

**Attachment O-3**

Stormwater Management and Site BMP Plan

# Stormwater Management and Site BMP Plan:

## 1.0 Purpose and Intent:

The purpose of the Stormwater Management Plan (Stormwater Plan) for the DS Johnson Mine Site is to protect and improve the quality of surface waters and groundwaters by reducing the amount of pollutants potentially contained in the stormwater runoff. This primary goal is accomplished by:

- 1.1 Identification of sources of stormwater contamination;
- 1.2 Development of appropriate source area pollution prevention best management practices designed to prevent or minimize stormwater contamination;
- 1.3 Development of stormwater treatment best management practices to reduce stormwater contaminants prior to discharge; and
- 1.4 Development of schedules, as necessary, to ensure that the stormwater management actions developed within the SWPPP are implemented and evaluated on a regular basis.

This Stormwater Plan outlines source area pollution prevention and sediment treatment best management practices that shall be utilized to minimize sediment discharge to the maximum extent practicable. Other stormwater pollutants, such as salt, petroleum products, or other materials potentially hazardous to surface waters or groundwaters will be controlled to the maximum extent practicable by the use of source area pollution prevention best management practices and treatment best management practices.

A Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the currently permitted DS Mine Site. This Stormwater Plan includes the DS and Johnson Mine Site. Plan sheets and more in-depth hydrologic calculations will be developed as construction plans are finalized.

It is recognized that prior to the Johnson Mine Site construction the Operator must obtain an amendment to their current Non-Metallic Mineral Mining WPDES coverage. The development of the SWPPP amendment for the Site will take into consideration stormwater management, erosion and sedimentation controls presented here modified to reflect further site design and mine planning.

## 2.0 Activity Description:

Proposed activities on the Johnson Site include clearing and grubbing, stripping topsoil, grading, excavating, constructing berms, constructing basins and installing stormwater outfall structures, construction of stormwater management features (diversion, ditches, swales and ponds), along with any necessary erosion control devices.

## 3.0 Site Drainage:

### 3.1 Existing Drainage Patterns and Receiving Waters:

The existing drainage patterns are shown on Figure O-2, "Initial Site Map". The majority of the site drains to an existing outfall at the south-east corner of the Johnson Site. This outfall is a culvert that crosses 135th Avenue into a wetland complex and an intermittent stream, which is tributary to Running Valley Creek. A portion of the Johnson site drains to a culvert near the existing driveway located in the south west area of

the site. This culvert also crosses 135th Avenue and drains into a wetland complex and is tributary to Running Valley Creek. Running Valley Creek is classified by WDNR as a Class II Trout Stream. There are no impaired waters or outstanding/exceptional resource waters within 1 mile of the site.

### 3.2 Wetlands:

A preliminary field review performed by Ayres Associates to determine the presence of wetlands was performed in October 2014 and January 2015. Wetlands were identified on the eastern portion of the Johnson Site. No wetlands were identified on the western portion of the Johnson Site. There will be no wetland impacts as part of this project. Hydrology will be maintained to the identified wetlands through pond discharges and stormwater diversions.

### 3.3 Existing Site Soils:

#### Soil Information:

The USDA Natural Resources Conservation Service (NRCS) soil survey data for Chippewa County shows the proposed project boundary to include 8 soil series with varying slopes. Table O-1, "*Chippewa County Soil Survey Data Table*", lists the soils types found on the Johnson Site. Figure O-3, "*Soils Map*", illustrates the Johnson Site soils.

There are four dominant soil types on the Site; the Seaton silt loam (SeC2) 6%-12% slopes, the Gale Silt Loam (GAC2) 6%-12% slopes, the Arenzville silt loam (AoA) 0%-3% slopes, and the Northfield Silt Loam (NtC2) 6%-12% slopes. The site soils classifications range from hydrologic group A to hydrologic soil group D soil. A table of the Johnson Site soils is found in Section 3.1 of the Reclamation Plan Amendment and Figure O-3, "Soil Survey Map", illustrates the Site soils.

A horizon soils will be kept separate from B horizon soils. Topsoil will not be stockpiled with general overburden materials.

### 3.4 Proposed Site Drainage:

The currently permitted DS Mine Site drainage patterns and stormwater facilities consist of a series of drainage basins that provide stormwater quality treatment and runoff rate control. The proposed site drainage areas are shown on Figure 3, Proposed Conditions Drainage Map, and the stormwater ponds have been modeled using HydroCAD. The HydroCAD calculations are provided at the end of this Stormwater Management and Site BMP Plan. The Operator proposes to construct and maintain stormwater management facilities at the Johnson Site to provide additional stormwater treatment for the DS Mine Site. The proposed stormwater management facilities will function as part of the treatment train that currently exists at the DS Mine Site. The purpose of the proposed stormwater management facilities is to provide the Operator the ability to treat stormwater prior to discharging off the Site into the local drainage ways and the waters of the state. The proposed stormwater treatment includes two large stormwater basins, Ponds B8.0 and B8.1, that are designed to hold the runoff from the back-to-back 100-YR, 24-hr storm event. Pond B8.0 is designed to receive runoff from the DS Mine Site drainage series which ends at pond B1.1. Pond B8.0 discharges into Pond B8.1 through a 48 inch diameter outlet pipe. Pond B8.1 is designed as landlocked

basin with only an emergency overflow weir to provide flow to safely pass any storm event over the back-to-back 100-YR, 24-hr storm event. Pond B8.1 is designed with an outlet structure to allow the Operator to release water from the pond after testing to determine that the discharge meets the required water quality standards. Stormwater ponds at the DS and Johnson sites may need to be discharged off-site under certain circumstances. Prior to discharging process and/or stormwater off-site from stormwater ponds the Operator will take into account many factors including: discharge water quality, the condition of the downstream receiving resource, weather conditions, mining and reclamation status, and consideration of additional infiltration and/or evaporation practices. . In order to control the rate of flow and volume of runoff leaving the site, routine inspections will be conducted at the Site, and stormwater will be re-circulated on-site to the extent practicable and allowed to infiltrate.

- 3.4.1. Maximize Consumptive Use: The Operator will provide additional measures to decrease the volume of water that leaves the Site by directing as much runoff as practicable to the excavated quarry, by increasing the surface area of stormwater ponds (as a result of this amendment), and by increasing the frequency of applying water to stockpiles, haul roads, and other areas requiring dust control or watering to the extent practicable. The added pond surface area and increased frequency of applying water, as practicable, will promote water consumption by means of evaporation. The application of these additional measures will depend on weather conditions.
- 3.4.2. No Continuous Discharge: The Operator will not release stormwater off-site from any stormwater pond on a continual basis. When stormwater is released from a pond by either pumping or opening an outlet pipe, the scheduled discharge flow rate(s) will be controlled to the extent practicable to take into account the pre-mining peak flows, the recent weather conditions, and the condition of the downstream resources. The release of stormwater from a pond will be limited to approximately a few days, with at least a few days between scheduled discharges as practicable.
- 3.4.3. Downstream Resources: The condition and type of the downstream resource of each pond will be considered prior to each scheduled discharge in order to minimize impact to the downstream resources. Downstream resources that could be affected by discharges from the DS and Johnson sites include agricultural fields to the east, an intermittent stream to the south, and woodland drainage ways to the north and west. Prior to releasing water from the ponds measures will be taken to prevent erosion in the intermittent stream channel by controlling discharge rates and discharge time periods. Pond discharge flow rates will be controlled, discharge time periods controlled, and discharge timing scheduled in order to prevent the downstream woodlands and agricultural fields from becoming continuously inundated and wet as practicable.
- 3.4.4. Discharge Rate and Intensity: When stormwater is released from a pond it will be discharged to approximately mimic the natural conditions of pre-mining stormwater flow and reduce potential off site impacts to the extent practicable.
- 3.4.5. Discharge Planning: The weather conditions will likely dictate when and how much water will need to be discharged from each pond. During dry periods much of the stormwater can be managed internally, by either infiltration (through a water use application as described in 3.4.1 above) or just by the evaporation that will occur from the surface of each pond. During wet and/or

extreme rainfall events or periods, it will be much more difficult to manage the stormwater internally and water will likely need to be treated and discharged off-site. The current mining conditions, including market demand, mine floor open areas, and reclamation procedures/timing, will also have an impact on when and how much water will need to be discharged off-site. The water quality will also be considered prior to a scheduled discharge. Only water that meets the current standards for TSS (and other parameters) required by the WiDNR will be discharged off-site (currently maximum TSS is at 40mg/L per the NMM General WPDES Permit No. WI-0046515-05, dated 7/1/09). The Operator intends to discharge non-process stormwater in accordance with process water quality standards.

Each pond on the DS and Johnson sites will need to be managed differently. For each pond an operating procedure will be developed. This operating procedure will include details on the controlled discharge rate utilized, the approximate discharge period, discharge timing based on recent weather conditions and current mine conditions, and discharge procedures including pumping and/or pipe outlet openings.

#### 4.0 Potential Source Areas of Stormwater Contamination

- 4.1 Access Roads: Unpaved site access and internal mining haul roads may generate dust. Necessary moisture will be applied to the construction area and haul roads in order to prevent the spread of dust. Approved dust control products may be used as necessary.
- 4.2 Land Disturbing Activities: Typical land disturbing activities at the Site will include constructing roads, overburden removal, clearing and grubbing, topsoil and overburden removal, excavating sandstone, perimeter berming, reclamation grading, and other related activities. BMPs that minimize erosion and sedimentation will be most effective if installed as close as possible to the source. A list of best management practices (BMPs) used to control land disturbing activities is presented in Section 5.0.
- 4.2 Storage Areas for Raw Products: Product storage areas, including topsoil, overburden, and raw sand stockpiles are potential areas for stormwater contamination. Raw sand stockpiles will be on-site for brief time periods and any runoff from the stockpiles will be directed into stormwater treatment ponds.
- 4.3 Areas of Significant Erosion: These include areas stripped in preparation of mining, stockpiles, internal access roads, transfer/staging areas, unreclaimed mining areas, and runoff from off-site areas. A list of best management practices (BMPs) used to control areas of significant erosion is presented in Section 5.0.
- 4.4 Vehicle Maintenance Areas: Stormwater contacting areas where vehicle maintenance or washing occurs has the potential to pick up contaminants. All vehicle maintenance will take place in an area with spill prevention measures in place.
- 4.5 Washing Areas for Equipment and Vehicles: Any external washing of trucks and other construction vehicles will be limited to a defined area of the site. Vehicles will be washed only on an area stabilized with stone that drains to an approved sediment trapping device. Runoff from the washing area will be contained and waste properly disposed of. No engine degreasing is allowed on site.

## 5.0 Best Management Practices:

The primary objective of BMPs to be implemented at the Site is to:

- Minimize disturbed areas;
- Stabilize inactive disturbed areas;
- Minimize stormwater runoff from the active mining areas of the mining operation;
- Collect and retain sediment from active areas of the mining operation;
- Minimize velocities from access roads that drain out of the Site; and
- Collect sediment from access roads and vehicles that operate in the mine.

Permanent and temporary best management practices to be incorporated into the construction of the site as well as during mining, reclamation and processing activities:

- 5.1 Silt Fence
- 5.2 Rock Construction Entrance
- 5.3 Diversion Berms
- 5.4 Conveyance Swales
- 5.5 Erosion Control Matting
- 5.6 Ditch Checks
- 5.7 Sedimentation Basins with valves to control the release of treated stormwater
- 5.8 Water Applied Polymer (flocculants and coagulants)
- 5.9 Seeding and Mulching
- 5.10 Temporary Infiltration Areas within recessed portion of the mine floor

## 6.0 General Operations:

- 6.1 Temporary and permanent erosion prevention and sediment controls will be used during construction activities to provide soil stabilization for disturbed areas and structural controls to divert runoff and remove sediment. Controls are also identified to address other potential stormwater pollutant sources such as construction materials, waste disposal, control of vehicle traffic, and sanitary waste disposal.
- 6.2 BMPs identified on the above referenced plans and in the SWPPP to be prepared for the Site in accordance with the WPDES Nonmetallic Mining General Permit WI-0046515-5 shall be selected, installed, and maintained in an appropriate and functional manner that is in accordance with relevant manufacturer specifications and accepted engineering practices.
- 6.3 Sediment control practices shall be established on all down gradient perimeters before any up gradient land disturbing activities begin. These practices shall remain in place until final stabilization has been established.

## 7.0 Erosion Prevention Practices

- 7.1 The location of areas not to be disturbed shall be delineated (e.g. with flags, stakes, signs, silt fence, etc.) on the Site before work begins.

- 7.2 The removal of trees and surface vegetation shall be avoided wherever possible. Mining activity shall be phased in order to expose the smallest practical area of soil at any given time. Appropriate phasing, vegetative buffer strips, horizontal slope grading, and other construction practices that minimize erosion shall be implemented.
- 7.3 Following initial soil disturbance or redisturbance, permanent or temporary stabilization against erosion due to rain, wind, and running water shall be completed as soon as possible, but in no case later than 14 calendar days, on all disturbed or graded areas including stormwater management pond sideslopes. This requirement does not apply to those areas that are currently being used for material storage or for those areas on which mining, grading, site building, or other activities are actively underway.
- 7.4 Vegetation shall be established on all topsoil stockpiles and diversion berms and swales.
- 7.5 Any areas to be paved shall be stabilized using early application of gravel base.
- 7.6 The normal wetted perimeter of any temporary or permanent drainage ditch or swale that conveys water from any portion of the processing area or active unstabilized mining and reclamation fill areas, or diverts water around the site, within 200 lineal feet from the property edge, or within 200 feet from the point of discharge to any surface water shall be stabilized within 24 hours of connecting to a surface water.
- 7.7 The remaining portions of any temporary or permanent drainage ditches or swales shall be stabilized within 14 calendar days after connecting to a surface water and construction in that portion of the ditch has temporarily or permanently ceased.
- 7.8 Pipe outlets shall be provided with temporary or permanent energy dissipation within 24 hours of connection to a surface water. An 18 inch thick layer of WiDOT 606 medium riprap shall be placed onto a 9 inch thick layer of granular filter material at locations indicated on the plan in accordance with WiDOT 606. Two layers of WiDOT 645.3.7 Type HR Geotextile fabric shall be installed beneath the granular filter material. The installation at pipe outfalls shall be configured as shown on Sheet C3 Sedimentation and Erosion Control Details, for the size of pipe indicated and the geotextile fabric shall extend under the culvert apron a minimum of 3 feet. For pipe sizes smaller than 12 inch diameter, the minimum quantity of riprap and filter blanket shall be no less than that required for 12 inch diameter pipes.
- 7.9 Necessary moisture or approved dust control shall be applied to the mine area and haul roads in order to prevent the spread of dust.

## **8.0 Soil Stabilization**

- 8.1 Water and maintain seeded areas on a timely day-to-day basis. In the event of a seeding failure, reseed and mulch the areas where the original seed has failed to grow and perform additional watering as necessary.
- 8.2 In areas to be temporarily seeded, use introduced seed mixture in accordance with WiDOT Seed Mix No. 20. Apply seed mixture in accordance with WiDOT Standard Spec. 630 and WDNR Conservation Practice

Standard 1059.

- 8.3 In areas to be permanently seeded, establish and maintain native seed mixtures in accordance with Reclamation Plan.
- 8.4 Reinforce pond overflow swales with Landlok TRM 450 turf reinforcement mat, or approved equal. Install the mat in accordance with the manufacturer's recommendations.
- 8.5 In seeded areas with slopes equal to or flatter than 4:1, apply WiDOT Standard Spec. 627 mulch uniformly over the soil surface by hand or machine within 24 hours after seeding in accordance with WiDOT Standard Spec. 627.3. Apply mulch at a rate of 2 tons per acre. Immediately after placement, anchor all mulch material into the soil by crimping (straight disking) in a direction perpendicular to that of the overland stormwater flow. Punch the mulch into the soil to a depth of 2 to 3 inches with a disk spacing of 8" or less.
- 8.6 In seeded areas with slopes steeper than 4:1, install biodegradable erosion control blankets uniformly over the soil surface by hand within 24 hours after seeding in accordance with manufacturers recommendations. Use WiDOT Standard Spec. 628.2 ECRM Class I Type B mat.
- 8.7 In seeded ditches, install ECRM or TRM erosion control mats uniformly over the soil surface by hand within 24 hours after seeding in accordance with manufacturers recommendations. Use WiDOT Standard Spec. 628.2 ECRM Class I Type B mat or TRM Class III Type C mat.
- 8.8 Erosion Control Blanket Installation: Lay the blanket parallel to the direction of water flow with the netting on the top. Spread the blankets evenly without stretching so that fibers are in direct contact with the soil. Overlap adjacent strip edges 2 - 4 inches. Overlap strip ends a minimum of 10 inches with the upgrade strip on top. Bury the upstream end of each blanket at least 6 inches in a vertical trench with the soil pressed firmly against the embedded mat. Install additional check trenches at 50' intervals. Staple strip ends and end overlaps with not more than 12 inches between staples. Staple all other joints and edges at 2 ft. intervals. Place additional staples down the center of each blanket in a diamond pattern at a maximum of 2 foot intervals. Insert all staples flush with the ground surface. Staples shall be 11 gauge or heavier "U"-shaped with a 1 - 2 inch crown. Staple length shall be 10 inches.
- 8.9 Winter Mulching: Snow mulching consists of mulch material spread over frozen ground. Mulch materials that do not require disc-anchoring into the soil may be placed without modification. Mulch materials that require disc-anchoring may be anchored with hydraulic soil stabilizers or may be frozen to the soil by applying water at a rate of 2000 gallons per acre over the mulch as a substitution for disc-anchoring.

## 9.0 Sediment Control Practices

- 9.1 Sediment control practices shall be implemented in order to minimize sediment from entering surface waters.
- 9.2 Temporary or permanent sediment control measures including silt fence at perimeter of construction, rock construction entrances, sediment filters, silt sacks, and sedimentation basins shall be installed prior to beginning site clearing, grading, or other land-disturbing activity.

- 9.3 Sediment control practices shall be established on all down gradient perimeters before any up gradient land disturbing activities begin. These practices shall remain in place until final stabilization has been established.
- 9.4 The timing of the installation of sediment control practices may be adjusted in order to accommodate short-term activities, but sediment control practices shall be installed before the next precipitation event even if the short-term activity is not complete.
- 9.5 If the down gradient treatment system becomes overloaded, additional up gradient sediment control practices or redundant BMPs shall be installed in order to eliminate the overloading.
- 9.6 Check dams, diversion swales, or other grade control practices shall be installed in order to ensure sheet flow and prevent rills (for slope lengths greater than 75 feet with a grade of 3:1 or steeper).
- 9.7 Before beginning construction, a temporary rock construction entrance shall be installed at each point where vehicles exit the construction site. Place the rock aggregate in a layer at least 6 inches thick across the entire width of the entrance. Extend the rock entrance at least 50 feet into the construction zone. Use a geotextile fabric beneath the aggregate in order to prevent migration of soil into the rock from below. The entrance shall be maintained in a condition that will prevent tracking or flowing of sediment onto paved roadways. Periodic top dressing with additional stone shall be provided as required. Entrances not protected by temporary rock construction entrances shall be closed to all construction traffic.
- 9.8 If necessary, the wheels of construction vehicles shall be cleaned in order to remove soils before the vehicles leave the construction site. Vehicles shall be washed only on an area stabilized with stone that drains into an approved sediment trapping device.
- 9.9 All soils and sediments tracked or otherwise deposited onto adjacent property shall be removed on a daily basis throughout the duration of the project.
- 9.10 Silt fence or other effective sediment controls shall be installed around all temporary soil stockpiles. Soil or dirt stockpiles shall be located such that the downslope drainage length is no less than 25 feet from the toe of the pile to a surface water, including stormwater conveyances such as swales, pipes and ditches unless there is a bypass in place for the stormwater.
- 9.11 Silt Fence: WiDOT Standard Specification 628.2.6 silt fence. Silt fence shall be installed along the contour (on a level horizontal plane) with the ends turned up (J-hooks) in order to help pond water behind the fence. The silt fence shall be installed on the uphill side of the support posts. A post spacing of 4 feet or less shall be provided. Posts shall be driven at least 2 feet into the ground. The silt fence fabric shall be anchored in a trench at least 6 inches deep and 6 inches wide dug on the upslope side of the support posts. The fabric shall be laid in the trench and then backfilled and compacted with a vibratory plate compactor. Any splices in the fabric shall be made at a fence post. At splices, the fabric shall be overlapped at least 6 inches, folded over, and securely fastened to the fence post. A silt fence backed by snow fence, wire mesh, or stiff plastic mesh reinforcement shall be installed and maintained directly downstream of all storm sewer outfalls.

- 9.12 Erosion control facilities in areas where concentrated flows occur (such as swales, ditches, and areas in front of culverts and catchbasins) shall be reinforced by backing them with snow fence, wire mesh, or stiff plastic mesh reinforcement until paving and turf establishment operations have been completed. Posts for the reinforcing fence shall be 4 inch diameter wood posts, or standard steel fence posts weighing not less than 1.3 lbs per lineal foot, with a minimum length of 30 inches plus burial depth. Posts for the reinforcing fence shall be spaced at intervals of 10 feet or less. Posts for the reinforcing fence shall be driven at least 2 feet into the ground.
- 9.13 All temporary erosion and sediment control devices shall be maintained in place until the contributing drainage area has been stabilized. Any rilling, gully formation, or washouts shall be repaired. After final establishment of permanent stabilization, all temporary synthetic, structural, and non-biodegradable erosion and sediment control devices and any accumulated sediments shall be removed and disposed of off-site. Permanent sedimentation basins shall be restored to their design condition immediately following stabilization of the site.

## 10.0 Permanent Stormwater Management System

- 10.1 Stormwater contaminated with sediment shall, to the maximum extent practicable, be captured on the nonmetallic mining site and then allowed to evaporate or infiltrate into the earth so the sediment is removed prior to discharge to groundwater. The tracking of sediment onto local roads shall be minimized by the use of BMPs such as, an asphalt or concrete approach to the road or use of a temporary rock construction entrance. There shall be no direct injection, through wells, of stormwater into the groundwater.
- 10.2 Stormwater discharges off the mining site to wetlands or to surface waters from areas with exposed earthen materials (including aggregate materials stockpiled for reuse) shall be treated with solids separation BMPs to reduce the amount of sediment discharged to the maximum extent practicable. These treatment practices may include settling, sedimentation, water applied polymers, and filtration.
- 10.3 Wet Sedimentation Basin: Stormwater runoff from disturbed surfaces that cannot be infiltrated will be treated by on-site wet sedimentation basins. The basins were designed in accordance with WDNR Conservation Practice Standard 1064 and Class 2 soils and water applied polymers.
- 10.3.1 Sediment removed from a pond that has been treated with chemical additives will be tested annually in accordance with NR 518.06 in order to characterize the excavated material as applicable. Testing will include the following constituents, as applicable:
- Nutrient content including Kjeldahl-nitrogen, ammonia-nitrogen, nitrate and nitrate-nitrogen, phosphorous and potassium;
  - Metals including aluminum, barium, boron, calcium, copper, iron, manganese, magnesium, sodium, strontium and zinc; and
  - Salt content including chlorides, fluorides and sulfates.
  - Additional constituents may be required by the County, including arsenic, lead and acrylamide.
- 10.3.2 Water applied polymers to remove sediment in stormwater ponds may include Biostar-CH (liquid),

Biostar-CHL (powder) and Biostar-AP. Any water applied polymer used at the site will comply with WiDNR and County standards. The types and volumes of polymers used will be reported in the Annual Reclamation Report and Activities Plan. All application rates and quantities are reported to the WI DNR on a minimum annual basis.

10.4 Treatment Surface Area: The treatment surface area provided for the site is designed so that the peak discharge from the site for the 1-year, 24-hour design storm does not exceed the allowable using Equation 1 of the WDNR Conservation Practice Standard 1064.

10.5 Maintenance Plan: Routine maintenance will be performed to assure that stormwater ponds will continue to function as designed. All components of the stormwater system shall be inspected at least quarterly, including in early spring and early autumn, and after major storm events. Repairs will be made whenever the performance of a stormwater control structure is needed. Significant soil erosion, clogged or damaged inlets, significant sedimentation of the pond, rilling of side slopes, and other compromised features of the stormwater system are examples of items requiring repair work. A stormwater basin will require sediment removal if sediment has decreased the wet storage volume by 50 percent of its original design volume. If a stormwater basin requires sediment cleanout, the basin will be restored to a minimum of its original design contours and vegetated state. Contributing drainage areas must be kept clear of litter and vegetative debris, inflow pipes and overflow spillways kept clear, inlet areas kept clean, and undesirable vegetation removed. Erosion impairing the function or integrity of the facilities, if any, will be corrected, and any structural damage impairing or threatening to impair the function of the facilities will be repaired. This will also include repairing areas where requiring work to ensure the long term success and establishment of vegetative cover including additional fertilizer, soil amendments, weed or pest control, mulching seeding, etc.



**SWPPP -amendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

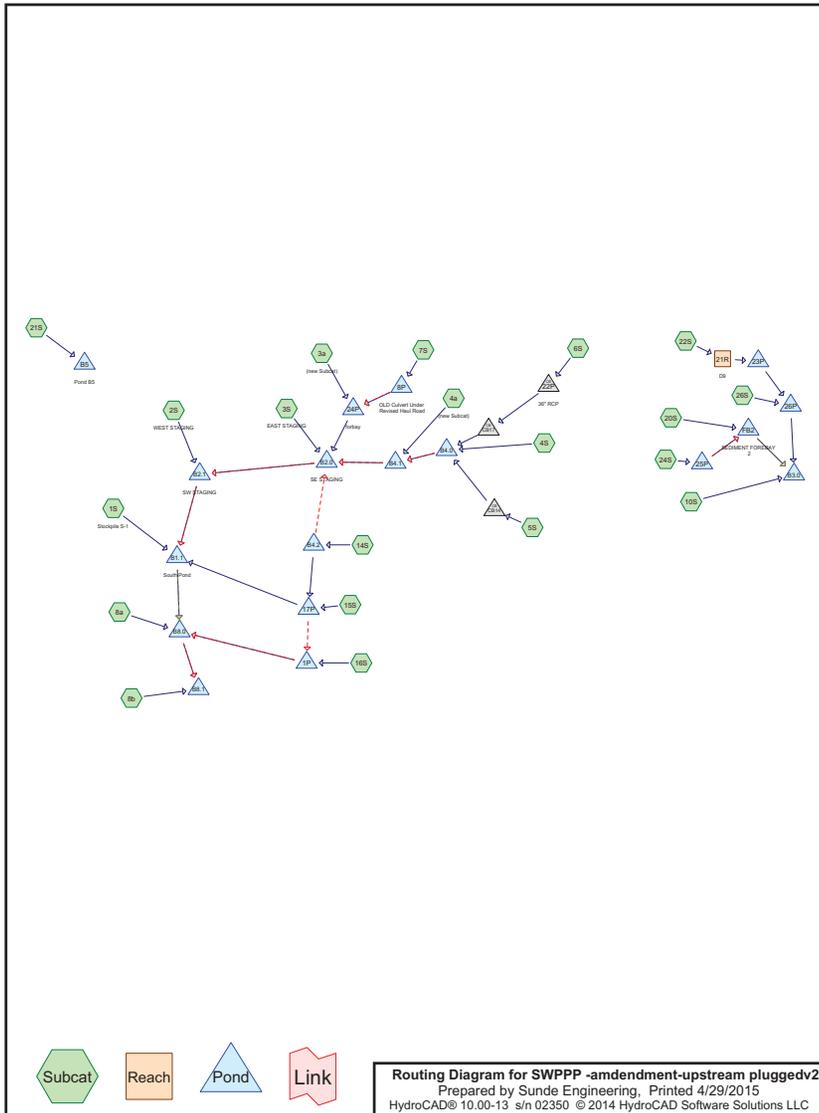
Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 2

Time span=0.00-750.00 hrs, dt=0.02 hrs, 37501 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Stockpile S-1</b>	Runoff Area=11.779 ac 3.28% Impervious Runoff Depth=0.36" Flow Length=1,286' Tc=8.2 min CN=59 Runoff=4.97 cfs 0.352 af
<b>Subcatchment 2S: WEST STAGING</b>	Runoff Area=43.531 ac 5.62% Impervious Runoff Depth=1.42" Tc=6.0 min CN=86 Runoff=102.61 cfs 5.152 af
<b>Subcatchment 3a: (new Subcat)</b>	Runoff Area=6.700 ac 0.00% Impervious Runoff Depth=1.77" Tc=10.0 min CN=94 Runoff=17.53 cfs 0.990 af
<b>Subcatchment 3S: EAST STAGING</b>	Runoff Area=3.779 ac 75.21% Impervious Runoff Depth=2.10" Tc=5.0 min CN=97 Runoff=12.83 cfs 0.661 af
<b>Subcatchment 4a: (new Subcat)</b>	Runoff Area=4.100 ac 0.00% Impervious Runoff Depth=0.70" Tc=10.0 min CN=71 Runoff=3.42 cfs 0.241 af
<b>Subcatchment 4S:</b>	Runoff Area=5.473 ac 0.00% Impervious Runoff Depth=1.64" Tc=10.0 min CN=91 Runoff=12.96 cfs 0.747 af
<b>Subcatchment 5S:</b>	Runoff Area=5.480 ac 0.00% Impervious Runoff Depth=0.94" Tc=10.0 min CN=77 Runoff=7.04 cfs 0.429 af
<b>Subcatchment 6S:</b>	Runoff Area=5.250 ac 0.00% Impervious Runoff Depth=1.39" Tc=10.0 min CN=86 Runoff=10.54 cfs 0.609 af
<b>Subcatchment 7S:</b>	Runoff Area=14.520 ac 0.00% Impervious Runoff Depth=1.12" Tc=10.0 min CN=81 Runoff=22.89 cfs 1.357 af
<b>Subcatchment 8a:</b>	Runoff Area=6.447 ac 7.12% Impervious Runoff Depth=0.61" Tc=15.0 min CN=69 Runoff=3.88 cfs 0.330 af
<b>Subcatchment 8b:</b>	Runoff Area=20.800 ac 0.00% Impervious Runoff Depth=0.49" Tc=30.0 min CN=67 Runoff=6.46 cfs 0.849 af
<b>Subcatchment 10S:</b>	Runoff Area=20.478 ac 0.00% Impervious Runoff Depth=0.30" Tc=10.0 min CN=63 Runoff=5.21 cfs 0.506 af
<b>Subcatchment 14S:</b>	Runoff Area=15.100 ac 0.00% Impervious Runoff Depth=0.42" Tc=10.0 min CN=56 Runoff=9.52 cfs 0.532 af
<b>Subcatchment 15S:</b>	Runoff Area=6.663 ac 5.06% Impervious Runoff Depth=0.33" Tc=6.0 min CN=48 Runoff=3.80 cfs 0.184 af
<b>Subcatchment 16S:</b>	Runoff Area=2.379 ac 7.88% Impervious Runoff Depth=0.25" Tc=6.0 min CN=47 Runoff=0.99 cfs 0.050 af
<b>Subcatchment 20S:</b>	Runoff Area=9.000 ac 0.00% Impervious Runoff Depth=0.26" Tc=10.0 min CN=63 Runoff=1.80 cfs 0.192 af



**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 3

**Subcatchment21S:** Runoff Area=15.971 ac 0.00% Impervious Runoff Depth=1.13"  
Tc=44.0 min CN=85 Runoff=11.66 cfs 1.498 af

**Subcatchment22S:** Runoff Area=13.470 ac 0.00% Impervious Runoff Depth=0.17"  
Tc=10.0 min CN=61 Runoff=1.23 cfs 0.188 af

**Subcatchment24S:** Runoff Area=12.330 ac 0.00% Impervious Runoff Depth=0.17"  
Tc=10.0 min CN=61 Runoff=1.12 cfs 0.172 af

**Subcatchment26S:** Runoff Area=2.182 ac 0.00% Impervious Runoff Depth=0.00"  
Tc=10.0 min CN=46 Runoff=0.00 cfs 0.001 af

**Reach 21R: D9** Avg. Flow Depth=0.08' Max Vel=0.61 fps Inflow=1.23 cfs 0.188 af  
n=0.025 L=1,750.0' S=0.0034 '/' Capacity=186.59 cfs Outflow=0.38 cfs 0.188 af

**Pond 1P:** Peak Elev=1,105.82' Storage=203 cf Inflow=0.99 cfs 0.050 af  
Primary=0.83 cfs 0.050 af Secondary=0.00 cfs 0.000 af Outflow=0.83 cfs 0.050 af

**Pond 8P: OLD Culvert Under Revised Haul** Peak Elev=1,216.43' Storage=527 cf Inflow=22.89 cfs 1.357 af  
Primary=22.80 cfs 1.357 af Secondary=0.00 cfs 0.000 af Outflow=22.80 cfs 1.357 af

**Pond 17P:** Peak Elev=1,113.74' Storage=0 cf Inflow=7.65 cfs 0.694 af  
Primary=7.65 cfs 0.694 af Secondary=0.00 cfs 0.000 af Outflow=7.65 cfs 0.694 af

**Pond 22P: 36" RCP** Peak Elev=1,241.34' Inflow=10.54 cfs 0.609 af  
36.0" Round Culvert n=0.012 L=65.0' S=0.0077 '/' Outflow=10.54 cfs 0.609 af

**Pond 23P:** Peak Elev=1,266.21' Storage=1,171 cf Inflow=0.38 cfs 0.188 af  
24.0" Round Culvert n=0.010 L=55.0' S=0.0727 '/' Outflow=0.29 cfs 0.188 af

**Pond 24P: forbay** Peak Elev=1,130.81' Storage=4,482 cf Inflow=40.28 cfs 2.347 af  
Outflow=39.22 cfs 2.347 af

**Pond 25P:** Peak Elev=1,228.39' Storage=7 cf Inflow=1.12 cfs 0.172 af  
Primary=1.12 cfs 0.172 af Secondary=0.00 cfs 0.000 af Outflow=1.12 cfs 0.172 af

**Pond 26P:** Peak Elev=1,184.04' Storage=244 cf Inflow=0.29 cfs 0.189 af  
Outflow=0.28 cfs 0.189 af

**Pond B1.1: South Pond** Peak Elev=1,106.49' Storage=1.045 af Inflow=12.55 cfs 1.045 af  
Outflow=0.00 cfs 0.000 af

**Pond B2.0: SE STAGING** Peak Elev=1,127.82' Storage=75,659 cf Inflow=47.77 cfs 5.055 af  
Primary=3.71 cfs 5.055 af Secondary=0.00 cfs 0.000 af Outflow=3.71 cfs 5.055 af

**Pond B2.1: SW STAGING** Peak Elev=1,129.63' Storage=444,636 cf Inflow=103.67 cfs 10.208 af  
Outflow=0.00 cfs 0.000 af

**Pond B3.0:** Peak Elev=1,155.60' Storage=34,434 cf Inflow=6.46 cfs 1.059 af  
Outflow=0.28 cfs 1.059 af

**Pond B4.0:** Peak Elev=1,187.66' Storage=48,750 cf Inflow=30.54 cfs 1.785 af  
Primary=1.12 cfs 1.785 af Secondary=0.00 cfs 0.000 af Outflow=1.12 cfs 1.785 af

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 4

**Pond B4.1:** Peak Elev=1,186.89' Storage=44,689 cf Inflow=4.25 cfs 2.026 af  
Primary=0.54 cfs 2.026 af Secondary=0.00 cfs 0.000 af Outflow=0.54 cfs 2.026 af

**Pond B4.2:** Peak Elev=1,133.18' Storage=4,451 cf Inflow=9.52 cfs 0.532 af  
Primary=5.53 cfs 0.510 af Secondary=1.95 cfs 0.022 af Outflow=7.48 cfs 0.532 af

**Pond B5: Pond B5** Peak Elev=1,121.98' Storage=44,143 cf Inflow=11.66 cfs 1.498 af  
Outflow=0.57 cfs 1.498 af

**Pond B8.0:** Peak Elev=1,075.22' Storage=9,535 cf Inflow=4.61 cfs 0.380 af  
Primary=0.28 cfs 0.380 af Secondary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.380 af

**Pond B8.1:** Peak Elev=1,073.36' Storage=53,523 cf Inflow=6.65 cfs 1.230 af  
Outflow=0.00 cfs 0.000 af

**Pond CB14:** Peak Elev=1,206.00' Inflow=7.04 cfs 0.429 af  
36.0" Round Culvert n=0.012 L=94.0' S=0.2021 '/' Outflow=7.04 cfs 0.429 af

**Pond CB17:** Peak Elev=1,240.44' Inflow=10.54 cfs 0.609 af  
36.0" Round Culvert n=0.010 L=258.0' S=0.1984 '/' Outflow=10.54 cfs 0.609 af

**Pond FB2: SEDIMENT FOREBAY 2** Peak Elev=1,170.26' Storage=1,174 cf Inflow=2.87 cfs 0.364 af  
Primary=1.94 cfs 0.364 af Tertiary=0.00 cfs 0.000 af Outflow=1.94 cfs 0.364 af

**Total Runoff Area = 225.432 ac Runoff Volume = 15.040 af Average Runoff Depth = 0.80"**  
**97.05% Pervious = 218.775 ac 2.95% Impervious = 6.657 ac**

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sundt Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 5

**Summary for Subcatchment 1S: Stockpile S-1**

Runoff = 4.97 cfs @ 12.01 hrs, Volume= 0.352 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description			
0.386	98	Paved parking, HSG B			
2.600	30	Woods, Good, HSG A			
1.112	77	Woods, Good, HSG D			
* 7.012	61	stockpile			
0.669	98	Water Surface, 0% imp, HSG B			
<hr/>					
11.779	59	Weighted Average			
11.393		96.72% Pervious Area			
0.386		3.28% Impervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	300	0.0100	1.21		<b>Sheet Flow, Sheet Flow</b> Smooth surfaces n= 0.011 P2= 2.80"
2.1	200	0.0100	1.61		<b>Shallow Concentrated Flow, Shallow Conc Flow</b> Unpaved Kv= 16.1 fps
0.1	156	0.4230	24.59	295.02	<b>Channel Flow, Channel Flow, rock chute</b> Area= 12.0 sf Perim= 18.0' r= 0.67' n= 0.030
1.9	630	0.0300	5.61	112.24	<b>Channel Flow, Channel Flow, downslope to pond</b> Area= 20.0 sf Perim= 30.0' r= 0.67' n= 0.035
8.2	1,286	Total			

**Summary for Subcatchment 2S: WEST STAGING**

Runoff = 102.61 cfs @ 11.97 hrs, Volume= 5.152 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
* 27.900	94	mine
1.920	30	Woods, Good, HSG A
6.981	77	Woods, Good, HSG D
* 3.502	61	Stockpile
2.446	98	Paved parking, HSG B
0.782	98	Water Surface, 0% imp, HSG B
<hr/>		
43.531	86	Weighted Average
41.085		94.38% Pervious Area
2.446		5.62% Impervious Area

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sundt Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 6

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

**Summary for Subcatchment 3a: (new Subcat)**

Runoff = 17.53 cfs @ 12.01 hrs, Volume= 0.990 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
* 6.700	94	mine
6.700		100.00% Pervious Area

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

**Summary for Subcatchment 3S: EAST STAGING**

Runoff = 12.83 cfs @ 11.96 hrs, Volume= 0.661 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
* 0.700	94	mine
2.842	98	Paved parking, HSG B
0.237	98	Water Surface, 0% imp, HSG B
<hr/>		
3.779	97	Weighted Average
0.937		24.79% Pervious Area
2.842		75.21% Impervious Area

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

**Summary for Subcatchment 4a: (new Subcat)**

Runoff = 3.42 cfs @ 12.02 hrs, Volume= 0.241 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 7

Area (ac)	CN	Description
* 3.000	61	
1.100	98	Water Surface, 0% imp, HSG B
4.100	71	Weighted Average
4.100		100.00% Pervious Area

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

**Summary for Subcatchment 4S:**

Runoff = 12.96 cfs @ 12.01 hrs, Volume= 0.747 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
* 4.246	94	BARE SOIL
0.614	98	Water Surface, 0% imp, HSG B
* 0.613	61	STOCKPILE
5.473	91	Weighted Average
5.473		100.00% Pervious Area

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

**Summary for Subcatchment 5S:**

Runoff = 7.04 cfs @ 12.02 hrs, Volume= 0.429 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
* 2.850	61	STOCKPILE
* 2.630	94	BARE SOIL
5.480	77	Weighted Average
5.480		100.00% Pervious Area

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

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 8

**Summary for Subcatchment 6S:**

Runoff = 10.54 cfs @ 12.01 hrs, Volume= 0.609 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
* 4.000	94	BARE SOIL
* 1.250	61	stockpile
5.250	86	Weighted Average
5.250		100.00% Pervious Area

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

**Summary for Subcatchment 7S:**

Runoff = 22.89 cfs @ 12.01 hrs, Volume= 1.357 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
* 8.620	94	BARE SOIL
* 5.900	61	OB STOCKPILE
14.520	81	Weighted Average
14.520		100.00% Pervious Area

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

**Summary for Subcatchment 8a:**

Runoff = 3.88 cfs @ 12.07 hrs, Volume= 0.330 af, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
5.009	61	>75% Grass cover, Good, HSG B
0.979	98	Water Surface, 0% imp, HSG B
0.459	98	Paved parking, HSG B
6.447	69	Weighted Average
5.988		92.88% Pervious Area
0.459		7.12% Impervious Area

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 9

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

**Summary for Subcatchment 8b:**

Runoff = 6.46 cfs @ 12.24 hrs, Volume= 0.849 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
* 17.450	61	
3.350	98	Water Surface, 0% imp, HSG B
20.800	67	Weighted Average
20.800		100.00% Pervious Area

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

**Summary for Subcatchment 10S:**

Runoff = 5.21 cfs @ 12.04 hrs, Volume= 0.506 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
1.320	98	Water Surface, 0% imp, HSG B
* 5.000	61	pond upland
* 14.158	61	stockpile
20.478	63	Weighted Average
20.478		100.00% Pervious Area

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

**Summary for Subcatchment 14S:**

Runoff = 9.52 cfs @ 12.02 hrs, Volume= 0.532 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 10

Area (ac)	CN	Description
1.454	74	Farmsteads, HSG B
3.036	86	Farmsteads, HSG D
7.015	30	Woods, Good, HSG A
0.635	55	Woods, Good, HSG B
2.960	77	Woods, Good, HSG D
15.100	56	Weighted Average
15.100		100.00% Pervious Area

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

**Summary for Subcatchment 15S:**

Runoff = 3.80 cfs @ 11.98 hrs, Volume= 0.184 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
4.404	30	Woods, Good, HSG A
1.585	77	Woods, Good, HSG D
0.674	93	Paved roads w/open ditches, 50% imp, HSG D
6.663	48	Weighted Average
6.326		94.94% Pervious Area
0.337		5.06% Impervious Area

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

**Summary for Subcatchment 16S:**

Runoff = 0.99 cfs @ 11.97 hrs, Volume= 0.050 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
0.629	55	Woods, Good, HSG B
0.375	89	Paved roads w/open ditches, 50% imp, HSG B
1.306	30	Woods, Good, HSG A
0.069	77	Woods, Good, HSG D
2.379	47	Weighted Average
2.192		92.12% Pervious Area
0.187		7.88% Impervious Area

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 11

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

**Summary for Subcatchment 20S:**

Runoff = 1.80 cfs @ 12.05 hrs, Volume= 0.192 af, Depth= 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
0.400	98	Water Surface, 0% imp, HSG A
* 8.600	61	stockpile
9.000	63	Weighted Average
9.000		100.00% Pervious Area

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

**Summary for Subcatchment 21S:**

Runoff = 11.66 cfs @ 12.43 hrs, Volume= 1.498 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
3.830	77	Newly graded area, HSG A
8.116	86	Newly graded area, HSG B
1.946	86	Newly graded area, HSG B
2.079	94	Newly graded area, HSG D
15.971	85	Weighted Average
15.971		100.00% Pervious Area

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

**Summary for Subcatchment 22S:**

Runoff = 1.23 cfs @ 12.08 hrs, Volume= 0.188 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 12

Area (ac)	CN	Description
* 13.470	61	stockpile
13.470		100.00% Pervious Area

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

**Summary for Subcatchment 24S:**

Runoff = 1.12 cfs @ 12.08 hrs, Volume= 0.172 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
* 12.330	61	
12.330		100.00% Pervious Area

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

**Summary for Subcatchment 26S:**

Runoff = 0.00 cfs @ 24.02 hrs, Volume= 0.001 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 1-Year Rainfall=2.40"

Area (ac)	CN	Description
1.170	43	Woods/grass comb., Fair, HSG A
1.012	49	50-75% Grass cover, Fair, HSG A
2.182	46	Weighted Average
2.182		100.00% Pervious Area

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

**Summary for Reach 21R: D9**

Inflow Area = 13.470 ac, 0.00% Impervious, Inflow Depth = 0.17" for 1-Year event  
Inflow = 1.23 cfs @ 12.08 hrs, Volume= 0.188 af  
Outflow = 0.38 cfs @ 13.55 hrs, Volume= 0.188 af, Atten= 69%, Lag= 88.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Max. Velocity= 0.61 fps, Min. Travel Time= 47.7 min  
Avg. Velocity = 0.37 fps, Avg. Travel Time= 78.5 min

**SWPPP -amendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sundt Engineering  
HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Printed 4/29/2015  
Page 13

Peak Storage= 1,090 cf @ 12.75 hrs  
Average Depth at Peak Storage= 0.08'  
Bank-Full Depth= 2.50' Flow Area= 38.8 sf, Capacity= 186.59 cfs

8.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 ' / Top Width= 23.00'  
Length= 1,750.0' Slope= 0.0034 '  
Inlet Invert= 1,274.00', Outlet Invert= 1,268.00'



**Summary for Pond 1P:**

Inflow Area = 2.379 ac, 7.88% Impervious, Inflow Depth = 0.25" for 1-Year event  
Inflow = 0.99 cfs @ 11.97 hrs, Volume= 0.050 af  
Outflow = 0.83 cfs @ 12.02 hrs, Volume= 0.050 af, Atten= 16%, Lag= 2.6 min  
Primary = 0.83 cfs @ 12.02 hrs, Volume= 0.050 af  
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Peak Elev= 1,105.82' @ 12.02 hrs Surf.Area= 1,539 sf Storage= 203 cf

Plug-Flow detention time= 4.3 min calculated for 0.050 af (100% of inflow)  
Center-of-Mass det. time= 4.3 min ( 843.9 - 839.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,105.56'	47,408 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,105.56	0	0	0
1,106.00	2,568	565	565
1,108.00	3,332	5,900	6,465
1,110.00	10,486	13,818	20,283
1,112.00	16,639	27,125	47,408

Device	Routing	Invert	Outlet Devices
#1	Primary	1,105.56'	<b>24.0" Round Culvert 1</b> L= 76.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,105.56' / 1,103.47' S= 0.0275 ' / n= 0.012, Flow Area= 3.14 sf
#2	Primary	1,105.57'	<b>24.0" Round Culvert 2</b> L= 76.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,105.57' / 1,103.31' S= 0.0297 ' / n= 0.012, Flow Area= 3.14 sf
#3	Secondary	1,107.62'	<b>5.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

**SWPPP -amendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sundt Engineering  
HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Printed 4/29/2015  
Page 14

Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=0.82 cfs @ 12.02 hrs HW=1,105.82' (Free Discharge)  
 ↳ **1=Culvert 1** (Inlet Controls 0.43 cfs @ 1.75 fps)  
 ↳ **2=Culvert 2** (Inlet Controls 0.40 cfs @ 1.71 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,105.56' (Free Discharge)  
 ↳ **3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond 8P: OLD Culvert Under Revised Haul Road**

Inflow Area = 14.520 ac, 0.00% Impervious, Inflow Depth = 1.12" for 1-Year event  
Inflow = 22.89 cfs @ 12.01 hrs, Volume= 1.357 af  
Outflow = 22.80 cfs @ 12.02 hrs, Volume= 1.357 af, Atten= 0%, Lag= 0.5 min  
Primary = 22.80 cfs @ 12.02 hrs, Volume= 1.357 af  
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Peak Elev= 1,216.43' @ 12.02 hrs Surf.Area= 559 sf Storage= 527 cf

Plug-Flow detention time= 0.3 min calculated for 1.357 af (100% of inflow)  
Center-of-Mass det. time= 0.3 min ( 808.3 - 808.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,214.50'	67,513 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,214.50	0	0	0
1,216.00	420	315	315
1,218.00	1,064	1,484	1,799
1,220.00	2,700	3,764	5,563
1,227.00	15,000	61,950	67,513

Device	Routing	Invert	Outlet Devices
#1	Primary	1,214.50'	<b>36.0" Round Culvert</b> L= 106.0' Ke= 0.500 Inlet / Outlet Invert= 1,214.50' / 1,205.30' S= 0.0868 ' / n= 0.012, Flow Area= 7.07 sf
#2	Secondary	1,226.00'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=22.74 cfs @ 12.02 hrs HW=1,216.43' (Free Discharge)  
 ↳ **1=Culvert** (Inlet Controls 22.74 cfs @ 4.73 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,214.50' (Free Discharge)  
 ↳ **2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 15

**Summary for Pond 17P:**

Inflow Area = 21.763 ac, 1.55% Impervious, Inflow Depth = 0.38" for 1-Year event  
 Inflow = 7.65 cfs @ 12.03 hrs, Volume= 0.694 af  
 Outflow = 7.65 cfs @ 12.03 hrs, Volume= 0.694 af, Atten= 0%, Lag= 0.0 min  
 Primary = 7.65 cfs @ 12.03 hrs, Volume= 0.694 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs / 2  
 Peak Elev= 1,113.74' @ 12.03 hrs Surf.Area= 2 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 0.694 af (100% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 882.3 - 882.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,113.72'	1,306 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,113.72	0	0	0
1,114.00	28	4	4
1,116.00	486	514	518
1,117.00	1,091	789	1,306

Device	Routing	Invert	Outlet Devices
#1	Primary	1,112.37'	<b>15.0" Round North Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.37' / 1,110.42' S= 0.0320 ' /' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Primary	1,112.32'	<b>15.0" Round Middle Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.32' / 1,110.26' S= 0.0338 ' /' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Primary	1,112.31'	<b>15.0" Round South Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.31' / 1,109.99' S= 0.0380 ' /' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#4	Secondary	1,114.50'	<b>10.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=15.63 cfs @ 12.03 hrs HW=1,113.74' (Free Discharge)  
 1=North Pipe (Inlet Controls 5.09 cfs @ 4.14 fps)  
 2=Middle Pipe (Inlet Controls 5.25 cfs @ 4.28 fps)  
 3=South Pipe (Inlet Controls 5.29 cfs @ 4.31 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,113.72' (Free Discharge)  
 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 16

**Summary for Pond 22P: 36" RCP**

Inflow Area = 5.250 ac, 0.00% Impervious, Inflow Depth = 1.39" for 1-Year event  
 Inflow = 10.54 cfs @ 12.01 hrs, Volume= 0.609 af  
 Outflow = 10.54 cfs @ 12.01 hrs, Volume= 0.609 af, Atten= 0%, Lag= 0.0 min  
 Primary = 10.54 cfs @ 12.01 hrs, Volume= 0.609 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,241.34' @ 12.01 hrs  
 Flood Elev= 1,248.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,240.00'	<b>36.0" Round Culvert</b> L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 1,240.00' / 1,239.50' S= 0.0077 ' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

**Primary OutFlow** Max=10.48 cfs @ 12.01 hrs HW=1,241.34' (Free Discharge)  
 1=Culvert (Barrel Controls 10.48 cfs @ 5.06 fps)

**Summary for Pond 23P:**

Inflow Area = 13.470 ac, 0.00% Impervious, Inflow Depth = 0.17" for 1-Year event  
 Inflow = 0.38 cfs @ 13.55 hrs, Volume= 0.188 af  
 Outflow = 0.29 cfs @ 14.80 hrs, Volume= 0.188 af, Atten= 25%, Lag= 75.2 min  
 Primary = 0.29 cfs @ 14.80 hrs, Volume= 0.188 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,266.21' @ 14.80 hrs Surf.Area= 5,620 sf Storage= 1,171 cf  
 Flood Elev= 1,270.00' Surf.Area= 21,442 sf Storage= 42,920 cf

Plug-Flow detention time= 103.0 min calculated for 0.188 af (100% of inflow)  
 Center-of-Mass det. time= 102.9 min ( 1,184.2 - 1,081.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,266.00'	42,920 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,266.00	5,326	0	0
1,268.00	8,076	13,402	13,402
1,270.00	21,442	29,518	42,920

Device	Routing	Invert	Outlet Devices
#1	Primary	1,266.00'	<b>24.0" Round Culvert</b> L= 55.0' Ke= 0.500 Inlet / Outlet Invert= 1,266.00' / 1,262.00' S= 0.0727 ' /' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

**Primary OutFlow** Max=0.28 cfs @ 14.80 hrs HW=1,266.21' (Free Discharge)  
 1=Culvert (Inlet Controls 0.28 cfs @ 1.57 fps)

**SWPPP -amendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 17

**Summary for Pond 24P: forbay**

Inflow Area = 21.220 ac, 0.00% Impervious, Inflow Depth = 1.33" for 1-Year event  
 Inflow = 40.28 cfs @ 12.02 hrs, Volume= 2,347 af  
 Outflow = 39.22 cfs @ 12.04 hrs, Volume= 2,347 af, Atten= 3%, Lag= 1.3 min  
 Primary = 39.22 cfs @ 12.04 hrs, Volume= 2,347 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,130.81' @ 12.04 hrs Surf.Area= 6,085 sf Storage= 4,482 cf

Plug-Flow detention time= 4.4 min calculated for 2,347 af (100% of inflow)  
 Center-of-Mass det. time= 4.4 min ( 808.1 - 803.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,130.00'	30,793 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,130.00	4,956	0	0
1,132.00	7,736	12,692	12,692
1,134.00	10,365	18,101	30,793

Device	Routing	Invert	Outlet Devices
#1	Primary	1,130.00'	<b>20.0' long x 7.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.66 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

**Primary OutFlow** Max=39.21 cfs @ 12.04 hrs HW=1,130.81' (Free Discharge)  
 ↳1=**Broad-Crested Rectangular Weir** (Weir Controls 39.21 cfs @ 2.41 fps)

**Summary for Pond 25P:**

Inflow Area = 12.330 ac, 0.00% Impervious, Inflow Depth = 0.17" for 1-Year event  
 Inflow = 1.12 cfs @ 12.08 hrs, Volume= 0.172 af  
 Outflow = 1.12 cfs @ 12.08 hrs, Volume= 0.172 af, Atten= 0%, Lag= 0.1 min  
 Primary = 1.12 cfs @ 12.08 hrs, Volume= 0.172 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,228.39' @ 12.08 hrs Surf.Area= 39 sf Storage= 7 cf

Plug-Flow detention time= 0.1 min calculated for 0.172 af (100% of inflow)  
 Center-of-Mass det. time= 0.1 min ( 970.1 - 969.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,228.00'	2,325 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**SWPPP -amendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 18

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,228.00	0	0	0
1,230.00	200	200	200
1,232.50	1,500	2,125	2,325

Device	Routing	Invert	Outlet Devices
#1	Primary	1,228.00'	<b>36.0" Round CMP Round 36"</b> L= 111.0' Ke= 0.500 Inlet / Outlet Invert= 1,228.00' / 1,220.00' S= 0.0721 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 7.07 sf
#2	Secondary	1,231.50'	<b>10.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.66 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=1.12 cfs @ 12.08 hrs HW=1,228.38' (Free Discharge)  
 ↳1=**CMP\_Round 36"** (Inlet Controls 1.12 cfs @ 2.11 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,228.00' (Free Discharge)  
 ↳2=**Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond 26P:**

Inflow Area = 15.652 ac, 0.00% Impervious, Inflow Depth = 0.14" for 1-Year event  
 Inflow = 0.29 cfs @ 14.80 hrs, Volume= 0.189 af  
 Outflow = 0.28 cfs @ 15.09 hrs, Volume= 0.189 af, Atten= 2%, Lag= 17.6 min  
 Primary = 0.28 cfs @ 15.09 hrs, Volume= 0.189 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,184.04' @ 15.09 hrs Surf.Area= 5,482 sf Storage= 244 cf

Plug-Flow detention time= 14.5 min calculated for 0.189 af (100% of inflow)  
 Center-of-Mass det. time= 14.5 min ( 1,199.0 - 1,184.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,184.00'	53,131 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,184.00	5,435	0	0
1,186.00	7,547	12,982	12,982
1,188.00	9,957	17,504	30,486
1,190.00	12,688	22,645	53,131

Device	Routing	Invert	Outlet Devices
#1	Primary	1,178.00'	<b>12.0" Round Culvert</b> L= 160.0' Ke= 0.500 Inlet / Outlet Invert= 1,178.00' / 1,156.00' S= 0.1375 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,184.00'	<b>30.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 19

**Primary OutFlow** Max=0.24 cfs @ 15.09 hrs HW=1,184.04' (Free Discharge)

1=Culvert (Passes 0.24 cfs of 8.90 cfs potential flow)

2=Orifice/Grate (Weir Controls 0.24 cfs @ 0.69 fps)

**Summary for Pond B1.1: South Pond**

Inflow Area = 122.375 ac, 4.91% Impervious, Inflow Depth = 0.10" for 1-Year event  
 Inflow = 12.55 cfs @ 12.02 hrs, Volume= 1.045 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min  
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,106.49' @ 137.00 hrs Surf.Area= 0.736 ac Storage= 1.045 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,105.00'	15.761 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,105.00	0.669	0.000	0.000
1,106.00	0.713	0.691	0.691
1,108.00	0.805	1.518	2.209
1,115.00	1.168	6.906	9.114
1,115.50	1.196	0.591	9.705
1,116.00	1.225	0.605	10.311
1,120.00	1.500	5.450	15.761

Device	Routing	Invert	Outlet Devices
#1	Tertiary	1,115.00'	<b>15.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Tertiary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,105.00' (Free Discharge)

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

**Summary for Pond B2.0: SE STAGING**

Inflow Area = 45.302 ac, 6.27% Impervious, Inflow Depth = 1.34" for 1-Year event  
 Inflow = 47.77 cfs @ 12.02 hrs, Volume= 5.055 af  
 Outflow = 3.71 cfs @ 12.85 hrs, Volume= 5.055 af, Atten= 92%, Lag= 49.7 min  
 Primary = 3.71 cfs @ 12.85 hrs, Volume= 5.055 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,127.82' @ 12.85 hrs Surf.Area= 21,387 sf Storage= 75.659 cf

Plug-Flow detention time= 559.3 min calculated for 5.055 af (100% of inflow)

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 20

Center-of-Mass det. time= 559.3 min ( 2,191.3 - 1,632.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,123.00'	346,902 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,123.00	10,335	0	0
1,124.00	12,325	11,330	11,330
1,132.00	31,322	174,588	185,918
1,134.00	39,831	71,153	257,071
1,136.00	50,000	89,831	346,902

Device	Routing	Invert	Outlet Devices
#1	Primary	1,123.00'	<b>30.0" Round Culvert</b> L= 172.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,123.00' / 1,121.00' S= 0.0116 ' / Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 4.91 sf
#2	Device 1	1,123.00'	<b>5.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,127.50'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#4	Device 1	1,130.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Secondary	1,135.00'	<b>20.0' long x 20.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=3.70 cfs @ 12.85 hrs HW=1,127.82' (Free Discharge)

1=Culvert (Passes 3.70 cfs of 44.92 cfs potential flow)

2=Orifice/Grate (Orifice Controls 1.41 cfs @ 10.34 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 2.29 cfs @ 1.84 fps)

4=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,123.00' (Free Discharge)

5=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B2.1: SW STAGING**

Inflow Area = 88.833 ac, 5.95% Impervious, Inflow Depth = 1.38" for 1-Year event  
 Inflow = 103.67 cfs @ 11.97 hrs, Volume= 10.208 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,129.63' @ 750.00 hrs Surf.Area= 58,689 sf Storage= 444,636 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,120.00'	1,174,558 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 21

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,120.00	34,065	0	0
1,128.00	54,144	352,836	352,836
1,130.00	59,730	113,874	466,710
1,132.00	65,543	125,273	591,983
1,134.00	69,258	134,801	726,784
1,140.00	80,000	447,774	1,174,558

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,135.00'	<b>20.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,120.00' (Free Discharge)

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

**Summary for Pond B3.0:**

Inflow Area = 57.460 ac, 0.00% Impervious, Inflow Depth = 0.22" for 1-Year event  
 Inflow = 6.46 cfs @ 12.06 hrs, Volume= 1.059 af  
 Outflow = 0.28 cfs @ 24.21 hrs, Volume= 1.059 af, Atten= 96%, Lag= 729.1 min  
 Primary = 0.28 cfs @ 24.21 hrs, Volume= 1.059 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,155.60' @ 24.21 hrs Surf.Area= 58,871 sf Storage= 34,434 cf

Plug-Flow detention time= 2,308.2 min calculated for 1.059 af (100% of inflow)  
 Center-of-Mass det. time= 2,308.1 min ( 3,263.9 - 955.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,155.00'	819,820 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,155.00	55,861	0	0
1,156.00	60,876	58,369	58,369
1,158.00	71,125	132,001	190,370
1,160.00	81,662	152,787	343,157
1,162.00	92,487	174,149	517,306
1,164.00	103,598	196,085	713,391
1,165.00	109,260	106,429	819,820

Device	Routing	Invert	Outlet Devices
#1	Primary	1,155.00'	<b>24.0" Round Culvert</b> L= 93.0' Ke= 0.500 Inlet / Outlet Invert= 1,155.00' / 1,144.00' S= 0.1183 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,155.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,164.40'	<b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 22

3.31 3.32

**Primary OutFlow** Max=0.28 cfs @ 24.21 hrs HW=1,155.60' (Free Discharge)

1=Culvert (Passes 0.28 cfs of 2.09 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.28 cfs @ 3.17 fps)

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

**Summary for Pond B4.0:**

Inflow Area = 16.203 ac, 0.00% Impervious, Inflow Depth = 1.32" for 1-Year event  
 Inflow = 30.54 cfs @ 12.01 hrs, Volume= 1.785 af  
 Outflow = 1.12 cfs @ 14.00 hrs, Volume= 1.785 af, Atten= 96%, Lag= 119.4 min  
 Primary = 1.12 cfs @ 14.00 hrs, Volume= 1.785 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,187.66' @ 14.00 hrs Surf.Area= 31,545 sf Storage= 48,750 cf

Plug-Flow detention time= 688.4 min calculated for 1.785 af (100% of inflow)  
 Center-of-Mass det. time= 688.9 min ( 1,490.6 - 801.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,186.00'	301,602 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,186.00	27,052	0	0
1,188.00	32,452	59,504	59,504
1,190.00	37,847	70,299	129,803
1,192.00	43,586	81,433	211,236
1,194.00	46,780	90,366	301,602

Device	Routing	Invert	Outlet Devices
#1	Primary	1,186.00'	<b>12.0" Round Culvert</b> L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 1,183.00' / 1,186.00' S= -0.0750 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf
#2	Device 1	1,186.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,192.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	1,193.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Secondary	1,192.00'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 23

**Primary OutFlow** Max=1.12 cfs @ 14.00 hrs HW=1,187.66' (Free Discharge)

- 1=Culvert (Passes 1.12 cfs of 4.08 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.12 cfs @ 5.73 fps)
- 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,186.00' (Free Discharge)

- 5=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B4.1:**

Inflow Area = 20.303 ac, 0.00% Impervious, Inflow Depth = 1.20' for 1-Year event  
 Inflow = 4.25 cfs @ 12.02 hrs, Volume= 2.026 af  
 Outflow = 0.54 cfs @ 29.97 hrs, Volume= 2.026 af, Atten= 87%, Lag= 1,077.1 min  
 Primary = 0.54 cfs @ 29.97 hrs, Volume= 2.026 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,186.89' @ 29.97 hrs Surf.Area= 51,764 sf Storage= 44,689 cf

Plug-Flow detention time= 1,471.0 min calculated for 2.025 af (100% of inflow)  
 Center-of-Mass det. time= 1,471.4 min ( 2,879.7 - 1,408.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,186.00'	513,285 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,186.00	48,285	0	0
1,188.00	56,074	104,359	104,359
1,190.00	64,059	120,133	224,492
1,192.00	72,367	136,426	360,918
1,194.00	80,000	152,367	513,285

Device	Routing	Invert	Outlet Devices
#1	Primary	1,186.00'	<b>12.0" Round Culvert</b> L= 84.0' Ke= 0.500 Inlet / Outlet Invert= 1,186.00' / 1,185.00' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.09 sf
#2	Device 1	1,186.00'	<b>5.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,190.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Secondary	1,191.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 24

**Primary OutFlow** Max=0.54 cfs @ 29.97 hrs HW=1,186.89' (Free Discharge)

- 1=Culvert (Passes 0.54 cfs of 2.38 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.54 cfs @ 3.99 fps)
- 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,186.00' (Free Discharge)

- 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B4.2:**

Inflow Area = 15.100 ac, 0.00% Impervious, Inflow Depth = 0.42' for 1-Year event  
 Inflow = 9.52 cfs @ 12.02 hrs, Volume= 0.532 af  
 Outflow = 7.48 cfs @ 12.09 hrs, Volume= 0.532 af, Atten= 21%, Lag= 3.8 min  
 Primary = 5.53 cfs @ 12.09 hrs, Volume= 0.510 af  
 Secondary = 1.95 cfs @ 12.09 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,133.18' @ 12.09 hrs Surf.Area= 5,539 sf Storage= 4,451 cf

Plug-Flow detention time= 38.5 min calculated for 0.532 af (100% of inflow)  
 Center-of-Mass det. time= 38.4 min ( 893.0 - 854.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,132.30'	29,447 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,132.30	4,571	0	0
1,134.00	6,440	9,359	9,359
1,136.00	13,648	20,088	29,447

Device	Routing	Invert	Outlet Devices
#1	Primary	1,132.30'	<b>36.0" Round Culvert</b> L= 290.0' Ke= 0.500 Inlet / Outlet Invert= 1,132.30' / 1,123.00' S= 0.0321 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Secondary	1,133.00'	<b>10.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=5.51 cfs @ 12.09 hrs HW=1,133.18' (Free Discharge)

- 1=Culvert (Inlet Controls 5.51 cfs @ 3.19 fps)

**Secondary OutFlow** Max=1.92 cfs @ 12.09 hrs HW=1,133.18' (Free Discharge)

- 2=Broad-Crested Rectangular Weir (Weir Controls 1.92 cfs @ 1.07 fps)

**SWPPP -amendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 25

**Summary for Pond B5: Pond B5**

Inflow Area = 15.971 ac, 0.00% Impervious, Inflow Depth = 1.13" for 1-Year event  
 Inflow = 11.66 cfs @ 12.43 hrs, Volume= 1.498 af  
 Outflow = 0.57 cfs @ 18.09 hrs, Volume= 1.498 af, Atten= 95%, Lag= 339.9 min  
 Primary = 0.57 cfs @ 18.09 hrs, Volume= 1.498 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,121.98' @ 18.09 hrs Surf.Area= 26,003 sf Storage= 44,143 cf

Plug-Flow detention time= 1,072.7 min calculated for 1.498 af (100% of inflow)  
 Center-of-Mass det. time= 1,072.4 min ( 1,937.2 - 864.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,120.00'	179,032 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,120.00	18,496	0	0
1,122.00	26,064	44,560	44,560
1,124.00	33,627	59,691	104,251
1,126.00	41,154	74,781	179,032

Device	Routing	Invert	Outlet Devices
#1	Primary	1,120.00'	<b>24.0" Round Culvert</b> L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 1,120.00' / 1,104.00' S= 0.1818 1/8" Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,120.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,123.25'	<b>5.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)

**Primary OutFlow** Max=0.57 cfs @ 18.09 hrs HW=1,121.98' (Free Discharge)  
 1=Culvert (Passes 0.57 cfs of 15.05 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.57 cfs @ 6.49 fps)  
 3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B8.0:**

Inflow Area = 131.201 ac, 5.07% Impervious, Inflow Depth = 0.03" for 1-Year event  
 Inflow = 4.61 cfs @ 12.06 hrs, Volume= 0.380 af  
 Outflow = 0.28 cfs @ 13.97 hrs, Volume= 0.380 af, Atten= 94%, Lag= 114.7 min  
 Primary = 0.28 cfs @ 13.97 hrs, Volume= 0.380 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,075.22' @ 13.97 hrs Surf.Area= 43,944 sf Storage= 9,535 cf

Plug-Flow detention time= 858.8 min calculated for 0.380 af (100% of inflow)  
 Center-of-Mass det. time= 859.1 min ( 1,674.7 - 815.6 )

**SWPPP -amendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 26

Volume	Invert	Avail.Storage	Storage Description
#1	1,075.00'	840,564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,075.00	42,640	0	0
1,076.00	48,560	45,600	45,600
1,078.00	60,620	109,180	154,780
1,080.00	72,949	133,569	288,349
1,082.00	85,535	158,484	446,833
1,084.00	98,374	183,909	630,742
1,086.00	111,448	209,822	840,564

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,084.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	1,075.00'	<b>48.0" Round Culvert</b> L= 550.0' Ke= 0.500 Inlet / Outlet Invert= 1,075.00' / 1,073.00' S= 0.0036 1/8" Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

**Primary OutFlow** Max=0.28 cfs @ 13.97 hrs HW=1,075.22' (Free Discharge)  
 2=Culvert (Barrel Controls 0.28 cfs @ 1.56 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,075.00' (Free Discharge)  
 1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B8.1:**

Inflow Area = 152.001 ac, 4.38% Impervious, Inflow Depth = 0.10" for 1-Year event  
 Inflow = 6.65 cfs @ 12.25 hrs, Volume= 1.230 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,073.36' @ 576.10 hrs Surf.Area= 148,305 sf Storage= 53,523 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,073.00'	4,938,753 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,073.00	145,815	0	0
1,084.00	221,070	2,017,868	2,017,868
1,095.00	310,000	2,920,885	4,938,753

Device	Routing	Invert	Outlet Devices
#1	Primary	1,094.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b>

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 27

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60  
 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,073.00' (Free Discharge)

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

**Summary for Pond CB14:**

Inflow Area = 5.480 ac, 0.00% Impervious, Inflow Depth = 0.94" for 1-Year event  
 Inflow = 7.04 cfs @ 12.02 hrs, Volume= 0.429 af  
 Outflow = 7.04 cfs @ 12.02 hrs, Volume= 0.429 af, Atten= 0%, Lag= 0.0 min  
 Primary = 7.04 cfs @ 12.02 hrs, Volume= 0.429 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs

Peak Elev= 1,206.00' @ 12.02 hrs

Flood Elev= 1,214.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,205.00'	<b>36.0" Round Culvert</b> L= 94.0' Ke= 0.500 Inlet / Outlet Invert= 1,205.00' / 1,186.00' S= 0.2021 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

Primary OutFlow Max=7.01 cfs @ 12.02 hrs HW=1,206.00' (Free Discharge)

1=Culvert (Inlet Controls 7.01 cfs @ 3.40 fps)

**Summary for Pond CB17:**

Inflow Area = 5.250 ac, 0.00% Impervious, Inflow Depth = 1.39" for 1-Year event  
 Inflow = 10.54 cfs @ 12.01 hrs, Volume= 0.609 af  
 Outflow = 10.54 cfs @ 12.01 hrs, Volume= 0.609 af, Atten= 0%, Lag= 0.0 min  
 Primary = 10.54 cfs @ 12.01 hrs, Volume= 0.609 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs

Peak Elev= 1,240.44' @ 12.01 hrs

Flood Elev= 1,248.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,239.20'	<b>36.0" Round Culvert</b> L= 258.0' Ke= 0.500 Inlet / Outlet Invert= 1,239.20' / 1,188.00' S= 0.1984 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=10.48 cfs @ 12.01 hrs HW=1,240.44' (Free Discharge)

1=Culvert (Inlet Controls 10.48 cfs @ 3.79 fps)

**Summary for Pond FB2: SEDIMENT FOREBAY 2**

Inflow Area = 21.330 ac, 0.00% Impervious, Inflow Depth = 0.20" for 1-Year event  
 Inflow = 2.87 cfs @ 12.06 hrs, Volume= 0.364 af  
 Outflow = 1.94 cfs @ 12.15 hrs, Volume= 0.364 af, Atten= 32%, Lag= 5.2 min  
 Primary = 1.94 cfs @ 12.15 hrs, Volume= 0.364 af  
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 1-Year Rainfall=2.40"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 28

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,170.26' @ 12.15 hrs Surf.Area= 4,609 sf Storage= 1,174 cf

Plug-Flow detention time= 17.1 min calculated for 0.364 af (100% of inflow)  
 Center-of-Mass det. time= 17.1 min ( 945.9 - 928.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,170.00'	36,534 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,170.00	4,263	0	0
1,172.00	6,876	11,139	11,139
1,174.00	8,952	15,828	26,967
1,175.00	10,181	9,567	36,534

Device	Routing	Invert	Outlet Devices
#1	Primary	1,165.00'	<b>36.0" Round Culvert</b> L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 1,165.00' / 1,155.00' S= 0.1538 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf
#2	Device 1	1,170.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	1,174.00'	<b>5.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Tertiary	1,174.50'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.93 cfs @ 12.15 hrs HW=1,170.26' (Free Discharge)

1=Culvert (Passes 1.93 cfs of 66.03 cfs potential flow)

2=Broad-Crested Rectangular Weir (Weir Controls 1.93 cfs @ 1.46 fps)

3=Orifice/Grate ( Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,170.00' (Free Discharge)

4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 29

Time span=0.00-750.00 hrs, dt=0.02 hrs, 37501 points

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

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Stockpile S-1</b>	Runoff Area=11.779 ac 3.28% Impervious Runoff Depth=1.09" Flow Length=1,286' Tc=8.2 min CN=59 Runoff=19.03 cfs 1.066 af
<b>Subcatchment 2S: WEST STAGING</b>	Runoff Area=43.531 ac 5.62% Impervious Runoff Depth=2.94" Tc=6.0 min CN=86 Runoff=206.91 cfs 10.665 af
<b>Subcatchment 3a: (new Subcat)</b>	Runoff Area=6.700 ac 0.00% Impervious Runoff Depth=3.52" Tc=10.0 min CN=94 Runoff=33.39 cfs 1.966 af
<b>Subcatchment 3S: EAST STAGING</b>	Runoff Area=3.779 ac 75.21% Impervious Runoff Depth=3.88" Tc=5.0 min CN=97 Runoff=23.01 cfs 1.223 af
<b>Subcatchment 4a: (new Subcat)</b>	Runoff Area=4.100 ac 0.00% Impervious Runoff Depth=1.73" Tc=10.0 min CN=71 Runoff=9.51 cfs 0.592 af
<b>Subcatchment 4S:</b>	Runoff Area=5.473 ac 0.00% Impervious Runoff Depth=3.28" Tc=10.0 min CN=91 Runoff=25.14 cfs 1.495 af
<b>Subcatchment 5S:</b>	Runoff Area=5.480 ac 0.00% Impervious Runoff Depth=2.17" Tc=10.0 min CN=77 Runoff=16.64 cfs 0.989 af
<b>Subcatchment 6S:</b>	Runoff Area=5.250 ac 0.00% Impervious Runoff Depth=2.90" Tc=10.0 min CN=86 Runoff=21.48 cfs 1.269 af
<b>Subcatchment 7S:</b>	Runoff Area=14.520 ac 0.00% Impervious Runoff Depth=2.46" Tc=10.0 min CN=81 Runoff=50.26 cfs 2.979 af
<b>Subcatchment 8a:</b>	Runoff Area=6.447 ac 7.12% Impervious Runoff Depth=1.60" Tc=15.0 min CN=69 Runoff=11.55 cfs 0.858 af
<b>Subcatchment 8b:</b>	Runoff Area=20.800 ac 0.00% Impervious Runoff Depth=1.41" Tc=30.0 min CN=67 Runoff=21.49 cfs 2.439 af
<b>Subcatchment 10S:</b>	Runoff Area=20.478 ac 0.00% Impervious Runoff Depth=1.11" Tc=10.0 min CN=63 Runoff=31.16 cfs 1.899 af
<b>Subcatchment 14S:</b>	Runoff Area=15.100 ac 0.00% Impervious Runoff Depth=1.13" Tc=10.0 min CN=56 Runoff=25.81 cfs 1.420 af
<b>Subcatchment 15S:</b>	Runoff Area=6.663 ac 5.06% Impervious Runoff Depth=0.81" Tc=6.0 min CN=48 Runoff=9.32 cfs 0.452 af
<b>Subcatchment 16S:</b>	Runoff Area=2.379 ac 7.88% Impervious Runoff Depth=0.69" Tc=6.0 min CN=47 Runoff=2.69 cfs 0.137 af
<b>Subcatchment 20S:</b>	Runoff Area=9.000 ac 0.00% Impervious Runoff Depth=1.05" Tc=10.0 min CN=63 Runoff=13.00 cfs 0.789 af

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 30

<b>Subcatchment 21S:</b>	Runoff Area=15.971 ac 0.00% Impervious Runoff Depth=2.65" Tc=44.0 min CN=85 Runoff=27.97 cfs 3.526 af
<b>Subcatchment 22S:</b>	Runoff Area=13.470 ac 0.00% Impervious Runoff Depth=0.92" Tc=10.0 min CN=61 Runoff=17.16 cfs 1.028 af
<b>Subcatchment 24S:</b>	Runoff Area=12.330 ac 0.00% Impervious Runoff Depth=0.92" Tc=10.0 min CN=61 Runoff=15.71 cfs 0.941 af
<b>Subcatchment 26S:</b>	Runoff Area=2.182 ac 0.00% Impervious Runoff Depth=0.25" Tc=10.0 min CN=46 Runoff=0.28 cfs 0.046 af
<b>Reach 21R: D9</b>	Avg. Flow Depth=0.49' Max Vel=1.96 fps Inflow=17.16 cfs 1.028 af n=0.025 L=1,750.0' S=0.0034 '/' Capacity=186.59 cfs Outflow=9.16 cfs 1.028 af
<b>Pond 1P:</b>	Peak Elev=1,106.00' Storage=555 cf Inflow=2.69 cfs 0.137 af Primary=2.23 cfs 0.137 af Secondary=0.00 cfs 0.000 af Outflow=2.23 cfs 0.137 af
<b>Pond 8P: OLD Culvert Under Revised</b>	Peak Elev=1,218.08' Storage=1,881 cf Inflow=50.26 cfs 2.979 af Primary=49.03 cfs 2.979 af Secondary=0.00 cfs 0.000 af Outflow=49.03 cfs 2.979 af
<b>Pond 17P:</b>	Peak Elev=1,114.14' Storage=10 cf Inflow=19.33 cfs 1.621 af Primary=19.29 cfs 1.589 af Secondary=0.00 cfs 0.000 af Outflow=19.29 cfs 1.589 af
<b>Pond 22P: 36" RCP</b>	Peak Elev=1,242.05' Inflow=21.48 cfs 1.269 af 36.0" Round Culvert n=0.012 L=65.0' S=0.0077 '/' Outflow=21.48 cfs 1.269 af
<b>Pond 23P:</b>	Peak Elev=1,267.04' Storage=6,278 cf Inflow=9.16 cfs 1.028 af 24.0" Round Culvert n=0.010 L=55.0' S=0.0727 '/' Outflow=5.73 cfs 1.028 af
<b>Pond 24P: forbay</b>	Peak Elev=1,131.31' Storage=7,716 cf Inflow=81.81 cfs 4.945 af Outflow=80.31 cfs 4.945 af
<b>Pond 25P:</b>	Peak Elev=1,229.55' Storage=121 cf Inflow=15.71 cfs 0.941 af Primary=15.70 cfs 0.941 af Secondary=0.00 cfs 0.000 af Outflow=15.70 cfs 0.941 af
<b>Pond 26P:</b>	Peak Elev=1,184.36' Storage=2,034 cf Inflow=5.82 cfs 1.074 af Outflow=5.59 cfs 1.074 af
<b>Pond B1.1: South Pond</b>	Peak Elev=1,111.95' Storage=5.789 af Inflow=38.30 cfs 5.789 af Outflow=0.00 cfs 0.000 af
<b>Pond B2.0: SE STAGING</b>	Peak Elev=1,129.90' Storage=125,371 cf Inflow=105.97 cfs 10.765 af Primary=44.49 cfs 10.765 af Secondary=0.00 cfs 0.000 af Outflow=44.49 cfs 10.765 af
<b>Pond B2.1: SW STAGING</b>	Peak Elev=1,135.04' Storage=800,108 cf Inflow=216.76 cfs 21.430 af Outflow=1.03 cfs 3.134 af
<b>Pond B3.0:</b>	Peak Elev=1,157.78' Storage=174,565 cf Inflow=53.62 cfs 4.703 af Outflow=0.68 cfs 4.703 af
<b>Pond B4.0:</b>	Peak Elev=1,189.42' Storage=108,278 cf Inflow=63.24 cfs 3.753 af Primary=1.68 cfs 3.753 af Secondary=0.00 cfs 0.000 af Outflow=1.68 cfs 3.753 af

**Pond B4.1:** Peak Elev=1,187.83' Storage=94,934 cf Inflow=10.80 cfs 4.346 af  
 Primary=0.84 cfs 4.346 af Secondary=0.00 cfs 0.000 af Outflow=0.84 cfs 4.346 af

**Pond B4.2:** Peak Elev=1,133.62' Storage=6,965 cf Inflow=25.81 cfs 1.420 af  
 Primary=11.65 cfs 1.169 af Secondary=12.61 cfs 0.251 af Outflow=24.26 cfs 1.420 af

**Pond B5: Pond B5** Peak Elev=1,123.62' Storage=91,630 cf Inflow=27.97 cfs 3.526 af  
 Outflow=4.36 cfs 3.526 af

**Pond B8.0:** Peak Elev=1,075.49' Storage=21,646 cf Inflow=13.48 cfs 0.995 af  
 Primary=1.52 cfs 0.995 af Secondary=0.00 cfs 0.000 af Outflow=1.52 cfs 0.995 af

**Pond B8.1:** Peak Elev=1,074.00' Storage=149,549 cf Inflow=22.68 cfs 3.434 af  
 Outflow=0.00 cfs 0.000 af

**Pond CB14:** Peak Elev=1,206.61' Inflow=16.64 cfs 0.989 af  
 36.0" Round Culvert n=0.012 L=94.0' S=0.2021 '/' Outflow=16.64 cfs 0.989 af

**Pond CB17:** Peak Elev=1,241.07' Inflow=21.48 cfs 1.269 af  
 36.0" Round Culvert n=0.010 L=258.0' S=0.1984 '/' Outflow=21.48 cfs 1.269 af

**Pond FB2: SEDIMENT FOREBAY 2** Peak Elev=1,171.30' Storage=6,645 cf Inflow=28.69 cfs 1.730 af  
 Primary=24.60 cfs 1.730 af Tertiary=0.00 cfs 0.000 af Outflow=24.60 cfs 1.730 af

**Total Runoff Area = 225.432 ac Runoff Volume = 35.780 af Average Runoff Depth = 1.90"**  
**97.05% Pervious = 218.775 ac 2.95% Impervious = 6.657 ac**

**Summary for Subcatchment 1S: Stockpile S-1**

Runoff = 19.03 cfs @ 12.00 hrs, Volume= 1.066 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
0.386	98	Paved parking, HSG B
2.600	30	Woods, Good, HSG A
1.112	77	Woods, Good, HSG D
* 7.012	61	stockpile
0.669	98	Water Surface, 0% imp, HSG B
11.779	59	Weighted Average
11.393		96.72% Pervious Area
0.386		3.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	300	0.0100	1.21		<b>Sheet Flow, Sheet Flow</b> Smooth surfaces n= 0.011 P2= 2.80"
2.1	200	0.0100	1.61		<b>Shallow Concentrated Flow, Shallow Conc Flow</b> Unpaved Kv= 16.1 fps
0.1	156	0.4230	24.59	295.02	<b>Channel Flow, Channel Flow, rock chute</b> Area= 12.0 sf Perim= 18.0' r= 0.67' n= 0.030
1.9	630	0.0300	5.61	112.24	<b>Channel Flow, Channel Flow, downslope to pond</b> Area= 20.0 sf Perim= 30.0' r= 0.67' n= 0.035
8.2	1,286	Total			

**Summary for Subcatchment 2S: WEST STAGING**

Runoff = 206.91 cfs @ 11.97 hrs, Volume= 10.665 af, Depth= 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 27.900	94	mine
1.920	30	Woods, Good, HSG A
6.981	77	Woods, Good, HSG D
* 3.502	61	Stockpile
2.446	98	Paved parking, HSG B
0.782	98	Water Surface, 0% imp, HSG B
43.531	86	Weighted Average
41.085		94.38% Pervious Area
2.446		5.62% Impervious Area

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering  
HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Printed 4/29/2015  
Page 33

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

**Summary for Subcatchment 3a: (new Subcat)**

Runoff = 33.39 cfs @ 12.01 hrs, Volume= 1.966 af, Depth= 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 6.700	94	mine
6.700		100.00% Pervious Area

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

**Summary for Subcatchment 3S: EAST STAGING**

Runoff = 23.01 cfs @ 11.96 hrs, Volume= 1.223 af, Depth= 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.700	94	mine
2.842	98	Paved parking, HSG B
0.237	98	Water Surface, 0% imp, HSG B
3.779	97	Weighted Average
0.937		24.79% Pervious Area
2.842		75.21% Impervious Area

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

**Summary for Subcatchment 4a: (new Subcat)**

Runoff = 9.51 cfs @ 12.02 hrs, Volume= 0.592 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering  
HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Printed 4/29/2015  
Page 34

Area (ac)	CN	Description
* 3.000	61	
1.100	98	Water Surface, 0% imp, HSG B
4.100	71	Weighted Average
4.100		100.00% Pervious Area

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

**Summary for Subcatchment 4S:**

Runoff = 25.14 cfs @ 12.01 hrs, Volume= 1.495 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 4.246	94	BARE SOIL
0.614	98	Water Surface, 0% imp, HSG B
* 0.613	61	STOCKPILE
5.473	91	Weighted Average
5.473		100.00% Pervious Area

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

**Summary for Subcatchment 5S:**

Runoff = 16.64 cfs @ 12.02 hrs, Volume= 0.989 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 2.850	61	STOCKPILE
* 2.630	94	BARE SOIL
5.480	77	Weighted Average
5.480		100.00% Pervious Area

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

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 35

**Summary for Subcatchment 6S:**

Runoff = 21.48 cfs @ 12.01 hrs, Volume= 1.269 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 4.000	94	BARE SOIL
* 1.250	61	stockpile
5.250	86	Weighted Average
5.250		100.00% Pervious Area

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

**Summary for Subcatchment 7S:**

Runoff = 50.26 cfs @ 12.01 hrs, Volume= 2.979 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 8.620	94	BARE SOIL
* 5.900	61	OB STOCKPILE
14.520	81	Weighted Average
14.520		100.00% Pervious Area

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

**Summary for Subcatchment 8a:**

Runoff = 11.55 cfs @ 12.08 hrs, Volume= 0.858 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
5.009	61	>75% Grass cover, Good, HSG B
0.979	98	Water Surface, 0% imp, HSG B
0.459	98	Paved parking, HSG B
6.447	69	Weighted Average
5.988		92.88% Pervious Area
0.459		7.12% Impervious Area

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 36

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

**Summary for Subcatchment 8b:**

Runoff = 21.49 cfs @ 12.26 hrs, Volume= 2.439 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 17.450	61	
3.350	98	Water Surface, 0% imp, HSG B
20.800	67	Weighted Average
20.800		100.00% Pervious Area

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

**Summary for Subcatchment 10S:**

Runoff = 31.16 cfs @ 12.03 hrs, Volume= 1.899 af, Depth= 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
1.320	98	Water Surface, 0% imp, HSG B
* 5.000	61	pond upland
* 14.158	61	stockpile
20.478	63	Weighted Average
20.478		100.00% Pervious Area

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

**Summary for Subcatchment 14S:**

Runoff = 25.81 cfs @ 12.02 hrs, Volume= 1.420 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 37

Area (ac)	CN	Description
1.454	74	Farmsteads, HSG B
3.036	86	Farmsteads, HSG D
7.015	30	Woods, Good, HSG A
0.635	55	Woods, Good, HSG B
2.960	77	Woods, Good, HSG D
15.100	56	Weighted Average
15.100		100.00% Pervious Area

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

**Summary for Subcatchment 15S:**

Runoff = 9.32 cfs @ 11.97 hrs, Volume= 0.452 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
4.404	30	Woods, Good, HSG A
1.585	77	Woods, Good, HSG D
0.674	93	Paved roads w/open ditches, 50% imp, HSG D
6.663	48	Weighted Average
6.326		94.94% Pervious Area
0.337		5.06% Impervious Area

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

**Summary for Subcatchment 16S:**

Runoff = 2.69 cfs @ 11.98 hrs, Volume= 0.137 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
0.629	55	Woods, Good, HSG B
0.375	89	Paved roads w/open ditches, 50% imp, HSG B
1.306	30	Woods, Good, HSG A
0.069	77	Woods, Good, HSG D
2.379	47	Weighted Average
2.192		92.12% Pervious Area
0.187		7.88% Impervious Area

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 38

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

**Summary for Subcatchment 20S:**

Runoff = 13.00 cfs @ 12.03 hrs, Volume= 0.789 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
0.400	98	Water Surface, 0% imp, HSG A
* 8.600	61	stockpile
9.000	63	Weighted Average
9.000		100.00% Pervious Area

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

**Summary for Subcatchment 21S:**

Runoff = 27.97 cfs @ 12.41 hrs, Volume= 3.526 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
3.830	77	Newly graded area, HSG A
8.116	86	Newly graded area, HSG B
1.946	86	Newly graded area, HSG B
2.079	94	Newly graded area, HSG D
15.971	85	Weighted Average
15.971		100.00% Pervious Area

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

**Summary for Subcatchment 22S:**

Runoff = 17.16 cfs @ 12.03 hrs, Volume= 1.028 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sundt Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 39

Area (ac)	CN	Description
* 13.470	61	stockpile
13.470		100.00% Pervious Area

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

**Summary for Subcatchment 24S:**

Runoff = 15.71 cfs @ 12.03 hrs, Volume= 0.941 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 12.330	61	
12.330		100.00% Pervious Area

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

**Summary for Subcatchment 26S:**

Runoff = 0.28 cfs @ 12.07 hrs, Volume= 0.046 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
1.170	43	Woods/grass comb., Fair, HSG A
1.012	49	50-75% Grass cover, Fair, HSG A
2.182	46	Weighted Average
2.182		100.00% Pervious Area

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

**Summary for Reach 21R: D9**

Inflow Area = 13.470 ac, 0.00% Impervious, Inflow Depth = 0.92" for 10-Year event  
Inflow = 17.16 cfs @ 12.03 hrs, Volume= 1.028 af  
Outflow = 9.16 cfs @ 12.39 hrs, Volume= 1.028 af, Atten= 47%, Lag= 21.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Max. Velocity= 1.96 fps, Min. Travel Time= 14.9 min  
Avg. Velocity = 0.53 fps, Avg. Travel Time= 54.7 min

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sundt Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 40

Peak Storage= 8,211 cf @ 12.14 hrs  
Average Depth at Peak Storage= 0.49'  
Bank-Full Depth= 2.50' Flow Area= 38.8 sf, Capacity= 186.59 cfs

8.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding  
Side Slope Z-value= 3.0 ' / ' Top Width= 23.00'  
Length= 1,750.0' Slope= 0.0034 ' / '  
Inlet Invert= 1,274.00', Outlet Invert= 1,268.00'



**Summary for Pond 1P:**

Inflow Area = 2.379 ac, 7.88% Impervious, Inflow Depth = 0.69" for 10-Year event  
Inflow = 2.69 cfs @ 11.98 hrs, Volume= 0.137 af  
Outflow = 2.23 cfs @ 12.02 hrs, Volume= 0.137 af, Atten= 17%, Lag= 2.7 min  
Primary = 2.23 cfs @ 12.02 hrs, Volume= 0.137 af  
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
Peak Elev= 1,106.00' @ 12.02 hrs Surf.Area= 2,545 sf Storage= 555 cf

Plug-Flow detention time= 4.2 min calculated for 0.137 af (100% of inflow)  
Center-of-Mass det. time= 4.2 min ( 831.1 - 826.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,105.56'	47,408 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,105.56	0	0	0
1,106.00	2,568	565	565
1,108.00	3,332	5,900	6,465
1,110.00	10,486	13,818	20,283
1,112.00	16,639	27,125	47,408

Device	Routing	Invert	Outlet Devices
#1	Primary	1,105.56'	<b>24.0" Round Culvert 1</b> L= 76.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,105.56' / 1,103.47' S= 0.0275 ' / ' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Primary	1,105.57'	<b>24.0" Round Culvert 2</b> L= 76.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,105.57' / 1,103.31' S= 0.0297 ' / ' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#3	Secondary	1,107.62'	<b>5.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 41

Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=2.22 cfs @ 12.02 hrs HW=1,106.00' (Free Discharge)

└─1=Culvert 1 (Inlet Controls 1.14 cfs @ 2.25 fps)

└─2=Culvert 2 (Inlet Controls 1.09 cfs @ 2.22 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,105.56' (Free Discharge)

└─3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 8P: OLD Culvert Under Revised Haul Road**

Inflow Area = 14.520 ac, 0.00% Impervious, Inflow Depth = 2.46" for 10-Year event  
 Inflow = 50.26 cfs @ 12.01 hrs, Volume= 2,979 af  
 Outflow = 49.03 cfs @ 12.03 hrs, Volume= 2,979 af, Atten= 2%, Lag= 1.2 min  
 Primary = 49.03 cfs @ 12.03 hrs, Volume= 2,979 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,218.08' @ 12.03 hrs Surf.Area= 1,125 sf Storage= 1,881 cf

Plug-Flow detention time= 0.4 min calculated for 2,979 af (100% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 795.6 - 795.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,214.50'	67,513 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,214.50	0	0	0
1,216.00	420	315	315
1,218.00	1,064	1,484	1,799
1,220.00	2,700	3,764	5,563
1,227.00	15,000	61,950	67,513

Device	Routing	Invert	Outlet Devices
#1	Primary	1,214.50'	<b>36.0" Round Culvert</b> L= 106.0' Ke= 0.500 Inlet / Outlet Invert= 1,214.50' / 1,205.30' S= 0.0868 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Secondary	1,226.00'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=48.86 cfs @ 12.03 hrs HW=1,218.06' (Free Discharge)

└─1=Culvert (Inlet Controls 48.86 cfs @ 6.91 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,214.50' (Free Discharge)

└─2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 42

**Summary for Pond 17P:**

Inflow Area = 21.763 ac, 1.55% Impervious, Inflow Depth = 0.89" for 10-Year event  
 Inflow = 19.33 cfs @ 12.00 hrs, Volume= 1,621 af  
 Outflow = 19.29 cfs @ 12.00 hrs, Volume= 1,589 af, Atten= 0%, Lag= 0.1 min  
 Primary = 19.29 cfs @ 12.00 hrs, Volume= 1,589 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs / 2  
 Peak Elev= 1,114.14' @ 12.00 hrs Surf.Area= 61 sf Storage= 10 cf

Plug-Flow detention time= 6.0 min calculated for 1,589 af (98% of inflow)  
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,113.72'	1,306 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,113.72	0	0	0
1,114.00	28	4	4
1,116.00	486	514	518
1,117.00	1,091	789	1,306

Device	Routing	Invert	Outlet Devices
#1	Primary	1,112.37'	<b>15.0" Round North Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.37' / 1,110.42' S= 0.0320 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Primary	1,112.32'	<b>15.0" Round Middle Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.32' / 1,110.26' S= 0.0338 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Primary	1,112.31'	<b>15.0" Round South Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.31' / 1,109.99' S= 0.0380 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#4	Secondary	1,114.50'	<b>10.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=19.26 cfs @ 12.00 hrs HW=1,114.14' (Free Discharge)

└─1=North Pipe (Inlet Controls 6.32 cfs @ 5.15 fps)

└─2=Middle Pipe (Inlet Controls 6.46 cfs @ 5.26 fps)

└─3=South Pipe (Inlet Controls 6.48 cfs @ 5.28 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,113.72' (Free Discharge)

└─4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 22P: 36" RCP**

Inflow Area = 5.250 ac, 0.00% Impervious, Inflow Depth = 2.90" for 10-Year event  
 Inflow = 21.48 cfs @ 12.01 hrs, Volume= 1.269 af  
 Outflow = 21.48 cfs @ 12.01 hrs, Volume= 1.269 af, Atten= 0%, Lag= 0.0 min  
 Primary = 21.48 cfs @ 12.01 hrs, Volume= 1.269 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,242.05' @ 12.01 hrs  
 Flood Elev= 1,248.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,240.00'	<b>36.0" Round Culvert</b> L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 1,240.00' / 1,239.50' S= 0.0077 '"/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

**Primary OutFlow** Max=21.36 cfs @ 12.01 hrs HW=1,242.05' (Free Discharge)  
 1=Culvert (Barrel Controls 21.36 cfs @ 5.87 fps)

**Summary for Pond 23P:**

Inflow Area = 13.470 ac, 0.00% Impervious, Inflow Depth = 0.92" for 10-Year event  
 Inflow = 9.16 cfs @ 12.39 hrs, Volume= 1.028 af  
 Outflow = 5.73 cfs @ 12.63 hrs, Volume= 1.028 af, Atten= 37%, Lag= 14.4 min  
 Primary = 5.73 cfs @ 12.63 hrs, Volume= 1.028 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,267.04' @ 12.63 hrs Surf.Area= 6,755 sf Storage= 6,278 cf  
 Flood Elev= 1,270.00' Surf.Area= 21,442 sf Storage= 42,920 cf

Plug-Flow detention time= 40.5 min calculated for 1.028 af (100% of inflow)  
 Center-of-Mass det. time= 40.6 min ( 973.4 - 932.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,266.00'	42,920 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,266.00	5,326	0	0
1,268.00	8,076	13,402	13,402
1,270.00	21,442	29,518	42,920

Device	Routing	Invert	Outlet Devices
#1	Primary	1,266.00'	<b>24.0" Round Culvert</b> L= 55.0' Ke= 0.500 Inlet / Outlet Invert= 1,266.00' / 1,262.00' S= 0.0727 '"/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

**Primary OutFlow** Max=5.72 cfs @ 12.63 hrs HW=1,267.04' (Free Discharge)  
 1=Culvert (Inlet Controls 5.72 cfs @ 3.47 fps)

**Summary for Pond 24P: forbay**

Inflow Area = 21.220 ac, 0.00% Impervious, Inflow Depth = 2.80" for 10-Year event  
 Inflow = 81.81 cfs @ 12.02 hrs, Volume= 4.945 af  
 Outflow = 80.31 cfs @ 12.04 hrs, Volume= 4.945 af, Atten= 2%, Lag= 1.2 min  
 Primary = 80.31 cfs @ 12.04 hrs, Volume= 4.945 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,131.31' @ 12.04 hrs Surf.Area= 6,783 sf Storage= 7,716 cf

Plug-Flow detention time= 3.6 min calculated for 4.945 af (100% of inflow)  
 Center-of-Mass det. time= 3.6 min ( 792.5 - 788.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,130.00'	30,793 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,130.00	4,956	0	0
1,132.00	7,736	12,692	12,692
1,134.00	10,365	18,101	30,793

Device	Routing	Invert	Outlet Devices
#1	Primary	1,130.00'	<b>20.0' long x 7.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

**Primary OutFlow** Max=80.13 cfs @ 12.04 hrs HW=1,131.31' (Free Discharge)  
 1=Broad-Crested Rectangular Weir (Weir Controls 80.13 cfs @ 3.05 fps)

**Summary for Pond 25P:**

Inflow Area = 12.330 ac, 0.00% Impervious, Inflow Depth = 0.92" for 10-Year event  
 Inflow = 15.71 cfs @ 12.03 hrs, Volume= 0.941 af  
 Outflow = 15.70 cfs @ 12.04 hrs, Volume= 0.941 af, Atten= 0%, Lag= 0.1 min  
 Primary = 15.70 cfs @ 12.04 hrs, Volume= 0.941 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,229.55' @ 12.04 hrs Surf.Area= 155 sf Storage= 121 cf

Plug-Flow detention time= 0.1 min calculated for 0.941 af (100% of inflow)  
 Center-of-Mass det. time= 0.1 min ( 887.1 - 887.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,228.00'	2,325 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 45

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,228.00	0	0	0
1,230.00	200	200	200
1,232.50	1,500	2,125	2,325

Device	Routing	Invert	Outlet Devices
#1	Primary	1,228.00'	<b>36.0" Round CMP Round 36"</b> L= 111.0' Ke= 0.500 Inlet / Outlet Invert= 1,228.00' / 1,220.00' S= 0.0721 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 7.07 sf
#2	Secondary	1,231.50'	<b>10.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=15.63 cfs @ 12.04 hrs HW=1,229.55' (Free Discharge)

1=CMP\_Round 36" (Inlet Controls 15.63 cfs @ 4.24 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,228.00' (Free Discharge)

2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 26P:**

Inflow Area = 15.652 ac, 0.00% Impervious, Inflow Depth = 0.82" for 10-Year event  
 Inflow = 5.82 cfs @ 12.63 hrs, Volume= 1.074 af  
 Outflow = 5.59 cfs @ 12.73 hrs, Volume= 1.074 af, Atten= 4%, Lag= 5.9 min  
 Primary = 5.59 cfs @ 12.73 hrs, Volume= 1.074 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,184.36' @ 12.73 hrs Surf.Area= 5,817 sf Storage= 2,034 cf

Plug-Flow detention time= 9.9 min calculated for 1.074 af (100% of inflow)  
 Center-of-Mass det. time= 9.9 min ( 983.4 - 973.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,184.00'	53,131 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,184.00	5,435	0	0
1,186.00	7,547	12,982	12,982
1,188.00	9,957	17,504	30,486
1,190.00	12,688	22,645	53,131

Device	Routing	Invert	Outlet Devices
#1	Primary	1,178.00'	<b>12.0" Round Culvert</b> L= 160.0' Ke= 0.500 Inlet / Outlet Invert= 1,178.00' / 1,156.00' S= 0.1375 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,184.00'	<b>30.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 46

Primary OutFlow Max=5.58 cfs @ 12.73 hrs HW=1,184.36' (Free Discharge)

1=Culvert (Passes 5.58 cfs of 9.16 cfs potential flow)

2=Orifice/Grate (Weir Controls 5.58 cfs @ 1.97 fps)

**Summary for Pond B1.1: South Pond**

Inflow Area = 122.375 ac, 4.91% Impervious, Inflow Depth = 0.57" for 10-Year event  
 Inflow = 38.30 cfs @ 12.00 hrs, Volume= 5.789 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min  
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,111.95' @ 750.00 hrs Surf.Area= 1.010 ac Storage= 5.789 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,105.00'	15,761 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,105.00	0.669	0.000	0.000
1,106.00	0.713	0.691	0.691
1,108.00	0.805	1.518	2.209
1,115.00	1.168	6.906	9.114
1,115.50	1.196	0.591	9.705
1,116.00	1.225	0.605	10.311
1,120.00	1.500	5.450	15.761

Device	Routing	Invert	Outlet Devices
#1	Tertiary	1,115.00'	<b>15.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,105.00' (Free Discharge)

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

**Summary for Pond B2.0: SE STAGING**

Inflow Area = 45.302 ac, 6.27% Impervious, Inflow Depth = 2.85" for 10-Year event  
 Inflow = 105.97 cfs @ 12.02 hrs, Volume= 10.765 af  
 Outflow = 44.49 cfs @ 12.18 hrs, Volume= 10.765 af, Atten= 58%, Lag= 9.5 min  
 Primary = 44.49 cfs @ 12.18 hrs, Volume= 10.765 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,129.90' @ 12.18 hrs Surf.Area= 26,335 sf Storage= 125,371 cf

Plug-Flow detention time= 407.2 min calculated for 10.764 af (100% of inflow)

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sundt Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 47

Center-of-Mass det. time= 407.2 min ( 2,172.1 - 1,764.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,123.00'	346,902 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,123.00	10,335	0	0
1,124.00	12,325	11,330	11,330
1,132.00	31,322	174,588	185,918
1,134.00	39,831	71,153	257,071
1,136.00	50,000	89,831	346,902

Device	Routing	Invert	Outlet Devices
#1	Primary	1,123.00'	<b>30.0" Round Culvert</b> L= 172.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,123.00' / 1,121.00' S= 0.0116 ' /' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 4.91 sf
#2	Device 1	1,123.00'	<b>5.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,127.50'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#4	Device 1	1,130.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Secondary	1,135.00'	<b>20.0' long x 20.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=44.49 cfs @ 12.18 hrs HW=1,129.90' (Free Discharge)  
 1=Culvert (Passes 44.49 cfs of 54.69 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 1.70 cfs @ 12.46 fps)  
 3=Sharp-Crested Rectangular Weir (Weir Controls 42.79 cfs @ 5.07 fps)  
 4=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,123.00' (Free Discharge)  
 5=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B2.1: SW STAGING**

Inflow Area = 88.833 ac, 5.95% Impervious, Inflow Depth = 2.89" for 10-Year event  
 Inflow = 216.76 cfs @ 11.98 hrs, Volume= 21.430 af  
 Outflow = 1.03 cfs @ 50.47 hrs, Volume= 3.134 af, Atten= 100%, Lag= 2,309.4 min  
 Secondary = 1.03 cfs @ 50.47 hrs, Volume= 3.134 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,135.04' @ 50.47 hrs Surf.Area= 71,128 sf Storage= 800,108 cf

Plug-Flow detention time= 3,894.9 min calculated for 3.134 af (15% of inflow)  
 Center-of-Mass det. time= 3,024.5 min ( 4,504.5 - 1,480.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,120.00'	1,174,558 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sundt Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 48

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,120.00	34,065	0	0
1,128.00	54,144	352,836	352,836
1,130.00	59,730	113,874	466,710
1,132.00	65,543	125,273	591,983
1,134.00	69,258	134,801	726,784
1,140.00	80,000	447,774	1,174,558

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,135.00'	<b>20.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

**Secondary OutFlow** Max=0.48 cfs @ 50.47 hrs HW=1,135.04' (Free Discharge)  
 1=Broad-Crested Rectangular Weir (Weir Controls 0.48 cfs @ 0.54 fps)

**Summary for Pond B3.0:**

Inflow Area = 57.460 ac, 0.00% Impervious, Inflow Depth = 0.98" for 10-Year event  
 Inflow = 53.62 cfs @ 12.05 hrs, Volume= 4.703 af  
 Outflow = 0.68 cfs @ 24.29 hrs, Volume= 4.703 af, Atten= 99%, Lag= 734.4 min  
 Primary = 0.68 cfs @ 24.29 hrs, Volume= 4.703 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,157.78' @ 24.29 hrs Surf.Area= 69,977 sf Storage= 174,565 cf

Plug-Flow detention time= 3,219.0 min calculated for 4.703 af (100% of inflow)  
 Center-of-Mass det. time= 3,219.8 min ( 4,115.9 - 896.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,155.00'	819,820 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,155.00	55,861	0	0
1,156.00	60,876	58,369	58,369
1,158.00	71,125	132,001	190,370
1,160.00	81,662	152,787	343,157
1,162.00	92,487	174,149	517,306
1,164.00	103,598	196,085	713,391
1,165.00	109,260	106,429	819,820

Device	Routing	Invert	Outlet Devices
#1	Primary	1,155.00'	<b>24.0" Round Culvert</b> L= 93.0' Ke= 0.500 Inlet / Outlet Invert= 1,155.00' / 1,144.00' S= 0.1183 ' /' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,155.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,164.40'	<b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 49

3.31 3.32

**Primary OutFlow** Max=0.68 cfs @ 24.29 hrs HW=1,157.78' (Free Discharge)

- 1=Culvert (Passes 0.68 cfs of 20.16 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.68 cfs @ 7.78 fps)
- 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B4.0:**

Inflow Area = 16.203 ac, 0.00% Impervious, Inflow Depth = 2.78" for 10-Year event  
 Inflow = 63.24 cfs @ 12.01 hrs, Volume= 3,753 af  
 Outflow = 1.68 cfs @ 15.20 hrs, Volume= 3,753 af, Atten= 97%, Lag= 191.3 min  
 Primary = 1.68 cfs @ 15.20 hrs, Volume= 3,753 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,189.42' @ 15.20 hrs Surf.Area= 36,280 sf Storage= 108,278 cf

Plug-Flow detention time= 867.6 min calculated for 3,753 af (100% of inflow)  
 Center-of-Mass det. time= 868.0 min ( 1,655.7 - 787.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,186.00'	301,602 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,186.00	27,052	0	0
1,188.00	32,452	59,504	59,504
1,190.00	37,847	70,299	129,803
1,192.00	43,586	81,433	211,236
1,194.00	46,780	90,366	301,602

Device	Routing	Invert	Outlet Devices
#1	Primary	1,186.00'	<b>12.0" Round Culvert</b> L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 1,183.00' / 1,186.00' S= -0.0750 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf
#2	Device 1	1,186.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,192.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	1,193.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Secondary	1,192.00'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 50

**Primary OutFlow** Max=1.68 cfs @ 15.20 hrs HW=1,189.42' (Free Discharge)

- 1=Culvert (Passes 1.68 cfs of 6.46 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.68 cfs @ 8.57 fps)
- 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)
- 4=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,186.00' (Free Discharge)

- 5=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B4.1:**

Inflow Area = 20.303 ac, 0.00% Impervious, Inflow Depth = 2.57" for 10-Year event  
 Inflow = 10.80 cfs @ 12.02 hrs, Volume= 4,346 af  
 Outflow = 0.84 cfs @ 37.55 hrs, Volume= 4,346 af, Atten= 92%, Lag= 1,531.7 min  
 Primary = 0.84 cfs @ 37.55 hrs, Volume= 4,346 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,187.83' @ 37.55 hrs Surf.Area= 55,416 sf Storage= 94,934 cf

Plug-Flow detention time= 1,676.8 min calculated for 4,346 af (100% of inflow)  
 Center-of-Mass det. time= 1,677.2 min ( 3,216.8 - 1,539.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,186.00'	513,285 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,186.00	48,285	0	0
1,188.00	56,074	104,359	104,359
1,190.00	64,059	120,133	224,492
1,192.00	72,367	136,426	360,918
1,194.00	80,000	152,367	513,285

Device	Routing	Invert	Outlet Devices
#1	Primary	1,186.00'	<b>12.0" Round Culvert</b> L= 84.0' Ke= 0.500 Inlet / Outlet Invert= 1,186.00' / 1,185.00' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,186.00'	<b>5.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,190.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Secondary	1,191.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=0.84 cfs @ 37.55 hrs HW=1,187.83' (Free Discharge)  
 1=Culvert (Passes 0.84 cfs of 4.19 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.84 cfs @ 6.13 fps)  
 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,186.00' (Free Discharge)  
 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B4.2:**

Inflow Area = 15.100 ac, 0.00% Impervious, Inflow Depth = 1.13" for 10-Year event  
 Inflow = 25.81 cfs @ 12.02 hrs, Volume= 1,420 af  
 Outflow = 24.26 cfs @ 12.05 hrs, Volume= 1,420 af, Atten= 6%, Lag= 1.9 min  
 Primary = 11.65 cfs @ 12.05 hrs, Volume= 1,169 af  
 Secondary = 12.61 cfs @ 12.05 hrs, Volume= 0,251 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,133.62' @ 12.05 hrs Surf.Area= 6,017 sf Storage= 6,965 cf

Plug-Flow detention time= 23.4 min calculated for 1,420 af (100% of inflow)  
 Center-of-Mass det. time= 23.4 min ( 851.9 - 828.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,132.30'	29,447 cf	Custom Stage Data (Prismatic)Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,132.30	4,571	0	0
1,134.00	6,440	9,359	9,359
1,136.00	13,648	20,088	29,447

Device	Routing	Invert	Outlet Devices
#1	Primary	1,132.30'	36.0" Round Culvert L= 290.0' Ke= 0.500 Inlet / Outlet Invert= 1,132.30' / 1,123.00' S= 0.0321 ' S= 0.0321 ' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Secondary	1,133.00'	10.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=11.61 cfs @ 12.05 hrs HW=1,133.61' (Free Discharge)  
 1=Culvert (Inlet Controls 11.61 cfs @ 3.90 fps)

**Secondary OutFlow** Max=12.52 cfs @ 12.05 hrs HW=1,133.61' (Free Discharge)  
 2=Broad-Crested Rectangular Weir (Weir Controls 12.52 cfs @ 2.04 fps)

**Summary for Pond B5: Pond B5**

Inflow Area = 15.971 ac, 0.00% Impervious, Inflow Depth = 2.65" for 10-Year event  
 Inflow = 27.97 cfs @ 12.41 hrs, Volume= 3,526 af  
 Outflow = 4.36 cfs @ 13.65 hrs, Volume= 3,526 af, Atten= 84%, Lag= 74.0 min  
 Primary = 4.36 cfs @ 13.65 hrs, Volume= 3,526 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,123.62' @ 13.65 hrs Surf.Area= 32,176 sf Storage= 91,630 cf

Plug-Flow detention time= 1,061.6 min calculated for 3,526 af (100% of inflow)  
 Center-of-Mass det. time= 1,061.3 min ( 1,903.7 - 842.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,120.00'	179,032 cf	Custom Stage Data (Prismatic)Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,120.00	18,496	0	0
1,122.00	26,064	44,560	44,560
1,124.00	33,627	59,691	104,251
1,126.00	41,154	74,781	179,032

Device	Routing	Invert	Outlet Devices
#1	Primary	1,120.00'	24.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 1,120.00' / 1,104.00' S= 0.1818 ' S= 0.1818 ' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,120.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,123.25'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

**Primary OutFlow** Max=4.35 cfs @ 13.65 hrs HW=1,123.62' (Free Discharge)  
 1=Culvert (Passes 4.35 cfs of 24.47 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.78 cfs @ 8.94 fps)  
 3=Sharp-Crested Rectangular Weir (Weir Controls 3.57 cfs @ 1.98 fps)

**Summary for Pond B8.0:**

Inflow Area = 131.201 ac, 5.07% Impervious, Inflow Depth = 0.09" for 10-Year event  
 Inflow = 13.48 cfs @ 12.07 hrs, Volume= 0,995 af  
 Outflow = 1.52 cfs @ 12.76 hrs, Volume= 0,995 af, Atten= 89%, Lag= 41.4 min  
 Primary = 1.52 cfs @ 12.76 hrs, Volume= 0,995 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0,000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,075.49' @ 12.76 hrs Surf.Area= 45,546 sf Storage= 21,646 cf

Plug-Flow detention time= 499.4 min calculated for 0,995 af (100% of inflow)  
 Center-of-Mass det. time= 499.1 min ( 1,317.3 - 818.2 )

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 53

Volume	Invert	Avail.Storage	Storage Description
#1	1,075.00'	840,564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,075.00	42,640	0	0
1,076.00	48,560	45,600	45,600
1,078.00	60,620	109,180	154,780
1,080.00	72,949	133,569	288,349
1,082.00	85,535	158,484	446,833
1,084.00	98,374	183,909	630,742
1,086.00	111,448	209,822	840,564

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,084.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	1,075.00'	<b>48.0" Round Culvert</b> L= 550.0' Ke= 0.500 Inlet / Outlet Invert= 1,075.00' / 1,073.00' S= 0.0036 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

**Primary OutFlow** Max=1.50 cfs @ 12.76 hrs HW=1,075.49' (Free Discharge)  
 ↳**2=Culvert** (Barrel Controls 1.50 cfs @ 2.60 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,075.00' (Free Discharge)  
 ↳**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond B8.1:**

Inflow Area = 152.001 ac, 4.38% Impervious, Inflow Depth = 0.27" for 10-Year event  
 Inflow = 22.68 cfs @ 12.26 hrs, Volume= 3,434 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,074.00' @ 581.82 hrs Surf.Area= 152,670 sf Storage= 149,549 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,073.00'	4,938,753 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,073.00	145,815	0	0
1,084.00	221,070	2,017,868	2,017,868
1,095.00	310,000	2,920,885	4,938,753

Device	Routing	Invert	Outlet Devices
#1	Primary	1,094.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b>

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 54

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,073.00' (Free Discharge)  
 ↳**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond CB14:**

Inflow Area = 5.480 ac, 0.00% Impervious, Inflow Depth = 2.17" for 10-Year event  
 Inflow = 16.64 cfs @ 12.02 hrs, Volume= 0.989 af  
 Outflow = 16.64 cfs @ 12.02 hrs, Volume= 0.989 af, Atten= 0%, Lag= 0.0 min  
 Primary = 16.64 cfs @ 12.02 hrs, Volume= 0.989 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,206.61' @ 12.02 hrs  
 Flood Elev= 1,214.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,205.00'	<b>36.0" Round Culvert</b> L= 94.0' Ke= 0.500 Inlet / Outlet Invert= 1,205.00' / 1,186.00' S= 0.2021 ' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

**Primary OutFlow** Max=16.59 cfs @ 12.02 hrs HW=1,206.60' (Free Discharge)  
 ↳**1=Culvert** (Inlet Controls 16.59 cfs @ 4.31 fps)

**Summary for Pond CB17:**

Inflow Area = 5.250 ac, 0.00% Impervious, Inflow Depth = 2.90" for 10-Year event  
 Inflow = 21.48 cfs @ 12.01 hrs, Volume= 1.269 af  
 Outflow = 21.48 cfs @ 12.01 hrs, Volume= 1.269 af, Atten= 0%, Lag= 0.0 min  
 Primary = 21.48 cfs @ 12.01 hrs, Volume= 1.269 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,241.07' @ 12.01 hrs  
 Flood Elev= 1,248.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,239.20'	<b>36.0" Round Culvert</b> L= 258.0' Ke= 0.500 Inlet / Outlet Invert= 1,239.20' / 1,188.00' S= 0.1984 ' / Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 7.07 sf

**Primary OutFlow** Max=21.37 cfs @ 12.01 hrs HW=1,241.06' (Free Discharge)  
 ↳**1=Culvert** (Inlet Controls 21.37 cfs @ 4.64 fps)

**Summary for Pond FB2: SEDIMENT FOREBAY 2**

Inflow Area = 21.330 ac, 0.00% Impervious, Inflow Depth = 0.97" for 10-Year event  
 Inflow = 28.69 cfs @ 12.03 hrs, Volume= 1.730 af  
 Outflow = 24.60 cfs @ 12.08 hrs, Volume= 1.730 af, Atten= 14%, Lag= 2.9 min  
 Primary = 24.60 cfs @ 12.08 hrs, Volume= 1.730 af  
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

**SWPPP -amdendment-upstream pluggedv2**

Type II 24-hr 10-Year Rainfall=4.20"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 55

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,171.30' @ 12.08 hrs Surf.Area= 5,961 sf Storage= 6,645 cf

Plug-Flow detention time= 9.6 min calculated for 1.730 af (100% of inflow)  
 Center-of-Mass det. time= 9.6 min ( 886.2 - 876.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,170.00'	36,534 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,170.00	4,263	0	0
1,172.00	6,876	11,139	11,139
1,174.00	8,952	15,828	26,967
1,175.00	10,181	9,567	36,534

Device	Routing	Invert	Outlet Devices
#1	Primary	1,165.00'	<b>36.0" Round Culvert</b> L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 1,165.00' / 1,155.00' S= 0.1538 '"/ n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf
#2	Device 1	1,170.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	1,174.00'	<b>5.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Tertiary	1,174.50'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=24.56 cfs @ 12.08 hrs HW=1,171.30' (Free Discharge)  
 1=Culvert (Passes 24.56 cfs of 74.55 cfs potential flow)  
 2=Broad-Crested Rectangular Weir (Weir Controls 24.56 cfs @ 3.78 fps)  
 3=Orifice/Grate ( Controls 0.00 cfs)

**Tertiary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,170.00' (Free Discharge)  
 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**SWPPP -amdendment-upstream pluggedv2** Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Prepared by Sunde Engineering

Printed 4/29/2015

HydroCAD® 10.00-13 s/n 02350 © 2014 HydroCAD Software Solutions LLC

Page 56

Time span=0.00-750.00 hrs, dt=0.02 hrs, 37501 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Stockpile S-1</b>	Runoff Area=11.779 ac 3.28% Impervious Runoff Depth=2.32" Flow Length=1,286' Tc=8.2 min CN=59 Runoff=42.31 cfs 2.278 af
<b>Subcatchment 2S: WEST STAGING</b>	Runoff Area=43.531 ac 5.62% Impervious Runoff Depth=4.95" Tc=6.0 min CN=86 Runoff=340.58 cfs 17.939 af
<b>Subcatchment 3a: (new Subcat)</b>	Runoff Area=6.700 ac 0.00% Impervious Runoff Depth=5.73" Tc=10.0 min CN=94 Runoff=52.78 cfs 3.201 af
<b>Subcatchment 3S: EAST STAGING</b>	Runoff Area=3.779 ac 75.21% Impervious Runoff Depth=6.11" Tc=5.0 min CN=97 Runoff=35.59 cfs 1.926 af
<b>Subcatchment 4a: (new Subcat)</b>	Runoff Area=4.100 ac 0.00% Impervious Runoff Depth=3.35" Tc=10.0 min CN=71 Runoff=19.35 cfs 1.145 af
<b>Subcatchment 4S:</b>	Runoff Area=5.473 ac 0.00% Impervious Runoff Depth=5.40" Tc=10.0 min CN=91 Runoff=40.55 cfs 2.463 af
<b>Subcatchment 5S:</b>	Runoff Area=5.480 ac 0.00% Impervious Runoff Depth=3.95" Tc=10.0 min CN=77 Runoff=30.64 cfs 1.804 af
<b>Subcatchment 6S:</b>	Runoff Area=5.250 ac 0.00% Impervious Runoff Depth=4.92" Tc=10.0 min CN=86 Runoff=35.86 cfs 2.151 af
<b>Subcatchment 7S:</b>	Runoff Area=14.520 ac 0.00% Impervious Runoff Depth=4.34" Tc=10.0 min CN=81 Runoff=88.44 cfs 5.251 af
<b>Subcatchment 8a:</b>	Runoff Area=6.447 ac 7.12% Impervious Runoff Depth=3.17" Tc=15.0 min CN=69 Runoff=24.50 cfs 1.705 af
<b>Subcatchment 8b:</b>	Runoff Area=20.800 ac 0.00% Impervious Runoff Depth=2.93" Tc=30.0 min CN=67 Runoff=49.14 cfs 5.084 af
<b>Subcatchment 10S:</b>	Runoff Area=20.478 ac 0.00% Impervious Runoff Depth=2.56" Tc=10.0 min CN=63 Runoff=77.74 cfs 4.363 af
<b>Subcatchment 14S:</b>	Runoff Area=15.100 ac 0.00% Impervious Runoff Depth=2.20" Tc=10.0 min CN=56 Runoff=48.57 cfs 2.774 af
<b>Subcatchment 15S:</b>	Runoff Area=6.663 ac 5.06% Impervious Runoff Depth=1.57" Tc=6.0 min CN=48 Runoff=16.72 cfs 0.872 af
<b>Subcatchment 16S:</b>	Runoff Area=2.379 ac 7.88% Impervious Runoff Depth=1.46" Tc=6.0 min CN=47 Runoff=5.57 cfs 0.290 af
<b>Subcatchment 20S:</b>	Runoff Area=9.000 ac 0.00% Impervious Runoff Depth=2.48" Tc=10.0 min CN=63 Runoff=33.35 cfs 1.859 af

**Subcatchment21S:** Runoff Area=15.971 ac 0.00% Impervious Runoff Depth=4.72"  
 Tc=44.0 min CN=85 Runoff=49.40 cfs 6.276 af

**Subcatchment22S:** Runoff Area=13.470 ac 0.00% Impervious Runoff Depth=2.31"  
 Tc=10.0 min CN=61 Runoff=47.23 cfs 2.588 af

**Subcatchment24S:** Runoff Area=12.330 ac 0.00% Impervious Runoff Depth=2.31"  
 Tc=10.0 min CN=61 Runoff=43.23 cfs 2.369 af

**Subcatchment26S:** Runoff Area=2.182 ac 0.00% Impervious Runoff Depth=1.05"  
 Tc=10.0 min CN=46 Runoff=2.83 cfs 0.191 af

**Reach 21R: D9** Avg. Flow Depth=1.02' Max Vel=2.95 fps Inflow=47.23 cfs 2.588 af  
 n=0.025 L=1,750.0' S=0.0034 '/' Capacity=186.59 cfs Outflow=33.30 cfs 2.588 af

**Pond 1P:** Peak Elev=1,106.60' Storage=2,188 cf Inflow=13.53 cfs 0.369 af  
 Primary=11.46 cfs 0.369 af Secondary=0.00 cfs 0.000 af Outflow=11.46 cfs 0.369 af

**Pond 8P: OLD Culvert Under Revised** Peak Elev=1,220.93' Storage=8,849 cf Inflow=88.44 cfs 5.251 af  
 Primary=75.60 cfs 5.251 af Secondary=0.00 cfs 0.000 af Outflow=75.60 cfs 5.251 af

**Pond 17P:** Peak Elev=1,114.96' Storage=136 cf Inflow=33.26 cfs 2.979 af  
 Primary=25.07 cfs 2.916 af Secondary=8.11 cfs 0.079 af Outflow=33.17 cfs 2.994 af

**Pond 22P: 36" RCP** Peak Elev=1,242.88' Inflow=35.86 cfs 2.151 af  
 36.0" Round Culvert n=0.012 L=65.0' S=0.0077 '/' Outflow=35.86 cfs 2.151 af

**Pond 23P:** Peak Elev=1,268.59' Storage=19,321 cf Inflow=33.30 cfs 2.588 af  
 24.0" Round Culvert n=0.010 L=55.0' S=0.0727 '/' Outflow=19.07 cfs 2.588 af

**Pond 24P: forbay** Peak Elev=1,131.76' Storage=10,901 cf Inflow=125.60 cfs 8.452 af  
 Outflow=124.12 cfs 8.452 af

**Pond 25P:** Peak Elev=1,231.07' Storage=714 cf Inflow=43.23 cfs 2.369 af  
 Primary=42.68 cfs 2.369 af Secondary=0.00 cfs 0.000 af Outflow=42.68 cfs 2.369 af

**Pond 26P:** Peak Elev=1,186.81' Storage=19,477 cf Inflow=19.62 cfs 2.778 af  
 Outflow=10.90 cfs 2.778 af

**Pond B1.1: South Pond** Peak Elev=1,115.43' Storage=9,616 af Inflow=67.37 cfs 23.445 af  
 Outflow=10.92 cfs 14.331 af

**Pond B2.0: SE STAGING** Peak Elev=1,132.52' Storage=202,663 cf Inflow=172.63 cfs 18.608 af  
 Primary=64.92 cfs 18.608 af Secondary=0.00 cfs 0.000 af Outflow=64.92 cfs 18.608 af

**Pond B2.1: SW STAGING** Peak Elev=1,135.60' Storage=839,989 cf Inflow=396.14 cfs 36.547 af  
 Outflow=25.19 cfs 18.252 af

**Pond B3.0:** Peak Elev=1,161.23' Storage=447,928 cf Inflow=143.37 cfs 11.369 af  
 Outflow=1.03 cfs 11.369 af

**Pond B4.0:** Peak Elev=1,191.61' Storage=194,588 cf Inflow=107.03 cfs 6.418 af  
 Primary=2.19 cfs 6.418 af Secondary=0.00 cfs 0.000 af Outflow=2.19 cfs 6.418 af

**Pond B4.1:** Peak Elev=1,189.03' Storage=164,358 cf Inflow=21.05 cfs 7.563 af  
 Primary=1.10 cfs 7.563 af Secondary=0.00 cfs 0.000 af Outflow=1.10 cfs 7.563 af

**Pond B4.2:** Peak Elev=1,134.03' Storage=9,536 cf Inflow=48.57 cfs 2.774 af  
 Primary=18.85 cfs 2.106 af Secondary=27.76 cfs 0.667 af Outflow=46.61 cfs 2.774 af

**Pond B5: Pond B5** Peak Elev=1,124.54' Storage=122,787 cf Inflow=49.40 cfs 6.276 af  
 Outflow=23.48 cfs 6.276 af

**Pond B8.0:** Peak Elev=1,076.24' Storage=57,524 cf Inflow=34.63 cfs 16.405 af  
 Primary=9.90 cfs 16.405 af Secondary=0.00 cfs 0.000 af Outflow=9.90 cfs 16.405 af

**Pond B8.1:** Peak Elev=1,078.67' Storage=936,031 cf Inflow=54.38 cfs 21.489 af  
 Outflow=0.00 cfs 0.000 af

**Pond CB14:** Peak Elev=1,207.33' Inflow=30.64 cfs 1.804 af  
 36.0" Round Culvert n=0.012 L=94.0' S=0.2021 '/' Outflow=30.64 cfs 1.804 af

**Pond CB17:** Peak Elev=1,241.81' Inflow=35.86 cfs 2.151 af  
 36.0" Round Culvert n=0.010 L=258.0' S=0.1984 '/' Outflow=35.86 cfs 2.151 af

**Pond FB2: SEDIMENT FOREBAY 2** Peak Elev=1,172.57' Storage=15,250 cf Inflow=75.76 cfs 4.228 af  
 Primary=68.52 cfs 4.228 af Tertiary=0.00 cfs 0.000 af Outflow=68.52 cfs 4.228 af

**Total Runoff Area = 225.432 ac Runoff Volume = 66.528 af Average Runoff Depth = 3.54"**  
**97.05% Pervious = 218.775 ac 2.95% Impervious = 6.657 ac**

**Summary for Subcatchment 1S: Stockpile S-1**

Runoff = 42.31 cfs @ 12.00 hrs, Volume= 2.278 af, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
0.386	98	Paved parking, HSG B
2.600	30	Woods, Good, HSG A
1.112	77	Woods, Good, HSG D
* 7.012	61	stockpile
0.669	98	Water Surface, 0% imp, HSG B
11.779	59	Weighted Average
11.393		96.72% Pervious Area
0.386		3.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	300	0.0100	1.21		<b>Sheet Flow, Sheet Flow</b> Smooth surfaces n= 0.011 P2= 2.80"
2.1	200	0.0100	1.61		<b>Shallow Concentrated Flow, Shallow Conc Flow</b> Unpaved Kv= 16.1 fps
0.1	156	0.4230	24.59	295.02	<b>Channel Flow, Channel Flow, rock chute</b> Area= 12.0 sf Perim= 18.0' r= 0.67' n= 0.030
1.9	630	0.0300	5.61	112.24	<b>Channel Flow, Channel Flow, downslope to pond</b> Area= 20.0 sf Perim= 30.0' r= 0.67' n= 0.035
8.2	1,286	Total			

**Summary for Subcatchment 2S: WEST STAGING**

Runoff = 340.58 cfs @ 11.97 hrs, Volume= 17.939 af, Depth= 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 27.900	94	mine
1.920	30	Woods, Good, HSG A
6.981	77	Woods, Good, HSG D
* 3.502	61	Stockpile
2.446	98	Paved parking, HSG B
0.782	98	Water Surface, 0% imp, HSG B
43.531	86	Weighted Average
41.085		94.38% Pervious Area
2.446		5.62% Impervious Area

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

**Summary for Subcatchment 3a: (new Subcat)**

Runoff = 52.78 cfs @ 12.01 hrs, Volume= 3.201 af, Depth= 5.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 6.700	94	mine
6.700		100.00% Pervious Area

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

**Summary for Subcatchment 3S: EAST STAGING**

Runoff = 35.59 cfs @ 11.96 hrs, Volume= 1.926 af, Depth= 6.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 0.700	94	mine
2.842	98	Paved parking, HSG B
0.237	98	Water Surface, 0% imp, HSG B
3.779	97	Weighted Average
0.937		24.79% Pervious Area
2.842		75.21% Impervious Area

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

**Summary for Subcatchment 4a: (new Subcat)**

Runoff = 19.35 cfs @ 12.02 hrs, Volume= 1.145 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 3.000	61	
1.100	98	Water Surface, 0% imp, HSG B
4.100	71	Weighted Average
4.100		100.00% Pervious Area

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

**Summary for Subcatchment 4S:**

Runoff = 40.55 cfs @ 12.01 hrs, Volume= 2.463 af, Depth= 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 4.246	94	BARE SOIL
0.614	98	Water Surface, 0% imp, HSG B
* 0.613	61	STOCKPILE
5.473	91	Weighted Average
5.473		100.00% Pervious Area

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

**Summary for Subcatchment 5S:**

Runoff = 30.64 cfs @ 12.01 hrs, Volume= 1.804 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 2.850	61	STOCKPILE
* 2.630	94	BARE SOIL
5.480	77	Weighted Average
5.480		100.00% Pervious Area

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

**Summary for Subcatchment 6S:**

Runoff = 35.86 cfs @ 12.01 hrs, Volume= 2.151 af, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 4.000	94	BARE SOIL
* 1.250	61	stockpile
5.250	86	Weighted Average
5.250		100.00% Pervious Area

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

**Summary for Subcatchment 7S:**

Runoff = 88.44 cfs @ 12.01 hrs, Volume= 5.251 af, Depth= 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 8.620	94	BARE SOIL
* 5.900	61	OB STOCKPILE
14.520	81	Weighted Average
14.520		100.00% Pervious Area

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

**Summary for Subcatchment 8a:**

Runoff = 24.50 cfs @ 12.07 hrs, Volume= 1.705 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
5.009	61	>75% Grass cover, Good, HSG B
0.979	98	Water Surface, 0% imp, HSG B
0.459	98	Paved parking, HSG B
6.447	69	Weighted Average
5.988		92.88% Pervious Area
0.459		7.12% Impervious Area

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

**Summary for Subcatchment 8b:**

Runoff = 49.14 cfs @ 12.25 hrs, Volume= 5.084 af, Depth= 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 17.450	61	
3.350	98	Water Surface, 0% imp, HSG B
20.800	67	Weighted Average
20.800		100.00% Pervious Area

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

**Summary for Subcatchment 10S:**

Runoff = 77.74 cfs @ 12.02 hrs, Volume= 4.363 af, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
1.320	98	Water Surface, 0% imp, HSG B
* 5.000	61	pond upland
* 14.158	61	stockpile
20.478	63	Weighted Average
20.478		100.00% Pervious Area

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

**Summary for Subcatchment 14S:**

Runoff = 48.57 cfs @ 12.01 hrs, Volume= 2.774 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
1.454	74	Farmsteads, HSG B
3.036	86	Farmsteads, HSG D
7.015	30	Woods, Good, HSG A
0.635	55	Woods, Good, HSG B
2.960	77	Woods, Good, HSG D
15.100	56	Weighted Average
15.100		100.00% Pervious Area

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

**Summary for Subcatchment 15S:**

Runoff = 16.72 cfs @ 11.97 hrs, Volume= 0.872 af, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
4.404	30	Woods, Good, HSG A
1.585	77	Woods, Good, HSG D
0.674	93	Paved roads w/open ditches, 50% imp, HSG D
6.663	48	Weighted Average
6.326		94.94% Pervious Area
0.337		5.06% Impervious Area

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

**Summary for Subcatchment 16S:**

Runoff = 5.57 cfs @ 11.97 hrs, Volume= 0.290 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
0.629	55	Woods, Good, HSG B
0.375	89	Paved roads w/open ditches, 50% imp, HSG B
1.306	30	Woods, Good, HSG A
0.069	77	Woods, Good, HSG D
2.379	47	Weighted Average
2.192		92.12% Pervious Area
0.187		7.88% Impervious Area

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

**Summary for Subcatchment 20S:**

Runoff = 33.35 cfs @ 12.02 hrs, Volume= 1.859 af, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
0.400	98	Water Surface, 0% imp, HSG A
* 8.600	61	stockpile
9.000	63	Weighted Average
9.000		100.00% Pervious Area

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

**Summary for Subcatchment 21S:**

Runoff = 49.40 cfs @ 12.40 hrs, Volume= 6.276 af, Depth= 4.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
3.830	77	Newly graded area, HSG A
8.116	86	Newly graded area, HSG B
1.946	86	Newly graded area, HSG B
2.079	94	Newly graded area, HSG D
15.971	85	Weighted Average
15.971		100.00% Pervious Area

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

**Summary for Subcatchment 22S:**

Runoff = 47.23 cfs @ 12.02 hrs, Volume= 2.588 af, Depth= 2.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 13.470	61	stockpile
13.470		100.00% Pervious Area

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

**Summary for Subcatchment 24S:**

Runoff = 43.23 cfs @ 12.02 hrs, Volume= 2.369 af, Depth= 2.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
* 12.330	61	
12.330		100.00% Pervious Area

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

**Summary for Subcatchment 26S:**

Runoff = 2.83 cfs @ 12.04 hrs, Volume= 0.191 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14 Rainfall=6.44"

Area (ac)	CN	Description
1.170	43	Woods/grass comb., Fair, HSG A
1.012	49	50-75% Grass cover, Fair, HSG A
2.182	46	Weighted Average
2.182		100.00% Pervious Area

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

**Summary for Reach 21R: D9**

Inflow Area = 13.470 ac, 0.00% Impervious, Inflow Depth = 2.31" for 100-Year-Atlas14 event  
 Inflow = 47.23 cfs @ 12.02 hrs, Volume= 2.588 af  
 Outflow = 33.30 cfs @ 12.27 hrs, Volume= 2.588 af, Atten= 29%, Lag= 14.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Max. Velocity= 2.95 fps, Min. Travel Time= 9.9 min  
 Avg. Velocity= 0.65 fps, Avg. Travel Time= 44.7 min

Peak Storage= 19,780 cf @ 12.10 hrs  
 Average Depth at Peak Storage= 1.02'  
 Bank-Full Depth= 2.50' Flow Area= 38.8 sf, Capacity= 186.59 cfs

8.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding  
 Side Slope Z-value= 3.0 '/' Top Width= 23.00'  
 Length= 1,750.0' Slope= 0.0034 '/'  
 Inlet Invert= 1,274.00', Outlet Invert= 1,268.00'



**Summary for Pond 1P:**

Inflow Area = 2.379 ac, 7.88% Impervious, Inflow Depth = 1.86" for 100-Year-Atlas14 event  
 Inflow = 13.53 cfs @ 11.99 hrs, Volume= 0.369 af  
 Outflow = 11.46 cfs @ 12.02 hrs, Volume= 0.369 af, Atten= 15%, Lag= 2.1 min  
 Primary = 11.46 cfs @ 12.02 hrs, Volume= 0.369 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,106.60' @ 12.02 hrs Surf.Area= 2,799 sf Storage= 2,188 cf

Plug-Flow detention time= 3.9 min calculated for 0.369 af (100% of inflow)  
 Center-of-Mass det. time= 3.9 min ( 808.0 - 804.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,105.56'	47,408 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,105.56	0	0	0
1,106.00	2,568	565	565
1,108.00	3,332	5,900	6,465
1,110.00	10,486	13,818	20,283
1,112.00	16,639	27,125	47,408

Device	Routing	Invert	Outlet Devices
#1	Primary	1,105.56'	<b>24.0" Round Culvert 1</b> L= 76.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,105.56' / 1,103.47' S= 0.0275 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Primary	1,105.57'	<b>24.0" Round Culvert 2</b> L= 76.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,105.57' / 1,103.31' S= 0.0297 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#3	Secondary	1,107.62'	<b>5.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=11.39 cfs @ 12.02 hrs HW=1,106.60' (Free Discharge)  
 1=Culvert 1 (Inlet Controls 5.74 cfs @ 3.47 fps)  
 2=Culvert 2 (Inlet Controls 5.65 cfs @ 3.46 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,105.56' (Free Discharge)  
 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 8P: OLD Culvert Under Revised Haul Road**

Inflow Area = 14.520 ac, 0.00% Impervious, Inflow Depth = 4.34" for 100-Year-Atlas14 event  
 Inflow = 88.44 cfs @ 12.01 hrs, Volume= 5.251 af  
 Outflow = 75.60 cfs @ 12.07 hrs, Volume= 5.251 af, Atten= 15%, Lag= 3.1 min  
 Primary = 75.60 cfs @ 12.07 hrs, Volume= 5.251 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,220.93' @ 12.07 hrs Surf.Area= 4,340 sf Storage= 8,849 cf

Plug-Flow detention time= 0.7 min calculated for 5.251 af (100% of inflow)  
 Center-of-Mass det. time= 0.7 min ( 786.7 - 786.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,214.50'	67,513 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,214.50	0	0	0
1,216.00	420	315	315
1,218.00	1,064	1,484	1,799
1,220.00	2,700	3,764	5,563
1,227.00	15,000	61,950	67,513

Device	Routing	Invert	Outlet Devices
#1	Primary	1,214.50'	<b>36.0" Round Culvert</b> L= 106.0' Ke= 0.500 Inlet / Outlet Invert= 1,214.50' / 1,205.30' S= 0.0868 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Secondary	1,226.00'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=75.49 cfs @ 12.07 hrs HW=1,220.92' (Free Discharge)  
 1=Culvert (Inlet Controls 75.49 cfs @ 10.68 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,214.50' (Free Discharge)  
 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 17P:**

Inflow Area = 21.763 ac, 1.55% Impervious, Inflow Depth = 1.64" for 100-Year-Atlas14 event  
 Inflow = 33.26 cfs @ 11.99 hrs, Volume= 2,979 af  
 Outflow = 33.17 cfs @ 11.99 hrs, Volume= 2,994 af, Atten= 0%, Lag= 0.1 min  
 Primary = 25.07 cfs @ 11.99 hrs, Volume= 2,916 af  
 Secondary = 8.11 cfs @ 11.99 hrs, Volume= 0,079 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs / 2  
 Peak Elev= 1,114.96' @ 11.99 hrs Surf.Area= 247 sf Storage= 136 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 2.6 min ( 857.0 - 854.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,113.72'	1,306 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,113.72	0	0	0
1,114.00	28	4	4
1,116.00	486	514	518
1,117.00	1,091	789	1,306

Device	Routing	Invert	Outlet Devices
#1	Primary	1,112.37'	<b>15.0" Round North Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.37' / 1,110.42' S= 0.0320 ' / ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Primary	1,112.32'	<b>15.0" Round Middle Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.32' / 1,110.26' S= 0.0338 ' / ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Primary	1,112.31'	<b>15.0" Round South Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.31' / 1,109.99' S= 0.0380 ' / ' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#4	Secondary	1,114.50'	<b>10.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=25.04 cfs @ 11.99 hrs HW=1,114.95' (Free Discharge)  
 1=North Pipe (Inlet Controls 8.27 cfs @ 6.74 fps)  
 2=Middle Pipe (Inlet Controls 8.38 cfs @ 6.82 fps)  
 3=South Pipe (Inlet Controls 8.40 cfs @ 6.84 fps)

**Secondary OutFlow** Max=7.99 cfs @ 11.99 hrs HW=1,114.95' (Free Discharge)  
 4=Broad-Crested Rectangular Weir (Weir Controls 7.99 cfs @ 1.76 fps)

**Summary for Pond 22P: 36" RCP**

Inflow Area = 5.250 ac, 0.00% Impervious, Inflow Depth = 4.92" for 100-Year-Atlas14 event  
 Inflow = 35.86 cfs @ 12.01 hrs, Volume= 2,151 af  
 Outflow = 35.86 cfs @ 12.01 hrs, Volume= 2,151 af, Atten= 0%, Lag= 0.0 min  
 Primary = 35.86 cfs @ 12.01 hrs, Volume= 2,151 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,242.88' @ 12.01 hrs  
 Flood Elev= 1,248.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,240.00'	<b>36.0" Round Culvert</b> L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 1,240.00' / 1,239.50' S= 0.0077 ' / ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

**Primary OutFlow** Max=35.67 cfs @ 12.01 hrs HW=1,242.87' (Free Discharge)  
 1=Culvert (Barrel Controls 35.67 cfs @ 6.57 fps)

**Summary for Pond 23P:**

Inflow Area = 13.470 ac, 0.00% Impervious, Inflow Depth = 2.31" for 100-Year-Atlas14 event  
 Inflow = 33.30 cfs @ 12.27 hrs, Volume= 2,588 af  
 Outflow = 19.07 cfs @ 12.45 hrs, Volume= 2,588 af, Atten= 43%, Lag= 11.3 min  
 Primary = 19.07 cfs @ 12.45 hrs, Volume= 2,588 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,268.59' @ 12.45 hrs Surf.Area= 12,014 sf Storage= 19,321 cf  
 Flood Elev= 1,270.00' Surf.Area= 21,442 sf Storage= 42,920 cf

Plug-Flow detention time= 26.5 min calculated for 2,588 af (100% of inflow)  
 Center-of-Mass det. time= 26.6 min ( 914.0 - 887.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,266.00'	42,920 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,266.00	5,326	0	0
1,268.00	8,076	13,402	13,402
1,270.00	21,442	29,518	42,920

Device	Routing	Invert	Outlet Devices
#1	Primary	1,266.00'	<b>24.0" Round Culvert</b> L= 55.0' Ke= 0.500 Inlet / Outlet Invert= 1,266.00' / 1,262.00' S= 0.0727 ' / ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

**Primary OutFlow** Max=19.06 cfs @ 12.45 hrs HW=1,268.59' (Free Discharge)  
 1=Culvert (Inlet Controls 19.06 cfs @ 6.07 fps)

**Summary for Pond 24P: forbay**

Inflow Area = 21.220 ac, 0.00% Impervious, Inflow Depth = 4.78" for 100-Year-Atlas14 event  
 Inflow = 125.60 cfs @ 12.03 hrs, Volume= 8,452 af  
 Outflow = 124.12 cfs @ 12.05 hrs, Volume= 8,452 af, Atten= 1%, Lag= 1.2 min  
 Primary = 124.12 cfs @ 12.05 hrs, Volume= 8,452 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,131.76' @ 12.05 hrs Surf.Area= 7,407 sf Storage= 10,901 cf

Plug-Flow detention time= 3.1 min calculated for 8,452 af (100% of inflow)  
 Center-of-Mass det. time= 3.1 min ( 782.2 - 779.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,130.00'	30,793 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,130.00	4,956	0	0
1,132.00	7,736	12,692	12,692
1,134.00	10,365	18,101	30,793

Device	Routing	Invert	Outlet Devices
#1	Primary	1,130.00'	<b>20.0' long x 7.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

**Primary OutFlow** Max=123.77 cfs @ 12.05 hrs HW=1,131.76' (Free Discharge)  
 ↳1=**Broad-Crested Rectangular Weir** (Weir Controls 123.77 cfs @ 3.52 fps)

**Summary for Pond 25P:**

Inflow Area = 12.330 ac, 0.00% Impervious, Inflow Depth = 2.31" for 100-Year-Atlas14 event  
 Inflow = 43.23 cfs @ 12.02 hrs, Volume= 2,369 af  
 Outflow = 42.68 cfs @ 12.04 hrs, Volume= 2,369 af, Atten= 1%, Lag= 0.9 min  
 Primary = 42.68 cfs @ 12.04 hrs, Volume= 2,369 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,231.07' @ 12.04 hrs Surf.Area= 758 sf Storage= 714 cf

Plug-Flow detention time= 0.1 min calculated for 2,369 af (100% of inflow)  
 Center-of-Mass det. time= 0.1 min ( 856.4 - 856.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,228.00'	2,325 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,228.00	0	0	0
1,230.00	200	200	200
1,232.50	1,500	2,125	2,325

Device	Routing	Invert	Outlet Devices
#1	Primary	1,228.00'	<b>36.0" Round CMP Round 36"</b> L= 111.0' Ke= 0.500 Inlet / Outlet Invert= 1,228.00' / 1,220.00' S= 0.0721 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 7.07 sf
#2	Secondary	1,231.50'	<b>10.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=42.59 cfs @ 12.04 hrs HW=1,231.07' (Free Discharge)  
 ↳1=**CMP\_Round 36"** (Inlet Controls 42.59 cfs @ 6.02 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,228.00' (Free Discharge)  
 ↳2=**Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond 26P:**

Inflow Area = 15.652 ac, 0.00% Impervious, Inflow Depth = 2.13" for 100-Year-Atlas14 event  
 Inflow = 19.62 cfs @ 12.45 hrs, Volume= 2,778 af  
 Outflow = 10.90 cfs @ 12.94 hrs, Volume= 2,778 af, Atten= 44%, Lag= 29.4 min  
 Primary = 10.90 cfs @ 12.94 hrs, Volume= 2,778 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,186.81' @ 12.94 hrs Surf.Area= 8,521 sf Storage= 19,477 cf

Plug-Flow detention time= 15.1 min calculated for 2,778 af (100% of inflow)  
 Center-of-Mass det. time= 15.1 min ( 928.4 - 913.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,184.00'	53,131 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,184.00	5,435	0	0
1,186.00	7,547	12,982	12,982
1,188.00	9,957	17,504	30,486
1,190.00	12,688	22,645	53,131

Device	Routing	Invert	Outlet Devices
#1	Primary	1,178.00'	<b>12.0" Round Culvert</b> L= 160.0' Ke= 0.500 Inlet / Outlet Invert= 1,178.00' / 1,156.00' S= 0.1375 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,184.00'	<b>30.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.90 cfs @ 12.94 hrs HW=1,186.81' (Free Discharge)  
 1=Culvert (Inlet Controls 10.90 cfs @ 13.88 fps)  
 2=Orifice/Grate (Passes 10.90 cfs of 39.61 cfs potential flow)

**Summary for Pond B1.1: South Pond**

Inflow Area = 122.375 ac, 4.91% Impervious, Inflow Depth = 2.30" for 100-Year-Atlas14 event  
 Inflow = 67.37 cfs @ 12.00 hrs, Volume= 23.445 af  
 Outflow = 10.92 cfs @ 18.02 hrs, Volume= 14.331 af, Atten= 84%, Lag= 361.2 min  
 Tertiary = 10.92 cfs @ 18.02 hrs, Volume= 14.331 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,115.43' @ 18.02 hrs Surf.Area= 1.192 ac Storage= 9.616 af

Plug-Flow detention time= 2,097.0 min calculated for 14.331 af (61% of inflow)  
 Center-of-Mass det. time= 901.7 min ( 3,048.1 - 2,146.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,105.00'	15.761 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,105.00	0.669	0.000	0.000
1,106.00	0.713	0.691	0.691
1,108.00	0.805	1.518	2.209
1,115.00	1.168	6.906	9.114
1,115.50	1.196	0.591	9.705
1,116.00	1.225	0.605	10.311
1,120.00	1.500	5.450	15.761

Device	Routing	Invert	Outlet Devices
#1	Tertiary	1,115.00'	15.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Tertiary OutFlow Max=10.71 cfs @ 18.02 hrs HW=1,115.43' (Free Discharge)  
 1=Broad-Crested Rectangular Weir (Weir Controls 10.71 cfs @ 1.68 fps)

**Summary for Pond B2.0: SE STAGING**

Inflow Area = 45.302 ac, 6.27% Impervious, Inflow Depth = 4.93" for 100-Year-Atlas14 event  
 Inflow = 172.63 cfs @ 12.02 hrs, Volume= 18.608 af  
 Outflow = 64.92 cfs @ 12.22 hrs, Volume= 18.608 af, Atten= 62%, Lag= 11.8 min  
 Primary = 64.92 cfs @ 12.22 hrs, Volume= 18.608 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,132.52' @ 12.22 hrs Surf.Area= 33,519 sf Storage= 202,663 cf

Plug-Flow detention time= 364.9 min calculated for 18.608 af (100% of inflow)

Center-of-Mass det. time= 364.9 min ( 2,359.2 - 1,994.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,123.00'	346,902 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,123.00	10,335	0	0
1,124.00	12,325	11,330	11,330
1,132.00	31,322	174,588	185,918
1,134.00	39,831	71,153	257,071
1,136.00	50,000	89,831	346,902

Device	Routing	Invert	Outlet Devices
#1	Primary	1,123.00'	30.0" Round Culvert L= 172.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,123.00' / 1,121.00' S= 0.0116' /' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 4.91 sf
#2	Device 1	1,123.00'	5.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,127.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Device 1	1,130.00'	48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	1,135.00'	20.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=64.91 cfs @ 12.22 hrs HW=1,132.51' (Free Discharge)  
 1=Culvert (Barrel Controls 64.91 cfs @ 13.22 fps)  
 2=Orifice/Grate (Passes < 2.00 cfs potential flow)  
 3=Sharp-Crested Rectangular Weir (Passes < 110.04 cfs potential flow)  
 4=Orifice/Grate (Passes < 95.94 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,123.00' (Free Discharge)  
 5=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B2.1: SW STAGING**

Inflow Area = 88.833 ac, 5.95% Impervious, Inflow Depth = 4.94" for 100-Year-Atlas14 event  
 Inflow = 396.14 cfs @ 11.97 hrs, Volume= 36.547 af  
 Outflow = 25.19 cfs @ 13.53 hrs, Volume= 18.252 af, Atten= 94%, Lag= 93.7 min  
 Secondary = 25.19 cfs @ 13.53 hrs, Volume= 18.252 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,135.60' @ 13.53 hrs Surf.Area= 72,125 sf Storage= 839,989 cf

Plug-Flow detention time= 1,826.9 min calculated for 18.251 af (50% of inflow)  
 Center-of-Mass det. time= 937.0 min ( 2,516.7 - 1,579.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,120.00'	1,174,558 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,120.00	34,065	0	0
1,128.00	54,144	352,836	352,836
1,130.00	59,730	113,874	466,710
1,132.00	65,543	125,273	591,983
1,134.00	69,258	134,801	726,784
1,140.00	80,000	447,774	1,174,558

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,135.00'	<b>20.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Secondary OutFlow Max=25.18 cfs @ 13.53 hrs HW=1,135.60' (Free Discharge)  
 1=Broad-Crested Rectangular Weir (Weir Controls 25.18 cfs @ 2.09 fps)

**Summary for Pond B3.0:**

Inflow Area = 57.460 ac, 0.00% Impervious, Inflow Depth = 2.37" for 100-Year-Atlas14 event  
 Inflow = 143.37 cfs @ 12.04 hrs, Volume= 11.369 af  
 Outflow = 1.03 cfs @ 24.38 hrs, Volume= 11.369 af, Atten= 99%, Lag= 740.4 min  
 Primary = 1.03 cfs @ 24.38 hrs, Volume= 11.369 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,161.23' @ 24.38 hrs Surf.Area= 88,334 sf Storage= 447,928 cf

Plug-Flow detention time= 4,929.7 min calculated for 11.369 af (100% of inflow)  
 Center-of-Mass det. time= 4,930.5 min ( 5,798.3 - 867.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,155.00'	819,820 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,155.00	55,861	0	0
1,156.00	60,876	58,369	58,369
1,158.00	71,125	132,001	190,370
1,160.00	81,662	152,787	343,157
1,162.00	92,487	174,149	517,306
1,164.00	103,598	196,085	713,391
1,165.00	109,260	106,429	819,820

Device	Routing	Invert	Outlet Devices
#1	Primary	1,155.00'	<b>24.0" Round Culvert</b> L= 93.0' Ke= 0.500 Inlet / Outlet Invert= 1,155.00' / 1,144.00' S= 0.1183 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,155.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,164.40'	<b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32

3.31 3.32

Primary OutFlow Max=1.03 cfs @ 24.38 hrs HW=1,161.23' (Free Discharge)  
 1=Culvert (Passes 1.03 cfs of 34.60 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 1.03 cfs @ 11.86 fps)  
 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B4.0:**

Inflow Area = 16.203 ac, 0.00% Impervious, Inflow Depth = 4.75" for 100-Year-Atlas14 event  
 Inflow = 107.03 cfs @ 12.01 hrs, Volume= 6.418 af  
 Outflow = 2.19 cfs @ 16.11 hrs, Volume= 6.418 af, Atten= 98%, Lag= 245.7 min  
 Primary = 2.19 cfs @ 16.11 hrs, Volume= 6.418 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,191.61' @ 16.11 hrs Surf.Area= 42,476 sf Storage= 194,588 cf

Plug-Flow detention time= 1,110.7 min calculated for 6.418 af (100% of inflow)  
 Center-of-Mass det. time= 1,111.0 min ( 1,889.3 - 778.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,186.00'	301,602 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,186.00	27,052	0	0
1,188.00	32,452	59,504	59,504
1,190.00	37,847	70,299	129,803
1,192.00	43,586	81,433	211,236
1,194.00	46,780	90,366	301,602

Device	Routing	Invert	Outlet Devices
#1	Primary	1,186.00'	<b>12.0" Round Culvert</b> L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 1,183.00' / 1,186.00' S= -0.0750 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf
#2	Device 1	1,186.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,192.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	1,193.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Secondary	1,192.00'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=2.19 cfs @ 16.11 hrs HW=1,191.61' (Free Discharge)  
 1=Culvert (Passes 2.19 cfs of 8.38 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 2.19 cfs @ 11.15 fps)  
 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)  
 4=Orifice/Grate ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,186.00' (Free Discharge)  
 5=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B4.1:**

Inflow Area = 20.303 ac, 0.00% Impervious, Inflow Depth = 4.47" for 100-Year-Atlas14 event  
 Inflow = 21.05 cfs @ 12.02 hrs, Volume= 7.563 af  
 Outflow = 1.10 cfs @ 45.89 hrs, Volume= 7.563 af, Atten= 95%, Lag= 2,032.3 min  
 Primary = 1.10 cfs @ 45.89 hrs, Volume= 7.563 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,189.03' @ 45.89 hrs Surf.Area= 60,195 sf Storage= 164,358 cf

Plug-Flow detention time= 2,055.1 min calculated for 7.563 af (100% of inflow)  
 Center-of-Mass det. time= 2,055.1 min ( 3,779.5 - 1,724.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,186.00'	513,285 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,186.00	48,285	0	0
1,188.00	56,074	104,359	104,359
1,190.00	64,059	120,133	224,492
1,192.00	72,367	136,426	360,918
1,194.00	80,000	152,367	513,285

Device	Routing	Invert	Outlet Devices
#1	Primary	1,186.00'	<b>12.0" Round Culvert</b> L= 84.0' Ke= 0.500 Inlet / Outlet Invert= 1,186.00' / 1,185.00' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.9 sf
#2	Device 1	1,186.00'	<b>5.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,190.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Secondary	1,191.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=1.10 cfs @ 45.89 hrs HW=1,189.03' (Free Discharge)  
 1=Culvert (Passes 1.10 cfs of 5.40 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 1.10 cfs @ 8.09 fps)  
 3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,186.00' (Free Discharge)  
 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B4.2:**

Inflow Area = 15.100 ac, 0.00% Impervious, Inflow Depth = 2.20" for 100-Year-Atlas14 event  
 Inflow = 48.57 cfs @ 12.01 hrs, Volume= 2.774 af  
 Outflow = 46.61 cfs @ 12.04 hrs, Volume= 2.774 af, Atten= 4%, Lag= 1.6 min  
 Primary = 18.85 cfs @ 12.04 hrs, Volume= 2.106 af  
 Secondary = 27.76 cfs @ 12.04 hrs, Volume= 0.667 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,134.03' @ 12.04 hrs Surf.Area= 6,538 sf Storage= 9,536 cf

Plug-Flow detention time= 17.2 min calculated for 2.774 af (100% of inflow)  
 Center-of-Mass det. time= 17.3 min ( 836.2 - 818.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,132.30'	29,447 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,132.30	4,571	0	0
1,134.00	6,440	9,359	9,359
1,136.00	13,648	20,088	29,447

Device	Routing	Invert	Outlet Devices
#1	Primary	1,132.30'	<b>36.0" Round Culvert</b> L= 290.0' Ke= 0.500 Inlet / Outlet Invert= 1,132.30' / 1,123.00' S= 0.0321 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Secondary	1,133.00'	<b>10.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=18.83 cfs @ 12.04 hrs HW=1,134.03' (Free Discharge)  
 1=Culvert (Inlet Controls 18.83 cfs @ 4.47 fps)

**Secondary OutFlow** Max=27.71 cfs @ 12.04 hrs HW=1,134.03' (Free Discharge)  
 2=Broad-Crested Rectangular Weir (Weir Controls 27.71 cfs @ 2.70 fps)

**Summary for Pond B5: Pond B5**

Inflow Area = 15.971 ac, 0.00% Impervious, Inflow Depth = 4.72" for 100-Year-Atlas14 event  
 Inflow = 49.40 cfs @ 12.40 hrs, Volume= 6.276 af  
 Outflow = 23.48 cfs @ 12.87 hrs, Volume= 6.276 af, Atten= 52%, Lag= 28.6 min  
 Primary = 23.48 cfs @ 12.87 hrs, Volume= 6.276 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,124.54' @ 12.87 hrs Surf.Area= 35,641 sf Storage= 122,787 cf

Plug-Flow detention time= 637.8 min calculated for 6.276 af (100% of inflow)  
 Center-of-Mass det. time= 638.2 min ( 1,465.5 - 827.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,120.00'	179,032 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,120.00	18,496	0	0
1,122.00	26,064	44,560	44,560
1,124.00	33,627	59,691	104,251
1,126.00	41,154	74,781	179,032

Device	Routing	Invert	Outlet Devices
#1	Primary	1,120.00'	<b>24.0" Round Culvert</b> L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 1,120.00' / 1,104.00' S= 0.1818 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,120.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,123.25'	<b>5.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)

**Primary OutFlow** Max=23.47 cfs @ 12.87 hrs HW=1,124.53' (Free Discharge)  
 1=Culvert (Passes 23.47 cfs of 28.44 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.88 cfs @ 10.06 fps)  
 3=Sharp-Crested Rectangular Weir (Weir Controls 22.59 cfs @ 3.71 fps)

**Summary for Pond B8.0:**

Inflow Area = 131.201 ac, 5.07% Impervious, Inflow Depth = 1.50" for 100-Year-Atlas14 event  
 Inflow = 34.63 cfs @ 12.04 hrs, Volume= 16.405 af  
 Outflow = 9.90 cfs @ 19.63 hrs, Volume= 16.405 af, Atten= 71%, Lag= 455.3 min  
 Primary = 9.90 cfs @ 19.63 hrs, Volume= 16.405 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,076.24' @ 19.63 hrs Surf.Area= 50,019 sf Storage= 57,524 cf

Plug-Flow detention time= 238.8 min calculated for 16.405 af (100% of inflow)  
 Center-of-Mass det. time= 238.8 min ( 3,004.0 - 2,765.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,075.00'	840,564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,075.00	42,640	0	0
1,076.00	48,560	45,600	45,600
1,078.00	60,620	109,180	154,780
1,080.00	72,949	133,569	288,349
1,082.00	85,535	158,484	446,833
1,084.00	98,374	183,909	630,742
1,086.00	111,448	209,822	840,564

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,084.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	1,075.00'	<b>48.0" Round Culvert</b> L= 550.0' Ke= 0.500 Inlet / Outlet Invert= 1,075.00' / 1,073.00' S= 0.0036 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

**Primary OutFlow** Max=9.89 cfs @ 19.63 hrs HW=1,076.24' (Free Discharge)  
 2=Culvert (Barrel Controls 9.89 cfs @ 4.45 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,075.00' (Free Discharge)  
 1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B8.1:**

Inflow Area = 152.001 ac, 4.38% Impervious, Inflow Depth = 1.70" for 100-Year-Atlas14 event  
 Inflow = 54.38 cfs @ 12.25 hrs, Volume= 21.489 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,078.67' @ 750.00 hrs Surf.Area= 184,579 sf Storage= 936,031 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,073.00'	4,938,753 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,073.00	145,815	0	0
1,084.00	221,070	2,017,868	2,017,868
1,095.00	310,000	2,920,885	4,938,753

Device	Routing	Invert	Outlet Devices
#1	Primary	1,094.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b>

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60  
 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,073.00' (Free Discharge)  
 1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond CB14:**

Inflow Area = 5.480 ac, 0.00% Impervious, Inflow Depth = 3.95" for 100-Year-Atlas14 event  
 Inflow = 30.64 cfs @ 12.01 hrs, Volume= 1.804 af  
 Outflow = 30.64 cfs @ 12.01 hrs, Volume= 1.804 af, Atten= 0%, Lag= 0.0 min  
 Primary = 30.64 cfs @ 12.01 hrs, Volume= 1.804 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,207.33' @ 12.01 hrs  
 Flood Elev= 1,214.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,205.00'	<b>36.0" Round Culvert</b> L= 94.0' Ke= 0.500 Inlet / Outlet Invert= 1,205.00' / 1,186.00' S= 0.2021 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

**Primary OutFlow** Max=30.51 cfs @ 12.01 hrs HW=1,207.32' (Free Discharge)  
 1=Culvert (Inlet Controls 30.51 cfs @ 5.19 fps)

**Summary for Pond CB17:**

Inflow Area = 5.250 ac, 0.00% Impervious, Inflow Depth = 4.92" for 100-Year-Atlas14 event  
 Inflow = 35.86 cfs @ 12.01 hrs, Volume= 2.151 af  
 Outflow = 35.86 cfs @ 12.01 hrs, Volume= 2.151 af, Atten= 0%, Lag= 0.0 min  
 Primary = 35.86 cfs @ 12.01 hrs, Volume= 2.151 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,241.81' @ 12.01 hrs  
 Flood Elev= 1,248.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,239.20'	<b>36.0" Round Culvert</b> L= 258.0' Ke= 0.500 Inlet / Outlet Invert= 1,239.20' / 1,188.00' S= 0.1984 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 7.07 sf

**Primary OutFlow** Max=35.68 cfs @ 12.01 hrs HW=1,241.80' (Free Discharge)  
 1=Culvert (Inlet Controls 35.68 cfs @ 5.49 fps)

**Summary for Pond FB2: SEDIMENT FOREBAY 2**

Inflow Area = 21.330 ac, 0.00% Impervious, Inflow Depth = 2.38" for 100-Year-Atlas14 event  
 Inflow = 75.76 cfs @ 12.03 hrs, Volume= 4.228 af  
 Outflow = 68.52 cfs @ 12.07 hrs, Volume= 4.228 af, Atten= 10%, Lag= 2.5 min  
 Primary = 68.52 cfs @ 12.07 hrs, Volume= 4.228 af  
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,172.57' @ 12.07 hrs Surf.Area= 7,471 sf Storage= 15,250 cf

Plug-Flow detention time= 7.1 min calculated for 4.228 af (100% of inflow)  
 Center-of-Mass det. time= 7.1 min ( 858.0 - 850.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,170.00'	36,534 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,170.00	4,263	0	0
1,172.00	6,876	11,139	11,139
1,174.00	8,952	15,828	26,967
1,175.00	10,181	9,567	36,534

Device	Routing	Invert	Outlet Devices
#1	Primary	1,165.00'	<b>36.0" Round Culvert</b> L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 1,165.00' / 1,155.00' S= 0.1538 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf
#2	Device 1	1,170.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	1,174.00'	<b>5.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Tertiary	1,174.50'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=68.19 cfs @ 12.07 hrs HW=1,172.56' (Free Discharge)  
 1=Culvert (Passes 68.19 cfs of 83.82 cfs potential flow)  
 2=Broad-Crested Rectangular Weir (Weir Controls 68.19 cfs @ 5.32 fps)  
 3=Orifice/Grate ( Controls 0.00 cfs)

**Tertiary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,170.00' (Free Discharge)  
 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

Time span=0.00-750.00 hrs, dt=0.02 hrs, 37501 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Stockpile S-1</b>	Runoff Area=11.779 ac 3.28% Impervious Runoff Depth=6.99" Flow Length=1,286' Tc=8.2 min CN=59 Runoff=74.56 cfs 6.860 af
<b>Subcatchment 2S: WEST STAGING</b>	Runoff Area=43.531 ac 5.62% Impervious Runoff Depth=11.00" Tc=6.0 min CN=86 Runoff=377.63 cfs 39.908 af
<b>Subcatchment 3a: (new Subcat)</b>	Runoff Area=6.700 ac 0.00% Impervious Runoff Depth=12.14" Tc=10.0 min CN=94 Runoff=54.11 cfs 6.781 af
<b>Subcatchment 3S: EAST STAGING</b>	Runoff Area=3.779 ac 75.21% Impervious Runoff Depth=12.55" Tc=5.0 min CN=97 Runoff=35.82 cfs 3.951 af
<b>Subcatchment 4a: (new Subcat)</b>	Runoff Area=4.100 ac 0.00% Impervious Runoff Depth=8.86" Tc=10.0 min CN=71 Runoff=28.77 cfs 3.028 af
<b>Subcatchment 4S:</b>	Runoff Area=5.473 ac 0.00% Impervious Runoff Depth=11.68" Tc=10.0 min CN=91 Runoff=43.32 cfs 5.326 af
<b>Subcatchment 5S:</b>	Runoff Area=5.480 ac 0.00% Impervious Runoff Depth=9.72" Tc=10.0 min CN=77 Runoff=40.09 cfs 4.438 af
<b>Subcatchment 6S:</b>	Runoff Area=5.250 ac 0.00% Impervious Runoff Depth=11.03" Tc=10.0 min CN=86 Runoff=40.57 cfs 4.827 af
<b>Subcatchment 7S:</b>	Runoff Area=14.520 ac 0.00% Impervious Runoff Depth=10.25" Tc=10.0 min CN=81 Runoff=108.64 cfs 12.401 af
<b>Subcatchment 8a:</b>	Runoff Area=6.447 ac 7.12% Impervious Runoff Depth=8.63" Tc=15.0 min CN=69 Runoff=38.41 cfs 4.637 af
<b>Subcatchment 8b:</b>	Runoff Area=20.800 ac 0.00% Impervious Runoff Depth=8.31" Tc=30.0 min CN=67 Runoff=84.19 cfs 14.405 af
<b>Subcatchment 10S:</b>	Runoff Area=20.478 ac 0.00% Impervious Runoff Depth=7.81" Tc=10.0 min CN=63 Runoff=137.49 cfs 13.331 af
<b>Subcatchment 14S:</b>	Runoff Area=15.100 ac 0.00% Impervious Runoff Depth=6.35" Tc=10.0 min CN=56 Runoff=80.06 cfs 7.988 af
<b>Subcatchment 15S:</b>	Runoff Area=6.663 ac 5.06% Impervious Runoff Depth=4.98" Tc=6.0 min CN=48 Runoff=33.33 cfs 2.765 af
<b>Subcatchment 16S:</b>	Runoff Area=2.379 ac 7.88% Impervious Runoff Depth=4.99" Tc=6.0 min CN=47 Runoff=12.34 cfs 0.990 af
<b>Subcatchment 20S:</b>	Runoff Area=9.000 ac 0.00% Impervious Runoff Depth=7.71" Tc=10.0 min CN=63 Runoff=60.16 cfs 5.782 af

<b>Subcatchment 21S:</b>	Runoff Area=15.971 ac 0.00% Impervious Runoff Depth=10.95" Tc=44.0 min CN=85 Runoff=58.02 cfs 14.576 af
<b>Subcatchment 22S:</b>	Runoff Area=13.470 ac 0.00% Impervious Runoff Depth=7.48" Tc=10.0 min CN=61 Runoff=89.14 cfs 8.396 af
<b>Subcatchment 24S:</b>	Runoff Area=12.330 ac 0.00% Impervious Runoff Depth=7.48" Tc=10.0 min CN=61 Runoff=81.60 cfs 7.685 af
<b>Subcatchment 26S:</b>	Runoff Area=2.182 ac 0.00% Impervious Runoff Depth=4.94" Tc=10.0 min CN=46 Runoff=10.99 cfs 0.898 af
<b>Reach 21R: D9</b>	Avg. Flow Depth=1.54' Max Vel=3.70 fps Inflow=89.14 cfs 8.396 af n=0.025 L=1,750.0' S=0.0034 '/ Capacity=186.59 cfs Outflow=71.74 cfs 8.396 af
<b>Pond 1P:</b>	Peak Elev=1,107.90' Storage=6,119 cf Inflow=41.24 cfs 1.514 af Primary=34.90 cfs 1.506 af Secondary=1.83 cfs 0.008 af Outflow=36.72 cfs 1.514 af
<b>Pond 8P: OLD Culvert Under Revised</b>	Peak Elev=1,222.24' Storage=16,002 cf Inflow=108.64 cfs 12.401 af Primary=85.00 cfs 12.401 af Secondary=0.00 cfs 0.000 af Outflow=85.00 cfs 12.401 af
<b>Pond 17P:</b>	Peak Elev=1,115.56' Storage=326 cf Inflow=57.84 cfs 8.691 af Primary=28.58 cfs 8.209 af Secondary=29.09 cfs 0.524 af Outflow=57.67 cfs 8.733 af
<b>Pond 22P: 36" RCP</b>	Peak Elev=1,243.16' Inflow=40.57 cfs 4.827 af 36.0" Round Culvert n=0.012 L=65.0' S=0.0077 '/ Outflow=40.57 cfs 4.827 af
<b>Pond 23P:</b>	Peak Elev=1,297.18' Storage=42,920 cf Inflow=71.74 cfs 8.396 af 24.0" Round Culvert n=0.010 L=55.0' S=0.0727 '/ Outflow=83.19 cfs 8.396 af
<b>Pond 24P: forbay</b>	Peak Elev=1,131.86' Storage=11,607 cf Inflow=135.59 cfs 19.182 af Outflow=134.23 cfs 19.182 af
<b>Pond 25P:</b>	Peak Elev=1,232.41' Storage=2,191 cf Inflow=81.60 cfs 7.685 af Primary=58.05 cfs 7.445 af Secondary=23.23 cfs 0.240 af Outflow=81.29 cfs 7.685 af
<b>Pond 26P:</b>	Peak Elev=1,247.99' Storage=53,131 cf Inflow=85.21 cfs 9.294 af Outflow=28.43 cfs 9.294 af
<b>Pond B1.1: South Pond</b>	Peak Elev=1,118.79' Storage=13.990 af Inflow=388.46 cfs 79.497 af Outflow=291.68 cfs 70.383 af
<b>Pond B2.0: SE STAGING</b>	Peak Elev=1,134.01' Storage=257,296 cf Inflow=206.19 cfs 42.815 af Primary=70.08 cfs 42.815 af Secondary=0.00 cfs 0.000 af Outflow=70.08 cfs 42.815 af
<b>Pond B2.1: SW STAGING</b>	Peak Elev=1,138.14' Storage=1,029,105 cf Inflow=437.52 cfs 82.723 af Outflow=294.33 cfs 64.427 af
<b>Pond B3.0:</b>	Peak Elev=1,809.15' Storage=819,820 cf Inflow=241.85 cfs 36.092 af Outflow=386.59 cfs 36.091 af
<b>Pond B4.0:</b>	Peak Elev=1,193.19' Storage=264,354 cf Inflow=123.98 cfs 14.591 af Primary=9.49 cfs 11.664 af Secondary=69.32 cfs 2.927 af Outflow=78.81 cfs 14.591 af

**Pond B4.1:** Peak Elev=1,191.37' Storage=315,960 cf Inflow=99.73 cfs 17.620 af  
 Primary=7.18 cfs 16.655 af Secondary=11.37 cfs 0.965 af Outflow=18.55 cfs 17.619 af

**Pond B4.2:** Peak Elev=1,134.47' Storage=12,757 cf Inflow=80.06 cfs 7.988 af  
 Primary=27.39 cfs 5.926 af Secondary=49.92 cfs 2.062 af Outflow=77.31 cfs 7.988 af

**Pond B5: Pond B5** Peak Elev=1,125.46' Storage=157,515 cf Inflow=58.02 cfs 14.576 af  
 Outflow=31.96 cfs 14.576 af

**Pond B8.0:** Peak Elev=1,083.37' Storage=569,680 cf Inflow=345.67 cfs 76.533 af  
 Primary=123.85 cfs 76.533 af Secondary=0.00 cfs 0.000 af Outflow=123.85 cfs 76.533 af

**Pond B8.1:** Peak Elev=1,091.71' Storage=3,961,255 cf Inflow=190.49 cfs 90.938 af  
 Outflow=0.00 cfs 0.000 af

**Pond CB14:** Peak Elev=1,207.87' Inflow=40.09 cfs 4.438 af  
 36.0" Round Culvert n=0.012 L=94.0' S=0.2021 '/' Outflow=40.09 cfs 4.438 af

**Pond CB17:** Peak Elev=1,242.10' Inflow=40.57 cfs 4.827 af  
 36.0" Round Culvert n=0.010 L=258.0' S=0.1984 '/' Outflow=40.57 cfs 4.827 af

**Pond FB2: SEDIMENT FOREBAY 2** Peak Elev=1,174.90' Storage=35,474 cf Inflow=141.32 cfs 13.467 af  
 Primary=98.62 cfs 13.402 af Tertiary=12.40 cfs 0.065 af Outflow=111.02 cfs 13.467 af

**Total Runoff Area = 225.432 ac Runoff Volume = 168.973 af Average Runoff Depth = 8.99"**  
**97.05% Pervious = 218.775 ac 2.95% Impervious = 6.657 ac**

**Summary for Subcatchment 1S: Stockpile S-1**

Runoff = 74.56 cfs @ 35.99 hrs, Volume= 6.860 af, Depth= 6.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description			
0.386	98	Paved parking, HSG B			
2.600	30	Woods, Good, HSG A			
1.112	77	Woods, Good, HSG D			
* 7.012	61	stockpile			
0.669	98	Water Surface, 0% imp, HSG B			
11.779	59	Weighted Average			
11.393		96.72% Pervious Area			
0.386		3.28% Impervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	300	0.0100	1.21		<b>Sheet Flow, Sheet Flow</b> Smooth surfaces n= 0.011 P2= 2.80"
2.1	200	0.0100	1.61		<b>Shallow Concentrated Flow, Shallow Conc Flow</b> Unpaved Kv= 16.1 fps
0.1	156	0.4230	24.59	295.02	<b>Channel Flow, Channel Flow, rock chute</b> Area= 12.0 sf Perim= 18.0' r= 0.67' n= 0.030
1.9	630	0.0300	5.61	112.24	<b>Channel Flow, Channel Flow, downslope to pond</b> Area= 20.0 sf Perim= 30.0' r= 0.67' n= 0.035
8.2	1,286	Total			

**Summary for Subcatchment 2S: WEST STAGING**

Runoff = 377.63 cfs @ 35.97 hrs, Volume= 39.908 af, Depth=11.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 27.900	94	mine
1.920	30	Woods, Good, HSG A
6.981	77	Woods, Good, HSG D
* 3.502	61	Stockpile
2.446	98	Paved parking, HSG B
0.782	98	Water Surface, 0% imp, HSG B
43.531	86	Weighted Average
41.085		94.38% Pervious Area
2.446		5.62% Impervious Area

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

**Summary for Subcatchment 3a: (new Subcat)**

Runoff = 54.11 cfs @ 36.01 hrs, Volume= 6.781 af, Depth=12.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 6.700	94	mine
6.700		100.00% Pervious Area

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

**Summary for Subcatchment 3S: EAST STAGING**

Runoff = 35.82 cfs @ 35.96 hrs, Volume= 3.951 af, Depth=12.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 0.700	94	mine
2.842	98	Paved parking, HSG B
0.237	98	Water Surface, 0% imp, HSG B
3.779	97	Weighted Average
0.937		24.79% Pervious Area
2.842		75.21% Impervious Area

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

**Summary for Subcatchment 4a: (new Subcat)**

Runoff = 28.77 cfs @ 36.01 hrs, Volume= 3.028 af, Depth= 8.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 3.000	61	
1.100	98	Water Surface, 0% imp, HSG B
4.100	71	Weighted Average
4.100		100.00% Pervious Area

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

**Summary for Subcatchment 4S:**

Runoff = 43.32 cfs @ 36.01 hrs, Volume= 5.326 af, Depth=11.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 4.246	94	BARE SOIL
0.614	98	Water Surface, 0% imp, HSG B
* 0.613	61	STOCKPILE
5.473	91	Weighted Average
5.473		100.00% Pervious Area

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

**Summary for Subcatchment 5S:**

Runoff = 40.09 cfs @ 36.01 hrs, Volume= 4.438 af, Depth= 9.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 2.850	61	STOCKPILE
* 2.630	94	BARE SOIL
5.480	77	Weighted Average
5.480		100.00% Pervious Area

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

**Summary for Subcatchment 6S:**

Runoff = 40.57 cfs @ 36.01 hrs, Volume= 4.827 af, Depth=11.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 4.000	94	BARE SOIL
* 1.250	61	stockpile
5.250	86	Weighted Average
5.250		100.00% Pervious Area

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

**Summary for Subcatchment 7S:**

Runoff = 108.64 cfs @ 36.01 hrs, Volume= 12.401 af, Depth=10.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 8.620	94	BARE SOIL
* 5.900	61	OB STOCKPILE
14.520	81	Weighted Average
14.520		100.00% Pervious Area

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

**Summary for Subcatchment 8a:**

Runoff = 38.41 cfs @ 36.06 hrs, Volume= 4.637 af, Depth= 8.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
5.009	61	>75% Grass cover, Good, HSG B
0.979	98	Water Surface, 0% imp, HSG B
0.459	98	Paved parking, HSG B
6.447	69	Weighted Average
5.988		92.88% Pervious Area
0.459		7.12% Impervious Area

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

**Summary for Subcatchment 8b:**

Runoff = 84.19 cfs @ 36.23 hrs, Volume= 14.405 af, Depth= 8.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 17.450	61	
3.350	98	Water Surface, 0% imp, HSG B
20.800	67	Weighted Average
20.800		100.00% Pervious Area

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

**Summary for Subcatchment 10S:**

Runoff = 137.49 cfs @ 36.01 hrs, Volume= 13.331 af, Depth= 7.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
1.320	98	Water Surface, 0% imp, HSG B
* 5.000	61	pond upland
* 14.158	61	stockpile
20.478	63	Weighted Average
20.478		100.00% Pervious Area

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

**Summary for Subcatchment 14S:**

Runoff = 80.06 cfs @ 36.01 hrs, Volume= 7.988 af, Depth= 6.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
1.454	74	Farmsteads, HSG B
3.036	86	Farmsteads, HSG D
7.015	30	Woods, Good, HSG A
0.635	55	Woods, Good, HSG B
2.960	77	Woods, Good, HSG D
15.100	56	Weighted Average
15.100		100.00% Pervious Area

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

**Summary for Subcatchment 15S:**

Runoff = 33.33 cfs @ 35.97 hrs, Volume= 2.765 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
4.404	30	Woods, Good, HSG A
1.585	77	Woods, Good, HSG D
0.674	93	Paved roads w/open ditches, 50% imp, HSG D
6.663	48	Weighted Average
6.326		94.94% Pervious Area
0.337		5.06% Impervious Area

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

**Summary for Subcatchment 16S:**

Runoff = 12.34 cfs @ 35.97 hrs, Volume= 0.990 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
0.629	55	Woods, Good, HSG B
0.375	89	Paved roads w/open ditches, 50% imp, HSG B
1.306	30	Woods, Good, HSG A
0.069	77	Woods, Good, HSG D
2.379	47	Weighted Average
2.192		92.12% Pervious Area
0.187		7.88% Impervious Area

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

**Summary for Subcatchment 20S:**

Runoff = 60.16 cfs @ 36.01 hrs, Volume= 5.782 af, Depth= 7.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
0.400	98	Water Surface, 0% imp, HSG A
* 8.600	61	stockpile
9.000	63	Weighted Average
9.000		100.00% Pervious Area

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

**Summary for Subcatchment 21S:**

Runoff = 58.02 cfs @ 36.40 hrs, Volume= 14.576 af, Depth=10.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
3.830	77	Newly graded area, HSG A
8.116	86	Newly graded area, HSG B
1.946	86	Newly graded area, HSG B
2.079	94	Newly graded area, HSG D
15.971	85	Weighted Average
15.971		100.00% Pervious Area

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

**Summary for Subcatchment 22S:**

Runoff = 89.14 cfs @ 36.01 hrs, Volume= 8.396 af, Depth= 7.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 13.470	61	stockpile
13.470		100.00% Pervious Area

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

**Summary for Subcatchment 24S:**

Runoff = 81.60 cfs @ 36.01 hrs, Volume= 7.685 af, Depth= 7.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
* 12.330	61	
12.330		100.00% Pervious Area

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

**Summary for Subcatchment 26S:**

Runoff = 10.99 cfs @ 36.01 hrs, Volume= 0.898 af, Depth= 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Type II 24-hr 100-Year-Atlas14\_BT B Rainfall=6.44" x 2

Area (ac)	CN	Description
1.170	43	Woods/grass comb., Fair, HSG A
1.012	49	50-75% Grass cover, Fair, HSG A
2.182	46	Weighted Average
2.182		100.00% Pervious Area

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

**Summary for Reach 21R: D9**

Inflow Area = 13.470 ac, 0.00% Impervious, Inflow Depth = 7.48" for 100-Year-Atlas14\_BT B event  
 Inflow = 89.14 cfs @ 36.01 hrs, Volume= 8.396 af  
 Outflow = 71.74 cfs @ 36.20 hrs, Volume= 8.396 af, Atten= 20%, Lag= 11.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Max. Velocity= 3.70 fps, Min. Travel Time= 7.9 min  
 Avg. Velocity = 0.86 fps, Avg. Travel Time= 34.1 min

Peak Storage= 34,040 cf @ 36.07 hrs  
 Average Depth at Peak Storage= 1.54'  
 Bank-Full Depth= 2.50' Flow Area= 38.8 sf, Capacity= 186.59 cfs

8.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding  
 Side Slope Z-value= 3.0 ' Top Width= 23.00'  
 Length= 1,750.0' Slope= 0.0034 '  
 Inlet Invert= 1,274.00', Outlet Invert= 1,268.00'



**Summary for Pond 1P:**

Inflow Area = 2.379 ac, 7.88% Impervious, Inflow Depth = 7.64" for 100-Year-Atlas14\_BT B event  
 Inflow = 41.24 cfs @ 35.98 hrs, Volume= 1.514 af  
 Outflow = 36.72 cfs @ 36.02 hrs, Volume= 1.514 af, Atten= 11%, Lag= 2.1 min  
 Primary = 34.90 cfs @ 36.02 hrs, Volume= 1.506 af  
 Secondary = 1.83 cfs @ 36.02 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,107.90' @ 36.02 hrs Surf.Area= 3,292 sf Storage= 6,119 cf

Plug-Flow detention time= 3.5 min calculated for 1.514 af (100% of inflow)  
 Center-of-Mass det. time= 3.5 min ( 1,845.2 - 1,841.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,105.56'	47,408 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,105.56	0	0	0
1,106.00	2,568	565	565
1,108.00	3,332	5,900	6,465
1,110.00	10,486	13,818	20,283
1,112.00	16,639	27,125	47,408

Device	Routing	Invert	Outlet Devices
#1	Primary	1,105.56'	<b>24.0" Round Culvert 1</b> L= 76.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,105.56' / 1,103.47' S= 0.0275 ' / ' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Primary	1,105.57'	<b>24.0" Round Culvert 2</b> L= 76.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,105.57' / 1,103.31' S= 0.0297 ' / ' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#3	Secondary	1,107.62'	<b>5.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=34.80 cfs @ 36.02 hrs HW=1,107.89' (Free Discharge)  
 1=Culvert 1 (Inlet Controls 17.43 cfs @ 5.55 fps)  
 2=Culvert 2 (Inlet Controls 17.37 cfs @ 5.53 fps)

**Secondary OutFlow** Max=1.75 cfs @ 36.02 hrs HW=1,107.89' (Free Discharge)  
 3=Broad-Crested Rectangular Weir (Weir Controls 1.75 cfs @ 1.30 fps)

**Summary for Pond 8P: OLD Culvert Under Revised Haul Road**

Inflow Area = 14.520 ac, 0.00% Impervious, Inflow Depth = 10.25' for 100-Year-Atlas14\_BT B event  
 Inflow = 108.64 cfs @ 36.01 hrs, Volume= 12,401 af  
 Outflow = 85.00 cfs @ 36.08 hrs, Volume= 12,401 af, Atten= 22%, Lag= 4.0 min  
 Primary = 85.00 cfs @ 36.08 hrs, Volume= 12,401 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,222.24' @ 36.08 hrs Surf.Area= 6,631 sf Storage= 16,002 cf

Plug-Flow detention time= 0.8 min calculated for 12,401 af (100% of inflow)  
 Center-of-Mass det. time= 0.8 min ( 1,584.5 - 1,583.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,214.50'	67,513 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,214.50	0	0	0
1,216.00	420	315	315
1,218.00	1,064	1,484	1,799
1,220.00	2,700	3,764	5,563
1,227.00	15,000	61,950	67,513

Device	Routing	Invert	Outlet Devices
#1	Primary	1,214.50'	<b>36.0" Round Culvert</b> L= 106.0' Ke= 0.500 Inlet / Outlet Invert= 1,214.50' / 1,205.30' S= 0.0868 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Secondary	1,226.00'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=84.94 cfs @ 36.08 hrs HW=1,222.23' (Free Discharge)  
 1=Culvert (Inlet Controls 84.94 cfs @ 12.02 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,214.50' (Free Discharge)  
 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 17P:**

Inflow Area = 21.763 ac, 1.55% Impervious, Inflow Depth = 4.79' for 100-Year-Atlas14\_BT B event  
 Inflow = 57.84 cfs @ 35.98 hrs, Volume= 8,691 af  
 Outflow = 57.67 cfs @ 35.99 hrs, Volume= 8,733 af, Atten= 0%, Lag= 0.1 min  
 Primary = 28.58 cfs @ 35.99 hrs, Volume= 8,209 af  
 Secondary = 29.09 cfs @ 35.99 hrs, Volume= 0,524 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs / 2  
 Peak Elev= 1,115.56' @ 35.99 hrs Surf.Area= 385 sf Storage= 326 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 2.2 min ( 1,741.8 - 1,739.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,113.72'	1,306 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,113.72	0	0	0
1,114.00	28	4	4
1,116.00	486	514	518
1,117.00	1,091	789	1,306

Device	Routing	Invert	Outlet Devices
#1	Primary	1,112.37'	<b>15.0" Round North Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.37' / 1,110.42' S= 0.0320 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Primary	1,112.32'	<b>15.0" Round Middle Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.32' / 1,110.26' S= 0.0338 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Primary	1,112.31'	<b>15.0" Round South Pipe</b> L= 61.0' Ke= 0.500 Inlet / Outlet Invert= 1,112.31' / 1,109.99' S= 0.0380 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#4	Secondary	1,114.50'	<b>10.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=28.56 cfs @ 35.99 hrs HW=1,115.55' (Free Discharge)  
 1=North Pipe (Inlet Controls 9.45 cfs @ 7.70 fps)  
 2=Middle Pipe (Inlet Controls 9.54 cfs @ 7.78 fps)  
 3=South Pipe (Inlet Controls 9.56 cfs @ 7.79 fps)

**Secondary OutFlow** Max=28.87 cfs @ 35.99 hrs HW=1,115.55' (Free Discharge)  
 4=Broad-Crested Rectangular Weir (Weir Controls 28.87 cfs @ 2.74 fps)

**Summary for Pond 22P: 36" RCP**

Inflow Area = 5.250 ac, 0.00% Impervious, Inflow Depth = 11.03" for 100-Year-Atlas14\_BT B event  
 Inflow = 40.57 cfs @ 36.01 hrs, Volume= 4.827 af  
 Outflow = 40.57 cfs @ 36.01 hrs, Volume= 4.827 af, Atten= 0%, Lag= 0.0 min  
 Primary = 40.57 cfs @ 36.01 hrs, Volume= 4.827 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,243.16' @ 36.01 hrs  
 Flood Elev= 1,248.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,240.00'	<b>36.0" Round Culvert</b> L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 1,240.00' / 1,239.50' S= 0.0077 ' ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

**Primary OutFlow** Max=40.37 cfs @ 36.01 hrs HW=1,243.15' (Free Discharge)  
 1=Culvert (Barrel Controls 40.37 cfs @ 6.77 fps)

**Summary for Pond 23P:**

Inflow Area = 13.470 ac, 0.00% Impervious, Inflow Depth = 7.48" for 100-Year-Atlas14\_BT B event  
 Inflow = 71.74 cfs @ 36.20 hrs, Volume= 8,396 af  
 Outflow = 83.19 cfs @ 36.28 hrs, Volume= 8,396 af, Atten= 0%, Lag= 4.5 min  
 Primary = 83.19 cfs @ 36.28 hrs, Volume= 8,396 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,297.18' @ 36.28 hrs Surf.Area= 21,442 sf Storage= 42,920 cf  
 Flood Elev= 1,270.00' Surf.Area= 21,442 sf Storage= 42,920 cf

Plug-Flow detention time= 24.8 min calculated for 8,395 af (100% of inflow)  
 Center-of-Mass det. time= 24.8 min ( 1,822.7 - 1,797.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,266.00'	42,920 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,266.00	5,326	0	0
1,268.00	8,076	13,402	13,402
1,270.00	21,442	29,518	42,920

Device	Routing	Invert	Outlet Devices
#1	Primary	1,266.00'	<b>24.0" Round Culvert</b> L= 55.0' Ke= 0.500 Inlet / Outlet Invert= 1,266.00' / 1,262.00' S= 0.0727 ' ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

**Primary OutFlow** Max=81.47 cfs @ 36.28 hrs HW=1,296.01' (Free Discharge)  
 1=Culvert (Inlet Controls 81.47 cfs @ 25.93 fps)

**Summary for Pond 24P: forbay**

Inflow Area = 21.220 ac, 0.00% Impervious, Inflow Depth = 10.85" for 100-Year-Atlas14\_BT B event  
 Inflow = 135.59 cfs @ 36.03 hrs, Volume= 19,182 af  
 Outflow = 134.23 cfs @ 36.05 hrs, Volume= 19,182 af, Atten= 1%, Lag= 1.2 min  
 Primary = 134.23 cfs @ 36.05 hrs, Volume= 19,182 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,131.86' @ 36.05 hrs Surf.Area= 7,539 sf Storage= 11,607 cf

Plug-Flow detention time= 3.1 min calculated for 19,181 af (100% of inflow)  
 Center-of-Mass det. time= 3.1 min ( 1,559.5 - 1,556.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,130.00'	30,793 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,130.00	4,956	0	0
1,132.00	7,736	12,692	12,692
1,134.00	10,365	18,101	30,793

Device	Routing	Invert	Outlet Devices
#1	Primary	1,130.00'	<b>20.0' long x 7.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

**Primary OutFlow** Max=133.92 cfs @ 36.05 hrs HW=1,131.86' (Free Discharge)  
 1=Broad-Crested Rectangular Weir (Weir Controls 133.92 cfs @ 3.61 fps)

**Summary for Pond 25P:**

Inflow Area = 12.330 ac, 0.00% Impervious, Inflow Depth = 7.48" for 100-Year-Atlas14\_BT B event  
 Inflow = 81.60 cfs @ 36.01 hrs, Volume= 7,685 af  
 Outflow = 81.29 cfs @ 36.02 hrs, Volume= 7,685 af, Atten= 0%, Lag= 0.5 min  
 Primary = 58.05 cfs @ 36.02 hrs, Volume= 7,445 af  
 Secondary = 23.23 cfs @ 36.02 hrs, Volume= 0.240 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,232.41' @ 36.02 hrs Surf.Area= 1,453 sf Storage= 2,191 cf

Plug-Flow detention time= 0.2 min calculated for 7,685 af (100% of inflow)  
 Center-of-Mass det. time= 0.2 min ( 1,770.7 - 1,770.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,228.00'	2,325 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,228.00	0	0	0
1,230.00	200	200	200
1,232.50	1,500	2,125	2,325

Device	Routing	Invert	Outlet Devices
#1	Primary	1,228.00'	<b>36.0" Round CMP Round 36"</b> L= 111.0' Ke= 0.500 Inlet / Outlet Invert= 1,228.00' / 1,220.00' S= 0.0721 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 7.07 sf
#2	Secondary	1,231.50'	<b>10.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=58.03 cfs @ 36.02 hrs HW=1,232.41' (Free Discharge)  
 1=CMP\_Round 36" (Inlet Controls 58.03 cfs @ 8.21 fps)

Secondary OutFlow Max=23.16 cfs @ 36.02 hrs HW=1,232.41' (Free Discharge)  
 2=Broad-Crested Rectangular Weir (Weir Controls 23.16 cfs @ 2.55 fps)

**Summary for Pond 26P:**

Inflow Area = 15.652 ac, 0.00% Impervious, Inflow Depth = 7.13" for 100-Year-Atlas14\_BT B event  
 Inflow = 85.21 cfs @ 36.28 hrs, Volume= 9,294 af  
 Outflow = 28.43 cfs @ 36.56 hrs, Volume= 9,294 af, Atten= 67%, Lag= 16.9 min  
 Primary = 28.43 cfs @ 36.56 hrs, Volume= 9,294 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,247.99' @ 36.56 hrs Surf.Area= 12,688 sf Storage= 53,131 cf

Plug-Flow detention time= 25.2 min calculated for 9,294 af (100% of inflow)  
 Center-of-Mass det. time= 25.2 min ( 1,857.1 - 1,831.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,184.00'	53,131 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,184.00	5,435	0	0
1,186.00	7,547	12,982	12,982
1,188.00	9,957	17,504	30,486
1,190.00	12,688	22,645	53,131

Device	Routing	Invert	Outlet Devices
#1	Primary	1,178.00'	<b>12.0" Round Culvert</b> L= 160.0' Ke= 0.500 Inlet / Outlet Invert= 1,178.00' / 1,156.00' S= 0.1375 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,184.00'	<b>30.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=28.43 cfs @ 36.56 hrs HW=1,247.99' (Free Discharge)  
 1=Culvert (Barrel Controls 28.43 cfs @ 36.20 fps)  
 2=Orifice/Grate (Passes 28.43 cfs of 189.07 cfs potential flow)

**Summary for Pond B1.1: South Pond**

Inflow Area = 122.375 ac, 4.91% Impervious, Inflow Depth = 7.80" for 100-Year-Atlas14\_BT B event  
 Inflow = 388.46 cfs @ 36.03 hrs, Volume= 79,497 af  
 Outflow = 291.68 cfs @ 36.14 hrs, Volume= 70,383 af, Atten= 25%, Lag= 6.9 min  
 Tertiary = 291.68 cfs @ 36.14 hrs, Volume= 70,383 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,118.79' @ 36.14 hrs Surf.Area= 1,417 ac Storage= 13,990 af

Plug-Flow detention time= 763.0 min calculated for 70,381 af (89% of inflow)  
 Center-of-Mass det. time= 249.4 min ( 2,758.2 - 2,508.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,105.00'	15,761 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,105.00	0.669	0.000	0.000
1,106.00	0.713	0.691	0.691
1,108.00	0.805	1.518	2.209
1,115.00	1.168	6.906	9.114
1,115.50	1.196	0.591	9.705
1,116.00	1.225	0.605	10.311
1,120.00	1.500	5.450	15.761

Device	Routing	Invert	Outlet Devices
#1	Tertiary	1,115.00'	<b>15.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Tertiary OutFlow Max=291.61 cfs @ 36.14 hrs HW=1,118.79' (Free Discharge)  
 1=Broad-Crested Rectangular Weir (Weir Controls 291.61 cfs @ 5.14 fps)

**Summary for Pond B2.0: SE STAGING**

Inflow Area = 45.302 ac, 6.27% Impervious, Inflow Depth = 11.34" for 100-Year-Atlas14\_BT B event  
 Inflow = 206.19 cfs @ 36.02 hrs, Volume= 42,815 af  
 Outflow = 70.08 cfs @ 36.26 hrs, Volume= 42,815 af, Atten= 66%, Lag= 14.4 min  
 Primary = 70.08 cfs @ 36.26 hrs, Volume= 42,815 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,134.01' @ 36.26 hrs Surf.Area= 39,860 sf Storage= 257,296 cf

Plug-Flow detention time= 279.0 min calculated for 42,813 af (100% of inflow)

Center-of-Mass det. time= 279.0 min ( 2,861.6 - 2,582.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,123.00'	346,902 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,123.00	10,335	0	0
1,124.00	12,325	11,330	11,330
1,132.00	31,322	174,588	185,918
1,134.00	39,831	71,153	257,071
1,136.00	50,000	89,831	346,902

Device	Routing	Invert	Outlet Devices
#1	Primary	1,123.00'	<b>30.0" Round Culvert</b> L= 172.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,123.00' / 1,121.00' S= 0.0116 ' /' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 4.91 sf
#2	Device 1	1,123.00'	<b>5.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,127.50'	<b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#4	Device 1	1,130.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Secondary	1,135.00'	<b>20.0' long x 20.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=70.07 cfs @ 36.26 hrs HW=1,134.00' (Free Discharge)  
 1=Culvert (Barrel Controls 70.07 cfs @ 14.28 fps)  
 2=Orifice/Grate (Passes < 2.16 cfs potential flow)  
 3=Sharp-Crested Rectangular Weir (Passes < 146.43 cfs potential flow)  
 4=Orifice/Grate (Passes < 121.09 cfs potential flow)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,123.00' (Free Discharge)  
 5=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond B2.1: SW STAGING**

Inflow Area = 88.833 ac, 5.95% Impervious, Inflow Depth = 11.17" for 100-Year-Atlas14\_BT B event  
 Inflow = 437.52 cfs @ 35.97 hrs, Volume= 82,723 af  
 Outflow = 294.33 cfs @ 36.04 hrs, Volume= 64,427 af, Atten= 33%, Lag= 4.6 min  
 Secondary = 294.33 cfs @ 36.04 hrs, Volume= 64,427 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,138.14' @ 36.04 hrs Surf.Area= 76,676 sf Storage= 1,029,105 cf

Plug-Flow detention time= 1,144.0 min calculated for 64,426 af (78% of inflow)  
 Center-of-Mass det. time= 468.2 min ( 2,691.2 - 2,223.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,120.00'	1,174,558 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,120.00	34,065	0	0
1,128.00	54,144	352,836	352,836
1,130.00	59,730	113,874	466,710
1,132.00	65,543	125,273	591,983
1,134.00	69,258	134,801	726,784
1,140.00	80,000	447,774	1,174,558

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,135.00'	<b>20.0' long x 12.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

**Secondary OutFlow** Max=293.66 cfs @ 36.04 hrs HW=1,138.14' (Free Discharge)  
 1=Broad-Crested Rectangular Weir (Weir Controls 293.66 cfs @ 4.68 fps)

**Summary for Pond B3.0:**

Inflow Area = 57.460 ac, 0.00% Impervious, Inflow Depth = 7.54" for 100-Year-Atlas14\_BT B event  
 Inflow = 241.85 cfs @ 36.02 hrs, Volume= 36,092 af  
 Outflow = 386.59 cfs @ 36.02 hrs, Volume= 36,091 af, Atten= 0%, Lag= 0.0 min  
 Primary = 386.59 cfs @ 36.02 hrs, Volume= 36,091 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,809.15' @ 36.02 hrs Surf.Area= 109,260 sf Storage= 819,820 cf

Plug-Flow detention time= 3,933.1 min calculated for 36,091 af (100% of inflow)  
 Center-of-Mass det. time= 3,933.1 min ( 5,713.3 - 1,780.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,155.00'	819,820 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,155.00	55,861	0	0
1,156.00	60,876	58,369	58,369
1,158.00	71,125	132,001	190,370
1,160.00	81,662	152,787	343,157
1,162.00	92,487	174,149	517,306
1,164.00	103,598	196,085	713,391
1,165.00	109,260	106,429	819,820

Device	Routing	Invert	Outlet Devices
#1	Primary	1,155.00'	<b>24.0" Round Culvert</b> L= 93.0' Ke= 0.500 Inlet / Outlet Invert= 1,155.00' / 1,144.00' S= 0.1183 ' /' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,155.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,164.40'	<b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32

3.31 3.32

**Primary OutFlow** Max=386.59 cfs @ 36.02 hrs HW=1,809.15' (Free Discharge)  
 1=Culvert (Inlet Controls 386.59 cfs @ 123.06 fps)  
 2=Orifice/Grate (Passes < 10.75 cfs potential flow)  
 3=Broad-Crested Rectangular Weir (Passes < 326,121.79 cfs potential flow)

**Summary for Pond B4.0:**

Inflow Area = 16.203 ac, 0.00% Impervious, Inflow Depth = 10.81" for 100-Year-Atlas14\_BT B event  
 Inflow = 123.98 cfs @ 36.01 hrs, Volume= 14.591 af  
 Outflow = 78.81 cfs @ 36.10 hrs, Volume= 14.591 af, Atten= 36%, Lag= 5.6 min  
 Primary = 9.49 cfs @ 36.10 hrs, Volume= 11.664 af  
 Secondary = 69.32 cfs @ 36.10 hrs, Volume= 2.927 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,193.19' @ 36.10 hrs Surf.Area= 45,491 sf Storage= 264,354 cf

Plug-Flow detention time= 952.0 min calculated for 14.591 af (100% of inflow)  
 Center-of-Mass det. time= 952.4 min ( 2,509.2 - 1,556.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,186.00'	301,602 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,186.00	27,052	0	0
1,188.00	32,452	59,504	59,504
1,190.00	37,847	70,299	129,803
1,192.00	43,586	81,433	211,236
1,194.00	46,780	90,366	301,602

Device	Routing	Invert	Outlet Devices
#1	Primary	1,186.00'	<b>12.0" Round Culvert</b> L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 1,183.00' / 1,186.00' S= -0.0750 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf
#2	Device 1	1,186.00'	<b>6.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,192.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	1,193.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#5	Secondary	1,192.00'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=9.49 cfs @ 36.10 hrs HW=1,193.19' (Free Discharge)  
 1=Culvert (Outlet Controls 9.49 cfs @ 12.08 fps)  
 2=Orifice/Grate (Passes < 2.49 cfs potential flow)  
 3=Broad-Crested Rectangular Weir (Passes < 21.58 cfs potential flow)  
 4=Orifice/Grate (Passes < 3.44 cfs potential flow)

**Secondary OutFlow** Max=69.19 cfs @ 36.10 hrs HW=1,193.19' (Free Discharge)  
 5=Broad-Crested Rectangular Weir (Weir Controls 69.19 cfs @ 2.90 fps)

**Summary for Pond B4.1:**

Inflow Area = 20.303 ac, 0.00% Impervious, Inflow Depth = 10.41" for 100-Year-Atlas14\_BT B event  
 Inflow = 99.73 cfs @ 36.07 hrs, Volume= 17.620 af  
 Outflow = 18.55 cfs @ 36.65 hrs, Volume= 17.619 af, Atten= 81%, Lag= 34.9 min  
 Primary = 7.18 cfs @ 36.65 hrs, Volume= 16.655 af  
 Secondary = 11.37 cfs @ 36.65 hrs, Volume= 0.965 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,191.37' @ 36.65 hrs Surf.Area= 69,739 sf Storage= 315,960 cf

Plug-Flow detention time= 1,686.9 min calculated for 17.619 af (100% of inflow)  
 Center-of-Mass det. time= 1,687.3 min ( 4,049.7 - 2,362.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,186.00'	513,285 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,186.00	48,285	0	0
1,188.00	56,074	104,359	104,359
1,190.00	64,059	120,133	224,492
1,192.00	72,367	136,426	360,918
1,194.00	80,000	152,367	513,285

Device	Routing	Invert	Outlet Devices
#1	Primary	1,186.00'	<b>12.0" Round Culvert</b> L= 84.0' Ke= 0.500 Inlet / Outlet Invert= 1,186.00' / 1,185.00' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	1,186.00'	<b>5.0" Vert. Orifice/Grate</b> C= 0.600
#3	Device 1	1,190.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Secondary	1,191.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

**Primary OutFlow** Max=7.18 cfs @ 36.65 hrs HW=1,191.37' (Free Discharge)  
 1=Culvert (Barrel Controls 7.18 cfs @ 9.14 fps)  
 2=Orifice/Grate (Passes < 1.49 cfs potential flow)  
 3=Broad-Crested Rectangular Weir (Passes < 26.54 cfs potential flow)

**Secondary OutFlow** Max=11.34 cfs @ 36.65 hrs HW=1,191.37' (Free Discharge)  
 4=Broad-Crested Rectangular Weir (Weir Controls 11.34 cfs @ 1.54 fps)

**Summary for Pond B4.2:**

Inflow Area = 15.100 ac, 0.00% Impervious, Inflow Depth = 6.35" for 100-Year-Atlas14\_BT B event  
 Inflow = 80.06 cfs @ 36.01 hrs, Volume= 7,988 af  
 Outflow = 77.31 cfs @ 36.04 hrs, Volume= 7,988 af, Atten= 3%, Lag= 1.5 min  
 Primary = 27.39 cfs @ 36.04 hrs, Volume= 5,926 af  
 Secondary = 49.92 cfs @ 36.04 hrs, Volume= 2,062 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,134.47' @ 36.04 hrs Surf.Area= 8,122 sf Storage= 12,757 cf

Plug-Flow detention time= 15.3 min calculated for 7,988 af (100% of inflow)  
 Center-of-Mass det. time= 15.3 min ( 1,724.0 - 1,708.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,132.30'	29,447 cf	Custom Stage Data (Prismatic)Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,132.30	4,571	0	0
1,134.00	6,440	9,359	9,359
1,136.00	13,648	20,088	29,447

Device	Routing	Invert	Outlet Devices
#1	Primary	1,132.30'	36.0" Round Culvert L= 290.0' Ke= 0.500 Inlet / Outlet Invert= 1,132.30' / 1,123.00' S= 0.0321 ' S= 0.0321 ' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Secondary	1,133.00'	10.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

**Primary OutFlow** Max=27.34 cfs @ 36.04 hrs HW=1,134.46' (Free Discharge)  
 1=Culvert (Inlet Controls 27.34 cfs @ 5.01 fps)

**Secondary OutFlow** Max=49.73 cfs @ 36.04 hrs HW=1,134.46' (Free Discharge)  
 2=Broad-Crested Rectangular Weir (Weir Controls 49.73 cfs @ 3.40 fps)

**Summary for Pond B5: Pond B5**

Inflow Area = 15.971 ac, 0.00% Impervious, Inflow Depth = 10.95" for 100-Year-Atlas14\_BT B event  
 Inflow = 58.02 cfs @ 36.40 hrs, Volume= 14,576 af  
 Outflow = 31.96 cfs @ 36.79 hrs, Volume= 14,576 af, Atten= 45%, Lag= 23.4 min  
 Primary = 31.96 cfs @ 36.79 hrs, Volume= 14,576 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,125.46' @ 36.79 hrs Surf.Area= 39,137 sf Storage= 157,515 cf

Plug-Flow detention time= 478.6 min calculated for 14,576 af (100% of inflow)  
 Center-of-Mass det. time= 479.0 min ( 2,087.1 - 1,608.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,120.00'	179,032 cf	Custom Stage Data (Prismatic)Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,120.00	18,496	0	0
1,122.00	26,064	44,560	44,560
1,124.00	33,627	59,691	104,251
1,126.00	41,154	74,781	179,032

Device	Routing	Invert	Outlet Devices
#1	Primary	1,120.00'	24.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 1,120.00' / 1,104.00' S= 0.1818 ' S= 0.1818 ' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,120.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,123.25'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

**Primary OutFlow** Max=31.96 cfs @ 36.79 hrs HW=1,125.46' (Free Discharge)  
 1=Culvert (Inlet Controls 31.96 cfs @ 10.17 fps)  
 2=Orifice/Grate (Passes < 0.97 cfs potential flow)  
 3=Sharp-Crested Rectangular Weir (Passes < 49.08 cfs potential flow)

**Summary for Pond B8.0:**

Inflow Area = 131.201 ac, 5.07% Impervious, Inflow Depth = 7.00" for 100-Year-Atlas14\_BT B event  
 Inflow = 345.67 cfs @ 36.10 hrs, Volume= 76,533 af  
 Outflow = 123.85 cfs @ 36.89 hrs, Volume= 76,533 af, Atten= 64%, Lag= 47.7 min  
 Primary = 123.85 cfs @ 36.89 hrs, Volume= 76,533 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,083.37' @ 36.89 hrs Surf.Area= 94,305 sf Storage= 569,680 cf

Plug-Flow detention time= 112.4 min calculated for 76,531 af (100% of inflow)  
 Center-of-Mass det. time= 112.4 min ( 2,787.0 - 2,674.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,075.00'	840,564 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,075.00	42,640	0	0
1,076.00	48,560	45,600	45,600
1,078.00	60,620	109,180	154,780
1,080.00	72,949	133,569	288,349
1,082.00	85,535	158,484	446,833
1,084.00	98,374	183,909	630,742
1,086.00	111,448	209,822	840,564

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,084.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	1,075.00'	<b>48.0" Round Culvert</b> L= 550.0' Ke= 0.500 Inlet / Outlet Invert= 1,075.00' / 1,073.00' S= 0.0036 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

**Primary OutFlow** Max=123.85 cfs @ 36.89 hrs HW=1,083.37' (Free Discharge)  
 ↳ **2=Culvert** (Barrel Controls 123.85 cfs @ 9.86 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,075.00' (Free Discharge)  
 ↳ **1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond B8.1:**

Inflow Area = 152.001 ac, 4.38% Impervious, Inflow Depth = 7.18" for 100-Year-Atlas14\_BT B event  
 Inflow = 190.49 cfs @ 36.27 hrs, Volume= 90,938 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,091.71' @ 750.00 hrs Surf.Area= 283,363 sf Storage= 3,961,255 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,073.00'	4,938,753 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,073.00	145,815	0	0
1,084.00	221,070	2,017,868	2,017,868
1,095.00	310,000	2,920,885	4,938,753

Device	Routing	Invert	Outlet Devices
#1	Primary	1,094.00'	<b>20.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b>

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,073.00' (Free Discharge)  
 ↳ **1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Summary for Pond CB14:**

Inflow Area = 5.480 ac, 0.00% Impervious, Inflow Depth = 9.72" for 100-Year-Atlas14\_BT B event  
 Inflow = 40.09 cfs @ 36.01 hrs, Volume= 4.438 af  
 Outflow = 40.09 cfs @ 36.01 hrs, Volume= 4.438 af, Atten= 0%, Lag= 0.0 min  
 Primary = 40.09 cfs @ 36.01 hrs, Volume= 4.438 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,207.87' @ 36.01 hrs  
 Flood Elev= 1,214.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,205.00'	<b>36.0" Round Culvert</b> L= 94.0' Ke= 0.500 Inlet / Outlet Invert= 1,205.00' / 1,186.00' S= 0.2021 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

**Primary OutFlow** Max=39.91 cfs @ 36.01 hrs HW=1,207.85' (Free Discharge)  
 ↳ **1=Culvert** (Inlet Controls 39.91 cfs @ 5.75 fps)

**Summary for Pond CB17:**

Inflow Area = 5.250 ac, 0.00% Impervious, Inflow Depth = 11.03" for 100-Year-Atlas14\_BT B event  
 Inflow = 40.57 cfs @ 36.01 hrs, Volume= 4.827 af  
 Outflow = 40.57 cfs @ 36.01 hrs, Volume= 4.827 af, Atten= 0%, Lag= 0.0 min  
 Primary = 40.57 cfs @ 36.01 hrs, Volume= 4.827 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,242.10' @ 36.01 hrs  
 Flood Elev= 1,248.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,239.20'	<b>36.0" Round Culvert</b> L= 258.0' Ke= 0.500 Inlet / Outlet Invert= 1,239.20' / 1,188.00' S= 0.1984 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 7.07 sf

**Primary OutFlow** Max=40.39 cfs @ 36.01 hrs HW=1,242.09' (Free Discharge)  
 ↳ **1=Culvert** (Inlet Controls 40.39 cfs @ 5.78 fps)

**Summary for Pond FB2: SEDIMENT FOREBAY 2**

Inflow Area = 21.330 ac, 0.00% Impervious, Inflow Depth = 7.58" for 100-Year-Atlas14\_BT B event  
 Inflow = 141.32 cfs @ 36.02 hrs, Volume= 13.467 af  
 Outflow = 111.02 cfs @ 36.08 hrs, Volume= 13.467 af, Atten= 21%, Lag= 4.1 min  
 Primary = 98.62 cfs @ 36.08 hrs, Volume= 13.402 af  
 Tertiary = 12.40 cfs @ 36.08 hrs, Volume= 0.065 af

Routing by Stor-Ind method, Time Span= 0.00-750.00 hrs, dt= 0.02 hrs  
 Peak Elev= 1,174.90' @ 36.08 hrs Surf.Area= 10,052 sf Storage= 35,474 cf

Plug-Flow detention time= 6.9 min calculated for 13.467 af (100% of inflow)  
 Center-of-Mass det. time= 6.9 min ( 1,768.0 - 1,761.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,170.00'	36,534 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,170.00	4,263	0	0
1,172.00	6,876	11,139	11,139
1,174.00	8,952	15,828	26,967
1,175.00	10,181	9,567	36,534

Device	Routing	Invert	Outlet Devices
#1	Primary	1,165.00'	<b>36.0" Round Culvert</b> L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 1,165.00' / 1,155.00' S= 0.1538 '"/ n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf
#2	Device 1	1,170.00'	<b>5.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	1,174.00'	<b>5.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Tertiary	1,174.50'	<b>20.0' long x 5.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

**Primary OutFlow** Max=98.57 cfs @ 36.08 hrs HW=1,174.89' (Free Discharge)  
 1=Culvert (Inlet Controls 98.57 cfs @ 13.94 fps)  
 2=Broad-Crested Rectangular Weir (Passes < 179.36 cfs potential flow)  
 3=Orifice/Grate (Passes < 0.62 cfs potential flow)

**Tertiary OutFlow** Max=12.02 cfs @ 36.08 hrs HW=1,174.89' (Free Discharge)  
 4=Broad-Crested Rectangular Weir (Weir Controls 12.02 cfs @ 1.55 fps)