

Alice Southside Wastewater Treatment Plant Assessment FINAL REPORT

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Executive Summary

The Nueces River Authority (NRA), through a reimbursement contract with the Coastal Bend Bays & Estuaries Program (CBBEP), contracted to conduct an engineering assessment of the City of Alice's Southside Wastewater Treatment Plant (Southside WWTP) and to prepare a funding application on the City's behalf to the Texas Water Development Board (TWDB) Clean Water State Revolving Fund (CWSRF). This report summarizes the activities completed under CBBEP Project 2528 and documents the outcomes achieved.

The Southside WWTP, originally constructed in 1969 and last significantly upgraded in 1984, serves a population of approximately 17,600 residents through 7,200 household connections in Alice, Texas — a small, rural community in Jim Wells County. The plant discharges treated effluent into Lattas Creek, which flows into San Fernando Creek and ultimately into Baffin Bay, a waterbody listed as impaired for *E. coli* and of concern for elevated nutrient levels in the Texas Integrated Report.

To accomplish the grant scope, NRA retained Kleinfelder, a licensed engineering firm (TBPELS Firm No. F-3937), to conduct a comprehensive engineering assessment of the Southside WWTP. The resulting Assessment Report, completed in March 2026, documented critical deficiencies across all major process components — headworks, biological treatment, clarifiers, solids handling, and disinfection — with the majority of mechanical equipment having exceeded its useful service life of 40+ years. The total estimated capital cost to address all identified needs, including infrastructure for Type I water reuse, is approximately \$38.4 million.

NRA subsequently prepared and submitted a Project Information Form (PIF) to the TWDB CWSRF program on March 6, 2026, on behalf of the City of Alice. On March 16, 2026, TWDB notified project contacts that the PIF (No. 17687, Application ID 2487951) had been accepted and the project placed on the CWSRF Clean Water Fund Intended Use Plan – Project Priority List. This acceptance positions the City of Alice to be formally invited to submit a complete loan application once the public comment period concludes.

The successful completion of these project tasks — engineering assessment, facilities plan, and TWDB PIF acceptance — fulfills all required deliverables under the CBBEP Scope of Work and represents a critical step toward securing the funding necessary to rehabilitate the Southside WWTP, protect downstream water quality in Baffin Bay, and implement beneficial reuse of treated effluent for the first time from this facility.

Background / Objective

Project Background

The City of Alice, Texas operates two municipal wastewater treatment plants that collectively serve the entire city. The Southside WWTP is located at 286 County Road 383 in Jim Wells County and operates under TPDES Permit No. WQ0010536002, issued by the Texas Commission on Environmental Quality (TCEQ) on June 17, 2024. The facility is permitted to discharge treated effluent to Lattas Creek at an annual average daily flow of 2.6 million gallons per day (MGD).

Lattas Creek flows approximately three miles downstream to San Fernando Creek and then into Baffin Bay. The Southside WWTP is one of thirteen wastewater treatment plants that discharge into Baffin Bay via San Fernando Creek. San Fernando Creek and Baffin Bay are listed as impaired by *E. coli* in the Texas Integrated Report, with additional concerns related to elevated chlorophyll-a, total phosphorus, depressed dissolved oxygen, nitrates, and pH in those receiving waters.

The Southside WWTP was originally constructed in 1969 and underwent its last major expansion in 1984. While certain equipment items (influent pumps, mechanical bar screen) have been replaced in more recent years, the vast majority of process equipment currently in service was installed during the 1984 upgrade and has far exceeded its expected useful life of 20–25 years. The plant and its aging infrastructure have become increasingly vulnerable to process failures, operational inefficiencies, and potential permit violations.

Like many small, rural communities in South Texas, the City of Alice lacks the population base and tax base to independently finance the scale of infrastructure improvements required. The community also faces challenges in accessing engineering expertise and navigating competitive state and federal funding applications. This project was designed specifically to bridge both of those gaps.

Project Objective

The purpose of CBBEP Project 2528, as established in the executed Scope of Work, was twofold:

- To conduct a comprehensive engineering assessment of the City of Alice Southside Wastewater Treatment Plant system, including identification of deficiencies, recommendations for improvements, and a budgetary cost estimate; and
- To prepare and submit an application to the Texas Water Development Board – State Revolving Fund Clean Water Fund on behalf of the City of Alice for funding to implement the recommended improvements.

Completion of these tasks directly supports the protection of Baffin Bay and its tributary waters by helping ensure the Southside WWTP can maintain and improve effluent quality in the long term, and by opening a pathway to the financial resources required to make those improvements a reality.

Project Activities

Post-Award Meeting

Following contract execution, NRA conducted the required post-award meeting with the CBBEP Authorized Representative, Kathryn Tunnell, to review and confirm the scope of work, deliverables, invoicing procedures, and project timeline. All required reporting procedures and communication protocols were established at that time.

Engineering Firm Procurement

NRA issued a Request for Proposals (RFP) for engineering services consistent with CBBEP and applicable federal procurement requirements. The RFP was presented to the CBBEP Authorized Representative for review and approval prior to posting. Following a competitive selection process, NRA contracted with Kleinfelder (TBPELS Engineering Firm No. F-3937; San Antonio, Texas office) to conduct the engineering assessment. The CBBEP Authorized Representative was included on all significant communications with the engineering firm.

Engineering Assessment

Kleinfelder conducted a comprehensive assessment of the Southside WWTP, which included two site visits and a desktop analysis of process performance data. The first site visit was conducted on March 26, 2025, and the second on June 11, 2025. During both visits, Kleinfelder staff conducted visual inspection of equipment and process areas, interviewed plant operators, and reviewed operational records. Travis Pruski of the Nueces River Authority participated in the June 2025 site visit alongside City of Alice staff.

The assessment was supplemented by a review of the plant's TPDES permit (Permit No. WQ0010536002), Monthly Operating Reports from January 2021 through July 2025 (with some gaps due to file storage issues at the facility), process control data from January 2023 through July 2025, and the original 1984 plant expansion construction drawings.

Kleinfelder completed the Alice, Texas Southside Wastewater Treatment Plant Assessment Report in March 2026, including a signed and sealed Facilities Plan meeting TWDB requirements. All assessment deliverables were submitted to the CBBEP Authorized Representative.

Funding Application Preparation

Following completion of the engineering assessment, NRA prepared and submitted a Project Information Form (PIF) to the Texas Water Development Board for the CWSRF Clean Water Fund program on behalf of the City of Alice. The PIF was submitted on March 6, 2026, and was authorized by Nick Dornak of Kleinfelder (Water Strategy Lead) and the City of Alice's City Manager, Michael Esparza. The total project cost submitted in the PIF was \$38,375,000, with the City of Alice seeking planning, design, and construction funding through the CWSRF program.

Assessment Findings

Plant Overview and Permit Compliance

The Southside WWTP is currently receiving an average daily flow of approximately 0.92 MGD, well below its permitted capacity of 2.6 MGD. Based on available data from 2021 through 2025, the facility has been generally meeting its TPDES discharge limitations with notable exceptions. Permit exceedances were documented for ammonia-nitrogen in February 2021 and for E. coli in February 2021, April 2021, and April 2022. A gap in available monitoring data from May 2023 through October 2024 prevented complete compliance evaluation for that period.

While the facility is currently meeting most permit parameters on average, several deficiencies identified during the assessment increase the risk of future compliance issues, particularly during wet weather events when inflow and infiltration (I&I) causes significant flow surges that overload the treatment process.

Key Deficiencies Identified

The Kleinfelder assessment identified critical deficiencies across all major process components of the Southside WWTP. The following table summarizes the key findings by treatment stage:

Treatment Stage	Key Deficiencies
Influent Pumping & Wet Well	Inoperable dry well sump pump (TCEQ code violation); corroded safety railing with no bollards or kick-plates; uncovered wet well causing odors; leaking pump seals on all three influent pumps.
Preliminary Treatment (Headworks)	Grit classifier, sluice gates, and grit pumps have exceeded useful life with visible corrosion and mechanical wear; corroded grating posing worker safety risk; deteriorated concrete surfaces with exposed aggregate; equipment located outdoors, unprotected from elements.
Biological Treatment – Aeration	Two of three blowers are over 50 years old and operating beyond design life; one blower non-operational; influent plug valves on all six lines are inoperable; mixed liquor suspended solids (MLSS) at 9,036 mg/L — nearly double the recommended maximum; sludge accumulation observed in aeration tank bottoms; aeration piping leaking in multiple locations.
Biological Treatment – Clarifiers	All three clarifiers and the Mixed Liquor (ML) Box show significant corrosion; skimmers inoperable or malfunctioning; sluice gates in ML Box corroded and at end of useful life; clarifiers exceed TCEQ surface overflow rate limits during peak flow events; FOG (fats, oil, and grease) observed floating in clarifier effluent.
Disinfection & Dechlorination	Gaseous chlorine and sulfur dioxide systems pose health, safety, and regulatory compliance risks; chlorine and SO ₂ cylinders stored together in violation of TCEQ standards; cylinders exposed to direct sunlight and elements; chlorine contact basin sluice gates inoperable; concrete deterioration in contact basins with exposed rebar; dechlorination equipment housed in dilapidated structure.

Solids Handling	Aerobic digesters decommissioned and not in service; waste activated sludge (WAS) wasted only quarterly, causing elevated MLSS concentrations; open sludge drying beds attracting disease vectors.
Data & Process Management	No SCADA system; no computerized maintenance management system (CMMS); limited process monitoring instrumentation; incomplete operational data records.
Abandoned Infrastructure & Site	Decommissioned original bar screen structure with broken railing and rotted wood covers; decommissioned original chlorine contact basin with no safety railing; abandoned aerobic digesters not evaluated for reuse potential; overgrown vegetation around process tanks and piping due to lack of adequate walkways.

Additional Considerations

Beyond the core process deficiencies, the assessment also evaluated the following advanced topics:

Disinfection Alternatives:

Kleinfelder evaluated five disinfection technology options. The assessment recommends replacing the current gaseous chlorine and sulfur dioxide system with liquid sodium hypochlorite for chlorination and sodium bisulfite for dechlorination. This upgrade would substantially improve worker safety, eliminate multiple TCEQ regulatory concerns, and improve operational reliability. At minimum, if gas systems are retained, significant safety upgrades to cylinder storage and handling are required.

Beneficial Reuse:

The WWTP currently discharges an average of approximately 1.0 MGD of treated effluent to Lattas Creek. The assessment identifies this as a significant water reuse opportunity for the City of Alice. To produce Type I reclaimed water — suitable for residential irrigation, parks, school yards, and other public-contact uses — the plant would require the addition of cloth media disk filtration, chlorine contact basin modifications, a reuse pump station at the outfall, and a distribution piping network. The City of Alice already practices effluent reuse at its North WWTP (golf course land application), and this project would create first-time reuse capacity at the Southside WWTP.

Nutrient Removal:

The current extended aeration process is not designed for advanced nutrient removal. Given that Baffin Bay is impaired and experiencing concerns related to nitrates, chlorophyll-a, and total phosphorus, future permit requirements may mandate nutrient removal upgrades. The assessment recommends an alternatives analysis using plant-specific data before any nutrient removal investments are made.

PFAS:

Per- and polyfluoroalkyl substances (PFAS) represent an emerging regulatory concern for wastewater utilities nationwide. The assessment recommends that NRA monitor PFAS legislation at the state and local level, coordinate with other WWTP operators to advocate for state-funded sampling programs and investigate potential industrial PFAS sources in the wastewater catchment area.

Budgetary Cost Estimate

Kleinfelder developed a Class 4 (AACE) budgetary cost estimate based on manufacturer quotes and cost-indexed data from comparable projects. Costs are expressed in December 2025 dollars.

Treatment Stage / Work Category	Key Scope Items	Budgetary Cost
Influent Pumping & Wet Well	Safety improvements, level sensors, sump pump	\$145,000
Preliminary Treatment	Grit equipment, sluice gates, railings, grating	\$860,000
Biological Treatment	Blowers, valves, diffusers, DO sensors, clarifiers	\$2,895,000
Disinfection, Dechlorination & Outfall	Liquid chemical conversion, building rehab, gates	\$495,000
Solids Handling	Aerobic digester rehabilitation	\$750,000
Data Management	SCADA and CMMS implementation	\$2,680,000
Site Improvements	Walkways, abandoned infrastructure safety	\$345,000
Water Reuse Infrastructure	Clothe filters, CC basin mods, pump station, piping	\$5,640,000
Electrical, I&C & Controls	30% of equipment costs for new systems	\$2,460,000
Traffic & Environmental Controls	Temporary construction controls	\$65,000
Surveying	WWTP and water reuse conveyance survey	\$170,000
Asset Management Plan & G/L/F	Asset management plan, general, legal, financial	\$200,000
Contractor Markups	25% overhead, profit, mobilization, bonds, insurance	\$2,670,000

Construction Contingency	50% of construction subtotal	\$6,650,000
Engineering Services	24% of construction costs for design and SDC	\$4,800,000
TOTAL ESTIMATED BUDGETARY COST		\$38,375,000

**Budgetary costs based on December 2025 dollars. AACE Class 4 estimate.*

Funding Application

TWDB Clean Water State Revolving Fund (CWSRF) PIF Submission

Following completion of the engineering assessment and Facilities Plan, NRA coordinated with the City of Alice and Kleinfelder to prepare a Project Information Form (PIF) for submission to the Texas Water Development Board’s CWSRF Clean Water Fund program. The CWSRF is the primary recommended funding mechanism for this project, offering low-interest loans at 30–35% below market rates with long repayment terms and potential principal forgiveness for disadvantaged communities.

The City of Alice’s median household income and socioeconomic data support a determination of disadvantaged community status. Based on census data submitted with the PIF, the City has an average median household income of \$48,676, an unemployment rate of 4.08%, and an average monthly sewer bill of approximately \$25.00. The estimated principal forgiveness eligibility calculated by TWDB is 30%, which could translate to significant grant relief on the total project cost.

PIF Summary

The following table summarizes the key information submitted in the TWDB Project Information Form:

Field	Information
PIF Number	17687
Application ID	2487951
Entity	Alice (City of Alice, Texas)
Project Name	Alice Southside WWTP Infrastructure Improvements and Reuse – Design/Construction
Funding Type	CWSRF (Clean Water State Revolving Fund)
Project Category	POTW (Publicly Owned Treatment Works)
Discharge Segment	Lattas Creek → San Fernando Creek → Baffin Bay (Segment No. 2492)
Population Served	17,595
Household Connections	7,200
Total Estimated Project Cost	\$38,375,000
SRF-Funded Amount	\$38,375,000 (planning, design, and construction)
Estimated Principal Forgiveness	30% (disadvantaged community determination)
Anticipated Construction Start	September 1, 2028

Anticipated Construction Completion	August 31, 2029
Watershed Protection Plan	San Fernando and Petronila Creeks WPP (TCEQ-accepted, June 2022)
Asset Management Plan	To be prepared as part of the project
Reuse Component	Yes – Type I reclaimed water production and delivery infrastructure
Date Submitted	March 6, 2026
Submitted By	Nick Dornak, Kleinfelder (Water Strategy Lead), on behalf of City of Alice

Qualifying Criteria

The PIF identified several key rating criteria that strengthen the City of Alice’s competitive position on the CWSRF Intended Use Plan:

- **Watershed Protection Plan:** The receiving water, Lattas Creek/San Fernando Creek/Baffin Bay (Segment 2492), is listed in the TCEQ-accepted San Fernando and Petronila Creeks Watershed Protection Plan (June 2022), and this project implements management measures identified in that plan.
- **More Stringent Effluent Limits:** The project includes conversion to Type I reclaimed water production, which requires meeting treatment standards more stringent than the current discharge permit.
- **Innovative and Alternative Technology:** The project incorporates Type I effluent reuse, qualifying as an alternative technology under CWSRF definitions.
- **Water Conservation:** The reuse component directly supports reduction of per capita potable water consumption by 3% over 5 years and 6% over 10 years, consistent with the City’s adopted water conservation and drought contingency plan.
- **State Water Plan Alignment:** The project implements reuse, conservation, and drought management strategies identified in the 2022 Texas State Water Plan.
- **Disadvantaged Community:** The City of Alice’s socioeconomic data supports a 30% estimated principal forgiveness determination.
- **First-Time Service:** The project will provide first-time Type I reuse service for a planned 358-home residential development in the City’s service area.

Outcome

TWDB PIF Acceptance

On March 16, 2026, the Texas Water Development Board notified project contacts that the Project Information Form submitted on behalf of the City of Alice had been reviewed by TWDB staff and accepted as suitable for inclusion in the CWSRF Intended Use Plan – Project Priority List. This notification confirmed PIF No. 17687 (Application ID 2487951) for the project “Alice Southside WWTP Infrastructure Improvements and Reuse – Design/Construction” in the status of ACCEPTED.

The TWDB notification, addressed to City of Alice City Manager Michael Esparza and project engineering contacts at Kleinfelder, indicated that:

- The project will be posted for public comments in accordance with CWSRF program requirements.
- Following the public comment and response period, the City of Alice will be formally invited to submit a full loan application.
- An application record has been created in the TWDB Online Loan Application system, accessible through the Entity Contact’s dashboard.
- The Application may not be submitted until the PIF record status is changed from “Accepted” to “Invited.”

This acceptance represents a significant milestone for the City of Alice, opening the pathway to access low-interest CWSRF financing and potential principal forgiveness to fund the Southside WWTP improvements.

Disadvantaged Community Qualification

The PIF submittal included a complete Disadvantaged Community section with census-based socioeconomic data for the City of Alice. Based on this data, TWDB calculated a Household Cost Factor of 3% and an estimated principal forgiveness eligibility of 30% of the total loan amount. If the project receives a 30% principal forgiveness, this would translate to approximately \$11.5 million in grant-equivalent funding toward the \$38.4 million project, substantially reducing the repayment burden on City of Alice ratepayers.

Project Impact on Baffin Bay Water Quality

The successful pursuit of CWSRF funding for the Southside WWTP directly supports the broader water quality goals of the Coastal Bend Bays & Estuaries Program. The Southside WWTP is one of thirteen wastewater treatment plants discharging into Baffin Bay via San Fernando Creek. Upgrading this facility will:

- Reduce the risk of E. coli and ammonia-nitrogen permit exceedances that contribute to the documented impairment of San Fernando Creek and Baffin Bay.
- Improve treatment reliability during wet weather events, when I&I-driven flow surges currently stress the aging treatment process and risk solids carryover into receiving waters.
- Enable implementation of safer and more reliable disinfection technology, reducing the risk of chlorine incidents that could impact nearby residents and downstream water quality.
- Create the infrastructure foundation for future nutrient removal upgrades that may be needed as water quality standards for Baffin Bay evolve.

- Introduce Type I water reuse from the Southside WWTP for the first time, diverting treated effluent from Lattas Creek to beneficial non-potable uses and reducing nutrient loading to the bay.

Conclusion

CBBEP Project 2528 has successfully accomplished all tasks and deliverables specified in the Scope of Work, including the post-award meeting, procurement and oversight of engineering services, completion of a comprehensive WWTP assessment and Facilities Plan, submission of a TWDB CWSRF Project Information Form, and delivery of all required reports.

The engineering assessment conducted by Kleinfelder documented in detail the extent and severity of infrastructure deficiencies at the Alice Southside WWTP, confirmed the need for urgent capital investment, and established the Facilities Plan required by TWDB to qualify for funding. The assessment also identified significant opportunities to improve Baffin Bay water quality through process upgrades, safer disinfection practices, and the introduction of beneficial water reuse.

The TWDB's acceptance of the City of Alice's PIF on March 16, 2026, represents a concrete and meaningful outcome for the CBBEP investment. The City of Alice is now positioned to progress through the CWSRF application process and, if successful, to access tens of millions of dollars in low-interest financing with potential principal forgiveness — funding that the community could not have realistically accessed without the technical and financial advisory support provided through this grant.

The Nueces River Authority thanks the Coastal Bend Bays & Estuaries Program for its support of this project. The partnership between NRA and CBBEP continues to demonstrate how targeted investments in planning and technical assistance can leverage far larger public infrastructure investments that protect and restore coastal bay systems for the benefit of all South Texans.

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