Hooks Wastewater Treatment Plant Feasibility Study, 2018

DRAFT

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INTRODUCTION

Project Summary

The purpose of this report is to analyze the existing Hooks Waste Water Treatment Plant (WWTP) located off of Willow Oaks Drive in Hooks, Texas. After reviewing the current conditions of the plant, three (3) potential courses of action for the future of this WWTP will be analyzed. The three (3) alternatives to be compared are: 1) reconditioning the existing facility, 2) decommissioning the current facility (or portions thereof) to construct a new facility, and 3) decommissioning the current facility (or portions thereof) and connecting to the Ron Collins Treatment Facility owned and operated by Riverbend Water Resources District (RWRD).

Existing Facility

The existing Hooks WWTP was constructed in the early 1990s and was permitted on March 7th, 1990 under TCEQ Permit No. 10507-01. The plant was designed to handle an average monthly loading of 0.9 million gallons per day (mgd) which was estimated to be achieved by the year 2010. Over the past three years the average monthly loading has been 0.379 mgd which is only 0.42% of the permitted maximum. Historical population data indicates that Hooks population has grown at a rate of 0.3% in the period from 2010 to 2017. Additionally, the Texas Water Development Board is indicating a projected growth of approximately 3.7% for the period of 2020 to 2070. The historical and predicted growth indicates that the current permitted capacity should serve the population of the City well into the future.

The Hooks' plant is a simple system featuring few components and low maintenance requirements in order to maintain operation. This system utilizes a process known as extended aeration which utilizes activated sludge at a longer mixing time to digest the primary solids. The main advantage of this variation of an activated sludge plant is that wasted sludge does not have to be treated once it is removed from the aeration basin. In the next section of this report, we will detail the step by step process of this plant and provide pictures of each component and its current condition.

Evaluation Process

.Our evaluation will be based on three main factors,

1. Plant discharge versus permit requirements

    Compare available discharge reports and plant records to permit guidelines.

2. Plant operations versus design and manual requirements

    Does the plant still function as originally designed, any deviations from original manual.

3. Overall physical condition of the plant

    What, if any, aspects of the plant need maintenance or repair.

Based on these three criteria we can analyze future needs, short term needs, and immediate needs of the plant. These needs will provide us with the basis for comparison of reconditioning the existing facility versus the other alternatives.

EXISTING FACILITY ASSESSMENT

Permit Requirements

When the old Hooks Treatment Facility was replaced with the current plant, the NDPES permit number TX0022969 was amended on October 12, 1990. This permit outlines the allowable discharge from this facility into Jones Creek which flows into the Red River (Segment No. 0201 of the Red River Basin) via Barkman Creek. In order for the state and federal agencies to monitor the efficiency of this plant, an effluent discharge report or a "Discharge Monitoring Report (DMR)" is to be submitted to Texas Commission on Environmental Quality on a monthly basis. (Formerly known as Texas Water Commission as

PERMIT EFFLUENT CONCENTRATION		
Effluent Characteristic	7-Day Average	30-Day Average
BOD	15 mg/l	10 mg/l
TSS	25 mg/l	15 mg/l
NH_3-N	6 mg/l	3 mg/l
D.O.	4 mg/l	4 mg/l
Chlorine Residual Greater than 1 mg/l but less than 4 mg/l		
pH Greater than 6.0 but less than 9.0		
Flow Max Day Flow: 1875 gpm / Max 30 Day Average: 0.9 mgd		

listed on permit)

General Plant Design

The overall plant design is considered a form of activated sludge treatment system called extended aeration. When the plant was designed in 1990 it was estimated that the flow was 0.36 mgd and the flow in 2010 would be 0.9 mgd. The principal components of the plant are:

1. **Bar Screen**
2. **Lift Station**
3. **Aeration Basin**
4. **Clarifiers**
5. **Post Aeration Basin (Polishing Pond)**
6. **Chlorine Contact Facility**

7. Sludge Drying Beds

8. Operations and Maintenance Building

Existing Plant Site

Sewage arrives from the west via a 21 inch gravity sewer line. Before entering the lift station, the raw influent passes through a manual bar screen. Adjoining the bar screen is a lift station consisting of a ten (10) foot by thirteen (13) foot wet well that houses three (3)- fifteen (15) horsepower pumps. The pumps are rated at 500 gpm at 29.5’ of total developed head (tdh); 1,000 gpm at 21.5’ of tdh; and 1400 gpm at 13.0’ of tdh. From the lift station, influent is pumped into a flow splitter box adjacent to the aeration basin. The aeration basin is designed to detain the wastewater for twenty four (24) hours (at design flows) for primary treatment. The treated “secondary” sewage is transferred to the pair of clarifiers where the effluent is separated from the sludge. The separated sludge is returned to the aeration basin and the effluent is sent to the polishing pond for an additional dissolved oxygen (D.O.) boost and settling period. From there the effluent is sent to the chlorine contact chamber for disinfection, and is discharged into Jones Creek.

Analysis of Plant Components

Bar Screen, Wet Well, & Lift Station

The headworks appear to be in moderate condition from a structural and mechanical standpoint. Pumps and level control devices were not inspected in this report.

Figure 1.1: Manual Bar Screen & Entrance to Lift Station

Figure 1.2: Wet Well and Lift Pumps

The bar screen and lift station (Figure 1.1) from a surface view appear to be in good condition and free of any structural cracking or spalling. The manual bar screen appears to be functioning to maintain good operational depth as described in the operations manual and as shown in Figure 1.1. It should be noted with a manual bar screen, there is the potential for clogging which could lead to overflows and undesirable items bypassing the screening process. It was noted that a mechanical bar screen was a component of the plant design but was removed after a mechanical failure of that equipment. Manual bar screens are one of the most labor intensive components of the plant and require the most attention during major storms and flow events. The lift station shows signs of overflowing at some point in time. The residual scum points to frequent elicit discharges that may or may not have been reported. It was explained to us that this was due to a failed pump and increased rainfall and the problem has been resolved.

Aeration Basin

Per the original construction plans, the aeration basin is an earth lined basin measuring 120' by 138'. From a surface view, the pond has a concrete apron that encompasses the entire perimeter of the pond and ends approximately 18" below the minimum water surface elevation. With the plant in operation, it is not possible to fully inspect the condition and serviceability of the basin liner. It is possible that the original liner of the polishing basin has been removed or damaged. It is recommended that a geotechnical testing firm be engaged to obtain samples from the basin floors to verify the integrity of the basin liner system.

Figure 1.3: Wet Well and Lift Pumps

Figure 1.4: Concrete Joint Separation on West Side of Aeration Basin, Possible infiltration into surrounding soils

Figure 1.5: Significant Cracking on West Side of Basin

Figure 1.6: Cracking on South Side of Basin

Figure 1.7: Significant Joint Separation and Cracking on East Side of Basin

Figure 1.8: Cracking along northeast corner of Basin

The concrete apron around the aeration basin has multiple cracks and locations of significant joint separation. Depending on how this basin was constructed, this could be cause for concern of untreated effluent infiltrating the surrounding soils. A more in-depth review of the condition of the aeration basin below the surface is recommended.

Oxygen Diffuser System

The main component of this treatment system is the addition of oxygen to the aeration basin to maintain the activated sludge process. This is accomplished by a Biolac (by Parkson) treatments system utilizing aeration chains and diffusers fed by three (3) - forty (40) horsepower blowers. The details of the Biolac system are available in the plant operations manual. The original design was that only two (2) blowers are needed at the design flow of 0.9 mgd with one (1) blower shut off. This would allow alternating blowers for maintenance and rest time periodically for the blowers. At the current loading of the plant, daily operation

Figure 1.9: Aeration System, Diffusers range from little to no flow (far left) to blown pipe with direct flow (center) Surface of Aeration Basin should be relatively calm with evenly distributed flow.

should only need one (1) to two (2) blowers to maintain the aeration basin. According to plant operators, since 2016 all three pumps have been operated at all times to maintain the aeration process, unnecessarily increasing energy costs to the facility. It is believed that all three pumps must be utilized simultaneously due to the presence of air leaks in the distribution piping and an uneven air distribution within the basin. Figure 1.9 shows significant hot spots and cold spots. The uneven distribution of air in the treatment process results in pockets of inactivity and zones with either too much or too little air. These variable zones can make it difficult to sustain consistent test results.

Additionally, little or no maintenance records exist to explain or detail the frequency or occurrence of cleaning or repair of the diffuser system. Large dead areas like in Figure 1.13 show "red worms" that compete with the good bacteria for food. This causes excessive and unnecessary dumping and rebuilding of sludge. Figure 1.14 shows PVC pipe added to increase aeration. This temporary fix has not been that effective.

Figure 1.10: "Dead" Area in Basin due to Low Oxygen Flow Debris hanging from support cables throughout Pond

Figure 1.11: Blown Out Diffuser in Need of Repair.

Figure 1.12: Blown Out Diffuser Adjacent to Large Joint Separation and Debris Pile on Surface of Basin

Figure 12.13: Large “Dead” Area due to Low Oxygen

Figure 1.14: PVC Pipe added Diffuser System

Figure 1.15: PVC Pipe Diffuser System, added to Decrease Dead Zones

Figure 1.16: 3 Blowers Used to Maintain Aeration System. All three are currently being utilized to maintain basin.

Clarifiers & Sludge Airlift System

Separating the aeration and the dual clarifiers is a clarifier curtain wall. There is a small opening at the bottom of the wall to allow flow into the clarifier area. There the sludge is allowed to settle to the bottom and removed with a flocculation rake and sludge airlift system. The airlift system returns the sludge back to the aeration basin or allows excess sludge to be wasted onto the sludge drying beds. While excess sludge is being removed at the bottom of the clarifier, clarified effluent remains at the surface. The effluent pours over the thirty six (36) foot long v-notch weir structures and into the polishing ponds. At the time of inspection one of the flocculation rakes was not in operation due to a mechanical failure. Additionally, at one location on the south curtain wall effluent was flowing over the wall allowing untreated materials to enter the clarifier. Areas of debris and vegetative growth that had accumulated within and around the clarifiers were also observed.

Figure 1.17: North Clarifier

Figure 1.18: Breech in the North Clarifier Curtain Wall

Figure 1.19: Surface Debris and Algae Build up In North Clarifier

Figure 1.20: South Clarifier Weir Structure (Flocculation Rake inactive)

Polishing Basin

Once the clarified effluent enters the weir structure it travels to the polishing basin to allow for secondary settling and the addition of oxygen. The aerated polishing basing and quiescent polishing basin is a combined rectangular basin that is approximately twelve (12) feet in depth with a concrete apron to 18 inches below the minimum water surface elevation with an earthen liner below. This basin is separated into approximate one-half sections by a baffle wall with an approximate ten square foot opening to allow flow through the baffle wall. Two outlet box structures, one in each portion of the basin allows the treated effluent to flow to the flow monitoring station/chlorination chamber. The outlet structures are equipped with a weir plate structure to control the outflow.

Figure 1.21: Polishing Pond and Biolac Aeration System

Figure 1.22: Polishing Basin from East side of curtain Wall

Figure 1.23: Polishing Basin from East Side looking West

Figure 1.24: Significant Cracking north side of Polishing Basin

Figure 1.25: Cracking along Polishing Basin Apron

Figure 1.26: Significant Cracking and Separation at Southeast corner of Polishing Basin

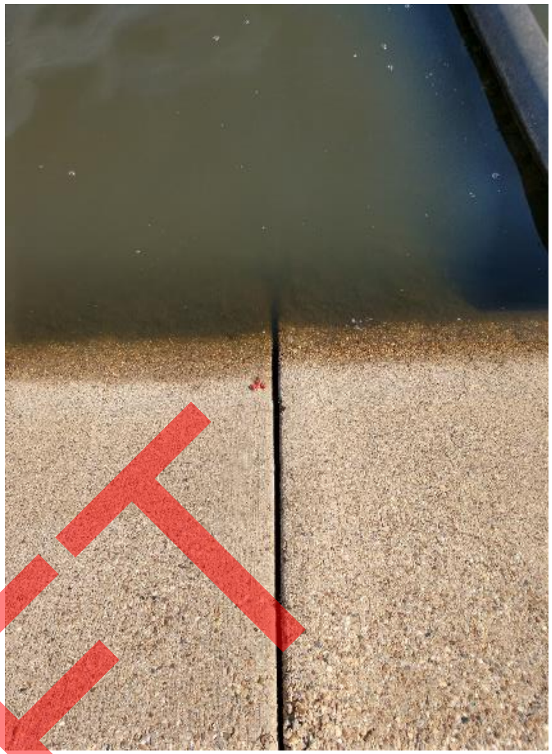

Figure 1.27: Joint Separation Along South end of Polishing Basin

Flow Monitoring and Chlorine Contact System

The flow control/monitoring for the plant is a Parshall flume located downstream of the polishing basin which appeared to be in good operating condition and has been recently calibrated.

The chlorination system for the plant has two major operational issues. The primary issue with the chlorination system is clogging of the chlorine injectors. When clogging occurs, little or no chlorine is provided for proper disinfection. This clogging can occur at any time and result in periods where effluent most likely will not meet the permitted discharge requirements. The primary cause of the clogging is the utilization of plant water instead of a potable water source. Plant water can contain solids that foul or plug the injectors. This issue should be effectively solved if potable water were to be provided at this location. In the interim until a potable water is available for this use, an enhanced strainer system on these components should help to minimize the potential for clogging. Additionally, plant operators can implement a more frequent inspection schedule to monitor the injection point. The second item impacting the chlorination system is the need for a dual feed chlorination system with automatic switch-over capabilities when one of the chlorine feed containers is exhausted. Controls should be automatic so the switch over will occur as needed and allow full consumption of a container.

Otherwise, when properly operating, the plant chlorination appears to be performing in satisfactory condition.

Sludge Drying Beds

To prevent a buildup of solids within the aeration basin, sludge is wasted periodically onto 5 sludge drying beds. All but one of these beds are overgrown with vegetation and appeared to not have been used for an extended period of time. Also, the surface of the bed filter material was below the bottom level of the concrete runner in the basin which indicates the basin may have been over-excavated in the past and could create issues with sludge removal if returned to use. Also, multiple drying beds were missing pipe fittings necessary to properly waste sludge; reflective of moving pipe fittings between beds for operation.

No sludge disposal records were available from the City. This operational component of the plant could not be evaluated. Also, it was observed during site visit that maintenance efforts were begun on the beds.

Unknown Conditions

Due to the inability to shut down the facility to perform a detailed full assessments of certain aspects of the plant could not be made at this time. This list includes (but is not limited to) the following:

- Aeration and Polishing Basins
  - Actual Depth
  - Liner Material
  - Sludge Depth
- Lift Station Pumps (Note, the lift station pumps in use are not as described in the plant operations manual.)

Overall Plant Assessment

Overall, the system is aged but is well built and is sufficient to meet the needs of the City of Hooks. Plant operations are reflective of poor maintenance, insufficient budget and inexperienced operators/teams over an extended period of time. Operations are driven by budgeting priorities and not by operational, permit standards.

The following items are recommendations and repairs for short term needs of the plant:

- Repair of all leaking air distribution piping;
- Cleaning, repair or replacement of air diffusion devices;
- Balancing of air distribution to obtain a uniform air distribution in the aeration basin;
- Repair the sludge rake system in the south clarifier;
- Repair the curtain wall in the north clarifier;
- Repair the cracks in all basins;
- Installation of a back-up emergency power generation system;
- Installation of a plant entrance sign with emergency contact number;
- Installation of “No Trespassing” or other appropriate warning signs on all sides of the perimeter security fence;
- Repair of leaning sections of the perimeter security fence;
- Installation of emergency eye-wash stations and other safety equipment at appropriate locations within the plant site;
- Establishment of a daily record keeping system for plant operations in compliance with the plant operations manual; and
- Establishment of a minimum budget for plant operations and maintenance.

Upon completion of these short term maintenance items, evaluation of plant operations should be conducted to determine if discharge parameters could be achieved with only two blowers operating to allow for cycling of the blowers.

<u>Long Term Operational Needs</u>

In the longer term, the following are recommendations for maintenance and operational upgrades to improve the operations of the plant.

- Installation of a potable water system to minimize clogging of the chlorine injection system;
- Implement basic cleaning and safety procedures;
- Evaluation of the elevation of the bar screen/headworks lift station to determine if those facilities are located above the 100-year flood elevation and what modifications could be made to elevate said facilities to an elevation above the 100-year flood elevation;
- Based on the original design of the basin concrete aprons, develop a crack sealing/maintenance program to minimize further degradation of the aprons;
- Installation of a security/emergency response lighting system at key locations within the plant facility;
- Add earth fill along the perimeter of the basin concrete aprons and establish vegetation to prevent further/future undermining of the aprons;
- Construction of an influent equalization basin to minimize peaks in flow during wet weather conditions;
- Installation of a grit and/or solids removal system to preserve plant pump and piping components; and
- Installation of a SCADA remote monitoring system for key plant components to allow for overall plant monitoring.

CONSTRUCTING A NEW WWTP

Plant Criteria

The selection of the type of treatment process for a new wastewater treatment plant should identify the best, most reasonable, cost effective and reliable wastewater treatment plant for Hooks. This selection process should be carefully considered as it will be a decision that the City will have to live with for a long-long time. Some of the types of treatment plants that could be considered are:

1. Oxidation Ditches (a.k.a. carousels). This method has many options for biological nutrient removal treatment and surge capacity.
2. Conventional or Extended Aeration. This method is a suspended growth system including nitrification, denitrification and proprietary schemes.
3. Contact Stabilization. This method is also a suspended growth system with limited nutrient removal capability.
4. Fixed-Film Treatment Processes. This method includes trickling filters, biotowers, rotating biological contactors and other proprietary systems.
5. Aerated Lagoons or Facilitative Lagoons.
6. Sequence Batch Reactors
7. Other state-of-the-art treatment schemes. Typically these would not be appropriate for a system the size of the City of Hooks.

Due to the importance of selecting the right type of plant, and the many unknowns at this time, it is outside of the scope of this report to determine a new plant configuration.

New Plant Considerations

In order to decommission the existing plant and construct a new facility there are a few items that need to be addressed. If a new facility is built and the old plant is removed, a new TCEQ wastewater discharge permit will be required. The current permit has more lenient criteria for the effluent discharge characteristics from the plant and allows the current facility to be grandfathered under the older plant requirements. A new plant will not be grandfathered under the old standards, thus current design standards will be required to design the new plant and effluent discharge.

Also, as shown on the attached exhibit, the majority of the existing plant facility and City of Hooks' property lies within a FEMA Zone A floodplain. Since regulations require that the entire facility be constructed outside of the floodway, we anticipate approximately 3.5 acres will need to be purchased from the adjoining property to facilitate a new wastewater treatment plant (+/- depending on plant type and configuration). As depicted on the exhibit, we determined that the most economical solution is to purchase additional property from the adjoining property to the south. Any land purchased to the south would be outside of the 100 year floodplain and allows utilization of the approximately 1.5 acres of city property currently not in the floodplain. Once the new plant is constructed flow from the existing lift station can be diverted to the new plant, treated, and then discharged into the existing 48" outfall pipe just past the chlorine contact chamber and allowed to be released at the existing discharge location.

The existing plant would need to be decommissioned and removed leaving only the outfall and lift station. Since it appears that the existing bar screen and lift station are below the 100 year floodplain elevation, to meet current TCEQ regulations a containment berm would need to be constructed around this portion of the plant. This berm will serve a dual purpose, preventing floodwaters from entering the system and to prevent any unauthorized discharges from flowing out the top of the lift station and into the creek. It is also recommended to construct a potable waterline to the new facility during this process.

While a new plant will improve plant efficiency and decrease maintenance needs, plant maintenance and active management is still required. While incurring an upfront cost to construct the new plant, the city is still be responsible for daily maintenance to prolong the life of the new facility to the maximum possible. Further study is needed to determine the cost of a new plant, future operations, and the monthly utility costs.

ALTERNATE WWTP OPTIONS

Route Evaluation from Hooks to Collins

If desired by the City of Hooks and Riverbend, the existing Hooks treatment plant can be decommissioned and rerouted to the Ron Collins treatment plant owned and operated by Riverbend. In order to evaluate this option, multiple routes and alignments from the current Hooks treatment facility to the Riverbend Facility were studied. Our basis of evaluation in order of importance was:

- minimize land owner impact, I-30 and US-82 crossing locations
- most direct alignment feasibly possible
- Input from TexAmericas Center for routing and placement

Since around 60% of the proposed alignment will be located on the TexAmericas Campus it was important to have their input on an alignment to ensure minimal conflicts if this option is pursued. Based on these criteria it was determined that layout #3 was the best option at this level of study. In order to construct the new facilities up to 4 land owners, TxDOT right of way, Texas Northeastern RR right of way and TexAmericas property would be impacted.

Equipment Requirements

Multiple new facilities will be necessary to pump the city of Hooks effluent over 4.5 miles to the Collins Plant and a vertical elevation change of over 35 feet. As shown on the attached exhibit, a 10 foot by 15 foot wet well with and automatic screen or rake is proposed at the current plant site. This new wet well shall have an overflow pipe back to the existing lift station to allow for EQ storage in the existing aeration during wet weather. It is a requirement to provide aeration to the EQ basin so the existing maintenance house, pumps, and aeration lines will need to remain in place. The Existing clarifiers, sludge drying beds, polishing basin, chlorine chamber, and outfall should to be decommissioned and removed. Once the clarifier is removed the side of the clarifier pit will need to be core drilled to allow installation of a gravity return pipe to the new wet well. Since the current daily flow is around 0.36 million gallons per day (MGD) but the design flow required by TCEQ is 2.7 MGD, we recommend variable frequency drive pumps be installed in the new wet well to allow for variable pumping volumes as needed based on inflow characteristics. It is to be noted that the higher flows are due to inflow and infiltration when heavy rains are received during times of saturated ground conditions. Based on our preliminary findings, an 800 gallon per minute (GPM), a 1200 GPM, and a 2000 GPM pump is needed at the wet well in order to have the required TCEQ capacity. In order to transport this much effluent 12 inch force mains are needed, and 21 inch gravity lines will need to be used. In total, around 14,500 linear feet of 12 inch force main, 10,350 linear feet of 21 inch gravity, 600 linear feet of 12” force main by bore under I-30,US-82,and Texas Northeastern Railroad along with over 20+ gravity sewer manholes.

Benefits to the Ron Collins Plant

Since the primary source of effluent for the Ron Collins plant is Red River Army Depot (RRAD), Riverbend faces many challenges with plant operations. RRAD has no residential housing which affects the quality of effluent and operates on a 4 day week with little to no effluent on Friday, Saturday, or Sunday. The addition of Hooks’ primarily residential flow and being able to supply the Collins Plant with effluent 7 days a week allows the plant to operate more efficiently and consistently. Additionally, utilization of the existing aeration basin at the Hooks WWTP as an equalization basin would help minimize the peak wet weather flows to the plant. Construction of a similar equalization basin for the influent currently going to the Collins Plant would further aid the operations of the plant.

COMPARISON OPTIONS 1-3

Cost Analysis

Based on the options listed above a preliminary cost analysis has been made. These costs are for comparison purposes of this report only and are not to be used for budgeting purposes. Once an option has been selected a more in depth study is necessary to determine a more precise project cost.

Opinion of Probable Cost Estimates

Short Term Operational Upgrades	Quantity	Unit	Unit Cost		Estimated Cost	
Repair/Replace Air Distribution Piping*	1	LS	$	155,000	$	155,000.00
Repair Sludge Rake System	1	LS	$	5,000.00	$	5,000.00
Repair Curtain Wall	1	LS	$	3,000.00	$	3,000.00
Emergency Generator	1	LS	$	75,000.00	$	75,000.00
Plant Safety (Signage, Eye Wash, PPE, ETC)	1	LS	$	3,000.00	$	3,000.00
Security Fence Repairs	1	LS	$	3,000.00	$	3,000.00
Engineering	1	LS	$	14,944.40	$	14,944.40
Contingency (20%)	1	LS	$	29,888.80	$	29,888.80
		Total Estimated Cost			**$**	**301,277.20**

*** - Based on actual material and installation quote from Biolac**

Long Term Operational Upgrades	Quantity	Unit	Unit Cost		Estimated Cost	
Potable Water System	3000	LF	$	15.00	$	45,000.00
Lift Station Containment Berm	1	LS	$	80,000.00	$	80,000.00
Automatic Bar Screen *	1	LS	$	100,000.00	$	100,000.00
Basin Concrete Apron Repairs/Maintenance	1	LS	$	5,000.00	$	5,000.00
Security/Emergency Lighting	1	LS	$	25,000.00	$	25,000.00
Basin Area Site Grading Repairs	1	LS	$	10,000.00	$	10,000.00
Influent Equalization Basin	1	LS	$	325,000.00	$	325,000.00
Grit Removal System	1	LS	$	800,000.00	$	800,000.00
SCADA Monitoring System	1	LS	$	40,000.00	$	40,000.00
Engineering	1	LS	$	133,000.00	$	133,000.00
Contingency (20%)	1	LS	$	266,000.00	$	266,000.00
		Total Estimated Cost			**$**	**1,829,000.00**

*** - Based on actual material quote from Biolac**

Hooks WWTP Decommission & Replacement				
	Quantity	Unit	Unit Cost	Estimated Cost
1.0 MGD Package Treatment Plant (RS Means)	1	LS	$ 10,000,000.00	$ 10,000,000.00
Plant Decommissioning	1	LS	$ 800,000.00	$ 800,000.00
Engineering	1	LS	$ 700,000.00	$ 700,000.00
Surveying (Design, Easements& New Property)	1	LS	$ 5,000.00	$ 5,000.00
Land Acquisition	1	LS	$ 30,000.00	$ 30,000.00
Contingency (20%)	1	LS	$ 2,307,000.00	$ 2,307,000.00
		Total Estimated Cost		**$ 13,842,000.00**

Hooks WWTP Decommissioning & Reroute to Collins				
	Quantity	Unit	Unit Cost	Estimated Cost
12" Force Main	13900	LF	$ 60.00	$ 834,000.00
12" Force Main by Bore (Steel Encased)	600	LF	$ 460.00	$ 276,000.00
21" Gravity Main	10350	LF	$ 50.00	$ 517,500.00
Manholes	22	EA	$ 6,000.00	$ 132,000.00
Triplex Pump Lift Station	2	EA	$ 870,000.00	$ 1,740,000.00
Conversion of Aeration Basin to EQ Basin	1	LS	$ 20,000.00	$ 20,000.00
Plant Decommissioning	1	LS	$ 450,000.00	$ 450,000.00
Engineering	1	LS	$ 277,865.00	$ 277,865.00
Surveying (design & Easements)	1	LS	$ 25,000.00	$ 25,000.00
Contingency (20%)	1	LS	$ 793,900.00	$ 793,900.00
		Total Estimated Cost		**$ 3,438,765.00**

Direct Comparison

Each option has its own advantages and drawbacks. Performing the short-term and long-term maintenance needs at the plant is the most economical path at this time. However, with an approximate 30 year old plant, other major maintenance or equipment failures are possible as many components of the plant are at or past their typical performance life. It is imperative that the City budget funds for the maintenance needs of the plant. Additionally, the operating costs of the plant would continue to be the responsibility of the City. IT is to be noted that the current treatment plant discharge is less stringent than allowed for new plants. If the plant is not maintained in a better fashion, the TCEQ could more closely scrutinize the plant and wastewater discharge. Replacing the existing plant is the most costly option but eliminates concerns with the current plant. Overall this would lead to a reduced maintenance cost but would require a funding for design and construction.

Rerouting the flow to the Collins plant would be more than the cost of maintenance upgrades to the existing Hooks WWTP but less than the cost of the construction of a new facility. This option would significantly reduce Hooks' maintenance costs and regulatory requirements of operations of a WWTP. Combining into a regional treatment location would meet one of the goals of the TCEQ and potentially benefit TexAmericas Center with their redevelopment plans.

SUMMARY

Recognizing that the users of the City services for wastewater disposal are the ultimate payers for the services, a rate impact analysis to the estimate the cost implications for the options is recommended. Based on discussions with Riverbend, rates per 1,000 gallons could range from $3.50 to $9.75, depending on current operational and treatment budget as well as facility charges, this could be a yearly operational expense of $462,000 to $1,287,000 for approximately 11MG per month.

Existing Plant Upgrades – On the surface, this option would be considered the least-cost alternative, however with the current age of the plant this may not necessarily be the best option. Operational and maintenance costs should be expected to increase as the plant continues to age and components reach failure points and replacement is required.

Additionally, given the overall condition of the City's wastewater system, both from a collection system and treatment plant perspective it may be in the City's best interest to have a third party responsible for the wastewater treatment and disposal so that it can concentrate on the needs of the collection system.

It should be noted that the short term plant upgrades would need to be performed regardless of which of these three options are selected. These upgrades are minimally needed so that plant operations are in reasonable compliance with TCEQ requirements. With Riverbend overseeing plant operations and routine operation being performed by City staff, a coordinated and focused effort on the part of both parties is needed to bring current plant deficiencies to the standards established by the permit and TCEQ.

Decommissioning and New Plant Construction – Construction of a new wastewater treatment plant is the most costly option and most likely unreasonable because of the cost. To be in compliance with current regulations, additional properties would have to be obtained to eliminate so that the plant could be located outside of the FEMA floodplain. The design, permitting and construction time is the longest of the alternatives evaluated.

Decommissioning and Connection to the Collins Plant – With this option the City would contract with Riverbend at a wholesale wastewater treatment rate to provide these services to the City. This would eliminate the WWTP operations and maintenance from City responsibility. Additionally, it would meet a TCEQ objective of regional wastewater treatment

where feasible.

Recommendation – Based on the findings of this report, it is recommended that the decommissioning and connection to the Collins Plant be pursued as the best alternative. This option provides the following benefits:

- relieves the City of WWTP operation and maintenance of an aging plant,
- provides a regional solution to wastewater treatment,
- provides a municipal sewage base to the operations of the Collins plant,
- provides opportunity to TexAmericas Center to utilize the infrastructure which directly and indirectly benefits both the City and Riverbend, and
- Provides a stable long-term wastewater disposal means for the City.