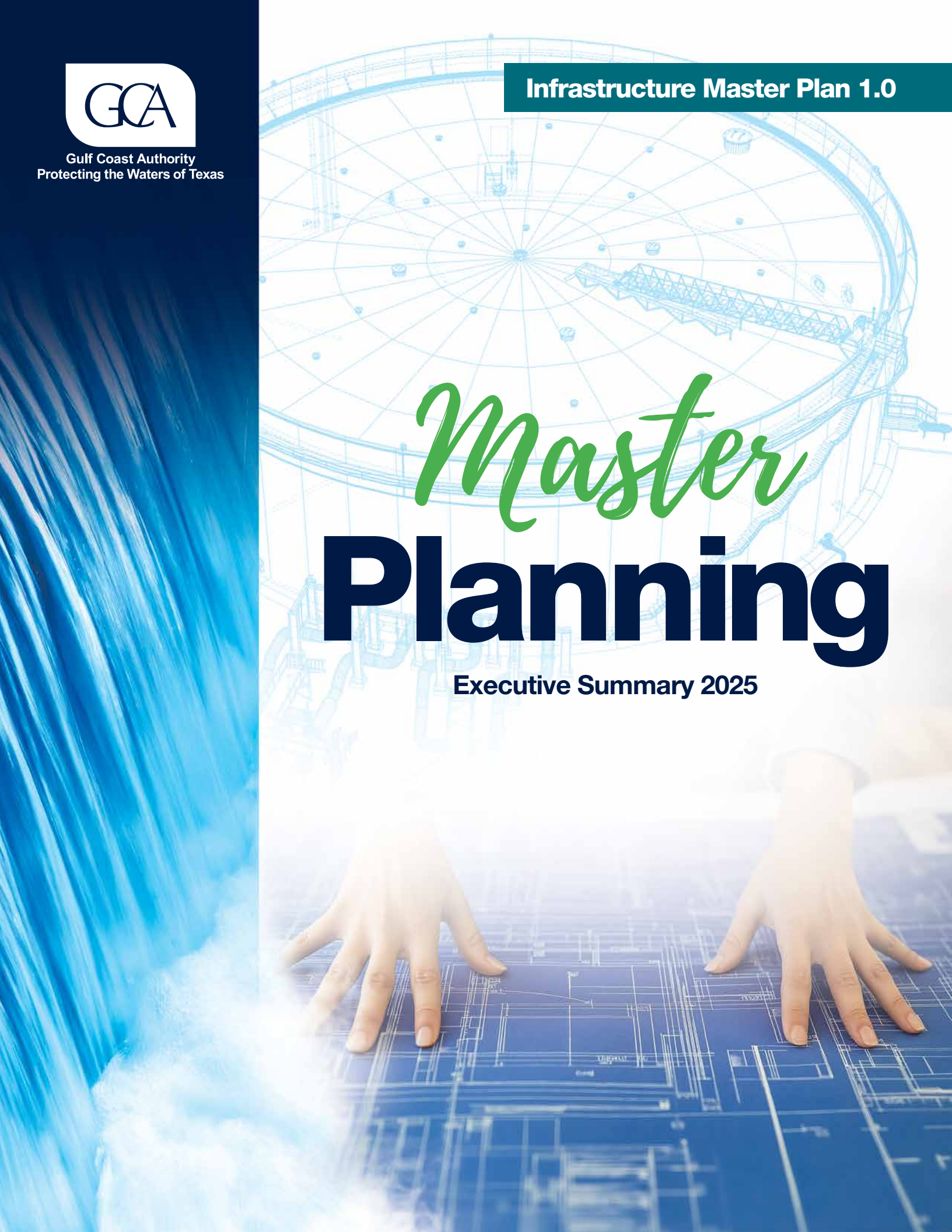
Gulf Coast Authority
Protecting the Waters of Texas

Infrastructure Master Plan 1.0

Master Planning

Executive Summary 2025



From the **Chair of the Board**

For more than 55 years, Gulf Coast Authority has played a vital role in protecting Texas waterways and supporting regional growth. As stewards of this important mission, the Board understands that maintaining this legacy requires both strategic foresight and sustained investment.

The Infrastructure Master Plan marks a significant milestone in that effort. This initiative reflects thoughtful collaboration across the organization and ensures that future infrastructure decisions are grounded in sound planning, technical insight, and fiscal responsibility. It equips GCA to respond effectively to growth, regulatory change, and aging assets, while continuing to serve our customers and participants with excellence.

On behalf of the Board, I would like to extend sincere appreciation to Chief Executive Officer Liz Fazio Hale and the entire GCA team for their leadership, expertise, and commitment in bringing this critical effort to life. Their collective work has laid a strong foundation for the future of the Authority.

Kevin Scott

From the General Manager/CEO

Gulf Coast Authority's facilities have long served as the foundation of our mission to protect the waters of Texas and support the state's industry and economic development. As these essential assets age, it became evident that a comprehensive, long-term, Authority-wide initiative was necessary to ensure responsible growth, efftective modernization, and the continued delivery of the high standard of service for which GCA is known.

The Infrastructure Master Plan represents the culmination of a multi-year effort dedicated to establishing a clear strategic direction for our facilities, systems, and services. Guided by a cross-functional team of leadership, technical experts, and external engineering partners, this plan reflects GCA's unwavering commitment to remaining reliable, compliant, future-ready, and mission-focused. A special thank you to our Senior Management Team, Scott Harris, COO; Phyllis Frank, CTO; and Carrie Latimer, CFO, as well as our Technical Services Team, especially Jonathan Sandhu, Technical Director, Project Manager Jonte' Greer, Assistant Director of General Engineering, and Joanne MacDougall, Senior Process Analyst for leading such an important endeavor.

I would also like to extend many thanks to the Board of Directors for their steadfast support throughout the development of this strategic initiative.

I am honored to lead a team of highly dedicated professionals whose unwavering commitment will ensure the continued success and resilience of GCA for years to come.

Elizabeth Fazio Hale

In 2022

GCA launched its master planning effort and evaluated a total of 3,933 assets across its existing facilities and assigned a condition rating to each, including Very Good, Good, Fair, Poor, and Very Poor. As of the date of this report, GCA's evaluated assets ranked as follows:

In 2024

GCA held assets of $365.6 million, including a recent $34 million expansion of capacity at its Bayport Facility. The current GCA Capital Improvement Plans (CIP) for a 5-year period anticipates more than $100M in infrastructure improvements/ rehabilitation. Through master planning efforts, the CIP has been refocused on a more realistic, long-term approach over a 20-year period, which includes $180.4 million for the five currently operating facilities, distributed as follows:

- **Bayport:** **$129,300,000**
- **Blackhawk:** **$34,700,000**
- **40 Acre:** **$5,500,000**
- **Odessa:** **$9,100,00**
- **Washburn Tunnel:** **$30,000,000**

GCA Infrastructure Master Planning

Gulf Coast Authority has five existing facilities that on average treat nearly 50 million gallons per day (MGD), with a combined maximum treatment capacity of almost 145 MGD. Over the 55-year history of the Authority, these facilities were either acquired or built over time, but all are at least 40 years old. Effective management, engineering, operations, and maintenance have ensured the ongoing operational functionality of these facilities over the years. However, given their increasing age, the Authority determined that a detailed infrastructure master plan would provide a valuable tool for aligning GCA's people and financial resources, including capital planning.

As population and industrial growth continue to accelerate in Texas, it is expected that demand for GCA services will increase[1]. Providing the infrastructure to meet those needs will require a significant investment of GCA resources, including people, time, and funding.

Through detailed, thoughtful master planning, the Authority has developed tools and processes for better assessing the reliability of its infrastructure and planning for future repairs and replacements. GCA's Infrastructure Master Plan 1.0 is a living document with anticipated annual utilization not only for financial planning but also operational processes and ongoing asset maintenance and replacement capabilities.

[1] *In 2025, GCA completed a new facility in North Texas with assets valued at roughly $40 million. Due to the greenfield nature of this project, it was not included in the current master planning initiative but will be monitored and reviewed for incorporation into future master planning initiatives.*

GCA Background

GCA was created in 1969 by the State of Texas to provide cost-effective regional wastewater and water resource services to industry and municipalities across the state. Guided by a vision centered on clean water and innovative water management strategies, GCA enables its customers to meet environmental goals and maintain regulatory compliance while focusing on their core operations.

Our regionalized treatment facilities are founded on a philosophy of environmentally sound, economically feasible, and technically advanced solutions. GCA's original jurisdiction consists of Chambers, Harris, and Galveston counties.

Utilizing interlocal agreements to provide clean water and water reuse services, GCA has expanded its impact and services to the West and North Central regions of Texas. GCA is governed by a nine-member appointed Board of Directors and managed by the General Manager/Chief Executive Officer.

Vision

To lead Texas in clean water and value-added initiatives with innovative, cost-effective, and reliable wastewater and water reuse management solutions and to serve as a provider of choice for national bond conduit financial services.

Mission

To protect the waters of the State of Texas through environmentally sound, economically feasible, and technologically advanced wastewater and water management practices.

Key Business Strengths

Our reputation for providing safe, reliable, cost-effective, and compliant services makes us a trusted resource for treating some of the hardest-to-treat wastewaters while protecting the environment and supporting economic development.

GCA Infrastructure Master Planning Process

A planning team, including senior leadership, facility management, and technical, operational, and engineering experts, was formed to develop a comprehensive master plan on GCA's current and aging infrastructure. Assisted by a third-party engineering firm, the planning team set out a scope of work defining its goals for the planning process. This effort included asset evaluations and assessment of asset tracking tools; national, regional, and local regulatory reviews; operational and process procedure development and documentation; and capital improvement prioritization modeling for capital project funding over 5-, 10-, and 20-year increments.

In March 2023, the planning team conducted site visits to the five GCA facilities to meet with plant staff and review the project scope, goals, and objectives. They then worked through 12 planning steps, ranging from facility assessment to alternatives evaluation and ultimately the development of recommendations and a capital project improvement plan. The plan was developed along two parallel tracks focused on: 1) treatment system improvements to meet future customer needs and regulatory requirements; and 2) an asset rehabilitation and replacement investment forecast.

With this plan, GCA is taking a systematic approach to treatment system improvement that manages assets throughout their life cycle to ensure the asset risk profile is maintained at an acceptable level, employing hydraulic models and processes, with regular risk assessment updates.

Asset Evaluation

Risk Assessment

Replacing assets simply based on chronological age can result in unnecessary expenditure due to the asset performing better than expected and having a longer useful life than initially anticipated. Instead, GCA's master planning team undertook to evaluate the condition of each asset and determine remaining useful life, thus creating a systematic and cost-effective approach to asset refurbishment and replacement.

An asset's effective age represents an assessment of its Likelihood of Failure (LOF); increasing or decreasing its position on an expected life curve, based on its current condition. The effective asset age is, therefore, the result of adjusting an asset's chronological age due to relative differences in the asset's current condition as compared to an expected condition. The remaining useful life is a predicted number of years the asset is estimated to continue operating before failure based on the current physical condition of the asset. The asset effective age and remaining useful life were calculated for all assets and used to determine the final LOF score.

GCA developed a risk management framework based on the Likelihood of Failure (LOF) and Consequence of Failure (COF). LOF and COF were given a 1 through 5 score (negligible through severe) based on the criteria established. The LOF score represents the estimated percent chance of failure of an asset or when the asset is predicted to fail. The COF score represents the estimated magnitude of impact of the asset failing using triple-bottom line criteria (environmental, social, and economic). A heat map, or matrix, is used to help visualize the risk results. The team established four risk levels (Low, Medium, High, and Severe) based on the numerical risk value calculated from the combination of LOF and COF. The risk matrices for each facility are shown in their respective sections to summarize final risk scores. The values shown in the individual, colored squares are representative of the number of assets with that corresponding risk score. All risk matrices are a snapshot of the time of assessment and publication of this report.

Hydraulic and Process Models

Modeling refines decision-making by aligning investments with actual system performance rather than theoretical assumptions. It provides a more precise and dynamic understanding of system performance than traditional methods that rely solely on historical flow data or design assumptions. By simulating flow or leading through the system, modeling helps to pinpoint areas of concern such as bottlenecks or underutilized capacity. This allows for targeted infrastructure improvements and avoids unnecessary capital expenditure. The results of each model helped assess whether facilities can meet future demand scenarios and guide the prioritization of capital projects based on risk, performance, and regulatory requirements.

The staff at each GCA facility identified site-specific objectives to guide planning and evaluation efforts. Using a hydraulic model, the team then calculated hydraulic grade lines across a range of flow rates. These scenarios are summarized in a table within each respective facility's section. With the model, the team also identified any hydraulic restrictions under existing and projected future flow conditions. Process modeling allowed future loading scenarios to be assessed and whether capacity expansion would be required.

Capital Improvement Project Optimization

For capital improvement planning, the GCA team applied a value-based capital prioritization approach, called the Capital Improvement Plan (CIP) Prioritization Process, to analyze and prioritize projects based on a ranking of the value they provide to GCA. A value-based process acknowledges that all capital projects bring a level of benefit to GCA, and it utilizes a defined process to capture the magnitude and type of benefit each specific project provides. The following process framework helps the team understand the impact that budget and staffing constraints have on overall system risk and prioritize projects based on the benefit they offer to the facility and GCA overall.

Each project is analyzed within the Project Prioritization and Optimization Model, allowing the user to balance project costs, added value, and other parameters and constraints in a way that is quantified and defendable. This data then serves as the basis of the optimization and prioritization analysis. The end goal is to help GCA manage costs while scheduling capital projects that bring the most value to the system. The figure above summarizes the prioritization and optimization approach used for all GCA's wastewater facilities.

Capital Improvement Prioritization

The detailed results of the prioritized CIP are shown in each respective facility section. The graph outlines when each project was originally identified to start (under "Current Funding Install Year") and the actual start year ("Prioritized CIP Install Year"). This allows GCA to maximize the value of each project while keeping investments in line with the capital budget. Over the next 20 years and with annual updates, this prioritization strategy will support long-term planning, helping ensure that investments are made at the right time to maintain system performance and reliability and to allow for aging and timely updates.

Bayport

The Bayport Facility is GCA's largest facility; serving over 75 industrial customers. Metered flow from the individual customers is conveyed via pipeline. The facility also receives low strength wastewater via an open channel canal. The facility receives industrial wastewater flows through a main lift station and is pumped to the 1st step oxygen activated sludge treatment (AST) tanks. The 1st step process is followed by a 2nd step activated sludge system that provides further biological treatment. Clarifiers remove the activated sludge from the wastewater. Treated wastewater flows from the clarifiers through a series of polishing ponds prior to chlorine disinfection and pumped discharge.

The revenues to manage, operate, maintain, and construct capital improvements at the Bayport Facility are provided by the customer industries in accordance with the rate order approved by the GCA Board of Directors. The diversity of industrial participants can result in highly variable wastewater flows, organic loadings, and wastewater constituents.

Goals

Shift from reactive to preventative maintenance

Create a prioritized improvement roadmap

Improve monitoring of ammonia and total suspended solids compliance

Identify and troubleshoot plant hydraulic issues

Advance regenerative thermal oxidizer (RTO) resilience

Flow Component	Existing Average	Existing Peak	Future 10-Year Average	Future 10-Year Peak
Total Influent (mgd)	20.2	50.4	21.7	54.2
Total RAS (mgd)	13.25	13.25	14.6	14.6

Risk Assessment Summary

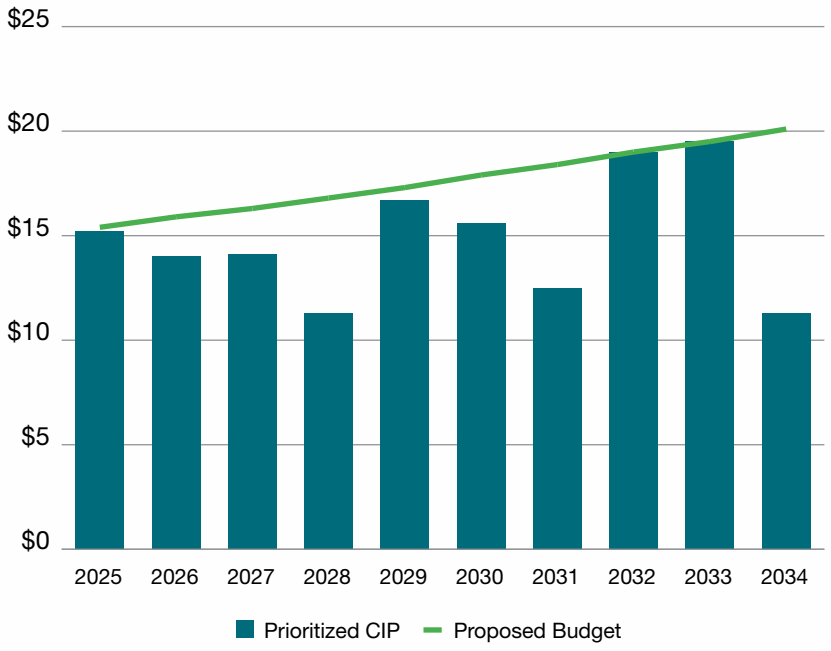
Severe 29 Assets

High 28 Assets

Medium 413 Assets

Low 759 Assets

Annual Spend ($ Millions)



Blackhawk

The Blackhawk Facility provides regional municipal wastewater treatment services to two municipal utility districts and two cities. Wastewater is pumped to the Blackhawk Facility headworks from multiple lift stations in the municipal customer's collection system. From the headworks, the flow then splits into the five aeration basins along with the return activated sludge (RAS) and solids return streams. The flow from the aeration basin effluent is then split to three different final clarifiers. After the final clarifiers, the flow goes through traveling bridge gravity sand filters and through ultraviolet (UV) disinfection before being discharged to Clear Creek.

The revenues to manage, operate, and maintain this facility are provided by the customers it serves through contracts for pollution control services. Under these contracts, the participants reimburse GCA on a monthly basis the actual costs plus contributions to the contingency reserve for capital equipment replacement.

Goals

Prioritize equipment replacements based on operational criticality

Procure user-friendly tools to enhance usability for plant staff

Leverage the Computerized Maintenance Management System (CMSS)

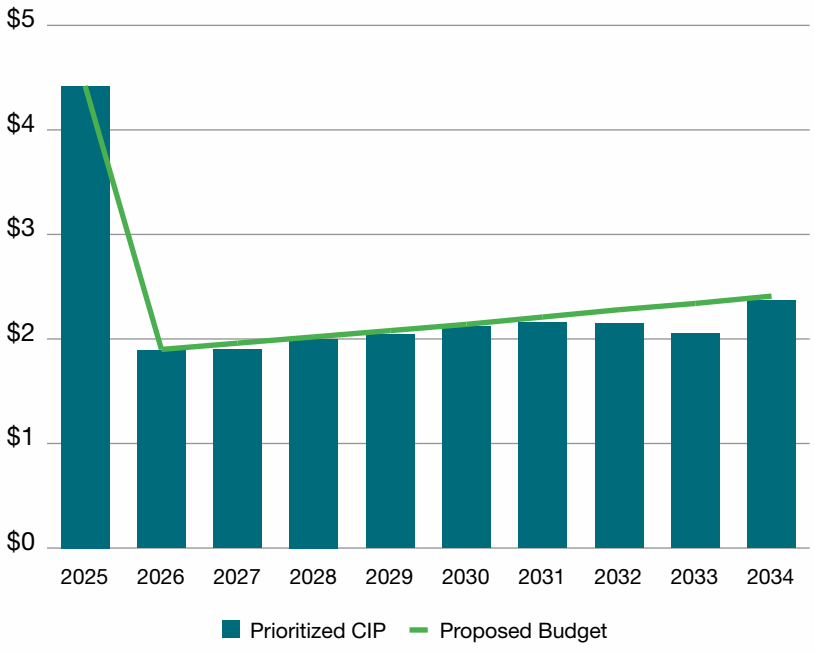
Establish system redundancy for solids transfer between digesters

Flow Component	Existing Average	Existing Peak	Future 10-Year Average	Future 10-Year Peak
Total Influent (mgd)	5.3	27.7	6.7	21.7
Total RAS (mgd)	2.65	6.2	3.35	4.86

Risk Assessment Summary

Severe	9 Assets
High	30 Assets
Medium	62 Assets
Low	285 Assets

Annual Spend ($ Millions)



40-Acre and Campbell Bayou

The 40-Acre Facility treats wastewater from various industrial users in the area in addition to receiving flow from a nearby non-hazardous leachate and a non-hazardous sludge disposal unit (landfarm) from Campbell Bayou, also owned by GCA. The industrial flows enter the facility at different points depending on influent characteristics and treatment requirements. The facility employs an oxygen activated sludge (OAS) process coupled with a series of basins for further polishing. Waste Activated Sludge (WAS) from the final clarifiers is sent to the digester basin, which currently stores the wasted sludge. Discharges from the 40-Acre facility are conveyed to the Hurricane Leevee Canal and then to the Texas ship channel.

As a cost reimbursable facility, the revenue to operate 40-Acre is provided by the industries with which GCA has written service contracts. The industrial participants pay for operations and maintenance (O&M) costs through quarterly revenue payments to cover budgeted expenses with periodic variance adjustments to actual costs.

Goals

Develop prioritization and justification for infrastructure renewal

Implement a strategy for managing decreasing flows and loads

Create a plan for the sludge digester basin

Increase automation in data management and reporting

Flow Component	Existing Average	Existing Peak	Future 5-Year Average	Future 5-Year Peak	Future 10-Year Average	Future 10-Year Peak
Total Influent (mgd)	7.53	30	6.7	12.8	13.4	25.5
Total RAS (mgd)	2	5.96	1.71	1.83	3.41	3.64

Risk Assessment Summary

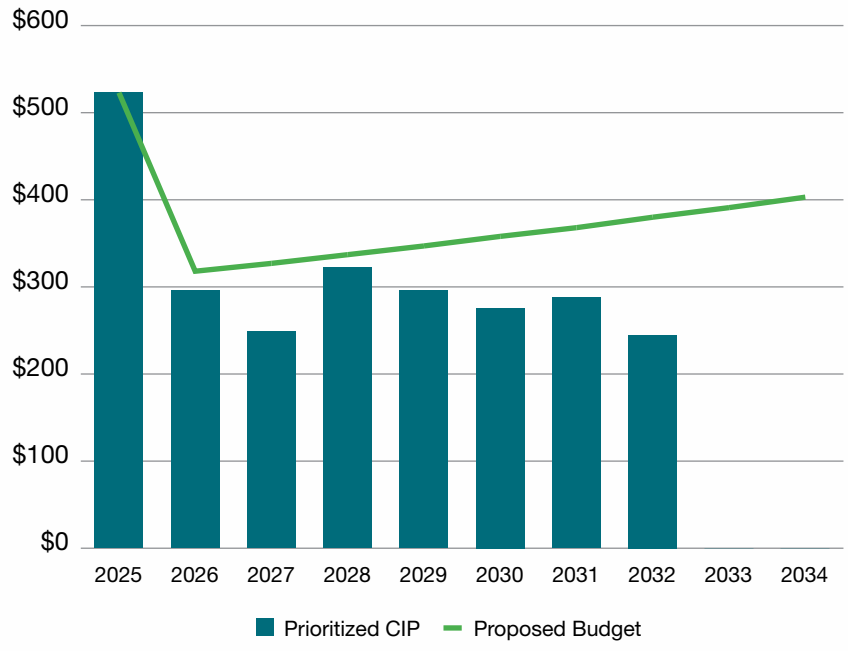
Severe — 4 Assets

High — 34 Assets

Medium — 88 Assets

Low — 110 Assets

Annual Spend ($ Thousands)



Odessa

The Odessa Facility treats wastewater from four industrial customers and trucked in non-hazardous wastes from load waste haulers. A portion of the treated effluent from the facility is sold for reuse in fracking operations. Wastewater flows by gravity to a lift station located onsite, then flows through in-line grinding units before entering five single stage aeration basins. The activated sludge is then either returned to the aeration process or wasted to aerobic digesters.

The clarified wastewater flows from the clarifiers to chlorine disinfection, sand filtration, and dechlorination prior to being discharged to Monahan's Draw. Waste activated sludge (WAS) from the clarifiers is stored in the aerobic digesters where it undergoes some solids reduction. The solids are then pumped to a belt fiter press, where they are further dewatered in the belt filter press before being sent out to the landfills.

The revenues to manage, operate, and maintain the Odessa Facility are provided from its local industrial customers, in accordance with negotiated agreements which is approved by the GCA Board of Directors. Revenues are also obtained from treatment of trucked in waste from domestic and industrial sources and selling of industrial reuse.

Goals

Prioritize equipment replacements based on remaining useful life

Evaluate and optimize clarifier flow distribution

Assess condition and integrity of underground piping

Expand use of MPulse to support a proactive maintenance strategy

Develop decommissioning and repurpose plans for abandoned structures and equipment

Flow Component	Existing Average	Existing Peak	Future 5-Year Average	Future 5-Year Peak	Future 10-Year Average	Future 10-Year Peak
Total Influent (mgd)	7.53	30	6.7	12.8	13.4	25.5
Total RAS (mgd)	2	5.96	1.71	1.83	3.41	3.64

Risk Assessment Summary

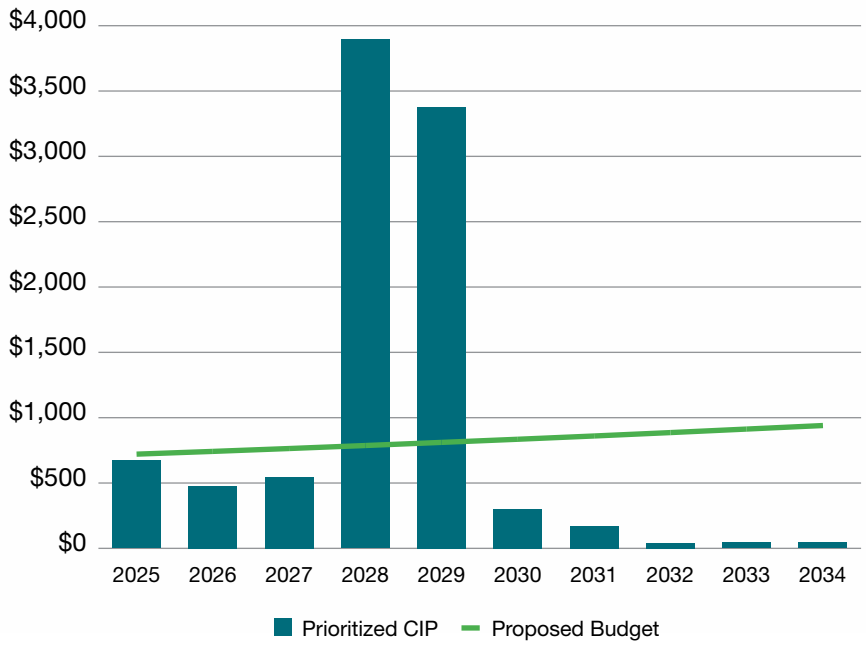
Severe — 5 Assets

High — 32 Assets

Medium — 103 Assets

Low — 71 Assets

Annual Spend ($ Thousands)



Washburn Tunnel and Vince Bayou

Daily Flow	**12.2 mgd**
Capacity	**30 mgd**
Assets Reviewed	**1,726**

The Washburn Tunnel Facility receives wastewater from local industries located along the Houston Ship Channel. The high organic wastewaters (Bio Stream) enter separately from low organic wastewater that requires primary solids removal. The Bio Stream enters the 1st step aeration basin for pure oxygen activated sludge treatment. In parallel, the low organic wastewater stream flows into the primary clarifier for solids removal. Both streams then combine and flow to a second step activated sludge treatment process that is split into two parallel aeration and clarification systems. Treated water is then disinfected with peracetic acid and discharged to the Houston Ship Channel. Return activated sludge (RAS) from all secondary clarifiers is sent back to the 1st step aeration basin, while waste activated sludge (WAS) is pumped to the primary clarifier or routed to a gravity thickener. Combined sludge is dewatered in the belt presses and hauled to a landfill. The Washburn Tunnel Facility also receives trucked in wastewater via GCA's Vince Bayou Receiving Station.

The revenues to manage, operate, and maintain Washburn Tunnel are provided by the participating industries, participants and their customers. Contracts for wastewater treatment services with the participants provide for cost reimbursements on a monthly basis to cover budgeted expenditures followed by monthly variance adjustments.

Goals

Manage excess plant capacity

Improve operational efficiency

Address algae buildup in the final clarifiers

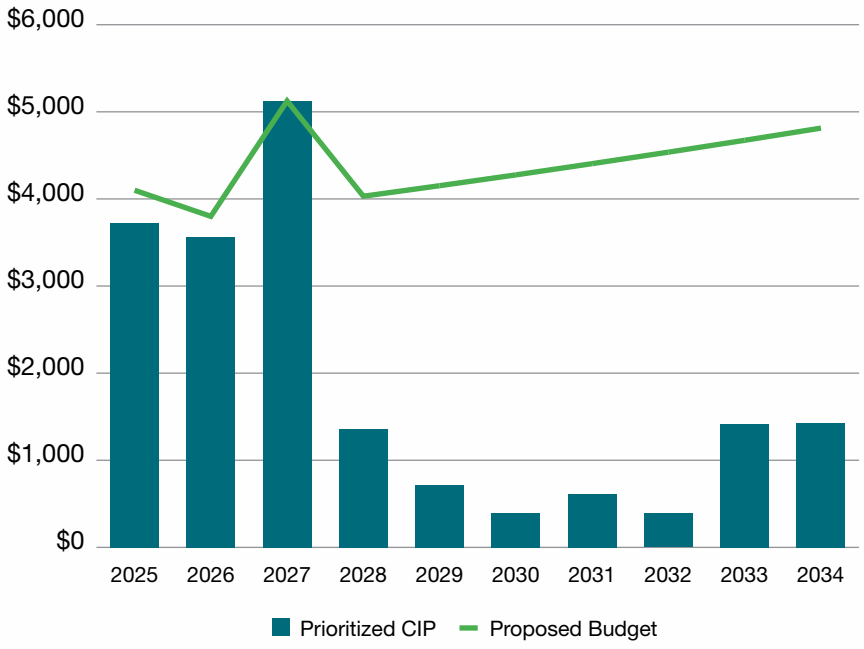
Evaluate need for additional storage, filtration, and screening

Flow Component	Existing Average	Existing Peak	Future 2-Year Average	Future 2-Year Peak	Future 5-Year Average	Future 5-Year Peak
Total Influent (mgd)	12.6	40	9.6	15.9	23.6	47.1
Total RAS (mgd)	7.6	17	4.4	4	14.3	20

Risk Assessment Summary

Severe	1	Assets
High	24	Assets
Medium	198	Assets
Low	983	Assets

Annual Spend ($ Thousands)



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The individuals listed above have served as champions of this initiative, contributing more than 2,700 working hours alongside their core responsibilities. Their combined efforts reflect the dedication and teamwork that define GCA. We are thankful for their exceptional commitment, collaboration, and work ethic in bringing the Infrastructure Master Plan to life.

Board of Directors

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J.M. “Mark” Schultz
Treasurer

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Franklin D.R. Jones, Jr.
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General Manager/
Chief Executive Officer

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Phyllis Frank
Chief Technical Officer

Carrie Latimer
Chief Financial Officer

CORE VALUES

S	SAFETY
C	COMMUNICATION
R	RELIABILITY
I	INTEGRITY
P	PLANNING
T	TEAMWORK
S	STEWARDSHIP

Protecting the waters of the State of Texas through environmentally sound, economically feasible, and technologically advanced wastewater and water management practices.

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