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STORMWATER MANAGEMENT REPORT

PREPARED FOR:

THE NEIGHBORHOOD AT EDGEWATER HILL
EDGEWATER CIRCLE EXTENSION
EAST HAMPTON, CONNECTICUT

OCTOBER 2018

PREPARED BY:

BOUNDARIES LLC

PROJECT I.D. NO. 17-2525-9

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Introduction

On behalf of Edgewater Hill Enterprises, LLC, Boundaries LLC has prepared the following stormwater management report for the proposed subdivision associated with the extension of Edgewater Circle and the construction of Persimmon Way. The subject site is part of the mixed use phased construction of the Edgewater Hill Master Plan Development located on East High Street (Ct Rte. 66) as prepared by Fuss & O'Neill in 2012. The stormwater management system has been designed to meet the requirements of the Connecticut Department of Energy and Environmental Protection (CT DEEP) Stormwater Quality Manual, the Connecticut Department of Transportation Drainage Manual and the local standards for both peak stormwater runoff flow rate attenuation and stormwater quality mitigation for the 2, 10, 25, 50 and the 100-year storm events.

The proposed development includes the construction of approximately 1,000-feet of road for the Edgewater Circle extension and approximately 200-feet for Persimmon Way. Roadways will be 24-wide, 2-way asphalt roads with bituminous lip curbing and 4-foot bituminous sidewalk with associated infrastructure including a formal stormwater collection, conveyance and management system, sanitary sewer, water and natural gas to service 19 new residential home sites.

The location of the project is shown on the Location Map included as Figure 1 (Existing Conditions section of this report). The subject parcel is depicted as Map 10A/Block 85/Lot 5C of the Town land records.

There is a substantial freshwater inland wetland body west of the proposed development and a small, isolated inland wetland area located on the eastern side. The majority of the development area drains easterly and eventually drains to Cattle Lot Brook. A portion of the site drains easterly to the wetlands.

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey (Appendix-1), the soils on the site consist of Woodbridge fine sandy loam (Hydrologic Soil Group (HSG) C/D), Paxton and Montauk fine sandy loams (HSG C) and Paxton-Urban Land Complex (HSG C). Primary soil types within the project area are 71E & 72E Nipmuck-Brimfield complex and rock outcrop Complex

Additionally, soil test holes were conducted on July 31, 2018 to develop an understanding of the soil profile. Soil test results are provided on the project plans.

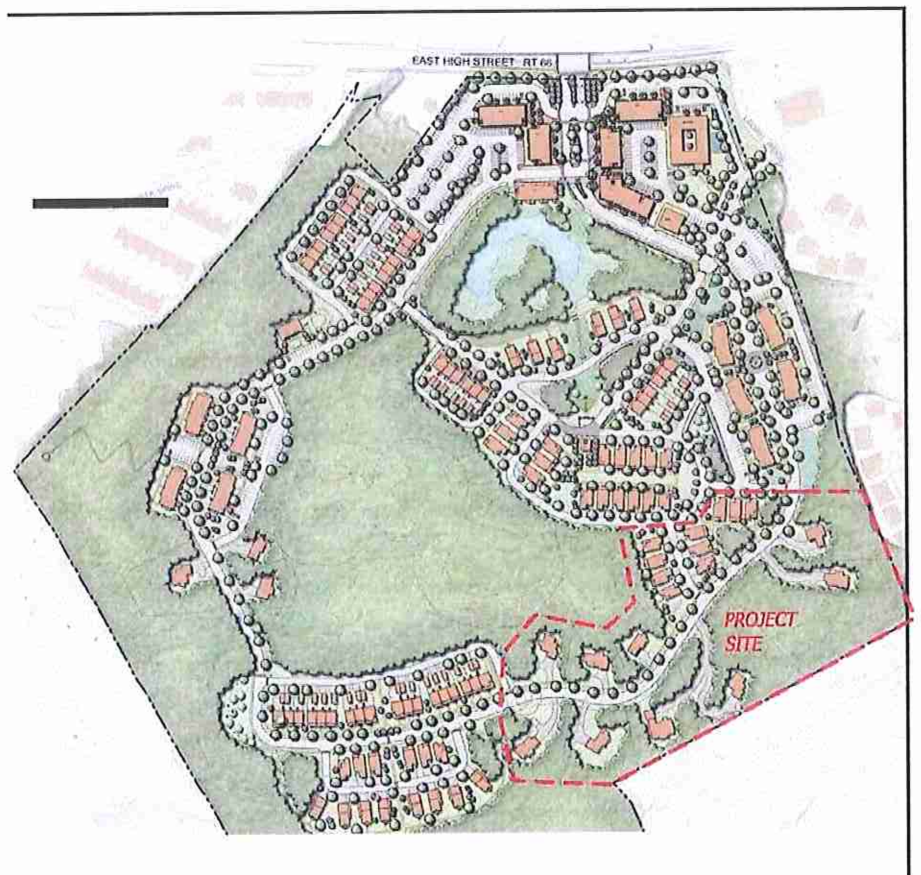
Existing and post-development conditions have been analyzed using the HydroCAD software incorporating SCRS TR-55 Method for hydrology. Storm events assessed are the 24-hour, type III storm events for the 2, 10, 25, 50 and 100-year storm events. Catchment areas are provided in Attachment-1. Pipe hydraulics have been analyzed using the Manning Equation. Pipe hydraulic calculations are located in Attachment-3. Existing conditions hydrology is in Appendix-4. Post-developed hydrology is in Appendix-5. The water quality volumes for the stormwater management basins have been calculated using the methods detailed in the CT DEEP Stormwater Quality Manual. The calculations are provided in Attachment-2.

Existing Conditions

The existing site is located east of the initial phases of the Edgewater Master Plan development currently under construction. The initial phases are on the easterly side of East High Street (CT Rte. 66) as shown below. The subject parcel for this proposal consists of wooded areas located in the northeast extreme of the Edgewater parcel. The subject site generally slopes from west to east. A small portion of the site drains westerly towards the "A" series wetlands located in the central portion of the overall site. To the East, runoff flows overland and eventually reaches Cattle Lot Brook. Areas draining westerly and into the wetlands flow west to the man-made pond located on the master site. The pond is drained through an existing 18"-diameter pipe which directs flows to a 30"-diameter drainage cross culvert beneath Rte. 66. As so, the project site is naturally divided into two (2) distinct watersheds: East and West. The east watershed consists of those areas draining easterly into wooded areas off site and west areas which drain into the wetlands and the man-made pond. Reference project watershed mapping for existing conditions for more detailed information (Appendix-2). The Existing conditions aerial photography of the site is shown below.

Figure 1: Aerial Photo of site

Figure 2: Image of Master Plan



Proposed Conditions

The project consists of the construction of approximately 1,000' of 24-foot wide asphalt roadway to serve 10 individual single-family home sites, six (6) cottage-style home sites and two (2) duplex style home sites (19 lots). The proposed road is an extension of the existing Edgewater Circle which serves previous phases of the Master Plan development. The proposed road will include a gravel cul-de-sac at the phase termination point. Roadway infrastructure will include a 4-foot concrete sidewalk, storm drainage facilities, sanitary sewer and potable water.

The stormwater management system consists of 10 precast concrete catch basins with cast iron grates, four (4) precast concrete manholes with HDPE piping to capture and convey stormwater runoff. Additional features include StormTech MC-3500 subsurface detention/infiltration systems for all roof areas, a pipe infiltration system and two (2) stormwater management basins.

Project Design:

I. Piping and Collection System Design:

Piping System
Roadway runoff is collected in the proposed catch basin inlet system. The system consists of ten (10) Type "C" catch basins, four (4) drainage manholes with HDPE piping.

Peak system inflow rates have been calculated for a 25-year storm for system designs. Catchment areas are provided in Attachment-1. Piping systems design flow rates and hydraulics have been modeled using the HydroCAD design software. Reference Report Appendix-3 for more detailed information. Note that prior to discharge into the basin (SMB-1), a short section of 24" HDPE is designed at a slope of 0.7% to slow the velocity into the basin sediment forebay (DMH 3 – SMB 1) Pipe run designs have been computed using the Manning's Formula. A summary of the results is as follow:

Table 1: Pipe Flow Analysis Table

Pipe Segment	Design Peak Flow Rate (cfs)	Pipe Capacity (cfs)	Average Flow Depth (feet)	Maximum Flow Velocity (fps)
South System				
CB 1 – CB 2	0.68	6.46	0.27	3.4
CB 2 – DMH 1	1.04	13.70	0.23	6.58
DMH 1 – CB 4	1.04	14.77	0.22	6.92
CB 3 – CB 4	1.78	6.46	0.45	4.49
CB 4 – CB 6	3.32	17.06	0.37	10.76
CB 5 – CB 6	1.80	6.46	0.45	4.50
CB 6 – DMH 2	5.01	6.53	0.82	5.84
North System				
CB 10 – CB 9	0.97	6.46	0.33	3.79
CB 9 – CB 8	3.21	6.95	0.60	5.54
CB 8 – CB 7	3.91	6.69	0.69	5.66
CB 7 – DMH 2	5.19	6.85	0.81	6.14
DMH 2 – DMH 3	9.87	46.24	0.47	20.80
DMH 3 – SMB 1	9.87	19.12	1.02	6.13
SMB Access Drive Cross Culvert	0.45	8.59	0.10	10.85

Note that Sub-System-1 inlets CB-1 & 2 are located at the phase termination where in the future, Edgewater Circle will be extended into a future phase. Based upon preliminary design of the future road extension, the roadway high point will be realized in the future extension and is anticipated to be at approximately roadway station 27+65. Runoff from this entire upgradient portion of future road has been included in the piping design. Other upgradient areas have also been included in the watersheds for pipe design in its existing conditions. Anticipation is all upgradient site development outside proposed road areas will be required to provide stormwater management design such that there will not be an increase in peak flow rates.

II. Gutterflow Analysis

A Gutterflow analysis have been performed to assess the inlet capability of the stormwater collection systems for the roadway stormwater collection system. The analysis has been performed for the 10-year design storm in accordance with the CT DOT Drainage Manual requirements. Reference Attachment-2 for the analysis.

Maximum allowed flow width is half the travel lane or 6-feet.
Per the analysis, catch basins PCB-7 and 10 exceeded the 6 feet.
PCB-7 flow width = 6.28'
PCB-10 flow width = 8.00'

To resolve the flow width issues, double catch basins will be employed at both of these locations.

III. Outlet Protection Design:

All drainage outlets are to have rip-rap outlet protection. Associated with this project, there are three (3) stormwater piping discharges. The outlet protection will dissipate potentially erosive discharge velocities and permanently stabilize the piping outlet location.

The three (3) site piping discharge locations that require the design of outlet protection are as follow:

1. Inlet into Stormwater Management Basin SMB-1 from DMH-3
2. Outlet from SMB-2 into the level spreader LS-1
3. Cross culvert beneath SMB maintenance access drive

The outlet protection devices have been sized in accordance with the latest edition of the Connecticut Guidelines for Soil Erosion and Sediment Control Manual. Outlet protection rip-rap apron dimensions (minimum) are as follow:

1. **Discharge into SMB-1 from DMH-3:** The outlet is a 24" HDPE flared end outlet
   Pipe slope = 0.7%

   Use Pre-Formed Scour Hole due to grade of land → Reference Report Attachment-3

   Modified Riprap, B = 10', L = 12', D = 12"

2. **Discharge into LS-1 from SMB-1:** The outlet is 56' of 15" HDPE flared end outlet @
   Pipe slope = 0.89%

   Peak Q-25 = 2.1cfs at 4.7fps, flow depth = 0.49' < ½ pipe diameter (Appendix-3)

Use Pre-Formed Scour Hole due to grade of land → Reference Report Attachment-3

Modified Riprap, B = 7.5', L = 9.0', D = 0.75'

3. **SMB Access Drive Culvert:** The outlet is 26' of 12" HDPE flared end outlet @ Pipe slope = 7.7%

Peak Q-25 = 0.45cfs at 10.8fps, flow depth = 0.10' < ½ pipe diameter

Use Pre-Formed Scour Hole due to grade of land → Reference Report Attachment-3

Modified Riprap, B = 5.0', L = 6.0', D = 0'

IV. <u>Roof Drain Infiltration Chamber System Designs:</u>

There are 18 subsurface stormwater infiltration systems for roof runoff associated with this project. Each system will consist of four (4) units with two (2) end sections of the StormTech MC-3500 units within a crushed stone bed (12" on all sides). Reference Report Attachment-5 for typical section of the StormTech MC-3500 system. Infiltration is neglected as part of the system design calculations.

The systems have been to store all of the runoff associated with a 10-year, 24-hour design storm without any discharge. The system designs are as follow:

The system consists of 1 rows of 4 units each with 12" stone on all sides including above and below. Each system provided with an overflow pipe should the system become full to capacity. The system overflow will be a 6" diameter pipe installed at the top of the chamber to assure the system is full prior to discharge.

Provided storage:
1. Chambers: 4 chambers and 2 end caps length = 32'+/-
   Provided storage = 109.9cf/unit +14.9cf/end cap = 469.4cf
2. Stone: assume 40% voids
   Trench volume = (34' x 8.4' x 5.75 – chambers) x 0.40 = 469.1cf
3. Total storage = 469.4 + 469.1 = 938.5cf+/-

Required storage:
Single family house average area = 1,924sf
Based upon NOAA PDS-based frequency estimates with 90% confidence intervals table for East Hampton, 10-year recurrence interval, 24-hour storm is 5.19 inches
10-year runoff volume = 1924sf x 5.19" x 1'/12" = 832cf

938cf provided > 832cf storm volume → the systems provide more than ample capacity to completely store all of the runoff from a 10-year storm

Time to Drain:
Infiltration rate is based upon the average permeability rate for the project soils. The average rate

is a rate of 3.24 inch/hour = 0.0045 ft/min
Infiltration area = system footprint and side walls with 12" stone on outside, top and bottom
Infiltration area = bottom + sides = (34' x 8.4') + 2(34'x5.75') + 2(8.4'x5.75') = 773.2sf

Outflow Rate = permeability rate x infiltration area = 0.0045 ft/min x 773.2sf = 3.48cf/min

Time to Drain = volume/rate = 932cf / 3.48cf/min = 268 min = 4.46 hours

V. <u>Swale Design</u>

A swale has been incorporated into the stormwater system to direct stormwater runoff associated with Lots 4 – 7 to the stormwater management basin. The stormwater runoff from the development of the driveways and lawn areas for these four (4) lots will be collected and conveyed to SMB-2 via the swale. Roof areas are to be directed into infiltration systems.

The swale is located along the easterly side (rear) of proposed lots 4 through 7 and is approximately 300' long at a slope of 8.0%.
The swale will be of trapezoidal geometry with a 2' wide base, 12" depth and 3:1 side slopes.

Reference the HydroCAD model results in Appendix-6
Flow capacity = 59.8cfs
100year peak flow = 6.7cfs → flow depth = 0.34' at maximum velocity = 6.58fps.
25-year peak flow = 4.21cfs → flow depth = 0.26' at maximum velocity = 5.75fps

Using the CT DOT Drainage Manual Section 7.6 Roadside Channel (Type A) Design
Flow depth = 0.34' (100-year storm)
Equation 7.12: maximum shear stress = 62.4pcf x d x S
Where d = maximum depth of flow = 0.34'
S = channel slope = 0.08ft/ft
Max shear stress = 62.4 x 0.34 x 0.08 = 1.7psf
Per table 7-4 Permissible Shear Stresses for Lining Materials

Option 1: Type H – Synthetic Matt has an allowable stress = 2.0psf – must be permanent
Option 2: Rip Rap-Modified 6" has an allowable stress = 2.0psf

Use option 2- 6" modified rip rap channel

VI. <u>Stormwater Management Basin Designs:</u>

To address stormwater runoff quality concerns and provide storage to ensure there is not in increase in the peak runoff flow rate from the project site, two Stormwater Management Basins (SMB) have been incorporated into the project. The basins have been designed to function in succession: SMB-1 provides the requirement for storage of the design Water Quality Volume (WQV) as prescribed by the 2004 Connecticut Stormwater Quality Manual by CT DEEP.

The remaining storage within SMB-1 acts as detention prior to be directed to SMB-2 via a rip rap channel. SMB-2 has been designed to provide ample storage to mitigate the peak flow rates of runoff from the developed areas.

The basin designs are as follow:

→ ***Stormwater Management Basin-1***

SMB-1 is located between roadway station 20+00 and 21+00 left and is approximately 60' east of the proposed road. The watershed area directed to the basin include areas that contribute into CB's 1 through 10 and an area east of the road that drain overland into the basin. The basin design includes a 440cf sediment forebay to capture sand, sediment and debris. A riprap preformed scour hole at the piping discharge location will also act as a sediment forebay for the basin.

Water Quality Volume (WQV) is to be maintained within the permanent pool of the basin. For this reason, the low-level outlet will be located such that the WQV is contained within the basin beneath the invert of the lowest outlet.

The required WQV = 3,532cf (0.0810 Ac-ft, reference report Attachment-4)

At elevation 526.10, the provided storage volume is 0.081 ac-ft

Lowest outlet at elevation 526.15 or 4.15' above basin bottom.

Flow calculations are based on fully developed site conditions (including future roadway areas). Basin areas and outlet structures are as follows:

Table 2 - Stormwater Management Basin-1 Design Data

Elevation (Ft)	**Area** (Acre)	**Outlet Data**
522.0	0.0136	
524.0	0.0423	
526.0	0.0791	Outflow Weir Spillway W=4'-9", D=0.35', Elevation = 526.15
527.0	0.1008	
527.5	0.1066	Emergency Overflow Spillway: W=10'-0", D=12", Elevation = 526.5

The basin outflow is discharged into the outlet control structure which directs outflows to a 15" diameter culvert and discharges into a riprap apron and level spreader (LS-1).

A summary of the design results for the SMB-1 flow rates is as follow:

Basin inflow hydrographs have been routed through basin models for the 2, 10, 25, 50 and 100-year storm events. The modeling results are provided in Report Appendix-5. A summary of the modeling results is as follow:

Table 3 – SMB-1 Flow Summary

Storm Event	Peak Flow Into Basin (cfs)	Peak Flow Out of Basin (cfs)	Maximum Water Elevation In Basin (ft)
2-Year	3.22	0.47	525.27
10-Year	8.30	6.32	525.78
25-Year	11.86	10.57	526.04
50-Year	14.74	13.80	526.21
100-Year	17.67	16.70	526.36

Basin outlets consist of a 4'-9" wide outflow weir and a 10' wide rip-rap emergency spillway which discharge into an 80' long riprap channel which directs outflow to SMB-2.

Rip Rap Channel Design

The outflow from SMB-1 is directed to SMB-2 through a rip rap channel that begins at the outflow and emergency overflow weirs from SMB-1 and directs the basin outflow into SMB-2. The swale has been designed to minimize any potential impact associated with the basin outflow.
The swale is to be trapezoidal with a 5' wide bottom and 12" deep with 3:1 side slopes.

Using HydroCAD modeling software, the swale capacity has been calculated. Reference Appendix-5 for more information
Channel Capacity = 174.5cfs.

The hydraulics of the Rip Rap Channel has been modeled for the 2, 10, 25, 50 and 100-year storm events. The modeling results are provided in Report Appendix-5

A summary of the modeling results is as follows:

Table 4 – SMB-1 Rip Rap Channel Flow Summary

Storm Event	Peak Flow Into Channel (cfs)	Average Depth In Channel (ft)	Maximum Velocity (fps)
2-Year	0.47	0.04	2.51
10-Year	6.32	0.17	6.65
25-Year	10.57	0.23	7.97
50-Year	13.80	0.27	8.74
100-Year	16.70	0.30	9.32

As is evident in the average flow depths, there is more than ample capacity to convey the peak outflow from SMB-1 for a 100-year storm.
Stone stabilization of the rip rap swale is crucial to the integrity of the outflow system. The stone is sized similar to the swale east of lots 4-7.

Rip Rap Channel Stabilization:
Using the CT DOT Drainage Manual Section 7.6 Roadside Channel (Type A) Design
Flow depth = 0.30' (100-year storm)
Equation 7.12: maximum shear stress = 62.4pcf x d x S
Where d = maximum depth of flow = 0.30'
S = channel slope = 0.22ft/ft
Max shear stress = 62.4 x 0.30 x 0.22 = 4.1psf
Per table 7-4 Permissible Shear Stresses for Lining Materials

Option 1: Intermediate Rip Rap – 12" allowable stress = 4.0psf – must be permanent
Option 2: Standard Rip Rap - 15" has an allowable stress = 5.0psf

Due to the 100-year outflow repre4snting an extreme case, it is recommended that the channel be constructed with 12" Standard rip rap.

→ ***Stormwater Management Basin-2***

SMB-2 is located at roadway station 20+50 left and is approximately 170' east of the proposed road. The watershed area directed to the basin include the outflow from SMB-1, flow associated with the swale along the eastern parcel boundary (Lots 4-6) and overland flows that flow directly into the basin.

Water Quality Volume (WQV) is to be maintained within the permanent pool of the basin. For this reason, the low-level outlet will be located such that the WQV is contained within the basin beneath the invert of the lowest outlet.

The WQV for SMB-2 = 443cf (reference report Attachment-5)

Lowest outlet at elevation 510.0 or 12" above basin bottom.
WQV provided = 0.015 ac-ft = 653cf > 443cf → **OK**

Flow calculations are based on fully developed site conditions. Basin areas and outlet structure are as follows:

Table 5 - Stormwater Management Basin-2 Design Data

Elevation (Ft)	**Area** (Acre)	**Outlet Data**
509.0	0.006	Low Level Outlet Orifice: Diameter = 10" @ Invert = 510.0
510.0	0.016	Mid-level Outlet Weir: Weir width = 6" @ Invert = 512.25.0
511.0	0.0308	
512.0	0.0557	High-level Outlet Weir Weir width = 10" @ Invert = 513.9
514.0	0.1016	
516.0	0.1574	Outflow Riser Grate Elevation = 514.75
516.25	0.1890	Emergency Overflow Spillway: W=10'-0", D=12", Elevation = 515.25

The basin outflow is discharged into the outlet control structure which directs outflows to an 18" diameter culvert and discharges into a riprap apron and level spreader (LS-2).

A summary of the design results for the SMB-2 flow rates is as follow:

Basin inflow hydrographs have been routed through basin models for the 2, 10, 25, 50 and 100-year storm events. The modeling results are provided in Report Appendix-5. A summary of the modeling results is as follows:

Table 6 – SMB-2 Flow Summary

Storm Event	Peak Flow Into Basin (cfs)	Peak Flow Out of Basin (cfs)	Maximum Water Elevation In Basin (ft)
2-Year	0.94	0.59	510.17
10-Year	7.77	4.35	512.72
25-Year	13.39	7.47	514.19
50-Year	17.96	10.85	514.91
100-Year	22.08	14.92	515.45

Basin outlets consist of a 10' wide rip-rap emergency spillway and a 4' diameter precast riser. The riser includes a grated inlet at the crest, rectangular weir cutouts and orifice holes within the structure for the upper, mid and low level and outlet requirements.

Outlet structure discharges the basin outflow into a discharge culvert which directs the outflow into level spreader LS-1.

The discharge culvert consists of 89' of 15" HDPE at slope = 1.4%.
100-year discharge = 14.92cfs at velocity = 8.44fps
25-year discharge = 7.47cfs at velocity = 4.23fps
Reference Appendix-6 for more detailed information

Level Spreader Design
The level spreader has been designed to minimize any potential impact associated with the basin outflow. The basin outflow pipe discharges into a riprap outlet which directs the discharge into a level spreader. The spreader is an 18" deep depression with a concrete curb buried into the downgradient side. The intent is that the discharge will fill the 18" depression and as the water surface elevated to the curb height, the curb will force the discharge to spread out evenly over the entire length of the curb resulting in a sheet flow discharge pattern.

The hydraulics of the level spreader has been modeled for the 2, 10, 25, 50 and 100-year storm events. The modeling results are provided in Report Appendix-5

A summary of the modeling results is as follow:

Table 7 – SMB-2 Level Spreader LS-1 Flow Summary

Storm Event	Peak Flow Out of Spreader (cfs)	Maximum Depth Over Curb (ft)	Peak Velocity of Spreader Outflow (fps)
2-Year	0.59	0.02	0.43
10-Year	4.35	0.06	0.84
25-Year	7.47	0.09	1.01
50-Year	10.85	0.12	1.15
100-Year	14.92	0.14	1.29

Overall the outflow velocities are very minor in nature and should not have any detrimental impact upon downgradient areas. Therefore, the level spreader LS-1 is sized appropriately to safely convey the peak flow rates while reducing the potential for erosion downstream of the outlet.

Pre-Development and Post-Development Peak Flow Rate Analysis

As a result of the planned development, there will be an increase in impervious and grass surfaced areas, which will result in an increase in the stormwater runoff. The stormwater management systems including the StormTech MC-3500 subsurface infiltration system (SIS), roof infiltration systems and the Stormwater Management Basins have been designed to provide storage of peak runoff flows to eliminate peak flow increases. For analysis purposes, the historical (pre-development) and post-developed peak runoff flow rates have been calculated.

Peak runoff flow rates have been calculated for the 2, 10, 25, 50 and 100-year storm events using the SCS TR-20 Method and HydroCAD software. See Report Appendix-5 for Historical flow calculations and Appendix-6 for the Post- Developed flows.

There are two analysis points for this site: East and West Nodes.

East Node: Northeast Parcel Line
Analysis node is the northeasterly property line of the project parcel.
Reference Report Appendix-5 & 6 for more detailed information.
Pre-development watershed area = 13.275 acres
Post-development watershed area = 13.50 acres
(Note that the roof areas directed to infiltration are not accounted for in this figure as they do not contribute runoff to the node)

Table 8 - East Node Summary
Peak Runoff Flow Rates –Proposed Conditions vs. Existing Conditions

Storm Event	Existing Conditions To Rte 66 (CFS)	Proposed Conditions To Rte 66 (CFS)	Change in Peak Runoff Rate (CFS)
2-Year	1.44	1.12	-0.32 (22%)
10-Year	8.20	7.91	-0.29 (4%)
25-Year	14.28	13.47	-0.81 (6%)
50-Year	19.59	18.93	-0.66 (3%)
100-Year	25.30	25.05	-0.25 (1%)

As demonstrated above, the proposed stormwater management system provides peak runoff rate attenuation for all the modeled storm events. There is an average of 6% reduction in the peak rate of runoff.

West Node: "A" series wetlands
Analysis node is the "A" series wetland edge.
Reference Report Appendix-5 & 6 for more detailed information.
Pre-development watershed area = 4.0 acres
Post-development watershed area = 3.2 acres

Table 9 - West Node Summary
Peak Runoff Flow Rates –Proposed Conditions vs. Existing Conditions

Storm Event	Existing Conditions B-Series Wetland Edge (CFS)	Proposed Conditions B-Series Wetland Edge (CFS)	Change in Peak Runoff Rate (CFS)
2-Year	0.43	0.38	-0.05 (12%)
10-Year	2.50	2.22	-0.28 (11%)
25-Year	4.33	3.86	-0.47 (11%)
50-Year	5.91	5.28	-0.63 (11%)
100-Year	7.59	6.79	-0.80 (11%)

Due to the reduction in watershed area, there is a reduction peak runoff flow rate to the "A" series wetlands. There is an average of 11% reduction in the peak rate of runoff.

Summary

The proposed stormwater management system has been designed in accordance with the CT DEEP Stormwater Quality Manual and the CT DOT Drainage Manual. The proposed stormwater system provides peak flow attenuation, water quality treatment, and groundwater recharge as required.

There is an anticipated decrease in the peak runoff flow rates for the design storm events required by the Town of East Hampton regulations. The site drainage systems have been designed to encourage infiltration of the collected and treated stormwater into the groundwater table to emulate the pre-developed conditions and provide a steady source of recharge. The stormwater quality BMP devices employed on site should provide adequate protection of downstream resources.

It is our professional opinion that there will be no significant impact associated with this project upon downstream wetlands, watercourses or adjacent properties.

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EDGEWATER CIRCLE EXTENSION
EAST HAMPTON, CONNECTICUT

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PROJECT I.D. NO. 17-2524-9

The Neighborhood at Edgewater Hill Report Attachments

Table of Attachments

ATTACHMENT – 1

Catchment – Pre and Post-Developed Conditions

Watershed Catchment Areas: Pre-Development

Job Number 17-2524-9 14-May-18

Edgewater Subdivision

East Hampton, Connecticut *JPD, PE*

Watershed Characteristics: Surface Description	Area (SF)	Area (Acres)	Coefficient	AxC
EAST WATERSHED				
Northeast Parcel Corner				
Wooded	215,823	4.955	0.25	1.24
Totals:	***215,823***	***4.955***	***Total AxC =***	***1.24***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	70	0.042	
shallow concentrated	Wooded	200	0.06	
shallow concentrated - INTO WETLANDS	Wooded	150	0.187	
Wetlands J1000 - J1010	Wooded	130	0.005	
shallow concentrated	Wooded	200	0.04	
Totals:		***750***		
Central Northeast Property Line				
Wooded	87,666	2.013	0.25	0.50
Totals:	***87,666***	***2.013***	***Total AxC =***	***0.50***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	40	0.05	
shallow concentrated	Wooded	350	0.149	
Totals:		***390***		
Southern Northeast Property Line				
Wooded	274,718	6.307	0.25	1.58
Totals:	***274,718***	***6.307***	***Total AxC =***	***1.58***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	60	0.025	
shallow concentrated	Wooded	80	0.018	
shallow concentrated	Wooded	225	0.155	
Totals:		***365***		

WEST WATERSHED (VP 607-610)

To Vernal Pool Flags VP 607 - 610 & 600				
Wooded	174,454	4.005	0.25	1.00
Totals:	***174,454***	***4.005***	***Total AxC =***	***1.00***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	50	0.02	
shallow concentrated - INTO WETLANDS	Wooded	140	0.02	
shallow concentrated within wetlands	Wooded	225	0.005	
Totals:		***415***		

Watershed Catchment Areas: Post-Development

Job Number 17-2524-9 — Jun-18

Edgewater Subdivision

East Hampton, Connecticut — *JPD, PE*

Watershed Characteristics: Surface Description	Area (SF)	Area (Acres)	Coefficient	AxC
EAST WATERSHED				
Northeast Parcel Corner	All roof areas to infiltration			
Impervious - Road, Walk & Driveways	3,708	0.085	0.95	0.08
Impervious - Roof	0	0.000	0.95	0.00
Lawn/Landscaped	40,677	0.934	0.35	0.33
Wooded	91,824	2.108	0.25	0.53
Totals:	*136,209*	*3.127*	*Total AxC =*	*0.93*
Time Of Concentration:	*surface*	*Length*	*Slope*	
sheet	Wooded	75	0.067	
shallow concentrated	Wooded	85	0.26	
shallow concentrated - INTO WETLANDS	Wooded	50	0.12	
Wetlands J1000 - J1010	Wooded	130	0.005	
shallow concentrated	Wooded	200	0.04	
Totals:		*540*		
Central Northeast Property Line				
Areas Overland to Node				
Lawn/Landscaped	13,904	0.319	0.35	0.11
Wooded	7,295	0.167	0.25	0.04
Totals:	*21,199*	*0.487*	*Total AxC =*	*0.15*
Time Of Concentration:	*surface*	*Length*	*Slope*	
sheet	Wooded	50	0.2	
shallow concentrated	Wooded	75	0.19	
shallow concentrated	Wooded	165	0.073	
Totals:		*290*		
Areas Overland To SMB-1				
Impervious - Driveways	2,039	0.047	0.95	0.04
Lawn/Landscaped	18,041	0.414	0.35	0.14
Wooded	2,444	0.056	0.25	0.01
Totals:	*22,524*	*0.517*	*Total AxC =*	*0.20*
Time Of Concentration:	*surface*	*Length*	*Slope*	
sheet	Grassed	90	0.29	
Totals:		*90*		
Areas Overland To SMB-2				
Lawn/Landscapec	14,663	0.337	0.35	0.12
Totals:	*14,663*	*0.337*	*Total AxC =*	*0.12*
Time Of Concentration:	*surface*	*Length*	*Slope*	
sheet	Grassed	140	0.28	
Totals:		*140*		
Areas Overland To Swale				
Impervious - Driveways	5,544	0.127	0.95	0.12
Lawn/Landscaped	47,569	1.092	0.35	0.38
Wooded	14,716	0.338	0.25	0.08
Totals:	*67,829*	*1.557*	*Total AxC =*	*0.59*
Time Of Concentration:	*surface*	*Length*	*Slope*	
sheet	Grassed	85	0.059	
sheet	Grassed	175	0.074	
Totals:		*260*		

CB-1				
Impervious - Road, Walk & Driveways	2,112	0.048	0.95	0.05
Future Road	2,688	0.062	0.95	0.06
Lawn/Landscapec	1,055	0.024	0.35	0.01
Totals:	***5,855***	***0.134***	***Total AxC =***	***0.11***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	60	0.02	
shallow concentrated	Paved	60	0.05	
Totals:		***120***		
CB-2				
Impervious - Road, Walk & Driveways	1,584	0.036	0.95	0.03
Future Road	2,688	0.062	0.95	0.06
Lawn/Landscapec	758	0.017	0.35	0.01
Totals:	***5,030***	***0.115***	***Total AxC =***	***0.10***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Lawn	15	0.02	
shallow concentrated	Paved	100	0.05	
Totals:		***115***		
CB-3				
Impervious - Road, Walk & Driveways	6,255	0.144	0.95	0.14
Impervious - Roof	0	0.000	0.95	0.00
Lawn/Landscaped	11,204	0.257	0.35	0.09
Wooded	5,149	0.118	0.25	0.03
Totals:	***22,608***	***0.519***	***Total AxC =***	***0.26***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Lawn	80	0.05	
shallow concentrated	Lawn	60	0.05	
shallow concentrated	Paved	180	0.06	
Totals:		***320***		
CB-4				
Impervious - Road, Walk & Driveways	3,065	0.070	0.95	0.07
Lawn/Landscapec	1,021	0.023	0.35	0.01
Totals:	***4,086***	***0.094***	***Total AxC =***	***0.08***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Lawn	15	0.02	
shallow concentrated	Paved	250	0.045	
Totals:		***265***		
CB-5				
Impervious - Road, Walk & Driveways	6,166	0.142	0.95	0.13
Impervious - Roof	0	0.000	0.95	0.00
Lawn/Landscaped	28,417	0.652	0.35	0.23
Wooded	655	0.015	0.25	0.00
Totals:	***35,238***	***0.809***	***Total AxC =***	***0.37***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	100	0.035	
shallow concentrated	Wooded	45	0.03	
shallow concentrated	Paved	60	0.03	
Totals:		***205***		
CB-6				
Impervious - Road, Walk & Driveways	3,435	0.079	0.95	0.07
Lawn/Landscapec	1,145	0.026	0.35	0.01
Totals:		***0.105***	***Total AxC =***	***0.08***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Lawn	15	0.02	
shallow concentrated	Paved	275	0.06	
Totals:		***290***		

CB-7				
Impervious - Road, Walk & Driveways	4,600	0.106	0.95	0.10
Impervious - Roof	0	0.000	0.95	0.00
Future Road	1,200	0.028	0.95	0.03
Lawn/Landscaped	13,013	0.299	0.35	0.10
Wooded	2,386	0.055	0.25	0.01
Totals:	***21,199***	***0.487***	***Total AxC =***	***0.24***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	40	0.015	
shallow concentrated	Paved	210	0.04	
Totals:		***250***		

CB-8				
Impervious - Road, Walk & Driveways	3,532	0.081	0.95	0.08
Impervious - Roof	0	0.000	0.95	0.00
Future Road	1,200	0.028	0.95	0.03
Lawn/Landscapec	4,952	0.114	0.35	0.04
Totals:	***9,684***	***0.222***	***Total AxC =***	***0.14***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Lawn	65	0.02	
shallow concentrated	Paved	140	0.04	
Totals:		***205***		

CB-9				
Impervious - Road, Walk & Driveways	9,536	0.219	0.95	0.21
Impervious - Roof	0	0.000	0.95	0.00
Lawn/Landscaped	26,746	0.614	0.35	0.21
Wooded	2,089	0.048	0.25	0.01
Totals:	***38,371***	***0.881***	***Total AxC =***	***0.43***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	45	0.015	
shallow concentrated	Lawn	155	0.01	
shallow concentrated	Paved	65	0.01	
Totals:		***265***		

CB-10				
Impervious - Road, Walk & Driveways	5,667	0.130	0.95	0.12
Lawn/Landscaped	4,352	0.100	0.35	0.03
Wooded	3,312	0.076	0.25	0.02
Totals:	***13,331***	***0.306***	***Total AxC =***	***0.18***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	80	0.04	
shallow concentrated	Lawn	20	0.1	
shallow concentrated	Paved	140	0.02	
Totals:		***240***		

Southern Northeast Parcel corner				
Impervious - Driveways	545	0.013	0.95	0.01
Lawn/Landscaped	20,865	0.479	0.35	0.17
Wooded	141,286	3.243	0.25	0.81
Totals:	***162,696***	***3.735***	***Total AxC =***	***0.81***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	110	0.01	
shallow concentrated	Wooded	300	0.07	
shallow concentrated	Wooded	175	0.23	
Totals:		***585***		

WEST WATERSHED (VP 607-610)

To Vernal Pool Flags VP 607 - 610 & 600				
Lawn/Landscaped	6,076	0.139	0.35	0.05
Wooded	132,687	3.046	0.25	0.76
Totals:	***138,763***	***3.186***	***Total AxC =***	***0.76***
Time Of Concentration:	***surface***	***Length***	***Slope***	
sheet	Wooded	80	0.015	
shallow concentrated - Wetlands	Wooded	225	0.005	
Totals:		***305***		

ATTACHMENT – 2

Gutterflow Analysis

GUTTERFLOW ANALYSIS
10-Year Storm

Boundaries LLC
179 Pachaug River Drive
Griswold, CT

Date: 6/19/2018

Analysis based upon CT DOT Drainage Manual
Uniform Cross Slope Pavement (0.0208ft/ft)
Manning's "n" = 0013
Allowable Flow width = 1/2 lane = 12'/2 = 6' for 10-Year Storm (CT DOT)

Inlet Description	Drainage Area "A" (Ac)	Drainage Area "A" x Runoff Coef. "C"	Time to Inlet (min)	System Flow time (min)	Rainfall Intensity "I" (in/hr)	A x C	Total A x C (To Inlet + previous bypass)	Flow to Inlet "Q" (cfs)	Gutter Grade (ft/ft)	Cross Slope (ft/ft)	Flow Width at Gutter "T" (ft)	Flow Depth at Gutter "d" (ft)	Bypass Q (cfs)	AC Bypass	AC into Inlet
Edgewater Circle															
PCB-1 Road Sta 25+00R	0.204	0.10	7.40	0.01	6.39	0.10	0.10	0.64	0.060	0.0208	3.94	0.082	0.00	0.00	0.10
PCB-2 Road Sta 25+00L	0.084	0.05	7.41	0.20	6.38	0.05	0.05	0.32	0.060	0.0208	3.04	0.063	0.00	0.00	0.05
PCB-3 Road Sta 22+50R	0.519	0.26	6.70	0.10	6.69	0.26	0.26	1.74	0.060	0.0208	5.74	0.119	1.02	0.15	0.11
PCB-4 Road Sta 22+50L	0.094	0.08	7.61	0.10	6.27	0.08	0.23	1.46	0.060	0.0208	5.37	0.112	0.82	0.13	0.10
PCB-5 Road Sta 21+18R*	0.809	0.37	30.30	0.01	2.81	0.37	0.52	1.47	0.010	0.0208	7.53	0.157	0.00	N/A	0.52
PCB-6 Road Sta 21+18L*	0.105	0.08	30.31	1.53	2.80	0.08	0.21	0.59	0.010	0.0208	5.35	0.111	0.00	N/A	0.21
PCB-7 Road Sta 0+34L	0.579	0.30	12.20	0.35	4.76	0.30	0.30	1.43	0.025	0.0208	6.28	0.131	0.00	0.00	0.30
PCB-8 Road Sta 18+63R	0.240	0.16	7.40	0.06	6.39	0.16	0.16	1.02	0.025	0.0208	5.54	0.115	0.00	0.00	0.16
PCB-9 Road Sta 17+12R*	0.881	0.43	16.60	1.19	4.01	0.43	0.43	1.72	0.010	0.0208	8.00	0.166	0.00	N/A	0.43
PCB-10 Road Sta 17+12L*	0.306	0.18	14.50	0.23	4.23	0.18	0.18	0.76	0.010	0.0208	5.89	0.122	0.00	N/A	0.18

Note: Inlets denoted with * are Sag condition
Inlets denoted with "DBL" are Double Grate Inlets
System Flow Time from HydroCAD modeling
Rainfall Intesity values interpolated from NOAA PDS-based precipitation frequency estimates (inches/hour)

Inlet Capacity Notes:

1. Type C basins w/ type A grate: Length clear opening = 2.31', Width of clear opening=1.35', Perimeter=5.02', Area=3.13sf
2. Type C basin, Type A grate, DOUBLE: Perimeter = 7.33', Area=6.26'
3. Type C-L basin w/ type A grate: Perimeter=7.33', Area=3.13'
4. Type C-L basin w/ Type A grate-DOUBLE: Perimeter=11.96', Area=6.26sf
5. C-L Grate in sag requires clogging factor: Cfs=2.0 expressway, parking lots and other depressed sags
   Cfs=1.25 expressway medians, swales, ditches where minimal tree growth is expected

ATTACHMENT - 3

Outlet Protection Design Calculations

The Neighborhood at Edgewater Hill
Outlet Protection Design Calculations

Empirical Preformed Scour Hole Equations:

Type 1: Scour Hole Depression = one-half pipe rise, m (ft)

$d_{50} = (0.0276\ R_p^2\ /TW)\ (Q/R_p^{2.5})^{1.333}$ ($d_{50} = (0.0125R_p^2/TW)\ (Q/R_p^{2.5})^{1.333}$) **(11.35)**

Type 1 and 2 preformed scour hole dimensions (See Figure 11-15)

$C = 3S_p + 6F$	Basin Length m (ft)	
$B = 2S_p + 6F$	Basin Inlet and Outlet Width m (ft)	**(11.37)**
$F = 0.5R_p$ (Type 1) or R_p (Type 2)	Basin Depression m (ft)	

Table 11-14 solves the above set of equations for Type 1 and 2 preformed scour holes for various pipe sizes.

The type of riprap required is as follows:

Modified	$d_{50} < 0.13$m (0.42 ft)
Intermediate	0.13m (0.42 ft) $< d_{50} <$ 0.20m (0.67 ft)
Standard	0.20m (0.67 ft) $< d_{50} <$ 0.38m (1.25 ft)

L_a = length of apron, m (ft)
S_p = inside diameter for circular sections or maximum inside pipe span for non-circular sections, m (ft)
Q = pipe (design) discharge, cms (cfs)
TW = tailwater depth, m (ft)
R_p = maximum inside pipe rise, m (ft)
Note: $S_p = R_p$ = inside diameter for circular sections

DMH 2 Discharge to SMB 1

S_p=	24 Inches	Pipe Diameter
Q=	9.9 CFS	25-year flow
d_{50}=	0.11 FT	Equation 11.35, Use Modified Riprap
F=	1.00 FT	Equation 11.37
C=	12.0 FT	Equation 11.37
B=	10 FT	Equation 11.37

SMB-1 Outlet Structure to LS-1 Level Spreader

S_p=	18 Inches	Pipe Diameter
Q=	7.5 CFS	25-year flow
d_{50}=	0.11 FT	Equation 11.35, Use Modified Riprap
F=	0.75 FT	Equation 11.37
C=	9.0 FT	Equation 11.37
B=	7.5 FT	Equation 11.37

Cross Culvert Beneath SMB Access Maintenance Road

S_p=	12 Inches	Pipe Diameter
Q=	0.5 CFS	25-year flow
d_{50}=	0.00 FT	Equation 11.35, Use Modified Riprap
F=	0.50 FT	Equation 11.37
C=	6.0 FT	Equation 11.37
B=	5 FT	Equation 11.37

ATTACHMENT – 4

Water Quality Volume Calculations

The Neighborhood at Edgewater Hill

Water Quality Flow Calculations

STORMWATER MANAGEMENT BASINS 1

Water Quality Volume for Stormwater Treatment System Sizing

WQV = (1")(R)(A)/12

WQV = Water Quality Volume (acre-feet)

R = Runoff Co-Efficient = 0.005 + 0.009(I)

I = Impervious Area (%)

A = Site Area (acres)

IA=	1.06
I =	22.57 %
R =	0.21
A =	4.68

WQV = 0.08 acre-feet

= **3,531.54 cubic feet**

Water Quality Flow

Modified TR-55 Method as described in Appendix B of the Stormwater Quality Manual

$$CN = \frac{1000}{[10 + 5P + 10Q - 10(Q^2 + 1.25QP)^{1/2}]}$$

P=	1 inch	
Q=	(WQVx12)/DA	
WQV=	0.08 acre-feet	
DA=	4.68 acres	
Q=	0.21 inches	
CN=	86.41	
Ia=	0.184 in	From Appendix B, Table 4-1
Tc=	0.250 hours	From HydroCAD, plus pipe travel time
qu=	650 csm/in	From Appendix B, Exhibit 4-III
WQF=	(qu)x(DA)x(Q)	
WQF=	**0.99 cfs**	

The Neighborhood at Edgewater Hill

Water Quality Flow Calculations

STORMWATER MANAGEMENT BASINS 2

Water Quality Volume for Stormwater Treatment System Sizing

WQV = (1")(R)(A)/12

WQV = Water Quality Volume (acre-feet)

R = Runoff Co-Efficient = 0.005 + 0.009(I)

I = Impervious Area (%)

A = Site Area (acres)

IA=	0.13	
I =	8.16	%
R =	0.08	
A =	1.56	

WQV =	0.01	acre-feet
=	**443.17**	**cubic feet**

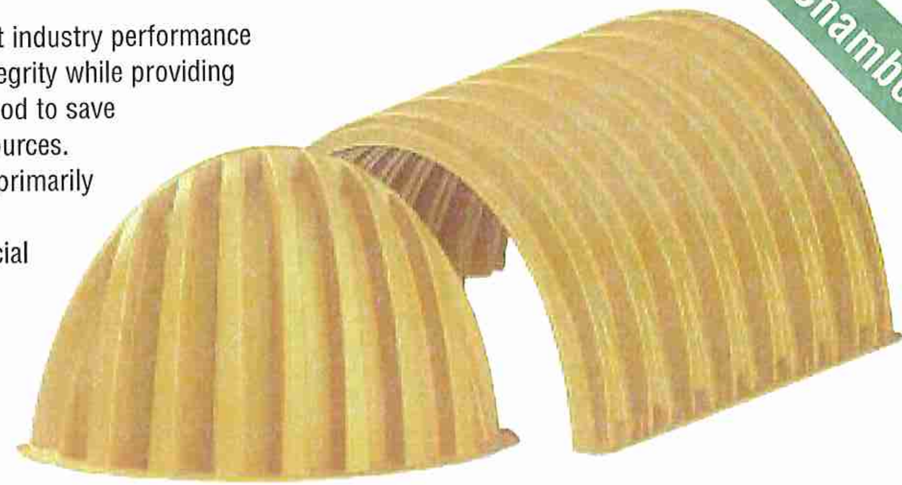
ATTACHMENT – 5

StormTech 3500 Information

StormTech MC-3500 Chamber

MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.



StormTech MC-3500 Chamber (not to scale)

Nominal Chamber Specifications

Size (L x W x H)	90" (2286 mm) x 77" (1956 mm) x 45" (1143 mm)
Chamber Storage	109.9 ft³ (3.11 m³)
Min. Installed Storage*	178.9 ft³ (5.06 m³)
Weight	134 lbs (60.8 kg)

* This assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 9" (230 mm) of stone between chambers/end caps and 40% stone porosity.

StormTech MC-3500 End Cap (not to scale)

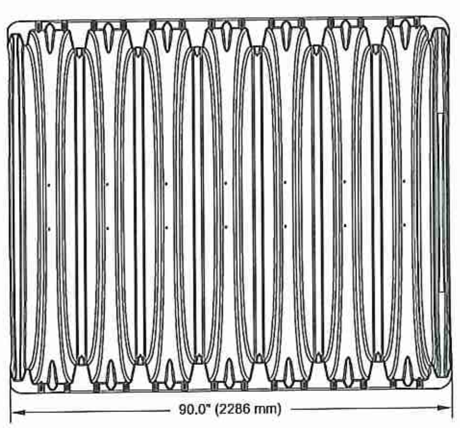
Nominal End Cap Specifications

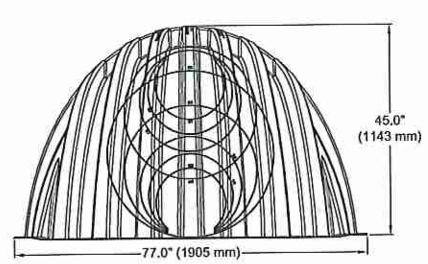
Size (L x W x H)	26.5" (673 mm) x 71" (1803 mm) x 45.1" (1145 mm)
End Cap Storage	14.9 ft³ (0.42 m³)
Min. Installed Storage*	46.0 ft³ (1.30 m³)
Weight	49 lbs (22.2 kg)

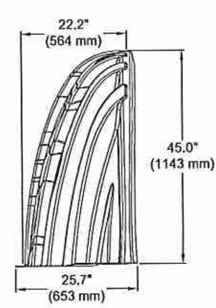
*This assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 6" (150 mm) of stone perimeter, 9" (230 mm) of stone between chambers/end caps and 40% stone porosity.

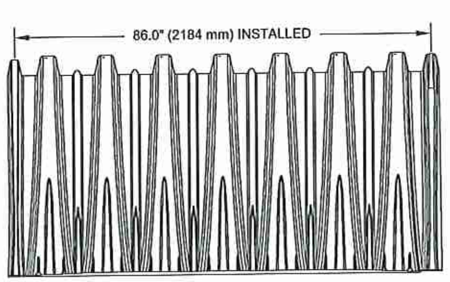
Shipping

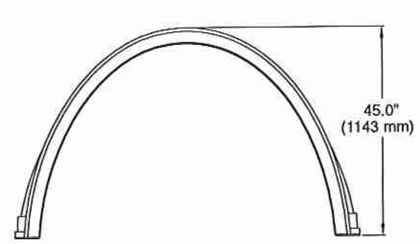
- 15 chambers/pallet
- 16 end caps/pallet
- 7 pallets/truck











StormTech MC-3500 Chamber

Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
	ft³ (m³)	9 (230)	12 (300)	15 (375)	18 (450)
MC-3500 Chamber	109.9 (3.11)	178.9 (5.06)	184.0 (5.21)	189.2 (5.36)	194.3 (5.5)
MC-3500 End Cap	14.9 (0.42)	46.0 (1.33)	47.7 (1.35)	49.4 (1.40)	51.1 (1.45)

NOTE: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 6" (150 mm) stone perimeter.

Amount of Stone Per Chamber

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-3500	9.1 (6.4 yd³)	9.7 (6.9 yd³)	10.4 (7.3 yd³)	11.1 (7.8 yd³)
End Cap	4.1 (2.9 yd³)	4.3 (3.0 yd³)	4.5 (3.2 yd³)	4.7 (3.3 yd³)
METRIC kg (m³)	230 mm	300 mm	375 mm	450 mm
MC-3500	8220 (4.9 m³)	8831 (5.3 m³)	9443 (5.6 m³)	10054 (6.0 m³)
End Cap	3699 (2.2 m³)	3900 (2.3 m³)	4100 (2.5 m³)	4301 (2.6 m³)

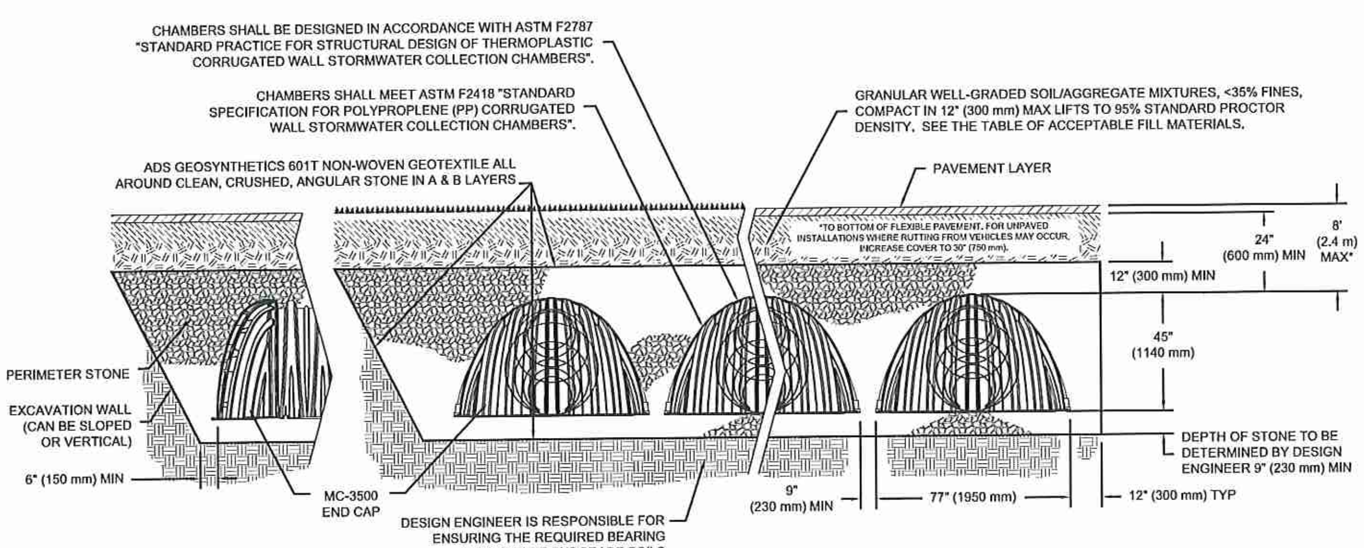
NOTE: Assumes 12" (300 mm) of stone above, and 9" (230 mm) row spacing, and 6" (150 mm) of perimeter stone in front of end caps.

Volume of Excavation Per Chamber/End Cap in yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-3500	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)	13.8 (10.5)
End Cap	4.1 (3.1)	4.2 (3.2)	4.4 (3.3)	4.5 (3.5)

NOTE: Assumes 9" (230 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as the depth of cover increases.

General Cross Section

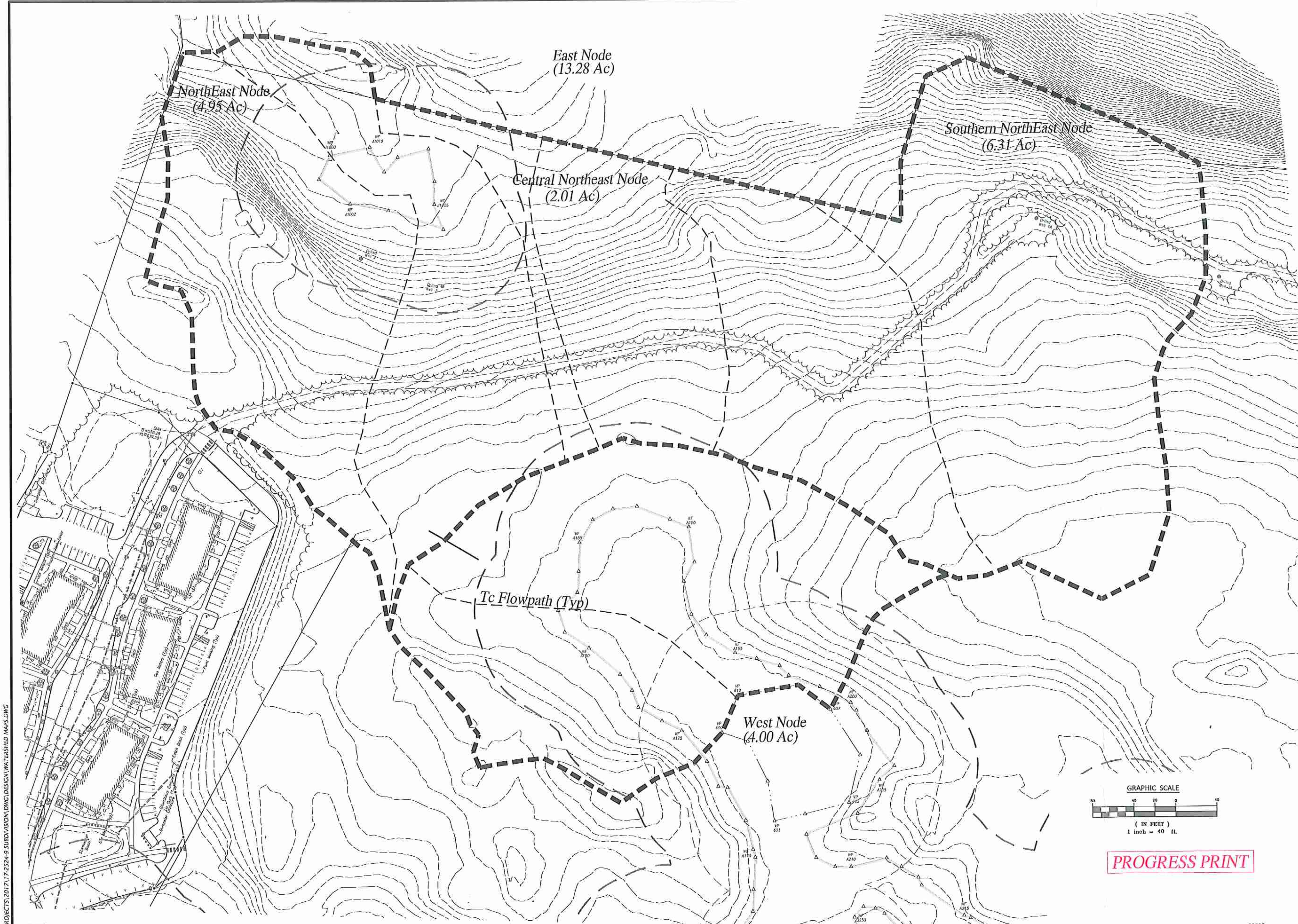


*FOR COVER DEPTHS GREATER THAN 8.0' PLEASE CONTACT STORMTECH

THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS, WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.

ATTACHMENT – 6

Watershed Maps



JEFFREY DEWEY, P.E. 20003
LICENSE NO. DATE

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BOUNDARIES
CIVIL ENGINEERING LAND SURVEYING LAND USE PLANNING SOIL SCIENCE
Boundaries LLC
179 Pachaug River Drive, Griswold, CT 06351
T 860.376.2006 | www.boundariesllc.net

Improvement Location & Topographic Survey
"Pre-Development Watershed Map"
The Neighborhood at Edgewater Hill
Edgewater Enterprises, LLC
Edgewater Circle East Hampton, Connecticut

SCALE: 1" = 40'
DATE: August 2018
JOB I.D. NO. 17-2524-9
Revisions

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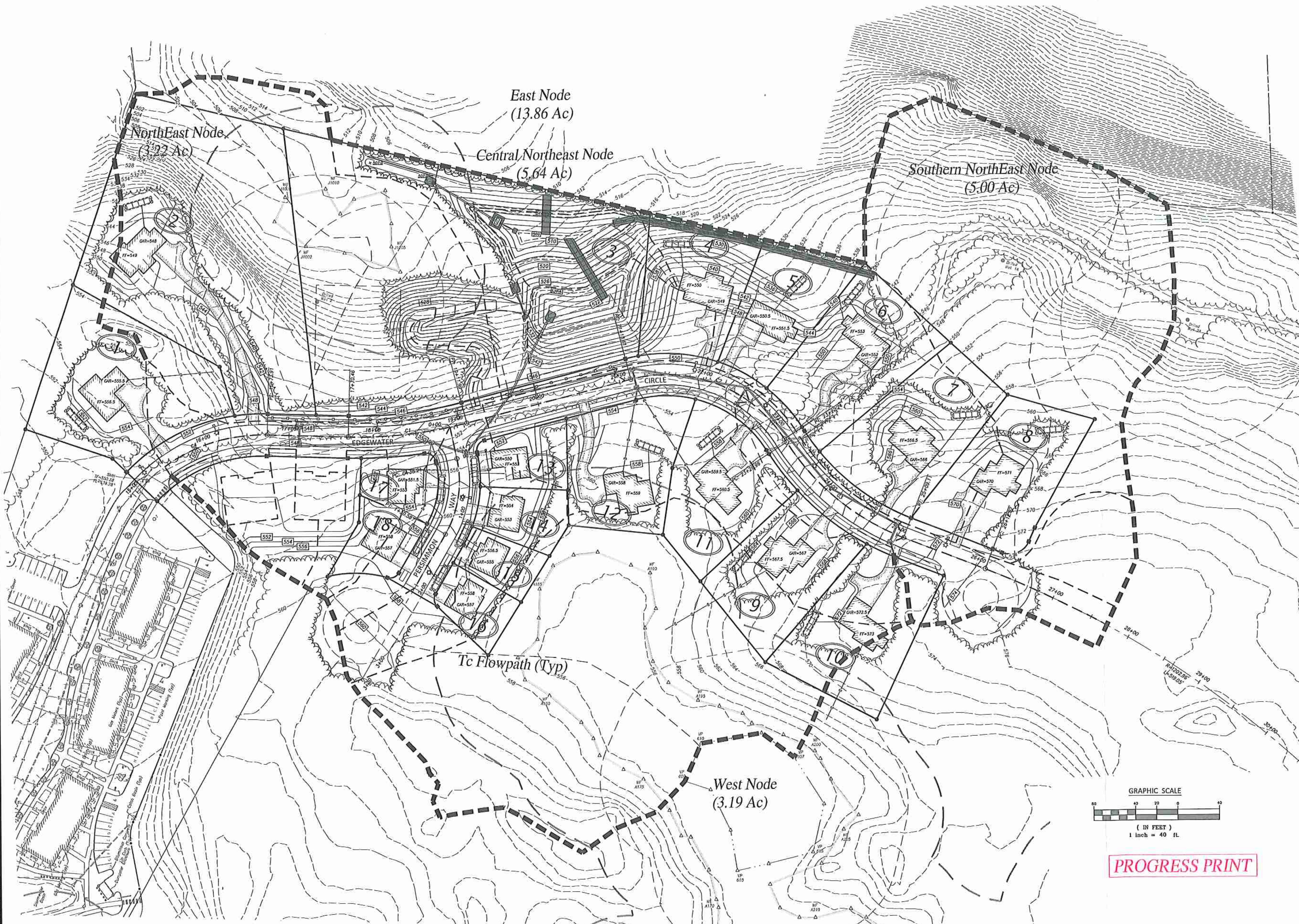

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