



November 3, 2022

Mr. Bill Pedersen
Director of Public Works
City of Deer Park
710 East San Augustine
Deer Park, Texas 77536

Subject: Proposal to Provide Professional Engineering Services
 City of Deer Park Wastewater Treatment Plant
 Digester Structure and Improvements Evaluation

Dear Mr. Pedersen:

Ardurra Group, Inc. (Ardurra") is pleased to submit this proposal to the City of Deer Park to perform an evaluation study of digester structure for City's wastewater treatment plant. The digester at the Deer Park Wastewater treatment plant was constructed in 1970s. The City recently hired Terracon who conducted a visual inspection of the exterior of the digester and reported vertical cracks in digester basin concrete walls, leakage of liquid through several vertical cracks and vertical joints between walls at corners of the digester, and exposed aggregate on the interior side of walls facing wastewater sludge. The basin structure has been in service for nearly 50 years and the effectiveness of implementing repairs on the exterior side to protect the concrete walls is limited. Therefore, the City desires to remove the digester from service to allow for inspecting the structure in order to determine the future rehabilitation scope, estimate cost opinion, and anticipated rehabilitation schedule. It is anticipated that each of the three digester cells will be taken offline one at a time for inspection.

The follow presents our understanding of the proposed project, the required scope of work for engineering services, our proposed technical approach, anticipated schedule, and estimated fees.

1.0 Description and Scope

Ardurra will provide the following scope of services:

- Task 1. Data Review and Process Evaluation- Engineer will review the existing plant record drawings, previous reports and operations data necessary to understand current plant operating conditions and digester systems. The following data will be requested from the City, if available:



- a) 2-year worth of mixed liquor suspended solids (MLSS) data in waste activated sludge (WAS) provided by the city in excel format.
- b) Sludge manifest and solids percentage in thickened sludge and sludge cake provided by the city in excel format.
- c) Other data as needed.

Analyze to determine if there are any adverse impacts on treatment process should one cell of the digester be removed offline for inspection. Should this be the case, identify potential using other existing structures to temporarily store WAS.

- Task 2. Work Plan for Digester Isolation - Develop a work plan for use to isolate digester basin cells. The work plan will include a preliminary layout for temporary piping set up and routing, temporary bypass pump selection and required power supply, and temporary stop log/plates etc. The work plan will include conceptual exhibits for removing each cell one at a time, and a narrative of work to be performed. A safety protocol will also be developed for project team to use. It is assumed that City will be responsible for providing and installing temporary equipment, draining the basin, pressure washing and disinfecting prior to field inspection. The city will provide ladders and safety equipment as identified by Ardurra and set in place ready for use.
- Task 3. Field Inspection – Once the digester cell has been removed from service, conduct field inspection to assess existing condition and determine deficiency that need to be improved.
- Task 4. New Digester Alternative. In addition to the condition assessment of the existing digester to identify rehabilitation improvements, the City would also like to explore an option of building a new digester. The evaluation of this alternative will include the following assumptions:
 - a) The new digester will be similar in configuration to the existing with partitioning walls and multiple cells to provide operational flexibility and facilitate maintenance as needed. A common influent channel and an effluent channel may be considered in the new digester.
 - b) The new digester will be provided with a coarse bubble air drop and diffuser system for mixing air requirements. Air will be supplied by the existing blowers with a new air piping system to route to the new digester.
 - c) Record drawings will be used to assume foundation and structural design of the new digester.



For the new digester alternative evaluation, a conceptual layout and an improvement site plan will be developed based on above assumptions. A planning-level cost opinion will be prepared to compare this option with the rehabilitation option. Electrical and structural design support considerations will also be reviewed.

- Task 5. Technical Memorandum Development - Prepare a technical memorandum to summarize the following:
 - a) Observations and findings from the structural and process mechanical field inspection and evaluation.
 - b) Digester rehabilitation scope, constructability considerations, a planning-level cost opinion and anticipated schedule for the rehabilitation option.
 - c) Conceptual layout, constructability considerations, a planning-level cost opinion and anticipated schedule for the new digester option.

2.0 Schedule

We anticipate being able to commence work immediately after receiving Notice to Proceed. It is anticipated that the Work Plan will be completed with four (4) weeks after all requested data have been received. Technical Memorandum will be completed with six (6) weeks after all three digester cells have been inspected, and submitted to the City for review.

3.0 Fees, Terms and Conditions

Based on the scope of services outlined above, we prepared a level of effort estimate. We estimate a lump sum, not to exceed fee of \$101,199 to complete the subject project. A detailed level of effort estimate is shown on **Exhibit A**. Our fee estimate is based on an estimate of required services.

Please feel free to contact me at (713) 208-9463 or email: ysun@ardurra.com to discuss any questions you may have. Thank you for the opportunity to propose these professional engineering services for the City of Deer Park.

Very truly yours,

Yue Sun, P.E., BCEE
Project Director
TBPE Firm Registration No F-10053

Exhibit A - Level of Efforts Fee Estimate
City of Deer Park
Wastewater Treatment Plant - Digester Structure and Improvements Evaluation

Task No.	Task Description	Principal / QA/QC	Sr. Project Manager	Engineer 5/6	Project Engineer	Sr. Structural Engineer	Sr. Electrical Engineer	Sr. CAD Designer	Admin Support	Accounting	Total	Ardurra Subtotal		
		\$275 hrs	\$275 hrs	\$180 hrs	\$160 hrs	\$240 hrs	\$240 hrs	\$155 hrs	\$120 hrs	\$120 hrs	hrs	Cost \$	ODC \$	Totals \$
Digester Evaluation														
1	Data Collection, Review and Analysis		4	16	18	4	6				48	\$9,260		\$9,260
2	Work Plan Development	2	6	32	30			8	1		79	\$14,120		\$14,120
3	Field Inspection		4	16	24	24					68	\$13,580		\$13,580
4	New Digester Alternative		10	40	60	20	20	32			182	\$34,110		\$34,110
5	Tech Memo Development	2	8	32	48	18	16		4	4	132	\$25,310		\$25,310
	Expense (5%) of labor cost)												\$4,819	\$4,819
	TOTAL	4	32	136	180	66	42	40	5	4	509	\$96,380	\$4,819	\$101,199