Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director

AGENDA
REGULAR MEETING #10-2018
MAY 17, 2018 – 7:00 PM AT DISTRICT OFFICES
ALL MEETINGS ARE OPEN TO THE PUBLIC

1. Call to Order & Pledge of Allegiance
2. Administrative Matters
   A. Roll Call
   B. Previous Meeting Minutes Page 3
   C. Additions and Deletions to the Agenda
3. Comments from the Public
4. Status Updates
   A. Loxahatchee River Watershed Page 10
   B. Loxahatchee River District Dashboard Page 11
5. Consent Agenda (see next page) Page 12
6. Regular Agenda
   A. Consent Agenda Items Pulled for Discussion
   B. Whispering Trails Gravity Sewer Construction Page 150
   C. Gravity Service Lining Contract Page 154
7. Reports (see next page) Pulled for Discussion
8. Future Business Page 203
9. Board Comments
10. Adjournment

"…if a person decides to appeal any decision made by the Board, with respect to any matter considered at such meeting or hearing, he/she will need a record of the proceedings, and that, for such purpose, he/she may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based."

Submitted by:
Date: May 7, 2018

5. CONSENT AGENDA

All items listed in this portion of the agenda are considered routine and will be enacted by one motion. There will be no separate discussion of these items unless requested by a Board member or citizen; in which event, the item will be removed and considered under the regular agenda.

A. Fixed Asset Disposal – to approve disposal Page 13
B. Customer Service Policy Revisions – to approve revisions Page 14
C. Construction Standards & Technical Specifications – to approve updates Page 19
D. Change Orders to Current Contracts – to approve modifications Page 136

7. REPORTS

A. Neighborhood Sewering Page 155
B. Legal Counsel's Report Page 158
C. Engineer's Report Page 159
D. Busch Wildlife Sanctuary Page 167
E. Director's Report Page 168

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D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: Governing Board

FROM: Recording Secretary

DATE: May 9, 2018

RE: Approval of Meeting Minutes

Attached herewith are the minutes of the Public Hearing and Regular Meeting of April 19, 2018. As such, the following motion is presented for your consideration.

> "THAT THE GOVERNING BOARD approve the minutes of the April 19, 2018 Public Hearing and Regular Meeting as submitted."

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Ref. 08-2018

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT
PUBLIC HEARING – MINUTES
APRIL 19, 2018

1. CALL TO ORDER AND PLEDGE OF ALLEGIANCE

Chairman Snyder called the Public Hearing of April 19, 2018 to order at 6:55 P.M.

2. ROLL CALL

The following Board Members were in attendance:

Mr. Boggie
Mr. Silverman
Mr. Snyder
Mr. Rockoff

3. TO RECEIVE PUBLIC COMMENTS PERTAINING TO THE FINAL ASSESSMENT ROLL FOR TURTLE CREEK SUBSYSTEM 1.

No comments from the public were received.

4. COMMENTS FROM THE BOARD

No comments from the Board were received.

5. ADJOURNMENT

Chairman Snyder adjourned the Public Hearing at 6:58 P.M.

_____ _____

BOARD CHAIRMAN BOARD SECRETARY

_____

RECORDING SECRETARY

Ref: #09-2018

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT
REGULAR MEETING - MINUTES
APRIL 19, 2018

1. CALL TO ORDER

Chairman Snyder called the Regular Meeting of April 19, 2018 to order at 7:00 pm.

2. ADMINISTRATIVE MATTERS

A. ROLL CALL

The following Board Members were in attendance.

Mr. Silverman
Mr. Snyder
Mr. Boggie
Mr. Rockoff

Staff Members in attendance were Dr. Arrington, Mr. Dean, Ms. Peterson, Mr. Howard, and Mr. Campbell.

Consultants in attendance were Mr. Bomerito from Hazen and Sawyer, Ms. Miranda and Mr. Fowler from Holtz Consulting, Mr. Pugsley from Mathews Consulting and Mr. Shenkman with Smith, Gaskill & Shenkman.

Ms. Knight from Busch Wildlife Sanctuary was also in attendance.

B. PREVIOUS MEETING MINUTES

The minutes of the Public Hearing and Regular Meeting of March 15, 2018 were presented for approval and the following motion was made.

MOTION: Made by Mr. Boggie, Seconded by Mr. Silverman,
Passed Unanimously.

"THAT THE GOVERNING BOARD approve the minutes of the March 15, 2018 Public Hearing and Regular Meeting as submitted."

C. ADDITIONS & DELETIONS TO THE AGENDA

No additions or deletions were made.

3. COMMENTS FROM THE PUBLIC

No comments were received.

4. STATUS UPDATES

A. LOXAHATCHEE WATERSHED STATUS

Mr. Howard gave an update on the impact of the exceptionally dry weather conditions.

B. LOXAHATCHEE RIVER DISTRICT DASHBOARD

Dr. Arrington reviewed the District Dashboard.

5. CONSENT AGENDA

MOTION: Made by Mr. Rockoff, Seconded by Mr. Boggie,
Passed unanimously.

"THAT THE GOVERNING BOARD approve the Consent Agenda of April 19, 2018 as submitted."

The following motions were approved as a result of the Board's adoption of the Consent Agenda:

A. Final Assessment-Turtle Creek Subsystem 1 (2018-08)

"THAT THE GOVERNING BOARD approve Resolution 2018-08 adopting the Turtle Creek Subsystem 1 Final Assessment Roll and Exhibits."

B. Notice of Intent to Assess-8th Street (2018-09)

"THAT THE GOVERNING BOARD approve Resolution 2018-09, the Notice of Intent to Assess, the Pending Lien Notice, and the Exhibits for the 8th Street Assessment Area."

C. Notice of Intent to Assess-96 Pine Hill Trail E (2018-10)

"THAT THE GOVERNING BOARD approve Resolution 2018-10, the Notice of Intent to Assess, the Pending Lien Notice, and the Exhibits for the 96 Pine Hill Trl E Assessment Area."

D. Notice of Intent to Assess-Chippewa St (2018-11)

"THAT THE GOVERNING BOARD approve Resolution 2018-11, the Notice of Intent to Assess, the Pending Lien Notice, and the Exhibits for the Chippewa Street Assessment Area."

E. Notice of Intent to Assess-US 1-Juno (2018-12)

"THAT THE GOVERNING BOARD approve Resolution 2018-12, the Notice of Intent to Assess, the Pending Lien Notice, and the Exhibits for the 12750 US 1 Assessment Area."

F. Notice of Intent to Assess-County Line Rd-Martin Co. (2018-13)

"THAT THE GOVERNING BOARD approve Resolution 2018-13, the Notice of Intent to Assess, the Pending Lien Notice, and the Exhibits for the County Line Rd-Martin County Assessment Area."

G. Approval of Banking Account modification – to approve modifications

"THAT THE DISTRICT GOVERNING BOARD authorize the Executive Director to migrate our existing SunTrust Business Checking account to a SunTrust Public Funds NOW ECR account for the remainder of our contract term."

H. Executive Director Contract – to approve extension

"THAT THE GOVERNING BOARD approve the proposed amendments to the Executive Director's Employment Agreement and authorize the Board Chairman to execute an amended Employment Agreement between Loxahatchee River Environmental Control District and D. Albrey Arrington, and authorizes the Board Chairman to sign off on the Executive Director's job description."

I. Lift Stations 70+71 generator/automated transfer switch purchases – to approve purchases

"THAT THE DISTRICT GOVERNING BOARD authorize the Executive Director to proceed with the purchase of One, New, 100 kW Generac, Diesel, Generator from ACF, Inc., for LS #70, in the amount of $39,366.00, in accordance with ACF Quote #0020164592, and FSA Contract FSA17-VEH15.0; Specification #71.

AND

THAT THE DISTRICT GOVERNING BOARD authorize the purchase of one new 150Amp Automatic Transfer Switch from ACF, Inc. in accordance with their Quote dated March 21, 2018 and in accordance with FSA Contract FSA17-VEH15.0; Specification #75, and in the amount of $5,466.00.

AND

THAT THE DISTRICT GOVERNING BOARD authorize the purchase of One (1), New, 60 kW, Diesel Generator for Lift Station #71 in the amount of $29,650.00 from ACF, Inc. in accordance with ACF Quote #0020164577 and FSA 17-VEH15.0; Specification #71.

AND

THAT THE DISTRICT GOVERNING BOARD authorize the purchase of One (1), New, 100 Amp, Automatic Transfer Switch from ACF, Inc. in accordance with their Quote dated March 21, 2018 and in accordance with FSA Contract FSA17-VEH15.0; Specification #75, and in the amount of $4,466.00"

J. Deep Well pump & motor purchases – to approve purchases

"THAT THE GOVERNING BOARD authorize the Executive Director to purchase 1 New Layne pump, motor and discharge head for the Injection Well Pump Station from TAW in accordance with their Quotation #60023910-3 dated 3/26/2018 in the amount of $66,132.36."

K. Fixed Asset Disposal – to approve disposal

"THAT THE GOVERNING BOARD authorize the Executive Director to dispose of tangible personal property including fixed asset numbers MCE116 an ME43."

L. Liability and Workers' Compensation Insurance – to renew insurance

No action was taken.

M. Change Orders to Current Contracts – to approve modifications

"THAT THE DISTRICT GOVERNING BOARD authorize the Executive Director to execute Change Order #1 to the Turtle Creek Subsystem 2&3 Gravity Sewer contract with Giannetti Contracting Corp. in the amount of $16,481.18."

6. REGULAR AGENDA

A. CONSENT AGENDA ITEMS PULLED FOR DISCUSSION

No items were pulled for discussion.

B. MASTER LIFT STATION REHABILITATION

Dr. Arrington reviewed Mr. Yerkes memo.

MOTION: Made by Mr. Silverman, Seconded by Mr. Rockoff,
Passed Unanimously.

"THAT THE GOVERNING BOARD authorize award of the Master Lift Station Rehabilitation Contract to TLC Diversified, Inc., in the amount of $1,860,777.00, in accordance with their bid of April 12, 2018.

And

THAT THE GOVERNING BOARD authorize a Contingency for this project in the amount of $ 56,000.00."

C. WHISPERING TRAILS GRAVITY SEWER CONSTRUCTION

Dr. Arrington reviewed Mr. Yerkes memo. No action was taken.

D. STRATEGIC PLANNING

Dr. Arrington reviewed the results of the Strategic Planning meeting.

7. REPORTS

D. BUSCH WILDLIFE SANCTUARY

Ms. Kight reviewed the Sanctuary's dashboard.

The following reports stood as written:

A. NEIGHBORHOOD SEWERING

B. LEGAL COUNSEL'S REPORT

C. ENGINEER'S REPORTS

E. DIRECTOR'S REPORT

8. FUTURE BUSINESS

Dr. Arrington reviewed the Future Business.

9. COMMENTS FROM THE BOARD

No comments were received.

10. ADJOURNMENT

MOTION: Made by Mr. Rockoff, Seconded by Mr. Silverman, Passed Unanimously.

"That the Regular Meeting of April 19, 2018 adjourn at 8:15."

_____ _____

BOARD CHAIRMAN BOARD SECRETARY

_____

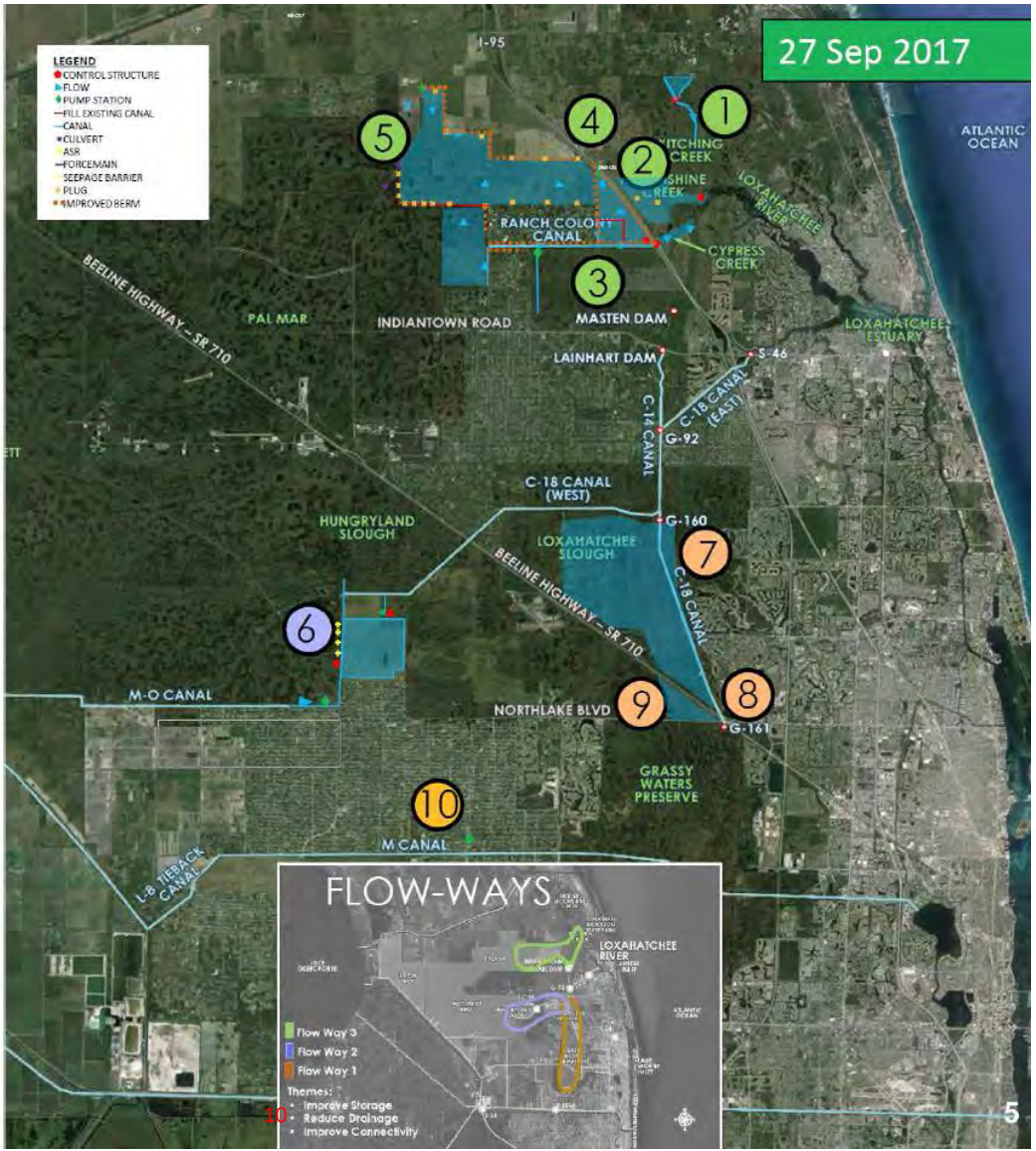
RECORDING SECRETARY

Loxahatchee River Watershed Status
ACOE and SFWMD Loxahatchee River Watershed Restoration Project Update

A series of planning studies for ecosystem restoration has been ongoing as part of the Comprehensive Everglades Restoration Plan (CERP). The Loxahatchee River Watershed Restoration Project is one of these studies with the goal to restore and sustain the overall quantity, quality, timing and distribution of fresh water to the river. As part of the most recent effort since December 2014, the Project Delivery Team (PDT) has been thoroughly evaluating all aspects of restoration planning for the Loxahatchee. On May 9 the PDT met to present their findings, recommendations, and next steps. At our meeting we will provide a summary of the PDT meeting and this restoration planning effort.

ALTERNATIVE 5

1. Kitching Creek (Hydration): Spreader canal; weir/plug (Jenkins Ditch)
2. Moonshine Creek (MC) & Gulfstream East (GE) (Restoration): Connect HSLCD ditch to MC; clear MC vegetation; weir Hobe Grove Ditch; regrade adjacent area to historic topography
3. Cypress Creek Canal (CCC) (Reduce Over-drainage): Replace CCC weir; raise berm at Ranch Colony; automate twin 84-inch culverts; pump and spreader swale
4. Gulfstream West (Restoration & Reduce Over-drainage): Partial backfill & relocate southern end of HSLCD canal; small pump; construct flow through marsh to attenuate flow
5. Palmar East (Restoration & Connectivity) Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm; redirect drainage to GW flow-through marsh via north Nine Gems canal
6. C-18W Reservoir (9,500 acre-feet & 4 ASR Wells): Above-ground reservoir; inflow pump; discharge structure; seepage control; M-O Canal Connector and pump
7. G-160 Structure (Reduce Over-drainage): Improve Hydroperiod in Loxahatchee Slough
8. G-161 Structure (Connectivity): GWP water to Loxahatchee Slough
9. GWP Triangle (Connectivity)
10. M-1 Pump Station (Conveyance): Deliver Lower M-1 Basin water to M-Canal, GWP, and G-161



LOXAHATCHEE RIVER DISTRICT'S EXECUTIVE DASHBOARD

		Stewardship	Wastewater						Engineering	General Business					EHS	River Health		
		# People educated at RC	Mean Daily Incoming Flow	Delivery of Reclaimed Water	Customer Service	Sewer Overflow	Permit exceedance	NANO Blend to Reuse (@ 511)	Grease Interceptor Inspections	Cash Available	Revenue (non-assessment)	Operating Expenses	Capital Projects		Employee Safety	Lainhart Dam Daily Flow	Salinity @ NB seagrass beds	River Water Quality
Benchmark / Customer Expectation		% of Target	million gallons/day	# days demand not met	# blockages with damage in home	# occurrences	# occurrences	Max Specific Conductance (umhos/cm)	% requiring pump out	$	% of Budget	% of Budget	% within budget	% on time	# of OSHA recordable injuries	Flow (cfs)	‰	Fecal Coliform Bacteria (cfu/100ml)
Green Level		≥ 90%	< 7.7	Zero	Zero	Zero	Zero	<1542	≤ 15	≥ $9,894,657	≥ 95%	≥ 85% but ≤ 105%	≥80%	≥80%	Zero	mean ≥ 69	min ≥ 20 ‰	90% of sites ≤ 200
Yellow		< 90%	< 8.8	≥ 2	1	≥ 1	≥ 1	≤1875	≤ 25	< $9,894,657	≥ 90%	≥ 80%	≥60%	≥60%	-	mean ≥ 35	min ≥ 10 ‰	2 or more sites >200 but ≤ 400
Red		<75%	≥ 8.8	≥ 9	≥ 2	> 2	≥ 2	>1875	> 25	< $5,557,057	< 90%	< 80% or > 105%	< 60%	< 60%	≥ 1	min < 35	min < 10 ‰	≥ 2 sites > 400
2015 Baseline		2,139	6.8	0	0	1	0	1,093	14	$ 30,199,659	104%	111%	92%	78%	0	78	24.8	0 > 200
2016 Baseline		2,169	6.7	0	0	1	0	1,063	12	$ 33,223,653	96%	90%	100%	85%	0	104	18	1 > 200
2017 Baseline		104%	6.5	1	0	3	0	1,141	8	$ 29,707,389	96%	85%	98%	83%	0	57	20	1 > 200
2017	Apr	98%	7.0	2	0	1	0	1077	18	$ 30,421,690	94%	89%	100%	79%	0	8	28.4	0 > 200
	May	89%	6.3	0	0	2	0	964	8	$ 31,466,437	95%	89%	100%	79%	0	15	31.5	0 > 200
	June	123%	6.7	0	0	0	0	1039	0	$ 28,992,848	94%	89%	100%	79%	0	18	15.9	0 > 200
	July	111%	6.2	0	1	1	0	1011	4	$ 29,834,468	95%	88%	100%	79%	0	89	27.0	1 > 200
	Aug	78%	6.0	0	0	3	0	1056	15	$ 30,208,664	95%	88%	100%	79%	0	73	23.4	0 > 200
	Sept	71%	6.2	6	3*	9	0	1355	6	$ 28,132,953	95%	88%	100%	79%	0	25	11.2	0 > 200
	Oct	103%	6.2	0	0	5	0	1482	10	$ 28,969,760	100%	72%	93%	93%	0	143	6.5	3 > 400
	Nov	139%	7.1	0	0	0	0	1124	2	$ 29,973,080	97%	80%	93%	93%	0	77	14.4	1 > 200
	Dec	126%	6.8	0	0	3	0	1159	11	$ 29,366,604	98%	82%	93%	87%	0	68	20.7	3 > 200
2018	Jan	121%	7.1	0	0	3	0	1240	15	$ 29,774,007	99%	81%	93%	67%	1	84	27.6	1 > 200
	Feb	118%	7.1	0	0	0	0	1299	10	$ 31,873,924	97%	82%	93%	60%	0	43	31.8	0 > 200
	Mar	104%	7.0	0	0	1	0	1322	6	$ 30,590,419	101%	86%	93%	60%	0	0	33.6	1 > 200
	Apr	116%	6.8	0	0	1	0	1350	14	$ 30,470,440	101%	88%	93%	47%	0	0	32.3	1 > 200
Consecutive Months at Green		7	107	7	9	0	57	92	12	106	70	2	31	0	3	0	5	4
Metric Owner		O'Neill	Campbell	Dean	Dean	Campbell	Campbell	Campbell	Dean	Peterson	Peterson	Peterson	Yerkes	Yerkes	Campbell	Howard	Howard	Howard

Metric	Explanation
Sewer Overflow	We had a minor sewer spill within our wastewater treatment plant. The spill was caused by a brief loss of power to filter pump station 2. Normally, this would not cause a spill, but filter pump station 1 is offline due to ongoing treatment plant upgrades.
Capital Projects	The following projects continue to be behind schedule: Whispering Trails neighborhood sewering; Loxahatchee River Rd wastewater and IQ force main; Alt A1A bridge force main; Deep Bed Filters, 2018 lift station rehabs; and replacement of the Jupiter Ocean Racket Club wastewater forcemain.
Lainhart Flows	Lainhart Dam minimum flow this month was 0 cfs; mean flow was 24 cfs. April rainfall totalled 5.25 inches, but that has not recovered the watershed from the previous two months that were very dry. SFWMD has been operating the system to maximize flows (around 50 cfs) on the weekends to facilitate recreation, but weekday flows are

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D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: Governing Board

FROM: Administration Staff

DATE: May 9, 2018

SUBJECT: Consent Agenda

All items listed below are considered routine and will be enacted by one motion. There will be no separate discussion of these items unless requested by a Board Member or citizen, in which event, the item will be removed and considered under the regular agenda.

This month's consent agenda consists of the following items:

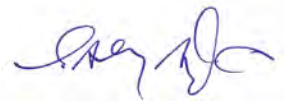
A. Fixed Asset Disposal – to approve disposal
B. Customer Service Policy Revisions – to approve revisions
C. Construction Standards & Technical Specifications – to approve updates
D. Change Orders to Current Contracts – to approve modifications

Should you have any questions regarding these items, I would be pleased to discuss them further with you.

The following Motion is provided for Board consideration:

"THAT THE GOVERNING BOARD approve the Consent Agenda of May 17, 2018 as presented."

Signed,



D. Albrey Arrington, Ph.D.
Executive Director

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D. Albrey Arrington, Ph.D., Executive Director

Memorandum

To: Governing Board

From: Kara Peterson, Director of Finance and Administration

Date: May 17, 2018

Subject: Disposal of Fixed Assets

Whenever the District disposes of tangible personal property of a non-consumable nature we are required by Florida Statutes to bring the matter to the attention of the governing body. Therefore, consistent with our procedures, I request your authorization to dispose of the items listed below:

Tag #	F/A #	Description	Date Recorded	Acquired Value	Book Value
2177	ME239	Cadet Electric Blower	09/30/96	$ 764	$ -
2641	N/A	Dell Precision T3500	09/30/11	1,230	-
2694	N/A	Dell Precision T1600	09/30/12	960	-
2637	N/A	Dell Precision T1500	09/30/11	795	-
2678	N/A	Dell Precision T1500	09/30/11	795	-
Total Assets to be Disposed				**$ 4,544**	**$ -**

These items are no longer of use to the District and will be sold or scrapped.

If you have any questions, please feel free to contact me.

I offer the following motion for your consideration:

> **"THAT THE GOVERNING BOARD authorize the Executive Director to dispose of tangible personal property including fixed asset number ME239 and asset tag #'s 2641, 2694, 2637 and 2678."**

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D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: Albrey Arrington, Ph.D., Executive Director

FROM: Bud Howard, Director of Information Services

DATE: May 11, 2018

SUBJECT: Policy & Procedures for Customer Service

In an effort to standardize and clarify our procedures and supplement our Rules, Staff and Legal Counsel have developed the attached District Policies that will be used to guide our Customer Service staff.

Three (3) of these policies formally memorialize long-established procedures that are not specified under our rules. These policies include 1) Non-Residential Billing by Water Use, 2) Multiple Water Meter Non-Residential, and 3) End Sewer Service Charges.

The 4th policy for your consideration is a revision to our Delinquent Account Payment Plan policy. Here I have reorganized the text of the policy for clarity and added the section addressing the minimum monthly payment calculation for non-residential/commercial customers.

We recommend the following motion:

"THAT THE DISTRICT GOVERNING BOARD authorizes the Executive Director to implement the following District Policies & Procedures:

1. **Non-Residential Billing by Water Use**
2. **Multiple Water Meter Non-Residential/Commercial Billing**
3. **End Sewer Service Charges**
4. **Delinquent Account Payment Plan**

with an effective date of May 17, 2018."

Loxahatchee River District Policy

Department: Customer Service	**Effective Date**:
Policy: Non-Residential Billing by Water Use	
Purpose: To memorialize the established method for computation of non-residential sewer service bills.	
Policy #:	

Rule 31-10.007(1B) defines the billing rate for non-residential customers as the cost per thousand gallons of metered water usage (i.e., used water is discharged to the sewer and treated by the District). The District calculates quarterly sewer service charges based on actual potable water used at the property.

To provide a more stable quarterly bill, the District's quarterly sewer bill is based upon a 12-month rolling average of water consumption (often termed budget billing or balanced billing). The District computes the quarterly sewer services bill by calculating the average monthly potable water used over the past 12 months, multiplied by the present rate, then multiplied by 3 to for the quarterly bill. The sewer service charge is based on the following water consumption schedule to provide time for data processing:

Quarter Billing	Water Use From	Water Use To
Q1 – January	December 1	November 30
Q2 – April	March 1	February 28
Q3 – July	June 1	May 31
Q4 - October	September 1	August 31

Customers that do not have a metered water supply, or that have not established a minimum of 1 month of water use history, or certain other uses where the water consumption is not representative of flow to sewer (e.g., public parks, pool backwash; marinas and pump out station) the sewer charge is a flat rate based on the number of equivalent connections established in the developer agreement.

Authority: Chapter 31-10.007(1b)	
Authorized: ☐ Governing Board	Date: May 18, 2018
Approved: ☐ Executive Director	Date: May 18, 2018
Revised:	

Loxahatchee River District Policy

Department: Customer Service	**Effective Date**:
Policy: Multi-meter Non-Residential Billing	
Purpose: To clarify the computation of sewer service charges for non-residential customers with multiple water meters serving the property.	
Policy #:	
Quarterly sewer service charges for non-residential customers are computed based on metered water usage (per Rule 31-10.007(1b) and Non-residential Billing by Water Use Policy). Commercial properties designated by a single County parcel are assigned one District account number but may be served by multiple water meters from the local municipal water provider. Quarterly sewer service charges shall be the computed by the sum of water use for all meters serving the property. At the owner's request, the District will provide a report summarizing water use by water meter to provide clarity in the data used to compute the quarterly sewer service charges.	
Authority: Chapter 31-10.007(1b)	
Authorized: ☐ Governing Board	Date: May 18, 2018
Approved: ☐ Executive Director	Date: May 18, 2018
Revised:	

Loxahatchee River District Policy

Department: Customer Service	**Effective Date**:
Policy: End Sewer Service Charges	
Purpose: To clarify the process to end sewer service charges. Complements Initiate Sewer Service Charges Policy	
Policy #:	

Because sewer service charges begin the quarter *following* Certificate of Occupancy or other condition specified in the Initiate Sewer Services Policy, the customer is responsible for sewer service charges *including* the quarter sewer services end. For example, if an owner sells a property in February, that owner is responsible for sewer service charges for all Q1. For customers that request an Estoppel, the quarterly sewer service charge may be prorated by the closing agent.

The District's Billing Quarters are:

- Q1 – January through March
- Q2 – April through June
- Q3 – July through September
- Q4 – October through December

This policy is independent of any proration agreement between buyers and sellers.

Authority: Chapter 31-10.007(1b)	
Authorized: ☐ Governing Board	Date: May 18, 2018
Approved: ☐ Executive Director	Date: May 18, 2018
Revised:	

Loxahatchee River District Policy

Department: Customer Service	**Effective Date**: September 16, 2016
Policy: Delinquent Account Payment Plan	
Purpose: Payment Plan for Delinquent Quarterly Service Charges.	
Policy #:	

This spirit of this payment plan is to satisfy 12 months of delinquent charges, plus ongoing sewer service charges, and bring the account current in less than one year.

Customers desiring to bring delinquent quarterly service charges current may enter into a Payment Plan Agreement. In order to enter into a Payment Plan Agreement, a customer must:

1. Have not defaulted on a payment plan agreement in the previous 12-months;
2. Complete the District's Payment Plan Agreement form; and
3. Agree to make a minimum MONTHLY payment to the District greater than, or equal to:
   A. Residential customers: 67% of the present quarterly sewer service charge until the account is current. Example: For a quarterly sewer service charge of $66.91 the monthly payment is $44.83 ($66.91 * 0.67 = $44.83); or
   B. Non-Residential/Commercial customers: the calculated amount based on the total due, plus 3 quarters of the anticipated forthcoming quarterly bills, which brings the account current at 10 to 12 months, depending if payment plan starts at the beginning or end of billing quarter. The minimum monthly payment is calculated as: (Total Amount Due + 3 * the average quarterly bill) / 10.5. Example: ($4,000 total due + 3 * $1,000 average quarterly bill) / 10.5 = $667 minimum monthly payment;
4. and, make the first payment greater than, or equal to, the minimum payment.

The District will forbear Delinquent Fees for customers actively participating in, and fully compliant with the terms of, an approved payment plan. Forbearance of Delinquent Fees will begin on the date of the first monthly payment on an approved payment plan.

If the District does not receive the minimum payment in two consecutive calendar months, the Payment Plan Agreement will be considered in default, and delinquent charges, fees and interest will resume accruing.

The minimum monthly payment shall be adjusted to any rate changes once the new rates take effect. Delinquent accounts accumulate charges, fees, and interest in accordance with Rule 31-10.009.

Authority: Chapter 31-10.009(9)	
Authorized: ☐ Governing Board	Date: 9/16/2016
Approved: ☐ Executive Director	Date: 9/16/2016
Revised: May 17, 2018	

Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: Governing Board

DEPARTMENT: Engineering Services
Kris Dean, P.E.

DATE: May 11, 2018

SUBJECT: Construction Standards Update – May 2018

In April of 1983 the Governing Board approved the District's first "Manual of Minimum Construction Standards and Technical Specifications". Since the initial adoption, this document has been updated from time to time as codes, rules, materials and methods have changed and improved over time. These changes were most recently approved by the Board in March 2017.

This May Engineering Services is updating the Manual of Minimum Construction Standards and Technical Specifications. All updates can be reviewed in the Manual of Minimum Construction Standards and Technical Specifications, attached.

A summary of the update is as follows.

1. Table of Contents
    a. Added Section 161 Variable Speed/PLC Control Panels
    b. Added Section 162 Generator and ATS
    c. Added Section 168 Instrumentation
    d. Added Section 169 Programmable Logic Controller
    e. Added Section 170 Remote Telemetry Unit (RTU) – Lift Stations
2. Section 1.02.3
    a. Revised standard width of lift station access drive from 12' to 16'
3. Section 2
    a. Deleted the requirement to relay an entire gravity main run when abandoning 3 or more services.
    b. Revised to allow other than 1150 rpm pumps at the District Engineer's discretion.
    c. Revised to include 100-year flood elevation on construction plans.
    d. Revised to require remote telemetry on new lift stations.
    e. Deleted Level I-IV lift station classifications.
    f. Various text edits for clarity.

    g. Deleted 2.08 Grease, Oil and Sand Interceptors (Added Section 122)
4. Section 3
    a. Various text edits for clarity and delete redundant specifications.
5. Section 107
    a. Revised locating/tracking/steering requirements for directional drill installations.
    b. Added tracer wire termination box requirements
6. Section 111
    a. Various text edits for clarity
7. Section 114
    a. Added requirement for 316SS backer rings on HDPE flange adapters.
8. Section 121
    a. Corrected ASTM reference.
9. Section 122
    a. New section added for Grease, Oil and Sand Interceptors.
10. Section 130
    a. Deleted Ball Check Valves.
    b. Deleted Rubber Flapper Swing Check Valves.
    c. Added Brass Check Valves.
11. Section 140
    a. Deleted Low Pressure Air Test
12. Section 150
    a. Added standard requirement for 20HP and smaller stations.
    b. Added alternate requirements for stations serving critical infrastructure and performing as repump.
    c. Added maximum distance limit from station to transformer.
    d. Revised standard equipment list for clarity.
    e. Deleted operating conditions (redundant, covered in Section 2)
    f. Added sacrificial pump faces.
    g. Added telemetry requirements.
    h. Added H-20 loading for hatches in possible traffic areas.
    i. Added section reference for valves.
    j. Added section reference for piping.
    k. Added section reference for wetwell and vault structures.
    l. Added submittal requirements.
    m. Added manufacturer services requirement.
    n. Added Operation and Maintenance requirements
13. Section 151
    a. Deleted cost LPSS cost limits for grinder stations in new developments.
    b. Deleted PVC ball check valves.
14. Section 152
    a. Updated for 2018 ratification
15. Section 161 – NEW
16. Section 162 – NEW
17. Section 168 – NEW
18. Section 169 – NEW

19. Section 170 – NEW
20. SD-31
    a. Revised to include 100-year flood elevation on elevation schedule.

Therefore, the following motion is recommended for approval:

"THAT THE DISTRICT GOVERNING BOARD ratify and approve the Loxahatchee River Environmental Control District's "Manual of Minimum Construction Standards and Technical Specifications", as of May 17, 2018, and authorize the District Engineer and Executive Director to update the Construction Standards and Technical Specifications from time to time, and periodically present it to the Governing Board for ratification and approval."

LOXAHATCHEE RIVER

ENVIRONMENTAL CONTROL DISTRICT

MANUAL OF MINIMUM

CONSTRUCTION STANDARDS

AND TECHNICAL SPECIFICATIONS

~~MARCH 2017~~May 2018

MANUAL OF MINIMUM CONSTRUCTION

STANDARDS AND TECHNICAL SPECIFICATIONS

FOR

LOXAHATCHEE RIVER DISTRICT

D. Albrey Arrington, Ph.D.
Executive Director

Kris Dean, P.E.
Director of Engineering

~~March 2017~~May 2018

TABLE OF CONTENTS

SECTION 1

ADMINISTRATIVE AND GENERAL

1.01 General

The purpose of this manual is to provide the minimum construction standards for design and construction work associated with wastewater systems within the District and is intended to supplement the requirements of other regulatory agencies. The design engineer is to use good engineering judgment in the design of wastewater systems. The design engineer and the contractor are responsible for providing sound, workable, and long lasting systems.

The intent of this section is to provide members of the development community with a brief introduction to the Loxahatchee River Environmental Control District, also referred to as "District", its function, and procedures.

The Loxahatchee River Environmental Control District is an agency of government which was created in 1971 for the purpose of providing utility and other environmental services within the 72 square mile basin of the Loxahatchee River. Currently, the District owns, operates, and regulates the regional wastewater system serving Tequesta, Jupiter, Juno Beach, Juno, and the unincorporated areas of northern Palm Beach and southern Martin Counties.

The District offices are located at 2500 Jupiter Park Drive, Jupiter, Florida. The offices are open between 8:00 A.M. and 5:00 P.M. weekdays. The telephone number during working hours is (561) 747-5700. For emergency situations outside of normal office hours, the telephone number is (561) 747-5708. The District website can be found at http://www.loxahatcheeriver.org.

With specific regard to new development, the District's legislated policy is to provide the required utility services to the area now and as it continues to grow. It is, therefore, the agency's intent to work closely with new development to assure that the utility services can be provided in a manner which is both timely and consistent with the standards and specifications set forth in this manual.

Please note that the District's "Manual of Minimum Construction Standards and Technical Specifications" may change from time to time. All projects will be subject to the current District, local, state and federal rules and regulations at the time of submittal of final engineering drawings for approval.

1.02 Procedures Prior to Construction

1.02.1 Introductory Meeting

It is highly recommended that the project representative (s) (owner, engineers) meet with the District's Deputy Executive Director early in the planning stages of the development. At such time a determination of sewer and reuse water availability will be made, and financial impacts will be reviewed.

1.02.2 Developer Agreement

The submittal of a properly executed agreement, along with payment for certain charges, is required before the District will review the engineering plans. Copies of the District's Standard Developer Agreement and Chapter 31-10 F.A.C., which addresses the charges, are available online or at the District offices.

1.02.3 District Installed Facilities

During the introductory meeting the developer may wish to discuss the availability of District installed regional and sub regional facilities to serve the proposed project, although, this program is limited to larger developments.

The District currently maintains a program where sub regional lift stations may be constructed by and paid for by the District. A sub regional facility must be designated and approved by the District Governing Board. Staff will take no action for recommending designation of a facility for installation until a developer agreement is executed and all fees are paid.

Staff reviews and assesses the project based upon economic feasibility, consistency with the District Master Plan and its current and future demand. To promote stable and effective communication between the District and the Developer, we will require the Developer to coordinate all communication through the Engineer of Record.

In designating a sub regional facility, the following items are the responsibility of the owner/developer:

Provide the District with any project information necessary for the design of lift station(s) and force mains(s).

Provide, at developer's expense, all necessary electrical service to the lift station site in conjunction with construction activities.

Provide suitable access to lift station and force main sites for District and contractor's vehicles and equipment. Paved asphaltic concrete or reinforced concrete access drives will be provided (Min. ~~12~~16' wide) prior to acceptance.

Provide appropriately sized sanitary sewer gravity lines that are necessary to serve adjoining properties in conjunction with lift station construction.

Sewer lines to adjoining properties must be activated concurrent with lift station, or upon demand from the District.

The last collection manhole, just upstream of the lift station, should be placed in a manner to minimize road, lane or sidewalk closures should by-pass operations be needed at the lift station. The District may require this last collection manhole to be placed inside the lift station easement.

Provide all clearing, grubbing and rough grading of the lift station and force main sites prior to construction.

Provide survey requirements and staking of the lift station and force main upon request from the District. Staking shall include provision of one stake at center of the proposed wet well, with 50' offsets and bench mark. Force main shall be staked at center line with 10' offsets every 100 feet, with a set bench mark. All survey work shall be performed by a professional surveyor licensed in the State of Florida.

Developer shall convey a deed to the lift station property prior to construction, and all required easements as follows:

Permanent Easements:

a. Lift Station - 40' x 40'
b. Force Mains - 10' wide minimum
c. Gravity Mains - 15' wide minimum for sewers

Temporary Construction Easements:

a. Lift Station - 100' x 100'
b. Force Mains - 30' wide minimum
c. Gravity Mains - 50' wide minimum

Developer's contractor will be responsible to make gravity line connections from the system collection manhole to the lift station after the construction of the wet well has been completed.

District staff will work in conjunction with the developer's project engineer to plan for the service area. Station design will be performed by the District. Construction will be contracted for by the District and inspected by District personnel.

1.02.4 Developer Installed Facilities - Plan Review and Approval

An initial electronic plan submittal (PDF) is recommended. Submittal should contain; one (1) complete set of plans including sewer, reuse, water and drainage systems, and paving and grading details. Upon review, the design engineer will be notified of

acceptance or comments which need to be addressed. District staff will work with the Developer's Engineer of Record to address the final design of Developer installed facilities.

Final submittal for approval will require additional plan sets, to include one electronic (PDF), two (2) hardcopy fullsize (24x36) sets for District files, four (4) sets for Florida Department of Environmental Protection and/or Palm Beach County Health Department, plus any additional sets required by the engineer or owner.

District approval of utility plans and specifications, as well as sign off on the Florida Department of Environmental Protection/Health Department application, is required.

Plan review will be for technical sufficiency of design for incorporation into the District system. This review, as well as plan approval by the District, does not relieve the design engineer of his liabilities or responsibility for a properly detailed design. District Engineering staff will be available to work with the design engineer to assure the plans meet the requirements set forth in this manual.

All plan submittals must be signed and sealed by a Professional Engineer, registered in the State of Florida. Plans which are marked "Preliminary" or "Draft" will not be approved.

Supplemental data to be furnished with the final plans submitted for approval includes the following:

1. Project Summary

    a. Number of residential units being served or non-residential uses.
    b. Number of Manholes
    c. L.F. of Gravity Main (for each pipe size)
    d. L.F. of Force Main (for each pipe size)
    e. Number of Lift Stations and depth of each

2. Basis of determination of design capacity and design flow.

3. Calculations and plot of system head curves.

4. Calculations of pump cycle times.

5. Wet well floatation calculations.

6. Landscaping plan that includes the proposed sewer facilities on the plan to determine if the necessary setbacks are provided.

7. Preliminary phasing plan (for entirety of project) that includes a table indicating number and type of lots (i.e., multifamily, single family, etc) and the year those lots require DOH certifications.

1.03 Developer Installed Facilities - Procedures During Construction

1.03.1 Periodic Inspection

Throughout construction, the developer will look to his consulting engineering firm for progress by periodic inspections. District Engineering staff will periodically check the site during construction for progress. If problems are encountered during construction, it will be the developer's responsibility through his engineers, to resolve them to the District's satisfaction. Any revision of substance to the approved plans shall be submitted to the District for approval prior to incorporation into the work.

1.03.2 Pre-Final Inspection Submittals

1. Approximately 60 days prior to construction completion, the Developer's Engineer of Record shall provide the Deputy Executive Director the following for review and approval:

    a. A signed and sealed cost of construction of the sewer improvements. This information will be used to establish the value of the maintenance bond.

    b. A final Phasing Plan. The Phasing Plan should encompass the project in its entirety, and is solely at the discretion of the District as to timing and extent of phases.

2. Upon receipt of the above information the Deputy Executive Director will prepare a letter to the Owner, with copy to the engineer, with the Bill of Sale and easement forms prepared for execution, along with a listing of administrative items to be provided prior to District inspection of facilities for acceptance.

1.04 Developer Installed Facilities - Procedures Following Construction

1.04.1 Project Completion

A project is not considered complete and prepared for District final inspection until such time as:

1. All sewer system construction is completed in accordance with plans and specifications and inspected and certified by the engineer.

2. Where sewers are constructed in paved areas, at least the 1st lift of asphalt has been provided.

3. Areas over lines and laterals, which are not proposed to be paved, shall be brought to finish compacted grade.

1.04.2 Project Completion Submittals

Upon Completion of Construction, but before District final inspection, submit the following items in forms acceptable to the District:

1. Bill of Sale

2. Grant of Easement

3. Maintenance Bond: From a surety company and executed by an attorney-in-fact for the surety company with a certified copy of his Power-Of Attorney attached to the Bond; or a

4. Letter of Credit: From a financial institution and in a form acceptable to the District.

5. Record Drawings: Submit one (1) blackline copy of the record drawings, signed and sealed by a Florida licensed Professional Surveyor & Mapper. Record drawings must comply with LRD's standard detail SD-29 "Record Drawing Submittal Guide".

6. Department of Environmental Protection Certificate of Completion Executed by Owner and Certifying Engineer.

7. Letter of Certification from the Engineer of Record

8. Performance Test Results: infiltration/exfiltration, pressure, leakage and pump start-up test records. All documents must be signed and sealed by the Engineer of Record.

9. Copy of Site Plan and Recorded Plat indicating all building numbers and street names.

10. Payment for all buildings connected to the system.

1.04.3 Final Inspection

After the owner and project engineer have provided the documents as outlined in Section 1.04.2, and all punchlist items have been remedied, the District engineering staff will conduct a final inspection and recommend acceptance or denial. If acceptance is denied,

a letter will be sent to the project engineer advising of the denial and reasons for such. Subsequently, the project engineer should address the comments and request scheduling a final reinspection. It should be noted that after the final inspection, any comments to the initial Record Drawing submittal shall be provided to the Engineer of Record for any remedies.

1.04.4 Final Record Drawings

After District Engineering staff has completed the final inspection and all work is to the satisfaction of the District Engineer, the final Record Drawings shall be submitted to the District, as follows:

1. Two (2) final black line record drawings, signed and sealed by a Florida licensed Professional Surveyor & Mapper. This record drawing shall meet the technical standards for "Record Survey" set forth by the Florida Board of Professional surveyors and mappers, pursuant to Chapter 472 of the Florida Statutes and Chapter 61G17-6, Florida Administrative Code.

2. One (1) compact disc with the record drawing in AutoCAD 2008 or later format and PDF format. Only one (1) AutoCAD file shall be accepted containing the entire record drawing (additional files used for x-referencing are acceptable) and one Adobe Acrobat file with the entire record drawing as seen on the paper copy. The District will no longer accept separate AutoCAD and/or Adobe Acrobat files for separate record drawing pages. The AutoCAD files must be established in state plane coordinate system, NAD 83, Florida East Zone. The vertical datum referenced shall be NGVD 29.

1.04.5 One Year Maintenance Bond and Inspection

Prior to acceptance by the District, a maintenance bond which will remain in effect for one year from the date of District acceptance of the system, must be provided to the District. Shortly before the expiration of the one year maintenance bond, the District will reinspect the system in a manner similar to the final inspection (i.e., broken pipes, deflection, infiltration, etc.) The District will advise the developer of any defects found, unless of an emergency nature, during this inspection and will require correction to be made prior to expiration of the maintenance bond.

Should adequate progress, in the opinion of the District, not be made in correcting the deficiencies, the District will look to the bonding company to pay for corrective action taken by the District.

A Letter of Credit drawn upon a financial institution licensed in the State of Florida, and in a form acceptable to the District may be provided in lieu of a maintenance bond.

1.04.5 District Acceptance

Upon satisfactory finding of the final inspection, the Department of Environmental Protection/Health Department Certification of Completion will be executed by the Executive Director, thereby, accepting the system for operation and maintenance.

1.04.6 Operation and Maintenance

With the exception of service laterals which lie beyond right-of-way or easement lines, or in common areas of ownership, the wastewater system serving the development will be operated and maintained by the District's personnel, who are well trained and responsive to the needs of the community.

1.04.7 Utility Billing

The District's accounting department will continue to work with the Developer in the collection of connection charges as new buildings are tied into the system, and in the billing of quarterly service charges.

1.05 Definitions and Abbreviations

The term "Owner" or "District" shall mean the Loxahatchee River Environmental Control District.

The term "Director" shall mean the Executive Director of the Loxahatchee River Environmental Control District.

The term "Engineer" or "Design Engineer" shall be the engineer registered in the State of Florida that signs and seals the plans of a developer or other person or entity.

The term "District Engineer" shall be the engineer designated by the District, whether acting directly or as an authorized agent of the District, acting within the scope of duties entrusted to them.

The abbreviation listed below shall have the meaning set forth opposite each:

AASHTO	American Association of State Highway Transportation Officials
ACI	American Concrete Institute
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Material

AWWA	American Water Works Association
NEC	National Electric Code
NEMA	National Electric Manufacturers Association
AWG	American or Brown and Sharpe Wire Gage
NPT	National Pipe Thread
WOG	Water, Oil, Gas

END OF SECTION 1

SECTION 2

DESIGN CRITERIA

2.01 General

The requirements of this section are a minimum and nothing herein shall be construed to eliminate consideration of a design based on a rational procedure not covered by such requirements. Standards or minimum requirements set forth in this Manual are not intended to relieve the Developer, Contractor, or Design Engineer from complying with good engineering and construction practices under specific conditions which require a higher degree of procedure, standards, or requirements. Where the Developer, Contractor, or Design Engineer is not capable of following the requirements of the Manual due to certain site conditions, any deviation from the requirements set forth in the Manual shall first be approved by the District. It is intended that the requirements of this section shall be applicable in all cases where the facilities being constructed or to be constructed shall be owned and/or operated and maintained by the District.

2.02 Design Capacity

Gravity sewer systems should be designed for the estimated ultimate tributary population. Parts of the system that can be readily increased in capacity such as lift stations may be submitted for approval based on phased implementation. The basis of design for all projects shall accompany the plan documents.

2.03 Design Flow

Sewer system Average Daily Flow (ADF) designs shall be based on the design flows as listed in Chapter 64E-6 of the Florida Administrative Code.

2.03.1 Peak Hourly Flow

Peak Hourly Flow (PHF) shall be utilized for the sizing of all gravity sewers, force mains and lift station pump sizing. Peak hourly flow peaking factor (Pf) shall follow Figure 1 - Ratio of Peak Hourly Flow to Design Average Flow, of the "Recommended Standards for Wastewater Facilities", by the Waste Water Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, latest edition.

For low pressure sewer systems, all low pressure mains and LRD's approved grinder pump systems (centrifugal) shall be sized based upon the estimated peak design flow. The estimated peak design shall follow either Part 4 – Design Flows, of the "Design and Specification Guidelines for Low Pressure Sewer Systems", by the FDEP, latest edition or Chapter 2, "Manual – Alternative Wastewater Collection Systems", by the EPA, latest edition.

2.04 Gravity Sewers

2.04.1 New Construction

The basic design criteria for gravity sewers shall be as follows:

Pipe material – all new gravity sewer shall be of PVC construction. Use of epoxy coated D.I.P. will only be allowed with prior approval from the District Engineer.

The minimum gravity sewer pipe line diameter – All new gravity sewer mains (manhole to manhole) shall be a minimum of 8-inches in diameter.

The minimum depth of cover shall be as follows: 3'-6" for DIP or PVC C-900 and 4'-0" for PVC SDR-26. Any cover that is proposed to be less than 4'-0" must be given prior approval by the Director of Engineering.

Straight alignment and constant slope between manholes.

All manholes shall be precast concrete with monolithic bases and concentric conical cone sections.

Manholes are required at the end of each line; at all changes in grade, size or alignment. Stubs eight (8) inches or larger will require a manhole at the terminus point.

Manholes shall be spaced not greater than 400 feet for sewers fifteen (15) inches in diameter or less, 450 feet for sewers eighteen (18) inches in diameter or greater.

Five foot drop manholes (internal type) are to be provided for a sewer entering a manhole at an elevation twenty-four 24 inches or more above the lowest manhole channel invert. (See Standard Details)

A positive 0.1-foot grade differential shall be provided between the upstream and downstream invert on all manholes.

All sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second, based on Kutter's formula using an "n" value of 0.013. The following are minimum slopes allowed:

Sewer Size	Slope in Ft/100 Ft
8-inch	0.40
10-inch	0.28
12-inch	0.22
15-inch	0.15
18-inch	0.12
21-inch	0.10

24-inch	0.08
27-inch	0.067
30-inch	0.058
36-inch	0.046

When possible, slopes at least 10% above the minimums shown are preferred. However, in no case will slopes be designed which would provide a mean velocity less than 2.0 feet per second when flowing full, based on an "n" value of 0.013.

When a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 0.8 depth point of both sewers at the same elevation.

Intersecting sewers shall not meet at an alignment angle of less than 90 degrees to downstream flow.

Manholes deeper than 14 feet from the lowest invert to the manhole rim, manholes ~~that have~~with a force main discharg~~eing into it~~, manholes with inside drops and the last collection manhole just upstream of a lift station, shall be given a minimum 0.5-inch coat of Sewper Coat, Strong Seal, Refratta HAC 100 or other approved calcium aluminate corrosion barrier.

The last collection manhole, just upstream of the lift station, should be placed in a manner to minimize road, lane or sidewalk closures should by-pass operations be needed at the lift station. The District may require this last collection manhole to be placed inside the lift station easement.

All gravity sewers shall be placed in the center of any roadway and within any easements. The minimum gravity sewer easement is 15' wide.

No landscaping or ~~construction of~~ surface features (i.e., walls, fences, fountains, etc.) shall be placed in a manner that would adversely affect access to utility easements or District infrastructure. Trees shall be a minimum of 10' away from any gravity sewer main or service line/lateral. This may be reduced to 7' with the use of an approved root barrier system.

All gravity sewer mains shall be a minimum of 10' horizontally from any structures. This setback shall be measured from the outside edge of the pipe to the nearest part of the structure, including underground (i.e., footers) or above ground (i.e., roof overhangs) features.

In addition to the above requirements, gravity sewer design shall follow ~~Ten States Standards~~Recommended Standards for Wastewater Facilities, at a minimum.

2.04.2 Adjustments to Existing Sewer Infrastructure

There may be instances where an area is being redeveloped or when a new developer takes ownership of a project from a previous developer and wishes to make modifications to already constructed, but not yet activated sewer facilities. The following criteria shall apply:

It is advised that developers of redesigned projects meet with the District Engineer to conduct a pre-application meeting and/or conduct due diligence prior to submitting final engineering plans to discuss the proper procedure for obtaining approval for any modifications.

This manual is updated from time to time, thus any comments provided at a pre-application/due diligence meeting should be considered conceptual in nature and may no longer be applicable by the time final engineering drawings are ~~submittal~~ submitted to the District for approval (See Section 1.01).

~~Up to two (2) s~~Services may be abandoned on a gravity run (manhole to manhole) and the service must be entirely removed, including the mainline wye fitting. The repair(s) must be completed using one ~~(1)~~two sleeves and one ~~(1) bell end~~ spool piece per abandoned service.

~~If there are three (3) or more services that will require abandonment, then the entire gravity main run (manhole to manhole) must be re-laid, per the current LRD standards at the time of the work.~~

Lift stations and all related appurtenances must be brought up to current LRD standards if they haven't been installed.

LRD will accept all gravity and force mains as constructed and re-inspect them based upon the LRD standards at the time the project was approved. However, additional appurtenances may be required to be installed, such as air release/vacuum valves or inline valves should the District Engineer require them. Additionally, all setbacks shall be based upon the current LRD standards.

LRD will accept all previously agreed to sewer easement widths, though the~~y~~ extent of the easements may require modifications should any infrastructure be removed or added.

Any new infrastructure proposed by the new developer shall meet all current LRD standards.

2.05 Pumping Stations

The basic design criteria for pump stations are as follows:

Sized to handle the peak hourly flows from the tributary areas with the largest pumping unit out of service (firm capacity).

Total dynamic head based on static head, lift station friction losses and pipeline friction factor (C) of 120. Pumping units shall be capable of operating based on a C=100 and not "running out" based on a C=140.

Pumping units capable of passing spheres of at least three (3) inches in diameter.

Under normal conditions, pumps operate under a positive suction head.

Controls included to automatically alternation of the pumps in use.

Maximum pump speed of submersible pumps shall not be greater than 1800 rpm unless specifically allowed by the District Engineer. The maximum pump speed of other raw wastewater pumps shall be 1150 rpm unless specifically allowed by the District Engineer.

Four types of pump stations are considered for use in the District. The pump station types are as follows:

Level I & Level II	Submersible
Level III	Built in place - constant or variable speed pumps
Level IV	Built in place - variable speed pumps.

Typical application of the various pump station types is shown on Figure 2-1, page 2-11.

All electrical and mechanical equipment to be protected from physical damage by a 100 year flood. The 100 year flood elevation shall be shown on lift station construction plans.

Lift stations shall be provided with remote telemetry (Data Flow Systems radio telemetry or cellular telemetry) and wetwell level instrumentation. Telemetry shall be compatible with the District's existing Data Flow Systems system.

Detailed specifications and drawings for Level I pump stations and appurtenances are included elsewhere in this manual. Other levels of pump stations require site specific designs and will be reviewed on a case by case basis. Design criteria for these stations are contained in the "Recommended Standards for Wastewater Facilities", by the Water Supply Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, latest edition (i.e., Ten States Standards).

All wet wells shall be designed to resist flotation at times of the highest groundwater and/or the 100 year flood (whichever is greater) at the site, without consideration of the weight of the pumps, with a safety factory of at least 1.0. Flotation calculations ~~based on a unit weight of concrete of 130 pounds per cubic foot~~ shall be submitted to the District for review with all pump station plans

Wet well cycle times shall be 10 minutes minimum 30 minutes maximum; based on the formula:

$$T = \frac{V}{Q-S} + \frac{V}{S}$$

Where:

T = Cycle time (minutes)
V = Effective volume of wet well (gallons)
Q = Pumping rate (gpm)
S = Average daily flow (gpm)

~~All lift stations shall be given a 1.0 inch coat of Sewper Coat, Strong Seal, Refratta HAC 100 or other approved calcium aluminate corrosion barrier.~~
Additional design criteria for these stations are contained in the "Recommended Standards for Wastewater Facilities", by the Water Supply Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, latest edition.

2.06 Force Main

The basic design criteria for force mains are as follows:

Pipe material – C-900 PVC, epoxy lined ductile iron pipe or HDPE (DR-11 min).

Minimum size - 4 inch diameter.

Minimum velocity - 2 feet per second.

Maximum velocity - 8 feet per second.

Minimum depth of cover - 3 feet.

Branches of intersecting force mains shall be provided with appropriate valves such that one branch may be shut down for maintenance and repair without interrupting the flow of other branches. Stubouts on a force main, placed in anticipation of future connections, shall be equipped with a valve to allow such connections without interruption of service.

At all times, the force main shall be laid level and per the design elevations approved by the District. An automatic air release valve shall be placed at all high points of all force mains with

a diameter of (4) inches or larger, as indicated on the construction plans and approved by the District.

All automatic air release/air vacuum valves shall be placed in a manhole as provided in the District's standard details.

Force main design drawings are to indicate elevations at all high points and all low points with constant slopes in between such points. Low point drains should be placed at all low points in the force main profile.

Approved restrained joints shall be provided at all force main bends.

Terminal ends of force main (permanent or temporary) shall be as shown on the Standard Details.

2.07 Separation Requirements

Storm and sanitary sewers crossing under water mains shall be laid to provide a minimum vertical dDistance of ~~eighteen (18)~~ twelve inches between the invert of the upper pipe and the crown of the lower pipe. Where this minimum separation cannot be maintained, the crossing shall be arranged so that the sewer pipe joints and water main joints are equidistant from the point of crossing with no less than ten (10) feet between any two joints and both pipes shall be D.I.P. Where there is no alternative to sewer pipes crossing over a water main, the criteria for the minimum separation between lines and joints in the above, shall be required and both pipes shall be D.I.P. irrespective of separation. D.I.P. is not required for storm sewers. Vertical separations of less than (12) inches, will not be accepted.

Where storm sewers cross above or below sanitary sewer mains, the minimum vertical separation between the outside of the storm sewer main and the outside of the sanitary sewer main is ~~(18)~~twelve inches. Where the minimum separation cannot be maintained, the sewer main shall be constructed of C-900, DR-18 PVC at the conflict with one full joint (min. 20 feet) centered on the conflict. Vertical separations of less than ~~(12)~~six inches, will not be accepted.

The minimum vertical separation between sanitary sewer mains and any other utility other than those listed above is ~~(12)~~twelve inches. Vertical separations of less than ~~(12)~~twelve inches, will not be accepted.

Maintain ten ~~(10)~~ feet horizontal distance between water mains, ~~and~~ storm pipes and ~~or~~ sanitary sewer mains unless reduced separation is allowed by the FDEP, Palm Beach County Health Department and the District Engineer., ~~as a minimum~~. Separations greater than ten feet may be ~~This may be required to be increased~~ required for drainage pipes larger than 48" in diameter.

~~2.08 Grease, Oil and Sand Interceptors~~

~~Grease, oil and sand can be a serious problem for any sewer system if not taken care of properly and adequately. When grease is discharged into a gravity collection system, it can cause~~

~~operation and maintenance problems not only inside those gravity lines, but also with the downstream lift stations and force mains. Additionally, grease inhibits the biological processes at the wastewater treatment plant.~~

~~Frequent and adequate cleaning of interceptors is important and often over looked. Interceptors shall be provided when the resultant discharge from a business contains excessive amounts of grease, oil, lint, sand or other solids and substances that are harmful or hazardous when discharged into wastewater, or in the opinion of the District Engineer the resultant discharge from such occupancy will be detrimental to the District facilities.~~

~~Grease interceptors will be required on all food service establishments where any kind food is prepared on site, or in the opinion of the District Engineer the resultant discharge from such occupancy will be detrimental to the District facilities. Examples of businesses that will be required to have a grease interceptor are restaurants, delis, bakeries, sandwhich shops, schools, hospitals, assisted and independent living facilities, etc.~~

~~Grease interceptors will be sized according to one of the two (2) formulas listed in the 2010 Florida Building Code – Plumbing, Chapter 10 – Traps, Interceptors and Separators, Table 1003.5.1, whichever best applies for the proposed establishment. The minimum sized grease interceptor shall be 750 gallons, which will also apply to businesses where the above formulas might not directly apply.~~

~~When multiple tanks are required, they must be installed in series. This also applies to pre-existing restaurants (or any facility) that require additional capacity to augment their existing interceptors.~~

~~Interceptors shall not be shared. Each business location is required to have its own interceptor(s) and its own separate plumbing to the interceptor(s). When the same establishment has multiple discharge points that require installation of interceptors at different locations, such as an institutional facility with a kitchen and a laundry, each use shall be provided with separate plumbing and the required interceptor(s).~~

~~All equipment and plumbing fixtures in a food service facility that may introduce fats, oil or grease into the LRD wastewater facilities must be connected through the grease interceptor, including but not limited to:~~

~~a. Scullery sinks (two or three compartment)~~

~~b. Pots and pan sinks~~

~~c. Floor drains in kitchen, walk-in coolers and washing areas (not including public restrooms~~

~~d. Pre-wash sinks~~

e. Dishwashers and other washing machines

f. Automatic hood wash units

Indoor garbage can washes

Oil/Sand interceptors are required for all car washes and establishments with facilities for servicing vehicles/mechanical equipment. All plumbing (other than the restroom) from the area where repairs and maintenance is being performed shall connect to an oil/sand interceptor; this includes but is not limited to floor drains and hand wash sinks. Engine oil, transmission oil, coolant, solvents, additives, brake fluid or any other fluid collected in the process of servicing vehicles/mechanical equipment shall not be discharged into the interceptor or other plumbing; the handling and disposal of these fluids shall be in compliance with the DEP and LRD rules and regulations.

Oil/Sand interceptors are also required for hydraulic elevators and all outdoor elevators, such as in parking garages, where sump pumps and/or drains are proposed to discharge to LRD's sewer system. Oil/sand interceptors are not required for indoor elevators within approved alarm system that meets the 2010 Florida Building Code.

Oil/Sand separators shall be sized based upon the 2010 Florida Building Code – Plumbing, Chapter 10 – Traps, Interceptors and Separators, Section 1003.4.2.2. The minimum sized oil/sand separator shall be 750 gallons.

Lint interceptors are required for all Laundromats and all apartment complexes with a central laundry room with at least 5 washing machines or more. Interceptors shall be equipped with a wire basket or similar device that's removable for cleaning and prevents passage of solids ½" or larger in size, strings, rags, buttons or other materials detrimental to the wastewater facilities. Lint interceptors shall be sized based on the following formula: Number of washers X 2 cycles per hour X 20 gallons per cycle flow rate X 2.0 hours retention time X 1.5 storage factor. The minimum sized lint interceptor shall be 750 gallons.

All interceptor construction shall be concrete and shall meet all applicable standards in Chapter 64E-6, Florida Administrative Code.

All interceptors shall be provided with two (2) access manholes: one (1) over the inlet and one (1) over the outlet. LRD approved, traffic rated lids shall be installed with manhole covers to finished grade. Manhole frame & covers and inside openings in the top slab, for tanks sized 1,250 gallons or less, shall be manufactured by US foundry with a 24-inch minimum clear opening. Manhole frame & covers and inside openings in the top slab, for tanks larger than 1250 gallons, shall be US foundry, model 230-AB-M, double ring & cover, with a 30-inch minimum clear opening.

All manhole covers shall be marked with the lettering: "GREASE", "OIL" or "LINT", as applicable.

~~Under the counter (flow-based) grease traps are not allowed.~~

~~Wastewater from toilets, urinals, showers, and other similar plumbing fixtures for human waste shall not discharge into an interceptor.~~

~~2.08.01 Grease Interceptor Exemptions~~

~~There are instances where a food service establishment may not require a grease interceptor. In these instances an exemption from a grease interceptor may be allowed. In order to qualify for an exemption, the following minimum criteria must be met.~~

- ~~No food preparation on-site.~~
- ~~The following equipment is prohibited from being on-site: oven, dishwasher, stove top cooking surfaces/griddle, fryers, ranges, or any equipment used to cook food.~~
    - ~~Only pre-made food may be allowed to be heated on-site using the following equipment: toasters, microwaves or sandwich presses.~~
- ~~If serving food on-site, all food is served on paper/plastic plates using disposable utensils or in the pre-packaging it was brought on-site in.~~
- ~~All condiments are pre-packaged in individual servings.~~

~~If the above criteria cannot be initially met or if it is found that after an exemption is given the above criteria are no longer being met, then a District-approved grease interceptor must be installed. Failure to do so will result in a violation of the District's Sewer Use Rule outlined in Chapter 31-13, Florida Administrative Code, which may result in fines against the property.~~

~~Any exemptions provided are permanent, so long as these requirements are met.~~

2.09 Sewer Use Regulations

The Loxahatchee River Environmental Control District has adopted certain rules and regulations regarding the acceptability and pretreatment requirements for certain types of wastewaters. These rules and regulations are published in Chapter 31-13 of the District Rules and may be amended from time to time. Prospective users of the system should contact the District Deputy Executive Director for information regarding the above referenced rules and the Director of Operations for compatibility of the anticipated wastewater wit_h the District's facilities.

SECTION 3

MISCELLANEOUS REQUIREMENTS

3.01 Lines,~~.~~ Grades and Measurements

Alignment and grade of all pipe, tunnels and borings shall be continuously controlled by use of lasers or other acceptable method. Laser alignment and grade through the pipeline is the preferred method. The District Engineer shall be permitted at any time to check the lines, elevations, reference marks, laser, etc., set by the Contractor or the Design Engineer.

3.02 Work to Conform

The maximum allowed vertical deviation of any single gravity pipe, tunnel or boring from plan grade shall be three percent (3%) of inside diameter. No single gravity pipe shall vary in horizontal alignment right or left, from the pipe centerline by more than five percent (5%) of inside diameter. Force main joint deflections shall be limited by AWWA Standards and manufacturer's recommendation.

3.03 Pipeline location

Pipelines shall not be located closer to an existing or proposed structure than the horizontal distance obtained when drawing a 45 degree angle from the proposed invert of the pipeline to bottom outside face of the footing. In no case shall this distance be less than ten (10) feet. Pipelines shall be located as indicated on the drawings, but ~~the right is reserved to the~~the Design Engineer is responsible to make such modifications in location as may be found desirable to avoid interference with existing structures or for other reasons, which are not material to the interest of the District and which do not otherwise conflict with any other statement or criteria set forth in this manual. The District should be notified of such changes in a timely fashion and such changes shall be recorded on Record Drawings.

3.04 Pipe Adapters

When joining pipes of different types, District approved transition sleeves, adapters, and couplings shall be used.

3.05 Fittings and Stoppers

Branches, stub-outs and fittings shall be laid as indicated in the Standard Details and shown on the approved drawings. Open ends of pipe and branches shall be closed with nonmetallic "wing nut" expansion stoppers secured in place in an acceptable manner. Stoppers shall be designed to remain in pl~~.~~ace and watertight during infiltration tests. ~~The location of all service lines shall be marked with a District approved electronic marker sensor at the cleanout location.~~

3.06 Service Lines

a. General

Service lines shall be as shown on the Standard Details. Service lines for a single building structure shall be minimum of 4 inches in diameter; for two building structures, a minimum of 6-inches in diameter. Where three or more building structures are connected to a single service line, the service line shall be considered a gravity sewer, shall be minimum of 8-inches in diameter, and shall be in accordance with the criteria covering District maintained gravity sewers.

If a residential property requires an easement across another residential property to gain access to District sewers this easement shall be conveyed to the District. This shall only be allowed when agreed to in writing by the District engineer.

b. Maintenance Responsibility

The service line (lateral) cleanout will usually delineate the point of responsibility between the District and the property owner; however, the following variations do exist:

1. Multi-family Units - Public right-of-way - Owner's responsibility to the right-of-way line.

2. Multi-family Units - Non Public right-of-way - Owner's responsibility to the main line connection.

3. Commercial Buildings - Owner's responsibility to the main line.

4. Condominium with Common Areas - Non Public right-of-way Owner's responsibility to the main line connection.

5. Condominium with Common Areas Adjacent to Public right-of-way - District assumes responsibility within the public right-of-way.

3.07 Service Line Markers

A service line marker shall be installed 12-inches {minimum} above the service wye adjacent to the cleanout of each service line. The service line markers shall be Electronic System, Sanitary Marker 1258, as manufactured by 3M.

3.08 Bolts, Anchor Bolts, and Nuts

Anchor bolts shall have suitable washers and, where so required, their nuts shall be hexagonal. All anchor bolts, nuts, washers, plates, and bolt sleeves shall be galvanized unless otherwise indicated or specified.

Expansion bolts shall have malleable iron and lead composition elements or the required number of units and sizes.

Bolts, anchor bolts, nuts and washers specified to be stainless steel shall be type 316 stainless steel.

Anchor bolts and expansion bolts shall be set accurately. If anchor bolts are set before the concrete has been placed, they shall be carefully held in suitable templates of approved design. If anchor or expansion bolts are set after the concrete has been placed, all necessary drilling and grouting or caulking shall be done and care shall be taken not to damage the structure or finish by cracking, chipping, spalling, or otherwise during the drilling and caulking.

3.09 Concrete Inserts

Concrete inserts shall be designed to safely support the maximum load that can be imposed by the bolts used in the inserts. Inserts shall be of a type which will permit locking of the bolt head or nut. All inserts shall be galvanized.

3.10 Protection against Electrolysis

Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact with any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other approved materials.

END OF SECTION 3

SECTION 100

EXCAVATION, BACKFILL, FILL AND GRADING

100.01 Description

All excavations shall be made in such manner and to such widths as will provide suitable room for building the structures or laying and jointing the piping. All ~~and all~~ sheeting, bracing, supports,~~;~~ coffer dams~~ming~~, pumping and draining~~;~~ shall be performed to render the bottom of the excavations firm, dry and acceptable in all respects.

100.02 Sheeting and Bracing

Sheeting and bracing shall be furnished as may be necessary to support the sides of the excavation and to prevent any movement of earth which could in any way diminish the width of the excavation to less than that necessary for proper construction, or could otherwise injure or delay the work, or endanger adjacent structures.

All timber sheeting and bracing shall be left in place unless otherwise directed by the Design Engineer to remove same or cut off at a specified elevation.

All sheeting and bracing, including trench boxes not to be left in place, shall be carefully removed in such manner as not to endanger the construction or other structures. All voids left or caused by the withdrawal of sheeting shall be backfilled immediately with approved material and compacted by ramming with tools especially adapted to that purpose, by watering, or by other means as may be directed by the Design Engineer.

100.03 Drainage

100.03.1 General

To ensure proper conditions at all times during construction, all means shall be used to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations. Such excavations shall be kept dry until the structures, pipes and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged.

All water pumped or drained from the work shall be disposed of in a suitable manner without undue interference with other work, damage to pavements, other surfaces, or property. Suitable temporary pipes, flumes, or channels shall be provided for water that may flow along or across the site of the work. All requirements of all regulatory agencies regarding dewatering and the discharge of water from the project shall be complied with.

All labor, materials, tools, and equipment shall be provided, as necessary, to properly control the quality of the discharge from the dewatering operations as described herein. All applicable laws, rules and regulations governing the discharge of water from dewatering operations shall be

complied with. All dewatering shall be accomplished by the use of sanded well points and other techniques deemed necessary by the Contractor to properly dewater the trench excavations.

The water discharged from the Contractor's dewatering operation shall not exceed the turbidity limits promulgated by the State of Florida Department of Environmental Protection discharge standards for the Loxahatchee River or its tributaries.

Unless otherwise directed by the Design Engineer, an approved siltation tank shall be installed ahead of dewatering discharge points. In addition, silt screens and other devices and techniques may be required to maintain the discharge quality at turbidity levels below the required limits.

Any and all methods approved by the Design Engineer to control the bacteriological quality of well point discharge into existing drainage ditches and/or canals shall be utilized. Levels for fecal coliform in a discharge which ultimately leads to the Loxahatchee River, shall not exceed those promulgated by the State of Florida Department of Environmental Protection discharge standards.

100.03.2 Drainage Wellpoint System

If it is necessary to drain the soil and prevent saturated soil from flowing into the excavation, an efficient drain wellpoint system will be utilized. The well points shall be designed especially for this service. The pumping unit shall be designed for use with the wellpoints and shall be capable of maintaining a high vacuum and of handling large volumes of air and water at the same time.

100.04 Trench Excavation

Where pipe is to be laid in rock bedding or concrete cradle, the trench may be excavated by machinery to, or to just below, the designated subgrade, provided that the material remaining at the bottom of the trench is not disturbed.

If the trench is excavated below the designated subgrade, the undercut shall be backfilled with compacted bedding rock, uniformly graded from 1/4 inch size.

100.05 Depth of Trench

Trenches shall be excavated to such points as will permit the pipe to be laid at the elevations, slopes, or depths of cover indicated and at uniform slopes between indicated elevations.

100.06 Width of Trench

Pipe trenches shall be made as narrow as practicable and shall not be widened by scraping or loosening materials from the sides, Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.

Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one (1) foot above the top of the pipe.

100.07 Trench Excavation in Fill

If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to go to a height of at least three (3) feet above the top of the pipe, whichever is the lesser, Particular care shall be taken to ensure maximum consolidation of material under the pipe location, The pipe trench shall be excavated as though in undisturbed material.

100.08 Unauthorized Excavation

If bottom of any excavation is taken out or disturbed beyond the limits indicated or prescribed, the resulting void shall be backfilled with embedment material compacted to a minimum of 90% of AASHO T-180 or to the standards of the applicable agency having jurisdiction.

100.09 Elimination of Unsuitable Material

Pipe bedding shall extend a minimum of 4 inches below the pipe. The pipe shall be supported on suitable material ascertained by the Design Engineer following good engineering practices.

100.10 Backfilling

As soon as practicable after the pipes have been laid, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, the backfilling shall be started and thereafter it shall proceed until its completion.

100.10.1 Backfill Materials

The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. The materials and the methods shall both be subject to the approval and direction of the Design Engineer. No stone or rock fragment larger than 3 ioches in greatest dimension shall be placed in the backfill nor shall large masses of backfill material be dropped into the trench in such a manner as to endanger the pipeline. If necessary, a timber grillage shall be used to break the fall of material dropped from a height of more than 5 feet. Pieces of bituminous pavement shall be excluded from the backfill unless their use is expressly permitted, in which case they shall be broken up as directed.

100.10.2 Embedment Materials

These materials are described in subsequent sections of this Manual. The use and placement of these materials are indicated on the Standard Details and specified herein.

100.10.3 Zone Around Pipe

The zone around the pipe shall be backfilled with the materials and to the densities and limits indicated on the details.

100.10.4 Compaction

Compaction shall be accomplished by tamping, or under appropriate construction techniques to achieve the required densities.

100.10.5 Maximum Density

Unless specified otherwise, the percents of maximum density referred to in these specifications refers to the maximum density obtained when the material is laboratory tested in accordance with the procedures outlined in Designation AASHTO T-180, Latest Revision or as otherwise required by the governmental agency having jurisdiction over the finished roadway. Field densities shall be determined by a testing laboratory using accepted methods.

100.10.6 Miscellaneous Requirements

Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine materials. Only approved quantities of stones and rock fragments shall be used in the backfill.

All voids left by the removal of sheeting shall be completely backfilled with suitable material, thoroughly compacted.

END OF SECTION 100

SECTION 101

PIPE EMBEDMENT MATERIALS

101.01 General

Pipe embedment materials, as specified herein, shall be installed as shown on the details and/or as specified.

101.02 Class 1 Materials (Bedding Rock)

The material shall be 3/4 inch to 1/4 inch graded material such as coral, crushed stone, crushed shells or bedding rock, well graded in size, 100% passing a 1 inch sieve opening, and as specified in ASTM 57. The bedding rock shall consist of clean hard and durable particles or fragments, free from dirt, vegetable or other objectionable matter. Samples and gradation analysis shall be approved by the Design Engineer before any material is delivered to the job site.

101.03 Class 2 Material

The material shall be well graded, clean course sand and gravels with a maximum particle size of *3/4* inch, containing a small percentage of fines and free of organic and other deleterious matter.

101.04 Class 3 Material (Select Backfill)

The material shall be fine sand and clayey gravels, including fine sands, sand-clay mixtures and gravel-clay mixtures, free of organic and other deleterious matter.

101.05 Placing and Compacting

The material shall be spread in layers of uniform thickness and installed to the densities and where shown on the Standard Details or as required.

After each pipe has been brought to grade, aligned and placed in final position, the embedment material shall be deposited and densified under the pipe haunches on each side of the pipe. Following this operation, the remainder of the embedment material shall be installed as shown on the Standard Details and as specified herein.

END OF SECTION 101

SECTION 107

HORIZONTAL DIRECTIONAL DRILL

107.01 General

This specification covers installation of 4" and larger diameter HDPE pipe using horizontal directional drill methods. Installations shall comply with FDOT Standard Specification (Latest Edition) Section 555, ASTM F1962 and this specification.

107.02 Material and Equipment

The drilling fluid shall be a bentonite drilling fluid with or without polymer additives. All materials shall be NSF/ANSI 60 certified.

Pipe and fittings shall comply with Section 114.

Locating/Tracking/Steering equipment for installations across open water shall utilize a magnetic tracking system utilizing a DC or AC current and a surveyed surface loop coil. Locating/Tracking/Steering equipment in other locations shall require a walk-over tracking system. The locating/tracking/steering equipment shall place the pilot bore with a maximum horizontal tolerance of +/- 52% of directional bore pipe depth below grade.

All directional drills shall be installed with a minimum 2" DR 11HDPE conduit with and two minimum 10 gauge tracer wires installed for the full length of the bore. The conduit shall be terminated in a CDR box installed at each end of the bore. The 10 gauge tracer wires shall be and terminated in the valve box for the isolation valves on each end. The conduit diameter and wall thickness shall be sized to withstand anticipated pull back forces of the installation. Tracer wire shall be high strength copper clad steel, Copperhead Soloshot EHS or approved equal.

107.03 Submittals

Submit technical data, cut sheets and shop drawings for equipment and materials including but not limited to drilling fluid (including MSDS Sheet), additives, pipe, fittings, adapters, pipe stiffeners, bore plan, locating and tracking equipment, locating tracking equipment calibration, locating and tracking equipment certification, heat fusion technician certification and proposed sequence of construction for approval by the Engineer.

Horizontal and vertical alignment of the pilot bore based on location information from the locating/tracking/steering equipment outlined in paragraph 107.02 and surveyed points on the DC surface looped coil. The horizontal and vertical alignment shall be referenced to horizontal and vertical datum requirements as specified in the Record Drawing Submittal Guide, Standard Detail SD-29. **The horizontal and vertical alignment shall be as-built and certified by the steering contractor as complying with the locating/tracking/steering equipment manufacturers recommended procedures.**

A log of directional drilling machine pressures during pulling operations converted to tensile stress seen in the pipe. Hydraulic pressure produced by the machine alone is not acceptable.

Experience and project resumes.

107.04 Experience

The directional drill contractor and locating/tracking/steering/contractor shall demonstrate experience in similar horizontal directional drills. Experience shall be a minimum of 5 successful installations of same or larger diameter of same or longer length in the previous 5 years. The directional drill contractor shall submit a list of references.

107.04 Placement and Testing

Perform all locates and pothole all potential conflicts prior to submitting the bore plan. The bore plan shall not be approved until all known conflicts have been resolved.

HDPE pipe shall be handled with care to include only the use of nylon slings for lifting and the use of appropriate sized pipeline rollers for supporting and maneuvering the pipe during fusion and pull back operations.

After fusing, prior to placement, the HDPE piping shall be filled with potable water and pressure tested at 100 psi for 2 hours. Each joint shall be visibly inspected for leakage at the end of 2 hours. Any sections showing visible leakage shall be cut out and the remaining pipe fused together and retested. After placement the HDPE pipe shall be pressure tested per Section 140.

All pipe installed below the water table shall be flooded with water prior to pulling operations.

Installations shall not exceed the pipe manufacturer's recommended radius of curvature.

The reamed hole shall not exceed 1.5 times the nominal diameter of the installed pipe.

All directional bores shall include one isolation valve on each end.

Upon completion bore pits shall be cleaned of excess drilling fluid and backfilled with clean fill.

END OF SECTION 101

SECTION 109

LARGE DIAMETER PVC PRESSURE PIPE

109.01 General

It is the intent of this section to provide a uniform standard for all PVC pressure pipe used in force main construction, whose nominal diameter exceeds 12 inches.

109.02 Larger Diameter PVC Pressure Pipe (D.I.O.D.)

All pipe shall meet the requirements for polyvinyl chloride pipe as specified in ASTM D2241, made from virgin PVC type 1120 compound with cell classification per ASTM D1784. The pipe shall be supplied in 20 foot lengths with an integral bell on each length and having a groove to retain the rubber sealing gasket. The other end of the pipe shall be cut square, beveled, and indelibly marked to the insertion depth. The pipe shall have a minimum dimension ratio (DR) of 25 with a pressure rating of not less than 150 psi. Outside diameter of the pipe shall be equal to ductile iron pipe. Pipe joints may be deflected up to the maximum deflection as recommended by the pipe manufacturer. Gaskets shall be as recommended by the pipe manufacturer for sewer application and shall comply with the requirements of ASTM F477.

The pipe manufacturer shall submit an affidavit of compliance that all materials used in the pipe production meet the requirements of Uni-Bell Pipe Association Standards and latest AWWA C-905 specifications.

PVC pressure pipe shall be installed with a magnetic tape suitable for locating pipe in the future. The tape shall be laid directly over the pipeline, at a depth (as recommended by the manufacturer) compatible with electronic pipe locators (not more than 18" deep from finished grade).

Electronic markers (EMS) shall be placed over the pipeline at each bend or valve along the length of the line (See Section 3.07).

109.03 Fittings

Fittings shall be 40 mil epoxy lined ductile iron as specified in Sections 111 and 112.07.

109 04 Installation

The pipe shall be installed in strict accordance with the manufacturer's recommendations. PVC pipe joints should not be deflected more than that recommended by the manufacturer's specifications.

No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece, at the Contractor's sole expense.

No PVC pipe shall be cut within a three (3) foot distance from the end of the bell end of the pipe.

Each pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the completed work.

Pipe and fittings shall be laid accurately to the lines and grades indicated on the Drawings. Care shall be taken to ensure a good alignment both horizontally and vertically.

Each length of pipe shall have a firm bearing along its entire length. Bedding as shown on the Standard Details shall be utilized. Compaction along the sides of pipe shall be strictly enforced at a minimum of 98% of AASHTD T-180 to a point one (1) foot above the pipe.

Pipe utilized for sewer force mains shall be colored green. Pipe used for reuse mains shall be colored purple throughout.

109.05 Assembling Push-On-Joints

Push-on joints shall be made up by first inserting the gasket (where applicable) into the grove of the bell and applying a thin film of special nontoxic gasket lubricant uniformly over the spigot end of the pipe. The chamfered end of the plain pipe shall be inserted into the gasket and then forced past it until it seats against the bottom of the socket.

END OF SECTION 109

SECTION 111

DUCTILE IRON PIPE AND FITTINGS

111.01 Pipe

All ductile iron pipe shall be designed in accordance with ANSI/AWWA C150/A21.50, ~~1976, or~~ latest revision, based on a Type 2 bedding condition and shall be manufactured in accordance with ANSI/AWWA C151/A21.51. Along with the Record Drawings, the Design Engineer shall furnish the District a sworn statement from the manufacturer in accordance with Section 51.4.2 of ANSI/AWWA C151/A21.51, for truck load quantities of pipe. Each pipe shall be marked with the manufacturer's year of manufacture and the class of pipe. The words "Ductile Iron or D.I." shall be stamped on the pipe.

Ductile Iron Pipe shall be ~~a~~ minimum ~~of~~ Pressure Class 350 up to 20-inches in diameter and Pressure Class 250 for larger diameters.

Where ductile iron pipe is used, fittings shall be ductile iron and conform to the requirements of ANSI/AWWA C153/A21.53, and shall be of a pressure classification at least equal to that of the pipe with which they are used.

111.02 Adapters

Where it is necessary to joint pipe of different type, the necessary adapters shall be utilized. Adapters shall have ends conforming to the above specifications for the appropriate type of joint to receive the adjoining pipe. Adapters joining two classes of pipe may be of the lighter class provided that the annular space in bell and spigot type joints will be sufficient for proper jointing.

111.03 Types of Joints

Joints for ductile iron pipe shall be either push on or mechanical joint for buried piping and flanged joints for exposed or interior piping. Joints for pipe in casings shall be mechanical joint type with retainer glands unless otherwise approved by the District Engineer. Retainer glands shall be equal to those manufactured by EBBA Iron Corp., known as "meg-a-lugs".

Joint for mechanical joint pipe shall conform to ANSI/AWWA C111/A21.11. Joints for push on joint pipe shall be equal to "Tyton" as manufactured by United States Pipe and Foundry Company, or equal. If the pipe bell is grooved, the minimum thickness at the groove shall be equal to that of the thickness class specified herein.

The plain end of push on pipe shall be manufactured to a true circle and chamfered to facilitate fitting the gasket.

Push on and mechanical joint pipe and fittings shall be provided with sufficient quantities of accessories conforming to ANSI/AWWA C111/A21.11.

Flanges shall conform to ANSI B16.1, Class 125. All bolts and nuts for flanged pipe shall conform to ANSI B18.2.1. and B18.2.2 and manufactured of 316 S.S.

Gaskets shall be of a composition suitable for exposure to the liquid within the pipe.

111.04 Lining and Coating

All ductile iron force main pipe and fittings shall be furnished with an interior epoxy lining. The lining material for pipe and fittings shall be epoxy coatings, 40 mil thick, and shall be "Protecto 401", "Permite 9043 Type II", or "Linerguard" and conform to the latest standards of ANSI/AWWA C104/A21.4.

The District will require that ductile iron pipes used in gravity sewers be lined with epoxy as specified above.

All buried pipe and fittings shall receive an external bituminous coating in accordance with ANSI 21.10.

All above ground ductile iron pipe and fittings shall ~~receive a~~be coated ~~and painted~~ green exterior (force mains) or purple (reclaimed water mains). The primer shall be TNEMEC-Alumi~~m~~num Mastic #135 (3 to 5 mils DFT), the intermediate coat shall be Series 66 Epoxoline Hi-Build Epoxy (4 to 6 mils DFT) and the finish coat shall be Series 73 Endura-Shield III Urethane (2 to 3 mils DFT).

111.05 Handling and Cutting Pipe

Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe and linings, scratching or marring machined surfaces, and abrasion of the pipe coating or lining.

Any fitting showing a crack shall be marked as rejected and removed at once from the work.

In any pipe showing a distinct crack and in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portions, if so approved by the Design Engineer, may be cut off before the pipe is laid so that the pipe used is perfectly sound. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack.

Except as otherwise approved, all cutting shall be done with knives or saws adapted to the purpose. Hammer and chisel or so-called wheel snap cutters shall not be used to cut pipe. All cut ends shall be examined for possible cracks caused by cutting.

Cut ends to be used with push on joints shall be carefully chamfered to prevent cutting the gasket when the pipe is laid or installed.

Lined and coated pipe and fittings shall be installed as, and assembled as, recommended by the pipe manufacturer for the particular lining~~.~~ used.

11.06 Installing Pipe and Fittings

No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece.

Each pipe and fitting shall be cleared of all debris, dirt, etc . before being laid and shall be kept clean until accepted in the complete work.

Pipe and fittings shall be laid accurately to the lines and grades indicated on the Drawings or required. Care shall be taken to ensure a good alignment both horizontally and vertically.

Electronic markers (EMS) shall be placed over the pipeline at each bend or valve along the length of the line and at intervals of not more than 300' on straight runs. ~~(See Section 3.07)~~

Each length of pipe shall have firm beddar~~ar~~ing along its entire length. Bedding requirements are shown on the Standard Details.

When mechanical joint, push on joint. or similar pipe is laid. the bell of the pipe shall be cleaned of excess tar or other obstruction and wiped out before the cleaned and prepared spigot of the next pipe is inserted into it. The new pipe shall be shoved firmly into place until properly seated and held securely until the joint has been completed. The ductile iron pipe shall not have a joint deflection greater than that recommended by the manufacturer.

111.07 Temporary Plugs

At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

111.08 Assembling Push On Joints

Push on joints shall be made up by first inserting the gasket into the groove of the bell and applying a thin film of special nontoxic gasket lubricant uniformly over the inner surface of the gasket which will be in contact with the spigot end of the pipe. The chamfered end of the plain pipe shall be inserted into the gasket and then forced past it until it seats against the bottom of the socket.

111.09 Bolted Joints

Materials for bolted joints shall be as specified herein. Before the pieces are assembled, rust preventative coatings shall be removed from machined surfaces. Pipe ends, sockets, sleeves, housings, and gaskets shall be thoroughly cleaned and all burrs and other defects shall be carefully smoothed.

111.10 Assembling Mechanical Joints

Surfaces against which the gasket will come in contact shall be thoroughly brushed with a wire brush prior to assembly of the joint. The gasket shall be cleaned. The gasket, bell, and spigot shall be lubricated by being washed in soapy water. The gland and gasket, in that order, shall be slipped over the spigot and the spigot shall be inserted into the bell until it is correctly seated. The gasket shall then be seated evenly in the bell at all points, centering the spigot, and the gland shall be pressed firmly against the gaskets. After all bolts have been inserted and the nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint to the proper tension, preferably by means of a torque wrench.

The correct range of torque~~, as indicated by a torque wrench and the length of the wrench (if not a torque wrench), used by an average man to produce such range of torque,~~ shall not exceed ~~ninety foot pounds~~the manufacturer's recommendation.

If effective sealing of the joint is not attained at the maximum torque indicated above, the joint shall be disassembled and thoroughly cleaned, then reassembled. Bolts shall not be over stressed to tighten a leaking joint.

111.11 Restraints

Restrained joints shall be mechanical joint with ductile iron retainer glands, for pipe sizes 3 inches through 24 inches. The mechanical joints including the ductile iron retainer glands shall conform to ANSI/AWWA C111/A21.11 for Rubber Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings. All mechanical joint pipe and fittings shall be furnished with high strength cast iron tee head bolts and hex nuts with composition, dimensions, and threading in accordance with ANSI/AWWA C111/A21.11. The retainer glands shall be cast of high strength ductile iron and fitted with cup point, square head, double heat treated special alloy steel set screws. The retainer glands shall be EBBA Iron Corp. "M~~m~~eg-a-L~~l~~ug" or approved equal.

"Field Lok" push on retainer gaskets as manufactured by the U.S. Pipe and Foundry Co., or equal. can be used in lieu of retainer glands for ductile iron pipe sizes 4"-12". Restrained joints for ductile iron pipe and fittings greater than 12 inches may be of the single rubber compression gasket push on or mechanical joint type such as TR-FLEX as manufactured by U.S. Pipe and Foundry, Fastite Joint Pipe by the American Cast Iron Pipe Co ., Locked Mechanical Joint F-217-D or Super-Lock Joint by the Clow Corporation, or approved equal.

When approved by the District, the Contractor may place reaction and thrust blocking at the back of ~~all~~ tapping sleeves. ~~and other fittings as shown on the approved plans.~~ Blocking shall be poured against firm compaction material. The concrete for thrust blocking shall be as specified under Concrete Masonry.

END OF SECTION 111

SECTION 112

POLYVINYL CHLORIDE GRAVITY SEWER PIPE

112.01 General

This standard designates general requirements for unplasticized polyvinyl chloride (PVC) plastic class pipe with integral bell and spigot joints for the conveyance of sewage. This class of pipe shall not be used where the depth of invert is greater than 14'-0" from finished grade, where there are special wellfied protection zones and for other scenarios where identified by the District's Engineer. In those cases, along with any other special cases required by the District Engineer, approved pressure pipe shall be utilized.

112.02 Materials

Unplasticized polyvinyl chloride pipe (PVC) shall be integral wall bell and spigot joints which meets the requirements of ASTM Specifications D3034 for SDR 26 or up to 15 inch diameter pipe. The pipe shall meet the following ASTM Standards: *D3212* (Joint), F477 (Gasket) and *D1784* (PVC Compound).

Gravity sewer pipe and fittings from 18 inches through 27 inches shall meet ASTM F-879.

112.03 Stiffness

The pipe stiffness for gravity sewer pipe shall have a minimum pipe stiffness of 115 psi when measured at 5% vertical deflection and tested in accordance with ASTM D2412.

112.04 Pipe Bell

The bell of the pipe shall be designed to use a rubber ring gasket to allow for contraction and expansion. The bell shall consist of an integral wall section designed to be at least as strong as the pipe wall or an integral sleeve reinforced bell.

112.05 Tests

112.05.1 Acetone Test

A two inch long sample ring shall not flake or disintegrate when immersed for 20 minutes in a sealed container of acetone when conducted in accordance with ASTM *D2152*. (Swelling or softening is not considered a failure.)

112.05.2 Flattening

A six inch long sample ring shall be compressed between parallel plates to 0.40% of the outside diameter of the pipe without evidence of splitting, cracking or breaking.

112.05.3 Impact Test

The pipe shall be tested at 73 degrees F and not fail an impact of a falling twelve (12) pound missile with a two inch radius at the levels prescribed by ASTM D2444. Sizes four inches through 12 inches shall pass an impact of 120 ft/lbs.

112.05.4 Marking

All PVC pipe .shall be marked in accordance with Section 12.1 of ASTM D3034.

112.06 Standard Laying Lengths

All pipe shall be furnished in standard laying lengths provided by the pipe manufacturer.

112.07 Fittings

PVC sewer fittings shall conform to the requirements of ASTM D3034 specification with minimum wall thickness of SDR-26 as defined in section 7.4.1. Fittings in sizes through 8" shall be molded in one piece with elastomeric joints and minimum socket depths as specified in sections 6.2 and 7.3.2. Gaskets shall have a minimum cross sectional area of 0.20 sq. in. and conform to ASTM F477 specification. Fittings in sizes not available in injection molded form shall be fabricated from SDR-26 thickness pipe and in accordance with section 7.11 of the specification with manufacturers standard pipe bells and gaskets.

112.08 Adapters

Where necessary to join pipe of different types, approved transition joints, as shown in the details, are acceptable. When joining sewer pipe to ductile iron or C-900 pipe, an adapter equal to Harco 300 series shall be used.

112.09 Handling and Cutting Pipe

The pipe manufacturer's recommendation for handling, storing, unloading and cutting pipe shall be followed. Individual pipes shall not be allowed to drop from the truck when unloading. Pipe units shall not be handled with chains or single cables. Pipe shall not be stored more than two units high. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe or scratching or marring machined or finished surfaces.

Any fitting showing a crack shall be marked as rejected and removed at once from the work.

In any pipe showing a distinct crack and in which it is believed there is not incipient fracture beyond the limits of the visible crack, the cracked portions, if so approved by the Design Engineer, may be cut off before the pipe is laid so that the pipe used is perfectly sound. The cut shall be made in the sound barrel at a point at least 12-inches from the visible limits of the crack.

Except as otherwise approved, all cutting shall be done with knives or saws adapted to the purpose. All cut ends shall be examined for possible cracks caused by cutting.

Cut ends to be used with push on joints shall be carefully chamfered and the reference mark located in accordance with the manufacturer's recommendation to prevent cutting the gasket when the pipe is laid or installed.

112.10 Installing Pipe and Fittings

No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece.

Each pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work. Pipe and fittings shall be laid accurately to the lines and grades indicated on the drawings or required. Care shall be taken to ensure a good alignment both horizontally and vertically.

Each length of pipe shall have a firm bearing along its entire length. Embedment requirements are shown on the Standard Details.

The bell of the pipe shall be cleaned of dirt or other obstruction and wiped out before the cleaned and prepared spigot of the next pipe is inserted into it. Only lubricants made by the pipe manufacturer may be used on the spigot. The new pipe shall be shoved firmly into place until properly seated and held securely until the joint has been completed.

112.11 Temporary Plugs

At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

112.12 preparation of Trench Bottom

The trench bottom shall be constructed to provide a firm, stable and uniform support for the full length of the pipe. Unsuitable foundation material shall be removed as required by the Engineer and refilled with Class 1, 2, or 3 material. Class 2 or 3 material shall be compacted to a minimum of 90% standard proctor density.

112.13 Backfill Materials for PVC Gravity Lines

Three broad classes of material shall be used for bedding, haunching, and pipe side support.

CLASS 1 - Angular, *1/4* to *3/4* inch graded stone,
of which 100% passes a 1 inch sieve such as coral,
slag, cinders, crushed stone, crushed shells, or

bedding rock.

CLASS 2 - Coarse sands and gravels with maximum particle size 3/4 inch including variously graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW. and SP are included in this class.

CLASS 3 - Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM, and SC are included in this class. Included in Class 3 are existing soil types classified as select backfill.

Class 1, Class 2, or Class 3 material shall be used for bedding material to the top of the pipe. Special care must be taken to insure that Class 1. 2, or 3 material is worked under the pipe haunch. Class 2 or 3 material shall be compacted to a minimum of 98% density per AASHO T - 180. The District has the option, at any time, to take density tests to confirm the 98% compaction. Precautions shall be taken to prevent movement of the pipe when placing and compacting material under the pipe haunches.

If Class 2 or 3 material is used for bedding and haunching, a dry trench shall be maintained.

Under certain conditions, the Engineer may be faced with an unusual amount of water running in the trench which he may find necessary to remove in order to properly install and compact the embedment material. The Engineer may elect to remove the water with trench side pumps through the use of Class 1 material for bedding. The depth of Class 1 material will depend upon the amount of water, but take care to ensure that the trench wall soil material is such that it will not be removed from the area adjacent to the bedding as a result of the running water. The Engineer may also elect to utilize well points or under drain to control excessive ground water. If Class 1 material is used as bedding and under drain, it must be utilized at least up to the top of the pipe.

112.14 Manhole Connections

Where PVC gravity or force main pipe enters the manhole, approved sealing adapters as manufactured by Harco, Fernco or equal, shall be used. Any coupling used shall be coated with an epoxy coated sand finish approved by the District.

112.15 Bell Holes for Elastomeric Seal Joints

When the pipe being installed is provided with elastomeric seal joints, bell holes shall be excavated in the bedding material to allow for unobstructed assembly of the joint. Care should be taken that the bell hole is not larger than necessary to accomplish proper joint assembly. When

the joint has been made, the bell hole should be carefully filled with bedding or haunching material to provide for adequate support of the pipe throughout the entire length.

112.16 Testing

Pipe deflection shall not exceed 5% measured by a go/no-go gauge or mandrel. The District may confirm the pipe deflection at the end of the job prior to acceptance. Additionally, the District may confirm the pipe deflection just prior to end of the one year guarantee period. Pipe sections exceeding 5% long term deflection will be relaid by the Contractor or the Developer at his own cost and expense and retested until the District's *go/no-go* gauge passes through the pipe section.

The District's mandrel will be considered the "official" gauge used for deflection testing. The standard District gauge is manufactured by "HURCO" Technologies, Inc., Harrisburg, S.D. The outside diameter of the District's mandrel is as follows:

Pipe Diameter (Inches)	Mandrel Diameter (Inches)
8	7.28
10	9.08
12	10.79

END OF SECTION 112

SECTION 113

4"-12" DIAMETER POLYVINYL CHLORIDE FORCE MAIN PIPE

113.01 General

This standard designates general requirements for unplasticized Polyvinyl Chloride (PVC) plastic class pipe with integral bell and spigots joints for the conveyance of sewage: All pipe shall be marked as indicated in Section 2.5 of AWWA C-900, Latest Revision.

113.02 Materials

All pipe shall meet the requirements of AWWA-C-900 "Polyvinyl Chloride (PVC) Pressure Pipe". The DR of the pipe shall be calculated based on Appendix A of AWWA C-900, using a Class C bedding. The minimum pipe stiffness is DR 18. The pipe shall be extruded in sizes 4-inches through 12 inches ductile iron pipe equivalent outside diameter. All Class 150 pipe shall be minimum DR-18.. The pipe shall meet the following ASTM Standards:

D1784 (PVC Compound), D3139 (Joint), and F477 (Gasket).

113.03 Stiffness

The pipe stiffness using F//\Y PVC class pressure pipe is contained in the table below:

CLASS	DR	F//\Y
150	18	375
200	14	914

113.04 Pipe Bell

The bell of the pipe shall be designed to use a rubber ring gasket to allow for contraction and expansion. The bell shall consist of an integral wall section designed to be at least as strong as the pipe wall or an integral sleeve reinforced bell. The gasket shall be secured in the race by means of a nonmetallic polypropylene retainer ring or snugly seated in deep grooves to protect gasket roll-out upon assembly.

113.05 Tests

113.05.1 Factory Test

Each joint of pipe shall pass a factory hydrostatic test at four (4) times the pressure class of the pipe for five seconds.

113.05.2 Quick Burst Test

The pipe shall be designed to pass, without failure, the burst test for each rated class as follows:

DR 18 (755 psi) and
DR 14 (985 psi)

113.05.4 Acetone Test

A 2-inch long sample ring shall not flake or disintegrate when immersed for 20 minutes in a sealed container of acetone when conducted in a accordance with ASTM 0-2152. (Swelling or softening is not considered a failure).

113.05.5 Flattening

A 2-inch long sample ring shall be compressed between parallel plates to 40% of the outside diameter of the pipe without evidence of splitting, cracking, or breaking.

113.05.6 Impact Test

The pipe shall be tested at 73 degrees F and not fail an impact of a falling twelve (12) pound missile with a 2-inch radius at the levels prescribed by ASTM D2444. Sizes 4-inches through 12-inches shall pass an impact of 120 ft./lbs.

113.06 Fittings

Fittings shall be ductile iron conforming to AWWA Standard C-153 or approved PVC fittings, conforming to AWWA Standard C-907.

113.07 Adapters

Where it is necessary to joint pipe of different type, the necessary adapters shall be utilized. In the case of gravity sewers and service connections, transition joints as shown on the Details are acceptable. Adapters shall have ends conforming to the above specifications for the appropriate type of joint to receive the adjoining pipe. Adapters joining two classes of pipe may be of the lighter class provided that the annular space in bell and spigot type joints will be sufficient for proper jointing.

113.08 Handling and Cutting Pipe

The pipe manufacturer's recommendation for handling, storing, 'Unloading, and cutting pipe shall be followed. Individual pipes shall not be allowed to drop from the truck when unloading. Pipe units shall not be handled with chains or single cables. Pipe shall not be stored more than two units high. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe or scratching or marring machined or finished surfaces.

Any fitting showing a crack shall be marked as rejected and removed at once from the work.

In any pipe showing a distinct crack and in which it is believed there is not incipient fracture beyond the limits of the visible crack, the cracked portions, IT so approved by the Design Engineer, may be cut off before he pipe is laid so that the pipe used is perfectly sound. The cut shall be made in the sound barrel at a point at least 12-inches from the visible limits of the crack.

Except as otherwise approved, all cutting shall be done with knives or saws adapted to the purpose. All cut ends shall be examined for possible cracks caused by cutting.

Cut ends to be used with push-on joints shall be carefully chamfered and the reference mark located in accordance with the manufacturer's recommendation to prevent cutting the gasket when the pipe is laid or installed.

113.09 Installing Pipe and Fittings

No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece.

Each pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work. Pipe and fittings shall be laid accurately to the lines and grades indicated on the Drawings or required. Care shall be taken to ensure a good alignment both horizontally and vertically.

Each length of pipe shall have a firm bearing along its entire length. Embedment requirements are shown on the Standard Details.

The bell of the pipe shall be cleaned of dirt or other obstruction and wiped out before the cleaned and prepared spigot of the next pipe is inserted into it. Only lubricants made by the pipe manufacturer may be used on the spigot. The new pipe shall be shoved firmly into place until properly seated and held securely until the joint has been completed. The ductile iron pipe shall not have a joint deflection greater than that recommended by the manufacturer:

113.10 Temporary Plugs

At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs. If water is in the trench when work is resumed. the plug shall not be removed until all danger of water entering the pipe has passed.

113.11 Restraint

Approved retainer glands equal to "Meg-a-Lug" as Manufactured by Ebba Iron Manufacturing Company made specifically for restraining PVC (C-900) force mains will be used.

END OF SECTION 113

SECTION 114

4"-65" DIAMETER HIGH DENSITY POLYETHYLENE FORCE MAIN PIPE

113.01 General

This standard designates general requirements for high density polyethylene pipe used in force main installations. All piping shall be marked as indicated in AWWA C-906, latest revision with the following minimum information; AWWA C-906, diameter, dimension ratio, resin and pressure rating.

113.02 Materials

All pipe shall be manufactured from PE4710, be minimum DR-11, 200 psi, meet the requirements of AWWA-C-906 and be listed with the Plastic Pipe Institute's (PPI) TR4. The resin shall be formulated with carbon black and/or utilize ultraviolet stabilizer for protection against UV rays. The pipe shall meet the following ASTM Standards D3350 and F714.

Single joints of pipe shall be a minimum of 40 feet in length. Damaged pipe may have the damaged area cut out and the remaining portion reused as long as the remaining portion is a minimum of 20 feet in length.

113.03 Fittings and Adapters and Restraints

Molded butt fusion fittings and adapters shall conform to ASTM D 3261, utilize HDPE conforming to this specification and have the same dimension ratio as the pipe. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe.

Pipe stiffeners shall be used in conjunction with ductile iron fittings where MJ or flanged adapters are not used. The pipe stiffeners shall be 316 stainless steel as manufactured by JCM Industries or pre-approved equal. Pipe stiffeners in conjunction with ductile iron fittings shall only be used with the written approval of the District Engineer for HDPE pipe 12" diameter and smaller. When approved, MEGALUG Series 2000PV mechanical joint restraints or approved equal shall be used.

Flange adapters shall include 316 SS backer rings.

113.04 Handling and Cutting Pipe

The pipe manufacturer's recommendation for handling, storing, 'Unloading, and cutting pipe shall be followed. Individual pipes shall not be allowed to drop from the truck when unloading. Pipe units shall not be handled with chains or single cables. Pipe shall not be stored more than two units high. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe or scratching or marring machined or finished surfaces.

Any fitting showing slices, scratches or gouges shall be rejected and removed at once from the work.

Any pipe showing slices, scratches or gouges where it is believed there is not damage beyond the limits of the visible defect, if so approved by the Design Engineer, may be cut off at a point at least 12-inches from the visible limits of the crack so long as the resulting piece does not violate the minimum length allowed.

Except as otherwise approved, all cutting shall be done with knives or saws adapted to the purpose. All cut ends shall be examined for possible cracks caused by cutting. All cuts shall be square and smooth.

113.05 Butt Fusion Joining

All HDPE pipe and fittings shall be butt fused following the procedures outlined in ASTM F2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings. Fusion machine operators shall hold current certifications for fusing HDPE meeting ASTM F2620.

113.06 Installing Pipe and Fittings

See Section 107 Horizontal Directional Drill.

113.7 Temporary Plugs

The open ends of pipe shall be closed by temporary watertight plugs at all times. If water is in the trench when work is resumed. the plug shall not be removed until all danger of water entering the pipe has passed.

END OF SECTION 114

SECTION 120

CONCRETE MASONRY

120.01 Materials

120.01.1 Concrete

Ready-mixed concrete shall be used. It shall comply with the Standard Specifications for Ready-Mixed Concrete, ASTM Designation C94 for the strengths specified herein. Alternate No.2, under Paragraph 4 - Quality of Concrete ASTM C94 shall govern for the design of the concrete mixture.

120.01.2 Cement

Type I cement shall be used in concrete for general purposes. Type II cement shall be used for sewer manholes, wet wells, and all other applications where the concrete may be exposed to a wastewater atmosphere.

120.01.3 Reinforcing Steel

Reinforcing bars and mesh shall be sizes and shapes as indicated on the drawings. Bars shall be deformed bars of intermediate grade, new billet steel conforming with ASTM Designation A-615, Grade 60. Wire mesh shall conform with ASTM Designation A-I85.

120.01.4 Water Stops

Water stops shall be molded PVC, hollow center bulb, multiple ribbed as manufactured by W.R. Meadows, Inc., Electrovert, Inc. or Serviced Products Corporation, or approved equal.

120.02 Concrete

120.02.1 Mix

Concrete shall be composed of Portland cement, coarse aggregate, fine aggregate and water. The concrete mix shall be designed to produce the quality specified, proportioned and mixed in accordance with the requirements set forth herein and shall in all cases meet the following requirements:

Class	Location	28 Day Compressive Strength
A.	Specifically Required on Plans	4,000 psi
B.	General Structural Concrete	3,000 psi

C. Non-structural Applications 2,500 psi

120.02.2 Slump

The concrete, when placed, shall show slumps within the following limits when tested in accordance with the Method of Test for Slump of Portland Cement Concrete, ASTM Standard Specification C-143.

Type of Concrete	Min. Slump	Max. Slump
Mass Concrete	1 Inch	3 Inches
Reinforced Concrete:		
Thin vertical sections and thin columns, 7 inches or less in thickness	3 Inches	6 Inches
Heavy vertical sections more than 7 inches in thickness	3 Inches	5 Inches
Structural Slabs	1 Inch	4 Inches

120.02.3 Air Entraining

Air entrained concrete shall conform with the following requirements:

	Maximum Aggregate Size(Inches):				
	3/8:	1-2:	3/4:	1:	1-1/2:
Average total air content, percent (Plus or minus 1%):	5	5	4	4	3

120.03 Placing Concrete

Concrete shall be placed before the initial set has occurred and in no event after it has contained its water for more than 30 minutes.

The concrete shall be compacted and worked in an approved manner into all corners and angles of the forms and around reinforcement and embedded fixtures in such a manner to prevent segregation of the coarse aggregate.

All concrete shall be placed with an aid of mechanical vibrating equipment supplemented by hand forking or spading. Vibration shall be transmitted directly to the concrete and not through the forms. The duration of vibration at any location in the forms shall be held to a minimum necessary to produce thorough compaction. The concrete shall be placed by suitable equipment

as nearly as possible to its final location and without any segregation of the aggregate. Any free vertical drop shall not exceed 4-*1/2* feet.

Expansion joints shall be placed as indicated on the plans. Joint material shall be installed as indicated and as approved by the Design Engineer. Construction joints shall be made only at locations indicated on the plans or approved by the Design Engineer, and in such manner as not to impair the strength, water-tightness or appearance of the structure.

120.04 Finishing

All top surfaces which are not covered by forms and which are not to be covered by additional concrete or backfill, shall be carried slightly above grade and struck off by board finish. All edges shall be provided with a *3/4* inch chamfer. All exposed surfaces which show board marks, joint marks or other irregularities after the forms are removed shall, at the discretion of the Design Engineer, be rubbed with carborundum brick, filled or otherwise dressed to produce a smooth true surface.

No special concrete or cement mortar topping course shall be used for slab finish unless shown on the drawings. The slab shall be brought to a true and even finish by power or hand floating. Unless otherwise specified, the surface shall be steel troweled to a smooth finish. Troweling shall be the minimum to obtain a smooth, dense surface and shall not be done until the mortar has hardened sufficiently to prevent excess fine material from being worked to the surface. The top surface of the wet well shall immediately after troweling, be brushed lightly with a soft bristle janitor's push broom to produce a non-slip surface. The brushing shall be sufficient to mark the surface only without appreciably disturbing the troweled finish.

120.05 Curing

All concrete shall be kept wet by covering with water and approved water saturated covering, or other approved method which will keep all surfaces continuously wet for a period of seven (7) days, unless otherwise specified by the Design Engineer. All concrete shall be adequately protected from injurious action by the sun. Fresh concrete shall be protected from heavy rains, flowing water and mechanical injury. All concrete shall be kept damp for at least seven (7) days by covering with an approved saturated covering, by a system of perforated pipes of mechanical sprinklers, or by any other approved method which will keep all surfaces continuously damp.

Where wood forms are left in place during curing, they shall be kept wet at all times to prevent opening at the joints and drying out of the concrete. Water for curing shall be clean and entirely free from any elements which might cause staining or discoloration of the concrete.

120.06 Forms

Forms shall be of wood, metal, or other approved material shall be built true to line and grade, mortar tight, adequately braced and supported, and sufficiently rigid to prevent displacement or sagging.

Forms, except those lined with absorptive form lining, shall be coated with a non-staining mineral oil applied shortly before placing the concrete. In lieu of oiling, forms for unexposed surfaces may be thoroughly wetted immediately before placing the concrete.

Forms ties shall be of a design such that when forms are removed no metal shall be within 1 inch of the finished surface. Holes remaining from withdrawn tie rods or bolts shall be filled solid with cement mortar.

Under normal conditions, the minimum waiting period after placing concrete for stripping forms shall be as follows:

Where Used	Time
1. Bottom forms of girders and beams, floor slabs, and other concrete.	5 Days
2. Walls, piers, columns, sides of beams, and other vertical surfaces.	24-48 hours

The use of this schedule shall not operate to relieve the Contractor or the Design Engineer of responsibility for the safety of the structure.

120.07 Embedded Items

In addition to steel reinforcement, pipes, and other metal objects, as shown on the plans or ordered to be built into, or set in, or attached to the concrete, all necessary precautions shall be taken to prevent these objects being displaced, broken, or deformed. Before concrete is placed, care shall be taken to determine that any embedded or wood parts are firmly and securely fastened in place as indicated. They shall be thoroughly cleaned and free of paint or other coating, rust, scale, oil, or any foreign matter. The embedding of wood in concrete shall be avoided whenever possible; metal being used instead. The concrete shall be packed tightly around the pipes and other metal work to prevent leakage and to secure perfect adhesion. Drains shall be adequately protected from intrusion of concrete.

Concrete placing operations shall not begin until the reinforcing steel, utilities, anchor bolts, etc., to be embedded in concrete have been inspected and approved by the Design Engineer.

120.08 Laboratory Services

Laboratory Services shall be performed by an independent commercial testing laboratory approved by the District. The Design Engineer shall furnish the District with copies of compression and slump test reports for every thirty (30) cubic yards or portion thereof of concrete placed. It shall be the responsibility of the Design Engineer to produce concrete of the strength, durability, workability and finish specified, furnish representative material for specimens in quantities required by the testing laboratory, and cooperate and assist in taking

samples of materials for testing. The District reserves the right to take and test additional concrete samples.

END OF SECTION 120

SECTION 121

MANHOLES AND STRUCTURES

121.01 General

Manholes and structures shall conform in shape, size, dimensions, materials and other respects to the Standard Details or as directed by the District's Engineer.

All manholes shall be precast concrete with monolithic base sections. Invert channels may be formed in the concrete of the base or may be formed of brick and mortar upon the base.

All manholes which will receive direct force main discharges, or are at least 14-feet deep (rim to lowest inver) and the last collection manhole just upstream of any lift station shall receive a minimum 0.5-inch thick calcium aluminate corrosion barrier such as Sewper Coat, Strong Seal, Refratta HAC 100 or approved equal, and installed per the manufacturers recommendations.

The inverts shall conform accurately to the size of the adjoining pipes. Sides inverts shall be curved and main inverts (where direction changes) shall be laid out in smooth curves of the longest possible radius which is tangent to the centerlines of adjoining sewers.

Connections to existing structures shall be made only by mechanically coring a hole through the structure. Jackhammer and other methods of cutting a hole through an existing structure are not acceptable.

Rubber "boots" subject to District approval, will be allowed for making pipe connections to structures provided that a layer of non-shrink grout be applied to seal the annular space on the inside of the manhole for the full wall thickness. The boots shall be cast in the precast structure and shall utilize stainless steel bands and screws.

The frames and covers shall be set to conform accurately to the grade of the finished pavement or roadway surface; in unsurfaced areas, the frames and covers shall be set 3-inches higher than the surrounding ground surface.

Concrete shall conform to the requirements specified under Concrete Masonry.

121.02 Precast Concrete Sections

Precast concrete sections, if used, shall conform to the ASTM C478 Standard Specifications for Precast Reinforced Concrete Manhole ~~Risers and Tops, Designation C-478~~ Section, ~~L~~latest r~~R~~evision, with the following exceptions and additional requirements:

Type II cement shall be used.

Sections shall be steam cured and shall not be shipped until at least five (5) days after having cast.

Acceptance of the sections will be on the basis of material tests, finished quality, and inspection of the completed product.

Cones shall be 30" - concentric type

Joint material in riser sections shall be of the bitumastic type as manufactured by RAM-NEK or equal.

No more than two (2) lift holes may be cast or drilled in each section.

121.03 Shallow Manhole

When the depth from the deepest invert to the top of the cone section is 4'-0" or less, an approved shallow cone section with a 30" opening shall be used. In no case shall a flat slab top section be used.

121.04 Setting Precast Sections

Precast reinforced concrete sections shall be set so as to be vertical with sections in true alignment.

All holes in sections, used for their handling, shall be thoroughly plugged with mortar. The mortar shall be one part cement and 1-1/2 parts sand; mixed slightly damp to the touch (just short of "balling"); hammered into the holes until it is dense and an excess of paste appears on the surface; and then finished smooth and flush with the adjoining surfaces.

Anti-hydro grout shall be used to fill all voids around sanitary sewer pipe and manhole sections.

121.05 Mortar for Brick and Concrete Block Work

The mortar shall be composed of Portland cement, hydrated lime, and sand, in which the volume of sand shall not exceed three (3) times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 for dense, hard burned brick to 1:3/4 for softer brick. In general, mortar for Grade SA brick shall be mixed in the proportions of 1:1/2:4-1/2.

Cement shall be Type II Portland cement as specified for under Concrete Masonry.

Hydrated lime shall be Type "S" conforming to the ASTM Standard Specification for Hydrated Lime for Masonry Purposes, Designation C207 - Latest Revision.

The sand shall be well graded clean, durable particles all of which shall pass a No. 8 sieve.

121.06 Laying Brick

Only clean, red, fire cured brick shall be used. The brick or block shall be moistened by suitable means, as directed, until they are neither so dry as to absorb water from the mortar, nor so wet as to be slippery when laid.

Each brick or block shall be laid in a full bed and joint of mortar without repairing subsequent grouting, flushing, or filling, and shall be thoroughly bonded as directed.

121.07 Plastering and Curing Brick

Outside faces of brick shall be plastered with mortar from 1/4 inch to 3/8 inch thick. If required, the brick shall be properly moistened prior to application of the mortar. The plaster shall be carefully spread and troweled so that all cracks are thoroughly worked out. After hardening, the plaster shall be carefully checked by being tapped for bond and soundness. Unbonded or unsound plaster shall be removed and replaced.

Brick and plaster shall be protected from too rapid drying by the use of burlaps kept moist, or by other approved means and shall be protected from the weather, all as required.

121.08 Frames and Covers

The castings for the frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sandholes and defects of every nature which render them unfit for the service for which they are intended.

All castings shall be thoroughly cleaned and subject to a careful hammer inspection.

Casting shall be at least Class 30 conforming to the ASTM Standard Specification for Gray Iron Castings, Designation A48- Latest Revision, and conform to the standard details.

The contact surface of the frame and cover seat shall be a machine fit and the cover surface shall be "knobbed".

Before being shipped from the foundry, castings shall be given one coat of coat tar pitch varnish, applied in a satisfactory manner so as to make a uniform coating which does not tend to scale off.

121.09 Setting Frames and Covers

Frames shall be set with the tops conforming accurately to the grade of the pavement or finished roadway surface, in unsurfaced areas the frames and covers shall be set 3 inches higher than the surrounding ground. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed around the bottom flange. The mortar shall be smoothly finished to be flush with the top of the flange and have a slight slope to shed water away from the frame.

Cover shall be left in place in the frames on completion of other work at the manholes.

121.10 Adjustment of Existing Manhole Frames

When it is necessary to raise existing manhole frames due to repaving of roads or other reasons, the frames shall be shimmed with masonry, brick and Type II cement mortar to the new finished grade, or in the case of sodded areas, 2" above finished grade. In no case shall adjustment rings or adapters be used, unless specifically authorized by the District.

When new paving operations cause the manhole frame to be adjusted upwards, manholes will be raised using conventional shimming methods under the frame. The use of adapter rings in the existing frame will not be permitted.

END OF SECTION 121

SECTION 122

~~DESIGN CRITERIA~~GREASE INTERCEPTORS AND TRAPS

~~2.08~~122.01 Grease, Oil and Sand Interceptors

122.01.01 Grease Interceptors

Grease, oil and sand can be a serious problem for any sewer system if not taken care of properly and adequately. When grease is discharged into a gravity collection system, it can cause operation and maintenance problems not only inside those gravity lines, but also with the downstream lift stations and force mains. Additionally, grease inhibits the biological processes at the wastewater treatment plant.

Frequent and adequate cleaning of interceptors is important and often over looked. Interceptors shall be provided when the resultant discharge from a business contains excessive amounts of grease, oil, lint, sand or other solids and substances that are harmful or hazardous when discharged into wastewater, or in the opinion of the District Engineer the resultant discharge from such occupancy will be detrimental to the District facilities.

Grease interceptors will be required on all food service establishments where any kind of food is prepared on site, or in the opinion of the District Engineer the resultant discharge from such occupancy will be detrimental to the District facilities. Examples of businesses that will be required to have a grease interceptor are restaurants, delis, bakeries, sandw~~h~~ich shops, schools, hospitals, assisted and independent living facilities, etc.

Grease interceptors will be sized according to one of the two (2) formulas listed in the 2010 Florida Building Code ~~—~~ Plumbing, Chapter 10 – Traps, Interceptors and Separators, Table 1003.5.1, whichever best applies for the proposed establishment. The minimum sized grease interceptor shall be 750 gallons, which will also apply to businesses where the above formulas might not directly apply.

When multiple tanks are required, they must be installed in series. This also applies to pre-existing restaurants (or other~~any~~ facilities~~y~~) that require additional capacity to augment their existing interceptors.

Interceptors shall not be shared. Each business location is required to have its own interceptor(s) and its own separate plumbing to the interceptor(s). When the same establishment has multiple discharge points that require installation of interceptors at different locations, such as an institutional facility with a kitchen and a laundry, each use shall be provided with separate plumbing and the required interceptor(s).

All equipment and plumbing fixtures in a food service facility that may introduce fats, oil or grease into the LRD wastewater facilities must be connected through the grease

interceptor, including but not limited to:

a. Scullery sinks (two or three compartment)

b. Pots and pan sinks

c. Floor drains in kitchen, walk-in coolers and washing areas (not including public restrooms

d. Pre wash sinks

e. Dishwashers and other washing machines

f. Automatic hood wash units

g. Indoor garbage can washes

Under the counter (flow-based) grease traps are not allowed.

122.01.02 Oil/Sand Iinterceptors

Oil/Sand interceptors are required for all car washes and establishments with facilities for servicing vehicles/mechanical equipment. All plumbing (other than the restroom) from the area where repairs and maintenance is being performed shall connect to an oil/sand interceptor; this includes but is not limited to floor drains and hand wash sinks. Engine oil, transmission oil, coolant, solvents, additives, brake fluid or any other fluid collected in the process of servicing vehicles/mechanical equipment shall not be discharged into the interceptor or other plumbing; the handling and disposal of these fluids shall be in compliance with the DEP and LRD rules and regulations.

Oil/Sand interceptors are also required for hydraulic elevators and all outdoor elevators, such as in parking garages, where sump pumps and/or drains are proposed to discharge to LRD's sewer system. Oil/sand interceptors are not required for indoor elevators with anin approved alarm system that meets the 2010 Florida Building Code.

Oil/Sand separators shall be sized based upon the 2010 Florida Building Code - Plumbing, Chapter 10 – Traps, Interceptors and Separators, Section 1003.4.2.2. The minimum sized oil/sand separator shall be 750 gallons.

122.02 Lint Iinterceptors

Lint interceptors are required for all lLaundromats and all apartment complexesestablishments with a central laundry room with at least 5 washing machines or more. Interceptors shall be equipped with a wire basket or similar device that's removable for cleaning and prevents passage of solids ½" or larger in size, strings, rags, buttons or other materials detrimental to the wastewater facilities. Lint interceptors shall

be sized based on the following formula: Number of washers X 2 cycles per hour X 20 gallons per cycle flow rate X 2.0 hours retention time X 1.5 storage factor. The minimum sized lint interceptor shall be 750 gallons.

122.03 General Requirements

All interceptor construction shall be concrete and shall meet all applicable standards in Chapter 64E-6, Florida Administrative Code.

All interceptors shall be provided with two (2) access manholes: one (1) over the inlet and one (1) over the outlet. LRD approved, traffic rated lids shall be installed with manhole covers to finished grade. Manhole frame & covers and inside openings in the top slab, for tanks sized 1,250 gallons or less, shall be manufactured by US foundry with a 24-inch minimum clear opening. Manhole frame & covers and inside openings in the top slab, for tanks larger than 1250 gallons, shall be US foundry, model 230-AB-M, double ring & cover, with a 30-inch minimum clear opening.

All manhole covers shall be marked with the lettering: “GREASE”, “OIL” or “LINT”, as applicable.

Wastewater from toilets, urinals, showers, and other similar plumbing fixtures for human waste shall not discharge into an interceptor.

~~Under the counter (flow-based) grease traps are not allowed.~~

~~Wastewater from toilets, urinals, showers, and other similar plumbing fixtures for human waste shall not discharge into an interceptor.~~

~~2.08~~122.0~~41~~ Grease Interceptor Exemptions

There are instances where a food service establishment may not require a grease interceptor. In these instances an exemption from a grease interceptor may be allowed. In order to qualify for an exemption, the following minimum criteria must be met.

- No food preparation on-site.
- The following equipment is prohibited from being on-site: oven, dishwasher, stove top cooking surfaces/griddle, fryers, ranges, or any equipment used to cook food.
    - Only pre-made food may be allowed to be heated on-site using the following equipment: toasters, microwaves or sandwich presses.
- If serving food on-site, all food is served on paper/plastic plates using disposable utensils or in the pre-packaging it was brought on-site in.
- All condiments are pre-packaged in individual servings.

If the above criteria cannot be initially met or if it is found that after an exemption is given the above criteria are no longer being met, then a District-approved grease interceptor must be

installed. Failure to do so will result in a violation of the District's Sewer Use Rule outlined in Chapter 31-13, Florida Administrative Code, which may result in fines against the property.

Any exemptions provided are permanent, so long as these requirements are met.

SECTION 130

VALVES AND APPURTENANCES

130.01 General

All buried valves and appurtenances including exposed nuts, bolts, and retainer glands shall be given an exterior approved bitumastic or epoxy coating. All valves shall open counterclockwise. All valves shall have extension stems pinned to the operating nut with a stainless steel pin extension. Stems will not be required where the valve operation nut is less than 30" from finished grade.

Contractors must supply LRD with shop drawings clearly indicating that the criterion for each type of valve or appurtenance listed in this section is satisfied.

130.02 Plug Valves

All mechanical joint and flanged plug valves shall be of the nonlubricated eccentric type. Valves shall be rated for not less than 125 psi pressure differential acting in either direction (bi-directional). At this differential, the valve shall provide drip tight shutoff. All components shall be of corrosion resistant construction. Valve flanges shall be ANSI B16.1, class 125 pound with a full round or other acceptable type port to assure minimum turbulence and minimum pressure drop. Valve bodies shall be of ductile iron and seats shall be of nickel-alloy. Valves are to have a balance plug, coated with a resilient material solidly bonded to a cast iron or semi-steel core, as required, to assure low torque and bubble-tight shutoff. The valve plug shall touch on the seat when in the closed position.

Plug valve port areas shall be at least 100% through 24 inches in diameter. For plug valves 30” and larger, a port area of at least 75% is required.

Buried plug valves shall be installed vertically with non-rising stems and shall open by turning a two inch square operating nut counterclockwise. An arrow shall be cast into the nut skirt to indicate the open direction.

Plug valves shall be as manufactured by DeZurik Corporation, Milliken, Keystone Valve Manufacturing Company (Ballcentric Type), or approved equal.

130.03 Resilient Seat Gate Valves

Gate valves shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 or C515, Latest Revision, and in accordance with the following specifications. Valves shall have an unobstructed waterway canal equal to or greater than the full nominal diameter of the valve.

The valves are to be non-rising stem with the stem made of cast, forged, or rolled bronze as shown in AWWA C509. Two stem seals shall be provided and shall be of the O-ring type, one

above and one below the thrust collar. A two inch square operating nut shall be provided for operating the valve. The stem nut, also made of bronze, may be independent of the gate or cast integrally with the gate. If the stem nut is cast integrally, the threads shall be straight and true with the axis of the stem to avoid binding during the opening or closing cycle.

The valve body, bonnet, and bonnet cover shall be ductile iron. All ferrous surfaces inside the valve body shall have a fusion bonded epoxy coating applied at the valve manufacturer's facilities. The coating shall meet or exceed all requirements of AWWA C550. All bolts, nuts and washers shall be stainless steel to limit exterior corrosion and maintain fastener strength.

The sealing mechanism shall consist of a cast iron or ductile iron gate having a vulcanized Buna-N or SBR synthetic rubber coating or a Buna-N rubber seat mechanically retained on the gate. The resilient sealing mechanism shall provide zero leakage at 250-psi working pressure. All valves shall have pressure tests performed to the requirements of AWWA C509 or C515 specifications, as applicable, prior to shipment from the manufacturer. Valve shall seat and be drip-tight at the working pressure when installed with the line flow in either direction.

All valves are to be tested in strict accordance with AWWA C509. Resilient seat gate valves shall be as manufactured by Mueller, Metro-Series, American Darling or approved equal.

Valves shall be covered by a Manufacturer's 10 year limited warranty from date of purchase by end user and delivered within 30 days from receipt of purchase order. The supplier will also provide laminated maintenance manuals.

~~130.04 Ball Check Valves~~

~~When allowed to be used with submersible lift stations, all ball check valves shall be flanged end, ball check type, suitable for buried service. Ball check valves shall be rated for not less than 150 psi and shall be of corrosion resistant construction. Valve flanges shall be ANSI B16.1, class 125 pound. Valve bodies shall be of cast iron construction. The balls shall be hollow steel with vulcanized nitrite rubber coating. For low static head applications, swing check valves may be substituted.~~

~~Check valves shall be HDL ball check valves, Type 2016 as manufactured by FLYGT Corporation, or approved equal.~~

130.05 Swing Check Valves

Swing check valves for sewage, sludge, and general service shall be in accordance with AWWA C 508, unless otherwise specified below, full-opening; designed for a working pressure of 150 psi unless otherwise shown, and shall have a flanged cover piece to provide access to the disc. Corrosive ferrous surface of valves, 4-inch and larger, which will be in contact with water, shall receive a fusion-bonded epoxy coating conforming to AWWA C550. The valve body and cover shall be of cast iron to ASTM A126, with flanged ends to ANSI B16.1, or mechanical joint ends, as shown.

The valve disc shall be of cast iron, ductile iron, or bronze to ASTM B 62. The valve seat and rings shall be of bronze to ASTM B 92 or B 148, or stainless steel. The hinge pin shall be of bronze or stainless steel.

Suppliers or Equal:

American-Darling Valve Co.

APCO (Valve and Primer Corp.)

Crane Company

Mueller Co.

The valves shall have a lever and counterweight and shall be suitable for horizontal or vertical mounting.

~~130.05.1 Rubber Flapper Swing Check Valves~~

~~The Rubber Flapper Swing Check Valve shall have a heavily constructed cast iron body and cover. The body shall be long pattern design (not wafer), with integrally cast on end flanges. The flapper shall be Buna-N having an "0" ring seating edge and be internally reinforced with steel.~~

~~The body and cover shall be lined with *1/8"* thick natural rubber. The lining shall be autoclaved to the body and cover and cured to 55 durometer shore A±5. The lining shall be tested in conformance with ASTM 0573. Flapper shall be captured between the body and the body cover in a manner to permit the flapper to flex from the closed to full open position during flow through the valve. Flapper shall be easily removed without need to remove valve from line. Check valves to have full pipe size flow area. Seating surface to be on a 45 degree angle requiring the flapper to travel only 35 degrees from closed to full open position, for minimum head loss and non-slam closure.~~

~~Buna-N flapper to have an elastic spring, molded internally, to assist the flapper to close against a slight head to prevent slamming. Flapper opening should be capable of passing three inch solids.~~

~~To create backflow through the check valve, i.e., to prime or back-flush a clogged pump, an external backflow device can be furnished.~~

~~Valve exterior shall be painted with red oxide phenolic primer paint as accepted by the FDA for use in contact with potable water. Materials of construction shall be certified in writing to conform to A.S.T.M. specifications as follows:~~

~~Body and Cover Cast Iron ASTM A48, Class 30~~

~~Flapper Buna N~~
~~Lining Natural Rubber~~

~~Valve to be APCO Series 100R Rubber Flapper Swing Check Valve, as manufactured by Valve & Primer Corp., Schaumburg, Illinois, U.S.A. or approved equal.~~

130.06 Air Release, Air Vacuum Valves, and Combination Type Valves

The air release and air vacuum valves shall be of the type especially designed for forced sewer systems. The valve shall be of the short body type and capable of releasing air, gas, or vapor under pressure during system operation or allow air to enter the system when the system is draining, as applicable. The valve shall be as shown on the Standard Details with a two inch inlet. The venting orifice shall be sized by the Design Engineer based on a working pressure of 75 psi.

It shall be the responsibility of the design engineer to determine which valve is necessary for the pipeline conditions encountered.

Air release and air vacuum valves shall be ARI D-025 (See Standard Details).

130.07 Ball Valves ~~Curb Stops~~

Ball valves ~~curb stops~~ shall be limited to ¾" through 2-1/2" in size and shall have cast brass, bronze or stainless steel body, bronze tee head, stem with check, full round way opening and provision for locking in a closed position.

Ball valves can be used for force main and low pressure sewer applications up to 2-1/2" in diameter. The primary use in force main applications is for ARV isolation valve use (See Standard Details).

Valves shall be designed to be fully opened with a 90-degree turn of the operating handle and shall be full port design with bi-directional sealing rated for a minimum 150 psi working pressure~~, at a minimum.~~.

Brass ball valves in the low pressure system~~V~~alve shall be as manufactured by Ford~~ends may be~~ , or approved equal, with NPT or pack joint ends~~, push on or solvent welded,~~ as needed.

Where these valves are direct buried, a 2" square gate valve operating nut shall be included.

130.08 Brass Check Valves

Brass check valves shall be Proflo PFX31 size 1-1/2" to 2".

~~130.08 Gate Valves Three Inches and Smaller~~

~~Unless otherwise indicated on the Drawings, along with approval by the District Engineer, gate valves three inches and smaller shall be 125 pound bronze valves with screwed ends to suit the piping in which they are installed. Body material shall conform to SSTM Standard Specification for Composition bronze Castings, Designation B62-70. Valves shall have union bonnet, rising stem, inside screw, and solid wedge gate.~~

~~Stems shall be made of wrought silicon bronze. If the Manufacturer does not furnish this stem material in the class specified, the valves shall be furnished in the next higher class in which the stem material is available.~~

~~Gate valves shall be manufactured by Jenkins Brothers, New York, NY; Lunkenheimer Co., Cincinnati, OH; or equal.~~

130.09 Valve Boxes and Vaults

All buried ~~plug~~ valves~~,~~ ~~resilient seat gate valves and brass construction ball valves~~ shall be equipped with a valve box. Valve boxes shall be heavy duty construction for traffic loading type, cast iron, three piece, slide type, or screw type with drop covers. The valve boxes shall be adjustable to six inches up or down from the nominal required cover of the pipe.

A number six base section shall be provided. Minimum shaft diameter shall be *5-1/4* inches and minimum metal thickness shall be *3/16* inch. Boxes shall be coated with an approved bitumastic or epoxy coating. Valve box covers shall have the word "SEWER" or "REUSE" cast thereon depending on the application. Swing check valves shall be installed in an approved suitable vault for easy access by the District maintenance staff.

Valve boxes shall be installed on firmly compacted material at a level approximately equal to the elevation of the valve packing plate. No contact between the valve and the box shall be permitted. On plug valves, the positioner on the operating mechanism shall be kept free of rocks, debris, etc.

Where valves are installed with over six feet of cover, or where the ground water table is within three feet of the ground level, an extension stem shall be provided to bring an operating nut within two feet of the finished grade. This extension, stem shall be satisfactorily pinned to the valve operation nut to prevent dislodging during operation of the valve.

END OF SECTION 130

SECTION 140

PIPELINE INTEGRITY TESTS

140.01 General

The District will inspect all sewer facilities prior to acceptance and again just prior to the expiration of the one year guarantee.

When a section of pipe of a length deemed adequate by the Design Engineer is ready for testing, the pipe shall be flushed and then tested in accordance with the applicable testing method as described herein. Suitable temporary testing plugs or caps shall be installed. All necessary pressure pumps, pipe connections, meters, gauges, water, weirs, bulkheads, and other necessary equipment and all labor required for carrying out these tests shall be furnished. The Design Engineer shall notify the District at least 48 hours prior to any testing so that it may, at its option, have a representative present during the testing.

Gravity sewers shall be tested in accordance with the Hydraulic Infiltration/Exfiltration Test as described herein or, at the Contractor's option, in accordance with the Low Pressure Air Test as described herein. Additionally, PVC Gravity sewers shall be tested for deflection as described herein. Force mains shall be tested in accordance with the Pressure and Leakage Test for Force Mains as described herein.

If the District Engineer so desires, the first section of any line between two manholes shall be tested as soon as possible after backfilling has been completed. If such tests appear to be satisfactory and acceptable, progressive testing of completed sections of the lines may be deferred at the option of the District's Engineer, and at the request of the Contractor, until all pipe has been laid and before final acceptance. However, if permitted, this will not constitute a waiver of any of the tests or the leakage requirements.

Sections of pipe tested for infiltration and exfiltration prior to completion of the project shall be subject to a final inspection at completion of the project, and also subject to additional leakage tests, if warranted in the opinion of the District Engineer.

If the section fails to pass the applicable tests, the Contractor shall do everything necessary to locate, uncover and repair or replace the defective pipe, fitting or joint, all at his own expense. Additional testing will be required to assure passage of the test.

140.02 Hydraulic Infiltration/Exfiltration Tests

Upon completion of a section of the sewer, the pipe shall be dewatered and tested to measure the infiltration for at least three (3) consecutive days. Test section shall be from manhole to manhole. Longer test sections may be used with the approval of the District Engineer.

The amount of infiltration/exfiltration including manholes, "Y" branches and connections shall not exceed 10 gallons per inch diameter per mile of sewer per 24 hours for clay.

For making the infiltration tests, underdrains, if used, shall be plugged, well points and other groundwater drainage shall be stopped to permit the groundwater to return to its normal level. Infiltration shall be measured by the use of weirs designed specifically for this purpose or other acceptable means approved by the District Engineer.

As required, suitable bulkheads shall be installed to permit the test of the sewer.

Where the crown of the pipe is below the natural groundwater table at the time and place of testing, the pipe shall be tested for infiltration. Suitable watertight plugs shall be installed and section of pipe to be tested shall be pumped dry before start of test. Where the crown of the pipe is above the natural water table, the pipe shall be tested for exfiltration by installing necessary plugs and filling pipes and manholes with water and maintaining a static head of water of a minimum of two feet above the crown of the pipe during the test. Exfiltration tests shall be conducted on main lines and lateral lines, unless waived by the District Engineer. The water level of internal pressure to be used for exfiltration test shall be determined by the Design Engineer.

The sewers shall pass the applicable test before any connections are made to buildings or to active sewers.

~~140.03 Low Pressure Air Test~~

~~The Contractor may use a low pressure air test as an option to the hydraulic infiltration/exfiltration leakage test for gravity lines. The sewers shall pass the applicable test before any connections are made to buildings or active sewers.~~

~~For making the low pressure air tests, the Contractor shall use equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low pressure air. The equipment shall be provided with an air regulator valve or air safety valve so set that the internal air pressure in the pipeline cannot exceed 8 psig.~~

~~140.03.1 Preparation of Sewer Line~~

~~When required by the Engineer, the leakage test using low pressure air shall be made on each manhole to manhole section of pipeline after placement of the backfill.~~

~~The Contractor shall flush and clean the sewer line prior to testing, leaving the interior pipe surface wet for the test.~~

~~140.03.2 Conditions and Requirements~~

~~Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psig greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe at the time of the test. However, the internal air pressure in the sealed line shall not be~~

allowed to exceed 8 psig. When the maximum pressure exerted by the groundwater is greater that 4 psig, the Contractor shall conduct only an infiltration test.

Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.

All air used shall pass through a single control panel.

When the sewer section to be tested contains more than one size of pipe, the minimum allowable time shall be based on the largest diameter pipe in the section, and shall be the time shown in the test table included hereinafter reduced by 0.5 minutes.

The Contractor shall be extremely cautious when testing with low pressure air. It is extremely important that the various plugs be installed and braced in such a way as to prevent blowouts. Inasmuch as a force of 250 lbf (112N) is exerted on an 8 inch (230 mm) plug by an internal pipe pressure of 5 psi (34 kPa), it should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous.

As a safety precaution, pressurizing equipment shall include a regulator or relief valve set at 8 psi to avoid overpressurizing and damaging an otherwise acceptable line. NO ONE shall be allowed in the manholes during testing.

140.03.3 Procedures

Determine the test duration for the section under test by computation from the applicable formula shown in ASTM C828-75T or from prepared air test tables included hereinafter. The pressure holding time is based on an average holding pressure of 3 psi (21 kPa) gauge or a drop from 3.5 psi (24 kPa) to 2.5 psi (17 kPa) gauge.

Air shall be introduced into the section of the line being tested until the internal air pressure of the sewer line is raised to approximately 4.0 psi (28 kPa) gauge. After an internal pressure of approximately 4.0 psi is obtained, allow at least 2 minutes for the air pressure to stabilize. The pressure will normally show some drop until the temperature of the air in the test section stabilizes.

When the pressure has stabilized and is at or above the starting test pressure of 3.5 psi (24 kPa) gauge, commence the test. Before starting the test, the pressure may be allowed to drop to 3.5 psig. Record the drop in pressure for the test period. If the pressure has dropped more than 1.0 psi (7 kPa) gauge during the test period, the line has failed. The test may be discontinued when the prescribed test time has been completed even though the 1.0 psig drop has not occurred.

The test shall be done in the presence of the Design Engineer and written record of the test and results prepared by the Design Engineer and submitted to the District.

140.03.4 Table for Air Testing

~~The air test table included hereinafter has been prepared utilizing applicable formulas from ASTM C838-75T. It is based on an allowable air loss of 0.003 ft. 3/min. per square foot of internal pipe surface, a maximum air loss per test section of 3.5 ft. 3/min. It applies when testing one pipe diameter only and for convenience ignores service lines which, in most instances, create only insignificant differences in test time.~~

140.04 Pressure and Leakage Test for Force Mains

Except as otherwise directed by the District, all pipelines shall be given combined pressure and leakage tests in sections of length approved by the District's Engineer. The Contractor shall furnish and install suitable temporary plugs or caps; all necessary pressure pumps, pipe connections, meters, gauges, and other necessary equipment; and all labor required. The Design Engineer shall witness all tests.

Subject to approval of the Design Engineer and provided that the tests are made within a reasonable time considering the progress of the project as a whole, and the need to put the section into service, the Contractor may make the tests when he desires.

The section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe. If air release valves are not available at high points for releasing air, the Contractor shall make the necessary excavations and do the necessary backfilling and make the completion of the test.

The section under test shall be maintained full of water for a period of 24 hours prior to the combined pressure and leakage test being applied.

Two pressure and leakage tests shall be conducted for each pipeline segment. The first test shall be conducted at the average working pressure of the pipeline segment. The second test shall be conducted at a test pressure of 100 pounds per square inch.

The pressure and leakage test shall consist of first raising the water pressure (based on the elevation of the lowest point of the section under test and corrected to the gauge location) to the specified pressure. If the Contractor cannot achieve the specified pressure and maintain it for a period of one hour with no loss of pressure and no additional pumping, the section shall be considered as having failed to pass the pressure test. The District may require that the pressure and leakage test be run in accordance with AWWA C-600 Standards, latest revision (Four Hour Test).

~~AIR TEST TABLE~~

~~Based on Formulas from ASTM C828-75T~~
~~Specification time (min:sec) required for pressure drop from 3.5 to 2.5 PSIG~~

~~When testing one pipe diameter only~~

Length of Line (ft)	PIPE DIAMETER							
	6	8	10	12	15	18	21	24
25	0:10	0:18	0:28	0:40	1:02	1:20	2:01	2:38
50	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17
75	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55
100	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34
125	0:50	1:28	2:18	3:18	5:09	7:26	9:55	11:20
150	0:59	1:46	2:45	3:58	6:11	8:30	9:55	11:20
175	1:09	2:03	3:13	4:37	7:05	8:30	9:55	11:20
200	1:19	2:21	3:40	5:17	7:05	8:30	9:55	12:06
225	1:29	2:38	4:08	5:40	7:05	8:30	10:25	13:36
250	1:39	2:56	4:35	5:40	7:05	8:31	11:35	15:07
275	1:49	3:14	4:43	5:40	7:05	9:21	12:44	16:38
300	1:59	3:31	4:43	5:40	7:05	10:12	13:53	18:09
350	2:19	3:47	4:43	5:40	8:16	11:54	16:12	21:10
400	2:38	3:47	4:43	6:03	9:27	13:36	18:31	24:12
450	2:50	3:47	4:43	6:48	10:38	15:19	20:50	27:13
500	2:50	3:47	5:14	7:34	11:49	17:01	23:09	30:14
550	2:50	3:47	5:45	8:19	13:00	18:43	25:28	33:16

~~For pipe diameters other than what's shown, please contact the District's Director of Engineering for testing specifications.~~

END OF SECTION 140

SECTION 150

SUBMERSIBLE LIFT STATIONS

150.01 ~~General~~Scope

It is the intent of this standard is to provide component requirements and general design guidelines for~~to specify a two pump~~ submersible wastewater lift station~~s complete in every respect whether or not covered by this specification or the construction details~~. This standard shall be used in conjunction with Standard Details SD-31 through 35 and referenced standards for complete submersible wastewater lift station requirements.

This specification typically defines requirements for 20HP and smaller lift stations. Lift stations greater than 20 HP, serving critical infrastructure or performing as a repump station may require alternate design criteria including variable speed, tri-plex configuration, permanent standby emergency power and PLC control. These additional design criteria will be defined by Engineering Services during the design.

150.02 Site

Lift station sites shall be provided with a minimum 40' x 40 lift station easement. Variations on the easement shall be considered on a case by case basis where access, maintenance and bypass operations can be accommodated with alternate configurations acceptable to the District and approved by Engineering Services.

The lift station site~~surface of the lift station~~ and ~~paved~~ access ~~roadway~~ shall be set at proper elevations and configurations ~~that future~~such that access and maintenance to the station will not be impaired by flooding, excessive road grades, swales, walls~~,~~ or landscaping~~ in any manner.~~ A lift station site plan ~~of the lift station site (plot plan)~~ indicating all topographical features, rights-of-way,~~ and~~ easements and adjoining contiguous areas shall be submitted to the District for approval~~ of the site and adjoining contiguous areas~~.

All above or at grade facilities shall be above the 1% Annual Chance Flood (100-year flood) zone, as shown on Flood Insurance Rate Maps (FIRMs). Site and lift station plans shall include the 100-year flood elevation.

150.03 Power

The Contractor shall coordinate with and pay all fees, deposits, and service costs to Florida Power and Light Corp. to ~~relocate the existing~~provide a three phase, 480V or 240V ~~volt~~ underground power service to the new lift station site. The transformer for the station shall be located not further than 25 feet from the nearest station easement line.

The power meter for the lift station shall be located on the lift station site, installed on the District's standard control panel rack.

150.04 Lift Station Standard Equipment

~~The lift station and appurtenances shall include all couplings, anchor bolts, piping, valves, electrical equipment, etc., required for a complete working installation.~~

A list of standard lift station equipment ~~included under this item is~~is given below. This list is not all inclusive and the Contractor shall supply all other equipment necessary for complete working installations. The lift station shall include:

Two (2) explosion proof submersible type sewage pumps with 316 stainless steel guide rails, base plates and all accessories.

Two (2) discharge lines with swing check valves and plug valves and emergency tap connection~~installed inside a precast valve vault.~~

~~One (1) pump level control system for pump lead-lag controls and high level alarm~~Instrumentation/control system, (requirements vary on station size).~~, electrical panel, etc.~~.

One (1) electrical control panel, NEMA 4X, to house electrical equipment, pump controls, alarms and protection.

One (1) wet well ~~structure with access hatch and safety grates~~.

One (1) valve vault.

Concrete covers with aluminum access hatches and safety grates

~~control center, NEMA 4X, to house electrical equipment, pump controls, alarms and protection.~~

Influent drop assemblies

Permanent standby generator and ATS, (requirements vary on station size).

Radio or Cellular Telemetry System

Coatings

Concrete pads

Landscaping/site screening

The wet well structure shall receive a minimum 1.0-inch thick calcium aluminate corrosion barrier such as Sewper Coat, Strong Seal, Refratta HAC 100 or approved equal, and installed per the manufacturers recommendations.

One (1) influent (collection) manhole structure with piping connecting to the wet well structure. The distance between the collection manhole and the wet well shall be no more than 50 feet.

~~150.02 Operating Conditions~~

~~Each pump shall have sufficient design capacity to satisfy the design criteria and conditions specified by the design Engineer. The design engineer shall submit calculations based on design criteria enumerated in these standards for the following:~~

~~A. Average Daily Flow~~
~~B. Peak Design Flow~~
~~C. System Head Curves~~
~~D. Wet Well Cycle Time~~
~~E. Flotation~~

150.0~~5~~3 Pumps and Motors

The pumps shall be capable of handling grit and raw unscreened sewage. The design shall be such that the pump unit will be automatically and firmly connected to the discharge piping when lowered into place on its mating discharge connection, permanently installed in the wet well. The pump shall be easily removable for inspection or service requiring no bolts, nuts, or other fastenings to be disconnected.

All major parts, such as the stator casing, oil casing, sliding bracket, volute, and impeller shall be of gray iron. All surfaces coming into contact with sewage shall be protected by a coating resistant to sewage. All exposed bolts and nuts shall be of stainless steel.

Pump faces shall be machined to accept a sacrificial plate between the pump face and seat. The sacrificial plate shall be manufactured from ¼" brass plate, bolted to the pump face and removable/replaceable.

A wear ring system shall be installed to provide efficient sealing between the volute and impeller.

The impeller shall be hard alloy gray cast iron of non-clogging design capable of handling solids, fibrous material, heavy sludge, and other matter found in normal sewage applications. The impeller shall be constructed with a long throughout without acute

turns. The impeller shall be dynamically balanced. The impeller shall be a slip fit to the shaft and key driven. Non-corroding fasteners shall be used.

Each pump shall be provided with a mechanical rotating shaft seal system running in an oil reservoir having separate, constantly hydro-dynamically lubricated and lapped seal faces.

The lower seal unit between the pump and oil chamber shall contain one stationary and one positively driven rotating tungsten-carbide ring.

The upper seal unit between the oil pump and motor housing shall contain one stationary tungsten-carbide ring and one positively driven rotating carbon ring. Each interface shall be held in contact by its own spring system supplemented by external liquid pressures. The seals shall be easily inspected and replaceable.

The shaft sealing system shall be capable of operating submerged to depths of, or pressure equivalent to, 65 feet. No seal damage shall result from operating the pumping unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication.

A sliding guide bracket shall be an integral part of the pump unit. The volute casing shall have a machined discharge flange to automatically and firmly connect with the cast iron discharge connection, which when bolted to the floor of the sump and discharge line, will receive the pump discharge connection flange without the need of adjustment, fasteners, clamps or similar devices.

Installation of the pump unit to the discharge connection shall be the result of a simple linear downward motion of the pump unit guided by no less than two guide bars. No other motion of the pump unit, such as tilting or rotating, shall be acceptable. Sealing of the discharge interface by means of a diaphragm, O-ring, or other device will not be considered acceptable or equal to a metal to metal contact of the pump discharge flange and mating discharge connection specified and required. No portion of the pump unit shall bear directly on the floor of the wet well. There shall be no more than a 90 degree bend allowed between the volute discharge flanges and station piping.

The pump motor shall be housed in an air or oil filled watertight casing and shall have moisture resistant Class “F” 155 degree C insulation. Oil filled casing shall be filled with transformer oil, quality BP Energol JSO, or Shell Diala D or DX. The motor shall be a minimum of 5 BHP, rated for operation at 1700 or l750 rpm, on a 230V ~~volt~~, 3-phase, 60 hertz power supply. The cable entry water seal design shall be such that precludes specific torque requirements to insure a watertight and submersible seal. Epoxies, silicones or other secondary sealing systems shall not be required or used. The cable entry junction box and motor shall be separated by a stator lead sealing gland or terminal board which shall isolate the motor interior from foreign materials gaining access through the pump top.

Pump motor cable installed shall be suitable for submersible pump applications and this shall be indicated by a code or legend permanently marked on the cable. Cable sizing shall conform to NEC specifications for pump motors and shall be of adequate size for the motor rating. Pump motor cable shall be ample length to reach the rack mounted panel. Cable length to be determined by the site plans.

The pump cable shall have 90 degree C rated insulated material based on 40 degree ambient and shall have anti-roping and anti-wicking design. All mating surfaces of major parts shall be machined and fitted with nitrile O-rings where watertight sealing is required. Machining and fittings shall be such that sealing is accomplished by automatic compression in two planes and 0-ring contact made on four surfaces, without the requirement of specific torque to affect this. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered adequate. Tolerances of all parts shall be such that allows replacement of any parts without additional machining required to insure sealing a described above. No secondary sealing compounds, greases, or other devices shall be used.

Each unit shall be provided with an adequately designed cooling system. Thermal radiators integral to the stator housing, cast in on unit, are acceptable. Where water jackets along or in conjunction with radiators are used, separate circulation shall be provided. Cooling media channels and ports shall be no-clogging by virtue of their dimensions. Provisions for external cooling and flushing shall be provided.

Pump and motor assemblies shall meet NEC and NFPA requirements for explosion proof installations in Class 1, Division1, Group D environments.

The pumps and motors shall be manufactured by FLYGT Corporation.

150.046 Control Panel

This section is specific to single speed, duplex lift stations with float control, for variable speed, PLC controlled stations see Section 161.

The Contractor shall furnish and install a heavy duty type District Standard control panel as shown on the plans and specified here, as manufactured by Sta-Con Incorporated, QCI, or approved equal, and in accordance with the detail sheets SD-31 through 35.

The control panel shall contain all the remote electrical equipment necessary to provide for the operation of the pumps. The panel shall start and stop the pumps in the wet well.

The control panel shall start the “lead” pump when the liquid level rises to a preselected elevation “D”. If the influent rate exceeds the capacity of the “lead” pump, the lag pump shall be started when the liquid level rises to a preselected elevation “C” (higher than “D”). If the liquid level rises to a preselected elevation “B” (higher than “C”), the high

level alarm shall be activated. When the liquid level falls to a persecuted elevation "E" (lower than "D"), both pumps shall be stopped.

The control panel shall be contained in a single enclosure, fabricated of not less than 14 gauge 316 stainless steel, NEMA 4X construction. The door shall be formed with minimum lip of 3/4" and full height hinged. Closure mechanisms shall be No. 3 S.S. fasteners with No. 3 keepers as manufactured by Simmons Fasteners, or approved equal.

The interior door shall be constructed of .080 inch thick 6061-T6 aluminum. The interior and exterior doors shall be provided with a stop mechanism to hold the doors open which working in the panel. A rain shield shall be provided.

The control panel shall include the following items plus any other items shown on the plans or required for a complete, operational installation.

Circuit breakers with combination full voltage motor Starters for each pump.

"Hand-Off-Auto" selector switch for each pump, heavy duty oil tight type (toggle switches will not be acceptable).

Automatic pump alternator with test switch.

Duplex receptacle with 15 amp circuit breaker 115V GFI.

Control power circuit breaker.

Main circuit breaker.

Emergency power minimum 100 amp circuit breaker and 100 amp, 4 wire, 3 pole, reverse service generator receptacle. Emergency power to match main breaker size.

Lightning arrestor, 3 phase.

Surge capacitor.

Phase monitor, to prevent energization of pump motors in the event of phase failure or reversal or low voltage.

Indicating light for each level regulator (float switch).

"Running" indicating light for each pump.

Elapsed time meter for each pump, 2-1/2", 6 digit non-reset.

~~———~~Emergency/High level alarm light and horn, 12 VDC with battery back-up.~~, with Flasher, outdoor~~
~~———type mounted on top of the control panel.~~

The panel shall include back-up circuitry to permit one pump to operate with a normal drawdown in the event of failure (open circuit) of the "stop" level regulator.

Spare parts to be furnished with the panel include:

2 - 120V Relays
1 - Alternator
1 - Phase Monitor
12 - Lamps
12 - Fuse Links
1 – Intrinsically Safe Barrier
1 – Alarm Controller

A copy of the panel wiring diagram shall be attached to the inside of the outer panel door. An extra copy shall be given to the District.

~~150.05 Control Panel Components~~

The basic components and layout of the control panel are shown on Standard Details 31, 32, 33 and 34.

Substitutions of these components will be permitted for approved equal, interchangeable products upon obtaining specific written approval from the District.

150.07 Telemetry

Lift stations shall be provided with a District standard radio telemetry system by Data Flow Systems. Telemetry systems shall provide monitoring and control for the following signals;

1. Digital
    a. Power Fail
    b. Auxiliary Power
    c. High Level
    d. Pump # 1 Fail
    e. Pump # 2 Fail
    f. Pump Run # 1
    g. Pump Run # 2
    h. Pump On # 1
    i. Pump On # 2

j. Pump Off # 1
k. Pump Off # 2
l. Spare
m. Spare

2. Analog
   a. Wetwell Level
   b. Spare
   c. Spare

An alternative cellular telemetry system may be available. Coordinate with the District's Director of Engineering Services for specifics.

150.086 Access Hatches & Fall Through Safety Prevention Systems

The wet well and valve vault access hatch shall be single leaf design with a minimum clear opening at 36" x 48", but must also meet the minimum clear opening as required by the pump manufacturer. The frame shall be a minimum: 3" x 3" x 1//4" aluminum angles and the cover shall be 1/4" aluminum angles and the cover shall be 1/4" aluminum diamond pattern. The hatch shall be completed with anchor straps, automatic hold open arm and cover release, forged brass or stainless steel hinges with stainless steel pins, hasp and staple lock, flush type handles, upper guide holders and sensor cable holder. The cover shall be reinforced to withstand a live load of 300 lbs./sq. ft. unless in areas that may experience traffic. Hatches in traffic areas shall meet H-20 design loading criteria, at a minimum. Hinges shall be of the interior type.

For all stations 6' in diameter or larger, the Contractor shall provide fall through safety prevention systems. All systems will be of the grate type as manufactured by U.S.F. Fabrication, Inc., able to withstand a pedestrian load of 300 lbs/sq. ft. ~~and shall be of dual leaf design~~. The safety grate must be constructed of aluminum and/or stainless steel. All hardware must be of 316 stainless steel construction.

The configuration of the hatch and safety grate shall be such that opposing sides of the wetwell opening are protected when the safety grate is in the upright position and safety chains from the safety grate to the hatch shall be provided to protect adjacent sides.

10' diameter and larger wetwells and tri-plex stations will require custom hatch and safety grate designs to be determined in coordination with the District's Director of Engineering Services during design.

150.0709 ~~Mercury Roto~~ Floats

~~Twenty four (24) Volt~~24V ~~mercury level control~~float switches with internal single pole mercury switch shall be installed in the wet well to control the operation of the pumps with variations of liquid level in the wet well. The float switches shall be ~~a snap action switch activated by a rolling steel ball in a switching tube~~ sealed in a polypropylene casing with a firmly bonded electrical cable protruding. Floats shall be Roto-Float type S as manufactured by Anchor Scientific Inc.~~, known as Roto-Floats.~~

~~150.10 Information and Services to be Furnished by Manufacturer of Equipment~~

~~Detailed wiring diagrams of the entire installation including main power supply, pump motors, control circuits, alarm circuits, and metering circuits shall be submitted. The diagrams shall include schematic and connection wiring diagrams.~~

~~Four (4) copies of detailed installation drawings including wiring diagrams, pump curves and maintenance and operating manuals shall be submitted to the District at the time of initial start-up.~~

~~The services of a factory-trained representative shall be furnished for the lift station start-up. The representative shall check all electrical components, wiring, and pump operations.~~

150.10 Valves

See Section 130

150.11 Pipe and Fittings

See Section 114 for HDPE pipe and fittings used in the wetwell. See Section 111 for ductile iron pipe and fittings.

150.12 Wetwell and Valve Vault

See Section 121 and standard details SD-31

150.~~11~~ 13 Wet Well via Caisson Construction

Wet wells installed via the caisson method are allowed only with prior approval by the Loxahatchee River District. Final acceptance of the wet well by caisson method will only occur when it is determined that:

- Wet well has no structural damage, deep gouges and and/or cracks.
- Wet well has been installed at the design depths indicated.
- Wet well is plumb. The maximum deviation shall be 1/8” per foot of each precast section.

- Wet well tremie seal is leak free and there are no continually damp areas prior to the installation of the secondary pour.
- Wet well sections show no evidence of separation and that the structure has not settled.
- Wet well walls, specifically at the joints, are flush and without overhang.
- Wet well was installed in proper sequence.

If any of the above items are not met to the satisfaction of the District, the wet well will be rejected and it will be the contractor's responsibility to remedy the problem at his own expense. The contractor shall also provide a warrantee that the wet well will meet the above requirements for a 1-year period from the date of District acceptance.

150.14 Submittals

The following submittals are required for approval prior to construction of the project.

1. Lift Station Calculations to include
    a. Average Daily Flow
    b. Peak Hour Flow
    c. System Head Curves
    d. Wetwell Cycle Time
    e. Anti-Flotation
2. Lift Station Site Plan
3. Pump and Motor
4. Pipe and Fittings
5. Valves
6. Concrete Structures
7. Control Panel – complete detailed design including electrical schematic, panel layout, bill of materials
8. Panel Rack
9. Base Plates
10. Rails, Brackets and Adapters
11. Conduit and Cable
12. Aluminum Hatches and Safety Grates

Detailed wiring diagrams of the entire installation including main power supply, pump motors, control circuits, alarm circuits, and metering circuits shall be submitted. The diagrams shall include schematic and connection wiring diagrams.

Four (4) copies of detailed installation drawings including wiring diagrams, pump curves and maintenance and operating manuals shall be submitted to the District at the time of initial start-up.

150.10 Services to be Furnished by Manufacturer of Equipment

The services of a factory-trained representative shall be furnished for the lift station start-up. The representative shall check all electrical components, wiring, and pump operations.

150.15 Operation and Maintenance

Upon completion and successful start up of the lift station the District will be provided with two copies of the lift station operation and maintenance manual. The manual shall include operation and maintenance detail including service intervals for all equipment provided with the lift station. Operation and maintenance manuals shall also include AS-BUILT drawings for the lift station, control panel, wiring schematics and appurtenances.

150.~~12~~16 Warranty ~~level~~

The pump manufacturer shall warrant the pumps for a period of five (5) years from the date of pump manufacturer's start-up. The warranty shall include a minimum 100% coverage of the manufacturer's shop labor and parts for the first eighteen months, then 50% coverage through the third year, and then 25% coverage through the fifth year.

END OF SECTION 150

SECTION 151

LOW PRESSURE SEWER SYSTEMS

151.01 General Intent

It is the intent of the District to provide sanitary sewer service to the citizens, businesses, and industry of the area in a manner which maximizes use of existing facilities, minimizes environmental damage, and provides solutions to existing problems.

Gravity collection systems with central lift stations are the preferred methods of collecting and transporting sewage to the regional facilities. All property owners should anticipate connection via these conventional facilities unless otherwise directed by the District.

The District recognizes that the construction of gravity sanitary sewer lines is not conducive to all areas, and that utilization of an alternative system may be necessary to provide access to regional facilities.

The District may at its sole discretion allow or direct the utilization of LPSS where it is determined to be in the best interest of the District. The District may direct the use of LPSS to minimize the impacts of gravity sewer construction upon existing neighborhoods or upon environmentally sensitive areas.

The use and implementation of LPSS shall be at the sole discretion of the District and no installation shall be considered as a precedent for justifying the acceptance of LPSS in a similar or like situation.

151.02 Administration

The administrative procedures for construction are set forth in the latest revision of the District Construction Standards and Technical Specifications and shall be adhered to unless specifically modified in writing by the District.

151.03 Utilization

151.03.01 LPSS for Existing Developments

For the purpose of this section, the term "existing developments" shall be considered as those areas which have previously developed on septic tanks to the extent that a substantial portion of the subdivision is now built out; or, under less prevalent circumstances, an area which has received site plan approval and is plated/subdivided based upon use of septic tanks.

The criteria for the District's determination of whether the use of LPSS is warranted includes, but is not limited to: existing developments of less than 40 homes, or in areas of high water tables, or in areas where work space for construction activities is unreasonably restricted or in areas where available gravity collection lines have not been provided by prior construction.

Existing gravity sewer systems will be utilized to the maximum extent possible; however, LPSS may be considered in existing neighborhoods where gravity construction would be unreasonably restricted in the opinion of the District Engineer.

151.03.02 Community Grinder Systems

The use of a community grinder system is a merge of a LPSS system and a traditional gravity collection system, in that there are instances where the District would allow "grinder systems" in conjunction with small gravity system to serve a community. In accordance with Section 151.01 above, the utilization of smaller "grinder systems" with limited gravity collection systems will be encouraged in new developments where environmental concerns would be adversely impacted by the construction of a traditional non-clog lift station and/or deep gravity lines, at the sole determination of the District.

Grinder systems could be considered for:

- New Development – areas of less than 15 homes, with a suitable site for a grinder station~~, and cost no more than 200% of a LPSS system.~~.
- Existing Development – areas of less than 20 homes, both sides of street participating, and cost is not greater than 200% of LPSS, unless specifically requested by property owners.

151.04 Responsibility

151.04.1 District

A low pressure sewer system may consist of one or more pump stations. A pump station shall be considered as the individual pumping unit which serves a single residence, or a commercial or industrial customer. In the latter cases, the unit may contain two pumps (duplex).

All plans for the construction of any portion of an LPSS shall be submitted to the District Engineer for review and approval.

All LPSS facilities which are located within public rights-of-way shall be conveyed to the District for operation and maintenance.

Any facility, associated with an LPSS, which is located outside of the private property being served, must be within a dedicated easement or right of way. The easement shall be conveyed to the District.

The District shall be responsible for the operation and maintenance of all facilities (force mains, valves, etc.) within rights-of-way, or dedicated platted utility easements which serve more than one unit.

Property owners must execute a License Agreement for District maintenance of residential and low flow nonresidential pump stations.

151.04.2 Residential or Non-residential User Responsibilities

Each individual residential or low flow non-residential user of the LPSS system shall provide his own pump station, electrical service, force main and connection to the District owned collection/transmission lines. The District shall be responsible for the operation and maintenance of all residential and 3-phase non-residential low flow equipment serving his individual property, whether located on his property or in easements off of his property. The residential or nonresidential user shall be responsible for the installation of the pump station, control panel, force main valves, and all appurtenances which are a part of the system solely serving the individual user. Maintenance will be provided in accordance with the License Agreement provisions.

Low Pressure Systems for commercial and single phase low flow non-residential use shall: 1) require a duplex grinder pump system, and 2) be operated and maintained by the property owner in accordance with P.B.C. Health Dept./Florida DEP requirements

The user shall provide electrical power from his meter to the control panel, and all operating costs shall be users responsibility.

151.05 Submissions And Approvals

All installations of individual units shall be reviewed and approved by the District Engineer prior to construction. The District Engineering Department shall be notified at time of installation of the pumping unit and prior to connection to the District line. Connection excavations shall remain open and protected until such time as an inspection has been performed and a satisfactory connection is made.

All installations shall be made in accordance with District Technical Specifications, and local plumbing and electrical codes, and the regulations of the Florida Department of Environmental Protections.

Submittals for area lines which will be taken over by the District for operation and maintenance shall be made by a Professional Engineer, registered in the State of Florida. The District may require a hydraulic analysis from the Professional Engineer to determine if the existing District infrastructure has the capacity to accept new connections. Once hydraulic capacity has been determined available, six (6) sets of signed and sealed construction plans shall be submitted for approval. The construction shall also be inspected and certified by a Florida registered professional engineer upon completion.

Submittals for individual installations shall include a shop drawing of the pump station and control panel, and an as-built drawing showing tie-in dimensions of the force main, valves, and any electrical conduits.

The use of pumping units is restricted to specific makes and models for which the District will maintain a limited spare parts inventory for emergency situations only.

151.06 Definition

A low pressure sewer system is defined as a means of conveying sewage by individual pumping units through a small pressurized force main to a discharge point which can be part of an existing force main or gravity system.

151.07 General System Design Considerations

The following particulars should be considered in the design of any proposed low pressure system:

1. Geographical location.
2. Type of development - number of residences.
3. Topography of service area (where applicable).
4. Layout of existing or proposed service area.
5. Projected sewage flows.
6. Location of nearest existing sewer facility.
7. Soil and water table information.
8. Availability of electric power.

151.07.1 System Layout And Alignment

The pressure sewer system should be designed so that all contributory lines are branched into a main collector. "Looping" and "dead-endings" of macerated sewage in remote areas of the system shall be avoided.

Pressure lines should be laid out to provide runs as short as possible with a minimum of major change in direction.

In order to facilitate maintenance and repair, force mains should be laid outside the limits of pavement or heavy traffic areas.

All system lines shall be kept full, under a positive pressure head at all times. This can be maintained by locating the system terminus at the highest elevation, or by employment of a positive pressure control devise at the terminus.

To minimize the number of potential air pockets, pressure lines should be installed on a continuously rising grade as much as possible to predetermined points where air release devices and cleanout ports can be installed in accordance with the Standard Details.

151.07.2 Design Flow

As in any collection system, a pressure sewer system must be designed to effectively handle all sewage flow generated in the service area especially during times of peak flows.

Peak flow shall be determined by accepted sanitary sewer engineering principals and standards established by regulatory agencies. Proper design should assure that each contributing pump unit in the service area, no matter what its location or what other units are operating at the same time, will be able to deliver into the system during these peak flow system conditions at a rate sufficient to insure that there will be no sewage removal problem at any individual building or unit. A pumping rate in the range of 8-10 gal./min. is normally considered sufficient.

151.07.3 Line Sizing And Velocities

Line sizing must be designed to insure that scouring velocities will occur in the system pressure lines at some regular interval. At the same time they must avoid excessive system pressures which can jeopardize the delivery capacity of any unit on the system.

To insure that scouring will occur during design flows, it is recommended that the velocities in the pressure lines be maintained in the 2-5 ft./sec. range at regular intervals.

Minimum service line and tap diameters for commercial connections shall be 2-inches. In the case of tying into an existing 2 or 2.5-inch main, a tee with a 2-inch outlet shall be cut in.

151.07.4 Operation Of Contributing Pumping Units

A most important design consideration is that the proper operation of any and each pumping unit on the system be assured during any flow conditions which could exist. This includes the most demanding maximum peak design flow which may be seldom, if ever, encountered (such as immediately following an extended power outage).

151.07.5 System Flushing

Design shall provide for the ability to mechanically purge sewage from the system at regular intervals. Flushing connections to the force main system are shown in the Standard Details.

151.07.6 Air Release

Design shall provide for relief of air at high points along the system. Valves and piping configuration is shown in the Standard Details.

151.08 Pumping Units

The pumping units shall combine a centrifugal submersible pumping unit(s) with a patented grinding assembly which is capable of reducing sewage and its normal constituents (together with sticks, rubber, bones, rags, plastics, etc.) to a particulate slurry which can easily be transported through small diameter pipes.

The units shall be furnished complete with unit tank, electrical control panel, level controls, alarms, check and ball valves, and other necessary appurtenances as shown on the Standard Details.

Pumps shall be manufactured by Barnes and have a 1-1/4" vertical discharge outlet. Reference the District's low pressure sewer standard details (LP details) for information regarding pump models and configurations.

151.09 Piping And Appurtenances

151.09.1 Pipe

Schedule 40 PVC: Pipe shall be Type I, PVC 1120 with a hydrostatic design stress of 2000 psi for liquid at 73.4 F. Pipe shall conform to ASTM D 1785, ASTM F 480 and ASSTM D 2665.

HDPE: Pipe shall be PE 4710 with a minimum hydrostatic design stress of 800 psi for liqui~~e~~d at 73.4 F utilizing a 0.5 design factor. Pipe shall conform to ASTM 3035 and ANSI/AWWA C901.

151.09.2 Valves and Cleanouts

Isolation valves shall be strategically placed along the pressure main at services, junction points, changes of direction, and recommended intervals along extensive straight runs (see LP Details). Isolation valves shall be ball type made of brass and be capable of operation with a 2" operating nut and be placed within a District approved valve box. Refer to the District's LP details for specifics on which isolation valves are not required to have a valve box.

Each pumping unit shall be isolated from the low pressure force main system by a PVC ball valve (service valve) and ~~a ball~~ check valve, positioned at the street right-of-way line, inside of a service box (see LP details). ~~This service valve shall be a thermoplastic ball that is 1.5 inches in diameter and made of Type I, grade I, PVC, rated at 150 PSI at 120 F. The ball check valve shall be 2 inches in diameter.~~

This service line will typically be 1.5 inches in diameter, set in a District approved meter box, at no more than 18" depths at the right of way line (see LP Details).

151.09.3 System Wiring and Control

Each individual contributing pumping unit shall be connected by underground conduit to the individual home electrical power supply. This conduit may be laid in the same trench as the gravity service pipe to the unit tank. Wiring and conduits shall be installed in accordance with all applicable local codes and regulations.

Liquid level controls shall be a sealed mercury switch in an approved float ball. The switch shall be sealed for life with a heavy neoprene jacketed control cord permanently attached.

A high water activated alarm shall be supplied. An alarm light shall be mounted on the building or control panel in such a manner so that it will be visible to building occupants and from the contiguous street areas.

The electrical control panel shall consist of the following:

Corrosion Proof Enclosure
NEMA 3R rating
Hinged Access Panel
Lockable Latch
120V AC Control Voltage - single phase
GFI Receptacle on dead front
Audible Alarm
Rated Disconnect Switch
The electrical control panel enclosure and its components shall be UL listed.

Typical wiring diagram is shown on the District's LP Details.

151.09.4 Tanks and Covers

Tanks shall be constructed of polymer or reinforced fiberglass polyester resin and the minimum size shall be 30" x 60" for a simplex configuration. Interior surface to be 10-20 mil. thick gel coated to provide a smooth sealed surface. Lockable gasketed water tight covers shall be flat aluminum and capable of supporting a 300 lb. wheel load. The fiberglass tank shall have an integral anti-flotation flange which will anchor into a concrete collar designed to counteract uplift forces.

The wall thickness of the fiberglass tank shall be sufficient to withstand a water saturated sand load of 120 pcf with a safety factor of two (2) for all depths.

Inlet hubs shall be as shown on the District's LP details. All hardware shall be stainless steel and be leak proof sealed.

The cover (lid) shall be 2/3^{rds} hinged single leaf, rated at 300 lbs/sq. ft and be lockable. The lid shall be set at a minimum, six (6") inches above final grade.

Conduit opening shall be sealed with an approved duct seal.

Float and wire hanger bracket shall be stainless steel (Type 304).

All interior piping shall be Schedule 80 PVC. A PVC union on the horizontal discharge pipe shall allow for the quick removal of the grinder pump assembly. The discharge line inside the tank shall also have a 1.25 inch PVC ball type check valve located inside the tank.

END OF SECTION 151

SECTION 152

ADOPTION OF STANDARDS

The Loxahatchee River Environmental Control District Manual of Minimum Construction Standards and Technical Specifications were initially adopted and promulgated by the Governing Board in April, 1983.

The current edition was ratified by the Loxahatchee River Environmental Control District's Governing Board, on ~~March 16, 2017~~May 17, ,2018, with a ~~unanimous~~ _____vote as follows:

"THAT THE DISTRICT GOVERNING BOARD ratify the Loxahatchee River Environmental Control District's "Manual of Minimum Construction Standards and Technical Specifications", as of ~~March 16~~May 17, 201~~87~~, and authorize the District Engineer and Executive Director to update the Construction Standards and Technical Specifications from time to time, and periodically present it to the Governing Board for ratification."

Board Member	Vote
Mr. Snyder, Chairman	"~~Aye~~____"
Mr. Rostock, Vice-Chairman	"~~Aye~~____"
Dr. Rockoff, Treasurer	"~~Aye~~____"
Mr. Boggie, Secretary	"~~Aye~~____"
Mr. Silverman, Assistant Secretary/Treasurer	"~~Aye~~____"

D. Albrey Arrington, Ph.D.
Executive Director
Loxahatchee River Environmental Control District

SECTION 161

VARIABLE SPEED/PLC CONTROL PANELS

150.01 General

This section provides for design, construction, installation and start-up of a custom power and control panel by a qualified panel manufacturer. The panel and components shall comply with the requirements of this specification and other sections and standard details of the District's Manual of Minimum Construction Standards and Technical Specifications.

This section is generally used for variable speed submersible wastewater lift stations greater than 20HP

150.02 Submittals

Submittals for the power and control panel shall include but not be limited to the following:

1. Panel materials of construction, layout and dimensions.
2. Anchoring details to concrete slab
3. Wind load calculations (if required by permitting authority)
4. Scaled dead front layout
5. Scaled back plan layout
6. Scaled component layout
7. Power, Instrumentation, Radio Telemetry and Control wiring schematics

150.03 Panel

The control panel shall be NEMA 4X ground mount enclosure with double doors and leg kit for floor standing. The panel shall be minimum thickness 12-gauge 316 stainless steel, enclosure and doors. The doors shall be formed with minimum lip of 3/4", full height concealed hinges, stainless steel door clamps on non-hinged sides and pad-lock hasps. The center post shall be removable for full access to the panel interior. A rain/drip ledge shall be provided over the doors. Sun shields shall be provided on top, east, west and south facing sides.

The interior doors/dead fronts shall be construction of minimum 0.080 inch 6061-T6 aluminum.

Both exterior and interior doors shall have a mechanism to hold the doors open.

The panel shall be manufactured by Hoffman or approved equal.

The control panel shall be designed and tested in conformance with UL 508.

150.04 Operating Protocol

The power and control panel shall provide for manual and automatic operation of the lift station pumps utilizing an ultrasonic level controller, programmable logic controller and variable speed drives. The station operating protocol shall be as follows.

1. Operating Protocol 1: Level Control

    a. ELEV A all pumps off
    b. ELEV >= B lead pump on. speed adjust to maintain level
    c. ELEV >=C lag 1 pump on. lead and lag 1 match speed and adjust to maintain level
    d. ELEV >=D lag 2 pump on. lead, lag 1 and lag 2 match speed and adjust to maintain level
    e. ELEV E all pumps on 100% speed
    f. LEVEL DECREASNG/MATCHED PUMP SPEED BELOW 50% for X seconds lag 2 off. Lead and lag 1 match speed adjust to maintain ELEV C.
    g. LEVEL DECREASING/MATCHED PUMP SPEED BELOW 50% for Y seconds lag 1 off. Lead adjusts speed to maintain ELEV D.

2. Operating protocol 2: Constant Speed

    a. ELEV INCREASING
        i. ELEV >=B lead pump on. N% speed.
        ii. ELEV >=C for X seconds. Lag 1 on. N% speed.
        iii. ELEV >=D for X seconds. Lag 2 on. N% speed.
    b. ELEV DECREASING
        i. ELEV <=C for X seconds. Lag 2 off.
        ii. ELEV <=B for X seconds. Lag 1 off.
        iii. ELEV <=A for X seconds. All pumps off.

3. Operating protocol 3: Manual/Hand

    a. With the HOA selector switch in Hand the selected pump shall turn on and speed be manually adjusted through the AFD. In Hand, all alarms shall function, but pump operation will not be prevented except for specific pump manufacturer alarms in place to prevent hard to the pump and/or motor.

4. Alarm Functions

    a. With the station in Hand, Off or Auto the alarm functions shall be fully operable.
    b. Alarms shall be available for the following
        i. Pump Out of Service, each pump.
        ii. Pump Fail to Run, each pump
        iii. AFD Fault, each drive.
        iv. ATS Fault
        v. Generator Fault

vi. UPS Fault
vii. Communication Fault
viii. Wetwell High Level

c. The station shall have two high level alarm systems.
   i. Alarm 1: PLC based alarm system using a preset high level as read from the pressure transmitter. This alarm will activate onsite and offsite audible and visual alarms including the following.
      1. Audible Alarm Horn
      2. Visual Alarm Light
      3. High Level indicator located on the dead front inside the panel.
      4. Alarm indication on the Panel PC
      5. Alarm indication in the PLC
      6. Alarm indication to the DFS Radio Telemetry System
      7. Alarm indication in the Plant VT SCADA system.
   ii. Alarm 2: Back up to Alarm 1 using a high level float switch inside the wetwell. This alarm will activate onsite and offsite audible and visual alarms including the following.
      1. Audible Alarm Horn
      2. Visual Alarm Light
      3. High Level indicator located on the dead front inside the panel.
      4. Alarm indication on the Panel PC
      5. Alarm indication in the PLC
      6. Alarm indication to the DFS Radio Telemetry System
      7. Alarm indication in the Plant VT SCADA system.

5. Emergency Standby Generator Limited Operation – On emergency standby generator power station operation shall be limited to 2 pumps.

6. Pump Off – Back Up Float System

   a. With the station in Auto a low level float in the wetwell will automatically shut off all pump operation until the high level float switch is activated.

Programming shall allow for operators to change all variables noted above though a simple interface via a laptop computer or the HMI.

150.05 Adjustable Frequency Drive:

Adjustable frequency drives shall be Eaton PowerXL DG1 Series. Drives shall be rated for 480V, 3 PH, 60 HZ. Drives shall be variable torque, pulse width modulated. Drive horsepower rating shall equal or exceed maximum pump motor horsepower requirements at any point on the pump curve.
The drive shall include a keypad interface that provides the following functions and displays at a minimum; Output frequency, frequency reference, motor speed, motor current, motor torque, motor power and motor voltage.

The drive shall include the following protective features, at a minimum; over current, over voltage, inverter fault, under voltage, input phase loss, output phase loss and under/over temperature.

The drive shall include the following field programmable I/O, at a minimum; DIGITAL: eight 24VDC digital inputs and eight 24VDC digital outputs including local/remote, drive ready, fault, running, overload, set speed, current. ANALOG: two 4-20 mA analog outputs, two 4-20 mA analog inputs.

The drive manufacturer shall provide services of a field service technician to assist in installation, setup and training.

Drives shall come with a minimum 12 month warranty.

150.06 Programmable Logic Controller: See Section 169

150.07 Uninterruptible Power Source (UPS)

Power and control panels shall be provided with an UPS for the control and telemetry system. The UPS shall be Eaton 5P Tower UPS with an Eaton Network Card-MS. The UPS shall be sized by the Contractor based on control and radio telemetry loads and to provide a minimum 10 minutes of backup power to these systems in the event of power failure.

The UPS shall provide power through an APC 120V 10 outlet rack mounted automatic transfer switch model number AP7750A. In the event of UPS failure the ATS shall switch to commercial power, if available.

150.08 Operator Interface/Panel PC

Power and control panels shall be provided with an operator interface/panel PC. The panel PC shall be Phoenix Contact USA Panel PC – VL2 PPC 2000 – 2400334:

Order Key **2400334/D29/A20/I32/R26/M52/M00/OS64/T00/S00/EF00/PS01**

The panel PC shall come with the following specific options:

1. Passive cooling system and fanless design for industrial applications
2. Panel PC (PPC): IP65 rating in front panel and IP20 rating in back. The control panel design shall ensure only IP65 areas are exposed when the dead front is closed.
3. Display shall be 47.0 cm / 18.5" TFT (Thin Film Transitor)
4. Screen resolution 1366 x 768 Pixel(s) (WXGA)
5. LED Backlighting
6. Intel® Celeron® N2930 1.83 GHz/2.16 GHz processor
7. Operating system shall be Windows® 10 IoT Enterprise LTSB 2015 (32-bit), Multi-language

8. RAM 4 GB DDR3 SODIMM
9. Mass storage - 2,5" SSD (MLC), 160 GB
10. Network 2x Ethernet (10/100/1000 Mbps), RJ45
11. Interfaces 1x COM (RS-232/422/485)
12. 4x USB 2.0
13. Monitor output 1x DisplayPort
14. Service life of battery 5 years
15. Environmental Conditions
    a. Degree of protection IP65 (front), IP30 (back)
    b. Ambient temperature (operation) 0 °C ... 45 °C (with HDD)
    c. Ambient temperature (storage/transport) -40 °C ... 70 °C
    d. Permissible humidity (operation) 5 % ... 95 % (non-condensing)
    e. Permissible humidity (storage/transport) 5 % ... 95 % (non-condensing)
    f. Power supply unit 24 V DC ±20 %

150.09 Ethernet Switch

Power and control panels shall be provided with an Ethernet switch to connect all networked devices including but not limited to the Panel PC, Uninterruptible Power Source and PLC. Ethernet switches shall be Allen Bradley Stratix 5700.

150.10 Ventilation

The panel shall include forced ventilation sufficient to maintain panel interior temperatures and conditions within the ranges set by the manufacturers of equipment located within the panel. Ventilation shall include filtration to prevent the entrance of dust, debris and water from entering the panel.

150.11 Level Transducer/Transmitter: See Section 169

150.12 Circuit Breakers:

Circuit breakers shall be Square D H-Frame sized per panel and pump power requirements.

150.13 Miscellaneous Materials and Requirements:

1. In general, except as specified otherwise in this section or the drawings, panel components shall comply with the Bill of Materials, on Sheet SD-34 of the District's Manual of Minimum Construction Standard and Technical Specifications.
2. One Duplex 15 amp 120 V GFCI receptacle with dedicated circuit breaker.
3. Two overhead fluorescent or LED lights with integral on/off switch mounted inside the panel behind each door in front of the dead front. The lights shall be 120V.
4. One "Hand-Off-Auto" selector switch for each pump, heavy duty oil tight type (toggle switches will not be acceptable).
5. One control power circuit breaker.
6. One main circuit breaker.

7. Secondary Backup Generator circuit breaker with Main Breaker Lockout.
8. Secondary Backup Generator receptacle.
9. Lightning arrestor, surge protector and phase monitor. The phase monitor shall lock out pump operation in the event of phase loss, reversal or low voltage.
10. One "RUN" indicator light for each pump.
11. One "FAIL" indicator light for each pump.
12. One Elapsed time meter for each pump, 2-1/2", 6 digit non-resettable.
13. Independent 12VDC High Level Alarm System -
    a. Alarm light, 12 VDC, with Flasher, outdoor type mounted on top of the control panel.
    b. Alarm Horn, 12 VDC, outdoor type mounted on side of control panel.
    c. High Level Alarm Circuitry to include high level float in the wetwell. Alarm circuit to match the District Standard, including the intrinsic safe circuit in the wetwell.
    d. This alarm shall act independently from the PLC
14. A copy of the panel wiring diagram asbuilts and bill of materials shall be attached to the inside of the outer panel door. An extra copy shall be given to the District.

Spare parts to be furnished with the panel include:

2 - 120V Relays
1 - Alternator
1 - Phase Monitor
12 - Lamps
12 - Fuse Links
1 – Intrinsically Safe Barrier
1 – Alarm Controller

150.14 System Integration

System integration shall be performed by

Frank Sczurek, Process Analyst
Process Control Consultants
PO Box 1174
Loxahatchee, FL 33470

Phone: 561-791-1511
Email: proccon@comcast.net

System integration shall include integration of the adjustable frequency drives, level transmitter, level transducer, programmable logic controller, uninterruptable power source, generator controller, panel PC, automatic transfer switch, Data Flow Systems RTU and the District's VT Scada System for a fully functional system capable of implementing the required operating protocol and monitor/control functions as detailed in the specifications and the System Block Diagram.

System integration shall include screen development. At a minimum the following screens shall be provided at the Panel PC.

1. Overview – shows diagrammatic representation of the lift station pumps, drives, wetwell, generator and ATS and include equipment status and alarm and HOA functions. This screen shall also display, at a minimum, pump speed, pump hours, wetwell level, power source, voltage and current.
2. Setup Screen – allows setup of station parameters to include lead, lag, standby selection, time delays, tandem pump operation criteria, pump speed limits, operating levels and alarm levels,
3. Alarm/Fault Screen – displays a complete list of programmed alarms, indicates current/active alarm, allows alarm acknowledgment, allows setup of alarm parameters.
4. Trend Screen – Provide trending for lift station parameters including pump speed, wetwell level, estimated flow (based on correlation between pump speed, pump head and pump curve).

The following minimum screens shall be provided in the Plant VT SCADA system. Screens shall conform in style and function to the District's existing VT SCADA screens.

1. Station Status
2. Historical Trending

150.15 Radio Telemetry

The power and control panel shall include dry contacts for the radio telemetry unit. Dry contacts shall be provided for all I/O listed below.

1. Pump Status
2. Pump Fail
3. Pump Call to Run/Off
4. Commercial Power
5. Auxiliary Power
6. High Alarm – back up float
7. Generator General Alarm
8. Generator Low Coolant
9. Generator Fuel Alarm
10. Generator Fail
11. Pump Speed
12. Pump Disable
13. Wetwell Level
14. 2 Spare Digital
15. 2 Spare Analog

SECTION 162

EMERGENCY STANDBY DIESEL GENERATOR SET

162.01 General

The generator shall provide emergency power to the lift station adequate to operate the station and all appurtenances. A detailed sizing report shall be submitted for approval.. The generator set shall be 130 C (266 F) temperature rise at 0.8 PF, 480/277V, 3 phase, four wire at 500' above sea level and ambient temperature 25C (77 F). The generator set shall be EPA certified for this specific application (permanent standby emergency power) but not have less than an EPA Tier III emission certification.

The generator set shall include an automatic transfer switch, battery charger, batteries, sound attenuating/hurricane rated/weather resistant enclosure and exhaust silencer and come as a complete package from the manufacturer.

Work shall also include a generator sizing report based on design loads detailed in the contract including pumps, controls, instrumentation, lightening and miscellaneous loads verifying manufacturers concurrence with the above sizing.

162.02 Applicable Codes, Standards and Specifications

The installation shall comply with all applicable rules, regulations, and ordinances of the following:

National Electric Code (NEC)
Occupational and Safety Health Standards (OSHA)
Florida Building Code (FBC)
National Fire Prevention Association (NFPA)
Underwriters Laboratory (UL)
International Standardization Organization (ISO)
National Electrical Manufacturers Association (NEMA)
American National Standards Institute (ANSI)
Institute of Electrical and Electronics Engineers (IEEE)
Environmental Protection Agency (EPA)
Town of Jupiter
Palm Beach County

162.03 Submittals

The generator set submittal shall include drawings and schematics that fully depict the product being provided. Submittals shall include the following:

A. Generator sizing report
B. Generator set plans and elevations.
C. Enclosure including plans and elevations.
D. Fuel tank including plans and elevations.
E. Engine, combustion air, exhaust, fuel, lubrication and cooling performance specifications.
F. Alternator specifications.

G. Fuel consumption rates.
H. Generator set rating (Prime at 105 C temperature rise)
I. Exhaust silencer.
J. Generator breaker
K. Battery charger.
L. Controller.
M. Enclosure including sound attenuation, wind rating and weather rating (wind driven rain proof).
N. Tier Rating.
O. Start-up report
P. Factory production testing.

162.04 Acceptable Manufacturers

The generator set, fuel tank and enclosure shall be supplied by a single manufacturer. The generator set shall be manufactured by Caterpillar, Kohler, Cummins/Onan, Detroit Diesel or Generac.

162.05 Warranty

The generator set and ATS shall have a one year warranty from the date of acceptance by the District.

162.06 Diesel Engine Generator Set

The engine shall be water-cooled four-stroke compression ignition diesel and rated to drive the generator set after derating for elevation (altitude) and temperature.

Voltage regulation shall be within 5% of rated voltage at constant load. Frequency regulation shall be within 3%. Total harmonic distortion shall not exceed 5%.

When loaded voltage dip shall not exceed 20% and frequency dip shall not exceed 10%. Recovery time shall not exceed 3 seconds.

The generator shall be synchronous, four pole, revolving field, permanent magnet, drip proof, air cooled and direct connected to the engine. Insulation shall be Class H and suitable for use in wind driven rain and salt spray environments. Temperature rise shall not exceed 130 C at standby rating and 105 C at prime rating.

A. Governor: The generator set shall be equipped with an electronic governor that maintains frequency regulation within 3%.

B. Fuel System: The fuel system shall be equipped with a 5 micron fuel filter/water separator. The filter shall be sized to handle 125% of the fuel flow at full load. The fuel pump shall be engine driven, positive displacement and mechanical.

   The fuel tank shall be sized for min. 72 hour run time at full load based on published fuel consumption rates provided by the generator set manufacturer. The fuel tank shall be belly style installed beneath the enclosure but not form a structural member of the enclosure. Fuel fill shall be readily accessible without opening the enclosure. The tank shall be fitted with a local, mechanical fuel gauge. The tank shall be double walled with inspection port for the interstitial space.

C. Space Heater: The generator shall have a 120V space heater sized to maintain the generator windings above temperatures typical in the installation location.

D. Jacket Water Heater: The generator shall have a 120V jacket water heater sized to maintain the engine block at 90 F.

E. Battery Charger: The generator shall have a 120V powered 12V or 24V battery charger with trickle charge/maintain function and standard charging capability. The battery charger shall be sized based on charging requirements and sizes of batteries provided as part of the standard generator set.

F. Batteries: Batteries (12V or 24 V) based on the charging and starting systems shall be provided. Batteries shall be easily accessible for maintenance and replacement and be installed in a corrosion resistant (fiberglass or plastic) battery tray.

G. Cooling System: The cooling system shall incorporate an engine driven fan, enclosure mounted radiator and ethylene glycol based coolant. Access to the radiator cap shall allow for filling of coolant without the need for additional funnels, piping, etc.

H. Enclosure: The enclosure shall be sound attenuating (78 dB(A) at 7 meters), weather proof, aluminum and wind rated for min. 165 MPH (or current PBC requirement). The enclosure shall be coated with manufacturers standard coating system and color.

Sound attenuating material shall be moisture and weather resistant, securely fastened to the enclosure interior and protected from damage during routine maintenance and operation.

The enclosure shall house the generator muffler and all generator appurtenances (controller, radiator, breaker, etc.) except the fuel tank.

All hinges, latches and locks shall be corrosion resistant stainless steel.

I. Controller: The generator controller shall provide/display the following functions.

a. Programmable generator exercise schedule.
b. Cool down period prior to shutoff.
c. All phase AC voltage
d. Current output
e. Each phase AC voltage
f. Utility status
g. KW power output
h. Power factor
i. Total runtime
j. Last runtime
k. Engine Speed
l. Overcrank
m. Oil Pressure
n. Fuel Pressure
o. Water Temperature
p. Coolant Level
q. Battery Voltage
r. Frequency
s. Off/On/Auto(Remote)
t. Alarms

i. Oil Pressure
ii. Coolant Temperature
iii. Coolant Level
iv. Low Fuel Pressure
v. Engine Speed
vi. Overcrank
vii. Battery Voltage

J. Generator Main Circuit Breaker: The generator set shall be provided with a generator main breaker mounted and wired on the generator set. The main breaker shall be UL listed, 480/277 VAC, 200 ampere and configured such that load side cables enter through the bottom of the enclosure.

K. Air Filter: The generator set shall be provided with a dry type replaceable air filter.

L. Mounts: Mounts for the generator set to the frame shall be spring type vibration isolation mounts.

M. Exhaust Silencer: The exhaust silencer shall limit exhaust noise to 78 dB(A) at 7 meters. All enclosure interior exhaust piping shall be insulated to maintain a surface temperature not to exceed 150 degrees F. The insulation shall be installed so that it does not interfere with other components. The insulation shall not be asbestos base.

162.07 Automatic Transfer Switch

The automatic transfer switch shall be UL listed, electrically operated, 480/277 VAC, 3 phase, 60 Hz, 200 ampere and incorporate a mechanical lockout for only normal or emergency power. The use of molded case circuit breakers, contactors or components that are not intended for continuous duty, repetitive switching and transfer service will not be allowed.

The switch shall be mounted in a NEMA-4XSS enclosure.

The switch shall provide the following functions:

A. Phase voltage sensing and transfer of power based on voltage of primary or emergency source. Transfer limits shall be adjustable for pick-up (85%-100% of nominal voltage) or drop-out (75%- 98% of pickup).

B. Three phase voltage sensing and transfer of power based on voltage of primary or emergency source. Transfer limits shall be adjustable for pick-up (85%-100% of nominal voltage) or drop-out (fixed at 84%086% of pickup).

C. Three phase frequency sensing and transfer of power based on frequency of primary or emergency source. Transfer limits shall be adjustable for pick-up (90%-100%) and drop out (fixed at 87%-89% of pickup).

D. Time delay start in accordance with NFPA 110, Level 1, Type 10 (10 seconds).

E. Time delay transfer to emergency power after start. Transfer time shall be adjustable from 0-120 seconds.

F. Time delay transfer to primary power. Transfer time shall be adjustable from 0-30 minutes.

G. Time delay shutdown of emergency generator after transfer to primary power. Transfer time shall be adjustable from 0-15 minutes.

H. Status display:

a. Primary Power Status
b. Emergency Power Status
c. Current Power Source
d. Time to transfer (in consideration of time delays) to/from emergency
e. Transfer complete to/from emergency
f. Time to emergency generator stop

162.07 Testing

The generator set shall have factory production testing completed at the rated load. The production testing shall incorporate all parameters and limits identified in this specification. A factory certified record of testing shall be provided in the submittal.

After installation the manufacturer shall provide start up and testing services. Services shall conform to NFPA 110 and include start and shut down cycles, automatic start and load bank test at full load for 2 hours, power transfer and operation of the station on emergency power for not less than 2 additional hours.

162.08 Start-up and Instructions

On completion of the installation, start-up shall be performed by the generator set service representative. Operating and maintenance instruction manuals shall be supplied and operator training provided to operating personnel (minimum 2 hours training). Upon completion a start-up report shall be provided.

SECTION 168

INSTRUMENTATION

168.01 General

Instrumentation as described in this specification and shown in the drawings shall be provided.

Instrumentation shall be incorporated into the design requirements of the Contractor utilizing the equipment and materials included in this specification.

All electrical components of the system shall operate on 120 volt, single-phase, 60 hertz or 24 VDC power, except as otherwise noted in the specifications.

All electrical components located within the wetwell and the wetwell side of any sealed conduit fitting shall be Intrinsically Safe.

All necessary fuses or switches required by the instrumentation manufacturer for his equipment shall be provided with the equipment.

168.02 Submittals

Detailed design drawings including product specification sheets, mounting hardware, location, conduit, cable and tag numbers shall be provided.

168.03 Cable

All electronic (4-20MADC) signal wire shall be two conductors, copper, twisted pair with tape foil shield and drain wire. The shield is to be grounded at the PLC I/O panel only for single point grounding, in accordance with manufacturer's instructions. Single triad shielded cables for potentiometer signal cables shall be three conductors, copper, twisted triad with tape foil shield and drain wire. The cables must be UL listed for wet locations as defined by the NEC.

168.04 Instrument Mounts

All instruments shall be mounted in readily accessible positions that do not require entry into the wetwell for removal or maintenance. Brackets shall be fabricated to hold instruments. All brackets shall be 304 or 316 stainless steel. All mounting hardware, screws, machine bolts with washers and nuts shall be 316 stainless steel.

168.05 Conduits

All low voltage signals shall be isolated from high level control or power signals in separate conduits. All instrumentation signal conduits below grade shall be SCH80 PVC or 304 stainless steel. All underground conduits shall have grounding bushings and a No. 8 AWG copper minimum cable run to a ground lug at the termination points.

168.06 Lightning/Surge Protection

All transmitters with 4-20 MADC outputs shall have a transmitter mounted surge protection unit. The surge protection unit shall be a EDCO SS65 or approved equal.

168.07 Intrinsically Safe Pressure Transducer

Pressure transducers shall be intrinsically safe and encased in a 316 stainless steel housing.

1. Range: 0 – 15 PSI
2. Cable: Minimum 50’
3. Output: 4 – 20 mA
4. Accuracy: +/-5%

Pressure transducers shall be Blue Ribbon Model 311Z or approved equal.

168.08 Intrinsically Safe Pressure Transmitter

Pressure transmitters shall be intrinsically safe, backlit and mounted in the power and control panel dead-front.

1. Display: 5 Digit
2. Input: 24 VDC
3. Output: 4 – 20 mA
4. Accuracy: +/- 0.03%

Pressure transmitters shall be Precision Digital model 688 or approved equal.

2.08 Power Supplies

All instruments shall be looped powered with an appropriately rated power supply. Each instrument shall have a dedicated power supply.

2.09 Field Calibration and Testing

All instruments shall be set up, calibrated and tested in the field. The Contractor shall provide calibration sheets and testing equipment for each instrument. When installation is complete all components shall be tested to confirm operation and compliance with the contract.

2.10 Installation

All equipment shall be installed per the manufacturers requirements.

SECTION 169

PROGRAMMABLE LOGIC CONTROLLERS

169.01 General

This section describes the hardware and software requirements for a new Programmable Logic Controller (PLC)for a duplex or tri-plex lift submersible wastewater lift station with adjustable frequency drives, level control, emergency standby power, DFS radio telemetry unit (or) Cellular telemetry unit and appurtenances.

This section provides all labor and material required for the PLC system including the panels, equipment, software, screen development, programming, conduit, cable, tie-ins, checkout and start-up of the complete integrated system. This section shall be used in conjunction with the approved drawings and Section 161, Variable Speed/PLC Control Panels.

The latest version available at the time of installation of all PLC development software and communication driver software shall be provided.

All software and programming shall be and required to perform the following functions in addition to the interlocking, monitoring and control functions indicated on the loop diagram drawings and developed in the PLC logic and OWS screen development meetings.

All enclosures shall be UL listed and NEMA rated to house the PLC, remote I/O, power supplies, and terminal blocks as shown in the drawings.

All panels shall be UL listed and labeled as a completed assembly. The panel fabricator shall furnish and install all items not specifically detailed in the drawings required to have the panels UL listed and labeled. All inspections, approvals and modifications required to have the completed panel labeled and listed by UL shall be furnished by, and the responsibility of the panel fabricator..

169.02 Applicable Standards

NEC
NEMA
UL
IEC

Temperature	IEC60068:
Relative Humidity	IEC60068:
Vibration	IEC 60068
Shock	IEC 60068
Emissions	IEC61000
ESD Immunity	IEC 61000

Radiated RF Immunity	IEC61000
EFT/B Immunity	IEC61000
Surge Immunity	IEC61000
Conducted RF Immunity	IEC61000

169.03 Operation and Maintenance Manuals

All products shall be provided with operation and maintenance manuals complete with installation, troubleshooting and technical information on the equipment provided under this contract. Manuals shall be published by the equipment manufacturer.

169.04 Training

Training and instruction shall be given by the manufacturer or representative. Training shall be four (4) hours for personnel selected by the Owner in the operation and general maintenance of the PLC. This training is independent of operator training for lift station observation and operation associated with automated controls.

169.05 Submittals

Submittals shall include installation drawings and manufacturer cutsheets clearly defining the products to be provided, their accessories/options and interconnectivity with all systems. Drawings shall also include single line system diagrams and detailed line diagrams for power, input/output and tag numbers.

169.06 Spare Parts

A. One CPU
B. One of each Network Module
C. One of each type of input/output and data link module
D. One of each type of power supply

169.07 Programmable Logic Controller

1. Approved Manufacturer

   The PLC system shall be a Rockwell Automation 1756 ControlLogix L7*** .

2. General

   The PLC system (memory, communications, input/output modules, processor, power supplies, software) shall be a modular chassis mounted system and come complete from one manufacturer to provide a complete functioning control system as depicted in the Control Block Diagram and described in the operating protocol and of sufficient capacity for future expansion as allowed for in this specification.

Products shall be provided with conformal coatings, factory applied, to extend product life in harsh, corrosive environments.

The PLC shall be programmable and configurable from a Windows 7 and Windows 10

3. Communication

The PLC system shall be Ethernet compatible or have an Ethernet module accessible by a laptop computer. Programming functions associated with the PLC system shall be accessible through the Ethernet connection.

The PLC shall have a compatible communication modules or ports for communicating with the emergency standby generator controller exclusive of input/output modules and dry contacts. This communication port shall allow for sharing of all monitoring and alarm data associated with the emergency generator controller.

4. Input/Output Modules

The PLC shall have analog and discrete input/output modules sufficient for all proposed and future nodes identified in the control block diagram associated with the DFS Radio Telemetry System.

The PLC shall have analog an discrete input/output modules sufficient for all proposed generator status and generator fail signals.

The PLC shall have analog and discrete input/output modules sufficient for all proposed ATS, commercial, generator power signals.

The PLC shall have analog and discrete input/output modules sufficient for variable speed pump control based on level. PLC control and monitoring of variable speed drives shall be through analog and discrete input/output modules. The use of proprietary communication protocols for variable speed drive control shall be allowed.

The PLC shall have the ability to accommodate 50% additional I/O modules.

5. Central Processing Unit

The PLC configuration shall be maintained through a power loss. The PLC shall continue with operations when power is reinstated without additional programming, uploads or resets.

The PLC system shall utilize a Secure Digital (SD) card for non-volatile memory

to store a user program and tag data on the PLC. The PLC system shall be configurable to trigger the controller to save to or load from the SD card and to load to the controller from the SD card on power up.

The minimum size CPU shall be an A-B Rockwell Automation ControlLogix Series 1756-L71 with 128 MBs of optional nonvolatile memory storage.

6. Power Supplies

Power supplies shall be surge and transient protected, and shall accept input voltages of 90 to 130 VAC. The power supplies shall be fused.

All PLC systems power supplies shall be modular, allowing the power supply to be removed for replacement without affecting input/output modules or wiring.

The PLC systems shall come with redundant power supply.

7. Wire and Cabling

All PLC specific cables shall be furnished by the PLC system manufacturer and be designed for the intended use.

All other wire shall be stranded copper type TFF or MTW, 18 GA for I/O and minimum 14 GA for power.

8. Programming

The CPU shall be capable of being programmed by an external IBM compatible host device via either a serial communication port or Ethernet port on the CPU, or a parallel communication port on an input/output chassis. Serial programming shall be possible without the use of a workstation interface board.

Software shall be Rockwell Automation RSLogix 5000 Professional Edition.

All software shall be registered to the Owner.

9. Terminal Blocks

Input/output modules shall utilize removable terminal blocks to connect all field side wiring.

10. Signal Isolators, Converters and Conditioners

Instrument signals shall be 4 – 20 mA DC. Signal isolators and converters shall be provided as necessary to comply with this requirement. The devices shall be mounted in the panel and such that field wiring may be changed/maintained

without affecting the devices.

All communication circuitry shall include protection against lightning, spikes and other transient surges.

11. Grounding

The grounding system of the PLC system shall be tied into the main ground system. The tie-in shall be made from the panel frames to the main ground system.

169.08 Execution

Start-up and testing services for the PLC system shall be provided. The PLC system shall be fully tested against the requirements outlined in this section and Section 161 and the operating protocol and equipment manufacturer requirements. Test procedures and checklists for approval shall be submitted prior to testing. . Completed test checklists shall submitted as part of the project record documentation.

SECTION 170

REMOTE TERMINAL UNIT (RTU) – LIFT STATION

170.01 General

The District has an existing Radio Telemetry System as manufactured by Data Flow Systems, Melbourne, Florida (321) 259-5009. For compatibility purposes, new remote terminal units will be required as specified herein from Data Flow Systems (DFS) 321-259-5009. The remote terminal unit shall include all materials, labor, tools, equipment, and appurtenances necessary for the proper completion of the work. The work covered by these specifications consists of providing all design, labor, tools, materials, and testing necessary for the supply of the RTU as described herein.

Physical location information shall be provided to DFS for radio communication study purposes. Information shall be provided in the form of GPS readings or street map with actual site location(s) clearly marked.

The RTU shall be housed in its own enclosure. The RTU enclosure shall be mounted on the antenna tower. The RTU shall be powered by 120 VAC commercial power, monitor local statuses and transmit those statuses to the existing central site when polled by the master radio. An Uninterruptible Power Source (UPS) shall be included with the RTU.

170.02 Equipment Specification

170.02.1 Remote Terminal Unit (RTU204)

The remote terminal unit shall be DFS Model RTU204. The RTU shall communicate with the central site via a two-way radio link and designed to accommodate the required plug-in function modules. Function module card connectors shall be gold-over-nickel plated to inhibit corrosion. The RTU shall be housed in a white color NEMA 4X 316 SS enclosure. All mounting hardware utilized shall be stainless steel. The enclosure shall be capable of being locked. The latches utilized to secure the door of each enclosure shall not require the use of a screwdriver to open or close.

170.02.2 Power Supply Module (PSM003)

The RTU shall include a Power Supply Module (PSM003). All function modules in the RTU shall run off DC voltage from +7.5 volts to +13 volts. The PSM shall supply +12 volts. A battery backup shall be provided in event of power failure. The power supply shall be surge protected. The power supply shall be short circuit protected by current limiting. Normal operation shall automatically resume when the short circuit overload is removed. The power supply shall be sized to operate the system with the battery removed. The power supply module shall provide a battery backed, isolated bias voltage source. The circuit breaker for the power supply module shall be part of the power supply module. Neither the use of tools nor the disconnection of any wires shall be required to replace the power supply module.

170.02.3 Backup Battery/Uninterruptable Power Supply (UPS)

The RTU shall have the uninterruptible power supply (UPS) function built in. The RTU's internal Power Supply Module shall keep the battery at a float charge. The battery shall not be damaged by deep discharges.

170.02.4 Telemetry Interface Module (TIM007)

a) The Telemetry Interface Module (TIM) shall incorporate a synthesized programmable radio.
b) A data buffer on the TIM shall enable it to query and store the I/O function module(s) status between radio polling loops until data is requested by the central site.
c) The TIM shall feature a wake up/report/sleep mode to aid in battery conservation for solar-powered applications.
d) The TIM shall support four levels of digipeating (store and forward), enabling radio messages from a different RTU to be routed to the central site.
e) The TIM shall monitor AC power on the Power Supply Module and DC Bias to the RTU I/O function modules.
f) The TIM shall incorporate a 2x8 character LCD display and 3-button user interface for field diagnostics and support data without the use of a portable computer.
g) The TIM shall incorporate a test mode switch that places the radio into a service mode.
h) The TIM shall incorporate LEDs for TX, RX, Power, CPU Fault.

170.02.5 Digital Monitor Module (DMM002)

The RTU shall include a Digital Monitor Module (DMM002). The DMM002 shall accept 12 on/off inputs of 12 to 30 volts AC or DC. Voltages from 100 to 300 volts AC or DC shall be accommodated with the use of an inline voltage converter device. Status reporting of these inputs shall have an accuracy of +- 2 seconds, the accuracy being defined as time of an occurrence to actual time recorded by the central site computer. The DMM002 shall not require interfacing relays to monitor 24 VDC, 115 VAC, 220 VAC or 480 VAC. The DMM002 shall have LEDs to indicate: the status of each input point; receive communications; transmit communications; CPU fault; and power status. The configuration of the monitor points as alarm points or monitor points (pump run time monitors) shall be operator changeable. The configuration shall not require any software or firmware changes in the system.

170.02.6 Antenna Subsystem

DFS shall determine the antenna type and height required for reliable communications. A high gain directional or omni antenna shall be used to transmit and receive data. The antenna mast/pole shall be hot dipped galvanized for corrosion protection. All mounting hardware shall be made of stainless steel. The coax cable shall be the type that utilizes an inert semi-liquid compound to flood the copper braid. The coax cable shall be of the RG-8 construction type and have the RF-loss characteristic of foam flex. The coax cable shall be RTC 400 as supplied by DFS. Type N connectors shall be utilized at both ends of the coax and sealed with 3-inch sections of Alpha FIT321-1-0 sealant shrink tubing. The coax cable shall be secured to the mast/pole with AE112 Bandit coated 316 stainless steel cable ties. The RTU shall be protected from electrical surge or transients entering through the coaxial cable by use of a IS-B50LN-C2 Polyphaser coaxial cable surge protector.

170.02.7 RTU Monitor Points

The RTU shall accommodate the following monitor points.

Discrete Input (DI):

1. COMMERCIAL POWER
2. HIGH WET WELL LEVEL
3. PUMP 1 RUN STATUS
4. PUMP 2 RUN STATUS
5. PUMP 1 FAULT
6. PUMP 2 FAULT
7. GENERATOR GENERAL ALARM

170.03 Installation

In order to insure total system integration with the existing system, secure and provide the services of Data Flow Systems, Inc. for RTU hardware.

170.04 Programming

Antenna alignment fine-tuning procedure, configuration of RTU into the system, RTU point-by point verification at the central computer, and RTU screen generation services shall be covered by the District.

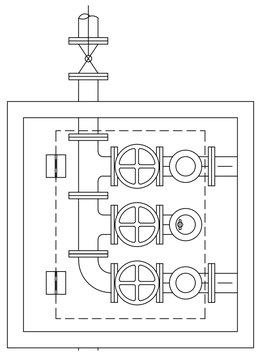
170.05 Warranty

DFS shall warrant all hardware provided under this contract against all defects in material and workmanship for a period of one year. The RTU plug-in modules shall carry an additional 2-year return-to-manufacturer warranty and shall be covered against damage due to lightning and surge the entire three year period.

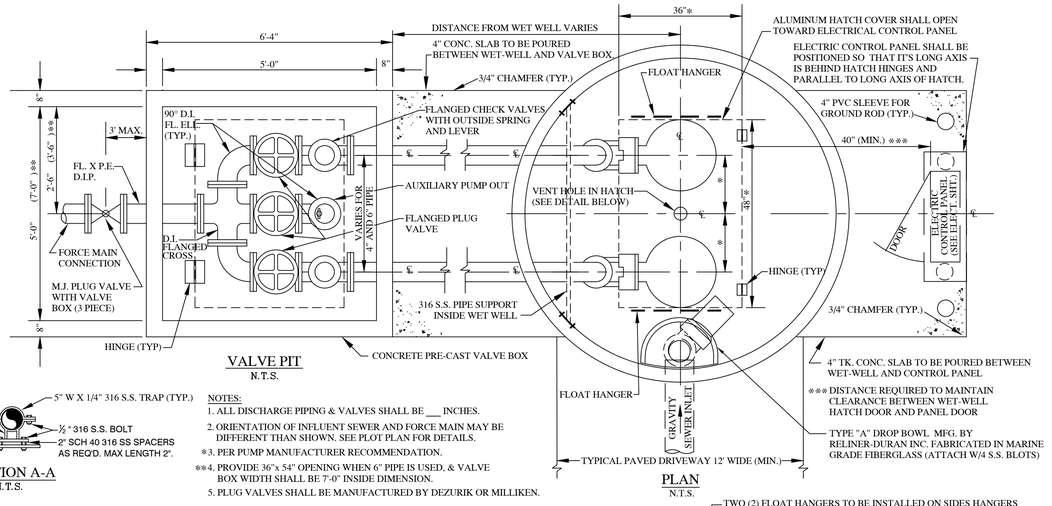
170.06 Spare Parts

Provide the following spare parts with the RTU:

a. (1) Telemetry Interface Module (TIM007)
b. (1) Power Supply Module (PSM003)
c. (1) Digital Monitor Module (DMM002)
d. (1) Backup Battery
e. (1) RTU Antenna



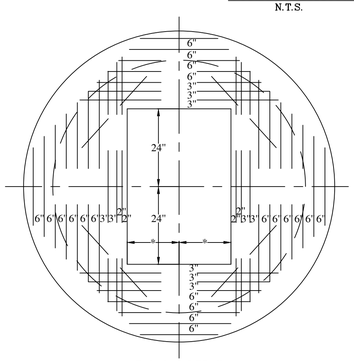
VALVE PIT ALTERNATE SIDE OUTLET CONFIGURATIONS
N.T.S.



VALVE PIT
N.T.S.

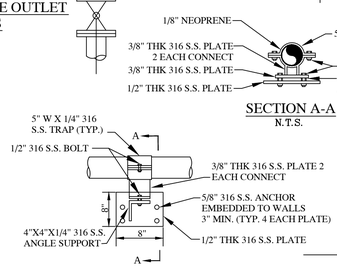
NOTES:
1. ALL DISCHARGE PIPING & VALVES SHALL BE ___ INCHES.
2. ORIENTATION OF INFLUENT SEWER AND FORCE MAIN MAY BE DIFFERENT THAN SHOWN. SEE PLOT PLAN FOR DETAILS.
*3. PER PUMP MANUFACTURER RECOMMENDATION.
**4. PROVIDE 36"x 54" OPENING WHEN 6" PIPE IS USED, & VALVE BOX WIDTH SHALL BE 7'-0" INSIDE DIMENSION.
5. PLUG VALVES SHALL BE MANUFACTURED BY DEZURIK OR MILLIKEN.

PLAN
N.T.S.



TOP SLAB DETAIL
N.T.S.

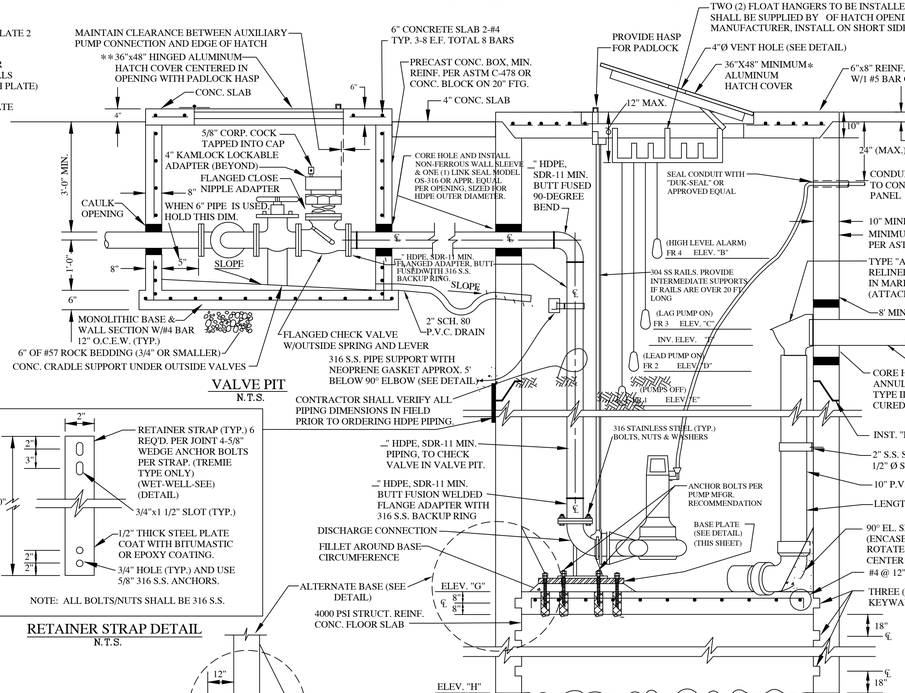
NOTES:
1. ALL BARS IN TOP SLAB TO BE #5 LOCATION OF OPENING IN TOP SLAB TO BE VERIFIED BY DESIGN ENGINEER WITH REQUIREMENT OF PUMP MANUFACTURER.
*2. PER PUMP MANUFACTURER RECOMMENDATION.



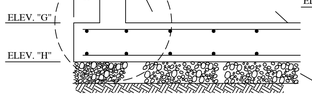
SECTION A-A
N.T.S.

NOTES:
1. CONSTRUCT ALL WELDS IN ACCORDANCE WITH AWS D-1.6 STRUCTURAL WELDING CODE.

ANGLE PIPE SUPPORT DETAIL
N.T.S.



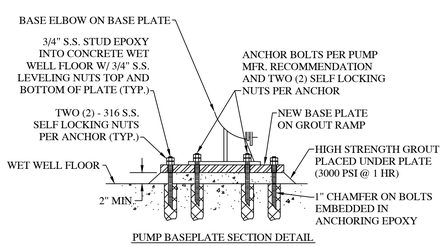
VALVE PIT
N.T.S.



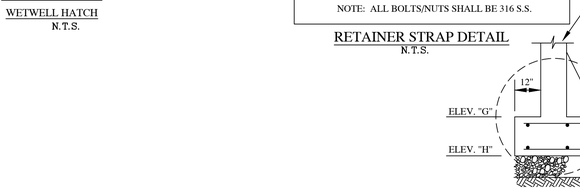
ALTERNATE MONOLITHIC BASE SECTION
N.T.S.

NOTE:
ALTERNATE MONOLITHIC BASE USED AT ENGINEERS DISCRETION

WET WELL ILLUSTRATIVE SECTION (INSTALLATION VIA CAISSON METHOD)
N.T.S.

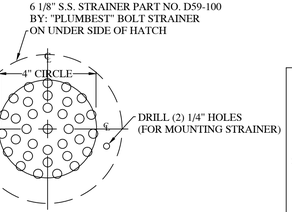


PUMP BASEPLATE SECTION DETAIL
N.T.S.



NOTE: ALL BOLTS/NUTS SHALL BE 316 S.S.

RETAINER STRAP DETAIL
N.T.S.



VENT HOLE DETAIL
WETWELL HATCH
N.T.S.

ELEVATION SCHEDULE	
ELEV. "A"	
ELEV. "B"	
ELEV. "C"	
ELEC. "D"	
ELEV. "E"	
ELEV. "F"	
ELEV. "G"	
ELEV. "H"	
100-YEAR STORM ELEVATION	

PUMP SELECTION	
PRESS. IN EXIST. F.M.	
SUCTION LIFT	
STATION LOSS	
FRICTION LOSS	
STATIC HEAD	
T.D.H. (FEET)	

PUMP DATA

MANUFACTURER: _____SEWAGE PUMP
MODEL: _____SERIES: _____
MOTORS: _____HP, _____VOLT, _____WIRE, 60 HZ.
PUMPS DELIVERING _____ (Design) G.P.M. AT _____ (Design) FT. T.D.H.

PUMPS DELIVERING [ ] (Asbuilt) G.P.M. AT [ ] (Asbuilt) FT. T.D.H.

RESERVED FOR SITE PLAN

GENERAL SPECIFICATIONS

IT IS THE INTENT OF THIS STANDARD TO SPECIFY A TWO PUMP SUB- MERSIBLE LIFT STATION COMPLETE IN EVERY RESPECT WHETHER OR NOT COVERED BY SPECIFICATION OR THESE CONSTRUCTION DETAILS.

THE SURFACE OF THE LIFT STATION AND PAVED ACCESS ROADWAY SHALL BE SET AT PROPER ELEVATIONS SO THAT FUTURE ACCESS TO THE STATION WILL NOT BE IMPAIRED BY FLOODING, EXCESSIVE ROAD GRADES, SWALES, WALLS OR LANDSCAPING IN ANY MANNER. A SITE PLAN OF THE LIFT STATION SIZE (PLOT PLAN) INDICATING ALL TOPOGRAPHICAL FEATURES, RIGHT-OF-WAYS AND EASEMENTS SHALL BE SUBMITTED TO THE DISTRICT FOR APPROVAL OF THE SITE AND ADJOIN- ING CONTIGUOUS AREAS.

THE WETWELL DRIVEWAY IS INCLUDED WITH THE JOB, IT WILL BE CONSTRUCTED PER LOCAL CODE REQUIREMENTS.

THE CONTRACTOR SHALL COORDINATE WITH AND PAY ALL FEES, DEPOSITS, AND SERVICE COSTS TO FLORIDA POWER AND LIGHT CORP., TO BRING THREE (3) PHASE, FOUR (4) WIRE 230/120 VOLT (480 VOLTS WHEN REQUIRED) UNDERGROUND POWER SERVICE TO THE LIFT STATION SITE. THIS REQUIREMENT DOES NOT APPLY TO PROJECTS INVOLVING LIFT STATION REHABILITATION WORK PERFORMED BY THE DISTRICT.

THE LIFT STATION AND APPURTENANCES SHALL INCLUDE ALL COUPLINGS, ANCHOR BOLTS, PIPING, VALVES, ELECTRICAL EQUIPMENT, ETC., REQUIRED FOR A COMPLETE WORKING INSTALLATION.

A LIST OF EQUIPMENT INCLUDED UNDER THIS ITEM IS GIVEN BELOW. THIS LIST IS NOT ALL INCLUSIVE AND THE CONTRACTOR SHALL SUPPLY ALL OTHER EQUIPMENT NECESSARY FOR COMPLETE WORKING INSTALL- ATIONS. THE LIFT STATION SHALL INCLUDE:

TWO (2) SUBMERSIBLE TYPE SEWAGE PUMPS WITH 304 STAINLESS STEEL GUIDE RAILS AND ALL ACCESSORIES.

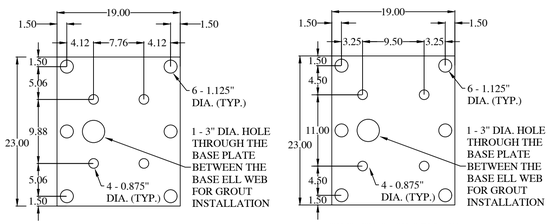
TWO (2) DISCHARGE LINES WITH SWING CHECK VALVES, DEZURIK PLUG VALVES INSTALLED WITHIN A PRE-CAST CONCRETE PIT. (SEE STANDARD DETAIL THIS SHEET)

ONE (1) PUMP LEVEL CONTROL SYSTEM FOR PUMP LEAD/LAG CONTROLS WITH HIGH LEVEL ALARM, ELECTRICAL PANEL, ETC. (SEE LSELE SHT.)

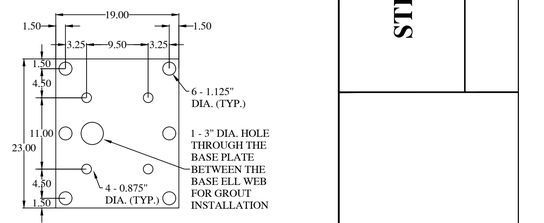
ONE (1) WET-WELL STRUCTURE WITH ACCESS HATCH.

ONE (1) PRE-CAST VALVE PIT STRUCTURE.

BASE PLATE: 316 STAINLESS STEEL 0.50" THICK
(ALL MEASUREMENTS IN INCHES)



4"X4" ELBOWS
N.T.S.



6"X6", 6"X8", 8"X8" ELBOWS
N.T.S.

NOTES:
1. EACH BASE ELBOW SHALL BE SECURED TO THE BOTTOM OF THE WET WELL WITH FOUR (4) 3/4" DIAMETER 316 S.S. THREADED RODS, 316 S.S. SELF LOCKING NUTS, AND 316 S.S. PLATE. THE PLATE SHALL BE SECURED WITH SIX (6) 1" DIAMETER 316 S.S. THREADED RODS. THE THREADED RODS SHALL BE EMBEDDED A MINIMUM OF 6" INTO THE CONCRETE AND THE MAXIMUM TIGHTENING TORQUE APPLIED IS 110 FT. LBS.
2. ANCHOR STUD HEIGHTS ABOVE THE GROUT RAMP SHOULD ALLOW FOR PLATE AND BASE ELBOW THICKNESSES, WASHERS, DOUBLE SELF-LOCKING NUTS WITH VERY LITTLE EXTRA HEIGHT (I.E., 0.25: OR LESS).
3. EACH ANCHORING ROD SHALL HAVE TWO (2) SELF-LOCKING NUTS, AND A SINGLE WASHER. EACH PUMP BASE ELBOW SHALL UTILIZE 2"x2"x1/4" 316 SS FABRICATED WASHERS.
4. CONTRACTOR SHALL USE A QUICK SET, HIGH STRENGTH, NON-SHRINKING GROUT TO CREATE 1-INCH (MINIMUM) LIFT OFF OF EXISTING FLOOR (7000 PSI @ 24 HOURS). CONTRACTOR SHALL ENSURE EXISTING FLOOR IS CLEANED AND PREPARED TO MAXIMIZE BONDING OF GROUT. DRY PACKING NOT ALLOWED.
5. ALTERNATE BASE ELL STUDS. CONTRACTOR MAY PROVIDE (4) - 3/4" 316 SS THREADED RODS INSTALLED THROUGH 0.875" DIA. HOLES AND WELDED TO THE BOTTOM OF THE BASE PLATE TO ANCHOR THE BASE ELLS TO THE BASE PLATES.

Rev.	Description

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT
2500 JUPITER PARK DRIVE
JUPITER, FL 33458-8964
(561) 747-5700 MAIN
(561) 747-5929 FAX
www.loxahatcheeriver.org

LIFT STATION STRUCTURAL & MECHANICAL STANDARD DETAILS

Drawn:	JD
Checked:	KD
Proj. Eng.	KD
Scale:	NTS
Date:	MARCH, 2017

SD-31

Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: D. ALBREY ARRINGTON, Ph.D.
Executive Director

FROM: CLINTON R. YERKES
Deputy Executive Director

DATE: MAY 2, 2018

SUBJECT: ALT. A1A BRIDGE FORCE MAIN JOINT PROJECT
Change Order

As you may recall the subject project is a Joint Project with the Town of Jupiter for the installation of a Water Main and a portion of the District Force Main that will replace the current subaqueous crossing of the Loxahatchee River just west of the Railroad bridge.

Although, this is indicated as the 6th change order to the contract, the District has had only 1 prior change related to the Force Main work.

The current change order if for a revision to the air release valve (ARV) piping that had not been addressed in the contract plans or specifications. This item is presented for Board approval since there was no contingency requested for this contract with the Town. The proposed change and the value have been reviewed by Hazen & Sawyer and District staff and find it reasonable.

The following motion is suggested for approval of this item:

> **"THAT THE GOVERNING BOARD authorize approval of the Town of Jupiter's Change Order #6 to the Alt. A1A Damon Bridge Water Main/Force Main contract in the amount of $2,347.00 for ARV piping changes."**

Should you have any questions, please contact me or Taylor Bomarito (Hazen & Sawyer).

V://cip/proj/Alt A1AFM 2016/Changes/Board Memo 5-2-2018

PURCHASE ORDER

LOXAHATCHEE RIVER
ENVIRONMENTAL CONTROL DISTRICT
2500 JUPITER PARK DRIVE
JUPITER, FL 33458-8964
TEL (561) 747-5700
OPERATIONS (561) 747-5709
FAX (561) 747-9929

TAX ID# 85-8012618682C-5

P.O. NUMBER	48720
VENDOR # TOWJUP	
DATE 4/25/18	
REQUESTED BY CLINT YERKES	
PREPARED BY DH	DATE 4/25
INPUT	

TO
TOWN OF JUPITER

PURPOSE: ALT A1A BRIDGE CO #6

QUAN.	ITEM NO.	DESCRIPTION	ACCT.	UNIT PRICE	AMOUNT
		ALT A1A BRIDGE FORCE MAIN-TOWN CHANGE ORDER #6 REVISION TO ARV DISCHARGE PIPING AT THE ARV. IN ACCORDANCE WITH PROPOSAL FROM MURRAY LOGAN DATED 4/9/18.	40-64-51-5630	NOT TO EXCEED	2,347.00

Above Order Number must appear on all correspondence, Invoices, packages and shipping papers. Notify us immediately if you are unable to ship complete order by date specified. Your acceptance of this order is your warranty to us that you are complying with the U.S. Fair Labor Standards Act of 1936, as amended, and we reserve the right of refuse merchandise not in strict accordance with this order.

Purchasing Agent

Authorized Signature

Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: Governing Board

FROM: D. Albrey Arrington, Ph.D., Executive Director

DATE: May 9, 2018

SUBJECT: Jupiter Farms Elementary Force Main
Engineering Services Contract –Amendment to Agreement

On May 4, 2018 I sought approval from the Board to execute a time-sensitive change order in accordance with our Procurement Policy Section 2.07(5) to the Jupiter Farms Elementary School Force Main Engineering Contract with Mathews Consulting.

This change order is expected to net a construction cost savings of $176,000 due to the more efficient design of the force main using the shorter Haynie Lane route.

Since no Board Member indicated a need for public discussion prior to approval, the following motion is suggested for Board approval:

> **"THAT THE GOVERNING BOARD authorize the Executive Director to execute the time-sensitive change order to the engineering contract with Mathews Consulting in the amount of $33,004.00."**

Please contact me should you have any questions concerning this matter.

PURCHASE ORDER

LOXAHATCHEE RIVER
ENVIRONMENTAL CONTROL DISTRICT
2500 JUPITER PARK DRIVE
JUPITER, FL 33458-8964
TEL (561) 747-5700
OPERATIONS (561) 747-5709
FAX (561) 747-9929

TAX ID# 85-8012618682C-5

P.O. NUMBER	48728
VENDOR #	MATCON
DATE	5/3/18
REQUESTED BY	CLINT YERKES
PREPARED BY	DH
DATE	5/3
INPUT	

TO MATHEWS CONSULTING

PURPOSE: JUP FARMS ELEM. ADDITIONAL WORK

QUAN.	ITEM NO.	DESCRIPTION	ACCT.	UNIT PRICE	AMOUNT
		JUPITER FARMS ELEMENTARY SCHOOL ADDITIONAL ENGINEERING WORK IN ACCORDANCE WITH AGREEMENT DATED 4/27/18 INCLUDING:	40-63-31-5630		
		TASK 1-DATA COLLECTION			16,907.00
		TASK 3-DESIGN SERVICES			11,482.00
					28,389.00
		TASK 4-PERMITTING			4,615.00
		APPROVED BY THE GOVERNING BOARD AT THE REGULAR MEETING ON 5/17/18.			33,004.00

Above Order Number must appear on all correspondence, Invoices, packages and shipping papers. Notify us immediately if you are unable to ship complete order by date specified. Your acceptance of this order is your warranty to us that you are complying with the U.S. Fair Labor Standards Act of 1936, as amended, and we reserve the right of refuse merchandise not in strict accordance with this order.

Purchasing Agent

Authorized Signature C. Yerkes

AGREEMENT BETWEEN LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT AND MATHEWS CONSULTING, A BAXTER & WOODMAN COMPANY FOR PROFESSIONAL ENGINEERING SERVICES

"JUPITER FARMS ELEMENTARY SANITARY SEWER SYSTEM – ADDITIONAL WORK"

DATE: May 8, 2018

BACKGROUND

This Agreement is for the performance of engineering services by Mathews Consulting, a Baxter & Woodman Company (MC) pursuant to the Continuing Contract for Professional Engineering Services between Loxahatchee River District (District) and MC dated February 3, 2015, hereafter referred to as the Contract. The District has the right to stop work at any time being only responsible for costs incurred up to that time.

The Loxahatchee River Environmental Control District (District) provides wastewater service to Jupiter, Tequesta, portions of Juno Beach, unincorporated northern Palm Beach County and unincorporated southern Martin County. The District is working with the Palm Beach County School District to provide a connection to the District's existing wastewater system to service Jupiter Farms Elementary School. Jupiter Farms Elementary School is currently served by a package wastewater lift station located on-site. The project will consists of the construction of a 4-inch force main and new lift station which will be located at the site of the existing packaged wastewater treatment plant.

The District and MC currently have an agreement entitled "Jupiter Farms Sanitary Sewer System," dated June 29, 2017, that includes the design of the proposed 4-inch force main route from the existing lift station at Jupiter Farms Elementary School along 117th Drive North, 174th Court North, Alexander Run and W. Indiantown Road. MC submitted the 100% design package for this agreement in March 2018. Per approval by South Indian River Water Control District (SIRWCD) on April 19, 2018, SIRWCD will grant an easement to the District for installation of the proposed 4-inch force main along 117th Drive North (a.k.a. Haynie Lane) up to the intersection with W. Indiantown Road. The District has requested that MC provide additional services for this project to alter the proposed force main route to extend from Jupiter Farms Elementary School along 117th Drive North up to the connection point on W. Indiantown Road, just east of the Jupiter-Palm Beach Motorcoach Resort. Refer to **Exhibit A** for the Project Location Map for the areas included in this Agreement between the District and MC.

The design elements for this additional work are assumed to include the following:

- Approximately 3,100 LF of 4" PVC C-900 force main that will be installed via directional drill methods. Final pipeline routing may decrease or increase the pipeline length estimates accordingly.
- Directional Drill Pits.

SCOPE OF WORK

The District has requested comprehensive additional engineering services from MC to provide data collection and engineering design related to the additional work requested for the Jupiter Farms Elementary Sanitary Sewer System Project. Specific additional work elements for this project include the following:

- Task 1 – Data Collection
- Task 3 – Design Services

TASK 1 - DATA COLLECTION

Subtask 1.1 – Survey

Consultant shall furnish the services of a professional surveyor to provide additional survey services consisting of field topography and horizontal locations referenced by baseline stationing. All existing facilities and utilities within the established project limits will be referenced by baseline station with an offset distance (left or right) from baseline for the project and will include the following:

1. Topography survey at 100-foot intervals and at major ground elevation changes to depict existing ground profile at proposed project area along Haynie Lane commencing at the northeast corner of the school site continuing north to W. Indiantown Road (~ 3,100 LF). This shall be accomplished by creating a baseline in the field to collect pertinent data which shall include the following:

   a. Location of all visible fixed improvements within the project limits, including physical objects, roadway pavement, canals, driveways, sidewalks, curb, trees, signs, fences, power poles, buildings, and other encumbrances, including point of curvature and point of tangency. This also includes the horizontal location of the front two corners of the building on each lot and finished floor elevations.

   b. Location of all known above and below ground existing utilities: FP&L, BellSouth, Cable TV, Natural Gas, Potable Water (pipe diameter, valves, fire hydrants, and meters), Force Mains (pipe diameter, TOP, and valves), Reclaimed Water Mains (pipe diameter, TOP, and valves), Sanitary Sewer (pipe diameter, manhole inverts and direction, rim elevations, laterals, and clean-outs), Storm Sewers (pipe diameter, manhole inverts and direction, catch basins, and rim/grate elevations), and **all** other accessible structures.

   c. Identify platted rights-of-way (including bearing and distances for centerline), lot numbers, house address, ownership lines, block numbers and dedicated easements.

   d. Elevations along road right-of-way or easements shall be indicated every 100 feet, at a minimum, to indicate centerline grades, edge of pavement grades, and shoulder grades, low points, and all right-of-way or easement lines. Intermediate grades shall be indicated at all grade breaks, driveways, sidewalks and 10 feet beyond R-O-W/Easement lines.

   e. Provide and reference benchmarks at **maximum 600-foot intervals**. Elevations to be referenced to an existing established Town or County Benchmark.

   f. Complete survey of the existing or proposed lift station site.

   g. The above topographical survey data will be prepared in AutoCAD (Version 2016) format at a scale of 1"=20', as one continuous file. Mathews Consulting standard layering system shall be used.

2. Sketch and descriptions for each of the two required easements:
   - Lift Station and Force Main easement along School District property
   - Force Main easement along 117th Drive North (South Indian River Water Control District has an existing roadway easement along 117th Drive North)

Subtask 1.2 – Utility Coordination

Coordination with utility agencies (electric, phone, gas, CATV, and water) shall be performed to collect record information. MC shall forward copies of the survey information to the Utility Companies and ask them to "red-line" their known utilities onto the survey drawings. The information will be incorporated by MC into the design drawings. If coordination with any Utility Company proves to be problematic, the District will be notified. This Subtask includes reconciling apparent discrepancies between record information and existing photographic and field-verification information.

Subtask 1.3 – Subsurface Investigations

MC shall furnish the services of a professional geotechnical firm to provide a geotechnical evaluation of the project area along the force main alignment and at the proposed lift station site, if required. A total of two (2) soil borings (an average depth of 15-ft.) are anticipated for soil strata identification, relative soil density and to determine the ground water level as part of the project.

TASK 3 – DESIGN SERVICES

Design shall consist of preparation of Contract Specifications, Contract Drawings (plan/profile), and Construction Cost Opinion.

Subtask 3.1 Construction Documents

Preparation of construction documents shall include contract drawings and technical specifications. Contract drawings shall include: cover sheet, general notes, plan/profile drawings, lift station drawings and miscellaneous detail sheets. The drawing scale shall be 1-inch equals 20 feet for pipeline plan and 1-inch equals 2 feet for pipeline profile. MC shall prepare the engineering design elements on topographic survey information in an AutoCAD release 2016 format. Contract documents shall include: "front-end" documents and technical specifications and shall conform to the District Standards. Any force main located in Palm Beach County ROW shall conform to Palm Beach County Standards. The front-end documents shall be submitted with the revised 100% submittal and will be provided in MS WORD format.

Drawings and specifications (one pdf copy) shall be submitted for District review at the revised 100% (plan/profile) stages. MC shall meet with the District to discuss comments, and incorporate comments into final documents.

Subtask 3.2 Construction Cost Opinion

Preparation of construction cost opinion at the revised 100% design stage. The construction cost opinion shall reflect changes in general scope, extent or character of design requirements incorporated during the various design review stages.

Subtask 3.3 Design Meetings

MC shall attend one (1) design review meeting (revised 100%) with the District and Palm Beach County School Board and provide a written summary of the issues discussed.

Subtask 3.5 Quality Assurance

MC shall provide internal QA/QC reviews on the revised 100% Design Documents (e.g. drawings, specifications, and cost estimates).

TASK 4 – PERMITTING PHASE

MC previously secured a permit from PBCHD for the "Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System" based on the original force main alignment. In order to construct the force main along Haynie Lane, PBCHD has indicated that a new permit application will be required. This additional scope of services includes the work necessary for MC to prepare and submit the revised 100% Design plans and PBCHD permit application documents for approval.

The District has also requested MC to provide engineering services to coordinate the decommissioning of the existing package WWTP per PBCHD regulations as part of the additional work for this project.

Permit applications shall be completed, as required for PBCHD **(Task 4.1)**, as follows:

- Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System.
- Decommissioning of existing package WWTP on-site at Jupiter Farms Elementary School per PBCHD requirements, which include the following procedures:

    - Processes and procedures for the removal of plant contents (liquid and sludge)
    - Processes and procedures for the cleaning and disinfection of the treatment tankage
    - Statement of disposition and security measures for both the above ground and below ground tankage to secure against hazardous conditions and to prevent public access.

    MC will prepare and submit to PBCHD a detailed plan which outlines the proposed methods to be employed to meet the above requirements for decommissioning of the existing package WWTP. The physical demolition and abandonment of the WWTP structures, electrical systems and percolation ponds is specifically excluded.

Associated permit application fees shall be determined by MC and paid by District.

In addition to preparing the permit application and necessary requirements for decommissioning the package WWTP for PBCHD, MC shall assist the District in consultations with the appropriate authorities. Consultation services shall include the following:

- Attend up to one (1) pre-application meeting and/or telephone meeting with the staff of PBCHD.
- Attend up to one (1) meeting and/or telephone meeting with PBCHD during review of the final permit applications.
- One (1) site visit to determine WWTP plant volumes (liquid and sludge) in order to provide an assumed quantity to the Contractor for the WWTP decommissioning process.
- Respond to request(s) for additional information from PBCHD.

ASSUMPTIONS

Work described herein is based upon the assumptions listed below. If conditions differ from those assumed in a manner that will affect schedule or Scope of Work, MC shall advise District in writing of the magnitude of the required adjustments. Changes in completion schedule or compensation to MC will be negotiated with District. Services to be provided by the District and other related key assumptions include:

1. MC assumes that all existing and proposed infrastructure pipeline alignments are within the District's, PBC, SIRWCD and School District rights-of-way.

2. District will be responsible for acquisition of easements (including temporary construction easements), if required. MC shall provide services of a Professional Land Surveyor (PLS) to prepare required sketch and descriptions, only.

3. District will provide MC record drawings of all available existing facilities in the project area.

4. MC assumes that there are no contaminated soils or groundwater in the project area.

CONTRACT PERFORMANCE

COMPLETION DATES

The duration of major work tasks (calendar days) to complete the additional work tasks as well as the impacts to the overall project completion timeline are as indicated on the Project Schedule shown in **Exhibit B**.

SUMMARY OF PROPOSED FEES

Proposed labor costs and associated expenses for the additional engineering services (Not-to-Exceed) are tabulated below and detailed in **Exhibit C**.

ENGINEERING SERVICES	ENGINEERING FEE
Task 1 – Data Collection	$16,907.00 (NTE)
Task 3 – Design Services	$11,482.00 (NTE)
Task 4 – Permitting	$4,615.00 (NTE)
TOTAL ENGINEERING SERVICES	**$33,004.00**

DELIVERABLES

TASKS	DELIVERABLES	QUANTITY
1. Revised Site Survey	Signed and Sealed Survey Drawings	1 - Set
3. Construction Document Production	Revised 100% Drawings & Specs & Front-Ends Cost Estimate @ Revised 100%	1 – pdf 22"x34"/11"x17" 1 – Set (pdf)

IN WITNESS WHEREOF, the parties have made and executed this agreement as of the date written below.

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT

Witnesses:

Diane Stonecipher

Diane Stonecipher

Debra Henderson

By: _____ 5/9/18
D. Albrey Arrington, Ph D, Executive Director Date

Date Executed: 5-9-18

MATHEWS CONSULTING, A BAXTER & WOODMAN COMPANY

Witnesses:

_____

_____

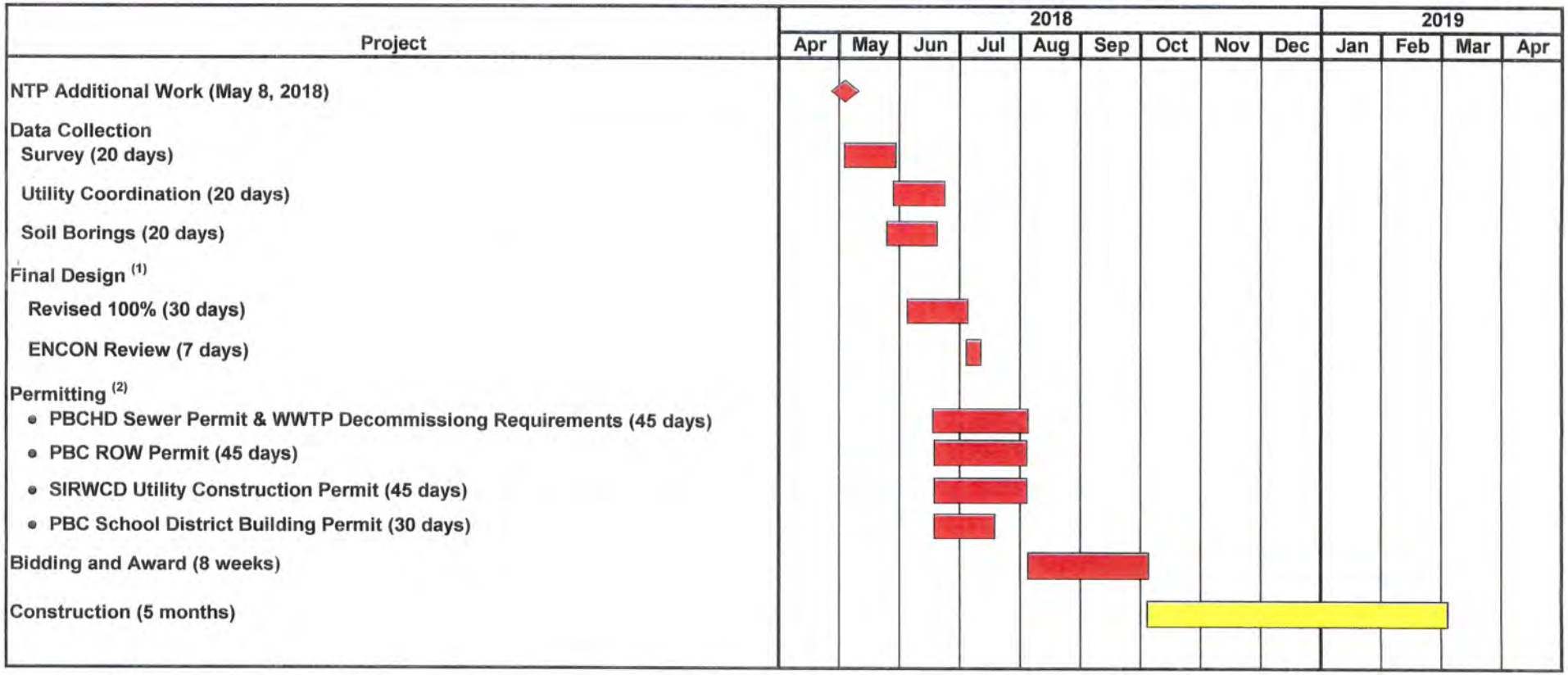
By: _____ 5/8/18
Jason A. Pugsley, P.E., Vice President Date

Date Executed: 5/8/18

Exhibit A
Project Location Map

Exhibit B

Jupiter Farms Elementary Sanitary Sewer System - Additional Work - Project Schedule



Notes:
(1) The design schedule is based upon conducting a review meeting within 7 calendar days after District receives the submittal. All review comments shall be provided to MC within 7 calendar days after District receives the submittal. An adjustment to the overall schedule will be required in case the review meeting takes longer to be conducted and/or obtaining comments takes longer to receive.

(2) Estimated based upon usual regulatory agency review period.

MATHEWS CONSULTING
a BAXTER & WOODMAN company

EXHIBIT C

Jupiter Farms Elementary Sanitary Sewer System - Additional Work

Budget Summary for Mathews Consulting, a Baxter & Woodman Company

Task No.	Task Description	Labor Classification and Hourly Rates								
		Principal $165.00	Senior Engineer $142.00	Engineer $115.00	Sr. Engineering Technician $105.00	Construction Manager $110.00	Construction Inspector $90.00	Clerical $65.00	Total Labor	Sub-Consultant Services
1	**Data Collection**									
1.1	Survey (3,100 LF) & 2 Easement Sketch & Descriptions			3	5				$870.00	$13,350.00
1.2	Utility Coordination			3	2				$555.00	
1.3	Subsurface Investigations (Soil Borings)		1	1	2				$467.00	$300.00
	Subtotal Task 1	**0**	**1**	**7**	**9**	**0**	**0**	**0**	**$1,892.00**	**$13,650.00**
3	**Design**									
3.1	Revised 100% Drawings & Specifications			30	48			3	$8,685.00	
3.2	Construction Cost Opinion			12					$1,380.00	
3.3	Design Meeting		2	3					$629.00	
3.5	Quality Assurance		4			2			$788.00	
	Subtotal Task 3	**0**	**6**	**45**	**48**	**2**	**0**	**3**	**$11,482.00**	**$0.00**
4	**Permitting**									
4.1	PBCHD Force Main Permit & Decommissioning	15		12	6			2	$4,615.00	
	existing WWTP requirements									
	Subtotal Task 4	**15**	**0**	**12**	**6**	**0**	**0**	**2**	**$4,615.00**	**$0.00**
	Labor Subtotal Hours	15	7	64	63	2	0	5		$13,650.00
	Labor Subtotal	$2,475	$994	$7,360	$6,615	$220	$0	$325	$17,989.00	
	Labor Total Costs	**$17,989**								
	Subconsultant Costs Total	$13,650								
	Subconsultant Multiplier	1.1								
	Subconsultant Total	**$15,015**								
	Project Total	**$33,004**								

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Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: D. ALBREY ARRINGTON, Ph.D.
Executive Director

FROM: CLINTON R. YERKES
Deputy Executive Director

DATE: May 7, 2018

SUBJECT: WHISPERING TRAILS NEIGHBORHOOD SEWER SYSTEM
Award of Construction Contract

This is a budgeted item in the amount of $3.0 million for the current year, and the balance of the contract to be completed next fiscal year.

Whispering trails is a large neighborhood off Loxahatchee River Road. It has 181 properties that will be connected to the sewer system upon completion. Concurrent with this project will be the installation of a force main and IQ main replacement on Loxahatchee River Road.

Mathews Consulting's memo is attached providing a summary of the bids and their recommendation for award to the low bidder, Giannetti Contracting Corp.

The following motion is suggested for approval by the Governing Board:

"THAT THE GOVERNING BOARD authorize award of the Whispering Trails Neighborhood Sewering Contract to Giannetti Contracting Corp., in the amount of $4,487,424.80, in accordance with their bid of April 13, 2018.

and

THAT THE GOVERNING BOARD authorize a Contingency for this project in the amount of $ 135,000.00."

Thank you for your consideration of this item.

Should you have any questions please contact me or Jason Pugsley, P.E. with Mathews Consulting.

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MATHEWS CONSULTING
a BAXTER & WOODMAN company

May 4, 2018

Mr. Clint Yerkes
Deputy Executive Director
Loxahatchee River Environmental Control District
2500 Jupiter Park Drive
Jupiter, FL 33458

Subject: **Loxahatchee River Environmental Control District**
Whispering Trails Gravity Sewer System
Recommendation of Award

Dear Mr. Yerkes:

On Friday, April 13, 2018 at 9:30 A.M., bids were received by the Loxahatchee River District for the Whispering Trails Gravity Sewer System project. Two (2) bids were received as follows:

	Name of Bidder	**Total Base Lump Sum Bid Price**
1.	Giannetti Contracting Corporation.	$4,487,424.80
2.	Foster Marine Contractors, Inc.	$5,729,426.40

We have reviewed the bid proposals submitted by each of the Contractors and have not found any mathematical errors with any of the bids submitted. The Bid Tabulation Sheet is attached.

The following summarizes our findings for the low bidder:

Giannetti Contracting Corporation.

- Acknowledged Addendum No's. 1 through 5.
- Provided Bid Bond (10%).
- Schedule of Bid Prices was filled out correctly.
- Company Financial information was provided and is acceptable.
- Provided Questionnaire.
- Company Headquarters is based in Pompano Beach, Florida.

Mathews Consulting, a Baxter & Woodman Company, has contacted references for Gianetti Contracting Corporation and has received satisfactory feedback. It appears that Gianetti Contracting Corporation should be able to complete a project of this size based on past working experience in Southern Florida. They also have the required equipment and manpower available to complete the project. Mathews Consulting therefore recommends award of the Construction Contract to Gianetti Contracting Corporation in the amount of $4,487,424.80, based on the Company being the lowest responsive bidder and providing the best value to the District.

If you have any questions regarding the information presented, please contact us at 561-655-6175.

Sincerely,

MATHEWS CONSULTING,
A BAXTER & WOODMAN COMPANY

Jason A. Pugsley, P.E.
Vice President / Florida Operations Manager

Enclosures
cc: Kris Dean, LRD (w/o enclosure)
MC File No. 161237.00

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT
WHISPERING TRAILS GRAVITY SEWER SYSTEM

Bid Date 4/13/16 @ 9:30 AM

BID TABULATION SHEET

				Glanenetti Contracting Corporation		Foster Marine Contractors, Inc.	
Item #	Description	Est. Qty.	Units	Price Bid	Total	Price Bid	Total
	GENERAL CONDITIONS						
1	Mobilization, Insurance and Bonds	1	LS	$365,000.00	$365,000.00	$450,000.00	$450,000.00
2	Maintenance of Traffic	1	LS	$100,000.00	$100,000.00	$1,075,000.00	$1,075,000.00
3	As-Built Record Drawings	1	LS	$150,000.00	$150,000.00	$50,000.00	$50,000.00
4	Audio Video Documentation	1	LS	$10,000.00	$10,000.00	$6,500.00	$6,500.00
5	NPDES Permit/Erosion Protection Measures	1	LS	$25,000.00	$25,000.00	$30,000.00	$30,000.00
6	Trench Safety and Special Shoring	1	ls	$100,000.00	$100,000.00	$25,000.00	$25,000.00
	ROADWAY						
7	Remove & Dispose of Existing Pavement Section (Varying Thickness)	25,750	SY	$3.00	$77,250.00	$5.50	$141,625.00
8	1-1/2" Type S-1 Asphalt (1 lift)	25,593	SY	$9.60	$245,692.80	$12.35	$316,073.55
9	8" Limerock Base (LBR 100) (includes prime and tack coat)	26,874	SY	$14.00	$376,236.00	$17.25	$463,576.50
10	12" Compacted Subgrade (LBR 40)	28,153	SY	$4.50	$126,688.50	$5.90	$166,102.70
11	1" Mill and 1" Type S-1 Asphalt Overlay	4,393	SY	$10.50	$46,126.50	$13.50	$59,305.50
12	2' Valley Gutter	160	LF	$36.00	$5,760.00	$40.00	$6,400.00
13	Header Curb	388	LF	$23.00	$8,924.00	$31.00	$12,028.00
14	Remove Existing Header Curb	260	LF	$6.00	$1,560.00	$5.00	$1,300.00
15	RA Mountable Curb	126	LF	$45.00	$5,670.00	$60.00	$7,560.00
16	Open Cut Pavement Trench Repair	1,059	LF	$39.00	$41,301.00	$65.00	$68,835.00
	SEWER						
17	8" PVC SDR 26 Sanitary Sewer Pipe (0'-6')	301	LF	$49.00	$14,749.00	$55.00	$16,555.00
18	8" PVC SDR 26 Sanitary Sewer Pipe (6'-8')	3,596	LF	$54.00	$194,184.00	$74.00	$266,104.00
19	8" PVC SDR 26 Sanitary Sewer Pipe (8'-10')	3,371	LF	$61.00	$205,631.00	$78.00	$262,938.00
20	8" PVC SDR 26 Sanitary Sewer Pipe (10'-12')	1,352	LF	$66.00	$89,232.00	$82.00	$110,864.00
21	8" PVC SDR 26 Sanitary Sewer Pipe (12'-14')	1,219	LF	$100.00	$121,900.00	$87.00	$106,053.00
22	8" PVC C900 (DR 25) Sanitary Sewer Pipe (12'-14')	375	LF	$101.00	$37,875.00	$120.00	$45,000.00
23	8" PVC C900 (DR 25) Sanitary Sewer Pipe (14'-16')	869	LF	$150.00	$130,350.00	$130.00	$112,970.00
24	8" PVC C900 (DR 25) Sanitary Sewer Pipe (16'-18')	221	LF	$395.00	$87,295.00	$155.00	$34,255.00
25	10" PVC C900 (DR 25) Sanitary Sewer Pipe (16'-18')	14	LF	$521.00	$7,294.00	$530.00	$7,420.00
26	10" PVC C900 (DR 25) Sanitary Sewer Pipe (18'-20')	15	LF	$521.00	$7,815.00	$550.00	$8,250.00
27	4' MH (0'-6')	3	EA	$4,071.00	$12,213.00	$5,000.00	$15,000.00
28	4' MH (6'-8')	19	EA	$4,888.00	$92,872.00	$5,900.00	$112,100.00
29	4' MH (8'-10')	13	EA	$5,240.00	$68,120.00	$7,700.00	$100,100.00
30	4' MH (10'-12')	8	EA	$6,784.00	$54,272.00	$10,300.00	$82,400.00
31	4' MH (12'-14')	8	EA	$7,091.00	$56,728.00	$12,500.00	$100,000.00
32	4' MH (14'-16')	3	EA	$10,087.00	$30,261.00	$18,300.00	$54,900.00
33	5' MH (10'-12')	1	EA	$9,658.00	$9,658.00	$11,000.00	$11,000.00
34	5' MH (10'-12') with Inside Drop	2	EA	$10,443.00	$20,886.00	$15,500.00	$31,000.00
35	5' MH (14'-16') with Inside Drop	1	EA	$15,558.00	$15,558.00	$22,500.00	$22,500.00
36	5' MH (18'-20') with Inside Drop	2	EA	$17,373.00	$34,746.00	$23,000.00	$46,000.00
37	4" PVC Lateral - Single Service w/ Clean-out (Short, <45')	114	EA	$1,178.00	$134,292.00	$1,580.00	$180,120.00
38	4" PVC Lateral - Single Service w/ Clean-out (Long, >45')	56	EA	$1,529.00	$85,624.00	$1,950.00	$109,200.00
39	6" PVC Lateral - Double Service w/ Clean-out (Short, <45')	3	EA	$2,702.00	$8,106.00	$2,500.00	$7,500.00
40	6" PVC Lateral - Double Service w/ Clean-out (Long, >45')	2	EA	$4,533.00	$9,066.00	$5,000.00	$10,000.00
41	1' Flowable Fill Cap for Laterals	102	EA	$960.00	$97,920.00	$350.00	$35,700.00
	Submersible Lift Station & Forcemain						
42	Lift Station #180 including wet-well, valve vault, hatches, pumps, guide rails discharge basis, control panel,piping, valves, etc.	1	LS	$490,000.00	$490,000.00	$340,000.00	$340,000.00
43	2.5" (SCH 80) Force Main & Fittings	264	LF	$31.00	$8,184.00	$18.25	$4,818.00
44	4" (PVC 900) Force Main (Push-On)	1,347	LF	$49.00	$66,003.00	$20.25	$27,276.75
45	4" (PVC 900) Force Main (Restrained Joints)	203	LF	$43.00	$8,729.00	$25.00	$5,075.00
46	DIP Compact Fittings (Epoxy Coated)	1	TON	$6,121.00	$6,121.00	$17,000.00	$17,000.00
47	4" Plug Valve w/ Box	1	EA	$1,795.00	$1,795.00	$1,800.00	$1,800.00
48	Connect to Existing 4" C-900 PVC Force Main, incl. fittings (Dwg. C-14)	2	EA	$4,157.00	$8,314.00	$2,200.00	$4,400.00
49	4-Foot Wide Reinforced Concrete Shoulder (6" Thick) at Round-a-bout (Dwg. D-6)	396	SF	$17.00	$6,732.00	$11.00	$4,356.00
50	Grass Paver block Lift Station Drive	145	SF	$29.00	$4,205.00	$40.00	$5,800.00
51	Lift Station #180 Landscaping	1	LS	$20,000.00	$20,000.00	$20,000.00	$20,000.00
52	Concrete Bollards	4	EA	$1,000.00	$4,000.00	$500.00	$2,000.00
53	FPL Electrical Service to Lift Station #180	1	LS	$82,000.00	$82,000.00	$75,000.00	$75,000.00
	Signing and Marking						
54	Thermoplastic Pavement Marking						
54a	Thermoplastic Solid Stripe (6" White)	388	LF	$2.00	$776.00	$2.35	$911.80
54b	Thermoplastic Solid Stripe (6" Yellow)	374	LF	$2.00	$748.00	$2.35	$878.90
54c	Thermoplastic Solid Stripe (18" Yellow)	192	LF	$6.00	$1,152.00	$6.50	$1,248.00
54d	Thermoplastic Skip Stripe (Guide Lines 8' (18'-18'))	80	LF	$3.00	$240.00	$3.00	$240.00
55	RPM Bi-Directional White/Red	73	EA	$6.00	$438.00	$7.00	$511.00
56	RPM Bi-Directional White/Yellow	22	EA	$6.00	$132.00	$6.85	$150.70
57	Furnish & Install Traffic Signs with Post	12	EA	$500.00	$6,000.00	$550.00	$6,600.00
58	Pavement Markings	1	LS	$5,000.00	$5,000.00	$6,500.00	$6,500.00
	Miscellaneous						
59	Dewatering	1	LS	$425,000.00	$425,000.00	$400,000.00	$400,000.00
60	Flowable Fill	75	CY	$200.00	$15,000.00	$275.00	$20,625.00
61	Round-a-bout Light fixtures	2	EA	$7,500.00	$15,000.00	$8,500.00	$17,000.00
TOTAL ITEMS 1 - 61					**$4,487,424.80**		**$5,729,426.40**
Bid Bond				YES		YES	
Addendum No. 1				YES		YES	
Questionnaire				YES		YES	

Item 6C – GRAVITY SERVICE LINING CONTRACT

This item was not ready at notebook delivery time.

LOXAHATCHEE RIVER DISTRICT

Neighborhood Sewering Schedule

Rank *	Area Description	# Lots	Activity	Original Target Date	Revised Target Date
10	Turtle Creek Subsystem 3	5	Notified Owners – September 2012 Notice of Intent – December 2016 Contract Award – August 2017 Notified to Connect – April 2018	2016	2017
10	Turtle Creek Subsystem 2	28	Notified Owners – September 2012 Notice of Intent – October 2016 Contract Award – August 2017 Notified to Connect – April 2018	2016	2017
14	Whispering Trails	181	Notified Owners – January 2013 Notice of Intent – November 2016 Contract Award – May 2018	2017	2017
16	Limestone Creek Road-West	82	Notified Owners – January 2013	2018	2018
19	US Coast Guard Station Offices *(institutional)* PX Commercial *(commercial)*	 2 ECs 2 ECs	US Government - private roads Albrey- mtg. w/BLM & Historical 3-2011 Prelim design prepared In House 4-2011	2019	2018
20	New Palm Beach Heights	34	Notified Owners – January 2016	2019	2019
22	Bridgewater	70	In discussions with developer/engineer	2019	2019
11	Jupiter Farms (East)	708		TBD	TBD
11	PB Country Estates	1547		TBD	TBD

* Rank based upon "2010 Septic System Inventory & Assessment"
TBD = To be determined

Rank*	Area Description	Lots	Activity	Original Target Date	Revised Target Date
None	PBC Riverbend Park *(institutional)*	12ECs	Not. of availability-Costs pd, plans reviewed Project Complete – January 2018	2011	2016
D	Loggerhead Park *(institutional)*	6 ECs	Need Easements from Palm Beach County	2014	2017
C	FDOT Turnpike Station *(institutional)*	3 ECs	Notified to Connect – February 2016 Variance requested – May 2016	2012	2017
I	Chippewa Street	6	Notified Owners-1/14, Petition Rec'd 4/16 Feasibility Letter LPSS/Gravity – July 2016 Permit Issued – February 2018 Notice of Intent to Assess – April 2018 Construction start – May 2018	2018	2017
	US 1 (12750), Juno Beach *(commercial)*	2	Notified Owners – January 2014 Notice of Intent to Assess – April 2018 Construction start – May 2018	2017	2018
H	County Line Road - Martin Co. (19701, 19721, 19741)	3	Notified Owners – July 2013 Notice of Intent to Assess – April 2018 Construction start – May 2018	2017	2018
F	North A-1-A	3	Postponed -Town Activities in area	2012	2018
G	815 S. US 1 (Yum Yum Tree)	9 ECs	Notified Owner – November 2014	2016	2018
H	Olympus Dr, Juno (LP)	2	Notified Owners – June 2013 Design started – August 2017	2016	2018
I	96 Pine Hill Trl E	1	Notified Owner – February 2015 Notice of Intent to Assess – April 2018 Construction start – May 2018	2018	2018
	8th Street	3	Notified Owners – January 2014 Design completed – April 2018 Notice of Intent to Assess – April 2018 Construction start – May 2018	2018	2018
	18890 SE Country Club Dr, Cove Pt	1	Notified Owner – April 2017 Design started – August 2017	2018	2018
	18870 SE Country Club Dr, Cove Pt	1	Notified Owner – August 2017	2019	2019
	19087 SE County Line Rd	1	Notified Owner – January 2017 Design started – August 2017	2018	2018
	US Highway 1 Residential	3	Notified Owners – August 2017	2019	2019
	Ocean Dr (120 + 140)	2	Notified Owners – June 2013 Notice of Intent – January 2018 Construction start – May 2018	2018	2019
	Thelma Ave. LPSS	4	Notified Owners – September 2017	2020	2020

* Rank based upon "2010 Septic System Inventory & Assessment"

TBD = To be determined

Private Road Areas – Page 3

Rank *	Area Description	# Lots	Activity	Original Target Date	Revised Target Date
AA	Peninsular Road	5	Private Road Notice of Intent – February 2010 Partial construction complete - June 2013 Soliciting easements for remainder of project	2010	AEO
BB	Rivers Edge Road (Martin Co.)	35	Notified Owners – August 2010 Private Road - Design started Notice of Intent – February 2014 Easements Solicited – May 2014 Project Delayed	2013	AEO
CC	171st Street (Martin Co.)	7	Private Road In House Design Owners notified October 2012 Easement rec'd from Church – April 2017 Grant received	2014	AEO
CC	Jamaica Dr	11	Private Road Owners notified Oct 2012 In House Design started	2014	AEO
CC	197th Place, 66th Terrace, 66th Way	21	Notified Owners – Aug 2010 *Private Roads Notice of Intent to Assess – February 2015	2014	AEO
DD	Taylor Road	38	Notified Owners – September 2011 Private Roads	2015	AEO
EE	Imperial Woods LPSS	47	Notified Owners – October 2010 Withdrew Notification – Feb 2011 Easement Obtained – August 2017 Notice of Intent to Assess – September 2017 Start Design – March 2018	2016	2018
EE	Hobart St SE (Martin Co.)	13	Notified Owners – October 2012 Private Road	2016	AEO
FF	Rolling Hills	51	Notified Owners – January 2013 Private HOA	2017	AEO
FF	Gardiner Lane	2	Notified Owners – July 2013 Private Road	2017	AEO
HH	Harbor Rd. S. LPSS	6	Notified Owners – January 2014 Private Road	2017	AEO
GG	Rockinghorse *(north of Roebuck Road)*	10	Notified Owners – January 2013	2018	AEO
GG	Island Country Estates	47	Notified Owners – January 2013 Private HOA-Received Easement – Feb. 2018	2018	AEO
HH	SE Indian Hills	12	Notified Owners – January 2016 Easement for Road & Utilities, No Dedication	2019	AEO

* Rank based upon "2010 Septic System Inventory & Assessment"
TBD = To be determined
AEO = As easements are obtained

Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

To: Governing Board

From: D. Albrey Arrington, Ph.D.

Date: May 8, 2018

Subject: Legal Report

The Legal Report was not available at notebook delivery time. It will be provided to the Board at the meeting.

Hazen and Sawyer
2101 NW Corporate Boulevard, Suite 301
Boca Raton, Florida 33431 ● 561.997.8070

MEMORANDUM

TO: Albrey Arrington, Ph.D. / Loxahatchee River District

COPY: Clint Yerkes / Loxahatchee River District
Tony Campbell / Loxahatchee River District

FROM: Albert Muniz / Hazen and Sawyer

DATE: May 9, 2018

FILE: 42009-029.3.1.3

SUBJECT: Loxahatchee River District
Engineer's Monthly Status Report through April 30, 2018

The following is a summary of work performed by Hazen and Sawyer (Hazen) on Loxahatchee River District (LRD) projects through the above referenced date.

General Operational Assistance – This project involves providing LRD with engineering assistance related to wastewater operations.

Monthly Progress

- LRD staff and Hazen personnel continue to communicate to discuss plant operations on an as needed basis. The wastewater treatment process continues to perform well.
- Hazen continues to provide assistance on an as needed basis.
- Hazen recently inspected the condition of Clarifier No. 2, portions of which are in poor condition. Hazen is currently evaluating alternatives for repair and/or replacement of the clarifier mechanism and will be coordinating corrective actions with staff.

Clarifier No. 2

**Clarifier No. 2
Upper Portion of
Center Column Pipe**

Deep Bed Sand Filters – Final Design and Construction Management Services – The existing traveling bridge filters and filter structure have served the LRD wastewater treatment facility for over 20 years. In lieu of repair, it is the LRD staff's desire to replace the filters with deep bed sand filters. Deep bed filters offer additional benefits over traveling bridge filters including de-nitrification capabilities as well as proven performance during plant upset conditions. Construction is nearing completion.

Monthly Progress

- Kirlin was issued a Notice to Proceed on January 18, 2016. The substantial and final completion dates are currently December 18, 2017 and March 14, 2018, respectively. A change order with additional time is under review.

- Filter Electrical Building - Installation of electrical equipment inside the building is complete. The main electrical tie and the installation of the power transformers have been completed. Large feeder wire and small gauge wire installation for the DBF facility is complete. Installation of asphaltic roofing and lightning protection have been completed. Backup power distribution connections to Electrical Building No. 1 and No. 3 and the Blower Building have been completed.

Installation of Filter Influent Piping at FPS 1

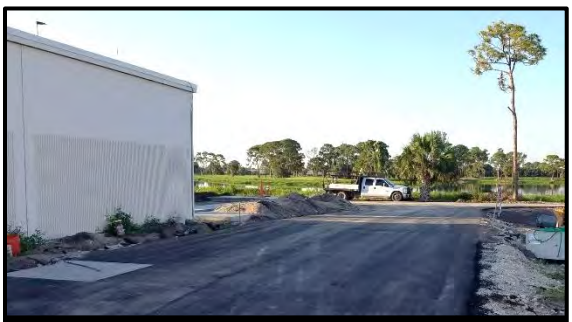
- Deep Bed Filters – The facility is nearing completion with the exception of punch-list and ancillary items. Performance testing of the filters was completed on January 19, 2018. The facility was turned over to LRD on February 5, 2018.

- Parshall Flume Flow Meter - The new parshall flume facility has been completed. The flume has been installed and grouted in. The new walkway, stairs and handrail are nearly completed. The electrical and instrumentation installation for the facility are complete. The mud-valve has been installed. The facility is now in-service.

- Filter Feed Pump Station No. 1 - Removal of the existing slide gate at Filter Feed Pump Station No. 1 and installation of the new overflow weir has been previously completed. Portions of the structural repairs have begun. New flanged piping has been installed. Baffle walls, pipe supports and pump pads have been completed. Installation of vertical turbine pumps has been completed with startup/testing remaining. Electrical connections have been completed.

Modification of Synthetic Media Filter Piping

- Process Piping - Installation of the all underground Phase II piping is completed, including the tie-in to the Injection Well Pump Station, to the Chlorine Contact Basin piping, and to the existing Backwash Recovery Basin. Installation of above ground piping is completed at the deep bed filters. Phase III piping is nearly complete including removal of abandoned BWW and IQ lines. Phase III grouting and PS1 to DBF piping are ongoing.



New Asphalt Near Filter Electrical Building

- Electrical Building No. 1 and No. 3 – Gilmore has installed four new VFDs for Filter Pump Station No. 1 in Electrical Building No. 3. Installation of the hardened wall for Electrical Building No. 3 generator louvers is nearly complete.

- Site work - Installation of site underground electrical duct bank is complete. Grading around the structures and general site cleanup continues. The storm drainage line on the west side the Blower Building has been installed. Installation of the catch basins is nearly complete. Demolition of the Traveling Bridge Filters is nearly complete. Work continues on asphalt, site painting and restoration work.

Newly Painted Deep Injection Well Piping

- The first month of sampling comprised two sampling events on the first and the third Tuesday of the month (March 6, 2018 and March 20, 2018). The sampling events have been completed by Sue Noel of LRD. Hazen has remained in contact with Ms. Noel, who has advised that the first month of sampling was completed with no issues.

Alternate A1A / Damon Bridge Water Transmission Main Replacement and Force Main Installation – Hazen was authorized to design a new 16-inch force main pipeline in parallel with a Town of Jupiter water main replacement on the Alternate A1A Bridge in Jupiter. Below is a summary of activities performed to date:

- Design and permitting were completed by end of March 2017

- The following permits have been issued with assistance from Hazen:

  - ✓ Town of Jupiter Engineering/Utility Permit
  - ✓ FDEP/DOH Wastewater Permit
  - ✓ ACOE General Permit
  - ✓ FDEP ERP Exemption Request
  - ✓ FDOT Utility Permit

Pigging of Force Main

- Murray Logan Construction, Inc. was the successful low responsive bidder and was awarded the contract. Contract dates revised per Change Order No. 1 approved on August 3, 2017 are as follow:

Notice-to-Proceed	March 31, 2017
Substantial Completion	April 30, 2018 (Original date was October 27, 2017)
Final Completion	May 30, 2018 (Original date was November 26, 2017)

- A pre-construction meeting was held on March 31, 2017

- A pre-work meeting was held on July 12, 2017.

- Murray Logan began mobilization in mid-July. The installation of Town of Jupiter's new water valves has occurred. Due to the long lead time for the aerial steel pipe, Murray Logan remobilized in early December 2017.

Final Piping at South End of Bridge

- Murray Logan has completely removed the existing aerial water main and has installed all bridge bent pipe supports and all spans of steel water main and stainless-steel force main pipe. Installation of all ARV assemblies continue.

- The tie-ins on the north and south sides of the River are complete. Flushing and pigging of both pipelines is completed. Pressure testing of piping and bacteriological testing of the water main remains.

Wastewater Treatment Plant Operating Permit Renewal – Preparation of the permit application to renew the existing operating permit is ongoing.

- Historical operating data was obtained from LRD staff in support of the operating permit
- The meeting held with LRD staff week of April 2, 2018 to review operating information and verify data such as calibration certificates.
- A preliminary draft renewal application has been prepared and shared with LRD staff. A final DRAFT will be submitted for review by administration by May 18, 2018.
- Comments received from LRD will be incorporated and the renewal application will be submitted by end of May 2018 to the FDEP.
- Historical operating data was obtained from LRD staff in support of the operating permit

As always, please feel free to contact us should you have any questions or need to discuss the progress of any of the above projects in more detail.

Loxahatchee River Environmental Control District
Monthly Status Report
May 10, 2018

Submitted To: Clinton Yerkes, Deputy Director

The following is a summary of work performed by Mathews Consulting (MC), a Baxter and Woodman Company, on District projects through May 10, 2018.

Alternate A1A Bridge Force Main Extension Design

MC has received permits for the following agencies:

- Florida Department of Transportation R.O.W. Permit
- Florida Department of Environmental Protection – Environmental Resource Permitting
- Florida East Coast (FEC) Railway Parallel Infrastructure License

The following permits/licenses are still pending:

- Town of Jupiter (TOJ) Engineering Permit
- Resubmittal for PBCHD

MC revised the plans and updated and submitted the required permit application documents to PBCHD. MC has revised the plans for submission to Town of Jupiter and is coordinating the approval of the required permit.

Master Lift Station No. 1 Rehabilitation

MC completed its evaluation of the Bids submitted and issued a Recommendation of Award letter on April 18, 2018. The project was awarded to TLC Diversified, Inc. at the April 19, 2018 Board meeting. The District is in the process of preparing and executing the Contract Documents.

Whispering Trails Gravity Sewer System

Contractor Bids were received on April 13, 2018. MC completed its evaluation of the Bids and issued a Recommendation of Award letter on May 4, 2018. The project is on the agenda for award at the May 17, 2018 Board meeting.

Jupiter Farms Elementary Sanitary Sewer System

Upon submission of the 100% Design Submittal, the District indicated that consideration was being given to modifying the proposed force main alignment to route the force main north along Haynie Lane. During the last period, MC coordinated with the District to evaluate the cost and schedule impacts to re-route the force main. MC is still awaiting permit comments/approval from SIRWCD and the Palm Beach County School District. Over the next period, MC will work to revise the project design documents based on the desired force main realignment and finalize the permits.

Respectfully Submitted by:

MATHEWS CONSULTING,
A BAXTER & WOODMAN COMPANY

Jason A. Pugsley, P.E.
Vice President / Florida Operations Manager

Holtz Consulting Engineers, Inc.

HOLTZ CONSULTING ENGINEERS, INC.

270 South Central Boulevard, Suite 207, Jupiter, FL 33458 (561) 575 2005

MEMORANDUM

To: Clint Yerkes, Deputy Director, Loxahatchee River Environmental Control District

From: Christine Miranda, PE
Holtz Consulting Engineers, Inc.

Date: May 10, 2018

Subject: **Loxahatchee River Environmental Control District Monthly Status Report**

The following is a summary of work performed by Holtz Consulting Engineers, Inc. (HCE) on Loxahatchee River District projects through May 10, 2018.

Loxahatchee River Road Reclaimed Water Main Replacement and Force Main Extension

- The Contractor has completed the installation of all the force main and reclaimed water main piping along Loxahatchee River Road. The crossings of Loxahatchee River Road still need to be completed. Air release valve structures have been delivered to the project site.

Turtle Creek –Subsystem 2& 3 – Gravity Sewers

- The certification of completion to place the gravity sewer system into operation has been submitted to the Florida Department of Environmental Protection and the system has been released to be placed into service.
- The Contractor is working on finishing all remaining punch list items. Road crews are currently working on the roadway, and the second lift of asphalt will be completed by May 11, 2018.

Lift Station No. 082 Master Plan

- HCE is currently working on finalizing the development of the hydraulic model. The hydraulic model is scheduled to be completed by mid-May. Upon completion of the development of the model, the selected scenarios will be inputted for analysis.
- HCE staff met with LRD staff on April 24, 2018 to discuss calibration of the model.

Imperial Woods Low Pressure Sewer System

- Survey has commenced on the project and will be sent to HCE by May 11, 2018.
- The 30% Design Submittal and Engineers Opinion of Probable Construction Cost will be submitted to staff by June 22, 2018.

Busch Wildlife Sanctuary

The 2nd Quarter Report will be presented at the July, 2018 Board Meeting.

Director's Report

- Admin. & Fiscal Report attach. #1
- Engineering Report attach. #2
- Operations Report attach. #3
- Information Services Report attach. #4
- Environmental Education attach. #5
- Other Matters attach. #6

Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458-8964
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org
D. Albrey Arrington, Ph.D., Executive Director

Memorandum

To: Governing Board

From: Kara Peterson, Director of Finance and Administration

Date: May 11, 2018

Subject: Monthly Financial Report

Cash and Investments

Balances as of April 30, 2018

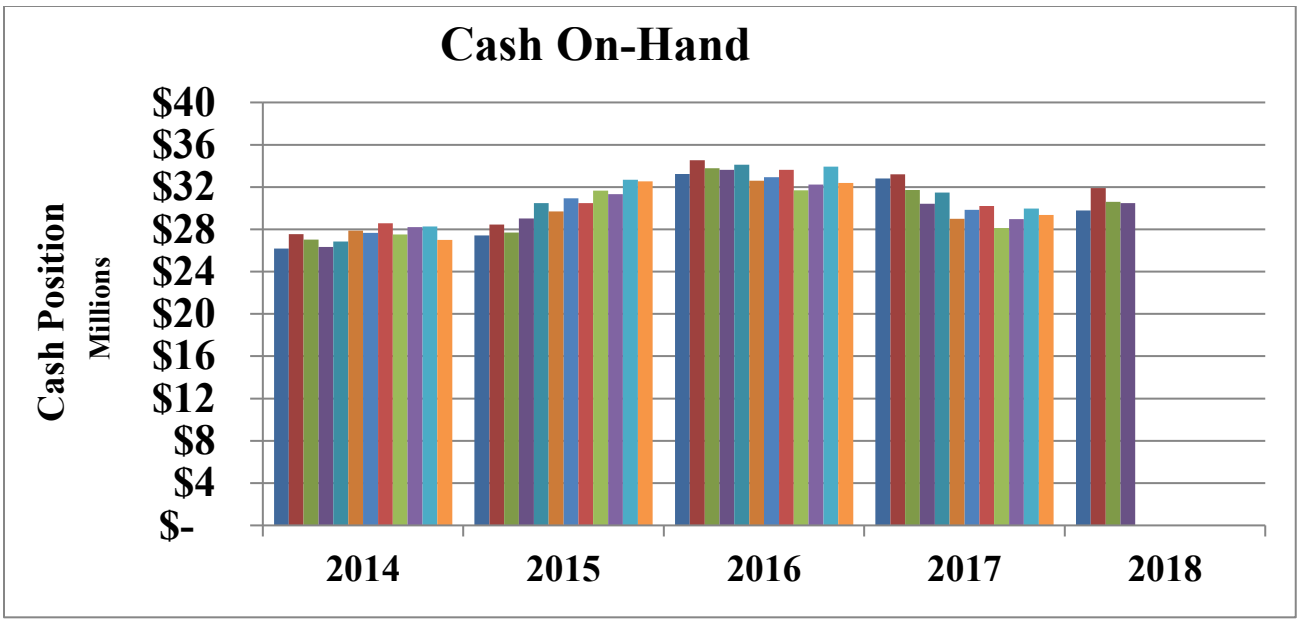
Certificates of Deposit:

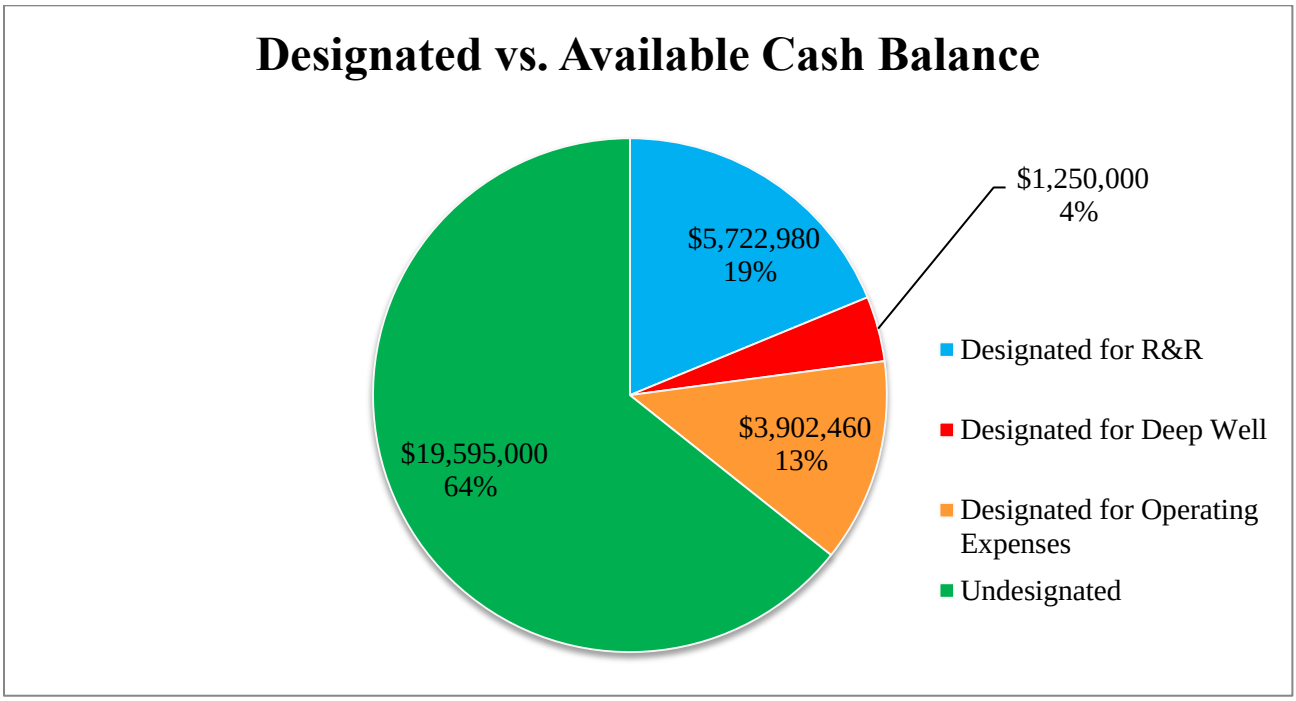
Institution	Original Term	Maturity	Rate		Amount
TD Bank	3 Years	05/22/18	1.14%	$	2,068,193
Bank United	1.5 Years	07/26/18	1.15%		2,040,888
TD Bank	5 Years	08/19/18	1.87%		2,183,531
US Bank	6 Months	09/14/18	1.93%		1,002,487
Bank United	1 Year	11/07/18	1.54%		1,007,354
US Bank	9 Months	12/10/18	2.06%		1,002,654
TD Bank	5 Years	04/29/19	1.88%		1,617,221
TD Bank	5 Years	09/22/19	2.09%		2,156,393
Subtotal				**$**	**13,078,721**
Other:					
FL Community Bank - Public Demand			1.60%	$	11,850,639
TD Bank - NOW			1.60%		2,060,680
SunTrust-Business Account			0.35%		3,480,400
Subtotal				**$**	**17,391,719**
Total				**$**	**30,470,440**

Average weighted rate of return on investments is: 1.49%

As of 04/30/18:
3 month Short Term Bond: 1.87%
1 month Federal Fund Rate: 1.75%

Cash position for April 2017 was $30,421,690. Current Cash position is **up** by $48,750.





Financial Information

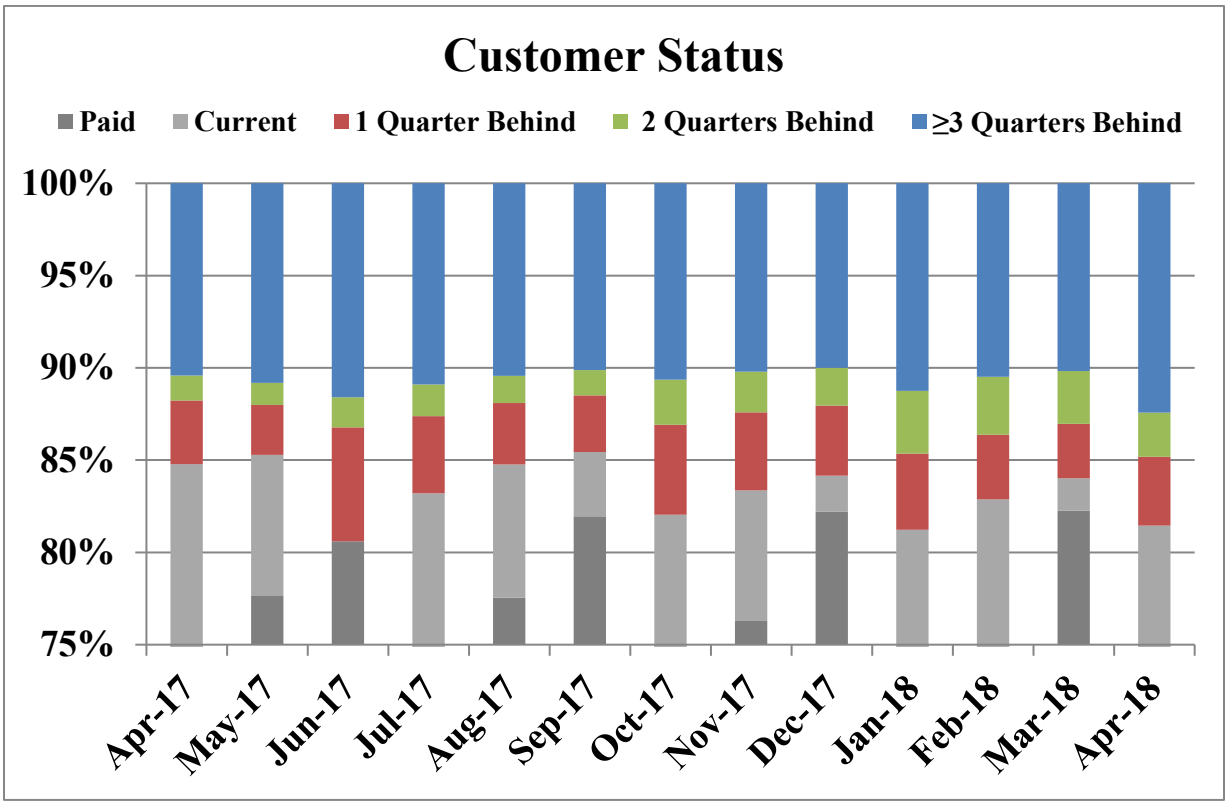
- Legal fees billed for the month of April was $21,945. The fiscal year-to-date total is $56,710.
- There was no Septage billing for the month of April. The fiscal year to date total is $269.
- Developer's Agreement – There were no new Developer agreements in April.
- All I.Q. Water Agreements are current.
- Estoppel fees collected in April totaled $9,775. The fiscal year-to-date total is $49,875.

Summary of Budget vs. Actual

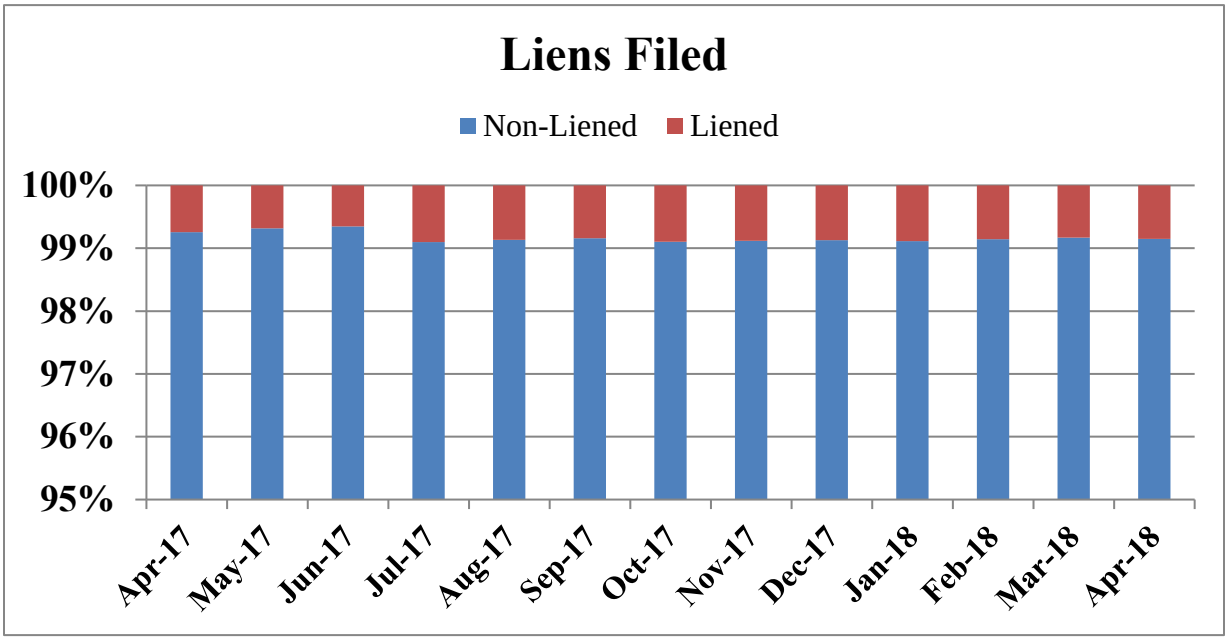
Budget Benchmark 58.00%	Actual April	Actual YTD	Budget FY 18	Favorable (Unfavorable)	Budget Expended
Revenues					
Operating Revenues					
Regional Sewer Service	$1,398,288	$9,753,698	$16,909,884	$ (7,156,186)	57.68%
Standby Sewer Service	7,995	78,027	189,216	(111,189)	41.24%
IQ Water Charges	192,329	1,346,302	2,200,544	(854,242)	61.18%
Admin. and Engineering Fees	5,337	67,671	55,775	11,896	121.33%
Late Fees	15,314	33,193	20,000	13,193	165.97%
Interest on Charges	8,835	30,480	20,000	10,480	152.40%
Other Revenue	44,457	227,528	327,000	(99,472)	69.58%
Subtotal Operating Revenues	1,672,555	11,536,899	19,722,419	(8,185,520)	58.50%
Capital Revenues					
Assessments	112,021	1,517,277	5,348,000	(3,830,723)	28.37%
Line Charges	26,321	376,213	260,800	115,413	144.25%
Plant Charges	67,315	992,399	1,536,790	(544,391)	64.58%
Capital Contributions	-	467,434	1,003,000	(535,566)	0.00%
Subtotal Capital Revenues	205,657	3,353,323	8,148,590	(4,795,267)	41.15%
Other Revenues					
Grants	808	10,108	608,000	(597,892)	1.66%
Interest Income	39,062	215,434	229,800	(14,366)	93.75%
Subtotal Other Revenues	39,870	225,542	837,800	(612,258)	26.92%
Total Revenues	$ 1,918,082	$ 15,115,764	$28,708,809	$ (13,593,045)	52.65%
Expenses					
Salaries and Wages	$383,569	$2,746,645	$ 5,466,500	$ 2,719,855	50.25%
Payroll Taxes	29,001	206,028	404,000	197,972	51.00%
Retirement Contributions	56,235	428,457	714,500	286,043	59.97%
Employee Health Insurance	98,262	674,896	1,263,500	588,604	53.41%
Workers Compensation Insuranc	6,277	45,686	103,600	57,914	44.10%
General Insurance	152,395	337,881	346,272	8,391	97.58%
Supplies and Expenses	84,765	544,953	1,070,685	525,732	50.90%
Utilities	120,153	730,822	1,519,980	789,158	48.08%
Chemicals	71,131	382,554	635,770	253,216	60.17%
Repairs and Maintenance	113,759	879,371	2,076,148	1,196,777	42.36%
Outside Services	142,886	1,005,036	1,771,870	766,834	56.72%
Contingency			225,000	225,000	0.00%
Subtotal Operating Expenses	1,258,433	7,982,329	15,597,825	7,615,496	51.18%
Capital					
Capital Improvements	280,471	2,916,244	10,099,500	7,183,256	28.88%
Renewal and Replacement	441,077	1,853,707	5,377,500	3,523,793	34.47%
Contingency		40,495	234,000	193,505	17.31%
Subtotal Capital	721,548	4,810,446	15,711,000	10,900,554	30.62%
Total Expenses	$ 1,979,981	$ 12,792,775	$31,308,825	$ 18,516,050	40.86%
Excess Revenues Over (Under) Expenses	$ (61,899)	$ 2,322,989	$ (2,600,016)	$ 4,923,005	

Accounts Receivable

The chart below illustrates customers' receivable status as a percentage of quarterly sewer billing. Paid or current balances represent approximately 70% billing.



The District serves approximately 32,000 customers. Currently, the District has 274 liens filed which represent approximately 1% of our customers.



Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458
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D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: D. Albrey Arrington, Ph.D.
Executive Director

FROM: Kris Dean, P.E.
Director of Engineering Services

DATE: May 10, 2018

SUBJECT: Director's Report - Engineering Division
May 2018 Board Meeting

Developer Projects

Staff were active on 10 Developer projects including the following activities.

Planning: Staff performed planning activities on the following projects.

Blowing Rocks: Staff coordinated with local engineering firms for design requirements to connect Blowing Rocks to the District's wastewater collection system.

Austrade Office Center: Staff performed plan reviews on the Austrade Office Center located on US1 between Palm Court and Harbor Road South in Tequesta.

Inlet Waters: Staffed coordinated with the developer for design requirements to connect a proposed residential development along A1A across from Burt Reynolds Park.

Blowing Rocks Residential Towers: Staff coordinated with the developer for design requirements to connect a new 21-unit residential development on Jupiter Island to the Districts wastewater collection system.

Sonoma Isles IQ: The developer has re-engaged with staff for extension of the re-use system from Indiantown Rd to serve Sonoma Isles. The system will discharge into a lake on site for repump into the Sonoma Isles irrigation system.

Love Street: Preliminary engineering plans were submitted for review. This is a commercial project for re-development on Love Street just off A1A.

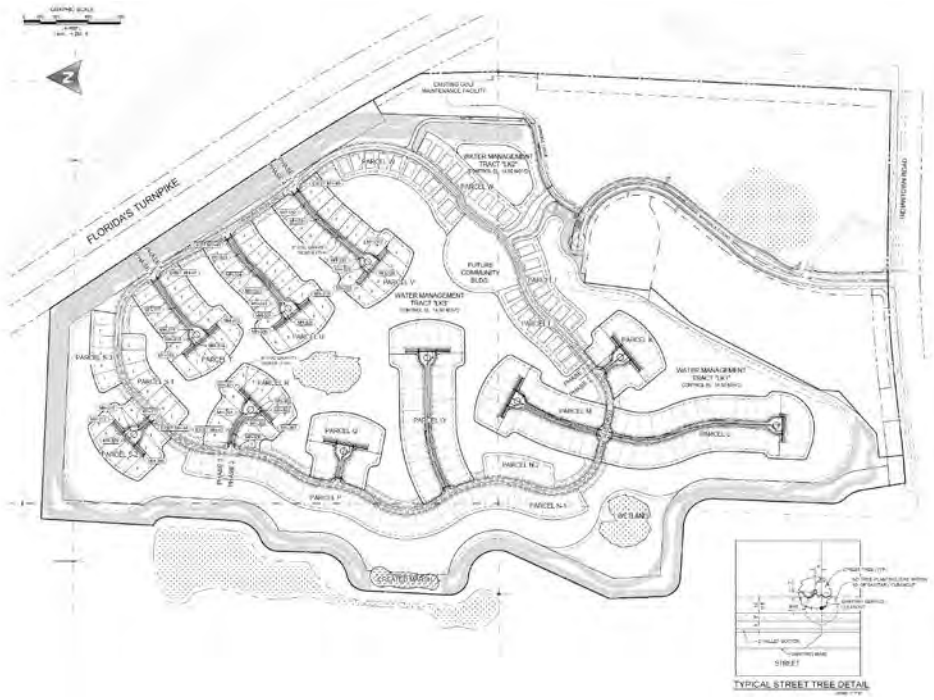
Admirals Cove: Staff are working with Admirals Cove engineers for plan approval on a new tennis pavilion, spa and kitchen expansion.

Construction: Staff performed construction inspections, shop drawing review, RFI responses and/or attended preconstruction meetings for the following projects.

Jupiter Medical Center Pediatric Unit: Staff attended a preconstruction meeting to coordinate abandonment of District facilities no longer needed when the new unit is constructed.

Final Completion: Staff performed final completion activities to include testing, final inspections, record drawings review and punch lists.

Sonoma Isles Residential Phase 3, Plat 4: This phase of the project provides a gravity collection system to serve approximately 17 homes on an interior cul-de-sac in the development. Final inspections are complete as well as punch list items. Staff are coordinating with the engineer to determine current status and proposed schedule to complete the IQ system for Sonoma Isles before accepting this phase of the development.



Institute for Healthy Living: Staff are working to complete testing of the gravity system to serve the Institute for Healthy Living, located off Central, South of Frederick Small in Abacoa.

4000 Palmwood Dr: A project to extend the low pressure system in Palmwood to 4000 Palmwood Dr.

One Year Inspections:

Sonoma Isles Plat 3: Staff are conducting one year inspections on this phase of Sonoma Isles. Pictured are inspection staff performing a manhole entry and apparently testing a new selfie stick as part of the one year.

Capital Projects

Staff were active on 31 Capital and/or Utility projects including the following activities.

Design/Bid: Staff are currently in the design or bidding phase for the following projects.

Lift Station 114 Rehabilitation: Upgrades and rehabilitation of lift station 114. This station is a re-

pump station serving the A1A corridor from Olympus through Juno Beach. Bids were received on February 2, 2018.

Lift Station Rehabilitations for 2018: Staff have completed plans for 4 station rehabilitations and are working on a format for a general lift station rehabilitation contract. The general services contract will allow for rehabilitation of specific lift station components at to be determined lift statin sites and will also incorporate these 4 stations.

Jupiter Ocean Racquet Club: Staff are currently working on design for replacement/relocation of the asbestos concrete force main serving Jupiter Ocean Racquet Club. Design is complete. Staff are in the permitting phase.

Pump Station Upgrades: When the new Loxahatchee River force main crossing is complete four pump stations upstream of the crossing will require upgrades to meet the new head conditions. All equipment has been delivered. Staff have scheduled to complete this work by the end of April 2018.

18890 Country Club: Staff are working on design and permitting for a remnant property on Country Club Drive. This will be a low pressure sewer system discharging into the Lift Station 043 collection system.

Chippewa Street: The contractor is scheduled to mobilize and complete this project in May 2018. This will be a low pressure sewer system serving 6 properties and discharging in the Master Lift Station collection system.

8th Street: The contractor is scheduled to mobilize and complete this project in May 2018. This will be a low pressure sewer system serving 4 properties and discharging in the Lift Station 018 collection system.

120 and 140 Ocean Drive: The contractor is scheduled to mobilize and complete this project in June 2018. This will be a low pressure sewer system serving two properties and discharging in the Lift Station 133 collection system.

12750 US 1: The contractor is scheduled to mobilize and complete this project in May 2018. This will be a low pressure sewer system serving a commercial property and discharging in the Lift Station 132 collection system.

County Line Road: Staff are working on design and permitting for 3 remnant properties on County Line Road west of Seabrook Dr. Conflicts found during design have required this project be low pressure instead of gravity. This will be a low pressure sewer system serving three properties and discharging in the Lift Station 050 collection system.

96 Pine Hill Trail E.: Design is complete and permits have been acquired. Staff are working with the District's low pressure general construction services contractor for pricing. This will be a low pressure sewer system serving one property and discharging in the Lift Station 054 collection system.

LS 70 and 71 Emergency Standby Generators: Two separate projects, each provides a permanent emergency standby generator at lift stations 70 and 71. Both are part of the cascading lift station system along Country Club Drive in Tequesta. This project, originally scheduled for advertisement in April 2018 is delayed as we coordinate final design with the electrical engineer and determine

the final structure of the bidding documents. This project will include owner direct purchase of emergency generators and automatic transfer switches.

Lift Station 70 Control Panel: In conjunction with the emergency generator at lift station 70, staff also intend to replace the station control panel with a variable speed panel. In an effort to expedite the panel and complete this work with the emergency generator, staff intend to include the panel as a design/build specification, with specific component and performance requirements, in the emergency standby generator project.

Construction Barn Drainage: Staff are currently working with a local engineering firm for drainage modifications to the area around the construction barn to prevent ponding and flooding of the stock pile area. Staff are coordinating with contractors for pricing.

19750 Riverside Drive: Staff are working on design and permitting for 1 remnant property off Riverside Drive. This will be gravity service discharging in the Lift Station 048 collection system.

Cellular Telemetry: IT and Engineering staff are working on a project to test cellular telemetry installation at existing stations with no telemetry. Two units have been installed in the system and integrated into the District's SCADA system. The concept has been deemed viable, now staff will begin working on the procurement process. It is anticipated that we will select up to three suppliers to source the telemetry units through a competitive bid process.

Construction: Staff provided construction inspection and engineering oversight for the following projects.

LS057 and LS066 Collection System Lining: The contractor has mobilized and cleaned the system. Main lining completed in April. The contractor is performing TV inspections to verify the installation before closing the project out.

Radio Telemetry System: Staff are working with Data Flow Systems (DFS) on a rehabilitation project for approximately 30 stations in our lift station telemetry system. When complete we anticipate significant improvements with communication speed and dependability and hope to continue a system evaluation on the remaining 36 existing lift station DFS units and existing 24 irrigation station DFS units this year for rehabilitation next year.

Lift Station 54 Driveway: Staff have selected a contractor for construction of a driveway to Lift Station 54. Construction is scheduled to be complete by July 2018. The new driveway will provide better access and safety for staff when performing maintenance on the lift station.

Consultant Projects:

Master Lift Station Rehabilitation: This project is for the rehabilitation for the Master Lift Station located just east of Pennock Ln on Indiantown Rd. The project will include pump replacement piping modifications, bypass facilities, isolation valves coatings and emergency generator replacement. This project was awarded last month.

Alternate A1A Subaqueous Crossing Replacement: This portion of the project includes piping up to the aerial bridge crossing at the Loxahatchee River and Alternate A1A. The FEC permit has been issued and the consultant is finalizing the 90% submittal.

Jupiter Inlet Colony Neighborhood Rehabilitation: This project provides a gravity collection

system and lift station to serve the approximate 240 homes and town facilities located in Jupiter Inlet Colony. The project reached Substantial Completion in December. The punch list, excluding final close out of the complaint log is complete and staff are reviewing the final pay application package.

Turtle Creek Sub-Phase 2 and 3: This project provides gravity sewer to the western portion of Turtle Creek. The project is released for operation. The contractor and engineer are working through final punch list items in the field.

Alternate A1A/Damon Bridge Water Main Replacement and Force Main Installation: This project includes installation of a new 16" force main on the Damon Bridge to replace the existing 24" force main subaqueous crossing of the Loxahatchee River. Construction is complete. The project is currently being tested.

Loxahatchee River Road IQ Main Replacement and 4" Force Main Installation: A project to replace a 16" aerial crossing along Loxahatchee River Road and extend the Loxahatchee River Road force main system up to Whispering Trails. Bore installations are complete. Testing is underway prior to certifications to the PBCHD and making final connections.

Whispering Trails Neighborhood Sewer System: This project provides a gravity sewer system to provide service to 181 lots in the Whispering Trails Subdivision off of Loxahatchee River Road. This project is recommended for award under Tab 6B.

Jupiter Farms Elementary: This project extends the District's transmission system to Jupiter Farms Elementary School and connects the school to the District's system. Plans are being revised for an alternate route to the school based on easements being granted from SIRWCD.

Lift Station 082 Master Plan Hydraulic Model: This project includes modeling of the District's lift station and transmission system south of the Inlet and east of the Intracoastal. The project is using the District's existing GIS data for a basis and will include future projections for flow and design parameters and cost estimates for Lift Station 082 to allow it to serve current, future and repump needs moving forward.

Imperial Woods: This project includes a low pressure sewer system to serve the Imperial Woods development off Loxahatchee River Road. Survey is underway in the development with design to follow.

<u>One Year Inspections:</u>

none

Other Utility Projects

These projects include plan review, coordination and inspections associated with other utilities such as the Town of Jupiter, Village of Tequesta, Town of Juno Beach, Palm Beach County and Martin Co.

Toney Penna and Old Dixie Hwy: A PBC project to improve the intersection. Minor adjustments to existing District facilities are required.

SR 5 from Beach Road to County Line Road: An FDOT project to repave and reconfigure a portion of SR 5 (US 1) from Beach Road to County Line Road. Staff are coordinating with the FDOT for adjustments and replacement of District facilities to accommodate the revised right of way.

Center Street from Thelma Ave to Woodland Estates: A PBC project that widens Center St., installs storm water improvements and relocates the Town of Jupiter water main.

Sawfish Bay: A Town of Jupiter project to install restrooms at Sawfish Bay.

Town of Jupiter Annual Paving: Staff are coordinating with the Town of Jupiter for adjustment of our facilities impacted by the Town's annual paving schedule.

Bert Winters Park: A Palm Beach County project to expand parking and add bathroom facilities to Bert Winter's Park in Juno Beach.

Indiantown Road from Turnpike to US1 Intersection Improvements: Staff reviewed plans and provided location information to FDOT to resolve conflicts with proposed intersection improvements. One conflict has been identified that will require the District to relocated their existing facilities to accommodate a proposed light pole.

Indiantown Road and Jupiter Farms Road Drainage Improvements: A PBC project to expand the intersection and install drainage improvements at Jupiter Farms Road and Indiantown Road.

Alley Ways from Indiantown to Toney Penna just west of Old Dixie: A town of Jupiter project for drainage improvements.

Jupiter Cresta: A PBC neighborhood repaving project.

Penn Park: A PBC neighborhood repaving project. Staff and the Town of Jupiter are currently coordinating with PBC in an attempt to delay paving to allow time for evaluation and possible rehabilitation of existing infrastructure in this area.

Elsa Rd. Drainage Improvements: This is a Town of Jupiter project to provide drainage improvements in the development off Elsa Rd.

Construction Department

LS065 Collection System: Based on previous TV inspections staff have mobilized and are progressing quickly through the lift station 65 collection system; completing point repairs and clean out installations in anticipation service lateral and gravity main lining in the near future.

LS114 Collection Manhole Adjustment: construction crews enlarged the top section and installed a 48" manhole frame and cover at Lift Station 114 to accommodate bypass pumping equipment to be used during the upcoming station rehabilitation.

Collections/Reuse Department

Above pictures depict:

Scheduled work being performed at the master reclaimed water pump station IQ 511; Pump #1(160hp) and Pump #2 (335hp) were pulled for factory rebuilds; #3 and #4 (both 335hp) were pulled for maintenance (cooling jacket flush and oil change) and reinstalled. All work was performed by the District's Collection/Reuse crews and electricians.

Below pictures depict:

IQ 511 Pumps #1 and #2 being loaded and secured for transport to the Xylem certified service center.

Below pictures depict:

Lift station # 93 at near the entrance to Dubois Park(Jupiter), received a new electrical disconnection and panel rack, as well as a new concrete slab. The existing control panel, still in serviceable condition, was re-used as part of the project.

Below pictures depict:

Jupiter Inlet Colony's Lift Station #60 is online (top left). Warranty work (top right) was performed on the generator and the pump control panel this month. Both issues were picked up by alarm with the new cellular telemetry unit (bottom right) and sent to SCADA (bottom left) prior to service interruptions or sanitary sewer overflows.

*During reporting month, there was no major systems interruption in Collection/Transmission/Reuse system.

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D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: Albrey Arrington, Executive Director

FROM: Tony Campbell, Director of Operations

DATE: May 8, 2018

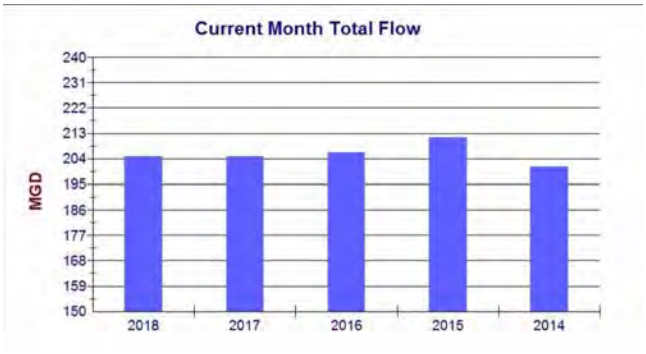
SUBJECT: Operations Department Monthly – Report for April 2018

Treatment Plant Division

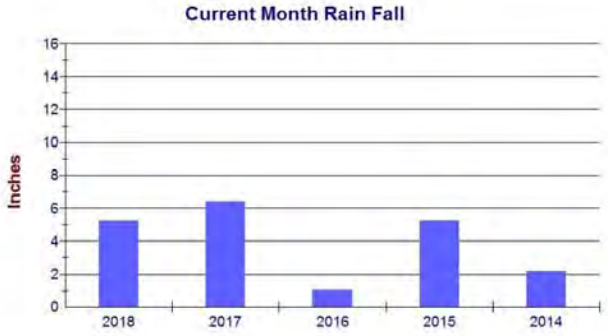
BELOW LEFT. The district recently acquired two C.E.M. SMART 6 microwave moisture analyzers. The two original moisture analyzers were in service for over thirty years. One of the new analyzers was placed in service at the dewatering building for accurate measurement of the moisture content of wasted sludge that is hauled to the pelletization facility for recycled use. The District purchased the same analyzers used by Palm Beach County Solid Waste Authority to lessen the variance between the District's moisture measurements and those taken by Palm Beach County Solid Waste Authority.

BELOW RIGHT. Operation's experienced employees continue to train our newest operators on the proper and safe use of tools and equipment. Troubleshooting and process control are a few of the training topics that were covered this month. Operator trainees learned to stop and start a faulted injection well pump. The injection well pump is used to send reuse water that cannot be repurposed to the injection well.

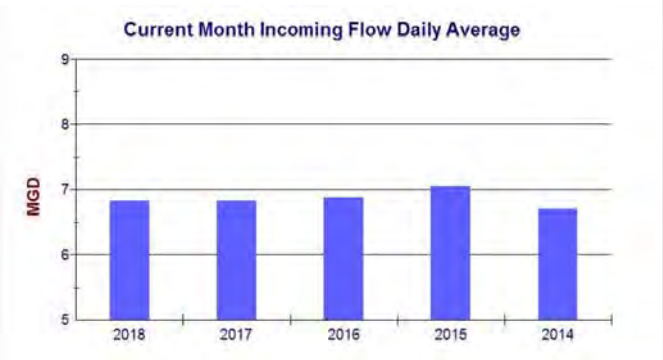
We have had another great month of no Permit exceedances



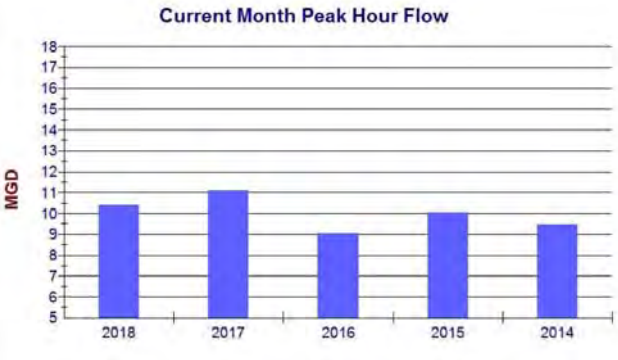
The plant total flow for the month of April was 204.78 million gallons.



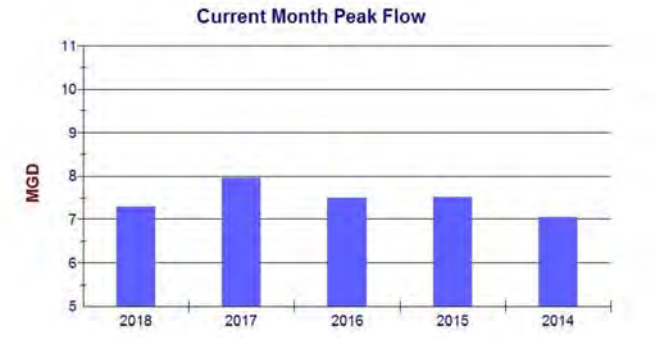
5.25 inches of rainfall was recorded at the plant site during the month of April.



The treatment plant incoming flow for the month of April averaged 6.83MGD compared to 6.82 MGD one year ago, for the same month.



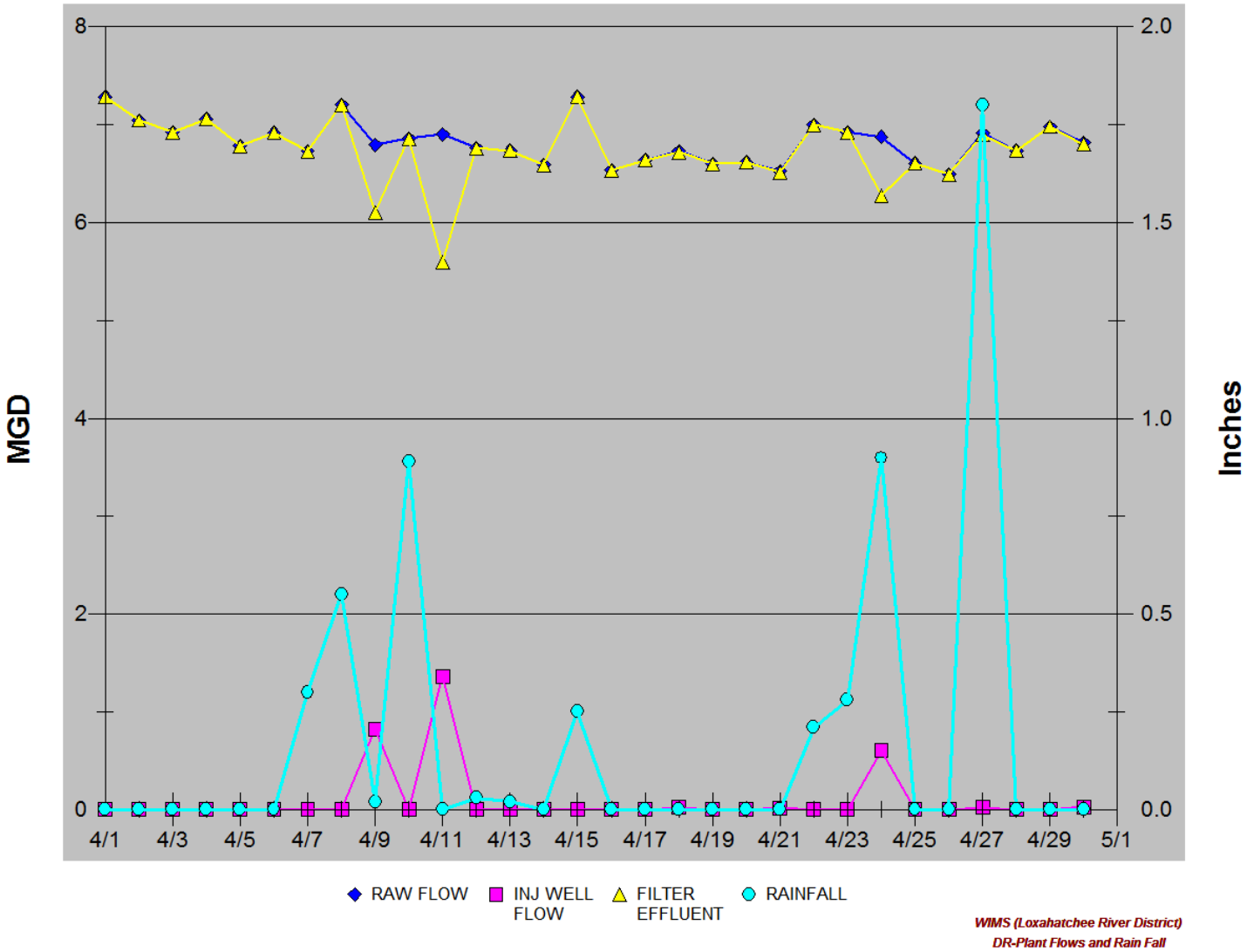
The peak hourly flow rate in April was 10.39 MGD.



The greatest single day average flow in April was 7.28 MGD.

Plant Site Overflow:
On 2/27/2018 Operations experienced a Hydraulic overflow of Secondary Effluent at FPS2. The overflow was caused by a loss of power to Filter Pump Station #2 during the transfer of power from FPL to Generator. The Station was overflowing for 3 minutes resulting in a loss of 1000 gallons of Clarified Secondary Effluent. Immediately after power was restored to Station the affected area was disinfected with Lime. The overflow was contained on plant site with no contact to any of our Lakes or Surface Waters. This Overflow was reported to all appropriate Agencies.

For the month of April, the plant received 204.78 MG of influent flow of which 202.13 million gallons were sent to the IQ storage system where they were dispersed as needed to the various golf courses and the Abacoa development sites. We received 5.25 inches of rain during the month and 2.87 million gallons of blended effluent was diverted to the Injection Well. Overall, 98.71% of incoming flows was recycled for IQ use and the plant delivered 207.74 million gallons of IQ water to the Reuse customers.



Year to date, the plant recycled 81.93% of all incoming flow and the total amount of IQ water delivered to reuse customers stands at 736.34 million gallons.

All required monthly reporting has been submitted on time.

Safety / Compliance

SAFETY TRAINING. Safety training for the month of April reviewed Arc Flash Safety. Session objectives focused on preventing injuries caused by an electrical arc explosion. It is not necessary to touch live electrical components to sustain an injury. Arc flash incidents are generally burn injuries, not electrical shocks. The use of protective boundaries, suitable PPE for approach and Lock Out / Tag Out procedures to ensure equipment is de-energized, are key to safe maintenance procedures.

DEP TESTING. The DEP has concluded the paper and pencil exams for water and wastewater certifications held here at the District. Computer based testing has been re-introduced to the certification program and announces the end of the District's continued partnership to provide a testing facility for our area. The District continues to provide educational prep courses to those who strive to enhance their license certifications and industry knowledge.

TOUCH-A-TRUCK. The annual Touch-A-Truck event was a huge success. It was held in a new location at the Abacoa Town Center. There was a huge turn out and weather was beautiful throughout the day.

The District demonstrated use of the Vac-Con once again. The crowd gathered every half hour to witness the capabilities of this powerful piece of equipment. The pipe clearing demonstration allowed for a great visual experience for people to witness exactly how the District maintains our community's infrastructure for peak performance.

The District has no OSHA recordable injuries to report for the month of April.

The District has no lost time to report due to injury for the month of April.

Maintenance

BELOW. The District is implementing a tank cleaning program throughout the year rotating tanks to be cleaned on an annual basis for inspection and preventative maintenance of structures. Work is done in-house. Images below are before and after the recovery basin tank cleaning. The basin has been pumped and cleaned.

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D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: Albrey Arrington, Ph.D., Executive Director

FROM: Bud Howard, Director of Information Services

DATE: May 10, 2018

SUBJECT: Monthly Governing Board Update for April 2018

WildPine Ecological Laboratory

Riverkeeper Project
District and Town of Jupiter Staff collected water quality samples from 25 monitoring stations in April. Overall water quality in April was not as good as March when compared against to State and Federal water quality criteria.

Total Nitrogen (TN) was "good", with 92% of the stations below the Numeric Nutrient Criteria (NNC) for each river segment. The maximum TN concentration was 2.1 mg/L at St. 735 (Sims Creek drains into Southwest Fork). The average TN for all sites was 0.8 mg/L.

Concentrations of Total Phosphorus (TP) also increased this month. In April 28% (7 out of 25) of our stations monitored for TP were "poor" according to the NNC. Like chlorophyll, the maximum TP concentration was 0.2 mg/L at Station 74 (Sims Creek drains into Southwest Fork). The average TP for all sites was 0.06 mg/L.

Chlorophyll concentrations are starting to ramp up as temperatures begin to rise and rainfall brings nutrients to the river. When compared to the strict Numeric Nutrient Criteria (NNC) for each river segment, 76% (19 out of 25) of our stations were considered "poor" for chlorophyll in April. The highest concentration was 202 µg/L at Station 74 (Sims Creek drains into Southwest Fork). That is 10 times higher than the NNC limit of 20 µg/L for freshwaters! Major amounts of aquatic vegetation were backed up in the canal and were likely contributing to the extremely high level. The other 24 stations were between 1 and 25 µg/L and the average for all sites was 17 µg/L.

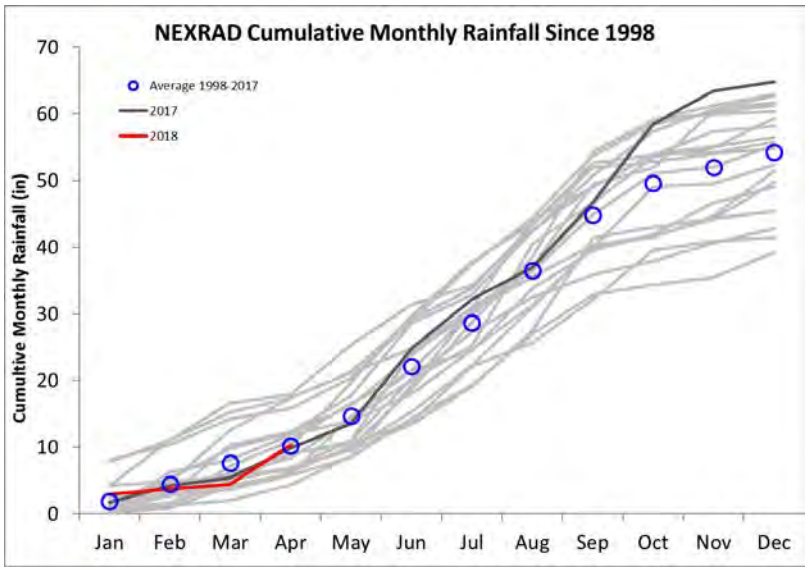
Concentrations of fecal coliform bacteria throughout the watershed in April increased similarly with 24% (6 out of 25) of the stations sampled showed "poor" water quality (based on DEP's threshold of 800 MPN/100 mL). Median fecal bacteria concentrations for all sites were 115 MPN/100 mL this month. The highest concentration of fecal coliforms (6,131 MPN/100 mL) was at the Caloosahatchee Culvert in Jones Creek. This brackish station also had the highest enterococci population at 24,196 MPN/100 mL.

Research Update

Dr. Rachel Harris attended the 12th International Symposium on Biogeochemistry of Wetlands this month and presented a poster on "Enterococci in wrack, sediments and surface water". As a follow up of this initial study, the District has been working with the Town of Jupiter in Jones Creek, trying to document conditions and identify sources of high fecal indicator bacteria (FIB). This month Rachel attended a meeting with the Town's Storm Water Division, Department of Environmental Protection (DEP), and the Town's tree trimming contractor, to provide our water quality results and opinion that trimming the mangroves and clearing decaying vegetation could help improve water quality by increasing sunlight and flows/flushing. The residents and managers are eager to work together to try to improve water quality conditions in Jones Creek.

Hydrologic Monitoring

Rainfall in late April brought the monthly total to 5.9" averaged across the watershed using the radar based rain totals (NEXRAD). This was approximately twice the normal rainfall typically measured in April (2.8"). Cumulative rainfall for 2018 (Jan-April) is 10.4", which is very near the twenty-year average of 10.3" for the same period. Rainfall occurred on 17 days in April, with the largest single day rainfall of 1.5" occurring on April 27.



Cumulative annual rainfall using NEXRAD data. Red line indicates current 2018 cumualtive rainfall total. Blue circles indicate mean accumulative rainfall since 1998. (2017 indicated as dark gray line).

Prior to the rainfall of late April, the watershed was rain deficit which resulted in lower than desired flow rates over the Lainhard Dam in the Northwest Fork of the river. Mean daily flow measured at the dam was 24 cfs with 18 days at or below the MFL of 35 cfs. To help overcome the freshwater deficit, the SFWMD is releasing supplemental flows from Grassy Waters Preserve through the G-161 since late March with average daily flow of 15 cfs through April 30. The SFMWD is operating the G-92 structure that delivers water to the Northwest Fork on a three-day closed, four-day open schedule. When G-92 is closed, the flow measured at the Lainhard Dam went to single digits (even zero) repeatedly during April.

These low flows have had an observable effect on salinity in the Northwest Fork. Until the additional flows supplied by mid-month rainfall, bottom salinity at the USGS monitoring structure oscillated around, and frequently exceeded, the 2 ppt maximum salinity benchmark set forth in the restoration plan and even reached 14 ppt.

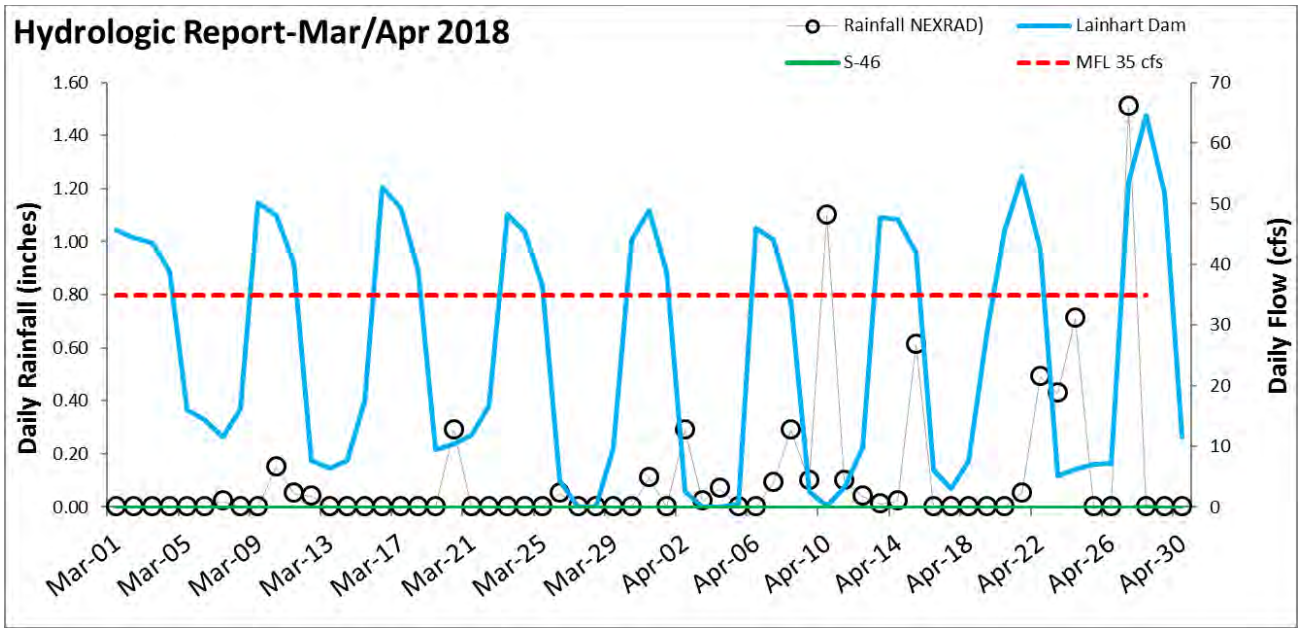
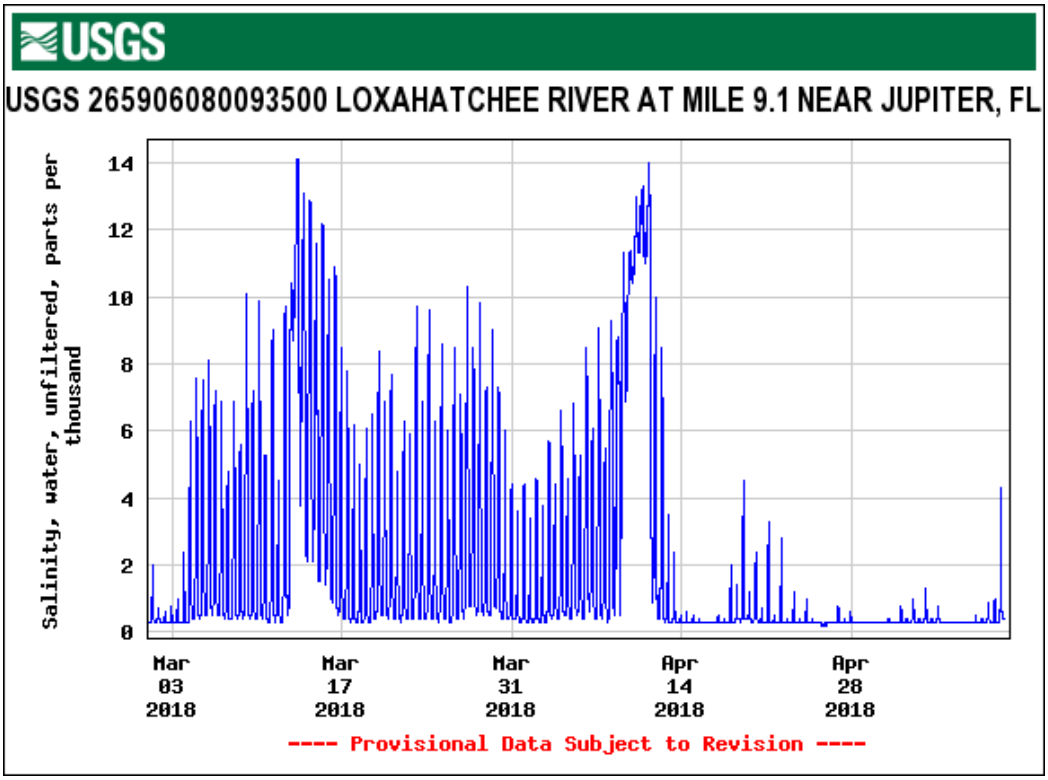


Figure shows relationship between recent daily rainfall (NEXRAD) and mean daily flow measured at S-46 (green line) and Lainhart Dam (blue line) control structures. Dashed red line indicates minimum flows and levels (MFL) of 35 cfs.



Instantaneous salinity measurements taken near bottom of river at River Mile 9.1 by USGS for the SFWMD. Salinity measurements above 2 ppt are considered harmful to the freshwater habitats. Salinity observations of this magnitude and duration this far upstream are exceptionally rare.

Oyster Settlement Monitoring

Oyster settlement monitoring for the 29-day period from 4/5/18 through 5/4/18 has been completed and shows that settlement activity has begun. Based on past monitoring data, we expect the densities to go up as water begins to warm to spawning threshold temperatures typically experienced this time of year. Oyster settlement in both forks of the river have been higher than average with 5,160 spat m^2 in the Northwest Fork (NWF) and 3,639 spat m^2 in the Southwest Fork (SWF), compared to the nine-year average of 4,351 and 3,102 spat m^2, respectively.

Oyster spat observed in the SWF were also notably larger than those of the NWF. This is a common observation between the two sample locations. The largest spat in the SWF were 25 mm suggesting a maximum growth rate of near 0.9 mm/day given the 29-day deployment period.

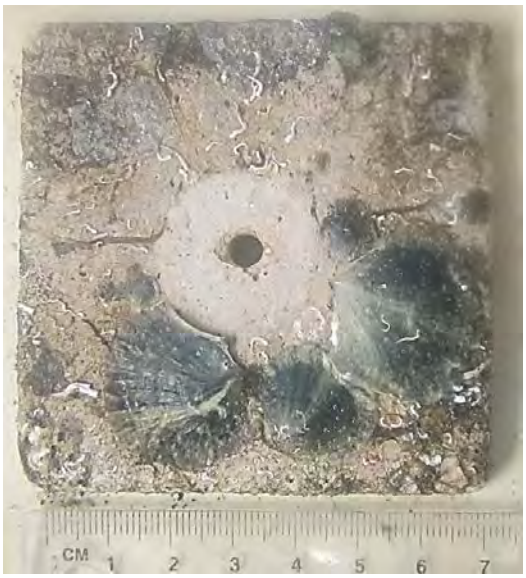


Image shows relative size of oyster spat settled on tiles during the 29-day deployment in the SWF. Measurement scale is in cm. Large spat are typical of the SWF and not often observed in the NWF.

Seagrass Monitoring and Mapping

Seagrass monitoring for 2018 has commenced! April was the first of three bimonthly seagrass monitoring events each year, the other two are scheduled for June and August. This was determined to be the ideal sampling period to capture peak of seagrass growing season. Early indications show a modest change in total seagrass from 2017 (see figure below). The exception was at the Inlet site, where the total seagrass occurrence declined from approximately 70% coverage from 2012 through 2017 to 40% in April 2018. It is too early to know if this is an artifact of natural variability or the accelerated continuation of an ongoing trend in the river.

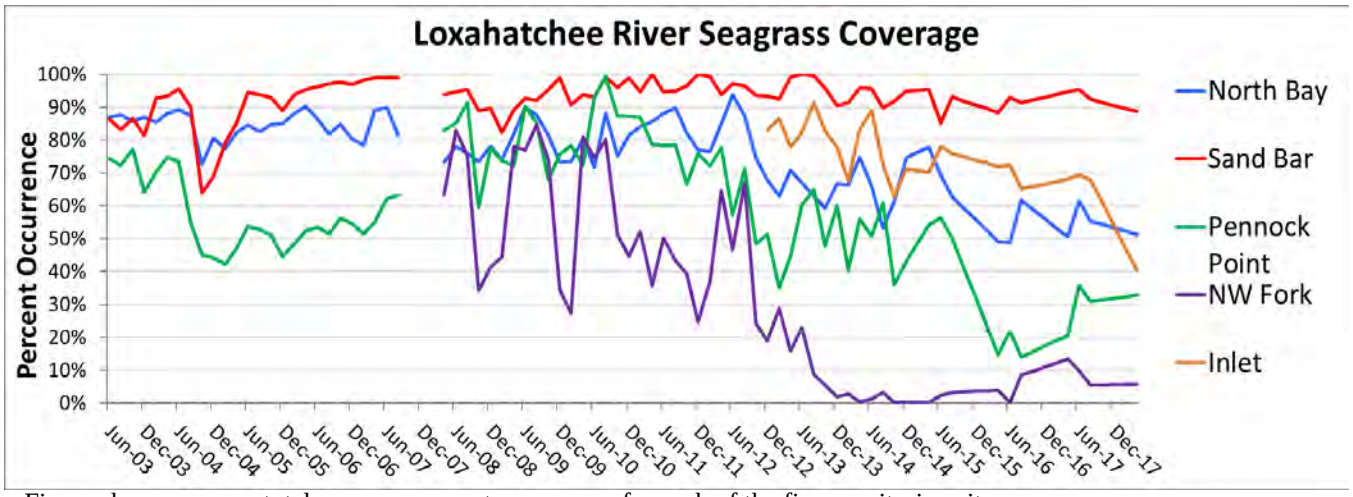
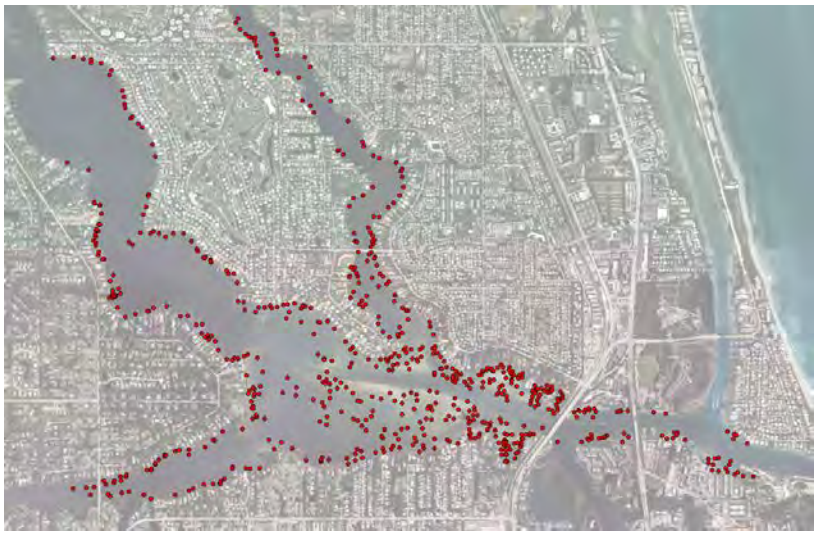


Figure shows average total seagrass percent occurrence for each of the five monitoring sites.

This summer, the lab will also be conducting an estuary-wide seagrass monitoring/mapping project. This project involves revisiting 668 individual points in the river and deploying a $9m^2$ collapsable quadrats to document seagrass presence. When overlaid on the previous 2007, 2010, and 2014 mapping projects (where presence or absence of seagrass has been documented) we will have the ability to compare the current data to historical data to gauge changes in overall distribution and compostion of seagrass in the Loxahatchee River.



Map of seagrass sampling points for estuary-wide seagrass mapping project for summer 2018. The lab staff plans to revisit 668 individual points randomly selected from previously established points. Each study point represents 9 square meters.

Volunteer Water Quality Monitoring Program

The overall Volunteer Water Quality grade for April scored slightly better than March with an "A". Four stations scored an "A" and 3 stations scored "B's". The "B" stations consisted of 2 upstream stations that scored "poor" for higher than optimal salinity.

Table: Volunteer Score. Colored cells show Dark (High) to Light (Low) results. Results are compared to historical values specific to each site to determine an overall score and final grade. Color is based on an average monthly score based on results of either a 1 or 2 ("1" =normal; "2 "=abnormal). Secchi is visible to bottom (depth in meters).

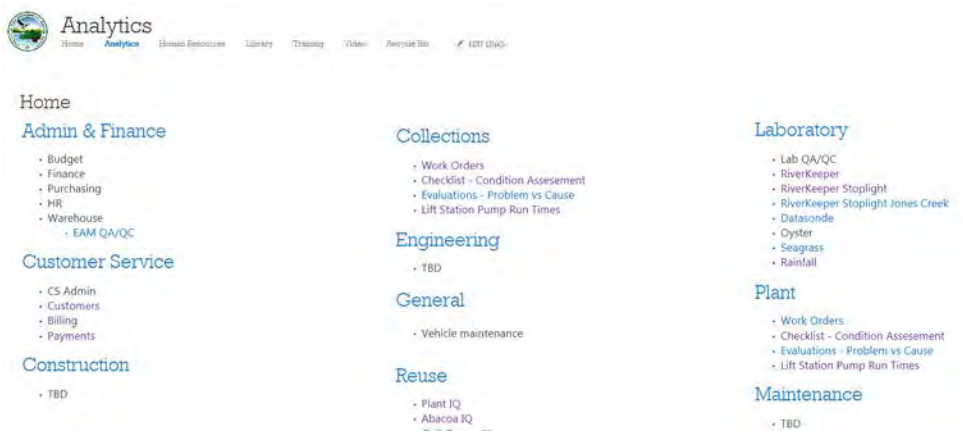
Site	Temp (F)	Secchi	Salinity	pH	DO	DO%	Color	Vis	Salt	pH	DO	DO%	Color	Score	Grade
LR10V	77.0	**VAB**	34.4	8.3	6.9	100.7	1.2	**VAB**	Good	Good	Good	Good	Good	100.0	A
LR22V	76.1	**VAB**	30.0	8.5	6.6	93.9	1.0	**VAB**	Fair	Good	Good	Good	Good	90.0	A
LR30V	75.1	1.5	35.3	8.1	6.2	90.6	1.0	Good	Good	Good	Good	Good	Good	100.0	A
LR50V	75.2	**VAB**	35.8	8.1	5.3	76.6	1.0	**VAB**	Good	Good	Fair	Good	Good	90.0	A
LR52.5V	76.3	0.9	32.3	8.0	5.3	76.6	1.0	Good	Good	Good	Good	Good	Good	89.6	B
LR62V	72.1	1.2	23.3	7.8	17.8	230.0	1.0	Good	Poor	Good	Good	Good	Good	83.3	B
LR107V	73.4	**VAB**	14.0	6.9	5.4	67.5	1.0	**VAB**	Poor	Good	Good	Good	Good	80.0	B
Average	75.0							scale:	0=poor	2=fair	4=good			90.4	A

Customer Service

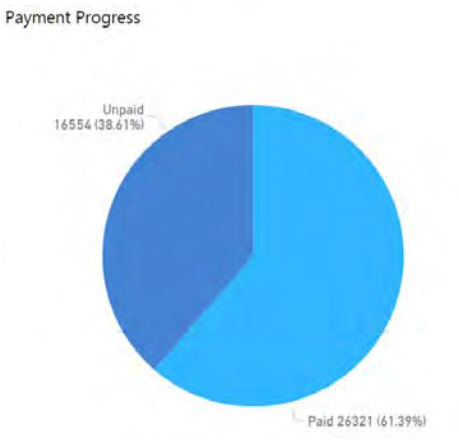
Payment Processing
Q2-2018 bills started going out to customers on April 13. Staff processed 9,453 payments totaling over $1.3M from our quick paying customers. Roughly 54% of those payments came in digital form for highly efficient processing. In April more of our digital paying customers paid through their banks online bill pay (31%) than by phone/website (23%). With bills due May 15, we look forward to seeing how many of our customers utilize the much-requested Recurring Payment option this quarter.

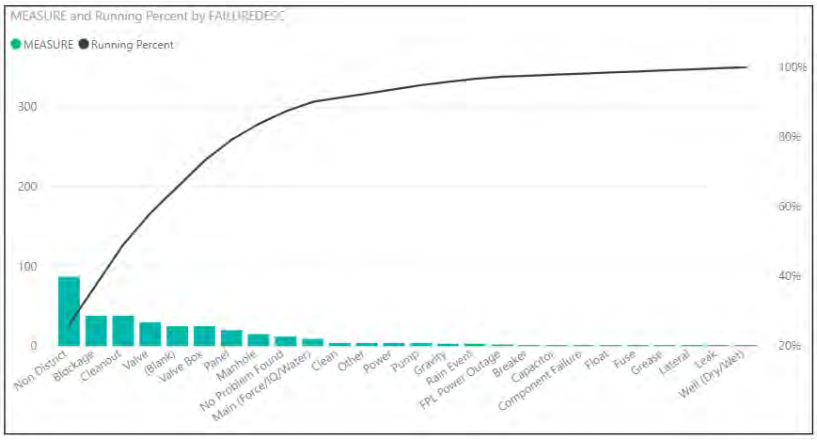
Information Technology

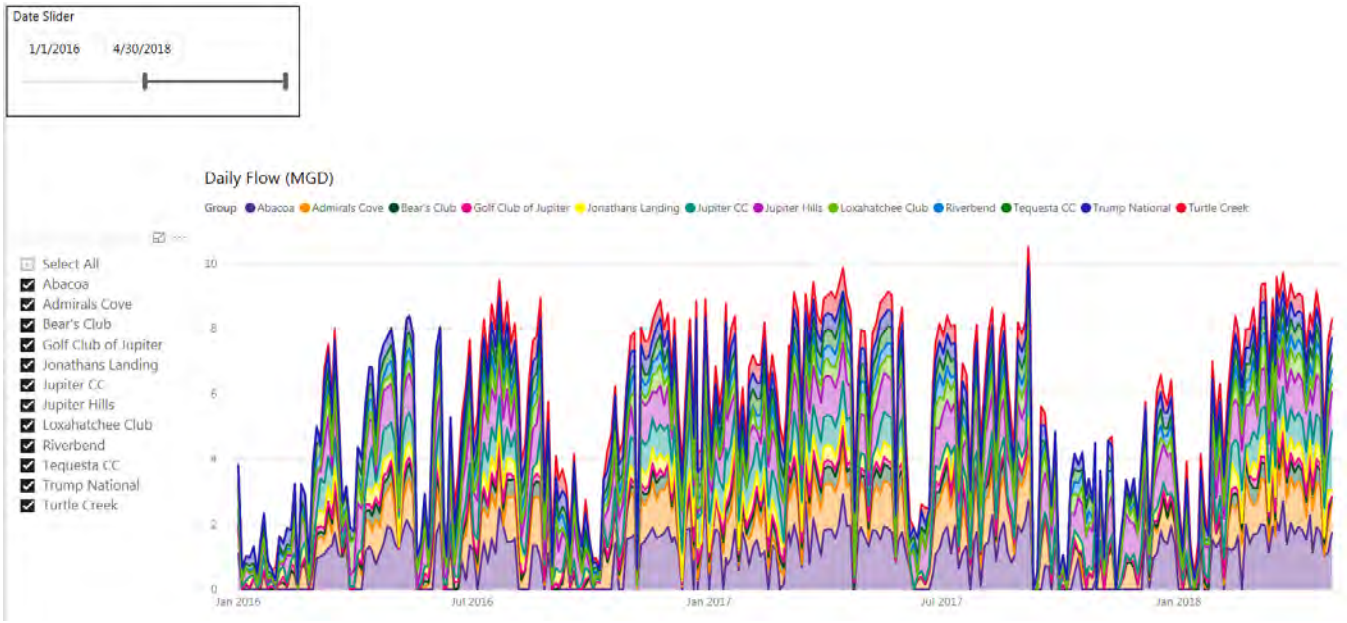
Analytics
The District's internal Analytics Portal if finally live! This provides a one stop shop for links to all our data visualization and mining tools. This centralized information will help staff see some of the information utilized by the various departments and get ideas for different ways to work with their data. While only in its early stages, we believe this is the beginning of a new era of data utilization for our organization.



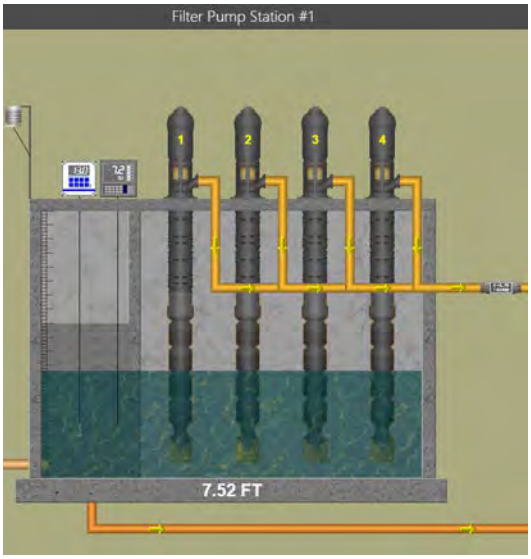
Screenshot of our new Analytics Portal (above) with sample graphics from the various data tools (below) showing the proportions of customers paid to date this quarter, and a pareto chart showing the counts of various causes of sewer overflows.







Another example of our Analytics tools showing daily Reuse deliveries to each customer.



Deep Bed Filters

IT staff continues to support the Deep Bed Filter project with process controls and SCADA modifications. Enhancements include coordinating connectivity of new drives for Filter Pump Station #1 to our main control system and modifying the design of pump station SCADA screens to accurately represent pumps, drives and instrumentation.

Loxahatchee River Environmental Center
May 2018

River Center Summary Statistics

LRD'S ENVIRONMENTAL STEWARDSHIP DASHBOARD

		Total Visitors	School & Camp Visitors	RC Offsite Programs	RC Onsite Programs	RC Staff Guest Appearances	Program Cancellations	Volunteer Engagement	1st Time Visitors	Visitor Satisfaction	Staff Assessment	Environmental Stewardship	Expenses	Program Revenue
Benchmark / Customer Expectation		% of Target	% of Target	% of Target	% of Target	% of Target	% of programs	% of Target	% of Target	Rating Average	Rating Average	Positive Responses	% within budget	% of Target
Green Level		≥ 90%	≥ 90%	≥ 90%	≥ 90%	≥ 90%	< 5%	≥ 90%	≥ 90%	≥4	≥4	≥90%	≥ 85% but ≤ 105%	≥ 90%
Yellow		≥ 75%	≥ 75%	≥ 75%	≥ 75%	≥ 75%	< 10%	≥ 75%	≥ 75%	≥3	≥3	≥80%	≥ 80%	≥ 75%
Red		<75%	<75%	<75%	<75%	<75%	> 10%	<75%	<75%	<3	<3	<80%	< 80% or > 105%	<75%
2016 Baseline		99%	104%	51%	110%	155%		102%	27%	N/A	N/A	N/A	111%	124%
2017	Apr	96%	101%	133%	103%	124%	0%	141%	27%	5.0	N/A	N/A	123%	151%
	May	88%	85%	70%	90%	68%	53%	122%	32%	5.0	N/A	N/A	105%	108%
	June	109%	104%	160%	114%	6%	0%	91%	71%	4.9	N/A	N/A	105%	127%
	July	99%	95%	142%	119%	161%	0%	97%	43%	4.9	N/A	N/A	103%	191%
	Aug	77%	43%	89%	80%	80%	11%	120%	50%	4.7	N/A	N/A	103%	107%
	Sept	71%	96%	96%	90%	0%	0%	62%	48%	N/A	N/A	N/A	98%	104%
	Oct	103%	107%	90%	156%	304%	8%	79%	113%	5.0	4.0	78%	93%	100%
	Nov	139%	145%	1120%	265%	600%	13%	67%	92%	4.9	4.2	88%	96%	101%
	Dec	126%	113%	150%	125%	18%	0%	117%	50%	5.0	4.1	90%	96%	101%
	Jan	121%	78%	117%	122%	15%	11%	233%	98%	4.7	3.9	93%	85%	87%
2018	Feb	118%	133%	169%	155%	124%	24%	161%	67%	4.2	4.0	88%	93%	75%
	Mar	104%	83%	263%	143%	186%	0%	77%	46%	4.8	3.6	97%	91%	49%
	Apr	116%	66%	227%	113%	480%	42%	205%	84%	5.0	3.9	99%	83%	41%
Consecutive Months at Green		7	0	11	8	3	1	1	0	6	0	2	0	0
Metric Owner		O'Neill	Harris	Harris/Duggan	Harris/Duggan	Duggan	Harris	Harris	O'Neill	O'Neill	O'Neill	O'Neill	O'Neill	O'Neill

Metric	Explanation
School & Camp Visitors	We had 5 programs cancel or reschedule for a "loss" of approximately 170 students
Program Cancellations	5 programs cancelled. 4 of them have rescheduled for May.
1st time Visitors	This number is increasing. Possibly due to outreach, but is more likely that numbers are being counted more accurately
Staff Assessment	Many of the groups arrived late and we had a couple groups that were special needs but did not inform us prior to the program.
Expenses	We have not spent to the target amount for this month. June should see us back in the green with all the expenses for summer programs.
Revenues	We are still trying to adjust our expected revenues based on deferred payments. We hope to see this turn around in June when summer programs start.

River Center General

Lecture Series

On Friday, May 4th the River Center welcomed Tom Fitz, Emmy-award winning cinematographer for his presentation entitled "Challenges in Wildlife Filmmaking." His presentation discussed his career to date, stories from the field and clips from his award-winning work with the BBC, PBS and more! It was a fantastic presentation by an amazing speaker. We had over **60** participants at this event.

Special Programs

Kayak Tour-Fullerton Island

On Friday, April 13th the River Center hosted a public kayak tour to Fullerton Island and Sawfish Bay Park as part of our ongoing Naturalist Series. Launching from Burt Reynold's Park, guests paddled their way up the Intracoastal towards Sawfish Bay Park. Once there, guests found large queen conchs and several nine-arm sea stars. Then we made our way over to Fullerton Island to explore the mangrove restoration areas. It was a perfect day on the water and we look forward to visiting that location again soon. We had 14 guests participate in our paddle.

Girl Scout Eco-Action Workshop – BUGS!

On Saturday, April 7th twenty-eight Daisy and Brownie Girl Scouts visited the River Center for a special Girl Scout Bug Workshop. Brownies earned their Legacy Bug badge while the Daisy's earned their Clover Petal learning how to use resources wisely. The girls created buggy crafts while learning about bug anatomy with antenna, eyes, and wings. They explored the garden finding all kinds of different and unusual bug species, learned about why bugs are important, and how to protect bug habitats. The Girl Scouts also became bug scientists doing bug research and creating bug posters. Most importantly they learned how much we rely on insects and how amazing they really are. At the end of the workshop, the girls gathered in a friendship circle and took home sunflower seed packets to plant a bug habitat in their community. The River Center staff would like to thank all the partners and volunteers who participated in the workshop; especially the Society of Women Engineers and ERM Group Foundation Inc. and Pratt & Whitney for their continued support.

Homeschool Workshop: Animal Behavior

We held our final River Center homeschool workshop for the school year on April 17th. Twenty-five students ages 5-11 came to learn about animal communication and behavior between animals of the same species, between different species, and between predator and prey. Students matched different pictures with the corresponding animal behavior and learned about how animals communicate through visual, auditory, chemical, and tactile behavior. We then got the opportunity to play a fun game outside called Quick, Frozen, Critter where the students as animals had to survive from predators by running, freezing, or hiding in safety zones. Throughout the school year we facilitated eight workshops with 215 students participating; ranging from ages 5-17. These programs have been very successful and we are looking forward to next year's programs.

Loxahatchee River Boat Tour

Fourteen guests took a journey up the beautiful, Wild and Scenic Loxahatchee River aboard the "Osprey" Aqua Adventure Tours led by a River Center Naturalist on April 18th. This was an exciting day out on the water because we had retired District Biologist for the Florida Park Service, Dick Roberts; Jupiter Inlet Lighthouse and Museum historian, Josh Liller; and Doris Urban from the South Florida Water Management District on board. Guest literally learned from the experts in history, river research and protection, as well as management of our South Florida water resources. During the trip, we saw different estuarine habitats and explored the untouched and protected areas of the river. We saw a mother osprey with her two chicks and a variety of water birds like Great Blue Herons, Brown Pelicans, Ibis, and Belted Kingfishers. We also saw an American Alligator swimming across the river as well as several freshwater turtles catching some rays.

Girl Scout C.S.I. Workshop

On April 21st the River Center hosted another Girl Scout Eco-Action Workshop. "Clever Science Investigators" (C.S.I.) focused on Junior and Cadette Girl Scouts earning their Special Agent and Detective badges. Forty-eight girls learned what it takes to be a "detective" using microscopes, cracking codes, finger printing, and took part in the Eye Witness Challenge. Our Scouts also developed their special agent skills creating "cryptic" and "mimicry" disguises, practiced the art of animal detection, and followed the clues to solve a real River Center mystery. Special thanks to the volunteers from the Society of Women Engineers for leading one of the rotations and the ERM Foundation and Pratt & Whitney for their continued support.

Allegro Assisted Living Facility

Residents from the Allegro Assisted Living Facility participated in the River Center's Saturday Public Tour and Fish Feeding on April 28th. Folks got the chance to learn about the aquariums and exhibits of the River Center, what habitats they represent in the Loxahatchee River, what critters call these unique places home, and what they eat. They also got the chance to watch youth volunteers and staff feed the aquariums; it's is always a fun opportunity to watch the alligator, turtles, pufferfish, and grouper chow down on bait fish, shrimp, and squid. As a special treat, members of the groups participated in a touch tank demonstration getting the opportunity to hold and touch our sea urchins, conchs, horseshoe crab, and sea stars.

Outreach

Great American Cleanup

On Saturday, April 14th, the River Center participated in the Great American Cleanup at Coral Cove Park with Keep Palm Beach County Beautiful. Over 40 volunteers came out to clean up trash and debris from the sandy beach and dunes of Coral Cove. We collected over 30 pounds of trash and recycling in just three hours. It was a great day for a cleanup and our volunteers were extremely successful in keeping Palm Beach County beautiful.

Wild and Scenic Film Festival at the Lighthouse

River Center staff was invited to participate in the Jupiter Inlet Lighthouse and Museum's fourth annual Wild and Scenic Film Festival on Saturday, April 14th. A composition of short films was presented to a crowd of over three hundred like-minded environmental enthusiasts. The River Center was present to distribute information about the center and our upcoming events. It was a beautiful night for a film festival at the Jupiter Inlet Lighthouse. Over 80 guests visited the River Center's booth.

Discover the Palm Beaches Networking Event

On Tuesday, April 17th the River Center participated in Discover the Palm Beaches: Hotel and Attractions Speed Networking! This tradeshow event, aimed at hotel concierges and travel agencies, gathered information about local businesses and attractions throughout Palm Beach County. A large variety of people attended the event and it was exciting to spread the word about the River Center to a diverse audience. Over 90 people visited the River Center's booth.

Pratt & Whitney Earth day celebration

The River Center participated in the Earth day Celebration at Pratt & Whitney on Thursday, April 19th. This event, held in the Café, brought out many different organizations all to promote and celebrate the environment. It was great to be able to reach a different type of audience and to interact with people in different industries. It was a unique and exciting outreach and the River Center looks forward to attending this event again in the future. Over 135 guests visited the River Center booth for this event.

Coastal Fest

On Saturday, April 28th the River Center participated in Coastal Fest under the Indiantown Road Bridge. This Town of Jupiter family friendly event showcased various business, local artisans and fun attractions around Jupiter. Activities included bounce houses, our River Center touch tank, face painting and live music. We had over 600 people visit the River Center table.

Volunteer of the Month – Jackie Cole

This month we would like to acknowledge Jackie Cole as our Volunteer of the Month. Jackie has been an active volunteer since December of 2017. Since her start she has earned over 80 hours of volunteer service. She volunteers her time every Tuesday and Thursday to help with programs and maintenance around the center. She has also assisted at Girl Scout Programs and at our annual Night on the Loxahatchee event. She is amazing and always welcoming to anyone who enters the center. We know that anytime Jackie is here, we can breathe a sigh of relief. She is a great asset to our volunteer team and we appreciate all that she does for us! We look forward to her continued support! Thank you, Jackie, for all you do!

Upcoming River Center Events

RSVP at www.lrdrivercenter.org/events-calendar
rivercenter@lrecd.org or 561-743-7123

May 17, 8:30am – 11am: Public Kayak Tour – Riverbend Park: Join the River Center for our Public Kayak Tour to Riverbend Park on Thursday, May 17th. Paddle along through Florida's first Wild and Scenic river on our naturalist led tour for great views of local wildlife and a cypress swamp. All equipment will be provided but interested participants should bring water shoes, sunscreen, and plenty of water! The cost for this program is $20 per person. Make sure to reserve your spot today! Space is limited!

May 19, 11:30am – 12:20pm: Girl Scouts: Fish Like a Girl: This first-time opportunity for younger Girl Scouts to get "hooked" on fishing with this workshop for younger girls. Inspired by the "Run Like A Girl" video, we know that there are lots of things that we can do "like a girl." Girls will learn the basics of fishing including knot tying, tackle, and casting. Other topics that will be covered are: conservation, regulations, fish anatomy (dissection), and fish identification. And, of course, we will be fishing!!!

June 2-July 14: Jr. Angler Fishing Tournament: The Loxahatchee River District's River Center, in partnership with Fishing Headquarters, is delighted to announce the 5th Annual Jr. Angler Fishing Tournament. Due to its high popularity last year with over 50 anglers, participation for this year's tournament is expected to grow. Interested anglers should mark their calendars and set their reels for Saturday, June 2nd when the contest officially opens. Registration is open May 11th and throughout the entire tournament. Anglers will have until July 14, 2018 to accumulate points in this unique catch-and-release tournament. By having the anglers photographed with the fish they catch and then submitted online. The contest is run over the course of several weeks instead of just a single day of competition. In addition, the contest awards points not only for the number of fish caught, but also for the number of different species represented in the submissions. The more fish you catch and the more species you catch, the better your chances are to win! These innovative guidelines encourage contestants to spend time throughout the summer exploring the diversity of habitats and fish species in our Palm Beach and Martin Counties.

June 9, 9 am – 12 pm: Fishing Clinic: Fishing clinics are a great way for kids to learn the basics of fishing methods and tactics! Parents will learn important safety tips for taking kids fishing and how to abide by regulations when out fishing. The River Center in partnership with Fishing Headquarters provides half-day fishing clinics for kids that give your child a fun, engaging overview of the following: Knots, lures and bait, Fish Identification, Casting Practice, Fishing Safety, Conservation and Regulation, FISHING! (of course). Cost $10/child. Please RSVP.

June 14, 8am – 4pm: Boating Safely Class: The River Center continues to collaborate with the US Coast Guard Auxiliary "Flotilla 52" to provide a series of Boating Safely Classes targeted specifically to young boaters in our community. These classes are provided through a generous sponsorship by the AustinBlu Foundation, a not-for-profit dedicated to raising awareness and promoting educational programs to improve boater safety. There is no cost for this class, however there is a deposit required to reserve a seat. The deposit of $10 will be refunded in full to all students who complete the class. Recommended for children 12 years and up.

June 15, 8:30am – 11am: Introduction to Kayaking 101: Join the River Center staff for a workshop designed to help you paddle more efficiently, with less pain and strain, learn important safety skills and where to find great paddling locations. $20 per person. RSVP is required.

June 16, 10 am – 12 pm: Family Estuary Exploration: Blowing Rocks Preserve (lagoonside). Bring Swimsuit & Sunscreen, Closed Toed Water Shoes {NO FLIP FLOPS OR CROCS}, Refillable Water Bottle. Please RSVP.

June 23, 10 am – 11:30 am: Little Otters Family Fun: This summer program is designed for families with children ages 3-6 held on selected Saturdays this summer. The program will include a themed story, touch tank demonstration, dip netting and crab hunting. There are both inside and outside portions along with opportunities to get your feet wet.

June 30, 10 am – 12 pm: Family Estuary Exploration: Blowing Rocks Preserve (lagoonside). Bring Swimsuit & Sunscreen, Closed Toed Water Shoes {NO FLIP FLOPS OR CROCS}, Refillable Water Bottle. Please RSVP.

July 3, 8:30am – 11am: Introduction to Kayaking 101: Join the River Center staff for a workshop designed to help you paddle more efficiently, with less pain and strain, learn important safety skills and where to find great paddling locations. $20 per person. RSVP is required.

Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director

MEMORANDUM

TO: Governing Board

FROM: Administration Staff

DATE: May 8, 2018

SUBJECT: Consultant Payments

The following amounts have been reviewed, and approved for payment to our consultants for work performed during the prior month.

	Prior Month	Fiscal YTD
Smith, Gaskill & Shenkman, PA	$6,591.14	$55,023.69
Arcadis		$40,201.93
Hazen	$35,233.41	$237,441.81
Holtz	$11,834.00	$84,932.83
Mathews	$11,714.21	$132,983.64

Should you have any questions in regard to these items, please contact Kara Peterson concerning the attorney's invoice, and Clint Yerkes concerning the engineers' invoices.

J:\BOARD\Consult2018.docx

Future Business

Neighborhood Sewering:

- Island Country Estates Engineering Contract Award
- Preliminary Assessment-Turtle Creek Subsystem 2
- Preliminary Assessment-Turtle Creek Subsystem 3
- Preliminary Assessment-Jupiter Inlet Colony

- **Other:**
- Budget Assumptions FY 2019
- Alternate A1A Force Main Extension Contract
- Lift Station Rehabilitation Contract