

Appendix B1

Storm Water Management Calculations for Post Closure Conditions

Appendix B1.1

2000 Plan of Operation Update Storm Water Calculations

SURFACE WATER MANAGEMENT CALCULATIONS COLUMBIA DRY ASH DISPOSAL FACILITY

PURPOSE:

The purpose of the surface water runoff calculations is to demonstrate that the surface water control features incorporated into the proposed design will collect and transfer surface water from the landfill in a controlled manner and will minimize erosion. The surface water runoff calculations were performed for the western half (Phase 1) of the landfill, which this 10-year Plan of Operation Update report addresses.

SITE GEOMETRY:

The surface water runoff from Phase 1 of the landfill will be routed to the existing South Sedimentation Basin. Diversion berms, downslope channels, and perimeter ditches are incorporated into the design to route the surface water to the southwestern corner of the landfill, where it is then routed to the South Sedimentation Basin. The South Sedimentation Basin was constructed during construction of Module 1 North. The south sedimentation pond discharges to a wetland area to the south of the pond.

METHODOLOGIES:

The following methods and procedures were used to demonstrate that the proposed surface water control features will collect and transfer surface water in controlled manner and minimize erosion potential:

Hydrograph Generation

Peak stormwater flows for the 25-year, 24-hour and 100-year, 24-hour storm events were calculated using the Quick TR-55 computer model developed by the National Resources Conservation Service (NRCS) (formerly known as the Soil Conservation Service (SCS)). The Quick TR-55 methods for computing hydrographs are based on the methodologies presented in the Urban Hydrology for Small Watersheds manual. The Quick TR-55 model is designed to simulate the surface runoff response of a watershed to a precipitation event. Input parameters for the model include precipitation depth for a particular storm event, contributing drainage areas, runoff curve numbers, and time of concentration.

SURFACE WATER MANAGEMENT CALCULATIONS (CONTINUED) COLUMBIA DRY ASH DISPOSAL FACILITY

The time of concentration calculations combine overland flow time (i.e., sheet flow), shallow concentrated flow time, and channel flow time. Curve numbers for a specified drainage area were also calculated using the methodologies and tables presented in TR-55 (see **Reference** section at the end of this appendix).

Diversion Berm, Downslope Channels, and Perimeter Ditch Sizing

These control structures are sized to channel the peak storm runoff to the sedimentation basin while maintaining low enough velocities to limit the erosion potential. The proposed design allows storm water which comes into contact with the final cover to be routed by diversion berms and downslope channels to the perimeter ditches, which will then transport the water to the south sedimentation basin.

Diversion berm, downslope channels, and perimeter ditch locations and details are shown on the Plan Sheets. A portion of the perimeter ditch along the western side of the landfill was constructed as part of the construction of Module 1 North.

In conjunction with the graphical peak discharge methods as presented in TR-55, the Flowmaster computer modeling program was used to assist in the design of these control structures. This program allows the user to input the channel geometry, the slope of the channel, an estimated Manning's "n" value for the channel, and the peak flow in the channel. The program then determines the peak flow depth and the peak velocity for the given geometry of the control feature.

The diversion berms, downslope channels, and perimeter ditches were sized by calculating the peak flow each structure would have to manage in a worst-case design scenario (i.e., surface water runoff from the largest area of landfill final cover during the 25-year, 24-hour storm event). The drainage structure was modeled using the Flowmaster computer model to verify channel depth and velocity in the structure.

Sedimentation Pond Sizing

The sedimentation pond sizing process involved determining the proper ratio of surface area to flowrate that would allow a 15 micron particle size to settle out during a design storm event.

SURFACE WATER MANAGEMENT CALCULATIONS (CONTINUED)
COLUMBIA DRY ASH DISPOSAL FACILITY

A table presented in the Erosion and Sediment Control Handbook (Goldman et al., 1986) provides the surface area-to-discharge ratios required to achieve settlement of the desired particle sizes (see the **Reference** section of this appendix).

The Pond Pack 6.0 computer program was used in conjunction with accepted formulas and engineering calculations to size the sedimentation basins. Calculations were performed to determine the performance of the basins as follows:

1. The inflow hydrograph for the basin was calculated as part of the hydrograph computations. The regulations require that sediment basins be sized for a 25-year, 6-hour storm event. Sediment basin calculations for the Alliant Columbia Ash Disposal Facility were based on the basin's peak discharge during the 25-year, 24-hour storm which equals or exceeds the basin inflow for average rainfall intensity of the 25-year, 6-hour storm.
2. Outlet structures were designed to provide the necessary detention of peak stormwater runoff from the final cover for the 25-year, 24-hour storm event.
3. The inflow hydrograph was routed through the sedimentation pond using the Pond Pack 6.0 program to determine the basin's peak water elevation and discharge during the 25-year, 24-hour storm.
4. The emergency spillways for the sedimentation basins were sized for the 100-year, 24-hour storm event.

ASSUMPTIONS:

Summarized below are some of the major assumptions and data used in the computations:

1. Due to the presence of a drainage layer in the proposed landfill final cover, the soil for the landfill area was modeled between a Type B and C soil to account for greater water infiltration

SURFACE WATER MANAGEMENT CALCULATIONS (CONTINUED)
COLUMBIA DRY ASH DISPOSAL FACILITY

through the cover. The final cover was modeled as a grassland in good condition, which resulted in a runoff curve number of 67.5.

2. SCS Type II storm was selected according to SCS storm distribution maps for the United States.
3. A 2-year, 24-hour storm event in the vicinity of the facility equates to 2.7 inches according to figures provided in TR-55.
4. A 25-year, 24-hour storm event in the vicinity of the facility equates to 4.7 inches according to precipitation data provided in TR-55.
5. A 100-year, 24-hour storm event in the vicinity of the facility equates to 5.9 inches according to precipitation data provided in TR-55.
6. Grass-lined berms and channels were designed for a maximum velocity of 4 feet per second (fps).
7. A Manning's "n" value of 0.045 was used to model a grass-lined berm or channel, as provided by the parameters set in the Flowmaster model.
8. Depths of channels were designed to be a minimum of 1 foot, with a minimum freeboard of 0.5 foot. Depths of diversion berms were designated to be a minimum of 2 feet, with a minimum of 0.5 foot of freeboard.
9. A 15-micron particle was targeted to be settled out of the water column. The 15-micron particle is classified as a medium-fine silt by the AASHTO Soil Classification System.

SURFACE WATER MANAGEMENT CALCULATIONS (CONTINUED)
COLUMBIA DRY ASH DISPOSAL FACILITY

RESULTS:

Based on the results of the surface water runoff computations presented in this appendix, the proposed surface water control features will adequately handle the runoff from a 25-year, 24-hour storm event while minimizing erosion. The drainage features will be constructed as shown on the Plan Sheets.

All diversion berms and perimeter ditches will maintain greater than 0.5 foot of freeboard during the design storm event. The sedimentation basins will settle out particles 15 microns and larger in diameter and will dewater in no less than three days. The detailed calculations are included with this appendix.

I:\1370\Reports\surface water calcs writeup.wpd

Time of Concentration Calculations

Type.... Tc Calcs
Name.... LF TO S BASIN

File.... I:\1370\Columbia.ppk
Title... Landfill runoff to south basin

Landfill Area (1/2)

.....
TIME OF CONCENTRATION CALCULATOR
.....

Landfill runoff to south basin

Segment #1: Tc: TR-55 Sheet
Description: final cover slope

Mannings n .1900
Hydraulic Length 60.00 ft
2yr, 24hr P 2.7000 in
Slope .050000 ft/ft

Avg.Velocity .17 ft/sec

Segment #1 Time: .0989 hrs

Segment #2: Tc: TR-55 Sheet
Description: final cover slope

Mannings n .1900
Hydraulic Length 60.00 ft
2yr, 24hr P 2.7000 in
Slope .250000 ft/ft

Avg.Velocity .32 ft/sec

Segment #2 Time: .0520 hrs

Segment #3: Tc: TR-55 Shallow
Description: diversion berm

Hydraulic Length 1530.00 ft
Slope .020000 ft/ft
Unpaved

Avg.Velocity 2.28 ft/sec

Segment #3 Time: .1863 hrs

Type.... Tc Calcs
Name.... LF TO S BASIN

File.... I:\1370\Columbia.ppk
Title... Landfill runoff to south basin

Landfill Area (2/2)

Segment #4: Tc: TR-55 Channel
Description: perimeter ditch

Flow Area	32.0000	sq.ft
Wetted Perimeter	22.60	ft
Hydraulic Radius	1.42	ft
Slope	.006000	ft/ft
Mannings n	.0300	
Hydraulic Length	320.00	ft
Avg.Velocity	4.85	ft/sec

Segment #4 Time: .0183 hrs

=====
Total Tc: .3555 hrs
=====

Type.... Tc Calcs
Name.... PERIPH TO S BASI

West peripheral area leading to west perimeter ditch (1/2) Page 1.01

File.... I:\1370\COLUMBIA.PPK
Title... Peripheral area to south basin (area outside of LF leading to basin)

.....
TIME OF CONCENTRATION CALCULATOR
.....

Peripheral area to south basin (area outside of LF leading to basin)

Segment #1: Tc: TR-55 Sheet
Description: flow into ditch

Mannings n .1900
Hydraulic Length 10.00 ft
2yr, 24hr P 2.7000 in
Slope .330000 ft/ft

Avg.Velocity .25 ft/sec

Segment #1 Time: .0111 hrs

Segment #2: Tc: TR-55 Channel
Description: flow along perimeter ditch

Flow Area 22.0000 sq.ft
Wetted Perimeter 17.60 ft
Hydraulic Radius 1.25 ft
Slope .006000 ft/ft
Mannings n .0300
Hydraulic Length 800.00 ft

Avg.Velocity 4.46 ft/sec

Segment #2 Time: .0498 hrs

Segment #3: Tc: TR-55 Channel
Description: flow along perimeter ditch

Flow Area 57.0000 sq.ft
Wetted Perimeter 29.00 ft
Hydraulic Radius 1.97 ft
Slope .006000 ft/ft
Mannings n .0300
Hydraulic Length 1010.00 ft

Avg.Velocity 6.04 ft/sec

Segment #3 Time: .0465 hrs

Type.... Tc Calcs
Name.... PERIPH TO S BASI

West peripheral area leading to west perimeter ditch (z/z) Page 1.02

File.... I:\1370\COLUMBIA.PPK
Title... Peripheral area to south basin (area outside of LF leading to basin)

=====
Total Tc: .1073 hrs
=====

Type.... Tc Calcs
Name.... E PERIPHERAL

*Northeast peripheral
area leading to east perimeter ditch
(1/1)*

File.... I:\1370\COLUMBIA.PPK
Title... Eastern peripheral area (north of leachate basin)
 leading to east ditch

.....
TIME OF CONCENTRATION CALCULATOR
.....

Eastern peripheral area (north of leachate basin) leading to east ditch

Segment #1: Tc: TR-55 Sheet

Mannings n .1900
Hydraulic Length 40.00 ft
2yr, 24hr P 2.7000 in
Slope .425000 ft/ft

Avg.Velocity .37 ft/sec

Segment #1 Time: .0304 hrs

Segment #2: Tc: TR-55 Sheet

Mannings n .1900
Hydraulic Length 260.00 ft
2yr, 24hr P 2.7000 in
Slope .023000 ft/ft

Avg.Velocity .17 ft/sec

Segment #2 Time: .4362 hrs

Segment #3: Tc: TR-55 Shallow

Hydraulic Length 520.00 ft
Slope .014000 ft/ft
Unpaved

Avg.Velocity 1.91 ft/sec

Segment #3 Time: .0757 hrs

=====
Total Tc: .5423 hrs
=====

Type.... Tc Calcs
Name.... BASIN PERIPHERAL

Page 1.01
*Southeast/South peripheral
area leading to South perimeter
ditch (1/2)*

File.... I:\1370\COLUMBIA.PPK
Title... South peripheral area to south perimeter ditch

.....
TIME OF CONCENTRATION CALCULATOR
.....

South peripheral area to south perimeter ditch

Segment #1: Tc: TR-55 Sheet

Mannings n .1900
Hydraulic Length 300.00 ft
2yr, 24hr P 2.7000 in
Slope .010000 ft/ft

Avg.Velocity .12 ft/sec

Segment #1 Time: .6825 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length 110.00 ft
Slope .096000 ft/ft
Unpaved

Avg.Velocity 5.00 ft/sec

Segment #2 Time: .0061 hrs

Segment #3: Tc: TR-55 Shallow

Hydraulic Length 550.00 ft
Slope .022000 ft/ft
Unpaved

Avg.Velocity 2.39 ft/sec

Segment #3 Time: .0638 hrs

Type.... Tc Calcs
Name.... BASIN PERIPHERAL

Page 1.02
*Southeast/south peripheral
area leading to south perimeter
ditch (2/2)*

File.... I:\1370\COLUMBIA.PPK
Title... South peripheral area to south perimeter ditch

Segment #4: Tc: TR-55 Channel
Description: flow along south perimeter ditch

Flow Area 100.0000 sq.ft
Wetted Perimeter 32.40 ft
Hydraulic Radius 3.09 ft
Slope .012000 ft/ft
Mannings n .0300
Hydraulic Length 1030.00 ft

Avg.Velocity 11.53 ft/sec

Segment #4 Time: .0248 hrs

=====
Total Tc: .7773 hrs
=====

Type.... Tc Calcs
Name.... LF TO S BASIN

File.... I:\1370\Columbia.ppk
Title... Landfill runoff to south basin

*Equations used by PondPack
to calculate Tc (1/2)*

Tc Equations used...

==== SCS TR-55 Sheet Flow =====

$$Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))$$

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow =====

Unpaved surface:

$$V = 16.1345 * (Sf**0.5)$$

Paved surface:

$$V = 20.3282 * (Sf**0.5)$$

$$Tc = (Lf / V) / (3600sec/hr)$$

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs
Name.... LF TO S BASIN

*Equations used by Pond Pack
to calculate Tc (2/2)*

File.... I:\1370\Columbia.ppk
Title... Landfill runoff to south basin

==== SCS Channel Flow =====

$$R = Aq / Wp$$
$$V = (1.49 * (R^{2/3}) * (Sf^{-0.5})) / n$$

$$Tc = (Lf / V) / (3600\text{sec/hr})$$

Where: R = Hydraulic radius
Aq = Flow area, sq.ft.
Wp = Wetted perimeter, ft
V = Velocity, ft/sec
Sf = Slope, ft/ft
n = Mannings n
Tc = Time of concentration, hrs
Lf = Flow length, ft

Hydrograph Generation

File.... I:\1370\COLUMBIA.PPK
 Title... Runoff to south basin
 HYG Dir = I:\1370\
 HYG file = S BASIN.HYG south basin 25

*To South Basin
 25-yr, 24-hr storm
 (1/2)*

TR-55 TABULAR HYDROGRAPH METHOD
 TYPE II Distribution
 25yr, 24hr Rainfall Depth = 4.70 in

Total Area = 63.400 acres or .099063 sq.mi.
 Peak Discharge = 69 cfs
 WARNING: Drainage areas of two or more subareas
 differ by a factor of 5 or greater.

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
Landfill area	29.600	67.5	.4000	.0000	4.70	1.63	I.20 .20
W peripheral	4.600	67.5	.1000	.0000	4.70	1.63	I.20 .20
Basin area	1.800	98.0	.1000	.0000	4.70	4.46	I.01 .10
NE peripheral	13.700	67.5	.5000	.0000	4.70	1.63	I.20 .20
SE/S periphera	13.700	67.5	.7500	.0000	4.70	1.63	I.20 .20

* Travel time from subarea outfall to composite watershed outfall point.
 I -- Subarea where user specified interpolation between Ia/p tables.

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated (Yes/No)	Ia/p Messages
	Tc (hrs)	* Tt (hrs)	Tc (hrs)	* Tt (hrs)		
Landfill area	.3600	.0000	.40	.00	Yes	--
peripheral	.1000	.0000	**	**	Yes	--
Basin area	.1000	.0000	**	**	No	Computed Ia/p < .1
NE peripheral	.5400	.0000	.50	.00	Yes	--
SE/S periphera	.7800	.0000	.75	.00	Yes	--

* Travel time from subarea outfall to composite watershed outfall point.
 * Tc & Tt are available in the hydrograph tables.

Type.... TR-55 Tabular Hyd.Peaks
Name.... TO SOUTH BASIN Tag: 25

File.... I:\1370\COLUMBIA.PPK
Title... Runoff to south basin
HYG Dir = I:\1370\
HYG file = S BASIN.HYG south basin 25

To South Basin
25-yr, 24-hr storm
(2/2)

TR-55 TABULAR HYDROGRAPH METHOD
TYPE II Distribution
25yr, 24hr Rainfall Depth = 4.70 in

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
-----	-----	-----
Landfill area	40	12.3
W peripheral	11	12.1
Basin area	13	12.1
NE peripheral	17	12.4
SE/S periphera	13	12.6
-----	-----	-----
Composite Watershed	69	12.4

Type.... TR-55 Tabular Hyd.Input Data
 Name.... TO SOUTH BASIN Tag: 100

*To South Basin
 100-yr, 24-hr*

File.... I:\1370\COLUMBIA.PPK
 Title... Runoff to south basin
 HYG Dir = I:\1370\
 HYG file = S BASIN.HYG south basin 100

TR-55 TABULAR HYDROGRAPH METHOD
 TYPE II Distribution
 100yr, 24hr Rainfall Depth = 5.90 in

Total Area = 63.400 acres or .099063 sq.mi.
 Peak Discharge = 110 cfs
 WARNING: Drainage areas of two or more subareas
 differ by a factor of 5 or greater.

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
Landfill area	29.600	67.5	.4000	.0000	5.90	2.50	I.16 .16
W peripheral	4.600	67.5	.1000	.0000	5.90	2.50	I.16 .16
Basin area	1.800	98.0	.1000	.0000	5.90	5.66	I.01 .10
E peripheral	13.700	67.5	.5000	.0000	5.90	2.50	I.16 .16
<i>SE/S</i> periphera	13.700	67.5	.7500	.0000	5.90	2.50	I.16 .16

* Travel time from subarea outfall to composite watershed outfall point.
 I -- Subarea where user specified interpolation between Ia/p tables.

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated	Ia/p Messages
	Tc (hrs)	* Tt (hrs)	Tc (hrs)	* Tt (hrs)	(Yes/No)	
landfill area	.3600	.0000	.40	.00	Yes	--
w peripheral	.1000	.0000	**	**	Yes	--
Basin area	.1000	.0000	**	**	No	Computed Ia/p < .1
peripheral	.5400	.0000	.50	.00	Yes	--
<i>E/S</i> periphera	.7800	.0000	.75	.00	Yes	--

* Travel time from subarea outfall to composite watershed outfall point.
 * Tc & Tt are available in the hydrograph tables.

Type.... TR-55 Tabular Hyd.Peaks
Name.... TO SOUTH BASIN Tag: 100

File.... I:\1370\COLUMBIA.PPK
Title... Runoff to south basin
HYG Dir = I:\1370\
HYG file = S BASIN.HYG south basin 100

TR-55 TABULAR HYDROGRAPH METHOD
TYPE II Distribution
100yr, 24hr Rainfall Depth = 5.90 in

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
-----	-----	-----
Landfill area	65	12.3
W peripheral	18	12.1
Basin area	16	12.1
NE peripheral	27	12.4
SE/S periphera	21	12.6
-----	-----	-----
Composite Watershed	110	12.4

Diversion Berm, Downslope
Swale, and Perimeter
Ditch Sizing Calculations

Type.... Tc Calcs
Name.... WORSTCASE DIV BE

File.... I:\1370\COLUMBIA.PPK
Title... Tc for worst case diversion berm sizing calcs

.....
TIME OF CONCENTRATION CALCULATOR
.....

Tc for worst case diversion berm sizing calcs

Segment #1: Tc: TR-55 Sheet
Description: final cover slope - 25%

Mannings n .1900
Hydraulic Length 95.00 ft
2yr, 24hr P 2.7000 in
Slope .250000 ft/ft

Avg.Velocity .35 ft/sec

Segment #1 Time: .0751 hrs

Segment #2: Tc: TR-55 Shallow
Description: diversion berm

Hydraulic Length 2090.00 ft
Slope .020000 ft/ft
Unpaved

Avg.Velocity 2.28 ft/sec

Segment #2 Time: .2544 hrs

=====
Total Tc: .3295 hrs
=====

Type.... TR-55 Tabular Hyd.Input Data
 Name.... WORSTCASE DIV BE Tag: 25

File.... I:\1370\COLUMBIA.PPK
 Title... Hydrograph for worst-case diversion berm sizing calcs
 HYG Dir = I:\1370\
 HYG file = NONE STORED WORSTCASE DIV BE 25

TR-55 TABULAR HYDROGRAPH METHOD
 TYPE II Distribution
 25yr, 24hr Rainfall Depth = 4.70 in

Total Area = 4.600 acres or .007187 sq.mi.
 Peak Discharge = 7 cfs

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
east side ph 1	4.600	67.5	.3000	.0000	4.70	1.63	I.20 .20

* Travel time from subarea outfall to composite watershed outfall point.
 I -- Subarea where user specified interpolation between Ia/p tables.

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated (Yes/No)	Ia/p Messages
	Tc (hrs)	* Tt (hrs)	Tc (hrs)	* Tt (hrs)		
east side ph 1	.3300	.0000	.30	.00	Yes	--

* Travel time from subarea outfall to composite watershed outfall point.

Type.... TR-55 Tabular Hyd.Peaks
Name.... WORSTCASE DIV BE Tag: 25

File.... I:\1370\COLUMBIA.PPK
Title... Hydrograph for worst-case diversion berm sizing calcs
HYG Dir = I:\1370\
HYG file = NONE STORED WORSTCASE DIV BE 25

TR-55 TABULAR HYDROGRAPH METHOD
TYPE II Distribution
25yr, 24hr Rainfall Depth = 4.70 in

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
east side ph 1	7	12.2
Composite Watershed	7	12.2

Worksheet
Worksheet for Triangular Channel

*Worst-case diversion
berm*

Project Description	
Worksheet	Triangular Channe
Flow Element	Triangular Channe
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coeffic	0.030
Slope	020000 ft/ft
Left Side Slope	4.00 H : V
Right Side Slope	3.00 H : V
Discharge	7.00 cfs

Results	
Depth	0.75 ft
Flow Area	2.0 ft ²
Wetted Perim	5.47 ft
Top Width	5.25 ft
Critical Depth	0.76 ft
Critical Slope	0.019122 ft/ft
Velocity	3.55 ft/s
Velocity Head	0.20 ft
Specific Energ	0.95 ft
Froude Numb	1.02
Flow Type	supercritical

Type.... Tc Calcs
Name.... WORST CASE FLUME

File.... I:\1370\COLUMBIA.PPK
Title... Tc for worst case downslope flume sizing calcs

.....
TIME OF CONCENTRATION CALCULATOR
.....

Tc for worst case downslope flume sizing calcs

Segment #1: Tc: TR-55 Sheet
Description: final cover slope - 5%

Mannings n .1900
Hydraulic Length 60.00 ft
2yr, 24hr P 2.7000 in
Slope .050000 ft/ft

Avg.Velocity .17 ft/sec

Segment #1 Time: .0989 hrs

Segment #2: Tc: TR-55 Sheet
Description: final cover slope - 25%

Mannings n .1900
Hydraulic Length 60.00 ft
2yr, 24hr P 2.7000 in
Slope .250000 ft/ft

Avg.Velocity .32 ft/sec

Segment #2 Time: .0520 hrs

Segment #3: Tc: TR-55 Shallow
Description: diversion berm

Hydraulic Length 1790.00 ft
Slope .020000 ft/ft
Unpaved

Avg.Velocity 2.28 ft/sec

Segment #3 Time: .2179 hrs

=====
Total Tc: .3688 hrs
=====

Type.... TR-55 Tabular Hyd.Input Data
 Name.... WORST CASE FLUME Tag: 25

File.... I:\1370\COLUMBIA.PPK
 Title... Hydrograph for worst-case downslope flume sizing calcs
 HYG Dir = I:\1370\
 HYG file = NONE STORED WORST CASE FLUME 25

TR-55 TABULAR HYDROGRAPH METHOD
 TYPE II Distribution
 25yr, 24hr Rainfall Depth = 4.70 in

Total Area = 7.500 acres or .011719 sq.mi.
 Peak Discharge = 10 cfs

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
To SE flume	7.500	67.5	.4000	.0000	4.70	1.63	I.20 .20

* Travel time from subarea outfall to composite watershed outfall point.
 I -- Subarea where user specified interpolation between Ia/p tables.

>>>> Computer Modifications of Input Parameters <<<<

Subarea Description	Input Values		Rounded Values		Ia/p Interpolated	Ia/p Messages
	Tc (hrs)	* Tt (hrs)	Tc (hrs)	* Tt (hrs)	(Yes/No)	
To SE flume	.3700	.0000	.40	.00	Yes	--

* Travel time from subarea outfall to composite watershed outfall point.

Type.... TR-55 Tabular Hyd.Peaks
Name.... WORST CASE FLUME Tag: 25

File.... I:\1370\COLUMBIA.PPK
Title... Hydrograph for worst-case downslope flume sizing calcs
HYG Dir = I:\1370\
HYG file = NONE STORED WORST CASE FLUME 25

TR-55 TABULAR HYDROGRAPH METHOD
TYPE II Distribution
25yr, 24hr Rainfall Depth = 4.70 in

>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
To SE flume	10	12.3
Composite Watershed	10	12.3

Worksheet
Worksheet for Trapezoidal Channel

*Worst-case downslope
channel (SW channel)*

Project Description	
Worksheet	downslope flume
Flow Element	Trapezoidal Cha
Method	Manning's Form
Solve For	Channel Depth

Input Data	
Mannings Coeffic	0.040
Slope	200000 ft/ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	10.00 cfs

Results	
Depth	0.18 ft
Flow Area	1.9 ft ²
Wetted Perim	11.16 ft
Top Width	11.10 ft
Critical Depth	0.30 ft
Critical Slope	0.035988 ft/ft
Velocity	5.17 ft/s
Velocity Head	0.41 ft
Specific Enerç	0.60 ft
Froude Numb	2.18
Flow Type	supercritical

Worksheet
Worksheet for Trapezoidal Channel

*Worst-case west perimeter
ditch*

Project Description	
Worksheet	worst-case west perimeter
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coeffic	0.030
Slope	006000 ft/ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	5.00 ft
Discharge	31.00 cfs

Results	
Depth	1.13 ft
Flow Area	9.5 ft ²
Wetted Perimr	12.17 ft
Top Width	11.80 ft
Critical Depth	0.88 ft
Critical Slope	0.015659 ft/ft
Velocity	3.26 ft/s
Velocity Head	0.16 ft
Specific Energ	1.30 ft
Froude Numb.	0.64
Flow Type	Subcritical

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	worst-case east perimeter
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

*Worst-case east
perimeter ditch*

Input Data	
Mannings Coeffic	0.030
Slope	005000 ft/ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	57.00 cfs

Results	
Depth	1.23 ft
Flow Area	16.9 ft ²
Wetted Perimr	17.79 ft
Top Width	17.39 ft
Critical Depth	0.91 ft
Critical Slope	0.014803 ft/ft
Velocity	3.38 ft/s
Velocity Head	0.18 ft
Specific Energ	1.41 ft
Froude Numb	0.61
Flow Type	Subcritical

Worksheet
Worksheet for Trapezoidal Channel

*Worst-case south
perimeter ditch*

Project Description	
Worksheet	worst case south perimeter
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coeffic	0.030
Slope	012000 ft/ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	70.00 cfs

Results	
Depth	1.08 ft
Flow Area	14.4 ft ²
Wetted Perimr	16.85 ft
Top Width	16.50 ft
Critical Depth	1.03 ft
Critical Slope	0.014316 ft/ft
Velocity	4.88 ft/s
Velocity Head	0.37 ft
Specific Energ	1.45 ft
Froude Numb	0.92
Flow Type	Subcritical

Worksheet
Worksheet for Trapezoidal Channel

*Ditch from SW corner
of Landfill to South
Basin*

Project Description	
Worksheet	ditch from SW corner of LF to S
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coeffic	0.030
Slope	006000 ft/ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	15.00 ft
Discharge	69.00 cfs

Results	
Depth	1.07 ft
Flow Area	19.4 ft ²
Wetted Perim	21.74 ft
Top Width	21.40 ft
Critical Depth	0.82 ft
Critical Slope	0.014896 ft/ft
Velocity	3.56 ft/s
Velocity Head	0.20 ft
Specific Energ	1.26 ft
Froude Numb	0.66
Flow Type	Subcritical

Basin Volume Computations

Type.... Vol: Planimeter
Name.... SOUTH BASIN

File.... I:\1370\COLUMBIA.PPK
Title... south basin volume

POND VOLUME CALCULATIONS

Planimeter scale: 1.00 ft/in

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
789.00	62411.000	1.4328	.0000	.000	.000
790.00	68355.000	1.5692	4.5014	1.500	1.500
792.00	74865.000	1.7187	4.9301	3.287	4.787
794.00	82150.000	1.8859	5.4049	3.603	8.390

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1, Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Outlet Structure Data

Type.... Outlet Input Data
Name.... SOUTH BASIN2

File.... I:\1370\COLUMBIA.PPK
Title... south basin outlet structure

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 789.50 ft
Increment = 1.00 ft
Max. Elev.= 794.00 ft

OUTLET CONNECTIVITY

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
-----	----		-----	-----	-----
Weir-Rectangular	e1	--->	TW	793.000	794.000
Stand Pipe	s1	--->	c1	791.000	794.000
Orifice-Circular	o1	--->	c1	789.500	794.000
Culvert-Circular	c1	--->	TW	789.000	794.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

Structure ID = e1
Structure Type = Weir-Rectangular

of Openings = 1
Crest Elev. = 793.00 ft
Weir Length = 10.00 ft
Weir Coeff. = 3.300000

Weir TW effects (Use adjustment equation)

Structure ID = s1
Structure Type = Stand Pipe

of Openings = 1
Invert Elev. = 791.00 ft
Diameter = 2.5000 ft
Orifice Area = 4.9087 sq.ft
Orifice Coeff. = .600
Weir Length = 7.85 ft
Weir Coeff. = 3.300
K, Submerged = .000
K, Reverse = 1.000
Kb, Barrel = .000000 (per ft of full flow)
Barrel Length = .00 ft
Mannings n = .0000

Structure ID = o1
Structure Type = Orifice-Circular

of Openings = 72
Invert Elev. = 789.50 ft
Diameter = .0400 ft
Orifice Coeff. = .600

Type.... Outlet Input Data
Name.... SOUTH BASIN2

File.... I:\1370\COLUMBIA.PPK
Title... south basin outlet structure

OUTLET STRUCTURE INPUT DATA

Structure ID = c1
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 1.2500 ft
Upstream Invert = 789.00 ft
Dnstream Invert = 788.50 ft
Horiz. Length = 50.00 ft
Barrel Length = 50.00 ft
Barrel Slope = .01000 ft/ft

OUTLET CONTROL DATA...

Mannings n = .0130
Ke = .9000 (forward entrance loss)
Kb = .023225 (per ft of full flow)
Kr = .9000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...

Equation form = 1
Inlet Control K = .0340
Inlet Control M = 1.5000
Inlet Control c = .05530
Inlet Control Y = .5400
T1 ratio (HW/D) = 1.258
T2 ratio (HW/D) = 1.420
Slope Factor = -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

At T1 Elev = 790.57 ft ---> Flow = 4.80 cfs
At T2 Elev = 790.77 ft ---> Flow = 5.49 cfs

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...

Maximum Iterations= 30
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft

Type.... Individual Outlet Curves
Name.... SOUTH BASIN2

File.... I:\1370\COLUMBIA.PPK
Title... south basin outlet structure

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = e1 (Weir-Rectangular)

Upstream ID = (Pond Water Surface)

DNstream ID = TW (Pond Outfall)

WS Elev, Device	Q	Tail Water	Notes
WS Elev.	Q	TW Elev Converge	Computation Messages
ft	cfs	ft +/-ft	
789.50	.00	Free Outfall	WS below an invert; no flow.
790.50	.00	Free Outfall	WS below an invert; no flow.
791.00	.00	Free Outfall	WS below an invert; no flow.
791.50	.00	Free Outfall	WS below an invert; no flow.
792.50	.00	Free Outfall	WS below an invert; no flow.
793.00	.00	Free Outfall	WS below an invert; no flow.
793.50	11.67	Free Outfall	H=.50; Htw=.00; Qfree=11.67;
794.00	33.00	Free Outfall	H=1.00; Htw=.00; Qfree=33.00;

Type.... Individual Outlet Curves
 Name.... SOUTH BASIN2

File.... I:\1370\COLUMBIA.PPK
 Title... south basin outlet structure

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = s1 (Stand Pipe)

 Upstream ID = (Pond Water Surface)
 DNstream ID = c1 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
789.50	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
790.50	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
791.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
791.50	7.06	791.50	791.50	791.50	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
792.50	8.78	792.50	792.50	792.50	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
793.00	9.52	793.00	793.00	793.00	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
793.50	10.21	793.50	793.50	793.50	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						
794.00	10.86	794.00	794.00	794.00	.000	.000	Free Outfall	
		DS HGL+Loss > crest: Flow set to Downstream outlet.						

File.... I:\1370\COLUMBIA.PPK
 Title... south basin outlet structure

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = o1 (Orifice-Circular)

 Upstream ID = (Pond Water Surface)
 DNstream ID = c1 (Culvert-Circular)

NUMBER OF OPENINGS = 72
 EACH FLOW = SUM OF OPENINGS x FLOW FOR ONE OPENING

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
789.50	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
790.50	.43	790.50	Free	789.42	.000	.000	Free Outfall	
		H =.98						
791.00	.53	791.00	Free	789.47	.000	.000	Free Outfall	
		H =1.48						
791.50	.00	791.50	791.50	791.50	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
792.50	.00	792.50	792.50	792.50	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
793.00	.00	793.00	793.00	793.00	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
793.50	.00	793.50	793.50	793.50	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						
794.00	.00	794.00	794.00	794.00	.000	.000	Free Outfall	
		Full riser flow. Q=0 this opening.						

Type.... Individual Outlet Curves
 Name.... SOUTH BASIN2

File.... I:\1370\COLUMBIA.PPK
 Title... south basin outlet structure

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = c1 (Culvert-Circular)

Mannings open channel maximum capacity: 6.95 cfs

UPstream ID's= s1, o1

DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
789.50	.00	789.00	Free	Free	.000	.000	Free Outfall	
790.50	.43	789.42	Free	Free	.000	.000	Free Outfall	
791.00	.53	789.47	Free	Free	.000	.000	Free Outfall	
791.50	7.06	791.50	Free	Free	.000	.000	Free Outfall	
792.50	8.78	792.50	Free	Free	.000	.000	Free Outfall	
793.00	9.52	793.00	Free	Free	.000	.000	Free Outfall	
793.50	10.21	793.50	Free	Free	.000	.000	Free Outfall	
794.00	10.86	794.00	Free	Free	.000	.000	Free Outfall	

Pond Routing Summary

Type.... Pond Routing Summary
Name.... SOUTH BASIN2 Tag: 25

File.... I:\1370\COLUMBIA.PPK
Title... routing of hydrograph through south basin

*South Basin
25-yr, 24-hr Storm*

LEVEL POOL ROUTING SUMMARY

HYG Dir = I:\1370\
Inflow HYG file = SBASIN.HYG - south basin 25
Outflow HYG file = NONE STORED - SOUTH BASIN2·OUT 25

Pond Node Data = south basin
Pond Volume Data = south basin
Pond Outlet Data = south basin2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 789.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout = .00 cfs
Time Increment = .1000 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====
Peak Inflow = 69.00 cfs at 12.4000 hrs
Peak Outflow = 7.94 cfs at 14.1000 hrs

Peak Elevation = 792.01 ft
Peak Storage = 4.805 ac-ft
=====

*← Peak discharge
from basin*

← Peak water elevation

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 8.872
- Infiltration = .000
- HYG Vol OUT = 8.101
- Retained Vol = .769

Unrouted Vol = -.001 ac-ft (.016% of Inflow Volume)

WARNING: Inflow hydrograph truncated on left side.
WARNING: Outflow hydrograph truncated on right side.



Sheet No. _____

Calc. No. _____

Rev. No. _____

Job No. 1370

Job Columbia Plan of Op Update

By BLP Date 8/23/00

Client Alliant

Subject Basin Calcs

Chk'd. MKH Date 8-31-00

Basin Particle Size Settling Capability

Basin required to settle out ≥ 15 micron (0.015 mm) particle for a 25-yr, 24-hr storm event.

From calculations, peak discharge from basin is 7.94 cfs and peak water elevation is 792.0 ft. The corresponding surface area of the basin at elevation 792.0 is 74,865 sf (see Basin Volume Computations Section). The surface area to discharge ratio is therefore

$$\frac{74,865 \text{ sf}}{7.94 \text{ cfs}} = 9,429 \text{ sf/cfs}$$

From the Erosion and Sediment Control Handbook, the required surface area to discharge ratio to settle out a 15 micron particle is 3,125 sf/cfs.

$9,429 \text{ sf/cfs} > 3,125 \text{ sf/cfs}$, therefore the basin is adequately sized to settle out a 15 micron particle

File.... I:\1370\COLUMBIA.PPK
 Title... routing of hydrograph through south basin

South Basin
 Outflow Hydrograph
 (1/7)

POND ROUTED TOTAL OUTFLOW HYG...

HYG file =
 HYG ID = SOUTH BASIN2 OUT
 HYG Tag = 25

Basin dewatering time -
 Begin discharge: 12.2
 End discharge: 113.8 sa
 Total discharge time: 101.6
 or 4.2 days, which
 is greater than the
 required minimum
 of 3 days

 Peak Discharge = 7.94 cfs
 Time to Peak = 14.1000 hrs
 HYG Volume = 8.101 ac-ft

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
11.0000	.00	.00	.00	.00	.00
11.5000	.00	.00	.00	.00	.00
12.0000	.00	.00	.10	.24	.39
12.5000	.48	.92	3.82	6.00	7.14
13.0000	7.31	7.44	7.55	7.64	7.72
13.5000	7.78	7.83	7.87	7.90	7.92
14.0000	7.93	7.94	7.94	7.94	7.93
14.5000	7.92	7.91	7.90	7.89	7.87
15.0000	7.84	7.82	7.80	7.77	7.75
15.5000	7.73	7.71	7.68	7.66	7.63
16.0000	7.60	7.57	7.54	7.51	7.48
16.5000	7.45	7.42	7.40	7.37	7.34
17.0000	7.31	7.28	7.26	7.23	7.20
17.5000	7.18	7.15	7.13	7.10	7.08
18.0000	6.96	6.77	6.60	6.44	6.28
18.5000	6.14	6.00	5.88	5.76	5.65
19.0000	5.55	5.45	5.36	5.27	5.19
19.5000	5.12	5.01	4.89	4.77	4.66
20.0000	4.55	4.46	4.36	4.28	4.20
20.5000	4.12	4.05	3.99	3.92	3.87
21.0000	3.81	3.76	3.71	3.67	3.63
21.5000	3.59	3.55	3.51	3.48	3.45
22.0000	3.42	3.40	3.37	3.35	3.33
22.5000	3.31	3.29	3.24	3.16	3.09
23.0000	3.02	2.95	2.89	2.84	2.78
23.5000	2.74	2.69	2.65	2.61	2.57
24.0000	2.53	2.47	2.37	2.29	2.21
24.5000	2.13	2.06	1.99	1.93	1.87
25.0000	1.82	1.77	1.72	1.67	1.60

File.... I:\1370\COLUMBIA.PPK
 Title... routing of hydrograph through south basin

South Basin
 Outflow Hydrograph
 (2/7)

WARNING: Hydrograph truncated on right side.

Time hrs	HYDROGRAPH ORDINATES (cfs)				
	Output Time increment = .1000 hrs				
	Time on left represents time for first value in each row.				
25.5000	1.50	1.40	1.32	1.23	1.15
26.0000	1.08	1.01	.95	.89	.83
26.5000	.78	.73	.69	.64	.60
27.0000	.56	.53	.53	.53	.53
27.5000	.53	.53	.53	.53	.53
28.0000	.53	.52	.52	.52	.52
28.5000	.52	.52	.52	.52	.52
29.0000	.52	.52	.52	.52	.52
29.5000	.52	.52	.52	.52	.52
30.0000	.51	.51	.51	.51	.51
30.5000	.51	.51	.51	.51	.51
31.0000	.51	.51	.51	.51	.51
31.5000	.51	.51	.51	.51	.50
32.0000	.50	.50	.50	.50	.50
32.5000	.50	.50	.50	.50	.50
33.0000	.50	.50	.50	.50	.50
33.5000	.50	.50	.50	.50	.49
34.0000	.49	.49	.49	.49	.49
34.5000	.49	.49	.49	.49	.49
35.0000	.49	.49	.49	.49	.49
35.5000	.49	.49	.49	.49	.48
36.0000	.48	.48	.48	.48	.48
36.5000	.48	.48	.48	.48	.48
37.0000	.48	.48	.48	.48	.48
37.5000	.48	.48	.48	.48	.48
38.0000	.47	.47	.47	.47	.47
38.5000	.47	.47	.47	.47	.47
39.0000	.47	.47	.47	.47	.47
39.5000	.47	.47	.47	.47	.47
40.0000	.47	.46	.46	.46	.46
40.5000	.46	.46	.46	.46	.46
41.0000	.46	.46	.46	.46	.46
41.5000	.46	.46	.46	.46	.46
42.0000	.46	.46	.46	.45	.45
42.5000	.45	.45	.45	.45	.45
43.0000	.45	.45	.45	.45	.45
43.5000	.45	.45	.45	.45	.45
44.0000	.45	.45	.45	.45	.45
44.5000	.44	.44	.44	.44	.44
45.0000	.44	.44	.44	.44	.44
45.5000	.44	.44	.44	.44	.44
46.0000	.44	.44	.44	.44	.44
46.5000	.44	.44	.44	.43	.43

Type.... Pond Routed HYG (total out)
Name.... SOUTH BASIN2 Tag: 25

File.... I:\1370\COLUMBIA.PPK
Title... routing of hydrograph through south basin

South Basin
Outflow Hydrograph
(3/7)

WARNING: Hydrograph truncated on right side:

Time hrs	HYDROGRAPH ORDINATES (cfs)				
	Output Time increment = .1000 hrs Time on left represents time for first value in each row.				
47.0000	.43	.43	.43	.43	.43
47.5000	.43	.43	.43	.43	.43
48.0000	.43	.43	.43	.42	.42
48.5000	.42	.42	.42	.42	.42
49.0000	.42	.42	.42	.41	.41
49.5000	.41	.41	.41	.41	.41
50.0000	.41	.41	.41	.41	.40
50.5000	.40	.40	.40	.40	.40
51.0000	.40	.40	.40	.40	.40
51.5000	.39	.39	.39	.39	.39
52.0000	.39	.39	.39	.39	.39
52.5000	.39	.38	.38	.38	.38
53.0000	.38	.38	.38	.38	.38
53.5000	.38	.38	.38	.37	.37
54.0000	.37	.37	.37	.37	.37
54.5000	.37	.37	.37	.37	.37
55.0000	.36	.36	.36	.36	.36
55.5000	.36	.36	.36	.36	.36
56.0000	.36	.36	.35	.35	.35
56.5000	.35	.35	.35	.35	.35
57.0000	.35	.35	.35	.35	.34
57.5000	.34	.34	.34	.34	.34
58.0000	.34	.34	.34	.34	.34
58.5000	.34	.34	.33	.33	.33
59.0000	.33	.33	.33	.33	.33
59.5000	.33	.33	.33	.33	.33
60.0000	.33	.32	.32	.32	.32
60.5000	.32	.32	.32	.32	.32
61.0000	.32	.32	.32	.32	.31
61.5000	.31	.31	.31	.31	.31
62.0000	.31	.31	.31	.31	.31
62.5000	.31	.31	.31	.30	.30
63.0000	.30	.30	.30	.30	.30
63.5000	.30	.30	.30	.30	.30
64.0000	.30	.30	.30	.29	.29
64.5000	.29	.29	.29	.29	.29
65.0000	.29	.29	.29	.29	.29
65.5000	.29	.29	.29	.28	.28
66.0000	.28	.28	.28	.28	.28
66.5000	.28	.28	.28	.28	.28
67.0000	.28	.28	.28	.28	.27
67.5000	.27	.27	.27	.27	.27
68.0000	.27	.27	.27	.27	.27

Type.... Pond Routed HYG (total out)
Name.... SOUTH BASIN2 Tag: 25

File.... I:\1370\COLUMBIA.PPK
Title... routing of hydrograph through south basin

South Basin
Outflow Hydrograph
(4/7)

WARNING: Hydrograph truncated on right side.

Time hrs	HYDROGRAPH ORDINATES (cfs)				
	Output Time increment = .1000 hrs				
	Time on left represents time for first value in each row.				
68.5000	.27	.27	.27	.27	.27
69.0000	.26	.26	.26	.26	.26
69.5000	.26	.26	.26	.26	.26
70.0000	.26	.26	.26	.26	.26
70.5000	.26	.26	.25	.25	.25
71.0000	.25	.25	.25	.25	.25
71.5000	.25	.25	.25	.25	.25
72.0000	.25	.25	.25	.25	.24
72.5000	.24	.24	.24	.24	.24
73.0000	.24	.24	.24	.24	.24
73.5000	.24	.24	.24	.24	.24
74.0000	.24	.24	.24	.23	.23
74.5000	.23	.23	.23	.23	.23
75.0000	.23	.23	.23	.23	.23
75.5000	.23	.23	.23	.23	.23
76.0000	.23	.23	.22	.22	.22
76.5000	.22	.22	.22	.22	.22
77.0000	.22	.22	.22	.22	.22
77.5000	.22	.22	.22	.22	.22
78.0000	.22	.22	.21	.21	.21
78.5000	.21	.21	.21	.21	.21
79.0000	.21	.21	.21	.21	.21
79.5000	.21	.21	.21	.21	.21
80.0000	.21	.21	.20	.20	.20
80.5000	.20	.20	.20	.20	.20
81.0000	.20	.20	.20	.20	.20
81.5000	.20	.20	.20	.20	.20
82.0000	.20	.20	.20	.20	.19
82.5000	.19	.19	.19	.19	.19
83.0000	.19	.19	.19	.19	.19
83.5000	.19	.19	.19	.19	.19
84.0000	.19	.19	.19	.19	.19
84.5000	.19	.19	.18	.18	.18
85.0000	.18	.18	.18	.18	.18
85.5000	.18	.18	.18	.18	.18
86.0000	.18	.18	.18	.18	.18
86.5000	.18	.18	.18	.18	.18
87.0000	.18	.18	.17	.17	.17
87.5000	.17	.17	.17	.17	.17
88.0000	.17	.17	.17	.17	.17
88.5000	.17	.17	.17	.17	.17
89.0000	.17	.17	.17	.17	.17
89.5000	.17	.17	.17	.16	.16

Type.... Pond Routed HYG (total out)
Name.... SOUTH BASIN2 Tag: 25

File.... I:\1370\COLUMBIA.PPK
Title... routing of hydrograph through south basin

*South Basin
Outflow Hydrograph
(5/7)*

WARNING: Hydrograph truncated on right side.

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
90.0000	.16	.16	.16	.16	.16
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91.0000	.16	.16	.16	.16	.16
91.5000	.16	.16	.16	.16	.16
92.0000	.16	.16	.16	.16	.16
92.5000	.15	.15	.15	.15	.15
93.0000	.15	.15	.15	.15	.15
93.5000	.15	.15	.15	.15	.15
94.0000	.15	.15	.15	.15	.15
94.5000	.15	.15	.15	.15	.15
95.0000	.15	.15	.15	.15	.14
95.5000	.14	.14	.14	.14	.14
96.0000	.14	.14	.14	.14	.14
96.5000	.14	.14	.14	.14	.14
97.0000	.14	.14	.14	.14	.14
97.5000	.14	.14	.14	.14	.14
98.0000	.14	.14	.14	.14	.14
98.5000	.14	.13	.13	.13	.13
99.0000	.13	.13	.13	.13	.13
99.5000	.13	.13	.13	.13	.13
100.0000	.13	.13	.13	.13	.13
100.5000	.13	.13	.13	.13	.13
101.0000	.13	.13	.13	.13	.13
101.5000	.13	.13	.13	.13	.12
102.0000	.12	.12	.12	.12	.12
102.5000	.12	.12	.12	.12	.12
103.0000	.12	.12	.12	.12	.12
103.5000	.12	.12	.12	.12	.12
104.0000	.12	.12	.12	.12	.12
104.5000	.12	.12	.12	.12	.12
105.0000	.12	.12	.12	.12	.12
105.5000	.12	.11	.11	.11	.11
106.0000	.11	.11	.11	.11	.11
106.5000	.11	.11	.11	.11	.11
107.0000	.11	.11	.11	.11	.11
107.5000	.11	.11	.11	.11	.11
108.0000	.11	.11	.11	.11	.11
108.5000	.11	.11	.11	.11	.11
109.0000	.11	.11	.11	.11	.11
109.5000	.11	.10	.10	.10	.10
110.0000	.10	.10	.10	.10	.10
110.5000	.10	.10	.10	.10	.10
111.0000	.10	.10	.10	.10	.10

Type.... Pond Routed HYG (total out)
 Name.... SOUTH BASIN2 Tag: 25

File.... I:\1370\COLUMBIA.PPK
 Title... routing of hydrograph through south basin

South Basin
 Outflow Hydrograph
 (6/7)

WARNING: Hydrograph truncated on right side.

Time hrs	HYDROGRAPH ORDINATES (cfs)				
	Output Time increment = .1000 hrs Time on left represents time for first value in each row.				
111.5000	.10	.10	.10	.10	.10
112.0000	.10	.10	.10	.10	.10
112.5000	.10	.10	.10	.10	.10
113.0000	.10	.10	.10	.10	.10
113.5000	.10	.10	.10	.10	.10
114.0000	.09	.09	.09	.09	.09
114.5000	.09	.09	.09	.09	.09
115.0000	.09	.09	.09	.09	.09
115.5000	.09	.09	.09	.09	.09
116.0000	.09	.09	.09	.09	.09
116.5000	.09	.09	.09	.09	.09
117.0000	.09	.09	.09	.09	.09
117.5000	.09	.09	.09	.09	.09
118.0000	.09	.09	.09	.09	.09
118.5000	.09	.09	.09	.09	.09
119.0000	.08	.08	.08	.08	.08
119.5000	.08	.08	.08	.08	.08
120.0000	.08	.08	.08	.08	.08
120.5000	.08	.08	.08	.08	.08
121.0000	.08	.08	.08	.08	.08
121.5000	.08	.08	.08	.08	.08
122.0000	.08	.08	.08	.08	.08
122.5000	.08	.08	.08	.08	.08
123.0000	.08	.08	.08	.08	.08
123.5000	.08	.08	.08	.08	.08
124.0000	.08	.08	.08	.08	.08
124.5000	.07	.07	.07	.07	.07
125.0000	.07	.07	.07	.07	.07
125.5000	.07	.07	.07	.07	.07
126.0000	.07	.07	.07	.07	.07
126.5000	.07	.07	.07	.07	.07
127.0000	.07	.07	.07	.07	.07
127.5000	.07	.07	.07	.07	.07
128.0000	.07	.07	.07	.07	.07
128.5000	.07	.07	.07	.07	.07
129.0000	.07	.07	.07	.07	.07
129.5000	.07	.07	.07	.07	.07
130.0000	.07	.07	.07	.07	.07
130.5000	.07	.06	.06	.06	.06
131.0000	.06	.06	.06	.06	.06
131.5000	.06	.06	.06	.06	.06
132.0000	.06	.06	.06	.06	.06
132.5000	.06	.06	.06	.06	.06

.10 End discharge

Type.... Pond Routed HYG (total out)
Name.... SOUTH BASIN2 Tag: 25

File.... I:\1370\COLUMBIA.PPK
Title... routing of hydrograph through south basin

South Basin
Outflow Hydrograph
(7/7)

WARNING: Hydrograph truncated on right side.

Time hrs	HYDROGRAPH ORDINATES (cfs)				
	Output Time increment = .1000 hrs Time on left represents time for first value in each row.				
133.0000	.06	.06	.06	.06	.06
133.5000	.06	.06	.06	.06	.06
134.0000	.06	.06	.06	.06	.06
134.5000	.06	.06	.06	.06	.06
135.0000	.06	.06	.06	.06	.06
135.5000	.06	.06	.06	.06	.06
136.0000	.06	.06	.06	.06	.06
136.5000	.06	.06	.06	.06	.06
137.0000	.06	.06	.06	.06	.06
137.5000	.06	.06	.06	.06	.06
138.0000	.05	.05	.05	.05	.05
138.5000	.05	.05	.05	.05	.05
139.0000	.05	.05	.05	.05	.05
139.5000	.05	.05	.05	.05	.05
140.0000	.05	.05	.05	.05	.05
140.5000	.05	.05	.05	.05	.05
141.0000	.05	.05	.05	.05	.05
141.5000	.05	.05	.05	.05	.05
142.0000	.05	.05	.05	.05	.05
142.5000	.05	.05	.05	.05	.05
143.0000	.05	.05	.05	.05	.05
143.5000	.05	.05	.05	.05	.05
144.0000	.05	.05	.05	.05	.05
144.5000	.05	.05	.05	.05	.05
145.0000	.05	.05	.05	.05	.05
145.5000	.05	.05	.05	.05	.05
146.0000	.05	.05	.05	.05	.05
146.5000	.05	.05	.04	.04	.04
147.0000	.04	.04	.04	.04	.04
147.5000	.04	.04	.04	.04	.04
148.0000	.04	.04	.04	.04	.04
148.5000	.04	.04	.04	.04	.04
149.0000	.04	.04	.04	.04	.04
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150.0000	.04	.04	.04	.04	.04
150.5000	.04	.04	.04	.04	.04
151.0000	.04	.04	.04	.04	.04
151.5000	.04	.04	.04	.04	.04
152.0000	.04	.04	.04	.04	.04
152.5000	.04	.04	.04	.04	.04
153.0000	.04	.04	.04	.04	.04
153.5000	.04	.04	.04	.04	.04
154.0000	.04	.04	.04	.04	.04

File.... I:\1370\COLUMBIA.PPK
Title... routing of hydrograph through south basin

*South Basin
100-yr, 24-hr Storm*

LEVEL POOL ROUTING SUMMARY

HYG Dir = I:\1370\
Inflow HYG file = SBASIN.HYG - south basin 100
Outflow HYG file = NONE STORED - SOUTH BASIN2 OUT 100

Pond Node Data = south basin
Pond Volume Data = south basin
Pond Outlet Data = south basin2

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 789.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout = .00 cfs
Time Increment = .1000 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====
Peak Inflow = 110.00 cfs at 12.4000 hrs
Peak Outflow = 16.79 cfs at 13.7000 hrs ← *Peak discharge from basin*

Peak Elevation = 793.29 ft ← *Peak water elevation*
Peak Storage = 7.080 ac-ft
=====

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 13.207
- Infiltration = .000
- HYG Vol OUT = 12.435
- Retained Vol = .770

Unrouted Vol = -.001 ac-ft (.011% of Inflow Volume)

WARNING: Inflow hydrograph truncated on left side.
WARNING: Outflow hydrograph truncated on right side.

References

Sheet flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment. These n values are for very shallow flow depths of about 0.1 foot or so. Table 3-1 gives Manning's n values for sheet flow for various surface conditions.

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overton and Meadows 1976) to compute T_t :

$$T_t = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} s^{0.4}} \quad [\text{Eq. 3-3}]$$

Table 3-1.—Roughness coefficients (Manning's n) for sheet flow

Surface description	n^1
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover $\leq 20\%$	0.06
Residue cover $> 20\%$	0.17
Grass:	
Short grass prairie	0.15
Dense grasses ²	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods: ³	
Light underbrush	0.40
Dense underbrush	0.80

¹The n values are a composite of information compiled by Engman (1986).

²Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

³When selecting n , consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

where

T_t = travel time (hr),
 n = Manning's roughness coefficient (table 3-1),
 L = flow length (ft),
 P_2 = 2-year, 24-hour rainfall (in), and
 s = slope of hydraulic grade line (land slope, ft/ft).

This simplified form of the Manning's kinematic solution is based on the following: (1) shallow steady uniform flow, (2) constant intensity of rainfall excess (that part of a rain available for runoff), (3) rainfall duration of 24 hours, and (4) minor effect of infiltration on travel time. Rainfall depth can be obtained from appendix B.

Shallow concentrated flow

After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from figure 3-1, in which average velocity is a function of watercourse slope and type of channel. For slopes less than 0.005 ft/ft, use equations given in appendix F for figure 3-1. Tillage can affect the direction of shallow concentrated flow. Flow may not always be directly down the watershed slope if tillage runs across the slope.

After determining average velocity in figure 3-1, use equation 3-1 to estimate travel time for the shallow concentrated flow segment.

Open channels

Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle sheets. Manning's equation or water surface profile information can be used to estimate average flow velocity. Average flow velocity is usually determined for bank-full elevation.

Table 2-2c.—Runoff curve numbers for other agricultural lands¹

Cover description		Curve numbers for hydrologic soil group—			
		A	B	C	D
Cover type	Hydrologic condition				
Pasture, grassland, or range—continuous forage for grazing. ²	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
		Ave = 67.5			
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ³	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Woods—grass combination (orchard or tree farm). ³	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. ³	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

¹Average runoff condition, and $I_n = 0.2S$.

²Poor: <50% ground cover or heavily grazed with no mulch.
 Fair: 50 to 75% ground cover and not heavily grazed.
 Good: >75% ground cover and lightly or only occasionally grazed.

³Poor: <50% ground cover.
 Fair: 50 to 75% ground cover.
 Good: >75% ground cover.

⁴Actual curve number is less than 30; use CN = 30 for runoff computations.

⁵CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

⁶Poor: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
 Fair: Woods are grazed but not burned, and some forest litter covers the soil.
 Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

0.6^u

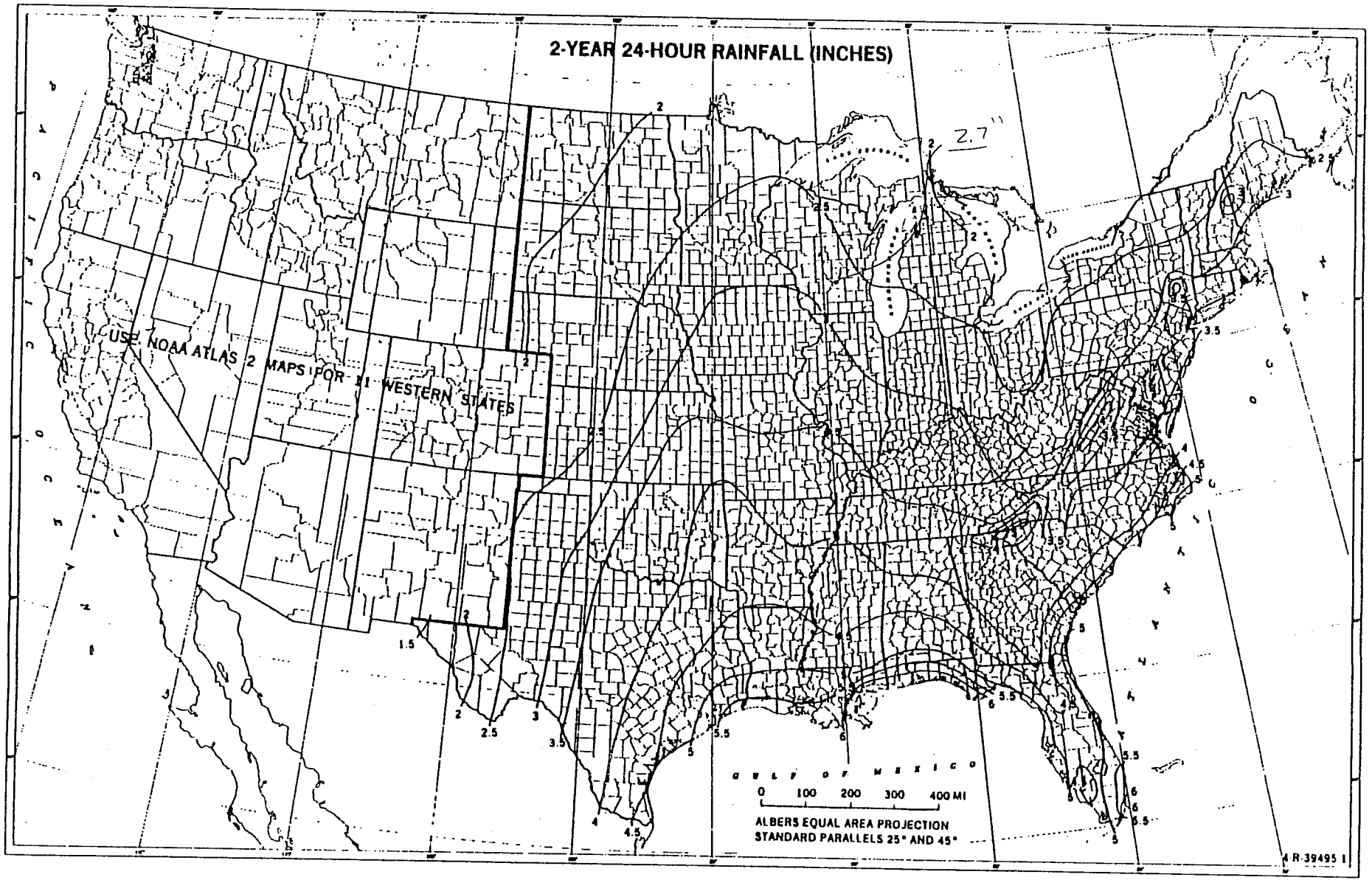


Figure B-3.—Two-year, 24-hour rainfall.

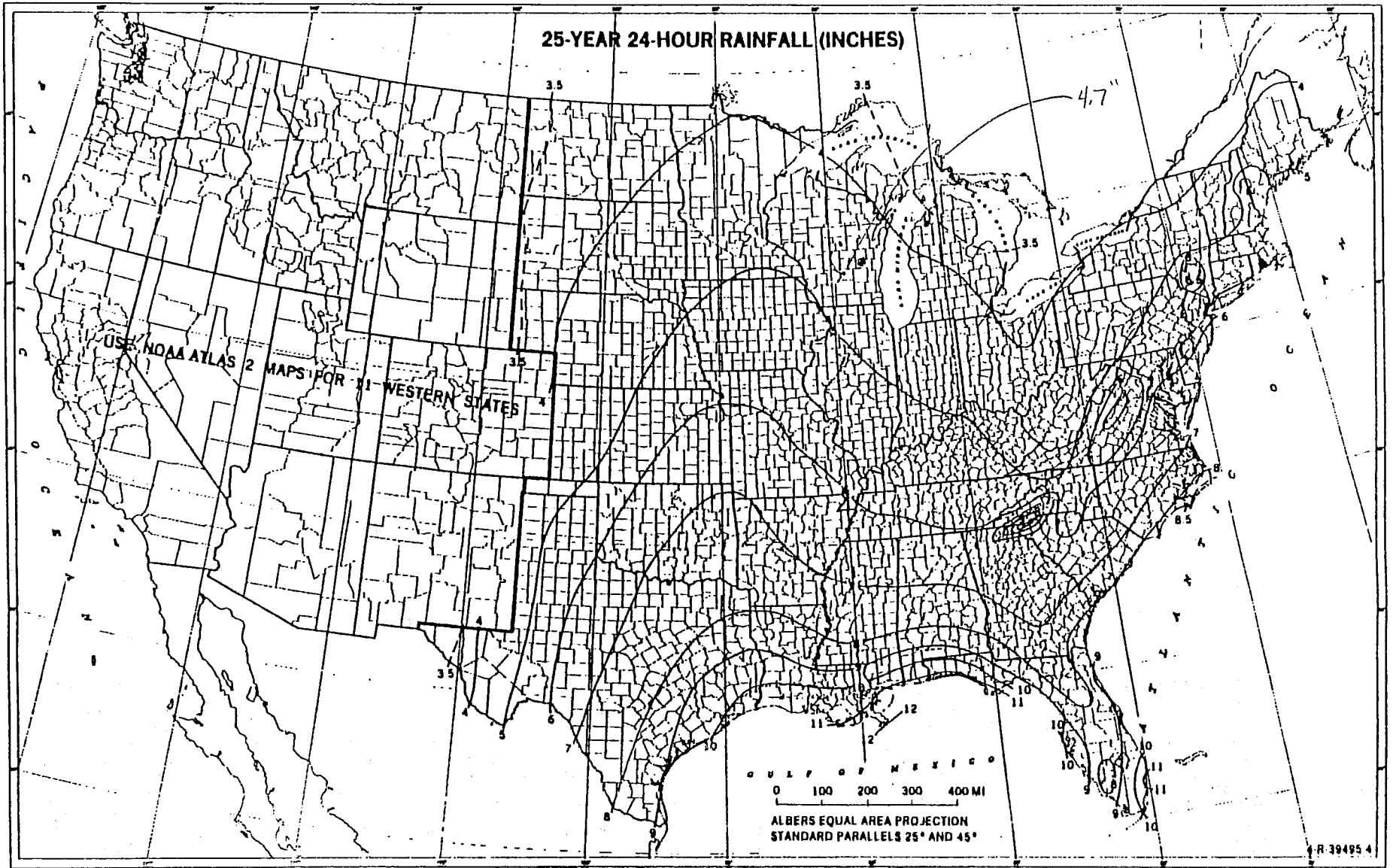


Figure B-6.—Twenty-five-year, 24-hour rainfall.

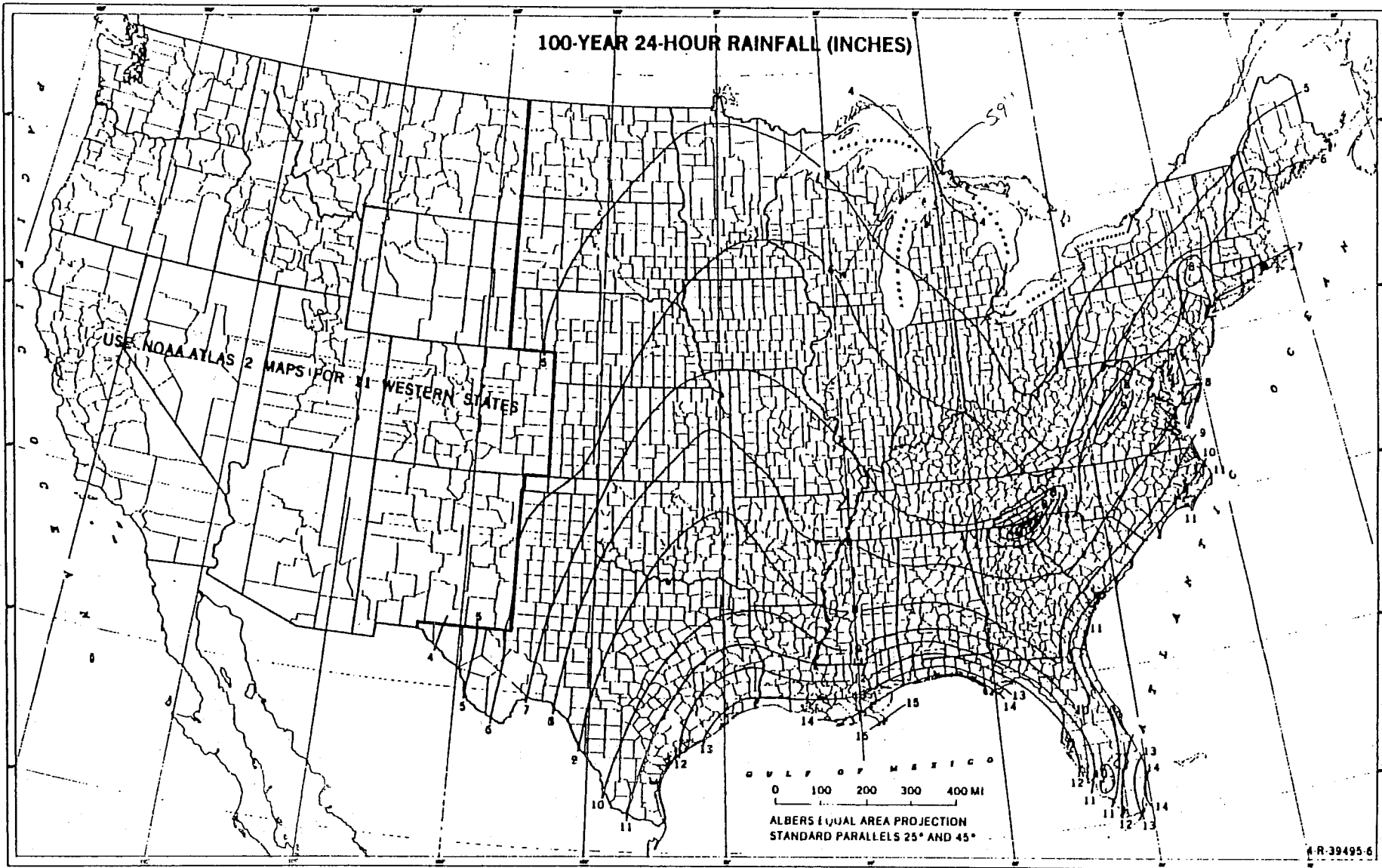


Figure B-8.—One-hundred-year, 24-hour rainfall.

TABLE 8.1 Surface Area Requirements of Sediment Traps and Basins

Particle size, mm	Settling velocity, ft/sec (m/sec)	Surface area requirements,	
		ft ² per ft ³ /sec discharge	(m ² per m ³ /sec discharge)
0.5 (coarse sand)	0.19 (0.058)	6.3	(20.7)
0.2 (medium sand)	0.067 (0.020)	17.9	(58.7)
0.1 (fine sand)	0.023 (0.0070)	52.2	(171.0)
0.05 (coarse silt)	0.0062 (0.0019)	193.6	(635.0)
0.02 (medium silt)	0.00096 (0.00029)	1,250.0	(4,101.0)
0.01 (fine silt)	0.00024 (0.000073)	5,000.0	(16,404.0)
0.005 (clay)	0.00006 (0.000018)	20,000.0	(65,617.0)

→ Ave = 3,125 sf/cfs

weight composed of particles in the 0.01- to 0.02-mm range. A surface area 4 times larger would be needed to capture 5 percent more of this soil.

A balance between the cost-effectiveness of a certain basin size and the desire to capture fine particles must be achieved. It is desirable to capture the very small soil particles (clays and fine silts) because they cause turbidity and other water quality problems. However, Table 8.1 shows that a basin would have to be very large to capture particles smaller than 0.02 mm, particularly clay particles 0.005 mm and smaller. Because of the high cost of trapping very small particles, the authors recommend 0.02 as the design particle size for sediment basins except in areas with coarse soils, where a larger design particle may be used. The 0.02-mm particle is classified as a medium silt by the AASHTO soil classification system.

8.2d Basin Discharge Rate

The peak discharge, calculated by the rational or another approved method, is used to size the basin riser. During any major storm, a sediment basin should fill with water to the top of its riser and then discharge at the rate of inflow to the basin. A sediment basin is not designed with a large water storage volume as is a reservoir. If the inflow exceeds the design peak flow used to size the riser, the overflow should discharge down an emergency spillway.

8.2e Design Runoff Rate

In the equation for surface area of a sediment basin, the discharge rate Q is a variable to be chosen by the designer. The above discussion of basin discharge rate shows that the discharge rate is, to a large extent, equal to the inflow. The riser is sized to handle the peak inflow to the basin. The authors suggest determining the surface area by the average runoff of a 10-year, 6-hr storm instead

of the peak flow. A substantial savings in size, and therefore cost, is obtained, and basin efficiency is not significantly decreased.

Consider a basin designed to capture the 0.02-mm particle at the average runoff rate. The average rainfall per hour is 17 percent of the total rainfall in a 6-hr storm (Sec. 4.1f). On a site with soils with a moderately high clay content, under ideal settling conditions this basin would retain about 62 percent of the eroded soil (i.e., 62 percent of the soil, by weight, is composed of 0.02-mm or larger particles).

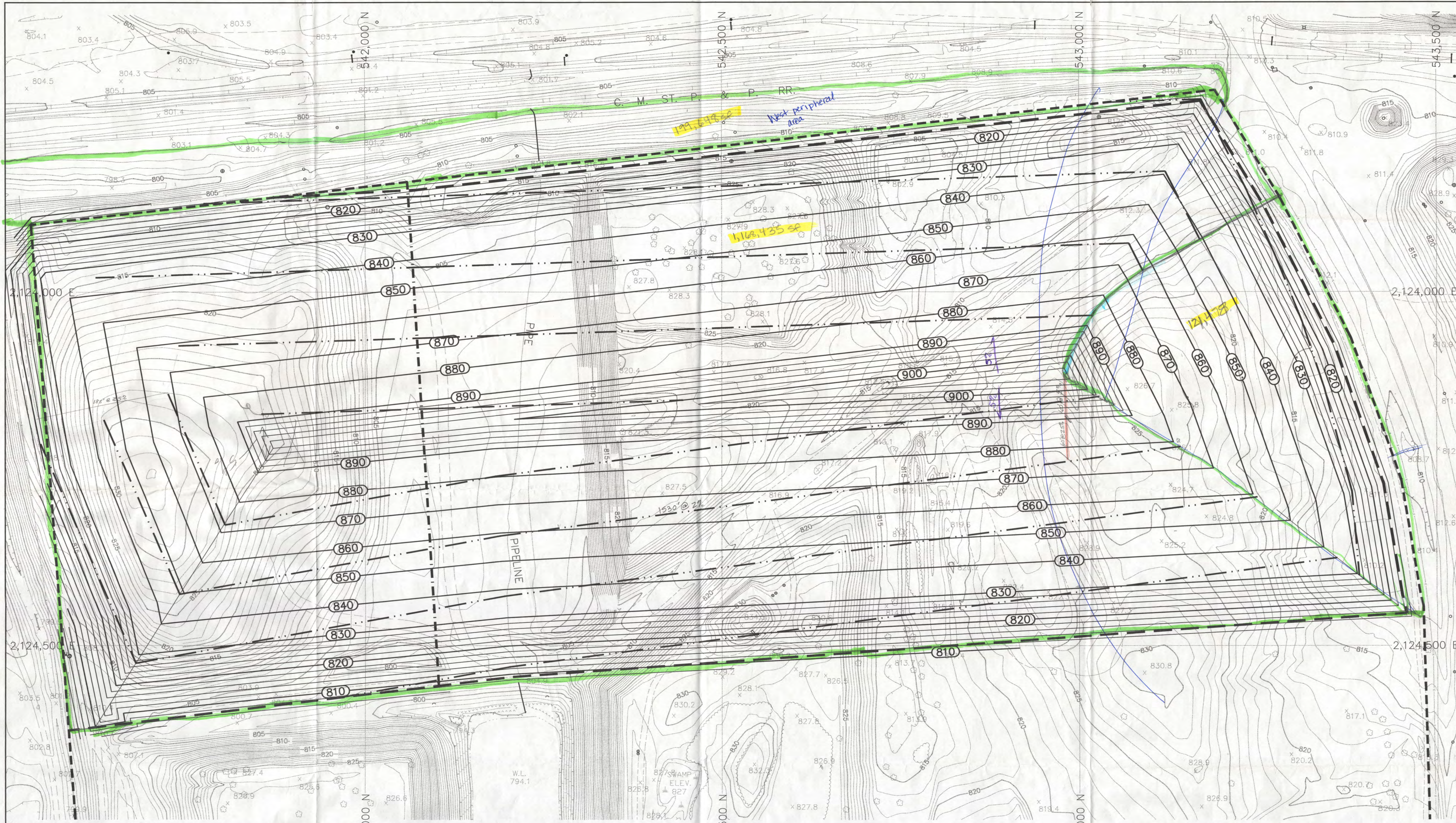
If the surface area of this basin were instead designed for the peak flow, it would be roughly 3 times larger. According to data from the U.S. Bureau of Reclamation (10), 25 percent of the total rainfall in a 6-hr storm falls in a ½-hr period (Fig. 4.2). Since the rainfall intensity i value is in units of inches (or millimeters) per hour, the peak flow can be calculated by using an i value of 50 percent of the 6-hr total. Since basin surface area is directly proportional to the discharge rate ($A = 1.2Q/V_s$) and the peak discharge rate in a 6-hr storm is 2.9 times the average rate (50% = $2.9 \times 17\%$), the surface area sized for the peak flow would be about 3 times the surface area sized for the average flow. The basin sized for the peak flow would capture, during most of the storm except the peak, particles with approximately one-third the settling velocity of the design particle. Since the 0.02-mm particle settles at 0.00096 ft/sec (0.00029 m/sec), particles with a settling velocity of 0.00032 ft/sec (0.000098 m/sec) would then be captured. These are approximately 0.01-mm particles.

Suppose a basin on a site with clayey soils were sized by using the peak runoff rate. For the purpose of illustration, suppose the soil composition were typical of the San Francisco Bay Area as in the preceding example (62 percent of particles, by weight, greater than 0.02 mm and 5 percent, by weight, from 0.01 to 0.02 mm). A basin with a large surface area based on the peak runoff would capture the 0.01- to 0.02-mm particles as well as particles greater than 0.02 mm, or 67 percent of the eroded material. The basin efficiency would be increased 8 percent (5/62) by tripling the surface area. Thus it is generally much more cost-effective to size a basin by using the average runoff rather than the peak, and basin efficiency will not be significantly lower.

8.2f Settling Depth

If a basin is too shallow, water flowing rapidly through the basin may resuspend settled particles and decrease efficiency of capture. A similar problem occurs in grit-settling chambers at sewage treatment plants, where velocity must be controlled to prevent particle resuspension. An equation that describes scour in a grit chamber (2) is:

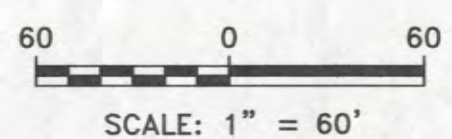
$$V_{scour} = \frac{1.48G}{n} \times \left[r^{1/6} \times k(S_s - 1) \times \frac{d}{304.8} \right]^{1/2}$$



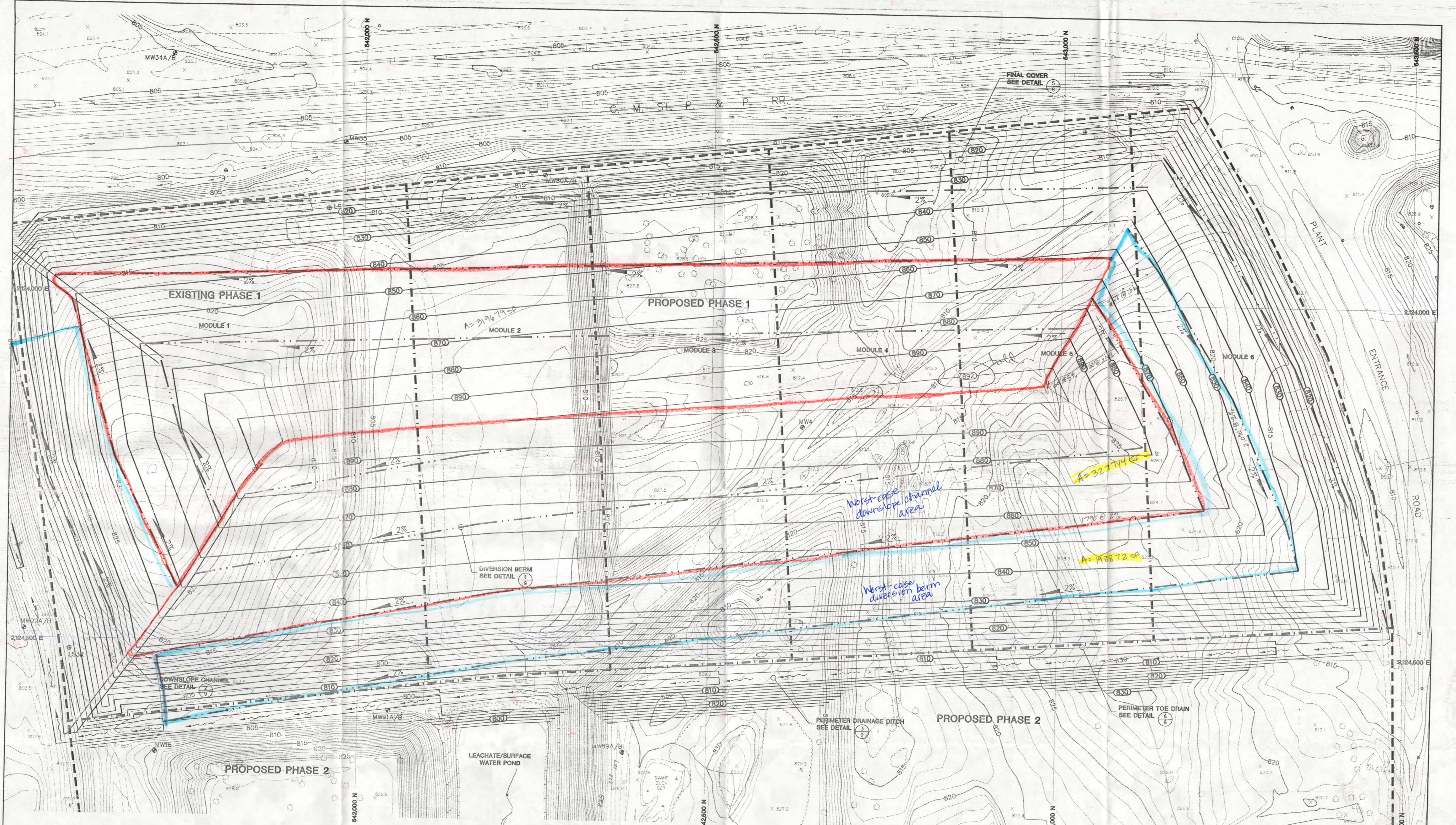
LEGEND

	PROPOSED LIMITS OF FILL		PAVED ROAD
	APPROVED LIMITS OF FILL		UNPAVED ROAD
	EXISTING SPOT ELEVATION		VEGETATION
	EXISTING GRADES (5' INTERVAL)		RAILROAD TRACKS
	EXISTING GRADES (1' INTERVAL)		FENCE
	EDGE OF WATER		CULVERT

Areas obtained from AutoCAD



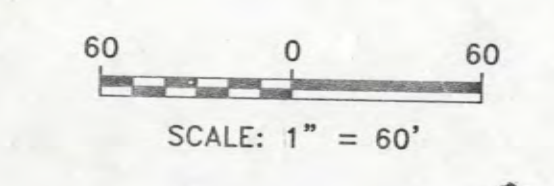
PROPOSED FINAL GRADES	
PLAN OF OPERATION UPDATE ALLIANT - COLUMBIA ASH DISPOSAL FACILITY TOWN OF PACIFIC COLUMBIA COUNTY, WISCONSIN	
PROJECT NO. 1370	
DRAWN BY: RR/KP	
CHECKED BY: MRH	
DRAWN: 07/28/00 REVISED: 08/16/00	
SHEET 4 OF 8	



LEGEND

--- PHASE/MODULE LIMIT	--- PAVED ROAD	--- PROPOSED FINAL GRADES (5' INTERVAL)
- - - APPROVED LIMITS OF FILL	--- UNPAVED ROAD	--- PROPOSED FINAL GRADES (1' INTERVAL)
--- EXISTING SPOT ELEVATION	--- VEGETATION	--- PROPOSED DIVERSION BERM
--- EXISTING GRADES (5' INTERVAL)	--- RAILROAD TRACKS	--- PROPOSED DOWNSLOPE CHANNEL
--- EXISTING GRADES (1' INTERVAL)	--- FENCE	--- DRAINAGE DITCH
--- EDGE OF WATER	--- CULVERT	

Areas determined by planimeter



DRAFT

PROPOSED FINAL GRADES

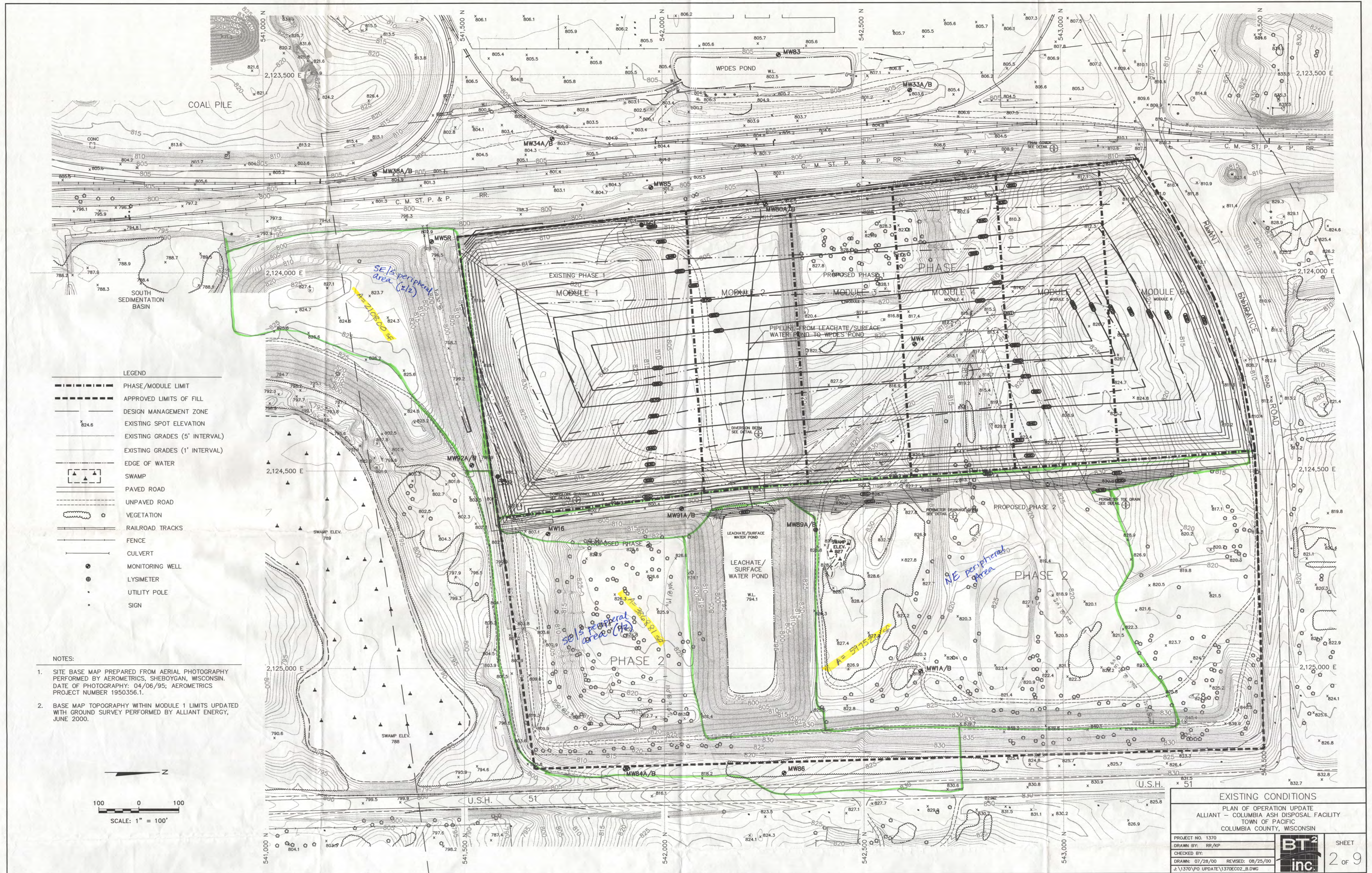
PLAN OF OPERATION UPDATE
 ALLIANT - COLUMBIA ASH DISPOSAL FACILITY
 TOWN OF PACIFIC
 COLUMBIA COUNTY, WISCONSIN

PROJECT NO. 1370
 DRAWN BY: RR/XP
 CHECKED BY: MSH
 DRAWN: 07/28/00 REVISED: 08/25/00
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SHEET 4 OF 9

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Appendix B1.2

2021 Leachate/Surface Water Pond Capacity Evaluation

March 10, 2021
File No. 25220183.00

Ms. Ann Bekta
Wisconsin Department of Natural Resources
2514 Morse Street
Janesville, WI 53545

Subject: Leachate/Surface Water Pond Capacity Evaluation
Dry Ash Disposal Facility – Columbia Energy Center
License #3025
Town of Pacific, Columbia County, Wisconsin

Dear Ms. Bekta:

On behalf of Wisconsin Power and Light Company (WPL), SCS Engineers (SCS) has prepared this leachate/surface water pond (pond) capacity evaluation in preparation for Phase 1, Module 5 (Module 5) and Module 6 (Module 6) liner construction at the dry ash disposal facility located at the Columbia Energy Center (Columbia) in the Town of Pacific, Wisconsin. This evaluation has been prepared in accordance with Condition No. 1 of the Rain Cover System Plan of Operation Approval Modification issued by Wisconsin Department of Natural Resources (WDNR) on June 6, 2018 (**Attachment A**). Construction of Module 5 and Module 6 is expected to begin in mid-2021 and be completed by the end of 2021.

POND CAPACITY EVALUATION

A pond capacity evaluation was performed using storm water modeling. The evaluation demonstrates that the pond can accommodate a 25-year, 24-hour storm with up to 6.54 acres of open landfill area without overtopping. The model write-up and results are included in **Attachment B**. Based on this conclusion, WPL plans to manage pond levels using a similar approach implemented during construction and operation of Phase 1, Module 4 (Module 4). WPL proposes to use a rain cover in Module 5 and Module 6 to offset the required intermediate/final cover area necessary.

The evaluation was performed to determine the amount of open/contributing area in Modules 2, 3, 4, 5, and 6 that can be accommodated in the pond below the maximum lined pond limits (i.e., to elevation 796.97). The following scenarios were evaluated:

- Scenario 1 – 50 percent of Module 5 open (partially active); Module 6 and remaining 50 percent of Module 5 covered with a rain cover (**Figure 1, Attachment B**).
- Scenario 2 – 100 percent of Module 5 open (fully active); Module 6 covered with a rain cover (**Figure 2, Attachment B**).
- Scenario 3 – 50 percent of Module 6 open (partially active) (**Figure 3, Attachment B**).
- Scenario 4 – 100 percent of Module 6 open (fully active) (**Figure 4, Attachment B**).

Figures 1 through **4** show the resulting general area requiring intermediate/final cover to achieve open landfill area for the scenarios modeled. The actual location of cover placement may vary



depending on coal combustion residual (CCR) grades, but the required additional intermediate/final cover area will be met.

POND MANAGEMENT PLAN

While Module 5 and Module 6 are constructed and completed, water levels in the pond will be managed as outlined below:

During Construction of Module 5 and Module 6, Through Installation of a Rain Cover Over a Frost Protection Layer

- **Intermediate/final cover in Module 3 and Module 4.**
 - Areas with existing intermediate/final cover will continue to be routed to the South Sedimentation Basin, reducing the volume discharging to the pond.
 - Intermediate cover will be placed on portions of Modules 3 and 4 if final waste grades are reached.
- **Water level management in the pond.**
 - The pond will be pumped dry and maintained by the site or Module 5 and Module 6 liner construction contractor:
 - At the start of Module 5 and Module 6 construction;
 - Following rain events during Module 5 and Module 6 construction; and
 - Following rain events during placement of the frost protection layer in Module 5 and Module 6.

Note: During frost protection placement, there will be more than 6.54 acres of open landfill space; however, the pond will be able to accommodate a 10-year 24-hour storm (assuming a starting elevation of 6 inches of water in the pond). This transition period will last approximately 6 weeks or less and consist of the placement of approximately 50,000 cubic yards of frost protection material.

- **Installation of a rain cover in Module 5 and Module 6.**
 - A rain cover will be installed after the frost protection layer is placed in Module 5 and Module 6.
 - The rain cover will allow clean storm water to be diverted away from the leachate/contact water collection system prior to additional filling operations, reducing the volume discharging to the pond.

During Subsequent Filling in Module 5

Filling in Module 5, beyond the frost protection layer, is expected to begin in early 2022. When filling commences, water levels will be managed as follows:

- **Transition of disposal operations into Module 5.**
 - WPL will remove a portion of the Module 5 rain cover only large enough to accommodate the transition of disposal operations in Module 5.

- To the extent possible, in advance of the transition and during the transition, WPL may begin placing intermediate cover with internal resources in areas of Modules 3 and 4 where final or interim waste grades have been achieved.
- WPL will continue installation of intermediate cover or begin the procurement of external resources (i.e., engineering and contractor assistance) to install final cover in Modules 3 and 4 once the transition of disposal operations into Module 5 is complete. WPL intends to monitor waste grades in Modules 3 and 4 using regular airspace surveys and GPS equipment to predict the timing of the transition as accurately as possible.
- During the transition of disposal operations into Module 5, there may be more than 6.54 acres of open landfill space; however, the pond will be able to accommodate at least a 10-year 24-hour storm (assuming a starting elevation of 6 inches of water in the pond). The duration of this transition period will be as short as possible. The required timing of the transition in relation to the construction season may affect the duration of the transition.
- **Placement of additional intermediate/final cover in Modules 3 and 4.**
 - Following the complete transition of disposal operations into Module 5, WPL will focus on achieving the 6.54 acres of open landfill (if not already obtained) by placing additional intermediate/final cover in Modules 3 and 4 as described in the Pond Capacity Evaluation section above.
 - To maintain a maximum open area of 6.54 acres, WPL will place intermediate/final cover over a currently active area in Modules 3 and 4 that is equal to the area of the Module 5 rain cover they will remove. For example, 1.98 acres of intermediate/final cover will need to be installed if 50 percent of the rain cover were removed, and 4.03 acres of intermediate/final cover will need to be installed if 100 percent of the rain cover were removed.
- **Water level management in the pond and staged removal of rain cover.**
 - The rain cover may be removed in sections during additional waste filling, allowing portions of storm water in Module 5 to continue to be diverted from the pond.
 - Water levels will be managed by pumping to specified maximum starting elevations prior to the start of anticipated storm events. Operating level figures are attached to the pond evaluation in **Attachment B** for open scenarios of 50 percent and 100 percent of Module 5. Operating levels will be updated for actual removal areas.

During Subsequent Filling in Module 6

Filling in Module 6, beyond the frost protection layer, is expected to begin in 2023. When filling commences, water levels will be managed as follows:

- **Transition of disposal operations into Module 6.**
 - WPL will remove a portion of the Module 6 rain cover only large enough to accommodate the transition of disposal operations in Module 6.
 - To the extent possible, in advance of the transition and during the transition, WPL may begin placing intermediate cover with internal resources in areas of Modules 4 and 5 where final or interim waste grades have been achieved.

- WPL will continue installation of intermediate cover or begin the procurement of external resources (i.e., engineering and contractor assistance) to install final cover in Modules 4 and 5 once the transition of disposal operations into Module 6 is complete. WPL intends to monitor waste grades in Modules 4 and 5 using regular airspace surveys to predict the timing of the transition as accurately as possible.
- During the transition of disposal operations into Module 6, there may be more than 6.54 acres of open landfill space; however, the pond will be able to accommodate at least a 10-year 24-hour storm (assuming a starting elevation of 6 inches of water in the pond). The duration of this transition period will be as short as possible. The required timing of the transition in relation to the construction season may affect the duration of the transition.
- **Placement of additional intermediate/final cover in Modules 4 and 5.**
 - Following the complete transition of disposal operations into Module 6, WPL will focus on achieving the 6.54 acres of open landfill by placing additional intermediate/final cover in Modules 4 and 5 as described in the Pond Capacity Evaluation section above.
 - To maintain a maximum open area of 6.54 acres, WPL will place intermediate/final cover over a currently active area in Modules 4 and 5 that is equal to the area of the Module 6 rain cover they will remove. For example, 6.07 acres of intermediate/final cover will need to be installed if 50 percent of the rain cover were removed, and 7.97 acres of intermediate/final cover will need to be installed if 100 percent of the rain cover were removed. NOTE: The total areas of coverage are measured from current 2021 intermediate/final cover areas.
- **Water level management in the pond and staged removal of rain cover.**
 - The rain cover may be removed in sections during additional waste filling, allowing portions of storm water in Module 6 to continue to be diverted from the pond.
 - Water levels will be managed by pumping to specified maximum starting elevations prior to the start of anticipated storm events. Operating level figures are attached to the pond evaluation in **Attachment B** for open scenarios of 50 percent and 100 percent of Module 6. Operating levels will be updated for actual removal areas.

PLAN MODIFICATION

A Plan of Operation Approval Modification (Plan Modification) to install a rain cover in Module 4 and future modules was provided on April 17, 2018, and approved on June 6, 2018 (**Attachment A**). The Plan Modification addressed installation, maintenance, and removal requirements for the rain cover. A preconstruction report will be submitted at a later date including geosynthetics material for Module 5 and Module 6 construction.

Ms. Ann Bekta
March 10, 2021
Page 5

If you have any questions regarding the contents of this letter, please contact Jeff Maxted at 608.458.3853 or Phil Gearing at 608.216.7324.

Sincerely,



Phillip E. Gearing, PE
Project Manager
SCS Engineers



Mark R. Huber, PE
Project Director
SCS Engineers

RJG/AJR_jsn/PEG/MRH

cc: Jeff Maxted, Alliant Energy
Brian Clepper, WPL – Columbia Energy Center

Encl. Attachment A – WDNR Correspondence
Attachment B – Leachate/Surface Water Pond Capacity Evaluation

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Attachment A
WDNR Correspondence

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
3911 Fish Hatchery Road
Fitchburg WI 53711-5397

Scott Walker, Governor
Daniel L. Meyer, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711



June 6, 2018

File Ref: FID 111049180
Columbia County
Approval

Mr. Jeff Maxted
Alliant Energy Corporation
4902 North Biltmore Lane
Madison, WI 53718-2148

Subject: Rain Cover System, Plan of Operation Approval Modification, Dry Ash Disposal Facility, Columbia Energy Center License #3025

Dear Mr. Maxted:

The requested modification to your plan of operation for a rain cover system has been reviewed and approved. Please include the attached approval in the written operating record for the landfill as specified in s. NR 506.17, Wis. Adm. Code.

The proposed modification includes the installation and operation of a proposed rain cover system above the completed liner and leachate collection system at the Wisconsin Power and Light Company (WPL) Columbia dry ash disposal facility. The rain cover will allow WPL to divert clean storm water away from the leachate collection system. Diverting clean storm water will minimize the volume of leachate that is collected in the leachate/surface water pond.

If you have any questions regarding this letter, please contact Ann Bekta at ann.bekta@wisconsin.gov or (608)743-4845.

Sincerely,

A handwritten signature in cursive script that reads 'Cynthia Moore'.

Cynthia Moore
Waste and Materials Management Program Supervisor
South Central Region

c: Ann Bekta – DNR JSC
Adam Hogan – DNR SCR
Valerie Joosten – DNR NER
Eric Nelson – ENelson@scsengineers.com
Nate Sievers - NathanielSievers@alliantenergy.com

PROJECT SUMMARY COLUMBIA DRY ASH DISPOSAL LANDFILL

Background

During the construction of Phase 1, Module 2 it was discovered that the peak liner elevation of the existing leachate/surface water pond was at approximately 797 MSL instead of the design elevation of 798. Because of this, the new maximum allowable pond water level was set at 796.97 MSL. In the 2010 Plan of Operation Update the peak water elevation in the pond from a 25-year, 24-hour storm event when Module 3 is operating is 797.17 MSL, which is above the maximum allowable pond water level. Condition 1 of the Department's February 13, 2012 Phase 1, Module 2 liner construction documentation approval required an evaluation of the leachate/surface water pond capacity. The evaluation contained recommendations for a leachate management plan during Phase 1, Module 3 operation. Additional recommendations were discussed in a June 10, 2016 letter. It was determined that a combination of additional final and intermediate cover in Phase 1, Modules 1 and 2 and a rain cover system would maintain the pond water level below the maximum allowable level of 796.9 MSL.

Because the rain cover system for Phase 1, Module 3 was effective in keeping the levels of the pond below the maximum allowable level, WPL proposes to use the system in future modules.

Rain Cover System

WPL is proposing to use rain covers to divert clean storm water away from the leachate collection system in newly constructed landfill cells at the Columbia Energy Center (Columbia) dry ash disposal facility. WPL will install rain covers over new liner and leachate collection systems or coal combustion residual (CCR) frost protection material, and the rain covers will remain in place until removal is needed to facilitate waste placement operations.

The rain covers will prevent storm water contact with leachate drainage layer material and frost protection material, which may both consist of CCR. The rain covers will collect clean, non-contact storm water that would otherwise be managed as leachate with the leachate collection system and allow WPL to divert that water to the perimeter drainage system.

The rain cover will be installed over the leachate drainage layer material, or frost protection layer, and anchored in a trench or with sand bags at the limits of the rain cover area. The rain cover will consist of a 12-mil polyethylene scrim reinforced polyethylene geomembrane. The 12-mil scrim reinforced polyethylene geomembrane material will be stitched together. A ballast system consisting of sandbags and rope installed on a grid over the scrim material will be used to protect the barrier layer from wind damage. The sand bag and rope ballast system will be installed on a grid over the scrim material. Sandbags will be installed on a 10-foot by 5-foot grid with ropes tied to the bags along the north-south lines. Sandbags used in the ballast system will be filled with a sand material and will not contain bottom ash.

When used, the rain cover will be terminated at a berm. The perimeter berms or temporary berms constructed within the limits of each module will be used to provide storm water containment. A berm will be constructed along the tie in or existing delineation berm between adjacent modules (i.e., existing and newly constructed). This berm will be constructed by grading the waste or general fill material in the existing module. The berm between adjacent modules is required to keep clean storm water on the rain cover and leachate off the rain cover. If interior berms are constructed for containment, the height will be determined based on storm water calculations to be performed prior to construction of each

module. The berm between adjacent modules will be at least 4 feet high, but will be no higher than the exterior perimeter berms. Outlets from the rain cover area will also be sized based on storm water calculations performed for each module where a rain cover is installed.

Non-contact storm water that accumulates on top of a rain cover will gravity drain or be pumped into the perimeter drainage swales. The perimeter drainage swales drain to the sedimentation basin located to the south of the landfill. Water collected on the rain cover will be visually inspected for evidence of leachate or contact water and other impacts before it is pumped into the perimeter drainage system. Evidence of leachate or contact water impacts may include a discoloration of the water, an accumulation of coal combustion residuals (CCR) at the collection point or signs of erosion along the limits of the rain cover where it abuts the active disposal area. The rain cover limits, including the berm and anchoring, will be inspected after all significant precipitation events (>0.5 inches) to ensure that leachate or contact water has not run onto the rain cover. In the event that leachate or contact water runs onto the rain cover, all water collected on the rain cover will be managed as leachate and hauled to the ash pond for disposal or used for dust control within the landfill limits of waste.

No CCR material will be placed on top of the rain cover. The rain cover will be removed in sections as filling operations proceed in each module. The rain cover will be cut at the limits of the operating area for CCR disposal and a new berm will be constructed at the rain cover limits to maintain flow to a new collection point. When removed, rain cover materials may be stored for reuse in future installations. The removed material may also be used for future repairs depending on the condition of material. Rain cover materials in poor condition after removal will be disposed offsite.

An updated Construction Quality Assurance (CQA) Plan that incorporates the rain cover will be included with the geosynthetics preconstruction report for future module construction. For future modules, the preconstruction report will also contain the storm water calculations performed to determine if a rain cover is needed. If a rain cover is required, the preconstruction report will contain the rain cover product identification, material properties, and installation recommendations from the manufacturer.

The installed limits of the rain cover will be surveyed and provided along with photographic documentation of the installation in the construction documentation report for each module, or as an addendum to the construction documentation report.

**BEFORE THE
STATE OF WISCONSIN**

**DEPARTMENT OF NATURAL RESOURCES
PLAN OF OPERATION APPROVAL MODIFICATION
FOR THE WISCONSIN POWER AND LIGHT (WPL)
COLUMBIA DRY ASH DISPOSAL LANDFILL (#03025)**

FINDINGS OF FACT

The Department finds:

1. Wisconsin Power and Light (WPL) owns and operates a non-hazardous solid waste disposal facility located in Section 27, T12N, R9W, Town of Pacific, Columbia County, Wisconsin.
2. The Department conditionally approved a plan of operation for the facility on June 30, 1983. The plan of operation was updated on November 2, 2000 and January 28, 2011.
3. On April 19, 2018, Alliant Energy, on behalf of WPL, submitted a plan modification request to the Department for a rain cover system. The correct plan review fee of \$1,650 was received by the Department on June 5, 2018.
4. The information submitted in connection with the modification request includes a report prepared by SCS Engineers, entitled "Plan Modification Rain Cover, Dry Ash Disposal Facility, Columbia Energy Center, Town of Pacific, Wisconsin" dated April 17, 2018 and was received by the Department on April 19, 2018.
5. Additional documents considered in connection with the modification request include documents supporting the following approvals:
 - a. The Department's June 30, 1983 plan of operation approval.
 - b. The Department's November 2, 2000 plan of operation update approval.
 - c. The Department's January 28, 2011 plan of operation update approval.
 - d. Alliant's February 24, 2016 leachate/surface water pond capacity evaluation.
 - e. Alliant's June 10, 2016 letter containing additional information regarding the leachate/surface water pond capacity evaluation.
 - f. The Department's July 1, 2016 plan of operation approval modification for a rain cover system.
 - g. The Department files for the Columbia Energy Center Landfill #3025.
6. If the special conditions set forth below are complied with, the proposal will meet the requirements of chs. NR 500-538, Wis. Adm. Code.

CONCLUSIONS OF LAW

1. The Department has authority under s. 289.30(6), Stats., to modify a plan of operation approval if the modification would not inhibit compliance with the applicable portions of chs. NR 500-538, Wis. Adm. Code.
2. The Department has authority to approve a plan of operation approval modification with special conditions if the conditions are needed to ensure compliance with chs. NR 500-538, Wis. Adm. Code.
3. The conditions of this approval are needed to ensure compliance with chs. NR 500-538, Wis. Adm. Code.
4. In accordance with the foregoing, the Department has the authority under s. 289.30, Stats., to issue the following conditional plan of operation approval modification.

PLAN OF OPERATION MODIFICATION APPROVAL

The Department hereby approves the proposed modification to the plan of operation for the Wisconsin Power and Light Columbia Dry Ash Landfill to allow the use of a rain cover system, subject to chs. NR 500- 538, Wis. Adm. Code and the following:

1. For future modules, the preconstruction report shall contain the storm water calculations performed to determine if a rain cover is needed or not.
2. If a rain cover is required in a module, the preconstruction report shall contain the rain cover product identification, material properties, and installation recommendations from the manufacturer.
3. If a rain cover is required in a module, the installed limits of the rain cover shall be surveyed and provided along with photographic documentation of the installation in the construction documentation report for each module, or as an addendum to the construction documentation report.

The Department retains the right to require the submittal of additional information or to modify this approval at any time if, in the Department's opinion, further modifications are necessary. Unless specifically stated, the conditions of this approval modification do not supersede or replace any previous conditions of approval for this facility.

NOTICE OF APPEAL RIGHTS

If you believe you have a right to challenge this decision made by the Department, you should know that Wisconsin statutes and administrative codes establish time periods and requirements for reviewing Department decisions.

To seek judicial review of the Department's decision, sections 227.52 and 227.53, Stats., establish criteria for filing a petition for judicial review. You have 30 days after the decision is mailed or otherwise served by the Department to file your petition with the appropriate circuit court and serve the petition on the Department. The petition shall name the Department of Natural Resources as the respondent.

Dated: June 6, 2018

DEPARTMENT OF NATURAL RESOURCES
For the Secretary



Cynthia Moore
Cynthia Moore
Waste and Materials Management Program
South Central Region



Ann M. Bekta
Ann M. Bekta, P.E.
Waste Management Engineer
South Central Region

Attachment B

Leachate/Surface Water Pond Capacity Evaluation

Purpose:

The purpose of the leachate/surface water pond evaluation is to determine the following based on the as-built leachate/surface water pond top of liner elevation of 796.97 (see Background section below):

- The amount of intermediate/final cover area required with Module 5 and 6 constructed in order to maintain the peak water elevation resulting from the 25-year, 24-hour storm event at the maximum allowable 796.97.
- Based on the amount of intermediate/final cover area determined from the above, determine the maximum starting water elevations in the leachate/surface water pond to accommodate 1, 2, 5, and 10-year, 24-hour storm events without overtopping.

Background:

- During construction of Module 2, the top of the leachate/surface water pond liner was determined to be at elevation 796.97.
- Previous calculations submitted to the WDNR on January 30, 2018, evaluated the leachate/surface water pond capacity based on the as-built pond liner elevation.
- A similar evaluation was performed for Module 3 and 4 construction that produced a chart of maximum leachate/surface water pond starting elevations vs. rainfall storage capacity.
- Portions of Modules 1, 2, and 3 currently have final or intermediate cover in place (see **Figure 1**).

Approach:

- Use the previously developed HydroCAD storm water model from Module 4 construction to model the below three scenarios.
 1. Scenario 1 – Assume a rain cover is in place over 50% of Module 5 and 100% of Module 6, resulting in the remaining 50% of Module 5 contributing to the leachate/surface water pond.
 2. Scenario 2 – Assume all of Module 5 is contributing to the leachate/surface water pond, while Module 6 is still under the rain cover.
 3. Scenario 3 – Assume a rain cover is in place over 50% of Module 6, resulting in 50% of Module 6 contributing to the leachate/surface water pond.
 4. Scenario 4 – Assume all of Module 6 is contributing to the leachate/surface water pond

Assumptions:

- Ash surfaces and intermediate cover areas were assumed to be impermeable (CN=98).
- The top of pond liner elevation is 796.97 (see Background section).
- Time of Concentration is 20 minutes for open areas.

Results:

- Scenario 1 - with 50% of Module 5 contributing to the leachate/storm water pond:
 - The maximum allowable contributing area of landfill to the leachate/surface water pond is 4.47 acres for the leachate/surface water pond to accommodate the runoff from a 25-year, 24-hour storm without overtopping.
 - The remainder of landfill (1.98 acres) would need to be closed/covered with final or intermediate cover and routed away from the pond.
 - Figure 1** shows a conceptual 1.98 acres of additional cover, and **Figure 1a** shows the various operating levels of the leachate/surface water pond to accommodate the various storm events with the additional cover in place.
- Scenario 2 - with 100% of Module 5 contributing to the leachate/storm water pond:
 - The maximum allowable contributing area of landfill to the leachate/surface water pond is 2.42 acres for the leachate/surface water pond to accommodate the runoff from a 25-year, 24-hour storm without overtopping.
 - The remainder of landfill (4.03 acres) would need to be closed/covered with final or intermediate cover and routed away from the pond.
 - Figure 2** shows a conceptual 4.03 acres of additional cover, and **Figure 2a** shows the various operating levels of the leachate/surface water pond to accommodate the various storm events with the additional cover in place.
- Scenario 3 - with 50% of Module 6 contributing to the leachate/storm water pond:
 - The maximum allowable contributing area of landfill to the leachate/surface water pond is 4.64 acres for the leachate/surface water pond to accommodate the runoff from a 25-year, 24-hour storm without overtopping.
 - The remainder of landfill (6.07 acres) would need to be closed/covered with final or intermediate cover and routed away from the pond.
 - Figure 3** shows a conceptual 6.07 acres of additional cover, and **Figure 3a** shows the various operating levels of the leachate/surface water pond to accommodate the various storm events with the additional cover in place.
- Scenario 4 - with 100% of Module 6 contributing to the leachate/storm water pond:
 - The maximum allowable contributing area of landfill to the leachate/surface water pond is 2.74 acres for the leachate/surface water pond to accommodate the runoff from a 25-year, 24-hour storm without overtopping.
 - The remainder of landfill (7.97 acres) would need to be closed/covered with final or intermediate cover and routed away from the pond.

Job No. 25220183.00

CALC. NO.

Job: Columbia Energy Center

REV. NO.

Client WPL

BY RJG DATE 02/10/21

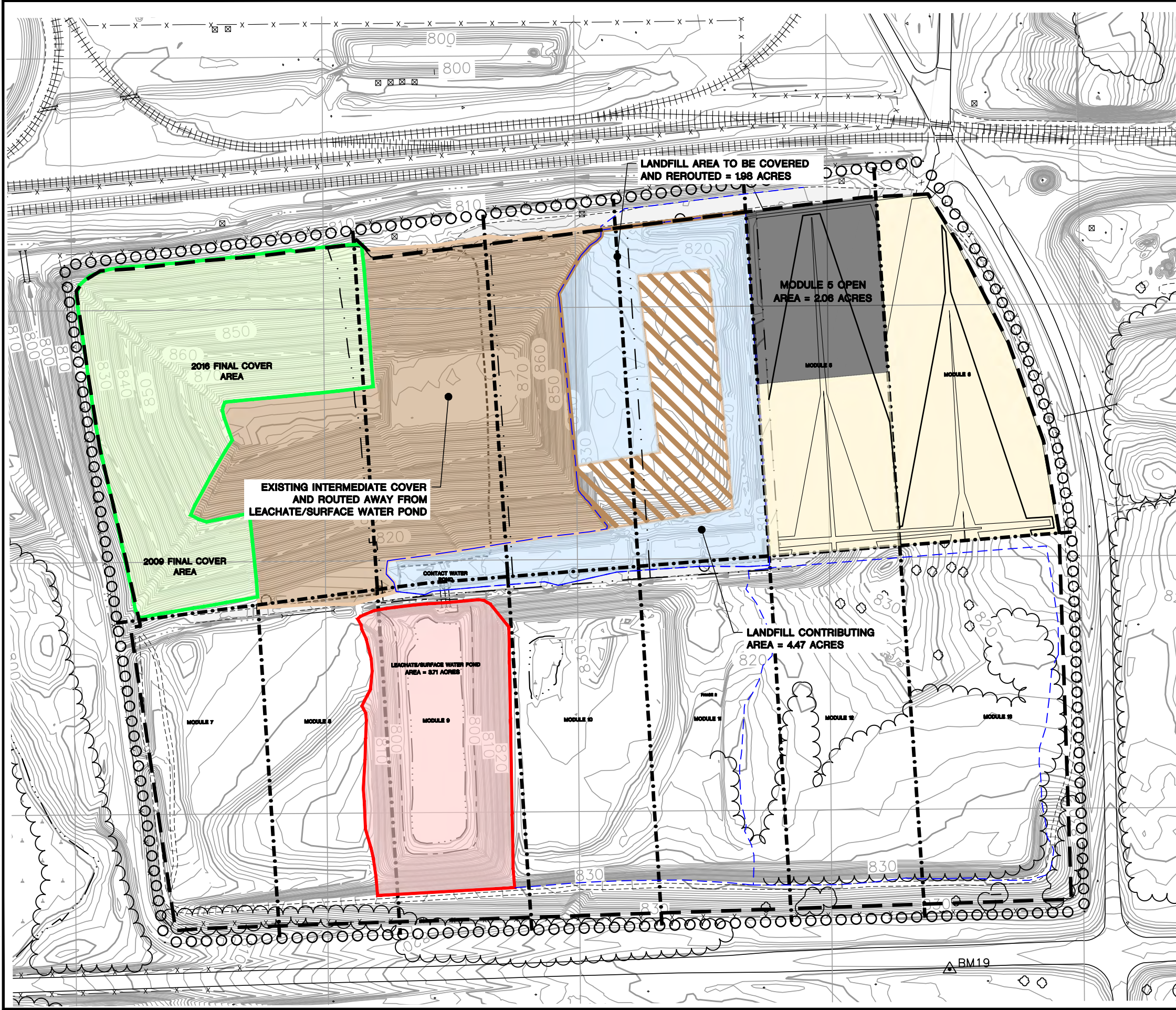
Subject Module 5/6 - Leachate/Surface Water Pond Evaluation

CHK'D. MH DATE 3/1/21

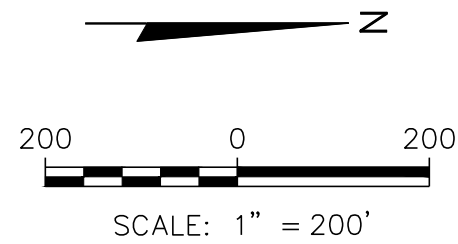
- **Figure 4** shows a conceptual 7.97 acres of additional cover, and **Figure 4a** shows the various operating levels of the leachate/surface water pond to accommodate the various storm events with the additional cover in place.

The HydroCAD reports for each scenario and storm event modeled are attached.

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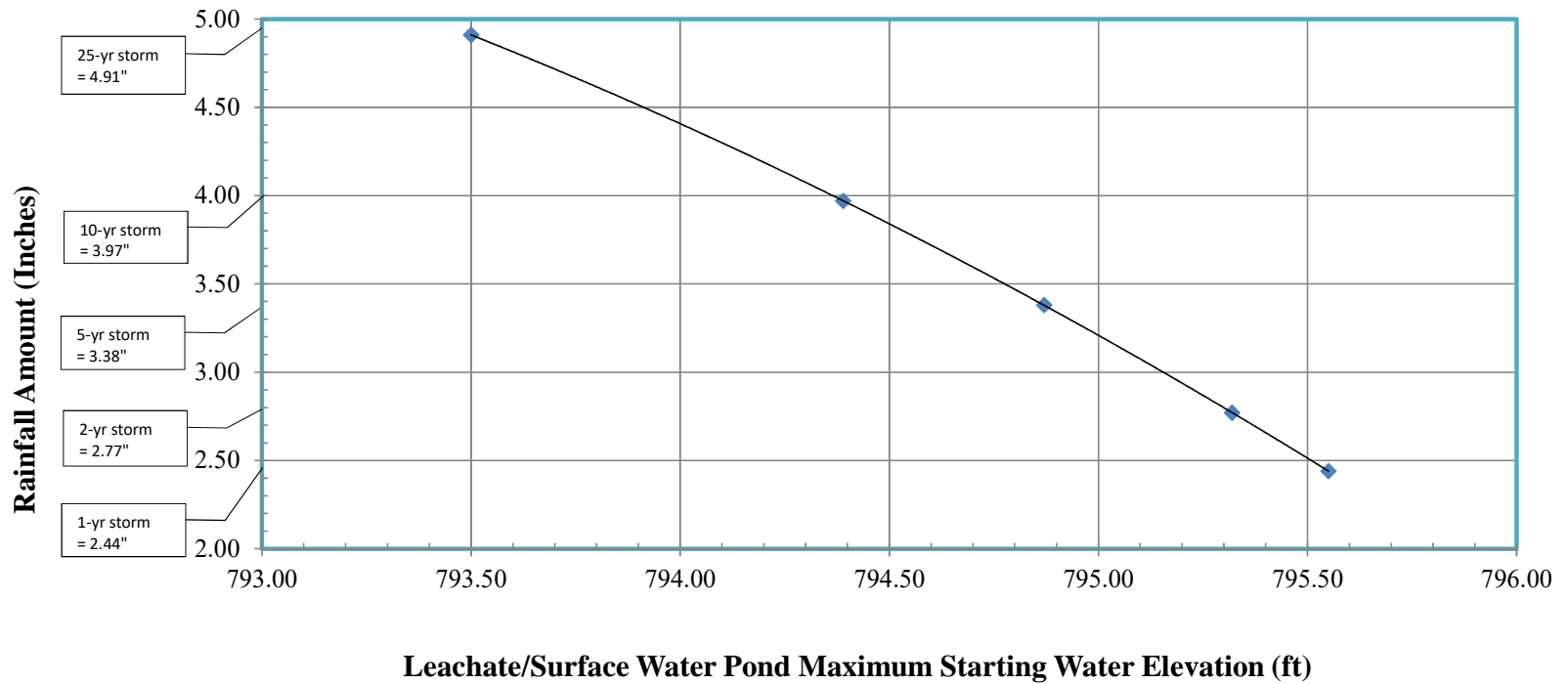


- LEGEND**
- DRY ASH DISPOSAL FACILITY LIMITS
 - — — — — APPROVED LIMITS OF WASTE
 - · · · · PROPOSED MODULE LIMIT
 - — — — — EXISTING GRADE (2' CONTOUR)
 - — — — — 690 EXISTING GRADE (10' CONTOUR)
 - · - · - · EDGE OF WATER (APPROXIMATE)
 - █ EXISTING FINAL COVER AREA
 - █ EXISTING INTERMEDIATE COVER AND ROUTED AWAY FROM POND
 - █ LEACHATE/SURFACE WATER POND CONTRIBUTING AREA
 - █ LANDFILL CONTRIBUTING AREA
 - █ MODULE 5 CONTRIBUTING AREA
 - █ AREA TO BE COVERED/REROUTED
 - █ MODULE 5 AND 6 COVERED WITH RAIN COVER



CLIENT LOGO IF AVAILABLE	WISCONSIN POWER AND LIGHT COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WISCONSIN 53954	COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WISCONSIN 53954	LEACHATE/SURFACE WATER POND EVALUATION SCENARIO 1	FIGURE 1
	PROJECT NO. 25220183.00	DRAWN BY: R/JG	ENGINEER	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830
DRAWN: 02/11/21	CHECKED BY: PG			
REVISED: 03/01/21	APPROVED BY:			

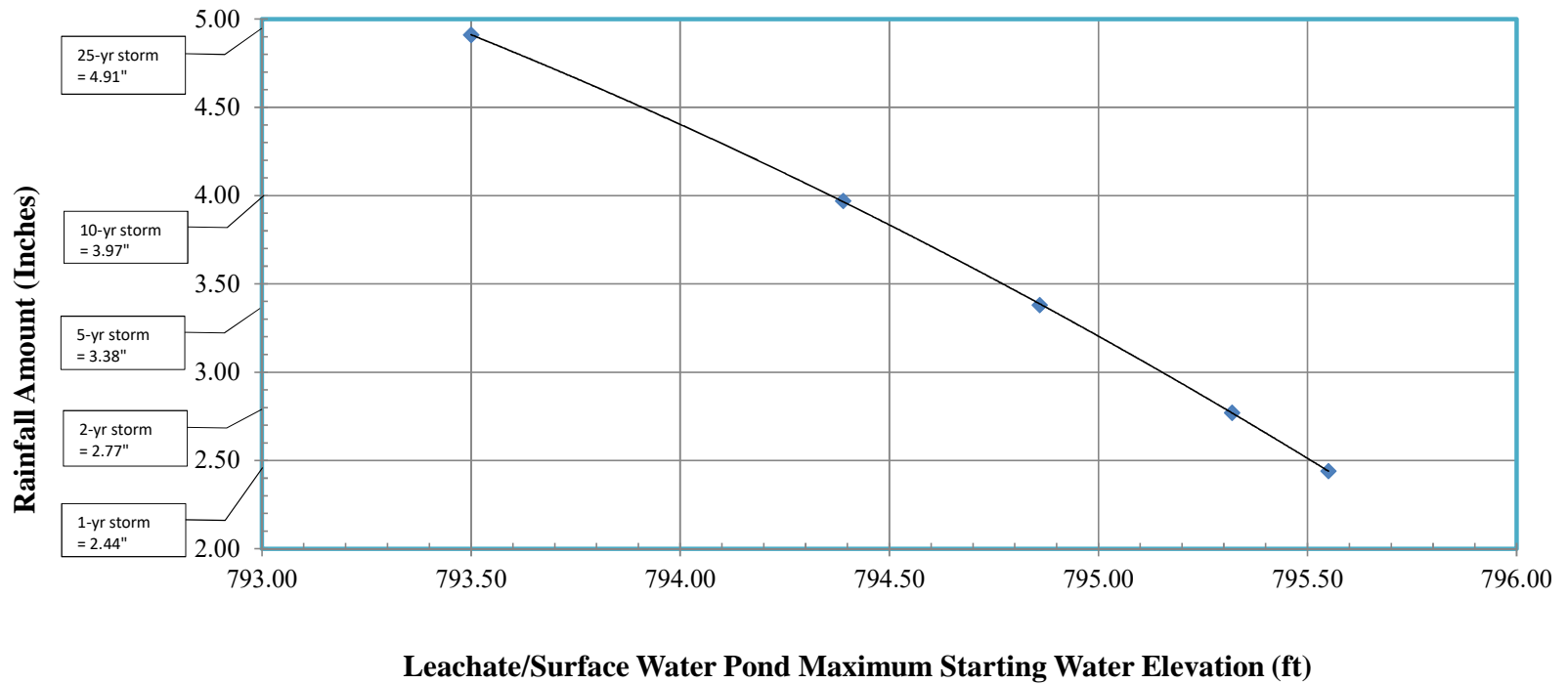
Figure 1A
Columbia Energy Center
Scenario 1 - Module 5 50% Open
Leachate/Surface Water Pond Maximum Starting Water Elevation



Notes/Assumptions:

1. Maximum starting water elevations based on 2011 Mod 2 as-built survey which determined the top of pond liner elevation = 796.97.
2. Maximum starting water elevation assumes no freeboard.
3. Previously developed HydroCAD model utilized with curve number for intermediate cover areas and ash surfaces assumed at CN = 98.
4. HydroCAD model assumes drainage areas contributing to pond include (refer to Leachate/Surface Water Pond Evaluation figure dated 11/28/17):
 - Mod 5 open area = 50% of module = 2.06 acres.
 - Landfill open area = 4.47 acres (previously open/contributing area [6.45 acres] - required closure/rerouted area [1.98 acres]).
 - Leachate/Surface Water Pond Area, 3.71 acres.

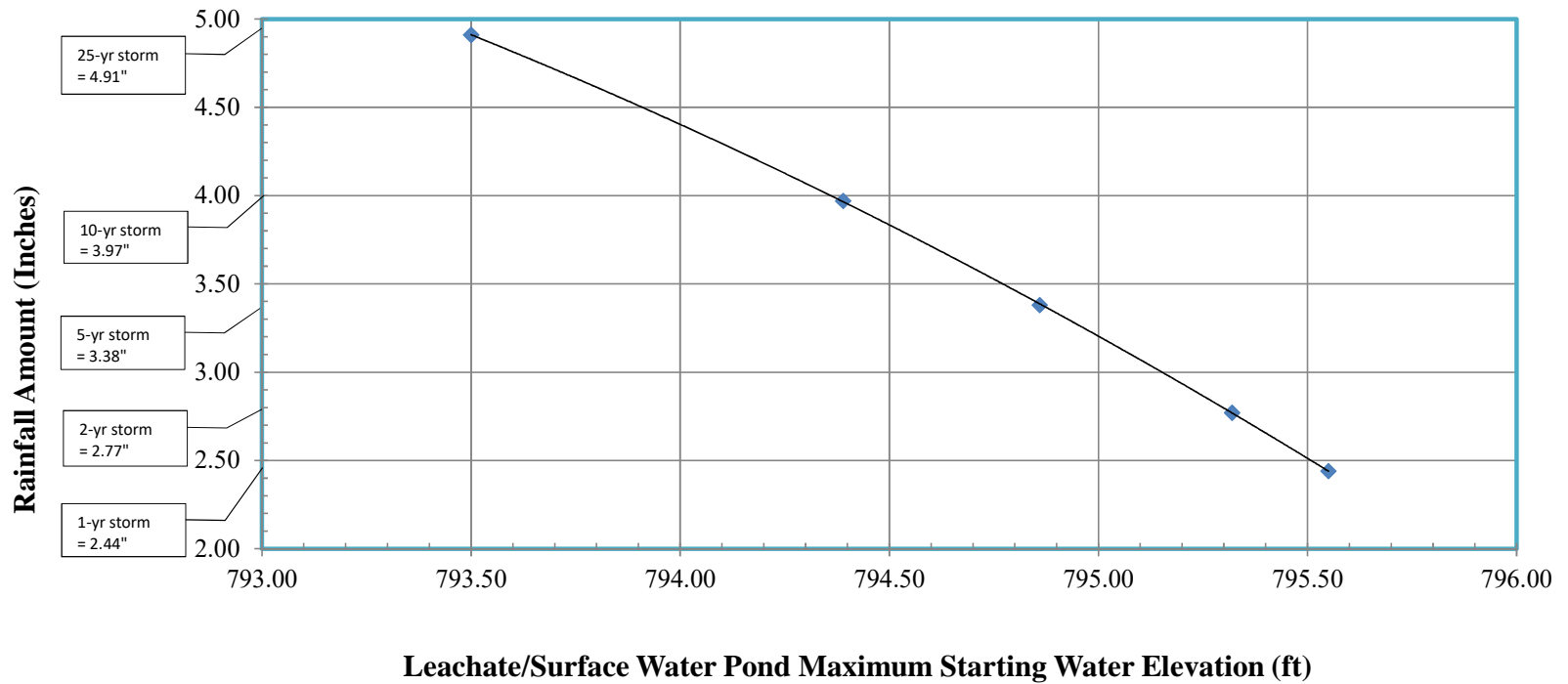
Figure 2A
Columbia Energy Center
Scenario 2 - Module 5 100% Open
Leachate/Surface Water Pond Maximum Starting Water Elevation



Notes/Assumptions:

1. Maximum starting water elevations based on 2011 Mod 2 as-built survey which determined the top of pond liner elevation = 796.97.
2. Maximum starting water elevation assumes no freeboard.
3. Previously developed HydroCAD model utilized with curve number for intermediate cover areas and ash surfaces assumed at CN = 98.
4. HydroCAD model assumes drainage areas contributing to pond include (refer to Leachate/Surface Water Pond Evaluation figure dated 11/2/17):
 - Mod 5 open area = 100% of module = 4.12 acres.
 - Landfill open area = 2.42 acres (previously open/contributing area [6.45 acres] -require closure/rerouted area [4.03 acres]).
 - Leachate/Surface Water Pond Area, 3.71 acres.

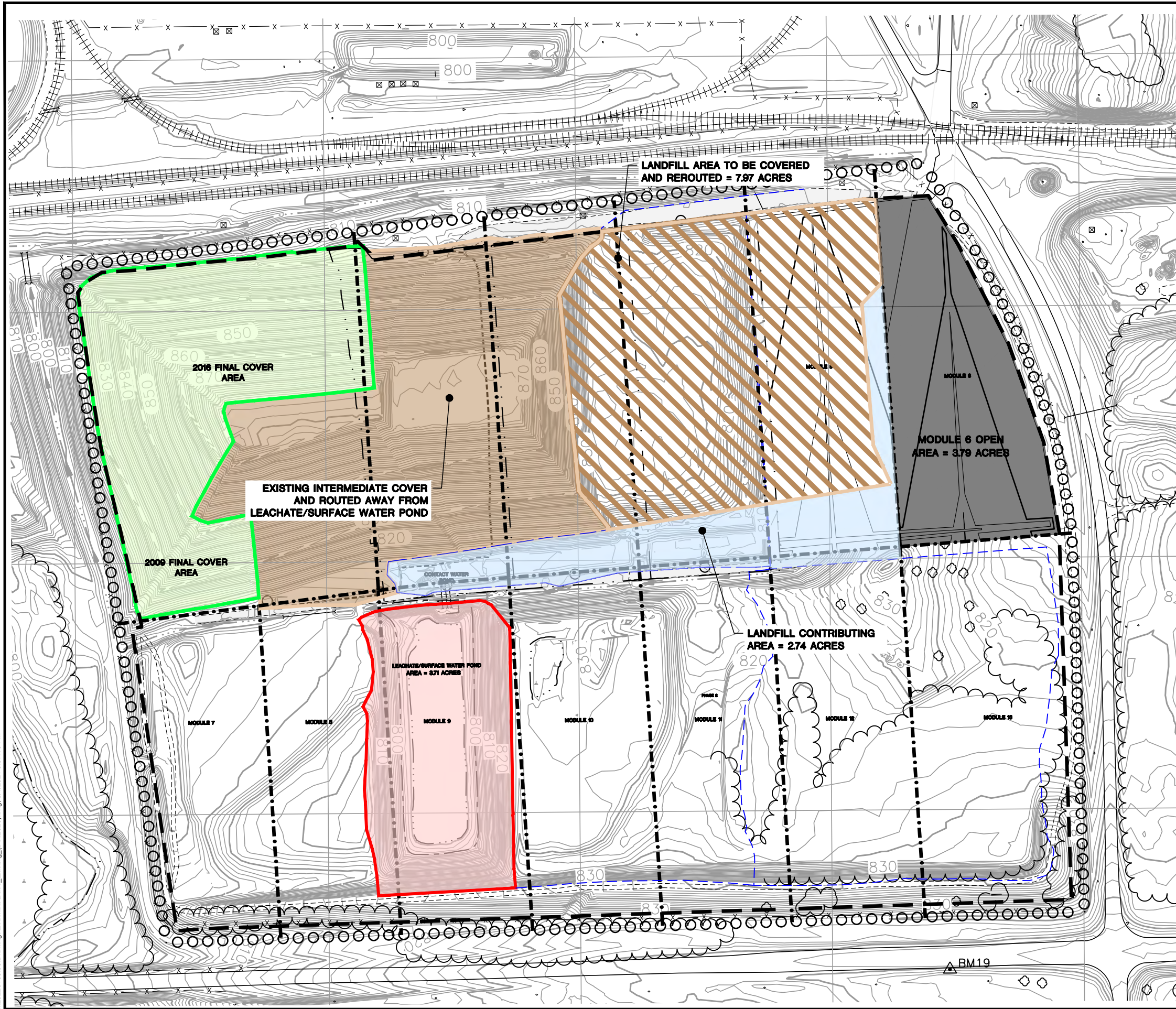
Figure 3A
Columbia Energy Center
Scenario 3 - Module 6 50% Open
Leachate/Surface Water Pond Maximum Starting Water Elevation



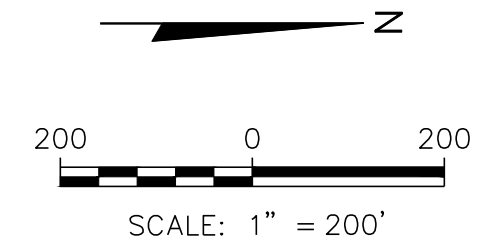
Notes/Assumptions:

1. Maximum starting water elevations based on 2011 Mod 2 as-built survey which determined the top of pond liner elevation = 796.97.
2. Maximum starting water elevation assumes no freeboard.
3. Previously developed HydroCAD model utilized with curve number for intermediate cover areas and ash surfaces assumed at CN = 98.
4. HydroCAD model assumes drainage areas contributing to pond include (refer to Leachate/Surface Water Pond Evaluation figure dated 11/2/17):
 - Mod 6 open area = 50% of module = 1.895 acres.
 - Landfill open area = 4.64 acres (previously open/contributing area and Mod 5 [10.71 acres] -require closure/rerouted area [6.07 acres]).
 - Leachate/Surface Water Pond Area, 3.71 acres.

I:\2520183.00\Drawings\Leachate\Base_Existing_(Dec2020).dwg, 3/1/2021 8:57:16 PM

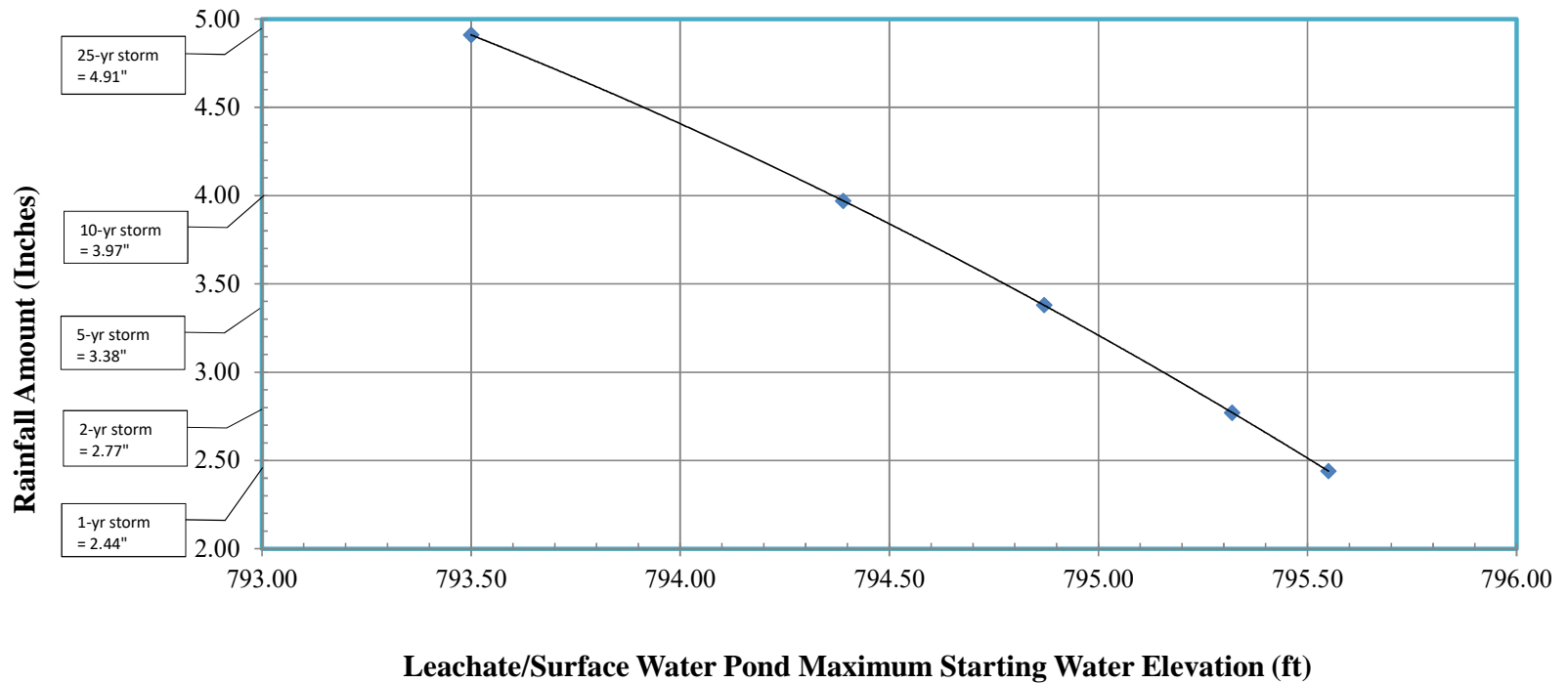


- LEGEND**
- ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ DRY ASH DISPOSAL FACILITY LIMITS
 - — — — — APPROVED LIMITS OF WASTE
 - · - · - · - · - · - · PROPOSED MODULE LIMIT
 - — — — — EXISTING GRADE (2' CONTOUR)
 - 690 — — — — — EXISTING GRADE (10' CONTOUR)
 - · - · - · - · - · - · EDGE OF WATER (APPROXIMATE)
 - [Green Box] EXISTING FINAL COVER AREA
 - [Brown Box] EXISTING INTERMEDIATE COVER AND ROUTED AWAY FROM POND
 - [Red Box] LEACHATE/SURFACE WATER POND CONTRIBUTING AREA
 - [Light Blue Box] LANDFILL CONTRIBUTING AREA
 - [Dark Grey Box] MODULE 6 CONTRIBUTING AREA
 - [Hatched Box] AREA TO BE COVERED/REROUTED



CLIENT LOGO IF AVAILABLE WISCONSIN POWER AND LIGHT COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WISCONSIN 53954		COLUMBIA ENERGY CENTER W8375 MURRAY ROAD PARDEEVILLE, WISCONSIN 53954		LEACHATE/SURFACE WATER POND EVALUATION SCENARIO 4	
PROJECT NO:	25220183.00	DRAWN BY:	RJG	ENGINEER	
DRAWN:	02/17/21	CHECKED BY:	PG	SCS ENGINEERS	
REVISED:	03/01/21	APPROVED BY:		2830 DAIRY DRIVE MADISON, WI 53718-6751	
				PHONE: (608) 224-2830	
FIGURE 4					

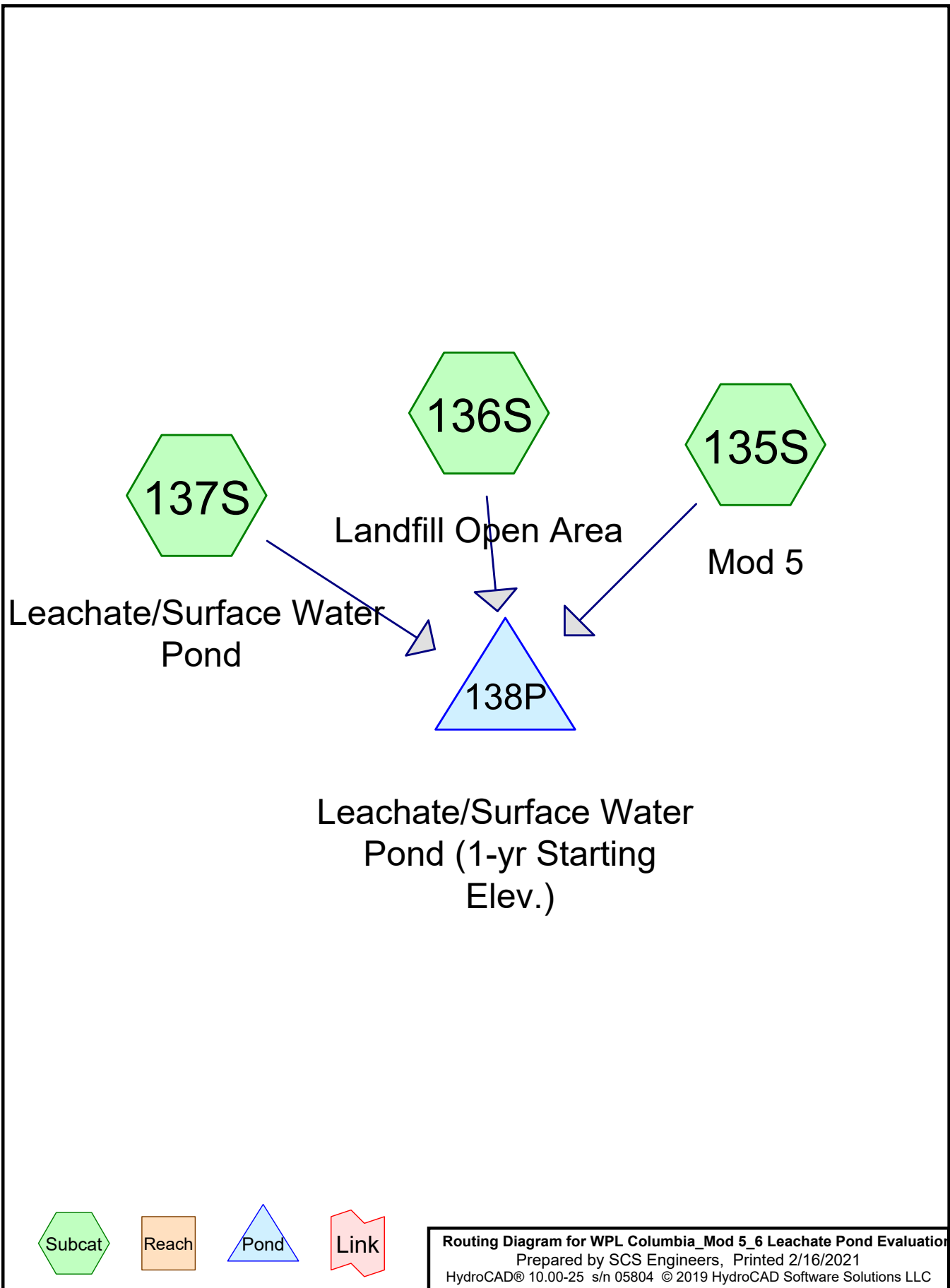
Figure 4A
Columbia Energy Center
Scenario 3 - Module 6 50% Open
Leachate/Surface Water Pond Maximum Starting Water Elevation



Notes/Assumptions:

1. Maximum starting water elevations based on 2011 Mod 2 as-built survey which determined the top of pond liner elevation = 796.97.
2. Maximum starting water elevation assumes no freeboard.
3. Previously developed HydroCAD model utilized with curve number for intermediate cover areas and ash surfaces assumed at CN = 98.
4. HydroCAD model assumes drainage areas contributing to pond include (refer to Leachate/Surface Water Pond Evaluation figure dated 11/2/17):
 - Mod 6 open area = 100% of module = 3.79 acres.
 - Landfill open area = 2.74 acres (previously open/contributing area and Mod 5 [10.71 acres] -require closure/rerouted area [7.97 acres]).
 - Leachate/Surface Water Pond Area, 3.71 acres.

Scenario 1



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 135S: Mod 5	Runoff Area=2.060 ac 100.00% Impervious Runoff Depth=2.21" Tc=20.0 min CN=98 Runoff=4.11 cfs 0.380 af
Subcatchment 136S: Landfill Open Area	Runoff Area=4.470 ac 100.00% Impervious Runoff Depth=2.21" Tc=20.0 min CN=98 Runoff=8.91 cfs 0.824 af
Subcatchment 137S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=2.21" Tc=0.0 min CN=98 Runoff=12.92 cfs 0.684 af
Pond 138P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,576 cf Inflow=18.52 cfs 1.887 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.240 ac Runoff Volume = 1.887 af Average Runoff Depth = 2.21"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.240 ac

Summary for Subcatchment 135S: Mod 5

Runoff = 4.11 cfs @ 12.29 hrs, Volume= 0.380 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 2.060	98	Ash
2.060		100.00% Impervious Area

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

Summary for Subcatchment 136S: Landfill Open Area

Runoff = 8.91 cfs @ 12.29 hrs, Volume= 0.824 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 4.470	98	Mod 4 Allowable Open Area
4.470		100.00% Impervious Area

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

Summary for Subcatchment 137S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 12.92 cfs @ 12.04 hrs, Volume= 0.684 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Pond 138P: Leachate/Surface Water Pond (1-yr Starting Elev.)

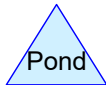
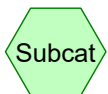
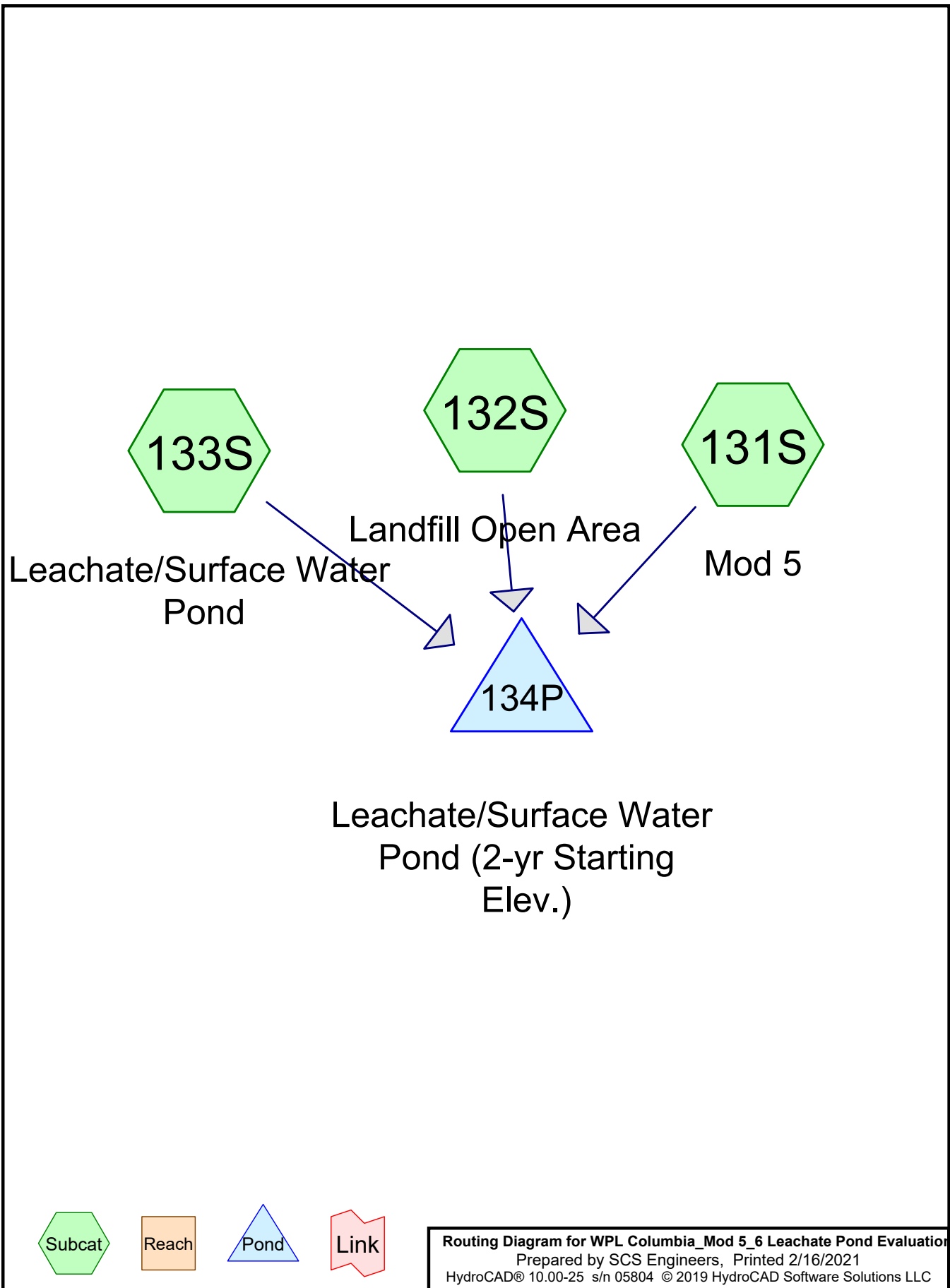
Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 2.21" for 1-yr, 24-hr storm event
 Inflow = 18.52 cfs @ 12.05 hrs, Volume= 1.887 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.55' Surf.Area= 53,339 sf Storage= 115,388 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,582 sf Storage= 197,576 cf (82,188 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (82,260 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 131S: Mod 5	Runoff Area=2.060 ac 100.00% Impervious Runoff Depth=2.54" Tc=20.0 min CN=98 Runoff=4.69 cfs 0.436 af
Subcatchment 132S: Landfill Open Area	Runoff Area=4.470 ac 100.00% Impervious Runoff Depth=2.54" Tc=20.0 min CN=98 Runoff=10.17 cfs 0.946 af
Subcatchment 133S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=2.54" Tc=0.0 min CN=98 Runoff=14.73 cfs 0.785 af
Pond 134P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,716 cf Inflow=21.13 cfs 2.167 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.240 ac Runoff Volume = 2.167 af Average Runoff Depth = 2.54"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.240 ac

Summary for Subcatchment 131S: Mod 5

Runoff = 4.69 cfs @ 12.29 hrs, Volume= 0.436 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 2.060	98	Ash
2.060		100.00% Impervious Area

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

Summary for Subcatchment 132S: Landfill Open Area

Runoff = 10.17 cfs @ 12.29 hrs, Volume= 0.946 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 4.470	98	Mod 4 Allowable Open Area
4.470		100.00% Impervious Area

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

Summary for Subcatchment 133S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.73 cfs @ 12.04 hrs, Volume= 0.785 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Pond 134P: Leachate/Surface Water Pond (2-yr Starting Elev.)

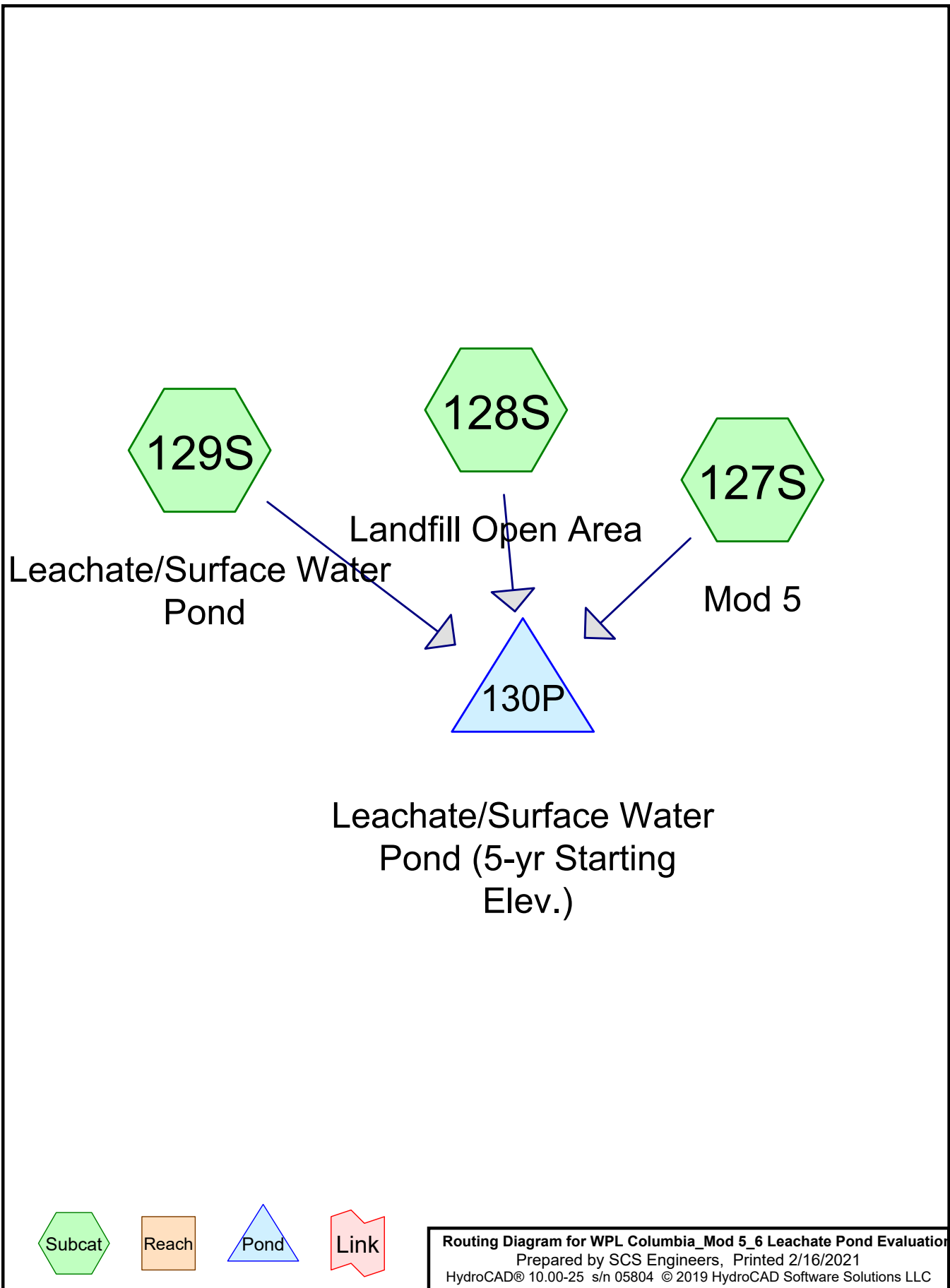
Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 2.54" for 2-yr, 24-hr storm event
 Inflow = 21.13 cfs @ 12.05 hrs, Volume= 2.167 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.32' Surf.Area= 51,527 sf Storage= 103,328 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,593 sf Storage= 197,716 cf (94,388 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (94,319 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 127S: Mod 5	Runoff Area=2.060 ac 100.00% Impervious Runoff Depth=3.15" Tc=20.0 min CN=98 Runoff=5.75 cfs 0.540 af
Subcatchment 128S: Landfill Open Area	Runoff Area=4.470 ac 100.00% Impervious Runoff Depth=3.15" Tc=20.0 min CN=98 Runoff=12.48 cfs 1.172 af
Subcatchment 129S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.15" Tc=0.0 min CN=98 Runoff=18.06 cfs 0.973 af
Pond 130P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,910 cf Inflow=25.94 cfs 2.685 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.240 ac Runoff Volume = 2.685 af Average Runoff Depth = 3.15"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.240 ac

Summary for Subcatchment 127S: Mod 5

Runoff = 5.75 cfs @ 12.29 hrs, Volume= 0.540 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 2.060	98	Ash
2.060		100.00% Impervious Area

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

Summary for Subcatchment 128S: Landfill Open Area

Runoff = 12.48 cfs @ 12.29 hrs, Volume= 1.172 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 4.470	98	Mod 4 Allowable Open Area
4.470		100.00% Impervious Area

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

Summary for Subcatchment 129S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 18.06 cfs @ 12.04 hrs, Volume= 0.973 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Pond 130P: Leachate/Surface Water Pond (5-yr Starting Elev.)

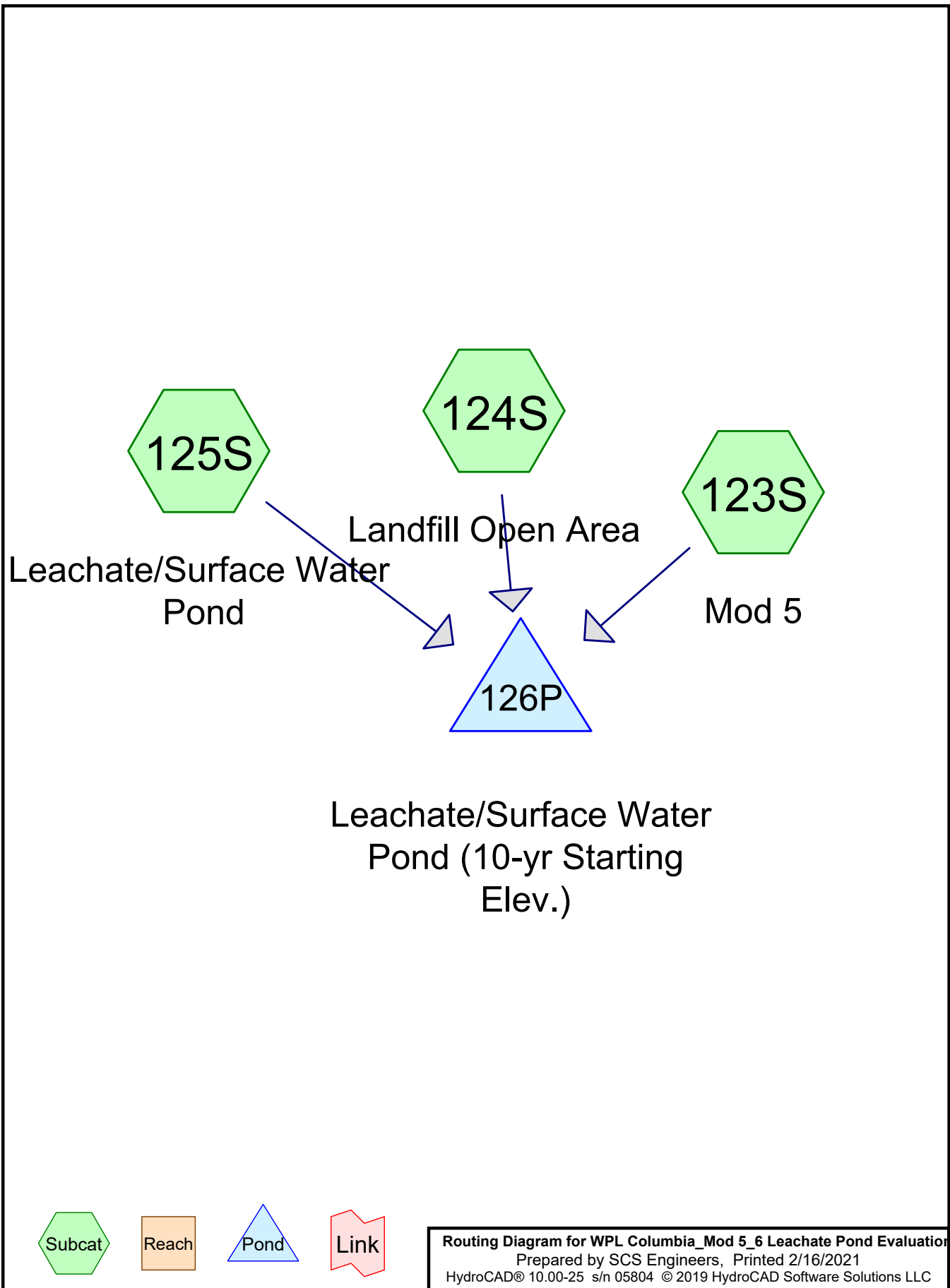
Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 3.15" for 5-yr, 24-hr storm event
 Inflow = 25.94 cfs @ 12.05 hrs, Volume= 2.685 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.87' Surf.Area= 47,981 sf Storage= 80,939 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,608 sf Storage= 197,910 cf (116,972 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (116,709 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 123S: Mod 5	Runoff Area=2.060 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=6.78 cfs 0.641 af
Subcatchment 124S: Landfill Open Area	Runoff Area=4.470 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=14.70 cfs 1.391 af
Subcatchment 125S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.74" Tc=0.0 min CN=98 Runoff=21.27 cfs 1.155 af
Pond 126P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,655 cf Inflow=30.59 cfs 3.187 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.240 ac Runoff Volume = 3.187 af Average Runoff Depth = 3.74"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.240 ac

Summary for Subcatchment 123S: Mod 5

Runoff = 6.78 cfs @ 12.29 hrs, Volume= 0.641 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 2.060	98	Ash
2.060		100.00% Impervious Area

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

Summary for Subcatchment 124S: Landfill Open Area

Runoff = 14.70 cfs @ 12.29 hrs, Volume= 1.391 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 4.470	98	Mod 4 Allowable Open Area
4.470		100.00% Impervious Area

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

Summary for Subcatchment 125S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.27 cfs @ 12.04 hrs, Volume= 1.155 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Pond 126P: Leachate/Surface Water Pond (10-yr Starting Elev.)

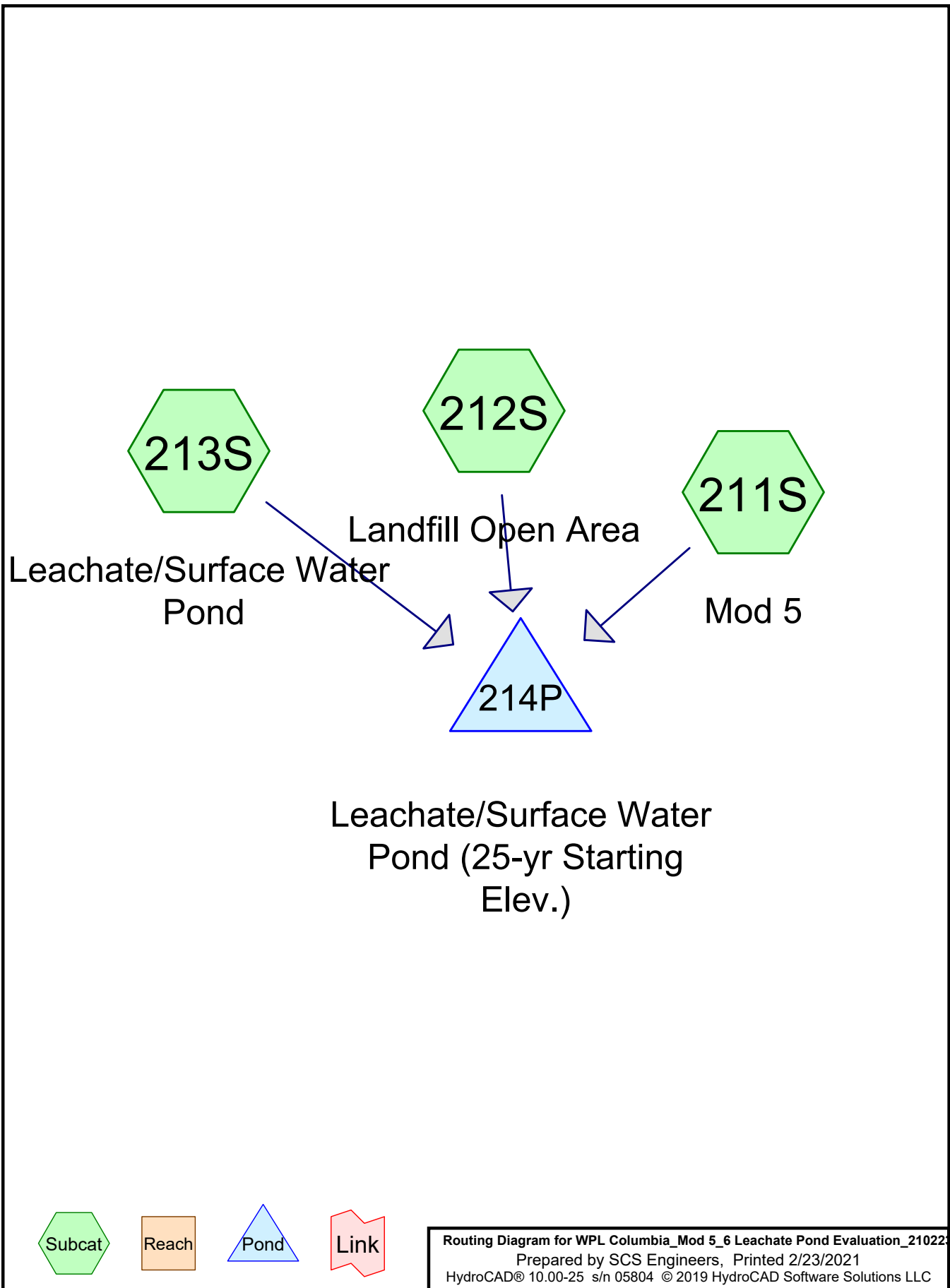
Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 30.59 cfs @ 12.05 hrs, Volume= 3.187 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.39' Surf.Area= 44,199 sf Storage= 58,815 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,588 sf Storage= 197,655 cf (138,840 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (138,832 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Summary for Pond 214P: Leachate/Surface Water Pond (25-yr Starting Elev.)

Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 37.96 cfs @ 12.05 hrs, Volume= 3.988 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 793.50' Surf.Area= 31,107 sf Storage= 24,119 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,602 sf Storage= 197,830 cf (173,712 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (173,529 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654

Summary for Subcatchment 211S: Mod 5

Runoff = 8.41 cfs @ 12.28 hrs, Volume= 0.802 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 2.060	98	Ash
2.060		100.00% Impervious Area

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

Summary for Subcatchment 212S: Landfill Open Area

Runoff = 18.24 cfs @ 12.28 hrs, Volume= 1.741 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 4.470	98	Mod 4 Allowable Open Area
4.470		100.00% Impervious Area

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

Summary for Subcatchment 213S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

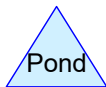
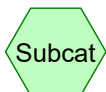
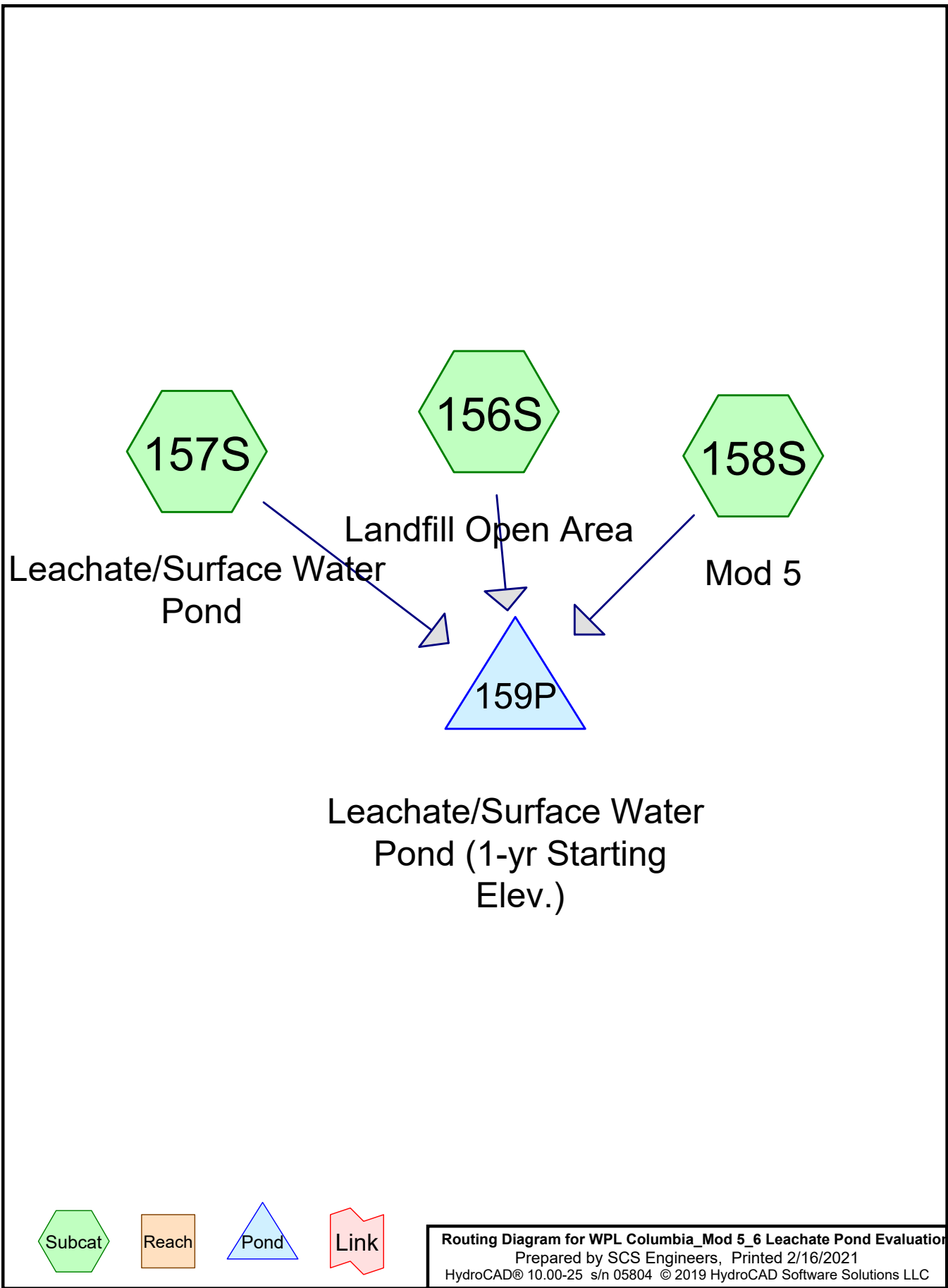
Runoff = 26.38 cfs @ 12.04 hrs, Volume= 1.445 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Scenario 2



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 156S: Landfill Open Area	Runoff Area=2.417 ac 100.00% Impervious Runoff Depth=2.21" Tc=20.0 min CN=98 Runoff=4.82 cfs 0.445 af
Subcatchment 157S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=2.21" Tc=0.0 min CN=98 Runoff=12.92 cfs 0.684 af
Subcatchment 158S: Mod 5	Runoff Area=4.120 ac 100.00% Impervious Runoff Depth=2.21" Tc=20.0 min CN=98 Runoff=8.22 cfs 0.759 af
Pond 159P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,632 cf Inflow=18.52 cfs 1.888 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.247 ac Runoff Volume = 1.888 af Average Runoff Depth = 2.21"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.247 ac

Summary for Subcatchment 156S: Landfill Open Area

Runoff = 4.82 cfs @ 12.29 hrs, Volume= 0.445 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 2.417	98	Mod 4 Allowable Open Area
2.417		100.00% Impervious Area

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

Summary for Subcatchment 157S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 12.92 cfs @ 12.04 hrs, Volume= 0.684 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 158S: Mod 5

Runoff = 8.22 cfs @ 12.29 hrs, Volume= 0.759 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 4.120	98	Ash
4.120		100.00% Impervious Area

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

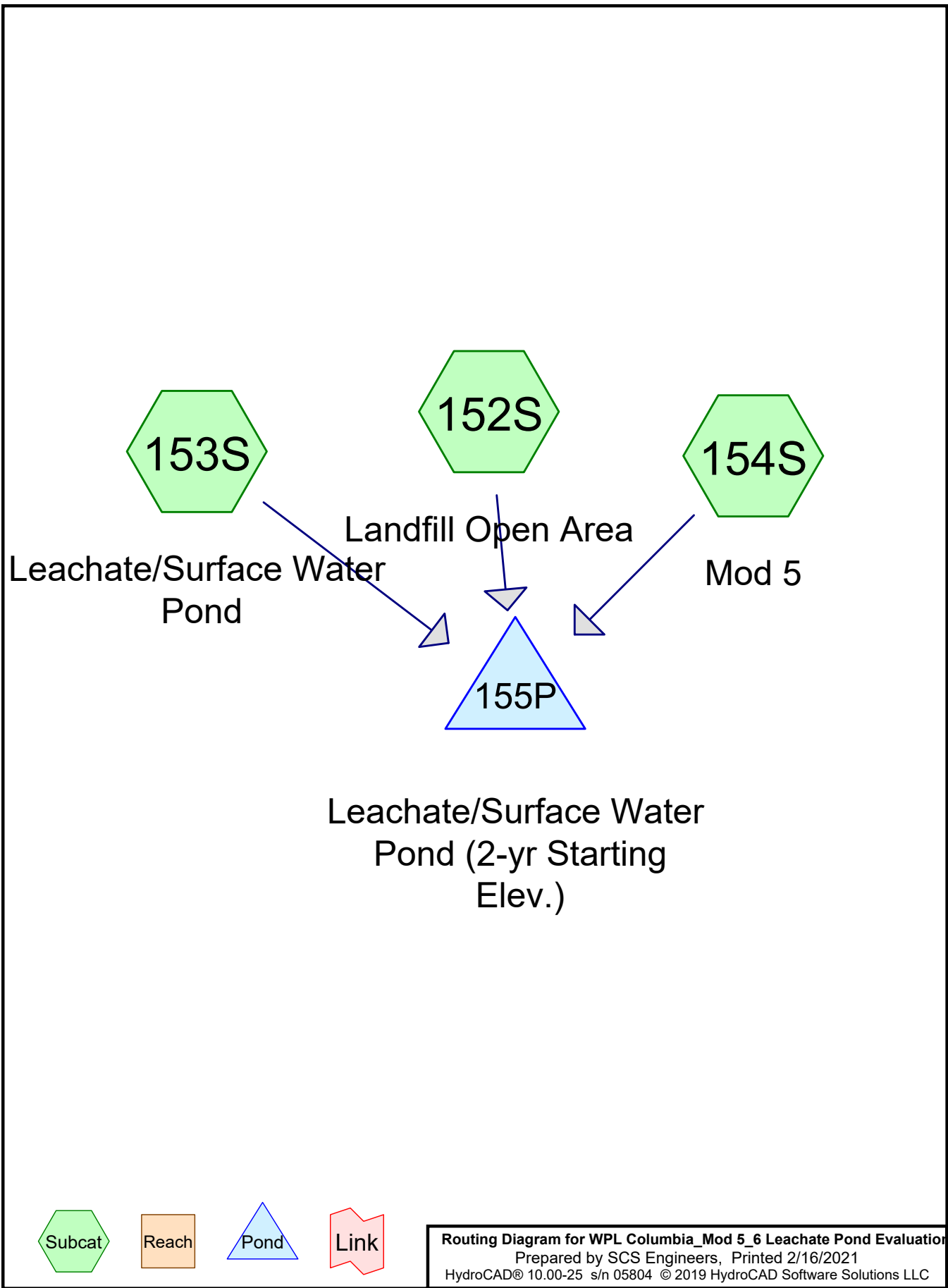
Summary for Pond 159P: Leachate/Surface Water Pond (1-yr Starting Elev.)

Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 2.21" for 1-yr, 24-hr storm event
 Inflow = 18.52 cfs @ 12.05 hrs, Volume= 1.888 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.55' Surf.Area= 53,339 sf Storage= 115,388 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,586 sf Storage= 197,632 cf (82,244 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (82,260 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 152S: Landfill Open Area	Runoff Area=2.417 ac 100.00% Impervious Runoff Depth=2.54" Tc=20.0 min CN=98 Runoff=5.50 cfs 0.511 af
Subcatchment 153S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=2.54" Tc=0.0 min CN=98 Runoff=14.73 cfs 0.785 af
Subcatchment 154S: Mod 5	Runoff Area=4.120 ac 100.00% Impervious Runoff Depth=2.54" Tc=20.0 min CN=98 Runoff=9.37 cfs 0.872 af
Pond 155P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,780 cf Inflow=21.14 cfs 2.168 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.247 ac Runoff Volume = 2.168 af Average Runoff Depth = 2.54"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.247 ac

Summary for Subcatchment 152S: Landfill Open Area

Runoff = 5.50 cfs @ 12.29 hrs, Volume= 0.511 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 2.417	98	Mod 4 Allowable Open Area
2.417		100.00% Impervious Area

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

Summary for Subcatchment 153S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.73 cfs @ 12.04 hrs, Volume= 0.785 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 154S: Mod 5

Runoff = 9.37 cfs @ 12.29 hrs, Volume= 0.872 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 4.120	98	Ash
4.120		100.00% Impervious Area

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

Summary for Pond 155P: Leachate/Surface Water Pond (2-yr Starting Elev.)

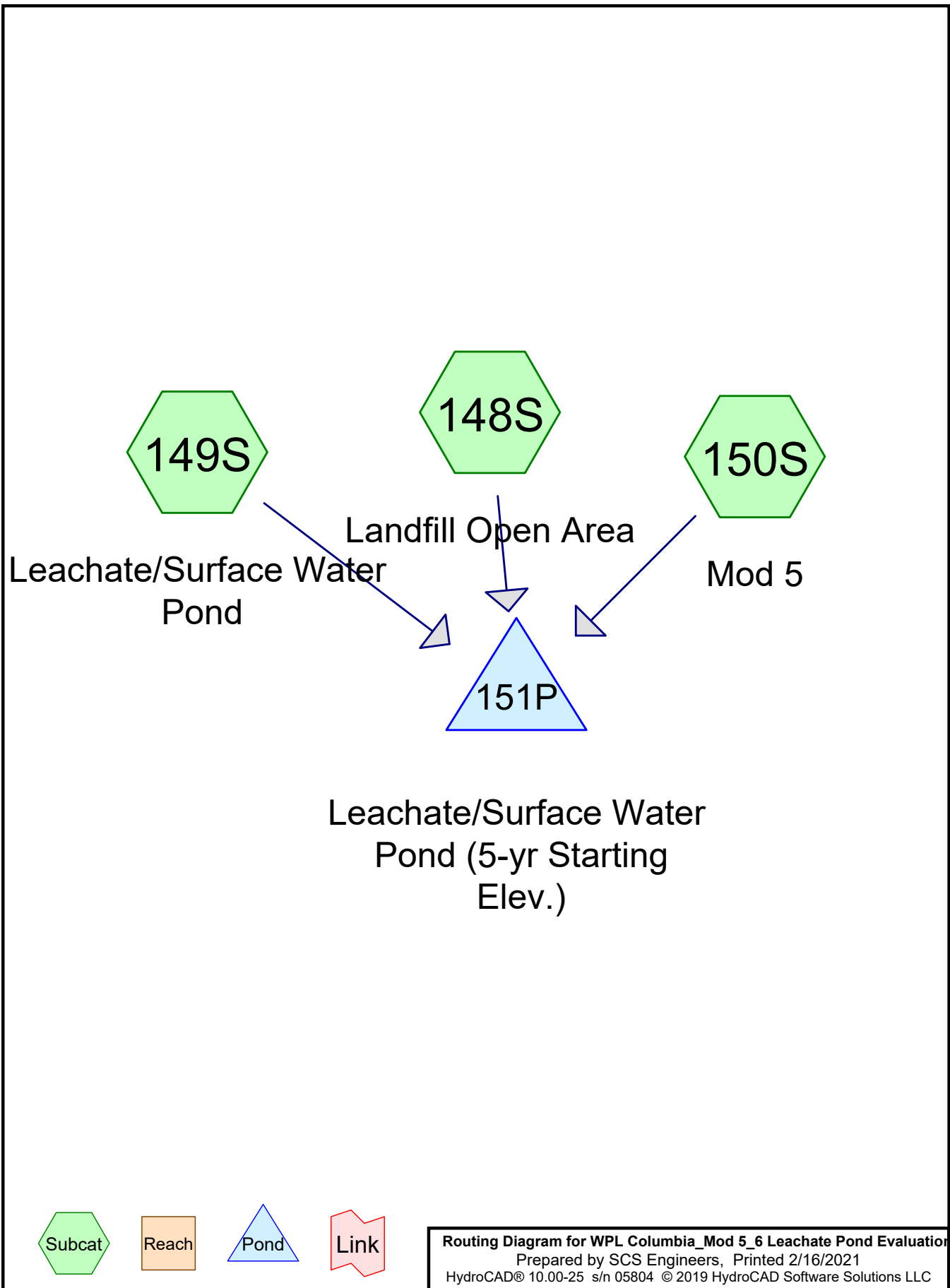
Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 2.54" for 2-yr, 24-hr storm event
 Inflow = 21.14 cfs @ 12.05 hrs, Volume= 2.168 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.32' Surf.Area= 51,527 sf Storage= 103,328 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,598 sf Storage= 197,780 cf (94,452 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (94,319 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 148S: Landfill Open Area	Runoff Area=2.417 ac 100.00% Impervious Runoff Depth=3.15" Tc=20.0 min CN=98 Runoff=6.75 cfs 0.634 af
Subcatchment 149S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.15" Tc=0.0 min CN=98 Runoff=18.06 cfs 0.973 af
Subcatchment 150S: Mod 5	Runoff Area=4.120 ac 100.00% Impervious Runoff Depth=3.15" Tc=20.0 min CN=98 Runoff=11.50 cfs 1.080 af
Pond 151P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,510 cf Inflow=25.95 cfs 2.687 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.247 ac Runoff Volume = 2.687 af Average Runoff Depth = 3.15"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.247 ac

Summary for Subcatchment 148S: Landfill Open Area

Runoff = 6.75 cfs @ 12.29 hrs, Volume= 0.634 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 2.417	98	Mod 4 Allowable Open Area
2.417		100.00% Impervious Area

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

Summary for Subcatchment 149S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 18.06 cfs @ 12.04 hrs, Volume= 0.973 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 150S: Mod 5

Runoff = 11.50 cfs @ 12.29 hrs, Volume= 1.080 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 4.120	98	Ash
4.120		100.00% Impervious Area

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

Summary for Pond 151P: Leachate/Surface Water Pond (5-yr Starting Elev.)

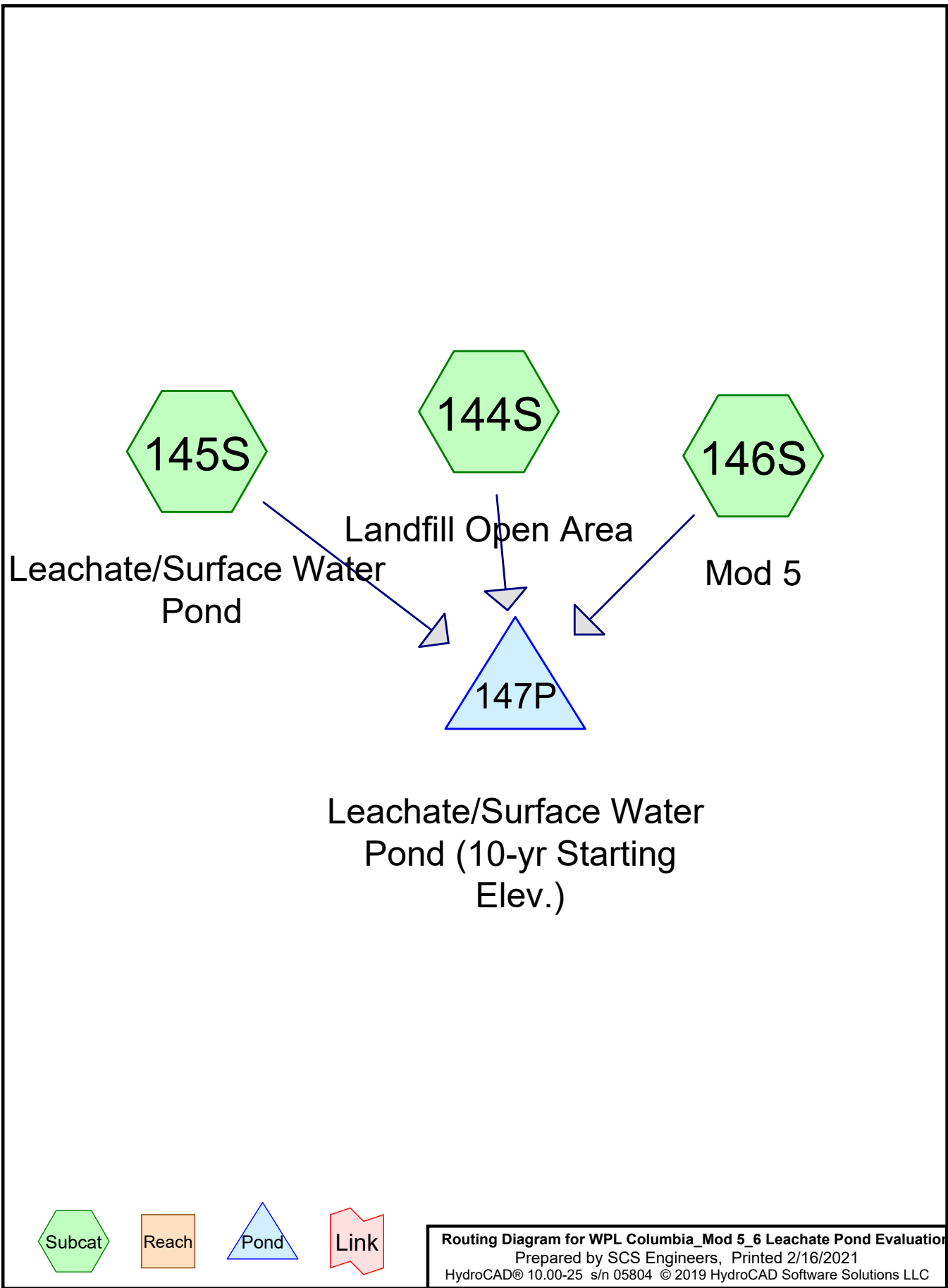
Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 3.15" for 5-yr, 24-hr storm event
 Inflow = 25.95 cfs @ 12.05 hrs, Volume= 2.687 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.86' Surf.Area= 47,902 sf Storage= 80,459 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,577 sf Storage= 197,510 cf (117,051 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (117,188 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 144S: Landfill Open Area	Runoff Area=2.417 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=7.95 cfs 0.752 af
Subcatchment 145S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.74" Tc=0.0 min CN=98 Runoff=21.27 cfs 1.155 af
Subcatchment 146S: Mod 5	Runoff Area=4.120 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=13.55 cfs 1.282 af
Pond 147P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,750 cf Inflow=30.60 cfs 3.190 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.247 ac Runoff Volume = 3.190 af Average Runoff Depth = 3.74"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.247 ac

Summary for Subcatchment 144S: Landfill Open Area

Runoff = 7.95 cfs @ 12.29 hrs, Volume= 0.752 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 2.417	98	Mod 4 Allowable Open Area
2.417		100.00% Impervious Area

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

Summary for Subcatchment 145S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.27 cfs @ 12.04 hrs, Volume= 1.155 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 146S: Mod 5

Runoff = 13.55 cfs @ 12.29 hrs, Volume= 1.282 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 4.120	98	Ash
4.120		100.00% Impervious Area

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

Summary for Pond 147P: Leachate/Surface Water Pond (10-yr Starting Elev.)

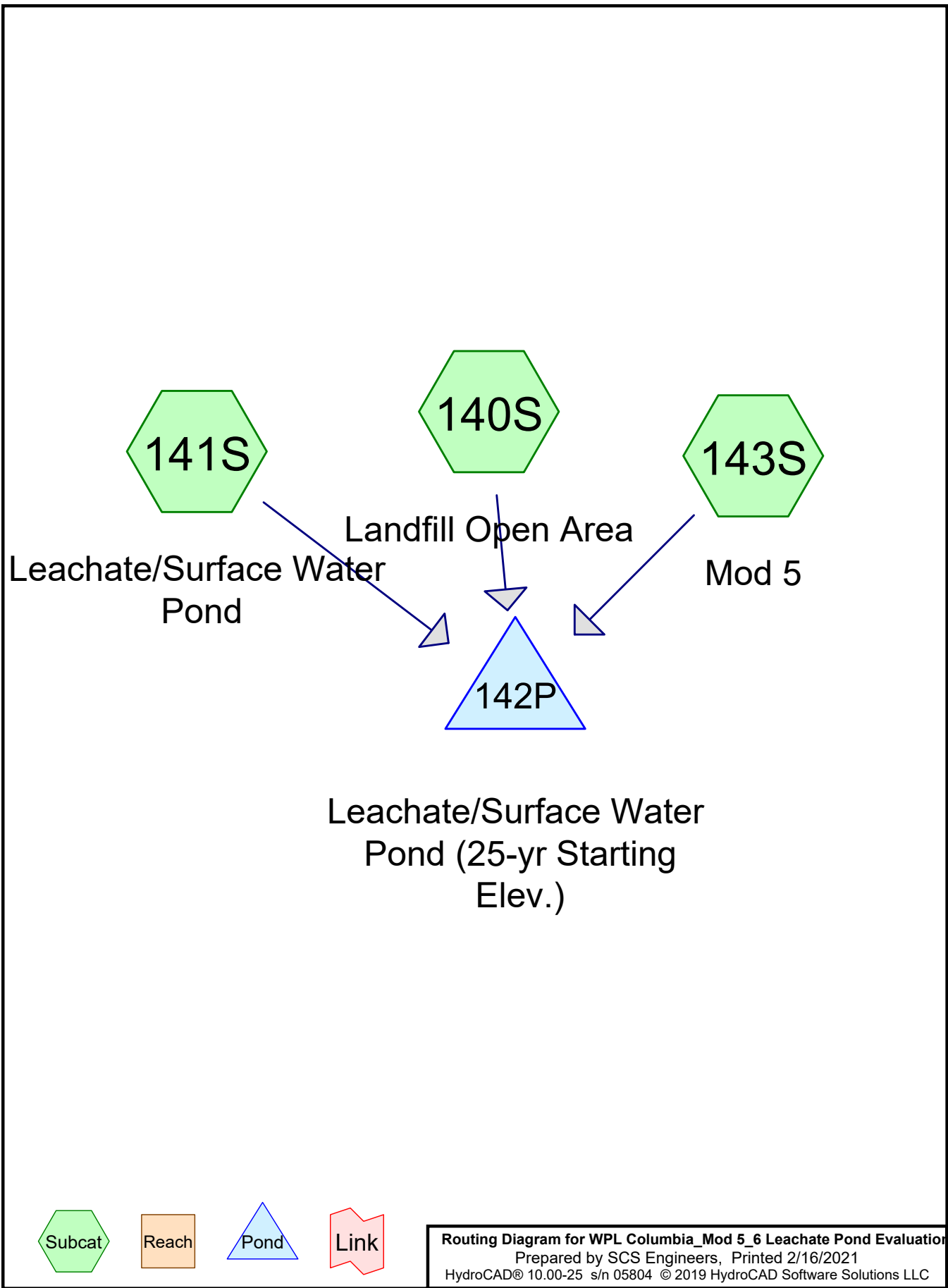
Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 30.60 cfs @ 12.05 hrs, Volume= 3.190 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.39' Surf.Area= 44,199 sf Storage= 58,815 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,596 sf Storage= 197,750 cf (138,935 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (138,832 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Summary for Pond 142P: Leachate/Surface Water Pond (25-yr Starting Elev.)

Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 37.97 cfs @ 12.05 hrs, Volume= 3.991 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 793.50' Surf.Area= 31,107 sf Storage= 24,119 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,611 sf Storage= 197,949 cf (173,831 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (173,529 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654

Summary for Subcatchment 140S: Landfill Open Area

Runoff = 9.86 cfs @ 12.28 hrs, Volume= 0.941 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 2.417	98	Mod 4 Allowable Open Area
2.417		100.00% Impervious Area

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

Summary for Subcatchment 141S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 26.38 cfs @ 12.04 hrs, Volume= 1.445 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 143S: Mod 5

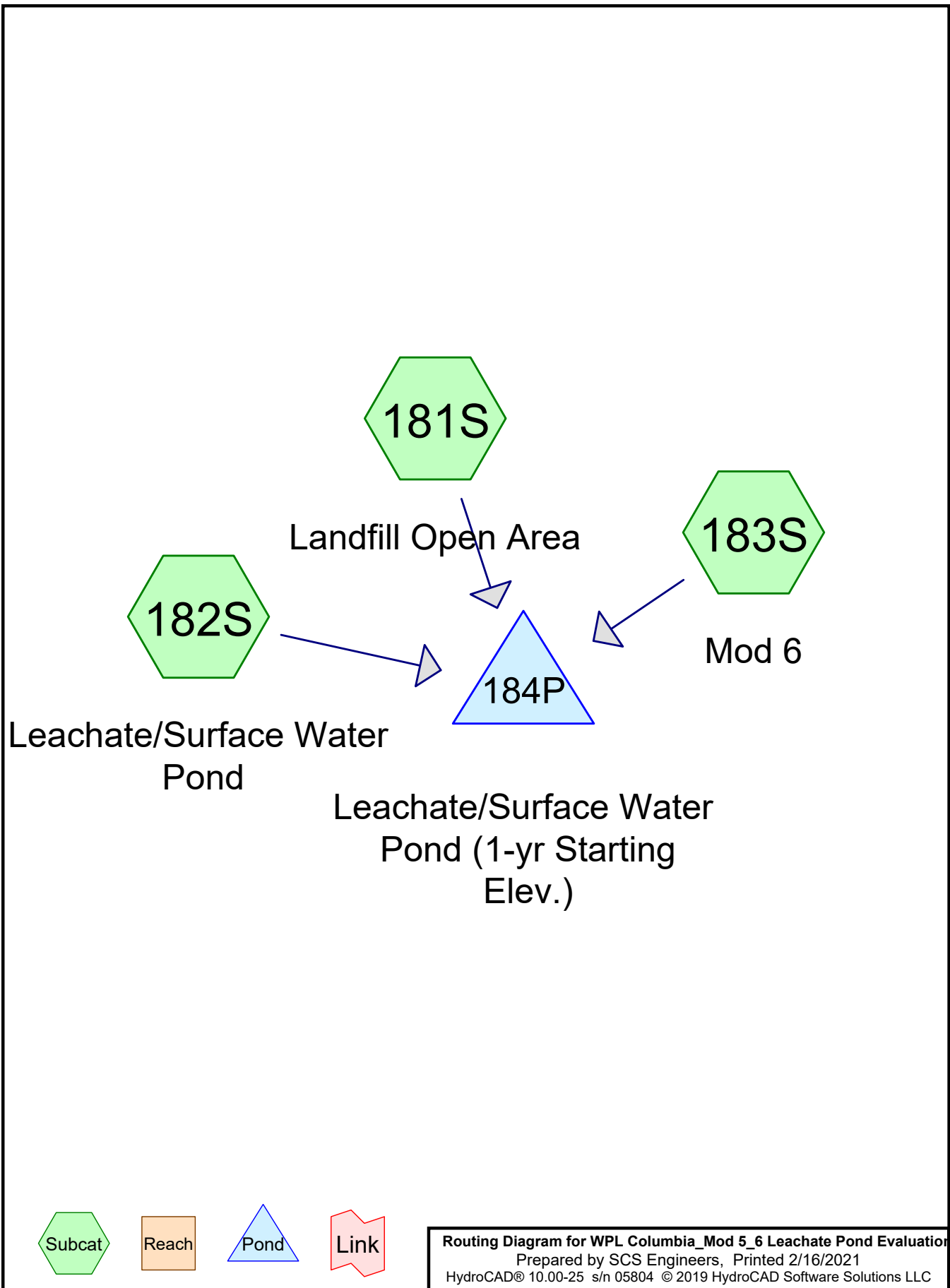
Runoff = 16.82 cfs @ 12.28 hrs, Volume= 1.605 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 4.120	98	Ash
4.120		100.00% Impervious Area

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

Scenario 3



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 181S: Landfill Open Area	Runoff Area=4.642 ac 100.00% Impervious Runoff Depth=2.21" Tc=20.0 min CN=98 Runoff=9.26 cfs 0.855 af
Subcatchment 182S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=2.21" Tc=0.0 min CN=98 Runoff=12.92 cfs 0.684 af
Subcatchment 183S: Mod 6	Runoff Area=1.895 ac 100.00% Impervious Runoff Depth=2.21" Tc=20.0 min CN=98 Runoff=3.78 cfs 0.349 af
Pond 184P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,632 cf Inflow=18.52 cfs 1.888 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.247 ac Runoff Volume = 1.888 af Average Runoff Depth = 2.21"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.247 ac

Summary for Subcatchment 181S: Landfill Open Area

Runoff = 9.26 cfs @ 12.29 hrs, Volume= 0.855 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 4.642	98	Mod 4 Allowable Open Area
4.642		100.00% Impervious Area

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

Summary for Subcatchment 182S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 12.92 cfs @ 12.04 hrs, Volume= 0.684 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 183S: Mod 6

Runoff = 3.78 cfs @ 12.29 hrs, Volume= 0.349 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 1.895	98	Ash
1.895		100.00% Impervious Area

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

Summary for Pond 184P: Leachate/Surface Water Pond (1-yr Starting Elev.)

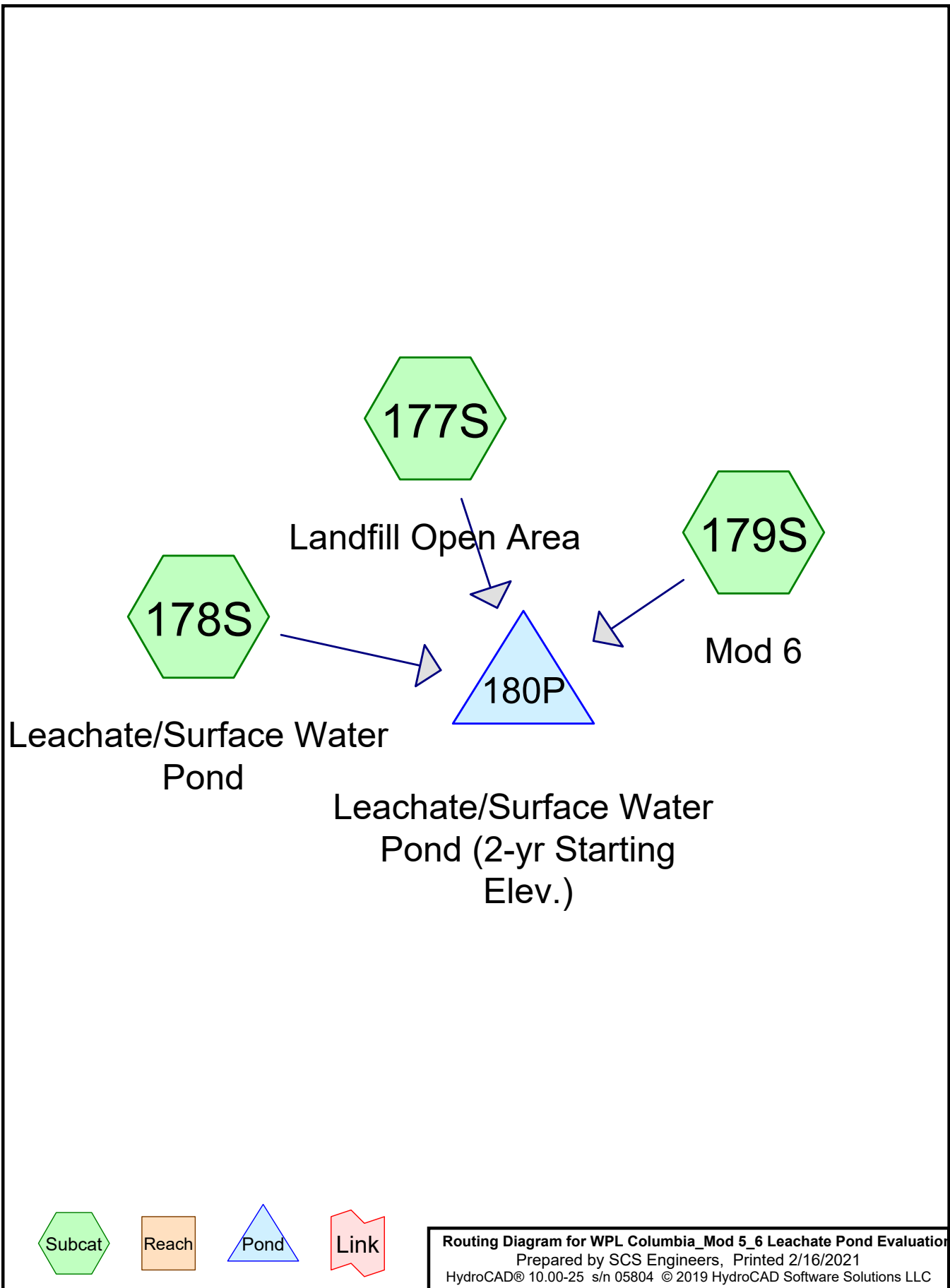
Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 2.21" for 1-yr, 24-hr storm event
 Inflow = 18.52 cfs @ 12.05 hrs, Volume= 1.888 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.55' Surf.Area= 53,339 sf Storage= 115,388 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,586 sf Storage= 197,632 cf (82,244 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (82,260 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 177S: Landfill Open Area	Runoff Area=4.642 ac 100.00% Impervious Runoff Depth=2.54" Tc=20.0 min CN=98 Runoff=10.56 cfs 0.982 af
Subcatchment 178S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=2.54" Tc=0.0 min CN=98 Runoff=14.73 cfs 0.785 af
Subcatchment 179S: Mod 6	Runoff Area=1.895 ac 100.00% Impervious Runoff Depth=2.54" Tc=20.0 min CN=98 Runoff=4.31 cfs 0.401 af
Pond 180P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,780 cf Inflow=21.14 cfs 2.168 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.247 ac Runoff Volume = 2.168 af Average Runoff Depth = 2.54"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.247 ac

Summary for Subcatchment 177S: Landfill Open Area

Runoff = 10.56 cfs @ 12.29 hrs, Volume= 0.982 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 4.642	98	Mod 4 Allowable Open Area
4.642		100.00% Impervious Area

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

Summary for Subcatchment 178S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.73 cfs @ 12.04 hrs, Volume= 0.785 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 179S: Mod 6

Runoff = 4.31 cfs @ 12.29 hrs, Volume= 0.401 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 1.895	98	Ash
1.895		100.00% Impervious Area

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

Summary for Pond 180P: Leachate/Surface Water Pond (2-yr Starting Elev.)

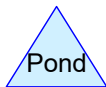
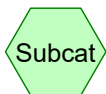
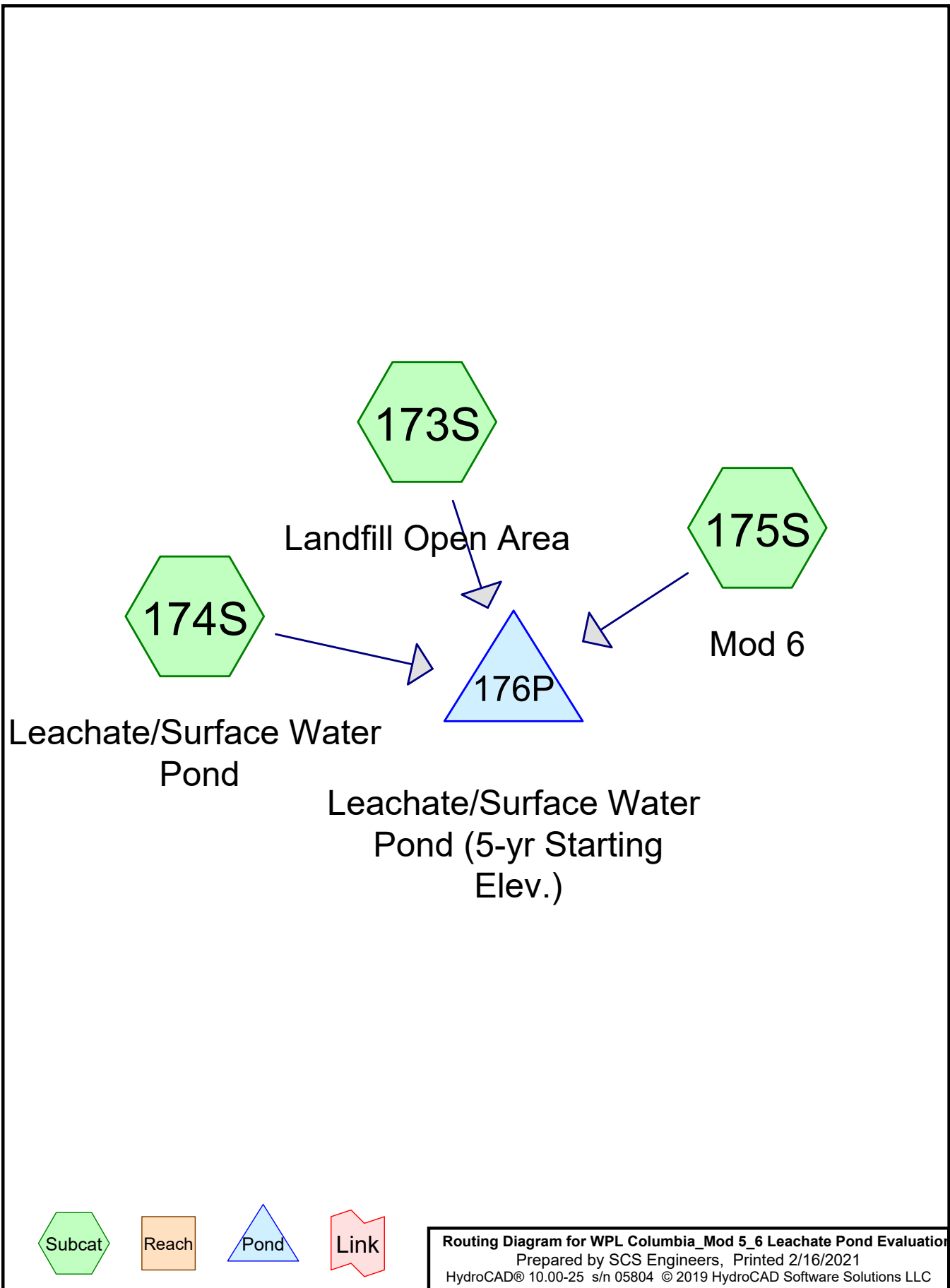
Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 2.54" for 2-yr, 24-hr storm event
 Inflow = 21.14 cfs @ 12.05 hrs, Volume= 2.168 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.32' Surf.Area= 51,527 sf Storage= 103,328 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,598 sf Storage= 197,780 cf (94,452 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (94,319 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 173S: Landfill Open Area	Runoff Area=4.642 ac 100.00% Impervious Runoff Depth=3.15" Tc=20.0 min CN=98 Runoff=12.96 cfs 1.217 af
Subcatchment 174S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.15" Tc=0.0 min CN=98 Runoff=18.06 cfs 0.973 af
Subcatchment 175S: Mod 6	Runoff Area=1.895 ac 100.00% Impervious Runoff Depth=3.15" Tc=20.0 min CN=98 Runoff=5.29 cfs 0.497 af
Pond 176P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,510 cf Inflow=25.95 cfs 2.687 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.247 ac Runoff Volume = 2.687 af Average Runoff Depth = 3.15"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.247 ac

Summary for Subcatchment 173S: Landfill Open Area

Runoff = 12.96 cfs @ 12.29 hrs, Volume= 1.217 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 4.642	98	Mod 4 Allowable Open Area
4.642		100.00% Impervious Area

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

Summary for Subcatchment 174S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 18.06 cfs @ 12.04 hrs, Volume= 0.973 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 175S: Mod 6

Runoff = 5.29 cfs @ 12.29 hrs, Volume= 0.497 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 1.895	98	Ash
1.895		100.00% Impervious Area

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

Summary for Pond 176P: Leachate/Surface Water Pond (5-yr Starting Elev.)

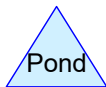
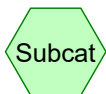
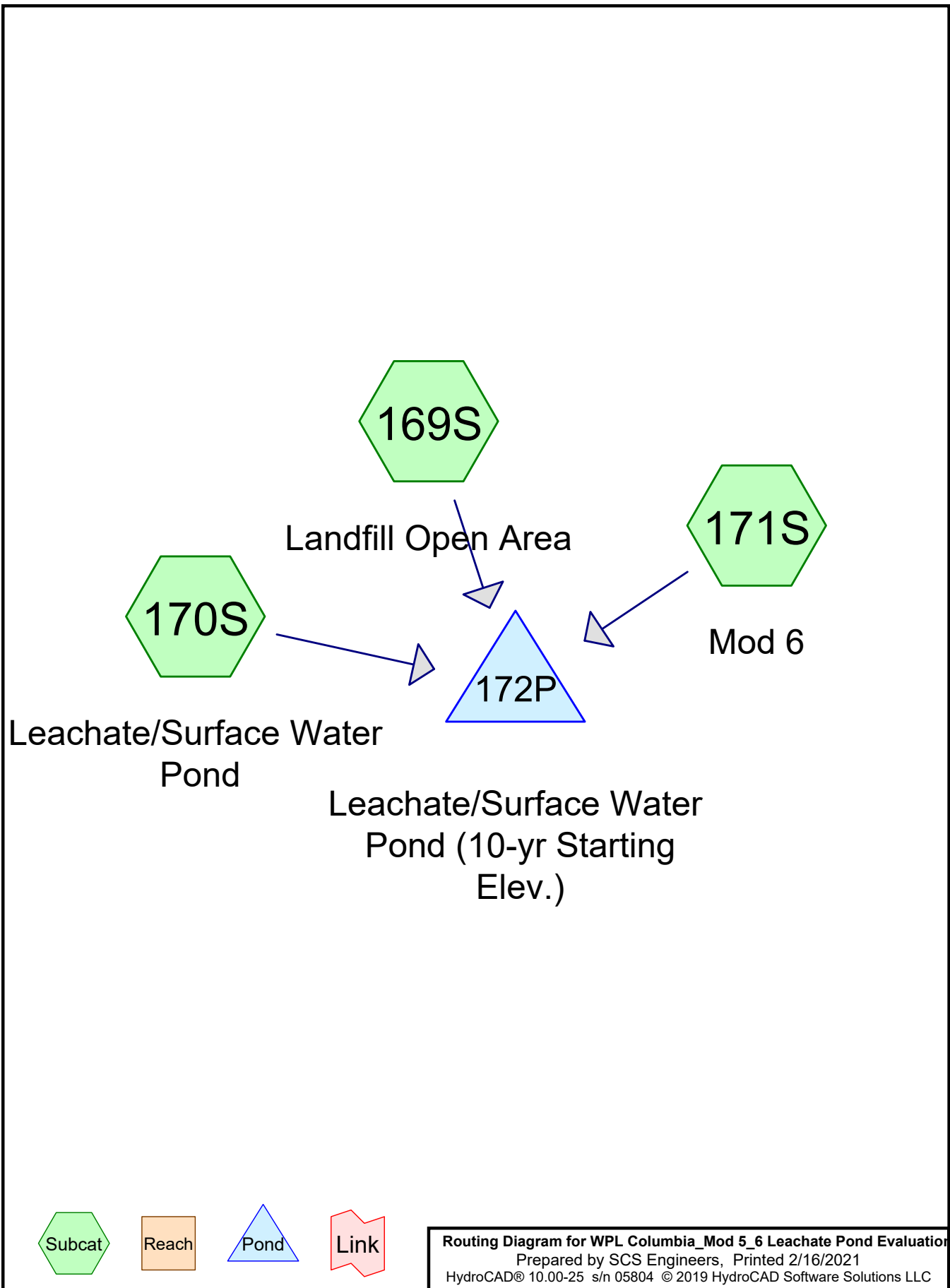
Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 3.15" for 5-yr, 24-hr storm event
 Inflow = 25.95 cfs @ 12.05 hrs, Volume= 2.687 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.86' Surf.Area= 47,902 sf Storage= 80,459 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,577 sf Storage= 197,510 cf (117,051 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (117,188 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Routing Diagram for WPL Columbia Mod 5_6 Leachate Pond Evaluation

Prepared by SCS Engineers, Printed 2/16/2021

HydroCAD® 10.00-25 s/n 05804 © 2019 HydroCAD Software Solutions LLC

Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 169S: Landfill Open Area	Runoff Area=4.642 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=15.27 cfs 1.445 af
Subcatchment 170S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.74" Tc=0.0 min CN=98 Runoff=21.27 cfs 1.155 af
Subcatchment 171S: Mod 6	Runoff Area=1.895 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=6.23 cfs 0.590 af
Pond 172P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,750 cf Inflow=30.60 cfs 3.190 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.247 ac Runoff Volume = 3.190 af Average Runoff Depth = 3.74"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.247 ac

Summary for Subcatchment 169S: Landfill Open Area

Runoff = 15.27 cfs @ 12.29 hrs, Volume= 1.445 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 4.642	98	Mod 4 Allowable Open Area
4.642		100.00% Impervious Area

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

Summary for Subcatchment 170S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.27 cfs @ 12.04 hrs, Volume= 1.155 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 171S: Mod 6

Runoff = 6.23 cfs @ 12.29 hrs, Volume= 0.590 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 1.895	98	Ash
1.895		100.00% Impervious Area

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

Summary for Pond 172P: Leachate/Surface Water Pond (10-yr Starting Elev.)

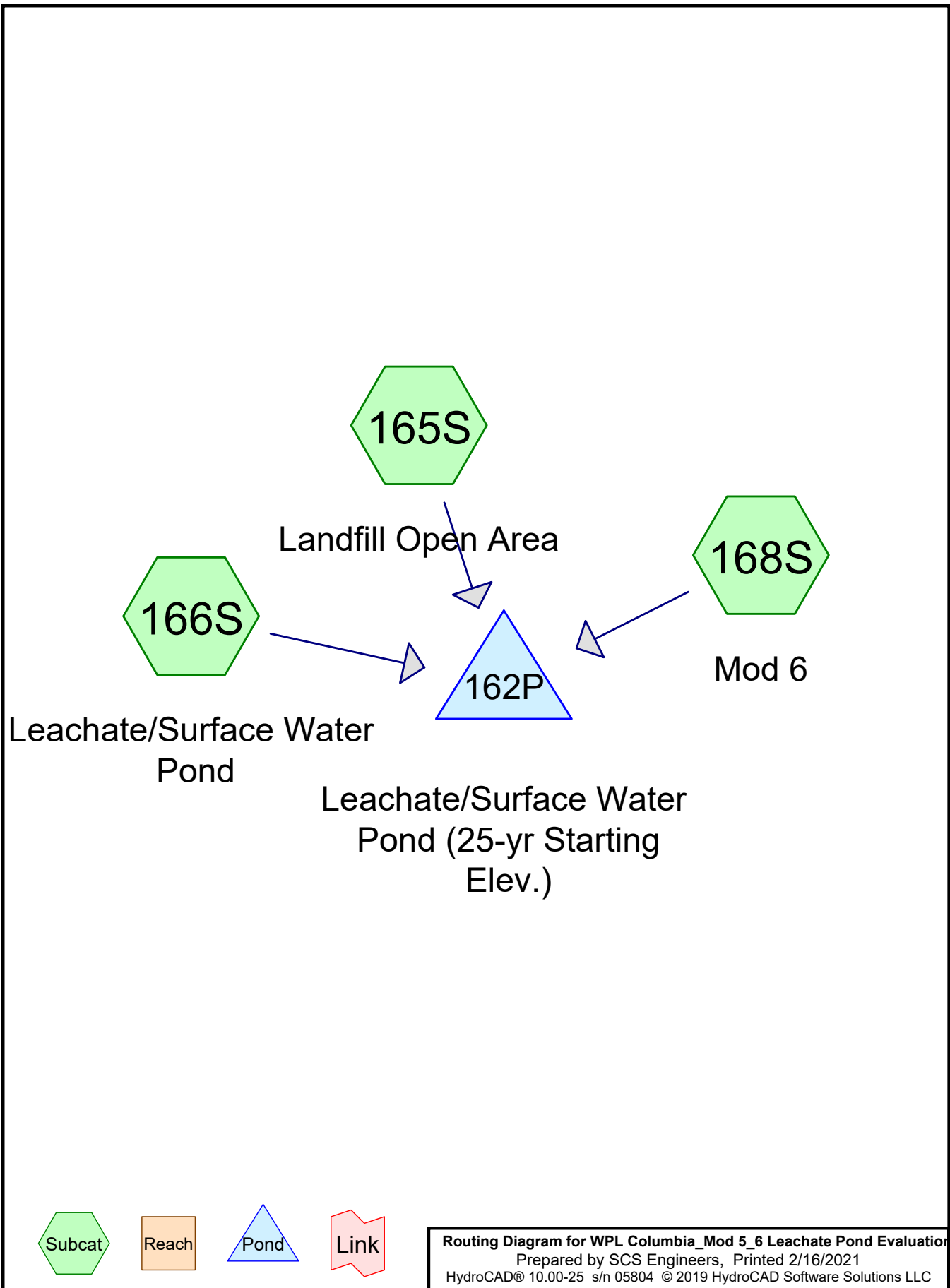
Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 30.60 cfs @ 12.05 hrs, Volume= 3.190 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.39' Surf.Area= 44,199 sf Storage= 58,815 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,596 sf Storage= 197,750 cf (138,935 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (138,832 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Summary for Pond 162P: Leachate/Surface Water Pond (25-yr Starting Elev.)

Inflow Area = 10.247 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 37.97 cfs @ 12.05 hrs, Volume= 3.991 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 793.50' Surf.Area= 31,107 sf Storage= 24,119 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,611 sf Storage= 197,949 cf (173,831 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (173,529 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654

Summary for Subcatchment 165S: Landfill Open Area

Runoff = 18.95 cfs @ 12.28 hrs, Volume= 1.808 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 4.642	98	Mod 4 Allowable Open Area
4.642		100.00% Impervious Area

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

Summary for Subcatchment 166S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 26.38 cfs @ 12.04 hrs, Volume= 1.445 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 168S: Mod 6

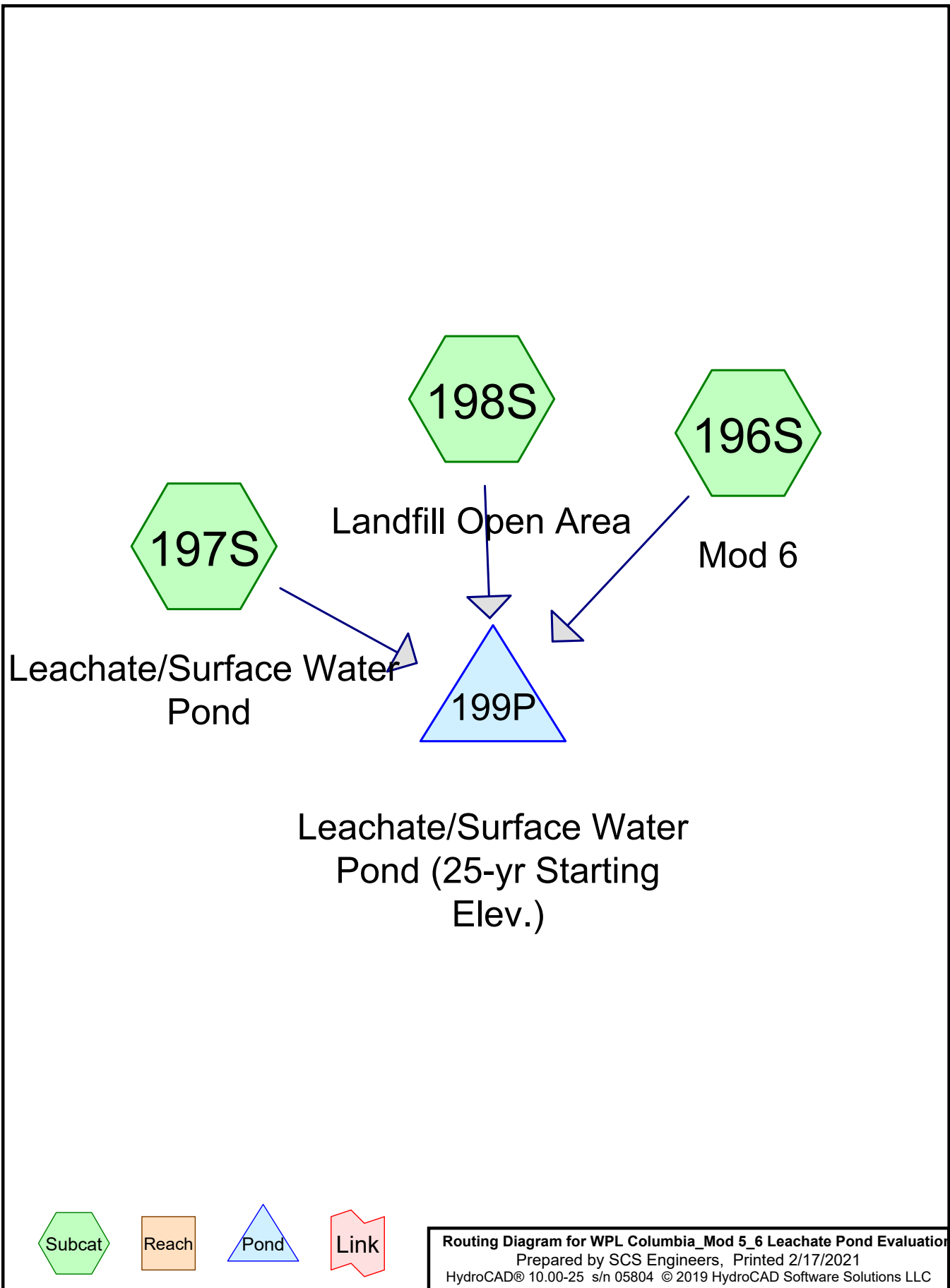
Runoff = 7.73 cfs @ 12.28 hrs, Volume= 0.738 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 1.895	98	Ash
1.895		100.00% Impervious Area

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

Scenario 4



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 196S: Mod 6	Runoff Area=3.790 ac 100.00% Impervious Runoff Depth=2.21" Tc=20.0 min CN=98 Runoff=7.56 cfs 0.698 af
Subcatchment 197S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=2.21" Tc=0.0 min CN=98 Runoff=12.92 cfs 0.684 af
Subcatchment 198S: Landfill Open Area	Runoff Area=2.740 ac 100.00% Impervious Runoff Depth=2.21" Tc=20.0 min CN=98 Runoff=5.46 cfs 0.505 af
Pond 199P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,576 cf Inflow=18.52 cfs 1.887 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.240 ac Runoff Volume = 1.887 af Average Runoff Depth = 2.21"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.240 ac

Summary for Subcatchment 196S: Mod 6

Runoff = 7.56 cfs @ 12.29 hrs, Volume= 0.698 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 3.790	98	Ash
3.790		100.00% Impervious Area

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

Summary for Subcatchment 197S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 12.92 cfs @ 12.04 hrs, Volume= 0.684 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 198S: Landfill Open Area

Runoff = 5.46 cfs @ 12.29 hrs, Volume= 0.505 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 2.740	98	Allowable Open Area
2.740		100.00% Impervious Area

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

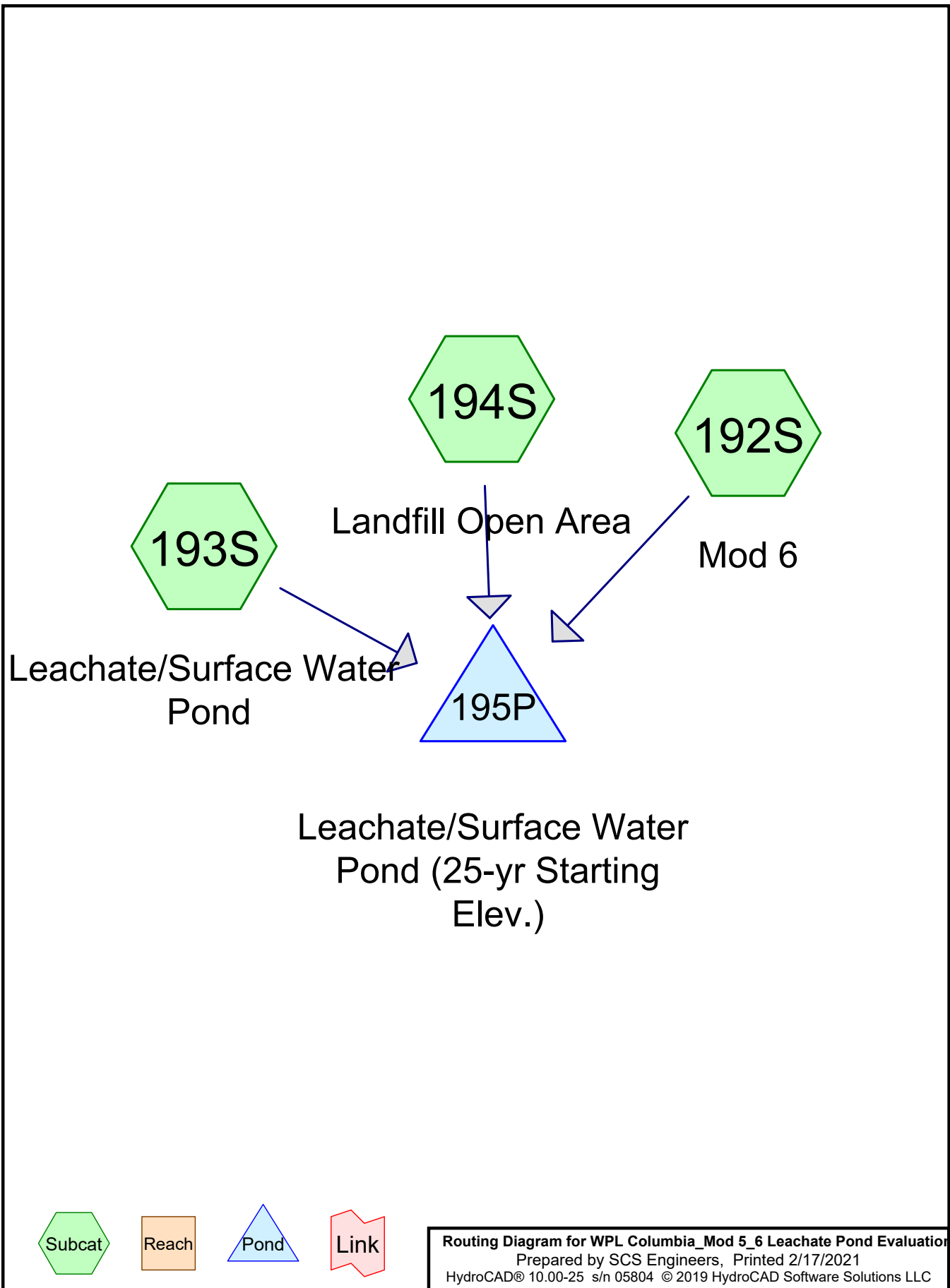
Summary for Pond 199P: Leachate/Surface Water Pond (25-yr Starting Elev.)

Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 2.21" for 1-yr, 24-hr storm event
 Inflow = 18.52 cfs @ 12.05 hrs, Volume= 1.887 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.55' Surf.Area= 53,339 sf Storage= 115,388 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,582 sf Storage= 197,576 cf (82,188 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (82,260 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 192S: Mod 6	Runoff Area=3.790 ac 100.00% Impervious Runoff Depth=2.54" Tc=20.0 min CN=98 Runoff=8.62 cfs 0.802 af
Subcatchment 193S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=2.54" Tc=0.0 min CN=98 Runoff=14.73 cfs 0.785 af
Subcatchment 194S: Landfill Open Area	Runoff Area=2.740 ac 100.00% Impervious Runoff Depth=2.54" Tc=20.0 min CN=98 Runoff=6.23 cfs 0.580 af
Pond 195P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,716 cf Inflow=21.13 cfs 2.167 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.240 ac Runoff Volume = 2.167 af Average Runoff Depth = 2.54"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.240 ac

Summary for Subcatchment 192S: Mod 6

Runoff = 8.62 cfs @ 12.29 hrs, Volume= 0.802 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 3.790	98	Ash
3.790		100.00% Impervious Area

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

Summary for Subcatchment 193S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.73 cfs @ 12.04 hrs, Volume= 0.785 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 194S: Landfill Open Area

Runoff = 6.23 cfs @ 12.29 hrs, Volume= 0.580 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 2.740	98	Allowable Open Area
2.740		100.00% Impervious Area

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

Summary for Pond 195P: Leachate/Surface Water Pond (25-yr Starting Elev.)

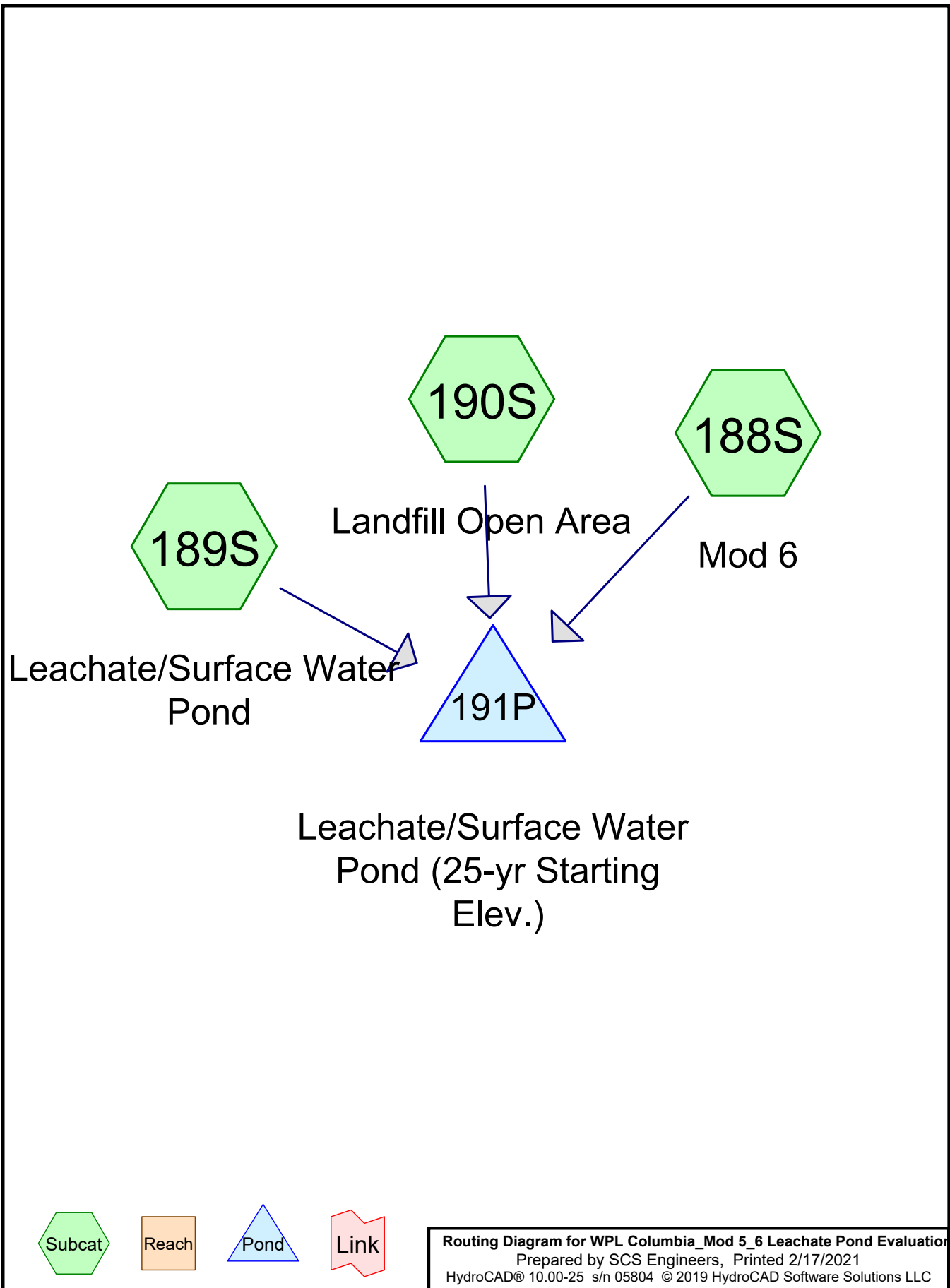
Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 2.54" for 2-yr, 24-hr storm event
 Inflow = 21.13 cfs @ 12.05 hrs, Volume= 2.167 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.32' Surf.Area= 51,527 sf Storage= 103,328 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,593 sf Storage= 197,716 cf (94,388 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (94,319 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 188S: Mod 6	Runoff Area=3.790 ac 100.00% Impervious Runoff Depth=3.15" Tc=20.0 min CN=98 Runoff=10.58 cfs 0.994 af
Subcatchment 189S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.15" Tc=0.0 min CN=98 Runoff=18.06 cfs 0.973 af
Subcatchment 190S: Landfill Open Area	Runoff Area=2.740 ac 100.00% Impervious Runoff Depth=3.15" Tc=20.0 min CN=98 Runoff=7.65 cfs 0.719 af
Pond 191P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,910 cf Inflow=25.94 cfs 2.685 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.240 ac Runoff Volume = 2.685 af Average Runoff Depth = 3.15"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.240 ac

Summary for Subcatchment 188S: Mod 6

Runoff = 10.58 cfs @ 12.29 hrs, Volume= 0.994 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 3.790	98	Ash
3.790		100.00% Impervious Area

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

Summary for Subcatchment 189S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 18.06 cfs @ 12.04 hrs, Volume= 0.973 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 190S: Landfill Open Area

Runoff = 7.65 cfs @ 12.29 hrs, Volume= 0.719 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 2.740	98	Allowable Open Area
2.740		100.00% Impervious Area

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

Summary for Pond 191P: Leachate/Surface Water Pond (25-yr Starting Elev.)

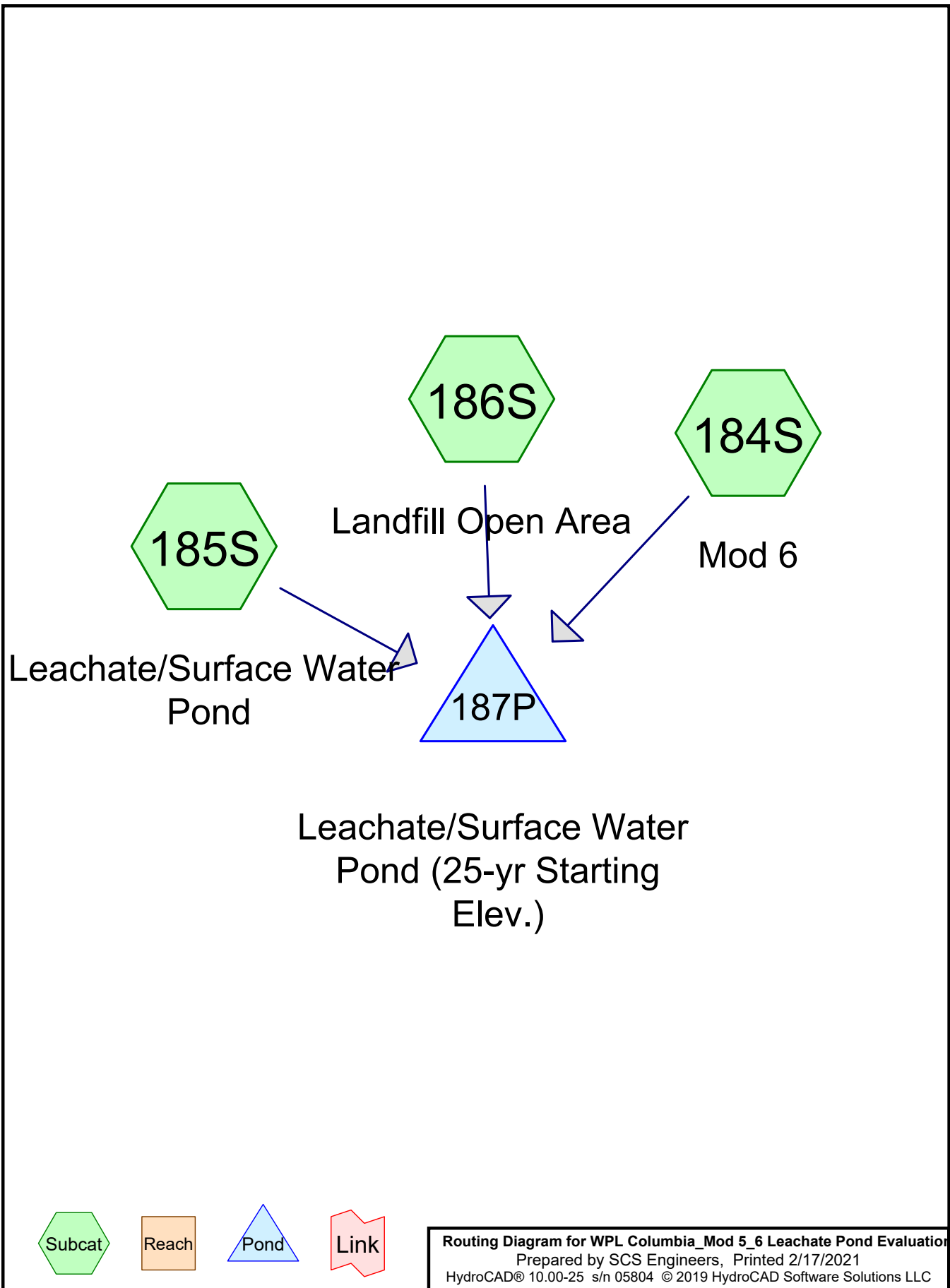
Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 3.15" for 5-yr, 24-hr storm event
 Inflow = 25.94 cfs @ 12.05 hrs, Volume= 2.685 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.87' Surf.Area= 47,981 sf Storage= 80,939 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,608 sf Storage= 197,910 cf (116,972 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (116,709 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 184S: Mod 6	Runoff Area=3.790 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=12.47 cfs 1.180 af
Subcatchment 185S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.74" Tc=0.0 min CN=98 Runoff=21.27 cfs 1.155 af
Subcatchment 186S: Landfill Open Area	Runoff Area=2.740 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=9.01 cfs 0.853 af
Pond 187P: Leachate/SurfaceWater	Peak Elev=796.97' Storage=197,655 cf Inflow=30.59 cfs 3.187 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 10.240 ac Runoff Volume = 3.187 af Average Runoff Depth = 3.74"
0.00% Pervious = 0.000 ac 100.00% Impervious = 10.240 ac

Summary for Subcatchment 184S: Mod 6

Runoff = 12.47 cfs @ 12.29 hrs, Volume= 1.180 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.790	98	Ash
3.790		100.00% Impervious Area

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

Summary for Subcatchment 185S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.27 cfs @ 12.04 hrs, Volume= 1.155 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 186S: Landfill Open Area

Runoff = 9.01 cfs @ 12.29 hrs, Volume= 0.853 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 2.740	98	Allowable Open Area
2.740		100.00% Impervious Area

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

Summary for Pond 187P: Leachate/Surface Water Pond (25-yr Starting Elev.)

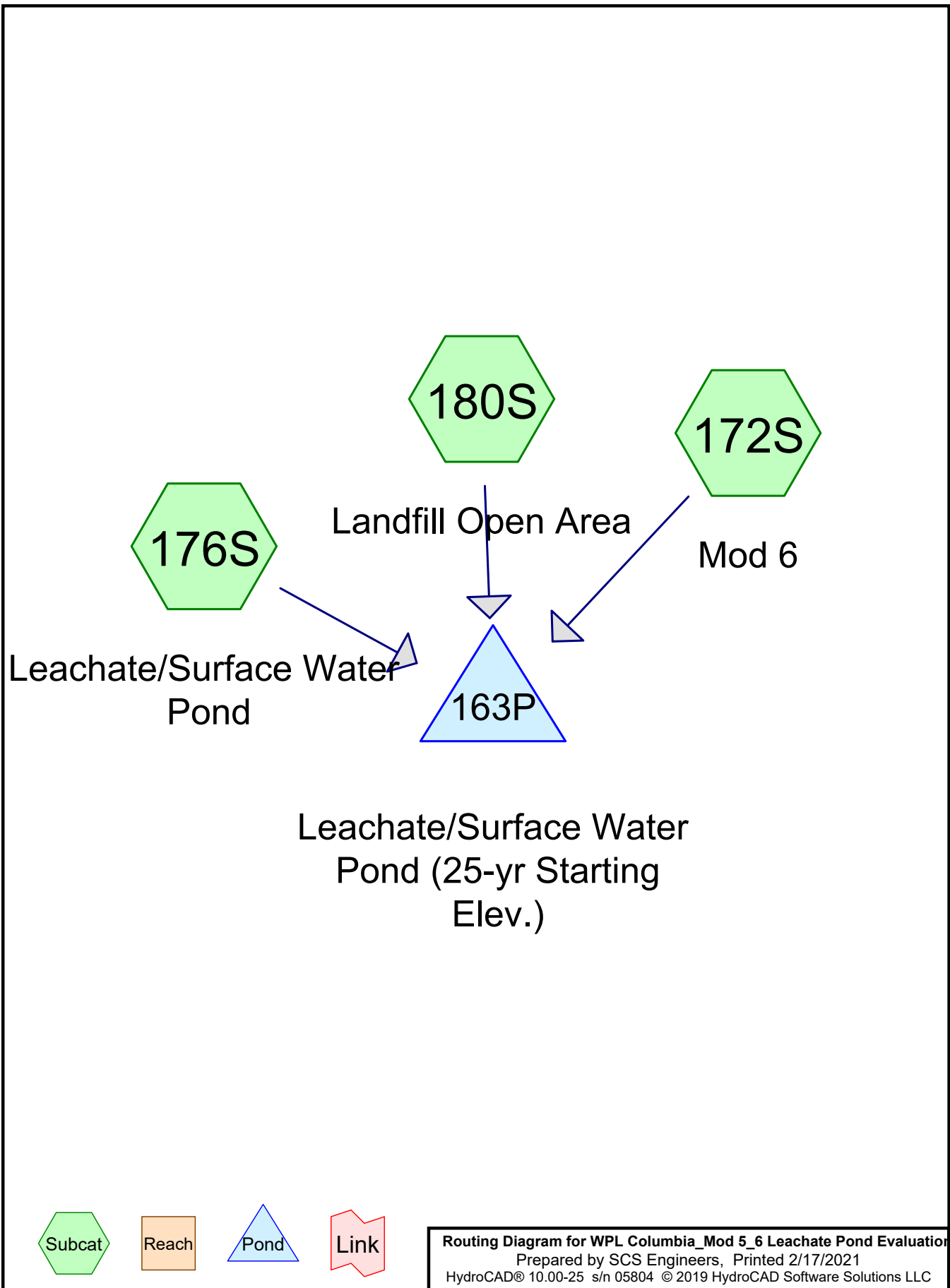
Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 30.59 cfs @ 12.05 hrs, Volume= 3.187 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.39' Surf.Area= 44,199 sf Storage= 58,815 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,588 sf Storage= 197,655 cf (138,840 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (138,832 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Summary for Pond 163P: Leachate/Surface Water Pond (25-yr Starting Elev.)

Inflow Area = 10.240 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 37.96 cfs @ 12.05 hrs, Volume= 3.988 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 793.50' Surf.Area= 31,107 sf Storage= 24,119 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,602 sf Storage= 197,830 cf (173,712 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (173,529 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654

Summary for Subcatchment 172S: Mod 6

Runoff = 15.47 cfs @ 12.28 hrs, Volume= 1.476 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 3.790	98	Ash
3.790		100.00% Impervious Area

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

Summary for Subcatchment 176S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 26.38 cfs @ 12.04 hrs, Volume= 1.445 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 180S: Landfill Open Area

Runoff = 11.18 cfs @ 12.28 hrs, Volume= 1.067 af, Depth= 4.67"

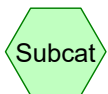
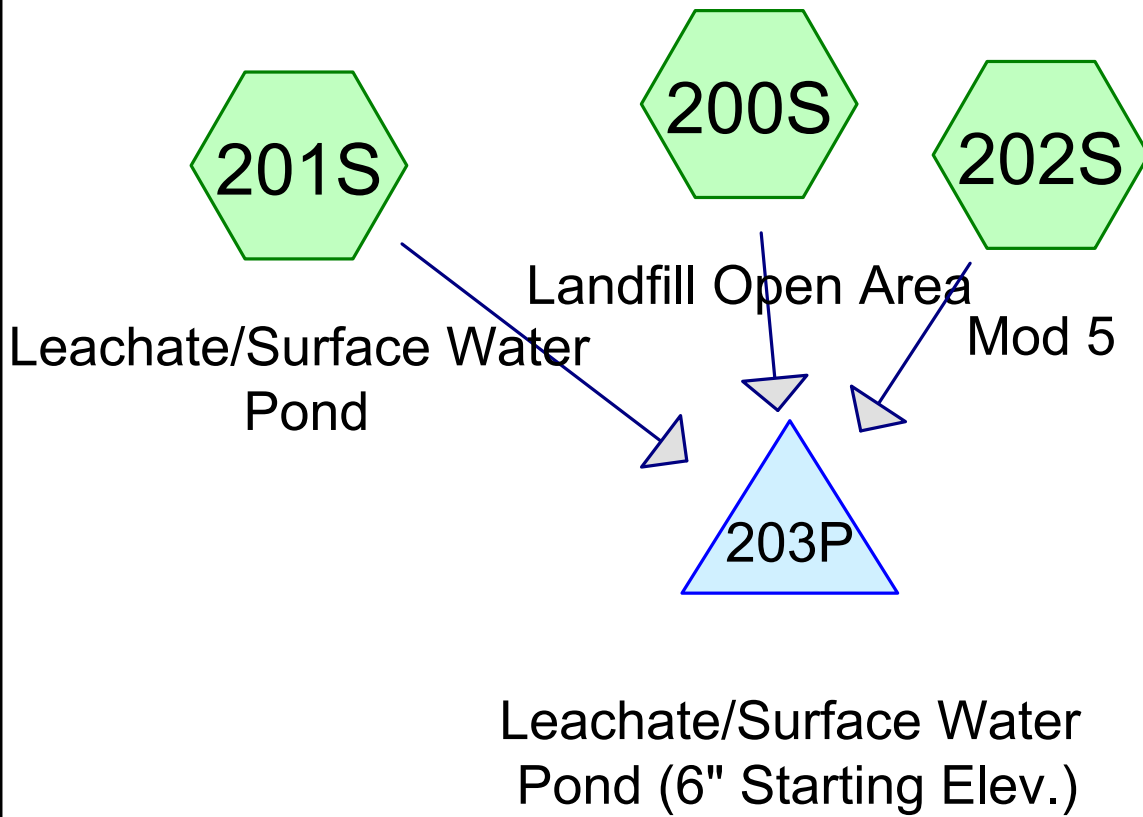
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 2.740	98	Allowable Open Area
2.740		100.00% Impervious Area

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

Frost Protection Placement

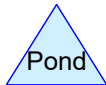
Base - Existing w/Mod
5 frost barrier
construction



Subcat



Reach



Pond



Link

Routing Diagram for WPL Columbia_Mod 5_6 Leachate Pond Evaluation

Prepared by SCS Engineers, Printed 2/17/2021

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Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment200S: Landfill Open Area	Runoff Area=6.450 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=21.22 cfs 2.008 af
Subcatchment201S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.74" Tc=0.0 min CN=98 Runoff=21.27 cfs 1.155 af
Subcatchment202S: Mod 5	Runoff Area=4.120 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=13.55 cfs 1.282 af
Pond 203P: Leachate/SurfaceWater	Peak Elev=796.95' Storage=196,646 cf Inflow=39.08 cfs 4.445 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 14.280 ac Runoff Volume = 4.445 af Average Runoff Depth = 3.74"
0.00% Pervious = 0.000 ac 100.00% Impervious = 14.280 ac

Summary for Subcatchment 200S: Landfill Open Area

Runoff = 21.22 cfs @ 12.29 hrs, Volume= 2.008 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 6.450	98	Mod 4 Open
6.450		100.00% Impervious Area

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

Summary for Subcatchment 201S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.27 cfs @ 12.04 hrs, Volume= 1.155 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 202S: Mod 5

Runoff = 13.55 cfs @ 12.29 hrs, Volume= 1.282 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 4.120	98	Ash
4.120		100.00% Impervious Area

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

Summary for Pond 203P: Leachate/Surface Water Pond (6" Starting Elev.)

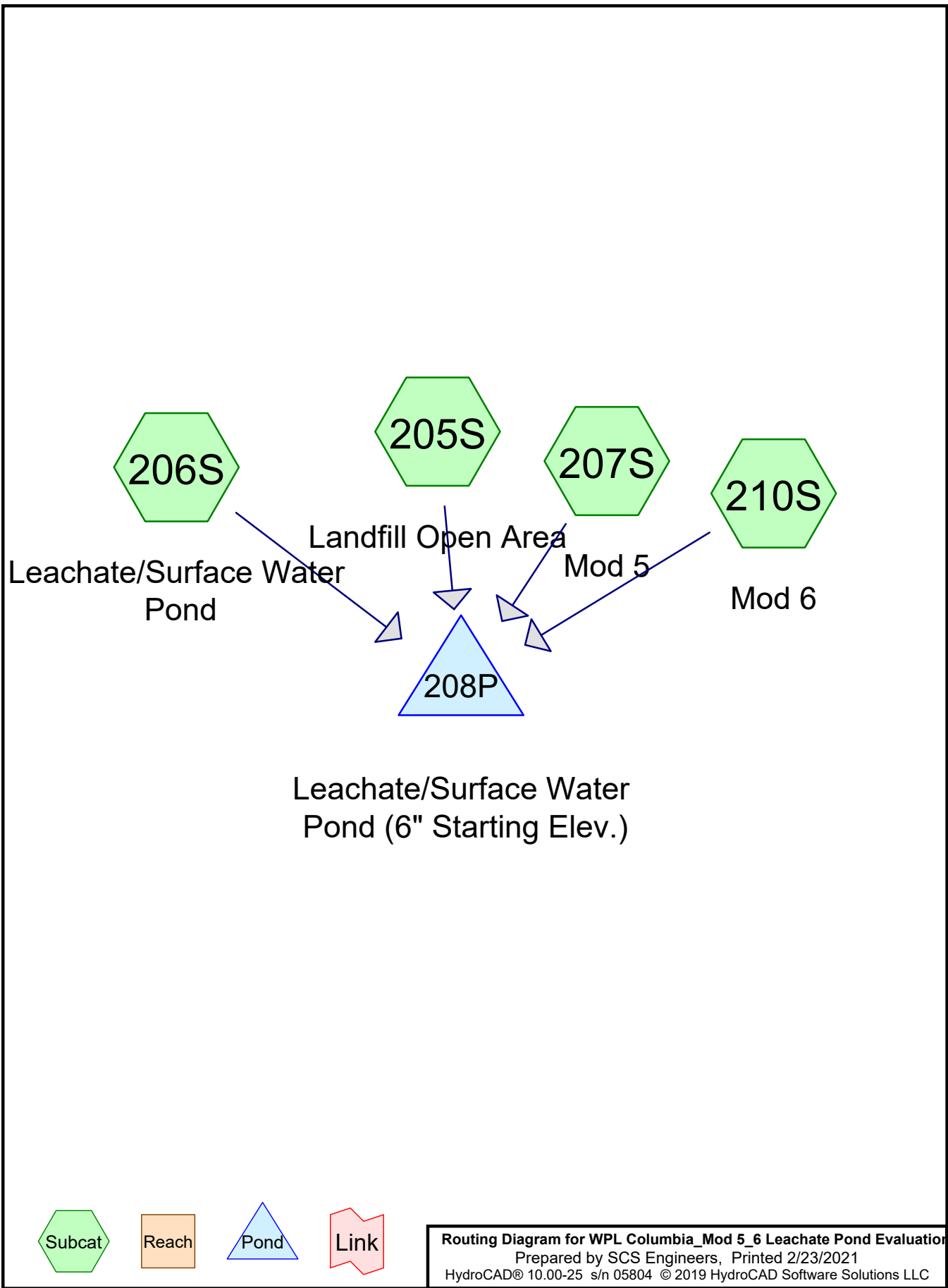
Inflow Area = 14.280 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 39.08 cfs @ 12.27 hrs, Volume= 4.445 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 792.50' Surf.Area= 11,070 sf Storage= 3,030 cf
 Peak Elev= 796.95' @ 25.15 hrs Surf.Area= 61,509 sf Storage= 196,646 cf (193,616 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (194,617 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment205S: Landfill Open Area	Runoff Area=6.450 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=21.22 cfs 2.008 af
Subcatchment206S: Leachate/Surface	Runoff Area=3.710 ac 100.00% Impervious Runoff Depth=3.74" Tc=0.0 min CN=98 Runoff=21.27 cfs 1.155 af
Subcatchment207S: Mod 5	Runoff Area=4.120 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=13.55 cfs 1.282 af
Subcatchment210S: Mod 6	Runoff Area=3.790 ac 100.00% Impervious Runoff Depth=3.74" Tc=20.0 min CN=98 Runoff=12.47 cfs 1.180 af
Pond 208P: Leachate/SurfaceWater	Peak Elev=797.76' Storage=248,035 cf Inflow=51.51 cfs 5.625 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 18.070 ac Runoff Volume = 5.625 af Average Runoff Depth = 3.74"
0.00% Pervious = 0.000 ac 100.00% Impervious = 18.070 ac

Summary for Subcatchment 205S: Landfill Open Area

Runoff = 21.22 cfs @ 12.29 hrs, Volume= 2.008 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 6.450	98	Mod 4 Open
6.450		100.00% Impervious Area

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

Summary for Subcatchment 206S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.27 cfs @ 12.04 hrs, Volume= 1.155 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 207S: Mod 5

Runoff = 13.55 cfs @ 12.29 hrs, Volume= 1.282 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 4.120	98	Ash
4.120		100.00% Impervious Area

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

Summary for Subcatchment 210S: Mod 6

Runoff = 12.47 cfs @ 12.29 hrs, Volume= 1.180 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.790	98	Ash
3.790		100.00% Impervious Area

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

Summary for Pond 208P: Leachate/Surface Water Pond (6" Starting Elev.)

[58] Hint: Peaked 0.79' above defined flood level

Inflow Area = 18.070 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 51.51 cfs @ 12.28 hrs, Volume= 5.625 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 792.50' Surf.Area= 11,070 sf Storage= 3,030 cf
 Peak Elev= 797.76' @ 25.15 hrs Surf.Area= 65,434 sf Storage= 248,035 cf (245,005 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (194,617 cf above start)

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	792.00'	263,654 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654

Appendix B1.3

2022 Leachate/Surface Water Pond Evaluation

Purpose:

The purpose of the leachate/surface water pond evaluation is to determine the following based on the as-built leachate/surface water pond top of liner elevation of 796.97 (see Background section below):

- The maximum amount of open area during each filling phase in order to maintain the peak water elevation resulting from the 25-year, 24-hour storm event at the maximum allowable 796.97.
- The amount of open area allowable with pond closure filling in order to maintain the peak water elevation resulting from the 25-year, 24-hour storm event at the maximum allowable 796.97.
- Based on the amount of allowable open area determined from the above, determine the maximum starting water elevations in the leachate/surface water pond to accommodate 1, 2, 5, and 10-year, 24-hour storm events without overtopping.

Background:

- During construction of Module 2, the top of the leachate/surface water pond liner was determined to be at elevation 796.97.
- Previous calculations submitted to the WDNR on January 30, 2018, evaluated the leachate/surface water pond capacity based on the as-built pond liner elevation.
- A similar evaluation was performed for Module 3 and 4 construction and then Module 5 and 6 construction that produced a chart of maximum leachate/surface water pond starting elevations vs. rainfall storage capacity.
- Portions of Modules 1, 2, 3, and 4 currently have final or intermediate cover in place and Module 5 and 6 currently have rain cover (see **Figure 1 through 4**).
- Module 10 and 11 will be constructed in 2022.

Approach:

- Use the previously developed HydroCAD storm water model to model the below four filling scenarios.
 1. Filling Phase 0 – Assumes portions of Module 2, 3, 4, 5, and 6 contributing to the leachate/surface water pond while material is placed from the pond closure and the plant. See **Figure 1** for filling grades and contributing area
 2. Filling Phase 1 – Assumes portions of Module 2, 3, 4, 5, and 6 contributing to the leachate/surface water pond while material is placed from the pond closure and the plant. See **Figure 2** for filling grades and contributing area
 3. Filling Phase 2 – Assumes portions of Module 2, 3, 4, 5, and 6 contributing to the leachate/surface water pond while material is placed from the pond closure and the plant. See **Figure 3** for filling grades and contributing area.

4. Filling Phase 3 – Assumes portions of Module 2, 3, 4, 5, and 6 contributing to the leachate/surface water pond while material is placed from the pond closure and the plant. See **Figure 4** for filling grades and contributing area.
5. Filling Phase 4 – Assumes portions of Module 2, 3, 4, 5, 6, 10, and 11 contributing to the leachate/surface water pond while material is placed from the pond closure and the plant. See **Figure 5** for filling grades and contributing area.

Assumptions:

- Ash surfaces and intermediate cover areas were assumed to be impermeable (CN=98).
- The top of pond liner elevation is 796.97 (see Background section).
- Time of Concentration is 20 minutes for open areas.

Results:

1. Maximum allowable open area during filling and prior to perimeter grade/Module 10 and 11 construction is 7.78 acres.
2. Maximum allowable open area during filling and after perimeter grades/Module 10 and 11 base grades are completed is 8.51 acres.
3. Filling Phase 0:
 - The contributing area of landfill to the leachate/surface water pond is 7.45 acres for the leachate/surface water pond to accommodate the runoff from a 25-year, 24-hour storm without overtopping.
 - The remainder of landfill would need to be closed/covered with final or intermediate cover and routed away from the pond.
 - **Figure 1** shows a proposed filling sequence, and **Figure 1a** shows the various operating levels of the leachate/surface water pond to accommodate the various storm events with the additional cover in place.
4. Filling Phase 1:
 - The contributing area of landfill to the leachate/surface water pond is 7.78 acres for the leachate/surface water pond to accommodate the runoff from a 25-year, 24-hour storm without overtopping.
 - The remainder of landfill would need to be closed/covered with final or intermediate cover and routed away from the pond.
 - **Figure 2** shows a proposed filling sequence, and **Figure 2a** shows the various operating levels of the leachate/surface water pond to accommodate the various storm events with the additional cover in place.
5. Filling Phase 2:
 - The contributing area of landfill to the leachate/surface water pond is 7.69 acres for the leachate/surface water pond to accommodate the runoff from a 25-year, 24-hour storm without overtopping.

- The remainder of landfill would need to be closed/covered with final or intermediate cover and routed away from the pond.
- **Figure 3** shows a proposed filling sequence, and **Figure 3a** shows the various operating levels of the leachate/surface water pond to accommodate the various storm events with the additional cover in place.

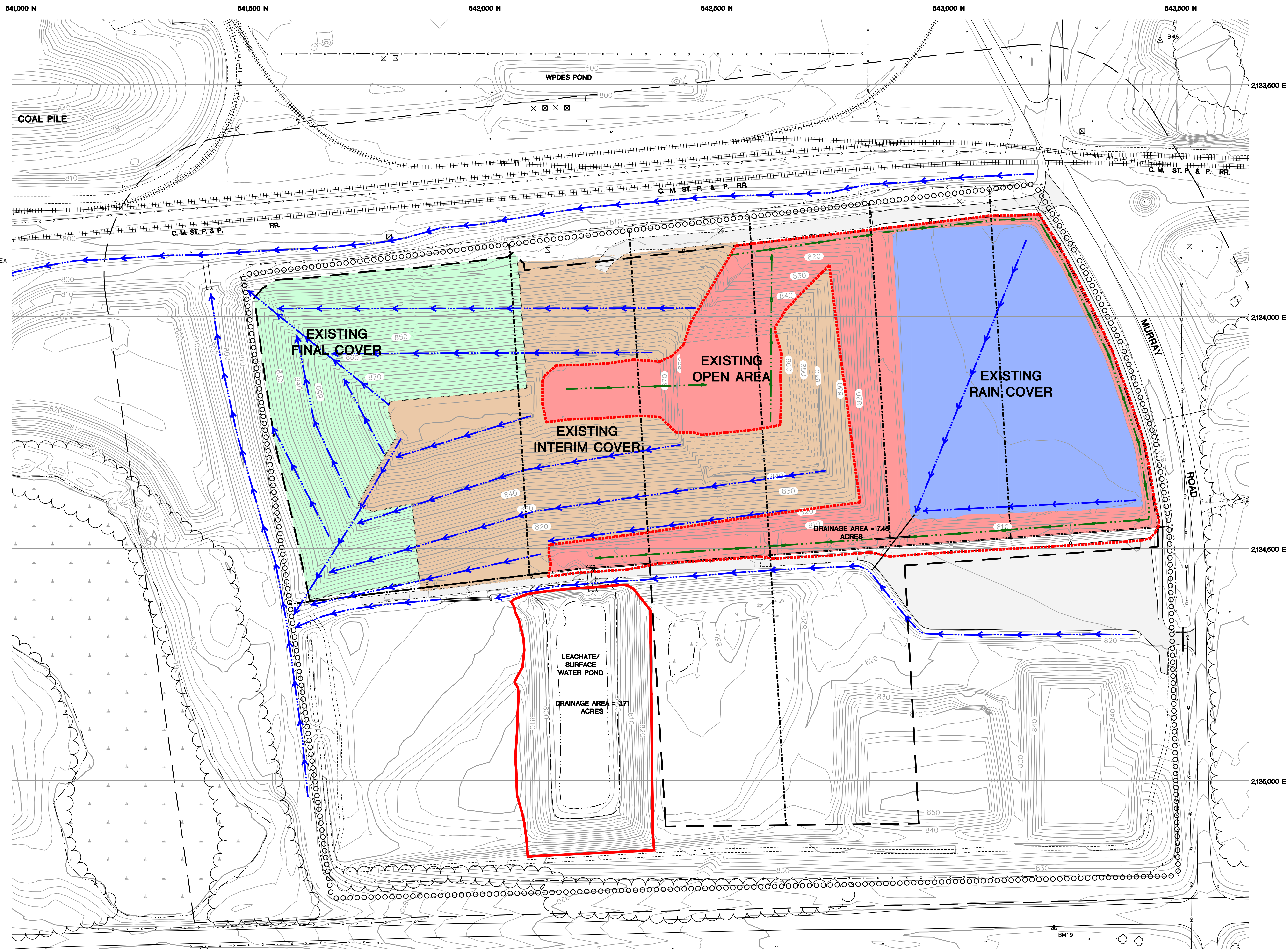
6. Filling Phase 3:

- The contributing area of landfill to the leachate/surface water pond is 7.64 acres for the leachate/surface water pond to accommodate the runoff from a 25-year, 24-hour storm without overtopping.
- The remainder of landfill would need to be closed/covered with final or intermediate cover and routed away from the pond.
- **Figure 4** shows a proposed filling sequence, and **Figure 4a** shows the various operating levels of the leachate/surface water pond to accommodate the various storm events with the additional cover in place.

7. Filling Phase 4:

- The contributing area of landfill to the leachate/surface water pond is 8.44 acres for the leachate/surface water pond to accommodate the runoff from a 25-year, 24-hour storm without overtopping.
- The remainder of landfill would need to be closed/covered with final or intermediate cover and routed away from the pond.
- **Figure 5** shows a proposed filling sequence, and **Figure 5a** shows the various operating levels of the leachate/surface water pond to accommodate the various storm events with the additional cover in place.

The HydroCAD reports for the maximum open contributing area, each scenario modeled are attached.



- LEGEND**
- DRY ASH DISPOSAL FACILITY LIMITS
 - LIMITS OF WASTE
 - - - - - LINER PHASE/MODULE LIMIT
 - 810 — EXISTING GRADE (10' INTERVAL)
 - 840 — EXISTING GRADE (2' INTERVAL)
 - 840 — PROPOSED WASTE GRADE (10' INTERVAL)
 - 840 — PROPOSED WASTE GRADE (2' INTERVAL)
 - — — — — CONTACT WATER DRAINAGE
 - — — — — SURFACE WATER DRAINAGE
 - - - - - PROPOSED OPEN LANDFILL DRAINAGE AREA
 - — — — — PROPOSED LEACHATE/SURFACE WATER DRAINAGE AREA

FILLING SEQUENCE	ESTIMATED AIRSPACE VOLUME	ESTIMATED OPEN AREA
0		
1		
2		
3		
TOTAL		70 ACRES

NOTES:

- SEE SHEET 2 FOR BASE MAP LEGEND ITEMS AND NOTES.

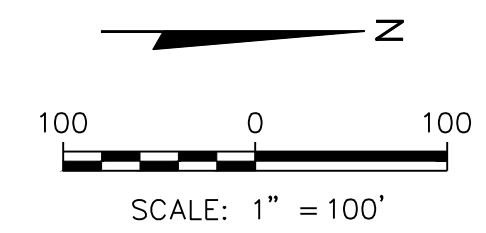
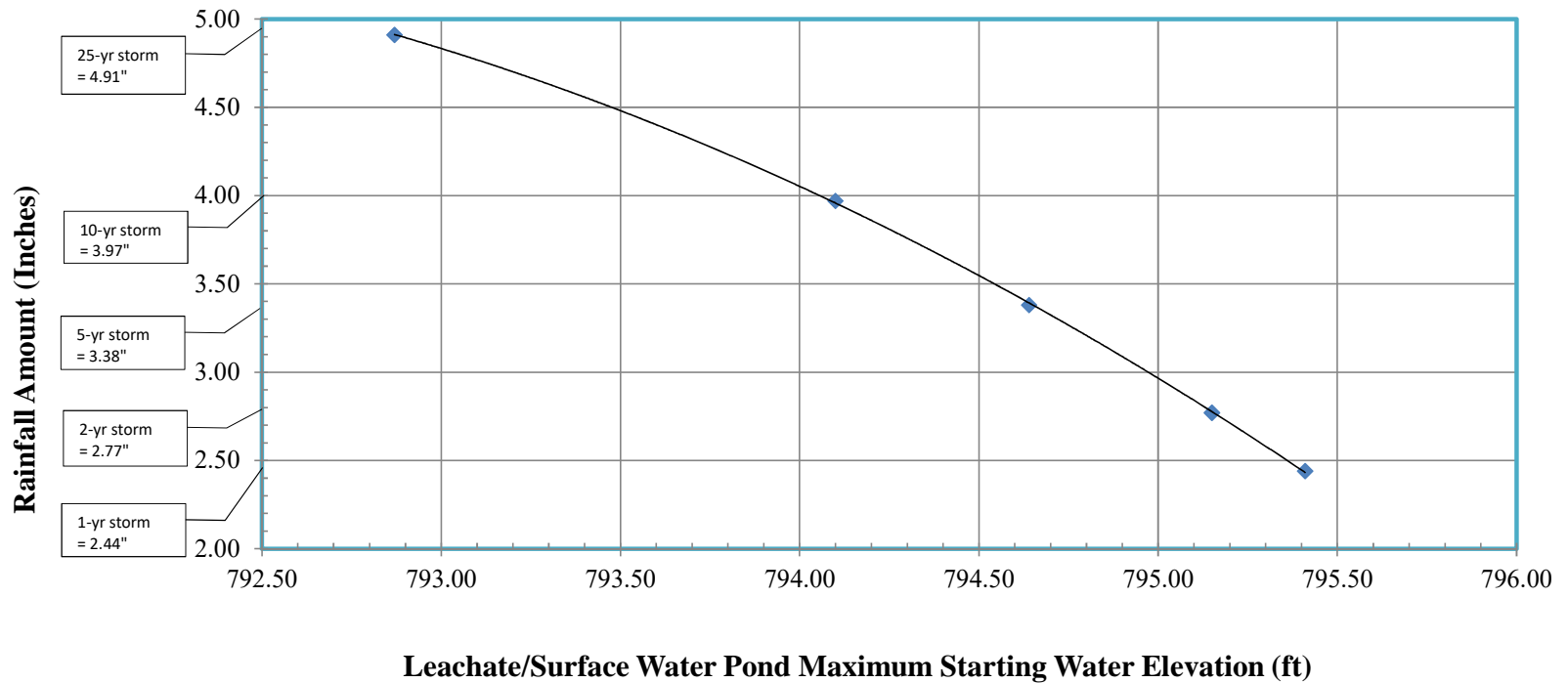


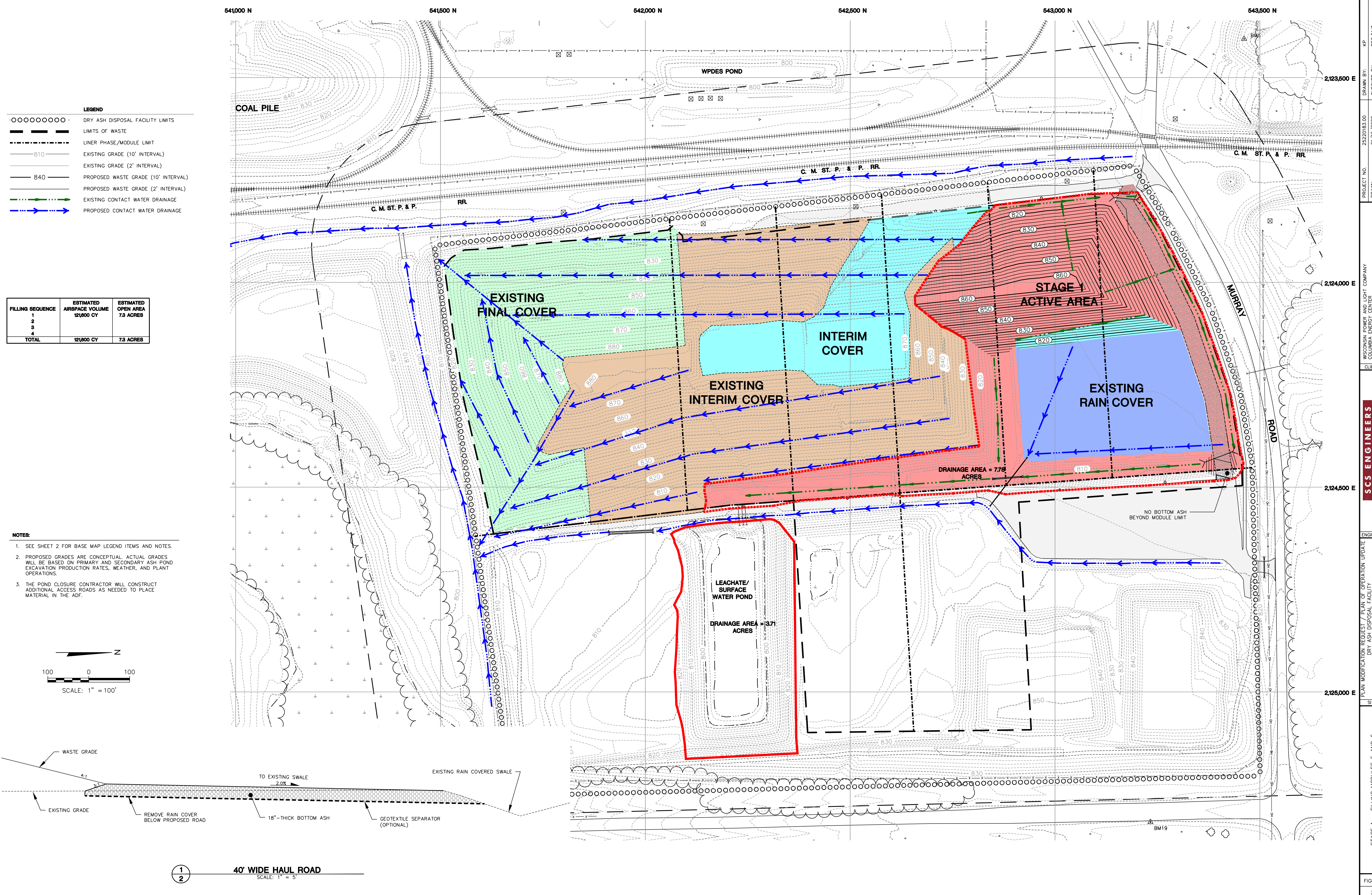
Figure 1A
Columbia Energy Center
Phase 0 Filling- Open Landfill Area
Leachate/Surface Water Pond Maximum Starting Water Elevation



Notes/Assumptions:

1. Maximum starting water elevations based on 2011 Mod 2 as-built survey which determined the top of pond liner elevation = 796.97.
2. Maximum starting water elevation assumes no freeboard.
3. Previously developed HydroCAD model utilized with curve number for intermediate cover areas and ash surfaces assumed at CN = 98.
4. HydroCAD model assumes drainage areas contributing to pond include (Figure 1):
 - Landfill open area = 7.46 acres.
 - Leachate/Surface Water Pond Area, 3.71 acres.
5. Maximum open area per HydroCAD model during filling is 7.78 acres.

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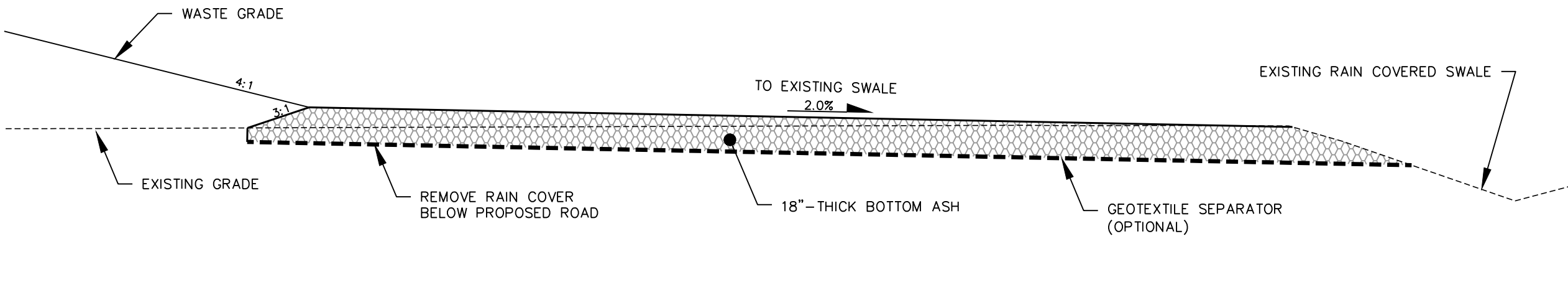
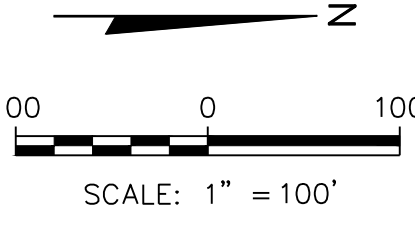


LEGEND

- DRY ASH DISPOSAL FACILITY LIMITS
- LIMITS OF WASTE
- - - - - LINER PHASE/MODULE LIMIT
- 810 — EXISTING GRADE (10' INTERVAL)
- 840 — EXISTING GRADE (2' INTERVAL)
- 840 — PROPOSED WASTE GRADE (10' INTERVAL)
- 840 — PROPOSED WASTE GRADE (2' INTERVAL)
- EXISTING CONTACT WATER DRAINAGE
- - - - - PROPOSED CONTACT WATER DRAINAGE

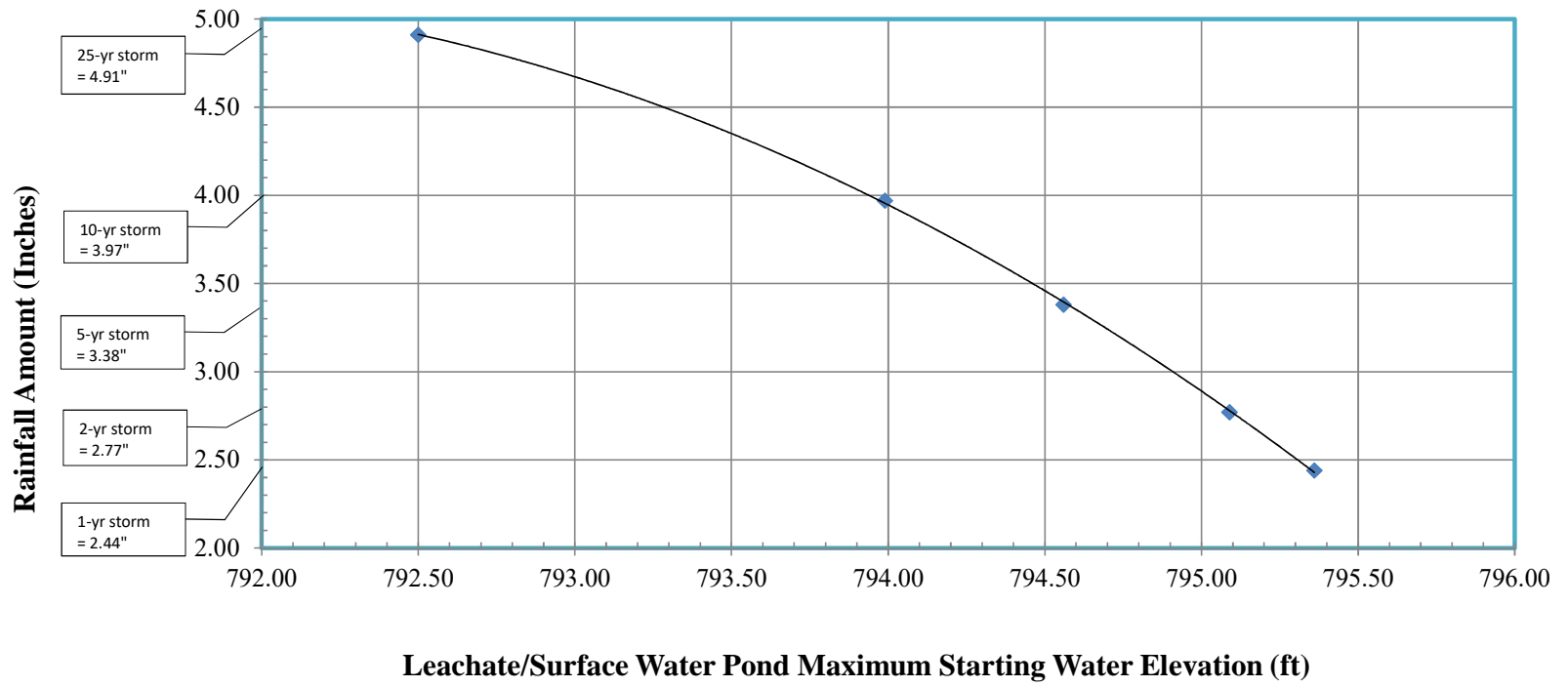
FILLING SEQUENCE	ESTIMATED AIRSPACE VOLUME	ESTIMATED OPEN AREA
1	121600 CY	73 ACRES
2		
3		
4		
TOTAL	121600 CY	73 ACRES

- NOTES:
- SEE SHEET 2 FOR BASE MAP LEGEND ITEMS AND NOTES.
 - PROPOSED GRADES ARE CONCEPTUAL. ACTUAL GRADES WILL BE BASED ON PRIMARY AND SECONDARY ASH POND EXCAVATION PRODUCTION RATES, WEATHER, AND PLANT OPERATIONS.
 - THE POND CLOSURE CONTRACTOR WILL CONSTRUCT ADDITIONAL ACCESS ROADS AS NEEDED TO PLACE MATERIAL IN THE ADF.



1 2
40' WIDE HAUL ROAD
SCALE: 1" = 5'

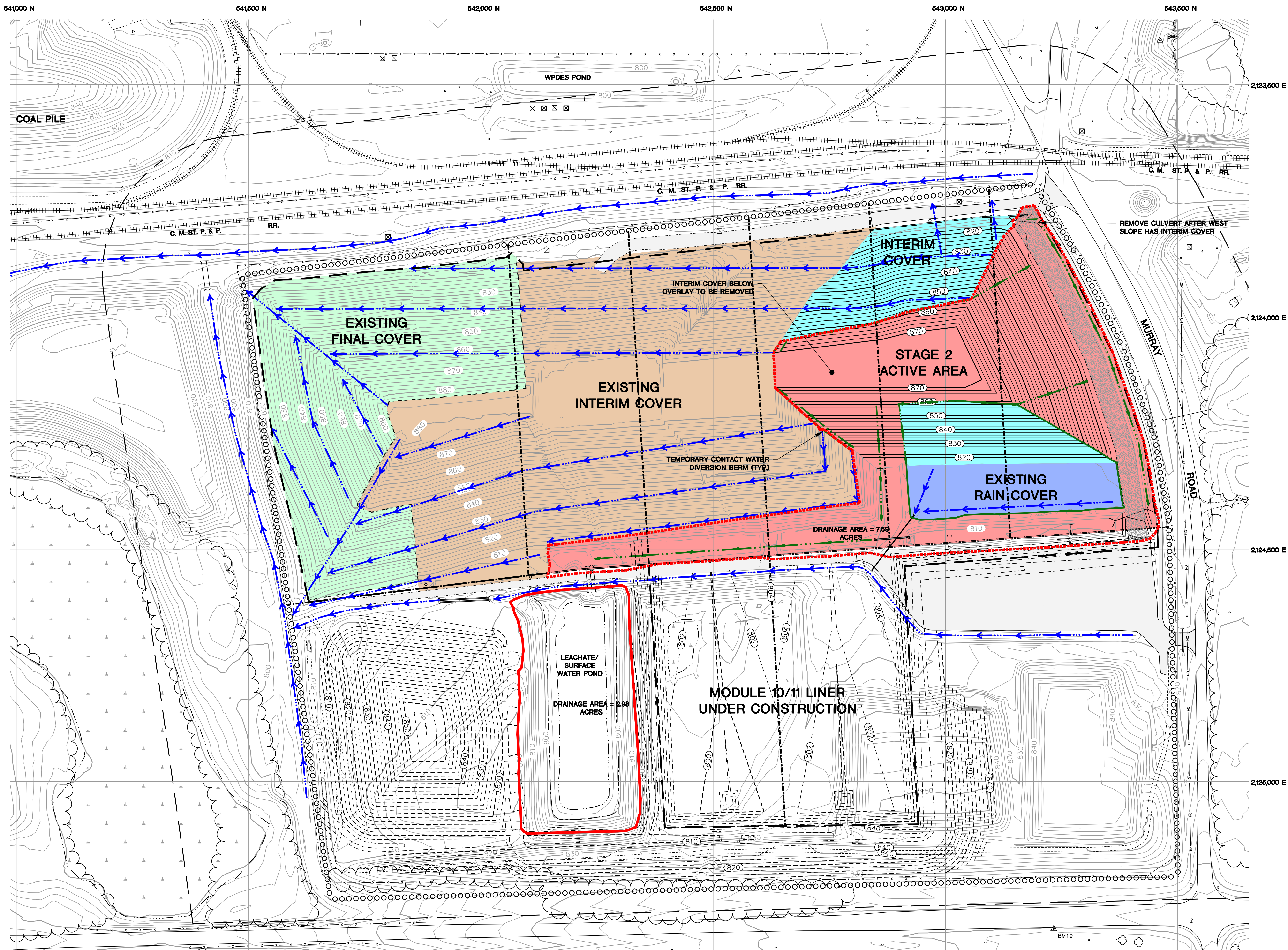
Figure 2A
Columbia Energy Center
Phase 1 Filling- Open Landfill Area
Leachate/Surface Water Pond Maximum Starting Water Elevation



Notes/Assumptions:

1. Maximum starting water elevations based on 2011 Mod 2 as-built survey which determined the top of pond liner elevation = 796.97.
2. Maximum starting water elevation assumes no freeboard.
3. Previously developed HydroCAD model utilized with curve number for intermediate cover areas and ash surfaces assumed at CN = 98.
4. HydroCAD model assumes drainage areas contributing to pond include (Figure 1):
 - Landfill open area = 7.78 acres.
 - Leachate/Surface Water Pond Area, 3.71 acres.
5. Maximum open area per HydroCAD model during filling is 7.78 acres.

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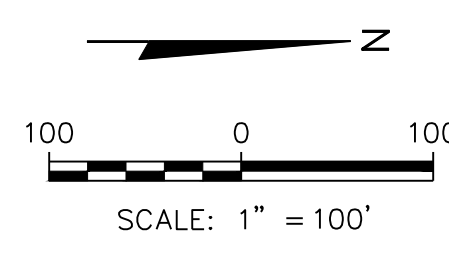


LEGEND

- DRY ASH DISPOSAL FACILITY LIMITS
- LIMITS OF WASTE
- - - - - LINER PHASE/MODULE LIMIT
- - - - - FINAL COVER LIMITS
- 810 EXISTING GRADE (10' INTERVAL)
- 840 EXISTING GRADE (2' INTERVAL)
- 840 PROPOSED WASTE GRADE (10' INTERVAL)
- 840 PROPOSED WASTE GRADE (2' INTERVAL)
- 840 PROPOSED MODULE 10 AND 11 SUBBASE AND PERIMETER WASTE GRADE (10' INTERVAL)
- 840 PROPOSED MODULE 10 AND 11 SUBBASE AND PERIMETER WASTE GRADE (2' INTERVAL)
- EXISTING CONTACT WATER DRAINAGE
- PROPOSED CONTACT WATER DRAINAGE
- PROPOSED OPEN LANDFILL DRAINAGE AREA
- PROPOSED LEACHATE/SURFACE WATER DRAINAGE AREA

FILLING SEQUENCE	ESTIMATED AIRSPACE VOLUME	ESTIMATED OPEN AREA
1	121600 CY	72 ACRES
2	151000 CY	72 ACRES
3		
4		
TOTAL	272700 CY	72 ACRES

- NOTES:**
- SEE SHEET 2 FOR BASE MAP LEGEND ITEMS AND NOTES.
 - PROPOSED GRADES ARE CONCEPTUAL. ACTUAL GRADES WILL BE BASED ON PRIMARY AND SECONDARY ASH POND EXCAVATION PRODUCTION RATES, WEATHER, AND PLANT OPERATIONS.
 - THE POND CLOSURE CONTRACTOR WILL CONSTRUCT ADDITIONAL ACCESS ROADS AS NEEDED TO PLACE MATERIAL IN THE ADF.



PROJECT NO. 25220183.00
 DRAWN BY: PEG/AJT
 CHECKED BY: PEG/AJT
 REVISIONS: 01/15/2022
 05/09/2022
 APPROVED BY: MRH 05/25/2022

WISCONSIN POWER AND LIGHT COMPANY
 COLUMBIA ENERGY CENTER
 93735 MURRAY ROAD
 PARKEEVILLE, WI 53954

CLIENT

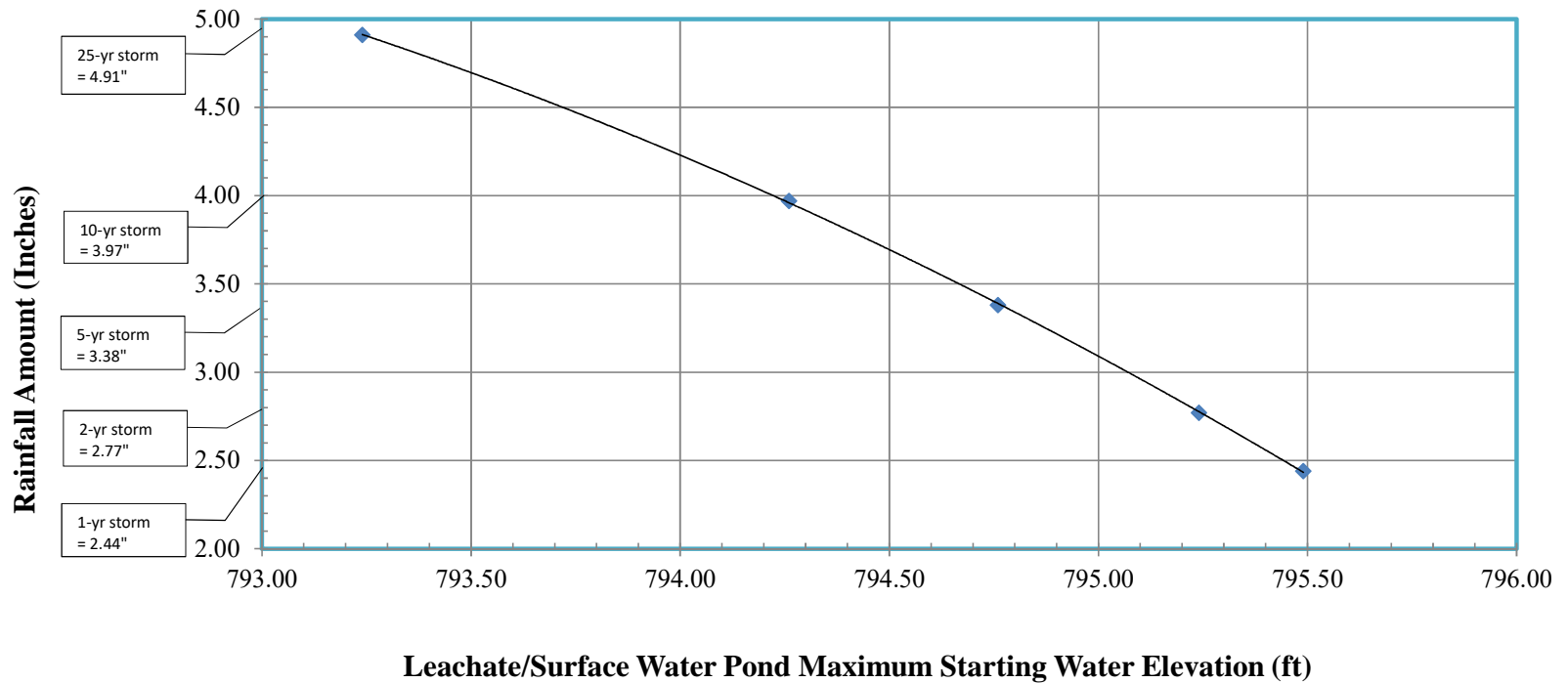
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ENGINEER

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 TOWN OF PACIFIC, WISCONSIN

FIGURE 3

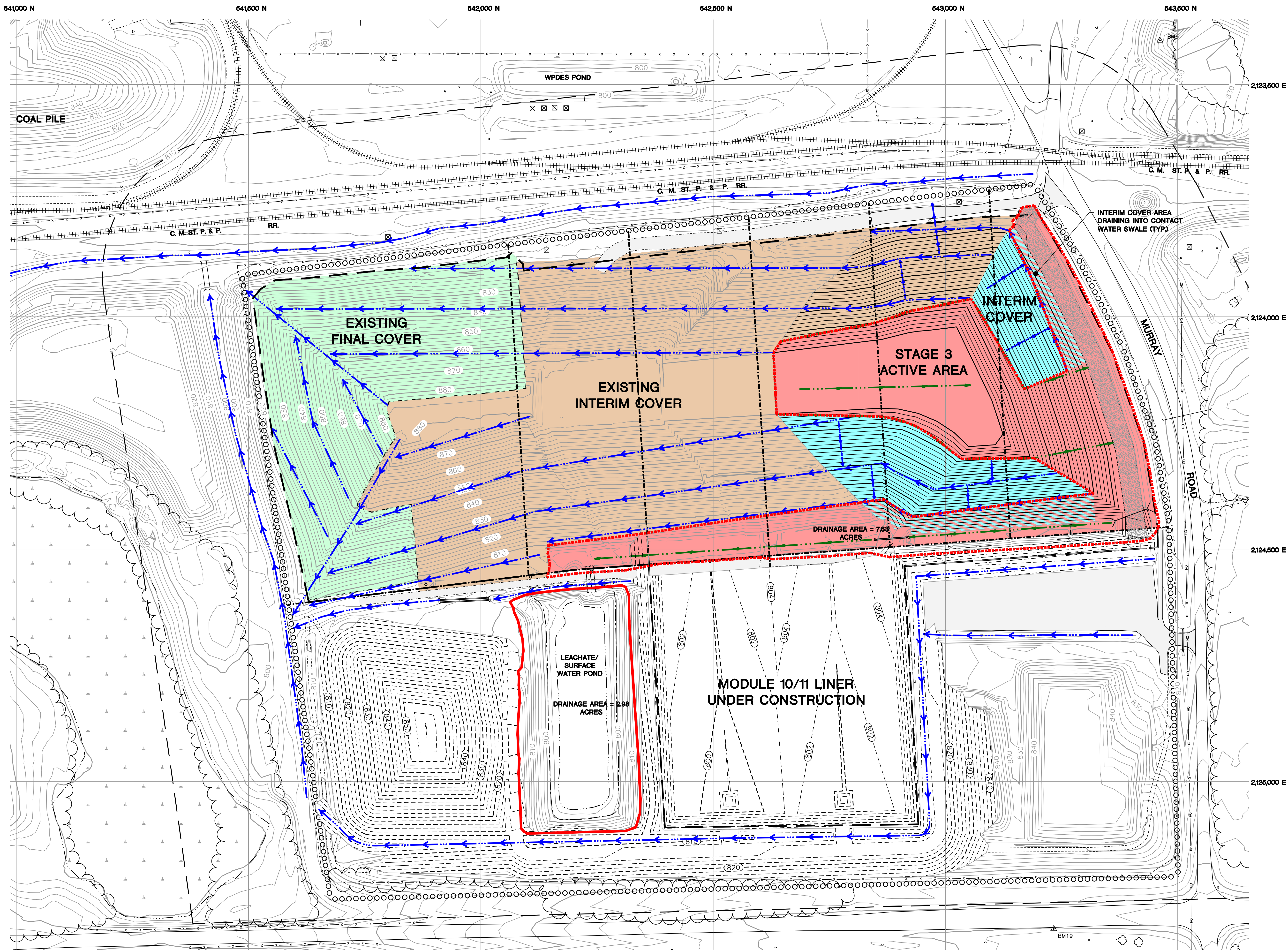
Figure 3A
Columbia Energy Center
Phase 2 Filling- Open Landfill Area
Leachate/Surface Water Pond Maximum Starting Water Elevation



Notes/Assumptions:

1. Maximum starting water elevations based on 2011 Mod 2 as-built survey which determined the top of pond liner elevation = 796.97.
2. Maximum starting water elevation assumes no freeboard.
3. Previously developed HydroCAD model utilized with curve number for intermediate cover areas and ash surfaces assumed at CN = 98.
4. HydroCAD model assumes drainage areas contributing to pond include (Figure 1):
 - Landfill open area = 7.69 acres.
 - Leachate/Surface Water Pond Area, 2.98 acres.
5. Maximum open area per HydroCAD model during filling is 8.51 acres.

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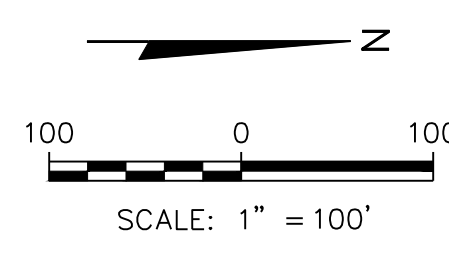


LEGEND

- DRY ASH DISPOSAL FACILITY LIMITS
- LIMITS OF WASTE
- - - - - LINER PHASE/MODULE LIMIT
- 810 EXISTING GRADE (10' INTERVAL)
- 840 EXISTING GRADE (2' INTERVAL)
- 840 PROPOSED WASTE GRADE (10' INTERVAL)
- 840 PROPOSED WASTE GRADE (2' INTERVAL)
- 840 PROPOSED MODULE 10 AND 11 SUBBASE AND PERIMETER WASTE GRADE (10' INTERVAL)
- 840 PROPOSED MODULE 10 AND 11 SUBBASE AND PERIMETER WASTE GRADE (2' INTERVAL)
- EXISTING CONTACT WATER DRAINAGE
- PROPOSED CONTACT WATER DRAINAGE
- PROPOSED OPEN LANDFILL DRAINAGE AREA
- PROPOSED LEACHATE/SURFACE WATER DRAINAGE AREA

FILLING SEQUENCE	ESTIMATED AIRSPACE VOLUME	ESTIMATED OPEN AREA
1	121,600 CY	
2	151,100 CY	
3	107,300 CY	72 ACRES
4		
TOTAL	380,000 CY	72 ACRES

- NOTES:**
- SEE SHEET 2 FOR BASE MAP LEGEND ITEMS AND NOTES.
 - PROPOSED GRADES ARE CONCEPTUAL. ACTUAL GRADES WILL BE BASED ON PRIMARY AND SECONDARY ASH POND EXCAVATION PRODUCTION RATES, WEATHER, AND PLANT OPERATIONS.
 - THE POND CLOSURE CONTRACTOR WILL CONSTRUCT ADDITIONAL ACCESS ROADS AS NEEDED TO PLACE MATERIAL IN THE ADF.



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 APPROVED BY: MRH 05/25/2022

WISCONSIN POWER AND LIGHT COMPANY
 COLUMBIA ENERGY CENTER
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 PARKEEVILLE, WI 53954

CLIENT

SCS ENGINEERS
 2820 JIMMY DRIVE MADISON, WI 53718-9291
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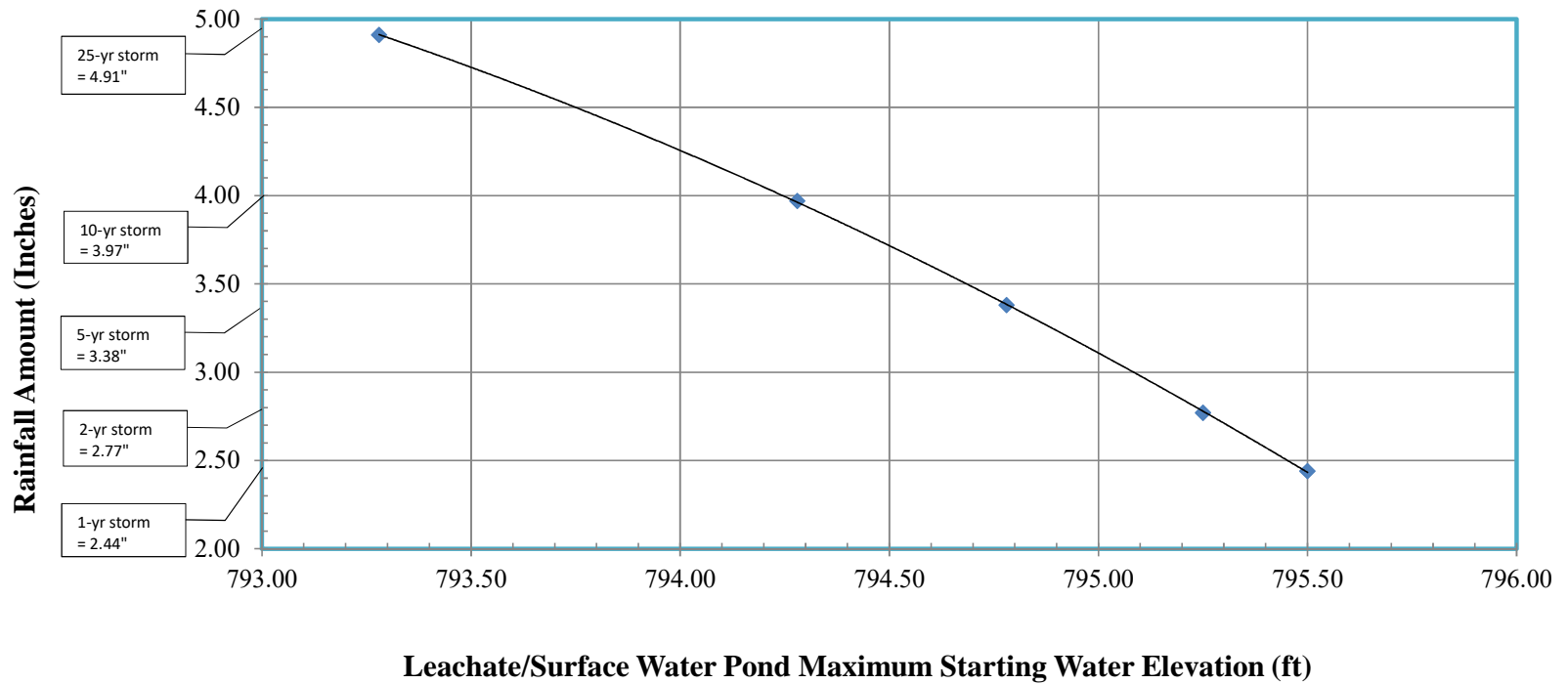
ENGINEER

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 TOWN OF PACIFIC, WISCONSIN

STAGE 3 - FILLING MODULES 5 AND 6

FIGURE 4

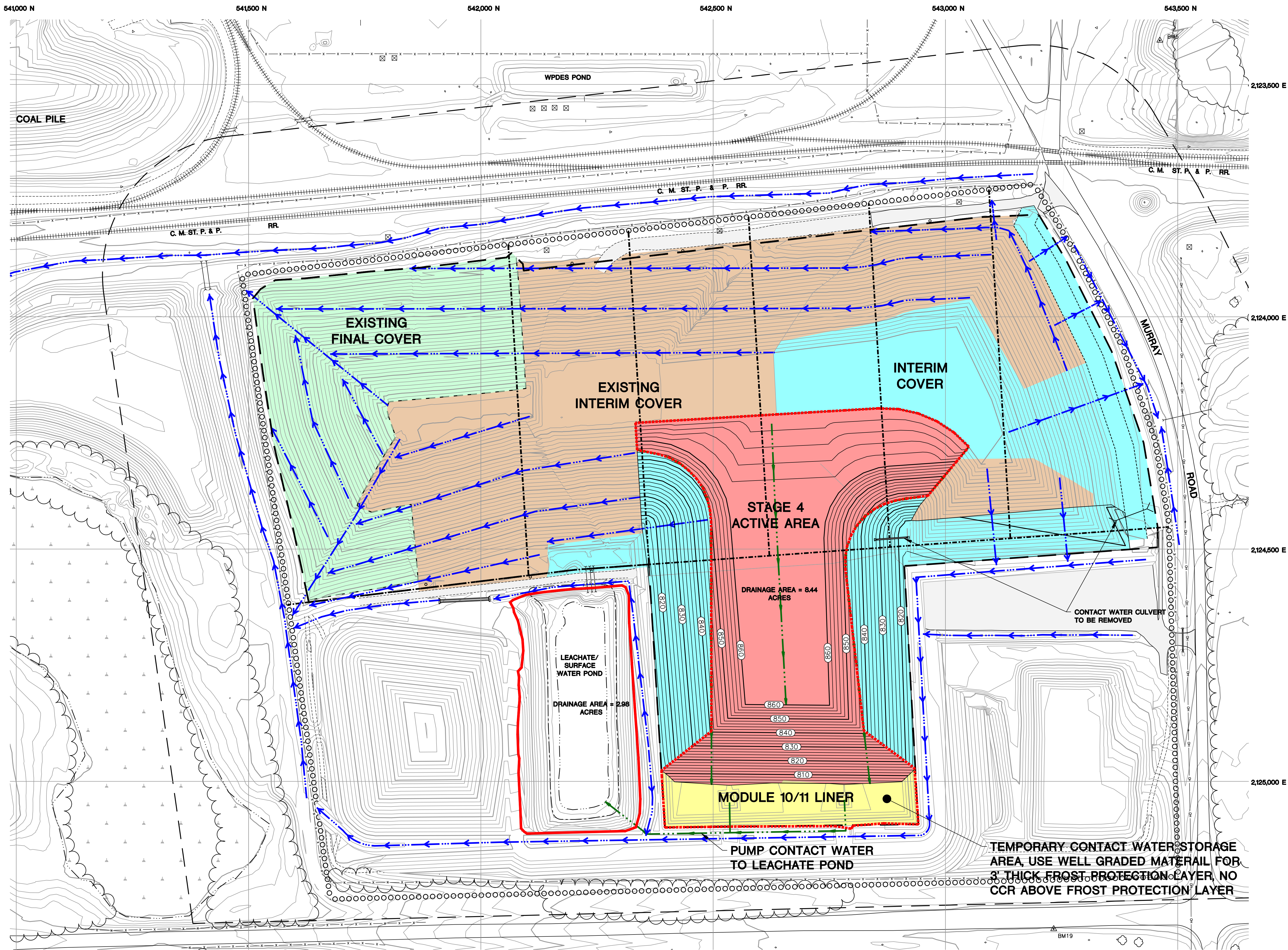
Figure 4A
Columbia Energy Center
Phase 3 Filling- Open Landfill Area
Leachate/Surface Water Pond Maximum Starting Water Elevation



Notes/Assumptions:

1. Maximum starting water elevations based on 2011 Mod 2 as-built survey which determined the top of pond liner elevation = 796.97.
2. Maximum starting water elevation assumes no freeboard.
3. Previously developed HydroCAD model utilized with curve number for intermediate cover areas and ash surfaces assumed at CN = 98.
4. HydroCAD model assumes drainage areas contributing to pond include (Figure 1):
 - Landfill open area = 7.64 acres.
 - Leachate/Surface Water Pond Area, 2.98 acres.
5. Maximum open area per HydroCAD model during filling is 8.51 acres.

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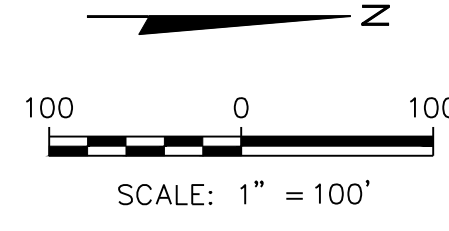


LEGEND

- DRY ASH DISPOSAL FACILITY LIMITS
- LIMITS OF WASTE
- - - - - LINER PHASE/MODULE LIMIT
- FINAL COVER LIMITS
- 810 EXISTING GRADE (10' INTERVAL)
- 840 EXISTING GRADE (2' INTERVAL)
- 840 PROPOSED WASTE GRADE (10' INTERVAL)
- 840 PROPOSED WASTE GRADE (2' INTERVAL)
- - - - - PROPOSED MODULE 10 AND 11 SUBBASE AND PERIMETER WASTE GRADE (10' INTERVAL)
- - - - - PROPOSED MODULE 10 AND 11 SUBBASE AND PERIMETER WASTE GRADE (2' INTERVAL)
- EXISTING CONTACT WATER DRAINAGE
- PROPOSED CONTACT WATER DRAINAGE
- PROPOSED OPEN LANDFILL DRAINAGE AREA
- PROPOSED LEACHATE/SURFACE WATER DRAINAGE AREA

FILLING SEQUENCE	ESTIMATED AIRSPACE VOLUME	ESTIMATED OPEN AREA
1	121,600 CY	
2	151,100 CY	
3	107,300 CY	
4	471,600 CY	73 ACRES
TOTAL	869,600 CY	73 ACRES

- NOTES:**
- SEE SHEET 2 FOR BASE MAP LEGEND ITEMS AND NOTES.
 - PROPOSED GRADES ARE CONCEPTUAL. ACTUAL GRADES WILL BE BASED ON PRIMARY AND SECONDARY ASH POND EXCAVATION PRODUCTION RATES, WEATHER, AND PLANT OPERATIONS.
 - THE POND CLOSURE CONTRACTOR WILL CONSTRUCT ADDITIONAL ACCESS ROADS AS NEEDED TO PLACE MATERIAL IN THE ADF.



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 APPROVED BY: MRH 05/25/2022

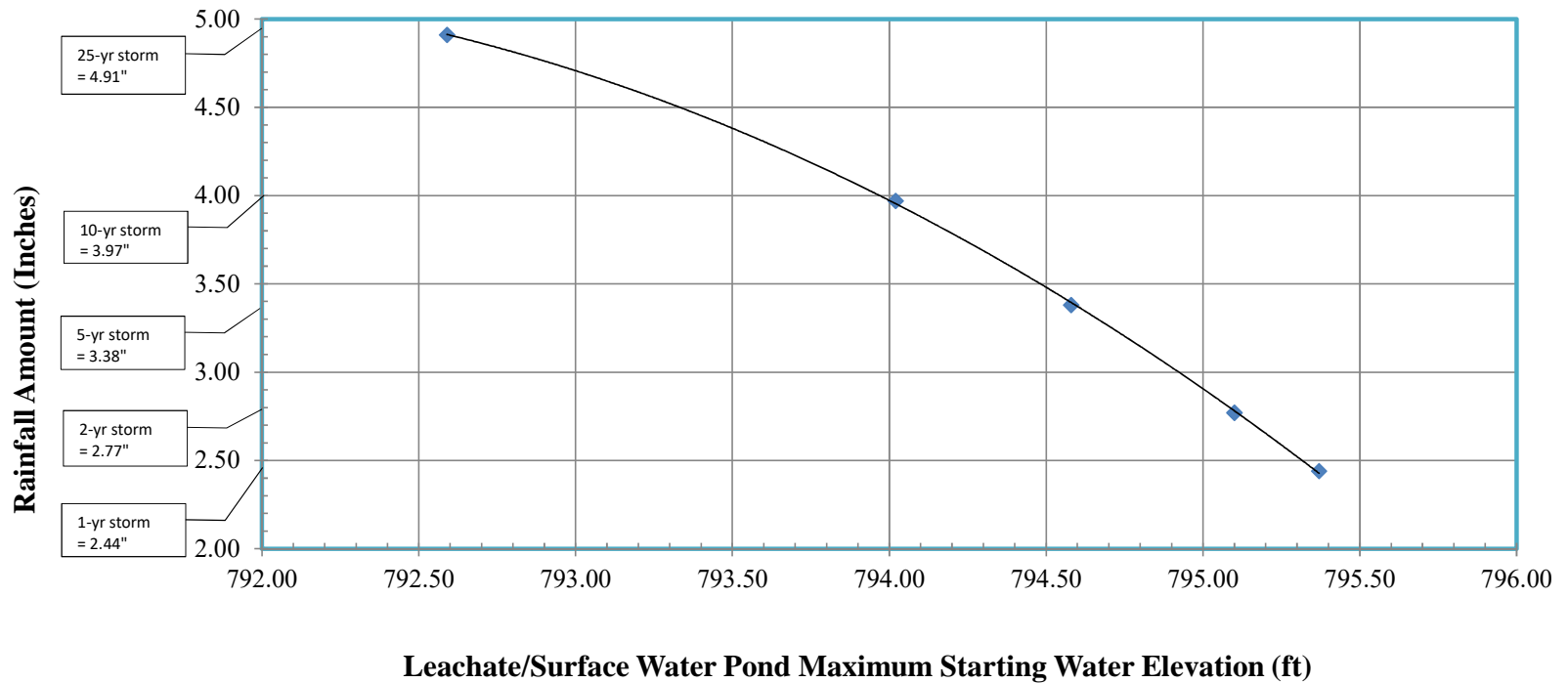
WISCONSIN POWER AND LIGHT COMPANY
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STAGE 4 - FILLING MODULES 10 AND 11
 FIGURE 5

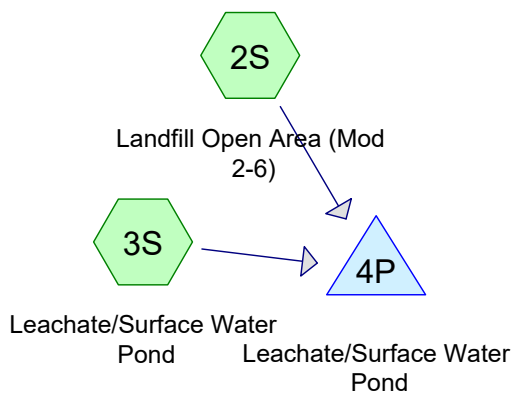
**Figure 5A
Columbia Energy Center
Phase 4 Filling- Open Landfill Area
Leachate/Surface Water Pond Maximum Starting Water Elevation**



Notes/Assumptions:

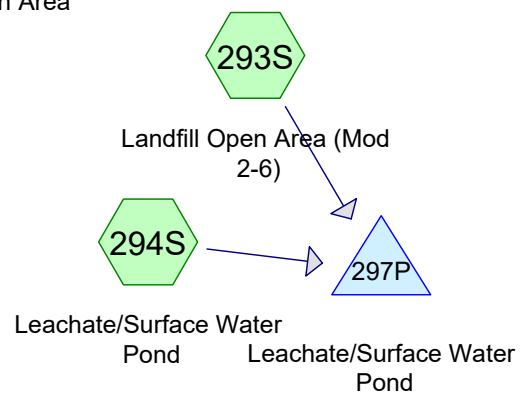
1. Maximum starting water elevations based on 2011 Mod 2 as-built survey which determined the top of pond liner elevation = 796.97.
2. Maximum starting water elevation assumes no freeboard.
3. Previously developed HydroCAD model utilized with curve number for intermediate cover areas and ash surfaces assumed at CN = 98.
4. HydroCAD model assumes drainage areas contributing to pond include (Figure 1):
 - Landfill open area = 8.44 acres.
 - Leachate/Surface Water Pond Area, 2.98 acres.
5. Maximum open area per HydroCAD model during filling is 8.51 acres.

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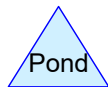
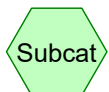
Phase 0 Filling **Phase 1 Filling**

Maximum Open Area



Phase 2 Filling **Phase 3 Filling**

Phase 4 Filling



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: Landfill Open Area	Runoff Area=7.780 ac	100.00% Impervious	Runoff Depth=4.67"
	Tc=20.0 min	CN=98	Runoff=31.75 cfs 3.030 af
Subcatchment 3S: Leachate/Surface	Runoff Area=3.710 ac	100.00% Impervious	Runoff Depth=4.67"
	Tc=0.0 min	CN=98	Runoff=26.38 cfs 1.445 af
Subcatchment 293S: Landfill Open Area	Runoff Area=8.510 ac	100.00% Impervious	Runoff Depth=4.67"
	Tc=20.0 min	CN=98	Runoff=34.73 cfs 3.314 af
Subcatchment 294S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=4.67"
	Tc=0.0 min	CN=98	Runoff=21.19 cfs 1.161 af
Pond 4P: Leachate/SurfaceWater Pond	Peak Elev=796.97'	Storage=197,946 cf	Inflow=40.23 cfs 4.475 af
			Outflow=0.00 cfs 0.000 af
Pond 297P: Leachate/SurfaceWater Pond	Peak Elev=796.97'	Storage=197,946 cf	Inflow=39.03 cfs 4.475 af
			Outflow=0.00 cfs 0.000 af

Summary for Subcatchment 2S: Landfill Open Area (Mod 2-6)

Runoff = 31.75 cfs @ 12.28 hrs, Volume= 3.030 af, Depth= 4.67"
 Routed to Pond 4P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 7.075	98	Mod 2 - 6 Open Area
* 0.705	98	Access Road
7.780	98	Weighted Average
7.780		100.00% Impervious Area

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

Summary for Subcatchment 3S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 26.38 cfs @ 12.04 hrs, Volume= 1.445 af, Depth= 4.67"
 Routed to Pond 4P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 3.710	98	Leachate Surface Water Pond
3.710		100.00% Impervious Area

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

Summary for Subcatchment 293S: Landfill Open Area (Mod 2-6)

Runoff = 34.73 cfs @ 12.28 hrs, Volume= 3.314 af, Depth= 4.67"
 Routed to Pond 297P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 8.510	98	Mod 2 - 11 Open Area
8.510		100.00% Impervious Area

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

Summary for Subcatchment 294S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.19 cfs @ 12.04 hrs, Volume= 1.161 af, Depth= 4.67"
 Routed to Pond 297P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Pond 4P: Leachate/Surface Water Pond

Inflow Area = 11.490 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 40.23 cfs @ 12.06 hrs, Volume= 4.475 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 792.50' Surf.Area= 11,070 sf Storage= 3,030 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,611 sf Storage= 197,946 cf (194,915 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (194,617 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 297P: Leachate/Surface Water Pond

Inflow Area = 11.490 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 39.03 cfs @ 12.27 hrs, Volume= 4.475 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 792.50' Surf.Area= 11,070 sf Storage= 3,030 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,611 sf Storage= 197,946 cf (194,915 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (194,617 cf above start)

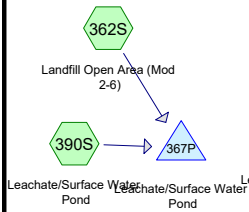
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

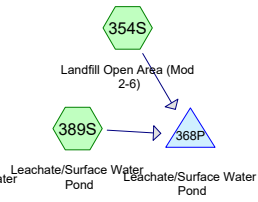
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

1-Year Storm Analysis

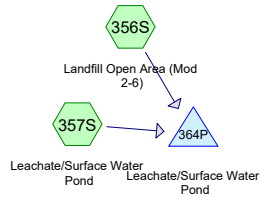
Phase 0 Filling



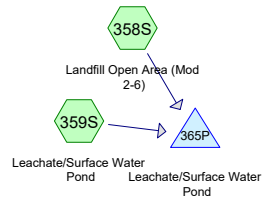
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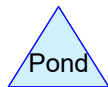
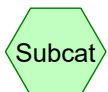
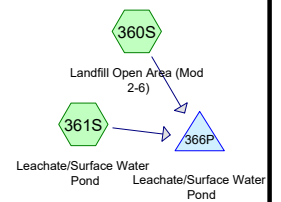
Phase 2 Filling



Phase 3 Filling



Phase 4 Filling



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 354S: Landfill Open Area	Runoff Area=339,047 sf	100.00% Impervious	Runoff Depth=2.21"
	Tc=20.0 min	CN=98	Runoff=15.52 cfs 1.434 af
Subcatchment 356S: Landfill Open Area	Runoff Area=335,031 sf	100.00% Impervious	Runoff Depth=2.21"
	Tc=20.0 min	CN=98	Runoff=15.34 cfs 1.417 af
Subcatchment 357S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=2.21"
	Tc=0.0 min	CN=98	Runoff=10.38 cfs 0.549 af
Subcatchment 358S: Landfill Open Area	Runoff Area=332,594 sf	100.00% Impervious	Runoff Depth=2.21"
	Tc=20.0 min	CN=98	Runoff=15.23 cfs 1.407 af
Subcatchment 359S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=2.21"
	Tc=0.0 min	CN=98	Runoff=10.38 cfs 0.549 af
Subcatchment 360S: Landfill Open Area	Runoff Area=367,758 sf	100.00% Impervious	Runoff Depth=2.21"
	Tc=20.0 min	CN=98	Runoff=16.84 cfs 1.556 af
Subcatchment 361S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=2.21"
	Tc=0.0 min	CN=98	Runoff=10.38 cfs 0.549 af
Subcatchment 362S: Landfill Open Area	Runoff Area=324,737 sf	100.00% Impervious	Runoff Depth=2.21"
	Tc=20.0 min	CN=98	Runoff=14.87 cfs 1.374 af
Subcatchment 389S: Leachate/Surface	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=2.21"
	Tc=0.0 min	CN=98	Runoff=12.91 cfs 0.683 af
Subcatchment 390S: Leachate/Surface	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=2.21"
	Tc=0.0 min	CN=98	Runoff=12.91 cfs 0.683 af
Pond 364P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,850 cf	Inflow=17.45 cfs 1.966 af Outflow=0.00 cfs 0.000 af
Pond 365P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,930 cf	Inflow=17.34 cfs 1.956 af Outflow=0.00 cfs 0.000 af
Pond 366P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,593 cf	Inflow=18.94 cfs 2.105 af Outflow=0.00 cfs 0.000 af
Pond 367P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,577 cf	Inflow=19.31 cfs 2.056 af Outflow=0.00 cfs 0.000 af
Pond 368P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,611 cf	Inflow=19.60 cfs 2.117 af Outflow=0.00 cfs 0.000 af

Summary for Subcatchment 354S: Landfill Open Area (Mod 2-6)

Runoff = 15.52 cfs @ 12.29 hrs, Volume= 1.434 af, Depth= 2.21"
 Routed to Pond 368P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (sf)	CN	Description
* 339,047	98	Mod 2 - 6 Open Area
339,047		100.00% Impervious Area

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

Summary for Subcatchment 356S: Landfill Open Area (Mod 2-6)

Runoff = 15.34 cfs @ 12.29 hrs, Volume= 1.417 af, Depth= 2.21"
 Routed to Pond 364P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (sf)	CN	Description
* 335,031	98	Mod 2 - 6 Open Area
335,031		100.00% Impervious Area

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

Summary for Subcatchment 357S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 10.38 cfs @ 12.04 hrs, Volume= 0.549 af, Depth= 2.21"
 Routed to Pond 364P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 358S: Landfill Open Area (Mod 2-6)

Runoff = 15.23 cfs @ 12.29 hrs, Volume= 1.407 af, Depth= 2.21"
 Routed to Pond 365P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (sf)	CN	Description
* 332,594	98	Mod 2 - 6 Open Area
332,594		100.00% Impervious Area

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

Summary for Subcatchment 359S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 10.38 cfs @ 12.04 hrs, Volume= 0.549 af, Depth= 2.21"
 Routed to Pond 365P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 360S: Landfill Open Area (Mod 2-6)

Runoff = 16.84 cfs @ 12.29 hrs, Volume= 1.556 af, Depth= 2.21"
 Routed to Pond 366P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (sf)	CN	Description
* 367,758	98	Mod 2 - 11 Open Area
367,758		100.00% Impervious Area

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

Summary for Subcatchment 361S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 10.38 cfs @ 12.04 hrs, Volume= 0.549 af, Depth= 2.21"
 Routed to Pond 366P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 362S: Landfill Open Area (Mod 2-6)

Runoff = 14.87 cfs @ 12.29 hrs, Volume= 1.374 af, Depth= 2.21"
 Routed to Pond 367P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (sf)	CN	Description
* 324,737	98	Mod 2 - 6 Open Area
324,737		100.00% Impervious Area

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

Summary for Subcatchment 389S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 12.91 cfs @ 12.04 hrs, Volume= 0.683 af, Depth= 2.21"
 Routed to Pond 368P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Subcatchment 390S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 12.91 cfs @ 12.04 hrs, Volume= 0.683 af, Depth= 2.21"
 Routed to Pond 367P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Pond 364P: Leachate/Surface Water Pond

Inflow Area = 10.671 ac, 100.00% Impervious, Inflow Depth = 2.21" for 1-yr, 24-hr storm event
 Inflow = 17.45 cfs @ 12.27 hrs, Volume= 1.966 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.49' Surf.Area= 52,866 sf Storage= 112,201 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,604 sf Storage= 197,850 cf (85,648 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (85,446 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

WPL Columbia_Leachate Pond Evaluation_22MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Prepared by SCS Engineers

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 365P: Leachate/Surface Water Pond

Inflow Area = 10.615 ac, 100.00% Impervious, Inflow Depth = 2.21" for 1-yr, 24-hr storm event
 Inflow = 17.34 cfs @ 12.27 hrs, Volume= 1.956 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.50' Surf.Area= 52,945 sf Storage= 112,730 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,610 sf Storage= 197,930 cf (85,199 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (84,917 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 366P: Leachate/Surface Water Pond

Inflow Area = 11.423 ac, 100.00% Impervious, Inflow Depth = 2.21" for 1-yr, 24-hr storm event
 Inflow = 18.94 cfs @ 12.27 hrs, Volume= 2.105 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.37' Surf.Area= 51,921 sf Storage= 105,914 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,583 sf Storage= 197,593 cf (91,679 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (91,733 cf above start)

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

WPL Columbia_Leachate Pond Evaluation_22MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

Prepared by SCS Engineers

Printed 5/25/2022

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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 367P: Leachate/Surface Water Pond

Inflow Area = 11.161 ac, 100.00% Impervious, Inflow Depth = 2.21" for 1-yr, 24-hr storm event
 Inflow = 19.31 cfs @ 12.05 hrs, Volume= 2.056 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.41' Surf.Area= 52,236 sf Storage= 107,997 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,582 sf Storage= 197,577 cf (89,579 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (89,650 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 368P: Leachate/Surface Water Pond

Inflow Area = 11.489 ac, 100.00% Impervious, Inflow Depth = 2.21" for 1-yr, 24-hr storm event
 Inflow = 19.60 cfs @ 12.06 hrs, Volume= 2.117 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.36' Surf.Area= 51,842 sf Storage= 105,395 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,585 sf Storage= 197,611 cf (92,216 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (92,252 cf above start)

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

WPL Columbia_Leachate Pond Evaluation_22 MSE 24-hr 4 1-yr, 24-hr storm Rainfall=2.44"

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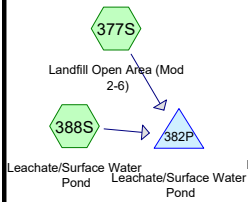
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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

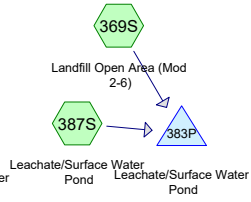
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

2-Year Storm Analysis

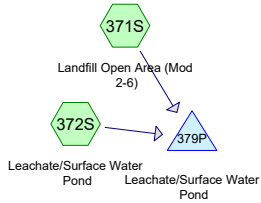
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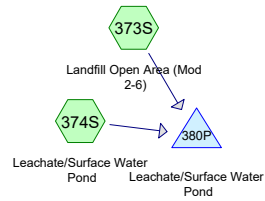
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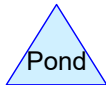
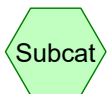
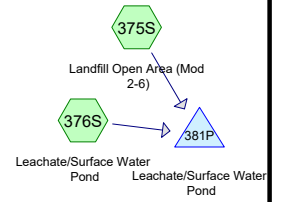
Phase 2 Filling



Phase 3 Filling



Phase 4 Filling



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 369S: Landfill Open Area	Runoff Area=339,047 sf	100.00% Impervious	Runoff Depth=2.54"
	Tc=20.0 min	CN=98	Runoff=17.70 cfs 1.647 af
Subcatchment 371S: Landfill Open Area	Runoff Area=335,031 sf	100.00% Impervious	Runoff Depth=2.54"
	Tc=20.0 min	CN=98	Runoff=17.49 cfs 1.628 af
Subcatchment 372S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=2.54"
	Tc=0.0 min	CN=98	Runoff=11.83 cfs 0.631 af
Subcatchment 373S: Landfill Open Area	Runoff Area=332,594 sf	100.00% Impervious	Runoff Depth=2.54"
	Tc=20.0 min	CN=98	Runoff=17.37 cfs 1.616 af
Subcatchment 374S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=2.54"
	Tc=0.0 min	CN=98	Runoff=11.83 cfs 0.631 af
Subcatchment 375S: Landfill Open Area	Runoff Area=367,758 sf	100.00% Impervious	Runoff Depth=2.54"
	Tc=20.0 min	CN=98	Runoff=19.20 cfs 1.787 af
Subcatchment 376S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=2.54"
	Tc=0.0 min	CN=98	Runoff=11.83 cfs 0.631 af
Subcatchment 377S: Landfill Open Area	Runoff Area=324,737 sf	100.00% Impervious	Runoff Depth=2.54"
	Tc=20.0 min	CN=98	Runoff=16.96 cfs 1.578 af
Subcatchment 387S: Leachate/Surface	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=2.54"
	Tc=0.0 min	CN=98	Runoff=14.72 cfs 0.784 af
Subcatchment 388S: Leachate/Surface	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=2.54"
	Tc=0.0 min	CN=98	Runoff=14.72 cfs 0.784 af
Pond 379P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,593 cf	Inflow=19.90 cfs 2.258 af Outflow=0.00 cfs 0.000 af
Pond 380P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,587 cf	Inflow=19.77 cfs 2.246 af Outflow=0.00 cfs 0.000 af
Pond 381P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,471 cf	Inflow=21.61 cfs 2.417 af Outflow=0.00 cfs 0.000 af
Pond 382P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,558 cf	Inflow=22.04 cfs 2.362 af Outflow=0.00 cfs 0.000 af
Pond 383P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,589 cf	Inflow=22.37 cfs 2.431 af Outflow=0.00 cfs 0.000 af

Summary for Subcatchment 369S: Landfill Open Area (Mod 2-6)

Runoff = 17.70 cfs @ 12.29 hrs, Volume= 1.647 af, Depth= 2.54"
 Routed to Pond 383P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (sf)	CN	Description
* 339,047	98	Mod 2 - 6 Open Area
339,047		100.00% Impervious Area

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

Summary for Subcatchment 371S: Landfill Open Area (Mod 2-6)

Runoff = 17.49 cfs @ 12.29 hrs, Volume= 1.628 af, Depth= 2.54"
 Routed to Pond 379P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (sf)	CN	Description
* 335,031	98	Mod 2 - 6 Open Area
335,031		100.00% Impervious Area

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

Summary for Subcatchment 372S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 11.83 cfs @ 12.04 hrs, Volume= 0.631 af, Depth= 2.54"
 Routed to Pond 379P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 373S: Landfill Open Area (Mod 2-6)

Runoff = 17.37 cfs @ 12.29 hrs, Volume= 1.616 af, Depth= 2.54"
 Routed to Pond 380P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (sf)	CN	Description
* 332,594	98	Mod 2 - 6 Open Area
332,594		100.00% Impervious Area

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

Summary for Subcatchment 374S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 11.83 cfs @ 12.04 hrs, Volume= 0.631 af, Depth= 2.54"
 Routed to Pond 380P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 375S: Landfill Open Area (Mod 2-6)

Runoff = 19.20 cfs @ 12.29 hrs, Volume= 1.787 af, Depth= 2.54"
 Routed to Pond 381P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

WPL Columbia_Leachate Pond Evaluation_22MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

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	Area (sf)	CN	Description
*	367,758	98	Mod 2 - 11 Open Area
	367,758		100.00% Impervious Area

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

Summary for Subcatchment 376S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 11.83 cfs @ 12.04 hrs, Volume= 0.631 af, Depth= 2.54"
 Routed to Pond 381P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

	Area (ac)	CN	Description
*	2.980	98	Leachate Surface Water Pond
	2.980		100.00% Impervious Area

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

Summary for Subcatchment 377S: Landfill Open Area (Mod 2-6)

Runoff = 16.96 cfs @ 12.29 hrs, Volume= 1.578 af, Depth= 2.54"
 Routed to Pond 382P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

	Area (sf)	CN	Description
*	324,737	98	Mod 2 - 6 Open Area
	324,737		100.00% Impervious Area

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

Summary for Subcatchment 387S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.72 cfs @ 12.04 hrs, Volume= 0.784 af, Depth= 2.54"
 Routed to Pond 383P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Subcatchment 388S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.72 cfs @ 12.04 hrs, Volume= 0.784 af, Depth= 2.54"
 Routed to Pond 382P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Pond 379P: Leachate/Surface Water Pond

Inflow Area = 10.671 ac, 100.00% Impervious, Inflow Depth = 2.54" for 2-yr, 24-hr storm event
 Inflow = 19.90 cfs @ 12.27 hrs, Volume= 2.258 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.24' Surf.Area= 50,897 sf Storage= 99,231 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,583 sf Storage= 197,593 cf (98,362 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (98,416 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

WPL Columbia_Leachate Pond Evaluation_22MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 380P: Leachate/Surface Water Pond

Inflow Area = 10.615 ac, 100.00% Impervious, Inflow Depth = 2.54" for 2-yr, 24-hr storm event
 Inflow = 19.77 cfs @ 12.27 hrs, Volume= 2.246 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.25' Surf.Area= 50,975 sf Storage= 99,740 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,583 sf Storage= 197,587 cf (97,847 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (97,907 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 381P: Leachate/Surface Water Pond

Inflow Area = 11.423 ac, 100.00% Impervious, Inflow Depth = 2.54" for 2-yr, 24-hr storm event
 Inflow = 21.61 cfs @ 12.27 hrs, Volume= 2.417 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.10' Surf.Area= 49,793 sf Storage= 92,183 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,574 sf Storage= 197,471 cf (105,288 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (105,464 cf above start)

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

WPL Columbia_Leachate Pond Evaluation_22MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 382P: Leachate/Surface Water Pond

Inflow Area = 11.161 ac, 100.00% Impervious, Inflow Depth = 2.54" for 2-yr, 24-hr storm event
 Inflow = 22.04 cfs @ 12.05 hrs, Volume= 2.362 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.15' Surf.Area= 50,187 sf Storage= 94,682 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,581 sf Storage= 197,558 cf (102,876 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (102,965 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 383P: Leachate/Surface Water Pond

Inflow Area = 11.489 ac, 100.00% Impervious, Inflow Depth = 2.54" for 2-yr, 24-hr storm event
 Inflow = 22.37 cfs @ 12.06 hrs, Volume= 2.431 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 795.09' Surf.Area= 49,715 sf Storage= 91,685 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,583 sf Storage= 197,589 cf (105,904 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (105,962 cf above start)

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

WPL Columbia_Leachate Pond Evaluation_22 MSE 24-hr 4 2-yr, 24-hr storm Rainfall=2.77"

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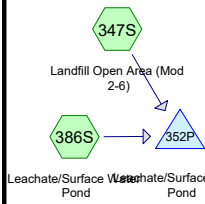
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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

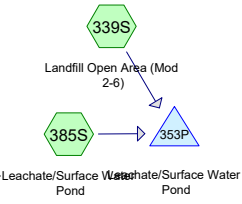
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

5-Year Storm Analysis

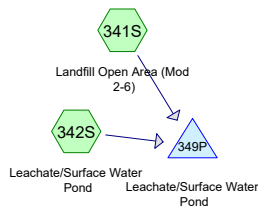
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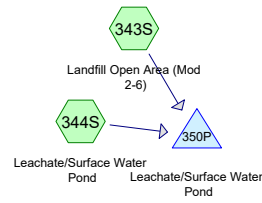
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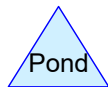
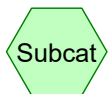
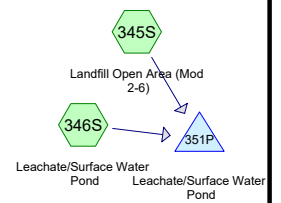
Phase 2 Filling



Phase 3 Filling



Phase 4 Filling



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 339S: Landfill Open Area	Runoff Area=339,047 sf	100.00% Impervious	Runoff Depth=3.15"
	Tc=20.0 min	CN=98	Runoff=21.73 cfs 2.041 af
Subcatchment 341S: Landfill Open Area	Runoff Area=335,031 sf	100.00% Impervious	Runoff Depth=3.15"
	Tc=20.0 min	CN=98	Runoff=21.47 cfs 2.017 af
Subcatchment 342S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=3.15"
	Tc=0.0 min	CN=98	Runoff=14.51 cfs 0.781 af
Subcatchment 343S: Landfill Open Area	Runoff Area=332,594 sf	100.00% Impervious	Runoff Depth=3.15"
	Tc=20.0 min	CN=98	Runoff=21.31 cfs 2.002 af
Subcatchment 344S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=3.15"
	Tc=0.0 min	CN=98	Runoff=14.51 cfs 0.781 af
Subcatchment 345S: Landfill Open Area	Runoff Area=367,758 sf	100.00% Impervious	Runoff Depth=3.15"
	Tc=20.0 min	CN=98	Runoff=23.57 cfs 2.214 af
Subcatchment 346S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=3.15"
	Tc=0.0 min	CN=98	Runoff=14.51 cfs 0.781 af
Subcatchment 347S: Landfill Open Area	Runoff Area=324,737 sf	100.00% Impervious	Runoff Depth=3.15"
	Tc=20.0 min	CN=98	Runoff=20.81 cfs 1.955 af
Subcatchment 385S: Leachate/Surface	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=3.15"
	Tc=0.0 min	CN=98	Runoff=18.04 cfs 0.972 af
Subcatchment 386S: Leachate/Surface	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=3.15"
	Tc=0.0 min	CN=98	Runoff=18.04 cfs 0.972 af
Pond 349P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,605 cf	Inflow=24.41 cfs 2.798 af Outflow=0.00 cfs 0.000 af
Pond 350P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,910 cf	Inflow=24.26 cfs 2.784 af Outflow=0.00 cfs 0.000 af
Pond 351P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,834 cf	Inflow=26.51 cfs 2.995 af Outflow=0.00 cfs 0.000 af
Pond 352P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,602 cf	Inflow=27.07 cfs 2.927 af Outflow=0.00 cfs 0.000 af
Pond 353P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,686 cf	Inflow=27.48 cfs 3.013 af Outflow=0.00 cfs 0.000 af

Summary for Subcatchment 339S: Landfill Open Area (Mod 2-6)

Runoff = 21.73 cfs @ 12.29 hrs, Volume= 2.041 af, Depth= 3.15"
 Routed to Pond 353P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (sf)	CN	Description
* 339,047	98	Mod 2 - 6 Open Area
339,047		100.00% Impervious Area

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

Summary for Subcatchment 341S: Landfill Open Area (Mod 2-6)

Runoff = 21.47 cfs @ 12.29 hrs, Volume= 2.017 af, Depth= 3.15"
 Routed to Pond 349P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (sf)	CN	Description
* 335,031	98	Mod 2 - 6 Open Area
335,031		100.00% Impervious Area

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

Summary for Subcatchment 342S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.51 cfs @ 12.04 hrs, Volume= 0.781 af, Depth= 3.15"
 Routed to Pond 349P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

WPL Columbia_Leachate Pond Evaluation_22MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

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

Summary for Subcatchment 343S: Landfill Open Area (Mod 2-6)

Runoff = 21.31 cfs @ 12.29 hrs, Volume= 2.002 af, Depth= 3.15"
 Routed to Pond 350P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (sf)	CN	Description
* 332,594	98	Mod 2 - 6 Open Area
332,594		100.00% Impervious Area

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

Summary for Subcatchment 344S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.51 cfs @ 12.04 hrs, Volume= 0.781 af, Depth= 3.15"
 Routed to Pond 350P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 345S: Landfill Open Area (Mod 2-6)

Runoff = 23.57 cfs @ 12.29 hrs, Volume= 2.214 af, Depth= 3.15"
 Routed to Pond 351P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (sf)	CN	Description
* 367,758	98	Mod 2 - 11 Open Area
367,758		100.00% Impervious Area

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

Summary for Subcatchment 346S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.51 cfs @ 12.04 hrs, Volume= 0.781 af, Depth= 3.15"
 Routed to Pond 351P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 347S: Landfill Open Area (Mod 2-6)

Runoff = 20.81 cfs @ 12.29 hrs, Volume= 1.955 af, Depth= 3.15"
 Routed to Pond 352P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (sf)	CN	Description
* 324,737	98	Mod 2 - 6 Open Area
324,737		100.00% Impervious Area

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

Summary for Subcatchment 385S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 18.04 cfs @ 12.04 hrs, Volume= 0.972 af, Depth= 3.15"
 Routed to Pond 353P : Leachate/Surface Water Pond

WPL Columbia_Leachate Pond Evaluation_22MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Subcatchment 386S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 18.04 cfs @ 12.04 hrs, Volume= 0.972 af, Depth= 3.15"
Routed to Pond 352P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Pond 349P: Leachate/Surface Water Pond

Inflow Area = 10.671 ac, 100.00% Impervious, Inflow Depth = 3.15" for 5-yr, 24-hr storm event
Inflow = 24.41 cfs @ 12.27 hrs, Volume= 2.798 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
Starting Elev= 794.76' Surf.Area= 47,114 sf Storage= 75,708 cf
Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,584 sf Storage= 197,605 cf (121,897 cf above start)
Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (121,939 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

WPL Columbia_Leachate Pond Evaluation_22MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 350P: Leachate/Surface Water Pond

Inflow Area = 10.615 ac, 100.00% Impervious, Inflow Depth = 3.15" for 5-yr, 24-hr storm event
 Inflow = 24.26 cfs @ 12.27 hrs, Volume= 2.784 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 794.78' Surf.Area= 47,272 sf Storage= 76,652 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,608 sf Storage= 197,910 cf (121,257 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (120,995 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 351P: Leachate/Surface Water Pond

Inflow Area = 11.423 ac, 100.00% Impervious, Inflow Depth = 3.15" for 5-yr, 24-hr storm event
 Inflow = 26.51 cfs @ 12.27 hrs, Volume= 2.995 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 794.58' Surf.Area= 45,696 sf Storage= 67,355 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,602 sf Storage= 197,834 cf (130,479 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (130,292 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

WPL Columbia_Leachate Pond Evaluation_22MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 352P: Leachate/Surface Water Pond

Inflow Area = 11.161 ac, 100.00% Impervious, Inflow Depth = 3.15" for 5-yr, 24-hr storm event
 Inflow = 27.07 cfs @ 12.05 hrs, Volume= 2.927 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.64' Surf.Area= 46,169 sf Storage= 70,111 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,584 sf Storage= 197,602 cf (127,491 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (127,536 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 353P: Leachate/Surface Water Pond

Inflow Area = 11.489 ac, 100.00% Impervious, Inflow Depth = 3.15" for 5-yr, 24-hr storm event
 Inflow = 27.48 cfs @ 12.06 hrs, Volume= 3.013 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.56' Surf.Area= 45,539 sf Storage= 66,443 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,591 sf Storage= 197,686 cf (131,243 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (131,204 cf above start)

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

WPL Columbia_Leachate Pond Evaluation_22 MSE 24-hr 4 5-yr, 24-hr storm Rainfall=3.38"

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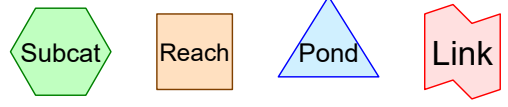
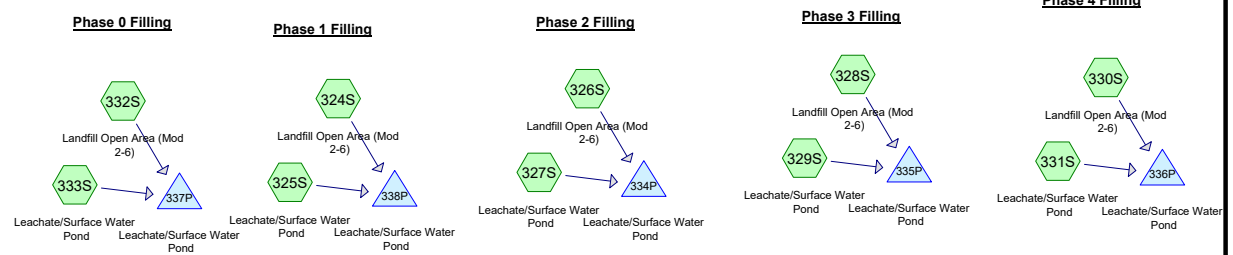
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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

10-Year Storm Analysis



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 324S: Landfill Open Area	Runoff Area=339,047 sf	100.00% Impervious	Runoff Depth=3.74"
	Tc=20.0 min	CN=98	Runoff=25.60 cfs 2.423 af
Subcatchment 325S: Leachate/Surface	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=3.74"
	Tc=0.0 min	CN=98	Runoff=21.25 cfs 1.154 af
Subcatchment 326S: Landfill Open Area	Runoff Area=335,031 sf	100.00% Impervious	Runoff Depth=3.74"
	Tc=20.0 min	CN=98	Runoff=25.30 cfs 2.394 af
Subcatchment 327S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=3.74"
	Tc=0.0 min	CN=98	Runoff=17.09 cfs 0.928 af
Subcatchment 328S: Landfill Open Area	Runoff Area=332,594 sf	100.00% Impervious	Runoff Depth=3.74"
	Tc=20.0 min	CN=98	Runoff=25.12 cfs 2.377 af
Subcatchment 329S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=3.74"
	Tc=0.0 min	CN=98	Runoff=17.09 cfs 0.928 af
Subcatchment 330S: Landfill Open Area	Runoff Area=367,758 sf	100.00% Impervious	Runoff Depth=3.74"
	Tc=20.0 min	CN=98	Runoff=27.77 cfs 2.628 af
Subcatchment 331S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=3.74"
	Tc=0.0 min	CN=98	Runoff=17.09 cfs 0.928 af
Subcatchment 332S: Landfill Open Area	Runoff Area=324,737 sf	100.00% Impervious	Runoff Depth=3.74"
	Tc=20.0 min	CN=98	Runoff=24.52 cfs 2.320 af
Subcatchment 333S: Leachate/Surface	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=3.74"
	Tc=0.0 min	CN=98	Runoff=21.25 cfs 1.154 af
Pond 334P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,822 cf	Inflow=28.77 cfs 3.322 af Outflow=0.00 cfs 0.000 af
Pond 335P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,929 cf	Inflow=28.58 cfs 3.304 af Outflow=0.00 cfs 0.000 af
Pond 336P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,874 cf	Inflow=31.24 cfs 3.555 af Outflow=0.00 cfs 0.000 af
Pond 337P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,655 cf	Inflow=31.91 cfs 3.474 af Outflow=0.00 cfs 0.000 af
Pond 338P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,547 cf	Inflow=32.39 cfs 3.576 af Outflow=0.00 cfs 0.000 af

Summary for Subcatchment 324S: Landfill Open Area (Mod 2-6)

Runoff = 25.60 cfs @ 12.29 hrs, Volume= 2.423 af, Depth= 3.74"
 Routed to Pond 338P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (sf)	CN	Description
* 339,047	98	Mod 2 - 6 Open Area
339,047		100.00% Impervious Area

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

Summary for Subcatchment 325S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.25 cfs @ 12.04 hrs, Volume= 1.154 af, Depth= 3.74"
 Routed to Pond 338P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Subcatchment 326S: Landfill Open Area (Mod 2-6)

Runoff = 25.30 cfs @ 12.29 hrs, Volume= 2.394 af, Depth= 3.74"
 Routed to Pond 334P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (sf)	CN	Description
* 335,031	98	Mod 2 - 6 Open Area
335,031		100.00% Impervious Area

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

Summary for Subcatchment 327S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 17.09 cfs @ 12.04 hrs, Volume= 0.928 af, Depth= 3.74"
 Routed to Pond 334P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 328S: Landfill Open Area (Mod 2-6)

Runoff = 25.12 cfs @ 12.29 hrs, Volume= 2.377 af, Depth= 3.74"
 Routed to Pond 335P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (sf)	CN	Description
* 332,594	98	Mod 2 - 6 Open Area
332,594		100.00% Impervious Area

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

Summary for Subcatchment 329S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 17.09 cfs @ 12.04 hrs, Volume= 0.928 af, Depth= 3.74"
 Routed to Pond 335P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 330S: Landfill Open Area (Mod 2-6)

Runoff = 27.77 cfs @ 12.29 hrs, Volume= 2.628 af, Depth= 3.74"
 Routed to Pond 336P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (sf)	CN	Description
* 367,758	98	Mod 2 - 11 Open Area
367,758		100.00% Impervious Area

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

Summary for Subcatchment 331S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 17.09 cfs @ 12.04 hrs, Volume= 0.928 af, Depth= 3.74"
 Routed to Pond 336P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 332S: Landfill Open Area (Mod 2-6)

Runoff = 24.52 cfs @ 12.29 hrs, Volume= 2.320 af, Depth= 3.74"
 Routed to Pond 337P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (sf)	CN	Description
* 324,737	98	Mod 2 - 6 Open Area
324,737		100.00% Impervious Area

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

Summary for Subcatchment 333S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.25 cfs @ 12.04 hrs, Volume= 1.154 af, Depth= 3.74"
 Routed to Pond 337P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Pond 334P: Leachate/Surface Water Pond

Inflow Area = 10.671 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 28.77 cfs @ 12.27 hrs, Volume= 3.322 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 794.26' Surf.Area= 43,175 sf Storage= 53,136 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,601 sf Storage= 197,822 cf (144,686 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (144,511 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

WPL Columbia_Leachate Pond Evaluation_2MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 335P: Leachate/Surface Water Pond

Inflow Area = 10.615 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 28.58 cfs @ 12.27 hrs, Volume= 3.304 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 794.28' Surf.Area= 43,332 sf Storage= 54,001 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,610 sf Storage= 197,929 cf (143,927 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (143,646 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 336P: Leachate/Surface Water Pond

Inflow Area = 11.423 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 31.24 cfs @ 12.27 hrs, Volume= 3.555 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 794.02' Surf.Area= 41,284 sf Storage= 43,001 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,605 sf Storage= 197,874 cf (154,873 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (154,646 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

WPL Columbia_Leachate Pond Evaluation_2MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 337P: Leachate/Surface Water Pond

Inflow Area = 11.161 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 31.91 cfs @ 12.05 hrs, Volume= 3.474 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 794.10' Surf.Area= 41,914 sf Storage= 46,329 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,588 sf Storage= 197,655 cf (151,326 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (151,318 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 338P: Leachate/Surface Water Pond

Inflow Area = 11.489 ac, 100.00% Impervious, Inflow Depth = 3.74" for 10-yr, 24-hr storm event
 Inflow = 32.39 cfs @ 12.06 hrs, Volume= 3.576 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 793.99' Surf.Area= 40,926 sf Storage= 41,767 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,580 sf Storage= 197,547 cf (155,781 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (155,880 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

WPL Columbia_Leachate Pond Evaluation_2MSE 24-hr 4 10-yr, 24-hr storm Rainfall=3.97"

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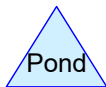
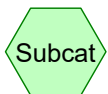
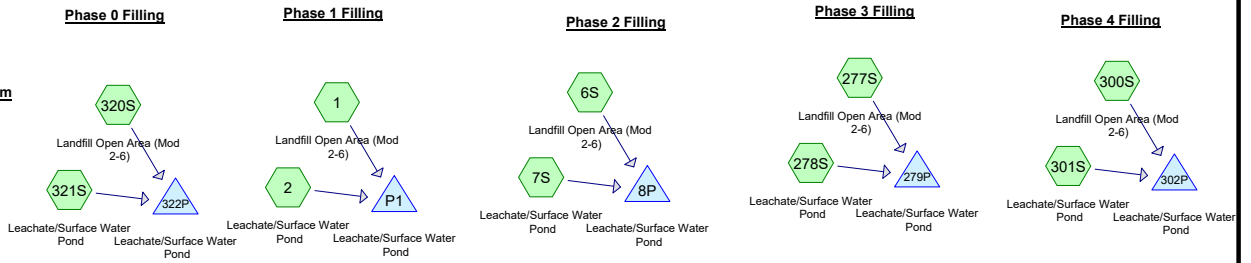
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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

25-Year Storm Analysis



Time span=0.00-33.00 hrs, dt=0.05 hrs, 661 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Landfill Open Area	Runoff Area=339,047 sf	100.00% Impervious	Runoff Depth=4.67"
	Tc=20.0 min	CN=98	Runoff=31.77 cfs 3.031 af
Subcatchment 2: Leachate/Surface Water	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=4.67"
	Tc=0.0 min	CN=98	Runoff=26.35 cfs 1.443 af
Subcatchment 6S: Landfill Open Area	Runoff Area=335,031 sf	100.00% Impervious	Runoff Depth=4.67"
	Tc=20.0 min	CN=98	Runoff=31.39 cfs 2.995 af
Subcatchment 7S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=4.67"
	Tc=0.0 min	CN=98	Runoff=21.19 cfs 1.161 af
Subcatchment 277S: Landfill Open Area	Runoff Area=332,594 sf	100.00% Impervious	Runoff Depth=4.67"
	Tc=20.0 min	CN=98	Runoff=31.16 cfs 2.974 af
Subcatchment 278S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=4.67"
	Tc=0.0 min	CN=98	Runoff=21.19 cfs 1.161 af
Subcatchment 300S: Landfill Open Area	Runoff Area=367,758 sf	100.00% Impervious	Runoff Depth=4.67"
	Tc=20.0 min	CN=98	Runoff=34.46 cfs 3.288 af
Subcatchment 301S: Leachate/Surface	Runoff Area=2.980 ac	100.00% Impervious	Runoff Depth=4.67"
	Tc=0.0 min	CN=98	Runoff=21.19 cfs 1.161 af
Subcatchment 320S: Landfill Open Area	Runoff Area=324,737 sf	100.00% Impervious	Runoff Depth=4.67"
	Tc=20.0 min	CN=98	Runoff=30.43 cfs 2.903 af
Subcatchment 321S: Leachate/Surface	Runoff Area=3.706 ac	100.00% Impervious	Runoff Depth=4.67"
	Tc=0.0 min	CN=98	Runoff=26.35 cfs 1.443 af
Pond 8P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,735 cf	Inflow=35.69 cfs 4.156 af Outflow=0.00 cfs 0.000 af
Pond 279P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,837 cf	Inflow=35.46 cfs 4.134 af Outflow=0.00 cfs 0.000 af
Pond 302P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,879 cf	Inflow=38.75 cfs 4.448 af Outflow=0.00 cfs 0.000 af
Pond 322P: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,831 cf	Inflow=39.61 cfs 4.347 af Outflow=0.00 cfs 0.000 af
Pond P1: Leachate/Surface Water Pond	Peak Elev=796.97'	Storage=197,936 cf	Inflow=40.21 cfs 4.474 af Outflow=0.00 cfs 0.000 af

Summary for Subcatchment 1: Landfill Open Area (Mod 2-6)

Runoff = 31.77 cfs @ 12.28 hrs, Volume= 3.031 af, Depth= 4.67"
 Routed to Pond P1 : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (sf)	CN	Description
* 339,047	98	Mod 2 - 6 Open Area
339,047		100.00% Impervious Area

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

Summary for Subcatchment 2: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 26.35 cfs @ 12.04 hrs, Volume= 1.443 af, Depth= 4.67"
 Routed to Pond P1 : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Subcatchment 6S: Landfill Open Area (Mod 2-6)

Runoff = 31.39 cfs @ 12.28 hrs, Volume= 2.995 af, Depth= 4.67"
 Routed to Pond 8P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (sf)	CN	Description
* 335,031	98	Mod 2 - 6 Open Area
335,031		100.00% Impervious Area

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

Summary for Subcatchment 7S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.19 cfs @ 12.04 hrs, Volume= 1.161 af, Depth= 4.67"
 Routed to Pond 8P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 277S: Landfill Open Area (Mod 2-6)

Runoff = 31.16 cfs @ 12.28 hrs, Volume= 2.974 af, Depth= 4.67"
 Routed to Pond 279P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (sf)	CN	Description
* 332,594	98	Mod 2 - 6 Open Area
332,594		100.00% Impervious Area

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

Summary for Subcatchment 278S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.19 cfs @ 12.04 hrs, Volume= 1.161 af, Depth= 4.67"
 Routed to Pond 279P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

WPL Columbia_Leachate Pond Evaluation_2MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

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Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 300S: Landfill Open Area (Mod 2-6)

Runoff = 34.46 cfs @ 12.28 hrs, Volume= 3.288 af, Depth= 4.67"
 Routed to Pond 302P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (sf)	CN	Description
* 367,758	98	Mod 2 - 11 Open Area
367,758		100.00% Impervious Area

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

Summary for Subcatchment 301S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.19 cfs @ 12.04 hrs, Volume= 1.161 af, Depth= 4.67"
 Routed to Pond 302P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 2.980	98	Leachate Surface Water Pond
2.980		100.00% Impervious Area

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

Summary for Subcatchment 320S: Landfill Open Area (Mod 2-6)

Runoff = 30.43 cfs @ 12.28 hrs, Volume= 2.903 af, Depth= 4.67"
 Routed to Pond 322P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (sf)	CN	Description
* 324,737	98	Mod 2 - 6 Open Area
324,737		100.00% Impervious Area

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

Summary for Subcatchment 321S: Leachate/Surface Water Pond

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 26.35 cfs @ 12.04 hrs, Volume= 1.443 af, Depth= 4.67"
 Routed to Pond 322P : Leachate/Surface Water Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

Area (ac)	CN	Description
* 3.706	98	Leachate Surface Water Pond
3.706		100.00% Impervious Area

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

Summary for Pond 8P: Leachate/Surface Water Pond

Inflow Area = 10.671 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 35.69 cfs @ 12.27 hrs, Volume= 4.156 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs
 Starting Elev= 793.24' Surf.Area= 25,898 sf Storage= 16,708 cf
 Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,594 sf Storage= 197,735 cf (181,027 cf above start)
 Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (180,939 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

WPL Columbia_Leachate Pond Evaluation_2MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 279P: Leachate/Surface Water Pond

Inflow Area = 10.615 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 35.46 cfs @ 12.27 hrs, Volume= 4.134 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 793.28' Surf.Area= 26,699 sf Storage= 17,760 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,603 sf Storage= 197,837 cf (180,077 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (179,887 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 302P: Leachate/Surface Water Pond

Inflow Area = 11.423 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 38.75 cfs @ 12.27 hrs, Volume= 4.448 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 792.59' Surf.Area= 12,873 sf Storage= 4,108 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,606 sf Storage= 197,879 cf (193,772 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (193,540 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

WPL Columbia_Leachate Pond Evaluation_2MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond 322P: Leachate/Surface Water Pond

Inflow Area = 11.161 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 39.61 cfs @ 12.05 hrs, Volume= 4.347 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 792.87' Surf.Area= 18,484 sf Storage= 8,498 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,602 sf Storage= 197,831 cf (189,333 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (189,150 cf above start)

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	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390

Summary for Pond P1: Leachate/Surface Water Pond

Inflow Area = 11.489 ac, 100.00% Impervious, Inflow Depth = 4.67" for 25-yr, 24-hr storm event
 Inflow = 40.21 cfs @ 12.06 hrs, Volume= 4.474 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.05 hrs

Starting Elev= 792.50' Surf.Area= 11,070 sf Storage= 3,030 cf

Peak Elev= 796.97' @ 25.15 hrs Surf.Area= 61,610 sf Storage= 197,936 cf (194,906 cf above start)

Flood Elev= 796.97' Surf.Area= 61,588 sf Storage= 197,647 cf (194,617 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

WPL Columbia_Leachate Pond Evaluation_2MSE 24-hr 4 25-yr, 24-hr storm Rainfall=4.91"

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Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	405,390 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,051	0	0
794.00	41,126	42,177	42,177
796.00	56,885	98,011	140,188
798.00	66,581	123,466	263,654
800.00	75,155	141,736	405,390



Appendix B1.4
2022 Storm Water Management Calculations

Storm Water Management Calculations

Purpose:

The purpose of the storm water runoff calculations is to demonstrate that the existing storm water sedimentation basin and proposed storm water management features included in the Modules 10 and 11 Plan Modification Request can accommodate and safely convey the runoff from a 25-year, 24-hour storm event during post closure conditions.

Items addressed in these calculations:

- Sedimentation Basin
- Swales
- Culverts
- Diversion Berms
- Downslope Flumes & Energy Dissipaters
- Rock Chutes
- Discharge Aprons

The proposed storm water management conditions are shown on **Figure 1**.

The calculations support the capacity check of the following existing storm water management feature:

Feature	Purpose	Design Method
Sedimentation Basin	To safely handle 25-year, 24-hour storm event without overtopping the 100-year, 24-hour emergency spillway.	HydroCAD runoff modeling
Swales	Convey storm water runoff from adjacent areas to Culvert C2 and offsite during post construction conditions	HydroCAD runoff modeling and Swale Calculation
Culverts	Convey storm water from the final cover perimeter swales during post construction conditions	HydroCAD runoff modeling and HY-8 Culvert Model
Diversion Berms	Reduce storm water runoff from long final cover slopes and to divert water to perimeter swales during post construction conditions	HydroCAD runoff modeling and Diversion Berm Calculations
Downslope Flumes & Energy Dissipaters	Convey storm water from diversion berms down slope to discharge locations during post construction conditions	HydroCAD runoff modeling and Downslope Flume Calculations
Rock Chutes	Erosion protection and convey storm water from energy dissipaters (Flume 1 and Flume 2) to existing swale during post construction conditions	HydroCAD runoff modeling and Rock Chute Calculation
Discharge Aprons	Erosion protection from culvert discharge at culverts	HydroCAD runoff modeling and Riprap Apron Calculation

Approach:

Hydrograph Generation

HydroCAD was used to model the storm water management system and develop the hydrographs

using TR-20 methodologies. The model is designed to simulate the surface runoff response of a watershed to a precipitation event. Input parameters for the model include precipitation depth for the design storm events from NOAA ATLAS 14, contributing drainage areas, runoff curve numbers, and time of concentration.

Swale Sizing

The proposed swales were sized for the 25-year, 24-hour storm event. A spreadsheet based on Manning's equation was used to determine the depth of flow and velocity in the swales based on the swale geometry and peak flow in the swales (as determined by the Hydrograph Generation models).

Culvert Sizing

Culverts were sized for the 25-year, 24-hour storm event using the HY-8 computer model developed by the US Department of Transportation, Federal Highway Administration.

Diversion Berms

Diversion berms were sized for the 25-year, 24-hour storm event using the Manning's Equation to determine the depth of flow and velocity in the swale based on the swale geometry and peak flow for the storm event (as determined by the Hydrograph Generation Calculations).

Downslope Flumes and Energy Dissipaters Sizing

Flumes and energy dissipaters were sized for the 25-year, 24-hour storm event. Manning's equation and the orifice equation were used to size the flumes. Energy dissipaters were sized using tables from the reference book "Hydraulic Design of Energy Dissipaters for Culverts and Channels" US Department of Transportation, Federal Highway Administration, July 2006.

Rock Chute Sizing

Rock chutes were sized for the 25-year, 24-hour storm event. Rock Chutes were sized based on the flow to each culvert location. The Iowa NRCS Rock Chute Design spreadsheet was used to size the chute and riprap.

Discharge Apron Sizing

Riprap aprons were sized for the 25-year, 24-hour storm event using equations in Section 5.2 – Riprap Blanket of WisDOT FDM 13-35-5. The riprap aprons were sized based on the flow to the culvert location. The riprap sizing was used to size the riprap discharge apron.

Basin Sizing

Route the proposed construction and existing drainage runoff through the sedimentation basin to confirm the basin can handle the 25-year, 24-hour storm event. HydroCAD was used to model the runoff flow through the basin outfall (as determined by the Hydrograph Generation model).

Key Assumptions:

- Drainage areas and time of concentration flow paths are as shown on **Figure 1** for Post Construction Conditions.
- An MSE4 rainfall distribution was used based on NRCS Wisconsin rainfall distribution regions. The precipitation depth for the 25-year, 24-hour storm was assumed to be 4.91 inches, based on NOAA ATLAS 14 Point Precipitation Frequency Estimates (NOAA's National Weather Service Hydrometeorological Design Studies Center Precipitation Frequency Data Server).
- Runoff curve numbers were based on tables presented in Urban Hydrology for Small Watersheds, and were assumed as follows and as listed in the modeling.

Cover Type	CN
Final Cover	69 – Pasture/grassland/range in good condition, hydrologic soil group (HSG) C/B (assumed mid value between each soil group)
Pasture, grassland or range	39 – Pasture/grassland/range, Good, HSG A
Rain Cover	98 – Rain Cover (plastic smooth material)
Pavement	98 – impervious HSG A
Gravel	96 – Gravel, HSG A

- Type A soil group for non-disturbed areas outside the landfill as soils are loamy sand.
- Other assumptions are included with the calculations attached to this appendix.

Results:

Hydrograph Generation

The hydrograph modeling results for the 25-year and 100-year, 24-hour storm events are included in the Post Construction Conditions Hydrograph Generation section.

Basin Sizing

The existing sedimentation basin has the capacity to safely contain the 25-year, 24-hour storm event and safely pass the 100-year, 24-hour storm event through the emergency spillway. Refer to the Basin Sizing section.

Swale Sizing

The proposed swales will be constructed as shown on the Drawings. The swales have the capacity to safely convey the both the 25-year, 24-hour storm events and maintain a minimum 0.5 foot of freeboard. Refer to the Swale Sizing section.

Appropriate erosion control product was selected based on the velocities and shear stress in the swales. Refer to the Swale Sizing section below for the evaluation.

Culvert Sizing

Culverts will be as shown in the Drawings. The culverts have the capacity to safely convey the 25-year, 24-hour storm event. Refer to the Culvert Sizing Section for the detailed calculations.

Diversion Berm Sizing

The proposed final berms will be constructed as shown on the Drawings. The diversion berms will contain the runoff from the 25-year, 24-hour storm event. Refer to the Diversion Berm Design section.

Downslope Flume and Energy Dissipater Sizing

The downslope flumes and energy dissipaters will be constructed as shown on the Drawings. The downslope flumes are designed to contain the runoff from the 25-year, 24-hour storm event. Energy dissipaters at the bottom of the downslope flumes have been designed to handle the peak velocities. Refer to the Downslope Flume and Energy Dissipater Sizing section below for detailed calculations.

Rock Chute Sizing

The proposed rock chutes will be constructed as shown in the Drawings. The rock chutes will accommodate the runoff from the 25-year, 24-hour storm event. Refer to the Rock Chute Sizing section.

Job No. 25220183.00 Job Columbia Dry Ash Disposal

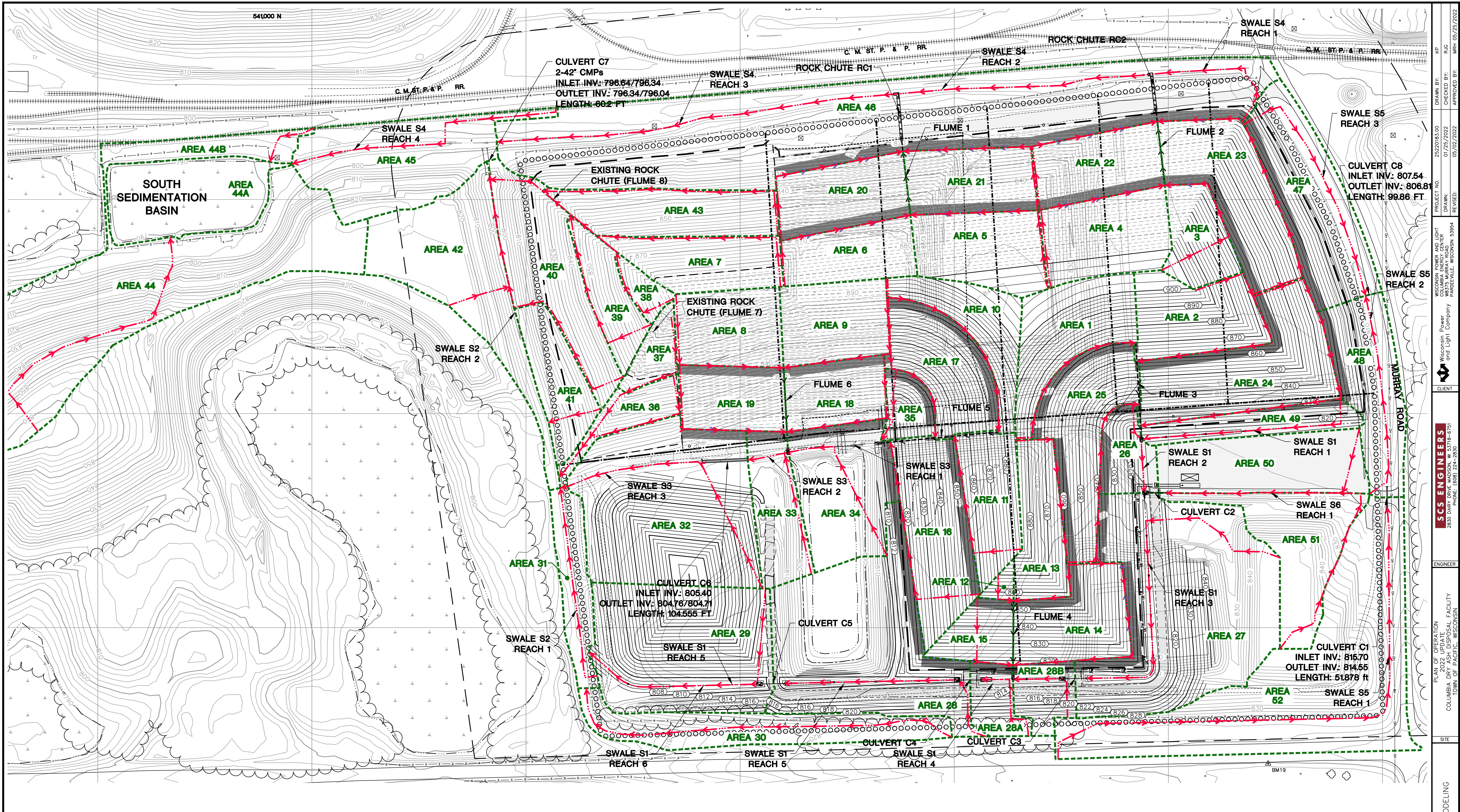
BY RJG DATE 4/7/22

Client WPL Subject Storm Water Management

CHK'D. MRH DATE 4/8/22

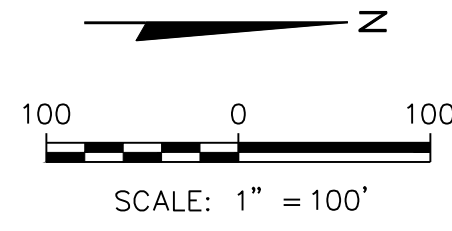
Discharge Apron Sizing

The proposed riprap aprons will be constructed as shown in the Drawings. The aprons will accommodate the runoff from the 25-year, 24-hour storm event. Refer to Discharge Apron Sizing for design calculations.



LEGEND	
○○○○○○○○	DRY ASH DISPOSAL FACILITY LIMITS
—	LIMITS OF WASTE
---	LINER PHASE/MODULE LIMIT
---	FINAL COVER LIMITS
---	APPROXIMATE INTERMEDIATE COVER LIMITS/AREA
---	PAVED ROAD
---	UNPAVED ROAD
---	VEGETATION
---	FENCE
—810—	EXISTING GRADE (10' INTERVAL)
—820—	EXISTING GRADE (2' INTERVAL)
---	SWALE
---	EDGE OF WATER
---	WETLAND
—840—	PROPOSED PHASE 1 FINAL GRADE (10' INTERVAL)
---	PROPOSED PHASE 1 FINAL GRADE (2' INTERVAL)
—840—	PROPOSED GRADE (10' INTERVAL)
---	PROPOSED GRADE (2' INTERVAL)
---	PROPOSED PERIMETER ROAD
---	PROPOSED SWALE
---	PROPOSED CULVERT
○	PROPOSED LEACHATE COLLECTION SYSTEM CLEANOUT
□	PROPOSED LEACHATE VAULT
---	PROPOSED LEACHATE FORCEMAIN
---	PROPOSED UNDERGROUND ELECTRIC
---	PROPOSED DIVERSION BERM
---	PROPOSED DOWNSLOPE FLUME
---	PROPOSED ENERGY DISSIPATOR
---	PROPOSED RIPRAP
---	DRAINAGE AREA DIVIDES
---	FLOW PATH

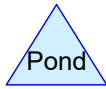
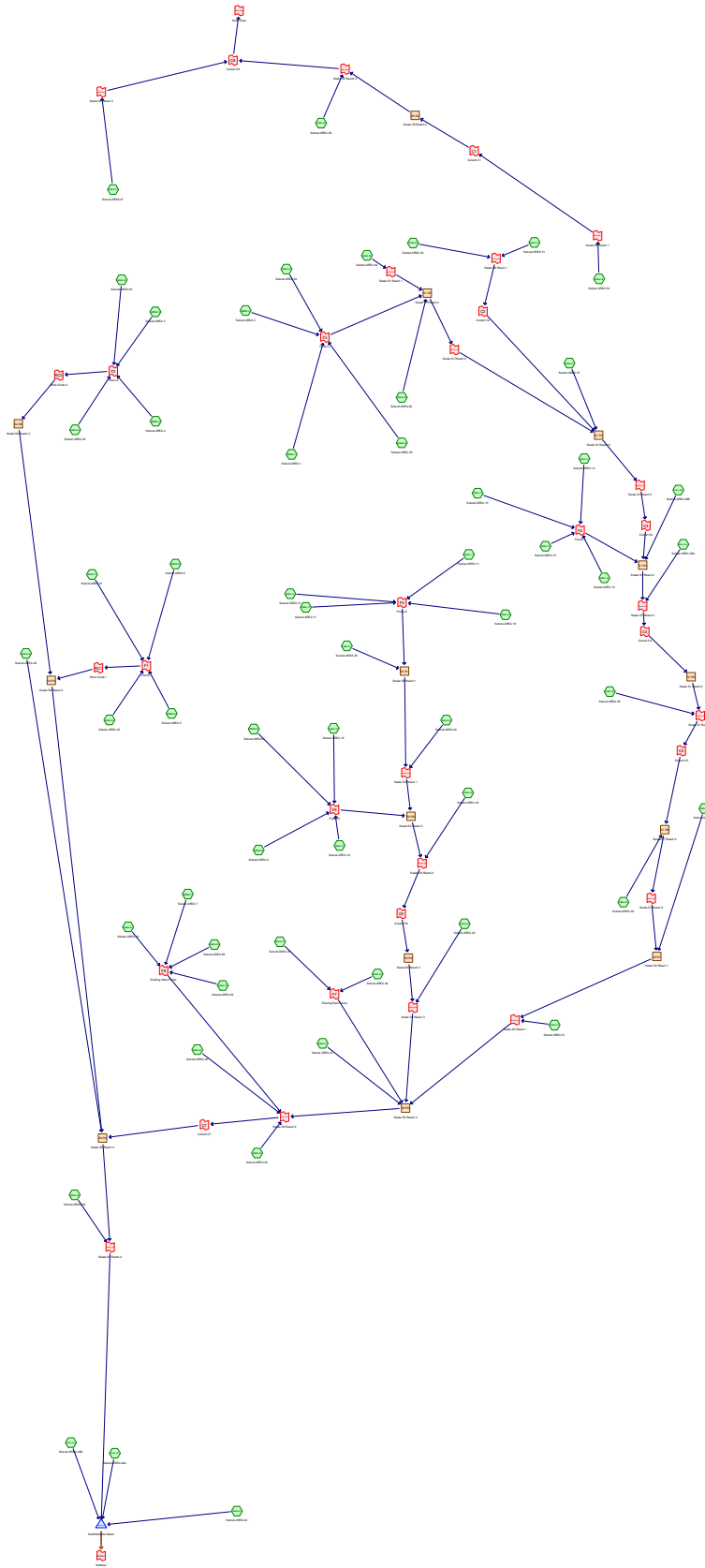
- NOTES:**
- SEE SHEET 2 OF PLAN OF OPERATION UPDATE (2022) PLAN SET FOR BASE MAP LEGEND ITEMS AND NOTES.
 - SWALE S4 REACHES ARE BETWEEN AREA BOUNDARY AND FLUMES IN AREA 45 AND 46.
 - FINAL SLOPES IN AREAS 27, 29, 32, 33, 34, AND 51 ARE ASSUMED DUE TO THESE AREAS BEING USED FOR STOCKPILES DURING CONSTRUCTION DURING THE LIFE OF THE DRY ASH DISPOSAL FACILITY.



PROJECT NO. 25220181.00
 DRAWN BY: RAG
 CHECKED BY: MRH
 APPROVED BY: MRH
 DATE: 01/25/2022
 DATE: 05/02/2022
 CLIENT: Wisconsin Power and Light Company
 ADDRESS: 2830 JENNY DRIVE MADISON, WI 53718-9291
 PHONE: (608) 224-2830
 ENGINEER: SCS ENGINEERS
 PLAN OF OPERATION: COLUMBIA DRY ASH DISPOSAL FACILITY
 TOWN OF PACIFIC, WISCONSIN
 SITE
 STORM WATER MODELING
 FIGURE 1

Post Construction Conditions Hydrograph Generation

- 25-year, 24-hour Storm Event
- 100-year, 24-hour Storm Event



Routing Diagram for COL_POO Closure Conditions-031722
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COL_POO Closure Conditions-031722

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COL POO FINAL CONDITIONS

MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment AREA 1: Subcat AREA 1	Runoff Area=1.288 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=408' Tc=2.6 min CN=69 Runoff=4.58 cfs 0.203 af
Subcatchment AREA 10: Subcat AREA 10	Runoff Area=0.914 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=500' Tc=3.2 min CN=69 Runoff=3.17 cfs 0.144 af
Subcatchment AREA 11: Subcat AREA 11	Runoff Area=0.949 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=391' Tc=4.6 min CN=69 Runoff=3.10 cfs 0.150 af
Subcatchment AREA 12: Subcat AREA 12	Runoff Area=0.098 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=92' Tc=2.5 min CN=69 Runoff=0.35 cfs 0.015 af
Subcatchment AREA 13: Subcat AREA 13	Runoff Area=0.890 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=590' Tc=4.6 min CN=69 Runoff=2.91 cfs 0.140 af
Subcatchment AREA 14: Subcat AREA 14	Runoff Area=1.145 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=625' Tc=5.1 min CN=69 Runoff=3.66 cfs 0.181 af
Subcatchment AREA 15: Subcat AREA 15	Runoff Area=0.512 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=235' Tc=4.2 min CN=69 Runoff=1.71 cfs 0.081 af
Subcatchment AREA 16: Subcat AREA 16	Runoff Area=1.510 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=522' Tc=4.9 min CN=69 Runoff=4.89 cfs 0.238 af
Subcatchment AREA 17: Subcat AREA 17	Runoff Area=1.228 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=386' Tc=4.7 min CN=69 Runoff=4.00 cfs 0.194 af
Subcatchment AREA 18: Subcat AREA 18	Runoff Area=0.813 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=383' Tc=4.6 min CN=69 Runoff=2.66 cfs 0.128 af
Subcatchment AREA 19: Subcat AREA 19	Runoff Area=0.847 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=394' Tc=4.6 min CN=69 Runoff=2.77 cfs 0.134 af
Subcatchment AREA 2: Subcat AREA 2	Runoff Area=1.167 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=613' Tc=5.1 min CN=69 Runoff=3.73 cfs 0.184 af
Subcatchment AREA 20: Subcat AREA 20	Runoff Area=1.054 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=453' Tc=4.7 min CN=69 Runoff=3.43 cfs 0.166 af
Subcatchment AREA 21: Subcat AREA 21	Runoff Area=1.030 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=448' Tc=4.7 min CN=69 Runoff=3.35 cfs 0.162 af
Subcatchment AREA 22: Subcat AREA 22	Runoff Area=1.030 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=448' Tc=4.7 min CN=69 Runoff=3.35 cfs 0.162 af
Subcatchment AREA 23: Subcat AREA 23	Runoff Area=1.548 ac 0.00% Impervious Runoff Depth=1.89" Flow Length=715' Tc=5.4 min CN=69 Runoff=4.89 cfs 0.244 af

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COL POO FINAL CONDITIONS

MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Subcatchment AREA 24: Subcat AREA 24 Runoff Area=1.952 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=889' Tc=5.8 min CN=69 Runoff=6.05 cfs 0.308 af

Subcatchment AREA 25: Subcat AREA 25 Runoff Area=1.515 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=495' Tc=3.9 min CN=69 Runoff=5.13 cfs 0.239 af

Subcatchment AREA 26: Subcat AREA 26 Runoff Area=0.518 ac 0.00% Impervious Runoff Depth=1.74"
Flow Length=216' Tc=4.1 min CN=67 Runoff=1.59 cfs 0.075 af

Subcatchment AREA 27: Subcat AREA 27 Runoff Area=4.140 ac 0.00% Impervious Runoff Depth=0.55"
Flow Length=864' Tc=12.0 min CN=48 Runoff=1.68 cfs 0.191 af

Subcatchment AREA 28: Subcat AREA 28 Runoff Area=142,960 sf 0.00% Impervious Runoff Depth=0.66"
Flow Length=573' Tc=9.1 min CN=50 Runoff=2.08 cfs 0.179 af

Subcatchment AREA 28A: Subcat AREA 28A Runoff Area=0.423 ac 0.00% Impervious Runoff Depth=0.60"
Flow Length=234' Tc=9.1 min CN=49 Runoff=0.23 cfs 0.021 af

Subcatchment AREA 28B: Subcat AREA 28B Runoff Area=0.476 ac 0.00% Impervious Runoff Depth=0.71"
Flow Length=211' Tc=4.5 min CN=51 Runoff=0.47 cfs 0.028 af

Subcatchment AREA 29: Subcat AREA 29 Runoff Area=2.792 ac 0.00% Impervious Runoff Depth=0.22"
Flow Length=463' Tc=14.8 min CN=40 Runoff=0.16 cfs 0.050 af

Subcatchment AREA 3: Subcat AREA 3 Runoff Area=0.717 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=409' Tc=6.3 min CN=69 Runoff=2.17 cfs 0.113 af

Subcatchment AREA 30: Subcat AREA 30 Runoff Area=1.415 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=941' Slope=0.0260 '/ Tc=22.0 min CN=39 Runoff=0.06 cfs 0.021 af

Subcatchment AREA 31: Subcat AREA 31 Runoff Area=0.698 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=481' Tc=4.4 min CN=39 Runoff=0.03 cfs 0.011 af

Subcatchment AREA 32: Subcat AREA 32 Runoff Area=3.353 ac 0.00% Impervious Runoff Depth=0.46"
Flow Length=663' Tc=17.3 min CN=46 Runoff=0.81 cfs 0.128 af

Subcatchment AREA 33: Subcat AREA 33 Runoff Area=38,914 sf 0.00% Impervious Runoff Depth=0.60"
Flow Length=377' Tc=16.0 min CN=49 Runoff=0.37 cfs 0.045 af

Subcatchment AREA 34: Subcat AREA 34 Runoff Area=68,484 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=488' Tc=16.2 min CN=44 Runoff=0.25 cfs 0.049 af

Subcatchment AREA 35: Subcat AREA 35 Runoff Area=0.375 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=174' Slope=0.2500 '/ Tc=4.2 min CN=69 Runoff=1.25 cfs 0.059 af

Subcatchment AREA 36: Subcat AREA 36 Runoff Area=0.487 ac 0.00% Impervious Runoff Depth=1.82"
Flow Length=425' Tc=4.4 min CN=68 Runoff=1.54 cfs 0.074 af

Subcatchment AREA 37: Subcat AREA 37 Runoff Area=0.344 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=510' Tc=4.6 min CN=69 Runoff=1.12 cfs 0.054 af

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COL POO FINAL CONDITIONS

MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Subcatchment AREA 38: Subcat AREA 38 Runoff Area=0.223 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=590' Tc=4.1 min CN=69 Runoff=0.75 cfs 0.035 af

Subcatchment AREA 39: Subcat AREA 39 Runoff Area=0.656 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=642' Tc=5.3 min CN=69 Runoff=2.08 cfs 0.103 af

Subcatchment AREA 4: Subcat AREA 4 Runoff Area=1.247 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=478' Tc=6.6 min CN=69 Runoff=3.74 cfs 0.197 af

Subcatchment AREA 40: Subcat AREA 40 Runoff Area=1.618 ac 0.00% Impervious Runoff Depth=1.18"
Flow Length=699' Tc=5.2 min CN=59 Runoff=3.05 cfs 0.160 af

Subcatchment AREA 41: Subcat AREA 41 Runoff Area=0.826 ac 0.00% Impervious Runoff Depth=1.12"
Flow Length=722' Tc=5.9 min CN=58 Runoff=1.40 cfs 0.077 af

Subcatchment AREA 42: Subcat AREA 42 Runoff Area=2.177 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=415' Tc=9.1 min CN=39 Runoff=0.09 cfs 0.033 af

Subcatchment AREA 43: Subcat AREA 43 Runoff Area=1.228 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=778' Tc=5.9 min CN=69 Runoff=3.79 cfs 0.194 af

Subcatchment AREA 44: Subcat AREA 44 Runoff Area=5.227 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=701' Tc=7.9 min CN=39 Runoff=0.22 cfs 0.079 af

Subcatchment AREA 44A: Subcat AREA Runoff Area=1.508 ac 100.00% Impervious Runoff Depth=4.67"
Tc=0.0 min CN=98 Runoff=10.70 cfs 0.587 af

Subcatchment AREA 44B: Subcat AREA 44B Runoff Area=0.594 ac 0.00% Impervious Runoff Depth=0.66"
Flow Length=147' Slope=0.0544 '/ Tc=7.6 min CN=50 Runoff=0.41 cfs 0.032 af

Subcatchment AREA 45: Subcat AREA 45 Runoff Area=2.001 ac 0.00% Impervious Runoff Depth=0.33"
Flow Length=681' Tc=21.9 min CN=43 Runoff=0.24 cfs 0.055 af

Subcatchment AREA 46: Subcat AREA 46 Runoff Area=7.367 ac 0.36% Impervious Runoff Depth=1.18"
Flow Length=1,904' Tc=9.2 min CN=59 Runoff=11.31 cfs 0.727 af

Subcatchment AREA 47: Subcat AREA 47 Runoff Area=79,132 sf 8.81% Impervious Runoff Depth=1.52"
Flow Length=582' Tc=9.1 min CN=64 Runoff=3.79 cfs 0.230 af

Subcatchment AREA 48: Subcat AREA 48 Runoff Area=57,540 sf 11.76% Impervious Runoff Depth=1.32"
Flow Length=489' Tc=5.4 min CN=61 Runoff=2.79 cfs 0.145 af

Subcatchment AREA 49: Subcat AREA 49 Runoff Area=0.691 ac 0.00% Impervious Runoff Depth=1.18"
Flow Length=522' Tc=4.3 min CN=59 Runoff=1.37 cfs 0.068 af

Subcatchment AREA 5: Subcat AREA 5 Runoff Area=1.195 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=482' Tc=6.6 min CN=69 Runoff=3.58 cfs 0.188 af

Subcatchment AREA 50: Subcat AREA 50 Runoff Area=1.482 ac 0.00% Impervious Runoff Depth=4.00"
Flow Length=570' Tc=3.4 min CN=92 Runoff=9.68 cfs 0.494 af

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Subcatchment AREA 51: Subcat AREA 51 Runoff Area=1.417 ac 0.00% Impervious Runoff Depth=0.22"
Flow Length=884' Tc=12.2 min CN=40 Runoff=0.08 cfs 0.025 af

Subcatchment AREA 52: Subcat AREA 52 Runoff Area=197,330 sf 13.14% Impervious Runoff Depth=0.51"
Flow Length=1,294' Tc=6.3 min CN=47 Runoff=2.06 cfs 0.191 af

Subcatchment AREA 6: Subcat AREA 6 Runoff Area=0.892 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=415' Tc=4.6 min CN=69 Runoff=2.92 cfs 0.141 af

Subcatchment AREA 7: Subcat AREA 7 Runoff Area=1.017 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=833' Tc=5.8 min CN=69 Runoff=3.15 cfs 0.160 af

Subcatchment AREA 8: Subcat AREA 8 Runoff Area=1.009 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=409' Tc=4.7 min CN=69 Runoff=3.29 cfs 0.159 af

Subcatchment AREA 9: Subcat AREA 9 Runoff Area=1.047 ac 0.00% Impervious Runoff Depth=1.89"
Flow Length=426' Tc=4.8 min CN=69 Runoff=3.40 cfs 0.165 af

Reach S1 R2: Swale S1 Reach 2 Avg. Flow Depth=0.76' Max Vel=2.58 fps Inflow=22.03 cfs 1.077 af
n=0.030 L=127.0' S=0.0055 '/ Capacity=140.64 cfs Outflow=21.68 cfs 1.077 af

Reach S1 R3: Swale S1 Reach 3 Avg. Flow Depth=0.88' Max Vel=2.69 fps Inflow=31.44 cfs 1.788 af
n=0.030 L=578.0' S=0.0051 '/ Capacity=135.10 cfs Outflow=27.38 cfs 1.788 af

Reach S1 R4: Swale S1 Reach 4 Avg. Flow Depth=0.94' Max Vel=3.19 fps Inflow=35.79 cfs 2.233 af
n=0.030 L=195.8' S=0.0066 '/ Capacity=154.36 cfs Outflow=35.20 cfs 2.233 af

Reach S1 R5: Swale S1 Reach 5 Avg. Flow Depth=0.97' Max Vel=2.89 fps Inflow=35.39 cfs 2.255 af
n=0.030 L=411.6' S=0.0053 '/ Capacity=137.86 cfs Outflow=33.17 cfs 2.255 af

Reach S1 R6: Swale S1 Reach 6 Avg. Flow Depth=0.97' Max Vel=2.87 fps Inflow=35.21 cfs 2.484 af
n=0.030 L=430.9' S=0.0052 '/ Capacity=136.28 cfs Outflow=33.18 cfs 2.484 af

Reach S2 R1: Swale S2 Reach 1 Avg. Flow Depth=1.18' Max Vel=1.99 fps Inflow=33.19 cfs 2.506 af
n=0.030 L=472.0' S=0.0020 '/ Capacity=84.99 cfs Outflow=29.93 cfs 2.506 af

Reach S2 R2: Swale S2 Reach 2 Avg. Flow Depth=0.98' Max Vel=3.41 fps Inflow=48.80 cfs 4.314 af
n=0.030 L=751.0' S=0.0069 '/ Capacity=182.04 cfs Outflow=46.24 cfs 4.314 af

Reach S3 R1: Swale S3 Reach 1 Avg. Flow Depth=0.63' Max Vel=2.73 fps Inflow=16.31 cfs 0.785 af
n=0.030 L=215.0' S=0.0070 '/ Capacity=125.24 cfs Outflow=15.87 cfs 0.785 af

Reach S3 R2: Swale S3 Reach 2 Avg. Flow Depth=1.75' Max Vel=3.61 fps Inflow=27.94 cfs 1.419 af
n=0.030 L=97.0' S=0.0070 '/ Capacity=71.57 cfs Outflow=27.78 cfs 1.419 af

Reach S3 R3: Swale S3 Reach 3 Avg. Flow Depth=0.73' Max Vel=3.34 fps Inflow=27.86 cfs 1.464 af
n=0.030 L=353.0' S=0.0097 '/ Capacity=186.19 cfs Outflow=26.59 cfs 1.464 af

Reach S4 R2: Swale S4 Reach 2 Avg. Flow Depth=0.46' Max Vel=2.23 fps Inflow=14.04 cfs 0.716 af
n=0.030 L=601.0' S=0.0069 '/ Capacity=174.20 cfs Outflow=11.87 cfs 0.716 af

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Reach S4 R3: Swale S4 Reach 3 Avg. Flow Depth=0.63' Max Vel=2.42 fps Inflow=23.93 cfs 1.374 af
n=0.030 L=946.0' S=0.0056 '/' Capacity=156.53 cfs Outflow=18.66 cfs 1.374 af

Reach S4 R4: Swale S4 Reach 4 Avg. Flow Depth=1.27' Max Vel=4.35 fps Inflow=81.28 cfs 7.099 af
n=0.030 L=483.0' S=0.0082 '/' Capacity=427.66 cfs Outflow=80.05 cfs 7.099 af

Reach S5 R2: Swale S5 Reach 2 Inflow=2.06 cfs 0.191 af
Outflow=2.06 cfs 0.191 af

Pond Sed Pond: Sedimentation Basin Peak Elev=791.59' Storage=137,326 cf Inflow=82.78 cfs 7.853 af
Primary=9.42 cfs 1.973 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=14.75 cfs 7.854 af

Link C1: Culvert C1 Inflow=2.06 cfs 0.191 af
Primary=2.06 cfs 0.191 af

Link C2: Culvert C2 Inflow=9.68 cfs 0.520 af
Primary=9.68 cfs 0.520 af

Link C3: Culvert C3 Inflow=27.38 cfs 1.788 af
Primary=27.38 cfs 1.788 af

Link C4: Culvert C4 Inflow=35.39 cfs 2.255 af
Primary=35.39 cfs 2.255 af

Link C5: Culvert C5 Inflow=35.21 cfs 2.434 af
Primary=35.21 cfs 2.434 af

Link C6: Culvert C6 Inflow=27.86 cfs 1.464 af
Primary=27.86 cfs 1.464 af

Link C7: Culvert C7 Inflow=52.15 cfs 4.999 af
Primary=52.15 cfs 4.999 af

Link C8: Culvert C8 Inflow=8.32 cfs 0.566 af
Primary=8.32 cfs 0.566 af

Link F1: Flume 1 Inflow=13.17 cfs 0.658 af
Primary=13.17 cfs 0.658 af

Link F2: Flume 2 Inflow=14.04 cfs 0.716 af
Primary=14.04 cfs 0.716 af

Link F3: Flume 3 Inflow=19.08 cfs 0.934 af
Primary=19.08 cfs 0.934 af

Link F4: Flume 4 Inflow=8.58 cfs 0.417 af
Primary=8.58 cfs 0.417 af

Link F5: Flume 5 Inflow=15.06 cfs 0.725 af
Primary=15.06 cfs 0.725 af

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Link F6: Flume 6	Inflow=12.11 cfs 0.586 af Primary=12.11 cfs 0.586 af
Link F7: Existing East Flume	Inflow=2.66 cfs 0.128 af Primary=2.66 cfs 0.128 af
Link F8: Existing West Flume	Inflow=9.73 cfs 0.492 af Primary=9.73 cfs 0.492 af
Link North Area: North Area	Inflow=8.32 cfs 0.566 af Primary=8.32 cfs 0.566 af
Link RC1: Rock Chute 1	Inflow=13.17 cfs 0.658 af Primary=13.17 cfs 0.658 af
Link RC2: Rock Chute 2	Inflow=14.04 cfs 0.716 af Primary=14.04 cfs 0.716 af
Link Swale 1 R6: Swale S1 Reach 6	Inflow=33.18 cfs 2.484 af Primary=33.18 cfs 2.484 af
Link Swale S1 R1: Swale S1 Reach 1	Inflow=1.37 cfs 0.068 af Primary=1.37 cfs 0.068 af
Link Swale S1 R2: Swale S1 Reach 2	Inflow=21.68 cfs 1.077 af Primary=21.68 cfs 1.077 af
Link Swale S1 R3: Swale S1 Reach 3	Inflow=27.38 cfs 1.788 af Primary=27.38 cfs 1.788 af
Link Swale S1 R4: Swale S1 Reach 4	Inflow=35.39 cfs 2.255 af Primary=35.39 cfs 2.255 af
Link Swale S1 R5: Swale S1 Reach 5	Inflow=35.21 cfs 2.434 af Primary=35.21 cfs 2.434 af
Link Swale S2 R1: Swale S2 Reach 1	Inflow=29.95 cfs 2.516 af Primary=29.95 cfs 2.516 af
Link Swale S2 R2: Swale S2 Reach 2	Inflow=52.15 cfs 4.999 af Primary=52.15 cfs 4.999 af
Link Swale S3 R1: Swale S3 Reach 1	Inflow=15.88 cfs 0.833 af Primary=15.88 cfs 0.833 af
Link Swale S3 R2: Swale S3 Reach 2	Inflow=27.86 cfs 1.464 af Primary=27.86 cfs 1.464 af
Link Swale S3 R3: Swale S3 Reach 3	Inflow=26.70 cfs 1.592 af Primary=26.70 cfs 1.592 af

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Link Swale S4 R4: Swale S4 Reach 4

Inflow=80.09 cfs 7.154 af
Primary=80.09 cfs 7.154 af

Link Swale S5 R1: Swale S5 Reach 1

Inflow=2.06 cfs 0.191 af
Primary=2.06 cfs 0.191 af

Link Swale S5 R2: Swale S5 Reach 2

Inflow=4.68 cfs 0.336 af
Primary=4.68 cfs 0.336 af

Link Swale S5 R3: Swale S5 Reach 3

Inflow=3.79 cfs 0.230 af
Primary=3.79 cfs 0.230 af

Link Swale S6 R1: Swale S6 Reach 1

Inflow=9.68 cfs 0.520 af
Primary=9.68 cfs 0.520 af

Link Wetland: Wetland

Inflow=9.42 cfs 1.973 af
Primary=9.42 cfs 1.973 af

Total Runoff Area = 82.060 ac Runoff Volume = 8.419 af Average Runoff Depth = 1.23"
97.02% Pervious = 79.615 ac 2.98% Impervious = 2.446 ac

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Summary for Subcatchment AREA 1: Subcat AREA 1

Runoff = 4.58 cfs @ 12.11 hrs, Volume= 0.203 af, Depth= 1.89"
Routed to Link F3 : Flume 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.288	69	Pasture/grassland/range, Fair, HSG B
1.288		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	37	0.2500	0.36		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.9	371	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
2.6	408	Total			

Summary for Subcatchment AREA 10: Subcat AREA 10

Runoff = 3.17 cfs @ 12.11 hrs, Volume= 0.144 af, Depth= 1.89"
Routed to Link F5 : Flume 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.914	69	Pasture/grassland/range, Fair, HSG B
0.914		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	46	0.2500	0.37		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.1	454	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
3.2	500	Total			

Summary for Subcatchment AREA 11: Subcat AREA 11

Runoff = 3.10 cfs @ 12.12 hrs, Volume= 0.150 af, Depth= 1.89"
Routed to Link F5 : Flume 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Area (ac)	CN	Description
0.949	69	Pasture/grassland/range, Fair, HSG B
0.949		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	14	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	277	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	391	Total			

Summary for Subcatchment AREA 12: Subcat AREA 12

Runoff = 0.35 cfs @ 12.11 hrs, Volume= 0.015 af, Depth= 1.89"
Routed to Link F4 : Flume 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.098	69	Pasture/grassland/range, Fair, HSG B
0.098		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	56	0.2500	0.39		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	36	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
2.5	92	Total			

Summary for Subcatchment AREA 13: Subcat AREA 13

Runoff = 2.91 cfs @ 12.12 hrs, Volume= 0.140 af, Depth= 1.89"
Routed to Link F4 : Flume 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Area (ac)	CN	Description
0.890	69	Pasture/grassland/range, Fair, HSG B
0.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	87	0.2500	0.42		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.2	503	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	590	Total			

Summary for Subcatchment AREA 14: Subcat AREA 14

Runoff = 3.66 cfs @ 12.13 hrs, Volume= 0.181 af, Depth= 1.89"
Routed to Link F4 : Flume 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.145	69	Pasture/grassland/range, Fair, HSG B
1.145		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	27	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	498	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
5.1	625	Total			

Summary for Subcatchment AREA 15: Subcat AREA 15

Runoff = 1.71 cfs @ 12.12 hrs, Volume= 0.081 af, Depth= 1.89"
Routed to Link F4 : Flume 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.512	69	Pasture/grassland/range, Fair, HSG B
0.512		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	85	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.2	235	Total			

Summary for Subcatchment AREA 16: Subcat AREA 16

Runoff = 4.89 cfs @ 12.13 hrs, Volume= 0.238 af, Depth= 1.89"
Routed to Link F5 : Flume 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.510	69	Pasture/grassland/range, Fair, HSG B
1.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	372	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.9	522	Total			

Summary for Subcatchment AREA 17: Subcat AREA 17

Runoff = 4.00 cfs @ 12.12 hrs, Volume= 0.194 af, Depth= 1.89"
Routed to Link F5 : Flume 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.228	69	Pasture/grassland/range, Fair, HSG B
1.228		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.3	63	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	223	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	386	Total			

Summary for Subcatchment AREA 18: Subcat AREA 18

Runoff = 2.66 cfs @ 12.12 hrs, Volume= 0.128 af, Depth= 1.89"
Routed to Link F6 : Flume 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.813	69	Pasture/grassland/range, Fair, HSG B
0.813		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	48	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	235	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	383	Total			

Summary for Subcatchment AREA 19: Subcat AREA 19

Runoff = 2.77 cfs @ 12.12 hrs, Volume= 0.134 af, Depth= 1.89"
Routed to Link F6 : Flume 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.847	69	Pasture/grassland/range, Fair, HSG B
0.847		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	244	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	394	Total			

Summary for Subcatchment AREA 2: Subcat AREA 2

Runoff = 3.73 cfs @ 12.13 hrs, Volume= 0.184 af, Depth= 1.89"
Routed to Link F3 : Flume 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.167	69	Pasture/grassland/range, Fair, HSG B
1.167		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	18	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	495	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
5.1	613	Total			

Summary for Subcatchment AREA 20: Subcat AREA 20

Runoff = 3.43 cfs @ 12.12 hrs, Volume= 0.166 af, Depth= 1.89"
Routed to Link F1 : Flume 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.054	69	Pasture/grassland/range, Fair, HSG B
1.054		100.00% Pervious Area

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MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	303	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	453	Total			

Summary for Subcatchment AREA 21: Subcat AREA 21

Runoff = 3.35 cfs @ 12.12 hrs, Volume= 0.162 af, Depth= 1.89"
Routed to Link F1 : Flume 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.030	69	Pasture/grassland/range, Fair, HSG B
1.030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	298	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	448	Total			

Summary for Subcatchment AREA 22: Subcat AREA 22

Runoff = 3.35 cfs @ 12.12 hrs, Volume= 0.162 af, Depth= 1.89"
Routed to Link F2 : Flume 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.030	69	Pasture/grassland/range, Fair, HSG B
1.030		100.00% Pervious Area

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MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	298	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	448	Total			

Summary for Subcatchment AREA 23: Subcat AREA 23

Runoff = 4.89 cfs @ 12.13 hrs, Volume= 0.244 af, Depth= 1.89"
Routed to Link F2 : Flume 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.548	69	Pasture/grassland/range, Fair, HSG B
1.548		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	24	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	591	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
5.4	715	Total			

Summary for Subcatchment AREA 24: Subcat AREA 24

Runoff = 6.05 cfs @ 12.13 hrs, Volume= 0.308 af, Depth= 1.89"
Routed to Link F3 : Flume 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.952	69	Pasture/grassland/range, Fair, HSG B
1.952		100.00% Pervious Area

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MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	24	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.9	765	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
5.8	889	Total			

Summary for Subcatchment AREA 25: Subcat AREA 25

Runoff = 5.13 cfs @ 12.12 hrs, Volume= 0.239 af, Depth= 1.89"
Routed to Link F3 : Flume 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.515	69	Pasture/grassland/range, Fair, HSG B
1.515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	67	0.2500	0.40		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.1	428	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
3.9	495	Total			

Summary for Subcatchment AREA 26: Subcat AREA 26

Runoff = 1.59 cfs @ 12.12 hrs, Volume= 0.075 af, Depth= 1.74"
Routed to Reach S1 R2 : Swale S1 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.396	69	Pasture/grassland/range, Fair, HSG B
0.072	39	Pasture/grassland/range, Good, HSG A
0.049	96	Gravel surface, HSG A
* 0.000	0	Pasture/grassland/range, Fair
0.518	67	Weighted Average
0.518		100.00% Pervious Area

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MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	93	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.5	123	0.0055	4.39	140.49	Trap/Vee/Rect Channel Flow, Swale 1 Reach 2 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
4.1	216	Total			

Summary for Subcatchment AREA 27: Subcat AREA 27

Runoff = 1.68 cfs @ 12.25 hrs, Volume= 0.191 af, Depth= 0.55"
Routed to Reach S1 R3 : Swale S1 Reach 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.651	69	Pasture/grassland/range, Fair, HSG B
2.758	39	Pasture/grassland/range, Good, HSG A
0.010	96	Gravel surface, HSG A
0.295	96	Gravel surface, HSG A
0.426	39	Pasture/grassland/range, Good, HSG A
* 0.000	0	
* 0.000	0	
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	Pasture/grassland/range, Good
4.140	48	Weighted Average
4.140		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0500	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.3	217	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	20	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	14	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	513	0.0051	4.23	135.28	Trap/Vee/Rect Channel Flow, Swale 1 Reach 3 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
12.0	864	Total			

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Summary for Subcatchment AREA 28: Subcat AREA 28

Runoff = 2.08 cfs @ 12.19 hrs, Volume= 0.179 af, Depth= 0.66"
 Routed to Link Swale S1 R5 : Swale S1 Reach 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (sf)	CN	Description
30,267	69	Pasture/grassland/range, Fair, HSG B
100,859	39	Pasture/grassland/range, Good, HSG A
* 11,834	96	Gravel surface
142,960	50	Weighted Average
142,960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	78	0.0526	0.22		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.1	22	0.2500	0.32		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	24	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	23	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	16	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	410	0.0053	4.31	137.91	Trap/Vee/Rect Channel Flow, Swale 1 Reach Bot.W=8.00' D=2.00' Z= 4.0 ' Top.W=24.00' n= 0.030 Earth, grassed & winding
9.1	573	Total			

Summary for Subcatchment AREA 28A: Subcat AREA 28A

Runoff = 0.23 cfs @ 12.20 hrs, Volume= 0.021 af, Depth= 0.60"
 Routed to Link Swale S1 R4 : Swale S1 Reach 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.035	69	Pasture/grassland/range, Fair, HSG B
0.257	39	Pasture/grassland/range, Good, HSG A
0.075	39	Pasture/grassland/range, Good, HSG A
0.010	96	Gravel surface, HSG A
0.046	96	Gravel surface, HSG A
0.423	49	Weighted Average
0.423		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	82	0.0334	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.0	18	0.2500	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	34	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	20	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	13	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	67	0.0069	4.92	157.36	Trap/Vee/Rect Channel Flow, Bot.W=8.00' D=2.00' Z= 4.0 ' /' Top.W=24.00' n= 0.030 Earth, grassed & winding
9.1	234	Total			

Summary for Subcatchment AREA 28B: Subcat AREA 28B

Runoff = 0.47 cfs @ 12.13 hrs, Volume= 0.028 af, Depth= 0.71"
Routed to Reach S1 R4 : Swale S1 Reach 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.050	69	Pasture/grassland/range, Fair, HSG B
0.110	39	Pasture/grassland/range, Good, HSG A
0.240	39	Pasture/grassland/range, Good, HSG A
0.009	96	Gravel surface, HSG A
0.067	96	Gravel surface, HSG A
0.476	51	Weighted Average
0.476		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	58	0.2500	0.39		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.6	20	0.0050	0.53		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
1.0	18	0.2500	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	115	0.0055	4.39	140.49	Trap/Vee/Rect Channel Flow, Bot.W=8.00' D=2.00' Z= 4.0 ' /' Top.W=24.00' n= 0.030 Earth, grassed & winding
4.5	211	Total			

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Summary for Subcatchment AREA 29: Subcat AREA 29

Runoff = 0.16 cfs @ 12.58 hrs, Volume= 0.050 af, Depth= 0.22"
Routed to Reach S1 R6 : Swale S1 Reach 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.056	96	Gravel surface, HSG A
2.735	39	Pasture/grassland/range, Good, HSG A
* 0.000	0	Gravel surface
2.792	40	Weighted Average
2.792		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0150	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.9	100	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	16	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	247	0.0052	4.27	136.60	Trap/Vee/Rect Channel Flow, Swale S1 Reach 5 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
14.8	463	Total			

Summary for Subcatchment AREA 3: Subcat AREA 3

Runoff = 2.17 cfs @ 12.14 hrs, Volume= 0.113 af, Depth= 1.89"
Routed to Link F2 : Flume 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.717	69	Pasture/grassland/range, Fair, HSG B
0.717		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	44	0.1000	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.4	56	0.2500	0.39		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	76	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	233	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
6.3	409	Total			

Summary for Subcatchment AREA 30: Subcat AREA 30

Runoff = 0.06 cfs @ 13.18 hrs, Volume= 0.021 af, Depth= 0.18"
Routed to Reach S2 R1 : Swale S2 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.415	39	Pasture/grassland/range, Good, HSG A
1.415		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0260	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.9	194	0.0260	1.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.6	647	0.0260	1.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.0	941	Total			

Summary for Subcatchment AREA 31: Subcat AREA 31

Runoff = 0.03 cfs @ 12.44 hrs, Volume= 0.011 af, Depth= 0.18"
Routed to Link Swale S2 R1 : Swale S2 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.698	39	Pasture/grassland/range, Good, HSG A
0.698		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	34	0.2500	0.35		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.8	447	0.0020	2.65	84.72	Trap/Vee/Rect Channel Flow, Swale 2 Reach 1 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
4.4	481	Total			

Summary for Subcatchment AREA 32: Subcat AREA 32

Runoff = 0.81 cfs @ 12.38 hrs, Volume= 0.128 af, Depth= 0.46"
Routed to Link Swale S3 R3 : Swale S3 Reach 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.567	69	Pasture/grassland/range, Fair, HSG B
2.413	39	Pasture/grassland/range, Good, HSG A
0.099	96	Gravel surface, HSG A
0.274	39	Pasture/grassland/range, Good, HSG A
3.353	46	Weighted Average
3.353		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0140	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
4.2	211	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	23	0.1740	2.92		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	329	0.0097	5.83	186.57	Trap/Vee/Rect Channel Flow, Swale 3 Reach 3 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
17.3	663	Total			

Summary for Subcatchment AREA 33: Subcat AREA 33

Runoff = 0.37 cfs @ 12.32 hrs, Volume= 0.045 af, Depth= 0.60"
Routed to Link Swale S3 R2 : Swale S3 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Area (sf)	CN	Description
4,079	96	Gravel surface, HSG A
1,422	96	Gravel surface, HSG A
30,707	39	Pasture/grassland/range, Good, HSG A
* 2,706	69	Pasture/grassland/range, Fair, HSG A
38,914	49	Weighted Average
38,914		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0140	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.6	178	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4000	4.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	87	0.0070	5.23	125.44	Trap/Vee/Rect Channel Flow, Swale 3 Reach 2 Bot.W=8.00' D=2.00' Z= 2.0 '/' Top.W=16.00' n= 0.030 Earth, grassed & winding
16.0	377	Total			

Summary for Subcatchment AREA 34: Subcat AREA 34

Runoff = 0.25 cfs @ 12.43 hrs, Volume= 0.049 af, Depth= 0.37"
Routed to Link Swale S3 R1 : Swale S3 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (sf)	CN	Description
5,695	69	Pasture/grassland/range, Fair, HSG B
3,470	96	Gravel surface, HSG A
59,319	39	Pasture/grassland/range, Good, HSG A
68,484	44	Weighted Average
68,484		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0140	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.4	170	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	15	0.4000	4.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	203	0.0070	5.23	125.44	Trap/Vee/Rect Channel Flow, Swale 3 Reach 1 Bot.W=8.00' D=2.00' Z= 2.0 '/' Top.W=16.00' n= 0.030 Earth, grassed & winding
16.2	488	Total			

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MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Summary for Subcatchment AREA 35: Subcat AREA 35

Runoff = 1.25 cfs @ 12.12 hrs, Volume= 0.059 af, Depth= 1.89"
 Routed to Reach S3 R1 : Swale S3 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description			
0.375	69	Pasture/grassland/range, Fair, HSG B			
0.375		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	74	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
4.2	174	Total			

Summary for Subcatchment AREA 36: Subcat AREA 36

Runoff = 1.54 cfs @ 12.12 hrs, Volume= 0.074 af, Depth= 1.82"
 Routed to Link F7 : Existing East Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description			
0.470	69	Pasture/grassland/range, Fair, HSG B			
0.016	39	Pasture/grassland/range, Good, HSG A			
* 0.000	0	Pasture/grassland/range, Good			
0.487	68	Weighted Average			
0.487		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	90	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.7	201	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.2	134	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
4.4	425	Total			

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MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Summary for Subcatchment AREA 37: Subcat AREA 37

Runoff = 1.12 cfs @ 12.12 hrs, Volume= 0.054 af, Depth= 1.89"
 Routed to Link F7 : Existing East Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.344	69	Pasture/grassland/range, Fair, HSG B
0.344		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	30	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	126	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.3	254	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
4.6	510	Total			

Summary for Subcatchment AREA 38: Subcat AREA 38

Runoff = 0.75 cfs @ 12.12 hrs, Volume= 0.035 af, Depth= 1.89"
 Routed to Link F8 : Existing West Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.223	69	Pasture/grassland/range, Fair, HSG B
0.223		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	77	0.2500	0.41		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.5	156	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.5	357	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
4.1	590	Total			

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Summary for Subcatchment AREA 39: Subcat AREA 39

Runoff = 2.08 cfs @ 12.13 hrs, Volume= 0.103 af, Depth= 1.89"
 Routed to Link F8 : Existing West Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description			
0.656	69	Pasture/grassland/range, Fair, HSG B			
0.656		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	11	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	314	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.3	217	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
5.3	642	Total			

Summary for Subcatchment AREA 4: Subcat AREA 4

Runoff = 3.74 cfs @ 12.14 hrs, Volume= 0.197 af, Depth= 1.89"
 Routed to Link F2 : Flume 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description			
1.247	69	Pasture/grassland/range, Fair, HSG B			
1.247		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	57	0.1000	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.0	43	0.2500	0.37		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	83	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	295	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
6.6	478	Total			

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Summary for Subcatchment AREA 40: Subcat AREA 40

Runoff = 3.05 cfs @ 12.13 hrs, Volume= 0.160 af, Depth= 1.18"
 Routed to Link Swale S2 R2 : Swale S2 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.079	69	Pasture/grassland/range, Fair, HSG B
0.539	39	Pasture/grassland/range, Good, HSG A
* 0.000	0	Pasture/grassland/range, Good
1.618	59	Weighted Average
1.618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	77	0.2500	0.41		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.8	237	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.3	70	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	315	0.0069	5.05	181.72	Trap/Vee/Rect Channel Flow, Swale S2 Reach 2 Bot.W=10.00' D=2.00' Z= 4.0 '/' Top.W=26.00' n= 0.030 Earth, grassed & winding
5.2	699	Total			

Summary for Subcatchment AREA 41: Subcat AREA 41

Runoff = 1.40 cfs @ 12.14 hrs, Volume= 0.077 af, Depth= 1.12"
 Routed to Reach S2 R2 : Swale S2 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.520	69	Pasture/grassland/range, Fair, HSG B
0.306	39	Pasture/grassland/range, Good, HSG A
0.826	58	Weighted Average
0.826		100.00% Pervious Area

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MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	26	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	596	0.0069	5.05	181.72	Trap/Vee/Rect Channel Flow, Swale S2 Reach 2 Bot.W=10.00' D=2.00' Z= 4.0 ' Top.W=26.00' n= 0.030 Earth, grassed & winding
5.9	722	Total			

Summary for Subcatchment AREA 42: Subcat AREA 42

Runoff = 0.09 cfs @ 12.55 hrs, Volume= 0.033 af, Depth= 0.18"
Routed to Link Swale S2 R2 : Swale S2 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
2.177	39	Pasture/grassland/range, Good, HSG A
2.177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	66	0.0303	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.6	34	0.2500	0.35		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	49	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	266	0.0069	5.05	181.72	Trap/Vee/Rect Channel Flow, Swale S2 Reach 2 Bot.W=10.00' D=2.00' Z= 4.0 ' Top.W=26.00' n= 0.030 Earth, grassed & winding
9.1	415	Total			

Summary for Subcatchment AREA 43: Subcat AREA 43

Runoff = 3.79 cfs @ 12.14 hrs, Volume= 0.194 af, Depth= 1.89"
Routed to Link F8 : Existing West Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.228	69	Pasture/grassland/range, Fair, HSG B
1.228		100.00% Pervious Area

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MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.0	6	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.9	541	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.2	131	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
5.9	778	Total			

Summary for Subcatchment AREA 44: Subcat AREA 44

Runoff = 0.22 cfs @ 12.54 hrs, Volume= 0.079 af, Depth= 0.18"
Routed to Pond Sed Pond : Sedimentation Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
5.227	39	Pasture/grassland/range, Good, HSG A
5.227		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	75	0.0933	0.28		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.3	25	0.2500	0.33		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.0	10	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	381	0.0265	7.85	109.92	Trap/Vee/Rect Channel Flow, Bot.W=0.00' D=2.00' Z= 4.0 & 3.0 '/' Top.W=14.00' n= 0.030 Earth, grassed & winding
0.8	162	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	48	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.9	701	Total			

Summary for Subcatchment AREA 44A: Subcat AREA 44A

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 10.70 cfs @ 12.09 hrs, Volume= 0.587 af, Depth= 4.67"
Routed to Pond Sed Pond : Sedimentation Basin

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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.508	98	Water Surface, HSG A
1.508		100.00% Impervious Area

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

Summary for Subcatchment AREA 44B: Subcat AREA 44B

Runoff = 0.41 cfs @ 12.17 hrs, Volume= 0.032 af, Depth= 0.66"
 Routed to Pond Sed Pond : Sedimentation Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.479	39	Pasture/grassland/range, Good, HSG A
0.115	96	Gravel surface, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
0.594	50	Weighted Average
0.594		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0544	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.5	47	0.0544	1.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.6	147	Total			

Summary for Subcatchment AREA 45: Subcat AREA 45

Runoff = 0.24 cfs @ 12.57 hrs, Volume= 0.055 af, Depth= 0.33"
 Routed to Link Swale S4 R4 : Swale S4 Reach 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Area (ac)	CN	Description
* 0.000	0	, HSG A
1.870	39	Pasture/grassland/range, Good, HSG A
0.000	96	Gravel surface, HSG A
0.130	96	Gravel surface, HSG A
2.001	43	Weighted Average
2.001		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0074	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
4.7	169	0.0074	0.60		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	49	0.0800	1.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	363	0.0082	5.42	162.67	Trap/Vee/Rect Channel Flow, Swale S4 Reach 2 Bot.W=8.00' D=2.00' Z= 4.0 & 3.0 ' Top.W=22.00' n= 0.030 Earth, grassed & winding
21.9	681	Total			

Summary for Subcatchment AREA 46: Subcat AREA 46

Runoff = 11.31 cfs @ 12.18 hrs, Volume= 0.727 af, Depth= 1.18"
Routed to Reach S4 R4 : Swale S4 Reach 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
3.081	69	Pasture/grassland/range, Fair, HSG B
0.590	96	Gravel surface, HSG B
3.264	39	Pasture/grassland/range, Good, HSG A
0.017	98	Paved parking, HSG A
0.009	98	Paved parking, HSG A
0.378	96	Gravel surface, HSG A
0.001	96	Gravel surface, HSG A
0.026	96	Gravel surface, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	Pasture/grassland/range, Fair
7.367	59	Weighted Average
7.340		99.64% Pervious Area
0.027		0.36% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	51	0.2500	0.38		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	16	0.2500	2.44		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
0.9	31	0.0050	0.58		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
0.4	47	0.0650	1.78		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.6	1,759	0.0073	5.26	178.68	Trap/Vee/Rect Channel Flow, Swale S4 Reach 1 Bot.W=10.00' D=2.00' Z= 3.0 & 4.0 ' Top.W=24.00' n= 0.030 Earth, grassed & winding
9.2	1,904	Total			

Summary for Subcatchment AREA 47: Subcat AREA 47

Runoff = 3.79 cfs @ 12.17 hrs, Volume= 0.230 af, Depth= 1.52"
Routed to Link Swale S5 R3 : Swale S5 Reach 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (sf)	CN	Description
49,617	69	Pasture/grassland/range, Fair, HSG B
6,971	98	Paved parking, HSG A
1,619	96	Gravel surface, HSG A
20,925	39	Pasture/grassland/range, Good, HSG A
79,132	64	Weighted Average
72,161		91.19% Pervious Area
6,971		8.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	43	0.2500	0.37		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	11	0.1111	1.63		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
0.7	12	0.2500	0.28		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.9	28	0.0393	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.4	488	0.0024	2.40	52.81	Trap/Vee/Rect Channel Flow, Swale S5 Reach 3 Bot.W=0.00' D=2.00' Z= 5.0 & 6.0 ' Top.W=22.00' n= 0.030 Earth, grassed & winding
9.1	582	Total			

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MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Summary for Subcatchment AREA 48: Subcat AREA 48

Runoff = 2.79 cfs @ 12.13 hrs, Volume= 0.145 af, Depth= 1.32"
 Routed to Link Swale S5 R2 : Swale S5 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (sf)	CN	Description
24,597	69	Pasture/grassland/range, Fair, HSG B
24,117	39	Pasture/grassland/range, Good, HSG A
2,057	96	Gravel surface, HSG A
6,769	98	Paved parking, HSG A
57,540	61	Weighted Average
50,771		88.24% Pervious Area
6,769		11.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	19	0.0050	0.53		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
1.7	29	0.1667	0.29		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.1	441	0.0024	2.38	40.39	Trap/Vee/Rect Channel Flow, Swale S5 Reach 2 Bot.W=0.00' D=2.00' Z= 2.5 & 6.0 '/' Top.W=17.00' n= 0.030 Earth, grassed & winding
5.4	489	Total			

Summary for Subcatchment AREA 49: Subcat AREA 49

Runoff = 1.37 cfs @ 12.12 hrs, Volume= 0.068 af, Depth= 1.18"
 Routed to Link Swale S1 R1 : Swale S1 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.439	69	Pasture/grassland/range, Fair, HSG B
0.246	39	Pasture/grassland/range, Good, HSG A
0.006	96	Gravel surface, HSG A
0.691	59	Weighted Average
0.691		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	59	0.2500	0.39		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.8	463	0.0053	4.31	137.91	Trap/Vee/Rect Channel Flow, Swale S1 Reach 1 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding

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4.3 522 Total

Summary for Subcatchment AREA 5: Subcat AREA 5

Runoff = 3.58 cfs @ 12.14 hrs, Volume= 0.188 af, Depth= 1.89"
Routed to Link F1 : Flume 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.195	69	Pasture/grassland/range, Fair, HSG B
1.195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	59	0.1000	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.9	41	0.2500	0.36		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	85	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	297	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding

6.6	482	Total
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Summary for Subcatchment AREA 50: Subcat AREA 50

Runoff = 9.68 cfs @ 12.11 hrs, Volume= 0.494 af, Depth= 4.00"
Routed to Link Swale S6 R1 : Swale S6 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.100	39	Pasture/grassland/range, Good, HSG A
0.001	39	Pasture/grassland/range, Good, HSG A
1.382	96	Gravel surface, HSG A
1.482	92	Weighted Average
1.482		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0119	1.04		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
0.4	47	0.0119	1.76		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	10	0.5000	4.95		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.4	413	0.0066	5.00	130.01	Trap/Vee/Rect Channel Flow, Swale S6 Reach 1 Bot.W=8.00' D=2.00' Z= 2.5 '/' Top.W=18.00' n= 0.030 Earth, grassed & winding
3.4	570	Total			

Summary for Subcatchment AREA 51: Subcat AREA 51

Runoff = 0.08 cfs @ 12.54 hrs, Volume= 0.025 af, Depth= 0.22"
Routed to Link Swale S6 R1 : Swale S6 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
1.396	39	Pasture/grassland/range, Good, HSG A
0.020	96	Gravel surface, HSG A
1.417	40	Weighted Average
1.417		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0500	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.2	302	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	53	0.0313	2.85		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.4	429	0.0066	5.00	130.01	Trap/Vee/Rect Channel Flow, Swale S6 Reach 1 Bot.W=8.00' D=2.00' Z= 2.5 '/' Top.W=18.00' n= 0.030 Earth, grassed & winding
12.2	884	Total			

Summary for Subcatchment AREA 52: Subcat AREA 52

Runoff = 2.06 cfs @ 12.16 hrs, Volume= 0.191 af, Depth= 0.51"
Routed to Link Swale S5 R1 : Swale S5 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Area (sf)	CN	Description
169,213	39	Pasture/grassland/range, Good, HSG A
25,933	98	Paved parking, HSG A
2,184	96	Gravel surface, HSG A
197,330	47	Weighted Average
171,397		86.86% Pervious Area
25,933		13.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	18	0.0050	0.52		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
1.4	21	0.1333	0.25		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
4.3	1,255	0.0096	4.82	125.20	Trap/Vee/Rect Channel Flow, Swale S5 Reach 1 Bot.W=0.00' D=2.00' Z= 6.0 & 7.0 ' Top.W=26.00' n= 0.030 Earth, grassed & winding
6.3	1,294	Total			

Summary for Subcatchment AREA 6: Subcat AREA 6

Runoff = 2.92 cfs @ 12.12 hrs, Volume= 0.141 af, Depth= 1.89"
Routed to Link F1 : Flume 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description
0.892	69	Pasture/grassland/range, Fair, HSG B
0.892		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.0	7	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	308	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	415	Total			

Summary for Subcatchment AREA 7: Subcat AREA 7

Runoff = 3.15 cfs @ 12.13 hrs, Volume= 0.160 af, Depth= 1.89"
Routed to Link F8 : Existing West Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Area (ac)	CN	Description			
1.017	69	Pasture/grassland/range, Fair, HSG B			
1.017		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	18	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	419	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.4	296	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
5.8	833	Total			

Summary for Subcatchment AREA 8: Subcat AREA 8

Runoff = 3.29 cfs @ 12.12 hrs, Volume= 0.159 af, Depth= 1.89"
Routed to Link F6 : Flume 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

Area (ac)	CN	Description			
1.009	69	Pasture/grassland/range, Fair, HSG B			
1.009		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.3	66	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	243	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	409	Total			

Summary for Subcatchment AREA 9: Subcat AREA 9

Runoff = 3.40 cfs @ 12.13 hrs, Volume= 0.165 af, Depth= 1.89"
Routed to Link F6 : Flume 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 25-yr, 24-hr Rainfall=4.91"

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Area (ac)	CN	Description
1.047	69	Pasture/grassland/range, Fair, HSG B
1.047		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	76	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	250	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.8	426	Total			

Summary for Reach S1 R2: Swale S1 Reach 2

Inflow Area = 7.131 ac, 0.00% Impervious, Inflow Depth = 1.81" for 25-yr, 24-hr event
 Inflow = 22.03 cfs @ 12.12 hrs, Volume= 1.077 af
 Outflow = 21.68 cfs @ 12.13 hrs, Volume= 1.077 af, Atten= 2%, Lag= 0.5 min
 Routed to Link Swale S1 R2 : Swale S1 Reach 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.58 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 0.69 fps, Avg. Travel Time= 3.1 min

Peak Storage= 1,066 cf @ 12.13 hrs
 Average Depth at Peak Storage= 0.76' , Surface Width= 14.08'
 Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 140.64 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
 Side Slope Z-value= 4.0 ' Top Width= 24.00'
 Length= 127.0' Slope= 0.0055 '
 Inlet Invert= 814.81', Outlet Invert= 814.11'



Summary for Reach S1 R3: Swale S1 Reach 3

Inflow Area = 14.170 ac, 0.00% Impervious, Inflow Depth = 1.51" for 25-yr, 24-hr event
 Inflow = 31.44 cfs @ 12.12 hrs, Volume= 1.788 af
 Outflow = 27.38 cfs @ 12.15 hrs, Volume= 1.788 af, Atten= 13%, Lag= 1.6 min
 Routed to Link Swale S1 R3 : Swale S1 Reach 3

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.69 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 15.9 min

Peak Storage= 5,875 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.88' , Surface Width= 15.05'
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 135.10 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 578.0' Slope= 0.0051 '/'
Inlet Invert= 814.11', Outlet Invert= 811.17'



Summary for Reach S1 R4: Swale S1 Reach 4

Inflow Area =	17.292 ac,	0.00% Impervious,	Inflow Depth = 1.55"	for 25-yr, 24-hr event
Inflow =	35.79 cfs @ 12.14 hrs,	Volume=	2.233 af	
Outflow =	35.20 cfs @ 12.15 hrs,	Volume=	2.233 af,	Atten= 2%, Lag= 0.7 min
Routed to Link Swale S1 R4 : Swale S1 Reach 4				

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.19 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 4.6 min

Peak Storage= 2,163 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.94' , Surface Width= 15.52'
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 154.36 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 195.8' Slope= 0.0066 '/'
Inlet Invert= 811.17', Outlet Invert= 809.87'



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Summary for Reach S1 R5: Swale S1 Reach 5

Inflow Area = 17.714 ac, 0.00% Impervious, Inflow Depth = 1.53" for 25-yr, 24-hr event
Inflow = 35.39 cfs @ 12.15 hrs, Volume= 2.255 af
Outflow = 33.17 cfs @ 12.18 hrs, Volume= 2.255 af, Atten= 6%, Lag= 1.6 min
Routed to Link Swale S1 R5 : Swale S1 Reach 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.89 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 10.7 min

Peak Storage= 4,722 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.97', Surface Width= 15.73'
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 137.86 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 411.6' Slope= 0.0053 '/'
Inlet Invert= 809.77', Outlet Invert= 807.59'



Summary for Reach S1 R6: Swale S1 Reach 6

Inflow Area = 23.788 ac, 0.00% Impervious, Inflow Depth = 1.25" for 25-yr, 24-hr event
Inflow = 35.21 cfs @ 12.18 hrs, Volume= 2.484 af
Outflow = 33.18 cfs @ 12.21 hrs, Volume= 2.484 af, Atten= 6%, Lag= 1.8 min
Routed to Link Swale 1 R6 : Swale S1 Reach 6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.87 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.65 fps, Avg. Travel Time= 11.0 min

Peak Storage= 4,986 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.97', Surface Width= 15.78'
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 136.28 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 430.9' Slope= 0.0052 '/'
Inlet Invert= 807.15', Outlet Invert= 804.92'

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Summary for Reach S2 R1: Swale S2 Reach 1

Inflow Area = 25.203 ac, 0.00% Impervious, Inflow Depth = 1.19" for 25-yr, 24-hr event
Inflow = 33.19 cfs @ 12.21 hrs, Volume= 2.506 af
Outflow = 29.93 cfs @ 12.26 hrs, Volume= 2.506 af, Atten= 10%, Lag= 3.0 min
Routed to Link Swale S2 R1 : Swale S2 Reach 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.99 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 0.45 fps, Avg. Travel Time= 17.6 min

Peak Storage= 7,099 cf @ 12.26 hrs
Average Depth at Peak Storage= 1.18' , Surface Width= 17.45'
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 84.99 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 472.0' Slope= 0.0020 '/'
Inlet Invert= 802.25', Outlet Invert= 801.30'



Summary for Reach S2 R2: Swale S2 Reach 2

Inflow Area = 42.068 ac, 0.00% Impervious, Inflow Depth = 1.23" for 25-yr, 24-hr event
Inflow = 48.80 cfs @ 12.18 hrs, Volume= 4.314 af
Outflow = 46.24 cfs @ 12.25 hrs, Volume= 4.314 af, Atten= 5%, Lag= 4.2 min
Routed to Link Swale S2 R2 : Swale S2 Reach 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.41 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 16.7 min

Peak Storage= 10,190 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.98' , Surface Width= 17.81'
Bank-Full Depth= 2.00' Flow Area= 36.0 sf, Capacity= 182.04 cfs

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10.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 26.00'
Length= 751.0' Slope= 0.0069 '/'
Inlet Invert= 801.30', Outlet Invert= 796.10'



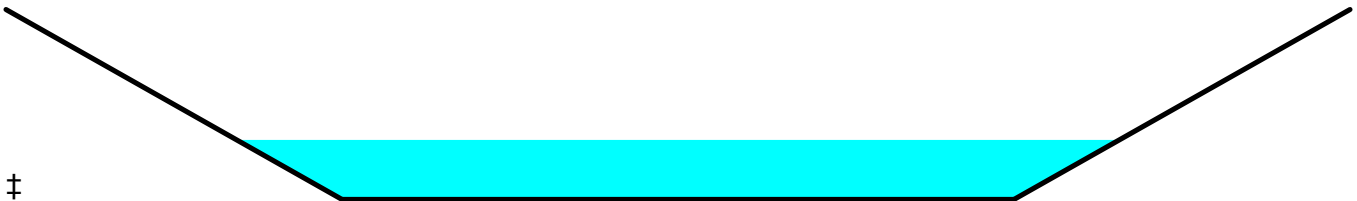
Summary for Reach S3 R1: Swale S3 Reach 1

Inflow Area = 4.976 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 16.31 cfs @ 12.12 hrs, Volume= 0.785 af
Outflow = 15.87 cfs @ 12.13 hrs, Volume= 0.785 af, Atten= 3%, Lag= 0.7 min
Routed to Link Swale S3 R1 : Swale S3 Reach 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.73 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.67 fps, Avg. Travel Time= 5.4 min

Peak Storage= 1,248 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.63', Surface Width= 10.51'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 125.24 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 215.0' Slope= 0.0070 '/'
Inlet Invert= 807.58', Outlet Invert= 806.08'



Summary for Reach S3 R2: Swale S3 Reach 2

Inflow Area = 10.265 ac, 0.00% Impervious, Inflow Depth = 1.66" for 25-yr, 24-hr event
Inflow = 27.94 cfs @ 12.13 hrs, Volume= 1.419 af
Outflow = 27.78 cfs @ 12.13 hrs, Volume= 1.419 af, Atten= 1%, Lag= 0.3 min
Routed to Link Swale S3 R2 : Swale S3 Reach 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.61 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 1.2 min

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Peak Storage= 745 cf @ 12.13 hrs

Average Depth at Peak Storage= 1.75' , Surface Width= 8.77'

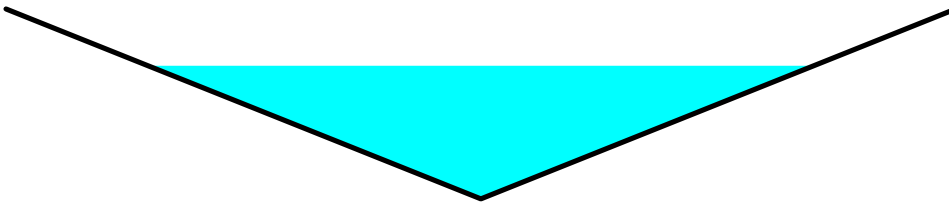
Bank-Full Depth= 2.50' Flow Area= 15.6 sf, Capacity= 71.57 cfs

0.00' x 2.50' deep channel, n= 0.030 Earth, grassed & winding

Side Slope Z-value= 2.5 ' / ' Top Width= 12.50'

Length= 97.0' Slope= 0.0070 ' / '

Inlet Invert= 806.08', Outlet Invert= 805.40'



Summary for Reach S3 R3: Swale S3 Reach 3

Inflow Area = 11.158 ac, 0.00% Impervious, Inflow Depth = 1.57" for 25-yr, 24-hr event

Inflow = 27.86 cfs @ 12.13 hrs, Volume= 1.464 af

Outflow = 26.59 cfs @ 12.15 hrs, Volume= 1.464 af, Atten= 5%, Lag= 1.0 min

Routed to Link Swale S3 R3 : Swale S3 Reach 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Max. Velocity= 3.34 fps, Min. Travel Time= 1.8 min

Avg. Velocity= 0.88 fps, Avg. Travel Time= 6.7 min

Peak Storage= 2,810 cf @ 12.15 hrs

Average Depth at Peak Storage= 0.73' , Surface Width= 13.83'

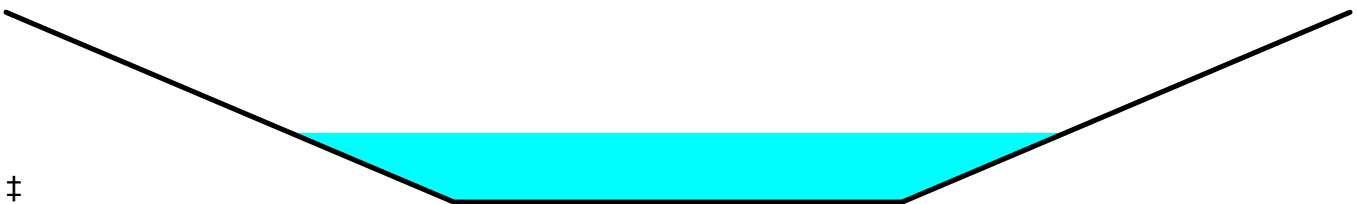
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 186.19 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding

Side Slope Z-value= 4.0 ' / ' Top Width= 24.00'

Length= 353.0' Slope= 0.0097 ' / '

Inlet Invert= 804.71', Outlet Invert= 801.30'



‡

Summary for Reach S4 R2: Swale S4 Reach 2

Inflow Area = 4.541 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event

Inflow = 14.04 cfs @ 12.13 hrs, Volume= 0.716 af

Outflow = 11.87 cfs @ 12.17 hrs, Volume= 0.716 af, Atten= 15%, Lag= 2.1 min

Routed to Reach S4 R3 : Swale S4 Reach 3

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.23 fps, Min. Travel Time= 4.5 min

Avg. Velocity = 0.55 fps, Avg. Travel Time= 18.3 min

Peak Storage= 3,193 cf @ 12.17 hrs

Average Depth at Peak Storage= 0.46' , Surface Width= 13.21'

Bank-Full Depth= 2.00' Flow Area= 34.0 sf, Capacity= 174.20 cfs

10.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding

Side Slope Z-value= 4.0 3.0 '/' Top Width= 24.00'

Length= 601.0' Slope= 0.0069 '/'

Inlet Invert= 806.43', Outlet Invert= 802.26'



Summary for Reach S4 R3: Swale S4 Reach 3

[62] Hint: Exceeded Reach S4 R2 OUTLET depth by 0.23' @ 12.28 hrs

Inflow Area = 8.711 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event

Inflow = 23.93 cfs @ 12.14 hrs, Volume= 1.374 af

Outflow = 18.66 cfs @ 12.20 hrs, Volume= 1.374 af, Atten= 22%, Lag= 3.4 min

Routed to Reach S4 R4 : Swale S4 Reach 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.42 fps, Min. Travel Time= 6.5 min

Avg. Velocity = 0.57 fps, Avg. Travel Time= 27.9 min

Peak Storage= 7,289 cf @ 12.20 hrs

Average Depth at Peak Storage= 0.63' , Surface Width= 14.42'

Bank-Full Depth= 2.00' Flow Area= 34.0 sf, Capacity= 156.53 cfs

10.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding

Side Slope Z-value= 3.0 4.0 '/' Top Width= 24.00'

Length= 946.0' Slope= 0.0056 '/'

Inlet Invert= 802.26', Outlet Invert= 796.96'



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Summary for Reach S4 R4: Swale S4 Reach 4

[62] Hint: Exceeded Reach S4 R3 OUTLET depth by 0.67' @ 12.27 hrs

Inflow Area = 65.063 ac, 0.04% Impervious, Inflow Depth = 1.31" for 25-yr, 24-hr event
Inflow = 81.28 cfs @ 12.20 hrs, Volume= 7.099 af
Outflow = 80.05 cfs @ 12.23 hrs, Volume= 7.099 af, Atten= 2%, Lag= 1.7 min
Routed to Link Swale S4 R4 : Swale S4 Reach 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.35 fps, Min. Travel Time= 1.9 min
Avg. Velocity= 0.97 fps, Avg. Travel Time= 8.3 min

Peak Storage= 8,890 cf @ 12.23 hrs
Average Depth at Peak Storage= 1.27' , Surface Width= 18.91'
Bank-Full Depth= 3.00' Flow Area= 61.5 sf, Capacity= 427.66 cfs

10.00' x 3.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 4.0 '/' Top Width= 31.00'
Length= 483.0' Slope= 0.0082 '/'
Inlet Invert= 796.96', Outlet Invert= 793.00'



Summary for Reach S5 R2: Swale S5 Reach 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.530 ac, 13.14% Impervious, Inflow Depth = 0.51" for 25-yr, 24-hr event
Inflow = 2.06 cfs @ 12.16 hrs, Volume= 0.191 af
Outflow = 2.06 cfs @ 12.16 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min
Routed to Link Swale S5 R2 : Swale S5 Reach 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Pond Sed Pond: Sedimentation Basin

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=42)

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Inflow Area = 74.393 ac, 2.06% Impervious, Inflow Depth = 1.27" for 25-yr, 24-hr event
 Inflow = 82.78 cfs @ 12.23 hrs, Volume= 7.853 af
 Outflow = 14.75 cfs @ 13.29 hrs, Volume= 7.854 af, Atten= 82%, Lag= 64.1 min
 Discarded = 5.33 cfs @ 13.29 hrs, Volume= 5.880 af
 Primary = 9.42 cfs @ 13.29 hrs, Volume= 1.973 af
 Routed to Link Wetland : Wetland
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link Wetland : Wetland
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link Wetland : Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 Peak Elev= 791.59' @ 13.29 hrs Surf.Area= 63,986 sf Storage= 137,326 cf
 Flood Elev= 794.00' Surf.Area= 75,797 sf Storage= 304,443 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 184.8 min (1,043.0 - 858.2)

Volume	Invert	Avail.Storage	Storage Description
#1	789.00'	304,443 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
789.00	27,325	0	0
790.00	55,972	41,649	41,649
791.00	61,532	58,752	100,401
792.00	65,703	63,618	164,018
793.00	69,675	67,689	231,707
794.00	75,797	72,736	304,443

Device	Routing	Invert	Outlet Devices
#1	Primary	787.70'	15.0" Round Culvert L= 40.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 787.70' / 787.50' S= 0.0050 ' /' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	791.00'	30.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	790.50'	0.8" Vert. Orifice/Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	790.00'	0.8" Vert. Orifice/Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	789.00'	0.5" Vert. Orifice/Grate X 14.00 columns X 6 rows with 6.0" cc spacing C= 0.600 Limited to weir flow at low heads
#6	Secondary	792.50'	20.0' 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
#7	Tertiary	793.00'	158.0' 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
#8	Discarded	789.00'	3.600 in/hr Exfiltration over Surface area

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Discarded OutFlow Max=5.33 cfs @ 13.29 hrs HW=791.59' (Free Discharge)

↑**8=Exfiltration** (Exfiltration Controls 5.33 cfs)

Primary OutFlow Max=9.42 cfs @ 13.29 hrs HW=791.59' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 9.42 cfs @ 7.67 fps)

↑**2=Orifice/Grate** (Passes < 11.59 cfs potential flow)

↑**3=Orifice/Grate** (Passes < 0.07 cfs potential flow)

↑**4=Orifice/Grate** (Passes < 0.08 cfs potential flow)

↑**5=Orifice/Grate** (Passes < 0.58 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=789.00' TW=0.00' (Dynamic Tailwater)

↑**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=789.00' TW=0.00' (Dynamic Tailwater)

↑**7=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link C1: Culvert C1

Inflow Area = 4.530 ac, 13.14% Impervious, Inflow Depth = 0.51" for 25-yr, 24-hr event

Inflow = 2.06 cfs @ 12.16 hrs, Volume= 0.191 af

Primary = 2.06 cfs @ 12.16 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min

Routed to Reach S5 R2 : Swale S5 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C2: Culvert C2

Inflow Area = 2.899 ac, 0.00% Impervious, Inflow Depth = 2.15" for 25-yr, 24-hr event

Inflow = 9.68 cfs @ 12.11 hrs, Volume= 0.520 af

Primary = 9.68 cfs @ 12.11 hrs, Volume= 0.520 af, Atten= 0%, Lag= 0.0 min

Routed to Reach S1 R3 : Swale S1 Reach 3

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C3: Culvert C3

Inflow Area = 14.170 ac, 0.00% Impervious, Inflow Depth = 1.51" for 25-yr, 24-hr event

Inflow = 27.38 cfs @ 12.15 hrs, Volume= 1.788 af

Primary = 27.38 cfs @ 12.15 hrs, Volume= 1.788 af, Atten= 0%, Lag= 0.0 min

Routed to Reach S1 R4 : Swale S1 Reach 4

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Summary for Link C4: Culvert C4

Inflow Area = 17.714 ac, 0.00% Impervious, Inflow Depth = 1.53" for 25-yr, 24-hr event
Inflow = 35.39 cfs @ 12.15 hrs, Volume= 2.255 af
Primary = 35.39 cfs @ 12.15 hrs, Volume= 2.255 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R5 : Swale S1 Reach 5

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C5: Culvert C5

Inflow Area = 20.996 ac, 0.00% Impervious, Inflow Depth = 1.39" for 25-yr, 24-hr event
Inflow = 35.21 cfs @ 12.18 hrs, Volume= 2.434 af
Primary = 35.21 cfs @ 12.18 hrs, Volume= 2.434 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R6 : Swale S1 Reach 6

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C6: Culvert C6

Inflow Area = 11.158 ac, 0.00% Impervious, Inflow Depth = 1.57" for 25-yr, 24-hr event
Inflow = 27.86 cfs @ 12.13 hrs, Volume= 1.464 af
Primary = 27.86 cfs @ 12.13 hrs, Volume= 1.464 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S3 R3 : Swale S3 Reach 3

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C7: Culvert C7

Inflow Area = 48.985 ac, 0.00% Impervious, Inflow Depth = 1.22" for 25-yr, 24-hr event
Inflow = 52.15 cfs @ 12.23 hrs, Volume= 4.999 af
Primary = 52.15 cfs @ 12.23 hrs, Volume= 4.999 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S4 R4 : Swale S4 Reach 4

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C8: Culvert C8

Inflow Area = 7.668 ac, 11.88% Impervious, Inflow Depth = 0.89" for 25-yr, 24-hr event
Inflow = 8.32 cfs @ 12.15 hrs, Volume= 0.566 af
Primary = 8.32 cfs @ 12.15 hrs, Volume= 0.566 af, Atten= 0%, Lag= 0.0 min
Routed to Link North Area : North Area

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Summary for Link F1: Flume 1

Inflow Area = 4.170 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 13.17 cfs @ 12.13 hrs, Volume= 0.658 af
Primary = 13.17 cfs @ 12.13 hrs, Volume= 0.658 af, Atten= 0%, Lag= 0.0 min
Routed to Link RC1 : Rock Chute 1

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F2: Flume 2

Inflow Area = 4.541 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 14.04 cfs @ 12.13 hrs, Volume= 0.716 af
Primary = 14.04 cfs @ 12.13 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min
Routed to Link RC2 : Rock Chute 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F3: Flume 3

Inflow Area = 5.923 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 19.08 cfs @ 12.12 hrs, Volume= 0.934 af
Primary = 19.08 cfs @ 12.12 hrs, Volume= 0.934 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R2 : Swale S1 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F4: Flume 4

Inflow Area = 2.645 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 8.58 cfs @ 12.12 hrs, Volume= 0.417 af
Primary = 8.58 cfs @ 12.12 hrs, Volume= 0.417 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R4 : Swale S1 Reach 4

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F5: Flume 5

Inflow Area = 4.601 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 15.06 cfs @ 12.12 hrs, Volume= 0.725 af
Primary = 15.06 cfs @ 12.12 hrs, Volume= 0.725 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S3 R1 : Swale S3 Reach 1

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Summary for Link F6: Flume 6

Inflow Area = 3.717 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 12.11 cfs @ 12.12 hrs, Volume= 0.586 af
Primary = 12.11 cfs @ 12.12 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S3 R2 : Swale S3 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F7: Existing East Flume

Inflow Area = 0.830 ac, 0.00% Impervious, Inflow Depth = 1.85" for 25-yr, 24-hr event
Inflow = 2.66 cfs @ 12.12 hrs, Volume= 0.128 af
Primary = 2.66 cfs @ 12.12 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S2 R2 : Swale S2 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F8: Existing West Flume

Inflow Area = 3.122 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 9.73 cfs @ 12.13 hrs, Volume= 0.492 af
Primary = 9.73 cfs @ 12.13 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.0 min
Routed to Link Swale S2 R2 : Swale S2 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link North Area: North Area

Inflow Area = 7.668 ac, 11.88% Impervious, Inflow Depth = 0.89" for 25-yr, 24-hr event
Inflow = 8.32 cfs @ 12.15 hrs, Volume= 0.566 af
Primary = 8.32 cfs @ 12.15 hrs, Volume= 0.566 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link RC1: Rock Chute 1

Inflow Area = 4.170 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 13.17 cfs @ 12.13 hrs, Volume= 0.658 af
Primary = 13.17 cfs @ 12.13 hrs, Volume= 0.658 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S4 R3 : Swale S4 Reach 3

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Summary for Link RC2: Rock Chute 2

Inflow Area = 4.541 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25-yr, 24-hr event
Inflow = 14.04 cfs @ 12.13 hrs, Volume= 0.716 af
Primary = 14.04 cfs @ 12.13 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S4 R2 : Swale S4 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale 1 R6: Swale S1 Reach 6

Inflow Area = 23.788 ac, 0.00% Impervious, Inflow Depth = 1.25" for 25-yr, 24-hr event
Inflow = 33.18 cfs @ 12.21 hrs, Volume= 2.484 af
Primary = 33.18 cfs @ 12.21 hrs, Volume= 2.484 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S2 R1 : Swale S2 Reach 1

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S1 R1: Swale S1 Reach 1

Inflow Area = 0.691 ac, 0.00% Impervious, Inflow Depth = 1.18" for 25-yr, 24-hr event
Inflow = 1.37 cfs @ 12.12 hrs, Volume= 0.068 af
Primary = 1.37 cfs @ 12.12 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R2 : Swale S1 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S1 R2: Swale S1 Reach 2

Inflow Area = 7.131 ac, 0.00% Impervious, Inflow Depth = 1.81" for 25-yr, 24-hr event
Inflow = 21.68 cfs @ 12.13 hrs, Volume= 1.077 af
Primary = 21.68 cfs @ 12.13 hrs, Volume= 1.077 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R3 : Swale S1 Reach 3

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S1 R3: Swale S1 Reach 3

Inflow Area = 14.170 ac, 0.00% Impervious, Inflow Depth = 1.51" for 25-yr, 24-hr event
Inflow = 27.38 cfs @ 12.15 hrs, Volume= 1.788 af
Primary = 27.38 cfs @ 12.15 hrs, Volume= 1.788 af, Atten= 0%, Lag= 0.0 min
Routed to Link C3 : Culvert C3

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Summary for Link Swale S1 R4: Swale S1 Reach 4

Inflow Area = 17.714 ac, 0.00% Impervious, Inflow Depth = 1.53" for 25-yr, 24-hr event
Inflow = 35.39 cfs @ 12.15 hrs, Volume= 2.255 af
Primary = 35.39 cfs @ 12.15 hrs, Volume= 2.255 af, Atten= 0%, Lag= 0.0 min
Routed to Link C4 : Culvert C4

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S1 R5: Swale S1 Reach 5

Inflow Area = 20.996 ac, 0.00% Impervious, Inflow Depth = 1.39" for 25-yr, 24-hr event
Inflow = 35.21 cfs @ 12.18 hrs, Volume= 2.434 af
Primary = 35.21 cfs @ 12.18 hrs, Volume= 2.434 af, Atten= 0%, Lag= 0.0 min
Routed to Link C5 : Culvert C5

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S2 R1: Swale S2 Reach 1

Inflow Area = 25.901 ac, 0.00% Impervious, Inflow Depth = 1.17" for 25-yr, 24-hr event
Inflow = 29.95 cfs @ 12.26 hrs, Volume= 2.516 af
Primary = 29.95 cfs @ 12.26 hrs, Volume= 2.516 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S2 R2 : Swale S2 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S2 R2: Swale S2 Reach 2

Inflow Area = 48.985 ac, 0.00% Impervious, Inflow Depth = 1.22" for 25-yr, 24-hr event
Inflow = 52.15 cfs @ 12.23 hrs, Volume= 4.999 af
Primary = 52.15 cfs @ 12.23 hrs, Volume= 4.999 af, Atten= 0%, Lag= 0.0 min
Routed to Link C7 : Culvert C7

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S3 R1: Swale S3 Reach 1

Inflow Area = 6.548 ac, 0.00% Impervious, Inflow Depth = 1.53" for 25-yr, 24-hr event
Inflow = 15.88 cfs @ 12.13 hrs, Volume= 0.833 af
Primary = 15.88 cfs @ 12.13 hrs, Volume= 0.833 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S3 R2 : Swale S3 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Summary for Link Swale S3 R2: Swale S3 Reach 2

Inflow Area = 11.158 ac, 0.00% Impervious, Inflow Depth = 1.57" for 25-yr, 24-hr event
Inflow = 27.86 cfs @ 12.13 hrs, Volume= 1.464 af
Primary = 27.86 cfs @ 12.13 hrs, Volume= 1.464 af, Atten= 0%, Lag= 0.0 min
Routed to Link C6 : Culvert C6

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S3 R3: Swale S3 Reach 3

Inflow Area = 14.511 ac, 0.00% Impervious, Inflow Depth = 1.32" for 25-yr, 24-hr event
Inflow = 26.70 cfs @ 12.15 hrs, Volume= 1.592 af
Primary = 26.70 cfs @ 12.15 hrs, Volume= 1.592 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S2 R2 : Swale S2 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S4 R4: Swale S4 Reach 4

Inflow Area = 67.064 ac, 0.04% Impervious, Inflow Depth = 1.28" for 25-yr, 24-hr event
Inflow = 80.09 cfs @ 12.23 hrs, Volume= 7.154 af
Primary = 80.09 cfs @ 12.23 hrs, Volume= 7.154 af, Atten= 0%, Lag= 0.0 min
Routed to Pond Sed Pond : Sedimentation Basin

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S5 R1: Swale S5 Reach 1

Inflow Area = 4.530 ac, 13.14% Impervious, Inflow Depth = 0.51" for 25-yr, 24-hr event
Inflow = 2.06 cfs @ 12.16 hrs, Volume= 0.191 af
Primary = 2.06 cfs @ 12.16 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min
Routed to Link C1 : Culvert C1

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S5 R2: Swale S5 Reach 2

Inflow Area = 5.851 ac, 12.83% Impervious, Inflow Depth = 0.69" for 25-yr, 24-hr event
Inflow = 4.68 cfs @ 12.15 hrs, Volume= 0.336 af
Primary = 4.68 cfs @ 12.15 hrs, Volume= 0.336 af, Atten= 0%, Lag= 0.0 min
Routed to Link C8 : Culvert C8

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Summary for Link Swale S5 R3: Swale S5 Reach 3

Inflow Area = 1.817 ac, 8.81% Impervious, Inflow Depth = 1.52" for 25-yr, 24-hr event
Inflow = 3.79 cfs @ 12.17 hrs, Volume= 0.230 af
Primary = 3.79 cfs @ 12.17 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.0 min
Routed to Link C8 : Culvert C8

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Swale S6 R1: Swale S6 Reach 1

Inflow Area = 2.899 ac, 0.00% Impervious, Inflow Depth = 2.15" for 25-yr, 24-hr event
Inflow = 9.68 cfs @ 12.11 hrs, Volume= 0.520 af
Primary = 9.68 cfs @ 12.11 hrs, Volume= 0.520 af, Atten= 0%, Lag= 0.0 min
Routed to Link C2 : Culvert C2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link Wetland: Wetland

Inflow Area = 74.393 ac, 2.06% Impervious, Inflow Depth = 0.32" for 25-yr, 24-hr event
Inflow = 9.42 cfs @ 13.29 hrs, Volume= 1.973 af
Primary = 9.42 cfs @ 13.29 hrs, Volume= 1.973 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment AREA 1: Subcat AREA 1	Runoff Area=1.288 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=408' Tc=2.6 min CN=69 Runoff=7.63 cfs 0.342 af
Subcatchment AREA 10: Subcat AREA 10	Runoff Area=0.914 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=500' Tc=3.2 min CN=69 Runoff=5.29 cfs 0.242 af
Subcatchment AREA 11: Subcat AREA 11	Runoff Area=0.949 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=391' Tc=4.6 min CN=69 Runoff=5.21 cfs 0.251 af
Subcatchment AREA 12: Subcat AREA 12	Runoff Area=0.098 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=92' Tc=2.5 min CN=69 Runoff=0.58 cfs 0.026 af
Subcatchment AREA 13: Subcat AREA 13	Runoff Area=0.890 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=590' Tc=4.6 min CN=69 Runoff=4.89 cfs 0.236 af
Subcatchment AREA 14: Subcat AREA 14	Runoff Area=1.145 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=625' Tc=5.1 min CN=69 Runoff=6.17 cfs 0.303 af
Subcatchment AREA 15: Subcat AREA 15	Runoff Area=0.512 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=235' Tc=4.2 min CN=69 Runoff=2.86 cfs 0.136 af
Subcatchment AREA 16: Subcat AREA 16	Runoff Area=1.510 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=522' Tc=4.9 min CN=69 Runoff=8.20 cfs 0.400 af
Subcatchment AREA 17: Subcat AREA 17	Runoff Area=1.228 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=386' Tc=4.7 min CN=69 Runoff=6.72 cfs 0.326 af
Subcatchment AREA 18: Subcat AREA 18	Runoff Area=0.813 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=383' Tc=4.6 min CN=69 Runoff=4.47 cfs 0.215 af
Subcatchment AREA 19: Subcat AREA 19	Runoff Area=0.847 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=394' Tc=4.6 min CN=69 Runoff=4.66 cfs 0.225 af
Subcatchment AREA 2: Subcat AREA 2	Runoff Area=1.167 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=613' Tc=5.1 min CN=69 Runoff=6.28 cfs 0.309 af
Subcatchment AREA 20: Subcat AREA 20	Runoff Area=1.054 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=453' Tc=4.7 min CN=69 Runoff=5.77 cfs 0.279 af
Subcatchment AREA 21: Subcat AREA 21	Runoff Area=1.030 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=448' Tc=4.7 min CN=69 Runoff=5.64 cfs 0.273 af
Subcatchment AREA 22: Subcat AREA 22	Runoff Area=1.030 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=448' Tc=4.7 min CN=69 Runoff=5.64 cfs 0.273 af
Subcatchment AREA 23: Subcat AREA 23	Runoff Area=1.548 ac 0.00% Impervious Runoff Depth=3.18" Flow Length=715' Tc=5.4 min CN=69 Runoff=8.23 cfs 0.410 af

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Subcatchment AREA 24: Subcat AREA 24 Runoff Area=1.952 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=889' Tc=5.8 min CN=69 Runoff=10.20 cfs 0.517 af

Subcatchment AREA 25: Subcat AREA 25 Runoff Area=1.515 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=495' Tc=3.9 min CN=69 Runoff=8.59 cfs 0.402 af

Subcatchment AREA 26: Subcat AREA 26 Runoff Area=0.518 ac 0.00% Impervious Runoff Depth=2.98"
Flow Length=216' Tc=4.1 min CN=67 Runoff=2.74 cfs 0.129 af

Subcatchment AREA 27: Subcat AREA 27 Runoff Area=4.140 ac 0.00% Impervious Runoff Depth=1.28"
Flow Length=864' Tc=12.0 min CN=48 Runoff=5.63 cfs 0.442 af

Subcatchment AREA 28: Subcat AREA 28 Runoff Area=142,960 sf 0.00% Impervious Runoff Depth=1.44"
Flow Length=573' Tc=9.1 min CN=50 Runoff=5.98 cfs 0.395 af

Subcatchment AREA 28A: Subcat AREA 28A Runoff Area=0.423 ac 0.00% Impervious Runoff Depth=1.36"
Flow Length=234' Tc=9.1 min CN=49 Runoff=0.71 cfs 0.048 af

Subcatchment AREA 28B: Subcat AREA 28B Runoff Area=0.476 ac 0.00% Impervious Runoff Depth=1.53"
Flow Length=211' Tc=4.5 min CN=51 Runoff=1.20 cfs 0.061 af

Subcatchment AREA 29: Subcat AREA 29 Runoff Area=2.792 ac 0.00% Impervious Runoff Depth=0.69"
Flow Length=463' Tc=14.8 min CN=40 Runoff=1.21 cfs 0.161 af

Subcatchment AREA 3: Subcat AREA 3 Runoff Area=0.717 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=409' Tc=6.3 min CN=69 Runoff=3.66 cfs 0.190 af

Subcatchment AREA 30: Subcat AREA 30 Runoff Area=1.415 ac 0.00% Impervious Runoff Depth=0.63"
Flow Length=941' Slope=0.0260 '/' Tc=22.0 min CN=39 Runoff=0.43 cfs 0.074 af

Subcatchment AREA 31: Subcat AREA 31 Runoff Area=0.698 ac 0.00% Impervious Runoff Depth=0.63"
Flow Length=481' Tc=4.4 min CN=39 Runoff=0.42 cfs 0.036 af

Subcatchment AREA 32: Subcat AREA 32 Runoff Area=3.353 ac 0.00% Impervious Runoff Depth=1.13"
Flow Length=663' Tc=17.3 min CN=46 Runoff=3.11 cfs 0.315 af

Subcatchment AREA 33: Subcat AREA 33 Runoff Area=38,914 sf 0.00% Impervious Runoff Depth=1.36"
Flow Length=377' Tc=16.0 min CN=49 Runoff=1.14 cfs 0.101 af

Subcatchment AREA 34: Subcat AREA 34 Runoff Area=68,484 sf 0.00% Impervious Runoff Depth=0.98"
Flow Length=488' Tc=16.2 min CN=44 Runoff=1.20 cfs 0.128 af

Subcatchment AREA 35: Subcat AREA 35 Runoff Area=0.375 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=174' Slope=0.2500 '/' Tc=4.2 min CN=69 Runoff=2.10 cfs 0.099 af

Subcatchment AREA 36: Subcat AREA 36 Runoff Area=0.487 ac 0.00% Impervious Runoff Depth=3.08"
Flow Length=425' Tc=4.4 min CN=68 Runoff=2.62 cfs 0.125 af

Subcatchment AREA 37: Subcat AREA 37 Runoff Area=0.344 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=510' Tc=4.6 min CN=69 Runoff=1.89 cfs 0.091 af

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Subcatchment AREA 38: Subcat AREA 38 Runoff Area=0.223 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=590' Tc=4.1 min CN=69 Runoff=1.25 cfs 0.059 af

Subcatchment AREA 39: Subcat AREA 39 Runoff Area=0.656 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=642' Tc=5.3 min CN=69 Runoff=3.50 cfs 0.174 af

Subcatchment AREA 4: Subcat AREA 4 Runoff Area=1.247 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=478' Tc=6.6 min CN=69 Runoff=6.31 cfs 0.331 af

Subcatchment AREA 40: Subcat AREA 40 Runoff Area=1.618 ac 0.00% Impervious Runoff Depth=2.23"
Flow Length=699' Tc=5.2 min CN=59 Runoff=6.03 cfs 0.300 af

Subcatchment AREA 41: Subcat AREA 41 Runoff Area=0.826 ac 0.00% Impervious Runoff Depth=2.13"
Flow Length=722' Tc=5.9 min CN=58 Runoff=2.84 cfs 0.147 af

Subcatchment AREA 42: Subcat AREA 42 Runoff Area=2.177 ac 0.00% Impervious Runoff Depth=0.63"
Flow Length=415' Tc=9.1 min CN=39 Runoff=0.93 cfs 0.114 af

Subcatchment AREA 43: Subcat AREA 43 Runoff Area=1.228 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=778' Tc=5.9 min CN=69 Runoff=6.39 cfs 0.325 af

Subcatchment AREA 44: Subcat AREA 44 Runoff Area=5.227 ac 0.00% Impervious Runoff Depth=0.63"
Flow Length=701' Tc=7.9 min CN=39 Runoff=2.38 cfs 0.273 af

Subcatchment AREA 44A: Subcat AREA Runoff Area=1.508 ac 100.00% Impervious Runoff Depth=6.35"
Tc=0.0 min CN=98 Runoff=14.38 cfs 0.798 af

Subcatchment AREA 44B: Subcat AREA 44B Runoff Area=0.594 ac 0.00% Impervious Runoff Depth=1.44"
Flow Length=147' Slope=0.0544 '/ Tc=7.6 min CN=50 Runoff=1.17 cfs 0.071 af

Subcatchment AREA 45: Subcat AREA 45 Runoff Area=2.001 ac 0.00% Impervious Runoff Depth=0.90"
Flow Length=681' Tc=21.9 min CN=43 Runoff=1.16 cfs 0.150 af

Subcatchment AREA 46: Subcat AREA 46 Runoff Area=7.367 ac 0.36% Impervious Runoff Depth=2.23"
Flow Length=1,904' Tc=9.2 min CN=59 Runoff=22.74 cfs 1.366 af

Subcatchment AREA 47: Subcat AREA 47 Runoff Area=79,132 sf 8.81% Impervious Runoff Depth=2.69"
Flow Length=582' Tc=9.1 min CN=64 Runoff=6.90 cfs 0.408 af

Subcatchment AREA 48: Subcat AREA 48 Runoff Area=57,540 sf 11.76% Impervious Runoff Depth=2.41"
Flow Length=489' Tc=5.4 min CN=61 Runoff=5.30 cfs 0.265 af

Subcatchment AREA 49: Subcat AREA 49 Runoff Area=0.691 ac 0.00% Impervious Runoff Depth=2.23"
Flow Length=522' Tc=4.3 min CN=59 Runoff=2.68 cfs 0.128 af

Subcatchment AREA 5: Subcat AREA 5 Runoff Area=1.195 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=482' Tc=6.6 min CN=69 Runoff=6.05 cfs 0.317 af

Subcatchment AREA 50: Subcat AREA 50 Runoff Area=1.482 ac 0.00% Impervious Runoff Depth=5.65"
Flow Length=570' Tc=3.4 min CN=92 Runoff=13.35 cfs 0.698 af

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Subcatchment AREA 51: Subcat AREA 51 Runoff Area=1.417 ac 0.00% Impervious Runoff Depth=0.69"
Flow Length=884' Tc=12.2 min CN=40 Runoff=0.67 cfs 0.082 af

Subcatchment AREA 52: Subcat AREA 52 Runoff Area=197,330 sf 13.14% Impervious Runoff Depth=1.20"
Flow Length=1,294' Tc=6.3 min CN=47 Runoff=7.48 cfs 0.454 af

Subcatchment AREA 6: Subcat AREA 6 Runoff Area=0.892 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=415' Tc=4.6 min CN=69 Runoff=4.90 cfs 0.236 af

Subcatchment AREA 7: Subcat AREA 7 Runoff Area=1.017 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=833' Tc=5.8 min CN=69 Runoff=5.31 cfs 0.269 af

Subcatchment AREA 8: Subcat AREA 8 Runoff Area=1.009 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=409' Tc=4.7 min CN=69 Runoff=5.52 cfs 0.268 af

Subcatchment AREA 9: Subcat AREA 9 Runoff Area=1.047 ac 0.00% Impervious Runoff Depth=3.18"
Flow Length=426' Tc=4.8 min CN=69 Runoff=5.71 cfs 0.278 af

Reach S1 R2: Swale S1 Reach 2 Avg. Flow Depth=1.01' Max Vel=3.03 fps Inflow=37.51 cfs 1.827 af
n=0.030 L=127.0' S=0.0055 '/' Capacity=140.64 cfs Outflow=37.05 cfs 1.827 af

Reach S1 R3: Swale S1 Reach 3 Avg. Flow Depth=1.18' Max Vel=3.17 fps Inflow=53.22 cfs 3.049 af
n=0.030 L=578.0' S=0.0051 '/' Capacity=135.10 cfs Outflow=47.76 cfs 3.049 af

Reach S1 R4: Swale S1 Reach 4 Avg. Flow Depth=1.26' Max Vel=3.74 fps Inflow=62.37 cfs 3.811 af
n=0.030 L=195.8' S=0.0066 '/' Capacity=154.36 cfs Outflow=61.58 cfs 3.811 af

Reach S1 R5: Swale S1 Reach 5 Avg. Flow Depth=1.31' Max Vel=3.42 fps Inflow=62.23 cfs 3.859 af
n=0.030 L=411.6' S=0.0053 '/' Capacity=137.86 cfs Outflow=59.21 cfs 3.859 af

Reach S1 R6: Swale S1 Reach 6 Avg. Flow Depth=1.36' Max Vel=3.44 fps Inflow=65.66 cfs 4.415 af
n=0.030 L=430.9' S=0.0052 '/' Capacity=136.28 cfs Outflow=62.73 cfs 4.415 af

Reach S2 R1: Swale S2 Reach 1 Avg. Flow Depth=1.65' Max Vel=2.39 fps Inflow=62.82 cfs 4.489 af
n=0.030 L=472.0' S=0.0020 '/' Capacity=84.99 cfs Outflow=57.87 cfs 4.489 af

Reach S2 R2: Swale S2 Reach 2 Avg. Flow Depth=1.40' Max Vel=4.16 fps Inflow=95.28 cfs 7.736 af
n=0.030 L=751.0' S=0.0069 '/' Capacity=182.04 cfs Outflow=90.88 cfs 7.736 af

Reach S3 R1: Swale S3 Reach 1 Avg. Flow Depth=0.85' Max Vel=3.26 fps Inflow=27.41 cfs 1.319 af
n=0.030 L=215.0' S=0.0070 '/' Capacity=125.24 cfs Outflow=26.88 cfs 1.319 af

Reach S3 R2: Swale S3 Reach 2 Avg. Flow Depth=2.14' Max Vel=4.13 fps Inflow=47.52 cfs 2.432 af
n=0.030 L=97.0' S=0.0070 '/' Capacity=71.57 cfs Outflow=47.32 cfs 2.432 af

Reach S3 R3: Swale S3 Reach 3 Avg. Flow Depth=0.98' Max Vel=3.94 fps Inflow=47.83 cfs 2.533 af
n=0.030 L=353.0' S=0.0097 '/' Capacity=186.19 cfs Outflow=46.22 cfs 2.533 af

Reach S4 R2: Swale S4 Reach 2 Avg. Flow Depth=0.63' Max Vel=2.70 fps Inflow=23.68 cfs 1.204 af
n=0.030 L=601.0' S=0.0069 '/' Capacity=174.20 cfs Outflow=20.91 cfs 1.204 af

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Reach S4 R3: Swale S4 Reach 3 Avg. Flow Depth=0.89' Max Vel=2.94 fps Inflow=41.60 cfs 2.309 af
n=0.030 L=946.0' S=0.0056 '/' Capacity=156.53 cfs Outflow=34.31 cfs 2.309 af

Reach S4 R4: Swale S4 Reach 4 Avg. Flow Depth=1.82' Max Vel=5.29 fps Inflow=159.67 cfs 12.653 af
n=0.030 L=483.0' S=0.0082 '/' Capacity=427.66 cfs Outflow=157.44 cfs 12.653 af

Reach S5 R2: Swale S5 Reach 2 Inflow=7.48 cfs 0.454 af
Outflow=7.48 cfs 0.454 af

Pond Sed Pond: Sedimentation Basin Peak Elev=793.06' Storage=236,005 cf Inflow=164.77 cfs 13.946 af
.167 af Primary=11.35 cfs 4.914 af Secondary=22.50 cfs 1.762 af Tertiary=6.00 cfs 0.104 af Outflow=45.68 cfs 13.947 af

Link C1: Culvert C1 Inflow=7.48 cfs 0.454 af
Primary=7.48 cfs 0.454 af

Link C2: Culvert C2 Inflow=13.45 cfs 0.780 af
Primary=13.45 cfs 0.780 af

Link C3: Culvert C3 Inflow=47.76 cfs 3.049 af
Primary=47.76 cfs 3.049 af

Link C4: Culvert C4 Inflow=62.23 cfs 3.859 af
Primary=62.23 cfs 3.859 af

Link C5: Culvert C5 Inflow=65.15 cfs 4.254 af
Primary=65.15 cfs 4.254 af

Link C6: Culvert C6 Inflow=47.83 cfs 2.533 af
Primary=47.83 cfs 2.533 af

Link C7: Culvert C7 Inflow=103.37 cfs 8.978 af
Primary=103.37 cfs 8.978 af

Link C8: Culvert C8 Inflow=19.20 cfs 1.127 af
Primary=19.20 cfs 1.127 af

Link F1: Flume 1 Inflow=22.19 cfs 1.105 af
Primary=22.19 cfs 1.105 af

Link F2: Flume 2 Inflow=23.68 cfs 1.204 af
Primary=23.68 cfs 1.204 af

Link F3: Flume 3 Inflow=32.10 cfs 1.570 af
Primary=32.10 cfs 1.570 af

Link F4: Flume 4 Inflow=14.43 cfs 0.701 af
Primary=14.43 cfs 0.701 af

Link F5: Flume 5 Inflow=25.31 cfs 1.219 af
Primary=25.31 cfs 1.219 af

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Link F6: Flume 6	Inflow=20.36 cfs 0.985 af Primary=20.36 cfs 0.985 af
Link F7: Existing East Flume	Inflow=4.50 cfs 0.216 af Primary=4.50 cfs 0.216 af
Link F8: Existing West Flume	Inflow=16.40 cfs 0.828 af Primary=16.40 cfs 0.828 af
Link North Area: North Area	Inflow=19.20 cfs 1.127 af Primary=19.20 cfs 1.127 af
Link RC1: Rock Chute 1	Inflow=22.19 cfs 1.105 af Primary=22.19 cfs 1.105 af
Link RC2: Rock Chute 2	Inflow=23.68 cfs 1.204 af Primary=23.68 cfs 1.204 af
Link Swale 1 R6: Swale S1 Reach 6	Inflow=62.73 cfs 4.415 af Primary=62.73 cfs 4.415 af
Link Swale S1 R1: Swale S1 Reach 1	Inflow=2.68 cfs 0.128 af Primary=2.68 cfs 0.128 af
Link Swale S1 R2: Swale S1 Reach 2	Inflow=37.05 cfs 1.827 af Primary=37.05 cfs 1.827 af
Link Swale S1 R3: Swale S1 Reach 3	Inflow=47.76 cfs 3.049 af Primary=47.76 cfs 3.049 af
Link Swale S1 R4: Swale S1 Reach 4	Inflow=62.23 cfs 3.859 af Primary=62.23 cfs 3.859 af
Link Swale S1 R5: Swale S1 Reach 5	Inflow=65.15 cfs 4.254 af Primary=65.15 cfs 4.254 af
Link Swale S2 R1: Swale S2 Reach 1	Inflow=58.13 cfs 4.525 af Primary=58.13 cfs 4.525 af
Link Swale S2 R2: Swale S2 Reach 2	Inflow=103.37 cfs 8.978 af Primary=103.37 cfs 8.978 af
Link Swale S3 R1: Swale S3 Reach 1	Inflow=27.22 cfs 1.447 af Primary=27.22 cfs 1.447 af
Link Swale S3 R2: Swale S3 Reach 2	Inflow=47.83 cfs 2.533 af Primary=47.83 cfs 2.533 af
Link Swale S3 R3: Swale S3 Reach 3	Inflow=47.45 cfs 2.848 af Primary=47.45 cfs 2.848 af

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Link Swale S4 R4: Swale S4 Reach 4

Inflow=157.92 cfs 12.803 af
Primary=157.92 cfs 12.803 af

Link Swale S5 R1: Swale S5 Reach 1

Inflow=7.48 cfs 0.454 af
Primary=7.48 cfs 0.454 af

Link Swale S5 R2: Swale S5 Reach 2

Inflow=12.65 cfs 0.720 af
Primary=12.65 cfs 0.720 af

Link Swale S5 R3: Swale S5 Reach 3

Inflow=6.90 cfs 0.408 af
Primary=6.90 cfs 0.408 af

Link Swale S6 R1: Swale S6 Reach 1

Inflow=13.45 cfs 0.780 af
Primary=13.45 cfs 0.780 af

Link Wetland: Wetland

Inflow=39.85 cfs 6.780 af
Primary=39.85 cfs 6.780 af

Total Runoff Area = 82.060 ac Runoff Volume = 15.074 af Average Runoff Depth = 2.20"
97.02% Pervious = 79.615 ac 2.98% Impervious = 2.446 ac

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Summary for Subcatchment AREA 1: Subcat AREA 1

Runoff = 7.63 cfs @ 12.11 hrs, Volume= 0.342 af, Depth= 3.18"
 Routed to Link F3 : Flume 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.288	69	Pasture/grassland/range, Fair, HSG B
1.288		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	37	0.2500	0.36		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.9	371	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
2.6	408	Total			

Summary for Subcatchment AREA 10: Subcat AREA 10

Runoff = 5.29 cfs @ 12.11 hrs, Volume= 0.242 af, Depth= 3.18"
 Routed to Link F5 : Flume 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.914	69	Pasture/grassland/range, Fair, HSG B
0.914		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	46	0.2500	0.37		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.1	454	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
3.2	500	Total			

Summary for Subcatchment AREA 11: Subcat AREA 11

Runoff = 5.21 cfs @ 12.12 hrs, Volume= 0.251 af, Depth= 3.18"
 Routed to Link F5 : Flume 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Area (ac)	CN	Description
0.949	69	Pasture/grassland/range, Fair, HSG B
0.949		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	14	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	277	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	391	Total			

Summary for Subcatchment AREA 12: Subcat AREA 12

Runoff = 0.58 cfs @ 12.11 hrs, Volume= 0.026 af, Depth= 3.18"
Routed to Link F4 : Flume 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.098	69	Pasture/grassland/range, Fair, HSG B
0.098		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	56	0.2500	0.39		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	36	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
2.5	92	Total			

Summary for Subcatchment AREA 13: Subcat AREA 13

Runoff = 4.89 cfs @ 12.12 hrs, Volume= 0.236 af, Depth= 3.18"
Routed to Link F4 : Flume 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Area (ac)	CN	Description
0.890	69	Pasture/grassland/range, Fair, HSG B
0.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	87	0.2500	0.42		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.2	503	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	590	Total			

Summary for Subcatchment AREA 14: Subcat AREA 14

Runoff = 6.17 cfs @ 12.13 hrs, Volume= 0.303 af, Depth= 3.18"
Routed to Link F4 : Flume 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.145	69	Pasture/grassland/range, Fair, HSG B
1.145		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	27	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	498	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
5.1	625	Total			

Summary for Subcatchment AREA 15: Subcat AREA 15

Runoff = 2.86 cfs @ 12.12 hrs, Volume= 0.136 af, Depth= 3.18"
Routed to Link F4 : Flume 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.512	69	Pasture/grassland/range, Fair, HSG B
0.512		100.00% Pervious Area

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	85	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.2	235	Total			

Summary for Subcatchment AREA 16: Subcat AREA 16

Runoff = 8.20 cfs @ 12.12 hrs, Volume= 0.400 af, Depth= 3.18"
Routed to Link F5 : Flume 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.510	69	Pasture/grassland/range, Fair, HSG B
1.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	372	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.9	522	Total			

Summary for Subcatchment AREA 17: Subcat AREA 17

Runoff = 6.72 cfs @ 12.12 hrs, Volume= 0.326 af, Depth= 3.18"
Routed to Link F5 : Flume 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.228	69	Pasture/grassland/range, Fair, HSG B
1.228		100.00% Pervious Area

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.3	63	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	223	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	386	Total			

Summary for Subcatchment AREA 18: Subcat AREA 18

Runoff = 4.47 cfs @ 12.12 hrs, Volume= 0.215 af, Depth= 3.18"
Routed to Link F6 : Flume 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.813	69	Pasture/grassland/range, Fair, HSG B
0.813		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	48	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	235	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	383	Total			

Summary for Subcatchment AREA 19: Subcat AREA 19

Runoff = 4.66 cfs @ 12.12 hrs, Volume= 0.225 af, Depth= 3.18"
Routed to Link F6 : Flume 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.847	69	Pasture/grassland/range, Fair, HSG B
0.847		100.00% Pervious Area

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	244	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	394	Total			

Summary for Subcatchment AREA 2: Subcat AREA 2

Runoff = 6.28 cfs @ 12.13 hrs, Volume= 0.309 af, Depth= 3.18"
Routed to Link F3 : Flume 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.167	69	Pasture/grassland/range, Fair, HSG B
1.167		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	18	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	495	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
5.1	613	Total			

Summary for Subcatchment AREA 20: Subcat AREA 20

Runoff = 5.77 cfs @ 12.12 hrs, Volume= 0.279 af, Depth= 3.18"
Routed to Link F1 : Flume 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.054	69	Pasture/grassland/range, Fair, HSG B
1.054		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	303	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	453	Total			

Summary for Subcatchment AREA 21: Subcat AREA 21

Runoff = 5.64 cfs @ 12.12 hrs, Volume= 0.273 af, Depth= 3.18"
Routed to Link F1 : Flume 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.030	69	Pasture/grassland/range, Fair, HSG B
1.030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	298	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	448	Total			

Summary for Subcatchment AREA 22: Subcat AREA 22

Runoff = 5.64 cfs @ 12.12 hrs, Volume= 0.273 af, Depth= 3.18"
Routed to Link F2 : Flume 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.030	69	Pasture/grassland/range, Fair, HSG B
1.030		100.00% Pervious Area

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	50	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	298	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	448	Total			

Summary for Subcatchment AREA 23: Subcat AREA 23

Runoff = 8.23 cfs @ 12.13 hrs, Volume= 0.410 af, Depth= 3.18"
Routed to Link F2 : Flume 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.548	69	Pasture/grassland/range, Fair, HSG B
1.548		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	24	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	591	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
5.4	715	Total			

Summary for Subcatchment AREA 24: Subcat AREA 24

Runoff = 10.20 cfs @ 12.13 hrs, Volume= 0.517 af, Depth= 3.18"
Routed to Link F3 : Flume 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.952	69	Pasture/grassland/range, Fair, HSG B
1.952		100.00% Pervious Area

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	24	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.9	765	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
5.8	889	Total			

Summary for Subcatchment AREA 25: Subcat AREA 25

Runoff = 8.59 cfs @ 12.12 hrs, Volume= 0.402 af, Depth= 3.18"
Routed to Link F3 : Flume 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.515	69	Pasture/grassland/range, Fair, HSG B
1.515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	67	0.2500	0.40		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.1	428	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
3.9	495	Total			

Summary for Subcatchment AREA 26: Subcat AREA 26

Runoff = 2.74 cfs @ 12.12 hrs, Volume= 0.129 af, Depth= 2.98"
Routed to Reach S1 R2 : Swale S1 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.396	69	Pasture/grassland/range, Fair, HSG B
0.072	39	Pasture/grassland/range, Good, HSG A
0.049	96	Gravel surface, HSG A
* 0.000	0	Pasture/grassland/range, Fair
0.518	67	Weighted Average
0.518		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	93	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.5	123	0.0055	4.39	140.49	Trap/Vee/Rect Channel Flow, Swale 1 Reach 2 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
4.1	216	Total			

Summary for Subcatchment AREA 27: Subcat AREA 27

Runoff = 5.63 cfs @ 12.22 hrs, Volume= 0.442 af, Depth= 1.28"
Routed to Reach S1 R3 : Swale S1 Reach 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.651	69	Pasture/grassland/range, Fair, HSG B
2.758	39	Pasture/grassland/range, Good, HSG A
0.010	96	Gravel surface, HSG A
0.295	96	Gravel surface, HSG A
0.426	39	Pasture/grassland/range, Good, HSG A
* 0.000	0	
* 0.000	0	
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	Pasture/grassland/range, Good
4.140	48	Weighted Average
4.140		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0500	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.3	217	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	20	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	14	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	513	0.0051	4.23	135.28	Trap/Vee/Rect Channel Flow, Swale 1 Reach 3 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
12.0	864	Total			

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Summary for Subcatchment AREA 28: Subcat AREA 28

Runoff = 5.98 cfs @ 12.18 hrs, Volume= 0.395 af, Depth= 1.44"
 Routed to Link Swale S1 R5 : Swale S1 Reach 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (sf)	CN	Description
30,267	69	Pasture/grassland/range, Fair, HSG B
100,859	39	Pasture/grassland/range, Good, HSG A
* 11,834	96	Gravel surface
142,960	50	Weighted Average
142,960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	78	0.0526	0.22		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.1	22	0.2500	0.32		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	24	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	23	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	16	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	410	0.0053	4.31	137.91	Trap/Vee/Rect Channel Flow, Swale 1 Reach Bot.W=8.00' D=2.00' Z= 4.0 ' Top.W=24.00' n= 0.030 Earth, grassed & winding
9.1	573	Total			

Summary for Subcatchment AREA 28A: Subcat AREA 28A

Runoff = 0.71 cfs @ 12.18 hrs, Volume= 0.048 af, Depth= 1.36"
 Routed to Link Swale S1 R4 : Swale S1 Reach 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.035	69	Pasture/grassland/range, Fair, HSG B
0.257	39	Pasture/grassland/range, Good, HSG A
0.075	39	Pasture/grassland/range, Good, HSG A
0.010	96	Gravel surface, HSG A
0.046	96	Gravel surface, HSG A
0.423	49	Weighted Average
0.423		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	82	0.0334	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.0	18	0.2500	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	34	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	20	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	13	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	67	0.0069	4.92	157.36	Trap/Vee/Rect Channel Flow, Bot.W=8.00' D=2.00' Z= 4.0 ' /' Top.W=24.00' n= 0.030 Earth, grassed & winding
9.1	234	Total			

Summary for Subcatchment AREA 28B: Subcat AREA 28B

Runoff = 1.20 cfs @ 12.13 hrs, Volume= 0.061 af, Depth= 1.53"
Routed to Reach S1 R4 : Swale S1 Reach 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.050	69	Pasture/grassland/range, Fair, HSG B
0.110	39	Pasture/grassland/range, Good, HSG A
0.240	39	Pasture/grassland/range, Good, HSG A
0.009	96	Gravel surface, HSG A
0.067	96	Gravel surface, HSG A
0.476	51	Weighted Average
0.476		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	58	0.2500	0.39		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.6	20	0.0050	0.53		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
1.0	18	0.2500	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	115	0.0055	4.39	140.49	Trap/Vee/Rect Channel Flow, Bot.W=8.00' D=2.00' Z= 4.0 ' /' Top.W=24.00' n= 0.030 Earth, grassed & winding
4.5	211	Total			

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Summary for Subcatchment AREA 29: Subcat AREA 29

Runoff = 1.21 cfs @ 12.31 hrs, Volume= 0.161 af, Depth= 0.69"
Routed to Reach S1 R6 : Swale S1 Reach 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.056	96	Gravel surface, HSG A
2.735	39	Pasture/grassland/range, Good, HSG A
* 0.000	0	Gravel surface
2.792	40	Weighted Average
2.792		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0150	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.9	100	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	16	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	247	0.0052	4.27	136.60	Trap/Vee/Rect Channel Flow, Swale S1 Reach 5 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
14.8	463	Total			

Summary for Subcatchment AREA 3: Subcat AREA 3

Runoff = 3.66 cfs @ 12.14 hrs, Volume= 0.190 af, Depth= 3.18"
Routed to Link F2 : Flume 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.717	69	Pasture/grassland/range, Fair, HSG B
0.717		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	44	0.1000	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.4	56	0.2500	0.39		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	76	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	233	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
6.3	409	Total			

Summary for Subcatchment AREA 30: Subcat AREA 30

Runoff = 0.43 cfs @ 12.46 hrs, Volume= 0.074 af, Depth= 0.63"
Routed to Reach S2 R1 : Swale S2 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.415	39	Pasture/grassland/range, Good, HSG A
1.415		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0260	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.9	194	0.0260	1.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.6	647	0.0260	1.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.0	941	Total			

Summary for Subcatchment AREA 31: Subcat AREA 31

Runoff = 0.42 cfs @ 12.14 hrs, Volume= 0.036 af, Depth= 0.63"
Routed to Link Swale S2 R1 : Swale S2 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.698	39	Pasture/grassland/range, Good, HSG A
0.698		100.00% Pervious Area

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	34	0.2500	0.35		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.8	447	0.0020	2.65	84.72	Trap/Vee/Rect Channel Flow, Swale 2 Reach 1 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
4.4	481	Total			

Summary for Subcatchment AREA 32: Subcat AREA 32

Runoff = 3.11 cfs @ 12.31 hrs, Volume= 0.315 af, Depth= 1.13"
Routed to Link Swale S3 R3 : Swale S3 Reach 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.567	69	Pasture/grassland/range, Fair, HSG B
2.413	39	Pasture/grassland/range, Good, HSG A
0.099	96	Gravel surface, HSG A
0.274	39	Pasture/grassland/range, Good, HSG A
3.353	46	Weighted Average
3.353		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0140	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
4.2	211	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	23	0.1740	2.92		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	329	0.0097	5.83	186.57	Trap/Vee/Rect Channel Flow, Swale 3 Reach 3 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding
17.3	663	Total			

Summary for Subcatchment AREA 33: Subcat AREA 33

Runoff = 1.14 cfs @ 12.28 hrs, Volume= 0.101 af, Depth= 1.36"
Routed to Link Swale S3 R2 : Swale S3 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Area (sf)	CN	Description
4,079	96	Gravel surface, HSG A
1,422	96	Gravel surface, HSG A
30,707	39	Pasture/grassland/range, Good, HSG A
* 2,706	69	Pasture/grassland/range, Fair, HSG A
38,914	49	Weighted Average
38,914		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0140	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.6	178	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4000	4.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	87	0.0070	5.23	125.44	Trap/Vee/Rect Channel Flow, Swale 3 Reach 2 Bot.W=8.00' D=2.00' Z= 2.0 '/' Top.W=16.00' n= 0.030 Earth, grassed & winding
16.0	377	Total			

Summary for Subcatchment AREA 34: Subcat AREA 34

Runoff = 1.20 cfs @ 12.30 hrs, Volume= 0.128 af, Depth= 0.98"
Routed to Link Swale S3 R1 : Swale S3 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (sf)	CN	Description
5,695	69	Pasture/grassland/range, Fair, HSG B
3,470	96	Gravel surface, HSG A
59,319	39	Pasture/grassland/range, Good, HSG A
68,484	44	Weighted Average
68,484		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0140	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.4	170	0.0140	0.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	15	0.4000	4.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	203	0.0070	5.23	125.44	Trap/Vee/Rect Channel Flow, Swale 3 Reach 1 Bot.W=8.00' D=2.00' Z= 2.0 '/' Top.W=16.00' n= 0.030 Earth, grassed & winding
16.2	488	Total			

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Summary for Subcatchment AREA 35: Subcat AREA 35

Runoff = 2.10 cfs @ 12.12 hrs, Volume= 0.099 af, Depth= 3.18"
 Routed to Reach S3 R1 : Swale S3 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description			
0.375	69	Pasture/grassland/range, Fair, HSG B			
0.375		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	74	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
4.2	174	Total			

Summary for Subcatchment AREA 36: Subcat AREA 36

Runoff = 2.62 cfs @ 12.12 hrs, Volume= 0.125 af, Depth= 3.08"
 Routed to Link F7 : Existing East Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description			
0.470	69	Pasture/grassland/range, Fair, HSG B			
0.016	39	Pasture/grassland/range, Good, HSG A			
* 0.000	0	Pasture/grassland/range, Good			
0.487	68	Weighted Average			
0.487		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	90	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.7	201	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 ' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.2	134	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 ' Top.W=24.00' n= 0.078 Riprap, 12-inch
4.4	425	Total			

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Summary for Subcatchment AREA 37: Subcat AREA 37

Runoff = 1.89 cfs @ 12.12 hrs, Volume= 0.091 af, Depth= 3.18"
 Routed to Link F7 : Existing East Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.344	69	Pasture/grassland/range, Fair, HSG B
0.344		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	30	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	126	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.3	254	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
4.6	510	Total			

Summary for Subcatchment AREA 38: Subcat AREA 38

Runoff = 1.25 cfs @ 12.12 hrs, Volume= 0.059 af, Depth= 3.18"
 Routed to Link F8 : Existing West Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.223	69	Pasture/grassland/range, Fair, HSG B
0.223		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	77	0.2500	0.41		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.5	156	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.5	357	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
4.1	590	Total			

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Summary for Subcatchment AREA 39: Subcat AREA 39

Runoff = 3.50 cfs @ 12.13 hrs, Volume= 0.174 af, Depth= 3.18"
 Routed to Link F8 : Existing West Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.656	69	Pasture/grassland/range, Fair, HSG B
0.656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	11	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	314	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.3	217	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
5.3	642	Total			

Summary for Subcatchment AREA 4: Subcat AREA 4

Runoff = 6.31 cfs @ 12.14 hrs, Volume= 0.331 af, Depth= 3.18"
 Routed to Link F2 : Flume 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.247	69	Pasture/grassland/range, Fair, HSG B
1.247		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	57	0.1000	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.0	43	0.2500	0.37		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	83	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	295	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 '/' Top.W=12.00' n= 0.030 Earth, grassed & winding
6.6	478	Total			

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Summary for Subcatchment AREA 40: Subcat AREA 40

Runoff = 6.03 cfs @ 12.13 hrs, Volume= 0.300 af, Depth= 2.23"
 Routed to Link Swale S2 R2 : Swale S2 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.079	69	Pasture/grassland/range, Fair, HSG B
0.539	39	Pasture/grassland/range, Good, HSG A
* 0.000	0	Pasture/grassland/range, Good
1.618	59	Weighted Average
1.618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	77	0.2500	0.41		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.8	237	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.3	70	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0	315	0.0069	5.05	181.72	Trap/Vee/Rect Channel Flow, Swale S2 Reach 2 Bot.W=10.00' D=2.00' Z= 4.0 '/' Top.W=26.00' n= 0.030 Earth, grassed & winding
5.2	699	Total			

Summary for Subcatchment AREA 41: Subcat AREA 41

Runoff = 2.84 cfs @ 12.14 hrs, Volume= 0.147 af, Depth= 2.13"
 Routed to Reach S2 R2 : Swale S2 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.520	69	Pasture/grassland/range, Fair, HSG B
0.306	39	Pasture/grassland/range, Good, HSG A
0.826	58	Weighted Average
0.826		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	26	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	596	0.0069	5.05	181.72	Trap/Vee/Rect Channel Flow, Swale S2 Reach 2 Bot.W=10.00' D=2.00' Z= 4.0 ' Top.W=26.00' n= 0.030 Earth, grassed & winding
5.9	722	Total			

Summary for Subcatchment AREA 42: Subcat AREA 42

Runoff = 0.93 cfs @ 12.22 hrs, Volume= 0.114 af, Depth= 0.63"
Routed to Link Swale S2 R2 : Swale S2 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
2.177	39	Pasture/grassland/range, Good, HSG A
2.177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	66	0.0303	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.6	34	0.2500	0.35		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.2	49	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	266	0.0069	5.05	181.72	Trap/Vee/Rect Channel Flow, Swale S2 Reach 2 Bot.W=10.00' D=2.00' Z= 4.0 ' Top.W=26.00' n= 0.030 Earth, grassed & winding
9.1	415	Total			

Summary for Subcatchment AREA 43: Subcat AREA 43

Runoff = 6.39 cfs @ 12.13 hrs, Volume= 0.325 af, Depth= 3.18"
Routed to Link F8 : Existing West Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.228	69	Pasture/grassland/range, Fair, HSG B
1.228		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.0	6	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.9	541	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 '/' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.2	131	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Riprap Flume Bot.W=12.00' D=2.00' Z= 3.0 '/' Top.W=24.00' n= 0.078 Riprap, 12-inch
5.9	778	Total			

Summary for Subcatchment AREA 44: Subcat AREA 44

Runoff = 2.38 cfs @ 12.19 hrs, Volume= 0.273 af, Depth= 0.63"
Routed to Pond Sed Pond : Sedimentation Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
5.227	39	Pasture/grassland/range, Good, HSG A
5.227		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	75	0.0933	0.28		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.3	25	0.2500	0.33		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.0	10	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	381	0.0265	7.85	109.92	Trap/Vee/Rect Channel Flow, Bot.W=0.00' D=2.00' Z= 4.0 & 3.0 '/' Top.W=14.00' n= 0.030 Earth, grassed & winding
0.8	162	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	48	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.9	701	Total			

Summary for Subcatchment AREA 44A: Subcat AREA 44A

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 14.38 cfs @ 12.09 hrs, Volume= 0.798 af, Depth= 6.35"
Routed to Pond Sed Pond : Sedimentation Basin

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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.508	98	Water Surface, HSG A
1.508		100.00% Impervious Area

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

Summary for Subcatchment AREA 44B: Subcat AREA 44B

Runoff = 1.17 cfs @ 12.16 hrs, Volume= 0.071 af, Depth= 1.44"
 Routed to Pond Sed Pond : Sedimentation Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.479	39	Pasture/grassland/range, Good, HSG A
0.115	96	Gravel surface, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
0.594	50	Weighted Average
0.594		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0544	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.5	47	0.0544	1.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.6	147	Total			

Summary for Subcatchment AREA 45: Subcat AREA 45

Runoff = 1.16 cfs @ 12.41 hrs, Volume= 0.150 af, Depth= 0.90"
 Routed to Link Swale S4 R4 : Swale S4 Reach 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Area (ac)	CN	Description
* 0.000	0	, HSG A
1.870	39	Pasture/grassland/range, Good, HSG A
0.000	96	Gravel surface, HSG A
0.130	96	Gravel surface, HSG A
2.001	43	Weighted Average
2.001		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0074	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
4.7	169	0.0074	0.60		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	49	0.0800	1.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	363	0.0082	5.42	162.67	Trap/Vee/Rect Channel Flow, Swale S4 Reach 2 Bot.W=8.00' D=2.00' Z= 4.0 & 3.0 ' Top.W=22.00' n= 0.030 Earth, grassed & winding
21.9	681	Total			

Summary for Subcatchment AREA 46: Subcat AREA 46

Runoff = 22.74 cfs @ 12.17 hrs, Volume= 1.366 af, Depth= 2.23"
Routed to Reach S4 R4 : Swale S4 Reach 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
3.081	69	Pasture/grassland/range, Fair, HSG B
0.590	96	Gravel surface, HSG B
3.264	39	Pasture/grassland/range, Good, HSG A
0.017	98	Paved parking, HSG A
0.009	98	Paved parking, HSG A
0.378	96	Gravel surface, HSG A
0.001	96	Gravel surface, HSG A
0.026	96	Gravel surface, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	, HSG A
* 0.000	0	Pasture/grassland/range, Fair
7.367	59	Weighted Average
7.340		99.64% Pervious Area
0.027		0.36% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	51	0.2500	0.38		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	16	0.2500	2.44		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
0.9	31	0.0050	0.58		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
0.4	47	0.0650	1.78		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.6	1,759	0.0073	5.26	178.68	Trap/Vee/Rect Channel Flow, Swale S4 Reach 1 Bot.W=10.00' D=2.00' Z= 3.0 & 4.0 ' Top.W=24.00' n= 0.030 Earth, grassed & winding
9.2	1,904	Total			

Summary for Subcatchment AREA 47: Subcat AREA 47

Runoff = 6.90 cfs @ 12.17 hrs, Volume= 0.408 af, Depth= 2.69"
Routed to Link Swale S5 R3 : Swale S5 Reach 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (sf)	CN	Description
49,617	69	Pasture/grassland/range, Fair, HSG B
6,971	98	Paved parking, HSG A
1,619	96	Gravel surface, HSG A
20,925	39	Pasture/grassland/range, Good, HSG A
79,132	64	Weighted Average
72,161		91.19% Pervious Area
6,971		8.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	43	0.2500	0.37		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	11	0.1111	1.63		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
0.7	12	0.2500	0.28		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
2.9	28	0.0393	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.4	488	0.0024	2.40	52.81	Trap/Vee/Rect Channel Flow, Swale S5 Reach 3 Bot.W=0.00' D=2.00' Z= 5.0 & 6.0 ' Top.W=22.00' n= 0.030 Earth, grassed & winding
9.1	582	Total			

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Summary for Subcatchment AREA 48: Subcat AREA 48

Runoff = 5.30 cfs @ 12.13 hrs, Volume= 0.265 af, Depth= 2.41"
 Routed to Link Swale S5 R2 : Swale S5 Reach 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (sf)	CN	Description
24,597	69	Pasture/grassland/range, Fair, HSG B
24,117	39	Pasture/grassland/range, Good, HSG A
2,057	96	Gravel surface, HSG A
6,769	98	Paved parking, HSG A
57,540	61	Weighted Average
50,771		88.24% Pervious Area
6,769		11.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	19	0.0050	0.53		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
1.7	29	0.1667	0.29		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.1	441	0.0024	2.38	40.39	Trap/Vee/Rect Channel Flow, Swale S5 Reach 2 Bot.W=0.00' D=2.00' Z= 2.5 & 6.0 '/' Top.W=17.00' n= 0.030 Earth, grassed & winding
5.4	489	Total			

Summary for Subcatchment AREA 49: Subcat AREA 49

Runoff = 2.68 cfs @ 12.12 hrs, Volume= 0.128 af, Depth= 2.23"
 Routed to Link Swale S1 R1 : Swale S1 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.439	69	Pasture/grassland/range, Fair, HSG B
0.246	39	Pasture/grassland/range, Good, HSG A
0.006	96	Gravel surface, HSG A
0.691	59	Weighted Average
0.691		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	59	0.2500	0.39		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.8	463	0.0053	4.31	137.91	Trap/Vee/Rect Channel Flow, Swale S1 Reach 1 Bot.W=8.00' D=2.00' Z= 4.0 '/' Top.W=24.00' n= 0.030 Earth, grassed & winding

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4.3 522 Total

Summary for Subcatchment AREA 5: Subcat AREA 5

Runoff = 6.05 cfs @ 12.14 hrs, Volume= 0.317 af, Depth= 3.18"
 Routed to Link F1 : Flume 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.195	69	Pasture/grassland/range, Fair, HSG B
1.195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	59	0.1000	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
1.9	41	0.2500	0.36		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	85	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	297	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding

6.6	482	Total
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Summary for Subcatchment AREA 50: Subcat AREA 50

Runoff = 13.35 cfs @ 12.11 hrs, Volume= 0.698 af, Depth= 5.65"
 Routed to Link Swale S6 R1 : Swale S6 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.100	39	Pasture/grassland/range, Good, HSG A
0.001	39	Pasture/grassland/range, Good, HSG A
1.382	96	Gravel surface, HSG A
1.482	92	Weighted Average
1.482		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0119	1.04		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
0.4	47	0.0119	1.76		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	10	0.5000	4.95		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.4	413	0.0066	5.00	130.01	Trap/Vee/Rect Channel Flow, Swale S6 Reach 1 Bot.W=8.00' D=2.00' Z= 2.5 '/' Top.W=18.00' n= 0.030 Earth, grassed & winding
3.4	570	Total			

Summary for Subcatchment AREA 51: Subcat AREA 51

Runoff = 0.67 cfs @ 12.27 hrs, Volume= 0.082 af, Depth= 0.69"
Routed to Link Swale S6 R1 : Swale S6 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.396	39	Pasture/grassland/range, Good, HSG A
0.020	96	Gravel surface, HSG A
1.417	40	Weighted Average
1.417		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0500	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
3.2	302	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	53	0.0313	2.85		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.4	429	0.0066	5.00	130.01	Trap/Vee/Rect Channel Flow, Swale S6 Reach 1 Bot.W=8.00' D=2.00' Z= 2.5 '/' Top.W=18.00' n= 0.030 Earth, grassed & winding
12.2	884	Total			

Summary for Subcatchment AREA 52: Subcat AREA 52

Runoff = 7.48 cfs @ 12.15 hrs, Volume= 0.454 af, Depth= 1.20"
Routed to Link Swale S5 R1 : Swale S5 Reach 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Area (sf)	CN	Description
169,213	39	Pasture/grassland/range, Good, HSG A
25,933	98	Paved parking, HSG A
2,184	96	Gravel surface, HSG A
197,330	47	Weighted Average
171,397		86.86% Pervious Area
25,933		13.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	18	0.0050	0.52		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.77"
1.4	21	0.1333	0.25		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
4.3	1,255	0.0096	4.82	125.20	Trap/Vee/Rect Channel Flow, Swale S5 Reach 1 Bot.W=0.00' D=2.00' Z= 6.0 & 7.0 ' Top.W=26.00' n= 0.030 Earth, grassed & winding
6.3	1,294	Total			

Summary for Subcatchment AREA 6: Subcat AREA 6

Runoff = 4.90 cfs @ 12.12 hrs, Volume= 0.236 af, Depth= 3.18"
Routed to Link F1 : Flume 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
0.892	69	Pasture/grassland/range, Fair, HSG B
0.892		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.0	7	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	308	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.6	415	Total			

Summary for Subcatchment AREA 7: Subcat AREA 7

Runoff = 5.31 cfs @ 12.13 hrs, Volume= 0.269 af, Depth= 3.18"
Routed to Link F8 : Existing West Flume

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Area (ac)	CN	Description
1.017	69	Pasture/grassland/range, Fair, HSG B
1.017		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.1	18	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	419	0.0200	4.80	23.38	Trap/Vee/Rect Channel Flow, Existing Diversion Berm Bot.W=0.00' D=1.18' Z= 4.0 & 3.0 ' Top.W=8.26' n= 0.030 Earth, grassed & winding
0.4	296	0.2500	12.26	441.43	Trap/Vee/Rect Channel Flow, Bot.W=12.00' D=2.00' Z= 3.0 ' Top.W=24.00' n= 0.078 Riprap, 12-inch
5.8	833	Total			

Summary for Subcatchment AREA 8: Subcat AREA 8

Runoff = 5.52 cfs @ 12.12 hrs, Volume= 0.268 af, Depth= 3.18"
Routed to Link F6 : Flume 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

Area (ac)	CN	Description
1.009	69	Pasture/grassland/range, Fair, HSG B
1.009		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.3	66	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	243	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.7	409	Total			

Summary for Subcatchment AREA 9: Subcat AREA 9

Runoff = 5.71 cfs @ 12.12 hrs, Volume= 0.278 af, Depth= 3.18"
Routed to Link F6 : Flume 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Area (ac)	CN	Description
1.047	69	Pasture/grassland/range, Fair, HSG B
1.047		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	100	0.2500	0.43		Sheet Flow, Grass: Short n= 0.150 P2= 2.77"
0.4	76	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	250	0.0200	6.74	80.87	Trap/Vee/Rect Channel Flow, Diversion Berm Bot.W=0.00' D=2.00' Z= 4.0 & 2.0 ' Top.W=12.00' n= 0.030 Earth, grassed & winding
4.8	426	Total			

Summary for Reach S1 R2: Swale S1 Reach 2

Inflow Area = 7.131 ac, 0.00% Impervious, Inflow Depth = 3.07" for 100-yr, 24-hr event
 Inflow = 37.51 cfs @ 12.12 hrs, Volume= 1.827 af
 Outflow = 37.05 cfs @ 12.12 hrs, Volume= 1.827 af, Atten= 1%, Lag= 0.4 min
 Routed to Link Swale S1 R2 : Swale S1 Reach 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.03 fps, Min. Travel Time= 0.7 min
 Avg. Velocity = 0.80 fps, Avg. Travel Time= 2.7 min

Peak Storage= 1,553 cf @ 12.12 hrs
 Average Depth at Peak Storage= 1.01' , Surface Width= 16.12'
 Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 140.64 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
 Side Slope Z-value= 4.0 ' Top Width= 24.00'
 Length= 127.0' Slope= 0.0055 '
 Inlet Invert= 814.81', Outlet Invert= 814.11'



Summary for Reach S1 R3: Swale S1 Reach 3

Inflow Area = 14.170 ac, 0.00% Impervious, Inflow Depth = 2.58" for 100-yr, 24-hr event
 Inflow = 53.22 cfs @ 12.12 hrs, Volume= 3.049 af
 Outflow = 47.76 cfs @ 12.15 hrs, Volume= 3.049 af, Atten= 10%, Lag= 1.5 min
 Routed to Link Swale S1 R3 : Swale S1 Reach 3

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Max. Velocity= 3.17 fps, Min. Travel Time= 3.0 min

Avg. Velocity = 0.70 fps, Avg. Travel Time= 13.8 min

Peak Storage= 8,716 cf @ 12.15 hrs

Average Depth at Peak Storage= 1.18' , Surface Width= 17.47'

Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 135.10 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding

Side Slope Z-value= 4.0 '/' Top Width= 24.00'

Length= 578.0' Slope= 0.0051 '/'

Inlet Invert= 814.11', Outlet Invert= 811.17'



Summary for Reach S1 R4: Swale S1 Reach 4

Inflow Area = 17.292 ac, 0.00% Impervious, Inflow Depth = 2.64" for 100-yr, 24-hr event

Inflow = 62.37 cfs @ 12.14 hrs, Volume= 3.811 af

Outflow = 61.58 cfs @ 12.15 hrs, Volume= 3.811 af, Atten= 1%, Lag= 0.6 min

Routed to Link Swale S1 R4 : Swale S1 Reach 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Max. Velocity= 3.74 fps, Min. Travel Time= 0.9 min

Avg. Velocity = 0.81 fps, Avg. Travel Time= 4.0 min

Peak Storage= 3,220 cf @ 12.15 hrs

Average Depth at Peak Storage= 1.26' , Surface Width= 18.09'

Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 154.36 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding

Side Slope Z-value= 4.0 '/' Top Width= 24.00'

Length= 195.8' Slope= 0.0066 '/'

Inlet Invert= 811.17', Outlet Invert= 809.87'



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Summary for Reach S1 R5: Swale S1 Reach 5

Inflow Area = 17.714 ac, 0.00% Impervious, Inflow Depth = 2.61" for 100-yr, 24-hr event
Inflow = 62.23 cfs @ 12.15 hrs, Volume= 3.859 af
Outflow = 59.21 cfs @ 12.17 hrs, Volume= 3.859 af, Atten= 5%, Lag= 1.3 min
Routed to Link Swale S1 R5 : Swale S1 Reach 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.42 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 9.2 min

Peak Storage= 7,135 cf @ 12.17 hrs
Average Depth at Peak Storage= 1.31' , Surface Width= 18.48'
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 137.86 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 411.6' Slope= 0.0053 '/'
Inlet Invert= 809.77', Outlet Invert= 807.59'



Summary for Reach S1 R6: Swale S1 Reach 6

Inflow Area = 23.788 ac, 0.00% Impervious, Inflow Depth = 2.23" for 100-yr, 24-hr event
Inflow = 65.66 cfs @ 12.17 hrs, Volume= 4.415 af
Outflow = 62.73 cfs @ 12.20 hrs, Volume= 4.415 af, Atten= 4%, Lag= 1.5 min
Routed to Link Swale 1 R6 : Swale S1 Reach 6

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.44 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 9.4 min

Peak Storage= 7,852 cf @ 12.20 hrs
Average Depth at Peak Storage= 1.36' , Surface Width= 18.86'
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 136.28 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 430.9' Slope= 0.0052 '/'
Inlet Invert= 807.15', Outlet Invert= 804.92'

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Summary for Reach S2 R1: Swale S2 Reach 1

Inflow Area = 25.203 ac, 0.00% Impervious, Inflow Depth = 2.14" for 100-yr, 24-hr event
Inflow = 62.82 cfs @ 12.20 hrs, Volume= 4.489 af
Outflow = 57.87 cfs @ 12.24 hrs, Volume= 4.489 af, Atten= 8%, Lag= 2.5 min
Routed to Link Swale S2 R1 : Swale S2 Reach 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.39 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 15.1 min

Peak Storage= 11,415 cf @ 12.24 hrs
Average Depth at Peak Storage= 1.65' , Surface Width= 21.24'
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 84.99 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 ' / ' Top Width= 24.00'
Length= 472.0' Slope= 0.0020 ' / '
Inlet Invert= 802.25', Outlet Invert= 801.30'



Summary for Reach S2 R2: Swale S2 Reach 2

Inflow Area = 42.068 ac, 0.00% Impervious, Inflow Depth = 2.21" for 100-yr, 24-hr event
Inflow = 95.28 cfs @ 12.17 hrs, Volume= 7.736 af
Outflow = 90.88 cfs @ 12.23 hrs, Volume= 7.736 af, Atten= 5%, Lag= 3.1 min
Routed to Link Swale S2 R2 : Swale S2 Reach 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.16 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 14.3 min

Peak Storage= 16,407 cf @ 12.23 hrs
Average Depth at Peak Storage= 1.40' , Surface Width= 21.20'
Bank-Full Depth= 2.00' Flow Area= 36.0 sf, Capacity= 182.04 cfs

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10.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 26.00'
Length= 751.0' Slope= 0.0069 '/'
Inlet Invert= 801.30', Outlet Invert= 796.10'



Summary for Reach S3 R1: Swale S3 Reach 1

Inflow Area = 4.976 ac, 0.00% Impervious, Inflow Depth = 3.18" for 100-yr, 24-hr event
Inflow = 27.41 cfs @ 12.12 hrs, Volume= 1.319 af
Outflow = 26.88 cfs @ 12.13 hrs, Volume= 1.319 af, Atten= 2%, Lag= 0.6 min
Routed to Link Swale S3 R1 : Swale S3 Reach 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.26 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.77 fps, Avg. Travel Time= 4.7 min

Peak Storage= 1,774 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.85' , Surface Width= 11.40'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 125.24 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 215.0' Slope= 0.0070 '/'
Inlet Invert= 807.58', Outlet Invert= 806.08'



Summary for Reach S3 R2: Swale S3 Reach 2

Inflow Area = 10.265 ac, 0.00% Impervious, Inflow Depth = 2.84" for 100-yr, 24-hr event
Inflow = 47.52 cfs @ 12.13 hrs, Volume= 2.432 af
Outflow = 47.32 cfs @ 12.13 hrs, Volume= 2.432 af, Atten= 0%, Lag= 0.3 min
Routed to Link Swale S3 R2 : Swale S3 Reach 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.13 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 1.1 min

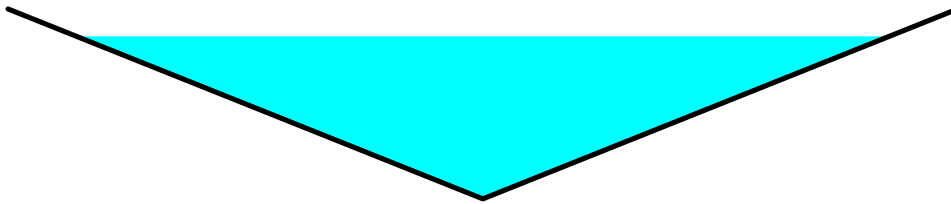
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Peak Storage= 1,111 cf @ 12.13 hrs
Average Depth at Peak Storage= 2.14' , Surface Width= 10.70'
Bank-Full Depth= 2.50' Flow Area= 15.6 sf, Capacity= 71.57 cfs

0.00' x 2.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.5 '/' Top Width= 12.50'
Length= 97.0' Slope= 0.0070 '/'
Inlet Invert= 806.08', Outlet Invert= 805.40'



Summary for Reach S3 R3: Swale S3 Reach 3

Inflow Area = 11.158 ac, 0.00% Impervious, Inflow Depth = 2.72" for 100-yr, 24-hr event
Inflow = 47.83 cfs @ 12.13 hrs, Volume= 2.533 af
Outflow = 46.22 cfs @ 12.15 hrs, Volume= 2.533 af, Atten= 3%, Lag= 0.9 min
Routed to Link Swale S3 R3 : Swale S3 Reach 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.94 fps, Min. Travel Time= 1.5 min
Avg. Velocity= 1.02 fps, Avg. Travel Time= 5.8 min

Peak Storage= 4,140 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.98' , Surface Width= 15.86'
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 186.19 cfs

8.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 353.0' Slope= 0.0097 '/'
Inlet Invert= 804.71', Outlet Invert= 801.30'



‡

Summary for Reach S4 R2: Swale S4 Reach 2

Inflow Area = 4.541 ac, 0.00% Impervious, Inflow Depth = 3.18" for 100-yr, 24-hr event
Inflow = 23.68 cfs @ 12.13 hrs, Volume= 1.204 af
Outflow = 20.91 cfs @ 12.16 hrs, Volume= 1.204 af, Atten= 12%, Lag= 1.8 min
Routed to Reach S4 R3 : Swale S4 Reach 3

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.70 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 16.0 min

Peak Storage= 4,652 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.63' , Surface Width= 14.44'
Bank-Full Depth= 2.00' Flow Area= 34.0 sf, Capacity= 174.20 cfs

10.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 3.0 '/' Top Width= 24.00'
Length= 601.0' Slope= 0.0069 '/'
Inlet Invert= 806.43', Outlet Invert= 802.26'



Summary for Reach S4 R3: Swale S4 Reach 3

[62] Hint: Exceeded Reach S4 R2 OUTLET depth by 0.32' @ 12.25 hrs

Inflow Area =	8.711 ac,	0.00% Impervious,	Inflow Depth = 3.18"	for 100-yr, 24-hr event
Inflow =	41.60 cfs @ 12.14 hrs,	Volume=	2.309 af	
Outflow =	34.31 cfs @ 12.18 hrs,	Volume=	2.309 af,	Atten= 18%, Lag= 2.7 min
Routed to Reach S4 R4 : Swale S4 Reach 4				

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.94 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 24.5 min

Peak Storage= 11,027 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.89' , Surface Width= 16.22'
Bank-Full Depth= 2.00' Flow Area= 34.0 sf, Capacity= 156.53 cfs

10.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 4.0 '/' Top Width= 24.00'
Length= 946.0' Slope= 0.0056 '/'
Inlet Invert= 802.26', Outlet Invert= 796.96'



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Summary for Reach S4 R4: Swale S4 Reach 4

[62] Hint: Exceeded Reach S4 R3 OUTLET depth by 0.96' @ 12.25 hrs

Inflow Area = 65.063 ac, 0.04% Impervious, Inflow Depth = 2.33" for 100-yr, 24-hr event
Inflow = 159.67 cfs @ 12.19 hrs, Volume= 12.653 af
Outflow = 157.44 cfs @ 12.21 hrs, Volume= 12.653 af, Atten= 1%, Lag= 1.3 min
Routed to Link Swale S4 R4 : Swale S4 Reach 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.29 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.12 fps, Avg. Travel Time= 7.2 min

Peak Storage= 14,379 cf @ 12.21 hrs
Average Depth at Peak Storage= 1.82' , Surface Width= 22.73'
Bank-Full Depth= 3.00' Flow Area= 61.5 sf, Capacity= 427.66 cfs

10.00' x 3.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 4.0 '/' Top Width= 31.00'
Length= 483.0' Slope= 0.0082 '/'
Inlet Invert= 796.96', Outlet Invert= 793.00'



Summary for Reach S5 R2: Swale S5 Reach 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.530 ac, 13.14% Impervious, Inflow Depth = 1.20" for 100-yr, 24-hr event
Inflow = 7.48 cfs @ 12.15 hrs, Volume= 0.454 af
Outflow = 7.48 cfs @ 12.15 hrs, Volume= 0.454 af, Atten= 0%, Lag= 0.0 min
Routed to Link Swale S5 R2 : Swale S5 Reach 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Pond Sed Pond: Sedimentation Basin

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Inflow Area = 74.393 ac, 2.06% Impervious, Inflow Depth = 2.25" for 100-yr, 24-hr event
 Inflow = 164.77 cfs @ 12.20 hrs, Volume= 13.946 af
 Outflow = 45.68 cfs @ 12.70 hrs, Volume= 13.947 af, Atten= 72%, Lag= 30.2 min
 Discarded = 5.84 cfs @ 12.70 hrs, Volume= 7.167 af
 Primary = 11.35 cfs @ 12.70 hrs, Volume= 4.914 af
 Routed to Link Wetland : Wetland
 Secondary = 22.50 cfs @ 12.70 hrs, Volume= 1.762 af
 Routed to Link Wetland : Wetland
 Tertiary = 6.00 cfs @ 12.70 hrs, Volume= 0.104 af
 Routed to Link Wetland : Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs
 Peak Elev= 793.06' @ 12.70 hrs Surf.Area= 70,052 sf Storage= 236,005 cf
 Flood Elev= 794.00' Surf.Area= 75,797 sf Storage= 304,443 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 169.7 min (1,014.6 - 845.0)

Volume	Invert	Avail.Storage	Storage Description
#1	789.00'	304,443 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
789.00	27,325	0	0
790.00	55,972	41,649	41,649
791.00	61,532	58,752	100,401
792.00	65,703	63,618	164,018
793.00	69,675	67,689	231,707
794.00	75,797	72,736	304,443

Device	Routing	Invert	Outlet Devices
#1	Primary	787.70'	15.0" Round Culvert L= 40.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 787.70' / 787.50' S= 0.0050 ' / ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	791.00'	30.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	790.50'	0.8" Vert. Orifice/Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	790.00'	0.8" Vert. Orifice/Grate X 4.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	789.00'	0.5" Vert. Orifice/Grate X 14.00 columns X 6 rows with 6.0" cc spacing C= 0.600 Limited to weir flow at low heads
#6	Secondary	792.50'	20.0' 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
#7	Tertiary	793.00'	158.0' 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
#8	Discarded	789.00'	3.600 in/hr Exfiltration over Surface area

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MSE 24-hr 4 100-yr, 24-hr Rainfall=6.59"

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Discarded OutFlow Max=5.84 cfs @ 12.70 hrs HW=793.06' (Free Discharge)

↑**8=Exfiltration** (Exfiltration Controls 5.84 cfs)

Primary OutFlow Max=11.35 cfs @ 12.70 hrs HW=793.06' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 11.35 cfs @ 9.25 fps)

↑**2=Orifice/Grate** (Passes < 33.94 cfs potential flow)

↑**3=Orifice/Grate** (Passes < 0.11 cfs potential flow)

↑**4=Orifice/Grate** (Passes < 0.12 cfs potential flow)

↑**5=Orifice/Grate** (Passes < 0.91 cfs potential flow)

Secondary OutFlow Max=22.49 cfs @ 12.70 hrs HW=793.06' TW=0.00' (Dynamic Tailwater)

↑**6=Broad-Crested Rectangular Weir** (Weir Controls 22.49 cfs @ 2.00 fps)

Tertiary OutFlow Max=5.99 cfs @ 12.70 hrs HW=793.06' TW=0.00' (Dynamic Tailwater)

↑**7=Broad-Crested Rectangular Weir** (Weir Controls 5.99 cfs @ 0.62 fps)

Summary for Link C1: Culvert C1

Inflow Area = 4.530 ac, 13.14% Impervious, Inflow Depth = 1.20" for 100-yr, 24-hr event

Inflow = 7.48 cfs @ 12.15 hrs, Volume= 0.454 af

Primary = 7.48 cfs @ 12.15 hrs, Volume= 0.454 af, Atten= 0%, Lag= 0.0 min

Routed to Reach S5 R2 : Swale S5 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C2: Culvert C2

Inflow Area = 2.899 ac, 0.00% Impervious, Inflow Depth = 3.23" for 100-yr, 24-hr event

Inflow = 13.45 cfs @ 12.11 hrs, Volume= 0.780 af

Primary = 13.45 cfs @ 12.11 hrs, Volume= 0.780 af, Atten= 0%, Lag= 0.0 min

Routed to Reach S1 R3 : Swale S1 Reach 3

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C3: Culvert C3

Inflow Area = 14.170 ac, 0.00% Impervious, Inflow Depth = 2.58" for 100-yr, 24-hr event

Inflow = 47.76 cfs @ 12.15 hrs, Volume= 3.049 af

Primary = 47.76 cfs @ 12.15 hrs, Volume= 3.049 af, Atten= 0%, Lag= 0.0 min

Routed to Reach S1 R4 : Swale S1 Reach 4

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Summary for Link C4: Culvert C4

Inflow Area = 17.714 ac, 0.00% Impervious, Inflow Depth = 2.61" for 100-yr, 24-hr event
Inflow = 62.23 cfs @ 12.15 hrs, Volume= 3.859 af
Primary = 62.23 cfs @ 12.15 hrs, Volume= 3.859 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R5 : Swale S1 Reach 5

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C5: Culvert C5

Inflow Area = 20.996 ac, 0.00% Impervious, Inflow Depth = 2.43" for 100-yr, 24-hr event
Inflow = 65.15 cfs @ 12.17 hrs, Volume= 4.254 af
Primary = 65.15 cfs @ 12.17 hrs, Volume= 4.254 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R6 : Swale S1 Reach 6

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C6: Culvert C6

Inflow Area = 11.158 ac, 0.00% Impervious, Inflow Depth = 2.72" for 100-yr, 24-hr event
Inflow = 47.83 cfs @ 12.13 hrs, Volume= 2.533 af
Primary = 47.83 cfs @ 12.13 hrs, Volume= 2.533 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S3 R3 : Swale S3 Reach 3

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C7: Culvert C7

Inflow Area = 48.985 ac, 0.00% Impervious, Inflow Depth = 2.20" for 100-yr, 24-hr event
Inflow = 103.37 cfs @ 12.20 hrs, Volume= 8.978 af
Primary = 103.37 cfs @ 12.20 hrs, Volume= 8.978 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S4 R4 : Swale S4 Reach 4

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link C8: Culvert C8

Inflow Area = 7.668 ac, 11.88% Impervious, Inflow Depth = 1.76" for 100-yr, 24-hr event
Inflow = 19.20 cfs @ 12.15 hrs, Volume= 1.127 af
Primary = 19.20 cfs @ 12.15 hrs, Volume= 1.127 af, Atten= 0%, Lag= 0.0 min
Routed to Link North Area : North Area

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

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Summary for Link F1: Flume 1

Inflow Area = 4.170 ac, 0.00% Impervious, Inflow Depth = 3.18" for 100-yr, 24-hr event
Inflow = 22.19 cfs @ 12.13 hrs, Volume= 1.105 af
Primary = 22.19 cfs @ 12.13 hrs, Volume= 1.105 af, Atten= 0%, Lag= 0.0 min
Routed to Link RC1 : Rock Chute 1

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F2: Flume 2

Inflow Area = 4.541 ac, 0.00% Impervious, Inflow Depth = 3.18" for 100-yr, 24-hr event
Inflow = 23.68 cfs @ 12.13 hrs, Volume= 1.204 af
Primary = 23.68 cfs @ 12.13 hrs, Volume= 1.204 af, Atten= 0%, Lag= 0.0 min
Routed to Link RC2 : Rock Chute 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F3: Flume 3

Inflow Area = 5.923 ac, 0.00% Impervious, Inflow Depth = 3.18" for 100-yr, 24-hr event
Inflow = 32.10 cfs @ 12.12 hrs, Volume= 1.570 af
Primary = 32.10 cfs @ 12.12 hrs, Volume= 1.570 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R2 : Swale S1 Reach 2

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F4: Flume 4

Inflow Area = 2.645 ac, 0.00% Impervious, Inflow Depth = 3.18" for 100-yr, 24-hr event
Inflow = 14.43 cfs @ 12.12 hrs, Volume= 0.701 af
Primary = 14.43 cfs @ 12.12 hrs, Volume= 0.701 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S1 R4 : Swale S1 Reach 4

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Summary for Link F5: Flume 5

Inflow Area = 4.601 ac, 0.00% Impervious, Inflow Depth = 3.18" for 100-yr, 24-hr event
Inflow = 25.31 cfs @ 12.12 hrs, Volume= 1.219 af
Primary = 25.31 cfs @ 12.12 hrs, Volume= 1.219 af, Atten= 0%, Lag= 0.0 min
Routed to Reach S3 R1 : Swale S3 Reach 1

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs