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**Stormwater Management Plan**

**Bridge Park Block C**

**City of Dublin, Ohio**

**March 30, 2015**

Engineers

Surveyors

Planners

Scientists



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**Project Summary:**

Project Name: Bridge Park Block C  
Location: City of Dublin, Ohio  
Type: Stormwater Management Plan  
Reviewing Agency: City of Dublin

**Hydrologic Summary:**

Rainfall Data: City of Dublin Stormwater Management Design Manual

1-yr	2.20"
2-yr	2.63"
5-yr	3.24"
10-yr	3.74"
25-yr	4.44"
50-yr	5.02"
100-yr	5.63"

Rainfall Distribution: NRCS Type II 24 hour  
Detention Policy: City of Dublin  
Water Quality: City of Dublin, Ohio EPA  
Hydrology Modeling Program: HydroCAD 10.00

**Design Summary:**

Detention: Not required due to project being located within the "Bridge Street District East A Exemption Area"  
Water Quality: Bio-retention Basins, StormTech Isolator Rows  
Receiving Water Body: Scioto River

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### 1.0 INTRODUCTION

The following report provides a detailed analysis and design of the stormwater management plan for the Bridge Park Block C redevelopment project in the City of Dublin, Ohio. The proposed site is located northeast of the intersection of Dale Drive and Riverside Drive. The proposed project will disturb 3.47 acres of existing open space associated with the old driving range and several existing developed parcels along Dale Drive into a new commercial development. Of the 3.47 acres of disturbance, 2.96 acres will be routed to proposed bio-retention basins and StormTech Isolator Rows for quality control. This project is not required to provide quantity control due to it being located in the “Bridge Street District East A Exemption Area” as shown on Figure 2-1 within the City of Dublin Stormwater Management Design Manual. Runoff from the site discharges to the Scioto River which is located west of the project area.

### 2.0 HYDROLOGIC ANALYSIS

Hydrologic parameters such as Runoff Curve Number (RCN) and Time of Concentration were determined using standard Natural Resources Conservation Service (NRCS) methodology. The 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storm event discharge amounts were calculated using the NRCS TR-55 method. This analysis reflects the NRCS Type II distribution, 24-hr storm duration. Rainfall depths were obtained from the City of Dublin Stormwater Management Design Manual. The peak flow rates were computed using the HydroCAD 10.00 computer program.

### 3.0 EXISTING CONDITIONS ANALYSIS

The existing condition project area, as shown in Exhibit 1 in Appendix D, is comprised of two subareas, Existing 01 and Existing 02. Existing 01 consists of 2.86 acres of open space in Type “C” Soils (Milton Silt Loam, Miamian Silt Loam) which corresponds to a Runoff Curve Number of 74. Existing 01 outlines the area that is considered new development area.

Existing 02 consists of 0.61 acres of open space and commercial development in Type “C” Soils (Milton Silt Loam, Miamian Silt Loam) which corresponds to a Runoff Curve Number of 95 (based on the area being 89% impervious). Existing 02 is considered redevelopment area. The existing site characteristics are shown in Table 1.

**Table 1  
Existing Subarea Characteristics**

Subarea Identifier	Tributary Area (acres)	Land Usage	% Impervious	Composite Runoff Curve Number
Existing 01	2.86	Open Space – Considered New Development Area	0%	74
Existing 02	0.61	Open Space, Commercial – Considered Redevelopment Area	89%	95
<b>Total</b>	<b>3.47</b>	-	-	-

This project is not required to provide quantity control due to it being located in Bridge Park District A. Since there is no detention requirement no existing condition analysis with respect to peak flow rate calculations has been performed.



#### 4.0 PROPOSED CONDITIONS ANALYSIS

Exhibit 2, provided within Appendix D, shows the post-developed site condition. The post-developed site is comprised of four subareas, Subareas 01, 02, 03, and 04. Runoff from the proposed buildings will be routed to the proposed bio-retention basins (Subarea 01 to Bio Basin 01, Subarea 02 to Bio Basin 02, etc.) which are supplemented with StormTech Isolator Rows for post-construction water quality treatment. Subarea 01 will discharge to a proposed 15-inch storm sewer which discharges directly to the Scioto River. Subareas 02, 03 and 04 will discharge to a proposed 30-inch storm sewer along proposed Longshore Street located between Buildings C2 and C3 which discharge to the Scioto River. The post-developed subarea characteristics are summarized in Table 2. Table 3 shows the 100-year maximum water surface elevations.

**Table 2**  
**Post-developed Subarea Characteristics**

Subarea Identifier	Tributary Area (acres)	Land Usage	% Impervious	Composite Runoff Curve Number	Time of Concentration (min)
Subarea 01	0.44	Building C1, Bio-retention Basin	98%	97	5.0
Subarea 02	0.43	Building C2, Bio-retention Basin	96%	97	5.0
Subarea 03	0.45	Building C3, Bio-retention Basin	93%	96	5.0
Subarea 04	1.64	Building C4, Bio-retention Basin	97%	97	5.0
<b>Total</b>	<b>2.96</b>	-	-	-	-

**Table 3**  
**Proposed Bio-retention Basin Performance**

Bio-retention Basin	100-year Maximum W.S.E (feet)	Top of Bank Elevation (feet)	Storage Volume Utilized (cu-ft)
01	809.39	810.00	494
02	808.38	809.00	614
03*	815.21	816.00	843
04*	816.18	817.00	1,466

\*The maximum W.S.E and Top of Bank provided in Table 3 are the values for the most upstream tier of the multi-tiered bio-retention basin. Additional water surface elevations and top of banks for the multi-tiered basins are provided within the HydroCAD output.



## 5.0 OUTLET DESIGN

The proposed stormwater management features will utilize multiple outlet control structures to convey stormwater runoff. A description of each feature is included in this section. The features are organized by the subareas (Exhibit 2) they are located within and/or service.

The proposed bio-retention basins will be situated in an offline configuration from the building roof drains and downstream storm sewer system. The proposed roof drain will come into a “diversion” structure at an elevation below the bottom of the proposed bio-retention basin surface. Within the diversion structure, a weir wall will be placed to force stormwater runoff coming from the roof drain to back-up until it reaches the elevation of window which directs runoff to the bio-retention surface. As runoff continues to pond up in the diversion structure and bio-retention basin, it will overtop the weir wall and direct runoff to the downstream storm sewer system. Runoff that gets trapped behind the weir wall and lower than the window will be drained by a small diameter relief orifice at the bottom of the weir wall which directs the runoff to the downstream storm sewer on the opposite side of the wall.

The proposed StormTech Isolator Row systems will be located downstream of the bio-retention basins and will also be situated in an offline configuration to allow larger storm events to bypass the water quality feature. A weir wall be used to direct the water quality flow into StormTech Isolator Row which will then discharge the clean runoff on the downstream side of the weir wall.

### **Subarea 01 - Building C1**

The outlet for Bio Basin 01 will be located on the west side of the basin, Structure 3. As described above, runoff is backed-up by the 4-foot weir wall and discharges out of the 4-foot (wide) by 3-inch (high) window with an invert that is 2-inches above the surface of the bio-retention basin. Larger storm events will cause the runoff to pond up in the bio-retention basin and overtop the weir wall at an elevation of 809.00 feet which then discharges to a 12-inch outlet pipe. Runoff will continue through the downstream storm sewer until it reaches Structure 2 which is the diversion structure that routes runoff into StormTech 01. The weir wall in Structure 2 will route the water quality flow to the StormTech Isolator Row and all higher flows will overtop the 4-foot weir wall and discharge to the 15-inch outlet pipe which discharges to the Scioto River.

### **Bio Basin 01 Outlet Structure – Structure 3**

- Bottom of Stone layer– 805.33 feet
- Bottom of Basin (surface of Bio-retention media layer) – 808.33 feet
- Top of Basin – 810.00 feet
- Outlet to Bio-Retention Basin– 4-foot wide by 3-inch high window, invert at 808.50 feet
- 1<sup>st</sup> stage outlet – 0.5-inch relief orifice in weir wall, invert at 805.50 feet
- 2<sup>nd</sup> stage outlet – 4-foot wide by 3-inch high window, invert at 808.50 feet (allows water to enter and exit the bio-retention basin)
- 3<sup>rd</sup> stage outlet – 4-foot weir wall, top of crest at 809.00 feet (allows 8-inches of ponding in the bio-retention basins)
- Tailwater control: 12-inch outlet pipe with 1.0% slope, invert at 805.50 feet, controls 1<sup>st</sup> through 3<sup>rd</sup> stage outlets



### StormTech 01 (StormTech SC-740 Isolator Row) – Structure 2

- Bottom of StormTech Storage System – 800.85 feet
- Invert of StormTech SC-740 Chamber – 801.35 feet
- Top of StormTech SC-740 Chamber – 803.85 feet
- Top of StormTech Storage System – 804.35 feet
- Number of Chambers – 4
- A 4-foot weir, invert at 801.20 feet, directs runoff to a 6-inch opening, invert at 800.85 feet, that conveys the water quality flow into the StormTech Isolator Row
- Higher flows bypass the weir wall and continue to the downstream pipe
- Tailwater Control – 15-inch outlet pipe with 0.39% slope, invert at 800.85 feet

### Subarea 02 - Building C2

The proposed bio-retention basins will be situated in an offline configuration from the building roof drains and downstream storm sewer system. The proposed roof drain will come into a “diversion” structure at an elevation below the bottom of the proposed bio-retention basin surface. Within the diversion structure, a weir wall will be placed to force stormwater runoff coming from the roof drain to back-up until it reaches the elevation of window which directs runoff to the bio-retention surface. As runoff continues to pond up in the diversion structure and bio-retention basin, it will overtop the weir wall and direct runoff to the downstream storm sewer system. Runoff that gets trapped behind the weir wall and lower than the window will be drained by a small diameter relief orifice at the bottom of the weir wall which directs the runoff to the downstream storm sewer on the opposite side of the wall.

The proposed StormTech Isolator Row systems will be located downstream of the bio-retention basins and will also be situated in an offline configuration to allow larger storm events to bypass the water quality feature. A weir wall will be used to direct the water quality flow into StormTech Isolator Row which will then discharge the clean runoff on the downstream side of the weir wall.

The outlet for Bio Basin 01 will be located on the west side of the basin, Structure 5. As described above, runoff is backed-up by the 4-foot weir wall and discharges out of the 4-foot (wide) by 3-inch (high) window with an invert that is 2-inches above the surface of the bio-retention basin. Larger storm events will cause the runoff to pond up in the bio-retention basin and overtop the weir wall at an elevation of 808.00 feet which then discharges to a 12-inch outlet pipe. Runoff will continue through the downstream storm sewer until it reaches Structure 4 which is the diversion structure that routes runoff into StormTech 02. The weir wall in Structure 4 will route the water quality flow to the StormTech Isolator Row and all higher flows will overtop the 4-foot weir wall and discharge to the 15-inch outlet pipe which discharges to the Scioto River.

### Bio Basin 02 Outlet Structure – Structure 5

- Bottom of Stone layer– 804.33 feet
- Bottom of Basin (surface of Bio-retention media layer) – 807.33 feet
- Top of Basin – 809.00 feet
- Outlet to Bio-Retention Basin– 4-foot wide by 3-inch high window, invert at 807.50 feet
- 1<sup>st</sup> stage outlet – 0.5-inch relief orifice in weir wall, invert at 804.50 feet
- 2<sup>nd</sup> stage outlet – 4-foot wide by 3-inch high window, invert at 807.33 feet (allows water to enter and exit the bio-retention basin)
- 3<sup>rd</sup> stage outlet – 4-foot weir wall, top of crest at 808.00 feet (allows 8-inches of ponding in the bio-retention basins)



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- Tailwater control: 12-inch outlet pipe with 1.0% slope, invert at 804.50 feet, controls 1<sup>st</sup> through 3<sup>rd</sup> stage outlets

#### StormTech 02 (StormTech SC-740 Isolator Row) – Structure 4

- Bottom of StormTech Storage System – 799.82 feet
- Invert of StormTech SC-740 Chamber – 800.32 feet
- Top of StormTech SC-740 Chamber – 802.82 feet
- Top of StormTech Storage System – 803.32 feet
- Number of Chambers – 4
- A 4-foot weir, invert at 800.10 feet, directs runoff to a 6-inch opening, invert at 799.82 feet, that conveys the water quality flow into the StormTech Isolator Row
- Higher flows bypass the weir wall and continue to the downstream pipe
- Tailwater Control – 15-inch outlet pipe with 0.39% slope, invert at 799.82 feet

#### Subarea 03- Building C3

The proposed bio-retention basins will be situated in an offline configuration from the building roof drains and downstream storm sewer system. The proposed roof drain will come into a “diversion” structure at an elevation below the bottom of the proposed bio-retention basin surface. Within the diversion structure, a weir wall will be placed to force stormwater runoff coming from the roof drain to back-up until it reaches the elevation of window which directs runoff to the bio-retention surface. As runoff continues to pond up in the diversion structure and bio-retention basin, it will overtop the weir wall and direct runoff to the downstream storm sewer system. Runoff that gets trapped behind the weir wall and lower than the window will be drained by a small diameter relief orifice at the bottom of the weir wall which directs the runoff to the downstream storm sewer on the opposite side of the wall.

High flows that cannot be conveyed down the tiered system will cause the water to pond up in the bio-retention basin and overtop the weir wall at an elevation of 815.00 feet before discharging to a 12-inch outlet pipe which discharges to the proposed StormTech system.

The proposed StormTech Isolator Row systems will be located downstream of the bio-retention basins and will also be situated in an offline configuration to allow larger storm events to bypass the water quality feature. A weir wall be used to direct the water quality flow into StormTech Isolator Row which will then discharge the clean runoff on the downstream side of the weir wall.

#### Bio Basin 03 Diversion Structure – Structure 10\*

\*elevation listed are for the top tier in the bio-retention basin. For additional information on the tiers of the bio-retention basin reference the HydroCAD Output provided within Appendix C.

- Bottom of Stone layer– 811.33 feet
- Bottom of Basin (surface of Bio-retention media layer) – 814.33 feet
- Top of Basin – 816.00 feet
- Outlet to Bio-Retention Basin– 4-foot wide by 3-inch high window, invert at 814.50 feet
- 1<sup>st</sup> stage outlet – 0.5-inch relief orifice in weir wall, invert at 811.50 feet
- 2<sup>nd</sup> stage outlet – 4-foot wide by 3-inch high window, invert at 814.50 feet (allows water to enter and exit the bio-retention basin)
- 3<sup>rd</sup> stage outlet – 4-foot weir wall, top of crest at 815.00 feet (allows 8-inches of ponding in the bio-retention basins)



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- Tailwater control: 12-inch outlet pipe with 1.0% slope, invert at 811.50 feet, controls 1<sup>st</sup> through 3<sup>rd</sup> stage outlets

#### Bio Basin 03 Outlet Structure – Structure 7

- Bottom of Stone layer – 810.50 feet
- Bottom of Basin (surface of Bio-retention media layer) – 813.50 feet
- Top of Basin – 815.00 feet
- 1<sup>st</sup> stage outlet – Infiltration through Bio-retention Media, top of surface elevation 813.50 feet
- 2<sup>nd</sup> stage outlet - Neenah R4871 Grate, invert at 814.00 feet
- Tailwater control: 12-inch outlet pipe with 1.0% slope, invert at 810.50 feet, controls 1<sup>st</sup> through 2<sup>nd</sup> stage outlets

#### StormTech 03 (StormTech SC-740 Isolator Row) – Structure 6

- Bottom of StormTech Storage System – 799.68 feet
- Invert of StormTech SC-740 Chamber – 800.18 feet
- Top of StormTech SC-740 Chamber – 802.68 feet
- Top of StormTech Storage System – 803.18 feet
- Number of Chambers – 14
- A 4-foot weir, invert at 801.90 feet, directs runoff to a 6-inch opening, invert at 799.68 feet, that conveys the water quality flow into the StormTech Isolator Row
- Higher flows bypass the weir wall and continue to the downstream pipe
- Tailwater Control – 15-inch outlet pipe with 0.39% slope, invert at 799.68 feet

#### Subarea 04 - Building C4

The proposed bio-retention basins will be situated in an offline configuration from the building roof drains and downstream storm sewer system. The proposed roof drain will come into a “diversion” structure at an elevation below the bottom of the proposed bio-retention basin surface. Within the diversion structure, a weir wall will be placed to force stormwater runoff coming from the roof drain to back-up until it reaches the elevation of window which directs runoff to the bio-retention surface. As runoff continues to pond up in the diversion structure and bio-retention basin, it will overtop the weir wall and direct runoff to the downstream storm sewer system. Runoff that gets trapped behind the weir wall and lower than the window will be drained by a small diameter relief orifice at the bottom of the weir wall which directs the runoff to the downstream storm sewer on the opposite side of the wall.

High flows that cannot be conveyed down the tiered system will cause the water to pond up in the bio-retention basin and overtop the weir wall at an elevation of 815.00 feet before discharging to a 12-inch outlet pipe which discharges to the proposed StormTech system.

The proposed StormTech Isolator Row systems will be located downstream of the bio-retention basins and will also be situated in an offline configuration to allow larger storm events to bypass the water quality feature. A weir wall will be used to direct the water quality flow into StormTech Isolator Row which will then discharge the clean runoff on the downstream side of the weir wall.



#### Bio Basin 04 Diversion Structure – Structure 9\*

\*elevation listed are for the top tier in the bio-retention basin. For additional information on the tiers of the bio-retention basin reference the HydroCAD Output provided within Appendix C.

- Bottom of Stone layer– 812.33 feet
- Bottom of Basin (surface of Bio-retention media layer) – 815.33 feet
- Top of Basin – 817.00 feet
- Outlet to Bio-Retention Basin– 4-foot wide by 3-inch high window, invert at 815.50 feet
- 1<sup>st</sup> stage outlet – 0.5-inch relief orifice in weir wall, invert at 812.50 feet
- 2<sup>nd</sup> stage outlet – 4-foot wide by 3-inch high window, invert at 814.33 feet (allows water to enter and exit the bio-retention basin)
- 3<sup>rd</sup> stage outlet – 4-foot weir wall, top of crest at 816.00 feet (allows 8-inches of ponding in the bio-retention basins)
- Tailwater control: 12-inch outlet pipe with 1.0% slope, invert at 812.50 feet, controls 1<sup>st</sup> through 3<sup>rd</sup> stage outlets

#### Bio Basin 04 Outlet Structure – Structure 8

- Bottom of Stone layer – 810.50 feet
- Bottom of Basin (surface of Bio-retention media layer) – 813.50 feet
- Top of Basin – 815.00 feet
- 1<sup>st</sup> stage outlet – Infiltration through Bio-retention Media, top of surface elevation 813.50 feet
- 2<sup>nd</sup> stage outlet - Neenah R4871 Grate, invert at 814.00 feet
- Tailwater control: 12-inch outlet pipe with 1.0% slope, invert at 810.50 feet, controls 1<sup>st</sup> through 2<sup>nd</sup> stage outlets

#### StormTech 03 (StormTech SC-740 Isolator Row) – Structure 6

- Bottom of StormTech Storage System – 799.68 feet
- Invert of StormTech SC-740 Chamber – 800.18 feet
- Top of StormTech SC-740 Chamber – 802.68 feet
- Top of StormTech Storage System – 803.18 feet
- Number of Chambers – 14
- A 4-foot weir, invert at 801.90 feet, directs runoff to a 6-inch opening, invert at 799.68 feet, that conveys the water quality flow into the StormTech Isolator Row
- Higher flows bypass the weir wall and continue to the downstream pipe
- Tailwater Control – 15-inch outlet pipe with 0.39% slope, invert at 799.68 feet

## **6.0 POST-CONSTRUCTION WATER QUALITY**

The proposed project is classified as a redevelopment project per the EPA General Permit. Strategies to meet the requirements include treating at least 20% of the existing impervious area; reduce the impervious area by 20%, or a combination of the two. It is also required that 100% of the water quality volume for new impervious area be treated. The project will treat more than 20% of the required water quality volume from existing impervious/pervious areas and 100% of new impervious areas to meet water quality requirements. The project area associated with the redevelopment condition is 3.47 acres of which 0.54 acres is existing impervious area and 3.34 acres is proposed impervious area. The calculated water quality volume for the entire project area (3.47 acres) is 6,459 cubic feet. Water quality calculations are provided within Appendix B.

Impervious areas within the development are tributary to the proposed bio-retention basins and StormTech chambers. To determine the amount of surface area that is required for the bio-retention basins, the water quality volume for the tributary area was calculated. Per the City of Dublin Stormwater Management Design Manual, the bio-retention basin areas required are provided below.

**Table 4  
Bio-retention Surface Area Requirements**

Bio-retention Basin	Subarea Identifier	Tributary area (acres)	Calculated Water Quality Volume (ac-ft)	Required Bio-retention Surface Area (ft <sup>2</sup> )	Provided Bio-retention Surface Area (ft <sup>2</sup> )
01	Subarea 01	0.44	0.024	808	467
02	Subarea 02	0.43	0.022	759	584
03	Subarea 03	0.45	0.022	748	1,120
04	Subarea 04	1.64	0.086	2,953	2,034
<b>Total</b>	-	<b>2.96</b>	<b>0.154</b>	<b>5,268</b>	<b>4,205</b>

Due to the bio-retention basins providing insufficient surface area to treat the required water quality volume the bio-retention basins will be supplemented with StormTech Isolator rows situated downstream of the bio-retention basins. Due to site constraints and insufficient room for a traditional water quality BMP, the StormTech Isolator Row will be utilized as a supplemental BMP to assist with meeting the 80% TSS Removal requirement. The use of a StormTech Isolator row as a water quality BMP has been justified by independent testing. Included within Appendix B of this report is a document presenting the results of TSS removal testing of the StormTech Isolator Row. There is no drawdown requirement for this site due to the project being classified as a “small construction activity” as defined by the OEPA.

The StormTech Isolator Row is designed to trap sediment and pollutants. The Isolator Row is wrapped in geo-textile fabrics, which keep sediment and pollutants within the Isolator Row where they will be removed periodically based on a proposed maintenance schedule (typically every 6-12 months, the frequency based on first year observations). The water quality flow that is generated from the water quality event will be routed to the Isolator Row where it will be filtered before it can reach the proposed outlet control structure.

To calculate a water quality flow for structure sizing, a HydroCAD model was created to determine the peak runoff rate based on a rainfall depth of 0.75”. Accurate modeling of runoff from a common rainfall event was accomplished by using the 2-hour duration, 0-10 mi<sup>2</sup>, 1<sup>st</sup> Quartile, 50% Huff distribution with a rainfall depth of 0.75”. Adjustments to the Runoff Curve Number were made so as to produce a runoff volume equal to, or slightly higher than, the calculated water quality volume. A curve number of 99 was found to generate the calculated water quality volumes (runoff volumes).

The SC-740 chamber is recommended for this application due to the restricted amount of space available. Each chamber is 85.4 inches long with a width of 51 inches. Each chamber is rated to treat 2.5 gallons per minute per square foot of chamber bed area. The SC-740 has a chamber bed area of 30.3 square feet per chamber which is being provided in an offline configuration as shown on Exhibit 2. Water quality calculations to determine the number of required chambers and information on the SC-740 chamber are provided in Appendix B and are summarized in Table 5 below.



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**Table 5**  
**StormTech Sizing Calculations**

Subarea Identifier	StormTech Identifier	Tributary area (acres)	Calculated Water Quality Volume (ac-ft)	Water Quality Flow (cfs)	Required Number of SC-740 Chambers	Provided Number of SC-740 Chambers
Subarea 01	01	0.44	0.024	0.42	3	4
Subarea 02	02	0.43	0.022	0.41	3	4
Subarea 03	03	0.45	0.022	0.47	3	14*
Subarea 04	03	1.64	0.086	1.56	10	
<b>Total</b>	-	<b>2.96</b>	<b>0.154</b>	-	-	-

\*Subareas 03 and 04 are treated by a single StormTech system, StormTech 03.

The StormTech system will treat a tributary area of 2.96 acres (Subarea 01, 02, 03, & 04). The required water quality volume to be treated for the 3.47 acres of disturbance is 6,459 cubic feet. The StormTech Isolator Row will treat a water quality volume of 0.154 ac-ft or 6,708 cubic feet. The water quality calculations are included in Appendix B.

## 7.0 CONCLUSION

The proposed stormwater management plan for the Bridge Park Block C meets all requirements for both the City of Dublin and the Ohio EPA.

APPENDIX A:  
Storm Sewer Calculations









APPENDIX B:  
Water Quality Calculations

Water Quality Volume Calculation Spreadsheet

Project Name: Bridge Park Block C

Limits of Disturbance = 3.47 acres  
Total Tributary Area = 3.11 acres

Redevelopment Area = 0.61 acres (0.54 acres of ex. Impervious area)  
New Impervious Area =  $\frac{2.86 \text{ acres}}{3.470 \text{ acres}}$

Per redevelopment requirements only 20% of water quality volume for the existing impervious area and open space will require treatment:

Existing Impervious Area and Open Space (Redevelopment Area)

Area = 0.61 acres  
% imp = 0.89  
C = 0.72  
WQv = 0.027 ac-ft  
or... 1189 ft<sup>3</sup>  
20% of WQv = 238 ft<sup>3</sup>

Per redevelopment requirements, 100% of water quality volume for new impervious area will require treatment:

New Impervious Area

Area = 2.86 acres  
% imp = 0.95  
C = 0.80  
WQv = 0.143 ac-ft  
or... 6221 ft<sup>3</sup>  
100% of WQv = 6221 ft<sup>3</sup>

Total Required WQv = 6459 ft<sup>3</sup>

WQ Calculation Summary

Required WQv = 6459 ft<sup>3</sup>

Provided WQv = 6708 ft<sup>3</sup>

Water quality volume calculated using the Ohio EPA formula CPA/12

The "C" coefficient was calculated using the ASCE method

$$C = 0.858i^3 - 0.778i^2 + 0.774i + 0.04$$

Ohio EPA formula

$$WQv = CPA/12$$

A = area (acres)

P = 0.75"

C = (see above)

Water Quality Volume Calculation Spreadsheet

**Project Name:** Bridge Park Block C

**Subarea 01**

Area = 0.44 acres  
 % imp = 0.98  
 C = 0.86  
**WQv = 0.024 ac-ft**  
**WQf = 0.42 cfs**

**Subarea 02**

Area = 0.52 acres  
 % imp = 0.96  
 C = 0.82  
**WQv = 0.027 ac-ft**  
**WQf = 0.41 cfs**

**Subarea 03**

Area = 1.68 acres  
 % imp = 0.97  
 C = 0.84  
**WQv = 0.088 ac-ft**  
**WQf = 1.56 cfs**

**Subarea 04**

Area = 0.47 acres  
 % imp = 0.94  
 C = 0.79  
**WQv = 0.023 ac-ft**  
**WQf = 0.47 cfs**

Water quality volume calculated using the Ohio EPA formula CPA/12

The "C" coefficient was calculated using the ASCE method

$$C = 0.858i^3 - 0.778i^2 + 0.774i + 0.04$$

Ohio EPA formula

$$WQv = CPA/12$$

A = area (acres)

$$P = 0.75"$$

C = (see previous page)

Surface Area Calculations

**Bio Basin 01**

**Subarea 01**

WQv = 0.024 ac-ft  
 d = 2.00 ft  
 K =  $1.2 \times 10^{-5}$  ft/s  
 T = 24 hr  
 h = 0.50 ft  
 A = 0.018 acres  
 or  
**A = 792 ft<sup>2</sup>**

Area required = 

792
-----

 ft<sup>2</sup>  
 Area provided = 

467
-----

 ft<sup>2</sup>

**Bio Basin 02**

**Subarea 02**

WQv = 0.027 ac-ft  
 d = 2.00 ft  
 K =  $1.2 \times 10^{-5}$  ft/s  
 T = 24 hr  
 h = 0.50 ft  
 A = 0.021 acres  
 or  
**A = 899 ft<sup>2</sup>**

Area required = 

899
-----

 ft<sup>2</sup>  
 Area provided = 

584
-----

 ft<sup>2</sup>

**Bio Basin 03**

**Subarea 03**

WQv = 0.088 ac-ft  
 d = 2.00 ft  
 K =  $1.2 \times 10^{-5}$  ft/s  
 T = 24 hr  
 h = 0.50 ft  
 A = 0.068 acres  
 or  
**A = 2,964 ft<sup>2</sup>**

Area required = 

2964
------

 ft<sup>2</sup>  
 Area provided = 

2034
------

 ft<sup>2</sup>

**Bio Basin 04**

**Subarea 04**

WQv = 0.023 ac-ft  
 d = 2.00 ft  
 K =  $1.2 \times 10^{-5}$  ft/s  
 T = 24 hr  
 h = 0.50 ft  
 A = 0.018 acres  
 or  
**A = 781 ft<sup>2</sup>**

Area required = 

781
-----

 ft<sup>2</sup>  
 Area provided = 

1120
------

 ft<sup>2</sup>

$$A = WQv * d_s / (3600 * K * (h_s + d_s) * t_s)$$

d<sub>s</sub> = planting media depth = 2 ft

h<sub>s</sub> = average depth water = 1/2 maximum depth = 0.90 feet/2 = 0.45 feet

K = planting media permeability =  $1.2 \times 10^{-5}$  ft/sec

t<sub>s</sub> = drawdown time = 24 hours

## Water Quality Peak Flow Calculation Spreadsheet

Project Name: Bridge Park Block C

### *StormTech Isolator Row*

Use NRCS method to determine peak flow during 2-hour duration, 0.75" rainfall event  
Impervious and pervious area runoff volume modeled seperately to more accurately predict peak flow  
Rainfall distribution, Huff, 1st quartile, 2-hour duration storm, 0-10 sq. mile, 50% probability curve

#### **Subarea 01 Isolator Row**

Water Quality Peak Flow =	0.42 cfs	
Water Quality Volume =	0.024 ac-ft	
Required Isolator Area =	75.3984 sq. ft.	(2.5 gpm/ft <sup>2</sup> )
Chamber Model =	SC-740	
Chamber floor area =	30.3 sq. ft.	(per chamber)
Required Chambers =	3	
Provided Chambers =	4	

#### **Subarea 02 Isolator Row**

Water Quality Peak Flow =	0.41 cfs	
Water Quality Volume =	0.027 ac-ft	
Required Isolator Area =	73.6 sq. ft.	(2.5 gpm/ft <sup>2</sup> )
Chamber Model =	SC-740	
Chamber floor area =	30.3 sq. ft.	(per chamber)
Required Chambers =	3	
Provided Chambers =	4	

#### **Subarea 03 Isolator Row**

Water Quality Peak Flow =	1.56 cfs	
Water Quality Volume =	0.088 ac-ft	
Required Isolator Area =	280.051 sq. ft.	(2.5 gpm/ft <sup>2</sup> )
Chamber Model =	SC-740	
Chamber floor area =	30.3 sq. ft.	(per chamber)
Required Chambers =	10	
Provided Chambers =	10	

#### **Subarea 04 Isolator Row**

Water Quality Peak Flow =	0.47 cfs	
Water Quality Volume =	0.023 ac-ft	
Required Isolator Area =	84.4 sq. ft.	(2.5 gpm/ft <sup>2</sup> )
Chamber Model =	SC-740	
Chamber floor area =	30.3 sq. ft.	(per chamber)
Required Chambers =	3	
Provided Chambers =	4	

APPENDIX C:  
HydroCAD Output



Pre-developed 01



Pre-developed 02



WQf 01



Subarea 01



Bio Basin 01



StormTech 01



WQf 02



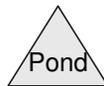
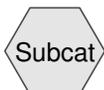
Subarea 02



Bio Basin 02



StormTech 02



Routing Diagram for 20131481 - A

Prepared by Symanetc, Printed 3/30/2015

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.870	99	(25S, 26S)
2.930	74	>75% Grass cover, Good, HSG C (8S, 9S)
0.540	98	Paved parking, HSG C (9S)
0.030	74	bio basin (5S, 27S)
0.930	98	impervious (5S, 27S)

**Summary for Subcatchment 5S: Subarea 02**

Runoff = 1.36 cfs @ 11.95 hrs, Volume= 0.081 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
* 0.500	98	impervious
* 0.020	74	bio basin
0.520	97	Weighted Average
0.020		3.85% Pervious Area
0.500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 8S: Pre-developed 01**

Runoff = 1.91 cfs @ 11.98 hrs, Volume= 0.107 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
2.860	74	>75% Grass cover, Good, HSG C
2.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 9S: Pre-developed 02**

Runoff = 1.53 cfs @ 11.95 hrs, Volume= 0.085 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.070	74	>75% Grass cover, Good, HSG C
0.610	95	Weighted Average
0.070		11.48% Pervious Area
0.540		88.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 25S: WQf 01**

Runoff = 1.21 cfs @ 11.94 hrs, Volume= 0.076 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
* 0.440	99	
0.440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 26S: WQf 02**

Runoff = 1.18 cfs @ 11.94 hrs, Volume= 0.075 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
* 0.430	99	
0.430		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 27S: Subarea 01**

Runoff = 1.15 cfs @ 11.95 hrs, Volume= 0.068 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
* 0.430	98	impervious
* 0.010	74	bio basin
0.440	97	Weighted Average
0.010		2.27% Pervious Area
0.430		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Pond 19P: Bio Basin 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 1.87" for 1 year event  
 Inflow = 1.36 cfs @ 11.95 hrs, Volume= 0.081 af  
 Outflow = 1.39 cfs @ 11.97 hrs, Volume= 0.081 af, Atten= 0%, Lag= 1.4 min  
 Primary = 1.39 cfs @ 11.97 hrs, Volume= 0.081 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 808.22' @ 11.97 hrs Surf.Area= 584 sf Storage= 522 cf

Plug-Flow detention time= 123.5 min calculated for 0.081 af (100% of inflow)  
 Center-of-Mass det. time= 124.4 min ( 896.3 - 771.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	807.33'	975 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
807.33	584	0	0
809.00	584	975	975

Device	Routing	Invert	Outlet Devices
#1	Device 2	804.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	804.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	808.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.29 cfs @ 11.97 hrs HW=808.21' (Free Discharge)  
 ↳ **2=Culvert** (Passes 1.29 cfs of 5.64 cfs potential flow)  
 ↳ ↳ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.25 fps)  
 ↳ ↳ ↳ **3=Custom Weir/Orifice** (Weir Controls 1.27 cfs @ 1.51 fps)

**Summary for Pond 28P: Bio Basin 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 1.87" for 1 year event  
 Inflow = 1.15 cfs @ 11.95 hrs, Volume= 0.068 af  
 Outflow = 1.18 cfs @ 11.97 hrs, Volume= 0.068 af, Atten= 0%, Lag= 1.3 min  
 Primary = 1.18 cfs @ 11.97 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 809.20' @ 11.97 hrs Surf.Area= 467 sf Storage= 406 cf

Plug-Flow detention time= 108.1 min calculated for 0.068 af (100% of inflow)

**20131481 - A**

Prepared by Symanetc

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Type II 24-hr 1 year Rainfall=2.20"

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Center-of-Mass det. time= 108.7 min ( 880.6 - 771.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	808.33'	780 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
808.33	467	0	0
810.00	467	780	780

Device	Routing	Invert	Outlet Devices
#1	Device 2	805.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	805.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.50' / 804.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	809.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.09 cfs @ 11.97 hrs HW=809.19' (Free Discharge)

- ↑ **2=Culvert** (Passes 1.09 cfs of 5.62 cfs potential flow)
- ↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.22 fps)
- ↑ **3=Custom Weir/Orifice** (Weir Controls 1.08 cfs @ 1.42 fps)

**Summary for Pond 36P: StormTech 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 1.87" for 1 year event  
 Inflow = 1.18 cfs @ 11.97 hrs, Volume= 0.068 af  
 Outflow = 1.18 cfs @ 11.97 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.47 cfs @ 11.96 hrs, Volume= 0.056 af  
 Secondary = 0.70 cfs @ 11.97 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 801.35' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.20'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	800.85'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	800.85'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 800.85' / 800.75' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.46 cfs @ 11.96 hrs HW=801.33' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.46 cfs @ 2.37 fps)

**Secondary OutFlow** Max=0.65 cfs @ 11.97 hrs HW=801.34' (Free Discharge)

↳ **3=Culvert** (Passes 0.65 cfs of 0.71 cfs potential flow)

↳ **1=Custom Weir/Orifice** (Weir Controls 0.65 cfs @ 1.21 fps)

### Summary for Pond 37P: StormTech 02

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 1.87" for 1 year event  
 Inflow = 1.39 cfs @ 11.97 hrs, Volume= 0.081 af  
 Outflow = 1.39 cfs @ 11.97 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.51 cfs @ 11.97 hrs, Volume= 0.062 af  
 Secondary = 0.88 cfs @ 11.97 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 800.36' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	800.10'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.82'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.82'	<b>15.0" Round Culvert</b> L= 50.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.82' / 799.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.48 cfs @ 11.97 hrs HW=800.33' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.48 cfs @ 2.47 fps)

**Secondary OutFlow** Max=0.80 cfs @ 11.97 hrs HW=800.33' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 0.80 cfs @ 2.49 fps)

↳ **1=Custom Weir/Orifice** (Passes 0.80 cfs of 1.48 cfs potential flow)

**Summary for Subcatchment 5S: Subarea 02**

Runoff = 1.65 cfs @ 11.94 hrs, Volume= 0.099 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
* 0.500	98	impervious
* 0.020	74	bio basin
0.520	97	Weighted Average
0.020		3.85% Pervious Area
0.500		96.15% Impervious Area

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

**Summary for Subcatchment 8S: Pre-developed 01**

Runoff = 3.05 cfs @ 11.98 hrs, Volume= 0.163 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
2.860	74	>75% Grass cover, Good, HSG C
2.860		100.00% Pervious Area

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

**Summary for Subcatchment 9S: Pre-developed 02**

Runoff = 1.83 cfs @ 11.95 hrs, Volume= 0.106 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.070	74	>75% Grass cover, Good, HSG C
0.610	95	Weighted Average
0.070		11.48% Pervious Area
0.540		88.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 25S: WQf 01**

Runoff = 1.44 cfs @ 11.94 hrs, Volume= 0.092 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
* 0.440	99	
0.440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 26S: WQf 02**

Runoff = 1.41 cfs @ 11.94 hrs, Volume= 0.090 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
* 0.430	99	
0.430		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 27S: Subarea 01**

Runoff = 1.40 cfs @ 11.94 hrs, Volume= 0.084 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
* 0.430	98	impervious
* 0.010	74	bio basin
0.440	97	Weighted Average
0.010		2.27% Pervious Area
0.430		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Pond 19P: Bio Basin 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 2.29" for 2 year event  
 Inflow = 1.65 cfs @ 11.94 hrs, Volume= 0.099 af  
 Outflow = 1.68 cfs @ 11.97 hrs, Volume= 0.099 af, Atten= 0%, Lag= 1.4 min  
 Primary = 1.68 cfs @ 11.97 hrs, Volume= 0.099 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 808.25' @ 11.97 hrs Surf.Area= 584 sf Storage= 540 cf

Plug-Flow detention time= 106.4 min calculated for 0.099 af (100% of inflow)  
 Center-of-Mass det. time= 106.1 min ( 872.8 - 766.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	807.33'	975 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
807.33	584	0	0
809.00	584	975	975

Device	Routing	Invert	Outlet Devices
#1	Device 2	804.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	804.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	808.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.56 cfs @ 11.97 hrs HW=808.24' (Free Discharge)  
 ↑ **2=Culvert** (Passes 1.56 cfs of 5.66 cfs potential flow)  
 ↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.29 fps)  
 ↑ **3=Custom Weir/Orifice** (Weir Controls 1.55 cfs @ 1.61 fps)

**Summary for Pond 28P: Bio Basin 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 2.29" for 2 year event  
 Inflow = 1.40 cfs @ 11.94 hrs, Volume= 0.084 af  
 Outflow = 1.43 cfs @ 11.97 hrs, Volume= 0.084 af, Atten= 0%, Lag= 1.3 min  
 Primary = 1.43 cfs @ 11.97 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 809.23' @ 11.96 hrs Surf.Area= 467 sf Storage= 419 cf

Plug-Flow detention time= 94.3 min calculated for 0.084 af (100% of inflow)

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Type II 24-hr 2 year Rainfall=2.63"

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Center-of-Mass det. time= 94.0 min ( 860.7 - 766.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	808.33'	780 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
808.33	467	0	0
810.00	467	780	780

Device	Routing	Invert	Outlet Devices
#1	Device 2	805.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	805.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.50' / 804.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	809.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.32 cfs @ 11.97 hrs HW=809.21' (Free Discharge)

↑ **2=Culvert** (Passes 1.32 cfs of 5.64 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.25 fps)

↑ **3=Custom Weir/Orifice** (Weir Controls 1.31 cfs @ 1.52 fps)

**Summary for Pond 36P: StormTech 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 2.29" for 2 year event  
 Inflow = 1.43 cfs @ 11.97 hrs, Volume= 0.084 af  
 Outflow = 1.43 cfs @ 11.97 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.52 cfs @ 11.97 hrs, Volume= 0.066 af  
 Secondary = 0.91 cfs @ 11.97 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 801.40' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.20'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	800.85'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	800.85'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 800.85' / 800.75' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.50 cfs @ 11.97 hrs HW=801.38' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.50 cfs @ 2.54 fps)

**Secondary OutFlow** Max=0.82 cfs @ 11.97 hrs HW=801.38' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 0.82 cfs @ 2.47 fps)

↳ **1=Custom Weir/Orifice** (Passes 0.82 cfs of 0.98 cfs potential flow)

### Summary for Pond 37P: StormTech 02

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 2.29" for 2 year event  
 Inflow = 1.68 cfs @ 11.97 hrs, Volume= 0.099 af  
 Outflow = 1.68 cfs @ 11.97 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.57 cfs @ 11.97 hrs, Volume= 0.075 af  
 Secondary = 1.11 cfs @ 11.97 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 800.43' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	800.10'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.82'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.82'	<b>15.0" Round Culvert</b> L= 50.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.82' / 799.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.54 cfs @ 11.97 hrs HW=800.40' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.54 cfs @ 2.77 fps)

**Secondary OutFlow** Max=1.01 cfs @ 11.97 hrs HW=800.40' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 1.01 cfs @ 2.65 fps)

↳ **1=Custom Weir/Orifice** (Passes 1.01 cfs of 2.18 cfs potential flow)

**Summary for Subcatchment 5S: Subarea 02**

Runoff = 2.06 cfs @ 11.94 hrs, Volume= 0.126 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
* 0.500	98	impervious
* 0.020	74	bio basin
0.520	97	Weighted Average
0.020		3.85% Pervious Area
0.500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 8S: Pre-developed 01**

Runoff = 4.86 cfs @ 11.97 hrs, Volume= 0.254 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
2.860	74	>75% Grass cover, Good, HSG C
2.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 9S: Pre-developed 02**

Runoff = 2.32 cfs @ 11.95 hrs, Volume= 0.136 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.070	74	>75% Grass cover, Good, HSG C
0.610	95	Weighted Average
0.070		11.48% Pervious Area
0.540		88.52% Impervious Area

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Type II 24-hr 5 year Rainfall=3.24"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 25S: WQf 01**

Runoff = 1.78 cfs @ 11.94 hrs, Volume= 0.114 af, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
* 0.440	99	
0.440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 26S: WQf 02**

Runoff = 1.74 cfs @ 11.94 hrs, Volume= 0.112 af, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
* 0.430	99	
0.430		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 27S: Subarea 01**

Runoff = 1.74 cfs @ 11.94 hrs, Volume= 0.106 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
* 0.430	98	impervious
* 0.010	74	bio basin
0.440	97	Weighted Average
0.010		2.27% Pervious Area
0.430		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Pond 19P: Bio Basin 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 2.90" for 5 year event  
 Inflow = 2.06 cfs @ 11.94 hrs, Volume= 0.126 af  
 Outflow = 2.10 cfs @ 11.97 hrs, Volume= 0.126 af, Atten= 0%, Lag= 1.4 min  
 Primary = 2.10 cfs @ 11.97 hrs, Volume= 0.126 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 808.30' @ 11.97 hrs Surf.Area= 584 sf Storage= 564 cf

Plug-Flow detention time= 89.4 min calculated for 0.126 af (100% of inflow)  
 Center-of-Mass det. time= 89.1 min ( 850.2 - 761.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	807.33'	975 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
807.33	584	0	0
809.00	584	975	975

Device	Routing	Invert	Outlet Devices
#1	Device 2	804.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	804.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	808.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.94 cfs @ 11.97 hrs HW=808.28' (Free Discharge)  
 ↑ **2=Culvert** (Passes 1.94 cfs of 5.69 cfs potential flow)  
 ↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.33 fps)  
 ↑ **3=Custom Weir/Orifice** (Weir Controls 1.93 cfs @ 1.73 fps)

**Summary for Pond 28P: Bio Basin 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 2.90" for 5 year event  
 Inflow = 1.74 cfs @ 11.94 hrs, Volume= 0.106 af  
 Outflow = 1.78 cfs @ 11.96 hrs, Volume= 0.106 af, Atten= 0%, Lag= 1.2 min  
 Primary = 1.78 cfs @ 11.96 hrs, Volume= 0.106 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 809.26' @ 11.96 hrs Surf.Area= 467 sf Storage= 436 cf

Plug-Flow detention time= 79.4 min calculated for 0.106 af (100% of inflow)

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Type II 24-hr 5 year Rainfall=3.24"

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Center-of-Mass det. time= 79.1 min ( 840.2 - 761.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	808.33'	780 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
808.33	467	0	0
810.00	467	780	780

Device	Routing	Invert	Outlet Devices
#1	Device 2	805.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	805.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.50' / 804.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	809.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.64 cfs @ 11.96 hrs HW=809.25' (Free Discharge)

- ↑ **2=Culvert** (Passes 1.64 cfs of 5.67 cfs potential flow)
- ↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.30 fps)
- ↑ **3=Custom Weir/Orifice** (Weir Controls 1.63 cfs @ 1.63 fps)

**Summary for Pond 36P: StormTech 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 2.90" for 5 year event  
 Inflow = 1.78 cfs @ 11.96 hrs, Volume= 0.106 af  
 Outflow = 1.78 cfs @ 11.96 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.59 cfs @ 11.97 hrs, Volume= 0.082 af  
 Secondary = 1.19 cfs @ 11.96 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 801.49' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.20'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	800.85'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	800.85'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 800.85' / 800.75' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.57 cfs @ 11.97 hrs HW=801.46' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.57 cfs @ 2.89 fps)

**Secondary OutFlow** Max=1.08 cfs @ 11.96 hrs HW=801.46' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 1.08 cfs @ 2.65 fps)

↳ **1=Custom Weir/Orifice** (Passes 1.08 cfs of 1.72 cfs potential flow)

### Summary for Pond 37P: StormTech 02

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 2.90" for 5 year event  
 Inflow = 2.10 cfs @ 11.97 hrs, Volume= 0.126 af  
 Outflow = 2.10 cfs @ 11.97 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.65 cfs @ 11.96 hrs, Volume= 0.092 af  
 Secondary = 1.45 cfs @ 11.97 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 800.53' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	800.10'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.82'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.82'	<b>15.0" Round Culvert</b> L= 50.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.82' / 799.62' S= 0.0040 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.61 cfs @ 11.96 hrs HW=800.49' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.61 cfs @ 3.13 fps)

**Secondary OutFlow** Max=1.33 cfs @ 11.97 hrs HW=800.50' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 1.33 cfs @ 2.85 fps)

↳ **1=Custom Weir/Orifice** (Passes 1.33 cfs of 3.25 cfs potential flow)

**Summary for Subcatchment 5S: Subarea 02**

Runoff = 2.39 cfs @ 11.94 hrs, Volume= 0.147 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
* 0.500	98	impervious
* 0.020	74	bio basin
0.520	97	Weighted Average
0.020		3.85% Pervious Area
0.500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 8S: Pre-developed 01**

Runoff = 6.47 cfs @ 11.97 hrs, Volume= 0.336 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
2.860	74	>75% Grass cover, Good, HSG C
2.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 9S: Pre-developed 02**

Runoff = 2.71 cfs @ 11.95 hrs, Volume= 0.161 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.070	74	>75% Grass cover, Good, HSG C
0.610	95	Weighted Average
0.070		11.48% Pervious Area
0.540		88.52% Impervious Area

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

**Summary for Subcatchment 25S: WQf 01**

Runoff = 2.06 cfs @ 11.94 hrs, Volume= 0.133 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
* 0.440	99	
0.440		100.00% Impervious Area

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

**Summary for Subcatchment 26S: WQf 02**

Runoff = 2.01 cfs @ 11.94 hrs, Volume= 0.130 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
* 0.430	99	
0.430		100.00% Impervious Area

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

**Summary for Subcatchment 27S: Subarea 01**

Runoff = 2.02 cfs @ 11.94 hrs, Volume= 0.124 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
* 0.430	98	impervious
* 0.010	74	bio basin
0.440	97	Weighted Average
0.010		2.27% Pervious Area
0.430		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Pond 19P: Bio Basin 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 3.39" for 10 year event  
 Inflow = 2.39 cfs @ 11.94 hrs, Volume= 0.147 af  
 Outflow = 2.44 cfs @ 11.97 hrs, Volume= 0.147 af, Atten= 0%, Lag= 1.3 min  
 Primary = 2.44 cfs @ 11.97 hrs, Volume= 0.147 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 808.33' @ 11.96 hrs Surf.Area= 584 sf Storage= 582 cf

Plug-Flow detention time= 78.4 min calculated for 0.147 af (100% of inflow)  
 Center-of-Mass det. time= 79.4 min ( 836.9 - 757.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	807.33'	975 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
807.33	584	0	0
809.00	584	975	975

Device	Routing	Invert	Outlet Devices
#1	Device 2	804.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	804.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	808.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.25 cfs @ 11.97 hrs HW=808.31' (Free Discharge)  
 ↳ **2=Culvert** (Passes 2.25 cfs of 5.71 cfs potential flow)  
 ↳ ↳ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.37 fps)  
 ↳ ↳ ↳ **3=Custom Weir/Orifice** (Weir Controls 2.24 cfs @ 1.82 fps)

**Summary for Pond 28P: Bio Basin 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 3.39" for 10 year event  
 Inflow = 2.02 cfs @ 11.94 hrs, Volume= 0.124 af  
 Outflow = 2.07 cfs @ 11.96 hrs, Volume= 0.124 af, Atten= 0%, Lag= 1.2 min  
 Primary = 2.07 cfs @ 11.96 hrs, Volume= 0.124 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 809.29' @ 11.96 hrs Surf.Area= 467 sf Storage= 450 cf

Plug-Flow detention time= 69.9 min calculated for 0.124 af (100% of inflow)

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Type II 24-hr 10 year Rainfall=3.74"

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Center-of-Mass det. time= 70.7 min ( 828.2 - 757.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	808.33'	780 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
808.33	467	0	0
810.00	467	780	780

Device	Routing	Invert	Outlet Devices
#1	Device 2	805.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	805.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.50' / 804.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	809.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.91 cfs @ 11.96 hrs HW=809.28' (Free Discharge)

↑ **2=Culvert** (Passes 1.91 cfs of 5.69 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.33 fps)

↑ **3=Custom Weir/Orifice** (Weir Controls 1.89 cfs @ 1.72 fps)

**Summary for Pond 36P: StormTech 01**

Inflow Area =	0.440 ac, 97.73% Impervious, Inflow Depth = 3.39" for 10 year event
Inflow =	2.07 cfs @ 11.96 hrs, Volume= 0.124 af
Outflow =	2.07 cfs @ 11.96 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min
Primary =	0.64 cfs @ 11.96 hrs, Volume= 0.094 af
Secondary =	1.43 cfs @ 11.96 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 801.56' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.20'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	800.85'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	800.85'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 800.85' / 800.75' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.61 cfs @ 11.96 hrs HW=801.52' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.61 cfs @ 3.13 fps)

**Secondary OutFlow** Max=1.29 cfs @ 11.96 hrs HW=801.52' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 1.29 cfs @ 2.78 fps)

↳ **1=Custom Weir/Orifice** (Passes 1.29 cfs of 2.41 cfs potential flow)

### Summary for Pond 37P: StormTech 02

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 3.39" for 10 year event  
 Inflow = 2.44 cfs @ 11.97 hrs, Volume= 0.147 af  
 Outflow = 2.44 cfs @ 11.97 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.70 cfs @ 11.96 hrs, Volume= 0.106 af  
 Secondary = 1.74 cfs @ 11.97 hrs, Volume= 0.041 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 800.61' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	800.10'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.82'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.82'	<b>15.0" Round Culvert</b> L= 50.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.82' / 799.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.66 cfs @ 11.96 hrs HW=800.56' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.66 cfs @ 3.39 fps)

**Secondary OutFlow** Max=1.59 cfs @ 11.97 hrs HW=800.57' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 1.59 cfs @ 2.98 fps)

↳ **1=Custom Weir/Orifice** (Passes 1.59 cfs of 4.18 cfs potential flow)

**Summary for Subcatchment 5S: Subarea 02**

Runoff = 2.85 cfs @ 11.94 hrs, Volume= 0.177 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
* 0.500	98	impervious
* 0.020	74	bio basin
0.520	97	Weighted Average
0.020		3.85% Pervious Area
0.500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 8S: Pre-developed 01**

Runoff = 8.85 cfs @ 11.96 hrs, Volume= 0.459 af, Depth= 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
2.860	74	>75% Grass cover, Good, HSG C
2.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 9S: Pre-developed 02**

Runoff = 3.26 cfs @ 11.95 hrs, Volume= 0.196 af, Depth= 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.070	74	>75% Grass cover, Good, HSG C
0.610	95	Weighted Average
0.070		11.48% Pervious Area
0.540		88.52% Impervious Area

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

**Summary for Subcatchment 25S: WQf 01**

Runoff = 2.45 cfs @ 11.94 hrs, Volume= 0.158 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
* 0.440	99	
0.440		100.00% Impervious Area

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

**Summary for Subcatchment 26S: WQf 02**

Runoff = 2.39 cfs @ 11.94 hrs, Volume= 0.155 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
* 0.430	99	
0.430		100.00% Impervious Area

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

**Summary for Subcatchment 27S: Subarea 01**

Runoff = 2.41 cfs @ 11.94 hrs, Volume= 0.150 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
* 0.430	98	impervious
* 0.010	74	bio basin
0.440	97	Weighted Average
0.010		2.27% Pervious Area
0.430		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Pond 19P: Bio Basin 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 4.09" for 25 year event  
 Inflow = 2.85 cfs @ 11.94 hrs, Volume= 0.177 af  
 Outflow = 2.91 cfs @ 11.96 hrs, Volume= 0.177 af, Atten= 0%, Lag= 1.3 min  
 Primary = 2.91 cfs @ 11.96 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 808.37' @ 11.96 hrs Surf.Area= 584 sf Storage= 606 cf

Plug-Flow detention time= 68.2 min calculated for 0.177 af (100% of inflow)  
 Center-of-Mass det. time= 69.2 min ( 822.8 - 753.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	807.33'	975 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
807.33	584	0	0
809.00	584	975	975

Device	Routing	Invert	Outlet Devices
#1	Device 2	804.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	804.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	808.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.69 cfs @ 11.96 hrs HW=808.35' (Free Discharge)  
 ↳ **2=Culvert** (Passes 2.69 cfs of 5.74 cfs potential flow)  
 ↳ ↳ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.42 fps)  
 ↳ ↳ **3=Custom Weir/Orifice** (Weir Controls 2.68 cfs @ 1.93 fps)

**Summary for Pond 28P: Bio Basin 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 4.09" for 25 year event  
 Inflow = 2.41 cfs @ 11.94 hrs, Volume= 0.150 af  
 Outflow = 2.47 cfs @ 11.96 hrs, Volume= 0.150 af, Atten= 0%, Lag= 1.2 min  
 Primary = 2.47 cfs @ 11.96 hrs, Volume= 0.150 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 809.33' @ 11.96 hrs Surf.Area= 467 sf Storage= 467 cf

Plug-Flow detention time= 61.0 min calculated for 0.150 af (100% of inflow)

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Type II 24-hr 25 year Rainfall=4.44"

Prepared by Symanetc

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Center-of-Mass det. time= 61.8 min ( 815.3 - 753.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	808.33'	780 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
808.33	467	0	0
810.00	467	780	780

Device	Routing	Invert	Outlet Devices
#1	Device 2	805.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	805.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.50' / 804.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	809.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.28 cfs @ 11.96 hrs HW=809.31' (Free Discharge)

↑ **2=Culvert** (Passes 2.28 cfs of 5.71 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.37 fps)

↑ **3=Custom Weir/Orifice** (Weir Controls 2.26 cfs @ 1.82 fps)

**Summary for Pond 36P: StormTech 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 4.09" for 25 year event  
 Inflow = 2.47 cfs @ 11.96 hrs, Volume= 0.150 af  
 Outflow = 2.47 cfs @ 11.96 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.71 cfs @ 11.96 hrs, Volume= 0.111 af  
 Secondary = 1.76 cfs @ 11.96 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 801.65' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.20'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	800.85'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	800.85'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 800.85' / 800.75' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.67 cfs @ 11.96 hrs HW=801.61' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.67 cfs @ 3.43 fps)

**Secondary OutFlow** Max=1.60 cfs @ 11.96 hrs HW=801.61' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 1.60 cfs @ 2.94 fps)

↳ **1=Custom Weir/Orifice** (Passes 1.60 cfs of 3.43 cfs potential flow)

### Summary for Pond 37P: StormTech 02

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 4.09" for 25 year event  
 Inflow = 2.91 cfs @ 11.96 hrs, Volume= 0.177 af  
 Outflow = 2.91 cfs @ 11.96 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.77 cfs @ 11.96 hrs, Volume= 0.124 af  
 Secondary = 2.15 cfs @ 11.97 hrs, Volume= 0.053 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 800.71' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	800.10'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.82'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.82'	<b>15.0" Round Culvert</b> L= 50.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.82' / 799.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.73 cfs @ 11.96 hrs HW=800.66' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.73 cfs @ 3.70 fps)

**Secondary OutFlow** Max=1.96 cfs @ 11.97 hrs HW=800.66' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 1.96 cfs @ 3.15 fps)

↳ **1=Custom Weir/Orifice** (Passes 1.96 cfs of 5.54 cfs potential flow)

**Summary for Subcatchment 5S: Subarea 02**

Runoff = 3.23 cfs @ 11.94 hrs, Volume= 0.202 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
* 0.500	98	impervious
* 0.020	74	bio basin
0.520	97	Weighted Average
0.020		3.85% Pervious Area
0.500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 8S: Pre-developed 01**

Runoff = 10.91 cfs @ 11.96 hrs, Volume= 0.567 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
2.860	74	>75% Grass cover, Good, HSG C
2.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 9S: Pre-developed 02**

Runoff = 3.72 cfs @ 11.94 hrs, Volume= 0.226 af, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.070	74	>75% Grass cover, Good, HSG C
0.610	95	Weighted Average
0.070		11.48% Pervious Area
0.540		88.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 25S: WQf 01**

Runoff = 2.77 cfs @ 11.94 hrs, Volume= 0.180 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
* 0.440	99	
0.440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 26S: WQf 02**

Runoff = 2.70 cfs @ 11.94 hrs, Volume= 0.176 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
* 0.430	99	
0.430		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 27S: Subarea 01**

Runoff = 2.74 cfs @ 11.94 hrs, Volume= 0.171 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
* 0.430	98	impervious
* 0.010	74	bio basin
0.440	97	Weighted Average
0.010		2.27% Pervious Area
0.430		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Pond 19P: Bio Basin 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 4.67" for 50 year event  
 Inflow = 3.23 cfs @ 11.94 hrs, Volume= 0.202 af  
 Outflow = 3.30 cfs @ 11.96 hrs, Volume= 0.202 af, Atten= 0%, Lag= 1.3 min  
 Primary = 3.30 cfs @ 11.96 hrs, Volume= 0.202 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 808.40' @ 11.96 hrs Surf.Area= 584 sf Storage= 625 cf

Plug-Flow detention time= 61.8 min calculated for 0.202 af (100% of inflow)  
 Center-of-Mass det. time= 62.8 min ( 813.6 - 750.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	807.33'	975 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
807.33	584	0	0
809.00	584	975	975

Device	Routing	Invert	Outlet Devices
#1	Device 2	804.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	804.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	808.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=3.05 cfs @ 11.96 hrs HW=808.38' (Free Discharge)  
 ↳ **2=Culvert** (Passes 3.05 cfs of 5.76 cfs potential flow)  
 ↳ ↳ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.46 fps)  
 ↳ ↳ **3=Custom Weir/Orifice** (Weir Controls 3.04 cfs @ 2.01 fps)

**Summary for Pond 28P: Bio Basin 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 4.67" for 50 year event  
 Inflow = 2.74 cfs @ 11.94 hrs, Volume= 0.171 af  
 Outflow = 2.80 cfs @ 11.96 hrs, Volume= 0.171 af, Atten= 0%, Lag= 1.1 min  
 Primary = 2.80 cfs @ 11.96 hrs, Volume= 0.171 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 809.36' @ 11.96 hrs Surf.Area= 467 sf Storage= 481 cf

Plug-Flow detention time= 55.4 min calculated for 0.171 af (100% of inflow)

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Prepared by Symanetc

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Type II 24-hr 50 year Rainfall=5.02"

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Center-of-Mass det. time= 56.2 min ( 807.0 - 750.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	808.33'	780 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
808.33	467	0	0
810.00	467	780	780

Device	Routing	Invert	Outlet Devices
#1	Device 2	805.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	805.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.50' / 804.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	809.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.58 cfs @ 11.96 hrs HW=809.34' (Free Discharge)

↑ **2=Culvert** (Passes 2.58 cfs of 5.73 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.41 fps)

↑ **3=Custom Weir/Orifice** (Weir Controls 2.57 cfs @ 1.90 fps)

**Summary for Pond 36P: StormTech 01**

Inflow Area =	0.440 ac, 97.73% Impervious, Inflow Depth = 4.67" for 50 year event
Inflow =	2.80 cfs @ 11.96 hrs, Volume= 0.171 af
Outflow =	2.80 cfs @ 11.96 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min
Primary =	0.75 cfs @ 11.96 hrs, Volume= 0.125 af
Secondary =	2.05 cfs @ 11.96 hrs, Volume= 0.047 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 801.73' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.20'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	800.85'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	800.85'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 800.85' / 800.75' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.72 cfs @ 11.96 hrs HW=801.68' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.72 cfs @ 3.66 fps)

**Secondary OutFlow** Max=1.86 cfs @ 11.96 hrs HW=801.68' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 1.86 cfs @ 3.06 fps)

↳ **1=Custom Weir/Orifice** (Passes 1.86 cfs of 4.32 cfs potential flow)

**Summary for Pond 37P: StormTech 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 4.67" for 50 year event  
 Inflow = 3.30 cfs @ 11.96 hrs, Volume= 0.202 af  
 Outflow = 3.30 cfs @ 11.96 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.81 cfs @ 11.96 hrs, Volume= 0.139 af  
 Secondary = 2.49 cfs @ 11.96 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 800.80' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	800.10'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.82'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.82'	<b>15.0" Round Culvert</b> L= 50.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.82' / 799.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.77 cfs @ 11.96 hrs HW=800.74' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.77 cfs @ 3.94 fps)

**Secondary OutFlow** Max=2.28 cfs @ 11.96 hrs HW=800.74' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 2.28 cfs @ 3.27 fps)

↳ **1=Custom Weir/Orifice** (Passes 2.28 cfs of 6.73 cfs potential flow)

**Summary for Subcatchment 5S: Subarea 02**

Runoff = 3.64 cfs @ 11.94 hrs, Volume= 0.229 af, Depth= 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
* 0.500	98	impervious
* 0.020	74	bio basin
0.520	97	Weighted Average
0.020		3.85% Pervious Area
0.500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 8S: Pre-developed 01**

Runoff = 13.13 cfs @ 11.96 hrs, Volume= 0.686 af, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
2.860	74	>75% Grass cover, Good, HSG C
2.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 9S: Pre-developed 02**

Runoff = 4.20 cfs @ 11.94 hrs, Volume= 0.256 af, Depth= 5.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.070	74	>75% Grass cover, Good, HSG C
0.610	95	Weighted Average
0.070		11.48% Pervious Area
0.540		88.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 25S: WQf 01**

Runoff = 3.10 cfs @ 11.94 hrs, Volume= 0.202 af, Depth= 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
* 0.440	99	
0.440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 26S: WQf 02**

Runoff = 3.03 cfs @ 11.94 hrs, Volume= 0.197 af, Depth= 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
* 0.430	99	
0.430		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 27S: Subarea 01**

Runoff = 3.08 cfs @ 11.94 hrs, Volume= 0.193 af, Depth= 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
* 0.430	98	impervious
* 0.010	74	bio basin
0.440	97	Weighted Average
0.010		2.27% Pervious Area
0.430		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Pond 19P: Bio Basin 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 5.28" for 100 year event  
 Inflow = 3.64 cfs @ 11.94 hrs, Volume= 0.229 af  
 Outflow = 3.72 cfs @ 11.96 hrs, Volume= 0.229 af, Atten= 0%, Lag= 1.2 min  
 Primary = 3.72 cfs @ 11.96 hrs, Volume= 0.229 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 808.43' @ 11.96 hrs Surf.Area= 584 sf Storage= 644 cf

Plug-Flow detention time= 56.3 min calculated for 0.228 af (100% of inflow)  
 Center-of-Mass det. time= 57.3 min ( 805.7 - 748.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	807.33'	975 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
807.33	584	0	0
809.00	584	975	975

Device	Routing	Invert	Outlet Devices
#1	Device 2	804.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	804.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	808.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=3.43 cfs @ 11.96 hrs HW=808.41' (Free Discharge)  
 ↳ **2=Culvert** (Passes 3.43 cfs of 5.78 cfs potential flow)  
 ↳ ↳ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.49 fps)  
 ↳ ↳ **3=Custom Weir/Orifice** (Weir Controls 3.42 cfs @ 2.09 fps)

**Summary for Pond 28P: Bio Basin 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 5.28" for 100 year event  
 Inflow = 3.08 cfs @ 11.94 hrs, Volume= 0.193 af  
 Outflow = 3.15 cfs @ 11.96 hrs, Volume= 0.193 af, Atten= 0%, Lag= 1.1 min  
 Primary = 3.15 cfs @ 11.96 hrs, Volume= 0.193 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 809.39' @ 11.96 hrs Surf.Area= 467 sf Storage= 494 cf

Plug-Flow detention time= 50.6 min calculated for 0.193 af (100% of inflow)

**20131481 - A**

Prepared by Symanetc

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Type II 24-hr 100 year Rainfall=5.63"

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Center-of-Mass det. time= 51.4 min ( 799.8 - 748.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	808.33'	780 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
808.33	467	0	0
810.00	467	780	780

Device	Routing	Invert	Outlet Devices
#1	Device 2	805.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	805.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.50' / 804.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	809.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.90 cfs @ 11.96 hrs HW=809.36' (Free Discharge)

↑ **2=Culvert** (Passes 2.90 cfs of 5.75 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.44 fps)

↑ **3=Custom Weir/Orifice** (Weir Controls 2.89 cfs @ 1.98 fps)

**Summary for Pond 36P: StormTech 01**

Inflow Area =	0.440 ac, 97.73% Impervious, Inflow Depth = 5.28" for 100 year event
Inflow =	3.15 cfs @ 11.96 hrs, Volume= 0.193 af
Outflow =	3.15 cfs @ 11.96 hrs, Volume= 0.193 af, Atten= 0%, Lag= 0.0 min
Primary =	0.80 cfs @ 11.96 hrs, Volume= 0.139 af
Secondary =	2.35 cfs @ 11.96 hrs, Volume= 0.055 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 801.80' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.20'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	800.85'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	800.85'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 800.85' / 800.75' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.76 cfs @ 11.96 hrs HW=801.75' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.76 cfs @ 3.87 fps)

**Secondary OutFlow** Max=2.14 cfs @ 11.96 hrs HW=801.75' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 2.14 cfs @ 3.18 fps)

↳ **1=Custom Weir/Orifice** (Passes 2.14 cfs of 5.30 cfs potential flow)

### Summary for Pond 37P: StormTech 02

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 5.28" for 100 year event  
 Inflow = 3.72 cfs @ 11.96 hrs, Volume= 0.229 af  
 Outflow = 3.72 cfs @ 11.96 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.86 cfs @ 11.96 hrs, Volume= 0.154 af  
 Secondary = 2.86 cfs @ 11.96 hrs, Volume= 0.074 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 800.89' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	800.10'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.82'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.82'	<b>15.0" Round Culvert</b> L= 50.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.82' / 799.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.82 cfs @ 11.96 hrs HW=800.82' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.82 cfs @ 4.17 fps)

**Secondary OutFlow** Max=2.61 cfs @ 11.96 hrs HW=800.82' (Free Discharge)

↳ **3=Culvert** (Barrel Controls 2.61 cfs @ 3.39 fps)

↳ **1=Custom Weir/Orifice** (Passes 2.61 cfs of 8.03 cfs potential flow)

**Summary for Subcatchment 5S: Subarea 02**

Runoff = 0.31 cfs @ 0.34 hrs, Volume= 0.021 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
* 0.500	98	impervious
* 0.020	74	bio basin
0.520	97	Weighted Average
0.020		3.85% Pervious Area
0.500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 8S: Pre-developed 01**

Runoff = 0.01 cfs @ 1.99 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
2.860	74	>75% Grass cover, Good, HSG C
2.860		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 9S: Pre-developed 02**

Runoff = 0.23 cfs @ 0.49 hrs, Volume= 0.018 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.070	74	>75% Grass cover, Good, HSG C
0.610	95	Weighted Average
0.070		11.48% Pervious Area
0.540		88.52% Impervious Area

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

**Summary for Subcatchment 25S: WQf 01**

Runoff = 0.42 cfs @ 0.30 hrs, Volume= 0.024 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
* 0.440	99	
0.440		100.00% Impervious Area

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

**Summary for Subcatchment 26S: WQf 02**

Runoff = 0.41 cfs @ 0.30 hrs, Volume= 0.023 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
* 0.430	99	
0.430		100.00% Impervious Area

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

**Summary for Subcatchment 27S: Subarea 01**

Runoff = 0.26 cfs @ 0.34 hrs, Volume= 0.017 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
* 0.430	98	impervious
* 0.010	74	bio basin
0.440	97	Weighted Average
0.010		2.27% Pervious Area
0.430		97.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Pond 19P: Bio Basin 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 0.47" for WQ event  
 Inflow = 0.31 cfs @ 0.34 hrs, Volume= 0.021 af  
 Outflow = 0.18 cfs @ 0.80 hrs, Volume= 0.021 af, Atten= 42%, Lag= 27.9 min  
 Primary = 0.18 cfs @ 0.80 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 808.05' @ 0.81 hrs Surf.Area= 584 sf Storage= 423 cf

Plug-Flow detention time= 169.0 min calculated for 0.021 af (100% of inflow)  
 Center-of-Mass det. time= 169.8 min ( 219.0 - 49.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	807.33'	975 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
807.33	584	0	0
809.00	584	975	975

Device	Routing	Invert	Outlet Devices
#1	Device 2	804.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	804.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 804.50' / 803.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	808.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=0.18 cfs @ 0.80 hrs HW=808.05' (Free Discharge)  
 ↳ **2=Culvert** (Passes 0.18 cfs of 5.52 cfs potential flow)  
 ↳ ↳ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.05 fps)  
 ↳ ↳ ↳ **3=Custom Weir/Orifice** (Weir Controls 0.17 cfs @ 0.76 fps)

**Summary for Pond 28P: Bio Basin 01**

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 0.47" for WQ event  
 Inflow = 0.26 cfs @ 0.34 hrs, Volume= 0.017 af  
 Outflow = 0.19 cfs @ 0.73 hrs, Volume= 0.017 af, Atten= 28%, Lag= 23.5 min  
 Primary = 0.19 cfs @ 0.73 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 809.06' @ 0.74 hrs Surf.Area= 467 sf Storage= 341 cf

Plug-Flow detention time= 137.6 min calculated for 0.017 af (100% of inflow)

Center-of-Mass det. time= 137.3 min ( 186.5 - 49.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	808.33'	780 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
808.33	467	0	0
810.00	467	780	780

Device	Routing	Invert	Outlet Devices
#1	Device 2	805.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#2	Primary	805.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.50' / 804.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	809.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=0.17 cfs @ 0.73 hrs HW=809.05' (Free Discharge)

↑ **2=Culvert** (Passes 0.17 cfs of 5.51 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.05 fps)

↑ **3=Custom Weir/Orifice** (Weir Controls 0.15 cfs @ 0.74 fps)

### Summary for Pond 36P: StormTech 01

Inflow Area = 0.440 ac, 97.73% Impervious, Inflow Depth = 0.47" for WQ event  
 Inflow = 0.19 cfs @ 0.73 hrs, Volume= 0.017 af  
 Outflow = 0.19 cfs @ 0.73 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.19 cfs @ 0.73 hrs, Volume= 0.017 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 801.12' @ 0.74 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.20'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	800.85'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	800.85'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 800.85' / 800.75' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.17 cfs @ 0.73 hrs HW=801.10' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 1.70 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=800.85' (Free Discharge)

↳ **3=Culvert** ( Controls 0.00 cfs)

↳ **1=Custom Weir/Orifice** ( Controls 0.00 cfs)

**Summary for Pond 37P: StormTech 02**

Inflow Area = 0.520 ac, 96.15% Impervious, Inflow Depth = 0.47" for WQ event  
 Inflow = 0.18 cfs @ 0.80 hrs, Volume= 0.021 af  
 Outflow = 0.18 cfs @ 0.80 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.18 cfs @ 0.80 hrs, Volume= 0.021 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 800.08' @ 0.80 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	800.10'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.82'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.82'	<b>15.0" Round Culvert</b> L= 50.5' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.82' / 799.62' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.18 cfs @ 0.80 hrs HW=800.08' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 1.74 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=799.82' (Free Discharge)

↳ **3=Culvert** ( Controls 0.00 cfs)

↳ **1=Custom Weir/Orifice** ( Controls 0.00 cfs)



Subarea 04



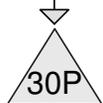
Diversion Structure 04



Bio Cell 4A



Bio Cell 4B



Bio Cell 4C



Bio Cell 4D



Bio Cell 4E



Subarea 03



Diversion Structure 03



Bio Cell 3A



Bio Cell 3B



Bio Cell 3C



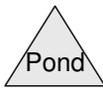
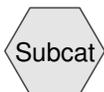
StormTech 03



WQf 04



WQf 03



**Routing Diagram for 20131481 - B**

Prepared by Symanetc, Printed 3/30/2015

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
2.090	99	(27S, 28S)
0.080	74	bio basin (6S, 7S)
2.070	98	impervious (6S, 7S)

**Summary for Subcatchment 6S: Subarea 04**

Runoff = 4.40 cfs @ 11.95 hrs, Volume= 0.262 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
* 1.630	98	impervious
* 0.050	74	bio basin
1.680	97	Weighted Average
0.050		2.98% Pervious Area
1.630		97.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 7S: Subarea 03**

Runoff = 1.42 cfs @ 11.88 hrs, Volume= 0.069 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
* 0.030	74	bio basin
* 0.440	98	impervious
0.470	96	Weighted Average
0.030		6.38% Pervious Area
0.440		93.62% Impervious Area

**Summary for Subcatchment 27S: WQf 04**

Runoff = 4.49 cfs @ 11.94 hrs, Volume= 0.285 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
* 1.640	99	
1.640		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 28S: WQf 03**

Runoff = 1.46 cfs @ 11.88 hrs, Volume= 0.078 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 1 year Rainfall=2.20"

Area (ac)	CN	Description
* 0.450	99	
0.450		100.00% Impervious Area

**Summary for Pond 21P: Diversion Structure 04**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.87" for 1 year event  
 Inflow = 4.40 cfs @ 11.95 hrs, Volume= 0.262 af  
 Outflow = 4.40 cfs @ 11.95 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.99 cfs @ 11.95 hrs, Volume= 0.221 af  
 Secondary = 1.41 cfs @ 11.95 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Peak Elev= 816.15' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	812.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	812.50'	<b>15.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 812.50' / 811.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Device 3	816.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 8.00 8.00

**Primary OutFlow** Max=2.91 cfs @ 11.95 hrs HW=816.13' (Free Discharge)  
 ↳ **1=Orifice/Grate** (Orifice Controls 2.91 cfs @ 2.91 fps)

**Secondary OutFlow** Max=1.23 cfs @ 11.95 hrs HW=816.13' (Free Discharge)  
 ↳ **3=Culvert** (Passes 1.23 cfs of 9.25 cfs potential flow)  
 ↳ ↳ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.15 fps)  
 ↳ ↳ ↳ **4=Custom Weir/Orifice** (Weir Controls 1.22 cfs @ 1.18 fps)

**Summary for Pond 22P: Bio Cell 4E**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.48" for 1 year event  
 Inflow = 3.04 cfs @ 11.96 hrs, Volume= 0.208 af  
 Outflow = 3.03 cfs @ 11.97 hrs, Volume= 0.203 af, Atten= 0%, Lag= 0.2 min  
 Primary = 3.03 cfs @ 11.97 hrs, Volume= 0.203 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

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Type II 24-hr 1 year Rainfall=2.20"

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Peak Elev= 814.22' @ 11.97 hrs Surf.Area= 409 sf Storage= 293 cf

Plug-Flow detention time= 19.3 min calculated for 0.203 af (98% of inflow)

Center-of-Mass det. time= 5.7 min ( 803.3 - 797.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	614 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	409	0	0
815.00	409	614	614

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=2.90 cfs @ 11.97 hrs HW=814.21' (Free Discharge)↑ **1=Culvert** (Passes 2.90 cfs of 6.45 cfs potential flow)↑ **2=Orifice/Grate** (Weir Controls 2.90 cfs @ 1.50 fps)**Summary for Pond 23P: Diversion Structure 03**

Inflow Area =	0.470 ac, 93.62% Impervious, Inflow Depth = 1.77" for 1 year event
Inflow =	1.42 cfs @ 11.88 hrs, Volume= 0.069 af
Outflow =	1.42 cfs @ 11.88 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min
Primary =	1.41 cfs @ 11.88 hrs, Volume= 0.052 af
Secondary =	0.01 cfs @ 11.88 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 814.87' @ 11.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	814.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	811.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	811.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 811.50' / 810.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#4	Device 3	815.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.28 cfs @ 11.88 hrs HW=814.84' (Free Discharge)

↑ **1=Orifice/Grate** (Orifice Controls 1.28 cfs @ 1.88 fps)

**Secondary OutFlow** Max=0.01 cfs @ 11.88 hrs HW=814.84' (Free Discharge)

↑ **3=Culvert** (Passes 0.01 cfs of 5.35 cfs potential flow)

↑ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 8.77 fps)

↑ **4=Custom Weir/Orifice** ( Controls 0.00 cfs)

### Summary for Pond 24P: Bio Cell 3C

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 1.16" for 1 year event  
 Inflow = 1.30 cfs @ 11.90 hrs, Volume= 0.045 af  
 Outflow = 1.26 cfs @ 11.90 hrs, Volume= 0.041 af, Atten= 3%, Lag= 0.4 min  
 Primary = 1.26 cfs @ 11.90 hrs, Volume= 0.041 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.12' @ 11.91 hrs Surf.Area= 376 sf Storage= 233 cf

Plug-Flow detention time= 34.6 min calculated for 0.041 af (90% of inflow)  
 Center-of-Mass det. time= 7.2 min ( 765.7 - 758.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	376	0	0
815.00	376	564	564

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=1.24 cfs @ 11.90 hrs HW=814.12' (Free Discharge)

↑ **1=Culvert** (Passes 1.24 cfs of 6.35 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 1.24 cfs @ 1.13 fps)

### Summary for Pond 28P: StormTech 03

Inflow Area = 2.150 ac, 96.28% Impervious, Inflow Depth = 1.68" for 1 year event  
 Inflow = 5.54 cfs @ 11.94 hrs, Volume= 0.302 af  
 Outflow = 5.54 cfs @ 11.94 hrs, Volume= 0.302 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.47 cfs @ 11.94 hrs, Volume= 0.222 af  
 Secondary = 4.07 cfs @ 11.94 hrs, Volume= 0.079 af

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Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 802.36' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.90'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.68'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.68'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.68' / 799.58' S= 0.0039 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.47 cfs @ 11.94 hrs HW=802.33' (Free Discharge)↳ **2=Orifice/Grate** (Orifice Controls 1.47 cfs @ 7.46 fps)**Secondary OutFlow** Max=3.72 cfs @ 11.94 hrs HW=802.33' (Free Discharge)↳ **3=Culvert** (Passes 3.72 cfs of 8.33 cfs potential flow)↳ **1=Custom Weir/Orifice** (Weir Controls 3.72 cfs @ 2.15 fps)**Summary for Pond 29P: Bio Cell 4B**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.56" for 1 year event

Inflow = 3.10 cfs @ 11.95 hrs, Volume= 0.218 af

Outflow = 3.07 cfs @ 11.96 hrs, Volume= 0.214 af, Atten= 1%, Lag= 0.3 min

Primary = 3.07 cfs @ 11.96 hrs, Volume= 0.214 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 815.62' @ 11.96 hrs Surf.Area= 568 sf Storage= 353 cf

Plug-Flow detention time= 20.6 min calculated for 0.214 af (98% of inflow)

Center-of-Mass det. time= 8.2 min ( 788.3 - 780.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.00'	852 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.00	568	0	0
816.50	568	852	852

Device	Routing	Invert	Outlet Devices
#1	Primary	815.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=2.90 cfs @ 11.96 hrs HW=815.61' (Free Discharge)↳ **1=Custom Weir/Orifice** (Weir Controls 2.90 cfs @ 1.73 fps)

**Summary for Pond 30P: Bio Cell 4C**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.53" for 1 year event  
 Inflow = 3.07 cfs @ 11.96 hrs, Volume= 0.214 af  
 Outflow = 3.05 cfs @ 11.96 hrs, Volume= 0.210 af, Atten= 1%, Lag= 0.3 min  
 Primary = 3.05 cfs @ 11.96 hrs, Volume= 0.210 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.12' @ 11.96 hrs Surf.Area= 479 sf Storage= 297 cf

Plug-Flow detention time= 16.5 min calculated for 0.210 af (98% of inflow)  
 Center-of-Mass det. time= 6.0 min ( 794.3 - 788.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	719 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.50	479	0	0
816.00	479	719	719

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=2.90 cfs @ 11.96 hrs HW=815.11' (Free Discharge)  
 ↑1=**Custom Weir/Orifice** (Weir Controls 2.90 cfs @ 1.73 fps)

**Summary for Pond 31P: Bio Cell 4A**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.58" for 1 year event  
 Inflow = 2.99 cfs @ 11.95 hrs, Volume= 0.221 af  
 Outflow = 3.10 cfs @ 11.95 hrs, Volume= 0.218 af, Atten= 0%, Lag= 0.3 min  
 Primary = 3.10 cfs @ 11.95 hrs, Volume= 0.218 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 816.12' @ 11.95 hrs Surf.Area= 299 sf Storage= 237 cf

Plug-Flow detention time= 17.1 min calculated for 0.217 af (98% of inflow)  
 Center-of-Mass det. time= 7.6 min ( 780.0 - 772.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.33'	499 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.33	299	0	0
817.00	299	499	499

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Device	Routing	Invert	Outlet Devices
#1	Primary	815.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=2.90 cfs @ 11.95 hrs HW=816.11' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 2.90 cfs @ 1.73 fps)

**Summary for Pond 32P: Bio Cell 3A**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 1.33" for 1 year event  
 Inflow = 1.41 cfs @ 11.88 hrs, Volume= 0.052 af  
 Outflow = 1.36 cfs @ 11.89 hrs, Volume= 0.049 af, Atten= 3%, Lag= 0.4 min  
 Primary = 1.36 cfs @ 11.89 hrs, Volume= 0.049 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.05' @ 11.88 hrs Surf.Area= 296 sf Storage= 214 cf

Plug-Flow detention time= 31.0 min calculated for 0.049 af (93% of inflow)  
 Center-of-Mass det. time= 11.0 min ( 750.7 - 739.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.33'	494 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.33	296	0	0
816.00	296	494	494

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.29 cfs @ 11.89 hrs HW=815.04' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 1.29 cfs @ 1.51 fps)

**Summary for Pond 33P: Bio Cell 3B**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 1.24" for 1 year event  
 Inflow = 1.36 cfs @ 11.89 hrs, Volume= 0.049 af  
 Outflow = 1.30 cfs @ 11.90 hrs, Volume= 0.045 af, Atten= 5%, Lag= 0.7 min  
 Primary = 1.30 cfs @ 11.90 hrs, Volume= 0.045 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.54' @ 11.90 hrs Surf.Area= 448 sf Storage= 244 cf

Plug-Flow detention time= 29.7 min calculated for 0.045 af (93% of inflow)  
 Center-of-Mass det. time= 7.7 min ( 758.4 - 750.7 )

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Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	672 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	448	0	0
815.50	448	672	672

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.29 cfs @ 11.90 hrs HW=814.54' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 1.29 cfs @ 1.51 fps)

### Summary for Pond 34P: Bio Cell 4D

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.50" for 1 year event  
 Inflow = 3.05 cfs @ 11.96 hrs, Volume= 0.210 af  
 Outflow = 3.04 cfs @ 11.96 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.2 min  
 Primary = 3.04 cfs @ 11.96 hrs, Volume= 0.208 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.62' @ 11.96 hrs Surf.Area= 279 sf Storage= 173 cf

Plug-Flow detention time= 9.7 min calculated for 0.208 af (99% of inflow)

Center-of-Mass det. time= 3.3 min ( 797.6 - 794.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	419 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	279	0	0
815.50	279	419	419

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=2.90 cfs @ 11.96 hrs HW=814.61' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 2.90 cfs @ 1.73 fps)

**Summary for Subcatchment 6S: Subarea 04**

Runoff = 5.33 cfs @ 11.94 hrs, Volume= 0.321 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
* 1.630	98	impervious
* 0.050	74	bio basin
1.680	97	Weighted Average
0.050		2.98% Pervious Area
1.630		97.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 7S: Subarea 03**

Runoff = 1.73 cfs @ 11.88 hrs, Volume= 0.086 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
* 0.030	74	bio basin
* 0.440	98	impervious
0.470	96	Weighted Average
0.030		6.38% Pervious Area
0.440		93.62% Impervious Area

**Summary for Subcatchment 27S: WQf 04**

Runoff = 5.38 cfs @ 11.94 hrs, Volume= 0.343 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
* 1.640	99	
1.640		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 28S: WQf 03**

Runoff = 1.74 cfs @ 11.88 hrs, Volume= 0.094 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 2 year Rainfall=2.63"

Area (ac)	CN	Description
* 0.450	99	
0.450		100.00% Impervious Area

**Summary for Pond 21P: Diversion Structure 04**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.29" for 2 year event  
 Inflow = 5.33 cfs @ 11.94 hrs, Volume= 0.321 af  
 Outflow = 5.33 cfs @ 11.94 hrs, Volume= 0.321 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.16 cfs @ 11.95 hrs, Volume= 0.266 af  
 Secondary = 2.17 cfs @ 11.94 hrs, Volume= 0.054 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Peak Elev= 816.19' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	812.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	812.50'	<b>15.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 812.50' / 811.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Device 3	816.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 8.00 8.00

**Primary OutFlow** Max=3.09 cfs @ 11.95 hrs HW=816.18' (Free Discharge)  
 ↳ **1=Orifice/Grate** (Orifice Controls 3.09 cfs @ 3.09 fps)

**Secondary OutFlow** Max=1.93 cfs @ 11.94 hrs HW=816.18' (Free Discharge)  
 ↳ **3=Culvert** (Passes 1.93 cfs of 9.31 cfs potential flow)  
 ↳ ↳ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.20 fps)  
 ↳ ↳ ↳ **4=Custom Weir/Orifice** (Weir Controls 1.92 cfs @ 1.37 fps)

**Summary for Pond 22P: Bio Cell 4E**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.81" for 2 year event  
 Inflow = 3.21 cfs @ 11.96 hrs, Volume= 0.253 af  
 Outflow = 3.20 cfs @ 11.97 hrs, Volume= 0.248 af, Atten= 1%, Lag= 0.2 min  
 Primary = 3.20 cfs @ 11.97 hrs, Volume= 0.248 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

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Peak Elev= 814.23' @ 11.97 hrs Surf.Area= 409 sf Storage= 297 cf

Plug-Flow detention time= 17.2 min calculated for 0.248 af (98% of inflow)

Center-of-Mass det. time= 5.8 min ( 800.4 - 794.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	614 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	409	0	0
815.00	409	614	614

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=3.08 cfs @ 11.97 hrs HW=814.22' (Free Discharge)↑ **1=Culvert** (Passes 3.08 cfs of 6.45 cfs potential flow)↑ **2=Orifice/Grate** (Weir Controls 3.08 cfs @ 1.53 fps)**Summary for Pond 23P: Diversion Structure 03**

Inflow Area =	0.470 ac, 93.62% Impervious, Inflow Depth = 2.19" for 2 year event
Inflow =	1.73 cfs @ 11.88 hrs, Volume= 0.086 af
Outflow =	1.73 cfs @ 11.88 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min
Primary =	1.72 cfs @ 11.88 hrs, Volume= 0.068 af
Secondary =	0.01 cfs @ 11.88 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 814.92' @ 11.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	814.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	811.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	811.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 811.50' / 810.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#4	Device 3	815.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.57 cfs @ 11.88 hrs HW=814.89' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 1.57 cfs @ 2.01 fps)

**Secondary OutFlow** Max=0.01 cfs @ 11.88 hrs HW=814.89' (Free Discharge)

↑3=Culvert (Passes 0.01 cfs of 5.39 cfs potential flow)

↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.84 fps)

↑4=Custom Weir/Orifice ( Controls 0.00 cfs)

### Summary for Pond 24P: Bio Cell 3C

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 1.55" for 2 year event  
 Inflow = 1.59 cfs @ 11.90 hrs, Volume= 0.061 af  
 Outflow = 1.56 cfs @ 11.90 hrs, Volume= 0.057 af, Atten= 2%, Lag= 0.4 min  
 Primary = 1.56 cfs @ 11.90 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.14' @ 11.90 hrs Surf.Area= 376 sf Storage= 240 cf

Plug-Flow detention time= 34.1 min calculated for 0.056 af (93% of inflow)  
 Center-of-Mass det. time= 7.0 min ( 773.1 - 766.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	376	0	0
815.00	376	564	564

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=1.55 cfs @ 11.90 hrs HW=814.14' (Free Discharge)

↑1=Culvert (Passes 1.55 cfs of 6.37 cfs potential flow)

↑2=Orifice/Grate (Weir Controls 1.55 cfs @ 1.22 fps)

### Summary for Pond 28P: StormTech 03

Inflow Area = 2.150 ac, 96.28% Impervious, Inflow Depth = 2.11" for 2 year event  
 Inflow = 6.75 cfs @ 11.94 hrs, Volume= 0.377 af  
 Outflow = 6.75 cfs @ 11.94 hrs, Volume= 0.377 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.50 cfs @ 11.94 hrs, Volume= 0.269 af  
 Secondary = 5.25 cfs @ 11.94 hrs, Volume= 0.109 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 802.45' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.90'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.68'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.68'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.68' / 799.58' S= 0.0039 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.49 cfs @ 11.94 hrs HW=802.41' (Free Discharge)  
 ↳ **2=Orifice/Grate** (Orifice Controls 1.49 cfs @ 7.59 fps)

**Secondary OutFlow** Max=4.84 cfs @ 11.94 hrs HW=802.42' (Free Discharge)  
 ↳ **3=Culvert** (Passes 4.84 cfs of 8.55 cfs potential flow)  
 ↳ **1=Custom Weir/Orifice** (Weir Controls 4.84 cfs @ 2.35 fps)

**Summary for Pond 29P: Bio Cell 4B**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.88" for 2 year event  
 Inflow = 3.28 cfs @ 11.95 hrs, Volume= 0.263 af  
 Outflow = 3.26 cfs @ 11.96 hrs, Volume= 0.259 af, Atten= 1%, Lag= 0.3 min  
 Primary = 3.26 cfs @ 11.96 hrs, Volume= 0.259 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.63' @ 11.96 hrs Surf.Area= 568 sf Storage= 359 cf

Plug-Flow detention time= 18.3 min calculated for 0.258 af (98% of inflow)  
 Center-of-Mass det. time= 8.1 min ( 785.3 - 777.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.00'	852 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.00	568	0	0
816.50	568	852	852

Device	Routing	Invert	Outlet Devices
#1	Primary	815.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.08 cfs @ 11.96 hrs HW=815.62' (Free Discharge)  
 ↳ **1=Custom Weir/Orifice** (Weir Controls 3.08 cfs @ 1.77 fps)

**Summary for Pond 30P: Bio Cell 4C**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.85" for 2 year event  
 Inflow = 3.26 cfs @ 11.96 hrs, Volume= 0.259 af  
 Outflow = 3.23 cfs @ 11.96 hrs, Volume= 0.255 af, Atten= 1%, Lag= 0.3 min  
 Primary = 3.23 cfs @ 11.96 hrs, Volume= 0.255 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.13' @ 11.96 hrs Surf.Area= 479 sf Storage= 302 cf

Plug-Flow detention time= 15.0 min calculated for 0.255 af (99% of inflow)  
 Center-of-Mass det. time= 6.0 min ( 791.3 - 785.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	719 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.50	479	0	0
816.00	479	719	719

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.08 cfs @ 11.96 hrs HW=815.12' (Free Discharge)  
 ↑1=**Custom Weir/Orifice** (Weir Controls 3.08 cfs @ 1.77 fps)

**Summary for Pond 31P: Bio Cell 4A**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.90" for 2 year event  
 Inflow = 3.16 cfs @ 11.95 hrs, Volume= 0.266 af  
 Outflow = 3.28 cfs @ 11.95 hrs, Volume= 0.263 af, Atten= 0%, Lag= 0.4 min  
 Primary = 3.28 cfs @ 11.95 hrs, Volume= 0.263 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 816.13' @ 11.95 hrs Surf.Area= 299 sf Storage= 241 cf

Plug-Flow detention time= 15.3 min calculated for 0.263 af (99% of inflow)  
 Center-of-Mass det. time= 7.1 min ( 777.3 - 770.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.33'	499 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.33	299	0	0
817.00	299	499	499

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Type II 24-hr 2 year Rainfall=2.63"

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Device	Routing	Invert	Outlet Devices
#1	Primary	815.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.09 cfs @ 11.95 hrs HW=816.12' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 3.09 cfs @ 1.77 fps)

**Summary for Pond 32P: Bio Cell 3A**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 1.73" for 2 year event  
 Inflow = 1.72 cfs @ 11.88 hrs, Volume= 0.068 af  
 Outflow = 1.67 cfs @ 11.89 hrs, Volume= 0.064 af, Atten= 3%, Lag= 0.4 min  
 Primary = 1.67 cfs @ 11.89 hrs, Volume= 0.064 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.08' @ 11.88 hrs Surf.Area= 296 sf Storage= 223 cf

Plug-Flow detention time= 32.4 min calculated for 0.064 af (95% of inflow)  
 Center-of-Mass det. time= 11.4 min ( 757.9 - 746.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.33'	494 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.33	296	0	0
816.00	296	494	494

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.57 cfs @ 11.89 hrs HW=815.07' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 1.57 cfs @ 1.61 fps)

**Summary for Pond 33P: Bio Cell 3B**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 1.64" for 2 year event  
 Inflow = 1.67 cfs @ 11.89 hrs, Volume= 0.064 af  
 Outflow = 1.59 cfs @ 11.90 hrs, Volume= 0.061 af, Atten= 5%, Lag= 0.6 min  
 Primary = 1.59 cfs @ 11.90 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.57' @ 11.90 hrs Surf.Area= 448 sf Storage= 258 cf

Plug-Flow detention time= 30.9 min calculated for 0.061 af (95% of inflow)  
 Center-of-Mass det. time= 8.3 min ( 766.1 - 757.9 )

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Type II 24-hr 2 year Rainfall=2.63"

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Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	672 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	448	0	0
815.50	448	672	672

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.56 cfs @ 11.90 hrs HW=814.57' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 1.56 cfs @ 1.61 fps)

### Summary for Pond 34P: Bio Cell 4D

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 1.82" for 2 year event  
 Inflow = 3.23 cfs @ 11.96 hrs, Volume= 0.255 af  
 Outflow = 3.21 cfs @ 11.96 hrs, Volume= 0.253 af, Atten= 0%, Lag= 0.1 min  
 Primary = 3.21 cfs @ 11.96 hrs, Volume= 0.253 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.63' @ 11.96 hrs Surf.Area= 279 sf Storage= 176 cf

Plug-Flow detention time= 8.5 min calculated for 0.252 af (99% of inflow)

Center-of-Mass det. time= 3.3 min ( 794.6 - 791.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	419 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	279	0	0
815.50	279	419	419

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.08 cfs @ 11.96 hrs HW=814.62' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 3.08 cfs @ 1.77 fps)

**Summary for Subcatchment 6S: Subarea 04**

Runoff = 6.64 cfs @ 11.94 hrs, Volume= 0.405 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
* 1.630	98	impervious
* 0.050	74	bio basin
1.680	97	Weighted Average
0.050		2.98% Pervious Area
1.630		97.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 7S: Subarea 03**

Runoff = 2.17 cfs @ 11.88 hrs, Volume= 0.109 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
* 0.030	74	bio basin
* 0.440	98	impervious
0.470	96	Weighted Average
0.030		6.38% Pervious Area
0.440		93.62% Impervious Area

**Summary for Subcatchment 27S: WQf 04**

Runoff = 6.64 cfs @ 11.94 hrs, Volume= 0.427 af, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
* 1.640	99	
1.640		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 28S: WQf 03**

Runoff = 2.15 cfs @ 11.88 hrs, Volume= 0.117 af, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 5 year Rainfall=3.24"

Area (ac)	CN	Description
* 0.450	99	
0.450		100.00% Impervious Area

**Summary for Pond 21P: Diversion Structure 04**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.90" for 5 year event  
 Inflow = 6.64 cfs @ 11.94 hrs, Volume= 0.405 af  
 Outflow = 6.64 cfs @ 11.94 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.38 cfs @ 11.95 hrs, Volume= 0.329 af  
 Secondary = 3.26 cfs @ 11.94 hrs, Volume= 0.076 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Peak Elev= 816.25' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	812.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	812.50'	<b>15.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 812.50' / 811.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Device 3	816.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 8.00 8.00

**Primary OutFlow** Max=3.31 cfs @ 11.95 hrs HW=816.23' (Free Discharge)  
 ↳ **1=Orifice/Grate** (Orifice Controls 3.31 cfs @ 3.31 fps)

**Secondary OutFlow** Max=2.97 cfs @ 11.94 hrs HW=816.23' (Free Discharge)  
 ↳ **3=Culvert** (Passes 2.97 cfs of 9.39 cfs potential flow)  
 ↳ ↳ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.28 fps)  
 ↳ ↳ ↳ **4=Custom Weir/Orifice** (Weir Controls 2.95 cfs @ 1.58 fps)

**Summary for Pond 22P: Bio Cell 4E**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.26" for 5 year event  
 Inflow = 3.43 cfs @ 11.97 hrs, Volume= 0.316 af  
 Outflow = 3.40 cfs @ 11.97 hrs, Volume= 0.311 af, Atten= 1%, Lag= 0.1 min  
 Primary = 3.40 cfs @ 11.97 hrs, Volume= 0.311 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

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Type II 24-hr 5 year Rainfall=3.24"

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Peak Elev= 814.23' @ 11.97 hrs Surf.Area= 409 sf Storage= 300 cf

Plug-Flow detention time= 15.2 min calculated for 0.311 af (99% of inflow)

Center-of-Mass det. time= 5.7 min ( 795.6 - 789.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	614 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	409	0	0
815.00	409	614	614

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=3.29 cfs @ 11.97 hrs HW=814.23' (Free Discharge)↑ **1=Culvert** (Passes 3.29 cfs of 6.46 cfs potential flow)↑ **2=Orifice/Grate** (Weir Controls 3.29 cfs @ 1.57 fps)**Summary for Pond 23P: Diversion Structure 03**

Inflow Area =	0.470 ac, 93.62% Impervious, Inflow Depth = 2.79" for 5 year event
Inflow =	2.17 cfs @ 11.88 hrs, Volume= 0.109 af
Outflow =	2.17 cfs @ 11.88 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min
Primary =	2.15 cfs @ 11.88 hrs, Volume= 0.090 af
Secondary =	0.01 cfs @ 11.88 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 814.99' @ 11.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	814.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	811.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	811.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 811.50' / 810.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#4	Device 3	815.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.96 cfs @ 11.88 hrs HW=814.95' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 1.96 cfs @ 2.16 fps)

**Secondary OutFlow** Max=0.01 cfs @ 11.88 hrs HW=814.95' (Free Discharge)

↑3=Culvert (Passes 0.01 cfs of 5.44 cfs potential flow)

↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.92 fps)

↑4=Custom Weir/Orifice ( Controls 0.00 cfs)

### Summary for Pond 24P: Bio Cell 3C

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 2.13" for 5 year event  
 Inflow = 2.01 cfs @ 11.89 hrs, Volume= 0.083 af  
 Outflow = 1.96 cfs @ 11.90 hrs, Volume= 0.079 af, Atten= 2%, Lag= 0.3 min  
 Primary = 1.96 cfs @ 11.90 hrs, Volume= 0.079 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.16' @ 11.90 hrs Surf.Area= 376 sf Storage= 249 cf

Plug-Flow detention time= 32.4 min calculated for 0.079 af (95% of inflow)  
 Center-of-Mass det. time= 7.2 min ( 777.2 - 770.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	376	0	0
815.00	376	564	564

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=1.96 cfs @ 11.90 hrs HW=814.16' (Free Discharge)

↑1=Culvert (Passes 1.96 cfs of 6.40 cfs potential flow)

↑2=Orifice/Grate (Weir Controls 1.96 cfs @ 1.32 fps)

### Summary for Pond 28P: StormTech 03

Inflow Area = 2.150 ac, 96.28% Impervious, Inflow Depth = 2.71" for 5 year event  
 Inflow = 8.38 cfs @ 11.93 hrs, Volume= 0.485 af  
 Outflow = 8.38 cfs @ 11.93 hrs, Volume= 0.485 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.53 cfs @ 11.94 hrs, Volume= 0.335 af  
 Secondary = 6.85 cfs @ 11.93 hrs, Volume= 0.150 af

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Type II 24-hr 5 year Rainfall=3.24"

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Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 802.55' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.90'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.68'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.68'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.68' / 799.58' S= 0.0039 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.52 cfs @ 11.94 hrs HW=802.52' (Free Discharge)↑**2=Orifice/Grate** (Orifice Controls 1.52 cfs @ 7.75 fps)**Secondary OutFlow** Max=6.39 cfs @ 11.93 hrs HW=802.52' (Free Discharge)↑**3=Culvert** (Passes 6.39 cfs of 8.79 cfs potential flow)↑**1=Custom Weir/Orifice** (Weir Controls 6.39 cfs @ 2.58 fps)**Summary for Pond 29P: Bio Cell 4B**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.33" for 5 year event  
 Inflow = 3.49 cfs @ 11.96 hrs, Volume= 0.326 af  
 Outflow = 3.48 cfs @ 11.96 hrs, Volume= 0.322 af, Atten= 1%, Lag= 0.5 min  
 Primary = 3.48 cfs @ 11.96 hrs, Volume= 0.322 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 815.65' @ 11.96 hrs Surf.Area= 568 sf Storage= 367 cf

Plug-Flow detention time= 16.0 min calculated for 0.321 af (98% of inflow)

Center-of-Mass det. time= 7.6 min ( 780.8 - 773.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.00'	852 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.00	568	0	0
816.50	568	852	852

Device	Routing	Invert	Outlet Devices
#1	Primary	815.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.31 cfs @ 11.96 hrs HW=815.63' (Free Discharge)↑**1=Custom Weir/Orifice** (Weir Controls 3.31 cfs @ 1.81 fps)

**Summary for Pond 30P: Bio Cell 4C**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.30" for 5 year event  
 Inflow = 3.48 cfs @ 11.96 hrs, Volume= 0.322 af  
 Outflow = 3.45 cfs @ 11.97 hrs, Volume= 0.318 af, Atten= 1%, Lag= 0.3 min  
 Primary = 3.45 cfs @ 11.97 hrs, Volume= 0.318 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.14' @ 11.97 hrs Surf.Area= 479 sf Storage= 308 cf

Plug-Flow detention time= 13.0 min calculated for 0.317 af (99% of inflow)  
 Center-of-Mass det. time= 5.8 min ( 786.6 - 780.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	719 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.50	479	0	0
816.00	479	719	719

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.30 cfs @ 11.97 hrs HW=815.13' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 3.30 cfs @ 1.81 fps)

**Summary for Pond 31P: Bio Cell 4A**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.35" for 5 year event  
 Inflow = 3.38 cfs @ 11.95 hrs, Volume= 0.329 af  
 Outflow = 3.49 cfs @ 11.96 hrs, Volume= 0.326 af, Atten= 0%, Lag= 0.6 min  
 Primary = 3.49 cfs @ 11.96 hrs, Volume= 0.326 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 816.15' @ 11.95 hrs Surf.Area= 299 sf Storage= 244 cf

Plug-Flow detention time= 13.0 min calculated for 0.325 af (99% of inflow)  
 Center-of-Mass det. time= 6.4 min ( 773.2 - 766.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.33'	499 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.33	299	0	0
817.00	299	499	499

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Device	Routing	Invert	Outlet Devices
#1	Primary	815.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.31 cfs @ 11.96 hrs HW=816.13' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 3.31 cfs @ 1.81 fps)

**Summary for Pond 32P: Bio Cell 3A**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 2.30" for 5 year event  
 Inflow = 2.15 cfs @ 11.88 hrs, Volume= 0.090 af  
 Outflow = 2.10 cfs @ 11.88 hrs, Volume= 0.087 af, Atten= 2%, Lag= 0.4 min  
 Primary = 2.10 cfs @ 11.88 hrs, Volume= 0.087 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.13' @ 11.88 hrs Surf.Area= 296 sf Storage= 236 cf

Plug-Flow detention time= 30.7 min calculated for 0.087 af (96% of inflow)  
 Center-of-Mass det. time= 11.6 min ( 761.2 - 749.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.33'	494 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.33	296	0	0
816.00	296	494	494

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.97 cfs @ 11.88 hrs HW=815.11' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 1.97 cfs @ 1.74 fps)

**Summary for Pond 33P: Bio Cell 3B**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 2.22" for 5 year event  
 Inflow = 2.10 cfs @ 11.88 hrs, Volume= 0.087 af  
 Outflow = 2.01 cfs @ 11.89 hrs, Volume= 0.083 af, Atten= 5%, Lag= 0.6 min  
 Primary = 2.01 cfs @ 11.89 hrs, Volume= 0.083 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.62' @ 11.89 hrs Surf.Area= 448 sf Storage= 276 cf

Plug-Flow detention time= 28.4 min calculated for 0.083 af (96% of inflow)  
 Center-of-Mass det. time= 8.7 min ( 770.0 - 761.2 )

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Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	672 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	448	0	0
815.50	448	672	672

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=1.96 cfs @ 11.89 hrs HW=814.61' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 1.96 cfs @ 1.74 fps)

**Summary for Pond 34P: Bio Cell 4D**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.27" for 5 year event  
 Inflow = 3.45 cfs @ 11.97 hrs, Volume= 0.318 af  
 Outflow = 3.43 cfs @ 11.97 hrs, Volume= 0.316 af, Atten= 1%, Lag= 0.1 min  
 Primary = 3.43 cfs @ 11.97 hrs, Volume= 0.316 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.64' @ 11.97 hrs Surf.Area= 279 sf Storage= 179 cf

Plug-Flow detention time= 7.6 min calculated for 0.316 af (99% of inflow)  
 Center-of-Mass det. time= 3.2 min ( 789.8 - 786.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	419 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	279	0	0
815.50	279	419	419

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.30 cfs @ 11.97 hrs HW=814.63' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 3.30 cfs @ 1.81 fps)

**Summary for Subcatchment 6S: Subarea 04**

Runoff = 7.72 cfs @ 11.94 hrs, Volume= 0.475 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
* 1.630	98	impervious
* 0.050	74	bio basin
1.680	97	Weighted Average
0.050		2.98% Pervious Area
1.630		97.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 7S: Subarea 03**

Runoff = 2.52 cfs @ 11.88 hrs, Volume= 0.129 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
* 0.030	74	bio basin
* 0.440	98	impervious
0.470	96	Weighted Average
0.030		6.38% Pervious Area
0.440		93.62% Impervious Area

**Summary for Subcatchment 27S: WQf 04**

Runoff = 7.67 cfs @ 11.94 hrs, Volume= 0.495 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
* 1.640	99	
1.640		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 28S: WQf 03**

Runoff = 2.49 cfs @ 11.88 hrs, Volume= 0.136 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 10 year Rainfall=3.74"

Area (ac)	CN	Description
* 0.450	99	
0.450		100.00% Impervious Area

**Summary for Pond 21P: Diversion Structure 04**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.39" for 10 year event  
 Inflow = 7.72 cfs @ 11.94 hrs, Volume= 0.475 af  
 Outflow = 7.72 cfs @ 11.94 hrs, Volume= 0.475 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.53 cfs @ 11.94 hrs, Volume= 0.380 af  
 Secondary = 4.18 cfs @ 11.94 hrs, Volume= 0.095 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Peak Elev= 816.30' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	812.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	812.50'	<b>15.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 812.50' / 811.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Device 3	816.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 8.00 8.00

**Primary OutFlow** Max=3.46 cfs @ 11.94 hrs HW=816.28' (Free Discharge)  
 ↳ **1=Orifice/Grate** (Orifice Controls 3.46 cfs @ 3.46 fps)

**Secondary OutFlow** Max=3.83 cfs @ 11.94 hrs HW=816.28' (Free Discharge)  
 ↳ **3=Culvert** (Passes 3.83 cfs of 9.45 cfs potential flow)  
 ↳ ↳ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.33 fps)  
 ↳ ↳ ↳ **4=Custom Weir/Orifice** (Weir Controls 3.81 cfs @ 1.72 fps)

**Summary for Pond 22P: Bio Cell 4E**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.62" for 10 year event  
 Inflow = 3.58 cfs @ 11.97 hrs, Volume= 0.367 af  
 Outflow = 3.55 cfs @ 11.98 hrs, Volume= 0.362 af, Atten= 1%, Lag= 0.1 min  
 Primary = 3.55 cfs @ 11.98 hrs, Volume= 0.362 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

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Peak Elev= 814.24' @ 11.97 hrs Surf.Area= 409 sf Storage= 303 cf

Plug-Flow detention time= 13.8 min calculated for 0.361 af (99% of inflow)

Center-of-Mass det. time= 5.6 min ( 791.7 - 786.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	614 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	409	0	0
815.00	409	614	614

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=3.45 cfs @ 11.98 hrs HW=814.24' (Free Discharge)

↑ **1=Culvert** (Passes 3.45 cfs of 6.47 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 3.45 cfs @ 1.59 fps)

**Summary for Pond 23P: Diversion Structure 03**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 3.28" for 10 year event  
 Inflow = 2.52 cfs @ 11.88 hrs, Volume= 0.129 af  
 Outflow = 2.52 cfs @ 11.88 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.46 cfs @ 11.88 hrs, Volume= 0.109 af  
 Secondary = 0.07 cfs @ 11.90 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 815.03' @ 11.88 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	814.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	811.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	811.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 811.50' / 810.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#4	Device 3	815.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.26 cfs @ 11.88 hrs HW=815.00' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 2.26 cfs @ 2.27 fps)

**Secondary OutFlow** Max=0.05 cfs @ 11.90 hrs HW=815.02' (Free Discharge)

↑3=Culvert (Passes 0.05 cfs of 5.49 cfs potential flow)

↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.01 fps)

↑4=Custom Weir/Orifice (Weir Controls 0.04 cfs @ 0.48 fps)

### Summary for Pond 24P: Bio Cell 3C

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 2.60" for 10 year event  
 Inflow = 2.31 cfs @ 11.89 hrs, Volume= 0.102 af  
 Outflow = 2.27 cfs @ 11.90 hrs, Volume= 0.098 af, Atten= 2%, Lag= 0.3 min  
 Primary = 2.27 cfs @ 11.90 hrs, Volume= 0.098 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.18' @ 11.90 hrs Surf.Area= 376 sf Storage= 255 cf

Plug-Flow detention time= 29.5 min calculated for 0.097 af (96% of inflow)  
 Center-of-Mass det. time= 7.5 min ( 778.0 - 770.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	376	0	0
815.00	376	564	564

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=2.24 cfs @ 11.90 hrs HW=814.18' (Free Discharge)

↑1=Culvert (Passes 2.24 cfs of 6.41 cfs potential flow)

↑2=Orifice/Grate (Weir Controls 2.24 cfs @ 1.38 fps)

### Summary for Pond 28P: StormTech 03

Inflow Area = 2.150 ac, 96.28% Impervious, Inflow Depth = 3.21" for 10 year event  
 Inflow = 9.74 cfs @ 11.93 hrs, Volume= 0.574 af  
 Outflow = 9.74 cfs @ 11.93 hrs, Volume= 0.574 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.55 cfs @ 11.93 hrs, Volume= 0.389 af  
 Secondary = 8.19 cfs @ 11.93 hrs, Volume= 0.185 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 802.63' @ 11.93 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.90'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.68'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.68'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.68' / 799.58' S= 0.0039 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.54 cfs @ 11.93 hrs HW=802.60' (Free Discharge)  
 ↳ **2=Orifice/Grate** (Orifice Controls 1.54 cfs @ 7.87 fps)

**Secondary OutFlow** Max=7.67 cfs @ 11.93 hrs HW=802.60' (Free Discharge)  
 ↳ **3=Culvert** (Passes 7.67 cfs of 8.95 cfs potential flow)  
 ↳ **1=Custom Weir/Orifice** (Weir Controls 7.67 cfs @ 2.74 fps)

### Summary for Pond 29P: Bio Cell 4B

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.69" for 10 year event  
 Inflow = 3.64 cfs @ 11.96 hrs, Volume= 0.377 af  
 Outflow = 3.63 cfs @ 11.97 hrs, Volume= 0.372 af, Atten= 0%, Lag= 0.5 min  
 Primary = 3.63 cfs @ 11.97 hrs, Volume= 0.372 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.65' @ 11.97 hrs Surf.Area= 568 sf Storage= 372 cf

Plug-Flow detention time= 14.7 min calculated for 0.372 af (99% of inflow)  
 Center-of-Mass det. time= 7.2 min ( 777.4 - 770.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.00'	852 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.00	568	0	0
816.50	568	852	852

Device	Routing	Invert	Outlet Devices
#1	Primary	815.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.47 cfs @ 11.97 hrs HW=815.64' (Free Discharge)  
 ↳ **1=Custom Weir/Orifice** (Weir Controls 3.47 cfs @ 1.84 fps)

**Summary for Pond 30P: Bio Cell 4C**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.66" for 10 year event  
 Inflow = 3.63 cfs @ 11.97 hrs, Volume= 0.372 af  
 Outflow = 3.60 cfs @ 11.97 hrs, Volume= 0.369 af, Atten= 1%, Lag= 0.3 min  
 Primary = 3.60 cfs @ 11.97 hrs, Volume= 0.369 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.15' @ 11.97 hrs Surf.Area= 479 sf Storage= 313 cf

Plug-Flow detention time= 12.0 min calculated for 0.369 af (99% of inflow)  
 Center-of-Mass det. time= 5.6 min ( 783.0 - 777.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	719 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.50	479	0	0
816.00	479	719	719

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.46 cfs @ 11.97 hrs HW=815.14' (Free Discharge)  
 ↑1=**Custom Weir/Orifice** (Weir Controls 3.46 cfs @ 1.84 fps)

**Summary for Pond 31P: Bio Cell 4A**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.71" for 10 year event  
 Inflow = 3.53 cfs @ 11.94 hrs, Volume= 0.380 af  
 Outflow = 3.64 cfs @ 11.96 hrs, Volume= 0.377 af, Atten= 0%, Lag= 0.7 min  
 Primary = 3.64 cfs @ 11.96 hrs, Volume= 0.377 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 816.16' @ 11.96 hrs Surf.Area= 299 sf Storage= 247 cf

Plug-Flow detention time= 11.7 min calculated for 0.376 af (99% of inflow)  
 Center-of-Mass det. time= 5.9 min ( 770.2 - 764.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.33'	499 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.33	299	0	0
817.00	299	499	499

Device	Routing	Invert	Outlet Devices
#1	Primary	815.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.46 cfs @ 11.96 hrs HW=816.14' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 3.46 cfs @ 1.84 fps)

### Summary for Pond 32P: Bio Cell 3A

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 2.77" for 10 year event  
 Inflow = 2.46 cfs @ 11.88 hrs, Volume= 0.109 af  
 Outflow = 2.41 cfs @ 11.88 hrs, Volume= 0.105 af, Atten= 2%, Lag= 0.4 min  
 Primary = 2.41 cfs @ 11.88 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.15' @ 11.88 hrs Surf.Area= 296 sf Storage= 244 cf

Plug-Flow detention time= 28.7 min calculated for 0.105 af (97% of inflow)  
 Center-of-Mass det. time= 11.4 min ( 761.6 - 750.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.33'	494 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.33	296	0	0
816.00	296	494	494

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.25 cfs @ 11.88 hrs HW=815.14' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 2.25 cfs @ 1.82 fps)

### Summary for Pond 33P: Bio Cell 3B

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 2.69" for 10 year event  
 Inflow = 2.41 cfs @ 11.88 hrs, Volume= 0.105 af  
 Outflow = 2.31 cfs @ 11.89 hrs, Volume= 0.102 af, Atten= 4%, Lag= 0.5 min  
 Primary = 2.31 cfs @ 11.89 hrs, Volume= 0.102 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.64' @ 11.89 hrs Surf.Area= 448 sf Storage= 289 cf

Plug-Flow detention time= 26.6 min calculated for 0.102 af (97% of inflow)  
 Center-of-Mass det. time= 9.0 min ( 770.5 - 761.6 )

**20131481 - B**

Type II 24-hr 10 year Rainfall=3.74"

Prepared by Symanetc

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Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	672 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	448	0	0
815.50	448	672	672

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.24 cfs @ 11.89 hrs HW=814.64' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 2.24 cfs @ 1.82 fps)

### Summary for Pond 34P: Bio Cell 4D

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 2.63" for 10 year event  
 Inflow = 3.60 cfs @ 11.97 hrs, Volume= 0.369 af  
 Outflow = 3.58 cfs @ 11.97 hrs, Volume= 0.367 af, Atten= 1%, Lag= 0.1 min  
 Primary = 3.58 cfs @ 11.97 hrs, Volume= 0.367 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.65' @ 11.97 hrs Surf.Area= 279 sf Storage= 182 cf

Plug-Flow detention time= 6.8 min calculated for 0.366 af (99% of inflow)

Center-of-Mass det. time= 3.1 min ( 786.1 - 783.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	419 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	279	0	0
815.50	279	419	419

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.46 cfs @ 11.97 hrs HW=814.64' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 3.46 cfs @ 1.84 fps)

**Summary for Subcatchment 6S: Subarea 04**

Runoff = 9.21 cfs @ 11.94 hrs, Volume= 0.572 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
* 1.630	98	impervious
* 0.050	74	bio basin
1.680	97	Weighted Average
0.050		2.98% Pervious Area
1.630		97.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 7S: Subarea 03**

Runoff = 3.02 cfs @ 11.88 hrs, Volume= 0.156 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
* 0.030	74	bio basin
* 0.440	98	impervious
0.470	96	Weighted Average
0.030		6.38% Pervious Area
0.440		93.62% Impervious Area

**Summary for Subcatchment 27S: WQf 04**

Runoff = 9.12 cfs @ 11.94 hrs, Volume= 0.591 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
* 1.640	99	
1.640		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 28S: WQf 03**

Runoff = 2.95 cfs @ 11.88 hrs, Volume= 0.162 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 25 year Rainfall=4.44"

Area (ac)	CN	Description
* 0.450	99	
0.450		100.00% Impervious Area

**Summary for Pond 21P: Diversion Structure 04**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 4.09" for 25 year event  
 Inflow = 9.21 cfs @ 11.94 hrs, Volume= 0.572 af  
 Outflow = 9.21 cfs @ 11.94 hrs, Volume= 0.572 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.72 cfs @ 11.94 hrs, Volume= 0.449 af  
 Secondary = 5.49 cfs @ 11.94 hrs, Volume= 0.124 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Peak Elev= 816.35' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	812.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	812.50'	<b>15.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 812.50' / 811.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Device 3	816.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 8.00 8.00

**Primary OutFlow** Max=3.65 cfs @ 11.94 hrs HW=816.33' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 3.65 cfs @ 3.65 fps)

**Secondary OutFlow** Max=5.05 cfs @ 11.94 hrs HW=816.33' (Free Discharge)  
 ↑3=Culvert (Passes 5.05 cfs of 9.52 cfs potential flow)  
 ↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.40 fps)  
 ↑4=Custom Weir/Orifice (Weir Controls 5.04 cfs @ 1.89 fps)

**Summary for Pond 22P: Bio Cell 4E**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.11" for 25 year event  
 Inflow = 3.77 cfs @ 11.98 hrs, Volume= 0.435 af  
 Outflow = 3.74 cfs @ 11.98 hrs, Volume= 0.430 af, Atten= 1%, Lag= 0.2 min  
 Primary = 3.74 cfs @ 11.98 hrs, Volume= 0.430 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 814.25' @ 11.98 hrs Surf.Area= 409 sf Storage= 307 cf

Plug-Flow detention time= 12.3 min calculated for 0.429 af (99% of inflow)

Center-of-Mass det. time= 5.4 min ( 787.0 - 781.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	614 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	409	0	0
815.00	409	614	614

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=3.65 cfs @ 11.98 hrs HW=814.25' (Free Discharge)

↑ **1=Culvert** (Passes 3.65 cfs of 6.48 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 3.65 cfs @ 1.62 fps)

### Summary for Pond 23P: Diversion Structure 03

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 3.98" for 25 year event  
 Inflow = 3.02 cfs @ 11.88 hrs, Volume= 0.156 af  
 Outflow = 3.02 cfs @ 11.88 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.75 cfs @ 11.87 hrs, Volume= 0.133 af  
 Secondary = 0.29 cfs @ 11.90 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 815.09' @ 11.87 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	814.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	811.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	811.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 811.50' / 810.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#4	Device 3	815.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.53 cfs @ 11.87 hrs HW=815.05' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 2.53 cfs @ 2.53 fps)

**Secondary OutFlow** Max=0.28 cfs @ 11.90 hrs HW=815.07' (Free Discharge)

↑3=Culvert (Passes 0.28 cfs of 5.53 cfs potential flow)

↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.08 fps)

↑4=Custom Weir/Orifice (Weir Controls 0.26 cfs @ 0.89 fps)

### Summary for Pond 24P: Bio Cell 3C

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 3.23" for 25 year event  
 Inflow = 2.64 cfs @ 11.89 hrs, Volume= 0.127 af  
 Outflow = 2.60 cfs @ 11.89 hrs, Volume= 0.122 af, Atten= 2%, Lag= 0.3 min  
 Primary = 2.60 cfs @ 11.89 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.20' @ 11.89 hrs Surf.Area= 376 sf Storage= 262 cf

Plug-Flow detention time= 27.4 min calculated for 0.122 af (97% of inflow)  
 Center-of-Mass det. time= 7.8 min ( 777.7 - 769.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	376	0	0
815.00	376	564	564

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=2.53 cfs @ 11.89 hrs HW=814.19' (Free Discharge)

↑1=Culvert (Passes 2.53 cfs of 6.43 cfs potential flow)

↑2=Orifice/Grate (Weir Controls 2.53 cfs @ 1.43 fps)

### Summary for Pond 28P: StormTech 03

Inflow Area = 2.150 ac, 96.28% Impervious, Inflow Depth = 3.90" for 25 year event  
 Inflow = 11.71 cfs @ 11.93 hrs, Volume= 0.699 af  
 Outflow = 11.71 cfs @ 11.93 hrs, Volume= 0.699 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.67 cfs @ 11.91 hrs, Volume= 0.462 af  
 Secondary = 10.04 cfs @ 11.93 hrs, Volume= 0.237 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 803.06' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.90'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.68'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.68'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.68' / 799.58' S= 0.0039 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.66 cfs @ 11.91 hrs HW=803.01' (Free Discharge)  
 ↳ **2=Orifice/Grate** (Orifice Controls 1.66 cfs @ 8.44 fps)

**Secondary OutFlow** Max=9.59 cfs @ 11.93 hrs HW=802.94' (Free Discharge)  
 ↳ **3=Culvert** (Inlet Controls 9.59 cfs @ 7.81 fps)  
 ↳ **1=Custom Weir/Orifice** (Passes 9.59 cfs of 13.85 cfs potential flow)

**Summary for Pond 29P: Bio Cell 4B**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.18" for 25 year event  
 Inflow = 3.81 cfs @ 11.96 hrs, Volume= 0.445 af  
 Outflow = 3.80 cfs @ 11.97 hrs, Volume= 0.441 af, Atten= 0%, Lag= 0.6 min  
 Primary = 3.80 cfs @ 11.97 hrs, Volume= 0.441 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.67' @ 11.97 hrs Surf.Area= 568 sf Storage= 378 cf

Plug-Flow detention time= 12.9 min calculated for 0.440 af (99% of inflow)  
 Center-of-Mass det. time= 6.7 min ( 773.4 - 766.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.00'	852 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.00	568	0	0
816.50	568	852	852

Device	Routing	Invert	Outlet Devices
#1	Primary	815.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.66 cfs @ 11.97 hrs HW=815.66' (Free Discharge)  
 ↳ **1=Custom Weir/Orifice** (Weir Controls 3.66 cfs @ 1.87 fps)

**Summary for Pond 30P: Bio Cell 4C**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.15" for 25 year event  
 Inflow = 3.80 cfs @ 11.97 hrs, Volume= 0.441 af  
 Outflow = 3.78 cfs @ 11.97 hrs, Volume= 0.437 af, Atten= 1%, Lag= 0.4 min  
 Primary = 3.78 cfs @ 11.97 hrs, Volume= 0.437 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.16' @ 11.97 hrs Surf.Area= 479 sf Storage= 318 cf

Plug-Flow detention time= 10.7 min calculated for 0.437 af (99% of inflow)  
 Center-of-Mass det. time= 5.3 min ( 778.6 - 773.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	719 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.50	479	0	0
816.00	479	719	719

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.66 cfs @ 11.97 hrs HW=815.16' (Free Discharge)  
 ↑1=**Custom Weir/Orifice** (Weir Controls 3.66 cfs @ 1.87 fps)

**Summary for Pond 31P: Bio Cell 4A**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.20" for 25 year event  
 Inflow = 3.72 cfs @ 11.94 hrs, Volume= 0.449 af  
 Outflow = 3.81 cfs @ 11.96 hrs, Volume= 0.445 af, Atten= 0%, Lag= 0.7 min  
 Primary = 3.81 cfs @ 11.96 hrs, Volume= 0.445 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 816.17' @ 11.96 hrs Surf.Area= 299 sf Storage= 250 cf

Plug-Flow detention time= 10.4 min calculated for 0.445 af (99% of inflow)  
 Center-of-Mass det. time= 5.4 min ( 766.7 - 761.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.33'	499 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.33	299	0	0
817.00	299	499	499

Device	Routing	Invert	Outlet Devices
#1	Primary	815.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.65 cfs @ 11.96 hrs HW=816.16' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 3.65 cfs @ 1.87 fps)

### Summary for Pond 32P: Bio Cell 3A

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 3.41" for 25 year event  
 Inflow = 2.75 cfs @ 11.87 hrs, Volume= 0.133 af  
 Outflow = 2.72 cfs @ 11.88 hrs, Volume= 0.130 af, Atten= 1%, Lag= 0.4 min  
 Primary = 2.72 cfs @ 11.88 hrs, Volume= 0.130 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.18' @ 11.88 hrs Surf.Area= 296 sf Storage= 252 cf

Plug-Flow detention time= 26.3 min calculated for 0.130 af (97% of inflow)  
 Center-of-Mass det. time= 11.1 min ( 760.8 - 749.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.33'	494 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.33	296	0	0
816.00	296	494	494

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.53 cfs @ 11.88 hrs HW=815.16' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 2.53 cfs @ 1.89 fps)

### Summary for Pond 33P: Bio Cell 3B

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 3.32" for 25 year event  
 Inflow = 2.72 cfs @ 11.88 hrs, Volume= 0.130 af  
 Outflow = 2.64 cfs @ 11.89 hrs, Volume= 0.127 af, Atten= 3%, Lag= 0.5 min  
 Primary = 2.64 cfs @ 11.89 hrs, Volume= 0.127 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.67' @ 11.89 hrs Surf.Area= 448 sf Storage= 302 cf

Plug-Flow detention time= 24.7 min calculated for 0.127 af (97% of inflow)  
 Center-of-Mass det. time= 9.1 min ( 769.9 - 760.8 )

**20131481 - B**

Type II 24-hr 25 year Rainfall=4.44"

Prepared by Symanetc

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Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	672 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	448	0	0
815.50	448	672	672

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.53 cfs @ 11.89 hrs HW=814.66' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 2.53 cfs @ 1.89 fps)

**Summary for Pond 34P: Bio Cell 4D**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.12" for 25 year event  
 Inflow = 3.78 cfs @ 11.97 hrs, Volume= 0.437 af  
 Outflow = 3.77 cfs @ 11.98 hrs, Volume= 0.435 af, Atten= 0%, Lag= 0.2 min  
 Primary = 3.77 cfs @ 11.98 hrs, Volume= 0.435 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.66' @ 11.97 hrs Surf.Area= 279 sf Storage= 185 cf

Plug-Flow detention time= 6.2 min calculated for 0.435 af (100% of inflow)

Center-of-Mass det. time= 3.0 min ( 781.6 - 778.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	419 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	279	0	0
815.50	279	419	419

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.66 cfs @ 11.98 hrs HW=814.66' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 3.66 cfs @ 1.87 fps)

**Summary for Subcatchment 6S: Subarea 04**

Runoff = 10.45 cfs @ 11.94 hrs, Volume= 0.653 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
* 1.630	98	impervious
* 0.050	74	bio basin
1.680	97	Weighted Average
0.050		2.98% Pervious Area
1.630		97.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 7S: Subarea 03**

Runoff = 3.43 cfs @ 11.88 hrs, Volume= 0.178 af, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
* 0.030	74	bio basin
* 0.440	98	impervious
0.470	96	Weighted Average
0.030		6.38% Pervious Area
0.440		93.62% Impervious Area

**Summary for Subcatchment 27S: WQf 04**

Runoff = 10.31 cfs @ 11.94 hrs, Volume= 0.670 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
* 1.640	99	
1.640		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 28S: WQf 03**

Runoff = 3.34 cfs @ 11.88 hrs, Volume= 0.184 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 50 year Rainfall=5.02"

Area (ac)	CN	Description
* 0.450	99	
0.450		100.00% Impervious Area

**Summary for Pond 21P: Diversion Structure 04**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 4.67" for 50 year event  
 Inflow = 10.45 cfs @ 11.94 hrs, Volume= 0.653 af  
 Outflow = 10.45 cfs @ 11.94 hrs, Volume= 0.653 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.86 cfs @ 11.94 hrs, Volume= 0.504 af  
 Secondary = 6.58 cfs @ 11.94 hrs, Volume= 0.150 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Peak Elev= 816.40' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	812.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	812.50'	<b>15.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 812.50' / 811.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Device 3	816.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 8.00 8.00

**Primary OutFlow** Max=3.79 cfs @ 11.94 hrs HW=816.38' (Free Discharge)  
 ↳ **1=Orifice/Grate** (Orifice Controls 3.79 cfs @ 3.79 fps)

**Secondary OutFlow** Max=6.08 cfs @ 11.94 hrs HW=816.38' (Free Discharge)  
 ↳ **3=Culvert** (Passes 6.08 cfs of 9.58 cfs potential flow)  
 ↳ ↳ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.46 fps)  
 ↳ ↳ ↳ **4=Custom Weir/Orifice** (Weir Controls 6.07 cfs @ 2.01 fps)

**Summary for Pond 22P: Bio Cell 4E**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.50" for 50 year event  
 Inflow = 3.91 cfs @ 11.98 hrs, Volume= 0.490 af  
 Outflow = 3.89 cfs @ 11.98 hrs, Volume= 0.486 af, Atten= 1%, Lag= 0.2 min  
 Primary = 3.89 cfs @ 11.98 hrs, Volume= 0.486 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

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Type II 24-hr 50 year Rainfall=5.02"

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Peak Elev= 814.26' @ 11.98 hrs Surf.Area= 409 sf Storage= 309 cf

Plug-Flow detention time= 11.5 min calculated for 0.486 af (99% of inflow)

Center-of-Mass det. time= 5.1 min ( 783.5 - 778.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	614 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	409	0	0
815.00	409	614	614

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=3.80 cfs @ 11.98 hrs HW=814.25' (Free Discharge)↑ **1=Culvert** (Passes 3.80 cfs of 6.49 cfs potential flow)↑ **2=Orifice/Grate** (Weir Controls 3.80 cfs @ 1.64 fps)**Summary for Pond 23P: Diversion Structure 03**

Inflow Area =	0.470 ac, 93.62% Impervious, Inflow Depth = 4.55" for 50 year event
Inflow =	3.43 cfs @ 11.88 hrs, Volume= 0.178 af
Outflow =	3.43 cfs @ 11.88 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min
Primary =	2.95 cfs @ 11.87 hrs, Volume= 0.153 af
Secondary =	0.51 cfs @ 11.90 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 815.13' @ 11.87 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	814.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	811.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	811.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 811.50' / 810.50' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#4	Device 3	815.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.70 cfs @ 11.87 hrs HW=815.08' (Free Discharge)

↑ **1=Orifice/Grate** (Orifice Controls 2.70 cfs @ 2.70 fps)

**Secondary OutFlow** Max=0.49 cfs @ 11.90 hrs HW=815.11' (Free Discharge)

↑ **3=Culvert** (Passes 0.49 cfs of 5.56 cfs potential flow)

↑ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.12 fps)

↑ **4=Custom Weir/Orifice** (Weir Controls 0.48 cfs @ 1.09 fps)

### Summary for Pond 24P: Bio Cell 3C

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 3.74" for 50 year event  
 Inflow = 2.86 cfs @ 11.88 hrs, Volume= 0.147 af  
 Outflow = 2.83 cfs @ 11.89 hrs, Volume= 0.142 af, Atten= 1%, Lag= 0.3 min  
 Primary = 2.83 cfs @ 11.89 hrs, Volume= 0.142 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.21' @ 11.89 hrs Surf.Area= 376 sf Storage= 266 cf

Plug-Flow detention time= 25.1 min calculated for 0.142 af (97% of inflow)  
 Center-of-Mass det. time= 8.0 min ( 776.7 - 768.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	376	0	0
815.00	376	564	564

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=2.73 cfs @ 11.89 hrs HW=814.20' (Free Discharge)

↑ **1=Culvert** (Passes 2.73 cfs of 6.44 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 2.73 cfs @ 1.47 fps)

### Summary for Pond 28P: StormTech 03

Inflow Area = 2.150 ac, 96.28% Impervious, Inflow Depth = 4.48" for 50 year event  
 Inflow = 13.34 cfs @ 11.93 hrs, Volume= 0.802 af  
 Outflow = 13.34 cfs @ 11.93 hrs, Volume= 0.802 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.89 cfs @ 11.91 hrs, Volume= 0.523 af  
 Secondary = 11.45 cfs @ 11.93 hrs, Volume= 0.280 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 803.92' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.90'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.68'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.68'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.68' / 799.58' S= 0.0039 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.86 cfs @ 11.91 hrs HW=803.79' (Free Discharge)  
 ↳ **2=Orifice/Grate** (Orifice Controls 1.86 cfs @ 9.46 fps)

**Secondary OutFlow** Max=10.82 cfs @ 11.93 hrs HW=803.66' (Free Discharge)  
 ↳ **3=Culvert** (Inlet Controls 10.82 cfs @ 8.82 fps)  
 ↳ **1=Custom Weir/Orifice** (Passes 10.82 cfs of 30.62 cfs potential flow)

**Summary for Pond 29P: Bio Cell 4B**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.57" for 50 year event  
 Inflow = 3.94 cfs @ 11.96 hrs, Volume= 0.500 af  
 Outflow = 3.94 cfs @ 11.97 hrs, Volume= 0.496 af, Atten= 0%, Lag= 0.6 min  
 Primary = 3.94 cfs @ 11.97 hrs, Volume= 0.496 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.67' @ 11.97 hrs Surf.Area= 568 sf Storage= 382 cf

Plug-Flow detention time= 11.9 min calculated for 0.495 af (99% of inflow)  
 Center-of-Mass det. time= 6.3 min ( 770.5 - 764.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.00'	852 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.00	568	0	0
816.50	568	852	852

Device	Routing	Invert	Outlet Devices
#1	Primary	815.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.79 cfs @ 11.97 hrs HW=815.66' (Free Discharge)  
 ↳ **1=Custom Weir/Orifice** (Weir Controls 3.79 cfs @ 1.89 fps)

**Summary for Pond 30P: Bio Cell 4C**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.54" for 50 year event  
 Inflow = 3.94 cfs @ 11.97 hrs, Volume= 0.496 af  
 Outflow = 3.93 cfs @ 11.97 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.4 min  
 Primary = 3.93 cfs @ 11.97 hrs, Volume= 0.492 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.17' @ 11.97 hrs Surf.Area= 479 sf Storage= 322 cf

Plug-Flow detention time= 9.8 min calculated for 0.491 af (99% of inflow)  
 Center-of-Mass det. time= 5.0 min ( 775.5 - 770.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	719 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.50	479	0	0
816.00	479	719	719

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.80 cfs @ 11.97 hrs HW=815.16' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 3.80 cfs @ 1.89 fps)

**Summary for Pond 31P: Bio Cell 4A**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.60" for 50 year event  
 Inflow = 3.86 cfs @ 11.94 hrs, Volume= 0.504 af  
 Outflow = 3.94 cfs @ 11.96 hrs, Volume= 0.500 af, Atten= 0%, Lag= 0.6 min  
 Primary = 3.94 cfs @ 11.96 hrs, Volume= 0.500 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 816.17' @ 11.95 hrs Surf.Area= 299 sf Storage= 252 cf

Plug-Flow detention time= 9.5 min calculated for 0.500 af (99% of inflow)  
 Center-of-Mass det. time= 5.0 min ( 764.2 - 759.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.33'	499 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.33	299	0	0
817.00	299	499	499

Device	Routing	Invert	Outlet Devices
#1	Primary	815.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.78 cfs @ 11.96 hrs HW=816.16' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 3.78 cfs @ 1.89 fps)

**Summary for Pond 32P: Bio Cell 3A**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 3.92" for 50 year event  
 Inflow = 2.95 cfs @ 11.87 hrs, Volume= 0.153 af  
 Outflow = 2.93 cfs @ 11.88 hrs, Volume= 0.150 af, Atten= 1%, Lag= 0.4 min  
 Primary = 2.93 cfs @ 11.88 hrs, Volume= 0.150 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.20' @ 11.87 hrs Surf.Area= 296 sf Storage= 257 cf

Plug-Flow detention time= 24.1 min calculated for 0.150 af (98% of inflow)  
 Center-of-Mass det. time= 10.7 min ( 759.6 - 749.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.33'	494 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.33	296	0	0
816.00	296	494	494

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.71 cfs @ 11.88 hrs HW=815.18' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 2.71 cfs @ 1.94 fps)

**Summary for Pond 33P: Bio Cell 3B**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 3.83" for 50 year event  
 Inflow = 2.93 cfs @ 11.88 hrs, Volume= 0.150 af  
 Outflow = 2.86 cfs @ 11.88 hrs, Volume= 0.147 af, Atten= 2%, Lag= 0.5 min  
 Primary = 2.86 cfs @ 11.88 hrs, Volume= 0.147 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.69' @ 11.88 hrs Surf.Area= 448 sf Storage= 311 cf

Plug-Flow detention time= 22.7 min calculated for 0.146 af (98% of inflow)  
 Center-of-Mass det. time= 9.1 min ( 768.7 - 759.6 )

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Type II 24-hr 50 year Rainfall=5.02"

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Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	672 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	448	0	0
815.50	448	672	672

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.72 cfs @ 11.88 hrs HW=814.68' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 2.72 cfs @ 1.94 fps)

### Summary for Pond 34P: Bio Cell 4D

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.52" for 50 year event  
 Inflow = 3.93 cfs @ 11.97 hrs, Volume= 0.492 af  
 Outflow = 3.91 cfs @ 11.98 hrs, Volume= 0.490 af, Atten= 0%, Lag= 0.2 min  
 Primary = 3.91 cfs @ 11.98 hrs, Volume= 0.490 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.67' @ 11.97 hrs Surf.Area= 279 sf Storage= 187 cf

Plug-Flow detention time= 5.6 min calculated for 0.489 af (99% of inflow)  
 Center-of-Mass det. time= 2.8 min ( 778.3 - 775.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	419 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	279	0	0
815.50	279	419	419

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.80 cfs @ 11.98 hrs HW=814.66' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 3.80 cfs @ 1.89 fps)

**Summary for Subcatchment 6S: Subarea 04**

Runoff = 11.75 cfs @ 11.94 hrs, Volume= 0.739 af, Depth= 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
* 1.630	98	impervious
* 0.050	74	bio basin
1.680	97	Weighted Average
0.050		2.98% Pervious Area
1.630		97.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 7S: Subarea 03**

Runoff = 3.86 cfs @ 11.88 hrs, Volume= 0.202 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
* 0.030	74	bio basin
* 0.440	98	impervious
0.470	96	Weighted Average
0.030		6.38% Pervious Area
0.440		93.62% Impervious Area

**Summary for Subcatchment 27S: WQf 04**

Runoff = 11.57 cfs @ 11.94 hrs, Volume= 0.753 af, Depth= 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
* 1.640	99	
1.640		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 28S: WQf 03**

Runoff = 3.75 cfs @ 11.88 hrs, Volume= 0.207 af, Depth= 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Type II 24-hr 100 year Rainfall=5.63"

Area (ac)	CN	Description
* 0.450	99	
0.450		100.00% Impervious Area

**Summary for Pond 21P: Diversion Structure 04**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 5.28" for 100 year event  
 Inflow = 11.75 cfs @ 11.94 hrs, Volume= 0.739 af  
 Outflow = 11.75 cfs @ 11.94 hrs, Volume= 0.739 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.00 cfs @ 11.94 hrs, Volume= 0.561 af  
 Secondary = 7.74 cfs @ 11.94 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Peak Elev= 816.45' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	812.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	812.50'	<b>15.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 812.50' / 811.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Device 3	816.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 8.00 8.00

**Primary OutFlow** Max=3.92 cfs @ 11.94 hrs HW=816.42' (Free Discharge)  
 ↳ **1=Orifice/Grate** (Orifice Controls 3.92 cfs @ 3.92 fps)

**Secondary OutFlow** Max=7.17 cfs @ 11.94 hrs HW=816.42' (Free Discharge)  
 ↳ **3=Culvert** (Passes 7.17 cfs of 9.64 cfs potential flow)  
 ↳ ↳ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.51 fps)  
 ↳ ↳ **4=Custom Weir/Orifice** (Weir Controls 7.16 cfs @ 2.13 fps)

**Summary for Pond 22P: Bio Cell 4E**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.91" for 100 year event  
 Inflow = 4.06 cfs @ 11.98 hrs, Volume= 0.548 af  
 Outflow = 4.04 cfs @ 11.98 hrs, Volume= 0.543 af, Atten= 0%, Lag= 0.2 min  
 Primary = 4.04 cfs @ 11.98 hrs, Volume= 0.543 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

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Peak Elev= 814.26' @ 11.98 hrs Surf.Area= 409 sf Storage= 312 cf

Plug-Flow detention time= 10.5 min calculated for 0.542 af (99% of inflow)

Center-of-Mass det. time= 4.9 min ( 780.2 - 775.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	614 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	409	0	0
815.00	409	614	614

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=3.94 cfs @ 11.98 hrs HW=814.26' (Free Discharge)↑ **1=Culvert** (Passes 3.94 cfs of 6.49 cfs potential flow)↑ **2=Orifice/Grate** (Weir Controls 3.94 cfs @ 1.66 fps)**Summary for Pond 23P: Diversion Structure 03**

Inflow Area =	0.470 ac, 93.62% Impervious, Inflow Depth = 5.16" for 100 year event
Inflow =	3.86 cfs @ 11.88 hrs, Volume= 0.202 af
Outflow =	3.86 cfs @ 11.88 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min
Primary =	3.11 cfs @ 11.87 hrs, Volume= 0.174 af
Secondary =	0.78 cfs @ 11.89 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 815.17' @ 11.87 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	814.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	811.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	811.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 811.50' / 810.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#4	Device 3	815.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.86 cfs @ 11.87 hrs HW=815.12' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 2.86 cfs @ 2.86 fps)

**Secondary OutFlow** Max=0.73 cfs @ 11.89 hrs HW=815.14' (Free Discharge)

↑**3=Culvert** (Passes 0.73 cfs of 5.59 cfs potential flow)

↑**2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 9.17 fps)

↑**4=Custom Weir/Orifice** (Weir Controls 0.72 cfs @ 1.24 fps)

### Summary for Pond 24P: Bio Cell 3C

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 4.26" for 100 year event  
 Inflow = 3.03 cfs @ 11.88 hrs, Volume= 0.167 af  
 Outflow = 3.00 cfs @ 11.89 hrs, Volume= 0.163 af, Atten= 1%, Lag= 0.3 min  
 Primary = 3.00 cfs @ 11.89 hrs, Volume= 0.163 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.22' @ 11.89 hrs Surf.Area= 376 sf Storage= 269 cf

Plug-Flow detention time= 23.5 min calculated for 0.162 af (97% of inflow)  
 Center-of-Mass det. time= 8.1 min ( 775.4 - 767.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	376	0	0
815.00	376	564	564

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=2.88 cfs @ 11.89 hrs HW=814.21' (Free Discharge)

↑**1=Culvert** (Passes 2.88 cfs of 6.44 cfs potential flow)

↑**2=Orifice/Grate** (Weir Controls 2.88 cfs @ 1.50 fps)

### Summary for Pond 28P: StormTech 03

Inflow Area = 2.150 ac, 96.28% Impervious, Inflow Depth = 5.09" for 100 year event  
 Inflow = 15.01 cfs @ 11.93 hrs, Volume= 0.911 af  
 Outflow = 15.01 cfs @ 11.93 hrs, Volume= 0.911 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.12 cfs @ 11.92 hrs, Volume= 0.586 af  
 Secondary = 12.89 cfs @ 11.93 hrs, Volume= 0.325 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 804.94' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.90'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.68'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.68'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.68' / 799.58' S= 0.0039 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=2.06 cfs @ 11.92 hrs HW=804.67' (Free Discharge)  
 ↳ **2=Orifice/Grate** (Orifice Controls 2.06 cfs @ 10.49 fps)

**Secondary OutFlow** Max=12.22 cfs @ 11.93 hrs HW=804.58' (Free Discharge)  
 ↳ **3=Culvert** (Inlet Controls 12.22 cfs @ 9.96 fps)  
 ↳ **1=Custom Weir/Orifice** (Passes 12.22 cfs of 57.63 cfs potential flow)

**Summary for Pond 29P: Bio Cell 4B**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.98" for 100 year event  
 Inflow = 4.07 cfs @ 11.95 hrs, Volume= 0.558 af  
 Outflow = 4.07 cfs @ 11.96 hrs, Volume= 0.554 af, Atten= 0%, Lag= 0.6 min  
 Primary = 4.07 cfs @ 11.96 hrs, Volume= 0.554 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.68' @ 11.96 hrs Surf.Area= 568 sf Storage= 387 cf

Plug-Flow detention time= 11.1 min calculated for 0.554 af (99% of inflow)  
 Center-of-Mass det. time= 5.9 min ( 767.8 - 761.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.00'	852 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.00	568	0	0
816.50	568	852	852

Device	Routing	Invert	Outlet Devices
#1	Primary	815.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.92 cfs @ 11.96 hrs HW=815.67' (Free Discharge)  
 ↳ **1=Custom Weir/Orifice** (Weir Controls 3.92 cfs @ 1.91 fps)

**Summary for Pond 30P: Bio Cell 4C**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.95" for 100 year event  
 Inflow = 4.07 cfs @ 11.96 hrs, Volume= 0.554 af  
 Outflow = 4.06 cfs @ 11.97 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.4 min  
 Primary = 4.06 cfs @ 11.97 hrs, Volume= 0.550 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.18' @ 11.97 hrs Surf.Area= 479 sf Storage= 326 cf

Plug-Flow detention time= 9.1 min calculated for 0.549 af (99% of inflow)  
 Center-of-Mass det. time= 4.8 min ( 772.6 - 767.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	719 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.50	479	0	0
816.00	479	719	719

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.94 cfs @ 11.97 hrs HW=815.17' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 3.94 cfs @ 1.92 fps)

**Summary for Pond 31P: Bio Cell 4A**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 4.01" for 100 year event  
 Inflow = 4.00 cfs @ 11.94 hrs, Volume= 0.561 af  
 Outflow = 4.07 cfs @ 11.95 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.6 min  
 Primary = 4.07 cfs @ 11.95 hrs, Volume= 0.558 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 816.18' @ 11.95 hrs Surf.Area= 299 sf Storage= 254 cf

Plug-Flow detention time= 8.7 min calculated for 0.558 af (99% of inflow)  
 Center-of-Mass det. time= 4.6 min ( 761.8 - 757.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.33'	499 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.33	299	0	0
817.00	299	499	499

Device	Routing	Invert	Outlet Devices
#1	Primary	815.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.92 cfs @ 11.95 hrs HW=816.17' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 3.92 cfs @ 1.91 fps)

**Summary for Pond 32P: Bio Cell 3A**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 4.44" for 100 year event  
 Inflow = 3.11 cfs @ 11.87 hrs, Volume= 0.174 af  
 Outflow = 3.10 cfs @ 11.87 hrs, Volume= 0.170 af, Atten= 1%, Lag= 0.4 min  
 Primary = 3.10 cfs @ 11.87 hrs, Volume= 0.170 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.21' @ 11.87 hrs Surf.Area= 296 sf Storage= 262 cf

Plug-Flow detention time= 22.5 min calculated for 0.170 af (98% of inflow)  
 Center-of-Mass det. time= 10.3 min ( 758.3 - 748.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.33'	494 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.33	296	0	0
816.00	296	494	494

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.87 cfs @ 11.87 hrs HW=815.19' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 2.87 cfs @ 1.97 fps)

**Summary for Pond 33P: Bio Cell 3B**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 4.35" for 100 year event  
 Inflow = 3.10 cfs @ 11.87 hrs, Volume= 0.170 af  
 Outflow = 3.03 cfs @ 11.88 hrs, Volume= 0.167 af, Atten= 2%, Lag= 0.5 min  
 Primary = 3.03 cfs @ 11.88 hrs, Volume= 0.167 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.71' @ 11.88 hrs Surf.Area= 448 sf Storage= 317 cf

Plug-Flow detention time= 21.6 min calculated for 0.167 af (98% of inflow)  
 Center-of-Mass det. time= 9.0 min ( 767.3 - 758.3 )

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Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	672 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	448	0	0
815.50	448	672	672

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=2.88 cfs @ 11.88 hrs HW=814.69' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 2.88 cfs @ 1.98 fps)

### Summary for Pond 34P: Bio Cell 4D

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 3.93" for 100 year event  
 Inflow = 4.06 cfs @ 11.97 hrs, Volume= 0.550 af  
 Outflow = 4.06 cfs @ 11.98 hrs, Volume= 0.548 af, Atten= 0%, Lag= 0.2 min  
 Primary = 4.06 cfs @ 11.98 hrs, Volume= 0.548 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.68' @ 11.97 hrs Surf.Area= 279 sf Storage= 190 cf

Plug-Flow detention time= 5.3 min calculated for 0.548 af (100% of inflow)

Center-of-Mass det. time= 2.7 min ( 775.2 - 772.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	419 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	279	0	0
815.50	279	419	419

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=3.94 cfs @ 11.98 hrs HW=814.67' (Free Discharge)

↑1=Custom Weir/Orifice (Weir Controls 3.94 cfs @ 1.92 fps)

**Summary for Subcatchment 6S: Subarea 04**

Runoff = 1.00 cfs @ 0.34 hrs, Volume= 0.066 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
* 1.630	98	impervious
* 0.050	74	bio basin
1.680	97	Weighted Average
0.050		2.98% Pervious Area
1.630		97.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 7S: Subarea 03**

Runoff = 0.21 cfs @ 0.33 hrs, Volume= 0.016 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
* 0.030	74	bio basin
* 0.440	98	impervious
0.470	96	Weighted Average
0.030		6.38% Pervious Area
0.440		93.62% Impervious Area

**Summary for Subcatchment 27S: WQf 04**

Runoff = 1.56 cfs @ 0.30 hrs, Volume= 0.088 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
* 1.640	99	
1.640		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry,</b>

**Summary for Subcatchment 28S: WQf 03**

Runoff = 0.47 cfs @ 0.22 hrs, Volume= 0.024 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Area (ac)	CN	Description
* 0.450	99	
0.450		100.00% Impervious Area

**Summary for Pond 21P: Diversion Structure 04**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 0.47" for WQ event  
 Inflow = 1.00 cfs @ 0.34 hrs, Volume= 0.066 af  
 Outflow = 1.00 cfs @ 0.34 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.99 cfs @ 0.34 hrs, Volume= 0.064 af  
 Secondary = 0.01 cfs @ 0.30 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.78' @ 0.30 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	815.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	812.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	812.50'	<b>15.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 812.50' / 811.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#4	Device 3	816.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 8.00 8.00

**Primary OutFlow** Max=0.92 cfs @ 0.34 hrs HW=815.77' (Free Discharge)  
 ↳ **1=Orifice/Grate** (Orifice Controls 0.92 cfs @ 1.68 fps)

**Secondary OutFlow** Max=0.01 cfs @ 0.30 hrs HW=815.78' (Free Discharge)  
 ↳ **3=Culvert** (Passes 0.01 cfs of 8.75 cfs potential flow)  
 ↳ ↳ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 8.69 fps)  
 ↳ ↳ ↳ **4=Custom Weir/Orifice** ( Controls 0.00 cfs)

**Summary for Pond 22P: Bio Cell 4E**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 0.36" for WQ event  
 Inflow = 1.02 cfs @ 0.58 hrs, Volume= 0.051 af  
 Outflow = 1.18 cfs @ 0.61 hrs, Volume= 0.046 af, Atten= 0%, Lag= 2.0 min  
 Primary = 1.18 cfs @ 0.61 hrs, Volume= 0.046 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 814.11' @ 0.60 hrs Surf.Area= 409 sf Storage= 252 cf

Plug-Flow detention time= 10.3 min calculated for 0.046 af (91% of inflow)  
Center-of-Mass det. time= 4.3 min ( 66.3 - 62.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	614 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	409	0	0
815.00	409	614	614

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=1.08 cfs @ 0.61 hrs HW=814.11' (Free Discharge)

↑1=Culvert (Passes 1.08 cfs of 6.34 cfs potential flow)

↑2=Orifice/Grate (Weir Controls 1.08 cfs @ 1.08 fps)

### Summary for Pond 23P: Diversion Structure 03

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 0.41" for WQ event  
 Inflow = 0.21 cfs @ 0.33 hrs, Volume= 0.016 af  
 Outflow = 0.21 cfs @ 0.33 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.20 cfs @ 0.33 hrs, Volume= 0.014 af  
 Secondary = 0.01 cfs @ 0.30 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs

Peak Elev= 814.60' @ 0.30 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	814.50'	<b>24.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	811.50'	<b>0.5" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	811.50'	<b>12.0" Round Culvert</b> L= 100.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 811.50' / 810.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#4	Device 3	815.00'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=0.19 cfs @ 0.33 hrs HW=814.60' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 0.19 cfs @ 1.00 fps)

**Secondary OutFlow** Max=0.01 cfs @ 0.30 hrs HW=814.60' (Free Discharge)

↑3=Culvert (Passes 0.01 cfs of 5.15 cfs potential flow)

↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.45 fps)

↑4=Custom Weir/Orifice ( Controls 0.00 cfs)

### Summary for Pond 24P: Bio Cell 3C

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 0.19" for WQ event  
 Inflow = 0.14 cfs @ 0.75 hrs, Volume= 0.007 af  
 Outflow = 0.07 cfs @ 1.32 hrs, Volume= 0.003 af, Atten= 52%, Lag= 34.4 min  
 Primary = 0.07 cfs @ 1.32 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.02' @ 1.30 hrs Surf.Area= 376 sf Storage= 194 cf

Plug-Flow detention time= 50.0 min calculated for 0.003 af (42% of inflow)  
 Center-of-Mass det. time= 27.2 min ( 98.4 - 71.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	813.50'	564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
813.50	376	0	0
815.00	376	564	564

Device	Routing	Invert	Outlet Devices
#1	Primary	810.50'	<b>12.0" Round Culvert</b> L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.50' / 810.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	814.00'	<b>2.0" x 24.0" Horiz. Orifice/Grate X 8.00</b> C= 0.600 in 27.5" x 27.5" Grate (51% open area) Limited to weir flow at low heads

**Primary OutFlow** Max=0.05 cfs @ 1.32 hrs HW=814.01' (Free Discharge)

↑1=Culvert (Passes 0.05 cfs of 6.25 cfs potential flow)

↑2=Orifice/Grate (Weir Controls 0.05 cfs @ 0.40 fps)

### Summary for Pond 28P: StormTech 03

Inflow Area = 2.150 ac, 96.28% Impervious, Inflow Depth = 0.30" for WQ event  
 Inflow = 1.20 cfs @ 0.61 hrs, Volume= 0.053 af  
 Outflow = 1.20 cfs @ 0.61 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.20 cfs @ 0.61 hrs, Volume= 0.053 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 801.52' @ 0.61 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	801.90'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 6.00 Width (feet) 4.00 4.00
#2	Primary	799.68'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Secondary	799.68'	<b>15.0" Round Culvert</b> L= 25.8' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 799.68' / 799.58' S= 0.0039 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

**Primary OutFlow** Max=1.14 cfs @ 0.61 hrs HW=801.38' (Free Discharge)  
 ↳ **2=Orifice/Grate** (Orifice Controls 1.14 cfs @ 5.80 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=799.68' (Free Discharge)  
 ↳ **3=Culvert** ( Controls 0.00 cfs)  
 ↳ **1=Custom Weir/Orifice** ( Controls 0.00 cfs)

**Summary for Pond 29P: Bio Cell 4B**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 0.44" for WQ event  
 Inflow = 1.06 cfs @ 0.40 hrs, Volume= 0.061 af  
 Outflow = 1.06 cfs @ 0.44 hrs, Volume= 0.057 af, Atten= 0%, Lag= 2.1 min  
 Primary = 1.06 cfs @ 0.44 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.47' @ 0.40 hrs Surf.Area= 568 sf Storage= 265 cf

Plug-Flow detention time= 9.1 min calculated for 0.057 af (93% of inflow)  
 Center-of-Mass det. time= 4.3 min ( 55.9 - 51.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.00'	852 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.00	568	0	0
816.50	568	852	852

Device	Routing	Invert	Outlet Devices
#1	Primary	815.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=0.93 cfs @ 0.44 hrs HW=815.46' (Free Discharge)  
 ↳ **1=Custom Weir/Orifice** (Weir Controls 0.93 cfs @ 1.18 fps)

**Summary for Pond 30P: Bio Cell 4C**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 0.41" for WQ event  
 Inflow = 1.06 cfs @ 0.44 hrs, Volume= 0.057 af  
 Outflow = 1.37 cfs @ 0.51 hrs, Volume= 0.053 af, Atten= 0%, Lag= 4.4 min  
 Primary = 1.37 cfs @ 0.51 hrs, Volume= 0.053 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.00' @ 0.51 hrs Surf.Area= 479 sf Storage= 240 cf

Plug-Flow detention time= 8.2 min calculated for 0.053 af (93% of inflow)  
 Center-of-Mass det. time= 3.8 min ( 59.7 - 55.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.50'	719 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.50	479	0	0
816.00	479	719	719

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=1.27 cfs @ 0.51 hrs HW=814.99' (Free Discharge)  
 ↑1=**Custom Weir/Orifice** (Weir Controls 1.27 cfs @ 1.31 fps)

**Summary for Pond 31P: Bio Cell 4A**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 0.46" for WQ event  
 Inflow = 0.99 cfs @ 0.34 hrs, Volume= 0.064 af  
 Outflow = 1.06 cfs @ 0.40 hrs, Volume= 0.061 af, Atten= 0%, Lag= 3.7 min  
 Primary = 1.06 cfs @ 0.40 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 815.97' @ 0.40 hrs Surf.Area= 299 sf Storage= 192 cf

Plug-Flow detention time= 6.7 min calculated for 0.061 af (95% of inflow)  
 Center-of-Mass det. time= 2.9 min ( 51.5 - 48.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	815.33'	499 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
815.33	299	0	0
817.00	299	499	499

**20131481 - B**

Huff 0-10sm 1Q 2.00 hrs WQ Rainfall=0.75"

Prepared by Symanetc

Printed 3/30/2015

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Device	Routing	Invert	Outlet Devices
#1	Primary	815.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

**Primary OutFlow** Max=1.06 cfs @ 0.40 hrs HW=815.97' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 1.06 cfs @ 1.24 fps)

**Summary for Pond 32P: Bio Cell 3A**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 0.36" for WQ event  
 Inflow = 0.20 cfs @ 0.33 hrs, Volume= 0.014 af  
 Outflow = 0.24 cfs @ 0.51 hrs, Volume= 0.011 af, Atten= 0%, Lag= 10.8 min  
 Primary = 0.24 cfs @ 0.51 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.90' @ 0.51 hrs Surf.Area= 296 sf Storage= 168 cf

Plug-Flow detention time= 24.6 min calculated for 0.011 af (76% of inflow)  
 Center-of-Mass det. time= 11.2 min ( 55.9 - 44.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.33'	494 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.33	296	0	0
816.00	296	494	494

Device	Routing	Invert	Outlet Devices
#1	Primary	814.83'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 4.00 4.00

**Primary OutFlow** Max=0.22 cfs @ 0.51 hrs HW=814.90' (Free Discharge)  
 ↑1=Custom Weir/Orifice (Weir Controls 0.22 cfs @ 0.84 fps)

**Summary for Pond 33P: Bio Cell 3B**

Inflow Area = 0.470 ac, 93.62% Impervious, Inflow Depth = 0.28" for WQ event  
 Inflow = 0.24 cfs @ 0.51 hrs, Volume= 0.011 af  
 Outflow = 0.14 cfs @ 0.75 hrs, Volume= 0.007 af, Atten= 42%, Lag= 14.4 min  
 Primary = 0.14 cfs @ 0.75 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.37' @ 0.70 hrs Surf.Area= 448 sf Storage= 168 cf

Plug-Flow detention time= 31.1 min calculated for 0.007 af (69% of inflow)  
 Center-of-Mass det. time= 15.3 min ( 71.2 - 55.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	672 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	448	0	0
815.50	448	672	672

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

**Primary OutFlow** Max=0.12 cfs @ 0.75 hrs HW=814.37' (Free Discharge)  
 ↳1=Custom Weir/Orifice (Weir Controls 0.12 cfs @ 0.69 fps)

**Summary for Pond 34P: Bio Cell 4D**

Inflow Area = 1.680 ac, 97.02% Impervious, Inflow Depth = 0.38" for WQ event  
 Inflow = 1.37 cfs @ 0.51 hrs, Volume= 0.053 af  
 Outflow = 1.02 cfs @ 0.58 hrs, Volume= 0.051 af, Atten= 26%, Lag= 4.1 min  
 Primary = 1.02 cfs @ 0.58 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.10 hrs  
 Peak Elev= 814.47' @ 0.60 hrs Surf.Area= 279 sf Storage= 130 cf

Plug-Flow detention time= 5.1 min calculated for 0.051 af (96% of inflow)  
 Center-of-Mass det. time= 2.2 min ( 62.0 - 59.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	419 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

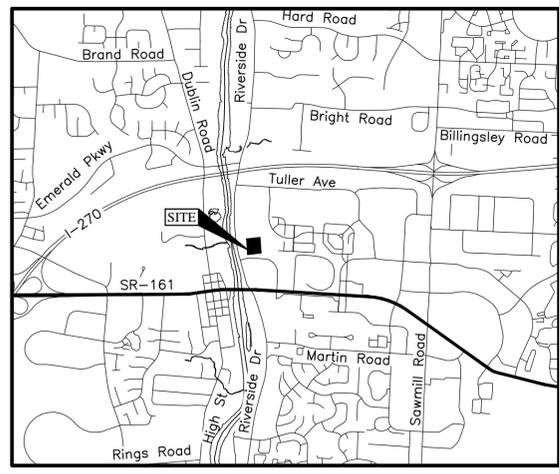
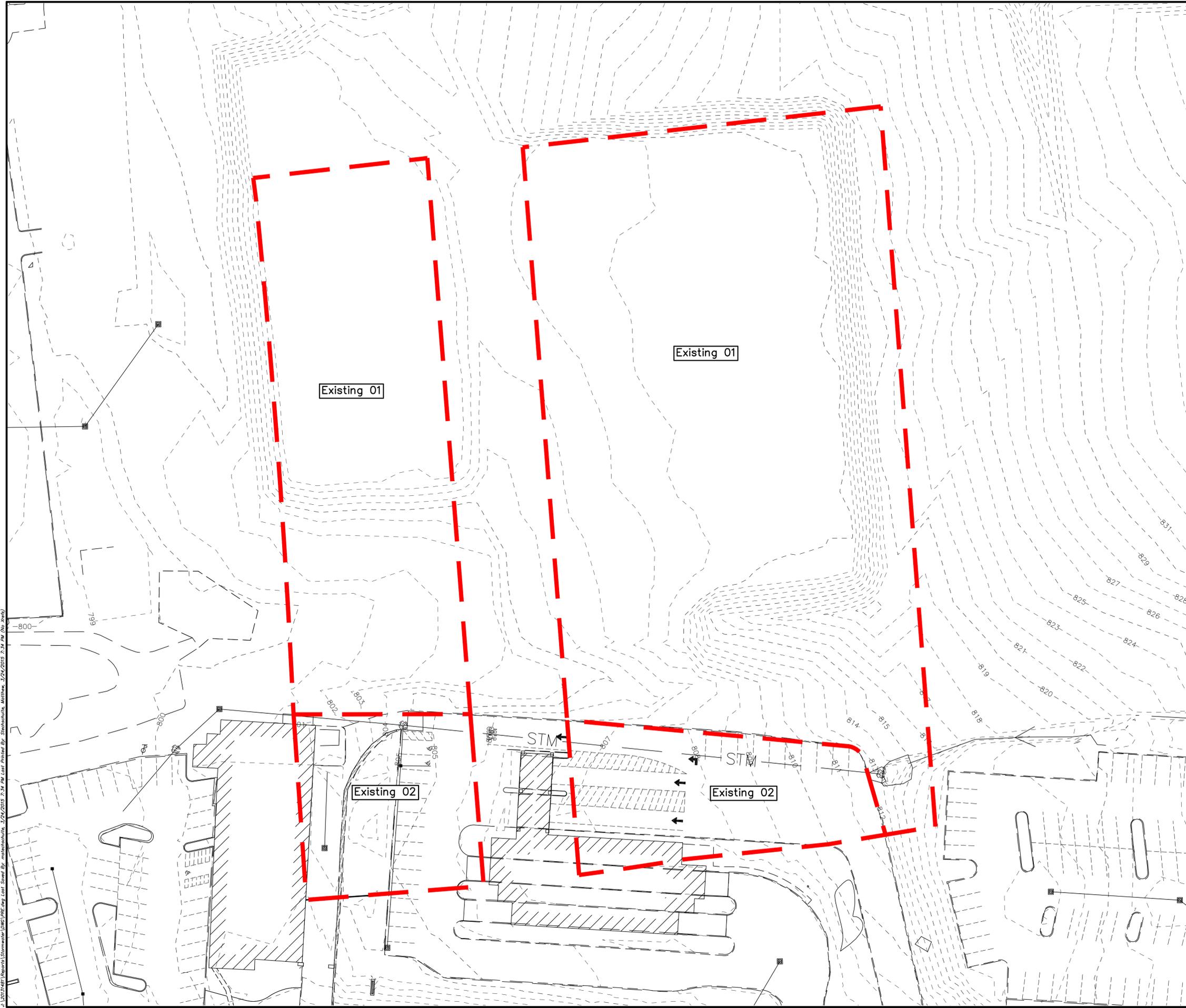
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
814.00	279	0	0
815.50	279	419	419

Device	Routing	Invert	Outlet Devices
#1	Primary	814.33'	<b>Custom Weir/Orifice, Cv= 2.62 (C= 3.28)</b> Head (feet) 0.00 1.50 Width (feet) 6.00 6.00

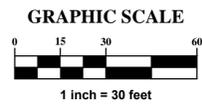
**Primary OutFlow** Max=0.94 cfs @ 0.58 hrs HW=814.46' (Free Discharge)  
 ↳1=Custom Weir/Orifice (Weir Controls 0.94 cfs @ 1.19 fps)

## APPENDIX D:

### Exhibits



**LOCATION MAP**  
Not to Scale



Existing 01  
 Considered New Development Area  
 Area= 2.86 acres  
 RCN= 74  
 TC= 0.083 hrs

Existing 02  
 Considered Redevelopment Area  
 Area= 0.61 acres  
 RCN= 95  
 TC= 0.083 hrs

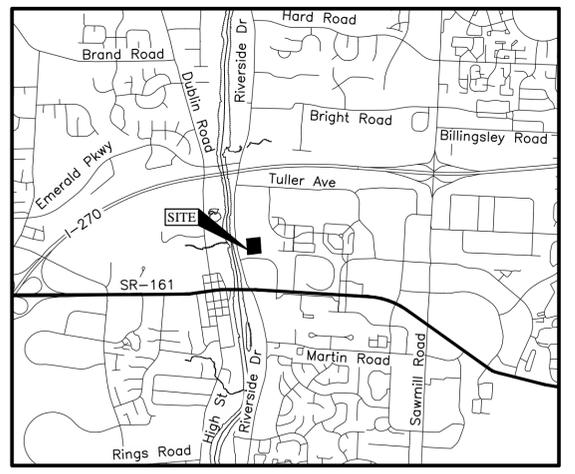
**Legend**  
 ——— Limits of Disturbance

**Soil Classification**  
 M<sub>c</sub>2 – Milton Silt Loam      Type "C" Soils  
 M<sub>k</sub>B – Miamian Silt Loam    Type "C" Soils

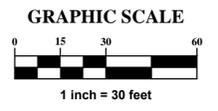
	Job No. 2013-1481	Sheet <b>EXHIBIT 1</b>
	Date MARCH, 2015	Scale 1" = 30'
CITY OF DUBLIN, FRANKLIN COUNTY, OHIO STORMWATER MANAGEMENT PLAN FOR <b>BRIDGE PARK BLOCK C</b> EXISTING CONDITIONS STORMWATER WORK MAP		
EMH Evans, Mechwart, Hamblen & Tibon, Inc. 5200 New Albany Road, Columbus, OH 43224 Phone: 614.278.6000 Fax: 614.278.6000		

C:\2013\1481\Stormwater\DWG\Print.dwg, Last Saved By: mstachurski, 3/24/2015 7:34 PM, Last Printed By: Stachurski, Matthew, 3/24/2015 7:34 PM (No Zoom)

4/20/2016 10:58 AM (Stormwater) [DWG] POST.rvt (Last Saved By: mitchell@emh.com, 3/20/2016 2:49 PM (Last Printed By: Stephanie@emh.com, 3/20/2016 2:50 PM (No Print)



**LOCATION MAP**  
Not to Scale



<p><b>Subarea 01</b> Area= 0.44 acres RCN= 97 TC= 0.083 hrs</p>	<p><b>Bio Basin 01</b> discharges to StormTech 01 StormTech 01 discharges to 15" storm sewer along Riverside Dr</p>
<p><b>Subarea 02</b> Area= 0.52 acres RCN= 97 TC= 0.083 hrs</p>	<p><b>Bio Basin 02</b> discharges to StormTech 02 StormTech 02 discharges to 30" storm sewer along Longshore St</p>
<p><b>Subarea 03</b> Area= 0.47 acres RCN= 96 TC= 0.083 hrs</p>	<p><b>Bio Basin 03</b> discharges to StormTech 03 StormTech 03 discharges to 30" storm sewer along Longshore St</p>
<p><b>Subarea 04</b> Area= 1.68 acres RCN= 97 TC= 0.083 hrs</p>	<p><b>Bio Basin 04</b> discharges to StormTech 03 StormTech 03 discharges to 30" storm sewer along Longshore St</p>

**Legend**

	Limits of Disturbance
	Tributary Boundary
	Bioretention Area
	StormTech Chambers

**Soil Classification**

McC2 - Milton Silt Loam	Type "C" Soils
MkK - Miamian Silt Loam	Type "C" Soils

	CITY OF DUBLIN, FRANKLIN COUNTY, OHIO STORMWATER MANAGEMENT PLAN FOR <b>BRIDGE PARK BLOCK C</b> POST-DEVELOPED STORMWATER TRIBUTARY MAP	Job No. 2013-1481 Date MARCH, 2015 Sheet EXHIBIT 2	Scale 1" = 30' Date MARCH, 2015 Sheet EXHIBIT 2
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