Wastewater Management Plan
Islamorada, Village of Islands

PREPARED FOR:

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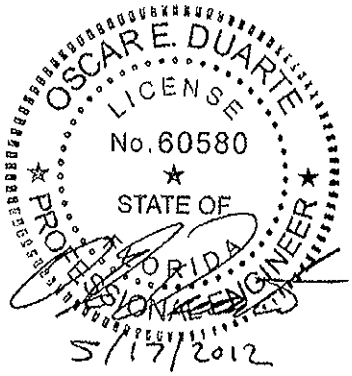


TABLE OF CONTENTS

EXECUTIVE SUMMARY

Project Description and Needs for Project

Within the Florida Keys National Marine Sanctuary (Sanctuary) are unique and nationally significant marine environments, including seagrass meadows, mangrove islands, and the only living coral barrier reef in North America. These marine environments support rich biological communities possessing extensive conservation, recreational, commercial, and aesthetic values, all of which give this area special international significance. The Sanctuary offers many opportunities for recreation, commercial fishing, and tourism based businesses that comprise a large portion of Florida's economy.

Numerous scientific studies have documented the contribution of failing septic tanks and cesspools to the deterioration of canal and nearshore water quality in the Keys. In addition, research has suggested that increased nutrient loadings from wastewater into canals and nearshore waters are one of the major contributors to the decline of water quality within the Sanctuary.

Currently, the majority of residents and commercial establishments in Islamorada, Village of Islands are not connected to advanced wastewater treatment systems; rather septic tanks and outdated onsite package plants. These systems, if not properly operated, allow bacteria and nutrients to leech into near shore waters. In areas where testing is performed on near shore waters, beaches are often posted for health advisories after moderate rainfall because fecal coliform bacteria have leeched into surface waters.

Project Alternatives / Cost Comparison

To remedy the pollution of near shore waters and comply with the State's mandate, Islamorada has requested and has received proposals for a design/build operate project and has subsequently selected Veolia/AECOM to construct the needed centralized, advanced wastewater facilities. The Request for Proposals allowed two alternatives for wastewater treatment: an "On-Island" treatment alternative whereby all wastewater would be collected, treated and disposed of within the Village of Islamorada and a second alternative which involves pumping all wastewater generated within the Village to the Key Largo Wastewater Treatment Plant for treatment and disposal. The Village will select the most cost-effective alternative which provides the best value solution to the Village residents. Details of each of these treatment alternatives are provided below.

Alternative No. 1:

The first alternative is an "On-Island" approach which would consist of collecting wastewater from all four islands via vacuum, low-pressure, and gravity collection systems, and treating it at a new wastewater reclamation facility to be constructed in the southern portion of Plantation Key. Specifically, the new wastewater treatment facility is proposed to be located at 86560 Overseas Highway, known locally as the Key Lime property, a 3 acre parcel within the Village's industrial zone. The facility would be constructed using Sequencing Batch Reactor (SBR) technology at a maximum month capacity of 1.1 MGD. A reuse system could be added to the facility should it be deemed beneficial to the community at a later time. Several other locations have been considered as the location of the wastewater facility including a 3 acre parcel located at 87201 Old Highway known as the "Beach Site", and expanding the Village's existing North Plantation Key Wastewater Treatment Facility, located at 286 Gardenia Street, from 0.25 MGD to 1.1 MGD Average Annual Daily Flow (AADF). Should the Key

Lime site alternative become a less desirable on-island alternative, the Village would consider locating the facility to one of the other identified sites. The total estimated capital cost for constructing an on-island treatment facility and commensurate hybrid collection system is approximately $98 million.

Alternative No. 2:

The second alternative includes collecting wastewater from each of the four islands via a hybrid collection system consisting of vacuum, low-pressure, and gravity technologies and sending flows via force main to an existing wastewater treatment plant located at 100301 Overseas Highway in Key Largo owned and operated by the Key Largo Wastewater Treatment District. This alternative requires the construction of booster stations to send flows to the Key Largo wastewater treatment facility. As part of this alternative, the existing wastewater treatment facility in North Plantation Key could be kept in service and would produce reuse water if the Village determined it was cost effective. The total estimated capital cost for constructing a hybrid collection system and transmitting flow to the Key Largo Wastewater Treatment Plant for proper treatment and disposal is approximately $105 million.

Selected Alternative

Both alternatives are still being considered in the design/build process, however, the second alternative which includes collecting the wastewater from each of the four islands via a hybrid collection system (consisting of mostly vacuum technology) and sending it to an existing wastewater treatment plant located on Key Largo owned and operated by the Key Largo Wastewater Treatment District appears to be the most publicly desirable. The Village is currently negotiating an agreement with the selected design/build/operate firm Veolia/AECOM to implement this alternative.

1.0 PROPOSED PROJECT / EXISTING ENVIRONMENT

Islamorada, Village of Islands is an incorporated village in Monroe County, Florida. According to the United States Census Bureau, the village has a total area of 7.2 square miles. 7.1 square miles of it is land and 0.1 square miles of it (1.93%) is water.

The climate of Islamorada is warm and humid. The average high temperature in the summer reaches up to 90 degrees F while the average low temperature during the winter months is 57 degrees F. The annual precipitation in the area is approximately 45 inches of which 61 percent occurs in the summer and early fall months between June and October.

A majority of the area is primarily composed of Pennekamp gravelly muck, which has 0-2 percent slopes and is extremely stony. There are other soils identified but they too are denoted as "muck" with a tidal influence. The parent material of Pennekamp soil is loamy residuum over coral limestone.

Pennekamp soils are generally well drained and have 4 to 16 inches of cover before reaching a restrictive feature such as paralithic bedrock. The depth to the water table is generally 42 to 60 inches. A typical profile is 0 to 3 inches of gravelly muck, 3 to 8 inches of very gravelly loam and 8 to 12 inches of weathered bedrock.

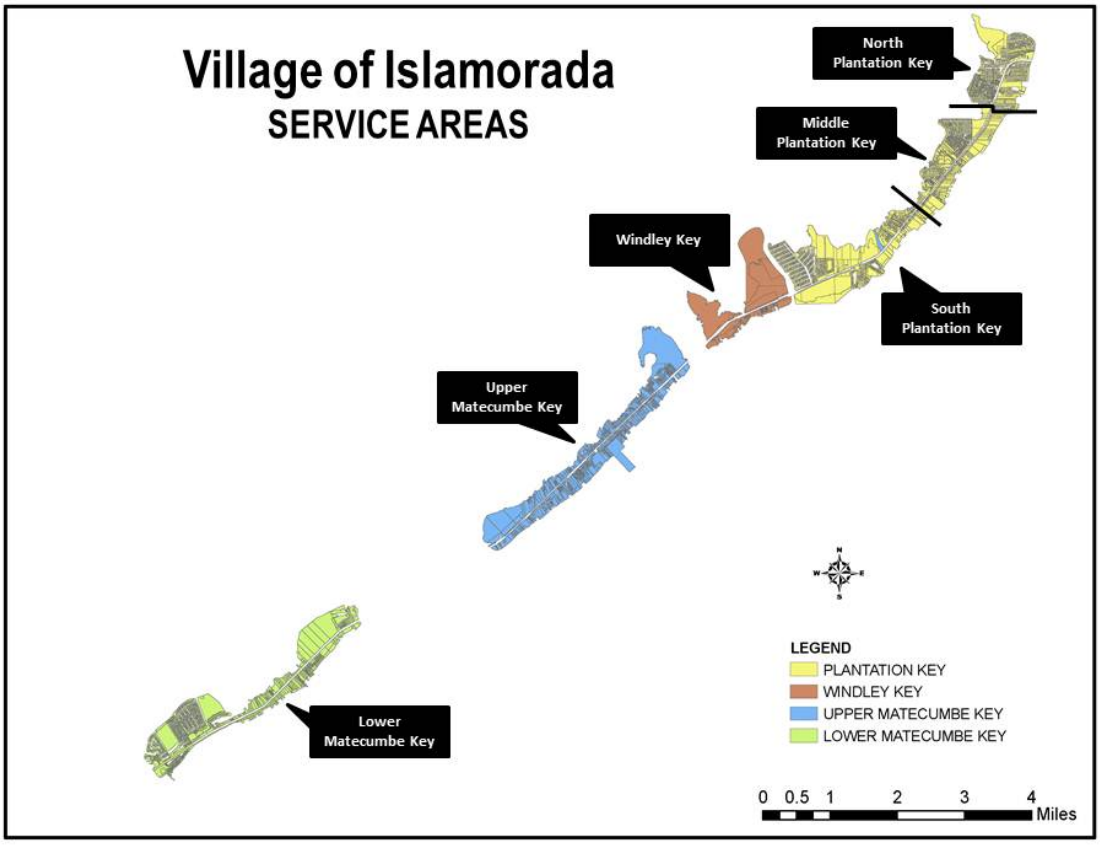
The other soils classified as tidal muck make up less than 6% of Islamorada's composition and do not differ that greatly from the Pennekamp characteristics to be noteworthy herein. They too have parent materials that consist of organic materials over coral limestone.

2.0 CURRENT CONDITIONS

2.1 Service Areas / Existing Facilities

Islamorada, Village of Islands, is located within the Florida Keys and consists of four islands; Plantation Key, Windley Key, Upper Matecumbe Key, and Lower Matecumbe Key. Islamorada is a vacation destination with a population of roughly 6,300 which fluctuates seasonally and has a variety of hotels, resorts, and marinas. Over half of Islamorada's residents live on Plantation Key, the largest of Islamorada's four islands. Plantation Key contains a number of residential subdivisions, many of which are interspersed with canals. Islamorada's public schools are located on Plantation Key, as are several condominiums and a variety of businesses serving both local population and tourists. A graphical representation of the proposed service areas is presented in **Figure 2-1**.

Figure 2-1. Proposed Service Areas for Islamorada



The proposed wastewater infrastructure for the Village of Islamorada consists of six service areas which are delineated below in **Table 2-1**.

Table 2-1. Wastewater Service Areas within Islamorada

Service Area	Location
North Plantation Key	MM 89.8 to Tavernier Bridge
Middle Plantation Key	MM 88.0 to MM 89.8
South Plantation Key	MM 85.9 to MM 88.0
Windley Key	MM 83.9 to MM 85.8
Upper Matecumbe Key	MM 80.1 to MM 83.5
Lower Matecumbe Key	MM 73.5 to MM 77.5

Historically, Islamorada's wastewater infrastructure has been privately owned. Most homeowners and small public/private facilities discharge wastewater to septic tanks, while larger facilities discharge to onsite, privately owned wastewater treatment package plants. Most of these systems are not capable of meeting future effluent standards without replacement or upgrade.

In 2007, The Village constructed its first wastewater treatment facility and supporting collection system. The North Plantation Key WWTP came on line with an average daily maximum month capacity of 0.355 million gallons per day (MGD). The associated collection system was constructed in two phases.

Phase I was permitted and became operational in 2007 for the Plantation Key Colony neighborhood in the North Plantation Key service area. The Phase II system collects wastewater from the remaining residents and commercial customers of North Plantation Key.

The North Plantation Key WWTP is equipped with a 240,000 gallon reclaimed storage tank and associated pumping station. A 6-inch diameter reclaimed water line was installed during this timeframe from the North Plantation Key WWTP to the Village's Founders Park to carry future reclaimed water to the park for irrigation. The reclaimed water line runs along the ocean side of US-1 and crosses the highway both near the treatment facility and the park.

The proposed project would provide a regional wastewater system for the entire village of Islamorada, and would replace the existing septic systems and package wastewater treatment facilities. The collection system would consist of a vacuum system or a hybrid system that would be primarily vacuum sewers with some low-pressure and gravity sewers. Because the project would be constructed through a design/build process, the treatment and disposal of the wastewater would be provided through one of two alternatives described in the Request for Proposals. The first alternative is an "On-Island" approach with the treatment facility to be constructed on Plantation Key. The second alternative is to pump the wastewater to the Key Largo Wastewater Treatment District facility for treatment and disposal through a transmission main that would be installed parallel to existing transmission mains along US-1. Existing wastewater infrastructure in the remaining five service areas currently remain privately owned and operated.

2.2 Historical Flows

Per the Islamorada Wastewater Management Master Plan (E-Sciences, 2005), the average water usage per EDU in Islamorada was estimated to equal 174 gallons per day (gpd). Wastewater flows were estimated to equal 90 percent of the water flow for a rate of 157 gpd per EDU (0.90 x 174 gpd).

North Plantation Key WWTP. The Village constructed its first wastewater facility, the North Plantation Key WWTP, and its' supporting collection system in 2007. The first phase of the collection system was constructed and permitted in 2007 serving the Plantation Key Colony service area. The second phase of construction collects wastewater from the remaining residential and commercial customers in North Plantation Key and is currently in the final stages of commissioning.

The North Plantation Key WWTP, located on Gardenia Street just north of Woods Avenue, has a permitted design capacity of 0.355 MGD based on an average daily maximum month flow under FDEP Permit No. FLA 351849. The WWTP serves the entire North Plantation Key service area which includes the area north of High Street (located at mile marker 89.8) to the Tavernier Bridge. The treatment plant utilizes an immersed membrane bioreactor process for treatment and disposes of its treated effluent using Class V injection wells. Effluent disposal can also be accomplished using the Village's permitted reclaimed water system, consisting of an above ground storage tank (240,000 gallon), transfer pumps, and a 6-inch diameter force main for conveyance of reclaimed water to the Village's Founders Park where future irrigation with reclaimed water is possible.

The 2004 Preliminary Design Report for the North Plantation Key Wastewater Treatment Plant established a water usage rate of 182 gpd per EDU. Estimated wastewater flows were assumed to equal 85 percent of the established water flow rate for a wastewater design flow of 155 gpd per EDU. The Village's Program Delivery Analysis Report (January 2010) and most recent Capacity Analysis Report (April 2011), as well as various Monroe County planning documents, utilize an estimated wastewater flow rate of 157 gpd per EDU.

Current flow data indicates that the 157 gpd per EDU may be used as the maximum monthly average daily flow (MMADF) for design purposes. This data comes from a review of historical wastewater flows from the North Plantation Key WWTP for the period July 2006 through June 2011, monthly operating reports for the 55 existing package plants located within the Village of Islamorada over a three year period ranging from May 2008 through April 2011, and Florida Keys Aqueduct Authority water billing data for the Village of Islamorada for calendar years 2006 and 2008. Based on this data and knowledge of similarwastewater flows from other areas of the Keys, the 157 gpd per EDU is recommended as a MMADF. Using a typical peaking factor of 1.3, an average annual daily flow of 121 gpd per EDU is recommended for design use.

Package Treatment Plants. More than 50 FDEP permitted package treatment plants currently serve properties located in the Village of Islamorada. Permitted capacities for these facilities range from 3,000 to 70,000 gpd. These package treatment plants account for a total of 2,948 EDUs with individual flows ranging from 100 to 52,000 gpd.

2.3 Historical Loadings

Historical loading data was obtained from FDEP for the existing North Plantation Key WWTP. This facility has a permitted maximum monthly capacity of 0.355 mgd. Flow and wastewater loading data from the plant's monthly operating reports were analyzed to develop design data for all of Islamorada.

Figure 2.2 summarizes the most recent 18 months of flow records from the North Plantation Key WWTP. Monthly average flows and the largest daily flow in each monthly period are presented in the figure. This graphic clearly illustrates an increase in average daily and maximum daily flows since January 2010. Flow increases are more dramatic if data prior to 2010 is included as part of this analysis.

Design flows were developed considering the North Plantation Key WWTP data and past studies. Overall monthly flow averaged 0.070 mgd for the period ranging from January 2010 through June 2011. The recommended peaking factor for the ratio of maximum monthly average daily flow (MMADF) to annual average daily flow (AADF) was equal to 1.3 (based on the *Village of Islamorada Wastewater Management Master Plan, ESciences, November 2005*). Applying this 1.3 peaking factor to the current average flows at North Plantation Key results in a predicted maximum average daily flow of 0.092 mgd, a value which is slightly higher but consistent with current North Plantation Key data.

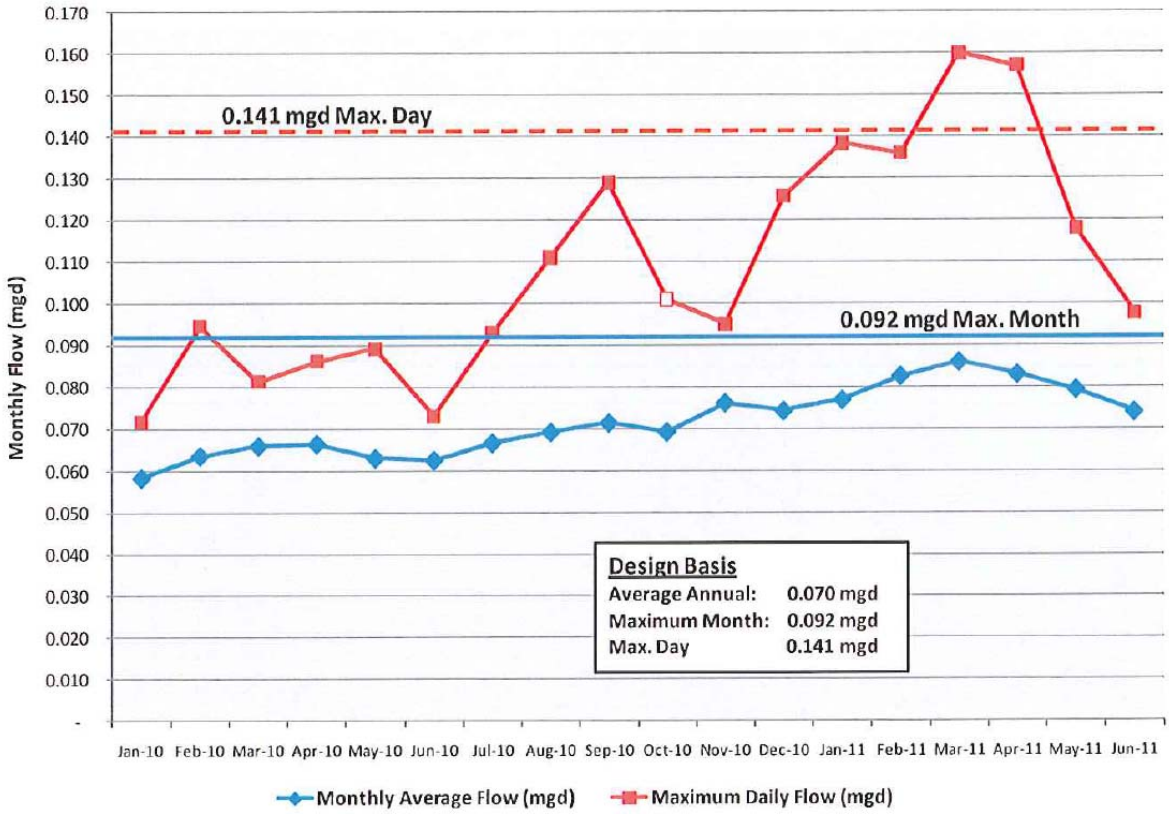


Figure 2.2 Influent Flow at the North Plantation Key WWTP (January 2010 – June 2011)

A similar approach was taken for maximum daily flows. A peaking factor of 2.0 (maximum day to annual average) has been reported in previous studies. Again, applying this factor to current average flows yield a maximum day flow of 0.141 mgd which is consistent with actual North Plantation Key data

For the same 18-month period, **Figures 2.3** and **2.4** present concentration and mass loadings for carbonanceous 5-day biochemical oxygen demand ($CBOD_5$) and total suspended solids (TSS) respectively. Because samples are only collected and analyzed a few times each month, the amount of data is relatively small and averages made on a monthly basis are not meaningful. Instead, a more statistically based analysis was employed. Utilizing the 85th percentile values of the 18-month data set (36 values) results in a maximum month value of 175 lb/day for $CBOD_5$ and 177 lb/day for TSS. These proposed maximum month values fit with the rest of the data as indicated in the figures.

Using a similar approach, the 99th percentile values were used to define maximum daily loadings. Engineering judgment was used to remove any values that were judged as being outliers and non-representative of the system-wide. For example, a $CBOD_5$ concentration of 543 mg/L (observed on June 15, 2010) was eliminated and the resulting 99th percentile for $CBOD_5$ was equivalent to 250 lb/day. Summarily, TSS values of 549 mg/L and 577 mg/L were judged anomalous and the resulting mass loadings were eliminated from calculation of the maximum daily load. This resulted in a maximum day design value for TSS of 259 lb/day.

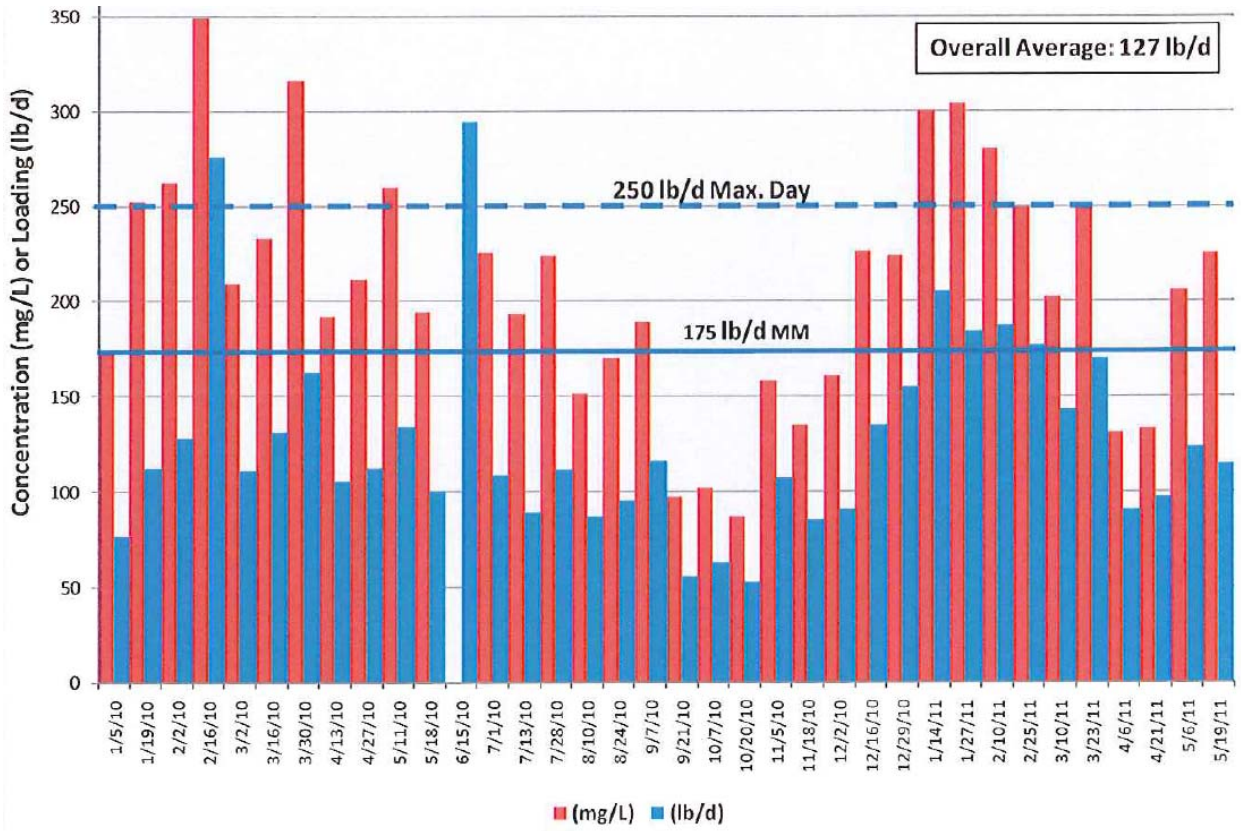


Figure 2.3 Influent CBOD5 Observed at the North Plantation Key WWTP

Available data for total Kjeldahl nitrogen (TKN) and total phosphorus (TP) was limited due to permit sampling requirements and the limited timeframe that the North Plantation Key WWTP has been operational. Based on a total of 11 data values for each nutrient parameter, mass loadings were calculated for both TKN and TP using the same peaking factor for maximum month and maximum day (as determined in the flow analysis). This calculation method had the effect of assuming a fixed concentration and which remained constant under all three flow conditions. Design concentrations were established as 64 mg/L and 9 mg/L for TKN and TP, respectively.

The Middle Plantation Key Area MPK-2 Basis of Design Report (Wade Trim, October 2009) included 24 total alkalinity measurements in the plant influent over the period from April 2008 through March 2009. Based on this information, a plant influent total alkalinity of 300 mg/L is assumed. Appendix B presents data used for the assumed plant influent alkalinity value.

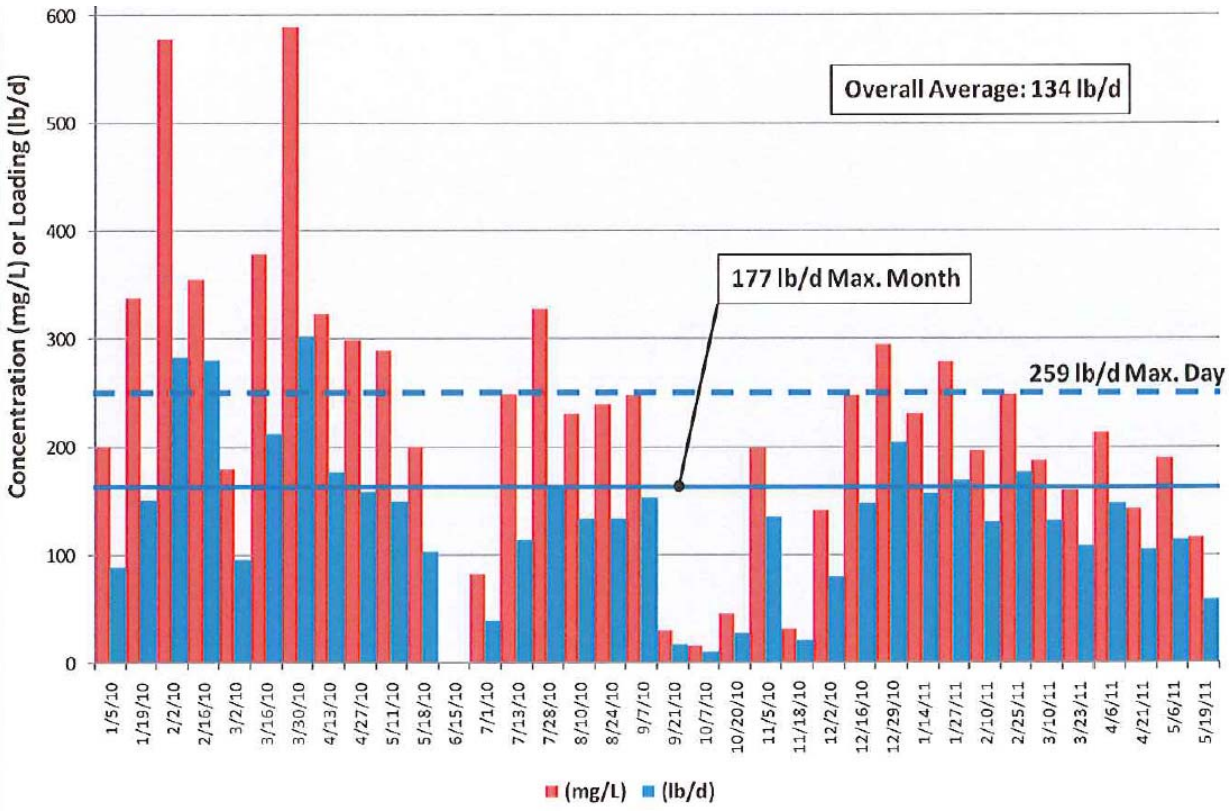


Figure 2.4 Influent TSS Observed at the North Plantation Key WWTP

3.0 FUTURE CONDITIONS

3.1 EDU and Flow Estimates

This section presents projected EDU and flow estimates for the Islamorada service area which includes North Plantation Key, Middle Plantation Key, South Plantation Key, Windley Key, Upper Matecumbe Key, and Lower Matecumbe Key.

3.1.1 Package Plants

Permitted package plant EDU estimates and EDU calculated flows for each service area are delineated in **Table 3-1** below. EDU calculated flows for package plants are based on using 121 gallons per day per EDU to be consistent with flow projections used with the Village's *Veolia Water /AECOM DBOF Proposal*. These permitted estimates include all governmental facilities which utilize package plants for wastewater treatment and disposal in the Village of Islamorada. Individual permitted active and inactive facilities using package plants are identified by service area (see Appendix A).

Table 3.1 Active Permitted Package Plant EDUs and Calculated Flows

Service Area *	# Package Plants	Total EDUs	EDU Calculated Flow (gpd)
Middle Plantation Key	6	414	49,998
South Plantation Key	7	460	55,554
Windley Key	9	512	61,834
Upper Matecumbe Key	27	1,724	208,206
Lower Matecumbe Key	5	146	17,632
Totals	**54**	**3,256**	**393,224**

* North Plantation Key (NPK) contains three active package plants which send flow to the existing NPK WWTP. These flows are accounted in the WWTP flow and not included in Table 3.1 to avoid duplication but are identified in Appendix A.

3.1.2 Residential/Commercial Flows

A summary of EDUs and flows for residential/commercial customers are based on service area and are presented in **Table 3-2**. Total flows for each service area are based on using 121 gallons per day per EDU. Total estimated residential/commercial flows were estimated to equal approximately 1.05 million gallons per day.

Table 3.2 Residential / Commercial EDU and Flow Projections

Service Area	Estimated EDUs	Total Non-Package Plant Flows (gpd)
North Plantation Key	1,703	205,670
Middle Plantation Key	772	93,234
South Plantation Key	1,066	128,740
Windley Key	22	2,657
Upper Matecumbe Key	988	119,320
Lower Matecumbe Key	1,282	154,826
Totals	**5,833**	**704,447**

3.1.3 Total Service Area Flows

Total projected service area flows, including all permitted package plants, were estimated to equal approximately 1.1 million gallons per day based on using an annual average daily flow rate of 121 gallons per day and a total projected EDU count of 9,089.

Table 3.3 Combined Residential and Package Plant EDU and Flow Projections

Service Area	Total Estimated EDUs	Projected Service Area Flows
North Plantation Key	1,703	205,670
Middle Plantation Key	1,186	143,232
South Plantation Key	1,526	184,294
Windley Key	534	64,491
Upper Matecumbe Key	2,712	327,526

Lower Matecumbe Key	1,428	172,458
Totals	**9,089**	**1,097,671**

3.2 Flow Ratios

3.2.1 MMADF /AADF

The following data sets were analyzed to develop wastewater conveyance and treatment design capacity:

- Village of Islamorada historical wastewater flows for the period of July 2006 through June 2011 for the Village's North Plantation Key Wastewater Treatment Plant
- FKAA water billing data for the Village of Islamorada for the calendar years of 2006 and 2008
- FDEP monthly operating reports for the 54 existing active privately owned wastewater treatment plants throughout the Village of Islamorada for the three year period of May 2008 through April 2011

GIS data from FKAA meter routes were obtained to correlate the water meter data to specific properties within Islamorada's proposed wastewater service areas. Each property served by the wastewater collection system was identified and inventoried in a bottom up evaluation of EDUs and projected wastewater flows.

The design flows in the April 2011 Capacity Analysis Report were developed from an analysis that included the following data:

- FDEP monthly operating reports for the Middle Plantation Key and South Plantation Key privately owned wastewater treatment plants for the six year period 2004 to 2009.
- FDEP monthly operating reports for the Lower Matecumbe, Upper Matecumbe, and Windley Key privately owned wastewater treatment plants for the single year 2010.

The design flows developed for this program have been based on the following design conditions:

- Single family homes, condominiums, and each unit in multi-family complexes count as 1 EDU.
- MMADF is based on 157 gpd/EDU.
- The AADF is equal to 121 gpd/EDU (MMADF/1.30 peaking factor)
- Peaking factors for components of the collection systems such as each vacuum pit and vacuum buffer tank were 3.50 and 7.00, respectively, in accordance with AIRVAC design criteria and stipulated design criteria for using buffer tanks in the Islamorada service area (see **Table 3-5**). For residential and commercial connections, a maximum of 4 EDUs will be allowed per single vacuum pit. For commercial connections, a maximum of 20 EDUs will be allowed on a single buffer tank and a maximum of 40 EDUs will allowed on a dual buffer tank.
- All other design flow requirements specified under 62-604.600(7)(a), Florida Administrative Code (F.A.C.) for the construction of a vacuum sewer system will be followed.

Table 3.4 Summary of Projected Flows

Service Area	EDUs	ADF (gpd)	MMADF (gpd)
Residential/Commercial Properties	1,703	205,670	
Package WWTPs	-	-	
North Plantation Key Total	**1,703**	**205,670**	**267,371**
Residential/Commercial Properties	772	93,234	
Package WWTPs	414	49,998	
Middle Plantation Key Total	**1,186**	**143,232**	**186,202**
Residential/Commercial Properties	1,066	128,740	
Package WWTPs	460	55,554	
South Plantation Key Total	**1,526**	**184,294**	**239,582**
Residential/Commercial Properties	22	2,657	
Package WWTPs	512	61,834	
Windley Key Total	**534**	**64,491**	**83,838**
Residential/Commercial Properties	988	119,320	
Package WWTPs	1,724	208,206	
Upper Matecumbe Key Total	**2,712**	**327,526**	**425,784**
Residential/Commercial Properties	1,282	154,826	
Package WWTPs	146	17,632	
Lower Matecumbe Key Total	**1,428**	**172,458**	**224,196**
TOTALS	**9,089**	**1,097,672**	**1,426,973**

Table 3.5 Design Criteria for Vacuum Sewer Valve Pits

Valve Pit Type	Peak Q (gpm)	Service Type	MMDF/EDU (gpd)	Peak Factor	Peak Q (gpm/EDU)	Max. # of EDUs
AIRVAC Valve Pit	3 gpm	Residential	157	3.50	0.38	4
AIRVAC Valve Pit	3 gpm	Commercial	157	7.00	0.76	4
Single Buffer Tank	15 gpm	Commercial	157	7.00	0.76	20
Dual Buffer Tank	30 gpm	Commercial	157	7.00	0.76	40
Dual Buffer Tank	60 gpm	Commercial	157	7.00	0.76	80

3.3 PHF/AADF

Treatment facility and collection system designs will be based on accommodating peak hourly flow rates using Ten State Standards for the calculation of a peaking factor which is defined as the ratio of Peak Hourly Flow to Average Daily Flow (PF = PHF/ADF). The peaking factor (PF) was calculated as follows:

$$P.F. = \frac{18 + \sqrt{\frac{Population}{1000}}}{4 + \sqrt{\frac{Population}{1000}}}$$

Per the 2008 census, the Village of Islamorada had a population of 6,323. Using this population, a peaking factor of 3.15 was calculated.

$$P.F. = \frac{18 + \sqrt{\frac{6323}{1000}}}{4 + \sqrt{\frac{6323}{1000}}}$$

$$P.F. = \frac{20.51}{6.51} = 3.15$$

The calculated peaking factor of 3.15 exceeds the minimum peaking factor of 2.5 recommended by the vacuum system equipment manufacturer. Therefore the peaking factor of 3.15 is appropriate and consistent with design criteria typically used with this type of wastewater treatment and collection system.

3.4 Loading Estimates

Design wastewater characteristics based on current flows and loadings for the existing North Plantation Key WWTP are summarized in **Table 3.6**. These characteristics will be used as a basis of design for the treatment of all Islamorada flows and loadings.

Table 3.6 Design Basis for All Future Islamorada Loadings

Parameter	Annual Average	Maximum Month	Maximum Day
Design Flow, mgd	0.070	0.092	0.141
BOD5, 1000 lb/day	0.127	0.175	0.252
BOD5, mg/L	217	229	214
TSS, 1000 lb/day	0.134	0.177	0.259
TSS, mg/L	227	232	220
TKN, 1000 lb/day	0.038	0.049	0.075
TKN, mg/L	64	63	64
Total Phosphorus, 1000 lb/day	0.0053	0.0069	0.0106
Total Phosphorus, mg/L	9	9	9
Alkalinity, mg/L	300	300	300

4.0 PROPOSED FACLIITIES

The proposed project would provide a regional wastewater system for the entire Village of Islamorada, and would replace the existing septic systems and package wastewater treatment facilities. The

collection system would consist of a hybrid system that would be primarily vacuum sewers with some low pressure grinder stations and gravity lines. Because the project would be constructed through a design/build process, the treatment and disposal of the wastewater would be provided through one of two alternatives. The first alternative is an "On-Island" approach with the treatment facility to be constructed on Plantation Key. The second alternative is to pump the wastewater to the Key Largo Wastewater Treatment District facility for treatment and disposal through a transmission main that would be installed parallel to the existing transmission main.

4.1 Comparison of Collection Options and Costs

4.1.1 Hybrid Collection System Alternative

This section describes the proposed hybrid collection system. The Monroe County Sanitary Wastewater Master Plan (SWMP) introduced the use of vacuum sewers as one of the most cost-effective collection alternatives for the Keys. The SWMP concluded that vacuum sewers are a cost-effective alternative to gravity systems due to smaller diameter collection mains and because they are installed at shallower depths than conventional gravity systems. The flat topography and soil conditions in the study area generally favor the installation of a vacuum sewer system over a gravity or low pressure system depending on the density of the service area and the general configuration of the property which to which a service connection is provided.

In addition, experience has shown that for vacuum systems to be cost-effective, a minimum of 75 to 100 customers per vacuum pump station is generally required. The average number of customers per station proposed for the Islamorada system will typically range from 900 to 2,700 EDUs per vacuum pump station. Previous planning studies in Florida have also shown that vacuum sewers are a more cost effective method for sewering residential areas which have parcels less than 0.5 acre in size (*Phillippi Creek Septic System Replacement Program, Sarasota County, September 2000*).

The advantage of utilizing a vacuum collection system includes a substantial reduction in water use, material and construction costs, and treatment expenses. Some advantages include:

- Small pipe sizes – typically 4, 6, 8, and 10 inches are used;
- Installation of smaller diameter pipes at shallow depths eliminates the need for wide, deep trenches, reduces excavation costs and potential dewatering costs;
- High scouring velocities are attained, reducing the risk of blockages and keeping wastewater aerated and mixed;
- The system will not allow major leaks to go unnoticed, resulting in reduced environmental damage from exfiltration of wastewater;
- Only one source of power (at the vacuum station) is required. No on-lot power demand exists at the valve pits; and
- The elimination of infiltration permits a reduction in size and cost of the treatment plant.

Table 4.1 demonstrates the approach for serving the approximate 9,089 EDUs comprising the Islamorada wastewater central system using a hybrid collection system alternative. Estimated EDUs served by each collection system type were estimated based on recent design/build/operate/financial proposals received by the Village.

Table 4.1 Hybrid Wastewater Collection System Alternative Summary

Service Area	Total EDUs	Vacuum Sewers		Gravity Sewer & Lift Stations	
		Estimated EDUs	% EDUs	Estimated EDUs	% EDUs
Lower Matecumbe Key	1,428	1,054	74	374	26
Upper Matecumbe Key	2,712	1,000	37	1,712	63
Windley Key	534	0	0	534	100
South Plantation Key	1,526	935	61	591	39
South Plantation Key WWTP Subtotal	**6,200**	**2,989**	**48**	**3,211**	**52**
Middle Plantation Key	1,186	705	59	481	41
North Plantation Key	1,703	1,703	100	0	0
North Plantation Key WWTP Subtotal	**2,889**	**2,408**	**83**	**481**	**17**
ESTIMATED TOTALS	**9,089**	**5,397**	**59**	**3,692**	**41**

The following existing and proposed facilities within the collection system have been identified:

- Existing FDEP permitted package WWTPs that will be decommissioned and connected to the Islamorada centralized collection system.
- Proposed lift stations, master lift stations, and additional vacuum stations to be owned by Islamorada and operated by the Village's selected Design/Build/Operate firm. A total of four new vacuum pump stations would be constructed under this alternative – one on each of the service areas (Lower Matecumbe Key, Upper Matecumbe Key, South Plantation Key, and Middle Plantation Key).
- Proposed private lift stations anticipated to be needed to convey flows from properties now served by FDEP permitted WWTPs, other multi-EDU properties now served by onsite treatment systems, and properties set too far from the central sewer system utility piping to allow a gravity connection due to the excessive depth required for vacuum service. These facilities will be owned, operated, and maintained by the private property owners.

4.1.2 Grinder Pump / Low Pressure Collection Alternative

A low-pressure collection system utilizing grinder pump stations for the entire Islamorada service area is proposed as an alternative to the hybrid system. Grinder or low-pressure collection systems are used effectively in coastal areas and have been considered a cost effective solution where construction of a vacuum collection system is not considered economically feasible.

This alternative includes the installation of a self-contained pumping system on individual properties consisting of a wet well, grinder pump, valving, and controls with the following features:

- Low-flow/high-head pump capacity
- Slow speed (1725 rpm) 4-pole motor, which provides sufficient torque, reduces wear, and reduces operation and maintenance costs
- Essentially constant flow to provide self-scouring behavior

- Large-diameter grinder to nearly eliminate jamming
- Integral pump and control simplifies service
- Mercury-free pressure switch level controls

The grinder pump is a complete unit that includes the pump, check valve, 183.5-gallon high density polyethylene (HDPE) tank with 4-inch inlet connection and controls. The grinder processes all solids into fine particles, including plastic, rubber, fiber and wood. These fine particles pass easily through the 1¼-inch discharge connection, which is adaptable to any piping material. The check valve assembly is designed for non-clog operation. This pump would be used in most single-family residential applications. In situation where higher flows are required, such as in commercial or institutional applications, a duplex or triplex pump configuration would be used.

4.1.3 Selected Collection Alternative

The capital cost comparison for each collection alternative is presented in **Table 4.2**.

Table 4.2 Collection System Alternative Capital Cost Comparison

Service Area	Hybrid Collection System	Grinder Pump/Low Pressure
Total Village Capital Cost	**$95,571,000**	**$88,133,000**
Additional Customer Capital Cost	$0	**$20,415,500**
TOTAL OVERALL CAPITAL COST	**$95,571,000**	**$108,548,500**

Footnotes:

1. *Hybrid system costs taken from Reynolds Water Islamorada/Arcadis DBOF Proposal dated October 28, 2011*
2. *Low pressure system costs taken from Reynolds Water Islamorada/Arcadis DBOF Proposal dated October 28, 2011*
3. *Additional Customer Capital Cost based for furnishing grinder pumps based on 80% of the total residential / commercial EDUs (5,833) at $3,500 per EDU. Customer hook-up and installation costs are assumed equal between both alternatives after the cost to furnish the grinder pumps is included.*
4. *Costs above include transmissions lines required for the system.*

This capital cost comparison is made for the Village-incurred costs necessary to implement the improvements for each alternative. Under *Grinder Pump / Low Pressure Collection Alternative,* the costs incurred for this improvement do not include the additional on-lot capital cost incurred by each homeowner which include purchase and installation of a grinder pump, control panel, piping, and required electrical modifications. These additional capital improvements required by each individual residential unit will range from approximately $5,000 to $8,000 depending on the home's age and parcel size.

The selected collection alternative for this project is the *Hybrid Collection System Alternative*. This alternative was selected based on current knowledge of using vacuum sewers as the preferred method of collection in the Florida Keys and the minimal burden to homeowners. Additionally, the reliability, constructability, cost effectiveness, and aesthetic benefits provided by using vacuum sewer in the majority of the project makes this the preferred alternative. In remote or low density locations where

vacuum sewer is not cost effective, gravity and low pressure collection systems will be considered as an alternative.

4.2 Comparison of Treatment Options

Two treatment alternatives considered as options for treatment of the Village's wastewater are presented below.

4.2.1 Treatment Alternative 1 – "On-Island" Approach"

Treatment Alternative 1 is the "On-Island" approach which would treat wastewater collected on each of the four Village islands at two wastewater treatment facilities on Plantation Key. The first would include upgrading the existing North Plantation Key WWTP in capacity from 0.25 MGD to 1.1 MGD AADF. The second would consist of constructing a new wastewater plant located in the South Plantation Key. The South Plantation Key facility would be designed for an annual average daily capacity of 1.1 MGD and would consist of a sequencing batch reactor (SBR) for the biological treatment of wastewater.

4.2.1.1 North Plantation Key WWTP

The principle treatment technology at this facility is a membrane reactor. The process provides biological treatment at very high solids concentrations and employs the membranes for all liquid/solids separation. Three primary modifications are needed to increase capacity:

1. Membrane Capacity. The key to the modifications are new high rate MBR membranes that can fit into the same space as the existing membranes yet have almost double the surface area and accordingly can handle almost double the flow.
2. Tank Volumes. In order not to compromise advanced effluent quality requirements, larger tank volumes were needed to maintain nitrification/denitrification efficiency. The required detention times in the pre-anoxic, pre-aeration, post anoxic tanks would be modified for the respective process.
3. New Equalization Tanks. To achieve the required tank volumes, a new equalization tank will be added to the system. The tank will be located outside the existing process tank complex and will allow the existing equalization tanks that are located within the MBR tank area to be reworked to provide the necessary process volumes.

Figure 4.1 illustrates both the existing and proposed tank arrangements for the existing North Plantation Key process tanks. **Figure 4.2** presents the process flow diagram for the upgrades to the North Plantation Key WWTP.

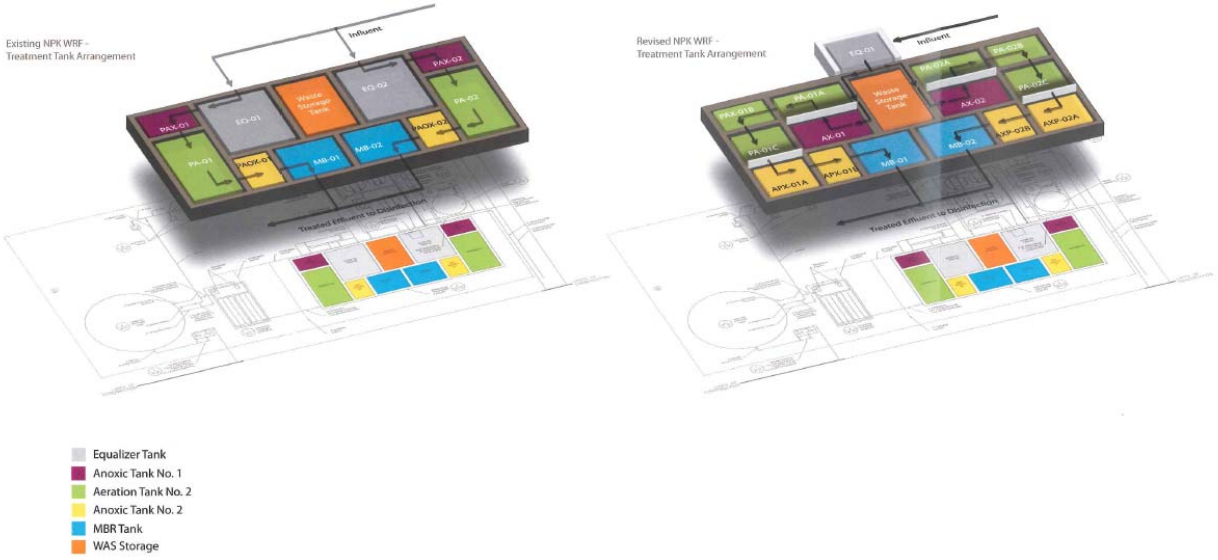


Figure 4.1 Existing and Proposed Tank Arrangements at North Plantation Key WWTP

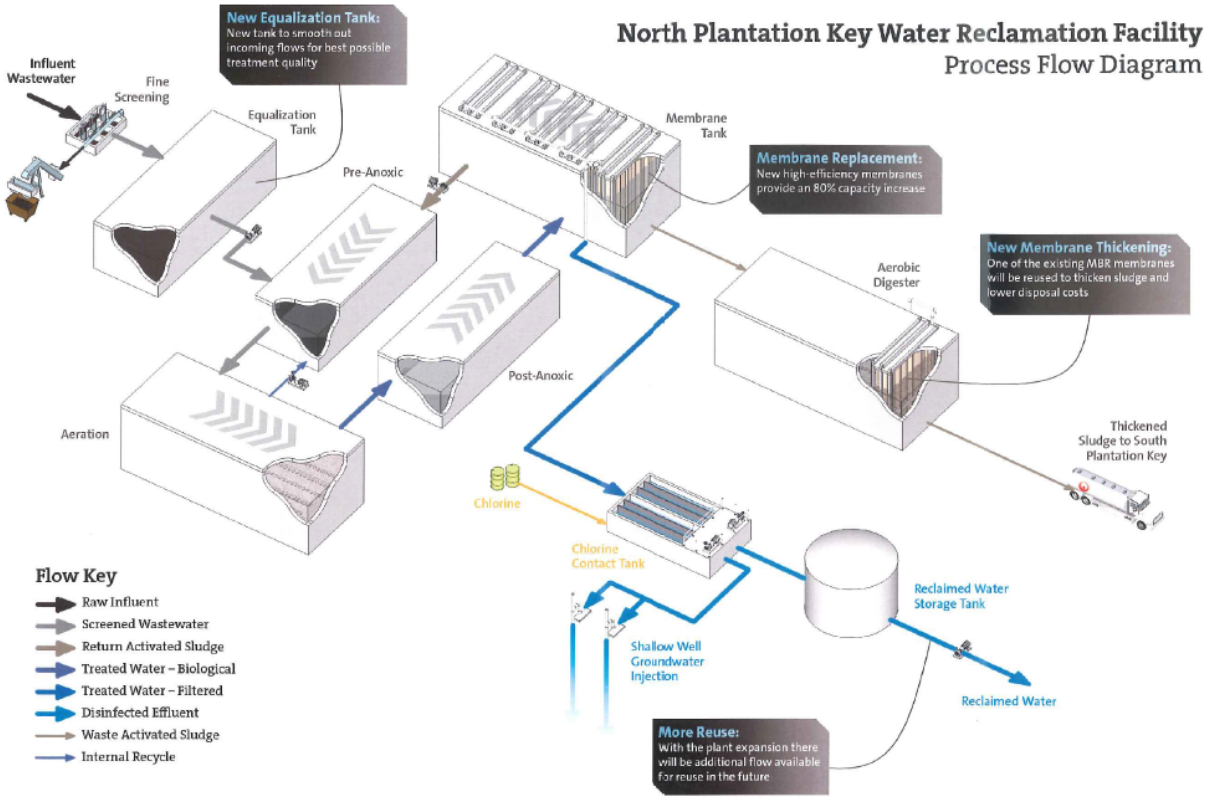


Figure 4.2 Proposed Process Flow Diagram for North Plantation Key WWTP

Additional upgrades to the unit treatment processes for the proposed North Plantation Key facility are as follows:

Screening. The existing screens along with the screen conveyor washer compactor will be removed. Two new 2mm perforated plate type fine screens sized to handle the instantaneous pumping capacity of the upstream vacuum stations. Each of the two screens will have a firm capacity of 1100 gpm flow. Screens will be located on top of the new EQ tank. The new screens will include a screenings wash press similar to the existing screens. The screens will be enclosed to facilitate odor control.

MBR Process. The existing Pre-Anoxic Tanks shall be converted into the new Pre-Aeration Tanks. The mixers in the existing Pre-Anoxic tanks shall be relocated into the new Post Anoxic tanks. Each of the existing equalization tanks will be divided with a new concrete wall into two new Pre-Anoxic tanks. Influent will be pumped from the new equalization tank into the new Pre-Anoxic tanks.

WAS Storage and Thickening. The existing WAS tank will be reused with one change. One of the membranes that was removed from tank MB-01 will be used to thicken the WAS to reduce the number of trucks that are required to haul the WAS to the nearby South Plantation Key facility for dewatering.

Disinfection. The existing chlorine contact chambers will be enlarged to maintain a minimum of 15 minute chlorine contact time.

4.2.1.2 South Plantation Key WWTP

The South Plantation Key facility would be designed for a MMADF capacity of 1.1 MGD and would consist of a sequencing batch reactor (SBR) for the biological treatment of wastewater. The proposed flow diagram for the South Plantation Key WWTP is presented in **Figure 4.3**.

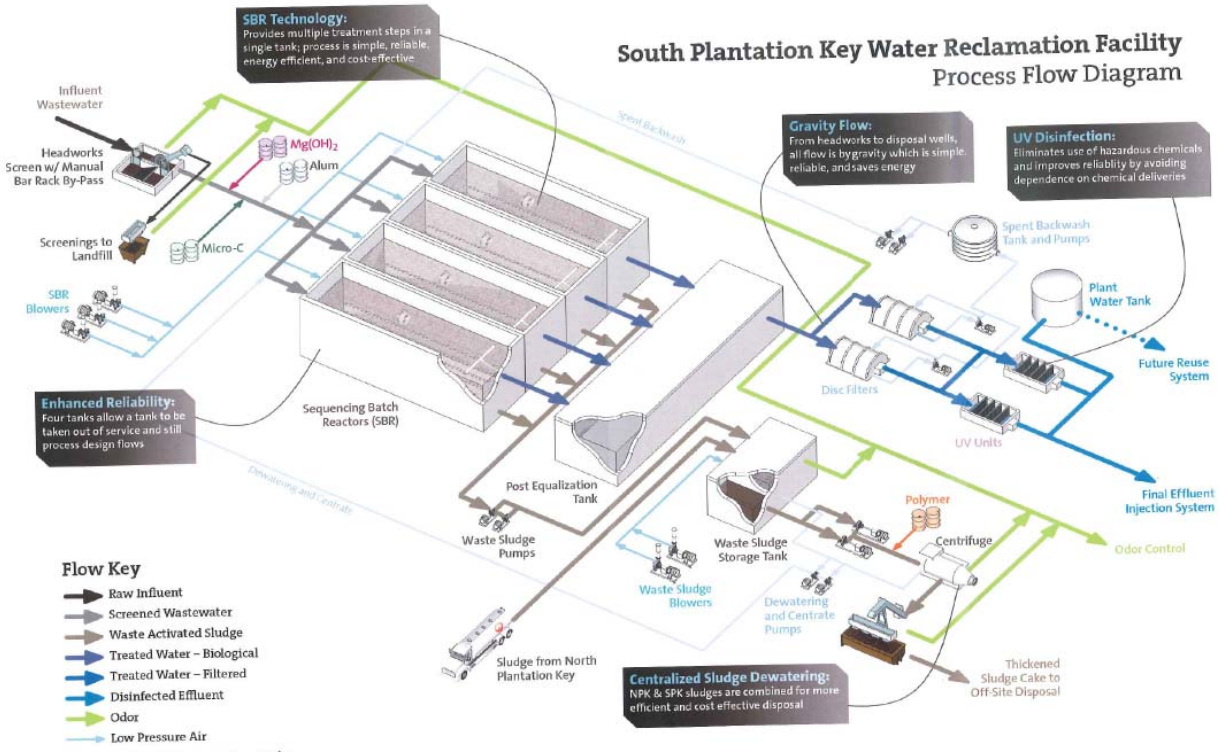


Figure 4.3 Proposed Process Flow Diagram for SPK WWTP

Liquid phase treatment processes will be provided as follows:

Screening. Multiple force mains from the collection system serving the master lift stations from Upper Matecumbe and South Plantation Key will be routed to the screening system. A rotating basket type microstrainer with screw conveyor will be located on the roof level.

Grit Removal. Grit accumulation will be managed by periodic removal from the SBRs during annual/bi-annual tank inspections. Due to the tightness of the vacuum systems, grit accumulation is typically very low.

SBR Biological Treatment with Nutrient Removal. Five different unit processes are combined in the sequencing batch treatment: biological treatment, nitrification, denitrification, biological phosphorous removal, and sludge digestion. These different treatment objectives will be obtained by varying the environmental conditions within the batch reactor.

UV Disinfection. A low-pressure, low intensity UV system will be located in the disc filter area and will receive filtered effluent flow by gravity.

Reuse Storage Tank. Effluent from the UV system will be discharged to a treated water storage tanks to provide an adequate volume of filter backwash water as well as the plant service water system. Discharge from the tank will be by gravity through a 12 inch pipeline to the effluent disposal wells.

Solids phase treatment processes will be provided as follows:

WAS Pumping. Waste activated sludge (WAS) will be pumped from the SBRs a total of sixteen times per day. Depending on the type of wasting strategy, sludge will be wasted during the SBR react cycle or at the completion of each treatment batch. Two waste sludge pumps will be provided (one operating, one spare) together with four motorized valves.

WAS Storage. The WAS storage tank will be located in the reclamation facility operations building adjacent to the south end of the SBR tanks. The WAS tank will be concrete and will have a capacity of approximately 55,000 gallons. Approximately five days of storage will be provided under normal operating conditions.

4.2.2 Treatment Alternative 2 – "Pump to Key Largo"

Treatment Alternative 2 consists of decommissioning the existing North Plantation Key WWTP and conveying all wastewater flow generated in the Islamorada service area to the KLWTD wastewater treatment facility and possibly decommissioning the NPK WWTP.

For this alternative, the identified four new vacuum pump stations would be constructed: one vacuum pump station on Lower Matecumbe Key, one vacuum pump station on Upper Matecumbe Key that is co-located with a master wastewater pumping station for conveyance of force main flow, and one vacuum pump station serving Middle Plantation Key service area to a new master pumping station located at the site of the existing North Plantation Key WWTP. A new master lift station would be constructed at the North Plantation Key WWTP to convey wastewater from the service areas treated at this facility to the KLWTD wastewater treatment facility.

Wastewater transmission mains will cross waterways at Indian Key Channel, Tea Table Creek Channel, Tavernier Creek, Snake Creek, and Whale Harbor. Directional drilling will be used to cross

the waterways and HDPE piping will be installed. All vacuum and master lift stations will be equipped with standby power and odor control.

Tables 4.3 and **4.4** summarize the major components of the wastewater system for this alternative:

Table 4.3 Summary of Vacuum Pump Stations

Vacuum Station	Wastewater Pumps	Vacuum Pumps	Vacuum Tank	Standby Generator	Odor Control on Vacuum Discharge
Lower Matecumbe Key VPS	Two, each 60 hp, rated at 450 gpm @ 180 ft TDH	Three, each 25 hp, each rated at 455 cfm	3000 gallons	180 kW	Activated carbon
Upper Matecumbe Key VPS	Two, each 5 hp, each rated at 300 gpm @ 30 ft TDH	Three, each 25 hp, each rated at 455 cfm	3000 gallons	See Master Lift Station on Table 4.4 below	See Master Lift Station on Table 4.4 below
South Plantation Key VPS	Two, each 15 hp, each rated at 300 gpm @ 45 ft TDH	Three, each 25 hp, each rated at 455 cfm	3000 gallons	See Master Lift Station on Table 4.4 below	See Master Lift Station on Table 4.4 below
Middle Plantation Key VPS	Two, each 30 hp, each rated at 300 gpm @ 112 ft TDH	Three, each 25 hp, each rated at 455 cfm	3000 gallons	180 kW	Activated carbon

Table 4.4 Summary of Master Lift Stations

Vacuum Station	Wastewater Pumps	Wet Well	Standby Generator	Odor Control on Vacuum Discharge
Upper Matecumbe Key MLS	Two, each 100 hp, each rated at 1200 gpm @ 166 ft TDH	14.5 ft long, 10 ft wide, 9 ft deep	225 kW (includes capacity for the VPS)	Biofilter & activated carbon
South Plantation Key MLS	Two, each 125 hp, each rated at 1500 gpm @ 185 ft TDH	21.75 ft long, 10 ft wide, 9 ft deep	Standby generator: 275 kW	Biofilter & activated carbon
North Plantation Key MLS	Two, each 60 hp, each rated at 870 gpm @ 160 ft TDH	Utilizes existing NPK Flow EQ Tank #1 or #2	Use existing NPK WWTP generator	Biofilter & activated carbon

Under Treatment Alternative 2, existing privately owned package wastewater treatment plants in Islamorada will be decommissioned by their owners. New service connections will be provided to connect these flows to the new collection and treatment system. Existing collection system elements

connected to existing package plants will remain in place and will continue to be the responsibility of each property owner.

Design considerations for the wastewater transmission system are as follows:

- Routes for the transmission mains are within the US 1 corridor that already contains numerous utilities (potable water, storm drainage, fiber optic, cable, telecommunications, and overhead power)
- FDOT has jurisdiction over maintenance of traffic and restoration requirements.
- Hydraulic system modeling will be utilized to determine proper pipeline sizing; surge analysis; and surge protection needs for the transmission system.

Table 4.5 summarizes transmission main design requirements.

Table 4.5 Transmission Main Design Criteria Summary

Condition	Requirement
Transmission Mains	
Minimum Cover	36 inches
Minimum Pipeline velocities	2.0 fps
Minimum Diameter	6 inches
Maximum Diameter	16 inches
Pipe Materials	PVC, SDR 14, polywrapped DIP Class 51 (or equal)
Joining Systems	Push on joint, mechanical joint, restrained joint

The proposed piping configuration for the transmission main to the Key Largo Wastewater Treatment Facility is presented in **Figure 4.4**.

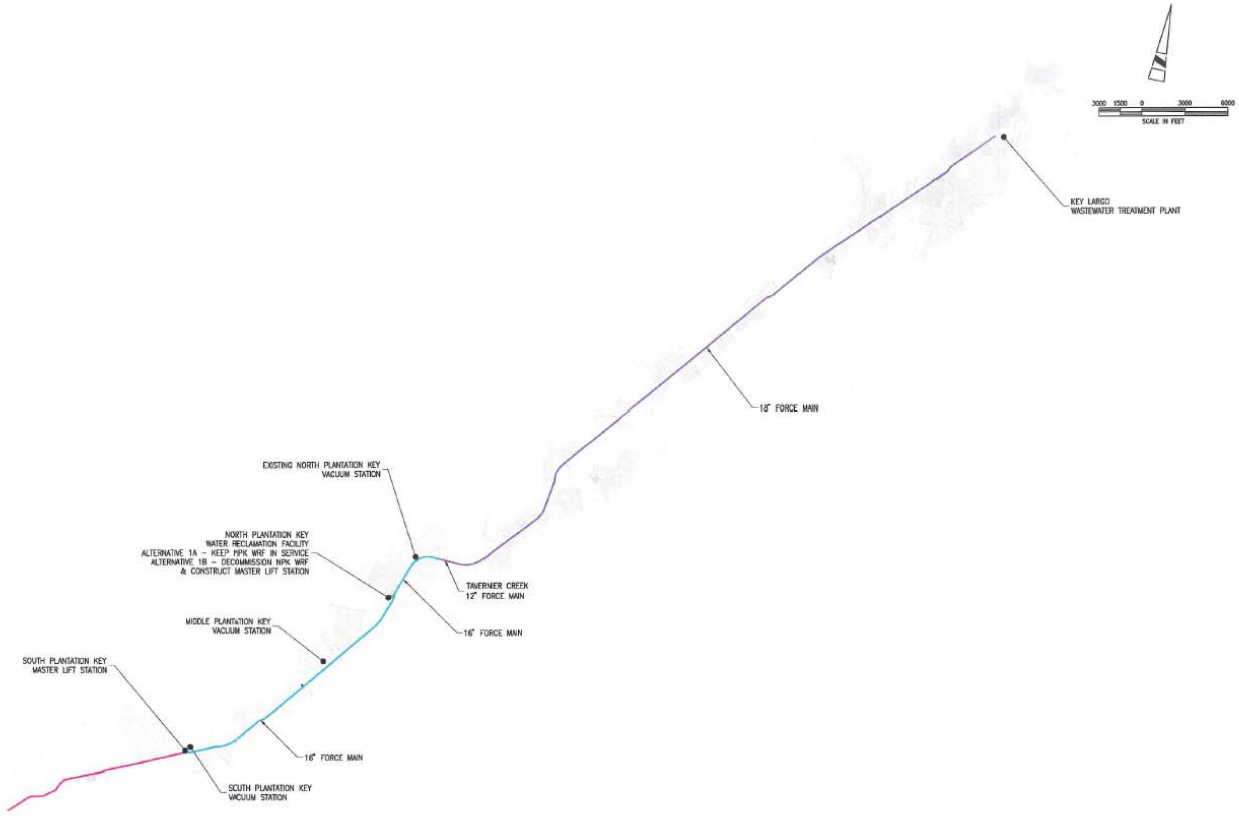


Figure 4.4 Proposed Transmission Main to Key Largo

4.2.3 Selected Treatment Alternative

The capital cost comparison for each treatment alternative is presented in Table 4.6.

Table 4.6 Treatment Alternative Capital Cost Comparison

Service Area	Alternative 1 – On-Island	Alternative 2 – Pump to Key Largo
Total Village Capital Cost	**$98,718,000**	**$105,115,000**

***F**ootnotes*

1. *Costs above include the selected collection system alternative costs, the hybrid collection system. Costs for the collection system are generally equal between each alternative.*
2. *Treatment alternative capital costs came from DBOF proposals received from Veolia/AECOM on October 28, 2011.*

The capital costs of both Treatment Alternatives 1 and 2 are relatively similar. However, since pumping to Key Largo eliminates the need for purchasing property for a South Plantation Key site, Alternative 2 is the selected alternative.

5.0 ENVIRONMENTAL EFFECTS/BENEFITS

Creating a centralized wastewater treatment system for the Village of Islamorada will eliminate numerous septic tanks, cesspools, and small unreliable package plants which are sources of nutrient loadings and major contributors to the decline of nearshore water quality. The addition of the proposed wastewater treatment system will have a beneficial effect on the environment.

The transmission mains for the proposed wastewater system upgrade are in areas that have previously been disturbed, are not located within important farmland or formally classified lands, and will not affect zoning or future land use.

5.1 Human Health Impact

The selected alternative will have no significant adverse human health or environmental effects on minority or low income communities. Temporary adverse impacts observed at the construction sites will include increased noise levels, minor disruptions in traffic, and an increase in the amount of airborne particulates. Control measures will be implemented to minimize these temporary impacts.

5.2 Endangered Species

The U.S. Fish & Wildlife Service (USFWS) identifies 46 endangered species in Monroe County, Florida (Appendix C), 44 of which could potentially be affected by wastewater pipeline projects (Appendix D). No adverse effects on any water bodies, endangered plants or animals are expected as a result of the project.

5.3 Florida Finding of No Significant Impact (FFONSI)

In April 2012, the proposed *Village of Islamorada Wastewater Management Plan* was submitted to the Florida Department of Environmental Protection's (FDEP) Bureau of Water Facilities Funding for review in accordance with 62-503, F.A.C. Review comments provided by FDEP have been addressed in the final version of the *Village of Islamorada Wastewater Management Plan.* The FDEP subsequently issued a Florida Finding of No Significant Impact (FFONSI) for Islamorada's proposed Wastewater Management Plan (Appendix E), which was published in the Florida Administrative Weekly, Volume 38, Number 16 (Appendix F) on April 20, 2012.

In accordance with Section 7 of the Endangered Species Act, and in satisfaction of a request by the Environmental Protection Agency that the USFWS participate in the review of all SRF Loan projects, the project planning documentation was also forwarded to the USFWS for review. On May 9, 2012, the U.S. Fish & Wildlife Service issued their concurrence with FDEP's finding that the wastewater implementation project, proceeding under the Collection Alternative 1 – Hybrid Collection System, Treatment Alternative 2 – Pump to Key Largo would not adversely affect listed species.

5.4 Florida State Clearinghouse Review

The proposed *Village of Islamorada Wastewater Management Plan* was also submitted to the Florida State Clearinghouse in April 2012 for a multi-disciplined intergovernmental review. All comments resulting from this review will be addressed by the Village in coordination with the FDEP.

5.5 Permits

Each of the 54 existing package wastewater treatment plants throughout Islamorada have been properly permitted (Appendix A). Environmental Resource Permit No. 44-0301378-002 (Appendix G), was issued by the FDEP on August 10, 2011 for construction of a stormwater management system to support planned construction of a Middle Plantation Key Vacuum Station. With the selection of Collection System 1 (Hybrid Collection System), Treatment Alternative 2 (Pump to Key Largo), construction of a Middle Plantation Key Vacuum Station is no longer necessary. Additional FDEP permits will be obtained by Veolia Water/AECOM following execution of the construction contract and as construction progresses.

6.0 ESTIMATED OPERATIONS, MAINTENANCE & REPAIR COSTS

Operating expenses, excluding interest on debt, depreciation, and other non-cash items, are based on Veolia/AECOM updated service fees reflecting elimination of the North Plantation Key WWTF and transmission of flow from the Village to the KLWTD. Contract negotiations with Veolia/AECOM, dba Islamorada Water, LLC, are expected to be completed and a Design, Build and Operate (DBO) Agreement entered into in June 2012.

Veolia/AECOM is expected to assume operation, maintenance and management of the North Plantation Key WWTF from U.S. Water Services Corporation in July 2012. Islamorada will pay an Interim Service Fee to Veolia/AECOM for the operation, maintenance and management of the NPK Facilities until the centralized wastewater system is operational, at which time NPK Facilities costs will be included in a Total Annual Service Fee paid to Veolia/AECOM for operation, maintenance and management of the entire system.

Upon commencement of operations of the Interim Service period in 2012, Islamorada will pay Veolia/AECOM an Annual Service Fee comprised of a Fixed Operations & Maintenance (O&M) Fee, a Variable O&M Fee, and a Renewal & Replacement Fee. The Total Annual Service Fee will be prorated in 2012 and 2015. The estimated Total Annual Service Fee in 2013 and 2014 will be $1,012,731 and $1,040,284, respectively.

The Total Annual Service Fee will decrease upon construction completion in 2015, at which time the Variable O&M Fee will be removed from the Total Annual Service Fee calculation. Beginning in 2016, the estimated Annual Service Fee will be $757,183.

7.0 FINANCIAL FEASIBILITY

7.1 Capital Financing Plan

To evaluate the financial feasibility and develop a public debt and equity structure to assist the Village in implementing the centralized wastewater program by the end of 2015, the Village retained the services of Raftelis Financial Consultants, RBC Capital Markets and the Public Resources Management Group. The resulting Capital Financing Plan (Appendix I) utilizes a blend of SRF loans, revenue bonds, and rate/assessment revenue to fund the Village's wastewater project, and identifies the average rate levels needed to support the ongoing operations of the wastewater facilities.

The CFP features a Schedule of Projected Revenues and Debt Coverage for Pledged Revenues based on a preliminary financial forecast of Islamorada's wastewater system over a ten year forecast period ending September 30, 2022. Outlined in the CFP are annual projections of sales (rate) revenue,

interest income earned on fund balances, annual assessment revenue, and other revenue sources; operations and maintenance expenses; and existing and projected future debt service. Principle considerations and assumptions upon which the CFP is predicated include Islamorada's wastewater operating experience at North Plantation Key, operating and capital cost estimates provided by Veolia/AECOM and wastewater flow projections provided in the DBOF RFP.

The Schedule of Projected Revenues and Debt Coverage for Pledged Revenues projections ("Debt Coverage Projections") are based on a project cost of $118,100,880 and assume 3% contingency, for a total project cost of $121,643.907 (see Exhibit I, Table 2). Funding sources identified in the Debt Coverage Projections include approximately $90.3 million of project costs funded from SRF loans and revenue bonds, with the remaining project costs funded from a combination of State of Florida grant allocation ($18.5 million awarded in 2012), assessment revenues, and rate revenues that will be available during project construction (see Exhibit I, Table 3). These amounts represent the Village's actual capital funding plan and the associated debt service coverage projections rely on these amounts. However, in the methodology set forth in the SRF loan capital cost eligibility, certain allowances, contingencies, and exclusions must be applied to meet the application requirements. The total Capital Cost shown on Page 1 of the CFP is based on the underlying project cost of $118,100,880. However this amount is adjusted upward to meet SRF formula-specific allowances including higher contingency and administrative cost factors to derive a total Capital Cost of $126,846,383 shown on Page 1 of the CFP. This amount is further adjusted on Page 1 of the CFP to account for the SRF Loan Service Fee and Capitalized Interest allowances. Finally, Page 1 of the CFP calculates the Annual Debt Service based on these formula-driven factors in order to fulfill the requirements of the SRF loan application process. However, the Village's actual planned debt service is detailed on the Debt Coverage Projections and associated assumptions detailed therein.

7.2 State Revolving Fund (SRF) Loans

In January 2012, Islamorada submitted a Pre-Construction Request for Inclusion (RFI) to the FDEP requesting State Revolving Fund (SRF) Loan funding in support of Islamorada's Collection, Transmission, Treatment and Disposal Facilities, FDEP Project No. WW88202. On February 22, 2012, the FDEP approved Pre-Construction loan funding in the amount of $6,194,014 for the project (Appendix H). Islamorada submitted a subsequent Construction RFI in May 2012, requesting an additional $102,152,369 in SRF Loan funds for Construction. Village staff anticipates completion of the SRF Loan application process in June, 2012.

7.3 State Revenue Bonds

In April 2012, the State of Florida appropriated $50,000,000 in bond proceeds in the Adopted 2012-2013 State Budget for construction of wastewater treatment facilities in the Florida Keys Area of Critical State Concern, including $18,500,000 after issuance costs and reserves are accounted for, for the construction of wastewater facilities in Islamorada, provided the execution of a construction contract by September 1, 2012 and completion of construction of the central wastewater facilities in 2015.

7.4 Rate/Assessment Revenue

Non-ad valorem assessment revenue is the primary source used to repay State Revolving Fund Loans and other debt incurred by the Village for the wastewater project. Revenue from rates for services is a secondary source.

North Plantation Key Non-ad Valorem Assessments

On August 23, 2005, the Village Council adopted Resolution No. 05-08-42, the Initial Assessment Resolution to fund construction of the wastewater collection and treatment facilities necessary to provide central wastewater collection and treatment services to properties in the North Plantation Key assessment area. On September 15, 2005, the Village Council adopted Resolution No. 05-09-49, the Final Assessment Resolution which included a reduction to the estimated project costs for financing. Both Resolutions are attached as Appendix J.

In accordance with Florida Statutes, the Village Council has adopted the following annual assessment resolutions for fiscal years 2006-2007 through 2011-2012 to approve the assessment roll for each year:

Resolution No. 06-09-72	Adopted September 14, 2006
Resolution No. 07-09-49	Adopted September 6, 2007
Resolution No. 08-09-63	Adopted September 11, 2008
Resolution No. 09-09-76	Adopted September 14, 2009
Resolution No. 10-09-58	Adopted September 9, 2010
Resolution No. 11-08-50	Adopted August 9, 2011

In establishing the final assessment amount, Village consultants estimated that the annual debt service principal and interest total would be $471,294.12 based on financing $7,042,972.53 over 30 years at 5.25% interest. The financed amount was derived from the remaining estimated cost of wastewater collection and treatment not covered by grants.

The Schedule of Prior and Parity Liens included in the attached Capital Finance Plan reflects a total annual debt service (principal and interest) obligation of $686,626 for current financing secured to fund NPK construction. Of this amount, $344,419 is existing SRF debt service, and $410,354 including the coverage requirement. As reflected on Page 3, Attachment -1 to the Capital Finance Plan, NPK annual assessment revenue after pre-payments is $400,200 per year continuing through 2035. The remaining debt service obligation from SRF and other lenders is covered by rates charged for wastewater services at the NPK plant.

The current NPK rates were initially developed in 2005 and have been adjusted since. Initially the NPK rates were developed to recover just plant operations and maintenance costs and renewal and replacement costs, with the NPK assessments funding the NPK debt service. Because NPK required more debt and capital expenditures over time than originally planned, the NPK rates now fund a portion of debt service. After construction and financing plans for the wastewater project in the remaining service area are finalized, the Village will review cost allocations and rates for the entire wastewater project and all wastewater assessment areas.

Remaining Service Area Non-ad Valorem Assessments

On June 23, 2011, the Village Council adopted Resolution No. 11-06-38 the Initial Assessment Resolution for the Remaining Service Area (RSA) of the Village excluding North Plantation Key. The Phase 1 assessment was based on $20 million needed as preliminary funding for construction and financing anticipating that a second or Phase 2 assessment would be needed in the future. On July 28, 2011, the Village Council adopted Resolution No. 11-07-47, the Final Assessment Resolution for the RSA. This Resolution included an amendment to remove 113 properties to be assessed by a separate resolution at a future date. Both Resolutions are attached as Appendix K.

The Schedule of Prior and Parity Liens included in the attached Capital Finance Plan reflects a total estimated annual debt service (principal and interest) obligation of up to $5,928,350 for SRF and other financing secured to fund RSA construction. The Capital Finance Plan indicates that after a Phase 2 non-ad valorem assessment for the RSA is levied, the Village will receive $2,400,000 in annual assessment revenue to apply as the primary funding source for debt service. Then rates for operations and maintenance will be used to supplement any debt service not covered by assessments. As RSA wastewater project progresses, the Village will continue to apply for grants to reduce funding needed from borrowing.

Again, after construction and financing plans for the wastewater project in the RSA are finalized, the Village will review cost allocations and rates for the entire wastewater project and all wastewater assessment areas to ensure that net revenues are sufficient to cover debt service.

8.0 SCHEDULE

Table 8-1 outlines the preliminary schedule for the Islamorada Wastewater Management Plan.

Table 8.1 – Preliminary Schedule for Islamorada Wastewater Management Plan

Task	Date
Notice To Proceed	June 21, 2012
Begin Construction	June 22, 2012
Complete Construction	December 1, 2015