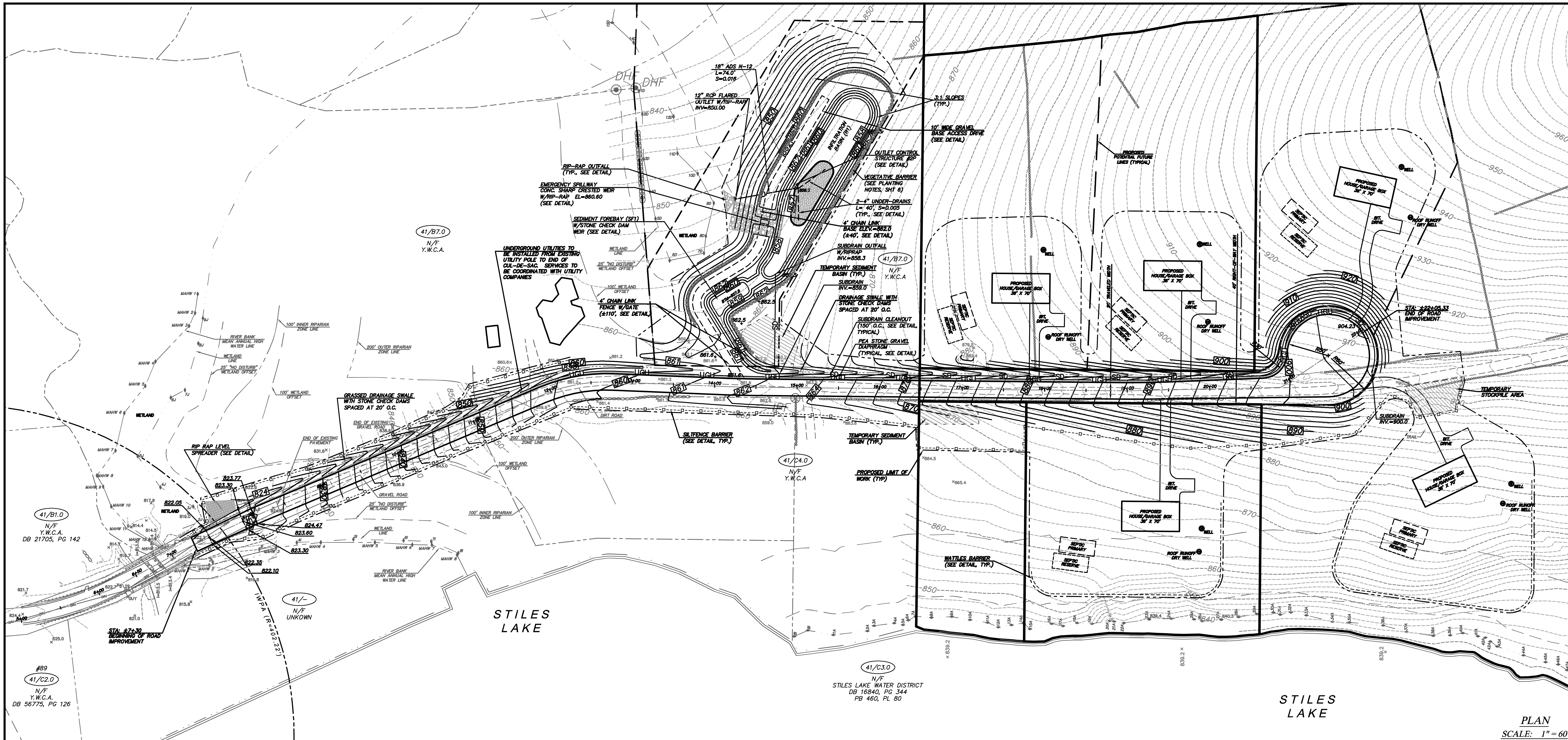
Phone: (603) 585-6959 Fax: (603) 585-6960

PARKER STREET (NORTH) - DEFINITIVE SUBDIVISION
LEICESTER, MASSACHUSETTS

LOT LAYOUT PLAN
PREPARED FOR: SCHOLD DEVELOPMENT, LLC (OWNER/APPLICANT)
77 CHICKERING ROAD, SPENCER, MA 01562

PLAN DATE: JUNE 8, 2021
CHECKED: PFG & BCM
DRAWN: BCM
SCALE: AS NOTED

REV.	DATE	DESCRIPTION	BY
1	8/24/21	REVS PER QUINN ENG. TECH. REVIEW & LPB	BCM



PLAN

SCALE: 1" = 60'

EROSION CONTROL NOTES

1) AS THIS PROJECT SHALL ALTER OVER ONE ACRE OF LAND, IT WILL REQUIRE FILING A NOTICE OF INTENT WITH THE EPA UNDER THE NPDES PHASE II PROGRAM AND WILL REQUIRE A STORMWATER POLLUTION PREVENTION PLAN (SWPP) TO BE FILED PRIOR TO ANY LAND DISTURBANCE. THE SWPP SHALL BE PROVIDED TO THE SITE CONTRACTOR PRIOR TO CONSTRUCTION AND SHALL BE ACCESSIBLE ON SITE DURING ALL CONSTRUCTION ACTIVITY.

2) THE CONTRACTOR SHALL REVIEW AND COMPLY WITH ALL REQUIREMENTS OF THE PROJECT "ORDER OF CONDITIONS" AS ISSUED BY THE TOWN OF LEICESTER CONSERVATION COMMISSION. THE CONTRACTOR AND ALL SUB-CONTRACTORS ARE TO BE MADE AWARE OF THE ORDER OF CONDITIONS AS GRANTED BY THE LEICESTER CONSERVATION COMMISSION AND ITS REGULATIONS APPLICABLE TO THIS PROJECT. A COPY OF THIS ORDER IS TO BE READILY AVAILABLE ON SITE AT ALL TIMES.

3) THE SEDIMENTATION AND EROSION CONTROLS DEPICTED HEREON ARE THE MINIMUM REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER MAINTENANCE OF ALL EROSION CONTROLS AND SHALL INSTALL ADDITIONAL MITIGATION MEASURES AS MAY BE NECESSARY TO ENSURE PROTECTION OF ALL THE WETLAND RESOURCES.

4) PRIOR TO THE START OF ANY CONSTRUCTION, ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED AS DEPICTED HEREON. THE CONTRACTOR SHALL MAINTAIN THESE MEASURES UNTIL ALL WORK IS COMPLETED AND ALL AREAS HAVE BEEN STABILIZED.

5) AT NO TIME SHOULD HEAVY EQUIPMENT CROSS THE EROSION CONTROL BARRIERSE OR OPERATE BEYOND THE LIMIT OF WORK DEPICTED HEREON. ALL FUELING OF CONSTRUCTION EQUIPMENT IS TO BE DONE IN THE UPLANDS OUTSIDE OF THE 100' BUFFER ZONE.

6) TEMPORARY STABILIZATION OF DISTURBED AREAS IS TO LIMIT EROSION TOWARD THE WETLAND AREAS. ALL TRENCHES ARE TO BE FILLED ON A DAILY BASIS WITH SPECIAL CARE TAKEN TO AVOID ROUTING RAINFALL THROUGH GULLIES TOWARD THE WETLAND AREAS. TEMPORARY DETENTION BASINS ARE TO BE INSTALLED IN AREAS PRONE TO CHANNEL FLOWS DURING PERIODS OF HIGH INTENSITY RAINFALL.

7) THE CONTRACTOR IS TO USE PROPER JUDGMENT RELATIVE TO CONSTRUCTION PRACTICES DURING ADVERSE WEATHER CONDITIONS OR PERIODS OF HIGH GROUNDWATER. NO WORK IS TO BE PERFORMED NEAR THE WETLAND AREAS DURING PERIODS OF HEAVY RAINFALL.

8) PERIODIC MAINTENANCE OF THE EROSION CONTROL MEASURES IS REQUIRED IN ORDER TO INSURE THE PROPER PROTECTION OF THE RESOURCE AREAS. ALL EROSION CONTROL STRUCTURES ARE TO BE INSPECTED ON A WEEKLY BASIS OR WHENEVER THERE IS A STORM EVENT EXCEEDING 1/2" OF RAIN IN TWENTY FOUR HOURS.

9) THE TREE CLEARING REMOVAL LIMITS SHALL NOT EXTEND BEYOND THE SILTFENCE/ HAYBALE EROSION CONTROL BARRIERS AND THE LIMIT OF WORK. AREAS OF EXISTING VEGETATION TO REMAIN ARE TO BE PROTECTED THROUGHOUT CONSTRUCTION.

10) THE BASE OF ALL STOCKPILES SHALL BE CONTAINED WITHIN THE EROSION CONTROL MEASURES LIMITS. STOCKPILES TO BE LEFT OVER 30 DAYS SHALL BE SEEDED WITH ANNUAL RYE GRASS.

11) THE FUNCTIONING OF THE TEMPORARY SEDIMENT CONTROLS OR CONSTRUCTION OPERATIONS SHALL NOT CAUSE NOTICEABLE SEDIMENT PLUMES. IF PLUMES OCCUR, THE CONTRACTOR SHALL STOP WORK AND INSTALL ADDITIONAL SEDIMENTATION CONTROLS IMMEDIATELY TO PREVENT FURTHER SEDIMENTATION.

12) THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL ACCUMULATED SEDIMENT AS REQUIRED BY THE CONSERVATION COMMISSION OR AS DIRECTED BY THE ENGINEER.

13) AFTER THE CONSTRUCTION/INSTALLATION OF THE PERMANENT DRAINAGE INFRA-STRUCTURE, THE CONTRACTOR SHALL INSTALL AND MAINTAIN THE APPROPRIATE SEDIMENTATION CONTROLS TO PROTECT THE INTEGRITY OF THE STRUCTURES DURING THE ONGOING CONSTRUCTION. ALL CATCH BASINS SHALL HAVE A STREAMGUARD TYPE II-S CBF CATCH BASIN FILTER INSTALLED. THE FILTERS SHALL BE MAINTAINED AND/OR REPLACED AS NECESSARY UNTIL THE CONSTRUCTION IS COMPLETED.

14) ALL DISTURBED NON-PAVED AREAS WITHIN THE PROJECT LIMIT OF WORK SHALL BE DRESSED WITH A MINIMUM OF FOUR INCHES (4") OF SCREENED LOAM AND SHALL BE SEEDED WITH AN APPROVED GRASS MIX AND MULCHED AS SOON AS POSSIBLE IN ORDER TO INSURE THE RAPID STABILIZATION OF THE EROSION PRONE AREAS. A CONSERVATION SEED MIXTURE OF 20% ANNUAL RYEGRASS, 30% CREEPING RED FESCUE, 30% CHEWINGS FESCUE AND 20% PERENNIAL RYEGRASS IS RECOMMENDED. IF PERMANENT SEEDING CAN NOT BE INSTALLED IMMEDIATELY AFTER FINAL GRADING, THE AREAS ARE TO BE TEMPORARILY MULCHED TO STABILIZE ALL SLOPES UPON COMPLETION OF WORK TO PREVENT EROSION OF SOILS INTO THE RESOURCE AREAS AND THEIR ASSOCIATED BUFFER ZONES. DURING THE GROW-IN PERIOD, TEMPORARY EROSION CONTROLS (I.E. BARK MULCH OR STRAW) IS TO BE USED TO PREVENT EROSION DURING PERIODS OF RAINFALL OR SNOW MELT. WHERE PRACTICAL DURING CONSTRUCTION, DISTURBED AREAS SHALL BE STABILIZED BY TEMPORARILY SEEDING OR MULCHING.

15) ALL DISTURBED AREAS TO BE LEFT DORMANT FOR MORE THAN 60 DAYS SHALL BE STABILIZED BY TEMPORARILY SEEDING OR MULCHING.

16) DEWATERING OPERATIONS, IF REQUIRED SHALL DISCHARGE ONTO STABILIZED AREAS AND ALL DISCHARGE WATER IS TO PASS THROUGH SEDIMENTATION CONTROL DEVICES TO PREVENT IMPACTS UPON THE WETLAND RESOURCES, DRAINAGE SYSTEMS, AND ABUTTING PROPERTIES.

17) ALL TEMPORARY SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE REMOVED IN THEIR ENTIRETY AFTER FINAL SITE STABILIZATION AND ISSUANCE OF THE FINAL CERITIFCATE OF COMPLIANCE BY THE CONSERVATION COMMISSION.

18) THE APPLICANT IS TO NOTIFY THE LEICESTER CONSERVATION COMMISSION ONCE THE JURISDICTIONAL WORK HAS BEEN COMPLETED AND THE ENTIRE SITE HAS BEEN PROPERLY STABILIZED. UPON APPROVAL OF THE WORK SUBJECT TO THE ORDER OF CONDITIONS, THE APPLICANT IS TO RECEIVE A CERTIFICATE OF COMPLIANCE THAT IS TO BE RECORDED AT THE WORCESTER REGISTRY OF DEEDS.

GENERAL CONSTRUCTION SEQUENCE

ADVANCEMENT OF ROADWAY CONSTRUCTION AND ASSOCIATED INFRASTRUCTURE SHALL FOLLOW THE GENERAL SEQUENCE NOTED BELOW.

1) THE LIMITS OF CLEARING SHALL BE STAKED OUT PRIOR TO ANY CONSTRUCTION.

2) INSTALL EROSION CONTROL BARRIERS AS DEPICTED HEREON.

3) THE CONTRACTOR SHALL COORDINATE A SITE MEETING WITH THE TOWN LEICESTER PLANNING BOARD AGENT (QUINN ENGINEERING, INC.), CONSERVATION COMMISSION REPRESENTATIVE, HIGHWAY DEPARTMENT, AND GRAZ ENGINEERING, LLC. FOR REVIEW AND APPROVAL OF THE EROSION CONTROLS & LIMIT OF WORK FOR THE PROJECT PRIOR TO ANY TREE CLEARING AND CODNSTRUCTION ACTIVITIES.

4) CLEAR THE AREAS FOR THE TEMPORARY SEDIMENT BASINS AND TEMPORARY SWALES FOR THE PROJECT AND START CONSTRUCTION OF EACH.

5) COMPLETE CLEARING WITHIN LIMITS OF WORK FOR PROJECT.

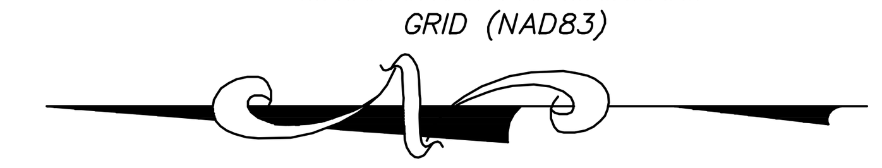
6) STRIP AND STOCKPILE TOPSOIL FOR WITHIN ROADWAY AND DRAINAGE BASIN AREAS. STABILIZE TOPSOIL NOT SUBJECT TO IMMEDIATE USE WITH A TEMPORARY SEEDING MIXTURE. ALL STOCKPILES SHALL BE RINGED WITH SILT FENCE.

7) MASS GRADING – PERFORM EARTHWORK CUT TO FILLS FOR ROADWAY AND DRAINAGE BASIN AS DEPICTED HEREON. STABILIZE DISTURBED AREAS BY HAY AND SEED IN ACCORDANCE WITH THE ORDER OF CONDITIONS.

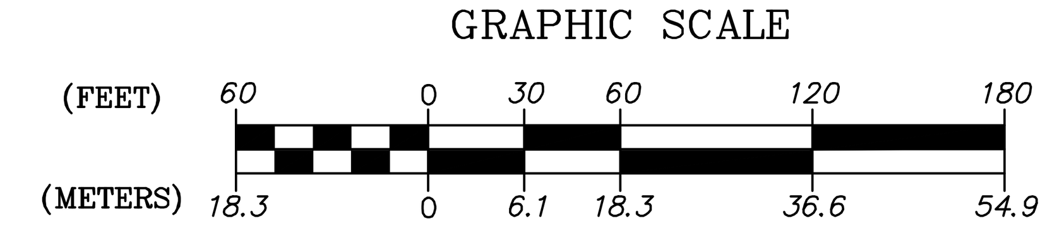
8) INSTALL INFRASTRUCTURE IMPROVEMENTS FOR THE PROJECT (INCLUDING ROADWAY & RIGHT-OF-WAY GRADING, STORM WATER BASIN, ETC.) AS DEPICTED HEREON.

9) LOT DEVELOPMENT AND HOME-BUILDING.

MERIDIAN OF MASSACHUSETTS MAINLAND GRID (NAD83)



GRAPHIC SCALE



1 inch = 60 ft.

LEGEND

——328——	EXISTING CONTOURS
——328——	MASS GIS CONTOURS 5K_ARC
328	DESIGN CONTOURS
+867.0	DESIGN GRADES
——□——	SILTFENCE
———	WATTLES
—·—·—	LIMIT OF WORK

APPROVED UNDER THE SUBDIVISION CONTROL LAW PLANNING BOARD OF LEICESTER

DATE:

GRAZ Engineering, L.L.C.

323 West Lake Road, Fitzwilliam, NH 03447
Phone: (603) 585-6959 Fax: (603) 585-6960

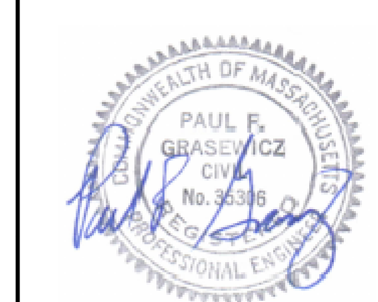
PARKKER STREET (NORTH) - DEFINITIVE SUBDIVISION
LEICESTER, MASSACHUSETTS

EROSION CONTROL PLAN

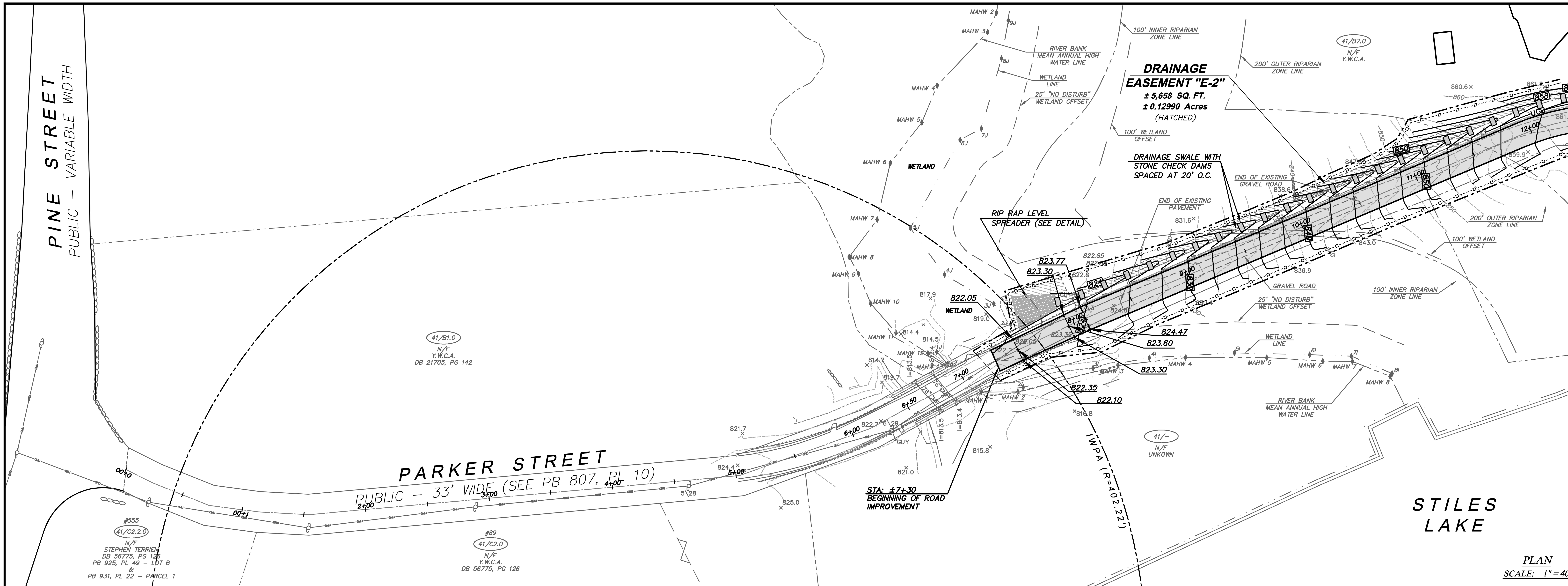
PREPARED FOR: SCHOLD DEVELOPMENT, LLC (OWNER/APPLICANT)
77 CHICKERING ROAD, SPENCER, MA 01562

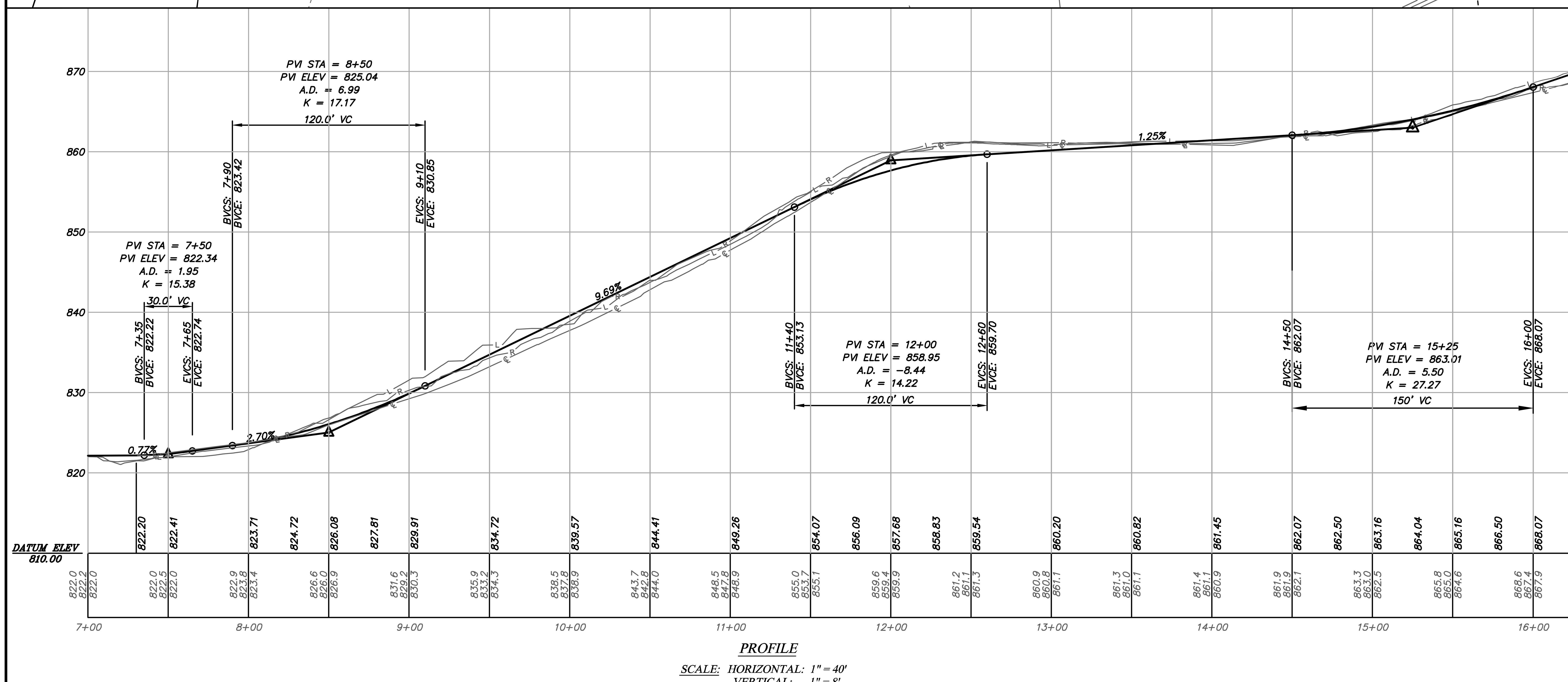
SCALE: AS NOTED	DRAWN: BCM	CHECKED: PFG & BCM	PLAN DATE: JUNE 8, 2021

REV.	DATE	DESCRIPTION	BY
1	8/24/21	REVS PER QUINN ENG. TECH. REVIEW & LPB	BCM



SHEET 4 OF 8





LEGEND

---328---	EXISTING CONTOURS
—328—	DESIGN CONTOURS
+867.0	DESIGN GRADES
---□---□---	SILTFENCE
– – – – –	WATTLES
—·—·—	LIMIT OF WORK
⌒⌒⌒⌒	PROPOSED TREE LINE
☼	LOT/STREET LIGHT

MERIDIAN OF MASSACHUSETTS MAINLAND GRID (NAD83)

GRAPHIC SCALE

(FEET) 40 0 20 40 80 120

(METERS) 12.2 0 6.1 12.2 24.4 36.6

1 inch = 40 ft.

PROFILE LEGEND

PROPOSED GRADE CENTERLINE
EXISTING GRADE 25' RIGHT
EXISTING GRADE CENTERLINE
EXISTING GRADE 25' LEFT

APPROVED UNDER THE SUBDIVISION CONTROL LAW PLANNING BOARD OF LEICESTER

DATE: ____________

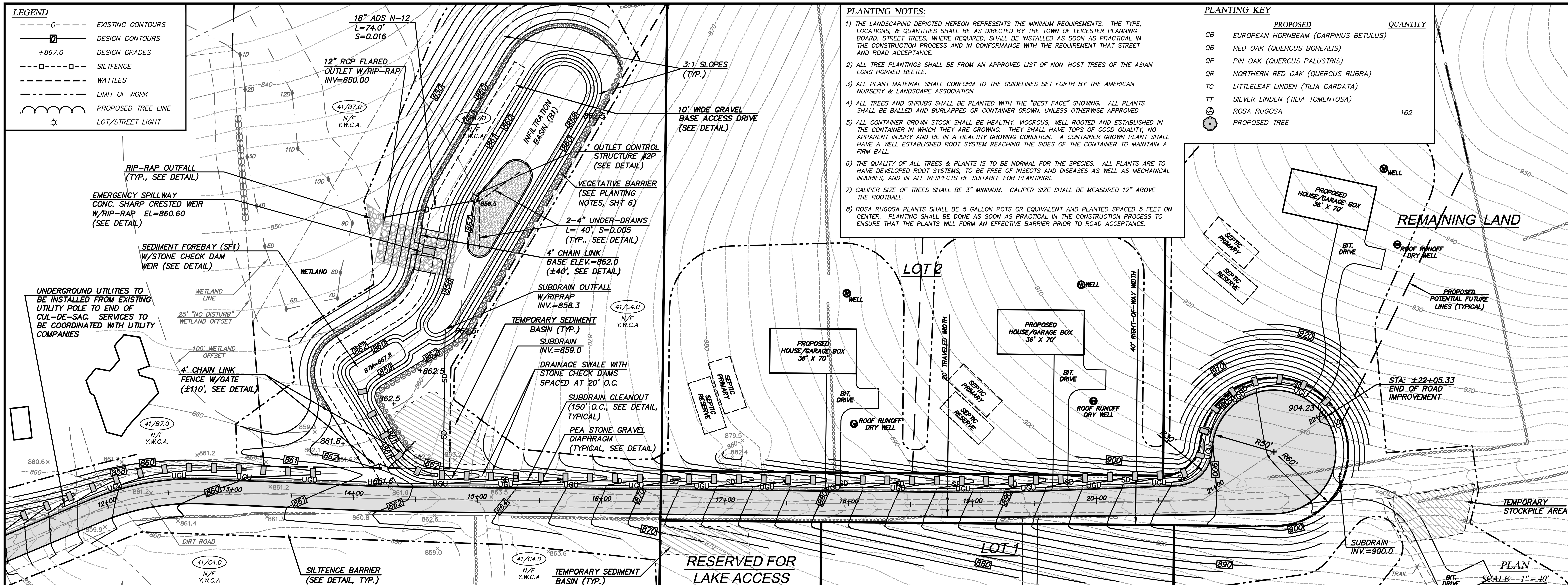
GRAZ Engineering, L.L.C.
323 West Lake Road, Fitzwilliam, NH 03447
Phone: (603) 585-6959 Fax: (603) 585-6960

PARKKER STREET (NORTH) - DEFINITIVE SUBDIVISION
LEICESTER, MASSACHUSETTS

PARKER STREET - PLAN & PROFILE (SHEET 1 OF 2)
PREPARED FOR: SCHOLD DEVELOPMENT, LLC (OWNER/APPLICANT)
77 CHICKERING ROAD, SPENCER, MA 01562

SCALE: AS NOTED | DRAWN: BCM | CHECKED: PFG & BCM | PLAN DATE: JUNE 8, 2021

REV.	DATE	DESCRIPTION	BY
1	8/24/21	REVS PER QUINN ENG. TECH. REVIEW & LPB	BCM

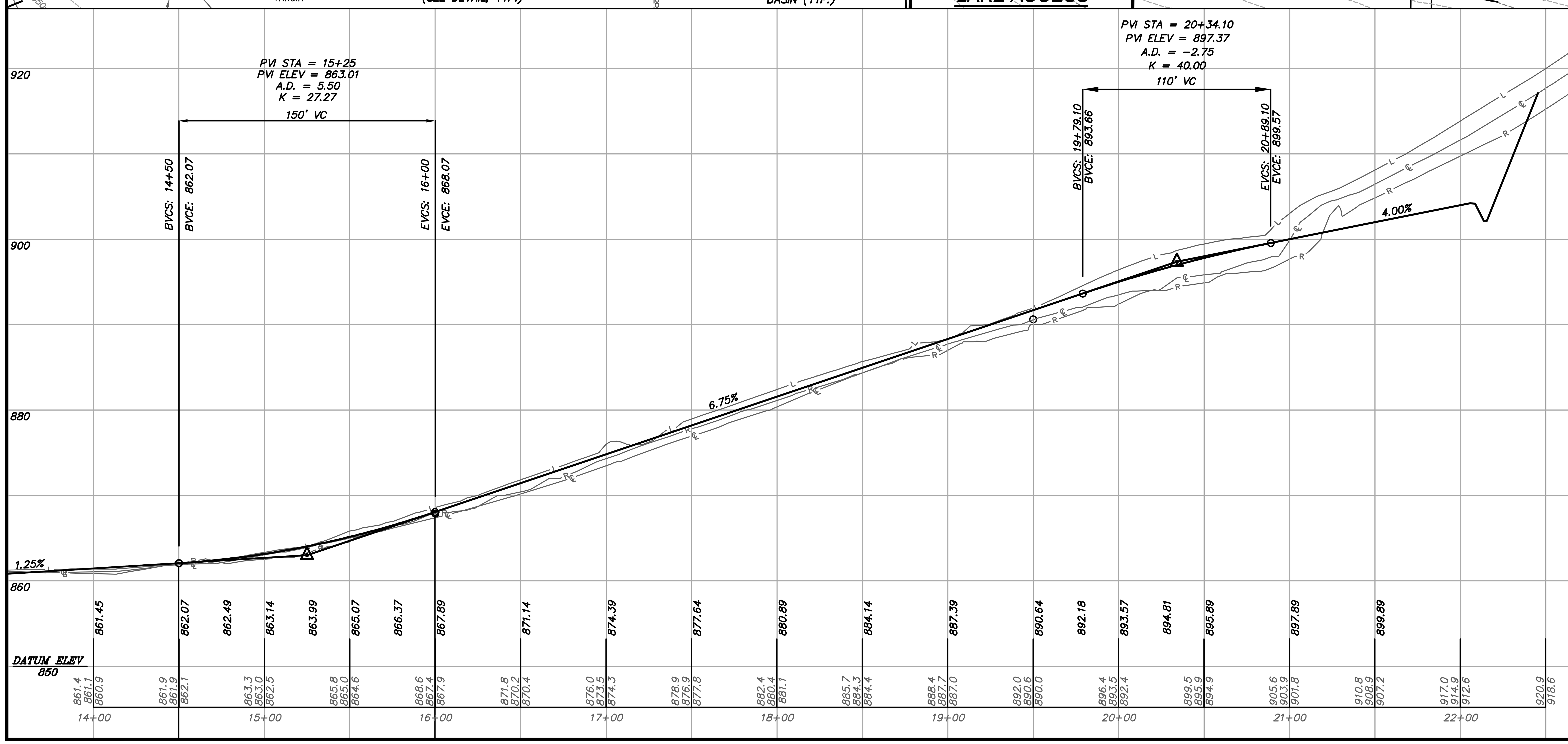


PLANTING NOTES:

1) THE LANDSCAPING DEPICTED HEREON REPRESENTS THE MINIMUM REQUIREMENTS. THE TYPE, LOCATIONS, & QUANTITIES SHALL BE AS DIRECTED BY THE TOWN OF LEICESTER PLANNING BOARD. STREET TREES, WHERE REQUIRED, SHALL BE INSTALLED AS SOON AS PRACTICAL IN THE CONSTRUCTION PROCESS AND IN CONFORMANCE WITH THE REQUIREMENT THAT STREET AND ROAD ACCEPTANCE.
2) ALL TREE PLANTINGS SHALL BE FROM AN APPROVED LIST OF NON-HOST TREES OF THE ASIAN LONG HORNED BEETLE.
3) ALL PLANT MATERIAL SHALL CONFORM TO THE GUIDELINES SET FORTH BY THE AMERICAN NURSERY & LANDSCAPE ASSOCIATION.
4) ALL TREES AND SHRUBS SHALL BE PLANTED WITH THE "BEST FACE" SHOWING. ALL PLANTS SHALL BE BALLED AND BURLAPPED OR CONTAINER GROWN, UNLESS OTHERWISE APPROVED.
5) ALL CONTAINER GROWN STOCK SHALL BE HEALTHY. VIGOROUS, WELL ROOTED AND ESTABLISHED IN THE CONTAINER IN WHICH THEY ARE GROWING. THEY SHALL HAVE TOPS OF GOOD QUALITY, NO APPARENT INJURY AND BE IN A HEALTHY GROWING CONDITION. A CONTAINER GROWN PLANT SHALL HAVE A WELL ESTABLISHED ROOT SYSTEM REACHING THE SIDES OF THE CONTAINER TO MAINTAIN A FIRM BALL.
6) THE QUALITY OF ALL TREES & PLANTS IS TO BE NORMAL FOR THE SPECIES. ALL PLANTS ARE TO HAVE DEVELOPED ROOT SYSTEMS, TO BE FREE OF INSECTS AND DISEASES AS WELL AS MECHANICAL INJURIES, AND IN ALL RESPECTS BE SUITABLE FOR PLANTINGS.
7) CALIPER SIZE OF TREES SHALL BE 3" MINIMUM. CALIPER SIZE SHALL BE MEASURED 12" ABOVE THE ROOTBALL.
8) ROSA RUGOSA PLANTS SHALL BE 5 GALLON POTS OR EQUIVALENT AND PLANTED SPACED 5 FEET ON CENTER. PLANTING SHALL BE DONE AS SOON AS PRACTICAL IN THE CONSTRUCTION PROCESS TO ENSURE THAT THE PLANTS WILL FORM AN EFFECTIVE BARRIER PRIOR TO ROAD ACCEPTANCE.

PLANTING KEY

	PROPOSED	QUANTITY
CB	EUROPEAN HORNBEAM (CARPINUS BETULUS)	
QB	RED OAK (QUERCUS BOREALIS)	
QP	PIN OAK (QUERCUS PALUSTRIS)	
QR	NORTHERN RED OAK (QUERCUS RUBRA)	
TC	LITTLELEAF LINDEN (TILIA CARDATA)	
TT	SILVER LINDEN (TILIA TOMENTOSA)	
	ROSA RUGOSA	162
	PROPOSED TREE	



STREET/LOT LIGHTING

1) EACH LOT SHALL BE PROVIDED WITH A STANDARD LAMP POST LIGHT ON THE LOT NEAR THE INTERSECTION OF DRIVEWAY WITH THE STREET RIGHT-OF-WAY LINE. THE TYPE AND INSTALLATION SHALL BE AS DIRECTED BY THE TOWN OF LEICESTER PLANNING BOARD AND IN ACCORDANCE WITH THE STATE ELECTRICAL CODES.

PARKER STREET (NORTH) - LEICESTER, MA
TABLE OF SOIL TEST PIT DATA

Testing Date: 08/16/21

Performed by: Brian MacEwen, SE#1430, GRAZ Engineering, LLC

TP#	LOCATION	DEPTH	HORIZON	TEXTURE	ESHWT	NOTES
		(inches)			(inches)	
1	B1	0-5	A	F.S.L.		
		5-22	Bc	F.S.L.		
		22-48	Cd	F.S.L.	28	Moist, No Refusal
2	B1	0-7	A	F.S.L.		
		7-21	Bc	F.S.L.		
		21-46	Cd	F.S.L.	34	Moist, No Refusal
3	SF1	0-6	A	F.S.L.		
		6-26	Bc	F.S.L.		
		26-40	Cd	F.S.L.	32	Moist, No Refusal

MERIDIAN OF MASSACHUSETTS MAINLAND GRID (NAD83)

GRAPHIC SCALE

(FEET) 40 0 20 40 80 120

(METERS) 12.2 0 6.1 12.2 24.4 36.6

1 inch = 40 ft.

PROFILE LEGEND

PROPOSED GRADE CENTERLINE

EXISTING GRADE 25' RIGHT

EXISTING GRADE CENTERLINE

EXISTING GRADE 25' LEFT

APPROVED UNDER THE SUBDIVISION CONTROL LAW PLANNING BOARD OF LEICESTER

DATE:

GRAZ Engineering, L.L.C.
323 West Lake Road, Fitzwilliam, NH 03447
Phone: (603) 585-6959 Fax: (603) 585-6960

PARKER STREET (NORTH) - DEFINITIVE SUBDIVISION LEICESTER, MASSACHUSETTS

PARKER STREET - PLAN & PROFILE (SHEET 2 OF 2)

PREPARED FOR: SCHOLD DEVELOPMENT, LLC (OWNER/APPLICANT) 77 CHICKERING ROAD, SPENCER, MA 01562

SCALE: AS NOTED	DRAWN: BCM	CHECKED: PFG & BCM	PLAN DATE: JUNE 8, 2021

REV.	DATE	DESCRIPTION	BY
1	8/24/21	REVS PER QUINN ENG. TECH. REVIEW & LPB	BCM

GENERAL CONSTRUCTION NOTES

1) ALL REQUIRED PERMITS SHALL BE SECURED PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITIES.

2) THE TOWN OF LEICESTER CONSERVATION COMMISSION'S ORDER OF CONDITIONS ARE HEREBY MADE CONDITIONS OF THE JURISDICTIONAL WORK FOR THIS PROJECT.

3) AT LEAST 10 DAYS PRIOR TO COMMENCING ANY CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE TOWN LEICESTER PLANNING BOARD, CONSERVATION COMMISSION, BUILDING DEPARTMENT, HIGHWAY DEPARTMENT, & BOARD OF HEALTH, GRAZ ENGINEERING, LLC, AND QUINN ENGINEERING, INC.

4) IN ACCORDANCE WITH CHAPTER 82, SECTION 40, INCLUDING AMENDMENTS, ALL CONTRACTORS SHALL NOTIFY IN WRITING ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG-SAFE AT 1-888-344-7233, 72 HOURS BEFORE ANY EXCAVATION.

5) THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN HEREON, ARE APPROXIMATE AND ARE BASED ON THE FIELD LOCATION OF THE OBSERVABLE STRUCTURES SUCH AS CATCH BASINS, MANHOLES, WATER GATES, ETC. AND THE COMPILATION OF INFORMATION OBTAINED FROM VARIOUS UTILITY COMPANIES, AND GOVERNMENT AGENCIES. THE ENGINEER DOES NOT GUARANTEE THAT ALL UTILITIES AND SUB-SURFACE STRUCTURES ARE SHOWN. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION, AND INVERT ELEVATIONS OF THE UTILITIES AND STRUCTURES, PRIOR TO THE START OF CONSTRUCTION.

6) ALL WORK AND MATERIALS SHALL CONFORM TO THE TOWN OF LEICESTER SUBDIVISION RULES & REGULATIONS, ZONING BYLAWS, PLANNING BOARD DECISIONS, CONSERVATION COMMISSION ORDERS, & HIGHWAY DEPARTMENT STANDARDS, AND THE LATEST EDITION OF THE MASSACHUSETTS HIGHWAY DEPARTMENT OF PUBLIC WORKS (MHDPW) CONSTRUCTION STANDARDS AND THE MHDPW "STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES" AND ALL OF THEIR RESPECTIVE AMENDMENTS, UNLESS OTHERWISE SPECIFIED BY THE LOCAL AUTHORITY OR THE ENGINEER.

7) THE CONTRACTOR SHALL COORDINATE ALL UTILITY AND ROADWAY CONSTRUCTION WITHIN THE TOWN RIGHT-OF-WAYS WITH THE HIGHWAY DEPARTMENT SUPERINTENDENT AND/OR THE APPROPRIATE UTILITY COMPANY.

8) THE CONTRACTOR SHALL PROVIDE EVERYTHING NECESSARY TO CONSTRUCT THE UTILITIES AND ROADWAY WITHIN THE SPECIFIED PARAMETERS AND IN A WORKMANSHIP LIKE MANNER.

9) THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY DISCREPANCIES ARE OBSERVED BETWEEN THE EXISTING CONDITIONS DEPICTED HEREON AND THE FIELD VERIFIED CONDITIONS.

10) THE CONTRACTOR SHALL CONTROL AIRBORNE DUST WITH USE OF SPRAYED WATER AS REQUIRED TO MINIMIZE THE IMPACTS TO NEIGHBORING PROPERTIES. THE USE OF CALCIUM CHLORIDE OR OTHER CHEMICALS ARE PROHIBITED.

11) THIS ROADWAY PROJECT SHALL BE BUILT ALL IN ONE PHASE. IF AT ANY TIME SHOULD THE DEVELOPER DECIDE TO CONSTRUCT THE PROJECT IN PHASES, A CONSTRUCTION SEQUENCING PLAN SHALL BE SUBMITTED TO THE PLANNING BOARD FOR REVIEW AND APPROVAL PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITIES.

12) ALL PROPOSED LOTS ARE TO BE SERVICED BY PRIVATE ON-SITE SEPTIC AND WELLS.

13) THE TEST PITS FOR THE PROPOSED STORMWATER INFILTRATION BASIN SHALL BE PERFORMED PRIOR THE COMMENCEMENT OF ANY ROADWAY CONSTRUCTION.

14) BACK FILL FOR UTILITY TRENCHES SHALL BE PLACED IN 12-INCH LOOSE LIFTS AND COMPACTED TO 95 PERCENT DRY DENSITY, IN ACCORDANCE WITH ASTM DESIGNATION 1557-70 METHOD D.

15) "GRAVEL BASE" MATERIALS SHALL CONFORM WITH THE CURRENT TOWN SUBDIVISION REGULATIONS AND THE 1997 MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES. M1.03.0 TYPE "B" GRAVEL SHALL BE USED AND PLACED IN CONFORMANCE WITH MASS DOT SECTION 401.

16) TOP COURSE, BINDER COURSE, & MODIFIED CAPE COD BERM SHALL BE BE CLASS 1, TYPE I-1 (M3.11.0 & M3.12.0), PLACED IN ACCORDANCE WITH MASS DOT SECTION 460.

17) PLACE 4" OF LOAM AND SEED IN ALL DISTURBED AREAS OF THE PROJECT NOT OTHERWISE IMPROVED (E.G. PAVED, RIP-RAPPED, ETC.).

18) ALL PROPOSED GRADES SHALL BE GRADED SMOOTHLY AND EVENLY NTO THE EXISTING GRADES AND PROVIDE POSITIVE DRAINAGE. THE TOPS AND BOTTOMS OF ALL SLOPES SHALL BE ROUNDED OFF.

19) THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE RECORDS OF THE LOCATION AND ELEVATION OF ALL WORK INSTALLED, INCLUDING TIES TO SERVICE LATERALS, AND SUBMIT ONE SET OF RED-LINED AS BUILT DRAWINGS TO THE ENGINEER OF RECORD.

20) FINAL DRIVEWAY LOCATIONS SHALL BE DETERMINED BY DEVELOPER DURING CONSTRUCTION. CURB CUTS AND DRIVEWAY OPENINGS SHALL BE COORDINATED WITHE THE HIGHWAY DEPARMENT SUPERINTENDENT AND COMPLY WITH THE TOWN DPW & SUBDIVISION REGULATIONS.

DEMOLITION NOTES

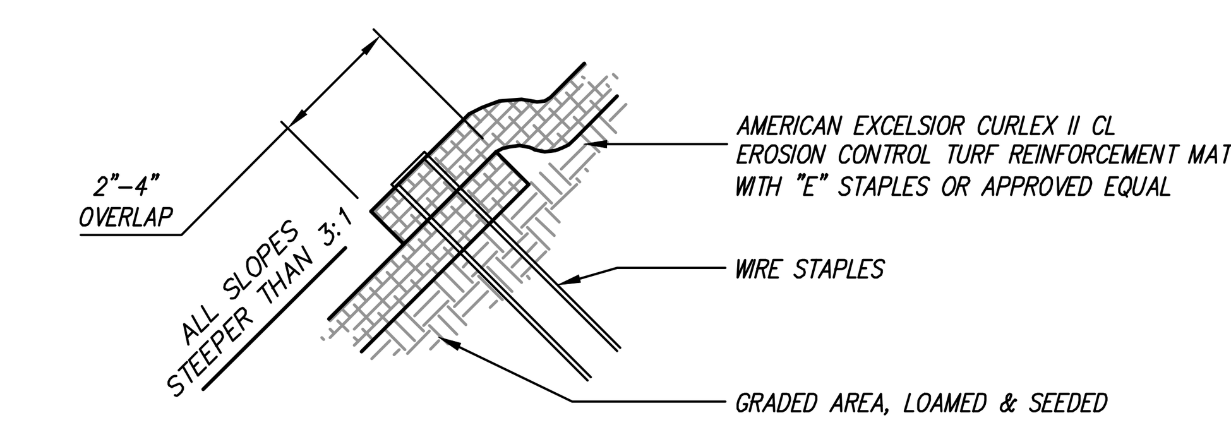
1) THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICES. ANY DAMAGE TO THE EXISTING UTILITIES BY THE CONTRACTOR'S OPERATION SHALL BE IMMEDIATELY AND COMPLETELY REPAIRED AT THE CONTRACTOR'S EXPENSE.

2) THE CONTRACTOR SHALL SAW CUT THE EXISTING BITUMINOUS PAVEMENT ON PARKER STREET WHERE REQUIRED TO CONSTRUCT AND SMOOTHLY BLEND THE PROPOSED ROADWAY AND WITH THE EXISTING PAVEMENT.

3) ALL EXISTING FEATURES TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY AND DISPOSED OF LEGALLY OFF SITE UNLESS NOTED OTHERWISE.

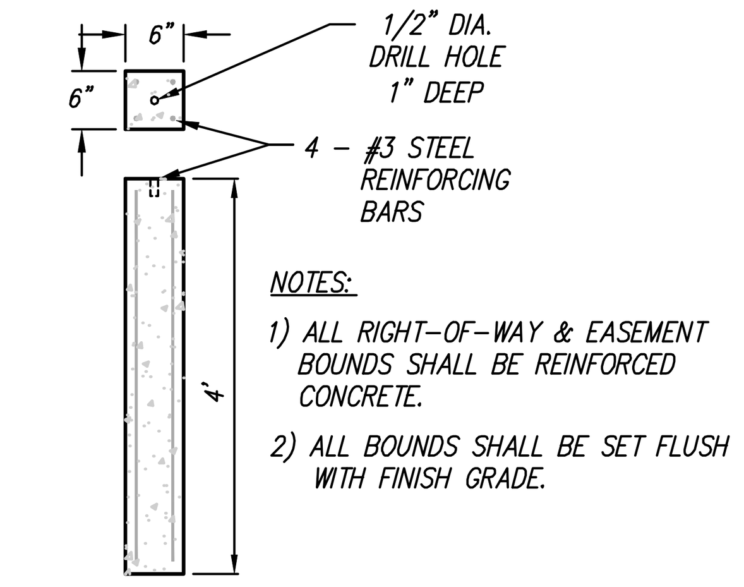
4) THE CONTRACTOR SHALL COORDINATE WITH RESPECTIVE GOVERNMENT AGENCIES AND UTILITY COMPANIES FOR DETAILS ON THE TEMPORARY REMOVAL, RELOCATION, AND ABANDONMENT OF ALL OVERHEAD AND UNDERGROUND UTILITY SERVICES INCLUDING ELECTRICAL, COMMUNICATIONS, WATER, SEWER, DRAINAGE, CATV, AND GAS.

5) THE TREE CLEARING LIMITS SHALL NOT EXTEND BEYOND THE HAYBALE/SILT FENCE BARRIER. AREAS OF EXISTING VEGETATION TO REMAIN ARE TO BE PROTECTED THROUGHOUT CONSTRUCTION. REVIEW THE ACTUAL LIMITS OF CLEARING WITH THE OWNER, AND SELECTIVELY CLEAR AND PRUNE AS REQUIRED TO REMOVE DEAD, DISEASED, OR POORLY FORMED VEGETATION.



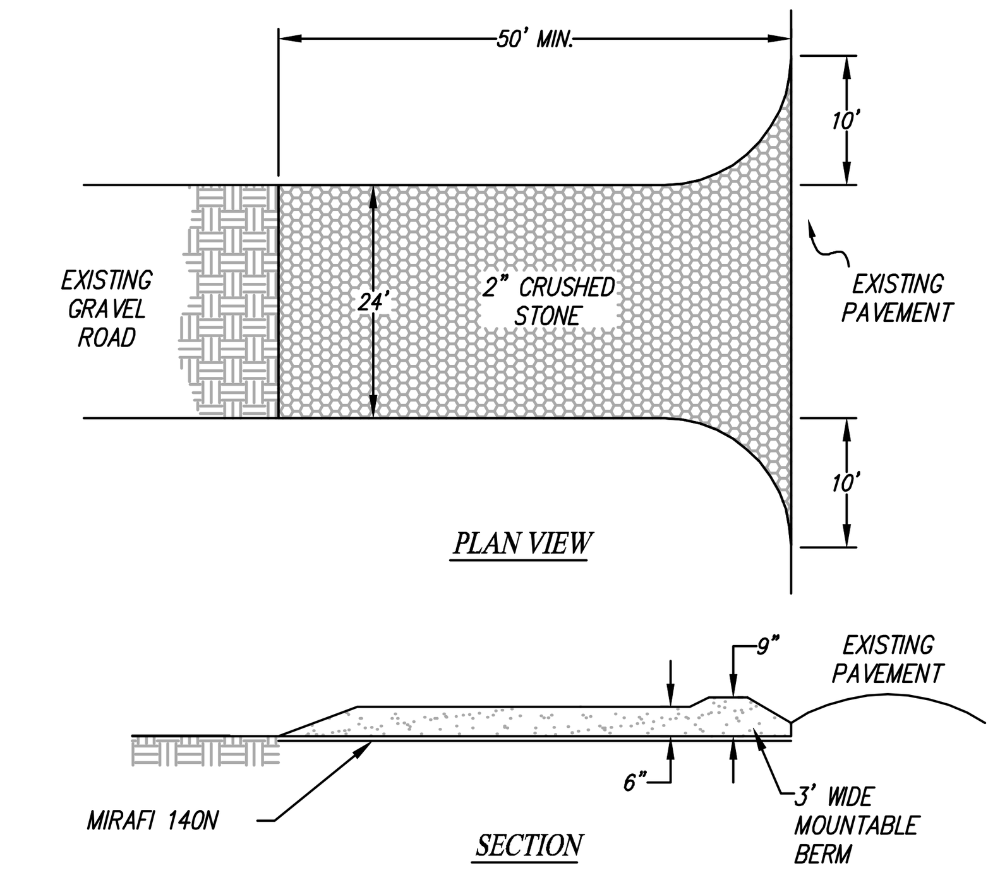
INSTALLATION NOTES:
1. RECOMMENDED STAPLES ARE MINIMUM 4" BIODEGRADABLE E-STAPLE AS PROVIDED BY AMERICAN EXCELSIOR CO., OR 6" WIRE FOR COHESIVE SOILS OR 8" WIRE FOR NON-COHESIVE SOILS.
2. INSERT STAPLES SO THAT HEADS ARE PARALLEL TO THE FLOW OF THE WATER.
3. UPSLOPE BLANKET LAPS OVER DOWNSLOPE BLANKETS IN A SHINGLE AFFECT.
4. SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR OTHER CONSTRUCTION REQUIREMENTS.)

SLOPE STABILIZATION EROSION BLANKET
N.T.S

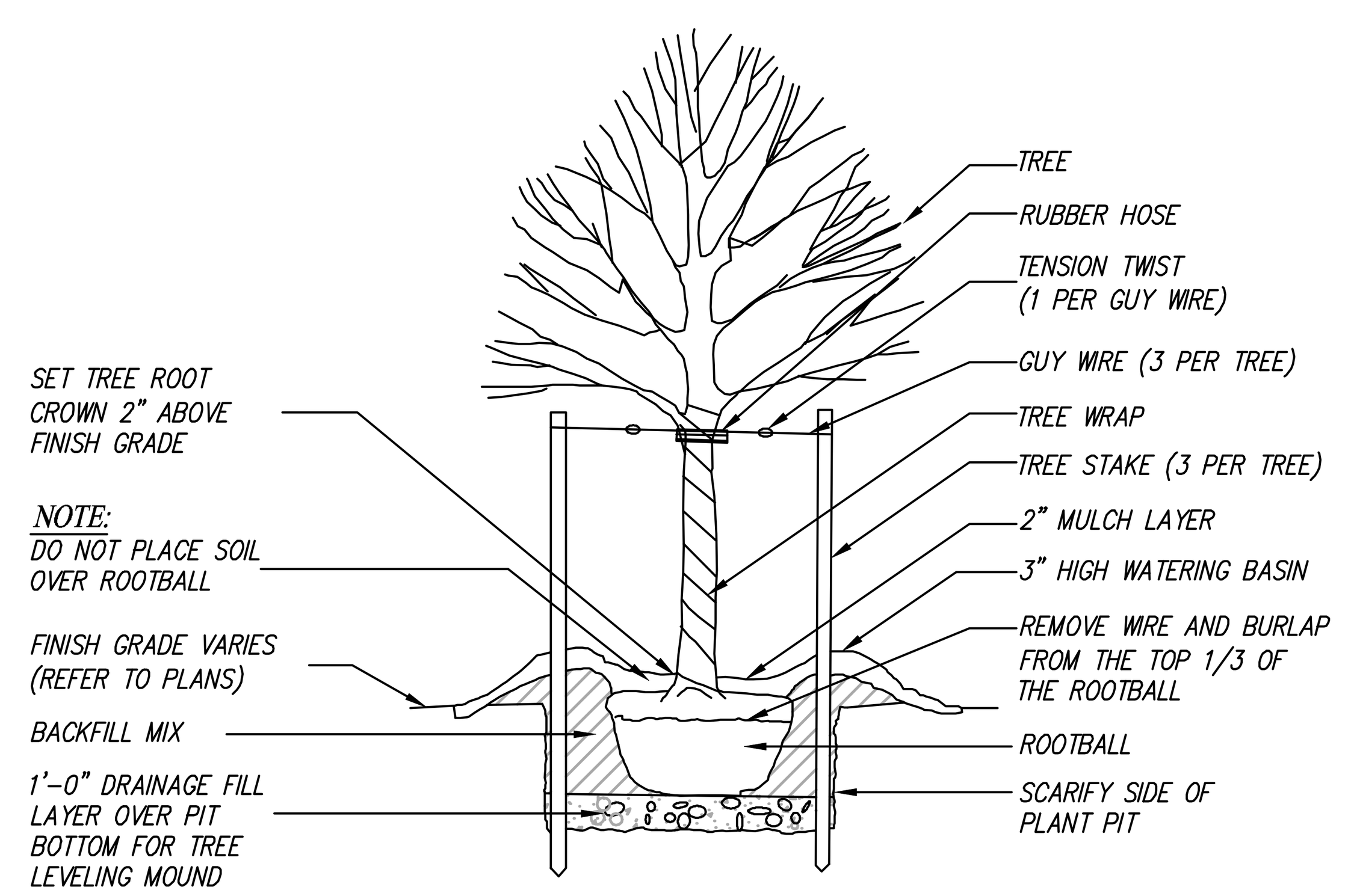


NOTES:
1) ALL RIGHT-OF-WAY & EASEMENT BOUNDS SHALL BE REINFORCED CONCRETE.
2) ALL BOUNDS SHALL BE SET FLUSH WITH FINISH GRADE.

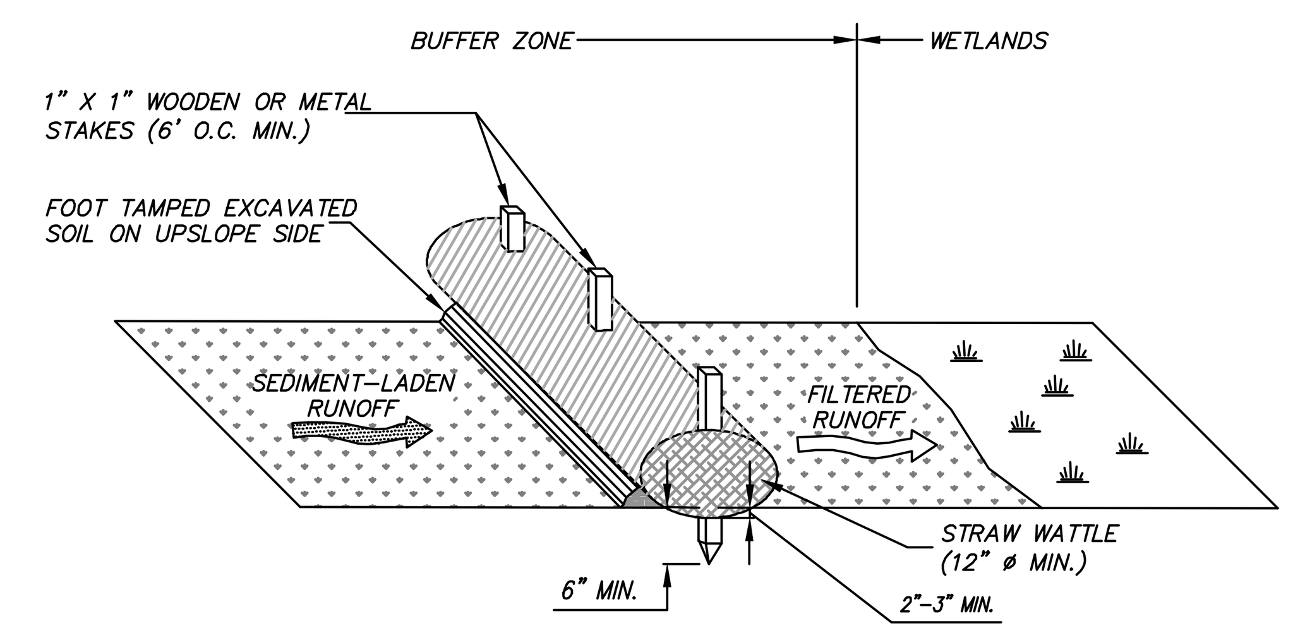
CONCRETE BOUND
N.T.S.



STABILIZED CONSTRUCTION ENTRANCE AT BALDWIN STREET
N.T.S.

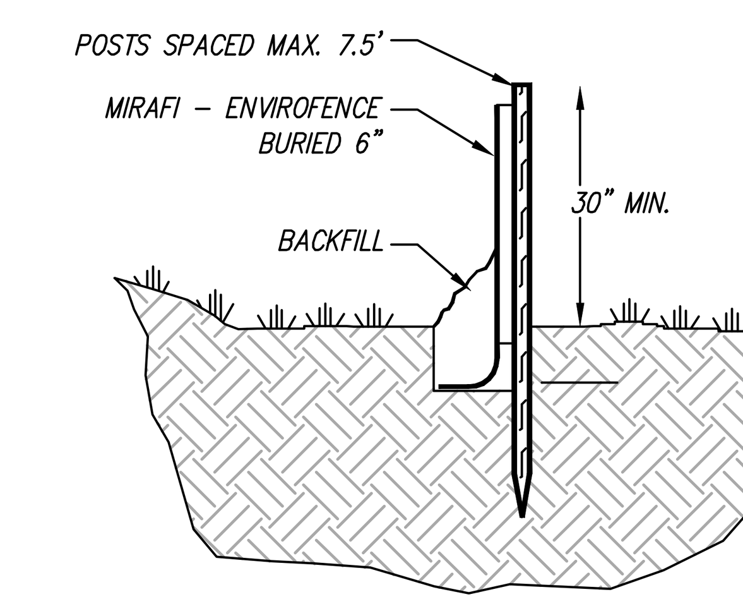


TREE PLANTING/ WITHOUT DRAINAGE
N.T.S.



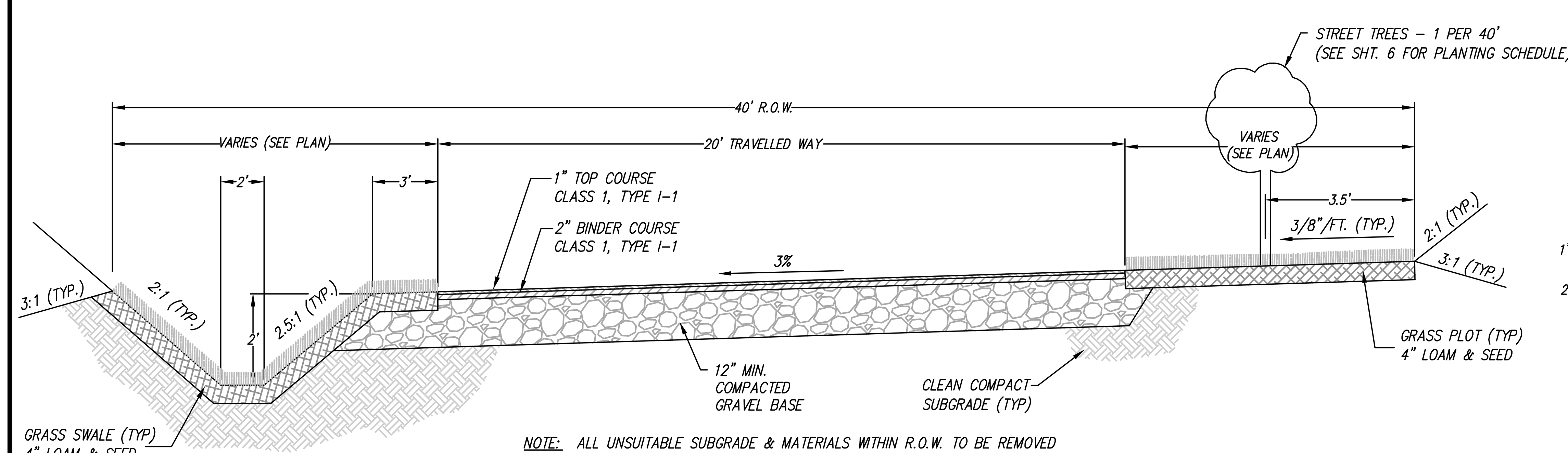
NOTES:
1) SHEATHING FOR STRAW WATTLES SHALL BE 100% BIODGRADABLE AND WITHOUT FIXED DIAMETER OPENINGS.
2) WATTLES SHALL BE AS THE SOLE EROSION CONTROL BARRIER AT ALL LOCATIONS WITH UPGRADIENT SLOPES OF LESS THAN 10%.
3) DIG A TRENCH 2"-3" DEEP X 9" WIDE WHERE WATTLES ARE TO BE INSTALLED.
4) SEAT WATTLE FIRMLY INTO TRENCH AND STAKE WITH WOODEN STAKES AT 6' O.C. MINIMUM.
5) FOOT TAMP THE EXCAVATED SOIL ALONG THE ENTIRE UPSLOPE SIDE THE WATTLES TO PREVENT DRAINAGE FROM ROUTING BENEATH THE BARRIER.

STRAW WATTLE EROSION CONTROL BARRIER DETAIL
N.T.S.

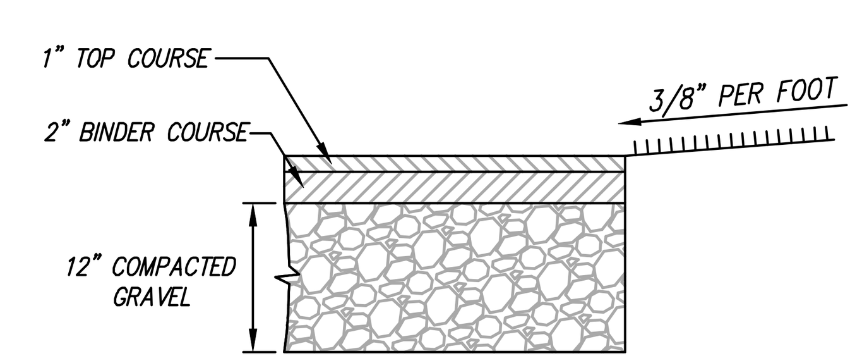


NOTES:
1) SILT FENCE SHALL BE THE SOLE EROSION CONTROL BARRIER AT ALL LOCATIONS WITH UPGRADIENT SLOPES OF EQUAL OR GREATER THAN 10% AND AROUND ALL STOCKPILES.
2) DIG A TRENCH 4" DEEP X 4" WIDE WHERE SILT FENCE IS TO BE INSTALLED.
3) SEAT THE SILT FENCE AGAINST THE DOWNGRADIENT SIDE OF THE TRENCH WITH THE BASE OF THE FENCING FABRIC SEATED INTO BOTTOM OF THE TRENCH.
4) STAKE WITH WOODEN STAKES AT 7.5' MAXIMUM ON CENTER.
5) FOOT TAMP THE EXCAVATED SOIL ALONG THE ENTIRE UPSLOPE SIDE THE SILT FENCE TO PREVENT DRAINAGE FROM ROUTING BENEATH THE BARRIER.

SILT FENCE EROSION CONTROL BARRIER DETAIL
N.T.S.



STANDARD ROADWAY CROSS- SECTION
N.T.S.



ROADWAY PAVEMENT CROSS SECTION
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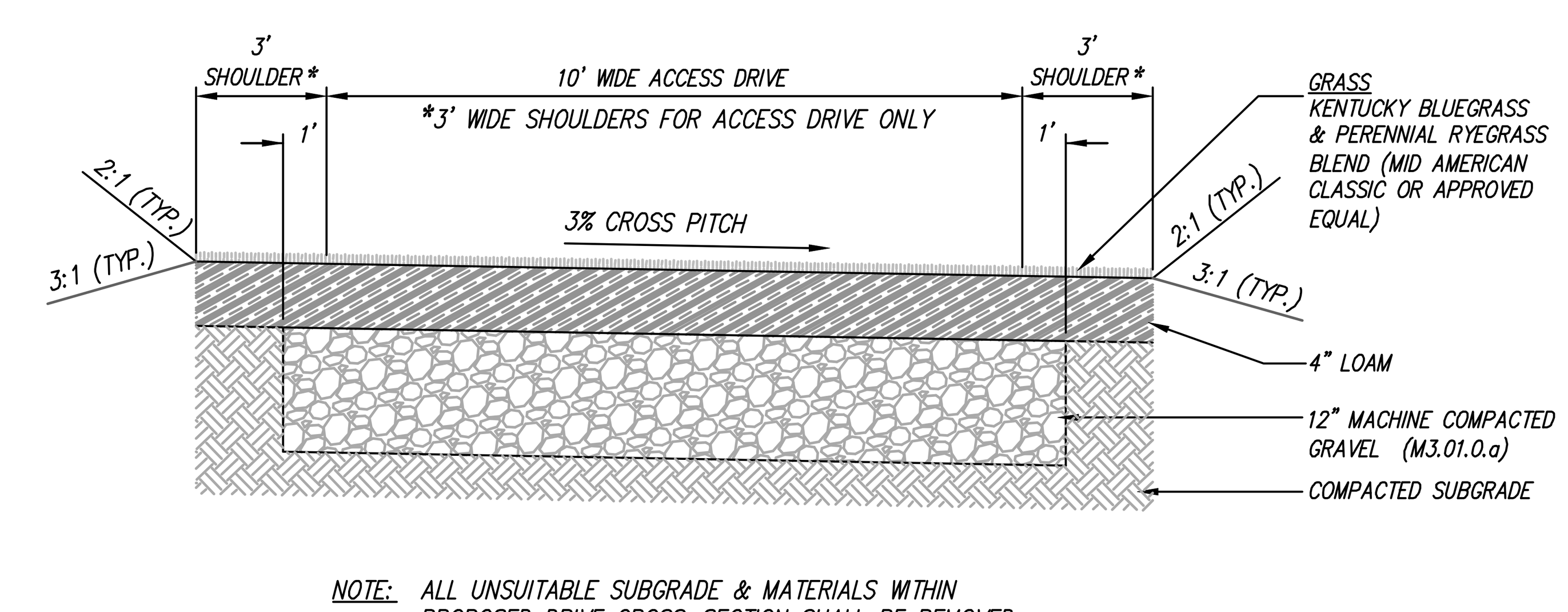

ACCESS & STORM WATER BASIN BERM DRIVE CROSS-SECTION
N.T.S.

APPROVED UNDER THE SUBDIVISION CONTROL LAW PLANNING BOARD OF LEICESTER

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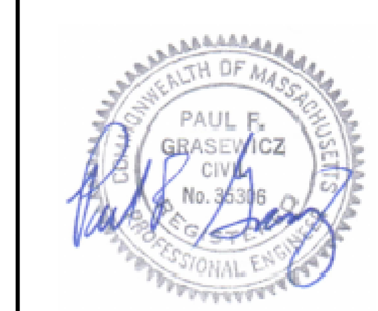
DATE: ______________________

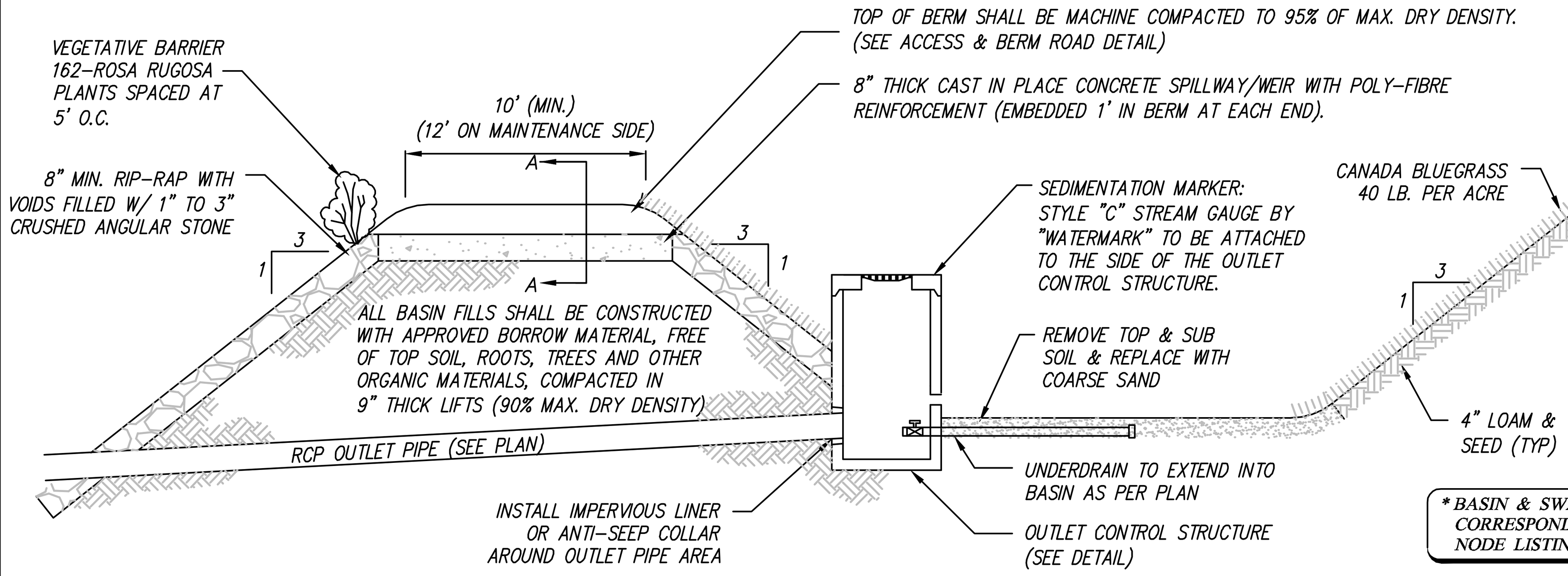
GRAZ Engineering, L.L.C.
323 West Lake Road, Fitzwilliam, NH 03447
Phone: (603) 585-6959 Fax: (603) 585-6960

PARKER STREET (NORTH) - DEFINITIVE SUBDIVISION
LEICESTER, MASSACHUSETTS

CONSTRUCTION NOTES & DETAILS
PREPARED FOR: SCHOLD DEVELOPMENT, LLC (OWNER/APPLICANT)
77 CHICKERING ROAD, SPENCER, MA 01562

SCALE: AS NOTED	DRAWN: BCM	CHECKED: PFG & BCM	PLAN DATE: JUNE 8, 2021
REV.	DATE	DESCRIPTION	BY
1	8/24/21	REVS PER QUINN ENG. TECH. REVIEW & LPB	BCM



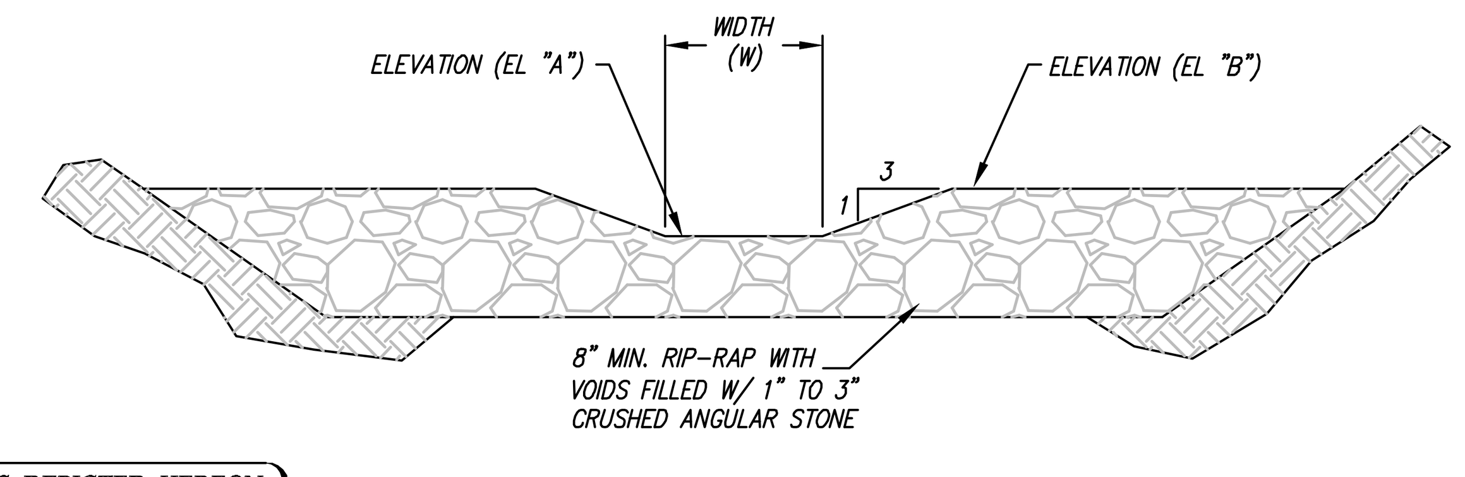


*BASIN & SWALE NUMBERS DEPICTED HEREON CORRESPOND TO THE HYDROLOGY REPORT NODE LISTING.

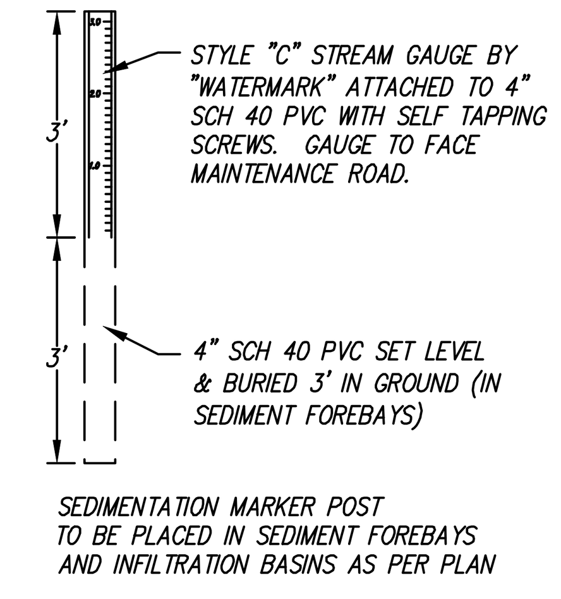
STORMWATER BASIN CROSS SECTION
N.T.S.

TABLE OF SEDIMENT FOREBAY WEIR DIMENSIONS

BASIN #*	EL "A"	EL "B"	W
1P	860.30	861.30	4'



SEDIMENT FOREBAY WEIR SECTION A-A
N.T.S.

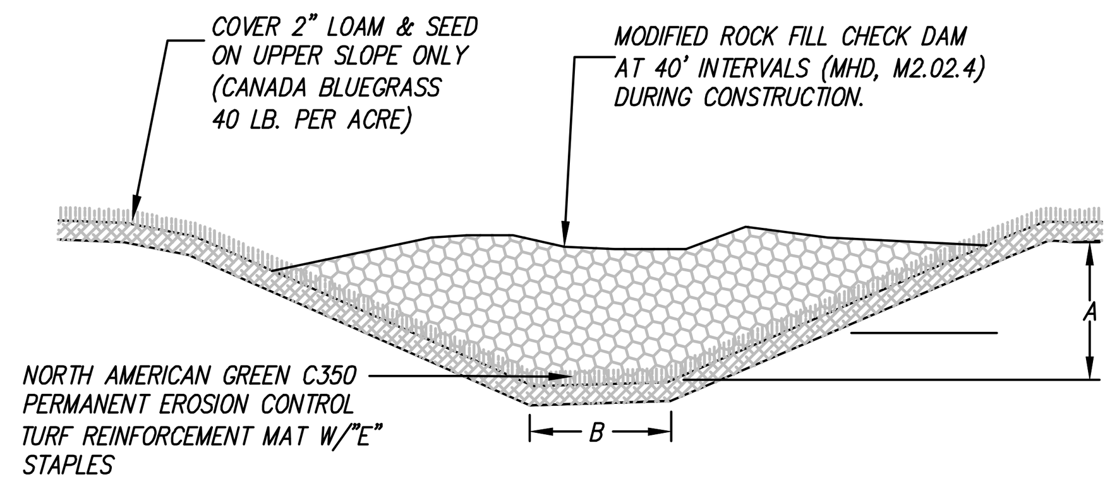


SEDIMENTATION MARKER POST
N.T.S.

TABLE OF SWALE DIMENSIONS

SWALE #*	A	B
53R	1.0'	4'

NOTE: LONGITUDINAL SLOPE AS PER PLAN



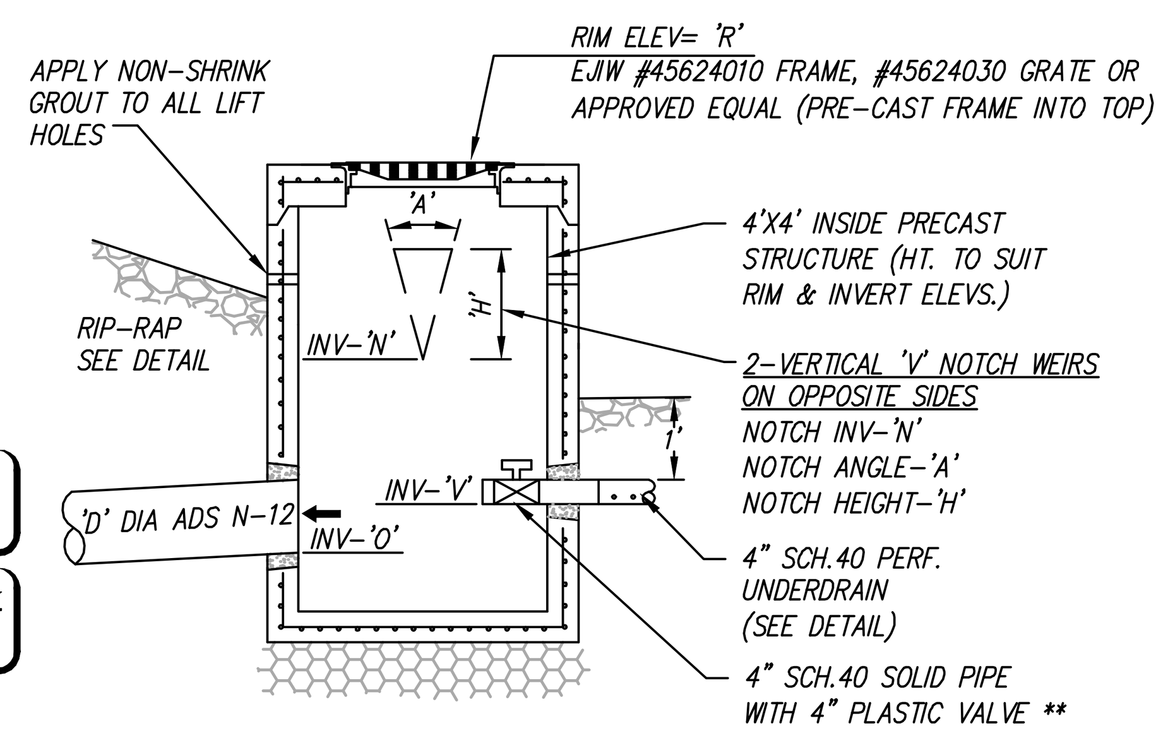
GRASSED DRAINAGE SWALE
N.T.S.

TABLE OF OUTLET CONTROL STRUCTURE DIMENSIONS

ELEMENT	BASIN #* B1
PIPE - 'D'	18"
INV - 'O'	851.20
INV - 'N'	857.30
ANGLE - 'A'	70°
HEIGHT - 'H'	1.5'
NO. OF NOTCHES	2
RIM - 'R'	860.60
INV - 'V'	855.00

*BASIN NUMBERS DEPICTED HEREON CORRESPOND TO THE HYDROLOGY REPORT NODE LISTING.

** VALVE TO BE INSTALLED IN THE CLOSED POSITION. VALVE IS FOR DRAIN DOWN PURPOSES ONLY.



STORMWATER OUTLET CONTROL STRUCTURE
N.T.S.

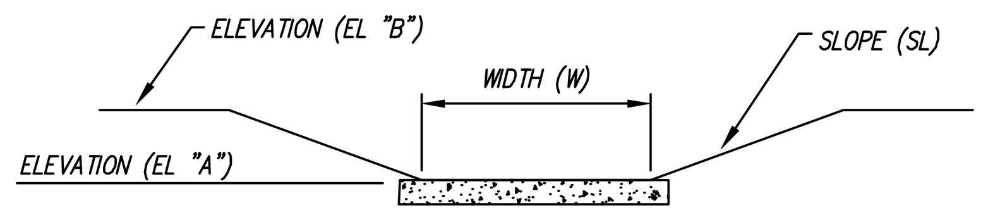
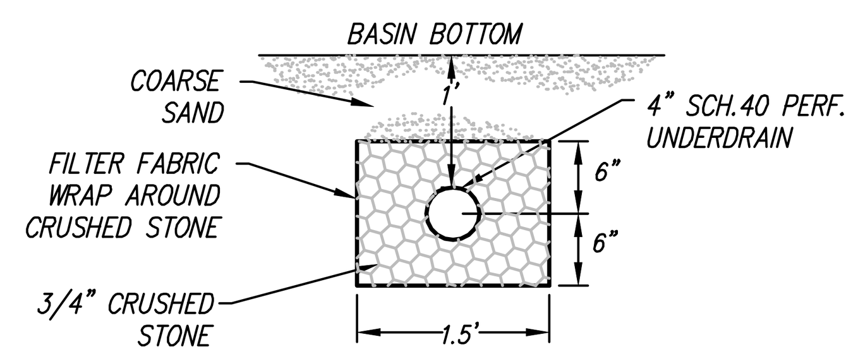


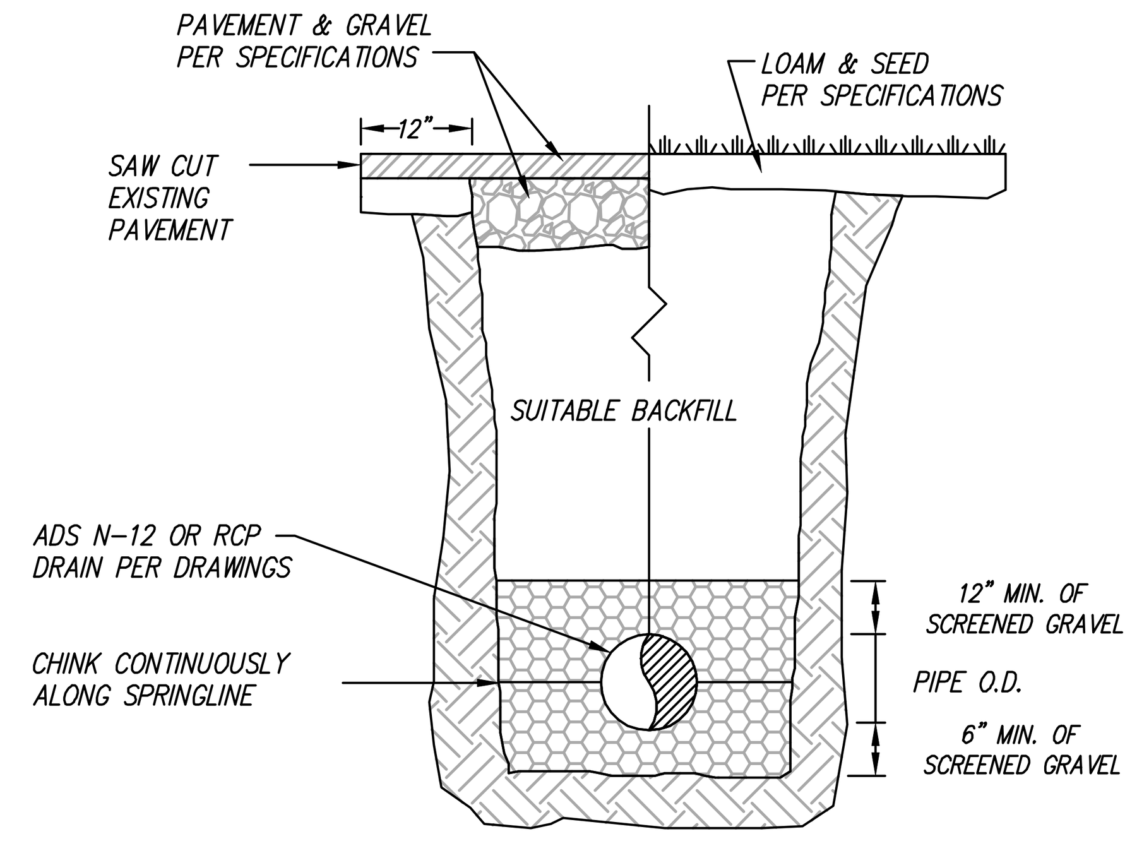
TABLE OF STORMWATER BASIN OVERFLOW WEIR DIMENSIONS

BASIN #*	EL "A"	EL "B"	W	SL
2P	860.60	862.30	5'	12:1

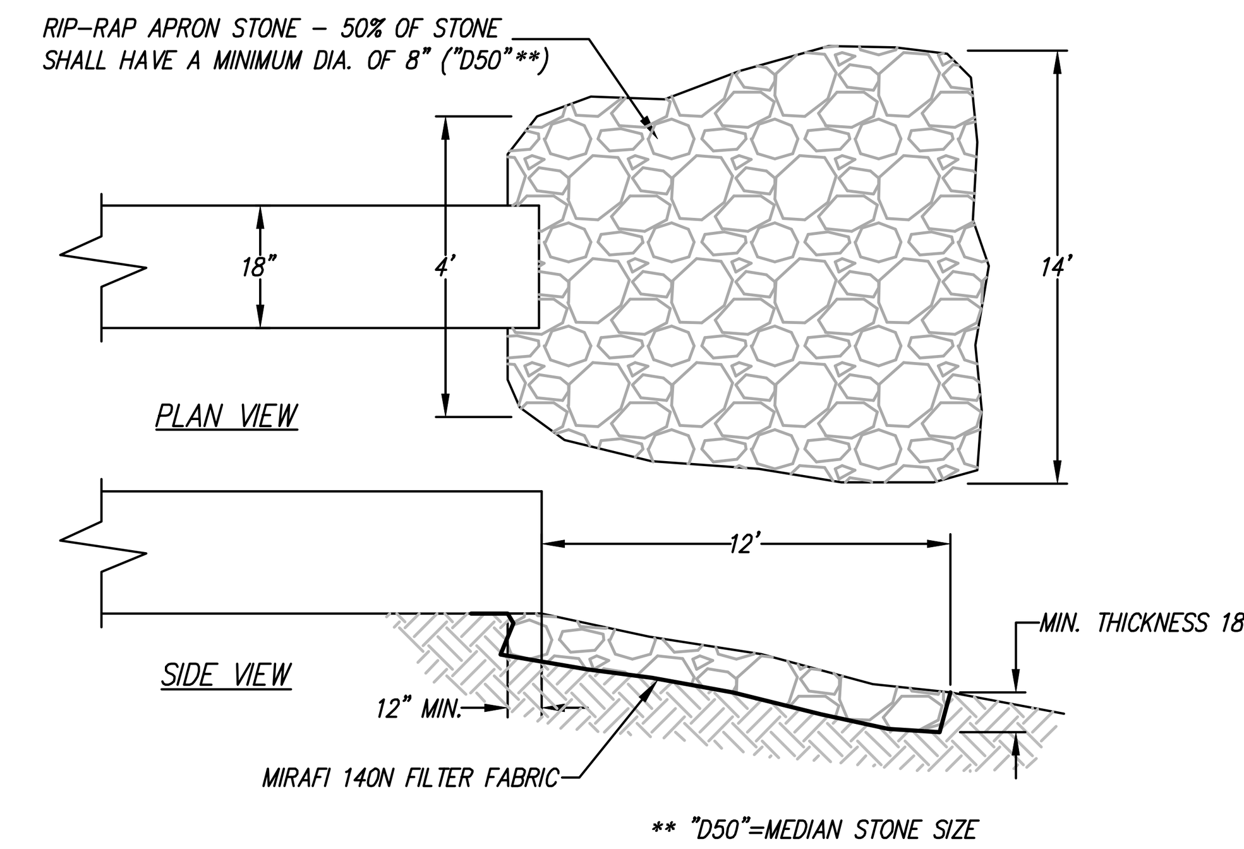
STORMWATER BASIN WEIR SECTION A-A
N.T.S.



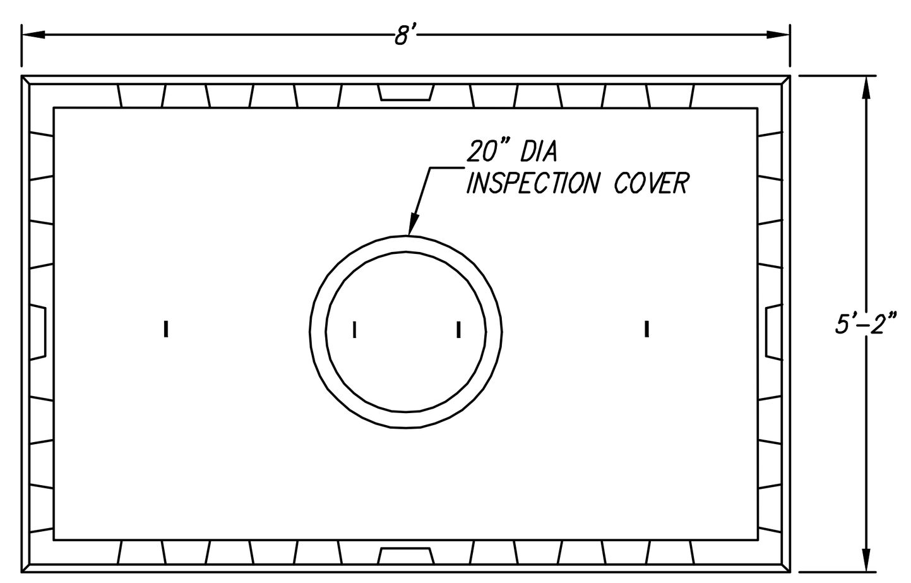
STORMWATER BASIN UNDERDRAIN DETAIL
N.T.S.



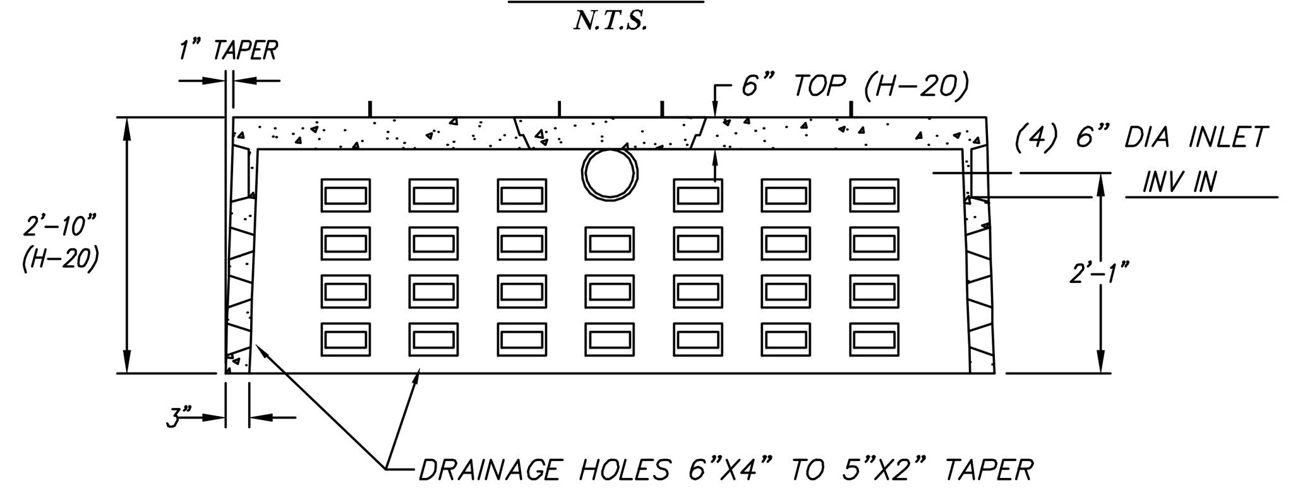
DRAIN TRENCH SECTION
N.T.S.



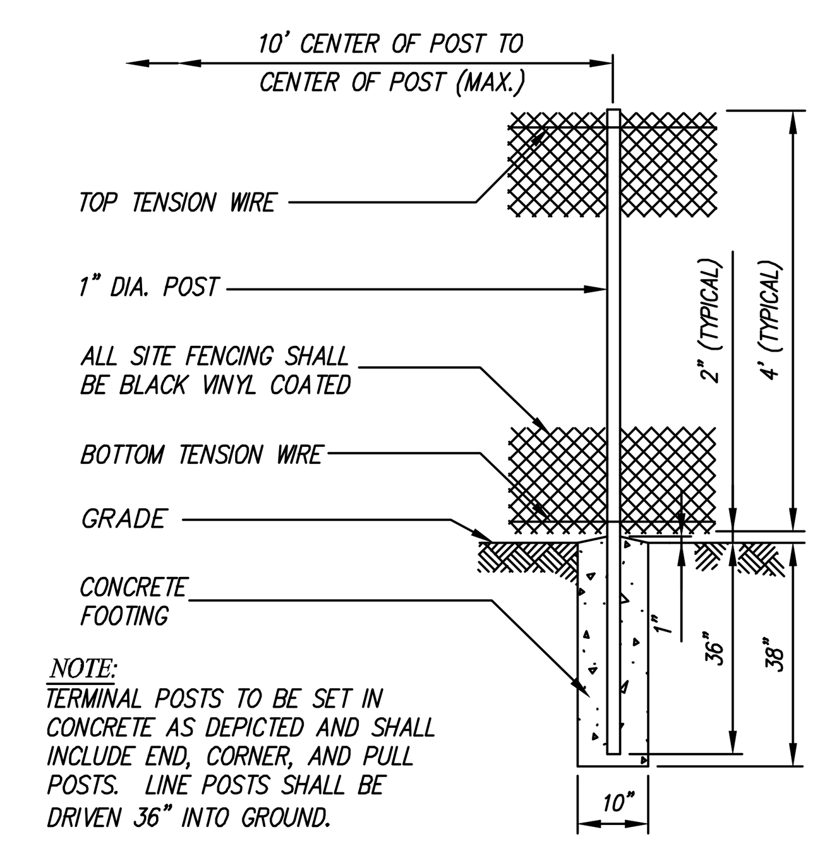
FLARED OUTLET & RIP-RAP APRON DETAIL
N.T.S.



PLAN VIEW
N.T.S.

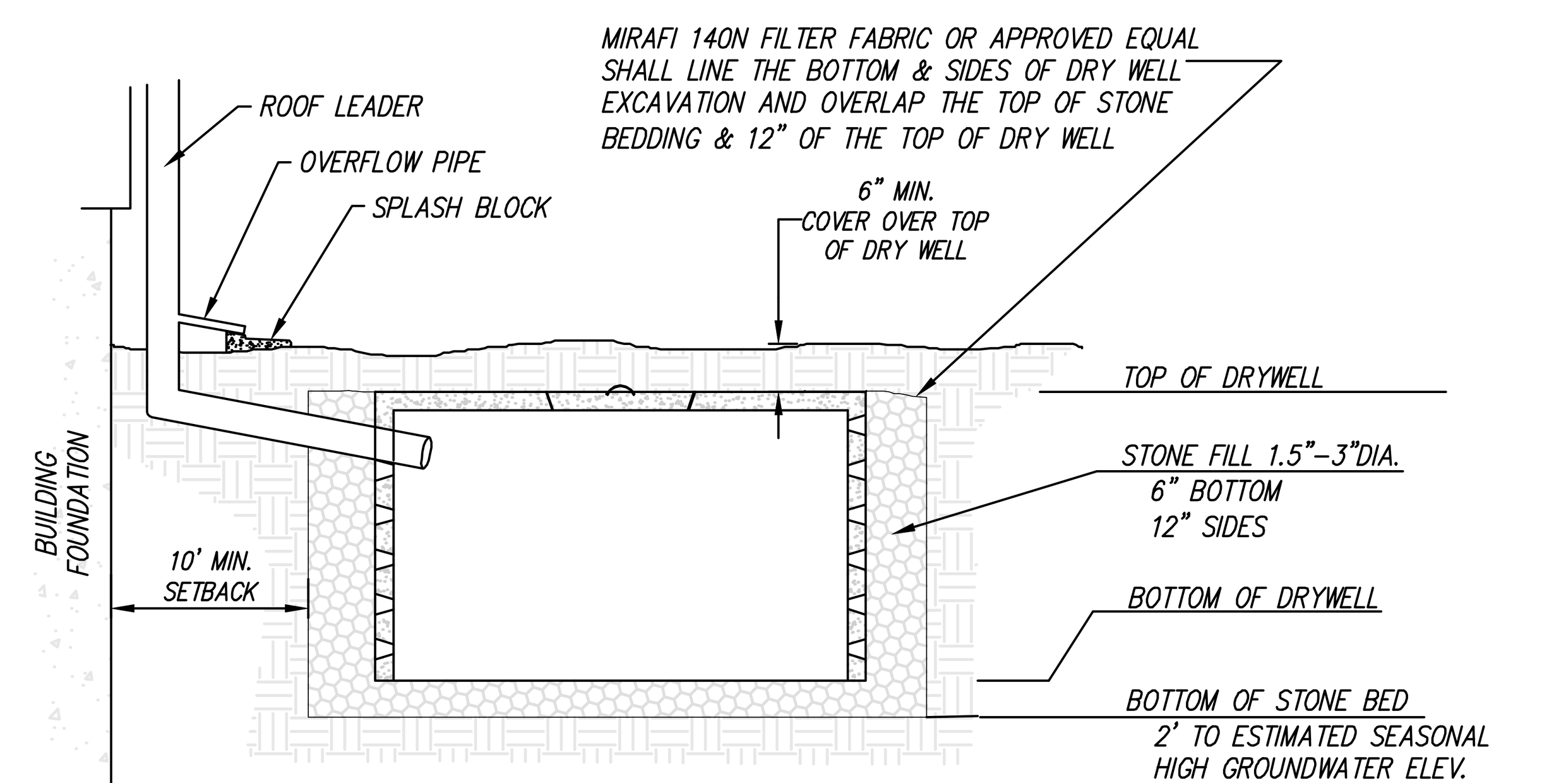


SECTION VIEW
N.T.S.



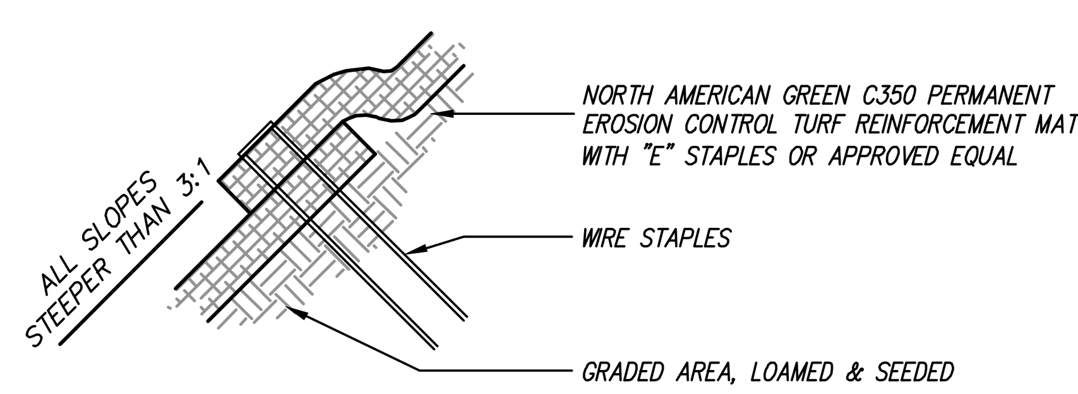
NOTE:
TERMINAL POSTS TO BE SET IN CONCRETE AS DEPICTED AND SHALL INCLUDE END, CORNER, AND PULL POSTS. LINE POSTS SHALL BE DRIVEN 36" INTO GROUND.

CHAIN LINK FENCE
N.T.S.



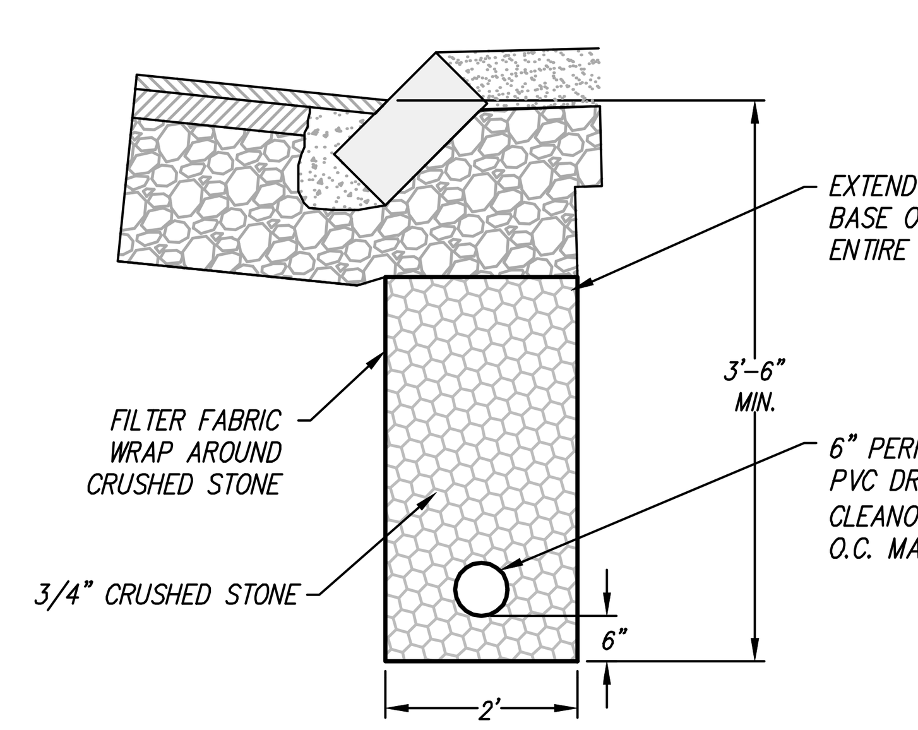
NOTES
1) DRYWELLS SHALL BE INSTALLED IN STONE BED AS DEPICTED HEREON FOR THE INDIVIDUAL LOTS FOR STORMWATER RECHARGE WHEREVER THE FIELD CONDITIONS MAKE IT POSSIBLE. EACH LOT SHALL BE EVALUATED BASED ON A SITE SOIL EVALUATION OF THE ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATION AT THE TIME OF LOT CONSTRUCTION.
2) THE DRYWELLS SHALL BE SHEA CONCRETE PRODUCTS 500 GALLON SHALLOW RECTANGULAR OR APPROVED EQUAL.
3) THE DRYWELLS SHALL BE RATED FOR H20 LOADING.

ROOF DRAIN & DRYWELL CONNECTION DETAIL
N.T.S.



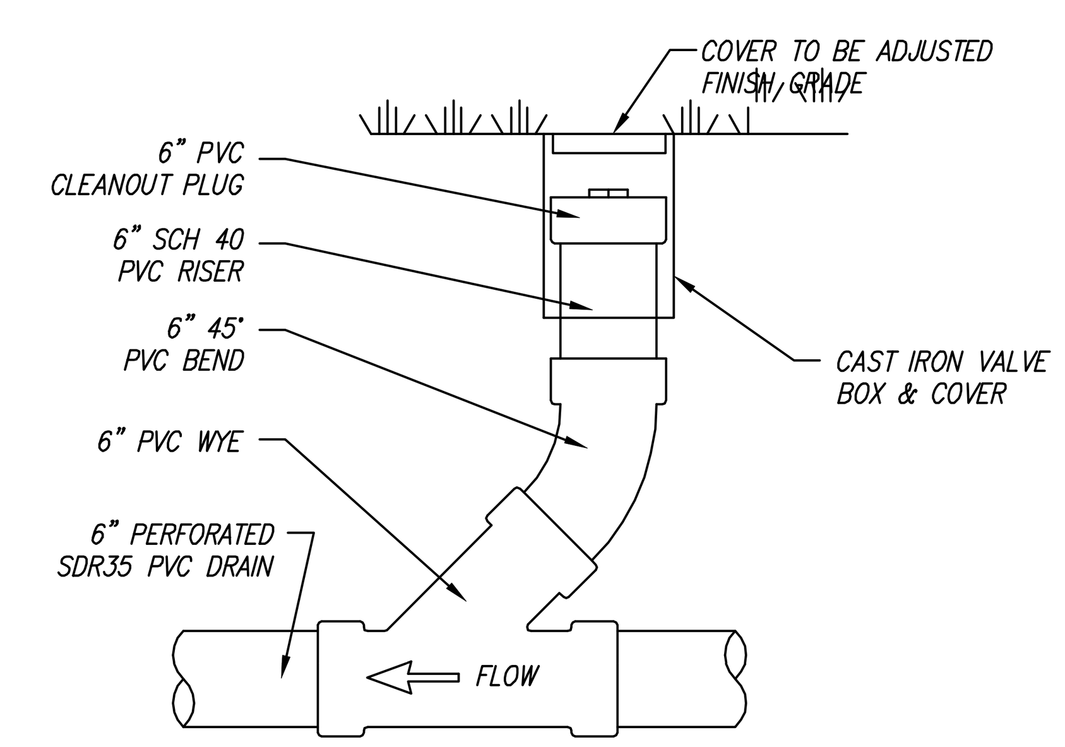
INSTALLATION NOTES:
END SEAM OF BLANKETS OVERLAP 2"-4". PLACE STAPLES, ONE ON EACH CORNER OF BLANKET, 12" O.C. ALONG BLANKET END THROUGH BOTH BLANKETS. UPSLOPE BLANKET LAPS OVER DOWNSLOPE BLANKETS IN A SHINGLE AFFECT. (SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR OTHER CONSTRUCTION REQUIREMENTS.)

SLOPE STABILIZATION EROSION BLANKET
N.T.S



STA ±14+75 TO 21+50 EAST SIDE

SUBDRAIN DETAIL
N.T.S.



CLEANOUT DETAIL
N.T.S.

APPROVED UNDER THE
SUBDIVISION CONTROL LAW
PLANNING BOARD OF LEICESTER

DATE: ____________

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