Northern Palm Beach County Improvement District

Cycle 4, Year 1

MS4 Permit No. FLS000018-004

Part V. – Monitoring Requirements; Sub-part A. – Assessment Program

Assessment Program Objective

The purpose of this assessment program is to provide information for the Northern Palm Beach County Improvement District (NPBCID) to determine the overall effectiveness of its Stormwater Management Program (SWMP) in reducing stormwater pollutant loadings from its Municipal Separate Storm Sewer System (MS4) to receiving water bodies.

Assessment Program Components

As required by the MS4 Permit, the following parts make up this Assessment Program:

- **Water Quality Monitoring**
- **Pollutant Loading**
- **Evaluation and Response Plan**

Water Quality Monitoring Plan

Currently, the joint NPDES program in Palm Beach County reports ambient water quality data at several monitoring sites based on the location of major outfalls and TMDL's within the County. For the Water Quality Monitoring Plan, NPBCID is proposing to use the ambient water quality data reported by the MS4 group activities and ambient water quality monitoring sites by the Loxahatchee River District.

NPBCID has 22 major outfalls from 24 Units of Development. All units received Environmental Resource Permits from South Florida Water Management District. All Units have structural and non-structural controls that significantly reduce pollutant loadings from these systems. Table 1 has a listing of these development and the receiving waterbodies. Note that Units 14 and 21 discharge into Unit 43, which in turn discharges overland through the Loxahatchee Slough and then into the C-18 Canal. **Figure 1** identifies these units, the major outfalls for these units, receiving waterbodies and ambient water quality stations. The water quality stations include Loxahatchee River District (LRD), Palm Beach County Environmental District (ERM), and South Florida Water Management District (SFWMD) sites.

Figure 1

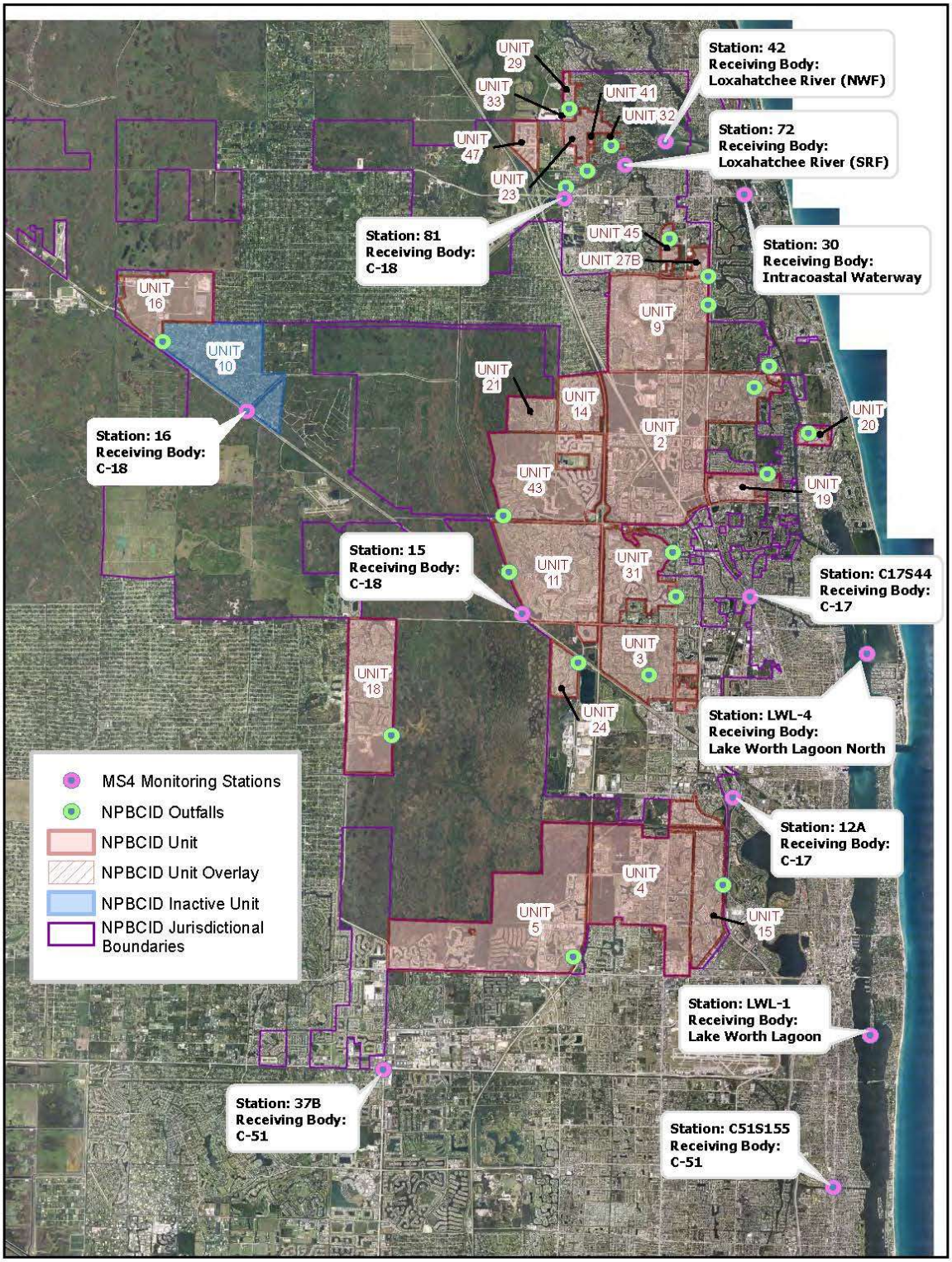
UNIT 29
UNIT 33
UNIT 41
UNIT 32
UNIT 47
UNIT 23
Station: 42
Receiving Body:
Loxahatchee River (NWF)
Station: 72
Receiving Body:
Loxahatchee River (SRF)
Station: 81
Receiving Body:
C-18
UNIT 45
UNIT 27B
Station: 30
Receiving Body:
Intracoastal Waterway
UNIT 16
UNIT 10
UNIT 9
UNIT 21
UNIT 14
UNIT 20
UNIT 2
Station: 16
Receiving Body:
C-18
UNIT 43
UNIT 19
Station: 15
Receiving Body:
C-18
UNIT 11
UNIT 31
Station: C17S44
Receiving Body:
C-17
UNIT 3
UNIT 18
UNIT 24
Station: LWL-4
Receiving Body:
Lake Worth Lagoon North
Station: 12A
Receiving Body:
C-17
UNIT 4
UNIT 5
UNIT 15
Station: LWL-1
Receiving Body:
Lake Worth Lagoon
Station: 37B
Receiving Body:
C-51
Station: C51S155
Receiving Body:
C-51
MS4 Monitoring Stations
NPBCID Outfalls
NPBCID Unit
NPBCID Unit Overlay
NPBCID Inactive Unit
NPBCID Jurisdictional Boundaries

Table 1 NPBCID MS4 Units of Development	
Unit	**Receiving Waterbody**
2	Intracoastal Waterway (North)
3	C-17 Canal
4	C-17 Canal
5	C-51 Canal
9	Intracoastal Waterway (North)
11	C-18 Canal
14	Unit 43
15	C-18 Canal
16	Inactive Unit 10 to C-18 (West)
18	Grassy Water Preserve
19	Intracoastal Waterway (North)
20	Intracoastal Waterway (North)
21	Unit 43
23	SW Fork Loxahatchee River
24	C-17 Canal
27B	Intracoastal Waterway (North)
29	NW Fork Loxahatchee River
31	C-17 Canal
32	SW Fork Loxahatchee River
33	NW Fork Loxahatchee River
41	SW Fork Loxahatchee River
43	C-18 Canal
45	SW Fork Loxahatchee River
47	SW Fork Loxahatchee River

Monitoring Locations

Based on the location of the outfalls of NPBCID Units of Development and MS4 Outfall, twelve monitoring stations have been established. Monitoring locations are shown in Table 2. Table 2 identifies these monitoring stations, along with relevant information about each location.

Table 2
Monitoring Stations

Station Number	Latitude/ Longitude	Receiving Waterbody	Agency	Frequency
30	26.934576 -80.083153	Intracoastal Waterway	LRD	Bi-Monthly
42	26.950246 -80.108790	Loxahatchee River (NWF)	LRD	Bi-Monthly
72	26.943301 -80.121856	Loxahatchee River (SRF)	LRD	Monthly
81	26.933743 -80.141791	C-18	LRD	Monthly
15	26.812656 -80.156218	C-18	ERM	Bi-Monthly
16	26.872281 -80.245657	C-18	ERM	Bi-Monthly
LWL-1	26.6890 -80.044161		ERM	Monthly
LWL-4	26.8004 -80.0443	Lake Worth Lagoon North	ERM	Monthly
C17S44	26.817267 -80.082067	C-17	SFWMD	Monthly
12A	26.758688 -80.088300	C-17	ERM	Bi-Monthly
37B	26.679921 -80.202474	C-51	ERM	Bi-Monthly
C51S155	26.644628 -80.056523	C-51	SFWMD	Monthly

Sampling Method and Monitoring Parameters

The method of sample collection is in situ using a water quality monitoring instrument such as a surface grab method. Water samples are collected, preserved, and stored according to FDEP Standard Operating Procedures. Information on the sampling methodology and water quality data can be found on the Palm Beach County MS4 website (pbco-npdes.org under Annual Report – Joint Reports) and the Loxahatchee River Districts website (loxahatcheeriver.org) under Protecting the River – RiverKeeper.

Water parameters are listed in Table 3. All ERM and LRD data are uploaded into DEP Watershed Information Network (STORET). SFWMD data is available on the District's environmental database that stores hydrologic, meteorological, hydrogeologic and water quality data (DBHYDRO).

Table 3

MS4 Monitoring Parameters Table

Parameter	Units	Field Measurement	Laboratory Analysis
Chlorophyll A	ug/l		*X*
Copper, Dissolved	ug/l		*X*
Oxygen	*% Saturation*	*X*	
Nitrate + Nitrite	*mg/l*		*X*
pH	*SU*	*X*	
Temperature	*˚c*	*X*	
Total Kjeldahl Nitrogen	*mg/l*		*X*
Total Nitrogen	*mg/l*		*X*
Total Phosphorus	*mg/l*		*X*
Total Suspended Solids	*mg/l*		*X*
Specific Conductivity	*umhos*	*X*	
Turbidity	*NTU*	*X*	

Pollutant Loading Estimate Plan

The Palm Beach County MS4 permittee group will provide NPBCID with pollutant loading estimates. Prior to Year 3, NPBCID will participate in this effort by reviewing its MS4 contributing areas to each receiving water, and will provide updated information on the area extents and the land uses located therein. In addition, any water quality best management practices (BMPs) that are in place within the MS4 area, will be identified, along with their geospatial extent.

In accordance with the MS4 Permit, pollutant load estimates for the following parameters must be developed once during each permit cycle: Biochemical Oxygen Demand (BOD_5), Copper (Cu), Total Nitrogen (TN), Total Phosphorus (TP), Total Suspended Solids (TSS), Zinc (Zn).

The EMC values to be used in the Cycle 4 pollutant loading estimates are the same as those used in Cycle 3. This will provide consistency in comparing data to previous estimates.

The EMC values used in the Cycle 3 pollutant loading estimates (See Table 4) were taken from the 2012 City of Lake Worth Stormwater Master Plan completed by CDM Smith, because the values were determined to be representative of all of the Palm Beach County MS4s. CDM Smith chose EMC values appropriate for each land use category, from sources including NPDES data, Harvey Harper's studies, and NURP studies.

Table 4
Event Mean Concentrations (mg/l)

Land Use	% DCIA	BOD_5	Cu	TN	TP	TSS	Zn
Agriculture/Pasture	1	3.8	0.013	1.86	0.430	43.2	0.021
Forest/Open	0	13.0	0.001	0.71	0.210	16.0	0.010
Cropland	1	3.8	0.013	1.86	0.430	43.2	0.021
Single-Family, Low Density	5	10.0	0.005	1.18	0.280	21.0	0.026
Single-Family, Medium Density	25	7.0	0.008	1.64	0.340	26.0	0.042
Single-Family, High Density	50	12.0	0.010	1.90	0.450	74.0	0.100
Industrial, Heavy	90	11.0	0.015	1.27	0.350	64.0	0.096
Industrial, Light/Office	60	17.0	0.006	2.20	0.430	94.0	0.170
Commercial	75	17.0	0.006	2.20	0.430	94.0	0.170
Highway, Major	75	5.2	0.025	1.10	0.200	46.0	0.116
Wetlands	25	3.0	0.001	1.18	0.020	11.0	0.006
Water	25	3.0	0.001	1.18	0.020	11.0	0.006

To determine a practical estimate of the current pollutant loading, the NPBCID will use the land use based pollutant loading estimates provided by the group as the starting point from which pollutant load reductions will be subtracted. The pollutant load reductions will be estimated based on the BMPs that have been put in place within the MS4 contributing areas. In this way, when future estimates are done, and potentially additional reduction measures or BMPs are put in place, the estimated pollutant loading will reflect the reductions.

Evaluation and Response Plan

Once the Assessment Program is approved by FDEP, presumably sometime during Year 2 of the permit cycle, NPBCID will extract sampling information from the selected SFWMD site from prior joint annual reports, and additional collected data from SFWMD for our use moving forward. The first annual report on the Assessment Program will be concurrent with the Year 3 Annual Report Form (March 2020).

Water quality monitoring results will be available annually, and the most recent year's data will be compared to that which came before, with respect to our MS4 receiving water bodies. A summary of the water quality monitoring data, with respect to our MS4 will be developed and included in Assessment Program Annual Report.

The pollutant loading estimates developed during Year 3 of the permit cycle will be reviewed, and if possible, compared with previous permit cycles, with respect to our MS4. A discussion of the comparison will be included in the Assessment Program Annual Report.

Receiving water trending reports/graphs for various parameters, as presented in the Joint Annual Report, will be reviewed, and a discussion will be included in NPBCID's annual Assessment Report.

Based on the data from the water quality monitoring and the pollutant loading estimates, an effort will be made to determine if one portion of the MS4 should be targeted for additional loading reduction efforts, or additional pollutant control measures.