

Suiter *Surveying* *& Land Planning, Inc.*

JASON WALKER – HIGHWAY 12

Hydrology Report

For: Jason Walker
July 20, 2023

Record Book 562, Page 1434
Site Area: 13.68 Ac. +/-

By: William M. Suiter, PE
1805A Alpine Drive
Clarksville, TN 37040
(931) 920-1750
TN Lic. 117294



The following data is a hydrologic model of the pre- vs. post-development conditions for a proposed residential-site grading plan on Highway 12 near Ashland City, TN. The site in its entirety consists of 13.68 acres (+/-) with only 7.7 acres being proposed for disturbance.

The amount of cut proposed for the site assumes that the developer will eventually hit bedrock. In order to bring the site to proposed finished grades and eventually re-establish vegetative cover (where desired), the contractor will most likely have to over-excavate the bedrock and refill with topsoil.

A detention basin has been proposed for the site that limits runoff rates to less-than pre-developed conditions for both the construction phase (bedrock, impervious) and topsoil/grass, or a mixture of the two.

A chart denoting expected runoff rates for either end of the spectrum is shown below and compared to pre-developed runoff rates for the site:

Rain Event (24 Hr)	Existing Runoff (CFS)	Proposed Runoff	
		Site Excavated to Bedrock (CFS)	Site Refilled with Topsoil/Grass (CFS)
2 yr	11.6	9.5	6.0
5 yr	17.4	12.0	7.5
10 yr	22.2	14.0	9.0
25 yr	29.4	16.1	10.9
50 yr	35.4	17.9	13.0
100 yr	41.7	23.1	15.0

Soils in this area generally fall into the "C" type hydrologic group, and this classification was assumed throughout the model to follow. Although the model itself analyses all 6 of the return events listed above, only the 2 year and 100-year events were attached (especially noting that there are two proposed cases of final conditions). However, additional detail is certainly available if requested.

Jason Walker - Highway 12 (Existing Condition)

Pre-Developed



Pre-Developed
Watershed



Routing Diagram for Jason Walker - Highway 12 (Construction Phase)
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Jason Walker - Highway 12 (Construction Phase)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.888	73	Woods, Fair, HSG C (1S)
8.888	73	TOTAL AREA

Jason Walker - Highway 12 (Construction Phase)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
8.888	HSG C	1S
0.000	HSG D	
0.000	Other	
8.888		TOTAL AREA

Jason Walker - Highway 12 (Construction Phase)

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Walker - Highway 12

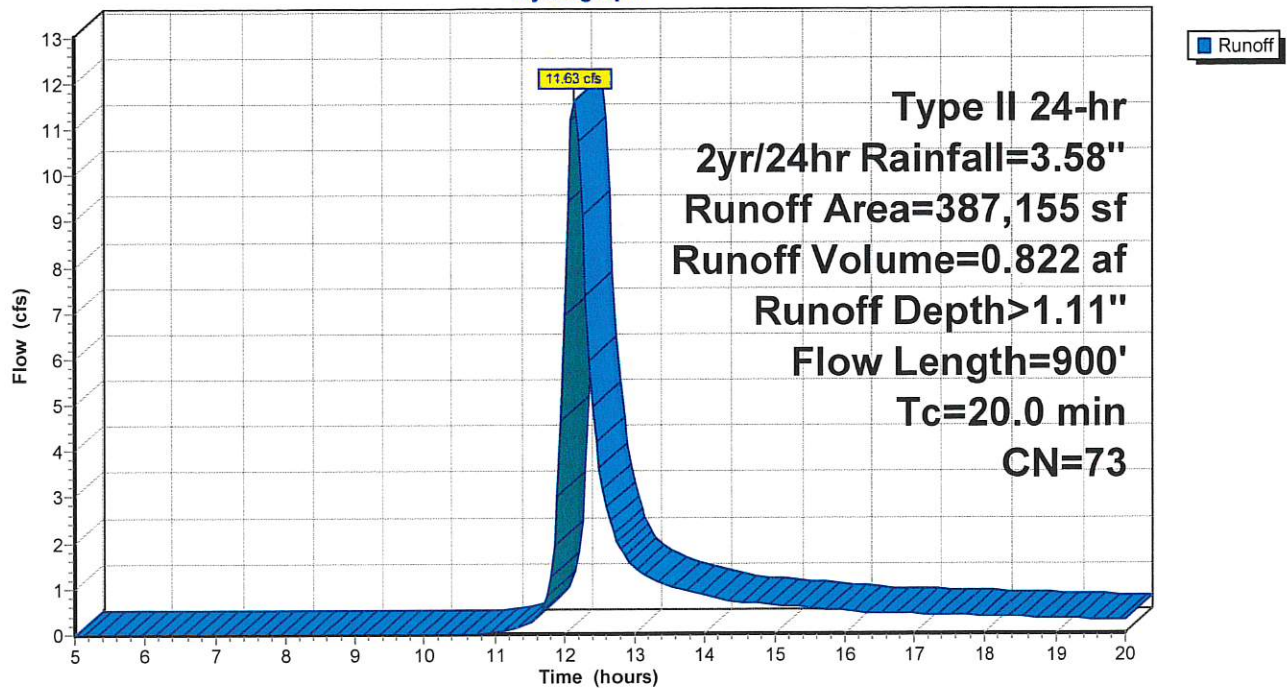
Type II 24-hr 2yr/24hr Rainfall=3.58"

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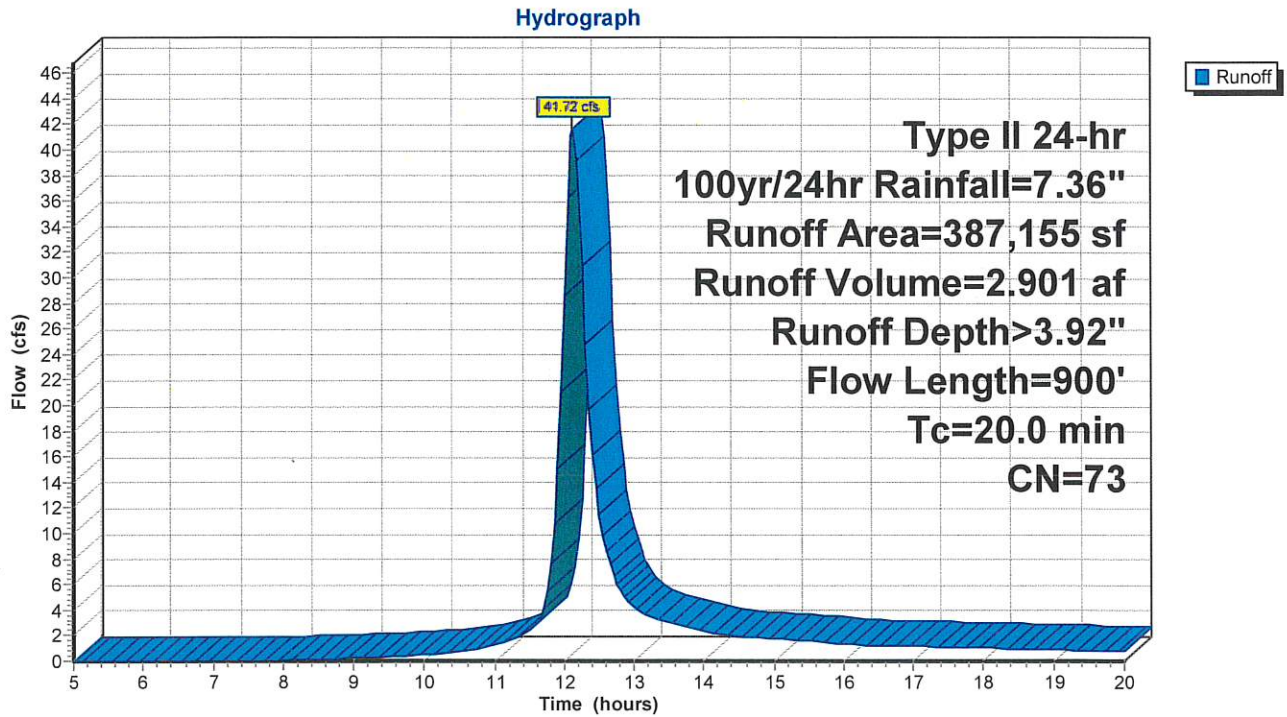
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Subcatchment 1S: Pre-Developed Watershed

Hydrograph

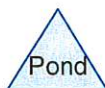
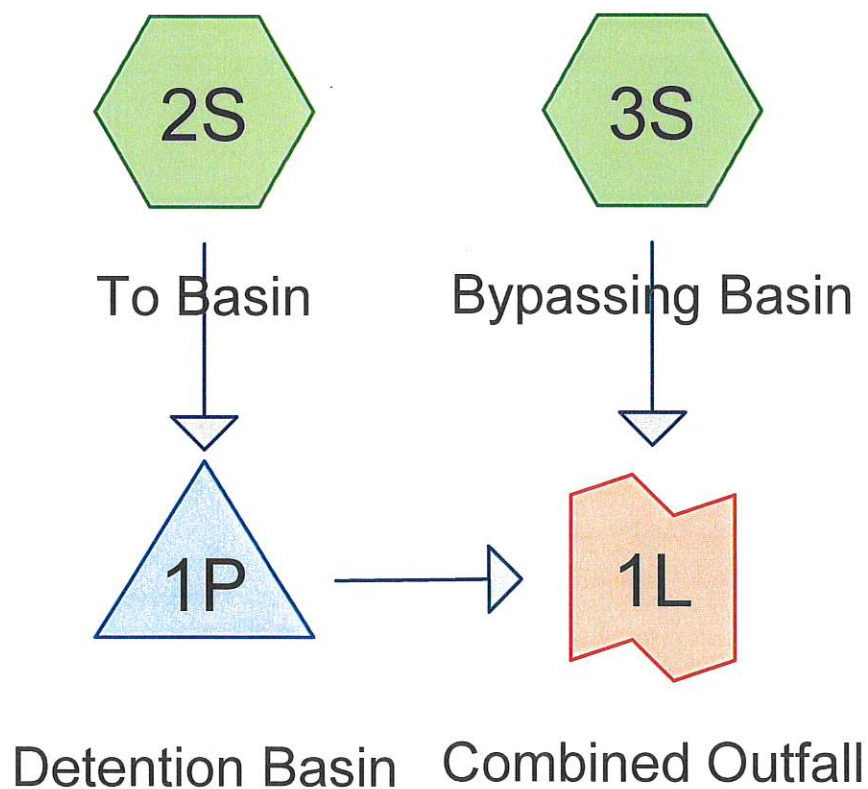


Subcatchment 1S: Pre-Developed Watershed



Jason Walker - Highway 12 (Bedrock)

Construction Phase



Routing Diagram for Jason Walker - Highway 12 (Construction Phase)

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Jason Walker - Highway 12 (Construction Phase)

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.579	98	Bedrock (2S, 3S)
3.303	73	Woods, Fair, HSG C (2S)
8.882	89	TOTAL AREA

Jason Walker - Highway 12 (Construction Phase)

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
3.303	HSG C	2S
0.000	HSG D	
5.579	Other	2S, 3S
8.882		TOTAL AREA

Jason Walker - Highway 12 (Construction Phase)

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	461.00	460.50	100.0	0.0050	0.021	18.0	0.0	0.0

Jason Walker - Highway 12 (Construction Phase)

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Walker - Highway 12

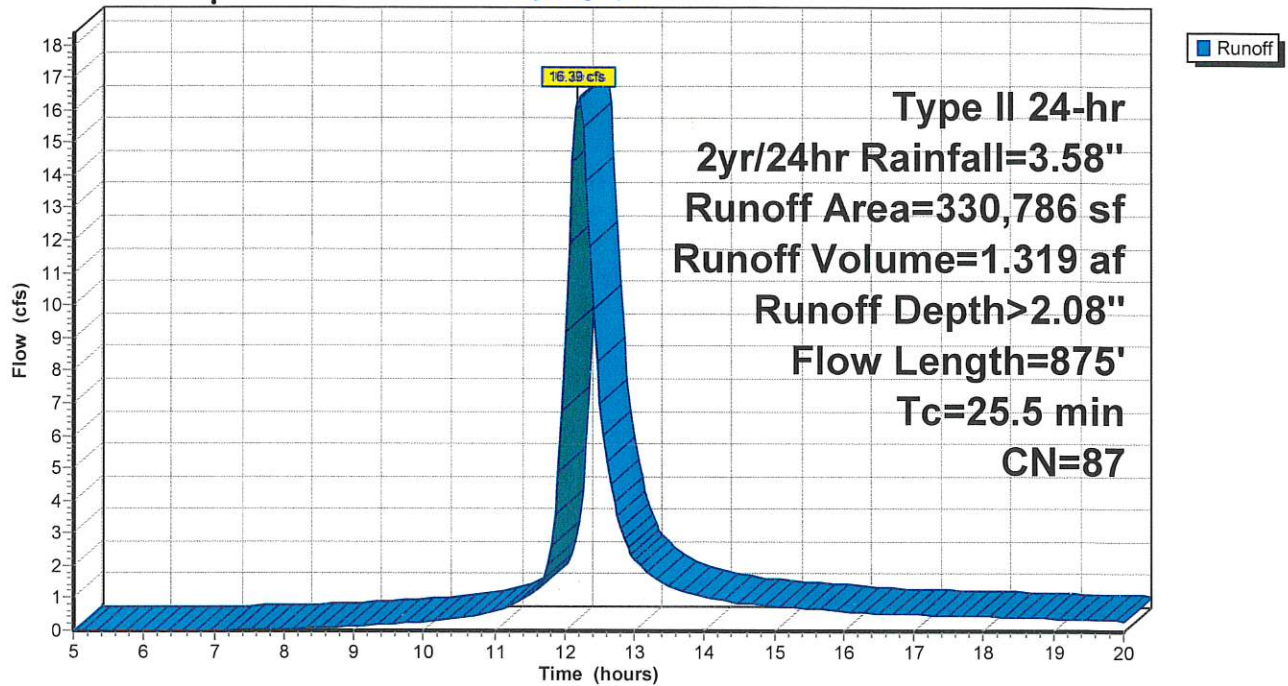
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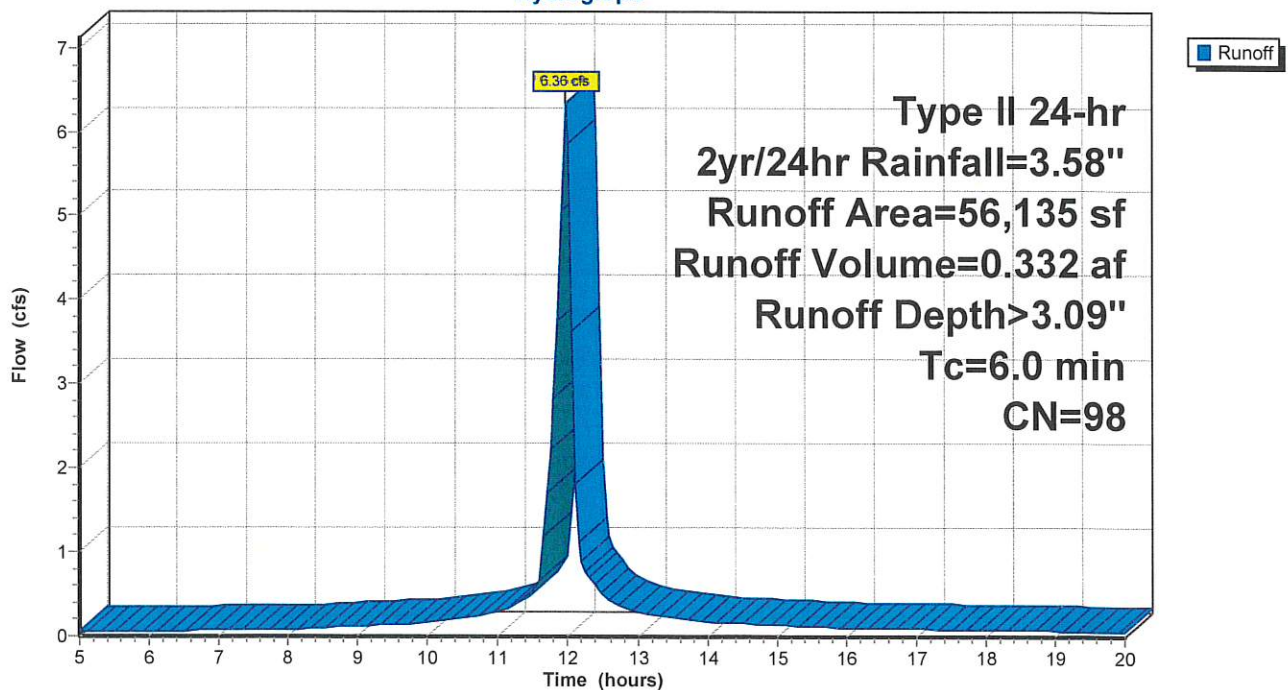
Subcatchment 2S: To Basin

Hydrograph



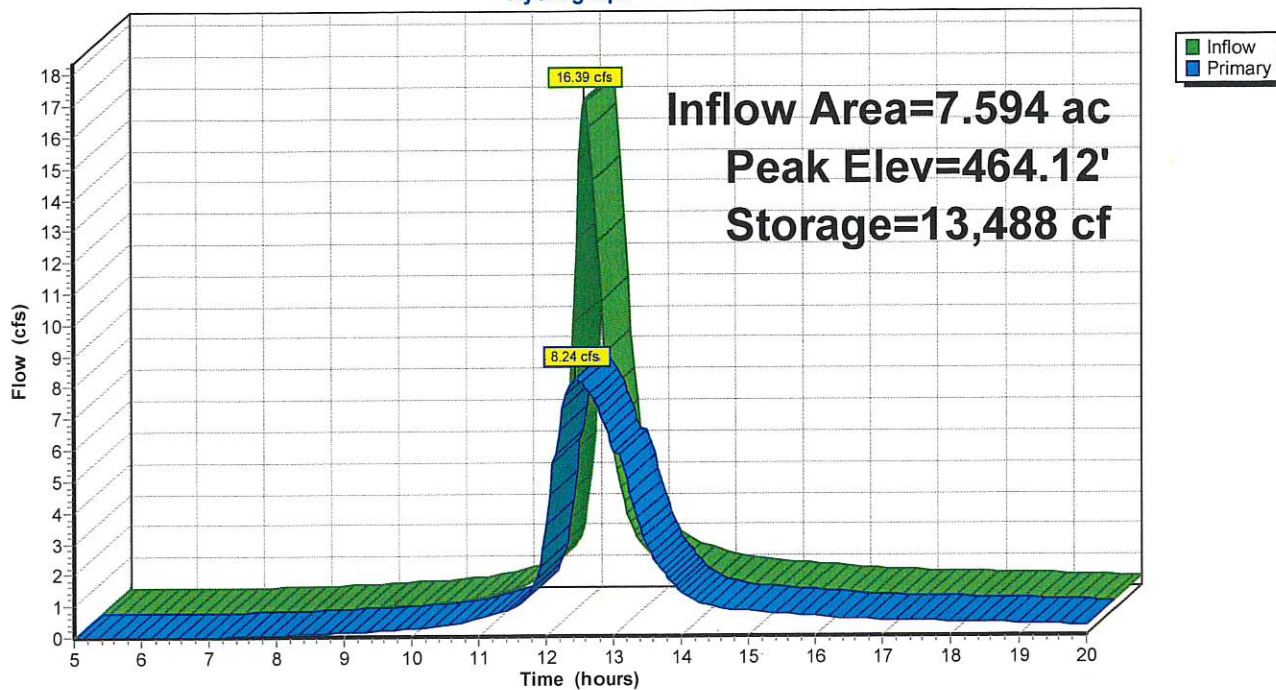
Subcatchment 3S: Bypassing Basin

Hydrograph



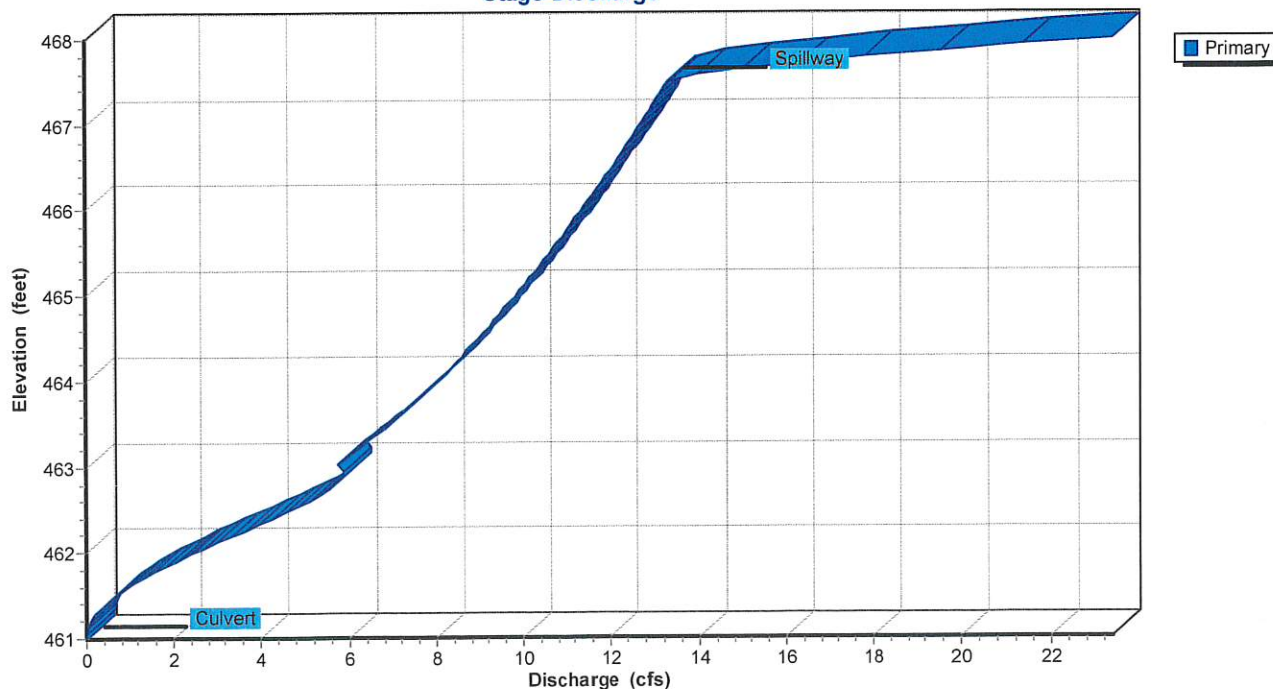
Pond 1P: Detention Basin

Hydrograph



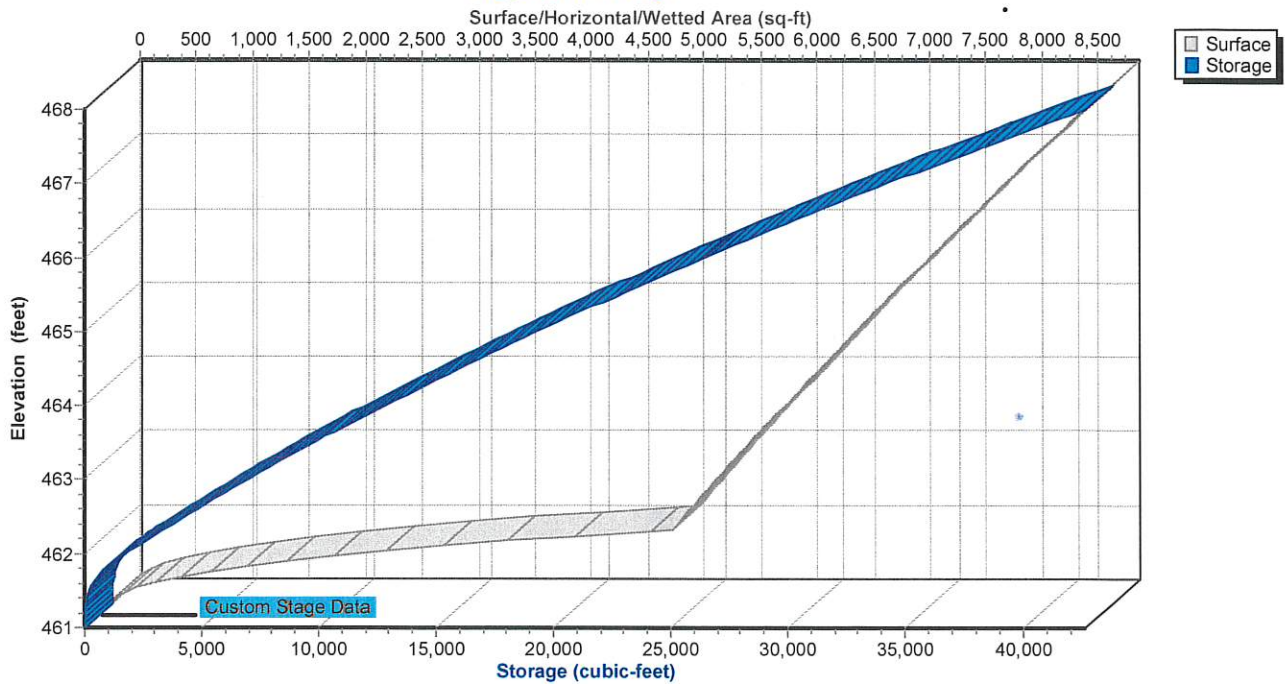
Pond 1P: Detention Basin

Stage-Discharge



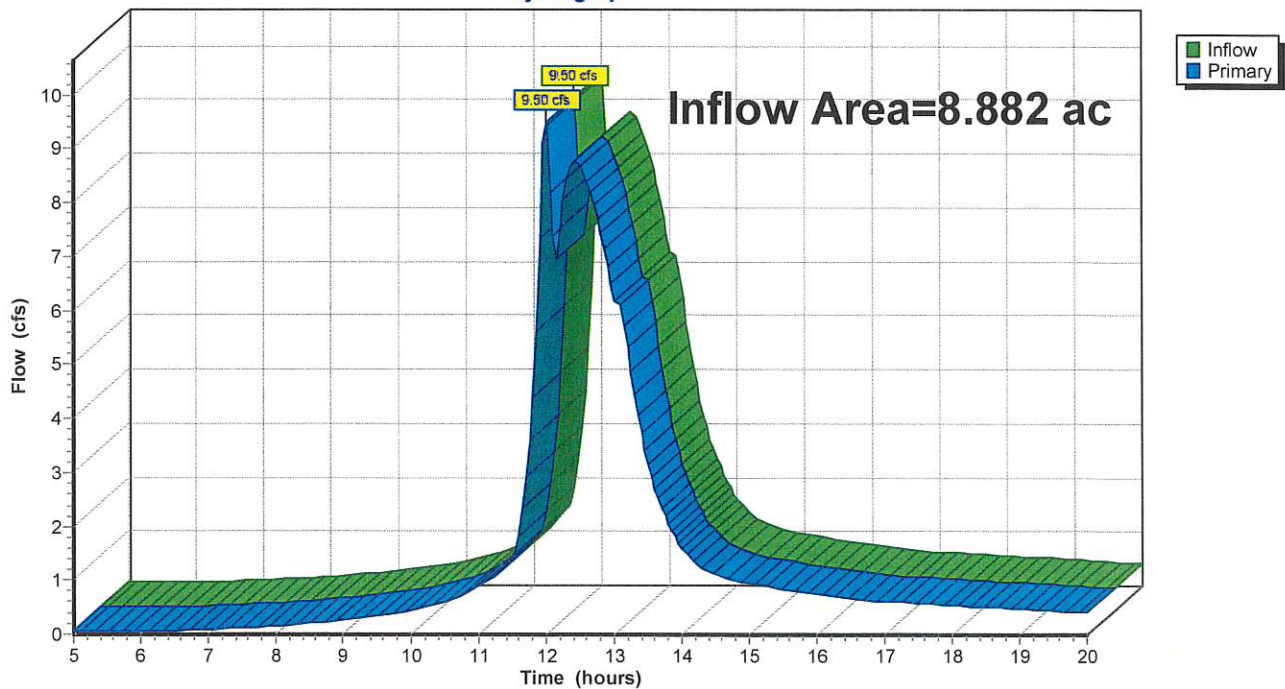
Pond 1P: Detention Basin

Stage-Area-Storage

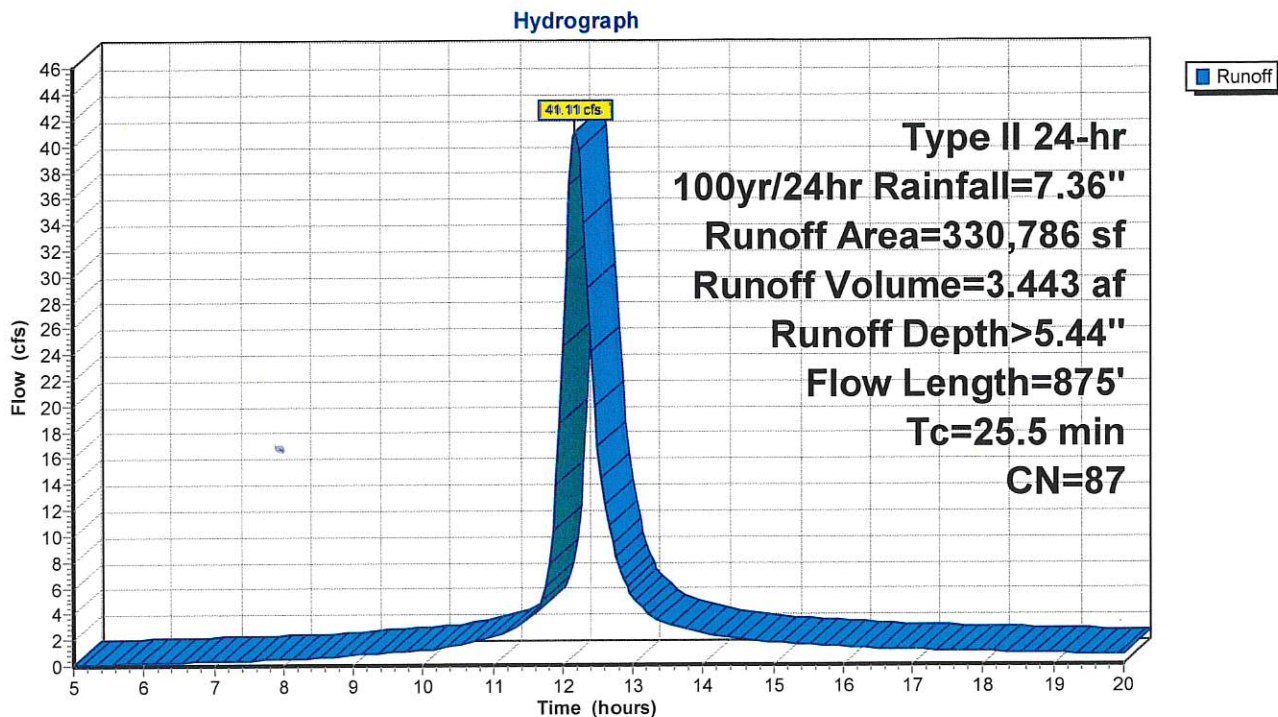


Link 1L: Combined Outfall

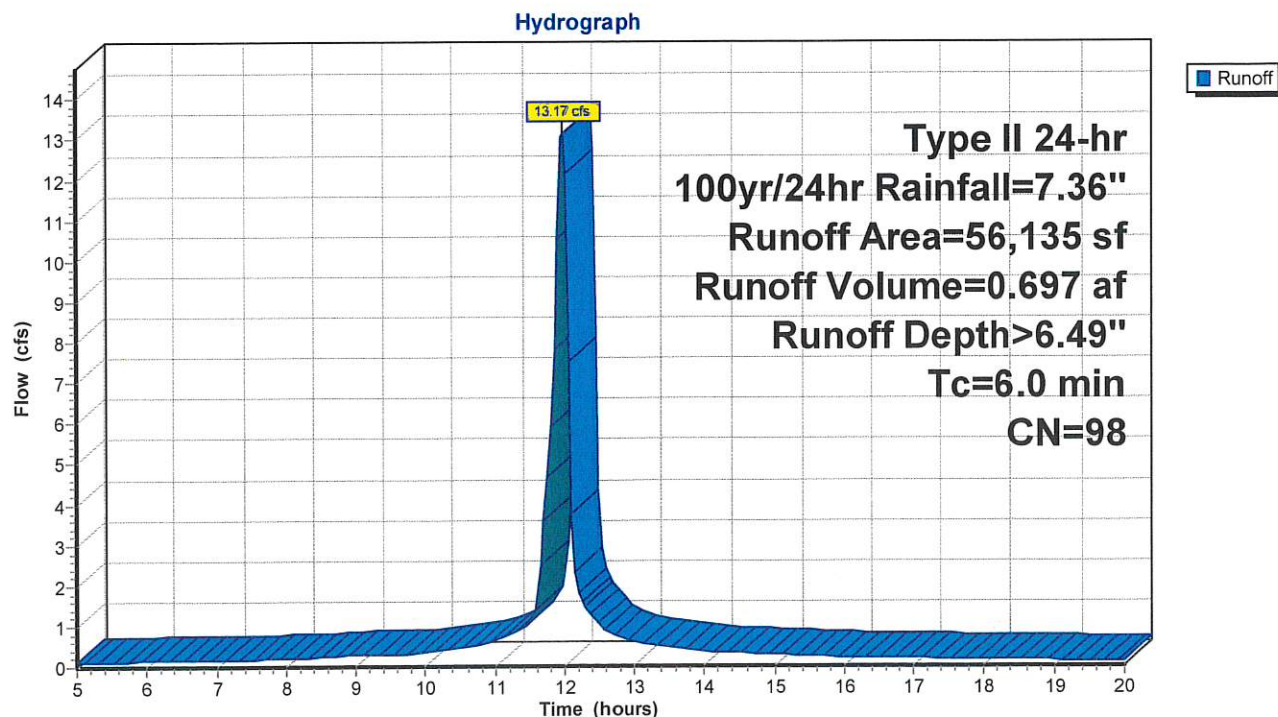
Hydrograph



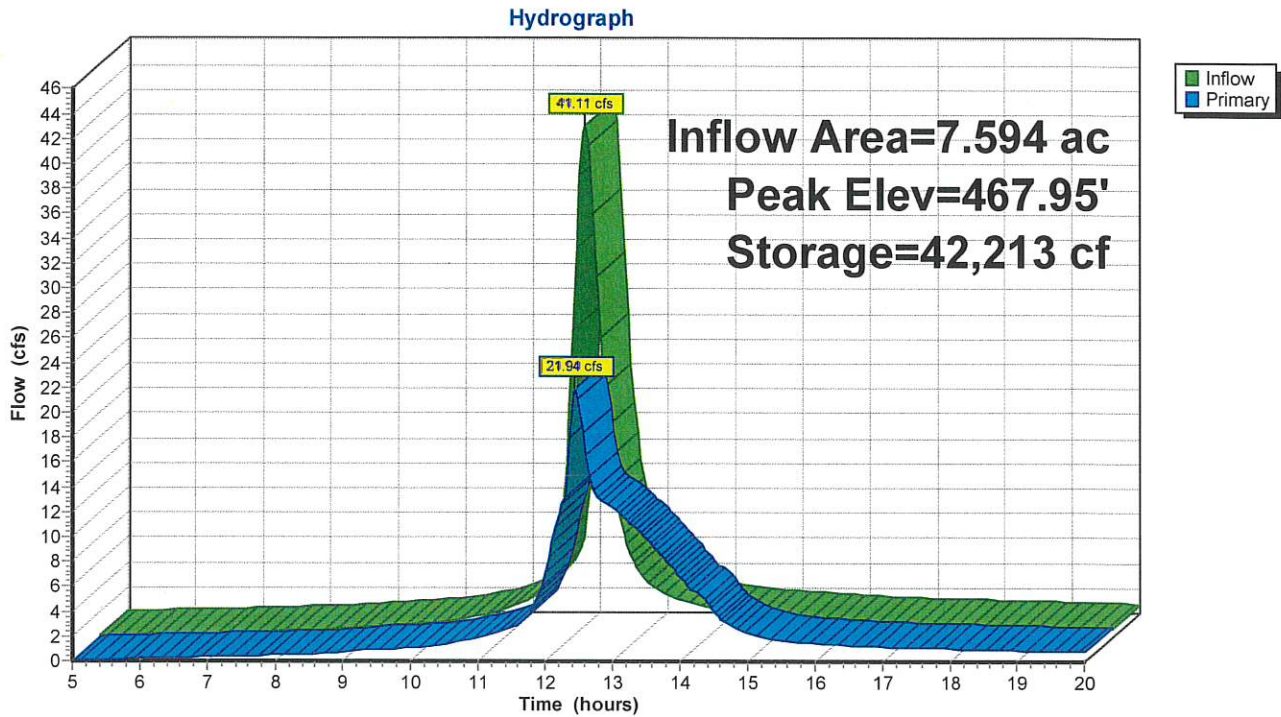
Subcatchment 2S: To Basin



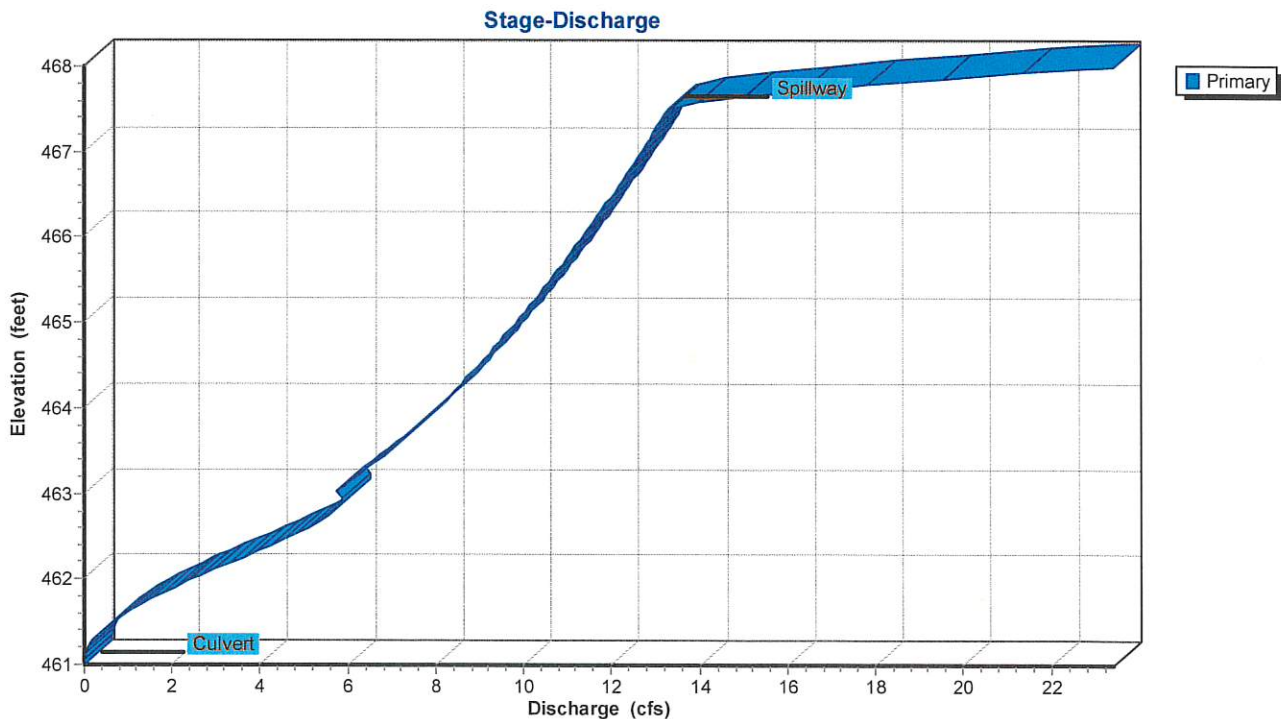
Subcatchment 3S: Bypassing Basin



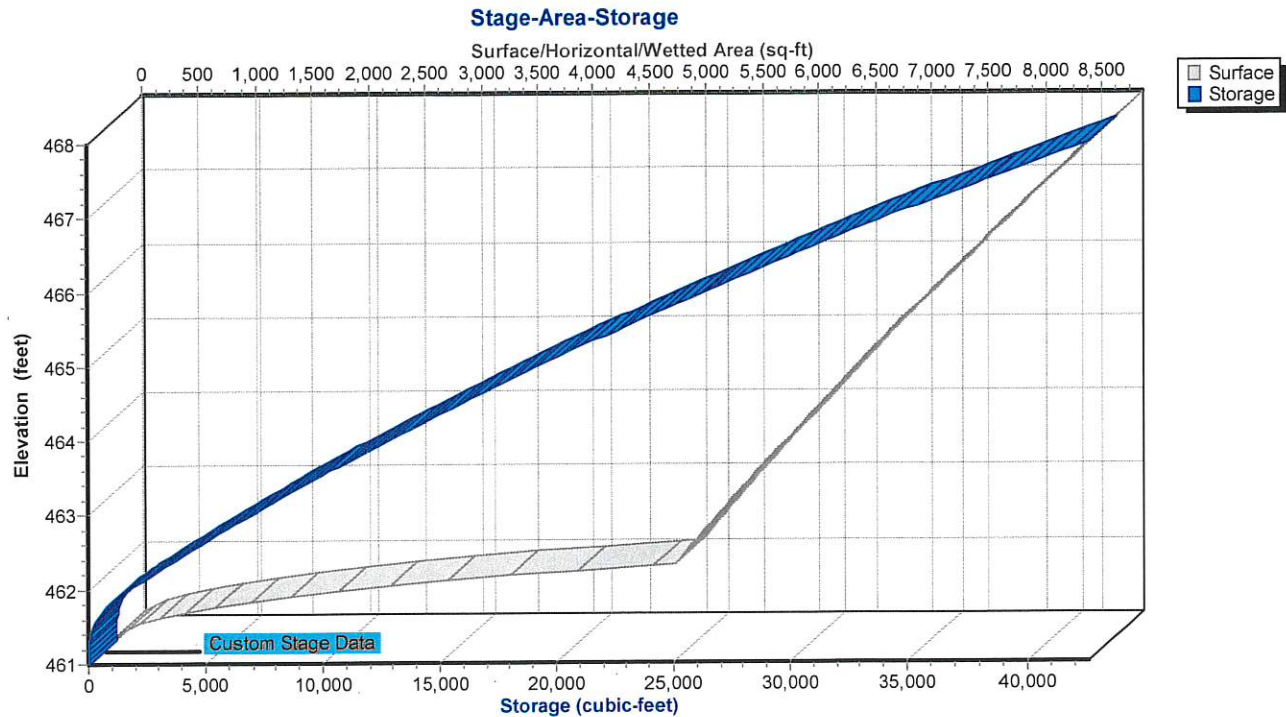
Pond 1P: Detention Basin



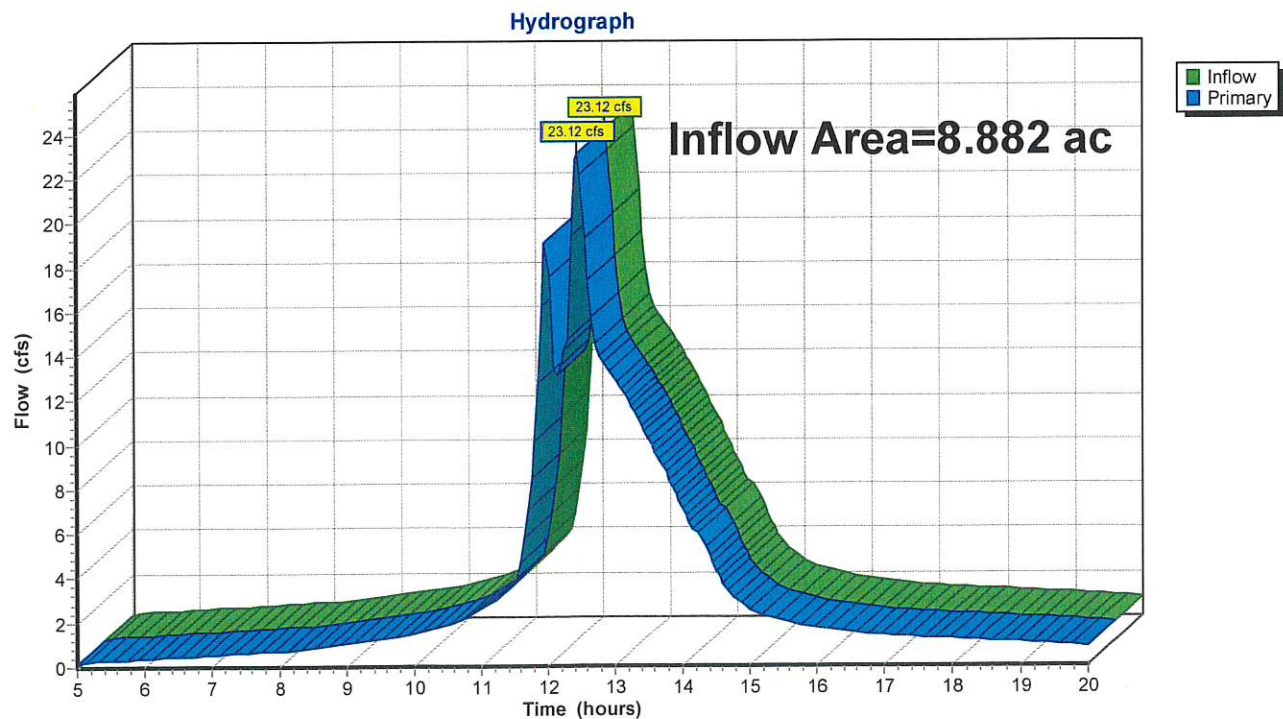
Pond 1P: Detention Basin



Pond 1P: Detention Basin

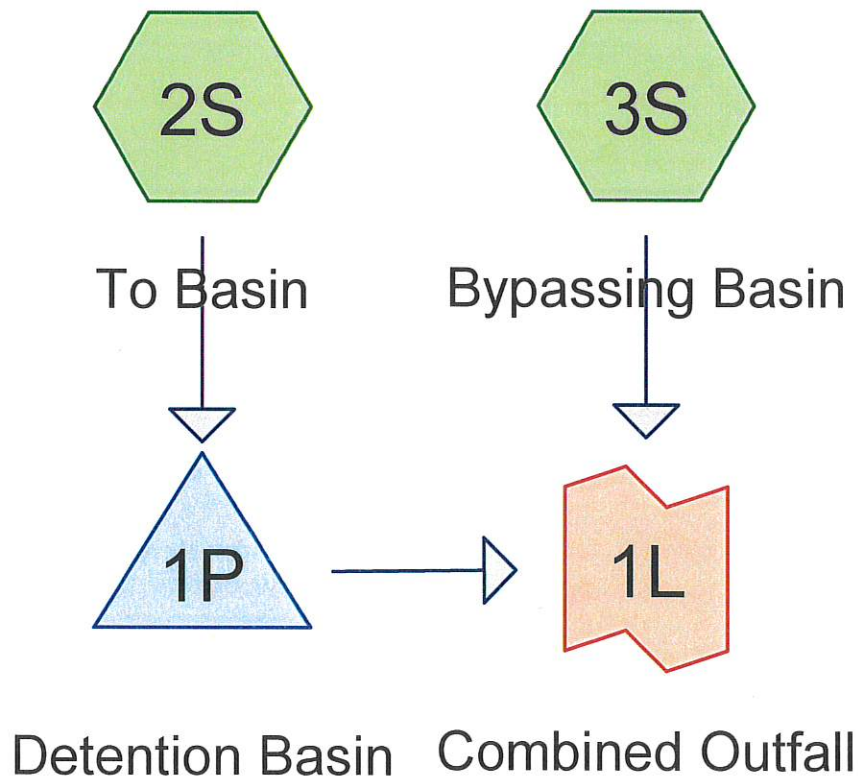


Link 1L: Combined Outfall



Jason Walker - Highway 12 (Topsoil/Grass Refill)

Post-Developed



Jason Walker - Highway 12

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.579	74	>75% Grass cover, Good, HSG C (2S, 3S)
3.303	73	Woods, Fair, HSG C (2S)
8.882	74	TOTAL AREA

Jason Walker - Highway 12

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
8.882	HSG C	2S, 3S
0.000	HSG D	
0.000	Other	
8.882		TOTAL AREA

Jason Walker - Highway 12

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	461.00	460.50	100.0	0.0050	0.021	18.0	0.0	0.0

Jason Walker - Highway 12

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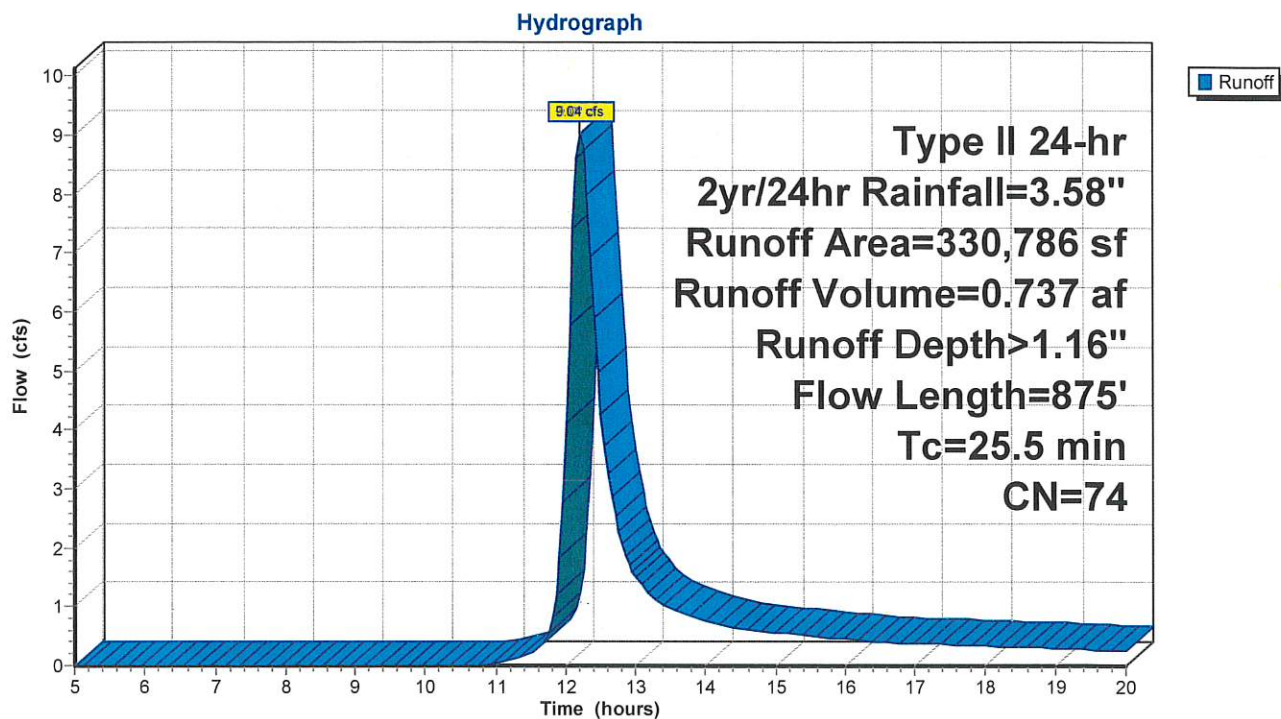
Walker - Highway 12

Type II 24-hr 2yr/24hr Rainfall=3.58"

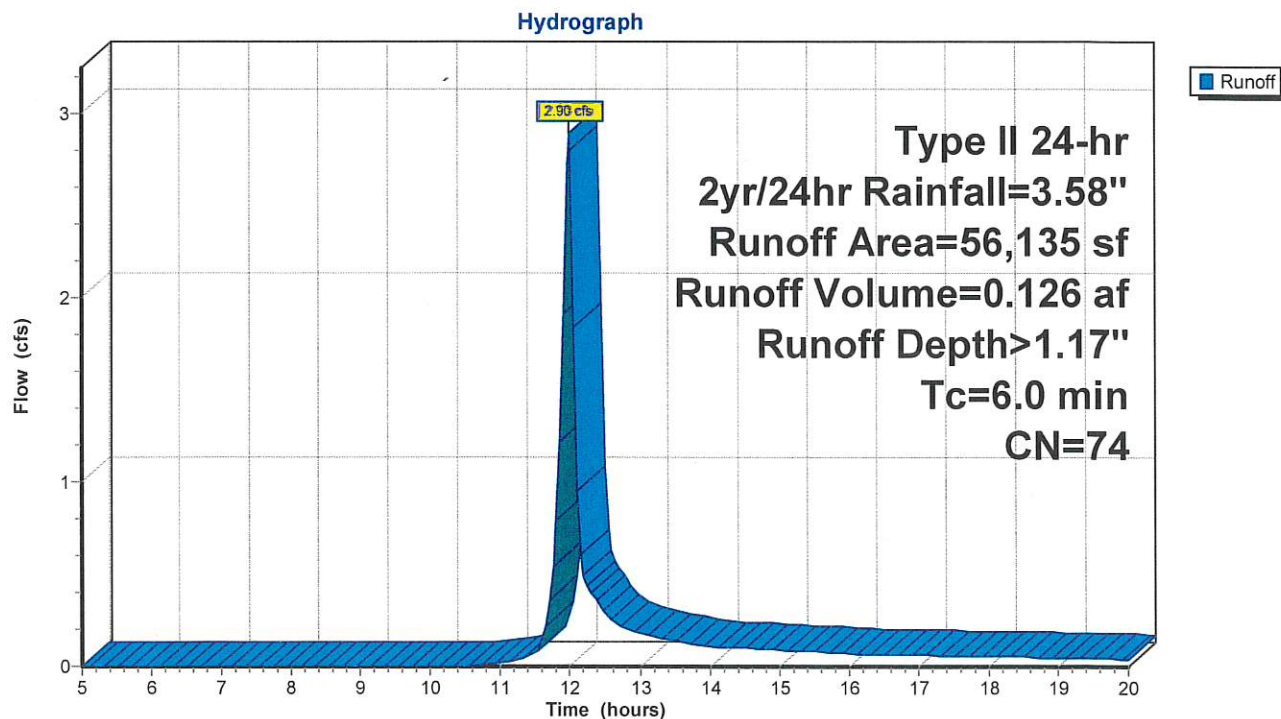
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Subcatchment 2S: To Basin



Subcatchment 3S: Bypassing Basin



Jason Walker - Highway 12

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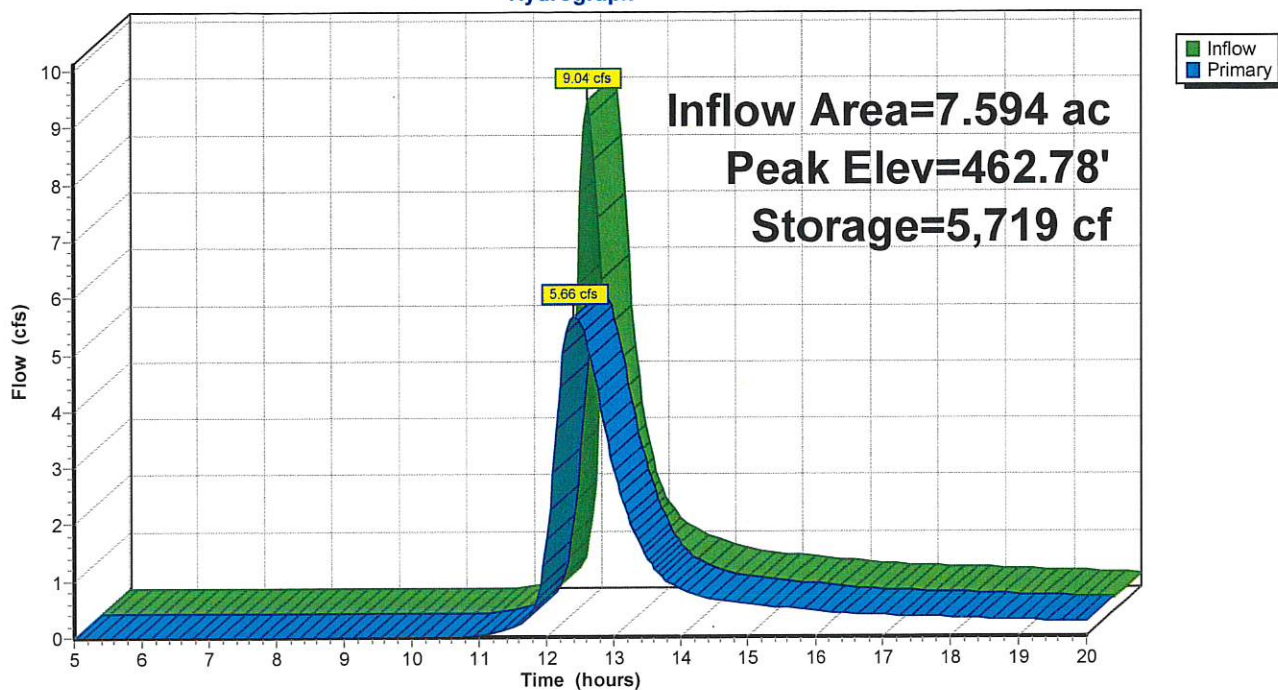
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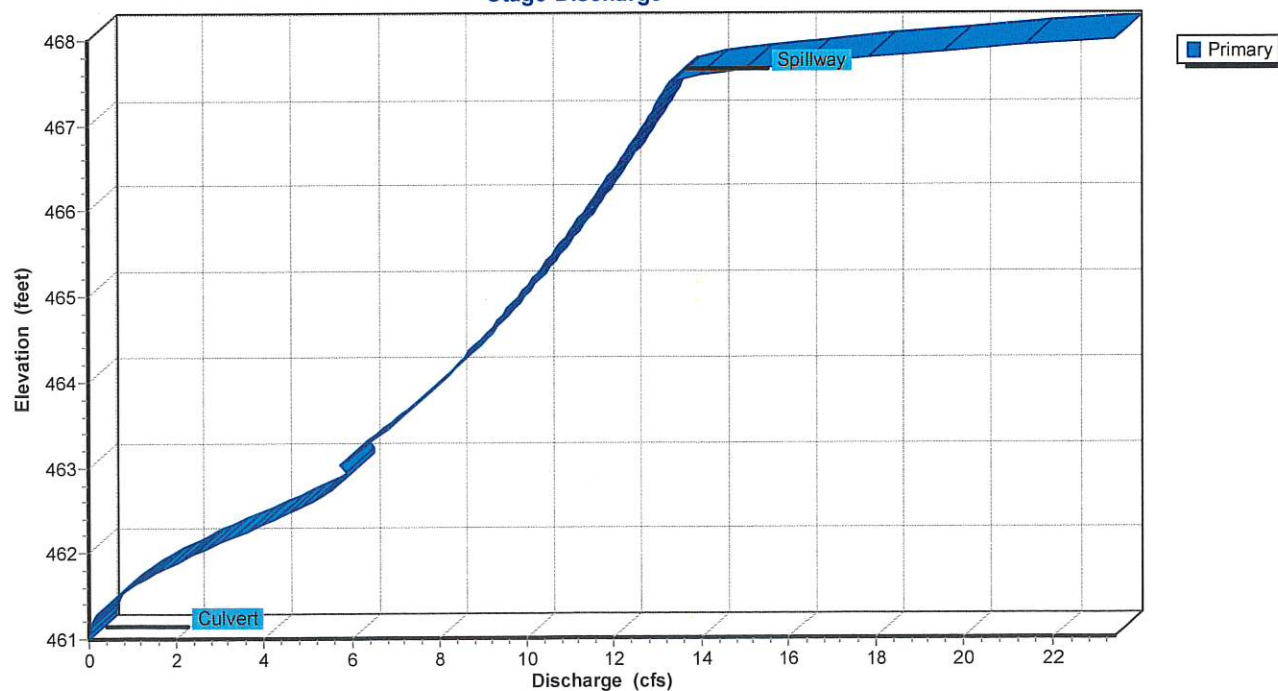
Pond 1P: Detention Basin

Hydrograph



Pond 1P: Detention Basin

Stage-Discharge



Jason Walker - Highway 12

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Walker - Highway 12

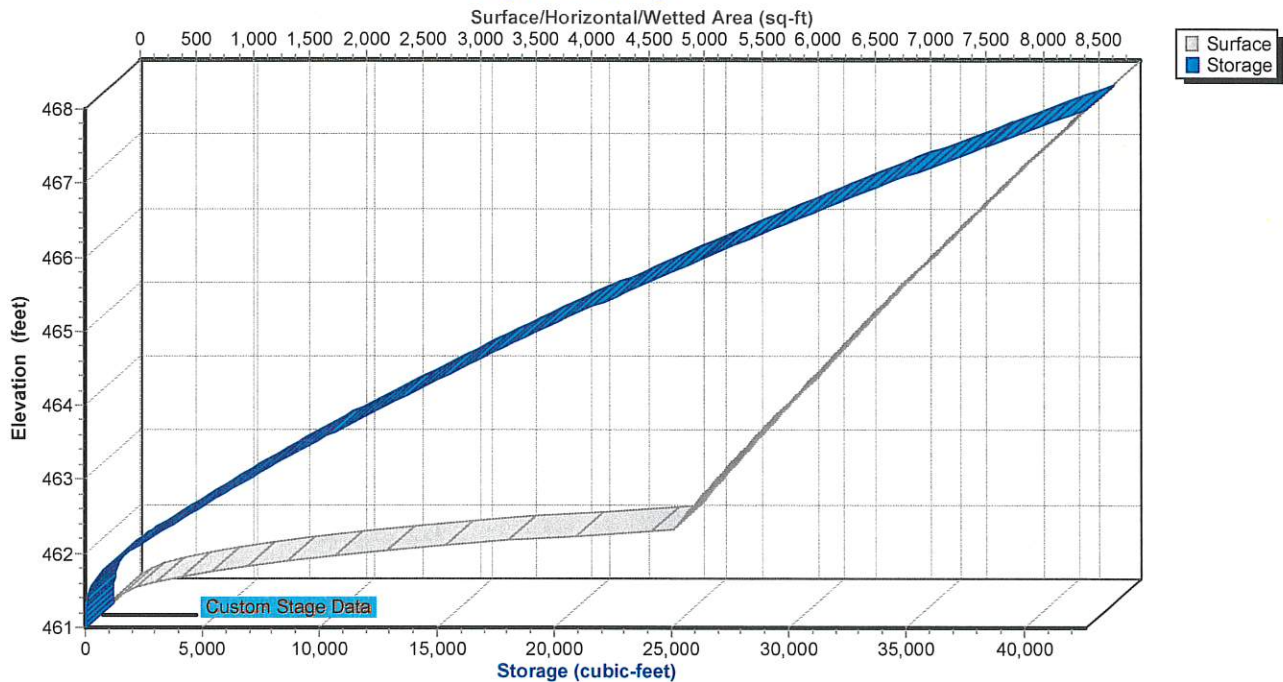
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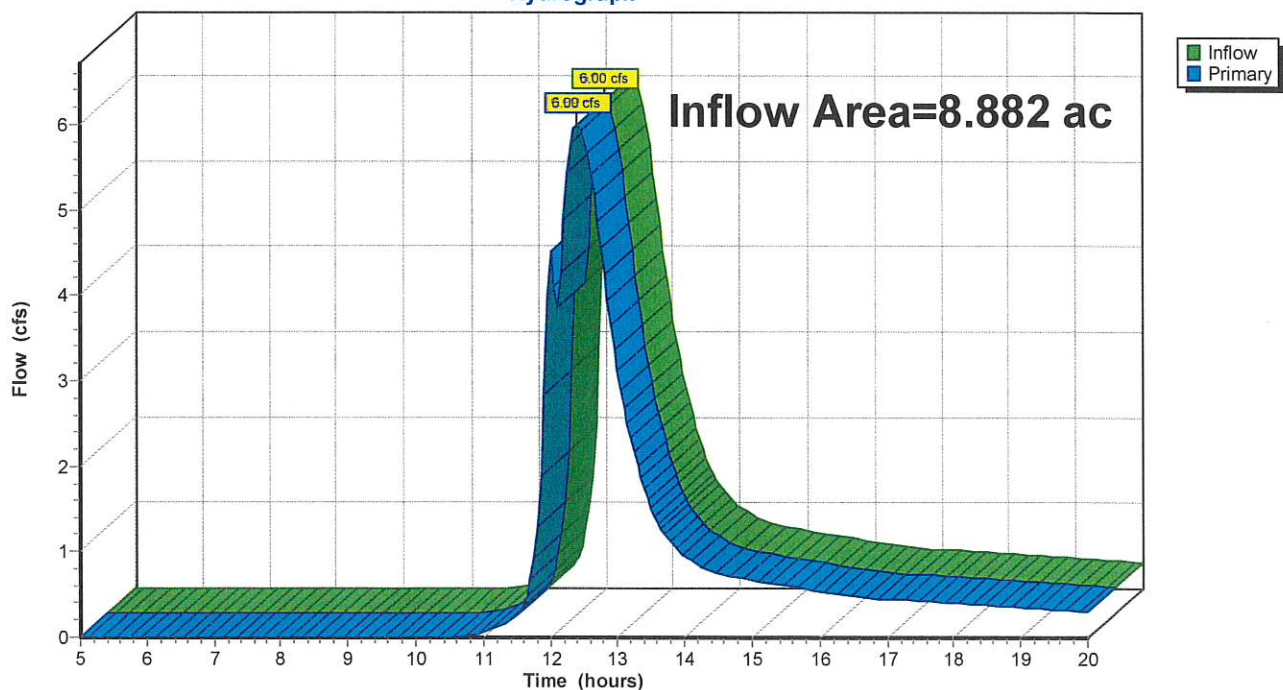
Pond 1P: Detention Basin

Stage-Area-Storage



Link 1L: Combined Outfall

Hydrograph



Jason Walker - Highway 12

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Walker - Highway 12

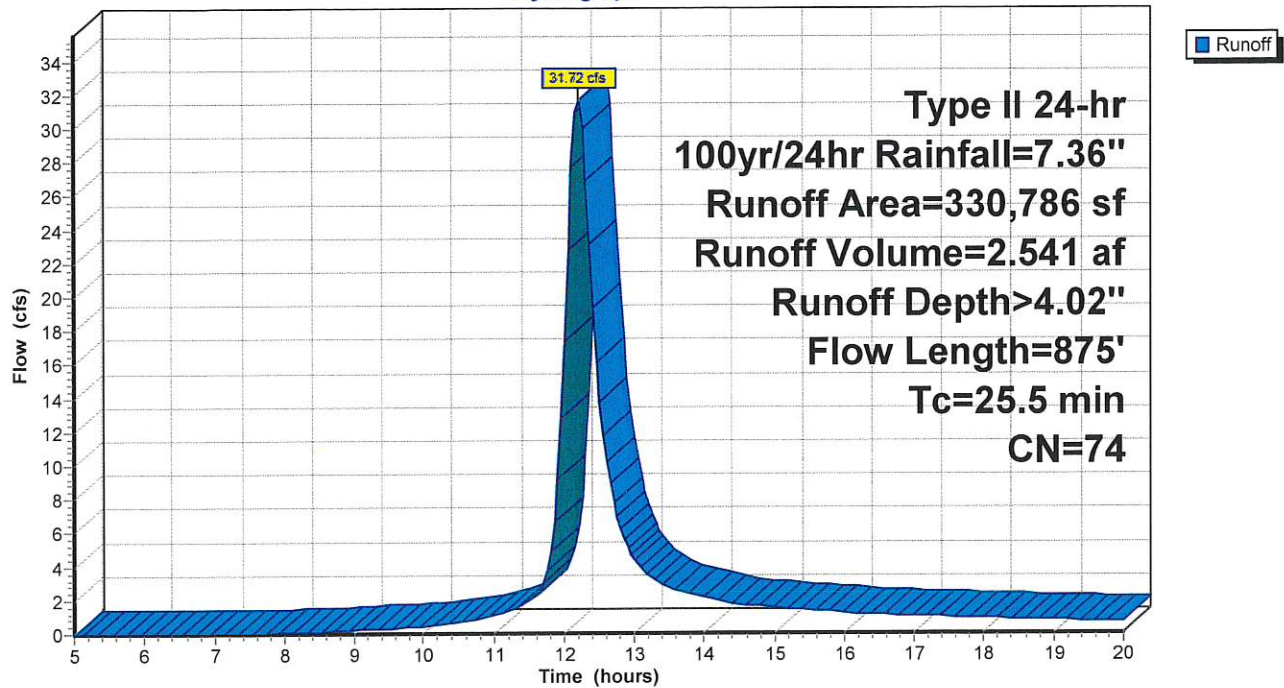
Type II 24-hr 100yr/24hr Rainfall=7.36"

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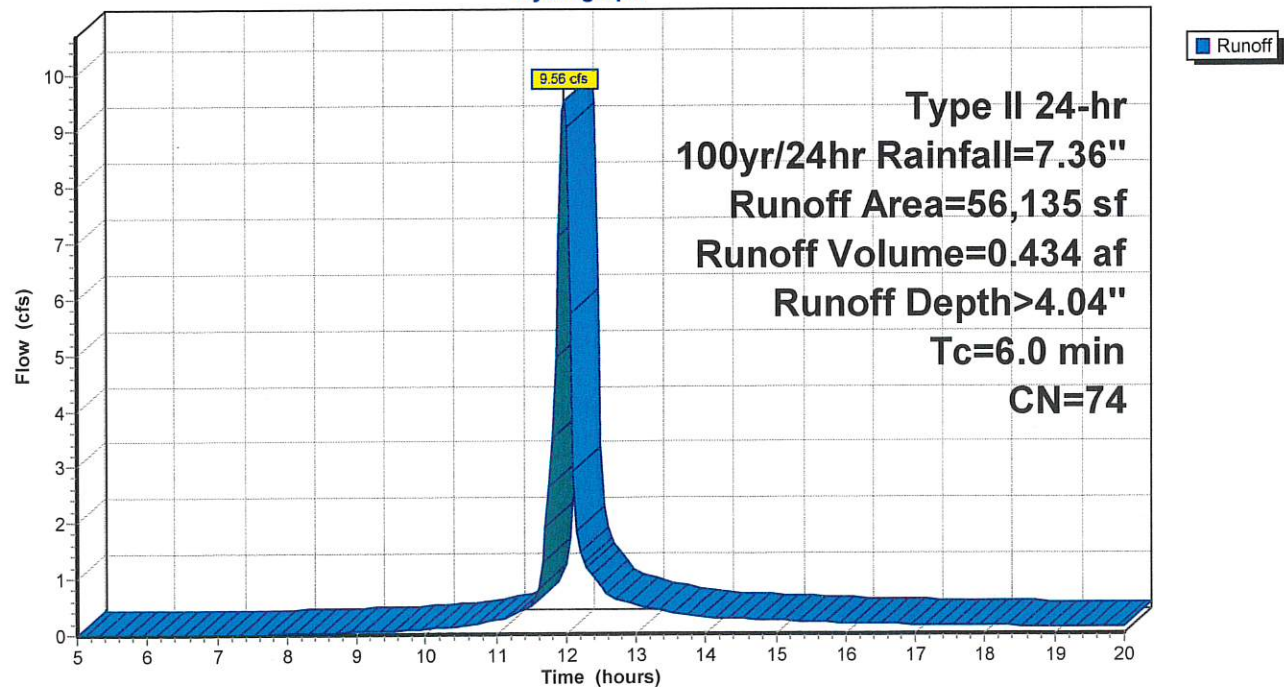
Subcatchment 2S: To Basin

Hydrograph



Subcatchment 3S: Bypassing Basin

Hydrograph



Jason Walker - Highway 12

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Walker - Highway 12

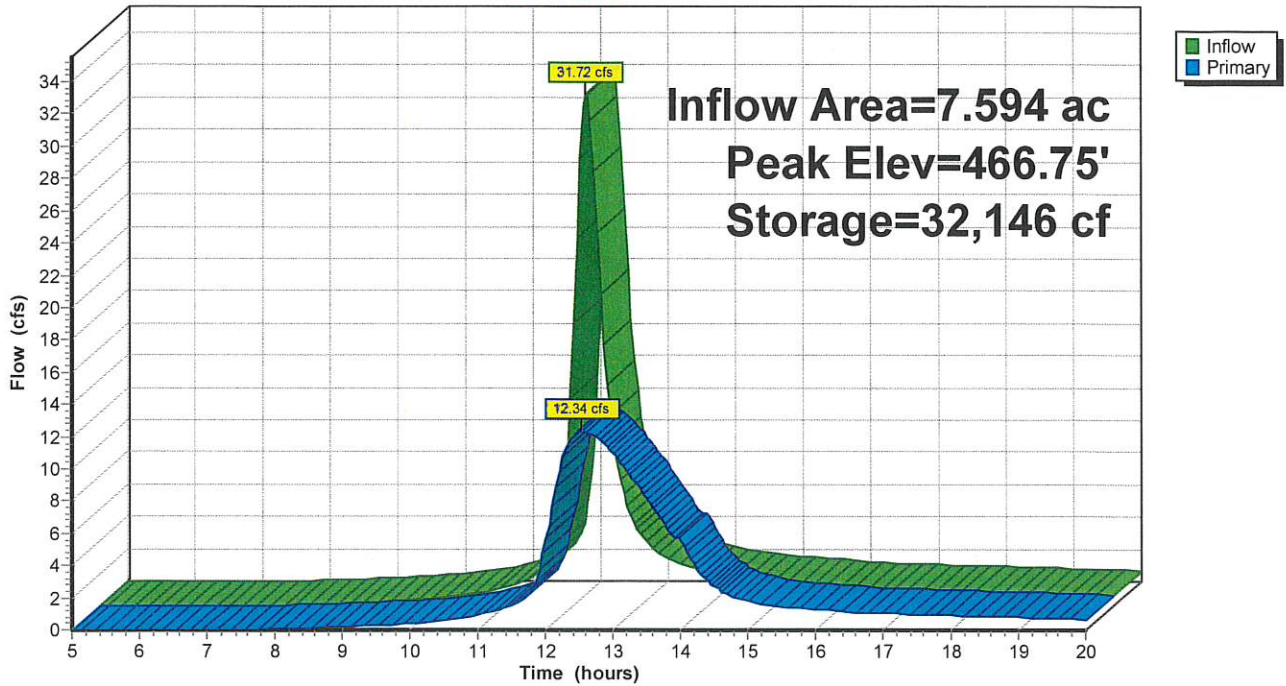
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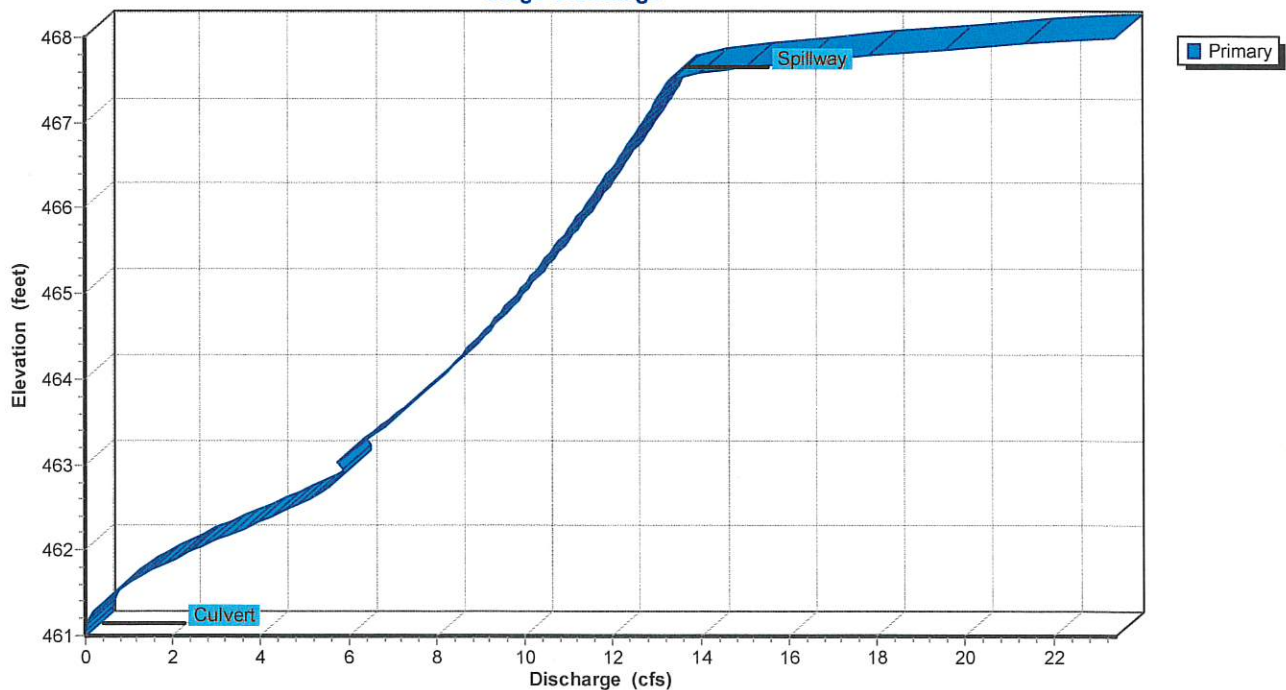
Pond 1P: Detention Basin

Hydrograph



Pond 1P: Detention Basin

Stage-Discharge



Jason Walker - Highway 12

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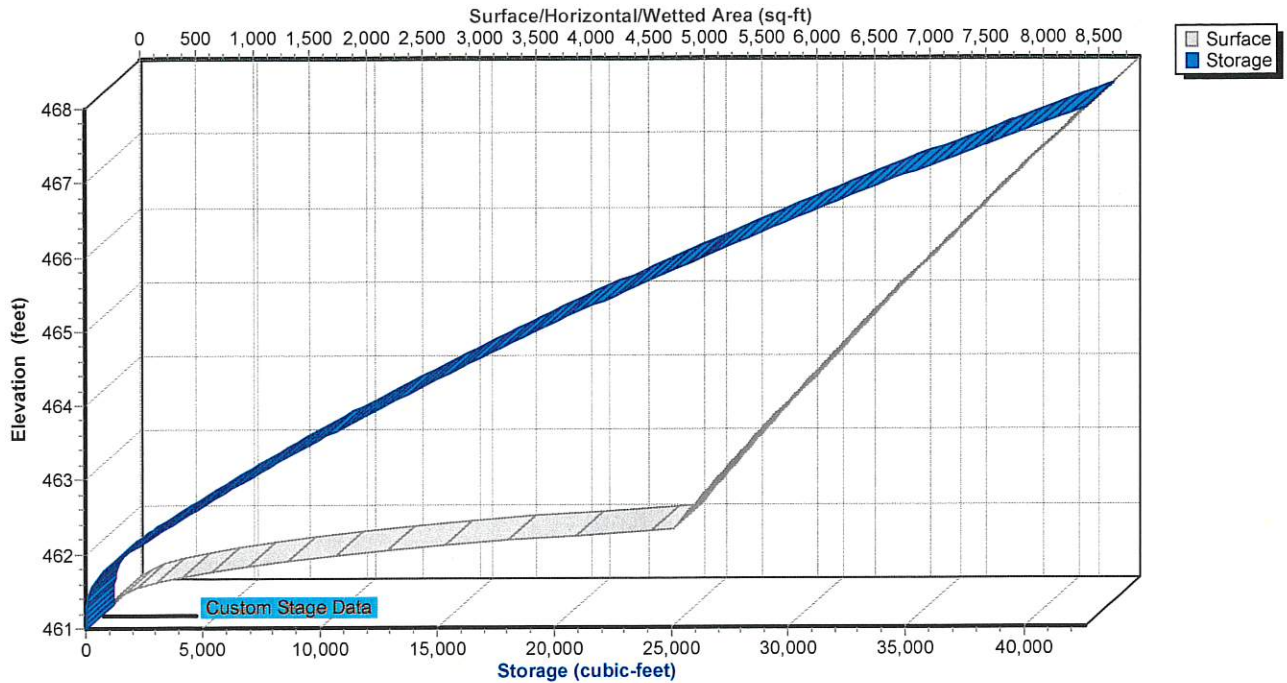
Walker - Highway 12
Type II 24-hr 100yr/24hr Rainfall=7.36"

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Pond 1P: Detention Basin

Stage-Area-Storage



Link 1L: Combined Outfall

Hydrograph

