

23 Ocean Avenue Stormwater Management Narrative

Date: June 2, 2016
From: John Mahoney, P.E.
Peer Review: Stephen J. Bradstreet, P.E.
Location: 23 Ocean Avenue, Portland, Maine

Existing Conditions:

The site is a 9,519 SF (.22 acres) acre parcel located at 23 Ocean Avenue, which is located at the northeast corner of the intersection of Ocean Avenue and Hersey Street. The parcel is currently occupied by a 1,222 square-foot office building, parking area, and lawn. The parcel drains from northwest to southeast with a change in elevation of approximately four feet.

Stormwater runoff currently drains across the lawn area to the existing paved parking lot to the southeast. The site is graded such that stormwater runoff concentrates in the southeast corner. Runoff exits the site through the existing driveway into the public right-of-way on Hersey Street. Runoff then flows down the Hersey Street gutter for approximately 300 feet then into a catch basin that is connected to a 15" combined sewer.

The existing drainage systems on Ocean Avenue and Hersey Street are currently combined sanitary sewer and stormdrain systems.

Based on the Cumberland County USDA soil survey GIS data, the existing soils on this site are hydrological group C & D, moderately to somewhat poorly drained.

Proposed Development:

The owner is proposing to continue the use of the existing building as office space and to construct a mixed-use building with four two-bedroom apartments and eight offices. The proposed development will result in a moderate increase in the impervious area.

Stormwater Management – Basic Standards:

Erosion and sedimentation control measures are detailed and described on Sheets C1 - C3. Good housekeeping practices shall be in accordance with Maine DEP Best Management Practices. A post

construction stormwater management plan and a stormwater BMP inspection and maintenance log are included with this submission.

Stormwater Management - Quality:

We are proposing to install pervious pavers in the patio between the buildings and at the driveway entrance, to construct two rain gardens and to install an underdrained roof drain collection system in order to capture and infiltrate stormwater runoff.

Approximately one third of the parking lot, half the existing building's roof and a portion of the property to the north will drain overland to a shallow rain garden situated on the eastern lot boundary. Overflow from this rain garden will be directed to the rain garden at the southeastern corner, allowing for two opportunities for stormwater quality improvement. The site is graded such that the entire parking area is directed to this second deeper rain garden. We have included a strip of pervious pavers (pitched away from Hersey Street at the driveway entrance to capture stormwater and direct it towards the rain garden before it can leave the site.

The entire roof of the proposed building and the southern half of the roof of the existing building will be piped into an underdrain system with 12" of crushed stone storage below the pipe. This underdrain system will daylight to the rain garden in the southeast corner. The proposed building's foundation drainage will be collected and pumped to this underdrain system and daylight to the same rain garden area. During larger storm events, when the capacity of the rain gardens and stone storage is exceeded, stormwater will overflow from the rain garden in the southeast corner through the driveway into the Hersey Street gutter as it does now.

Because the water from the entire site flows to this southeast corner and because the site's soils are not well drained, it is our opinion that it will be necessary to underdrain the rain garden in the southeast corner. We are proposing to connect this underdrain to the 8" combined sewer in Hersey Street because it is the only viable option. This underdrain will be significantly lower than and separated from the roof drain conveyance system by 18" of sand (Underdrain Type B Backfill MDOT 703.22), which will dramatically reduce the rate of discharge into the combined sewer and reduce pollutant loads.

Stormwater Management - Quantity:

In our opinion, the combination of collecting and treating stormwater prior to discharging to the combined sewer on Hersey Street will reduce the site's contribution to surface drainage on Hersey Street during typical precipitation events. Due to the size of the property and the existing drainage patterns, meeting the flooding standard would require underground storage and piping a significant amount of surface runoff directly into the combined system. For these reasons, we are requesting a waiver to the flooding standard. Installation of the proposed stormwater management measures on this property will also facilitate connection to separated storm drain in the event that the City undertakes separation of storm drain and sewer on Hersey Street.

23 Ocean Avenue: Post-Construction Stormwater Compliance Requirements

The Applicant shall maintain the BMPs in accordance with the approved plan and shall demonstrate compliance with the plan as follows:

- (a) *Inspections.* The owner or operator of a BMP shall hire a qualified post-construction stormwater inspector to at least annually, inspect the BMPs, including but not limited to any parking areas, catch basins, drainage swales, detention basins and ponds, rain gardens, pervious pavers, pipes and related structures, in accordance with all municipal and state inspection, cleaning and maintenance requirements of the approved post-construction stormwater management plan.
- (b) *Maintenance and repair.* If the BMP requires maintenance, repair or replacement to function as intended by the approved post-construction stormwater management plan, the owner or operator of the BMP shall take corrective action(s) to address the deficiency or deficiencies as soon as possible after the deficiency is discovered and shall provide a record of the deficiency and corrective action(s) to the department of public services ("DPS") in the annual report.
- (c) *Annual report.* The owner or operator of a BMP or a qualified post-construction stormwater inspector hired by that person, shall, on or by June 30 of each year, provide a completed and signed certification to DPS in a form provided by DPS, certifying that the person has inspected the BMP(s) and that they are adequately maintained and functioning as intended by the approved post-construction stormwater management plan, or that they require maintenance or repair, including the record of the deficiency and corrective action(s) taken.
- (d) *Filing fee.* Any persons required to file an annual certification under this section shall include with the annual certification a filing fee established by DPS to pay the administrative and technical costs of review of the annual certification.
- (e) *Right of entry.* In order to determine compliance with this article and with the post-construction stormwater management plan, DPS may enter upon property at reasonable hours with the consent of the owner, occupant or agent to inspect the BMPs.

23 Ocean Avenue: Stormwater BMP Inspection and Maintenance Log

The City of Portland, ME requires ongoing annual inspections to ensure the proper maintenance and operation of stormwater management facilities. Inspections must be conducted by third parties qualified by the City.

A. General Information

Use only one Cover Sheet per site with as many specific structural BMP Inspection Report attachments as needed. Attach required color digital photos of site, structures and devices as applicable with captions.

Project Name:	23 Ocean Avenue	Inspection Date:	
Parcel Map, Block and Lot:	129 G001	Current Weather:	
BMP Owner:	Steven & Roberta Cope	Date / Amount Last Precip:	
Owner Mailing Address:	172 Concord Street Portland, ME 04103	3PI Company:	
		3PI Mailing Address:	
Owner Phone #:	(207) 939-3326	Inspector Name:	
Owner Email:	adcope1@yahoo	Inspector Phone #:	
		Inspector Email:	

B. Inspection Report Attachments

Please document the number of each structural BMP type found at this site in the blank spaces provided below. Use additional Attachments if / as needed and submit all Attachments together with the Cover Sheet as a single report.

BMP Type	Number BMPs at site
Vegetated Areas	-
Rain Garden Areas	2
Parking-Driveway Area	1
Stormdrain (Roof Drain) Outlets	1
Pervious paver areas	2

Other (describe

C. Inspection Results

FAIL**

** If any one item on an Inspection Report attachment is coded as "Work Needed" then entire BMP fails inspection.

** If a site has multiple BMPs and one fails inspection, mark as "Fail" until all BMPs pass inspection.

Note: Applicable BMP Inspection Reports and confirmatory color digital photos summarizing required repairs must be submitted to the City following completion of the preliminary inspection. A re-inspection and certification must be completed within 60 days of the failed preliminary report. It is recommended that the inspector be part of the repair / maintenance process to ensure that repairs are performed properly.

PASS

Note: a qualified professional (as determined by the City) must sign below and include all applicable Inspection Report attachments and confirmatory digital color photos with captions.

D. Professional Certification (as qualified by City of Portland Stormwater Program Coordinator)

To be completed only when all BMPs at this site are functioning as designed with no outstanding maintenance issues.

I, _____, as a duly qualified third party inspector attest that a thorough inspection has been completed for ALL applicable BMPs that are associated with this particular site. All inspected structural BMPs are performing as designed and intended and are in compliance with the provisions of the City Portland's Standards

Signature: _____

Date: _____

Form Adapted from the City of South Portland's Annual Structural BMP Inspection Report Cover Sheet

	Date:
General Information	Observations
Inspection duration (hours)	
Days since last precipitation	
Quantity of last precipitation (in)	
Type of inspection	
Storm event	
Current weather	
Photos taken	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Nearby natural resources	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Copy of ESC plan	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
MEDEP Permit # (if applicable)	
General info notes	
Vegetated Areas	Observations
No bare areas (< 90% covered) with sparse growth	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
No erosion	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Vegetated area notes	
Stormdrain (roof drain) outlets	Observations
Accumulated sediments and debris at the outlet and within the conduit have been removed.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Erosion damage at the outlet have been repaired	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Outlet notes	
Pervious Pavers	Observations
Pavers observed to be free draining and clear of sediment and debris.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Sediment and debris removed with shop vacuum	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<p>Pervious Paver Notes: Pervious pavers should be cleaned of leaf matter by using a blower. Sweeping is inferior as it will only push material into the gaps. Sanding of pervious paver surfaces should be minimized because sand will collect in the gaps and clog the pavers.</p> <p>The pervious paved surface should be inspected annually and during rain events. If the gaps are observed to be clogged then sediment/debris will need to be removed by vacuuming.</p>	
Rain Garden Areas	Observations
Accumulated sediments and debris (trash) within the infiltration area have been removed and legally disposed of	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Sediment forebays are clear of debris	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Grades as shown on the Drainage & Utilities Plan – C1 have been retained	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Plantings are healthy	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA

Rain Garden Notes			
The rain garden areas are planted depressions intended to slow and infiltrate stormwater run-off and it is critical that they not be filled in. Sediment forebays must be clear of debris and mulch must be replaced annually.			
Parking/Driveway Area			
Accumulated winter sand has been cleared	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
Pavement swept to help remove sediment	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
No stormwater is impeded by accumulations of material	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
Notes:			
Other Comments		Observations	
Corrective action needed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
<i>If corrective action in needed, please explain detail</i>			
Verbal notification provided to responsible party	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Verbal notification contact			
Follow up required	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Final comment notes			

Photos (*use additional pages as needed*)

Review Notes

Date Reviewed:
Reviewed by:
Date entered:
Date edited:
Edited by:

23 Ocean Avenue, Portland, Maine

**STORMWATER DRAINAGE SYSTEM
MAINTENANCE AGREEMENT AND
RELEASE FROM LIABILITY**

IN CONSIDERATION OF the site plan and subdivision approval granted by the Planning Board of the City of Portland to a plan entitled **23 Ocean Avenue: Utility & Stormwater Management Plan** prepared for **Steven & Roberta Cope**, by **Ransom Consulting, Inc.** dated [REDACTED], 2016 recorded in the Cumberland County Registry of Deeds in Plan Book [REDACTED], Page [REDACTED] (the “Plan”) and pursuant to a condition thereof, **Steven & Roberta Cope** (owner) having a mailing address of **172 Concord Street, Portland, Maine 04103**, the owner of the subject premises, does hereby agree, for itself, its successors and assigns (the “Owner”), as follows:

Maintenance Agreement

That it will, at its own cost and expense and at all times in perpetuity, maintain in good repair and in proper working order the stormwater drainage system, as shown on said plan, including but not limited to the **rain gardens, roof drain outlets, and pervious pavers** in strict compliance with the Maintenance of Facilities as described in **23 Ocean Avenue Stormwater Management Narrative and the 23 Ocean Avenue Stormwater Inspection and Maintenance Log** (Stormwater Management Plan) dated [REDACTED], 2016 and Chapter 32 of the Portland City Code. Owner of the subject premises further agrees to keep a Stormwater Maintenance Log that will be made available for inspection by the City of Portland upon reasonable notice and request.

This Agreement is for the benefit of the said City of Portland and all persons in lawful possession of the property; further, that the said City of Portland may enforce this Agreement by an action at law or in equity in any court of competent jurisdiction; further, that after giving the Owner written notice as described in this Agreement, and a stated time to perform, that the said City of Portland, by its authorized agents or representatives, may, but is not obligated to, enter upon the property in question to maintain, repair, or replace said stormwater drainage system, including but not limited to the **rain gardens, roof drain outlets, and pervious pavers** thereon in the event of any failure or neglect thereof, the cost and expense thereof to be reimbursed in full to the said City of Portland by the Owner upon written demand. Any funds owed to the City under this paragraph shall be secured by a lien on the property.

This Agreement shall bind the undersigned only so long as it retains any interest in said premises, and shall run with the land and be binding upon the Owner's successors and assigns as their interests may from time to time appear. The Owner agrees to provide a copy of this Agreement to any successor or assign and to forward to the City an Addendum signed by any successor or assign in which the successor or assign states that the successor or assign has read the Agreement, agrees to all its terms and conditions.

For the purpose of this Agreement the real estate shown by chart, block and lot number in the records on file in the City Assessor's office shall constitute "the property" that may be entered by the City and liened if the City is not paid all of its costs and charges following the mailing of a written demand for payment to the Owner pursuant to the process and with the same force and effect as that established by 36 M.R.S.A. §§ 942 and 943 for real estate tax liens.

Any written notices or demands required by this Agreement shall be complete on the date the notice is mailed to the owner of record as shown on the tax roles on file in the City Assessor's Office. If the property has more than one owner on said tax rolls, service shall be complete by mailing it to only the first listed owner. The failure to receive any written notice required by this Agreement shall not prevent the City from entering the property and performing maintenance or repairs on the stormwater system, or any component thereof, or liening it or create a cause of action against the City.

Dated at Portland, Maine this _____ day of _____, 20__.

By: _____
Its: _____

STATE OF MAINE
CUMBERLAND, ss.

Date: _____

Personally appeared the above-named _____, and acknowledged the foregoing instrument to be his/his free act and deed in his/her said capacity, and the free act and deed of said _____.

Before me,

Notary Public/Attorney at Law

Print name: _____

23 Ocean Avenue Pre-Development & Post Development Stormwater Calculations

Date: October 12, 2016
From: John Mahoney, P.E.
Location: 23 Ocean Avenue, Portland, Maine

Existing Conditions:

The site is a 9,519 SF (.22 acres) acre parcel located at 23 Ocean Avenue, which is located at the northeast corner of the intersection of Ocean Avenue and Hersey Street. The parcel is currently occupied by a 1,222 square-foot office building, parking area, and lawn. The parcel drains from northwest to southeast with a change in elevation of approximately four feet.

Stormwater runoff currently drains across the lawn area to the existing paved parking lot to the southeast. The site is graded such that stormwater runoff concentrates in the southeast corner. Runoff exits the site through the existing driveway into the public right-of-way on Hersey Street. Runoff then flows down the Hersey Street gutter for approximately 300 feet then into a catch basin that is connected to a 15" combined sewer.

The existing drainage systems on Ocean Avenue and Hersey Street are currently combined sanitary sewer and stormdrain systems.

Proposed Development:

The owner is proposing to continue the use of the existing building as office space and to construct a mixed-use building with four two-bedroom apartments and eight offices. The proposed development will result in a moderate increase in the impervious area.

The existing site impervious area is: 4,036 SF

The new site impervious area is: 6,188 SF

Estimated increase in impervious area: 2,152 SF

Stormwater Management - Quantity:

The attached stormwater calculations were developed using HydroCAD 10.0 and are based on existing and proposed topography, existing and proposed impervious areas, soil Hydrologic Group and land cover information. The model utilizes 24-hour duration, Type III storms for 2-year, 10-year, 25-year, 50-year and 100-year return periods. The attached figures show the locations of our analysis points. The existing condition is that the entire site drains to Analysis Point 1. The proposed condition is that the roof from the new building will drain to the existing catch basin on Ocean Avenue near the intersection of Hersey (Analysis Point 2), while the remaining portion of the site will drain to Hersey Street (Analysis Point 1)

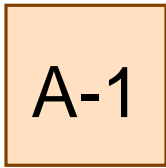
Storm Event	PRE-Development Peak Runoff RATES cubic feet per second (CFS)	
	Analysis Point 1 (Hersey Street Gutter)	Analysis Point 2 (Ocean Avenue Catch Basin)
2-year Storm (3.19 inches)	0.52	-
10-year Storm (4.77 inches)	0.89	-
25-year Storm (6.01 inches)	1.18	-
50-year Storm (7.66 inches)	1.45	-
100-year Storm (8.54 inches)	1.77	-

Storm Event	POST-Development Peak Runoff RATES cubic feet per second (CFS)	
	Analysis Point 1	Analysis Point 2
2-year Storm (3.19 inches)	0.38	0.21
10-year Storm (4.77 inches)	0.64	0.31
25-year Storm (6.01 inches)	0.85	0.39
50-year Storm (7.66 inches)	1.03	0.47
100-year Storm (8.54 inches)	1.26	0.56

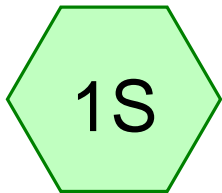
As shown indicated above, the peak flow rates discharging to Hersey Street will decrease for all storm events. This is because both the total area and impervious area draining to Hersey Street are proposed to decrease.

The City has asked us to redirect drainage from this site to Ocean Avenue so it can be connected to a new separated stormdrain system, proposed to be installed in the near future. Because the entire property currently drains to Hersey Street, the proposed discharge rates to Ocean Avenue (Analysis Point 2) are increases as shown above.

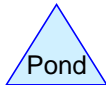
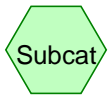
It is our understanding that the proposed stormdrain system will be will be designed to convey area stormwater flows. After the separated drainage system is installed, this project will have zero impact on the Ocean Avenue combined sewer and as mentioned above, flow rates to Hersey will decrease. For these reasons, we are requesting either a waiver of the flooding standard or a determination that the flooding standing has been met.



Analysis Point 1



Entire Site



23Ocean_PRE-Development_2016-10-12

Prepared by Ransom Consulting

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.126	80	>75% Grass cover, Good, HSG D (1S)
0.093	98	Paved parking & roofs (1S)
0.219	88	TOTAL AREA

23Ocean_PRE-Development_2016-10-12

Prepared by Ransom Consulting

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.126	HSG D	1S
0.093	Other	1S
0.219		TOTAL AREA

23Ocean_PRE-Development_2016-10-12

Prepared by Ransom Consulting

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.126	0.000	0.126	>75% Grass cover, Good	1S
0.000	0.000	0.000	0.000	0.093	0.093	Paved parking & roofs	1S
0.000	0.000	0.000	0.126	0.093	0.219	TOTAL AREA	

Time span=2.00-20.00 hrs, dt=0.02 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Entire Site

Runoff Area=9,519 sf 42.40% Impervious Runoff Depth>3.25"
Tc=5.0 min CN=88 Runoff=0.89 cfs 0.059 af

Reach A-1: AnalysisPoint 1

Avg. Flow Depth=0.11' Max Vel=3.18 fps Inflow=0.89 cfs 0.059 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=0.89 cfs 0.059 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.059 af Average Runoff Depth = 3.25"
57.60% Pervious = 0.126 ac 42.40% Impervious = 0.093 ac

Summary for Subcatchment 1S: Entire Site

Runoff = 0.89 cfs @ 12.07 hrs, Volume= 0.059 af, Depth> 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
 Type III 24-hr SE_Cu 10-yr Rainfall=4.77"

Area (sf)	CN	Description
4,036	98	Paved parking & roofs
5,483	80	>75% Grass cover, Good, HSG D
9,519	88	Weighted Average
5,483		57.60% Pervious Area
4,036		42.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1

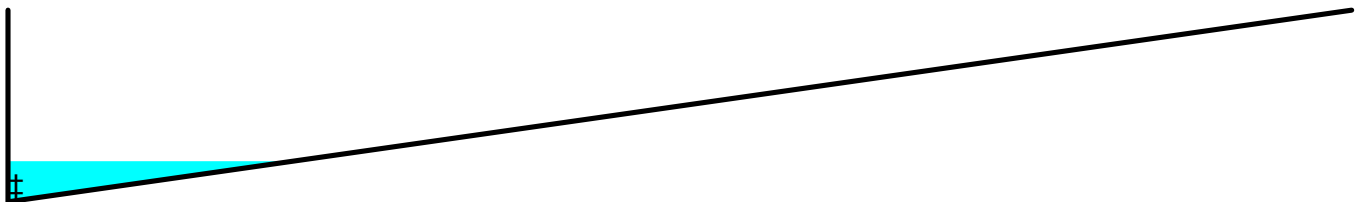
Hersey Street Gutter

Inflow Area = 0.219 ac, 42.40% Impervious, Inflow Depth > 3.25" for SE_Cu 10-yr event
 Inflow = 0.89 cfs @ 12.07 hrs, Volume= 0.059 af
 Outflow = 0.89 cfs @ 12.07 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
 Max. Velocity= 3.18 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 1.30 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.07 hrs
 Average Depth at Peak Storage= 0.11'
 Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'



Time span=2.00-20.00 hrs, dt=0.02 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Entire Site

Runoff Area=9,519 sf 42.40% Impervious Runoff Depth>6.73"
Tc=5.0 min CN=88 Runoff=1.77 cfs 0.123 af

Reach A-1: AnalysisPoint 1

Avg. Flow Depth=0.14' Max Vel=3.77 fps Inflow=1.77 cfs 0.123 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=1.77 cfs 0.123 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.123 af Average Runoff Depth = 6.73"
57.60% Pervious = 0.126 ac 42.40% Impervious = 0.093 ac

Summary for Subcatchment 1S: Entire Site

Runoff = 1.77 cfs @ 12.07 hrs, Volume= 0.123 af, Depth> 6.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
 Type III 24-hr SE_Cu 100-yr Rainfall=8.54"

Area (sf)	CN	Description
4,036	98	Paved parking & roofs
5,483	80	>75% Grass cover, Good, HSG D
9,519	88	Weighted Average
5,483		57.60% Pervious Area
4,036		42.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1

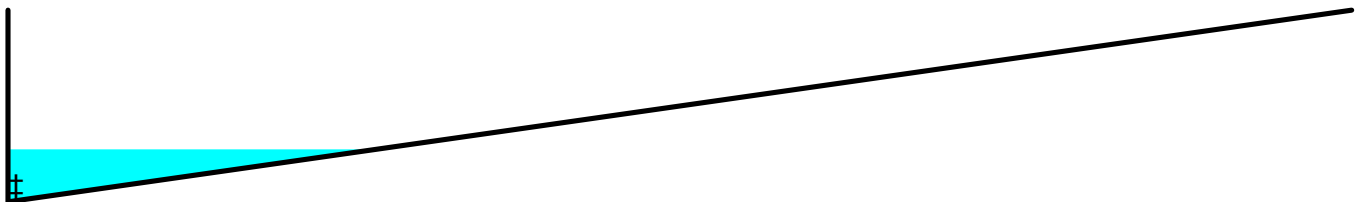
Hersey Street Gutter

Inflow Area = 0.219 ac, 42.40% Impervious, Inflow Depth > 6.73" for SE_Cu 100-yr event
 Inflow = 1.77 cfs @ 12.07 hrs, Volume= 0.123 af
 Outflow = 1.77 cfs @ 12.07 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
 Max. Velocity= 3.77 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.07 hrs
 Average Depth at Peak Storage= 0.14'
 Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'



Time span=2.00-20.00 hrs, dt=0.02 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Entire Site

Runoff Area=9,519 sf 42.40% Impervious Runoff Depth>1.86"
Tc=5.0 min CN=88 Runoff=0.52 cfs 0.034 af

Reach A-1: AnalysisPoint 1

Avg. Flow Depth=0.09' Max Vel=2.79 fps Inflow=0.52 cfs 0.034 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=0.52 cfs 0.034 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.034 af Average Runoff Depth = 1.86"
57.60% Pervious = 0.126 ac 42.40% Impervious = 0.093 ac

Summary for Subcatchment 1S: Entire Site

Runoff = 0.52 cfs @ 12.07 hrs, Volume= 0.034 af, Depth> 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr SE_Cu 2-yr Rainfall=3.19"

Area (sf)	CN	Description
4,036	98	Paved parking & roofs
5,483	80	>75% Grass cover, Good, HSG D
9,519	88	Weighted Average
5,483		57.60% Pervious Area
4,036		42.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1

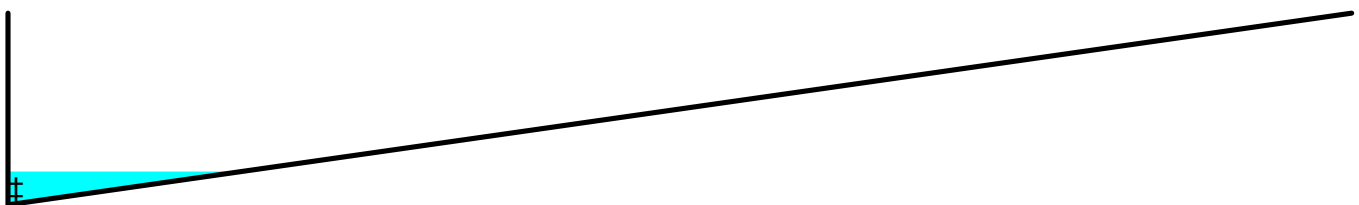
Hersey Street Gutter

Inflow Area = 0.219 ac, 42.40% Impervious, Inflow Depth > 1.86" for SE_Cu 2-yr event
 Inflow = 0.52 cfs @ 12.07 hrs, Volume= 0.034 af
 Outflow = 0.52 cfs @ 12.08 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
 Max. Velocity= 2.79 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 1.18 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.08 hrs
 Average Depth at Peak Storage= 0.09'
 Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'



Time span=2.00-20.00 hrs, dt=0.02 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Entire Site

Runoff Area=9,519 sf 42.40% Impervious Runoff Depth>4.38"
Tc=5.0 min CN=88 Runoff=1.18 cfs 0.080 af

Reach A-1: AnalysisPoint 1

Avg. Flow Depth=0.12' Max Vel=3.41 fps Inflow=1.18 cfs 0.080 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=1.18 cfs 0.080 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.080 af Average Runoff Depth = 4.38"
57.60% Pervious = 0.126 ac 42.40% Impervious = 0.093 ac

Summary for Subcatchment 1S: Entire Site

Runoff = 1.18 cfs @ 12.07 hrs, Volume= 0.080 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
 Type III 24-hr SE_Cu 25-yr Rainfall=6.01"

Area (sf)	CN	Description
4,036	98	Paved parking & roofs
5,483	80	>75% Grass cover, Good, HSG D
9,519	88	Weighted Average
5,483		57.60% Pervious Area
4,036		42.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1

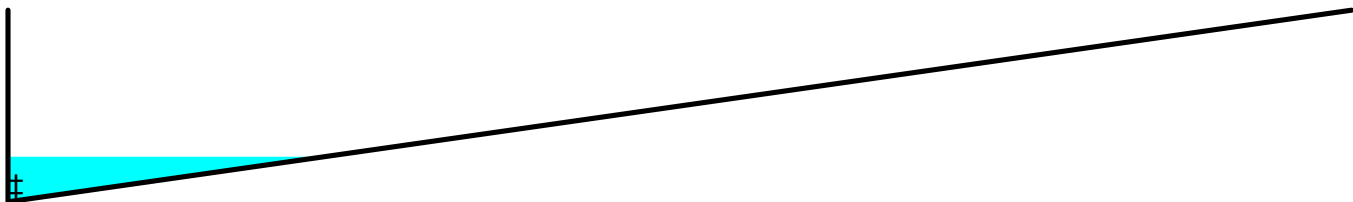
Hersey Street Gutter

Inflow Area = 0.219 ac, 42.40% Impervious, Inflow Depth > 4.38" for SE_Cu 25-yr event
 Inflow = 1.18 cfs @ 12.07 hrs, Volume= 0.080 af
 Outflow = 1.18 cfs @ 12.07 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
 Max. Velocity= 3.41 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 1.38 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.07 hrs
 Average Depth at Peak Storage= 0.12'
 Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'



Time span=2.00-20.00 hrs, dt=0.02 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Entire Site

Runoff Area=9,519 sf 42.40% Impervious Runoff Depth>5.44"
Tc=5.0 min CN=88 Runoff=1.45 cfs 0.099 af

Reach A-1: AnalysisPoint 1

Avg. Flow Depth=0.13' Max Vel=3.59 fps Inflow=1.45 cfs 0.099 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=1.45 cfs 0.099 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.099 af Average Runoff Depth = 5.44"
57.60% Pervious = 0.126 ac 42.40% Impervious = 0.093 ac

Summary for Subcatchment 1S: Entire Site

Runoff = 1.45 cfs @ 12.07 hrs, Volume= 0.099 af, Depth> 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
 Type III 24-hr SE_Cu 50-yr Rainfall=7.16"

Area (sf)	CN	Description
4,036	98	Paved parking & roofs
5,483	80	>75% Grass cover, Good, HSG D
9,519	88	Weighted Average
5,483		57.60% Pervious Area
4,036		42.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1

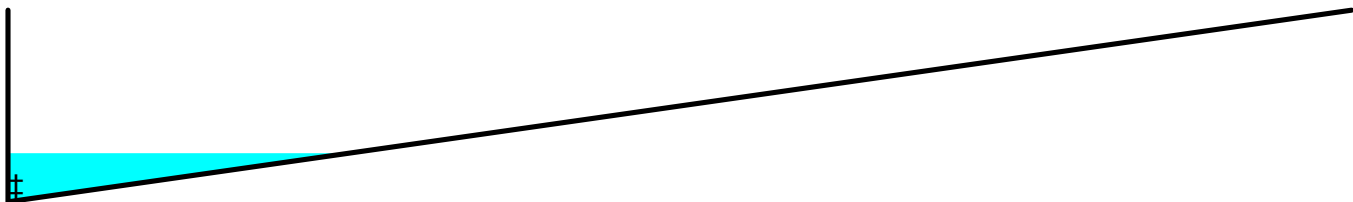
Hersey Street Gutter

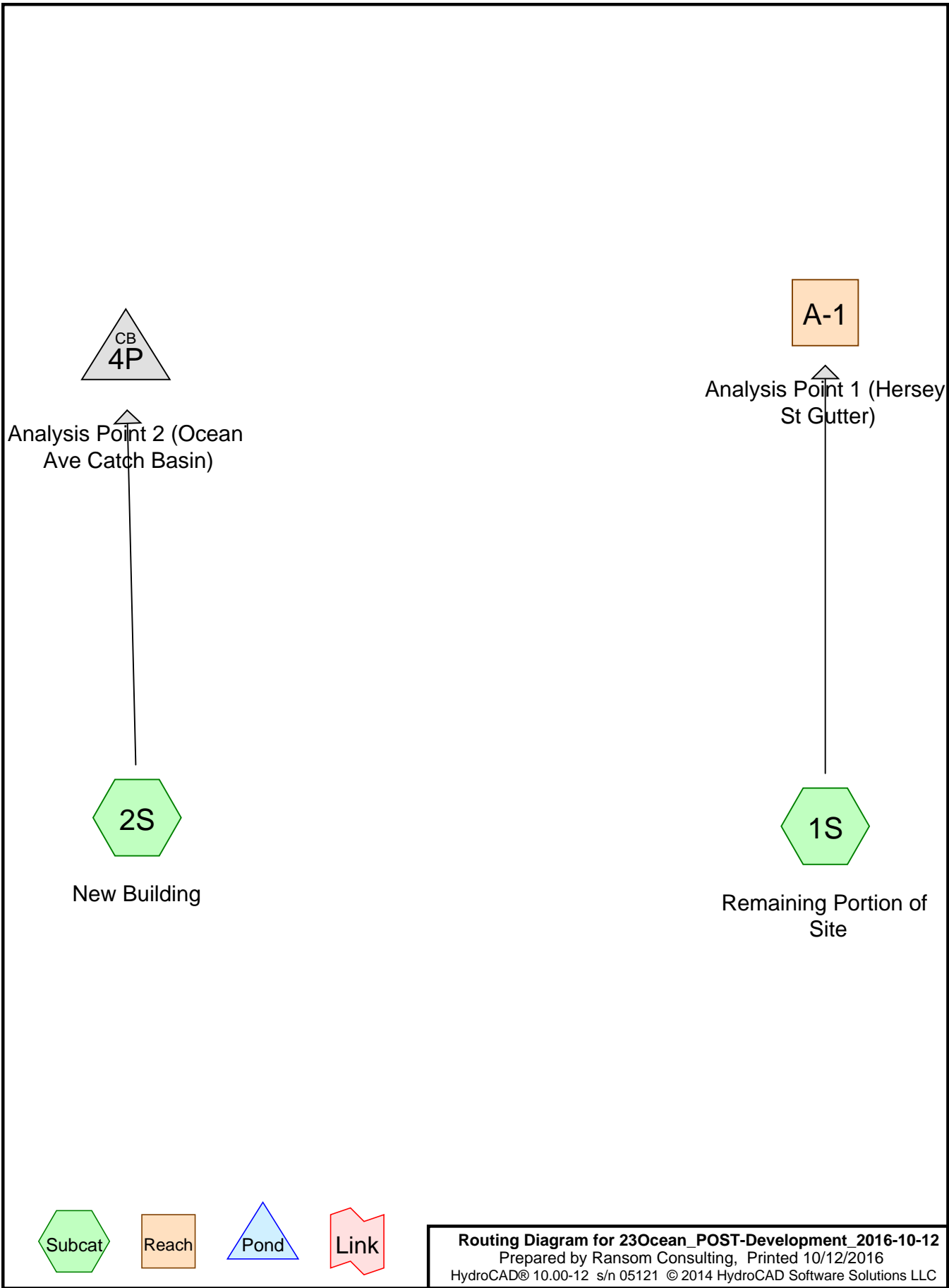
Inflow Area = 0.219 ac, 42.40% Impervious, Inflow Depth > 5.44" for SE_Cu 50-yr event
 Inflow = 1.45 cfs @ 12.07 hrs, Volume= 0.099 af
 Outflow = 1.45 cfs @ 12.07 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 2.00-20.00 hrs, dt= 0.02 hrs
 Max. Velocity= 3.59 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.07 hrs
 Average Depth at Peak Storage= 0.13'
 Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'





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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.076	80	>75% Grass cover, Good, HSG D (1S)
0.142	98	Paved parking & roofs (1S, 2S)
0.219	92	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.076	HSG D	1S
0.142	Other	1S, 2S
0.219		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.076	0.000	0.076	>75% Grass cover, Good	1S
0.000	0.000	0.000	0.000	0.142	0.142	Paved parking & roofs	1S, 2S
0.000	0.000	0.000	0.076	0.142	0.219	TOTAL AREA	

Time span=0.00-20.00 hrs, dt=0.02 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Remaining Portion of Runoff Area=6,695 sf 50.25% Impervious Runoff Depth>3.35"
Tc=5.0 min CN=89 Runoff=0.64 cfs 0.043 af

Subcatchment2S: New Building Runoff Area=2,824 sf 100.00% Impervious Runoff Depth>4.32"
Tc=5.0 min CN=98 Runoff=0.31 cfs 0.023 af

Reach A-1: AnalysisPoint 1 (Hersey St Avg. Flow Depth=0.09' Max Vel=2.93 fps Inflow=0.64 cfs 0.043 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=0.64 cfs 0.043 af

Pond 4P: AnalysisPoint 2 (Ocean Ave Catch Basin) Peak Elev=49.29' Inflow=0.31 cfs 0.023 af
12.0" Round Culvert n=0.012 L=20.0' S=0.0100 '/' Outflow=0.31 cfs 0.023 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.066 af Average Runoff Depth = 3.64"
34.99% Pervious = 0.076 ac 65.01% Impervious = 0.142 ac

Summary for Subcatchment 1S: Remaining Portion of Site

Runoff = 0.64 cfs @ 12.07 hrs, Volume= 0.043 af, Depth> 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr SE_Cu 10-yr Rainfall=4.77"

Area (sf)	CN	Description
3,364	98	Paved parking & roofs
3,331	80	>75% Grass cover, Good, HSG D
6,695	89	Weighted Average
3,331		49.75% Pervious Area
3,364		50.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Subcatchment 2S: New Building

Runoff = 0.31 cfs @ 12.07 hrs, Volume= 0.023 af, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr SE_Cu 10-yr Rainfall=4.77"

Area (sf)	CN	Description
2,824	98	Paved parking & roofs
2,824		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1 (Hersey St Gutter)

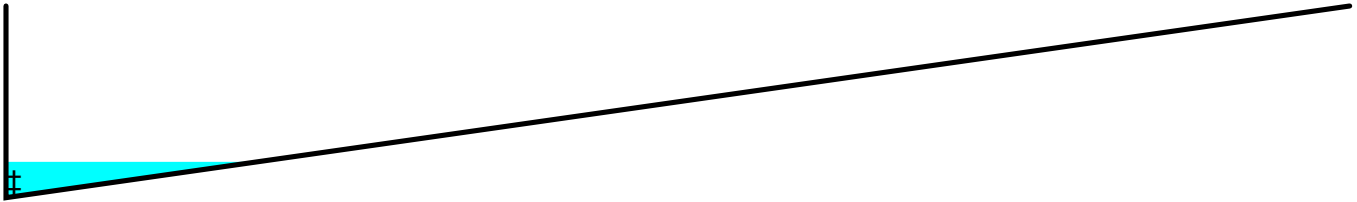
Hersey Street Gutter

Inflow Area = 0.154 ac, 50.25% Impervious, Inflow Depth > 3.35" for SE_Cu 10-yr event
Inflow = 0.64 cfs @ 12.07 hrs, Volume= 0.043 af
Outflow = 0.64 cfs @ 12.07 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
Max. Velocity= 2.93 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'



Summary for Pond 4P: Analysis Point 2 (Ocean Ave Catch Basin)

Inflow Area = 0.065 ac, 100.00% Impervious, Inflow Depth > 4.32" for SE_Cu 10-yr event
 Inflow = 0.31 cfs @ 12.07 hrs, Volume= 0.023 af
 Outflow = 0.31 cfs @ 12.07 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.31 cfs @ 12.07 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Peak Elev= 49.29' @ 12.07 hrs
 Flood Elev= 54.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.00'	12.0" Round 12" Catch Basin Lead L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.00' / 48.80' S= 0.0100 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.31 cfs @ 12.07 hrs HW=49.29' (Free Discharge)
 ↳ **12" Catch Basin Lead** (Barrel Controls 0.31 cfs @ 2.50 fps)

Time span=0.00-20.00 hrs, dt=0.02 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Remaining Portion of Runoff Area=6,695 sf 50.25% Impervious Runoff Depth>6.85"
Tc=5.0 min CN=89 Runoff=1.26 cfs 0.088 af

Subcatchment2S: New Building Runoff Area=2,824 sf 100.00% Impervious Runoff Depth>7.93"
Tc=5.0 min CN=98 Runoff=0.56 cfs 0.043 af

Reach A-1: AnalysisPoint 1 (Hersey St Avg. Flow Depth=0.12' Max Vel=3.46 fps Inflow=1.26 cfs 0.088 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=1.26 cfs 0.088 af

Pond 4P: AnalysisPoint 2 (Ocean Ave Catch Basin) Peak Elev=49.40' Inflow=0.56 cfs 0.043 af
12.0" Round Culvert n=0.012 L=20.0' S=0.0100 '/' Outflow=0.56 cfs 0.043 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.131 af Average Runoff Depth = 7.17"
34.99% Pervious = 0.076 ac 65.01% Impervious = 0.142 ac

Summary for Subcatchment 1S: Remaining Portion of Site

Runoff = 1.26 cfs @ 12.07 hrs, Volume= 0.088 af, Depth > 6.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr SE_Cu 100-yr Rainfall=8.54"

Area (sf)	CN	Description
3,364	98	Paved parking & roofs
3,331	80	>75% Grass cover, Good, HSG D
6,695	89	Weighted Average
3,331		49.75% Pervious Area
3,364		50.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Subcatchment 2S: New Building

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 0.043 af, Depth > 7.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr SE_Cu 100-yr Rainfall=8.54"

Area (sf)	CN	Description
2,824	98	Paved parking & roofs
2,824		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1 (Hersey St Gutter)

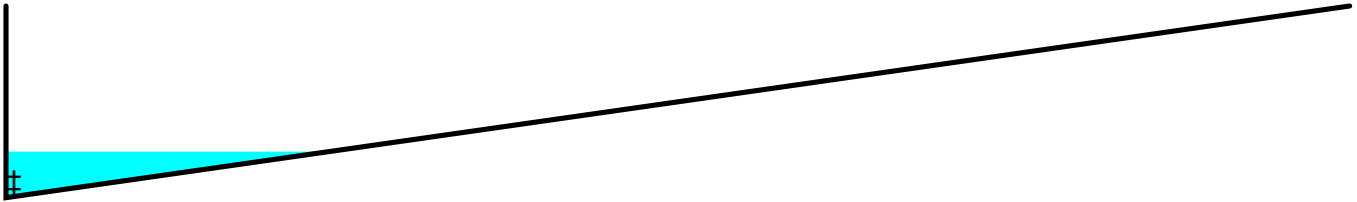
Hersey Street Gutter

Inflow Area = 0.154 ac, 50.25% Impervious, Inflow Depth > 6.85" for SE_Cu 100-yr event
Inflow = 1.26 cfs @ 12.07 hrs, Volume= 0.088 af
Outflow = 1.26 cfs @ 12.07 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
Max. Velocity= 3.46 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 1.39 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'



Summary for Pond 4P: Analysis Point 2 (Ocean Ave Catch Basin)

Inflow Area = 0.065 ac, 100.00% Impervious, Inflow Depth > 7.93" for SE_Cu 100-yr event
 Inflow = 0.56 cfs @ 12.07 hrs, Volume= 0.043 af
 Outflow = 0.56 cfs @ 12.07 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.56 cfs @ 12.07 hrs, Volume= 0.043 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Peak Elev= 49.40' @ 12.07 hrs
 Flood Elev= 54.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.00'	12.0" Round 12" Catch Basin Lead L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.00' / 48.80' S= 0.0100 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.56 cfs @ 12.07 hrs HW=49.40' (Free Discharge)
 ↳ **12" Catch Basin Lead** (Barrel Controls 0.56 cfs @ 2.84 fps)

Time span=0.00-20.00 hrs, dt=0.02 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Remaining Portion of Runoff Area=6,695 sf 50.25% Impervious Runoff Depth>1.95"
Tc=5.0 min CN=89 Runoff=0.38 cfs 0.025 af

Subcatchment2S: New Building Runoff Area=2,824 sf 100.00% Impervious Runoff Depth>2.82"
Tc=5.0 min CN=98 Runoff=0.21 cfs 0.015 af

Reach A-1: AnalysisPoint 1 (Hersey St Avg. Flow Depth=0.08' Max Vel=2.58 fps Inflow=0.38 cfs 0.025 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=0.38 cfs 0.025 af

Pond 4P: AnalysisPoint 2 (Ocean Ave Catch Basin) Peak Elev=49.23' Inflow=0.21 cfs 0.015 af
12.0" Round Culvert n=0.012 L=20.0' S=0.0100 '/' Outflow=0.21 cfs 0.015 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.040 af Average Runoff Depth = 2.20"
34.99% Pervious = 0.076 ac 65.01% Impervious = 0.142 ac

Summary for Subcatchment 1S: Remaining Portion of Site

Runoff = 0.38 cfs @ 12.07 hrs, Volume= 0.025 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr SE_Cu 2-yr Rainfall=3.19"

Area (sf)	CN	Description
3,364	98	Paved parking & roofs
3,331	80	>75% Grass cover, Good, HSG D
6,695	89	Weighted Average
3,331		49.75% Pervious Area
3,364		50.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Subcatchment 2S: New Building

Runoff = 0.21 cfs @ 12.07 hrs, Volume= 0.015 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr SE_Cu 2-yr Rainfall=3.19"

Area (sf)	CN	Description
2,824	98	Paved parking & roofs
2,824		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1 (Hersey St Gutter)

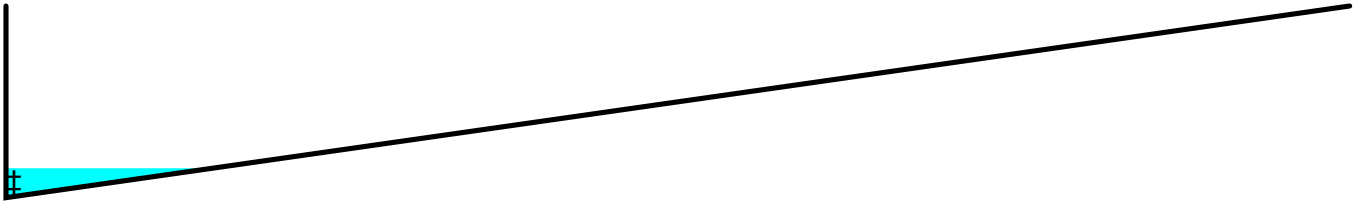
Hersey Street Gutter

Inflow Area = 0.154 ac, 50.25% Impervious, Inflow Depth > 1.95" for SE_Cu 2-yr event
Inflow = 0.38 cfs @ 12.07 hrs, Volume= 0.025 af
Outflow = 0.38 cfs @ 12.08 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
Max. Velocity= 2.58 fps, Min. Travel Time= 0.1 min
Avg. Velocity= 1.09 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'



Summary for Pond 4P: Analysis Point 2 (Ocean Ave Catch Basin)

Inflow Area = 0.065 ac, 100.00% Impervious, Inflow Depth > 2.82" for SE_Cu 2-yr event
 Inflow = 0.21 cfs @ 12.07 hrs, Volume= 0.015 af
 Outflow = 0.21 cfs @ 12.07 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.21 cfs @ 12.07 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Peak Elev= 49.23' @ 12.07 hrs
 Flood Elev= 54.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.00'	12.0" Round 12" Catch Basin Lead L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.00' / 48.80' S= 0.0100 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.20 cfs @ 12.07 hrs HW=49.23' (Free Discharge)
 ↳ **12" Catch Basin Lead** (Barrel Controls 0.20 cfs @ 2.27 fps)

Time span=0.00-20.00 hrs, dt=0.02 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Remaining Portion of Runoff Area=6,695 sf 50.25% Impervious Runoff Depth>4.49"
Tc=5.0 min CN=89 Runoff=0.85 cfs 0.058 af

Subcatchment2S: New Building Runoff Area=2,824 sf 100.00% Impervious Runoff Depth>5.51"
Tc=5.0 min CN=98 Runoff=0.39 cfs 0.030 af

Reach A-1: AnalysisPoint 1 (Hersey St Avg. Flow Depth=0.10' Max Vel=3.14 fps Inflow=0.85 cfs 0.058 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=0.85 cfs 0.058 af

Pond 4P: AnalysisPoint 2 (Ocean Ave Catch Basin) Peak Elev=49.33' Inflow=0.39 cfs 0.030 af
12.0" Round Culvert n=0.012 L=20.0' S=0.0100 '/' Outflow=0.39 cfs 0.030 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.087 af Average Runoff Depth = 4.79"
34.99% Pervious = 0.076 ac 65.01% Impervious = 0.142 ac

Summary for Subcatchment 1S: Remaining Portion of Site

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.058 af, Depth> 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Type III 24-hr SE_Cu 25-yr Rainfall=6.01"

Area (sf)	CN	Description
3,364	98	Paved parking & roofs
3,331	80	>75% Grass cover, Good, HSG D
6,695	89	Weighted Average
3,331		49.75% Pervious Area
3,364		50.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Subcatchment 2S: New Building

Runoff = 0.39 cfs @ 12.07 hrs, Volume= 0.030 af, Depth> 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Type III 24-hr SE_Cu 25-yr Rainfall=6.01"

Area (sf)	CN	Description
2,824	98	Paved parking & roofs
2,824		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1 (Hersey St Gutter)

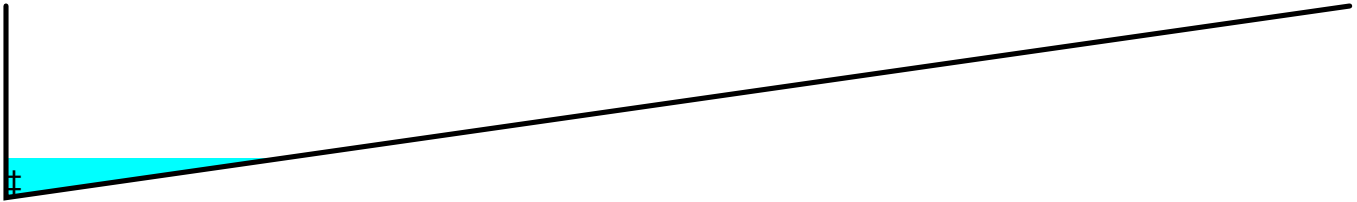
Hersey Street Gutter

Inflow Area = 0.154 ac, 50.25% Impervious, Inflow Depth > 4.49" for SE_Cu 25-yr event
 Inflow = 0.85 cfs @ 12.07 hrs, Volume= 0.058 af
 Outflow = 0.85 cfs @ 12.07 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Max. Velocity= 3.14 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 1.27 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.07 hrs
 Average Depth at Peak Storage= 0.10'
 Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'



Summary for Pond 4P: Analysis Point 2 (Ocean Ave Catch Basin)

Inflow Area = 0.065 ac, 100.00% Impervious, Inflow Depth > 5.51" for SE_Cu 25-yr event
 Inflow = 0.39 cfs @ 12.07 hrs, Volume= 0.030 af
 Outflow = 0.39 cfs @ 12.07 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.39 cfs @ 12.07 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Peak Elev= 49.33' @ 12.07 hrs
 Flood Elev= 54.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.00'	12.0" Round 12" Catch Basin Lead L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.00' / 48.80' S= 0.0100 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 12.07 hrs HW=49.33' (Free Discharge)
 ↳ **12" Catch Basin Lead** (Barrel Controls 0.39 cfs @ 2.63 fps)

Time span=0.00-20.00 hrs, dt=0.02 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Remaining Portion of Runoff Area=6,695 sf 50.25% Impervious Runoff Depth>5.56"
Tc=5.0 min CN=89 Runoff=1.04 cfs 0.071 af

Subcatchment2S: New Building Runoff Area=2,824 sf 100.00% Impervious Runoff Depth>6.61"
Tc=5.0 min CN=98 Runoff=0.47 cfs 0.036 af

Reach A-1: AnalysisPoint 1 (Hersey St Avg. Flow Depth=0.11' Max Vel=3.30 fps Inflow=1.04 cfs 0.071 af
n=0.013 L=10.0' S=0.0400 '/' Capacity=55.95 cfs Outflow=1.03 cfs 0.071 af

Pond 4P: AnalysisPoint 2 (Ocean Ave Catch Basin) Peak Elev=49.36' Inflow=0.47 cfs 0.036 af
12.0" Round Culvert n=0.012 L=20.0' S=0.0100 '/' Outflow=0.47 cfs 0.036 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.107 af Average Runoff Depth = 5.87"
34.99% Pervious = 0.076 ac 65.01% Impervious = 0.142 ac

Summary for Subcatchment 1S: Remaining Portion of Site

Runoff = 1.04 cfs @ 12.07 hrs, Volume= 0.071 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Type III 24-hr SE_Cu 50-yr Rainfall=7.16"

Area (sf)	CN	Description
3,364	98	Paved parking & roofs
3,331	80	>75% Grass cover, Good, HSG D
6,695	89	Weighted Average
3,331		49.75% Pervious Area
3,364		50.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Subcatchment 2S: New Building

Runoff = 0.47 cfs @ 12.07 hrs, Volume= 0.036 af, Depth> 6.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Type III 24-hr SE_Cu 50-yr Rainfall=7.16"

Area (sf)	CN	Description
2,824	98	Paved parking & roofs
2,824		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 5 minutes

Summary for Reach A-1: Analysis Point 1 (Hersey St Gutter)

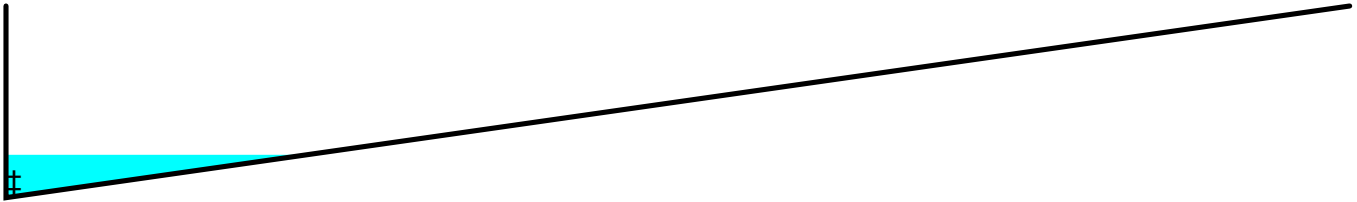
Hersey Street Gutter

Inflow Area = 0.154 ac, 50.25% Impervious, Inflow Depth > 5.56" for SE_Cu 50-yr event
 Inflow = 1.04 cfs @ 12.07 hrs, Volume= 0.071 af
 Outflow = 1.03 cfs @ 12.07 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Max. Velocity= 3.30 fps, Min. Travel Time= 0.1 min
 Avg. Velocity= 1.32 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.07 hrs
 Average Depth at Peak Storage= 0.11'
 Bank-Full Depth= 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs

0.00' x 0.50' deep channel, n= 0.013 Asphalt, smooth
 Side Slope Z-value= 0.0 50.0 ' / ' Top Width= 25.00'
 Length= 10.0' Slope= 0.0400 ' / '
 Inlet Invert= 50.40', Outlet Invert= 50.00'



Summary for Pond 4P: Analysis Point 2 (Ocean Ave Catch Basin)

Inflow Area = 0.065 ac, 100.00% Impervious, Inflow Depth > 6.61" for SE_Cu 50-yr event
 Inflow = 0.47 cfs @ 12.07 hrs, Volume= 0.036 af
 Outflow = 0.47 cfs @ 12.07 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.47 cfs @ 12.07 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.02 hrs
 Peak Elev= 49.36' @ 12.07 hrs
 Flood Elev= 54.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.00'	12.0" Round 12" Catch Basin Lead L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.00' / 48.80' S= 0.0100 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.47 cfs @ 12.07 hrs HW=49.36' (Free Discharge)
 ↳ **12" Catch Basin Lead** (Barrel Controls 0.47 cfs @ 2.73 fps)