Page

SPECIAL MEETING AGENDA

1. CALL TO ORDER AND ROLL CALL

2. APPROVAL OF MINUTES

A. 02-19-2020 Draft Minutes 3 - 6

CC 19 Feb 2020 Draft Minutes

3. OPPORTUNITY FOR PUBLIC COMMENT

4. CONTINUING BUSINESS

A. W1611-1- Application of J.E. Shepard Company and Capstone Collegiate Communities-Construction of a 358-Unit Multi-family Development-1621 Storrs Road and Middle Turnpike (Assessor Parcel IDs 9.23.1, 9.23.7 and 9.23.8) 7 - 886

W1611-1 Staff Memo
W1611-1 Application Coverletter
W1611-1 JE Shepard-Capstone Collegiate-Multi-family Development Application
W1611-1 LandTech review 01.16.20
W1611-1 02.06.20 Applicant response to LandTech Jan. Ltr
W1611-1 UConn Intervention Petition 01-27-2020
W1611-1 02.06.20 Applicant response to intervener
W1611-1 Stormwater- Operation & Maintenance
W1611-1 Wetland Functions and Values Report revised 12-30-19
W1611-1 Site Plans - REV- 02.06.20
W1611-1 SWM Report - Rev 02.6.20
W1611-1 LandTech 1621 Storrs Rd review 2-13-2020
W1611-1 19 Feb 2020 UConn Letter to the Conservation Commission
W1611-1 Comments from J.Silander to Cons Com Re Davison Environmental report -02-14-2020
W1611-1 Mona Friedland Letter re application 02-18-2020
W1611-1 Applicant Cons Com Presentation 02-19-2020

5. NEW BUSINESS

A. Application of the Mansfield Non-Profit Housing Development Corporation (owner/applicant) for a multifamily development at 113-121 S. Eagleville Rd (Parcel ID 16.57.5)(IWA File W-1612) 887 - 1119

W1612-Staff Receipt Memo
W1612 Wetlands Application

Town of Mansfield
CONSERVATION COMMISSION
Meeting of 19 February 2020
Council Chambers, Audrey P. Beck Building
(Yet-to-be-approved) MINUTES

Members present: Quentin Kessel, Scott Lehmann, Will Ouimet (Alt.), Chadwick Rittenhouse, Michael Soares. *Members absent*: Mary Harper, Erin King, Genevieve Rigler (Alt.), John Silander.
Others present: Jennifer Kaufman (Wetlands Agent). **W1611-1 Applicants:** David Fresk (J.E. Shepard Co.), Tom Cody (Robinson & Cole), Geoffrey Fitzgerald (Bohler Engineering), Michael Klemens (Michael W. Klemens LLC), Eric Davison & Michael Klein (Davison Environmental). **W1611-1 Intervener:** Robert Sitkowski (UConn), Mark Branse (Halloran & Sage), Scott Angus & Steve Normandin (NV5). **W1611-1 Peer review:** Chris Allan & Rob Pryor (LandTech).

1. The meeting was **called to order** at 7:02p by Chair Michael Soares. In the absence of three members, Alternate Ouimet was entitled to vote at this meeting.

2. The **draft minutes** of the meeting of 18 December 2019 were (1) amended to replace "Environmental Studies and Landscape Architecture" with "Environmental Studies, Natural Resources & the Environment, and Energy & Environmental Management" in the penultimate sentence of item 4, and (2) approved, as amended, without dissent. {The regular January 2020 meeting was cancelled.}

3. IWA referral: W1611 (J. E. Shepard Co. & Capstone Collegiate Communities).
{Kessel disclosed that he is negotiating sale of a barn with Robert Sitkowski at UConn. He said he would abstain from voting on any recommendation to the IWA regarding W1611-1 and would recuse himself and leave the meeting if anyone present objected to his participating in discussion. Representatives of the applicants and intervener said they had no objection, so Kessel did not get the evening off. Soares also disclosed that he'd worked on other projects with some of the firms involved in this application, and invited objections to his participation in the Commission's consideration of this application. Again, no objection was voiced.}

The applicants seek a wetlands permit for a multi-unit housing project on a 19.23 acre parcel that extends in an irregular band from 1621 Storrs Rd (Rte.195) around the southern one of the "Four Corners" to Middle Turnpike (Rte.44) between CVS and Key Bank. The proposal calls for 358 units in ten 3-4 story residential buildings, a 5-level parking garage with 482 spaces, and an additional 187 parking spaces adjacent to the residential buildings. Access would be from Rte.44. A large wetland lies to the NE of the proposed development. No work in wetlands is proposed, but 2.64 acres of the upland review area (URA) would be disturbed. Buildings 300, 400, 500, 600 & 700 are wholly or partially in the URA; building 700 is approximately 50 feet from wetlands at its closest point. The storm-water management system calls for infiltration basins between these buildings and the wetland; their construction would involve work as close as 16 feet to wetlands.

a. Applicants' presentation.

Tom Cole, attorney for the applicants, reviewed the history of the proposal, noting that its current form incorporates modifications of what had been originally proposed (in August 2019) to address issues raised in LandTech's peer review of that proposal, which was commissioned by the IWA.

Geoff Fitzgerald summarized the current version of the proposal, with particular attention to aspects of it of interest to the Commission.

- The storm-water management system (similar to the one built at Storrs Center) is designed to limit post-development runoff volume and peak flows to pre-development levels. Storm-water, collected in deep catch basins, will be directed via hydrodynamic separators to large-capacity underground vaults, thence distributed to sand infiltration basins, with overflow into the wetland via level spreaders.
- The original footprint of the development was reduced (after consultation with Michael Klemens) to preserve habitat near an off-site vernal pool, located between the south edge of the parcel and Discovery Dr. Most of the non-developed portion of the parcel would be protected by a conservation easement.
- An old root cellar on the parcel (just west of building 500) would be preserved. Small trees and soil atop its roof of large stone slabs would be removed and replaced with blueberry sod.

According to **Michael Klemens**, an authority on vernal pools, "critical habitat" for amphibians that make use of a vernal pool extends c.750 ft from it. About a quarter of critical habitat for the off-site vernal pool is on-site, and protecting it is important, especially since a good bit of the rest has, in Klemens' view, been compromised by construction of Discovery Dr. He was pleased that the applicants had responded to his concerns by (1) reducing the original footprint of the development, (2) agreeing to a conservation easement that takes much of the remainder of the parcel off the table for any future development, and (3) incorporating into the project's design an effective barrier to keep amphibians out of the development.

Eric Davison defended his report on "Wetland function and values" from e-mailed comments by Commission member John Silander (2/14/20) to the effect that it was "rather slim on site details," particularly when compared with an assessment done in connection with the Storrs Lodges application. In Davison's view, the Storrs Lodges proposal required a more thorough assessment of wetland function and values because that project had direct wetland impacts, an on-site vernal pool, and state-listed species issues, none of which occur in connection with the applicants' proposal.

Q & A

- Q (Lehmann): What is the proposed amphibian barrier made of, and how long would it last? A (Klemens): It's a plastic material; the condition of the barrier must be monitored and repairs made if it is found to be compromised.
- Q (Kessel): What maintenance would the storm-water management system require?
- A (Fitzgerald): Catch basins and hydrodynamic separators need periodic cleaning; they are accessed by manholes. The underground installations are very robust and should last at least 100 years.
- Q (Rittenhouse): Silander notes that streams in the wetland are not delineated. Would delineation trigger provision of a protective buffer for them? A (Davison): Watercourses within wetlands fall under the broader protections afforded to wetlands, so no additional protection would be gained by delineating these streams.
- Q (Soares): How is maintenance of the amphibian barrier and storm-water management system to be implemented? A (Fitzgerald): This is the responsibility of the property owner; there will be a maintenance agreement.
- Q (Soares): Are there any data that permit assessment of the impact of Discovery Dr on the ecology of the off-site vernal pool? A (Klemens): It's difficult to figure out what is

going on from data collected by various people; there's also a lot of natural variation in amphibian populations, so it's hard to discern trends over a relatively short time period.

- Q (Lehmann): Concerning water quality, the Storm Water Management Report addresses reducing the TSS (total suspended solids) load of runoff, but says little about TDS (total dissolved solids). Why is this, given that there is a lot of pavement in the development to be de-iced in winter? A (Fitzgerald): The development's contribution to any ecological problems attributable to de-icing would probably be insignificant, relative to what ConnDOT dumps on Rte.44.

b. Intervener's presentation

Mark Branse, attorney for UConn, stated that the University's challenge to this application issues from its interest in (1) seeing that development of the Four Corners area – the gateway to UConn – is well-done and (2) protecting the off-site vernal pool, in which UConn has invested a lot of money for an amphibian underpass and barriers on Discovery Dr. The University's position is that the application, as it stands, is deficient and that more needs to be done to justify granting a wetlands permit for the development. Atty. Branse cited John Silander's comments (see above), which were submitted completely independently, in support of this position.

Scott Angus questioned the accuracy of the 150 ft boundary of the URA delineated on the applicants' site plans. He also maintained a row of 3-4 story buildings above the wetland would likely create an edge effect, altering the wetland's ecology.

Steve Normandin observed that the applicants' storm-water management plan relies heavily on the five infiltration basins. It is important that infiltration rates in these basins be sufficient to limit runoff to no more than pre-development levels, if the applicants' stated aim is to be achieved. However, in Mr. Normandin's view, there is insufficient evidence for assurance on this point. Two infiltration test pits at the location of each basin (as recommended by DEEP) would have provided a reasonable basis for judgment, yet only five test pits in all were located in these locations. Moreover, there was considerable variation in the results for individual test pits, suggesting that infiltration rates can vary considerably across relatively small distances. He urged additional infiltration testing at the basin locations to insure that the proposed basins are appropriately located and sized. The "Potential Seasonal High Groundwater Table" for basin 1 appears to be at the level of the basin floor, suggesting that it might not absorb any storm-water at certain times of year.

In conclusion, Atty. Branse urged the Commission to agree that a more thorough study is needed. He also called attention to LandTech's conclusion (in its letter of 2/13/20 to Jennifer Kaufman) that " the potential effects to groundwater have been minimized to the extent practicable based on the site conditions *and the extent of the proposed development*" (his emphasis). He suggested that the Commission should not be satisfied with the best that can be done for wetlands, given the size of the development, but should ask what kind of development is appropriate, given a desired level of wetlands protection.

c. Peer review presentation

Chris Allan briefly reviewed LandTech's role in assessing the wetlands impact of the proposal and the history of its back-and-forth with the applicants on issues of concern. He said that the applicants had been very responsive to LandTech's concerns, and is now satisfied that the infiltration basins will work as advertised and not discharge storm-water in a way that alters wetland hydrology.

Q&A

- Q (Soares): Do the peer reviewers have anything to say about concerns expressed this evening on behalf of the intervener? A (Allan): LandTech was engaged to review the applicants' proposal and is generally satisfied that its concerns about the original proposal have been adequately addressed by the applicants in the final version of the proposal.
- Q (Lehmann): Are additional test pits then not needed, contrary to what the intervener claims? A (**Rob Pryor**): The "two-test pits" recommendation cited by Mr. Normandin is a guideline, not a requirement. In LandTech's view, the applicants have made a reasonable judgment about infiltration, and a margin of safety has been built into the design of the storm-water management system. Even if part of a basin has high groundwater, it is likely that the average groundwater level in it is lower.
- Q (Ouimet): What's under the sand and gravel in the infiltration basins? Are the basins to be created by cut-and-fill? A (Fitzgerald): Yes, they will be formed by cut-and-fill. To the extent possible, the enclosing berms would be carved from undisturbed ground, rather than just piled up, so as to minimize erosion.
- Q (Lehmann): The size of the development leaves a narrow buffer between it and the wetland – much narrower than the 100 ft recommended by the 2004 Connecticut Stormwater Quality Manual (at 4.3) – increasing the risk of wetland impacts during (and maybe after) construction. What assurance can the applicants offer about this? A (Cody): We considered whether shrinking the development would lower the risk of a significant negative impact on wetlands and decided that it would not. A (Fitzgerald): In terms of stormwater management, you can't do better than to limit flows to pre-development levels, and this design does that. A (Allan): Construction will need careful monitoring. LandTech made suggestions for reducing the risk of damage to wetlands during construction, which were accepted by the applicants. A (Cody): The developer has agreed to third-party monitoring during construction.

The Commission thanked the presenters and briefly considered putting together a comment on W1611-1 for the IWA. However, fatigue and the late hour suggested that it would be preferable to authorize Soares to draft a comment for discussion, amendment, and approval at a special meeting.

4. Adjourned at 10:17p. Commission members who attended this meeting will assemble at 6:30p on Wednesday, 26 February 2020 for a special meeting to consider and approve comments to the IWA regarding W1611-1. This meeting will be followed by a special meeting of the Commission regarding W1612 (Mansfield Non-profit Development Corp., multi-unit development at 113-121 S. Eagleville Rd), commencing at 7:00p.

Scott Lehmann, Secretary, 20 February 2020.

MEMO

To: Inland Wetlands Agency

CC: Conservation Commission

From: Jennifer Kaufman, AICP, Senior Planner/Inland Wetlands Agent

Date: January 2, 2020

Subject: W1611-1- Application of J.E. Shepard Company and Capstone Collegiate Communities-Construction of a 358 Multi-family Development-1621 Storrs Road and Middle Turnpike (Assessor Parcel IDs 9.23.1, 9.23.7 and 9.23.8)

PROJECT OVERVIEW

☐ The project includes work in wetlands.

☒ The project includes work in the 150-foot upland review area.

☒ The project is located in a Public Water Supply watershed.

J.E. Shepard Company and Capstone Collegiate Communities are submitting a revised application to construct a 358-unit multi-family development at 1621 Storrs Road and Middle Turnpike (Assessor Parcel IDs 9.23.1, 9.23.7 and 9.23.8). In their submittal, the applicants summarize the changes from the previous application submitted in September 2019 and subsequently withdrawn.

The IWA authorized staff to hire LandTech to provide the technical review of the previous application. Because this firm is familiar with the site and the application, staff recommends that the Agency contract with them to review this revised application. Further, because this is a large project, close to the wetlands with an extensive stormwater management system, I recommend holding a public hearing for this application. However, staff recommends that the Agency schedule the hearing at your meeting on January 21st to avoid opening the hearing and immediately adjourning it to a later date.

PROPOSED MOTION:

Move To:

1. Receive the revised application submitted by JE Shepard Company and Capstone Collegiate Communities (IWA File 1611-1) under the Inland Wetlands and Watercourses Regulations of the Town of Mansfield for construction of a 358-unit multi-family development in 10 residential buildings on property located at 1621 Storrs Road and Middle Turnpike (Assessor Parcel IDs 9.23.1, 9.23.7 and 9.23.8) as shown on a map dated 8/22/2019, revised through 12/30/2019 and as described in application submissions and to refer said application to staff and the Conservation Commission for review and comments.

2. Authorize staff to engage the services of Land Tech, Inc. to provide independent review of the application. Pursuant to section 8.6 of Mansfield's Inland Wetlands and Watercourses Regulations, fees incurred for this review will be the responsibility of the applicants; a deposit in the amount of the estimated cost shall be provided prior to issuance of a notice to proceed.

Robinson+Cole

THOMAS P. CODY

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
tcody@rc.com
Direct (860) 275-8264

Via Electronic Mail and Hand Delivery

December 31, 2019

Mr. Paul Aho, Chairman
Mansfield Inland Wetlands Agency
Audrey P. Beck Municipal Building
4 South Eagleville Road
Mansfield, CT 06268

Re: Application for Inland Wetlands Permit
Properties of D.D.S. Associates, LLC and Benjamin Brown
1621 Storrs Road and Adjacent Vacant Land, and Property on Middle Turnpike
Tax Parcels 9.23.1, 9.23.7, 9.23.8
The J.E. Shepard Company and Capstone Collegiate Communities, Applicants

Dear Chairman Aho and Members of the Inland Wetlands Agency:

Enclosed please find the following materials in support of an application for an Inland Wetlands Permit for the above referenced properties:

1. IWA application form (submitted electronically)
2. Additional application information including property owner information and project statement
3. Consent and authorization of the two property owners involved
4. List of abutting property owners (including property directly across the street) based on information in the Mansfield Tax Assessor records as of December 30, 2019
5. Application fee of $1,060.00
6. "Wetland Functions & Values Assessment, 1621 Storrs Road and Middle Turnpike, Mansfield, CT" prepared by Davison Environmental, LLC, dated 12/30/2019
7. "Storm Water Management Report for Capstone Collegiate Communities," prepared by Bohler Engineering, dated December 30, 2019
8. "Appendix F: Operation and Maintenance, Stormwater Operation and Site Maintenance Plan for Capstone Collegiate Communities," prepared by Bohler Engineering, dated December 30, 2019
9. Site Development Plan sheets prepared by Bohler Engineering (rev. 12/30/19) (2 full size, 17 in reduced format):

a. Cover Sheet
b. Overall Area Plan
c. ALTA/ACSM Survey
d. Site Preparation Plan
e. Site Plan
f. Grading Plan
g. Overall Drainage Plan
h. Curtain Drain Plan
i. Drainage Pipe Schedule
j. Utility Plan
k. Soil Erosion & Sediment Control Plan (Phase I)
l. Soil Erosion & Sediment Control Plan (Phase II)
m. Soil Erosion & Sediment Control Plan (Phase III)
n. Soil Erosion & Sediment Control Notes & Details Sheet
o. Landscape Plan
p. Root Cellar Landscape Plan
q. Landscape Notes & Details Sheet
r. Construction Detail Sheets (6 sheets)
s. General Notes Sheet

We look forward to presenting this application to you at an upcoming public hearing.

Thank you for your consideration.

Sincerely,

Thomas P. Cody
Robinson & Cole LLP
Attorneys for the Applicants

Enclosures
Copy to: David Fresk, The J.E. Shepard Company
Amanda Wallis, Capstone Collegiate Communities

APPLICATION FOR INLAND WETLANDS PERMIT
THE J.E. SHEPARD COMPANY
CAPSTONE COLLEGIATE COMMUNITIES

ADDITIONAL INFORMATION

Project Statement

The Property

This is an Application for an inland wetlands permit for property located at 1621 Storrs Road and Middle Turnpike (the "Property"). The Property consists of three lots of record (Assessors Lots 1, 7 and 8, Map 9, Block 23). Ownership information is listed above. The applicant, The J.E. Shepard Company, owns land in the Four Corners area of Mansfield, and is under contract to purchase a portion of the Property. Capstone Collegiate Communities, the other applicant, is a leading developer of residential communities.

The Inland Wetlands and Watercourses

The inland wetlands and watercourses located at the Property were field delineated by Eric Davison of Davison Environmental, LLC, a Registered Soil Scientist, and field located on a survey by James C. Weed, Connecticut Professional Land Surveyor. An application to amend the Town's official Inland Wetlands Map was approved by the Commission in November, 2018. The wetland delineation is depicted on the plan sheets included in this Application.

The Proposed Project

The Project is a multi-family development consisting of a series of 10 residential buildings and a total of 358 units. The units will include a mix of 1, 2 and 3 bedroom designs. Parking will be provided in two ways. First, a parking garage will be incorporated into one of the residential buildings in a way that hides the view of the garage. The parking garage will contain a total of 482 spaces on five levels. In addition, a total of 187 surface spaces will be distributed throughout the Project.

All of the Property that is directly involved in the Project is zoned Planned Business 3 (PB-3). A portion of the Property will not be developed, including land zoned PB-3 and RAR-90. To the south and west, the Property is bounded entirely by land zoned for Research and Development/Limited Industrial uses (RD/LI) that is owned by the University of Connecticut. To the east, the Property is setback from Storrs Road a distance of over 400 feet, and four acres of land adjacent to Storrs Road is zoned RAR-90. This will provide an appropriate buffer to the uses along Storrs Road.

The multi-family use that is proposed in the application is a permitted use in the PB-3 zone district with special permit approval from the Planning and Zoning Commission. We believe

that this application complies with all pertinent zoning requirements. A separate application for special permit approval will be submitted at a later date.

The Project completely avoids any direct impacts to inland wetlands and watercourses. There will be no filling, grading or other disturbances directly within wetlands. Development activity is proposed within the Town's 150-foot upland review area. Approximately 2.64 acres within the upland review area will be disturbed during construction. A portion of this area will be revegetated at the end of construction. Post-construction, a total of approximately 0.972 acres within the upland review area will be impervious surfaces. Most of the Project is located at least 40 feet from the closest edge of the delineated wetlands. In one area behind Building 500, a proposed stormwater level spreader would be as close as 16 feet from the edge of the wetlands.

The applicants have included a "Wetland Functions and Values Assessment" prepared by Davison Environmental. The Davison report concludes that direct wetland impacts have been avoided, and the potential for other indirect impacts to wetlands has been mitigated through the application's inclusion of soil erosion and sediment controls and stormwater best management practices.

The application includes a comprehensive soil erosion and sediment control plan. The entire site will be stabilized with erosion controls before any site clearing begins. Erosion controls will be maintained throughout the entire course of the construction process. The applicants' current intent is to construct the Project in a single phase of construction.

The Application includes a "Storm Water Management Report" prepared by Bohler Engineering that thoroughly analyzes drainage at the site from both water quality and quantity management perspectives. The Project incorporates a number of stormwater best management practices, including the use of deep-sump hooded catch basins, water quality units, sand filter settling basins, and a rain garden. These features are explained in the report and depicted on the plan sheets. With these features, the application is expected to meet or exceed the goal of removing 80% or more of the total suspended solids in stormwater flows.

The report also includes a full analysis of the pre and post construction drainage conditions. The report analyzes the existing and proposed conditions peak runoff rates and volumes for the 2-, 10-, 25- and 100-year storms. Bohler Engineering expects that the peak flow rates will be maintained or reduced for all of the storm frequencies that were analyzed. In addition, the overall volume of runoff will be carefully managed to mimic existing conditions.

Finally, the Application includes an Operations and Maintenance Plan for the Project prepared by Bohler Engineering. The O&M Plan includes procedures and protocols for maintenance of all stormwater management features; litter and debris removal; parking lot sweeping; snow removal and use of de-icers; integrated pest management strategies for vegetated areas; trash removal; and maintenance of walkways and trails.

A vernal pool exists off-site on property owned by the University of Connecticut. The applicants have carefully studied the potential impacts of the Project on the vernal pool, and will submit a letter report addressing this issue separately.

Previous Application

The applicants previously submitted an application to the Commission in August, 2019. That application underwent extensive review by the Town's peer review consultants. A number of comments and questions were raised. The applicants chose to withdraw the first application so that the comments and questions could be addressed thoroughly, and the application materials were revised accordingly.

In summary, the following changes were made to the previous application:

1. The number of buildings in the project was reduced from 11 to 10. With this change, surface parking was also shifted and an additional stormwater filter basin and green space were added.
2. The total number of surface parking spaces was reduced from 192 to 187.
3. The amount of impervious surface proposed to be located within the Upland Review Area was reduced from 1.72 acres to 0.972 acres.
4. The total amount of disturbance during construction within the Upland Review Area was reduced from 2.87 acres to 2.64 acres.
5. The trash compactor and enclosure were removed from the Upland Review Area.
6. The closest point of disturbance to the wetland edge was previously near wetland flag #49 where a level spreader was 23 feet from the wetland edge. Although this distance has been reduced to 16 feet in the revised application, other areas of the project are much farther from the wetland edge. For example, the southeasterly corner of Building 800 was previously located as close as 29 feet from the wetland edge. This building has been relocated and replaced by Building 700, which is no closer than 50 feet from the wetland edge.
7. The stormwater management plan maintains or reduces the peak rate of runoff in each of the design storms that were analyzed (2, 10, 25 and 100-year storms). Additionally, the analysis of the volume of runoff at the primary watershed discharge point shows a decrease in volume of 2.1% in the 100-year storm. This is a significant improvement over the previous application, which had a 13% increase in the volume of runoff in the 100-year storm.

In summary, the applicants believe that the revisions to the application have improved the project plan. The applicants appreciate the input of the Town Staff and peer review consultants.

PROPERTY OWNERS

Property Owner 1:

Property Location:
Middle Turnpike, Mansfield, CT
Parcel ID 9.23.1

Owner:
D.D.S. Associates, LLC
Attention: Deborah Javit
231 Farmington Avenue
Farmington, CT 06032
djavit@ddsdevelopment.com

Property Owner 2:

Property Location:
1621 Storrs Road and adjacent vacant land, Mansfield, CT
Parcel ID 9.23.7 and 9.23.8

Owner:
Benjamin Brown
7331 Shelby Place
Unit 45
Rancho Cucamonga, CA 91739
bbsweeps@hotmail.com

AUTHORIZATION AND CONSENT TO APPLICATION

Property Owner Information:

Name: Benjamin Brown

Address: 1621 Storrs Road and adjacent vacant land, Mansfield, CT (Tax Assessor Lots 9.23.7 and 9.23.8)

Re: Application for Inland Wetlands Permit

To the Mansfield Inland Wetlands Agency:

Please be advised that I own land in the Town of Mansfield, Connecticut, known as 1621 Storrs Road and the adjacent vacant land (Tax Assessor Lots 9.23.7 and 9.23.8) (the "Property"). I hereby authorize and give my consent to Capstone Collegiate Communities ("Capstone") to prepare, submit and pursue approval of an application for an inland wetlands permit relating to the Property. I also authorize representatives of Capstone to appear at meetings of the Agency on my behalf in support of the application. This consent also authorizes the Agency, its staff and its consultants to enter and inspect the Property at reasonable times for reasons relating to review of the application.

Very Truly Yours,

Benjamin Brown

Date: 8-19-2019

19712005-v1

AUTHORIZATION AND CONSENT TO APPLICATION

Property Owner Information:

Name: D.D.S. Associates, LLC

Address: Middle Turnpike, Mansfield, CT (Tax Assessor Lot 9.23.1)

Re: Application for Inland Wetlands Permit

To the Mansfield Inland Wetlands Agency:

Please be advised that D.D.S. Associates, LLC ("D.D.S.") owns land in the Town of Mansfield, Connecticut, located on Middle Turnpike (Tax Assessor Lot 9.23.1) (the "Property"). D.D.S. hereby authorizes and gives its consent to Capstone Collegiate Communities ("Capstone") to prepare, submit and pursue approval of an application for an inland wetlands permit relating to the Property. D.D.S. also authorizes representatives of Capstone to appear at meetings of the Agency on its behalf in support of the application. This consent also authorizes the Agency, its staff and its consultants to enter and inspect the Property at reasonable times for reasons relating to review of the application.

D.D.S. ASSOCIATES, LLC

By: _____ Date: 08/16/19

Debra Javit
Member
Duly Authorized

19711986-v1

APPLICATION FOR INLAND WETLANDS PERMIT
CAPSTONE COLLEGIATE COMMUNITIES
THE J.E. SHEPARD COMPANY

LIST OF ABUTTING PROPERTY OWNERS
ACCORDING TO TOWN OF MANSFIELD ASSESSOR RECORDS 12/30/19

Property Owner	Parcel ID	Property Address	Mailing Address
Agree Mansfield LLC	Map 9, Block 23, Lot 2-03	632 Middle Turnpike Mansfield, CT 06268	Agree Limited Partnership 70 E Long Lake Rd Bloomfield Hills, MI 48304
Aino Kardestuncer	Map 9, Block 23, Lot 4	1641 Storrs Rd. Mansfield, CT 06268	128 Dewing School Rd Woodstock, CT 06281
Robert I & Jane Moskowitz	Map 9, Block 23, Lot 5	1637-1639 Storrs Rd. Mansfield, CT 06268	117 Stonemill Rd. Storrs, CT 06268
Harriet Schneiderman, Trustee & Leo Schneiderman Trust	Map 9, Block 23, Lot 6	1631 Storrs Rd. Mansfield, CT 06268	1631 Storrs Rd. Mansfield, CT 06268
Mohawk Real Estate Holdings LLC	Map 9, Block 24, Lot 14	1632 Storrs Rd. Mansfield, CT 06268	304 Woodmont Drive Coventry, CT 06238
Stanley Properties LLC & Christy Skorupski et al.	Map 9, Block 24, Lot 13	1630 Storrs Rd. Mansfield, CT 06268	6003 Seminole Court Ocean Springs, MS 39564
Yadollah Ghiaei	Map 9, Block 24, Lot 12	1620 Storrs Rd. Mansfield, CT 06268	PO Box 505 Storrs, CT 06268
James Loviza & Ashley Elliot	Map 9, Block 24, Lot 11	1614 Storrs Rd. Mansfield, CT 06268	4 King Arthur Court 5 Saratoga Springs, NY 12866
University of Connecticut and House 69 – Patch House	Map 15, Block 32, Lot UC1098	1595 Storrs Rd. Mansfield, CT 06268	U Box 3252 Facilities Management Storrs, CT 06269

University of Connecticut	Map 8, Block 23, Lot 1-4	Discovery Drive Mansfield, CT 06268	343 Mansfield Rd. Unit 1177 Storrs, CT 06269
574-596 Middle Turnpike LLC	Map 8, Block 23, Lot 1	596 Middle Turnpike Mansfield, CT 06268	c/o Keybank National Association P.O. Box 94839 Cleveland, OH 44101
Ruihe Development LLC	Map 8, Block 15, Lot 15	591 Middle Turnpike Mansfield, CT 06268	12 Hillyndale Rd. Storrs, CT 06268
S & P Properties LLC	Map 8, Block 15, Lot 14	603-607 Middle Turnpike Mansfield, CT 06268	PO Box 85 Andover, CT 06232
S & P Properties LLC	Map 8, Block 15, Lot 13	611 Middle Turnpike Mansfield, CT 06268	PO Box 85 Andover, CT 06232
Yamei Development LLC	Map 8, Block 15, Lot 11	625 Middle Turnpike Mansfield, CT 06268	12 Hillyndale Rd. Storrs, CT 06268

PLANNING MANAGEMENT

View

PROJECT

Case Name:

PROPERTY INFORMATION

Properties:

STORRS RD MANSFIELD CENTER, CT 06250 (9.23.7) (9.23.7)
1621 STORRS RD STORRS, CT 06268 (9.23.8) (9.23.8)
Primary: MIDDLE TPKE STORRS, CT 06268 (9.23.1) (9.23.1)

INFORMATION

Approval #:
Status: Created
Case #: W-20-0001
Application Date: 12/31/2019
Case Type: Wetlands Activity
Issued Date:
Subcases: Inland Wetlands - IWA
Expiration Date:
Online Authentication Code:
Description Of Work: This is an application for an inland wetlands permit for property located at 1621 Storrs Road and Middle Turnpike in Mansfield. The project is a multi-family community consisting of 10 residential buildings and a total of 358 dwelling units. The project completely avoids any direct impacts to inland wetlands and watercourses. There will be no filling, grading or other disturbances directly within wetlands. Development activity is proposed within the Town's 150-foot upland review area.

ADDITIONAL INFORMATION

IWA File No: W1611-1

ACTION DATES AND DEADLINES

Date Application Filed: 12/31/2019
Deadline for Decision:
Decision Date:
Deadline to Advertise Decisions:
Date Decision Advertised:

NOTIFICATION DATES AND DEADLINES

Planning Management (W-20-0001)

Case Type: Wetlands Activity Inland Wetlands - IWA
Start Date: 12/31/2019
Status: Created
Issued Date:

Fee Charges (3)

Item: Admin Fee
Amount: $2.00
Fee Assessed By: Jennifer Kaufman

Item: Land Use Fee
Amount: $58.00
Fee Assessed By: Jennifer Kaufman

Item: Wetlands Agency Fee
Amount: $125.00
Fee Assessed By: Jennifer Kaufman

Total Amount: $185.00
Amount Paid: $0.00
Amount Due: $185.00

Contacts (4)

Property Owner
BROWN BENJAMIN
7331 SHELBY PL UNIT 45 RANCHO CUCAMANGA, CA 91739
EDIT

Property Owner
BROWN BENJAMIN
7331 SHELBY PL UNIT 45 RANCHO CUCAMANGA, CA 91739
EDIT

Applicant
Thomas Cody (Robinson and Cole)
280 Trumbull Street Hartford, CT 06103
EDIT

Property Owner
D D S ASSOCIATES LLC JAVIT MAX C/O
231 FARMINGTON AVENUE FARMINGTON, CT 06032
EDIT

Properties (3)

[9.23.7]
STORRS RD MANSFIELD CENTER, CT 06250

Historic District?	No
Within 150' of a wetland or watercourse?	Yes
Historic Village	Mansfield Four Corners
Public Water Supply Watershed	No
Scenic Road?	No
Parcel ID	9.23.7
Zone	RAR-90
Map	9
Acreage	8.5
Subregional Drainage Basin	Willimantic River
Block	23
USGS Quadrangle	Coventry
Natural Diversity Database (NDDB)	Yes

Deadline for Abutter Notification:		Date of Abutter Notification:	
Deadline of DPH Notification:		Date of DPH Notification:	
Deadline of Water Company Notification:		Date of Water Company Notification:	
Deadline for Adjoining Municipality Notification:		Date of Adjoining Municipality Notification:	

PUBLIC HEARING DATES AND DEADLINES

Advertising Date 1:		Advertising Date 2:	
Deadline To Open Public Hearing:		Deadline To Close Public Hearing:	
Date Public Hearing Opened:		Date Public Hearing Closed:	

PARCEL DATA

Zoning Classification:	PB-3	Natural Diversity Database (NDDB):	Yes
USGS Quadrangle:	Coventry	Public Water Supply Watershed:	No
Subregional Drainage Basin:	Willimantic River	Acreage:	9.23

PROJECT CRITERIA

1. How close will the proposed activity be from the edge of wetlands/watercourses? (feet):	16	2. Does the area of activity drain towards the wetlands/watercourses?:	Yes
3. Quantify the area of disturbance in the wetlands/watercourses (square feet):	0	4. Quantify the area of disturbance within 150 feet of wetlands/watercourse (square feet):	114998
5. Equipment/machinery used:	All types of mechanical		
6.1a Quantify the volume of materials being extracted in the wetlands/watercourses(cubic yards):	0	6.1b Quantify the volume of materials being deposited in the wetlands/watercourses(cubic yards):	0

[9.23.8]
1621 STORRS RD STORRS, CT 06268

Historic District?	No
Within 150' of a wetland or watercourse?	Yes
Historic Village	Mansfield Four Corners
Public Water Supply Watershed	Yes
Scenic Road?	No
Parcel ID	9.23.8
Zone	RAR-90
Map	9
Acreage	1.5
Subregional Drainage Basin	Fenton River
Block	23
USGS Quadrangle	Coventry
Natural Diversity Database (NDDB)	Yes

[9.23.1]
MIDDLE TPKE STORRS, CT 06268

Historic District?	No
Within 150' of a wetland or watercourse?	Yes
Historic Village	N/A
Public Water Supply Watershed	No
Scenic Road?	No
Parcel ID	9.23.1
Zone	PB-3
Map	9
Acreage	9.23
Subregional Drainage Basin	Willimantic River
Block	23
USGS Quadrangle	Coventry
Natural Diversity Database (NDDB)	Yes

Inspections (1)

Wetlands Inspection
Date:
Status: Unscheduled
Inspector:
Results: Pending

Documents (0)

There are no Documents at this time.

Tagged Cases (0)

There are no Tagged Cases at this time.

6.1c Quantify the volume of materials being dispersed throughout the site in the wetlands/watercourses(cubic yards):	0
6.2a Quantify the volume of materials being extracted within 150 feet of wetlands/watercourse(cubic yards):	
6.2b Quantify the volume of materials being deposited within 150 feet of wetlands/watercourse(cubic yards):	
6.2c Quantify the volume of materials being dispersed throughout the site within 150 feet of wetlands/watercourse(cubic yards):	
7.1 Describe the material deposited in the wetlands:	N/A
7.2 Describe the material deposited within 150 feet of the wetlands:	A combination of existing on-site soils, clean fill, asphalt pavement, and building materials, as shown on the plans submitted with the application.
8. Erosion and sedimentation controls proposed:	Silt Fence
9. Are there other measures proposed to protect the wetlands/watercourses:	Yes
If yes? please describe:	The application include

Add Tag

Activities (12)

Planning Management Case Updated.
Jennifer Kaufman has updated planning management case #W-20-0001.
09:40:57 AM / Thu, Jan 2nd, 2020
Jennifer Kaufman

Fee Charged.
Magnet has charged the fee Wetlands Agency Fee in the amount of $125.00
09:40:54 AM / Thu, Jan 2nd, 2020
Jennifer Kaufman

Fee Charged.
Magnet has charged the fee Land Use Fee in the amount of $58.00
09:40:54 AM / Thu, Jan 2nd, 2020
Jennifer Kaufman

Fee Charged.
Magnet has charged the fee Admin Fee in the amount of $2.00
09:40:54 AM / Thu, Jan 2nd, 2020
Jennifer Kaufman

Web Application Approved.
Jennifer Kaufman has approved web application WEB-41701445
09:39:27 AM / Thu, Jan 2nd, 2020
Jennifer Kaufman

Show all 12 Activities

10. Will the proposed activities impact the wetlands/watercourses of an adjoining property:	No	**11. What alternatives have you considered that would have less impact to the wetlands/watercour:**	The application proposes no direct impacts to wetlands and watercourses. The applicant believes that the potential for indirect impacts to wetlands has been mitigated through the site controls and best management practices that are proposed.
12. Are the activities that you propose within 500 ft. of the adjoining municipality:	No	**13. Do the activities that you propose have the potential to cause traffic impacts to the adjacent municipality:**	No
14. Do the activities that you propose have the potential to cause water run-off impacts to the adjoining municipality:	No	**Conditions of Approval:**	
Held For:			

January 16, 2020

Jennifer Kaufman, AICP
Senior Planner/Inland Wetlands Agent
Town of Mansfield
4 South Eaglesville Road
Mansfield, CT 06268

RE: Mansfield Inland Wetlands Application Review
1621 Storrs Road and Middle Turnpike

Dear Ms. Kaufman:

LandTech conducted a review of application documents pertaining to proposed site improvements at 1621 Storrs Road and Middle Turnpike and conducted an on-site evaluation of the project area on September 19, 2019.

Reviewed application documents include:

- *Site Development Plans* (24 sheets) prepared by Bohler Engineering, dated December 30, 2019.
- *Stormwater Management Report*, with Appendices A through F, prepared by Bohler Engineering, dated December 30, 2019.
- *Wetland Functions & Values Assessment* Report prepared by Davison Environmental, dated December 30, 2019.
- Letter from Michael W. Klemens to Thomas P. Cody, dated August 30, 2019 regarding review of potential impacts to off-site vernal pool.
- Vernal Pool Exhibit prepared by Bohler Engineering, dated September 20, 2019.
- Table 1 - Summary of Vernal Pool Observations, UCONN North Hillside Road Extension, excerpt from Fuss & O'Neill report including vernal pool shown in Vernal Pool Exhibit.
- Letter/Report from Michael W. Klemens dated October 24, 2019 regarding responses to LandTech previous review comments.

As you are aware, LandTech conducted a review of previously submitted application documents, provided preliminary comments, and met with the applicant's design team and town to discuss the preliminary review comments. The application was subsequently withdrawn and resubmitted. The current application plans and reports address many of the concerns and comments LandTech provided under the previous application.

Our comments regarding our review of the current applications documents are provided below.

Stormwater Management

With the revised application submitted by the applicant, many of our previous concerns related to stormwater management have been addressed. Based on our review of the current application, we have the following comments:

In general, the proposed sand filters consist of a 6" of a loam mix over 6" of washed concrete sand, which is over a 6" gravel bedding layer. These layers are in general agreement with figure II-P4-I as shown in the Connecticut SWQM. However, the SWQM recommends a minimum filter bed depth of 18". The gravel bed provides very little in the way of filtration, based on its rapid permeability/large void ratio. The applicant should demonstrate how the proposed filter beds in the proposed sand filters are in conformance or at least meet the general provisions of the SWQM.

The permeability testing in the area of the proposed surface sand filters appears to be quite variable. The CT DEEP SWQM suggests a range of 0.3 inches/hour to 5.0 inches/hour as acceptable for infiltrative practices. Several of the reported infiltration rates within the proposed sand filter areas fall outside of the DEEP recommended range. We are less concerned with the rates that exceed 5.0 inches/hour because of the pre-treatment and filtration provided by the filtration bed, but the applicant should more formally address their reasoning, for the record, for proposing these structures in areas where the soil conditions are outside of the DEEP guidance.

Soil testing results in the vicinity of SFB-1, SFB-2, and SFB-3 indicate potential seasonal high groundwater near the proposed bottom of the basin. This condition could result in the bottoms of the basins remaining wet for extended periods during periods of seasonal high groundwater. The applicant may wish to provide an underdrain system, set in the upper portion of the filter bed, to eliminate this potential for the referenced sand filter basins.

The HydroCAD printouts for the various surface sand filters do not provide an elevation vs. time printout. This information should be included so that the drawdown time of the basin from peak elevation (100-year storm event) to completely dry can be determined. The CT DEEP recommends a drawdown time of no more than 72 hours.

The proposed project includes an extensive network of underdrains for the proposed buildings and underground stormwater chambers. In effect, the proposed underdrain system spans the entire north-south limits of the developed area (approximately 920 feet). The groundwater collected by these drains is then directed to three 50' level spreaders. The downgradient wetland resource is primarily groundwater fed. The applicant should explain whether or not the proposed system will result in discharging groundwater flow to the surface via the level spreaders and/or how the proposed underdrain system and level spreaders will function to maintain the groundwater flow to the wetland.

Based on information contained in the plan set and the report, the peak ponded elevations vs. the top of berm elevations for SPF-1, SPF-2, and SPF-3 are as follows:

Structure	Top of Berm	Peak Ponding Elevation (100-Year Storm)	Freeboard
SFB-1	611.0	610.35	0.65'
SFB-2	617.0	616.37	0.63'
SFB-3	623.0	622.99	0.01'

Section 10.11.4 requires that a minimum one-foot of freeboard is maintained between the 100-year storm elevation and the top of berm. We recommend that the applicant modify the plans to provide the required freeboard for SPP-1, SPF-2, and SPF-3.

Soil Erosion and Sediment Control

The applicant has addressed our previous comments regarding recommended revisions to the proposed soil erosion and sediment controls in the current plan set including the following:

- use of compost filled filter socks along the silt fence adjacent to wetlands,
- use water bars within the temporary diversion swales to reduce erosion potential,
- inclusion of sediment trap wet and dry storage volumes on plans, and
- inclusion of excavation dewatering method details and locations

It is recommended that additional temporary diversion swales be provided on the east sides of proposed Buildings 1000B and 600B and the north sides of proposed Buildings 300A and 400 to direct runoff to the proposed sediment traps.

If approved, we recommend that the town bond all erosion and sediment control measures and retain an independent third party to provide inspections and reporting by a qualified erosion and sediment control professional on a weekly basis and after each measurable precipitation event of 0.25 inches or greater until the site is permanently stabilized.

Wetland Impacts and Mitigation Measures

Wetland Hydrologic Impacts

During our review of the prior application we were concerned that alteration of site hydrology would result in adverse impact on the hydrology of the abutting wetland, which is largely groundwater fed. These impacts included decrease in precipitation infiltration, diversion of groundwater, increases in surface water discharge and decrease in groundwater discharge to the wetland.

The current placement of stormwater treatment basins and groundwater collection system level spreader discharges spaced along and adjacent to the wetland system is an improvement. However, as stated above, the applicant should explain whether or not the proposed extensive underdrain system will result in discharging groundwater flow to the surface via the level spreaders and/or how the proposed underdrain system and level spreaders will function to maintain the groundwater flow to the wetland.

Vernal Pool

The applicant has supplied information indicating that the off-site vernal pool, south of the property, is an important breeding area for a specialized group of amphibians that have evolved to use these temporarily flooded wetlands. The edge of the pool is located approximately 150 feet from the nearest point of the proposed development, placing it outside of the 100 ft *Vernal Pool Envelope* as described in Calhoun and Klemens, (2002)[1].

[1] Calhoun A.J.K. and M.W. Klemens. 2002. Best Development Practices, Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States. MCA Technical Paper No. 5 Metropolitan Conservation Allicance, Wildlife Conservation Society, Bronx, NY

We agree with the comment in the third party review letter from Dr. Michael Klemens, that current development plans maintain habitat connectivity for amphibian migration to and from the vernal pool to the extensive area of forest and wetlands to the east between the vernal pool and Storrs Road. The Klemens letter further states that the current plans comply with the aggregate of 25% maximum loss of *Critical Terrestrial Habitat* (CTH), following the recommendations set forth in Calhoun and Klemens (2002). Dr. Klemens further states that this is the "industry standard" for sustainable development of vernal pools and their associated upland habitat in New England.

The comment regarding compliance with the aggregate of 25% maximum loss of CTH is based on the Vernal Pool Exhibit provided by the applicant. Based on our initial review of the Vernal Pool Exhibit and 2016 Aerial photogrammetry, we requested additional clarification on the habitat conditions of recently developed, non-forested areas along Discovery Drive that were identified as "suitable habitat". This clarification was provided in the follow up letter from Dr. Klemens dated October 24, 2019. We find the response acceptable. It should be noted, however that a large portion of the Critical Terrestrial Habitat is located on off-site properties not under control of the applicant.

As previously requested, a landscape plan is provided in the current application that include a more extensive wetland buffer restoration and enhancement area on the east side of the property near the farm house that is identified as "suitable habitat" on the Vernal Pool Exhibit. It is strongly recommended that any undeveloped property within the Critical Terrestrial Habitat, wetlands and upland review areas be placed under a Conservation Easement and the Easement be marked in the field with placards or other boundary markers.

We also recommend that all wetland buffer planting areas and stormwater basin plantings be monitored for no less than 3 years. It should be the responsibility of the applicant to maintain the plantings and replace them as needed during the monitoring period.

If you have any questions or require further assistance, please call us.

Yours truly,
Land-Tech Consultants

Christopher P. Allan
Professional Wetland Scientist
Certified Soil Scientist

Robert Pryor, P.E., L.S.
Director of Site Planning & Engineering

BOHLER

16 Old Forge Road, Suite A
Rocky Hill, CT 06067
860.333.8900

February 6, 2020

Jennifer Kaufman, AICP
Senior Planner / Inland Wetlands Agent
Town of Mansfield
4 South Eaglesville Road
Mansfield, CT 06268

Re: Response to Mansfield Inland Wetlands Application Review
Residential Development
1621 Storrs Road & Middle Turnpike
Mansfield, CT

Dear Ms. Kaufman,

In response to Land-Tech Consultant's review letter dated January 16, 2020 pertaining to the application documents for the site improvements at 1621 Storrs Road and Middle Turnpike, Mansfield, CT, please see attached, our responses to their outstanding concerns. We have also provided herewith a revised set of application documents that address the changes recommended by Land-Tech. The following is a summary of the plan changes that have been made.

- Sand Filter Basin details have been modified to provide an 18" filter bed and underdrains where recommended.
- Sand Filter Basin grading has been modified to provide one-foot of freeboard.
- Infiltrative capacity of the Level Spreader outlets has been maximized by increasing the 8" perforated pipe in the design detail to a 12" perforated pipe, Additionally, level spreader outlets have been lengthened slightly in areas where grades could accommodate. Level Spreader calculations, including analysis of potential erosive velocities have been provided in the *Stormwater Management Report* Appendix.
- A Conservation Easement plan has been provided.
- Drainage structure outlet control orifices/sizes have been modified where necessary to accommodate the revisions made to the sand filter basins.
- Additional diversion swales have been provided on the Erosion and Sediment Control plans, as recommended.

If you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

BOHLER ENGINEERING

Geoffrey P. Fitzgerald, PE, AICP, Branch Manager

Stormwater Management

Sand Filter Basin Cross Section

In general, the proposed sand filters consist of a 6" of a loam mix over 6" of washed concrete sand, which is over a 6" gravel bedding layer. These layers are in general agreement with figure II-P4-I as shown in the Connecticut SWQM. However, the SWQM recommends a minimum filter bed depth of 18". The gravel bed provides very little in the way of filtration, based on its rapid permeability/large void ratio. The applicant should demonstrate how the proposed filter beds in the proposed sand filters are in conformance or at least meet the general provisions of the SWQM.

All Sand Filter Basin details have been modified to provide an 18" filter bed comprised of a layer of filter fabric, 12" of ASTM C-33 clean washed concrete sand, and 6" of Biofiltration Soil Mix. With hooded catch basins, CDS pretreatment units, and the 18" filter bed described above, the design provides excellent stormwater quality renovation prior to recharge.

Sand Filter Basin Location/Rates

The permeability testing in the area of the proposed surface sand filters appears to be quite variable. The CT DEEP SWQM suggests a range of 0.3 inches/hour to 5.0 inches/hour as acceptable for infiltrative practices. Several of the reported infiltration rates within the proposed sand filter areas fall outside of the DEEP recommended range. We are less concerned with the rates that exceed 5.0 inches/hour because of the pre-treatment and filtration provided by the filtration bed, but the applicant should more formally address their reasoning, for the record, for proposing these structures in areas where the soil conditions are outside of the DEEP guidance.

Throughout the design of this site, the layout has been modified several times to accommodate various site constraints (vernal pool, grading, bedrock, etc.). With the current redesign of the site, it was decided to perform test pits and soil tests along the entire eastern wetland edge and a few other locations, in an effort to have data for potential stormwater basin locations in areas where stormwater recharge would be most effective in maintaining the hydrology of the wetland systems.

The permeability testing results in the area of the proposed surface sand filters was variable. The CT DEEP SWQM suggests a range of 0.3 inches/hour to 5.0 inches/hour as acceptable for infiltrative practices. Several of the infiltration rates fell outside of the DEEP recommended range. In subsequent revisions to the filter basin layout and configuration, we avoided siting the filter basin in areas where the permeability was below 0.3 inches per hour. We were less concerned with the rates that exceed 5.0 inches/hour because of the pre-treatment and filtration provided by the filtration bed.

The results assisted the design team in choosing the best locations for the basins, resulting in the reconfiguration of several buildings. Using the groundwater and hydraulic conductivity results from the 22 test pits, five sand filter basins were located on or adjacent to the preferred test locations.

Typically, two test pits and soil tests were performed in or adjacent to the proposed filter basins. Based on discussion with Land-Tech, Bohler proposed that soil infiltration rates used for calculation purposes in our HydroCAD storm water models would be the average of the two test results, with a Factor of Safety of 2 applied. This, in application, is very similar in result to using the lowest rate for calculation purposes.

Sand Filter Underdrains

Soil testing results in the vicinity of SFB-1, SFB-2, and SFB-3 indicate potential seasonal high groundwater near the proposed bottom of the basin. This condition could result in the bottoms of the basins remaining wet for extended periods during periods of seasonal high groundwater. The applicant may wish to provide an underdrain system, set in the upper portion of the filter bed, to eliminate this potential for the referenced sand filter basins.

An underdrain system has been provided in SFB-1, SFB-2, and SFB-3 to eliminate the potential for seasonal high groundwater encroaching on the bottom of the basins. The sand filter basin details have been updated to provide a 4" perforated PVC pipe wrapped in filter fabric.

Sand Filter Drawdown Time

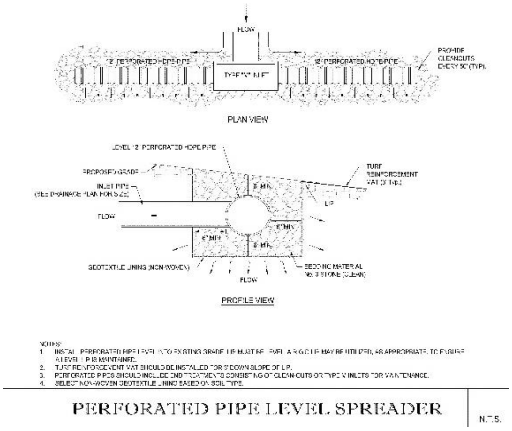
The HydroCAD printouts for the various surface sand filters do not provide an elevation vs. time printout. This information should be included so that the drawdown time of the basin from peak elevation (100-year storm event) to completely dry can be determined. The CT DEEP recommends a drawdown time of no more than 72 hours.

All the basins have a drawdown time less than 72 hours. The HydroCAD *Elevation vs. Time* charts have been provided in the revised documents.

Underdrain Level Spreader Functionality

The proposed project includes an extensive network of underdrains for the proposed buildings and underground stormwater chambers. In effect, the proposed underdrain system spans the entire north-south limits of the developed area (approximately 920 feet). The groundwater collected by these drains is then directed to three 50' level spreaders. The downgradient wetland resource is primarily groundwater fed. The applicant should explain whether or not the proposed system will result in discharging groundwater flow to the surface via the level spreaders and/or how the proposed underdrain system and level spreaders will function to maintain the groundwater flow to the wetland.

The use of curtain drains and foundation drains around buildings foundations and stormwater structures is common in engineering and construction in the northeast. The zone of influence of the proposed curtain drains is limited, and typically not more than 25 feet. As such, the use of curtain drains at foundations and structures addresses the groundwater depth at the point of use and the immediate surrounds and will by no means eliminate groundwater flows to the receiving wetlands. Additionally, the outlets intended to be used for our proposed curtain drains will not be point sources to daylight, but instead are proposed to be extended, below-grade level spreaders, designed to recharge captured flows back to the groundwater. This approach, along with the use of stormwater recharge filter basins for stormwater volume management, will maintain the water table at pre-development ranges.



Sand Filter Freeboard
Section 10.11.4 requires that a minimum one-foot of freeboard is maintained between the 100-year storm elevation and the top of berm. We recommend that the applicant modify the plans to provide the required freeboard for SPP-1, SPF-2, and SPF-3.

The basins have been modified to provide one-foot of freeboard during the 100-year storm event.

Soil Erosion and Sediment Control

Erosion Control Measures
The applicant has addressed our previous comments regarding recommended revisions to the proposed soil erosion and sediment controls in the current plan set including the following:
• use of compost filled filter socks along the silt fence adjacent to wetlands,
• use water bars within the temporary diversion swales to reduce erosion potential,
• inclusion of sediment trap wet and dry storage volumes on plans, and
• inclusion of excavation dewatering method details and locations

Noted.

Diversion Swales
It is recommended that additional temporary diversion swales be provided on the east sides of proposed Buildings 1000B and 600B and the north sides of proposed Buildings 300A and 400 to direct runoff to the proposed sediment traps.

Temporary diversion swales have been added to the Erosion and Sediment Control Plans at the recommended locations.

EC&S Bond
If approved, we recommend that the town bond all erosion and sediment control measures and retain an independent third party to provide inspections and reporting by a qualified erosion and sediment control professional on a weekly basis and after each measurable precipitation event of 0.25 inches or greater until the site is permanently stabilized.

Noted.

Wetland Impacts and Mitigation Measures

Wetland Hydrologic Impacts
During our review of the prior application we were concerned that alteration of site hydrology would result in adverse impact on the hydrology of the abutting wetland, which is largely groundwater fed. These impacts included decrease in precipitation infiltration, diversion of groundwater, increases in surface water discharge and decrease in groundwater discharge to the wetland.

The current placement of stormwater treatment basins and groundwater collection system level spreader discharges spaced along and adjacent to the wetland system is an improvement. However, as stated above, the applicant should explain whether or not the proposed extensive underdrain system will result in discharging groundwater flow to the surface via the level spreaders and/or how the proposed underdrain system and level spreaders will function to maintain the groundwater flow to the wetland.

The proposed development does not result in a decrease in precipitation infiltration, nor does it result in a significant increase in volume of water discharged as surface flow. As discussed above, the use of curtain drains at foundations and structures addresses the groundwater depth at the point of use and the immediate surrounds and will by no means eliminate groundwater flows to the receiving wetlands. The outlets for proposed curtain drains are proposed to be extended, below-grade level spreaders, designed to recharge captured flows back to the groundwater. The site stormwater management system has been carefully analyzed and designed to mimic the pre-development peak runoff flow rates AND volumes in the 2-, 10-, 25-, and 100-year storms in each of the drainage sub-basins present and analyzed on and around the predeveloped site.

We would also note that any variations in the extent or duration of inundation or soil saturation in the wetlands will be substantially less that the normal range of variations experienced in a groundwater slope wetland in glacial-till derived soils and will have no impact on the functions and values or ecological processes in the wetland.

Vernal Pool

The applicant has supplied information indicating that the off-site vernal pool, south of the property, is an important breeding area for a specialized group of amphibians that have evolved to use these temporarily flooded wetlands. The edge of the pool is located approximately 150 feet from the nearest point of the proposed development, placing it outside of the 100 ft Vernal Pool Envelope as described in Calhoun and Klemens, (2002).

We agree with the comment in the third party review letter from Dr. Michael Klemens, that current development plans maintain habitat connectivity for amphibian migration to and from the vernal pool to the extensive area of forest and wetlands to the east between the vernal pool and Storrs Road. The Klemens letter further states that the current plans comply with the aggregate of 25% maximum loss of Critical Terrestrial Habitat (CTH), following the recommendations set forth in Calhoun and Klemens (2002). Dr. Klemens further states that this is the "industry standard" for sustainable development of vernal pools and their associated upland habitat in New England.

The comment regarding compliance with the aggregate of 25% maximum loss of CTH is based on the Vernal Pool Exhibit provided by the applicant. Based on our initial review of the Vernal Pool Exhibit and 2016 Aerial photogrammetry, we requested additional clarification on the habitat conditions of recently developed, non-forested areas along Discovery Drive that were identified as "suitable habitat". This clarification was provided in the follow up letter from Dr. Klemens dated October 24, 2019. We find the response acceptable. It should be noted, however that a large portion of the Critical Terrestrial Habitat is located on off-site properties not under control of the applicant.

Noted and agreed.

As previously requested, a landscape plan is provided in the current application that include a more extensive wetland buffer restoration and enhancement area on the east side of the property near the farm house that is identified as "suitable habitat" on the Vernal Pool Exhibit. It is strongly recommended that any undeveloped property within the Critical Terrestrial Habitat, wetlands and upland review areas be placed under a Conservation Easement and the Easement be marked in the field with placards or other boundary markers.

A Conservation Easement plan has been provided to display the area offered for an easement.

We also recommend that all wetland buffer planting areas and stormwater basin plantings be

monitored for no less than 3 years. It should be the responsibility of the applicant to maintain the plantings and replace them as needed during the monitoring period.

Noted and agreed.

HALLORAN SAGE

Mark K. Branse
860.241.4088
branse@halloransage.com

January 27, 2020

VIA HAND DELIVERY

Jennifer Kaufman, AICP, Inland Wetland Agent/Environmental Planner
Town of Mansfield,
Audrey P. Beck Municipal Building
4 S Eagleville Road
Storrs, Mansfield, CT 06268

RE: INLAND WETLANDS AGENCY APPLICATION W1611-1 - APPLICATION OF J.E. SHEPARD COMPANY AND CAPSTONE COLLEGIATE COMMUNITIES - CONSTRUCTION OF A 358-UNIT MULTI-FAMILY DEVELOPMENT -1621 STORRS ROAD AND MIDDLE TURNPIKE (ASSESSOR PARCEL IDS 9.23.1, 9.23.7 AND 9.23.8)

Dear Ms. Kaufman:

This firm represents the University of Connecticut relative to pending and future applications for the above-captioned property in Mansfield. In that regard, enclosed please find the University of Connecticut's properly executed and acknowledged petition for intervention under Conn. Gen. Stat. §22a-19 as a party in the above-referenced application. As a party, the University requests notice of and the right to participate in any and all meetings with staff and/or consultants at which the applicant is present.

Please be assured that the University is not filing this intervention petition because it has any concerns that the Town will not be reviewing the application fully and completely. The Town has retained professional and capable consultants to assist it in this review and the University has done the same. The University's interest is particularly acute because of the tremendous effort and expense that it incurred in protecting the wetlands and vernal pools on its property during the Discovery Drive construction process and its goal is to protect those valuable resources from any unintended impairment as a result of the pending application.

Thank you for your cooperation and please feel free to contact me with any questions or concerns that you may have.

Sincerely,

Mark K. Branse

cc: Linda Painter, AICP, Director of Planning and Development, Town of Mansfield
Thomas Cody, Esq., Robinson & Cole, LLP
Robert Sitkowski, Associate Director of Real Estate, University of Connecticut

Halloran & Sage LLP One Goodwin Square 225 Asylum Street Hartford, CT 06103 860.522.6103 Fax 860.548.0006 halloransage.com
Hartford Danbury Middletown New Haven New London Westport Washington, D.C.

NOTICE OF INTERVENTION

BY THE UNIVERSITY OF CONNECTICUT

PER

CONNECTICUT GENERAL STATUTES SECTION 22a-19

Re: W1611-1 – Application of J.E. Shepard Company and Capstone Collegiate Communities – Construction of a 358-Unit Multi-Family Development --1621 Storrs Road and Middle Turnpike (Assessor Parcel IDs 9.23.1, 9.23.7 and 9.23.8)

Pursuant to Conn. Gen. Stat. § 22a-19(a), the University of Connecticut (hereinafter "Intervenor") hereby intervenes as a party in the above-referenced application (the "Development Application") on the subject property ("Development Property") and submits the following in support thereof:

The activities proposed in connection with the Development Application ("Development Activities") are reasonably likely to unreasonably impair, pollute or destroy the public trust in the air, waters, and natural resources of the State of Connecticut, which impacts are within the jurisdiction of the Mansfield Inland Wetlands Agency, and include, at a minimum, the following:

1. The proposed site development will use a combination of deep-sump hooded catch basins, HDPE Pipe ranging in diameter from 4" to 15", proprietary hydrodynamic separator units, proprietary underground closed bottom detention structures, rain gardens and infiltration basins to capture, convey, treat and discharge the stormwater runoff. Infiltration basins are stormwater impoundments designed to infiltrate water into the ground. The 2004 *Connecticut Stormwater Quality Manual* provides the following limitation for infiltration basins:

> Potential failure due to improper siting, design (including inadequate pretreatment), construction, and maintenance. Infiltration basins usually fail for one or more of the following reasons (Wisconsin DNR, 2000):
>
> (a) Premature clogging.
>
> (b) A design infiltration rate greater than the actual infiltration rate.
>
> (c) Because the basin was first used for site construction erosion control.
>
> (d) Soil was compacted during construction.
>
> (e) The upland soils or basin walls were not stabilized with vegetation, and sediment was delivered to the basin.

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The proposed development has not provided the necessary data to illustrate that the infiltration basins will function as designed. It is critical that the underlying soils have an appropriate infiltration rate. The soil infiltration rate can be initially determined based on the soil classifications, but more importantly, the rate should be subsequently confirmed by a field investigation. The 2004 *Connecticut Stormwater Quality Manual* recommends one infiltration test and one test pit or soil boring to be performed per 5,000 square feet of basin area. A minimum of three (3) infiltration tests and test pits or soil borings should be performed at each basin. The design of the basin should be based on the slowest rate obtained from the infiltration tests performed at the site. The applicant has performed soil boring and test pits on-site but has not located the test pits in the correct location. In addition, field tests were not performed to determine the infiltration rate. Laboratory testing was used to determine the saturate hydraulic conductivity of soil samples taken from the test pits. Laboratory testing should not be used to determine the field infiltration rates because the results do not adequately represent actual field conditions. Laboratory testing does not take into consideration existing factors such as the groundwater table and presence of bedrock, both of which can impede the movement of water below the soil. At a minimum two (2) tests should be performed at the bottom of each basin location, and the lowest infiltration rate would be used for calculation purposes.

If the design infiltration rate is not determined without adequate field testing, the basin might not function properly. A design infiltration rate that is lower than the actual infiltration rate could cause groundwater contamination. A design infiltration rate that is higher than the actual infiltration rate will cause a larger volume of water to drain into existing wetlands, which will modify their hydroperiod (i.e., the period of time during which wetlands are actually wet). This could lead to a chain of events that includes the die-back of floral species that are adapted to the pre-development hydrologic conditions and the introduction of invasive species, which will outcompete existing floral species. Furthermore, some of the stormwater runoff will be untreated and contain sediment and pollutants that will flow into receiving waters and downstream wetlands. This will modify their natural chemistry, resulting in habitat degradation and toxicological effects.

2. The stormwater runoff from tributary area PDA-1C, as shown on the Proposed Drainage Tributary Map included in Appendix D of the Storm Water Management Report, is collected and distributed by inlet control structure (ICS) 605. The intent of ICS-605 is to split the runoff collected. The water quality flow (flow generated by capturing 90% of the runoff from the average annual storm events, which is equivalent to the runoff associated with the first one inch of rainfall for any storm) will be conveyed to Sand Filter Basin 1 via a 4" plastic pipe. However, this 4" pipe is undersized and cannot convey the required water quality flow/volume to Sand Filter Basin 1. The water quality flow in excess of the 4" pipe capacity is directed to Underground Detention Basin UG-604. Structure UG-604 has a solid bottom with no infiltration or water quality remediation component. Structure UG-604 is designed to

temporarily detain the storm water runoff and slowly discharge the runoff to an existing catch basin located on Middle Turnpike (US-44) via a proposed 12" plastic pipe. The drainage system on US-44 discharges directly into the watercourse located northerly of Route 44. Thus, during a rainfall event greater than 0.75 inches, stormwater runoff from the site will be discharged, without any infiltration or pretreatment, into the watercourse and thence to the large wetlands located downstream. Climate change models and current observations indicate that there are, and will increasingly be, a larger number of intense rainfall events than those experienced historically. The net result is that stormwater is reasonably likely to flow into the watercourse under Route 44 without any pretreatment and on a regular basis. Untreated stormwater contains pollutants including, but not limited to, sediments containing chloride from salt treatment, nutrients such as phosphorus and nitrogen, heavy metals, and toxicants such as oils and grease. The increased pollutant loading will adversely impact the receiving waters and downstream wetland by modifying the natural chemistry of the receiving waters and downstream wetlands. This in turn will result in habitat degradation, and toxicological effects. Water quality impairment will change the components of macroinvertebrate community structure, including population and functional parameters.

3. The proposed site development includes five infiltration basin and two rain gardens. A key step in siting an infiltration basin is determining the elevation of the seasonally high groundwater. Groundwater measurements were recorded during the preliminary geotechnical investigation on 11/19/18 and 12/3/18 and during the Stormwater Management Area Evaluations on 11/14/2019 and 12/5/2019. Based on the proposed plans, geotechnical investigations and stormwater management area evaluations (Appendix D of the Stormwater Management Report), it appears that the infiltration basins will be excavated below or within three feet of the groundwater table. In addition, because these measurements were recorded in November and December, it is likely that the seasonally high groundwater table, which typically occurs between February and April, will be higher. Thus, these basins will likely contain ponded water for part of the year, hampering their effectiveness. The plans depict five borings and twenty-two test pits. Basins 1 and 2 indicate that their bottom elevations are located below the observed seasonally high groundwater levels shown on the record of subsurface investigation for test pits 2 and 3, meaning that they will have standing water, which will hamper their ability to detain, infiltrate, or renovate stormwater during rainfall events. The bottom of Basins 3, 4 and 5 will be within .4 feet of the groundwater which will impact their effectiveness to infiltrate. The overall effect of these design deficiencies is that during significant rainfall events water will flow off of the property at volumes and velocities that exceed current conditions. This will cause erosion and sedimentation downgradient and discharges of stormwater into the wetlands. The surface water discharges will create erosional channels in the wetland, which will eliminate vegetation and change the physical characteristics of the wetland.

4. As stated in the Wetland Functions and Values Assessment report submitted by the applicant, "This wetland is gently to moderately sloping throughout and is classified as a groundwater slope wetland. Groundwater slope wetlands are wetlands that occur on hillsides, where groundwater discharges to the surface through springs and seeps." Groundwater discharge is identified as a principal function of the wetland in the Wetland Functions and Values Assessment report. The majority of precipitation that falls on the existing, undeveloped site is infiltrated into the ground, which recharges the groundwater that feeds the adjacent wetland. The proposed development will result in a substantial decrease in infiltration and a significant increase in the volume of water discharged as surface flow. These changes are reasonably likely to result in less groundwater flow to support the wetlands, including the Vernal Pool to the south of the proposed Development Activities. These changes would alter the physical characteristics of the wetlands and vernal pool, drying them out during periods of low rainfall and flooding them during heavy rainfall events. The resulting change in the normal seasonal flow patterns, alteration of the water table and increased hydroperiod in the wetland will diminish the effectiveness of the wetland to provide one of its primary functions - to serve as a groundwater discharge wetland. The alteration of hydrology will result in significant alteration of wetland processes, species composition and ecological functions of the onsite wetlands.

5. The Vernal Pool to the south of the Development Application property supports a population of vernal pool obligate amphibian species. The three species of amphibian that have been documented in this pool include the Wood Frog (*Lithobates sylvaticus*), Spotted Salamanders, (*Ambystoma maculatum*) and Marbled Salamander (*Ambystoma opacum*). Vernal pools support these amphibian populations because during the summer season the water will dry up either via evaporation or infiltration and, therefore, cannot support predatory fish populations, which would otherwise forage on the amphibian eggs and larva. Hydroperiods in vernal pools fluctuate from year to year based on several hydrologic factors, including the amount of precipitation that falls during a season and depth to groundwater. Although most amphibian populations are accustomed to vernal pools periodically drying up during mating season and before the eggs and larva mature, sustained years of drying will result in the dying-off of the entire population. The design of the stormwater management system, as described above, is reasonably likely to deprive the vernal pool of the subsurface groundwater on which feeds it during the hydroperiod. This increased frequency of hydroperiod reduction will result in this high-functioning vernal pool becoming a "sink," or a habitat that attracts species, but is incapable of supporting that population, effectively creating a trap where the species will die. When this is repeated, this "sink" results in the extirpation, or dying-off, of the population. The loss of species dependent on the vernal pool will deprive the vernal pool of the wildlife that consume the detritus (e.g., leaves, etc.) that falls into the vernal pool, causing it to fill up and cease to exist over time. As observed by Dr.

Michael Klemens and quoted in the case of *River Sound Development, LLC, v. Old Saybrook Inland Wetlands and Watercourses Commission,* 122 Conn. App. 644 (2010):

> The plaintiff's expert, Michael Klemens, testified that "[t]he wood frogs remove a lot of the detritus in the pools. The leaves' energy is transported through the wood frog tadpoles. They're one of the few species which you can say there's direct nexus biologically. And also, the actual quality of the water, physical parameters of the water, are affected by wood frog tadpoles, which is an important thing to take note of." Klemens also testified regarding the effect of wood frogs on the physical quality of water within the vernal pools and concluded that he "would actually call [wood frogs] a keystone species in terms of the wetlands cycles." *Id.*, at 655.

The same situation is true for the vernal pool located to the south of the proposed Development Activities. The Spotted Salamanders and other species identified in this vernal pool consume the detritus and keep the vernal pool viable.

6. An extensive amount of groundwater collection drains (curtain drains) are proposed around all of the buildings, retaining walls, and underground stormwater detention structures. These drains are proposed to discharge to four-25-foot-long sections of perforated pipe level spreaders along the east side of the development site close to the edge of the wetland. Under existing conditions, groundwater discharge is likely evenly distributed along the approximately 1,000 feet of wetland edge adjacent to the development. Under proposed conditions, the intercepted groundwater will be discharged to a combined total length of 100 feet of level spreader associated with the curtain drains. This concentration of groundwater discharge into only 10% of the existing linear feet of existing conditions is reasonably likely to disrupt normal seasonal flow patterns of available water through natural discharge and water table depths of the wetland. There will not be sufficient groundwater flow to support the continued existence of the intermittent watercourse. Since the groundwater slope wetland and intermittent watercourse are headwater features, their primary source of hydrology is groundwater discharge. Headwater streams are highly vulnerable to groundwater fluctuations. The alteration of seasonal flows and changes in water table may reduce or potentially eliminate the intermittent watercourse on the subject property. The modification of seasonal flow patterns and water table alteration will result in physical and biological changes to the wetland.

7. Due to the extensive amount of groundwater drained, much of the discharge from the groundwater collection system will be in the form of surface water to the wetlands. This will adversely impact the wetlands by changing the physical and biological structure of the wetland by intermittently flooding the wetland and extending the hydroperiod. The surface

water discharge will establish erosional channels in the wetland thereby changing the physical characteristics of the wetland. Untreated stormwater will carry with it sediment, nutrients, toxicants and heavy metals which will change the normal chemistry of the wetland, resulting in habitat degradation, and toxicological effects of biological components. Wetland species adapted to longer periods of inundation including invasive species will outcompete the species currently adapted to current conditions.

8. The 150-foot upland review area is incorrectly depicted on the plans submitted and is inconsistent with the information provided at the site walk of November 9, 2019 ("Site Walk"). It is drawn as being 150 feet from *the edge* of the vernal pool to the south of the Development Property on property of the University of Connecticut, and its location is indicated as "approx." (approximate). While the location of the vernal pool is basically correct, site information compiled by the University indicates that the vernal pool is surrounded by an area of inland wetlands ranging from 3 to 30 feet from the edge of the vernal pool in the area in close proximity to the proposed Development Activities. During the site walk, representatives of the applicant stated that they were aware of the University's data and were aware that the vernal pool had a surrounding inland wetland, but the plans submitted do not depict that additional regulated area. Thus, the upland review area extends between approximately 3 to 12 feet farther into the southerly portion of the proposed development site. Furthermore, it is reasonably likely that activities proposed on the Development Property will adversely affect the omitted wetlands around the vernal pool by changing (reducing or increasing) the hydrology feeding the wetland and vernal pool. Any change to the hydrology of a vernal pool and its surrounding wetlands will adversely affect them by changing the species composition of both the vegetation and animals utilizing them. Invasive vegetative species will encroach and eventually dominate the area. Vernal pool obligate species will slowly die off and more generalist common species will dominate. If water remains at all, species like green frogs and bullfrogs will take over. This species change from wood frogs and mole salamanders to green frogs and bullfrogs will change the wetland/vernal pool system because in larval stages (tadpoles are larval frogs) they feed on different materials. Mole salamander and wood frog larva feed on the detritus found in the vernal pools. Bullfrog and green frog larva are significantly larger thus feeding on larger prey/forage like aquatic insects, plants and algae. This also means that the larger animals have more waste. This waste creates more algae. Vernal pool obligate animal species eat a very small amount of algae.

9. An existing 17,780 square foot subdrainage area within the proposed development footprint drains south in the direction of the offsite wetland and vernal pool. The applicant's stormwater management report calls for a partial diversion of runoff from this area into the stormwater collection system which will discharge into a different subdrainage area on the east side of the development. This diversion will reduce the subdrainage area from 17,780 square feet, pre-development, to 12,226 square feet, post development. The stormwater

management report calls for alteration of the pre-development drainage patterns and source of hydrology to the offsite vernal pool and associated wetland. This is contrary to the applicant's stormwater management report which states that "*the existing stormwater flows and volumes to the off-site vernal pool have analyzed and maintained to ensure the sustainability of this unique habitat.*" Similarly, the upland review area along the easterly side of the Development Property (N/F Kardestuncer) was stated on the Site Walk to have been drawn 150 feet from the stone wall which marks the property boundary, but this is not correct based on the plans. The plans do not show the upland review area line as parallel to the stone wall but rather at an angle, with a portion of the upland review line being as little as 120 feet from the stone wall. It is clear that the plans depict an upland review area based on a wetlands delineation which was made without the consent of the property owner and thus cannot be confirmed. Lastly, the area along the easterly property line where the proposed development is closest to the adjacent wetlands appears to be incorrect based on the Site Walk. The area where proposed Building No. 800 is closest to the wetland on the Kardestuncer property exhibits hydrophytic vegetation and evidence of wetland hydrology which are an indication that hydric (wetland) soils are present. The soils in this area should be reexamined. Without an accurate depiction of the upland review area, the Agency is unable to make the findings of impact that are mandated by its regulations.

10. The applicant has failed to address or evaluate the effect of building heights on the adjacent wetlands. The new site plans indicate that buildings 300A through D and 400 will be 3 stories high. Buildings 500A and B, 600 A and B, and 700A through H will be 3/4 split stories. According to the site plans, Buildings 400, 500, 600 and 700 are located within the 150-foot upland review area. According to the site plans, the footprint of Building 300 will straddle the 150-foot upland review area limit, Building 400 will be approximately 85-feet from the wetland, Building 500 will be approximately 65-feet from the wetland, Building 600 will be approximately 85-feet from the known wetland line, and Building 700 will be approximately 50-feet from the wetland. Grading and stormwater basins located between the buildings and wetland will range from 16 to 45 feet from the wetland. Note that a significant length of the offsite wetland on Block 23, Lot 4 is not depicted on the site plans which calls into question the actual distance of the Buildings 500, 600, stormwater basins and limit of disturbance from the wetland. Based on the path of the sun, light will be obstructed to the wetlands during the afternoon and concentrated on the wetlands during the morning, depending on the reflectivity of the building wall surfaces and window size and type. Clearing of vegetation on the site for buildings and stormwater management structures will allow more light to reach the wetlands during all times of the day, increasing the temperature of the wetlands. Building shading will not be adequate to counteract this tendency in the afternoon. Based on a review of the site plans and stormwater management report, roughly half of the property (9.5 acres of the 18.83-acre site) will be developed. The 9.5-acre portion of the property to be developed is principally mixed hardwood forest. According to the proposal, 2.64 acres of the 150-foot wetland buffer (upland review area) will be disturbed to accommodate the proposed development. A "wall" of 3/4 split-story

buildings and stormwater basins will be constructed parallel to the wetland for a distance of approximately 1,000 linear feet. Assuming the upland review area is approximately 3.44 acres at this location, the plan to remove 2.64 acres of mixed hardwood forest within the 150-foot wetland buffer (upland review area) equates to the loss of approximately 76.74 percent of the 150-foot wetland buffer (upland review area) in this defined area. The consequence of forest fragmentation and edge effect will result in changes in microclimatic conditions due to increased sunlight, temperature and wind. The changes in microclimatic conditions will allow for the establishment of invasive floral species that will outcompete and replace native species. The species richness and abundance of plants, macroinvertebrates, amphibians, and avian species will be replaced with greater numbers of invasive and exotic species. The resulting fragmentation and edge effect will adversely affect the wetlands by altering the physical and biological composition of the wetland.

11. In the absence of a planting plan for the proposed rain gardens, it is reasonably likely that invasive species such as Common Reed (*Phragmites australis*), Reed Canarygrass (*Phalaris arundinacea*), and other non-native species will invade and outcompete all other vegetation in the rain gardens. This invasion would likely spread into the adjacent wetlands. In most cases, when invasive plant species invade a site, they out-compete the native vegetative species and become the dominant vegetation within the wetland and often as a monoculture of that species. Most monocultures of invasive wetland vegetation become so dense within the wetland that the increased plant density promotes faster and more complete water absorption rates, thus drying out the wetland. In addition, the root systems of invasive plant species become an intertwined and nearly impenetrable layer, which, in groundwater-fed systems such as the vernal pool and the surrounding wetland, the invertebrate and leaf litter composition of the area changes. The result of the increased draw on the hydrology of the wetland and the change of the wetland invertebrate composition promotes even greater densities and additional numbers of invasive vegetative species that encroach within the wetland and vernal pool. Species such as Japanese stiltgrass (*Microstegium vimineum*), which needs a slightly drier wetland to be a problem, contribute to an even greater irreversible impact on the wetland and vernal pool. This continued alteration will eliminate the vernal pool completely, while the vernal pool animal species will have been extirpated years prior to this occurring.

12. A call-out for a "critter wall" is noted on sheet 5 of 24 and a detail of this "critter wall" is shown on sheet 23 as a detail called "Vertical Amphibian Barrier." Per sheet 5, this critter wall appears to encircle the entire envelope of the limits of disturbance. The detail for the "critter wall" on sheet 23 shows the wall to be comprised of a 6-inch wide and 24-inch tall concrete block buried approximately 12 inches into the soil. The above grade 12 inches of the block will face away from the development and will be backfilled on the development side. A small detail within the block shows a measurement of "Varies 0"-12" depicting how far the block extends out of the ground. This "critter wall" is

a new feature added to the current submission. It is not a sufficient attempt to keep the vernal pool dependent amphibian species from entering the development for the following reasons:

(a) There is a population of wood frogs that utilizes the vernal pool for breeding and egg-laying. Wood frogs can jump farther than 10 feet horizontally and more than 3 feet vertically. The 12 inch above grade wall (per plan details) will easily be crossed by the wood frogs as they leave the vernal pools after breeding. The adult wood frogs will face mortality events from multiple sources once they enter the development.

(b) In addition, when juvenile wood frogs exit the vernal pool on humid days in July after they develop and metamorph to land travel they will also be able to jump a 12-inch wall and will enter the development easily. These juveniles do not leave the pools in a mass movement on rainy nights like the adults enter them. They emigrate from the pool as they develop, which can vary by individual development. However, the movement occurs over a span of one or two weeks. The juveniles will face mortality from maintenance equipment, motor vehicles, people walking, lawn movers, and many other activities.

(c) An adult female Spotted Salamander usually reaches a length of nine and a half (9.5) inches from nose to tail. The rear legs are usually between 5 and 7 inches from the nose. Spotted Salamanders are mole salamanders, which spend the majority of their lives underground in tunnels, tree-root systems and subsurface rock systems. This species and the Marbled Salamander, which is the other mole salamander species documented utilizing the vernal pool, are adept climbers and will be able to scale the 12- inch wall rather easily. These salamanders move to and from the vernal pools on rainy nights. Their skin is moist, which allows them to adhere to wet surfaces, including smooth, wet surfaces, as proposed for this "critter wall."

(d) Per the plan details, on the development side of the wall the plans note that the finished grade varies. The plan shows the "critter wall" may be above grade by zero (0) to twelve (12) inches. If this variable depth is on the development side of the wall, this will create a trap for animals that might have entered the development. Critter walls are typically created to exclude animals from entering an area. If one does enter, there is no barrier to exclude it from leaving. A wall that is not backfilled to the top of the wall creates a barrier, and so the animal is trapped.

(e) There is no discussion about the maintenance of this "critter wall." High vegetation, debris, rocks and dirt on the outside of the critter wall will make it even easier for animals to enter the development. If maintenance is anticipated, this should be called out and, furthermore, this disturbance will place the development within the 150-foot Upland Review Area off of the wetland and vernal pool at the southern end of the site.

(f) The proposed "critter wall" -- if it functions as proposed and succeeds at keeping most critters out of the development – does not include a plan to direct these animals away from harm. Typically, an animal walks up and encounters the critter wall. If it cannot scale the wall, it will travel along the wall until it is directed away from it. As proposed, the critter wall ends at Middle Turnpike on both sides of the development. As it is proposed, the critter wall will direct all animals that cannot cross it onto a busy roadway where they will likely die.

(g) The critter wall surrounds the entire development. It is ironic that the critter wall is proposed to keep the "critters" that spend a week or so of a year in a vernal pool from entering the development, yet the existing upland forest where the development is proposed is where these "critters" spend 95% of the year. These animals will already have met their demise as the development is cleared, grubbed and constructed.

All of the above-mentioned reasons will result in the vernal pool obligate species being extirpated from the site and, as discussed in section number 4 of this notice of intervention, will irreversibly affect and alter the wetlands and waterbodies they utilize.

13. The revised layout plan shows a new, 4-foot wide trail connection behind Building 600, Building 700 and stormwater basins to the rear of the buildings. The trail connection extends through the upland review area and continues to the farmstead on Block 23, Lot 8. This linear improvement is referred to as a "new trail connection and proposed connection to Storrs Road." The detail sheets do not refer to either of them, do not show soil erosion and sediment control measures, and do not address the impact of the trail on the upland review area and adjacent wetlands. The only potential reference found in the detail sheets is an asphalt/bikeway, but no designated width is indicated. The trail connection/connection to Storrs Road is located in close to the wetlands and skirts the edge of wetlands. Since the details of the trail are unknown, it is assumed that the trail will impact the upland review area and wetland through increased surface water runoff and erosion, pollutant loading from salt application, dispersal of weed seeds by pedestrians and bicycles, and potential unauthorized off-trail disturbances.

14. There are feasible and prudent alternatives to the Proposed Development that will have a lesser impact on the regulated areas. The applicant has submitted a revised layout plan. However, the application does not document how the revised layout will result in fewer impacts on wetlands, watercourses, and wetland review area compared to the original (October 2019) submission. The revised functional values assessment report briefly touches on the merits of the revised stormwater management plan without supporting documentation and clearly disregards the alternatives analysis requirement outlined in Section 7.4G of the Inland Wetlands and Watercourses Regulations. Examples to minimize impacts include, but are not limited to, substantially increasing the distance between the wetlands and proposed development, reducing the size and scale of the proposed development, relocating the infiltration basins away from the wetland, demonstrating that the infiltration basins are located such that the shallow bedrock and high groundwater levels do not preclude the basins from effectively functioning, and ensuring that predevelopment drainage patterns, rates and volumes are maintained to protect onsite and offsite wetlands onsite intermittent water course, offsite vernal pool, and downstream wetland and surface water features.

WHEREFORE, the undersigned party hereby intervenes in this proceeding pursuant to Conn. Gen. Stat. § 22a-19(a) and states under oath that the above statements in this Verified Notice of Intervention are true and correct to the best of its knowledge and belief.

AND WHEREFORE, as the undersigned entity is a party to the proceedings before the Mansfield Inland Wetlands Agency, in the interest of due process and fundamental fairness they hereby request notice of all meetings, formal and informal, between the Applicant and the Agency and its staff and consultants at which this Development Application will be discussed.

The University of Connecticut

By _____
Name: Robert Sitkowski
Title: Assoc. Director of Real Estate

Subscribed and sworn to before me this 27th day of January, 2020 as to Robert Sitkowski.

Rosemary Marcellino
Commissioner of the Superior Court
Notary Public
My Commission Expires: 6|30|21

6300707v.1

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Via Electronic Mail

February 6, 2020

Mr. Paul Aho, Chairman
Inland Wetlands Agency
Audrey P. Beck Municipal Building
4 South Eagleville Road
Mansfield, CT 06268

Re: Application for Inland Wetlands Permit W1611-1
The J.E. Shepard Company and Capstone Collegiate Communities, Applicants
1621 Storrs Road and Adjacent Vacant Land, and Property on Middle Turnpike
Response to Notice of Intervention by University of Connecticut

Dear Chairman Aho and Members of the Inland Wetlands Agency:

The University of Connecticut recently filed a Notice of Intervention pursuant to General Statutes section 22a-19 for the purpose of raising environmental issues regarding the application. The Notice of Intervention consists of 11 single-spaced pages of unsupported factual characterizations and unattributed technical comments about the application. The applicants' professional team has reviewed the Notice of Intervention, and has observed that it is replete with factual inaccuracies about the project and the property itself. In addition, allegations are made about technical and scientific matters which are wholly unsupported and unfounded.

We recognize that the applicants have not yet made their initial presentation to the Commission, but we felt that it was important to set the record straight about what is stated in the Notice of Intervention. Accordingly, the applicants' professional team took the time to summarize their initial reaction to the University's positions in a response document that is attached to this letter.

The simple fact is that the applicants have spent two years planning and designing an excellent project. Extensive field work was conducted to understand site conditions. No direct impacts to wetlands or watercourses are proposed. A rigorous stormwater management plan has been designed to protect wetlands. Careful attention has been paid to protecting natural resources both on and off site. Habitat restoration has been proposed in previously disturbed areas. A large conservation easement has been proposed. Construction inspection, monitoring and maintenance has been proposed. Extensive third-party peer reviews have been completed.

Robinson+Cole

We look forward to presenting this application to you on March 4, 2020.

Sincerely,

Thomas P. Cody
Robinson & Cole LLP
Attorneys for the Applicants

Enclosure

Copy to: Linda Painter, AICP, Director of Planning & Development, Town of Mansfield
Mark K. Branse, Esq., Halloran & Sage LLP
David Fresk, The J.E. Shepard Company
Amanda Wallis, Capstone Collegiate Communities

Mansfield Inland Wetlands Agency

Application W1611-1 of J.E. Shepard Company and Capstone Collegiate Communities

Applicants' Response to Notice of Intervention by the University of Connecticut per CGS § 22a-19

February 6, 2020

Introduction

The applicants' approach to designing the project and preparing Application W1611-1 was interdisciplinary in nature. The applicants' professional team of scientists and engineers includes Bohler Engineering, Davison Environmental, LLC, and Michael W. Klemens, LLC. This team collaborated extensively during application preparation, and this collaboration is ongoing.

The University of Connecticut ("Intervenor") has filed a Notice of Intervention per Connecticut General Statutes § 22a-19 ("Intervention Petition") in this matter. The applicants' professional team has carefully reviewed the Intervention Petition and has numerous responses. For the sake of organization, and to facilitate the Commission's review, this document combines the responses of each consultant into a single, integrated response to each of the numbered allegations in the Intervention Petition. Attribution of the responses is provided with reference to Bohler Engineering ("**Bohler**"), Davison Environmental, LLC ("**Davison**"), and Michael W. Klemens, LLC ("**Klemens**").

The following numbered responses correspond to the numbered paragraphs set forth in the Intervention Petition. At the start of each numbered paragraph, we paraphrase the allegations of the Intervenor for the reader's convenience.

1. *The Intervention Petition alleges that there is potential for failure of the proposed stormwater management features, and that the proposed development has not provided data to illustrate that the basins will function. The Intervenor alleges that the 2004 Connecticut Stormwater Quality Manual ("SWQM") recommends one infiltration test and one test pit or boring to be performed per 5,000 square feet of basin area, and a minimum of three infiltration tests at each basin. The Intervenor alleges that field tests were not performed to determine the infiltration rate; that lab testing was used to determine the hydraulic conductivity of soils samples; and that a minimum of two tests should be performed at the bottom of each basin location, and the lowest rate used for calculation purposes.*

Bohler Response: The potential for failure in storm water management design is carefully considered during the design of any project. In this instance, the project design is consistent with best practices in our profession and in the industry. The potential for failure has been mitigated through project design features that are protective of the environment, and will continue to be mitigated through conscientious construction and inspection protocols.

The information and recommendations in the 2004 Connecticut Stormwater Quality Manual are provided for professional guidance and are intended to augment, rather than replace, professional judgement. The proposed application of these recommendations by the design team incorporates this judgment based on observation of field conditions, and previous professional experience in the application of Low Impact Development stormwater management techniques in the Town of Mansfield and elsewhere.

Potential failure of the proposed stormwater infiltration basins will be avoided by the following efforts that have been incorporated into the project design:

- Through the use of pre-construction and post-construction sediment controls as described in the design plans, premature clogging of stormwater infiltration basins can be easily avoided.
- Design infiltration rates are typically verified during construction. In this case, 22 test pits were excavated, 18 infiltration tests were performed, with 15 being in the vicinity of the five filter basins in order to better understand the anticipated infiltration rates on site. This is an extraordinary amount of field work in support of the project design, and far exceeds what is required.
- Concerns for damage or impact to the filter media from over-compaction, unstable basin walls, or use as sediment control basins during construction are unfounded, as the filter media (proposed to consist of 12 inches of sand and 6 inches of biofiltration soil mix) will not be placed until the site is stabilized and the filter basin construction is being finalized.

The initial conceptual stormwater management design was based on Soil Conservation Service soils classifications. Subsequently, two days of test pit investigations and soil testing were performed to establish actual field conditions. As the site planning and design were done with specific attention to maintaining stormwater flow rates and volumes to the receiving wetlands around the proposed development, it was important to locate infiltration basins proximate to the 900+ lineal feet (LF) of existing wetlands on the east side of the development, where infiltration would be most effective in recharging the stormwater to the ground to maintain the wetland hydrology. Approximately 50,000 SF of land was available for stormwater management, while maintaining as much buffer as possible to the wetland edge. In this area, 15 test pits and soil tests were performed, or 1 test pit per 3,300 SF of potential infiltration basin surface area. Infiltration basin locations were then refined to where they would be most effective.

The soil testing protocol was established with input from LandTech Consultants, the third-party environmental and civil engineering consultants who reviewed the application for the Town of Mansfield. In their correspondence to the Town dated November 11, 2019, LandTech requested the following:

> Soil testing shall consist of deep test pits and logging of soil characteristic, evidence of seasonal high groundwater, etc. Soil samples shall be taken at the proposed depths of the bottom of the basin and permeability tests shall be run to determine the infiltrative capacity of the soil, percolation tests are not acceptable.

With this input, Shelby tubes were used to collect undisturbed samples from test pit walls at the proposed bottom of basin, and falling head soil permeability tests were performed by Whitestone Associates, Environmental and Geotechnical Engineers.

The permeability testing results in the area of the proposed surface sand filters were variable. The SWQM suggests a range of 0.3 inches/hour to 5.0 inches/hour as acceptable for infiltrative practices. Several of the infiltration rates fell outside of the DEEP recommended range. In subsequent revisions to the filter basin layout and configuration, we avoided siting the filter basins in areas where the permeability was below 0.3 inches per hour. We were less concerned with the rates that exceed 5.0 inches/hour because of the pre-treatment and filtration provided by the filtration bed.

Typically, two test pits and soil tests were performed in or adjacent to each of the proposed filter basins. Bohler proposed that soil infiltration rates used for calculation purposes in our Hydrocad storm water models would be the average of the two test results, with a Factor of Safety of 2 applied. This, in application, is very similar in result to using the lowest rate for calculation purposes. Our understanding is that LandTech concurred with this approach.

Davison Response: The Intervenor's claims regarding the "chain of events" that might lead to vegetation die-back and introduction of invasive species are speculative and not specific. They also ignore the effect that the construction of Discovery Drive and the University's clearcutting on nearby land has already had on the area. In fact, invasive species are already present in the wetland.

The Intervenor's comment regarding the potential impact on wetlands from modified water chemistry is speculative, generic, and not supported by any evidence. Stormwater runoff from the water quality storm will be fully treated in a multi-step treatment train and infiltrated into the ground. This will provide treatment that substantially exceeds the CT DEEP recommendations.

2. *The Intervention Petition alleges that a 4" pipe is undersized and cannot convey the required water quality flow/volume to Sand Filter Basin 1. During a rainfall event greater than 0.75 inches, stormwater runoff from the site will be discharged, without any infiltration or pretreatment, into the watercourse and thence to the large wetlands located downstream. Climate change models and current observations indicate that there are, and will increasingly be, a larger number of intense rainfall events than those experienced historically. The net result is that stormwater is reasonably likely to flow into the watercourse under Route 44 without any pretreatment and on a regular basis. The increased pollutant loading will adversely impact the receiving waters and downstream wetland. This in turn will result in habitat degradation, and toxicological effects. Water quality impairment will change the components of macroinvertebrate community structure, including population and functional parameters.*

Bohler Response: This comment is factually inaccurate. It appears to have been written based on earlier versions of the design plans, and thus is inaccurate. The stormwater runoff from tributary area PDA-1C will be collected and distributed by inlet control structure (ICS) 605. The water quality flow (flow generated by capturing the first one inch of runoff) will be

conveyed to Sand Filter Basin 2 via a 4" HDPE pipe. This 4" pipe is NOT undersized and can easily convey the required water quality flow/volume to Sand Filter Basin 2. (Note: the peak flow rate for the 1" Type III 6-hr storm from PDA-1C is 0.02 cubic feet per second (cfs). The maximum capacity of the 4" HDPE at a 0.5% slope is 0.15 cfs. This pipe can be increased in size to 8" to reduce potential for blockage due to extraordinary circumstances, with the inlet controlled with a 4" orifice plate. The most current rainfall data has been utilized in our analysis to account for potential impacts from climate change.

In fact, the proposed distribution of the water quality flow runoff by ICS 605 treats 100% of the water quality flow, and only the continuous flows in a storm greater than one inch are directed to the underground detention facility and metered out slowly to the Route 44 drainage system in order to maintain the existing on-site drainage pattern.

Davison Response: All stormwater discharges from the project site will be treated to levels exceeding the CT DEEP recommendations. There is no basis for the claim that untreated stormwater will flow into the watercourse under Rte. 44. The impacts described are generic and speculative and most importantly, ignore the fact that under current conditions, inadequately treated stormwater is regularly discharged to the watercourse from Rte. 44 and nearby high-pollutant loading uses like gas stations.

3. *The Intervention Petition alleges that it appears that the proposed infiltration basins will be excavated below or within three feet of the groundwater table. In addition, because these measurements were recorded in November and December, it is likely that the seasonally high groundwater table, which typically occurs between February and April, will be higher. Thus, these basins will likely contain ponded water for part of the year, hampering their effectiveness. Basins 1 and 2 indicate that their bottom elevations are located below the observed seasonally high groundwater levels shown on the record of subsurface investigation for test pits 2 and 3, meaning that they will have standing water, which will hamper their ability to detain, infiltrate, or renovate stormwater during rainfall events. The bottom of Basins 3, 4 and 5 will be within.4 feet of the groundwater which will impact their effectiveness to infiltrate. During significant rainfall events water will flow off of the property at volumes and velocities that exceed current conditions. This will cause erosion and sedimentation downgradient and discharges of stormwater into the wetlands. The surface water discharges will create erosional channels in the wetland, which will eliminate vegetation and change the physical characteristics of the wetland.*

Bohler Response: The siting of the filter basins was based on test pit observations of actual ground water, as well as field evidence of the seasonal high ground water table elevation as evidenced by mottling layers and rust lines in the soil, as recorded by Whitestone Associates' soil evaluator. These are the best descriptors of long-term subsurface conditions. Included in materials submitted to the Commission today (Figure 1) are cross sections of the five proposed filter basins, showing locations of the observed groundwater elevation during field testing and observed Seasonal High Ground Water Table (SHGWT) where indicated during field testing by Whitestone Associates. Soil testing results in the vicinity of SFB-1, SFB-2, and SFB-3 indicate the potential for seasonal high groundwater to approach (but not intercept) the bottom of these basins. To address this, we have added an underdrain system set in the upper portion of the filter

bed of these three basins, to eliminate the potential for the basins to remain wet longer than necessary during periods of seasonal high groundwater. We believe that LandTech concurs with our approach. Most importantly, all basins will have a drawdown time that is less than the CTDEEP recommended maximum of 72 hours.

Davison Response: The comment regarding erosion is speculative. The intervenor has not provided any evidence that the stormwater discharges will exceed current volumes or result in erosive velocities. The discharges are managed in a manner that minimizes the potential for erosion by infiltration of 100% of the runoff from typical rainfall events, and the use of 4 long level spreaders for discharges from larger storms.

4. *The Intervention Petition alleges that the proposed development will result in a substantial decrease in infiltration and a significant increase in the volume of water discharged as surface flow. These changes are reasonably likely to result in less groundwater flow to support the wetlands, including the vernal pool to the south of the proposed Development Activities. These changes would alter the physical characteristics of the wetlands and vernal pool, drying them out during periods of low rainfall and flooding them during heavy rainfall events. The resulting change in the normal seasonal flow patterns, alteration of the water table and Increased hydroperiod in the wetland will diminish the effectiveness of the wetland to provide one of Its primary functions – to serve as a groundwater discharge wetland. The alteration of hydrology will result insignificant alteration of wetland processes, species composition and ecological functions of the onsite wetlands.*

Bohler Response: The proposed development does not result in a decrease in infiltration, nor does it result in a significant increase in the volume of water discharged as surface flow. The statement that changes caused by the proposed development "would alter the physical characteristics of the vernal pool, drying them out during periods of low rainfall and flooding them during heavy rainfall events" is false. The site stormwater management system has been carefully designed to mimic the pre-development peak runoff flow rates AND volumes in the 2-, 10-, 25-, and 100-year storms in each of the drainage sub-basins present and analyzed on and around the predeveloped site.

During project design, specific attention was paid to drainage area DP-7, which drains towards the existing off-site vernal pool. Post development, a negligible increase may occur in the volume of runoff to the vernal pool (0.002 acre feet), discharging at a slower flow rate than is currently experienced in the 2-year storm. This equates to a miniscule increase in water surface depth in the vernal pool of 0.067 inches, which will have no detrimental effect on the vernal pool and its habitat.

Davison Response: The stormwater discharges to the groundwater slope wetland will be managed so that pre- and post-development stormwater peak flows and volumes will be very similar. During approximately 90% of all rainfall events, all of the runoff will be treated and infiltrated back into the ground. During larger storm events, additional runoff will be infiltrated via the level spreaders. During those large storms, groundwater slope wetlands in dense glacial till typically receive overland flow and temporary inundation in areas of depressed

microtopography. The wetland is adapted to such fluctuations. The overall slope of the land facilitates drainage to the south via overland flow such that there will be no long-term alteration of the hydroperiod or wetland functions.

5. *The Intervention Petition alleges that the design of the stormwater management system is reasonably likely to deprive the vernal pool of the subsurface groundwater on which it feeds during the hydroperiod. This increased frequency of hydroperiod reduction will result in this high-functioning vernal pool becoming a "sink", or a habitat that attracts species, but is incapable of supporting that population, effectively creating a trap where the species will die. When this is repeated, this "sink" results in the extirpation, or dying off, of the population. The loss of species dependent on the vernal pool will deprive the vernal pool of the wildlife that consume the leaves that fall into the vernal pool, causing it to fill up and cease to exist over time. The same situation is true for the vernal pool located to the south of the proposed Development Activities. The Spotted Salamanders and other species identified in this vernal pool consume the detritus and keep the vernal pool viable.*

Klemens Response: The Intervention Petition exhibits a fundamental lack of understanding of vernal pool ecology and the role of vernal pool obligate species. If a vernal pool is dry during the breeding season ("mating season") as the Intervention Petition states, it likely does not have a hydroperiod long enough to support vernal pool obligates. While vernal pools exhibit significant year to year variation in water levels, and at times can dry up prematurely, in my many years of research experience studying thousands of vernal pools, a pool that is dry during the breeding season is not a vernal pool that supports obligates. The premise of the Intervenor's position is therefore scientifically incorrect.

While wood frogs do cycle leaf matter out of the pool, in my experience I have never seen a vernal pool fill with up with leaves and cease to exist as a wetland as suggested by the Intervenor. In addition, Spotted Salamanders do not consume detritus, as alleged in the Intervention Petition. In fact, Spotted Salamanders (both adult and larvae) are carnivores and do not feed on vegetation (leaves or detritus).

Less than 10% of the watershed that feeds the vernal pool (both surficial and subterranean) is located on the project site, and less than 10% of that area will become impervious (thus, less than 1% of the total vernal pool watershed will become impervious as a result of the project). Calculations in the storm water report exhibit a *de minimus* change in the hydrological inputs to the vernal pool. In short, this very minor alteration is overshadowed by the natural annual variation of hydrology that is considered normal for a vernal pool. The off-site vernal pool will be neither de-watered nor over-watered as a result of activities proposed within the small portion of the vernal pool shed that is located on the project property.

6. *The Intervention Petition alleges that under existing conditions, groundwater discharge is likely evenly distributed along the approximately 1,000 feet of wetland edge adjacent to the development. Under proposed conditions, the intercepted groundwater will be discharged to a combined total length of 100 feet of level spreader associated with the curtain drains. This concentration of groundwater discharge into only 10% of the*

existing linear feet of existing conditions is reasonably likely to disrupt normal seasonal flow patterns of available water through natural discharge and water table depths of the wetland. There will not be sufficient groundwater flow to support the continued existence of the intermittent watercourse. Since the groundwater slope wetland and intermittent watercourse are headwater features, their primary source of hydrology is groundwater discharge. Headwater streams are highly vulnerable to groundwater fluctuations. The alteration of seasonal flows and changes in water table may reduce or potentially eliminate the intermittent watercourse on the subject property. The modification of seasonal flow patterns and water table alteration will result in physical and biological changes to the wetland.

Bohler Response: The use of curtain drains and foundation drains around building foundations and stormwater structures are common engineering and construction practices in New England. Typically, these types of drains discharge to daylight at a point source located away from the construction. In this case, the zone of influence of the proposed curtain drains is limited, and typically not more than 25 feet. As such, the use of curtain drains at foundations and structures addresses the groundwater depth at the point of use and the immediate surrounding area and will not eliminate groundwater flows to the receiving wetlands. Additionally, the outlets designed for the project will not be point source discharges. Instead, they are proposed to be extended, below-grade level spreaders, designed to recharge captured flows back to the groundwater. This approach, along with the use of stormwater recharge filter basins for stormwater volume management, will maintain the water table at pre-development ranges.

Davison Response: The Intervenor's comment incorrectly describes the proposed work, and ignores the actual function of the stormwater management system. The curtain drains, which have an area of influence of approximately 25 feet, are located substantially further upslope from the wetlands. The curtain drains will not affect the groundwater levels in the wetlands. Additionally, all of the runoff from approximately 90% of rainfall events will be infiltrated into the ground in the sand filters, which are 25 feet or more upslope of the wetlands. Runoff from larger storms will be directed to 340 linear feet of infiltration trench-type level spreaders and modified stone wall level spreaders which are proposed along an 860-foot front, 20-50 feet upgradient from the wetland. The level spreaders are designed to maximize infiltration, as well as to provide non-erosive, dispersed flow in large storm events. Normal seasonal flow patterns will be maintained to a wetland which, as noted above, is well-adapted to a fluctuating water table, periodic saturation to the surface, and short-term inundation.

7. *The Intervention Petition alleges that due to the extensive amount of groundwater drained, much of the discharge from the groundwater collection system will be in the form of surface water to the wetlands. This will adversely impact the wetlands by changing the physical and biological structure of the wetland by intermittently flooding the wetland and extending the hydroperiod. The surface water discharge will establish erosional channels in the wetland thereby changing the physical characteristics of the wetland. Untreated stormwater will carry with it sediment, nutrients, toxicants and heavy metals which will change the normal chemistry of the wetland, resulting in habitat degradation, and toxicological effects of biological components. Wetland species adapted*

to longer periods of inundation including invasive species will outcompete the species currently adapted to current conditions.

Bohler Response: The use of curtain drains and foundation drains around building foundations and stormwater structures are common engineering and construction practices in New England. Typically, these types of drains discharge to daylight at a point source located away from the construction. In this case, the zone of influence of the proposed curtain drains is limited, and typically not more than 25 feet. As such, the use of curtain drains at foundations and structures addresses the groundwater depth at the point of use and the immediate surrounding area and will not eliminate groundwater flows to the receiving wetlands. Additionally, the outlets designed for the project will not be point source discharges. Instead, they are proposed to be extended, below-grade level spreaders, designed to recharge captured flows back to the groundwater. This approach, along with the use of stormwater recharge filter basins for stormwater volume management, will maintain the water table at pre-development ranges.

Davison Response: As noted above, there will be no surface discharge to the wetlands during 90% of all rainfall events. All discharges will be treated in excess of CT DEEP recommendations. The Intervenor's comment ignores the fact that groundwater slope wetlands in glacial till are well-adapted to a fluctuating water table, periodic saturation to the surface, and short-term inundation. The Intervenor's comment also conflicts with their own argument in paragraph #6, which posits an adverse impact from a reduced hydroperiod.

8. *The Intervention Petition alleges that the 150-foot upland review area is incorrectly depicted on the project site in the area of the off-site wetlands surrounding the off-site vernal pool.*

Bohler Response: The location of the off-site vernal pool has not been surveyed by the applicants because it is located off-site on University property. The vernal pool location depicted in the application was taken from a figure prepared by Fuss & O'Neill in 2010, and obtained by the development team from public records. This location and configuration of the vernal pool is the same as referenced by Fuss & O'Neill in a 2004 report. The 150-foot upland review area that extends onto the applicants' property and is shown on the application was drawn from the vernal pool limit obtained from the Fuss & O'Neill report. The upland review area line was not drawn using the limit of wetlands surrounding the vernal pool. This very minor mapping discrepancy has been revised and is reflected in the plans submitted today.

Klemens Response: It is not uncommon for vernal pools to be embedded or fringed within a larger wetland. This does not alter the vernal pool calculations. It is quite common for a part of the vernal pool envelope to be wetlands. As those wetlands have insufficient depth to support vernal pool functions, they are not mapped as part of the pool. The Intervention Petition incorrectly states that any change to the hydrology of the vernal pool will create a cascade of negative effects on virtually all aspects of the pool. This is simply incorrect.

The species composition of the forest and surrounding wetlands already have invasive species present. In fact, the University's clear cutting associated with the construction of Discovery Drive has created openings and edges which have facilitated the penetration of invasive plants

and animals into the vernal pool ecosystem. Again, a lack of fundamental biological knowledge is clearly evidenced by the Intervenor's statement if any water remains at all, species like green frogs and bullfrogs will take over. Both of these species require the conversion of the vernal pool into permanent or semi-permanent water bodies as green frogs have a two-year larval cycle and bull frogs have a three-year larval cycle. It's true that green frogs are present in the detention ponds associated with the Discovery Drive project. However, as long as the vernal pool continues to dry annually, neither of these frogs will become established (i.e., breed) in the vernal pool.

The Intervenor's contention that green frog and bullfrog larvae are carnivorous is not supported by any scientific literature that I have reviewed; they consume, as do wood frog tadpoles, plant material including detritus and algae. I am not aware of any peer reviewed scientific literature that evaluates the contribution of waste products between different tadpole species and how that has been shown to impact different wetlands. In fact, it's an apples-to-oranges comparison, as wood frogs breed in seasonal wetlands and green and bull frogs breed in permanent wetlands. These are two different wetland types with very different nutrient cycling capabilities and overall ecologies. The Intervenor's arguments are circular, and appear designed to mislead and confuse readers who may not have the knowledge or experience to discern the finer points of fact versus fiction.

9. *The Intervention Petition alleges that pre-development drainage patterns in the area draining toward the vernal pool will be altered. This is contrary to the applicant's stormwater management report which states that "the existing stormwater flows and volumes to the off-site vernal pool have been analyzed and maintained to ensure the sustainability of this unique habitat." The 150-foot upland review area along the easterly property boundary was stated during the site walk to have been drawn 150 feet from the stone wall which marks the property boundary, but this is not correct based on the plans. The area where proposed Building No. 800 is closest to the wetland on the Kardestuncer property exhibits hydrophytic vegetation and evidence of wetland hydrology which are an indication that hydric (wetland) soils are present. The soils in this area should be reexamined.*

Davison Response: The Intervention Petition ignores the previous wetland delineation work that was completed and approved by the Inland Wetlands Agency. First, the inland wetland boundary was marked by the applicants' soil scientist as required by state and local regulations, and survey-located on project plans. The wetland delineation was then reviewed and confirmed by a third-party soil scientist retained by the Town. The Inland Wetlands Agency conducted a site walk to review the wetland delineation, held a public hearing, and then adopted the wetland delineation that is incorporated into this application. The Intervenor's comments are completely unsupported. Contrary to the Intervenor's assertion, hydrophytic vegetation, hydrologic indicators, and/or hydric soils are not criteria for the delineation of wetlands in the State of Connecticut, where the project site is located.

Bohler Response: The Intervenor's comments are not based on the plans submitted by the applicants on 12/31/2019, as they reference building locations and other details that are obviously incorrect.

As discussed above in the response to comment #4, the site stormwater management system has been carefully designed to mimic pre-development peak runoff flow rates AND volumes in the 2-, 10-, 25-, and 100-year storms in each of the drainage sub-basins on and around the predeveloped site. Specific attention was paid to the drainage area DP-7, which drains towards the existing off-site vernal pool. Post development, a negligible increase may occur in the volume of runoff to the vernal pool (0.002 acre feet), discharging at a slower flow rate as experienced in the 2-year storm. This equates to a miniscule increase in water surface depth in the vernal pool of 0.067 inches, which will have no detrimental effect on the vernal pool and its habitat.

Klemens Response: The existing storm water flows pre and post development to the vernal pool have been analyzed and mimic the natural variation that occurs within the vernal pool basin. As discussed above, the amplitude of any alterations is so minor that it is obscured in the larger year to year variability of the water levels in the pool.

10. *The Intervention Petition alleges that the applicant has failed to address or evaluate the effect of building heights on the adjacent wetlands. Based on the path of the sun, light will be obstructed to the wetlands during the afternoon and concentrated on the wetlands during the morning, depending on the reflectivity of the building wall surfaces and window size and type. Clearing of vegetation on the site for buildings and stormwater management structures will allow more light to reach the wetlands during all times of the day, increasing the temperature of the wetlands. Building shading will not be adequate to counteract this tendency in the afternoon. The consequences of forest fragmentation and edge effect will result in changes in microclimatic condition due to increased sunlight, temperature and wind. This will allow for the establishment of invasive floral species that will outcompete and replace native species.*

Davison Response: The Intervenor's cascade of possible negative effects is a red herring. The wooded area on the project site is a small, isolated forest fragment that is already subject to the edge effect. This is due to its small size and the presence of high traffic roadways, extensive commercial development on three sides, and the University's previous clear-cutting of adjacent land near the vernal pool.

Klemens Response: The Intervenor's contention that the clearing of the site for development will allow more light penetration into the vernal pool, increasing its temperature, augmented by sunlight bouncing off the proposed building's windows, is indeed grasping at straws. To be crystal clear here, the major impact to the vernal pool was caused by the Intervenor's own construction of Discovery Drive. The chosen alignment of Discovery Drive passed right through the middle of two vernal pools, including the most sensitive area, the vernal pool envelope. The associated over-clearing for the roadway consumed critical terrestrial habitat. After Discovery Drive was constructed, the University continued to clear trees within the vernal pool envelope with its forestry studies.

The University constructed Discovery Drive in a manner that was not compliant with leading authorities on the subject (see Calhoun and Klemens (2002)). The major edge effect, and all the

other microclimatic allegations expounded upon in the Intervention Petition, have already occurred, as a direct result of the construction of Discovery Drive and other forestry operations.

For the University to now intervene in this matter and criticize an application that is compliant with Calhoun and Klemens (2002) begs credulity and is hypocritical. The University is using the "vernal pool card" for reasons other than resource protection as they have demonstrated by their actions and their disregard for this resource.

11. *The Intervention Petition alleges that in the absence of a planting plan for the proposed rain gardens, it is reasonably likely that invasive species such as Common Reed, Reed Canarygrass, and other non-native species will invade and outcompete all other vegetation in the rain gardens. This will in turn lead to a cascade of effects that will eliminate the vernal pool completely, while the vernal pool animal species will have been extirpated years prior to this occurring.*

Davison Response: The Intervenor's comments are factually incorrect and wildly speculative. Sheets 15 (Landscape Plan) and 17 (Landscape Notes and Details Sheet) of the plans specify and detail planting plans for the rain gardens. Additionally, the rain gardens are not close to the wetlands (±150 feet and ±290 feet distant) and are not reasonably likely to represent an unreasonable threat to the integrity of the wetland vegetation or ecological processes. Finally, the risk of invasive species is far greater from the construction of Discovery Drive and the clearing that was performed by the Intervenor itself, both of which are much closer to the wetlands in question.

Klemens Response: The vernal pool species are already impacted by the actions of the University by, among other things, only creating a single tunnel under Discovery Drive in non-compliance with leading authorities on the subject (see Calhoun and Klemens (2002)). Anticipating that large numbers of amphibians would, in fact, cross over Discovery Drive is revealed in the "Cape Cod" curbing design along the roadway. The problem with the design for Discovery Drive is that over time significant road mortality will occur and negatively impact the amphibians that cross over (as opposed to under) Discovery Drive. Furthermore, the Intervenor's statements concerning the absorption rates of invasive plant species and their interlocking roots are conjectural and should be compared with the red maple canopy that fringes the pool.

12. *The Intervention Petition alleges that the proposed "critter wall" is not designed properly and will result in the vernal pool obligate species being extirpated from the site.*

Klemens Response: The Intervenor's claims regarding the vertical climbing abilities of Spotted and Marbled Salamanders are spurious. The only Ambystomids in Connecticut that have some ability to climb (albeit weakly) are the slender blue spotted and Jefferson salamanders, neither which occur on site. The chucky Spotted and Marbled Salamanders have centers of gravity that make them very clumsy in any attempt to climb a vertical surface. Metamorph Spotted and Marbled Salamanders can climb if there is sufficient ambient humidity, but will not be able to circumvent an overhang on the wall. As far as the leaping ability of wood frogs, I have watched wood frogs cross roads in flight pattern – their leaps are generally well below two feet – they do

not possess the thigh musculature of pickerel or leopard frogs that allow for such extensive airborne leaps.

In my professional opinion a two-foot smooth faced barrier, with an overhang, will adequately exclude amphibians from the site. I agree that the following modifications should be made to the detail included in the application: 1. The barrier should be two feet in height with a 90-degree perpendicular rise of polished surface. 2. The barrier should have an overhang on top that extends four inches outward to prevent small amphibians from crossing over the barrier by surface tension of their skin especially during rainy nocturnal periods. I understand that these additions have been made to the plans submitted to the Town, and I concur with them.

Amphibians will not be diverted onto Middle Turnpike (Rte. 44). When they travel along the wall, they will eventually turn back into the conserved forest, well before they are near Middle Turnpike. They will in most instances not travel beyond the Critical Terrestrial Habitat illustrated in the Application. It makes no evolutionary sense from a bio-energetic perspective to travel such distances when optimal habitat exists nearby.

The application has taken great care to limit the loss of Critical Terrestial Habitat (CTH) to less than 25%, accounting already for the significant loss created by the construction of Discovery Drive. The application is compliant with my recommendation that no more than 25% of the aggregate CTH be disturbed. The proposed project conserves and restores significant portions of the CTH by restoring land that is currently disturbed. Unlike Discovery Drive, the proposed project completely respects the integrity of the vernal pool envelope, and will conserve the forest in the vernal pool envelope.

13. *The Intervention Petition alleges that the proposed 4-foot wide unpaved walking trail will cause increased surface water runoff and erosion, pollutant loading, dispersal of weed seeds and potential unauthorized off-trail disturbances.*

Davison Response: The proposed unimproved walking trail follows an existing woods road for most of its length. It will not be paved and no grading will be required. It will not result in erosion, increased runoff, or pollutant loading. Weeds and invasive species are currently common at the site as a result of the historic long-term agricultural use of the property. There will be no adverse impact on the upland review area or the wetland.

14. *The Intervention Petition alleges that the applicant does not document how the revised layout has fewer impacts on wetlands, watercourses and review areas, compared to the original (October 2019) submission.*

Bohler Response: The assessment by the design team of prudent and feasible alternatives began long before the October 2019 submission. Extensive study of the site has led to greater understanding of the key resources to be protected. Plans for development of the property have evolved over time to reflect increased protection of natural habitats and resources.

Respectfully submitted,

BOHLER ENGINEERING

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By: *Michael Anderson*
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DAVISON ENVIRONMENTAL, LLC

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Professional Soil Scientist
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MICHAEL W. KLEMENS, LLC

By: *Michael W. Klemens*
Michael W. Klemens, PhD

APPENDIX F: OPERATION AND MAINTENANCE

STORMWATER OPERATION AND SITE

MAINTENANCE PLAN

For

CAPSTONE
COLLEGIATE COMMUNITIES

PROPOSED

Residential Community

1621 Storrs Road, Parcels 9.23.7 and 9.23.1
Town of Mansfield,
Tolland County,
Connecticut

Prepared by:

BOHLER ENGINEERING
16 Old Forge Road
Rocky Hill, CT 06067

BOHLER
ENGINEERING

December 30, 2019
#CT181007

CONTACT / RESPONSIBLE PARTY:

Ben Walker
Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060

MANAGEMENT COMPANY:

Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060
(Local contact information will be designated before project construction.)

(Note: The contact information for the Contact/ Responsible Party shall be kept current. If ownership changes, the Operation and Maintenance Plan must be transferred to the new party.)

Construction Phase

During the construction phase, all erosion control devices and measures shall be maintained in accordance with the final record plans, local/state approvals and conditions, the CTDEEP Construction General Permit and the Stormwater Pollution Prevention Plan (SWPPP) if applicable. Additionally, the maintenance of all erosion / siltation control measures during construction shall be the responsibility of the general contractor. Contact information of the OWNER and CONTRACTOR shall be listed in the SWPPP for this site. The SWPPP also includes information regarding construction period allowable, housekeeping and emergency response procedures.

Post Development Controls

Once construction is completed, the post development stormwater Best Management Practices (BMP's) are to be operated and maintained in compliance with the following permanent procedures (note that the continued implementation of these procedures shall be the responsibility of the Owner or its assignee):

1. **Litter and Debris Removal:** Litter/Debris to be removed and disposed of weekly.

2. **Parking lots and on-site driveways:** Sweep at least four (4) times per year and on a more frequent basis depending on operations. All resulting sweepings shall be collected and properly disposed of off-site in accordance with CTDEEP and other applicable requirements.

3. **Catch basins, yard drains, trench drains, manholes and piping:** Inspect four (4) times per year and at the end of foliage and snow-removal seasons. These features shall be cleaned four (4) times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the catch basin or underground system. Accumulated sediment and hydrocarbons present must be removed

and properly disposed of off-site in accordance with CTDEEP and other applicable requirements.

4. **Water Quality Unit (Proprietary Separator):** Twice per year (Spring and Fall), Per manufacturers recommendations (attached).

5. **Water Quality Filtration Basin:** Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. Remove trash and debris at inlet riprap stilling pad, mow and remove grass clippings and accumulated organic matter. Any sediment removed shall be disposed of in accordance with CTDEEP and other applicable requirements.

6. **Underground Detention Basins:** Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. The outlet of the basin, if any, shall be inspected for erosion and sedimentation, and rip-rap shall be promptly repaired in the case of erosion. Sediment collecting in the bottom of the basin shall be inspected twice annually, and removal shall commence any time the sediment reaches a depth of six inches anywhere in the basin. Any sediment removed shall be disposed of in accordance with CTDEEP and other applicable requirements.

7. **Rain Gardens:** shall be inspected and cleared of trash monthly; mowed 2 to 12 times per year; mulched annually; fertilized annually; dead vegetation removed annually; pruned annually; replace entire media and all vegetation as needed. Any sediment removed shall be disposed of in accordance with CTDEEP and other applicable requirements.

8. **Landscape Replacement/ Restoration of Eroded Areas:** Landscaped areas shall be monitored, maintained and mulched as necessary, but at a minimum of twice annually. Plants shall be replaced as needed.

9. **Maintenance Access Roads:** Maintenance access roads shall be kept clear of debris and litter. Area shall be inspected annually, and woodchips shall be replaced as necessary to maintain a functional pathway.

10. **Trash Removal Procedures:** Exterior waste areas shall be cleaned weekly and waste screening will be inspected quarterly and repair on an as needed basis.

11. **Integrated Pest Management:** Operator will contract with a licensed pest management company to review the proposed site conditions and provide appropriate measures, procedures and controls to minimize potential pest issues.

Overall Site Operation and BMP Maintenance Schedule			
BMP	**Maintenance Protocol**	**Frequency of Maintenance**	**Responsible Party**
General	Litter & Debris Removal	Weekly	Management Company
Parking Lot sweeping	Sweep parking lots, collect and properly dispose	Minimum 4 times annually	3rd Party/ Management Company
General	Inspect and Clean stormwater structures and piping	Minimum 4 times annually	3rd Party/ Management Company
Water Quality Separator	Follow Manufacturer's Recommendations	2 times annually (Spring & Fall)	CDS Engineered Solutions/ Management Company
Water Quality Filter Basin	Inspection and Preventative maintenance. Rake bottom, remove trash and debris, mow and remove glass clippings and accumulated organic matter	After every major storm event for the first 3 months of install, and minimum 2 times annually, thereafter	Management Company
Underground Detention Basins	Outlet of basin to be inspected for erosion and sedimentation. Sediment collecting in the bottom of the basin shall be vacuumed and removed when sediment reaches a depth of six inches.	After every major storm event for the first 3 months of install, and minimum 2 times annually, thereafter	3rd Party/ Management Company
Rain Garden	Shall be inspected and cleared of trash	Monthly	Management Company
	Mowed	2-12 times per year	
	Dead debris removed, mulched, fertilized, pruned	Annually	
General	Landscaped areas to be maintained and mulched as necessary. Plants shall be replaced as needed	Minimum 2 times annually	Management Company
General	Exterior trash enclosure areas shall be inspected and cleaned	Weekly	Management Company

LONG-TERM POLLUTION PREVENTION PLAN

CONTACT / RESPONSIBLE PARTY:

Ben Walker
Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060

MANAGEMENT COMPANY:

Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060

For this site, the Long-Term Pollution Prevention Plan will consist of the following:

- No outdoor maintenance or washing of vehicles allowed.
- The property owner shall be responsible for "good housekeeping" including proper periodic maintenance of building and pavement areas, curbing, landscaping, etc.
- Proper storage and removal of solid waste (dumpsters). Disposal of debris, trash, sediment, and other waste material should be done at a suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations. Exterior waste areas will be cleaned weekly and waste screen
- Sweeping of driveways, a minimum of four times per year with a commercial cleaning unit. Any sediment removed shall be disposed of in accordance with applicable local and state requirements.
- Regular inspections and maintenance of Stormwater Management System as noted in the "O&M Plan".
- Landscape Plantings shall be monitored a minimum of four times per year and are to be replaced as necessary.
- Snow removal and ice management shall be the responsibility of the property owner. Snow shall not be plowed, dumped and/or placed in forebays, water quality filtration basins, rain gardens or similar stormwater controls. Salting of pavement / walkway areas during winter conditions shall only be done in accordance with all state/local requirements and approvals. Sanding is not recommended due to the use of pervious pavements. Salt storage areas shall be covered or located such that no direct untreated discharges are possible to receiving waters from the storage site. Salt shall be utilized to the minimum extent practical.

OPERATON AND MAINTENANCE TRAINING PROGRAM

The Owner will coordinate an annual in-house and 3rd-Party Management training session to discuss the Operations and Maintenance Plan, the Long-Term Pollution Prevention Plan, and the Storm Water Pollution Prevention Plan (SWPPP). Annual training will include the following:

- Explain the general operations of the stormwater management system and its BMPs
- Identify potential sources of stormwater pollution and measures / methods of reducing or eliminating that pollution
- Emphasize good housekeeping measures
- Explain goals and requirements of Landscaping program:
    - Reseed any bare areas as soon as they occur. Erosion control measures shall be installed in these areas to prevent deposits of sediment from entering the drainage system.
    - Grass shall be maintained at a minimum blade height of two to three inches and only 1/3 of the plant height shall be removed at a time. Clippings shall not be disposed of within stormwater management areas or adjacent resource areas.
    - Plants shall be pruned as necessary.
    - The use of fertilizers will be by licensed professionals and shall be employed only to the extent necessary to maintain healthy landscaping.
    - The use of pesticides will be by licensed professionals and shall be employed only to the extent necessary to maintain healthy landscaping. Where possible mechanical methods (i.e. pest traps) or biological methods (i.e. beneficial insects) of pest control shall be implemented.
- Explain the Snow Removal requirements of the Snow Removal program:
    - Snow piles shall be located adjacent to or on pervious surfaces in upland areas. This will allow snow melt water to filter in to the soil.
    - In no case shall snow be disposed of or stored in resource areas (wetlands, floodplain, streams or other water bodies).
    - In no case shall snow be disposed of or stored in the infiltration basins.
    - If necessary, stockpiled snow will be removed from the Site and disposed of at an off-site location in accordance with all local, state and federal regulations.
    - The amount of deicing chemicals shall be kept at the minimum amount required to provide safe pedestrian and vehicle travel.

STORMWATER MANAGEMENT SYSTEM

POST-CONSTRUCTION INSPECTION REPORT

LOCATION:

1621 Storrs Road, Parcel 9.23.1 & 9.23.7
Mansfield, Connecticut

RESPONSIBLE PARTY:

Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060
(Local contact information will be designated before project construction.)

NAME OF INSPECTOR:	INSPECTION DATE:
Note Condition of the Following (sediment depth, debris, standing water, damage, etc.):	
Litter & Debris removal:	
Parking lots and on-site driveways:	
Catch basins, yard drains, trench drains, manholes and piping:	
Water Quality Unit (Proprietary Separator):	
Water Quality Filtration Basin:	

Underground Detention Basins:
Rain Gardens:
Landscape Replacement/ Restoration of Eroded Areas:
Maintenance Access Roads:
Trash Removal Procedures:
Other
Comments:

STORMWATER INSPECTION AND MAINTENANCE LOG FORM			
1621 Storrs Road, Parcel 9.23.1 & 9.23.7 ***Mansfield, Connecticut***			
Stormwater Management Practice	Responsible Party	Frequency	Maintenance Activity Performed

Wetland Functions & Values Assessment

1621 Storrs Road and Middle Turnpike
Mansfield, CT

Submitted to:
Capstone Collegiate Communities
431 Office Park Drive
Birmingham, Alabama 35223

Submitted by:

Eric Davison
Wildlife Biologist
Registered Soil Scientist
Certified Professional Wetland Scientist

Submitted:

December 30, 2019

CONTENTS

ATTACHMENTS

- Figures 1-2
- Site Photographs

1.0 INTRODUCTION

Davison Environmental, LLC has prepared this wetland assessment on behalf of Capstone Collegiate Communities and the J.E. Shepard Company ("Applicants") in connection with an application to the Town of Mansfield Inland Wetland Agency for a proposed residential development. The Applicant proposes a multi-unit residential development with a two-way access drive leading from Middle Turnpike ("Project").

Site visits were conducted in April and May of 2017, August of 2018 and August of 2019. The purpose of those visits was to delineate wetlands and watercourses, assess the functions and values of wetlands, and evaluate vernal pools.

2.0 EXISTING ENVIRONMENT

2.1 General Site Description

The site includes three parcels totaling 18.836 acres, with frontage on both Middle Turnpike and Storrs Road. Most of the site is undeveloped and forested. The southeasterly parcel contains an historic farmhouse with a poultry barn and outbuildings. An historic farm road crosses the wetland to an old pasture area located in the southwest corner of the site. The topography slopes from south to north, with a large wetland occupying the east-central portions of the site.

2.2 Watershed

Site wetlands drain in a northwesterly direction, exiting the site at a culvert under Route 44. On the north side of Route 44, flows enter a large swamp system which drains to Cedar Swamp Brook. The system is part of the Willimantic River sub regional drainage basin.

2.3 Wetland and Watercourse Description

A single contiguous wetland is present on the eastern portion of the site. This wetland is gently to moderately sloping throughout and is classified as a *groundwater slope wetland*. Groundwater slope wetlands are wetlands that occur on hillsides, where groundwater discharges to the surface through springs and seeps. Due to the wetland's sloping topography areas of seasonally flooded hydrology (i.e., prolonged standing water) are absent.

The wetland originates to the south of the site (upslope) and flows north, eventually draining under Route 44 via a 24" culvert at wetland flags 72-73 and continuing north. As the wetland flows north across the site it broadens, and an intermittent watercourse develops within the center of the wetland.

The wetland is predominately forested, with one small area of wet meadow habitat near the poultry barn (see photos 1-5). Wetland vegetation consists of red maple (*Acer rubrum*), American elm (*Ulmus americana*) and yellow birch (*Betula allegheniensis*) in the tree layer. The shrub and herbaceous layers are dominated by spicebush (*Lindera benzoin*), skunk cabbage (*Symplocarpus foetidus*), clearweed (*Pilea pumila*), royal fern (*Osmunda regalis*), cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), goldenrod (*Solidago sp.*), sphagnum moss, and the invasive non-native Japanese barberry (*Berberis thunbergii*). Wet meadow habitat near the poultry barn is dominated by the invasive non-native reed canarygrass (*Phalaris arundinacea*).

The historic farm use has altered the wetland. Areas of wetland were previously filled to accommodate the two outbuildings and the farm road was installed to access the western portion of the site from the farmhouse. The farm road crossing consists of a hand laid stone culvert. Around the poultry barn, flows were diverted into several small channels to carry flow from the south around the barn and into the lower wetland system to the north.

2.4 Wetland and Watercourse Delineation

Site wetlands were delineated on August 3 and 28, 2018 by Registered Soil Scientist Eric Davison. Wetland soils on the site consist of the Ridgebury, Leicester and Whitman complex. This is an undifferentiated mapping unit consisting of two poorly drained (Ridgebury and Leicester) and one very poorly drained (Whitman) soil developed on glacial till in depressions and drainageways in uplands and valleys. Their use interpretations are very similar, and they typically are so intermingled on the landscape that separation is not practical. The Ridgebury and Leicester series have a seasonal high-water table at or near the surface (0-6") from fall through spring. They differ in that the Leicester soil has a more friable compact layer or hardpan, while the Ridgebury soils have a dense to very dense compact layer. The Whitman soil has a high-water table for much of the year and may frequently be ponded.

The non-wetland soils were not examined in detail, except as was necessary to determine the wetland boundary. Non-wetland soils consist of the Canton and Charlton complex, the Woodbridge series, and the Paxton and Montauk complex. The Canton series consists of very deep, well drained soils formed in a loamy mantle underlain by sandy glacial till. They are typically found on nearly level to very steep glaciated plains, hills, and ridges. Slope ranges from 0 to 35 percent. Permeability is moderately rapid in the solum and rapid in the substratum. The soils developed in a fine sandy loam mantle over acid sandy glacial till of Wisconsin age derived mainly from granite and gneiss and some fine-grained sandstone.

The Charlton series is a very deep, well drained loamy soil formed in friable till. They are typically nearly level to very steep soils on till plains and hills. Depth to bedrock and the seasonal high-water table is commonly more than 6 feet.

The Woodbridge series consists of moderately well drained loamy soils formed in compact, subglacial till. They are very deep to bedrock. They are nearly level to moderately steep soils on till plains, hills, and drumlins. Depth to the compact layer (hardpan) is 18 to 40 inches. Depth to bedrock is commonly more than 6 feet. Woodbridge soils have a seasonal high-water table on top of the compact layer (18-40”) from fall through late spring.

The Paxton series consists of well drained loamy soils formed in subglacial till. The soils are very deep to bedrock and moderately deep to a densic contact (known locally as hardpan). They are typically found on nearly level to steep soils on till plains, hills, and drumlins. The depth to the densic contact and material is commonly 20 to 40 inches, but the range includes 18 to 40 inches. Depth to bedrock is commonly more than 6 feet.

The Montauk series consists of very deep, well drained soils formed in glacial till derived primarily from granitic materials. These soils are typically found on upland till plains and moraines. Slope ranges from 0 to 35 percent. The landscape in some areas has many closed depressions, some of which are filled by perennial ponds or wet spots. The soils formed in thick

moderately coarse or medium textured glacial till mantles underlain by firm sandy till. Some areas have very stony or extremely stony surfaces. The potential for runoff is low to high. Permeability is moderate or moderately rapid in the solum and slow or moderately slow in the substratum.

2.5 Upland (Non-Wetland) Habitats

Upland habitats present at the site include mixed hardwood forest and old field. Mixed hardwood forest areas are dominated in the tree layer by sugar maple (*Acer saccharum*), hickory (*Cary asp.*), ash (*Fraxinus sp.*), black oak (*Quercus velutina*), hemlock (*Tsuga canadensis*) and black cherry (*Prunus serotina*). The shrub layer is sparsely vegetated and open, but includes Japanese barberry and spicebush, and the groundcover includes hay-scented fern (*Dennstaedtia punctilobula*), Virginia creeper (*Parthenocissus quinquefolia*) and the invasive non-native Asiatic bittersweet. See photos 7-8.

Areas of open meadow, succeeding to forest, occur within the southwest portion of the site (see photo 6). Based on the presence of several “wolf” trees, the area is likely former pastureland. Meadow vegetation is dominated by goldenrods, as well as reed canarygrass.

3.0 WETLAND FUNCTIONS AND VALUES

3.1 Wetland Functions and Values

The functions and values of Site wetlands are summarized in Table 1 and discussed in Sections 4.2. The *Highway Methodology* recognizes 13 separate wetland functions and values which are listed in Table 1.

The degree to which a wetland provides each of these functions is determined by one or more of the following factors: landscape position, substrate, hydrology, vegetation, history of disturbance, and size. Each wetland may provide one or more of the listed functions at significant levels. The determining factors that affect the level of function provided by a wetland can often be broken into two categories. The effectiveness of a wetland to provide a specified function is generally dependent on factors within the wetland whereas the opportunity to provide a function is often influenced by the wetland’s position in the landscape as well as adjacent land uses. For example, a depressed wetland with a restricted outlet may be considered highly effective in trapping sediment due to the long residence time of runoff water passing through the system. If this wetland is located in gently sloping woodland, however, there is no significant source of sediment in the runoff therefore the wetland is considered to have a small opportunity of providing this function.

Table 1: Summary of Wetland Functions and Values

Wetland Functions and Values	Groundwater Recharge/Discharge	Sediment/Shoreline Stabilization	Floodflow Alteration	Fish & Shellfish Habitat	Sediment/Toxicant/ Pathogen Retention	Nutrient Removal/Attenuation	Production Export	Wildlife Habitat	Recreation	Educational/Scientific Value	Uniqueness/Heritage	Visual Quality/Aesthetics	Listed Species Habitat
Wetland 1	P	N/A	P	N/A	P	P	S	S	U	U	S	S	U

Suitability
P = principal function
S = secondary function
U = function unlikely to be provided at a significant level
N/A = not applicable

3.2 Principal Functions and Values of Site Wetlands

Four principal functions and values were identified for site wetlands:

(1) Groundwater Recharge/Discharge – This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers (not necessarily public water supply aquifers), regardless of the size or importance of either. The wetland at the site is a hillside groundwater slope wetland where groundwater actively discharges to the surface via seeps and springs.

(2) Floodwater Storage – This function considers the effectiveness of the wetland in reducing flood damage by water retention for long periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas. The wetland at and near the site is large in size and occupies a location in the upper reaches of the watershed where floodwater retention is most important and effective. The wetland contains organic upper soil horizons which have a high water holding capacity. However, this function is limited due to the sloping topography of the wetland that does not allow standing water to develop.

(3) Sediment/Toxicant/Pathogen Retention – This function reduces or prevents degradation of downstream water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants or pathogens in runoff from surrounding uplands, or eroding upstream wetlands and/or watercourses. The wetland at the site contains organic upper soil horizons and moderately dense herbaceous vegetation capable of slowing water flow, capturing sediment and adsorbing toxicants and pathogens.

(4) Nutrient Removal/Retention/Transformation – This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands, and the ability of the wetland to process these nutrients into other forms or trophic levels. The wetland at the site contains organic upper soil horizon and moderately dense herbaceous vegetation capable of slowing water flow and sequestering and taking up nutrients.

4.0 REGULATED ACTIVITIES

In this application, direct wetland impacts have been avoided. There will be no filling, grading or other disturbance directly within wetlands. Work is proposed within the Town's 150-foot Upland Review Area (URA). A total of approximately 2.64± acres of work is proposed within the URA. Some of this disturbance is temporary in nature, required to achieve final grades. Most of this disturbance area consists of graded slopes and stormwater basins that will be re-vegetated. Therefore, post-construction impervious surfaces within the URA will be limited to approximately 0.972± acres.

With respect to separation distance of the development from wetlands, disturbance limits will remain a minimum of 16 feet from wetlands at its closest point near Building 500, but in most areas the limits of disturbance are in excess of 40 feet from wetlands.

5.0 WETLAND IMPACT ASSESSMENT & MITIGATION PLAN

5.1 Potential Short-term Impacts

Potential short-term Project impacts to wetlands and watercourses are primarily related to discharges during construction. In order to minimize the potential for these impacts, the erosion and sediment control measures have been designed in accordance with the "2002 Connecticut Guidelines for Soil Erosion and Sediment Control", CT DEEP Bulletin No. 34, and all amendments and addenda thereto as published by the Connecticut Department of Energy and Environmental Protection.

Given the short distance between the work areas and wetland boundary (minimum 16 feet from wetland flag #49 to proposed level spreader), buffering space that can accommodate an unintended sediment discharge should an erosion control barrier fail during construction is limited. Therefore, the potential for sediment to reach the wetland (as opposed to being remediated prior to discharge into the wetland) is increased. Care will need to be taken by the contractor and erosion and sedimentation control inspectors to ensure that a barrier failure does not result in discharge of sediment to wetlands. To insure that rigorous maintenance and inspection of the erosion and sedimentation controls occurs, the Applicant has agreed to 3rd party site inspections that were recommended by the Town's consultants, Landtech. It should also be noted that in some areas where grading activity will occur closest to the wetlands (e.g., east of building 500) a colonial era stone wall parallels the wetland and would act as an impediment to sediment movement in the event of a slope failure.

5.2 Potential Long-term Impacts

Direct wetland impacts have been avoided in the application. Therefore, discussed herein are potential indirect impacts that may occur, along with recommendations for avoiding or mitigating

such impacts. Potential indirect impacts can result from loss of wetland wildlife buffer function, and degradation of wetlands and watercourses from stormwater discharges.

Development within the wetland buffer[1] (i.e., upland area adjacent to the wetland) can affect the habitat value for wetland-dependent wildlife that utilize uplands adjacent to wetlands during the non-breeding portion of their life cycle. Vernal pool wildlife is a well-known example, as mole salamanders and wood frog utilize upland forest adjacent to breeding pools during the non-breeding season. In this case, the nearby, off-site vernal pool supports mole salamanders and wood frogs that are likely to inhabit portions of the subject parcel during the non-breeding season. The Applicants have studied this issue very carefully and have made adjustments to the plan to address vernal pool impacts. A separate letter will be submitted that addresses this issue.

With respect to the wetland wildlife habitat provided specifically by the onsite wetland, due to the sloping topography (and resulting saturated hydrology), the habitat value for wetland-dependent wildlife is limited. This is because most wetland wildlife require a long hydroperiod (depth and duration of standing water) provided by seasonally to permanently flooded wetlands. Simply put, without the presence of standing water for multiple months of the year, many species of wetland-dependent wildlife will not breed in this wetland. Therefore, impacts to wetland wildlife due to the loss of adjacent upland habitat will not be significant. There are two stream salamanders commonly associated with saturated groundwater discharge wetlands, the two-lined salamander (*Eurycea bislineata*) and dusky salamander (*Desmognathus fuscus*). Both species may occur in this wetland. Both species sometimes use upland areas adjacent to wetlands, particularly during the wetter spring season, but their movements are largely restricted to the wetland itself.

Stormwater discharges from developed areas can impact wetlands in two fundamental ways: (1) by introducing pollutants that degrade water quality; and (2) altering flow dynamics that affect downstream wetland and stream morphology.

Pollutants that can occur in stormwater include pathogens (e.g., from onsite sewage disposal systems), sediment (e.g., from snow and ice treatment); nutrients (e.g., from lawn care products or septic systems) and toxicants such as oil, grease (e.g., from automobile products). In this case, the site will be serviced by municipal sewer and therefore no onsite sewage treatment is proposed. With respect to sediment, toxicants and nutrients, modern stormwater treatment practices are designed to effectively capture and treat these pollutants before they enter wetlands and watercourses. Most effective at treating these pollutants are vegetated stormwater basins where pollutants are treated through sequestration (in the soil and plant material) as well as uptake by plants (e.g., nutrients), while sediment is captured in forebays and mechanically removed through periodic maintenance.

Stormwater treatment practices that qualify as *Primary Treatment Practices* have been incorporated into the site plans. Primary treatment practices, as defined the Connecticut Department of Energy and Environmental Protection's 2004 Connecticut Stormwater Quality

[1] The wetland buffer is a biological, as opposed to regulatory construct. It refers to the fact that many species of wetland-dependent wildlife utilize the upland (non-wetland) areas immediately adjacent to wetlands during some portion of their life cycle. It is not to be confused with the Upland Review Area, which is a regulatory area.

Manual (or related measures developed more recently) are most effective at treating stormwater pollutants. Stormwater measures proposed a treatment train that polishes stormwater using multiple methods before discharging to wetlands. The stormwater system proposed underground detention systems, sand filter basins, level spreaders, multiple outlet discharges to decrease concentrated flows, rain gardens, deep sump catch basins and swirl concentrators. This system will include mechanical pre-treatment of stormwater with final polishing to occur within the vegetated sand filter basins.

Development can alter wetland and stream flow dynamics by increasing the amount of peak flows (during a single storm), as well as the total volume of water that discharges from a site. These hydrologic changes can exacerbate local flooding, reduce the flood storage capacity of wetlands through organic matter erosion, stream channel erosion and downcutting. These impacts can ultimately reduce groundwater recharge and affect stream flow regimes which can impact aquatic habitat downstream. These impacts are mitigated through the proper sizing of stormwater treatment measures that preserve the pre-construction watersheds, peak flows rates and total volume of discharge. The proposed stormwater measures have been designed in a manner that largely maintains the existing natural discharge of groundwater from uplands to wetlands by utilizing multiple smaller basins thereby dispersing the discharge points across the wetland boundary to mimic natural wetland-upland groundwater interaction. With respect to stormwater volume, the project has been designed with minimal affect on the pre-construction runoff volumes, with a negligible change of +1.3% for the 2-year storm and a 1-2% decrease in the 10 through 100-year storms.

5.3 Recommended Mitigation Measures Proposed

Planting Recommendations

Davison Environmental has worked with Bohler Engineering to recommend plantings for the stormwater treatment basins and limits of disturbance aimed at maximizing the pollutant renovation function and habitat value. We recommended the following plantings:

1. Stormwater basins will be planted with emergent vegetation to promote the removal of particulate and soluble pollutants and nutrients through uptake, absorption, physical filtration and biological decomposition. *New England Erosion Control/Restoration Mix for Detention Basins and Moist Sites* (New England Wetland Plants, Inc.) is an emergent seed mixture containing native grasses and wildflowers designed to colonize generally moist, recently disturbed sites where quick growth of vegetation is desired to stabilize the soil surface. This mix is particularly appropriate for detention basins that do not hold standing water. Many of the plants in this mix can tolerate infrequent inundation after establishment, but not constant flooding. The seed mix should be planted at a rate of 1250 sq. ft./lb.

2. In addition to the basin seeding, 2” live plugs (Smooth Aster, Hop Sedge, Stout Wood Grass, Soft Rush, Woolgrass, Grey Goldenrod), spaced 18” on-center, will be planted.

3. The limits of disturbance should be planted with the *New England Conservation/Wildlife Mix* (New England Wetland Plants, Inc.) seed mix at a rate of 1750 sq ft/lb. This mix is designed to provide a permanent cover of grasses, wildflowers, and legumes for both

erosion control and wildlife habitat value. The mix is designed to be a no maintenance seeding, and is appropriate for cut and fill slopes, detention basin side slopes, and disturbed areas adjacent to developments. These areas should be mowed once annually.

Wetland Buffer Restoration and Enhancement

As compensation for wetland buffer functions lost, the Applicant has agreed to restore an existing degraded buffer area resulting from the historic farming operation. This area consists of the poultry barn along with several outbuildings. These buildings, along with associated garbage and debris, will be removed and the area will be planted with native vegetation.

The plans include four different tree species to reforest the area; eastern red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*), pin oak (*Quercus palustris*) and red maple. These tree species will provide cover and food for birds and other wildlife. Trees will be planted at 25-foot spacing and be a minimum of 8-feet tall. Areas of disturbed ground will be planted with the *New England Conservation/Wildlife Mix* (New England Wetland Plants seed mix at a rate of 1750 sq ft/lb). The resulting habitat will not be maintained except for a narrow path to accommodate small equipment access into the site via the farm road.

5.4 Summary and Conclusions

In summary, direct wetland impacts have been avoided. Therefore, the most deleterious impact associated with development - wetland loss, has been avoided. Indirect impacts include loss of wetland buffer habitat (i.e., development within the URA). While this can impact habitat for wetland-dependent wildlife, in this case, the subject wetland has low value for wetland-dependent wildlife due to its hydrology. Moreover, the majority of the URA disturbance is required for the construction of stormwater basins as opposed to impervious surfaces (2.64 acres total URA disturbance, 0.972 for impervious cover). These areas will ultimately be vegetated wetland buffer areas.

The greatest potential for wetland (and downstream watercourse) impacts can result from changes to stormwater quality and quantity. As noted above, these impacts have been mitigated by designing appropriate stormwater treatment practices that achieve significant pollutant removal and manage increases in peak flow rates and total volume of discharge.

When considering the project in totality - with no direct wetland impacts, significant measures to manage stormwater, URA habitat restoration that will mitigate URA impacts and compliance with vernal pool BMPs to protect the offsite vernal pool, it is my professional opinion that this project, if constructed as designed, will not adversely affect wetlands and watercourses.

6.0 REFERENCES

Connecticut Environmental Conditions Online (CTECO) (http://www.cteco.uconn.edu/)

Dowhan, J. and R. J. Craig. 1976. Rare and Endangered Species of Connecticut and Their Habitats. State Geological and Natural History Survey of Connecticut.

Mitsch, W.J. and Gosselink, J.G. 2007. Wetlands, fourth edition. John Wiley and Sons, Inc.

U.S. Army Corp of Engineers. 1995. The Highway Methodology Workbook – Wetland Functions and Values: A Descriptive Approach.

2004 Connecticut Stormwater Quality Manual. Connecticut Department of Environmental Protection.

FIGURES 1 and 2

FIGURE 1
Topographic Map
Storrs Rd & Middle Tnpk
Mansfield, CT

Legend

Site Boundary (approximate)

Map Description: 2016 aerial photograph showing site boundary.
This map is intended for general planning purposes only.

SCALE
0 375 750 1,500 Feet

N

Davison Environmental, LLC
www.davisonenvironmental.com

DAVISON ENVIRONMENTAL

FIGURE 2
Aerial Site Map
Storrs Rd & Middle Tnpk
Mansfield, CT

Legend

Site Boundary (approximate)

Map Description: 2016 aerial photograph showing site boundary.
This map is intended for general planning purposes only.

SCALE
0 125 250 500 Feet

N

Davison Environmental, LLC
www.davisonenvironmental.com

DAVISON ENVIRONMENTAL

SITE PHOTOGRAPHS

Photo 1: central portion of wetland, north side of site, showing central intermittent watercourse

Photo 2: southwest portion of wetlands, looking north

Photo 3: central portion of wetland during mid-summer

Photo 4: central portion of wetland showing areas of concentrated flow

Photo 5: wet meadow/emergent marsh wetland near farm buildings

Photo 6: open meadow west of wetland

Photo 7: upland forest, southwest corner of site

Photo 8: upland forest, southwest corner of site

Photo 9: area around poultry barn proposed for restoration of wetland buffer

SITE DEVELOPMENT PLANS

FOR:

PROPOSED

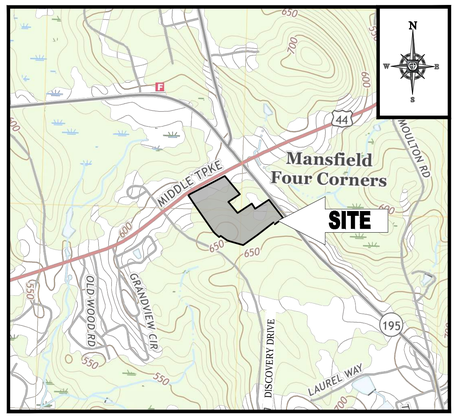
RESIDENTIAL DEVELOPMENT

CAPSTONE
COLLEGIATE COMMUNITIES

LOCATION OF SITE:

1621 STORRS RD & MIDDLE TURNPIKE
TOWN OF MANSFIELD
STATE OF CONNECTICUT

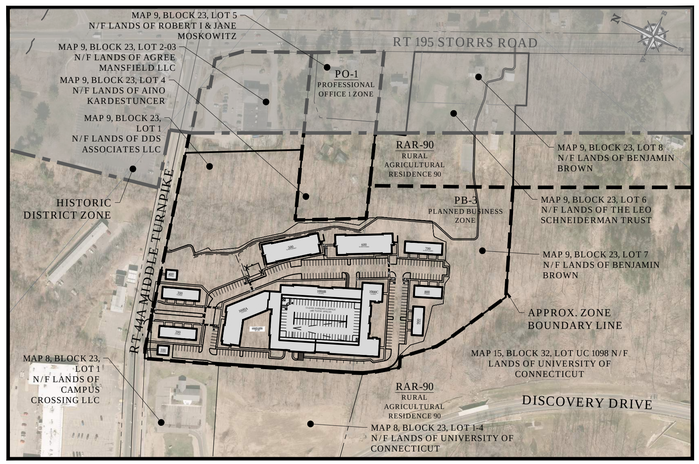
MAP 9, BLOCK 23, LOT 1, 7, & 8



LOCATION MAP

SCALE: 1"=1000'

PLAN REFERENCE: COVENTRY, CT USGS QUADRANGLE



AREA PLAN

SCALE: 1"=200'

SHEET TITLE	SHEET NUMBER
COVER SHEET	1 OF 25
OVERALL AREA PLAN	2 OF 25
ALTA / ACSM SURVEY (BY OTHERS)	1 OF 1
SITE PREPARATION PLAN	4 OF 25
SITE PLAN	5 OF 25
CONSERVATION EASEMENT PLAN	6 OF 25
GRADING PLAN	7 OF 25
OVERALL DRAINAGE PLAN	8 OF 25
CURTAIN DRAIN PLAN	9 OF 25
DRAINAGE PIPE SCHEDULE	10 OF 25
UTILITY PLAN	11 OF 25
SOIL EROSION & SEDIMENT CONTROL PLAN (PHASE I)	12 OF 25
SOIL EROSION & SEDIMENT CONTROL PLAN (PHASE II)	13 OF 25
SOIL EROSION & SEDIMENT CONTROL PLAN (PHASE III)	14 OF 25
SOIL EROSION CONTROL NOTES & DETAILS SHEET	15 OF 25
LANDSCAPE PLAN	16 OF 25
ROOT CELLAR LANDSCAPE PLAN	17 OF 25
LANDSCAPE NOTES & DETAILS SHEET	18 OF 25
CONSTRUCTION DETAIL SHEET	19 OF 25
CONSTRUCTION DETAIL SHEET	20 OF 25
CONSTRUCTION DETAIL SHEET	21 OF 25
CONSTRUCTION DETAIL SHEET	22 OF 25
CONSTRUCTION DETAIL SHEET	23 OF 25
CONSTRUCTION DETAIL SHEET	24 OF 25
GENERAL NOTES SHEET	25 OF 25

SHEET INDEX

PREPARED BY

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REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
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PERMIT SET

PROJECT No.:	CT181007
DRAWN BY:	MAA
CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

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G.P. FITZGERALD

PROFESSIONAL ENGINEER

SHEET TITLE:

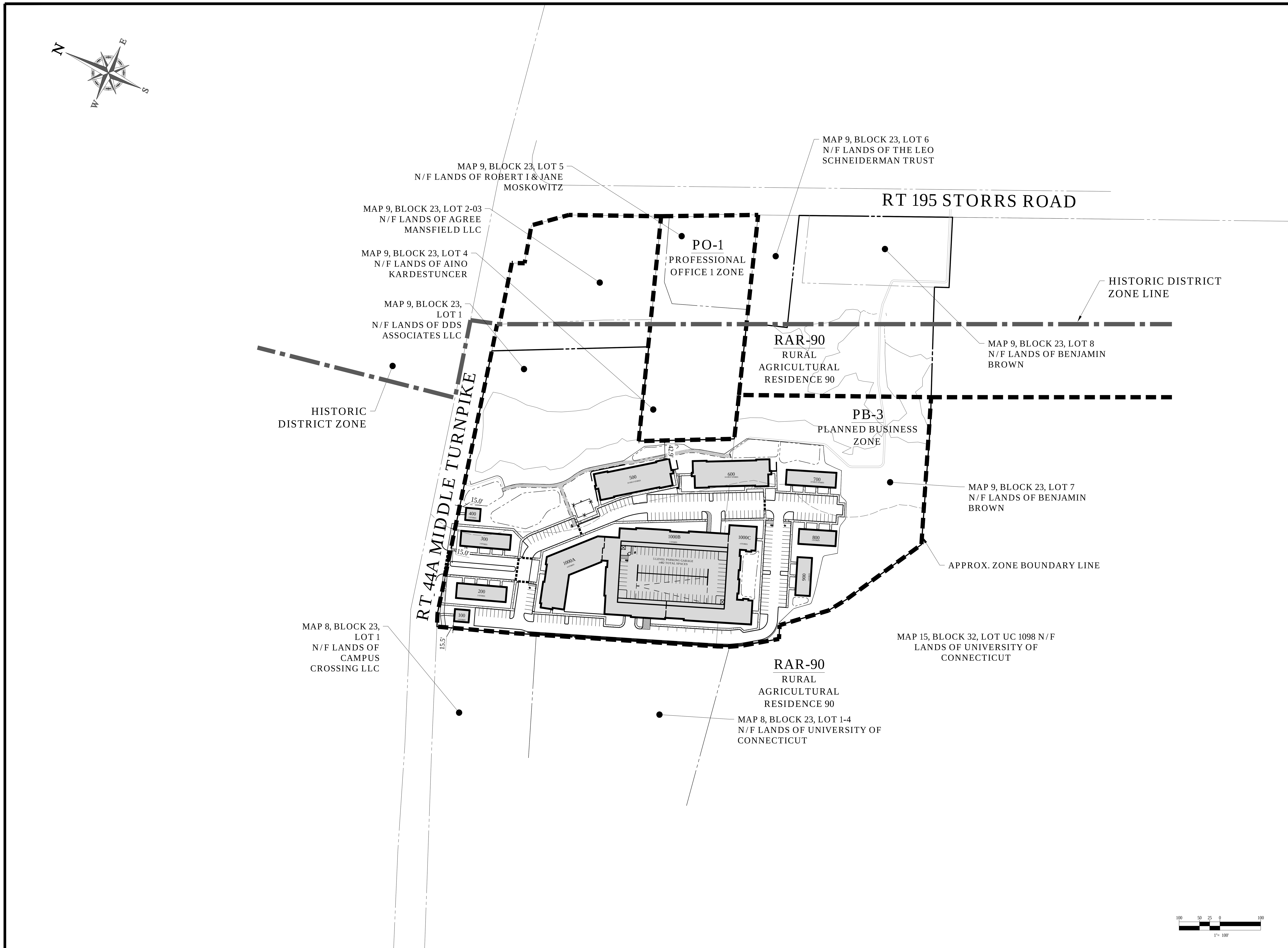
COVER SHEET

SHEET NUMBER:

1

OF 25

REV 1 - 02/06/2020



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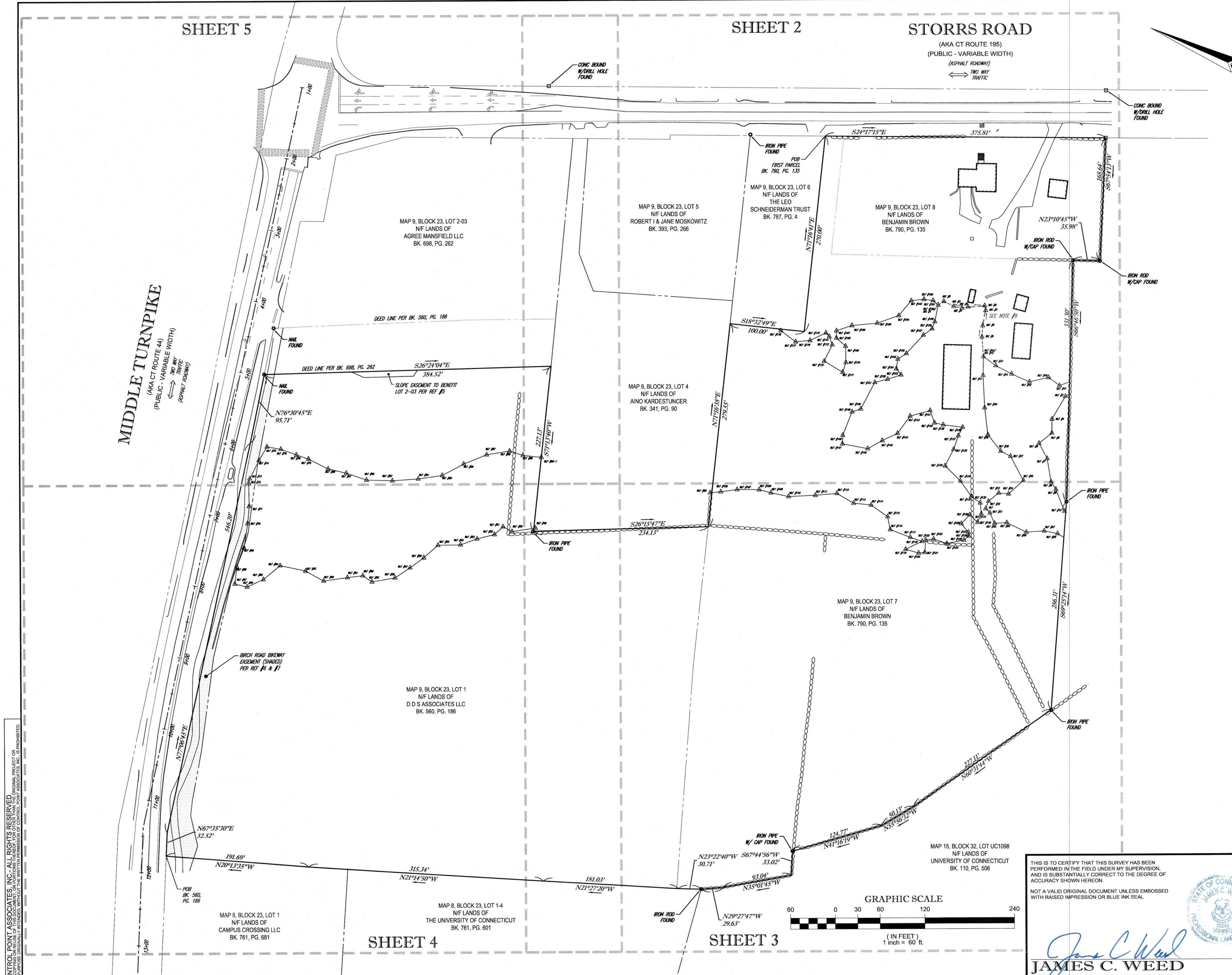
PROFESSIONAL ENGINEER

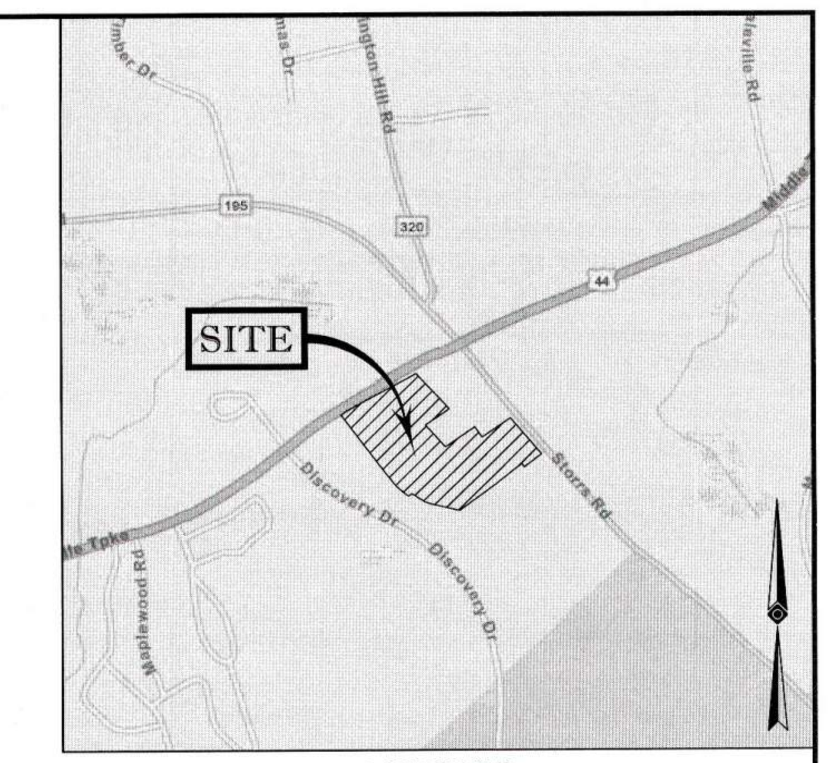
SHEET TITLE:

OVERALL AREA PLAN

SHEET NUMBER:
2
OF 25

REV 1 - 02/06/2020





LOCUS MAP
©2013 ESRI WORLD STREET MAPS

NOTES:

1. PROPERTY KNOWN AS LOTS 1, 7, & 8 AS SHOWN ON THE TOWN OF MANSFIELD, TOLLAND COUNTY, STATE OF CONNECTICUT ONLINE GEOGRAPHIC INFORMATION SYSTEM RESOURCE.

2. MAP 9, BLOCK 23, LOT 1 AREA = 399,881 SQUARE FEET OR 9.180 ACRES
MAP 9, BLOCK 23, LOT 7 AREA = 361,911 SQUARE FEET OR 8.308 ACRES
MAP 9, BLOCK 23, LOT 8 AREA = 58,703 SQUARE FEET OR 1.348 ACRES
TOTAL AREA = 820,495 SQUARE FEET OR 18.836 ACRES

3. LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE. LOCATIONS AND SIZES ARE BASED ON UTILITY MARK-OUTS, ABOVE GROUND STRUCTURES THAT WERE VISIBLE & ACCESSIBLE IN THE FIELD, AND THE MAPS AS LISTED IN THE REFERENCES AVAILABLE AT THE TIME OF THE SURVEY. AVAILABLE AS-BUILT PLANS AND UTILITY MARKOUT DOES NOT ENSURE MAPPING OF ALL UNDERGROUND UTILITIES AND STRUCTURES. BEFORE ANY EXCAVATION IS TO BEGIN, ALL UNDERGROUND UTILITIES SHOULD BE VERIFIED AS TO THEIR LOCATION, SIZE AND TYPE BY THE PROPER UTILITY COMPANIES. CONTROL POINT ASSOCIATES, INC. DOES NOT GUARANTEE THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA EITHER IN SERVICE OR ABANDONED.

4. THIS PLAN IS BASED ON INFORMATION PROVIDED BY A SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC. AND OTHER REFERENCE MATERIAL AS LISTED HEREON.

5. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND IS SUBJECT TO THE RESTRICTIONS, COVENANTS AND/OR EASEMENTS THAT MAY BE CONTAINED THEREIN.

6. BY GRAPHIC PLOTTING ONLY PROPERTY IS LOCATED IN FLOOD HAZARD ZONE C (AREAS OF MINIMAL FLOODING) PER REF. #2

7. ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON GPS OBSERVATIONS UTILIZING THE KEYSTONE VRS NETWORK (KEYNETGPS).

TEMPORARY BENCH MARKS SET:
TBM-A: MAG NAIL SET IN ASPHALT PAVEMENT - ELEVATION = 625.71'

TBM-B: MAG NAIL SET IN ASPHALT PAVEMENT - ELEVATION = 612.71'

PRIOR TO CONSTRUCTION IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT THE BENCHMARKS ILLUSTRATED ON THIS SKETCH HAVE NOT BEEN DISTURBED AND THEIR ELEVATIONS HAVE BEEN CONFIRMED. ANY CONFLICTS MUST BE REPORTED PRIOR TO CONSTRUCTION.

8. THE OFFSETS SHOWN ARE NOT TO BE USED FOR THE CONSTRUCTION OF ANY STRUCTURE, FENCE, PERMANENT ADDITION, ETC.

9. THE DELINEATION LINE WAS PLACED IN THE FIELD BY DAVISON ENVIRONMENTAL, LLC ON AUGUST 3, 2018, AND FIELD LOCATED BY CONTROL POINT ASSOCIATES, INC. ON AUGUST 7, 2018. THE INTERMITTENT WATER COURSE (IWC) WAS FLAGGED BY DAVISON ENVIRONMENTAL, LLC DURING SEPTEMBER OF 2018, AND FIELD LOCATED BY CONTROL POINT ASSOCIATES, INC. ON OCTOBER 4, 2018.

REFERENCES:

1. THE TOWN OF MANCHESTER ONLINE GEOGRAPHIC INFORMATION RESOURCE SYSTEM.

2. MAP ENTITLED "NATIONAL FLOOD INSURANCE PROGRAM, FIRM, FLOOD INSURANCE RATE MAP, TOWN OF MANSFIELD, CONNECTICUT, TOLLAND COUNTY, PANEL 5 OF 20," COMMUNITY-PANEL NUMBER 090128 0005 C, MAP REVISED: JANUARY 2, 1981.

3. MAP ENTITLED "RIGHT OF WAY MAP, TOWN OF MANSFIELD, WILLLIMANTIC - STORRS ROAD FROM THE COVENTRY PHOENIX ROAD SOUTHERLY ABOUT 10,200 FEET, ROUTE NO. 210," PREPARED BY THE CONNECTICUT STATE HIGHWAY DEPARTMENT, DATED SEPTEMBER 22, 1931, RIGHT OF WAY MAP NO. 340.

4. MAP ENTITLED "RIGHT OF WAY MAP, TOWN OF MANSFIELD, WARRENVILLE - MANSFIELD ROAD FROM THE STORRS ROAD WESTERLY ABOUT 10,000 FEET, ROUTE NO. 101," PREPARED BY THE CONNECTICUT STATE HIGHWAY DEPARTMENT, DATED 1934, RIGHT OF WAY MAP NO. 77-01.

5. MAP ENTITLED "PROPERTY SURVEY PREPARED FOR MERCHANT MANSFIELD LLC, STORRS ROAD, MANSFIELD, CONN.," PREPARED BY ALFORD ASSOCIATES, INC., DATED DECEMBER 7, 2000, FILED WITH THE TOWN OF MANSFIELD IN VOLUME 29, PAGE 37.

6. MAP ENTITLED "RIGHT OF WAY SURVEY, TOWN OF MANSFIELD, MAP SHOWING EASEMENT ACQUIRED FROM MERCHANT MANSFIELD LLC BY THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION, INSTALLATION OF BIRCH ROAD BIKEWAY," PREPARED BY JAMES F. BYRNES, JR., DATED MARCH 2002, PROJECT NO. 77-198.

7. MAP ENTITLED "RIGHT OF WAY SURVEY, TOWN OF MANSFIELD, MAP SHOWING EASEMENT ACQUIRED FROM MAX JAVIT BY THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION, INSTALLATION OF BIRCH ROAD BIKEWAY," PREPARED BY JAMES F. BYRNES, JR., DATED MARCH 2002, PROJECT NO. 77-198.

8. MAPS ENTITLED "PROPOSED WATER MAIN, MERROW ROAD (AKA ROUTE 195), TOLLAND TURNPIKE (AKA ROUTE 195), STORRS ROAD (AKA ROUTE 195) & MIDDLE TURNPIKE (AKA ROUTE 44), TOLLAND COUNTY & MANSFIELD CONNECTICUT," - TOLLAND ROUTE 195 AS-BUILTS, PREPARED GESICK & ASSOCIATES, DATED NOVEMBER 14, 2017 - SHEETS 20, 21 & 24.

I DELINEATED THE WETLANDS AND WATERCOURSES AS DEPICTED

Eric Davison

ERIC DAVISON
CERTIFIED PROFESSIONAL WETLAND SCIENTIST
REGISTERED SOIL SCIENTIST

No.	DESCRIPTION OF REVISION	FIELD CREW	DRAWN:	APPROVED:	DATE
1	REVISED PER ADDITIONAL WETLAND FLAG LOCATIONS	J.O.	A.M.M.	J.C.W.	10-17-18

THIS IS TO CERTIFY THAT THIS SURVEY HAS BEEN PERFORMED IN THE FIELD UNDER MY SUPERVISION, AND IS SUBSTANTIALLY CORRECT TO THE DEGREE OF ACCURACY SHOWN HEREON.

NOT A VALID ORIGINAL DOCUMENT UNLESS EMBOSSED WITH RAISED IMPRESSION OR BLUE INK SEAL

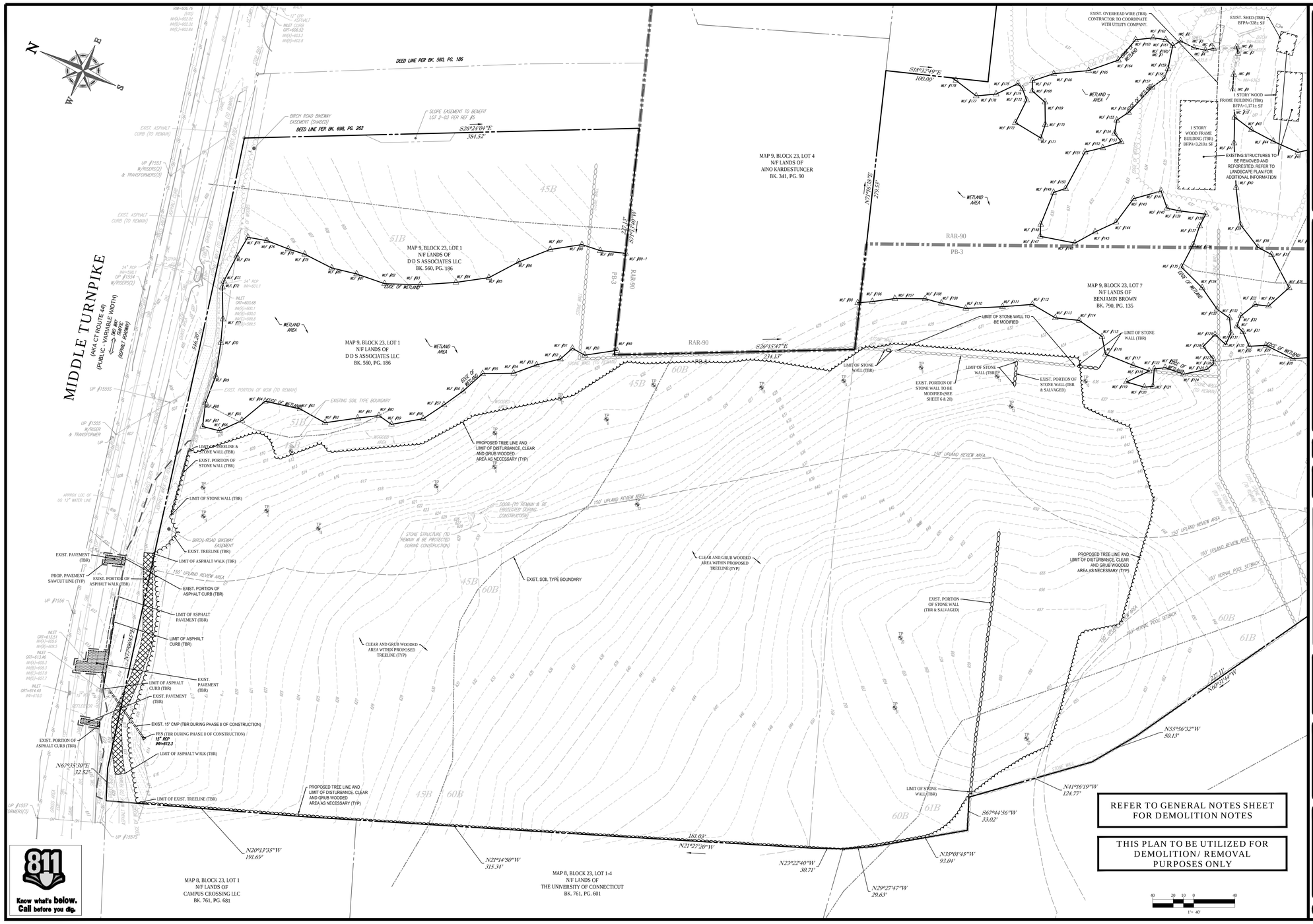
STATE OF CONNECTICUT · JAMES C. WEED · 70249 · LICENSED · PROFESSIONAL LAND SURVEYOR

James C Weed — 10-17-18
DATE

JAMES C. WEED
CONNECTICUT PROFESSIONAL LAND SURVEYOR #70249

FIELD DATE: 8-7-18	**BOUNDARY & TOPOGRAPHIC SURVEY PROPERTIES OF D D S ASSOCIATES LLC AND BENJAMIN BROWN**
FIELD BOOK NO.: 18-11MA	1621 STORRS ROAD & MIDDLE TURNPIKE
FIELD BOOK PG.: 71-74	LOTS 1, 7, & 8, BLOCK 23, MAP 9 TOWN OF MANSFIELD, TOLLAND COUNTY STATE OF CONNECTICUT
FIELD CREW: J.O./T.O.	**CONTROL POINT ASSOCIATES, INC.** 352 TURNPIKE ROAD SOUTHBOROUGH, MA 01772 508.948.3000 - 508.948.3003 FAX
DRAWN: A.M.M.	ALBANY, NY 5182175010 CHALFONT, PA 2157129800 MANHATTAN, NY 6467800411 MT LAUREL, NJ 6098572099 WARREN, NJ 9086680099

REVIEWED:	APPROVED:	DATE	SCALE	FILE NO.	DWG. NO.
S.P.P.	J.C.W.	8-24-18	1"=60'	03-180034	1 OF 5



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REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
2			
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CAD I.D.:	TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

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LOTS 1, 7, & 8, BLOCK 23, MAP 9
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www.BohlerEngineering.com

G.P. FITZGERALD
No. 24131
LICENSED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER

SHEET TITLE:

SITE PREPARATION PLAN

SHEET NUMBER:

4

OF 25

REV 1 - 02/06/2020

LAND USE / ZONING INFORMATION

ZONING ANALYSIS TABLE

ZONING DISTRICT	PB-3 (ABUTS RAR-90 AND PO-1)	
ZONE CRITERIA	REQUIRED	PROPOSED
MINIMUM LOT AREA	NONE	LOT 1 = 399,881 SF (9.180 Ac) LOT 7 = 361,911 SF (8.308 Ac) LOT 8 = 58,703 SF (1.348 Ac) TOTAL = 820,495 SF (18.836 Ac)
MINIMUM LOT WIDTH	N/A	±478.8'
MAX. BUILDING / STRUCTURE COVERAGE	N/A	135,515 SF + 9,989 (EXIST.): 145,504 SF / 820,195 SF = 17.74%
MIN. FRONT SETBACK	5 FEET	15.0'
MIN. SIDE SETBACK	15 FEET	15.5'
MIN. REAR SETBACK	25 FEET	45.11'
MAX. BUILDING HEIGHT	3 STORIES (200' FROM STREETS) +1 STORY FOR MIXED USE & STRUCTURED PARKING	3 STORIES (<200' OF STREET) 4 STORIES (>200' OF STREET)
IMPERVIOUS COVERAGE	N/A	±34.0% (IN LOTS 1 & 7)
PARKING CRITERIA (9.5'x19')	2 SPACES / UNIT x 25% REDUCTION = 1.75 x 358 UNITS = 627 SPACES	187 SURFACE SPACES + 482 STRUCTURED PARKING = 669 TOTAL SPACES
ACCESSIBLE PARKING SPACES	688 X 2% = 13.8 ~ 14	10 + 4 = 14 SPACES
ACCESSIBLE PARKING CRITERIA (STANDARD SPACE- 8'x18' W/ 5' ACCESS AISLE) (VAN ACCESSIBLE SPACE-8'x18' W/ 8' ACCESS AISLE)	TOTAL PARKING 501 TO 1000 = 2 PERCENT OF TOTAL ACCESSIBLE SPACES VAN ACCESSIBLE SPACES= 1 / 6 SPACES	

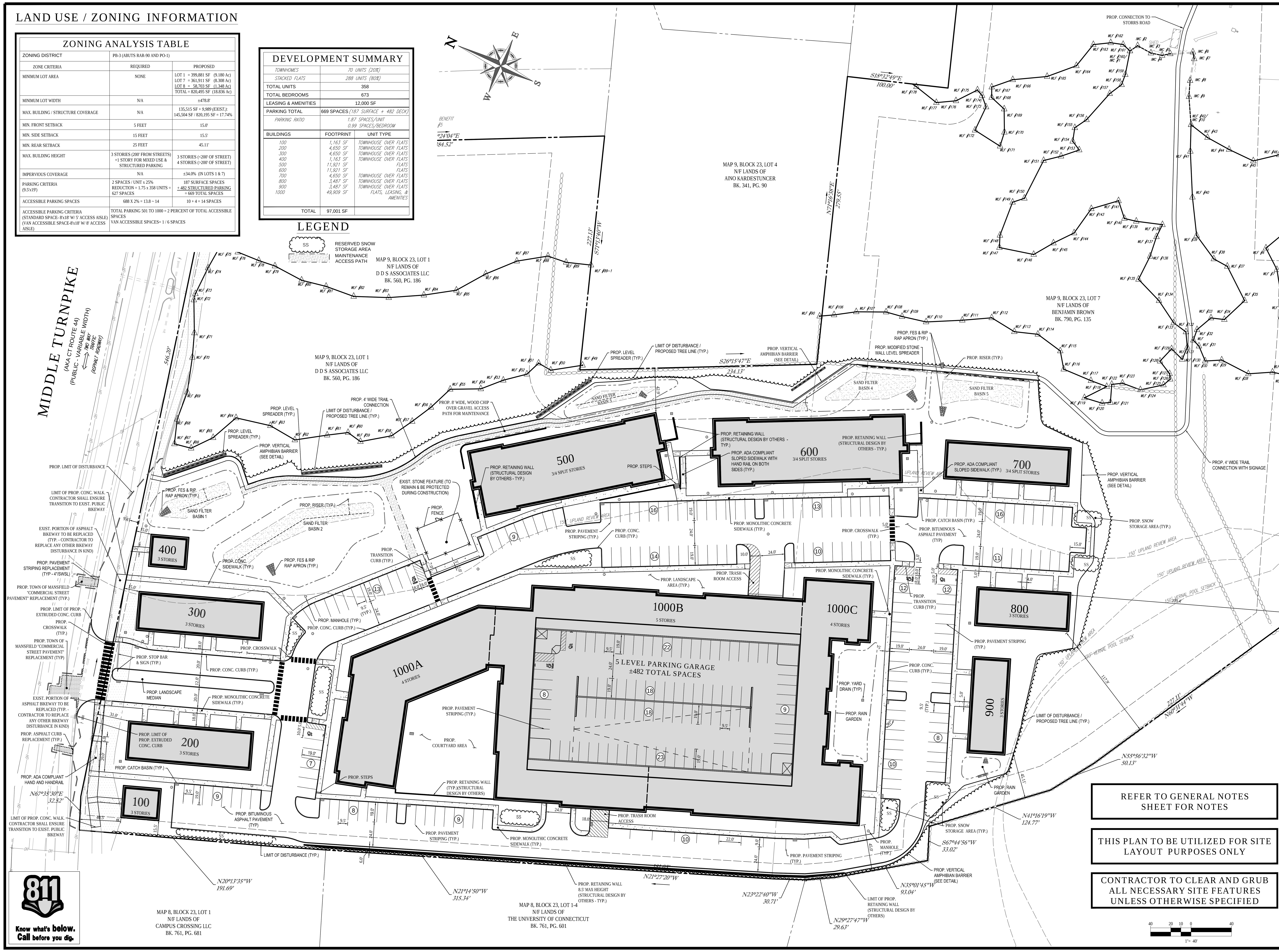
DEVELOPMENT SUMMARY

TOWNHOMES	70 UNITS (20%)	
STACKED FLATS	288 UNITS (80%)	
TOTAL UNITS	358	
TOTAL BEDROOMS	673	
LEASING & AMENITIES	12,000 SF	
PARKING TOTAL	669 SPACES (187 SURFACE + 482 DECK)	
PARKING RATIO	1.87 SPACES/UNIT 0.99 SPACES/BEDROOM	
BUILDINGS	FOOTPRINT	UNIT TYPE
100	1,163 SF	TOWNHOUSE OVER FLATS
200	4,650 SF	TOWNHOUSE OVER FLATS
300	4,650 SF	TOWNHOUSE OVER FLATS
400	1,163 SF	TOWNHOUSE OVER FLATS
500	11,921 SF	FLATS
600	11,921 SF	FLATS
700	4,650 SF	TOWNHOUSE OVER FLATS
800	3,487 SF	TOWNHOUSE OVER FLATS
900	3,487 SF	TOWNHOUSE OVER FLATS
1000	49,909 SF	FLATS, LEASING, & AMENITIES
TOTAL	97,001 SF	

LEGEND

SS — RESERVED SNOW STORAGE AREA

MAINTENANCE ACCESS PATH



REFER TO GENERAL NOTES SHEET FOR NOTES

THIS PLAN TO BE UTILIZED FOR SITE LAYOUT PURPOSES ONLY

CONTRACTOR TO CLEAR AND GRUB ALL NECESSARY SITE FEATURES UNLESS OTHERWISE SPECIFIED

811 Know what's below. Call before you dig.

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REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
2			
3			
4			
5			
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FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

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G.P. FITZGERALD
PROFESSIONAL ENGINEER

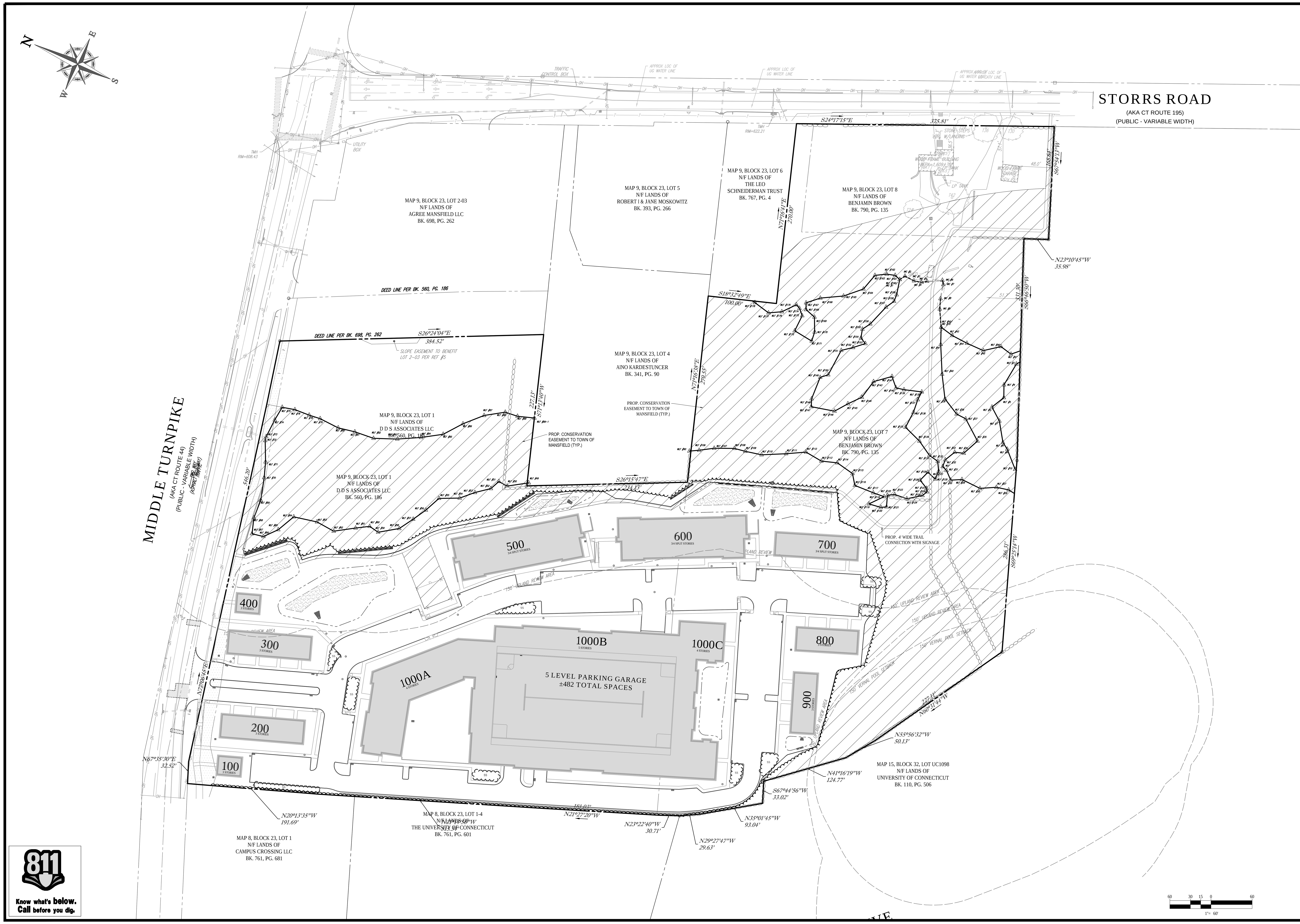
SHEET TITLE:

SITE PLAN

SHEET NUMBER:

5
OF 25

REV 1 - 02/06/2020



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PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
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2			
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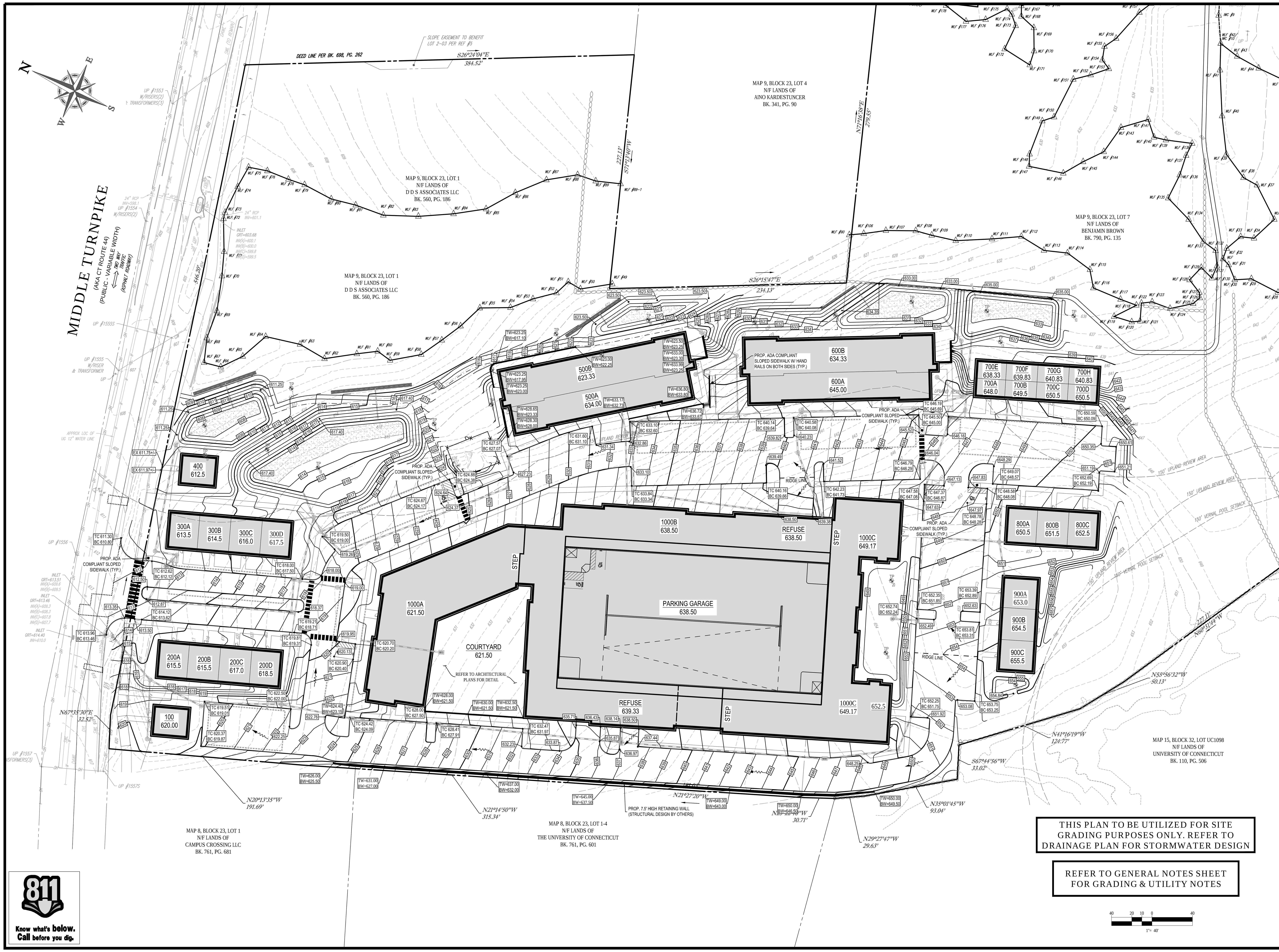
PROFESSIONAL ENGINEER

SHEET TITLE:

CONSERVATION EASEMENT PLAN

SHEET NUMBER:
6
OF 25

REV 1 - 02/06/2020



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DRAWN BY:	MAA
CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

BOHLER

16 OLD FORGE ROAD, SUITE A
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Phone: (860) 333-8900
Fax: (508) 480-9080
www.BohlerEngineering.com

G.P. FITZGERALD

PROFESSIONAL ENGINEER

SHEET TITLE:

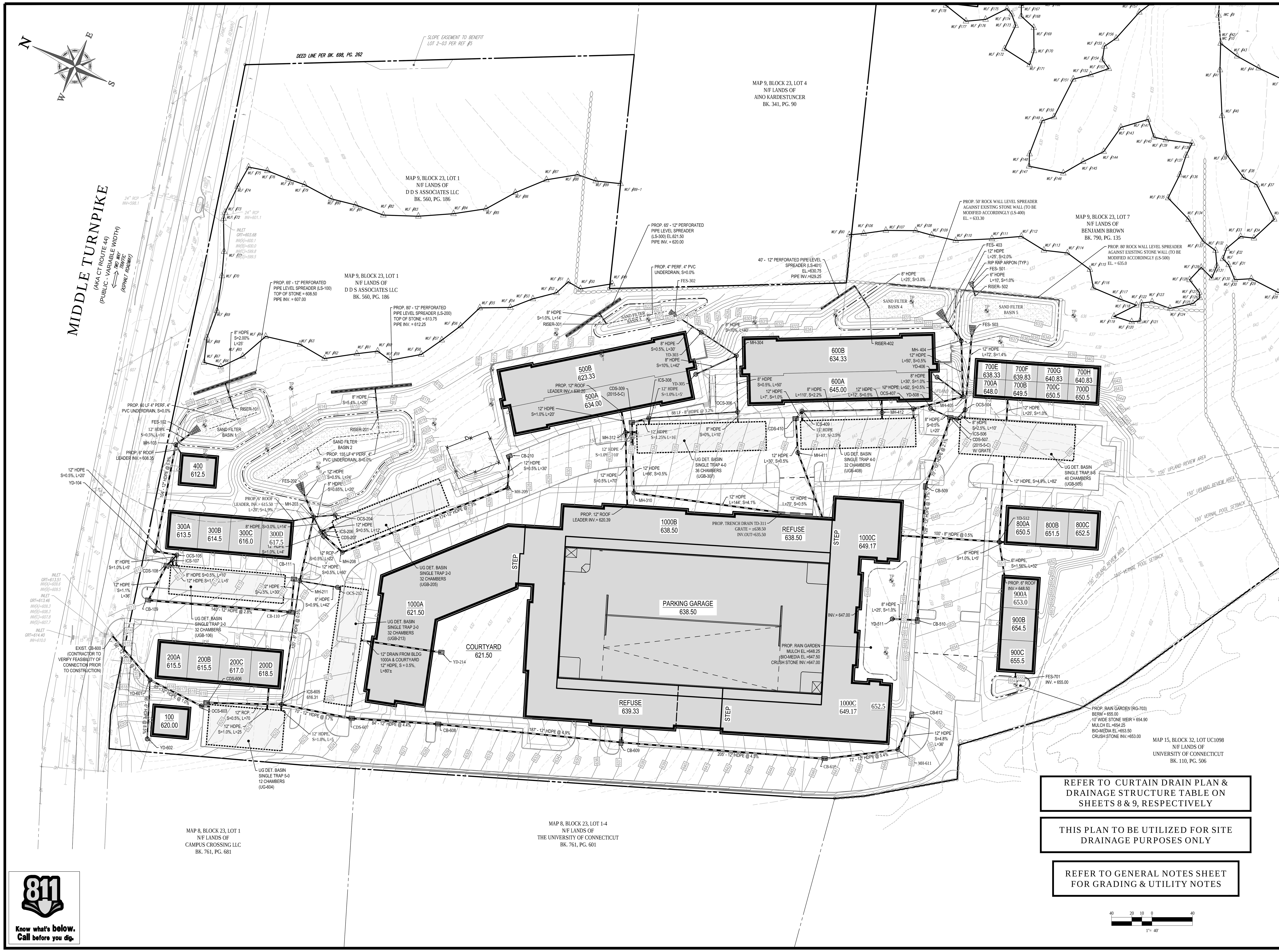
GRADING PLAN

SHEET NUMBER:

7

OF 25

REV 1 - 02/06/2020



REFER TO CURTAIN DRAIN PLAN & DRAINAGE STRUCTURE TABLE ON SHEETS 8 & 9, RESPECTIVELY

THIS PLAN TO BE UTILIZED FOR SITE DRAINAGE PURPOSES ONLY

REFER TO GENERAL NOTES SHEET FOR GRADING & UTILITY NOTES

1" = 40'

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REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
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PROJECT No.:	CT181007
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SHEET TITLE:

OVERALL DRAINAGE PLAN

SHEET NUMBER:
8
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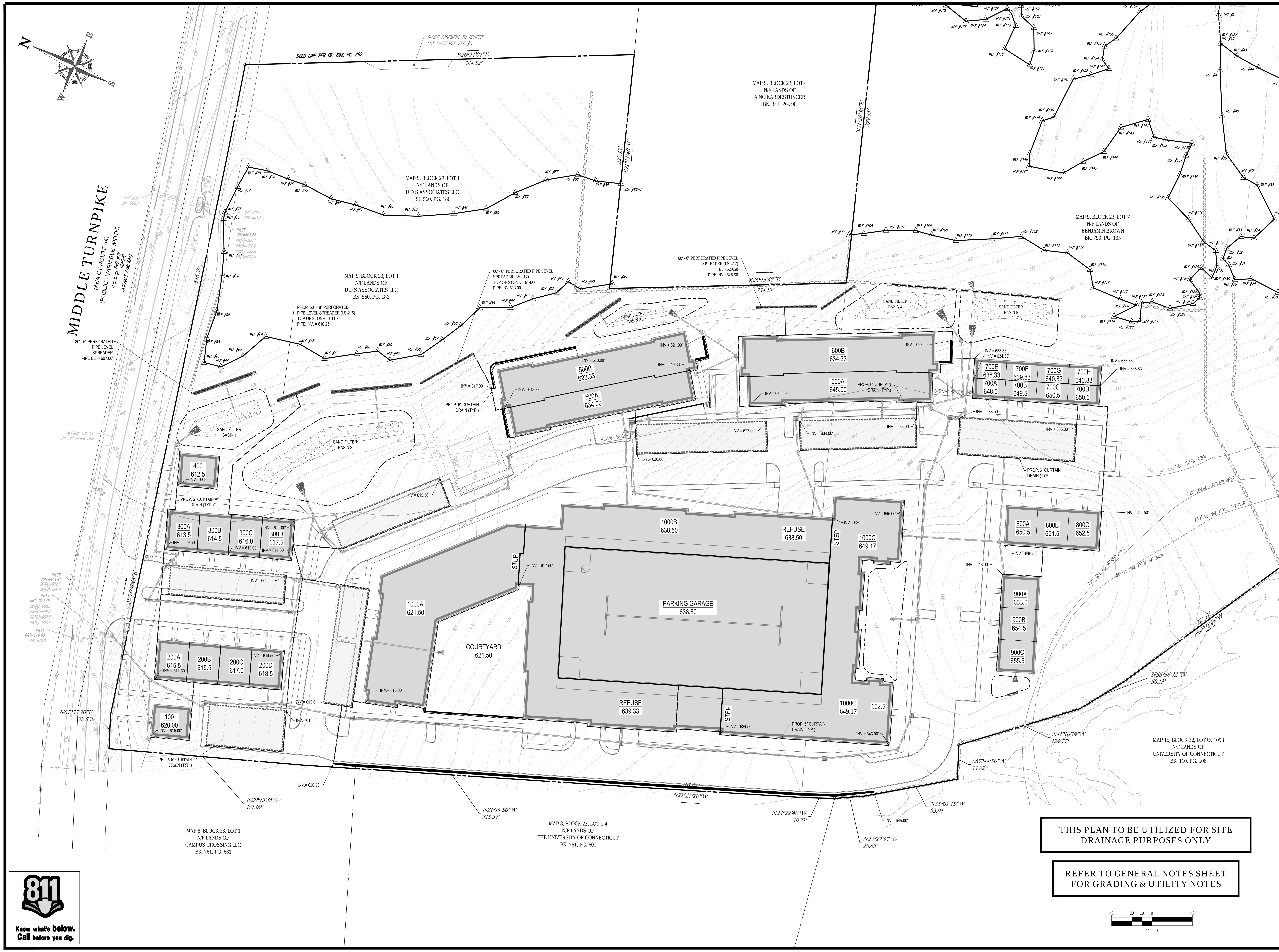
REV 1 - 02/06/2020



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CAPSTONE COLLEGIATE COMMUNITIES, LLC

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G.P. FITZGERALD
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SHEET TITLE:

CURTAIN DRAIN PLAN

SHEET NUMBER:

9

OF 25

REV 1 - 02/06/2020

DRAINAGE STRUCTURE TABLE

100's

NAME	RIM ELEV	INVERT
LS-100	608.50	12" PERFORATED PIPE = 607.00
RISER-101	609.80	8" TOP ORIFICE = 609.80 2" ORIFICE = 609.00 8" HDPE OUTLET = 607.50
SFB-1	611.00	BERM = 611.00 BASIN BOTTOM =608.50 INFILTRATION SEED= 608.00 SAND MEDIA / MIRAFI LINER = 607.0 EXIST. ROCK/GW = 605.00±
FES-102	-	INV. = 608.50
MH-103	611.50	INV. =608.58
YD-104	612.55	INV.=609.10
OCS-105	613.40	INV.=608.50
UGB-106	612.75	CHAMBER TOP = 611.25 12" INV. IN = 610.20 6" INV. OUT = 609.25 CHAMBER BOT = 609.25
ICS-107	613.25	12" INV. IN = 609.47' 12" INV. OUT = 611.20' 8" INV. OUT = 609.25' (4" ORIFICE PLATE)
CDS-108	612.60	INV. = 609.60
CB-109	613.00	INV. = 610.00
CB-110	618.10	INV.=613.90
CB-111	617.05	INV.=614.05

200's

NAME	RIM ELEV	INVERT
LS-200	613.75	12" PERFORATED PIPE = 612.25
RISER-201	616.00	6" TOP ORIFICE = 616.00 2" ORIFICE = 615.20 6" HDPE OUTLET = 613.75
SFB-2	617.00	BERM = 617.00 BASIN BOTTOM =614.50 INFILTRATION SEED= 614.00 SAND MEDIA = 613.50 CRUSHED STONE = 613.00 EXIST. ROCK/GW = 611.50±
FES-202	-	INV. = 615.00
MH-203	618.90	4" INV. = 615.12 (2) 6" INV. = 615.12 12" INV. = 615.12 12" INV. OUT = 615.12
OCS-204	620.00	2" ORIFICE = 615.25 8" INV. = 615.25
UGB-205	619.50	CHAMBER TOP = 617.25 12" INV. IN = 616.15 8" INV. OUT = 615.25 CHAMBER BOT = 615.25
ICS-206	619.45	12" INV. IN = 616.21 12" INV. OUT = 616.21 8" INV. OUT = 615.85 (4" ORIFICE PLATE)
CDS-207	619.00	INV. = 616.25
MH-208	619.40	INV. = 616.39
MH-209	627.00	INV.=623.92
CB-210	627.07	INV.=624.07
MH-211	617.40	INV. = 615.42
OCS-212	618.75	4" ORIFICE = 617.30 4" ORIFICE = 615.80 6" INV. = 615.80
UGB-213	618.80±	CHAMBER TOP = 617.80 12" INV. IN = 616.80 6" INV. OUT = 615.80 CHAMBER BOT = 615.80
YD-214	621.0±	12" INV. = 617.20

300's

NAME	RIM ELEV	INVERT
LS-300	621.50	12" PERFORATED PIPE = 620.00
RISER-301	622.00	8" TOP ORIFICE = 622.00 6" HDPE OUTLET = 620.14
SFB-3	623.00	BERM = 623.00 BASIN BOTTOM =621.25 INFILTRATION SEED= 620.75 SAND MEDIA = 620.25 CRUSHED STONE = 619.75 HIGH GW = 619.5± EXIST. ROCK = 616.0±
FES-302	-	INV.=620.60
YD-303	623.25	8" INV. = 621.75
MH-304	634.25	8" INV. IN = 625.75 4" INV. IN = 626.80 8" INV. OUT=625.75
YD-305	633.90	4" INV. = 631.00
OCS-306	637.90	5" INV IN = 626.00 8" INV. IN = 626.00 2" ORIFICE = 626.00 8" INV. OUT = 626.00
UGB-307	619.40	CHAMBER TOP = 630.00 12" INV. IN = 629.00 12" INV. IN (MH-312) = 628.00 8" INV. OUT = 626.00 CHAMBER BOT = 626.00
ICS-308	634.05	12" INV. IN = 629.75 12" INV. OUT = 629.05 8" INV. OUT = 628.85 (4" ORIFICE PLATE)
CDS-309	632.75	INV.=629.25
MH-310	633.98	INV.=629.58
TD-311	638.50	INV.=635.50
MH-312	633.00	INV. IN = 630.00 INV. OUT = 628.10

400's

NAME	RIM ELEV	INVERT
LS-400	633.30	50' WIDE ROCK WALL LEVEL SPREADER
LS-401	630.75	12" PERFORATED PIPE = 629.25
RISER-402	632.00	4" TOP ORIFICE = 632.65 2" ORIFICE = 632.00 8" HDPE OUTLET = 630.00
SFB-4	-	BERM = 634.30 STONE WALL WEIR = 633.30 BASIN BOTTOM = 631.50 INFILTRATION SEED= 631.00 SAND MEDIA = 630.50 CRUSHED STONE = 630.00 EXIST. ROCK/GW = 628.00±
FES-403	-	INV.=633.00
MH-404	636.50	INV. = 633.50
MH-405	645.50	6" INV. IN = 641.95 12" INV. IN = 633.75 12" INV. OUT = 633.75
YD-406	644.75	INV. = 642.25
OCS-407	644.90	6" INV. IN = 634.00 12" INV. IN = 634.00 2" ORIFICE = 634.00 4" ORIFICE = 636.00 4" ORIFICE = 637.00 INV. OUT = 634.00
UGB-408	640.25	CHAMBER TOP = 638.00 12" INV. IN = 636.90 15" INV. IN = 636.75 6" INV. OUT = 634.00 CHAMBER BOT = 634.00
ICS-409	640.80	12" INV. IN = 637.03 8" INV. OUT = 636.50 (4" ORIFICE PLATE) WEIR WALL = 639.28 15" INV. OUT = 637.00
CDS-410	640.10	INV. = 637.10
MH-411	640.50	INV. = 637.25
MH-412	644.10	INV. IN = 639.00 INV. OUT = 637.00

500's

NAME	RIM ELEV	INVERT
LS-500	635.00	80' WIDE ROCK WALL LEVEL SPREADER
FES-501	-	4" INV. = 633.75
RISER-502	634.50	2" ORIFICE = 634.50 6" HDPE OUTLET = 633.80
SFB-5	-	BERM = 636.00 STONE WALL WEIR = 635.00 BASIN BOTTOM = 633.50 INFILTRATION SEED= 633.00 SAND MEDIA = 632.50 CRUSHED STONE = 632.00 EXIST. ROCK/GW = 630.50±
FES-503	-	INV.=636.00
OCS-504	646.75	6" INV. IN = 637.00 3" INV. IN = 641.00 2" ORIFICE = 637.50 6" INV. OUT = 637.50
UGB-505	646.00	CHAMBER TOP = 643.00 (3) 12" INV. IN = 641.50 6" INV. OUT = 637.50 CHAMBER BOT = 637.50
ICS-506	646.00	12" INV. IN = 642.65 3" INV. OUT = 642.25 12" INV. OUT = 642.56
CDS-507	645.70	6" INV. IN = 642.70 12" INV. IN = 642.70 12" INV. OUT = 642.70
YD-508	644.90	INV. = 642.90
CB-509	646.87	INV. = 643.80
CB-510	652.25	6" INV. IN = 646.50 12" INV. OUT = 646.00
YD-511	648.50	INV. = 646.75
YD-512	650.25	6" INV. IN = 648.00 6" INV. IN = 645.75 8" INV. IN = 645.75 12" INV. OUT = 645.5

600's

NAME	RIM ELEV	INVERT
EX. CB-600	613.51	609.6
YD-601	615.00	INV. = 611.70
YD-602	619.50	INV. = 616.50
OCS-603	620.25	12" ORIFICE O.C. = 616.25 8" ORIFICE O.C. = 615.25 8" ORIFICE O.C. = 614.00 4" ORIFICE O.C. = 612.25 12" INV. OUT = 612.25
UGB-604	619.50	CHAMBER TOP = 617.25 12" INV. IN = 616.10 15" INV. IN = 616.10 12" INV. OUT = 612.25 CHAMBER BOT = 612.25
ICS-605	622.10	(2) 12" INV. IN = 616.15 15" INV. OUT = 616.15 4" INV. OUT = 616.00
CDS-606	619.00	INV.=616.50
CDS-607	624.05	INV.=621.00
CB-608	627.60	15" INV. IN = 624.35 12" INV. IN = 624.60 18" INV. OUT = 624.10
CB-609	637.00	(2) 12" INV. IN = 633.8 15" INV. OUT = 633.55
CB-610	646.15	INV. = 643.15
MH-611	650.05	INV. = 647.00
CB-612	651.75	INV. = 648.75
FES-701	655.00	INV. = 655.00 (ABOVE GROUND)

TEST PIT INFORMATION

TEST PIT	EXIST. GRADE	SEASONAL HIGH GWT	OBSERVED GWT	ROCK ELEVATION	Hydraulic Conductivity (in/hr)
TP-1	611.00	607.50	604.20	603.70	0.02
TP-2	616.00	613.20	609.70	609.70	8.76
TP-3	611.00	607.70	604.00	603.50	1.47
TP-4	619.00	616.00	611.70	611.50	-
TP-5	619.50	616.50	615.20	614.50	-
TP-6	621.00	-	-	617.50	-
TP-7	618.00	615.50	613.70	611.50	0.06
TP-8	623.50	620.50	619.70	617.00	0.08
TP-9	633.50	629.25	627.20	627.00	9.46
TP-10	636.00	632.70	629.70	630.50	0.10
TP-11	636.00	631.00	629.7	630.50	2.74
TP-12	630.50	625.50	-	623.70	0.25
TP-13	640.00	-	-	636.00	8.63
TP-14	632.00	-	626.00	625.50	16.81
TP-15	627.00	-	623.00	623.00	0.93
TP-16	622.50	-	619.50	616.00	4.02
TP-17	620.00	616.00	613.00	612.50	-
TP-18	620.00	-	-	612.50	0.76
TP-19	613.50	-	608.50	606.50	5.75
TP-20	655.40	-	-	649.40	18.41
TP-21	654.00	-	-	647.50	7.08
TP-22	655.40	-	-	649.40	1.16

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PERMIT SET

PROJECT No.: CT181007
DRAWN BY: MAA
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DATE: 12/30/19
SCALE: AS NOTED
CAD I.D.: TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

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LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
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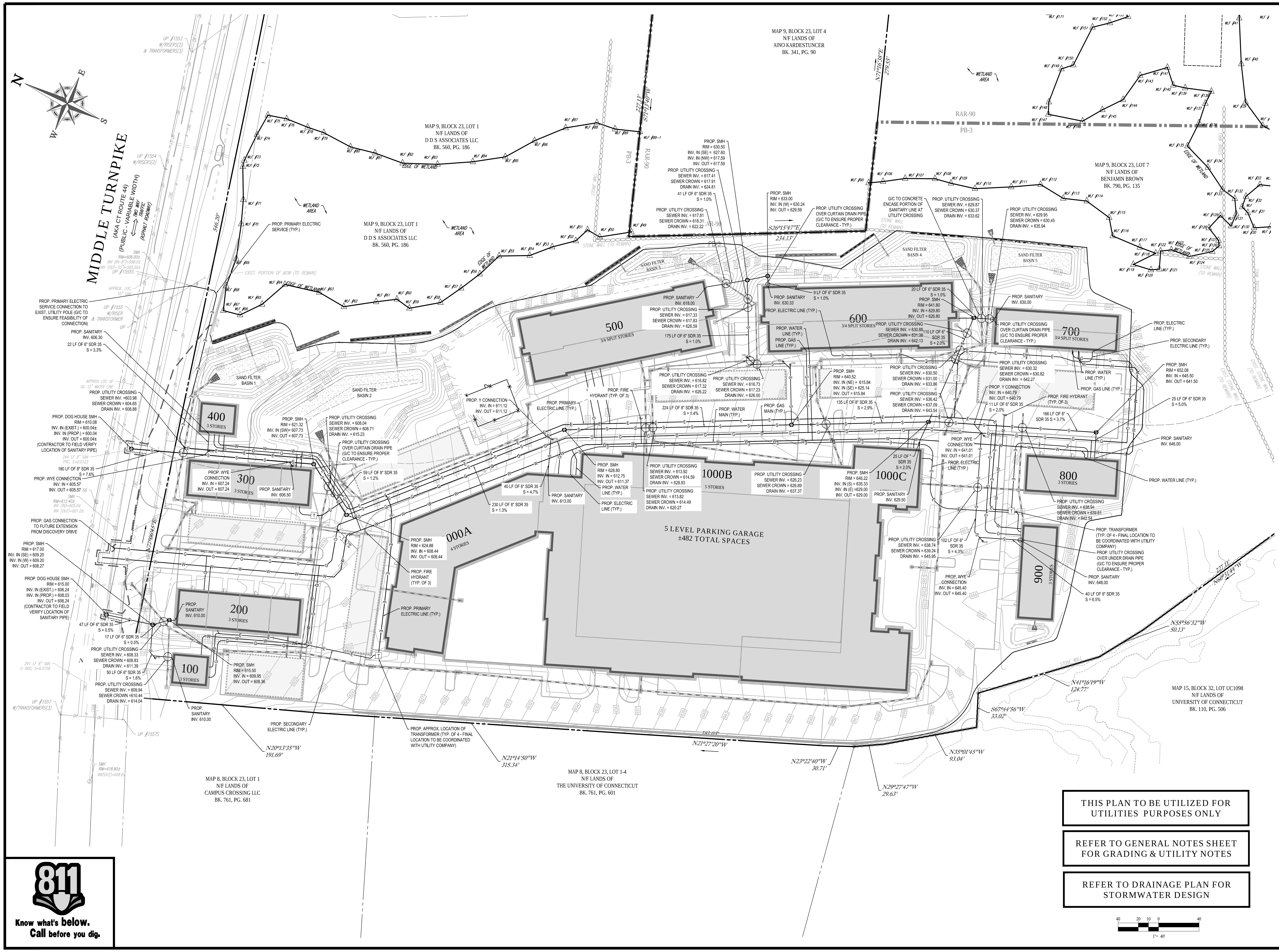
G.P. FITZGERALD
PROFESSIONAL ENGINEER

SHEET TITLE:

DRAINAGE PIPE SCHEDULE

SHEET NUMBER: 10 OF 25

REV 1 - 02/06/2020



THIS PLAN TO BE UTILIZED FOR UTILITIES PURPOSES ONLY

REFER TO GENERAL NOTES SHEET FOR GRADING & UTILITY NOTES

REFER TO DRAINAGE PLAN FOR STORMWATER DESIGN

1" = 40'

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G.P. FITZGERALD
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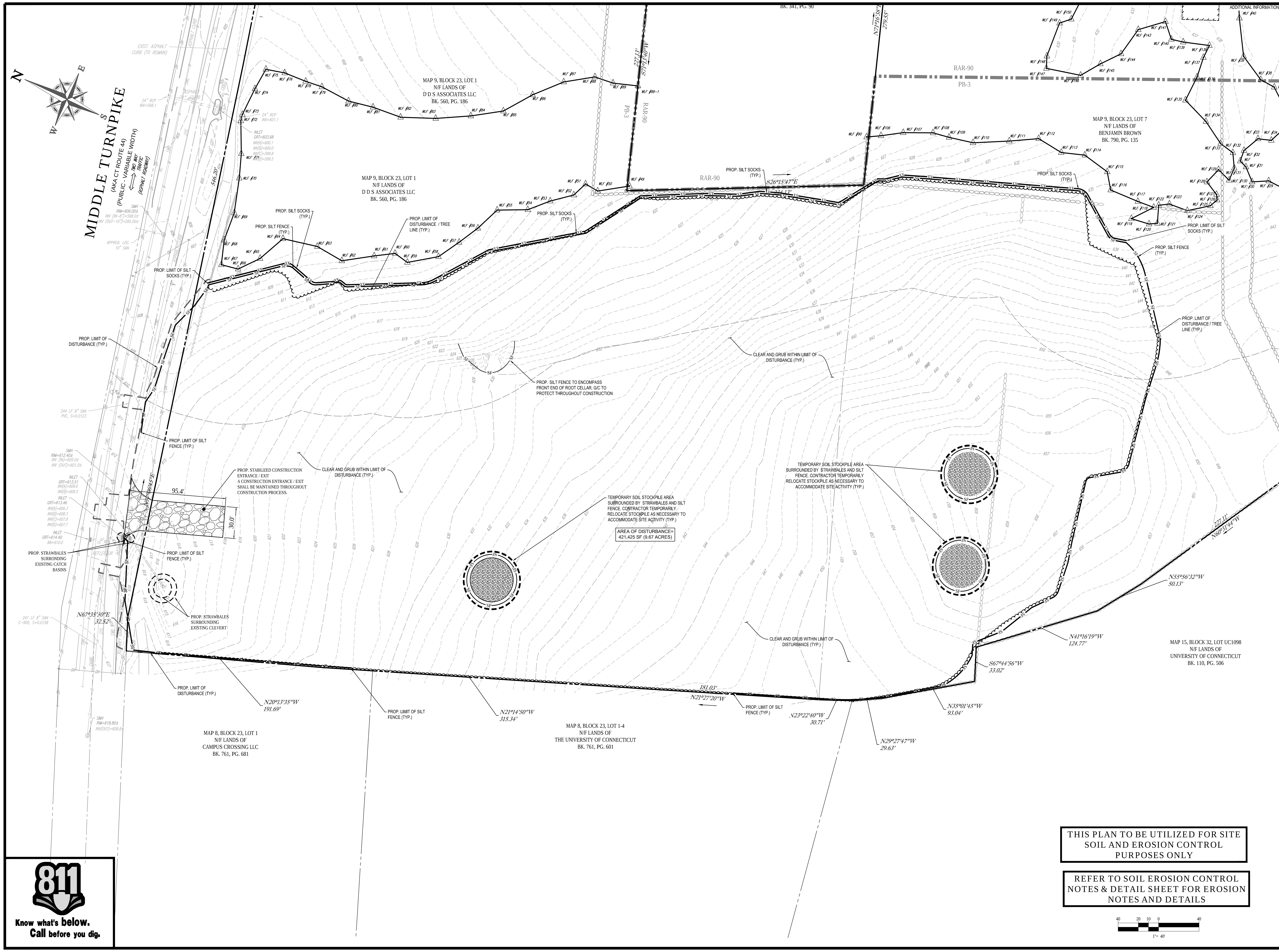
SHEET TITLE:
UTILITY PLAN

SHEET NUMBER:
11
OF 25

REV 1 - 02/06/2020



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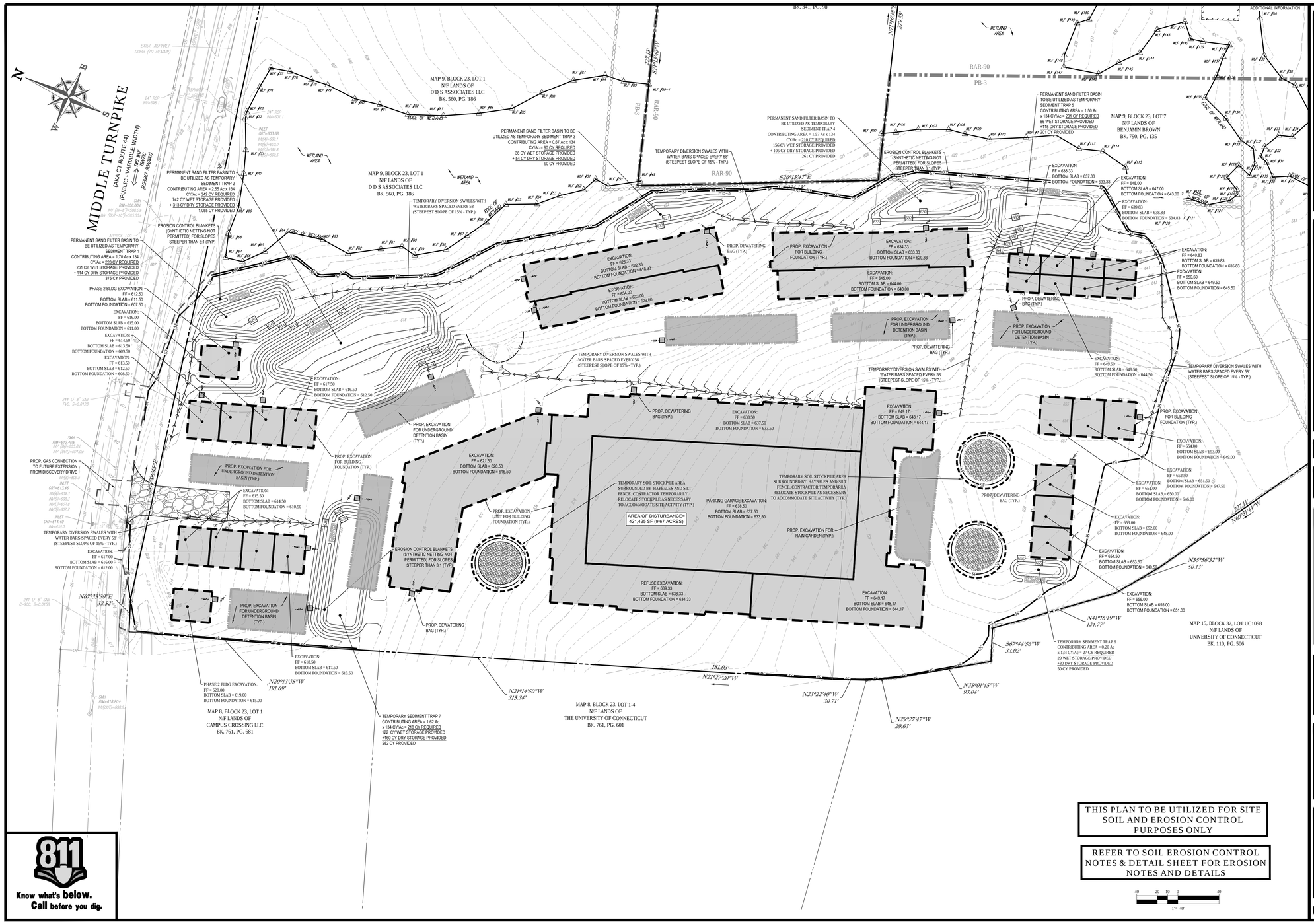
SHEET TITLE:
SOIL EROSION & SEDIMENT CONTROL PLAN (PHASE I)

SHEET NUMBER:
12
OF 25

REV 1 - 02/06/2020



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LICENSED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER

SHEET TITLE:
SOIL EROSION & SEDIMENT CONTROL PLAN (PHASE II)

SHEET NUMBER:
13
OF 25

REV 1 - 02/06/2020

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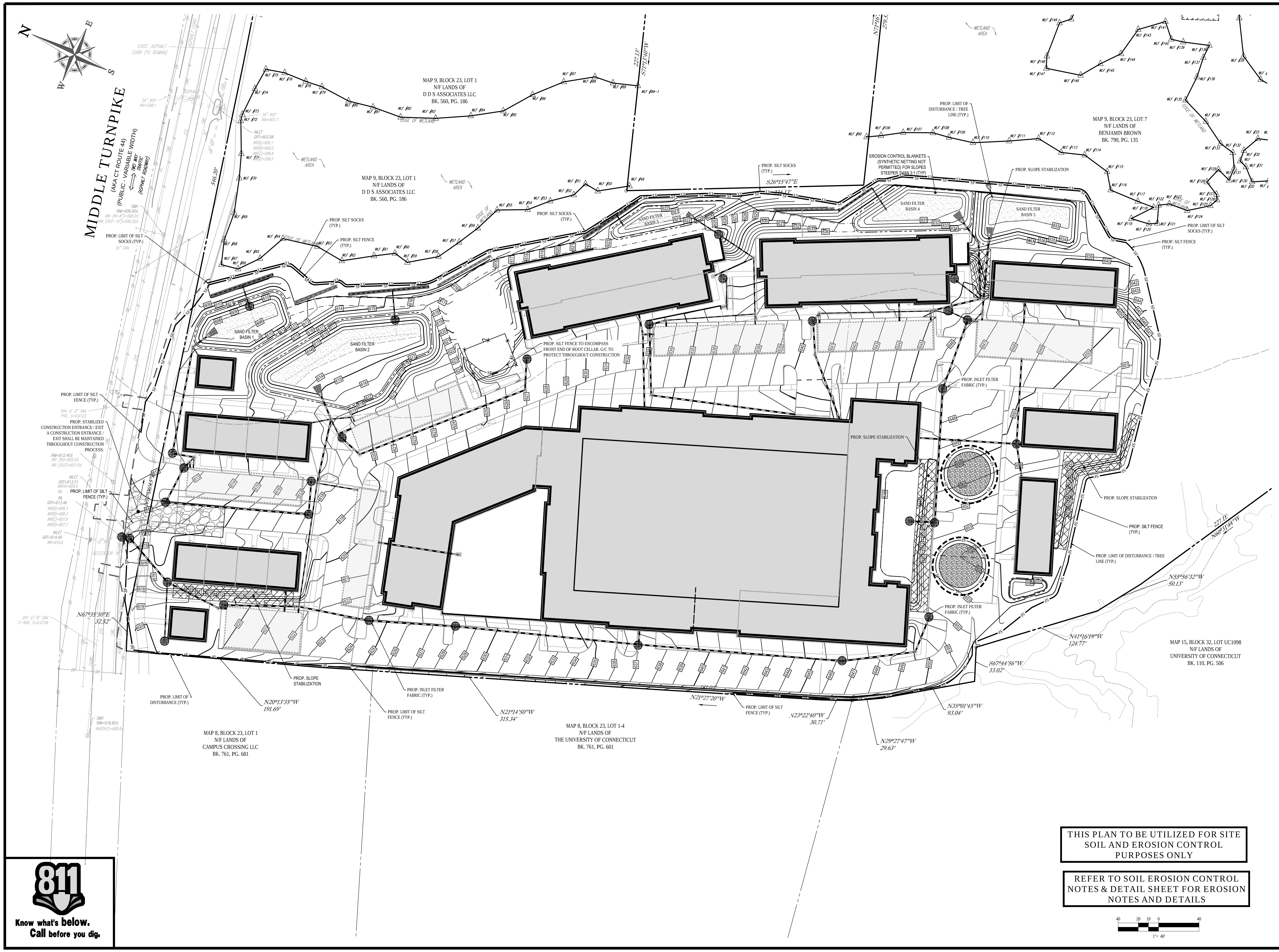

THIS PLAN TO BE UTILIZED FOR SITE SOIL AND EROSION CONTROL PURPOSES ONLY

REFER TO SOIL EROSION CONTROL NOTES & DETAIL SHEET FOR EROSION NOTES AND DETAILS

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CAPSTONE COLLEGIATE COMMUNITIES, LLC

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G.P. FITZGERALD
PROFESSIONAL ENGINEER

SHEET TITLE:

SOIL EROSION & SEDIMENT CONTROL PLAN (PHASE III)

SHEET NUMBER:
14
OF 25

REV 1 - 02/06/2020

EROSION & SEDIMENT CONTROL NOTES

1. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE DONE AS SET FORTH IN THE MOST CURRENT STATE SEDIMENT AND EROSION CONTROL MANUAL.
2. THOSE AREAS UNDERGOING ACTUAL CONSTRUCTION WILL BE LEFT IN AN UNTREATED OR UNVEGETATED CONDITION FOR A MINIMUM TIME. AREAS SHALL BE PERMANENTLY STABILIZED WITHIN 15 DAYS OF FINAL GRADING AND TEMPORARILY STABILIZED WITHIN 30 DAYS OF INITIAL DISTURBANCE OF THE SOIL. IF THE DISTURBANCE IS WITHIN 100 FEET OF A STREAM OR POND, THE AREA SHALL BE STABILIZED WITHIN 7 DAYS OR PRIOR TO ANY STORM EVENT (THIS WOULD INCLUDE WETLANDS).
3. SEDIMENT BARRIERS (SILT FENCE, STRAW BARRIERS, ETC.) SHOULD BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF THE CONTRIBUTING DRAINAGE AREA ABOVE THEM. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL AREAS WITH SLOPES GREATER THAN 15% AFTER OCTOBER 1ST THE SAME APPLIES FOR ALL SLOPES GREATER THAN 8%.
4. INSTALL SILTATION BARRIER AT TOE OF SLOPE TO FILTER SILT FROM RUNOFF. SEE SILTATION BARRIER DETAILS FOR PROPER INSTALLATION. SILTATION BARRIER WILL REMAIN IN PLACE PER NOTE #5.
5. ALL EROSION CONTROL STRUCTURES WILL BE INSPECTED, REPLACED AND/OR REPAIRED DAILY AND IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL OR SNOW MELT OR WHEN NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION OR DECOMPOSITION. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE STABILIZED BY TURF.
6. NO SLOPES, EITHER PERMANENT OR TEMPORARY, SHALL BE STEEPER THAN TWO TO ONE (2:1).
7. IF FINAL SEEDING OF THE DISTURBED AREAS IS NOT COMPLETED 45 DAYS PRIOR TO THE FIRST KILLING FROST, USE TEMPORARY MULCH (DORMANT SEEDING MAY BE ATTEMPTED AS WELL) TO PROTECT THE SITE AND DELAY SEEDING UNTIL THE NEXT RECOMMENDED SEEDING PERIOD.
8. TEMPORARY SEEDING OF DISTURBED AREAS THAT HAVE NOT BEEN FINAL GRADED SHALL BE COMPLETED 45 DAYS PRIOR TO THE FIRST KILLING FROST TO PROTECT FROM SPRING RUNOFF PROBLEMS.
9. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT WILL BE RETURNED TO THE SITE AND REGRADED ONTO OPEN AREAS.
10. REVEGETATION MEASURES WILL COMMENCE UPON COMPLETION OF CONSTRUCTION EXCEPT AS NOTED ABOVE. ALL DISTURBED AREAS NOT OTHERWISE STABILIZED WILL BE GRADED, SMOOTHED, AND PREPARED FOR FINAL SEEDING AS FOLLOWS:
   - 10.1. SIX INCHES OF LOAM WILL BE SPREAD OVER DISTURBED AREAS AND SMOOTHED TO A UNIFORM SURFACE.
   - 10.2. APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST. IF SOIL TESTING IS NOT FEASIBLE ON SMALL OR VARIABLE SITES, OR WHERE TIMING IS CRITICAL, FERTILIZER MAY BE APPLIED AT THE RATE OF 800 LB PER ACRE OR 18.4 LB PER 1,000 SF USING 10-20-20 OR EQUIVALENT. APPLY GROUND LIMESTONE (EQUIVALENT TO 50% CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF 3 TONS PER ACRE (138 LB PER1,000 SF).
   - 10.3. FOLLOWING SEED BED PREPARATION, DITCHES AND BACK SLOPES WILL BE SEEDED TO A MIXTURE OF 47% CREEPING RED FESCUE, 5% REDTOP, AND 48% TALL FESCUE. THE LAWN AREAS WILL BE SEEDED TO A PREMIUM TURF MIXTURE OF 44% KENTUCKY BLUE-GRASS, 44% CREEPING RED FESCUE, AND 12% PERENNIAL RYEGRASS: SEEDING RATE IS 1.03 LBS PER 1,000 SF LAWN QUALITY SOD MAY BE SUBSTITUTED FOR SEED.
   - 10.4. STRAW MULCH AT THE RATE OF 70-90 LBS PER 1,000 SF. A HYDRO-APPLICATION OF WOOD OR PAPER FIBER SHALL BE APPLIED FOLLOWING SEEDING. A SUITABLE BINDER SUCH AS CURASOL OR RMB PLUS WILL BE USED ON STRAW MULCH FOR WIND CONTROL.
11. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED ONCE THE SITE IS STABILIZED.
12. WETLANDS WILL BE PROTECTED W/strawBALES AND/OR SILT FENCE INSTALLED AT THE EDGE OF THE WETLAND OR THE BOUNDARY OF WETLAND DISTURBANCE.
13. ALL AREAS WITHIN 100 FEET OF A FLAGGED WETLAND OR STREAM SHALL HAVE AN EXPOSURE WINDOW OF NOT MORE THAN 7 DAYS.
14. ALL AREAS WITHIN 100 FEET OF A FLAGGED WETLAND OR STREAM SHALL FOLLOW APPROPRIATE EROSION CONTROL MEASURES PRIOR TO EACH STORM IF NOT BEING ACTIVELY WORKED,

MULCH

LOCATION	MULCH	RATE (1000 SF)
PROTECT AREA	STRAW	100 POUNDS
WINDY AREA	SHREDDED OR CHOPPED CORNSTALKS STRAW (ANCHORED)*	185-275 POUNDS 100 POUNDS
MODERATE TO HIGH VELOCITY AREAS OR STEEP SLOPES GREATER THAN 3:1	JUTE MESH OR EXCELSIOR MAT	AS REQUIRED
GREATER THAN 3:1	(REFER TO GEOTECHNICAL REPORT FOR FINAL DESIGN REQUIREMENT)	

* A HYDRO-APPLICATION OF WOOD, OR PAPER FIBER MAY BE APPLIED FOLLOWING SEEDING. A SUITABLE BINDER SUCH AS CURASOL OR RMB PLUS SHALL BE USED ON STRAW MULCH FOR WIND CONTROL.

MULCH ANCHORING

ANCHOR MULCH WITH PEG AND TWINE (1 SQ. YD/BLOCK); MULCH NETTING (AS PER MANUFACTURER); WOOD CELLULOSE FIBER (750 LBS/ACRE); CHEMICAL TACK (AS PER MANUFACTURER'S SPECIFICATIONS); USE OF A SERRATED STRAIGHT DISK. WETTING FOR SMALL AREAS AND ROAD DITCHES MAY BE PERMITTED.

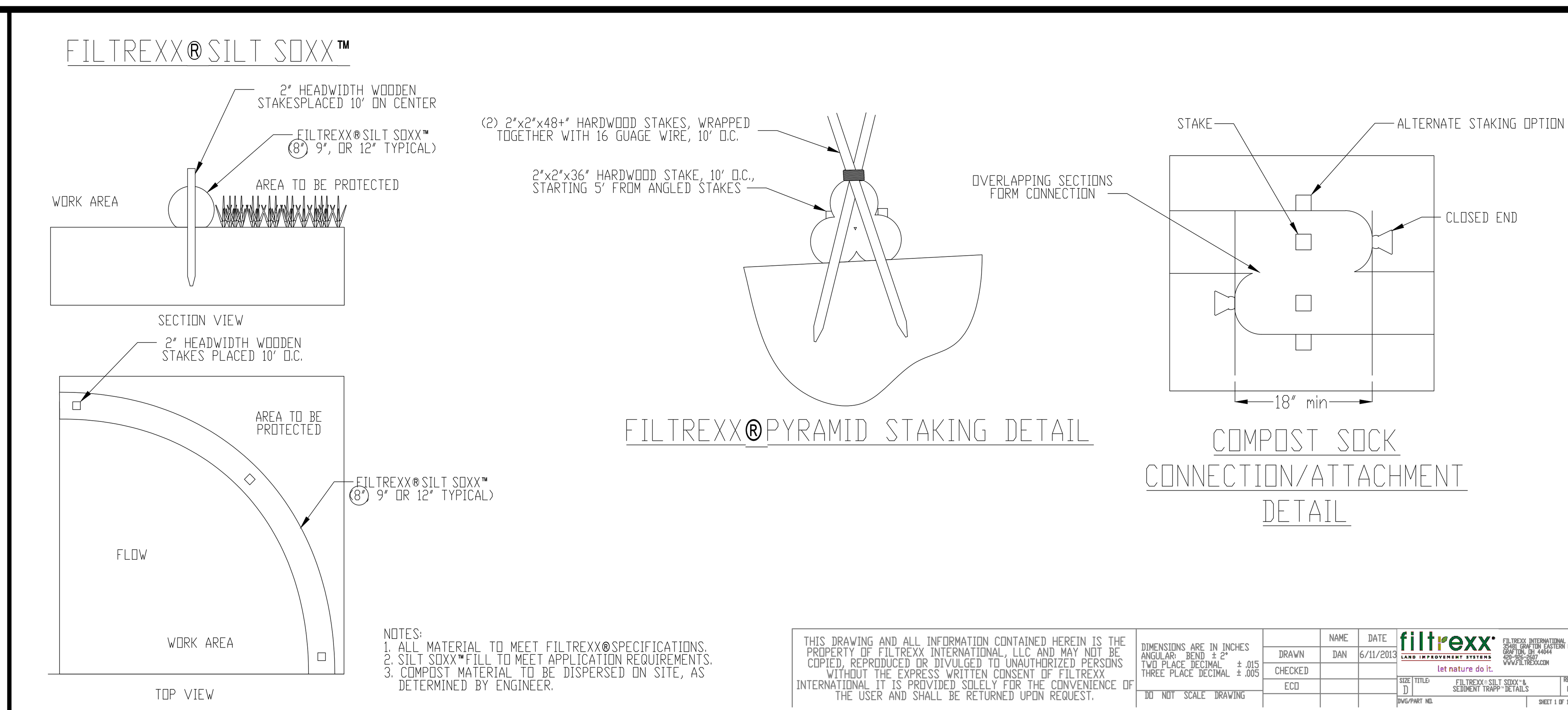
EROSION CONTROL NOTES DURING WINTER CONSTRUCTION

1. WINTER CONSTRUCTION PERIOD: NOVEMBER 1 THROUGH APRIL 15.
2. WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME.
3. EXPOSED AREA SHOULD BE LIMITED TO THAT WHICH CAN BE MULCHED IN ONE DAY PRIOR TO ANY SNOW EVENT.
4. CONTINUATION OF EARTHWORK OPERATION ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED SUCH THAT NO LARGER AREA OF THE SITE IS WITHOUT EROSION CONTROL PROTECTION AS LISTED IN ITEM 2 ABOVE.
5. AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED WITH STRAW OR straw AT A RATE OF 100 LB. PER 1,000 SQUARE FEET (WITH OR WITHOUT SEEDING) OR DORMANT SEEDED, MULCHED AND ADEQUATELY ANCHORED BY AN APPROVED ANCHORING TECHNIQUE.
6. BETWEEN THE DATES OF OCTOBER 15 AND APRIL 1ST, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE FREEZING TEMPERATURES THE SLOPES SHALL BE FINE GRADED AND EITHER PROTECTED WITH MULCH OR TEMPORARILY SEEDED AND MULCHED UNTIL SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 1ST AND IF THE EXPOSED AREA HAS BEEN LOAMED, FINAL GRADED AND IS SMOOTH, THEN THE AREA MAY BE DORMANT SEEDED AT A RATE OF 200 - 300% HIGHER THAN SPECIFIED FOR PERMANENT SEED AND THEN MULCHED. IF CONSTRUCTION CONTINUES DURING FREEZING WEATHER, ALL EXPOSED AREAS SHALL BE CONTINUOUSLY GRADED BEFORE FREEZING AND THE SURFACE TEMPORARILY PROTECTED FROM EROSION BY THE APPLICATION OF MULCH. SLOPES SHALL NOT BE LEFT UNEXPOSED OVER THE WINTER OR ANY OTHER EXTENDED TIME OF WORK SUSPENSION UNLESS TREATED IN THE ABOVE MANNER. UNTIL SUCH TIME AS WEATHER CONDITIONS ALLOW DITCHES TO BE FINISHED WITH THE PERMANENT SURFACE TREATMENT, EROSION SHALL BE CONTROLLED BY THE INSTALLATION OF BALES OF straw OR STONE CHECK DAMS IN ACCORDANCE WITH THE STANDARD DETAILS.
7. MULCHING REQUIREMENTS:
   - 7.1. BETWEEN THE DATES OF NOVEMBER 1ST AND APRIL 15TH ALL MULCH SHALL BE ANCHORED BY EITHER PEG LINE, MULCH NETTING OR WOOD CELLULOSE FIBER.
   - 7.2. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3% FOR SLOPE EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GREATER THAN 8%.
   - 7.3. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL AREAS WITH SLOPES GREATER THAN 15% AFTER OCTOBER 1ST THE SAME APPLIES FOR ALL SLOPES GREATER THAN 8%.
8. AFTER NOVEMBER 1ST THE CONTRACTOR SHALL APPLY DORMANT SEEDING OR MULCH AND ANCHORING ON ALL BARE EARTH AT THE END OF EACH WORKING DAY.
9. DURING THE WINTER CONSTRUCTION PERIOD ALL SNOW SHALL BE REMOVED FROM AREAS OF SEEDING AND MULCHING PRIOR TO PLACEMENT.
10. STOCKPILING OF MATERIALS (DIRT, WOOD, CONSTRUCTION MATERIALS, ETC.) MUST REMAIN COVERED AT ALL TIMES TO MINIMIZE ANY DUST PROBLEMS THAT MAY OCCUR WITH ADJACENT PROPERTIES AND TO PROVIDE MAXIMUM PROTECTION AGAINST EROSION RUNOFF.
11. EXISTING CATCH BASIN STRUCTURES SHALL BE PROTECTED UNTIL SUCH TIME AS THEY ARE REMOVED.

CONSTRUCTION SEQUENCE

THE FOLLOWING CONSTRUCTION SEQUENCE IS RECOMMENDED:

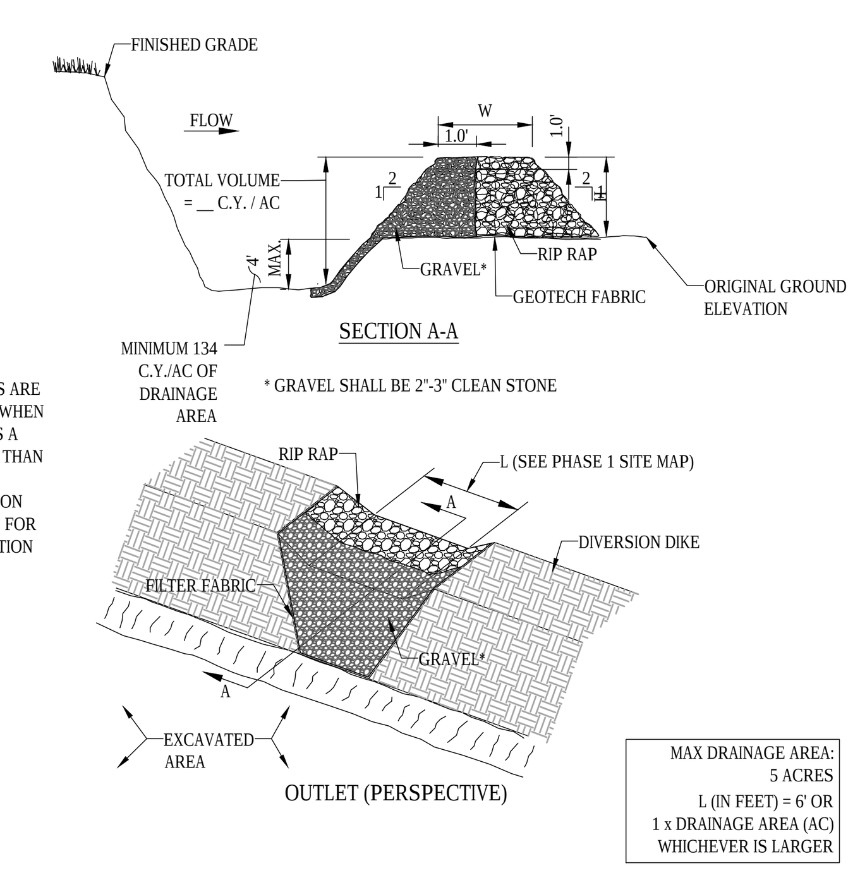
-INSTALLATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT (AS SHOWN)
-INSTALLATION OF EROSION CONTROL BARRIER (STRAW BALES, SILT FENCE, SILT SOCKS) (AS SHOWN)
-INSTALLATION OF INLET PROTECTION IN STREET
-DEMOLITION OF EXISTING SITE STRUCTURES AND AMENITIES (SEE DEMOLITION PLAN)
-CLEARING AND GRUBBING
-INSTALLATION OF TEMPORARY SWALES AND SEDIMENT TRAPS / SAND FILTER BASINS
-EARTHWORK AND EXCAVATION/FILLING AS NECESSARY
-INSTALLATION OF DEWATERING PUMP WITH FILTERBAGS
-PREPARE SUBBASE FOR DETENTION SYSTEM AND BUILDING PAD
-INSTALLATION OF EROSION CONTROL BLANKETS ON SLOPES STEEPER THAN 3:1
-CONSTRUCTION OF UTILITIES
-STABILIZE PERMANENT LAWN AREAS AND SLOPES WITH TEMPORARY SEEDING
-INSTALLATION OF INLET PROTECTION OF ON-SITE UTILITIES (AS SHOWN)
-CONSTRUCTION OF BUILDINGS
-CONSTRUCTION OF ALL CURBING AND LANDSCAPE ISLANDS AS INDICATED ON THE PLANS
-SPREAD TOPSOIL ON SLOPED AREAS AND SEED AND MULCH
-FINAL GRADING OF ALL SLOPED AREAS
-PLACE 6" TOPSOIL ON SLOPES AFTER FINAL GRADING COMPLETED. FERTILIZE, SEED, AND MULCH SEED MIXTURE TO BE INSTALLED AS REQUIRED.
-PRIOR TO TRANSITIONING TO A POST-CONSTRUCTION STORMWATER BASIN, THE BASIN MUST BE CLEARED OF ACCUMULATED SEIMENT, FULLY STABILZED, AND INSPECTED TO ENSURE THAT SIDE SLOPES, VOLUME, OUTLETS AND INLETS ARE AS DESIGNED
-ENSURE SAND FILTER BASIN PLANTINGS ARE ESTABLISHED PRIOR TO RELEASING DRAINAGE SYSTEM RUNOFF
-PAVE PARKING LOT
-LANDSCAPING PER LANDSCAPING PLAN
-REMOVE EROSION CONTROLS AS DISTURBED AREAS BECOME STABILIZED TO 70% STABILIZATION OR GREATER.



FILTREXX® SILT SOXX™
2" HEADWIDTH WOODEN STAKES PLACED 10' ON CENTER
WORK AREA
AREA TO BE PROTECTED
SECTION VIEW
TOP VIEW
FLOW
FILTREXX® PYRAMID STAKING DETAIL
COMPOST SOCK CONNECTION/ATTACHMENT DETAIL
STAKE
ALTERNATE STAKING OPTION
CLOSED END
18" min
NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. SILT SOXX™ FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.
PROPERTY OF FILTREXX INTERNATIONAL, LLC AND MAY NOT BE COPIED, REPRODUCED OR DIVULGED TO UNAUTHORIZED PERSONS WITHOUT THE EXPRESS WRITTEN CONSENT OF FILTREXX INTERNATIONAL. IT IS PROVIDED SOLELY FOR THE CONVENIENCE OF THE USER AND SHALL BE RETURNED UPON REQUEST.
ANGULAR: BEND ± 2°
TWO PLACE DECIMAL ± .015
THREE PLACE DECIMAL ± .005
DO NOT SCALE DRAWING
DRAWN DAN 6/11/2013
CHECKED
ECO
LAND IMPROVEMENT SYSTEMS
let nature do it.
FILTREXX® SILT SOXX™ & SEDIMENT TRAPP™ DETAILS
REV. NC
SHEET 1 OF 1

FILTREXX SILT SOXX DETAIL

N.T.S.



FINISHED GRADE
FLOW
W
1.0'
TOTAL VOLUME = __ C.Y. / AC
4' MAX.
RIP RAP
GRAVEL*
GEOTECH FABRIC
ORIGINAL GROUND ELEVATION
SECTION A-A
MINIMUM 134 C.Y./AC OF DRAINAGE AREA
* GRAVEL SHALL BE 2"-3" CLEAN STONE
L (SEE PHASE 1 SITE MAP)
DIVERSION DIKE
FILTER FABRIC
EXCAVATED AREA
OUTLET (PERSPECTIVE)

NOTE:
1. SEDIMENT TRAPS ARE TO BE CLEANED WHEN IT ACCUMULATES A DEPTH OF MORE THAN 12 INCHES
2. REFER TO EROSION CONTROL PLANS FOR SIZING INFORMATION

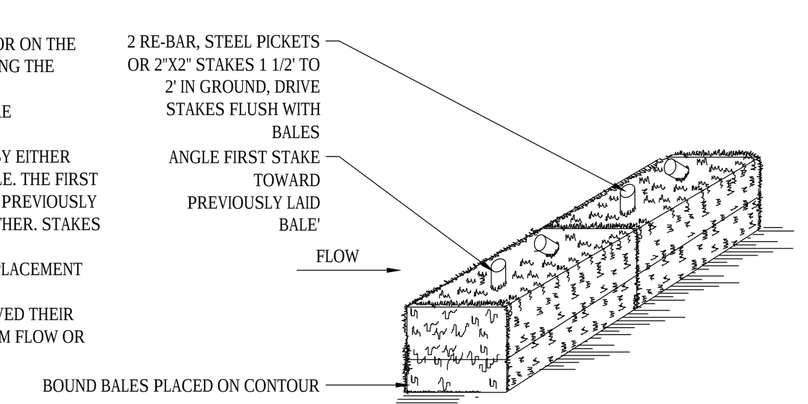
MAX DRAINAGE AREA: 5 ACRES
L (IN FEET) = 6' OR 1 x DRAINAGE AREA (AC) WHICHEVER IS LARGER

NOTE: ALL DISTURBED CONTRIBUTORY DRAINAGE AREAS MUST BE PERMANENTLY STABILIZED PRIOR TO CONVERTING A TEMPORARY SEDIMENT TRAP TO A PERMANENT BASIN. THE STORM DRAINS MUST BE FLUSHED AND THE BASIN MUST BE CLEARED OF ACCUMULATED SEDIMENT PRIOR TO PLANTING THE PERMANENT BASIN.

TEMPORARY SEDIMENT TRAP

N.T.S.

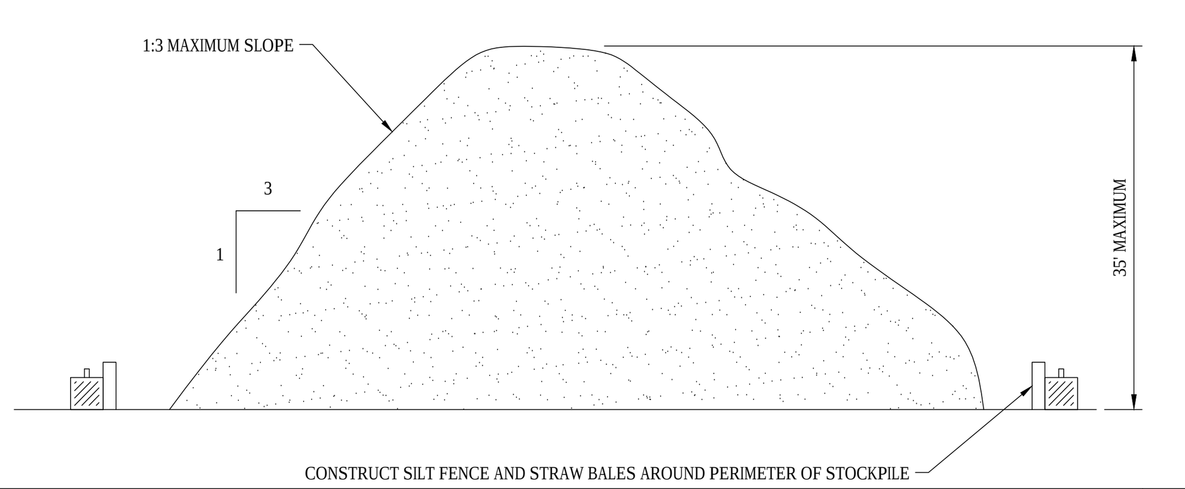
NOTES:
1. BALES SHALL BE PLACED AT THE TOP OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.



DRAINAGE AREA NO MORE THAN 1/4 AC. PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%

STRAW BALE DETAIL

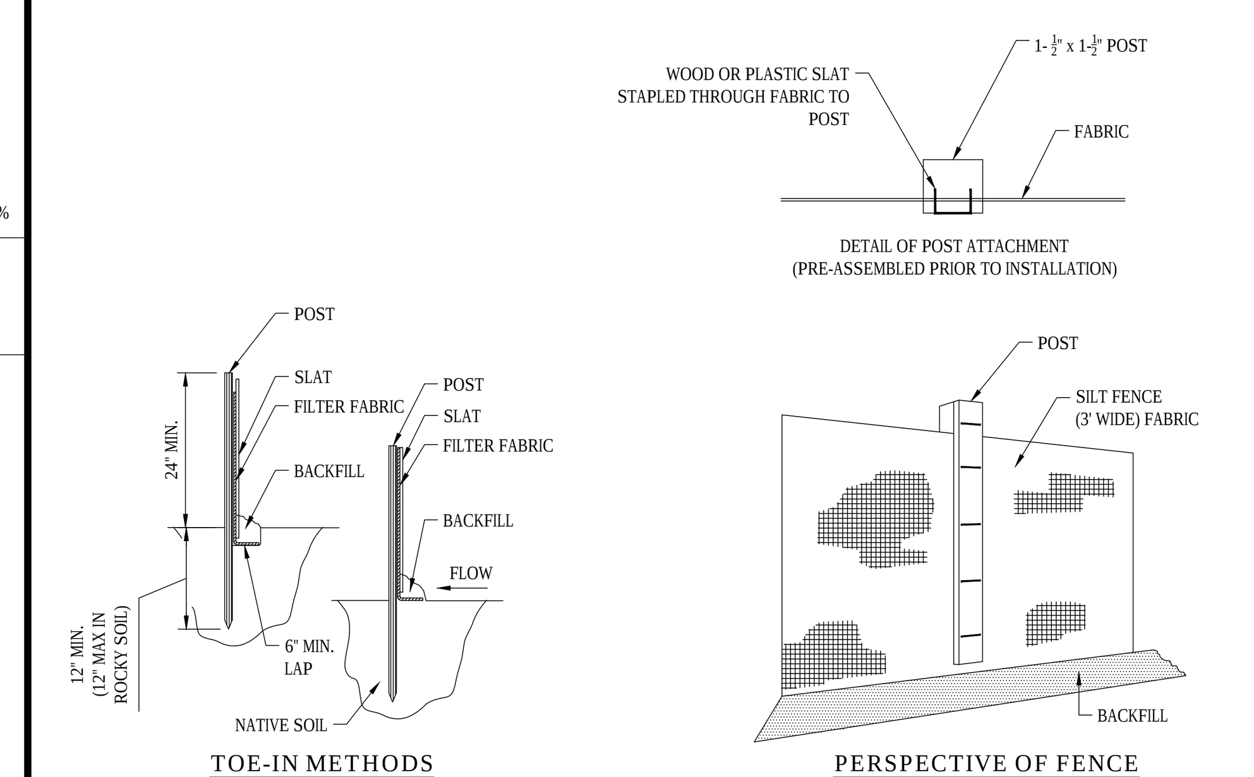
N.T.S.



TEMPORARY STOCKPILE DETAIL

N.T.S.

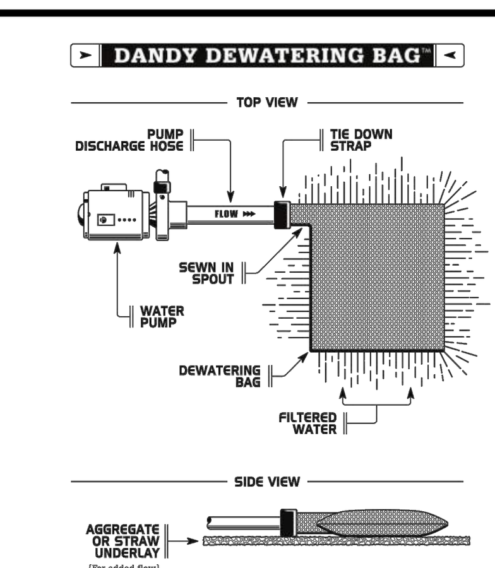
INSTALLATION:
1. EXCAVATE A 6"x 6" TRENCH ALONG THE LINE OF EROSION CONTROL OF THE SITE.
2. UNROLL SILTATION FENCE AND POSITION THE POSTS AGAINST THE BACK (DOWNSTREAM) WALL OF THE TRENCH (NET SIDE AWAY FROM FLOW DIRECTION).
3. DRIVE THE POST INTO THE GROUND UNTIL THE NETTING IS LAYING ACROSS THE TRENCH BOTTOM.
4. LAY THE TOE-IN FLAP OF THE FABRIC ONTO THE UNDISTURBED BOTTOM OF THE TRENCH, BACKFILL THE TRENCH AND TAMP THE SOIL. TOE-IN CAN ALSO BE ACCOMPLISHED BY LAYING FABRIC FLAP ON UNDISTURBED GROUND AND PILING & TAMP- ING FILL AT THE BASE.



1-½" x 1-½" POST
WOOD OR PLASTIC SLAT STAPLED THROUGH FABRIC TO POST
FABRIC
DETAIL OF POST ATTACHMENT (PRE-ASSEMBLED PRIOR TO INSTALLATION)
POST
SLAT
FILTER FABRIC
BACKFILL
FLOW
NATIVE SOIL
6" MIN. LAP
TOE-IN METHODS
SILT FENCE (3' WIDE) FABRIC
PERSPECTIVE OF FENCE

TYP. SILTATION FENCE DETAIL

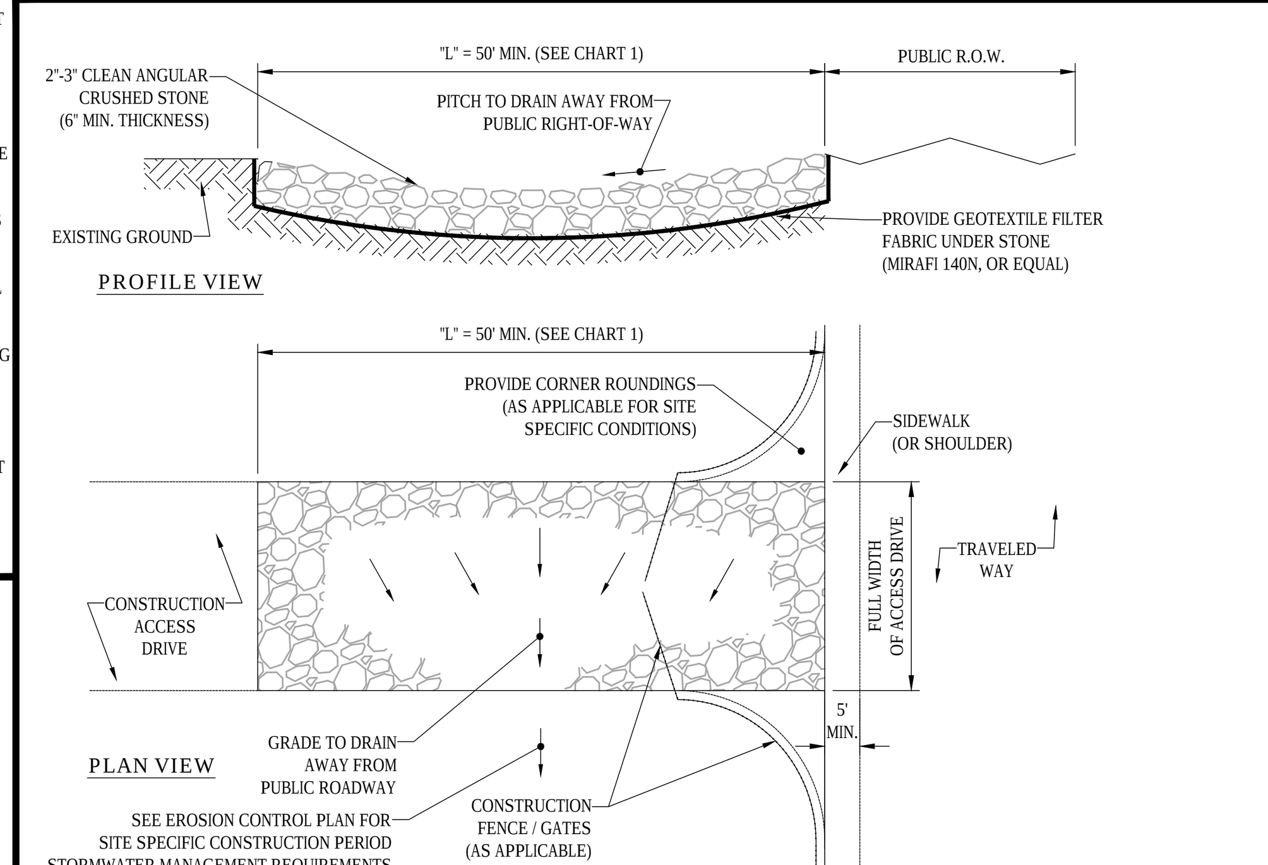
N.T.S.



DEWATERING BAG

N.T.S.

Know what's below. Call before you dig.



2"-3" CLEAN ANGULAR CRUSHED STONE (6" MIN. THICKNESS)
"L" = 50' MIN. (SEE CHART 1)
PUBLIC R.O.W.
PITCH TO DRAIN AWAY FROM PUBLIC RIGHT-OF-WAY
EXISTING GROUND
PROVIDE GEOTEXTILE FILTER FABRIC UNDER STONE (MIRAFI 140N, OR EQUAL)
PROFILE VIEW
PROVIDE CORNER ROUNDINGS (AS APPLICABLE FOR SITE SPECIFIC CONDITIONS)
SIDEWALK (OR SHOULDER)
TRAVELED WAY
CONSTRUCTION ACCESS DRIVE
FULL WIDTH OF ACCESS DRIVE
5' MIN.
PLAN VIEW
GRADE TO DRAIN AWAY FROM PUBLIC ROADWAY
SEE EROSION CONTROL PLAN FOR SITE SPECIFIC CONSTRUCTION PERIOD STORMWATER MANAGEMENT REQUIREMENTS
CONSTRUCTION FENCE / GATES (AS APPLICABLE)

CHART 1

PERCENT SLOPE OF ROADWAY	LENGTH OF STONE REQUIRED	
	COARSE GRAINED SOILS	FINE GRAINED SOILS
0 TO 2%	50 FT	100 FT
2% TO 5%	100 FT	200FT
>5%	ENTIRE ENTRANCE STABILIZED WITH FABC BASE COURSE (1)	

(1) AS PRESCRIBED BY LOCAL ORDINANCE OR OTHER GOVERNING AUTHORITY.

MAINTENANCE NOTES:
1. INSPECT STABILIZED CONSTRUCTION ENTRANCE / ANTI-TRACKING PAD AND SEDIMENT DISPOSAL AREA WEEKLY OR AFTER EVERY MAJOR RAIN STORM EVENT.
2. WASH WATER (IF USED) SHALL BE DIRECTED TOWARD A SEDIMENT TRAP, SUFFICIENTLY SIZED FOR SPECIFIC SITE CONDITIONS.
3. EXCESSIVELY MUD-CLOGGED STONE SHALL BE REMOVED AND REPLACED, AS NEEDED.

STABILIZED CONSTRUCTION EXIT

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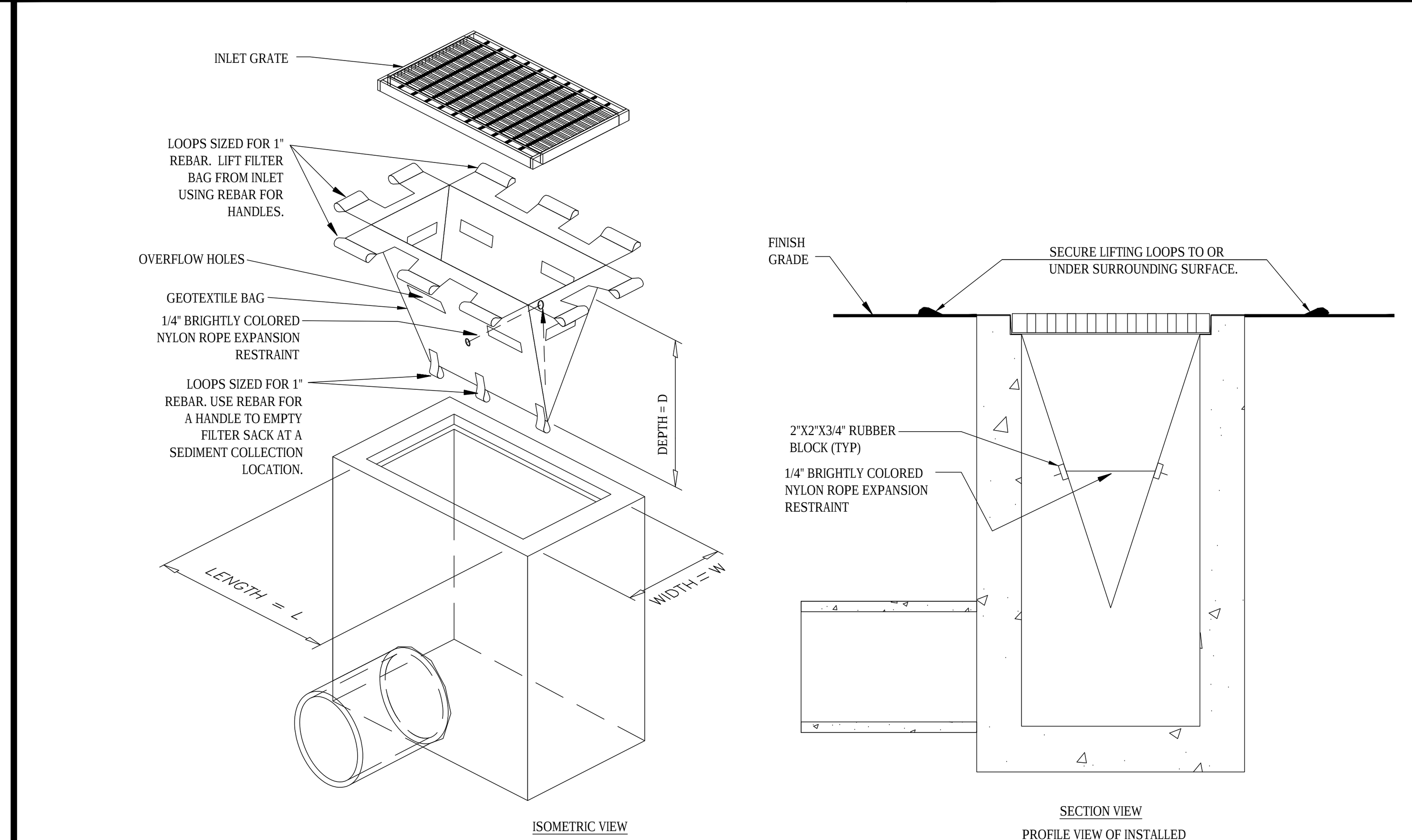


INLET GRATE
LOOPS SIZED FOR 1" REBAR. LIFT FILTER BAG FROM INLET USING REBAR FOR HANDLES.
OVERFLOW HOLES
GEOTEXTILE BAG
1/4" BRIGHTLY COLORED NYLON ROPE EXPANSION RESTRAINT
LOOPS SIZED FOR 1" REBAR. USE REBAR FOR A HANDLE TO EMPTY FILTER SACK AT A SEDIMENT COLLECTION LOCATION.
ISOMETRIC VIEW
FINISH GRADE
SECURE LIFTING LOOPS TO OR UNDER SURROUNDING SURFACE.
2"X2"X3/4" RUBBER BLOCK (TYP)
1/4" BRIGHTLY COLORED NYLON ROPE EXPANSION RESTRAINT
SECTION VIEW
PROFILE VIEW OF INSTALLED FILTER SACK

LOW TO MODERATE FLOW GEOTEXTILE FABRIC SPECIFICATION TABLE		
PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	120 LBS
MULLEN BURST	ASTM D-3786	800 PSI
TRAPEZOID TEAR	ASTM D-4533	120 LBS
UV RESISTANCE	ASTM D-4355	80 %
APPARENT OPENING SIZE	ASTM D-4751	40 US SIEVE
FLOW RATE	ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	0.55 SEC -1

MODERATE TO HIGH FLOW GEOTEXTILE FABRIC SPECIFICATION TABLE		
PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

1. REMOVE TRAPPED SEDIMENT WHEN BRIGHTLY COLORED EXPANSION RESTRAINT CAN NO LONGER BE SEEN.
2. GEOTEXTILE SHALL BE A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS REQUIREMENTS IN THE SPECIFICATIONS TABLE.
3. PLACE AN OIL ADSORBENT PAD OR PILLOW OVER INLET GRATE WHEN OIL SPILLS ARE A CONCERN.
4. INSPECT PER REGULATORY REQUIREMENTS.
5. THE WIDTH, "W", OF THE FILTER SACK SHALL MATCH THE INSIDE WIDTH OF THE GRATED INLET BOX.
6. THE DEPTH, "D", OF THE FILTER SACK SHALL BE BETWEEN 18 INCHES AND 36 INCHES
7. THE LENGTH, "L", OF THE FILTER SACK SHALL MATCH THE INSIDE LENGTH OF THE GRATED INLET BOX.

DO NOT USE IN PAVED AREAS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

TO BE USED IN EXISTING RIGHT OF WAY

FILTER SACKS (GRATED INLETS)

N.T.S.

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

PERMIT SET

PROJECT No.:	CT181007
DRAWN BY:	MAA
CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

BOHLER
16 OLD FORGE ROAD, SUITE A
ROCKY HILL, CT 06067
Phone: (860) 333-8900
Fax: (508) 480-9080
www.BohlerEngineering.com

G.P. FITZGERALD
PROFESSIONAL ENGINEER

SHEET TITLE:

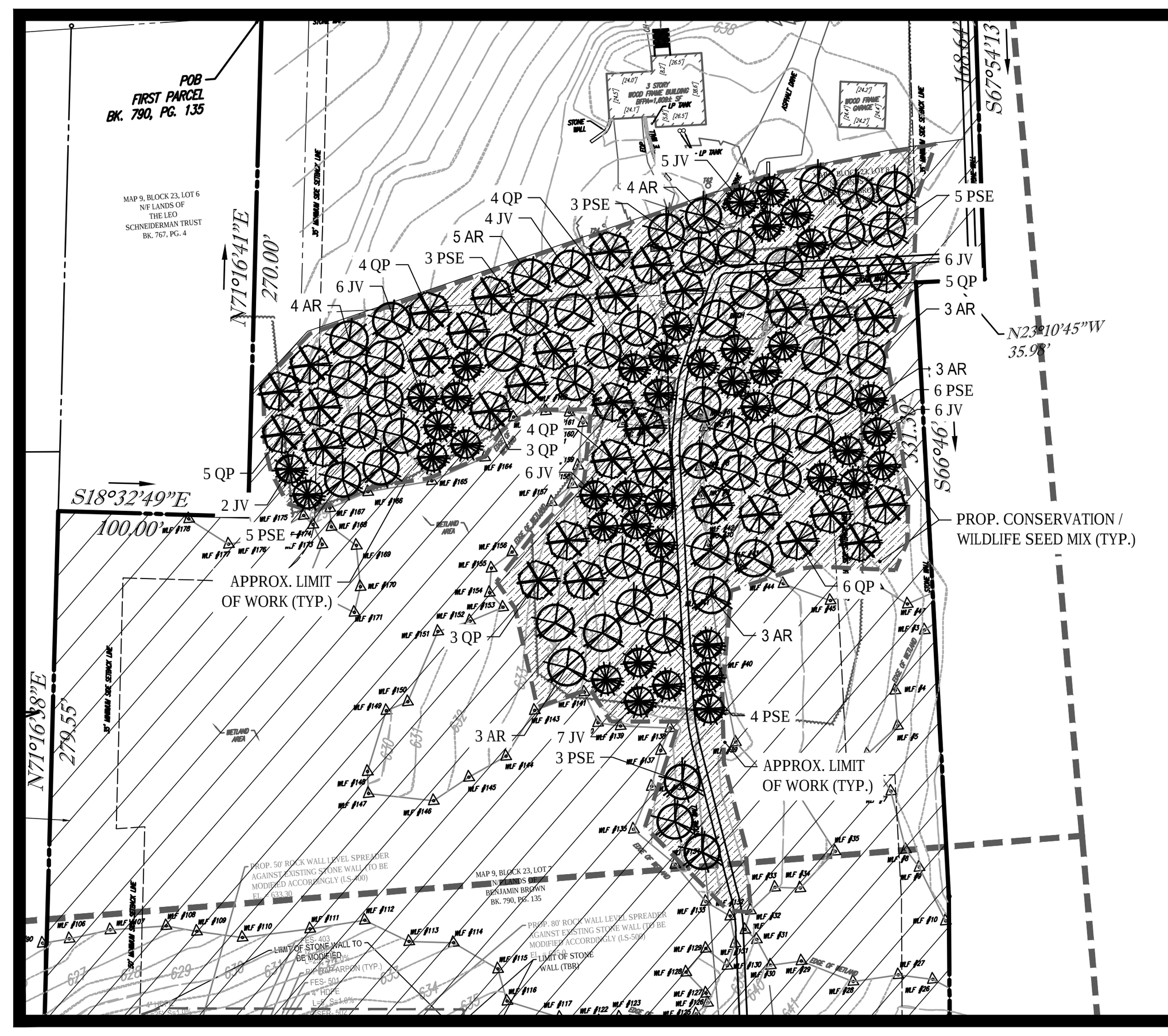
SOIL EROSION CONTROL NOTES & DETAILS SHEET

SHEET NUMBER:

15

OF 25

REV 1 - 02/06/2020



NOTE:
PROPOSED TREES SHALL BE A MINIMUM OF 8' TALL AND PLANTED 25' ON CENTER WITHIN THE LIMIT OF WORK. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE SEEDED WITH NEW ENGLAND CONSERVATION/WILDLIFE MIX BY NEW ENGLAND WETLAND PLANTS, INC. SEED MIX SHALL BE APPLIED AT A RATE OF 1750 SQ. FT. / LB.
FINAL LOCATION TO BE DETERMINED IN FIELD WITH OWNER.

INSET 'A'
SCALE: 1" = 40'

WETLAND MITIGATION LANDSCAPE SCHEDULE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	CONT.
SHADE TREES					
AR	24	ACER RUBRUM	RED MAPLE	2 1/2-3" CAL.	B+B
PSE	29	PRUNUS SEROTINA	BLACK CHERRY	2 1/2-3" CAL.	B+B
QP	34	QUERCUS PALUSTRIS	PIN OAK	2 1/2-3" CAL.	B+B
SUBTOTAL:	87				
EVERGREEN TREES					
JV	42	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	8-10'	B+B
SUBTOTAL:	42				

TOWN OF MANSFIELD LANDSCAPE REQUIREMENTS

SECTION	REQUIREMENTS	CALCULATIONS/PROPOSED
6 B 4 (1)	ALL MULTI-FAMILY RESIDENCE USES SHALL INCLUDE STRATEGICALLY PLACED LANDSCAPE AND BUFFER AREAS, WHICH SHALL BE DESIGNED TO PROTECT AND PRESERVE PROPERTY VALUES; TO PROVIDE PRIVACY FROM VISUAL INTRUSION, LIGHT, DIRT AND NOISE; TO PREVENT THE EROSION OF SOIL AND TO PROVIDE WATER RECHARGE AREAS; TO PROMOTE PEDESTRIAN AND VEHICULAR SAFETY; AND TO ENHANCE THE ENVIRONMENTAL QUALITY AND ATTRACTIVENESS OF MANSFIELD.	PROVIDED
10 A 11 (1)	DEVELOPMENTS ALONG ROUTES 44 AND 195 AND ALONG NORTH HILLSIDE ROAD SHALL INCORPORATE A PROMINENT PEDESTRIAN ORIENTED AND EXTENSIVELY LANDSCAPED STREETSCAPE. THE STREETSCAPE AREA SHALL INCLUDE WALKWAY/BIKEWAY, STREET TREES AND OTHER LANDSCAPE ENHANCEMENTS.	PROVIDED
10 A 11 (4)	PARKING, LOADING, WASTE DISPOSAL AND STORAGE AREAS SHALL BE LOCATED TO THE REAR OR SIDE OF BUILDINGS AND SCREENED FROM ADJACENT ROADWAYS AND WALKWAY/BIKEWAYS.	PROVIDED
10 D 19	INTERIOR PARKING LOT LANDSCAPE AREAS SHALL CONTAIN A MIX OF TREES, SHRUBS, GROUND COVERS AND OTHER PLANTINGS. AT A MINIMUM, ONE DECIDUOUS SHADE TREE SHALL BE PLANTED FOR EACH 10 PARKING SPACES.	193 PARKING SPACES / 10 = 19.3 OR 20 TREES

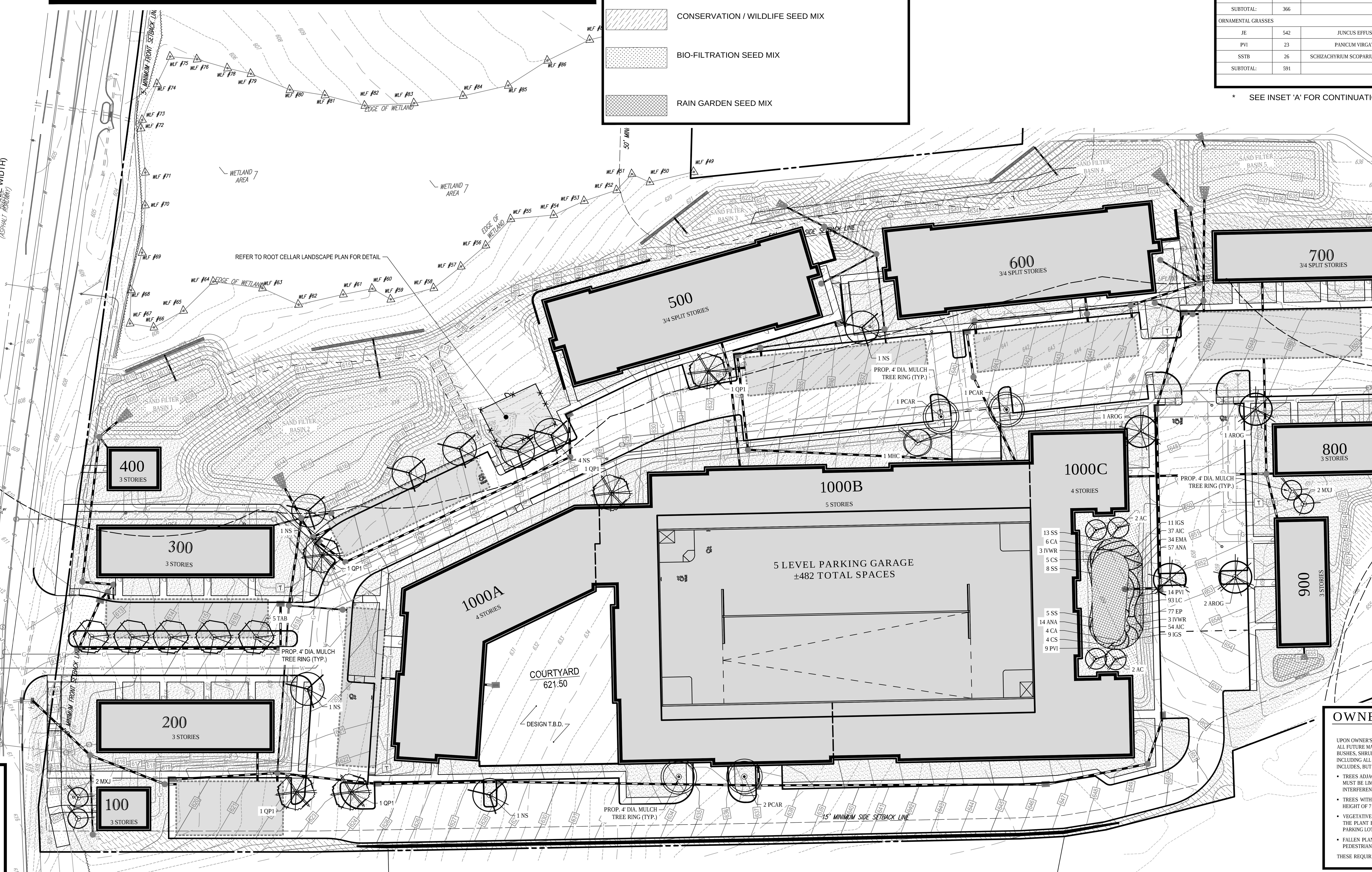
SEED MIX KEY

- HYDROSEED
- CONSERVATION / WILDLIFE SEED MIX
- BIO-FILTRATION SEED MIX
- RAIN GARDEN SEED MIX

LANDSCAPE SCHEDULE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	CONT.
SHADE TREES					
AROG	4	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	2 1/2-3" CAL.	B+B
NS	8	NYSSA SYLVATICA	SOURGUM OR TUPELO	2 1/2-3" CAL.	B+B
PCAR	4	PYRUS CALLERYANA 'ARISTOCRAT'	ARISTOCRAT CALLERY PEAR	2-2 1/2" CAL.	B+B
QP	6	QUERCUS PALUSTRIS	PIN OAK	2 1/2-3" CAL.	B+B
TAB	5	TILIA AMERICANA 'BOULEVARD'	BOULEVARD AMERICAN LINDEN	2 1/2-3" CAL.	B+B
SUBTOTAL:	27				
ORNAMENTAL TREES					
AC	4	AMELANCHIER CANADENSIS	MULTI STEM SHADBLOW SERVICEBERRY	8-10'	B+B
MHC	1	MALUS HUPEHENSIS 'CARDINAL'	CARDINAL TEA CRAB	2-2 1/2" CAL.	B+B
MXJ	4	MAGNOLIA X 'JANE'	COMPACT MAGNOLIA	6-7'	B+B
SUBTOTAL:	9				
EVERGREEN TREES					
JV	6	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	8-10'	B+B
SUBTOTAL:	6				
DECIDUOUS SHRUBS					
CA	10	CLETHRA ALNIFOLIA	SUMMERSWEET CLETHRA	24-30"	CONTAINER
CS	9	CORNUS SERICEA (FORMERLY STOLONIFERA)	RED OSIER DOGWOOD	2-3'	B+B
IVWR	6	ILEX VERTICILLATA 'WINTER RED'	WINTER RED WINTERBERRY HOLLY	30-36"	CONTAINER
SUBTOTAL:	25				
EVERGREEN SHRUBS					
IGS	20	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY HOLLY	24-30"	B+B
SUBTOTAL:	20				
PERENNIALS					
AIC	91	ASCLEPIAS INCARNATA 'CINDERELLA'	BUTTERFLY WEED	2 GAL.	CONTAINER
ANA	71	ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	2 GAL.	CONTAINER
EMA	34	EUPATORIUM MACULATUM 'ATROPURPUREUM'	JOE PYE WEED	2 GAL.	CONTAINER
EP	77	ECHINACEA PURPUREA	PURPLE CONEFLOWER	2 GAL.	CONTAINER
LC	93	LOBELIA CARDINALIS	CARDINAL FLOWER	2 GAL.	CONTAINER
SUBTOTAL:	366				
ORNAMENTAL GRASSES					
JE	542	JUNCUS EFFUSUS	COMMON RUSH	2"	PLUG
PVI	23	PANICUM VIRGATUM	SWITCH GRASS	2 GAL.	CONTAINER
SSTB	26	SCHIZACHYRIUM SCOPARIUM 'THE BLUES'	LITTLE BLUE STEM	2 GAL.	CONTAINER
SUBTOTAL:	591				

* SEE INSET 'A' FOR CONTINUATION



THIS PLAN TO BE UTILIZED FOR LANDSCAPE PURPOSES ONLY

REFER LANDSCAPE NOTES & DETAILS SHEET FOR LANDSCAPE NOTES AND DETAILS

OWNER MAINTENANCE RESPONSIBILITIES

UPON OWNER'S (OR OWNER CONTRACTOR'S) COMPLETION OF LANDSCAPING WORK, THE OWNER IS FULLY RESPONSIBLE FOR ALL FUTURE MAINTENANCE, CARE, UPKEEP, WATERING, AND TRIMMING OF ALL INSTALLED VEGETATION, PLANTS, TREE, BUSHES, SHRUBS, GRASSES, GRASS, ORNAMENTAL PLANTS AND FLOWERS, FLOWERS, GROUND COVER, AND LANDSCAPING, INCLUDING ALL LANDSCAPE ISLANDS AND AREAS ADJACENT OR PART OF THE LANDSCAPED AREAS. THIS RESPONSIBILITY INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING:

- TREES ADJACENT TO WALKWAYS AND AREAS OF PEDESTRIAN TRAFFIC MUST BE MAINTAINED TO ASSURE THAT ANY BRANCHES MUST BE LIMBED UP TO A CLEARANCE HEIGHT OF 7 FT. (FROM ALL PEDESTRIAN SURFACES) OR PRUNED BACK TO AVOID ANY INTERFERENCE WITH THE TYPICAL PATH OF TRAVEL.
- TREES WITHIN VEHICULAR SIGHT LINES, AS ILLUSTRATED ON THE LANDSCAPE PLAN, ARE TO BE TRIMMED TO A CLEARANCE HEIGHT OF 7 FT. (FROM ALL PAVED, TRAVELED SURFACES), OR AS OTHERWISE INDICATED ON THE PLANS.
- VEGETATIVE GROUND COVER, SHRUBS AND ORNAMENTAL PLANTS AND GRASSES MUST BE TRIMMED SO THAT NO PORTION OF THE PLANT EXCEEDS 30 INCHES ABOVE GRADE (OF ALL PAVED, TRAVEL SURFACES) ALONG AND WITHIN THE SIGHT LINES OF PARKING LOTS AND INGRESS-EGRESS WAYS.
- FALLEN PLANT FLOWERS, FRUIT, SEEDS AND DEBRIS DROPPINGS ARE TO BE REMOVED IMMEDIATELY FROM VEHICULAR AND PEDESTRIAN TRAFFIC AREAS TO PREVENT TRIPPING, SLIPPING OR ANY OTHER HAZARDS.

THESE REQUIREMENTS DO NOT AFFECT THE PLANT LIFE GUARANTEES THE LANDSCAPE CONTRACTOR IS REQUIRED TO PROVIDE.

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REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
2			
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PERMIT SET

PROJECT No.:	CT181007
DRAWN BY:	MAA
CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT
FOR
CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE
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LOTS 1, 7, & 8, BLOCK 23, MAP 9
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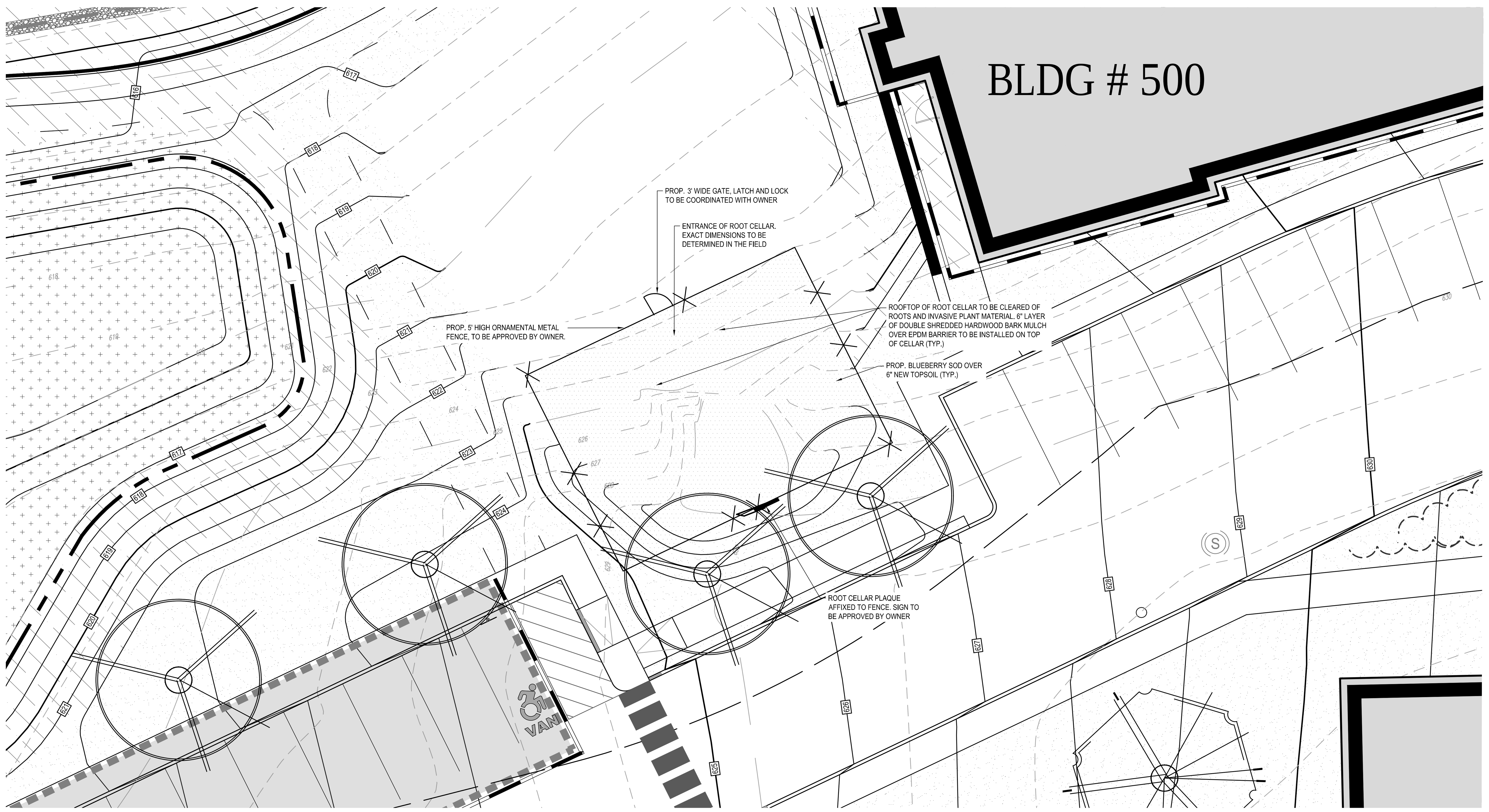
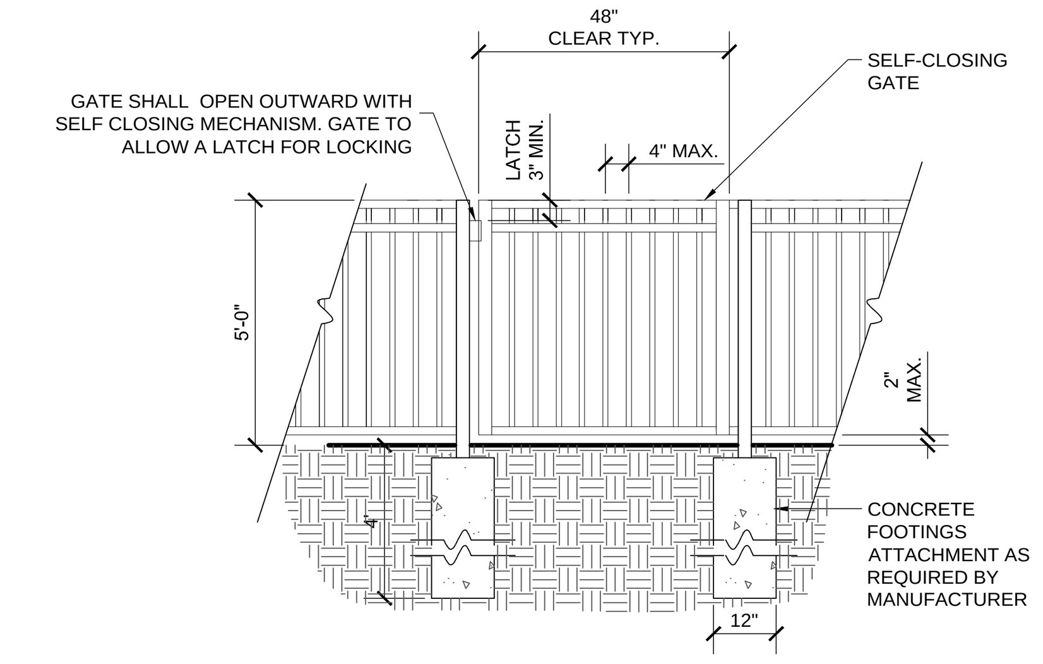
SHEET TITLE:
LANDSCAPE PLAN

SHEET NUMBER:
16
OF 25

REV 1 - 02/06/2020



EXISTING ROOT CELLAR



NOTES:
1. ALUMINUM FENCE, GATE, AND ALL HARDWARE SHALL BE BLACK IN COLOR
2. CONTRACTOR SHALL VERIFY THAT ALL FENCING MEETS APPLICABLE STATE, LOCAL, AND FEDERAL CODES
3. SUBMIT SHOP DRAWINGS/SAMPLES TO BE APPROVED BY OWNER.

ORNAMENTAL FENCE

SCALE: NTS

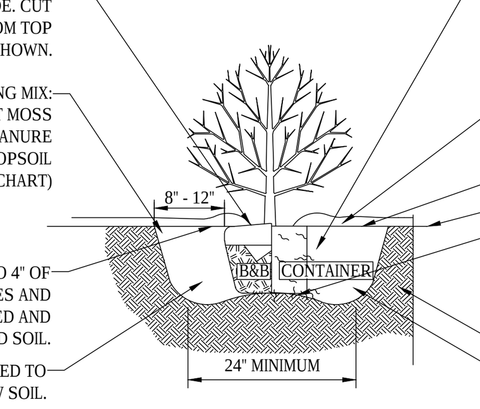
STANDARD FOR PERMANENT STABILIZATION WITH BLUEBERRY SOD

METHODS AND MATERIALS
1. BLUEBERRY SOD SHOULD BE FREE OF WEEDS AND UNDESIRABLE COARSE WEEDY GRASSES. SOD VARIETY SHOULD BE VACCINIUM AUGUSTIFOLIUM OR APPROVED EQUAL
2. BLUEBERRY SOD SHOULD NOT EXHIBIT HOLES GREATER THAN 6".
3. SOD SHOULD BE VIGOROUS AND DENSE . BROKEN PADS OR TORN AND UNEVEN ENDS WILL NOT BE ACCEPTABLE.
4. ONLY MOIST, FRESH, UNHEATED BLUEBERRY SOD SHOULD BE USED. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS.

I. SITE PREPARATION
A. GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR LIMING, FERTILIZING, AND SOIL PREPARATION. ALL GRADING SHOULD BE DONE IN ACCORDANCE WITH STANDARD FOR LAND GRADING.

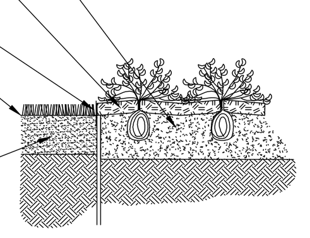
II. SOIL PREPARATION
A. CONTRACTOR SHALL CONTACT BLUEBERRY SOD VENDOR AND AMEND SOIL PER THEIR RECOMMENDATION

III. SOD PLACEMENT
A. SOD STRIPS SHOULD BE LAID ON THE CONTOUR, NEVER UP AND DOWN THE SLOPE, STARTING AT THE BOTTOM OF THE SLOPE AND WORKING UP. ON STEEP SLOPES, THE USE OF LADDERS WILL FACILITATE THE WORK AND PREVENT DAMAGE TO THE SOD. DURING PERIODS OF HIGH TEMPERATURE, LIGHTLY IRRIGATE THE SOIL IMMEDIATELY PRIOR TO LAYING THE SOD.
B. PLACE SOD STRIPS WITH SNUG, EVEN JOINTS THAT ARE STAGGERED. OPEN SPACES INVITE EROSION.
C. ROLL OR TAMP SOD IMMEDIATELY FOLLOWING PLACEMENT TO INSURE SOLID CONTACT OF ROOT MAT AND SOIL SURFACE. DO NOT OVERLAP SOD. ALL JOINTS SHOULD BE BUTTED TIGHTLY IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE DRYING OF THE ROOTS.
D. ON SLOPES GREATER THAN 3 TO 1, SECURE SOD TO SURFACE SOIL WITH WOOD PEGS, WIRE STAPLES, OR SPLIT SHINGLES (8 TO 10 INCHES LONG BY 3/4 INCH WIDE).
E. SURFACE WATER CANNOT ALWAYS BE DIVERTED FROM FLOWING OVER THE FACE OF THE SLOPE, BUT A CAPPING STRIP OF HEAVY JUTE OR PLASTIC NETTING, PROPERLY SECURED, ALONG THE CROWN OF THE SLOPE AND EDGES WILL PROVIDE EXTRA PROTECTION AGAINST LIFTING AND UNDERCUTTING OF SOD. THE SAME TECHNIQUE CAN BE USED TO ANCHOR SOD IN WATER CARRYING CHANNELS AND OTHER CRITICAL AREAS. WIRE STAPLES MUST BE USED TO ANCHOR NETTING IN CHANNEL WORK.
F. IMMEDIATELY FOLLOWING INSTALLATION, SOD SHOULD BE WATERED UNTIL MOISTURE PENETRATES THE SOIL LAYER BENEATH SOD TO A DEPTH OF 4 INCHES. MAINTAIN OPTIMUM MOISTURE FOR AT LEAST TWO WEEKS, AND CONTINUE IRRIGATION THROUGHOUT ENTIRE SEASON.



SHRUB PLANTING DETAIL

N.T.S.



GROUNDCOVER PLANTING

N.T.S.

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10 5 2.5 0 10
1"= 10'

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CAD I.D.:	TB-CT181007ss5

PROJECT:
RESIDENTIAL DEVELOPMENT
FOR
CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE
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MASSACHUSETTS No. 1217
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NEW YORK No. 002359
NEW HAMPSHIRE No. 109
CONNECTICUT No. 1359

SHEET TITLE:
ROOT CELLAR LANDSCAPE PLAN

SHEET NUMBER:
17
OF 25

REV 1 - 02/06/2020

LANDSCAPE SPECIFICATIONS

1. SCOPE OF WORK:

1.1. THE LANDSCAPE CONTRACTOR SHALL BE REQUIRED TO PERFORM ALL CLEARING, FINISHED GRADING, SOIL PREPARATION, PERMANENT SEEDING OR SODDING, PLANTING AND MULCHING INCLUDING ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT NECESSARY FOR THE COMPLETION OF THIS PROJECT, UNLESS OTHERWISE CONTRACTED BY THE GENERAL CONTRACTOR.

2. MATERIALS

2.1. GENERAL - ALL HARDSCAPE MATERIALS SHALL MEET OR EXCEED SPECIFICATIONS AS OUTLINED IN THE STATE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.

2.2. TOPSOIL - NATURAL, FRIABLE, LOAMY SILT SOIL HAVING AN ORGANIC CONTENT NOT LESS THAN 5%, A PH RANGE BETWEEN 4.5-7.0. IT SHALL BE FREE OF DEBRIS, ROCKS LARGER THAN ONE INCH (1"), WOOD, ROOTS, VEGETABLE MATTER AND CLAY CLODS.

2.3. LAWN - ALL DISTURBED AREAS ARE TO BE TREATED WITH A MINIMUM 6" THICK LAYER OF TOPSOIL, OR AS DIRECTED BY THE LOCAL ORDINANCE OR CLIENT, AND SEEDED OR SODDED IN ACCORDANCE WITH THE PERMANENT STABILIZATION METHODS INDICATED ON THE LANDSCAPE PLAN

2.3.1. LAWN SEED MIXTURE SHALL BE FRESH, CLEAN NEW CROP SEED.

2.3.2. SOD SHALL BE STRONGLY ROOTED, WEED AND DISEASE/PEST FREE WITH A UNIFORM THICKNESS. SOD INSTALLED ON SLOPES GREATER THAN 4:1 SHALL BE PEGGED TO HOLD SOD IN PLACE.

2.4. MULCH - ALL PLANTING BEDS SHALL BE MULCHED WITH A 3" THICK LAYER OF DOUBLE SHREDDED HARDWOOD BARK MULCH, UNLESS OTHERWISE STATED ON THE LANDSCAPE PLAN AND/OR LANDSCAPE PLAN NOTES /DETAILS.

2.5. FERTILIZER

2.5.1. FERTILIZER SHALL BE DELIVERED TO THE SITE MIXED AS SPECIFIED IN THE ORIGINAL UNOPENED STANDARD BAGS SHOWING WEIGHT, ANALYSIS AND NAME OF MANUFACTURER. FERTILIZER SHALL BE STORED IN A WEATHERPROOF PLACE SO THAT IT CAN BE KEPT DRY PRIOR TO USE.

2.5.2. FOR THE PURPOSE OF BIDDING, ASSUME THAT FERTILIZER SHALL BE 10% NITROGEN, 6% PHOSPHORUS AND 4% POTASSIUM BY WEIGHT. A FERTILIZER SHOULD NOT BE SELECTED WITHOUT A SOIL TEST PERFORMED BY A CERTIFIED SOIL LABORATORY.

2.6. PLANT MATERIAL

2.6.1. ALL PLANTS SHALL IN ALL CASES CONFORM TO THE REQUIREMENTS OF THE "AMERICAN STANDARD FOR NURSERY STOCK" (ANSI Z60.1), LATEST EDITION, AS PUBLISHED BY THE AMERICAN NURSERY & LANDSCAPE ASSOCIATION (FORMERLY THE AMERICAN ASSOCIATION OF NURSERYMEN).

2.6.2. IN ALL CASES, BOTANICAL NAMES SHALL TAKE PRECEDENCE OVER COMMON NAMES FOR ANY AND ALL PLANT MATERIAL.

2.6.3. PLANTS SHALL BE LEGIBLY TAGGED WITH THE PROPER NAME AND SIZE. TAGS ARE TO REMAIN ON AT LEAST ONE PLANT OF EACH SPECIES FOR VERIFICATION PURPOSES DURING THE FINAL INSPECTION.

2.6.4. TREES WITH ABRASION OF THE BARK, SUN SCALDS, DISFIGURATION OR FRESH CUTS OF LIMBS OVER 1¼", WHICH HAVE NOT BEEN COMPLETELY CALLUSED, SHALL BE REJECTED. PLANTS SHALL NOT BE BOUND WITH WIRE OR ROPE AT ANY TIME SO AS TO DAMAGE THE BARK OR BREAK BRANCHES.

2.6.5. ALL PLANTS SHALL BE TYPICAL OF THEIR SPECIES OR VARIETY AND SHALL HAVE A NORMAL HABIT OF GROWTH: WELL DEVELOPED BRANCHES, DENSELY FOLIATED, VIGOROUS ROOT SYSTEMS AND BE FREE OF DISEASE, INSECTS, PESTS, EGGS OR LARVAE.

2.6.6. CALIPER MEASUREMENTS OF NURSERY GROWN TREES SHALL BE TAKEN AT A POINT ON THE TRUNK SIX INCHES (6") ABOVE THE NATURAL GRADE FOR TREES UP TO AND INCLUDING A FOUR INCH (4") CALIPER SIZE. IF THE CALIPER AT SIX INCHES (6") ABOVE THE GROUND EXCEEDS FOUR INCHES (4") IN CALIPER, THE CALIPER SHOULD BE MEASURED AT A POINT 12" ABOVE THE NATURAL GRADE.

2.6.7. SHRUBS SHALL BE MEASURED TO THE AVERAGE HEIGHT OR SPREAD OF THE SHRUB, AND NOT TO THE LONGEST BRANCH.

2.6.8. TREES AND SHRUBS SHALL BE HANDLED WITH CARE BY THE ROOT BALL.

3. GENERAL WORK PROCEDURES

3.1. CONTRACTOR TO UTILIZE WORKMANLIKE INDUSTRY STANDARDS IN PERFORMING ALL LANDSCAPE CONSTRUCTION. THE SITE IS TO BE LEFT IN A CLEAN STATE AT THE END OF EACH WORKDAY. ALL DEBRIS, MATERIALS AND TOOLS SHALL BE PROPERLY STORED, STOCKPILED OR DISPOSED OF.

3.2. WASTE MATERIALS AND DEBRIS SHALL BE COMPLETELY DISPOSED OF AT THE CONTRACTOR'S EXPENSE. DEBRIS SHALL NOT BE BURIED, INCLUDING ORGANIC MATERIALS, BUT SHALL BE REMOVED COMPLETELY FROM THE SITE.

4. SITE PREPARATIONS

4.1. BEFORE AND DURING PRELIMINARY GRADING AND FINISHED GRADING, ALL WEEDS AND GRASSES SHALL BE DUG OUT BY THE ROOTS AND DISPOSED OF IN ACCORDANCE WITH GENERAL WORK PROCEDURES OUTLINED HEREIN.

4.2. ALL EXISTING TREES TO REMAIN SHALL BE PRUNED TO REMOVE ANY DAMAGED BRANCHES. THE ENTIRE LIMB OF ANY DAMAGED BRANCH SHALL BE CUT OFF AT THE BRANCH COLLAR. CONTRACTOR SHALL ENSURE THAT CUTS ARE SMOOTH AND STRAIGHT. ANY EXPOSED ROOTS SHALL BE CUT BACK WITH CLEAN, SHARP TOOLS AND TOPSOIL SHALL BE PLACED AROUND THE REMAINDER OF THE ROOTS. EXISTING TREES SHALL BE MONITORED ON A REGULAR BASIS FOR ADDITIONAL ROOT OR BRANCH DAMAGE AS A RESULT OF CONSTRUCTION. ROOTS SHALL NOT BE LEFT EXPOSED FOR MORE THAN ONE (1) DAY. CONTRACTOR SHALL WATER EXISTING TREES AS NEEDED TO PREVENT SHOCK OR DECLINE.

4.3. CONTRACTOR SHALL ARRANGE TO HAVE A UTILITY STAKE-OUT TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF ANY LANDSCAPE MATERIAL. UTILITY COMPANIES SHALL BE CONTACTED THREE (3) DAYS PRIOR TO THE BEGINNING OF WORK.

5. TREE PROTECTION

5.1. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES TO REMAIN. A TREE PROTECTION ZONE SHALL BE ESTABLISHED AT THE DRIP LINE OR AT THE LIMIT OF CONSTRUCTION DISTURBANCE, WHICHEVER IS GREATER. LOCAL STANDARDS THAT MAY REQUIRE A MORE STRICT TREE PROTECTION ZONE SHALL BE HONORED.

5.2. A FORTY-EIGHT INCH (48") HIGH WOODEN SNOW FENCE OR ORANGE COLORED HIGH-DENSITY 'VISI-FENCE', OR APPROVED EQUAL, MOUNTED ON STEEL POSTS SHALL BE PLACED ALONG THE BOUNDARY OF THE TREE PROTECTION ZONE. POSTS SHALL BE LOCATED AT A MAXIMUM OF EIGHT FEET (8') ON CENTER OR AS INDICATED WITHIN THE TREE PROTECTION DETAIL.

5.3. WHEN THE TREE PROTECTION FENCING HAS BEEN INSTALLED, IT SHALL BE INSPECTED BY THE APPROVING AGENCY PRIOR TO DEMOLITION, GRADING, TREE CLEARING OR ANY OTHER CONSTRUCTION. THE FENCING ALONG THE TREE PROTECTION ZONE SHALL BE REGULARLY INSPECTED BY THE LANDSCAPE CONTRACTOR AND MAINTAINED UNTIL ALL CONSTRUCTION ACTIVITY HAS BEEN COMPLETED.

5.4. AT NO TIME SHALL MACHINERY, DEBRIS, FALLEN TREES OR OTHER MATERIALS BE PLACED, STOCKPILED OR LEFT STANDING IN THE TREE PROTECTION ZONE.

6. SOIL MODIFICATIONS

6.1. CONTRACTOR SHALL ATTAIN A SOIL TEST FOR ALL AREAS OF THE SITE PRIOR TO CONDUCTING ANY PLANTING. SOIL TESTS SHALL BE PERFORMED BY A CERTIFIED SOIL LABORATORY.

6.2. LANDSCAPE CONTRACTOR SHALL REPORT ANY SOIL OR DRAINAGE CONDITIONS CONSIDERED DETRIMENTAL TO THE GROWTH OF PLANT MATERIAL. SOIL MODIFICATIONS, AS SPECIFIED HEREIN, MAY NEED TO BE CONDUCTED BY THE LANDSCAPE CONTRACTOR DEPENDING ON SITE CONDITIONS.

6.3. THE FOLLOWING AMENDMENTS AND QUANTITIES ARE APPROXIMATE AND ARE FOR BIDDING PURPOSES ONLY. COMPOSITION OF AMENDMENTS SHOULD BE REVISED DEPENDING ON THE OUTCOME OF A TOPSOIL ANALYSIS PERFORMED BY A CERTIFIED SOIL LABORATORY.

6.3.1. TO INCREASE A SANDY SOIL'S ABILITY TO RETAIN WATER AND NUTRIENTS, THOROUGHLY TILL ORGANIC MATTER INTO THE TOP 6-12". USE COMPOSTED MULCH / BARK. ALL PRODUCTS SHOULD BE COMPOSTED TO A DARK COLOR AND BE FREE OF PIECES WITH IDENTIFIABLE LEAF OR WOOD STRUCTURE. AVOID MATERIAL WITH A PH HIGHER THAN 7.5.

6.3.2. TO INCREASE DRAINAGE, MODIFY HEAVY CLAY OR SILT (MORE THAN 40% CLAY OR SILT) BY ADDING COMPOSTED PINE BARK (UP TO 30% BY VOLUME) AND/OR AGRICULTURAL GYPSUM. COARSE SAND MAY BE USED IF ENOUGH IS ADDED TO BRING THE SAND CONTENT TO MORE THAN 60% OF THE TOTAL MIX. SUBSURFACE DRAINAGE LINES MAY NEED TO BE ADDED TO INCREASE DRAINAGE.

6.3.3. MODIFY EXTREMELY SANDY SOILS (MORE THAN 85%) BY ADDING ORGANIC MATTER AND/OR DRY, SHREDDED CLAY LOAM UP TO 30% OF THE TOTAL MIX.

7. FINISHED GRADING

7.1. UNLESS OTHERWISE CONTRACTED, THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF TOPSOIL AND THE ESTABLISHMENT OF FINE-GRADING WITHIN THE DISTURBANCE AREA OF THE SITE.

7.2. LANDSCAPE CONTRACTOR SHALL VERIFY THAT SUBGRADE FOR INSTALLATION OF TOPSOIL HAS BEEN ESTABLISHED. THE SUBGRADE OF THE SITE MUST MEET THE FINISHED GRADE LESS THE REQUIRED TOPSOIL THICKNESS (1"±).

7.3. ALL LAWN AND PLANTING AREAS SHALL BE GRADED TO A SMOOTH, EVEN AND UNIFORM PLANE WITH NO ABRUPT CHANGE OF SURFACE AS DEPICTED WITHIN THIS SET OF CONSTRUCTION PLANS, UNLESS OTHERWISE DIRECTED BY THE PROJECT ENGINEER OR LANDSCAPE ARCHITECT.

7.4. ALL PLANTING AREAS SHALL BE GRADED AND MAINTAINED TO ALLOW FREE FLOW OF SURFACE WATER IN AND AROUND THE PLANTING BEDS. STANDING WATER SHALL NOT BE PERMITTED IN PLANTING BEDS.

8. TOPSOILING

8.1. CONTRACTOR SHALL PROVIDE A 6" THICK MINIMUM LAYER OF TOPSOIL, OR AS DIRECTED BY THE LOCAL ORDINANCE OR CLIENT, IN ALL PLANTING AREAS. TOPSOIL SHOULD BE SPREAD OVER A PREPARED SURFACE IN A UNIFORM LAYER TO ACHIEVE THE DESIRED COMPACTED THICKNESS.

8.2. ON-SITE TOPSOIL MAY BE USED TO SUPPLEMENT THE TOTAL AMOUNT REQUIRED. TOPSOIL FROM THE SITE MAY BE REJECTED IF IT HAS NOT BEEN PROPERLY REMOVED, STORED AND PROTECTED PRIOR TO CONSTRUCTION.

8.3. CONTRACTOR SHALL FURNISH TO THE APPROVING AGENCY AN ANALYSIS OF BOTH IMPORTED AND ON-SITE TOPSOIL TO BE UTILIZED IN ALL PLANTING AREAS. THE PH AND NUTRIENT LEVELS MAY NEED TO BE ADJUSTED THROUGH SOIL MODIFICATIONS AS NEEDED TO ACHIEVE THE REQUIRED LEVELS AS SPECIFIED IN THE MATERIALS SECTION ABOVE.

8.4. ALL LAWN AREAS ARE TO BE CULTIVATED TO A DEPTH OF SIX INCHES (6"). ALL DEBRIS EXPOSED FROM EXCAVATION AND CULTIVATION SHALL BE DISPOSED OF IN ACCORDANCE WITH GENERAL WORK PROCEDURES SECTION ABOVE. THE FOLLOWING SHALL BE TILLED INTO THE TOP FOUR INCHES (4") IN TWO DIRECTIONS (QUANTITIES BASED ON A 1,000 SQUARE FOOT AREA - FOR BID PURPOSES ONLY [SEE SPECIFICATION 6.A.]):

8.4.1. 20 POUNDS 'GRO-POWER' OR APPROVED SOIL CONDITIONER/FERTILIZER

8.4.2. 20 POUNDS NITRO-FORM (COURSE) 38-0-0 BLUE CHIP OR APPROVED NITROGEN FERTILIZER

8.5. THE SPREADING OF TOPSOIL SHALL NOT BE CONDUCTED UNDER MUDDY OR FROZEN CONDITIONS.

9. PLANTING

9.1. INSOFAR THAT IT IS FEASIBLE, PLANT MATERIAL SHALL BE PLANTED ON THE DAY OF DELIVERY. IN THE EVENT THAT THIS IS NOT POSSIBLE, LANDSCAPE CONTRACTOR SHALL PROTECT UNINSTALLED PLANT MATERIAL. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE DAY PERIOD AFTER DELIVERY. PLANTS THAT WILL NOT BE PLANTED FOR A PERIOD OF TIME GREATER THAN THREE DAYS SHALL BE HEALED IN WITH TOPSOIL OR MULCH TO HELP PRESERVE ROOT MOISTURE.

9.2. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AND IN ACCORDANCE WITH ACCEPTED LOCAL PRACTICE. PLANTS SHALL NOT BE INSTALLED IN TOPSOIL THAT IS IN A MUDDY OR FROZEN CONDITION.

9.3. ANY INJURED ROOTS OR BRANCHES SHALL BE PRUNED TO MAKE CLEAN-CUT ENDS PRIOR TO PLANTING UTILIZING CLEAN, SHARP TOOLS. ONLY INJURED OR DISEASED BRANCHING SHALL BE REMOVED.

9.4. ALL PLANTING CONTAINERS, BASKETS AND NON-BIODEGRADABLE MATERIALS SHALL BE REMOVED FROM ROOT BALLS DURING PLANTING. NATURAL FIBER BURLAP MUST BE CUT FROM AROUND THE TRUNK OF THE TREE AND FOLDED DOWN AGAINST THE ROOT BALL PRIOR TO BACKFILLING.

9.5. POSITION TREES AND SHRUBS AT THEIR INTENDED LOCATIONS AS PER THE PLANS AND SECURE THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO EXCAVATING PITS, MAKING NECESSARY ADJUSTMENTS AS DIRECTED.

9.6. PRIOR TO THE ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY, THE PROPOSED LANDSCAPE, AS SHOWN ON THE APPROVED LANDSCAPE PLAN, MUST BE INSTALLED, INSPECTED AND APPROVED BY THE APPROVING AGENCY. THE APPROVING AGENCY SHALL TAKE INTO ACCOUNT SEASONAL CONSIDERATIONS IN THIS REGARD AS FOLLOWS. THE PLANTING OF TREES, SHRUBS, VINES OR GROUND COVER SHALL OCCUR ONLY DURING THE FOLLOWING PLANTING SEASONS:

9.6.1. PLANTS: MARCH 15 TO DECEMBER 15

9.6.2. LAWN: MARCH 15 TO JUNE 15 OR SEPT. 1 TO DECEMBER 1

9.6.3. PLANTINGS REQUIRED FOR A CERTIFICATE OF OCCUPANCY SHALL BE PROVIDED DURING THE NEXT APPROPRIATE SEASON AT THE MUNICIPALITY'S DISCRETION. CONTRACTOR SHOULD CONTACT APPROVING AGENCY FOR POTENTIAL SUBSTITUTIONS.

9.7. FURTHERMORE, THE FOLLOWING TREE VARIETIES ARE UNUSUALLY SUSCEPTIBLE TO WINTER DAMAGE. WITH TRANSPLANT SHOCK AND THE SEASONAL LACK OF NITROGEN AVAILABILITY, THE RISK OF PLANT DEATH IS GREATLY INCREASED. IT IS NOT RECOMMENDED THAT THESE SPECIES BE PLANTED DURING THE FALL PLANTING SEASON:

ACER RUBRUM	PLATANUS X ACERIFOLIA
BETULA VARIETIES	POPULUS VARIETIES
CARPINUS VARIETIES	PRUNUS VARIETIES
CRATAEGUS VARIETIES	PYRUS VARIETIES
KOELREUTERIA	QUERCUS VARIETIES
LIQUIDAMBAR STYRACIFLUA	TILIA TOMENTOSA
LIRIODENDRON TULIPIFERA	ZELKOVA VARIETIES

9.8. PLANTING PITS SHALL BE DUG WITH LEVEL BOTTOMS, WITH THE WIDTH TWICE THE DIAMETER OF ROOT BALL. THE ROOT BALL SHALL REST ON UNDISTURBED GRADE. EACH PLANT PIT SHALL BE BACKFILLED IN LAYERS WITH THE FOLLOWING PREPARED SOIL MIXED THOROUGHLY:

9.8.1. 1 PART COMPOSTED MULCH / BARK

9.8.2. 1 PART COMPOSTED COW MANURE BY VOLUME

9.8.3. 3 PARTS TOPSOIL BY VOLUME

9.8.4. 21 GRAMS 'AGRIFORM' PLANTING TABLETS (OR APPROVED EQUAL) AS FOLLOWS:

9.8.4.1. 2 TABLETS PER 1 GALLON PLANT

9.8.4.2. 3 TABLETS PER 5 GALLON PLANT

9.8.4.3. 4 TABLETS PER 15 GALLON PLANT

9.8.4.4. LARGER PLANTS: 2 TABLETS PER ½" CALIPER OF TRUNK

9.9. FILL PREPARED SOIL AROUND BALL OF PLANT HALF-WAY AND INSERT PLANT TABLETS. COMPLETE BACKFILL AND WATER THOROUGHLY.

9.10. ALL PLANTS SHALL BE PLANTED SO THAT THE TOP OF THE ROOT BALL, THE POINT AT WHICH THE ROOT FLARE BEGINS, IS SET AT GROUND LEVEL AND IN THE CENTER OF THE PIT. NO SOIL IS TO BE PLACED DIRECTLY ON TOP OF THE ROOT BALL.

9.11. ALL PROPOSED TREES DIRECTLY ADJACENT TO WALKWAYS OR DRIVEWAYS SHALL BE PRUNED AND MAINTAINED TO A MINIMUM BRANCHING HEIGHT OF 7' FROM GRADE.

9.12. GROUND COVER AREAS SHALL RECEIVE A ¼" LAYER OF HUMUS RAKED INTO THE TOP 1" OF PREPARED SOIL PRIOR TO PLANTING. ALL GROUND COVER AREAS SHALL BE WEEDED AND TREATED WITH A PRE-EMERGENT CHEMICAL AS PER MANUFACTURER'S RECOMMENDATION.

9.13. NO PLANT, EXCEPT GROUND COVERS, GRASSES OR VINES, SHALL BE PLANTED LESS THAN TWO FEET (2') FROM EXISTING STRUCTURES AND SIDEWALKS.

9.14. ALL PLANTING AREAS AND PLANTING PITS SHALL BE MULCHED AS SPECIFIED HEREIN TO FILL THE ENTIRE BED AREA OR SAUCER. NO MULCH IS TO TOUCH THE TRUNK OF THE TREE OR SHRUB.

9.15. ALL PLANTING AREAS SHALL BE WATERED IMMEDIATELY UPON INSTALLATION IN ACCORDANCE WITH THE WATERING SPECIFICATIONS AS LISTED HEREIN.

10. TRANSPLANTING (WHEN REQUIRED)

10.1. ALL TRANSPLANTS SHALL BE DUG WITH INTACT ROOT BALLS CAPABLE OF SUSTAINING THE PLANT.

10.2. IF PLANTS ARE TO BE STOCKPILED BEFORE REPLANTING, THEY SHALL BE HEALED IN WITH MULCH OR SOIL, ADEQUATELY WATERED AND PROTECTED FROM EXTREME HEAT, SUN AND WIND.

10.3. PLANTS SHALL NOT BE DUG FOR TRANSPLANTING BETWEEN APRIL 10 AND JUNE 30.

10.4. UPON REPLANTING, BACKFILL SOIL SHALL BE AMENDED WITH FERTILIZER AND ROOT GROWTH HORMONE.

10.5. TRANSPLANTS SHALL BE GUARANTEED FOR THE LENGTH OF THE GUARANTEE PERIOD SPECIFIED HEREIN.

10.6. F TRANSPLANTS DIE, SHRUBS AND TREES LESS THAN SIX INCHES (6") DBH SHALL BE REPLACED IN KIND. TREES GREATER THAN SIX INCHES (6") DBH MAY BE REQUIRED TO BE REPLACED IN ACCORDANCE WITH THE MUNICIPALITY'S TREE REPLACEMENT GUIDELINES.

11. WATERING

11.1. NEW PLANTINGS OR LAWN AREAS SHALL BE ADEQUATELY IRRIGATED BEGINNING IMMEDIATELY AFTER PLANTING. WATER SHALL BE APPLIED TO EACH TREE AND SHRUB IN SUCH MANNER AS NOT TO DISTURB BACKFILL AND TO THE EXTENT THAT ALL MATERIALS IN THE PLANTING HOLE ARE THOROUGHLY SATURATED. WATERING SHALL CONTINUE AT LEAST UNTIL PLANTS ARE ESTABLISHED.

11.2. SITE OWNER SHALL PROVIDE WATER IF AVAILABLE ON SITE AT TIME OF PLANTING. IF WATER IS NOT AVAILABLE ON SITE, CONTRACTOR SHALL SUPPLY ALL NECESSARY WATER. THE USE OF WATERING BAGS IS RECOMMENDED FOR ALL NEWLY PLANTED TREES.

11.3. IF AN IRRIGATION SYSTEM HAS BEEN INSTALLED ON THE SITE, IT SHALL BE USED TO WATER PROPOSED PLANT MATERIAL, BUT ANY FAILURE OF THE SYSTEM DOES NOT ELIMINATE THE CONTRACTOR'S RESPONSIBILITY OF MAINTAINING THE DESIRED MOISTURE LEVEL FOR VIGOROUS, HEALTHY GROWTH.

12. GUARANTEE

12.1. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL PLANTS FOR A PERIOD OF 1 YEAR FROM APPROVAL OF LANDSCAPE INSTALLATION BY THE APPROVING AGENCY. CONTRACTOR SHALL SUPPLY THE OWNER WITH A MAINTENANCE BOND FOR TEN PERCENT (10%) OF THE VALUE OF THE LANDSCAPE INSTALLATION WHICH WILL BE RELEASED AT THE CONCLUSION OF THE GUARANTEE PERIOD AND WHEN A FINAL INSPECTION HAS BEEN COMPLETED AND APPROVED BY THE OWNER OR AUTHORIZED REPRESENTATIVE.

12.2. ANY DEAD OR DYING PLANT MATERIAL SHALL BE REPLACED FOR THE LENGTH OF THE GUARANTEE PERIOD. REPLACEMENT OF PLANT MATERIAL SHALL BE CONDUCTED AT THE FIRST SUCCEEDING PLANTING SEASON. ANY DEBRIS SHALL BE DISPOSED OF OFF-SITE, WITHOUT EXCEPTION.

12.3. TREES AND SHRUBS SHALL BE MAINTAINED BY THE CONTRACTOR DURING CONSTRUCTION AND THROUGHOUT THE 90 DAY MAINTENANCE PERIOD AS SPECIFIED HEREIN. CULTIVATION, WEEDING, WATERING AND THE PREVENTATIVE TREATMENTS SHALL BE PERFORMED AS NECESSARY TO KEEP PLANT MATERIAL IN GOOD CONDITION AND FREE OF INSECTS AND DISEASE.

12.4. LAWNS SHALL BE MAINTAINED THROUGH WATERING, FERTILIZING, WEEDING, MOWING, TRIMMING AND OTHER OPERATIONS SUCH AS ROLLING, REGARDING AND REPLANTING AS REQUIRED TO ESTABLISH A SMOOTH, ACCEPTABLE LAWN, FREE OF ERODED OR BARE AREAS.

13. CLEANUP

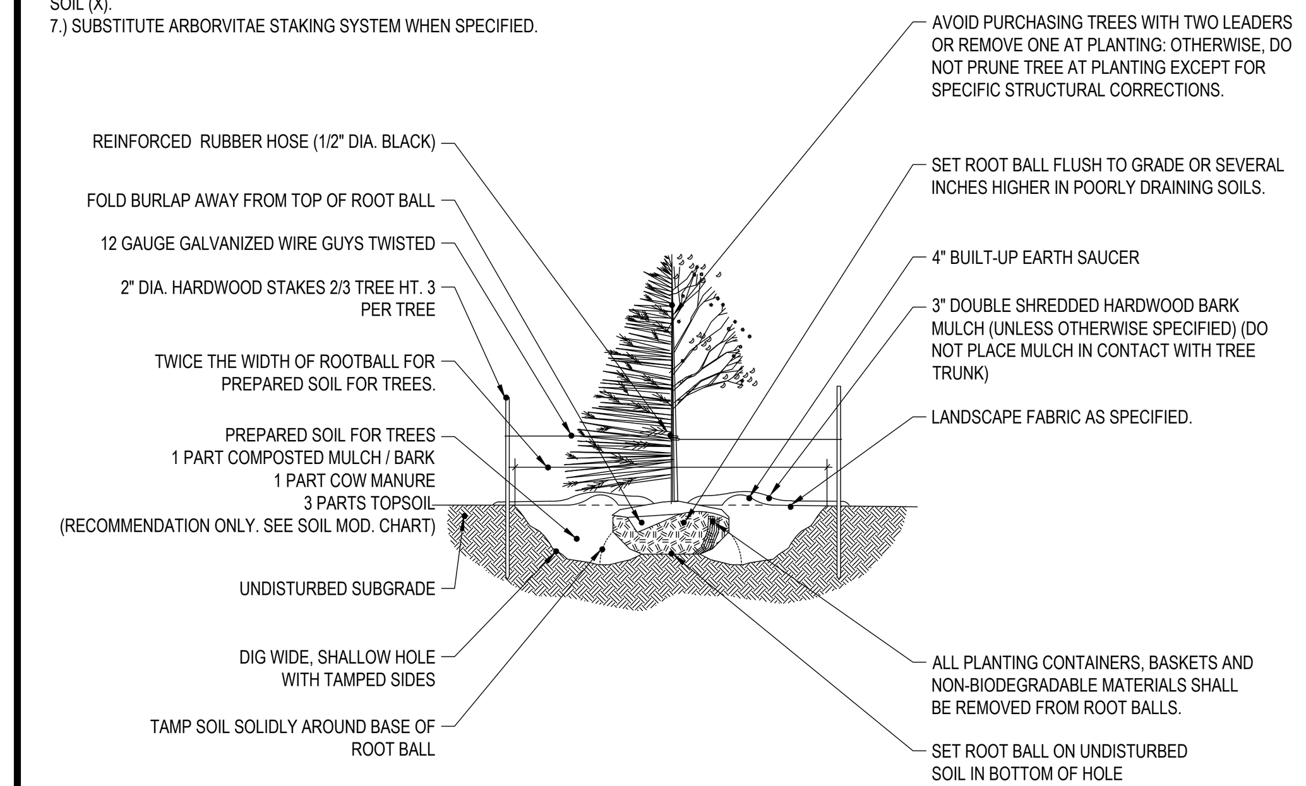
13.1. UPON THE COMPLETION OF ALL LANDSCAPE INSTALLATION AND BEFORE THE FINAL ACCEPTANCE, THE CONTRACTOR SHALL REMOVE ALL UNUSED MATERIALS, EQUIPMENT AND DEBRIS FROM THE SITE. ALL PAVED AREAS ARE TO BE CLEANED.

13.2. THE SITE SHALL BE CLEANED AND LEFT IN A NEAT AND ACCEPTABLE CONDITION AS APPROVED BY THE OWNER OR AUTHORIZED REPRESENTATIVE.

14. MAINTENANCE (ALTERNATIVE BID):

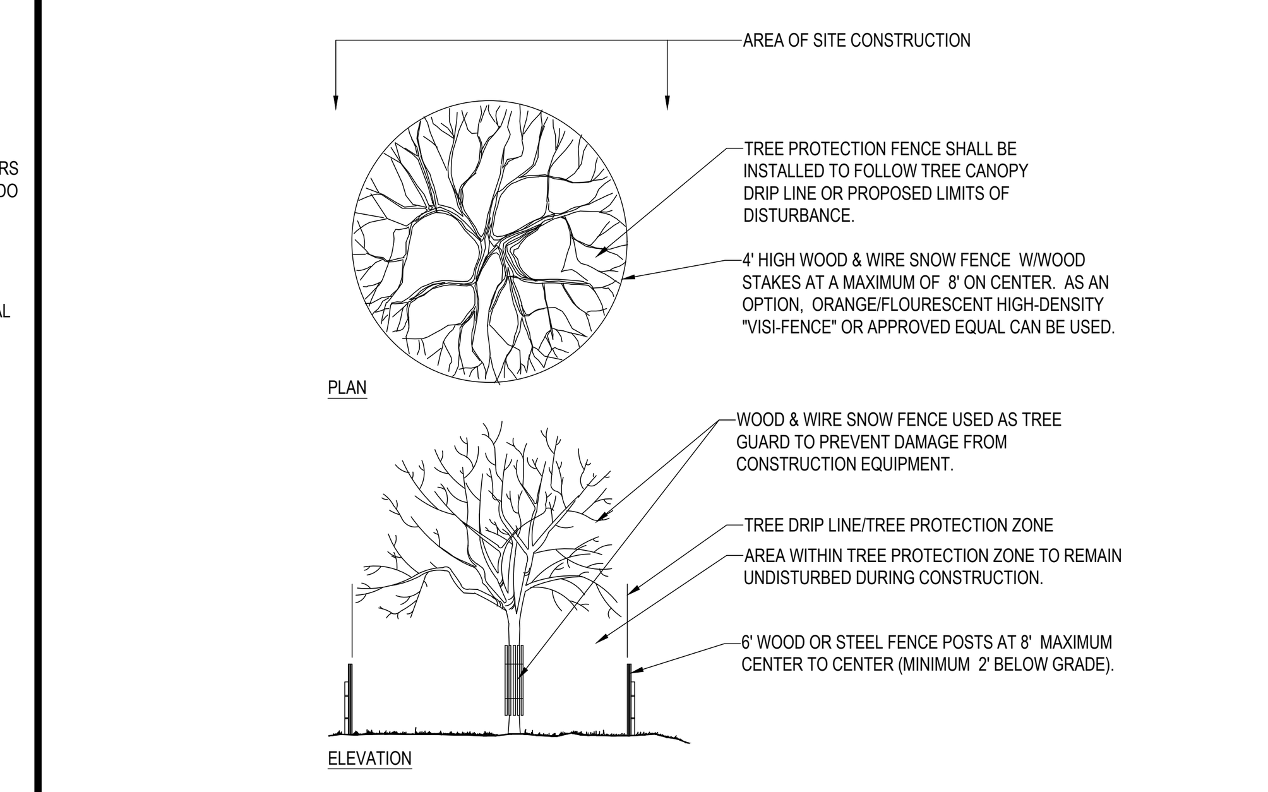
14.1. A 90 DAY MAINTENANCE PERIOD SHALL COMMENCE AT THE END OF ALL LANDSCAPE INSTALLATION OPERATIONS. THE 90 DAY MAINTENANCE PERIOD ENSURES TO THE OWNER/OPERATOR THAT THE NEWLY INSTALLED LANDSCAPING HAS BEEN MAINTAINED AS SPECIFIED ON THE APPROVED LANDSCAPE PLAN. ONCE THE INITIAL 90 DAY MAINTENANCE PERIOD HAS EXPIRED, THE OWNER/OPERATOR MAY REQUEST THAT BIDDERS SUBMIT AN ALTERNATE MAINTENANCE BID FOR A MONTHLY MAINTENANCE CONTRACT. THE ALTERNATE MAINTENANCE CONTRACT WILL ENCOMPASS ANY WORK THAT IS CONSIDERED APPROPRIATE TO ENSURE THAT PLANT AND LAWN AREAS ARE HEALTHY AND MANICURED TO THE APPROVAL OF THE OWNER/OPERATOR.

NOTES:
1.) NO SOIL OR MULCH SHALL BE PLACED AGAINST ROOT COLLAR OF PLANT.
2.) REMOVE ALL NON-BIODEGRADABLE MATERIAL AND ROPE FROM TRUNK & TOP OF ROOT BALL. FOLD BURLAP BACK 1/3 FROM ROOT BALL.
3.) PLANTING DEPTH SHALL BE THE SAME AS GROWN IN NURSERY.
4.) THOROUGHLY SOAK THE TREE ROOT BALL AND ADJACENT PREPARED SOIL SEVERAL TIMES DURING THE FIRST MONTH AFTER PLANTING AND REGULARLY THROUGHOUT THE FOLLOWING TWO SUMMERS.
5.) THE BOTTOM OF PLANTING PIT EXCAVATIONS SHOULD BE ROUGH TO AVOID MATTING OF SOIL LAYERS AS NEW SOIL IS ADDED. IT IS PREFERABLE TO TILL THE FIRST LIFT (2 TO 3 IN.) OF PLANTING SOIL INTO THE SUBSOIL.
6.) REFER TO THE CHART "GENERAL RANGE OF SOIL MODIFICATIONS & VOLUMES FOR VARIOUS SOIL CONDITIONS" TO DETERMINE MINIMUM WIDTH OF PREPARED SOIL (X).
7.) SUBSTITUTE ARBORVITAE STAKING SYSTEM WHEN SPECIFIED.



TREE PLANTING DETAIL

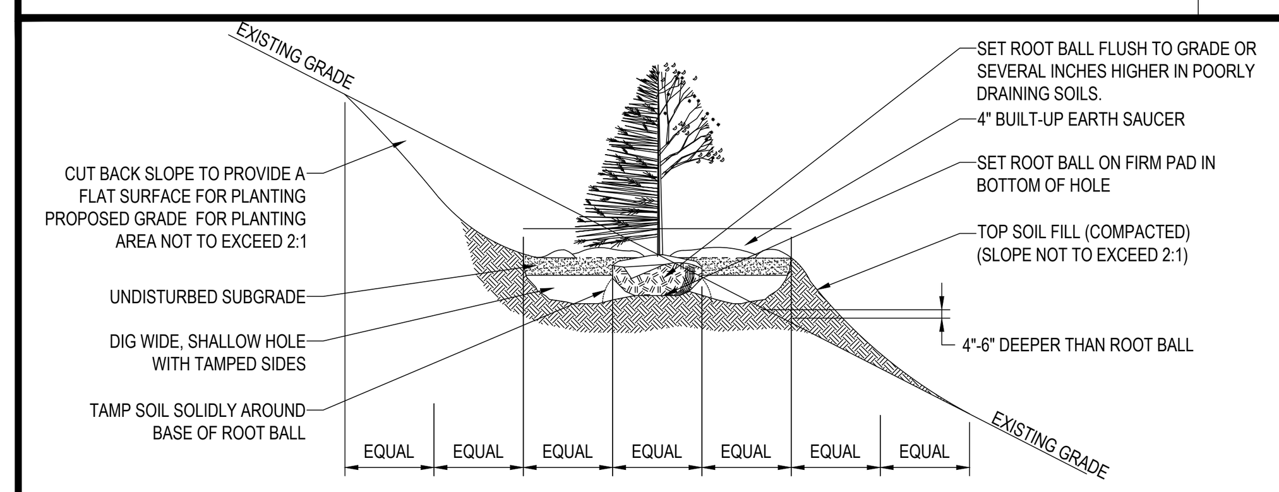
N.T.S.



NOTES:
1. COORDINATE WITH CIVIL ENGINEER.

TREE PROTECTION DURING SITE CONSTRUCTION

N.T.S.

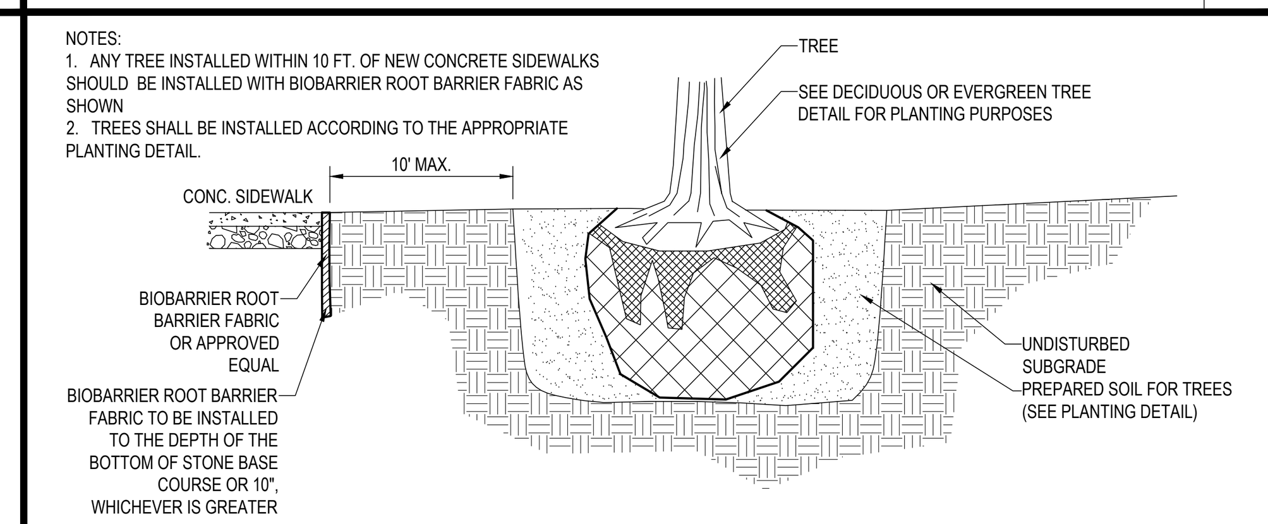


REFER TO TREE PLANTING DETAIL FOR GENERAL PLANTING SPECIFICATIONS

TREE PLANTING DETAIL - ON SLOPE

N.T.S.

NOTES:
1. ANY TREE INSTALLED WITHIN 10 FT. OF NEW CONCRETE SIDEWALKS SHOULD BE INSTALLED WITH BIOBARRIER ROOT BARRIER FABRIC AS SHOWN
2. TREES SHALL BE INSTALLED ACCORDING TO THE APPROPRIATE PLANTING DETAIL.



BIOBARRIER ROOT BARRIER DETAIL

N.T.S.

1. PRIOR TO SEEDING, AREA IS TO BE TOPSOILED, FINE GRADED, AND RAKED OF ALL DEBRIS LARGER THAN 2" DIAMETER.
2. PRIOR TO SEEDING, CONSULT MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
3. SEEDING RATES:

PERENNIAL RYEGRASS	1/2 LB/1000 SQ FT
KENTUCKY BLUEGRASS	1 LB/1000 SQ FT
RED FESCUE	1/2 LB/1000 SQ FT
SPREADING FESCUE	1/2 LB/1000 SQ FT
FERTILIZER (16.32.16)	2 LB/1000 SQ FT
LIQUID LIME	1 GAL/800 GAL.
TANK TACKIFIER	35 LB/800 GAL.
TANK FIBER MULCH	30 LB/1000 SQ FT

4. GERMINATION RATES WILL VARY AS TO TIME OF YEAR FOR SOWING. CONTRACTOR TO IRRIGATE SEEDED AREA UNTIL AN ACCEPTABLE STAND OF COVER IS ESTABLISHED BY OWNER.

HYDROSEED SPECIFICATIONS

"Conservation and Wildlife Seed Mix" AS PREPARED BY:

NEW ENGLAND WETLAND PLANTS, INC
820 WEST STREET, AMHERST, MA 01002
PHONE: 413-548-8000
EMAIL: INFO@NEWP.COM
WEBSITE: WWW.NEWP.COM

APPLICATION RATE: 25lbs/acre | 1750 sq ft/lbMinimum Order: 2 lbs

SPECIES: Virginia Wild Rye, (Elymus virginicus), Little Bluestem, (Schizachyrium scoparium), Big Bluestem, (Andropogon gerardii), Creeping Red Fescue, (Festuca rubra), Switch Grass, (Panicum virgatum), Partridge Pea, (Chamaecrista fasciculata), Deer Tongue, (Panicum clandestinum), Indian Grass, (Sorghastrum nutans), Ox Eye Sunflower, (Heliopsis helianthoides), Common Milkweed, (Asclepias syriaca), Spotted Joe Pye Weed, (Eupatorium maculatum), Grass Leaved Goldenrod, (Euthamia graminifolia), Blue Vervain, (Verbena hastata), New England Aster, (Aster novae-angliae), Early Goldenrod, (Solidago juncea).

CONSERVATION/ WILDLIFE SEED MIX SPECIFICATIONS

"NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES" AS PREPARED BY:

NEW ENGLAND WETLAND PLANTS, INC
820 WEST STREET, AMHERST, MA 01002

APPLICATION RATE: 1 LB. / 1250 SQ. FT. (35 LBS. / ACRE)
SPECIES: VIRGINIA WILD RYE, (ELYMUS VIRGINICUS), CREEPING RED FESCUE, (FESTUCA RUBRA), LITTLE BLUESTEM,(SCHIZACHYRIUM SCOPARIUM), BIG BLUESTEM, (ANDROPOGON GERARDII), FOX SEDGE, (CAREX VULPINOIDEA), SWITCH GRASS, (PANICUM VIRGATUM), ROUGH BENTGRASS, (AGROSTIS SCABRA), NEW ENGLAND ASTER, (ASTER NOVAE-ANGLIAE), BONESET, (EUPATORIUM PERFOLIATUM), GRASS LEAVED GOLDENROD, (EUTHAMIA GRAMINIFOLIA), GREEN BULRUSH, (SCIRPUS ATROVIRENS), BLUE VERVAIN, (VERBENA HASTATA), SOFT RUSH, (JUNCUS EFFUSUS), WOOL GRASS, (SCIRPUS CYPERINUS).

BIO-FILTRATION SEED MIX

"RAIN GARDEN MIX" AS PREPARED BY:

ERNST CONSERVATION SEEDS, INC.
8884 MERCER PIKE, MEADVILLE, PA 16335
PHONE: 800-873-3321 / 814-336-2404
EMAIL: SALES@ERNSTSEED.COM
WEBSITE: WWW.ERNSTSEED.COM
APPLICATION RATE: 1/2 LB. / 1000 SQ. FT. (20 LBS. / ACRE)

MIX COMPOSITION:

39.0% Schizachyrium scoparium, 'Camper'	1.5% Asclepias incarnata, PA Ecotype	0.5% Zizia aurea, PA Ecotype
15.0% Elymus virginicus, PA Ecotype	1.0% Juncus effusus	0.4% Geum canadense, PA Ecotype
8.0% Chasmanthium latifolium, WV Ecotype	1.0% Liatris spicata, PA Ecotype	0.4% Monarda fistulosa, Fort Indiantown Gap-PA Ecotype
6.4% Panicum rigidulum, PA Ecotype	1.0% Panicum sphaeroncarpon	0.3% Agrostis perennans, Albany Pine Bush-NY Ecotype
4.0% Chamaecrista fasciculata, PA Ecotype	1.0% Penstemon digitalis, PA Ecotype	0.3% Aster laevis, NY Ecotype
4.0% Echinacea purpurea	0.5% Baptisia australis, Southern WV Ecotype	0.3% Aster novae-angliae, PA Ecotype
3.0% Coreopsis lanceolata	0.5% Carex scoparia, PA Ecotype	0.3% Helenium autumnale, PA Ecotype
3.0% Rudbeckia hirta, Coastal Plain NC Ecotype	0.5% Eupatorium coelestinum, VA Ecotype	0.2% Aster umbellatus, PA Ecotype
2.0% Carex vulpinoidea, PA Ecotype	0.5% Pycnanthemum tenuifolium	0.2% Solidago patula, PA Ecotype
2.0% Heliopsis helianthoides, PA Ecotype	0.5% Senna hebecarpa, VA & WV Ecotype	0.1% Veronicastrum virginicum, PA Ecotype
2.0% Verbena hastata, PA Ecotype	0.5% Tradescantia ohiensis, PA Ecotype	

RAIN GARDEN SEED MIX SPECIFICATIONS

SOIL FOR BIORETENTION AREAS SHALL BE A SANDY LOAM, LOAMY SAND, OR LOAM TEXTURE PER USDA TEXTURAL TRIANGLE. MAXIMUM CLAY CONTENT IS <5%; SOIL MIXTURE SHALL BE 50-60% SAND; 20-30% LEAF COMPOST, DOUBLE SHREDDED HARDWOOD, MANURE OR OTHER APPROVED ORGANIC AMENDMENT (NON-SLUDGE) AND 20-30% TOPSOIL/LOAM BORROW. THE SOIL SHALL BE A UNIFORM MIX FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN BIORETENTION SOIL THAT MAY BE HARMFUL TO PLANT

GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUARKGRASS, JOHNSON GRASS, MUGWORT, NUTSEDGE, POISON IVY, CANADIAN THISTLE, TEARTHUB, JAPANESE KNOTWEED OR OTHER NOXIOUS WEEDS.

FERTILIZER SHALL NOT BE ADDED TO BIORETENTION AND RAIN GARDEN SOILS.

PLANTING SOIL FOR BIORETENTION AND RAIN GARDEN AREAS SHALL MEET THE FOLLOWING CRITERIA: PH

RANGE:	5.5-6.5		
ORGANIC MATTER	1.5-3.0%		
SOLUABLE SALT CONTENT	500 P.P.M. MAX. SIEVE ANALYSIS		
MAGNESIUM	32 PPM MIN.		
PHOSPHOROUS (PHOSPHATE P205)	69 PPM MAX. (PHOSPHATE P205)	POTASSIUM (K20)	78 PPM MIN.

BIO-FILTRATION SOIL MIX

BOHLER //
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
2			
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PERMIT SET

PROJECT No.:	CT181007
DRAWN BY:	MAA
CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:
RESIDENTIAL DEVELOPMENT
FOR
CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE
1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

BOHLER //
16 OLD FORGE ROAD, SUITE A
ROCKY HILL, CT 06067
Phone: (860) 333-8900
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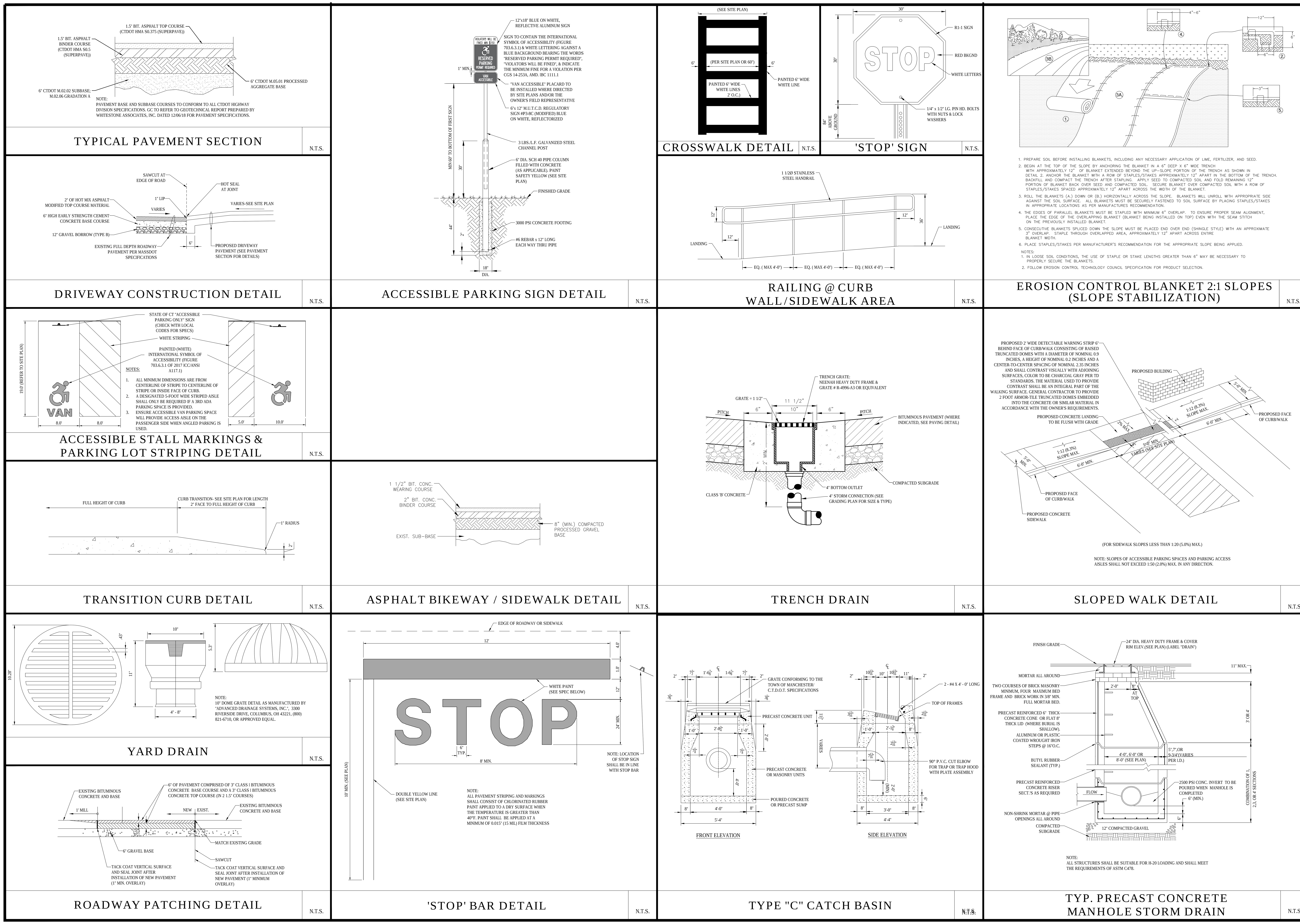
M.J. MRVA
LANDSCAPE ARCHITECT
MASSACHUSETTS No. 1217
RHODE ISLAND No. 419
NEW YORK No. 002359
NEW HAMPSHIRE No. 109
CONNECTICUT No. 1359

SHEET TITLE:
LANDSCAPE NOTES & DETAILS SHEET

SHEET NUMBER:
18
OF 25

REV 1 - 02/06/2020



BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

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FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

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G.P. FITZGERALD
PROFESSIONAL ENGINEER

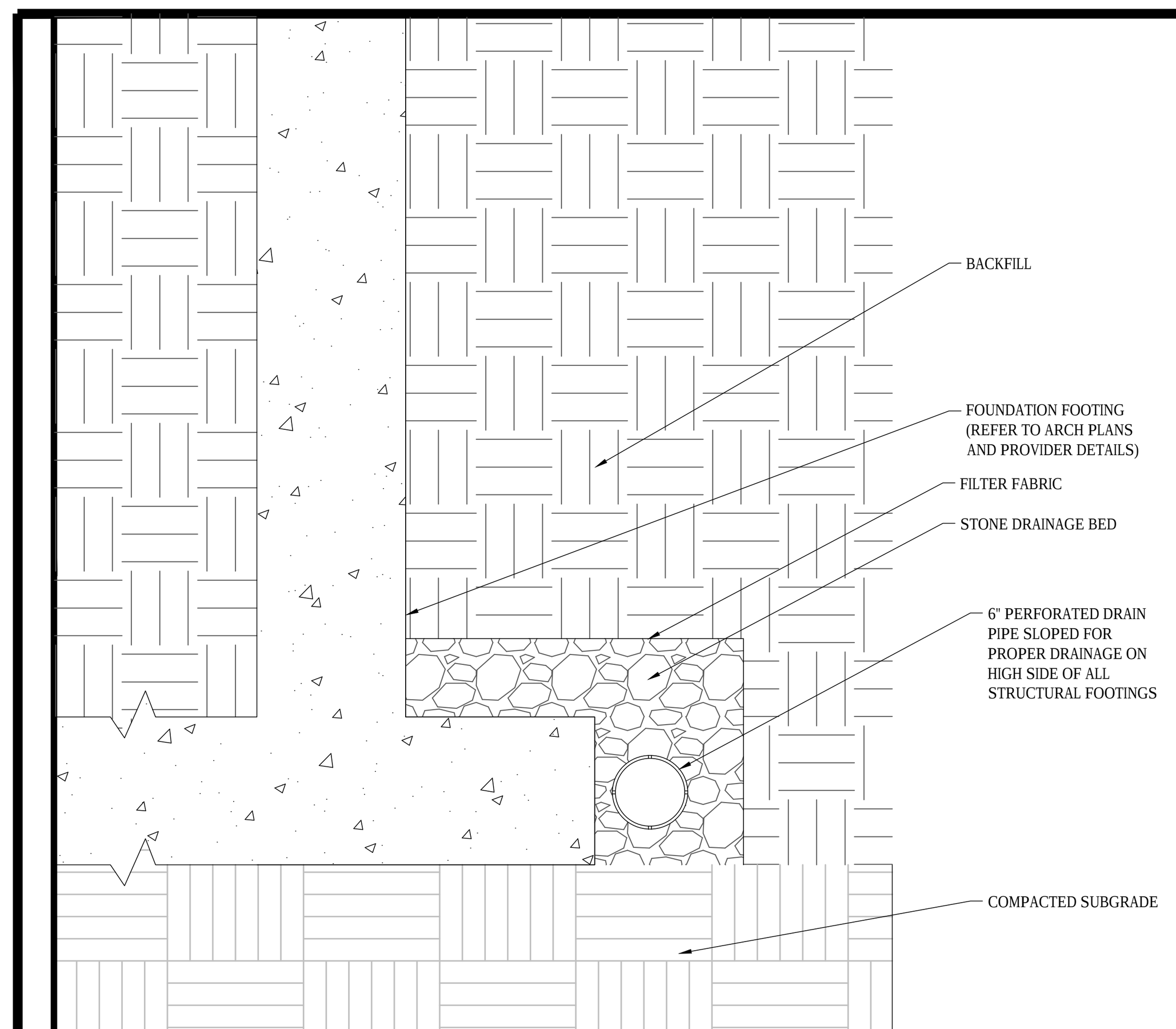
SHEET TITLE:

CONSTRUCTION DETAIL SHEET

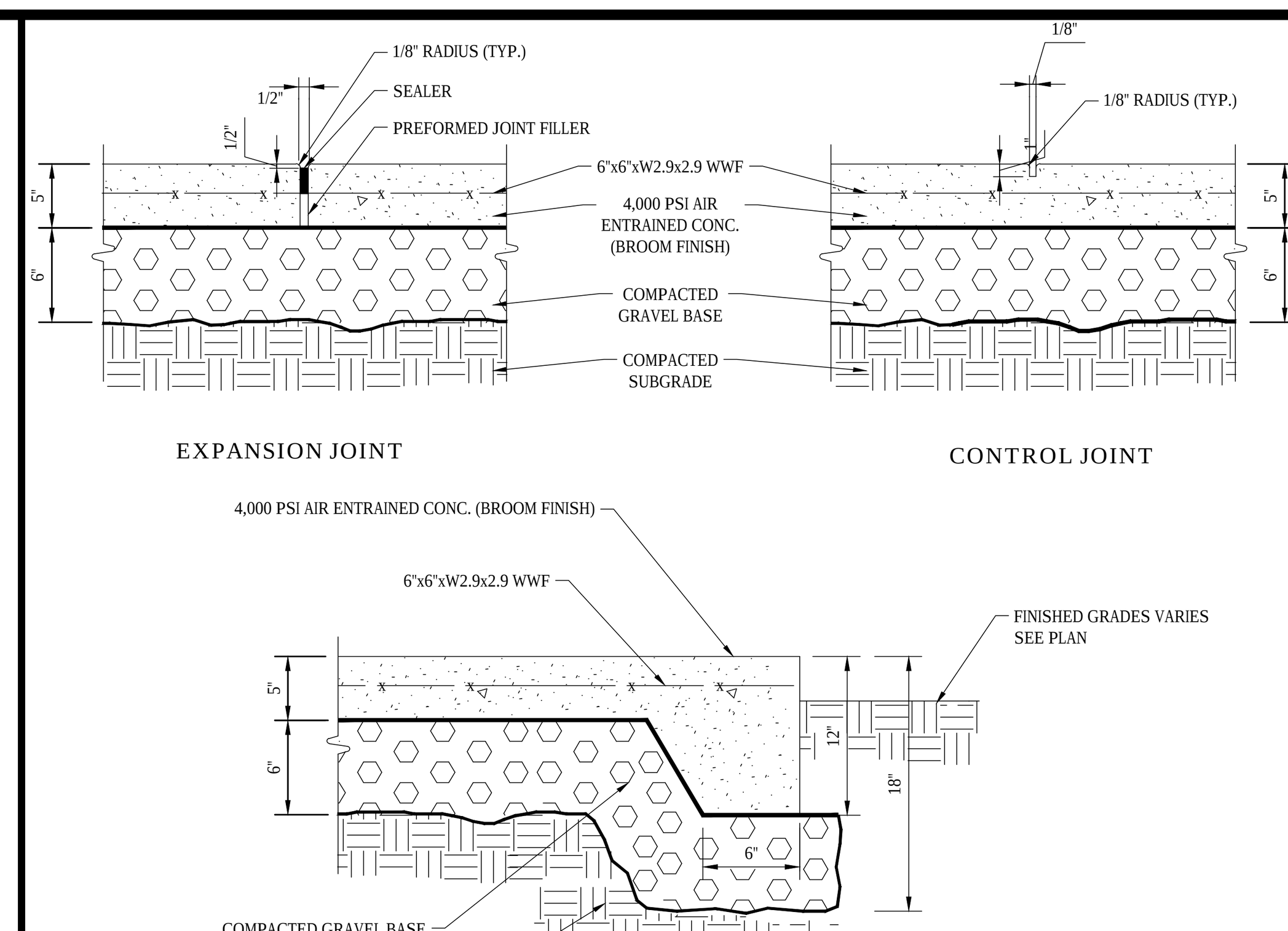
SHEET NUMBER:

19
OF 25

REV 1 - 02/06/2020



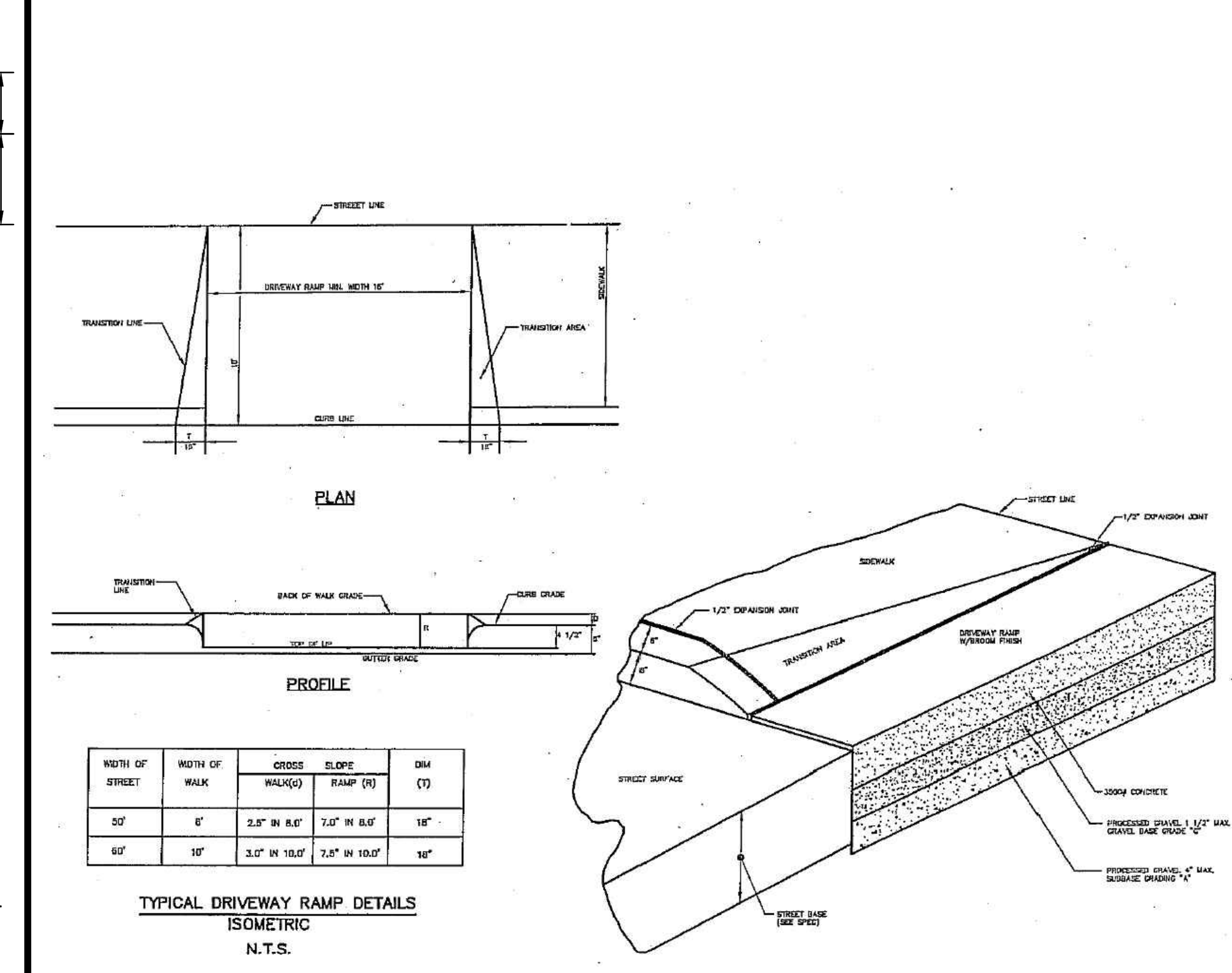
CURTAIN DRAIN DETAIL
N.T.S.



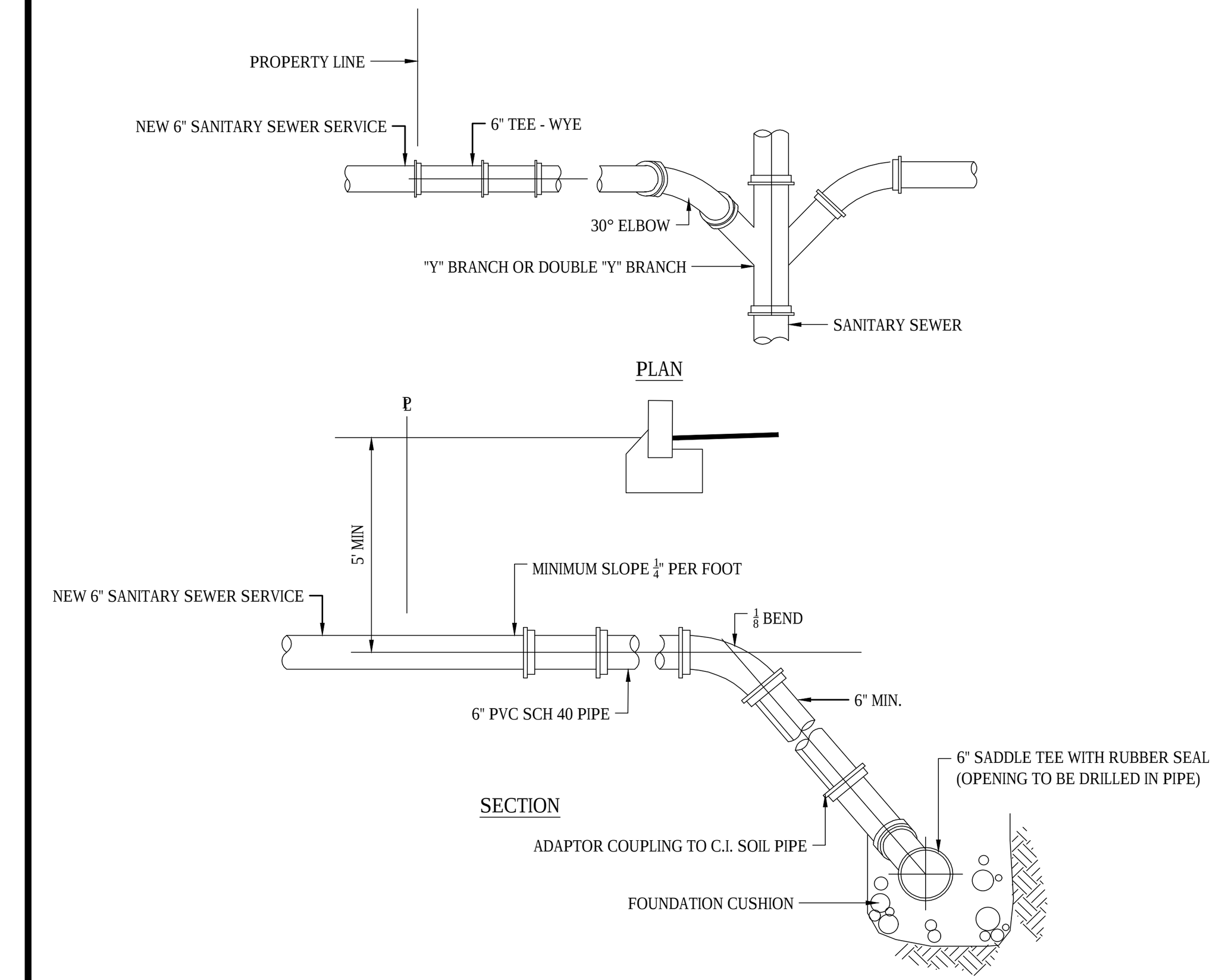
TO BE USED FOR BUILDING SURROUND AND OTHER CONCRETE WALKS. USE CHAIRS TO SUPPORT REINFORCING STEEL DURING POUR.

NOTES:
1. SEE SITE PLAN FOR WIDE AND GRADES
2. PROVIDE MINIMUM 1/8" FT. CROSS-SLOPE
3. PROVIDE CONTROL JOINTS 5'- 0" O.C. MIN.
4. PROVIDE EXPANSION JOINTS 20'- 0" O.C. MIN.

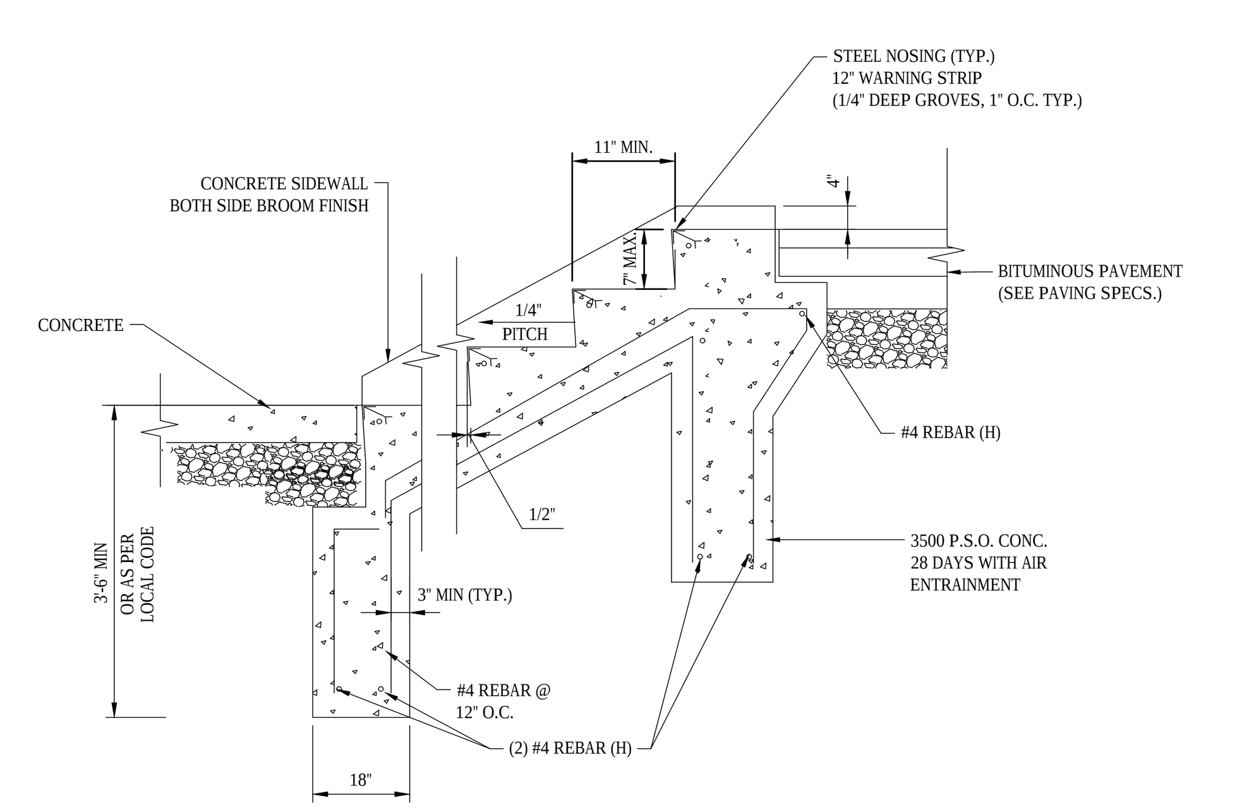
MONOLITHIC CONC. SIDEWALK DETAILS
N.T.S.



TOWN OF MANSFIELD DRIVEWAY RAMP DETAIL
N.T.S.

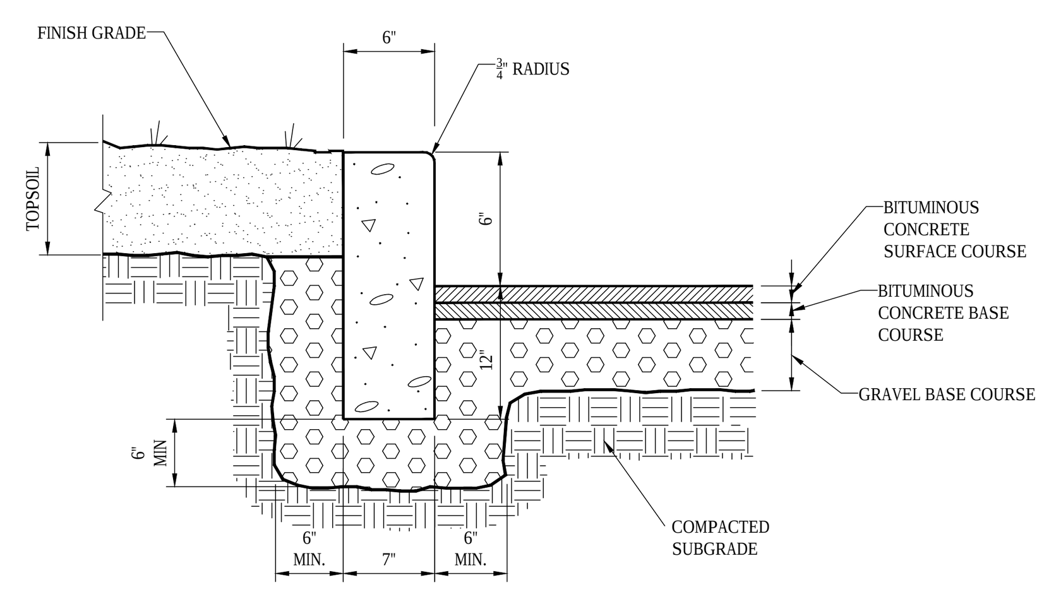


STANDARD (SEWER) CONNECTION
N.T.S.



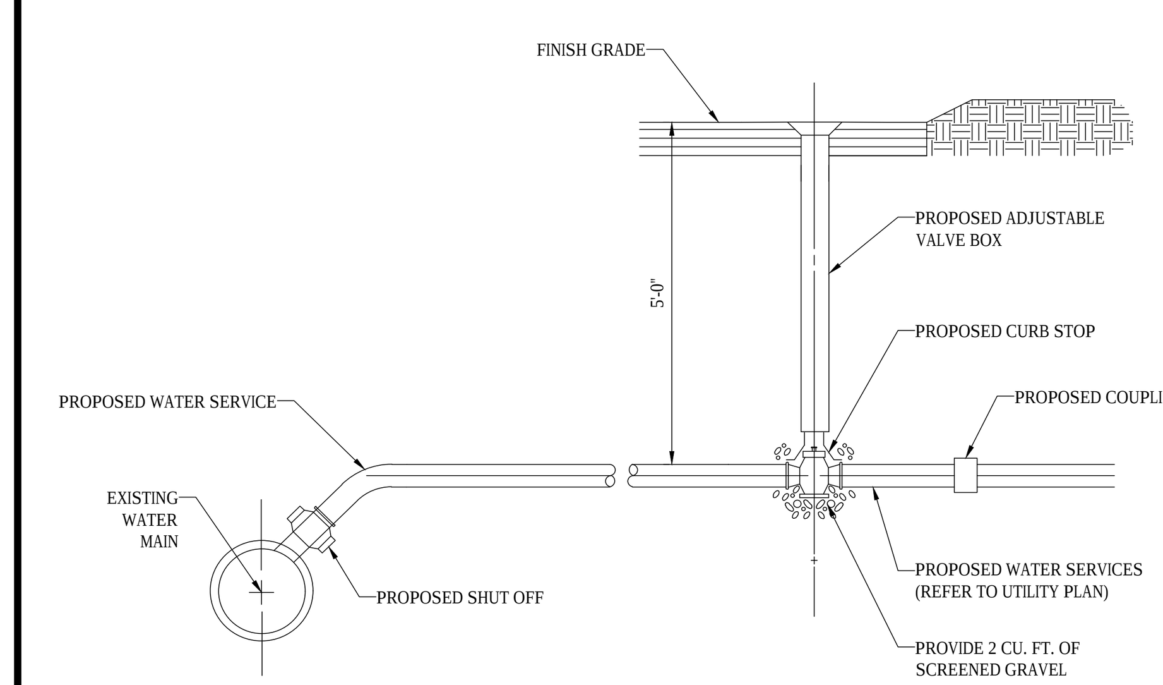
NOT FOR CONSTRUCTION

CONCRETE STEPS W/ SIDE WALLS
N.T.S.

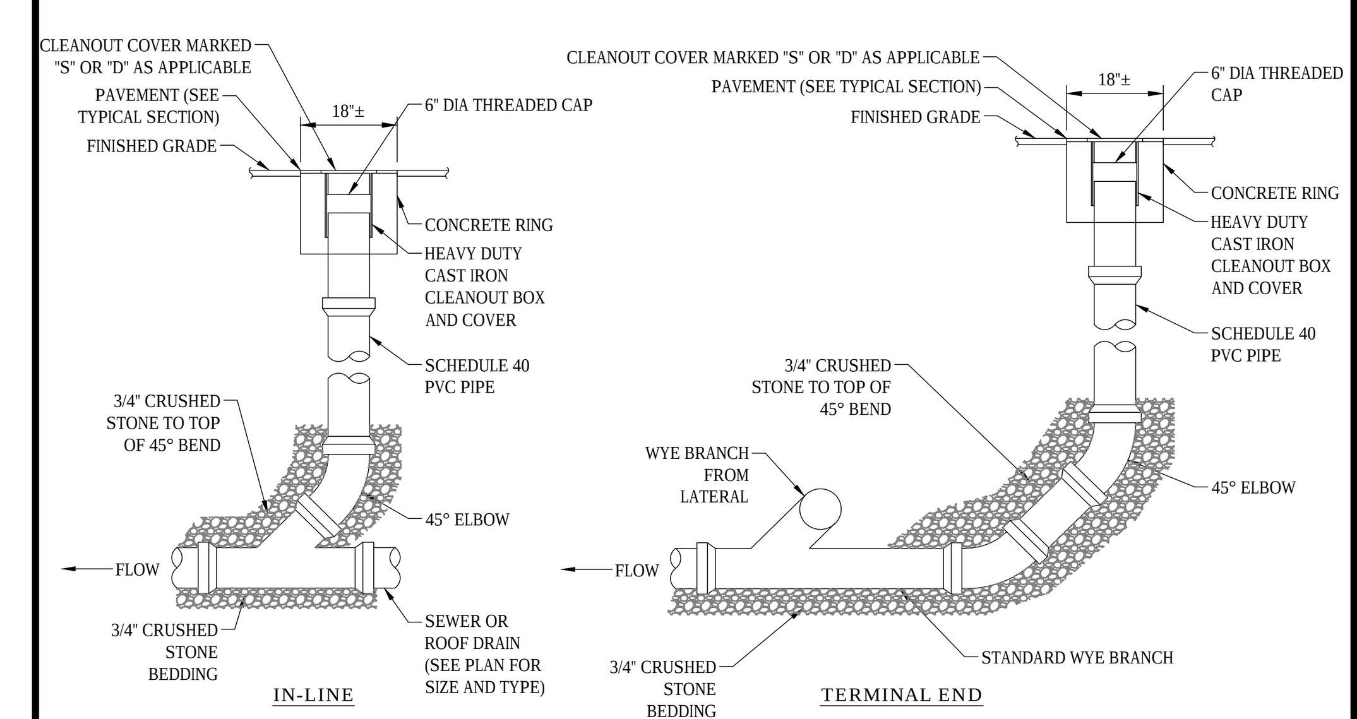


NOTE:
1. CURB SHALL CONSIST OF 4,000 PSI AIR ENTRAINED CONCRETE, EXPOSED EDGES TO HAVE RUBBED FINISH AND SURFACE SHALL BE TREATED WITH A CONCRETE PENETRANT/SEALER.
2. THE ENDS OF CURB SECTIONS SHALL BE CHAMFERED 1/4 INCH.
3. THE CORNERS OF CURB SECTIONS SHALL MATCH THE ADJACENT CURB IN SIZE, COLOR AND FINISH.
4. CURBS, CURB CORNERS OR EDGING SHALL BE FITTED TOGETHER AS CLOSELY AS POSSIBLE.
5. EXPANSION JOINTS SHALL BE INSTALLED AT A MAXIMUM OF TWENTY FEET (20') ON CENTER USING PREFORMED EXPANSION JOINT FILLER HAVING A THICKNESS OF 1/2 INCH.

PRECAST CONCRETE CURB DETAIL
N.T.S.

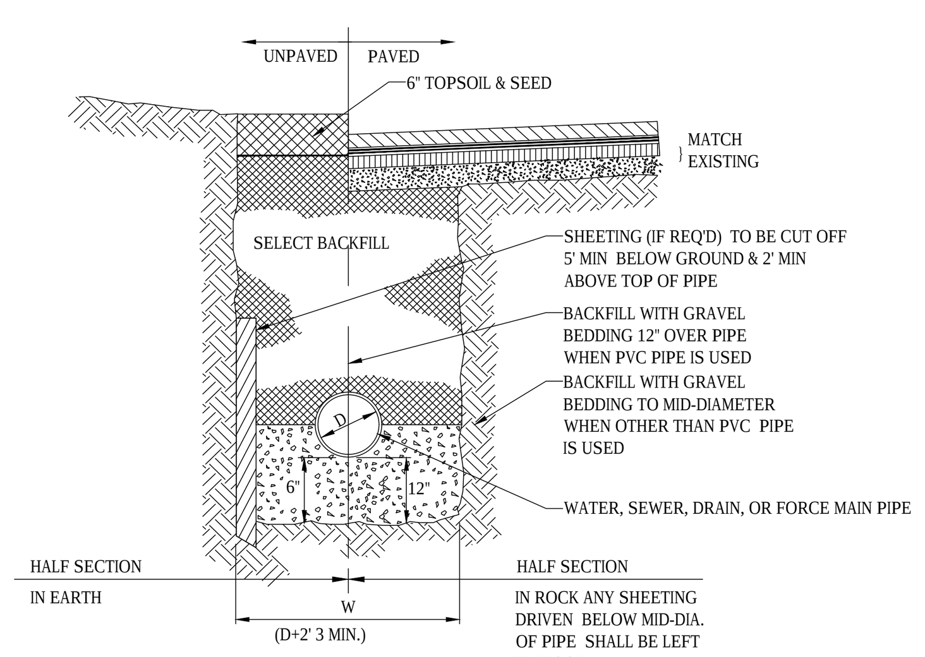


WATER SERVICE CONNECTION DETAIL
N.T.S.

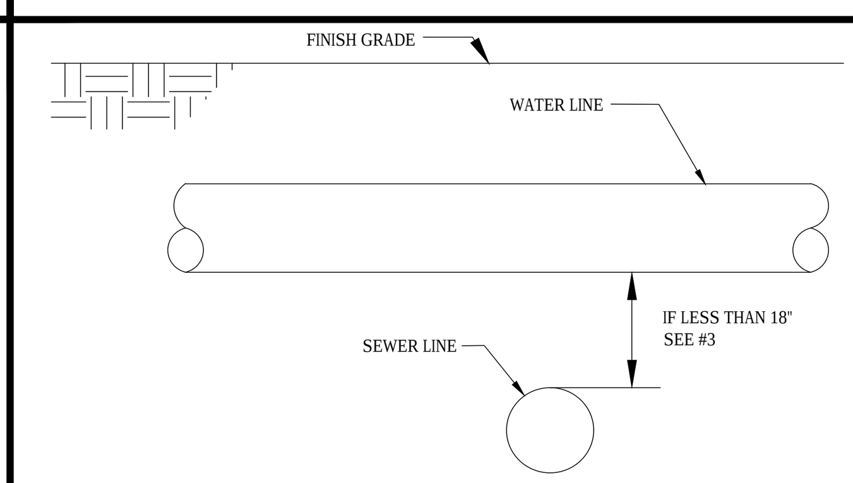


NOTES:
1. CLEANOUTS TO BE INSTALLED WHERE INDICATED ON THE PLANS.
2. CLEANOUT PIPE TO BE SAME SIZE AND MATERIAL AS SEWER/DRAIN LINE UP TO 8".
3. BACKFILL TO TOP OF 45° WITH 3/4" CRUSHED STONE.

CLEANOUT DETAIL
N.T.S.



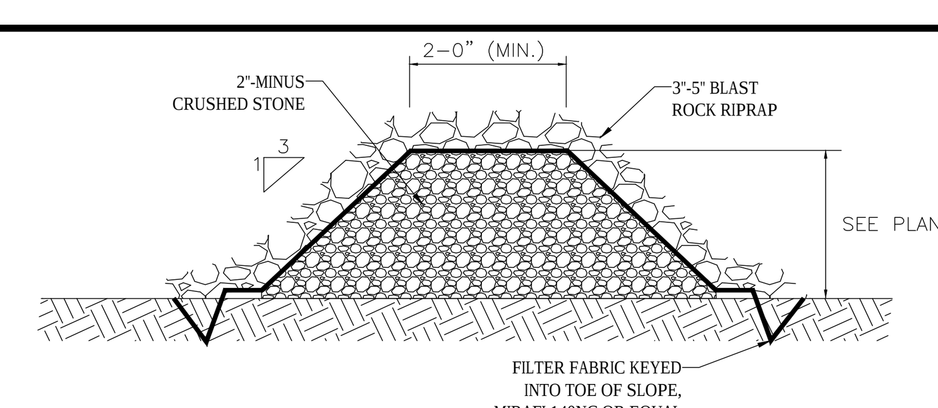
TYPICAL UTILITY TRENCH
N.T.S.



NOTES:
1. THE VERTICAL SEPARATION BETWEEN THE WATER MAIN AND THE SEWER LINE SHALL BE A MINIMUM OF 18 INCHES.
2. THE HORIZONTAL SEPARATION BETWEEN THE WATER MAIN AND THE SEWER LINE SHALL BE A MINIMUM OF 10 FEET.
3. IF 1 OR 2 CANNOT BE MAINTAINED EITHER:
   A. WATER MAIN IS TO BE RE-LOCATED OR RE-CONSTRUCTED USING MECHANICAL JOINTS DUCTILE IRON PIPE FOR A DISTANCE OF 10 FEET ON EITHER SIDE OF THE CROSSING. CENTER WATER MAIN LENGTH OF PIPE SO THAT CENTER OF PIPE SECTION IS OVER SEWER. CENTER LENGTH OF SEWER PIPE UNDER CENTER OF WATER MAIN SO THAT JOINTS ARE THE MAXIMUM DISTANCE POSSIBLE APART.
   B. WATER AND SEWER LINES SHALL BE CONCRETE ENCASED PER DETAIL.

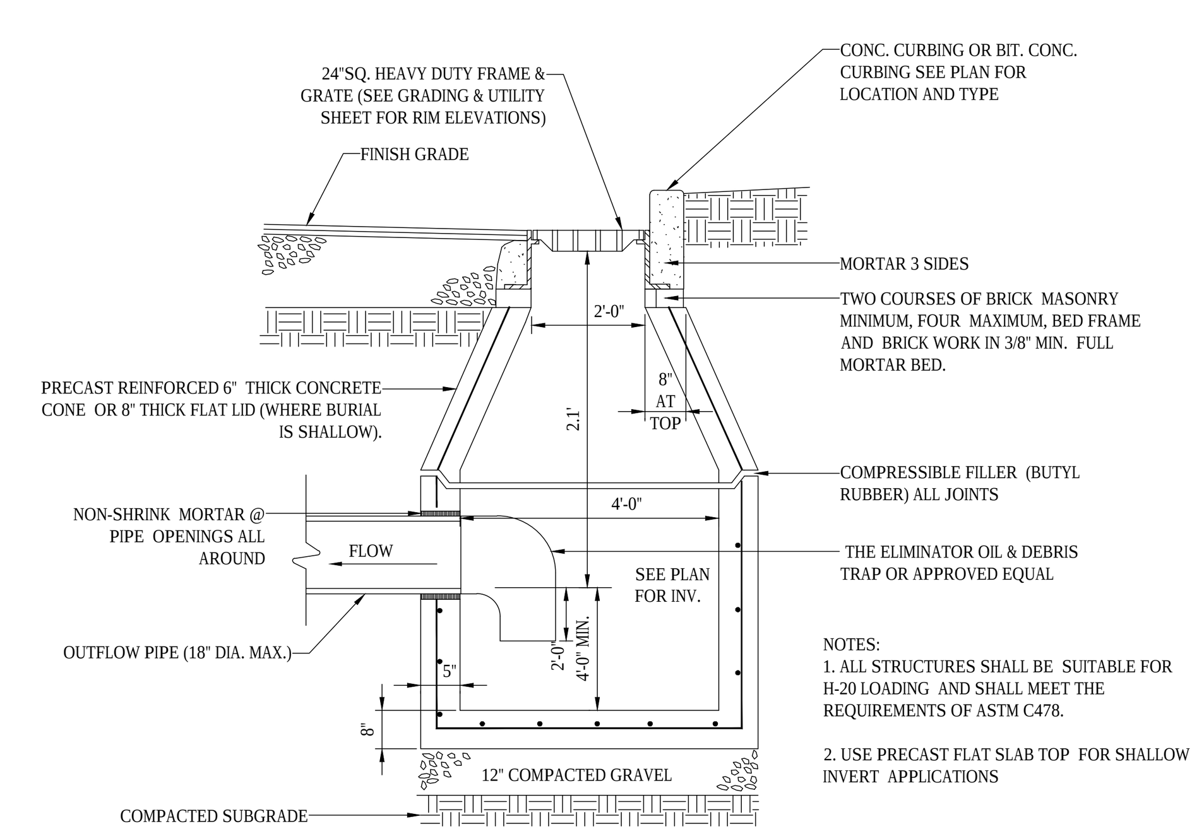
WHERE 10' HORIZONTAL SEPARATION OR 18" VERTICAL SEPARATION CANNOT BE ACHIEVED

WATER MAIN CROSSINGS
N.T.S.



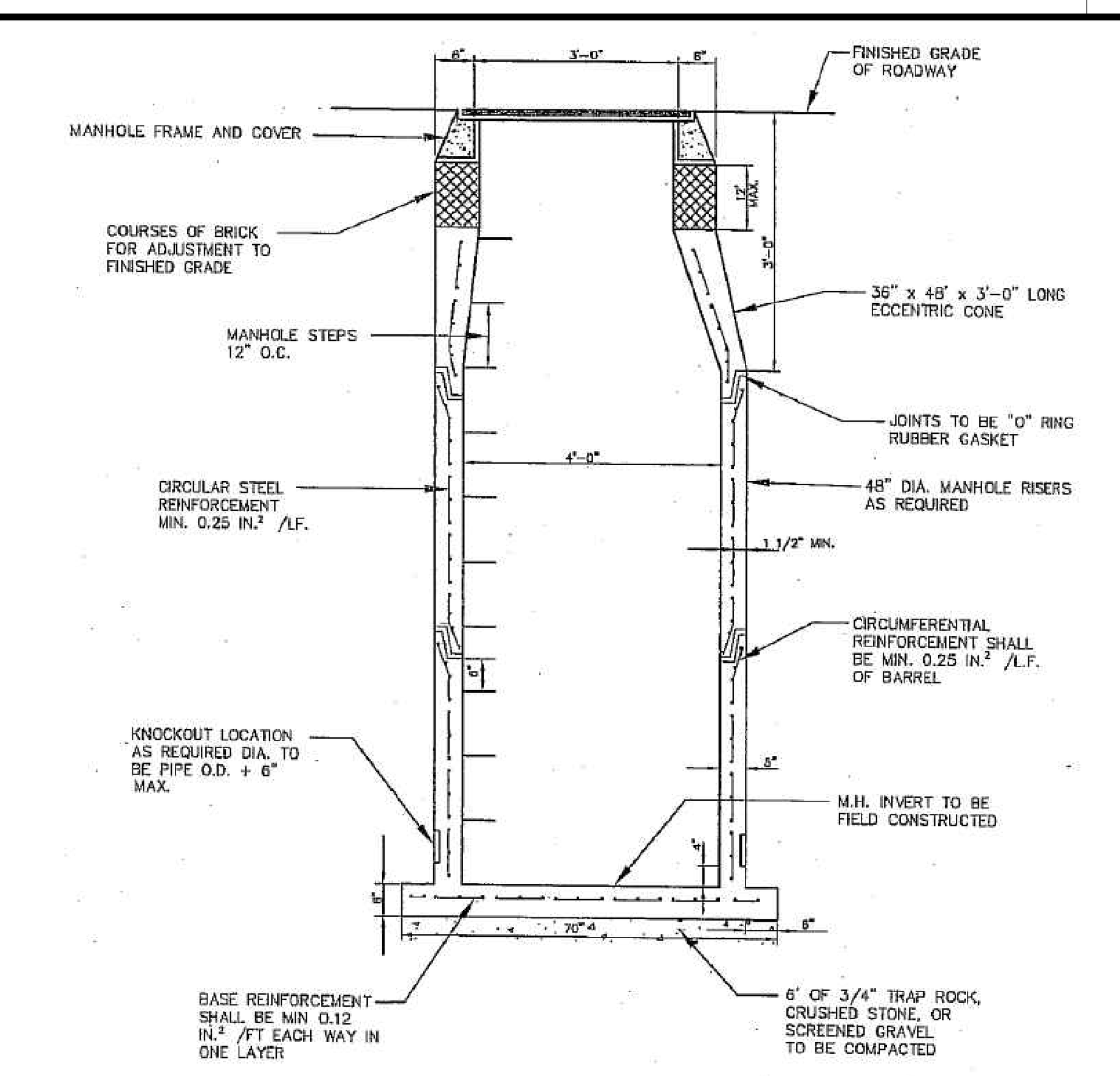
NOTES:
1. STONE SHALL BE PLACED MECHANICALLY OR BY HAND. STONE SHALL NOT BE DUMPED DIRECTLY INTO FOREBAY. SEE GRADING AND DRAINAGE PLAN.

STONE CHECK DAM



NOTES:
1. ALL STRUCTURES SHALL BE SUITABLE FOR H-20 LOADING AND SHALL MEET THE REQUIREMENTS OF ASTM C478.
2. USE PRECAST FLAT SLAB TOP FOR SHALLOW INVERT APPLICATIONS

PRECAST CONCRETE DEEP SUMP CATCH BASIN DETAIL
N.T.S.



TOWN OF MANSFIELD PRECAST MANHOLE DETAIL
N.T.S.

BOHLER //
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
2			
3			
4			
5			
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13			
14			
15			

PERMIT SET

PROJECT No.:	CT181007
DRAWN BY:	MAA
CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:
RESIDENTIAL DEVELOPMENT
FOR
CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE
1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

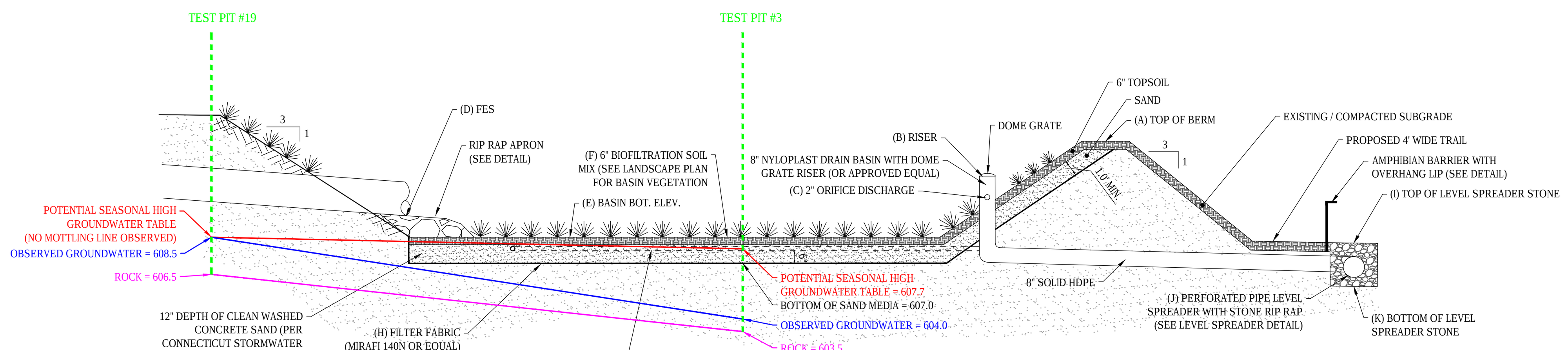
BOHLER //
16 OLD FORGE ROAD, SUITE A
ROCKY HILL, CT 06067
Phone: (860) 333-8900
Fax: (508) 480-9080
www.BohlerEngineering.com

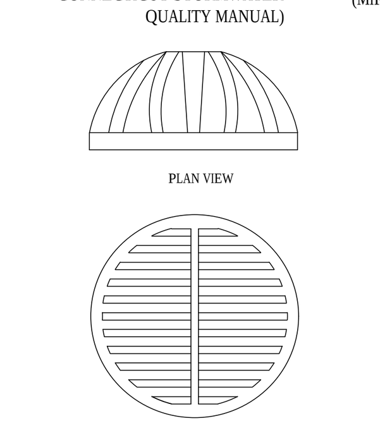
G.P. FITZGERALD
PROFESSIONAL ENGINEER

SHEET TITLE:
CONSTRUCTION DETAIL SHEET

SHEET NUMBER:
20
OF 25

REV 1 - 02/06/2020





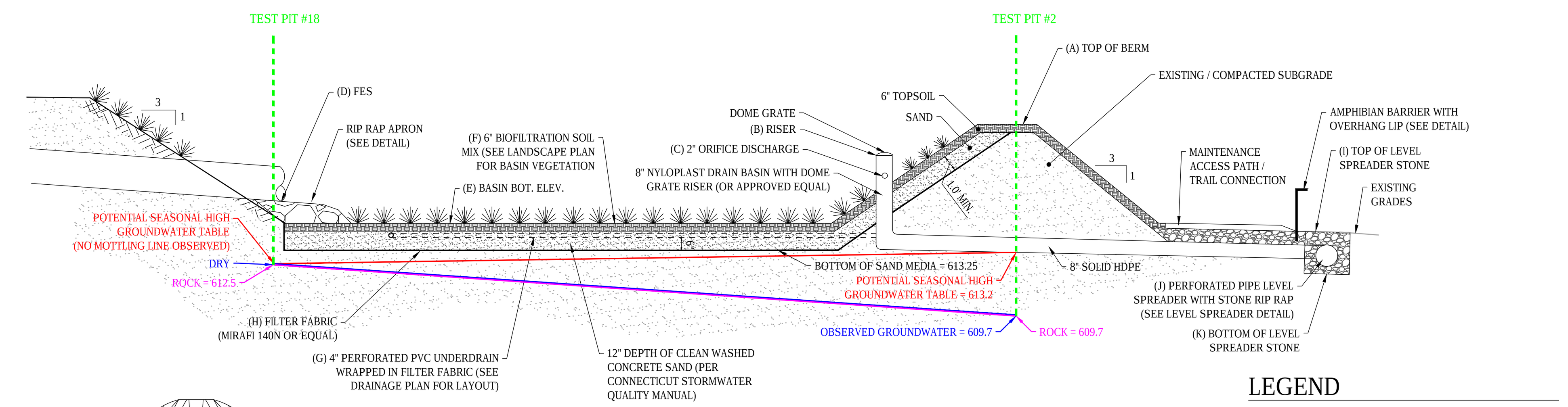
NOTE:
DOME GRATE DETAIL AS MANUFACTURED BY "ADVANCED DRAINAGE SYSTEMS, INC.", 3300 RIVERSIDE DRIVE, COLUMBUS, OH 43221, (800) 821-6710, OR APPROVED EQUAL.

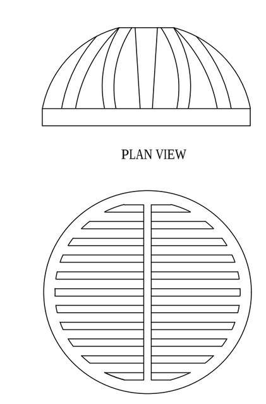
LEGEND

I.D.	SAND FILTER BASIN FEATURE	SFB-1
A	TOP OF BERM	611.20
B	RISER ELEVATION	609.80
C	RISER ORIFICE ELEV.	609.00
D	FES INVERT	608.50
E	BOT. ELEV. OF FILTER BASIN	608.50
F	6" BIOFILTRATION SOIL MIX	608.00
G	4" PERF. UNDERDRAIN INV.	607.50
H	SAND / FILTER FABRIC ELEV.	607.00
I	TOP OF L.S. STONE	608.50
J	LEVEL SPREADER INV.	607.17
K	BOTTOM OF L.S. STONE	606.50

SAND FILTER 1 BASIN DETAIL

N.T.S.





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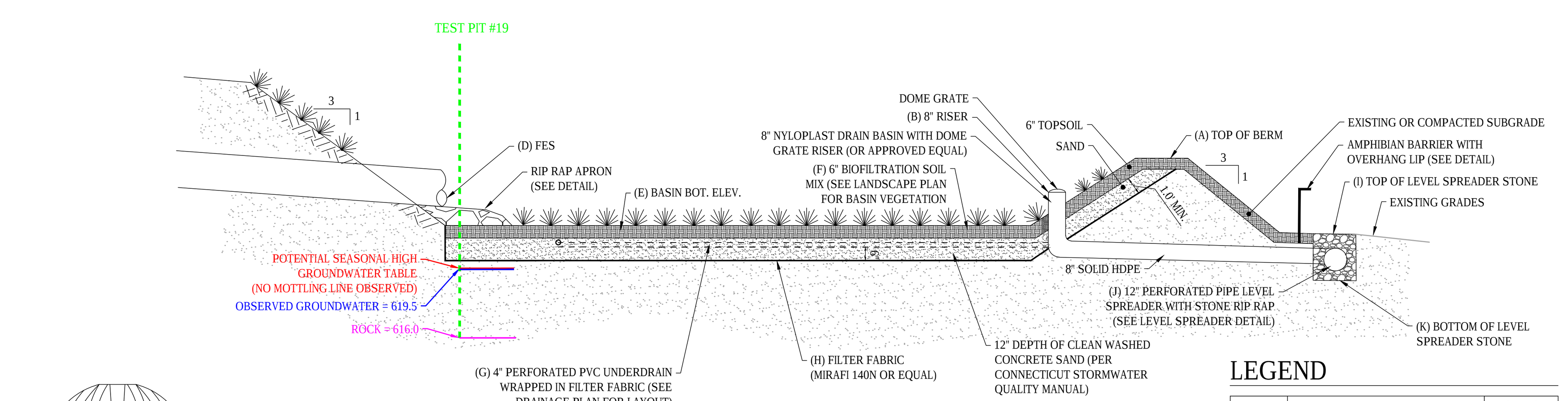
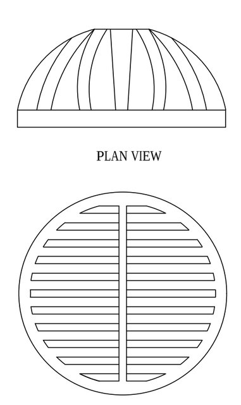
LEGEND

I.D.	SAND FILTER BASIN FEATURE	SFB-2
A	TOP OF BERM	617.40
B	RISER ELEVATION	616.00
C	RISER ORIFICE ELEV.	615.20
D	FES INVERT	615.00
E	BOT. ELEV. OF FILTER BASIN	614.75
F	6" BIOFILTRATION SOIL MIX	614.25
G	4" PERF. UNDERDRAIN INV.	613.75
H	SAND / FILTER FABRIC ELEV.	613.25
I	TOP OF L.S. STONE	613.75
J	LEVEL SPREADER INV.	612.42
K	BOTTOM OF L.S. STONE	611.75

SAND FILTER 2 BASIN DETAIL

N.T.S.





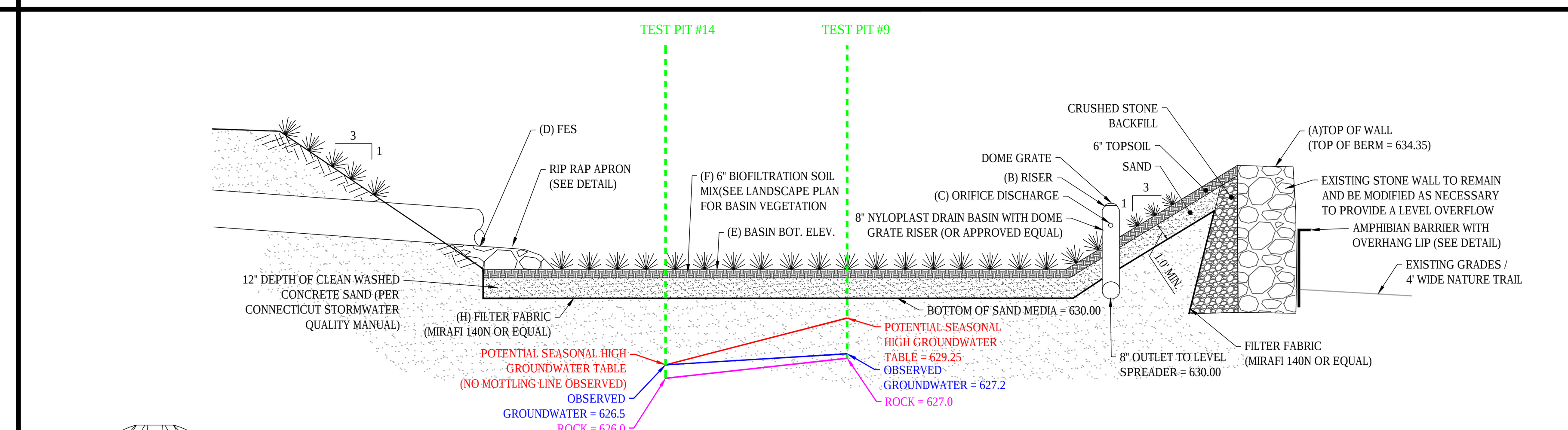
NOTE:
DOME GRATE DETAIL AS MANUFACTURED BY "ADVANCED DRAINAGE SYSTEMS, INC.", 3300 RIVERSIDE DRIVE, COLUMBUS, OH 43221, (800) 821-6710, OR APPROVED EQUAL.

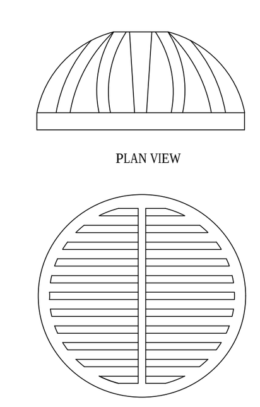
LEGEND

I.D.	SAND FILTER BASIN FEATURE	SFB-3
A	TOP OF BERM	623.50
B	RISER ELEVATION	622.00
C	RISER ORIFICE ELEV.	-
D	FES INVERT	622.00
E	BOT. ELEV. OF FILTER BASIN	621.50
F	6" BIOFILTRATION SOIL MIX	621.00
G	4" PERF. UNDERDRAIN INV.	620.50
H	SAND / FILTER FABRIC ELEV.	620.00
I	TOP OF L.S. STONE	621.50
J	LEVEL SPREADER INV.	620.17
K	BOTTOM OF L.S. STONE	619.50

SAND FILTER 3 BASIN DETAIL

N.T.S.





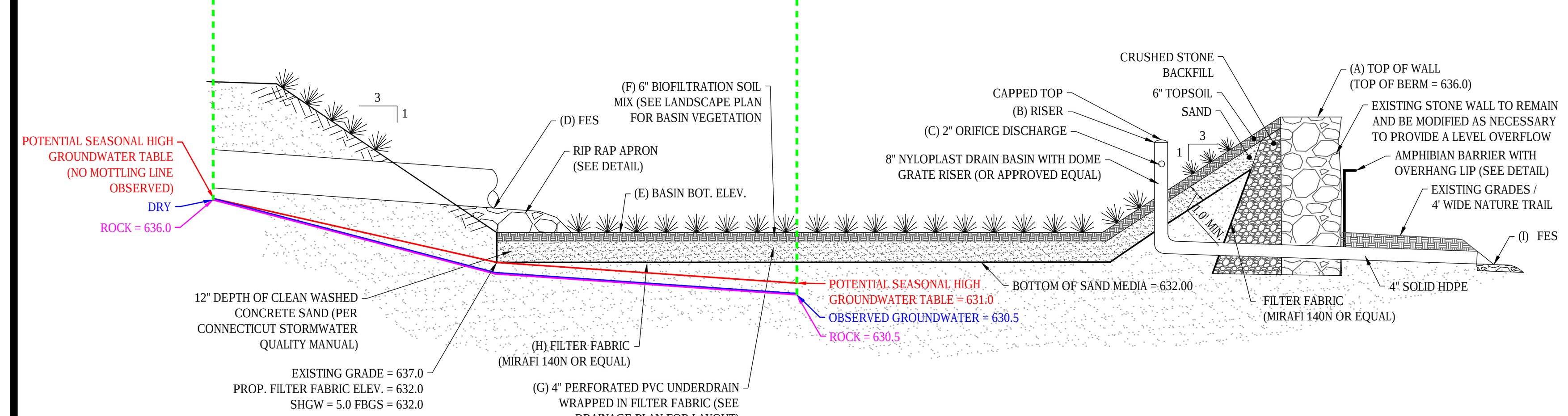
NOTE:
DOME GRATE DETAIL AS MANUFACTURED BY "ADVANCED DRAINAGE SYSTEMS, INC.", 3300 RIVERSIDE DRIVE, COLUMBUS, OH 43221, (800) 821-6710, OR APPROVED EQUAL.

LEGEND

I.D.	SAND FILTER BASIN FEATURE	SFB-4
A	TOP OF WALL	633.30
B	RISER ELEVATION	632.65
C	4" RISER ORIFICE ELEV. 2" RISER ORIFICE ELEV.	632.65 632.00
D	FES INVERT	633.00
E	BOT. ELEV. OF FILTER BASIN	631.50
F	6" BIOFILTRATION SOIL MIX	631.00
H	SAND / FILTER FABRIC ELEV.	630.00
I	TOP OF L.S. STONE	630.75
J	LEVEL SPREADER INV.	629.75
K	BOTTOM OF L.S. STONE	628.75

SAND FILTER 4 BASIN DETAIL

N.T.S.



LEGEND

I.D.	SAND FILTER BASIN FEATURE	SFB-5
A	TOP OF WALL	635.00
B	RISER ELEVATION	-
C	RISER ORIFICE ELEV.	634.50
D	FES INVERT	636.00
E	BOT. ELEV. OF FILTER BASIN	633.50
F	6" BIOFILTRATION SOIL MIX	633.00
H	SAND / FILTER FABRIC ELEV.	632.00
I	FES ELEVATION	633.75

SAND FILTER 5 BASIN DETAIL

N.T.S.

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

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PERMIT SET

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CHECKED BY:	GPF
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CAD I.D.:	TB-CT181007ss5

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RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

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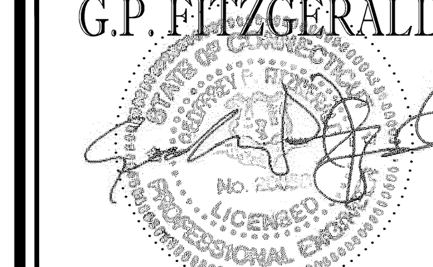

PROFESSIONAL ENGINEER

SHEET TITLE:

CONSTRUCTION DETAIL SHEET

SHEET NUMBER:

21

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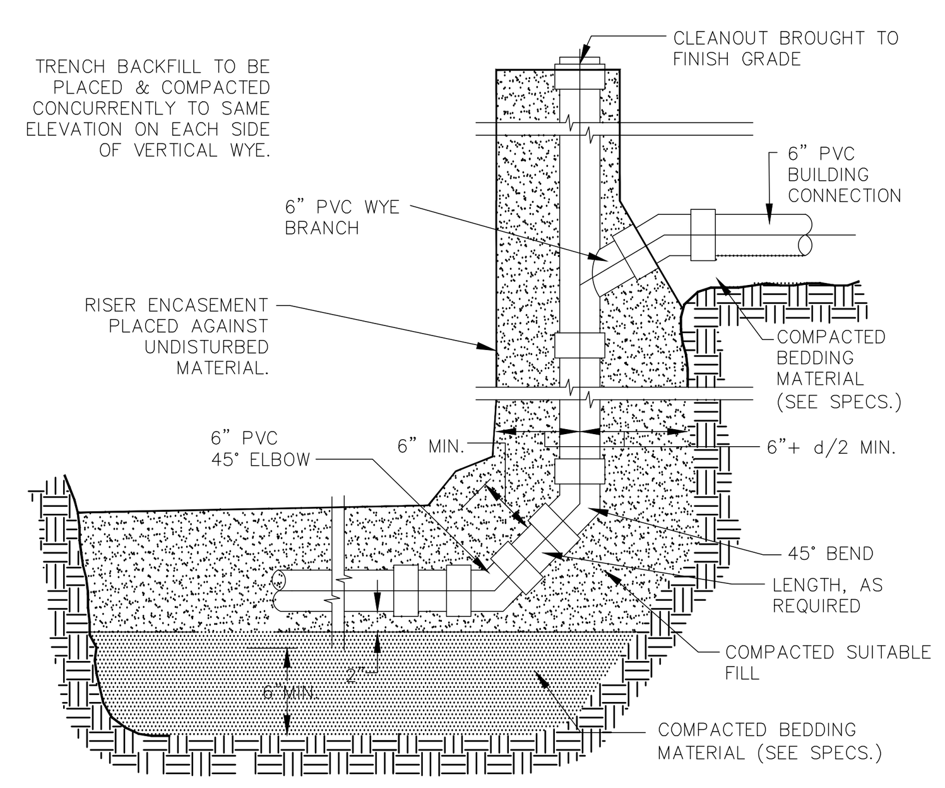
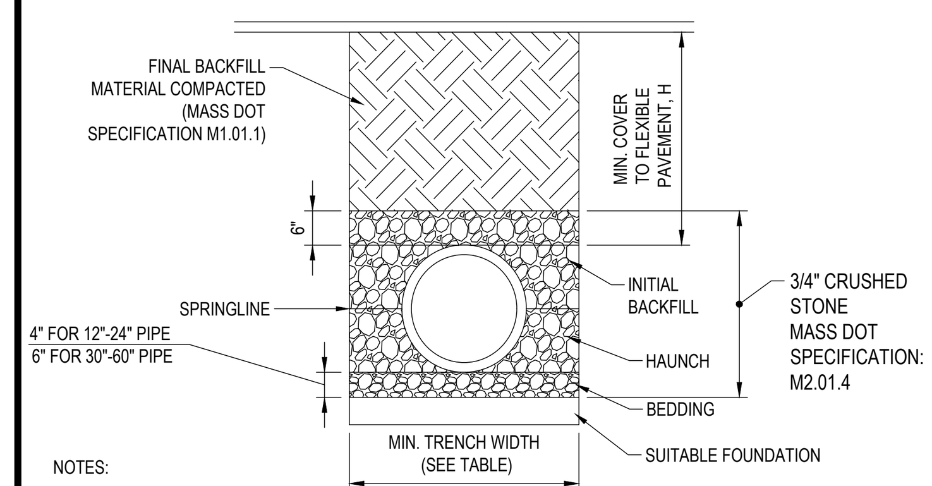
REV 1 - 02/06/2020



VERTICAL WYE AND DROP ROOF CLEANOUT DETAIL

N.T.S.



RECOMMENDED MIN. TRENCH WIDTH	
PIPE DIA.	MIN. TRENCH WIDTH
6"	23"
8"	26"
10"	28"
12"	30"
15"	34"
18"	39"
24"	48"
30"	56"
36"	64"
48"	80"
60"	96"

NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321 , "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION.

2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.

3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.

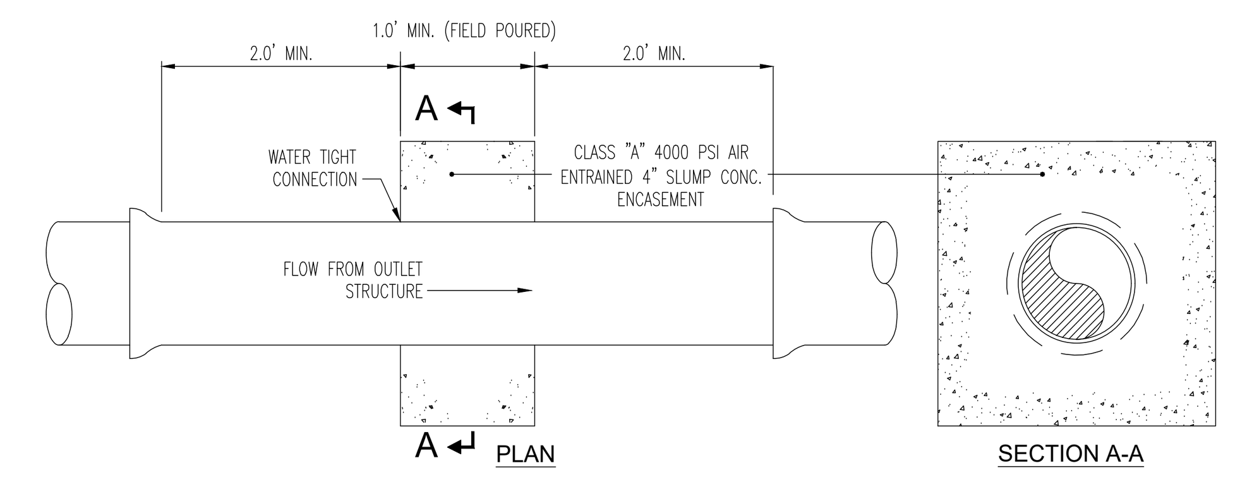
4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (7S0mm-900mm).

5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 54"-60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

HDPE STORM DRAINAGE TRENCH

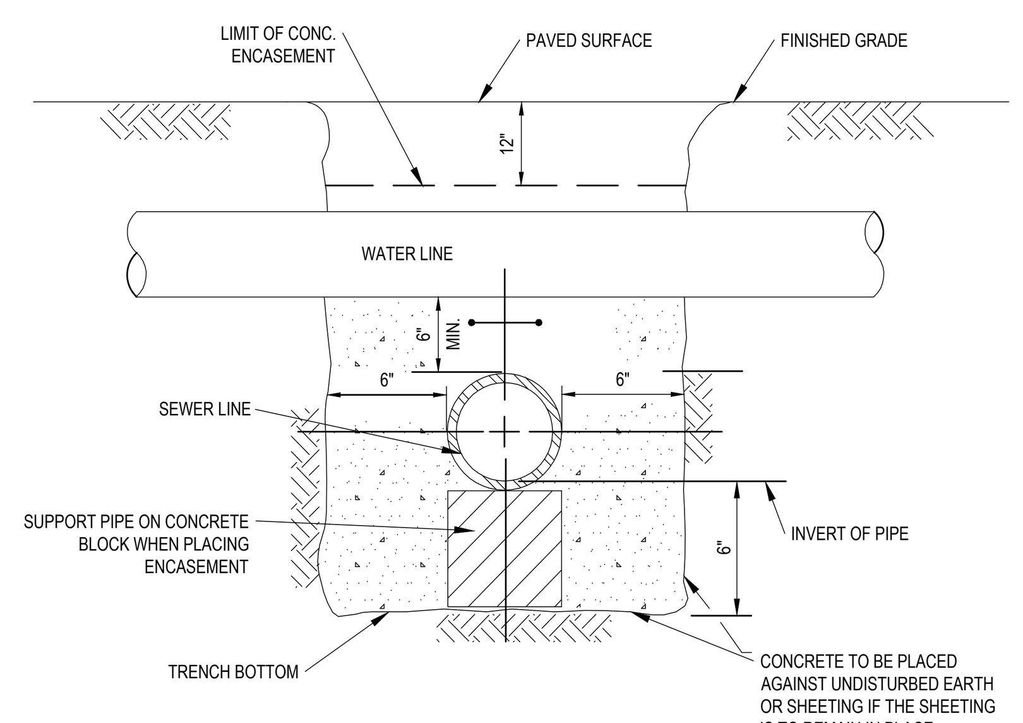
N.T.S.



NOTE:
FIELD POURED COLLARS SHALL HAVE A MINIMUM THICKNESS OF TWELVE (12) INCHES. COLLARS MAY NOT BE INSTALLED WITHIN TWO (2) FEET OF PIPE JOINTS. PRECAST COLLARS NOT ALLOWED ON CORRUGATED PIPE.

ANTI-SEEP COLLAR DETAIL

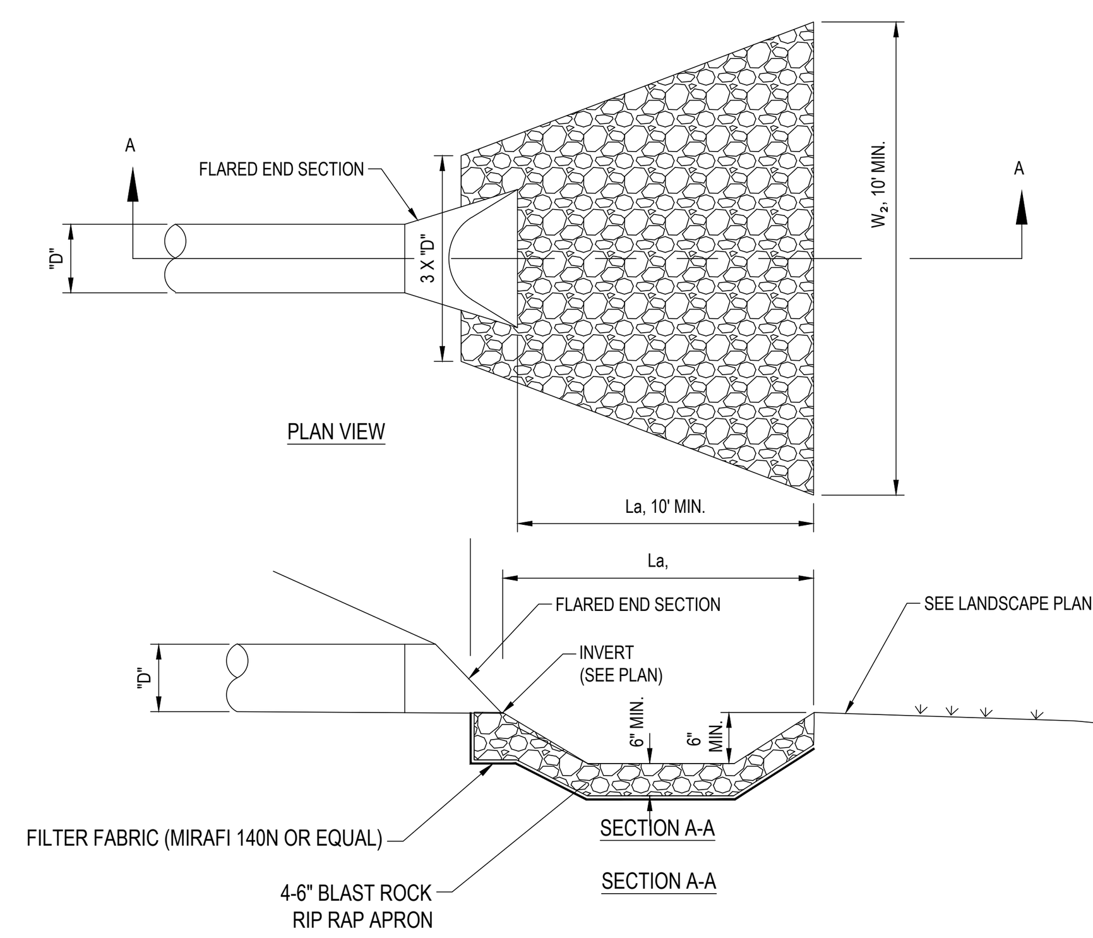
N.T.S.



NOTES:
1. PIPE MUST BE BRACED VERTICALLY & HORIZONTALLY TO PREVENT FLOATATION DURING PLACEMENT OF CONCRETE
2. ALL CONCRETE ENCASEMENT SHALL BE KEPT 12" BELOW THE BOTTOM OF ASPHALT PAVEMENT

CONCRETE ENCASEMENT DETAIL

N.T.S.



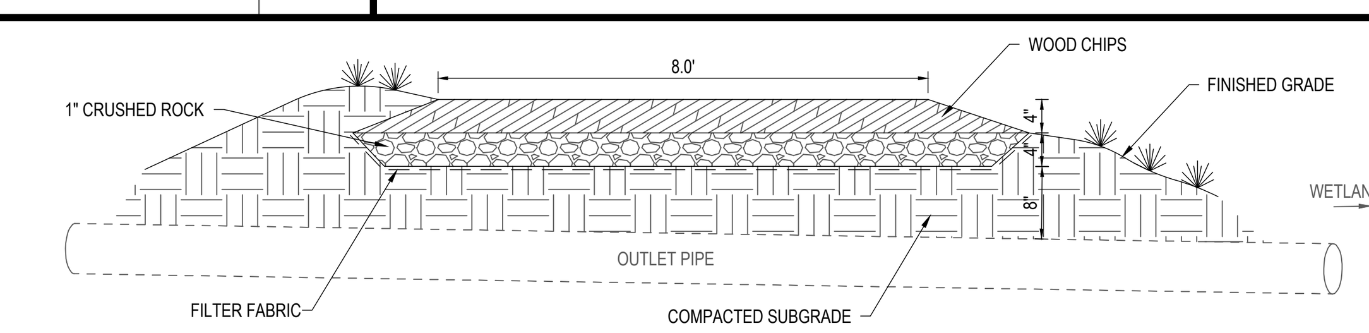
RIP-RAP APRON CHART

LOCATION	D (in.)	La (ft.)	W_2 (ft.)	d (in.)
FES-102	12	10	7	6
FES-202	12	11	8	6
FES-302	8	7	5	6
FES-403	12	11	8	6
FES-503	12	9	7	6

NOTE: 50% OF STONE BY WEIGHT SHALL BE SMALLER THAN d. THE LARGEST STONE SIZE SHALL BE 1.5xd. RIP RAP SHALL BE SOUND, DURABLE ROCK WHICH IS ANGULAR IN SHAPE. ROUNDED STONES, BOULDERS, SANDSTONE OR SIMILAR STONE OR RELATIVELY THIN SLABS WILL NOT BE ACCEPTABLE. ALL STONES SHALL BE SO GRADED THAT WHEN PLACED WITH THE LARGER STONES THE ENTIRE MASS WILL BE COMPACT.

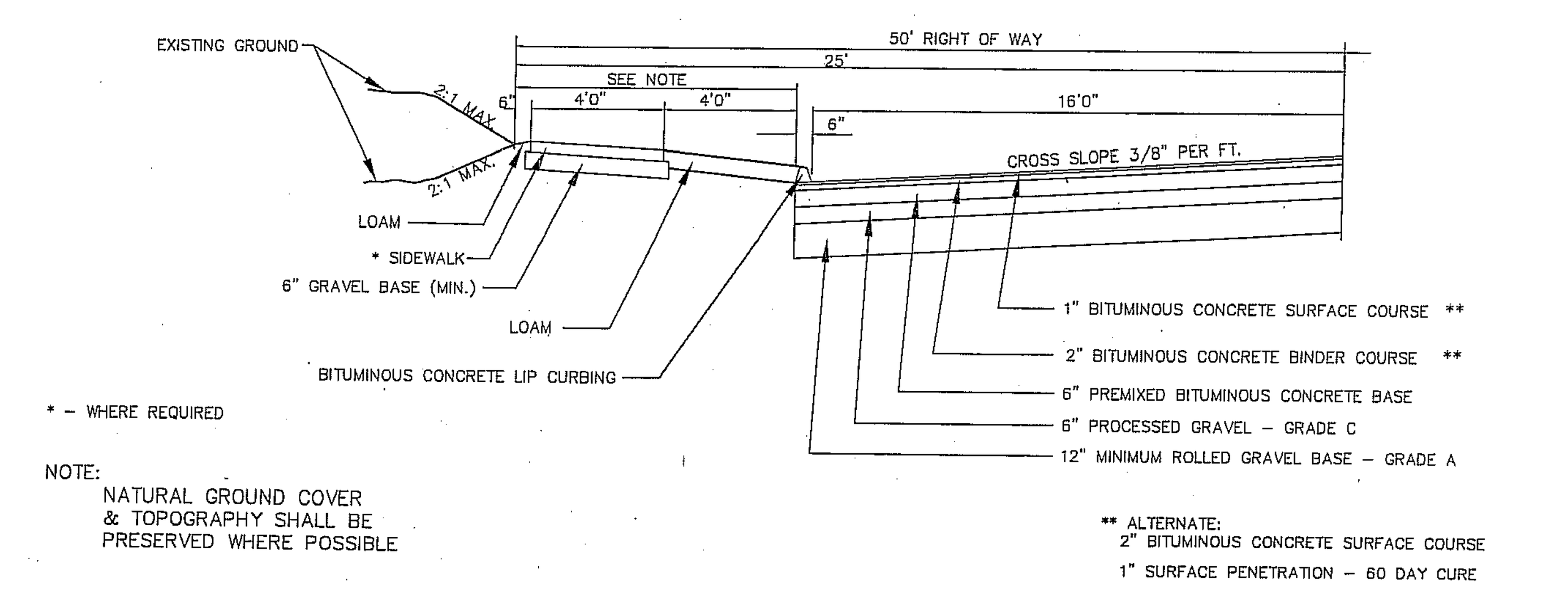
RIP-RAP APRON CHART DETAIL

N.T.S.



MAINTENANCE ACCESS PATH DETAIL

N.T.S.



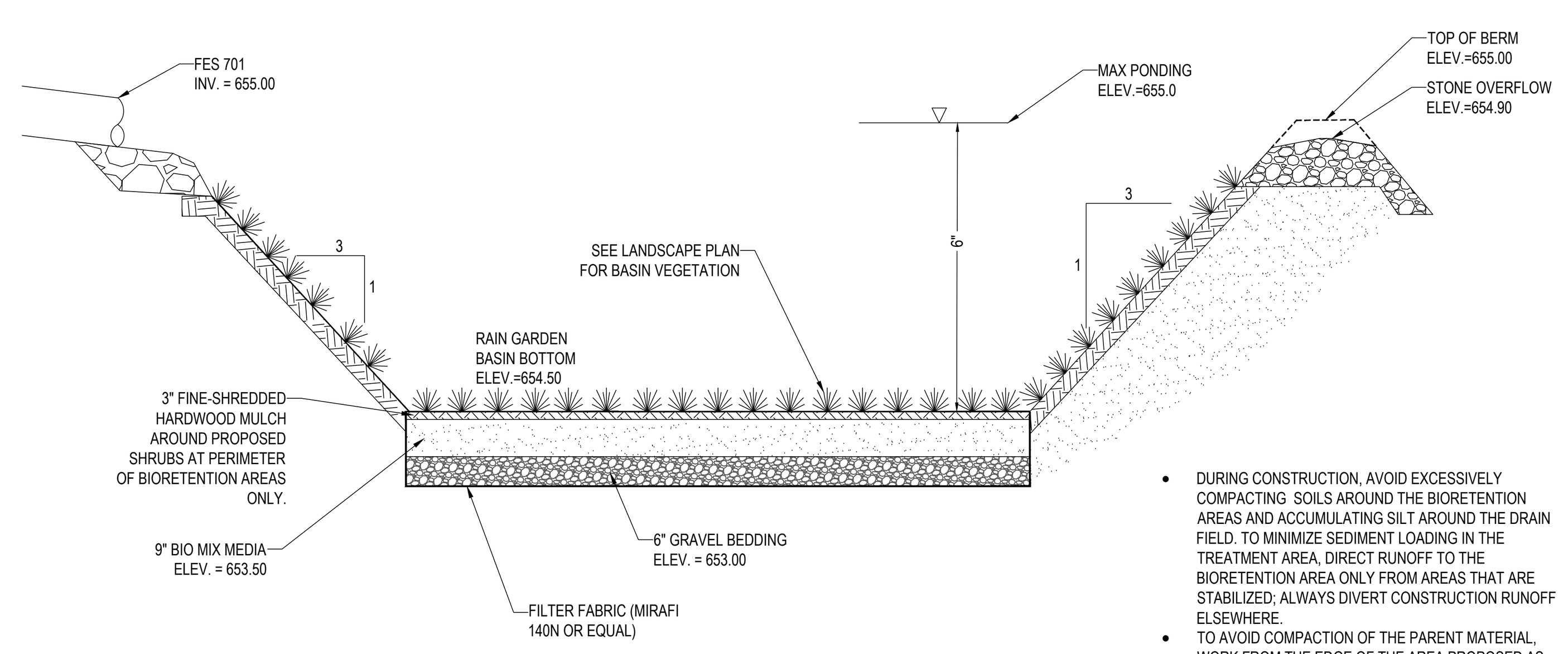
* - WHERE REQUIRED

NOTE:
NATURAL GROUND COVER & TOPOGRAPHY SHALL BE PRESERVED WHERE POSSIBLE

** ALTERNATE:
2" BITUMINOUS CONCRETE SURFACE COURSE
1" SURFACE PENETRATION - 60 DAY CURE

COMMERCIAL STREET PAVEMENT SECTION

N.T.S.



- DURING CONSTRUCTION, AVOID EXCESSIVELY COMPACTING SOILS AROUND THE BIORETENTION AREAS AND ACCUMULATING SILT AROUND THE DRAIN FIELD. TO MINIMIZE SEDIMENT LOADING IN THE TREATMENT AREA, DIRECT RUNOFF TO THE BIORETENTION AREA ONLY FROM AREAS THAT ARE STABILIZED; ALWAYS DIVERT CONSTRUCTION RUNOFF ELSEWHERE.
- TO AVOID COMPACTION OF THE PARENT MATERIAL, WORK FROM THE EDGE OF THE AREA PROPOSED AS THE LOCATION OF AN EXFILTRATIONG BIORETENTION CELL. NEVER DIRECT RUNOFF TO THE CELL UNTIL THE CELL AND THE CONTRIBUTING DRAINAGE AREAS ARE FULLY STABILIZED.
- PLACE PLANTING SOILS IN 1-FOOT TO 2-FOOT LIFTS AND COMPACT THEM WITH MINIMAL PRESSURE UNTIL THE DESIRED ELEVATION IS REACHED. SOME ENGINEERS SUGGEST FLOODING THE CELL BETWEEN EACH LIFT PLACEMENT IN LIEU OF COMPACTION.

- THE SOIL MIX FOR BIORETENTION AREAS SHOULD BE A MIXTURE OF SAND COMPOST AND SOIL.

O 40 % SAND,
O 20-30% TOPSOIL, AND
O 30-40% COMPOST.

- THE SOIL MIX MUST BE UNIFORM, FREE OF STONES, STUMPS, ROOTS OR SIMILAR OBJECTS LARGER THAN 2 INCHES. CLAY CONTENT SHOULD NOT EXCEED 5%.
- SOIL PH SHOULD GENERALLY BE BETWEEN 5.5-6.5, A RANGE THAT IS OPTIMAL FOR MICROBIAL ACTIVITY AND ADSORPTION OF NITROGEN, PHOSPHORUS, AND OTHER POLLUTANTS.
- USE SOILS WITH 1.5% TO 3% ORGANIC CONTENT AND MAXIMUM 500-PPM SOLUBLE SALTS.

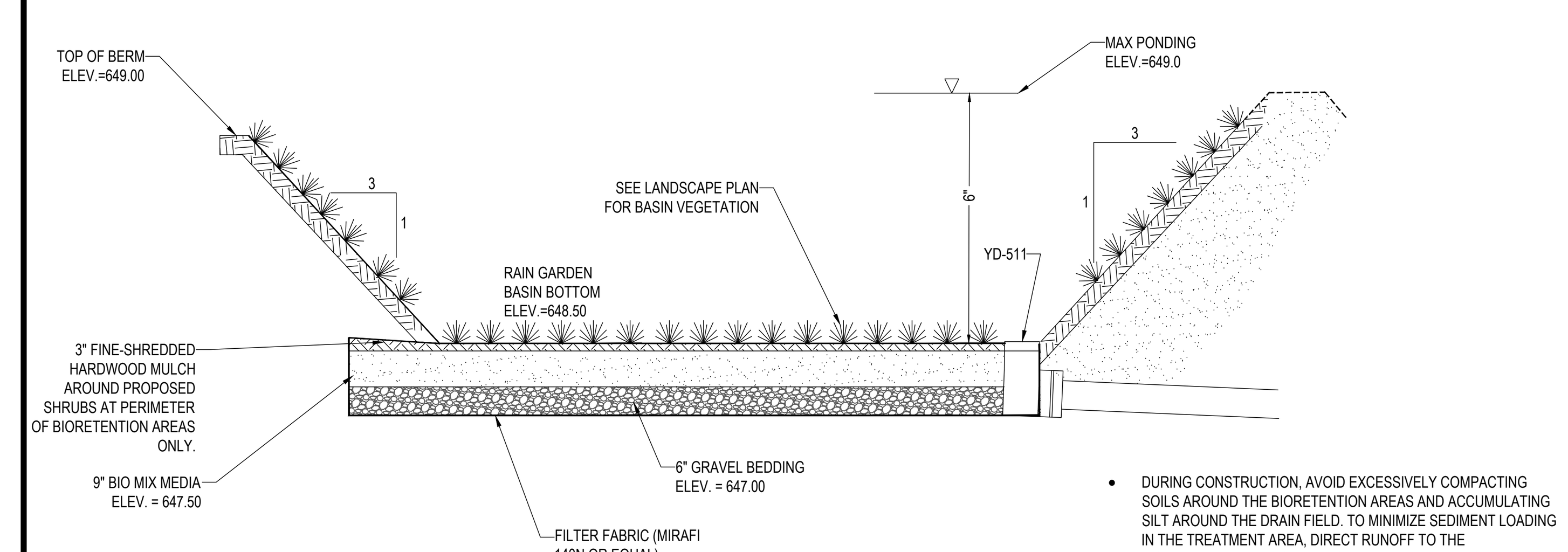
THE SAND COMPONENT SHOULD BE GRAVELLY SAND THAT MEETS ASTM D 422.

SIEVE SIZE	PERCENT PASSING
2-INCH	100
¾-INCH	70-100
¼-INCH	50-80
U.S NO. 40	15-40
U.S NO. 200	0-3

- THE TOPSOIL COMPONENT SHALL BE A SANDY LOAM, LOAMY SAND OR LOAM TEXTURE.
- THE COMPOST COMPONENT MUST BE PROCESSED FROM YARD WASTE IN ACCORDANCE WITH CTDEEP GUIDELINES. THE COMPOST SHALL NOT CONTAIN BIOSOLIDS.
- ON-SITE SOIL MIXING OR PLACEMENT IS NOT ALLOWED IF SOIL IS SATURATED OR SUBJECT TO WATER WITHIN 48 HOURS. COVER AND STORE SOIL TO PREVENT WETTING OR SATURATION.
- TEST SOIL FOR FERTILITY AND MICRO-NUTRIENTS AND, ONLY IF NECESSARY, AMEND MIXTURE TO CREATE OPTIMUM CONDITIONS FOR PLANT ESTABLISHMENT AND EARLY GROWTH.
- GRADE THE AREA TO ALLOW A PONDING DEPTH OF 6 TO 8 INCHES; DEPENDING ON SITE CONDITIONS, MORE OR LESS PONDING MAY BE APPROPRIATE.
- COVER THE SOIL WITH 2 TO 3 INCHES OF FINE-SHREDDED HARDWOOD MULCH.
- THE PLANTING PLAN SHALL INCLUDE A MIX OF HERBACEOUS PERENNIALS, SHRUBS, AND (IF CONDITIONS PERMIT) UNDERSTORY TREES THAT CAN TOLERATE INTERMITTENT PONDING, OCCASIONAL SALINE CONDITIONS DUE TO ROAD SALT, AND EXTENDED DRY PERIODS. A LIST OF PLANTS THAT ARE SUITABLE FOR BIORETENTION AREAS CAN BE FOUND AT THE END OF THIS SECTION. TO AVOID A MONOCULTURE, IT IS A GOOD PRACTICE TO INCLUDE ONE TREE OR SHRUB PER 50 SQUARE FEET OF BIORETENTION AREA, AND AT LEAST 3 SPECIES EACH OF HERBACEOUS PERENNIALS AND SHRUBS. INVASIVE AND EXOTIC SPECIES ARE PROHIBITED. THE PLANTING PLAN SHOULD ALSO MEET ANY APPLICABLE LOCAL LANDSCAPING REQUIREMENTS.

RAIN GARDEN (YD-511) NOTES AND DETAIL

N.T.S.



- DURING CONSTRUCTION, AVOID EXCESSIVELY COMPACTING SOILS AROUND THE BIORETENTION AREAS AND ACCUMULATING SILT AROUND THE DRAIN FIELD. TO MINIMIZE SEDIMENT LOADING IN THE TREATMENT AREA, DIRECT RUNOFF TO THE BIORETENTION AREA ONLY FROM AREAS THAT ARE STABILIZED; ALWAYS DIVERT CONSTRUCTION RUNOFF ELSEWHERE.
- TO AVOID COMPACTION OF THE PARENT MATERIAL, WORK FROM THE EDGE OF THE AREA PROPOSED AS THE LOCATION OF AN EXFILTRATIONG BIORETENTION CELL. NEVER DIRECT RUNOFF TO THE CELL UNTIL THE CELL AND THE CONTRIBUTING DRAINAGE AREAS ARE FULLY STABILIZED.
- PLACE PLANTING SOILS IN 1-FOOT TO 2-FOOT LIFTS AND COMPACT THEM WITH MINIMAL PRESSURE UNTIL THE DESIRED ELEVATION IS REACHED. SOME ENGINEERS SUGGEST FLOODING THE CELL BETWEEN EACH LIFT PLACEMENT IN LIEU OF COMPACTION.

- THE SOIL MIX FOR BIORETENTION AREAS SHOULD BE A MIXTURE OF SAND COMPOST AND SOIL.

O 40 % SAND,
O 20-30% TOPSOIL, AND
O 30-40% COMPOST.

- THE SOIL MIX MUST BE UNIFORM, FREE OF STONES, STUMPS, ROOTS OR SIMILAR OBJECTS LARGER THAN 2 INCHES. CLAY CONTENT SHOULD NOT EXCEED 5%.
- SOIL PH SHOULD GENERALLY BE BETWEEN 5.5-6.5, A RANGE THAT IS OPTIMAL FOR MICROBIAL ACTIVITY AND ADSORPTION OF NITROGEN, PHOSPHORUS, AND OTHER POLLUTANTS.
- USE SOILS WITH 1.5% TO 3% ORGANIC CONTENT AND MAXIMUM 500-PPM SOLUBLE SALTS.

THE SAND COMPONENT SHOULD BE GRAVELLY SAND THAT MEETS ASTM D 422.

SIEVE SIZE	PERCENT PASSING
2-INCH	100
¾-INCH	70-100
¼-INCH	50-80
U.S NO. 40	15-40
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- THE TOPSOIL COMPONENT SHALL BE A SANDY LOAM, LOAMY SAND OR LOAM TEXTURE.
- THE COMPOST COMPONENT MUST BE PROCESSED FROM YARD WASTE IN ACCORDANCE WITH CTDEEP GUIDELINES. THE COMPOST SHALL NOT CONTAIN BIOSOLIDS.
- ON-SITE SOIL MIXING OR PLACEMENT IS NOT ALLOWED IF SOIL IS SATURATED OR SUBJECT TO WATER WITHIN 48 HOURS. COVER AND STORE SOIL TO PREVENT WETTING OR SATURATION.
- TEST SOIL FOR FERTILITY AND MICRO-NUTRIENTS AND, ONLY IF NECESSARY, AMEND MIXTURE TO CREATE OPTIMUM CONDITIONS FOR PLANT ESTABLISHMENT AND EARLY GROWTH.
- GRADE THE AREA TO ALLOW A PONDING DEPTH OF 6 TO 8 INCHES; DEPENDING ON SITE CONDITIONS, MORE OR LESS PONDING MAY BE APPROPRIATE.
- COVER THE SOIL WITH 2 TO 3 INCHES OF FINE-SHREDDED HARDWOOD MULCH.
- THE PLANTING PLAN SHALL INCLUDE A MIX OF HERBACEOUS PERENNIALS, SHRUBS, AND (IF CONDITIONS PERMIT) UNDERSTORY TREES THAT CAN TOLERATE INTERMITTENT PONDING, OCCASIONAL SALINE CONDITIONS DUE TO ROAD SALT, AND EXTENDED DRY PERIODS. A LIST OF PLANTS THAT ARE SUITABLE FOR BIORETENTION AREAS CAN BE FOUND AT THE END OF THIS SECTION. TO AVOID A MONOCULTURE, IT IS A GOOD PRACTICE TO INCLUDE ONE TREE OR SHRUB PER 50 SQUARE FEET OF BIORETENTION AREA, AND AT LEAST 3 SPECIES EACH OF HERBACEOUS PERENNIALS AND SHRUBS. INVASIVE AND EXOTIC SPECIES ARE PROHIBITED. THE PLANTING PLAN SHOULD ALSO MEET ANY APPLICABLE LOCAL LANDSCAPING REQUIREMENTS.

RAIN GARDEN (RG-703) NOTES AND DETAIL

N.T.S.

BOHLER//
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
2			
3			
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PERMIT SET

PROJECT No.:	CT181007
DRAWN BY:	MAA
CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

BOHLER//
16 OLD FORGE ROAD, SUITE A
ROCKY HILL, CT 06067
Phone: (860) 333-8900
Fax: (508) 480-9080
www.BohlerEngineering.com

G.P. FITZGERALD
PROFESSIONAL ENGINEER

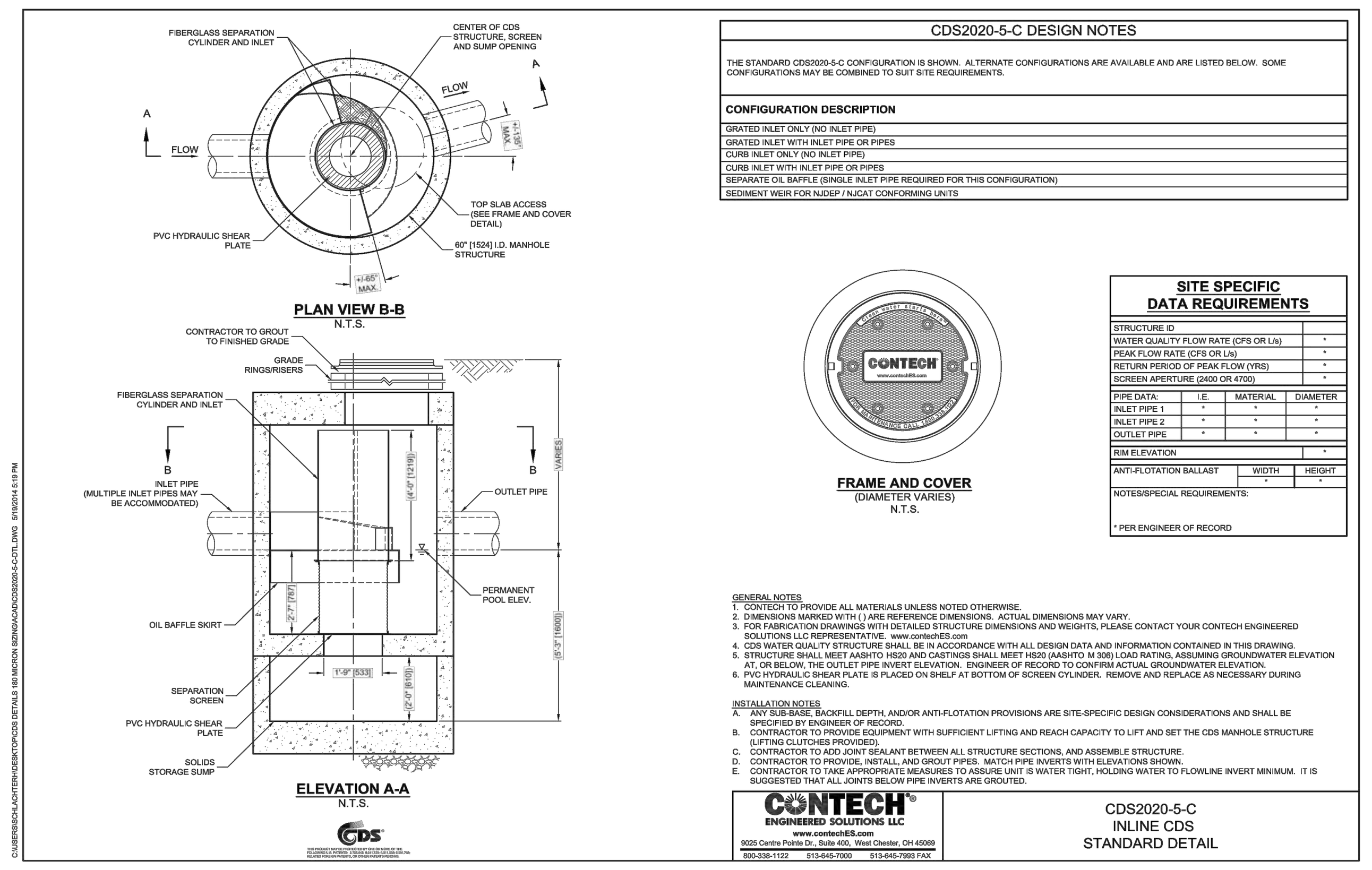
SHEET TITLE:

CONSTRUCTION DETAIL SHEET

SHEET NUMBER:

22
OF 25

REV 1 - 02/06/2020



CONTECH CDS UNIT 2020-5-C DETAIL

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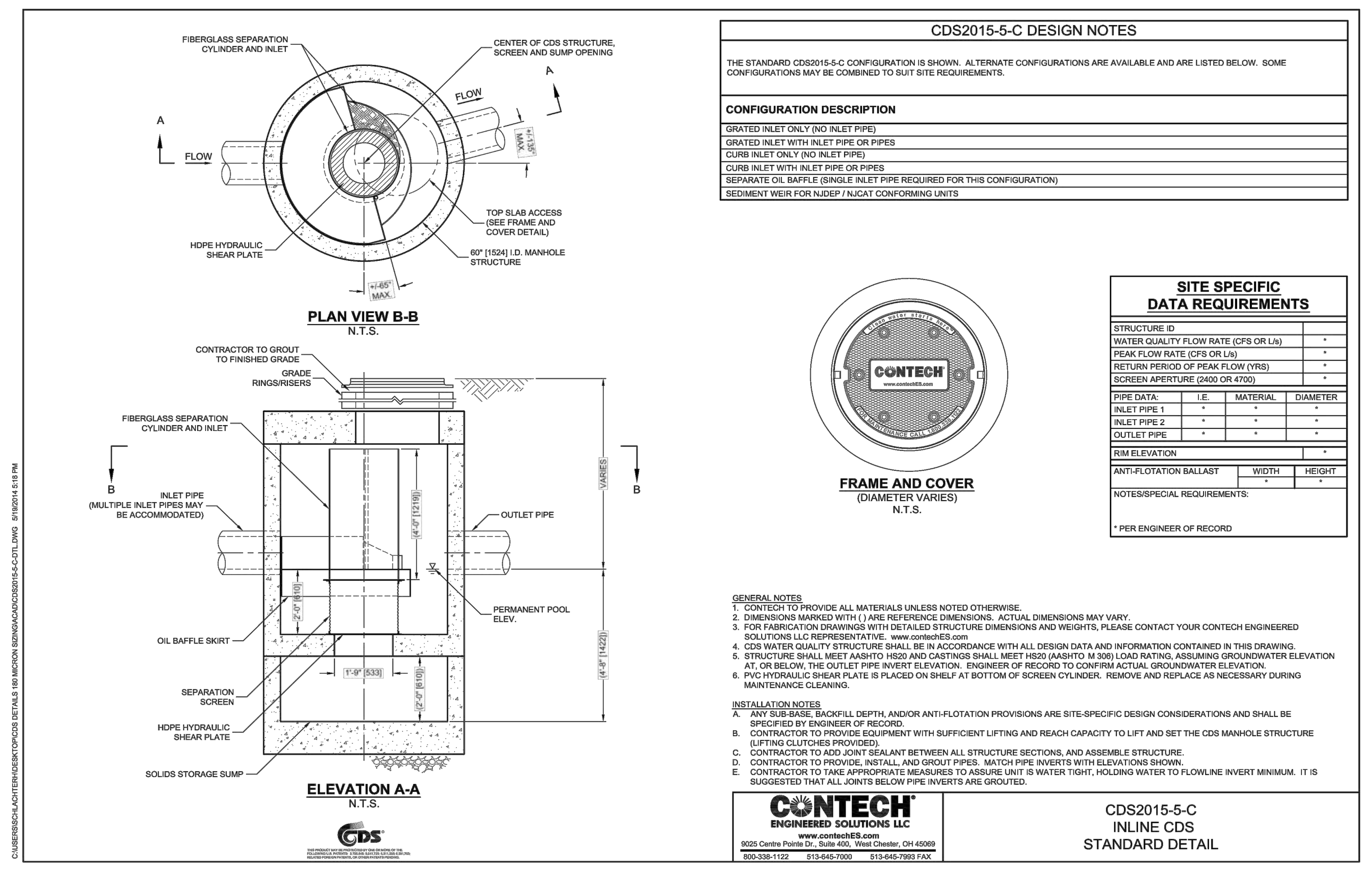

CONTECH CDS UNIT 2010-5-C DETAIL

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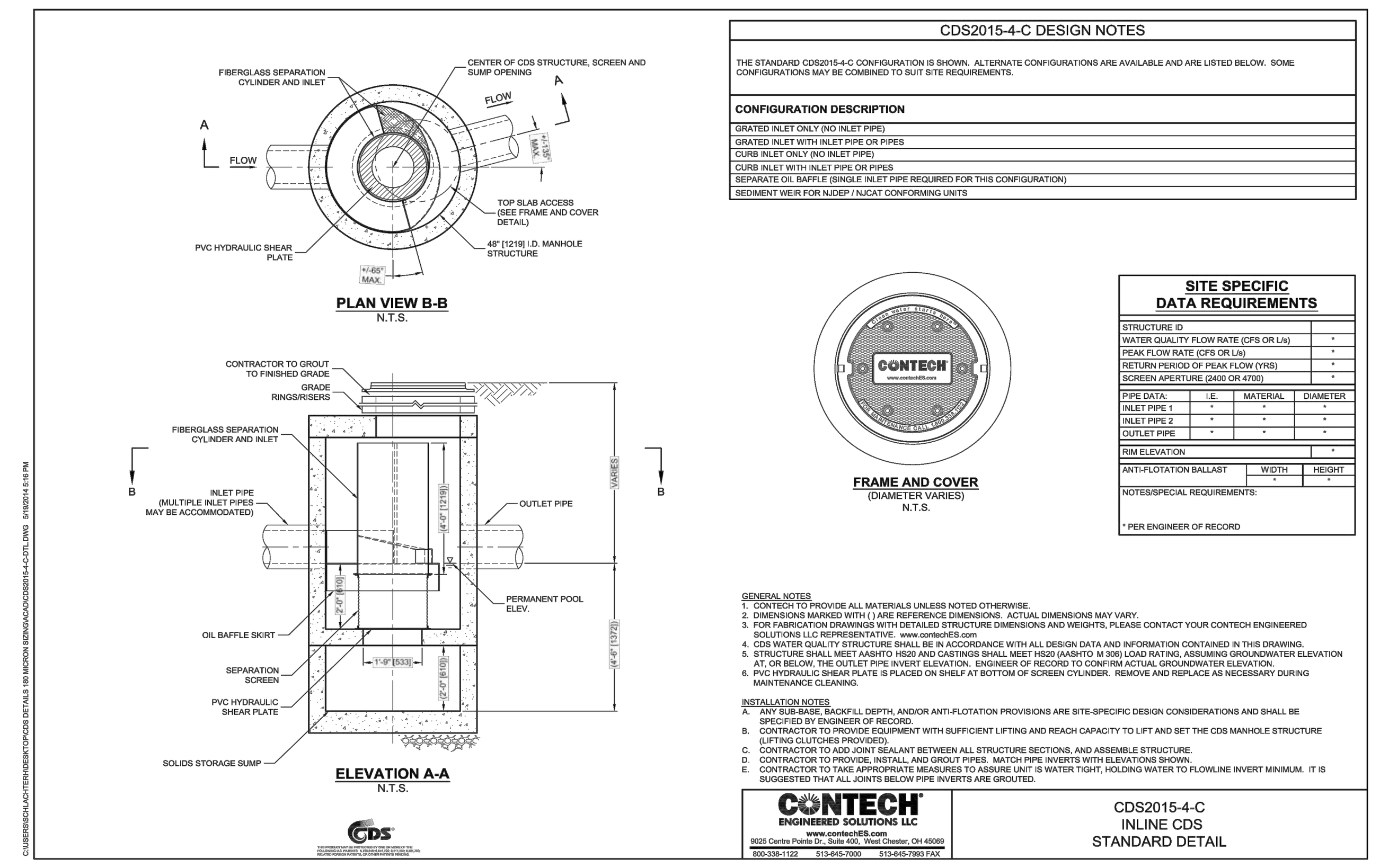

CONTECH CDS UNIT 2015-4 DETAIL

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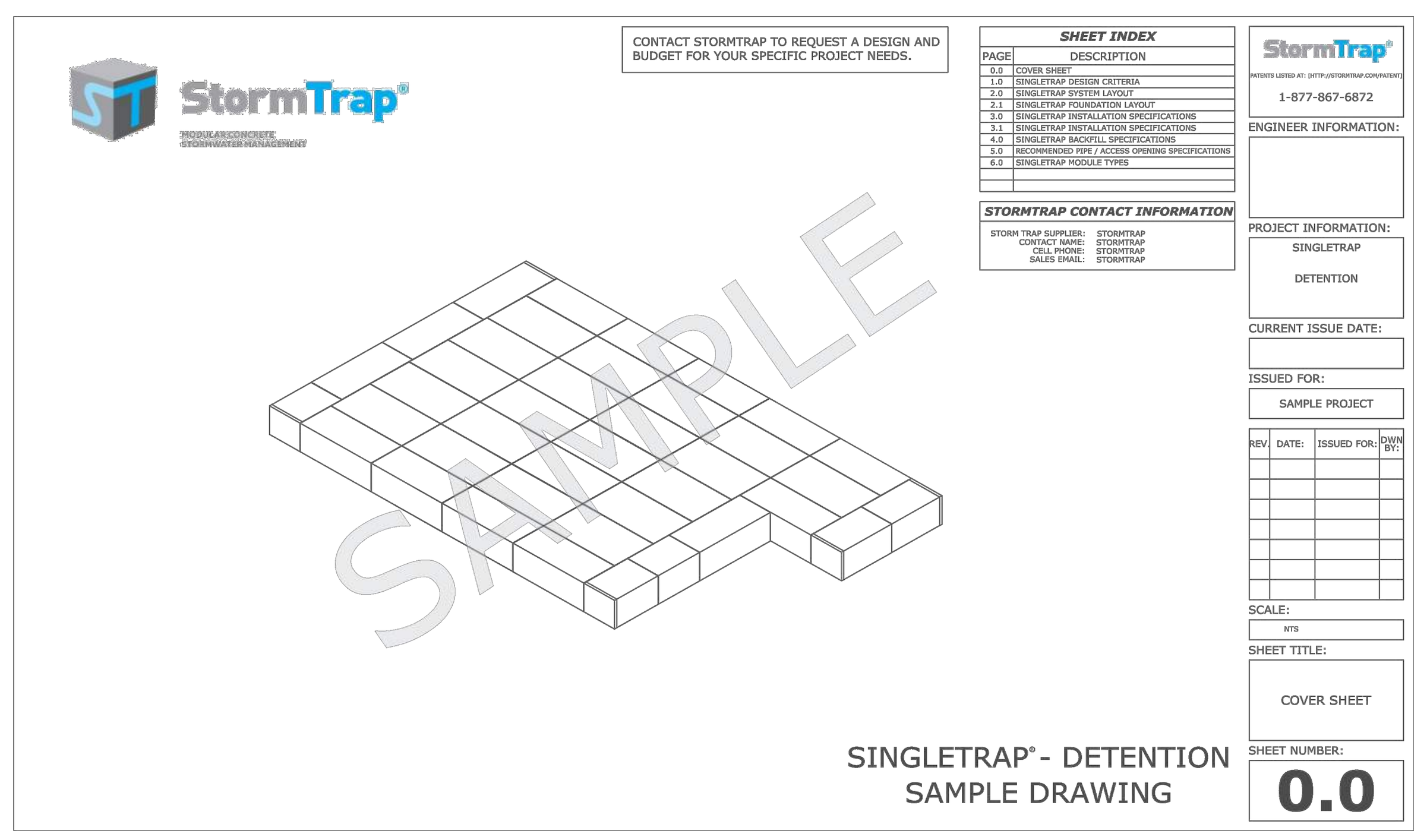

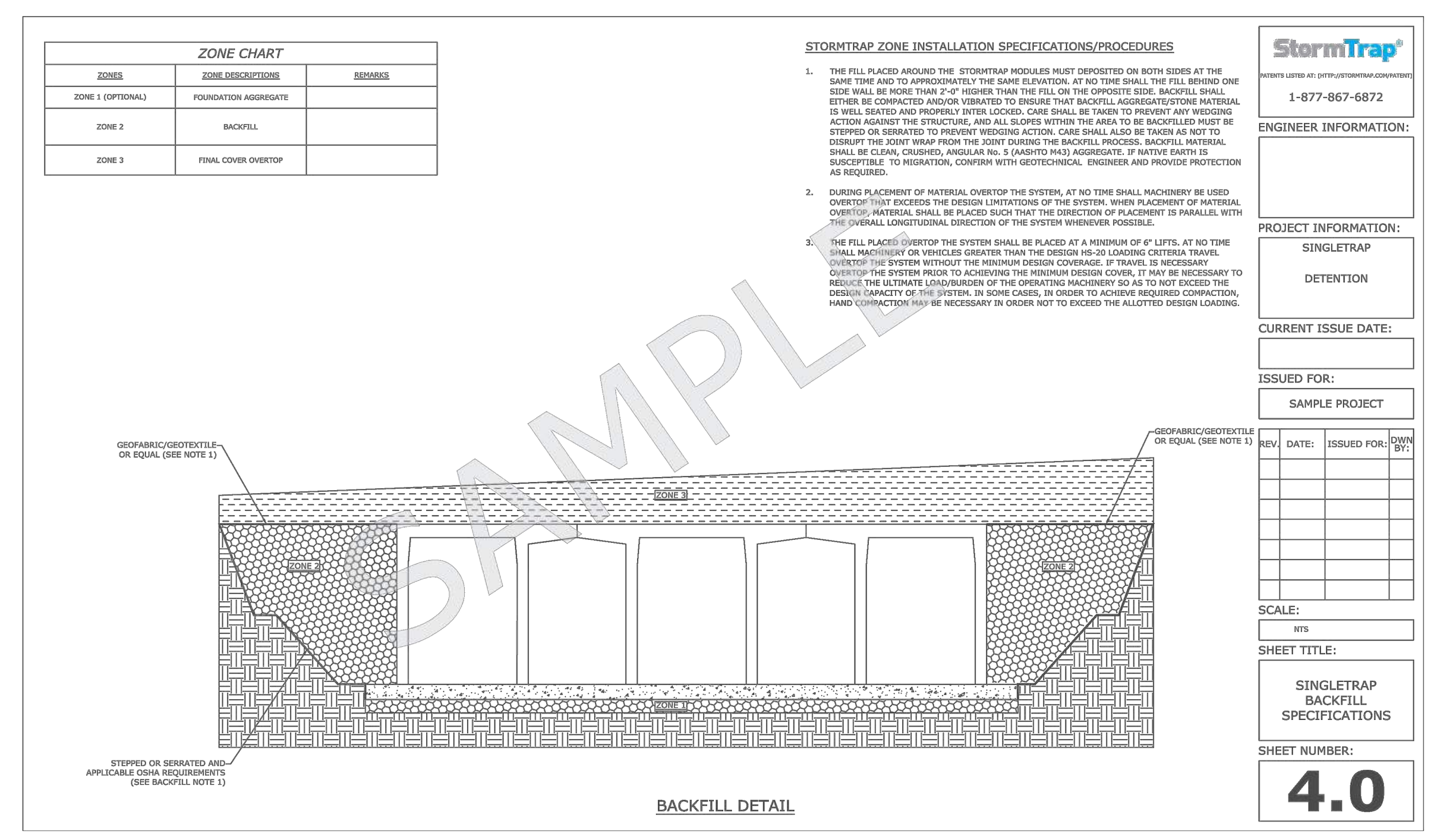

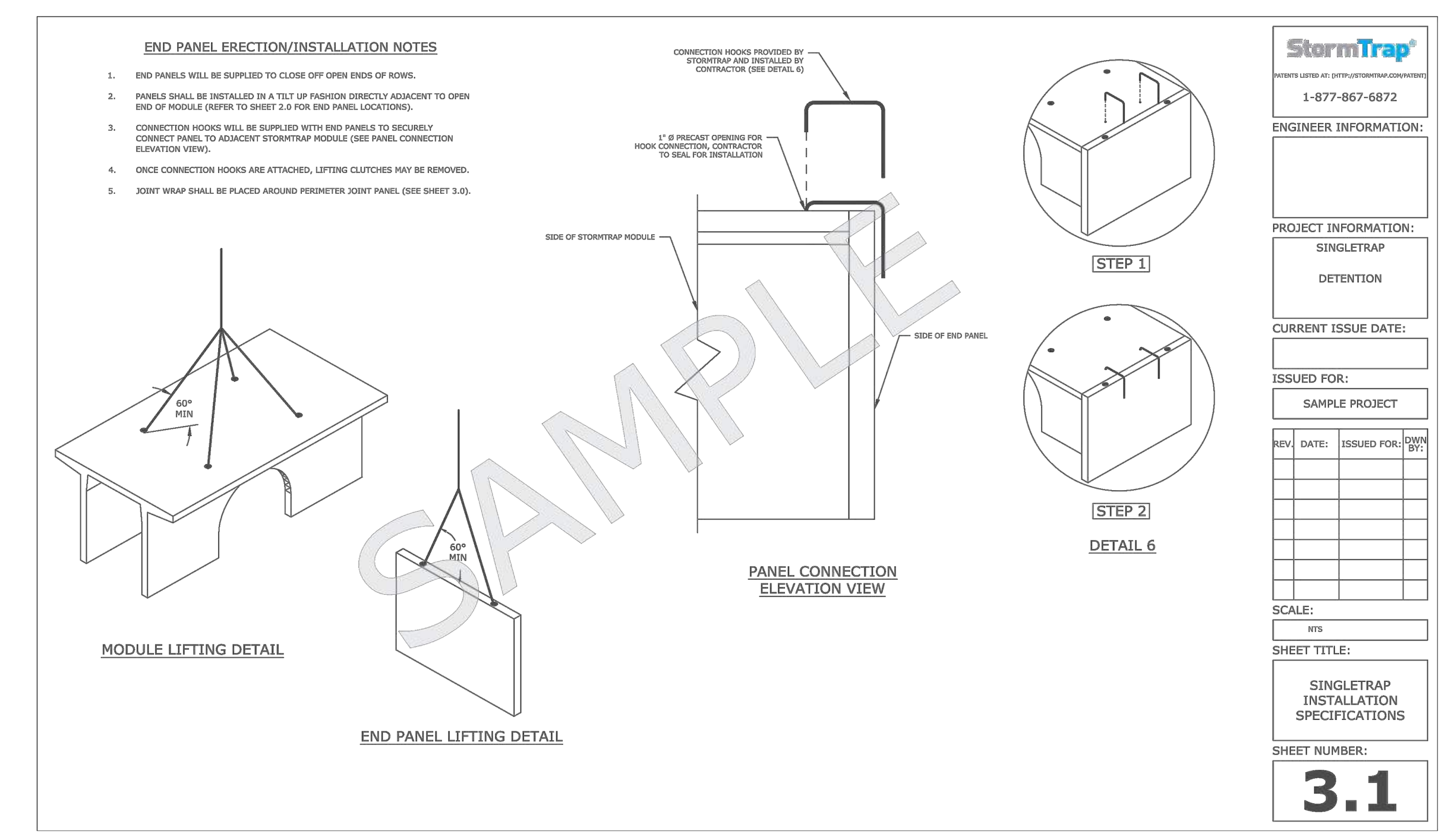

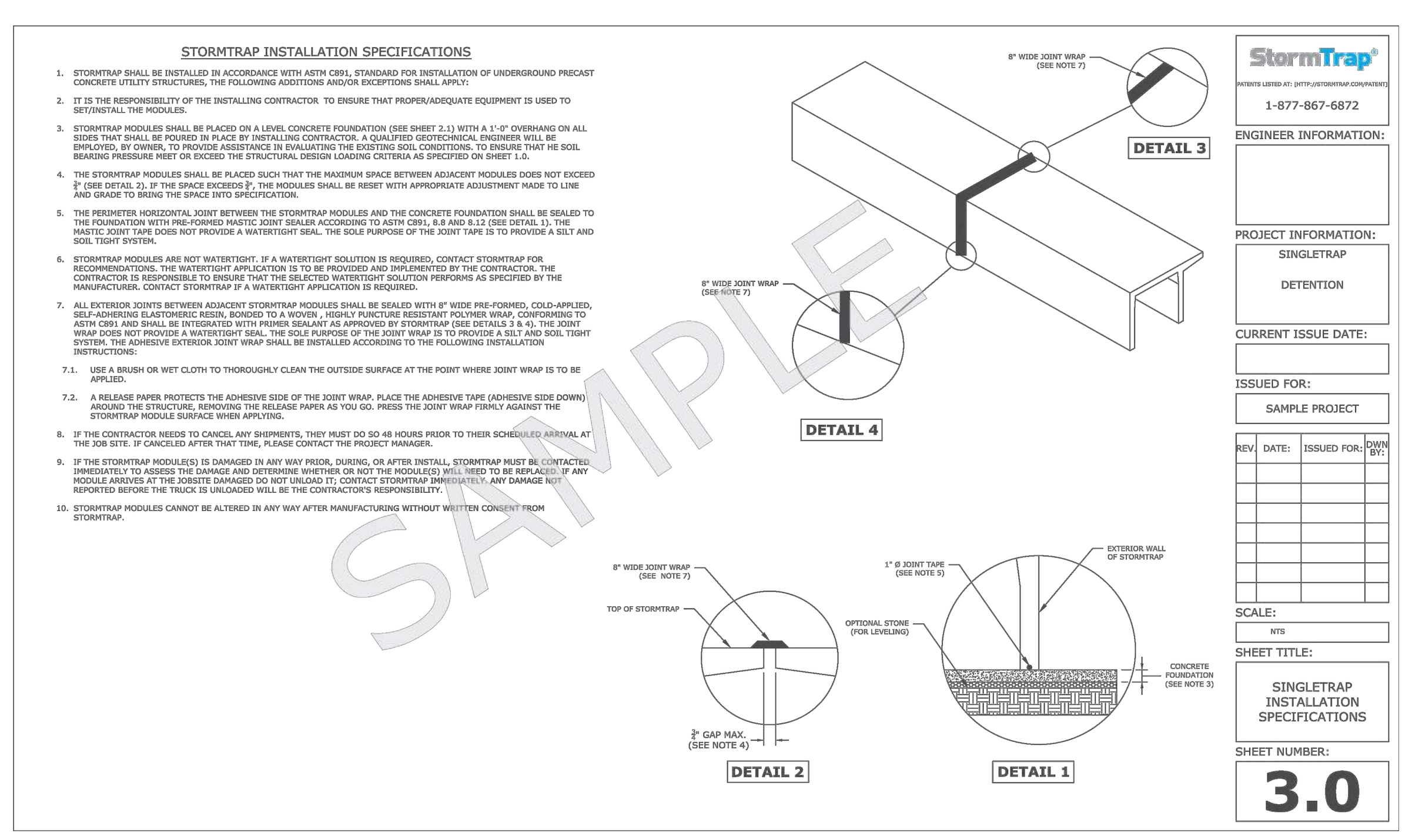

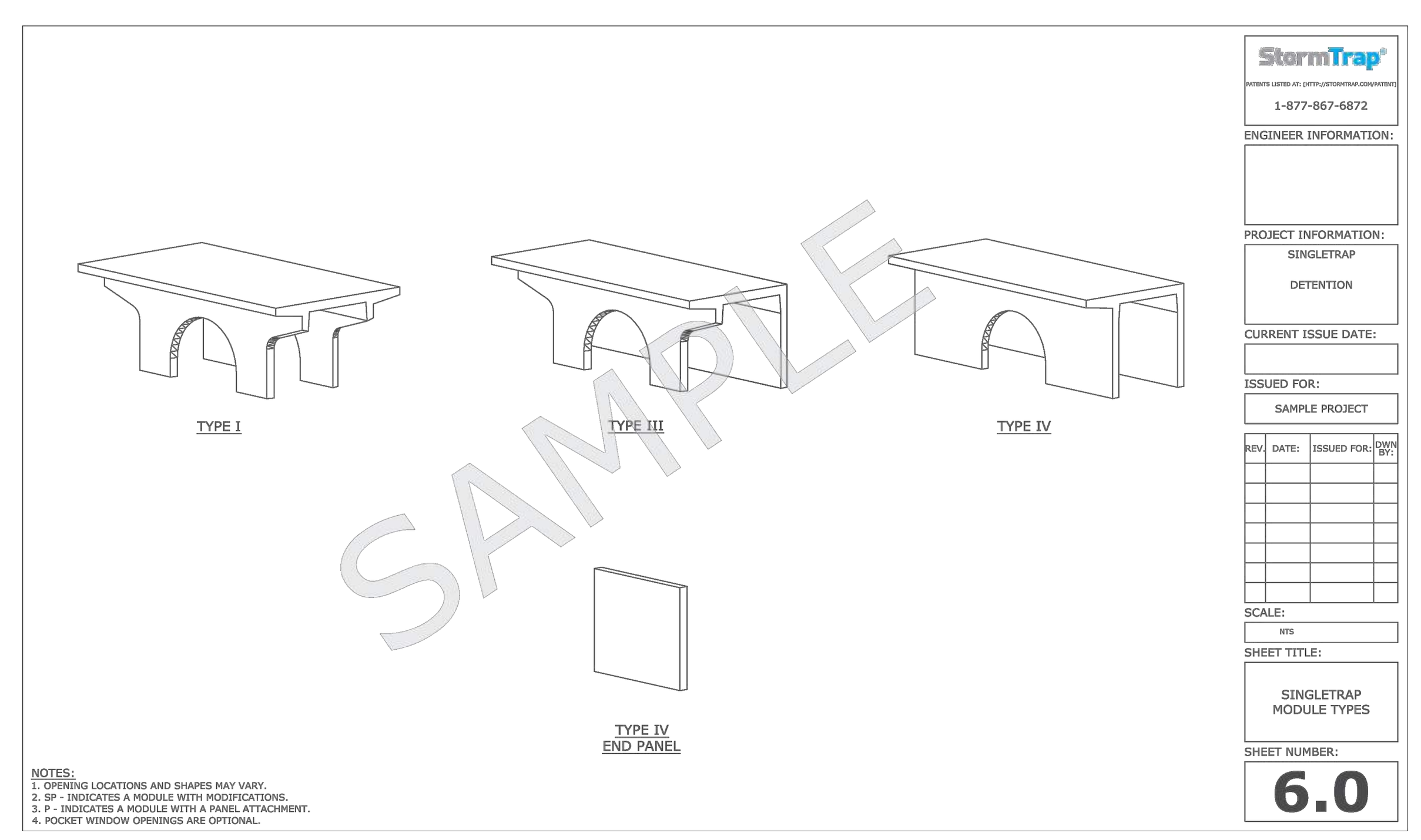

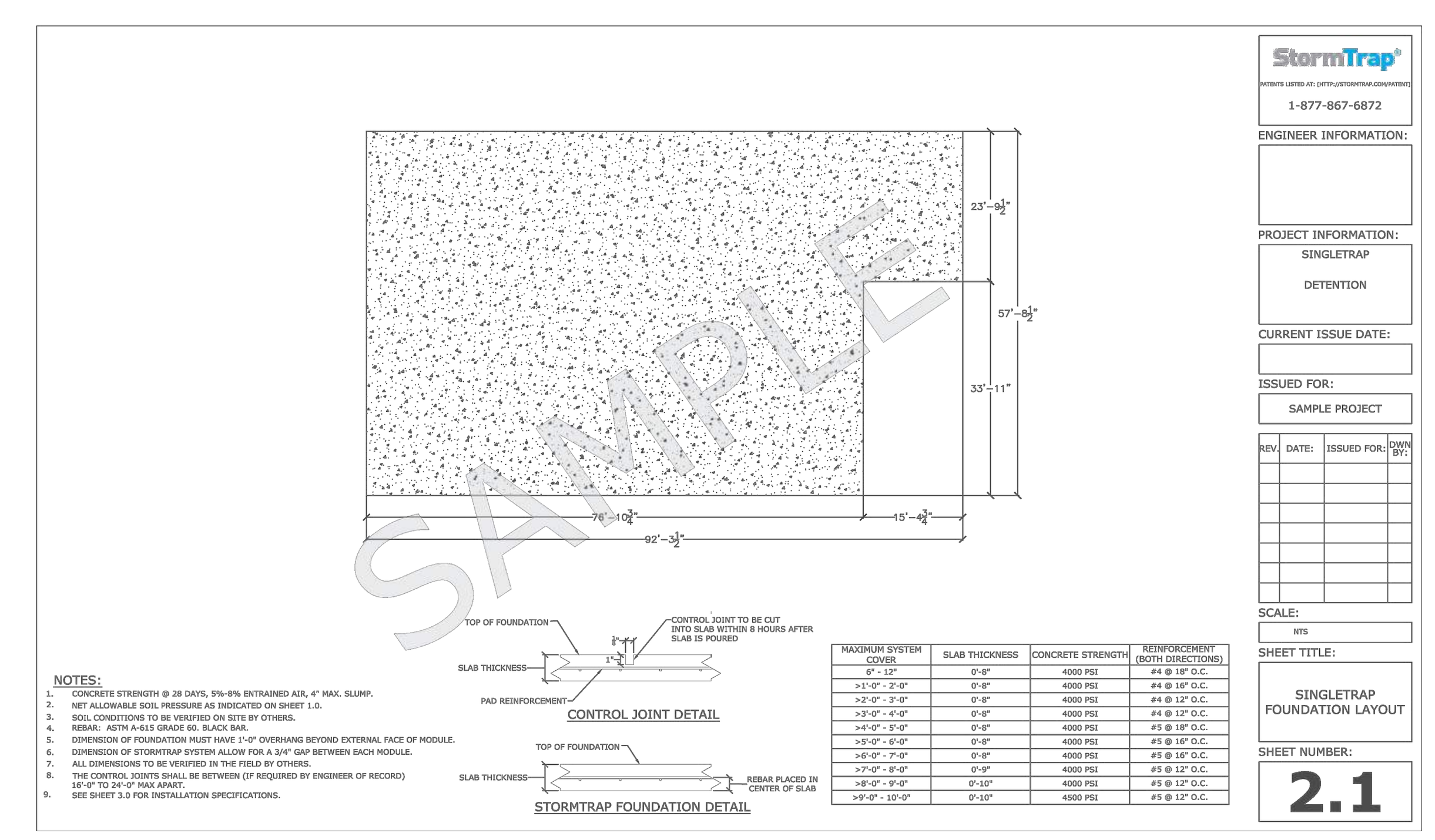

TYPICAL STORM TRAP CONFIGURATION DETAIL

N.T.S.

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

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PERMIT SET

PROJECT No.:	CT181007
DRAWN BY:	MAA
CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

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16 OLD FORGE ROAD, SUITE A
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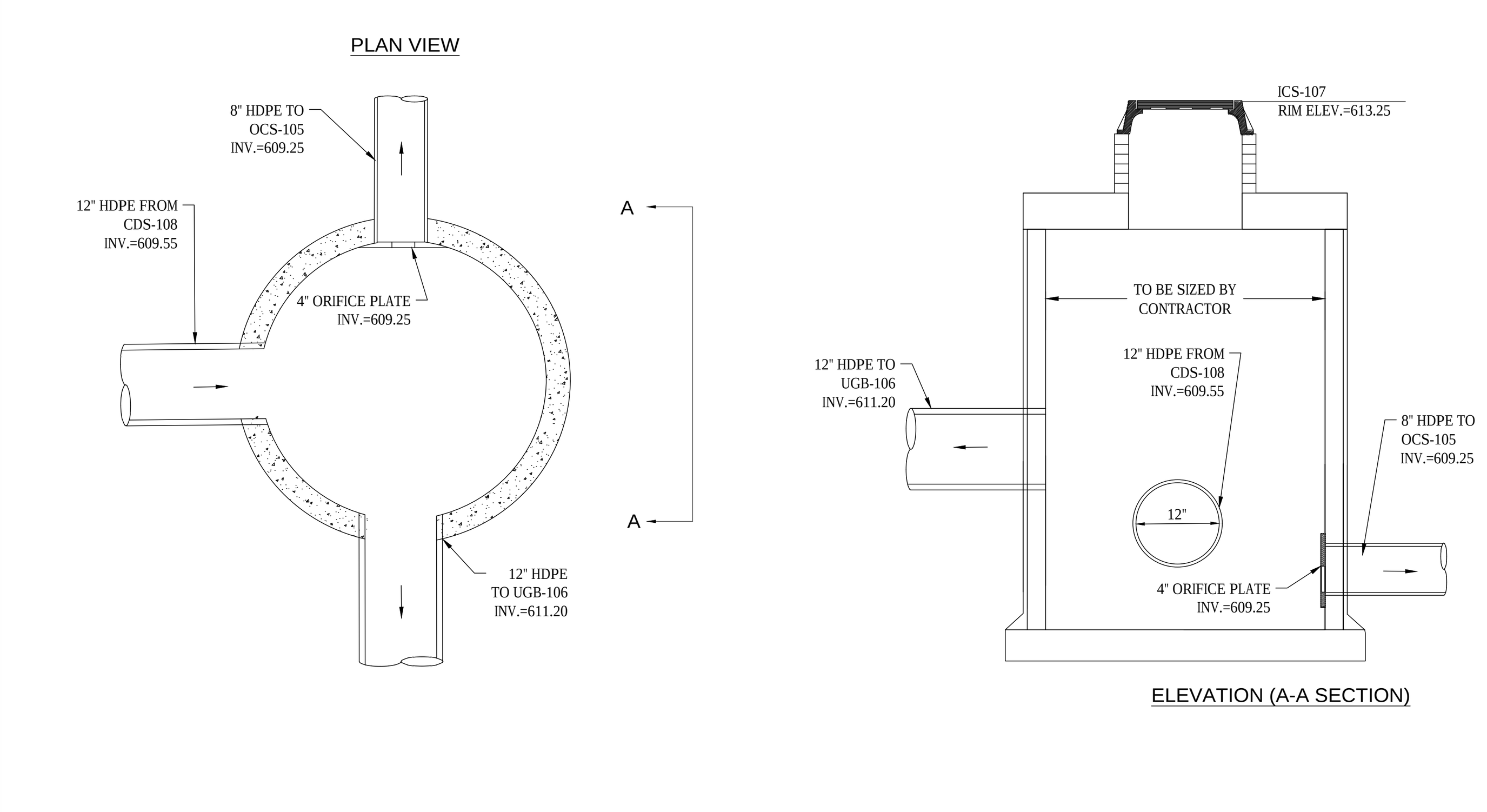
SHEET TITLE:

CONSTRUCTION DETAIL SHEET

SHEET NUMBER:

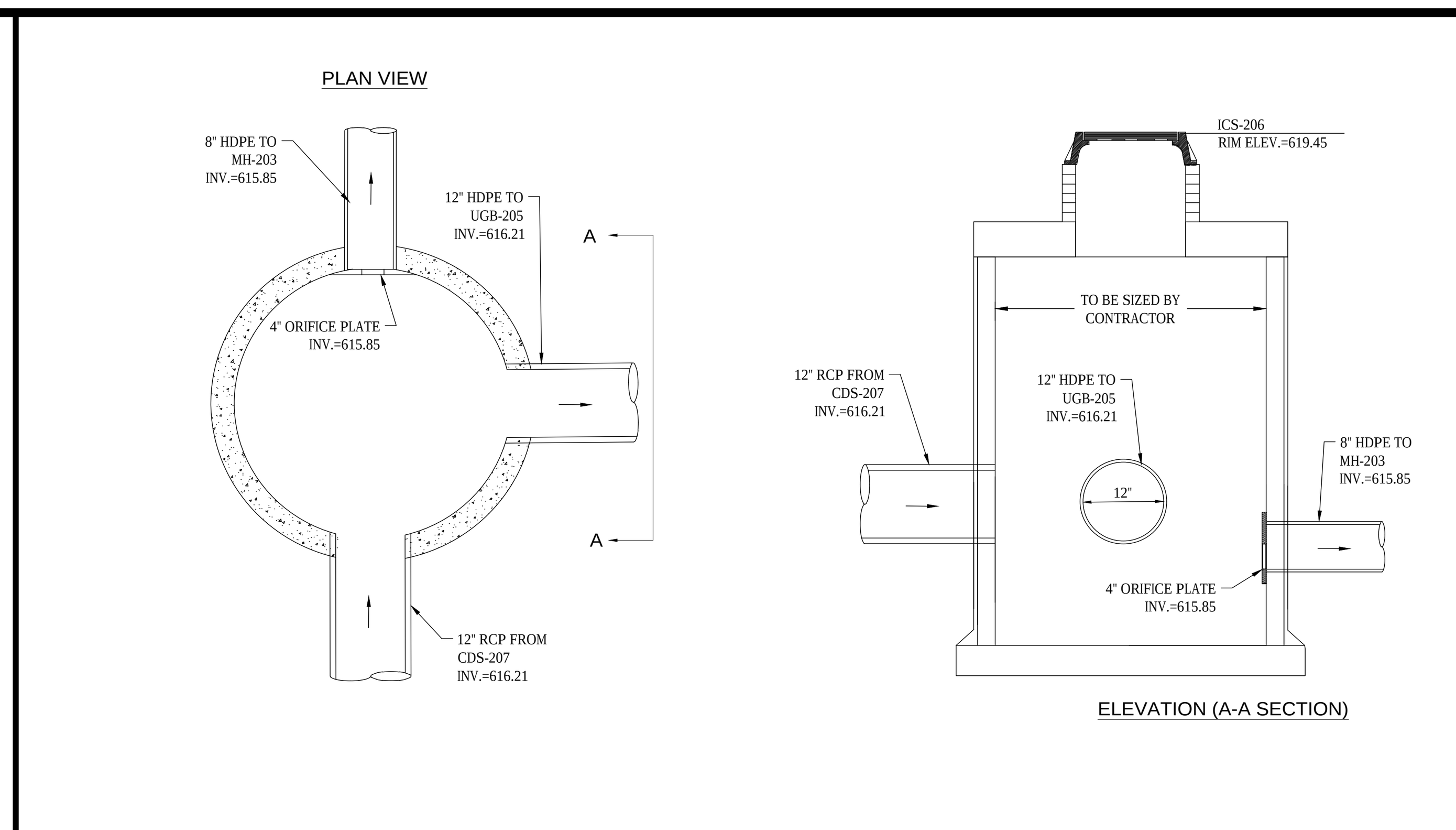
23
OF 25

REV 1 - 02/06/2020



INLET CONTROL STRUCTURE (ICS-107)

N.T.S.



INLET CONTROL STRUCTURE (ICS-206)

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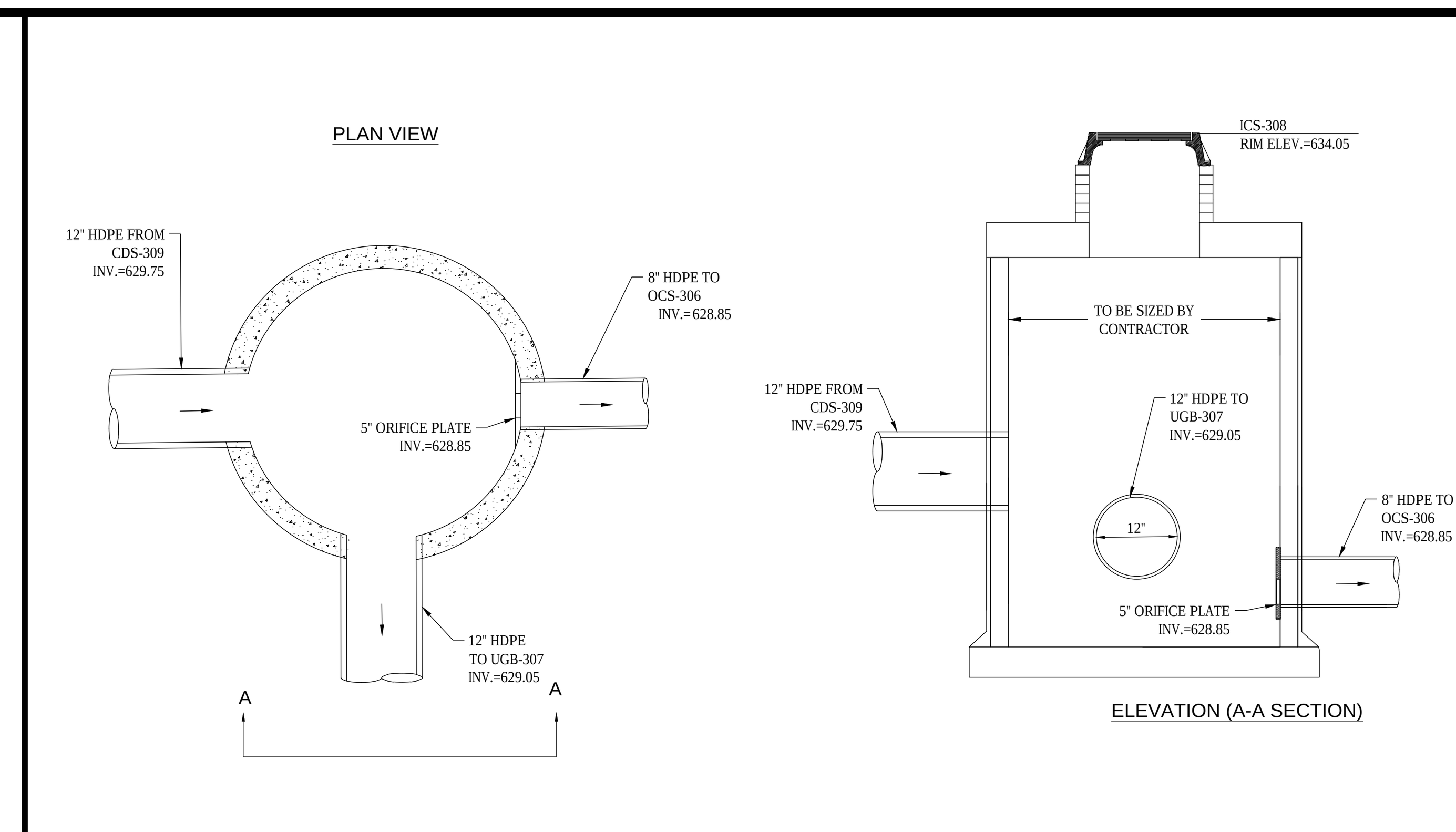
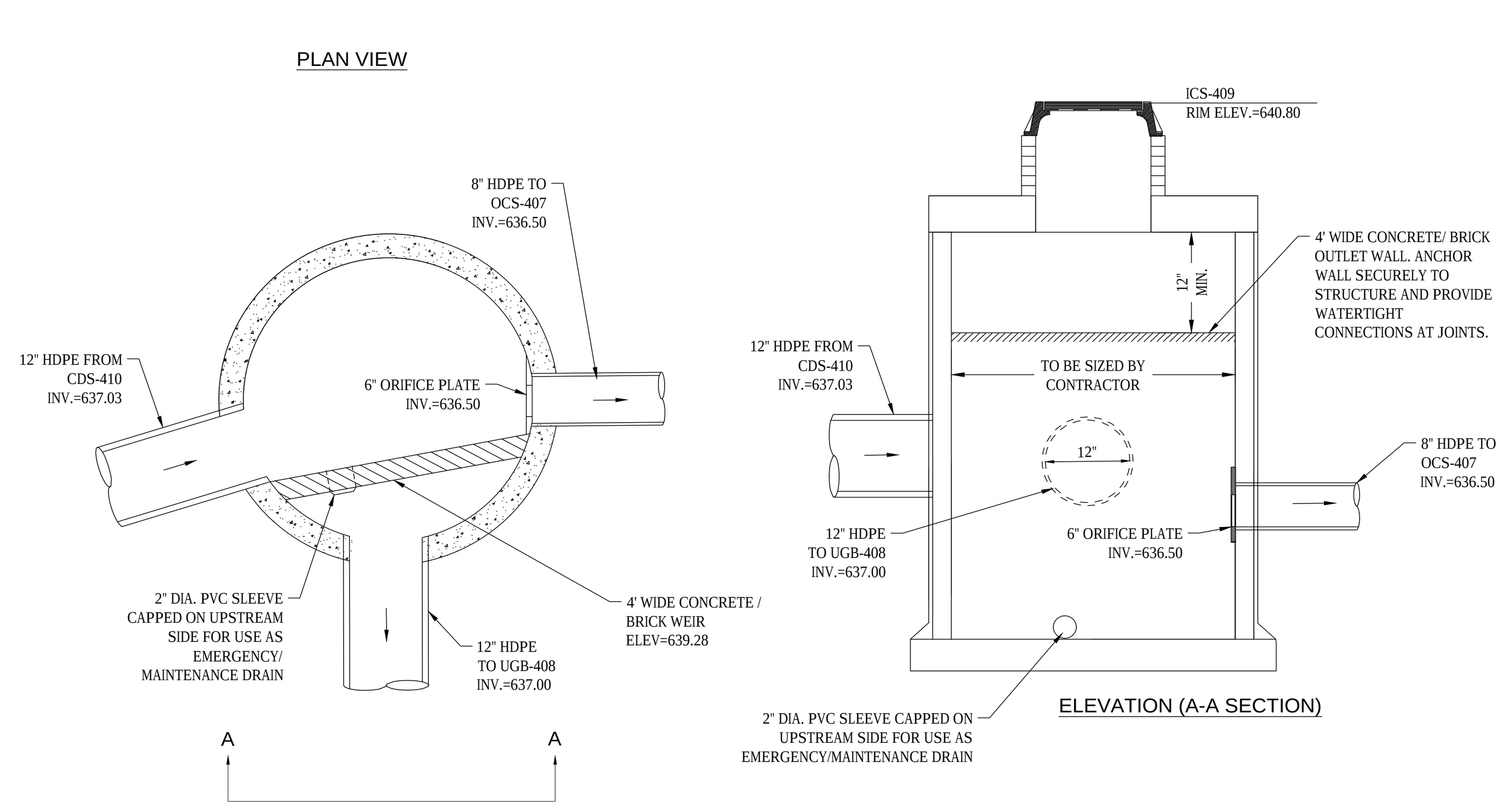


INLET CONTROL STRUCTURE (ICS-308)

N.T.S.



INLET CONTROL STRUCTURE (ICS-409)

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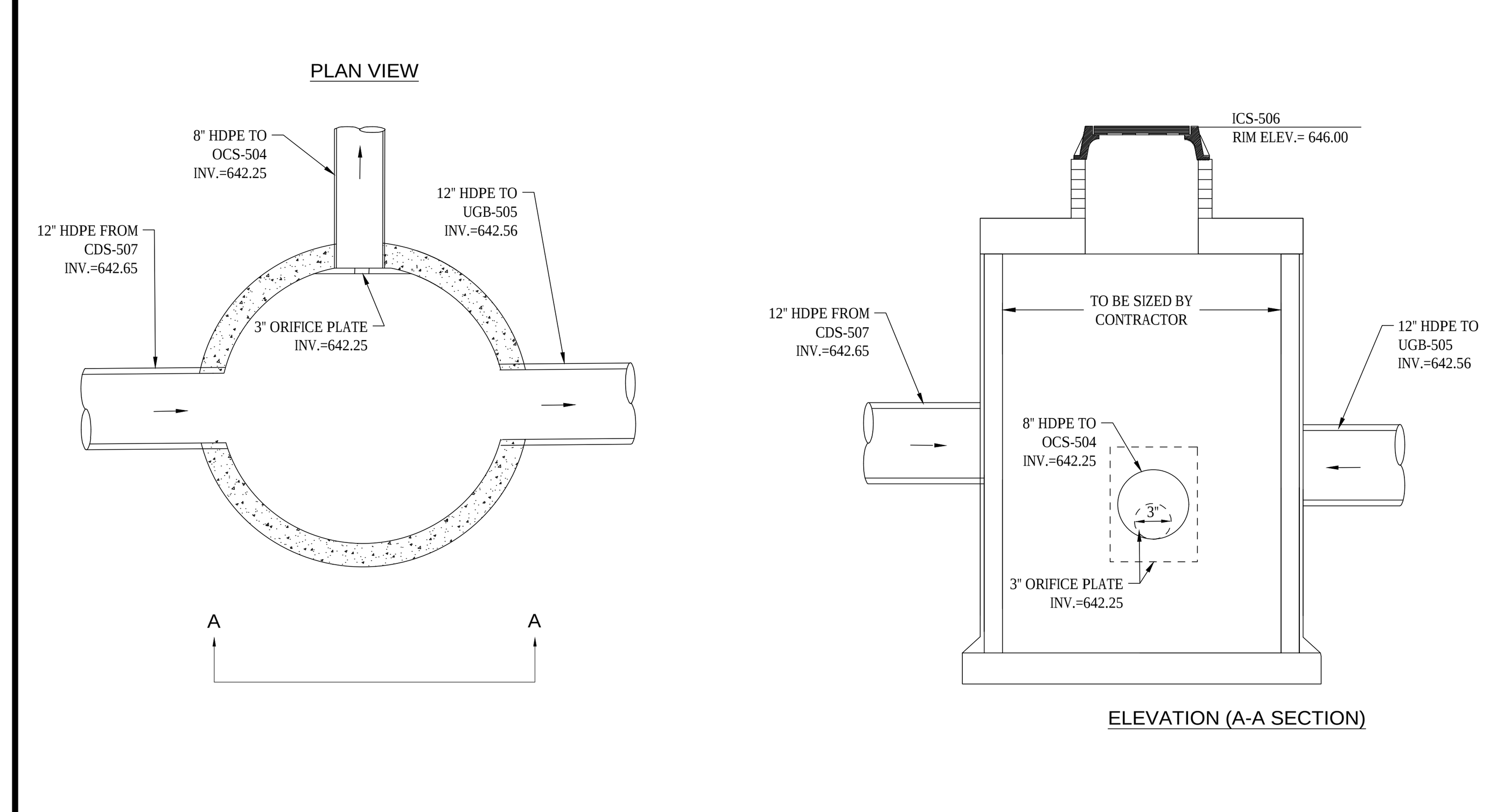
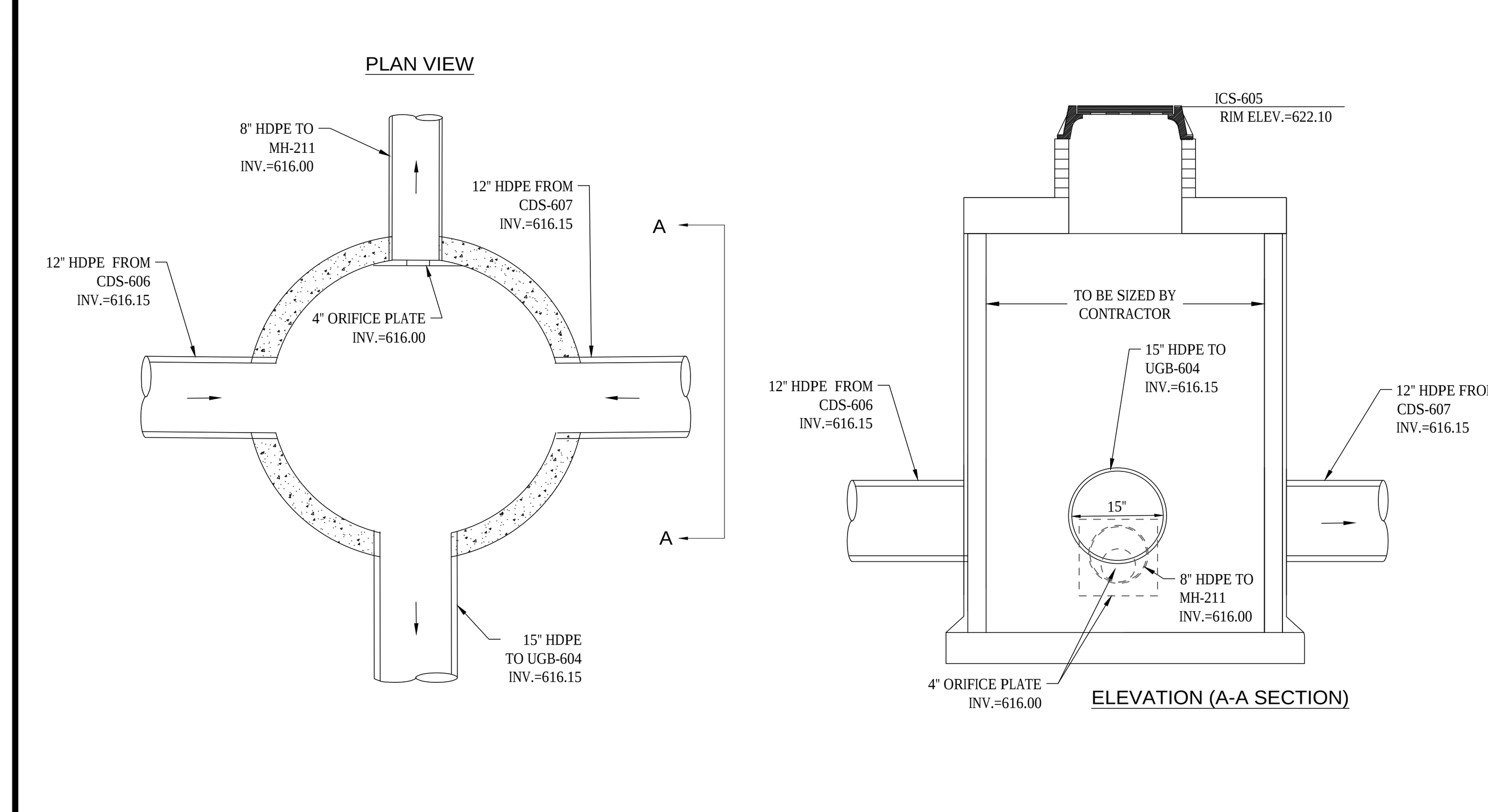


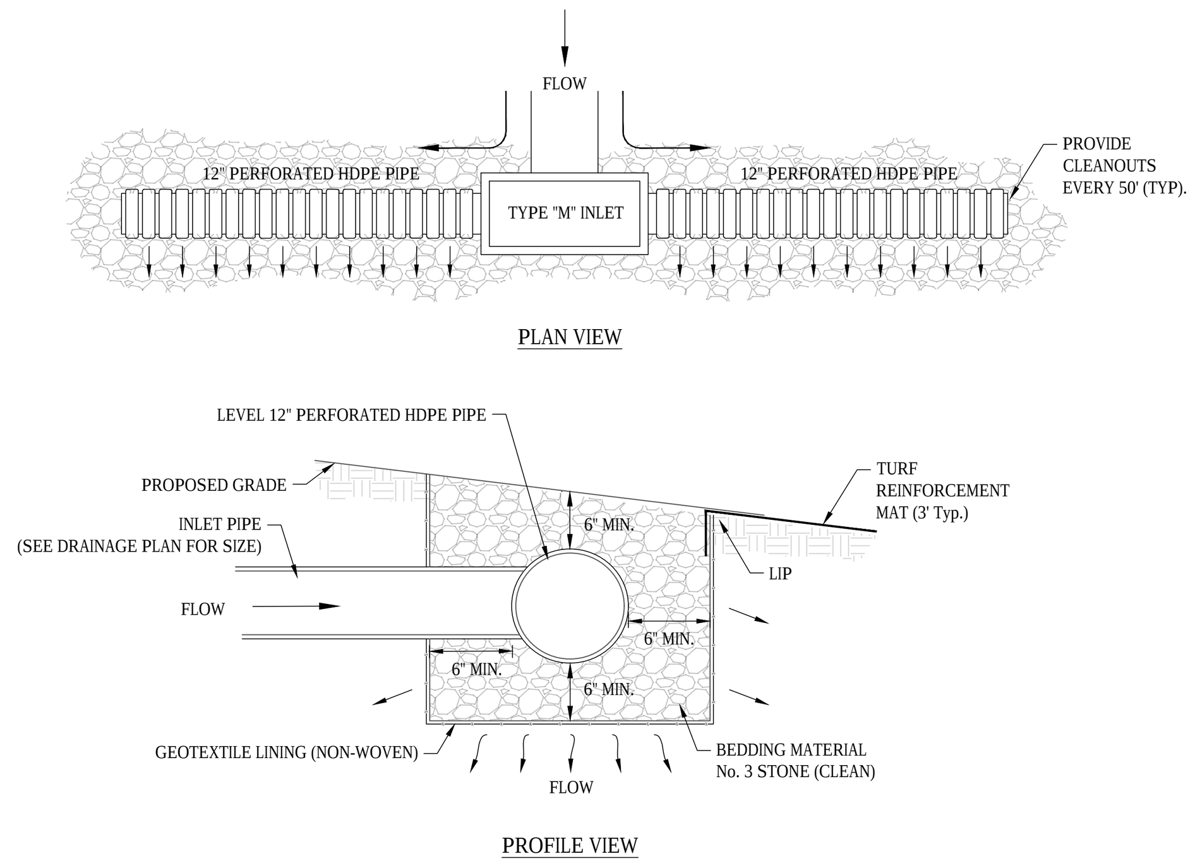
INLET CONTROL STRUCTURE (ICS-506)

N.T.S.



INLET CONTROL STRUCTURE (ICS-605)

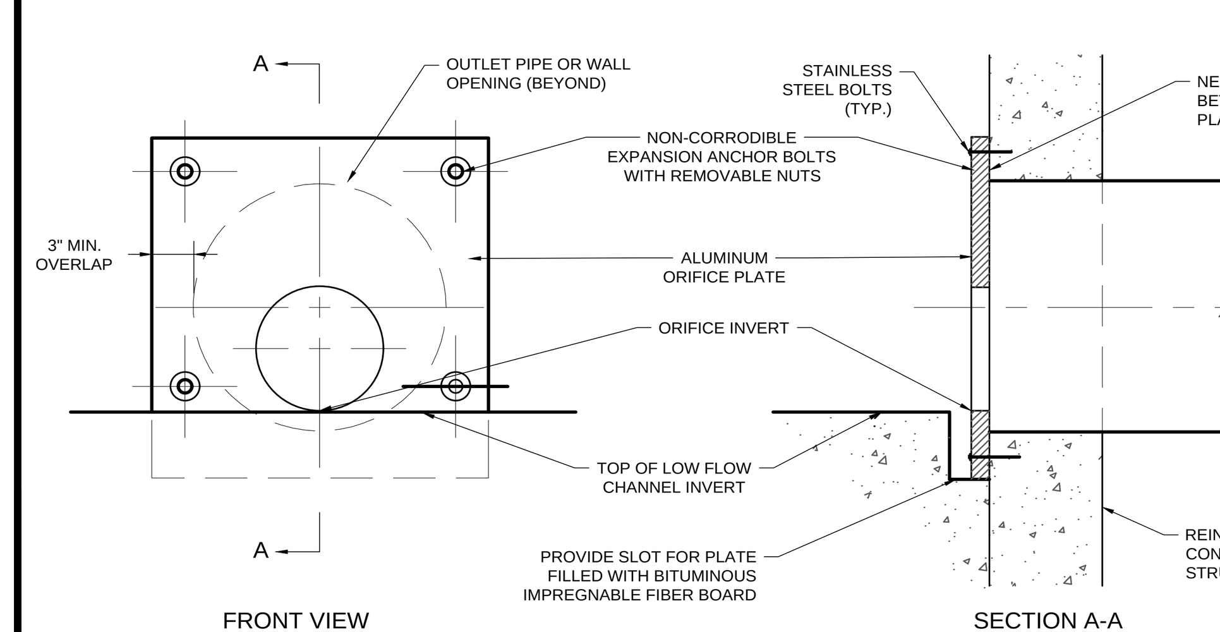
N.T.S.



NOTES:
1. INSTALL PERFORATED PIPE LEVEL INTO EXISTING GRADE. LIP MUST BE LEVEL. A RIGID LIP MAY BE UTILIZED, AS APPROPRIATE, TO ENSURE A LEVEL LIP IS MAINTAINED.
2. TURF REINFORCEMENT MAT SHOULD BE INSTALLED FOR 3' DOWN SLOPE OF LIP.
3. PERFORATED PIPES SHOULD INCLUDE END TREATMENTS CONSISTING OF CLEAN-OUTS OR TYPE M INLETS FOR MAINTENANCE.
4. SELECT NON-WOVEN GEOTEXTILE LINING BASED ON SOIL TYPE.

PERFORATED PIPE LEVEL SPREADER

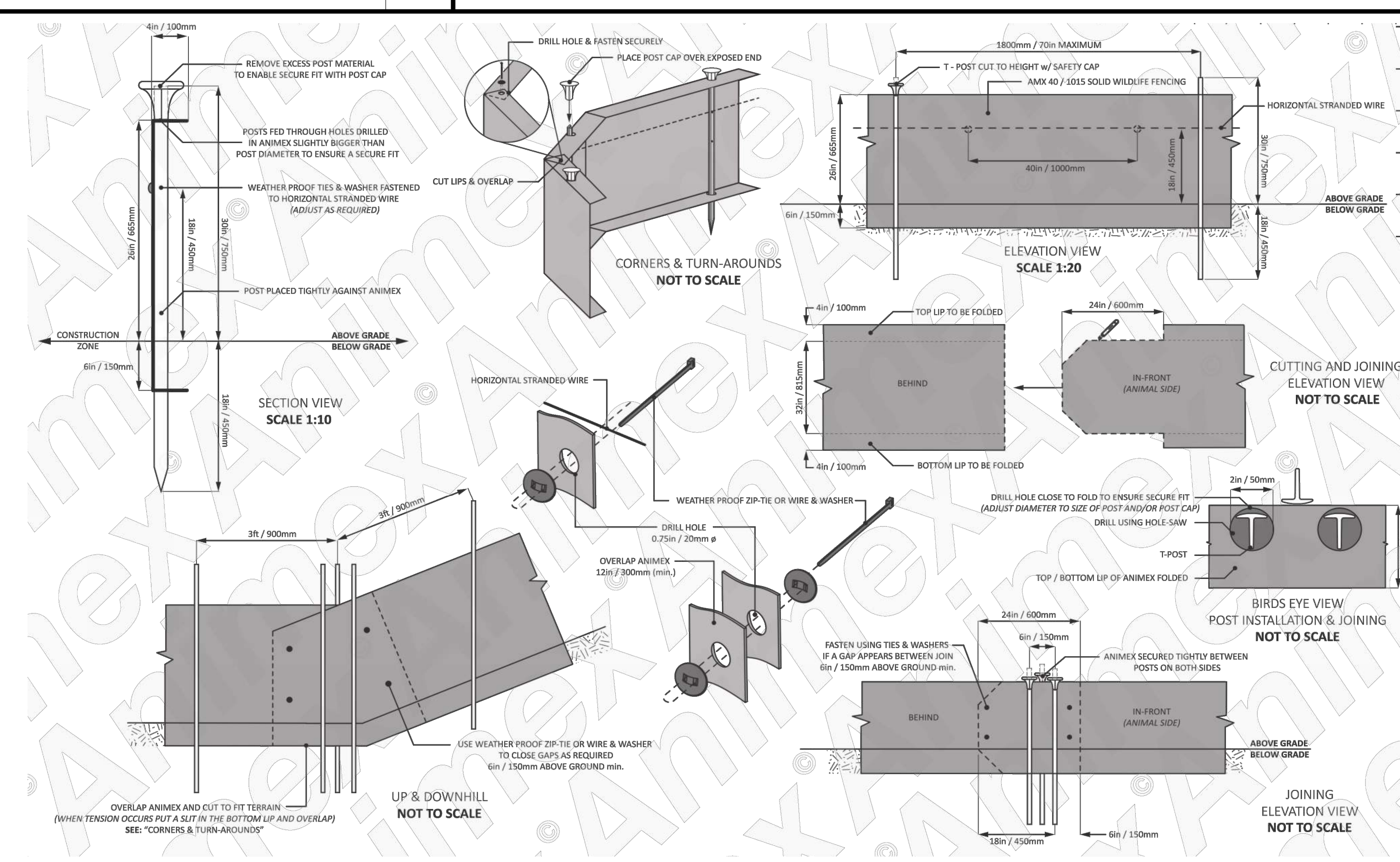
N.T.S.



NOTES:
1. PLATES GENERALLY NOT REQUIRED FOR ORIFICE DIAMETERS OR WEIR WIDTH GREATER THAN 12"
2. ALTERNATIVE MATERIALS MAY BE UTILIZED AS APPROVED BY ENGINEER OF RECORD PRIOR TO FABRICATION

ORIFICE PLATE DETAIL

N.T.S.



VERTICAL AMPHIBIAN BARRIER
AMX 40 / 1015 WILD LIFE FENCE

N.T.S.

BOHLER //

SITE CIVIL AND CONSULTING ENGINEERING
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REVISIONS

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PERMIT SET

PROJECT No.:	CT181007
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CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
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PROFESSIONAL ENGINEER

SHEET TITLE:

CONSTRUCTION DETAIL SHEET

SHEET NUMBER:

24
OF 25

REV 1 - 02/06/2020

GENERAL NOTES

CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THE NOTES AND SPECIFICATIONS CONTAINED HEREIN. CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL SUBCONTRACTORS FULLY AND COMPLETELY CONFORM TO AND COMPLY WITH THESE REQUIREMENTS.

1. THE FOLLOWING DOCUMENTS ARE INCORPORATED BY REFERENCE AS PART OF THIS SITE PLAN:
   - "BOUNDARY & TOPOGRAPHIC SURVEY PROPERTIES OF DDS ASSOCIATES LLC AND BENJAMIN BROWN", PREPARED BY CONTROL POINT ASSOCIATES, DATED 08/24/18, REVISED 10/18/18.
   - "ARCHITECTURAL CONCEPTUAL SITE PLAN" - PREPARED BY NILES BOLTON ASSOCIATES, DATED 07/15/19.
   - "PRELIMINARY GEOTECHNICAL INVESTIGATION", PREPARED BY WHITESTONE ASSOCIATES, DATED 12/06/18.
   - "SUPPLEMENTAL GEOTECHNICAL INVESTIGATION, ROCK PROBE SUMMARY", PREPARED BY WHITESTONE ASSOCIATES, DATED 01/08/19.
   - "PRELIMINARY STORMWATER MANAGEMENT AREA EVALUATION", PREPARED BY WHITESTONE ASSOCIATES, DATED 11/21/19.
   - "SUPPLEMENTAL STORMWATER MANAGEMENT AREA EVALUATION", PREPARED BY WHITESTONE ASSOCIATES, DATED 12/24/19.

   PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST VERIFY THAT HE/SHE HAS THE LATEST EDITION OF THE DOCUMENTS REFERENCED ABOVE. THIS IS CONTRACTOR'S RESPONSIBILITY.
2. ALL ACCESSIBLE (A/K/A ADA) PARKING SPACES MUST BE CONSTRUCTED TO MEET, AT A MINIMUM, THE MORE STRINGENT OF THE REQUIREMENTS OF THE "AMERICANS WITH DISABILITIES ACT" (ADA) CODE (42 U.S.C. § 12101 et seq. AND 42 U.S.C. § 4151 et seq.) OR THE REQUIREMENTS OF THE JURISDICTION WHERE THE PROJECT IS TO BE CONSTRUCTED, AND ANY AND ALL AMENDMENTS TO BOTH WHICH ARE IN EFFECT WHEN THESE PLANS ARE COMPLETED.
3. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED THE COMMENTS TO ALL PLANS AND OTHER DOCUMENTS REVIEWED AND APPROVED BY THE PERMITTING AUTHORITIES AND CONFIRMED THAT ALL NECESSARY OR REQUIRED PERMITS HAVE BEEN OBTAINED. CONTRACTOR MUST HAVE COPIES OF ALL PERMITS AND APPROVALS ON SITE AT ALL TIMES.
4. THE OWNER/CONTRACTOR MUST BE FAMILIAR WITH AND RESPONSIBLE FOR THE PROCUREMENT OF ANY AND ALL CERTIFICATIONS REQUIRED FOR THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
5. ALL WORK MUST BE PERFORMED IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS AND CONDITIONS OF APPROVAL, AND ALL APPLICABLE REQUIREMENTS, RULES, REGULATIONS, STATUTORY REQUIREMENTS, CODES, LAWS AND STANDARDS OF ALL GOVERNMENTAL ENTITIES WITH JURISDICTION OVER THIS PROJECT.
6. THE GEOTECHNICAL REPORT AND RECOMMENDATIONS SET FORTH HEREIN ARE A PART OF THE REQUIRED CONSTRUCTION DOCUMENTS AND, IN CASE OF CONFLICT, DISCREPANCY OR AMBIGUITY, THE MORE STRINGENT REQUIREMENTS AND/OR RECOMMENDATIONS CONTAINED IN THE PLANS AND THE GEOTECHNICAL REPORT AND RECOMMENDATIONS SHALL TAKE PRECEDENCE UNLESS SPECIFICALLY NOTED OTHERWISE ON THE PLANS. THE CONTRACTOR MUST NOTIFY THE ENGINEER, IN WRITING, OF ANY SUCH CONFLICT, DISCREPANCY OR AMBIGUITY BETWEEN THE GEOTECHNICAL REPORTS AND PLANS AND SPECIFICATIONS PRIOR TO PROCEEDING WITH ANY FURTHER WORK.
7. THESE PLANS ARE BASED ON INFORMATION PROVIDED TO BOHLER ENGINEERING BY THE OWNER AND OTHERS PRIOR TO THE TIME OF PLAN PREPARATION. CONTRACTOR MUST FIELD VERIFY EXISTING CONDITIONS AND NOTIFY BOHLER ENGINEERING, IN WRITING, IMMEDIATELY IF ACTUAL SITE CONDITIONS DIFFER FROM THOSE SHOWN ON THE PLAN, OR IF THE PROPOSED WORK CONFLICTS WITH ANY OTHER SITE FEATURES.
8. ALL DIMENSIONS SHOWN ON THE PLANS MUST BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR MUST NOTIFY ENGINEER, IN WRITING, IF ANY CONFLICTS, DISCREPANCIES, OR AMBIGUITIES EXIST PRIOR TO PROCEEDING WITH CONSTRUCTION. NO EXTRA COMPENSATION WILL BE PAID TO THE CONTRACTOR FOR WORK WHICH HAS TO BE REDONE OR REPAIRED DUE TO DIMENSIONS OR GRADES SHOWN INCORRECTLY ON THESE PLANS PRIOR TO CONTRACTOR GIVING ENGINEER WRITTEN NOTIFICATION OF SAME AND ENGINEER, THEREAFTER, PROVIDING CONTRACTOR WITH WRITTEN AUTHORIZATION TO PROCEED WITH SUCH ADDITIONAL WORK.
9. CONTRACTOR MUST REFER TO THE ARCHITECTURAL/BUILDING PLANS "OF RECORD" FOR EXACT LOCATIONS AND DIMENSIONS OF ENTRY/EXIT POINTS, ELEVATIONS, PRECISE BUILDING DIMENSIONS, AND EXACT BUILDING UTILITY LOCATIONS.
10. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST COORDINATE THE BUILDING LAYOUT BY CAREFUL REVIEW OF THE ENTIRE SITE PLAN AND THE LATEST ARCHITECTURAL PLANS (INCLUDING, BUT NOT LIMITED TO, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND FIRE SUPPRESSION PLAN, WHERE APPLICABLE). CONTRACTOR MUST IMMEDIATELY NOTIFY OWNER, ARCHITECT AND SITE ENGINEER, IN WRITING, OF ANY CONFLICTS, DISCREPANCIES OR AMBIGUITIES WHICH EXIST.
11. DEBRIS MUST NOT BE BURIED ON THE SUBJECT SITE AND ALL UNSUITABLE EXCAVATED MATERIAL AND DEBRIS (SOLID WASTE) MUST BE DISPOSED OF IN ACCORDANCE WITH THE REQUIREMENTS OF ANY AND ALL GOVERNMENTAL AUTHORITIES WHICH HAVE JURISDICTION OVER THIS PROJECT OR OVER CONTRACTOR.
12. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING WHEN SHORING IS REQUIRED AND FOR INSTALLING ALL SHORING REQUIRED DURING EXCAVATION (TO BE PERFORMED IN ACCORDANCE WITH CURRENT OSHA STANDARDS) AND ANY ADDITIONAL PRECAUTIONS TO BE TAKEN TO ASSURE THE STABILITY OF ADJACENT, NEARBY AND CONTIGUOUS STRUCTURES AND PROPERTIES.
13. THE CONTRACTOR IS TO EXERCISE EXTREME CARE WHEN PERFORMING ANY WORK ACTIVITIES ADJACENT TO PAVEMENT, STRUCTURES, ETC. WHICH ARE TO REMAIN EITHER FOR AN INITIAL PHASE OF THE PROJECT OR AS PART OF THE FINAL CONDITION. CONTRACTOR IS RESPONSIBLE FOR TAKING ALL APPROPRIATE MEASURES REQUIRED TO ENSURE THE STRUCTURAL STABILITY OF SIDEWALKS AND PAVEMENT, UTILITIES, BUILDINGS, AND INFRASTRUCTURE WHICH ARE TO REMAIN, AND TO PROVIDE A SAFE WORK AREA FOR THIRD PARTIES, PEDESTRIANS AND ANYONE INVOLVED WITH THE PROJECT.
14. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE DONE TO ANY NEW OR EXISTING CONSTRUCTION OR PROPERTY DURING THE COURSE OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO DRAINAGE, UTILITIES, PAVEMENT, STRIPING, CURB, ETC. AND SHALL BEAR ALL COSTS ASSOCIATED WITH SAME TO INCLUDE, BUT NOT BE LIMITED TO, REDESIGN, RE-SURVEY, RE-PERMITTING AND CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR AND MUST REPLACE ALL SIGNAL INTERCONNECTION CABLE, WIRING CONDUITS, AND ANY UNDERGROUND ACCESSORY EQUIPMENT DAMAGED DURING CONSTRUCTION AND MUST BEAR ALL COSTS ASSOCIATED WITH SAME. THE REPAIR OF ANY SUCH NEW OR EXISTING CONSTRUCTION OR PROPERTY MUST RESTORE SUCH CONSTRUCTION OR PROPERTY TO A CONDITION EQUIVALENT TO OR BETTER THAN THE CONDITIONS PRIOR TO COMMENCEMENT OF THE CONSTRUCTION, AND IN CONFORMANCE WITH APPLICABLE CODES, LAWS RULES, REGULATIONS, STATUTORY REQUIREMENTS AND STATUTES. CONTRACTOR MUST BEAR ALL COSTS ASSOCIATED WITH SAME. CONTRACTOR IS RESPONSIBLE TO DOCUMENT ALL EXISTING DAMAGE AND TO NOTIFY THE OWNER AND THE CONSTRUCTION MANAGER PRIOR TO THE START OF CONSTRUCTION.
15. ALL CONCRETE MUST BE AIR ENTRAINED AND HAVE THE MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS UNLESS OTHERWISE NOTED ON THE PLANS, DETAILS AND/OR GEOTECHNICAL REPORT.
16. THE ENGINEER IS NOT RESPONSIBLE FOR CONSTRUCTION METHODS, MEANS, TECHNIQUES OR PROCEDURES, GENERALLY OR FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES OR PROCEDURES FOR COMPLETION OF THE WORK DEPICTED BOTH ON THESE PLANS, AND FOR ANY CONFLICTS/SCOPE REVISIONS WHICH RESULT FROM SAME. CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE METHODS/MEANS FOR COMPLETION OF THE WORK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
17. THE ENGINEER OF RECORD IS NOT RESPONSIBLE FOR JOB SITE SAFETY. THE ENGINEER OF RECORD HAS NOT BEEN RETAINED TO PERFORM OR BE RESPONSIBLE FOR JOB SITE SAFETY, SAME BEING WHOLLY OUTSIDE OF ENGINEER'S SERVICES AS RELATED TO THE PROJECT. THE ENGINEER OF RECORD IS NOT RESPONSIBLE TO IDENTIFY OR REPORT ANY JOB SITE SAFETY ISSUES, AT ANY TIME.
18. ALL CONTRACTORS MUST CARRY THE SPECIFIED STATUTORY WORKER'S COMPENSATION INSURANCE, EMPLOYER'S LIABILITY INSURANCE AND LIMITS OF COMMERCIAL GENERAL LIABILITY INSURANCE (CGL). ALL CONTRACTORS MUST HAVE THEIR CGL POLICIES ENDORSED TO NAME BOHLER ENGINEERING, AND ITS PAST, PRESENT AND FUTURE OWNERS, OFFICERS, DIRECTORS, PARTNERS, SHAREHOLDERS, MEMBERS, PRINCIPALS, COMMISSIONERS, AGENTS, SERVANTS, EMPLOYEES, AFFILIATES, SUBSIDIARIES, AND RELATED ENTITIES, AND ITS SUBCONTRACTORS AND SUBCONSULTANTS AS ADDITIONAL NAMED INSURED AND TO PROVIDE CONTRACTUAL LIABILITY COVERAGE SUFFICIENT TO INSURE THIS HOLD HARMLESS AND INDEMNITY OBLIGATIONS ASSUMED BY THE CONTRACTORS. ALL CONTRACTORS MUST FURNISH BOHLER ENGINEERING WITH CERTIFICATIONS OF INSURANCE AS EVIDENCE OF THE REQUIRED INSURANCE PRIOR TO COMMENCING WORK AND UPON RENEWAL OF EACH POLICY DURING THE ENTIRE PERIOD OF CONSTRUCTION AND FOR ONE YEAR AFTER THE COMPLETION OF CONSTRUCTION. IN ADDITION, ALL CONTRACTORS WILL, TO THE FULLEST EXTENT PERMITTED UNDER THE LAW, INDEMNIFY, DEFEND AND HOLD HARMLESS BOHLER ENGINEERING AND ITS PAST, PRESENT AND FUTURE OWNERS, OFFICERS, DIRECTORS, PARTNERS, SHAREHOLDERS, MEMBERS, PRINCIPALS, COMMISSIONERS, AGENTS, SERVANTS, EMPLOYEES, AFFILIATES, SUBSIDIARIES, AND RELATED ENTITIES, AND ITS SUBCONTRACTORS AND SUBCONSULTANTS FROM AND AGAINST ANY DAMAGES, INJURIES, CLAIMS, ACTIONS, PENALTIES, EXPENSES, PUNITIVE DAMAGES, TORT DAMAGES, STATUTORY CLAIMS, STATUTORY CAUSES OF ACTION, LOSSES, CAUSES OF ACTION, LIABILITIES OR COSTS, INCLUDING, BUT NOT LIMITED TO, REASONABLE ATTORNEYS' FEES AND DEFENSE COSTS, ARISING OUT OF OR IN ANY WAY CONNECTED WITH OR TO THE PROJECT, INCLUDING ALL CLAIMS BY EMPLOYEES OF THE CONTRACTORS, ALL CLAIMS BY THIRD PARTIES AND ALL CLAIMS RELATED TO THE PROJECT. CONTRACTOR MUST NOTIFY ENGINEER, IN WRITING, AT LEAST THIRTY (30) DAYS PRIOR TO ANY TERMINATION, SUSPENSION OR CHANGE OF ITS INSURANCE HEREUNDER.
19. BOHLER ENGINEERING WILL REVIEW OR TAKE OTHER APPROPRIATE ACTION ON THE CONTRACTOR SUBMITTALS, SUCH AS SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND OTHER DATA, WHICH THE CONTRACTOR IS REQUIRED TO SUBMIT, BUT ONLY FOR THE LIMITED PURPOSE OF CHECKING FOR CONFORMANCE WITH THE DESIGN INTENT AND THE INFORMATION SHOWN IN THE CONSTRUCTION CONTRACT DOCUMENTS. CONSTRUCTION MEANS AND/OR METHODS AND/OR TECHNIQUES OR PROCEDURES, COORDINATION OF THE WORK WITH OTHER TRADES, AND CONSTRUCTION SAFETY PRECAUTIONS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND BOHLER HAS NO RESPONSIBILITY OR LIABILITY FOR SAME HEREUNDER. BOHLER ENGINEERING'S SHOP DRAWING REVIEW WILL BE CONDUCTED WITH REASONABLE PROMPTNESS WHILE ALLOWING SUFFICIENT TIME TO PERMIT ADEQUATE REVIEW. REVIEW OF A SPECIFIC ITEM MUST NOT INDICATE THAT BOHLER ENGINEERING HAS REVIEWED THE ENTIRE ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. BOHLER ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY DEVIATIONS FROM THE CONSTRUCTION DOCUMENTS NOT PROMPTLY AND IMMEDIATELY BROUGHT TO ITS ATTENTION, IN WRITING, BY THE CONTRACTOR. BOHLER ENGINEERING WILL NOT BE REQUIRED TO REVIEW PARTIAL SUBMISSIONS OR THOSE FOR WHICH SUBMISSIONS OF CORRELATED ITEMS HAVE NOT BEEN RECEIVED.
20. NEITHER THE PROFESSIONAL ACTIVITIES OF BOHLER ENGINEERING, NOR THE PRESENCE OF BOHLER ENGINEERING AND/OR ITS PAST, PRESENT AND FUTURE OWNERS, OFFICERS, DIRECTORS, PARTNERS, SHAREHOLDERS, MEMBERS, PRINCIPALS, COMMISSIONERS, AGENTS, SERVANTS, EMPLOYEES, AFFILIATES, SUBSIDIARIES, AND RELATED ENTITIES, AND ITS SUBCONTRACTORS AND SUBCONSULTANTS AT A CONSTRUCTION/PROJECT SITE, SHALL RELIEVE THE GENERAL CONTRACTOR OF ITS OBLIGATIONS, DUTIES AND RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, OVERSEEING, SUPERINTENDING AND COORDINATING THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND COMPLIANCE WITH ANY HEALTH OR SAFETY PRECAUTIONS REQUIRED BY ANY REGULATORY AGENCIES WITH JURISDICTION OVER THE PROJECT AND/OR PROPERTY. BOHLER ENGINEERING AND ITS PERSONNEL HAVE NO AUTHORITY TO EXERCISE ANY CONTROL OVER ANY CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES IN CONNECTION WITH THEIR WORK OR ANY HEALTH OR SAFETY PROGRAMS OR PROCEDURES. THE GENERAL CONTRACTOR IS SOLELY RESPONSIBLE FOR JOB SITE SAFETY. BOHLER ENGINEERING SHALL BE INDEMNIFIED BY THE GENERAL CONTRACTOR AND MUST BE NAMED AN ADDITIONAL INSURED UNDER THE GENERAL CONTRACTOR'S POLICIES OF GENERAL LIABILITY INSURANCE AS DESCRIBED ABOVE IN NOTE 19 FOR JOB SITE SAFETY.
21. IF THE CONTRACTOR DEVIATES FROM THE PLANS AND SPECIFICATIONS, INCLUDING THE NOTES CONTAINED HEREIN, WITHOUT FIRST OBTAINING THE PRIOR WRITTEN AUTHORIZATION OF THE ENGINEER FOR SUCH DEVIATIONS, THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE PAYMENT OF ALL COSTS INCURRED IN CORRECTING ANY WORK DONE WHICH DEVIATES FROM THE PLANS, ALL FINES AND/OR PENALTIES ASSESSED WITH RESPECT THERETO AND ALL COMPENSATORY OR PUNITIVE DAMAGES RESULTING THEREFROM AND, FURTHER, SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS THE ENGINEER, TO THE FULLEST EXTENT PERMITTED UNDER THE LAW, IN ACCORDANCE WITH PARAGRAPH 19 HEREIN, FOR AND FROM ALL FEES, ATTORNEYS' FEES, DAMAGES, COSTS, JUDGMENTS, PENALTIES AND THE LIKE RELATED TO SAME.
22. CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE AND PROTECTION OF TRAFFIC PLAN FOR ALL WORK THAT AFFECTS PUBLIC TRAVEL EITHER IN THE R.O.W. OR ON SITE. THE COST FOR THIS ITEM MUST BE INCLUDED IN THE CONTRACTOR'S PRICE.
23. ALL SIGNING AND PAVEMENT STRIPING MUST CONFORM TO MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES OR LOCALLY APPROVED SUPPLEMENT.
24. ENGINEER IS NOT RESPONSIBLE FOR ANY INJURY OR DAMAGES RESULTING FROM CONTRACTOR'S FAILURE TO BUILD OR CONSTRUCT IN STRICT ACCORDANCE WITH THE APPROVED PLANS. IF CONTRACTOR AND/OR OWNER FAIL TO BUILD OR CONSTRUCT IN STRICT ACCORDANCE WITH APPROVED PLANS, THEY AGREE TO JOINTLY AND SEVERALLY INDEMNIFY AND HOLD ENGINEER HARMLESS FOR ALL INJURIES AND DAMAGES THAT ENGINEER SUFFERS AND COSTS THAT ENGINEER INCURS.
25. OWNER MUST MAINTAIN AND PRESERVE ALL PHYSICAL SITE FEATURES AND DESIGN FEATURES DEPICTED ON THE PLANS AND RELATED DOCUMENTS, IN STRICT ACCORDANCE WITH THE APPROVED PLAN(S) AND DESIGN AND, FURTHER ENGINEER IS NOT RESPONSIBLE FOR ANY FAILURE TO SO MAINTAIN OR PRESERVE SITE AND/OR DESIGN FEATURES. IF OWNER FAILS TO MAINTAIN AND/OR PRESERVE ALL PHYSICAL SITE FEATURES AND/OR DESIGN FEATURES DEPICTED ON THE PLANS AND RELATED DOCUMENTS, OWNER AGREES TO INDEMNIFY AND HOLD ENGINEER HARMLESS FOR ALL INJURIES AND DAMAGES THAT ENGINEER SUFFERS AND COSTS THAT ENGINEER INCURS AS A RESULT OF SAID FAILURE.
26. ALL DIMENSIONS MUST BE TO FACE OF CURB, EDGE OF PAVEMENT, OR EDGE OF BUILDING, UNLESS NOTED OTHERWISE.
27. ALL CONSTRUCTION AND MATERIALS MUST COMPLY WITH AND CONFORM TO APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, LAWS, ORDINANCES, RULES AND CODES, AND ALL APPLICABLE OSHA REQUIREMENTS.
28. CONTRACTOR AND OWNER MUST INSTALL ALL ELEMENTS AND COMPONENTS IN STRICT COMPLIANCE WITH AND ACCORDANCE WITH MANUFACTURER'S STANDARDS AND RECOMMENDED INSTALLATION CRITERIA AND SPECIFICATIONS. IF CONTRACTOR AND/OR OWNER FAIL TO DO SO, THEY AGREE TO JOINTLY AND SEVERALLY INDEMNIFY AND HOLD ENGINEER HARMLESS FOR ALL INJURIES AND DAMAGES THAT ENGINEER SUFFERS AND COSTS THAT ENGINEER INCURS AS A RESULT OF SAID FAILURE.
29. CONTRACTOR IS RESPONSIBLE TO MAINTAIN ON-SITE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IN COMPLIANCE WITH EPA REQUIREMENTS FOR SITES WHERE ONE (1) ACRE OR MORE (UNLESS THE LOCAL JURISDICTION REQUIRES FEWER) IS DISTURBED BY CONSTRUCTION ACTIVITIES. CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL ACTIVITIES, INCLUDING THOSE OF SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE SWPPP, INCLUDING BUT NOT LIMITED TO LOGGING ACTIVITIES (MINIMUM ONCE PER WEEK AND AFTER RAINFALL EVENTS) AND CORRECTIVE MEASURES, AS APPROPRIATE.
30. AS CONTAINED IN THESE DRAWINGS AND ASSOCIATED APPLICATION DOCUMENTS PREPARED BY THE SIGNATORY PROFESSIONAL ENGINEER, THE USE OF THE WORDS CERTIFY OR CERTIFICATION CONSTITUTES AN EXPRESSION OF "PROFESSIONAL OPINION" REGARDING THE INFORMATION WHICH IS THE SUBJECT OF THE UNDERSIGNED PROFESSIONAL'S KNOWLEDGE OR BELIEF AND IN ACCORDANCE WITH COMMON ACCEPTED PROCEDURE CONSISTENT WITH THE APPLICABLE STANDARDS OF PRACTICE, AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTEE, EITHER EXPRESSED OR IMPLIED.

GENERAL GRADING & UTILITY PLAN NOTES

1. LOCATIONS OF ALL EXISTING AND PROPOSED SERVICES ARE APPROXIMATE AND MUST BE INDEPENDENTLY CONFIRMED WITH LOCAL UTILITY COMPANIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION OR EXCAVATION. SANITARY SEWER AND ALL OTHER UTILITY SERVICE CONNECTION POINTS MUST BE INDEPENDENTLY CONFIRMED BY THE CONTRACTOR IN THE FIELD PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ALL DISCREPANCIES MUST IMMEDIATELY BE REPORTED, IN WRITING, TO THE ENGINEER. CONSTRUCTION MUST COMMENCE BEGINNING AT THE LOWEST INVERT (POINT OF CONNECTION) AND PROGRESS UP GRADIENT. PROPOSED INTERFACE POINTS (CROSSINGS) WITH EXISTING UNDERGROUND UTILITIES SHALL BE FIELD VERIFIED BY TEST PIT PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. CONTRACTOR MUST VERTICALLY AND HORIZONTALLY LOCATE ALL UTILITIES AND SERVICES INCLUDING, BUT NOT LIMITED TO, GAS, WATER, ELECTRIC, SANITARY AND STORM SEWER, TELEPHONE, CABLE, FIBER OPTIC CABLE, ETC. WITHIN THE LIMITS OF DISTURBANCE OR WORK SPACE, WHICHEVER IS GREATER. THE CONTRACTOR MUST USE, REFER TO, AND COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY NOTIFICATION SYSTEM TO LOCATE ALL THE UNDERGROUND UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ALL DAMAGE TO ANY EXISTING UTILITIES DURING CONSTRUCTION, AT NO COST TO THE OWNER. CONTRACTOR SHALL BEAR ALL COSTS ASSOCIATED WITH DAMAGE TO ANY EXISTING UTILITIES DURING CONSTRUCTION.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW ALL CONSTRUCTION CONTRACT DOCUMENTS INCLUDING, BUT NOT LIMITED TO, ALL OF THE DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE INITIATION AND COMMENCEMENT OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT AND/OR DISCREPANCY BETWEEN THE DOCUMENTS RELATIVE TO THE SPECIFICATIONS OR THE RELATIVE OR APPLICABLE CODES, REGULATIONS, LAWS, RULES, STATUTES AND/OR ORDINANCES, IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO NOTIFY THE PROJECT ENGINEER OF RECORD, IN WRITING, OF SAID CONFLICT AND/OR DISCREPANCY PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR'S FAILURE TO NOTIFY THE PROJECT ENGINEER SHALL CONSTITUTE CONTRACTOR'S FULL AND COMPLETE ACCEPTANCE OF ALL RESPONSIBILITY TO COMPLETE THE SCOPE OF WORK AS DEFINED BY THE DRAWINGS AND IN FULL COMPLIANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS, LAWS, STATUTES, ORDINANCES AND CODES AND, FURTHER, CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH SAME.
4. THE CONTRACTOR MUST LOCATE AND CLEARLY AND UNAMBIGUOUSLY DEFINE VERTICALLY AND HORIZONTALLY ALL ACTIVE AND INACTIVE UTILITY AND/OR SERVICE SYSTEMS THAT ARE TO BE REMOVED. THE CONTRACTOR IS RESPONSIBLE TO PROTECT AND MAINTAIN ALL ACTIVE AND INACTIVE SYSTEMS THAT ARE NOT BEING REMOVED/RELOCATED DURING SITE ACTIVITY.
5. THE CONTRACTOR MUST FAMILIARIZE ITSELF WITH THE APPLICABLE UTILITY SERVICE PROVIDER REQUIREMENTS AND IS RESPONSIBLE FOR ALL COORDINATION REGARDING UTILITY DEMOLITION AS IDENTIFIED OR REQUIRED FOR THE PROJECT. THE CONTRACTOR MUST PROVIDE THE OWNER WITH WRITTEN NOTIFICATION THAT THE EXISTING UTILITIES AND SERVICES HAVE BEEN TERMINATED AND ABANDONED IN ACCORDANCE WITH THE JURISDICTION AND UTILITY COMPANY REQUIREMENTS AND ALL OTHER APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES.
6. THE CONTRACTOR MUST INSTALL ALL STORM SEWER AND SANITARY SEWER COMPONENTS WHICH FUNCTION BY GRAVITY PRIOR TO THE INSTALLATION OF ALL OTHER UTILITIES.
7. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF SITE PLAN DOCUMENTS AND ARCHITECTURAL DESIGN FOR EXACT BUILDING UTILITY CONNECTION LOCATIONS, GREASE TRAP REQUIREMENTS/DETAILS, DOOR ACCESS, AND EXTERIOR GRADING. THE ARCHITECT WILL DETERMINE THE UTILITY SERVICE SIZES. THE CONTRACTOR MUST COORDINATE INSTALLATION OF UTILITIES/SERVICES WITH THE INDIVIDUAL COMPANIES, TO AVOID CONFLICTS AND TO ENSURE THAT PROPER DEPTHS ARE ACHIEVED. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT INSTALLATION OF ALL IMPROVEMENTS COMPLIES WITH ALL UTILITY REQUIREMENTS WITH JURISDICTION AND/OR CONTROL OF THE SITE, AND ALL OTHER APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES AND, FURTHER, IS RESPONSIBLE FOR COORDINATING THE UTILITY TIE-INS/CONNECTIONS PRIOR TO CONNECTING TO THE EXISTING UTILITY/SERVICE. WHERE A CONFLICT(S) EXISTS BETWEEN THESE SITE PLANS AND THE ARCHITECTURAL PLANS, OR WHERE ARCHITECTURAL PLAN UTILITY CONNECTION POINTS DIFFER, THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE ENGINEER, IN WRITING, AND PRIOR TO CONSTRUCTION, RESOLVE SAME.
8. WATER SERVICE MATERIALS, BURIAL DEPTH, AND COVER REQUIREMENTS MUST BE SPECIFIED BY THE LOCAL UTILITY COMPANY. CONTRACTOR'S PRICE FOR WATER SERVICE MUST INCLUDE ALL FEES, COSTS AND APPURTENANCES REQUIRED BY THE UTILITY TO PROVIDE FULL AND COMPLETE WORKING SERVICE. CONTRACTOR MUST CONTACT THE APPLICABLE MUNICIPALITY TO CONFIRM THE PROPER WATER METER AND VAULT, PRIOR TO COMMENCING CONSTRUCTION.
9. ALL NEW UTILITIES/SERVICES, INCLUDING ELECTRIC, TELEPHONE, CABLE TV, ETC. ARE TO BE INSTALLED UNDERGROUND. ALL NEW UTILITIES/SERVICES MUST BE INSTALLED IN ACCORDANCE WITH THE UTILITY/SERVICE PROVIDER INSTALLATION SPECIFICATIONS AND STANDARDS.
10. SITE GRADING MUST BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT REFERENCED IN THIS PLAN SET. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING AND REPLACING UNSUITABLE MATERIALS WITH SUITABLE MATERIALS AS SPECIFIED IN THE GEOTECHNICAL REPORT. ALL EXCAVATED OR FILLED AREAS MUST BE COMPACTED AS OUTLINED IN THE GEOTECHNICAL REPORT. MOISTURE CONTENT AT TIME OF PLACEMENT MUST BE SUBMITTED IN A COMPACTION REPORT PREPARED BY A QUALIFIED GEOTECHNICAL ENGINEER, REGISTERED WITH THE STATE WHERE THE WORK IS PERFORMED, VERIFYING THAT ALL FILLED AREAS AND SUBGRADE AREAS WITHIN THE BUILDING PAD AREA AND AREAS TO BE PAVED HAVE BEEN COMPACTED IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT AND ALL APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES. SUBBASE MATERIAL FOR SIDEWALKS, CURB, OR ASPHALT MUST BE FREE OF ORGANICS AND OTHER UNSUITABLE MATERIALS. SHOULD SUBBASE BE DEEMED UNSUITABLE BY OWNER/DEVELOPER, OR OWNER/DEVELOPER'S REPRESENTATIVE, SUBBASE IS TO BE REMOVED AND FILLED WITH APPROVED FILL MATERIAL COMPACTED AS DIRECTED BY THE GEOTECHNICAL REPORT. EARTHWORK ACTIVITIES INCLUDING, BUT NOT LIMITED TO, EXCAVATION, BACKFILL, AND COMPACTING MUST COMPLY WITH THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT AND ALL APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES. EARTHWORK ACTIVITIES MUST COMPLY WITH THE STANDARD STATE DOT SPECIFICATIONS FOR ROADWAY CONSTRUCTION (LATEST EDITION) AND ANY AMENDMENTS OR REVISIONS THERETO.
11. ALL FILL, COMPACTION, AND BACKFILL MATERIALS REQUIRED FOR UTILITY INSTALLATION MUST BE AS PER THE RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL REPORT AND MUST BE COORDINATED WITH THE APPLICABLE UTILITY COMPANY SPECIFICATIONS. WHEN THE PROJECT DOES NOT HAVE GEOTECHNICAL RECOMMENDATIONS, FILL AND COMPACTION MUST, AT A MINIMUM, COMPLY WITH THE STATE DOT REQUIREMENTS AND SPECIFICATIONS AND CONSULTANT SHALL HAVE NO LIABILITY OR RESPONSIBILITY FOR OR AS RELATED TO FILL, COMPACTION AND BACKFILL. FURTHER, CONTRACTOR IS FULLY RESPONSIBLE FOR EARTHWORK BALANCE.
12. THE CONTRACTOR MUST COMPLY, TO THE FULLEST EXTENT, WITH THE LATEST OSHA STANDARDS AND REGULATIONS, AND/OR ANY OTHER AGENCY WITH JURISDICTION FOR EXCAVATION AND TRENCHING PROCEDURES. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE "MEANS AND METHODS" REQUIRED TO MEET THE INTENT AND PERFORMANCE CRITERIA OF OSHA, AS WELL AS ANY OTHER ENTITY THAT HAS JURISDICTION FOR EXCAVATION AND/OR TRENCHING PROCEDURES AND CONSULTANT SHALL HAVE NO RESPONSIBILITY FOR OR AS RELATED FOR OR AS RELATED TO EXCAVATION AND TRENCHING PROCEDURES.
13. PAVEMENT MUST BE SAW CUT IN STRAIGHT LINES, AND EXCEPT FOR EDGE OF BUTT JOINTS, MUST EXTEND TO THE FULL DEPTH OF THE EXISTING PAVEMENT. ALL DEBRIS FROM REMOVAL OPERATIONS MUST BE REMOVED FROM THE SITE AT THE TIME OF EXCAVATION. STOCKPILING OF DEBRIS WILL NOT BE PERMITTED.
14. THE TOPS OF EXISTING MANHOLES, INLET STRUCTURES, AND SANITARY CLEANOUT TOPS MUST BE ADJUSTED, AS NECESSARY, TO MATCH PROPOSED GRADES IN ACCORDANCE WITH ALL APPLICABLE STANDARDS, REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES.
15. DURING THE INSTALLATION OF SANITARY SEWER, STORM SEWER, AND ALL UTILITIES, THE CONTRACTOR MUST MAINTAIN A CONTEMPORANEOUS AND THOROUGH RECORD OF CONSTRUCTION TO IDENTIFY THE AS-INSTALLED LOCATIONS OF ALL UNDERGROUND INFRASTRUCTURE. THE CONTRACTOR MUST CAREFULLY NOTE ANY INSTALLATIONS THAT DEVIATE FROM THE INFORMATION CONTAINED IN THE UTILITY PLAN. THIS RECORD MUST BE KEPT ON A CLEAN COPY OF THE DRAINAGE OR UTILITY PLAN, WHICH CONTRACTOR MUST PROMPTLY PROVIDE TO THE OWNER AT THE COMPLETION OF WORK.
16. WHEN THE SITE IMPROVEMENT PLANS INVOLVE MULTIPLE BUILDINGS, SOME OF WHICH MAY BE BUILT AT A LATER DATE, THE CONTRACTOR MUST EXTEND ALL LINES, INCLUDING BUT NOT LIMITED TO STORM SEWER, SANITARY SEWER, UTILITIES, AND IRRIGATION LINE, TO A POINT AT LEAST FIVE (5) FEET BEYOND THE PAVED AREAS FOR WHICH THE CONTRACTOR IS RESPONSIBLE. CONTRACTOR MUST CAP ENDS AS APPROPRIATE, MARK LOCATIONS WITH A 2X4, AND MUST NOTE THE LOCATION OF ALL OF THE ABOVE ON A CLEAN COPY OF THE DRAINAGE OR UTILITY PLAN, WHICH CONTRACTOR MUST PROMPTLY PROVIDE TO THE OWNER UPON COMPLETION OF THE WORK.
17. THE CONTRACTOR IS FULLY RESPONSIBLE FOR VERIFICATION OF EXISTING TOPOGRAPHIC INFORMATION AND UTILITY INVERT ELEVATIONS PRIOR TO COMMENCING ANY CONSTRUCTION. CONTRACTOR MUST CONFIRM AND ENSURE 0.75% MINIMUM SLOPE AGAINST ALL ISLANDS, GUTTERS, AND CURBS; 1.0% ON ALL CONCRETE SURFACES; AND 1.5% MINIMUM ON ASPHALT (EXCEPT WHERE ADA REQUIREMENTS OR EXISTING TOPOGRAPHY LIMIT GRADES), TO PREVENT PONDING. CONTRACTOR MUST IMMEDIATELY IDENTIFY, IN WRITING TO THE ENGINEER, ANY DISCREPANCIES THAT MAY OR COULD AFFECT THE PUBLIC SAFETY, HEALTH OR GENERAL WELFARE, OR PROJECT COST. IF CONTRACTOR PROCEEDS WITH CONSTRUCTION WITHOUT PROVIDING PROPER NOTIFICATION, MUST BE AT THE CONTRACTOR'S OWN RISK AND, FURTHER, CONTRACTOR SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS THE DESIGN ENGINEER FOR ANY DAMAGES, COSTS, INJURIES, ATTORNEY'S FEES AND THE LIKE WHICH RESULT FROM SAME.
18. PROPOSED TOP OF CURB ELEVATIONS ARE GENERALLY 6" ABOVE EXISTING LOCAL ASPHALT GRADE UNLESS OTHERWISE NOTED. FIELD ADJUST TO CREATE A MINIMUM OF .075% GUTTER GRADE ALONG CURB FACE. IT IS CONTRACTOR'S OBLIGATION TO ENSURE THAT DESIGN ENGINEER APPROVES FINAL CURBING CUT SHEETS PRIOR TO INSTALLATION OF SAME.
19. REFER TO THIS SHEET FOR ADDITIONAL NOTES.
20. IN THE EVENT OF DISCREPANCIES AND/OR CONFLICTS BETWEEN PLANS OR RELATIVE TO OTHER PLANS, THE SITE PLAN WILL TAKE PRECEDENCE AND CONTROL. CONTRACTOR MUST IMMEDIATELY NOTIFY THE DESIGN ENGINEER, IN WRITING, OF ANY DISCREPANCIES AND/OR CONFLICTS.
21. CONTRACTOR IS REQUIRED TO SECURE ALL NECESSARY AND/OR REQUIRED PERMITS AND APPROVALS FOR ALL OFF SITE MATERIAL SOURCES AND DISPOSAL FACILITIES. CONTRACTOR MUST SUPPLY A COPY OF APPROVALS TO ENGINEER AND OWNER PRIOR TO INITIATING ANY WORK.
22. WHERE RETAINING WALLS (WHETHER OR NOT THEY MEET THE JURISDICTIONAL DEFINITION) ARE IDENTIFIED ON PLANS, ELEVATIONS IDENTIFIED ARE FOR THE EXPOSED PORTION OF THE WALL. WALL FOOTINGS/FOUNDATION ELEVATIONS ARE NOT IDENTIFIED HEREIN AND ARE TO BE SET/DETERMINED BY THE CONTRACTOR BASED ON FINAL STRUCTURAL DESIGN SHOP DRAWINGS PREPARED BY THE APPROPRIATE PROFESSIONAL LICENSED IN THE STATE WHERE THE CONSTRUCTION OCCURS.
23. STORM DRAINAGE PIPE:UNLESS INDICATED OTHERWISE, ALL STORM SEWER PIPE MUST BE REINFORCED CONCRETE PIPE (RCP) CLASS III WITH SILT TIGHT JOINTS. WHEN HIGH-DENSITY POLYETHYLENE PIPE (HDPE) IS CALLED FOR ON THE PLANS, IT MUST CONFORM TO AASHTO M294 AND TYPE S (SMOOTH INTERIOR WITH ANGULAR CORRUGATIONS) WITH GASKET FOR SILT TIGHT JOINT. PVC PIPE FOR ROOF DRAIN CONNECTION MUST BE SDR 26 OR SCHEDULE 40 UNLESS INDICATED OTHERWISE.
24. UNLESS INDICATED OTHERWISE ON THE DRAWINGS, SANITARY SEWER PIPE SHALL BE AS FOLLOWS:
    - FOR PIPES LESS THAN 12 FT. DEEP: POLYVINYL CHLORIDE (PVC) SDR 35 PER ASTM D3034
    - FOR PIPES MORE THAN 12 FT. DEEP: POLYVINYL CHLORIDE (PVC) SDR 26 PER ASTM D3034
    - FOR PIPE WITHIN 10 FT. OF BUILDING, PIPE MATERIAL SHALL COMPLY WITH APPLICABLE BUILDING AND PLUMBING CODES. CONTRACTOR TO VERIFY WITH LOCAL OFFICIALS.
25. STORM AND SANITARY SEWER PIPE LENGTHS INDICATED ARE NOMINAL AND MEASURED CENTER OF INLET AND/OR MANHOLES STRUCTURE TO CENTER OF STRUCTURE.
26. STORMWATER ROOF DRAIN LOCATIONS ARE BASED ON PRELIMINARY ARCHITECTURAL PLANS. CONTRACTOR IS RESPONSIBLE TO AND FOR VERIFYING LOCATIONS OF SAME BASED ON FINAL ARCHITECTURAL PLANS.
27. SEWERS CROSSING STREAMS AND/OR LOCATION WITHIN 10 FEET OF THE STREAM EMBANKMENT, OR WHERE SITE CONDITIONS SO INDICATE, MUST BE CONSTRUCTED OF STEEL, REINFORCED CONCRETE, DUCTILE IRON OR OTHER SUITABLE MATERIAL. SEWERS CONVEYING SANITARY FLOW COMBINED SANITARY AND STORMWATER FLOW OR INDUSTRIAL FLOW MUST BE SEPARATED FROM WATER MAINS BY A DISTANCE OF AT LEAST 10 FEET HORIZONTALLY. IF SUCH LATERAL SEPARATION IS NOT POSSIBLE, THE PIPES MUST BE IN SEPARATE TRENCHES WITH THE SEWER AT LEAST 18 INCHES BELOW THE BOTTOM OF THE WATER MAIN, OR SUCH OTHER SEPARATION AS APPROVED BY THE GOVERNMENT AGENCY WITH JURISDICTION OVER SAME.
    - WHERE APPROPRIATE SEPARATION FROM A WATER MAIN IS NOT POSSIBLE, THE SEWER MUST BE ENCASED IN CONCRETE, OR CONSTRUCTED OF DUCTILE IRON PIPE USING MECHANICAL OR SLIP-ON JOINTS FOR A DISTANCE OF AT LEAST 10 FEET ON EITHER SIDE OF THE CROSSING. IN ADDITION, ONE FULL LENGTH OF SEWER PIPE SHOULD BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM THE WATER LINE AS POSSIBLE. WHERE A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWER MUST BE PROVIDED.
28. WATER MAIN PIPING MUST BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE LOCAL WATER PURVEYOR. IN THE ABSENCE OF SUCH REQUIREMENTS, WATER MAIN PIPING MUST BE CEMENT-LINED DUCTILE IRON (DIP) MINIMUM CLASS 52 THICKNESS. ALL PIPE AND APPURTENANCES MUST COMPLY WITH THE APPLICABLE AWWA STANDARDS IN EFFECT AT THE TIME OF APPLICATION.
29. CONTRACTOR MUST ENSURE THAT ALL UTILITY TRENCHES LOCATED IN EXISTING PAVED ROADWAYS INCLUDING SEWER, WATER AND STORM SYSTEMS, MUST BE REPAIRED IN ACCORDANCE WITH REFERENCED MUNICIPAL, COUNTY AND/OR DOT DETAILS AS APPLICABLE. CONTRACTOR MUST COORDINATE INSPECTION AND APPROVAL OF COMPLETED WORK WITH THE AGENCY WITH JURISDICTION OVER SAME.
30. LOCATION OF PROPOSED UTILITY POLE RELOCATION IS AT THE SOLE DISCRETION OF UTILITY COMPANY.
31. CONSULTANT IS NEITHER LIABLE NOR RESPONSIBLE FOR ANY SUBSURFACE CONDITIONS AND FURTHER, SHALL HAVE NO LIABILITY FOR ANY HAZARDOUS MATERIALS, HAZARDOUS SUBSTANCES, OR POLLUTANTS ON, ABOUT OR UNDER THE PROPERTY.

GENERAL DEMOLITION NOTES

1. THIS PLAN REFERENCES DOCUMENTS AND INFORMATION BY:
   - "BOUNDARY & TOPOGRAPHIC SURVEY PROPERTIES OF DDS ASSOCIATES LLC AND BENJAMIN BROWN", PREPARED BY CONTROL POINT ASSOCIATES, DATED 08/24/18, REVISED 10/18/18.
2. CONTRACTOR SHALL PERFORM ALL WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, (29 U.S.C. 651 et seq.), AS AMENDED AND ANY MODIFICATIONS, AMENDMENTS OR REVISIONS TO SAME.
3. BOHLER ENGINEERING HAS NO CONTRACTUAL, LEGAL, OR OTHER RESPONSIBILITY FOR JOB SITE SAFETY OR JOB SITE SUPERVISION, OR ANYTHING RELATED TO SAME.
4. THE DEMOLITION PLAN IS INTENDED TO PROVIDE GENERAL INFORMATION, ONLY, REGARDING ITEMS TO BE DEMOLISHED AND/OR REMOVED. THE CONTRACTOR MUST ALSO REVIEW THE OTHER SITE PLAN DRAWINGS AND INCLUDE IN DEMOLITION ACTIVITIES ALL INCIDENTAL WORK NECESSARY FOR THE CONSTRUCTION OF THE NEW SITE IMPROVEMENTS.
5. CONTRACTOR MUST RAISE ANY QUESTIONS CONCERNING THE ACCURACY OR INTENT OF THESE PLANS OR SPECIFICATIONS, CONCERNS REGARDING THE APPLICABLE SAFETY STANDARDS, OR THE SAFETY OF THE CONTRACTOR OR THIRD PARTIES IN PERFORMING THE WORK ON THIS PROJECT, WITH BOHLER ENGINEERING, IN WRITING, AND RESPONDED TO BY BOHLER, IN WRITING, PRIOR TO THE INITIATION OF ANY SITE ACTIVITY AND ANY DEMOLITION ACTIVITY. ALL DEMOLITION ACTIVITIES MUST BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THESE PLANS AND SPECIFICATIONS AND ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, RULES, REQUIREMENTS, STATUTES, ORDINANCES AND CODES.
6. PRIOR TO STARTING ANY DEMOLITION, CONTRACTOR IS RESPONSIBLE FOR/TO:
   A. OBTAINING ALL REQUIRED PERMITS AND MAINTAINING THE SAME ON SITE FOR REVIEW BY THE ENGINEER AND OTHER PUBLIC AGENCIES WITH JURISDICTION THROUGHOUT THE DURATION OF THE PROJECT, SITE WORK, AND DEMOLITION WORK.
   B. NOTIFYING, AT A MINIMUM, THE MUNICIPAL ENGINEER, DESIGN ENGINEER, AND LOCAL SOIL CONSERVATION DISTRICT, 72 HOURS PRIOR TO THE START OF WORK.
   C. INSTALLING THE REQUIRED SOIL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO SITE DISTURBANCE.
   D. IN ACCORDANCE WITH STATE LAW, THE CONTRACTOR MUST CALL THE STATE ONE-CALL DAMAGE PROTECTION SYSTEM FOR UTILITY MARKOUT, IN ADVANCE OF ANY EXCAVATION.
   E. LOCATING AND PROTECTING ALL UTILITIES AND SERVICES, INCLUDING BUT NOT LIMITED TO GAS, WATER, ELECTRIC, SANITARY AND STORM SEWER, TELEPHONE, CABLE, FIBER OPTIC CABLE, ETC. WITHIN AND ADJACENT TO THE LIMITS OF PROJECT ACTIVITIES. THE CONTRACTOR MUST USE AND COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY NOTIFICATION SYSTEM TO LOCATE ALL THE UNDERGROUND UTILITIES.
   F. PROTECTING AND MAINTAINING IN OPERATION, ALL ACTIVE UTILITIES AND SYSTEMS THAT ARE NOT BEING REMOVED DURING ALL DEMOLITION ACTIVITIES.
   G. ARRANGING FOR AND COORDINATING WITH THE APPLICABLE UTILITY SERVICE PROVIDER(S) FOR THE TEMPORARY OR PERMANENT TERMINATION OF SERVICE REQUIRED BY THE PROJECT PLANS AND SPECIFICATIONS. THE CONTRACTOR MUST PROVIDE THE UTILITY ENGINEER AND OWNER WRITTEN NOTIFICATION THAT THE EXISTING UTILITIES AND SERVICES HAVE BEEN TERMINATED AND ABANDONED IN ACCORDANCE WITH JURISDICTIONAL AND UTILITY COMPANY REQUIREMENTS.
   H. COORDINATION WITH UTILITY COMPANIES REGARDING WORKING "OFF-PEAK" HOURS OR ON WEEKENDS AS MAY BE REQUIRED TO MINIMIZE THE IMPACT ON THE AFFECTED PARTIES. WORK REQUIRED TO BE DONE "OFF-PEAK" IS TO BE DONE AT NO ADDITIONAL COST TO THE OWNER.
   I. IN THE EVENT THE CONTRACTOR DISCOVERS ANY HAZARDOUS MATERIAL, THE REMOVAL OF WHICH IS NOT ADDRESSED IN THE PROJECT PLANS AND SPECIFICATIONS, THE CONTRACTOR MUST IMMEDIATELY CEASE ALL WORK AND IMMEDIATELY NOTIFY THE OWNER AND ENGINEER OF THE DISCOVERY OF SUCH MATERIALS.
7. THE FIRM OR ENGINEER OF RECORD IS NOT RESPONSIBLE FOR JOB SITE SAFETY OR SUPERVISION. CONTRACTOR MUST PROCEED WITH THE DEMOLITION IN A SYSTEMATIC AND SAFE MANNER, FOLLOWING ALL THE OSHA REQUIREMENTS, TO ENSURE PUBLIC AND CONTRACTOR SAFETY.
8. THE CONTRACTOR MUST PROVIDE ALL "MEANS AND METHODS" NECESSARY TO PREVENT MOVEMENT, SETTLEMENT, OR COLLAPSE OF EXISTING STRUCTURES, AND ANY OTHER IMPROVEMENTS THAT ARE REMAINING ON OR OFF SITE. THE CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS OF DAMAGE TO ALL ITEMS THAT ARE TO REMAIN. CONTRACTOR MUST USE NEW MATERIAL FOR ALL REPAIRS. CONTRACTOR'S REPAIR MUST INCLUDE THE RESTORATION OF ANY ITEMS REPAIRED TO THE PRE-DEMOLITION CONDITION, OR BETTER. CONTRACTOR SHALL PERFORM ALL REPAIRS AT THE CONTRACTOR'S SOLE EXPENSE.
9. THE CONTRACTOR MUST NOT PERFORM ANY EARTH MOVEMENT ACTIVITIES, DEMOLITION OR REMOVAL OF FOUNDATION WALLS, FOOTINGS, OR OTHER MATERIALS WITHIN THE LIMITS OF DISTURBANCE UNLESS SAME IS IN STRICT ACCORDANCE AND CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS, AND/OR UNDER THE WRITTEN DIRECTION OF THE OWNER'S STRUCTURAL OR GEOTECHNICAL ENGINEER.
10. CONTRACTOR MUST BACKFILL ALL EXCAVATION RESULTING FROM, OR INCIDENTAL TO, DEMOLITION ACTIVITIES. BACKFILL MUST BE ACCOMPLISHED WITH APPROVED BACKFILL MATERIALS, AND MUST BE SUFFICIENTLY COMPACTED TO SUPPORT NEW IMPROVEMENTS AND PERFORMED IN COMPLIANCE WITH THE RECOMMENDATIONS AND GUIDANCE IN THE GEOTECHNICAL REPORT. BACKFILLING MUST OCCUR IMMEDIATELY AFTER DEMOLITION ACTIVITIES, AND MUST BE DONE SO AS TO PREVENT WATER ENTERING THE EXCAVATION. FINISHED SURFACES MUST BE GRADED TO PROMOTE POSITIVE DRAINAGE.
11. EXPLOSIVES MUST NOT BE USED WITHOUT PRIOR WRITTEN CONSENT OF BOTH THE OWNER AND ALL APPLICABLE GOVERNMENTAL AUTHORITIES. ALL THE REQUIRED PERMITS AND EXPLOSIVE CONTROL MEASURES THAT ARE REQUIRED BY THE FEDERAL, STATE, AND LOCAL GOVERNMENTS MUST BE IN PLACE PRIOR TO CONTRACTOR STARTING AN EXPLOSIVE PROGRAM AND/OR ANY DEMOLITION. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ALL INSPECTION AND SEISMIC VIBRATION TESTING THAT IS REQUIRED TO MONITOR THE EFFECTS ON ALL LOCAL STRUCTURES.
12. CONTRACTOR MUST PROVIDE TRAFFIC CONTROL AND GENERALLY ACCEPTED SAFE PRACTICES IN CONFORMANCE WITH THE CURRENT FHWA "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), AND THE FEDERAL, STATE, AND LOCAL REGULATIONS WHEN DEMOLITION RELATED ACTIVITIES IMPACT ROADWAYS AND/OR ROADWAY RIGHT-OF-WAY.
13. CONTRACTOR MUST CONDUCT DEMOLITION ACTIVITIES IN SUCH A MANNER TO ENSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, SIDEWALKS, WALKWAYS, AND OTHER ADJACENT FACILITIES. STREET CLOSURE PERMITS MUST BE RECEIVED FROM THE APPROPRIATE GOVERNMENTAL AUTHORITY PRIOR TO THE COMMENCEMENT OF ANY ROAD OPENING OR DEMOLITION ACTIVITIES IN OR ADJACENT TO THE RIGHT-OF-WAY.
14. DEMOLITION ACTIVITIES AND EQUIPMENT MUST NOT USE AREAS OUTSIDE THE DEFINED PROJECT LIMIT LINE, WITHOUT WRITTEN PERMISSION OF THE OWNER AND ALL GOVERNMENTAL AGENCIES WITH JURISDICTION.
15. THE CONTRACTOR MUST USE DUST CONTROL MEASURES TO LIMIT AIRBORNE DUST AND DIRT RISING AND SCATTERING IN THE AIR IN ACCORDANCE WITH FEDERAL, STATE, AND/OR LOCAL STANDARDS. AFTER THE DEMOLITION IS COMPLETE, CONTRACTOR MUST CLEAN ALL ADJACENT STRUCTURES AND IMPROVEMENTS TO REMOVE ALL DUST AND DEBRIS CAUSED BY THE DEMOLITION OPERATIONS. THE CONTRACTOR IS RESPONSIBLE FOR RETURNING ALL ADJACENT AREAS TO THEIR "PRE-DEMOLITION" CONDITION.
16. CONTRACTOR IS RESPONSIBLE TO SAFEGUARD THE SITE AS NECESSARY TO PERFORM THE DEMOLITION IN SUCH A MANNER AS TO PREVENT THE ENTRY OF UNAUTHORIZED PERSONS AT ANY TIME.
17. CONTRACTOR IS RESPONSIBLE FOR SITE JOB SAFETY, WHICH MUST INCLUDE, BUT NOT BE LIMITED TO, THE INSTALLATION AND MAINTENANCE OF BARRIERS, FENCING AND OTHER APPROPRIATE SAFETY ITEMS NECESSARY TO PROTECT THE PUBLIC FROM AREAS OF CONSTRUCTION AND CONSTRUCTION ACTIVITY.
18. THIS DEMOLITION PLAN IS INTENDED TO IDENTIFY THOSE EXISTING ITEMS/CONDITIONS WHICH ARE TO BE REMOVED. IT IS NOT INTENDED TO PROVIDE DIRECTION AS TO THE MEANS, METHODS, SEQUENCING, TECHNIQUES AND PROCEDURES TO BE USED TO ACCOMPLISH THAT WORK. ALL MEANS, METHODS, SEQUENCING, TECHNIQUES AND PROCEDURES TO BE USED MUST BE IN STRICT ACCORDANCE WITH ALL STATE, FEDERAL, LOCAL, AND JURISDICTIONAL REQUIREMENTS. THE CONTRACTOR MUST COMPLY WITH ALL OSHA AND OTHER SAFETY PRECAUTIONS NECESSARY TO PROVIDE A SAFE WORK SITE.
19. DEBRIS MUST NOT BE BURIED ON THE SUBJECT SITE. ALL DEMOLITION WASTES AND DEBRIS (SOLID WASTE) MUST BE DISPOSED OF IN ACCORDANCE WITH ALL MUNICIPAL, COUNTY, STATE, AND FEDERAL LAWS AND APPLICABLE CODES. THE CONTRACTOR MUST MAINTAIN RECORDS TO DEMONSTRATE PROPER DISPOSAL ACTIVITIES, TO BE PROMPTLY PROVIDED TO THE OWNER UPON REQUEST.
20. CONTRACTOR MUST MAINTAIN A RECORD SET OF PLANS UPON WHICH IS INDICATED THE LOCATION OF EXISTING UTILITIES THAT ARE CAPPED, ABANDONED IN PLACE, OR RELOCATED DUE TO DEMOLITION ACTIVITIES. THIS RECORD DOCUMENT MUST BE PREPARED IN A NEAT AND WORKMAN-LIKE MANNER, AND TURNED OVER TO THE OWNER/DEVELOPER UPON COMPLETION OF THE WORK.

ADA INSTRUCTIONS TO CONTRACTOR:

CONTRACTORS MUST EXERCISE APPROPRIATE CARE AND PRECISION IN CONSTRUCTION OF ADA (ACCESSIBLE) ACCESSIBLE COMPONENTS AND ACCESS ROUTES FOR THE SITE. THESE COMPONENTS, AS CONSTRUCTED, MUST COMPLY WITH ALL APPLICABLE STATE AND LOCAL ACCESSIBILITY LAWS AND REGULATIONS AND THE CURRENT ADA AND/OR STATE ARCHITECTURAL ACCESS BOARD STANDARDS AND REGULATIONS' BARRIER FREE ACCESS AND ANY MODIFICATIONS, REVISIONS OR UPDATES TO SAME. FINISHED SURFACES ALONG THE ACCESSIBLE ROUTE OF TRAVEL FROM PARKING SPACE, PUBLIC TRANSPORTATION, PEDESTRIAN ACCESS, INTER-BUILDING ACCESS, TO POINTS OF ACCESSIBLE BUILDING ENTRANCE/EXIT, MUST COMPLY WITH THESE ADA AND/OR ARCHITECTURAL ACCESS BOARD CODE REQUIREMENTS. THESE INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

- PARKING SPACES AND PARKING AISLES - SLOPE SHALL NOT EXCEED 1:50 (1/4" PER FOOT OR NOMINALLY 2.0%) IN ANY DIRECTION.
- CURB RAMPS - SLOPE MUST NOT EXCEED 1:12 (8.3%) FOR A MAXIMUM OF SIX (6) FEET.
- LANDINGS - MUST BE PROVIDED AT EACH END OF RAMPS, MUST PROVIDE POSITIVE DRAINAGE, AND MUST NOT EXCEED 1:50 (1/4" PER FOOT OR NOMINALLY 2.0%) IN ANY DIRECTION.
- PATH OF TRAVEL ALONG ACCESSIBLE ROUTE - MUST PROVIDE A 36-INCH OR GREATER UNOBSTRUCTED WIDTH OF TRAVEL (CAR OVERHANGS AND/OR HANDRAILS CANNOT REDUCE THIS MINIMUM WIDTH). THE SLOPE MUST BE NO GREATER THAN 1:20 (5.0%) IN THE DIRECTION OF TRAVEL, AND MUST NOT EXCEED 1:50 (1/4" PER FOOT OR NOMINALLY 2.0%) IN CROSS SLOPE. WHERE PATH OF TRAVEL WILL BE GREATER THAN 1:20 (5.0%), ADA RAMP MUST BE ADHERED TO. A MAXIMUM SLOPE OF 1:12 (8.3%), FOR A MAXIMUM RISE OF 2.5 FEET, MUST BE PROVIDED. THE RAMP MUST HAVE ADA HAND RAILS AND "LEVEL" LANDINGS ON EACH END THAT ARE CROSS SLOPED NO MORE THAN 1:50 IN ANY DIRECTION (1/4" PER FOOT OR NOMINALLY 2.0%) FOR POSITIVE DRAINAGE.
- DOORWAYS - MUST HAVE A "LEVEL" LANDING AREA ON THE EXTERIOR SIDE OF THE DOOR THAT IS SLOPED AWAY FROM THE DOOR NO MORE THAN 1:50 (1/4" PER FOOT OR NOMINALLY 2.0%) FOR POSITIVE DRAINAGE. THIS LANDING AREA MUST BE NO LESS THAN 60 INCHES (5 FEET) LONG, EXCEPT WHERE OTHERWISE PERMITTED BY ADA STANDARDS FOR ALTERNATIVE DOORWAY OPENING CONDITIONS. (SEE ICC/ANSI A117.1-2003 AND OTHER REFERENCED INCORPORATED BY CODE.)
- WHEN THE PROPOSED CONSTRUCTION INVOLVES RECONSTRUCTION, MODIFICATION, REVISION OR EXTENSION OF OR TO ADA COMPONENTS FROM EXISTING DOORWAYS OR SURFACES, CONTRACTOR MUST VERIFY EXISTING ELEVATIONS SHOWN ON THE PLAN. NOTE THAT TABLE 405.2 OF THE DEPARTMENT OF JUSTICE'S ADA STANDARDS FOR ACCESSIBLE DESIGN ALLOWS FOR STEEPER RAMP SLOPES, IN RARE CIRCUMSTANCES. THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE DESIGN ENGINEER OF ANY DISCREPANCIES AND/OR FIELD CONDITIONS THAT DIFFER IN ANY WAY OR ANY RESPECT FROM WHAT IS SHOWN ON THE PLANS, IN WRITING, BEFORE COMMENCEMENT OF WORK. CONSTRUCTED IMPROVEMENTS MUST FALL WITHIN THE MAXIMUM AND MINIMUM LIMITATIONS IMPOSED BY THE BARRIER FREE REGULATIONS AND THE ADA REQUIREMENTS.
- THE CONTRACTOR MUST VERIFY THE SLOPES OF CONTRACTOR'S FORMS PRIOR TO POURING CONCRETE. IF ANY NON-CONFORMANCE IS OBSERVED OR EXISTS, CONTRACTOR MUST IMMEDIATELY NOTIFY THE ENGINEER PRIOR TO POURING CONCRETE. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS TO REMOVE, REPAIR AND REPLACE NON-CONFORMING CONCRETE.

IT IS STRONGLY RECOMMENDED THAT THE CONTRACTOR REVIEW THE INTENDED CONSTRUCTION WITH THE LOCAL BUILDING CODE PRIOR TO COMMENCEMENT OF CONSTRUCTION.

TYPICAL ABBREVIATIONS

KEY	DESCRIPTION	KEY	DESCRIPTION
BC	BOTTOM CURB	PROP.	PROPOSED
TC	TOP CURB	TBR/R	TO BE REMOVED AND REPLACED
BOC	BACK OF CURB	TBR	TO BE REMOVED
BW	BOTTOM OF WALL GRADE	TPF	TREE PROTECTION FENCE
TW	TOP OF WALL	BLDG.	BUILDING
EXIST.	EXISTING	SF	SQUARE FEET
BM.	BENCHMARK	SMH	SEWER MANHOLE
EOP	EDGE OF PAVEMENT	DMH	DRAIN MANHOLE
℄	CENTERLINE	STM.	STORM
FF	FINISHED FLOOR	SAN.	SANITARY
V.I.F.	VERIFY IN FIELD	CONC.	CONCRETE
GC	GENERAL CONTRACTOR	ARCH.	ARCHITECTURAL
HP	HIGH POINT	DEP.	DEPRESSED
LP	LOW POINT	R	RADIUS
TYP.	TYPICAL	MIN.	MINIMUM
INT.	INTERSECTION	MAX.	MAXIMUM
PC.	POINT OF CURVATURE	No. / #	NUMBER
PT.	POINT OF TANGENCY	W.	WIDE
PI.	POINT OF INTERSECTION	DEC.	DECORATIVE
PVI.	POINT OF VERTICAL INTERSECTION	ELEV.	ELEVATION
STA.	STATION	UNG.	UNDERGROUND
GRT	GRATE	R.O.W.	RIGHT OF WAY
INV.	INVERT	LF	LINEAR FOOT
DIP	DUCTILE IRON PIPE	LOD	LIMIT OF DISTURBANCE
PVC	POLYVINYL CHLORIDE PIPE	LOW	LIMIT OF WORK
HDPE	HIGH DENSITY POLYETHYLENE PIPE	L.S.A.	LANDSCAPED AREA
RCP	REINFORCED CONCRETE PIPE	±	PLUS OR MINUS
S	SLOPE	°	DEGREE
ME	MEET EXISTING	Ø / DIA.	DIAMETER

TYPICAL LEGEND

E□I□□I□G		PROPOSED
	PROPERTY LINE	
	SETBACK	
	EASEMENT	
	CURB	
	STORM MANHOLE	
	SEWER MANHOLE	
	CATCH BASIN	
WF#5	WETLAND FLAG	
	WETLAND LINE	
× 54.83	SPOT ELEVATION	53.52
× TC 54.58 G 53.78	TOP & BOTTOM OF CURB	TC=54.32 BC=53.82
53	CONTOUR	50
	FLOW ARROW	5%
	PAINTED ARROW	
	RIDGE LINE	
G G	GAS LINE	G G
T T	TELEPHONE LINE	T T
E E	ELECTRIC LINE	E E
W W	WATER LINE	W W
OH OH	OVERHEAD WIRE	OH OH
	STORM PIPE	
	SANITARY LINE	S S
10	PARKING COUNT	4
	SIGN	
	LIGHT POLE	
	GUIDE RAIL	
	UTILITY POLE	

REFER TO SITE PLAN FOR ZONING ANALYSIS TABLE AND LAND USE/ ZONING INFORMATION & NOTES

REFER TO SOIL EROSION CONTROL NOTES & DETAILS SHEET FOR TYPICAL EROSION NOTES AND DETAILS

REFER TO LANDSCAPE NOTES & DETAILS SHEET FOR TYPICAL LANDSCAPE NOTES AND DETAILS

BOHLER //

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	BY
1	02/06/20	RESPONSE TO COMMENTS	MAA
2			
3			
4			
5			
6			
7			
8			
9			
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11			
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13			
14			
15			

PERMIT SET

PROJECT No.:	CT181007
DRAWN BY:	MAA
CHECKED BY:	GPF
DATE:	12/30/19
SCALE:	AS NOTED
CAD I.D.:	TB-CT181007ss5

PROJECT:

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

1621 STORRS RD & MIDDLE TPKE
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

BOHLER //

16 OLD FORGE ROAD, SUITE A
ROCKY HILL, CT 06067
Phone: (860) 333-8900
Fax: (508) 480-9080
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G.P. FITZGERALD
PROFESSIONAL ENGINEER

SHEET TITLE:

GENERAL NOTES SHEET

SHEET NUMBER:

25

OF 25

REV 1 - 02/06/2020

STORM WATER MANAGEMENT REPORT

For

CAPSTONE
COLLEGIATE COMMUNITIES

PROPOSED

Residential Community

1621 Storrs Road & Middle Turnpike
Town of Mansfield,
Tolland County,
Connecticut

Prepared by:

BOHLER ENGINEERING
16 Old Forge Road
Rocky Hill, CT 06067

Michael A. Anderson
Connecticut P.E. Lic. #32503

BOHLER

December 30th, 2019
Revised: February 6th, 2020

Job# CT181007

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

I. EXECUTIVE SUMMARY

This report examines the changes in drainage that can be expected as the result of the construction of a proposed residential development located on the southerly side of Middle Turnpike (CT Route 44) in the Town of Mansfield, Connecticut. The site contains approximately 18.836 acres, with topography that slopes from the southwest to northeast towards a single contiguous wetland that runs along the northeasterly property line.

The proposed project includes the construction of ten (10) new residential housing structures with associated site amenities, including paved parking areas, landscaping, storm water management components, associated utilities and site amenities, covering approximately 9.5 acres of the existing site. This report presents a comparative analysis of the pre- and post-development volumes and site runoff conditions in detail that demonstrates that the project will mitigate potential impacts to nearby wetlands and ensure the long-term sustainability of the environmental resources on and around the site. Additionally, this report provides calculations documenting the design of the proposed stormwater conveyance/management system as illustrated within the accompanying Site Development Plans prepared by Bohler Engineering. The project will also provide erosion and sedimentation controls in accordance to the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control during the demolition and construction periods, as well as long term stabilization of the site. Finally, extensive stormwater Best Management Practices (BMPs) have been incorporated into the project design and are explained in this report.

For the purposes of this analysis the pre- and post-development drainage conditions were analyzed at seven (7) "design points" where stormwater runoff currently discharges to under existing conditions. These design points are described in further detail in **Section II** below. A summary of the existing and proposed conditions peak runoff rates and volumes for the 2-, 10-, 25-, and 100-year storms can be found in **Table 1.1** and **Table 1.2** below. In addition, the project has been designed according to the Stormwater Management Standards to the maximum extent practical as detailed herein.

The goal of the stormwater management design for this site is to limit increases in stormwater runoff volume and peak flows through properly designed and located stormwater management facilities, so that both the volume and peak rate of runoff from the site after development does not exceed the volume and peak rate of runoff from the site prior to development. Through the use of

an integrated system of BMPs designed and sited to both renovate and recharge stormwater while maintaining the predevelopment site hydrology on a watershed-wide basis, the system as designed effectively maintains or reduces the peak rate of runoff in each of the design storms (2, 10, 25 and 100-year) analyzed. Additionally, the analysis of the volume of runoff at the primary watershed discharge point shows a slight (2.0%) increase in volume during the 2-year storm, and decreases in volume of 0.9%, 1.1% and 1.8% in the 10-year, 25-year and 100-year storms, respectively.

Table 1.1: Design Point Peak Runoff Rate Summary*

Point of Analysis	2-Year Storm			10-Year Storm			25-Year Storm			100-Year Storm		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP-1	0.96	0.54	**-0.42**	2.91	2.39	**-0.52**	4.35	4.21	**-0.14**	6.77	6.64	**-0.13**
DP-2**	2.39	2.35	**-0.04**	8.10	7.97	**-0.13**	14.19	14.09	**-0.10**	25.68	25.68	**0**
DP-3	1.81	1.74	**-0.07**	8.48	8.10	**-0.38**	14.68	14.19	**-0.49**	26.15	25.34	**-0.81**
DP-4	1.79	1.78	**-0.01**	8.54	8.33	**-0.21**	14.56	14.11	**-0.45**	25.28	25.25	**-0.03**
DP-5	2.34	2.34	**0**	10.15	9.67	**-0.48**	16.45	15.53	**-0.92**	27.33	26.54	**-0.79**
DP-6	1.62	1.62	**0**	5.95	5.95	**0**	9.32	9.32	**0**	15.11	15.11	**0**
DP-7	0.05	0.04	**-0.01**	0.31	0.21	**-0.10**	0.55	0.55	**0**	0.98	0.94	**-0.04**

**Flows are represented in cubic feet per second (cfs)*
***Wetlands Discharge Point*

Table 1.2: Design Point Volume Summary*

	Point of Analysis	Drainage Area (acres)				2-Year Storm			10-Year Storm			25-Year Storm			100-Year Storm		
		Pre	Cumulative	Post	Cumulative	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
v	**DP-1**	2.232	-	2.975	-	0.122	0.189	**0.067**	0.312	0.459	**0.147**	0.453	0.656	**0.203**	0.692	0.984	**0.292**
Primary Watershed Discharge Point	**DP-2****	1.110	**25.839**	0.867	**26.004**	1.007	1.027	**0.02**	2.906	2.880	**-0.026**	4.364	4.316	**-0.048**	6.889	6.768	**-0.121**
^^^^	**DP-3**	6.597	22.497	7.224	24.792	0.807	0.731	**-0.076**	2.405	2.222	**-0.183**	3.647	3.401	**-0.246**	5.811	5.425	**-0.386**
^^^	**DP-4**	1.889	15.900	4.628	17.568	0.564	0.580	**0.016**	1.677	1.672	**-0.005**	2.545	2.551	**-0.006**	4.062	4.102	**0.04**
^^	**DP-5**	7.303	14.011	6.233	12.940	0.547	0.492	**-0.055**	1.557	1.441	**-0.116**	2.339	2.191	**-0.148**	3.697	3.578	**-0.119**
^	**DP-6**	6.707	-	6.707	-	0.273	0.273	**0**	0.776	0.776	**0**	1.162	1.162	**0**	1.83	1.83	**0**
	DP-7	0.408	**0.408**	0.281	**0.281**	0.01	0.012	**0.002**	0.034	0.03	**-0.004**	0.054	0.045	**-0.009**	0.090	0.071	**-0.019**

**Volumes are represented in acre feet (ac-ft)*
***Wetlands Discharge Point*

II. EXISTING SITE CONDITIONS

Existing Site Description

The site, located along the southerly side of Middle Turnpike (CT Route 44) in the Town of Mansfield, Connecticut, consists of approximately 18.836 acres of land. The majority of the site consists of undeveloped woodlands, with a few existing stone walls. The northwesterly edge of the site has an existing asphalt bikeway along the right-of-way and the easterly portion of the site has approximately 4.13 acres of wetlands. A vernal pool has been located offsite, southwest of the property on lot UC1098.

The site's 1988 (NAVD) elevations range from 606 to 660, with slopes generally at 5.5%. The majority of the site slopes in a northeasterly direction, toward the large wetland area, and Middle Turnpike (CT Route 44). Per Whitestone Associates, Inc.'s "Supplemental Geotechnical Investigation" dated January 8, 2019, the site sits on top of shallow bedrock ranging from 2.5 feet below ground surface (fbgs) to 12.5 fbgs. The highest point of the site lies nearest the southwest corner and has the shallowest rock of 2.5' fbgs. Although there are type "B" soils on the top half of the hill, high groundwater readings ranging from 0.8 to 4.1 fbgs were observed at five locations on site as seen in Whitestone Associates, Inc.'s "Preliminary Geotechnical Investigation" dated December 6, 2018. Subsequent soil testing was performed by Whitestone Associates on November 14, 2019 and again on December 5th and December 10th . This soil testing consisted included machine-excavated deep test pits and logging of soil characteristics, depth to bedrock, and evidence of seasonal high groundwater. Soil samples were taken at the approximate depths of the bottom of the proposed basins and permeability tests were performed to determine the infiltrative capacity of the soil within each of the proposed stormwater basins. These findings have been summarized in two reports by Whitestone Associates, titled "Preliminary Stormwater Management Area Evaluation" and Supplemental Stormwater Management Area Evaluation", dated November 21, 2019 and December 24, 2019, respectively. This soil testing, and the overall analysis of the watershed and its resources was used to inform the ultimate site development plan and impact mitigation designs.

On-Site Soil Information

There are six (6) types of soils found within the drainage areas. The first, located at northern portion of the site is Sutton fine sandy loam which is classified by the Natural Resource Conservation Service (NRCS) as Hydrologic Soil Group (HSG) "B/D". The second soil on site,

which is also located at the northern portion of the site, is Woodbridge fine sandy loam which is classified by the NRCS as HSG "C/D". The southwestern portion of the site is Canton and Charlton fine sandy loams which is classified by the NRCS as HSG "B". The off-site soils along the southeastern property line that contribute to drainage on-site are made up of three different soils. The soil types are Sutton Fine Sandy loam, Canton and Charlton fine sandy loams; which are classified by the NRCS as HSG "B" along with Ridgebury, Leicester, and Whitman soils which is classified by the NRCS as HSG "D". The remaining soils off-site soils are Woodbridge fine sandy loam, Canton and Charlton fine sandy loams, which range from stony to not very stony. These soils are classified by the NRCS as HSG "B" and "C/D" respectively. Refer to **Appendix B** for additional information.

Existing Collection and Conveyance

The north-western portion of the site (3.423 ac) drains to the north into the Middle Turnpike municipal drainage system and then eventually into the wetlands near wetland flag #72-73. A percentage of this area (1.191 ac) drains directly into Middle Turnpike where it is conveyed as shallow concentrated flow until reaching the wetlands near wetland flag #72-73. Besides a 0.408 acre portion of the site that drains south, the remainder of the analyzed area drains into these wetlands directly. Slopes on the site range from 0%-8% with on-site elevations ranging from 606 adjacent to Middle Turnpike to 660 at the southwesterly portion of the property.

Existing Watersheds and Design Point Information

The site was subdivided into nine (9) separate sub-catchments (refer to **Appendix C** for mapping) for the existing conditions as described below to analyze existing and proposed flow rates at each design point. The minimum time of concentration for all areas is calculated at 6 minutes (0.10 hr).

Subcatchment ED-1 in total is 2.23 acres with existing woods to be partially redeveloped. This area flows overland from south to north across the site where it is collected by the existing stormwater system in the Middle Turnpike right-of-way. The stormwater runoff from this subcatchment is not treated or attenuated and eventually discharged into the wetlands. This area has a calculated curve number of 69 and a time of concentration of 18.3 minutes.

Subcatchment ED-2 in total is 1.11 acres with existing woods to be redeveloped, impervious pavement located in the Middle Turnpike right of way, and the majority of an existing asphalt sidewalk to remain, with a portion of said sidewalk to be replaced in kind. This area flows overland

from south to north across the site where it is collected in the Middle Turnpike right of way and is conveyed easterly as shallow concentrated flow and eventually discharged at the wetlands culvert near wetland flag #72-73. The stormwater runoff from this subcatchment is not treated or attenuated. This area has a calculated curve number of 82 and a time of concentration of 14.0 minutes.

Subcatchment ED-3A in total is 1.43 acres with existing woods and impervious pavement to remain. This area flows overland from northeast to southwest across the site where it is collected by the abutting wetlands east of the site. The stormwater runoff from this subcatchment is not treated or attenuated. This area has a calculated curve number of 66 and a time of concentration of 23.6 minutes.

Subcatchment ED-3B in total is 5.17 acres with existing woods to be partially redeveloped. This area flows overland from south to north across the site where is collected by the abutting wetlands east of the site. The stormwater runoff from this subcatchment is not treated or attenuated. This area has a calculated curve number of 60 and a time of concentration of 23.6 minutes.

Subcatchment ED-4 in total is 1.89 acres with existing woods to be redeveloped. This area flows overland from south to northeast across the site where it is collected by the abutting wetlands east of the site. The stormwater runoff from this subcatchment is not treated or attenuated. This area has a calculated curve number of 56 and a time of concentration of 11.8 minutes.

Subcatchment ED-5A in total is 1.23 acres with existing woods to be remain, and existing buildings to be removed for wetlands restoration. This area flows overland from south to north where it is collected by the abutting wetlands east of the site. The stormwater runoff from this subcatchment is not treated or attenuated. This area has a calculated curve number of 76 and a time of concentration of 14.1 minutes.

Subcatchment ED-5B in total is 6.07 acres with existing woods to be partially redeveloped. This area flows from south to northeast where it is collected by abutting wetlands east of the site. The stormwater runoff in not treated or attenuated. This area has a calculated curve number of 56 and a time of concentration of 33.5 minutes.

Subcatchment ED-6 in total is 6.71 acres with existing woods to remain. This area flows overland from south to north where it is collected by abutting wetlands east of the site. The stormwater

runoff from this subcatchment is not treated or attenuated. This area has a calculated curve number of 61 and a time of concentration of 26.8 minutes.

Subcatchment ED-7 in total is 0.41 acres with existing woods to be redeveloped. This area flows overland from north to south where it discharges off-site into the abutting property. The stormwater runoff from this subcatchment is not treated or attenuated. This area has a calculated curve number of 55 and a time of concentration of 12.0 minutes.

To further understand the drainage patterns, Town of Mansfield GIS elevation contours were supplemented to the surveyed elevations to assist our design near the offsite vernal pool to the south and accurately model the wetland drainage areas in HydroCAD. The GIS grades were best fit onto our plan (hence the overlaps on the *Existing Drainage Tributary Map)* to get a sense of any ridge lines and valleys offsite. The pre- and post-development drainage conditions for the site were then analyzed at seven (7) "design points" where stormwater runoff currently drains to under existing conditions (ED1-ED-7). The primary wetlands watershed analysis point (DP-2) includes five of the seven design points (DP-1, and DP-3 thru DP-6) and is modeled using reach routing in HydroCAD.

Design Point #1 (DP-1) is the existing drainage system within the Middle Turnpike right-of-way. Under existing conditions, this design point receives stormwater flows from approximately 2.23 acres of land, designated as "ED-1". This watershed only includes wooded areas. This drainage system is conveyed to the outlet of the primary watershed design point (DP-2).

Design Point #2 (DP-2) is the wetland's discharge culvert located on the north-eastern portion of the property. Under existing conditions, this design point receives stormwater flows from approximately 1.11 acres of land, designated as "ED-2". Also, this design point accounts for the stormwater runoff from "DP-1" and "DP-3", which is essentially the ultimate Design Point. This watershed includes wooded areas, and impervious pavement from an existing sidewalk and the Middle Turnpike right of way. A portion of this sidewalk will be replaced in kind.

Design Point #3 (DP-3) is wetland area located on the eastern portion of the property. Under existing conditions, this design point receives stormwater flows from approximately 6.60 acres of land, designated as "ED-3A" and "ED-3B". This watershed includes wooded areas and a minor

amount of impervious pavement from an existing sidewalk. This section of wetlands was modeled as a channel reach using the average slopes to create its section and profile.

Design Point #4 (DP-4) is the wetland area located on the eastern portion of the property. Under existing conditions, this design point receives stormwater flows from approximately 1.89 acres of land, designated as "ED-4". This watershed only includes wooded areas. This section of wetlands was modeled as a channel reach using the average slopes to create its section and profile.

Design Point #5 (DP-5) is the wetland area located on the eastern portion of the property. Under existing conditions, this design point receives stormwater flows from approximately 7.30 acres of land, designated as "ED-5A" and "ED-5B". This watershed includes wooded areas and existing buildings. This section of wetlands was modeled as a channel reach using the average slopes to create its section and profile.

Design Point #6 (DP-6) is the wetland area located on the southeastern portion of the property. Under existing conditions, this design point receives stormwater flows from approximately 6.71 acres of land, designated as "ED-6". This watershed only includes wooded areas. This section of wetlands was modeled as a channel reach using the average slopes to create its section and profile.

Design Point # 7 (DP-7) is the southwesterly portion of the property line. Under existing conditions, the design point receives stormwater flows from approximately 0.41 acres of land, designated as "ED-7". This watershed only contains wooded areas and is part of the off-site vernal pool's drainage area.

Refer to **Table 2.1 and Table 2.2** for the calculated existing conditions peak rates of runoff and volumes. For additional hydrologic information and a graphical representation of the drainage areas, refer to **Appendix B, C, and D** of this report.

Table 2.1: Existing Conditions Peak Runoff Rates*

Point of Analysis	2-Year Storm	10-Year Storm	25-Year Storm	100-Year Storm
DP-1	0.96	2.91	4.35	6.77
DP-2	2.39	8.10	14.19	25.68
DP-3	1.81	8.48	14.68	26.15
DP-4	1.79	8.54	14.56	25.28
DP-5	2.34	10.15	16.45	27.33
DP-6	1.62	5.95	9.32	15.11
DP-7	0.05	0.31	0.55	0.98

**Flows are represented in cubic feet per second (cfs)*

Table 2.2: Existing Conditions Volume Summary*

Point of Analysis	2-Year Storm	10-Year Storm	25-Year Storm	100-Year Storm
DP-1	0.122	0.312	0.453	0.692
DP-2	1.007	2.906	4.364	6.889
DP-3	0.807	2.405	3.647	5.811
DP-4	0.564	1.677	2.545	4.062
DP-5	0.547	1.557	2.339	3.697
DP-6	0.273	0.776	1.162	1.829
DP-7	0.010	0.034	0.054	0.090

**Flows are represented in acre-feet (ac-ft)*

III. PROPOSED SITE CONDITIONS

Proposed Development Description

The proposed project consists of the construction of a new multi-unit residential community including 10 residential buildings, paved parking areas, a multi-leveled parking garage, landscaping, associated utilities, and a new stormwater management system. The site, including the proposed parking areas, have been designed to drain to deep-sump, hooded catch basins. The first inch of runoff is designed to be routed directly to the above ground infiltration basins, the remaining runoff will flow into the seven (7) underground closed bottom detention systems before being discharged to the above ground infiltration basins. Pretreatment of stormwater runoff will be provided by a combination of the deep-sump, hooded catch basins, two (2) raingardens, and six (6) proprietary treatment units prior to entering both the five (5) above ground sand filter basins

and seven (7) underground closed-bottom detention systems. These underground detention systems will provide the attenuation needed to reduce peak flows.

Proposed Development Collection and Conveyance

Deep sump, hooded catch basins are proposed to collect and route runoff from the paved parking areas to the proposed basins. Pipes have been designed for the 10-year storm using the Rational Method.

The best management practices (BMPs) incorporated into the proposed stormwater management system have been designed to meet or exceed 80% removal of total suspended solids (TSS) in storm water runoff. In addition, underdrains have been provided on the high side of all proposed structures, including the proposed retaining wall on the western edge of the property in an effort to direct ground water flow to several level spreaders to maintain flow to the respective wetlands. In addition, a Stormwater Operation and Maintenance (O&M) Plan, attached in **Appendix F**, has been developed which includes scheduled maintenance and periodic inspections of stormwater management structures and best management practices.

Proposed Watersheds and Design Point Information

The project has been designed to maintain the hydrology of the existing drainage watersheds to the greatest extent possible, with the same design points described in **Section II** above. Although the majority of the subject site area ultimately drains into the wetlands, the site was subdivided into seven (7) separate drainage areas for the proposed conditions as described below to compare existing flows into all receiving areas of the wetlands. The minimum time of concentration for all proposed areas is calculated as 6 minutes (0.1 hr).

Subcatchment PD-1 (Design Point #1) consists of 2.97 acres (PD-1A, PD-1B & PD-1C) of pavement, buildings 100, 200, and a portion of 1000B roofs, landscaped areas as well as existing wooded areas to remain. The runoff drains to proposed conveyance system and is routed through a Contech CDS unit for treatment prior to entering an underground detention basin. The first inch of runoff will be routed directly to an above ground sand filter basin (SFB-1) via an inlet control structure while the remaining portion will route directly to an underground detention basin. An internal outlet control structure discharges the underground detention system into the Middle Turnpike drainage system thru the same pipe as the existing condition. Calculated time of

concentrations varied from 6.0 minutes up to 15.9 minutes based on the existing surface cover types and slopes.

Subcatchment PD-2 (Design Point #2) consists of 0.867 acres of pavement, landscaping, and existing wooded areas to remain. The pavement, landscaped areas, and wooded areas to remain drain to the system within the Middle Turnpike right-of-way system, as it does today. A time of concentration of 8.8 minutes was calculated based on surface cover types.

Subcatchment PD-3 (Design Point #3) consists of 4.60 acres (PD-3A thru PD-3G) of pavement, building roofs, landscaping, and existing woods to remain. The runoff from paved areas, some landscaped areas, and buildings 300, 400 & 1000A drain to a series of catch basins and are ultimately conveyed to one of two above ground sand filter basins (SFB-1 or SFB-2). Flows from the proposed pavement are routed thru a Contech CDS unit for treatment prior to entering underground detention basins. The first inch of this runoff will be routed to one of two (2) above ground sand filter basins via three separate conveyance systems while the remaining portion will route directly to three separate underground detention basins. The outflow from the detention basins will also be routed to either of the two sand filter basins. The overflow from sand filter basins will discharge thru two (2) separate level spreaders prior to entering the existing wetland area. The roof runoff for building 1000A are directly discharged into the underground detention system. The roof runoff for buildings 300 & 400 are routed into sand filter basin #1 and #2 respectively. Calculated time of concentrations varied from 6 minutes up to 12.7 minutes based on the existing surface cover types and slopes. Approximately 1.43 acres of the drainage area consists of the existing woods to remain that continue to drain into the wetlands.

Subcatchment PD-4 (Design Point #4) consists of 2.99 acres (PD-4A thru PD-4G) of pavement, roof, landscaping, and existing woods to remain. The pavement and some landscaped areas drain to proposed catch basins which is routed through a Contech CDS unit for pretreatment prior to entering an underground detention basin. Building 500, 600 and a portion of 1000B runoff drains directly into one of two (2) underground detention systems. The first inch of this runoff will be routed to one of two above ground sand filter basins (SFB-3 or SFB-4) via an underground conveyance system while the remaining portion will route directly to the underground detention basins. The outflow from the detention basin will also be routed to the infiltration basin. The overflow from the sand filter basins will discharge through level spreaders prior to discharging

towards the existing wetland area. A time of concentration of 6.0 minutes was calculated based on surface cover types.

Subcatchment PD-5 (Design Point #5) consists of 7.86 acres (PD-5A thru PD-5E) of pavement, building roofs, landscaping, and existing woods. The pavement, landscaped areas, and buildings 700, 800, half of 900, and 1000C drain to proposed structures and are conveyed through a Contech CDS unit for pretreatment prior to entering an underground detention basin. The first inch of this runoff for the remaining sub-drainage areas will be routed to an above ground sand filter basin (SFB-5) via an underground conveyance system while the remaining portion will route directly to an underground detention basin. The outflow from the detention basins will also be routed to the above ground infiltration basin #5. The overflow from Infiltration Basin #2 will discharge through a level spreader on the uphill side of the existing stone wall prior to entering the existing wetlands upland area. An outlet control structure discharges the underground detention system into a sand filter basin with a trap rock outfall to disperse flows evenly thru the wall and towards the wetlands. Calculated time of concentrations varied from 6 minutes up to 33.5 minutes based on the existing surface cover types and slopes. Approximately 6.23 acres of the drainage area consists of the existing woods to remain that continue to drain into the wetlands.

Subcatchment PD-6 (Design Point #6) consists of 6.70 acres of existing woods. This area drains offsite towards the upper section of wetlands in the eastern portion of the site. The proposed flows are equivalent to existing because no work is proposed in this area. A 26.8-minute time of concentration was calculated based on the existing surface cover types and slopes.

Subcatchment DP-7 (Design Point #7) consists of 0.27 acres (PD-7A & PD-7B) of existing woods and half of Building 900 roof. This area drains offsite into a small rain garden towards an off-site vernal pool at the southern portion of the site. The rain garden outlet was designed to match existing flows and volume to the maximum extent practical. Calculated time of concentrations varied from 6 minutes up to 9.0 minutes based on the existing surface cover types and slopes.

Refer to **Table 3.1 & 3.2** for the calculated proposed conditions peak rates and volumes of runoff. For additional hydrologic information, refer to **Appendix D** and the Drainage Area Maps in the appendices of this report for a graphical representation of the proposed drainage areas.

Table 3.1: Proposed Conditions Peak Runoff Rates*

Point of Analysis	2-Year Storm	10-Year Storm	25-Year Storm	100-Year Storm
DP-1	0.54	2.39	4.21	6.64
DP-2	2.35	7.97	14.09	25.68
DP-3	1.74	8.10	14.19	25.34
DP-4	1.78	8.33	14.11	25.25
DP-5	2.34	9.67	15.53	26.54
DP-6	1.62	5.95	9.32	15.11
DP-7	0.04	0.21	0.55	0.94

**Flows are represented in cubic feet per second (cfs)*

Table 3.2: Proposed Conditions Volume Summary*

Point of Analysis	2-Year Storm	10-Year Storm	25-Year Storm	100-Year Storm
DP-1	0.189	0.459	0.656	0.984
DP-2	1.027	2.880	4.316	6.768
DP-3	0.731	2.222	3.401	5.425
DP-4	0.580	1.672	2.551	4.102
DP-5	0.492	1.441	2.191	3.578
DP-6	0.273	0.776	1.162	1.83
DP-7	0.012	0.03	0.045	0.071

**Flows are represented in acre-feet (ac-ft)*

IV. METHODOLOGY

Peak Flow Calculations

The methodology utilized to design the proposed stormwater management system includes compliance with the guidelines set forth in the 2004 CT Stormwater Quality Manual. The pre- and post-development runoff rates being discharged from the site were computed using the HydroCAD computer program. The drainage area and outlet information were entered into the program, which routes storm flows based on NRCS TR-20 and TR-55 methods. The other components of the model were determined following standard NRCS procedures for Curve Numbers (CNs) and times of concentrations documented in the appendices of this report. The rainfall data utilized and listed below in **Table 4.1** below for stormwater calculations is based on NOAA Atlas 14, Volume 10, Version 3 for Storrs Mansfield, Connecticut. Refer to **Appendix E** for more information.

Table 4.1: NOAA Rainfall Intensities

Frequency	2 year	10 year	25 year	100 year
Rainfall* (inches)	3.32	5.05	6.13	7.80

Values derived from NOAA ATLAS on 07/01/2019

The proposed stormwater management as designed will provide a decrease in peak rates of runoff from the proposed facility for the 2-, 10-, 25- and 100-year design storm events. The first inch storm has been included in the HydroCAD report to exemplify the "first flush" routing of the inlet control structures. Additionally, the proposed project follows the guidelines set forth in the 2004 CT Stormwater Quality Manual. Consistency with these standards is described further below.

V. STORMWATER MANAGEMENT BMPs

The project has been designed so that stormwater runoff from proposed impervious areas (including the building roof and paved parking/driveway areas) is collected and passed through a series of proposed drainage features for treatment prior to discharge. This design also routing the first inch of runoff directly to infiltration basins for water quality and groundwater recharge.

Peak Rate Attenuation

As outlined in **Table 1.1** and **Table 6.1**, the development of the site and the proposed stormwater management system, have been designed so that post-development peak rates of runoff are below, or approximately matching, the pre-development conditions for the 2-, 10-, 25- and 100-year storm events at all design points. Post-development flows for the 2-, 10-, 25- and 100-year storms for Design Point #7 have been matched almost identically given its proximity to the vernal pool and need to replicate existing flows and volumes as much as possible.

Groundwater Recharge Volume

The stormwater runoff from the project will be collected and diverted to one (1) rain garden, or one of seven (7) above ground infiltration basins. The project as proposed will involve the creation of 254,578 square feet of new impervious area and is subsequently required to infiltrate 4,296 cubic feet of stormwater as recommended in the 2004 CT Stormwater Quality Manual (based on hydrologic soil type). Recharge volume requirement is waived for type D soils – see **Appendix E** for calculations. The required water quality volume for the first inch of runoff is 10,629 cubic feet

as seen in the stormwater calculations in **Appendix E.** The proposed basins will provide 12,305 cubic feet of volume for groundwater recharge.

Stormwater Quality Treatment and Water Quality Volume

Stormwater quality treatment is provided by a treatment train that includes deep sump catch basins, two (2) rain gardens, CDS stormwater pretreatment hydrodynamic separators, and four sand filter infiltration basins. TSS removal calculations are included in **Appendix E** of this report. The project as proposed will involve the creation of 254,578 square feet of new impervious area and is required to treat 10,629 cubic feet of water quality volume as defined in the 2004 CT Stormwater Quality Manual. The proposed basins and rain gardens will provide 12,305 cubic feet of volume for water quality treatment. Refer to **Appendix E** of this report for calculations documenting required and provided water quality volumes.

Critical Areas

The proposed stormwater management system has been designed to provide at least eighty percent (80%) removal of Total Suspended Solids (TSS) through the use of the above-described Best Management Practices (BMPs). Refer to **Appendix E** for TSS removal calculations.

The existing stormwater flows and volumes to the off-site vernal pool have analyzed and maintained to ensure the sustainability of this unique habitat. See **Table 6.1 and 6.2** for pre and post comparisons.

Construction Period Pollution Prevention and Erosion and Sedimentation Control

The proposed project will provide construction period erosion and sedimentation controls as indicated within the site plan set provided for this project. This includes a proposed construction exit, protection for stormwater inlets, protection around temporary material stock piles and various other techniques as outlined on the erosion and sediment control sheets. Additionally, the project is required to file a CTDEEP General Permit Registration for Discharge of Stormwater from a construction activity and implement a Stormwater Pollution Prevention Plan (SWPPP) during the construction period. The SWPPP will be prepared prior to the start of construction and will be implemented by the site contractor under the guidance and responsibility of the project's proponent. Refer to the O&M Plan in **Appendix F**.

Operation and Maintenance Plan (O&M Plan)

An Operation and Maintenance (O&M) Plan for this site has been prepared and is included in **Appendix F** of this report. The O&M Plan outlines procedures and time tables for the long-term operation and maintenance of the proposed site stormwater management system, including initial inspections upon completion of construction, and periodic monitoring of the system components, in accordance with established practices and the manufacturer's recommendations.

VI. SUMMARY

In summary, the proposed stormwater management system illustrated on the drawings prepared by Bohler Engineering results in a reduction or closely matching peak flow rates on the subject site when compared to pre-development conditions for the 2-, 10-, 25- and 100-year storm frequencies. The system as designed effectively maintains or reduces the peak rate of runoff in each of the design storms (2, 10, 25 and 100-year) analyzed. Additionally, the analysis of the volume of runoff at the primary watershed discharge point shows a slight (2.0%) increase in volume during the 2-year storm, and decreases in volume of 0.9%, 1.1% and 1.8% in the 10-year, 25-year and 100-year storms, respectively. In addition, the proposed best management practices will result in an effective removal of total suspended solids and associated pollutants from the post-development runoff. The pre-development versus post-development stormwater discharge comparisons are contained in **Table 6.1 and 6.2** below.

Table 6.1: Design Point Peak Runoff Rate Summary*

Point of Analysis	2-Year Storm			10-Year Storm			25-Year Storm			100-Year Storm		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP-1	0.96	0.54	**-0.42**	2.91	2.39	**-0.52**	4.35	4.21	**-0.14**	6.77	6.64	**-0.13**
DP-2**	2.39	2.35	**-0.04**	8.10	7.97	**-0.13**	14.19	14.09	**-0.10**	25.68	25.68	**0**
DP-3	1.81	1.74	**-0.07**	8.48	8.10	**-0.38**	14.68	14.19	**-0.49**	26.15	25.34	**-0.81**
DP-4	1.79	1.78	**-0.01**	8.54	8.33	**-0.21**	14.56	14.11	**-0.45**	25.28	25.25	**-0.03**
DP-5	2.34	2.34	**0**	10.15	9.67	**-0.48**	16.45	15.53	**-0.92**	27.33	26.54	**-0.79**
DP-6	1.62	1.62	**0**	5.95	5.95	**0**	9.32	9.32	**0**	15.11	15.11	**0**
DP-7	0.05	0.04	**-0.01**	0.31	0.21	**-0.10**	0.55	0.55	**0**	0.98	0.94	**-0.04**

**Flows are represented in cubic feet per second (cfs)*
***Wetlands Discharge Point*

Table 6.2: Design Point Volume Summary*

	Point of Analysis	Drainage Area (acres)				2-Year Storm			10-Year Storm			25-Year Storm			100-Year Storm		
		Pre	Cumulative	Post	Cumulative	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
v	**DP-1**	2.232	-	2.975	-	0.122	0.189	**0.067**	0.312	0.459	**0.147**	0.453	0.656	**0.203**	0.692	0.984	**0.292**
Primary Watershed Discharge Point	**DP-2****	1.110	**25.839**	0.867	**26.004**	1.007	1.027	**0.020**	2.906	2.880	**-0.026**	4.364	4.316	**-0.048**	6.889	6.768	**-0.121**
^^^^	**DP-3**	6.597	22.497	7.224	24.792	0.807	0.731	**-0.076**	2.405	2.222	**-0.183**	3.647	3.401	**-0.246**	5.811	5.425	**-0.386**
^^^	**DP-4**	1.889	15.900	4.628	17.568	0.564	0.580	**0.016**	1.677	1.672	**-0.005**	2.545	2.551	**-0.006**	4.062	4.102	**0.04**
^^	**DP-5**	7.303	14.011	6.233	12.940	0.547	0.492	**-0.055**	1.557	1.441	**-0.116**	2.339	2.191	**-0.148**	3.697	3.578	**-0.119**
^	**DP-6**	6.707	-	6.707	-	0.273	0.273	**0**	0.776	0.776	**0**	1.162	1.162	**0**	1.83	1.83	**0**
	DP-7	0.408	**0.408**	0.281	**0.281**	0.01	0.012	**0.002**	0.034	0.03	**-0.004**	0.054	0.045	**-0.009**	0.090	0.071	**-0.019**

**Volumes are represented in acre feet (ac-ft)*
***Wetlands Discharge Point*

In response to the site conditions, we are proposing four (4) infiltration basins, and two (2) rain gardens to accommodate the groundwater recharge and infiltrate water quality volumes to treat the first inch of runoff to the maximum extent practical. High-level overflows have been provided for large storm events, where treated runoff will ultimately be evenly discharged towards the wetlands via level spreaders. The off-site vernal pool has very comparable post-development peak flows as pre-development which contributes to the sustainability of this resource. With the constraints of this site, stormwater runoff has been treated to the maximum extent practical in an effort to preserve the surrounding features and maintain peak flows and volumes leaving the subject site.

APPENDIX A: PROJECT LOCATION MAPS

- *USGS MAP*
- *FEMA FIRMETTE*