Technical Memorandum Wastewater Facility Improvements Cost Estimate

City of Bellaire

Wastewater Facilities Engineering and Support

HDR Project: 10387209

May 29, 2024

HDR Engineering, Inc.
Texas Registered Firm No. F-754

Contents

Tables

Figures

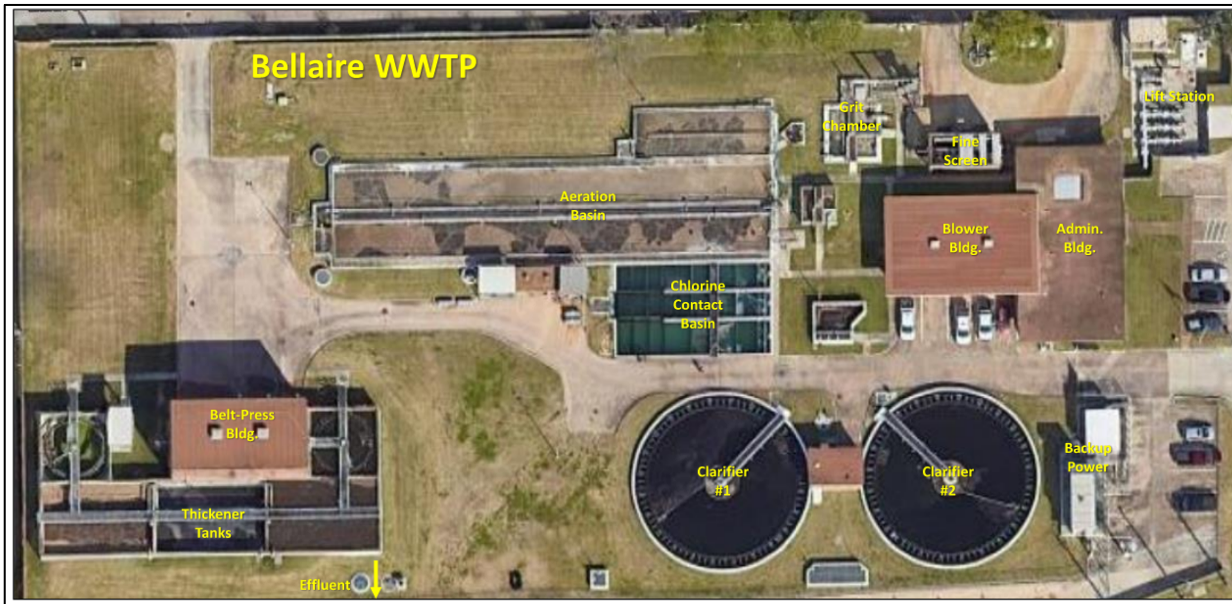
1 Introduction

As part of HDR's Task 3 for the Condition Assessment of City of Bellaire's wastewater treatment plant (WWTP), the City asked HDR to develop opinion of probable construction costs (OPCC) for several WWTP improvements alternatives. Improvements alternatives and OPCCs were developed for the WWTP's preliminary treatment unit processes (screening and grit removal), secondary treatment process, and disinfection.

1.1 Background

The City of Bellaire operates and maintains a WWTP located at 4401 Edith Street, Bellaire, Texas. The WWTP has gone through several upgrades and expansions with the last major expansion occurring in 1974. The existing lift station, grit chamber, Junction Box No. 1, pre-aeration basin (primary clarifier in 1974 converted to pre-aeration basin), clarifiers, chlorine contact basin (final clarifier in 1974 converted to chlorine contact basin) were placed into service in 1974. Several other modifications took place in 1994 including the addition of a fine screen facility, grit classifier, and a fine bubble diffused aeration system in the aeration basin. In 2017, the disinfection system, lift station piping, and blower building air piping were replaced. Many of the structures at the plant are nearing the end of their expected life and need to be replaced. These structures include the headworks, pre-aeration basins, aeration basins, secondary clarifier equipment, and chlorine contact basins. The existing plant has a permitted annual average daily flow (ADF) rate of 4.50 mgd and a permitted peak 2-hour flow rate of 11.0 mgd. **Figure 1-1** shows an aerial view of the existing WWTP.

Figure 1-1. Bellaire WWTP Aerial View



Public Works
Assistant Director of PW – Correy Woods (713-446-7794)
Chief Plant Operator – J. Jones (281-253-3463)

Vicinity Map
4401 Edith Street
Bellaire, TX 77401

2 General OPCC Assumptions

HDR prepared AACE Class 5 (accuracy range of -35% to +66%) planning level OPCCs for these evaluations. **Table 2-1** shows the different AACE planning cost estimate levels and provides further information on each of them.

Table 2-1. AACE Classification of Construction Cost Estimates

Estimate Class	Class 5	Class 4	Class 3	Class 2	Class 1
Project Phase Description[1]	Master Plan or Concept Design	Predesign Report and Drawings	50% to 60% Design Complete	90% to 95% Design Complete	Bid Documents
Level of Project Definition[2]	0% to 2%	1% to 15% PDR (up to 30% design)	10% to 40%	30% to 70%	70% to 100%
Accuracy of Estimate[2,3]	-35% to +60%	-20% to +40%	-15% to +30%	-10% to +20%	-5% to +10%
Undefined Work (Contingency)[2]	25% to 40%	20% to 30%	15% to 25%	10% to 20%	5% to 15%

Note: General – When transmitting an OPCC, include a reference to the AACE Class, the associated accuracy, and the assumptions. It should also indicate that the estimate does not represent extreme market fluctuations due to events which cannot be predicted.

1. Based on typical project deliverables.
2. Based on OPCC definition
3. Accuracy represents the variance from the estimate. For example, a Class 4 estimate isi -20% to +40% and will be between 0.8 and 1.4 times the estimate prepared by the engineer or professional estimator.

HDR's WaterCost tool – a planning level parametric cost estimating tool - was used to generate the OPCCs for the WWTP improvements. The tool derives costs from cost curves and typical conditions. The costs from these curves are simple to determine, easily modified, and are completed by the project engineering team. These curves are developed using default input values for a range of WWTP sizes.

The WaterCost tool requires several market assumptions to reliably generate accurate cost estimates for a project. These include ENR indexes, which are commonly used in several different markets and serve as a reflection of the local economy's effect on construction costs. The ENR indexes used for this analysis are listed in **Table 2-2**.

Table 2-2. ENR Index Assumptions

ENR Index	Value Used	ENR Index	Value Used
ENR CCI (20-City Average)	10,430	BLS Concrete	276.8
ENR Building Index	5,563	BLS Steel	158.7
ENR Skilled Labor Index	9,696	BLS Pipe and Valves	303.3
Producer Price Index for Finished Goods	193.4	BLS Electrical and Instrumentation	113.2
BLS General Purpose Machinery	227.2	Housing	150

Additional categorical costs involved with construction are also factored into the estimate by the tool through assumed percentages. These percentages are applied and added to the costs determined from the cost curves for each WWTP unit process in the estimate. These categories, and the percentages used for them in these estimates, are listed in **Table 2-3.**

Table 2-3. Assumptions Made for Additional Construction Costs

Category	Assumed Percentage	Category	Assumed Percentage
Misc./Unidentified Site Structures	20%	Field Conditions	7%
Sitework	15%	Mobilization & Demobilization	5%
Demolition	1%	Contingency	25%
I&C (SCADA)	8%	General Contractor OH & Profit	8%
Site Electrical	2%	Bonds & Insurance	1.5%
Yard Piping	5%	Construction Contingency	5%
Soil Conditions	7%	Legal & Fiscal	2%

It is important to note that these estimates do not include the engineering fees associated with these projects.

3 Alternative Evaluation

OPCCs were developed for improvement alternatives at the WWTP's headworks, the secondary treatment process, and the disinfection system. The OPCCs were developed for two ADF scenarios - 2.5 and 4.5 mgd – and peak two-hour flow rates of 6.25 and 11 mgd. Alternatives presented for an average day capacity of 2.5 mgd will require flow monitoring and flow data analysis to confirm and substantiate the need to rerate the plant from 4.5 mgd to 2.5 mgd, ADF. Additionally, the alternatives presented below assume the peaking factor remains the same between to two scenarios. Flow analysis to confirm peaking factor is required if the plant is re-rated.

It was assumed that all alternatives will require the installation and operation of a temporary treatment package plant. This cost is required due to the limited site space and the inability to construct operational facilities while keeping the existing facilities in service.]

3.1 Headworks Facilities

Based on the results of the condition assessment, the grit removal facility at the WWTP is nearing the end of its useful life. The screening facility is in fair condition and improvements can be made to provide continued use. Based on these findings, OPCCs were developed for two alternatives:

- Construction of a new grit removal facility with improvements to the screening area including construction of a building around the screens and channels.

- Construction of a new grit removal facility and screening facility.

OPCCs were developed assuming a peak flow capacities of 6.25 and 11 mgd (WWTP permitted peak two hour flow capacity).

3.2 Secondary Treatment Process

The two secondary treatment processes that were evaluated were a conventional activated sludge process and an aerobic granular sludge process.

3.2.1 Conventional Activated Sludge

The conventional activated sludge (CAS) processes is a proven and effective treatment technology. Conventional activated sludge processes biologically treat wastewater by creating set environmental conditions within a treatment basin. The set environmental conditions then allow certain types of bacteria to grow within the basin, which then remove contaminants from the wastewater through a series of chemical reactions. Conventional activated sludge processes typically require a headworks facility, treatment basins, an aeration system, secondary clarifiers, a disinfection system, and a solids processing system. The existing plant currently uses a conventional activated sludge process with aeration treatment basins.

Based on effluent permit requirements given to the City's WWTP by TCEQ, HDR determined that a MLE process would serve as a cost-effective form of treatment. A MLE process requires that there be two separate zones in the treatment basins, one with anoxic (no oxygen) conditions followed by the other with aerobic conditions. The MLE process also requires the use of an internal or nitrate recycle stream that takes effluent from the aerobic zone to the head of the anoxic zone. MLE processes are very effective at reliably removing BOD and ammonia (NH_4) from wastewater, while also providing full nitrogen removal as well.

The required basin volume and air supply system capacity for the Bellaire WWTP were determined using steady-state BioWin models for a 2.5 mgd ADF scenario and a 4.5 mgd ADF scenario. These systems were sized based on maximum month influent conditions with winter wastewater temperatures. The influent flow rates used for these models were determined by taking the assumed ADF flow rate and extrapolating that to a maximum month flow based on the ratio determined in the probability analysis on the plant's historical influent data from Section 2.2.1 in the *Process Capacity Analysis Technical Memorandum*. The influent concentrations determined from that probability analysis were also used for the models. The other assumptions used to set up the BioWin model are listed in **Table 3-1**.

Table 3-1. BioWin Model Assumptions

Parameter	Value	Notes
Grit Tank Volume, gal	60,000	From City asset list
Grit Tank Underflow, %	0.01	Percent of plant influent flow rate
MLSS in Basins, mg/L	2,950	Based on secondary clarifier steady-state point analysis
Anoxic Basin Volume, %	25	Percent of total basin volume based on common industry standard

Table 3-1. BioWin Model Assumptions (cont.)

Parameter	Value	Notes
Aerobic Basin Volume, %	75	Percent of total basin volume based on common industry standard
DO Setpoint in Aerobic Zones, mg/L	2.0	Common industry standard
NRCY/IMLR Flow, %	300	Percent of plant's influent flow rate
Secondary Clarifier Surface Area, sf	10,050	From record drawings
Secondary Clarifier Underflow, %	30	Percent of plant's influent flow rate
Aerobic SRT, days	6	Common industry standard
Aerobic Digester Volume, gal	12,600	From record drawings

The model was then run through several steady-state simulations to determine the basin volume and aeration system capacity required for the two different capacity scenarios. These results are listed in **Table 3-2** and were used to estimate the cost of this secondary treatment process alternative.

Table 3-2. BioWin Model Results

ADF Capacity, mgd	Anoxic Basin Volume, MG	Aerobic Basin Volume, MG	Total Basin Volume, MG	Air System Capacity Required, scfm
2.5	0.46	1.38	1.84	2,500
4.5	0.93	2.40	3.7	4,500

HDR prepared preliminary site plans for these alternatives based on these results. **Figure 3-1** shows a preliminary site plan for a conventional activated sludge MLE process for the 2.5 mgd ADF capacity scenario. The site plan presented below does not meet the buffer zone requirements set by TCEQ which requires greater than 150-ft from property line to the nearest treatment unit (30 TAC § 309.13(e)) and will require review and approval prior to proceeding with this alternative.

Figure 3-1. Preliminary Site Plan for 2.5 / 6.25 mgd CAS System

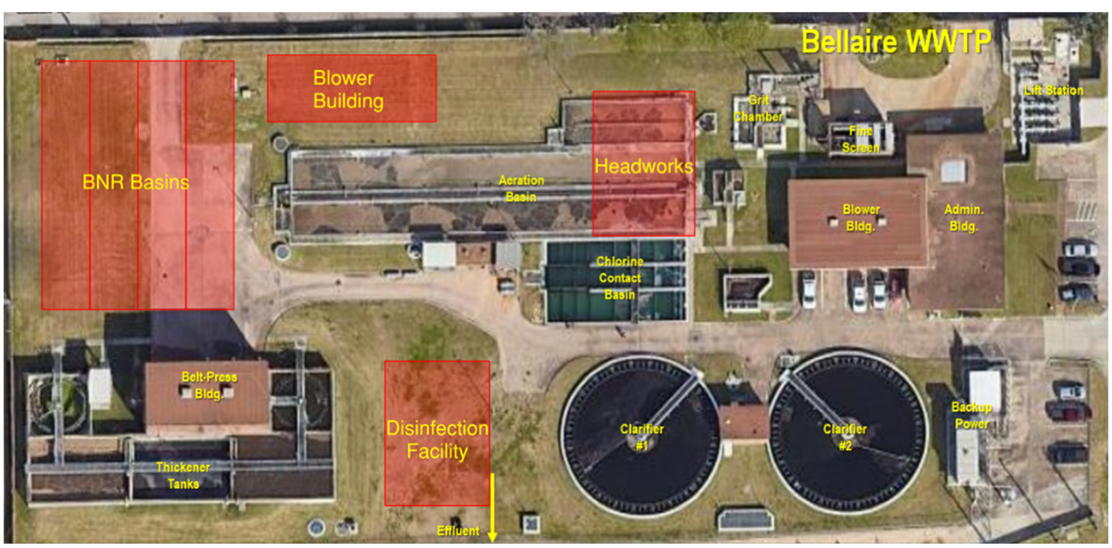
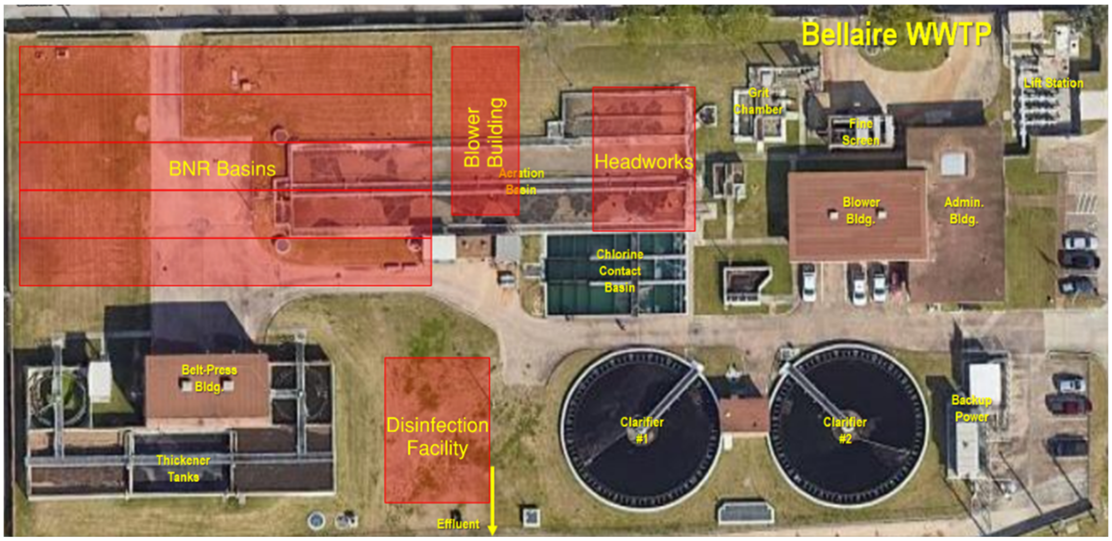


Figure 3-2 shows a preliminary site plan for a conventional activated sludge MLE process for the 4.5 mgd ADF capacity scenario. The site plan presented below does not meet the buffer zone requirements set by TCEQ which requires greater than 150-ft from property line to the nearest treatment unit (30 TAC § 309.13(e)) and will require review and approval prior to proceeding with this alternative.

Figure 3-2. Preliminary Site Plan for 4.5 / 11.0 mgd CAS System



The area shown for the CAS basins in these site plans assumes a basin side water depth of 20 feet. As noted above, a temporary package plant would be required to maintain plant operations while the existing basins are demolished and the new BNR basins are constructed due to the limited space on site.

3.2.2 Aerobic Granular Sludge

Aerobic granular sludge (AGS) is a type of activated sludge process that requires the establishment of environmental conditions that favor the development of granular sludge. Granular sludge is activated sludge that forms in larger granules that can measure 0.5-3.0 mm in diameter. Being larger and having more surface area than a typical activated sludge, granular sludge can settle much faster and can also provide anaerobic, anoxic, and aerobic environments within a single tank, which allows phosphorus and total nitrogen removal to occur within the same tank. Since the granular sludge settles much faster than conventional sludge, many manufacturers, including AquaNereda, have developed technologies utilizing granular sludge within a sequencing batch reactor. The combination of a sequencing batch reactor with granular sludge provides an effective and efficient wastewater treatment process within a compact footprint.

Typical AGS sequencing batch processes operate on a 3-stage cycle. The first stage is the simultaneous fill and draw time where treated wastewater is drawn out of the basin and replaced with influent wastewater. This is then followed by the second stage, when the granular sludge within the basin is given time to conduct the reactions involved with treating the wastewater in the basin. Once enough time has been given for the reactions to occur, the third stage occurs, when the granular sludge settles to the bottom of the basin before the process is repeated. Sludge will also be regularly removed from the basin to maintain a desired solids retention time (SRT) for granular sludge.

The required AGS basin volume and AGS equipment cost were determined for both scenarios using HDR's AquaNereda AGS Sizing tool. This tool was created through HDR's experience with designing AquaNereda AGS systems and a collection of budgetary costs for previous AGS projects that HDR has worked on. The basin volumes were determined based on the assumed influent characteristics, common biological parameters, hydraulic constraints, a targeted MLSS concentration, set batch reactor sequence cycle times, and a targeted effluent quality. The systems were also sized to allow for the basins to continuously receive influent and eliminate the need for wet weather storage. The costs were estimated by applying a cost curve to the collection of historical budgetary costs of AquaNereda systems. The tool provided two costs for the AGS equipment, one based on basin size and one on the maximum month influent flow rate at the plant. The higher of these two costs was used in this estimate. The design results for both capacity scenarios are listed in **Table 3-3** and were used to estimate the cost of this secondary treatment process alternative**.**

Table 3-3. HDR AquaNereda AGS Sizing Tool Results

Plant Capacity Scenario, mgd	Basin Volume (Each), MG	Number of Basins	Total Basin Volume, MG	AGS Equipment Cost
2.5 / 6.25	0.64	3	1.93	$7,000,000
4.5 / 11.0	0.94	3	2.82	$9,600,000

HDR also prepared preliminary site plans for these alternatives based on these results. **Figure 3-3** shows a preliminary site plan for an AquaNereda AGS process for the 2.5 mgd ADF capacity scenario. As noted above, the site plan presented below does not meet the buffer zone requirements set by TCEQ which requires greater than 150-ft from property line to the nearest treatment unit (30 TAC § 309.13(e)) and will require review and approval prior to proceeding with this alternative.

Figure 3-3. Preliminary Site Plan for 2.5 / 6.25 mgd AGS System

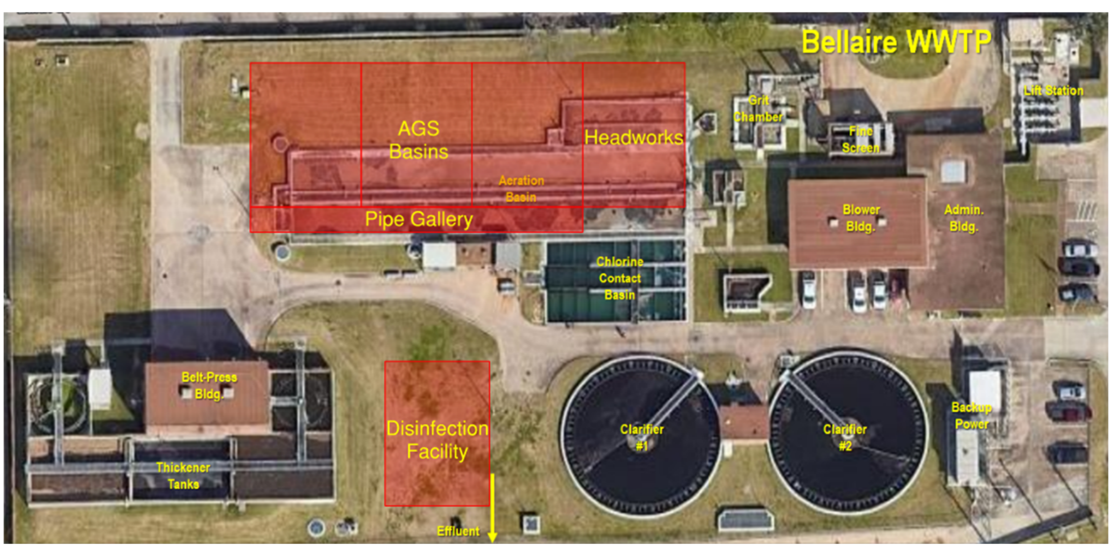
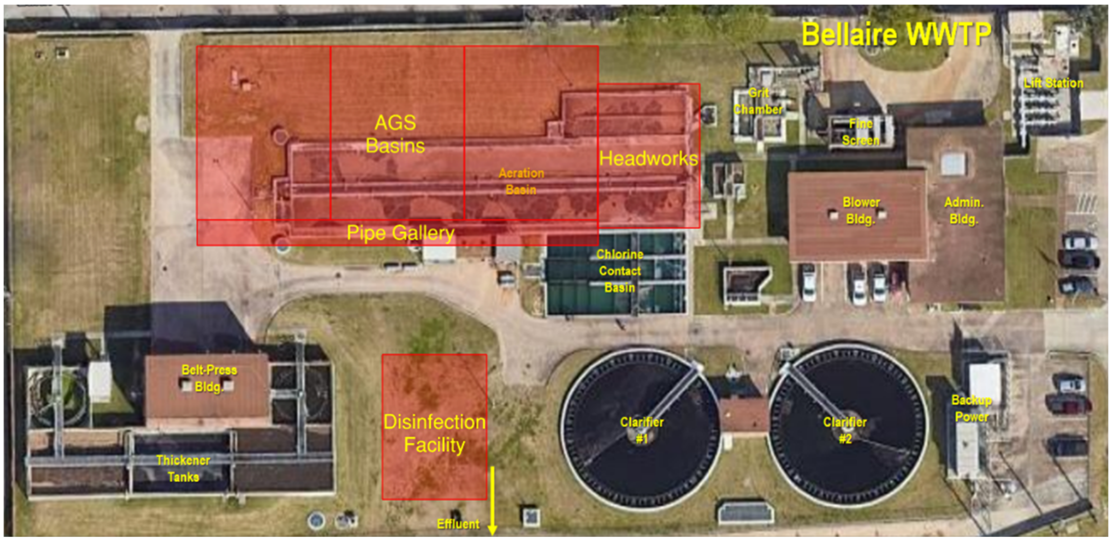


Figure 3-4 shows a preliminary site plan for an AquaNereda AGS process for the 4.5 mgd ADF capacity scenario. As noted above, the site plan presented below does not meet the buffer zone requirements set by TCEQ which requires greater than 150-ft from property line to the nearest treatment unit (30 TAC § 309.13(e)) and will require review and approval prior to proceeding with this alternative.

Figure 3-4. Preliminary Site Plan for 4.5 / 11.0 mgd AGS System



As with the CAS alternatives, a temporary package plant would be required to maintain plant operations while the existing basins are demolished and the new BNR basins are constructed due to the limited space on site.

3.3 Disinfection System

HDR developed OPCCS for two disinfection system alternatives – chemical disinfection with sodium hypochlorite and sodium bisulfite and ultraviolet (UV) light disinfection. The OPCC for each system was based on peak two-hour flow rates of 6.25 and 11 mgd.

Chemical disinfection involves the addition of chemicals to wastewater to kill or inactivate bacteria, viruses, and other microorganisms. The most common chemicals used for wastewater disinfection are chlorine gas and sodium hypochlorite. For this evaluation, it was assumed that a sodium hypochlorite chemical system would be used, due to the heavier maintenance requirements and safety concerns associated with chlorine gas. In addition to the disinfectant, sodium bisulfite would also have to be added to the wastewater for dichlorination.

UV disinfection involves the exposure of wastewater to ultraviolet light that will kill or inactivate bacteria, viruses, and other microorganisms. Various UV technologies are available in today's market including horizontal and inclined bulb systems.

4 Cost Estimate Results

The results of the cost estimate conducted by HDR are presented in the following sections. Annual operating costs for the secondary treatment and disinfection alternatives were also estimated. The OPCCs do not include costs for a temporary package treatment plant to treat flows during the construction of the proposed improvements. These costs are described and presented in Section 4.2.

4.1 Headworks, Secondary Treatment, and Disinfection Improvements

4.1.1 2.5 / 6.25 mgd WWTP

The OPCCs for the 2.5 mgd ADF and 6.25 mgd peak two hour WWTP improvements are presented by unit process alternative in **Table 4-1**.

Table 4-1. 2.5 / 6.25 mgd WWTP Unit Process Alternative Costs

Unit Process	Alternative	Total Construction Costs	Annual Operating Cost
Headworks	New grit and screenings facility	$6,500,000	N/A
	New grit and screenings facility rehab.	$4,200,000	N/A
Secondary Treatment	CAS	$17,800,000	$479,000
	AGS	$27,600,000	$476,000
Disinfection	Chemical	$4,721,000	$147,000
	UV	$2,331,000	$555,000

Table 4-2 presents the OPCCs for the combined alternatives.

Table 4-2. 2.5 / 6.25 mgd WWTP Combined Alternative Costs

Alternative	Total Construction Costs	Annual Operating Cost[1]
New HW, CAS, Chemical Disinfection	$29,000,000	$626,000
New HW, AGS, Chemical Disinfection	$38,800,000	$624,000
New HW, CAS, UV Disinfection	$26,700,000	$1,034,000
New HW, AGS, UV Disinfection	$36,400,000	$1,032,000
Rehab HW, CAS, Chemical Disinfection	$26,800,000	$626,000
Rehab HW, AGS, Chemical Disinfection	$36,500,000	$624,000
Rehab HW, CAS, UV Disinfection	$24,400,000	$1,034,000
Rehab HW, AGS, UV Disinfection	$34,100,000	$1,032,000

1. Includes the estimated operating costs for the secondary treatment process and disinfection process.

4.1.2 4.5 / 11.0 mgd WWTP

The OPCCs for the 4.5 mgd ADF and 11.0 mgd peak two hour WWTP improvements are presented by unit process alternative in **Table 4-3.**

Table 4-3. 4.5 / 11.0 mgd WWTP Unit Process Alternative Costs

Type of Unit Process	Alternative	Total Construction Costs	Annual Operating Cost
Headworks	New grit and screenings facility	$7,600,000	N/A
	New grit and screenings facility rehab.	$4,600,000	N/A
Secondary Treatment	CAS	$27,900,000	$729,000
	AGS	$38,000,000	$719,000
Disinfection	Chemical	$5,500,000	$248,000
	UV	$3,200,000	$942,000

Table 4-4 presents the results by combined alternatives.

Table 4-4. 4.5 / 11.0 mgd WWTP Combined Alternative Costs

Alternative	Total Construction Costs	Annual Operating Cost[1]
New HW, CAS, Chemical Disinfection	$41,000,000	$977,000
New HW, AGS, Chemical Disinfection	$51,100,000	$968,000
New HW, CAS, UV Disinfection	$38,700,000	$1,670,000
New HW, AGS, UV Disinfection	$48,800,000	$1,661,000
Rehab HW, CAS, Chemical Disinfection	$38,000,000	$977,000
Rehab HW, AGS, Chemical Disinfection	$48,100,000	$968,000
Rehab HW, CAS, UV Disinfection	$35,700,000	$1,670,000
Rehab HW, AGS, UV Disinfection	$45,800,000	$1,661,000

1. Only includes the estimated operating costs for the secondary treatment process and disinfection process.

4.2 Miscellaneous Plant Improvements

In addition to the headworks, secondary treatment, and disinfection system improvements described above, several other plant processes require upgrades to provide continued use. Costs for a temporary treatment plant package are also discussed below.

4.2.1 Bellaire Lift Station Replacement

Based on the plant condition assessment, the Bellaire Lift Station, which sends flow directly to the WWTP, should be replaced. The station has a firm capacity of 3.5 mgd and is a dry pit type station. The OPCC to replace this station is $2.00M.

4.2.2 Solids Dewatering Improvements

Solids dewatering improvements are also recommended for the WWTP. These improvements include two belt filter presses (one to replace the existing press and another for redundancy) and providing an elevated space within the existing dewatering buidling for those presses, to keep them above the 100-year floodplain elevation. The OPCC for these improvements is $4.20M.

4.2.3 Package Treatment Plant Costs

A temporary package plant will be required to treat the plant influent while proposed improvements are under construction. Assuming a construction duration of 36 months, the estimated costs for a package plant for the two different capacity scenarios are listed in **Table 4-5**. The assumed monthly rental costs for the package plants are from an estimate provided by a package plant manufacturer for a recent HDR project (adjusted for inflation).

Table 4-5. Construction Sequencing Estimated Costs

Plant Capacity Scenario, mgd	Monthly Rental Cost	Total Rental Cost for Project
2.5 / 6.25	$281,000	$10,100,000
4.5 / 11.0	$505,000	$18,200,000

The proposed location for the package plant would be on the southern side of the site, between the existing solids handling facility and secondary clarifiers.

5 Summary

Several pieces of infrastructure and equipment at the City of Bellaire's existing WWTP are nearing the end of their expected useful life and need to be replaced or rehabilitated in the upcoming years. HDR developed an AACE Class 5 construction cost estimate for the construction projects that will be needed to rehabilitate the existing WWTP. Cost estimates were conducted and provided for alternatives for multiple different unit processes at two different WWTP capacity scenarios. These two scenarios were:

1. 2.5 mgd ADF / 6.25 mgd peak flow capacity
2. 4.5 mgd ADF / 11.0 mgd peak flow capacity

The alternatives considered included:

1. Rehabilitate vs replace headworks screening facility
2. Conventional activated sludge vs AGS secondary treatment system
3. Chemical disinfection vs UV disinfection

Additionally, cost estimates were also conducted for required dewatering improvements at the WWTP and the replacement of the Bellaire Lift Station. It was also determined, through preliminary site plans, that a package plant would likely need to be rented and used to treat the WWTP's influent while the secondary treatment basins are under construction, so a cost estimate was provided for that as well.

The cost estimate results indicate that rehabilitating the headworks screens, conventional activated sludge, and UV disinfection would cost less compared to their counter-alternative. It is also important to note, however, that the cost of operating the AGS system would be slightly lower than that of a conventional system, and the cost of operating a chemical disinfection system would be significantly lower than a UV disinfection system. Other factors should also be considered when selecting an alternative though, including operator preference, availability, and proven effectiveness.

Additionally, since this is a Class 5 AACE construction cost estimate, an additional accuracy range of -35% and +60% should be considered with these cost estimate results.

For the 2.5/6.25 mgd capacity scenario, the total project cost was estimated to be within a range of $30.6M to $45.0M. If the package plant is required during construction, an additional $10.1M would be required for the rental cost. The total project costs for the 2.5/6.5 mgd capacity scenario alternatives, combined with the package plant costs, are presented in **Table 5-1**, along with the range of costs associated with this Class 5 AACE construction cost estimate.

Table 5-1. Summary of 2.5/6.25 mgd Capacity Alternative Total Costs

Alternative	Total Construction Cost	Total Project Cost	Total Project Cost -35%	Total Project Cost +60%
CAS with New HW & Chem Disinfection	$29,100,000	$45,400,000	$29,500,000	$72,600,000
AGS with New HW & Chem Disinfection	$38,800,000	$55,100,000	$35,800,000	$88,200,000
CAS with New HW & UV Disinfection	$26,700,000	$43,000,000	$28,000,000	$68,800,000
AGS with New HW & UV Disinfection	$36,400,000	$52,700,000	$34,300,000	$84,300,000
CAS with Rehab HW & Chem Disinfection	$26,800,000	$43,100,000	$28,000,000	$69,000,000
AGS with Rehab HW & Chem Disinfection	$36,500,000	$52,800,000	$34,300,000	$84,500,000
CAS with Rehab HW & UV Disinfection	$24,400,000	$40,700,000	$26,500,000	$65,100,000
AGS with Rehab HW & UV Disinfection	$34,100,000	$50,400,000	$32,800,000	$80,600,000

For the 4.5/11.0 mgd capacity scenario, the total project cost was estimated to be within a range of $41.9M to $57.3M. If the package plant is required during construction, an additional $18.2M would be required for the rental cost. The total project costs for the 4.5/11.0 mgd capacity scenario alternatives, combined with the package plant costs, are presented in **Table 5-2**, along with the range of costs associated with this Class 5 AACE construction cost estimate.

Table 5-2. Summary of 4.5/11.0 mgd Capacity Alternative Total Costs

Alternative	Total Construction Costs	Total Project Cost	Total Project Cost -35%	Total Project Cost +60%
CAS with New HW & Chem Disinfection	$41,000,000	$65,400,000	$42,500,000	$104,600,000
AGS with New HW & Chem Disinfection	$51,100,000	$75,500,000	$49,100,000	$120,800,000
CAS with New HW & UV Disinfection	$38,700,000	$63,100,000	$41,000,000	$101,000,000
AGS with New HW & UV Disinfection	$48,800,000	$73,200,000	$47,600,000	$117,100,000
CAS with Rehab HW & Chem Disinfection	$38,000,000	$62,400,000	$40,600,000	$99,800,000
AGS with Rehab HW & Chem Disinfection	$48,100,000	$72,500,000	$47,100,000	$116,000,000
CAS with Rehab HW & UV Disinfection	$35,700,000	$60,100,000	$39,100,000	$96,200,000
AGS with Rehab HW & UV Disinfection	$45,800,000	$70,200,000	$45,600,000	$112,300,000