



STATCO-DSI
WOODLAND, WASHINGTON

**PRELIMINARY
DRAINAGE REPORT**

PREPARED BY:



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DATE: 2/20/2024

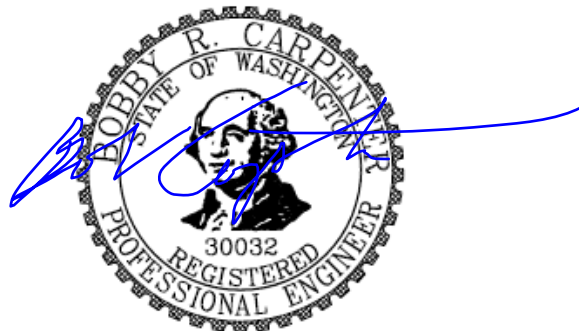
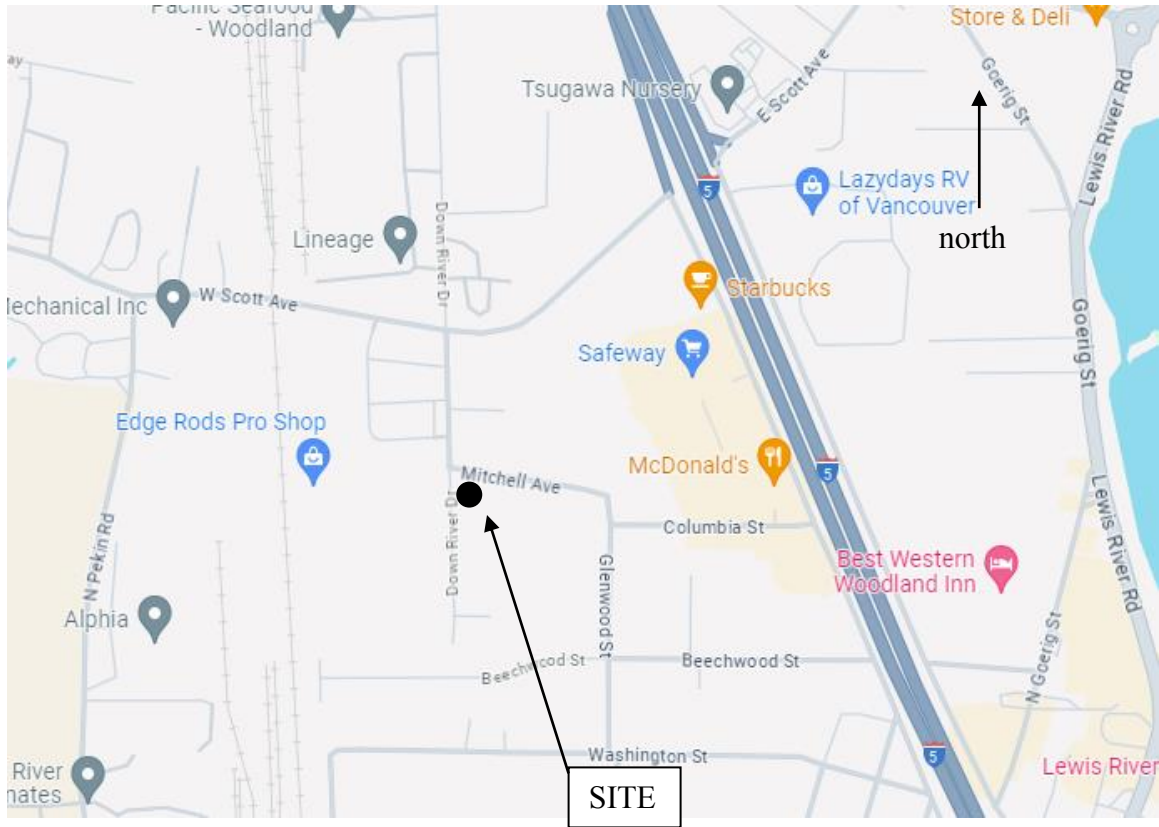


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VICINITY MAP



STATCO-DSI STORMWATER CONTROL DESIGN NARRATIVE

Introduction:

This stormwater report is prepared in support of the proposed STATCO-DSI Building addition located at 675 Mitchell Ave, Woodland WA. The proposal includes construction of a new 10,000 sf attached building/warehouse addition, a new paved laydown yard, parking spaces and landscape.

This stormwater design follows the standards set forth by the City of Woodland Municipal Code and the 1992 Puget Sound Stormwater Manual.

Existing Condition:

The 2.17-acre parcel is located at the southeast corner of the intersections of Mitchell Ave and Down River Drive in Woodland WA. The property is zoned light industrial and the existing use is a permitted use in the City Industrial Zone.

The site is relatively flat with an existing attached office and warehouse building located in the north portion of the site. The central portion of the site is paved laydown yard. This proposal will place a new 80' x 125' warehouse building at the east central portion of the site while the south half of the parcel which is undeveloped will be converted to paved laydown yard and parking facilities.

The existing light industrial facility was approved, permitted and constructed back in 1998. Public utilities, street frontage improvements, driveway access, and stormwater control facilities were all constructed and extended to the site at that time. The new proposal for expansion will not alter the existing site facilities except where pavement and grades will be altered. The existing stormwater facility will be modified to mitigate the new paved surface runoff and to comply with the current City of Woodland Stormwater code.

The existing paved surfaces and roof surfaces are all collected into an existing stormwater collection system of pipes and catch basin which is thence conveyed to the southwest corner of the site into an existing stormwater detention pond. The existing pond appears to a long bioswale style pond with grass sides and bottom presumably for treatment of surface waters and controlled by an outlet structure with orifice and overflow outlets that are ties into the existing City owned stormwater system located in Down River Drive.

The existing south half of the site is currently covered in pasture grass. The slope of this area all grades towards the existing stormwater swale located in the southwest corner of the site.

Site soils have been identified as Clay to silt loam. As identified in the Soil Survey of Cowlitz Area, Washington prepared by the US Department of Agriculture Soil Conservation Service, this soil is moderately permeable and surface runoff is

very slow with little hazard of erosion. Based upon a review of the Department of Ecology's well logs, water table in the area can be expected between 7 and 10 feet below ground surface.

Developed Condition:

In the developed condition the south half of the site currently covered with pasture grass will be replaced with new paved surfaces for laydown yard, parking and new perimeter landscape. The new 80' x 125' building expansion will require the removal of an equivalent area of existing paved laydown yard converting paved impervious areas into impervious roof area. The existing stormwater facility located in the southwest corner of the site will be modified and expanded to treat and detain the existing site stormwater runoff and the new paved surfaces associated with this proposal.

Landscaping plantings within perimeter setbacks and new street trees will be installed equal to or greater than 10% of the developed area of the site.

Design Approach:

Developed condition site surface waters are required to be treated and detained prior to discharge. Developed condition release rates are required to be one half of the pre-existing 2-yr site release and no greater than the pre-existing 10-yr and 100-yr site release rates.

In the existing condition the site has been analyzed as 100% pasture grass as indicated by a review of aerial photos of the from 1990 showing the site and neighboring parcels used as hay fields. In the developed condition the site includes paved parking surfaces, roof surfaces and landscape areas.

An existing and developed condition basin plan is attached in Appendix A and B.

The existing stormwater facility will be expanded to include the modification and improvement of the existing swale that treats surface waters from the existing site and a new expanded swale designed to treat surface runoff from the new paved expansion areas. The existing swale width geometry will be widened however the length and slope, inlet and outlet elevations are all set by existing construction and cannot be modified. Both swales are located within the confines of one large detention pond separated by a 2 ft high berm. In the event of larger storms above the water quality event, the two swales will be temporarily inundated.

See the preliminary stormwater plan attached in Appendix H.

The two swales have been designed to treat the water quality rainfall event and to provide a minimum of 9 minutes of travel residence time before discharge thru the outlet structure.

Cross sections and design criteria for each of the swales are shown in Appendix I.

The detention pond bottom elevation is 97 ft and the pond top elevation at 100 ft. The detention pond has been designed to detain developed condition surface water runoff to discharge rates of half the pre-existing 2-year release rate and to no more than the existing 10- and 100-year rainfall site release rates. Tables 1, 2 and 3 below tabulate the site existing, developed and discharge comparisons respectively.

Table 1 - Existing Condition Basin Flow Data

Basin #	Total	Pervious	Impervious	Pervious	Impervious	Tc (min)	Peak Flows (cfs)			
	Area (sf)	Area (sf)	Area (sf)	CN	CN		WQ	2 Yr	10 Yr	100 Yr
1	91912	91912	0	85		47.3	n/a	0.32	0.65	0.9

Table 2 - Developed Condition Basin Flow Data

Basin #	Area (sf.)	CN	Tc (min)	Peak Flows (cfs)			
				WQ	2 Yr	10 Yr	100 Yr
1	10,343	98	6	0.09	0.14	0.20	0.24
2	11,226	98	6	0.09	0.15	0.21	0.26
3	14,694	98	6	0.12	0.20	0.28	0.34
4	10,639	98	6	0.09	0.14	0.20	0.25
5	8,348	98	6	0.07	0.11	0.16	0.19
6	11,083	98	6	0.09	0.15	0.21	0.26
7	14,410	98	6	0.12	0.19	0.28	0.33

Table 3 - Detained Pond Release Rates

Rainfall	Detained Release	Pond El.
Event (Yr)	(cfs)	(ft)
2	0.16	98.59
10	0.21	99.24
100	0.30	99.52

Table 4 - ExTG. Vs. Developed Release Rates

Rainfall	Existing	Developed Peak
Event (Yr)	(cfs)	(cfs)
2	0.32	0.16
10	0.65	0.21
100	0.90	0.30

Note that the developed peak release rates are equal to or less than half of the 2-yr existing rate and no more than the 10 and 100-yr pre-existing release rates as required by code.

Design Criteria:

Santa Barbara Unit Hydrograph Model

Type 1A Storm

Site Soils: Clayto Silt Loam (Type B/C Soils Group)

Rainfall: (see isopluvial maps attached)

WQ = 1.6 in (64% of 2 Yr.)

2 Yr. = 2.5 in

10 Yr. = 3.5 in

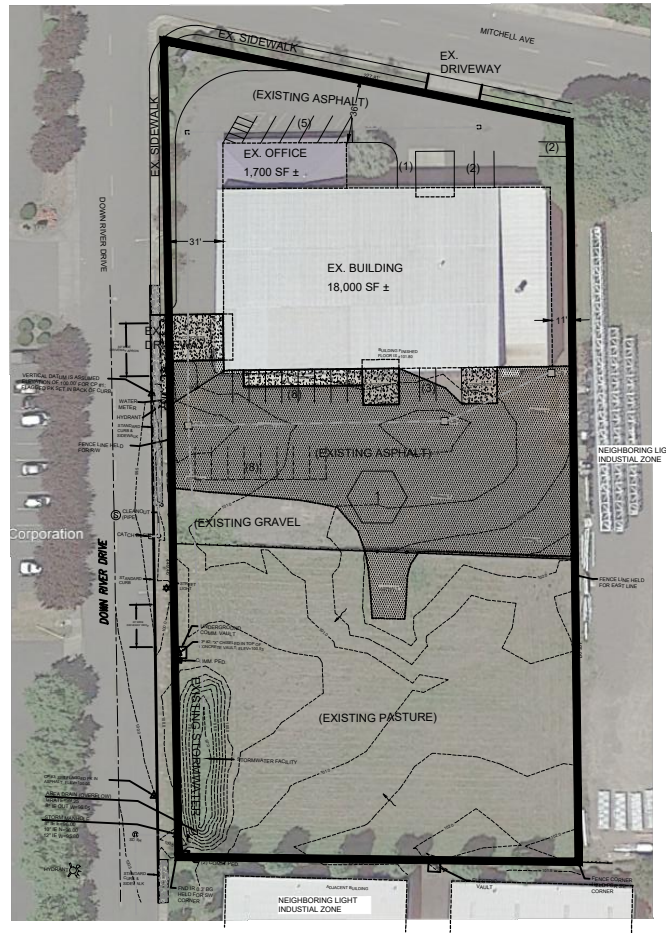
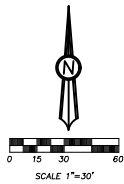
100 Yr. = 4.5 in

Curve numbers – 98 paved and roof areas

88 Landscape Areas

82 Pasture

APPENDIX A
EXISTING CONDITION BASIN PLAN



NOTE:
 THE EXISTING CONDITION WAS ASSUMED TO BE 100% PASTURE
 GRASS AS EXISTED PRE-CURRENT DEVELOPMENT BASED UPON
 AERIAL PHOTO RECORDS PRE-1998. CURRENT AERIAL PHOTO
 SHOWN IS FOR REFERENCE ONLY.

Table 1 - Existing Condition Basin Flow Data

Basin #	Total		Permeous		Impermeous		Peak Flow (cfs)				
	Area (sf)	Area (sf)	Area (sf)	CN	CN	Tc (min)	WQ	2 Yr	10 Yr	100 Yr	
(1)	91912	91912	0	85			42.3	n/a	0.32	0.65	0.30

LEGEND

- DRAINAGE BIN
- SURFACE WATER FLOW PATH

STATCO BUILDING EXPANSION
 EXISTING CONDITIONS BASIN PLAN
 675 MITCHELL AVE
 WOODLAND VA 28674

J.C. CARPENTER
 ENGINEER, INC.
 1100 S. BRADLEY LANE
 WOODLAND VA 28674
 CONTRACT NO. 21-001
 THE DATE IS LONG
 AT THE PROJECT SITE

REVISION

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REVISION

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APPENDIX B

DEVELOPED CONDITION BASIN PLAN

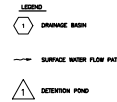
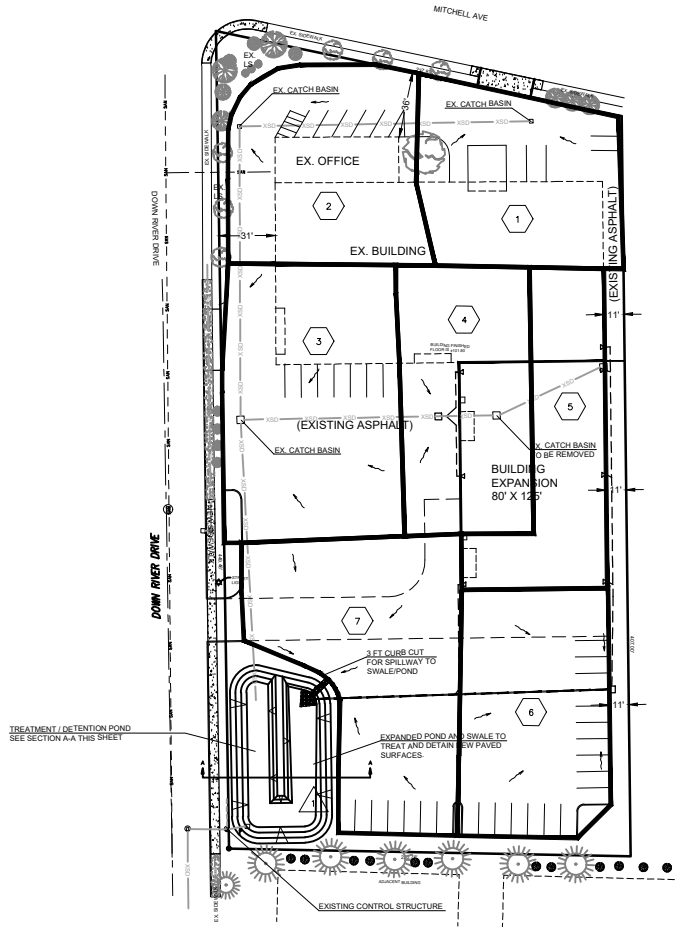
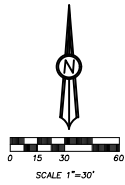
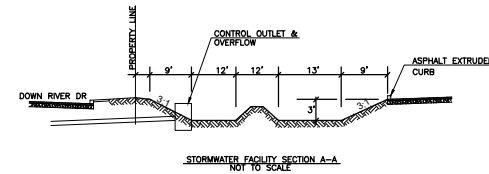


Table 2 - Developed Condition Basin Flow Data

Basin #	Area (cfs)	CN	Tc (min)	Peak Flows (cfs)			
				WQ	2 Yr	10 Yr	100 Yr
1	10,343	98	6	0.09	0.16	0.20	0.26
2	11,226	98	6	0.09	0.15	0.21	0.26
3	14,694	98	6	0.12	0.20	0.28	0.34
4	10,619	98	6	0.09	0.14	0.20	0.25
5	8,948	98	6	0.07	0.11	0.16	0.19
6	11,083	98	6	0.09	0.15	0.21	0.26
7	14,410	98	6	0.12	0.19	0.28	0.33

Table 3 - Detained Pond Release Rates

Rainfall Event (Yr)	Detained Release (cfs)	Pond El. (ft)
2	0.16	98.59
10	0.21	99.24
100	0.30	99.52



STATCO BUILDING EXPANSION
DEVELOPED CONDITION BASIN PLAN

675 MITCHELL AVE
WOODLAND VA 28674

REVISION

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DATE: 2/9/2024
PROJECT NO.: 21-001
CONTRACT NO.:
THIS LINE IS 1" LONG AT THE PROJECT SCALE

APPENDIX C

RUNOFF CURVE NUMBER TABLE

STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN

Table III-1.3 SCS Western Washington Runoff Curve Numbers
 (Published by SCS in 1982) Runoff curve numbers for selected agricultural,
 suburban and urban
 land use for Type 1A rainfall distribution, 24-hour storm duration.

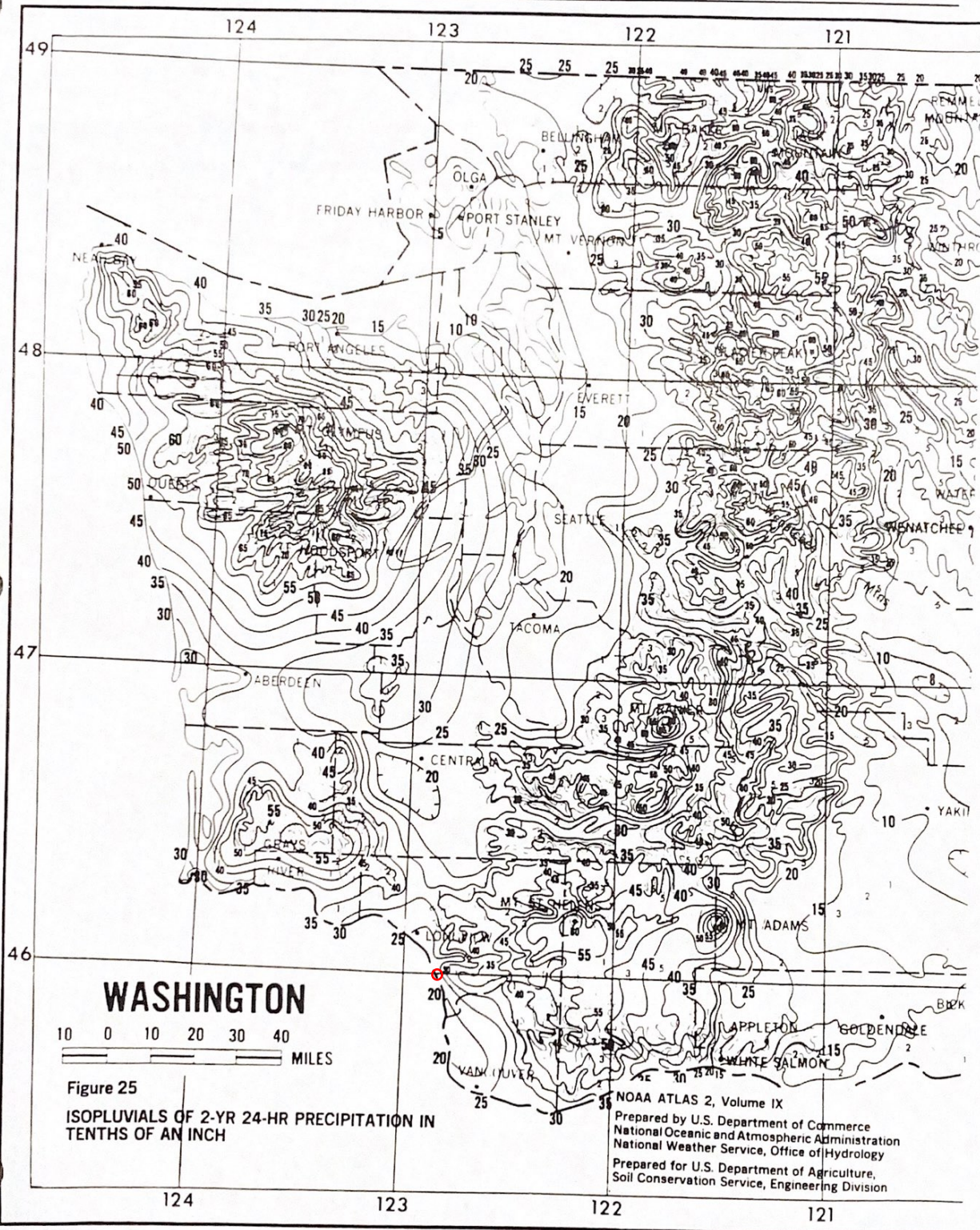
LAND USE DESCRIPTION	CURVE NUMBERS BY HYDROLOGIC SOIL GROUP			
	A	B	C	D
Cultivated land(1): winter condition	86	91	94	95
Mountain open areas: low growing brush & grasslands	74	82	89	92
Meadow or pasture:	65	78	85	89
Wood or forest land: undisturbed	42	64	76	81
Wood or forest land: young second growth or brush	55	72	81	86
Orchard: with cover crop	81	88	92	94
Open spaces, lawns, parks, golf courses, cemeteries, landscaping.				
Good condition: grass cover on $\geq 75\%$ of the area	68	80	86	90
Fair condition: grass cover on 50-75% of the area	77	85	90	92
Gravel roads & parking lots:	76	85	89	91
Dirt roads & parking lots:	72	82	87	89
Impervious surfaces, pavement, roofs etc.	98	98	98	98
Open water bodies: lakes, wetlands, ponds etc.	100	100	100	100
Single family residential(2):				
Dwelling Unit/Gross Acre %Impervious(3)				↑ Separate curve number shall be selected for pervious & impervious portions of the site or basin
1.0 DU/GA		15		
1.5 DU/GA		20		
2.0 DU/GA		25		
2.5 DU/GA		30		
3.0 DU/GA		34		
3.5 DU/GA		38		
4.0 DU/GA		42		
4.5 DU/GA		46		
5.0 DU/GA		48		
5.5 DU/GA		50		
6.0 DU/GA		52		
6.5 DU/GA		54		
7.0 DU/GA		56		
PUD's, condos, apartments, commercial businesses & industrial areas		%impervious must be computed		

- (1) For a more detailed description of agricultural land use curve numbers refer to National Engineering Handbook, Sec. 4, Hydrology, Chapter 9, August 1972.
- (2) Assumes roof and driveway runoff is directed into street/storm system.
- (3) The remaining pervious areas (lawn) are considered to be in good condition for these curve numbers.

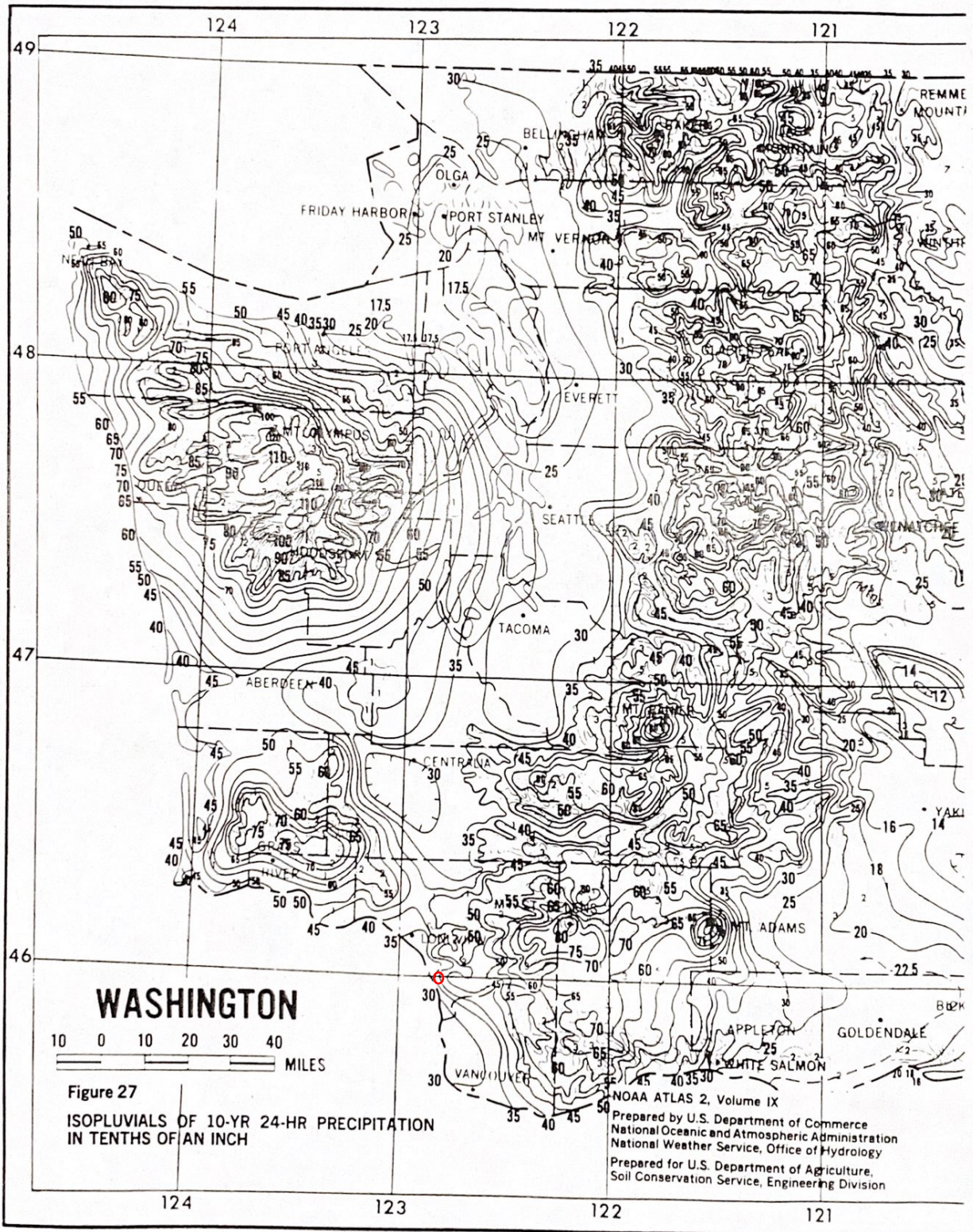
APPENDIX D

2, 10, 100 YEAR, 24 HOUR RAINFALL ISOPLUVIAL MAPs

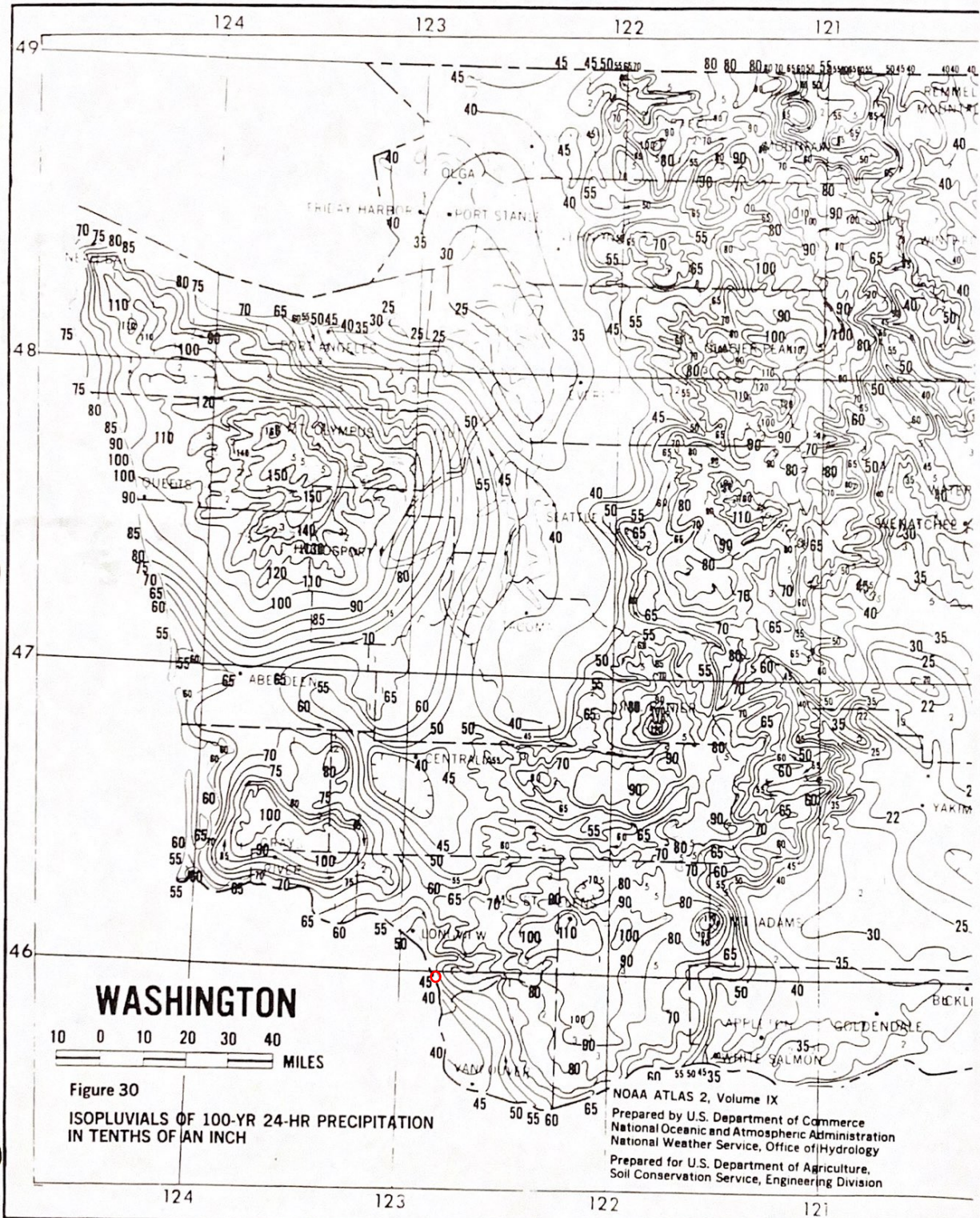
STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN



STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN

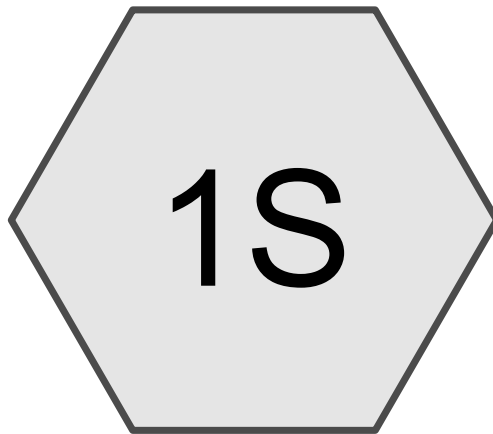


STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN

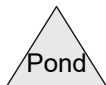
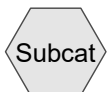


APPENDIX E

**EXISTING CONDITION 2, 10, 100-Yr HYDROLOGIC MODEL DESIGN
PRINTOUTS (HYDRO CAD)**



Existing Condition



Existing Condition pre 1998

Prepared by {enter your company name here}

HydroCAD® 10.00-26 s/n 03617 © 2020 HydroCAD Software Solutions LLC

Pre-Existing Condition (100% pasture)

Type IA 24-hr 2yr Rainfall=2.50"

Printed 2/22/2024

Page 2

Summary for Subcatchment 1S: Existing Condition

Runoff = 0.32 cfs @ 8.51 hrs, Volume= 0.142 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2yr Rainfall=2.50"

Area (ac)	CN	Description
* 2.110	82	pasture
2.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.3	210	0.0060	0.07		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"

Existing Condition pre 1998

Prepared by {enter your company name here}

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Pre-Existing Condition (100% pasture)

Type IA 24-hr 10yr Rainfall=3.50"

Printed 2/22/2024

Page 3

Summary for Subcatchment 1S: Existing Condition

Runoff = 0.65 cfs @ 8.47 hrs, Volume= 0.261 af, Depth> 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.50"

Area (ac)	CN	Description
* 2.110	82	pasture
2.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.3	210	0.0060	0.07		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"

Existing Condition pre 1998

Prepared by {enter your company name here}

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Pre-Existing Condition (100% pasture)

Type IA 24-hr 100yr Rainfall=4.20"

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Page 4

Summary for Subcatchment 1S: Existing Condition

Runoff = 0.90 cfs @ 8.46 hrs, Volume= 0.350 af, Depth> 1.99"

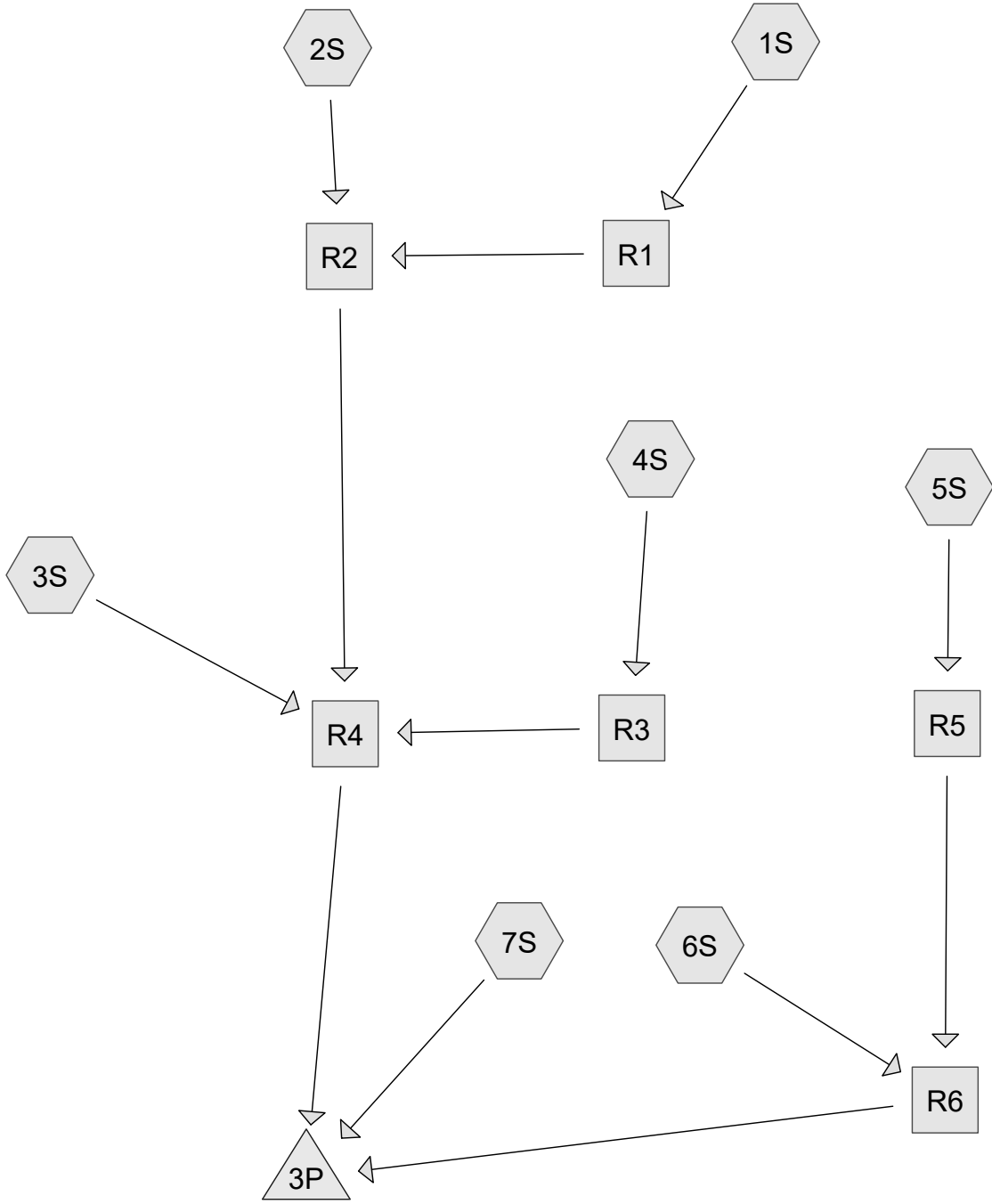
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100yr Rainfall=4.20"

Area (ac)	CN	Description
* 2.110	82	pasture
2.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.3	210	0.0060	0.07		Sheet Flow, Grass: Dense n= 0.240 P2= 2.50"

APPENDIX F

**DEVELOPED CONDITION 2, 10, 100-Yr HYDROLOGIC MODEL DESIGN
PRINTOUTS (HYDRO CAD)**



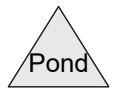
Detention Pond



WQ Swale



New East Swale



Routing Diagram for STATCO Expansion
 Prepared by {enter your company name here}, Printed 2/22/2024
 HydroCAD® 10.00-26 s/n 03617 © 2020 HydroCAD Software Solutions LLC

STATCO Expansion

Prepared by {enter your company name here}

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Developed Condition

Type IA 24-hr 2 yr Rainfall=2.50"

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Page 2

Summary for Subcatchment 1S:

Runoff = 0.14 cfs @ 7.88 hrs, Volume= 0.045 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (sf)	CN	Description
*	10,343	98	Asphalt and Roof
	10,343		100.00% Impervious Area

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

Summary for Subcatchment 2S:

Runoff = 0.15 cfs @ 7.88 hrs, Volume= 0.049 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (sf)	CN	Description
*	11,226	98	Asphalt and Roof
	11,226		100.00% Impervious Area

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

Summary for Subcatchment 3S:

Runoff = 0.20 cfs @ 7.88 hrs, Volume= 0.064 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (sf)	CN	Description
*	14,694	98	Paved Yard
	14,694		100.00% Impervious Area

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

STATCO Expansion

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Developed Condition

Type IA 24-hr 2 yr Rainfall=2.50"

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Page 3

Summary for Subcatchment 4S:

Runoff = 0.14 cfs @ 7.88 hrs, Volume= 0.046 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (sf)	CN	Description
*	10,639	98	Pavement
	10,639		100.00% Impervious Area

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

Summary for Subcatchment 5S:

Runoff = 0.11 cfs @ 7.88 hrs, Volume= 0.036 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (sf)	CN	Description
*	8,348	98	roof
	8,348		100.00% Impervious Area

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

Summary for Subcatchment 6S:

Runoff = 0.15 cfs @ 7.88 hrs, Volume= 0.048 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (sf)	CN	Description
*	11,083	98	roof and pavement
	11,083		100.00% Impervious Area

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

STATCO Expansion

Prepared by {enter your company name here}

HydroCAD® 10.00-26 s/n 03617 © 2020 HydroCAD Software Solutions LLC

Developed Condition

Type IA 24-hr 2 yr Rainfall=2.50"

Printed 2/22/2024

Page 4

Summary for Subcatchment 7S:

Runoff = 0.19 cfs @ 7.88 hrs, Volume= 0.063 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 yr Rainfall=2.50"

	Area (sf)	CN	Description
*	14,410	98	pAVEMENT
	14,410		100.00% Impervious Area

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

Summary for Reach 4R: New East Swale

Bank-Full Depth= 1.00' Flow Area= 15.5 sf, Capacity= 7.72 cfs

13.00' x 1.00' deep channel, n= 0.240
Side Slope Z-value= 2.0 3.0 ' /' Top Width= 18.00'
Length= 80.0' Slope= 0.0081 ' /'
Inlet Invert= 97.50', Outlet Invert= 96.85'



Summary for Reach 7R: WQ Swale

Bank-Full Depth= 0.50' Flow Area= 6.6 sf, Capacity= 1.04 cfs

12.00' x 0.50' deep channel, n= 0.240
Side Slope Z-value= 3.0 2.0 ' /' Top Width= 14.50'
Length= 80.0' Slope= 0.0019 ' /'
Inlet Invert= 97.00', Outlet Invert= 96.85'



STATCO Expansion

Prepared by {enter your company name here}

HydroCAD® 10.00-26 s/n 03617 © 2020 HydroCAD Software Solutions LLC

Developed Condition

Type IA 24-hr 2 yr Rainfall=2.50"

Printed 2/22/2024

Page 5

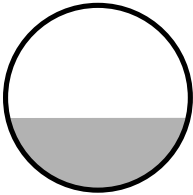
Summary for Reach R1:

Inflow Area = 0.237 ac, 100.00% Impervious, Inflow Depth > 2.27" for 2 yr event
Inflow = 0.14 cfs @ 7.88 hrs, Volume= 0.045 af
Outflow = 0.14 cfs @ 7.92 hrs, Volume= 0.045 af, Atten= 0%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.95 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.12 fps, Avg. Travel Time= 2.4 min

Peak Storage= 11 cf @ 7.89 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.43 cfs

6.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0050 '/'
Inlet Invert= 99.29', Outlet Invert= 98.49'



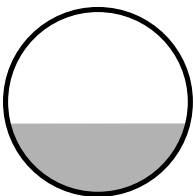
Summary for Reach R2:

Inflow Area = 0.495 ac, 100.00% Impervious, Inflow Depth > 2.27" for 2 yr event
Inflow = 0.29 cfs @ 7.90 hrs, Volume= 0.093 af
Outflow = 0.29 cfs @ 7.93 hrs, Volume= 0.093 af, Atten= 0%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.34 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 2.0 min

Peak Storage= 20 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.93 cfs

8.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0050 '/'
Inlet Invert= 98.49', Outlet Invert= 97.69'



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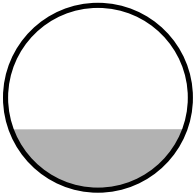
Summary for Reach R3:

Inflow Area = 0.244 ac, 100.00% Impervious, Inflow Depth > 2.27" for 2 yr event
Inflow = 0.14 cfs @ 7.88 hrs, Volume= 0.046 af
Outflow = 0.14 cfs @ 7.90 hrs, Volume= 0.046 af, Atten= 0%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.53 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 1.6 min

Peak Storage= 8 cf @ 7.89 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 140.0' Slope= 0.0100 '/'
Inlet Invert= 99.09', Outlet Invert= 97.69'



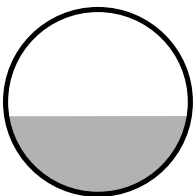
Summary for Reach R4:

Inflow Area = 1.077 ac, 100.00% Impervious, Inflow Depth > 2.26" for 2 yr event
Inflow = 0.63 cfs @ 7.91 hrs, Volume= 0.203 af
Outflow = 0.63 cfs @ 7.93 hrs, Volume= 0.203 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.86 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.65 fps, Avg. Travel Time= 1.5 min

Peak Storage= 32 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 1.68 cfs

10.0" Round Pipe
n= 0.012
Length= 145.0' Slope= 0.0050 '/'
Inlet Invert= 97.69', Outlet Invert= 96.96'



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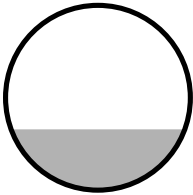
Summary for Reach R5:

Inflow Area = 0.192 ac, 100.00% Impervious, Inflow Depth > 2.27" for 2 yr event
Inflow = 0.11 cfs @ 7.88 hrs, Volume= 0.036 af
Outflow = 0.11 cfs @ 7.91 hrs, Volume= 0.036 af, Atten= 0%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.99 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 2.3 min

Peak Storage= 9 cf @ 7.89 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.48 cfs

6.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0063 '/'
Inlet Invert= 100.00', Outlet Invert= 99.00'



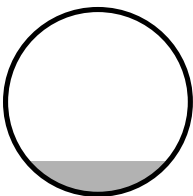
Summary for Reach R6:

Inflow Area = 0.446 ac, 100.00% Impervious, Inflow Depth > 2.27" for 2 yr event
Inflow = 0.26 cfs @ 7.89 hrs, Volume= 0.084 af
Outflow = 0.26 cfs @ 7.92 hrs, Volume= 0.084 af, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.71 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 1.8 min

Peak Storage= 16 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.68 cfs

12.0" Round Pipe
n= 0.012
Length= 165.0' Slope= 0.0091 '/'
Inlet Invert= 99.00', Outlet Invert= 97.50'



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Summary for Pond 3P: Detention Pond

Inflow Area = 1.854 ac, 100.00% Impervious, Inflow Depth > 2.26" for 2 yr event
 Inflow = 1.08 cfs @ 7.92 hrs, Volume= 0.350 af
 Outflow = 0.18 cfs @ 11.69 hrs, Volume= 0.237 af, Atten= 83%, Lag= 226.5 min
 Primary = 0.18 cfs @ 11.69 hrs, Volume= 0.237 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.82' @ 11.69 hrs Surf.Area= 4,000 sf Storage= 6,482 cf

Plug-Flow detention time= 436.4 min calculated for 0.237 af (68% of inflow)
 Center-of-Mass det. time= 241.6 min (916.1 - 674.4)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	11,840 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	5	0	0
97.00	2,140	1,073	1,073
98.00	2,964	2,552	3,625
99.00	4,226	3,595	7,220
100.00	5,015	4,621	11,840

Device	Routing	Invert	Outlet Devices
#1	Primary	96.85'	1.5" Vert. Orifice/Grate C= 0.600
#2	Primary	97.85'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	99.25'	2.0" x 2.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 11.69 hrs HW=98.82' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.08 cfs @ 6.65 fps)
- 2=Orifice/Grate (Orifice Controls 0.10 cfs @ 4.54 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

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Type IA 24-hr 10yr Rainfall=3.50"

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Summary for Subcatchment 1S:

Runoff = 0.20 cfs @ 7.87 hrs, Volume= 0.065 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.50"

	Area (sf)	CN	Description
*	10,343	98	Asphalt and Roof
	10,343		100.00% Impervious Area

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

Summary for Subcatchment 2S:

Runoff = 0.21 cfs @ 7.87 hrs, Volume= 0.070 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.50"

	Area (sf)	CN	Description
*	11,226	98	Asphalt and Roof
	11,226		100.00% Impervious Area

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

Summary for Subcatchment 3S:

Runoff = 0.28 cfs @ 7.87 hrs, Volume= 0.092 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.50"

	Area (sf)	CN	Description
*	14,694	98	Paved Yard
	14,694		100.00% Impervious Area

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

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Type IA 24-hr 10yr Rainfall=3.50"

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Summary for Subcatchment 4S:

Runoff = 0.20 cfs @ 7.87 hrs, Volume= 0.066 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.50"

	Area (sf)	CN	Description
*	10,639	98	Pavement
	10,639		100.00% Impervious Area

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

Summary for Subcatchment 5S:

Runoff = 0.16 cfs @ 7.87 hrs, Volume= 0.052 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.50"

	Area (sf)	CN	Description
*	8,348	98	roof
	8,348		100.00% Impervious Area

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

Summary for Subcatchment 6S:

Runoff = 0.21 cfs @ 7.87 hrs, Volume= 0.069 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.50"

	Area (sf)	CN	Description
*	11,083	98	roof and pavement
	11,083		100.00% Impervious Area

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

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Type IA 24-hr 10yr Rainfall=3.50"

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Summary for Subcatchment 7S:

Runoff = 0.28 cfs @ 7.87 hrs, Volume= 0.090 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.50"

	Area (sf)	CN	Description
*	14,410	98	pAVEMENT
	14,410		100.00% Impervious Area

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

Summary for Reach 4R: New East Swale

Bank-Full Depth= 1.00' Flow Area= 15.5 sf, Capacity= 7.72 cfs

13.00' x 1.00' deep channel, n= 0.240
Side Slope Z-value= 2.0 3.0 ' /' Top Width= 18.00'
Length= 80.0' Slope= 0.0081 ' /'
Inlet Invert= 97.50', Outlet Invert= 96.85'



Summary for Reach 7R: WQ Swale

Bank-Full Depth= 0.50' Flow Area= 6.6 sf, Capacity= 1.04 cfs

12.00' x 0.50' deep channel, n= 0.240
Side Slope Z-value= 3.0 2.0 ' /' Top Width= 14.50'
Length= 80.0' Slope= 0.0019 ' /'
Inlet Invert= 97.00', Outlet Invert= 96.85'



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Type IA 24-hr 10yr Rainfall=3.50"

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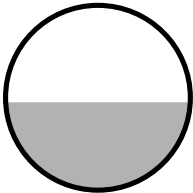
Summary for Reach R1:

Inflow Area = 0.237 ac, 100.00% Impervious, Inflow Depth > 3.26" for 10yr event
Inflow = 0.20 cfs @ 7.87 hrs, Volume= 0.065 af
Outflow = 0.20 cfs @ 7.91 hrs, Volume= 0.064 af, Atten= 0%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.14 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 2.1 min

Peak Storage= 15 cf @ 7.89 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.43 cfs

6.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0050 '/'
Inlet Invert= 99.29', Outlet Invert= 98.49'



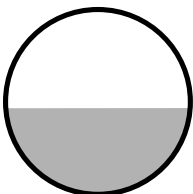
Summary for Reach R2:

Inflow Area = 0.495 ac, 100.00% Impervious, Inflow Depth > 3.26" for 10yr event
Inflow = 0.41 cfs @ 7.89 hrs, Volume= 0.134 af
Outflow = 0.41 cfs @ 7.92 hrs, Volume= 0.134 af, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.57 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 1.8 min

Peak Storage= 26 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.93 cfs

8.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0050 '/'
Inlet Invert= 98.49', Outlet Invert= 97.69'



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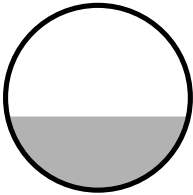
Summary for Reach R3:

Inflow Area = 0.244 ac, 100.00% Impervious, Inflow Depth > 3.26" for 10yr event
Inflow = 0.20 cfs @ 7.87 hrs, Volume= 0.066 af
Outflow = 0.20 cfs @ 7.90 hrs, Volume= 0.066 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.79 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.62 fps, Avg. Travel Time= 1.4 min

Peak Storage= 10 cf @ 7.88 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 140.0' Slope= 0.0100 '/'
Inlet Invert= 99.09', Outlet Invert= 97.69'



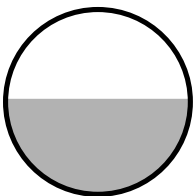
Summary for Reach R4:

Inflow Area = 1.077 ac, 100.00% Impervious, Inflow Depth > 3.26" for 10yr event
Inflow = 0.89 cfs @ 7.90 hrs, Volume= 0.292 af
Outflow = 0.89 cfs @ 7.92 hrs, Volume= 0.292 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.13 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.85 fps, Avg. Travel Time= 1.3 min

Peak Storage= 41 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 1.68 cfs

10.0" Round Pipe
n= 0.012
Length= 145.0' Slope= 0.0050 '/'
Inlet Invert= 97.69', Outlet Invert= 96.96'



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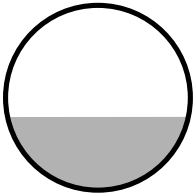
Summary for Reach R5:

Inflow Area = 0.192 ac, 100.00% Impervious, Inflow Depth > 3.26" for 10yr event
Inflow = 0.16 cfs @ 7.87 hrs, Volume= 0.052 af
Outflow = 0.16 cfs @ 7.91 hrs, Volume= 0.052 af, Atten= 0%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 2.1 min

Peak Storage= 12 cf @ 7.89 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.48 cfs

6.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0063 '/'
Inlet Invert= 100.00', Outlet Invert= 99.00'



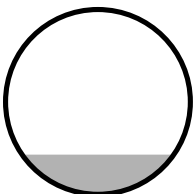
Summary for Reach R6:

Inflow Area = 0.446 ac, 100.00% Impervious, Inflow Depth > 3.26" for 10yr event
Inflow = 0.37 cfs @ 7.89 hrs, Volume= 0.121 af
Outflow = 0.37 cfs @ 7.91 hrs, Volume= 0.121 af, Atten= 0%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.00 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 1.6 min

Peak Storage= 20 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.68 cfs

12.0" Round Pipe
n= 0.012
Length= 165.0' Slope= 0.0091 '/'
Inlet Invert= 99.00', Outlet Invert= 97.50'



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Summary for Pond 3P: Detention Pond

Inflow Area = 1.854 ac, 100.00% Impervious, Inflow Depth > 3.26" for 10yr event
 Inflow = 1.54 cfs @ 7.91 hrs, Volume= 0.503 af
 Outflow = 0.28 cfs @ 11.24 hrs, Volume= 0.337 af, Atten= 82%, Lag= 199.7 min
 Primary = 0.28 cfs @ 11.24 hrs, Volume= 0.337 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 99.44' @ 11.24 hrs Surf.Area= 4,571 sf Storage= 9,141 cf

Plug-Flow detention time= 424.8 min calculated for 0.336 af (67% of inflow)
 Center-of-Mass det. time= 225.5 min (890.3 - 664.8)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	11,840 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	5	0	0
97.00	2,140	1,073	1,073
98.00	2,964	2,552	3,625
99.00	4,226	3,595	7,220
100.00	5,015	4,621	11,840

Device	Routing	Invert	Outlet Devices
#1	Primary	96.85'	1.5" Vert. Orifice/Grate C= 0.600
#2	Primary	97.85'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	99.25'	2.0" x 2.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.28 cfs @ 11.24 hrs HW=99.44' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.09 cfs @ 7.65 fps)
- 2=Orifice/Grate (Orifice Controls 0.13 cfs @ 5.90 fps)
- 3=Orifice/Grate (Orifice Controls 0.06 cfs @ 2.08 fps)

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Type IA 24-hr 100yr Rainfall=4.20"

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Summary for Subcatchment 1S:

Runoff = 0.24 cfs @ 7.87 hrs, Volume= 0.078 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100yr Rainfall=4.20"

	Area (sf)	CN	Description
*	10,343	98	Asphalt and Roof
	10,343		100.00% Impervious Area

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

Summary for Subcatchment 2S:

Runoff = 0.26 cfs @ 7.87 hrs, Volume= 0.085 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100yr Rainfall=4.20"

	Area (sf)	CN	Description
*	11,226	98	Asphalt and Roof
	11,226		100.00% Impervious Area

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

Summary for Subcatchment 3S:

Runoff = 0.34 cfs @ 7.87 hrs, Volume= 0.111 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100yr Rainfall=4.20"

	Area (sf)	CN	Description
*	14,694	98	Paved Yard
	14,694		100.00% Impervious Area

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

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Type IA 24-hr 100yr Rainfall=4.20"

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Summary for Subcatchment 4S:

Runoff = 0.25 cfs @ 7.87 hrs, Volume= 0.080 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100yr Rainfall=4.20"

	Area (sf)	CN	Description
*	10,639	98	Pavement
	10,639		100.00% Impervious Area

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

Summary for Subcatchment 5S:

Runoff = 0.19 cfs @ 7.87 hrs, Volume= 0.063 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100yr Rainfall=4.20"

	Area (sf)	CN	Description
*	8,348	98	roof
	8,348		100.00% Impervious Area

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

Summary for Subcatchment 6S:

Runoff = 0.26 cfs @ 7.87 hrs, Volume= 0.084 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100yr Rainfall=4.20"

	Area (sf)	CN	Description
*	11,083	98	roof and pavement
	11,083		100.00% Impervious Area

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

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Summary for Subcatchment 7S:

Runoff = 0.33 cfs @ 7.87 hrs, Volume= 0.109 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100yr Rainfall=4.20"

Area (sf)	CN	Description
* 14,410	98	pAVEMENT
14,410		100.00% Impervious Area

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

Summary for Reach 4R: New East Swale

Bank-Full Depth= 1.00' Flow Area= 15.5 sf, Capacity= 7.72 cfs

13.00' x 1.00' deep channel, n= 0.240
Side Slope Z-value= 2.0 3.0 '/' Top Width= 18.00'
Length= 80.0' Slope= 0.0081 '/'
Inlet Invert= 97.50', Outlet Invert= 96.85'



Summary for Reach 7R: WQ Swale

Bank-Full Depth= 0.50' Flow Area= 6.6 sf, Capacity= 1.04 cfs

12.00' x 0.50' deep channel, n= 0.240
Side Slope Z-value= 3.0 2.0 '/' Top Width= 14.50'
Length= 80.0' Slope= 0.0019 '/'
Inlet Invert= 97.00', Outlet Invert= 96.85'



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Type IA 24-hr 100yr Rainfall=4.20"

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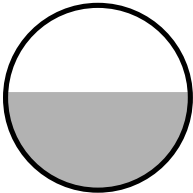
Summary for Reach R1:

Inflow Area = 0.237 ac, 100.00% Impervious, Inflow Depth > 3.95" for 100yr event
Inflow = 0.24 cfs @ 7.87 hrs, Volume= 0.078 af
Outflow = 0.24 cfs @ 7.91 hrs, Volume= 0.078 af, Atten= 0%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.24 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 2.0 min

Peak Storage= 17 cf @ 7.89 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.43 cfs

6.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0050 '/'
Inlet Invert= 99.29', Outlet Invert= 98.49'



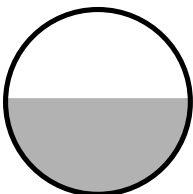
Summary for Reach R2:

Inflow Area = 0.495 ac, 100.00% Impervious, Inflow Depth > 3.95" for 100yr event
Inflow = 0.50 cfs @ 7.89 hrs, Volume= 0.163 af
Outflow = 0.50 cfs @ 7.92 hrs, Volume= 0.163 af, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.70 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 1.7 min

Peak Storage= 29 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.93 cfs

8.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0050 '/'
Inlet Invert= 98.49', Outlet Invert= 97.69'



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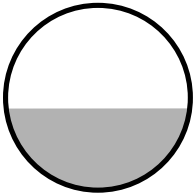
Summary for Reach R3:

Inflow Area = 0.244 ac, 100.00% Impervious, Inflow Depth > 3.95" for 100yr event
Inflow = 0.25 cfs @ 7.87 hrs, Volume= 0.080 af
Outflow = 0.24 cfs @ 7.89 hrs, Volume= 0.080 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.93 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 1.4 min

Peak Storage= 12 cf @ 7.88 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 140.0' Slope= 0.0100 '/'
Inlet Invert= 99.09', Outlet Invert= 97.69'



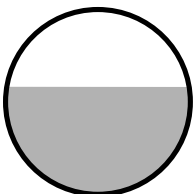
Summary for Reach R4:

Inflow Area = 1.077 ac, 100.00% Impervious, Inflow Depth > 3.95" for 100yr event
Inflow = 1.08 cfs @ 7.90 hrs, Volume= 0.354 af
Outflow = 1.08 cfs @ 7.92 hrs, Volume= 0.354 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.28 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 1.2 min

Peak Storage= 48 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 1.68 cfs

10.0" Round Pipe
n= 0.012
Length= 145.0' Slope= 0.0050 '/'
Inlet Invert= 97.69', Outlet Invert= 96.96'



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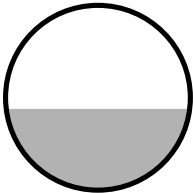
Summary for Reach R5:

Inflow Area = 0.192 ac, 100.00% Impervious, Inflow Depth > 3.95" for 100yr event
Inflow = 0.19 cfs @ 7.87 hrs, Volume= 0.063 af
Outflow = 0.19 cfs @ 7.91 hrs, Volume= 0.063 af, Atten= 0%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.31 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 2.0 min

Peak Storage= 13 cf @ 7.89 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.48 cfs

6.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0063 '/'
Inlet Invert= 100.00', Outlet Invert= 99.00'



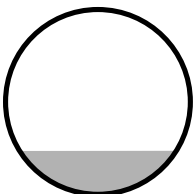
Summary for Reach R6:

Inflow Area = 0.446 ac, 100.00% Impervious, Inflow Depth > 3.95" for 100yr event
Inflow = 0.45 cfs @ 7.89 hrs, Volume= 0.147 af
Outflow = 0.45 cfs @ 7.91 hrs, Volume= 0.147 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.17 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.81 fps, Avg. Travel Time= 1.5 min

Peak Storage= 23 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.68 cfs

12.0" Round Pipe
n= 0.012
Length= 165.0' Slope= 0.0091 '/'
Inlet Invert= 99.00', Outlet Invert= 97.50'



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Summary for Pond 3P: Detention Pond

Inflow Area = 1.854 ac, 100.00% Impervious, Inflow Depth > 3.95" for 100yr event
 Inflow = 1.85 cfs @ 7.91 hrs, Volume= 0.610 af
 Outflow = 0.34 cfs @ 11.15 hrs, Volume= 0.425 af, Atten= 81%, Lag= 194.3 min
 Primary = 0.34 cfs @ 11.15 hrs, Volume= 0.425 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 99.80' @ 11.15 hrs Surf.Area= 4,856 sf Storage= 10,845 cf

Plug-Flow detention time= 407.9 min calculated for 0.425 af (70% of inflow)
 Center-of-Mass det. time= 219.9 min (880.6 - 660.6)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	11,840 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	5	0	0
97.00	2,140	1,073	1,073
98.00	2,964	2,552	3,625
99.00	4,226	3,595	7,220
100.00	5,015	4,621	11,840

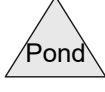
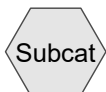
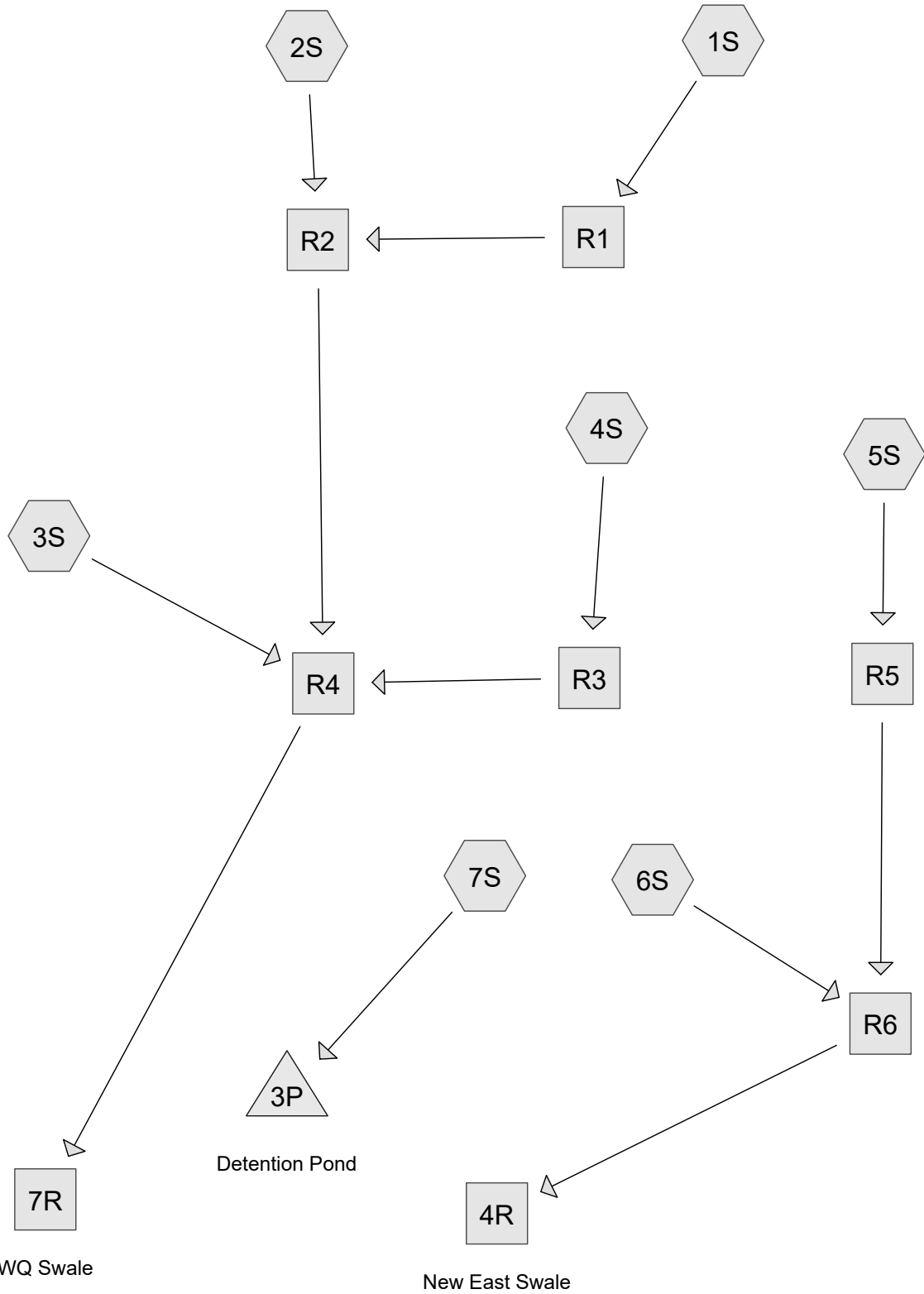
Device	Routing	Invert	Outlet Devices
#1	Primary	96.85'	1.5" Vert. Orifice/Grate C= 0.600
#2	Primary	97.85'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	99.25'	2.0" x 2.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.34 cfs @ 11.15 hrs HW=99.80' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.10 cfs @ 8.18 fps)
- 2=Orifice/Grate (Orifice Controls 0.14 cfs @ 6.58 fps)
- 3=Orifice/Grate (Orifice Controls 0.10 cfs @ 3.57 fps)

APPENDIX G

**WATER QUALITY (WQ) HYDROLOGIC MODEL DESIGN PRINTOUTS
(HYDRO CAD)**



Routing Diagram for STATCO Expansion
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Water Quality Event

Type IA 24-hr WQ Rainfall=1.60"

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Summary for Subcatchment 1S:

Runoff = 0.09 cfs @ 7.88 hrs, Volume= 0.027 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=1.60"

	Area (sf)	CN	Description
*	10,343	98	Asphalt and Roof
	10,343		100.00% Impervious Area

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

Summary for Subcatchment 2S:

Runoff = 0.09 cfs @ 7.88 hrs, Volume= 0.030 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=1.60"

	Area (sf)	CN	Description
*	11,226	98	Asphalt and Roof
	11,226		100.00% Impervious Area

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

Summary for Subcatchment 3S:

Runoff = 0.12 cfs @ 7.88 hrs, Volume= 0.039 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=1.60"

	Area (sf)	CN	Description
*	14,694	98	Paved Yard
	14,694		100.00% Impervious Area

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

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Water Quality Event

Type IA 24-hr WQ Rainfall=1.60"

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Summary for Subcatchment 4S:

Runoff = 0.09 cfs @ 7.88 hrs, Volume= 0.028 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=1.60"

	Area (sf)	CN	Description
*	10,639	98	Pavement
	10,639		100.00% Impervious Area

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

Summary for Subcatchment 5S:

Runoff = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=1.60"

	Area (sf)	CN	Description
*	8,348	98	roof
	8,348		100.00% Impervious Area

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

Summary for Subcatchment 6S:

Runoff = 0.09 cfs @ 7.88 hrs, Volume= 0.029 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=1.60"

	Area (sf)	CN	Description
*	11,083	98	roof and pavement
	11,083		100.00% Impervious Area

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

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Type IA 24-hr WQ Rainfall=1.60"

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Summary for Subcatchment 7S:

Runoff = 0.12 cfs @ 7.88 hrs, Volume= 0.038 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=1.60"

Area (sf)	CN	Description
* 14,410	98	pAVEMENT
14,410		100.00% Impervious Area

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

Summary for Reach 4R: New East Swale

Inflow Area = 0.446 ac, 100.00% Impervious, Inflow Depth > 1.37" for WQ event
Inflow = 0.16 cfs @ 7.94 hrs, Volume= 0.051 af
Outflow = 0.15 cfs @ 8.24 hrs, Volume= 0.050 af, Atten= 5%, Lag= 18.2 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.12 fps, Min. Travel Time= 11.4 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 23.6 min

Peak Storage= 104 cf @ 8.05 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00' Flow Area= 15.5 sf, Capacity= 7.72 cfs

13.00' x 1.00' deep channel, n= 0.240
Side Slope Z-value= 2.0 3.0 ' / ' Top Width= 18.00'
Length= 80.0' Slope= 0.0081 ' / '
Inlet Invert= 97.50', Outlet Invert= 96.85'



Summary for Reach 7R: WQ Swale

Inflow Area = 1.077 ac, 100.00% Impervious, Inflow Depth > 1.06" for WQ event
Inflow = 0.30 cfs @ 7.95 hrs, Volume= 0.095 af
Outflow = 0.27 cfs @ 8.31 hrs, Volume= 0.094 af, Atten= 8%, Lag= 21.5 min

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Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.10 fps, Min. Travel Time= 13.8 min

Avg. Velocity = 0.05 fps, Avg. Travel Time= 28.4 min

Peak Storage= 229 cf @ 8.08 hrs

Average Depth at Peak Storage= 0.23'

Bank-Full Depth= 0.50' Flow Area= 6.6 sf, Capacity= 1.04 cfs

12.00' x 0.50' deep channel, n= 0.240

Side Slope Z-value= 3.0 2.0 '/' Top Width= 14.50'

Length= 80.0' Slope= 0.0019 '/'

Inlet Invert= 97.00', Outlet Invert= 96.85'



Summary for Reach R1:

Inflow Area = 0.237 ac, 100.00% Impervious, Inflow Depth > 1.38" for WQ event

Inflow = 0.09 cfs @ 7.88 hrs, Volume= 0.027 af

Outflow = 0.09 cfs @ 7.93 hrs, Volume= 0.027 af, Atten= 0%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.71 fps, Min. Travel Time= 1.6 min

Avg. Velocity = 0.97 fps, Avg. Travel Time= 2.8 min

Peak Storage= 8 cf @ 7.90 hrs

Average Depth at Peak Storage= 0.15'

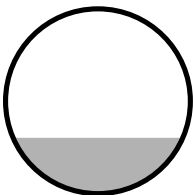
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.43 cfs

6.0" Round Pipe

n= 0.012

Length= 160.0' Slope= 0.0050 '/'

Inlet Invert= 99.29', Outlet Invert= 98.49'



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Water Quality Event

Type IA 24-hr WQ Rainfall=1.60"

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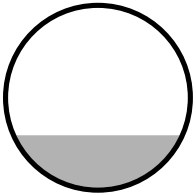
Summary for Reach R2:

Inflow Area = 0.495 ac, 100.00% Impervious, Inflow Depth > 1.38" for WQ event
Inflow = 0.18 cfs @ 7.91 hrs, Volume= 0.057 af
Outflow = 0.18 cfs @ 7.94 hrs, Volume= 0.057 af, Atten= 0%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.05 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 2.3 min

Peak Storage= 14 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.93 cfs

8.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0050 '/'
Inlet Invert= 98.49', Outlet Invert= 97.69'



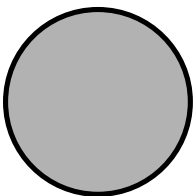
Summary for Reach R3:

Inflow Area = 0.244 ac, 100.00% Impervious, Inflow Depth > 1.38" for WQ event
Inflow = 0.09 cfs @ 7.88 hrs, Volume= 0.028 af
Outflow = 0.00 cfs @ 1.30 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 1.30 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 0.01' Flow Area= 0.0 sf, Capacity= 0.00 cfs

0.1" Round Pipe
n= 0.012
Length= 140.0' Slope= 0.0100 '/'
Inlet Invert= 99.09', Outlet Invert= 97.69'



STATCO Expansion

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Water Quality Event

Type IA 24-hr WQ Rainfall=1.60"

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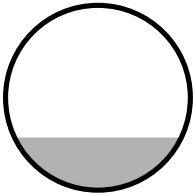
Summary for Reach R4:

Inflow Area = 1.077 ac, 100.00% Impervious, Inflow Depth > 1.06" for WQ event
Inflow = 0.30 cfs @ 7.92 hrs, Volume= 0.095 af
Outflow = 0.30 cfs @ 7.95 hrs, Volume= 0.095 af, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.33 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 1.8 min

Peak Storage= 19 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 1.68 cfs

10.0" Round Pipe
n= 0.012
Length= 145.0' Slope= 0.0050 '/'
Inlet Invert= 97.69', Outlet Invert= 96.96'



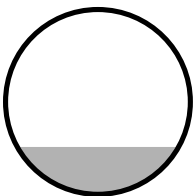
Summary for Reach R5:

Inflow Area = 0.192 ac, 100.00% Impervious, Inflow Depth > 1.38" for WQ event
Inflow = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af
Outflow = 0.07 cfs @ 7.93 hrs, Volume= 0.022 af, Atten= 0%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.74 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 2.7 min

Peak Storage= 6 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.48 cfs

6.0" Round Pipe
n= 0.012
Length= 160.0' Slope= 0.0063 '/'
Inlet Invert= 100.00', Outlet Invert= 99.00'



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Water Quality Event

Type IA 24-hr WQ Rainfall=1.60"

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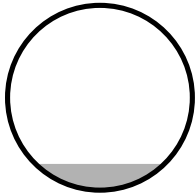
Summary for Reach R6:

Inflow Area = 0.446 ac, 100.00% Impervious, Inflow Depth > 1.38" for WQ event
Inflow = 0.16 cfs @ 7.90 hrs, Volume= 0.051 af
Outflow = 0.16 cfs @ 7.94 hrs, Volume= 0.051 af, Atten= 0%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.34 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 2.1 min

Peak Storage= 11 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.68 cfs

12.0" Round Pipe
n= 0.012
Length= 165.0' Slope= 0.0091 '/'
Inlet Invert= 99.00', Outlet Invert= 97.50'



Summary for Pond 3P: Detention Pond

Inflow Area = 0.331 ac, 100.00% Impervious, Inflow Depth > 1.38" for WQ event
Inflow = 0.12 cfs @ 7.88 hrs, Volume= 0.038 af
Outflow = 0.07 cfs @ 8.16 hrs, Volume= 0.038 af, Atten= 38%, Lag= 16.6 min
Primary = 0.07 cfs @ 8.16 hrs, Volume= 0.038 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 96.30' @ 8.16 hrs Surf.Area= 656 sf Storage= 101 cf

Plug-Flow detention time= 5.6 min calculated for 0.038 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (693.7 - 688.6)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	11,840 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	5	0	0
97.00	2,140	1,073	1,073
98.00	2,964	2,552	3,625
99.00	4,226	3,595	7,220
100.00	5,015	4,621	11,840

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Water Quality Event

Type IA 24-hr WQ Rainfall=1.60"

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Device	Routing	Invert	Outlet Devices
#1	Primary	96.85'	2.0" Vert. Orifice/Grate C= 0.600
#2	Primary	98.65'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	96.00'	2.0" x 2.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 8.16 hrs HW=96.30' (Free Discharge)

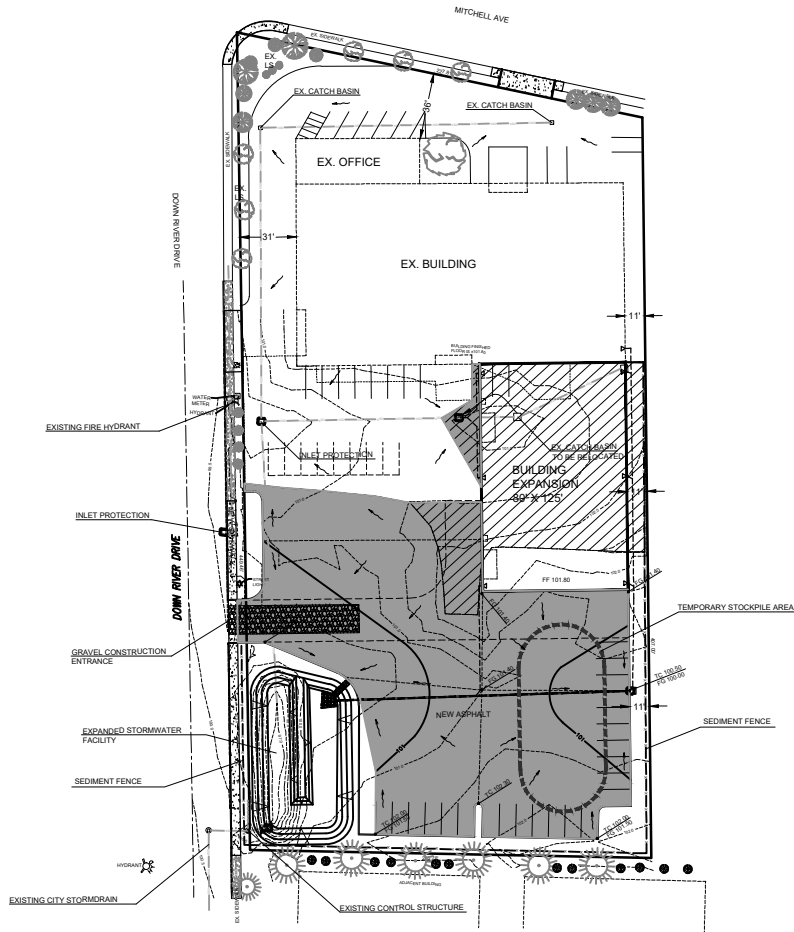
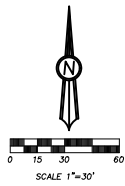
1=Orifice/Grate (Controls 0.00 cfs)

2=Orifice/Grate (Controls 0.00 cfs)

3=Orifice/Grate (Orifice Controls 0.07 cfs @ 2.66 fps)

APPENDIX H

PRELIMINARY GRADING & STORMWATER PLANS

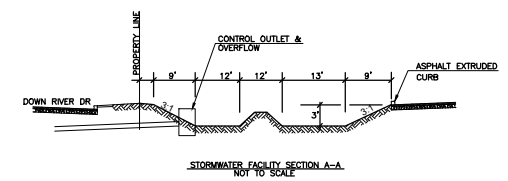
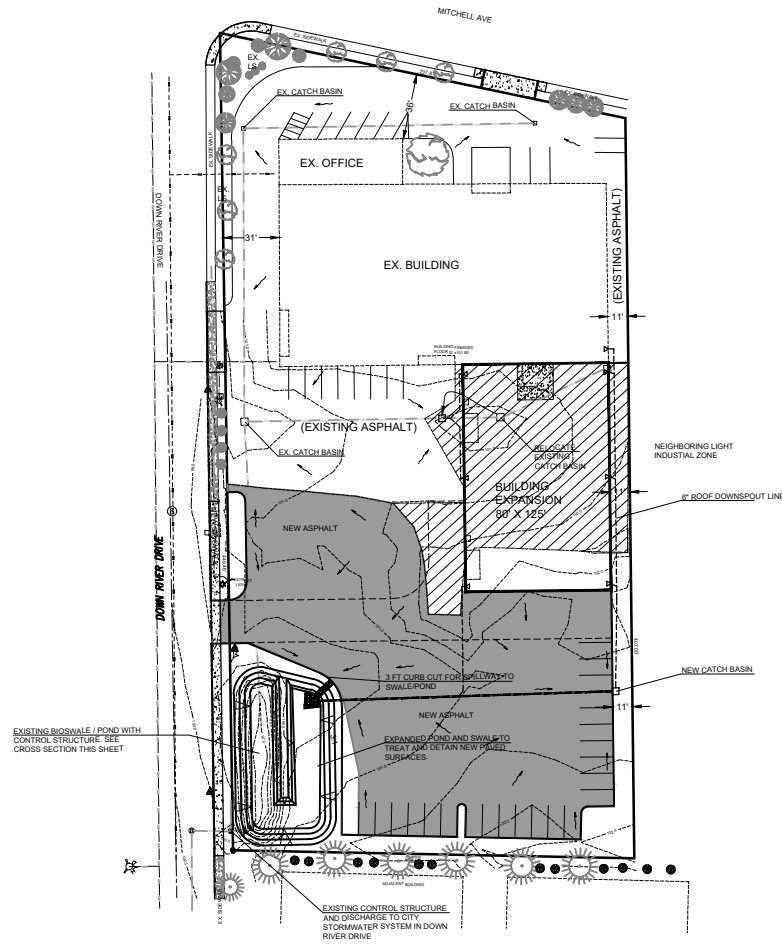
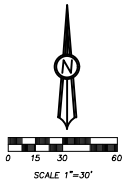


LEGEND

SYMBOL	DESCRIPTION
— TC 123.45	TOP OF CURB ELEVATION
— FG 123.45	FINISHED GRADE ELEVATION
→	SURFACE WATER FLOW DIRECTION
[Diagonal Hatching]	EXISTING ASPHALT TO BE REMOVED
[Solid Grey]	PROPOSED NEW ASPHALT

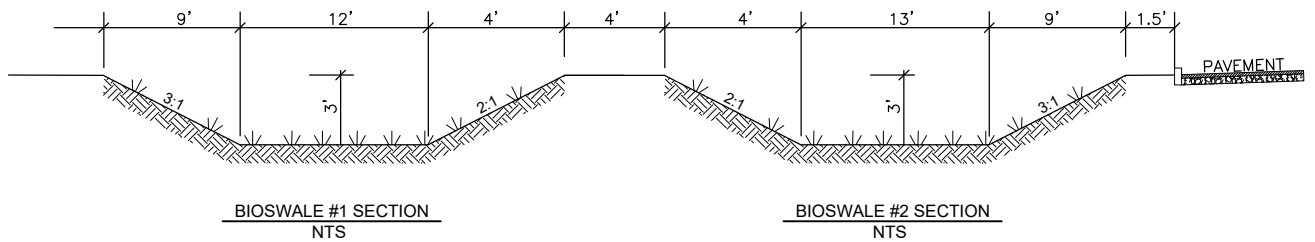
- GRADING AND CONSTRUCTION NOTES:**
- CONTRACTOR TO REMOVE STRIPPINGS AND UNSUITABLE MATERIAL TO A PREPARED SUBGRADE. SUBGRADE TO BE APPROVED BY AN ONSITE GEOTECHNICAL PROFESSIONAL.
 - IF DEWATERING IS REQUIRED, THE CONTRACTOR SHALL SUBMIT A PROPOSED DEWATERING PLAN. WATER TO BE PUMPED TO AN APPROVED AREA.
 - THE CONTRACTOR IS ADVISED TO DIG TEST HOLES OR USE WHATEVER METHOD HE DEEMS NECESSARY TO DETERMINE EARTHWORK QUANTITIES. EARTHWORK QUANTITIES MAY VARY DEPENDING ON SUCH VARIABLES AS COMPACTION, SHRINKAGE, CONTRACTORS METHOD OF OPERATION, STRIPPING DEPTHS, AND ACCURACY OF THE EARTHWORK TAKEOFF.
 - ALL STRIPPING, GRUBBING, GRADING, BACK-FILLING AND COMPACTION SHOULD BE OBSERVED BY AN ONSITE GEOTECHNICAL PROFESSIONAL.
- ESTIMATED GRADING QUANTITIES:**
- STRIPPINGS = ± 1,200 CY (8" DEPTH ASSUMED)
 CUT VOLUME = ± 500 CY
 FILL VOLUME = ± 500 CY
- * Excavation quantities do not include over excavations for footings, or underground utilities.
- NOTE: Strippings may be stockpiled for landscape backfill use after structural fill placement. Export material to be hauled away shall be disposed of at an approved off-site location.
- All quantities are in-place densities. No compaction factor, shrink, or swell conversions were taken into account.
- TOTAL AMOUNT OF LAND DISTURBING ACTIVITY = 45,743 SF (1.05 ACRES)

J.E. CARPENTER ENGINEER, INC. <small>1000 1st Avenue, Suite 100, Woodland, WA 98774</small>	
STATCO BUILDING EXPANSION PRELIMINARY GRADING & EROSION CONTROL PLAN	
675 MITCHELL AVE WOODLAND, WA 98774	
CONTRACT NO: 21-001 SHEET NO: 1 OF 1 DATE: 2-15-2024	THESE MEASUREMENTS ARE AT THE SOURCE SCALE
REVISION 0	REVISION 3
SET DATE: 2/15/2024	
3 / 6	



	J.C. CARPENTER ENGINEER, INC. 1000 FIVE STAR BLVD. #100 WOODLAND, VA 22674	CEE PROJECT NO. 21-001 CONTRACT NO. THIS LINE IS TO BE DRAWN AT THE PROJECT SCALE
	STATCO BUILDING EXPANSION PRELIMINARY STORMWATER PLAN 675 MITCHELL AVE WOODLAND, VA 22674	REVISION 0

APPENDIX I
BIOSWALE SECTIONS AND DESIGN CRITERIA



$L = 80'$
 $S = 0.19\%$
 $n = 0.24$
 $W = 12'$
 $Qwq = 0.27 \text{ cfs}$
 $T_{min.} = 12 \text{ min.}$

$L = 80'$
 $S = 0.81\%$
 $n = 0.24$
 $W = 13'$
 $Qwq = 0.15 \text{ cfs}$
 $T_{min.} = 11 \text{ min.}$