

PRELIMINARY STORM WATER MANAGEMENT COMPUTATIONS

FOR

Capital Investments

Single Family Residential Development

INDIAN RIVER COUNTY, FLORIDA

October 2024

Prepared by:

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FL Reg. No. 84598

Preliminary Surface-Water Management Statement

The following is a summary of the existing conditions and proposed surface-water management system for the Capital Investments project on Edwards Road. The intention here is to demonstrate proof-of-concept for the proposed system in keeping with current regulatory requirements.

A portion of the Existing Site had been previously developed as a citrus grove; elements of the beds and furrows are evident from the survey, though it is now almost entirely overgrown. The remainder (the north portion) appears to be native uplands. There does not appear to be a connection from the site to the North St Lucie River Water Control District (hereafter, NSLRWCD), but it is evident that excess runoff from the site drains to the south through the wetlands and into the Ten Mile Creek. The native areas of the site contain some wetlands that collect runoff from their immediate surroundings. Based on existing water elevations in and around the site, the season-high groundwater (hereafter, SHGW) elevation has been estimated at 9.00 N.A.V.D.

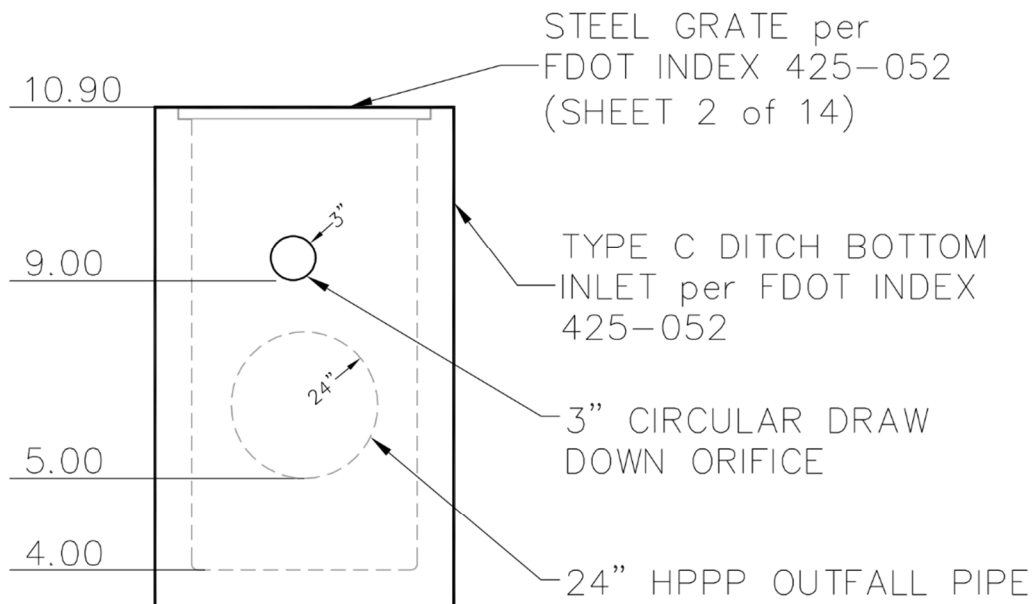
The proposed Surface-Water Management System (hereafter, SMS) will utilize a combination of dry retention and wet detention ponds to collect and treat stormwater runoff prior to discharge to the Ten Mile Creek (NSLRWCD); one outfall has been indicated for this design and shall discharge to the adjacent wetlands. Control elevation for the system shall be 9.00 N.A.V.D., in keeping with estimated SHGW elevations. Existing onsite wetlands will not be impacted.

For this Preliminary Design, we have modeled the SMS as a simple single-node/single-basin system. The goal here is to determine if the system has “broad-stroke” compliance with county and district requirements. Based on our calculations and models, we have determined the following:

- Pre-Development discharge rates for the 10yr-72hr event have not been determined, but we are confident that a more comprehensive model will show discharge rates far in excess of the Post-Development rates. Our preliminary model has post-development rate for the event at 3.45 cfs maximum.
- Post-Development peak stage for the 10yr-24hr event is below the proposed roadway elevations throughout the site.
- A 100yr-72hr event model has been included WITHOUT discharge. The peak stage for this model is 12.30 NAVD. All Finish Floor elevations shall be set above 13.00 NAVD.

Event	Rainfall (in.)	Max Stage (FT-NAVD)	PRE Q (cfs)	POST Q (cfs)
25yr-3 day	10.00	11.35 < 12.00 Berm	na	10.20
10yr-1 day	6.00	10.58 < 11.50 Inlet	na	0.49
10yr-3 day	8.50	NA	na	3.45
100yr-3 day	12.23	12.30 < 13.0 FFE	na	0.00

- The system is required by NSLRWCD to limit discharge for the 10yr-72hr event to no more than 2" over the drainage area in any 24-hour period from the event. For a 13.70-acre drainage area, this limits discharge to 2.283 acft in 24hrs. Our model shows discharge at only 2.07 acft in 24hrs, and so is compliant with NSLRWCD requirements.
- According to SFWMD requirements, the wet detention system shall have to provide treatment for 1.71 acft of stormwater runoff prior to discharge. This includes the additional 50% treatment requirement for impaired basins. The requisite treatment volume is detained within the system at elevation 10.61 N.A.V.D. Top-of-Bank for the proposed wet detention system is at elevation 12.00 N.A.V.D.
- To balance nutrient runoff pre-v-post, the system shall have to retain 0.200 acft of stormwater runoff prior to discharge into the wet detention system. The two systems will work in succession to retain the required nutrient load on-site. Please refer to the included BMPTRAINS report for more detailed information regarding nutrient abatement.
- The system has NOT been designed to comply with the SFWMD requirements for wet detention drawdown, as the requirements of NSLRWCD will not allow it. For this, the orifice has been designed at 3-inches, as accepted by the SFWMD. The overflow weir has been set above the required detention treatment volume. A preliminary design for the control structure is show below...



CONTROL STRUCTURE CS-1

SCALE = NTS

- The onsite wetlands shall NOT be incorporated into the SMS; the wetlands shall continue to receive the stormwater runoff they have historically received, albeit in a more controlled manner, allowing them to be “recharged” during rain events in a manner consistent with its history. These areas have not been used in consideration of treatment volume, as those calculations have been restricted to man-made elements of the SMS (refer to the “STORAGE NODE” stage-area calculations). These areas have NOT been included in the routing model for attenuation and are not included in the Water Quality or Nutrient Loading calculations.
- The available survey data shows little to no potential for offsite tributary area. As the parcel is bordered by canals to the north and south and roads to the east and west, it is difficult to imagine a scenario where a significant tributary can enter the site. There are definite impacts to the parcel from the adjacent right-of-way(s), but these areas are small in comparison to the overall site, and the system has been designed with enough excess that these tributaries can be readily managed by the system when the ultimate right-of-way design has been determined.

There is the possibility that the subdivision which is poised to be encompassed by the proposed development may be draining into the subject parcel, but the information available at present is inconclusive. We shall be investigating this area for future submittals. That said, we are confident that the proposed SMS has plenty of capacity to handle tributary from this area.

**PRELIMINARY
ICPR ROUTING MODEL**

FOR

INDRIO POINTE

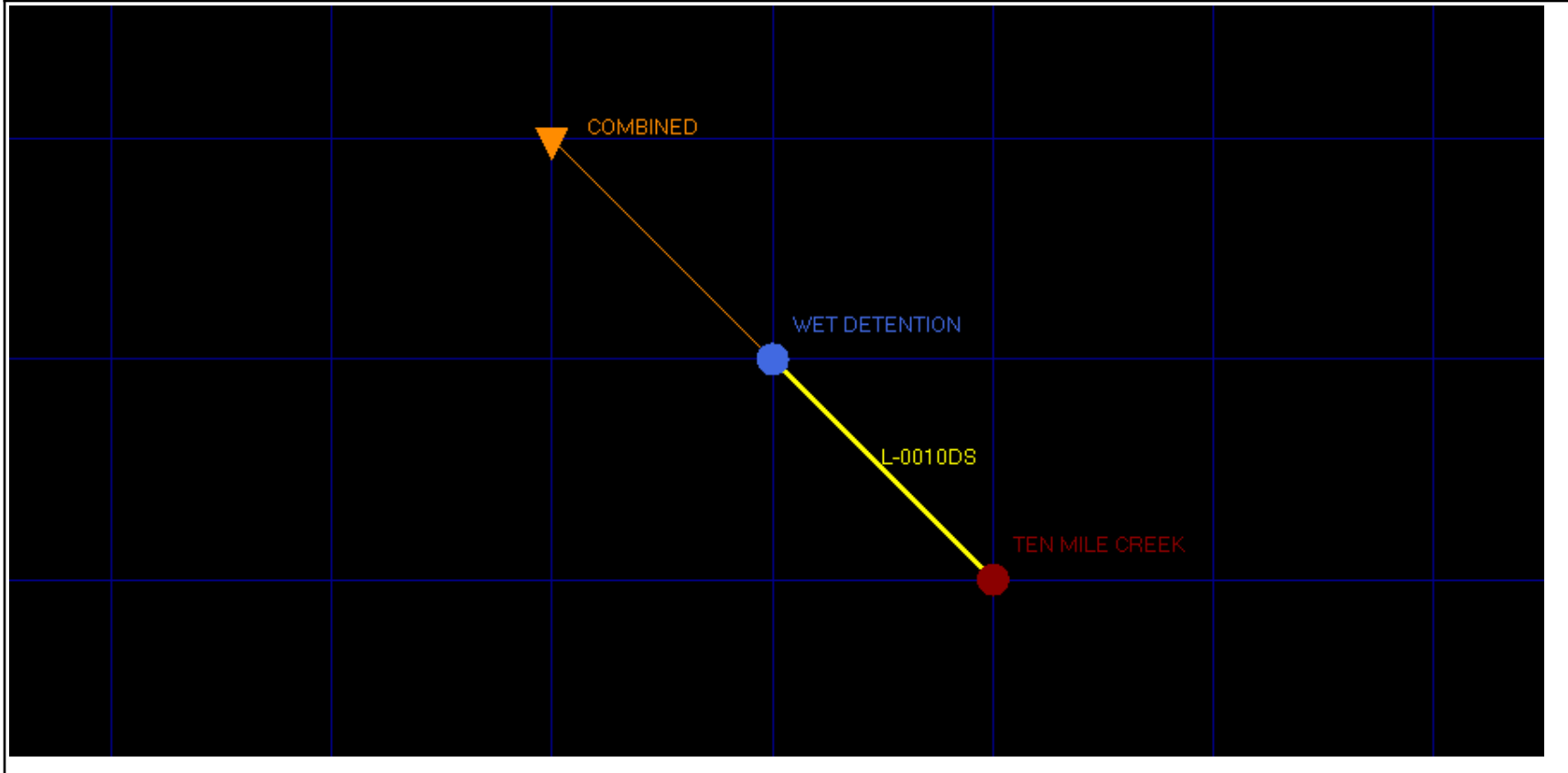
Single Family Residential Development

INDIAN RIVER COUNTY, FLORIDA

October 2024

CAPITAL INVESTMENTS - EDWARDS ROAD
STORMWATER ROUTING MODEL
POST DEVELOPMENT ANALYSIS
OCTOBER 2024

Background Image: PRELIM



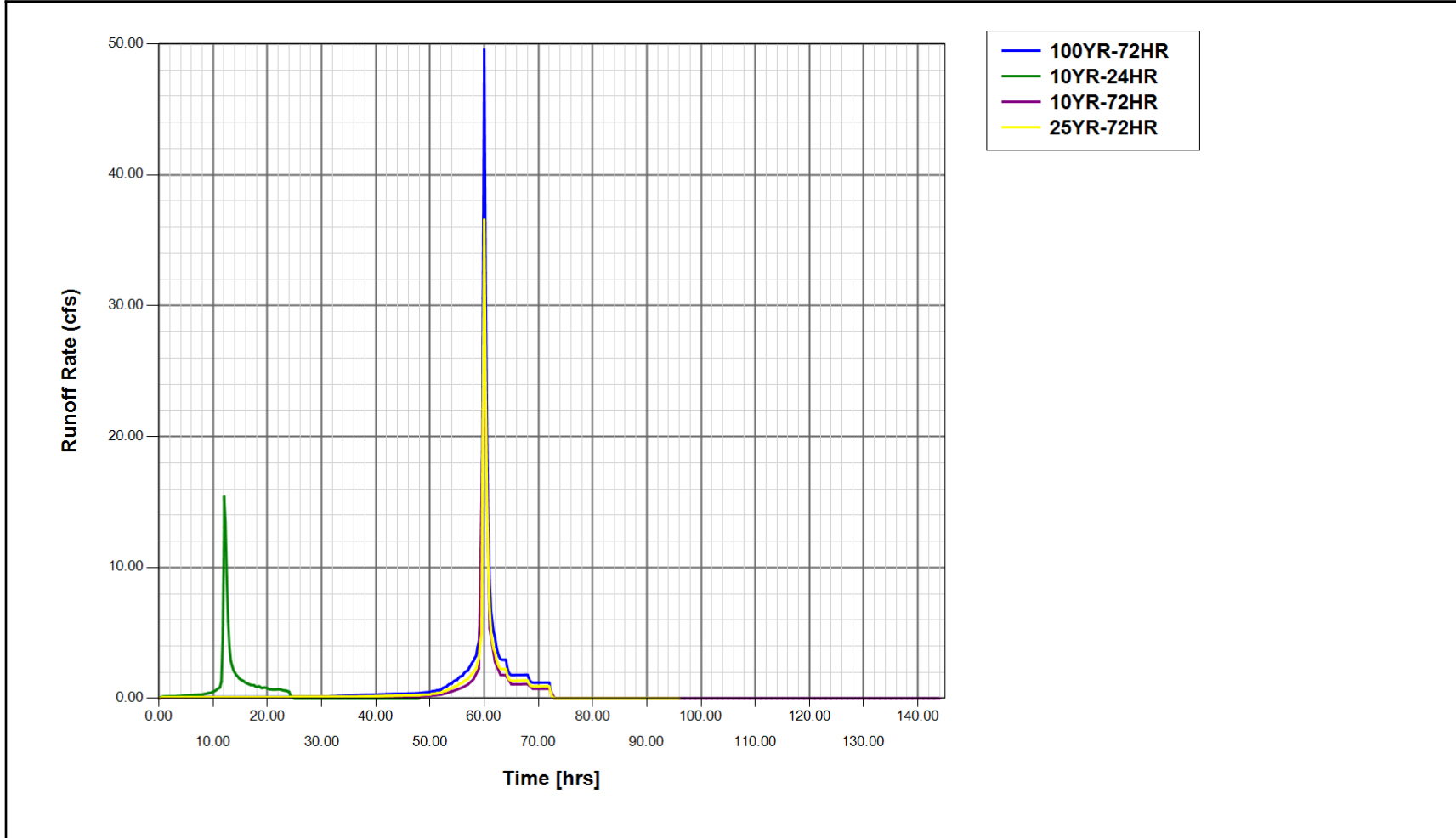
Simple Basin Runoff Summary [PRELIM]

CAPITAL INVESTMENTS - EDWARDS ROAD
 STORMWATER ROUTING MODEL
 POST DEVELOPMENT ANALYSIS
 OCTOBER 2024

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
COMBINED	100YR-72HR	49.57	60.0583	12.23	6.56	13.7000	58.6	50.21	15.45
COMBINED	10YR-24HR	15.43	12.1083	6.00	2.03	13.7000	61.2	50.21	15.45
COMBINED	10YR-72HR	28.16	60.0583	8.50	3.68	13.7000	59.7	50.21	15.45
COMBINED	25YR-72HR	36.57	60.0583	10.00	4.80	13.7000	59.1	50.21	15.45

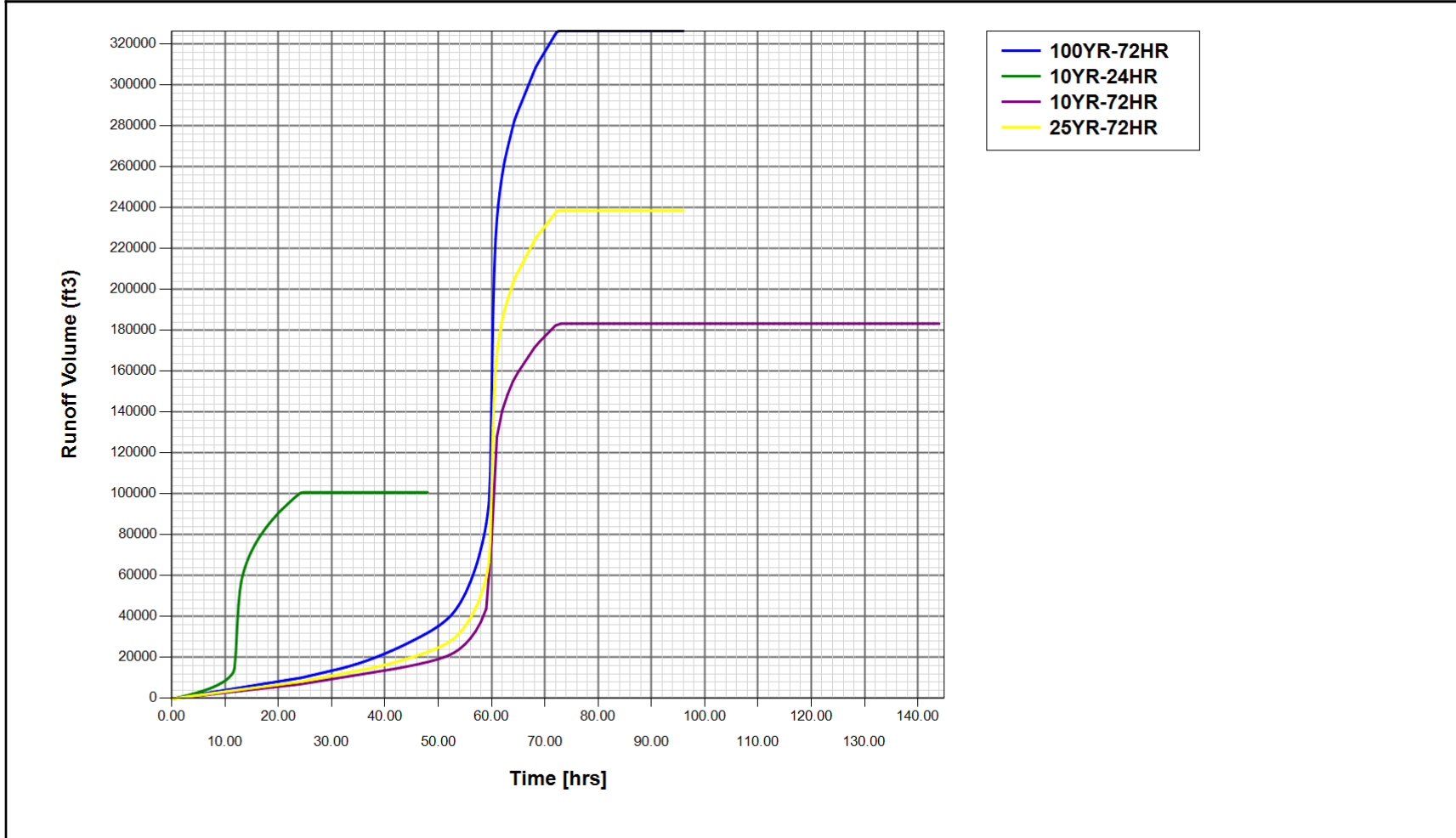
CAPITAL INVESTMENTS - EDWARDS ROAD
STORMWATER ROUTING MODEL
POST DEVELOPMENT ANALYSIS
OCTOBER 2024

Simple Basin Runoff Rate: COMBINED [PRELIM]



CAPITAL INVESTMENTS - EDWARDS ROAD
STORMWATER ROUTING MODEL
POST DEVELOPMENT ANALYSIS
OCTOBER 2024

Simple Basin Runoff Volume: COMBINED

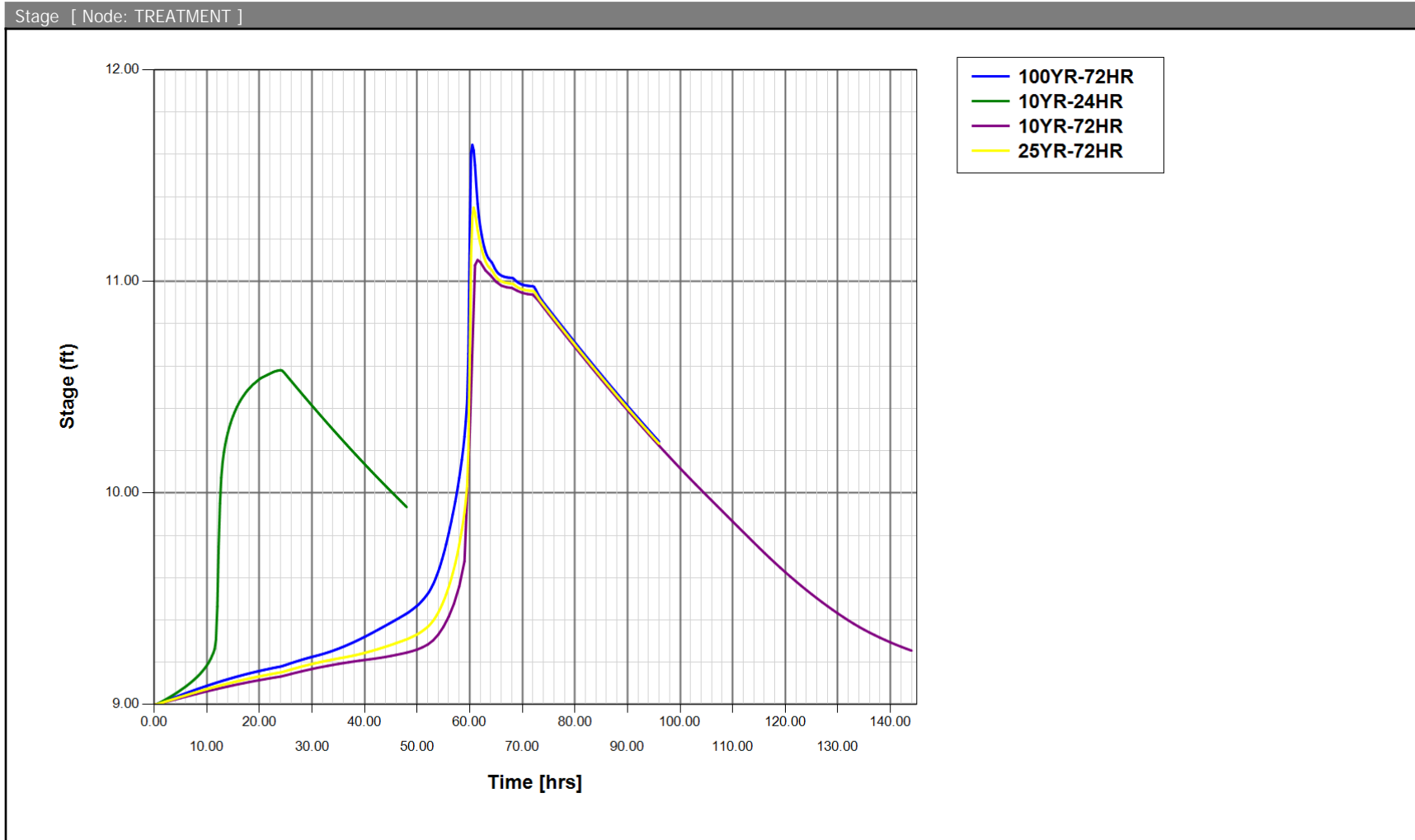


CAPITAL INVESTMENTS - EDWARDS ROAD
 STORMWATER ROUTING MODEL
 POST DEVELOPMENT ANALYSIS
 OCTOBER 2024

Node Max Conditions [PRELIM]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
TEN MILE CREEK	100YR-72HR	9999.00	7.00	0.0000	21.20	0.00	0
TEN MILE CREEK	10YR-24HR	9999.00	7.00	0.0000	0.49	0.00	0
TEN MILE CREEK	10YR-72HR	9999.00	7.00	0.0000	3.45	0.00	0
TEN MILE CREEK	25YR-72HR	9999.00	7.00	0.0000	10.20	0.00	0
TREATMENT	100YR-72HR	12.00	11.65	0.0010	49.57	21.21	128326
TREATMENT	10YR-24HR	12.00	10.58	0.0010	15.43	0.49	58495
TREATMENT	10YR-72HR	12.00	11.10	0.0010	28.16	3.45	62123
TREATMENT	25YR-72HR	12.00	11.35	0.0010	36.57	10.20	63845

CAPITAL INVESTMENTS - EDWARDS ROAD
STORMWATER ROUTING MODEL
POST DEVELOPMENT ANALYSIS
OCTOBER 2024



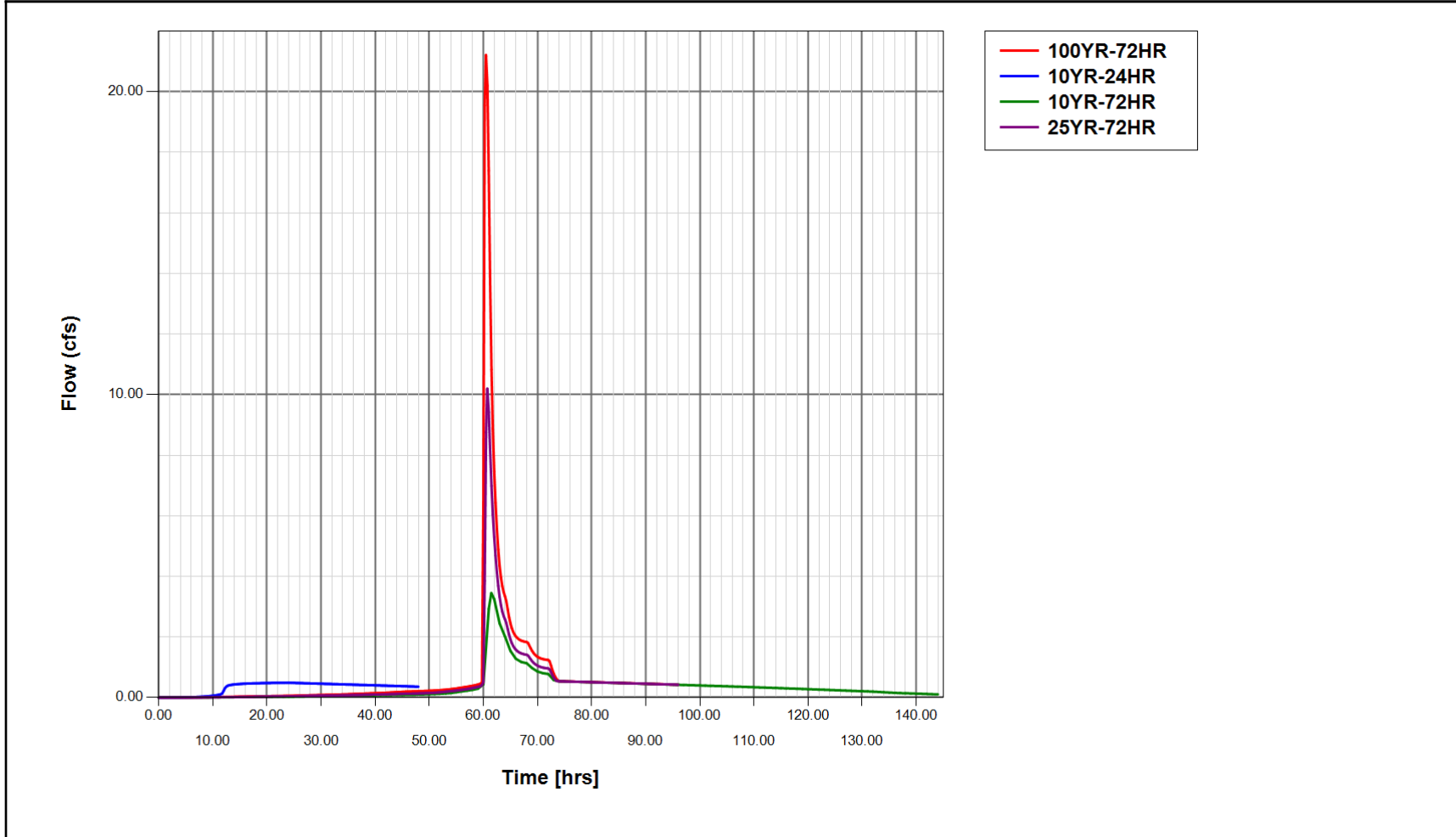
CAPITAL INVESTMENTS - EDWARDS ROAD
 STORMWATER ROUTING MODEL
 POST DEVELOPMENT ANALYSIS
 OCTOBER 2024

Link Min/Max Conditions [PRELIM]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-1 - Pipe	100YR-72HR	21.20	0.00	-0.06	0.00	0.00	0.00
CS-1 - Weir: 1	100YR-72HR	0.65	0.00	0.00	7.56	7.56	7.56
CS-1 - Weir: 2	100YR-72HR	20.58	0.00	-0.04	2.76	2.76	2.76
CS-1 - Pipe	10YR-24HR	0.49	0.00	0.00	0.00	0.00	0.00
CS-1 - Weir: 1	10YR-24HR	0.49	0.00	0.00	5.72	5.72	5.72
CS-1 - Weir: 2	10YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-1 - Pipe	10YR-72HR	3.45	0.00	0.02	0.00	0.00	0.00
CS-1 - Weir: 1	10YR-72HR	0.57	0.00	0.00	6.70	6.70	6.70
CS-1 - Weir: 2	10YR-72HR	2.88	0.00	0.02	1.43	1.43	1.43
CS-1 - Pipe	25YR-72HR	10.20	0.00	0.04	0.00	0.00	0.00
CS-1 - Weir: 1	25YR-72HR	0.61	0.00	0.00	7.11	7.11	7.11
CS-1 - Weir: 2	25YR-72HR	9.59	0.00	0.03	2.14	2.14	2.14

CAPITAL INVESTMENTS - EDWARDS ROAD
STORMWATER ROUTING MODEL
POST DEVELOPMENT ANALYSIS
OCTOBER 2024

Link Flow: CS-1 [PRELIM]



CAPITAL INVESTMENTS - EDWARDS ROAD
 STORMWATER ROUTING MODEL
100yr ZERO DISCHARGE ANALYSIS
 OCTOBER 2024

Simulation: 100YR-72HR

Scenario: PRELIM
 Run Date/Time: 10/24/2024 2:58:10 PM
 Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	30.0000	0.0500
Max Calculation Time:		15.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

CAPITAL INVESTMENTS - EDWARDS ROAD
STORMWATER ROUTING MODEL
100yr ZERO DISCHARGE ANALYSIS
OCTOBER 2024

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Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight Fact: 0.5 dec

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain Opt: Global

Rainfall Name: ~SFWMD-72

Rainfall Amount: 12.23 in

Storm Duration: 72.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area (1D): 100 ft²

Energy Switch (1D): Energy

Comment:

CAPITAL INVESTMENTS - EDWARDS ROAD
 STORMWATER ROUTING MODEL
 100yr ZERO DISCHARGE ANALYSIS
 OCTOBER 2024

Drop Structure Link: CS-1	Upstream Pipe	Downstream Pipe
Scenario: PRELIM	Invert: 5.00 ft	Invert: 5.00 ft
From Node: TREATMENT	Manning's N: 0.0110	Manning's N: 0.0110
To Node: TEN MILE CREEK	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 2.00 ft	Max Depth: 2.00 ft
Flow Direction: None	Bottom Clip	
Solution: Combine	Default: 0.00 ft	Default: 0.00 ft
Increments: 0	Op Table:	Op Table:
Pipe Count: 1	Ref Node:	Ref Node:
Damping: 0.0000 ft	Manning's N: 0.0000	Manning's N: 0.0000
Length: 250.00 ft	Top Clip	
FHWA Code: 1	Default: 0.00 ft	Default: 0.00 ft
Entr Loss Coef: 0.00	Op Table:	Op Table:
Exit Loss Coef: 1.00	Ref Node:	Ref Node:
Bend Loss Coef: 0.00	Manning's N: 0.0000	Manning's N: 0.0000
Bend Location: 0.00 dec		
Energy Switch: Energy		

Pipe Comment:

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Sharp Crested Vertical	Top Clip
Geometry Type: Circular	Default: 0.00 ft
Invert: 9.00 ft	Op Table:
Control Elevation: 9.00 ft	Ref Node:
Max Depth: 0.33 ft	Discharge Coefficients
	Weir Default: 3.200
	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

CAPITAL INVESTMENTS - EDWARDS ROAD
 STORMWATER ROUTING MODEL
 100yr ZERO DISCHARGE ANALYSIS
 OCTOBER 2024

Weir Comment:

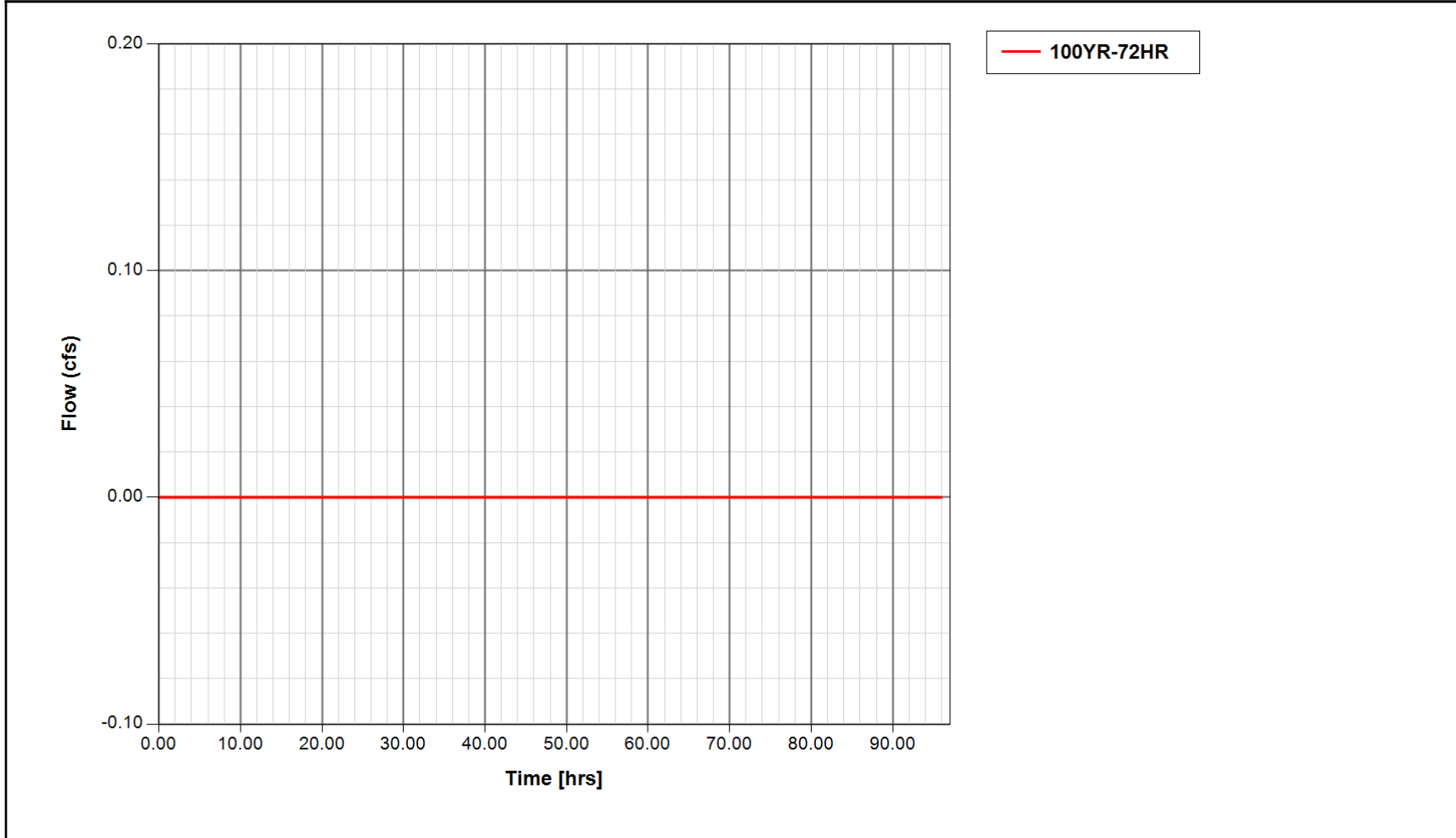
Weir Component	
Weir: 2	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 10.90 ft	Op Table:
Control Elevation: 10.90 ft	Ref Node:
Max Depth: 2.00 ft	Discharge Coefficients
Max Width: 3.00 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment:

Drop Structure Comment:

CAPITAL INVESTMENTS - EDWARDS ROAD
STORMWATER ROUTING MODEL
100yr ZERO DISCHARGE ANALYSIS
OCTOBER 2024

Link Flow: CS-1 [PRELIM]

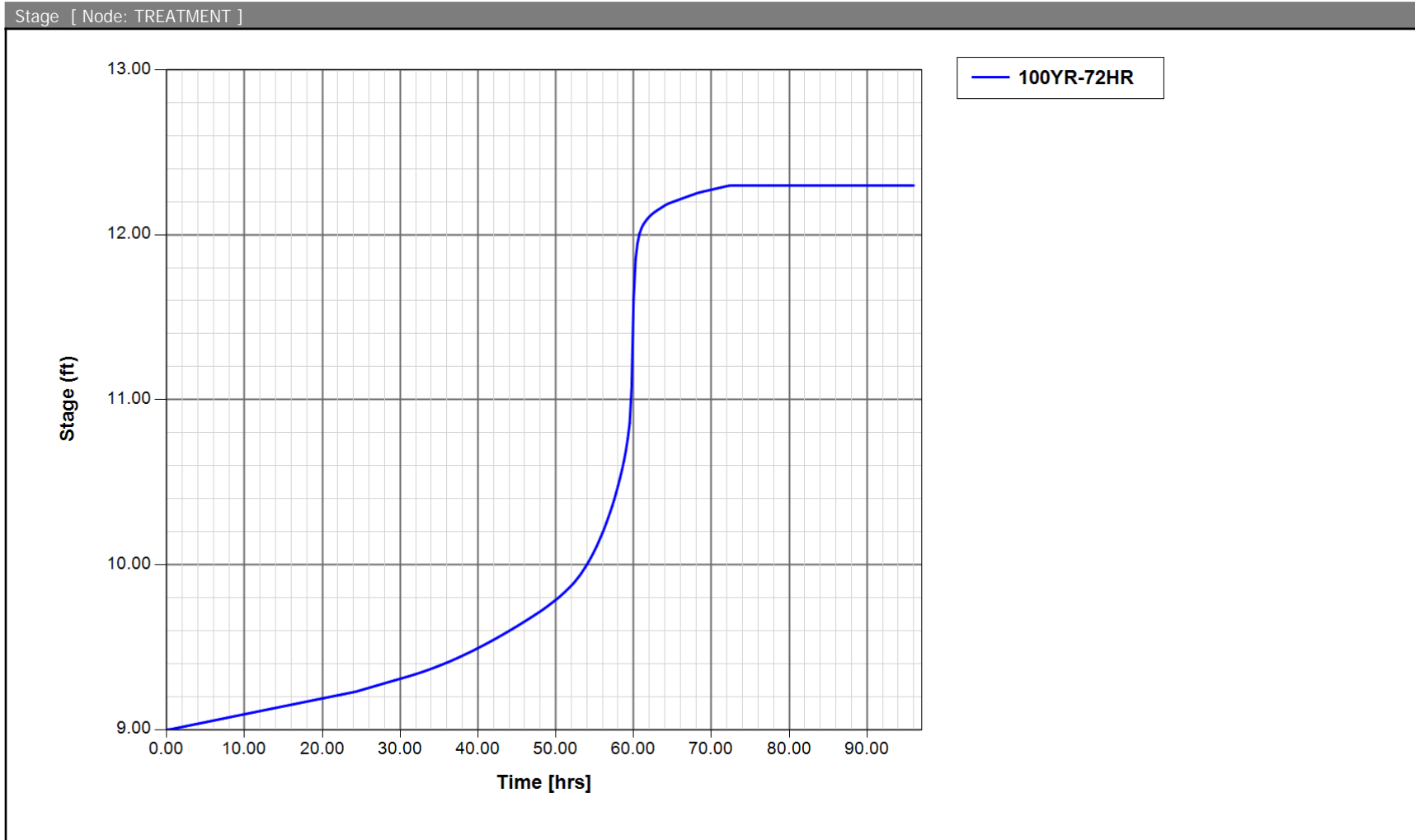


CAPITAL INVESTMENTS - EDWARDS ROAD
STORMWATER ROUTING MODEL
100yr ZERO DISCHARGE ANALYSIS
OCTOBER 2024

Node Max Conditions [PRELIM]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
TREATMENT	100YR-72HR	12.00	12.30	0.0010	49.56	0.00	404259

CAPITAL INVESTMENTS - EDWARDS ROAD
STORMWATER ROUTING MODEL
100yr ZERO DISCHARGE ANALYSIS
OCTOBER 2024



STORMWATER ROUTING MODEL

OUTFALL VOLUME ANALYSIS

OCTOBER 2024

Sim	Node Name	Relative Time [hrs]	Total Inflow Volume [ac_ft]
10YR-72HR	TEN MILE CREEK	0.0000	0.00
10YR-72HR	TEN MILE CREEK	1.0014	0.00
10YR-72HR	TEN MILE CREEK	2.0014	0.00
10YR-72HR	TEN MILE CREEK	3.0014	0.00
10YR-72HR	TEN MILE CREEK	4.0014	0.00
10YR-72HR	TEN MILE CREEK	5.0014	0.00
10YR-72HR	TEN MILE CREEK	6.0014	0.00
10YR-72HR	TEN MILE CREEK	7.0014	0.00
10YR-72HR	TEN MILE CREEK	8.0014	0.00
10YR-72HR	TEN MILE CREEK	9.0014	0.00
10YR-72HR	TEN MILE CREEK	10.0014	0.00
10YR-72HR	TEN MILE CREEK	11.0014	0.00
10YR-72HR	TEN MILE CREEK	12.0014	0.00
10YR-72HR	TEN MILE CREEK	13.0014	0.00
10YR-72HR	TEN MILE CREEK	14.0014	0.01
10YR-72HR	TEN MILE CREEK	15.0014	0.01
10YR-72HR	TEN MILE CREEK	16.0014	0.01
10YR-72HR	TEN MILE CREEK	17.0014	0.01
10YR-72HR	TEN MILE CREEK	18.0014	0.01
10YR-72HR	TEN MILE CREEK	19.0014	0.01
10YR-72HR	TEN MILE CREEK	20.0014	0.02
10YR-72HR	TEN MILE CREEK	21.0014	0.02
10YR-72HR	TEN MILE CREEK	22.0014	0.02
10YR-72HR	TEN MILE CREEK	23.0014	0.02
10YR-72HR	TEN MILE CREEK	24.0014	0.03
10YR-72HR	TEN MILE CREEK	25.0014	0.03
10YR-72HR	TEN MILE CREEK	26.0014	0.03
10YR-72HR	TEN MILE CREEK	27.0014	0.04
10YR-72HR	TEN MILE CREEK	28.0014	0.04
10YR-72HR	TEN MILE CREEK	29.0014	0.04
10YR-72HR	TEN MILE CREEK	30.0014	0.05
10YR-72HR	TEN MILE CREEK	31.0014	0.05
10YR-72HR	TEN MILE CREEK	32.0014	0.06
10YR-72HR	TEN MILE CREEK	33.0014	0.06
10YR-72HR	TEN MILE CREEK	34.0014	0.07
10YR-72HR	TEN MILE CREEK	35.0014	0.07
10YR-72HR	TEN MILE CREEK	36.0014	0.08
10YR-72HR	TEN MILE CREEK	37.0014	0.08
10YR-72HR	TEN MILE CREEK	38.0014	0.09
10YR-72HR	TEN MILE CREEK	39.0014	0.10
10YR-72HR	TEN MILE CREEK	40.0014	0.10

STORMWATER ROUTING MODEL

OUTFALL VOLUME ANALYSIS

OCTOBER 2024

Sim	Node Name	Relative Time [hrs]	Total Inflow Volume [ac_ft]
10YR-72HR	TEN MILE CREEK	41.0014	0.11
10YR-72HR	TEN MILE CREEK	42.0014	0.12
10YR-72HR	TEN MILE CREEK	43.0014	0.12
10YR-72HR	TEN MILE CREEK	44.0014	0.13
10YR-72HR	TEN MILE CREEK	45.0014	0.14
10YR-72HR	TEN MILE CREEK	46.0014	0.14
10YR-72HR	TEN MILE CREEK	47.0014	0.15
10YR-72HR	TEN MILE CREEK	48.0014	0.16
10YR-72HR	TEN MILE CREEK	49.0014	0.17
10YR-72HR	TEN MILE CREEK	50.0014	0.18
10YR-72HR	TEN MILE CREEK	51.0014	0.19
10YR-72HR	TEN MILE CREEK	52.0014	0.20
10YR-72HR	TEN MILE CREEK	53.0014	0.21
10YR-72HR	TEN MILE CREEK	54.0014	0.22
10YR-72HR	TEN MILE CREEK	55.0014	0.23
10YR-72HR	TEN MILE CREEK	56.0014	0.25
10YR-72HR	TEN MILE CREEK	57.0014	0.27
10YR-72HR	TEN MILE CREEK	58.0014	0.29
10YR-72HR	TEN MILE CREEK	59.0014	0.31
10YR-72HR	TEN MILE CREEK	60.0003	0.34
10YR-72HR	TEN MILE CREEK	61.0032	0.43
10YR-72HR	TEN MILE CREEK	62.0032	0.71
10YR-72HR	TEN MILE CREEK	63.0032	0.95
10YR-72HR	TEN MILE CREEK	64.0032	1.13
10YR-72HR	TEN MILE CREEK	65.0032	1.28
10YR-72HR	TEN MILE CREEK	66.0032	1.39
10YR-72HR	TEN MILE CREEK	67.0032	1.49
10YR-72HR	TEN MILE CREEK	68.0032	1.59
10YR-72HR	TEN MILE CREEK	69.0032	1.67
10YR-72HR	TEN MILE CREEK	70.0032	1.75
10YR-72HR	TEN MILE CREEK	71.0032	1.82
10YR-72HR	TEN MILE CREEK	72.0032	1.88
10YR-72HR	TEN MILE CREEK	73.0032	1.94
10YR-72HR	TEN MILE CREEK	74.0032	1.99
10YR-72HR	TEN MILE CREEK	75.0032	2.03
10YR-72HR	TEN MILE CREEK	76.0032	2.07
10YR-72HR	TEN MILE CREEK	77.0032	2.12
10YR-72HR	TEN MILE CREEK	78.0032	2.16
10YR-72HR	TEN MILE CREEK	79.0032	2.20
10YR-72HR	TEN MILE CREEK	80.0032	2.25
10YR-72HR	TEN MILE CREEK	81.0032	2.29

STORMWATER ROUTING MODEL

OUTFALL VOLUME ANALYSIS

OCTOBER 2024

Sim	Node Name	Relative Time [hrs]	Total Inflow Volume [ac_ft]
10YR-72HR	TEN MILE CREEK	82.0032	2.33
10YR-72HR	TEN MILE CREEK	83.0032	2.37
10YR-72HR	TEN MILE CREEK	84.0032	2.41
10YR-72HR	TEN MILE CREEK	85.0032	2.45
10YR-72HR	TEN MILE CREEK	86.0032	2.49
10YR-72HR	TEN MILE CREEK	87.0032	2.53
10YR-72HR	TEN MILE CREEK	88.0032	2.57
10YR-72HR	TEN MILE CREEK	89.0032	2.61
10YR-72HR	TEN MILE CREEK	90.0032	2.64
10YR-72HR	TEN MILE CREEK	91.0032	2.68
10YR-72HR	TEN MILE CREEK	92.0032	2.72
10YR-72HR	TEN MILE CREEK	93.0032	2.76
10YR-72HR	TEN MILE CREEK	94.0032	2.79
10YR-72HR	TEN MILE CREEK	95.0032	2.83
10YR-72HR	TEN MILE CREEK	96.0032	2.86
10YR-72HR	TEN MILE CREEK	97.0032	2.90
10YR-72HR	TEN MILE CREEK	98.0032	2.93
10YR-72HR	TEN MILE CREEK	99.0032	2.97
10YR-72HR	TEN MILE CREEK	100.0032	3.00
10YR-72HR	TEN MILE CREEK	101.0032	3.03
10YR-72HR	TEN MILE CREEK	102.0032	3.06
10YR-72HR	TEN MILE CREEK	103.0032	3.10
10YR-72HR	TEN MILE CREEK	104.0032	3.13
10YR-72HR	TEN MILE CREEK	105.0032	3.16
10YR-72HR	TEN MILE CREEK	106.0032	3.19
10YR-72HR	TEN MILE CREEK	107.0032	3.22
10YR-72HR	TEN MILE CREEK	108.0032	3.25
10YR-72HR	TEN MILE CREEK	109.0032	3.28
10YR-72HR	TEN MILE CREEK	110.0032	3.31
10YR-72HR	TEN MILE CREEK	111.0032	3.34
10YR-72HR	TEN MILE CREEK	112.0032	3.36
10YR-72HR	TEN MILE CREEK	113.0032	3.39
10YR-72HR	TEN MILE CREEK	114.0032	3.42
10YR-72HR	TEN MILE CREEK	115.0032	3.44
10YR-72HR	TEN MILE CREEK	116.0032	3.47
10YR-72HR	TEN MILE CREEK	117.0032	3.49
10YR-72HR	TEN MILE CREEK	118.0032	3.52
10YR-72HR	TEN MILE CREEK	119.0032	3.54
10YR-72HR	TEN MILE CREEK	120.0032	3.57
10YR-72HR	TEN MILE CREEK	121.0032	3.59
10YR-72HR	TEN MILE CREEK	122.0032	3.61

STORMWATER ROUTING MODEL

OUTFALL VOLUME ANALYSIS

OCTOBER 2024

Sim	Node Name	Relative Time [hrs]	Total Inflow Volume [ac_ft]
10YR-72HR	TEN MILE CREEK	123.0032	3.63
10YR-72HR	TEN MILE CREEK	124.0032	3.65
10YR-72HR	TEN MILE CREEK	125.0032	3.67
10YR-72HR	TEN MILE CREEK	126.0032	3.69
10YR-72HR	TEN MILE CREEK	127.0032	3.71
10YR-72HR	TEN MILE CREEK	128.0032	3.73
10YR-72HR	TEN MILE CREEK	129.0032	3.75
10YR-72HR	TEN MILE CREEK	130.0032	3.77
10YR-72HR	TEN MILE CREEK	131.0032	3.79
10YR-72HR	TEN MILE CREEK	132.0032	3.80
10YR-72HR	TEN MILE CREEK	133.0032	3.82
10YR-72HR	TEN MILE CREEK	134.0032	3.83
10YR-72HR	TEN MILE CREEK	135.0032	3.85
10YR-72HR	TEN MILE CREEK	136.0032	3.86
10YR-72HR	TEN MILE CREEK	137.0032	3.87
10YR-72HR	TEN MILE CREEK	138.0032	3.89
10YR-72HR	TEN MILE CREEK	139.0032	3.90
10YR-72HR	TEN MILE CREEK	140.0032	3.91
10YR-72HR	TEN MILE CREEK	141.0032	3.92
10YR-72HR	TEN MILE CREEK	142.0032	3.93
10YR-72HR	TEN MILE CREEK	143.0032	3.94
10YR-72HR	TEN MILE CREEK	144.0032	3.95

**PRELIMINARY
BMP TRAINS NUTRIENT LOADING
MODEL**

FOR

INDRIO POINTE

Single Family Residential Development

INDIAN RIVER COUNTY, FLORIDA

October 2024

BMPTRAINS Complete Report Ver 4.3.2

Project: CAPITAL – EDWARDS

Date: 10/25/2024 8:32:10 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	COMBINED
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	56.00

Pre-Condition Landuse Information

Landuse	Undeveloped - Mesic Flatwoods: TN=1.09 TP=0.043
Area (acres)	13.70
Rational Coefficient (0-1)	0.09
Non DCIA Curve Number	77.00
DCIA Percent (0-100)	0.00
Nitrogen EMC (mg/l)	1.090
Phosphorus EMC (mg/l)	0.043
Runoff Volume (ac-ft/yr)	5.869
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	7.888
Phosphorus Loading (kg/yr)	0.311

Post-Condition Landuse Information

Landuse	Single-Family: TN=2.070 TP=0.327
Area (acres)	13.70
Rational Coefficient (0-1)	0.15
Non DCIA Curve Number	60.00
DCIA Percent (0-100)	15.45
Wet Pond Area (ac)	1.00
Nitrogen EMC (mg/l)	2.070
Phosphorus EMC (mg/l)	0.327
Runoff Volume (ac-ft/yr)	8.920
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	22.767
Phosphorus Loading (kg/yr)	3.597

Catchment Number: 1 Name: COMBINED

Project: CAPITAL – EDWARDS

Date: 10/25/2024

Multiple BMP in Series Design Parameters

BMP in Series Number: 1

BMP Type: Retention

Retention Depth (in) 0.192

Retention Volume (ac-ft) 0.203

BMP in Series Number: 2

BMP Type: Wet Detention

Permanent Pool Volume (ac-ft) 7.770

Permanent Pool Volume (ac-ft) for 31 days residence 0.758

Annual Residence Time (days) 318

Littoral Zone Efficiency Credit

Wetland Efficiency Credit

BMP in Series Number: 3

BMP Type: None

BMP in Series Number: 4

BMP Type: None

Watershed Characteristics

Catchment Area (acres) 13.70

Contributing Area (acres) 12.700

Non-DCIA Curve Number 60.00

DCIA Percent 15.45

Rainfall Zone Florida Zone 2

Rainfall (in) 56.00

Surface Water Discharge

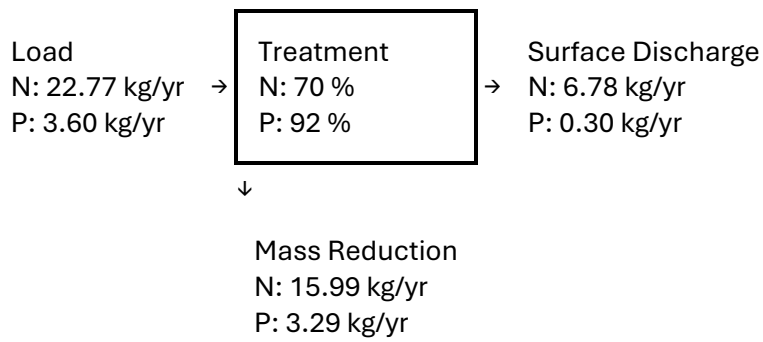
Required TN Treatment Efficiency (%) 65

Provided TN Treatment Efficiency (%) 70

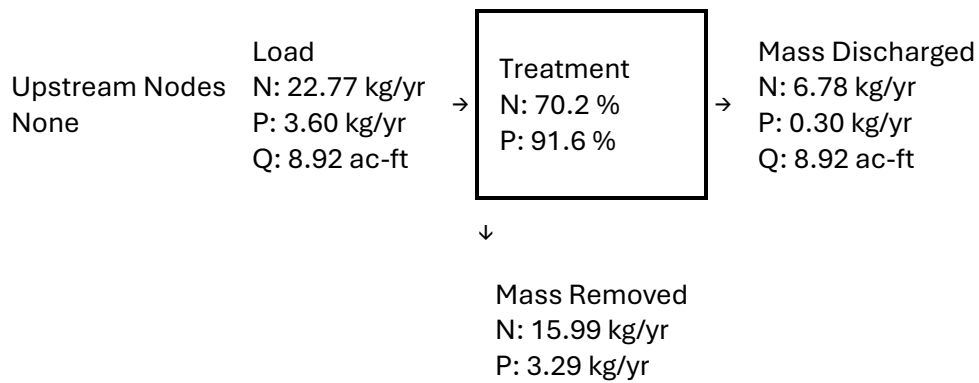
Required TP Treatment Efficiency (%) 91

Provided TP Treatment Efficiency (%) 92

Load for Multiple BMP in Series



Load Diagram for Multiple BMP (As Used In Routing)



Summary Treatment Report Version: 4.3.2

Project: CAPITAL - EDWARDS

Date:10/25/2024

Analysis Type: Net Improvement

BMP Types:

Catchment 1 - (COMBINED) Multiple BMP

Based on % removal values to the nearest percent

Routing Summary

Catchment 1 Routed to Outlet

Total nitrogen target removal met? **Yes**

Total phosphorus target removal met? **Yes**

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	7.89 kg/yr	
Total N post load	22.77 kg/yr	
Target N load reduction	65 %	
Target N discharge load	7.89 kg/yr	
Percent N load reduction	70 %	
Provided N discharge load	6.78 kg/yr	14.95 lb/yr
Provided N load removed	15.99 kg/yr	35.25 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	.311 kg/yr	
Total P post load	3.597 kg/yr	
Target P load reduction	91 %	
Target P discharge load	.311 kg/yr	
Percent P load reduction	92 %	
Provided P discharge load	.303 kg/yr	.67 lb/yr
Provided P load removed	3.294 kg/yr	7.263 lb/yr

**PRELIMINARY
BASIN CHARACTERISTICS
& SWM CALCULATIONS**

FOR

INDRIO POINTE

Single Family Residential Development

INDIAN RIVER COUNTY, FLORIDA

October 2024

Drainage Calculations - Area Take-Offs

Proposed Site Data

Area	SF	AC	%
Parcel Area	765,870	17.58	128.31
Offsite Tributary	0	0.00	0.00
Conservation Area	168,960	3.88	28.31
Right-of-Way Dedication	0	0.00	0.00
Drainage Area	596,910	13.70	100.00

Impervious Areas:

Vehicle Use Areas	84,595	1.94	14.17
Structures (Roofs)	100,234	2.30	16.79
Sidewalks & Paths	33,315	0.76	5.58
Other Pavement	38,162	0.88	6.39
Dry Pond Base	0	0.00	0.00
Wet SWM Areas	43,380	1.00	7.27
Total Impervious	299,686	6.88	50.21

Pervious Area:

Swale Base	7,380	0.17	1.24
Swale Banks	7,350	0.17	1.23
Wet Detention Banks	10,440	0.24	1.75
Open Green Space	272,054	6.25	45.58
Total Pervious	297,224	6.82	49.79

Soil Storage

Wet Season
 Water Table Elevation = 9.00 NAVD
 Avg. Grade Elevation = 12.0 NAVD
 Depth to Wet Season W.T. = 3.0 FT

Soil Storage - Reference SFWMD Permit Manual Vol IV						
Depth to W.T. (ft)	Coastal (1)		Flatwoods (2)		Depression (3)	
	Storage (in)	CN	Storage (in)	CN	Storage (in)	CN
1.0	0.6	94	0.6	94	0.6	94
1.5	1.6	87	1.6	87	1.4	88
2.0	2.5	80	2.5	80	2.1	83
2.5	4.6	70	4.0	72	3.3	76
3.0	6.6	60	5.4	65	4.4	69
3.5	8.8	54	7.2	59	5.6	65
4.0	10.9	48	9.0	53	6.8	60

Soil Storage = 5.4 inches
 Soil Moisture Storage, S = (0.75)(% Pervious)(Soil Storage)
 S = 2.02 inches

Stage Storage Calculations - Wet Detention Pond

SITE DATA/GRADING TABLE

DESCRIPTION	AREA (ACRE)	GRADING		REMARKS
		From	To	
DT BOT	0.996	9.00	12.00	VERTICAL
DT BANK	0.240	9.00	12.00	LINEAR
LME	0.400	12.00	12.50	LINEAR
0.64				

DETENTION POND - STAGE-AREA/STORAGE TABLE

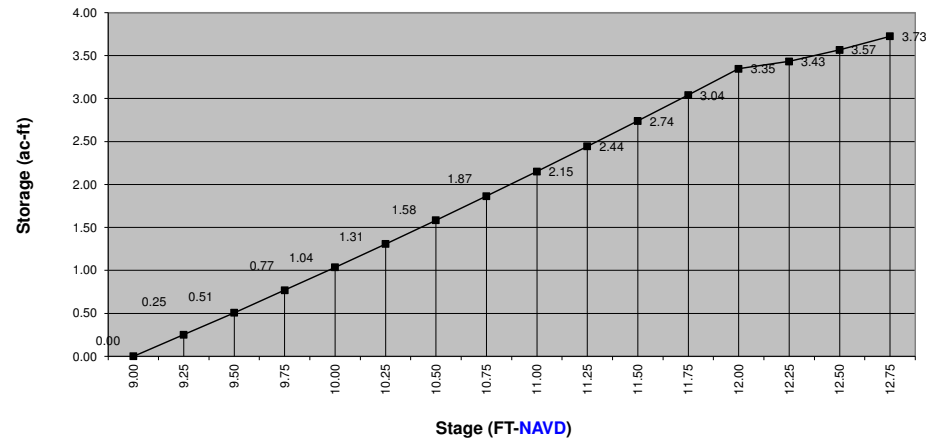
STAGE (feet)	AREA			TOTAL	STORAGE VOLUME (ACFT)	STAGE (feet)
	DT BOT	DT BANK	LME			
9.00	0.996	0.000	0.000	1.00	0.00	9.00
9.25	0.996	0.020	0.000	1.02	0.25	9.25
9.50	0.996	0.040	0.000	1.04	0.51	9.50
9.75	0.996	0.060	0.000	1.06	0.77	9.75
10.00	0.996	0.080	0.000	1.08	1.04	10.00
10.25	0.996	0.100	0.000	1.10	1.31	10.25
10.50	0.996	0.120	0.000	1.12	1.58	10.50
10.75	0.996	0.140	0.000	1.14	1.87	10.75
11.00	0.996	0.160	0.000	1.16	2.15	11.00
11.25	0.996	0.180	0.000	1.18	2.44	11.25
11.50	0.996	0.200	0.000	1.20	2.74	11.50
11.75	0.996	0.220	0.000	1.22	3.04	11.75
12.00	0.996	0.240	0.000	1.24	3.35	12.00
12.25	0.000	0.240	0.200	0.44	3.43	12.25
12.50	0.000	0.240	0.400	0.64	3.57	12.50
12.75	0.000	0.240	0.400	0.64	3.73	12.75
13.00	0.000	0.240	0.400	0.64	3.89	13.00
13.25	0.000	0.240	0.400	0.64	4.05	13.25
13.50	0.000	0.240	0.400	0.64	4.21	13.50
13.75	0.000	0.240	0.400	0.64	4.37	13.75
14.00	0.000	0.240	0.400	0.64	4.53	14.00
14.25	0.000	0.240	0.400	0.64	4.69	14.25
14.50	0.000	0.240	0.400	0.64	4.85	14.50
14.75	0.000	0.240	0.400	0.64	5.01	14.75
15.00	0.000	0.240	0.400	0.64	5.17	15.00
15.25	0.000	0.240	0.400	0.64	5.33	15.25
15.50	0.000	0.240	0.400	0.64	5.49	15.50
15.75	0.000	0.240	0.400	0.64	5.65	15.75
16.00	0.000	0.240	0.400	0.64	5.81	16.00

MEAN DEPTH OF PONDS

ELEVATION	AREA (sqft)	AVERAGE	VOLUME	Σ VOLUME
-1	21330	0	.	0.000
7	36860	29095	232760	5.343
9	43380	40120	80240	7.185

AREA OF POND AT PERMANENT POOL ELEVATION = 0.996 AC
 PERMANENT POOL VOLUME = 7.185 ACFT
 MEAN POND DEPTH = 7.215 FT

Stage - Storage



STAGE STORAGE CALCULATIONS - POST BASIN

SITE DATA/GRADING TABLE

DESCRIPTION	AREA (ACRE)	GRADING		REMARKS
		From	To	
WET DT	1.00	9.00	12.00	VERTICAL
WET DT BANK	0.24	9.00	12.00	LINEAR
DRY RT	0.169	10.00	12.00	VERTICAL
DRY RT BANK	0.169	10.00	12.00	LINEAR

1.57

RETENTION POND - STAGE-AREA/STORAGE TABLE

STAGE (FT)	AREAS			STORAGE VOLUME (ACFT)	STAGE (FT)
	DRY RT	DRY RT BANK	TOTAL		
10.00	0.17	0.00	0.17	0.000	10.00
10.25	0.17	0.02	0.19	0.045	10.25
10.50	0.17	0.04	0.21	0.095	10.50
10.75	0.17	0.06	0.23	0.151	10.75
11.00	0.17	0.08	0.25	0.212	11.00
11.25	0.17	0.11	0.27	0.278	11.25
11.50	0.17	0.13	0.30	0.349	11.50
11.75	0.17	0.15	0.32	0.426	11.75
12.00	0.17	0.17	0.34	0.508	12.00
12.25	0.17	0.17	0.34	0.592	12.25
12.50	0.17	0.17	0.34	0.677	12.50
12.75	0.17	0.17	0.34	0.761	12.75
13.00	0.17	0.17	0.34	0.846	13.00
13.25	0.17	0.17	0.34	0.930	13.25
13.50	0.17	0.17	0.34	1.015	13.50
13.75	0.17	0.17	0.34	1.099	13.75
14.00	0.17	0.17	0.34	1.184	14.00
14.25	0.17	0.17	0.34	1.268	14.25
14.50	0.17	0.17	0.34	1.353	14.50
14.75	0.17	0.17	0.34	1.438	14.75
15.00	0.17	0.17	0.34	1.522	15.00
15.25	0.17	0.17	0.34	1.607	15.25
15.50	0.17	0.17	0.34	1.691	15.50
15.75	0.17	0.17	0.34	1.776	15.75
16.00	0.17	0.17	0.34	1.860	16.00
16.25	0.17	0.17	0.34	1.945	16.25
16.50	0.17	0.17	0.34	2.029	16.50
16.75	0.17	0.17	0.34	2.114	16.75
17.00	0.17	0.17	0.34	2.198	17.00

WATER QUALITY VOLUME = 1.713 ACFT

1.71 ACFT COORESPONDS TO AN ELEVATION OF **10.61** 10.50 10.75
1.58 1.87

NUTRIENT ABATEMENT VOLUME = 0.200 ACFT

0.2 ACFT COORESPONDS TO AN ELEVATION OF **10.95** 10.75 11.00
0.15 0.21

DETENTION POND - STAGE-AREA/STORAGE TABLE

STAGE (FT)	AREAS			STORAGE VOLUME (ACFT)	STAGE (FT)
	WET DT	WET DT BANK	TOTAL		
9.00	1.00	0.00	1.00	0.000	9.00
9.25	1.00	0.02	1.02	0.251	9.25
9.50	1.00	0.04	1.04	0.508	9.50
9.75	1.00	0.06	1.06	0.769	9.75
10.00	1.00	0.08	1.08	1.036	10.00
10.25	1.00	0.10	1.10	1.307	10.25
10.50	1.00	0.12	1.12	1.584	10.50
10.75	1.00	0.14	1.14	1.865	10.75
11.00	1.00	0.16	1.16	2.152	11.00
11.25	1.00	0.18	1.18	2.443	11.25
11.50	1.00	0.20	1.20	2.739	11.50
11.75	1.00	0.22	1.22	3.041	11.75
12.00	1.00	0.24	1.24	3.347	12.00
12.25	1.00	0.24	1.24	3.656	12.25
12.50	1.00	0.24	1.24	3.965	12.50
12.75	1.00	0.24	1.24	4.274	12.75
13.00	1.00	0.24	1.24	4.583	13.00
13.25	1.00	0.24	1.24	4.892	13.25
13.50	1.00	0.24	1.24	5.200	13.50
13.75	1.00	0.24	1.24	5.509	13.75
14.00	1.00	0.24	1.24	5.818	14.00
14.25	1.00	0.24	1.24	6.127	14.25
14.50	1.00	0.24	1.24	6.436	14.50
14.75	1.00	0.24	1.24	6.745	14.75
15.00	1.00	0.24	1.24	7.054	15.00
15.25	1.00	0.24	1.24	7.363	15.25
15.50	1.00	0.24	1.24	7.671	15.50
15.75	1.00	0.24	1.24	7.980	15.75
16.00	1.00	0.24	1.24	8.289	16.00

Basin Routing Model Data & Calculations

"POST DEV COMBINED" DRAINAGE BASIN CHARACTERISTICS

SITE DATA (CURVE NUMBER) PRE-CONDITION BASIN

GROUND COVER (CONDITION)	SOIL GROUP	AREA (ACRES)	%	CN	AREA x CN
DRAINAGE AREA - NON DCIA		11.59			
PAVEMENT	C/D	0.00	0.0%	98	0
STRUCTURES	C/D	2.30	16.8%	98	226
OTHER IMPERVIOUS	C/D	1.47	10.7%	98	144
WET SWM AREAS	C/D	1.00	7.3%	98	98
DRY RETENTION BOTTOM	C/D	0.00	0.0%	39	0
PERVIOUS AREA	C/D	6.82	49.8%	39	266
TOTAL		11.59	84.5%		63

SITE DATA (AREAS BREAKDOWN)

ONSITE AREA	17.58 AC-ft		765,870 sqft
OFFSITE TRIBUTARY	0.00 AC-ft		0 sqft
CONSERVATION AREAS	3.88 AC-ft		168,960 sqft
RIGHT-OF-WAY DEDICATION	0.00 AC-ft		0 sqft
BASIN TOTAL	13.70 AC-ft		596,910 sqft
DCIA	2.12 AC-ft		92227.4 sqft
% DCIA			
TOTAL IMPERVIOUS AREA	6.88 AC-ft		
VEHICLE USE AREA =	1.94 AC-ft	100.00%	84,595 sqft
STRUCTURES =	2.30 AC-ft	0.00%	100,234 sqft
SIDEWALKS & PATHS =	0.76 AC-ft	0.00%	33,315 sqft
OTHER IMPERVIOUS =	0.88 AC-ft	20.00%	38,162 sqft
DRY RETENTION BOTTOM =	0.00 AC-ft	0.00%	0 sqft
WET SWM AREAS =	1.00 AC-ft	0.00%	43,380 sqft
TOTAL PERVIOUS AREA	6.82 AC-ft		
SWALE BASE =	0.17 AC-ft		7,380 sqft
SWALE BANKS =	0.17 AC-ft		7,350 sqft
WET DETENTION BANKS =	0.24 AC-ft		10,440 sqft
GREEN SPACE =	6.25 AC-ft		272,054 sqft
IMPERVIOUS AREA LESS ROOFS/WETLANDS =	1.94 AC-ft		
IMPERVIOUS AREA LESS WET SWM AREAS =	5.88 AC-ft		256306 sqft
DRAINAGE AREA LESS WET DETENTION =	17.58 AC-ft		
PERCENTAGE IMPERVIOUS =	50.21%		
DIRECTLY CONNECTED IMPERVIOUS AREA =	15.45%		

RUNOFF

Adjusted for Directly Connected Impervious Area (DCIA)

FREQUENCY, YR.	10-YR, 24-HR.	10-YR, 72-HR.	25-YR, 72-HR.	100-YR, 72-HR.
RAINFALL, P (24-HOUR)	6.00 inches	9.50 inches	10.00 inches	12.00 inches
SOIL STORAGE, S	5.81 inches	5.81 inches	5.81 inches	5.81 inches
RUNOFF, Q (IN)	2.20 inches	4.91 inches	5.33 inches	7.06 inches
RUNOFF VOLUME (ACFT)	3.18 AC-ft	6.42 AC-ft	6.91 AC-ft	8.93 AC-ft

RATIONAL METHOD RUNOFF COEFFICIENT = 0.38
(ASSUMING IMPERVIOUS = 0.9 & PERVIOUS = 0.2 & EXCLUDES LAKE AREA)

TIME OF CONCENTRATION

2YR-24HR RAINFALL = 4.80 inches

Sub-Area	FLOW LEGNTH (ft)	SLOPE (ft/ft)	MANNING'S DESC.	n-VALUE	FLOW AREA (sf)	PW (ft)	HYDRO RADIUS (ft)	TRAVEL VELOCITY (ft/sec)	TIME (hr)
BASIN ONE									
SHEET	100	0.0040	GRASS	0.240					0.1932
SHALLOW	200	0.0040	UNPAVED					1.020	0.0544
CHANNEL	0	0.0100	POOR	0.080	4.000	16.000	0.250	0.736	0.0000
PIPED	150	0.0050	18-inch	0.013	1.767	4.712	0.750	6.684	0.0062

Time of Concentration = 0.254 hours
= 15 minutes

Stage Storage Calculations - "POST DEV COMBINED" Developed Basin

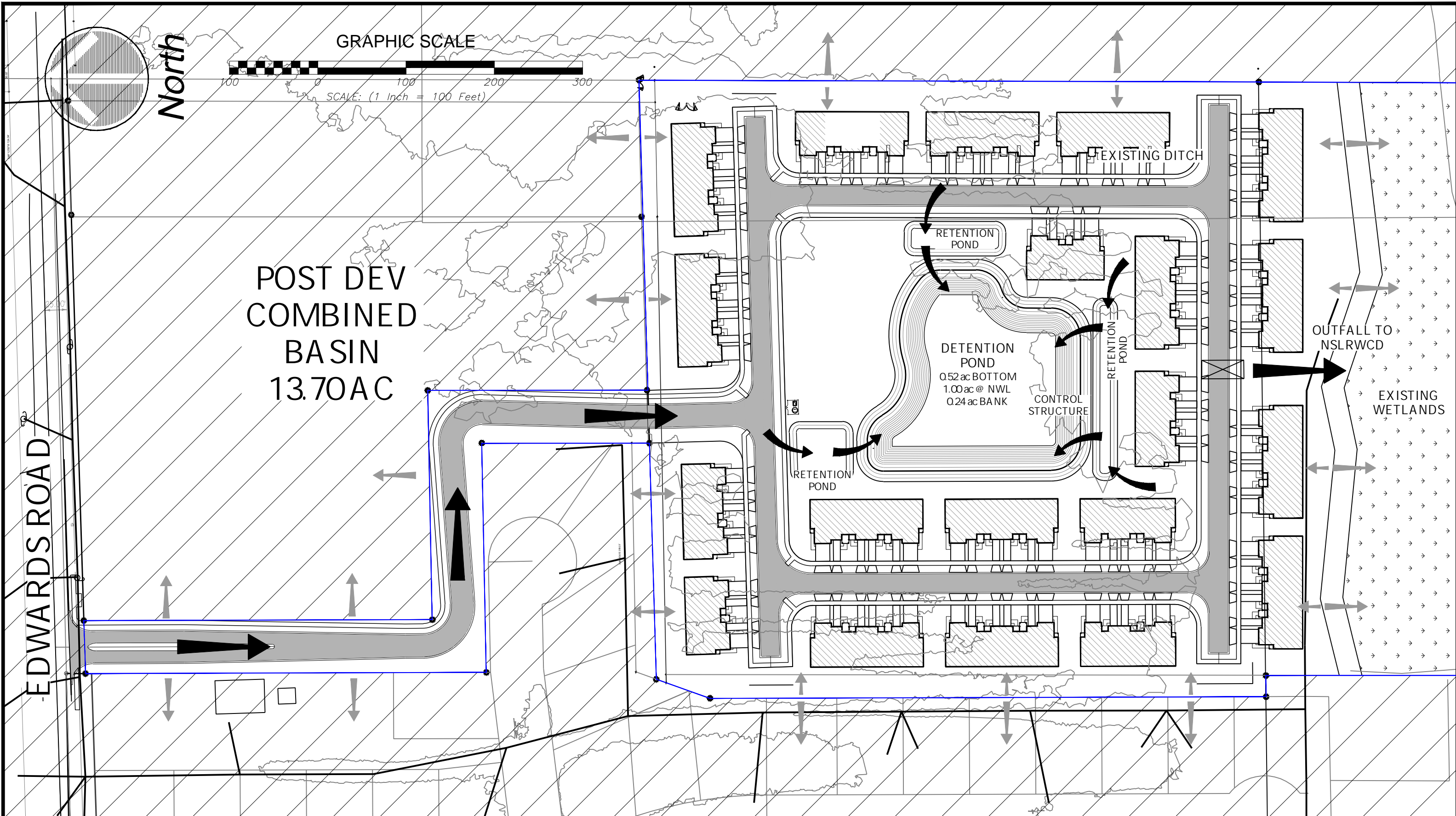
SITE DATA/GRADING TABLE

DESCRIPTION	AREA (ACRE)	GRADING		REMARKS
		From	To	
DT CTRL	0.996	9.00	12.00	VERTICAL
DT BANK	0.240	9.00	12.00	LINEAR
RT BOT	0.169	10.00	12.00	VERTICAL
RT BANK	0.169	10.00	12.00	LINEAR
ROW	2.720	11.50	12.25	LINEAR
OPEN	6.246	11.50	12.50	LINEAR
OTHER	0.000	9.00	12.00	LINEAR

10.54

STAGE-AREA/STORAGE TABLE

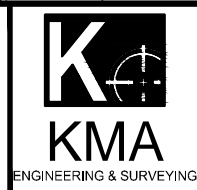
STAGE (feet)	AREAS							TOTAL	STORAGE VOLUME (ACFT)	STAGE (feet)
	DT CTRL	DT BANK	RT BOT	RT BANK	ROW	OPEN	OTHER			
9.00	0.996	0.000	0.000	0.000	0.000	0.000	0.000	1.00	0.00	9.00
9.25	0.996	0.020	0.000	0.000	0.000	0.000	0.000	1.02	0.25	9.25
9.50	0.996	0.040	0.000	0.000	0.000	0.000	0.000	1.04	0.51	9.50
9.75	0.996	0.060	0.000	0.000	0.000	0.000	0.000	1.06	0.77	9.75
10.00	0.996	0.080	0.169	0.000	0.000	0.000	0.000	1.25	1.06	10.00
10.25	0.996	0.100	0.169	0.021	0.000	0.000	0.000	1.29	1.37	10.25
10.50	0.996	0.120	0.169	0.042	0.000	0.000	0.000	1.33	1.70	10.50
10.75	0.996	0.140	0.169	0.063	0.000	0.000	0.000	1.37	2.04	10.75
11.00	0.996	0.160	0.169	0.084	0.000	0.000	0.000	1.41	2.38	11.00
11.25	0.996	0.180	0.169	0.105	0.000	0.000	0.000	1.45	2.74	11.25
11.50	0.996	0.200	0.169	0.127	0.000	0.000	0.000	1.49	3.11	11.50
11.75	0.996	0.220	0.169	0.148	0.907	1.561	0.000	4.00	3.80	11.75
12.00	0.996	0.240	0.169	0.169	1.813	3.123	0.000	6.51	5.11	12.00
12.25	0.996	0.240	0.169	0.169	2.720	4.684	0.000	8.98	7.05	12.25
12.50	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	9.49	12.50
12.75	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	12.12	12.75
13.00	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	14.76	13.00
13.25	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	17.39	13.25
13.50	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	20.02	13.50
13.75	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	22.66	13.75
14.00	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	25.29	14.00
14.25	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	27.93	14.25
14.50	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	30.56	14.50
14.75	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	33.20	14.75
15.00	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	35.83	15.00
15.25	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	38.47	15.25
15.50	0.996	0.240	0.169	0.169	2.720	6.246	0.000	10.54	41.10	15.50



DRAWING NAME	BASIN MAPS.dwg
DESIGN/DRAWN	BRB/PMP
SCALE	AS NOTED
DATE	10-25-2024
REVISION	

**POST DEVELOPMENT
DRAINAGE BASIN MAP**

CAPITAL INVESTMENTS
Multi-Family Residential
St Lucie County, Florida



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CERTIFICATE OF AUTHORIZATION NUMBER -00033705