Sub-Basin Landuse and Loading Summary

Prepared by: JLS
Checked by: BF
Prepared on: 10/29/2018

Subbasin Id

Existing:

Land Use Category based on Martin County	Runoff Coefficients (C)	Area (ac)	Runoff (ac-ft/yr)	Event Mean Concentration, EMC (mg/L)[2]						Mass Loading (lbs/yr)					
				BOD	TSS	TP	TKN	Pb	Zn	BOD	TSS	TP	TKN	Pb	Zn
Medium Density Fixed Single Family	0.341	20.24	32.78	7.90	37.50	0.327	2.07	0.004	0.062	702.88	3336.47	29.09	184.17	0.36	5.52
Total		**20.24**	**32.78**	**7.90**	**37.50**	**0.327**	**2.07**	**0.004**	**0.062**	**702.88**	**3,336.47**	**29.09**	**184.17**	**0.36**	**5.52**

Proposed:

Land Use Category based on Martin County	Runoff Coefficients (C)	Area (ac)	Runoff (ac-ft/yr)	Event Mean Concentration, EMC (mg/L)[2]						Mass Loading (lbs/yr)					
				BOD	TSS	TP	TKN	Pb	Zn	BOD	TSS	TP	TKN	Pb	Zn
Medium Density Fixed Single Family	0.341	20.24	32.78	7.90	37.50	0.327	2.07	0.004	0.062	702.88	3336.47	29.09	184.17	0.36	5.52
Total		**20.24**	**32.78**	**7.90**	**37.50**	**0.327**	**2.07**	**0.004**	**0.062**	**702.88**	**3,336.47**	**29.09**	**184.17**	**0.36**	**5.52**

Notes:

1) P: Annual Average Rainfall (in) (From H. Harper Report) = **57**
2) Total Event Mean Concentration determined via weighted average based on area breakdown
3) Mass Loading = EMC * C * ac * P

Prepared by: JLS
Checked by: BF
Prepared on: 10/29/2018

Estimated Pollutant Removal for Proposed Conditions within Sub-Basins B-1A, B-1B, B-2, B-3, B-4A, B-4B

Project: Old Palm City Ripple Stormwater Project
Project No: 18-003
Sub-Basin Name: B-1A, B-1B, B-2, B-3, B-4A, B-4B

NOTES:

1. Calculations based on assumption that ponds work in treatment train
2. TP and TN removal efficiencies based on Evaluation of Current Stormwater Design Criteria within the State of Florida by Harvey Harper, dated June 2007 Figures 5-9 and 5-10 for removal efficiency of wet detention ponds
3. TSS, BOD, Pb, Zn removal efficiencies based on Evaluation of Current Stormwater Design Criteria within the State of Florida by Harvey Harper, dated June 2007, Table 5-2 for mean values of wet detention ponds with min. detention time of 14 days
4. Treatment train efficiency = $Eff_1 + ((1-Eff_1) * Eff_2)$ based on Evaluation of Current Stormwater Design Criteria within the State of Florida
5. TP and TN removal efficiencies based on Final Report Baffle Box Effectiveness Monitoring Project by GPI Southeast, dated January 2010 Table 21 for removal efficiency of baffle boxes. This report presents accepted values by FDEP for removal efficiencies.

Proposed Treatment Train:

3 wet detention ponds (Sites 1, 2, and 3)
1 dry detention pond (Site 4)

Site Characteristics:

Estimated TP in Runoff from site =	0.327	mg/L			
	29.09	lb/yr	OR	13.20	kg/yr
Estimated TN in Runoff from site =	2.07	mg/L			
	184.17	lb/yr	OR	83.54	kg/yr
Estimated TSS in Runoff from site =	37.500	mg/L			
	3,336.47	lb/yr	OR	1,513.40	kg/yr
Estimated BOD in Runoff from site =	7.90	mg/L			
	702.88	lb/yr	OR	318.82	kg/yr
Estimated Pb in Runoff from site =	0.004	mg/L			
	0.36	lb/yr	OR	0.16	kg/yr
Estimated Zn in Runoff from site =	0.062	mg/L			
	5.52	lb/yr	OR	2.50	kg/yr

Site 1 (wet detention):

TN & TP Removal Calcs:

Estimated Permanent Pool Water Level =	2.1	FT-NAVD
Permanent Pool Volume (PPV) =	0.00	Ac-ft
Runoff (RO) =	32.78	Ac-ft/yr
Detention Time (t_d) =	0.1	days
TP Percent Removal =	23.5	%
TN Percent Removal =	0.5	%

Removal Efficiencies for TSS, BOD, Pb, & Zn:

TSS Removal Efficiency =	77.0	%
BOD Removal Efficiency =	75.0	%
Pb Removal Efficiency =	84.0	%
Zn Removal Efficiency =	85.0	%

Estimated Pollutant Removal for Proposed Conditions within Sub-Basins B-1A, B-1B, B-2, B-3, B-4A, B-4B

Project: Old Palm City Ripple Stormwater Project
Project No: 18-003
Sub-Basin Name: B-1A, B-1B, B-2, B-3, B-4A, B-4B

Site 2 (wet detention):

TN & TP Removal Calcs:

Estimated Permanent Pool Water Level =	1.5	FT-NAVD
Permanent Pool Volume (PPV) =	0.00	Ac-ft
Runoff (RO) =	32.78	Ac-ft/yr
Detention Time (t_d) =	0.0	days
TP Percent Removal =	12.4	%
TN Percent Removal =	0.1	%

Removal Efficiencies for TSS, BOD, Pb, & Zn:

TSS Removal Efficiency =	77.0	%
BOD Removal Efficiency =	75.0	%
Pb Removal Efficiency =	84.0	%
Zn Removal Efficiency =	85.0	%

Site 3 (wet detention):

TN & TP Removal Calcs:

Estimated Permanent Pool Water Level =	0.5	FT-NAVD
Permanent Pool Volume (PPV) =	1.27	Ac-ft
Runoff (RO) =	32.78	Ac-ft/yr
Detention Time (t_d) =	14.1	days
TP Percent Removal =	58.5	%
TN Percent Removal =	33.4	%

Removal Efficiencies for TSS, BOD, Pb, & Zn:

TSS Removal Efficiency =	77.0	%
BOD Removal Efficiency =	75.0	%
Pb Removal Efficiency =	84.0	%
Zn Removal Efficiency =	85.0	%

Site 4 (dry detention, based on assumed values from H. Harper, 2007):

Removal Efficiencies for TP, TN, TSS, BOD, Pb, & Zn:

Assumed 0% since this will be bypassed by the majority of the system

TP Percent Removal =	0.00	%
TN Percent Removal =	0.00	%
TSS Removal Efficiency =	0.0	%
BOD Removal Efficiency =	0.0	%
Pb Removal Efficiency =	0.0	%
Zn Removal Efficiency =	0.0	%

Estimated Pollutant Removal for Proposed Conditions within Sub-Basins B-1A, B-1B, B-2, B-3, B-4A, B-4B

Project: Old Palm City Ripple Stormwater Project
Project No: 18-003
Sub-Basin Name: B-1A, B-1B, B-2, B-3, B-4A, B-4B

Treatment Train Efficiency:

Overall Efficiency of Proposed Projects

TP Percent Removal =	72.2 %
TN Percent Removal =	33.8 %
TSS Removal Efficiency =	98.8 %
BOD Removal Efficiency =	98.4 %
Pb Removal Efficiency =	99.6 %
Zn Removal Efficiency =	99.7 %

Estimated Nutrient Removal Due to Proposed Projects Within Current Drainage Study:

(English)

Parameter	Proposed Conditions Nutrient Loads (lb/yr)	Estimated Reduction in Loads (lb/yr)
TP	29.09	21.00
TN	184.17	62.20
TSS	3,336.47	3,295.87
BOD	702.88	691.90
Pb	0.36	0.35
Zn	5.52	5.50

(Metric)

Parameter	Proposed Conditions Nutrient Loads (kg/yr)	Estimated Reduction in Loads (kg/yr)
TP	13.20	9.52
TN	83.54	28.21
TSS	1,513.40	1,494.98
BOD	318.82	313.84
Pb	0.16	0.16
Zn	2.50	2.49

Project: Old Palm City Ripple Stormwater
Project No: 18-003
Date: 10/29/2018
Engineer: JLS
Basin Name: Site 1
Computation Type: Prop Condition Stage-Storage
Datum: NAVD88

Assumed Pond Bottom: 1.9 NAVD

Starting Stage 1.9
Ending Stage 5.9
Stage Increment 0.25 Note: Stage Increment < End Elev - Start Elev

Name	**Wet Detention Area**
Area	**0.77**
Start Elev	**1.90**
End Elev	**5.00**

Stage Feet NAVD	Linear Storage Ac-ft	Total Storage Ac-ft
1.90	0.00	0.00
2.15	0.01	0.01
2.40	0.03	0.03
2.65	0.07	0.07
2.90	0.12	0.12
3.15	0.19	0.19
3.40	0.28	0.28
3.65	0.38	0.38
3.90	0.50	0.50
4.15	0.6	0.6
4.40	0.8	0.8
4.65	0.9	0.9
4.90	1.1	1.1
5.15	1.3	1.3
5.40	1.5	1.5
5.65	1.7	1.7
5.90	1.9	1.9

Project: Old Palm City Ripple Stormwater
Project No: 18-003
Date: 10/29/2018
Engineer: JLS
Basin Name: Site 2
Computation Type: Prop Condition Stage-Storage
Datum: NAVD88

Assumed Pond Bottom: 1.4 NAVD

Starting Stage 1.4
Ending Stage 5.9
Stage Increment 0.25 Note: Stage Increment < End Elev - Start Elev

Name	Swale Bottom	Bank Slopes (4:1 Max)	Detention Bottom (2% Typ)
Area	**0.06**	**0.20**	0.23
Start Elev	**1.40**	**1.40**	2.50
End Elev	**3.00**	**5.00**	4.50

Stage Feet NAVD	Linear Storage Ac-ft	Linear Storage Ac-ft	Linear Storage Ac-ft	Total Storage Ac-ft
1.40	0.00	0.00	0.00	0.0
1.65	0.00	0.00	0.00	0.0
1.90	0.00	0.01	0.00	0.0
2.15	0.01	0.02	0.00	0.0
2.40	0.02	0.03	0.00	0.0
2.65	0.03	0.04	0.00	0.1
2.90	0.04	0.06	0.01	0.1
3.15	0.05	0.09	0.02	0.2
3.40	0.07	0.11	0.05	0.2
3.65	0.1	0.1	0.1	0.3
3.90	0.1	0.2	0.1	0.4
4.15	0.1	0.2	0.2	0.5
4.40	0.1	0.3	0.2	0.6
4.65	0.1	0.3	0.3	0.7
4.90	0.2	0.3	0.3	0.8
5.15	0.2	0.4	0.4	0.9
5.40	0.2	0.4	0.4	1.1
5.65	0.2	0.5	0.5	1.2
5.90	0.2	0.5	0.6	1.3

Project: Old Palm City Ripple Stormwater
Project No: 18-003
Date: 10/29/2018
Engineer: JLS
Basin Name: Site 3
Computation Type: Prop Condition Stage-Storage
Datum: NAVD88

Assumed Pond Bottom: -9.5 NAVD

Starting Stage -3.0
Ending Stage 5.0
Stage Increment 0.50 Note: Stage Increment < End Elev - Start Elev

Name	Wet Detention Pond Bot	Wet Det Slopes (2:1)	Wet Det Slopes (4:1 Max)	Lake Maint. Area (2% Max)	Roadside Swales
Area	**0.01**	**0.15**	**0.20**	0.14	0.08
Start Elev	**-9.50**	**-9.50**	**-2.50**	3.74	1.85
End Elev	**0.00**	**-2.50**	**3.90**	4.00	3.90

Stage Feet NAVD	Vert Storage Ac-ft	Linear Storage Ac-ft	Linear Storage Ac-ft	Linear Storage Ac-ft	Linear Storage Ac-ft	Total Storage Ac-ft
-3.0	0.09	0.47	0.00	0.0	0.0	0.6
-2.5	0.10	0.54	0.00	0.0	0.0	0.6
-2.0	0.11	0.62	0.00	0.0	0.0	0.7
-1.5	0.12	0.70	0.02	0.0	0.0	0.8
-1.0	0.12	0.77	0.04	0.0	0.0	0.9
-0.5	0.13	0.85	0.06	0.0	0.0	1.0
0.0	0.14	0.93	0.10	0.0	0.0	1.2
0.5	0.14	1.01	0.14	0.0	0.0	1.3
1.0	0.15	1.08	0.19	0.0	0.0	1.4
1.5	0.2	1.2	0.3	0.0	0.0	1.6
2.0	0.2	1.2	0.3	0.0	0.0	1.7
2.5	0.2	1.3	0.4	0.0	0.0	1.9
3.0	0.2	1.4	0.5	0.0	0.0	2.1
3.5	0.2	1.5	0.6	0.0	0.1	2.3
4.0	0.2	1.5	0.7	0.0	0.1	2.5
4.5	0.2	1.6	0.8	0.1	0.1	2.8
5.0	0.2	1.7	0.9	0.2	0.2	3.1

Runoff Coefficients for Different Curve Numbers

From Appendix C of *Evaluation of Current Stormwater Design Criteria within the State of Florida*

Curve Number	Runoff Coefficients
30	0.008
31	0.009
32	0.010
33	0.010
34	0.011
35	0.012
36	0.013
37	0.014
38	0.016
39	0.017
40	0.018
41	0.019
42	0.021
43	0.022
44	0.024
45	0.025
46	0.027
47	0.029
48	0.030
49	0.032
50	0.034
51	0.036
52	0.038
53	0.040
54	0.042
55	0.044
56	0.047
57	0.049
58	0.052
59	0.054
60	0.057
61	0.060
62	0.063
63	0.067
64	0.070
65	0.073
66	0.077
67	0.081
68	0.085
69	0.089
70	0.093
71	0.098
72	0.104
73	0.109
74	0.115
75	0.120
76	0.127
77	0.135
78	0.142
79	0.150
80	0.157
81	0.167
82	0.178
83	0.188
84	0.199
85	0.209
86	0.226
87	0.242
88	0.259
89	0.275
90	0.292
91	0.323
92	0.353
93	0.384
94	0.414
95	0.445
96	0.501
97	0.558
98	0.614
99	0.614
100	0.614

Note: Original values in spreadsheet were from Zone 4 for 0% DCIA
PSL is in Zone 5, so those values are used in this spreadsheet

Table for CN to C Value from Appendix C of *Evaluation of Current Stormwater Design Criteria within the State of Florida* for Zone 5:

Zone 5

Mean Annual Runoff Coefficients (C Values) as a Function of DCIA Percentage and Non-DCIA Curve Number (CN)

NDCIA CN	Percent DCIA																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	0.008	0.048	0.088	0.128	0.168	0.208	0.248	0.288	0.328	0.368	0.408	0.448	0.488	0.528	0.568	0.608	0.648	0.688	0.728	0.768	0.808
35	0.012	0.052	0.092	0.132	0.171	0.211	0.251	0.291	0.331	0.370	0.410	0.450	0.490	0.529	0.569	0.609	0.649	0.689	0.728	0.768	0.808
40	0.018	0.057	0.097	0.136	0.176	0.215	0.255	0.294	0.334	0.373	0.413	0.452	0.492	0.531	0.571	0.611	0.650	0.690	0.729	0.769	0.808
45	0.025	0.064	0.103	0.142	0.182	0.221	0.260	0.299	0.338	0.377	0.417	0.456	0.495	0.534	0.573	0.612	0.651	0.691	0.730	0.769	0.808
50	0.034	0.072	0.111	0.150	0.189	0.227	0.266	0.305	0.343	0.382	0.421	0.460	0.498	0.537	0.576	0.614	0.653	0.692	0.731	0.769	0.808
55	0.044	0.082	0.121	0.159	0.197	0.235	0.273	0.312	0.350	0.388	0.426	0.464	0.502	0.541	0.579	0.617	0.655	0.693	0.732	0.770	0.808
60	0.057	0.095	0.132	0.170	0.207	0.245	0.282	0.320	0.357	0.395	0.433	0.470	0.508	0.545	0.583	0.620	0.658	0.695	0.733	0.770	0.808
65	0.073	0.110	0.147	0.183	0.220	0.257	0.294	0.330	0.367	0.404	0.441	0.477	0.514	0.551	0.588	0.624	0.661	0.698	0.735	0.771	0.808
70	0.093	0.129	0.165	0.201	0.236	0.272	0.308	0.344	0.379	0.415	0.451	0.486	0.522	0.558	0.594	0.629	0.665	0.701	0.737	0.772	0.808
75	0.120	0.155	0.189	0.223	0.258	0.292	0.327	0.361	0.395	0.430	0.464	0.498	0.533	0.567	0.602	0.636	0.670	0.705	0.739	0.774	0.808
80	0.157	0.189	0.222	0.254	0.287	0.319	0.352	0.385	0.417	0.450	0.482	0.515	0.547	0.580	0.613	0.645	0.678	0.710	0.743	0.775	0.808
85	0.209	0.239	0.269	0.299	0.329	0.359	0.389	0.419	0.449	0.479	0.509	0.538	0.568	0.598	0.628	0.658	0.688	0.718	0.748	0.778	0.808
90	0.292	0.318	0.343	0.369	0.395	0.421	0.447	0.472	0.498	0.524	0.550	0.576	0.602	0.627	0.653	0.679	0.705	0.731	0.756	0.782	0.808
95	0.445	0.464	0.482	0.500	0.518	0.536	0.554	0.572	0.590	0.609	0.627	0.645	0.663	0.681	0.699	0.717	0.736	0.754	0.772	0.790	0.808
98	0.614	0.624	0.633	0.643	0.653	0.662	0.672	0.682	0.692	0.701	0.711	0.721	0.730	0.740	0.750	0.760	0.769	0.779	0.789	0.798	0.808

MEAN EVENT CONCENTRATIONS (mg/L) FOR UNTREATED STORMWATER RUNOFF FROM ERD*

Landuse Category from Martin County	Oxygen Demand & Sediment (mg/L)		Nutrients (mg/L)		Heavy Metals (mg/L)	
	BOD	TSS	TP	TN	Pb	Zn
Medium Density Fixed Single Family	7.9	37.5	0.327	2.07	0.004	0.062
0	7.7	57.5	0.179	1.18	0.005	0.094
0	1.4	8.4	0.055	1.15	0.000	0.000
0	5.2	37.3	0.220	1.64	0.011	0.126

*** Values from Table 4-17 of June 2007 Evaluation of Current Stormwater Design Criteria**

Table 4-17 from *Evaluation of Current Stormwater Design Criteria within the State of Florida* by Harvey Harper, dated June 2007:

TABLE 4-17

SUMMARY OF LITERATURE-BASED RUNOFF CHARACTERIZATION DATA FOR GENERAL LAND USE CATEGORIES IN FLORIDA

LAND USE CATEGORY	TYPICAL RUNOFF CONCENTRATION (mg/l)						
	TOTAL N	TOTAL P	BOD	TSS	COPPER	LEAD	ZINC
Low-Density Residential[1]	1.61	0.191	4.7	23.0	0.008[4]	0.002[4]	0.031[4]
Single-Family	2.07	0.327	7.9	37.5	0.016	0.004	0.062
Multi-Family	2.32	0.520	11.3	77.8	0.009	0.006	0.086
Low-Intensity Commercial	1.18	0.179	7.7	57.5	0.018	0.005	0.094
High-Intensity Commercial	2.40	0.345	11.3	69.7	0.015	--	0.160
Light Industrial	1.20	0.260	7.6	60.0	0.003	0.002	0.057
Highway	1.64	0.220	5.2	37.3	0.032	0.011	0.126
Agricultural							
Pasture	3.47	0.616	5.1	94.3	--	--	--
Citrus	2.24	0.183	2.55	15.5	0.003	0.001	0.012
Row Crops	2.65	0.593	--	19.8	0.022	0.004	0.030
General Agriculture[2]	2.79	0.431	3.8	43.2	0.013	0.003	0.021
Undeveloped / Rangeland / Forest	1.15	0.055	1.4	8.4	--	--	--
Mining / Extractive	1.18	0.15	7.6[3]	60.0[3]	0.003[3]	0.002[3]	0.057[3]

1. Average of single-family and undeveloped loading rates
2. Mean of pasture, citrus, and row crop land uses
3. Runoff concentrations assumed equal to industrial values for these parameters
4. Value assumed to be equal to 50% of single-family concentration

Martin County Land Use Categories	Corresponding Land Use Category from Harvey Harper
Medium Density Fixed Single Family	Single-Family
0	Low-Intensity Commercial
0	Undeveloped/Rangeland/Forest
0	Highway

From *Evaluation of Current Stormwater Design Criteria within the State of Florida* by Harvey Harper, dated June 2007:

Residence time within a wet detention pond is determined by the relationship between the permanent pool volume and the annual runoff inputs, as follows:

$$Detention\ \ Time,\ t_d\ (days) = \frac{PPV}{RO} \times \frac{365\ days}{year}$$

where:

PPV = permanent pool volume (ac-ft)

RO = annual runoff inputs (ac-ft/yr)

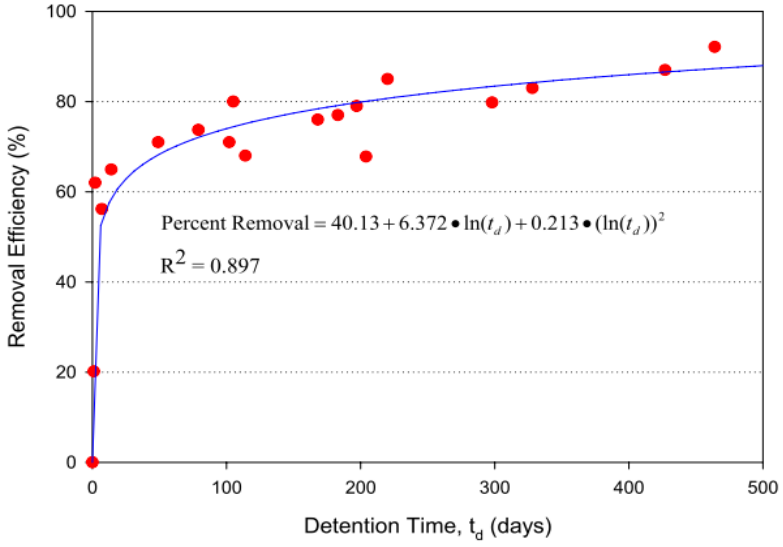

Figure 5-9. Removal Efficiency of Total Phosphorus in Wet Detention Ponds as a Function of Residence Time.

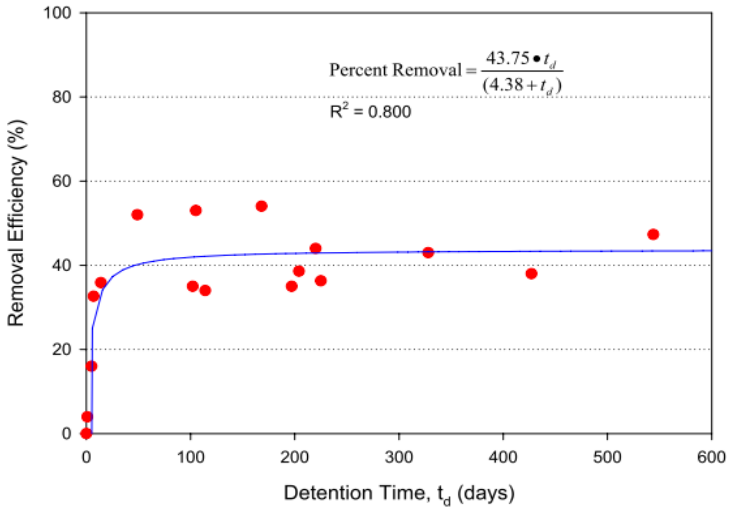

Figure 5-10. Removal Efficiency of Total Nitrogen in Wet Detention Ponds as a Function of Residence Time.

From *Evaluation of Current Stormwater Design Criteria within the State of Florida*
by Harvey Harper, dated June 2007:

TABLE 5-2

TREATMENT EFFICIENCIES FOR WET DETENTION SYSTEMS BASED ON SELECTED RESEARCH STUDIES IN FLORIDA

REFERENCE	STUDY SITE/ LAND USE	TYPE OF EFFICIENCIES REPORTED	MEAN REMOVAL EFFICIENCIES (%)							
			Total N	Ortho-P	Total P	TSS	BOD	Total Cu	Total Pb	Total Zn
PBS&J (1982)	Brevard County/ Commercial	Surface Water	--	--	69	94	--	--	96	--
Cullum (1984)	Boca Raton/ Residential	Surface Water Overall	12 15	93 82	55 60	68 64	-- --	-- --	-- --	-- --
Yousef, et al. (1986)	Maitland/ Highway	Surface Water	35	94	81	--	--	56	88	92
Yousef, et al. (1986)	EPCOT/ Highway	Surface Water	44	92	62	--	--	--	--	88
Martin & Miller (1987)	Orlando/ Urban	Surface Water	--	57	38	66	--	--	40	--
Harper (1988)	Orlando/ Residential	Surface Water	--	--	91	82	90	90	90	96
Harper & Herr (1993)	DeBary/ Commercial & Residential	Overall a. t_d=7 days b. t_d=14 days	 20 30	 40 60	 60 70	 85 85	 50 60	 40 50	 60 85	 85 95
Rushton & Dye (1993)	Tampa/Light Commercial	Surface Water	--	67	65	55	--	--	--	51
Rushton, et al. (1995)	Tampa/ Commercial	Overall a. t_d=2 days b. t_d=5 days c. t_d=14 days	 33 16 63	 69 39 92	 62 57 90	 71 67 94	 -- -- --	 ND 1 55	 ND ND 92	 56 32 87
DB Environmental (2005)	Melbourne	a. t_d=1 day b. t_d=7 days c. t_d=14 days	4 33 36	56 73 88	20 56 65	-- -- --	-- -- --	32 81 92	41 88 96	-- -- --
		MEAN VALUES[1]	**37**	**79**	**69**	**77**	**75**	**69**	**84**	**85**

1. Based on 14-day residence time, if applicable

$$\textit{Overall Treatment Train Efficiency (decimal)} = Eff_1 + (1 - Eff_1) \times Eff_2 \qquad \textit{(Eq. 1)}$$

where:

Eff_1 = efficiency of initial treatment system (decimal)

Eff_2 = efficiency of second treatment system (decimal)

From *Final Report, Baffle Box Effectiveness Monitoring Project, DEP Contract No. S0236*
by GPI Southeast, dated January 2010:

Site	Baffle Box Type	TN Mass Removal Efficiency (%)	TP Mass Removal Efficiency (%)	TN EMC Removal Efficiency (%)	TP EMC Removal Efficiency (%)
Parkway Blvd, Stuart	1	0.03	0.06	5.60	-15.30
Lincoln Lane, Stuart	1	1.00	4.50	-8.30	1.50
Average Type 1		**0.50**	**2.30**	**-1.35**	**-6.90**
Little John Lane, Rockledge	2	28.10	19.40	-11.30	-8.20
Oriole Drive, Sarasota	2	10.00	11.60	30.60	21.60
Average Type 2		**19.05**	**15.50**	**9.65**	**6.70**

Table 21 - Mass removal efficiencies of monitored baffle boxes

From ***Published data from various studies for Suntree Technoligies, Inc. for 2nd Generation Baffle Boxes***

Nutrient Separating Baffle Box - Removal Efficiencies

Numeric Reductions (mg/L)

	Total Suspended Solids mg/L			Total Phosphorus mg/L			Total Nitrogen mg/L		
Study	Influent	Effluent	Removal Efficiency	Influent	Effluent	Removal Efficiency	Influent	Effluent	Removal Efficiency
Dillard & Associates - Field Test	N/A	N/A	93.3%						
Pandit - Physical Modeling	N/A	N/A	89.8%						
Sunset Park Baffle Box	81.15	26.9	66.9%	1.909	1.022	46%			
Lubnow - Harvey's Lake	918	126	86.3%	0.47	0.32	32%			
Royal - Indialantic	32.9	7.6	76.9%	1.49	0.44	70%			
Royal - Micco	16.55	8.625	47.9%	0.055	0.0425	23%			
Pastore - Pine St	110	31	71.8%	0.33	0.19	42%	3.5	1.3	63%
Pastore - 5th St	85	27	68.2%	0.31	0.21	32%	1.6	0.99	38%
Pastore - 7th St	44	27	38.6%	0.22	0.18	18%	2.3	1.3	43%

	Zinc mg/L			Lead mg/L			Copper mg/L		
Study	Influent	Effluent	Removal Efficiency	Influent	Effluent	Removal Efficiency	Influent	Effluent	Removal Efficiency
Pastore - Pine St	0.072	0.044	39%	0.0085	0.0062	27%	0.012	0.0094	22%
Pastore - 5th St	0.088	0.038	57%	0.014	0.0065	54%	0.017	0.01	41%
Pastore - 7th St	0.057	0.041	28%	0.0066	0.0051	23%	0.014	0.011	21%

	BOD (mg/L)		
Study	Influent	Effluent	Removal Efficiency
Sunset Park Baffle Box	16.391	4.125	75%
Royal - Indialantic	1.88	1.4	26%
Royal - Micco	1.59	1.7	-7%

Dillard & Associates Consulting Engineers - Field Test for Suntree Nutrient Separating Baffle Box - Test Report - Feb 2005
Pandit & Gopatakrishnan - Florida Institute of Technology - Physical Modeling of a Stormwater Sediment Box - 1996 - Independent Test
Sunset Park Baffle Box - Brevard County Surface Water Improvement - St. John's River Water Management District - 1998 - Independent Test
Lubnow & Miller - Princeton Hydro - The Design, Installation, and Effectiveness of a Structural BMP for Harveys Lake - 2003 - Independent Test
Royal & Vanderbleek - Brevard County Surface Water Improvement Div - Sediment Control Project, Indiatlantic/Micco - 1994 - Independent Test
Pastore - Blue Water Environmental - Atlantic Beach Monitoring Study: Pine St, 5th St, 7th St - 2004