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DESIGN-BUILD DELIVERY

SUPPORTING MANUFACTURERS WITH PROGRESSIVE DESIGN-BUILD SOLUTIONS

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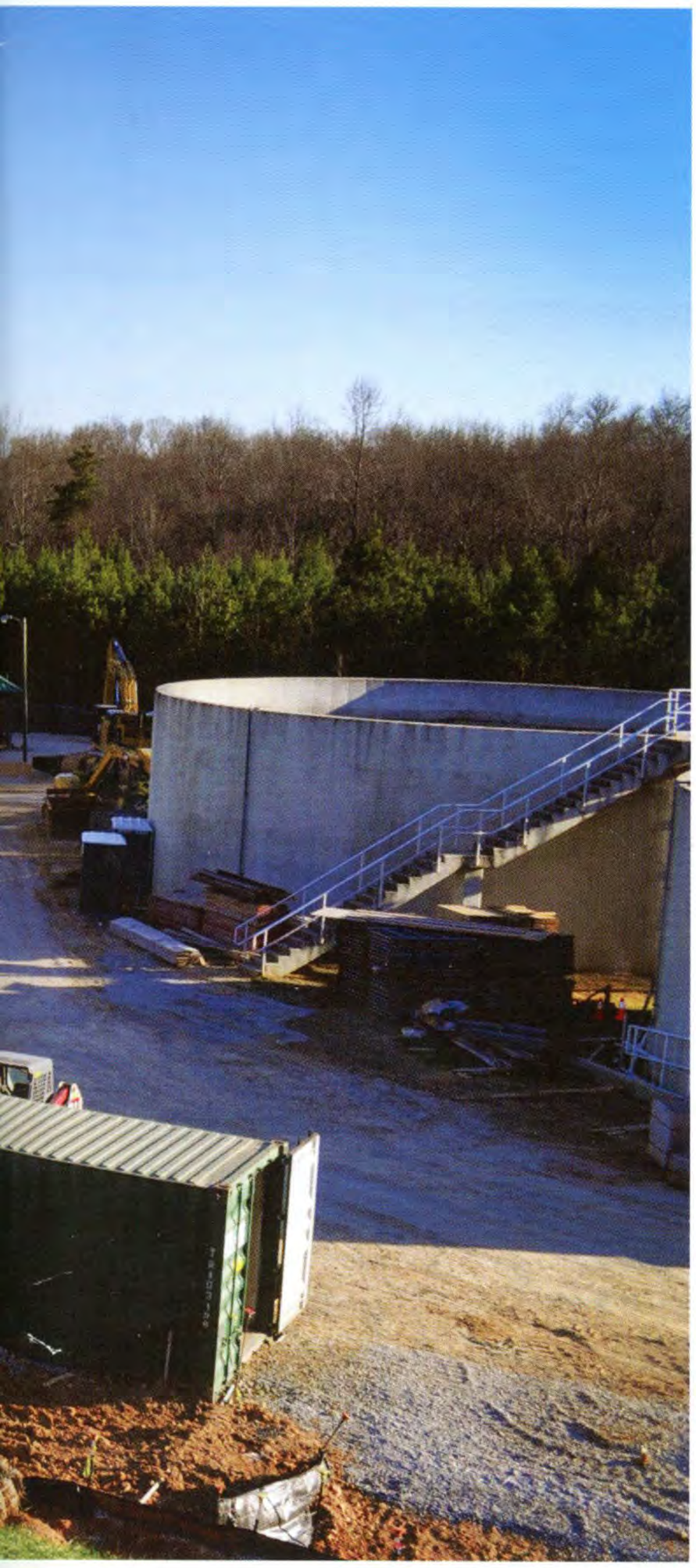
In 2014, a major global manufacturer of carbon fiber products announced plans to invest $1 billion to build a manufacturing plant on 400 acres in Moore, S.C. The greenfield production facility was to be located within the service area of the Spartanburg Sanitary Sewer District (SSSD). Specifically, it would be situated within the service area of the Lower North Tyger River Reclaimed Water Treatment Facility (LNTR)—an activated sludge treatment facility that provides secondary biological treatment in a single, carousel-type reactor with surface aeration, operating at approximately 1.15 million gal per day average daily flow.

An important negotiated condition of the siting of this industrial manufacturing facility in Spartanburg County was that SSSD would receive and treat all wastewater generated by the LNTR facility with minimal to no pretreatment required by the manufacturer. Recognizing the schedule for the industrial facility's discharge to LNTR was extremely aggressive, and that wastewater flow from the industrial facility would impact the hydraulic and process capacities of LNTR, SSSD set out to serve the manufacturing facility with the primary goals of maintaining compliance at LNTR and upholding the schedule for receiving the production wastewater.

Due to the planned buildout of the industrial facility and the current capacity of LNTR, SSSD identified the need for an improved and expanded facility to handle the anticipated flows. Project success hinged on addressing several key drivers and risks, including a 100% increase in average daily flow to a small conventional treatment plant within a two- to three-year time frame.

Given such factors, SSSD anticipated selecting an alternative project delivery method to effectively manage key drivers and risks, and engaged Gresham, Smith and Partners (GS&P) to serve as the owner's agent throughout the project cycle. In considering options and constraining factors, SSSD identified the



essential "must haves" for the project delivery process. These comprised a flexible and adaptable delivery approach; a significant level of collaboration with designers, consultants and the contractor teams; and a project delivery methodology that would allow for an "off-ramp" after completion of 60% design.

A PROGRESSIVE DESIGN-BUILD SOLUTION

Among project delivery alternatives, progressive design-build (PDB) was an approach that would allow a design-builder to be the lead project-contracting entity, with design and construction expertise integrated in a single point of accountability for an owner. The PDB model also offered a flexible project delivery approach that could rapidly and effectively respond to changing project information and design circumstances, the opportunity for a high level of collaboration within the entire project team and the option for a project "off-ramp."

The role of owner's agent was recognized by SSSD as an important component to the success of the PDB project delivery approach. As owner's agent, GS&P functioned as an extension of SSSD, providing technical guidance and expertise throughout the project cycle, including the scope definition and selection phases, contract development and negotiation assistance, assessment of wastewater treatability and treatment option evaluations, and construction-phase reviews and permitting assistance. The GS&P team also collaborated with SSSD to develop and define preliminary design conditions and criteria, request for qualifications (RFQ) solicitation, RFQ scoring and selection criteria, request for proposal (RFP) solicitation, and RFP scoring and selection criteria.

After receiving qualification statements and participating in presentations from all prospective qualifiers, a short list of three qualified teams was finalized, and these teams were each invited to prepare a proposal in response to the RFP solicitation. After receipt and review of proposals, SSSD conducted interviews with all three teams, resulting in the selection of the Haskell Co./Brown and Caldwell team.

SHARING THE STAKES

This entire project was executed in the construction phase in an extremely collaborative environment that included input from SSSD, GS&P, the Haskell Co./Brown and Caldwell team, state regulators and the industrial facility owner as project progress required. The engagement of multiple stakeholders allowed for the thorough investigation of the existing hydraulic and biological process capacity of LNTR, along with the completion of the industrial wastewater characterization and treatability evaluation. It also aided in the identification of potential impacts of the industrial wastewater contribution on current hydraulic capacity, process capacity and discharge compliance.

During the treatability phase of the project, an assessment identified requirements for discharge and compliance. The 12-month treatability study provided data to establish a plan forward for the successful treatment of the industrial wastewater flows at LNTR. The solution allowed large-scale improvements at the facility for hydraulic expansion and biological process upgrades to be deferred until projected flows and loads increase in the future. The collaborative interaction during the treatability phase showcased the progressive nature of the project, as the treatability work required continuous real-time feedback from the stakeholder groups, since new information was obtained on an almost daily basis and the project direction was adjusted accordingly.

Upon conclusion of the treatability work and capacity analyses, the basis of design information was developed and a path forward was established. Capacity evaluation technical memorandums (TMs) were adjusted based on the results of the treatability study and on the updated flow projections from the industrial manufacturing facility. This information was critical to the verification of existing LNTR unit process sizing and capacity. Design criteria were developed with project team input. This information was then documented in TMs and preliminary engineering reports (PERs) for project record. Construction of hydraulic improvements at the influent pump station was completed ahead of process improvement construction, since hydraulic information could be confirmed before the treatment process was proven.

Armed with a preliminary scope of work developed from the PERs, the design-builder's preconstruction team quickly developed a preliminary cost estimate and schedule for the proposed process improvements. This provided SSSD with early price certainty to secure board

approval to proceed with detailed design and construction.

The design of the proposed treatment improvements was developed over a six-month period by the design-builder, with continual input from SSSD and GS&P. Workshops were held to review the preliminary design and the design documents at the 30%, 60%, 90% and 100% milestones. Current design deliverables were issued to all stakeholders two weeks in advance of each milestone workshop. These sessions were attended by the entire project team, including the owner's management team and key operations, maintenance and lab staff; GS&P; the design-build team's project manager; key design discipline staff; the construction project manager; and the lead estimators.

Guaranteed maximum price (GMP) preparation began at 30% design with the development of a detailed project scope as well as subcontractor bid packages and outreach to the local construction community. Following issuance of the 60% design documents, the design-builder issued detailed bid packages and solicited competitive sealed bids from prequalified subcontractors. During the bid solicitation, the design-builder issued seven addendums to the bidding documents to keep pace with the evolving design effort. The PDB project delivery approach allowed the project team to work with multiple vendors, as an individual vendor might not have had the capability to handle one large package or a number of subsequent additions to the scope. All bids received were incorporated into a detailed open-book GMP proposal, which was submitted to SSSD. A separate GMP workshop was held to confirm vendor selections, finalize the project-risk register, establish appropriate contingencies, and finalize the GMP for board approval in an open and transparent manner. The final GMP was 9% below the preliminary cost estimate based on the PER.

THE TRUE VALUE OF PDB DELIVERY

PDB project delivery gave SSSD the ability to successfully execute a complex project on a fast-track schedule while continuing its commitments to protecting local water resources and supporting the local manufacturing industry. This type of collaborative effort is not typically realized in a traditional municipal project delivery method, and the continuous engagement between the design team members, construction team members and owner staff during design allowed the owner and the design-builder not only to evaluate multiple alternative approaches at each step during design development, but also to factor cost, schedule, constructability and risk into every decision to determine the best practices that addressed the needs of all stakeholders.

Without the benefit of collaborative PDB delivery, a treatment solution and refined project scope that resulted in an approximately 50% reduction in upfront capital infrastructure requirements compared to the original project scope—as well as the additional operations and maintenance costs, burdens and liabilities that SSSD would have assumed with the additional infrastructure—would have been difficult, if not impossible to achieve. The project represents an example of partnering and collaborating with a PDB model to meet challenges and deliver a successful project. IWWD

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