



June 26, 2020

Steve Cabral
Crossman Engineering
151 Centerville Road
Warwick, RI 02886

**RE: Frontier Road Solar
Hopkinton, RI
Project #: 2437-021**

Dear Mr. Cabral:

DiPrete Engineering has received your comments dated June 24, 2020. We have reviewed these comments and offer the following in response. The original comment titles are provided in italics with responses in bold. Please reference the Crossman letter for the full comments.

NOTE to SPECIFY TOPIC:

1. *Narragansett Electric Easement*

The applicant is still actively working with National Grid on the relocation of the utility poles and easement. The Applicant will agree that any increase in panels or additional clearing will be subject to planning board approval.

2. *Rhode Island Department of Health (RIDOH)*

The applicant is working with RIDOH on this matter. If the RIDOH requires panels to be removed from the well radius the applicant will reduce the size of the solar field. State approvals are not required at this stage, the Applicant is required to and will comply with RIDOH requirements.

3. *Landscape Plan*

We have relocated the landscape buffer in this area to be not located on the berm as requested. Below is a snapshot from the landscape plan showing this change.

The applicant has included in it's O&M Plan to conduct quarterly inspections of the site vegetation and landscaping to ensure that the approved landscaping plan is being complied with, or determine if any action is necessary. The Town's Ordinance provides for continued right of inspections and a mechanism to ensure compliance, such that there is no need for any additional condition on approval. (pg 10).-

4. *Operations and Maintenance (O&M)*

The O&M has been updated under Section 2.c.xi as requested to include owner, operator contact information and a provision confirming that no module washing will be performed. A copy of this revised plan is attached.

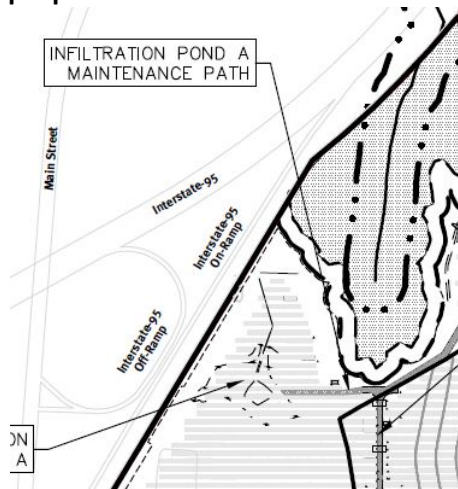
5. *Decommissioning Cost Estimate*

The Applicant accepts Crossman’s Decommissioning Estimate as sufficient to cover the complete costs of removal.

6. *Infiltration Pond A*

We prefer iron pins with caps to identify the limits of this pond area. They will be installed in areas off the access pathways to reduce the tripping hazard concern. We have concerns with the 3 ft cedar posts being installed in the access ways between panels and do not want 3 ft wood posts installed underneath the solar panels near electrical components.

One grass access pathway between the row of panels is identified on the SESC plan as shown below. Any of the grass access pathways between the rows of panels could be used for access to this area. There are multiple points of access to this area and we have identified just one.



7. *Low Flow Outlet Pond Riser*

The requested change has been included within the Stormwater O&M and is shown on page 11.

8. *Infiltration Pond B*

The identified concern has been addressed. Please see response to comment #3.

9. *Infiltration Pond D*

The primary outlet from Pond D is infiltration and a low flow outlet. The Overflow weir is emergency only and discharges no water for all storms up to and including the 100 year. The size and inverts of the pipe has been added to Sheet 4. DiPrete Engineering visibly reviewed the condition of the inlet and the pipe in the field, both appear to be in working condition. DiPrete Engineering analyzed this point pre to post conditions. We also reviewed the VHB design plans to check consistency between existing conditions and the design. The VHB design is consistent with what was built in the field. There is a reduction inflow to this point pre to post development. This are will be continuing to function the same as it does today.

10. *Infiltration Pond C*

Attached is a supplemental analysis for Pond C. DiPrete Engineering surveyed the drainage line that goes from Pond C to Pond F. We have confirmed that the drainage line does discharge to Pond F. We added the inlet from this ponding area and the culvert to the next downstream structure (pre and post development). Pre to post development there is a 60% decrease in overland flow from this pond. There is no flow to Pond F for the 1 and 10 year storms.

DiPrete Engineering reviewed the existing conditions and the VHB design plans. In both cases, stormwater from the grass areas flow to this point. Multiple inlets were designed by VHB and exist on site. These inlets are in series, each one flows to the next with the last structure being the double catch basin located withing the paved driveway. This double catch basin is located in a sag condition. The existing conditions and VHB design both use this DCB as the final capture point for the runoff from this area. Proposed conditions continue this drainage condition but with significantly decreased flow (and volume).

In conclusion, the existing conditions meet the design intent of the VHB Plans. The proposed design significantly decreases flow and volume to this area, there will be no impact from the proposed solar installation.

11. *Stone Trenches Parallel*

We have added a note and details to the plans for location, length, width, and depth of the stone trenches as requested.

12. *Access*

We have discussed the site plans previously provided to the fire department, and it is our understanding that they have informed to the planning department that fire will complete their final review after the final layout is approved. If the fire department has any concerns of the slope of the roadways, we will address on the final plans prior to obtaining a building permit.

13. *Town of Hopkinton Chapter 246 Non-Residential Photovoltaic Solar Energy*

Photographs of the equipment have been included within Appendix A of the Environmental Impact Statement prepared by Sage Environmental. The applicant agrees that, as required appurtenant structures installed at the site will be “architecturally compatible” and believe the typical equipment that they are proposing meets this requirement.

Please, feel free to contact me if you have any further questions regarding this matter.

Sincerely,
DiPrete Engineering Associates, Inc.

A handwritten signature in black ink, appearing to read "Dave Russo". The signature is fluid and cursive, with the first name "Dave" and last name "Russo" clearly distinguishable.

Dave Russo, PE
Senior Project Manager
drusso@diprete-eng.com

cc: Recipients Name (if applicable)

Enclosure (if applicable)

2437-021-ALLS-EHCD-INHS-SimRoute

Type III 24-hr 1-Year Rainfall=2.80"

Prepared by DiPrete Engineering

Printed 6/26/2020

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Time span=0.00-72.00 hrs, dt=0.005 hrs, 14401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Sim-Route method - Pond routing by Sim-Route method w/Net Flows

Pond 45P: ND-Pre-C

Peak Elev=142.79' Storage=1,946 cf Inflow=1.76 cfs 0.290 af

Discarded=0.077 cfs 0.077 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Tertiary=0.86 cfs 0.213 af Outflow=0.95 cfs 0.290 af

Pond 48P: IP-Pre-F

Peak Elev=132.26' Storage=7,306 cf Inflow=2.65 cfs 0.490 af

Discarded=0.27 cfs 0.337 af Primary=0.44 cfs 0.153 af Outflow=0.71 cfs 0.490 af

Link 49: DP-4

Inflow=0.44 cfs 0.153 af

Primary=0.44 cfs 0.153 af

Summary for Pond 45P: ND-Pre-C

Inflow	=	1.76 cfs @ 12.38 hrs,	Volume=	0.290 af
Outflow	=	0.95 cfs @ 12.70 hrs,	Volume=	0.290 af, Atten= 46%, Lag= 19.3 min
Discarded	=	0.09 cfs @ 12.70 hrs,	Volume=	0.077 af
Primary	=	0.00 cfs @ 0.00 hrs,	Volume=	0.000 af
Secondary	=	0.00 cfs @ 0.00 hrs,	Volume=	0.000 af
Tertiary	=	0.86 cfs @ 12.70 hrs,	Volume=	0.213 af

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-72.00 hrs, dt= 0.005 hrs
 Peak Elev= 142.79' @ 12.70 hrs Surf.Area= 3,707 sf Storage= 1,946 cf

Plug-Flow detention time= 81.7 min calculated for 0.290 af (100% of inflow)
 Center-of-Mass det. time= 81.7 min (1,021.8 - 940.1)

Volume	Invert	Avail.Storage	Storage Description
#1	141.50'	35,079 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
141.50	99	0	0
142.00	1,004	276	276
142.50	2,204	802	1,078
143.00	4,764	1,742	2,820
143.50	8,871	3,409	6,229
144.00	15,285	6,039	12,268
144.50	23,030	9,579	21,846
145.00	29,899	13,232	35,079

Device	Routing	Invert	Outlet Devices
#1	Primary	144.50'	30.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	141.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#3	Secondary	144.00'	8.00" Round Culvert L= 139.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 141.50' / 144.00' S= -0.0180 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.35 sf
#4	Device 5	142.32'	12.00" Vert. Orifice/Grate C= 0.600
#5	Tertiary	139.95'	8.00" Round Culvert L= 337.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.95' / 134.85' S= 0.0151 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.09 cfs @ 12.70 hrs HW=142.79' (Free Discharge)

↳ **2=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=141.50' TW=131.60' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=141.50' TW=144.00' (Dynamic Tailwater)

↳ **3=Culvert** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.86 cfs @ 12.70 hrs HW=142.79' TW=132.06' (Dynamic Tailwater)

↳ **5=Culvert** (Passes 0.86 cfs of 1.83 cfs potential flow)

↳ **4=Orifice/Grate** (Orifice Controls 0.86 cfs @ 2.34 fps)

Summary for Pond 48P: IP-Pre-F

Inflow	=	2.65 cfs @ 12.23 hrs,	Volume=	0.490 af
Outflow	=	0.71 cfs @ 14.09 hrs,	Volume=	0.490 af, Atten= 73%, Lag= 111.6 min
Discarded	=	0.27 cfs @ 14.09 hrs,	Volume=	0.337 af
Primary	=	0.44 cfs @ 14.09 hrs,	Volume=	0.153 af

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-72.00 hrs, dt= 0.005 hrs
 Peak Elev= 132.26' @ 14.09 hrs Surf.Area= 11,516 sf Storage= 7,306 cf

Plug-Flow detention time= 186.9 min calculated for 0.490 af (100% of inflow)
 Center-of-Mass det. time= 186.9 min (1,087.2 - 900.3)

Volume	Invert	Avail.Storage	Storage Description
#1	131.60'	43,664 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
131.60	10,639	0	0
132.00	11,196	4,367	4,367
133.00	12,433	11,815	16,182
134.00	13,727	13,080	29,262
135.00	15,077	14,402	43,664

Device	Routing	Invert	Outlet Devices
#1	Discarded	131.60'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	131.60'	1.00" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Primary	132.00'	22.00" Vert. Orifice/Grate C= 0.600
#4	Primary	134.30'	48.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.27 cfs @ 14.09 hrs HW=132.26' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.44 cfs @ 14.09 hrs HW=132.26' TW=0.00' (Dynamic Tailwater)

↳ **2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 3.78 fps)

↳ **3=Orifice/Grate** (Orifice Controls 0.39 cfs @ 1.73 fps)

↳ **4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 49: DP-4

Inflow = 0.44 cfs @ 14.09 hrs, Volume= 0.153 af
Primary = 0.44 cfs @ 14.10 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.3 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.005 hrs

2437-021-ALLS-EHCD-INHS-SimRoute

Type III 24-hr 10-Year Rainfall=4.90"

Prepared by DiPrete Engineering

Printed 6/26/2020

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Time span=0.00-72.00 hrs, dt=0.005 hrs, 14401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Sim-Route method - Pond routing by Sim-Route method w/Net Flows

Pond 45P: ND-Pre-C

Peak Elev=143.85' Storage=10,052 cf Inflow=6.53 cfs 1.271 af

cfs 0.180 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Tertiary=1.96 cfs 1.092 af Outflow=2.27 cfs 1.271 af

Pond 48P: IP-Pre-F

Peak Elev=132.84' Storage=14,182 cf Inflow=9.06 cfs 1.814 af

Discarded=0.29 cfs 0.454 af Primary=3.72 cfs 1.361 af Outflow=4.01 cfs 1.814 af

Link 49: DP-4

Inflow=3.72 cfs 1.361 af

Primary=3.72 cfs 1.361 af

Summary for Pond 45P: ND-Pre-C

Inflow = 6.53 cfs @ 12.20 hrs, Volume= 1.271 af
 Outflow = 2.27 cfs @ 13.88 hrs, Volume= 1.271 af, Atten= 65%, Lag= 100.8 min
 Discarded = 0.31 cfs @ 13.88 hrs, Volume= 0.180 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 1.96 cfs @ 13.88 hrs, Volume= 1.092 af

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-72.00 hrs, dt= 0.005 hrs
 Peak Elev= 143.85' @ 13.88 hrs Surf.Area= 13,297 sf Storage= 10,052 cf

Plug-Flow detention time= 62.4 min calculated for 1.271 af (100% of inflow)
 Center-of-Mass det. time= 62.5 min (967.1 - 904.6)

Volume	Invert	Avail.Storage	Storage Description
#1	141.50'	35,079 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
141.50	99	0	0
142.00	1,004	276	276
142.50	2,204	802	1,078
143.00	4,764	1,742	2,820
143.50	8,871	3,409	6,229
144.00	15,285	6,039	12,268
144.50	23,030	9,579	21,846
145.00	29,899	13,232	35,079

Device	Routing	Invert	Outlet Devices
#1	Primary	144.50'	30.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	141.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#3	Secondary	144.00'	8.00" Round Culvert L= 139.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 141.50' / 144.00' S= -0.0180 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.35 sf
#4	Device 5	142.32'	12.00" Vert. Orifice/Grate C= 0.600
#5	Tertiary	139.95'	8.00" Round Culvert L= 337.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.95' / 134.85' S= 0.0151 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.31 cfs @ 13.88 hrs HW=143.84' (Free Discharge)

↳ **2=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=141.50' TW=131.60' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=141.50' TW=144.00' (Dynamic Tailwater)

↳ **3=Culvert** (Controls 0.00 cfs)

Tertiary OutFlow Max=1.96 cfs @ 13.88 hrs HW=143.84' TW=132.69' (Dynamic Tailwater)

↳ **5=Culvert** (Barrel Controls 1.96 cfs @ 5.61 fps)

↳ **4=Orifice/Grate** (Passes 1.96 cfs of 3.83 cfs potential flow)

Summary for Pond 48P: IP-Pre-F

Inflow	=	9.06 cfs @ 12.21 hrs,	Volume=	1.814 af
Outflow	=	4.01 cfs @ 12.72 hrs,	Volume=	1.814 af, Atten= 56%, Lag= 30.5 min
Discarded	=	0.29 cfs @ 12.72 hrs,	Volume=	0.454 af
Primary	=	3.72 cfs @ 12.72 hrs,	Volume=	1.361 af

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-72.00 hrs, dt= 0.005 hrs
 Peak Elev= 132.84' @ 12.72 hrs Surf.Area= 12,232 sf Storage= 14,182 cf

Plug-Flow detention time= 100.3 min calculated for 1.814 af (100% of inflow)
 Center-of-Mass det. time= 100.3 min (1,006.4 - 906.2)

Volume	Invert	Avail.Storage	Storage Description
#1	131.60'	43,664 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
131.60	10,639	0	0
132.00	11,196	4,367	4,367
133.00	12,433	11,815	16,182
134.00	13,727	13,080	29,262
135.00	15,077	14,402	43,664

Device	Routing	Invert	Outlet Devices
#1	Discarded	131.60'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	131.60'	1.00" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Primary	132.00'	22.00" Vert. Orifice/Grate C= 0.600
#4	Primary	134.30'	48.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.29 cfs @ 12.72 hrs HW=132.84' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=3.72 cfs @ 12.72 hrs HW=132.84' TW=0.00' (Dynamic Tailwater)

↳ **2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 5.27 fps)

↳ **3=Orifice/Grate** (Orifice Controls 3.66 cfs @ 3.12 fps)

↳ **4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 49: DP-4

Inflow = 3.72 cfs @ 12.72 hrs, Volume= 1.361 af
Primary = 3.72 cfs @ 12.73 hrs, Volume= 1.361 af, Atten= 0%, Lag= 0.3 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.005 hrs

2437-021-ALLS-EHCD-INHS-SimRoute

Type III 24-hr 100-Year Rainfall=8.50"

Prepared by DiPrete Engineering

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Time span=0.00-72.00 hrs, dt=0.005 hrs, 14401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Sim-Route method - Pond routing by Sim-Route method w/Net Flows

Pond 45P: ND-Pre-C

Peak Elev=144.85' Storage=30,884 cf Inflow=29.33 cfs 3.511 af

0.473 af Primary=15.63 cfs 0.967 af Secondary=0.00 cfs 0.000 af Tertiary=2.08 cfs 2.071 af Outflow=18.36 cfs 3.511 af

Pond 48P: IP-Pre-F

Peak Elev=134.42' Storage=35,176 cf Inflow=26.45 cfs 4.632 af

Discarded=0.34 cfs 0.537 af Primary=17.44 cfs 4.095 af Outflow=17.77 cfs 4.632 af

Link 49: DP-4

Inflow=17.44 cfs 4.095 af

Primary=17.44 cfs 4.095 af

Summary for Pond 45P: ND-Pre-C

Inflow = 29.33 cfs @ 12.27 hrs, Volume= 3.511 af
 Outflow = 18.36 cfs @ 12.49 hrs, Volume= 3.511 af, Atten= 37%, Lag= 13.5 min
 Discarded = 0.66 cfs @ 12.49 hrs, Volume= 0.473 af
 Primary = 15.63 cfs @ 12.49 hrs, Volume= 0.967 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 2.08 cfs @ 12.49 hrs, Volume= 2.071 af

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-72.00 hrs, dt= 0.005 hrs
 Peak Elev= 144.85' @ 12.49 hrs Surf.Area= 27,905 sf Storage= 30,884 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 83.0 min (968.6 - 885.6)

Volume	Invert	Avail.Storage	Storage Description
#1	141.50'	35,079 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
141.50	99	0	0
142.00	1,004	276	276
142.50	2,204	802	1,078
143.00	4,764	1,742	2,820
143.50	8,871	3,409	6,229
144.00	15,285	6,039	12,268
144.50	23,030	9,579	21,846
145.00	29,899	13,232	35,079

Device	Routing	Invert	Outlet Devices
#1	Primary	144.50'	30.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	141.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#3	Secondary	144.00'	8.00" Round Culvert L= 139.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 141.50' / 144.00' S= -0.0180 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.35 sf
#4	Device 5	142.32'	12.00" Vert. Orifice/Grate C= 0.600
#5	Tertiary	139.95'	8.00" Round Culvert L= 337.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.95' / 134.85' S= 0.0151 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.66 cfs @ 12.49 hrs HW=144.85' (Free Discharge)

↳ **2=Exfiltration** (Exfiltration Controls 0.66 cfs)

Primary OutFlow Max=15.62 cfs @ 12.49 hrs HW=144.85' TW=134.10' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 15.62 cfs @ 1.47 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=141.50' TW=144.00' (Dynamic Tailwater)

↳ **3=Culvert** (Controls 0.00 cfs)

Tertiary OutFlow Max=2.08 cfs @ 12.49 hrs HW=144.85' TW=134.10' (Dynamic Tailwater)

↳ **5=Culvert** (Barrel Controls 2.08 cfs @ 5.95 fps)

↳ **4=Orifice/Grate** (Passes 2.08 cfs of 5.39 cfs potential flow)

Summary for Pond 48P: IP-Pre-F

Inflow	=	26.45 cfs @ 12.48 hrs,	Volume=	4.632 af
Outflow	=	17.77 cfs @ 12.69 hrs,	Volume=	4.632 af, Atten= 33%, Lag= 13.0 min
Discarded	=	0.34 cfs @ 12.69 hrs,	Volume=	0.537 af
Primary	=	17.44 cfs @ 12.69 hrs,	Volume=	4.095 af

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-72.00 hrs, dt= 0.005 hrs
 Peak Elev= 134.42' @ 12.69 hrs Surf.Area= 14,297 sf Storage= 35,176 cf

Plug-Flow detention time= 62.6 min calculated for 4.632 af (100% of inflow)
 Center-of-Mass det. time= 62.6 min (970.6 - 908.0)

Volume	Invert	Avail.Storage	Storage Description
#1	131.60'	43,664 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
131.60	10,639	0	0
132.00	11,196	4,367	4,367
133.00	12,433	11,815	16,182
134.00	13,727	13,080	29,262
135.00	15,077	14,402	43,664

Device	Routing	Invert	Outlet Devices
#1	Discarded	131.60'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	131.60'	1.00" Vert. Orifice/Grate X 2.00 C= 0.600
#3	Primary	132.00'	22.00" Vert. Orifice/Grate C= 0.600
#4	Primary	134.30'	48.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.34 cfs @ 12.69 hrs HW=134.42' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=17.43 cfs @ 12.69 hrs HW=134.42' TW=0.00' (Dynamic Tailwater)

↳ **2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 8.03 fps)

↳ **3=Orifice/Grate** (Orifice Controls 15.60 cfs @ 5.91 fps)

↳ **4=Orifice/Grate** (Weir Controls 1.75 cfs @ 1.14 fps)

Summary for Link 49: DP-4

Inflow = 17.44 cfs @ 12.69 hrs, Volume= 4.095 af
Primary = 17.44 cfs @ 12.70 hrs, Volume= 4.095 af, Atten= 0%, Lag= 0.3 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.005 hrs

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Type III 24-hr 1-Year Rainfall=2.80"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Pond 402: IP-Post-C

Peak Elev=141.66' Storage=2,222 cf Inflow=1.70 cfs 0.299 af
cfs 0.225 af Primary=0.00 cfs 0.000 af Secondary=0.34 cfs 0.074 af Tertiary=0.00 cfs 0.000 af Outflow=0.66 cfs 0.299 af

Pond 405: DP-Post-F

Peak Elev=132.65' Storage=6,802 cf Inflow=2.82 cfs 0.254 af
Outflow=0.13 cfs 0.253 af

Link 406: DP-4

Inflow=0.13 cfs 0.253 af
Primary=0.13 cfs 0.253 af

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Type III 24-hr 1-Year Rainfall=2.80"

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Summary for Pond 402: IP-Post-C

Inflow Area = 11.150 ac, 0.00% Impervious, Inflow Depth = 0.32" for 1-Year event
 Inflow = 1.70 cfs @ 12.42 hrs, Volume= 0.299 af
 Outflow = 0.66 cfs @ 13.06 hrs, Volume= 0.299 af, Atten= 61%, Lag= 38.7 min
 Discarded = 0.33 cfs @ 13.06 hrs, Volume= 0.225 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.34 cfs @ 13.06 hrs, Volume= 0.074 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 141.66' @ 13.06 hrs Surf.Area= 13,835 sf Storage= 2,222 cf

Plug-Flow detention time= 34.1 min calculated for 0.299 af (100% of inflow)
 Center-of-Mass det. time= 34.1 min (972.4 - 938.3)

Volume	Invert	Avail.Storage	Storage Description
#1	141.50'	103,803 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
141.50	13,537	0	0
142.00	14,456	6,998	6,998
142.50	15,389	7,461	14,460
143.00	16,338	7,932	22,391
143.50	17,303	8,410	30,802
144.00	19,128	9,108	39,909
144.50	26,584	11,428	51,337
145.00	30,864	14,362	65,699
146.00	45,344	38,104	103,803

Device	Routing	Invert	Outlet Devices
#1	Primary	144.50'	10.0' long x 17.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	141.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#3	Device 4	141.50'	6.00" Horiz. Low Flow C= 0.600 Limited to weir flow at low heads
#4	Secondary	140.50'	8.00" Round Low Flow Pipe L= 172.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 140.50' / 140.00' S= 0.0029 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#5	Device 6	142.30'	12.00" Vert. Orifice/Grate C= 0.600
#6	Tertiary	139.95'	8.00" Round Culvert L= 163.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.95' / 137.50' S= 0.0150 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf

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Type III 24-hr 1-Year Rainfall=2.80"

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Discarded OutFlow Max=0.33 cfs @ 13.06 hrs HW=141.66' (Free Discharge)

↳ **2=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=141.50' TW=132.00' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.34 cfs @ 13.06 hrs HW=141.66' TW=0.00' (Dynamic Tailwater)

↳ **4=Low Flow Pipe** (Passes 0.34 cfs of 0.91 cfs potential flow)

↳ **3=Low Flow** (Weir Controls 0.34 cfs @ 1.32 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=141.50' TW=132.00' (Dynamic Tailwater)

↳ **6=Culvert** (Passes 0.00 cfs of 1.70 cfs potential flow)

↳ **5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 405: DP-Post-F

Inflow Area = 14.366 ac, 6.85% Impervious, Inflow Depth = 0.21" for 1-Year event
 Inflow = 2.82 cfs @ 12.16 hrs, Volume= 0.254 af
 Outflow = 0.13 cfs @ 16.78 hrs, Volume= 0.253 af, Atten= 95%, Lag= 277.1 min
 Primary = 0.13 cfs @ 16.78 hrs, Volume= 0.253 af

Routing by Sim-Route method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 132.65' @ 16.78 hrs Surf.Area= 10,833 sf Storage= 6,802 cf

Plug-Flow detention time= 669.6 min calculated for 0.253 af (100% of inflow)
 Center-of-Mass det. time= 667.5 min (1,531.8 - 864.4)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	35,656 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	10,061	0	0
133.00	11,246	10,654	10,654
134.00	12,487	11,867	22,520
135.00	13,785	13,136	35,656

Device	Routing	Invert	Outlet Devices
#1	Device 2	132.00'	2.50" Horiz. Low Flow C= 0.600 Limited to weir flow at low heads
#2	Device 6	131.00'	6.00" Round Low Flow Pipe L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 131.00' S= 0.0000 1/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#3	Primary	134.00'	10.0' long x 17.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#4	Device 6	132.75'	12.00" W x 6.00" H Vert. Orifice #1 C= 0.600
#5	Device 6	133.75'	48.00" Horiz. Orifice #2 C= 0.600 Limited to weir flow at low heads
#6	Primary	131.00'	18.00" Round Culvert L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 123.00' S= 0.1569 1/ Cc= 0.900

n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.13 cfs @ 16.78 hrs HW=132.65' TW=0.00' (Dynamic Tailwater)

- ↑ 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
- ↑ 6=Culvert (Passes 0.13 cfs of 8.08 cfs potential flow)
- ↑ 2=Low Flow Pipe (Passes 0.13 cfs of 1.12 cfs potential flow)
- ↑ 1=Low Flow (Orifice Controls 0.13 cfs @ 3.89 fps)
- 4=Orifice #1 (Controls 0.00 cfs)
- 5=Orifice #2 (Controls 0.00 cfs)

Summary for Link 406: DP-4

Inflow Area =	14.366 ac,	6.85% Impervious,	Inflow Depth > 0.21"	for 1-Year event
Inflow =	0.13 cfs @	16.78 hrs,	Volume=	0.253 af
Primary =	0.13 cfs @	16.79 hrs,	Volume=	0.253 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10-Year Rainfall=4.90"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Pond 402: IP-Post-C Peak Elev=142.83' Storage=19,640 cf Inflow=11.61 cfs 1.280 af
cfs 0.384 af Primary=0.00 cfs 0.000 af Secondary=1.09 cfs 0.715 af Tertiary=1.05 cfs 0.180 af Outflow=2.52 cfs 1.280 af

Pond 405: DP-Post-F Peak Elev=133.42' Storage=15,475 cf Inflow=8.03 cfs 0.866 af
Outflow=1.73 cfs 0.865 af

Link 406: DP-4 Inflow=1.73 cfs 0.865 af
Primary=1.73 cfs 0.865 af

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Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Pond 402: IP-Post-C

Inflow Area = 11.150 ac, 0.00% Impervious, Inflow Depth = 1.38" for 10-Year event
 Inflow = 11.61 cfs @ 12.26 hrs, Volume= 1.280 af
 Outflow = 2.52 cfs @ 13.06 hrs, Volume= 1.280 af, Atten= 78%, Lag= 47.8 min
 Discarded = 0.38 cfs @ 13.06 hrs, Volume= 0.384 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 1.09 cfs @ 13.06 hrs, Volume= 0.715 af
 Tertiary = 1.05 cfs @ 13.06 hrs, Volume= 0.180 af

Routing by Sim-Route method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 142.83' @ 13.06 hrs Surf.Area= 16,015 sf Storage= 19,640 cf

Plug-Flow detention time= 126.2 min calculated for 1.280 af (100% of inflow)
 Center-of-Mass det. time= 126.2 min (1,007.7 - 881.5)

Volume	Invert	Avail.Storage	Storage Description
#1	141.50'	103,803 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
141.50	13,537	0	0
142.00	14,456	6,998	6,998
142.50	15,389	7,461	14,460
143.00	16,338	7,932	22,391
143.50	17,303	8,410	30,802
144.00	19,128	9,108	39,909
144.50	26,584	11,428	51,337
145.00	30,864	14,362	65,699
146.00	45,344	38,104	103,803

Device	Routing	Invert	Outlet Devices
#1	Primary	144.50'	10.0' long x 17.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	141.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#3	Device 4	141.50'	6.00" Horiz. Low Flow C= 0.600 Limited to weir flow at low heads
#4	Secondary	140.50'	8.00" Round Low Flow Pipe L= 172.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 140.50' / 140.00' S= 0.0029 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#5	Device 6	142.30'	12.00" Vert. Orifice/Grate C= 0.600
#6	Tertiary	139.95'	8.00" Round Culvert L= 163.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.95' / 137.50' S= 0.0150 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf

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Type III 24-hr 10-Year Rainfall=4.90"

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Discarded OutFlow Max=0.38 cfs @ 13.06 hrs HW=142.83' (Free Discharge)

↳ **2=Exfiltration** (Exfiltration Controls 0.38 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=141.50' TW=132.00' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.09 cfs @ 13.06 hrs HW=142.83' TW=0.00' (Dynamic Tailwater)

↳ **4=Low Flow Pipe** (Passes 1.09 cfs of 1.34 cfs potential flow)

↳ **3=Low Flow** (Orifice Controls 1.09 cfs @ 5.55 fps)

Tertiary OutFlow Max=1.05 cfs @ 13.06 hrs HW=142.83' TW=133.40' (Dynamic Tailwater)

↳ **6=Culvert** (Passes 1.05 cfs of 2.02 cfs potential flow)

↳ **5=Orifice/Grate** (Orifice Controls 1.05 cfs @ 2.48 fps)

Summary for Pond 405: DP-Post-F

Inflow Area = 14.366 ac, 6.85% Impervious, Inflow Depth = 0.72" for 10-Year event
 Inflow = 8.03 cfs @ 12.16 hrs, Volume= 0.866 af
 Outflow = 1.73 cfs @ 13.50 hrs, Volume= 0.865 af, Atten= 78%, Lag= 80.5 min
 Primary = 1.73 cfs @ 13.50 hrs, Volume= 0.865 af

Routing by Sim-Route method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 133.42' @ 13.50 hrs Surf.Area= 11,766 sf Storage= 15,475 cf

Plug-Flow detention time= 347.5 min calculated for 0.865 af (100% of inflow)
 Center-of-Mass det. time= 347.0 min (1,181.7 - 834.6)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	35,656 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	10,061	0	0
133.00	11,246	10,654	10,654
134.00	12,487	11,867	22,520
135.00	13,785	13,136	35,656

Device	Routing	Invert	Outlet Devices
#1	Device 2	132.00'	2.50" Horiz. Low Flow C= 0.600 Limited to weir flow at low heads
#2	Device 6	131.00'	6.00" Round Low Flow Pipe L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 131.00' S= 0.0000 1/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#3	Primary	134.00'	10.0' long x 17.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#4	Device 6	132.75'	12.00" W x 6.00" H Vert. Orifice #1 C= 0.600
#5	Device 6	133.75'	48.00" Horiz. Orifice #2 C= 0.600 Limited to weir flow at low heads
#6	Primary	131.00'	18.00" Round Culvert L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 123.00' S= 0.1569 1/ Cc= 0.900

n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.73 cfs @ 13.50 hrs HW=133.42' TW=0.00' (Dynamic Tailwater)

- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
- 6=Culvert (Passes 1.73 cfs of 10.99 cfs potential flow)
- 2=Low Flow Pipe (Passes 0.20 cfs of 1.39 cfs potential flow)
- 1=Low Flow (Orifice Controls 0.20 cfs @ 5.74 fps)
- 4=Orifice #1 (Orifice Controls 1.53 cfs @ 3.07 fps)
- 5=Orifice #2 (Controls 0.00 cfs)

Summary for Link 406: DP-4

Inflow Area = 14.366 ac, 6.85% Impervious, Inflow Depth > 0.72" for 10-Year event
 Inflow = 1.73 cfs @ 13.50 hrs, Volume= 0.865 af
 Primary = 1.73 cfs @ 13.51 hrs, Volume= 0.865 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

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Type III 24-hr 25-Year Rainfall=6.10"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Pond 402: IP-Post-C Peak Elev=143.59' Storage=32,334 cf Inflow=19.19 cfs 2.006 af
cfs 0.442 af Primary=0.00 cfs 0.000 af Secondary=1.37 cfs 0.943 af Tertiary=2.17 cfs 0.622 af Outflow=3.96 cfs 2.006 af

Pond 405: DP-Post-F Peak Elev=133.88' Storage=20,972 cf Inflow=11.29 cfs 1.583 af
Outflow=4.29 cfs 1.582 af

Link 406: DP-4 Inflow=4.29 cfs 1.582 af
Primary=4.29 cfs 1.582 af

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Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Pond 402: IP-Post-C

Inflow Area = 11.150 ac, 0.00% Impervious, Inflow Depth = 2.16" for 25-Year event
 Inflow = 19.19 cfs @ 12.26 hrs, Volume= 2.006 af
 Outflow = 3.96 cfs @ 13.02 hrs, Volume= 2.006 af, Atten= 79%, Lag= 45.4 min
 Discarded = 0.42 cfs @ 13.02 hrs, Volume= 0.442 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 1.37 cfs @ 13.02 hrs, Volume= 0.943 af
 Tertiary = 2.17 cfs @ 13.02 hrs, Volume= 0.622 af

Routing by Sim-Route method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 143.59' @ 13.02 hrs Surf.Area= 17,623 sf Storage= 32,334 cf

Plug-Flow detention time= 125.0 min calculated for 2.006 af (100% of inflow)
 Center-of-Mass det. time= 125.0 min (992.4 - 867.4)

Volume	Invert	Avail.Storage	Storage Description
#1	141.50'	103,803 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
141.50	13,537	0	0
142.00	14,456	6,998	6,998
142.50	15,389	7,461	14,460
143.00	16,338	7,932	22,391
143.50	17,303	8,410	30,802
144.00	19,128	9,108	39,909
144.50	26,584	11,428	51,337
145.00	30,864	14,362	65,699
146.00	45,344	38,104	103,803

Device	Routing	Invert	Outlet Devices
#1	Primary	144.50'	10.0' long x 17.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	141.50'	1.020 in/hr Exfiltration over Surface area Phase-In= 0.01'
#3	Device 4	141.50'	6.00" Horiz. Low Flow C= 0.600 Limited to weir flow at low heads
#4	Secondary	140.50'	8.00" Round Low Flow Pipe L= 172.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 140.50' / 140.00' S= 0.0029 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#5	Device 6	142.30'	12.00" Vert. Orifice/Grate C= 0.600
#6	Tertiary	139.95'	8.00" Round Culvert L= 163.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.95' / 137.50' S= 0.0150 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf

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Type III 24-hr 25-Year Rainfall=6.10"

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Discarded OutFlow Max=0.42 cfs @ 13.02 hrs HW=143.59' (Free Discharge)

↳ **2=Exfiltration** (Exfiltration Controls 0.42 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=141.50' TW=132.00' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.37 cfs @ 13.02 hrs HW=143.59' TW=0.00' (Dynamic Tailwater)

↳ **4=Low Flow Pipe** (Passes 1.37 cfs of 1.56 cfs potential flow)

↳ **3=Low Flow** (Orifice Controls 1.37 cfs @ 6.96 fps)

Tertiary OutFlow Max=2.17 cfs @ 13.02 hrs HW=143.59' TW=133.85' (Dynamic Tailwater)

↳ **6=Culvert** (Barrel Controls 2.17 cfs @ 6.23 fps)

↳ **5=Orifice/Grate** (Passes 2.17 cfs of 3.36 cfs potential flow)

Summary for Pond 405: DP-Post-F

Inflow Area = 14.366 ac, 6.85% Impervious, Inflow Depth = 1.32" for 25-Year event
 Inflow = 11.29 cfs @ 12.15 hrs, Volume= 1.583 af
 Outflow = 4.29 cfs @ 12.71 hrs, Volume= 1.582 af, Atten= 62%, Lag= 33.1 min
 Primary = 4.29 cfs @ 12.71 hrs, Volume= 1.582 af

Routing by Sim-Route method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 133.88' @ 12.71 hrs Surf.Area= 12,332 sf Storage= 20,972 cf

Plug-Flow detention time= 227.1 min calculated for 1.582 af (100% of inflow)
 Center-of-Mass det. time= 227.0 min (1,063.4 - 836.4)

Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	35,656 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
132.00	10,061	0	0
133.00	11,246	10,654	10,654
134.00	12,487	11,867	22,520
135.00	13,785	13,136	35,656

Device	Routing	Invert	Outlet Devices
#1	Device 2	132.00'	2.50" Horiz. Low Flow C= 0.600 Limited to weir flow at low heads
#2	Device 6	131.00'	6.00" Round Low Flow Pipe L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 131.00' S= 0.0000 1/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#3	Primary	134.00'	10.0' long x 17.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#4	Device 6	132.75'	12.00" W x 6.00" H Vert. Orifice #1 C= 0.600
#5	Device 6	133.75'	48.00" Horiz. Orifice #2 C= 0.600 Limited to weir flow at low heads
#6	Primary	131.00'	18.00" Round Culvert L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 123.00' S= 0.1569 1/ Cc= 0.900

n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.29 cfs @ 12.71 hrs HW=133.88' TW=0.00' (Dynamic Tailwater)

↑ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **6=Culvert** (Passes 4.29 cfs of 12.40 cfs potential flow)

↑ **2=Low Flow Pipe** (Passes 0.22 cfs of 1.53 cfs potential flow)

↑ **1=Low Flow** (Orifice Controls 0.22 cfs @ 6.59 fps)

↑ **4=Orifice #1** (Orifice Controls 2.24 cfs @ 4.49 fps)

↑ **5=Orifice #2** (Weir Controls 1.82 cfs @ 1.16 fps)

Summary for Link 406: DP-4

Inflow Area = 14.366 ac, 6.85% Impervious, Inflow Depth > 1.32" for 25-Year event

Inflow = 4.29 cfs @ 12.71 hrs, Volume= 1.582 af

Primary = 4.29 cfs @ 12.72 hrs, Volume= 1.582 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs