Beach Road Drainage Improvements Feasibility Study

Final Report

Prepared for:

Sarasota County

Water Resources
1001 Sarasota Center Boulevard
Sarasota, Florida 34240

Prepared by:

WilsonMiller

and

PBS&J

December 2005

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Table of Contents

Appendices

Exhibits

Figures

Tables

FOREWORD

This report was prepared for Sarasota County by WilsonMiller and Post, Buckley, Schuh & Jernigan (PBS&J) under contract number 2001-192.

ACKNOWLEDGEMENTS

Several staff from Sarasota County provided significant support and guidance to this project including: Ms. Theresa Connor, Mr. Bruce Maloney, Ms. Kathy Meaux, and Mr. Peter Peduzzi.

EXECUTIVE SUMMARY

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On April 12, 2004, concentrations of the fecal indicator bacteria groups *Enterococcus* and fecal coliforms were above state-mandated limits in the gulf, causing recreational water quality to be rated "poor," and a "no swim" advisory to be issued for Siesta Key Beach. Sarasota County staff immediately began comprehensive water quality monitoring at several locations upstream of the beach area that received the advisory. However, since the coliform bacteria tests only serve as an indicator of fecal contamination, a definitive source for the high bacteria counts could not be determined.

A study was initiated to determine the cause of the elevated bacterial counts. A storm sewer survey of the area identified an underground system of inlets and pipes that delivers stormwater to an underground vault, from which the first flush of stormwater is pumped to a retention pond. Subsurface flow from the retention pond along with excess runoff from the road flow to a ditch that discharges at Siesta Key Beach and empties near the Florida Department of Health (DOH) recreational beach monitoring site. Although the stormwater pipe system should not contain sewage, the observation of high bacterial counts during storm events called this assumption into question. Smoke tests and inspections of the wastewater force main system by Siesta Key Utilities Authority (SKUA) did not reveal any leaks into the stormwater conveyance system.

High levels of indicator bacteria (fecal coliforms and enterococci) in the stormwater/vault/drainage ditch suggested that these might be environmental reservoirs of indicator bacteria. No human-specific signals were obtained from the polymerase chain reaction (PCR) tests during either sample event, suggesting that no relationship exists between fecal indicator bacteria in the stormwater system and existing wastewater conveyance systems. Analysis of the *Enterococcus* fingerprints showed that during the rain event, populations in beach water and sediments were similar to populations in the ditch sediments and ditch water, as well as to populations in vault water and water in the stormwater pipe system. Similar results were found for *E. coli* populations.

Based on the results of the source tracking study, a feasibility study to evaluate various options for disinfection and diversion of stormwater from Siesta Key Beach was conducted. Sarasota County retained WilsonMiller and PBS&J to prepare a feasibility study for drainage improvements to Beach Road in the vicinity of Siesta Beach. WilsonMiller staff evaluated alternatives for a different discharge location for the Beach Road drainage system other than the Gulf of Mexico. PBS&J staff evaluated treatment and disinfection alternatives to improve water quality prior to discharge. A "treatment train" approach was recommended to treat and disinfect both baseflow and stormwater runoff.

Prior to the selection of a preferred alternative, the project team developed a decision tree to assist in the logical selection of optimal treatment alternatives, water delivery methods, and discharge locations. The decision tree is presented in **Figure E-1** on the following page.

Considerations that influenced alternative selections in the decision tree included identification of an alternative discharge location. An alternative discharge location is necessary since the existing freshwater baseflow from the ditch to the beach attracts large flocks of wading and shorebirds. This creates a secondary source of fecal loading to the beach and could pose a health risk to recreational users in or near this outfall. Discharge options included:

1. Maintaining the existing discharge in the current configuration
2. Construction of an offshore outfall via a subsurface pipe
3. Directing the existing baseflow and stormwater runoff away from the beach and allowing only infrequent high flows caused by major storm events (e.g., hurricanes) to continue to pass through to the beach.

A cost benefit analysis was performed to determine the preferred alternative for treating and discharging stormwater at the Siesta Key Beach site. Since Alternatives 1 and 2 had fatal flaws; in that the water quality discharged from either alternative would not likely meet water quality standards consistently at the discharge, only Alternative 3 was evaluated with a discharge location to the Grand Canal compared for cost and feasibility based on gravity sewer and pumping/force main options.

The preliminary cost analysis was prepared for a gravity alternative to the Grand Canal at $1.8 million and a pumping alternative to the Grand Canal at $1.4 million.

The recommendation is to proceed with a Preliminary Design Report phase to further define project design components, costs of construction, and operation and maintenance costs.

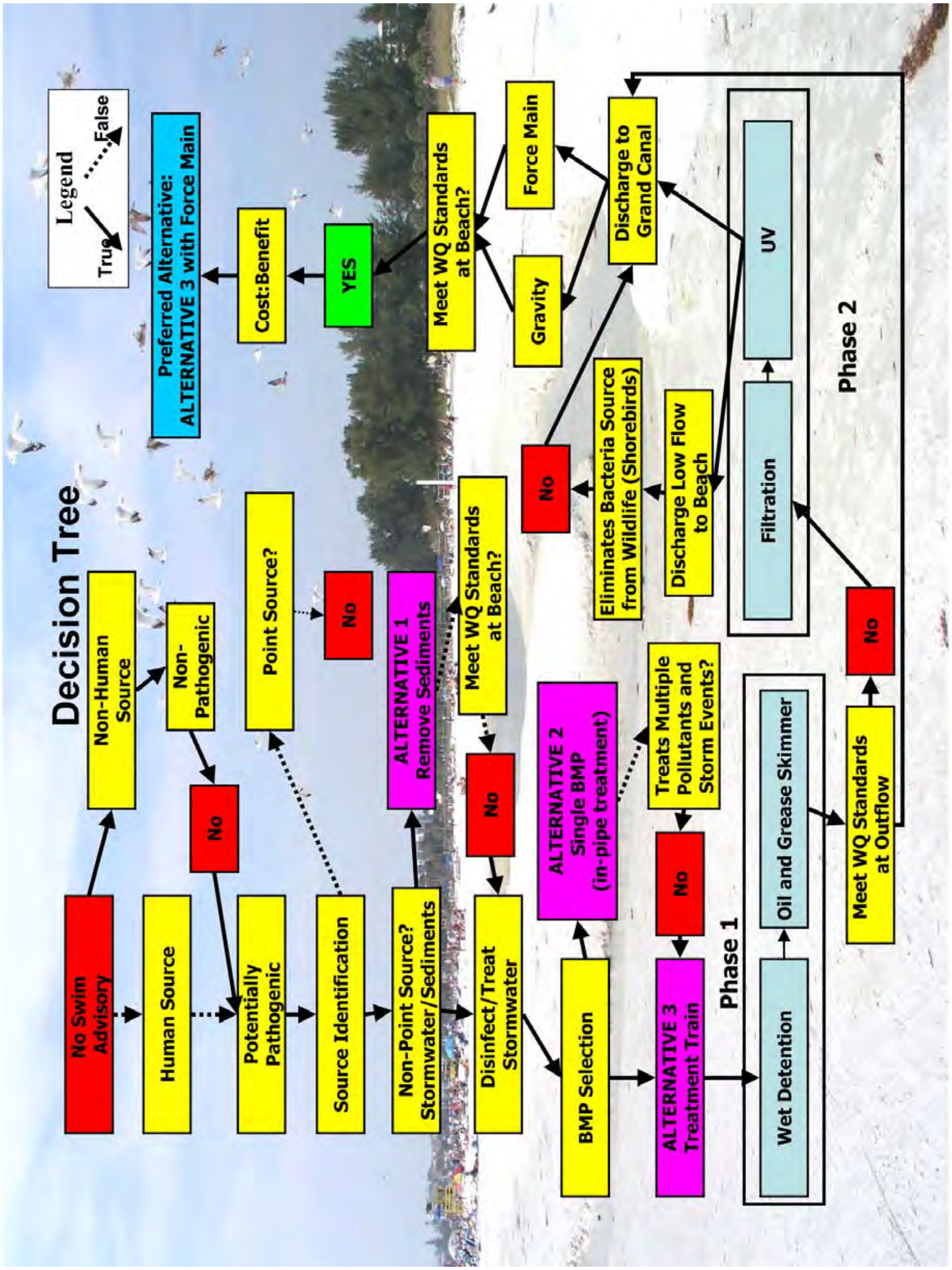


Figure E-1. Decision tree used to select the preferred stormwater treatment alternative for Siesta Key Beach.

1.0 INTRODUCTION

1.0 Introduction

Siesta Key Beach is located on a barrier island on the west coast of Florida in Sarasota County. It has been consistently listed among the top beaches in the United States and the world. On April 12, 2004, immediately following a significant rainfall event (Figure 1), fecal indicator bacteria levels at Siesta Key Beach were found to be elevated, causing water quality to be rated "poor" for both *Enterococcus* and fecal coliform parameters. As a result, a "no swim" advisory was issued for the recreational beach area.

Sarasota County staff have sampled several locations upstream of the beach area that received the advisory. The existing stormwater drainage system on Beach Road drains to a low point at which a stormwater pump station can discharge accumulated water in the pipe into a small retention pond. The pond discharges through side bank filtration into a ditch/swale system draining to the Gulf of Mexico and Siesta Key Beach. Discharge from the pipe system can also enter the Grand Canal via pipes along Calle De Siesta and Plaza De Las Palmas streets. Local residents report street flooding from a relatively small amount of rainfall. See Vicinity Map **Exhibit 1** – **Appendix A**.

Sample results from the County monitoring effort showed very high concentrations (above Class III Recreational Water Quality Standards) of both total and fecal coliform bacteria at numerous locations in the ditch and stormwater pipe drainage system that discharged to Siesta Key Beach. A follow-up study was conducted by the project team consisting of PBS&J, the University of South Florida, and Biological Consulting Services of North Florida Inc., to assess the source(s) of bacterial contamination at the beach (Harwood et al., 2005).

Although no evidence of a human source was found for the indicator bacteria within the stormwater system, there was evidence that the stormwater conveyance system is acting as a reservoir, or "breeding ground" for indicator bacteria. Rainfall flushes high bacterial loads through the system, and probably resuspends bacteria living in the sediments of the stormwater pipe, a vault structure, and drainage ditch, further elevating the load to receiving waters at the beach. The microbial pollution delivered to Siesta Key Beach via the stormwater system does not carry the same level of risk that it would if the pollution were from human sewage. However, members of the enterococci, including *Enterococcus faecium* and *Enterococcus faecalis*, are opportunistic pathogens, and elevated levels could conceivably pose a risk for the very young or immunocompromised. One of the final recommendations from this study was that the diversion of the drainage ditch from the beach should decrease or stop the intermittent observations of high bacterial levels at the beach. However, treatment of the diverted runoff should be considered if it will be discharged to other surface waters that would have human contact.

Sarasota County retained WilsonMiller and PBS&J to prepare a feasibility study for drainage improvements to Beach Road in the vicinity of Siesta Beach. WilsonMiller staff evaluated alternatives for a different discharge location for the Beach Road drainage system other than the Gulf of Mexico. PBS&J staff evaluated treatment and disinfection alternatives to improve water quality prior to discharge.

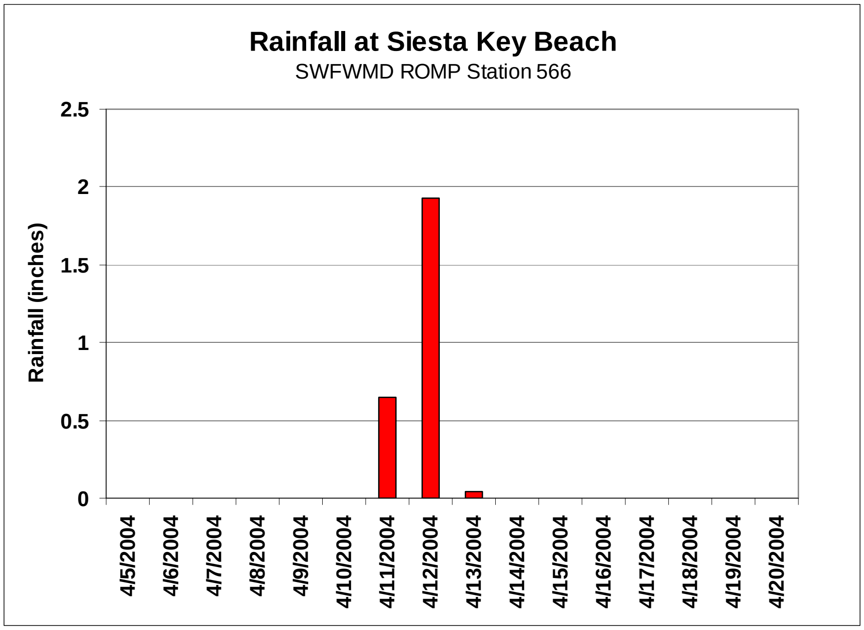


Figure 1. Rainfall, in inches, during the beach advisory at Siesta Key Beach.

The purpose of this feasibility study is to determine if a different discharge route for stormwater runoff is plausible after the discharge is treated or disinfected to enhance water quality. A treatment train approach was considered based on the existing site conditions, potential to treat other stormwater-related contaminants, and cost.

2.0 EXISTING SYSTEM DESCRIPTION

2.0 Existing System Description

Beach Road is a paved thoroughfare that runs parallel to Siesta Key Beach (**Figure 2**). A detailed study area map Exhibit 2 is presented in **Appendix B**. During roadway improvements in the 1980s, a series of underground pipes were installed under Beach Road which transport stormwater runoff from a 60±-acre basin to two outfalls to the Grand Canal and also a concrete vault located farther downstream on the west side of the road. A pump system empties the stormwater pipe during the onset of a storm event and pumps the first inch of runoff from the vault into a retention pond located immediately east of the pump station and vault. Subsurface flows from the retention pond drain laterally into an adjacent ditch that flows to the beach and into the Gulf of Mexico. This ditch system does not appear to be a natural feature based on a review of 1948 aerials of the site (**Figure 3**). The ditch is heavily shaded by both native (mangrove) and exotic (Brazilian pepper and Australian pine trees) vegetation which have recruited along the banks of the ditch. This vault-pond-ditch system has been considered a possible source of indicator bacteria at Siesta Key Beach.

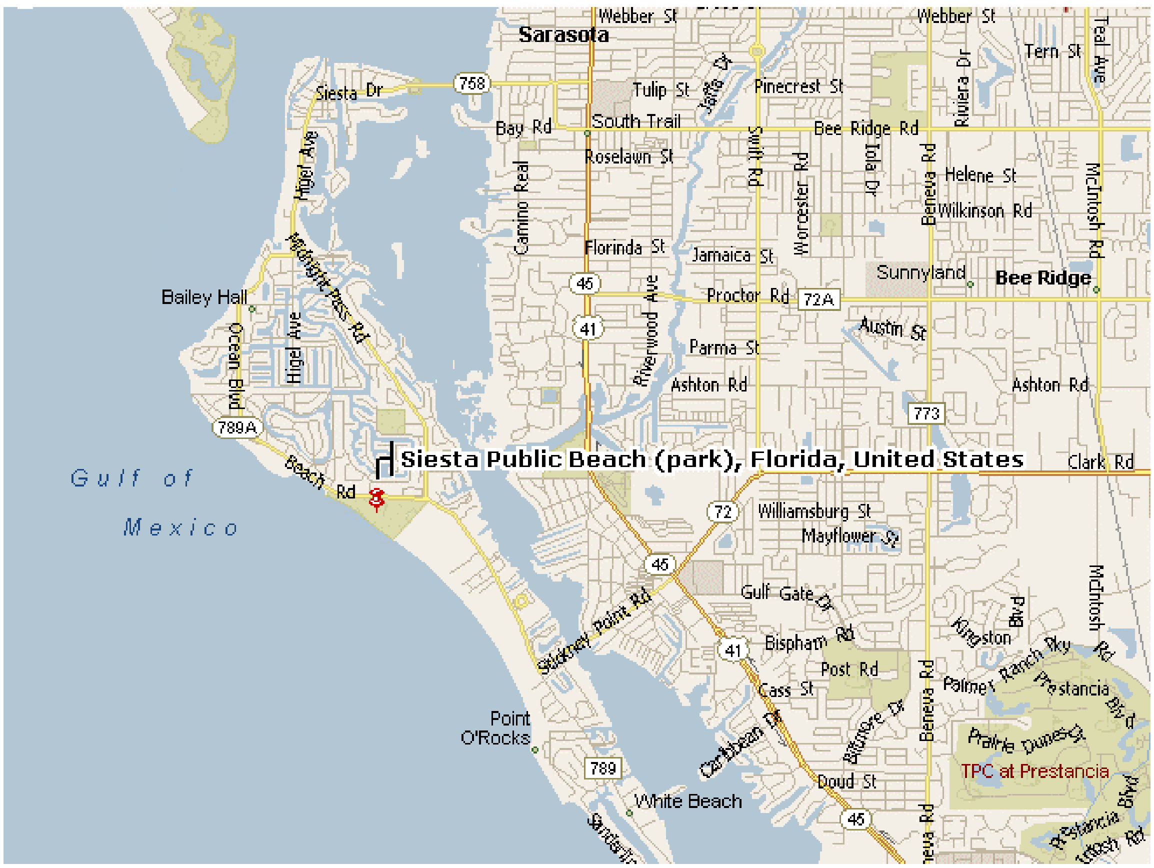


Figure 2. General project location map of Siesta Key Beach area.

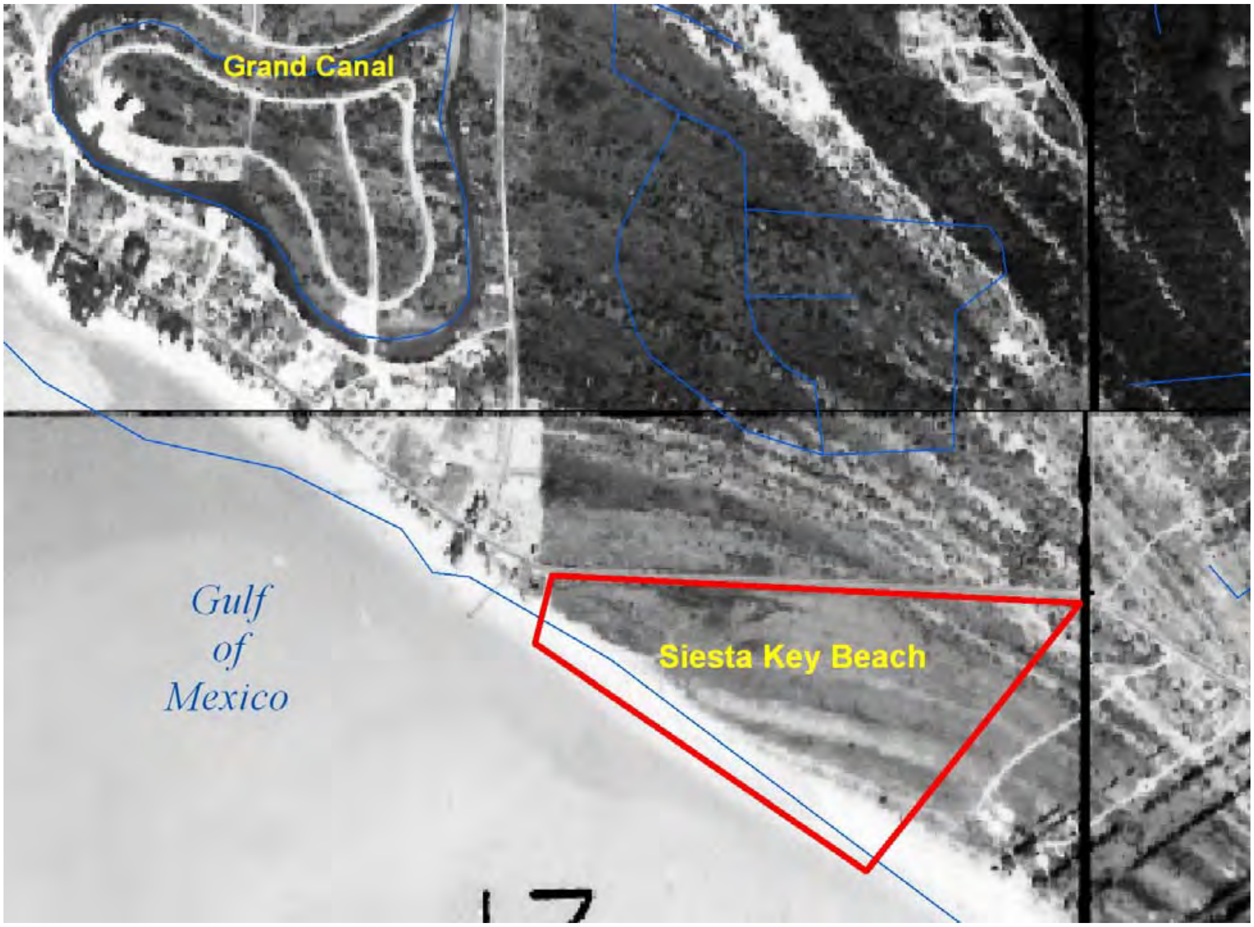


Figure 3. Historical aerial of the Siesta Key Beach area.

2.1 Development of Stormwater Model

Knowledge of runoff flow rates and volumes is critical to any stormwater design project, especially for those requiring specialized stormwater treatment systems including disinfection devices and pumping systems. To determine this information, drainage basins were developed from aerial photography, field observations and from record drawings of the Beach Road storm sewer system. This information is shown on the Drainage Basin Map, Exhibit 3 – **Appendix C**.

An existing stormwater system ICPR computer model was created from both surveyed pipe elevations and from County Record Drawings. Model nodal schematic drawings Exhibits 4 and 5 are presented in **Appendix D**. Drainage basin curve numbers (CN) and times of concentration were assigned based on a complete urban build-out average condition CN and a relatively short time of concentration of ten minutes. An expected flooding level of service provided by an older storm sewer system is typically a few inches of rain per day. This model was used to determine the existing level of service (LOS) from street flooding for a varying amount of rainfall. **Table 1** shows the total volume of stormwater runoff predicted for various rainfall amounts ranging from 1 to 5 inches over a 24-hour period.

Simulating the existing retention pond with the beach outfall and the two existing gravity outfall pipes to the Grand Canal, it was determined that no street flooding occurs from a 2-inch rainfall but street flooding occurs from a 3-inch rainfall. All computer modeling simulations accounted for a high tide of elevation 1.10. This defines the LOS that the existing stormwater system can provide. Runoff from more than two inches of rainfall cannot pass through the stormwater system without causing street flooding. This defines a target of an amount of rainfall that should be considered in the design of water quality improvements including both gravity and force main scenarios.

Table 1. Beach Road Design Flow Rates

				RAINFALL	RAINFALL	RAINFALL	RAINFALL	RAINFALL	RAINFALL	RAINFALL	RAINFALL	RAINFALL	RAINFALL
				P"	P"	P"	P"	P"	P"	P"	P"	P"	P"
			S	1	1	2	2	3	3	4	4	5	5
BASIN	CN	AREA	1000/	RUNOFF	VOLUME	RUNOFF	VOLUME	RUNOFF	VOLUME	RUNOFF	VOLUME	RUNOFF	VOLUME
NO.		AC	CN-10	Q"	CF	Q"	CF	Q"	CF	Q"	CF	Q"	CF
1000	68	1.90	4.71	0.00	5.01	0.19	1341.31	0.63	4321.65	1.20	8310.82	1.88	12963.53
1010	68	0.97	0.87	0.40	517.16	1.24	4355.69	2.16	7609.54	3.12	10977.21	4.09	14398.76
1020	68	5.61	4.71	0.00	14.79	0.19	3960.40	0.63	12760.24	1.20	24538.80	1.88	38276.52
1030	68	4.58	4.71	0.00	12.07	0.19	3233.27	0.63	10417.45	1.20	20033.46	1.88	31248.93
1040	68	0.56	4.71	0.00	1.48	0.19	395.33	0.63	1273.75	1.20	2449.51	1.88	3820.83
1050	68	1.47	4.71	0.00	3.88	0.19	1037.75	0.63	3343.59	1.20	6429.95	1.88	10029.68
1080	92	0.35	0.87	0.40	517.16	1.24	1589.60	2.16	2777.09	3.12	4006.12	4.09	5254.81
1100	70	0.44	4.29	0.00	7.36	0.24	384.29	0.71	1140.86	1.33	2123.75	2.04	3252.41
1114	92	0.43	0.87	0.40	620.88	1.24	1908.42	2.16	3334.08	3.12	4809.60	4.09	6308.74
1116	92	0.43	0.87	0.40	620.88	1.24	1908.42	2.16	3334.08	3.12	4809.60	4.09	6308.74
1118	80	4.08	2.50	0.08	1234.20	0.56	8330.85	1.25	18513.00	2.04	30237.90	2.89	42844.37
1120	92	0.35	0.87	0.40	517.16	1.24	1589.60	2.16	2777.09	3.12	4006.12	4.09	5254.81
1132	75	1.59	3.33	0.03	174.90	0.38	2198.74	0.96	5545.36	1.67	9619.50	2.45	14136.48
1134	80	7.04	2.50	0.08	2129.60	0.56	14374.80	1.25	31944.00	2.04	52175.20	2.89	73927.54
1142	92	0.74	0.87	0.40	1079.61	1.24	3318.41	2.16	5797.37	3.12	8363.05	4.09	10969.78
1144	92	0.54	0.87	0.40	788.89	1.24	2424.82	2.16	4236.24	3.12	6111.03	4.09	8015.81
1161	98	1.38	0.20	0.79	3961.96	1.77	8888.45	2.77	13867.36	3.77	18860.92	4.76	23860.62
1182	80	1.58	2.50	0.08	477.95	0.56	3226.16	1.25	7169.25	2.04	11709.78	2.89	16591.69
1184	92	0.97	0.87	0.40	1417.08	1.24	4355.69	2.16	7609.54	3.12	10977.21	4.09	14398.76
1186	98	2.33	0.20	0.79	6689.40	1.77	15007.32	2.77	23413.74	3.77	31844.89	4.76	40286.40
1188	98	0.62	0.20	0.79	1780.01	1.77	3993.36	2.77	6230.27	3.77	8473.75	4.76	10719.99
1151	98	1.51	0.20	0.79	4335.19	1.77	9725.77	2.77	15173.71	3.77	20637.68	4.76	26108.36
1146	98	1.57	0.20	0.79	4507.45	1.77	10112.23	2.77	15776.64	3.77	21457.72	4.76	27145.77
1329	80	1.91	2.50	0.08	577.78	0.56	3899.98	1.25	8666.63	2.04	14155.49	2.89	20057.05
1337	80	3.91	2.50	0.08	1182.78	0.56	7983.73	1.25	17741.63	2.04	28977.99	2.89	41059.19
1347A	80	2.40	2.50	0.08	726.00	0.56	4900.50	1.25	10890.00	2.04	17787.00	2.89	25202.57
1357	80	1.60	2.50	0.08	484.00	0.56	3267.00	1.25	7260.00	2.04	11858.00	2.89	16801.71
1360	80	2.16	2.50	0.08	653.40	0.56	4410.45	1.25	9801.00	2.04	16008.30	2.89	22682.31
1368	80	1.20	2.50	0.08	363.00	0.56	2450.25	1.25	5445.00	2.04	8893.50	2.89	12601.29
1372	80	2.43	2.50	0.08	735.08	0.56	4961.76	1.25	11026.13	2.04	18009.34	2.89	25517.60
1382	80	2.90	2.50	0.08	877.25	0.56	5921.44	1.25	13158.75	2.04	21492.63	2.89	30453.11
					1"		2"		3"		4"		5"
			TOTALS	CF	37013.35		145455.83		292355.01		460145.80		640498.15
				AF	0.85		3.34		6.71		10.56		14.70
				GALS	276896.86		1088155.09		2187107.80		3442350.75		4791566.64
			*	GPM	192.29		755.66		1518.82		2390.52		3327.48
				6" gpm		500.00							
				8" gpm				1000.00					
				10" gpm				1500.00					
				12" gpm						2000.00			
			* volume pumping rate in gpm over 24 hours										

2.2 Evaluation of Disinfection Alternatives

Since disinfection technologies have been utilized extensively in the water and wastewater industry, a review of current data was performed to determine if any emerging techniques could be transferred to the Siesta Key Beach scenario. The majority of domestic water and wastewater treatment facilities in Florida use chlorination for disinfection. The significant concerns associated with chlorination include:

- Production of potentially hazardous byproducts (chlorinated organic compounds, total tahalomethanes (TTHM) and Haloacetic Acids (HAA5).
- Toxicity concerns from chlorine residual for the biota in the receiving surface waters. Chemical dechlorination would be required.
- Inefficiency of chlorine in inactivation of pathogens
- Potential hazards associated with handling of chlorine in a gas or liquid form

Several alternative disinfection techniques have been developed to address some of these concerns. These include the following:

Chlorine Dioxide

Chlorine dioxide has had extensive use as a water disinfectant in Europe and the U.S. but has yet to be used as a wastewater disinfectant. It is both a powerful bactericide and virucide even at high pH levels and has an important advantage over chlorine in that it does not appear to produce THMs.

Chlorine dioxide is a yellow explosive gas produced *in situ* from the reaction of sodium chlorite with either chlorine gas or hydrochloric acid. Although THMs are not formed, chlorine dioxide can react with organics to yield other potentially hazardous chlorinated or unchlorinated by-products, some of which are known carcinogens.

Toxicity concerns from residual concentrations discharged to receiving waters would likely preclude the use of this chemical. Removal of this disinfectant (dechlorination) would be required prior to discharge.

Chloramines

Chloramines are composed of three chemicals formed when chlorine and ammonia-nitrogen are combined in water: monochloramine (NH2Cl), dichloramine (NHCl2), and trichloramine, or nitrogen trichloride (NCl3). Monochloramine is preferred because of its biocidal properties and minimal taste and odor. Monochloramine is created by controlling the chlorine-to-ammonia ratio to a value generally less than 5:1 by weight or 1:1 on a molar basis.

Chloramines play a major role in disinfecting pathogens, controlling tastes and odors, oxidizing inorganics and organics, and suppressing microbiological growth in water distribution systems. For utilities with extensive distribution systems and long detention times, chloramines aid in maintaining disinfectant residuals. Chloramines also have been found to produce fewer total trihalomethanes (TTHMs) than free chlorine.

Because they are more stable and less reactive than free chlorine, chloramines as secondary disinfectants help maintain a detectable residual throughout the water distribution system. Although chloramines are weaker disinfectants and require greater contact times than chlorine, utilities that experience bacterial regrowth in their distribution systems and switch to chloramines find that chloramines apparently penetrate deeper into the biofilm layer to inactivate microorganisms and inhibit their growth.

Because chloramines produce fewer TTHM disinfection by-products, the US Environmental Protection Agency has suggested the use of chloramines to replace free chlorine as a disinfectant. Case studies indicate common TTHM reductions of 40 to 80 percent when free chlorine is replaced by chloramines. Although Haloacetic Acids are present in lower concentrations with chloramination than with chlorination, research shows that, under certain circumstances, dihaloacetic acids and dissolved organic halogen are not well controlled by the use of chloramines. Research results imply that many unreported DBPs are created by chloramines. Generally, DBP formation decreases as pH increases and the chlorine-to-ammonia ratio decreases. Changing these two operating variables can significantly impact DBP formation.

Research has found that two-thirds of medium and large systems in the U.S. that chloraminate experience nitrification to some degree. With this two-step microbial process, ammonia is converted to nitrite and then to nitrate. The intermediate stage-nitrite--depletes the chloramine residual and increases heterotrophic bacteria. Two groups of factors influence nitrification and methods of control: water quality factors (pH, temperature, chloramine residual, ammonia concentration, chlorine-to-ammonia ratio, and concentrations of organic compounds) and distribution factors (detention time, reservoir design and operation, sediment, tuberculation in piping, biofilm, and absence of sunlight).

Increased chloramines also lead to accelerated corrosion and degradation of elastomers (i.e., gaskets) and some metals in distribution systems.

Toxicity concerns from residual concentrations discharged to receiving waters would likely preclude the use of this chemical. Removal of this disinfectant (dechlorination) would be required prior to discharge.

Peracetic Acid

Peracetic Acid (PAA) exists as an equilibrium mixture with hydrogen peroxide, acetic acid and water. It is suitable for disinfection and is an efficient bactericide at concentrations of 15 to 20 mg/L PAA and 2 minutes' contact time but is less effective as a virucide. PAA does not form THMs. The chemical has not reached production stage to allow trucking of bulk quantities, but its use will increase in the next 5 to 10 years as the market grows.

Again, toxicity concerns from residual concentrations discharged to receiving waters would likely preclude the use of this chemical. Removal of this disinfectant would be required prior to discharge.

Since a chemical additive is not likely to be permittable due to potential adverse affects to biological communities in the receiving waters of the discharge (Bay or Gulf of Mexico), several additional alternative disinfection methods were evaluated including ozone and ultraviolet light (UV) treatment.

Ozone

Ozone has been used as a disinfectant for almost as long as chlorine, although primarily for treating drinking water. Ozone disinfection is the least-used method in the U.S. although this technology has been widely accepted in Europe for decades. Ozone treatment has the ability to achieve higher levels of disinfection than either chlorine or UV; however, the capital costs as well as maintenance expenditures are not competitive with available alternatives. Also, because ozone is generally more expensive to produce and must be generated on-site and used immediately, it has been considered to be a less attractive alternative to chlorine than UV disinfection.

Ozone is an unstable gas, which is generated on-site by a high-voltage electrical discharge through air or oxygen. The resulting electrical discharge produces ozone (O3). This reaction results in substantial quantities of heat that must be quickly removed to keep the ozone from decomposing back to oxygen. To reduce the heat, most commercial ozone generators are water-cooled.

Ozone decomposes rapidly in aqueous solution and under alkaline conditions hydrolyses to form the OH radical, which is a powerful oxidant. Ozone is both an efficient bactericide and virucide. Though ozone appears not to produce THMs and may even destroy a number of THM precursors, it oxidizes a wide range of natural organics in wastewater and can lead to significant changes in the nature and concentrations of certain organic compounds. Ozone destroys most of the nonvolatile organic constituents in wastewater but produces others; concentrations of mutagenic micropollutants can be increased by ozonation.

Advantages:

- Ozone is more effective than chlorine in destroying viruses and bacteria.
- The ozonation process utilizes a short contact time (approximately 10 to 30 minutes).
- There are no harmful residuals that need to be removed after ozonation because ozone decomposes rapidly.
- Ozone is generated on-site, and thus, there are fewer safety problems associated with shipping and handling.
- Ozonation elevates the dissolved oxygen (DO) concentration of the effluent.
- THM formation is avoided.

Disadvantages:

- Operation and maintenance costs remain high because of the ozone generation process's more complex technology.
- Ozone must be produced on-site and used immediately.
- Ozone is very reactive and corrosive.
- Ozone is extremely irritating and possibly toxic, so off-gases from the contactor must be destroyed to prevent worker exposure.
- The cost of treatment can be relatively high in capital and in power intensiveness.

Ultraviolet (UV)

The State of Florida FDEP accepts ultraviolet (UV) disinfection as an alternative disinfection method that can effectively and safely be used to disinfect wastewater, reclaimed water, and drinking water. UV irradiation is the most popular alternative method, has long been recognized as an effective disinfectant and UV, unlike chlorine, does not produce disinfection byproducts, toxicity, or hazardous concerns. A list of Florida domestic wastewater treatment facilities presently using UV is listed in **Appendix E**.

UV disinfection uses special UV lamps to produce UV radiation at optimum germicidal wavelength of 250 to 265 nanometers which inactivates the organism through changes in the cells' deoxyribonucleic acid (DNA). This effectively inactivates the pathogens by interfering with their ability to replicate.

Advantages:

- UV disinfection is environmentally positive -- no chemicals are added to the effluent stream; therefore, there are no detrimental effects to aquatic life.
- This technology offers shorter treatment times. UV disinfection requires a six-to-10-second contact time, compared to a five-to-10-minute contact time for ozone and a 15-to-30-minute contact time for chlorine.
- There is no trihalomethane (THM) formation.
- Quartz surface cleaning is a key element of operation and maintenance. However, improvements are being made with self-cleaning wipers.
- The process leaves no residual to prevent regrowth.

Disadvantages:

- Operation and maintenance costs remain high because of substantial electrical usage.

Stormwater-Specific Treatment Methods

Disinfection of stormwater runoff for bacteria and other potential pathogens is an emerging technology. This is primarily due to the historical focus on removal of more conventional pollutants such as sediments, heavy metals, nutrients, and oil and grease or polycyclic aromatic hydrocarbons (PAHs). The lack of bacterial removal efficiency data is evidenced in the following table (**Table 2**), which is a summary of stormwater best management practices (BMPs) and pollutant removal efficiencies for structural and nonstructural systems developed by Guillory (2005). This information was gathered from several sources including the International BMP Database (www.bmpdatabase.org). One of the reasons for a lack of data regarding microorganism removal is due to the short sample holding times (6 hours) allowed for bacteria sampling. In many cases, automated sampling devices are used for sample collection and samples are sometimes collected up to 24 hours after a storm event.

However, a study by Kurz (1998) for the Southwest Florida Water Management District (SWFWMD) examined several BMPs (sand filtration, wet detention, alum coagulation) used in Florida and reported that removal of microbial indicators, specifically fecal coliform bacteria, can range from 65%± for sand filters to 98% for a shallow wet detention pond with a 5-day detention time. Use of alum treatment can provide up to 100% removal; however, the alum floc material can still harbor viable bacteria and viruses several days after treatment. A literature review performed for this report indicated that bacterial removal is extremely variable, depending upon inflow concentrations, type of BMP used, and amount of sedimentation or potential for sediment resuspension within the treatment device/system. Other wet detention pond studies in Florida suggest that removal rates can vary between -120% to 94% (mean of 25.1%) for a retrofitted stormwater pond in St. Petersburg (Jungle Lake) to 45%± (range of -150% to 99%) for the Sarasota County's Celery Fields Stormwater Facility. Neither of these systems had any additional treatment at the outfall that could have further reduced bacteria concentrations (e.g., sand filtration or UV treatment). Kurz (1998) recommended the use of a treatment train of BMPs to maximize microorganism removal since bacteria are often associated with suspended solids and additive removal rates can be achieved by multiple in-line systems. This study suggests the use of a sedimentation basin followed by sand filtration as one form of a treatment train.

A study and subsequent design of a UV treatment system by PBS&J for the City of Encinitas (California) also indicated significant bacteria removal could be achieved for a low flow creek system at Moonlight Beach. **Figure 4** below indicates that a 3-log reduction in fecal coliform and 4-log reduction in total coliform bacteria can be achieved with UV treatment. Another recent stormwater treatment project has been completed using ozone disinfection in California with similar results.

Table 2. Pollutant Removal Efficiencies (%) for various BMP techniques (Source: Guillory, 2005).

BMP	TSS	TP	TN	NO3	Metals	Bacteria	Oil & Grease	TPH	References
Structural BMPs									
Infiltration Trench1	75-99	50-75	45-70	NA	75-99	75-98	NA	75	Young et al. (1996)
Infiltration Basin1	75-99	50-70	45-70	NA	50-90	75-98	NA	75	Young et al. (1996)
Bioretention1	75	50	50	NA	75-80	NA	NA	75	Prince George's County (1993)
Detention Ponds4	46-98	20-94	28-50	24-60	24-89	NA	NA	NA	City of Austin (1990); City of Austin (1995); Harper & Herr (1993); Gain (1996); Martin & Smoot (1986);Young et al. (1996); Yu & Benelmouffok (1988); Yu et al. (1993 & 1994)
Wetlands	65	25	20	NA	35-65	NA	NA	NA	USEPA (1993)
Detention Tanks	NA	NA	NA	NA	NA	NA	NA	NA	
Underground Sand Filters	70-90	43-70	30-50	NA	22-91	NA	NA	NA	Bell et al. (1995); Horner & Horner(1995); Young et al. (1996)
Surface Sand Filters	75-92	27-80	27-71	0-23	33-91	NA	NA	NA	City of Austin (1990); Welborn & Veenhuis (1987)
Organic Media Filters	90-95	49	55	NA	48-90	90	90	90	Claytor and Schueler (1996); Stewart (1992); Stormwater Management (1994)
Vegetated Swales	30-90	20-85	0-50	NA	0-90	NA	75	NA	City of Austin (1995); Claytor and Schueler (1996); Kahn et al. (1992); Yousef et al. (1985); Yu & Kaighn (1995); Yu et al. (1993 & 1994)
Vegetated Filter Strips	27-70	20-40	20-40	NA	Feb-80	NA	NA	NA	Yu and Kaighn (1992); Young et al. (1996)
Oil-Grit Separators	20-40	< 10	< 10	NA	< 10	NA	50-80	NA	Young et al. (1996)
Catch Basin Inserts	NA	NA	NA	NA	NA	NA	up to 90	NA	King County (1995)
Manufactured Systems	NA	NA	NA	NA	NA	NA	up to 96	NA	Bryant et al. (1995)
Porous Pavements	82-95	60-71	80-85	NA	33-99	NA	NA	NA	MWCOG (1983); Hogland et al. (1987); Young et al. (1996)
Nonstructural BMPs									
Streetsweeping2	55-93	40-74	42-77	NA	35-85	NA	NA	NA	NVPDC (1992)
New and Innovative Practices									
Alum Injection	NA	89	78	14	NA	NA	NA	NA	Harper (1990)3
MCTT	83	NA	NA	14	95	NA	NA	NA	Pitt (1996)
Biofilters (e.g., StormTreat System)	95	89	NA	NA	65-98	83	NA	NA	Allard et al. (1996)
Vegetated Rock Filters	95	82	75	NA	21-80	78	NA	NA	DRMP (1995)

NA = Not Applicable or Not Available. Removal efficiencies may be based on either mass balance or average concentration calculations. The values may originate from evaluation of multiple events or from long-term monitoring. Ranges are provided wherever possible.

1.Based on capture of 12.7 mm (0.5 in) of runoff volume. Effectiveness directly related to volume of captured runoff.

2.Typical values; actual performance strongly related to the type of equipment, cleaning frequency, and number of passes.

3.Study examined improvement in water quality within the lake receiving alum-treated stormwater runoff.

4.Included are results for three different types of ponds: extended detention wet pond, wet pond, and extended detention dry pond.

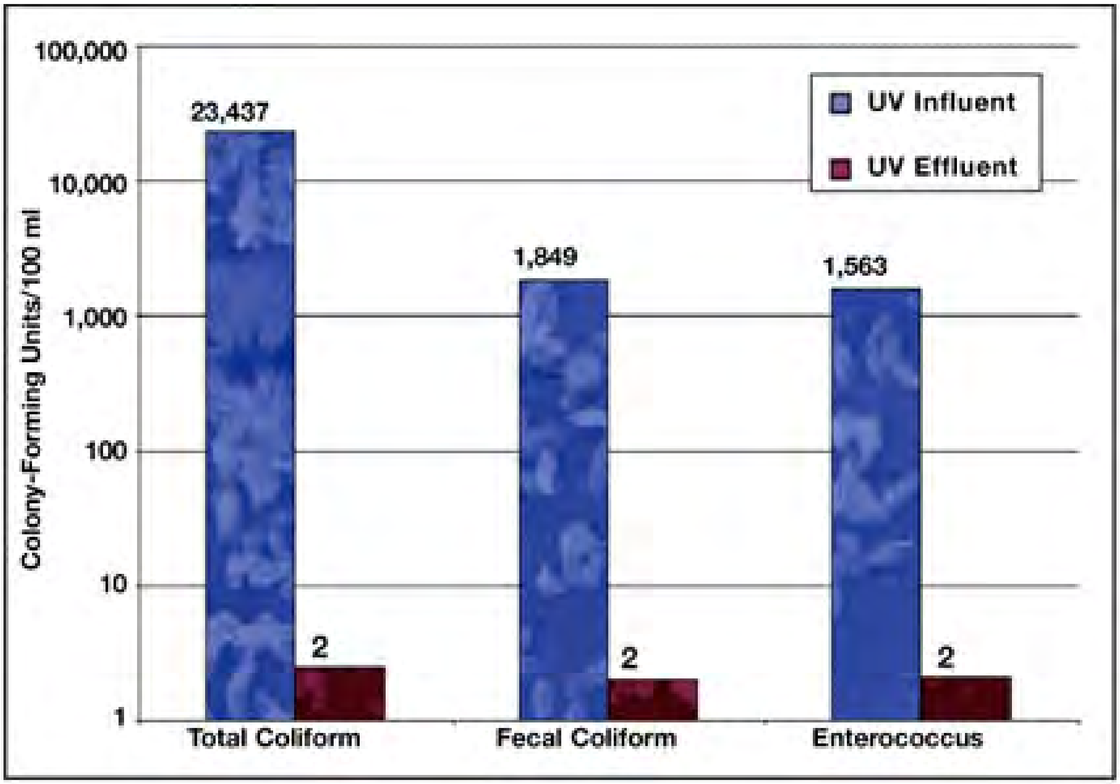


Figure 4. Bacteria removal during ambient conditions at the Moonlight Beach Urban Runoff UV Treatment Facility (September 3 through November 26, 2002). Values represent geometric means of daily data.

3.0 DEVELOPMENT OF STORMWATER TREATMENT ALTERNATIVES

3.0 DEVELOPMENT OF STORMWATER TREATMENT ALTERNATIVES

Based on the information developed in Section 2.0, several treatment alternatives were developed which considered the unique characteristics of the project location. These factors included: the spatial and temporal distribution of bacterial contamination, disinfection system advantages and disadvantages, site space constraints, topography, tidal influence on drainage flow rates and water stage, existing ditch systems and potential wetland impacts, the existing stormwater treatment pond, and future master plan needs for the park. Due to these constraints, options were evaluated that involved treating stormwater runoff from rainfall events that were similar in magnitude (or smaller) than the event that caused the “no swim” advisory.

The alternatives evaluated were based on utilizing the existing 36-in storm water pipe system which currently discharges into a control structure located near the maintenance buildings at the Siesta Key Beach Park. The control structure/junction box contains an overflow weir and a small duplex pump station which transfers a portion of the stormwater to an on-site pond. The pond discharges via side bank filtration and also an overflow pipe into the adjacent ditch, which then flows to Siesta Key Beach.

The following alternatives were evaluated through a decision matrix (discussed in the next Section) to determine if water quality standards could be met through treatment and disinfection at either the existing beach outfall or an alternative discharge point:

- Alternative 1 – Storm sewer maintenance cleaning with beach discharge
- Alternative 2 – Storm sewer disinfection with a pumped recirculation disinfection system and with beach discharge
- Alternative 3 – Stormwater disinfection by pond treatment system plus additional treatment and disinfection with pumped discharge to alternative receiving water (e.g., Grand Canal)

Public Interest

A newspaper article was published regarding the outfall to the beach on December 9, 2004 (**Appendix F**). Due to the potential public interest in the project, an early coordination meeting was held with the public on December 16, 2004. The minutes of the meeting are presented in **Appendix G**. Several issues related to the lack of greenspace and native vegetation at the park, the location of the outfall to the beach, and poor water quality were raised at the meeting. Another coordination meeting was held with County staff and a representative of the local homeowner’s association (Mr. Deet Jonker) on March 24, 2005. Mr. Jonker indicated that the local residents would likely view the discharge to the Grand Canal favorably if the water quality were not made worse by the discharge. In fact, the discharge into the canal could have a positive benefit of helping to flush the canal. The issues raised from the various public involvement forums were incorporated, as feasible, into the evaluation and development of alternative treatment solutions.

4.0 ALTERNATIVES ANALYSIS

4.0 ALTERNATIVES ANALYSIS

Prior to the selection of a preferred alternative, the project team developed a decision tree to assist in the logical selection of optimal treatment alternatives, water delivery methods, and discharge locations. The decision tree is presented in **Figure 5** on the following page.

Considerations that influenced alternative selections in the decision tree included identification of an alternative discharge location since the existing freshwater baseflow from the ditch to the beach attracts large flocks of wading and shorebirds which appears to be a secondary source of fecal loading to the beach (**Figure 6**) and could pose a health risk to recreational users in or near this outfall (**Figure 7**). Discharge options included:

1. Maintaining the existing discharge in the current configuration
2. Construction of an offshore outfall via a subsurface pipe
3. Directing the existing baseflow and stormwater runoff away from the beach and allowing only infrequent high flows caused by major storm events (e.g., hurricanes) to continue to pass through to the beach.

Option 1 would not be acceptable since the existing flows to the beach are creating a potential health risk by attracting large flocks of birds that could be a source of fecal contamination to the beach. Option 2 would be costly, require extensive permitting, and may still result in contamination of the recreational beach area depending upon inshore-offshore currents from the Gulf.

Option 3 appears to be an acceptable alternative; however, if an alternative discharge location were selected, an assessment of receiving waters would be necessary. Sarasota County staff implemented a special water quality monitoring program to assess background bacteria concentrations in both the stormwater management system and also in the Grand Canal, located north of the project site, which had been identified as a potential receiving waterbody for the rerouted discharge. The Grand Canal is an artificial waterway that was constructed for boat access to the interior portions of Siesta Key; it connects to Roberts Bay to the east. Bacteria concentrations from the canal exceeded the state standard at all stations, and were greatest at stations S and T (**Figures 8** and **9**), which receive discharges from the existing Beach Road stormwater system.

It was assumed that if these discharge points could be routed to the proposed treatment system, water quality should improve in this portion of the Grand Canal; however, there may be other stormwater inputs to this canal which may continue to cause high fecal coliform concentrations to occur in the future. The closest distance from the beach to the Grand Canal within County right-of-way would be at the bridge at Azure Way. Water quality at this location was also not within state standards (station Q) and should also be improved with the addition of disinfected flow from the Beach Road drainage system.

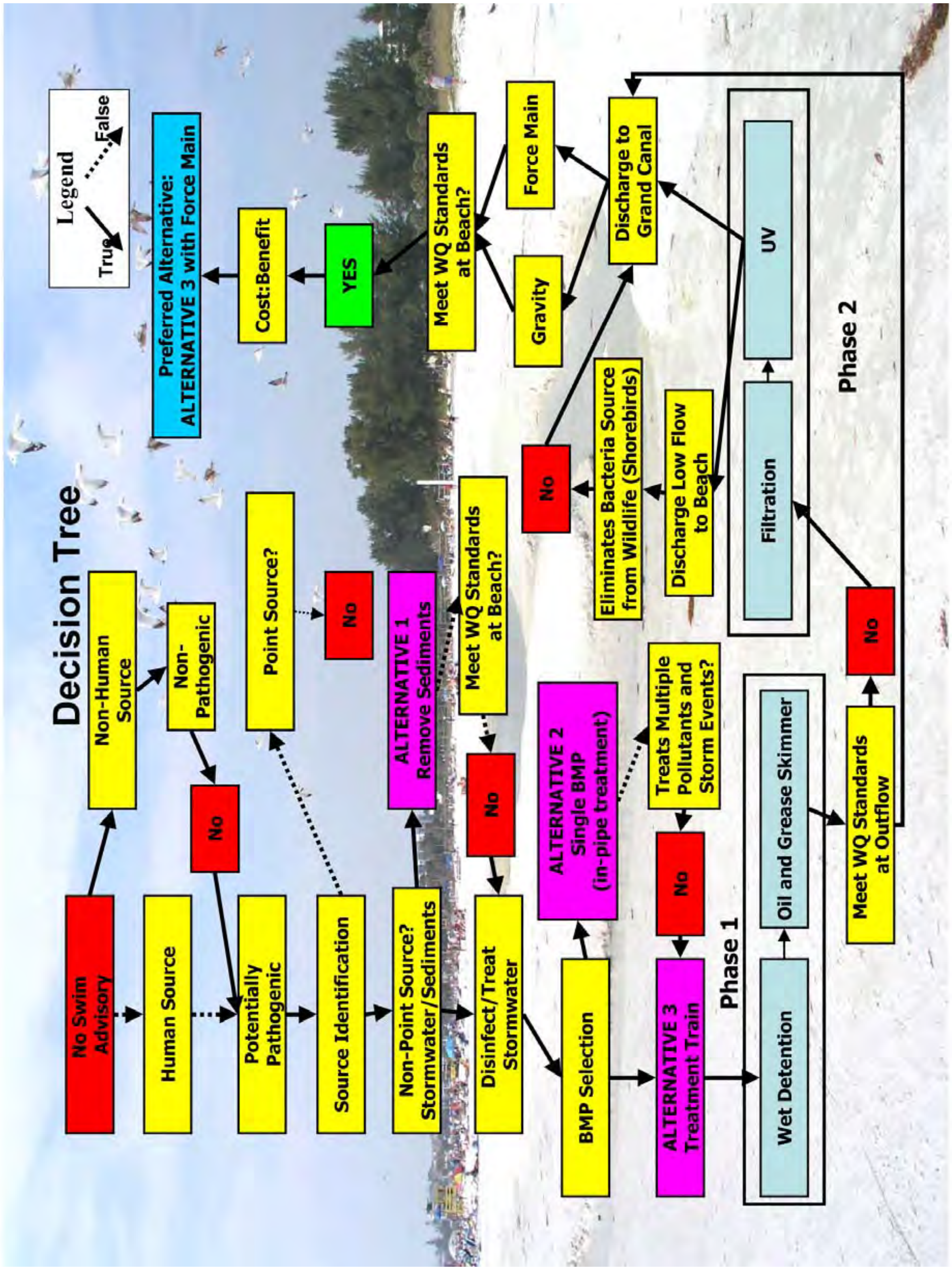


Figure 5. Decision tree used to select the preferred stormwater treatment alternative for Siesta Key Beach.

Figure 6. Bird usage of the ditch outfall to Siesta Key Beach.

Figure 7. Human contact at the ditch outfall to the beach.

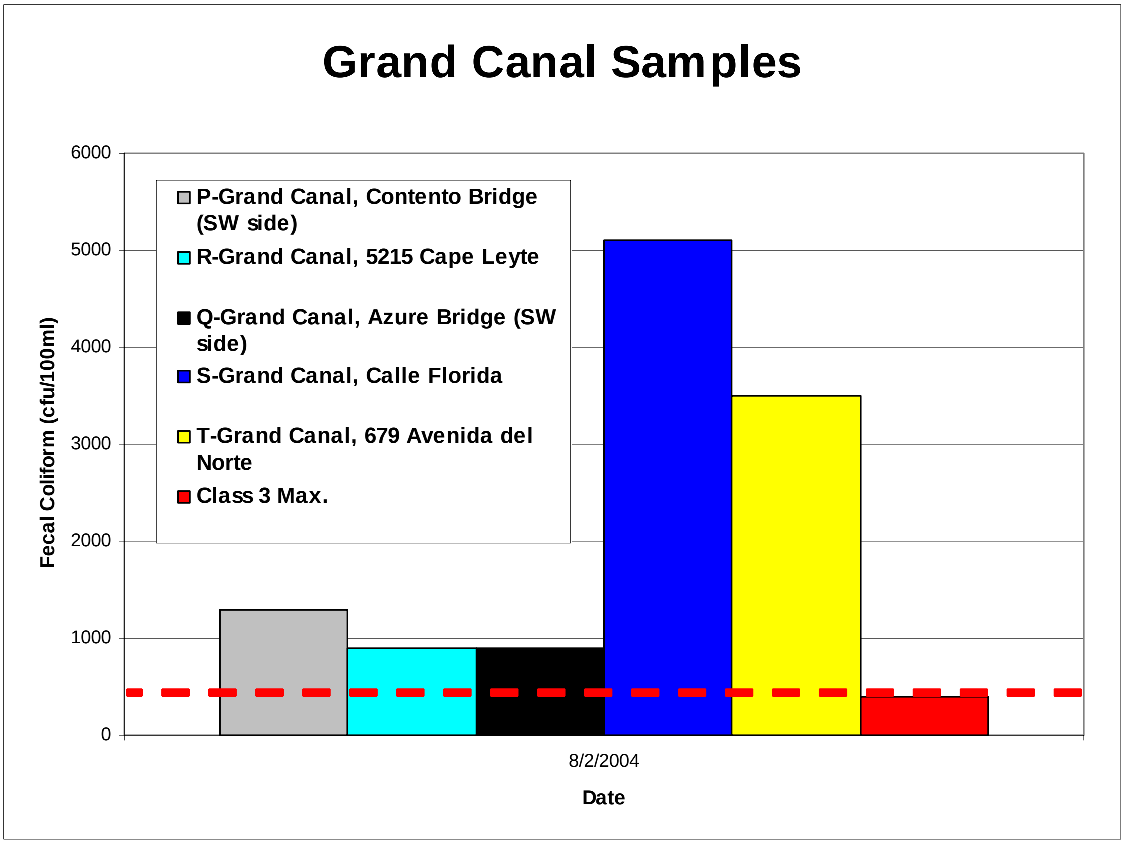


Figure 8. Fecal coliform bacteria concentrations from one of several sampling events for the Grand Canal. All samples exceeded the state standard of 400 cfu/100 ml.

Figure 9. County sampling station locations in the Grand Canal and stormwater system.

Alternative 1 – Storm sewer maintenance and cleaning with beach discharge

Since the findings of the PBS&J/USF report (Harwood et al., 2005) indicated that the sediments within the stormwater pipe system were one of the likely sources of bacteria contamination, a maintenance event for this system was recommended. Pre- and post-maintenance monitoring was also recommended to determine the efficacy of this alternative. During late 2004/early 2005, Sarasota County Drainage Operations staff used a Sewervac to clean the 36-inch storm sewer pipe from the upper reaches of the basin down to Siesta Key Beach.

Sampling conducted before and after County maintenance cleaning show a significant initial reduction in bacteria counts just by removal of sand and organic material deposits (**Figure 10**). The removal of the "breeding ground" results in a form of pipeline disinfection and this cleaning can be scheduled based on monitoring accumulations in the pipe and monitoring storm water bacterial counts. In addition, removal of exotic vegetation creating a shading effect along the existing ditch network may also improve water quality by allowing greater penetration of UV light to the water column. Removal of excess organic material and decaying vegetation could also result in reducing a growth media for bacteria in the ditch.

This option would not require expenditure of capital improvement costs. However, the frequency of cleaning to achieve water quality standards has not been determined. The periodic cleaning of sediments in the storm sewer system along Beach Road is suggested to be once every five years or as necessary determined by bacteriological testing. In fact, bacteria concentrations did exceed the allowable threshold for DOH beach water quality standards within a few months of the initial pipe cleaning (**Figure 11**) and so this may not be a viable alternative since other sources (e.g., stormwater runoff) can still cause water quality issues at the beach discharge despite the removal of sediments. In addition, this alternative does not result in the removal of the freshwater discharge to the beach which would continue to allow bird usage and contamination of the ditch to the beach.

Figure 10. Sediment and organic debris within the Beach Road stormwater pipe system.

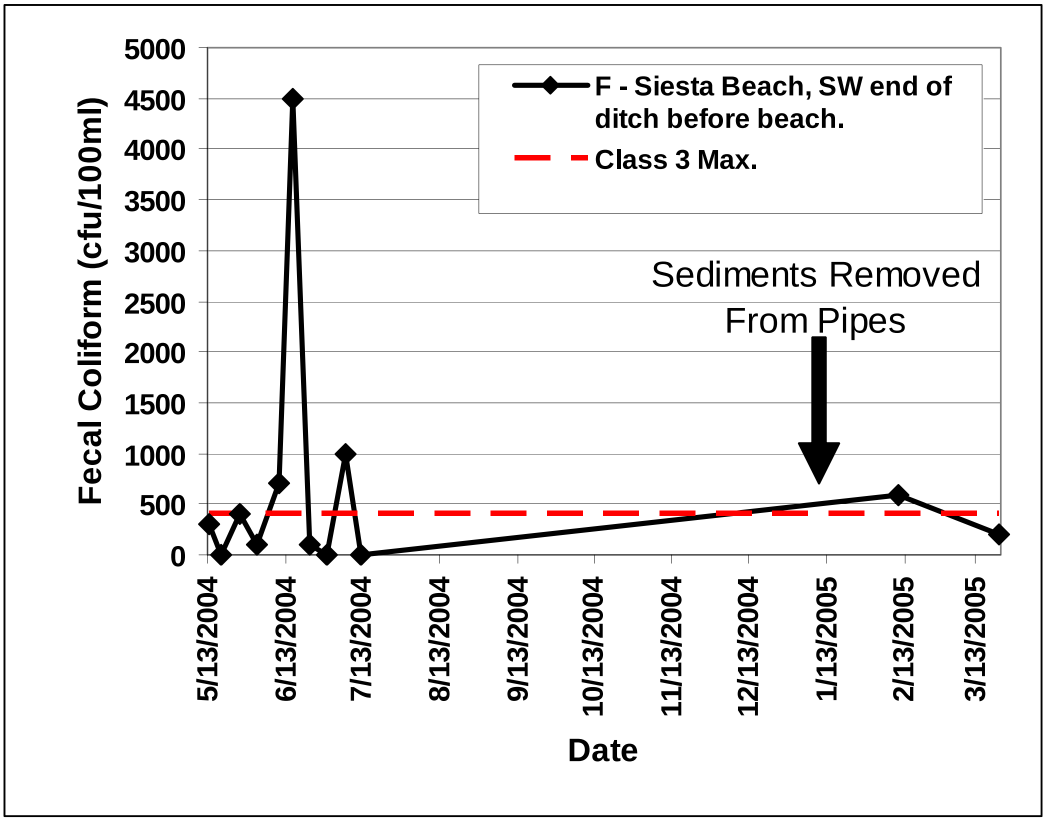


Figure 11. Fecal coliform bacteria concentrations in the drainage ditch discharging to Siesta Key Beach. Pipe cleaning to remove sediments occurred prior to 2/13/05.

Alternative 2 – Storm sewer disinfection with a pumped recirculation disinfection system with beach discharge

A second option was developed in the event that Alternative 1 would not reduce the beach discharge bacterial counts to within state standards. Alternative 2 would involve construction of a storm water pump station and disinfection system to treat the stormwater within the existing 36-inch pipe. This recirculating system would pump water at the downstream end of the drainage system through the disinfection unit (UV treatment) and then discharge the return water upstream. The pump station was based on a 6-in force main and could recirculate 500 to 1000 gpm, which is a volume equivalent of a 2 to 3 inch storm.

This recirculation will disinfect the pipe contents but since a residual disinfectant will not remain in the pipe, a first flush effect may result in a pulse of bacteria-contaminated stormwater through the system and out to the beach. In addition, this small volume of disinfected water would not be enough to dilute a 2-inch storm event significantly. The in-pipe volume at high tide is 16,700± CF while a 2-inch rain produces about 145,500 CF. The volume in the pipe that would be treated through the recirculation system would represent only about 11% of the incoming runoff. If the concentration of bacteria were 1,000 cfu/100ml in the stormwater runoff event, this 11% reduction may only reduce the concentration to 890 cfu/100 ml, still exceeding state standards, even if the stormwater was completely mixed. Other disadvantages to implementing this alternative are that only one potential pollutant would be removed in the pipe allowing other contaminants such as heavy metals, oil and grease (PAHs), and suspended solids to be discharged at the beach; and also the discharge at the beach would continue to allow bird usage and contamination of the ditch to the beach.

Alternative 3 – Stormwater disinfection using a phased treatment train with pumped discharge to Grand Canal

The third alternative is to construct a phased treatment train using wet detention, oil and grease skimmers, media (e.g., disc or sand) filtration, and UV disinfection. This alternative would be constructed within eight± acres of the County park property southeast of the existing storm water pond. The site is currently vegetated primarily by invasive exotic species including Brazilian pepper and Australian pine. Small pockets of native vegetation are present; however, the site currently provides minimal habitat value. Historically, the site was comprised of a sand dune system that has since been graded to form relatively flat topography and further necessitating the ditch network to drain surface water runoff to the Gulf. Recreational improvements are limited to a walking paths and a minimally utilized exercise trail. As a result of its current condition and proximity to the public beach, opportunities exist to better utilize the property to address storm water concerns and also improve its recreational value to the public.

By reconfiguring the existing storm water pond and expanding it to the southeast into a longer flow path comprised of deep and shallow pools and tidal marshes, the site will provide increased storage capacity and treatment for the majority of rainfall events that occur in this region. A meandering flow way would extend the attenuation time, allow greater UV penetration to cause bacterial die-off, and incorporates several phases of water quality treatment for other pollutants such as oil and grease (through the construction of skimmers), suspended solids, sediments, nutrients, and heavy metals. The planting of tidal marsh vegetation will effectively improve water quality through the trapping of fine particles and soluble pollutants. Deeper open water features would allow for sunlight penetration, previously shown to reduce bacteria concentrations.

See Appendix H for two site options of different land use for trails and parking.

In addition to excavating portions of the site, a ditch block constructed within the southerly outfall ditch to the beach would reduce the frequency of discharges into the gulf while increase the storm water volume and attenuation time on site. The resulting system would also result in secondary benefits including wildlife habitat and the reduction of invasive exotic vegetation. The outfall to the beach would also be eliminated except during major storm events, such as hurricanes, and so the persistent bird utilization and contamination of beach waters would be eliminated. Any bird usage in the created pond system would be treated by disinfection at the outfall.

Areas not utilized for stormwater treatment could be designed to improve the recreational value of the site. Hiking trails, gazebos, picnic tables, and boardwalks incorporated into the remaining uplands would maximize the utility of the property. Additional parking was also incorporated into the site to encourage utilization of the additional amenities, or to act as overflow parking for beachgoers. Two separate subalternatives were developed with one maximizing pond size area (Larger Pond) and one maximizing park recreational features (Smaller Pond); the dimensions of these alternatives are shown in **Table 3**. Schematics of the two designs are shown in **Appendix H**, along with Exhibit 6 indicating an alternative discharge route.

The conceptual layouts of the retention pond area are suggestions of how the County could utilize this area as part of a master parks and recreational area along the beach. The layouts can change to be consistent with a future developed master park plan by the County. The conceptual retention pond layouts can hopefully be used by the County's Parks and Recreation Department as a starting point of how the area could be developed. Any modifications to existing beach ditch systems previously permitted through the FDEP are believed to be able to be handled as permit revisions allowing for a more comprehensive creation of wetland systems in the treatment lagoon.

Table 3. Acreage estimates for the treatment pond alternatives.

Smaller Pond	**Area (sq. ft.)**	**Acres**
Open Water	65,700.00	1.51
Wetland Marsh	115,000.00	2.64
Recreational Area	77,400.00	1.78
Trail Length (linear feet)	2,480.00	
Larger Pond	**Area (sq. ft.)**	**Acres**
Open Water	100,340.00	2.30
Wetland Marsh	171,340.00	3.93
Recreational Area	26,400.00	0.61
Trail Length (linear feet)	2,620.00	

This alternative could be constructed in two phases. Phase 1 would include the wet detention system, oil and grease skimmers, and the construction of a discharge to the Grand Canal (either gravity or pump station and force main). Monitoring of the outflow of this system would be conducted over a series of storm events to determine if water quality standards for fecal coliform bacteria are able to be met by the wet detention system alone. In addition, sampling for total suspended solids and turbidity would also be performed to determine the need for additional filtration prior to construction of an in-line UV disinfection system. Once these analyses were conducted, selection of the optimal configuration for Phase 2 could take place with the subsequent construction of the media filter and UV disinfection system. Further monitoring would be required to confirm that the discharge meets state water quality standards.

Alternative 3a - Gravity Solution

WilsonMiller used the created stormwater model to simulate various scenarios of a new gravity outfall pipe to the Grand Canal along with the two existing discharge pipes to the canal as being open or closed. The approximate flow capacity of the incoming existing 36-inch pipe to the retention pond would have to be provided by a gravity outfall pipe. Due to burial depth limitations underneath existing sanitary sewers on Cape Leyte Drive, two 19"x30" elliptical pipes were simulated as a new gravity outfall pipe. The route for this canal outfall pipe would be from the retention pond north on Beach Road, east on Beach Way Drive, north on Cape Leyte Drive and then east on Azure Way to the Grand Canal. A length of this gravity outfall is 1,800± feet.

An advantage in disconnecting the Beach Road drainage to the two pipe outfalls to the Grand Canal would be to capture all runoff from this magnitude of storm along Beach Road so that the entirety of the runoff could be treated prior to discharge. If the stormwater retention pond could be expanded to provide more storage volume, disconnection of these two existing outfall pipes may be possible. Installing a new gravity outfall pipe, disconnection of the two existing outfall pipes to the Grand Canal from Beach Road and blocking the Gulf discharge ditch with a concrete ditch-block structure would maintain the current 2-inch rainfall dry street condition. However, closing the storm sewer pipes to the canal worsens the already flooded street in the existing condition during a 3-inch rainfall. Consequently closing the side street outfalls from Beach Road may be desirable relative to water quality but not be desirable from a street flooding perspective.

Generally the suggested gravity outfall system would reduce street flooding from the 3-inch rainfall compared to existing conditions if the side street weirs were to remain conveying runoff to the canal. With an expanded retention pond the 2-inch rainfall produces no street flooding if the two existing canal outfall pipes remain open or are closed. For the 3-inch rainfall, minor street flooding would result if the two outfall pipes remain open but more significant street flooding results if these outfalls were to be closed.

Weirs that direct some street runoff down the two side streets could be raised to only allow high flow from excessive rainfall greater than two inches to enter the canal. Raising these weirs within existing drainage structures to just under the inlet grate elevation may be difficult to construct. Since side street weir closure causes increased street flooding from excessive rainfall, the two side street outfall systems should remain open to convey local runoff to the Grand Canal.

Simulating the existing Beach Road storm sewer system for a 2-inch rainfall with no outfall and discharging into the existing stormwater pond produces a maximum stage of 3.77 ft. and causes street flooding. This indicates that the volume of the retention pond will have to be expanded if all of a 2-inch rainfall runoff from Beach Road were to be collected and treated prior to discharge. The existing stormwater pond along Beach Road may be considered to be moved and expanded into a treatment lagoon system. This lagoon would collect all runoff from the storm sewer system and allow it to be circulated through a salt marsh thereby improving the water quality. Excess rainfall events greater than two inches would overflow the improved discharge control structures and continue to flow to the beach.

The tidal affect on the storm sewer system is significant. High tide negatively affects the performance of the gravity outfall pipe and also reduces the peak water level of the storm in the pond and allows water to bypass through the system reducing the treatment time.

Appendix I contains a table of computer stormwater modeling scenarios and results.

Alternative 3b - Pumped Solution

The pumping scenario involved the collection of stormwater in an expanded, shallow stormwater treatment pond followed by further treatment in a preconstructed filter treated with ultra-violet (UV) light prior to discharge. If UV or chemical treatment of the stormwater discharge would be necessary, it would be easier to disinfect the stormwater in a small condensed flow stream in a pressurized pipe system.

The runoff volumes in **Table 1** were also converted to a gallon per minute (gpm) pumping rate. These pumping rates allow estimating how much stormwater runoff could be reasonably handled by a pumping system. Different possible pumping rates and discharge line sizes are shown below:

Force main	GPM
6"	500
8"	1000
10"	1500
12"	2000

The runoff volume from either a 2- or 3-inch, 24-hour rainfall event is approximately the capacity of a 6- to 8-inch force main if this volume were to be pumped within one day. Once runoff is collected, a design decision has to be made as to how long this water should remain in the treatment pond. Our engineering judgment is that this water should be evacuated to the discharge point within twenty-four hours. The cost for such a stormwater pumping facility would be significantly less than if a 10- to 12-inch force main system is envisioned to handle a higher rainfall amount.

From Table 1, if a 2-inch and 3-inch storm requires a daily force main pumping rate of 755 and 1518 gpm respectively, we interpolate that an 8-inch force main system can pump the accumulated runoff volume from a 2.3-inch rainfall at an average daily flow rate of 1000 gpm. Under such a scenario all runoff would be collected in a retention pond treated and pumped through an 8-inch force main to the discharge point in the Grand Canal following the same route as a gravity outfall.

So since disconnecting the two side street weirs to the canal does not exacerbate the 2-inch storm street flooding and if the pond could be expanded, then a pumping system could handle the storm runoff. Excess rainfall could be discharged to the beach over the proposed ditch-block. Weirs that direct some street runoff down the two side streets could be raised to only allow high flow from excessive rainfall to enter the canal. Raising these weirs within existing drainage structures to just under the inlet grate elevation may be difficult to construct. Consequently, blocking the incoming pipe from the intersection may be more practicable. The two side street outfall systems could remain open to convey local runoff from only the side streets to the Grand Canal.

The most viable option would be to collect all of the street runoff into an expanded stormwater pond and pump the water with improved water quality to a desired discharge point.

Site Availability

The County's Parks and Recreation Department must approve the layout of the proposed treatment pond and disinfection system prior to implementation of the project. The project team has met with Parks staff and understand that the County's Beach Improvement Plan may require the land currently utilized for the existing stormwater pond for other park facility purposes. As a result, the treatment pond expansion may require relocation farther to the south. Developing a stormwater treatment pond on this site would be an improvement to the existing park environment and offer the County the opportunity to expand its recreational parks system, provide environmental education opportunities, enhanced trail and open space areas, and, possibly, additional parking.

Environmental Permitting

Florida Department of Environmental Protection

Contact with the Florida Department of Environmental Protection (FDEP) was made to discuss the permitting of any site improvements waterward of the Coastal Construction Control Line (CCCL). The possibility of blocking site runoff to the beach could be viewed favorably by the FDEP from a beach erosion perspective. Should a ditch block be installed in the channel downstream of the retention pond to block low flow to the beach this work could be landward of the CCCL and not requiring a permit. Some ditch bank improvements would be necessary at the selected location of the ditch block. These improvements would address erosion and stability of the ditch block and would be included in a subsequent final design.

Southwest Florida Water Management District

A preapplication meeting was held with the Southwest Florida Water Management District (SWFWMD) to discuss the proposed water quality improvements of the project and the permitting of different discharge options on April 12, 2005. Minutes of the meeting are presented in **Appendix J**.

SWFWMD staff indicated that a pumped stormwater solution to the Grand Canal would likely be permittable if water quality standards were not exceeded by the discharge. Similarly a gravity piped outfall from Beach Road to the canal would be permittable if water quality was not adversely impacted by the project. Staff recommended that a monitoring program be implemented to determine the effectiveness of the treatment system. The monitoring program could be discontinued once the project was determined to be successful.

Cost Benefit Analysis

A cost benefit analysis was performed to determine the preferred alternative for treating and discharging stormwater at the Siesta Key Beach site. Since Alternatives 1 and 2 had fatal flaws, in that the water quality discharged from either alternative would not likely meet water quality standards consistently at the discharge, only Alternative 3 was evaluated with the discharge location to the Grand Canal based on gravity storm sewer and pumping/force main options.

Table 4. Comparison of costs for Alternatives 3a and 3b for the Siesta Key Beach discharge.

GRAVITY ALTERNATIVE

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
STORM MANHOLES	8	EA	$4,500	$36,000
CONFLICT MANHOLE	3	EA	$5,500	$16,500
19"X30" ERCP	3600	LF	$65	$234,000
PAVEMENT REPAIR	2000	SY	$25	$50,000
POND CLEARING/EROSION CONTROL	1	LS	$65,800	$65,800
POND EXCAVATION	20000	CY	$6	$120,000
POND PLANTINGS	1	LS	$50,000	$50,000
OIL/GREASE SKIMMERS	2	EA	$2,000	$4,000
DITCH BLOCK	1	EA	$2,500	$2,500
PRECAST FILTERS	4	EA	$60,000	$240,000
UV DISINFECTION	2	EA	$250,000	$500,000
CONTRACTOR OVERHEAD & PROFIT 15%				$200,000

GRAVITY SUBTOTAL	$1,518,800
Administrative and Contingency (20%)	$303,760
GRAVITY TOTAL COST ESTIMATE	**$1,822,560**

PUMPING ALTERNATIVE

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
PAVEMENT REPAIR	200	SY	$25	$5,000
POND CLEARING/EROSION CONTROL	1	LS	$65,800	$65,800
POND EXCAVATION	20000	CY	$6	$120,000
POND PLANTINGS	1	LS	$50,000	$50,000
OIL/GREASE SKIMMERS	2	EA	$2,000	$4,000
DITCH BLOCK	1	EA	$2,500	$2,500
PUMP STATION	1	LS	$150,000	$150,000
8" FORCE MAIN (DIRECTIONAL DRILL)	1800	LF	$100	$180,000
DISC FILTERS	2	EA	$75,000	$150,000
UV DISINFECTION	2	EA	$150,000	$300,000
CONTRACTOR OVERHEAD & PROFIT 15%				$154,000

PUMP SUBTOTAL	$1,181,300
Administrative and Contingency (20%)	$236,260
PUMP TOTAL COST ESTIMATE	**$1,417,560**

Based on the development of probable costs for either of the two discharge location options, the pumped discharge alternative is also less costly and more hydraulically reliable than the construction of a gravity system and is therefore the preferred alternative.

5.0 RECOMMENDATIONS

5.0 RECOMMENDATIONS

Based on the results of this feasibility study, stormwater runoff from the Beach Road drainage area could be treated in an expanded retention pond along Beach Road to acceptable water quality standards prior to discharge to the Grand Canal.

Ambient water quality for fecal coliform bacteria in the Grand Canal have been found to occasionally exceed the State's Class 3 water quality standards and so treated discharges from Beach Road should not adversely impact surface water quality at the point of discharge. In fact, some dilution may be provided with this higher-quality freshwater input that may reduce fecal coliform concentrations. Two existing outfalls to the Grand Canal that may be contributing bacterial loads would also be diverted to the treatment system, further enhancing water quality in the Grand Canal.

Logistically, pumping accumulated stormwater runoff from an expanded retention pond to the Grand Canal is a more hydraulically reliable system as opposed to a gravity outfall system due to the possibility of a high tide causing backflow during a rainfall event. This alternative is also less costly than the construction of a gravity system.

The exact location and size of the proposed stormwater retention pond within the Siesta Key Beach Park will need to be further discussed with County Parks Department staff. The Park Master Plan is currently being updated and so the inclusion of this system within the updated plan should be conducted as soon as possible so that other park enhancements, such as additional parking, trails, boardwalks, etc., can be coordinated with the proposed water quality enhancement project.

The stormwater improvement project has been developed using a treatment train approach with each component of the train having a bacterial removal component. If the project is implemented, it is recommended that the construction be phased and reevaluated after each treatment component is constructed. For example, the first two components (Phase 1) that should be constructed are the stormwater detention pond/wetland system, oil and grease skimmers, the weir to reduce discharges to the beach, and the pump station force main to the Grand Canal. Once this system has been constructed, monitoring of the inflow and outflow should be conducted to determine if water quality standards (fecal coliform bacteria concentrations <400 cfu/100 ml, enterococcus concentrations <103 cfu/100 ml) are being met.

If the thresholds for the "no swim" advisory are not met at the discharge point of the treatment system, then the prefabricated media filter and the UV treatment system should be constructed to further enhance bacteria disinfection processes and meet state standards. Continuous maintenance should also be conducted regularly to remove excess sediments within the pipe system; this has shown to be effective on reducing bacteria concentrations in the discharge based on monitoring before and after sediment removal.

In order to further define the above recommendations, the project should proceed to a more detailed Preliminary Design phase to further select equipment, construction costs, operation and maintenance costs, filtration and pump station design parameters.

6.0 REFERENCES

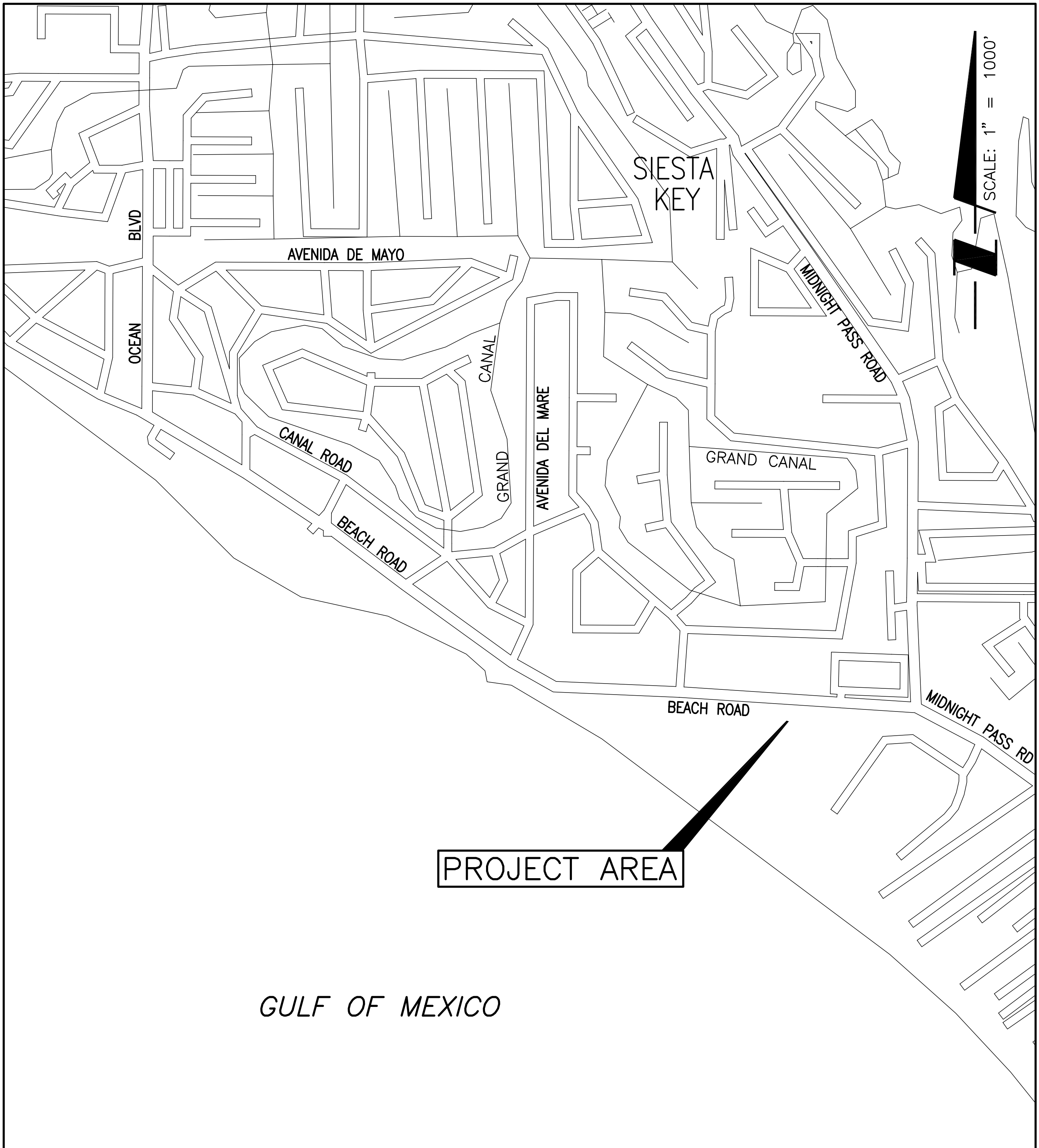
6.0 REFERENCES

Harwood, V., S. Shehane, M. Brownwell, M. Dontchev, and R. Kurz. 2005. Siesta Key Beach water quality sampling to determine sources of fecal indicator bacteria. Final Report to Sarasota County Water Resources.

Kurz, R. C. 1998. A comparison of rapid sand filtration, alum treatment, and wet detention for the removal of bacteria, viruses, and a protozoan surrogate from stormwater. Technical Report. Southwest Florida Water Management District.

APPENDIX A

BEACH ROAD DRAINAGE PROJECT VICINITY MAP



PROJECT: BEACH ROAD DRAINAGE IMPROVEMENTS FEASIBILITY STUDY

CLIENT: SARASOTA BOARD OF COUNTY COMMISSIONERS

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VICINITY MAP

SCALE: AS SHOWN	DATE: MAY 2005
SEC: 11, 12, 13 TWP: RGE:	REV NO:
PROJECT NO. 04222-009-000	INDEX NO: A-04222-009-000XXX
DRWN BY/EMP NO. JL/1726	EXHIBIT NO: 1

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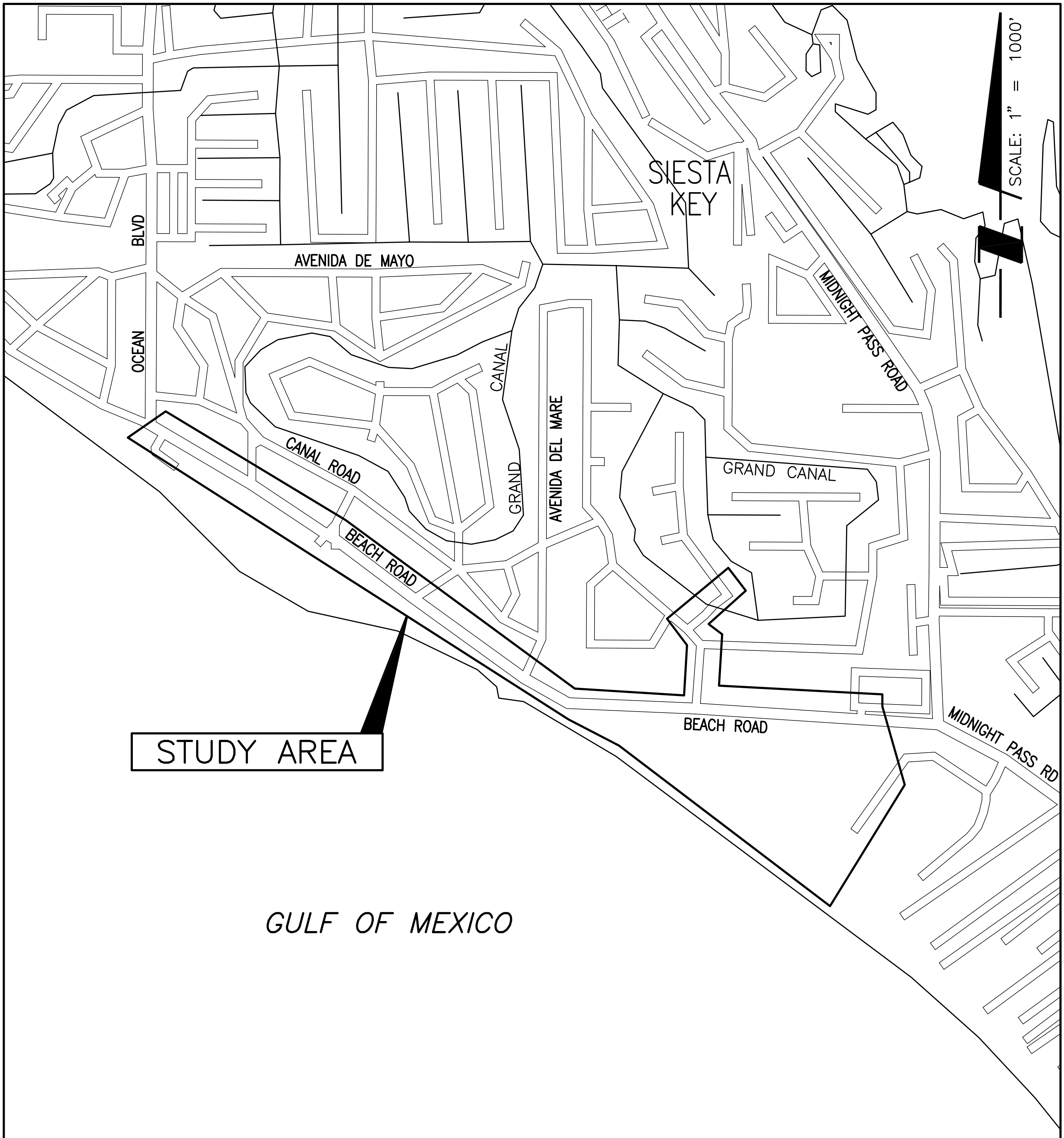
APPENDIX B

STUDY AREA MAP



PROJECT: BEACH ROAD DRAINAGE IMPROVEMENTS FEASIBILITY STUDY

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STUDY AREA

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SEC: 11, 12, 13 TWP: RGE:	REV NO:
PROJECT NO. 04222-009-000	INDEX NO: A-04222-009-000XXX
DRWN BY/EMP NO. JL/1726	EXHIBIT NO: 2

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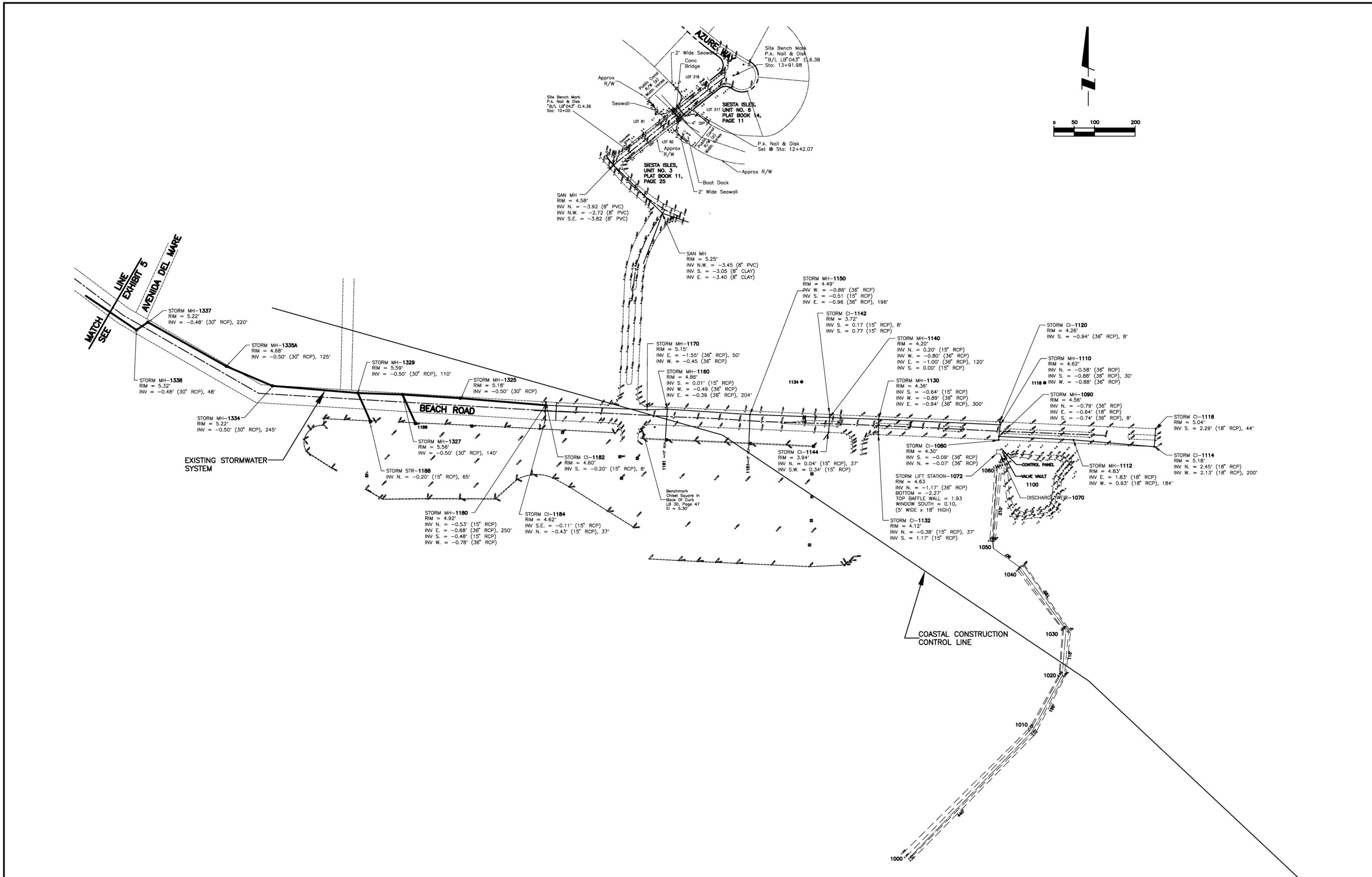
APPENDIX C

DRAINAGE BASIN MAP

APPENDIX D

LINK NODE SCHEMATIC



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PROJECT: BEACH ROAD DRAINAGE IMPROVEMENTS FEASIBILITY STUDY

DATE: 01/05

HORIZONTAL SCALE: 1" = 200'

VERTICAL SCALE: –

SEC: TWP: RGE:

TITLE: NODAL MAP

CROSS REFERENCE FILE NO.:

PROJECT NUMBER: 04222-009-000

JOSEPH E. HICKLE JR., P.E.
FLORIDA CERTIFICATE NO. 38925

INDEX NUMBER: D-04222-009-000XXX

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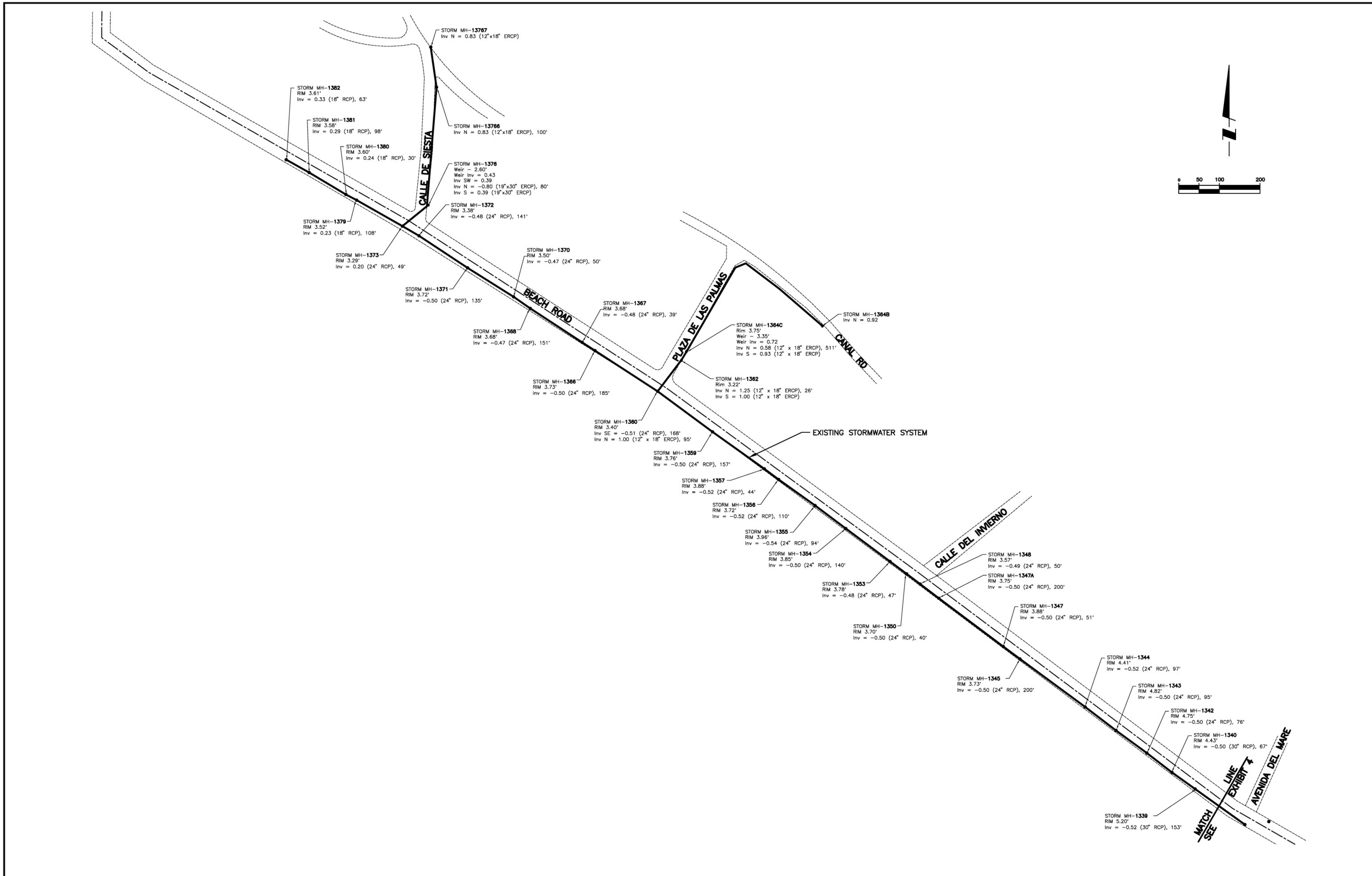

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					DRAWN BY:		
					CHECKED BY:		
					CONTRACT ADMIN. BY:		
					WM APPROVED BY:		

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DATE: 01/05
HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: –
SEC: TWP: RGE:

TITLE: NODAL MAP

CROSS REFERENCE FILE NO.:
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APPENDIX E

WWTPS USING UV DISINFECTION IN FLORIDA

Summary of UV Disinfection in Florida

Treatment Facility	County	DEP Distr.	Disinf. Level	WWTP Capacity (mgd)	Backup System	Discharge to	Notes
Bay County Regional	Bay	NW	Inter. & High	7.0 0.4	No	Surface & Reuse	Part III Reuse uses Cl_2 for disinfection Operation began in 1999
City of Lynn Haven	Bay	NW	Inter.	2.5	Yes	Surface water	Began operation in 1999 Backup is dual train UV with 2 separate modules per train
Panama City - Millville	Bay	NW	Inter.	5.0	No	Surface water	Began operation in 1999
Panama City Beach	Bay	NW	Inter. & High	10	Yes	Surface water	UV under construction, Part III reuse uses Cl_2 for disinfection Backup is Cl_2
Blountstown	Calhoun	NW	Basic	1.5	No	Surface water	Began operation in 1999
Homestead	Dade	SE	High	6.0	No	Rapid-rate	Began operation in 1999
Atlantic Dry Dock	Duval	NE	Basic	0.06	Yes	Surface water	
Baldwin	Duval	NE	Basic	0.4	Yes	Surface water	Wedeco system, vertical lamps, began operation in 1990
Buckman (JEA)	Duval	NE	Basic	52.0	No	Surface water	Began operation December 2000
Northeast (fka District II) (JEA)	Duval	NE	Basic	10	No	Surface water	Began operation in 2001
Southwest (JEA)	Duval	NE	Basic	10	No	Surface water	Began operation in 2001
Jacksonville - Mandarin	Duval	NE	Basic	7.5	No	Surface water	Began operation in 2000
Monterey (UWF)	Duval	NE	Basic	3.6	No	Surface water	
Bayou Marcous	Escambia	NW	Basic	8.2	Yes	Wetlands	Began operation in 1998 Backup is dual train UV with 3 separate modules per train
ECUA - Pensacola Beach	Escambia	NW	Inter.	2.4	No	Surface water	UV under construction
ECUA - Main Street	Escambia	NW	Basic	20	Yes	Surface water	Began operation June 2000 Backup is dual train UV with 2 separate modules per train
Pebble Creek	Hillsborough	SW	High	0.4	No	Surface water & reuse	Infilco Degremont, closed channel, horizontal lamps, 2 units installed in 1986, added 3rd unit in 1993, use Cl_2 for reuse
Waterway Estates	Lee	South	Basic	1.5	No	Surface water & reuse	Infilco Degremont, closed channel, horizontal lamps, began operation in 1991, use Cl_2 for reuse system

Treatment Facility	County	DEP Distr.	Disinf. Level	WWTP Capacity (mgd)	Backup System	Discharge to	Notes
Key Colony Beach	Monroe	South	Basic	0.34	Yes	Injection to Class V well	
East Central Regional	Palm Beach	SE	High	6.0	Yes	Surface Water	Will begin operation in 2004
Auburndale - Allred	Polk	SW	Basic	1.4	No	Surface water & citrus irrigation	Aquionics, closed channel, horizontal lamps, began operation in 1993
Auburndale - Westside	Polk	SW	Basic	1.6	Yes	Reuse	Aquionics, closed channel, horizontal lamps
Hastings	St. Johns	NE	Basic	0.12	Yes	Surface water	Infilco Degremont, open channel, vertical lamps, began operation in 1992. Due to problems w/ UV system, chlorine is primary disnfection method.
Ponte Vedra (UWF)	St. Johns	NE	High	0.5	No	Surface water & Reuse	Permit issued. Single channel, 9 banks in series. 140 mW-s/cm^2 at peak flow.
Daytona Beach - Bethune Point	Volusia	Central	High	13.0	No	Surface water & reuse	Trojan, open channel, medium pressure system began operation in 1999

APPENDIX F

NEWSPAPER ARTICLE -
SIESTA KEY BEACH WATER QUALITY

SARASOTA
Herald-Tribune

A MULTIMEDIA COMMUNICATIONS COMPANY THURSDAY, DECEMBER 9, 2004 50¢

Dirty pipe fouled water

Health officials say a storm-water pipe is the culprit in Siesta Key's no-swim advisories.

By TOM BAYLES
tom.bayles@heraldtribune.com

SIESTA KEY — Biologists say a drainage pipe beneath Beach Road that has been collecting sand, oil and bits of tires for 15 years is the culprit behind a spate of no-swim advisories earlier this year at Siesta Public Beach.

In places that pipe, which runs from the colorful Siesta Village to the sparkling beach, is half-filled with silt, goo and various unmentionables that have built up as a byproduct of storm water running through it.

Health officials and scientists who met Wednesday said that within that pipe is a bacteria plant of sorts, one that takes in animal waste washed into the drainage system and spits out fecal coliform and enterococcus.

The pipe empties in a pond at the south end of Siesta Public Beach, the crown jewel of the region's beaches, with white, powdery sand that got it named one of the best in the nation this year by "Dr. Beach" of Florida International University.

"We need to ask if there is a better way to do storm-water management here," said Theresa Conner, a Sarasota

PLEASE SEE BEACHES ON 13A

HERALD-TRIBUNE ARCHIVE / 2004
The bacteria found this spring and summer led to no-swimming signs being posted at Siesta Key, Turtle Beach, Venice Beach and Sarasota's Bird Key Park.

Drainage pipe blamed for water pollution

BEACHES FROM 1A

County water resources manager.

Conner is on a task force that's been studying the reasons behind the high levels of bacteria found in the water this spring and summer. The bacteria led to no-swim signs being posted at Siesta Key, Turtle Beach, Venice Beach and Sarasota's Bird Key Park.

The bacterial outbreaks indicate the possible presence of viruses or other disease-causing organisms that can lead to gastrointestinal problems for humans and infections in cuts and scrapes.

Children, pregnant women and people with poor immune systems are most at risk.

This is the first year of multiple no-swim advisories on Siesta Key. Biologists studying the problem say that's because of more frequent and more thorough water quality testing that began two years ago.

Water quality has been acceptable since this summer, but county and state health officials have hired a team of University of South Florida biologists to test the water and see where the bacteria comes from and what it contains.

A DNA test showed that the fecal coliform is the type that comes from animals, not humans, which means the bacteria in the water comes from waste produced by birds, dogs, and other creatures, not from a leaky sewer pipe.

It's harder for humans to catch diseases from animals.

The researchers found that bacterial levels in the pipe multiply between rains. The pipe sits underground, at a level where it is usually saturated.

The county will attempt to solve the problem three ways:

■ Clean out the pipe, then keep it clear.

■ Disinfect the pipe after it is cleaned.

■ Where the pipe empties into the woods at the south end of Siesta Public Beach is a coastal hammock, which could be restored so the area could naturally help filter pollutants from the water.

"In my mind, that would really address the problem we saw out there," Conner said.

The county has spent about $100,000 this year studying the problem and designing a fix.

What's less clear is how to fix the problems at Bird Key Park, where no-swimming signs were a regular fixture during the summer.

"There are problems with causeways all over the state," said Rob Bolesta, an engineer with the Florida Department of Health who works in Sarasota County.

Causeways are often places where dogs are allowed to play, Bolesta said, and not every pet owner picks up what the dogs deposit.

Bird feces from the walkway on the Ringling Bridge also washes down to the park.

Bolesta is set to start a public awareness campaign at the park, with signs asking that dog owners clean up after their pets.

He also plans to talk with the Florida Department of Transportation, owner of the bridge, about diverting the flow of rainwater coming off the walkway into the bridge's storm-water collection system.

The Venice no-swim advisories in May, Bolesta said, were posted as a result of construction crews working at a bird-feces-laden city pier, which may have stirred the waters where officials tested for the bacteria, leading to the high counts.

The task force's findings, and the county's plan to fix the problem, will be discussed in a meeting with Siesta Key homeowners next Thursday.

Last year, no-swim advisories were posted nine times in Sarasota County, 41 times in Manatee County and 42 times in Charlotte County.

The number of beach closings and advisories resulting from excessive pollution more than doubled in Florida last year, according to the National Resources Defense Council.

The council said the 307 Florida beaches monitored by health officials for pollution were closed or had no-swimming advisories posted on 3,986 days in 2003, up from 1,745 in 2002.

Across the country in 2003, there were more than 18,000 days when beaches were closed or people were warned not to swim, an increase of more than 51 percent from 2002, the NRDC reported.

The local no-swim advisories this spring and summer were posted after routine testing under the state's Healthy Beaches program, which tests the water off coastal counties every week.

Officials say the testing has become more thorough and more frequent in recent years.

Though pollutants are spotted more often, the testing also means safer shorelines because people know when it's not a good idea to go in the water.

"It's not scary to go to the beach," Conner said. "Things are actually safer now that this is going on."

Interested?

Health officials are planning a meeting Dec. 16 to explain the results of their investigation into the numerous no-swim advisories this year on Siesta Key. The meeting will start at 7 p.m. at the St. Boniface Episcopal Church Parish Hall, 5615 Midnight Pass Road, Siesta Key. For more information, call 861-6133.

APPENDIX G

PUBLIC MEETING MINUTES - HEALTHY BEACHES

Healthy Beaches Public Workshop
December 16, 2004 7:00 PM

Public Comments/Questions

1) Resident has lived here for 25 years and for as long as she can remember brown water has been coming out of the pipe onto the beach.

2) Why were the Australian pines taken down? The place looks terrible now.

3) The recreational area around the beach should be moved. The tennis courts need to be moved. More green space is needed.

4) There is a need for natural filtration. Get rid of the parking lot.

5) Why are RVs allowed to park in the parking lot? They take up 2 to 3 spaces.

6) What is the source of the Turtle Beach problem?

7) The parking lot is an eyesore. The area needs a more pleasant appearance. There is a need for more shade.

8) The County should use more Florida native or Florida friendly plants.

9) Why are we dumping stormwater into the Gulf of Mexico?

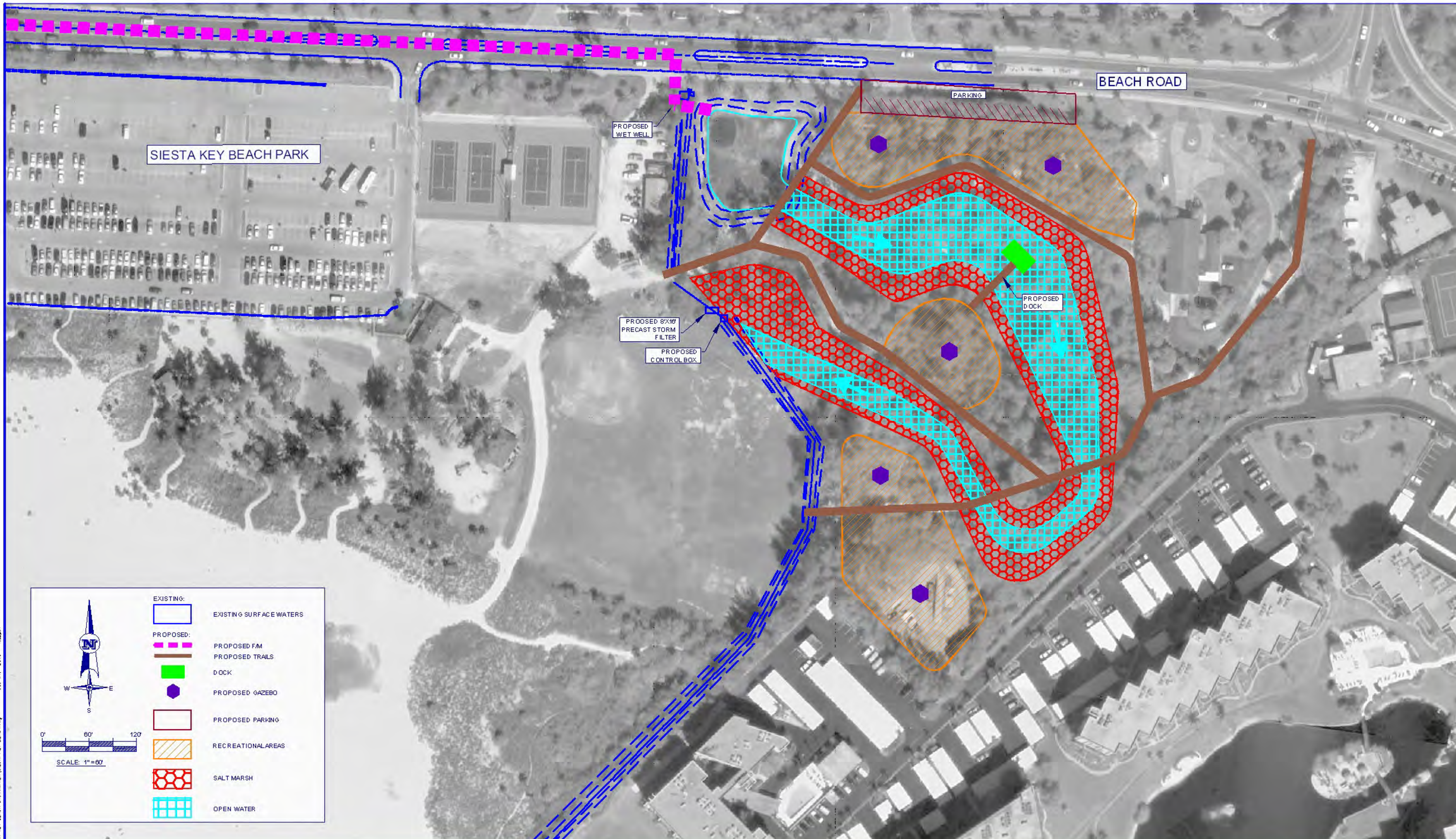
10) The County needs to look at the zoning regulations. Is there a limit on impervious surfaces?

11) Has the Parks Department conducted any wildlife surveys? There is a need for more green space.

12) During rain events, is the effluent tested and reported?

APPENDIX H

WET DETENTION POND CONCEPTUAL DESIGNS AND EQUIPMENT



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SOLID WASTE OPERATIONS
4000 KNIGHTS TRAIL ROAD
NOKOMIS, FLORIDA 34275

SARASOTA COUNTY 1921

PROJECT:
SIESTA KEY STORMWATER
IMPROVEMENT PLANS

TASK:
ALTERNATIVE 3
OPTION A

ORIGINAL: MAY 2005
REVISIONS:
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ENGINEER
DAVID A. WEBER
REG. NO. 29323
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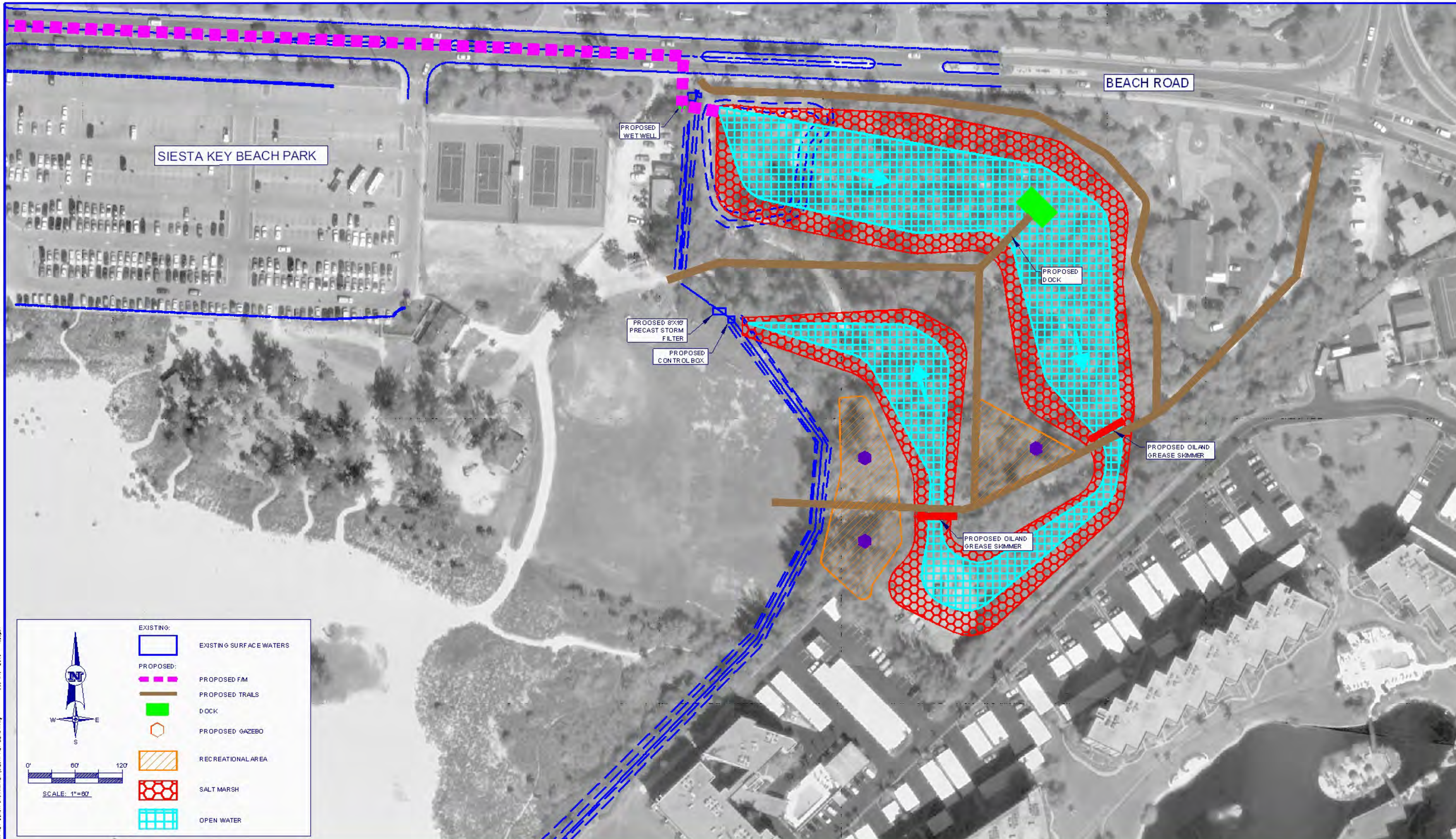
SHEET 1



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NOKOMIS, FLORIDA 34275

SARASOTA COUNTY 1921

PROJECT:
SIESTA KEY STORMWATER
IMPROVEMENT PLANS

TASK:
ALTERNATIVE 3
OPTION B

ORIGINAL: MAY 2005
REVISIONS:
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ENGINEER DAVID A. WEBER
REG. NO. 29323
DATE

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SARASOTA COUNTY 1921

PROJECT:
SIESTA KEY STORMWATER
IMPROVEMENT PLANS

TASK:
OVERALL SITE PLAN

ORIGINAL: MAY 2005
REVISIONS:
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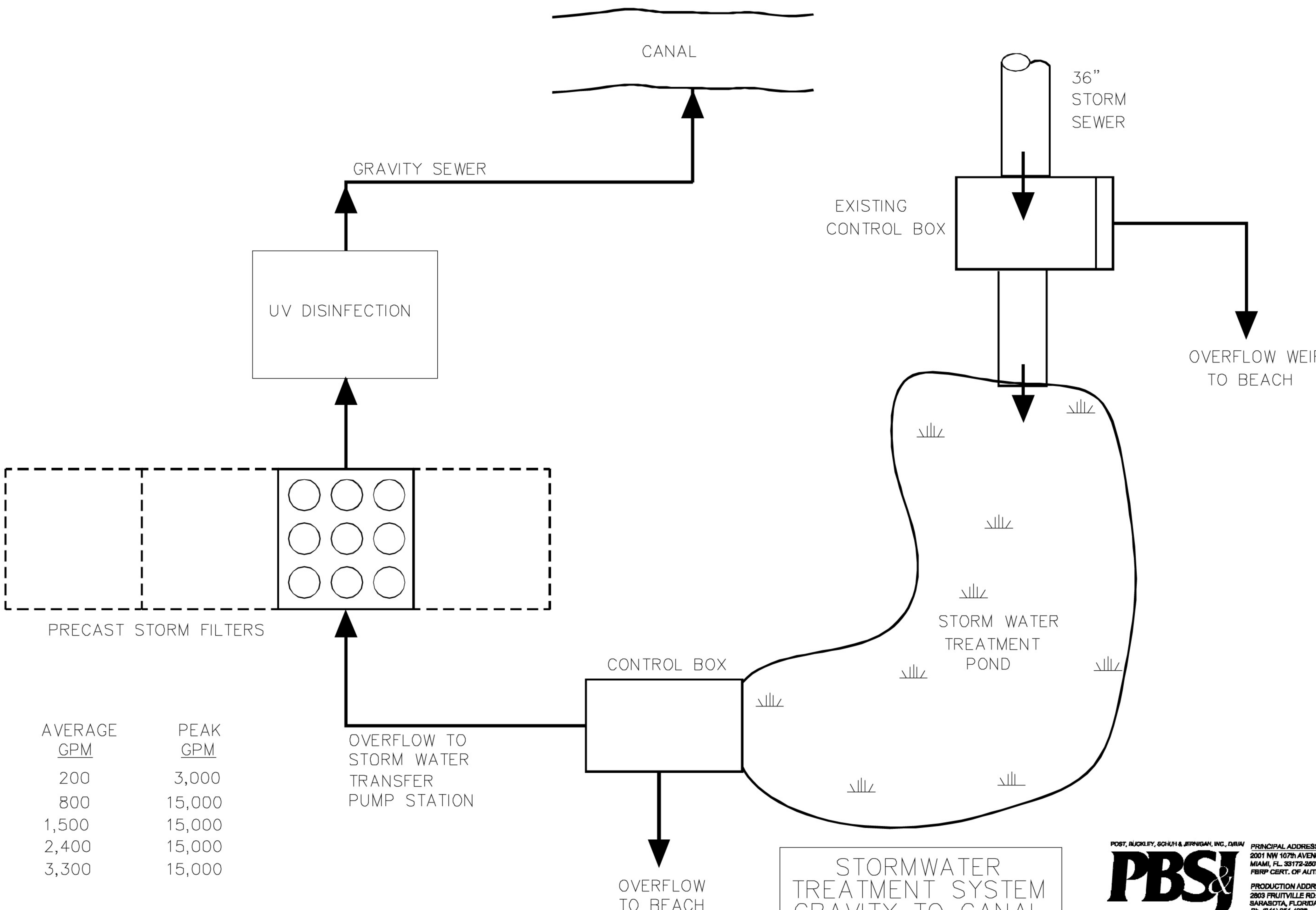
SHEET 3



STORM EVENT	AVERAGE GPM	PEAK GPM
1"	200	3,000
2"	800	15,000
3"	1,500	15,000
4"	2,400	15,000
5"	3,300	15,000

STORMWATER TREATMENT SYSTEM GRAVITY TO CANAL

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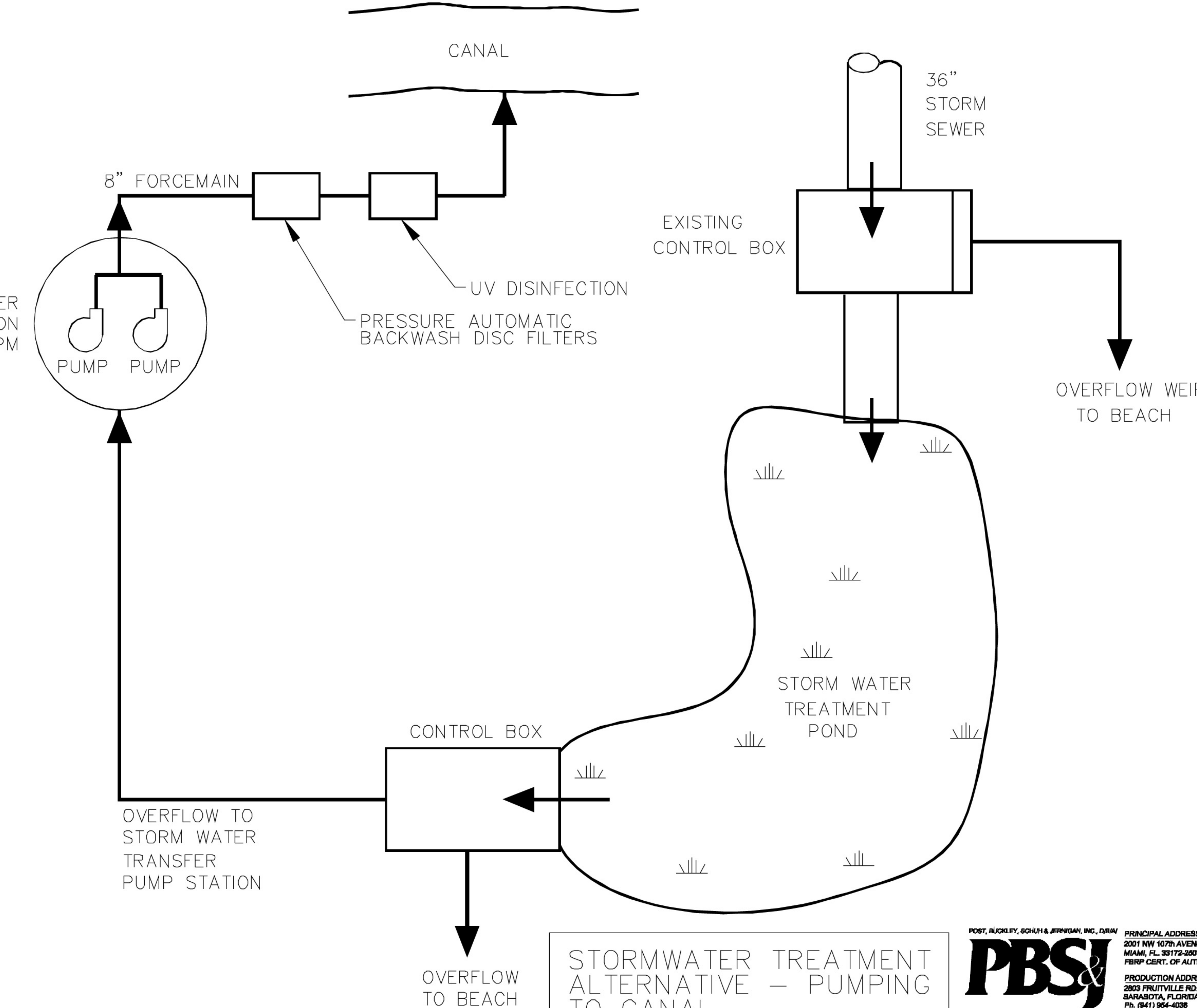

STORM EVENT	AVERAGE GPM	PEAK GPM
1"	200	3,000
2"	800	15,000
3"	1,500	15,000
4"	2,400	15,000
5"	3,300	15,000

STORMWATER TREATMENT ALTERNATIVE – PUMPING TO CANAL

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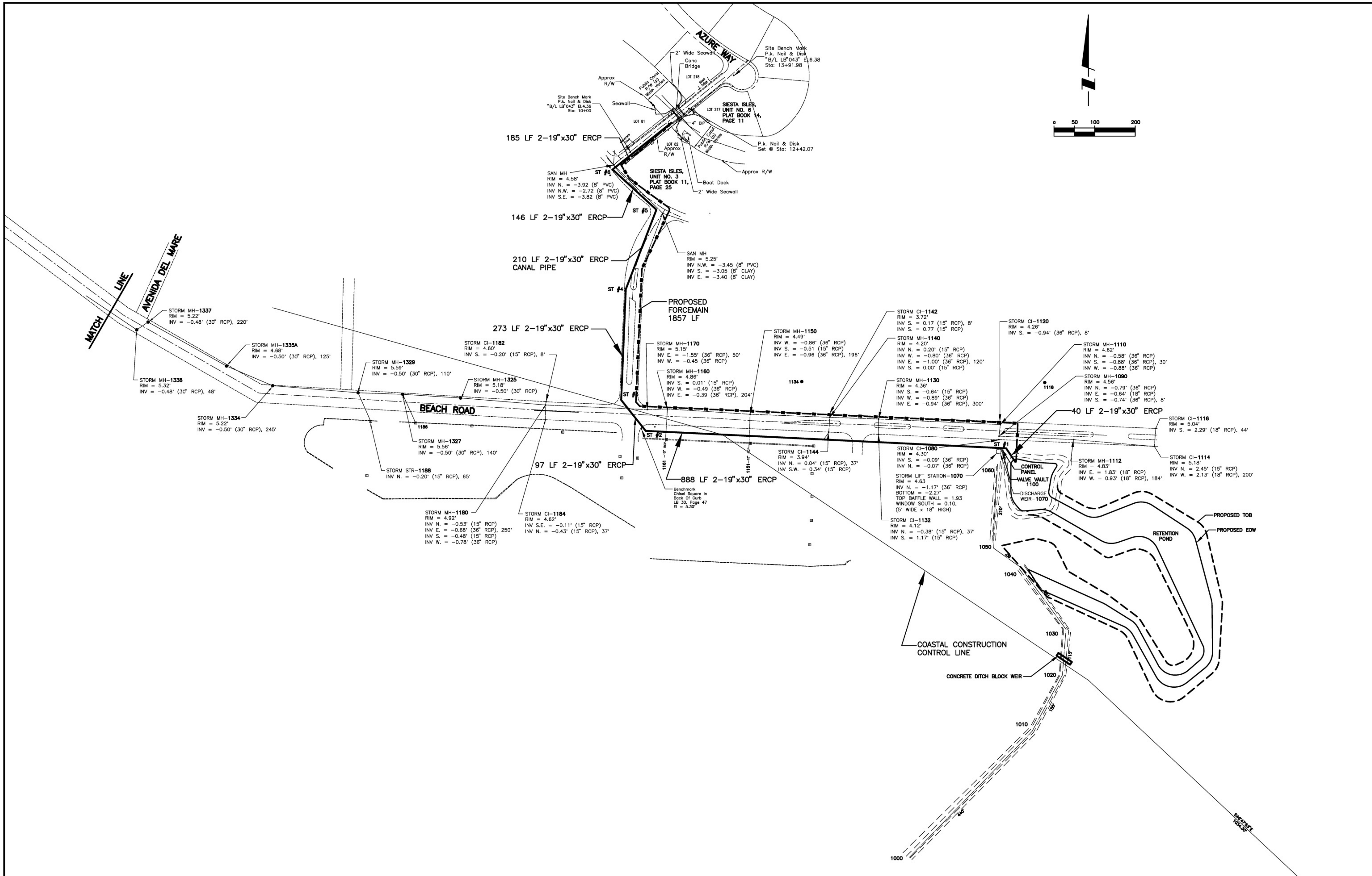

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CLIENT: SARASOTA BOARD OF COUNTY COMMISSIONERS

PROJECT: BEACH ROAD DRAINAGE IMPROVEMENTS FEASIBILITY STUDY

DATE: 01/05
HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: –
SEC: TWP: RGE:

TITLE: CONCEPTUAL DRAINAGE IMPROVEMENTS

CROSS REFERENCE FILE NO.:
PROJECT NUMBER: 04222-009-000

JOSEPH E. HICKLE JR., P.E.
FLORIDA CERTIFICATE NO. 38925
INDEX NUMBER: D-04222-009-000XXX
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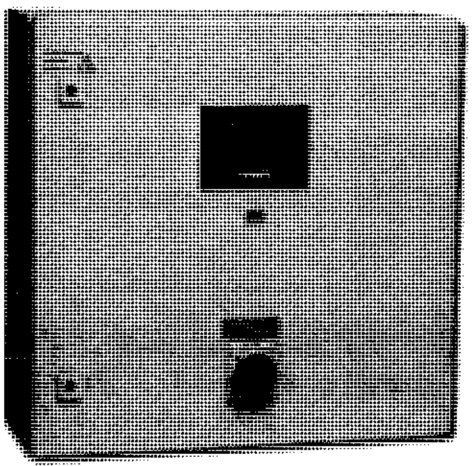
AQUIONICS World Leader in Ultraviolet Technology

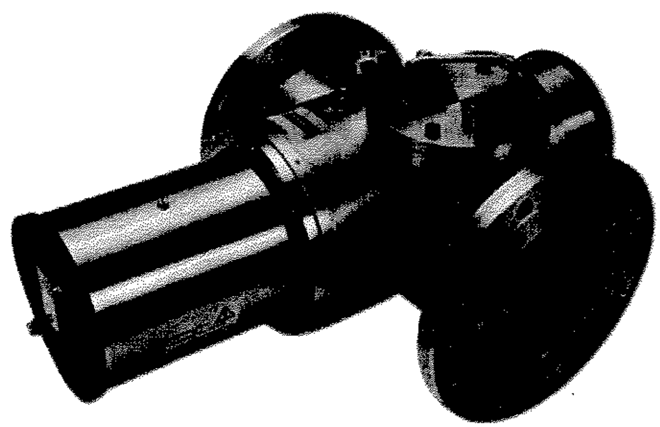
INLINE™

Compact Design, Premium Medium-Pressure Ultraviolet

The INLINE system uses high output medium pressure lamps oriented perpendicular to the fluid flow. This design has several unique advantages including the ability to **effectively treat very poor transmission fluids, or extremely high flow rates without bypass**. The compact design has **the smallest footprint** of any UV system and can treat gravity fed operations with



very little pressure drop. These systems are ideally suited for treating process, waste, or reuse water. INLINE is an excellent choice where space is critical or flows are high.



Aquionics' INLINE systems are cost effective and applicable to primary, secondary, and tertiary effluents as well as combined sewer overflows and stormwater.

SOME ADVANCED FEATURES:

- Compact design, smallest footprint.
- Low head loss.
- Designed for both gravity fed and pumped flow.
- Automatic quartz sleeve cleaning mechanisms insure consistent, reliable disinfection even when treating poor quality water.
- Heavy-duty, 316L stainless steel treatment chamber.
- High-intensity, medium-pressure UV lamps can be configured to treat any size flow requirements.
- Low capital and O&M costs.
- Easiest to install...Unit can be connected directly into existing piping system.
- Minimal maintenance requirements.
- Advanced, fail-safe, UV monitors.
- Eliminates chlorination and dechlorination processes.

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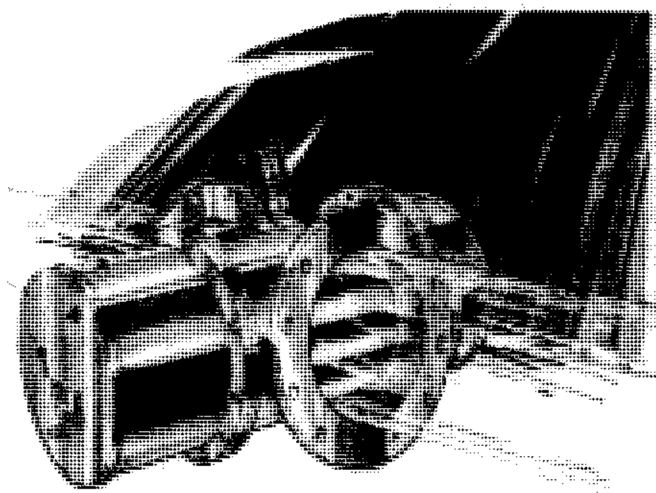
INLINE™ – SYSTEM FEATURES

CONTROL CABINET:

- Epoxy coated steel or stainless steel available.
- Available with NEMA 12 rating.
- 20 year design life transformers and capacitors to drive high power medium pressure lamps.



SOME OTHER SYSTEM FEATURES:

- Safety features include: cabinet interlocks, over-temperature shutoff, ground-fault protection, and numerous alarms and outputs.
- Mechanical and chemical wiper systems for automatic quartz sleeve cleaning.
- Sample ports and access hatches.

CONTROLS & MONITORING:

- Fail-safe UV monitor.
- All functions are microprocessor controlled.
- Many standard Controls, Alarms, and Input/Outputs are available.

LAMPS & SLEEVES:

- Medium-Pressure lamps emit *all* UV disinfection wavelengths.
- Single or multiple lamp configurations.
- High-purity quartz for maximum transmission.
- One 4000-watt multi-wave lamp is equivalent to 18 conventional low-pressure technology lamps.
- Lower maintenance cost than LP systems due to fewer lamps.

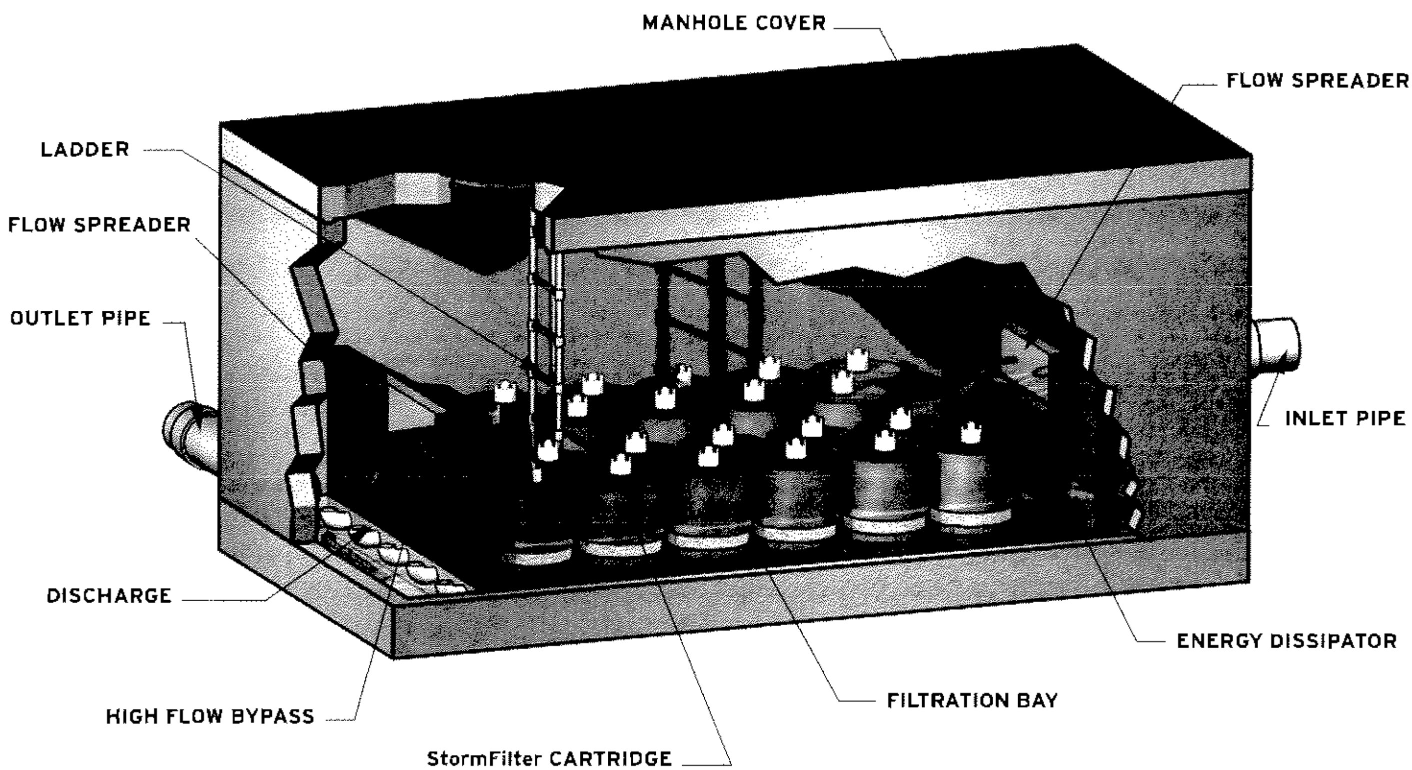
CHAMBER:

- 316L stainless steel construction.
- Compact, perpendicular lamp configuration.
- Automatic quartz sleeve cleaning.
- Access hatches.

AQUIONICS
World Leader in Ultraviolet Technology

Local Representative
EnviroSales of Florida, Inc.
4125 Bee Ridge Rd. Sarasota, FL 34233
Phone 941-343-9244 Fax 941-343-9245
E-mail chlavach@acun.com

THE STORMWATER MANAGEMENT StormFilter®

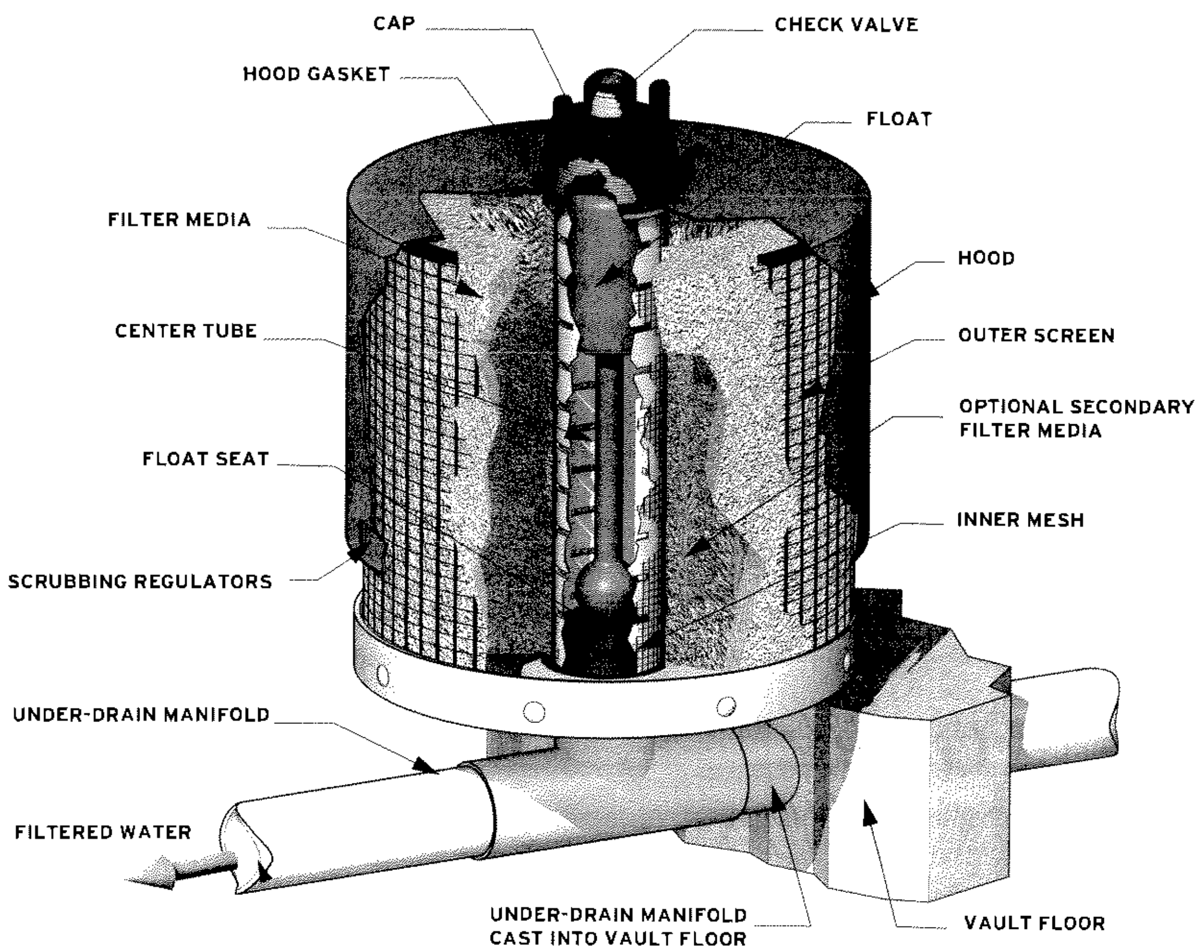


STORMWATER™
MANAGEMENT INC.

U.S. Patent No. 5,322,629, 5,624,576, 5,707,527, 6,027,639 and other U.S and Foreign patents pending.

StormFilter CARTRIDGE

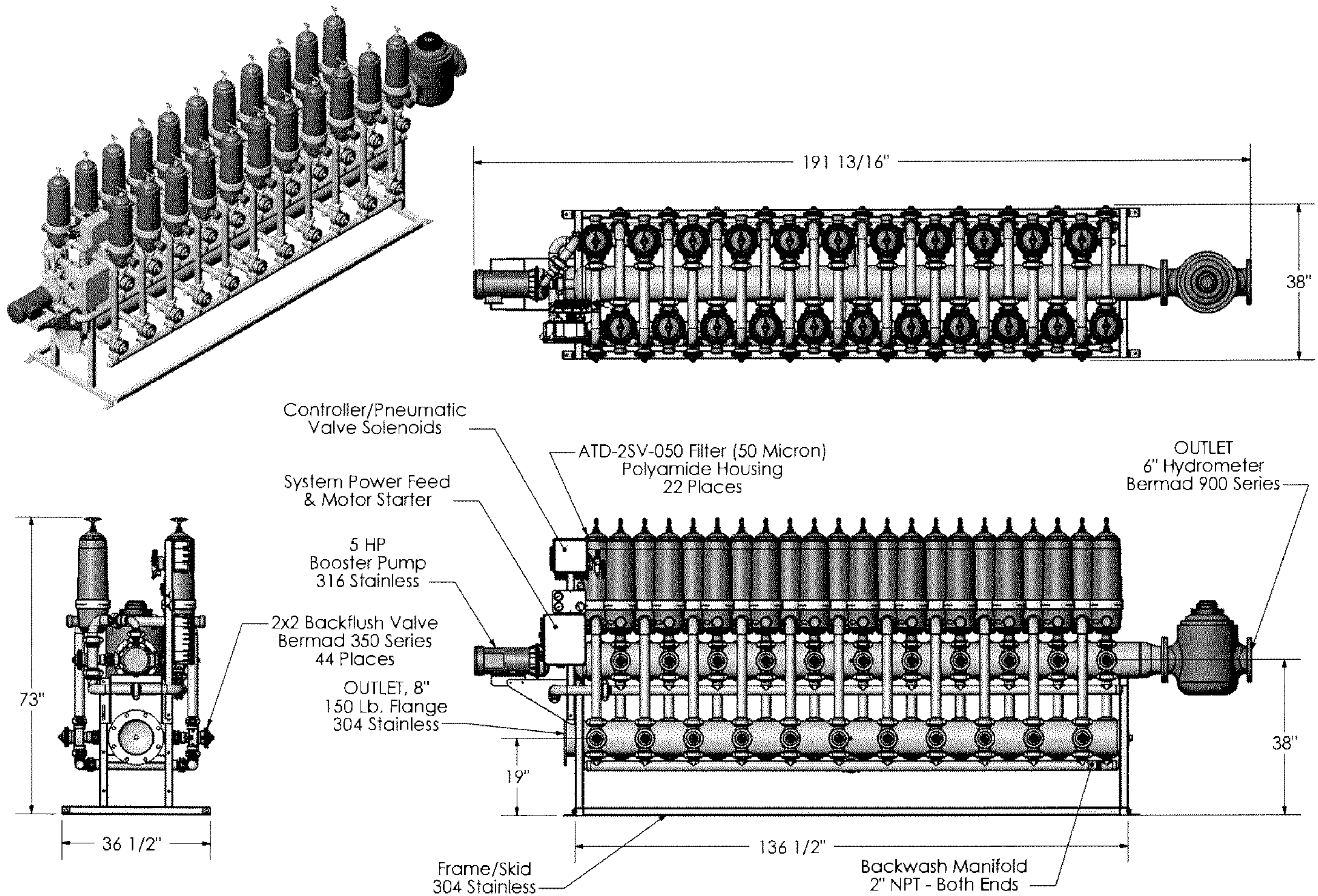
CARTRIDGE



STORMWATER MANAGEMENT INC.

U.S. Patent No. 5,322,629, 5,624,576, 5,707,527, 6,027,639 and other U.S and Foreign patents pending.

12021-B NE Airport Way, Portland, OR 97220 800.548.4667 800.561.1271



POWER REQUIREMENTS

Electrical: 460VAC/3 Phase/60 Hz/8A
Air Line: 4 CFM @ 80 - 100 PSI

Rev. A

PRODUCT SPECIFICATION	DRAWN	J. Larsen	4/13/05	TITLE Automatic Turbo-Disc Filter Skid System B2-ATD2(22)x8-050M-A-MOD1
MILLER-LEAMAN INC. 800 Orange Ave. Daytona Beach FL 32114	CHECKED			
	ENG APPR.			
	MKT APPR.			
	SHEET 1 OF 1			

APPENDIX I

STORMWATER MODELING SCENARIOS AND RESULTS

EXISTING CONDITIONS INPUT

```
================================================================================
==== Basins ====================================================================
================================================================================

       Name: 1000                        Node: 1000                Status: Onsite
      Group: BASE                        Type: SCS Unit Hydrograph

   Unit Hydrograph: Uh256                     Peaking Factor: 256.0
     Rainfall File: Flmod                Storm Duration(hrs): 24.00
Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
          Area(ac): 1.900                    Time Shift(hrs): 0.00
      Curve Number: 68.00               Max Allowable Q(cfs): 999999.000
           DCIA(%): 0.00

----------------------------------------------------------------------------------------
       Name: 1010                        Node: 1010                Status: Onsite
      Group: BASE                        Type: SCS Unit Hydrograph

   Unit Hydrograph: Uh256                     Peaking Factor: 256.0
     Rainfall File: Flmod                Storm Duration(hrs): 24.00
Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
          Area(ac): 0.970                    Time Shift(hrs): 0.00
      Curve Number: 68.00               Max Allowable Q(cfs): 999999.000
           DCIA(%): 0.00

----------------------------------------------------------------------------------------
       Name: 1020                        Node: 1020                Status: Onsite
      Group: BASE                        Type: SCS Unit Hydrograph

   Unit Hydrograph: Uh256                     Peaking Factor: 256.0
     Rainfall File: Flmod                Storm Duration(hrs): 24.00
Rainfall Amount(in): 2.000                 Time of Conc(min): 10.56
          Area(ac): 5.610                    Time Shift(hrs): 0.00
      Curve Number: 68.00               Max Allowable Q(cfs): 999999.000
           DCIA(%): 0.00

----------------------------------------------------------------------------------------
       Name: 1030                        Node: 1030                Status: Onsite
      Group: BASE                        Type: SCS Unit Hydrograph

   Unit Hydrograph: Uh256                     Peaking Factor: 256.0
     Rainfall File: Flmod                Storm Duration(hrs): 24.00
Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
          Area(ac): 4.580                    Time Shift(hrs): 0.00
      Curve Number: 68.00               Max Allowable Q(cfs): 999999.000
           DCIA(%): 0.00

----------------------------------------------------------------------------------------
       Name: 1040                        Node: 1040                Status: Onsite
      Group: BASE                        Type: SCS Unit Hydrograph

   Unit Hydrograph: Uh256                     Peaking Factor: 256.0
     Rainfall File: Flmod                Storm Duration(hrs): 24.00
Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
          Area(ac): 0.560                    Time Shift(hrs): 0.00
      Curve Number: 68.00               Max Allowable Q(cfs): 999999.000
           DCIA(%): 0.00

----------------------------------------------------------------------------------------
       Name: 1050                        Node: 1050                Status: Onsite
      Group: BASE                        Type: SCS Unit Hydrograph

   Unit Hydrograph: Uh256                     Peaking Factor: 256.0
     Rainfall File: Flmod                Storm Duration(hrs): 24.00
Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
          Area(ac): 1.470                    Time Shift(hrs): 0.00
      Curve Number: 68.00               Max Allowable Q(cfs): 999999.000
           DCIA(%): 0.00

----------------------------------------------------------------------------------------
       Name: 1080                        Node: 1080                Status: Onsite
      Group: BASE                        Type: SCS Unit Hydrograph
```

```
     Unit Hydrograph: Uh256              Peaking Factor: 256.0
       Rainfall File: Flmod           Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000            Time of Conc(min): 10.00
            Area(ac): 0.354              Time Shift(hrs): 0.00
        Curve Number: 92.00         Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

```
        Name: 1100               Node: 1100                Status: Onsite
       Group: BASE               Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256              Peaking Factor: 256.0
       Rainfall File: Flmod           Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000            Time of Conc(min): 10.00
            Area(ac): 0.440              Time Shift(hrs): 0.00
        Curve Number: 70.00         Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

```
        Name: 1114               Node: 1114                Status: Onsite
       Group: BASE               Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256              Peaking Factor: 256.0
       Rainfall File: Flmod           Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000            Time of Conc(min): 10.00
            Area(ac): 0.425              Time Shift(hrs): 0.00
        Curve Number: 92.00         Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

```
        Name: 1116               Node: 1116                Status: Onsite
       Group: BASE               Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256              Peaking Factor: 256.0
       Rainfall File: Flmod           Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000            Time of Conc(min): 10.00
            Area(ac): 0.425              Time Shift(hrs): 0.00
        Curve Number: 92.00         Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

```
        Name: 1118               Node: 1118                Status: Onsite
       Group: BASE               Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256              Peaking Factor: 256.0
       Rainfall File: Flmod           Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000            Time of Conc(min): 20.00
            Area(ac): 4.080              Time Shift(hrs): 0.00
        Curve Number: 80.00         Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

```
        Name: 1120               Node: 1120                Status: Onsite
       Group: BASE               Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256              Peaking Factor: 256.0
       Rainfall File: Flmod           Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000            Time of Conc(min): 10.00
            Area(ac): 0.354              Time Shift(hrs): 0.00
        Curve Number: 92.00         Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

```
        Name: 1132               Node: 1132                Status: Onsite
       Group: BASE               Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256              Peaking Factor: 256.0
       Rainfall File: Flmod           Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000            Time of Conc(min): 12.00
            Area(ac): 1.590              Time Shift(hrs): 0.00
        Curve Number: 75.00         Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

```
----------------------------------------------------------------------------------------------------
       Name: 1134                         Node: 1134                 Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                   Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                    Time of Conc(min): 30.00
             Area(ac): 7.040                      Time Shift(hrs): 0.00
         Curve Number: 80.00                 Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
       Name: 1142                         Node: 1142                 Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                   Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                    Time of Conc(min): 10.00
             Area(ac): 0.739                      Time Shift(hrs): 0.00
         Curve Number: 92.00                 Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
       Name: 1144                         Node: 1144                 Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                   Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                    Time of Conc(min): 10.00
             Area(ac): 0.540                      Time Shift(hrs): 0.00
         Curve Number: 92.00                 Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
       Name: 1146                         Node: 1146                 Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                   Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                    Time of Conc(min): 10.00
             Area(ac): 1.570                      Time Shift(hrs): 0.00
         Curve Number: 98.00                 Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
       Name: 1151                         Node: 1151                 Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                   Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                    Time of Conc(min): 10.00
             Area(ac): 1.510                      Time Shift(hrs): 0.00
         Curve Number: 98.00                 Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
       Name: 1161                         Node: 1161                 Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                   Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                    Time of Conc(min): 10.00
             Area(ac): 1.380                      Time Shift(hrs): 0.00
         Curve Number: 98.00                 Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
       Name: 1182                         Node: 1182                 Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph
```

```
     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 1.580                 Time Shift(hrs): 0.00
        Curve Number: 80.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
      Name: 1184                     Node: 1184                   Status: Onsite
     Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 0.697                 Time Shift(hrs): 0.00
        Curve Number: 92.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
      Name: 1186                     Node: 1186                   Status: Onsite
     Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 15.00
            Area(ac): 2.330                 Time Shift(hrs): 0.00
        Curve Number: 98.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
      Name: 1188                     Node: 1188                   Status: Onsite
     Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 0.620                 Time Shift(hrs): 0.00
        Curve Number: 98.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
      Name: 1329                     Node: 1329                   Status: Onsite
     Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 1.910                 Time Shift(hrs): 0.00
        Curve Number: 80.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
      Name: 1337                     Node: 1337                   Status: Onsite
     Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 3.910                 Time Shift(hrs): 0.00
        Curve Number: 80.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
      Name: 1347A                    Node: 1347A                  Status: Onsite
     Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 2.400                 Time Shift(hrs): 0.00
        Curve Number: 80.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

```
--------------------------------------------------------------------------------------------------------
       Name: 1357                     Node: 1357                  Status: Onsite
      Group: BASE                     Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                     Peaking Factor: 256.0
        Rainfall File: Flmod                Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                  Time of Conc(min): 10.00
             Area(ac): 1.600                     Time Shift(hrs): 0.00
         Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1360                     Node: 1360                  Status: Onsite
      Group: BASE                     Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                     Peaking Factor: 256.0
        Rainfall File: Flmod                Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                  Time of Conc(min): 10.00
             Area(ac): 2.160                     Time Shift(hrs): 0.00
         Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1368                     Node: 1368                  Status: Onsite
      Group: BASE                     Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                     Peaking Factor: 256.0
        Rainfall File: Flmod                Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                  Time of Conc(min): 10.00
             Area(ac): 1.200                     Time Shift(hrs): 0.00
         Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1372                     Node: 1372                  Status: Onsite
      Group: BASE                     Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                     Peaking Factor: 256.0
        Rainfall File: Flmod                Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                  Time of Conc(min): 10.00
             Area(ac): 2.430                     Time Shift(hrs): 0.00
         Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1382                     Node: 1382                  Status: Onsite
      Group: BASE                     Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                     Peaking Factor: 256.0
        Rainfall File: Flmod                Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                  Time of Conc(min): 10.00
             Area(ac): 2.900                     Time Shift(hrs): 0.00
         Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

    Name: 1000              Base Flow(cfs): 0.000          Init Stage(ft): 1.100
   Group: BASE                                             Warn Stage(ft): 4.600
    Type: Time/Stage


    Time(hrs)       Stage(ft)
--------------- ---------------
         0.00           1.100
        12.00           1.100
        24.00           1.100

------------------------------------------------------------------------------------------
    Name: 1010              Base Flow(cfs): 0.000          Init Stage(ft): 1.100
```

```
     Group: BASE                                           Warn Stage(ft): 3.800
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------

-------------------------------------------------------------------------------------------
      Name: 1020             Base Flow(cfs): 0.000         Init Stage(ft): 1.100
     Group: BASE                                           Warn Stage(ft): 3.600
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------

-------------------------------------------------------------------------------------------
      Name: 1030             Base Flow(cfs): 0.000         Init Stage(ft): 1.100
     Group: BASE                                           Warn Stage(ft): 3.700
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------

-------------------------------------------------------------------------------------------
      Name: 1040             Base Flow(cfs): 0.000         Init Stage(ft): 1.100
     Group: BASE                                           Warn Stage(ft): 3.600
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------

-------------------------------------------------------------------------------------------
      Name: 1050             Base Flow(cfs): 0.000         Init Stage(ft): 1.100
     Group: BASE                                           Warn Stage(ft): 4.900
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------

-------------------------------------------------------------------------------------------
      Name: 1060             Base Flow(cfs): 0.000         Init Stage(ft): 1.100
     Group: BASE                                           Warn Stage(ft): 4.600
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------

-------------------------------------------------------------------------------------------
      Name: 1070             Base Flow(cfs): 0.000         Init Stage(ft): 1.100
     Group: BASE                                           Warn Stage(ft): 4.630
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          0.100          0.0008
          4.630          0.0008

-------------------------------------------------------------------------------------------
      Name: 1072             Base Flow(cfs): 0.000         Init Stage(ft): 1.100
     Group: BASE                                           Warn Stage(ft): 4.630
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         -1.770          0.0017
          4.630          0.0017

-------------------------------------------------------------------------------------------
      Name: 1080             Base Flow(cfs): 0.000         Init Stage(ft): 1.100
     Group: BASE                                           Warn Stage(ft): 4.300
```

Type: Stage/Area

Stage(ft)	Area(ac)
-0.090	0.0003
4.300	0.0003

Name: 1090 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.560
Type: Stage/Area

Stage(ft)	Area(ac)
-0.640	0.0006
4.560	0.0006

Name: 1100 Base Flow(cfs): 0.000 Init Stage(ft): 3.000
Group: BASE Warn Stage(ft): 6.500
Type: Stage/Area

Stage(ft)	Area(ac)
3.000	0.1300
4.000	0.3200
6.500	0.4400

Name: 1110 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.620
Type: Stage/Area

Stage(ft)	Area(ac)
-0.880	0.0006
4.620	0.0006

Name: 1112 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.830
Type: Stage/Area

Stage(ft)	Area(ac)
0.930	0.0006
4.830	0.0006

Name: 1114 Base Flow(cfs): 0.000 Init Stage(ft): 2.130
Group: BASE Warn Stage(ft): 5.180
Type: Stage/Area

Stage(ft)	Area(ac)
2.130	0.0003
5.180	0.0003

Name: 1116 Base Flow(cfs): 0.000 Init Stage(ft): 2.290
Group: BASE Warn Stage(ft): 5.040
Type: Stage/Area

Stage(ft)	Area(ac)
2.290	0.0003
5.040	0.0003

Name: 1118 Base Flow(cfs): 0.000 Init Stage(ft): 3.000
Group: BASE Warn Stage(ft): 6.000

Type: Stage/Area

Stage(ft)	Area(ac)
3.000	0.6600
6.000	0.9000

Name: 1120 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.260
Type: Stage/Area

Stage(ft)	Area(ac)
-0.940	0.0003
4.260	0.0003

Name: 1130 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.360
Type: Stage/Area

Stage(ft)	Area(ac)
-0.940	0.0006
4.360	0.0006

Name: 1132 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.120
Type: Stage/Area

Stage(ft)	Area(ac)
-0.380	0.0003
4.120	0.0003

Name: 1134 Base Flow(cfs): 0.000 Init Stage(ft): 3.000
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
3.000	0.2130
6.000	0.3670

Name: 1140 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.200
Type: Stage/Area

Stage(ft)	Area(ac)
-1.000	0.0006
4.200	0.0006

Name: 1142 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.720
Type: Stage/Area

Stage(ft)	Area(ac)
0.170	0.0003
3.720	0.0003

Name: 1144 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.940
Type: Stage/Area

Stage(ft)	Area(ac)
0.040	0.0003
3.940	0.0003

Name: 1146 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.700
Type: Stage/Area

Stage(ft)	Area(ac)
4.460	0.0000
5.450	0.4567
5.600	0.9133
5.700	1.3700

Name: 1150 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.490
Type: Stage/Area

Stage(ft)	Area(ac)
-0.960	0.0006
4.490	0.0006

Name: 1151 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
4.160	0.0000
5.200	0.4300
5.500	0.8600
6.000	1.2900

Name: 1160 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.860
Type: Stage/Area

Stage(ft)	Area(ac)
-0.490	0.0006
4.860	0.0006

Name: 1161 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
4.490	0.0000
5.200	0.4600
5.500	0.9200
6.000	1.3800

Name: 1170 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.150
Type: Stage/Area

Stage(ft)	Area(ac)
-1.550	0.0006
5.150	0.0006

Name: 1180 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.920
Type: Stage/Area

Stage(ft)	Area(ac)
-0.780	0.0006
4.920	0.0006

Name: 1182 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.600
Type: Stage/Area

Stage(ft)	Area(ac)
-0.200	0.0003
4.600	0.0003

Name: 1184 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.620
Type: Stage/Area

Stage(ft)	Area(ac)
-0.430	0.0003
4.620	0.0003

Name: 1186 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.840
Type: Stage/Area

Stage(ft)	Area(ac)
4.810	0.0000
5.320	0.5825
5.490	1.1650
5.500	1.7475
5.840	2.3300

Name: 1188 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.600
Type: Stage/Area

Stage(ft)	Area(ac)
4.400	0.0000
5.600	0.6200

Name: 1325 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.180
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
5.180	0.0006

Name: 1327 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.560
Type: Stage/Area

Stage(ft)	Area(ac)

-0.500	0.0006
5.560	0.0006

Name: 1329 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.690
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
5.690	0.0006

Name: 1334 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.220
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
5.220	0.0006

Name: 1335A Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.680
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
4.680	0.0006

Name: 1337 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.220
Type: Stage/Area

Stage(ft)	Area(ac)
-0.470	0.0006
5.220	0.0006

Name: 1338 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.320
Type: Stage/Area

Stage(ft)	Area(ac)
-0.480	0.0006
5.320	0.0006

Name: 1339 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.200
Type: Stage/Area

Stage(ft)	Area(ac)
-0.520	0.0006
5.200	0.0006

Name: 1340 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.430
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006

4.430	0.0006

Name: 1342 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.750
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
4.750	0.0006

Name: 1343 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.820
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
4.820	0.0006

Name: 1344 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.410
Type: Stage/Area

Stage(ft)	Area(ac)
-0.520	0.0006
4.410	0.0006

Name: 1345 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.730
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.730	0.0006

Name: 1347 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.880
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.880	0.0006

Name: 1347A Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.750
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.750	0.0006

Name: 1348 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.570
Type: Stage/Area

Stage(ft)	Area(ac)
-0.490	0.0006
3.570	0.0006

Name: 1350 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.700
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.700	0.0006

Name: 1353 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.780
Type: Stage/Area

Stage(ft)	Area(ac)
-0.480	0.0006
3.780	0.0006

Name: 1354 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.850
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.850	0.0006

Name: 1355 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.960
Type: Stage/Area

Stage(ft)	Area(ac)
-0.540	0.0006
3.960	0.0006

Name: 1356 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.720
Type: Stage/Area

Stage(ft)	Area(ac)
-0.520	0.0006
3.720	0.0006

Name: 1357 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.880
Type: Stage/Area

Stage(ft)	Area(ac)
-0.520	0.0006
3.880	0.0006

Name: 1359 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.760
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.760	0.0006

```
Name: 1360                 Base Flow(cfs): 0.000        Init Stage(ft): 1.100
Group: BASE                                             Warn Stage(ft): 3.400
Type: Stage/Area
```

Stage(ft)	Area(ac)
-0.510	0.0006
3.400	0.0006

```
Name: 1362                 Base Flow(cfs): 0.000        Init Stage(ft): 1.100
Group: BASE                                             Warn Stage(ft): 3.220
Type: Stage/Area
```

Stage(ft)	Area(ac)
1.000	0.0005
3.220	0.0006

```
Name: 1364B                Base Flow(cfs): 0.000        Init Stage(ft): 1.100
Group: BASE                                             Warn Stage(ft): 4.000
Type: Time/Stage
```

Time(hrs)	Stage(ft)
0.00	1.100
12.00	1.100
24.00	1.100

```
Name: 1364C                Base Flow(cfs): 0.000        Init Stage(ft): 1.100
Group: BASE                                             Warn Stage(ft): 3.750
Type: Stage/Area
```

Stage(ft)	Area(ac)
-1.640	0.0005
3.750	0.0006

```
Name: 1366                 Base Flow(cfs): 0.000        Init Stage(ft): 1.100
Group: BASE                                             Warn Stage(ft): 3.730
Type: Stage/Area
```

Stage(ft)	Area(ac)
-0.500	0.0006
3.730	0.0006

```
Name: 1367                 Base Flow(cfs): 0.000        Init Stage(ft): 1.100
Group: BASE                                             Warn Stage(ft): 3.680
Type: Stage/Area
```

Stage(ft)	Area(ac)
-0.480	0.0006
3.680	0.0006

```
Name: 1368                 Base Flow(cfs): 0.000        Init Stage(ft): 1.100
Group: BASE                                             Warn Stage(ft): 3.680
Type: Stage/Area
```

Stage(ft)	Area(ac)
-0.470	0.0006
3.680	0.0006

Name: 1370 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.700
Type: Stage/Area

Stage(ft)	Area(ac)
-0.470	0.0006
3.500	0.0006

Name: 1371 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.720
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.720	0.0006

Name: 1372 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.380
Type: Stage/Area

Stage(ft)	Area(ac)
-0.480	0.0006
3.380	0.0006

Name: 1373 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.290
Type: Stage/Area

Stage(ft)	Area(ac)
0.200	0.0006
3.290	0.0006

Name: 1376 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.780
Type: Stage/Area

Stage(ft)	Area(ac)
-0.850	0.0005
3.780	0.0005

Name: 13766 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.000
Type: Stage/Area

Stage(ft)	Area(ac)
0.830	0.0005
4.000	0.0005

Name: 13767 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.000
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	1.100
12.00	1.100
24.00	1.100

Name: 1379 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.520
Type: Stage/Area

Stage(ft)	Area(ac)
0.230	0.0006
3.520	0.0006

Name: 1380 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.600
Type: Stage/Area

Stage(ft)	Area(ac)
0.240	0.0006
3.600	0.0006

Name: 1381 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.580
Type: Stage/Area

Stage(ft)	Area(ac)
0.290	0.0006
3.580	0.0006

Name: 1382 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.610
Type: Stage/Area

Stage(ft)	Area(ac)
0.330	0.0006
3.610	0.0006

==== Cross Sections ====

Name: 1000 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	4.600	0.045000
200.000	4.600	0.045000
211.760	2.800	0.045000
216.750	1.250	0.045000
221.740	2.200	0.045000
227.610	5.200	0.045000
327.610	5.200	0.045000

Name: 1010 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	3.800	0.045000
200.000	3.800	0.045000
205.250	2.700	0.045000
210.500	2.030	0.045000
215.750	2.600	0.045000
221.180	5.200	0.045000
321.180	5.200	0.045000

Name: 1020 Group: BASE

Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	3.600	0.045000
200.000	3.600	0.045000
202.350	2.800	0.045000
207.940	2.320	0.045000
213.520	3.000	0.045000
217.010	4.300	0.045000
317.010	4.300	0.045000

Name: 1030 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	3.700	0.045000
200.000	3.700	0.045000
202.670	2.900	0.045000
209.130	1.780	0.045000
215.580	3.100	0.045000
220.540	4.700	0.045000
320.540	4.700	0.045000

Name: 1040 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	3.600	0.045000
200.000	3.600	0.045000
205.090	2.900	0.045000
219.560	2.900	0.045000
222.940	3.900	0.045000
322.940	3.900	0.045000

Name: 1050 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	5.000	0.045000
200.000	5.000	0.045000
205.620	2.700	0.045000
209.370	2.900	0.045000
213.120	4.900	0.045000
313.120	4.900	0.045000

Name: 1060 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	5.100	0.045000
200.000	5.100	0.045000
205.800	3.200	0.045000
220.310	3.600	0.045000
225.060	6.900	0.045000
325.060	6.900	0.045000

Name: 1080W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	4.800	0.000000
0.100	4.300	0.000000

29.900	4.300	0.000000
30.000	4.800	0.000000

Name: 1114W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.680	0.000000
0.100	5.180	0.000000
15.900	5.700	0.000000
16.000	6.200	0.000000

Name: 1116W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.540	0.000000
0.100	5.040	0.000000
15.900	5.750	0.000000
16.000	6.250	0.000000

Name: 1144W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.160	0.000000
0.100	4.660	0.000000
43.900	4.660	0.000000
44.000	5.160	0.000000

Name: 1184W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.380	0.000000
0.100	4.880	0.000000
22.000	5.420	0.000000
43.900	4.880	0.000000
44.000	5.380	0.000000

Name: 1329W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.970	0.000000
1.000	5.720	0.000000
6.000	5.620	0.000000
8.000	5.220	0.000000
30.000	5.900	0.000000
52.000	5.240	0.000000
54.000	5.620	0.000000
59.000	5.720	0.000000
60.000	5.970	0.000000

Name: 1337W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.380	0.000000
1.000	5.130	0.000000
5.000	5.050	0.000000

7.000	4.670	0.000000
29.000	4.330	0.000000
51.000	4.670	0.000000
53.000	5.050	0.000000
58.000	5.150	0.000000
60.000	5.010	0.000000

Name: 1347AW Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	3.850	0.000000
1.000	3.700	0.000000
5.000	3.620	0.000000
7.000	3.240	0.000000
29.000	3.900	0.000000
51.000	3.240	0.000000
53.000	3.620	0.000000
58.000	3.720	0.000000
60.000	4.220	0.000000

Name: 1357W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	4.230	0.000000
1.000	3.980	0.000000
5.000	3.900	0.000000
11.000	3.900	0.000000
13.000	3.520	0.000000
29.000	4.000	0.000000
45.000	3.520	0.000000
47.000	3.900	0.000000
52.000	4.000	0.000000
60.000	6.000	0.000000

Name: 1360W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	3.800	0.000000
1.000	3.550	0.000000
5.000	3.470	0.000000
7.000	3.090	0.000000
29.000	3.750	0.000000
51.000	3.090	0.000000
53.000	3.470	0.000000
58.000	3.570	0.000000
60.000	4.070	0.000000

Name: 1368W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	4.220	0.000000
1.000	3.970	0.000000
11.000	3.770	0.000000
13.000	3.400	0.000000
29.000	3.900	0.000000
45.000	3.400	0.000000
47.000	3.770	0.000000
59.000	4.010	0.000000
60.000	4.260	0.000000

Name: 1372W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	4.150	0.000000
1.000	3.900	0.000000
11.000	3.700	0.000000
13.000	3.320	0.000000
29.000	3.800	0.000000
45.000	3.320	0.000000
47.000	3.700	0.000000
59.000	3.940	0.000000
60.000	4.190	0.000000

Name: 1382W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	4.150	0.000000
1.000	3.900	0.000000
11.000	3.700	0.000000
13.000	3.320	0.000000
29.000	3.800	0.000000
45.000	3.320	0.000000
47.000	3.700	0.000000
59.000	3.940	0.000000
60.000	4.190	0.000000

==== Operating Tables ====

Name: 1072PUMP Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

US Stage(ft)	Discharge(cfs)
1.600	10.00
4.630	10.00

==== Pipes ====

Name: 1050 From Node: 1050 Length(ft): 80.00
Group: BASE To Node: 1040 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 1.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	30.00	30.00
Rise(in):	30.00	30.00
Invert(ft):	2.270	2.200
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: 1080 From Node: 1080 Length(ft): 20.00
Group: BASE To Node: 1072 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.00
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	36.00	36.00
Rise(in):	36.00	36.00
Invert(ft):	-0.090	-1.170
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
---------------------------------------------------------------------------------------------------
        Name: 1090               From Node: 1090               Length(ft): 8.00
       Group: BASE                 To Node: 1080                    Count: 1
                                                        Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular       Circular                                Flow: Both
    Span(in): 36.00          36.00                     Entrance Loss Coef: 0.50
    Rise(in): 36.00          36.00                         Exit Loss Coef: 0.00
  Invert(ft): -0.740         -0.090                        Bend Loss Coef: 0.00
 Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                      Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
---------------------------------------------------------------------------------------------------
        Name: 1110               From Node: 1110               Length(ft): 30.00
       Group: BASE                 To Node: 1090                    Count: 1
                                                        Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular       Circular                                Flow: Both
    Span(in): 36.00          36.00                     Entrance Loss Coef: 0.50
    Rise(in): 36.00          36.00                         Exit Loss Coef: 0.00
  Invert(ft): -0.880         -0.790                        Bend Loss Coef: 0.00
 Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                      Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
---------------------------------------------------------------------------------------------------
        Name: 1112               From Node: 1112               Length(ft): 184.00
       Group: BASE                 To Node: 1110                    Count: 1
                                                        Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular       Circular                                Flow: Both
    Span(in): 18.00          18.00                     Entrance Loss Coef: 0.50
    Rise(in): 18.00          18.00                         Exit Loss Coef: 0.00
  Invert(ft): 0.930          -0.880                        Bend Loss Coef: 0.00
 Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                      Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
---------------------------------------------------------------------------------------------------
        Name: 1114               From Node: 1114               Length(ft): 200.00
       Group: BASE                 To Node: 1112                    Count: 1
                                                        Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular       Circular                                Flow: Both
```

```
      Span(in): 18.00           18.00                        Entrance Loss Coef: 0.50
      Rise(in): 18.00           18.00                            Exit Loss Coef: 0.00
    Invert(ft): 2.130           1.830                            Bend Loss Coef: 0.00
   Manning's N: 0.013000        0.013000                      Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000            0.000                          Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000            0.000                        Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
          Name: 1116                From Node: 1116                  Length(ft): 44.00
         Group: BASE                  To Node: 1114                       Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular        Circular                               Flow: Both
      Span(in): 18.00           18.00                        Entrance Loss Coef: 0.50
      Rise(in): 18.00           18.00                            Exit Loss Coef: 0.00
    Invert(ft): 2.290           2.450                            Bend Loss Coef: 0.00
   Manning's N: 0.013000        0.013000                      Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000            0.000                          Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000            0.000                        Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
          Name: 1120                From Node: 1120                  Length(ft): 8.00
         Group: BASE                  To Node: 1110                       Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular        Circular                               Flow: Both
      Span(in): 36.00           36.00                        Entrance Loss Coef: 0.50
      Rise(in): 36.00           36.00                            Exit Loss Coef: 0.00
    Invert(ft): -0.940          -0.580                           Bend Loss Coef: 0.00
   Manning's N: 0.013000        0.013000                      Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000            0.000                          Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000            0.000                        Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
          Name: 1130                From Node: 1130                  Length(ft): 300.00
         Group: BASE                  To Node: 1110                       Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular        Circular                               Flow: Both
      Span(in): 36.00           36.00                        Entrance Loss Coef: 0.50
      Rise(in): 36.00           36.00                            Exit Loss Coef: 0.00
    Invert(ft): -0.940          -0.880                           Bend Loss Coef: 0.00
   Manning's N: 0.013000        0.013000                      Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000            0.000                          Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000            0.000                        Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

	UPSTREAM	DOWNSTREAM		
Name:	1132	From Node: 1132	Length(ft):	37.00
Group:	BASE	To Node: 1130	Count:	1
			Friction Equation:	Average Conveyance
	UPSTREAM	DOWNSTREAM	Solution Algorithm:	Automatic
Geometry:	Circular	Circular	Flow:	Both
Span(in):	15.00	15.00	Entrance Loss Coef:	0.50
Rise(in):	15.00	15.00	Exit Loss Coef:	0.00
Invert(ft):	0.000	0.000	Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

	UPSTREAM	DOWNSTREAM		
Name:	1140	From Node: 1140	Length(ft):	120.00
Group:	BASE	To Node: 1130	Count:	1
			Friction Equation:	Average Conveyance
	UPSTREAM	DOWNSTREAM	Solution Algorithm:	Automatic
Geometry:	Circular	Circular	Flow:	Both
Span(in):	36.00	36.00	Entrance Loss Coef:	0.50
Rise(in):	36.00	36.00	Exit Loss Coef:	0.00
Invert(ft):	-1.000	-0.890	Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

	UPSTREAM	DOWNSTREAM		
Name:	1142	From Node: 1142	Length(ft):	8.00
Group:	BASE	To Node: 1140	Count:	1
			Friction Equation:	Average Conveyance
	UPSTREAM	DOWNSTREAM	Solution Algorithm:	Automatic
Geometry:	Circular	Circular	Flow:	Both
Span(in):	15.00	15.00	Entrance Loss Coef:	0.50
Rise(in):	15.00	15.00	Exit Loss Coef:	0.00
Invert(ft):	0.170	0.200	Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

	UPSTREAM	DOWNSTREAM		
Name:	1144	From Node: 1144	Length(ft):	37.00
Group:	BASE	To Node: 1140	Count:	1
			Friction Equation:	Average Conveyance
	UPSTREAM	DOWNSTREAM	Solution Algorithm:	Automatic
Geometry:	Circular	Circular	Flow:	Both
Span(in):	15.00	15.00	Entrance Loss Coef:	0.50
Rise(in):	15.00	15.00	Exit Loss Coef:	0.00
Invert(ft):	0.000	0.000	Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


------------------------------------------------------------------------------------------------
          Name: 1146              From Node: 1146              Length(ft): 56.00
         Group: BASE                To Node: 1144                   Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular      Circular                               Flow: Both
      Span(in): 15.00         15.00                    Entrance Loss Coef: 0.00
      Rise(in): 15.00         15.00                        Exit Loss Coef: 0.00
    Invert(ft): 0.340         0.340                        Bend Loss Coef: 0.00
   Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000         0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


------------------------------------------------------------------------------------------------
          Name: 1150              From Node: 1150              Length(ft): 196.00
         Group: BASE                To Node: 1140                   Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular      Circular                               Flow: Both
      Span(in): 36.00         36.00                    Entrance Loss Coef: 0.50
      Rise(in): 36.00         36.00                        Exit Loss Coef: 0.00
    Invert(ft): -0.960        -0.800                       Bend Loss Coef: 0.00
   Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000         0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


------------------------------------------------------------------------------------------------
          Name: 1151              From Node: 1151              Length(ft): 70.00
         Group: BASE                To Node: 1150                   Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular      Circular                               Flow: Both
      Span(in): 15.00         15.00                    Entrance Loss Coef: 0.00
      Rise(in): 15.00         15.00                        Exit Loss Coef: 0.00
    Invert(ft): -0.510        -0.510                       Bend Loss Coef: 0.00
   Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000         0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


------------------------------------------------------------------------------------------------
          Name: 1160              From Node: 1160              Length(ft): 204.00
         Group: BASE                To Node: 1150                   Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular      Circular                               Flow: Both
      Span(in): 36.00         36.00                    Entrance Loss Coef: 0.50
      Rise(in): 36.00         36.00                        Exit Loss Coef: 0.00
```

```
    Invert(ft): -0.390          -0.860                      Bend Loss Coef: 0.00
   Manning's N: 0.013000        0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000           0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------
          Name: 1161              From Node: 1161                 Length(ft): 70.00
         Group: BASE                To Node: 1160                      Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular        Circular                               Flow: Both
      Span(in): 15.00           15.00                    Entrance Loss Coef: 0.00
      Rise(in): 15.00           15.00                        Exit Loss Coef: 0.00
    Invert(ft): 0.010           0.010                        Bend Loss Coef: 0.00
   Manning's N: 0.013000        0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000           0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------
          Name: 1170              From Node: 1170                 Length(ft): 50.00
         Group: BASE                To Node: 1160                      Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular        Circular                               Flow: Both
      Span(in): 36.00           36.00                    Entrance Loss Coef: 0.50
      Rise(in): 36.00           36.00                        Exit Loss Coef: 0.00
    Invert(ft): -1.550          -0.490                       Bend Loss Coef: 0.00
   Manning's N: 0.013000        0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000           0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------
          Name: 1180              From Node: 1180                 Length(ft): 250.00
         Group: BASE                To Node: 1170                      Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
      Geometry: Circular        Circular                               Flow: Both
      Span(in): 36.00           36.00                    Entrance Loss Coef: 0.50
      Rise(in): 36.00           36.00                        Exit Loss Coef: 0.00
    Invert(ft): -0.680          -0.450                       Bend Loss Coef: 0.00
   Manning's N: 0.013000        0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000           0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------
```

```
        Name: 1182              From Node: 1182            Length(ft): 8.00
       Group: BASE                To Node: 1180                 Count: 1
                                                    Friction Equation: Average Conveyance
             UPSTREAM       DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular      Circular                             Flow: Both
    Span(in): 15.00         15.00                  Entrance Loss Coef: 0.50
    Rise(in): 15.00         15.00                      Exit Loss Coef: 0.00
  Invert(ft): -0.200        -0.530                     Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                  Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------
        Name: 1184              From Node: 1184            Length(ft): 37.00
       Group: BASE                To Node: 1180                 Count: 1
                                                    Friction Equation: Average Conveyance
             UPSTREAM       DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular      Circular                             Flow: Both
    Span(in): 15.00         15.00                  Entrance Loss Coef: 0.50
    Rise(in): 15.00         15.00                      Exit Loss Coef: 0.00
  Invert(ft): -0.430        -0.480                     Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                  Stabilizer Option: None


Upstream FHWA Inlet Edge Desoription:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------
        Name: 1186              From Node: 1186            Length(ft): 65.00
       Group: BASE                To Node: 1327                 Count: 1
                                                    Friction Equation: Average Conveyance
             UPSTREAM       DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular      Circular                             Flow: Both
    Span(in): 15.00         15.00                  Entrance Loss Coef: 0.00
    Rise(in): 15.00         15.00                      Exit Loss Coef: 0.00
  Invert(ft): 0.250         0.250                      Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                  Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------
        Name: 1188              From Node: 1188            Length(ft): 65.00
       Group: BASE                To Node: 1329                 Count: 1
                                                    Friction Equation: Average Conveyance
             UPSTREAM       DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular      Circular                             Flow: Both
    Span(in): 15.00         15.00                  Entrance Loss Coef: 0.00
    Rise(in): 15.00         15.00                      Exit Loss Coef: 0.00
  Invert(ft): 0.200         0.200                      Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                  Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
        Name: 1325                 From Node: 1325               Length(ft): 180.00
       Group: BASE                   To Node: 1180                    Count: 1
                                                         Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM                  Solution Algorithm: Automatic
    Geometry: Circular      Circular                                  Flow: Both
    Span(in): 30.00         30.00                       Entrance Loss Coef: 0.00
    Rise(in): 30.00         30.00                           Exit Loss Coef: 0.00
  Invert(ft): -0.500        -0.680                          Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                          Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
        Name: 1327                 From Node: 1327               Length(ft): 140.00
       Group: BASE                   To Node: 1325                    Count: 1
                                                         Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM                  Solution Algorithm: Automatic
    Geometry: Circular      Circular                                  Flow: Both
    Span(in): 30.00         30.00                       Entrance Loss Coef: 0.00
    Rise(in): 30.00         30.00                           Exit Loss Coef: 0.00
  Invert(ft): -0.500        -0.500                          Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                          Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
        Name: 1329                 From Node: 1329               Length(ft): 110.00
       Group: BASE                   To Node: 1327                    Count: 1
                                                         Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM                  Solution Algorithm: Automatic
    Geometry: Circular      Circular                                  Flow: Both
    Span(in): 30.00         30.00                       Entrance Loss Coef: 0.00
    Rise(in): 30.00         30.00                           Exit Loss Coef: 0.00
  Invert(ft): -0.500        -0.500                          Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                          Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
        Name: 1334                 From Node: 1334               Length(ft): 245.00
       Group: BASE                   To Node: 1329                    Count: 1
                                                         Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM                  Solution Algorithm: Automatic
    Geometry: Circular      Circular                                  Flow: Both
    Span(in): 30.00         30.00                       Entrance Loss Coef: 0.00
    Rise(in): 30.00         30.00                           Exit Loss Coef: 0.00
  Invert(ft): -0.500        -0.500                          Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
```

```
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
        Name: 1335A              From Node: 1335A               Length(ft): 125.00
       Group: BASE                 To Node: 1334                     Count: 1
                                                          Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM                 Solution Algorithm: Automatic
    Geometry: Circular        Circular                                 Flow: Both
    Span(in): 30.00           30.00                      Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                          Exit Loss Coef: 0.00
  Invert(ft): -0.500          -0.500                         Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
        Name: 1337               From Node: 1337                Length(ft): 220.00
       Group: BASE                 To Node: 1335A                    Count: 1
                                                          Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM                 Solution Algorithm: Automatic
    Geometry: Circular        Circular                                 Flow: Both
    Span(in): 30.00           30.00                      Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                          Exit Loss Coef: 0.00
  Invert(ft): -0.480          -0.500                         Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
        Name: 1338               From Node: 1338                Length(ft): 48.00
       Group: BASE                 To Node: 1337                     Count: 1
                                                          Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM                 Solution Algorithm: Automatic
    Geometry: Circular        Circular                                 Flow: Both
    Span(in): 30.00           30.00                      Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                          Exit Loss Coef: 0.00
  Invert(ft): -0.480          -0.480                         Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
        Name: 1339               From Node: 1339                Length(ft): 153.00
       Group: BASE                 To Node: 1338                     Count: 1
```

```
                                                    Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
   Geometry: Circular       Circular                             Flow: Both
   Span(in): 30.00          30.00                  Entrance Loss Coef: 0.00
   Rise(in): 30.00          30.00                      Exit Loss Coef: 0.00
 Invert(ft): -0.520         -0.480                     Bend Loss Coef: 0.00
Manning's N: 0.013000       0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
--------------------------------------------------------------------------------
       Name: 1340            From Node: 1340              Length(ft): 67.00
      Group: BASE              To Node: 1339                   Count: 1
                                                    Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
   Geometry: Circular       Circular                             Flow: Both
   Span(in): 30.00          30.00                  Entrance Loss Coef: 0.00
   Rise(in): 30.00          30.00                      Exit Loss Coef: 0.00
 Invert(ft): -0.500         -0.520                     Bend Loss Coef: 0.00
Manning's N: 0.013000       0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
--------------------------------------------------------------------------------
       Name: 1342            From Node: 1342              Length(ft): 76.00
      Group: BASE              To Node: 1340                   Count: 1
                                                    Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
   Geometry: Circular       Circular                             Flow: Both
   Span(in): 24.00          24.00                  Entrance Loss Coef: 0.00
   Rise(in): 24.00          24.00                      Exit Loss Coef: 0.00
 Invert(ft): -0.500         -0.500                     Bend Loss Coef: 0.00
Manning's N: 0.013000       0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
--------------------------------------------------------------------------------
       Name: 1343            From Node: 1343              Length(ft): 95.00
      Group: BASE              To Node: 1342                   Count: 1
                                                    Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
   Geometry: Circular       Circular                             Flow: Both
   Span(in): 24.00          24.00                  Entrance Loss Coef: 0.00
   Rise(in): 24.00          24.00                      Exit Loss Coef: 0.00
 Invert(ft): -0.500         -0.500                     Bend Loss Coef: 0.00
Manning's N: 0.013000       0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:

Circular Concrete: Square edge w/ headwall

```
--------------------------------------------------------------------------------------------------
         Name: 1344                From Node: 1344             Length(ft): 97.00
        Group: BASE                  To Node: 1343                  Count: 1
                                                       Friction Equation: Average Conveyance
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular      Circular                               Flow: Both
     Span(in): 24.00         24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00         24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.520        -0.500                       Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
--------------------------------------------------------------------------------------------------
         Name: 1345                From Node: 1345             Length(ft): 200.00
        Group: BASE                  To Node: 1344                  Count: 1
                                                       Friction Equation: Average Conveyance
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular      Circular                               Flow: Both
     Span(in): 24.00         24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00         24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.500        -0.520                       Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
--------------------------------------------------------------------------------------------------
         Name: 1347                From Node: 1347             Length(ft): 51.00
        Group: BASE                  To Node: 1345                  Count: 1
                                                       Friction Equation: Average Conveyance
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular      Circular                               Flow: Both
     Span(in): 24.00         24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00         24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.500        -0.500                       Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
--------------------------------------------------------------------------------------------------
         Name: 1347A               From Node: 1347A            Length(ft): 200.00
        Group: BASE                  To Node: 1347                  Count: 1
                                                       Friction Equation: Average Conveyance
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular      Circular                               Flow: Both
     Span(in): 24.00         24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00         24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.500        -0.500                       Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                     Stabilizer Option: None
```

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

----------------------------------------------------------------------------------------------------
         Name: 1348              From Node: 1348                 Length(ft): 50.00
        Group: BASE                To Node: 1347A                     Count: 1
                                                         Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 24.00          24.00                     Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.490         -0.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

----------------------------------------------------------------------------------------------------
         Name: 1350              From Node: 1350                 Length(ft): 40.00
        Group: BASE                To Node: 1348                      Count: 1
                                                         Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 24.00          24.00                     Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.500         -0.490                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

----------------------------------------------------------------------------------------------------
         Name: 1353              From Node: 1353                 Length(ft): 47.00
        Group: BASE                To Node: 1350                      Count: 1
                                                         Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 24.00          24.00                     Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.480         -0.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

----------------------------------------------------------------------------------------------------
         Name: 1354              From Node: 1354                 Length(ft): 140.00
        Group: BASE                To Node: 1353                      Count: 1
                                                         Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM                Solution Algorithm: Automatic
```

```
     Geometry: Circular        Circular                           Flow: Both
     Span(in): 24.00           24.00                 Entrance Loss Coef: 0.00
     Rise(in): 24.00           24.00                     Exit Loss Coef: 0.00
   Invert(ft): -0.500          -0.480                    Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                    Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                  Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
         Name: 1355                From Node: 1355               Length(ft): 94.00
        Group: BASE                  To Node: 1354                    Count: 1
                                                       Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Circular        Circular                             Flow: Both
     Span(in): 24.00           24.00                  Entrance Loss Coef: 0.00
     Rise(in): 24.00           24.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.540          -0.500                     Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
         Name: 1356                From Node: 1356               Length(ft): 110.00
        Group: BASE                  To Node: 1355                    Count: 1
                                                       Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Circular        Circular                             Flow: Both
     Span(in): 24.00           24.00                  Entrance Loss Coef: 0.00
     Rise(in): 24.00           24.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.520          -0.540                     Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
         Name: 1357                From Node: 1357               Length(ft): 44.00
        Group: BASE                  To Node: 1356                    Count: 1
                                                       Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Circular        Circular                             Flow: Both
     Span(in): 24.00           24.00                  Entrance Loss Coef: 0.00
     Rise(in): 24.00           24.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.520          -0.520                     Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
----------------------------------------------------------------------------------------------------
        Name: 1359              From Node: 1359              Length(ft): 157.00
       Group: BASE                To Node: 1357                   Count: 1
                                                       Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
    Geometry: Circular        Circular                              Flow: Both
    Span(in): 24.00           24.00                   Entrance Loss Coef: 0.00
    Rise(in): 24.00           24.00                       Exit Loss Coef: 0.00
 Invert(ft): -0.500          -0.520                      Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
        Name: 1360              From Node: 1360              Length(ft): 168.00
       Group: BASE                To Node: 1359                   Count: 1
                                                       Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
    Geometry: Circular        Circular                              Flow: Both
    Span(in): 24.00           24.00                   Entrance Loss Coef: 0.00
    Rise(in): 24.00           24.00                       Exit Loss Coef: 0.00
 Invert(ft): -0.510          -0.500                      Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
        Name: 1360OUT           From Node: 1360              Length(ft): 95.00
       Group: BASE                To Node: 1362                   Count: 1
                                                       Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
    Geometry: Horz Ellipse    Horz Ellipse                          Flow: Both
    Span(in): 18.00           18.00                   Entrance Loss Coef: 0.00
    Rise(in): 12.00           12.00                       Exit Loss Coef: 0.00
 Invert(ft): -0.510           1.000                      Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

```
----------------------------------------------------------------------------------------------------
        Name: 1362              From Node: 1362              Length(ft): 26.00
       Group: BASE                To Node: 1364C                  Count: 1
                                                       Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
    Geometry: Horz Ellipse    Horz Ellipse                          Flow: Both
    Span(in): 18.00           18.00                   Entrance Loss Coef: 0.00
    Rise(in): 12.00           12.00                       Exit Loss Coef: 0.00
 Invert(ft): 1.000            1.250                      Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

```
        Name: 1366             From Node: 1366            Length(ft): 185.00
       Group: BASE               To Node: 1360                 Count: 1
                                                   Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM            Solution Algorithm: Automatic
    Geometry: Circular      Circular                            Flow: Both
    Span(in): 24.00         24.00                 Entrance Loss Coef: 0.00
    Rise(in): 24.00         24.00                     Exit Loss Coef: 0.00
  Invert(ft): -0.500        -0.510                    Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                  Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1367             From Node: 1367            Length(ft): 39.00
       Group: BASE               To Node: 1366                 Count: 1
                                                   Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM            Solution Algorithm: Automatic
    Geometry: Circular      Circular                            Flow: Both
    Span(in): 24.00         24.00                 Entrance Loss Coef: 0.00
    Rise(in): 24.00         24.00                     Exit Loss Coef: 0.00
  Invert(ft): -0.480        -0.500                    Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                  Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1368             From Node: 1368            Length(ft): 151.00
       Group: BASE               To Node: 1367                 Count: 1
                                                   Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM            Solution Algorithm: Automatic
    Geometry: Circular      Circular                            Flow: Both
    Span(in): 24.00         24.00                 Entrance Loss Coef: 0.00
    Rise(in): 24.00         24.00                     Exit Loss Coef: 0.00
  Invert(ft): -0.470        -0.480                    Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                  Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1370             From Node: 1370            Length(ft): 50.00
       Group: BASE               To Node: 1368                 Count: 1
                                                   Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM            Solution Algorithm: Automatic
    Geometry: Circular      Circular                            Flow: Both
    Span(in): 24.00         24.00                 Entrance Loss Coef: 0.00
```

```
     Rise(in): 24.00            24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.470           -0.470                       Bend Loss Coef: 0.00
  Manning's N: 0.013000         0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000            0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000            0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
         Name: 1371              From Node: 1371                 Length(ft): 135.00
        Group: BASE                To Node: 1370                      Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM         DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular         Circular                               Flow: Both
     Span(in): 24.00            24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00            24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.500           -0.470                       Bend Loss Coef: 0.00
  Manning's N: 0.013000         0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000            0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000            0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
         Name: 1372              From Node: 1372                 Length(ft): 141.00
        Group: BASE                To Node: 1371                      Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM         DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular         Circular                               Flow: Both
     Span(in): 24.00            24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00            24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.480           -0.500                       Bend Loss Coef: 0.00
  Manning's N: 0.013000         0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000            0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000            0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
         Name: 1373              From Node: 1373                 Length(ft): 49.00
        Group: BASE                To Node: 1372                      Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM         DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular         Circular                               Flow: Both
     Span(in): 24.00            24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00            24.00                        Exit Loss Coef: 0.00
   Invert(ft): 0.200            -0.480                       Bend Loss Coef: 0.00
  Manning's N: 0.013000         0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000            0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000            0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
----------------------------------------------------------------------------------------------------
         Name: 1373OUT           From Node: 1373             Length(ft): 80.00
        Group: BASE                To Node: 1376                  Count: 1
                                                      Friction Equation: Average Conveyance
              UPSTREAM       DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Horz Ellipse  Horz Ellipse                          Flow: Both
     Span(in): 30.00         30.00                   Entrance Loss Coef: 0.20
     Rise(in): 19.00         19.00                       Exit Loss Coef: 0.20
   Invert(ft): 0.200         0.390                       Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

```
----------------------------------------------------------------------------------------------------
         Name: 13766             From Node: 13766            Length(ft): 100.00
        Group: BASE                To Node: 13767                 Count: 1
                                                      Friction Equation: Average Conveyance
              UPSTREAM       DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Horz Ellipse  Horz Ellipse                          Flow: Both
     Span(in): 18.00         18.00                   Entrance Loss Coef: 0.20
     Rise(in): 12.00         12.00                       Exit Loss Coef: 0.20
   Invert(ft): 0.830         0.830                       Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

```
----------------------------------------------------------------------------------------------------
         Name: 1379              From Node: 1379             Length(ft): 108.00
        Group: BASE                To Node: 1373                  Count: 1
                                                      Friction Equation: Average Conveyance
              UPSTREAM       DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Circular      Circular                              Flow: Both
     Span(in): 18.00         18.00                   Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                       Exit Loss Coef: 0.00
   Invert(ft): 0.230         0.200                       Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: 1380              From Node: 1380             Length(ft): 30.00
        Group: BASE                To Node: 1379                  Count: 1
                                                      Friction Equation: Average Conveyance
              UPSTREAM       DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Circular      Circular                              Flow: Both
     Span(in): 18.00         18.00                   Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                       Exit Loss Coef: 0.00
   Invert(ft): 0.240         0.230                       Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:

```
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


------------------------------------------------------------------------------------
        Name: 1381               From Node: 1381              Length(ft): 98.00
       Group: BASE                 To Node: 1380                   Count: 1
                                                        Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular       Circular                                Flow: Both
    Span(in): 18.00          18.00                     Entrance Loss Coef: 0.00
    Rise(in): 18.00          18.00                         Exit Loss Coef: 0.00
  Invert(ft): 0.290          0.240                         Bend Loss Coef: 0.00
 Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


------------------------------------------------------------------------------------
        Name: 1382               From Node: 1382              Length(ft): 63.00
       Group: BASE                 To Node: 1381                   Count: 1
                                                        Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular       Circular                                Flow: Both
    Span(in): 18.00          18.00                     Entrance Loss Coef: 0.00
    Rise(in): 18.00          18.00                         Exit Loss Coef: 0.00
  Invert(ft): 0.330          0.290                         Bend Loss Coef: 0.00
 Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


==========================================================================
==== Channels ============================================================
==========================================================================

         Name: 1010               From Node: 1010              Length(ft): 440.00
        Group: BASE                 To Node: 1000                   Count: 1

              UPSTREAM        DOWNSTREAM                 Friction Equation: Average Conveyance
     Geometry: Irregular      Irregular                 Solution Algorithm: Automatic
   Invert(ft): 2.030          1.250                                   Flow: Both
TClpInitZ(ft): 9999.000       9999.000                    Contraction Coef: 0.100
  Manning's N:                                              Expansion Coef: 0.300
 Top Clip(ft): 0.000          0.000                     Entrance Loss Coef: 0.000
 Bot Clip(ft): 0.000          0.000                         Exit Loss Coef: 0.000
    Main XSec: 1010           1000                        Outlet Ctrl Spec: Use dc or tw
 AuxElev1(ft): 0.000          0.000                        Inlet Ctrl Spec: Use dn
    Aux XSec1:                                           Stabilizer Option: None
 AuxElev2(ft): 0.000          0.000
    Aux XSec2:
Top Width(ft):
    Depth(ft):
Bot Width(ft):
 LtSdSlp(h/v):
 RtSdSlp(h/v):


------------------------------------------------------------------------------------
         Name: 1020               From Node: 1020              Length(ft): 155.00
        Group: BASE                 To Node: 1010                   Count: 1

              UPSTREAM        DOWNSTREAM                 Friction Equation: Average Conveyance
```

```
     Geometry: Irregular      Irregular              Solution Algorithm: Automatic
   Invert(ft): 2.320          2.030                                Flow: Both
TClpInitZ(ft): 9999.000       9999.000                 Contraction Coef: 0.100
  Manning's N:                                           Expansion Coef: 0.300
 Top Clip(ft): 0.000          0.000                  Entrance Loss Coef: 0.000
 Bot Clip(ft): 0.000          0.000                      Exit Loss Coef: 0.000
    Main XSec: 1020           1010                    Outlet Ctrl Spec: Use dc or tw
 AuxElev1(ft): 0.000          0.000                     Inlet Ctrl Spec: Use dn
    Aux XSec1:                                         Stabilizer Option: None
 AuxElev2(ft): 0.000          0.000
    Aux XSec2:
Top Width(ft):
    Depth(ft):
Bot Width(ft):
 LtSdSlp(h/v):
 RtSdSlp(h/v):

-------------------------------------------------------------------------------------------------
         Name: 1030                 From Node: 1030            Length(ft): 115.00
        Group: BASE                   To Node: 1020                 Count: 1

               UPSTREAM       DOWNSTREAM              Friction Equation: Average Conveyance
     Geometry: Irregular      Irregular              Solution Algorithm: Automatic
   Invert(ft): 1.780          2.320                                Flow: Both
TClpInitZ(ft): 9999.000       9999.000                 Contraction Coef: 0.100
  Manning's N:                                           Expansion Coef: 0.300
 Top Clip(ft): 0.000          0.000                  Entrance Loss Coef: 0.000
 Bot Clip(ft): 0.000          0.000                      Exit Loss Coef: 0.000
    Main XSec: 1030           1020                    Outlet Ctrl Spec: Use dc or tw
 AuxElev1(ft): 0.000          0.000                     Inlet Ctrl Spec: Use dn
    Aux XSec1:                                         Stabilizer Option: None
 AuxElev2(ft): 0.000          0.000
    Aux XSec2:
Top Width(ft):
    Depth(ft):
Bot Width(ft):
 LtSdSlp(h/v):
 RtSdSlp(h/v):

-------------------------------------------------------------------------------------------------
         Name: 1040                 From Node: 1040            Length(ft): 195.00
        Group: BASE                   To Node: 1030                 Count: 1

               UPSTREAM       DOWNSTREAM              Friction Equation: Average Conveyance
     Geometry: Irregular      Irregular              Solution Algorithm: Automatic
   Invert(ft): 2.900          1.780                                Flow: Both
TClpInitZ(ft): 9999.000       9999.000                 Contraction Coef: 0.100
  Manning's N:                                           Expansion Coef: 0.300
 Top Clip(ft): 0.000          0.000                  Entrance Loss Coef: 0.000
 Bot Clip(ft): 0.000          0.000                      Exit Loss Coef: 0.000
    Main XSec: 1040           1030                    Outlet Ctrl Spec: Use dc or tw
 AuxElev1(ft): 0.000          0.000                     Inlet Ctrl Spec: Use dn
    Aux XSec1:                                         Stabilizer Option: None
 AuxElev2(ft): 0.000          0.000
    Aux XSec2:
Top Width(ft):
    Depth(ft):
Bot Width(ft):
 LtSdSlp(h/v):
 RtSdSlp(h/v):

-------------------------------------------------------------------------------------------------
         Name: 1060                 From Node: 1060            Length(ft): 210.00
        Group: BASE                   To Node: 1050                 Count: 1

               UPSTREAM       DOWNSTREAM              Friction Equation: Average Conveyance
     Geometry: Irregular      Irregular              Solution Algorithm: Automatic
   Invert(ft): 0.000          2.140                                Flow: Both
TClpInitZ(ft): 9999.000       9999.000                 Contraction Coef: 0.100
  Manning's N:                                           Expansion Coef: 0.300
 Top Clip(ft): 0.000          0.000                  Entrance Loss Coef: 0.000
 Bot Clip(ft): 0.000          0.000                      Exit Loss Coef: 0.000
    Main XSec: 1060           1050                    Outlet Ctrl Spec: Use dc or tw
 AuxElev1(ft): 0.000          0.000                     Inlet Ctrl Spec: Use dn
    Aux XSec1:                                         Stabilizer Option: None
 AuxElev2(ft): 0.000          0.000
    Aux XSec2:
Top Width(ft):
    Depth(ft):
```

```
 Bot Width(ft):
  LtSdSlp(h/v):
  RtSdSlp(h/v):


==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

        Name: 1118              From Node: 1118              Length(ft): 50.00
       Group: BASE                To Node: 1112                   Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Average Conveyance
    Geometry: Circular       Circular                 Solution Algorithm: Automatic
    Span(in): 24.00          24.00                                  Flow: None
    Rise(in): 24.00          24.00                    Entrance Loss Coef: 0.000
  Invert(ft): 0.000          0.000                        Exit Loss Coef: 0.000
 Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure 1118 ***
                                                                              TABLE
                Count: 1                     Bottom Clip(in): 0.000
                 Type: Vertical: Mavis          Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular         Orifice Disc Coef: 0.600

             Span(in): 24.00                     Invert(ft): 0.000
             Rise(in): 18.00                Control Elev(ft): 0.000

------------------------------------------------------------------------------------------
        Name: 1134              From Node: 1134              Length(ft): 50.00
       Group: BASE                To Node: 1130                   Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Average Conveyance
    Geometry: Circular       Circular                 Solution Algorithm: Automatic
    Span(in): 24.00          24.00                                  Flow: None
    Rise(in): 24.00          24.00                    Entrance Loss Coef: 0.000
  Invert(ft): 0.000          0.000                        Exit Loss Coef: 0.000
 Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure 1134 ***
                                                                              TABLE
                Count: 1                     Bottom Clip(in): 0.000
                 Type: Vertical: Mavis          Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular         Orifice Disc Coef: 0.600

             Span(in): 24.00                     Invert(ft): 0.000
             Rise(in): 18.00                Control Elev(ft): 0.000

------------------------------------------------------------------------------------------
        Name: 1364C             From Node: 1364C             Length(ft): 511.00
       Group: BASE                To Node: 1364B                  Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Average Conveyance
    Geometry: Horz Ellipse   Horz Ellipse             Solution Algorithm: Automatic
    Span(in): 18.00          18.00                                  Flow: Both
    Rise(in): 12.00          12.00                    Entrance Loss Coef: 0.200
  Invert(ft): 0.580          0.920                        Exit Loss Coef: 0.200
 Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                        Solution Incs: 10
```

```
Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall


*** Weir 1 of 1 for Drop Structure 1364C ***
                                                                       TABLE
                Count: 1                        Bottom Clip(in): 0.000
                 Type: Vertical: Mavis             Top Clip(in): 0.000
                 Flow: Both                      Weir Disc Coef: 3.200
             Geometry: Rectangular             Orifice Disc Coef: 0.600

             Span(in): 40.20                         Invert(ft): 0.720
             Rise(in): 18.00                   Control Elev(ft): 0.720

----------------------------------------------------------------------------------------------------
        Name: 1376                From Node: 1376             Length(ft): 291.00
       Group: BASE                  To Node: 13766                 Count: 1

             UPSTREAM      DOWNSTREAM                  Friction Equation: Average Conveyance
    Geometry: Horz Ellipse  Horz Ellipse               Solution Algorithm: Automatic
    Span(in): 30.00         30.00                                    Flow: Both
    Rise(in): 19.00         19.00                      Entrance Loss Coef: 0.200
  Invert(ft): -0.800        0.830                          Exit Loss Coef: 0.200
 Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                           Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall


*** Weir 1 of 1 for Drop Structure 1376 ***
                                                                       TABLE
                Count: 1                        Bottom Clip(in): 0.000
                 Type: Vertical: Mavis             Top Clip(in): 0.000
                 Flow: Both                      Weir Disc Coef: 3.200
             Geometry: Rectangular             Orifice Disc Coef: 0.600

             Span(in): 31.20                         Invert(ft): 0.390
             Rise(in): 22.20                   Control Elev(ft): 0.390

==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

        Name: 1070                From Node: 1070
       Group: BASE                  To Node: 1060
        Flow: Both                    Count: 1
        Type: Vertical: Mavis      Geometry: Rectangular

                 Span(in): 60.00
                 Rise(in): 18.00
               Invert(ft): 0.100
    Control Elevation(ft): 0.100
                                            TABLE
          Bottom Clip(in): 0.000
             Top Clip(in): 0.000
      Weir Discharge Coef: 3.200
   Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
        Name: 1072                From Node: 1072
       Group: BASE                  To Node: 1070
        Flow: Both                    Count: 1
        Type: Vertical: Mavis      Geometry: Rectangular

                 Span(in): 96.00
                 Rise(in): 24.00
               Invert(ft): 1.930
    Control Elevation(ft): 1.930
                                            TABLE
          Bottom Clip(in): 0.000
```

```
             Top Clip(in): 0.000
      Weir Discharge Coef: 3.200
   Orifice Discharge Coef: 0.600

-----------------------------------------------------------------------------------------------------
      Name: 1080W                From Node: 1080
     Group: BASE                   To Node: 1100
      Flow: None                     Count: 1
      Type: Vertical: Mavis       Geometry: Irregular

                     XSec: 1080W
               Invert(ft): 4.300
    Control Elevation(ft): 4.300
   Struct Opening Dim(ft): 9999.00
                                            TABLE
           Bottom Clip(ft): 0.000
              Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600

-----------------------------------------------------------------------------------------------------
      Name: 1114W                From Node: 1114
     Group: BASE                   To Node: 1080
      Flow: Both                     Count: 1
      Type: Vertical: Mavis       Geometry: Irregular

                     XSec: 1114W
               Invert(ft): 5.180
    Control Elevation(ft): 5.180
   Struct Opening Dim(ft): 9999.00
                                            TABLE
           Bottom Clip(ft): 0.000
              Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600

-----------------------------------------------------------------------------------------------------
      Name: 1116W                From Node: 1116
     Group: BASE                   To Node: 1120
      Flow: Both                     Count: 1
      Type: Vertical: Mavis       Geometry: Irregular

                     XSec: 1116W
               Invert(ft): 5.040
    Control Elevation(ft): 5.040
   Struct Opening Dim(ft): 9999.00
                                            TABLE
           Bottom Clip(ft): 0.000
              Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600

-----------------------------------------------------------------------------------------------------
      Name: 1144W                From Node: 1144
     Group: BASE                   To Node: 1080
      Flow: Both                     Count: 1
      Type: Vertical: Mavis       Geometry: Irregular

                     XSec: 1144W
               Invert(ft): 4.630
    Control Elevation(ft): 4.630
   Struot Opening Dim(ft): 9999.00
                                            TABLE
           Bottom Clip(ft): 0.000
              Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600

-----------------------------------------------------------------------------------------------------
      Name: 1184W                From Node: 1184
     Group: BASE                   To Node: 1144
      Flow: Both                     Count: 1
      Type: Vertical: Mavis       Geometry: Irregular

                     XSec: 1184W
```

```
              Invert(ft): 4.880
     Control Elevation(ft): 4.880
    Struct Opening Dim(ft): 9999.00
                                          TABLE
          Bottom Clip(ft): 0.000
             Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600

--------------------------------------------------------------------------------------------
     Name: 1329W              From Node: 1329
    Group: BASE                 To Node: 1184
     Flow: Both                   Count: 1
     Type: Vertical: Mavis     Geometry: Irregular

                    XSec: 1329W
              Invert(ft): 5.220
     Control Elevation(ft): 5.220
    Struct Opening Dim(ft): 9999.00
                                          TABLE
          Bottom Clip(ft): 0.000
             Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600

--------------------------------------------------------------------------------------------
     Name: 1337W              From Node: 1337
    Group: BASE                 To Node: 1329
     Flow: Both                   Count: 1
     Type: Vertical: Mavis     Geometry: Irregular

                    XSec: 1337W
              Invert(ft): 4.670
     Control Elevation(ft): 4.670
    Struct Opening Dim(ft): 9999.00
                                          TABLE
          Bottom Clip(ft): 0.000
             Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600

--------------------------------------------------------------------------------------------
     Name: 1347AW             From Node: 1347A
    Group: BASE                 To Node: 1337
     Flow: Both                   Count: 1
     Type: Vertical: Mavis     Geometry: Irregular

                    XSec: 1347AW
              Invert(ft): 3.240
     Control Elevation(ft): 3.240
    Struct Opening Dim(ft): 9999.00
                                          TABLE
          Bottom Clip(ft): 0.000
             Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600

--------------------------------------------------------------------------------------------
     Name: 1357W              From Node: 1357
    Group: BASE                 To Node: 1347A
     Flow: Both                   Count: 1
     Type: Vertical: Mavis     Geometry: Irregular

                    XSec: 1357W
              Invert(ft): 3.520
     Control Elevation(ft): 3.520
    Struct Opening Dim(ft): 9999.00
                                          TABLE
          Bottom Clip(ft): 0.000
             Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600

--------------------------------------------------------------------------------------------
     Name: 1360W              From Node: 1360
```

```
       Group: BASE                To Node: 1357
        Flow: Both                  Count: 1
        Type: Vertical: Mavis     Geometry: Irregular

                   XSec: 1360W
             Invert(ft): 3.090
  Control Elevation(ft): 3.090
 Struct Opening Dim(ft): 9999.00
                                          TABLE
        Bottom Clip(ft): 0.000
           Top Clip(ft): 0.000
    Weir Discharge Coef: 3.200
 Orifice Discharge Coef: 0.600
```

```
        Name: 1368W             From Node: 1368
       Group: BASE                To Node: 1360
        Flow: Both                  Count: 1
        Type: Vertical: Mavis     Geometry: Irregular

                   XSec: 1368W
             Invert(ft): 3.400
  Control Elevation(ft): 3.400
 Struct Opening Dim(ft): 9999.00
                                          TABLE
        Bottom Clip(ft): 0.000
           Top Clip(ft): 0.000
    Weir Discharge Coef: 3.200
 Orifice Discharge Coef: 0.600
```

```
        Name: 1372W             From Node: 1372
       Group: BASE                To Node: 1368
        Flow: Both                  Count: 1
        Type: Vertical: Mavis     Geometry: Irregular

                   XSec: 1372W
             Invert(ft): 3.320
  Control Elevation(ft): 3.320
 Struct Opening Dim(ft): 9999.00
                                          TABLE
        Bottom Clip(ft): 0.000
           Top Clip(ft): 0.000
    Weir Discharge Coef: 3.200
 Orifice Discharge Coef: 0.600
```

```
        Name: 1382W             From Node: 1382
       Group: BASE                To Node: 1372
        Flow: Both                  Count: 1
        Type: Vertical: Mavis     Geometry: Irregular

                   XSec: 1382W
             Invert(ft): 3.320
  Control Elevation(ft): 3.320
 Struct Opening Dim(ft): 9999.00
                                          TABLE
        Bottom Clip(ft): 0.000
           Top Clip(ft): 0.000
    Weir Discharge Coef: 3.200
 Orifice Discharge Coef: 0.600
```

```
==========================================================================================
==== Rating Curves =======================================================================
==========================================================================================

        Name: 1072PUMP          From Node: 1072                     Count: 1
       Group: BASE                To Node: 1100                      Flow: Positive

              TABLE            ELEV ON(ft)     ELEV OFF(ft)
          #1: 1072PUMP         1.000           50.000
          #2:                  0.000           0.000
          #3:                  0.000           0.000
          #4:                  0.000           0.000
```

```
==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: SIM1
     Filename: Q:\04222\009-000 Beach Road\ICPR\EXISTING\SIM1.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: FLMOD
    Rainfall Amount(in): 2.00

Time(hrs)       Print Inc(min)
--------------- ---------------
36.000          15.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name: SIM1                Hydrology Sim: SIM1
     Filename: Q:\04222\009-000 Beach Road\ICPR\EXISTING\SIM1.I32

      Execute: Yes         Restart: No              Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.01000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 36.00
     Min Calc Time(sec): 0.2500                 Max Calc Time(sec): 15.0000
        Boundary Stages:                            Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
36.000          15.000

Group           Run
--------------- -----
BASE            Yes


==========================================================================================
==== Boundary Conditions =================================================================
==========================================================================================
```

EXISTING CONDITIONS OUTPUT

Existing Conditions with 2-inches of Rainfall

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max T Outf
1000	BASE	SIM1	0.00	1.100	4.600	0.0000	0	13.04	1.756	0
1010	BASE	SIM1	13.04	2.692	3.800	-0.9300	2866	12.85	1.801	13
1020	BASE	SIM1	12.79	2.868	3.600	-1.2200	1517	12.76	1.847	12
1030	BASE	SIM1	12.90	2.900	3.700	-0.6800	2019	12.83	2.152	12
1040	BASE	SIM1	12.84	2.977	3.600	-1.1000	1374	12.76	1.533	12
1050	BASE	SIM1	12.78	3.021	4.900	-1.0400	4027	12.32	4.089	12
1060	BASE	SIM1	12.77	3.023	4.600	0.0028	10073	12.16	10.133	12
1070	BASE	SIM1	12.75	3.025	4.630	-0.0091	113	12.16	10.658	12
1072	BASE	SIM1	12.72	3.032	4.630	0.0452	115	12.33	35.282	12
1080	BASE	SIM1	12.72	3.046	4.300	-0.0412	115	12.16	17.479	12
1090	BASE	SIM1	12.71	3.041	4.560	0.0170	116	12.16	11.083	12
1100	BASE	SIM1	25.00	3.078	6.500	0.0002	6309	12.59	10.031	0
1110	BASE	SIM1	12.71	3.056	4.620	-0.0060	145	15.86	11.318	12
1112	BASE	SIM1	12.71	3.056	4.830	-0.0007	243	12.17	0.731	12
1114	BASE	SIM1	12.71	3.057	5.180	0.0002	284	12.01	0.699	12
1116	BASE	SIM1	12.71	3.058	5.040	0.0001	146	12.00	0.356	12
1118	BASE	SIM1	26.00	3.285	6.000	0.0000	29741	12.25	1.033	0
1120	BASE	SIM1	12.71	3.051	4.260	-0.0088	114	12.00	0.296	15
1130	BASE	SIM1	12.71	3.057	4.360	-0.0034	146	12.17	8.130	12
1132	BASE	SIM1	12.71	3.059	4.120	0.0027	114	12.25	0.288	1
1134	BASE	SIM1	27.00	4.334	6.000	0.0001	12262	12.50	1.397	0
1140	BASE	SIM1	12.71	3.062	4.200	-0.0058	138	12.17	7.834	12
1142	BASE	SIM1	12.72	3.062	3.720	0.0027	113	12.00	0.618	12
1144	BASE	SIM1	12.70	3.071	3.940	0.0032	116	12.00	2.101	12
1146	BASE	SIM1	12.67	3.078	5.700	0.0017	115	12.00	1.777	12
1150	BASE	SIM1	12.71	3.060	4.490	-0.0075	145	12.02	6.864	12
1151	BASE	SIM1	12.70	3.068	6.000	0.0098	115	12.00	1.709	12
1160	BASE	SIM1	12.70	3.064	4.860	-0.0075	134	4.87	4.115	12
1161	BASE	SIM1	12.70	3.068	6.000	-0.0018	115	12.00	1.562	12
1170	BASE	SIM1	12.70	3.059	5.150	0.0069	136	12.08	4.625	4
1180	BASE	SIM1	12.67	3.061	4.920	-0.0056	144	12.19	2.746	12
1182	BASE	SIM1	12.67	3.061	4.600	0.0011	113	12.00	0.511	12
1184	BASE	SIM1	12.67	3.061	4.620	0.0008	114	12.00	0.583	12
1186	BASE	SIM1	12.67	3.087	5.840	0.0005	115	12.00	2.141	12
1188	BASE	SIM1	12.67	3.054	5.600	0.0004	115	12.00	0.702	12
1325	BASE	SIM1	12.70	3.057	5.180	0.0046	133	12.08	2.889	12
1327	BASE	SIM1	12.67	3.057	5.560	-0.0055	131	12.17	1.667	12
1329	BASE	SIM1	12.67	3.053	5.690	0.0032	137	17.86	0.915	1
1334	BASE	SIM1	12.67	3.042	5.220	0.0005	136	1.56	0.842	17
1335A	BASE	SIM1	12.67	3.034	4.680	0.0006	135	17.86	1.112	1
1337	BASE	SIM1	12.67	3.024	5.220	-0.0015	130	11.38	2.466	17
1338	BASE	SIM1	12.67	3.017	5.320	0.0021	126	17.86	1.976	11
1339	BASE	SIM1	12.67	3.004	5.200	-0.0021	127	11.44	2.867	17
1340	BASE	SIM1	12.63	2.995	4.430	0.0033	121	18.54	2.067	11
1342	BASE	SIM1	12.61	2.972	4.750	-0.0039	122	1.57	1.355	18
1343	BASE	SIM1	12.60	2.945	4.820	-0.0033	123	18.65	1.448	1
1344	BASE	SIM1	12.59	2.919	4.410	-0.0023	128	1.57	0.713	18
1345	BASE	SIM1	12.43	2.880	3.730	0.0022	126	18.65	2.079	1
1347	BASE	SIM1	12.42	2.865	3.880	-0.0025	126	1.56	0.880	18
1347A	BASE	SIM1	12.41	2.833	3.750	0.0031	126	19.39	2.815	1
1348	BASE	SIM1	12.40	2.810	3.570	-0.0065	118	11.53	3.882	19
1350	BASE	SIM1	12.40	2.789	3.700	0.0068	117	18.77	3.115	11
1353	BASE	SIM1	12.39	2.767	3.780	0.0038	122	1.56	1.154	18
1354	BASE	SIM1	12.38	2.729	3.850	-0.0025	125	18.77	1.428	1
1355	BASE	SIM1	12.37	2.699	3.960	-0.0029	123	1.56	1.384	18
1356	BASE	SIM1	12.37	2.667	3.720	0.0031	121	18.76	2.565	1
1357	BASE	SIM1	12.36	2.646	3.880	-0.0025	123	1.56	0.902	18
1359	BASE	SIM1	12.36	2.594	3.760	-0.0015	129	1.55	0.598	1
1360	BASE	SIM1	12.35	2.540	3.400	0.0010	134	17.86	0.778	19
1362	BASE	SIM1	12.35	2.433	3.220	0.0003	118	12.29	1.769	12
1364B	BASE	SIM1	0.00	1.100	4.000	0.0000	0	12.36	1.761	0
1364C	BASE	SIM1	12.36	2.380	3.750	0.0003	114	12.32	1.763	12
1366	BASE	SIM1	12.34	2.516	3.730	-0.0031	124	19.40	2.322	1
1367	BASE	SIM1	12.34	2.505	3.680	0.0035	123	17.86	1.273	19
1368	BASE	SIM1	12.34	2.484	3.680	-0.0027	123	18.81	1.930	17
1370	BASE	SIM1	12.34	2.469	3.700	0.0022	122	17.86	0.949	18
1371	BASE	SIM1	12.33	2.443	3.720	-0.0013	127	1.55	0.629	17
1372	BASE	SIM1	12.33	2.417	3.380	-0.0009	123	1.73	0.042	1
1373	BASE	SIM1	12.33	2.393	3.290	-0.0004	125	12.23	0.920	12
1376	BASE	SIM1	12.33	2.341	3.780	0.0021	118	12.23	4.112	12
13766	BASE	SIM1	12.33	2.219	4.000	-0.0021	134	12.23	4.664	12
13767	BASE	SIM1	0.00	1.100	4.000	0.0000	69	12.33	3.921	0
1379	BASE	SIM1	12.32	2.402	3.520	0.0004	118	12.23	0.903	12
1380	BASE	SIM1	12.32	2.407	3.600	-0.0006	118	12.24	0.896	12
1381	BASE	SIM1	12.32	2.416	3.580	0.0004	119	12.24	0.891	12
1382	BASE	SIM1	12.31	2.423	3.610	0.0003	115	12.00	0.938	12

Existing Conditions with 3-inches of Rainfall

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max T Outf
1000	BASE	SIM1	0.00	1.100	4.600	0.0000	0	12.74	8.305	0
1010	BASE	SIM1	12.76	3.182	3.800	-0.9300	3849	12.69	8.124	12
1020	BASE	SIM1	12.73	3.328	3.600	-1.2200	1984	12.67	8.032	12
1030	BASE	SIM1	12.72	3.392	3.700	-0.6800	2606	12.67	7.156	12
1040	BASE	SIM1	12.72	3.468	3.600	-1.1000	2090	12.66	6.455	12
1050	BASE	SIM1	12.68	3.690	4.900	-1.0400	4288	12.54	6.756	12
1060	BASE	SIM1	12.68	3.696	4.600	-0.0028	10225	12.02	13.528	12
1070	BASE	SIM1	12.64	3.730	4.630	-0.0094	113	12.02	13.638	12
1072	BASE	SIM1	12.62	3.765	4.630	0.0415	115	11.89	33.240	12
1080	BASE	SIM1	12.61	3.785	4.300	-0.0364	115	11.89	19.126	11
1090	BASE	SIM1	12.54	3.818	4.560	0.0171	116	12.17	14.687	11
1100	BASE	SIM1	25.00	3.824	6.500	0.0003	12480	12.02	10.166	0
1110	BASE	SIM1	12.46	3.874	4.620	-0.0064	145	12.02	18.146	12
1112	BASE	SIM1	12.46	3.885	4.830	0.0010	127	12.09	0.938	11
1114	BASE	SIM1	12.46	3.895	5.180	0.0007	130	12.05	1.077	12
1116	BASE	SIM1	12.46	3.896	5.040	0.0007	117	12.00	0.617	12
1118	BASE	SIM1	26.00	3.620	6.000	0.0000	30910	12.25	2.482	0
1120	BASE	SIM1	12.46	3.876	4.260	-0.0088	114	12.00	0.514	11
1130	BASE	SIM1	12.41	4.010	4.360	-0.0034	146	12.17	13.721	12
1132	BASE	SIM1	12.40	4.021	4.120	0.0008	114	12.00	0.817	12
1134	BASE	SIM1	27.00	5.617	6.000	0.0001	15130	12.25	3.480	0
1140	BASE	SIM1	12.37	4.100	4.200	0.0098	138	12.16	13.047	12
1142	BASE	SIM1	12.37	4.108	3.720	-0.0054	113	12.00	1.073	1
1144	BASE	SIM1	12.32	4.224	3.940	-0.0025	116	12.01	3.286	12
1146	BASE	SIM1	12.29	4.306	5.700	0.0010	115	12.00	2.715	12
1150	BASE	SIM1	12.35	4.167	4.490	0.0065	145	12.20	9.493	12
1151	BASE	SIM1	12.35	4.239	6.000	0.0035	1425	12.00	2.611	12
1160	BASE	SIM1	12.34	4.213	4.860	-0.0086	134	11.83	7.753	12
1161	BASE	SIM1	12.32	4.279	6.000	-0.0030	115	12.00	2.386	12
1170	BASE	SIM1	12.34	4.231	5.150	0.0080	136	12.26	5.880	11
1180	BASE	SIM1	12.33	4.264	4.920	0.0048	144	12.26	5.920	12
1182	BASE	SIM1	12.33	4.280	4.600	0.0011	113	12.00	1.278	12
1184	BASE	SIM1	12.33	4.275	4.620	0.0009	114	12.00	1.012	12
1186	BASE	SIM1	12.29	4.521	5.840	0.0009	115	12.00	3.279	12
1188	BASE	SIM1	12.32	4.331	5.600	0.0008	115	12.00	1.072	12
1325	BASE	SIM1	12.33	4.292	5.180	0.0033	133	12.26	4.164	12
1327	BASE	SIM1	12.32	4.316	5.560	0.0031	131	12.02	4.855	12
1329	BASE	SIM1	12.32	4.318	5.690	0.0022	137	12.22	1.035	11
1334	BASE	SIM1	12.32	4.316	5.220	0.0025	136	1.03	0.846	20
1335A	BASE	SIM1	12.32	4.317	4.680	0.0048	135	20.74	1.152	1
1337	BASE	SIM1	12.32	4.273	5.220	0.0057	130	12.32	59.197	20
1338	BASE	SIM1	12.32	4.307	5.320	-0.0049	126	20.74	1.990	12
1339	BASE	SIM1	12.32	4.300	5.200	0.0052	127	12.01	2.660	20
1340	BASE	SIM1	12.32	4.303	4.430	-0.0036	121	23.46	1.993	12
1342	BASE	SIM1	12.32	4.301	4.750	-0.0034	122	1.03	1.353	23
1343	BASE	SIM1	12.32	4.302	4.820	0.0031	123	23.57	1.447	1
1344	BASE	SIM1	12.32	4.300	4.410	-0.0022	128	12.02	0.820	23
1345	BASE	SIM1	12.32	4.301	3.730	0.0023	126	22.01	2.108	12
1347	BASE	SIM1	12.32	4.297	3.880	-0.0023	126	12.30	3.013	22
1347A	BASE	SIM1	12.32	4.347	3.750	-0.0060	126	24.22	2.795	12
1348	BASE	SIM1	12.32	4.285	3.570	0.0068	118	1.03	3.698	24
1350	BASE	SIM1	12.32	4.287	3.700	-0.0072	117	10.43	3.190	1
1353	BASE	SIM1	12.32	4.284	3.780	-0.0040	122	1.03	1.155	10
1354	BASE	SIM1	12.32	4.284	3.850	-0.0025	125	23.64	1.426	1
1355	BASE	SIM1	12.32	4.282	3.960	-0.0033	123	1.03	1.382	23
1356	BASE	SIM1	12.32	4.283	3.720	0.0034	121	23.22	2.585	1
1357	BASE	SIM1	12.32	4.203	3.880	-0.0032	123	12.32	82.923	23
1359	BASE	SIM1	12.32	4.264	3.760	-0.0017	129	12.32	3.482	12
1360	BASE	SIM1	12.32	4.322	3.400	0.0036	134	1.09	0.673	12
1362	BASE	SIM1	12.33	3.886	3.220	0.0010	118	12.30	3.573	12
1364B	BASE	SIM1	0.00	1.100	4.000	0.0000	0	12.33	3.265	0
1364C	BASE	SIM1	12.33	3.704	3.750	0.0009	114	12.31	3.269	12
1366	BASE	SIM1	12.32	4.247	3.730	0.0028	124	20.74	3.191	1
1367	BASE	SIM1	12.32	4.251	3.680	-0.0025	123	1.11	1.067	20
1368	BASE	SIM1	12.32	4.187	3.680	0.0022	123	12.32	53.838	1
1370	BASE	SIM1	12.32	4.241	3.700	-0.0020	122	1.17	0.931	12
1371	BASE	SIM1	12.32	4.234	3.720	-0.0020	127	12.31	3.280	1
1372	BASE	SIM1	12.32	4.281	3.380	0.0011	123	1.20	0.042	12
1373	BASE	SIM1	12.32	4.125	3.290	0.0009	125	12.01	1.562	12
1376	BASE	SIM1	12.33	3.928	3.780	-0.0029	118	12.29	7.652	12
13766	BASE	SIM1	12.33	3.379	4.000	0.0036	127	12.31	7.659	12
13767	BASE	SIM1	0.00	1.100	4.000	0.0000	69	12.33	7.657	0
1379	BASE	SIM1	12.32	4.158	3.520	0.0009	118	12.01	1.755	12
1380	BASE	SIM1	12.32	4.174	3.600	0.0010	118	12.01	1.948	12
1381	BASE	SIM1	12.32	4.205	3.580	0.0010	119	12.00	2.145	12
1382	BASE	SIM1	12.32	4.210	3.610	0.0010	115	12.00	2.345	12

PROPOSED CONDITIONS INPUT

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==========================================================================================
==== Basins ==============================================================================
==========================================================================================

          Name: 1000                    Node: 1000                 Status: Onsite
         Group: BASE                    Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                 Peaking Factor: 256.0
        Rainfall File: Flmod             Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000              Time of Conc(min): 10.00
             Area(ac): 1.900                 Time Shift(hrs): 0.00
         Curve Number: 68.00           Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

------------------------------------------------------------------------------------------
          Name: 1010                    Node: 1010                 Status: Onsite
         Group: BASE                    Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                 Peaking Factor: 256.0
        Rainfall File: Flmod             Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000              Time of Conc(min): 10.00
             Area(ac): 0.970                 Time Shift(hrs): 0.00
         Curve Number: 68.00           Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

------------------------------------------------------------------------------------------
          Name: 1020                    Node: 1020                 Status: Onsite
         Group: BASE                    Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                 Peaking Factor: 256.0
        Rainfall File: Flmod             Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000              Time of Conc(min): 10.56
             Area(ac): 5.610                 Time Shift(hrs): 0.00
         Curve Number: 68.00           Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

------------------------------------------------------------------------------------------
          Name: 1030                    Node: 1030                 Status: Onsite
         Group: BASE                    Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                 Peaking Factor: 256.0
        Rainfall File: Flmod             Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000              Time of Conc(min): 10.00
             Area(ac): 4.580                 Time Shift(hrs): 0.00
         Curve Number: 68.00           Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

------------------------------------------------------------------------------------------
          Name: 1040                    Node: 1040                 Status: Onsite
         Group: BASE                    Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                 Peaking Factor: 256.0
        Rainfall File: Flmod             Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000              Time of Conc(min): 10.00
             Area(ac): 0.560                 Time Shift(hrs): 0.00
         Curve Number: 68.00           Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

------------------------------------------------------------------------------------------
          Name: 1050                    Node: 1050                 Status: Onsite
         Group: BASE                    Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                 Peaking Factor: 256.0
        Rainfall File: Flmod             Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000              Time of Conc(min): 10.00
             Area(ac): 1.470                 Time Shift(hrs): 0.00
         Curve Number: 68.00           Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

------------------------------------------------------------------------------------------
          Name: 1080                    Node: 1080                 Status: Onsite
         Group: BASE                    Type: SCS Unit Hydrograph
```

```
     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod              Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000                Time of Conc(min): 10.00
            Area(ac): 0.354                  Time Shift(hrs): 0.00
        Curve Number: 92.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
        Name: 1100                     Node: 1100                 Status: Onsite
       Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod              Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000                Time of Conc(min): 10.00
            Area(ac): 0.440                  Time Shift(hrs): 0.00
        Curve Number: 70.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
        Name: 1114                     Node: 1114                 Status: Onsite
       Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod              Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000                Time of Conc(min): 10.00
            Area(ac): 0.425                  Time Shift(hrs): 0.00
        Curve Number: 92.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
        Name: 1116                     Node: 1116                 Status: Onsite
       Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod              Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000                Time of Conc(min): 10.00
            Area(ac): 0.425                  Time Shift(hrs): 0.00
        Curve Number: 92.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
        Name: 1118                     Node: 1118                 Status: Onsite
       Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod              Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000                Time of Conc(min): 20.00
            Area(ac): 4.080                  Time Shift(hrs): 0.00
        Curve Number: 80.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
        Name: 1120                     Node: 1120                 Status: Onsite
       Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod              Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000                Time of Conc(min): 10.00
            Area(ac): 0.354                  Time Shift(hrs): 0.00
        Curve Number: 92.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

------------------------------------------------------------------------------------------
        Name: 1132                     Node: 1132                 Status: Onsite
       Group: BASE                     Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod              Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000                Time of Conc(min): 12.00
            Area(ac): 1.590                  Time Shift(hrs): 0.00
        Curve Number: 75.00            Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

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--------------------------------------------------------------------------------------------------------
       Name: 1134                         Node: 1134                    Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                  Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                   Time of Conc(min): 30.00
             Area(ac): 7.040                     Time Shift(hrs): 0.00
         Curve Number: 80.00                Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1142                         Node: 1142                    Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                  Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                   Time of Conc(min): 10.00
             Area(ac): 0.739                     Time Shift(hrs): 0.00
         Curve Number: 92.00                Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1144                         Node: 1144                    Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                  Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                   Time of Conc(min): 10.00
             Area(ac): 0.540                     Time Shift(hrs): 0.00
         Curve Number: 92.00                Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1146                         Node: 1146                    Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                  Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                   Time of Conc(min): 10.00
             Area(ac): 1.570                     Time Shift(hrs): 0.00
         Curve Number: 98.00                Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1151                         Node: 1151                    Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                  Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                   Time of Conc(min): 10.00
             Area(ac): 1.510                     Time Shift(hrs): 0.00
         Curve Number: 98.00                Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1161                         Node: 1161                    Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256                       Peaking Factor: 256.0
        Rainfall File: Flmod                  Storm Duration(hrs): 24.00
   Rainfall Amount(in): 2.000                   Time of Conc(min): 10.00
             Area(ac): 1.380                     Time Shift(hrs): 0.00
         Curve Number: 98.00                Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1182                         Node: 1182                    Status: Onsite
      Group: BASE                         Type: SCS Unit Hydrograph
```

```
     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 1.580                 Time Shift(hrs): 0.00
        Curve Number: 80.00           Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

-----------------------------------------------------------------------------------
       Name: 1184                    Node: 1184                Status: Onsite
      Group: BASE                    Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 0.697                 Time Shift(hrs): 0.00
        Curve Number: 92.00           Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

-----------------------------------------------------------------------------------
       Name: 1186                    Node: 1186                Status: Onsite
      Group: BASE                    Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 15.00
            Area(ac): 2.330                 Time Shift(hrs): 0.00
        Curve Number: 98.00           Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

-----------------------------------------------------------------------------------
       Name: 1188                    Node: 1188                Status: Onsite
      Group: BASE                    Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 0.620                 Time Shift(hrs): 0.00
        Curve Number: 98.00           Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

-----------------------------------------------------------------------------------
       Name: 1329                    Node: 1329                Status: Onsite
      Group: BASE                    Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 1.910                 Time Shift(hrs): 0.00
        Curve Number: 80.00           Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

-----------------------------------------------------------------------------------
       Name: 1337                    Node: 1337                Status: Onsite
      Group: BASE                    Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 3.910                 Time Shift(hrs): 0.00
        Curve Number: 80.00           Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

-----------------------------------------------------------------------------------
       Name: 1347A                   Node: 1347A               Status: Onsite
      Group: BASE                    Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256                  Peaking Factor: 256.0
       Rainfall File: Flmod             Storm Duration(hrs): 24.00
 Rainfall Amount(in): 2.000               Time of Conc(min): 10.00
            Area(ac): 2.400                 Time Shift(hrs): 0.00
        Curve Number: 80.00           Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

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--------------------------------------------------------------------------------------------------------
       Name: 1357                          Node: 1357                    Status: Onsite
      Group: BASE                          Type: SCS Unit Hydrograph

    Unit Hydrograph: Uh256                       Peaking Factor: 256.0
      Rainfall File: Flmod                 Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
           Area(ac): 1.600                    Time Shift(hrs): 0.00
       Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1360                          Node: 1360                    Status: Onsite
      Group: BASE                          Type: SCS Unit Hydrograph

    Unit Hydrograph: Uh256                       Peaking Factor: 256.0
      Rainfall File: Flmod                 Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
           Area(ac): 2.160                    Time Shift(hrs): 0.00
       Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1368                          Node: 1368                    Status: Onsite
      Group: BASE                          Type: SCS Unit Hydrograph

    Unit Hydrograph: Uh256                       Peaking Factor: 256.0
      Rainfall File: Flmod                 Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
           Area(ac): 1.200                    Time Shift(hrs): 0.00
       Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1372                          Node: 1372                    Status: Onsite
      Group: BASE                          Type: SCS Unit Hydrograph

    Unit Hydrograph: Uh256                       Peaking Factor: 256.0
      Rainfall File: Flmod                 Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
           Area(ac): 2.430                    Time Shift(hrs): 0.00
       Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00

--------------------------------------------------------------------------------------------------------
       Name: 1382                          Node: 1382                    Status: Onsite
      Group: BASE                          Type: SCS Unit Hydrograph

    Unit Hydrograph: Uh256                       Peaking Factor: 256.0
      Rainfall File: Flmod                 Storm Duration(hrs): 24.00
  Rainfall Amount(in): 2.000                 Time of Conc(min): 10.00
           Area(ac): 2.900                    Time Shift(hrs): 0.00
       Curve Number: 80.00               Max Allowable Q(cfs): 999999.000
            DCIA(%): 0.00

==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

    Name: 1000              Base Flow(cfs): 0.000          Init Stage(ft): 1.100
   Group: BASE                                             Warn Stage(ft): 4.600
    Type: Stage/Area

    Stage(ft)         Area(ac)
--------------- ---------------

------------------------------------------------------------------------------------------
    Name: 1010              Base Flow(cfs): 0.000          Init Stage(ft): 1.100
   Group: BASE                                             Warn Stage(ft): 3.800
    Type: Stage/Area
```

Stage(ft)	Area(ac)

Name: 1020 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.600
Type: Stage/Area

Stage(ft)	Area(ac)

Name: 1030 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.700
Type: Stage/Area

Stage(ft)	Area(ac)

Name: 1040 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.600
Type: Stage/Area

Stage(ft)	Area(ac)

Name: 1050 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.900
Type: Stage/Area

Stage(ft)	Area(ac)

Name: 1060 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.600
Type: Stage/Area

Stage(ft)	Area(ac)

Name: 1070 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.630
Type: Stage/Area

Stage(ft)	Area(ac)
0.100	0.0008
4.630	0.0008

Name: 1072 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.630
Type: Stage/Area

Stage(ft)	Area(ac)
-1.770	0.0017
4.630	0.0017

Name: 1080 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.300
Type: Stage/Area

Stage(ft)	Area(ac)
-0.090	0.0003
4.300	0.0003

Name: 1090 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.560
Type: Stage/Area

Stage(ft)	Area(ac)
-0.640	0.0006
4.560	0.0006

Name: 1100 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.500
Type: Stage/Area

Stage(ft)	Area(ac)
1.100	0.0000
3.000	1.2700
4.000	2.1800
4.500	2.6300

Name: 1110 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.620
Type: Stage/Area

Stage(ft)	Area(ac)
-0.880	0.0006
4.620	0.0006

Name: 1112 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.830
Type: Stage/Area

Stage(ft)	Area(ac)
0.930	0.0006
4.830	0.0006

Name: 1114 Base Flow(cfs): 0.000 Init Stage(ft): 2.130
Group: BASE Warn Stage(ft): 5.180
Type: Stage/Area

Stage(ft)	Area(ac)
2.130	0.0003
5.180	0.0003

Name: 1116 Base Flow(cfs): 0.000 Init Stage(ft): 2.290
Group: BASE Warn Stage(ft): 5.040
Type: Stage/Area

Stage(ft)	Area(ac)
2.290	0.0003
5.040	0.0003

Name: 1118 Base Flow(cfs): 0.000 Init Stage(ft): 3.000
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
3.000	0.6600
6.000	0.9000

Name: 1120 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.260
Type: Stage/Area

Stage(ft)	Area(ac)
-0.940	0.0003
4.260	0.0003

Name: 1130 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.360
Type: Stage/Area

Stage(ft)	Area(ac)
-0.940	0.0006
4.360	0.0006

Name: 1132 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.120
Type: Stage/Area

Stage(ft)	Area(ac)
-0.380	0.0003
4.120	0.0003

Name: 1134 Base Flow(cfs): 0.000 Init Stage(ft): 3.000
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
3.000	0.2130
6.000	0.3670

Name: 1140 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.200
Type: Stage/Area

Stage(ft)	Area(ac)
-1.000	0.0006
4.200	0.0006

Name: 1142 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.720
Type: Stage/Area

Stage(ft)	Area(ac)
0.170	0.0003
3.720	0.0003

Name: 1144 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.940
Type: Stage/Area

Stage(ft)	Area(ac)
0.040	0.0003
3.940	0.0003

Name: 1146 Base Flow(cfs): 0.000 Init Stage(ft): 1.634
Group: BASE Warn Stage(ft): 5.700
Type: Stage/Area

0.34

Stage(ft)	Area(ac)
4.460	0.0000
5.450	0.4567
5.600	0.9133
5.700	1.3700

Name: 1150 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.490
Type: Stage/Area

Stage(ft)	Area(ac)
-0.960	0.0006
4.490	0.0006

Name: 1151 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

-0.51

Stage(ft)	Area(ac)
4.160	0.0000
5.200	0.4300
5.500	0.8600
6.000	1.2900

Name: 1160 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.860
Type: Stage/Area

Stage(ft)	Area(ac)
-0.490	0.0006
4.860	0.0006

Name: 1161 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

0.01

Stage(ft)	Area(ac)
4.490	0.0000
5.200	0.4600
5.500	0.9200
6.000	1.3800

Name: 1170 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.150
Type: Stage/Area

Stage(ft)	Area(ac)
-1.550	0.0006
5.150	0.0006

Name: 1180 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.920
Type: Stage/Area

Stage(ft)	Area(ac)
-0.780	0.0006
4.920	0.0006

Name: 1182 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.600
Type: Stage/Area

Stage(ft)	Area(ac)
-0.200	0.0003
4.600	0.0003

Name: 1184 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.620
Type: Stage/Area

Stage(ft)	Area(ac)
-0.430	0.0003
4.620	0.0003

Name: 1186 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.840
Type: Stage/Area

Stage(ft)	Area(ac)
4.810	0.0000
5.320	0.5825
5.490	1.1650
5.500	1.7475
5.840	2.3300

Name: 1188 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.600
Type: Stage/Area

Stage(ft)	Area(ac)
4.400	0.0000
5.600	0.6200

Name: 1325 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.180
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
5.180	0.0006

Name: 1327 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 5.560
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
5.560	0.0006

```
--------------------------------------------------------------------------------------------
     Name: 1329                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 5.690
     Type: Stage/Area


     Stage(ft)         Area(ac)
--------------- ---------------
        -0.500          0.0006
         5.690          0.0006

--------------------------------------------------------------------------------------------
     Name: 1334                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 5.220
     Type: Stage/Area


     Stage(ft)         Area(ac)
--------------- ---------------
        -0.500          0.0006
         5.220          0.0006

--------------------------------------------------------------------------------------------
     Name: 1335A                Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 4.680
     Type: Stage/Area


     Stage(ft)         Area(ac)
--------------- ---------------
        -0.500          0.0006
         4.680          0.0006

--------------------------------------------------------------------------------------------
     Name: 1337                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 5.220
     Type: Stage/Area


     Stage(ft)         Area(ac)
--------------- ---------------
        -0.470          0.0006
         5.220          0.0006

--------------------------------------------------------------------------------------------
     Name: 1338                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 5.320
     Type: Stage/Area


     Stage(ft)         Area(ac)
--------------- ---------------
        -0.480          0.0006
         5.320          0.0006

--------------------------------------------------------------------------------------------
     Name: 1339                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 5.200
     Type: Stage/Area


     Stage(ft)         Area(ac)
--------------- ---------------
        -0.520          0.0006
         5.200          0.0006

--------------------------------------------------------------------------------------------
     Name: 1340                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 4.430
     Type: Stage/Area


     Stage(ft)         Area(ac)
--------------- ---------------
        -0.500          0.0006
         4.430          0.0006
```

```
------------------------------------------------------------------------------------
     Name: 1342                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 4.750
     Type: Stage/Area


     Stage(ft)         Area(ac)
 --------------- ---------------
        -0.500          0.0006
         4.750          0.0006

------------------------------------------------------------------------------------
     Name: 1343                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 4.820
     Type: Stage/Area


     Stage(ft)         Area(ac)
 --------------- ---------------
        -0.500          0.0006
         4.820          0.0006

------------------------------------------------------------------------------------
     Name: 1344                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 4.410
     Type: Stage/Area


     Stage(ft)         Area(ac)
 --------------- ---------------
        -0.520          0.0006
         4.410          0.0006

------------------------------------------------------------------------------------
     Name: 1345                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 3.730
     Type: Stage/Area


     Stage(ft)         Area(ac)
 --------------- ---------------
        -0.500          0.0006
         3.730          0.0006

------------------------------------------------------------------------------------
     Name: 1347                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 3.880
     Type: Stage/Area


     Stage(ft)         Area(ac)
 --------------- ---------------
        -0.500          0.0006
         3.880          0.0006

------------------------------------------------------------------------------------
     Name: 1347A                Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 3.750
     Type: Stage/Area


     Stage(ft)         Area(ac)
 --------------- ---------------
        -0.500          0.0006
         3.750          0.0006

------------------------------------------------------------------------------------
     Name: 1348                 Base Flow(cfs): 0.000          Init Stage(ft): 1.100
    Group: BASE                                                Warn Stage(ft): 3.570
     Type: Stage/Area


     Stage(ft)         Area(ac)
 --------------- ---------------
        -0.490          0.0006
         3.570          0.0006

------------------------------------------------------------------------------------
```

Name: 1350 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.700
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.700	0.0006

Name: 1353 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.780
Type: Stage/Area

Stage(ft)	Area(ac)
-0.480	0.0006
3.780	0.0006

Name: 1354 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.850
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.850	0.0006

Name: 1355 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.960
Type: Stage/Area

Stage(ft)	Area(ac)
-0.540	0.0006
3.960	0.0006

Name: 1356 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.720
Type: Stage/Area

Stage(ft)	Area(ac)
-0.520	0.0006
3.720	0.0006

Name: 1357 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.880
Type: Stage/Area

Stage(ft)	Area(ac)
-0.520	0.0006
3.880	0.0006

Name: 1359 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.760
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.760	0.0006

Name: 1360 Base Flow(cfs): 0.000 Init Stage(ft): 1.100

```
     Group: BASE                                            Warn Stage(ft): 3.400
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         -0.510          0.0006
          3.400          0.0006

------------------------------------------------------------------------------------
      Name: 1362              Base Flow(cfs): 0.000          Init Stage(ft): 1.100
     Group: BASE                                             Warn Stage(ft): 3.220
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.000          0.0005
          3.220          0.0006

------------------------------------------------------------------------------------
      Name: 1364B             Base Flow(cfs): 0.000          Init Stage(ft): 1.100
     Group: BASE                                             Warn Stage(ft): 4.000
      Type: Time/Stage


      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00           1.100
          12.00           1.100
          24.00           1.100

------------------------------------------------------------------------------------
      Name: 1364C             Base Flow(cfs): 0.000          Init Stage(ft): 1.100
     Group: BASE                                             Warn Stage(ft): 3.750
      Type: Stage/Area

-1.64

      Stage(ft)        Area(ac)
--------------- ---------------
         -1.640          0.0005
          3.750          0.0006

------------------------------------------------------------------------------------
      Name: 1366              Base Flow(cfs): 0.000          Init Stage(ft): 1.100
     Group: BASE                                             Warn Stage(ft): 3.730
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         -0.500          0.0006
          3.730          0.0006

------------------------------------------------------------------------------------
      Name: 1367              Base Flow(cfs): 0.000          Init Stage(ft): 1.100
     Group: BASE                                             Warn Stage(ft): 3.680
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         -0.480          0.0006
          3.680          0.0006

------------------------------------------------------------------------------------
      Name: 1368              Base Flow(cfs): 0.000          Init Stage(ft): 1.100
     Group: BASE                                             Warn Stage(ft): 3.680
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
         -0.470          0.0006
          3.680          0.0006

------------------------------------------------------------------------------------
      Name: 1370              Base Flow(cfs): 0.000          Init Stage(ft): 1.100
```

Group: BASE Warn Stage(ft): 3.700
Type: Stage/Area

Stage(ft)	Area(ac)
-0.470	0.0006
3.500	0.0006

Name: 1371 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.720
Type: Stage/Area

Stage(ft)	Area(ac)
-0.500	0.0006
3.720	0.0006

Name: 1372 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.380
Type: Stage/Area

Stage(ft)	Area(ac)
-0.480	0.0006
3.380	0.0006

Name: 1373 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.290
Type: Stage/Area

Stage(ft)	Area(ac)
0.200	0.0006
3.290	0.0006

Name: 1376 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.780
Type: Stage/Area

-0.85

Stage(ft)	Area(ac)
-0.850	0.0005
3.780	0.0005

Name: 13766 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.000
Type: Stage/Area

Stage(ft)	Area(ac)
0.830	0.0005
4.000	0.0005

Name: 13767 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 4.000
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	1.100
12.00	1.100
24.00	1.100

Name: 1379 Base Flow(cfs): 0.000 Init Stage(ft): 1.100

Group: BASE Warn Stage(ft): 3.520
Type: Stage/Area

Stage(ft)	Area(ac)
0.230	0.0006
3.520	0.0006

Name: 1380 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.600
Type: Stage/Area

Stage(ft)	Area(ac)
0.240	0.0006
3.600	0.0006

Name: 1381 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.580
Type: Stage/Area

Stage(ft)	Area(ac)
0.290	0.0006
3.580	0.0006

Name: 1382 Base Flow(cfs): 0.000 Init Stage(ft): 1.100
Group: BASE Warn Stage(ft): 3.610
Type: Stage/Area

Stage(ft)	Area(ac)
0.330	0.0006
3.610	0.0006

==== Cross Sections ====

Name: 1000 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	4.600	0.045000
200.000	4.600	0.045000
211.760	2.800	0.045000
216.750	1.250	0.045000
221.740	2.200	0.045000
227.610	5.200	0.045000
327.610	5.200	0.045000

Name: 1010 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	3.800	0.045000
200.000	3.800	0.045000
205.250	2.700	0.045000
210.500	2.030	0.045000
215.750	2.600	0.045000
221.180	5.200	0.045000
321.180	5.200	0.045000

Name: 1020 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	3.600	0.045000
200.000	3.600	0.045000
202.350	2.800	0.045000
207.940	2.320	0.045000
213.520	3.000	0.045000
217.010	4.300	0.045000
317.010	4.300	0.045000

Name: 1030 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	3.700	0.045000
200.000	3.700	0.045000
202.670	2.900	0.045000
209.130	1.780	0.045000
215.580	3.100	0.045000
220.540	4.700	0.045000
320.540	4.700	0.045000

Name: 1040 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	3.600	0.045000
200.000	3.600	0.045000
205.090	2.900	0.045000
219.560	2.900	0.045000
222.940	3.900	0.045000
322.940	3.900	0.045000

Name: 1050 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	5.000	0.045000
200.000	5.000	0.045000
205.620	2.700	0.045000
209.370	2.900	0.045000
213.120	4.900	0.045000
313.120	4.900	0.045000

Name: 1060 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
100.000	5.100	0.045000
200.000	5.100	0.045000
205.800	3.200	0.045000
220.310	3.600	0.045000
225.060	6.900	0.045000
325.060	6.900	0.045000

Name: 1080W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	4.800	0.000000
0.100	4.300	0.000000
29.900	4.300	0.000000
30.000	4.800	0.000000

Name: 1114W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.680	0.000000
0.100	5.180	0.000000
15.900	5.700	0.000000
16.000	6.200	0.000000

Name: 1116W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.540	0.000000
0.100	5.040	0.000000
15.900	5.750	0.000000
16.000	6.250	0.000000

Name: 1144W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.160	0.000000
0.100	4.660	0.000000
43.900	4.660	0.000000
44.000	5.160	0.000000

Name: 1184W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.380	0.000000
0.100	4.880	0.000000
22.000	5.420	0.000000
43.900	4.880	0.000000
44.000	5.380	0.000000

Name: 1329W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.970	0.000000
1.000	5.720	0.000000
6.000	5.620	0.000000
8.000	5.220	0.000000
30.000	5.900	0.000000
52.000	5.240	0.000000
54.000	5.620	0.000000
59.000	5.720	0.000000
60.000	5.970	0.000000

Name: 1337W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	5.380	0.000000
1.000	5.130	0.000000
5.000	5.050	0.000000
7.000	4.670	0.000000
29.000	4.330	0.000000

51.000	4.670	0.000000
53.000	5.050	0.000000
58.000	5.150	0.000000
60.000	5.010	0.000000

Name: 1347AW Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	3.850	0.000000
1.000	3.700	0.000000
5.000	3.620	0.000000
7.000	3.240	0.000000
29.000	3.900	0.000000
51.000	3.240	0.000000
53.000	3.620	0.000000
58.000	3.720	0.000000
60.000	4.220	0.000000

Name: 1357W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	4.230	0.000000
1.000	3.980	0.000000
5.000	3.900	0.000000
11.000	3.900	0.000000
13.000	3.520	0.000000
29.000	4.000	0.000000
45.000	3.520	0.000000
47.000	3.900	0.000000
52.000	4.000	0.000000
60.000	6.000	0.000000

Name: 1360W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	3.800	0.000000
1.000	3.550	0.000000
5.000	3.470	0.000000
7.000	3.090	0.000000
29.000	3.750	0.000000
51.000	3.090	0.000000
53.000	3.470	0.000000
58.000	3.570	0.000000
60.000	4.070	0.000000

Name: 1368W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	4.220	0.000000
1.000	3.970	0.000000
11.000	3.770	0.000000
13.000	3.400	0.000000
29.000	3.900	0.000000
45.000	3.400	0.000000
47.000	3.770	0.000000
59.000	4.010	0.000000
60.000	4.260	0.000000

Name: 1372W Group: BASE
Encroachment: No

Station(ft) Elevation(ft) Manning's N

0.000	4.150	0.000000
1.000	3.900	0.000000
11.000	3.700	0.000000
13.000	3.320	0.000000
29.000	3.800	0.000000
45.000	3.320	0.000000
47.000	3.700	0.000000
59.000	3.940	0.000000
60.000	4.190	0.000000

Name: 1382W Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	4.150	0.000000
1.000	3.900	0.000000
11.000	3.700	0.000000
13.000	3.320	0.000000
29.000	3.800	0.000000
45.000	3.320	0.000000
47.000	3.700	0.000000
59.000	3.940	0.000000
60.000	4.190	0.000000

==== Operating Tables ====

Name: 1072PUMP Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

US Stage(ft)	Discharge(cfs)
1.600	10.00
4.630	10.00

==== Pipes ====

Name: 1050 From Node: 1040 Length(ft): 80.00
Group: BASE To Node: 1050 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 1.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	30.00	30.00
Rise(in):	30.00	30.00
Invert(ft):	2.200	2.270
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: 1080 From Node: 1080 Length(ft): 20.00
Group: BASE To Node: 1100 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.00
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	36.00	36.00
Rise(in):	36.00	36.00
Invert(ft):	-0.090	-1.170
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1090               From Node: 1090              Length(ft): 8.00
       Group: BASE                 To Node: 1080                   Count: 1
                                                      Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular      Circular                               Flow: Both
    Span(in): 36.00         36.00                    Entrance Loss Coef: 0.50
    Rise(in): 36.00         36.00                        Exit Loss Coef: 0.00
  Invert(ft): -0.740        -0.090                       Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1110               From Node: 1110              Length(ft): 30.00
       Group: BASE                 To Node: 1090                   Count: 1
                                                      Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular      Circular                               Flow: Both
    Span(in): 36.00         36.00                    Entrance Loss Coef: 0.50
    Rise(in): 36.00         36.00                        Exit Loss Coef: 0.00
  Invert(ft): -0.880        -0.790                       Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1112               From Node: 1112              Length(ft): 184.00
       Group: BASE                 To Node: 1110                   Count: 1
                                                      Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular      Circular                               Flow: Both
    Span(in): 18.00         18.00                    Entrance Loss Coef: 0.50
    Rise(in): 18.00         18.00                        Exit Loss Coef: 0.00
  Invert(ft): 0.930         -0.880                       Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1114               From Node: 1114              Length(ft): 200.00
       Group: BASE                 To Node: 1112                   Count: 1
                                                      Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular      Circular                               Flow: Both
    Span(in): 18.00         18.00                    Entrance Loss Coef: 0.50
    Rise(in): 18.00         18.00                        Exit Loss Coef: 0.00
```

```
    Invert(ft): 2.130          1.830                       Bend Loss Coef: 0.00
   Manning's N: 0.013000       0.013000                 Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000          0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
          Name: 1116              From Node: 1116              Length(ft): 44.00
         Group: BASE                To Node: 1114                   Count: 1
                                                        Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
      Geometry: Circular       Circular                              Flow: Both
      Span(in): 18.00          18.00                   Entrance Loss Coef: 0.50
      Rise(in): 18.00          18.00                       Exit Loss Coef: 0.00
    Invert(ft): 2.290          2.450                       Bend Loss Coef: 0.00
   Manning's N: 0.013000       0.013000                 Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000          0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
          Name: 1120              From Node: 1120              Length(ft): 8.00
         Group: BASE                To Node: 1110                   Count: 1
                                                        Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
      Geometry: Circular       Circular                              Flow: Both
      Span(in): 36.00          36.00                   Entrance Loss Coef: 0.50
      Rise(in): 36.00          36.00                       Exit Loss Coef: 0.00
    Invert(ft): -0.940         -0.580                      Bend Loss Coef: 0.00
   Manning's N: 0.013000       0.013000                 Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000          0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
          Name: 1130              From Node: 1130              Length(ft): 300.00
         Group: BASE                To Node: 1110                   Count: 1
                                                        Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
      Geometry: Circular       Circular                              Flow: Both
      Span(in): 36.00          36.00                   Entrance Loss Coef: 0.50
      Rise(in): 36.00          36.00                       Exit Loss Coef: 0.00
    Invert(ft): -0.940         -0.880                      Bend Loss Coef: 0.00
   Manning's N: 0.013000       0.013000                 Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000          0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
```

```
          Name: 1132                From Node: 1132               Length(ft): 37.00
         Group: BASE                  To Node: 1130                    Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM           DOWNSTREAM              Solution Algorithm: Automatic
      Geometry: Circular          Circular                              Flow: Both
      Span(in): 15.00             15.00                   Entrance Loss Coef: 0.50
      Rise(in): 15.00             15.00                       Exit Loss Coef: 0.00
    Invert(ft): 0.000             0.000                       Bend Loss Coef: 0.00
   Manning's N: 0.013000          0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000             0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000             0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
          Name: 1140                From Node: 1140               Length(ft): 120.00
         Group: BASE                  To Node: 1130                    Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM           DOWNSTREAM              Solution Algorithm: Automatic
      Geometry: Circular          Circular                              Flow: Both
      Span(in): 36.00             36.00                   Entrance Loss Coef: 0.50
      Rise(in): 36.00             36.00                       Exit Loss Coef: 0.00
    Invert(ft): -1.000            -0.890                      Bend Loss Coef: 0.00
   Manning's N: 0.013000          0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000             0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000             0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
          Name: 1142                From Node: 1142               Length(ft): 8.00
         Group: BASE                  To Node: 1140                    Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM           DOWNSTREAM              Solution Algorithm: Automatic
      Geometry: Circular          Circular                              Flow: Both
      Span(in): 15.00             15.00                   Entrance Loss Coef: 0.50
      Rise(in): 15.00             15.00                       Exit Loss Coef: 0.00
    Invert(ft): 0.170             0.200                       Bend Loss Coef: 0.00
   Manning's N: 0.013000          0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000             0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000             0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
          Name: 1144                From Node: 1144               Length(ft): 37.00
         Group: BASE                  To Node: 1140                    Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM           DOWNSTREAM              Solution Algorithm: Automatic
      Geometry: Circular          Circular                              Flow: Both
      Span(in): 15.00             15.00                   Entrance Loss Coef: 0.50
      Rise(in): 15.00             15.00                       Exit Loss Coef: 0.00
    Invert(ft): 0.000             0.000                       Bend Loss Coef: 0.00
   Manning's N: 0.013000          0.013000                  Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000             0.000                      Inlet Ctrl Spec: Use dn
  Bot Clip(in): 0.000             0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
        Name: 1146                From Node: 1146                 Length(ft): 56.00
       Group: BASE                  To Node: 1144                      Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular          Circular                               Flow: Both
    Span(in): 15.00             15.00                    Entrance Loss Coef: 0.00
    Rise(in): 15.00             15.00                        Exit Loss Coef: 0.00
  Invert(ft): 0.340             0.340                        Bend Loss Coef: 0.00
 Manning's N: 0.013000          0.013000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000             0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000             0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
        Name: 1150                From Node: 1150                 Length(ft): 196.00
       Group: BASE                  To Node: 1140                      Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular          Circular                               Flow: Both
    Span(in): 36.00             36.00                    Entrance Loss Coef: 0.50
    Rise(in): 36.00             36.00                        Exit Loss Coef: 0.00
  Invert(ft): -0.960            -0.800                       Bend Loss Coef: 0.00
 Manning's N: 0.013000          0.013000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000             0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000             0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
        Name: 1151                From Node: 1151                 Length(ft): 70.00
       Group: BASE                  To Node: 1150                      Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular          Circular                               Flow: Both
    Span(in): 15.00             15.00                    Entrance Loss Coef: 0.00
    Rise(in): 15.00             15.00                        Exit Loss Coef: 0.00
  Invert(ft): -0.510            -0.510                       Bend Loss Coef: 0.00
 Manning's N: 0.013000          0.013000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000             0.000                      Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000             0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
        Name: 1160                From Node: 1160                 Length(ft): 204.00
       Group: BASE                  To Node: 1150                      Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular          Circular                               Flow: Both
    Span(in): 36.00             36.00                    Entrance Loss Coef: 0.50
    Rise(in): 36.00             36.00                        Exit Loss Coef: 0.00
  Invert(ft): -0.390            -0.860                       Bend Loss Coef: 0.00
 Manning's N: 0.013000          0.013000                  Outlet Ctrl Spec: Use dc or tw
```

```
 Top Clip(in): 0.000           0.000                       Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
-----------------------------------------------------------------------------------------------------
         Name: 1161             From Node: 1161              Length(ft): 70.00
        Group: BASE               To Node: 1160                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM      DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular    Circular                                Flow: Both
     Span(in): 15.00       15.00                     Entrance Loss Coef: 0.00
     Rise(in): 15.00       15.00                         Exit Loss Coef: 0.00
   Invert(ft): 0.010       0.010                         Bend Loss Coef: 0.00
  Manning's N: 0.013000    0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000       0.000                       Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000       0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
-----------------------------------------------------------------------------------------------------
         Name: 1170             From Node: 1170              Length(ft): 50.00
        Group: BASE               To Node: 1160                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM      DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular    Circular                                Flow: Both
     Span(in): 36.00       36.00                     Entrance Loss Coef: 0.50
     Rise(in): 36.00       36.00                         Exit Loss Coef: 0.00
   Invert(ft): -1.550      -0.490                        Bend Loss Coef: 0.00
  Manning's N: 0.013000    0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000       0.000                       Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000       0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
-----------------------------------------------------------------------------------------------------
         Name: 1180             From Node: 1180              Length(ft): 250.00
        Group: BASE               To Node: 1170                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM      DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular    Circular                                Flow: Both
     Span(in): 36.00       36.00                     Entrance Loss Coef: 0.50
     Rise(in): 36.00       36.00                         Exit Loss Coef: 0.00
   Invert(ft): -0.680      -0.450                        Bend Loss Coef: 0.00
  Manning's N: 0.013000    0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000       0.000                       Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000       0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
-----------------------------------------------------------------------------------------------------
         Name: 1182             From Node: 1182              Length(ft): 8.00
        Group: BASE               To Node: 1180                   Count: 1
```

```
                                                        Friction Equation: Average Conveyance
            UPSTREAM       DOWNSTREAM                  Solution Algorithm: Automatic
   Geometry: Circular      Circular                                  Flow: Both
   Span(in): 15.00         15.00                       Entrance Loss Coef: 0.50
   Rise(in): 15.00         15.00                           Exit Loss Coef: 0.00
 Invert(ft): -0.200        -0.530                          Bend Loss Coef: 0.00
Manning's N: 0.013000      0.013000                      Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000        0.000                          Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000        0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
       Name: 1184             From Node: 1184                Length(ft): 37.00
      Group: BASE               To Node: 1180                     Count: 1
                                                        Friction Equation: Average Conveyance
            UPSTREAM       DOWNSTREAM                  Solution Algorithm: Automatic
   Geometry: Circular      Circular                                  Flow: Both
   Span(in): 15.00         15.00                       Entrance Loss Coef: 0.50
   Rise(in): 15.00         15.00                           Exit Loss Coef: 0.00
 Invert(ft): -0.430        -0.480                          Bend Loss Coef: 0.00
Manning's N: 0.013000      0.013000                      Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000        0.000                          Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000        0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
       Name: 1186             From Node: 1186                Length(ft): 65.00
      Group: BASE               To Node: 1327                     Count: 1
                                                        Friction Equation: Average Conveyance
            UPSTREAM       DOWNSTREAM                  Solution Algorithm: Automatic
   Geometry: Circular      Circular                                  Flow: Both
   Span(in): 15.00         15.00                       Entrance Loss Coef: 0.00
   Rise(in): 15.00         15.00                           Exit Loss Coef: 0.00
 Invert(ft): 0.250         0.250                           Bend Loss Coef: 0.00
Manning's N: 0.013000      0.013000                      Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000        0.000                          Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000        0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
       Name: 1188             From Node: 1188                Length(ft): 65.00
      Group: BASE               To Node: 1329                     Count: 1
                                                        Friction Equation: Average Conveyance
            UPSTREAM       DOWNSTREAM                  Solution Algorithm: Automatic
   Geometry: Circular      Circular                                  Flow: Both
   Span(in): 15.00         15.00                       Entrance Loss Coef: 0.00
   Rise(in): 15.00         15.00                           Exit Loss Coef: 0.00
 Invert(ft): 0.200         0.200                           Bend Loss Coef: 0.00
Manning's N: 0.013000      0.013000                      Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000        0.000                          Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000        0.000                         Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
```

Circular Concrete: Square edge w/ headwall

```
        Name: 1325              From Node: 1325              Length(ft): 180.00
       Group: BASE                To Node: 1180                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular        Circular                             Flow: Both
    Span(in): 30.00           30.00                  Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                      Exit Loss Coef: 0.00
  Invert(ft): -0.500          -0.680                     Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1327              From Node: 1327              Length(ft): 140.00
       Group: BASE                To Node: 1325                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular        Circular                             Flow: Both
    Span(in): 30.00           30.00                  Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                      Exit Loss Coef: 0.00
  Invert(ft): -0.500          -0.500                     Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1329              From Node: 1329              Length(ft): 110.00
       Group: BASE                To Node: 1327                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular        Circular                             Flow: Both
    Span(in): 30.00           30.00                  Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                      Exit Loss Coef: 0.00
  Invert(ft): -0.500          -0.500                     Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1334              From Node: 1334              Length(ft): 245.00
       Group: BASE                To Node: 1329                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular        Circular                             Flow: Both
    Span(in): 30.00           30.00                  Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                      Exit Loss Coef: 0.00
  Invert(ft): -0.500          -0.500                     Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                   Stabilizer Option: None
```

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------
        Name: 1335A              From Node: 1335A           Length(ft): 125.00
       Group: BASE                 To Node: 1334                 Count: 1
                                                      Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular        Circular                             Flow: Both
    Span(in): 30.00           30.00                  Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                      Exit Loss Coef: 0.00
  Invert(ft): -0.500          -0.500                     Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------
        Name: 1337               From Node: 1337            Length(ft): 220.00
       Group: BASE                 To Node: 1335A                Count: 1
                                                      Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular        Circular                             Flow: Both
    Span(in): 30.00           30.00                  Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                      Exit Loss Coef: 0.00
  Invert(ft): -0.480          -0.500                     Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------
        Name: 1338               From Node: 1338            Length(ft): 48.00
       Group: BASE                 To Node: 1337                 Count: 1
                                                      Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
    Geometry: Circular        Circular                             Flow: Both
    Span(in): 30.00           30.00                  Entrance Loss Coef: 0.00
    Rise(in): 30.00           30.00                      Exit Loss Coef: 0.00
  Invert(ft): -0.480          -0.480                     Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------
        Name: 1339               From Node: 1339            Length(ft): 153.00
       Group: BASE                 To Node: 1338                 Count: 1
                                                      Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
```

```
     Geometry: Circular        Circular                             Flow: Both
     Span(in): 30.00           30.00                  Entrance Loss Coef: 0.00
     Rise(in): 30.00           30.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.520          -0.480                     Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
         Name: 1340             From Node: 1340               Length(ft): 67.00
        Group: BASE               To Node: 1339                    Count: 1
                                                       Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Circular        Circular                             Flow: Both
     Span(in): 30.00           30.00                  Entrance Loss Coef: 0.00
     Rise(in): 30.00           30.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.500          -0.520                     Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
         Name: 1342             From Node: 1342               Length(ft): 76.00
        Group: BASE               To Node: 1340                    Count: 1
                                                       Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Circular        Circular                             Flow: Both
     Span(in): 24.00           24.00                  Entrance Loss Coef: 0.00
     Rise(in): 24.00           24.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.500          -0.500                     Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
         Name: 1343             From Node: 1343               Length(ft): 95.00
        Group: BASE               To Node: 1342                    Count: 1
                                                       Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Circular        Circular                             Flow: Both
     Span(in): 24.00           24.00                  Entrance Loss Coef: 0.00
     Rise(in): 24.00           24.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.500          -0.500                     Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
        Name: 1344                 From Node: 1344                  Length(ft): 97.00
       Group: BASE                   To Node: 1343                       Count: 1
                                                             Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                    Solution Algorithm: Automatic
    Geometry: Circular        Circular                                    Flow: Both
    Span(in): 24.00           24.00                         Entrance Loss Coef: 0.00
    Rise(in): 24.00           24.00                             Exit Loss Coef: 0.00
  Invert(ft): -0.520          -0.500                            Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                        Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                            Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                          Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
        Name: 1345                 From Node: 1345                  Length(ft): 200.00
       Group: BASE                   To Node: 1344                       Count: 1
                                                             Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                    Solution Algorithm: Automatic
    Geometry: Circular        Circular                                    Flow: Both
    Span(in): 24.00           24.00                         Entrance Loss Coef: 0.00
    Rise(in): 24.00           24.00                             Exit Loss Coef: 0.00
  Invert(ft): -0.500          -0.520                            Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                        Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                            Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                          Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
        Name: 1347                 From Node: 1347                  Length(ft): 51.00
       Group: BASE                   To Node: 1345                       Count: 1
                                                             Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                    Solution Algorithm: Automatic
    Geometry: Circular        Circular                                    Flow: Both
    Span(in): 24.00           24.00                         Entrance Loss Coef: 0.00
    Rise(in): 24.00           24.00                             Exit Loss Coef: 0.00
  Invert(ft): -0.500          -0.500                            Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                        Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                            Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                          Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
        Name: 1347A                From Node: 1347A                 Length(ft): 200.00
       Group: BASE                   To Node: 1347                       Count: 1
                                                             Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                    Solution Algorithm: Automatic
    Geometry: Circular        Circular                                    Flow: Both
    Span(in): 24.00           24.00                         Entrance Loss Coef: 0.00
    Rise(in): 24.00           24.00                             Exit Loss Coef: 0.00
  Invert(ft): -0.500          -0.500                            Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                        Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                            Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                          Stabilizer Option: None
```

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
         Name: 1348                From Node: 1348                Length(ft): 50.00
        Group: BASE                  To Node: 1347A                    Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 24.00          24.00                      Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                          Exit Loss Coef: 0.00
   Invert(ft): -0.490         -0.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
         Name: 1350                From Node: 1350                Length(ft): 40.00
        Group: BASE                  To Node: 1348                     Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 24.00          24.00                      Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                          Exit Loss Coef: 0.00
   Invert(ft): -0.500         -0.490                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
         Name: 1353                From Node: 1353                Length(ft): 47.00
        Group: BASE                  To Node: 1350                     Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 24.00          24.00                      Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                          Exit Loss Coef: 0.00
   Invert(ft): -0.480         -0.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


--------------------------------------------------------------------------------------------------------
         Name: 1354                From Node: 1354                Length(ft): 140.00
        Group: BASE                  To Node: 1353                     Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 24.00          24.00                      Entrance Loss Coef: 0.00
```

```
     Rise(in): 24.00           24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.500          -0.480                       Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
---------------------------------------------------------------------------------------------------
         Name: 1355               From Node: 1355               Length(ft): 94.00
        Group: BASE                 To Node: 1354                    Count: 1
                                                         Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular        Circular                               Flow: Both
     Span(in): 24.00           24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00           24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.540          -0.500                       Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
---------------------------------------------------------------------------------------------------
         Name: 1356               From Node: 1356               Length(ft): 110.00
        Group: BASE                 To Node: 1355                    Count: 1
                                                         Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular        Circular                               Flow: Both
     Span(in): 24.00           24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00           24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.520          -0.540                       Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
---------------------------------------------------------------------------------------------------
         Name: 1357               From Node: 1357               Length(ft): 44.00
        Group: BASE                 To Node: 1356                    Count: 1
                                                         Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular        Circular                               Flow: Both
     Span(in): 24.00           24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00           24.00                        Exit Loss Coef: 0.00
   Invert(ft): -0.520          -0.520                       Bend Loss Coef: 0.00
  Manning's N: 0.013000        0.013000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                      Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000           0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: 1359               From Node: 1359            Length(ft): 157.00
        Group: BASE                 To Node: 1357                 Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Circular       Circular                             Flow: Both
     Span(in): 24.00          24.00                  Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.500         -0.520                     Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                    Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: 1360               From Node: 1360            Length(ft): 168.00
        Group: BASE                 To Node: 1359                 Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Circular       Circular                             Flow: Both
     Span(in): 24.00          24.00                  Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.510         -0.500                     Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                    Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: 1360OUT            From Node: 1360            Length(ft): 95.00
        Group: BASE                 To Node: 1362                 Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Horz Ellipse   Horz Ellipse                         Flow: Both
     Span(in): 18.00          18.00                  Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                      Exit Loss Coef: 0.00
   Invert(ft): -0.510         1.000                      Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                    Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall


----------------------------------------------------------------------------------------------------
         Name: 1362               From Node: 1362            Length(ft): 26.00
        Group: BASE                 To Node: 1364C                Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM         DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Horz Ellipse   Horz Ellipse                         Flow: Both
     Span(in): 18.00          18.00                  Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                      Exit Loss Coef: 0.00
   Invert(ft): 1.000          1.250                      Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                    Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                   Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
```

Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

```
        Name: 1366                From Node: 1366               Length(ft): 185.00
       Group: BASE                  To Node: 1360                    Count: 1
                                                         Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular        Circular                                Flow: Both
   Span(in): 24.00            24.00                     Entrance Loss Coef: 0.00
   Rise(in): 24.00            24.00                         Exit Loss Coef: 0.00
 Invert(ft): -0.500           -0.510                        Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                       Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1367                From Node: 1367               Length(ft): 39.00
       Group: BASE                  To Node: 1366                    Count: 1
                                                         Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular        Circular                                Flow: Both
   Span(in): 24.00            24.00                     Entrance Loss Coef: 0.00
   Rise(in): 24.00            24.00                         Exit Loss Coef: 0.00
 Invert(ft): -0.480           -0.500                        Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                       Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1368                From Node: 1368               Length(ft): 151.00
       Group: BASE                  To Node: 1367                    Count: 1
                                                         Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular        Circular                                Flow: Both
   Span(in): 24.00            24.00                     Entrance Loss Coef: 0.00
   Rise(in): 24.00            24.00                         Exit Loss Coef: 0.00
 Invert(ft): -0.470           -0.480                        Bend Loss Coef: 0.00
 Manning's N: 0.013000        0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000           0.000                       Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000           0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1370                From Node: 1370               Length(ft): 50.00
       Group: BASE                  To Node: 1368                    Count: 1
                                                         Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular        Circular                                Flow: Both
   Span(in): 24.00            24.00                     Entrance Loss Coef: 0.00
   Rise(in): 24.00            24.00                         Exit Loss Coef: 0.00
 Invert(ft): -0.470           -0.470                        Bend Loss Coef: 0.00
```

```
 Manning's N: 0.013000         0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000            0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000            0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1371                From Node: 1371            Length(ft): 135.00
       Group: BASE                  To Node: 1370                 Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM         DOWNSTREAM              Solution Algorithm: Automatic
    Geometry: Circular         Circular                              Flow: Both
    Span(in): 24.00            24.00                   Entrance Loss Coef: 0.00
    Rise(in): 24.00            24.00                       Exit Loss Coef: 0.00
  Invert(ft): -0.500           -0.470                      Bend Loss Coef: 0.00
 Manning's N: 0.013000         0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000            0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000            0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1372                From Node: 1372            Length(ft): 141.00
       Group: BASE                  To Node: 1371                 Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM         DOWNSTREAM              Solution Algorithm: Automatic
    Geometry: Circular         Circular                              Flow: Both
    Span(in): 24.00            24.00                   Entrance Loss Coef: 0.00
    Rise(in): 24.00            24.00                       Exit Loss Coef: 0.00
  Invert(ft): -0.480           -0.500                      Bend Loss Coef: 0.00
 Manning's N: 0.013000         0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000            0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000            0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1373                From Node: 1373            Length(ft): 49.00
       Group: BASE                  To Node: 1372                 Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM         DOWNSTREAM              Solution Algorithm: Automatic
    Geometry: Circular         Circular                              Flow: Both
    Span(in): 24.00            24.00                   Entrance Loss Coef: 0.00
    Rise(in): 24.00            24.00                       Exit Loss Coef: 0.00
  Invert(ft): 0.200            -0.480                      Bend Loss Coef: 0.00
 Manning's N: 0.013000         0.013000                Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000            0.000                    Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000            0.000                   Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
        Name: 1373OUT             From Node: 1373            Length(ft): 80.00
```

```
        Group: BASE                To Node: 1376                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Horz Ellipse  Horz Ellipse                          Flow: Both
     Span(in): 30.00         30.00                  Entrance Loss Coef: 0.20
     Rise(in): 19.00         19.00                      Exit Loss Coef: 0.20
   Invert(ft): 0.200         0.390                      Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

```
         Name: 13766             From Node: 13766            Length(ft): 100.00
        Group: BASE                To Node: 13767                  Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Horz Ellipse  Horz Ellipse                          Flow: Both
     Span(in): 18.00         18.00                  Entrance Loss Coef: 0.20
     Rise(in): 12.00         12.00                      Exit Loss Coef: 0.20
   Invert(ft): 0.830         0.830                      Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

```
         Name: 1379              From Node: 1379             Length(ft): 108.00
        Group: BASE                To Node: 1373                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Circular      Circular                              Flow: Both
     Span(in): 18.00         18.00                  Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                      Exit Loss Coef: 0.00
   Invert(ft): 0.230         0.200                      Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
         Name: 1380              From Node: 1380             Length(ft): 30.00
        Group: BASE                To Node: 1379                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Circular      Circular                              Flow: Both
     Span(in): 18.00         18.00                  Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                      Exit Loss Coef: 0.00
   Invert(ft): 0.240         0.230                      Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000         0.000                    Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
        Name: 1381              From Node: 1381              Length(ft): 98.00
       Group: BASE                To Node: 1380                   Count: 1
                                                       Friction Equation: Average Conveyance
             UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular      Circular                                Flow: Both
    Span(in): 18.00         18.00                     Entrance Loss Coef: 0.00
    Rise(in): 18.00         18.00                         Exit Loss Coef: 0.00
  Invert(ft): 0.290         0.240                         Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
        Name: 1382              From Node: 1382              Length(ft): 63.00
       Group: BASE                To Node: 1381                   Count: 1
                                                       Friction Equation: Average Conveyance
             UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Circular      Circular                                Flow: Both
    Span(in): 18.00         18.00                     Entrance Loss Coef: 0.00
    Rise(in): 18.00         18.00                         Exit Loss Coef: 0.00
  Invert(ft): 0.330         0.290                         Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
        Name: CANAL             From Node: 1100              Length(ft): 1900.00
       Group: BASE                To Node: 1364B                  Count: 2
                                                       Friction Equation: Average Conveyance
             UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
    Geometry: Horz Ellipse  Horz Ellipse                            Flow: Both
    Span(in): 30.00         30.00                     Entrance Loss Coef: 0.20
    Rise(in): 19.00         19.00                         Exit Loss Coef: 0.50
  Invert(ft): 1.200         0.000                         Bend Loss Coef: 0.00
 Manning's N: 0.013000      0.013000                   Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall


==========================================================================================
==== Channels ============================================================================
==========================================================================================

        Name: 1010              From Node: 1000              Length(ft): 440.00
       Group: BASE                To Node: 1010                   Count: 1

             UPSTREAM       DOWNSTREAM                 Friction Equation: Average Conveyance
    Geometry: Irregular     Irregular                 Solution Algorithm: Automatic
  Invert(ft): 1.250         2.030                                   Flow: Both
TClpInitZ(ft): 9999.000     9999.000                    Contraction Coef: 0.100
```

```
   Manning's N:                                       Expansion Coef: 0.300
  Top Clip(ft): 0.000         0.000              Entrance Loss Coef: 0.000
  Bot Clip(ft): 0.000         0.000                  Exit Loss Coef: 0.000
     Main XSec: 1000          1010                 Outlet Ctrl Spec: Use dc or tw
  AuxElev1(ft): 0.000         0.000                 Inlet Ctrl Spec: Use dn
     Aux XSec1:                                   Stabilizer Option: None
  AuxElev2(ft): 0.000         0.000
     Aux XSec2:
 Top Width(ft):
     Depth(ft):
 Bot Width(ft):
  LtSdSlp(h/v):
  RtSdSlp(h/v):

----------------------------------------------------------------------------------------------------
          Name: 1020                From Node: 1010             Length(ft): 155.00
         Group: BASE                  To Node: 1020                  Count: 1

                UPSTREAM              DOWNSTREAM                Friction Equation: Average Conveyance
      Geometry: Irregular             Irregular                Solution Algorithm: Automatic
    Invert(ft): 2.030                 2.320                                  Flow: Both
 TClpInitZ(ft): 9999.000              9999.000                   Contraction Coef: 0.100
   Manning's N:                                                    Expansion Coef: 0.300
  Top Clip(ft): 0.000                 0.000                    Entrance Loss Coef: 0.000
  Bot Clip(ft): 0.000                 0.000                        Exit Loss Coef: 0.000
     Main XSec: 1010                  1020                       Outlet Ctrl Spec: Use dc or tw
  AuxElev1(ft): 0.000                 0.000                       Inlet Ctrl Spec: Use dn
     Aux XSec1:                                                 Stabilizer Option: None
  AuxElev2(ft): 0.000                 0.000
     Aux XSec2:
 Top Width(ft):
     Depth(ft):
 Bot Width(ft):
  LtSdSlp(h/v):
  RtSdSlp(h/v):

----------------------------------------------------------------------------------------------------
          Name: 1030                From Node: 1020             Length(ft): 115.00
         Group: BASE                  To Node: 1030                  Count: 1

                UPSTREAM              DOWNSTREAM                Friction Equation: Average Conveyance
      Geometry: Irregular             Irregular                Solution Algorithm: Automatic
    Invert(ft): 2.320                 1.780                                  Flow: Both
 TClpInitZ(ft): 9999.000              9999.000                   Contraction Coef: 0.100
   Manning's N:                                                    Expansion Coef: 0.300
  Top Clip(ft): 0.000                 0.000                    Entrance Loss Coef: 0.000
  Bot Clip(ft): 0.000                 0.000                        Exit Loss Coef: 0.000
     Main XSec: 1020                  1030                       Outlet Ctrl Spec: Use dc or tw
  AuxElev1(ft): 0.000                 0.000                       Inlet Ctrl Spec: Use dn
     Aux XSec1:                                                 Stabilizer Option: None
  AuxElev2(ft): 0.000                 0.000
     Aux XSec2:
 Top Width(ft):
     Depth(ft):
 Bot Width(ft):
  LtSdSlp(h/v):
  RtSdSlp(h/v):

----------------------------------------------------------------------------------------------------
          Name: 1040                From Node: 1030             Length(ft): 195.00
         Group: BASE                  To Node: 1040                  Count: 1

                UPSTREAM              DOWNSTREAM                Friction Equation: Average Conveyance
      Geometry: Irregular             Irregular                Solution Algorithm: Automatic
    Invert(ft): 1.780                 2.900                                  Flow: Both
 TClpInitZ(ft): 9999.000              9999.000                   Contraction Coef: 0.100
   Manning's N:                                                    Expansion Coef: 0.300
  Top Clip(ft): 0.000                 0.000                    Entrance Loss Coef: 0.000
  Bot Clip(ft): 0.000                 0.000                        Exit Loss Coef: 0.000
     Main XSec: 1030                  1040                       Outlet Ctrl Spec: Use dc or tw
  AuxElev1(ft): 0.000                 0.000                       Inlet Ctrl Spec: Use dn
     Aux XSec1:                                                 Stabilizer Option: None
  AuxElev2(ft): 0.000                 0.000
     Aux XSec2:
 Top Width(ft):
     Depth(ft):
 Bot Width(ft):
  LtSdSlp(h/v):
  RtSdSlp(h/v):
```

```
----------------------------------------------------------------------------------------------------
        Name: 1060                  From Node: 1050               Length(ft): 210.00
       Group: BASE                    To Node: 1100                    Count: 1

              UPSTREAM       DOWNSTREAM                     Friction Equation: Average Conveyance
    Geometry: Irregular      Irregular                     Solution Algorithm: Automatic
  Invert(ft): 2.140          0.000                                       Flow: Both
TClpInitZ(ft): 9999.000      9999.000                        Contraction Coef: 0.100
  Manning's N:                                                 Expansion Coef: 0.300
 Top Clip(ft): 0.000         0.000                         Entrance Loss Coef: 0.000
 Bot Clip(ft): 0.000         0.000                             Exit Loss Coef: 0.000
   Main XSec: 1050           1060                            Outlet Ctrl Spec: Use dc or tw
 AuxElev1(ft): 0.000         0.000                            Inlet Ctrl Spec: Use dn
   Aux XSec1:                                                Stabilizer Option: None
 AuxElev2(ft): 0.000         0.000
   Aux XSec2:
Top Width(ft):
   Depth(ft):
Bot Width(ft):
 LtSdSlp(h/v):
 RtSdSlp(h/v):


====================================================================================
==== Drop Structures ===============================================================
====================================================================================

        Name: 1118                  From Node: 1118               Length(ft): 50.00
       Group: BASE                    To Node: 1112                    Count: 1

              UPSTREAM       DOWNSTREAM                     Friction Equation: Average Conveyance
    Geometry: Circular       Circular                      Solution Algorithm: Automatic
    Span(in): 24.00          24.00                                       Flow: None
    Rise(in): 24.00          24.00                         Entrance Loss Coef: 0.000
  Invert(ft): 0.000          0.000                             Exit Loss Coef: 0.000
 Manning's N: 0.013000       0.013000                        Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                            Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                             Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure 1118 ***
                                                                                  TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Both                    Weir Disc Coef: 3.200
               Geometry: Rectangular          Orifice Disc Coef: 0.600

               Span(in): 24.00                      Invert(ft): 0.000
               Rise(in): 18.00                Control Elev(ft): 0.000

----------------------------------------------------------------------------------------------------
        Name: 1134                  From Node: 1134               Length(ft): 50.00
       Group: BASE                    To Node: 1130                    Count: 1

              UPSTREAM       DOWNSTREAM                     Friction Equation: Average Conveyance
    Geometry: Circular       Circular                      Solution Algorithm: Automatic
    Span(in): 24.00          24.00                                       Flow: None
    Rise(in): 24.00          24.00                         Entrance Loss Coef: 0.000
  Invert(ft): 0.000          0.000                             Exit Loss Coef: 0.000
 Manning's N: 0.013000       0.013000                        Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                            Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000          0.000                             Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure 1134 ***
                                                                                  TABLE
```

```
              Count: 1                         Bottom Clip(in): 0.000
               Type: Vertical: Mavis              Top Clip(in): 0.000
               Flow: Both                      Weir Disc Coef: 3.200
           Geometry: Rectangular             Orifice Disc Coef: 0.600

           Span(in): 24.00                           Invert(ft): 0.000
           Rise(in): 18.00                     Control Elev(ft): 0.000

---------------------------------------------------------------------------------------------------------
        Name: 1364C               From Node: 1364C              Length(ft): 511.00
       Group: BASE                  To Node: 1364B                   Count: 1

             UPSTREAM       DOWNSTREAM                  Friction Equation: Average Conveyance
    Geometry: Horz Ellipse  Horz Ellipse               Solution Algorithm: Automatic
    Span(in): 18.00         18.00                                    Flow: Both
    Rise(in): 12.00         12.00                      Entrance Loss Coef: 0.200
  Invert(ft): 0.580         0.920                          Exit Loss Coef: 0.200
 Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall


*** Weir 1 of 1 for Drop Structure 1364C ***
                                                                                  TABLE
              Count: 1                         Bottom Clip(in): 0.000
               Type: Vertical: Mavis              Top Clip(in): 0.000
               Flow: Both                      Weir Disc Coef: 3.200
           Geometry: Rectangular             Orifice Disc Coef: 0.600

           Span(in): 40.20                           Invert(ft): 0.720
           Rise(in): 18.00                     Control Elev(ft): 0.720

---------------------------------------------------------------------------------------------------------
        Name: 1376                From Node: 1376               Length(ft): 291.00
       Group: BASE                  To Node: 13766                   Count: 1

             UPSTREAM       DOWNSTREAM                  Friction Equation: Average Conveyance
    Geometry: Horz Ellipse  Horz Ellipse               Solution Algorithm: Automatic
    Span(in): 30.00         30.00                                    Flow: Both
    Rise(in): 19.00         19.00                      Entrance Loss Coef: 0.200
  Invert(ft): -0.800        0.830                          Exit Loss Coef: 0.200
 Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dn
Bot Clip(in): 0.000         0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall


*** Weir 1 of 1 for Drop Structure 1376 ***
                                                                                  TABLE
              Count: 1                         Bottom Clip(in): 0.000
               Type: Vertical: Mavis              Top Clip(in): 0.000
               Flow: Both                      Weir Disc Coef: 3.200
           Geometry: Rectangular             Orifice Disc Coef: 0.600

           Span(in): 31.20                           Invert(ft): 0.390
           Rise(in): 22.20                     Control Elev(ft): 0.390

==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

        Name: 1070                From Node: 1070
       Group: BASE                  To Node: 1060
        Flow: Both                    Count: 1
        Type: Vertical: Mavis      Geometry: Rectangular

             Span(in): 60.00
             Rise(in): 18.00
           Invert(ft): 0.100
```

```
    Control Elevation(ft): 0.100
                                               TABLE
          Bottom Clip(in): 0.000
             Top Clip(in): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600


-----------------------------------------------------------------------------------------------------
         Name: 1072                 From Node: 1072
        Group: BASE                   To Node: 1070
         Flow: Both                     Count: 1
         Type: Vertical: Mavis       Geometry: Rectangular

                Span(in): 96.00
                Rise(in): 24.00
              Invert(ft): 1.930
    Control Elevation(ft): 1.930
                                               TABLE
          Bottom Clip(in): 0.000
             Top Clip(in): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600


-----------------------------------------------------------------------------------------------------
         Name: 1080W                From Node: 1080
        Group: BASE                   To Node: 1100
         Flow: None                     Count: 1
         Type: Vertical: Mavis       Geometry: Irregular

                    XSec: 1080W
              Invert(ft): 4.300
    Control Elevation(ft): 4.300
   Struct Opening Dim(ft): 9999.00
                                               TABLE
          Bottom Clip(ft): 0.000
             Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600


-----------------------------------------------------------------------------------------------------
         Name: 1114W                From Node: 1114
        Group: BASE                   To Node: 1080
         Flow: Both                     Count: 1
         Type: Vertical: Mavis       Geometry: Irregular

                    XSec: 1114W
              Invert(ft): 5.180
    Control Elevation(ft): 5.180
   Struct Opening Dim(ft): 9999.00
                                               TABLE
          Bottom Clip(ft): 0.000
             Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600


-----------------------------------------------------------------------------------------------------
         Name: 1116W                From Node: 1116
        Group: BASE                   To Node: 1120
         Flow: Both                     Count: 1
         Type: Vertical: Mavis       Geometry: Irregular

                    XSec: 1116W
              Invert(ft): 5.040
    Control Elevation(ft): 5.040
   Struct Opening Dim(ft): 9999.00
                                               TABLE
          Bottom Clip(ft): 0.000
             Top Clip(ft): 0.000
       Weir Discharge Coef: 3.200
    Orifice Discharge Coef: 0.600


-----------------------------------------------------------------------------------------------------
         Name: 1144W                From Node: 1144
        Group: BASE                   To Node: 1080
         Flow: Both                     Count: 1
```

```
        Type: Vertical: Mavis      Geometry: Irregular

                    XSec: 1144W
             Invert(ft): 4.630
   Control Elevation(ft): 4.630
  Struct Opening Dim(ft): 9999.00
                                          TABLE
         Bottom Clip(ft): 0.000
            Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600

--------------------------------------------------------------------------------
        Name: 1184W                From Node: 1184
       Group: BASE                   To Node: 1144
        Flow: Both                     Count: 1
        Type: Vertical: Mavis       Geometry: Irregular

                    XSec: 1184W
             Invert(ft): 4.880
   Control Elevation(ft): 4.880
  Struct Opening Dim(ft): 9999.00
                                          TABLE
         Bottom Clip(ft): 0.000
            Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600

--------------------------------------------------------------------------------
        Name: 1329W                From Node: 1329
       Group: BASE                   To Node: 1184
        Flow: Both                     Count: 1
        Type: Vertical: Mavis       Geometry: Irregular

                    XSec: 1329W
             Invert(ft): 5.220
   Control Elevation(ft): 5.220
  Struct Opening Dim(ft): 9999.00
                                          TABLE
         Bottom Clip(ft): 0.000
            Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600

--------------------------------------------------------------------------------
        Name: 1337W                From Node: 1337
       Group: BASE                   To Node: 1329
        Flow: Both                     Count: 1
        Type: Vertical: Mavis       Geometry: Irregular

                    XSec: 1337W
             Invert(ft): 4.670
   Control Elevation(ft): 4.670
  Struct Opening Dim(ft): 9999.00
                                          TABLE
         Bottom Clip(ft): 0.000
            Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600

--------------------------------------------------------------------------------
        Name: 1347AW               From Node: 1347A
       Group: BASE                   To Node: 1337
        Flow: Both                     Count: 1
        Type: Vertical: Mavis       Geometry: Irregular

                    XSec: 1347AW
             Invert(ft): 3.240
   Control Elevation(ft): 3.240
  Struct Opening Dim(ft): 9999.00
                                          TABLE
         Bottom Clip(ft): 0.000
            Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600
```

```
--------------------------------------------------------------------------------
      Name: 1357W              From Node: 1357
     Group: BASE                 To Node: 1347A
      Flow: Both                   Count: 1
      Type: Vertical: Mavis     Geometry: Irregular

                   XSec: 1357W
             Invert(ft): 3.520
   Control Elevation(ft): 3.520
  Struct Opening Dim(ft): 9999.00
                                          TABLE
        Bottom Clip(ft): 0.000
           Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
      Name: 1360W              From Node: 1360
     Group: BASE                 To Node: 1357
      Flow: Both                   Count: 1
      Type: Vertical: Mavis     Geometry: Irregular

                   XSec: 1360W
             Invert(ft): 3.090
   Control Elevation(ft): 3.090
  Struct Opening Dim(ft): 9999.00
                                          TABLE
        Bottom Clip(ft): 0.000
           Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
      Name: 1368W              From Node: 1368
     Group: BASE                 To Node: 1360
      Flow: Both                   Count: 1
      Type: Vertical: Mavis     Geometry: Irregular

                   XSec: 1368W
             Invert(ft): 3.400
   Control Elevation(ft): 3.400
  Struct Opening Dim(ft): 9999.00
                                          TABLE
        Bottom Clip(ft): 0.000
           Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
      Name: 1372W              From Node: 1372
     Group: BASE                 To Node: 1368
      Flow: Both                   Count: 1
      Type: Vertical: Mavis     Geometry: Irregular

                   XSec: 1372W
             Invert(ft): 3.320
   Control Elevation(ft): 3.320
  Struct Opening Dim(ft): 9999.00
                                          TABLE
        Bottom Clip(ft): 0.000
           Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------
      Name: 1382W              From Node: 1382
     Group: BASE                 To Node: 1372
      Flow: Both                   Count: 1
      Type: Vertical: Mavis     Geometry: Irregular

                   XSec: 1382W
             Invert(ft): 3.320
   Control Elevation(ft): 3.320
  Struct Opening Dim(ft): 9999.00
                                          TABLE
        Bottom Clip(ft): 0.000
```

```
             Top Clip(ft): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600


==========================================================================================
==== Rating Curves =======================================================================
==========================================================================================

        Name: 1072PUMP            From Node: 1072                    Count: 1
       Group: BASE                  To Node: 1100                     Flow: Positive

              TABLE             ELEV ON(ft)      ELEV OFF(ft)
         #1: 1072PUMP           1.000            50.000
         #2:                    0.000            0.000
         #3:                    0.000            0.000
         #4:                    0.000            0.000


==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

        Name: SIM1
    Filename: Q:\04222\009-000 Beach Road\ICPR\PROPOSED\SIM1.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: FLMOD
   Rainfall Amount(in): 2.00

Time(hrs)       Print Inc(min)
--------------- ---------------
36.000          15.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

        Name: SIM1                 Hydrology Sim: SIM1
    Filename: Q:\04222\009-000 Beach Road\ICPR\PROPOSED\SIM1.I32

     Execute: Yes         Restart: No            Patch: No
 Alternative: No

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.01000
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 36.00
    Min Calc Time(sec): 0.2500               Max Calc Time(sec): 15.0000
       Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
36.000          15.000

Group           Run
--------------- -----
BASE            Yes

==========================================================================================
==== Boundary Conditions =================================================================
==========================================================================================
```

PROPOSED CONDITIONS OUTPUT

Proposed Condition with 2-inches of Rainfall; Open to Canal

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max T Outf
1000	BASE	SIM1	18.57	2.924	4.600	-0.1500	2801	12.25	0.131	18
1010	BASE	SIM1	18.56	2.924	3.800	-0.9300	3728	17.49	0.055	18
1020	BASE	SIM1	18.56	2.924	3.600	-1.2200	1629	12.22	0.233	12
1030	BASE	SIM1	18.56	2.924	3.700	-0.6800	2037	12.24	0.870	18
1040	BASE	SIM1	18.82	2.508	3.600	-1.1000	1538	18.55	0.155	18
1050	BASE	SIM1	18.85	2.270	4.900	-1.0400	906	18.78	0.165	18
1060	BASE	SIM1	0.00	1.100	4.600	*********	113	0.00	0.000	0
1070	BASE	SIM1	0.00	1.100	4.630	0.0000	113	0.00	0.000	0
1072	BASE	SIM1	0.00	1.100	4.630	-0.0111	113	0.00	0.000	0
1080	BASE	SIM1	12.43	2.031	4.300	-0.0092	144	12.19	9.851	12
1090	BASE	SIM1	12.39	2.058	4.560	0.0076	138	12.23	10.280	12
1100	BASE	SIM1	12.62	1.907	4.500	0.0004	37880	0.00	10.000	12
1110	BASE	SIM1	12.38	2.078	4.620	0.0031	249	14.07	8.882	12
1112	BASE	SIM1	12.37	2.080	4.830	-0.0006	321	12.05	0.688	11
1114	BASE	SIM1	12.05	2.599	5.180	0.0001	273	12.01	0.699	12
1116	BASE	SIM1	12.02	2.767	5.040	0.0001	142	12.00	0.355	12
1118	BASE	SIM1	26.00	3.285	6.000	0.0000	29741	12.25	1.033	0
1120	BASE	SIM1	12.38	2.073	4.260	-0.0093	115	12.00	0.296	14
1130	BASE	SIM1	12.34	2.128	4.360	0.0008	167	12.19	8.962	12
1132	BASE	SIM1	12.34	2.130	4.120	0.0005	114	12.25	0.288	10
1134	BASE	SIM1	27.00	4.334	6.000	0.0001	12262	12.50	1.397	0
1140	BASE	SIM1	12.32	2.157	4.200	-0.0010	179	12.17	8.724	12
1142	BASE	SIM1	12.32	2.161	3.720	0.0007	113	12.00	0.618	12
1144	BASE	SIM1	12.29	2.217	3.940	0.0063	116	0.00	4.096	0
1146	BASE	SIM1	12.27	2.256	5.700	-0.0083	115	12.00	1.776	0
1150	BASE	SIM1	12.32	2.180	4.490	0.0015	208	12.22	6.465	12
1151	BASE	SIM1	12.29	2.217	6.000	-0.0093	115	12.00	1.709	0
1160	BASE	SIM1	12.31	2.194	4.860	-0.0065	313	0.00	5.311	12
1161	BASE	SIM1	12.29	2.226	6.000	-0.0109	115	12.00	1.561	0
1170	BASE	SIM1	12.31	2.199	5.150	0.0061	343	12.26	4.083	12
1180	BASE	SIM1	12.31	2.210	4.920	0.0010	291	12.25	4.112	12
1182	BASE	SIM1	12.31	2.214	4.600	0.0010	113	12.00	0.511	12
1184	BASE	SIM1	12.31	2.215	4.620	0.0008	114	12.00	0.583	12
1186	BASE	SIM1	12.28	2.334	5.840	0.0004	115	12.00	2.141	12
1188	BASE	SIM1	12.30	2.251	5.600	-0.0006	115	12.00	0.702	12
1325	BASE	SIM1	12.31	2.228	5.180	0.0048	133	12.76	4.125	12
1327	BASE	SIM1	12.30	2.242	5.560	-0.0060	131	12.21	3.008	12
1329	BASE	SIM1	12.31	2.244	5.690	0.0038	137	12.04	3.483	12
1334	BASE	SIM1	12.31	2.248	5.220	-0.0036	136	1.77	0.770	12
1335A	BASE	SIM1	12.31	2.246	4.680	0.0032	135	12.04	2.554	1
1337	BASE	SIM1	12.31	2.252	5.220	-0.0065	130	9.96	2.450	12
1338	BASE	SIM1	12.30	2.244	5.320	0.0077	126	12.76	3.085	9
1339	BASE	SIM1	12.31	2.246	5.200	-0.0063	127	10.02	2.675	12
1340	BASE	SIM1	12.30	2.241	4.430	-0.0063	121	15.54	1.915	10
1342	BASE	SIM1	12.31	2.239	4.750	-0.0032	122	9.97	1.315	15
1343	BASE	SIM1	12.31	2.236	4.820	-0.0031	123	14.47	1.254	9
1344	BASE	SIM1	12.31	2.234	4.410	0.0014	128	1.92	0.653	14
1345	BASE	SIM1	12.31	2.230	3.730	-0.0018	126	14.44	2.061	1
1347	BASE	SIM1	12.31	2.229	3.880	0.0023	126	1.94	0.808	14
1347A	BASE	SIM1	12.31	2.225	3.750	0.0035	126	11.80	3.111	1
1348	BASE	SIM1	12.31	2.220	3.570	-0.0077	118	9.92	3.779	15
1350	BASE	SIM1	12.31	2.215	3.700	0.0083	117	14.07	3.251	9
1353	BASE	SIM1	12.32	2.210	3.780	-0.0048	122	1.98	1.063	14
1354	BASE	SIM1	12.32	2.201	3.850	-0.0034	125	11.76	1.311	1
1355	BASE	SIM1	12.32	2.193	3.960	0.0025	123	9.92	1.280	11
1356	BASE	SIM1	12.32	2.186	3.720	-0.0030	121	15.59	2.466	9
1357	BASE	SIM1	12.32	2.180	3.880	-0.0021	123	0.01	0.832	15
1359	BASE	SIM1	12.32	2.164	3.760	-0.0015	129	15.52	0.560	0
1360	BASE	SIM1	12.32	2.146	3.400	0.0019	134	11.83	0.972	15
1362	BASE	SIM1	12.32	2.084	3.220	0.0003	121	12.26	1.397	12
1364B	BASE	SIM1	0.00	1.100	4.000	0.0000	3409	12.54	7.175	0
1364C	BASE	SIM1	12.32	2.065	3.750	0.0006	125	12.29	1.389	12
1366	BASE	SIM1	12.32	2.140	3.730	-0.0049	124	11.82	2.982	14
1367	BASE	SIM1	12.32	2.137	3.680	0.0044	123	11.84	1.385	11
1368	BASE	SIM1	12.32	2.131	3.680	-0.0034	123	11.82	2.344	11
1370	BASE	SIM1	12.32	2.126	3.700	0.0034	122	11.84	1.216	11
1371	BASE	SIM1	12.32	2.117	3.720	-0.0022	127	11.82	0.593	11
1372	BASE	SIM1	12.32	2.108	3.380	-0.0020	127	0.01	0.036	11
1373	BASE	SIM1	12.32	2.104	3.290	-0.0003	138	12.27	0.819	12
1376	BASE	SIM1	12.32	2.078	3.780	0.0003	118	12.30	2.938	12
13766	BASE	SIM1	12.32	1.957	4.000	0.0002	134	12.31	2.935	12
13767	BASE	SIM1	0.00	1.100	4.000	0.0000	69	12.32	2.934	0
1379	BASE	SIM1	12.31	2.114	3.520	0.0007	118	12.25	0.833	12
1380	BASE	SIM1	12.31	2.119	3.600	-0.0008	118	12.25	0.850	12
1381	BASE	SIM1	12.31	2.128	3.580	0.0004	119	12.06	0.873	12
1382	BASE	SIM1	12.31	2.135	3.610	0.0004	115	12.00	0.938	12

Proposed Condition with 2-inches of Rainfall; Closed to Canal

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max T Outf
1000	BASE	SIM1	18.57	2.924	4.600	-0.1500	2801	12.25	0.131	17
1010	BASE	SIM1	18.57	2.924	3.800	-0.9300	3728	17.57	0.054	18
1020	BASE	SIM1	18.56	2.924	3.600	-1.2200	1629	12.22	0.233	12
1030	BASE	SIM1	18.56	2.924	3.700	-0.6800	2036	12.24	0.871	18
1040	BASE	SIM1	18.82	2.508	3.600	-1.1000	1538	18.55	0.155	18
1050	BASE	SIM1	18.86	2.270	4.900	-1.0400	919	18.78	0.165	18
1060	BASE	SIM1	0.00	1.100	4.600	*********	113	0.00	0.000	0
1070	BASE	SIM1	0.00	1.100	4.630	0.0000	113	0.00	0.000	0
1072	BASE	SIM1	0.00	1.100	4.630	-0.0111	113	0.00	0.000	0
1080	BASE	SIM1	12.57	2.232	4.300	-0.0096	140	12.23	12.111	12
1090	BASE	SIM1	12.50	2.265	4.560	0.0069	118	12.25	12.795	12
1100	BASE	SIM1	12.84	2.077	4.500	0.0004	42835	12.26	12.277	12
1110	BASE	SIM1	12.47	2.302	4.620	0.0064	166	12.08	6.714	12
1112	BASE	SIM1	12.46	2.302	4.830	-0.0007	307	12.05	0.688	9
1114	BASE	SIM1	12.05	2.599	5.180	0.0001	273	12.01	0.699	12
1116	BASE	SIM1	12.02	2.767	5.040	0.0001	142	12.00	0.355	12
1118	BASE	SIM1	26.00	3.285	6.000	0.0000	29741	12.25	1.033	0
1120	BASE	SIM1	12.47	2.294	4.260	0.0032	115	12.00	0.296	0
1130	BASE	SIM1	12.41	2.410	4.360	0.0009	146	12.25	11.281	12
1132	BASE	SIM1	12.41	2.412	4.120	0.0005	114	12.25	0.288	0
1134	BASE	SIM1	27.00	4.334	6.000	0.0000	12262	12.50	1.397	0
1140	BASE	SIM1	12.38	2.493	4.200	-0.0008	138	12.24	11.031	12
1142	BASE	SIM1	12.38	2.495	3.720	0.0007	113	12.00	0.618	12
1144	BASE	SIM1	12.35	2.540	3.940	0.0063	116	0.00	4.096	0
1146	BASE	SIM1	12.32	2.572	5.700	-0.0083	115	12.00	1.776	0
1150	BASE	SIM1	12.37	2.564	4.490	0.0015	146	12.29	8.993	12
1151	BASE	SIM1	12.35	2.594	6.000	-0.0093	115	12.00	1.709	0
1160	BASE	SIM1	12.37	2.601	4.860	-0.0079	136	12.34	7.872	12
1161	BASE	SIM1	12.36	2.626	6.000	-0.0109	115	12.00	1.561	0
1170	BASE	SIM1	12.37	2.618	5.150	0.0076	136	12.40	6.925	12
1180	BASE	SIM1	12.38	2.656	4.920	0.0012	144	12.39	6.920	12
1182	BASE	SIM1	12.37	2.659	4.600	0.0008	113	12.00	0.511	12
1184	BASE	SIM1	12.37	2.660	4.620	0.0007	114	12.00	0.583	12
1186	BASE	SIM1	12.36	2.851	5.840	0.0004	115	12.00	2.141	12
1188	BASE	SIM1	12.38	2.807	5.600	-0.0004	115	12.00	0.702	11
1325	BASE	SIM1	12.38	2.721	5.180	-0.0022	133	12.42	6.163	12
1327	BASE	SIM1	12.38	2.777	5.560	0.0013	131	12.41	6.154	12
1329	BASE	SIM1	12.39	2.803	5.690	-0.0025	137	12.51	4.635	12
1334	BASE	SIM1	12.39	2.830	5.220	-0.0024	136	12.54	3.898	12
1335A	BASE	SIM1	12.40	2.848	4.680	0.0030	135	12.54	3.870	12
1337	BASE	SIM1	12.40	2.874	5.220	-0.0040	130	11.95	7.482	12
1338	BASE	SIM1	12.41	2.881	5.320	0.0057	126	13.69	4.556	11
1339	BASE	SIM1	12.41	2.893	5.200	-0.0061	127	11.92	6.105	13
1340	BASE	SIM1	12.41	2.901	4.430	0.0041	121	12.60	3.032	11
1342	BASE	SIM1	12.42	2.924	4.750	-0.0034	122	12.59	3.002	12
1343	BASE	SIM1	12.43	2.950	4.820	0.0029	123	12.58	2.973	12
1344	BASE	SIM1	12.43	2.977	4.410	-0.0024	128	12.57	2.943	12
1345	BASE	SIM1	12.44	3.020	3.730	0.0023	126	12.56	2.916	12
1347	BASE	SIM1	12.44	3.040	3.880	-0.0024	126	12.55	2.890	12
1347A	BASE	SIM1	12.45	3.084	3.750	0.0027	126	19.09	3.384	12
1348	BASE	SIM1	12.45	3.097	3.570	-0.0041	118	11.16	4.136	19
1350	BASE	SIM1	12.45	3.109	3.700	0.0044	117	18.18	3.463	11
1353	BASE	SIM1	12.46	3.122	3.780	-0.0031	122	12.56	2.338	18
1354	BASE	SIM1	12.46	3.145	3.850	0.0020	125	12.54	2.314	12
1355	BASE	SIM1	12.46	3.162	3.960	0.0024	123	12.51	2.295	12
1356	BASE	SIM1	12.46	3.182	3.720	0.0024	121	22.20	2.992	12
1357	BASE	SIM1	12.46	3.195	3.880	0.0021	123	12.42	2.293	22
1359	BASE	SIM1	12.46	3.206	3.760	0.0014	129	12.64	1.859	12
1360	BASE	SIM1	12.46	3.217	3.400	0.0013	131	12.42	1.937	12
1362	BASE	SIM1	0.00	1.100	3.220	0.0000	123	0.00	0.000	0
1364B	BASE	SIM1	0.00	1.100	4.000	0.0000	3409	12.84	7.365	0
1364C	BASE	SIM1	0.00	1.100	3.750	0.0000	117	0.00	0.000	0
1366	BASE	SIM1	12.46	3.228	3.730	-0.0025	124	15.10	1.565	12
1367	BASE	SIM1	12.46	3.233	3.680	0.0025	123	16.58	1.686	15
1368	BASE	SIM1	12.46	3.243	3.680	-0.0025	123	15.10	1.618	16
1370	BASE	SIM1	12.46	3.246	3.700	0.0025	122	16.58	1.552	15
1371	BASE	SIM1	12.46	3.252	3.720	0.0029	127	15.11	1.709	16
1372	BASE	SIM1	12.46	3.258	3.380	0.0095	123	11.75	8.093	15
1373	BASE	SIM1	12.46	3.259	3.290	-0.0069	120	15.11	0.947	15
1376	BASE	SIM1	0.00	1.100	3.780	0.0000	113	0.00	0.000	0
13766	BASE	SIM1	0.00	1.100	4.000	0.0000	182	0.00	0.000	0
13767	BASE	SIM1	0.00	1.100	4.000	0.0000	69	0.00	0.000	0
1379	BASE	SIM1	12.46	3.266	3.520	0.0014	118	11.81	1.237	15
1380	BASE	SIM1	12.46	3.269	3.600	-0.0011	118	12.25	0.738	11
1381	BASE	SIM1	12.46	3.275	3.580	0.0008	119	12.19	0.813	12
1382	BASE	SIM1	12.46	3.279	3.610	0.0008	115	12.00	0.938	12

Proposed Condition with 3-inches of Rainfall; Open to Canal

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max T Outf
1000	BASE	SIM1	12.79	3.122	4.600	-0.1500	3152	12.25	0.610	13
1010	BASE	SIM1	12.79	3.121	3.800	-0.9300	4152	12.89	0.399	13
1020	BASE	SIM1	12.79	3.121	3.600	-1.2200	1832	12.54	1.323	12
1030	BASE	SIM1	12.78	3.116	3.700	-0.6800	2282	12.53	2.185	12
1040	BASE	SIM1	12.80	3.081	3.600	-1.1000	1737	12.53	2.147	12
1050	BASE	SIM1	12.87	2.536	4.900	-1.0400	3826	12.71	2.120	13
1060	BASE	SIM1	0.00	1.100	4.600	*********	113	0.00	0.000	0
1070	BASE	SIM1	0.00	1.100	4.630	0.0000	113	0.00	0.000	0
1072	BASE	SIM1	0.00	1.100	4.630	-0.0111	113	0.00	0.000	0
1080	BASE	SIM1	12.43	2.606	4.300	-0.0132	133	12.19	17.833	12
1090	BASE	SIM1	12.40	2.655	4.560	-0.0139	118	12.16	17.622	12
1100	BASE	SIM1	12.80	2.347	4.500	0.0004	50540	12.20	18.592	12
1110	BASE	SIM1	12.35	2.798	4.620	-0.0090	145	12.16	14.820	12
1112	BASE	SIM1	12.33	2.812	4.830	-0.0006	264	12.01	1.222	12
1114	BASE	SIM1	12.31	2.848	5.180	0.0001	291	12.01	1.219	12
1116	BASE	SIM1	12.29	2.880	5.040	-0.0001	144	12.00	0.617	12
1118	BASE	SIM1	26.00	3.620	6.000	0.0000	30910	12.25	2.482	0
1120	BASE	SIM1	12.35	2.794	4.260	-0.0094	114	12.00	0.514	13
1130	BASE	SIM1	12.28	3.074	4.360	-0.0011	146	12.19	16.206	12
1132	BASE	SIM1	12.28	3.090	4.120	0.0005	114	12.00	0.817	12
1134	BASE	SIM1	27.00	5.617	6.000	0.0002	15130	12.25	3.480	0
1140	BASE	SIM1	12.27	3.242	4.200	0.0012	138	12.18	15.449	12
1142	BASE	SIM1	12.26	3.254	3.720	0.0007	113	12.00	1.073	12
1144	BASE	SIM1	12.23	3.415	3.940	0.0063	116	0.00	4.096	12
1146	BASE	SIM1	12.20	3.522	5.700	-0.0083	115	12.00	2.715	0
1150	BASE	SIM1	12.26	3.367	4.490	-0.0017	145	12.21	11.792	12
1151	BASE	SIM1	12.24	3.470	6.000	-0.0093	115	12.00	2.611	0
1160	BASE	SIM1	12.26	3.456	4.860	-0.0065	134	12.25	9.804	12
1161	BASE	SIM1	12.25	3.541	6.000	-0.0109	115	12.00	2.386	0
1170	BASE	SIM1	12.26	3.493	5.150	0.0061	136	12.31	8.081	12
1180	BASE	SIM1	12.27	3.560	4.920	0.0015	144	12.30	8.062	12
1182	BASE	SIM1	12.26	3.580	4.600	0.0011	113	12.00	1.278	12
1184	BASE	SIM1	12.26	3.574	4.620	0.0009	114	12.00	1.012	12
1186	BASE	SIM1	12.25	3.913	5.840	0.0007	115	12.00	3.279	12
1188	BASE	SIM1	12.27	3.713	5.600	0.0007	115	12.00	1.072	12
1325	BASE	SIM1	12.27	3.626	5.180	-0.0012	133	12.35	6.319	12
1327	BASE	SIM1	12.27	3.683	5.560	0.0020	131	12.35	6.291	12
1329	BASE	SIM1	12.28	3.697	5.690	0.0027	137	12.15	4.196	12
1334	BASE	SIM1	12.28	3.701	5.220	-0.0031	136	12.46	1.947	11
1335A	BASE	SIM1	12.28	3.703	4.680	0.0045	135	12.35	3.134	12
1337	BASE	SIM1	12.28	3.714	5.220	-0.0093	130	11.59	3.745	12
1338	BASE	SIM1	12.28	3.705	5.320	0.0082	126	12.47	2.844	16
1339	BASE	SIM1	12.28	3.710	5.200	-0.0054	127	16.06	3.591	12
1340	BASE	SIM1	12.28	3.704	4.430	0.0055	121	20.30	1.915	16
1342	BASE	SIM1	12.28	3.708	4.750	0.0037	122	11.20	1.361	20
1343	BASE	SIM1	12.28	3.704	4.820	-0.0029	123	17.11	1.278	11
1344	BASE	SIM1	12.28	3.706	4.410	0.0025	128	11.59	0.769	17
1345	BASE	SIM1	12.28	3.704	3.730	0.0026	126	17.04	2.065	11
1347	BASE	SIM1	12.28	3.706	3.880	0.0024	126	11.59	0.996	17
1347A	BASE	SIM1	12.28	3.703	3.750	0.0052	126	20.31	2.887	11
1348	BASE	SIM1	12.29	3.696	3.570	-0.0068	118	7.71	3.781	20
1350	BASE	SIM1	12.29	3.690	3.700	0.0072	117	20.31	3.061	7
1353	BASE	SIM1	12.29	3.683	3.780	-0.0045	122	11.59	1.117	20
1354	BASE	SIM1	12.29	3.671	3.850	0.0030	125	19.99	1.312	11
1355	BASE	SIM1	12.30	3.662	3.960	0.0031	123	11.32	1.419	19
1356	BASE	SIM1	12.30	3.652	3.720	-0.0030	121	17.13	2.474	11
1357	BASE	SIM1	12.30	3.646	3.880	-0.0027	123	11.59	0.964	17
1359	BASE	SIM1	12.30	3.642	3.760	-0.0015	129	20.20	0.558	0
1360	BASE	SIM1	12.30	3.639	3.400	0.0020	134	11.59	1.097	20
1362	BASE	SIM1	12.31	3.377	3.220	0.0006	118	12.26	2.783	12
1364B	BASE	SIM1	0.00	1.100	4.000	0.0000	3409	12.63	11.852	0
1364C	BASE	SIM1	12.31	3.248	3.750	0.0006	114	12.28	2.760	12
1366	BASE	SIM1	12.30	3.631	3.730	0.0038	124	15.83	3.076	11
1367	BASE	SIM1	12.30	3.627	3.680	-0.0044	123	11.59	1.452	15
1368	BASE	SIM1	12.30	3.620	3.680	-0.0042	123	15.83	2.585	11
1370	BASE	SIM1	12.30	3.616	3.700	0.0044	122	11.59	1.204	15
1371	BASE	SIM1	12.30	3.609	3.720	-0.0028	127	35.86	0.590	11
1372	BASE	SIM1	12.30	3.602	3.380	0.0016	123	0.01	0.036	35
1373	BASE	SIM1	12.30	3.530	3.290	0.0006	125	12.13	1.769	12
1376	BASE	SIM1	12.31	3.383	3.780	0.0029	118	12.28	6.620	12
13766	BASE	SIM1	12.31	2.975	4.000	-0.0029	129	12.30	6.604	12
13767	BASE	SIM1	0.00	1.100	4.000	0.0000	69	12.31	6.600	0
1379	BASE	SIM1	12.30	3.554	3.520	0.0006	118	12.08	1.884	12
1380	BASE	SIM1	12.30	3.567	3.600	0.0006	118	12.05	2.008	12
1381	BASE	SIM1	12.30	3.589	3.580	0.0006	119	12.01	2.165	12
1382	BASE	SIM1	12.30	3.607	3.610	0.0006	115	12.00	2.346	12

Proposed Condition with 3-inches of Rainfall; Closed to Canal

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max T Outf
1000	BASE	SIM1	12.79	3.122	4.600	-0.1500	3152	12.25	0.610	13
1010	BASE	SIM1	12.79	3.121	3.800	-0.9300	4152	12.89	0.399	13
1020	BASE	SIM1	12.79	3.121	3.600	-1.2200	1832	12.54	1.323	12
1030	BASE	SIM1	12.78	3.116	3.700	-0.6800	2282	12.53	2.185	12
1040	BASE	SIM1	12.80	3.081	3.600	-1.1000	1737	12.53	2.147	12
1050	BASE	SIM1	13.15	2.712	4.900	-1.0400	3898	12.71	2.120	13
1060	BASE	SIM1	0.00	1.100	4.600	*********	113	0.00	0.000	0
1070	BASE	SIM1	0.00	1.100	4.630	0.0000	113	0.00	0.000	0
1072	BASE	SIM1	0.00	1.100	4.630	-0.0111	113	0.00	0.000	0
1080	BASE	SIM1	12.26	2.866	4.300	0.0362	121	12.26	23.079	12
1090	BASE	SIM1	12.26	2.941	4.560	-0.0139	117	12.29	21.216	12
1100	BASE	SIM1	13.14	2.673	4.500	0.0004	58750	12.26	36.502	13
1110	BASE	SIM1	12.27	3.175	4.620	-0.0064	145	12.29	23.235	12
1112	BASE	SIM1	12.28	3.195	4.830	-0.0007	218	11.97	1.074	12
1114	BASE	SIM1	12.29	3.212	5.180	0.0004	268	12.01	1.219	11
1116	BASE	SIM1	12.29	3.217	5.040	0.0003	145	12.00	0.617	12
1118	BASE	SIM1	26.00	3.620	6.000	0.0000	30910	12.25	2.482	0
1120	BASE	SIM1	12.27	3.178	4.260	0.0081	114	12.00	0.514	14
1130	BASE	SIM1	12.28	3.627	4.360	0.0011	146	12.21	19.976	12
1132	BASE	SIM1	12.28	3.642	4.120	0.0008	114	12.00	0.817	12
1134	BASE	SIM1	27.00	5.617	6.000	0.0001	15130	12.25	3.480	0
1140	BASE	SIM1	12.28	3.896	4.200	0.0009	138	12.21	19.268	12
1142	BASE	SIM1	12.28	3.907	3.720	0.0009	113	12.00	1.073	12
1144	BASE	SIM1	12.27	4.055	3.940	0.0063	116	0.00	4.096	12
1146	BASE	SIM1	12.26	4.148	5.700	-0.0083	115	12.00	2.715	0
1150	BASE	SIM1	12.29	4.122	4.490	0.0015	145	12.34	15.895	12
1151	BASE	SIM1	12.29	4.212	6.000	-0.0093	939	12.00	2.611	0
1160	BASE	SIM1	12.29	4.304	4.860	-0.0065	134	12.55	14.323	12
1161	BASE	SIM1	12.28	4.381	6.000	-0.0109	115	12.00	2.386	0
1170	BASE	SIM1	12.30	4.392	5.150	0.0060	136	12.74	13.406	12
1180	BASE	SIM1	12.30	4.549	4.920	0.0012	144	12.65	13.305	12
1182	BASE	SIM1	12.30	4.566	4.600	0.0012	113	12.00	1.278	12
1184	BASE	SIM1	12.30	4.561	4.620	0.0012	114	12.00	1.012	12
1186	BASE	SIM1	12.44	5.009	5.840	-0.0034	9892	12.00	3.279	12
1188	BASE	SIM1	12.50	4.971	5.600	-0.0062	12855	12.00	1.072	12
1325	BASE	SIM1	12.32	4.743	5.180	-0.0024	133	12.73	12.364	12
1327	BASE	SIM1	12.33	4.914	5.560	0.0014	131	12.72	12.235	12
1329	BASE	SIM1	12.33	5.011	5.690	-0.0025	137	12.33	31.381	12
1334	BASE	SIM1	12.33	5.032	5.220	0.0015	136	12.99	7.339	12
1335A	BASE	SIM1	12.33	5.030	4.680	0.0030	135	12.15	10.550	12
1337	BASE	SIM1	12.32	5.224	5.220	0.0047	130	11.99	7.140	12
1338	BASE	SIM1	12.33	5.058	5.320	0.0065	126	11.73	4.346	11
1339	BASE	SIM1	12.33	5.068	5.200	-0.0055	127	11.41	4.546	11
1340	BASE	SIM1	12.33	5.064	4.430	0.0057	121	13.31	2.891	11
1342	BASE	SIM1	12.33	5.066	4.750	0.0033	122	13.31	2.839	13
1343	BASE	SIM1	12.33	5.064	4.820	-0.0029	123	13.32	2.788	13
1344	BASE	SIM1	12.33	5.065	4.410	-0.0024	128	13.32	2.735	13
1345	BASE	SIM1	12.33	5.063	3.730	-0.0026	126	13.32	2.683	13
1347	BASE	SIM1	12.33	5.068	3.880	0.0026	126	13.32	2.632	13
1347A	BASE	SIM1	12.32	4.779	3.750	-0.0029	126	12.32	280.631	11
1348	BASE	SIM1	12.33	5.064	3.570	0.0047	118	9.54	4.162	12
1350	BASE	SIM1	12.33	5.055	3.700	-0.0046	117	25.40	3.454	9
1353	BASE	SIM1	12.33	5.058	3.780	0.0033	122	11.97	2.651	25
1354	BASE	SIM1	12.33	5.056	3.850	-0.0026	125	11.97	2.941	11
1355	BASE	SIM1	12.33	5.058	3.960	0.0028	123	11.97	3.227	11
1356	BASE	SIM1	12.33	5.050	3.720	-0.0030	121	12.31	12.042	11
1357	BASE	SIM1	12.32	5.402	3.880	-0.0061	123	12.00	5.683	12
1359	BASE	SIM1	12.32	5.062	3.760	-0.0019	129	11.92	2.158	11
1360	BASE	SIM1	12.32	4.710	3.400	0.0085	131	12.32	348.500	12
1362	BASE	SIM1	0.00	1.100	3.220	0.0000	123	0.00	0.000	0
1364B	BASE	SIM1	0.00	1.100	4.000	0.0000	3409	13.14	12.275	0
1364C	BASE	SIM1	0.00	1.100	3.750	0.0000	117	0.00	0.000	0
1366	BASE	SIM1	12.32	5.081	3.730	0.0029	124	11.41	1.830	12
1367	BASE	SIM1	12.32	5.071	3.680	0.0032	123	12.31	9.076	11
1368	BASE	SIM1	12.32	5.443	3.680	0.0047	123	11.99	3.490	12
1370	BASE	SIM1	12.32	5.083	3.700	0.0031	122	12.31	1.817	11
1371	BASE	SIM1	12.32	5.097	3.720	0.0032	127	11.94	1.980	12
1372	BASE	SIM1	12.32	4.754	3.380	-0.0092	123	12.32	318.981	11
1373	BASE	SIM1	12.32	5.128	3.290	-0.0069	120	11.36	0.967	12
1376	BASE	SIM1	0.00	1.100	3.780	0.0000	113	0.00	0.000	0
13766	BASE	SIM1	0.00	1.100	4.000	0.0000	182	0.00	0.000	0
13767	BASE	SIM1	0.00	1.100	4.000	0.0000	69	0.00	0.000	0
1379	BASE	SIM1	12.32	5.127	3.520	-0.0016	118	11.55	1.253	11
1380	BASE	SIM1	12.32	5.129	3.600	0.0016	118	11.93	1.344	11
1381	BASE	SIM1	12.32	5.129	3.580	0.0010	119	12.30	4.327	11
1382	BASE	SIM1	12.32	5.329	3.610	0.0023	115	12.00	2.346	12

APPENDIX J

SWFWMD PRE-APPLICATION MEETING MINUTES

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER: PA 3354

Date:	April 12, 2005 11:00 a.m.
Project Name:	BEACH ROAD IMPROVEMENTS
Attendees:	Joe Hickle, P.E. w/WilsonMiller , Mike Jones (Environmental Services –Sarasota County), Ray Kurz, P.E.(Post Buckley),Peter Peduzzi, P.E. (Sarasota County Project Manager), Theresa Connor (General Manager/Stormwater Resources) - David Z. Sua, P.E. and Edward M. Craig[IV], CPSS w/ the District

County:	Sarasota	**Sec/Twp/Rge:**	13/37S/17E
Total Land Acreage:		**Project Acreage:**	

Prior On-Site/Off-Site Permit Activity:

- An MSSW No. 40005814.000-.002 is associated with Beach Road, entitled "Sarasota County - Beach Road" issued July 19, 1991 (CSW / DLW, formerly of the District, were the District evaluators).

Project Overview:

- Reported that bacterial pollutants are migrating from the stormwater runoff from the surrounding areas and into the Gulf where the public beach areas are. The design is targeted to improve the non-human bacterial concerns associated with the water quality challenges. A major point of concern was reported to improve upon the public health and safety concerns.
- Several options being discussed include enhancing / enlarging the existing stormwater management pond located along the south side of Beach Road, and due east of Beach Way Drive, improvements to the internal / existing stormwater drainage conveyance pipes, creation of a salt marsh habitat, open water features, parking, trails, gazebos, and recreational areas.
- There are some canals located waterward of the Gulf of Mexico, reported as upland cut canals, that is proposed to receive additional discharges of stormwater.

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)

- At the above referenced location of the existing stormwater pond and possible future expansion… It was reported that there are no wetlands located within this project area locale. PBS&J, Inc. staff evaluated the area that may draw concern and reported that this area was a historical sand dune that has been scraped down and now persists with Australian pine and Brazilian pepper, both nuisance and exotic species. It was commented that this particular area does show signs of wetness, but expressed as merely surrounding surface water contributing area draining to and through this site location. District staff will need to field verify this area relative to wetland / surface water habitat value, indicators, etc… Based on the descriptive assessment of this area by PBS&J and Sarasota County Government staff, this area may not be of a major concern environmentally.
- However, an 'informal wetland and surface water boundary determination' request is recommended to be submitted to the District for District staff field verification prior to application submittal. The delineatyion of these areas conducted pursuant to Ch. 62-340, F.A.C. Include in the submittal, at minimum, a USDA-NRCS soil survey, USGS topographic map, aerial map, and location map. District staff will need to evaluate the habitat value pursuant to Subsection 3.2.2.3 of the Basis of Review (B.O.R.) associated with the wetland and/or surface water features.
- Address secondary impacts pursuant to Subsection 3.2.7 of the Basis of Review (e.g., water quantity, water quality, threatened and endangered species, etc…), where applicable.
- It was inquired if the area of salt marsh creation could be included for mitigation credits. This option may be limited due to the legal requirements associated with mitigation credit ROMA or Mitigation Bank requirements. This option will need to be further evaluated during the permit evaluation phase.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)

- Use NRCS estimate of seasonal high at the new pond expansion area. For the hydraulic modeling, use practical available data for the receiving area.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)

- A new pumping assembly is contemplated with emergency overflow. Note that there is already an existing pumping station in the are of the existing pond. Assure that modeling demonstrates that no adverse quantity impacts will occur in the receiving area.
- Peak discharge attenuation is not going to drive this design. The existing system fills up rapidly, per the consultants. The pumping will be based on that storm that the system can currently handle, with an emergency overflow. A 5yr storm is contemplated.
- A ditch block is proposed in the southerly existing outfall ditch. Assure it is has a concrete core that extends a minimum of 2 feet into the ditch sides. Set the crest elevation of the overflow such that excess southerly discharges do not cause adverse water quantity impacts to adjacent property (flows overtopping the ditch banks).

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)

- This is a quality retrofit project. However, pumped discharges to the northerly Grand Canal will require hydraulic assessment, to demonstrate that adverse quantity impacts will not occur at the new discharge location.
- The new pond could create a new bird habitat and therefore result in northerly discharges that cause or contribute to possible violations of quality standards in the new receiving area. Additional BMP treatment chamber will be placed online with a wet detention system. A monitoring program will be proposed/required, with background sampling locations and parameters as well as criteria for success proposal, and a request for cessation of monitoring. Such proposal will be reviewed by staff, and may be required to be adjusted, as may be practical or necessary to protect the District's interest in not permitting a project that causes/contributes to violations of state water quality standards.
- Look into providing redundancy in the new pumping facility, like auxiliary power supply. Try to set the intake at the downstream area to which filtered runoff is discharged. A dual chambered pond system may be considered.
- Assure that reasonable assurance is provided that the new facilities will improve the water quality at the new receiving area. Data on the performance of the chambered filtration device will be helpful.
- Design the northerly outfall so that pumped inflows do not cause a sediment migration and delta formation problem in the receiving area of Grand Canal.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)

- Any activities proposed in Sovereign Submerged Lands will need to attain proprietary authorizations pursuant to Ch. 18-20 and/or 18-21, F.A.C., where applicable. A title determination with the Division of Submerged Lands in Tallahassee is recommended to be performed by the applicant prior to application submittal.
- If SSL proprietary authorizations are requested, provide a completed ERP Application Section G. ($200.00 fee required, additional fees may be requested depending upon the proprietary authorization requested).

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)

- Provide legal ownership and control.
- Refer to Subsection 6.1(h) of the Basis of Review and address this design alternative condition.
- The concurrence of the northerly receiving system for the new point of discharge will be necessary. Note that the County has powers of eminent domain. Therefore if new rights-of-way will be required for the project then the names and addresses of the current owners of such properties will be required. Otherwise, provide copies of the fee simple deed of ownership over the project area.

Application Type and Fee Required:

- A Standard General (all other projects) ERP Application appears to qualify for this project, as discussed, if the qualifying wetland and/or surface water dredging and filling impacts are less than 1.0 acre in size ($1,600.00 fee appears to qualify). Provide a completed ERP Application Sections A., C., and E. with supporting calculations and information.

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

- it appears some of the project area could falls within the 'coastal construction control line'. Please refer to Tab C. of the ERP Manual under the Operating Agreement between FDEP and the SWFWMD, Section II, Part A(1)(j) for the responsibilities on authorization delegations between FDEP and the SWFWMD.
- Check for contaminated sites through FDEP. Provide any letters for the FDEP on their take on the CCCL. No work is currently proposed water ward of this line.
- Provide comments from the Division of Historical Resources for possible archeological artifacts.

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

DZS 4/12/09 EMC 04-12-05

David Z. Sua, P.E. and Edward M. Craig[IV], CPSS

APPENDIX K

SARASOTA COUNTY DRAFT REPORT REVIEW COMMENTS

4222-9
JEH
MDM
TB

SARASOTA COUNTY
"Dedicated to Quality Service"

RECEIVED
AUG 17 2005
WilsonMiller, Inc.

August 15, 2005

Mr. Joseph Hickle, P.E.
Wilson Miller, Inc.
6900 Professional Parkway East, Suite 100
Sarasota, Florida 34240-8414

Subject: Beach Road Drainage Improvements Feasibility Study
Review Comments – Draft Report

Dear Mr. Hickle:

We thank you for the above mentioned draft report received on June 22, 2005. We offer the following comments for review and discussion. A follow-up meeting will be scheduled in September to review the report and you can present the recommendations with the project team.

1. Show a sample of each typical treatment alternative system identified in the report. Typical schematic of what they look like or sample detail cut sheets of how they work.
2. Ultraviolet (UV) was the preferred treatment method, how many units would be needed for this site and do we need to make any arrangements for electrical service upgrades?
3. Refer to the cost estimate, page 27, should line items be added for directional drilling crossing Beach Road and seawall connection/ flow dispersion unit?
4. Please provide an estimate of the annual operation and maintenance costs of the selected treatment system.
5. Based on the permitting requirements, it there any annual costs that could be estimated for the additional water quality testing?
6. Will there need to be any ditch bank improvements near or upstream of the concrete dam, so water will not flow around the structure?
7. Refer to page 14, Alternative 1, What is the recommend cleaning and maintenance schedule of the Beach Road piping system. Is there a level of sand or criteria level that could be an indicator for regular pipe cleaning for this specific area?
8. This project may take some time to be funded and master plan developed for the park; are there any recommendations or any improvements now that the County can do along the existing ditch outfall to the beach? Would it be in our best interest to break sunlight to the existing ditch discharge, do some overhead clearing of the exotic vegetation and pruning mangroves?

PUBLIC WORKS • WATERSHED MANAGEMENT • 1001 Sarasota Center Boulevard • Sarasota, FL 34240
Tel: 941 861-0910 • Fax: 941 861-0986

9. Enlarge the appendix H graphics to ledger size (11x17) and fold into the report.

10. Comment note by Theresa Connor. It is not clear if any habitat will be affected by the construction of the concrete ditch block and do we need to keep saltwater in the ditch?

11. Comment note by Theresa Connor. Will a permit be needed to construction of the ditch block?

12. Drainage report review:

    a. Please provide templates with changes in model from existing to proposed.
    b. Please confirm which rainfall data and hydrology control rainfall distribution was used and clarify design storm criteria i.e.: 10year - 24 hour storm.
    c. Warnings should be corrected.
    d. Please illustrate location of low point of weir (4.33) and illustrate cross section location for the following weirs: 1337W.
    e. Confirm which rainfall amount was used, hydrology simulations have 3 inches but data used only 2 inches.
    f. Please use UH100C unit hydrograph for pre-development conditions.
    g. Please clarify if the nodes with the nomenclature MH are manholes.
    h. Show storm crossing from 1188 to 1329 and 1186 to 1327 on nodal map.
    i. Please illustrate pipe length and/or invert for pipes on both the nodal map and the conceptual basin drawings for the following: 1161, 1151, 1146, 1144, 1134,1132,1112, 1080,1325,1188,1186,1146,1144,1132.
    j. Pipe dimensions for 1116 in model do not correlate to data on nodal map.
    k. Please clarify why 1072Pump has only positive flow. The help screen on the ICPR model indicates if positive flow is selected and the tailwater is higher than the head water the program reads it as zero flow.
    l. Illustrate following nodes on nodal map: 1072, 1134, 1118, 1046, and 1134.
    m. Check upstream invert on channel 1060.
    n. There are increases in the nodal path from 1382 to 1345 that have increased above warning stages from existing to proposed conditions, please adjust data or explain increases.
    o. Node 1335A has a max stage that is higher than its warning stage.
    p. Pipe 1337 length on conceptual drainage improvements does not coincide with length in model.
    q. Inverts downstream of pipe 1130 in model do not coincide with inverts on conceptual drainage improvements
    r. Illustrate pipe "CANAL" on the conceptual drainage plan or clarify.
    s. Pleases clarify direction of flow on channel 1060.
    t. Please illustrate location of "concrete ditch block weir" in ICPR model.

13. Environmental Services notes by Kathy Meaux. The report looks pretty good. The graph on page 18 is slightly off. The values for the samples do not match the graph. Also, the standard for a one grab sample is 800 cfu/100 ml, but it does not matter for this event, since all samples exceeded that also. I like the recommendation of expanding the existing

stormwater retention pond and installing the pump system. The other park enhancements would be a big plus. I don't think you would have any problem with getting the public "buy-in". We would, of course, help out with the monitoring of a new system.

14. Parks & Recreation memo dated August 11, 2005 from Rob LaDue. Beaches and Natural Areas Parks staff have reviewed the subject PBS&J report, dated June 15, 2005 and have the following comments/questions:

1) Page 1 of the report indicates that "although *no evidence of a human source was found for the indicator bacteria within the stormwater system*, there was evidence that the stormwater conveyance system is acting as a reservoir, or breeding ground for indicator bacteria. Rainfall flushes high bacterial loads through the system, and probably re-suspends bacteria living in the sediments of the stormwater pipe, a vault structure, and drainage ditch, further elevating the load to receiving waters at the beach." Page 3 of the report indicates that the existing "vault-pond-ditch system has been considered a *possible* source of indicator bacteria at Siesta Key Beach." This information would strongly suggest that we are unsure whether the stormwater conveyance system is to blame for the problem, or if other sources (e.g., another stormwater system) might not be to blame. Given the cost to the County to implement the recommended alternative, might more definitive testing be initiated to verify that this system is the sole problem?

2) The legibility of the Appendix H aerial overlay keys was impossible to read and did not include a drawing for Alternative No. 3. However, it was evident from the drawings that construction proposed within Alternative Nos.1, 2, and the "Overall Site Plan" would impact native coastal hammock habitat that exists in the park. Pursuant to Policy II.2.a. of the *Guiding Principles for Evaluating Development Proposals in Native Habitats* Section of Chapter 2 (*Environment Chapter*) of the *Sarasota County Comprehensive Plan, clusters of overstory and understory coastal hammock vegetation shall be left undisturbed.* The extent of the impacts should be quantified with a habitat delineation survey for further review and comment.

3) Portions of the proposed construction located outside of the coastal hammock habitat will displace future park needs that are being identified for Siesta Public Beach (e.g., picnicking and parking areas). Parks and Recreation staff are reviewing options for a Siesta Beach Park Master Plan for this site, including a trail system. The proposed trail system shown on the Appendix H plans may be inadequate to meet identified needs (e.g., jogging trails will complete a loop). Until such time as Parks and Recreation staff has completed the Master Planning process, including public input and securing funding, design details for this stormwater system is premature.

4) The existing stormwater conveyance ditch that extends along the western edge of the project (shown in purple on the Appendix H drawings) contains mitigation that was previously required by the Florida Department of Environmental Protection (FDEP) for prior drainage improvements to Beach Road. This mitigation consists of mangroves that were installed within the ditch. Pursuant to Policy III.2.a. of the

Guiding Principles for Evaluating Development Proposals in Native Habitats Section of Chapter 2 (*Environment Chapter*) of the *Sarasota County Comprehensive Plan, mangrove swamp shall be preserved or enhanced.* It is unclear whether any impacts are proposed by this project to this area. The extent of any impacts should be quantified with a habitat delineation survey for further review and comment.

Should you have any questions, please contact me at (941) 861-0523.

Sincerely,

Peter Peduzzi

Peter A. Peduzzi, P.E.
Engineering Section Supervisor
Watershed Management

cc: Theresa Connor, P.E., General Manager, Watershed Management
Rodger Rasbury, General Manager, Program Management, Environmental Services
Kirk Bagley, CFM, Manager, Operations and Maintenance, Watershed Management
Jon Kramer, Acting Engineering Manager, Watershed Management
Scott Woodman, P.E., Planning Section Supervisor, Watershed Management
Lauren Torres, E.I., Project Manager, Watershed Management
Kathy Meaux, Environmental Specialist III, Environmental Services
Mike Jones, Environmental Specialist III, Natural Resources, EnSvcs
George Tatge, Manager, Beaches and Natural Area Parks, Parks & Recreation
Rob W. LaDue, Parks Supervisor, Beaches and Natural Areas Parks
Raymond Kurz, Ph.D., Senior Environmental Scientist II, PBS&J

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Peter Peduzzi - Comments on your Siesta Beach Comments.

From: Michael Jones
To: LaDue, Rob
Date: 8/25/2005 4:03 PM
Subject: Comments on your Siesta Beach Comments.
CC: Peduzzi, Peter

Hi Rob,
Your comments have been incorporated into the response from Stormwater to the consultant. Please keep in mind that this project was initiated to address the immediate concerns of citizens and Commissioners on Public Health Risks associated with last years beach closures. At present there is not even funding set up for implementing the project. Parks and Recreation staff are a part of this project team and have been invited to all major project meetings as well as solicited for input. With that in mind, I had the following comments on your comments #2 and #3.

2. The legibility of the Appendix H aerial overlay keys was impossible to read and did not include a drawing for Alternative No. 3. However, it was evident from the drawings that construction proposed within Alternative Nos.1, 2, and the "Overall Site Plan" would impact native coastal hammock habitat that exists in the park. Pursuant to Policy II.2.a. of the *Guiding Principles for Evaluating Development Proposals in Native Habitats* Section of Chapter 2 (*Environment Chapter*) of the *Sarasota County Comprehensive Plan, clusters of overstory and understory coastal hammock vegetation shall be left undisturbed.* The extent of the impacts should be quantified with a habitat delineation survey for further review and comment.

I am not sure that the area was native coastal hammock. Based on the attached 1948 aerial, it appears that the area was historically a dune system. I think over the years development has occurred surrounding this particular area altering drainage in a way conducive to the development of a hammock like system. Additionally, site visits have indicated spoil deposits in the area. At present the "hammock" is of low quality and dense with exotic vegetation. This joint project provides a wonderful opportunity to enhance/create a quality coastal hammock in this natural area. This would be accomplished by exotic removal and planting of native species. This could be built into the project plan.
Furthermore, plans are not concrete and merely conceptual at this stage.

3. Portions of the proposed construction located outside of the coastal hammock habitat will displace future park needs that are being identified for Siesta Public Beach (e.g., picnicking and parking areas). Parks and Recreation staff are reviewing options for a Siesta Beach Park Master Plan for this site, including a trail system. The proposed trail system shown on the Appendix H plans may be inadequate to meet identified needs (e.g., jogging trails will complete a loop). Until such time as Parks and Recreation staff have completed the Master Planning process, including public input and securing funding, design details for this stormwater system is premature.

   This project does not intend to supercede, or in anyway impact plans that Parks and Recreation has for the area. Addressing the concerns of the public and commissioners about public health protection and perception is not premature at this point due to last year's beach closure. The project actually provides an opportunity for cooperation between Parks and Recreation and Stormwater staff to meet the needs of public health safety and future public use.
   So please let us know what Park's and Recreation envisions for the area. The alternative plans are conceptual and very flexible at this time. This project is intended to be a cooperative effort to best address future public and environmental needs.

Michael S. Jones, P.W.S.
Environmental Specialist III
Sarasota County Environmental Services
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