



23 Ocean Avenue Pre-Development & Post Development Stormwater Calculations

Date:October 12, 2016From: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)

	PRE-Development Peak Runoff RATES cubic feet per second (CFS)				
Storm Event	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	-			

	POST-Development Peak Runoff RATES cubic feet per second (CFS)			
Storm Event	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 ether a waiver of the flooding standard or a determination that the flooding standing has been met.



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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

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Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	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

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HSG-A	HSG-B	HSG-C	HSG-D	Other	Total	Ground	Subcatchment
(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	Cover	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	

Ground Covers (all nodes)

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: Analysis Point 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"

A	rea (sf)	CN	Description					
	4,036	98	Paved parking & roofs					
	5,483	80	>75% Gras	s cover, Go	bod, HSG D			
	9,519	88	Weighted Average					
	5,483		57.60% Pervious Area					
	4,036		42.40% Impervious Area					
Tc (min)	Length (feet)	Slop (ft/ft	e 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 = Inflow = Outflow =	0.219 ac, 42.40% Impervious, Inflow De 0.89 cfs @ 12.07 hrs, Volume= 0.89 cfs @ 12.07 hrs, Volume=	pth > 3.25" for SE_Cu 10-yr event 0.059 af 0.059 af, Atten= 0%, Lag= 0.1 min
Routing by Stor-Ind Max. Velocity= 3.18 Avg. Velocity = 1.30	d+Trans method, Time Span= 2.00-20.00 8 fps, Min. Travel Time= 0.1 min 0 fps, Avg. Travel Time= 0.1 min	hrs, dt= 0.02 hrs
Peak Storage= 3 cf Average Depth at P Bank-Full Depth= 0	f @ 12.07 hrs Peak Storage= 0.11').50' Flow Area= 6.3 sf, Capacity= 55.95	cfs
0.00' x 0.50' deep Side Slope Z-value: Length= 10.0' Slop Inlet Invert= 50.40',	o channel, n= 0.013 Asphalt, smooth ≥ 0.0 50.0 '/' Top Width= 25.00' pe= 0.0400 '/' , 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: Analysis Point 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"

A	rea (sf)	CN	Description						
	4,036	98	Paved park	Paved parking & roofs					
	5,483	80	>75% Gras	s cover, Go	bod, HSG D				
	9,519	88	Weighted Average						
	5,483		57.60% Pervious Area						
	4,036		42.40% Impervious Area						
Tc (min)	Length (feet)	Slop (ft/ft	e 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 = Inflow = Outflow =	0.219 ac, 42.40% Impervious, Inflow I 1.77 cfs @ 12.07 hrs, Volume= 1.77 cfs @ 12.07 hrs, Volume=	Depth > 6.73" for SE_Cu 100-yr event 0.123 af 0.123 af, Atten= 0%, Lag= 0.1 min
Routing by Stor-Inc Max. Velocity= 3.7 Avg. Velocity = 1.5	d+Trans method, Time Span= 2.00-20.0 7 fps, Min. Travel Time= 0.0 min 1 fps, Avg. Travel Time= 0.1 min	0 hrs, dt= 0.02 hrs
Peak Storage= 5 c Average Depth at F Bank-Full Depth= 0	f @ 12.07 hrs Peak Storage= 0.14' 0.50' Flow Area= 6.3 sf, Capacity= 55.9	15 cfs
0.00' x 0.50' deep Side Slope Z-value Length= 10.0' Slo Inlet Invert= 50.40'	p channel, n= 0.013 Asphalt, smooth ≥= 0.0 50.0 '/' Top Width= 25.00' ppe= 0.0400 '/' ', 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: Analysis Point 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"

A	rea (sf)	CN	Description					
	4,036	98	Paved parking & roofs					
	5,483	80	>75% Gras	s cover, Go	bod, HSG D			
	9,519	88	Weighted Average					
	5,483		57.60% Pervious Area					
	4,036		42.40% Impervious Area					
Tc (min)	Length (feet)	Slop (ft/ft	e 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 = Inflow = 0 Outflow = 0	0.219 ac, 42.40% Impervious, Inflow D 0.52 cfs @ 12.07 hrs, Volume= 0.52 cfs @ 12.08 hrs, Volume=	epth > 1.86" for SE_Cu 2-yr event 0.034 af 0.034 af, Atten= 0%, Lag= 0.1 min
Routing by Stor-Ind- Max. Velocity= 2.79 Avg. Velocity = 1.18	I+Trans method, Time Span= 2.00-20.00 9 fps, Min. Travel Time= 0.1 min 8 fps, Avg. Travel Time= 0.1 min	hrs, dt= 0.02 hrs
Peak Storage= 2 cf Average Depth at P Bank-Full Depth= 0.	[:] @ 12.08 hrs Peak Storage= 0.09' 0.50' Flow Area= 6.3 sf, Capacity= 55.95	5 cfs
0.00' x 0.50' deep Side Slope Z-value= Length= 10.0' Slop Inlet Invert= 50.40',	channel, n= 0.013 Asphalt, smooth = 0.0 50.0 '/' Top Width= 25.00' pe= 0.0400 '/' 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: Analysis Point 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

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Page 12

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"

A	rea (sf)	CN	Description					
	4,036	98	Paved park	Paved parking & roofs				
	5,483	80	>75% Gras	s cover, Go	bod, HSG D			
	9,519	88	Weighted A	verage				
	5,483		57.60% Pervious Area					
	4,036		42.40% Impervious Area					
Tc (min)	Length (feet)	Slop (ft/f	e Velocity) (ft/sec)	Capacity (cfs)	Description			
5.0					Direct Entry, 5 minutes			

Summary for Reach A-1: Analysis Point 1

Hersey Street Gutter

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Inflow Area = Inflow = Outflow =	0.219 ac, 42.40% Impervious, Inflow Depth > 4.38 1.18 cfs @ 12.07 hrs, Volume= 0.080 af 1.18 cfs @ 12.07 hrs, Volume= 0.080 af, A	' for SE_Cu 25-yr event tten= 0%, Lag= 0.1 min
Routing by Stor-Ind Max. Velocity= 3.4 Avg. Velocity = 1.3	nd+Trans method, Time Span= 2.00-20.00 hrs, dt= 0.02 41 fps, Min. Travel Time= 0.0 min 38 fps, Avg. Travel Time= 0.1 min	2 hrs
Peak Storage= 3 c Average Depth at F Bank-Full Depth= 0	cf @ 12.07 hrs Peak Storage= 0.12' 0.50' Flow Area= 6.3 sf, Capacity= 55.95 cfs	
0.00' x 0.50' deep Side Slope Z-value Length= 10.0' Slo Inlet Invert= 50.40'	ep channel, n= 0.013 Asphalt, smooth ue= 0.0 50.0 '/' Top Width= 25.00' lope= 0.0400 '/' 0', 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: Analysis Point 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"

A	rea (sf)	CN	Description					
	4,036	98	Paved park	ing & roofs				
	5,483	80	>75% Gras	s cover, Go	bod, HSG D			
	9,519	88	Weighted A	Weighted Average				
	5,483		57.60% Pe	57.60% Pervious Area				
	4,036		42.40% Impervious Area					
Tc (min)	Length (feet)	Slop (ft/ft	e 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 = Inflow = Outflow =	0.219 ac, 42.40% Impervious, Inflow Depth > 5.44" for SE_Cu 50-yr event 1.45 cfs @ 12.07 hrs, Volume= 0.099 af 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 Average Depth at F Bank-Full Depth= 0	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	Soil	Subcatchment
(acres)	Group	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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			oround e		neuce,		
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	

Ground Covers (all nodes)

23Ocean_POST-Development_2016-10-12	Type III 24-hr SE_Cu 10-yr Rainfall=4.77
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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 ofRunoff Area=6,695 sf50.25% ImperviousRunoff Depth>3.35"Tc=5.0 minCN=89Runoff=0.64 cfs0.043 af

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

Subcatchment2S: New Building

Reach A-1: Analysis Point 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: Analysis Point 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	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 Length (min) (feet)	Slor (ft/	be Velocity Capacity Description ft) (ft/sec) (cfs)				
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"

Ar	ea (sf)	CN	Description				
	2,824	98	Paved parking & roofs				
	2,824		100.00% In	npervious A	rea		
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 0.154 ac, 50.25% Impervious, Inflow Depth > 3.35" Inflow Area = for SE Cu 10-yr event Inflow 0.64 cfs @ 12.07 hrs, Volume= 0.043 af = 0.64 cfs @ 12.07 hrs, Volume= Outflow 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

23Ocean POST-Development 2016-10-12 Type III 24-hr SE_Cu 10-yr Rainfall=4.77" Prepared by Ransom Consulting Printed 10/12/2016 HydroCAD® 10.00-12 s/n 05121 © 2014 HydroCAD Software Solutions LLC Page 7 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) 0.065 ac,100.00% Impervious, Inflow Depth > 4.32" for SE_Cu 10-yr event Inflow Area = 0.31 cfs @ 12.07 hrs, Volume= Inflow = 0.023 af Outflow 0.31 cfs @ 12.07 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min

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'

0.31 cfs @ 12.07 hrs, Volume=

=

=

Primary

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

0.023 af

Primary OutFlow Max=0.31 cfs @ 12.07 hrs HW=49.29' (Free Discharge) **1=12**" Catch Basin Lead (Barrel Controls 0.31 cfs @ 2.50 fps)

23Ocean_POST-Development_2016-10-12	Type III 24-hr SE_Cu 100-yr Rainfall=8.54"
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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 ofRunoff Area=6,695 sf50.25% ImperviousRunoff Depth>6.85"Tc=5.0 minCN=89Runoff=1.26 cfs0.088 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: Analysis Point 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: Analysis Point 2 (Ocean Ave Catch Basin) 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 (s	sf)	CN	Description				
3,30	64	98	Paved park	ing & roofs			
3,33	31	80 :	>75% Ġras	s cover, Go	bod, HSG D		
6,69	95	89	Weighted A	verage			
3,33	31	49.75% Pervious Area					
3,30	64	:	50.25% Imp	pervious Ar	ea		
Tc Len (min) (fe	gth eet)	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"

Ar	ea (sf)	CN	Description					
	2,824	98	Paved parking & roofs					
	2,824		100.00% Impervious Area					
Tc (min)	Length (feet)	Slope (ft/ft)	e 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

23Ocean POST-Development 2016-10-12 Type III 24-hr SE_Cu 100-yr Rainfall=8.54" Prepared by Ransom Consulting Printed 10/12/2016 HydroCAD® 10.00-12 s/n 05121 © 2014 HydroCAD Software Solutions LLC Page 10 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) 0.065 ac,100.00% Impervious, Inflow Depth > 7.93" for SE Cu 100-yr event Inflow Area = 0.56 cfs @ 12.07 hrs, Volume= Inflow = 0.043 af Outflow 0.56 cfs @ 12.07 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min = 0.56 cfs @ 12.07 hrs, Volume= Primary 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** 12.0" Round 12" Catch Basin Lead #1 49.00' Primary 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) 1=12" Catch Basin Lead (Barrel Controls 0.56 cfs @ 2.84 fps)

23Ocean_POST-Development_2010	6-10-12	Type III 24	-hr SE_Cu	2-yr Rainfall=3.19)"
Prepared by Ransom Consulting			I	Printed 10/12/2016	3
HydroCAD® 10.00-12 s/n 05121 © 2014 Hydr	oCAD Software So	olutions LLC		Page 11	_
Time span=0.00	-20.00 hrs, dt=0.	02 hrs, 1001 p	oints		
Runoff by SCS TF	R-20 method, UH	=SCS, Weight	ed-CN		
Reach routing by Stor-Ind+T	rans method - F	ond routing by	y Stor-Ind me	ethod	
	Dune# Anse C				
Subcatchment1S: Remaining Portion of	Runoff Area=6,	695 SF 50.25%		Runoff Deptn>1.95	
		1 C=5.0 min 0	CN=89 Rund	DIT=0.38 CTS 0.025 at	
Subcatchmont2S: Now Building	Runoff Area-2.8	24 sf 100 00%	Impervious	Runoff Denth>2 82"	
Subcatchinent25. New Building	Runon Area-2,0	$T_{c}=5.0 \text{ min}$ (CN-98 Runc	$ff_0 21 cfs_0 015 af$	
		10-0.0 1111		n=0.21 013 0.010 al	
Reach A-1: Analysis Point 1 (Hersey St A	va. Flow Depth=0	.08' Max Vel=2	2.58 fps Inflo	w=0.38 cfs 0.025 af	
n=0.013 L=*	10.0' S=0.0400 '/'	Capacitv=55.	95 cfs Outflo	w=0.38 cfs 0.025 af	
		,			
Pond 4P: Analysis Point 2 (Ocean Ave Cat	ch Basin)	Peak Elev	/=49.23' Inflo	w=0.21 cfs 0.015 af	
12.0" Round	Culvert n=0.012	L=20.0' S=0.0	100 '/' Outflo	w=0.21 cfs 0.015 af	
		0.040	<i>.</i> .		~

Total Runoff Area = 0.219 acRunoff Volume = 0.040 afAverage Runoff Depth = 2.20"34.99% Pervious = 0.076 ac65.01% 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"

Are	ea (sf)	CN	Description					
	3,364	98	Paved park	ing & roofs				
	3,331	80	>75% Gras	s cover, Go	bod, HSG D			
	6,695	89	Weighted Average					
	3,331		49.75% Pervious Area					
	3,364		50.25% Impervious Area					
Тс	Length	Slop	e Velocity	Capacity	Description			
(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)				
5.0					Direct Entry, 5 minutes			
Summary for Subcatchment 2S: New Building								

Runoff =	0.21 cfs @	12.07 hrs.	Volume=	0.015 af. D	epth> 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"

A	rea (sf)	CN	Description					
	2,824	98	Paved parking & roofs					
	2,824		100.00% In	npervious A	rea			
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 0.154 ac, 50.25% Impervious, Inflow Depth > 1.95" for SE_Cu 2-yr event Inflow Area = Inflow 0.025 af 0.38 cfs @ 12.07 hrs, Volume= = 0.38 cfs @ 12.08 hrs, Volume= Outflow 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

23Ocean POST-Development 2016-10-12 Type III 24-hr SE_Cu 2-yr Rainfall=3.19" Prepared by Ransom Consulting Printed 10/12/2016 HydroCAD® 10.00-12 s/n 05121 © 2014 HydroCAD Software Solutions LLC Page 13 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 0.21 cfs @ 12.07 hrs, Volume= Inflow = 0.015 af Outflow 0.21 cfs @ 12.07 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min = 0.21 cfs @ 12.07 hrs, Volume= 0.015 af Primary = 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) ←1=12" Catch Basin Lead (Barrel Controls 0.20 cfs @ 2.27 fps)

23Ocean_POST-Development_2016-10-12	Type III 24-hr	SE_Cu 25-yr Ra	ninfall=6.01"
Prepared by Ransom Consulting		Printed	10/12/2016
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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 ofRunoff Area=6,695 sf50.25% ImperviousRunoff Depth>4.49"Tc=5.0 minCN=89Runoff=0.85 cfs0.058 af

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: Analysis Point 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

Subcatchment2S: New Building

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

Are	ea (sf)	CN	Description				
	3,364	98	Paved park	ing & roofs			
	3,331	80	>75% Gras	s cover, Go	bod, HSG D		
	6,695	89	Weighted A	verage			
	3,331		49.75% Pe	rvious Area			
	3,364		50.25% Impervious Area				
Tc (min)	Length (feet)	Slop (ft/f	e Velocity t) (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"

A	rea (sf)	CN	Description			
	2,824	98	Paved parking & roofs			
	2,824		100.00% In	npervious A	rea	
Tc	Length	Slope	e Velocity	Capacity	Description	
(min)	(feet)	(ft/ft) (ft/sec)	(CfS)		
5.0					Direct Entry, 5 minutes	

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

Hersey Street Gutter 0.154 ac, 50.25% Impervious, Inflow Depth > 4.49" for SE_Cu 25-yr event Inflow Area = Inflow 0.058 af 0.85 cfs @ 12.07 hrs, Volume= = 0.85 cfs @ 12.07 hrs, Volume= Outflow 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

Type III 24-hr SE_Cu 25-yr Rainfall=6.01" 23Ocean POST-Development 2016-10-12 Prepared by Ransom Consulting Printed 10/12/2016 HydroCAD® 10.00-12 s/n 05121 © 2014 HydroCAD Software Solutions LLC Page 16 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) 0.065 ac,100.00% Impervious, Inflow Depth > 5.51" for SE_Cu 25-yr event Inflow Area = 0.39 cfs @ 12.07 hrs, Volume= Inflow = 0.030 af Outflow 0.39 cfs @ 12.07 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min = 0.39 cfs @ 12.07 hrs, Volume= Primary 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' Dovice Pouting Invert Outlet Devices

Device	Rouling	Inven	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) ←1=12" Catch Basin Lead (Barrel Controls 0.39 cfs @ 2.63 fps)

23Ocean_POST-Development_201	6-10-12 7	ype III 24-hr 🗧	SE_Cu 50-yr Rainfall=7.16"
Prepared by Ransom Consulting			Printed 10/12/2016
HydroCAD® 10.00-12 s/n 05121 © 2014 Hydr	oCAD Software Solu	tions LLC	Page 17
Time span=0.00 Runoff by SCS TF Reach routing by Stor-Ind+T	-20.00 hrs, dt=0.02 R-20 method, UH=S rans method - Poi	hrs, 1001 poin SCS, Weighted- nd routing by S	its ·CN tor-Ind method
Subcatchment1S: Remaining Portion of	Runoff Area=6,69	95 sf 50.25% Im Γc=5.0 min CN⊧	pervious Runoff Depth>5.56" =89 Runoff=1.04 cfs 0.071 af
Subcatchment2S: New Building	Runoff Area=2,824	sf 100.00% Im Tc=5.0 min CN:	pervious Runoff Depth>6.61" =98 Runoff=0.47 cfs 0.036 af
Reach A-1: Analysis Point 1 (Hersey St Analysis Point 1 (H	Avg. Flow Depth=0.1* 10.0' S=0.0400 '/' (1' Max Vel=3.30 Capacity=55.95 (0 fps Inflow=1.04 cfs 0.071 af cfs Outflow=1.03 cfs 0.071 af
Pond 4P: AnalysisPoint 2 (Ocean Ave Cat 12.0" Round	t ch Basin) I Culvert_n=0.012_L:	Peak Elev=49 20.0' S=0.0100	9.36' Inflow=0.47 cfs 0.036 af) '/' 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"

Ar	ea (sf)	CN	Description				
	3,364	98	Paved parking & roofs				
	3,331	80	>75% Gras	s cover, Go	bod, HSG D		
	6,695	89	Weighted Average				
	3,331		49.75% Pervious Area				
	3,364		50.25% Impervious Area				
		_					
Tc	Length	Slop	e Velocity	Capacity	Description		
(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)			
5.0					Direct Entry, 5 minutes		
			Summary	, for Sub	catchment 2S: New Building		
			Guinnar		Caterinent 20. New Dunung		

Runoff	=	0.47 cfs @	12.07 hrs.	Volume=	0.036 af. Depth> 6.6	۶1"

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"

A	rea (sf)	CN	Description			
	2,824	98	Paved parking & roofs			
	2,824		100.00% In	npervious A	rea	
Тс	Length	Slope	e Velocity	Capacity	Description	
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)		
5.0					Direct Entry, 5 minutes	

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

Hersey Street Gutter 0.154 ac, 50.25% Impervious, Inflow Depth > 5.56" for SE_Cu 50-yr event Inflow Area = Inflow 1.04 cfs @ 12.07 hrs, Volume= 0.071 af = 1.03 cfs @ 12.07 hrs, Volume= Outflow 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

Type III 24-hr SE_Cu 50-yr Rainfall=7.16" 23Ocean POST-Development 2016-10-12 Prepared by Ransom Consulting Printed 10/12/2016 HydroCAD® 10.00-12 s/n 05121 © 2014 HydroCAD Software Solutions LLC Page 19 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) 0.065 ac,100.00% Impervious, Inflow Depth > 6.61" for SE Cu 50-yr event Inflow Area = 0.47 cfs @ 12.07 hrs, Volume= Inflow = 0.036 af Outflow 0.47 cfs @ 12.07 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min = 0.47 cfs @ 12.07 hrs, Volume= Primary 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 Invort Outlet Devices

Device	Routing	niven	Outliet 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) ←1=12" Catch Basin Lead (Barrel Controls 0.47 cfs @ 2.73 fps)