

MEMORANDUM



TO: Jack Merriam, P.E.
Theresa Connor, P.E.
John Ryan

FROM: Brett Cunningham, P.E.
Suzi Kish, P.E.
Sarah Anderson, E.I.

DATE: September 25, 2006

XC:

RE: Roberts Bay Pollutant Load Reductions

Pollutant loads were calculated using the SIMPLE model developed by Jones Edmunds for Sarasota County. Complete model development is documented in *Sarasota County County-Wide Non-Point Source Pollutant Loading Model* (Jones Edmunds, August 2005). It was used to estimate the potential loading reductions resulting from the following scenarios:

- Preventing development of parcels within Red Bug Slough.
- Preventing development of the Wilson parcel.
- Removing the South Gate and Gulf Gate point source discharges.
- Reusing 500,000 gallons per day (gpd) from the South Gate effluent discharge for irrigation.
- Replacing the septic tanks included in the Phillippi Creek Septic System Replacement Program.
- Treating the stormwater runoff from the area draining to the Celery Fields.
- Treating the stormwater runoff from the Walker Property.

The locations of these scenarios are shown in Figure 1. Table 1 shows the estimated annual load reductions (kg/yr) for each scenario and a cost-effectiveness comparison. Table 2 provides total watershed loads.

Red Bug Slough and Wilson Property

To determine the reduction in future pollutant loading increases by preventing the development of Red Bug Slough and the Wilson parcel, the land use in the model was changed from the current category to medium-density residential and the loadings were compared to current conditions.

South Gate and Gulf Gate

To simulate the removal of the South Gate and Gulf Gate discharges, these point sources were removed from the point source spatial table. An additional scenario was modeled based on the



reuse of 500,000 gpd (0.8 cfs) of the Phillippi Creek flow through irrigation. The stormwater reuse rate (0.8 cfs) was less than the effluent disposal discharge rate (1.8 cfs) used for the model. The annual pollutant loadings were calculated based on the assumptions that irrigation resulted in a 75 percent loss of flow volume and that nutrients were reduced by 95 percent (CDM, 1993). Pollutant concentrations were obtained from monitoring data and values of typical wastewater treatment plant effluent in Sarasota County.

Phillippi Creek Septic System Replacement Program

Sarasota County supplied GIS polygons of the areas where septic systems would be replaced in the Phillippi Creek watershed. The septic systems located within these areas were removed from the model to estimate the pollutant loading reductions from this model scenario.

Celery Fields

To simulate the water quality impacts of the Celery Fields, a BMP polygon with the “wet detention” treatment type was added to the approximately 3,500-acre area north of the site which drains to the Celery Fields. However, there are existing BMPs servicing smaller treatment areas in this region. New BMP categories were created to simulate the effects of the BMPs in series. For areas with exclusive treatment from the Celery Fields a set of standard removal efficiencies for wet detention was assumed and for those areas with wet detention in series a set of higher removal efficiencies were used.

Walker Property

In addition to the area north of the Celery Fields, the water quality effects of treating the stormwater runoff via wet detention from the Walker property located east of the Celery Fields was modeled. The same approach used for modeling more than one BMP in the Celery Fields scenario was used for the Walker property.

REFERENCE

Camp Dresser & McKee (CDM), 1993. *NPDES Municipal Separate Storm Sewer System. Part 2 Permit Application*. Submitted to USEPA by Sarasota County and Co-Applicants.

MEMORANDUM

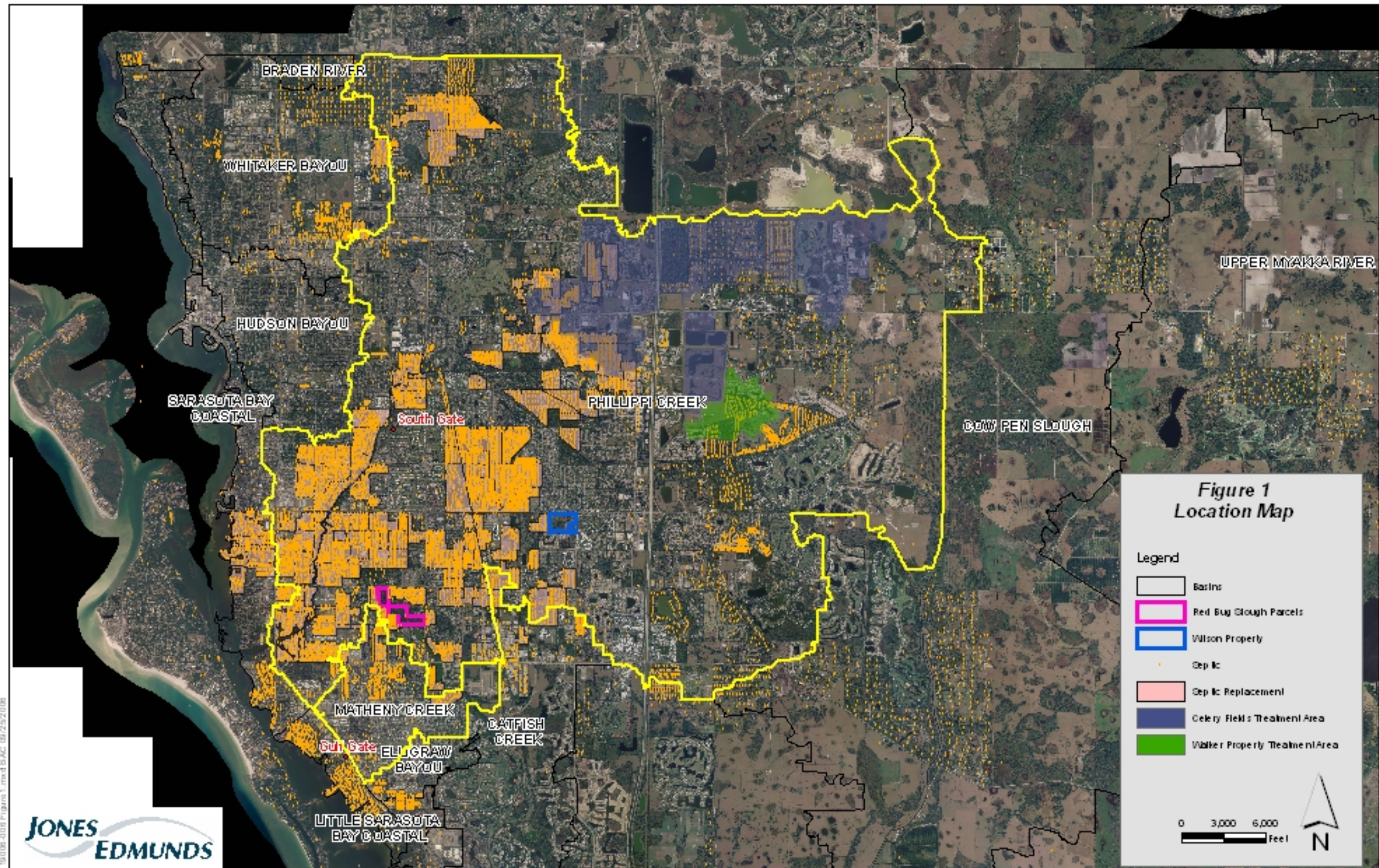


Table 1 Calculated Annual Loading Reductions (kg/yr) and Cost-effectiveness Comparison for Model Scenarios

Scenario	Pollutant Removal (kg/yr)				Project Cost	BOD Summary			TSS Summary			TP Summary			TN Summary		
	BOD	TSS	TP	TN		\$/BOD kg/yr	BOD for Phillippi	% Phillippi BOD Removed	\$/TSS kg/yr	TSS for Phillippi	% Phillippi TSS Removed	\$/TP kg/yr	TP for Phillippi	% Phillippi TP Removed	\$/TN kg/yr	TN for Phillippi	% Phillippi TN Removed
Preventing Red Bug Slough Property from being Developed	465	4,267	18	73	\$ 4,000,000	8,602	464,097	0.10%	937	3,081,516	0.14%	222,222	32,357	0.06%	54,795	273,529	0.03%
Preventing Wilson Property from being Developed	352	3,037	15	81	\$ 6,000,000	17,045.5	464,097	0.08%	1,976	3,081,516	0.10%	400,000	32,357	0.05%	74,074	273,529	0.03%
Removal of South Gate and Gulf Gate Discharges	8,041	4,640	2,067	8,890	\$ 30,000,000	3,730.9	464,097	1.73%	6,466	3,081,516	0.15%	14,514	32,357	6.39%	3,375	273,529	3.25%
South Gate Reuse Reduction	2,851	1,851	783	3,799	\$ 10,000,000	3,507.5	464,097	0.61%	5,402	3,081,516	0.06%	12,771	32,357	2.42%	2,632	273,529	1.39%
Septic System Replacement Program	104,705	69,803	5,115	149,116	\$ 150,000,000	1,432.6	464,097	22.56%	2,149	3,081,516	2.27%	29,326	32,357	15.81%	1,006	273,529	54.52%
Celery Fields	9,917	271,902	307	973	\$ 30,000,000	3,025.1	464,097	2.14%	110	3,081,516	8.82%	97,720	32,357	0.95%	30,832	273,529	0.36%
Walker Property	1,799	22,371	37	360	\$ 10,000,000	5,558.6	464,097	0.39%	447	3,081,516	0.73%	270,270	32,357	0.11%	27,778	273,529	0.13%

Table 2 Calculated Annual Loadings (kg/yr) for Matheny and Phillippi Creek Basins

Basin	BOD	TSS	TP	TN
Matheny Creek	21,146	154,953	1,179	12,620
Phillippi Creek	464,097	3,081,516	32,357	273,529
Total	485,243	3,236,469	33,536	286,149



For Informational Purposes Only