

I-95 at Ellis Road Interchange Pond Siting Report						Comp. By: MR	
Curve Number Calculations						Date: 7/9/2014	
						Checked By: CS	
						FPID: 426905-3-32-01	
Basin 1 Untreated Existing							
Total Roadway Area (ac):		52.28					
Roadway Pervious Area (ac):		43.88					
Roadway Impervious Area (ac):		8.40					
Land Use Description	CN	Imperv %	EMC(N)	EMC(P)	Area	CN*A	IMP Area
Woods, Good, B/D	77	0%	1.37	0.17	8.49	653.73	0.00
Open, Good, D (Within ROW)	80	0%	1.37	0.17	35.39	2831.20	0.00
Impervious Roadway	98	100%	1.37	0.17	8.40	823.20	8.40
Open Water	100	100%	1.37	0.17	0.00	0.00	0.00
Total Area:					52.28	4308.13	8.40
Composite Curve Number:						82.4	
EMC:							8.40
Basin 1 Treated Existing							
Total Area (ac):		16.01					
Roadway Pervious Area (ac):		5.82					
Roadway Impervious Area (ac):		5.96					
Pond Site Area (ac):		4.23					
Land Use Description	CN	Imperv %	EMC(N)	EMC(P)	Area	CN*A	IMP Area
Woods, Good, B/D	77	0%	1.37	0.17	0.00	0.00	0.00
Open, Good, D (Within ROW)	80	0%	1.37	0.17	5.82	465.60	0.00
Impervious Roadway	98	100%	1.37	0.17	5.96	584.08	5.96
Open Water	100	100%	1.37	0.17	4.23	423.00	4.23
Total Area:					16.01	1472.68	10.19
Composite Curve Number:						92.0	
Total Impervious:							10.19
Basin 2 Untreated Existing							
Total Area (ac):		24.81					
Roadway Pervious Area (ac):		22.09					
Roadway Impervious Area (ac):		0.08					
Pond Site Area (ac):		2.64					
Land Use Description	CN	Imperv %	EMC(N)	EMC(P)	Area	CN*A	IMP Area
Woods, Good, B/D	77	0%	1.37	0.17	22.09	1700.93	0.00
Open, Good, D (Within ROW)	80	0%	1.37	0.17	0.00	0.00	0.00
Impervious Roadway	98	100%	1.37	0.17	0.08	7.84	0.08
Open Water	100	100%	1.37	0.17	2.64	264.00	2.64
Total Area:					24.81	1972.77	2.72
Composite Curve Number:						79.5	
Total Impervious:							2.72
Basin 3 Treated Existing							
Total Area (ac):		8.30					
Roadway Pervious Area (ac):		5.01					
Roadway Impervious Area (ac):		2.88					
Pond Site Area (ac):		0.41					
Land Use Description	CN	Imperv %	EMC(N)	EMC(P)	Area	CN*A	IMP Area
Woods, Good, B/D	77	0%	1.37	0.17	4.54	349.58	0.00
Open, Good, D (Within ROW)	80	0%	1.37	0.17	0.47	37.60	0.00
Impervious Roadway	98	100%	1.37	0.17	2.88	282.24	2.88
Open Water	100	100%	1.37	0.17	0.41	41.00	0.41
Total Area:					8.30	710.42	3.29
Composite Curve Number:						85.6	
Total Impervious:							3.29
Basin 1A Proposed							
Total Area (ac):		30.76					
Roadway Pervious Area (ac):		15.54					
Roadway Impervious Area (ac):		10.49					
Pond Site Area (ac):		4.73					
Land Use Description	CN	Imperv %	EMC(N)	EMC(P)	Area	CN*A	IMP Area
Woods, Good, B/D	77	0%	1.37	0.17	15.54	1243.20	0.00
Open, Good, D (Within ROW)	80	0%	1.37	0.17	10.49	1028.02	10.49
Impervious Roadway	98	100%	1.37	0.17	4.73	473.00	4.73
Open Water	100	100%	1.37	0.17			
Total Area:					30.76	2744.22	15.22
Composite Curve Number:						89.2	
Total Impervious:							15.22
Basin 1 Untreated Proposed							
Total Area (ac):		10.53					
Roadway Pervious Area (ac):		6.72					
Roadway Impervious Area (ac):		3.81					
Land Use Description	CN	Imperv %	EMC(N)	EMC(P)	Area	CN*A	IMP Area
Woods, Good, B/D	77	0%	1.37	0.17	2.53	194.81	0.00
Open, Good, D (Within ROW)	80	0%	1.37	0.17	4.19	335.20	0.00
Impervious Roadway	98	100%	1.37	0.17	3.81	373.38	3.81
Total Area:					10.53	903.39	3.81
Composite Curve Number:						85.8	
Total Impervious:							3.81
Basin 1B Proposed							
Total Area (ac):		16.93					
Roadway Pervious Area (ac):		7.48					
Roadway Impervious Area (ac):		3.54					
Pond Site Area (ac):		5.91					
Land Use Description	CN	Imperv %	EMC(N)	EMC(P)	Area	CN*A	IMP Area
Woods, Good, B/D	77	0%	1.37	0.17	0.00	0.00	0.00
Open, Good, D (Within ROW)	80	0%	1.37	0.17	7.48	598.40	0.00
Impervious Roadway	98	100%	1.37	0.17	3.54	346.92	3.54
Open Water	100	100%	1.37	0.17	5.91	591.00	5.91
Total Area:					16.93	1536.32	9.45
Composite Curve Number:						90.7	
Total Impervious:							9.45

I-95 at Ellis Road Interchange Pond Siting Report						Comp. By: MR	
						Date: 7/9/2014	
Curve Number Calculations						Checked By: CS	
						FPID: 426905-0-02-01	
Basin 2 Proposed							
Total Area (ac): 34.89							
Roadway Pervious Area (ac): 21.65							
Roadway Impervious Area (ac): 10.06							
Pond Site Area (ac): 3.18							
Land Use Description	CN	Imperv %	EMC(N)	EMC(P)	Area	CN*A	IMP Area
Woods, Good, B/D	77	0%	1.37	0.17	0.00	0.00	0.00
Open, Good, D (Within ROW)	80	0%	1.37	0.17	21.65	1732.00	0.00
Impervious Roadway	98	100%	1.37	0.17	10.06	985.88	10.06
Open Water	100	100%	1.37	0.17	3.18	318.00	3.18
Total Area:					34.89	3035.88	13.24
Composite Curve Number:						87.0	
Total Impervious:							13.24
Basin 3 Proposed							
Total Area (ac): 7.64							
Roadway Pervious Area (ac): 4.76							
Roadway Impervious Area (ac): 2.88							
Land Use Description	CN	Imperv %	EMC(N)	EMC(P)	Area	CN*A	IMP Area
Woods, Good, B/D	77	0%	1.37	0.17	4.29	330.33	0.00
Open, Good, D (Within ROW)	80	0%	1.37	0.17	0.47	37.60	0.00
Impervious Roadway	98	100%	1.37	0.17	2.88	282.24	2.88
Open Water	100	100%	1.37	0.17	0.00	0.00	0.00
Total Area:					7.64	650.17	2.88
Composite Curve Number:						85.1	
Total Impervious:							2.88

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
 Date: 7/9/2014
 Chk. By: CS
 Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: 1A
 Total Area (ac): 30.76

Compute Required Treatment Volume

Treatment Volume is equal to the larger of either 1 inch of runoff or 2.5 inches times the Impervious Area.

Total Drainage Area (DA) = 30.76 ac
 Impervious Area (IA) = 10.49 ac (excludes pond area)

1" of runoff = $\frac{DA (1 \text{ in})}{12 \text{ in/ft}}$ = 2.56 ac-ft

2.5" over impervious area = $\frac{IA (2.5 \text{ in})}{12 \text{ in/ft}}$ = 2.19 ac-ft

Treatment Volume = 2.56 ac-ft
 Total Treatment Volume (w/addtl 50%) = 3.85 ac-ft (Class I Water Treatment Criteria)

Set Control and Weir Elevations

SHWT = 14.50

	Elevation (ft)	Area (ac)	Volume (ac-ft)**	Volume (cy)	Treatment Volume (ac-ft)
BOTTOM	7.00	3.82	0.00	0.00	0.00
SLOPE BREAK	12.50	4.34	22.44	36203.20	0.00
NWL	14.50	4.73	31.51	50836.13	0.00
TV EL	15.26	4.89	35.36	57039.40	3.85
Inside TOB	17.50	5.34	46.62	75205.53	15.11
Outside Berm	18.00	6.12	50.41	81331.55	18.90

Set the Elevation of the Overflow Control Structure

Water Quality Volume = 3.85 ac-ft

Set Weir based on containing Water Quality Volume above:

Volume above NWL = 3.85 ac-ft
 Corresponding Depth above NWL = 0.76 ft (determined by interpolation)
 Required Overflow Weir Elevation = 15.3 ft

Weir	15.26	4.89	3.85
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Calculate the Minimum Permanent Pool Volume

Rational C	Area (ac)	C x A
1.00	4.73	4.73
0.95	10.49	9.97
0.20	15.54	3.11

Total 30.76 17.80

Composite Runoff Coefficient = (TOTAL C x A)/(TOTAL AREA)

Composite Runoff Coefficient (C) = 0.58

Residence Time (RT) = 21 days
 Wet Season Duration (WD) = 153 days
 Wet Season Rainfall (WR) = 29 in

Permanent Pool = (AREA*C*WR*(RT/WD))/12

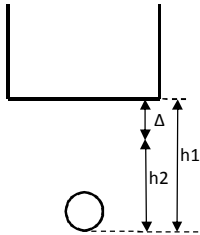
Required Permanent Pool = 5.91 ac-ft < 31.51 Permanent Pool Volume Sufficient

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
Date: 7/9/2014
Chk. By: CS
Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: 1A
Total Area (ac): 30.76

Size the Circular Bleed-Down Orifice

Treatment Volume = 3.85 ac-ft
167488.20 ft³
Diameter of orifice = 6.50 in
Area of orifice opening = 0.23 ft²

Bleed down Elevation = 14.50 ft
Treatment Volume Depth, h1 = 0.76 ft
Stage at half the treatment volume = 14.88 ft
Depth at Half Treatment Volume, h2 = 0.38 ft
h = 0.57 ft

Avg. Flow Rate Based on orifice size; Q = 0.840 cfs
Time Period to Bleed Down 1/2 Treatment Volume = 27.70 hr

Recovery Time Sufficient

Check the Mean Depth of the Pond

Mean Depth = Volume @ NWL / Area @ NWL

Volume @ NWL = 31.51 ac-ft
Area @ NWL = 4.73 ac

Mean Depth = 6.66 ft > 2' AND < 8'

Mean Depth OKAY

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
 Date: 7/9/2014
 Chk. By: CS
 Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: 1B
 Total Area (ac): 16.93

Compute Required Treatment Volume

Treatment Volume is equal to the larger of either 1 inch of runoff or 2.5 inches times the Impervious Area.

Total Drainage Area (DA) = 16.93 ac
 Impervious Area (IA) = 3.54 ac (excludes pond area)

1" of runoff = $\frac{DA (1 \text{ in})}{12 \text{ in/ft}}$ = 1.41 ac-ft

2.5" over impervious area = $\frac{IA (2.5 \text{ in})}{12 \text{ in/ft}}$ = 0.74 ac-ft

Treatment Volume = 1.41 ac-ft
 Total Treatment Volume (w/addtl 50%) = 2.12 ac-ft (Class I Water Treatment Criteria)

Set Control and Weir Elevations

SHWT = 14.50 Pond J LT NWL Per SJHP Plans

	Elevation (ft)	Area (ac)	Volume (ac-ft)**	Volume (cy)	Treatment Volume (ac-ft)
BOTTOM	7.00	4.87	0.00	0.00	0.00
SLOPE BREAK	12.50	5.47	28.44	45875.13	0.00
NWL	14.50	5.91	39.82	64234.87	0.00
TV EL	14.84	5.99	41.93	67649.08	2.12
Inside TOB	17.50	6.61	58.60	94533.27	18.78
Outside Berm	18.00	7.50	63.26	102054.26	23.44

Set the Elevation of the Overflow Control Structure

Water Quality Volume = 2.12 ac-ft

Set Weir based on containing Water Quality Volume above:

Volume above NWL = 2.12 ac-ft
 Corresponding Depth above NWL = 0.34 ft (determined by interpolation)
 Required Overflow Weir Elevation = 14.84 ft

Weir	14.84	5.99	2.12
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Calculate the Minimum Permanent Pool Volume

Rational C	Area (ac)	C x A
1.00	5.91	5.91
0.95	3.54	3.36
0.20	7.48	1.50
Total	16.93	10.77

Composite Runoff Coefficient = (TOTAL C x A)/(TOTAL AREA)

Composite Runoff Coefficient (C) = 0.64

Residence Time (RT) = 21 days
 Wet Season Duration (WD) = 153 days
 Wet Season Rainfall (WR) = 29 in

Permanent Pool = (AREA * C * WR * (RT / WD)) / 12

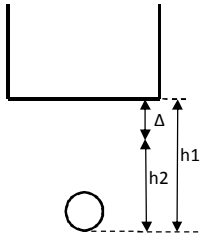
Required Permanent Pool = 3.57 ac-ft < 39.82 Permanent Pool Volume Sufficient

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
Date: 7/9/2014
Chk. By: CS
Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: 1B
Total Area (ac): 16.93

Size the Circular Bleed-Down Orifice

Treatment Volume = 2.12 ac-ft
92183.85 ft³
Diameter of orifice = 6.00 in
Area of orifice opening = 0.20 ft²

Bleed down Elevation = 14.50 ft
Treatment Volume Depth, h1 = 0.34 ft
Stage at half the treatment volume = 14.67 ft
Depth at Half Treatment Volume, h2 = 0.17 ft
h = 0.25 ft

Avg. Flow Rate Based on orifice size; Q = 0.476 cfs
Time Period to Bleed Down 1/2 Treatment Volume = 26.89 hr

Recovery Time Sufficient

Check the Mean Depth of the Pond

Mean Depth = Volume @ NWL / Area @ NWL

Volume @ NWL = 39.82 ac-ft
Area @ NWL = 5.91 ac

Mean Depth = 6.74 ft > 2' AND < 8'

Mean Depth OKAY

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
Date: 4/22/2014
Chk. By: CCS
Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: 2A
Total Area (ac): 34.89

Compute Required Treatment Volume

Treatment Volume is equal to the larger of either 1 inch of runoff or 2.5 inches times the Impervious Area.

Total Drainage Area (DA) = 34.89 ac
Impervious Area (IA) = 10.06 ac (excludes pond area)

1" of runoff = $\frac{DA (1 \text{ in})}{12 \text{ in/ft}}$ = 2.91 ac-ft

2.5" over impervious area = $\frac{IA (2.5 \text{ in})}{12 \text{ in/ft}}$ = 2.10 ac-ft

Treatment Volume = 2.91 ac-ft

Set Control and Weir Elevations

SHWT = 15.00 Surveyed WSE of adjacent existing borrow pit.

	Elevation (ft)	Area (ac)	Volume (ac-ft)**	Volume (cy)	Treatment Volume (ac-ft)
BOTTOM	6.00	3.52	0.00	0.00	0.00
SLOPE BREAK	13.00	4.05	26.50	42745.27	0.00
NWL	15.00	4.37	34.92	56329.53	0.00
TV EL	15.91	4.52	39.28	63365.68	4.36
Inside TOB	20.00	5.20	58.84	94928.53	23.93
Outside Berm	21.00	6.09	66.27	106922.63	31.36

Set the Elevation of the Overflow Control Structure

Water Quality Volume = 4.36 ac-ft

Set Weir based on containing Water Quality Volume above:

Volume above NWL = 4.36 ac-ft
Corresponding Depth above NWL = 0.91 ft (determined by interpolation)

Required Overflow Weir Elevation = 15.9 ft

Weir	15.91	4.52	4.36
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Calculate the Minimum Permanent Pool Volume

Rational C	Area (ac)	C x A
1.00	4.37	4.37
0.95	10.06	9.56
0.20	20.46	4.09

Total 34.89 18.02

Composite Runoff Coefficient = (TOTAL C x A)/(TOTAL AREA)

Composite Runoff Coefficient (C) = 0.52

Residence Time (RT) = 21 days
Wet Season Duration (WD) = 153 days
Wet Season Rainfall (WR) = 29 in

Permanent Pool = (AREA*C*WR*(RT/WD))/12

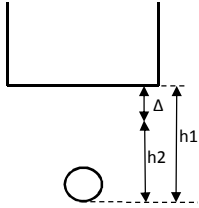
Required Permanent Pool = 5.98 ac-ft < 34.92 Permanent Pool Volume Sufficient

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
Date: 4/22/2014
Chk. By: CCS
Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: 2A
Total Area (ac): 34.89

Size the Circular Bleed-Down Orifice

Treatment Volume = 4.36 ac-ft
189976.05 ft³
Diameter of orifice = 7.00 in
Area of orifice opening = 0.27 ft²

Bleed down Elevation = 15.00 ft
Treatment Volume Depth, h1 = 0.91 ft
Stage at half the treatment volume = 15.46 ft
Depth at Half Treatment Volume, h2 = 0.46 ft
h = 0.68 ft

Avg. Flow Rate Based on orifice size; Q = 1.064 cfs
Time Period to Bleed Down 1/2 Treatment Volume = 24.80 hr

Recovery Time Sufficient

Check the Mean Depth of the Pond

Mean Depth = Volume @ NWL / Area @ NWL

Volume @ NWL = 34.92 ac-ft
Area @ NWL = 4.37 ac

Mean Depth = 7.99 ft > 2' AND < 8'

Mean Depth OKAY

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT		Comp. By: MR
WET DETENTION POND DESIGN CALCULATIONS		Date: 7/9/2014
		Chk. By: CCS
		Job No: 426905-3-32-01

Basin No: 2B

Total Area (ac): 34.89

Compute Required Treatment Volume

Treatment Volume is equal to the larger of either 1 inch of runoff or 2.5 inches times the Impervious Area.

Total Drainage Area (DA) = 34.89 ac

Impervious Area (IA) = 10.06 ac (excludes pond area)

1" of runoff = $\frac{DA (1 \text{ in})}{12 \text{ in/ft}}$ = 2.91 ac-ft

2.5" over impervious area = $\frac{IA (2.5 \text{ in})}{12 \text{ in/ft}}$ = 2.10 ac-ft

Treatment Volume = 2.91 ac-ft

Set Control and Weir Elevations

SHWT = 15.00 Surveyed WSE of adjacent existing borrow pit.

	Elevation (ft)	Area (ac)	Volume (ac-ft)**	Volume (cy)	Treatment Volume (ac-ft)
BOTTOM	8.00	2.29	0.00	0.00	0.00
SLOPE BREAK	13.00	2.77	12.65	20408.67	0.00
NWL	15.00	3.18	18.60	30008.00	0.00
TV EL	15.75	3.35	21.51	34698.77	2.91
Inside TOB	21.00	4.53	41.73	67324.40	23.13
Outside Berm	21.50	5.44	46.76	75438.43	28.16

Set the Elevation of the Overflow Control Structure

Water Quality Volume = 2.91 ac-ft

Set Weir based on containing Water Quality Volume above:

Volume above NWL = 2.91 ac-ft

Corresponding Depth above NWL = 0.75 ft (determined by interpolation)

Required Overflow Weir Elevation = 15.75 ft

Weir	15.75	3.35	2.91
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Calculate the Minimum Permanent Pool Volume

Rational C	Area (ac)	C x A
1.00	3.18	3.18
0.95	10.06	9.56
0.20	21.65	4.33
Total	34.89	17.07

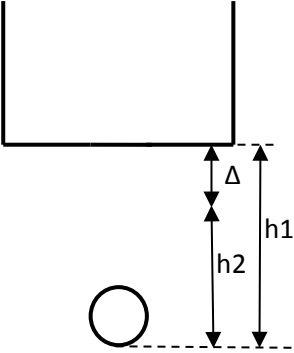
Composite Runoff Coefficient = (TOTAL C x A)/(TOTAL AREA)

Composite Runoff Coefficient (C) = 0.49

Residence Time (RT) = 21 days

Wet Season Duration (WD) = 153 days

Wet Season Rainfall (WR) = 29 in

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT		Comp. By: MR
WET DETENTION POND DESIGN CALCULATIONS		Date: 7/9/2014
		Chk. By: CCS
		Job No: 426905-3-32-01
Basin No: 2B		
Total Area (ac): 34.89		
Permanent Pool = (AREA*C*WR*(RT/WD))/12		
Required Permanent Pool = 5.66 ac-ft < 18.60 Permanent Pool Volume Sufficient		
Size the Circular Bleed-Down Orifice		
	Treatment Volume =	4.36 ac-ft
		189976.05 ft³
	Diameter of orifice =	6.50 in
	Area of orifice opening =	0.23 ft²
	Bleed down Elevation =	15.00 ft
	Treatment Volume Depth, h1 =	0.75 ft
	Stage at half the treatment volume =	15.38 ft
	Depth at Half Treatment Volume, h2 =	0.38 ft
	h =	0.57 ft
	Avg. Flow Rate Based on orifice size; Q =	0.835 cfs
Time Period to Bleed Down 1/2 Treatment Volume =	31.62 hr	
NOT OKAY		
Check the Mean Depth of the Pond		
Mean Depth = Volume @ NWL / Area @ NWL		
Volume @ NWL = 18.60 ac-ft		
Area @ NWL = 3.18 ac		
Mean Depth = 5.85 ft > 2' AND < 8' Mean Depth OKAY		

I-95 at Ellis Road Interchange Pond Siting Report

Comp. By: MR
Date: 5/19/2014
Checked By: CS
FPID: 426905-3-32-01

Nutrient Loading Calculations: Basin 1**Estimation of Pre-Development Loadings:****BASIN 1 TREATED**

Non DCIA CN = 80
DCIA Percentage = 37.23% (All impervious area is considered to be DCIA)
Basin Area = 16.01
Annual Runoff Coefficient, C = 0.362 *
Mean Annual Rainfall = 52 inches *(Refer to Appendix E of Draft Applicants Handbook. Zone 2, based on CN and DCIA)

Annual Runoff Volume (ac-ft) = Area (ac) * Mean Annual Rainfall (inches) * C * 1/12 (ft/in)

Annual Runoff Volume = 25.12 ac-ft/year

Composite Event Mean Concentration for Nitrogen, EMC(N) = 1.37 *(EMC Values for Highway. Table 3.4 March 2010 DEP Draft Applicants Handbook, See Appendix F)
Composite Event Mean Concentration for Phosphorus, EMC(P) = 0.17

Annual Mass Loading (kg/L) = Annual Runoff Volume (ac-ft/year) * EMC (mg/L)*CF

Conversion Factor, CF = 1.23

GROSS TN Loading = 42.45 kg TN/year

GROSS TP Loading = 5.27 kg TP/year

Determine Nutrient Removal Performed by Existing Pond:

%TN Removal = 35.0% (Removal Rate Provided by Cammie Dewey @ SJRWMD- Corresponds to 21-day RT)

%TP Removal = 64.5% (Removal Rate Provided by Cammie Dewey @ SJRWMD- Corresponds to 21-day RT)

NET TN Loading = 27.59 kg TN/year

NET TP Loading = 1.87 kg TP/year

BASIN 1 UNTREATED

Non DCIA CN = 80
DCIA Percentage = 16.07% (All impervious area is considered to be DCIA)
Basin Area = 52.28
Annual Runoff Coefficient, C = 0.223 *
Mean Annual Rainfall = 52 inches *(Refer to Appendix E of Draft Applicants Handbook. Zone 2, based on CN and DCIA)

Annual Runoff Volume (ac-ft) = Area (ac) * Mean Annual Rainfall (inches) * C * 1/12 (ft/in)

Annual Runoff Volume = 50.63 ac-ft/year

Basin is a mix of Highway and Undeveloped Land Use. Determine Composite EMC Values:

Land Use	EMC (TN)	EMC (TP)	Area (ac)
Undeveloped*	1.15	0.055	27.40
Pervious Highway	1.37	0.17	16.48
Impervious Highway	1.37	0.17	8.40

*(Undeveloped EMC Values from March 2008 DEP Draft Applicants Handbook. See Appendix F)

Composite Event Mean Concentration for Nitrogen, EMC(N) = 1.25
Composite Event Mean Concentration for Phosphorus, EMC(P) = 0.11

Annual Mass Loading (kg/L) = Annual Runoff Volume (ac-ft/year) * EMC (mg/L)*CF

Conversion Factor, CF = 1.23

TN Loading = 78.34 kg TN/year

TP Loading = 6.85 kg TP/year

TOTAL PRE DEVELOPMENT LOADING	
TN Loading =	105.93 kg TN/year
TP Loading =	8.72 kg TP/year

I-95 at Ellis Road Interchange Pond Siting Report

Comp. By: MR
Date: 5/19/2014
Checked By: CS
FPID: 426905-3-32-01

Nutrient Loading Calculations: Basin 1

Estimation of Post-Development Loadings:

BASIN 1 TREATED

Non DCIA CN = 80
DCIA Percentage = 29.42% (All impervious area is considered to be DCIA)
Basin Area = 47.69
Annual Runoff Coefficient, C = 0.316 *
Mean Annual Rainfall = 52 inches *(Refer to Appendix E of Draft Applicants Handbook. Zone 2, based on CN and DCIA)

Annual Runoff Volume (ac-ft) = Area (ac) * Mean Annual Rainfall (inches) * C * 1/12 (ft/in)

Annual Runoff Volume = 65.29 ac-ft/year

Composite Event Mean Concentration for Nitrogen, EMC(N) = 1.37 *(EMC Values for Highway. Table 3.4 March 2010 DEP Draft Applicants Handbook, See Appendix F)
Composite Event Mean Concentration for Phosphorus, EMC(P) = 0.17

Annual Mass Loading (kg/L) = Annual Runoff Volume (ac-ft/year) * EMC (mg/L)*CF

Conversion Factor, CF = 1.23

GROSS TN Loading = 110.31 kg TN/year

GROSS TP Loading = 13.69 kg TP/year

Determine Nutrient Removal Performed by Existing Pond:

%TN Removal = 35.00% (Removal Rate Provided by Cammie Dewey @ SJRWMD Corresponds to 21-day RT)
%TP Removal = 64.50% (Removal Rate Provided by Cammie Dewey @ SJRWMD Corresponds to 21-day RT)

NET TN Loading = 71.70 kg TN/year

NET TP Loading = 4.86 kg TP/year

BASIN 1 UNTREATED

Non DCIA CN = 80
DCIA Percentage = 36.18% (All impervious area is considered to be DCIA)
Basin Area = 10.53
Annual Runoff Coefficient, C = 0.363 *
Mean Annual Rainfall = 52 inches *(Refer to Appendix E of Draft Applicants Handbook. Zone 2, based on CN and DCIA)

Annual Runoff Volume (ac-ft) = Area (ac) * Mean Annual Rainfall (inches) * C * 1/12 (ft/in)

Annual Runoff Volume = 16.58 ac-ft/year

Composite Event Mean Concentration for Nitrogen, EMC(N) = 1.37 *(EMC Values for Highway. Table 3.4 March 2010 DEP Draft Applicants Handbook, See Appendix F)
Composite Event Mean Concentration for Phosphorus, EMC(P) = 0.17

Annual Mass Loading (kg/L) = Annual Runoff Volume (ac-ft/year) * EMC (mg/L)*CF

Conversion Factor, CF = 1.23

TN Loading = 28.01 kg TN/year

TP Loading = 3.48 kg TP/year

TOTAL POST DEVELOPMENT LOADING

TN Loading = 99.71 kg TN/year

TP Loading = 8.33 kg TP/year

Ellis Road at I-95 Interchange Pond Siting Report			Comp. By: CCS Date: 5/19/2014
Regional Basin Area Analysis			Chk. By: GRD FPID: 426905-3-32-01
L-16/ L-11 Junction	Area	CN	This basin is split between the L-11 and L-16 canals.
L16-3	44.47	85.38	
L-11 Canal Basin	Area	CN	Part of the L16-3 basin flows into the L-11 canal from the junction with canal L-16. A majority of L11-2 flows into canal L-11 after its junction with L-16.
From L-16/ L-11 Junction	9.50	85.38	
L11-2	128.787	78.96	
L11-2A	108.78	91	
L11-3	32.7	82.94	
L11-4	34.58	90.55	
L11-4A	20.55	88.47	
L11-5	57.84	81.87	
L15-3	67.42	76.74	
L15-4	53.52	83	
L16-5	452.52	83	
L16-5A	67.19	90	
Junction Total	1033.39	84.48	
L-16 Canal Basin	Area	CN	Only part of the L16-3 basin flows into the L-16 canal. The remainder flows into canal L-11. Improperly labeled as L16-1A on the node diagram
From L-16/ L-11 Junction	34.97	85.38	
M1-11	6.19	87	
M1-11A	11.18	87	
M1-11B	9.64	87	
M1-12A	96.7	89	
L16-1	33.43	84.5	
L16-2	52.68	84.82	
L16-4	56.53	82.59	
Junction Total	301.32	85.97	
M-1 Canal Basin	Area	CN	flow from the M-1/ L-16 junction flow from the L-15/ L-11 junction Only part of the M-1 canal is upstream of the point of confluence. Includes interchange area.
From M-1/ L-16 Junction	41.26	85.97	
From L-15/ L-11 Junction	294.50	84.48	
L15-1	129.8	84.49	
L15-2	38.66	76.81	
M1-10	86.5	80.4	
M1-10A	17.39	90	
TOTAL	608.12	83.67	Total Basin Area going to the point of analysis

Ellis Road at I-95 Interchange Pond Siting Report						Comp. By: CCS Date: 5/19/2014
Regional Basin Area Analysis						Chk. By: GRD FPID: 426905-3-32-01
Junction Analysis						
- This spreadsheet divides each junctions upstream contributing areas between the junctions' downstream canals. - The ratio of the max flow through each junctions' downstream channel is compared and applied to the upstream areas. - This data is from the existing regional ICPR model for the mean annual storm event.						
L-16/ L-11						
Junction Node	L16-3-1B					
Basin Area =	44.5	ac.				
Max Outflow =	173.5	cfs				
Max Time Outflow =	15.16	hr				
Canal	Link	Max Time Flow (hr)	Max Flow	Flow %	Basin Area (ac.)	
L-16	L1631A-B	15.16	173.55	78.6%	35.0	
L-11	L210310 & L11-L16W	13.435	47.17	21.4%	9.5	
						The max time is an average between the two links. The max flow is the sum.
Area flowing to Canal L-16 toward the M-1/ L-16 Junction=					35.0	ac.
Area flowing to Canal L-11 toward the L-15/ L-11 Junction=					9.50	ac.
L-15/ L-11 Junction						
Junction Node	L11-2-10					
Basin Area =	1033.4	ac.				
Max Outflow =	276.8	cfs				
Max Time Outflow =	13.70	hr				
Canal	Link	Max Time Flow (hr)	Max Flow	Flow %	Basin Area (ac.)	
L-11	E210E140	13.18	116.34	71.5%	738.9	
L-15	E210F230 & L11-L15W	13.55	46.37	28.5%	294.5	
						The link max flow and time are taken from the flow going into node: L15-2-30.
Area flowing to Canal L-11 and away from Ellis Road Pond=					738.9	ac.
Area flowing to Canal L-15 toward Ellis Road Pond=					294.50	ac.
M-1/ L-16 Junction						
Junction Node	M1-11-A2					
Basin Area =	301.3	ac.				
Max Outflow =	197.4	cfs				
Max Time Outflow =	15.44	hr				
Canal	Link	Max Time Flow (hr)	Max Flow	Flow %	Basin Area (ac.)	
M-1	M121011A	13.86	33.54	13.7%	41.3	
L-16	M1111AA2	18.93	211.38	86.3%	260.1	
						This downstream outfall represents a segment of nodes which flows westward beyond the M-1 canal.
Area flowing to Canal M-1 toward Ellis Road Pond=					41.3	ac.
Area flowing west away from Ellis Road Pond=					260.05	ac.

Regional Basin Land Use Calculations

Basin No: **Regional Basin for Joint-Use Pond**
 Total Area (ac): **608.12**

Design Logic

- This spreadsheet calculates the land use percentages for the total contributing area.
- Land use areas were determined from area take-offs of the total contributing area.
- The resulting land use ratios are applied to the estimated total contributing drainage area to determine the adjust land use areas.

Land Use Description	Land Use Area	% of Total	Adjusted Area
Agriculture	16.80	1.0%	6.34
Rangeland	253.55	15.7%	95.67
Wetland/ Wet Prairies	71.06	4.4%	26.81
Industrial	432.20	26.8%	163.07
Roads/ Highway	1.14	0.1%	0.43
Landfill	187.73	11.6%	70.83
Open Water	126.32	7.8%	47.66
Upland Forest	313.09	19.4%	118.13
Low Intensity Commercial	50.23	3.1%	18.95
Low Density Residential	5.75	0.4%	2.17
Medium Density Residential	10.67	0.7%	4.03
High Density Residential	143.21	8.9%	54.03
Pond Area (berms)	0.00		0.00
Pond Water Surface	0.00		0.00
Total	1611.76		608.12

Ellis Road at I-95 Pond Siting Report							Comp. By: CCS Date: 5/19/2014 Chk. By: GRD FPID: 426905-3-32-01		
Regional Basin Curve Number Calculations									
Basin No: Regional Basin for Joint-Use Pond Total Area (ac): 608.12									
Post-Development Conditions									
Total Area (ac): 608.12									
Land Use Description	CN	% Impervious	EMC(N)	EMC(P)	Area	CN*A	Imp Area	EMC(N)*A	EMC(P)*A
Argiculture	83.67	0.0%	2.420	0.460	6.34	530.52	0.00	15.34	2.917
Rangeland/ Undeveloped	83.67	0.0%	1.150	0.055	95.67	8004.69	0.00	110.02	5.262
Wetland/ Wet Prairies	83.67	0.0%	1.150	0.055	26.81	2243.32	0.00	30.83	1.475
Industrial	83.67	72.0%	1.140	0.230	163.07	13644.46	117.41	185.90	37.506
Roads/ Highway	83.67	100.0%	1.370	0.170	0.43	36.10	0.43	0.59	0.073
Landfill	83.67	0.0%	1.200	0.260	70.83	5926.70	0.00	85.00	18.416
Open Water	83.67	100.0%	0.000	0.000	47.66	3987.76	47.66	0.00	0.000
Upland Forest	83.67	0.0%	1.150	0.055	118.13	9884.13	0.00	135.85	6.497
Low Intensity Commercial	83.67	85.0%	0.930	0.160	18.95	1585.87	16.11	17.63	3.032
Low Density Residential	83.67	25.0%	1.500	0.180	2.17	181.47	0.54	3.25	0.390
Medium Density Residential	83.67	38.0%	1.850	0.310	4.03	336.95	1.53	7.45	1.248
High Density Residential	83.67	65.0%	1.910	0.480	54.03	4521.10	35.12	103.20	25.936
Total Area:					608.12	50883.06	218.80	695.06	102.752
Post Composite Curve Number:						83.67			
Post Composite Percent Impervious:							0.36		
Post Composite Event Mean Concentration for Nitrogen:								1.14	
Post Composite Event Mean Concentration for Phosphorus:									0.169
NOTES:									
- CN calculations can be found on the Basin Area Analysis sheet. - The areas on this sheet are calculated on the Land Use: Ellis Road Regional Basin sheet - See Report Narrative and Appendix F for basis of EMC values.									

Ellis Road at I-95 Pond Siting Report	Comp. By: CCS Date: 5/19/2014
Regional Basin Nutrient Loading Analysis	Chk. By: GRD FPID: 426905-3-32-01

* The purpose of this analysis is to determine the total nutrient loading from the M-1 Canal Regional Basin which has been determined to flow in M-1 as it crosses the project corridor.

Determine Gross Nutrient Loading

Non DCIA CN =

61

(Open Space, assume B Soils as an average)

Total Impervious Area =

218.80

(All impervious area assumed to be directly connected)

Total Area =

608.12

ac

DCIA Percentage =

35.98%

Annual Runoff Coefficient, C =

0.312

*(Refer to Appendix F. Zone 2, based on CN and DCIA)

Mean Annual Rainfall =

52

in

Annual Runoff Volume (ac-ft) = Area (ac) * Mean Annual Rainfall (in) * C * 1/12 (ft/in)

Annual Runoff Volume =

822.72

ac-ft/year

Composite Event Mean Concentration for Nitrogen, EMC(N) =

1.14

Composite Event Mean Concentration for Phosphorus, EMC(P) =

0.169

Annual Mass Loading (kg/L) = Annual Runoff Volume (ac-ft/year) * EMC (mg/L)*CF

Conversion Factor, CF =

1.23

Gross Nitrogen (TN) Loading

Annual TN Load =

1159.69

kg TN/year

Gross Phosphorus (TP) Loading

Annual TP Load =

171.44

kg TP/year

Incorporate Offsite Treatment

- Assume that the regional basin receives some level of stormwater treatment prior to discharge at point of analysis.

- Assume roughly half of the basin area experience a level of treatment equivalent to typical wet detention treatment.

- Typical Wet detention removal rates are 35% TN and 64.5% TP. If half the basin is treated, an average pre-treatment for the regional basin would be 17.5% TN and 32.25% TP.

Net Nitrogen (TN) Loading

Annual Net TN load = Gross TN Load * (1 - 17.5%)

=

956.75

kg TN/year

Net Phosphorus (TP) Loading

Annual Net TP Load = Gross TP Load * (1 - 32.25%)

=

116.15

kg TP/year

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
 Date: 4/22/2014
 Chk. By: CCS
 Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: **Joint Use Pond A**
 Total Area (ac): **296.00**

The size of the basin was maximized based on the amount of pond storage that could be provided by the regional pond sites. The size and location of the joint-use pond sites was determined based on meetings with FDOT. See Appendix C Technical Narrative.

Compute Required Treatment Volume

Treatment Volume is equal to the larger of either 1 inch of runoff or 2.5 inches times the Impervious Area.

Total Drainage Area (DA) = **296.00** ac
 Impervious Area (IA) = **106.56** ac (excludes pond area)

1" of runoff = $\frac{DA (1 \text{ in})}{12 \text{ in/ft}}$ = 24.67 ac-ft

2.5" over impervious area = $\frac{IA (2.5 \text{ in})}{12 \text{ in/ft}}$ = 22.20 ac-ft

Treatment Volume = **24.67** ac-ft

Set Control and Weir Elevations

SHWT = **15.00** (Assumed 1 foot below low point of existing grade)

	Elevation (ft)	Area (ac)	Volume (ac-ft)**	Volume (cy)	Treatment Volume (ac-ft)
BOTTOM	7.00	8.15	0.00	0.00	0.00
SLOPE BREAK	13.00	9.02	51.51	83102.80	0.00
NWL	15.00	9.61	70.14	113159.20	0.00
TV EL	17.38	10.34	94.81	152954.76	24.67
Inside TOB	20.00	11.14	122.02	196850.87	51.88
Outside Berm	21.00	12.71	136.55	220302.87	66.41

Set the Elevation of the Overflow Control Structure

Water Quality Volume = 24.67 ac-ft

Set Weir based on containing Water Quality Volume above:

Volume above NWL = 24.67 ac-ft
 Corresponding Depth above NWL = 2.38 ft (determined by interpolation)

Required Overflow Weir Elevation = 17.38 ft

Weir	17.38	10.34	24.67
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I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
 Date: 4/22/2014
 Chk. By: CCS
 Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: Joint Use Pond A
 Total Area (ac): 296.00

Calculate the Minimum Permanent Pool Volume

Rational C	Area (ac)	C x A
1.00	9.61	9.61
0.95	106.56	101.23
0.20	179.83	35.97
Total	296.00	146.81

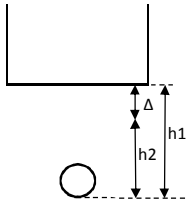
Composite Runoff Coefficient = (TOTAL C x A)/(TOTAL AREA)

Composite Runoff Coefficient (C) = 0.50

Residence Time (RT) = 21 days
 Wet Season Duration (WD) = 153 days
 Wet Season Rainfall (WR) = 29 in

Permanent Pool = (AREA*C*WR*(RT/WD))/12

Required Permanent Pool = 48.70 ac-ft < 70.14 Permanent Pool Volume Sufficient

Size the Circular Bleed-Down Orifice

Treatment Volume =	24.67	ac-ft
	1074480.00	ft ³
Diameter of orifice =	13.00	in
Area of orifice opening =	0.92	ft ²
Bleed down Elevation =	15.00	ft
Treatment Volume Depth, h1 =	2.38	ft
Stage at half the treatment volume =	16.19	ft
Depth at Half Treatment Volume, h2 =	1.19	ft
h =	1.78	ft

Avg. Flow Rate Based on orifice size; Q = 5.927 cfs
 Time Period to Bleed Down 1/2 Treatment Volume = 25.18 hr

Recovery Time Sufficient

Check the Mean Depth of the Pond

Mean Depth = Volume @ NWL / Area @ NWL

Volume @ NWL = 70.14 ac-ft
 Area @ NWL = 9.61 ac

Mean Depth = 7.30 ft > 2' AND < 8' Mean Depth OKAY

I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
 Date: 4/22/2014
 Chk. By: CCS
 Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: **Joint-Use Pond B**
 Total Area (ac): **296.00**

The size of the basin was maximized based on the amount of pond storage that could be provided by the regional pond sites. The size and location of the joint-use pond sites was determined based on meetings with FDOT. See Appendix C Technical Narrative.

Compute Required Treatment Volume

Treatment Volume is equal to the larger of either 1 inch of runoff or 2.5 inches times the Impervious Area.

Total Drainage Area (DA) = **296.00** ac
 Impervious Area (IA) = **106.56** ac (excludes pond area)

1" of runoff = $\frac{DA (1 \text{ in})}{12 \text{ in/ft}}$ = 24.67 ac-ft

2.5" over impervious area = $\frac{IA (2.5 \text{ in})}{12 \text{ in/ft}}$ = 22.20 ac-ft

Treatment Volume = **24.67** ac-ft

Set Control and Weir Elevations

SHWT = **15.00** (Assumed 1 foot below low point of existing grade)

	Elevation (ft)	Area (Ac)	Volume (Ac-ft)**	Volume (cy)	Treatment Volume (Ac-ft)
BOTTOM	8.00	6.12	0.00	0.00	0.00
SLOPE BREAK	13.00	7.14	33.15	53482.00	0.00
NWL	15.00	7.98	48.27	77875.60	0.00
TV EL	17.71	9.20	72.94	117671.16	24.67
Inside TOB	20.00	10.24	93.82	151362.93	45.55
Outside Berm	21.00	12.65	108.91	175711.31	60.64

Set the Elevation of the Overflow Control Structure

Water Quality Volume = 24.67 ac-ft

Set Weir based on containing Water Quality Volume above:

Volume above NWL = 24.67 ac-ft
 Corresponding Depth above NWL = 2.71 ft (determined by interpolation)

Required Overflow Weir Elevation = 17.71 ft

Weir	17.71	9.20	24.67
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I-95 AT ELLIS ROAD INTERCHANGE POND SITING REPORT

Comp. By: MR
 Date: 4/22/2014
 Chk. By: CCS
 Job No: 426905-3-32-01

WET DETENTION POND DESIGN CALCULATIONS

Basin No: Joint-Use Pond B
 Total Area (ac): 296.00

Calculate the Minimum Permanent Pool Volume

Rational C	Area (ac)	C x A
1.00	7.98	7.98
0.95	106.56	101.23
0.20	181.46	36.29
Total	296.00	145.50

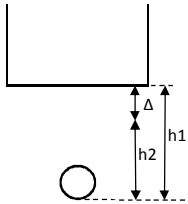
Composite Runoff Coefficient = (TOTAL C x A)/(TOTAL AREA)

Composite Runoff Coefficient (C) = 0.49

Residence Time (RT) = 21 days
 Wet Season Duration (WD) = 153 days
 Wet Season Rainfall (WR) = 29 in

Permanent Pool = (AREA*C*WR*(RT/WD))/12

Required Permanent Pool = 48.26 ac-ft < 48.27 Permanent Pool Volume Sufficient

Size the Circular Bleed-Down Orifice

Treatment Volume = 24.67 ac-ft
 1074480.00 ft³
 Diameter of orifice = 13.00 in
 Area of orifice opening = 0.92 ft²

Bleed down Elevation = 15.00 ft
 Treatment Volume Depth, h1 = 2.71 ft
 Stage at half the treatment volume = 16.35 ft
 Depth at Half Treatment Volume, h2 = 1.35 ft
 h = 2.03 ft

Avg. Flow Rate Based on orifice size; Q = 6.325 cfs
 Time Period to Bleed Down 1/2 Treatment Volume = 23.60 hr

NOT OKAY

Ellis Road at I-95 Pond Siting Report	Comp. By:	CCS
	Date:	5/19/2014
	Checked By:	GRD
	FPID:	426905-3-32-01
Joint-Use Pond Compensatory Treatment Analysis		
- The purpose of this calculation is to demonstrate that the regional pond provides adequate nutrient removal to compensate for basin 2 and determines excess provided treatment. The excess treatment is expressed in terms of nutrient load as well as equivalent roadway acres.		
Basin 2 Pre Development Nutrient Loading		
Note: The predevelopment condition is existing. Average undeveloped Event Mean Concentration Values for Nitrogen and Phosphorus are used for the pre-development condition. The Hydrologic Soil Group is B/D. Therefore the CN is 61.		
Non DCIA CN=	80	(Assumes undrained condition for B/D Soil- Area is low and wet)
Total Impervious Area=	0.08	(All impervious area assumed to be directly connected)
Total Area =	24.81	ac
DCIA Percentage =	0.32%	
Annual Runoff Coefficient, C =	0.080	*
Mean Annual Rainfall =	52	in *(Refer to Appendix F. Zone 2, based on CN and DCIA)
Annual Runoff Volume (ac-ft) = Area (ac) * Mean Annual Rainfall (in) * C * 1/12 (ft/in)		
Annual Runoff Volume =	8.63	ac-ft/year
Composite Event Mean Concentration for Nitrogen, EMC(N) =	1.15	(For Undeveloped Area)
Composite Event Mean Concentration for Phosphorus, EMC(P) =	0.055	
Annual Mass Loading (kg/L) = Annual Runoff Volume (ac-ft/year) * EMC (mg/L)*CF		
Conversion Factor, CF =	1.23	
Total Nitrogen (TN) Loading =	12.24	kg TN/year
Total Phosphorus (TP) Loading =	0.59	kg TP/year
Basin 2 Post Development Nutrient Loading		
Non DCIA CN=	61	(Open space, B soils)
Total Impervious Area=	12.94	(All impervious area assumed to be directly connected)
Total Area =	42.53	ac (Also includes basin 3 since it is proposed to direct-discharge.)
DCIA Percentage =	30.43%	
Annual Runoff Coefficient, C =	0.191	*
Mean Annual Rainfall =	52	in *(Refer to Appendix F. Zone 2, based on CN and DCIA)
Annual Runoff Volume (ac-ft) = Area (ac) * Mean Annual Rainfall (in) * C * 1/12 (ft/in)		
Annual Runoff Volume =	35.19	ac-ft/year
Event Mean Concentration for Nitrogen, EMC(N) =	1.37	(For Highway)
Event Mean Concentration for Phosphorus, EMC(P) =	0.17	
Annual Mass Loading (kg/L) = Annual Runoff Volume (ac-ft/year) * EMC (mg/L)*CF		
Conversion Factor, CF =	1.23	
Post-Development Total Nitrogen (TN) Loading =	59.46	kg TN/year
Post-Development Total Phosphorus (TP) Loading =	7.38	kg TP/year

Ellis Road at I-95 Pond Siting Report	Comp. By:	CCS
	Date:	5/19/2014
	Checked By:	GRD
	FPID:	426905-3-32-01

Joint-Use Pond Compensatory Treatment Analysis

Determine Required Nutrient Removal

Required Nitrogen Removal

80% Removal = **47.57** kg TN/year

Required Phosphorus Removal

80% Removal = **5.90** kg TN/year

Determine Nutrient Loading of Compensatory Basin

- The regional pond can provide enough treatment volume for 258 acres of the regional basin. An equivalent flow from the M-1 Canal will be routed into the regional pond for nutrient removal.

Regional Basin Area =	608.12	(See <i>Regional Curve Number Calculations</i>)
Total Impervious Area =	218.80	(See <i>Regional Curve Number Calculations</i>)
Net Nitrogen (TN) Loading =	956.75	(See <i>Regional Nutrient Loading Calculations</i>)
Net Phosphorus (TP) Loading =	116.15	(See <i>Regional Nutrient Loading Calculations</i>)

Compensatory Area to be routed to Joint-Use Pond = 296 acres

Non-DCIA CN =	61	
Total Impervious Area =	106.50	ac* *Based on the percentage of Impervious Area for the entire regional basin
DCIA Percentage =	35.98%	
Annual Runoff Coefficient, C =	0.312	* *(Refer to Appendix F. Zone 2, based on CN and DCIA)
Mean Annual Rainfall =	52	inches
Annual Runoff Volume (ac-ft) = Area (ac) * Mean Annual Rainfall (in) * C * 1/12 (ft/in)		
Annual Compensatory Area Runoff Volume =	400.46	ac-ft/year (FR)

- Nutrient loading will be calculated by taking the total regional basin nutrient loading value and multiplying it by the ratio of area between comp basin and regional basin.

Comp Basin Area =	296	=	48.67%
Regional Basin Area	608		
Annual Net TN load =	465.70	kg TN/year	
Annual Net TN load =	56.54	kg TN/year	

Determine Regional Pond Nutrient Removal

Proposed Permanent Pool Volume =	48.27	ac-ft (PPV)
Assumed Residence Time, t _d =	44	days PPV*365/FR

Wet Detention Total Nitrogen Removal Efficiency (%TN Removal) = **35.0%** (Removal Rate Provided by Cammie Dewey @ SJRWMD, corresponds to 21-day RT)

Wet Detention Total Phosphorus Removal Efficiency (%TP Removal) = **64.5%** (Removal Rate Provided by Cammie Dewey @ SJRWMD, corresponds to 21-day RT)

Annual Removal = Wet Detention % Removal * Annual Load

Total Nitrogen Removal =	162.99	kg TN/year
Total Phosphorus Removal =	36.47	kg TP/year

Ellis Road at I-95 Pond Siting Report

Comp. By:	CCS
Date:	5/19/2014
Checked By:	GRD
FPID:	426905-3-32-01

Joint-Use Pond Compensatory Treatment Analysis

Determine Excess Treatment

	Required Removal	Joint-Use Pond Removal	Excess Removal
Nitrogen	47.57	162.99	115.43
Phosphorus	5.90	36.47	30.56

Equate the excess nutrient removal to roadway acres.

Non DCIA CN= 61
 Total Impervious Area= 0.50
 Total Area= 1.00

Impervious area assumptions are based off of Ellis Road PDE
 Typical Section for SIS Urban w/ Bulkheaded Channel

DCIA Percentage = 50.00%

Annual Runoff Coefficient, C = 0.421
 Mean Annual Rainfall = 52

*(Refer to Appendix F. Zone 2, based on CN and DCIA)

Annual Runoff Volume (ac-ft) = Area (ac) * Mean Annual Rainfall (in) * C * 1/12 (ft/in)

Annual Runoff Volume = 1.83 ac-ft/year

Event Mean Concentration for Nitrogen, EMC(N) = 1.37
 Event Mean Concentration for Phosphorus, EMC(P) = 0.17

Annual Mass Loading (kg/L) = Annual Runoff Volume (ac-ft/year) * EMC (mg/L)*CF

Conversion Factor, CF = 1.23

Post-Development Total Nitrogen (TN) Loading = 3.08 kg TN/year

Post-Development Total Phosphorus (TP) Loading = 0.38 kg TP/year

Treatment Requirement is 80% Removal per current Rule

Required Nutrient Removal for 1 acre of Roadway
 TN = 2.47 kg TN/year
 TP = 0.31 kg TP/year

Compensatory Treatment Credit = [Excess Nutrient Removal]/[Required removal for 1 acre]

TN = 46.8 Roadway Acres (CONTROLS)
 TP = 99.8 Roadway Acres

COMP TREATMENT CREDIT = 46.8 Roadway Acres