Drainage Calculations for
SFWMD and City of Orlando

Hope Center West

(3032 Monte Carlo Trail
Orlando, FL 32805)

I hereby certify that to the best of my knowledge and belief, the design of the Stormwater Management System for the project known as: Princess Way Multifamily meets all of the requirements and has been designed substantially in accordance with City of Orlando Stormwater Management Criteria and SFWMD.

This item has been electronically signed and sealed by Gregory T. Chatelain, PE on the time & date stamp shown using digital signature. Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.

Digitally signed by Gregory T Chatelain
Date: 2024.11.20 10:54:32 -05'00'

Prepared by:

Gregory T. Chatelain, P.E.
November 2024

Gregory T. Chatelain, P.E.
FL P.E. # 90573

APPENDICES

STORM EVENTS
25YR/24HR
100 YR/72HR

INPUT REPORT
HYDROGRAPHS
ROUTING REPORTS

1 SUMMARY

The proposed Hope Center West Townhome Development is located in the area surrounded by Piedmont St. to the north, S. Goldwyn Ave to the west, Monte Carlo Trail to the south, and S. John Young Parkway to the east. The existing stormwater pond system consisting of 2 ponds was designed to take runoff from S. John Young Parkway and Piedmont St. This project is proposing combining the 2 ponds with the proposed stormwater pond to treat the proposed development all into 1 pond to consolidate the stormwater ponds to treat the stormwater runoff, while taking up the least amount of area.

The site currently consists of several single-family residences, a church and a small multifamily development. The existing stormwater pond receives stormwater from a section of John Young Parkway and Piedmont St. Due to the proposed multifamily development, a wet detention pond will be required. The water will sheet flow over the pavement to the pond through inlets. All water from the proposed development will be treated by the wet pond. A section of John Young Parkway and Piedmont St. will also discharge into the stormwater pond. A discharge structure will be installed in the pond and will discharge to the existing pipe of Piedmont St. which currently discharges to the west to a catch basin on S. Goldwyn which discharges to lake Mann. The proposed pond will discharge at a rate less than the pre-development rate, which is demonstrated in Section 1.5 of this report.

1.1 Existing Drainage

The pre-development model includes all basins within the project area. John Young roadway and Piedmont are included, since they flow into ponds SD-1 and SD-2. The basins shown on the pre-development map in Appendix A correlate to the Basin areas in the John Young drainage report where possible. Pre-development flow rates, basins, and flow paths of water were obtained from the drainage calculations for John Young Parkway, City Project 3400, State Project 75190-3504. The existing John Young Parkway basin map is included in Appendix A. The pre-development flows are summarized in Table 1. Basin information and nodal diagrams for the existing condition are included in Appendices B and D. Pre-development areas were determined by correlating the areas given in the CN calculations with the areas shown on the Basin Map in the John Young Parkway report. The corresponding FDOT basin data is included as supporting data in Appendix B. Furthermore, an additional basin B2A was modeled in ICPR, since the southwest section of the project area was not included in the report, since it drained west towards Goldwyn Ave. Basin B2 was also modeled in ICPR, since the 0.66-acre area to the south of Monte Carlo is not included in the post-development model. Therefore, only the 2.71-acre area north of Monte Carlo was included in the calculation for Basin B2.

In the existing condition the RDWAY Basin (John Young Parkway) and Piedmont discharge to Basin SD1 and SD2. The pond then discharges to the Piedmont right of way through a control structure which drains to Goldwyn then Lake Mann. Basins B4 and B2 flow to the west to the Goldwyn ROW to Lake Mann and do not flow to Ponds SD1 and SD2. Basin B2A flows to Goldwyn via Monte Carlo. The existing conditions consist of the areas shown in Table 1 which were taken from the John Young Report and modeled in ICPR as needed. The pre-development areas are shown in Appendix A.

The entire site area is 20.81 Acres including FDOT and Piedmont right of ways. Basins 2 and 2A drain to Monte Carlo then t the west to Lake Goldwyn, then to Lake Mann. Basin 4 drains into swales and storm drains in the Piedmont right of way then to Goldwyn which outfalls into

Lake Mann. Basin 4 does not enter the stormwater ponds SD1 and SD2. The Piedmont St. Pavement and right of way and a section of right of way on John Young Parkway drain into Basins SD1 and SD2. SD2 overflows into the Piedmont right of way to Goldwyn which discharges to Lake Mann through 24" and 30" pipes in the right of way.

In the existing condition for the 25 year/24 hour storm, the total discharge from Ponds SD-1 and SD-2 along with Basins 2, 2A, and 4 is 26.36 cfs. FDOT and Piedmont flow into the ponds SD1 then to SD2, so the flows in Piedmont and John Young roadway are not included in the total, since the combined flows of Piedmont, John Young RDWAY, SD1, and SD2 will be attenuated int eh pond and the only discharge will be that from the discharge structure in Pond SD2. Basins B2, 2A, and 4 bypass the ponds with a final destination of Lake Mann, so those flows are included in the total. The 25 year/24 hour storm was used, since the original report from John Young Parkway used 25 year 24 hour as the design storm for pre vs. post discharge. In the proposed condition the allowable discharge for the 25yr/24hr storm event will be 26.36 cfs.

Table 1:Existing Basin Summary Table

Basin	Pre Project RDWAY	Pre Project PIEDMONT	Pre Project SD1	Pre Project SD2	Pre Project B2	Pre Project B2A	Pre Project B4	Total
Drainage Basin Area	7.42 acres	1.47 acres	1.30 acres	1.07 acres	2.71 acres	2.80 acres	4.17 acres	20.94
Tc	35 min.	16 min.	10 min.	10 min.	60 min.	30 min.	78 min.	-
CN	92.7	91.1	95.2	95.5	86	82	83.5	-
Flow (CFS)	To Pond SD1	To Pond SD1	To Pond SD2	9.4 from outfall	5.04	6.90	5.02	26.36

Basin areas, Tc's, CN's, and flows were taken from the John Young drainage report. The flow rate of 9.4 cfs from SD2 was obtained based on the outfall from the discharge structure found in the John Young drainage report. The only area within the project limits without a defined flow in the report is B2A. Basin B2A flowed to Monte Carlo to Goldwyn to Lake Mann in the drainage report and bypassed the ponds on the John Young project. Basin 2A was not modeled in that John Young report. Therefore, I modeled Basin B2A in ICPR to determine the flow to Goldwyn. Basin 2 is modified to remove the area south of Monte Carlo, since that 0.66-acre area is offsite. Basin 2 was modeled in ICPR to determine flow from the basin. FDOT flowrate information is included in Appendix D.

Topography was determined based on Lidar information provided by the City of Orlando. The lidar map with contours can be seen in Appendix A.

1.2 SOILS AND GROUNDWATER

A review of the John Young Parkway Drainage Report indicates soil types within the project boundaries consist mainly of Smyrna Fine Sand (Type B/D Soil). The report states, "The areas encompassed by Basin SD are comprised of poorly drained soils which fall under the Hydrologic Soil Group (HSG) category BID. The soil names, map symbols and soil characteristics as delineated by the Soil Survey of Orange County, Florida, page 30,

31, 41 and 42 and on Figure 3-2 of this report are summarized below."

Map No.	Soil Name	HSG	Characteristics
22	Lochloosa	B/D	Approx. permeability of 2 to 20 in/hr
52	Wabasso	B/D	Approx. permeability of 6 to 20 in/hr

Existing soils onsite are B/D. The site will require fill for the development. The fill will be Type A soils. FDOT and Piedmont will remain as B/D soils. The FDOT soils info are included in Appendices B and D.

1.3 WETLANDS

Wetlands do not exist within the proposed site.

PROPOSED DEVELOPMENT

The proposed project will include construction of a combined pond to provide stormwater drainage treatment from John Young Parkway, Piedmont Ave., and the proposed development. The pond will have a discharge structure to the Piedmont right of way. The storm water management system will provide water quality treatment for the John Young and Piedmont roadway basins along with the proposed development area. PAV calculations were taken from the John Young Parkway drainage report for the John Young Parkway and Piedmont right of ways. The calculations for the John Young and Piedmont PAV can be seen in Appendix B.

Storm water attenuation is provided for the 25yr-24hr storm event. The proposed rate of discharge of 15.64 CFS leaving the control structure for the proposed wet detention pond for the onsite areas discharging is less than that of the predeveloped condition. In the proposed condition, all of the pre-development flow basins are routed to the master stormwater pond. The total predevelopment discharge to Lake Mann was 26.36 CFS. The proposed basins and discharges are seen in table 2 below and Appendix A.

All water will be treated by the proposed wet detention pond. The water will sheet flow over the pavement to the pond through inlets. The excess of permanent pool volume in the wet detention pond will serve as pretreatment and nutrient reduction. Please see BMP trains calculations in Appendix E. The stormwater management system has been designed to address the pollution abatement criteria and the attenuation of the peak runoff. The design meets or exceeds the requirements of the South Florida Water Management District (SFWMD), and City of Orlando.

2.1 REQUIRED PERMITS AND REVIEWS

- City of Orlando
- South Florida Water Management District (SFWMD) Permit

2.2 STORMWATER MANAGEMENT

Stormwater runoff from the site will be collected within the wet detention pond and discharged to Lake Mann. The storm water management system is designed to meet or exceed all requirements of City of Orlando and SFWMD.

2.2.1 BASIN

The entire site area including FDOT right of way and Piedmont Ave. is 20.94 Acres. The project consists of Basin A which is the proposed townhome development. Basin B is the stormwater pond. Basin C is the Piedmont right of way. The eastern 400' section of Piedmont right of way will be abandoned. This area will be added into the stormwater tract. The proposed project will provide its own storm water management system that will provide water quality treatment and storm water attenuation for the 25yr-24hr storm event. The 100 year-72-hour storm event is also modeled utilizing ICPR storm water modeling software and does not exceed the allowable discharges of 26.36 cfs.

Table 2:Proposed Basin Summary Table

Basin	Post Project RDWAY	Post Project A	Post Project B	Post Project C-Piedmont	Total
Drainage Basin Area	7.42 acres	7.68 acres	4.82 acres	1.02 acres	20.94
Tc	35 min.	10 min.	10 min.	10 min.	-
CN	92.7	74	85	84.5	-
Flow (CFS)	To Pond	To Pond	15.64 from outfall	To Pond	15.64

2.2.2 CN CALCULATIONS

Existing soils onsite are B/D. The site will require fill for the development. The fill will be Type A soils. FDOT and Piedmont will remain as B/D soils. The FDOT soils info are included in Appendix D. Curve Numbers were determined for the post development drainage basin and the calculations are provided.

2.2.3 TIME OF CONCENTRATION

The post-development time of concentration was calculated for each of the proposed post development basin. The resulting time of concentration is provided in Appendix B.

2.2.4 TAILWATER CONDITION

Tailwater for the proposed development basins was estimated based on the elevation of Lake Mann provided in the John Young Parkway drainage report for the 25 year/24 hour peak elevation. Please note that the drainage report was in NGVD 29, so a conversion was made to NAVD 88.

1.3 POLLUTION ABATEMENT VOLUME (PAV)

A wet detention pond is utilized for the Best Management Practice (BMP) to reduce the discharge of pollutants associated with stormwater runoff. The following are the PAV (Treatment Volume) requirements:

The PAV requirements for wet retention pond are as follows:

SFWMD

The Greater of:

1" of runoff over the Basin

or

2.5" of runoff over the Impervious Area
+0.5x the greater of the 2 not including existing impervious areas
+ PAV for John Young and Piedmont St.

City of Orlando

The Greater of:

1" of runoff over the Basin

or

2.5" of runoff over the Impervious Area including roofs
+ PAV for John Young and Piedmont St.

All PAV is provided within the wet detention pond. The supporting required PAV calculations are included with the provided PAV calculations in Appendix C. Required PAV for Piedmont and John Young were obtained from the John Young drainage report and are included in Appendix C.

1.4 PROPOSED DEVELOPMENT RUNOFF

The water will sheet flow over the pavement to the pond through inlets. SFWMD permanent pool volume criteria were met for the proposed pond. For detailed calculations regarding the ponds, permanent pool volumes and bleed-down-orifice sizing see Appendix C. The pond meets the recovery with the orifice size of 4 inches.

When the ponds stage up the water will discharge through 2 - modified C control structures which will discharge to the drainage system in Piedmont Ave. which will discharge to the S. Goldwyn Ave. drainage system which will discharge to lake Mann. through a minimum existing pipe size of 24". Each Type C Control structure will have 2 – 0.88' deep x 2' wide weirs. The overflow structures can be seen in Appendix E.

1.5 CONCLUSION

The design meets or exceeds all requirements of SFWMD and City of Orlando. The on-site stormwater management system was designed not to exceed the allowable discharge of 26.36 cfs for the 25 year 24 hour storm event. See input report and routing results are provided.

The post-development discharge rate and pond stage were determined using ICPR. Please refer to the input report, and drainage analysis summary. Please refer to the Table below for a summary of the peak discharge rates and the resulting maximum stages.

Stormwater Routing Summary Table			
	Pre-development Discharge(cfs)	Post-Development Discharge Rate (cfs)	Wet Retention Max Stage (ft) 100.0
25yr-24hr	26.36	15.64	99.50
100yr-72hr	-	-	99.81

The stormwater management system has been designed to meet or exceed all the requirements of SJRWMD by providing sufficient treatment and attenuation volumes within the pond.

Secondary treatment for nutrient removal is accomplished by excess permanent pool volume in the wet detention pond. The secondary treatment for nutrient removal was calculated using BMPTrains, which can be seen in Appendix E.

1.6 WETLAND IMPACTS/MITIGATION

No wetlands exist within the proposed basin.

APPENDIX A

PRE-DEVELOPMENT AND POST-DEVELOPMENT DRAINAGE BASIN MAPS

BASIN: *SD1+SD2
AREA: 2.37 ACRES
CN: 95.5
TC: 10 MINUTES

BASIN: *B2
AREA: 2.71 ACRES
CN: 84.5
TC: 60 MINUTES

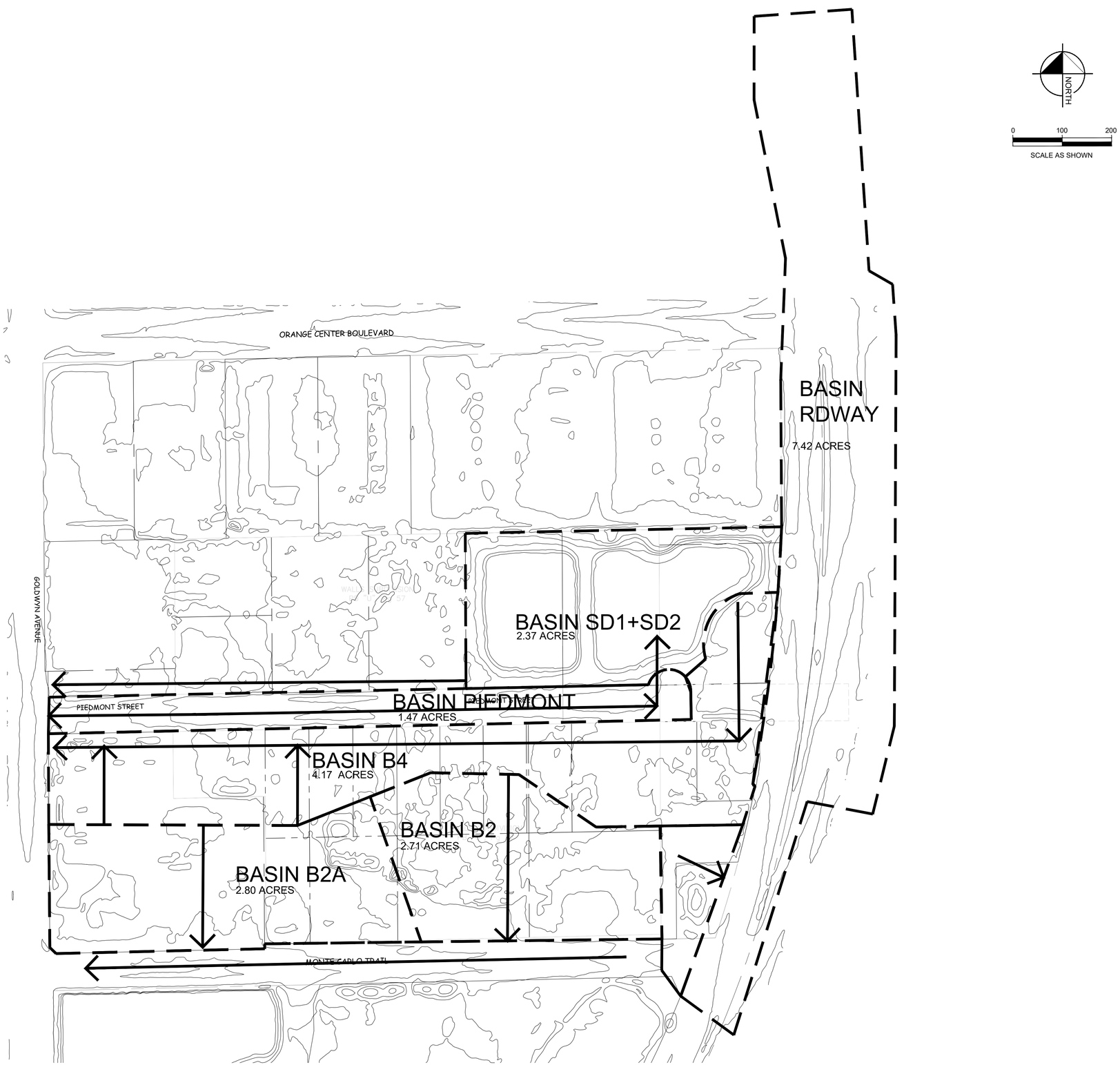
BASIN: B2A
AREA: 2.80 ACRES
CN: 82
TC: 30 MINUTES

BASIN: *B4
AREA: 4.17 ACRES
CN: 83.5
TC: 78 MINUTES

BASIN: *PIEDMONT
AREA: 1.47 ACRES
CN: 91.1
TC: 16 MINUTES

BASIN: *RDWAY
AREA: 7.42 ACRES
CN: 93
TC: 35 MINUTES

*BASIN INFORMATION, WAS TAKEN FROM JOHN YOUNG PARKWAY DRAINAGE REPORT



NORTH

0 100 200

SCALE AS SHOWN

No.	REVISIONS	DATE	BY

CHATELAIN ENGINEERING

DESIGN ENGINEER:
FLORIDA REGISTRATION NUMBER:
SEAL

SCALE AS NOTED
DESIGNED BY GC
DRAWN BY MC
CHECKED BY GC

PRE-DEVELOPMENT DRAINAGE BASIN

HOPE CENTER WEST
3032 MONTE CARLO TRAIL
ORLANDO, FL 32805
ORANGE COUNTY FLORIDA

DATE
10/2024
PROJECT NO.

SHEET NUMBER

Drawing name: F:\USB Drive\Chatelain Engineering\16 Hope Church\cadc\Hope Center pre development.dwg Nov 15, 2024 1:58pm by: Greg Chatelain

BASIN: *SD1+SD2
AREA: 2.37 ACRES
CN: 95.5
TC: 10 MINUTES

BASIN: *B2
AREA: 2.71 ACRES
CN: 84.5
TC: 60 MINUTES

BASIN: B2A
AREA: 2.80 ACRES
CN: 82
TC: 30 MINUTES

BASIN: *B4
AREA: 4.17 ACRES
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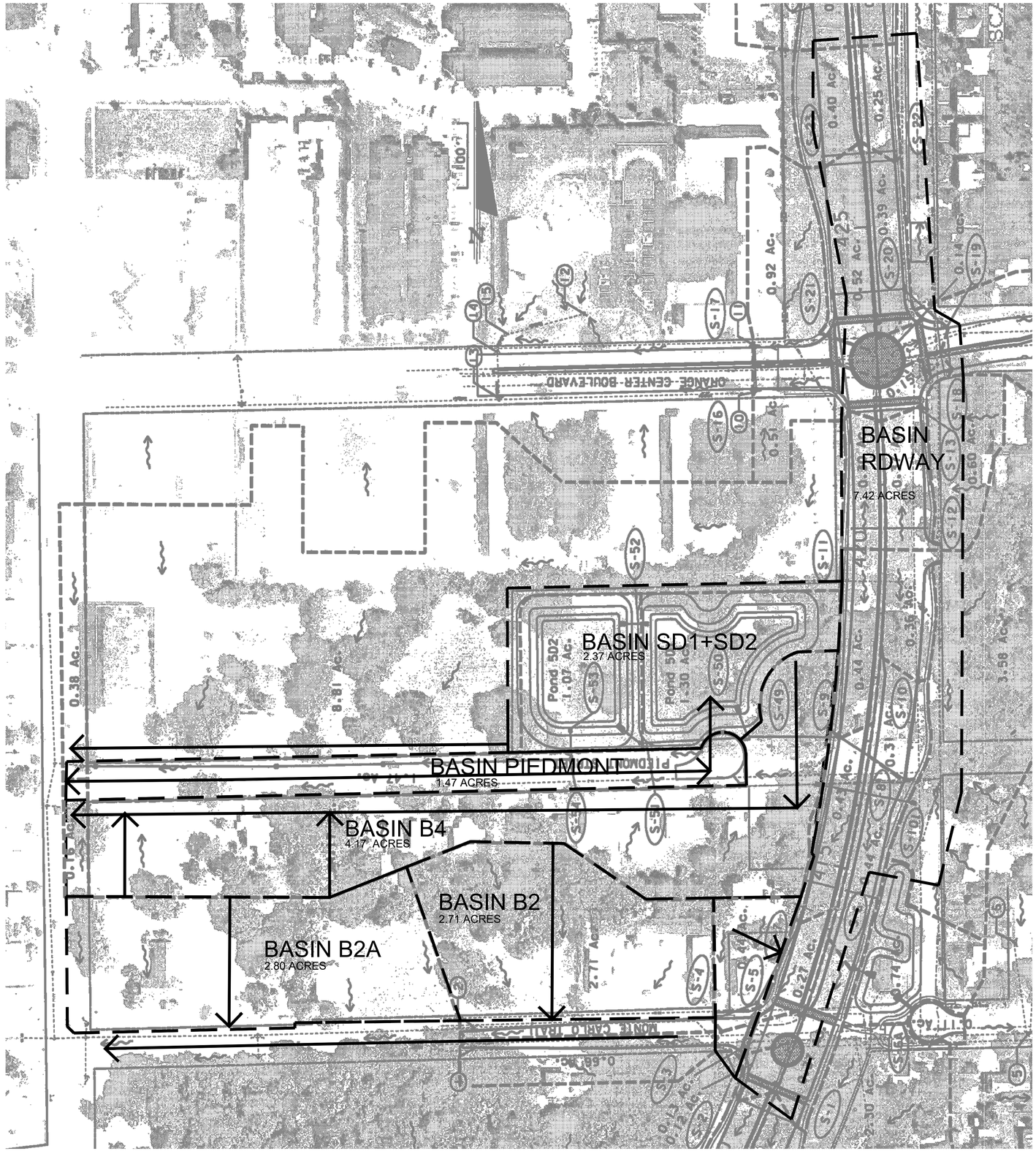


NORTH

0 100 200

SCALE AS SHOWN

No.	REVISIONS	DATE	BY

CHATELAIN ENGINEERING

SCALE: AS NOTED
DESIGNED BY GC
DRAWN BY MC
CHECKED BY GC

DESIGN ENGINEER:
FLORIDA REGISTRATION NUMBER:
SEAL

PRE-DEVELOPMENT
DRAINAGE BASIN

HOPE CENTER WEST
3032 MONTE CARLO TRAIL
ORLANDO, FL 32805
ORANGE COUNTY FLORIDA

DATE
10/2024
PROJECT NO.

SHEET NUMBER

Drawing name: F:\USB Drive\Chatelain Engineering\16 Hope Church\cad\Hope Center pre development.dwg CONCEPT PLAN Nov 13, 2024 4:25pm by: Greg Chatelain

STATE PROJ. NO.	SHEET NO.
75190-3528	2

Inlet 9

outfall

0.76 Ac.

0.38 Ac.

B4

Inlet 5

4.17 Ac.

8.81 Ac.

1.47 Ac.

BEGIN PROJECT
STA. 403+05.00

400

S-418

405

S-100

0.37 Ac.

S-420

0.38 Ac.

S-422

0.11 Ac.

0.15 Ac.

S-419

0.38 Ac.

410

0.48 Ac.

S-421

B2

2.11 Ac.

0.66 Ac.

MONTE CARLO TRAILS

S-54

Pond 5D2
1.07 Ac.

S-53

PIEDMONT

S-52

S-51

Pond 5D1
1.30 Ac.

S-50

S-49

S-3

0.13 Ac.

0.12 Ac.

S-2

S-4

0.44 Ac.

S-5

S-17

0.27 Ac.

S-1

2.30 Ac.

S-6

0.44 Ac.

S-8

0.31 Ac.

S-10

0.36 Ac.

S-101

0.74 Ac.

S-9

S-11

415

0.43 Ac.

0.44 Ac.

420

0.30 Ac.

0.37 Ac.

0.17 Ac.

S-12

S-13

S-18

0.60 Ac.

3.58 A

RDWAY

ORANGE CENTER BOULEVARD

S-16

S-17

0.51 Ac.

0.92 Ac.

1.05 Ac.

S-21

S-23

S-24

S-26

0.40 Ac.

0.38 Ac.

425

0.52 Ac.

S-20

0.39 Ac.

0.25 Ac.

0.38 Ac.

S-25

S-22

0.14 Ac.

S-19

100

L3

L4

L5

12

10

11

8

9

3

4

5

7

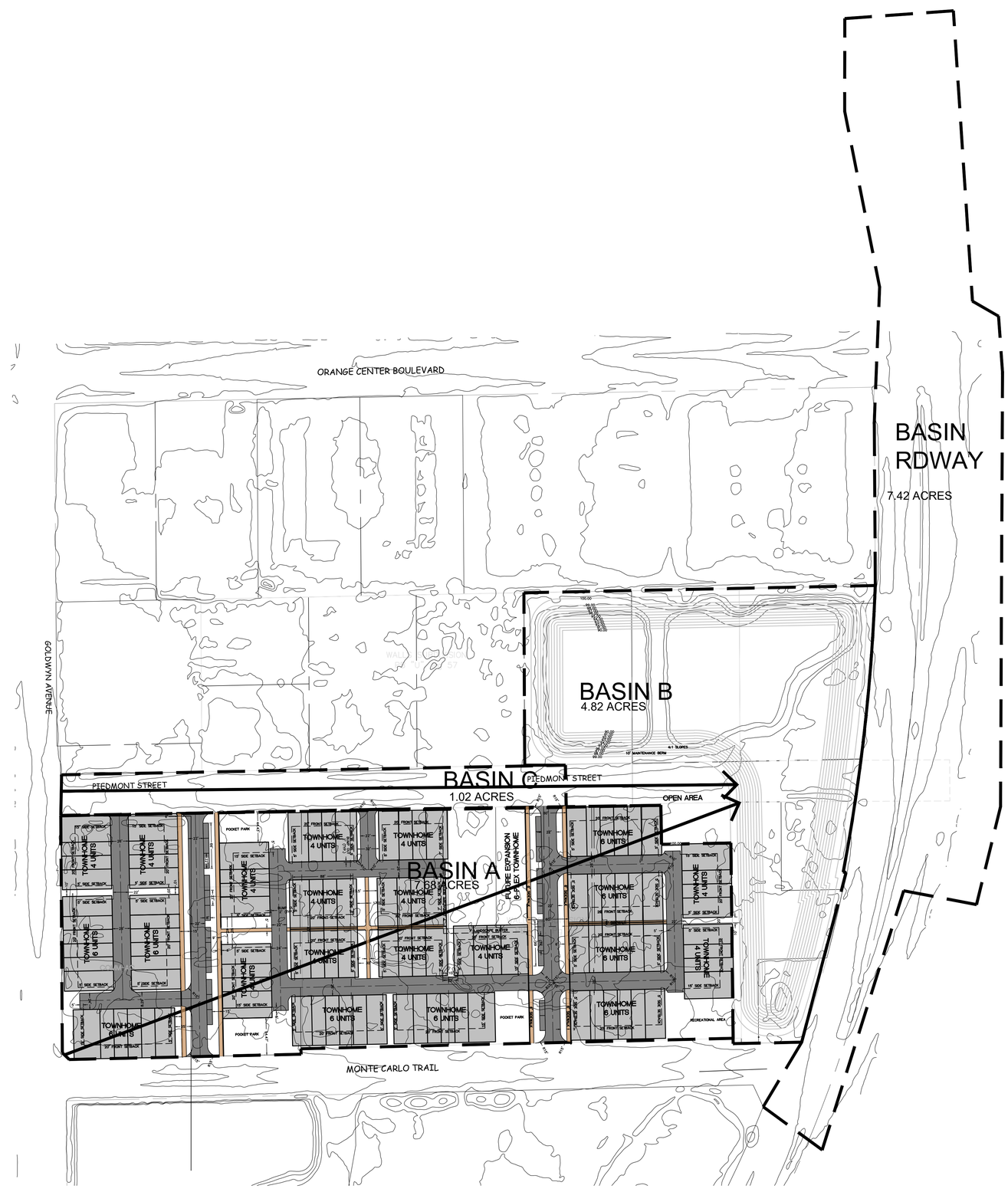
SCANNED

REVISIONS														
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

FLORIDA DEPARTMENT OF TRANSPORTATION

PEC/W.K. DAUGHERTY
ORLANDO • LAKE CITY

BASIN 5D POST DRAINAGE MAP



NORTH

0 100 200

SCALE AS SHOWN

BASIN: A
AREA: 7.68 ACRES
CN: 74
TC: 10 MINUTES

BASIN: B
AREA: 4.82 ACRES
CN: 85
TC: 10 MINUTES

BASIN: C-PIEDMONT
AREA: 1.02 ACRES
CN: 91
TC: 16 MINUTES

BASIN: RDWAY
AREA: 7.42 ACRES
CN: 93
TC: 35 MINUTES

No.	REVISIONS	DATE	BY

CHATELAIN ENGINEERING

DESIGN ENGINEER:
FLORIDA REGISTRATION NUMBER:
SEAL

SCALE AS NOTED
DESIGNED BY GC
DRAWN BY MC
CHECKED BY GC

POST-DEVELOPMENT DRAINAGE BASIN

HOPE CENTER WEST
3032 MONTE CARLO TRAIL
CITY OF ORLANDO
ORANGE COUNTY FLORIDA

DATE
10/2024
PROJECT NO.
SHEET NUMBER

Drawing name: F:\USB Drive\Chatelain Engineering\16 Hope Church\calc\Hope Center post development.dwg CONCEPT PLAN Nov 15, 2024 3:17pm by: Greg Chatelain

APPENDIX B

PRE-POST CURVE NUMBER AND TIME OF CONCENTRATION CALCULATIONS

CURVE NUMBER WORKSHEET

SITE Pre-DEVELOPMENT

Basin Name = B2

Basin Area = 2.710 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Residential(1/8 ac or less townhomes)		
	B/D	Poor		0.0
	B/D	Fair		0.0
0.910	B/D	Good	92.0	83.7
	B/D			
	B/D	Residential(1/2 ac lots)		
	B/D	Poor		0.0
	B/D	Fair		0.0
0.130	B/D	Good	85.0	11.1
	B/D			
1.140	B/D	open area	80.0	91.2
	B/D	Poor		0.0
	B/D	Fair		0.0
	B/D	Good		0.0
	B/D			
	B/D	Woods		
	B/D	Poor		0.0
	B/D	Fair		0.0
0.190	B/D	Good	77.0	14.6
	A,B,C,D	Semi-Impervious (Gravel)	78.0	0.0
0.340	A,B,C,D	Impervious (paved - curb and storm sew	98.0	33.3

WEIGHTED CURVE NUMBER = 86

WEIGHTED CURVE NUMBER = SUM (CN*AREA) / TOTAL AREA

CURVE NUMBER WORKSHEET

SITE Pre-DEVELOPMENT

Basin Name = B2A

Basin Area = 2.800 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Meadow		
	A	Poor		0.0
	A	Fair		0.0
2.490	B/D	Good	80.0	199.2
		Brush (Brush-Weed-Grass)		
	A	Poor	48.0	0.0
	A	Fair	35.0	0.0
	A/D	Good	30.0	0.0
		Woods/Grass (Orchard or Tree Farm)		
	A	Poor	57.0	0.0
	A	Fair	43.0	0.0
	A	Good	32.0	0.0
		Woods		
	A	Poor	45.0	0.0
	A	Fair	36.0	0.0
	A	Good	30.0	0.0
	A,B,C,D	Semi-Impervious (Gravel)	78.0	0.0
0.310	A,B,C,D	Impervious (Pavement, Concrete, Roof	98.0	30.4

WEIGHTED CURVE NUMBER = 82

WEIGHTED CURVE NUMBER = SUM (CN*AREA) / TOTAL AREA

CURVE NUMBER WORKSHEET

SITE POST-DEVELOPMENT

Basin Name = Basin Name = A

Basin Area = 7.680 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Grass (Lawns, Parks, Golf Courses, etc.)		
	A	Poor	68.0	0.0
	A	Fair	49.0	0.0
3.110	A	Good	39.0	121.3
		Brush (Brush-Weed-Grass)		
	A	Poor	48.0	0.0
	A	Fair	35.0	0.0
	A	Good	30.0	0.0
		Woods/Grass (Orchard or Tree Farm)		
	A	Poor	57.0	0.0
	A	Fair	43.0	0.0
	A	Good	32.0	0.0
		Woods		
	A	Poor	45.0	0.0
	A	Fair	36.0	0.0
	A	Good	30.0	0.0
	A,B,C,D	Semi-Impervious (Gravel)	78.0	0.0
	A,B,C,D	Pond	95.0	0.0
2.7400	A,B,C,D	Impervious (Roofs)	98.0	268.5
0.2300	A,B,C,D	Impervious (Sidewalks and lift station)	98.0	22.5
1.6000	A,B,C,D	Impervious (Parking and Roads)	98.0	156.8

WEIGHTED CURVE NUMBER = 74

WEIGHTED CURVE NUMBER = SUM (CN*AREA) / TOTAL AREA

CURVE NUMBER WORKSHEET

SITE POST-DEVELOPMENT

Basin Name = B

Basin Area = 4.820 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Grass (Lawns, Parks, Golf Courses, etc.)		
	A	Poor	68.0	0.0
	A	Fair	49.0	0.0
0.850	A	Good	39.0	33.2
		Brush (Brush-Weed-Grass)		
	A	Poor	48.0	0.0
	A	Fair	35.0	0.0
	A	Good	30.0	0.0
		Woods/Grass (Orchard or Tree Farm)		
	A	Poor	57.0	0.0
	A	Fair	43.0	0.0
	A	Good	32.0	0.0
		Woods		
	A	Poor	45.0	0.0
	A	Fair	36.0	0.0
	A	Good	30.0	0.0
	A,B,C,D	Semi-Impervious (Gravel)	78.0	0.0
3.970	A,B,C,D	Pond	95.0	377.2
	A,B,C,D	Impervious (Roofs)	98.0	0.0
	A,B,C,D	Impervious (Sidewalks and lift station)	98.0	0.0
	A,B,C,D	Impervious (Parking and Roads)	98.0	0.0

WEIGHTED CURVE NUMBER = 85

CURVE NUMBER WORKSHEET

SITE POST-DEVELOPMENT

Basin Name = FDOT RDWAY

Basin Area = 7.420 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Grass (Lawns, Parks, Golf Courses, etc.)		
	A	Poor	68.0	0.0
	A	Fair	49.0	0.0
2.200	B/D	Good	80.0	176.0
		Brush (Brush-Weed-Grass)		
	A	Poor	48.0	0.0
	A	Fair	35.0	0.0
	A	Good	30.0	0.0
		Woods/Grass (Orchard or Tree Farm)		
	A	Poor	57.0	0.0
	A	Fair	43.0	0.0
	A	Good	32.0	0.0
		Woods		
	A	Poor	45.0	0.0
	A	Fair	36.0	0.0
	A	Good	30.0	0.0
	A,B,C,D	Semi-Impervious (Gravel)	78.0	0.0
	A,B,C,D	Pond	95.0	0.0
	A,B,C,D	Impervious (Roofs)	98.0	0.0
	A,B,C,D	Impervious (Sidewalks and lift station)	98.0	0.0
5.220	A,B,C,D	Impervious (Parking and Roads)	98.0	511.6

WEIGHTED CURVE NUMBER = 93

CURVE NUMBER WORKSHEET

SITE POST-DEVELOPMENT

Basin Name = C - PIEDMONT

Basin Area = 1.020 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Grass (Lawns, Parks, Golf Courses, etc.)		
	A	Poor	68.0	0.0
	A	Fair	49.0	0.0
0.390	B/D	Good	80.0	31.2
		Brush (Brush-Weed-Grass)		
	A	Poor	48.0	0.0
	A	Fair	35.0	0.0
	A	Good	30.0	0.0
		Woods/Grass (Orchard or Tree Farm)		
	A	Poor	57.0	0.0
	A	Fair	43.0	0.0
	A	Good	32.0	0.0
		Woods		
	A	Poor	45.0	0.0
	A	Fair	36.0	0.0
	A	Good	30.0	0.0
	A,B,C,D	Semi-Impervious (Gravel)	78.0	0.0
	A,B,C,D	Pond	95.0	0.0
	A,B,C,D	Impervious (Roofs)	98.0	0.0
0.630	A,B,C,D	Impervious (Sidewalks and lift station)	98.0	61.7
	A,B,C,D	Impervious (Parking and Roads)	98.0	0.0

WEIGHTED CURVE NUMBER = 91

Hope Center Basin B2A

CALCULATE Pre-DEVELOPMENT
Tc NUMBER

TC1: OVERLAND FLOW < 300 ft.

	L=	196	FT
	N=	0.24	
	S=	0.003	
Intensity	IN1=	3.5	IN/HR
	IN2=	4	IN/HR
	IN3=	5	IN/HR

TC2: SHALLOW CONC. FLOW > 300 ft.

L=	0	FT
V=	1.9	FT/SEC

TC3: SHALLOW CONC. FLOW > 300 ft.

L=	0	FT
V=	5	FT/SEC

TC4: PIPE FLOW

L=	0	FT
V=	4.6	FT/SEC

T_c = T_o overland flow + T_s shallow conc. flow

To = .93 * (L^.6 * N^.6)/ (IN^.4 * S^.3)

T_{o1} =	32.45	MIN
T_{o2} =	30.76	MIN
T_{o3} =	28.13	MIN
T_o avg. =	30.45	

T_s = L/V

T_s = 0.00

Tp = 0.00

T_c = T_o + T_s + Tp

T_c = 30.45 => USE 30 MIN

USE 30 MIN

Tc's in pre-development basins were obtained from S. John Young Parkway draiange report. Draiange report sheets showing TC'S are included in Appendix B for all Basins, including Basins 2,4, RDWAY, and PIEDMONT. SD1 and 2 had TC's of 10.

Hope Center

CALCULATE Post-DEVELOPMENT Basin A
Tc NUMBER

TC1: OVERLAND FLOW < 300 ft.

	L=	300	FT
	N=	0.011	
	S=	0.02	
Intensity	IN1=	3.5	IN/HR
	IN2=	4	IN/HR
	IN3=	5	IN/HR

TC2: SHALLOW CONC. FLOW > 750 ft.

L=	0	FT
V=	3	FT/SEC

TC3: SHALLOW CONC. FLOW > 300 ft.

L=	0	FT
V=	5	FT/SEC

TC4: PIPE FLOW

L=	750	FT
V=	3	FT/SEC

T_c = T_o overland flow + T_s shallow conc. flow

To = .93 * (L^.6 * N^.6)/ (IN^.4 * S^.3)

T_{o1} =	3.73	MIN
T_{o2} =	3.54	MIN
T_{o3} =	3.23	MIN
T_o avg. =	3.50	
T_s = L/V		
T_s =	0.00	
Tp =	4.17	

T_c = T_o + T_s + Tp

T_c =	7.67	=>		8	MIN
			USE	10	MIN

FDOT Report

Piedmont TC=16
RDWAY TC=35

Tc's in post-development basins were obtained from S. John Young Parkway draiange report. Draiange report sheets showing TC'S are included in Appendix B for Basins RDWAY, and PIEDMONT. Basin B - Pond Tract had TC of 10.

POST-DEVELOPMENT

SUMMARY CONDITIONS

BASIN 5D

Post-development Calculations
Basin 5D

INTRODUCTION

Drainage Basin 5D is divided into thirteen (13) sub-basins identified as Basins 1A, 1B, 2 through 9, Pond 5D1, Pond 5D2, RDWY, RDWY2 and PIEDMONT which comprise a total area of 37.28 acres. The areas and hydrologic parameters for the individual sub-basins are tabulated below. Proposed land use for Basin 5D (in addition to John Young Parkway) will remain primarily residential and commercial.

John Young Parkway -- Basin 5D
Summary Of Post-development Hydrologic Parameters

Sub-basin I.D.	Basin Area (acres)	Time Of Concentration (min)	Curve Number	SCS Shape Factor
1A	2.30	65	80	323
1B	1.96	10*	93	323
2	3.37	60	85	323
3	3.58	62	78	323
4	4.17	78	84	323
5	8.81	59	88	323
8	0.16	10*	98	323
9	0.38	10*	98	323
POND5D1	1.30	10*	95	323
POND5D2	1.07	10*	96	323
RDWY	7.42	33**	93	323
RDWY2	1.29	25	89	323
PIEDMONT	1.47	16	91	323

Notes:

* -- Tc set to minimum acceptable value.

** -- Tc obtained from WaterWays runs.

The areas encompassed by Basin 5D are comprised of moderately drained soils which fall under the Hydrologic Soil Group (HSG) category B/D. The soil names, map symbols and soil characteristics as delineated by the Soil Survey of Orange County, Florida, page 30, 31, 41 and 42 and on Figure B of this report are summarized below.

John Young Parkway -- Basin 5C
Summary of Existing Soils

Map No.	Soil Name	HSG	Characteristics
22	Lochloosa	B/D	• Approx. permeability of 2 to 20 in/hr
52	Wabasso	B/D	• Approx. permeability of 6 to 20 in/hr

Notes:

1 -- Predominant soil type is Wabasso.

PROPOSED BASIN CHARACTERISTICS

The proposed drainage pattern for Basin 5D will remain essentially the same as in the existing condition. The post-development analysis for Basin No. 5D consists of providing water quality treatment and peak attenuation drainage for the addition of 8.89 Ac. of roadway area from approximately station 411+00 to station 427+75 on John Young Parkway and from approximately station 17+75 to station 28+10 on Piedmont Street. Water quality volume in the amount of 2.5" over the impervious area will be provided in the facility labeled pond 5D1. Peak attenuation will be provided in the facility labeled Pond 5D2. This off-line retention/detention concept is possible through the use of a diversion structure which diverts water quality runoff into the retention pond (Pond 5D1) first and then permits runoff to divert into the attenuation facility (Pond 5D2). In addition to the treatment and attenuation provided by ponds 5D1 and 5D2, a third pond (Pond 5D3) receives runoff from a portion of John Young Parkway (.44 Ac.) as well as the proposed Cul-De-Sac on Monte Carlos Trail (.11 Ac.), east of John Young Parkway. This pond has been designed as a dry bottom pond, sized to retain the 100 year - 24 hour storm of 10.6 inches of rainfall. The required treatment volume is recovered in less than 2 hours as the analysis in the following pages will show. Pond 5D3 was analyzed using the program Ponds - Version 1.54, for the 25 year - 24 hour, 25 year - 72 hour, and 100 year - 24 hour storms and used the soils information gathered for this project. The summary of results show the peak stages for the previously mentioned storms. In emergency situations, this pond overflows into a cross drain that passes under John Young Parkway and discharges to a storm sewer system that eventually outfalls to Lake Mann. The permeability of the soils in the pond area are summarized in the following table:

John Young Parkway - Basin 5D
Summary of Permeabilities for Pond 5D3

Boring	Depth from Existing Ground Surface (ft)	Calculated Mean Permeability Rate (ft/day)	Theoretical Vertical Permeability Rate (ft/day)	Theoretical Horizontal Permeability Rate (ft/day)
AB-130	3.0	10	7.1	14.2
AB-132	3.0	9	6.4	12.8
Average	3.0	9.5	6.8	13.5

Note: A vertical permeability of 6.8 was used when designing Pond 5D3

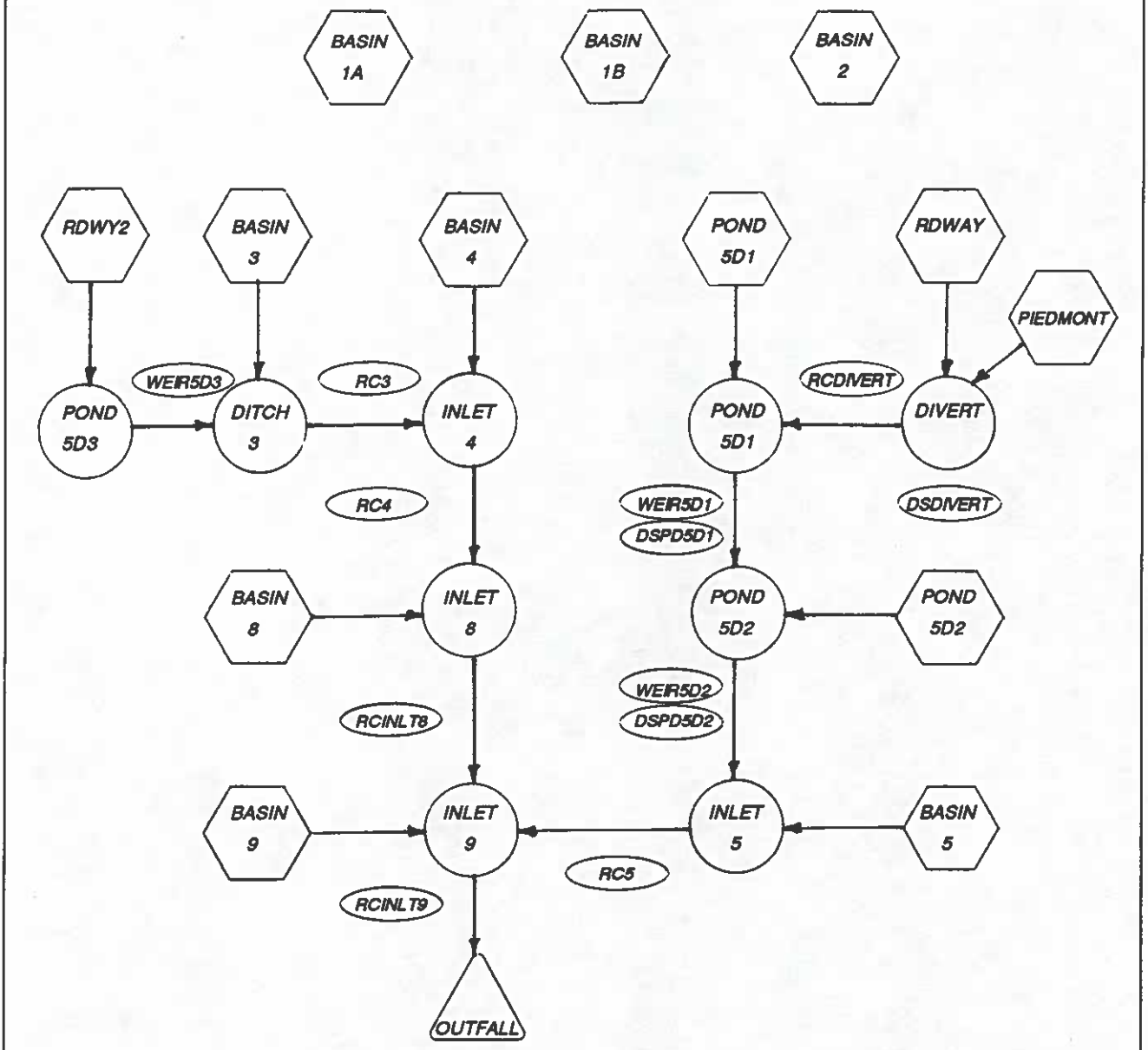
The southern portion of the roadway from approximately station 403+00 to 411+00 will follow the pre-developed drainage pattern and discharge to the existing treatment facility for basin 4. Additional storm sewer systems were constructed in Basin 5D to by-pass the runoff from off-site areas into systems discharging to Lake Mann and Clear Lake.

Due to the lack of topographic relief in the area, it was necessary to by-pass runoff from proposed roadway pavement additions in-order-to provide the proper conveyance to remove the runoff form the site. The primary location where roadway runoff was by-passed was in the area of Carter Street. This side street is to be widened several feet on either side for a length of approximately 400 feet. In addition to Carter St., Monte Carlo Trail is also to be widened for a length of approximately 550 feet. However, we have compensated for this off-site discharge by taking additional impervious areas that would normally runoff site, and redirecting these flows into our treatment pond. The following table summarizes the pre-developed untreated and treated areas from these "trade-off sites" with their post-developed untreated and treated areas.

John Young Parkway - Basin 5D
Summary of Impervious Area Trade

Location	Treated Impervious Area (Ac) Pre-Dev.	Untreated Impervious Area(Ac) Pre-Dev.	Treated Impervious Area (Ac) Post-Dev.	Untreated Impervious Area(Ac) Post-Dev.
Monte Carlo Tr.	0	0.61	0.40	0.35
Orange Center Blvd.	0	1.12	1.26	0.65
Carter Street	0	0.44	0	0.30
Totals	0	2.17	1.66	1.30

Calculations including: post-development curve numbers, times of concentration, water quality treatment volumes, pond stage/area/storage relationships, runoff hydrographs and flood routing results are included in the following pages.



LEGEND:

- Stage/Area/Storage Node
- Stage/Time Node
- Basin Runoff Hydrograph
- Reach Designation

PEC

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Orlando, Florida

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John Young Parkway

Post–development Basin 5D

"adICPR Schematic"

FIGURE 6-2

Post-development Summary Of Nodes And Reaches
Basin 5D

adICPR Node Name	Description
• BASIN1A	This node was used for analysis of the existing drainage area south of Monte Carlo Trail.
• BASIN2	This node was used for analysis of the existing storm water runoff along Monte Carlo Trail.
• RDWY3	This node was used for analysis of the existing storm water runoff for John Young Parkway Segment I.
• DITCH3	This node represents the stage/area relationship developed for BASIN 3. This stage/area relationship was developed using proposed ditch grades, survey information and Orange County aerial topography.
• INLET4	This node represents the stage/area relationship developed for the proposed inlets and swale design and from survey information and Orange County aerial topography for the existing areas located on the south side of Piedmont Street.
• INLET5	This node represents the stage/area relationship developed from proposed inlets, swale grades and depths located on the north side of Piedmont Street.
• DIVERT	This node represents the stage/area relationship for the proposed storm sewer diversion manhole. This manhole receives storm water runoff from roadway (RDWY) and diverts runoff primarily to POND5D1 then to POND5D2 via a weir.
• POND5D1	This node represents the stage/area relationship developed for the proposed retention facility for POND5D1.
• POND5D2	This node represents the stage/area relationship developed for the proposed retention facility for POND5D2.
• POND5D3	This node represents the stage/area relationship developed for the proposed retention facility for POND5D3.
• INLET8	This node represents the stage/area relationship for the existing inlet located in the southeast corner of Goldwyn Avenue and Piedmont Street.

- INLET9 — This node represents the stage/area relationship for the existing inlet located in the northeast corner of Goldwyn Avenue and Piedmont Street.
- OUTFALL — This node represents the stage/time relationship for an existing manhole located on Goldwyn Avenue. Initial and final tailwater stage was set at existing downstream pipe crown.

adICPR Reach Name Description

- RC3 — This reach represents the proposed cross drain connecting the east (DITCH3) and west (DITCH4) drainage areas at approximately Station 415+10.
- RC4 — This reach represents the existing pipe connection from DITCH4 to INLET8.
- RC5 — This reach represents the proposed pipe connection from DITCH5 to INLET9.
- DSDIVERT — This reach represents the proposed manhole, DIVERT. This reach consist of a weir set at the required water quality treatment elevation for POND5D1 and associated outfall pipe connection to POND5D2.
- RCDIVERT — This reach represents the proposed connection from DIVERT to POND5D1.
- WEIR5D1 — This reach represents the proposed emergency overflow weir from POND5D1 to POND5D2.
- DSPD5D1 — This reach represents the proposed drop structure for POND5D1. The reach consist of a weir set at the water quality treatment elevation for POND5C1, an orifice set at the control water elevation and associated outfall pipe connection to POND5D2.
- WEIR5D2 — This reach represents the proposed emergency overflow weir from POND5D2 to the outfall ditch (DITCH5).
- DSPD5D2 — This reach represents the proposed drop structure for POND5D2. The reach consist of a weir set at the control water elevation for POND5D2 and associated outfall pipe connection to DITCH5.

- WEIR5D3 — This reach represents the proposed emergency overflow weir from POND5D3 to DITCH3.
- RCINLT8 — This reach represents the existing pipe connection from INLET8 to INLET9.
- RCINLT9 — This reach represents the existing pipe connection from INLET9 to OUTFALL.
- RCINLT9 — This reach represents the infiltration rating curve form POND5D3 to the groundwater table.

POST-DEVELOPMENT

CURVE NUMBERS

BASIN 5D

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 01/21/95

Location: Basin 5D - Sub-basin 1A **Checked:** SAK **Date:** 01/21/95

Circle one: Present (Developed) SE Corner of John Young Pkwy and Monte Carlo

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
B/D	RESIDENTIAL DISTRICT 1/4 acre lots	87			1.06	92.22
B/D	WOODS Good Condition	73			1.24	90.52

1/ Use only one CN source per line.

Totals = 2.30 182.74

CN (weighted) = total product/total area Use CN = 79.5

REFERENCE: *Urban Hydrology for Small Watersheds* Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: [illegible]

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 01/21/95

Location: Basin 5D – Sub-basin 1B **Checked:** SAK **Date:** 01/21/95

Circle one: Present (Developed) Roadway drainage to offsite area

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm sewers	98			1.44	141.12
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.52	41.60

1/ Use only one CN source per line.

Totals = 1.96 182.72

CN (weighted) = total product/total area Use CN = 93.2

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: MASCHPSTICNBASIB.WK3

Runoff Curve Number

Project: OR–10 John Young Parkway **By:** KLD **Date:** 01/21/95

Location: Basin 5D – Sub–basin 2 **Checked:** SAK **Date:** 01/21/95

Circle one: Present (Developed) Drainage to Monte Carlo

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2–2	CN (1/) Fig. 2–3	CN (1/) Fig. 2–4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm sewers	98			0.34	33.32
B/D	RESIDENTIAL DISTRICT 1/8 acre or less lots (town houses)	92			0.91	83.72
B/D	RESIDENTIAL DISTRICT 1/2 acre lots	85			0.13	11.05
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			1.14	91.20
B/D	WOODS Good Condition	77			0.85	65.45

1/ Use only one CN source per line.

Totals = 3.37 284.74

CN (weighted) = total product/total area

Use CN = 84.5

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: \BASSDYPSTICNBAS2.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D - Sub-basin 3 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) East side of West Dale Ave.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/)			Area acres	Product of CN x area
		Tab. 2-2	Fig. 2-3	Fig. 2-4		
B/D	RESIDENTIAL DISTRICT 1/4 acre lots	87			0.45	39.15
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.27	21.60
B/D	WOODS Good Condition	77			2.86	220.22
				Totals =	3.58	280.97

1/ Use only one CN source per line.

CN (weighted) = total product/total area

Use CN = 78.5

REFERENCE: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation
Service, June 1986

FILE NAME \BASSDVFST\CNBAS3.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 04/12/95

Location: Basin 5D - Sub-basin 4 **Checked:** SAK **Date:** 04/12/95

Circle one: Present (Developed) South side of Piedmont St.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	Fig. 2-3	Fig. 2-4	Area acres	Product of CN x area
B/D	WOODS Good Condition	77			0.82	63.14
B/D	RESIDENTIAL DISTRICT 1/4 acre lots	87			2.45	213.15
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.90	72.00

1/ Use only one CN source per line.

Totals = 4.17 348.29

CN (weighted) = total product/total area Use CN = 83.5

REFERENCE: **Urban Hydrology for Small Watersheds** Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: [illegible]

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D – Sub-basin 5 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) North side of Piedmont St.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
	URBAN DISTRICT					
B/D	Commercial and Business	95			1.61	152.95
	RESIDENTIAL DISTRICT					
B/D	1/8 acre or less lots (town houses)	92			4.00	368.00
	RESIDENTIAL DISTRICT					
B/D	1/4 acre lots	87			0.25	21.75
	OPEN AREA					
B/D	Good Condition (grass cover > 75%)	80			2.95	236.00

1/ Use only one CN source per line.

Totals = 8.81 778.70

CN (weighted) = total product/total area Use CN = 88.4

REFERENCE: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME \BASSD\PST\CNBASS.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway By: KLD Date: 01/21/95

Location: Basin 5D – Sub-basin 8 Checked: SAK Date: 01/21/95

Circle one: Present (Developed) South drainage area for Goldwyn Ave.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm sewers	98			0.16	15.68

1/ Use only one CN source per line.

Totals = 0.16 15.68

CN (weighted) = total product/total area

Use CN = 98.0

REFERENCE: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation
Service, June 1986

FILE NAME: BASSDPSTCCBAR8.WK3

Runoff Curve Number

Project: OR–10 John Young Parkway **By:** KLD **Date:** 01/21/95

Location: Basin 5D – Sub-basin 9 **Checked:** SAK **Date:** 01/21/95

Circle one: Present (Developed) South drainage area for Goldwyn Ave.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2–2	CN (1/) Fig. 2–3	CN (1/) Fig. 2–4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm sewers	98			0.38	37.24
	Totals =				0.38	37.24

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = 98.0

REFERENCE: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: [illegible]

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D – Sub-basin Pond 5D1 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed)

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
–	Pond Water Surface Area	100			0.99	99.00
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.31	24.80

1/ Use only one CN source per line.

Totals = 1.30 123.80

CN (weighted) = total product/total area

Use CN = 95.2

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: \BASSD\PST\CNPOSD1.WK3

Runoff Curve Number

Project: OR–10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D – Sub–basin Pond 5D2 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed)

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2–2	CN (1/) Fig. 2–3	CN (1/) Fig. 2–4	Area acres	Product of CN x area
–	Pond Water Surface Area	100			0.83	83.00
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.24	19.20
Totals =					1.07	102.20

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = 95.5

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: \BASSD\PSTI\CNPD5D2.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D - Sub-basin Rdway **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) Roadway drainage to Ponds 5D1

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	Fig. 2-3	Fig. 2-4	Area acres	Product of CN x area
-	IMPERVIOUS AREA Paved: curbs and storm severs	98			5.22	511.56
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			2.20	176.00
	Totals =				7.42	687.56

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = 92.7

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME \BASSO\PSTICNRDWAY.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D - Sub-basin Rdway2 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) Areas Contributing to Pond 5D3

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
-	IMPERVIOUS AREA Paved: curbs and storm severs	98			0.44	43.12
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.69	55.20
-	Pond Bottom	100			0.16	16.00
	Totals =				1.29	114.32

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = 88.6

REFERENCE: **Urban Hydrology for Small Watersheds**
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME \BASSD\PSTICNRDWAY2.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D - Sub-basin Piedmont **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) Roadway drainage to Piedmont St.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm severs	98			0.91	89.18
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.56	44.80
	Totals =				1.47	133.98

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = **91.1**

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: \BASSD\PST\CNPIEDM.WK3

POST-DEVELOPMENT

TIME OF CONCENTRATION

BASIN 5D

Time of concentration (Tc) or travel time (Tt)

Project : OR-10 John Young Parkway **By:** KLD **Date:** 01/21/95
Location : Basin 5D - Sub-basin 1A **Checked:** SAK **Date:** 01/21/95

Circle One: Present (Developed) SE Corner John Young Pkwy and Monte Carlo

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCBAS1A.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID	AB	BC	
1. Surface description (Table 3-1)			Grass	Grass	
2. Mannings roughness coeff., n (Table 3-1)			0.24	0.24	
3. Flow length, L (total L < 300 ft.)	ft		125	177	
4. Two-yr 24-hr rainfall, P2	in		4.8	4.8	
5. Land slope, s	ft/ft		0.0096	0.0028	
6. Compute Tt	hr		0.31	0.67	= 0.98

Shallow concentrated flow

		Segment ID	CD		
7. Surface description (Paved or Unpaved)			Unpaved		
8. Flow length, L	ft		210		
9. Watercourse slope, s	ft/ft		0.0024		
10. Average velocity, V (Figure 3-1)	ft/s		0.8		
11. Tt = L/3600V Compute Tt	hr		0.07		= 0.07

Channel Flow

		Segment ID	EF		
12. Cross sectional flow area, a	sf		22.000		Assumed (1)
13. Wetted perimeter, Pw	ft		17.649		
14. Hydraulic radius, r = a/Pw Compute r	ft		1.247		
15. Channel slope, s	ft/ft		0.002		
16. Manning's roughness coeff., n			0.070		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s		1.103		
18. Flow length, L	ft		100		
19. Tt = L/3600V Compute Tt	ft		0.03		= 0.03
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)					hr 1.08
					min 65

(1) Assumed trapezoidal 5-foot bottom width ditch with 3:1 (H:V) side slopes and average depth of 2-feet.

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project : OR-10 John Young Parkway By: KLD Date: 01/21/95
Location : Basin 5D - Sub-basin 2 Checked: SAK Date: 01/21/95

Circle One: Present (Developed) Drainage area to Monte Carlo

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCBAS2.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)		AB		
2. Mannings roughness coeff., n (Table 3-1)		Grass		
3. Flow length, L (total L < 300 ft.)	ft	0.24		
4. Two-yr 24-hr rainfall, P2	in	300		
5. Land slope, s	ft/ft	4.8		
6. Compute Tt	hr	0.003		
		1.00		= 1.00

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)				
8. Flow length, L	ft			
9. Watercourse slope, s	ft/ft			
10. Average velocity, V (Figure 3-1)	ft/s			
11. Tt = L/3600V Compute Tt	hr			= 0.00

Channel Flow

		Segment ID		
12. Cross sectional flow area, a	sf			
13. Wetted perimeter, Pw	ft			
14. Hydraulic radius, r = a/Pw Compute r	ft			
15. Channel slope, s	ft/ft			
16. Manning's roughness coeff., n				
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s			
18. Flow length, L	ft			
19. Tt = L/3600V Compute Tt	ft			= 0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 1.00
				min 60

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project :	OR-10 John Young Parkway	**By:**	KLD	**Date:**	01/21/95
Location :	Basin 5D - Sub-basin 3	**Checked:**	SAK	**Date:**	01/21/95

Circle One: Present (Developed) East side of West Dale Ave.

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCBAS3.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID	AB	BC	
1.	Surface description (Table 3-1)		Grass	Grass	
2.	Mannings roughness coeff., n (Table 3-1)		0.24	0.24	
3.	Flow length, L (total L < 300 ft.)	ft	50	230	
4.	Two-yr 24-hr rainfall, P2	in	4.8	4.8	
5.	Land slope, s	ft/ft	0.002	0.004	
6.	Compute Tt	hr	0.28	0.72	= 1.00

Shallow concentrated flow

		Segment ID	CD	DE	
7.	Surface description (Paved or Unpaved)		Unpaved	Unpaved	
8.	Flow length, L	ft	50	50	
9.	Watercourse slope, s	ft/ft	0.02	0.004	
10.	Average velocity, V (Figure 3-1)	ft/s	2.3	1.0	
11.	Tt = L/3600V Compute Tt	hr	0.01	0.01	= 0.02

Channel Flow

		Segment ID	EF		
12.	Cross sectional flow area, a	sf	4.000		Assumed (1)
13.	Wetted perimeter, Pw	ft	6.472		
14.	Hydraulic radius, r = a/Pw Compute r	ft	0.618		
15.	Channel slope, s	ft/ft	0.004		
16.	Manning's roughness coeff., n		0.024		
17	V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	2.849		
18.	Flow length, L	ft	200		
19.	Tt = L/3600V Compute Tt	ft	0.02		= 0.02
20.	Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 1.04

(1) Assumed trapezoidal 4-foot bottom width ditch with 2:1 (H:V) side slopes and average depth of 1.5-feet.

min 62

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project : OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95
Location : Basin 5C - Sub-basin 4 **Checked:** SAK **Date:** 03/10/95

Circle One: Present (Developed) South side of Piedmont St.

Circle One: Tc Tt through subarea FN: \BAS5C\PST\TCBAS4.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)		AB		
2. Mannings roughness coeff., n (Table 3-1)		Grass		
3. Flow length, L (total L < 300 ft.)	ft	0.24		
4. Two-yr 24-hr rainfall, P2	in	290		
5. Land slope, s	ft/ft	4.8		
6. Compute Tt	hr	0.0017		
		1.22		= 1.22

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)				
8. Flow length, L	ft			
9. Watercourse slope, s	ft/ft			
10. Average velocity, V (Figure 3-1)	ft/s			
11. Tt = L/3600V Compute Tt	hr			= 0.00

Channel Flow

		Segment ID		
		BD	CD	
12. Cross sectional flow area, a	sf	1.7670	3.1416	
13. Wetted perimeter, Pw	ft	4.712	6.2832	
14. Hydraulic radius, r = a/Pw Compute r	ft	0.375	0.500	
15. Channel slope, s	ft/ft	0.0025	0.0025	
16. Manning's roughness coeff., n		0.012	0.012	
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	3.227	3.910	
18. Flow length, L	ft	600	340	
19. Tt = L/3600V Compute Tt	ft	0.05	0.02	= 0.08
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 1.30
				min 78

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project : OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95
Location : Basin 5C - Sub-basin 4 **Checked:** SAK **Date:** 03/10/95

Circle One: Present (Developed) South side of Piedmont St.

Circle One: Tc Tt through subarea FN: \BAS5C\PST\TCBAS4.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)				
2. Mannings roughness coeff., n (Table 3-1)				
3. Flow length, L (total L < 300 ft.)	ft			
4. Two-yr 24-hr rainfall, P2	in			
5. Land slope, s	ft/ft			
6. Compute Tt	hr			= 0.00

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)				
8. Flow length, L	ft			
9. Watercourse slope, s	ft/ft			
10. Average velocity, V (Figure 3-1)	ft/s			
11. Tt = L/3600V Compute Tt	hr			= 0.00

Channel Flow

		Segment ID		
		EF		
12. Cross sectional flow area, a	sf	20.0000	Assumed (1)	
13. Wetted perimeter, Pw	ft	14.944		
14. Hydraulic radius, r = a/Pw Compute r	ft	1.338		
15. Channel slope, s	ft/ft	0.005		
16. Manning's roughness coeff., n		0.024		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	5.332		
18. Flow length, L	ft	200		
19. Tt = L/3600V Compute Tt	ft	0.01		= 0.01
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 1.31

(1) Assumed trapezoidal 6-foot bottom width ditch with 2:1 (H:V) side slopes and average depth of 2-feet.

min 78

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project :	OR-10 John Young Parkway	**By:**	KLD	**Date:**	03/10/95
Location :	Basin 5D - Sub-basin 5	**Checked:**	SAK	**Date:**	03/10/95

Circle One: Present Developed North side of Piedmont Dr.

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCBAS5.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)		AB		
		Grass		
2. Mannings roughness coeff., n (Table 3-1)		0.24		
3. Flow length, L (total L < 300 ft.)	ft	300		
4. Two-yr 24-hr rainfall, P2	in	4.8		
5. Land slope, s	ft/ft	0.0067		
6. Compute Tt	hr	0.72		= 0.72

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)		BC	CD	
		Unpaved	Unpaved	
8. Flow length, L	ft	620	280	
9. Watercourse slope, s	ft/ft	0.0048	0.0028	
10. Average velocity, V (Figure 3-1)	ft/s	1.1	0.9	
11. Tt = L/3600V Compute Tt	hr	0.15	0.09	= 0.25

Channel Flow

		Segment ID		
12. Cross sectional flow area, a	sf	DE	EF	
		4.9087	4.9087	
13. Wetted perimeter, Pw	ft	7.854	7.854	
14. Hydraulic radius, r = a/Pw Compute r	ft	0.625	0.625	
15. Channel slope, s	ft/ft	0.003	0.005	
16. Manning's roughness coeff., n		0.012	0.012	
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	4.538	6.417	
18. Flow length, L	ft	284	20	
19. Tt = L/3600V Compute Tt	ft	0.02	0.00	= 0.02
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 0.99
				min 59

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project :	OR-10 John Young Parkway	**By:**	KLD	**Date:**	03/10/95
Location :	Basin 5D - Sub-basin Rdway2	**Checked:**	SAK	**Date:**	03/10/95

Circle One: Present Developed

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCRDWAY2.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID			
		AB			
1. Surface description (Table 3-1)		Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.24			
3. Flow length, L (total L < 300 ft.)	ft	100			
4. Two-yr 24-hr rainfall, P2	in	4.8			
5. Land slope, s	ft/ft	0.003			
6. Compute Tt	hr	0.41		=	0.41

Shallow concentrated flow

		Segment ID			
7. Surface description (Paved or Unpaved)					
8. Flow length, L	ft				
9. Watercourse slope, s	ft/ft				
10. Average velocity, V (Figure 3-1)	ft/s				
11. Tt = L/3600V Compute Tt	hr			=	0.00

Channel Flow

		Segment ID			
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	ft			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr	0.41
				min	25

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project :	OR-10 John Young Parkway	**By:**	KLD	**Date:**	03/10/95
Location :	Basin 5D - Sub-basin Piedmont	**Checked:**	SAK	**Date:**	03/10/95

Circle One: Present Developed — Piedmont St.

Circle One: Tc Tt through subarea — FN: \BAS5D\PST\TCPIEDM.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
		AB		
1. Surface description (Table 3-1)				
2. Mannings roughness coeff., n (Table 3-1)				
3. Flow length, L (total L < 300 ft.)	ft			
4. Two-yr 24-hr rainfall, P2	in			
5. Land slope, s	ft/ft			
6. Compute Tt	hr	0.16	0.00	0.16

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)				
8. Flow length, L	ft			
9. Watercourse slope, s	ft/ft			
10. Average velocity, V (Figure 3-1)	ft/s			
11. Tt = L/3600V Compute Tt	hr	0.00	0.00	0.00

Channel Flow

		Segment ID		
		BC	CD	
12. Cross sectional flow area, a	sf	1.7670	3.1416	
13. Wetted perimeter, Pw	ft	4.712	6.2832	
14. Hydraulic radius, r = a/Pw Compute r	ft	0.375	0.500	
15. Channel slope, s	ft/ft	0.002	0.002	
16. Manning's roughness coeff., n		0.012	0.012	
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	2.887	3.497	
18. Flow length, L	ft	900	240	
19. Tt = L/3600V Compute Tt	hr	0.09	0.02	0.11
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 0.27
				min 16

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

APPENDIX C

REQUIRED/PROVIDED TREATMENT VOLUME, PERMANENT POOL VOLUME AND ORIFICE DESIGN

REQUIRED TREATMENT VOLUME CALCULATONS
Project - SFWMD Specifications

11/14/2024

Determine the required Pollution Abatement Volume (PAV) for water quality treatment for the proposed Post Basin for SFWMD criteria.

CRITERIA: The stormwater management system is required to store a minimum volume equal to the first one inch of runoff from the developed site or 2.5 inches time the percentage of impervious area(excluding water surfaces and roofs) + an additional 50% of the increased impervious pre to post-development + existing PAV from John Young and Piedmont.

Site Post Basin – Online Storage

1. Compute the first inch of runoff from the developed site (Va): Basin = 12.5 AC

Va = 0.5 inch * developed site
Va = 0.5 inch * (1 foot / 12 inches) = 12.5 ac
Va = 0.5208 ac-ft
= 22688 ft^3
for the first half inch of runoff

Vb = 0.5 * developed site
Vb = 0.5 * (1 foot / 12 inches) = 12.5 ac
Vb = 0.5208 ac-ft
= 22688 ft^3

Total Va + Vb = 0.5208 + 0.5208 = 1.0417 ac-ft
= 45375 ft^3
(Required retention storage)

2 **Onsite SFWMD PAV for 2.5" x %imperviousness**

a. Site Available for water quality/impervious calculations
Site treatable = total project - (water surface+roof)
Site treatable = 7.68-(2.74) = 4.94 acres

Impervious area
Total site = 12.68
Pont tract=4.82 ac
Remaining area = 7.68 ac
pavement - 1.6ac
roof - 2.74 ac
sidewalk - 0.23 ac
pervious-3.29 ac
existing imperious pavement - 0.42 a
total impervious = 4.57 acres

b. Impervious area for water quality pervious/impervious
Impervious area = site treatable - (pervious)
Impervious area = 4.94-(3.29)=1.65

c. % Impervious =1.65/4.94=33.4%

d. 2.5" times the percentage of impervious = 2.5" x 0.334 = 0.83 inches to be treated

e. Volume Required for Quality Detention = inches to be treated x (total site-pond)
Volume Required=0.83/12 x 7.68) = 0.53 ac-ft

3 **Onsite SFWMD additional 50% of new impervious area**

a. Site Available for water quality/impervious calculations
Site treatable = total project - (water surface+roof)
Site treatable = 7.68-(2.74) = 4.94 acres

b. Impervious area for water quality pervious/impervious
Additional Impervious area (pavement only) = site treatable - (pervious+ existing impervious pavement)
Impervious area = 4.94-(3.29+0.42)=1.21

c. % Impervious =1.21/4.94 = 24.49%

d. 2.5" times the percentage of impervious = 2.5" x 0.2449 = 0.61 inches to be treated

e. Volume Required for Quality Detention = inches to be treated x (total site-pond)
Volume Required=0.61/12 x 7.68) = 0.39 ac-ft
50% of 0.39 0.2 AC-ft

4 FDOT **1.28 Ac-FT per page 231 of FDOT drainage report**
minus 300' of Piedmont to be abandoned and converted into pond
0.03 400'x24'x2.5"/12/43,560 = 0.03 Ac-Ft
1.25 remaining AC-FT from John Young and Piedmont

Since the 2.49 , ac-ft for 1 inch times impervious area is > 1.98 ac-ft for 2.5 inches over the developed site, the required pollution abatement volume is 2.49 ac-ft

REQUIRED TREATMENT VOLUME CALCULATONS
City of Orlando Specifications

11/14/2024

Determine the required Pollution Abatement Volume (PAV) for water quality treatment for the proposed Post Basin for City of Orlando criteria.

CRITERIA: The stormwater management system is required to store a minimum volume equal to the first one inch of runoff from the developed site or 2.5 inches times the impervious area (inlcuding roofs but excluding pond surface water) + existing PAV from John Young and Piedmont

Site Post Basin – Online Storage

1. Compute the first inch of runoff from the developed site (Va): Basin = 12.5 AC

Va = 0.5 inch * developed site
Va = 0.5 inch * (1 foot / 12 inches) = 12.5 ac
Va = 0.5208 ac-ft
= 22688 ft^3

for the first half inch of runoff

Vb = 0.5 * developed site
Vb = 0.5 * (1 foot / 12 inches) = 12.5 ac
Vb = 0.5208 ac-ft
= 22688 ft^3

Total Va + Vb = 0.5208 + 0.5208 = 1.0417 ac-ft (Required retention storage)
= 45375 ft^3

2. Compute 2.5 inches times the percentage of impervious (Vb): Impervious = 4.57 acres

Vc = 2.5 * total impervious
Vc = 2.5 * (1 foot / 12 inches) * 4.57
Vc = 0.9521 ac-ft
= 41473 ft^3

2.5" x impervious

PAV= 0.9521 ac-ft (Required retention storage)

3 **Piedmont and John Young Required PAV**
page 231 of drainage report
1.28 Ac-FT
minus 300' of Piedmont to be abandoned and converted into pond
0.03 400'x24'x2.5"/12/43,560 = 0.03 Ac-Ft
1.25 remaining AC-FT from John Young and Piedmont

Since the 2.29 , ac-ft for 1 inch times developed site is > 2.20 ac-ft for 2.5 inches over the impervious area, the required pollution abatement volume is 2.29 ac-ft

BASIN NO. 5D

WATER QUALITY CALCULATIONS FOR POND NO. 5D1

1. DETERMINE TOTAL ROADWAY AREA CONTRIBUTING TO POND NO. 5D1.
TOTAL AREA = 8.89 ACRES

2. DETERMINE PERCENT IMPERVIOUSNESS
TOTAL IMPERVIOUS AREA = 6.14 ACRES
TOTAL PERVIOUS AREA = 2.75 ACRES
TOTAL DRAINAGE AREA = 8.89 ACRES

$$\text{PERCENTAGE IMPERVIOUSNESS} = \frac{\text{TOTAL IMPERVIOUS AREA}}{\text{TOTAL DRAINAGE AREA}}$$

$$\text{PERCENTAGE IMPERVIOUSNESS} = \frac{6.14 \text{ ACRES}}{8.89 \text{ ACRES}} = 69\ \%\ (0.69)$$

3. "WET RETENTION VOLUME SHALL BE PROVIDED FOR THE FIRST INCH OF RUNOFF FROM THE DEVELOPED PROJECT, OR THE TOTAL RUNOFF OF 2.5 INCHES TIMES THE PERCENTAGE OF IMPERVIOUSNESS, WHICHEVER IS GREATER."

(REFERENCE: SECTION 3.2.2.2 - RETENTION/DETENTION CRITERIA, MANAGEMENT AND STORAGE OF SURFACE WATERS, PERMIT INFORMATION MANUAL, VOLUME IV, SOUTH FLORIDA WATER MANAGEMENT DISTRICT).

ONE INCH CRITERIA: (1")(8.89)/12 = 0.74 ACRE-FEET
2.5 INCH TIMES % IMP. CRITERIA: (2.5)(0.69)(8.89)/12 = 1.28 ACRE-FEET

THE 2.5 INCH TIMES % IMPERVIOUSNESS CRITERIA GOVERNS.
REQUIRED WET RETENTION VOLUME = 1.28 ACRE-FEET

4. STAGE STORAGE RELATIONSHIP FOR POND NO. 5D1

ELEVATION	SURFACE AREA	AVG. VOL.	ACC. VOL.
98.00	0.742		0.00
		0.781	
99.00	0.819		0.781
		0.906	
100.00	0.992		1.686
		1.081	
101.00	1.170		2.767

5. CONTROL ELEVATION DETERMINATION

$$\text{ELEVATION} = \frac{[\text{RET. VOL.} - \text{VOL. A}]}{\text{VOL B} - \text{VOL. A}} (\text{EL. B} - \text{EL. A}) + \text{EL. A}$$

ELE. @ A = 99.00 VOL. @ A = 0.781 ACRE-FEET
ELE. @ B = 100.00 VOL. @ B = 1.686 ACRE-FEET

$$\text{CONTROL ELE.} = \frac{[1.280 - .781]}{[1.686 - 0.781]} (100.0 - 99.0) + 99.0$$

CONTROL ELE. = 99.55

FILE NAME: PND5DWQ.WB2

PROVIDED POLLUTION ABATEMENT VOLUME CALCULATIONS

PROPOSED WET POND 1								
Stage	Area (sq.-ft.)	Area (ac.)	Volume (cu.-ft.)	Volume (ac-ft.)	Sum Volume (cu.-ft.)	Sum Volume (ac-ft)		
90.00	84762	1.95	-	-	-	-		
91.00	91889	2.11	88325.50	2.03	88325.50	2.03		
92.00	99152	2.28	95520.50	2.19	183846.00	4.22		
93.00	106508	2.45	102830.00	2.36	286676.00	6.58		
94.00	113965	2.62	110236.50	2.53	396912.50	9.11		
95.00	121522	2.79	117743.50	2.70	514656.00	11.81		
96.00	129180	2.97	125351.00	2.88	640007.00	14.69		
97.00	136938	3.14	133059.00	3.05	773066.00	17.75		
97.88	**143854**	**3.30**	**123548.48**	**2.84**	**896614.48**	**20.58**	**bleeder**	
98.00	144797	3.32	140867.50	3.23	913933.50	20.98		
98.62	**149732**	**3.44**	**91303.99**	**2.10**	**1005237.49**	**23.08**	**2.49**	**ac-ft provided at weir**
99.00	152757	3.51	148777.00	3.42	1062710.50	24.40		
100.00	173097	3.97	162927.00	3.74	1225637.50	28.14		
							2.49	**ac-ft required**

PROPOSED ROAD POND
REQUIRED TREATMENT VOLUME & STAGE/STORAGE
WET DETENTION

Basin Area =	12.50	acres
Impervious Area (Excluding pond area and roof) =	4.57	acres
TV = 1" of runoff over site = [(Basin Area)(1")]/12" =	1.04	acre-ft.
OR		
TV = 2.5" of runoff from imp. area = [(Imp Area)(2.5")]/12" =	0.53	acre-ft.
additional 1.5 times additonal impervious PER Section 4.2.1, A.H.	0.20	acre-ft.
FDOT - John Young and Piedont	1.25	acre-ft.
Greater of 2 calcs + John Young and Pidemont+additional 1.5 times additional impervious(1.04+0.20+1.25)=2.49	2.49	acre-ft.

TOTAL REQUIRED TREATMENT VOLUME =	**2.49**	**acre-ft.**
=	**108,464**	**CF**
Required Treatment Volume at Elevation =	98.62	ft
1/2 Required Treatment Volume =	1.25	acre-ft.
1/2 Required Treatment Volume at Elevation =	98.26	ft

Provided Treatment Volume =	2.49	acre-ft.
	108,464	CF
Provided Treatment Volume at Elevation =	98.62	ft

Pond 1

	Elevation (FT)	Feet	Area (SF)	Area (AC)	Avg. Area (SF)	Volume (CF)	Volume Sum (CF)	Volume Sum (Ac-Ft)
T.O.P.	100	2.12	173,097	3.974		162927	329,023	7.55
					162,927			
	99	1.12	152,757	3.507		148777	166,096	3.81
					148,777			
WEIR	98.62	0.74	149,732	3.437		108626.82	108,627	2.49
					146,793			
	98	0.12	144,797	3.324		17319.06	17,319	0.40
					144,326			
NWL	97.88	0	143,854	3.302		0	0	0.00
					140,396			
	97	0.88	136,938	3.144		123,548	123,548	2.84
					133,059			
	96	1.88	129,180	2.966		133,059	256,607	5.89
					125,351			
	95	2.88	121,522	2.790		125,351	381,958	8.77
					117,744			
	94	3.88	113,965	2.616		117,744	499,702	11.47
					110,237			
	93	4.88	106508	2.445		110,237	609,938	14.00
	92	5.88	99152	2.276		0	609,938	14.00
	91	6.88	91889	2.109		0	609,938	14.00
					95,635			
	90	7.88	84762	1.946		286,905	896,843	20.59

Permanent Pool Volume Calculation

wet pond

Drainage Area (ac.)	12.50	acres
Runoff Coefficient	0.422	
Wet Season Rainfall Depth (in.)	31.0	inches
Residence Time (days)	14	days
Wet Season (days)	153	days
Conversion Factor (in./ft.)	12	in/ft
PPV	1.25	ac-ft

Wet Pond

	Elevation (ft NGVD)	Area (ac.)	Volume (ac-ft)
Top of Bank	100		7.55
NWL	97.88		0.00
Bottom	90		20.59

PPV Required	**1.25 ac-ft**

PPV Provided	**20.59 ac-ft**
Mean Depth	**7.88 ft**

Runoff Coefficient Calculation

	AREA (AC)	RUNOFF COEFFICIENT
IMPERVIOUS AREA	4.570	0.95
PERVIOUS AREA	3.110	0.30

C = [(Impervious Area)x(0.95) + (Pervious Area)x(0.30)] / (Total Area)

RUNOFF COEFFICIENT =	0.422

PROPOSED POND
DRAWDOWN CALCULATION

total treatment volume=2.59 acres or 108,464 cubic feet
drawdown volume to be evacuated in no less than 24 hours

Q = TV / 2 t CF =	0.558	CFS

WHERE:	TV = TREATMENT VOLUME =	108464	CF
	t = RECOVERY TIME =	27	HrS
	CF = CONV FACTOR =	3600	sec/Hr

$H = (H_1 + H_2) / 2 =$	0.89	Ft.

WHERE:	H_1 = DEPTH OF TOTAL TREATMENT VOLUME =	0.74	Ft.
	H_2 = DEPTH OF HALF THE TREATMENT VOLUME =	0.38	Ft.

ORIFICE

$Q = C A (2 g h)^{1/2}$ ORIFICE FLOW EQUATION

$A = Q / C (2 g H)^{1/2} =$	0.12	SF

WHERE:	C = ORIFICE COEFFICIENT =	0.6	
	g = CONSTANT =	32.2	Ft/S^2
	H = HEAD =	0.89	Ft.
	Q = RATE OF DISCHARGE =	0.558	CFS

THEREFORE: ORIFICE DIAMETER

$D = (4 A / PI)^{1/2} =$	**4.75**	INCHES
ORIFICE PROVIDED:	**4.00**	INCHES

~~*Per the ICPR drawdown analysis, to meet the SJRWMD criteria of drawing down 1/2 of the required PAV within the first 24-30 hours following a storm event, a minumum 2.75 inch orifices will be provided.~~

APPENDIX D

PRE DEVELOPMENT DRAINAGE CALCULATIONS

Basin	Peak Discharge 25 year(cfs)	flow determined by
SD1+SD2, including John Young piedmont,and ponds 5D1 and 5D2	9.40	from FDOT max flow for DSPND5D2 on page 291 of report
B2	5.04	From FDOT basin, pg 265 OF REPORT and ICPR
B2A	6.90	from ICPR
B4	5.02	from FDOT discharge, pg 265 OF REPORT
Total discharge(cfs)	26.36	

Simple Basin : Multi Item | (sim, name) : Runoff Summary [Scenario1]

Sim Name	Basin Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]
2524	B2	5.04	12.6500	8.30	6.62	2.8000
2524	B2A	6.90	12.2833	8.30	6.14	2.7100

Simulation: 2524

Scenario: Scenario1
Run Date/Time: 11/12/2024 4:39:52 PM
Program Version: StormWise 4.08.03

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:	60.0000	0.1000
Max Calculation Time:		30.0000

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

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	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec	Ia/S:	0.20 dec
dZ Tolerance:	0.0010 ft		
Max dZ:	1.0000 ft	Smp/Man Basin Rain Opt:	Global
Link Optimizer Tol:	0.0001 ft		
		Rainfall Name:	~FLMOD
		Rainfall Amount:	8.30 in
		Storm Duration:	24.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

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JOHN YOUNG PKWY - SEGMENT 2 - POST BASIN 5D - 25 YR 24 HR
MARCH 6, 1995 (FN:\OR-10\PST\BASIN5D\OR025_24)

BASIN NAME	BASIN1A	BASIN1B	BASIN2	BASIN3	BASIN4
NODE NAME	BASIN1A	RDWAY3	BASIN2	DITCH3	INLET4
UNIT HYDROGRAPH	UH323	UH323	UH323	UH323	UH323
PEAKING FACTOR	323.	323.	323.	323.	323.
RAINFALL FILE	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE
RAIN AMOUNT (in)	8.60	8.60	8.60	8.60	8.60
STORM DURATION (hrs)	24.00	24.00	24.00	24.00	24.00
AREA (ac)	2.30	1.96	3.37	3.58	4.17
CURVE NUMBER	80.00	93.00	85.00	78.00	84.00
DCIA (%)	.00	.00	.00	.00	.00
TC (mins)	65.00	10.00	60.00	62.00	78.00
LAG TIME (hrs)	.00	.00	.00	.00	.00
BASIN STATUS	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE

BASIN	QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
BASIN1A	2.73	9.53	6.19	SE CORNER JY PKWY AND MONTE CARLO
BASIN1B	3.41	9.00	7.76	ROADWAY DRAINAGE TO OFFSITE
BASIN2	4.46	9.33	6.80	DRAINAGE TO MONTE CARLO
BASIN3	4.15	9.51	5.95	EAST SIDE OF WEST DALE AVE.
BASIN4	5.02	9.71	6.67	SOUTH SIDE OF PIEDMONT ST.

BASIN NAME	BASIN5	POND5D1	POND5D2	BASIN8	BASIN9
NODE NAME	INLET5	POND5D1	POND5D2	INLET8	INLET9
UNIT HYDROGRAPH	UH323	UH323	UH323	UH323	UH323
PEAKING FACTOR	323.	323.	323.	323.	323.
RAINFALL FILE	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE
RAIN AMOUNT (in)	8.60	8.60	8.60	8.60	8.60
STORM DURATION (hrs)	24.00	24.00	24.00	24.00	24.00
AREA (ac)	8.81	1.30	1.07	.16	.38
CURVE NUMBER	88.00	95.00	96.00	98.00	98.00
DCIA (%)	.00	.00	.00	.00	.00
TC (mins)	59.00	10.00	10.00	10.00	10.00
LAG TIME (hrs)	.00	.00	.00	.00	.00
BASIN STATUS	ONSITE	ONSITE	ONSITE	ONSITE	ONSITE

BASIN	QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
BASIN5	12.23	9.31	7.16	NORTH SIDE OF PIEDMONT ST.
POND5D1	2.28	9.00	8.00	POND AREA 5D1
POND5D2	1.89	8.73	8.12	POND AREA 5D2
BASIN8	.28	8.60	8.36	SOUTH GOLDWYN AVE
BASIN9	.67	8.60	8.36	NORTH GOLDWYN AVE

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JOHN YOUNG PKWY - SEGMENT 2 - POST BASIN 5D - 25 YR 24 HR
MARCH 6, 1995 (FN:\OR-10\PST\BASIN5D\OR025_24)

```
>>REACH NAME       : RC5
  FROM NODE        : INLET5
  TO NODE          : INLET9
  REACH TYPE       : CULVERT, CIRCULAR w/ ROADWAY
  FLOW DIRECTION   : POSITIVE AND NEGATIVE FLOWS ALLOWED
  TURBO SWITCH     : OFF

  CULVERT DATA     :
        SPAN (in):  30.000       RISE (in):  30.000     LENGTH (ft): 305.000
   U/S INVERT (ft):  94.400 D/S INVERT (ft):  93.700       MANNING N:    .012
      ENTRNC LOSS:    .500   # OF CULVERTS:   1.000

  POSITION A       : RECTANGULAR ROADWAY/BERM WEIR
    CREST EL. (ft): 100.000  CREST LN. (ft):  50.000      WEIR COEF.:   2.800
         RESERVED:********        RESERVED:********        RESERVED:********

  POSITION B       : RECTANGULAR ROADWAY/BERM WEIR
    CREST EL. (ft):********  CREST LN. (ft):********      WEIR COEF.:********
         RESERVED:********        RESERVED:********        RESERVED:********

              NOTE:

>>REACH NAME       : RCINLT8
  FROM NODE        : INLET8
  TO NODE          : INLET9
  REACH TYPE       : CULVERT, CIRCULAR w/ ROADWAY
  FLOW DIRECTION   : POSITIVE AND NEGATIVE FLOWS ALLOWED
  TURBO SWITCH     : OFF

  CULVERT DATA     :
        SPAN (in):  24.000       RISE (in):  24.000     LENGTH (ft):  88.000
   U/S INVERT (ft):  93.760 D/S INVERT (ft):  93.730       MANNING N:    .012
      ENTRNC LOSS:    .500   # OF CULVERTS:   1.000

  POSITION A       : NOT USED

  POSITION B       : NOT USED

              NOTE:
```

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        JOHN YOUNG PKWY - SEGMENT 2 - POST BASIN 5D - 25 YR 24 HR
        MARCH 6, 1995 (FN:\OR-10\PST\BASIN5D\OR025_24)

>>REACH NAME       : RCINLT9
  FROM NODE        : INLET9
  TO NODE          : OUTFALL
  REACH TYPE       : CULVERT, CIRCULAR w/ ROADWAY
  FLOW DIRECTION   : POSITIVE AND NEGATIVE FLOWS ALLOWED
  TURBO SWITCH     : OFF

  CULVERT DATA     :
        SPAN (in):   30.000       RISE (in):   30.000     LENGTH (ft):   47.000
   U/S INVERT (ft):  93.520 D/S INVERT (ft):   90.500       MANNING N:     .012
       ENTRNC LOSS:    .500    # OF CULVERTS:    1.000

  POSITION A       : NOT USED

  POSITION B       : NOT USED

               NOTE:

>>REACH NAME       : RCDIVERT
  FROM NODE        : DIVERT
  TO NODE          : POND5D1
  REACH TYPE       : CULVERT, CIRCULAR w/ ROADWAY
  FLOW DIRECTION   : POSITIVE AND NEGATIVE FLOWS ALLOWED
  TURBO SWITCH     : OFF

  CULVERT DATA     :
        SPAN (in):   36.000       RISE (in):   36.000     LENGTH (ft):   35.000
   U/S INVERT (ft):  96.000 D/S INVERT (ft):   95.500       MANNING N:     .012
       ENTRNC LOSS:    .500    # OF CULVERTS:    1.000

  POSITION A       : RECTANGULAR ROADWAY/BERM WEIR
    CREST EL. (ft):9999.000  CREST LN. (ft):    .000      WEIR COEF.:    2.800
          RESERVED:********        RESERVED:********        RESERVED:********

  POSITION B       : RECTANGULAR ROADWAY/BERM WEIR
    CREST EL. (ft):********  CREST LN. (ft):********      WEIR COEF.:********
          RESERVED:********        RESERVED:********        RESERVED:********

               NOTE:
```

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JOHN YOUNG PKWY - SEGMENT 2 - POST BASIN 5D - 25 YR 24 HR
MARCH 6, 1995 (FN:\OR-10\PST\BASIN5D\OR025_24)

```
>>REACH NAME       : DSPND5D2
  FROM NODE        : POND5D2
  TO NODE          : INLET5
  REACH TYPE       : DROP STRUCTURE w/ CIRC. CULVERT
  FLOW DIRECTION   : POSITIVE AND NEGATIVE FLOWS ALLOWED
  TURBO SWITCH     : OFF

  CULVERT DATA     :
         SPAN (in):  30.000       RISE (in):  30.000     LENGTH (ft): 515.000
   U/S INVERT (ft):  95.800 D/S INVERT (ft):  94.400       MANNING N:    .012
       ENTRNC LOSS:    .500   # OF CULVERTS:   1.000

  POSITION A       : RECTANGULAR RISER SLOT
    CREST EL. (ft):  98.000  CREST LN. (ft):   1.000    OPENING (ft):   2.400
         WEIR COEF.:   2.800       GATE COEF.:    .608 NUMBER OF ELEM.:   1.000

  POSITION B       : RECTANGULAR RISER SLOT
    CREST EL. (ft): 100.400  CREST LN. (ft):  14.333    OPENING (ft): 999.000
         WEIR COEF.:   3.200       GATE COEF.:    .600 NUMBER OF ELEM.:   1.000

               NOTE:
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JOHN YOUNG PKWY - SEGMENT 2 - POST BASIN 5D - 25 YR 24 HR
MARCH 6, 1995 (FN:\OR-10\PST\BASIN5D\OR025_24)

REACH SUMMARY

INDEX	RCHNAME	FRMNODE	TONODE	REACH TYPE
1	WEIR5D1	POND5D1	POND5D2	TRAPEZOIDAL WEIR/GATE/ORIFICE, MAVIS EQ.
2	WEIR5D2	POND5D2	INLET5	TRAPEZOIDAL WEIR/GATE/ORIFICE, MAVIS EQ.
3	WEIR5D3	POND5D3	DITCH3	TRAPEZOIDAL WEIR/GATE/ORIFICE, MAVIS EQ.
4	RC3	DITCH3	INLET4	CULVERT, CIRCULAR w/ ROADWAY
5	RC4	INLET4	INLET8	CULVERT, CIRCULAR w/ ROADWAY
6	RC5	INLET5	INLET9	CULVERT, CIRCULAR w/ ROADWAY
7	RCINLT8	INLET8	INLET9	CULVERT, CIRCULAR w/ ROADWAY
8	RCINLT9	INLET9	OUTFALL	CULVERT, CIRCULAR w/ ROADWAY
9	RCDIVERT	DIVERT	POND5D1	CULVERT, CIRCULAR w/ ROADWAY
10	DSDIVERT	DIVERT	POND5D2	DROP STRUCTURE w/ CIRC. CULVERT
11	DSPND5D1	POND5D1	POND5D2	DROP STRUCTURE w/ CIRC. CULVERT
12	DSPND5D2	POND5D2	INLET5	DROP STRUCTURE w/ CIRC. CULVERT
13	RC5D3	POND5D3	999	SINGLE STAGE-DISCHARGE RATING CURVE

POST-DEVELOPMENT

SUMMARY CONDITIONS

BASIN 5D

Post-development Calculations
Basin 5D

INTRODUCTION

Drainage Basin 5D is divided into thirteen (13) sub-basins identified as Basins 1A, 1B, 2 through 9, Pond 5D1, Pond 5D2, RDWY, RDWY2 and PIEDMONT which comprise a total area of 37.28 acres. The areas and hydrologic parameters for the individual sub-basins are tabulated below. Proposed land use for Basin 5D (in addition to John Young Parkway) will remain primarily residential and commercial.

John Young Parkway -- Basin 5D
Summary Of Post-development Hydrologic Parameters

Sub-basin I.D.	Basin Area (acres)	Time Of Concentration (min)	Curve Number	SCS Shape Factor
1A	2.30	65	80	323
1B	1.96	10*	93	323
2	3.37	60	85	323
3	3.58	62	78	323
4	4.17	78	84	323
5	8.81	59	88	323
8	0.16	10*	98	323
9	0.38	10*	98	323
POND5D1	1.30	10*	95	323
POND5D2	1.07	10*	96	323
RDWY	7.42	33**	93	323
RDWY2	1.29	25	89	323
PIEDMONT	1.47	16	91	323

Notes:

* -- Tc set to minimum acceptable value.

** -- Tc obtained from WaterWays runs.

The areas encompassed by Basin 5D are comprised of moderately drained soils which fall under the Hydrologic Soil Group (HSG) category B/D. The soil names, map symbols and soil characteristics as delineated by the Soil Survey of Orange County, Florida, page 30, 31, 41 and 42 and on Figure B of this report are summarized below.

John Young Parkway -- Basin 5C
Summary of Existing Soils

Map No.	Soil Name	HSG	Characteristics
22	Lochloosa	B/D	• Approx. permeability of 2 to 20 in/hr
52	Wabasso	B/D	• Approx. permeability of 6 to 20 in/hr

Notes:

1 -- Predominant soil type is Wabasso.

PROPOSED BASIN CHARACTERISTICS

The proposed drainage pattern for Basin 5D will remain essentially the same as in the existing condition. The post-development analysis for Basin No. 5D consists of providing water quality treatment and peak attenuation drainage for the addition of 8.89 Ac. of roadway area from approximately station 411+00 to station 427+75 on John Young Parkway and from approximately station 17+75 to station 28+10 on Piedmont Street. Water quality volume in the amount of 2.5" over the impervious area will be provided in the facility labeled pond 5D1. Peak attenuation will be provided in the facility labeled Pond 5D2. This off-line retention/detention concept is possible through the use of a diversion structure which diverts water quality runoff into the retention pond (Pond 5D1) first and then permits runoff to divert into the attenuation facility (Pond 5D2). In addition to the treatment and attenuation provided by ponds 5D1 and 5D2, a third pond (Pond 5D3) receives runoff from a portion of John Young Parkway (.44 Ac.) as well as the proposed Cul-De-Sac on Monte Carlos Trail (.11 Ac.), east of John Young Parkway. This pond has been designed as a dry bottom pond, sized to retain the 100 year - 24 hour storm of 10.6 inches of rainfall. The required treatment volume is recovered in less than 2 hours as the analysis in the following pages will show. Pond 5D3 was analyzed using the program Ponds - Version 1.54, for the 25 year - 24 hour, 25 year - 72 hour, and 100 year - 24 hour storms and used the soils information gathered for this project. The summary of results show the peak stages for the previously mentioned storms. In emergency situations, this pond overflows into a cross drain that passes under John Young Parkway and discharges to a storm sewer system that eventually outfalls to Lake Mann. The permeability of the soils in the pond area are summarized in the following table:

John Young Parkway - Basin 5D
Summary of Permeabilities for Pond 5D3

Boring	Depth from Existing Ground Surface (ft)	Calculated Mean Permeability Rate (ft/day)	Theoretical Vertical Permeability Rate (ft/day)	Theoretical Horizontal Permeability Rate (ft/day)
AB-130	3.0	10	7.1	14.2
AB-132	3.0	9	6.4	12.8
Average	3.0	9.5	6.8	13.5

Note: A vertical permeability of 6.8 was used when designing Pond 5D3

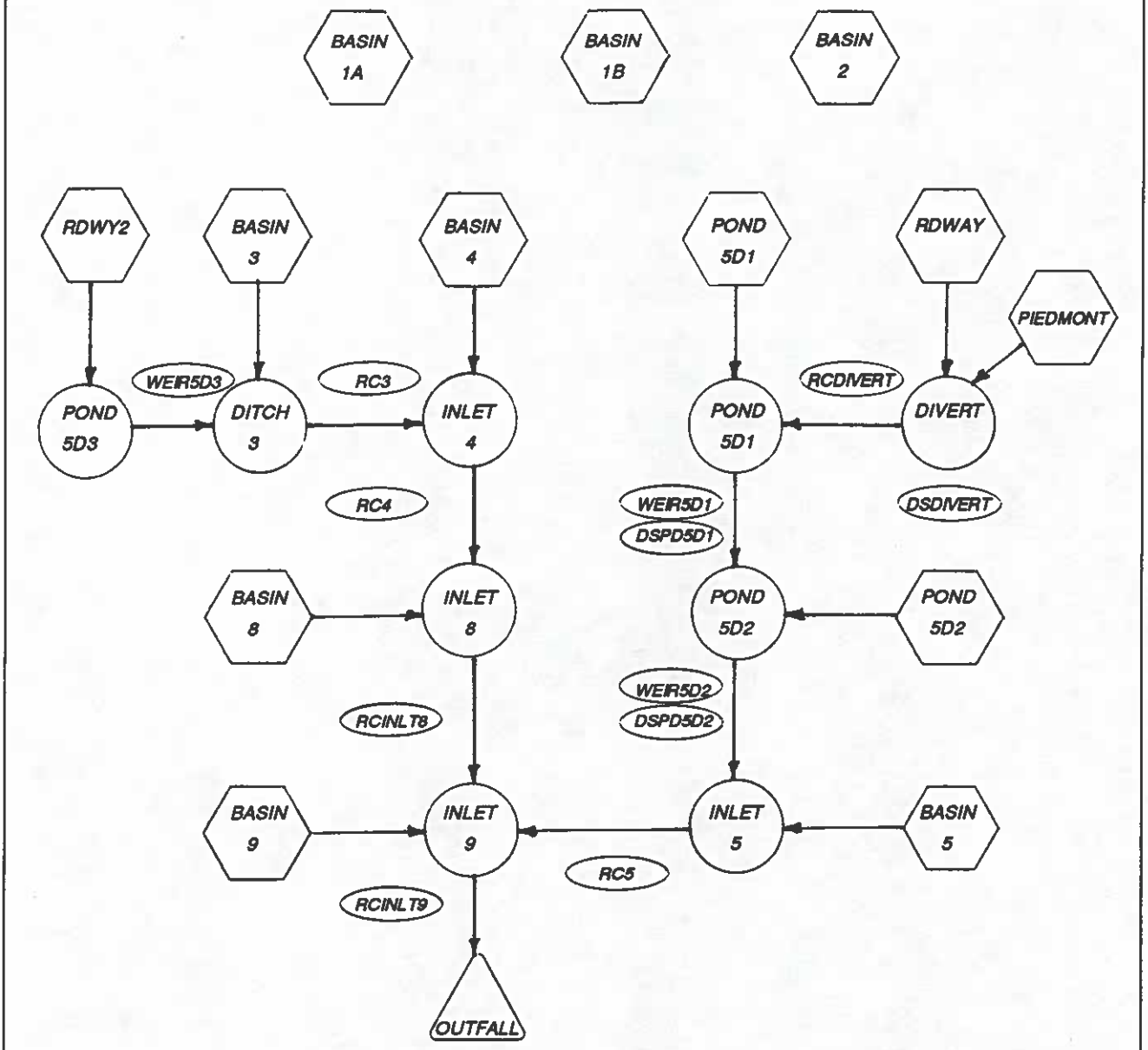
The southern portion of the roadway from approximately station 403+00 to 411+00 will follow the pre-developed drainage pattern and discharge to the existing treatment facility for basin 4. Additional storm sewer systems were constructed in Basin 5D to by-pass the runoff from off-site areas into systems discharging to Lake Mann and Clear Lake.

Due to the lack of topographic relief in the area, it was necessary to by-pass runoff from proposed roadway pavement additions in-order-to provide the proper conveyance to remove the runoff form the site. The primary location where roadway runoff was by-passed was in the area of Carter Street. This side street is to be widened several feet on either side for a length of approximately 400 feet. In addition to Carter St., Monte Carlo Trail is also to be widened for a length of approximately 550 feet. However, we have compensated for this off-site discharge by taking additional impervious areas that would normally runoff site, and redirecting these flows into our treatment pond. The following table summarizes the pre-developed untreated and treated areas from these "trade-off sites" with their post-developed untreated and treated areas.

John Young Parkway - Basin 5D
Summary of Impervious Area Trade

Location	Treated Impervious Area (Ac) Pre-Dev.	Untreated Impervious Area(Ac) Pre-Dev.	Treated Impervious Area (Ac) Post-Dev.	Untreated Impervious Area(Ac) Post-Dev.
Monte Carlo Tr.	0	0.61	0.40	0.35
Orange Center Blvd.	0	1.12	1.26	0.65
Carter Street	0	0.44	0	0.30
Totals	0	2.17	1.66	1.30

Calculations including: post-development curve numbers, times of concentration, water quality treatment volumes, pond stage/area/storage relationships, runoff hydrographs and flood routing results are included in the following pages.



LEGEND:

- Stage/Area/Storage Node
- Stage/Time Node
- Basin Runoff Hydrograph
- Reach Designation

PEC

PROFESSIONAL ENGINEERING CONSULTANTS, INC.

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Orlando, Florida

32801

John Young Parkway

Post–development Basin 5D

"adICPR Schematic"

FIGURE 6-2

Post-development Summary Of Nodes And Reaches
Basin 5D

adICPR Node Name	Description
• BASIN1A	This node was used for analysis of the existing drainage area south of Monte Carlo Trail.
• BASIN2	This node was used for analysis of the existing storm water runoff along Monte Carlo Trail.
• RDWY3	This node was used for analysis of the existing storm water runoff for John Young Parkway Segment I.
• DITCH3	This node represents the stage/area relationship developed for BASIN 3. This stage/area relationship was developed using proposed ditch grades, survey information and Orange County aerial topography.
• INLET4	This node represents the stage/area relationship developed for the proposed inlets and swale design and from survey information and Orange County aerial topography for the existing areas located on the south side of Piedmont Street.
• INLET5	This node represents the stage/area relationship developed from proposed inlets, swale grades and depths located on the north side of Piedmont Street.
• DIVERT	This node represents the stage/area relationship for the proposed storm sewer diversion manhole. This manhole receives storm water runoff from roadway (RDWY) and diverts runoff primarily to POND5D1 then to POND5D2 via a weir.
• POND5D1	This node represents the stage/area relationship developed for the proposed retention facility for POND5D1.
• POND5D2	This node represents the stage/area relationship developed for the proposed retention facility for POND5D2.
• POND5D3	This node represents the stage/area relationship developed for the proposed retention facility for POND5D3.
• INLET8	This node represents the stage/area relationship for the existing inlet located in the southeast corner of Goldwyn Avenue and Piedmont Street.

- INLET9 — This node represents the stage/area relationship for the existing inlet located in the northeast corner of Goldwyn Avenue and Piedmont Street.
- OUTFALL — This node represents the stage/time relationship for an existing manhole located on Goldwyn Avenue. Initial and final tailwater stage was set at existing downstream pipe crown.

adICPR Reach Name Description

- RC3 — This reach represents the proposed cross drain connecting the east (DITCH3) and west (DITCH4) drainage areas at approximately Station 415+10.
- RC4 — This reach represents the existing pipe connection from DITCH4 to INLET8.
- RC5 — This reach represents the proposed pipe connection from DITCH5 to INLET9.
- DSDIVERT — This reach represents the proposed manhole, DIVERT. This reach consist of a weir set at the required water quality treatment elevation for POND5D1 and associated outfall pipe connection to POND5D2.
- RCDIVERT — This reach represents the proposed connection from DIVERT to POND5D1.
- WEIR5D1 — This reach represents the proposed emergency overflow weir from POND5D1 to POND5D2.
- DSPD5D1 — This reach represents the proposed drop structure for POND5D1. The reach consist of a weir set at the water quality treatment elevation for POND5C1, an orifice set at the control water elevation and associated outfall pipe connection to POND5D2.
- WEIR5D2 — This reach represents the proposed emergency overflow weir from POND5D2 to the outfall ditch (DITCH5).
- DSPD5D2 — This reach represents the proposed drop structure for POND5D2. The reach consist of a weir set at the control water elevation for POND5D2 and associated outfall pipe connection to DITCH5.

- WEIR5D3 — This reach represents the proposed emergency overflow weir from POND5D3 to DITCH3.
- RCINLT8 — This reach represents the existing pipe connection from INLET8 to INLET9.
- RCINLT9 — This reach represents the existing pipe connection from INLET9 to OUTFALL.
- RCINLT9 — This reach represents the infiltration rating curve form POND5D3 to the groundwater table.

POST-DEVELOPMENT

CURVE NUMBERS

BASIN 5D

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 01/21/95

Location: Basin 5D - Sub-basin 1A **Checked:** SAK **Date:** 01/21/95

Circle one: Present (Developed) SE Corner of John Young Pkwy and Monte Carlo

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
B/D	RESIDENTIAL DISTRICT 1/4 acre lots	87			1.06	92.22
B/D	WOODS Good Condition	73			1.24	90.52

1/ Use only one CN source per line.

Totals = 2.30 182.74

CN (weighted) = total product/total area Use CN = 79.5

REFERENCE: *Urban Hydrology for Small Watersheds* Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: [illegible]

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 01/21/95

Location: Basin 5D – Sub-basin 1B **Checked:** SAK **Date:** 01/21/95

Circle one: Present (Developed) Roadway drainage to offsite area

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm sewers	98			1.44	141.12
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.52	41.60

1/ Use only one CN source per line.

Totals = 1.96 182.72

CN (weighted) = total product/total area Use CN = 93.2

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: MASCHPSTICNBASIB.WK3

Runoff Curve Number

Project: OR–10 John Young Parkway **By:** KLD **Date:** 01/21/95

Location: Basin 5D – Sub–basin 2 **Checked:** SAK **Date:** 01/21/95

Circle one: Present (Developed) Drainage to Monte Carlo

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2–2	CN (1/) Fig. 2–3	CN (1/) Fig. 2–4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm sewers	98			0.34	33.32
B/D	RESIDENTIAL DISTRICT 1/8 acre or less lots (town houses)	92			0.91	83.72
B/D	RESIDENTIAL DISTRICT 1/2 acre lots	85			0.13	11.05
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			1.14	91.20
B/D	WOODS Good Condition	77			0.85	65.45

1/ Use only one CN source per line.

Totals = 3.37 284.74

CN (weighted) = total product/total area

Use CN = 84.5

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: \BASSDYPSTICNBAS2.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D - Sub-basin 3 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) East side of West Dale Ave.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/)			Area acres	Product of CN x area
		Tab. 2-2	Fig. 2-3	Fig. 2-4		
B/D	RESIDENTIAL DISTRICT 1/4 acre lots	87			0.45	39.15
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.27	21.60
B/D	WOODS Good Condition	77			2.86	220.22

1/ Use only one CN source per line.

Totals = 3.58 280.97

CN (weighted) = total product/total area

Use CN = 78.5

REFERENCE: **Urban Hydrology for Small Watersheds**
Technical Release 55, Soil Conservation
Service, June 1986

FILE NAME \BASSDVFST\CNBAS3.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 04/12/95

Location: Basin 5D - Sub-basin 4 **Checked:** SAK **Date:** 04/12/95

Circle one: Present (Developed) South side of Piedmont St.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	Fig. 2-3	Fig. 2-4	Area acres	Product of CN x area
B/D	WOODS Good Condition	77			0.82	63.14
B/D	RESIDENTIAL DISTRICT 1/4 acre lots	87			2.45	213.15
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.90	72.00

1/ Use only one CN source per line.

Totals = 4.17 348.29

CN (weighted) = total product/total area Use CN = 83.5

REFERENCE: **Urban Hydrology for Small Watersheds** Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: [illegible]

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D – Sub-basin 5 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) North side of Piedmont St.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
	URBAN DISTRICT					
B/D	Commercial and Business	95			1.61	152.95
	RESIDENTIAL DISTRICT					
B/D	1/8 acre or less lots (town houses)	92			4.00	368.00
	RESIDENTIAL DISTRICT					
B/D	1/4 acre lots	87			0.25	21.75
	OPEN AREA					
B/D	Good Condition (grass cover > 75%)	80			2.95	236.00

1/ Use only one CN source per line.

Totals = 8.81 778.70

CN (weighted) = total product/total area Use CN = 88.4

REFERENCE: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME \BASSD\PST\CNBASS.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway By: KLD Date: 01/21/95

Location: Basin 5D – Sub-basin 8 Checked: SAK Date: 01/21/95

Circle one: Present (Developed) South drainage area for Goldwyn Ave.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm sewers	98			0.16	15.68

1/ Use only one CN source per line.

Totals = 0.16 15.68

CN (weighted) = total product/total area

Use CN = 98.0

REFERENCE: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation
Service, June 1986

FILE NAME: BASSDPSTCCBAR8.WK3

Runoff Curve Number

Project: OR–10 John Young Parkway **By:** KLD **Date:** 01/21/95

Location: Basin 5D – Sub-basin 9 **Checked:** SAK **Date:** 01/21/95

Circle one: Present (Developed) South drainage area for Goldwyn Ave.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2–2	CN (1/) Fig. 2–3	CN (1/) Fig. 2–4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm sewers	98			0.38	37.24
	Totals =				0.38	37.24

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = 98.0

REFERENCE: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: [illegible]

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D – Sub-basin Pond 5D1 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed)

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
–	Pond Water Surface Area	100			0.99	99.00
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.31	24.80

1/ Use only one CN source per line.

Totals = 1.30 123.80

CN (weighted) = total product/total area

Use CN = 95.2

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: \BASSD\PST\CNPOSD1.WK3

Runoff Curve Number

Project: OR–10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D – Sub–basin Pond 5D2 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed)

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2–2	CN (1/) Fig. 2–3	CN (1/) Fig. 2–4	Area acres	Product of CN x area
–	Pond Water Surface Area	100			0.83	83.00
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.24	19.20
Totals =					1.07	102.20

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = 95.5

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: \BASSD\PSTI\CNPD5D2.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D - Sub-basin Rdway **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) Roadway drainage to Ponds 5D1

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	Fig. 2-3	Fig. 2-4	Area acres	Product of CN x area
-	IMPERVIOUS AREA Paved: curbs and storm severs	98			5.22	511.56
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			2.20	176.00
	Totals =				7.42	687.56

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = 92.7

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME \BASSO\PSTICNRDWAY.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D - Sub-basin Rdway2 **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) Areas Contributing to Pond 5D3

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
-	IMPERVIOUS AREA Paved: curbs and storm severs	98			0.44	43.12
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.69	55.20
-	Pond Bottom	100			0.16	16.00
	Totals =				1.29	114.32

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = 88.6

REFERENCE: **Urban Hydrology for Small Watersheds**
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME \BASSD\PSTICNRDWAY2.WK3

Runoff Curve Number

Project: OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95

Location: Basin 5D - Sub-basin Piedmont **Checked:** SAK **Date:** 03/10/95

Circle one: Present (Developed) Roadway drainage to Piedmont St.

Runoff Curve Number (CN)

Soil Name and Hydrologic group (Appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN (1/) Tab. 2-2	CN (1/) Fig. 2-3	CN (1/) Fig. 2-4	Area acres	Product of CN x area
–	IMPERVIOUS AREA Paved: curbs and storm severs	98			0.91	89.18
B/D	OPEN AREA Good Condition (grass cover > 75%)	80			0.56	44.80
	Totals =				1.47	133.98

1/ Use only one CN source per line.

CN (weighted) = total product/total area Use CN = **91.1**

REFERENCE: ***Urban Hydrology for Small Watersheds***
Technical Release 55, Soil Conservation Service, June 1986

FILE NAME: \BASSD\PST\CNPIEDM.WK3

POST-DEVELOPMENT

TIME OF CONCENTRATION

BASIN 5D

Time of concentration (Tc) or travel time (Tt)

Project : OR-10 John Young Parkway **By:** KLD **Date:** 01/21/95
Location : Basin 5D - Sub-basin 1A **Checked:** SAK **Date:** 01/21/95

Circle One: Present (Developed) SE Corner John Young Pkwy and Monte Carlo

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCBAS1A.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID	AB	BC	
1. Surface description (Table 3-1)			Grass	Grass	
2. Mannings roughness coeff., n (Table 3-1)			0.24	0.24	
3. Flow length, L (total L < 300 ft.)	ft		125	177	
4. Two-yr 24-hr rainfall, P2	in		4.8	4.8	
5. Land slope, s	ft/ft		0.0096	0.0028	
6. Compute Tt	hr		0.31	0.67	= 0.98

Shallow concentrated flow

		Segment ID	CD		
7. Surface description (Paved or Unpaved)			Unpaved		
8. Flow length, L	ft		210		
9. Watercourse slope, s	ft/ft		0.0024		
10. Average velocity, V (Figure 3-1)	ft/s		0.8		
11. Tt = L/3600V Compute Tt	hr		0.07		= 0.07

Channel Flow

		Segment ID	EF		
12. Cross sectional flow area, a	sf		22.000		Assumed (1)
13. Wetted perimeter, Pw	ft		17.649		
14. Hydraulic radius, r = a/Pw Compute r	ft		1.247		
15. Channel slope, s	ft/ft		0.002		
16. Manning's roughness coeff., n			0.070		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s		1.103		
18. Flow length, L	ft		100		
19. Tt = L/3600V Compute Tt	ft		0.03		= 0.03
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)					hr 1.08
					min 65

(1) Assumed trapezoidal 5-foot bottom width ditch with 3:1 (H:V) side slopes and average depth of 2-feet.

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project : OR-10 John Young Parkway By: KLD Date: 01/21/95
Location : Basin 5D - Sub-basin 2 Checked: SAK Date: 01/21/95

Circle One: Present (Developed) Drainage area to Monte Carlo

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCBAS2.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)		AB		
2. Mannings roughness coeff., n (Table 3-1)		Grass		
3. Flow length, L (total L < 300 ft.)	ft	0.24		
4. Two-yr 24-hr rainfall, P2	in	300		
5. Land slope, s	ft/ft	4.8		
6. Compute Tt	hr	0.003		
		1.00		= 1.00

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)				
8. Flow length, L	ft			
9. Watercourse slope, s	ft/ft			
10. Average velocity, V (Figure 3-1)	ft/s			
11. Tt = L/3600V Compute Tt	hr			= 0.00

Channel Flow

		Segment ID		
12. Cross sectional flow area, a	sf			
13. Wetted perimeter, Pw	ft			
14. Hydraulic radius, r = a/Pw Compute r	ft			
15. Channel slope, s	ft/ft			
16. Manning's roughness coeff., n				
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s			
18. Flow length, L	ft			
19. Tt = L/3600V Compute Tt	ft			= 0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 1.00
				min 60

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project :	OR-10 John Young Parkway	**By:**	KLD	**Date:**	01/21/95
Location :	Basin 5D - Sub-basin 3	**Checked:**	SAK	**Date:**	01/21/95

Circle One: Present (Developed) East side of West Dale Ave.

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCBAS3.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID	AB	BC	
1.	Surface description (Table 3-1)		Grass	Grass	
2.	Mannings roughness coeff., n (Table 3-1)		0.24	0.24	
3.	Flow length, L (total L < 300 ft.)	ft	50	230	
4.	Two-yr 24-hr rainfall, P2	in	4.8	4.8	
5.	Land slope, s	ft/ft	0.002	0.004	
6.	Compute Tt	hr	0.28	0.72	= 1.00

Shallow concentrated flow

		Segment ID	CD	DE	
7.	Surface description (Paved or Unpaved)		Unpaved	Unpaved	
8.	Flow length, L	ft	50	50	
9.	Watercourse slope, s	ft/ft	0.02	0.004	
10.	Average velocity, V (Figure 3-1)	ft/s	2.3	1.0	
11.	Tt = L/3600V Compute Tt	hr	0.01	0.01	= 0.02

Channel Flow

		Segment ID	EF		
12.	Cross sectional flow area, a	sf	4.000		Assumed (1)
13.	Wetted perimeter, Pw	ft	6.472		
14.	Hydraulic radius, r = a/Pw Compute r	ft	0.618		
15.	Channel slope, s	ft/ft	0.004		
16.	Manning's roughness coeff., n		0.024		
17	V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	2.849		
18.	Flow length, L	ft	200		
19.	Tt = L/3600V Compute Tt	ft	0.02		= 0.02
20.	Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 1.04

(1) Assumed trapezoidal 4-foot bottom width ditch with 2:1 (H:V) side slopes and average depth of 1.5-feet.

min 62

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project : OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95
Location : Basin 5C - Sub-basin 4 **Checked:** SAK **Date:** 03/10/95

Circle One: Present (Developed) South side of Piedmont St.

Circle One: Tc Tt through subarea FN: \BAS5C\PST\TCBAS4.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)		AB		
2. Mannings roughness coeff., n (Table 3-1)		Grass		
3. Flow length, L (total L < 300 ft.)	ft	0.24		
4. Two-yr 24-hr rainfall, P2	in	290		
5. Land slope, s	ft/ft	4.8		
6. Compute Tt	hr	0.0017		
		1.22		= 1.22

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)				
8. Flow length, L	ft			
9. Watercourse slope, s	ft/ft			
10. Average velocity, V (Figure 3-1)	ft/s			
11. Tt = L/3600V Compute Tt	hr			= 0.00

Channel Flow

		Segment ID		
		BD	CD	
12. Cross sectional flow area, a	sf	1.7670	3.1416	
13. Wetted perimeter, Pw	ft	4.712	6.2832	
14. Hydraulic radius, r = a/Pw Compute r	ft	0.375	0.500	
15. Channel slope, s	ft/ft	0.0025	0.0025	
16. Manning's roughness coeff., n		0.012	0.012	
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	3.227	3.910	
18. Flow length, L	ft	600	340	
19. Tt = L/3600V Compute Tt	ft	0.05	0.02	= 0.08
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 1.30
				min 78

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project : OR-10 John Young Parkway **By:** KLD **Date:** 03/10/95
Location : Basin 5C - Sub-basin 4 **Checked:** SAK **Date:** 03/10/95

Circle One: Present (Developed) South side of Piedmont St.

Circle One: Tc Tt through subarea FN: \BAS5C\PST\TCBAS4.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)				
2. Mannings roughness coeff., n (Table 3-1)				
3. Flow length, L (total L < 300 ft.)	ft			
4. Two-yr 24-hr rainfall, P2	in			
5. Land slope, s	ft/ft			
6. Compute Tt	hr			= 0.00

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)				
8. Flow length, L	ft			
9. Watercourse slope, s	ft/ft			
10. Average velocity, V (Figure 3-1)	ft/s			
11. Tt = L/3600V Compute Tt	hr			= 0.00

Channel Flow

		Segment ID		
		EF		
12. Cross sectional flow area, a	sf	20.0000	Assumed (1)	
13. Wetted perimeter, Pw	ft	14.944		
14. Hydraulic radius, r = a/Pw Compute r	ft	1.338		
15. Channel slope, s	ft/ft	0.005		
16. Manning's roughness coeff., n		0.024		
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	5.332		
18. Flow length, L	ft	200		
19. Tt = L/3600V Compute Tt	ft	0.01		= 0.01
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 1.31

(1) Assumed trapezoidal 6-foot bottom width ditch with 2:1 (H:V) side slopes and average depth of 2-feet.

min 78

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project :	OR-10 John Young Parkway	**By:**	KLD	**Date:**	03/10/95
Location :	Basin 5D - Sub-basin 5	**Checked:**	SAK	**Date:**	03/10/95

Circle One: Present Developed North side of Piedmont Dr.

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCBAS5.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
1. Surface description (Table 3-1)		AB		
		Grass		
2. Mannings roughness coeff., n (Table 3-1)		0.24		
3. Flow length, L (total L < 300 ft.)	ft	300		
4. Two-yr 24-hr rainfall, P2	in	4.8		
5. Land slope, s	ft/ft	0.0067		
6. Compute Tt	hr	0.72		= 0.72

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)		BC	CD	
		Unpaved	Unpaved	
8. Flow length, L	ft	620	280	
9. Watercourse slope, s	ft/ft	0.0048	0.0028	
10. Average velocity, V (Figure 3-1)	ft/s	1.1	0.9	
11. Tt = L/3600V Compute Tt	hr	0.15	0.09	= 0.25

Channel Flow

		Segment ID		
12. Cross sectional flow area, a	sf	DE	EF	
		4.9087	4.9087	
13. Wetted perimeter, Pw	ft	7.854	7.854	
14. Hydraulic radius, r = a/Pw Compute r	ft	0.625	0.625	
15. Channel slope, s	ft/ft	0.003	0.005	
16. Manning's roughness coeff., n		0.012	0.012	
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	4.538	6.417	
18. Flow length, L	ft	284	20	
19. Tt = L/3600V Compute Tt	ft	0.02	0.00	= 0.02
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 0.99
				min 59

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project :	OR-10 John Young Parkway	**By:**	KLD	**Date:**	03/10/95
Location :	Basin 5D - Sub-basin Rdway2	**Checked:**	SAK	**Date:**	03/10/95

Circle One: Present Developed

Circle One: Tc Tt through subarea FN: \BAS5D\PST\TCRDWAY2.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID			
		AB			
1. Surface description (Table 3-1)		Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.24			
3. Flow length, L (total L < 300 ft.)	ft	100			
4. Two-yr 24-hr rainfall, P2	in	4.8			
5. Land slope, s	ft/ft	0.003			
6. Compute Tt	hr	0.41		=	0.41

Shallow concentrated flow

		Segment ID			
7. Surface description (Paved or Unpaved)					
8. Flow length, L	ft				
9. Watercourse slope, s	ft/ft				
10. Average velocity, V (Figure 3-1)	ft/s				
11. Tt = L/3600V Compute Tt	hr			=	0.00

Channel Flow

		Segment ID			
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	ft			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr	0.41
				min	25

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Time of concentration (Tc) or travel time (Tt)

Project :	OR-10 John Young Parkway	**By:**	KLD	**Date:**	03/10/95
Location :	Basin 5D - Sub-basin Piedmont	**Checked:**	SAK	**Date:**	03/10/95

Circle One: Present Developed — Piedmont St.

Circle One: Tc Tt through subarea — FN: \BAS5D\PST\TCPIEDM.WQ2

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Sheet flow (Applicable to Tc only)

		Segment ID		
		AB		
1. Surface description (Table 3-1)				
2. Mannings roughness coeff., n (Table 3-1)				
3. Flow length, L (total L < 300 ft.)	ft			
4. Two-yr 24-hr rainfall, P2	in			
5. Land slope, s	ft/ft			
6. Compute Tt	hr	0.16	0.00	0.16

Shallow concentrated flow

		Segment ID		
7. Surface description (Paved or Unpaved)				
8. Flow length, L	ft			
9. Watercourse slope, s	ft/ft			
10. Average velocity, V (Figure 3-1)	ft/s			
11. Tt = L/3600V Compute Tt	hr	0.00	0.00	0.00

Channel Flow

		Segment ID		
		BC	CD	
12. Cross sectional flow area, a	sf	1.7670	3.1416	
13. Wetted perimeter, Pw	ft	4.712	6.2832	
14. Hydraulic radius, r = a/Pw Compute r	ft	0.375	0.500	
15. Channel slope, s	ft/ft	0.002	0.002	
16. Manning's roughness coeff., n		0.012	0.012	
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s	2.887	3.497	
18. Flow length, L	ft	900	240	
19. Tt = L/3600V Compute Tt	hr	0.09	0.02	0.11
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11, and 19)				hr 0.27
				min 16

Reference: *Urban Hydrology for Small Watersheds*
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

APPENDIX E

POST DEVELOPMENT DRAINAGE CALCULATIONS

Simulation: 10072

Scenario: Scenario1
Run Date/Time: 11/12/2024 3:11:32 PM
Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	72.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

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

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

IA Recovery Time: 24.0000 hr
Ia/S: 0.20 dec

Max dZ:	1.0000 ft	Smp/Man Basin Rain Opt:	Global
Link Optimizer Tol:	0.0001 ft		
		Rainfall Name:	~FLMOD
		Rainfall Amount:	11.50 in
		Storm Duration:	72.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 2524

Scenario: Scenario1
Run Date/Time: 11/12/2024 3:11:42 PM
Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	336.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	60.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources		Lookup Tables	
Rainfall Folder:		Boundary Stage Set:	
		Extern Hydrograph Set:	
Unit Hydrograph Folder:		Curve Number Set:	
		Green-Ampt Set:	
		Vertical Layers Set:	
		Impervious Set:	

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec	Ia/S:	0.20 dec
dZ Tolerance:	0.0010 ft		
Max dZ:	1.0000 ft	Smp/Man Basin Rain Opt:	Global
Link Optimizer Tol:	0.0001 ft		
		Rainfall Name:	~FLMOD
		Rainfall Amount:	8.30 in
		Storm Duration:	24.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simple Basin: BASIN A

Scenario:	Scenario1
Node:	WET RETENTION
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	9999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	7.6800 ac
Curve Number:	74.0
Ia/S:	0.00
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Simple Basin Runoff Summary [Scenario1]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]
BASIN A	10072	18.60	36.0000	11.50	8.13	7.6800
BASIN A	2524	28.07	12.0500	8.30	5.19	7.6800

Simple Basin: BASIN B

Scenario:	Scenario1
Node:	WET RETENTION
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	9999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	4.8200 ac
Curve Number:	85.0
Ia/S:	0.00
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Simple Basin Runoff Summary [Scenario1]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]
BASIN B	10072	13.03	36.0000	11.50	9.60	4.8200
BASIN B	2524	21.40	12.0500	8.30	6.50	4.8200

Simple Basin: FDOT RDWAY

Scenario:	Scenario1
Node:	WET RETENTION
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	35.0000 min

Max Allowable Q:	9999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	7.4200 ac
Curve Number:	93.0
Ia/S:	0.00
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Simple Basin Runoff Summary [Scenario1]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]
FDOT RDWAY	10072	15.86	36.2000	11.50	10.60	7.4200
FDOT RDWAY	2524	20.07	12.3333	8.30	7.46	7.4200

Simple Basin: PIEDMONT

Scenario:	Scenario1
Node:	WET RETENTION
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	16.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	1.0200 ac
Curve Number:	91.0
Ia/S:	0.00
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Simple Basin Runoff Summary [Scenario1]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max	Total Rainfall	Total Runoff	Area [ac]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]
PIEDMONT	10072	2.70	36.0333	11.50	10.37	1.0200
PIEDMONT	2524	4.02	12.1000	8.30	7.22	1.0200

Node: LAKE MANN

Scenario: Scenario1
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 94.85 ft
Warning Stage: 0.00 ft
Alert Stage: 0.00 ft
Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	94.85
0	0	0	24.0000	94.85
0	0	0	72.0000	94.85
0	0	0	128.0000	94.85

Comment:

Node Max Conditions w/ Times [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Alert Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]	Time to Max Stage [hr]	Time to Min/Max Delta Stage [hr]	Time to Max Total Inflow [hr]	Time to Max Total Outflow [hr]
LAKE MANN	10072	0.00	0.00	94.85	0.0000	16.86	0.00	0	0.0000	0.0000	37.3409	0.0000
LAKE MANN	2524	0.00	0.00	94.85	0.0000	15.64	0.00	0	0.0000	0.0000	13.4094	0.0000

Node: WET RETENTION

Scenario: Scenario1
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 97.88 ft
Warning Stage: 100.00 ft
Alert Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
90.00	0.00	0
91.00	2.03	88427
92.00	4.22	183823
93.00	6.58	286625
94.00	9.11	396832
95.00	11.81	514444
96.00	14.69	639896
97.00	17.75	773190
97.88	20.58	896465
98.00	20.98	913889
98.62	23.08	1005365
99.00	24.40	1062864
100.00	28.14	1225778

Comment:

Node Max Conditions w/ Times [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Alert Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]	Time to Max Stage [hr]	Time to Min/Max Delta Stage [hr]	Time to Max Total Inflow [hr]	Time to Max Total Outflow [hr]
WET RETENTION	10072	100.00	0.00	99.81	0.0010	49.49	16.86	166481	37.3076	35.4284	36.0162	37.3409
WET RETENTION	2524	100.00	0.00	99.50	0.0010	68.30	15.64	162876	13.3761	11.1889	12.0666	13.4094

Drop Structure Link: WET POND DISCHARGE		Upstream Pipe		Downstream Pipe	
Scenario:	Scenario1	Invert:	97.00 ft	Invert:	94.90 ft
From Node:	WET RETENTION	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	LAKE MANN	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	2.00 ft	Max Depth:	2.00 ft
Pipe Flow Direction:	Both	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:	600.00 ft	Top Clip			
FHWA Code:	0	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.00	Op Table:		Op Table:	
Exit Loss Coef:	0.00	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
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Circular
Invert:	97.88 ft
Control Elevation:	97.88 ft
Max Depth:	0.32 ft

Bottom Clip

Default:	0.00 ft
Op Table:	
Ref Node:	

Top Clip

Default:	0.00 ft
Op Table:	
Ref Node:	

Discharge Coefficients

Weir Default:	3.200
Weir Table:	
Orifice Default:	0.600
Orifice Table:	

Weir Comment:

Weir Component

Weir:	2
Weir Count:	4
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	98.62 ft
Control Elevation:	98.62 ft
Max Depth:	0.88 ft
Max Width:	4.00 ft
Fillet:	0.00 ft

Bottom Clip

Default:	0.00 ft
Op Table:	
Ref Node:	

Top Clip

Default:	0.00 ft
Op Table:	
Ref Node:	

Discharge Coefficients

Weir Default:	3.200
Weir Table:	
Orifice Default:	0.600
Orifice Table:	

Weir Comment:

Weir Component

Weir:	3
Weir Count:	2
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	99.50 ft
Control Elevation:	99.50 ft
Max Depth:	999.00 ft
Max Width:	14.00 ft
Fillet:	0.00 ft

Bottom Clip

Default:	0.00 ft
Op Table:	
Ref Node:	

Top Clip

Default:	0.00 ft
Op Table:	
Ref Node:	

Discharge Coefficients

Weir Default:	3.200
Weir Table:	
Orifice Default:	0.600

Orifice Table:

Weir Comment:

Drop Structure Comment:

Link Min/Max Conditions with Times [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Time to Max Flow [hrs]	Time to Min Flow [hrs]	Time to Min/Max Delta Flow [hrs]	Time to Max Us Velocity [hrs]	Time to Max Ds Velocity [hrs]
WET POND DISCHARGE - Pipe	10072	16.86	0.00	0.11	0.00	0.00	37.3409	0.0000	40.8229	0.0000	0.0000
WET POND DISCHARGE - Weir: 1	10072	0.36	0.00	0.03	4.42	4.42	35.0108	0.0000	39.1001	35.0108	35.0108
WET POND DISCHARGE - Weir: 2	10072	15.55	0.00	0.17	2.02	2.02	39.3312	0.0000	40.8229	41.3888	41.3888
WET POND DISCHARGE - Weir: 3	10072	5.77	0.00	-0.04	0.81	0.81	37.2993	0.0000	37.5993	38.7297	38.7297
WET POND DISCHARGE - Pipe	2524	15.64	0.00	0.12	0.00	0.00	13.4094	0.0000	15.7969	0.0000	0.0000
WET POND DISCHARGE - Weir: 1	2524	0.36	0.00	0.00	4.42	4.42	12.0895	0.0000	12.3268	12.0895	12.0895
WET POND DISCHARGE - Weir: 2	2524	15.54	0.00	-0.17	2.02	2.02	13.3677	0.0000	12.3268	12.2000	12.2000

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Time to Max Flow [hrs]	Time to Min Flow [hrs]	Time to Min/Max Delta Flow [hrs]	Time to Max Us Velocity [hrs]	Time to Max Ds Velocity [hrs]
WET POND DISCHARGE - Weir: 3	2524	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000

Drop Structure Link: WET POND DISCHARGE		Upstream Pipe		Downstream Pipe	
Scenario:	Scenario1	Invert:	97.00 ft	Invert:	94.90 ft
From Node:	WET RETENTION	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	LAKE MANN	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	2.00 ft	Max Depth:	2.00 ft
Pipe Flow Direction:	Both	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:	600.00 ft	Top Clip			
FHWA Code:	0	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.00	Op Table:		Op Table:	
Exit Loss Coef:	0.00	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		Bottom Clip	
Weir:	1	Default:	0.00 ft
Weir Count:	1	Op Table:	
Weir Flow Direction:	Both	Ref Node:	
Damping:	0.0000 ft	Top Clip	
Weir Type:	Sharp Crested Vertical	Default:	0.00 ft
Geometry Type:	Circular	Op Table:	
Invert:	97.88 ft	Ref Node:	
Control Elevation:	97.88 ft	Discharge Coefficients	
Max Depth:	0.32 ft	Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component

Weir:	2
Weir Count:	4
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	98.62 ft
Control Elevation:	98.62 ft
Max Depth:	0.88 ft
Max Width:	4.00 ft
Fillet:	0.00 ft

Bottom Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	

Top Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	

Discharge Coefficients	
Weir Default:	3.200
Weir Table:	
Orifice Default:	0.600
Orifice Table:	

Weir Comment:

Weir Component

Weir:	3
Weir Count:	2
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	99.50 ft
Control Elevation:	99.50 ft
Max Depth:	999.00 ft
Max Width:	14.00 ft
Fillet:	0.00 ft

Bottom Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	

Top Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	

Discharge Coefficients	
Weir Default:	3.200
Weir Table:	
Orifice Default:	0.600
Orifice Table:	

Weir Comment:

Drop Structure Comment:

Link Min/Max Conditions with Times [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Time to Max Flow [hrs]	Time to Min Flow [hrs]	Time to Min/Max Delta Flow [hrs]	Time to Max Us Velocity [hrs]	Time to Max Ds Velocity [hrs]
WET POND DISCHARGE - Pipe	10072	16.86	0.00	0.11	0.00	0.00	37.3409	0.0000	40.8229	0.0000	0.0000
WET POND	10072	0.36	0.00	0.03	4.42	4.42	35.0108	0.0000	39.1001	35.0108	35.0108

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Time to Max Flow [hrs]	Time to Min Flow [hrs]	Time to Min/Max Delta Flow [hrs]	Time to Max Us Velocity [hrs]	Time to Max Ds Velocity [hrs]
DISCHARGE - Weir: 1											
WET POND DISCHARGE - Weir: 2	10072	15.55	0.00	0.17	2.02	2.02	39.3312	0.0000	40.8229	41.3888	41.3888
WET POND DISCHARGE - Weir: 3	10072	5.77	0.00	-0.04	0.81	0.81	37.2993	0.0000	37.5993	38.7297	38.7297
WET POND DISCHARGE - Pipe	2524	15.64	0.00	0.12	0.00	0.00	13.4094	0.0000	15.7969	0.0000	0.0000
WET POND DISCHARGE - Weir: 1	2524	0.36	0.00	0.00	4.42	4.42	12.0895	0.0000	12.3268	12.0895	12.0895
WET POND DISCHARGE - Weir: 2	2524	15.54	0.00	-0.17	2.02	2.02	13.3677	0.0000	12.3268	12.2000	12.2000
WET POND DISCHARGE - Weir: 3	2524	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000

Scenario	Sim	Node Name	Relative Time [hrs]	Stage [ft]
Scenario1	2524	WET RETENTION	0.0000	97.88
Scenario1	2524	WET RETENTION	1.0027	97.88
Scenario1	2524	WET RETENTION	2.0027	97.88
Scenario1	2524	WET RETENTION	3.0027	97.88
Scenario1	2524	WET RETENTION	4.0027	97.89
Scenario1	2524	WET RETENTION	5.0027	97.90
Scenario1	2524	WET RETENTION	6.0027	97.92
Scenario1	2524	WET RETENTION	7.0027	97.95
Scenario1	2524	WET RETENTION	8.0027	97.99
Scenario1	2524	WET RETENTION	9.0027	98.05
Scenario1	2524	WET RETENTION	10.0027	98.13
Scenario1	2524	WET RETENTION	11.0042	98.26
Scenario1	2524	WET RETENTION	12.0006	98.75
Scenario1	2524	WET RETENTION	13.0012	99.47
Scenario1	2524	WET RETENTION	14.0011	99.46
Scenario1	2524	WET RETENTION	15.0015	99.31
Scenario1	2524	WET RETENTION	16.0020	99.11
Scenario1	2524	WET RETENTION	17.0006	98.93
Scenario1	2524	WET RETENTION	18.0042	98.84
Scenario1	2524	WET RETENTION	19.0042	98.80
Scenario1	2524	WET RETENTION	20.0042	98.78
Scenario1	2524	WET RETENTION	21.0042	98.76
Scenario1	2524	WET RETENTION	22.0042	98.75
Scenario1	2524	WET RETENTION	23.0042	98.74
Scenario1	2524	WET RETENTION	24.0042	98.73
Scenario1	2524	WET RETENTION	25.0042	98.70
Scenario1	2524	WET RETENTION	26.0042	98.68
Scenario1	2524	WET RETENTION	27.0042	98.66
Scenario1	2524	WET RETENTION	28.0042	98.64
Scenario1	2524	WET RETENTION	29.0042	98.63
Scenario1	2524	WET RETENTION	30.0042	98.63
Scenario1	2524	WET RETENTION	31.0042	98.62
Scenario1	2524	WET RETENTION	32.0042	98.61
Scenario1	2524	WET RETENTION	33.0042	98.60
Scenario1	2524	WET RETENTION	34.0042	98.60
Scenario1	2524	WET RETENTION	35.0042	98.59
Scenario1	2524	WET RETENTION	36.0042	98.58
Scenario1	2524	WET RETENTION	37.0042	98.58
Scenario1	2524	WET RETENTION	38.0042	98.57
Scenario1	2524	WET RETENTION	39.0042	98.56
Scenario1	2524	WET RETENTION	40.0042	98.56
Scenario1	2524	WET RETENTION	41.0042	98.55

Scenario	Sim	Node Name	Relative Time [hrs]	Stage [ft]
Scenario1	2524	WET RETENTION	42.0042	98.54
Scenario1	2524	WET RETENTION	43.0042	98.54
Scenario1	2524	WET RETENTION	44.0042	98.53
Scenario1	2524	WET RETENTION	45.0042	98.52
Scenario1	2524	WET RETENTION	46.0042	98.52
Scenario1	2524	WET RETENTION	47.0042	98.51
Scenario1	2524	WET RETENTION	48.0042	98.50
Scenario1	2524	WET RETENTION	49.0042	98.50
Scenario1	2524	WET RETENTION	50.0042	98.49
Scenario1	2524	WET RETENTION	51.0042	98.48
Scenario1	2524	WET RETENTION	52.0042	98.48
Scenario1	2524	WET RETENTION	53.0042	98.47
Scenario1	2524	WET RETENTION	54.0042	98.47
Scenario1	2524	WET RETENTION	55.0042	98.46
Scenario1	2524	WET RETENTION	56.0042	98.45
Scenario1	2524	WET RETENTION	57.0042	98.45
Scenario1	2524	WET RETENTION	58.0042	98.44
Scenario1	2524	WET RETENTION	59.0042	98.44
Scenario1	2524	WET RETENTION	60.0042	98.43
Scenario1	2524	WET RETENTION	61.0042	98.42
Scenario1	2524	WET RETENTION	62.0042	98.42
Scenario1	2524	WET RETENTION	63.0042	98.41
Scenario1	2524	WET RETENTION	64.0042	98.41
Scenario1	2524	WET RETENTION	65.0042	98.40
Scenario1	2524	WET RETENTION	66.0042	98.40
Scenario1	2524	WET RETENTION	67.0042	98.39
Scenario1	2524	WET RETENTION	68.0042	98.38
Scenario1	2524	WET RETENTION	69.0042	98.38
Scenario1	2524	WET RETENTION	70.0042	98.37
Scenario1	2524	WET RETENTION	71.0042	98.37
Scenario1	2524	WET RETENTION	72.0042	98.36
Scenario1	2524	WET RETENTION	73.0042	98.36
Scenario1	2524	WET RETENTION	74.0042	98.35
Scenario1	2524	WET RETENTION	75.0042	98.35
Scenario1	2524	WET RETENTION	76.0042	98.34
Scenario1	2524	WET RETENTION	77.0042	98.34
Scenario1	2524	WET RETENTION	78.0042	98.33
Scenario1	2524	WET RETENTION	79.0042	98.33
Scenario1	2524	WET RETENTION	80.0042	98.32
Scenario1	2524	WET RETENTION	81.0042	98.32
Scenario1	2524	WET RETENTION	82.0042	98.31
Scenario1	2524	WET RETENTION	83.0042	98.31

Scenario	Sim	Node Name	Relative Time [hrs]	Stage [ft]
Scenario1	2524	WET RETENTION	84.0042	98.30
Scenario1	2524	WET RETENTION	85.0042	98.30
Scenario1	2524	WET RETENTION	86.0042	98.29
Scenario1	2524	WET RETENTION	87.0042	98.29
Scenario1	2524	WET RETENTION	88.0042	98.28
Scenario1	2524	WET RETENTION	89.0042	98.28
Scenario1	2524	WET RETENTION	90.0042	98.27
Scenario1	2524	WET RETENTION	91.0042	98.27
Scenario1	2524	WET RETENTION	92.0042	98.26
Scenario1	2524	WET RETENTION	93.0042	98.26
Scenario1	2524	WET RETENTION	94.0042	98.26
Scenario1	2524	WET RETENTION	95.0042	98.25
Scenario1	2524	WET RETENTION	96.0042	98.25
Scenario1	2524	WET RETENTION	97.0042	98.24
Scenario1	2524	WET RETENTION	98.0042	98.24
Scenario1	2524	WET RETENTION	99.0042	98.24
Scenario1	2524	WET RETENTION	100.0042	98.23
Scenario1	2524	WET RETENTION	101.0042	98.23
Scenario1	2524	WET RETENTION	102.0042	98.22
Scenario1	2524	WET RETENTION	103.0042	98.22
Scenario1	2524	WET RETENTION	104.0042	98.22
Scenario1	2524	WET RETENTION	105.0042	98.21
Scenario1	2524	WET RETENTION	106.0042	98.21
Scenario1	2524	WET RETENTION	107.0042	98.21
Scenario1	2524	WET RETENTION	108.0042	98.20
Scenario1	2524	WET RETENTION	109.0042	98.20
Scenario1	2524	WET RETENTION	110.0042	98.20
Scenario1	2524	WET RETENTION	111.0042	98.19
Scenario1	2524	WET RETENTION	112.0042	98.19
Scenario1	2524	WET RETENTION	113.0042	98.19
Scenario1	2524	WET RETENTION	114.0042	98.18
Scenario1	2524	WET RETENTION	115.0042	98.18
Scenario1	2524	WET RETENTION	116.0042	98.18
Scenario1	2524	WET RETENTION	117.0042	98.17
Scenario1	2524	WET RETENTION	118.0042	98.17
Scenario1	2524	WET RETENTION	119.0042	98.17
Scenario1	2524	WET RETENTION	120.0042	98.16
Scenario1	2524	WET RETENTION	121.0042	98.16
Scenario1	2524	WET RETENTION	122.0042	98.16
Scenario1	2524	WET RETENTION	123.0042	98.15
Scenario1	2524	WET RETENTION	124.0042	98.15
Scenario1	2524	WET RETENTION	125.0042	98.15

Scenario	Sim	Node Name	Relative Time [hrs]	Stage [ft]
Scenario1	2524	WET RETENTION	126.0042	98.15
Scenario1	2524	WET RETENTION	127.0042	98.14
Scenario1	2524	WET RETENTION	128.0042	98.14
Scenario1	2524	WET RETENTION	129.0042	98.14
Scenario1	2524	WET RETENTION	130.0042	98.14
Scenario1	2524	WET RETENTION	131.0042	98.13
Scenario1	2524	WET RETENTION	132.0042	98.13
Scenario1	2524	WET RETENTION	133.0042	98.13
Scenario1	2524	WET RETENTION	134.0042	98.13
Scenario1	2524	WET RETENTION	135.0042	98.12
Scenario1	2524	WET RETENTION	136.0042	98.12
Scenario1	2524	WET RETENTION	137.0042	98.12
Scenario1	2524	WET RETENTION	138.0042	98.12
Scenario1	2524	WET RETENTION	139.0042	98.11
Scenario1	2524	WET RETENTION	140.0042	98.11
Scenario1	2524	WET RETENTION	141.0042	98.11
Scenario1	2524	WET RETENTION	142.0042	98.11
Scenario1	2524	WET RETENTION	143.0042	98.11
Scenario1	2524	WET RETENTION	144.0042	98.10
Scenario1	2524	WET RETENTION	145.0042	98.10
Scenario1	2524	WET RETENTION	146.0042	98.10
Scenario1	2524	WET RETENTION	147.0042	98.10
Scenario1	2524	WET RETENTION	148.0042	98.10
Scenario1	2524	WET RETENTION	149.0042	98.09
Scenario1	2524	WET RETENTION	150.0042	98.09
Scenario1	2524	WET RETENTION	151.0042	98.09
Scenario1	2524	WET RETENTION	152.0042	98.09
Scenario1	2524	WET RETENTION	153.0042	98.09
Scenario1	2524	WET RETENTION	154.0042	98.08
Scenario1	2524	WET RETENTION	155.0042	98.08
Scenario1	2524	WET RETENTION	156.0042	98.08
Scenario1	2524	WET RETENTION	157.0042	98.08
Scenario1	2524	WET RETENTION	158.0042	98.08
Scenario1	2524	WET RETENTION	159.0042	98.08
Scenario1	2524	WET RETENTION	160.0042	98.07
Scenario1	2524	WET RETENTION	161.0042	98.07
Scenario1	2524	WET RETENTION	162.0042	98.07
Scenario1	2524	WET RETENTION	163.0042	98.07
Scenario1	2524	WET RETENTION	164.0042	98.07
Scenario1	2524	WET RETENTION	165.0042	98.07
Scenario1	2524	WET RETENTION	166.0042	98.06
Scenario1	2524	WET RETENTION	167.0042	98.06

Scenario	Sim	Node Name	Relative Time [hrs]	Stage [ft]
Scenario1	2524	WET RETENTION	168.0042	98.06
Scenario1	2524	WET RETENTION	169.0042	98.06
Scenario1	2524	WET RETENTION	170.0042	98.06
Scenario1	2524	WET RETENTION	171.0042	98.06
Scenario1	2524	WET RETENTION	172.0042	98.06
Scenario1	2524	WET RETENTION	173.0042	98.05
Scenario1	2524	WET RETENTION	174.0042	98.05
Scenario1	2524	WET RETENTION	175.0042	98.05
Scenario1	2524	WET RETENTION	176.0042	98.05
Scenario1	2524	WET RETENTION	177.0042	98.05
Scenario1	2524	WET RETENTION	178.0042	98.05
Scenario1	2524	WET RETENTION	179.0042	98.05
Scenario1	2524	WET RETENTION	180.0042	98.05
Scenario1	2524	WET RETENTION	181.0042	98.04
Scenario1	2524	WET RETENTION	182.0042	98.04
Scenario1	2524	WET RETENTION	183.0042	98.04
Scenario1	2524	WET RETENTION	184.0042	98.04
Scenario1	2524	WET RETENTION	185.0042	98.04
Scenario1	2524	WET RETENTION	186.0042	98.04
Scenario1	2524	WET RETENTION	187.0042	98.04
Scenario1	2524	WET RETENTION	188.0042	98.04
Scenario1	2524	WET RETENTION	189.0042	98.04
Scenario1	2524	WET RETENTION	190.0042	98.03
Scenario1	2524	WET RETENTION	191.0042	98.03
Scenario1	2524	WET RETENTION	192.0042	98.03
Scenario1	2524	WET RETENTION	193.0042	98.03
Scenario1	2524	WET RETENTION	194.0042	98.03
Scenario1	2524	WET RETENTION	195.0042	98.03
Scenario1	2524	WET RETENTION	196.0042	98.03
Scenario1	2524	WET RETENTION	197.0042	98.03
Scenario1	2524	WET RETENTION	198.0042	98.03
Scenario1	2524	WET RETENTION	199.0042	98.02
Scenario1	2524	WET RETENTION	200.0042	98.02
Scenario1	2524	WET RETENTION	201.0042	98.02
Scenario1	2524	WET RETENTION	202.0042	98.02
Scenario1	2524	WET RETENTION	203.0042	98.02
Scenario1	2524	WET RETENTION	204.0042	98.02
Scenario1	2524	WET RETENTION	205.0042	98.02
Scenario1	2524	WET RETENTION	206.0042	98.02
Scenario1	2524	WET RETENTION	207.0042	98.02
Scenario1	2524	WET RETENTION	208.0042	98.02
Scenario1	2524	WET RETENTION	209.0042	98.02

Scenario	Sim	Node Name	Relative Time [hrs]	Stage [ft]
Scenario1	2524	WET RETENTION	210.0042	98.02
Scenario1	2524	WET RETENTION	211.0042	98.01
Scenario1	2524	WET RETENTION	212.0042	98.01
Scenario1	2524	WET RETENTION	213.0042	98.01
Scenario1	2524	WET RETENTION	214.0042	98.01
Scenario1	2524	WET RETENTION	215.0042	98.01
Scenario1	2524	WET RETENTION	216.0042	98.01
Scenario1	2524	WET RETENTION	217.0042	98.01
Scenario1	2524	WET RETENTION	218.0042	98.01
Scenario1	2524	WET RETENTION	219.0042	98.01
Scenario1	2524	WET RETENTION	220.0042	98.01
Scenario1	2524	WET RETENTION	221.0042	98.01
Scenario1	2524	WET RETENTION	222.0042	98.01
Scenario1	2524	WET RETENTION	223.0042	98.00
Scenario1	2524	WET RETENTION	224.0042	98.00
Scenario1	2524	WET RETENTION	225.0042	98.00
Scenario1	2524	WET RETENTION	226.0042	98.00
Scenario1	2524	WET RETENTION	227.0042	98.00
Scenario1	2524	WET RETENTION	228.0042	98.00
Scenario1	2524	WET RETENTION	229.0042	98.00
Scenario1	2524	WET RETENTION	230.0042	98.00
Scenario1	2524	WET RETENTION	231.0042	98.00
Scenario1	2524	WET RETENTION	232.0042	98.00
Scenario1	2524	WET RETENTION	233.0042	98.00
Scenario1	2524	WET RETENTION	234.0042	98.00
Scenario1	2524	WET RETENTION	235.0042	98.00
Scenario1	2524	WET RETENTION	236.0042	98.00
Scenario1	2524	WET RETENTION	237.0042	98.00
Scenario1	2524	WET RETENTION	238.0042	97.99
Scenario1	2524	WET RETENTION	239.0042	97.99
Scenario1	2524	WET RETENTION	240.0042	97.99
Scenario1	2524	WET RETENTION	241.0042	97.99
Scenario1	2524	WET RETENTION	242.0042	97.99
Scenario1	2524	WET RETENTION	243.0042	97.99
Scenario1	2524	WET RETENTION	244.0042	97.99
Scenario1	2524	WET RETENTION	245.0042	97.99
Scenario1	2524	WET RETENTION	246.0042	97.99
Scenario1	2524	WET RETENTION	247.0042	97.99
Scenario1	2524	WET RETENTION	248.0042	97.99
Scenario1	2524	WET RETENTION	249.0042	97.99
Scenario1	2524	WET RETENTION	250.0042	97.99
Scenario1	2524	WET RETENTION	251.0042	97.99

Scenario	Sim	Node Name	Relative Time [hrs]	Stage [ft]
Scenario1	2524	WET RETENTION	252.0042	97.99
Scenario1	2524	WET RETENTION	253.0042	97.99
Scenario1	2524	WET RETENTION	254.0042	97.99
Scenario1	2524	WET RETENTION	255.0042	97.99
Scenario1	2524	WET RETENTION	256.0042	97.98
Scenario1	2524	WET RETENTION	257.0042	97.98
Scenario1	2524	WET RETENTION	258.0042	97.98
Scenario1	2524	WET RETENTION	259.0042	97.98
Scenario1	2524	WET RETENTION	260.0042	97.98
Scenario1	2524	WET RETENTION	261.0042	97.98
Scenario1	2524	WET RETENTION	262.0042	97.98
Scenario1	2524	WET RETENTION	263.0042	97.98
Scenario1	2524	WET RETENTION	264.0042	97.98
Scenario1	2524	WET RETENTION	265.0042	97.98
Scenario1	2524	WET RETENTION	266.0042	97.98
Scenario1	2524	WET RETENTION	267.0042	97.98
Scenario1	2524	WET RETENTION	268.0042	97.98
Scenario1	2524	WET RETENTION	269.0042	97.98
Scenario1	2524	WET RETENTION	270.0042	97.98
Scenario1	2524	WET RETENTION	271.0042	97.98
Scenario1	2524	WET RETENTION	272.0042	97.98
Scenario1	2524	WET RETENTION	273.0042	97.98
Scenario1	2524	WET RETENTION	274.0042	97.98
Scenario1	2524	WET RETENTION	275.0042	97.98
Scenario1	2524	WET RETENTION	276.0042	97.98
Scenario1	2524	WET RETENTION	277.0042	97.97
Scenario1	2524	WET RETENTION	278.0042	97.97
Scenario1	2524	WET RETENTION	279.0042	97.97
Scenario1	2524	WET RETENTION	280.0042	97.97
Scenario1	2524	WET RETENTION	281.0042	97.97
Scenario1	2524	WET RETENTION	282.0042	97.97
Scenario1	2524	WET RETENTION	283.0042	97.97
Scenario1	2524	WET RETENTION	284.0042	97.97
Scenario1	2524	WET RETENTION	285.0042	97.97
Scenario1	2524	WET RETENTION	286.0042	97.97
Scenario1	2524	WET RETENTION	287.0042	97.97
Scenario1	2524	WET RETENTION	288.0042	97.97
Scenario1	2524	WET RETENTION	289.0042	97.97
Scenario1	2524	WET RETENTION	290.0042	97.97
Scenario1	2524	WET RETENTION	291.0042	97.97
Scenario1	2524	WET RETENTION	292.0042	97.97
Scenario1	2524	WET RETENTION	293.0042	97.97

Scenario	Sim	Node Name	Relative Time [hrs]	Stage [ft]
Scenario1	2524	WET RETENTION	294.0042	97.97
Scenario1	2524	WET RETENTION	295.0042	97.97
Scenario1	2524	WET RETENTION	296.0042	97.97
Scenario1	2524	WET RETENTION	297.0042	97.97
Scenario1	2524	WET RETENTION	298.0042	97.97
Scenario1	2524	WET RETENTION	299.0042	97.97
Scenario1	2524	WET RETENTION	300.0042	97.97
Scenario1	2524	WET RETENTION	301.0042	97.97
Scenario1	2524	WET RETENTION	302.0042	97.96
Scenario1	2524	WET RETENTION	303.0042	97.96
Scenario1	2524	WET RETENTION	304.0042	97.96
Scenario1	2524	WET RETENTION	305.0042	97.96
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Scenario1	2524	WET RETENTION	307.0042	97.96
Scenario1	2524	WET RETENTION	308.0042	97.96
Scenario1	2524	WET RETENTION	309.0042	97.96
Scenario1	2524	WET RETENTION	310.0042	97.96
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Scenario1	2524	WET RETENTION	330.0042	97.96
Scenario1	2524	WET RETENTION	331.0042	97.96
Scenario1	2524	WET RETENTION	332.0042	97.96
Scenario1	2524	WET RETENTION	333.0042	97.96
Scenario1	2524	WET RETENTION	334.0042	97.95
Scenario1	2524	WET RETENTION	335.0042	97.95

Scenario	Sim	Node Name	Relative Time [hrs]	Stage [ft]
Scenario1	2524	WET RETENTION	336.0042	97.95

BECHTOL ENGINEERING AND TESTING, inc.

October 1, 2024
BET Project No. G24269

TO: Bishop Allen Wiggins
The Hope Church (The Village of Orlando, Inc.)
3032 Monte Carlo Trail
Orlando, Florida 32705

RE: Soil Borings & Permeability Testing
2941 Piedmont Street
Orlando, Orange County, Florida

Dear Bishop Wiggins,

As authorized, Bechtol Engineering and Testing, Inc. (BET) has conducted auger borings and field permeability/hydraulic conductivity testing at the subject site. The purpose of BET's borings and testing was to gain general insight as to the soil, groundwater and permeability characteristics in the areas of proposed stormwater management systems, and based on these characteristics to provide recommended design parameters for stormwater recovery analysis. Approximate locations of the borings and permeability tests performed are shown on the *Boring Location Plan* presented on the attached **Figure 1**. Encountered subsurface soils, groundwater levels, estimated seasonal high groundwater levels, and applicable permeability data are summarized on the *Soil Profiles*, shown on **Figure 1**.

Recommended design parameters for use in stormwater system design and recovery analyses are shown adjacent to the *Soil Profiles* on **Figure 1**. BET notes that the elevations are based on topographic data shown on the online Florida Geographic Information Office's LiDAR Mapping. Actual elevations may vary.

It should be noted that the estimated seasonal high groundwater levels should be considered accurate to approximately +/- 6 inches and do not provide any assurance that groundwater levels will not exceed these estimated levels during any given year in the future. Should surface water drainage be impeded, or should rainfall intensity, quantity and duration exceed the normally anticipated quantities, groundwater levels might exceed our seasonal high estimates. Furthermore, changes in the surface hydrology and subsurface drainage could have significant effects on the normal and seasonal high groundwater levels.

The boring profiles depict subsurface conditions only at the specific locations drilled and to the termination depths noted. Permeability and hydraulic conductivity rates noted are based on actual field measured parameters and do not incorporate any factor of safety for design.

The services requested and performed are for the sole purpose of aiding the design engineer in evaluating and designing stormwater management systems. Variations in subsurface conditions not disclosed by the borings and testing performed may occur, and could influence the performance and construction of such systems.

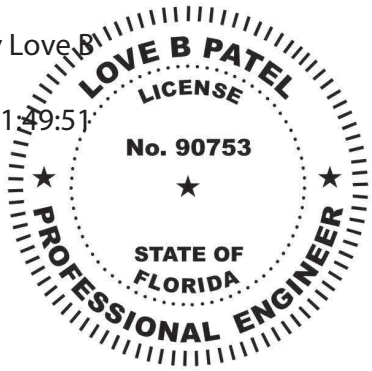
BET appreciates the opportunity to be of service, and trusts this information is complete and sufficient for your needs. If you should have any questions or if BET may be of further service, please do not hesitate to call.

Respectfully,

Bechtol Engineering and Testing, Inc.

Love B Patel

Digitally signed by Love B Patel
Date: 2024.10.01 11:49:51 -04'00'



Love B. Patel, P.E.
Senior Geotechnical Engineer
Love B. Patel, P.E., State of Florida
Professional Engineer, License No. 90753
This item has been digitally signed and sealed by Love B. Patel, P.E. on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.

BORING LOCATION PLAN

SCALE: 1" = 100'

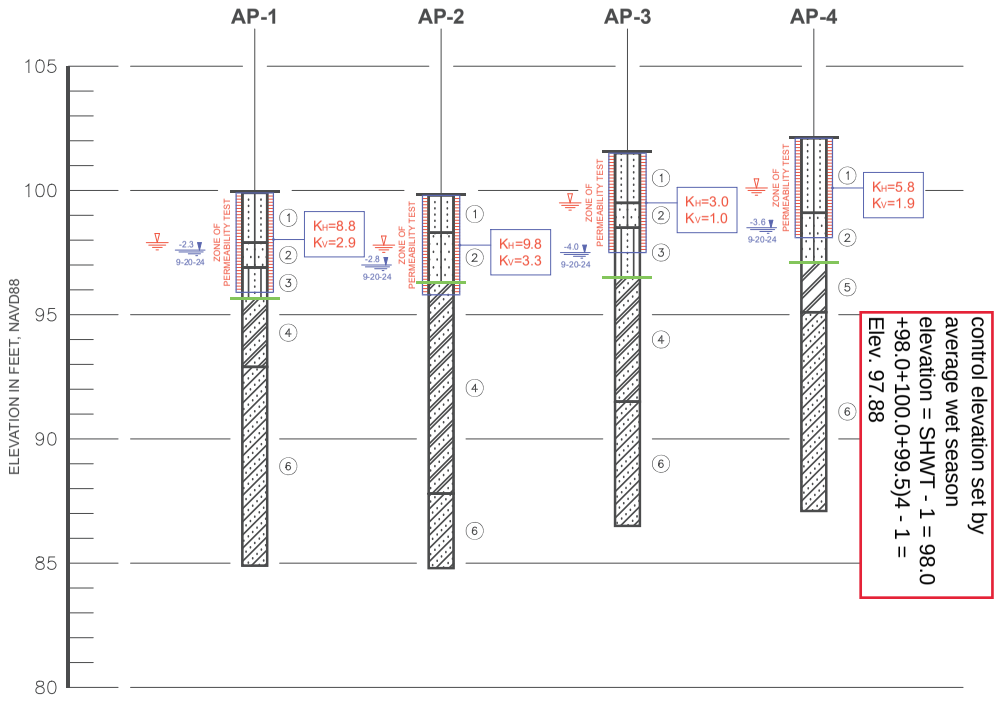
NOTE

ELEVATIONS BASED ON INTERPOLATION OF GROUND SURFACE ELEVATION AT BORING LOCATIONS FROM TOPOGRAPHIC DATA SHOWN ON THE ONLINE FLORIDA GEOGRAPHIC INFORMATION OFFICES LiDAR MAPPING. ACTUAL ELEVATIONS MAY VARY.

DATE OF DRILLING: 9/18/24

SOIL PROFILES

VERTICAL SCALE: 1" = 5'



SOIL & SYMBOL LEGEND

- 1 DARK BROWN TO BROWN SLIGHTLY SILTY TO SILTY FINE SAND, (SP-SM)(SM)
- 2 LIGHT BROWN TO BROWN AND LIGHT GRAY FINE SAND TO SLIGHTLY SILTY FINE SAND, (SP)(SP-SM)
- 3 LIGHT GRAY-BROWN TO GRAY SILTY TO CLAYEY FINE SAND, (SM)(SC)
- 4 LIGHT GRAY TO LIGHT BROWN CLAYEY SAND TO SANDY CLAY, (SC)(CL)
- 5 MOTTLED GRAY-BROWN TO ORANGISH-BROWN SANDY CALY, (CH)
- 6 LIGHT GRAY TO LIGHT BROWN SILTY TO CLAYEY FINE SAND, (SM)(SC)

(SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL AS DETERMINED BY VISUAL EXAMINATION

APPROXIMATE ELEVATION TO BASE OF AQUIFER

-2.3 9-18-24 GROUNDWATER LEVEL, REFERENCED IN FEET TO EXISTING GROUND SURFACE, DATE OF READING

ESTIMATED AVERAGE SEASONAL HIGH GROUNDWATER LEVEL

K_H MEASURED COEFFICIENT OF HORIZONTAL PERMEABILITY (IN FEET PER DAY)

K_V ESTIMATED COEFFICIENT OF VERTICAL PERMEABILITY (IN FEET PER DAY)

APPROXIMATE LOCATION OF AUGER BORING WITH FIELD PERMEABILITY TEST

FIELD:	CT KT CT
DRAWN:	KG
CHECKED:	CH
APPROVED:	LP
DATE:	9/25/24
SCALE:	NOTED
PROJ. NO.:	G24269
	FIGURE 1

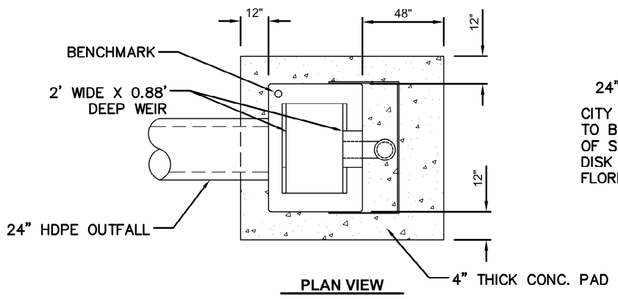
SOIL BORINGS AND PERMEABILITY TESTING

2941 PIEDMONT STREET

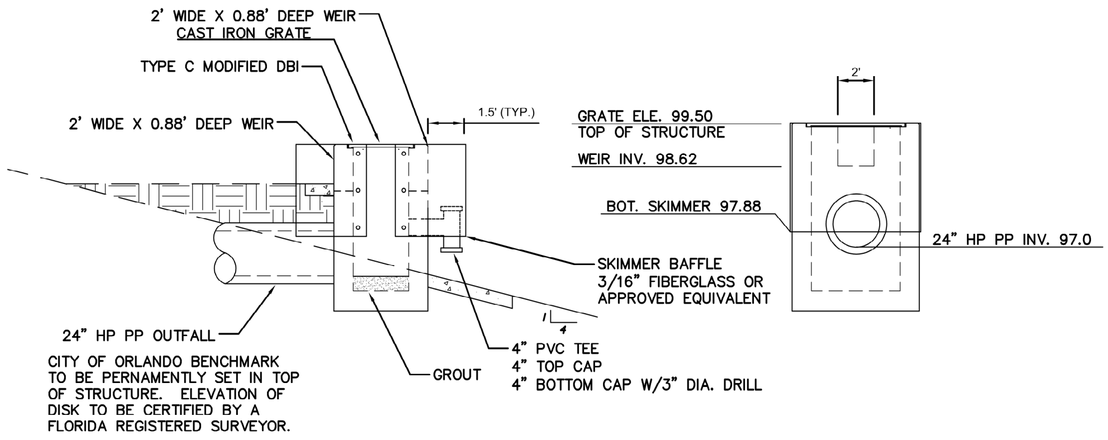
ORLANDO, ORANGE COUNTY, FLORIDA

BECHTOL ENGINEERING AND TESTING, INC.

CONSULTING GEOTECHNICAL, ENVIRONMENTAL AND MATERIALS TESTING ENGINEERS

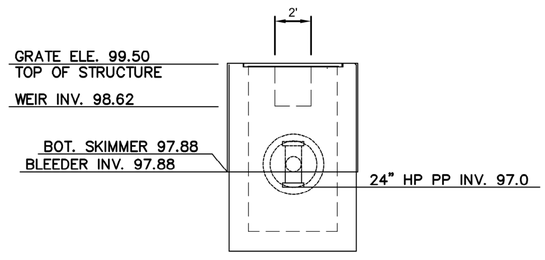


PLAN VIEW



SIDE VIEW

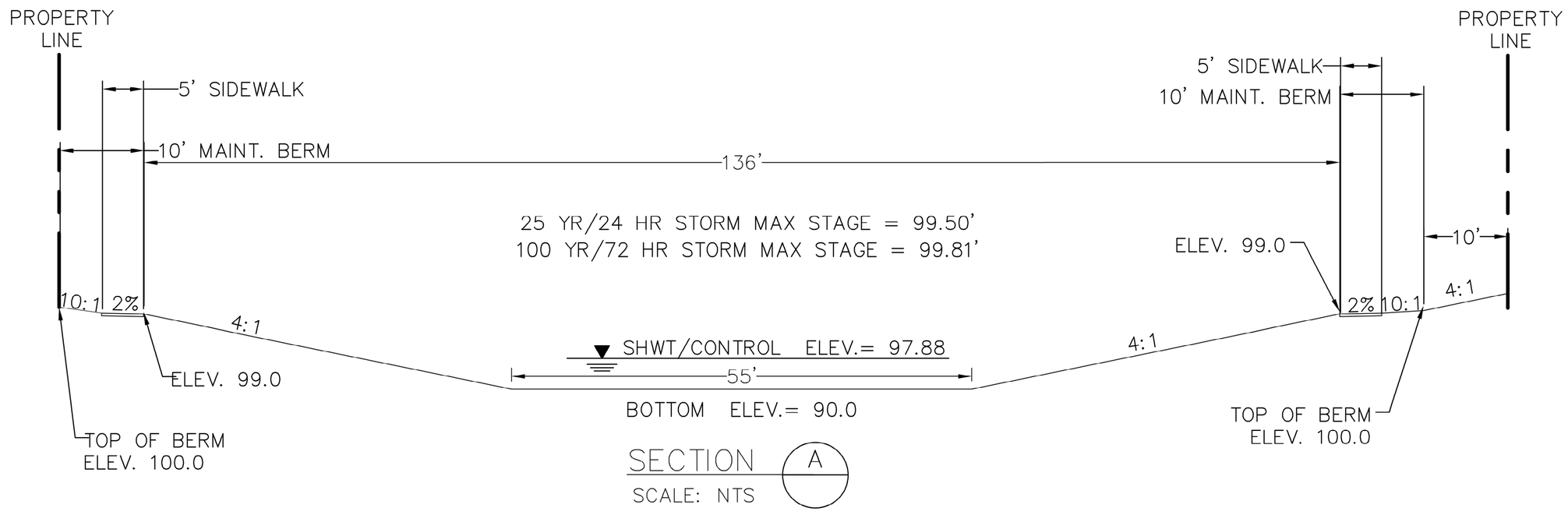
FRONT VIEW



REAR VIEW

CONTROL STRUCTURE FDOT TYPE C MODIFIED DBI

NTS



SECTION A

SCALE: NTS

SHEET NUMBER	DATE 11/2024	HOPE CENTER WEST 3032 MONTE CARLO TRAIL CITY OF ORLANDO ORANGE COUNTY FLORIDA	POND SECTION AND DISCHARGE STRUCTURE

SCALE AS NOTED	DESIGN ENGINEER:	CHATELAIN ENGINEERING
DESIGNED BY GC		
DRAWN BY MC	FLORIDA REGISTRATION NUMBER:	
CHECKED BY GC	SEAL	

No.	REVISIONS	DATE	BY

PATH: F:\USB Drive\Chatelain Engineering\16 Hope Church\calc\pond section and control structure.dwg PLOT DATE - November 15, 2024

CURVE NUMBER WORKSHEET

SITE Pre-DEVELOPMENT

Basin Name = Total - BMP Trains: B1,2,2A,4, and Piedmont

Basin Area = 12.050 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Meadow		
	A	Poor		0.0
	A	Fair		0.0
8.690	B/D	Good	80.0	695.2
		Brush (Brush-Weed-Grass)		
	A	Poor	48.0	0.0
	A	Fair	35.0	0.0
	A/D	Good	30.0	0.0
		Woods/Grass (Orchard or Tree Farm)		
	A	Poor	57.0	0.0
	A	Fair	43.0	0.0
	A	Good	32.0	0.0
		Woods		
	A	Poor	45.0	0.0
	A	Fair	36.0	0.0
	A	Good	30.0	0.0
	A,B,C,D	Semi-Impervious (Gravel)	78.0	0.0
0.910	A,B,C,D	Impervious	98.0	89.2
2.450	A,B,C,D	Impervious (Pavement, Concrete, Roof	98.0	240.1

WEIGHTED CURVE NUMBER = 85

CURVE NUMBER WORKSHEET

SITE POST-DEVELOPMENT

Basin Name = Total BMP Trains

Basin Area = 12.500 acres

AREA	SCS SOIL TYPE	COVER TYPE AND CONDITIONS	CURVE NUMBER	SUB TOTAL
		Grass (Lawns, Parks, Golf Courses, etc.)		
	A	Poor	68.0	0.0
	A	Fair	49.0	0.0
7.300	B/D	Good	80.0	584.0
		Brush (Brush-Weed-Grass)		
	A	Poor	48.0	0.0
	A	Fair	35.0	0.0
	A	Good	30.0	0.0
		Woods/Grass (Orchard or Tree Farm)		
	A	Poor	57.0	0.0
	A	Fair	43.0	0.0
	A	Good	32.0	0.0
		Woods		
	A	Poor	45.0	0.0
	A	Fair	36.0	0.0
	A	Good	30.0	0.0
	A,B,C,D	Semi-Impervious (Gravel)	78.0	0.0
	A,B,C,D	Pond	95.0	0.0
	A,B,C,D	Impervious	98.0	0.0
5.200	A,B,C,D	Impervious	98.0	91.0
	A,B,C,D	Impervious	98.0	0.0

WEIGHTED CURVE NUMBER = 54

Complete Report (not including cost) Ver 4.3.5

Project: Hope Center West
Date: 11/14/2024 9:38:17 AM

Site and Catchment Information

Analysis: Net Improvement

Catchment Name	Hope Center
Rainfall Zone	Florida Zone 2
Annual Mean Rainfall	50.03

Pre-Condition Landuse Information

Landuse	Low-Density Residential: TN=1.645 TP=0.27
Area (acres)	12.05
Rational Coefficient (0-1)	0.69
Non DCIA Curve Number	29.90
DCIA Percent (0-100)	85.00
Nitrogen EMC (mg/l)	1.645
Phosphorus EMC (mg/l)	0.270
Runoff Volume (ac-ft/yr)	34.563
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000
Nitrogen Loading (kg/yr)	70.104
Phosphorus Loading (kg/yr)	11.506

Post-Condition Landuse Information

Landuse	Multi-Family: TN=2.320 TP=0.520
Area (acres)	12.50
Rational Coefficient (0-1)	0.70
Non DCIA Curve Number	29.90
DCIA Percent (0-100)	87.00
Wet Pond Area (ac)	3.97
Nitrogen EMC (mg/l)	2.320
Phosphorus EMC (mg/l)	0.520
Runoff Volume (ac-ft/yr)	25.050
Groundwater N (kg/yr)	0.000
Groundwater P (kg/yr)	0.000

Nitrogen Loading (kg/yr)	71.657
Phosphorus Loading (kg/yr)	16.061

Catchment Number: 1 Name: Hope Center

Project: Hope Center West
Date: 11/14/2024

Wet Detention Design

Permanent Pool Volume (ac-ft)	20.460
Permanent Pool Volume (ac-ft) for 31 days residence	2.128
Annual Residence Time (days)	298
Littoral Zone Efficiency Credit	
Wetland Efficiency Credit	

Watershed Characteristics

Catchment Area (acres)	12.50
Contributing Area (acres)	8.530
Non-DCIA Curve Number	29.90
DCIA Percent	87.00
Rainfall Zone	Florida Zone 2
Rainfall (in)	50.03

Surface Water Discharge

Required TN Treatment Efficiency (%)	2
Provided TN Treatment Efficiency (%)	43
Required TP Treatment Efficiency (%)	28
Provided TP Treatment Efficiency (%)	83

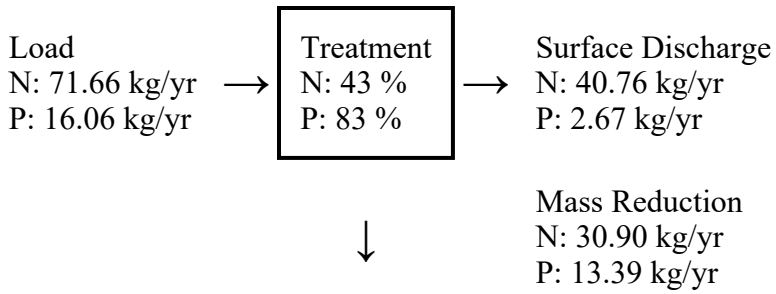
Media Mix Information

Type of Media Mix	Not Specified
Media N Reduction (%)	
Media P Reduction (%)	

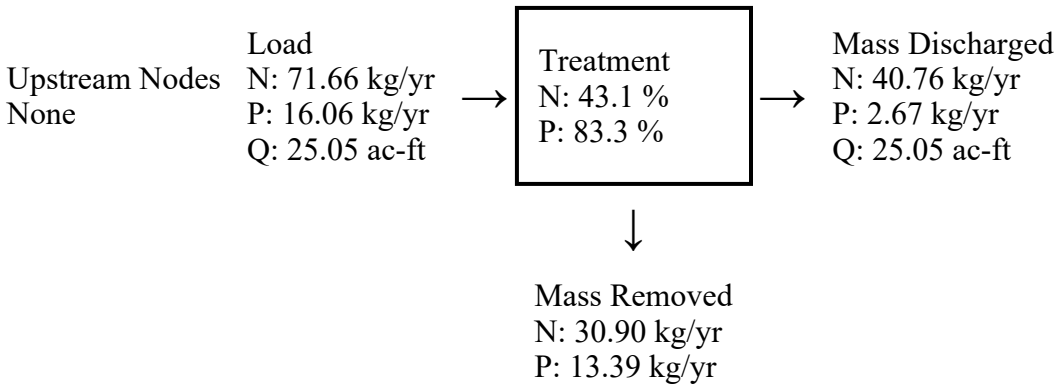
Groundwater Discharge (Stand-Alone)

Treatment Rate (MG/yr)	0.000
TN Mass Load (kg/yr)	0.000
TN Concentration (mg/L)	0.000
TP Mass Load (kg/yr)	0.000
TP Concentration (mg/L)	0.000

Load Diagram for Wet Detention (stand-alone)



Load Diagram for Wet Detention (As Used In Routing)



Summary Treatment Report Version: 4.3.5

Project: Hope Center West

Analysis Type: Net Improvement

Date:11/14/2024

BMP Types:

Catchment 1 - (Hope Center) Wet Detention

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	70.1 kg/yr	
Total N post load	71.66 kg/yr	
Target N load reduction	2 %	
Target N discharge load	70.1 kg/yr	
Percent N load reduction	43 %	
Provided N discharge load	40.76 kg/yr	89.88 lb/yr
Provided N load removed	30.9 kg/yr	68.13 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	11.506 kg/yr	
Total P post load	16.061 kg/yr	
Target P load reduction	28 %	
Target P discharge load	11.506 kg/yr	
Percent P load reduction	83 %	
Provided P discharge load	2.674 kg/yr	5.9 lb/yr
Provided P load removed	13.387 kg/yr	29.518 lb/yr