

CITY OF NAPLES OUTFALL SYSTEM COASTAL IMPACT ASSESSMENT & MANAGEMENT

Submitted to:
Florida Department of Environmental Protection
DEP Permit No. 0222355-001-JC



Prepared for:
The City of Naples

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**CITY OF NAPLES BEACH OUTFALL SYSTEM
COASTAL IMPACT ASSESSMENT & MANAGEMENT PLAN**

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Attached Report

Conceptual Stormwater Management Analysis of the Naples Beach Outfalls, prepared for Collier County for Collier County by Gulfshore Engineering, Inc., and Coastal Planning and Engineering, Inc., November 2009.

1. INTRODUCTION

The purpose of this report is to address Specific Condition 4.h. of the State Department of Environmental Protection (DEP) Joint Coastal Permit No. 0222355-001-JC for the Collier County Beach Nourishment Project, issued on January 12, 2005.

Throughout the State of Florida, there are many cases in which beach restoration projects are approved in areas which have stormwater designed to spill across the beach to the Gulf of Mexico or Atlantic Ocean. In other cases, the local community may have large outfall structures crossing the beach, and they may inhibit sea turtle access destination as well as pedestrian access along the beach. In some of these it is practical to re-route the stormwater inland or to store stormwater underground; in others it may not be practical. However, regardless of specific local circumstances, it is common for the State DEP to include the following condition as was done for the Collier County Beach Nourishment project. Specifically the permit condition states,

***h. Outfall Management Plan.** The County shall submit a long-range management plan (including an identification of viable funding sources) for the removal of storm water outfalls from the beach. Submittal of an acceptable plan will be a requirement of the Notice to Proceed for the **second** nourishment.*

Additionally, preceding the issuance of the referenced permit, the DEP issued an *Intent to Issue* on December 20, 2004 which included the following in reference to the outfalls along Naples Beach.

...The 1996 restoration project included the removal of several groin structures that had been undermined by erosion, reconstruction of six limestone-boulder groins, reconstruction of a timber-pile groin, and extension of the north jetty at Doctor's Pass. Several outfall pipes along the beach were extended to accommodate the additional beach width resulting from the 1996 nourishment project. Although these outfalls are adversely affecting the beach by contributing to erosion, impacting turtle nesting habitat, interfering with lateral beach access and degrading water quality, the cost of retrofitting the stormwater system is too great to require removal of the outfalls at this time. Therefore, the permittee will be required to submit a long-range management plan (which shall include identification of potential funding sources) for the eventual removal of these outfalls from the beach. Submittal of this plan will be a requirement of the Notice to Proceed for the second nourishment event.

The 10 outfalls within the City of Naples are located between the Naples Pier to the south and approximately one half mile north of the Naples Beach Club to the north. An aerial exhibit and site photographs of each of the outfalls are included in Appendix A for reference. The 10 stormwater outfall locations serve a total of 436 acres of inland property. Eight of the locations consist of a single pipe, and two of the locations have twin pipes. The diameters of the pipes range from 18 to 30 inches. The top elevation of the pipes ranges from +0.91 feet NGVD to a maximum height of +3.47 feet NGVD. In all cases the pipes have remained buried beneath the upland beach profile and become exposed near the waterline. For the purpose of evaluating the existing outfalls relative to the potential issues presented in the *Intent to Issue* listed above, a review of each of the potential impacts will be discussed herein along with recommended action to address those potential impacts.

2. POTENTIAL FOR CONTRIBUTING TO EROSION

The storm outfall pipes referenced in the JCP permit condition herein consist of a total of 10 outfall systems consisting of eight single pipes and two twin pipes made of PVC. All of the pipes extend across the beach profile such that the top of the pipe is buried and the outfall at least reaches the water's edge. The outfalls range in diameter from a minimum of 18 inches to a maximum of 30 inches. Sand can move around, beneath, or over the seaward portion of the pipes depending on the profile at the time. A series of site photos of each outfall is presented in Appendix A. A review of the September 2009 *Collier County Beach Renourishment Project Three-Year Post-Construction Monitoring Report* does not show any significant impact to the adjacent shorelines from any of the outfalls. In fact this project area is considered to be performing well.

While in the cases of outfalls #2 and #3 there appears to be minor localized effects from the adjacent rock mound groin, the outfall pipes in each case are immediately adjacent to the groins and appear to have minimal effect, if any, on the shoreline condition. The rock groins at outfalls #2 and #3 appear to have resulted in a localized shoreline adjustment in the form of a small offset along the beach. Those impacts remain localized without having significant downdrift impacts. The shoreline response to the groin at outfall #2 appears confined to the beach seaward of the Naples Beach Club property. The shoreline affect at the cluster pile groin at outfall #6 is a gradual increase both north and south as the pile cluster groin is very permeable and acts like a pier. Therefore, impacts to the littoral system and the beach from the outfalls are minimal and relatively insignificant, and no changes to the outfalls appear warranted based on littoral processes.

3. POTENTIAL IMPACT TO SEA TURTLE NESTING HABITAT

The beach in which the outfalls are located is sea turtle nesting habitat which is monitored annually by Collier County. Appendix B contains a summary of the sea turtle nesting data within the area containing the outfalls and a comparison of that data with a similar section of shoreline both north and south.

Based on the sea turtle nesting data collected over the project area (R-60 to R-69) as compared with data collected from R-50 to R-59 to the north and R-70 to R-79 to the south, there are no apparent trends or adverse impacts from the outfalls when comparing data from 1996 through 2008. The pipes traversing the beach remain buried and have not resulted in any apparent or documented impacts to the nesting marine turtles or their hatchlings. With the pipes extending to the shoreline, there are no trenches or scouring of the beach which has been observed in other coastal communities when the outfalls terminate further upland along the beach profile. No changes to the outfalls appear warranted based on sea turtle nesting. The difference between the incidence of nesting in the reach north of the outfalls, and within and south of the outfalls is believed to be due to other factors such as development lighting, seawalls, inlet influence and pedestrian traffic.

4. POTENTIAL FOR INTERFERING WITH LATERAL BEACH ACCESS

The site photographs in Appendix A and the beach profiles from R-60 through R-69 from the 2009 *Collier County Beach Renourishment Project Three-Year Post-Construction Monitoring Report*, which are provided in Appendix C, show that the outfall pipes are below grade and will not impede the public's ability to move laterally along the beach. While there may be some minor interruption at the shoreline at the water's edge, there appears ample room both seaward and upland in which to traverse the beach.

Details of each outfall in terms of size, elevation and portion of stormwater flow are provided in the following tables from the *Conceptual Stormwater Management Analysis – Naples Beach Outfalls* prepared for Collier County by Gulfshore Engineering, Inc. and Coastal Planning and Engineering (2009). A copy of the report is provided as an attachment to this report.

**Table 1
Summary of Beach Outfalls and Contributory Areas**

OUTFALL I.D. No.	ESTIMATED UPSTREAM CONTR. AREA	ESTIMATED 25 YR /3 DAY CONTRIBUTORY AREA DISCHARGE		CULVERT TYPE /DIAM	DESCRIPTION - OUTFALL DISCHARGE FLOW TYPE
		[ac-ft]	% of Total		
1	5.1	3.8	1.3%	Single / 24-in	<i>Intermittent - Uncontrolled Flow</i>
2	141.3	79.5	27.3%	Double / 30-in	<i>Continuous - Controlled Flow (weir)</i>
3	10.3	8.3	2.9%	Single / 18-in	<i>Intermittent - Uncontrolled Flow</i>
4	18.9	13.8	4.7%	Single / 18-in	<i>Intermittent - Uncontrolled Flow</i>
5	5.1	3.8	1.3%	Single / 14-in	<i>Intermittent - Uncontrolled Flow</i>
6	149.5	102.6	35.2%	Double / 30-in	<i>Continuous - Uncontrolled Flow</i>
7	34.3	25.6	8.8%	Single / 24-in	<i>Intermittent - Uncontrolled Flow</i>
8	48.4	36.5	12.5%	Single / 30-in	<i>Intermittent - Uncontrolled Flow</i>
9	9.5	7.1	2.4%	Single / 18-in	<i>Intermittent - Uncontrolled Flow</i>
10	13.6	10.1	3.5%	Single / 18-in	<i>Intermittent - Uncontrolled Flow</i>
Totals =	436.0	291.1			

Notes:

1: Discharge rates given are based on conceptual-level modeling only.

2: Outfalls #2 and #6 contribute an aggregate total of 182.1 (ac-ft) or 62.5% of total discharge

Table 2
Summary of Outfall Characteristics

ADMIN. No.	HISTORIC NUMBER	LOCATION	EROSION IMPACT	PIPELINE DIAMETER	INVERT El. (Ft NGVD)	NOMICNAL PIPE TOP El. (Ft NGVD)	TYPE and CONTRIBUTORY AREA
1	RG-16-1	R60+265'	Small-Moderate	24 in PVC	-0.02	2.11	In Rock Groin for Adjacent Condo
2	O-16-1	R62+650'	Moderate	2 x 30 in PVC	Both -0.14	2.49	Next to Rock Groin for hotel, parking lots, Gulf Shore Blvd. and Ponds
3	O-17-1	R63+535'	Moderate	18 in. PVC	-0.09	1.54	Next to Rock Groin from 8th Ave. N. and Gulf Shore Blvd.
4	O-17-2	R64+000'	Negligible	18 in PVC	-0.66	0.97	7th Avenue North and Gulf Shore Blvd.
5	O-17-3	R65+000'	Negligible	14 in PVC	0.23	1.52	6th Avenue North and Gulf Shore Blvd.
6	O-17-4	R65+410'	Small-Moderate	2 x 30 in PVC	0.17 & -0.52	2.46	Residential lots between 6th and 4th Ave. N., Gulf Shore Blvd. and Lake
7	O-17-5	R66+415'	Negligible	24 in PVC	-1.22	0.91	3rd Avenue North and Gulf Shore Blvd.
8	O-18-1	R67+400'	Negligible	30 in PVC	0.84	3.47	1st Avenue North and Gulf Shore Blvd.
9	O-18-2	R68+430'	Negligible	18 in PVC	0.30	1.93	1st Avenue South and Gulf Shore Blvd.
10	O-18-3	R69+000'	Negligible	18 in PVC	-0.40	1.23	2nd Avenue South and Gulf Shore Blvd.

No changes to the outfalls appear warranted based on lateral beach access.

5. POTENTIAL FOR DEGRADATION OF WATER QUALITY

The attached report entitled *Conceptual Stormwater Management Analysis – Naples Beach Outfalls* was prepared in order to evaluate the stormwater contribution of each outfall, evaluate alternatives to directing the flow to the Gulf of Mexico, and to evaluate ongoing water quality standards implemented by the City.

As indicated in Section 3 of the attached Naples Outfall Report, *...The current Stormwater Ordinance [Section 15-115] mandates a minimum level of water quality retention/detention on all properties discharging into City-owner roadway right of ways, consistent with SFWMD standards. In addition the City's Stormwater Department has on-going effort to maximize the*

water quality treatment within the City roadways by creating shallow retention swales designed to attenuate and capture runoff entering the right of way drainage system.

Also, the report further points out that outfalls #2 and #6 contribute an aggregate total of 182.1 (ac-ft) or 62.5% of total discharge. These two outfalls total coverage areas each include half of the available lakes. These lakes collect and attenuate adjacent runoff and provide treatment benefits within the storage basins.

Based on information from the City of Naples Streets and Stormwater Department, over 15 years ago the City of Naples adopted a Stormwater Utility Tax which has allowed the City to pursue a number of stormwater management programs. The City's current programs and policies related to improved stormwater management are listed below:

Private Development

- Commercial/Multifamily On-site Stormwater Management Regulations
- Single-Family On-site Stormwater Management Regulations
- Construction Site Maintenance Ordinance
- Fertilizer Regulatory Ordinance
- Illegal Waterway Dumping Ordinance

Public Development

- Adherence to SFWMD Regulations and Permitting
- Swale Restoration and Underdrain Program
- Filter Marsh/Water Quality Retention Initiatives
- Lake Assessment and Maintenance Contracts
- Water Quality Testing of Lakes, Rivers, Bays and Gulf
- NPDES Permit Conformance and Reporting

Water quality sampling stations near the beach stormwater outfalls have been monitored and are scheduled for additional monitoring in 2011 and 2013 by the South Florida DEP District to update the DEP impaired watershed listing. Currently the watershed draining into these outfalls is not impaired under the State Total Maximum Daily Loads (TMDL) program. TMDL is a calculation of maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. No changes to the outfalls appear warranted based on water quality.

6. SUMMARY

The outfalls along the beaches of the City of Naples have not caused any significant or documented impacts on local littoral processes, sea turtle nesting, lateral access or water quality. The City and Collier County have evaluated a number of alternatives to remove the outfall structures from the beach as encouraged by the Collier County Beach Restoration permit from the DEP; however, there appears to be no feasible cost effective alternatives.

The City has reviewed a number of alternatives to reduce the stormwater outfalls on the beach, including the following:

- 1) Re-route stormwater away from the beach toward Naples Bay – not practical since Naples Bay is currently an impaired water body and routing stormwater to the Bay would be counterproductive to restoration efforts.
- 2) Underground storage – not practical geologically and cost prohibitive.
- 3) Placement of infiltration tranches along the dune line – not practical due to the limited width of the beach and dune areas.

Collier County and their consultants Coastal Planning and Engineering, Inc. and Gulfshore Engineering, Inc., have completed a significant amount of work in evaluating the performance of the beach fill and outfalls along Naples beach. The attached report by Gulfshore Engineering, Inc. and Coastal Planning and Engineering, Inc. has found that the current drainage network appears sufficient from a water quality perspective and there is insufficient data to support the extremely high cost of altering the system to discharge the stormwater elsewhere.

With regard to the stormwater runoff through the outfalls, the City of Naples has been proactive in establishing and enforcing many Best Management Practices and programs to improve water quality programs for adherence to state stormwater management regulations and standards.

7. REFERENCES

City of Naples Interoffice Memorandum, Ron Wallace, P.E., Director of Streets and Water Department to A. William Moss, City Manager, *Stormwater Retrofit Development*, July 16, 2009.

Coastal Planning and Engineering, *Collier County Beach Renourishment Project Three-Year Post-Construction Monitoring Report*, September 2009.

Collier County Community Development and Environmental Services Division, Natural Resources Department, *Collier County Sea Turtle Protection Plan – Monitoring Data 1996 to 2008*.

Gulfshore Engineering, Inc. and Coastal Planning and Engineering, Inc., *Conceptual Stormwater Management Analysis – Naples Beach Outfalls*, prepared for Collier County 2009.

State of Florida Department of Environmental Protection Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization – Permit No. 0222355-001-JC issued January 12, 2005.