BARKER CABINETS BULDINGS #1 AND #2 SW GALBREATH

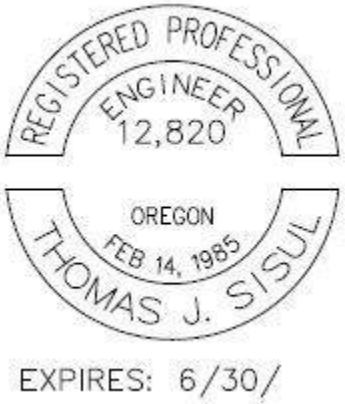
Sherwood, OR

Developer: RA Gray Construction

J.O. SGL 20-067

February 9, 2026

PRELIMINARY STORMWATER CALCULATIONS



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Narrative:

The goal of this storm report is to demonstrate that stormwater treatment and detention can be provided per the current Clean Water Services (CWS) rules and regulations.

The project site is Tax Lot 700 located in T2S, R1W, Section 28B, W.M. Washington County. The site is located on the southern side of Galbreath Drive.

For this development there is an existing building (Phase 1) of 29,380 SF and a proposed building (Phase 2) of 28,585 SF. In addition, there is approximately 35,220 SF of asphalt and concrete impervious area in Phase 1 and an estimated 25,060 SF of impervious area for Phase 2 inspected to be installed. Runoff from the improvements will be conveyed into an existing retention/detention pond in the northwest corner of the site.

Hydromodification Assessment Analysis:

The site's hydromodification analysis will be designed to meet current version of CWS R&O 19-22 code section 4.03. Current code requires Hydromodification Assessment analysis for developments that create or modify 1,000 square feet or greater of impervious surface that increase the amount or rate of surface water leaving a site.

Per the Hydromodification Map, the point of discharge is Rock Creek. This is a risk level of Low. It is also a developed area, and this is a project size Large (80,000 square feet and larger) with the post developed, after Phase 2 improvements, impervious area being an estimated 118,245 square feet.

Per table 4-2 of Hydromodification approach we fall under Category 2. The onsite detention pond will be used to meet CWS stormwater requirements for hydromodification, water quality, and detention.

Soil:

According to NRCS, the site has both Hillsboro Loam and Quatama Loam. Rapid Soil Solutions performed an onsite analysis of the infiltration rate of the existing pond facility constructed for the Phase #1 building measured an extremely high infiltration rate and recommended a 360 inches per hour infiltration rate for pond design with a Factor of Safety of 2, included in that infiltration rate. See field test result information prepared by Rapid Soil Solutions dated 9-26-2023.

The soil mix used for the growing media from Pro-Gro was tested to have a soil infiltration rate of 32.4 inches per hour. A Factor of Safety of 2 will be used to this measured rate and an infiltration rate through the soil 16 inches per hour will be used.

Requirements:

Water Quality Calculations

The development water quality treatment will be designed to meet current version of CWS R&O 19-22 code section 4.04. Current code requires water quality treatment for developments that create or modify 1,000 square feet or greater of impervious surface or increase the amount or rate of surface water leaving a site.

Area:

Pre-Developed Area Breakdown:

Pervious area	= 155,050 sf → 3.56 acres
Total area	= 155,050 sf → 3.56 acres

Post-Developed Area Breakdown:

Impervious area	= 118,245 sf → 2.71 acres
Pervious area	= 36,805 sf → 0.85 acres
Total area	= 155,050 sf → 3.56 acres

The stormwater requirements shall be met through a single detention pond in the northeast corner of the site. The pond will have a controlled outlet to the storm system in the street to the north.

Time of Concentration – Pre-Developed:

Time of concentration determined using equations from King County, Washington, Surface Water Design Manual.

Sheet Flow → $T_{C1} = \frac{0.42(n_s * L)^{0.8}}{(P_2)^{0.5} * (s_o^{0.4})}$

T_{C1} = Travel time for the sheet flow segment in minutes (min.)
n_s = Manning's roughness coefficient (per Table 3.5.2C, see attached)
L = Length of the sheet flow segment in feet (ft)
P_2 = 2-year, 24-hour rainfall (in)
s_o = Average slope of the overland area in feet per feet (ft/ft)

$T_{C1} = \frac{0.42[(0.15) * (150')]^{0.8}}{[(2.5^{0.5}) * (0.0467^{0.4})]}$ → **T_{C1} = 10.92 minutes**

Shallow Concentrated Flow → $T_{C2} = \frac{L}{(60) * (k) * (s_o)^{0.5}}$

T_{C2} = Travel time for the shallow concentrated flow segment in minutes (min.)
L = Length of the shallow concentrated flow segment in feet (ft)
k = Time of concentration velocity factor (ft/s) (per Table 3.5.2C, see attached)
s_o = Average slope of the overland area in feet per feet (ft/ft)

$T_{C2} = \frac{(300')}{(60)*(11)*(0.0100)^{0.4}}$ ➔ **T_{C2} = 2.87 minutes**

Total Time of Concentration ➔ $T_C = 10.92 + 2.87$ ➔ **T_C = 13.79 minutes**

Water Quality Flow:

The water quality volumes and flows calculated below are defined in R&O 19-22 section 4.08.2 & 4.08.5. Per CWS, the water quality storm event is 0.36 inches in 4 hours.

Water Quality Volume for Parking Area Runoff = $\frac{(0.36 \text{ in}) \times (\text{Impervious Area})}{(12 \text{ in/ft})}$

WQV = $\frac{(0.36 \text{ in}) \times (60{,}280 \text{ SF})}{(12 \text{ in/ft})}$ → **WQV = 1,808 cf**

Water Quality Flow for Parking Area Runoff = $\frac{\text{WQV}}{(14{,}400 \text{ sec.})}$

WQF = $\frac{(1{,}808 \text{ cf})}{(14{,}400 \text{ sec})}$ → **WQF = 0.126 cfs**

Water Quality Volume for Roof Runoff = $\frac{(0.36 \text{ in}) \times (\text{Impervious Area})}{(12 \text{ in/ft})}$

WQV = $\frac{(0.36 \text{ in}) \times (57{,}965 \text{ SF})}{(12 \text{ in/ft})}$ → **WQV = 1739 cf**

Water Quality Flow for Roof Runoff = $\frac{\text{WQV}}{(14{,}400 \text{ sec.})}$

WQF = $\frac{(1739 \text{ cf})}{(14{,}400 \text{ sec})}$ → **WQF = 0.121 cfs**

Total Water Quality Flow = 0.126 cfs + 0.121 cfs = 0.247 cfs

Water Quality Summary:

Water quality will be met through retention within the pond. The pond will infiltrate the water quality volume and does not release the runoff faster than the water quality flow value. See the results below for the water quality event of 0.36 inches over four hours. The calculations that follow are for a larger impervious area, that was projected previously. Since these are preliminary calculations for the site for land use we are using the larger runoff rate for now. We will refine for final calculations with permitting.

Summary for Pond 9P: Detention Pond

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=130)

Inflow Area = 3.559 ac, 82.40% Impervious, Inflow Depth = 0.16" for WQ Storm event
Inflow = 0.57 cfs @ 1.35 hrs, Volume=
Outflow = 0.38 cfs @ 1.50 hrs, Volume= 0.048 af, Atten= 32%, Lag= 9.1 min
Discarded = 0.38 cfs @ 1.50 hrs, Volume= 0.048 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 148.58' @ 1.50 hrs Surf.Area= 1,031 sf Storage= 79 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.7 min (136.4 - 135.7)

Volume	Invert	Avail.Storage	Storage Description
#1	148.50'	9,013 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

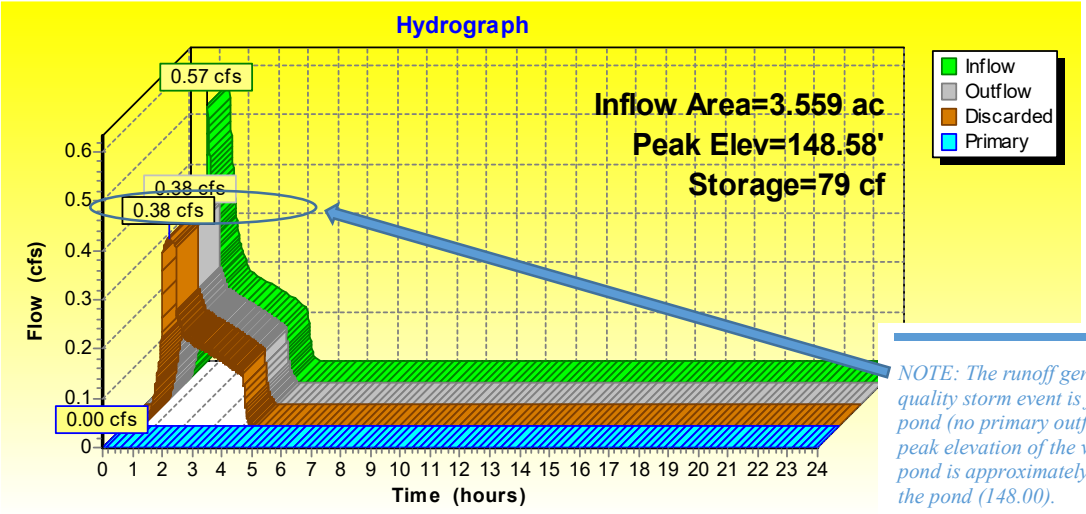
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
148.50	968	0	0
149.00	1,370	585	585
149.50	1,735	776	1,361
150.00	2,121	964	2,325
150.50	2,400	1,130	3,455
151.00	2,642	1,261	4,716
151.50	2,793	1,359	6,074
152.00	2,942	1,434	7,508
152.50	3,078	1,505	9,013

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.50'	**16.000 in/hr Exfiltration over Surface area**
#2	Primary	148.60'	**12.0" Round 12" Outlet** L= 40.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 148.60' / 148.20' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	148.60'	**1.5" Vert. 1.5" Orifice** C= 0.600
#4	Device 2	150.90'	**1.0" Vert. 1.0" Orifice** C= 0.600
#5	Device 2	152.00'	**3.1' long 12" Overflow** 2 End Contraction(s)

Discarded OutFlow Max=0.38 cfs @ 1.50 hrs HW=148.58' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.38 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=148.50' (Free Discharge)
└**2=12" Outlet** (Controls 0.00 cfs)
  ├**3=1.5" Orifice** (Controls 0.00 cfs)
  ├**4=1.0" Orifice** (Controls 0.00 cfs)
  └**5=12" Overflow** (Controls 0.00 cfs)

NOTE: The water quality flow calculated above per the CWS standards is 0.266 cfs. The input into HydroCAD for the WQ design storm was 0.36 inch over 4-hours matching the standards, but since it is a different method, the results differ. The HydroCAD method yields a higher inflow and, therefore, the calculation is more conservative than simply using the formula.



NOTE: The runoff generated from the water quality storm event is fully infiltrated in the pond (no primary outflow from the pond). The peak elevation of the water quality event in the pond is approximately 7" above the bottom of the pond (148.00).

Infiltration Requirements

Infiltration facilities shall be designed to manage the 10-year, 24-hour storm, and infiltrate this in 36 hours (per 4.08.5.b.1.A). Onsite infiltration testing by Rapid Soil Solutions after construction of the infiltration pond found that the detention pond had an extremely high infiltration rate and with a factor of safety, noted that 360 inches per hour could be used. (See report in Supplemental Data). However, the soil mix for the growing media had a rated infiltration rate of 32 inches per hour and we are using a factor of safety of 2 on that rate for a 16 inch/hour infiltration rate. (Also see discussion in Soil on first page of these calculations). Since total infiltration cannot be achieved in the 36-hour requirement, detention will be used (see section below for explanation).

Detention Calculations

Since there will not be enough infiltration to fully dispose of the site runoff, detention will be used. Per the CWS Design Standards Table 4-6 and 4-7, the post developed peak runoff rate of the 2-year post-developed storm must match 50% of the 2-year pre-developed peak runoff rate. The post developed peak runoff rate must also match the pre-developed peak runoff rate for the 5-year, 10-year, and 25-year storms.

Time of Concentration – Post-Developed:

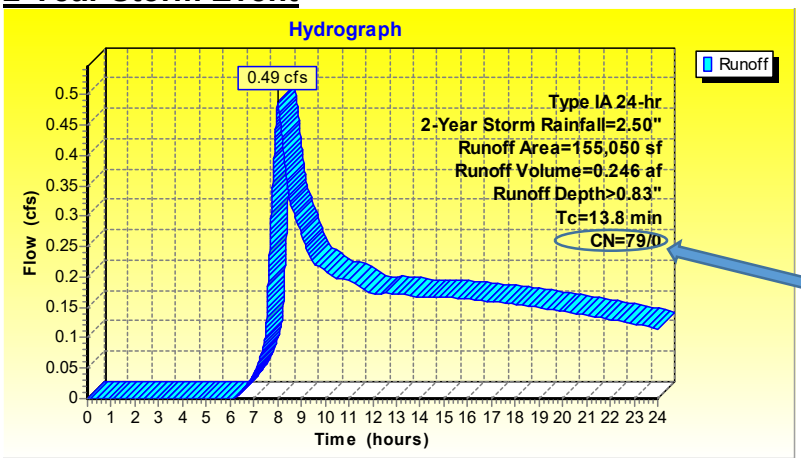
The post-developed time of concentration shall be **5 minutes** for the purposes of this report.

Rainfall Distribution: (See attached CWS Drawing No. 1280)

2-year, 24-hour storm event	Total depth = 2.50 inches
5-year, 24-hour storm event	Total depth = 3.10 inches
10-year, 24-hour storm event	Total depth = 3.45 inches
25-year, 24-hour storm event	Total depth = 3.90 inches

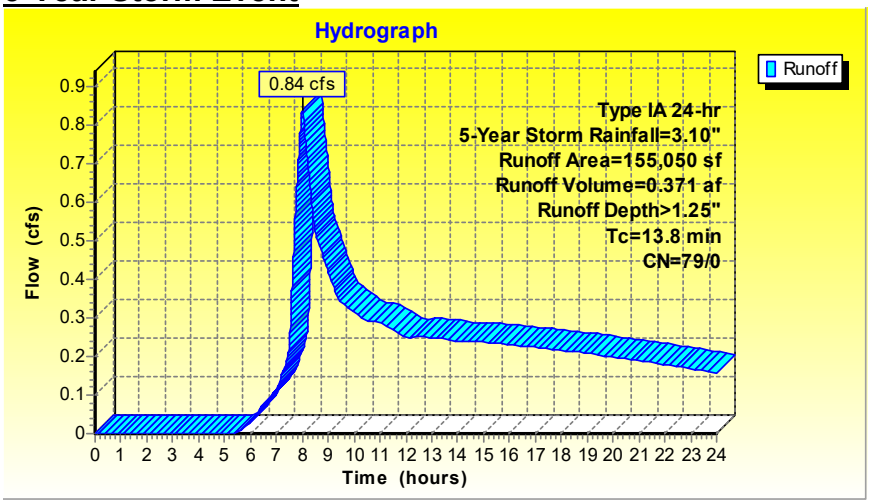
Pre-Developed Detention Routing

2-Year Storm Event

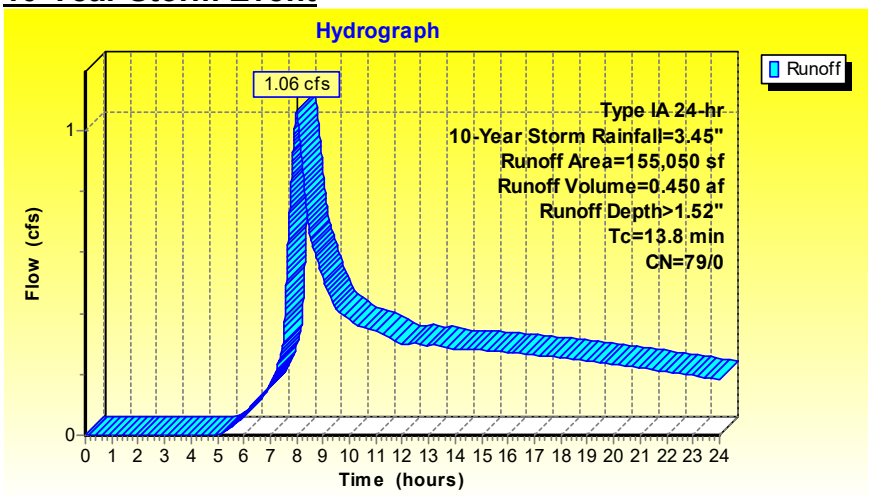


NOTE: The CN = 79 represents hydrologic group C soils with fair grass cover (per Table 3.5.2B - SCS Western Washington Runoff Curve Numbers, King County, Washington, Surface Water Design Manual).

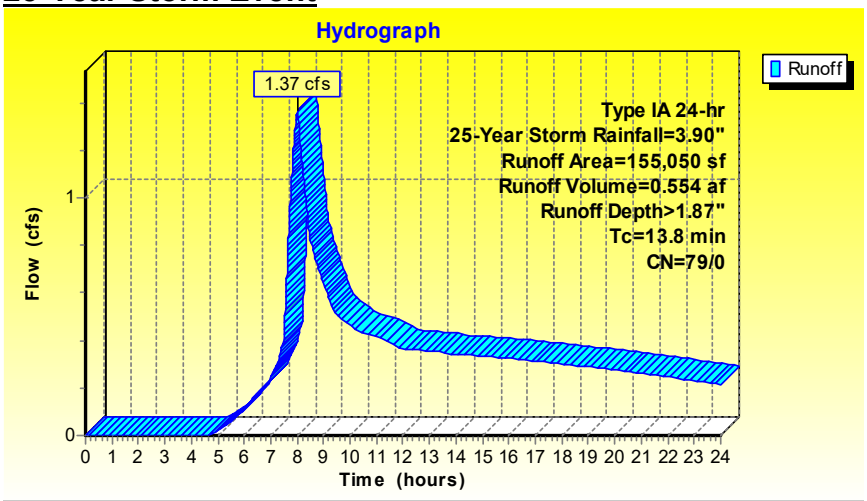
5-Year Storm Event



10-Year Storm Event



25-Year Storm Event



Site Release Rate Table

Storm Event	Pre-Developed Flow Rate (cfs)	Post-Developed Flow Rate (cfs)	Target Release Rate (cfs)
2	0.49	1.78	0.24
5	0.84	2.28	0.84
10	1.06	2.57	1.06
25	1.37	2.95	1.37

Detention Routing Data

A detention pond will be used. Per 4.04.2 at least 25% of the pond perimeter shall be vegetated to a side slope of 3H:1V or flatter. The retaining wall length at the top of the pond is 208 feet. The total perimeter of the pond at the top (152.00 contour) is 301 feet. Therefore, the unwalled portion of the pond is approximately 103 feet which is 34% to meet the vegetated side slope requirement. The minimum bottom width is 4.7 feet, and a minimum freeboard of 1-foot is required from the 25-year design water surface elevation. There will be infiltration at the bottom of the pond, a 1.5-inch orifice at 148.60, a 1-inch orifice at 150.90, and a 12” overflow at 152.00.

Post-Developed Detention Routing

2-Year Storm Event

Summary for Pond 9P: Detention Pond

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=10)

Inflow Area = 3.559 ac, 82.40% Impervious, Inflow Depth > 2.01" for 2-Year Storm event
Inflow = 1.78 cfs @ 7.89 hrs, Volume= 0.598 af
Outflow = 0.86 cfs @ 8.32 hrs, Volume= 0.598 af, Atten= 52%, Lag= 25.8 min
Discarded = 0.79 cfs @ 8.32 hrs, Volume= 0.581 af
Primary = 0.07 cfs @ 8.32 hrs, Volume= 0.017 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 150.03' @ 8.32 hrs Surf.Area= 2,138 sf Storage= 2,390 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 12.5 min (697.3 - 684.8)

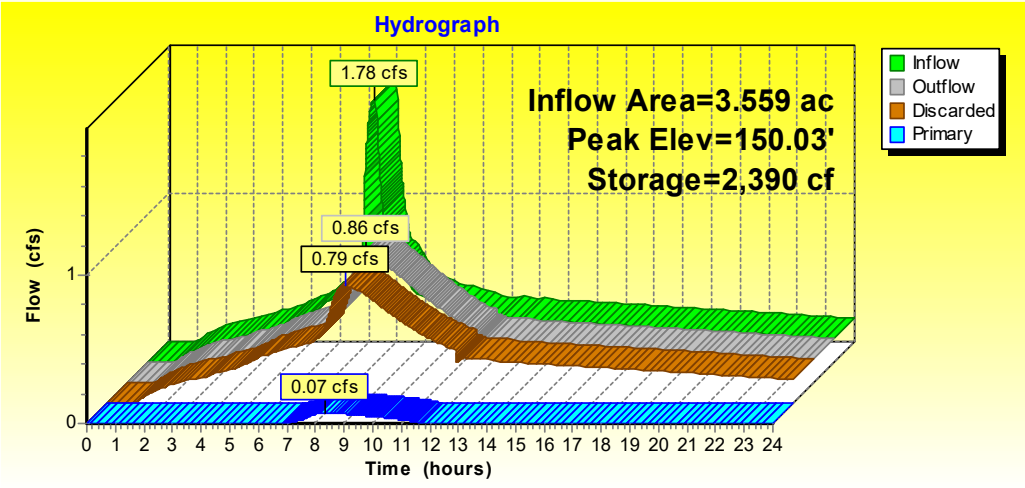
Volume	Invert	Avail.Storage	Storage Description
#1	148.50'	9,013 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
148.50	968	0	0
149.00	1,370	585	585
149.50	1,735	776	1,361
150.00	2,121	964	2,325
150.50	2,400	1,130	3,455
151.00	2,642	1,261	4,716
151.50	2,793	1,359	6,074
152.00	2,942	1,434	7,508
152.50	3,078	1,505	9,013

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.50'	**16.000 in/hr Exfiltration over Surface area**
#2	Primary	148.60'	**12.0" Round 12" Outlet** L= 40.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 148.60' / 148.20' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	148.60'	**1.5" Vert. 1.5" Orifice** C= 0.600
#4	Device 2	150.90'	**1.0" Vert. 1.0" Orifice** C= 0.600
#5	Device 2	152.00'	**3.1' long 12" Overflow** 2 End Contraction(s)

Discarded OutFlow Max=0.79 cfs @ 8.32 hrs HW=150.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.79 cfs)

Primary OutFlow Max=0.07 cfs @ 8.32 hrs HW=150.03' (Free Discharge)
└**2=12" Outlet** (Passes 0.07 cfs of 3.66 cfs potential flow)
  └**3=1.5" Orifice** (Orifice Controls 0.07 cfs @ 5.63 fps)
  └**4=1.0" Orifice** (Controls 0.00 cfs)
  └**5=12" Overflow** (Controls 0.00 cfs)



5-Year Storm Event

Summary for Pond 9P: Detention Pond

Inflow Area = 3.559 ac, 82.40% Impervious, Inflow Depth > 2.58" for 5-Year Storm event
Inflow = 2.28 cfs @ 7.89 hrs, Volume= 0.765 af
Outflow = 0.98 cfs @ 8.40 hrs, Volume= 0.765 af, Atten= 57%, Lag= 30.6 min
Discarded = 0.90 cfs @ 8.40 hrs, Volume= 0.737 af
Primary = 0.08 cfs @ 8.40 hrs, Volume= 0.029 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 150.57' @ 8.40 hrs Surf.Area= 2,435 sf Storage= 3,629 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 19.7 min (698.6 - 678.9)

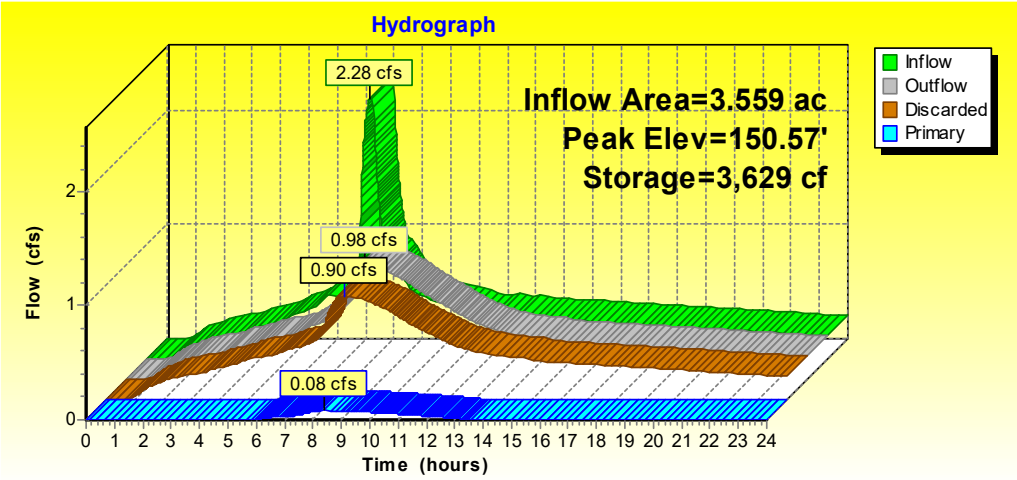
Volume	Invert	Avail.Storage	Storage Description
#1	148.50'	9,013 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
148.50	968	0	0
149.00	1,370	585	585
149.50	1,735	776	1,361
150.00	2,121	964	2,325
150.50	2,400	1,130	3,455
151.00	2,642	1,261	4,716
151.50	2,793	1,359	6,074
152.00	2,942	1,434	7,508
152.50	3,078	1,505	9,013

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.50'	**16.000 in/hr Exfiltration over Surface area**
#2	Primary	148.60'	**12.0" Round 12" Outlet** L= 40.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 148.60' / 148.20' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	148.60'	**1.5" Vert. 1.5" Orifice** C= 0.600
#4	Device 2	150.90'	**1.0" Vert. 1.0" Orifice** C= 0.600
#5	Device 2	152.00'	**3.1' long 12" Overflow** 2 End Contraction(s)

Discarded OutFlow Max=0.90 cfs @ 8.40 hrs HW=150.57' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.90 cfs)

Primary OutFlow Max=0.08 cfs @ 8.40 hrs HW=150.57' (Free Discharge)
└**2=12" Outlet** (Passes 0.08 cfs of 4.71 cfs potential flow)
  ├**3=1.5" Orifice** (Orifice Controls 0.08 cfs @ 6.65 fps)
  ├**4=1.0" Orifice** (Controls 0.00 cfs)
  └**5=12" Overflow** (Controls 0.00 cfs)



10-Year Storm Event

Summary for Pond 9P: Detention Pond

Inflow Area = 3.559 ac, 82.40% Impervious, Inflow Depth > 2.91" for 10-Year Storm event
Inflow = 2.57 cfs @ 7.89 hrs, Volume= 0.864 af
Outflow = 1.05 cfs @ 8.44 hrs, Volume= 0.864 af, Atten= 59%, Lag= 33.3 min
Discarded = 0.96 cfs @ 8.44 hrs, Volume= 0.827 af
Primary = 0.09 cfs @ 8.44 hrs, Volume= 0.037 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 150.89' @ 8.44 hrs Surf.Area= 2,591 sf Storage= 4,438 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 24.6 min (700.8 - 676.2)

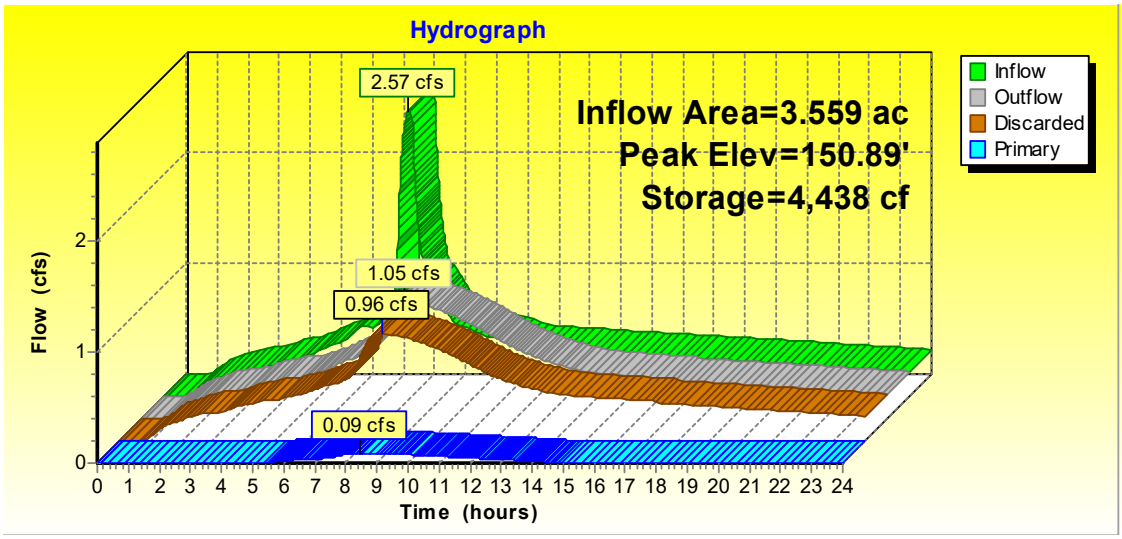
Volume	Invert	Avail.Storage	Storage Description
#1	148.50'	9,013 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
148.50	968	0	0
149.00	1,370	585	585
149.50	1,735	776	1,361
150.00	2,121	964	2,325
150.50	2,400	1,130	3,455
151.00	2,642	1,261	4,716
151.50	2,793	1,359	6,074
152.00	2,942	1,434	7,508
152.50	3,078	1,505	9,013

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.50'	**16.000 in/hr Exfiltration over Surface area**
#2	Primary	148.60'	**12.0" Round 12" Outlet** L= 40.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 148.60' / 148.20' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	148.60'	**1.5" Vert. 1.5" Orifice** C= 0.600
#4	Device 2	150.90'	**1.0" Vert. 1.0" Orifice** C= 0.600
#5	Device 2	152.00'	**3.1' long 12" Overflow** 2 End Contraction(s)

Discarded OutFlow Max=0.96 cfs @ 8.44 hrs HW=150.89' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.96 cfs)

Primary OutFlow Max=0.09 cfs @ 8.44 hrs HW=150.89' (Free Discharge)
└**2=12" Outlet** (Passes 0.09 cfs of 5.23 cfs potential flow)
  ├**3=1.5" Orifice** (Orifice Controls 0.09 cfs @ 7.19 fps)
  ├**4=1.0" Orifice** (Controls 0.00 cfs)
  └**5=12" Overflow** (Controls 0.00 cfs)



25-Year Storm Event

Summary for Pond 9P: Detention Pond

Inflow Area = 3.559 ac, 82.40% Impervious, Inflow Depth > 3.35" for 25-Year Storm event
Inflow = 2.95 cfs @ 7.89 hrs, Volume= 0.992 af
Outflow = 1.13 cfs @ 8.65 hrs, Volume= 0.992 af, Atten= 62%, Lag= 45.8 min
Discarded = 1.01 cfs @ 8.65 hrs, Volume= 0.940 af
Primary = 0.11 cfs @ 8.65 hrs, Volume= 0.052 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 151.31' @ 8.65 hrs Surf.Area= 2,737 sf Storage= 5,561 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 31.6 min (704.8 - 673.2)

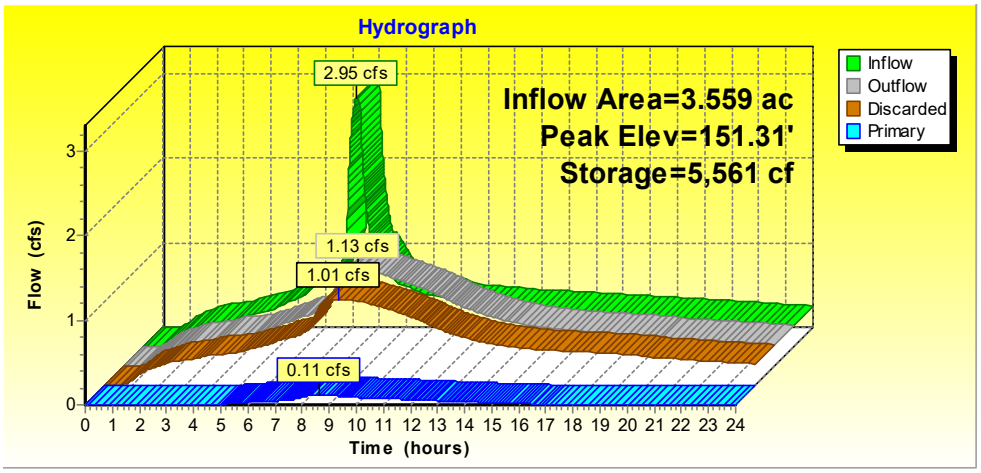
Volume	Invert	Avail.Storage	Storage Description
#1	148.50'	9,013 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
148.50	968	0	0
149.00	1,370	585	585
149.50	1,735	776	1,361
150.00	2,121	964	2,325
150.50	2,400	1,130	3,455
151.00	2,642	1,261	4,716
151.50	2,793	1,359	6,074
152.00	2,942	1,434	7,508
152.50	3,078	1,505	9,013

Device	Routing	Invert	Outlet Devices
#1	Discarded	148.50'	**16.000 in/hr Exfiltration over Surface area**
#2	Primary	148.60'	**12.0" Round 12" Outlet** L= 40.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 148.60' / 148.20' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	148.60'	**1.5" Vert. 1.5" Orifice** C= 0.600
#4	Device 2	150.90'	**1.0" Vert. 1.0" Orifice** C= 0.600
#5	Device 2	152.00'	**3.1' long 12" Overflow** 2 End Contraction(s)

Discarded OutFlow Max=1.01 cfs @ 8.65 hrs HW=151.31' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.01 cfs)

Primary OutFlow Max=0.11 cfs @ 8.65 hrs HW=151.31' (Free Discharge)
└**2=12" Outlet** (Passes 0.11 cfs of 5.85 cfs potential flow)
  ├**3=1.5" Orifice** (Orifice Controls 0.10 cfs @ 7.84 fps)
  ├**4=1.0" Orifice** (Orifice Controls 0.02 cfs @ 2.94 fps)
  └**5=12" Overflow** (Controls 0.00 cfs)



Routed Release Rate Table

Storm Event	Target Release Rate (cfs)	Post developed Flow Rate (cfs)	Actual Release Rate (cfs)
2	0.24	1.78	0.07
5	0.84	2.28	0.08
10	1.06	2.57	0.09
25	1.37	2.95	0.11

The post developed release rates from the detained portion of the site have been reduced to or below the target release rates (pre-developed flows).

Detention Summary

The post developed storm events will be detained and released at or below pre-existing flow rates.

The flow control structure will have a 12-inch riser with two orifices controlling the release rate. A 1.5-inch orifice set at 148.60 will control the 2-year, 5-year, and 10-year storm events.

The 25-year storm will be controlled with a second 1-inch set at 150.90 and the top of the riser at 151.98.

The pond has a surface area of 3078 square feet at an elevation of 152.50 and a retaining wall of 273 linear feet.

SUPPLEMENTAL DATA

Field Report

Project: SW Galbreath Rd
Location: Tualatin, OR

Date: 9/26/23
Developer: RA Gray

Rapid Soil Solutions (RSS) performed on Friday 9/22/23 an as built infiltration test in the excavated area for the storm water system.

The soils were a silty sand. RSS found the water drained instantaneously. RSS states the rate is infinity but use a rate of 360in/hr with a SF of 2 already applied.

If you have any questions with this field report, please contact me at the below numbers.

REGISTERED PROFESSIONAL ENGINEER
19244PE
OREGON
JULY 15, 1997
MIA C. MAHEDY
EXPIRES: 12/31/2024

Rapid Soil Solutions INC 503-816-3689 mia@rapidsoilsolutions.com

Turf & Soil Diagnostics

ACCREDITED TESTING Cert #0797.01

Pro-Gro Mixes & Materials
Miles Andrews
PO Box 1127
Tualatin, OR 97062

Date Received Jan-18-2024
Date Reported Jan-29-2024
Facility Product Development

Maximum Media Density for Dead Load Analysis of Green Roof Systems ‡

Lab ID#	Sample Name	Water Permeability (Saturated Hydraulic Conductivity) (in/hr)	(mm/min)	Initial Media Density (Application Density) (lb/ft^3)	(g/cm^3)	Maximum Media Density (Saturated Density) (lb/ft^3)	(g/cm^3)	Maximum Media Water Retention (%)	Air-filled Porosity‡‡ (%)	Dry Media Density (lb/ft^3)	(g/cm^3)
24010032-6	Storm Water	32.4	13.7	95.2	1.53	109.6	1.76	51.7	0.9	77.4	1.24

Lab ID#	Sample Name	Initial Sample Wt. (Kg)	Sample Volume (m^3)	Initial Sample Height (cm)	Final Sample Height (cm)	Sample Wt. After Draining (Kg)	Total Pore Space (%)	pH‡‡‡	Electrical Conductivity mmhos/cm	Organic Matter** (%)	Organic Matter** g/L
24010032-6	Storm Water	2.998	0.0020	10.8	10.8	3.5	52.5	6.5	0.1	4.9	60.3

Particle Size Evaluation*

Lab ID#	Sample Name	% Sand 2.0 - 0.063 mm	% Silt 0.063-0.002 mm	% Clay < 0.002mm	% Passing US sieve (mm) Gravel 3/8"	Gravel 1/8" (3.17)	Gravel 10 (2.0)	V. Coarse 18 (1.0)	Medium 60 (0.25)	V. Fine 230 (0.063)
24010032-6	Storm Water	68.6	6.3	2.8	100.0	86.3	77.7	67.6	20.5	9.0

‡ ASTM E2399 ‡‡At Maximum Media Density (Water-holding Capacity) ‡‡‡ASTM D4972 w $CaCl_2$ (not screened) *ASTM F1632 Method B **Ashed at 550° C (FLL Guidelines) Electrial Conductivity (1:5)

Samples were tested as received and comments pertain only to the samples shown.
This report may not be reproduced in part, but only in full.
Sample condition upon receipt was normal.
Samples were received with a transmittal letter.

Reviewed by _____

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E-mail: lab@turfdiag.com ■ Website: http://www.turfdiag.com