

Drainage Report

For:

**89-97 Washington Street
Weymouth, MA**

Prepared By:



**Hardy + Man Design Group, PC
1285 Washington Street
Weymouth, MA 02189**

March 22, 2024



Existing Site Conditions

The existing site is a 27,007 SF parcel of land located on Washington Street between Front Street and Broad Street. The parcel currently contains an existing commercial building with paved parking.

The topography of the site generally slopes downwards from approximate elevation 50 at the corner of the lot adjacent to Weston Park, to approximate elevation 40 at the front corner of the lot.

According to the NRCS Soil Survey and test pit information, the soils on-site are classified as sandy loam, hydrologic group B soil. The groundwater table is approximately 20 inches below grade.

Under the current conditions, there are no stormwater controls on site. Runoff from the site generally drains untreated toward the street. The site also is within the FEMA Flood Zone X, or area of minimal flood hazard.

Methodology

This drainage analysis utilizes TR-55 drainage guidelines which is an industry standard for urban hydrology small watersheds. The accompanying calculations analyze the impact to runoff from the proposed site development under a 24-hour 8.11-inch rain event, which is approximate to a 100-year storm event. Calculations were also performed for 25-year, 10-year, and 2-year storm events.

Proposed Conditions

The applicant proposes to demolish the existing building to construct a proposed 4-story mixed-use building with appurtenances as depicted on the accompanying site plans. The building is to have approximately 2,000 S.F. of retail space and 38 parking spaces on the first (ground) floor. The upper 3 stories are proposed to have 20 residential units, gym space, a meeting room and outdoor patio space. Site access will be provided by a proposed curb cut on Washington Street to the proposed parking area.

The proposed impervious coverage on the site will decrease from 24,255 SF to approximately 21,232 SF, resulting in 3,023 SF less impervious area. Runoff from the proposed roof will be collected by roof drain systems and routed to a proposed relocated drain pipe discharging to the Town Drain system. Runoff from paved drive areas is proposed to be collected in a Stormceptor 450i unit for treatment prior to discharge to the Town drainage system. The decrease in impervious areas results in a decrease in stormwater flows and the presence of high groundwater makes infiltration infeasible at this site.

The following table depicts the peak runoff rates and volumes for the existing and proposed conditions for different storm events. For reference the HydroCAD report has been attached to this report.

Peak Discharge Rates (cfs)

	2-year	10-year	25-year	100-year
Existing Conditions	1.75	2.89	3.59	4.67
Proposed Conditions	1.37	2.36	3.00	4.03

Runoff Volume (af)

	2-year	10-year	25-year	100-year
Existing Conditions	0.130	0.222	0.280	0.369
Proposed Conditions	0.114	0.194	0.246	0.329

Additionally, we have attached a HydroCAD report modelling the relocation of an existing 24-inch drain pipe that runs through the existing site. Based on the modelled flows, we are proposing to replace the pipe with a 15-inch PVC pipe

Erosion and Sedimentation Control Measures

Erosion control measures to be employed include a staked "Filter Sock" erosion control barrier. The barrier shall be inspected daily and be kept in place until such time that disturbed areas are re-vegetated or paved and are no longer a potential source of siltation. Additionally, a stabilized construction entrance will be installed.

Conclusion

The proposed redevelopment of the site will reduce the stormwater runoff flowrate by increasing pervious (landscaped) area. The result is a decrease in peak runoff rate and volume for the 2, 10 and 25-year and 100-year design events. Additionally, runoff from paved surfaces will be collected and treated prior to discharge.

During construction, the proposed erosion control measures protect sedimentation from construction activities from migrating from the site onto the public street and abutting properties.

The proposed stormwater management and erosion control design of the proposed development will meet the DEP Stormwater standards.

Stormwater Operation and Maintenance Plan

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Weymouth, MA
March 22, 2024

Stormwater Management System Owner:

Property Owner

The following Operation and Maintenance Plan is intended as a guide for maintaining the structural and non-structural BMP's post-construction. In order to document maintenance activities, the attached maintenance log should be kept on site. A minimum of two years' worth of records should be up to date and available for review and inspection, if requested by Town officials. The transfer of ownership (e.g. from developer to condo association or apartment complex owner) also includes the transfer of the maintenance obligation to the new owners. In order to ensure the proposed stormwater management system continues to function as designed and to prevent any adverse impacts down-gradient, proper maintenance is required.

Operation and Maintenance Plan During Construction

All erosion and sediment control measures must be in place prior to any disturbance.

Inlet Protection: catch basins shall be protected from siltation during construction through the use of siltation fabric. The siltation fabric must be installed under the catch basin grates and the grates must be secured to prevent untreated seepage. The fabric should be inspected daily and immediately after a rainstorm. Sediment deposits must be removed promptly and fabric must be repaired as necessary.

Perimeter Silt Protection: A "Silt Sock" (or approved equal) perimeter fence must be installed around the perimeter of work limits and material stockpiles. Installation shall be in accordance with manufacturer specifications and attached details. Silt fence shall be inspected daily. Trapped sediments shall be removed and repairs shall be made promptly.

Operation and Maintenance Activities

Driveway Sweeping: The parking lot shall be swept 2 times per year. More importantly early Spring after snow melt and late Fall after leaves fall.

Trench Drain and Stormceptor: The trench drains and stormceptor unit shall be inspected at least four (4) times per year and cleaned a minimum of two (2) times per year. Inspections should include the frames and grates, outlet pipes, and overall structure. Cleaning shall be conducted in the early spring (after winter sanding and before spring rains). The trench drain shall be cleaned utilizing a vacuum or clamshell type device. The Stormceptor shall be cleaned in accordance with manufacturer recommendations.

HydroCAD Report



Existing (89-93
Washington st)



Proposed Building



15" PVC Pipe



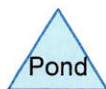
Off-Site



Proposed Driveway to
450i



TOTAL OFF-SITE



Routing Diagram for 89-93 Washington st WeymouthSPH3-22-24
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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing (89-93) Runoff Area=27,007 sf 89.81% Impervious Runoff Depth>2.52"
Tc=6.0 min CN=92 Runoff=1.75 cfs 0.130 af

Subcatchment 3S: Proposed Building Runoff Area=14,313 sf 100.00% Impervious Runoff Depth>3.14"
Tc=6.0 min CN=98 Runoff=1.05 cfs 0.086 af

Subcatchment 8S: Off-Site Runoff Area=8,608 sf 39.20% Impervious Runoff Depth>0.56"
Tc=6.0 min CN=62 Runoff=0.09 cfs 0.009 af

Subcatchment 13S: Proposed Driveway to Runoff Area=4,086 sf 86.76% Impervious Runoff Depth>2.33"
Tc=6.0 min CN=90 Runoff=0.25 cfs 0.018 af

Reach 9R: 15" PVC Pipe Avg. Flow Depth=0.30' Max Vel=4.67 fps Inflow=1.05 cfs 0.086 af
15.0" Round Pipe n=0.010 L=161.5' S=0.0100 '/' Capacity=8.38 cfs Outflow=1.03 cfs 0.086 af

Reach 12R: TOTAL OFF-SITE Inflow=1.37 cfs 0.114 af
Outflow=1.37 cfs 0.114 af

Total Runoff Area = 1.240 ac Runoff Volume = 0.244 af Average Runoff Depth = 2.36"
15.79% Pervious = 0.196 ac 84.21% Impervious = 1.044 ac

Summary for Subcatchment 1S: Existing (89-93 Washington st)

Runoff = 1.75 cfs @ 12.09 hrs, Volume= 0.130 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.38"

Area (sf)	CN	Description
10,009	98	Roofs, HSG A
14,073	98	Paved parking, HSG A
2,752	39	>75% Grass cover, Good, HSG A
* 173	98	Shed, HSG A
27,007	92	Weighted Average
2,752		10.19% Pervious Area
24,255		89.81% Impervious Area

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

Summary for Subcatchment 3S: Proposed Building

Runoff = 1.05 cfs @ 12.09 hrs, Volume= 0.086 af, Depth> 3.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.38"

Area (sf)	CN	Description
14,313	98	Roofs, HSG A
14,313		100.00% Impervious Area

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

Summary for Subcatchment 8S: Off-Site

Runoff = 0.09 cfs @ 12.12 hrs, Volume= 0.009 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.38"

Area (sf)	CN	Description
* 1,862	98	Side Walkway, HSG A
5,234	39	>75% Grass cover, Good, HSG A
* 1,512	98	Front Walkway, HSG A
8,608	62	Weighted Average
5,234		60.80% Pervious Area
3,374		39.20% Impervious Area

89-93 Washington st WeymouthSPH3-22-24

Type III 24-hr 2 year Rainfall=3.38"

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

Summary for Subcatchment 13S: Proposed Driveway to 450i

Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.018 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.38"

Area (sf)	CN	Description
3,545	98	Paved parking, HSG A
541	39	>75% Grass cover, Good, HSG A
4,086	90	Weighted Average
541		13.24% Pervious Area
3,545		86.76% Impervious Area

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

Summary for Reach 9R: 15" PVC Pipe

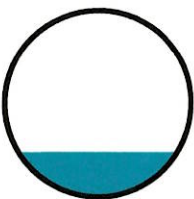
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 100.00% Impervious, Inflow Depth > 3.14" for 2 year event
 Inflow = 1.05 cfs @ 12.09 hrs, Volume= 0.086 af
 Outflow = 1.03 cfs @ 12.10 hrs, Volume= 0.086 af, Atten= 2%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 4.67 fps, Min. Travel Time= 0.6 min
 Avg. Velocity= 1.54 fps, Avg. Travel Time= 1.7 min

Peak Storage= 37 cf @ 12.09 hrs
 Average Depth at Peak Storage= 0.30'
 Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 8.38 cfs

15.0" Round Pipe
 n= 0.010 PVC, smooth interior
 Length= 161.5' Slope= 0.0100 '/'
 Inlet Invert= 40.77', Outlet Invert= 39.16'



Summary for Reach 12R: TOTAL OFF-SITE

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

Inflow Area = 0.620 ac, 78.62% Impervious, Inflow Depth > 2.20" for 2 year event
Inflow = 1.37 cfs @ 12.10 hrs, Volume= 0.114 af
Outflow = 1.37 cfs @ 12.10 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing (89-93) Runoff Area=27,007 sf 89.81% Impervious Runoff Depth>4.29"
Tc=6.0 min CN=92 Runoff=2.89 cfs 0.222 af

Subcatchment 3S: Proposed Building Runoff Area=14,313 sf 100.00% Impervious Runoff Depth>4.97"
Tc=6.0 min CN=98 Runoff=1.64 cfs 0.136 af

Subcatchment 8S: Off-Site Runoff Area=8,608 sf 39.20% Impervious Runoff Depth>1.57"
Tc=6.0 min CN=62 Runoff=0.33 cfs 0.026 af

Subcatchment 13S: Proposed Driveway to Runoff Area=4,086 sf 86.76% Impervious Runoff Depth>4.08"
Tc=6.0 min CN=90 Runoff=0.42 cfs 0.032 af

Reach 9R: 15" PVC Pipe Avg. Flow Depth=0.37' Max Vel=5.30 fps Inflow=1.64 cfs 0.136 af
15.0" Round Pipe n=0.010 L=161.5' S=0.0100 '/' Capacity=8.38 cfs Outflow=1.61 cfs 0.136 af

Reach 12R: TOTAL OFF-SITE Inflow=2.36 cfs 0.194 af
Outflow=2.36 cfs 0.194 af

Total Runoff Area = 1.240 ac Runoff Volume = 0.415 af Average Runoff Depth = 4.02"
15.79% Pervious = 0.196 ac 84.21% Impervious = 1.044 ac

Summary for Subcatchment 1S: Existing (89-93 Washington st)

Runoff = 2.89 cfs @ 12.09 hrs, Volume= 0.222 af, Depth> 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.21"

Area (sf)	CN	Description
10,009	98	Roofs, HSG A
14,073	98	Paved parking, HSG A
2,752	39	>75% Grass cover, Good, HSG A
* 173	98	Shed, HSG A
27,007	92	Weighted Average
2,752		10.19% Pervious Area
24,255		89.81% Impervious Area

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

Summary for Subcatchment 3S: Proposed Building

Runoff = 1.64 cfs @ 12.09 hrs, Volume= 0.136 af, Depth> 4.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.21"

Area (sf)	CN	Description
14,313	98	Roofs, HSG A
14,313		100.00% Impervious Area

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

Summary for Subcatchment 8S: Off-Site

Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.026 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.21"

Area (sf)	CN	Description
* 1,862	98	Side Walkway, HSG A
5,234	39	>75% Grass cover, Good, HSG A
* 1,512	98	Front Walkway, HSG A
8,608	62	Weighted Average
5,234		60.80% Pervious Area
3,374		39.20% Impervious Area

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

Summary for Subcatchment 13S: Proposed Driveway to 450i

Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.032 af, Depth> 4.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=5.21"

Area (sf)	CN	Description
3,545	98	Paved parking, HSG A
541	39	>75% Grass cover, Good, HSG A
4,086	90	Weighted Average
541		13.24% Pervious Area
3,545		86.76% Impervious Area

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

Summary for Reach 9R: 15" PVC Pipe

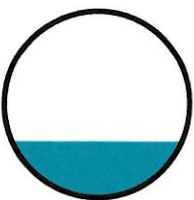
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 100.00% Impervious, Inflow Depth > 4.97" for 10 year event
Inflow = 1.64 cfs @ 12.09 hrs, Volume= 0.136 af
Outflow = 1.61 cfs @ 12.10 hrs, Volume= 0.136 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.30 fps, Min. Travel Time= 0.5 min
Avg. Velocity= 1.77 fps, Avg. Travel Time= 1.5 min

Peak Storage= 50 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 8.38 cfs

15.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 161.5' Slope= 0.0100 '/'
Inlet Invert= 40.77', Outlet Invert= 39.16'



Summary for Reach 12R: TOTAL OFF-SITE

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

Inflow Area = 0.620 ac, 78.62% Impervious, Inflow Depth > 3.75" for 10 year event
Inflow = 2.36 cfs @ 12.10 hrs, Volume= 0.194 af
Outflow = 2.36 cfs @ 12.10 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing (89-93) Runoff Area=27,007 sf 89.81% Impervious Runoff Depth>5.41"
Tc=6.0 min CN=92 Runoff=3.59 cfs 0.280 af

Subcatchment 3S: Proposed Building Runoff Area=14,313 sf 100.00% Impervious Runoff Depth>6.11"
Tc=6.0 min CN=98 Runoff=2.00 cfs 0.167 af

Subcatchment 8S: Off-Site Runoff Area=8,608 sf 39.20% Impervious Runoff Depth>2.33"
Tc=6.0 min CN=62 Runoff=0.51 cfs 0.038 af

Subcatchment 13S: Proposed Driveway to Runoff Area=4,086 sf 86.76% Impervious Runoff Depth>5.18"
Tc=6.0 min CN=90 Runoff=0.53 cfs 0.041 af

Reach 9R: 15" PVC Pipe Avg. Flow Depth=0.42' Max Vel=5.60 fps Inflow=2.00 cfs 0.167 af
15.0" Round Pipe n=0.010 L=161.5' S=0.0100 ' / ' Capacity=8.38 cfs Outflow=1.96 cfs 0.167 af

Reach 12R: TOTAL OFF-SITE Inflow=3.00 cfs 0.246 af
Outflow=3.00 cfs 0.246 af

Total Runoff Area = 1.240 ac Runoff Volume = 0.526 af Average Runoff Depth = 5.09"
15.79% Pervious = 0.196 ac 84.21% Impervious = 1.044 ac

Summary for Subcatchment 1S: Existing (89-93 Washington st)

Runoff = 3.59 cfs @ 12.09 hrs, Volume= 0.280 af, Depth> 5.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.35"

Area (sf)	CN	Description
10,009	98	Roofs, HSG A
14,073	98	Paved parking, HSG A
2,752	39	>75% Grass cover, Good, HSG A
* 173	98	Shed, HSG A
27,007	92	Weighted Average
2,752		10.19% Pervious Area
24,255		89.81% Impervious Area

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

Summary for Subcatchment 3S: Proposed Building

Runoff = 2.00 cfs @ 12.09 hrs, Volume= 0.167 af, Depth> 6.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.35"

Area (sf)	CN	Description
14,313	98	Roofs, HSG A
14,313		100.00% Impervious Area

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

Summary for Subcatchment 8S: Off-Site

Runoff = 0.51 cfs @ 12.10 hrs, Volume= 0.038 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.35"

Area (sf)	CN	Description
* 1,862	98	Side Walkway, HSG A
5,234	39	>75% Grass cover, Good, HSG A
* 1,512	98	Front Walkway, HSG A
8,608	62	Weighted Average
5,234		60.80% Pervious Area
3,374		39.20% Impervious Area

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Type III 24-hr 25 year Rainfall=6.35"

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

Summary for Subcatchment 13S: Proposed Driveway to 450i

Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.041 af, Depth> 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=6.35"

Area (sf)	CN	Description
3,545	98	Paved parking, HSG A
541	39	>75% Grass cover, Good, HSG A
4,086	90	Weighted Average
541		13.24% Pervious Area
3,545		86.76% Impervious Area

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

Summary for Reach 9R: 15" PVC Pipe

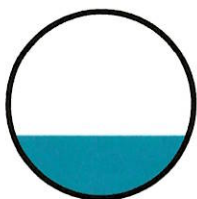
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 100.00% Impervious, Inflow Depth > 6.11" for 25 year event
 Inflow = 2.00 cfs @ 12.09 hrs, Volume= 0.167 af
 Outflow = 1.96 cfs @ 12.10 hrs, Volume= 0.167 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 5.60 fps, Min. Travel Time= 0.5 min
 Avg. Velocity= 1.88 fps, Avg. Travel Time= 1.4 min

Peak Storage= 58 cf @ 12.09 hrs
 Average Depth at Peak Storage= 0.42'
 Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 8.38 cfs

15.0" Round Pipe
 n= 0.010 PVC, smooth interior
 Length= 161.5' Slope= 0.0100 '/'
 Inlet Invert= 40.77', Outlet Invert= 39.16'



Summary for Reach 12R: TOTAL OFF-SITE

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

Inflow Area = 0.620 ac, 78.62% Impervious, Inflow Depth > 4.76" for 25 year event

Inflow = 3.00 cfs @ 12.10 hrs, Volume= 0.246 af

Outflow = 3.00 cfs @ 12.10 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing (89-93) Runoff Area=27,007 sf 89.81% Impervious Runoff Depth>7.15"
Tc=6.0 min CN=92 Runoff=4.67 cfs 0.369 af

Subcatchment 3S: Proposed Building Runoff Area=14,313 sf 100.00% Impervious Runoff Depth>7.87"
Tc=6.0 min CN=98 Runoff=2.55 cfs 0.215 af

Subcatchment 8S: Off-Site Runoff Area=8,608 sf 39.20% Impervious Runoff Depth>3.64"
Tc=6.0 min CN=62 Runoff=0.82 cfs 0.060 af

Subcatchment 13S: Proposed Driveway to Runoff Area=4,086 sf 86.76% Impervious Runoff Depth>6.91"
Tc=6.0 min CN=90 Runoff=0.69 cfs 0.054 af

Reach 9R: 15" PVC Pipe Avg. Flow Depth=0.47' Max Vel=6.00 fps Inflow=2.55 cfs 0.215 af
15.0" Round Pipe n=0.010 L=161.5' S=0.0100 '/' Capacity=8.38 cfs Outflow=2.51 cfs 0.215 af

Reach 12R: TOTAL OFF-SITE Inflow=4.03 cfs 0.329 af
Outflow=4.03 cfs 0.329 af

Total Runoff Area = 1.240 ac Runoff Volume = 0.699 af Average Runoff Depth = 6.76"
15.79% Pervious = 0.196 ac 84.21% Impervious = 1.044 ac

Summary for Subcatchment 1S: Existing (89-93 Washington st)

Runoff = 4.67 cfs @ 12.09 hrs, Volume= 0.369 af, Depth> 7.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.11"

Area (sf)	CN	Description
10,009	98	Roofs, HSG A
14,073	98	Paved parking, HSG A
2,752	39	>75% Grass cover, Good, HSG A
* 173	98	Shed, HSG A
27,007	92	Weighted Average
2,752		10.19% Pervious Area
24,255		89.81% Impervious Area

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

Summary for Subcatchment 3S: Proposed Building

Runoff = 2.55 cfs @ 12.09 hrs, Volume= 0.215 af, Depth> 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.11"

Area (sf)	CN	Description
14,313	98	Roofs, HSG A
14,313		100.00% Impervious Area

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

Summary for Subcatchment 8S: Off-Site

Runoff = 0.82 cfs @ 12.10 hrs, Volume= 0.060 af, Depth> 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.11"

Area (sf)	CN	Description
* 1,862	98	Side Walkway, HSG A
5,234	39	>75% Grass cover, Good, HSG A
* 1,512	98	Front Walkway, HSG A
8,608	62	Weighted Average
5,234		60.80% Pervious Area
3,374		39.20% Impervious Area

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

Summary for Subcatchment 13S: Proposed Driveway to 450i

Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.054 af, Depth> 6.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.11"

Area (sf)	CN	Description
3,545	98	Paved parking, HSG A
541	39	>75% Grass cover, Good, HSG A
4,086	90	Weighted Average
541		13.24% Pervious Area
3,545		86.76% Impervious Area

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

Summary for Reach 9R: 15" PVC Pipe

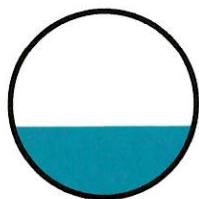
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 100.00% Impervious, Inflow Depth > 7.87" for 100 year event
Inflow = 2.55 cfs @ 12.09 hrs, Volume= 0.215 af
Outflow = 2.51 cfs @ 12.10 hrs, Volume= 0.215 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.00 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.03 fps, Avg. Travel Time= 1.3 min

Peak Storage= 69 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 8.38 cfs

15.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 161.5' Slope= 0.0100 '/'
Inlet Invert= 40.77', Outlet Invert= 39.16'



Summary for Reach 12R: TOTAL OFF-SITE

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

Inflow Area = 0.620 ac, 78.62% Impervious, Inflow Depth > 6.37" for 100 year event
Inflow = 4.03 cfs @ 12.10 hrs, Volume= 0.329 af
Outflow = 4.03 cfs @ 12.10 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing (89-93) Runoff Area=27,007 sf 89.81% Impervious Runoff Depth>7.15"
Tc=6.0 min CN=92 Runoff=4.67 cfs 0.369 af

Subcatchment 3S: Proposed Building Runoff Area=14,313 sf 100.00% Impervious Runoff Depth>7.87"
Tc=6.0 min CN=98 Runoff=2.55 cfs 0.215 af

Subcatchment 8S: Off-Site Runoff Area=8,608 sf 39.20% Impervious Runoff Depth>3.64"
Tc=6.0 min CN=62 Runoff=0.82 cfs 0.060 af

Subcatchment 13S: Proposed Driveway to Runoff Area=4,086 sf 86.76% Impervious Runoff Depth>6.91"
Tc=6.0 min CN=90 Runoff=0.69 cfs 0.054 af

Reach 9R: 15" PVC Pipe Avg. Flow Depth=0.47' Max Vel=6.00 fps Inflow=2.55 cfs 0.215 af
15.0" Round Pipe n=0.010 L=161.5' S=0.0100 '/ Capacity=8.38 cfs Outflow=2.51 cfs 0.215 af

Reach 12R: TOTAL OFF-SITE Inflow=4.03 cfs 0.329 af
Outflow=4.03 cfs 0.329 af

Total Runoff Area = 1.240 ac Runoff Volume = 0.699 af Average Runoff Depth = 6.76"
15.79% Pervious = 0.196 ac 84.21% Impervious = 1.044 ac

Summary for Subcatchment 1S: Existing (89-93 Washington st)

Runoff = 4.67 cfs @ 12.09 hrs, Volume= 0.369 af, Depth> 7.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=8.11"

Area (sf)	CN	Description
10,009	98	Roofs, HSG A
14,073	98	Paved parking, HSG A
2,752	39	>75% Grass cover, Good, HSG A
* 173	98	Shed, HSG A
27,007	92	Weighted Average
2,752		10.19% Pervious Area
24,255		89.81% Impervious Area

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

Summary for Subcatchment 3S: Proposed Building

Runoff = 2.55 cfs @ 12.09 hrs, Volume= 0.215 af, Depth> 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=8.11"

Area (sf)	CN	Description
14,313	98	Roofs, HSG A
14,313		100.00% Impervious Area

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

Summary for Subcatchment 8S: Off-Site

Runoff = 0.82 cfs @ 12.10 hrs, Volume= 0.060 af, Depth> 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=8.11"

Area (sf)	CN	Description
* 1,862	98	Side Walkway, HSG A
5,234	39	>75% Grass cover, Good, HSG A
* 1,512	98	Front Walkway, HSG A
8,608	62	Weighted Average
5,234		60.80% Pervious Area
3,374		39.20% Impervious Area

89-93 Washington st WeymouthSPH3-22-24

Type III 24-hr Custom Rainfall=8.11"

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

Summary for Subcatchment 13S: Proposed Driveway to 450i

Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.054 af, Depth> 6.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=8.11"

Area (sf)	CN	Description
3,545	98	Paved parking, HSG A
541	39	>75% Grass cover, Good, HSG A
4,086	90	Weighted Average
541		13.24% Pervious Area
3,545		86.76% Impervious Area

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

Summary for Reach 9R: 15" PVC Pipe

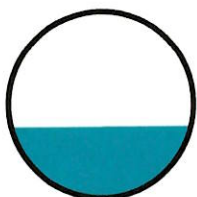
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 100.00% Impervious, Inflow Depth > 7.87" for Custom event
 Inflow = 2.55 cfs @ 12.09 hrs, Volume= 0.215 af
 Outflow = 2.51 cfs @ 12.10 hrs, Volume= 0.215 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 6.00 fps, Min. Travel Time= 0.4 min
 Avg. Velocity = 2.03 fps, Avg. Travel Time= 1.3 min

Peak Storage= 69 cf @ 12.09 hrs
 Average Depth at Peak Storage= 0.47'
 Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 8.38 cfs

15.0" Round Pipe
 n= 0.010 PVC, smooth interior
 Length= 161.5' Slope= 0.0100 '/'
 Inlet Invert= 40.77', Outlet Invert= 39.16'



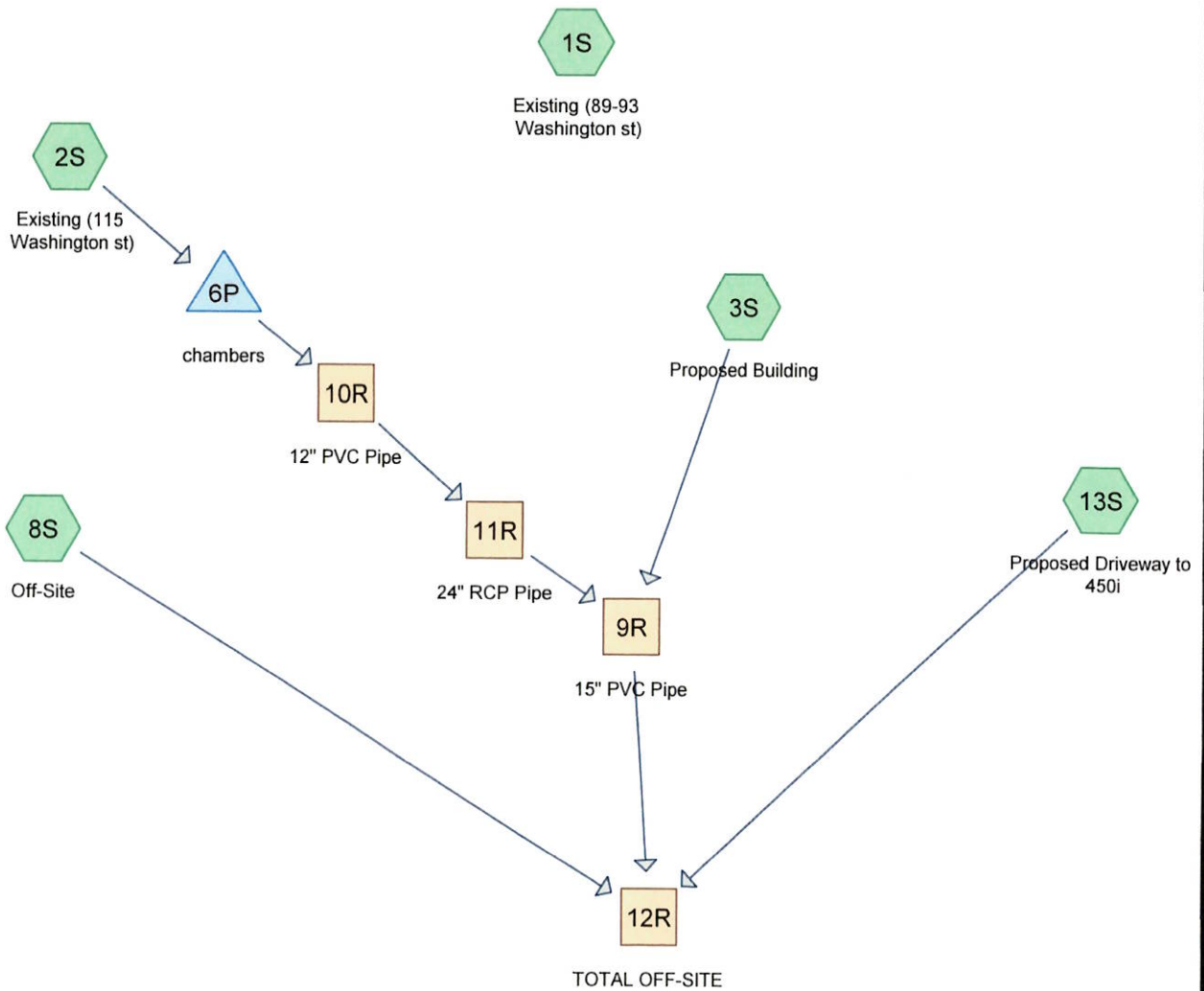
Summary for Reach 12R: TOTAL OFF-SITE

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

Inflow Area = 0.620 ac, 78.62% Impervious, Inflow Depth > 6.37" for Custom event
Inflow = 4.03 cfs @ 12.10 hrs, Volume= 0.329 af
Outflow = 4.03 cfs @ 12.10 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

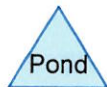
Pipe Sizing



Subcat



Reach



Pond



Link

Routing Diagram for 89-93 Washington st pipe sizing 3-22-24
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89-93 Washington st pipe sizing 3-22-24

Type III 24-hr 100 year Rainfall=8.11"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing (89-93) Runoff Area=27,007 sf 89.81% Impervious Runoff Depth>7.15"
Tc=6.0 min CN=92 Runoff=4.67 cfs 0.369 af

Subcatchment 2S: Existing (115) Runoff Area=6,592 sf 100.00% Impervious Runoff Depth>7.87"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.099 af

Subcatchment 3S: Proposed Building Runoff Area=14,313 sf 100.00% Impervious Runoff Depth>7.87"
Tc=6.0 min CN=98 Runoff=2.55 cfs 0.215 af

Subcatchment 8S: Off-Site Runoff Area=8,608 sf 39.20% Impervious Runoff Depth>3.64"
Tc=6.0 min CN=62 Runoff=0.82 cfs 0.060 af

Subcatchment 13S: Proposed Driveway to Runoff Area=4,086 sf 86.76% Impervious Runoff Depth>6.91"
Tc=6.0 min CN=90 Runoff=0.69 cfs 0.054 af

Reach 9R: 15" PVC Pipe Avg. Flow Depth=0.56' Max Vel=6.53 fps Inflow=3.51 cfs 0.296 af
15.0" Round Pipe n=0.010 L=161.5' S=0.0100 ' Capacity=8.38 cfs Outflow=3.46 cfs 0.296 af

Reach 10R: 12" PVC Pipe Avg. Flow Depth=0.33' Max Vel=4.77 fps Inflow=1.07 cfs 0.081 af
12.0" Round Pipe n=0.010 L=78.0' S=0.0100 ' Capacity=4.63 cfs Outflow=1.06 cfs 0.081 af

Reach 11R: 24" RCP Pipe Avg. Flow Depth=0.21' Max Vel=6.01 fps Inflow=1.06 cfs 0.081 af
24.0" Round Pipe n=0.011 L=170.0' S=0.0290 ' Capacity=45.53 cfs Outflow=1.05 cfs 0.081 af

Reach 12R: TOTAL OFF-SITE Inflow=4.96 cfs 0.410 af
Outflow=4.96 cfs 0.410 af

Pond 6P: chambers Peak Elev=103.49' Storage=795 cf Inflow=1.18 cfs 0.099 af
Discarded=0.00 cfs 0.004 af Primary=1.07 cfs 0.081 af Outflow=1.08 cfs 0.085 af

Total Runoff Area = 1.391 ac Runoff Volume = 0.798 af Average Runoff Depth = 6.88"
14.07% Pervious = 0.196 ac 85.93% Impervious = 1.196 ac

89-93 Washington st pipe sizing 3-22-24

Type III 24-hr 100 year Rainfall=8.11"

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Summary for Subcatchment 1S: Existing (89-93 Washington st)

Runoff = 4.67 cfs @ 12.09 hrs, Volume= 0.369 af, Depth> 7.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.11"

Area (sf)	CN	Description
10,009	98	Roofs, HSG A
14,073	98	Paved parking, HSG A
2,752	39	>75% Grass cover, Good, HSG A
* 173	98	Shed, HSG A
27,007	92	Weighted Average
2,752		10.19% Pervious Area
24,255		89.81% Impervious Area

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

Summary for Subcatchment 2S: Existing (115 Washington st)

Runoff = 1.18 cfs @ 12.09 hrs, Volume= 0.099 af, Depth> 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.11"

Area (sf)	CN	Description
* 4,717	98	paved
* 1,875	98	addition
6,592	98	Weighted Average
6,592		100.00% Impervious Area

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

Summary for Subcatchment 3S: Proposed Building

Runoff = 2.55 cfs @ 12.09 hrs, Volume= 0.215 af, Depth> 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.11"

Area (sf)	CN	Description
14,313	98	Roofs, HSG A
14,313		100.00% Impervious Area

89-93 Washington st pipe sizing 3-22-24

Type III 24-hr 100 year Rainfall=8.11"

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

Summary for Subcatchment 8S: Off-Site

Runoff = 0.82 cfs @ 12.10 hrs, Volume= 0.060 af, Depth> 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.11"

Area (sf)	CN	Description
* 1,862	98	Side Walkway, HSG A
5,234	39	>75% Grass cover, Good, HSG A
* 1,512	98	Front Walkway, HSG A
8,608	62	Weighted Average
5,234		60.80% Pervious Area
3,374		39.20% Impervious Area

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

Summary for Subcatchment 13S: Proposed Driveway to 450i

Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.054 af, Depth> 6.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.11"

Area (sf)	CN	Description
3,545	98	Paved parking, HSG A
541	39	>75% Grass cover, Good, HSG A
4,086	90	Weighted Average
541		13.24% Pervious Area
3,545		86.76% Impervious Area

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

Summary for Reach 9R: 15" PVC Pipe

[52] Hint: Inlet/Outlet conditions not evaluated

[62] Hint: Exceeded Reach 11R OUTLET depth by 0.36' @ 12.10 hrs

Inflow Area = 0.480 ac, 100.00% Impervious, Inflow Depth > 7.40" for 100 year event
 Inflow = 3.51 cfs @ 12.10 hrs, Volume= 0.296 af
 Outflow = 3.46 cfs @ 12.11 hrs, Volume= 0.296 af, Atten= 1%, Lag= 0.7 min

89-93 Washington st pipe sizing 3-22-24

Type III 24-hr 100 year Rainfall=8.11"

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Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 6.53 fps, Min. Travel Time= 0.4 min

Avg. Velocity = 2.19 fps, Avg. Travel Time= 1.2 min

Peak Storage= 87 cf @ 12.10 hrs

Average Depth at Peak Storage= 0.56'

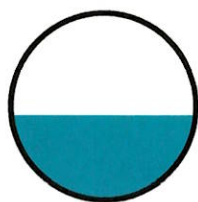
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 8.38 cfs

15.0" Round Pipe

n= 0.010 PVC, smooth interior

Length= 161.5' Slope= 0.0100 '/

Inlet Invert= 40.77', Outlet Invert= 39.16'



Summary for Reach 10R: 12" PVC Pipe

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.151 ac, 100.00% Impervious, Inflow Depth > 6.39" for 100 year event

Inflow = 1.07 cfs @ 12.12 hrs, Volume= 0.081 af

Outflow = 1.06 cfs @ 12.13 hrs, Volume= 0.081 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.77 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 1.79 fps, Avg. Travel Time= 0.7 min

Peak Storage= 17 cf @ 12.13 hrs

Average Depth at Peak Storage= 0.33'

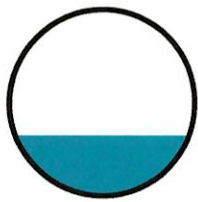
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.63 cfs

12.0" Round Pipe

n= 0.010 PVC, smooth interior

Length= 78.0' Slope= 0.0100 '/

Inlet Invert= 50.00', Outlet Invert= 49.22'



89-93 Washington st pipe sizing 3-22-24

Type III 24-hr 100 year Rainfall=8.11"

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Summary for Reach 11R: 24" RCP Pipe

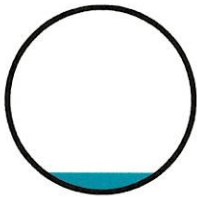
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.151 ac, 100.00% Impervious, Inflow Depth > 6.39" for 100 year event
Inflow = 1.06 cfs @ 12.13 hrs, Volume= 0.081 af
Outflow = 1.05 cfs @ 12.14 hrs, Volume= 0.081 af, Atten= 1%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.01 fps, Min. Travel Time= 0.5 min
Avg. Velocity= 2.24 fps, Avg. Travel Time= 1.3 min

Peak Storage= 30 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 45.53 cfs

24.0" Round Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 170.0' Slope= 0.0290 '/
Inlet Invert= 45.70', Outlet Invert= 40.77'

**Summary for Reach 12R: TOTAL OFF-SITE**

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

Inflow Area = 0.771 ac, 82.81% Impervious, Inflow Depth > 6.37" for 100 year event
Inflow = 4.96 cfs @ 12.10 hrs, Volume= 0.410 af
Outflow = 4.96 cfs @ 12.10 hrs, Volume= 0.410 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Pond 6P: chambers

Inflow Area = 0.151 ac, 100.00% Impervious, Inflow Depth > 7.87" for 100 year event
Inflow = 1.18 cfs @ 12.09 hrs, Volume= 0.099 af
Outflow = 1.08 cfs @ 12.12 hrs, Volume= 0.085 af, Atten= 9%, Lag= 2.1 min
Discarded = 0.00 cfs @ 12.12 hrs, Volume= 0.004 af
Primary = 1.07 cfs @ 12.12 hrs, Volume= 0.081 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 103.49' @ 12.12 hrs Surf.Area= 368 sf Storage= 795 cf

Plug-Flow detention time= 122.7 min calculated for 0.085 af (85% of inflow)
Center-of-Mass det. time= 57.8 min (798.4 - 740.6)

89-93 Washington st pipe sizing 3-22-24

Type III 24-hr 100 year Rainfall=8.11"

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Volume	Invert	Avail. Storage	Storage Description
#1A	100.00'	334 cf	16.00'W x 23.00'L x 3.54'H Field A 1,303 cf Overall - 469 cf Embedded = 834 cf x 40.0% Voids
#2A	100.50'	469 cf	Cultec R-330XL x 9 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap 9 Chambers in 3 Rows
		803 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	102.50'	8.0" Round Culvert L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 102.50' / 102.10' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#2	Discarded	100.00'	0.170 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 12.12 hrs HW=103.46' (Free Discharge)

↑2=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=1.05 cfs @ 12.12 hrs HW=103.46' (Free Discharge)

↑1=Culvert (Inlet Controls 1.05 cfs @ 3.01 fps)