

Appendix H
West Biloxi Wastewater Treatment Facility Assessment
Technical Memorandum

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Subject	West Biloxi WWTF Assessment	Project Name	Harrison County Utility Authority (HCUA) Water & Sewer Resources Plan Phase II
Attention	John Wilson, PE Executive Director, HCUA	Project No.	D3113002
From	Jacobs Engineering Group Inc. (Jacobs)		
Date	April 1, 2020		

1. Introduction

The West Biloxi Wastewater Treatment Facility (WWTF) was built in 1973, east of Popp's Ferry Road and south of Back Bay of Biloxi. In 1989, a large expansion and remodel was completed on the West Biloxi facility. Prior to this reconstruction, the plant consisted of a force main influent system, a grit removal system, two 30,000-square-foot aeration basins, two square clarifiers between the aeration basins, a circular suction clarifier, a chlorine contact chamber, and effluent sampler pump. For sludge processing, the facility used two aerobic digesters and a sludge thickening system. The 1989 update remodeled the portion of the existing facility used for secondary treatment into a space with three smaller aeration basins, a larger chlorine contact chamber, two post-aeration basins, and a blower and pump gallery. A cascade aerator and submersible effluent pumps were added at the effluent discharge location. A new secondary clarifier was built, and the existing clarifier was rehabbed. Additionally, a new headworks system was added, with three flow metering Parshall flumes, mechanical screens, an aerated grit removal system, and new influent pumps. The site plan and process flow diagram displaying the current layout of the West Biloxi WWTF are in Attachments 1 and 2, respectively.

The Parshall flumes were installed to measure the flow from the three areas serviced at West Biloxi, the city of Gulfport, the western portion of Biloxi, and Keesler Air Force Base (AFB). Due to the large expansion in 1989, the design average daily flow and permitted effluent flow at West Biloxi is 7.89 and 11.7 million gallons per day (MGD), respectively. According to the plant's record drawing, the peak design flow is much larger at around 27.1 MGD, which is approximately a 3.4 peaking factor. However, the Utility Partners operators interviewed at West Biloxi indicated that the surface aerators are turned off during flows of around 8 MGD to avoid settling issues in the secondary clarifiers. The effluent discharges into the Back Bay of Biloxi and all waste solids are hauled for reuse land application.

2. Influent

2.1 Overview

The Sunkist, Hiller Park, and Beauvoir pump stations convey flow from the Biloxi area to the West Biloxi WWTF through 18-inch force mains. The Sharon Hills, Jane Lane, Gulf View, and Broadwater pump stations also convey raw wastewater from Biloxi area to the West Biloxi WWTF through smaller force mains which are either 8-inch or 10-inch force mains. In addition, the Gulfport and Keesler pump stations convey flow from the city of Gulfport and Keesler AFB, respectively, to the West Biloxi WWTF through 20-inch force mains. The three flows from Biloxi, Gulfport, and Keesler are measured by three separate Parshall flumes upstream of the headworks at the West Biloxi facility. The average and peak daily flow recorded at the West Biloxi facility in the last 5-year period from January 2014 to December 2018 was 4.3 MGD and 15.5 MGD, respectively. Figure 2-1 shows the historical monthly average flows received at the West Biloxi facility between January 2014 and December 2018. Overall, the monthly average influent flow has remained below the plant's average design capacity of 7.89 MGD and permitted effluent capacity of 11.7 MGD. However, the plant received relatively high flows in 2018 and was operating near its design capacity in mid-2018 as seen on Figure 2-1.

2.2 Equipment

Flows to the West Biloxi WWTF are measured individually by flow source for billing purposes. The flows from city of Biloxi pump stations combine in a force main collection box and are measured with a 24-inch Parshall flume. The flow from Gulfport and Keesler AFB are measured with two separate 12-inch Parshall flumes.

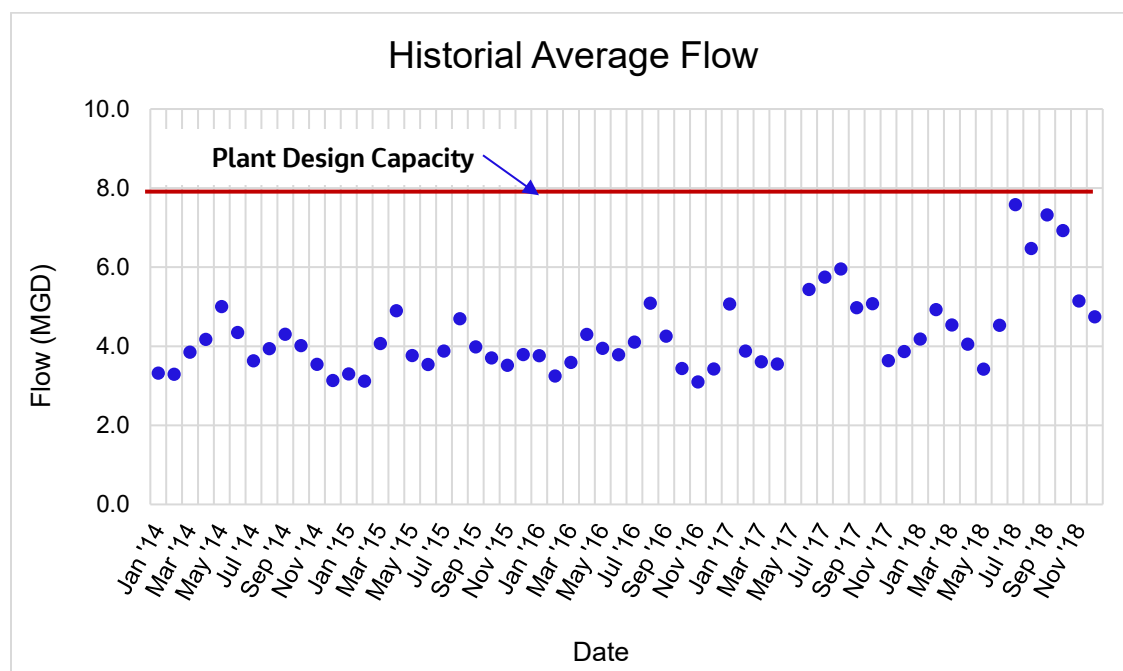


Figure 2-1. Historical Monthly Average Influent Flow

2.3 Influent Flow Projections

The West Biloxi WWTF is situated in the Biloxi service area that is expected to experience minimal population growth compared to other HCUA service areas such as D'Iberville. According to the HCUA 2015

Phase 1 Master Plan by Brown, Mitchell & Alexander, Inc. (BMA 2015), the Biloxi service area is projected to experience an annual population growth rate of 0.82 percent between 2015 and 2040. Additionally, an employment increase of 17.5 percent (0.65 percent per annum) is expected for the Biloxi service area within that same period.

The influent flow projections for the next 25 years (i.e., 2020 to 2045) for the West Biloxi WWTF was estimated using the Phase 1 population growth factors as well as the historical influent flow information obtained for 2015 to 2018. It should be noted that although relatively higher historical flows were recorded in 2018, more recent flow data (i.e. 2019 to 2020 flow data) was needed to confirm if flow is consistently increasing at West Biloxi WWTF, however, flow data for 2019 and 2020 was not available at the time of the analysis. Therefore, an average flow contribution per capita was calculated using the annual average monthly flow and estimated population for 2015 to 2018. An average flow per capita was estimated as 128.2 gallons per day per capita and was assumed to remain the same throughout the planning years. The projected average flow for the West Biloxi WWTF in 2045 is expected to be 5.5 MGD, a 43 percent increase from 2015. Despite the projected increase in flow, the West Biloxi WWTF will be operating at 70 percent of its average design capacity of 7.89 MGD and only 47 percent of its permitted average capacity of 11.7 MGD by 2045. The influent 5-day biochemical oxygen demand (BOD₅) is projected to reach 88 percent of plant's stated design capacity by 2045, with the current two aeration basins in service. The projected influent flows and BOD loadings are shown on Figure 2-2.

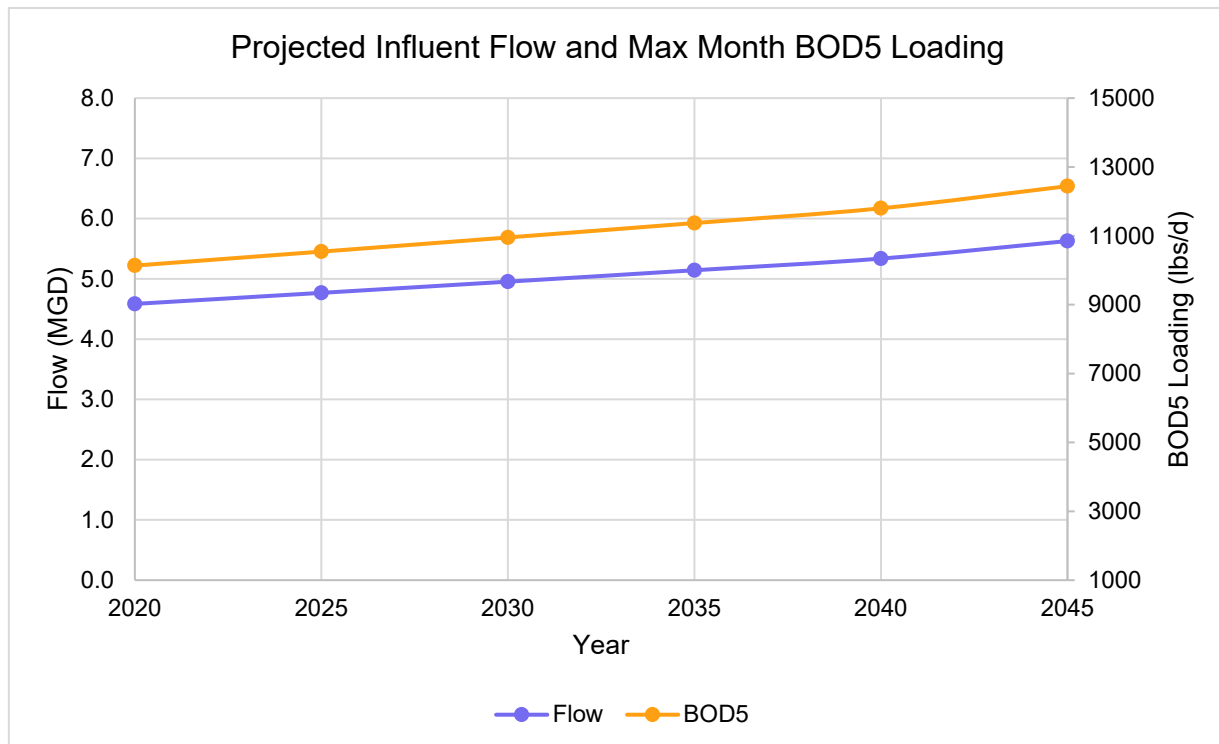


Figure 2-2. Projected Average Influent Flow and Max Month BOD₅ loading

2.4 Recommended Improvement

Section 4.5 outlines a recommendation to address future influent loads approaching the capacity of the secondary treatment system.

3. Headworks

The raw wastewater from the three influent Parshall flumes are combined in a concrete trough at the headworks for screening and grit removal. The headworks at the West Biloxi WWTF consists of mechanically cleaned screens and a defunct aerated grit removal system.

3.1 Headworks Screens

The influent proceeds to the headwork screens where the raw wastewater is screened to remove large debris to protect downstream unit processes. There are two Parkson Aquaguard traveling mechanical screens that are used to screen the influent. Screenings are compacted and discharged into a dumpster and later hauled to a landfill. From the plant's record drawing, each of the mechanical screens has 3/16-inch clear openings and have a capacity of 27.1 MGD. At the time of visit, both mechanical screens had some broken teeth as shown on Figure 3-1. Plant staff mentioned a handful of rags escape the screening process and end up in the return activated sludge (RAS) pumps or on cables of the aerators in the aeration basins. On one occasion, a rag ball was found in the aeration basin when the two mechanical screens were taken out of service. The mechanical screens are uncovered and significantly contribute to the odor issues at the facility. Overall, the mechanical screens were not in good condition at the time of visit. Replacement of the screens is recommended.



Figure 3-1. West Biloxi WWTF Headworks Screens

3.2 Grit Removal

The West Biloxi plant used to have an aerated grit removal system for separating grit from the screened influent. However, the aerated grit system has been out of service since 2004. Currently, the screened influent flows by gravity into the two grit basins, which are 41 feet long and 14 feet wide. The grit basins, which were originally aerated and equipped with swing diffusers, now function as primary settling basins where grit is settled. The supernatant is conveyed to an influent pump station to be conveyed to the

aeration basins. The settled grit is removed and hauled offsite every 6 to 8 months by Breaux Brothers. This grit removal process is not effective and can result in grit collection in downstream processes. Grit collection in downstream units such as the aeration basins decreases the capacity of the unit and interfere with the biological treatment because the mixed liquor will have a reduced volatile solids fraction. According to plant staff, observed grit in the aeration basin or other downstream units is sometimes used as an indicator to schedule for grit removal from the grit basins. A well-functioning grit removal system is recommended to protect downstream equipment and processes at the West Biloxi WWTF. Figure 3-2 shows the grit settling basins at the West Biloxi WWTF.



Figure 3-2. Aerated grit removal system at the West Biloxi WWTF out of service since 2004

3.3 Influent Pump Station

The effluent from the grit basins are conveyed into an influent pump station divided into two wet wells. There are two sluice gates that isolates the two wet wells. In addition, there is a connecting sluice gate between the wet wells that can be used to balance water levels between the wet wells when necessary. Each wet well contains three non-clog centrifugal submersible pumps that are driven by 40-horsepower motors and have the capacity to convey flow at 3,850 gallons per minute (gpm). The pumps convey the de-gritted flow to the aeration basins via a 30-inch pipe.

3.4 Influent Flow Measurement

In addition to the Parshall flumes upstream of the headworks screens, there is one 24-inch magnetic flowmeter that is used to measure total plant flow before the screened influent is discharged to the aeration basins.

3.5 Odor Control

West Biloxi WWTF has odor issues that sometimes generate complaints from nearby residents. The odor at the facility emanates from an uncovered influent channel and the headworks screens as well as other processes that results in the release of odorous gases into the atmosphere. The facility uses deodorant mist sprays located around the perimeter of the facility to control odor. According to plant staff, the spray helps reduce resident complaints. The reduction in the number of complaints was partially attributed to the residents being able to see the spray in use. During a follow-up meeting in February 2020, plant staff mentioned that the influent channel at that headworks is now covered and will help with odor control. Other odor control mechanisms need to be evaluated to further reduce odor at the West Biloxi WWTF.

3.6 Capacity/Reliability Assessment

Assessments of the headworks components at the West Biloxi facility are presented in Tables 3-1 and 3-2. The headworks screens have capacity to handle the current peak flow conditions. The grit removal system

cannot be assessed because it has been out of service since 2004. The grit removal system needs to be replaced to ensure effective grit removal at the West Biloxi WWTF.

Table 3-1. West Biloxi WWTF Headworks Screens Assessment

Parameter	Design Criteria	Capacity Assessment	Reliability
Number of Units	2 Mechanical	The current peak flow at the West Biloxi facility is 15.5 MGD. The mechanical screens have about 71% excess capacity.	Criteria ^b : 100% of the peak flow if the mechanical screen is taken out of service. One mechanical screen has 100% capacity for peak conditions.
Type	Self-cleaning traveling screens		
Capacity (Each) ^a	27.1 MGD Each		

^a Given capacity from plant record drawing (Sheet C-26).

^b Ten States Standard 2004, Section 61.124 (Health Research 2004).

Table 3-2. West Biloxi WWTF Headworks Grit Removal System Assessment

Parameter	Design Criteria	Capacity Assessment	Reliability
Number of Units	2	The two aerated grit removal systems have been out of service since 2004.	
Type	Aerated grit chambers		
Capacity (Each) ^a	13.56 MGD		

^a Given capacity of the aerated grit system when it was functional

3.7 Recommended Improvements

The headworks at the West Biloxi plant consists of two mechanical screens that have broken teeth and have reached the end of their useful life. Maintaining the current headwork screens prevents efficient preliminary treatment, which can cause problems to downstream unit processes. Rags and other floating materials sometimes escape the screening process due to the screen openings, inefficient cleaning of the screens leading to screenings carryover, or a combination of the two. As a result, the RAS pumps will need to be de-ragged more often, which will also increase operational and maintenance time and effort.

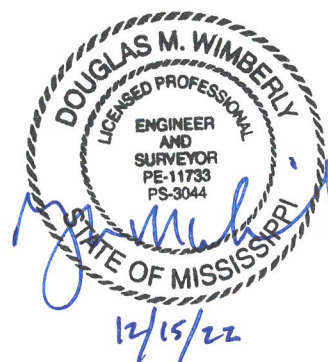
At present, grit removal is not effective because the aerated grit removal system has been out of service since 2004. Buildup in the grit chambers sometimes gets carried over into the aeration basins. Grit collection in the aeration basins reduces the mixed liquor volatile solids fraction and disrupts the biological process. In addition, the aeration basin capacity will reduce as a result of grit buildup. The entire headworks at the West Biloxi WWTF needs rehabilitation to ensure effective preliminary treatment of the wastewater to protect downstream processes and equipment. The following improvements are recommended for the headworks at the West Biloxi WWTF:

- 1) Replace the two mechanical screens with 6-millimeter perforated plate screens of same peak flow capacity as the current mechanical screens. The screens should be equipped with a cover over the entire screen surface to help control odor at the headworks. The two mechanical screens should have an alternating maintenance schedule such that both are not taken offline at the same time. This will help prevent rag balls from ending up in the aeration basins when both mechanical screens are out of service.

November 2022

SRF Facilities Plan

Harrison County Utility Authority (HCUA) West Biloxi WWTP Headworks and Grit Removal System



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1.0 Summary, Conclusions, and Recommendations

The Harrison County Utility Authority (HCUA) is considering a project to replace the existing solids removal system which has reached its operational life and will install a grit removal system to replace the existing system, the operation of which has been abandoned due to equipment failures at the West Biloxi WWTP. The new headworks will consist of a screen type solids removal system followed by a piston-grit type grit removal system. This project will meet the current and future needs of the plant by helping to reduce solids in the treatment effluent. It will also help to reduce buildup of grit in the plant which will prevent the reduction of treatment capacity. An alternate to this project was not considered as it proposes to replace an existing facility. The estimated project cost is \$15,340,000.

2.0 Need For The Project

This project proposes to replace the existing solids removal system and install a grit removal system to replace the existing system. This is necessary as the plant was originally built in 1973 but the existing systems being replaced were installed during a large facility expansion and remodel done in 1989 and the systems are nearing the end of their current useful life and is in need of replacement prior to total failure. Failure of this system would cause a buildup of solids in the plant which could cause maintenance issues as well as potentially cause violations of the discharge permit in the future.

3.0 Existing Situation

3.1 Planning Area and Boundaries

The planning area for the Harrison County Utility Authority (HCUA) is Harrison County, Mississippi. The facility is located in Biloxi, MS, east of Popps Ferry Road and south of Biloxi Back Bay. Refer to Figures 6.1 and 6.2 for a map of the project area.

3.2 Population Served

It is estimated that this treatment facility currently serves approximately 50,000 people.

3.3 Surface waters affected by or improved by the proposed project:

The Biloxi Back Bay is the direct receiving stream from the West Biloxi WWTP.

3.4 Organizational context (city only, city-county, intercity, etc.)

The Harrison County Utility Authority (HCUA) is a state formed entity governed by a Board of Directors comprised of the Mayors from each of the five cities and two Representatives from the Harrison County Board of Supervisors. The HCUA provides services for Water, Wastewater, Storm Water and Solid Waste operations throughout designated areas of Harrison County.

3.5 Location, description, and performance of existing facilities

According to the HCUA Phase 2 Master Plan dated September 2021, HCUA currently operates approximately 51 sewer pump stations, 10 wastewater treatment facilities, and a large network of gravity sewer and force mains.

Figure 3 below shows the general locations and capacities of HCUA's existing facilities in the study area.

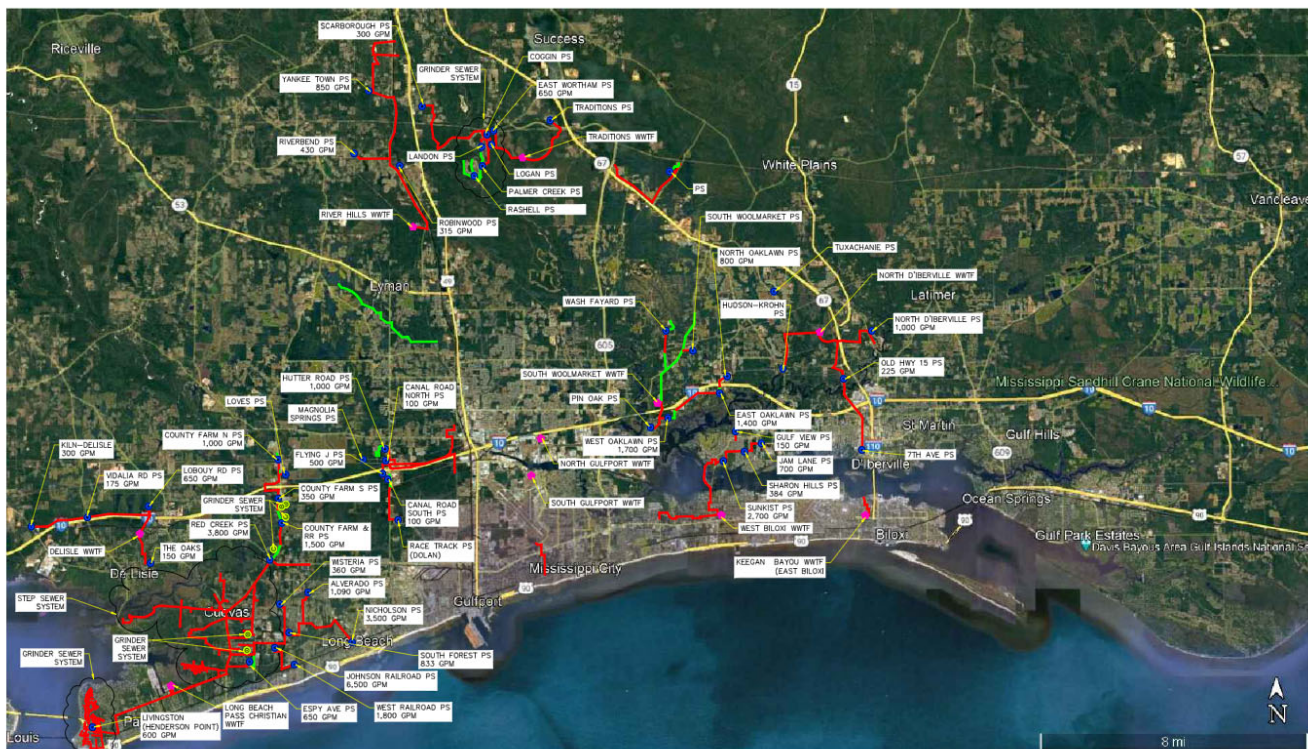


Figure 3- HCUA Facilities and Capacities

Per the Jacobs Engineering technical memorandum included in Attachment 1, The facility at the West Biloxi Wastewater Treatment Facility has an existing headworks which is in poor condition. The technical memorandum states that the mechanical screens have several missing teeth on them and that they are at the end of their life. The memorandum also states that the aerated grit chamber is not functional and has been out of service since 2004.

3.6 Identification of Significant Users

The users in the HCUA service area are primarily residential. Although there are also some light commercial users such as restaurants and retail shops, there are no significant users that utilize 5% or more of the plant's capacity.

3.7 Identification of unsewered areas and on-site systems

There are no known unsewered areas within the study area.

4.0 Waste Flow and Load

The West Biloxi WWTP is permitted for a max permitted flow of 11.7 MGD. The monthly average flow of the plant is currently 3.87 MGD.

4.1 Population Growth Data

On the following page is a table from the HCUA Phase 1 Master Plan that projects the population growth over time through 2040 in HCUA's various service areas. The West Biloxi Wastewater Treatment Plant service area is represented in the table below under West Biloxi and West Biloxi North.

Appendix I:
Projected Population Change to the Year 2040 by Wastewater Treatment Service Area

ID	SERVICE AREA	ESTIMATED		PROJECTED					2015-2040		
		2010	2015	2020	2025	2030	2035	2040	CHANGE	PCT	ANNUAL
1	West Wolf River	4,658	4,896	5,069	5,154	5,298	5,478	5,677	781	16.0	0.59
2	East Wolf River	3,813	3,951	4,029	3,970	4,026	4,230	4,585	635	16.1	0.60
3	Lizana	1,937	2,026	2,086	2,084	2,121	2,212	2,359	333	16.4	0.61
4	Howson	301	309	312	305	310	330	363	54	17.5	0.65
5	Success	1,555	1,637	1,698	1,700	1,719	1,770	1,859	222	13.5	0.51
6	DeSoto	1,319	1,451	1,572	1,672	1,720	1,718	1,679	227	15.7	0.59
7	Tuxachanie Creek	274	309	342	380	408	425	435	126	40.8	1.38
8	Three Rivers	1,012	1,051	1,075	1,072	1,094	1,142	1,214	163	15.5	0.58
9	Tchoutacabouffa River	1,586	1,683	1,760	1,785	1,810	1,845	1,893	210	12.5	0.47
Unservd Areas Subtotal		16,455	17,314	17,942	18,122	18,505	19,151	20,065	2,751	15.9	0.59
10	DeLisle	1,511	1,592	1,652	1,657	1,676	1,727	1,814	222	13.9	0.52
11	DeLisle North	739	830	915	1,013	1,092	1,157	1,212	383	46.1	1.53
12	Henderson Point	161	171	180	182	184	188	194	23	13.2	0.49
13	Pass Christian	4,581	4,861	5,080	5,186	5,300	5,437	5,602	741	15.3	0.57
14	Bayou Portage	76	85	94	104	112	119	125	39	46.1	1.53
15	Pineville	779	899	1,017	1,176	1,304	1,392	1,445	546	60.7	1.92
16	Long Beach	15,399	16,204	16,793	17,119	17,639	18,276	18,968	2,764	17.1	0.63
17	Long Beach North	2,777	2,880	2,940	2,927	2,983	3,106	3,287	407	14.1	0.53
West Harrison Subtotal		26,023	27,522	28,670	29,363	30,291	31,403	32,647	5,125	18.6	0.69
18	Gulfport South	32,041	33,894	35,315	36,035	36,962	38,086	39,370	5,476	16.2	0.60
19	Gulfport North	36,907	39,597	41,843	43,684	45,428	46,961	48,249	8,652	21.9	0.79
20	Gulfport North East	9,014	9,743	10,371	10,879	11,333	11,767	12,205	2,462	25.3	0.91
Gulfport Subtotal		77,962	83,234	87,529	90,597	93,723	96,814	99,823	16,590	19.9	0.73
21	West Biloxi	21,434	22,714	23,710	24,180	24,717	25,367	26,147	3,433	15.1	0.56
22	West Biloxi North	10,337	11,217	11,985	12,821	13,654	14,430	15,129	3,912	34.9	1.20
23	East Biloxi	6,766	7,330	7,819	8,252	8,647	9,017	9,376	2,046	27.9	0.99
Biloxi Subtotal		38,537	41,261	43,514	45,253	47,018	48,814	50,653	9,392	22.8	0.82
24	D'iberville	10,457	11,416	12,269	13,101	13,838	14,501	15,117	3,701	32.4	1.13
25	D'iberville North	1,472	1,718	1,959	2,305	2,591	2,794	2,919	1,202	70.0	2.14
D'iberville Subtotal		11,929	13,134	14,228	15,406	16,429	17,295	18,036	4,902	37.3	1.28
26	Woolmarket	5,409	5,922	6,380	6,864	7,301	7,692	8,044	2,123	35.8	1.23
27	Woolmarket East	856	948	1,033	1,119	1,187	1,244	1,296	348	36.7	1.26
Woolmarket Subtotal		6,265	6,870	7,413	7,982	8,489	8,936	9,340	2,470	36.0	1.24
28	Tradition	1,826	1,956	2,064	2,180	2,339	2,546	2,801	845	43.2	1.45
29	Tradition East	296	357	419	517	611	695	772	415	116.1	3.13
Tradition Subtotal		2,122	2,313	2,483	2,698	2,949	3,241	3,573	1,260	54.4	1.75
30	River Hills North	4,402	4,711	4,965	5,084	5,176	5,282	5,423	712	15.1	0.57
31	River Hills South	2,969	3,278	3,560	3,864	4,175	4,533	4,961	1,683	51.3	1.67
32	River Hills East	509	555	596	630	658	682	707	152	27.3	0.97
River Hills Subtotal		7,880	8,543	9,121	9,578	10,008	10,497	11,090	2,547	29.8	1.05
33	Seaway Industrial Park	0	0	0	0	0	0	0	0	0.0	0.00
34	Long Beach Industrial Park	34	38	42	47	50	52	52	13	35.2	1.20
HCDC Subtotal		34	38	42	48	50	52	52	13	35.2	1.20
HARRISON COUNTY TOTAL		187,207	200,229	210,942	219,047	227,463	236,203	245,279	45,050	22.5	0.82

- Demand:** Demand per the MDEQ Sewer Design Manual is recommended to be between 70 to 120 gallons per day per capita. This range assumes a use of 70 gpd plus between 0 to 50 gpd to account for infiltration into the system. In general, the rate of infiltration varies depending on several factors such as age, size, type, and many other factors.

4.2 Commercial/Industrial:

There are no known or planned major commercial or industrial users that would be connected to this proposed system.

4.3 Infiltration and Inflow:

As discussed above, the infiltration rate into the system is expected to be between 0 to 50 gpd depending on various factors.

4.4 Total Flow/Load:

Table 4.10 from the Phase 1 Master Plan is shown below which shows a summary of flows from the West Biloxi WWTP as well as from other plants which coincides with the expected demand values shown above. Further flow and loading data for the West Biloxi WWTP can be found in **Attachment 1**.

TABLE 4.10
HCUA Wastewater Treatment Facilities
Summary of Average and Peak Flows
July 2015

Name	Total Effluent Flow (Permit Mo. Average & Actual Yr. Avg)				Peak Day		Peak Week		Peak Month	
	Permitted Flow (MGD)	Average Daily Flow MGD (1/14-5/15)	Percent of Permitted Capacity	Dry Weather Flow (MGD) (1)	Flow (MGD) (2)	Peaking Factor (3)	Flow (MGD) (2)	Peaking Factor (3)	Flow (MGD) (2)	Peaking Factor (3)
EAST BILOXI (KEEGAN BAYOU) WWTF	10.00	4.34	43%	2.57	14.95	5.81	64.86	3.60	200.96	2.52
WEST BILOXI WWTF	11.70	3.87	33%	3.12	11.13	3.57	55.23	2.53	150.74	1.56
EAGLE POINT WWTF										
WOOLMARKET WWTF	2.00	0.26	13%	0.16	1.58	10.11	5.36	4.90	12.42	2.65
NORTH D'IBERVILLE WWTF	1.50	1.10	73%	0.89	3.20	3.60	44.16	7.09	43.07	1.56
GULFPORT NORTH WWTF	7.75	6.37	82%	4.46	30.52	6.84	212.72	6.81	275.45	2.06
GULFPORT SOUTH WWTF *	10.50	3.63	35%	2.96	37.34 ⁽⁴⁾	12.60	165.00 ⁽⁴⁾	7.95	356.44 ⁽⁴⁾	4.01
RIVERHILLS WWTF	0.50									
TRADITION WWTF	2.00	0.075	4%	0.05	0.58	10.20	1.00	2.51	3.01	1.70
LONG BEACH - PASS CHRISTIAN WWTF	7.00	2.93	42%	1.88	12.38	6.60	45.79	3.49	118.16	2.10
DELISLE WWTF	0.80	0.094	12%	0.07	0.63	9.24	1.45	3.02	3.86	1.88
OVERALL TOTALS:	53.75	22.66	42%	16.16	112.31		595.57		1164.10	

NOTES:

(1) Dry Weather Flow based on lowest daily average for the monthly reporting periods.

(2) Flow Data provided by Utility Partners.

(3) Peaking Factors based on Dry Weather Flow.

(4) Measured flow excludes bypass.

* Contains seasonal permit limits of 10.5 MGD and 16.0 MGD.

Furthermore, the improvements being proposed will be sized adequately to handle a 5-year, 24-hour storm event without any bypasses or overflows occurring.

5.0 Development of Alternatives

According to the WPCRLF Facilities Plan Checklist, this project falls under the category of a treatment system for a population of 10,000 or greater. The current technology includes an oxidation ditch and clarifier train after the headworks. The current project being proposed falls under rehabilitation since it is just replacing aging equipment and therefore does not require a cost-effectiveness analysis.

6.0 Selected Plan

6.1 General Information:

The selected plan includes the removal of the existing aerated grit removal system that has reached the end of its current operational life and replacing with a new Pisto-Grit type system. In addition, the project is to include the replacement of the headworks screens. Below is the current cost opinion for the proposed work as well as a site plan of the existing system layout from the HCUA Phase 2 Master Plan. The facility is located at the following coordinates:

Lat: 30.407172°

Long: -88.969027°

Table 2 Cost Estimate West Biloxi WWTP Headworks and Grit Removal System Harrison County Utility Authority					
Item	Item Description	Estimated Quantity	Unit	Unit Price	Item Total
1	Remove Existing Screening System and Aerated Grit Removal Basin	1	LS	\$ 1,015,000.00	\$ 1,015,000.00
2	Pisto-Grit Removal System (including grit handling, installation and appurtenances)	2	EA	\$ 1,750,000.00	\$ 3,500,000.00
3	Rotating Screen Solids Removal System (including washer, compactor, installation and appurtenances)	2	EA	\$ 1,400,000.00	\$ 2,800,000.00
4	Piping Rework	1	LS	\$ 450,000.00	\$ 450,000.00
5	Electrical and Instrumentation	1	LS	\$ 1,900,000.00	\$ 1,900,000.00
6	Site Work	1	LS	\$ 450,000.00	\$ 450,000.00
7	Mobilization	1	LS	\$ 1,200,000.00	\$ 1,200,000.00
8	Painting	1	LS	\$ 135,000.00	\$ 135,000.00
9	Misc. Metals	1	LS	\$ 350,000.00	\$ 350,000.00
10	Temporary By-Pass Pumping	1	LS	\$ 300,000.00	\$ 300,000.00
				Sub-Total	\$ 12,100,000.00
				Contingency (10%)	\$ 1,210,000.00
				Design	\$ 1,230,000.00
				CE&I	\$ 800,000.00
				Total Estimated Cost	\$ 15,340,000.00

Figure 6.0- Cost Estimate

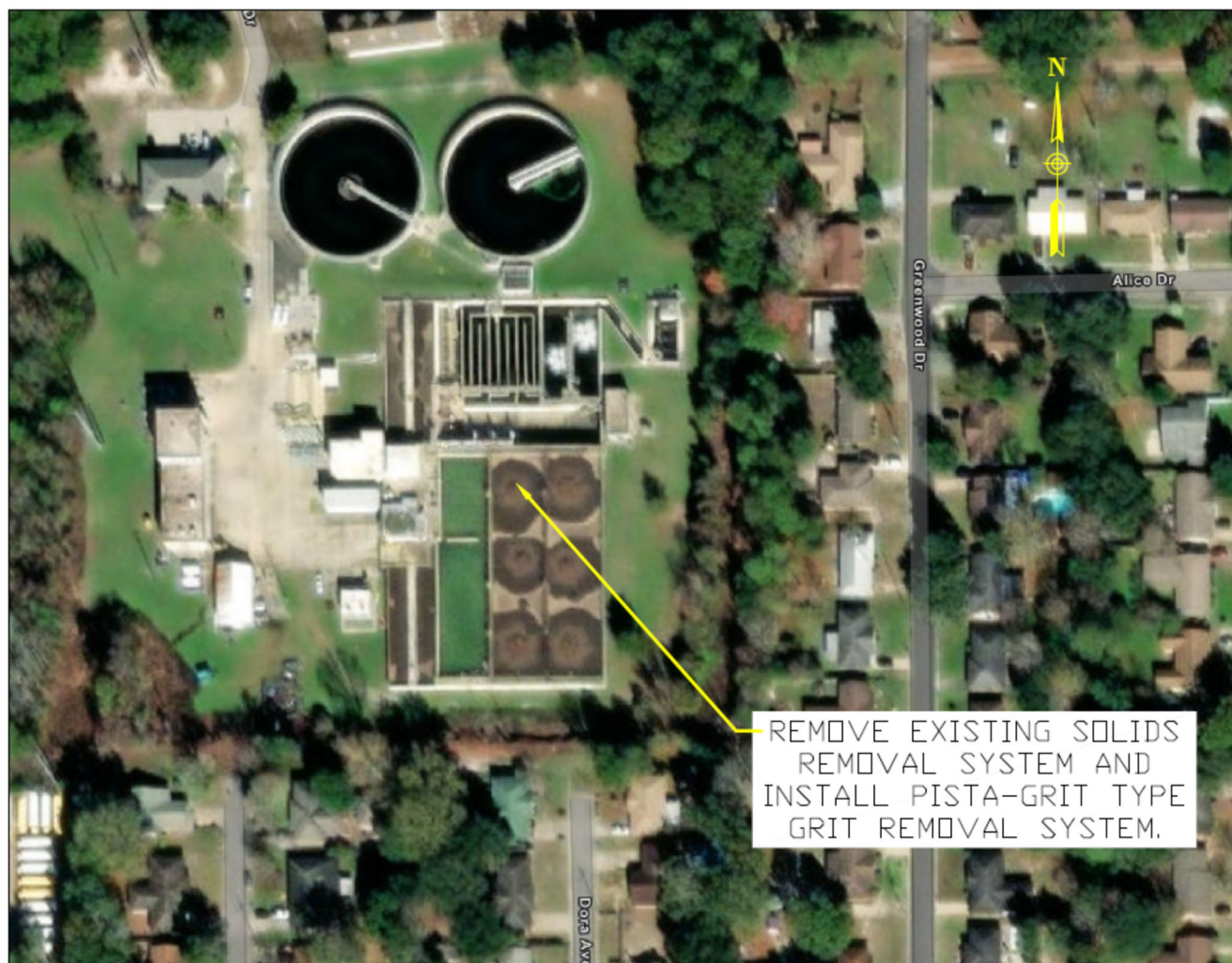


Figure 6.1- Proposed Improvements Map

Furthermore, the project is not located in a minority or low-income area and therefore has no impact on those areas.

6.2 Environmental Information and Impacts:

The project will be constructed within the limits of the existing treatment facility, and therefore, it is anticipated that all project activity will occur on previously disturbed ground and that no studies or special environmental permits will be required.

As part of the evaluation of the selected alternative, the selected plan was compared to the “no action alternative” for the effects on each of the factors shown:

	Selected Plan	No Action
Surface/groundwaters	Will Improve	Negatively Impact
Archaeological/historical/cultural resources	No Impact	No Impact
Vegetative/wildlife	Will Improve	Negatively Impact
Wetlands/navigable waterways	Will Improve	Negatively Impact
Floodplains	No Impact	No Impact
Coastal zones	No Impact	Negatively Impact
Air Quality	No Impact	No Impact

However, this Facility Plan will be submitted to all IGR Agencies for review and comment and if one of those agencies requires further study or permitting, it will be performed. Presented in **Attachment 2** are the letters where the Facility Plan was mailed to all the IGR agencies along with their comment letters in return. During the construction phase, minor temporary impacts including noise from construction equipment and dust and other erosion concerns may arise as is common in construction activities. These concerns will be mitigated using MDEQ recommended BMP's during construction to reduce those impacts.

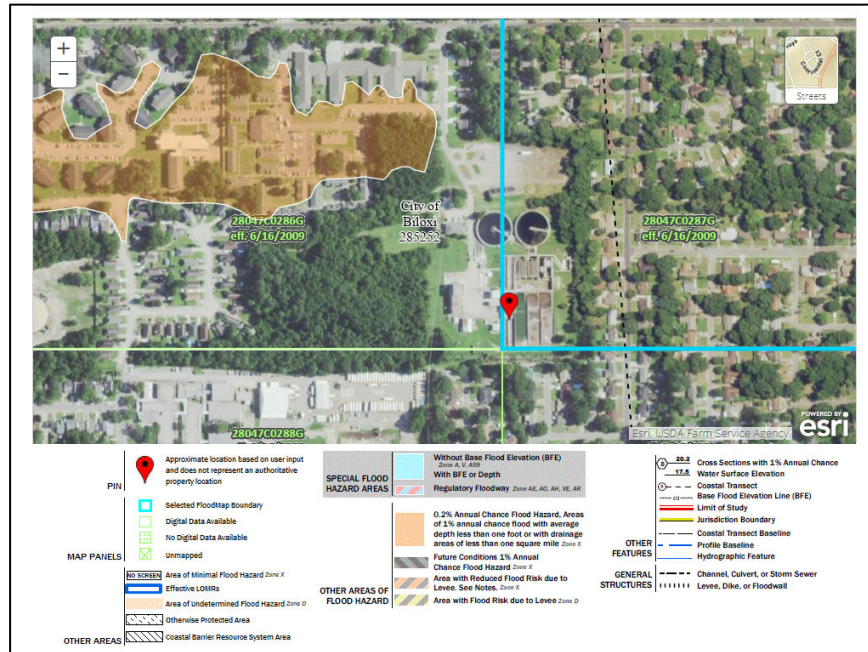
The current plant dewateres sludge created from the treatment process and disposes of solids at an offsite facility.

The project will not result in any increased loading. The plant has the necessary capacity to treat the demands.

The treated discharge from the treatment plant flows into Bernard Bayou which flows into Biloxi Bay which then flows into the Mississippi Sound. No adverse impacts to downstream potable water sources or recreational areas are anticipated due to the proposed project.

6.3 Flood Risks:

The project area is located outside of the 100-year flood hazard boundary. Below is a FEMA Flood Risk map of the project site:



6.4 Minority Issues:

The below table is a breakdown by minority group of the subject area from the 2020 Census. As the chart depicts, the Biloxi area contains a higher percentage of minority groups than most of the surrounding areas. Therefore, these groups are not being systematically excluded from receiving improvements.

	Biloxi, MS	Gulfport, MS	Bay St. Louis	Long Beach	Pass Christian
Race and Hispanic Origin					
White alone, percent	65.60%	52.70%	73.30%	88.50%	71.90%
Black or African American alone, percent(a)	20.90%	39.20%	18.40%	6.20%	19.40%
American Indian and Alaska Native alone, percent(a)	0.40%	0.20%	0.30%	0.00%	0.80%
Asian alone, percent(a)	4.70%	1.30%	1.10%	1.90%	1.10%
Native Hawaiian and Other Pacific Islander alone, percent(a)	0.10%	0.10%	0.00%	0.00%	0.00%
Two or More Races, percent	6.60%	5.10%	3.40%	3.30%	6.80%
Hispanic or Latino, percent(b)	9.00%	5.40%	6.00%	4.80%	4.80%
White alone, not Hispanic or Latino, percent	60.40%	50.00%	70.50%	84.30%	70.90%

7.0 Financial Analysis

See Financial Capability Summary in the following pages:

FINANCIAL CAPABILITY SUMMARY

Loan Recipient: Harrison County Utility Authority Date: 3/20/2023

Project Description:

Installation of new grit and solids removal headworks at the West Biloxi WWTP

1. Estimated Construction Costs

Planning/Application Phase Services	\$ 30,000.00
Design/Land Acquisition Phase Services	\$ 1,200,000.00
Land/Easement Purchase	\$ -
Construction	\$ 12,100,000.00
Construction Phase Services	\$ 800,000.00
Construction Contingency	\$ 1,210,000.00
Other()	
TOTAL	\$ 15,340,000.00

2. Funding Sources

WPCRLF Loan (New)	\$ 15,340,000.00
Other Loans/Bonds	\$ -
CDBG Grant	\$ -
Other Grant (	\$ -
Other (	\$ -
Less Other Loans	\$ -
TOTAL	\$ 15,340,000.00

3. New Debt Retirement

Financing Method	Amount	Interest Rate	Term	Annual Payment
WPCRLF (New)	\$ 15,340,000.00	1.80%	30	\$ 666,238.15
WPCRLF (Proposed LBPC WWTP Project)	\$ 25,660,000.00	1.80%	30	\$ 1,114,450.52
WPCRLF (Proposed NG WWTP Filter Project)	\$ 17,840,000.00	1.80%	30	\$ 774,816.73
WPCRLF (Proposed NG UV Project)	\$ 4,050,000.00	1.80%	30	\$ 175,897.30
Other Loan				\$ -
Bonds				\$ -
Other				\$ -
TOTAL				\$ 2,731,402.70

4. Estimated Annual Operation, Maintenance and Replacement (OM&R) Costs

Annual OM&R (new facilities)			
	Labor		\$ -
	Utilities		\$ 20,000.00
	Materials		\$ 10,000.00
	Outside Services		\$ 5,000.00
	Equipment Replacement		\$ 20,000.00
	Miscellaneous		\$ 10,000.00
a. Subtotal			\$ 65,000.00
b. Existing OM&R (to remain)			\$ 4,995,207.00
c. TOTAL OM&R (4a + 4b)			\$ 5,060,207.00

5. Total Estimated Annual Costs

Existing Debt Service					
WPCRLF (HCUA SRF C280828-06))	\$	4,665,908.00	0.80%	20	\$ 255,482.04
	RUS				
	Other				\$ 635,530.00

HCUA– West Biloxi WWTP Headworks and Grit Removal System
WPCRLF Facilities Plan
November 2022

New Facilities Debt Service (from 3)	\$ 2,731,402.70
Total Annual OM&R (from 4.c.)	<u>\$ 5,060,207.00</u>
TOTAL	\$ 8,682,621.74

6. User Charges

Existing Monthly Rates

Usage (1000 gal)		Class 1	Class 2	Class 3
First	(or Flat Fee)	\$	\$	\$
	to	\$/1000	\$/1000	\$/1000
	to	\$/1000	\$/1000	\$/1000
Over		\$/1000	\$/1000	\$/1000

Proposed Monthly Rates (if increase is proposed)

Usage (1000 gal)		Class 1	Class 2	Class 3
First	(or Flat Fee)	\$	\$	\$
	to	\$/1000	\$/1000	\$/1000
	to	\$/1000	\$/1000	\$/1000
Over		\$/1000	\$/1000	\$/1000

c. Proposed Revenue

Class	Avg. Use (1000 gal/mo)	Avg. Bill (\$/mo)	No. Users	Revenue (\$/mo)
1				
2				
3				
4				
Subtotal				

ANNUAL TOTAL (based on billings to member entities (cities and utility districts)) \$ 8,700,000.00 *

*HCUA funds its wastewater operations through cost sharing with member entities (Cities).
It does not send out individual customer bills on a monthly basis

7. Source of Annual Funding

User Charges (6. ANNUAL TOTAL)	\$ 8,700,000.00
Connection Fees	\$ -
Other ()	<u>\$ -</u>
TOTAL (must exceed 5 TOTAL)	\$ 8,700,000.00

8. Annual User Charge Per Household and High Cost Comparison

a. Total annual user charges (6. ANNUAL TOTAL)	\$ 8,700,000.00
b. Non-residential share of total	0
c. Residential share of total (8.a-8.b)	\$ 8,700,000.00
d. Existing households to be served	14486
e. Average per household (8.c/8.d)	\$ 600.58
f. Median household income	\$ 48,999.00
Percentage (8.e/8.fx100)	1.23%
High cost threshold* for community	1.75%

Is this a high cost project? No

*A project is considered high cost if the average total annual sewer bill per household (including all OM&R and debt retirement costs) exceeds the following thresholds: 1% of the community's Median Household Income (MHI) where MHI < \$10,000, 1.5% for \$10,000 to \$17,000, and 1.75% for MHI > \$17,000. Where water and sewer amounts cannot be accurately separated, add 1.5% to these thresholds.