



# Memorandum

**TO:** HONORABLE MAYOR  
AND CITY COUNCIL

**FROM:** Kerrie Romanow  
Barry Ng

**SUBJECT:** SEE BELOW

**DATE:** January 19, 2016

Approved

D. OSYL

Date

1/19/16

## INFORMATION

**SUBJECT: DECISION TO USE THE PROGRESSIVE DESIGN-BUILD DELIVERY METHOD FOR THE DIGESTED SLUDGE DEWATERING FACILITY PROJECT AT THE SAN JOSE-SANTA CLARA REGIONAL WASTEWATER FACILITY**

The purpose of this memorandum is to inform City Council of the decision by the Director of Environmental Services and the Director of Public Works to use the progressive design-build method to deliver the Digested Sludge Dewatering Facility Project and provide a summary of the reasoning behind such decision.

## BACKGROUND

The San José-Santa Clara Regional Wastewater Facility<sup>1</sup> (RWF) serves a number of jurisdictions. Due to the regional nature of the RWF, projects are subject to State law (as opposed to the City's Charter and Municipal Code). Prior to January 1, 2015, the RWF could only utilize the design-build project delivery method for projects valued over \$2,500,000 after obtaining approval from the Governor's Office of Planning and Research; however, on January 1, 2015, Senate Bill 785 (Wolk) took effect and allowed the use of design-build by special districts, local and state agencies for projects valued over \$1,000,000 as long as their respective governing bodies approved. Subsequently, on March 24, 2015, City Council adopted Resolution No. 77308 approving the use of low bid design-build and progressive design-build as possible delivery methods for projects in the RWF's Capital Improvement Program (CIP) and delegated authority to the Directors of Environmental Services and Public Works to determine the appropriate delivery method for each project. As stated in the memorandum which recommended the delegation of authority, staff is considering the use of the low bid design-build and progressive design-build delivery methods in addition to the traditional design-bid-build for various projects.

<sup>1</sup> The legal, official name of the facility remains San José/Santa Clara Water Pollution Control Plant, but beginning in early 2013, the facility was approved to use a new common name, the San José-Santa Clara Regional Wastewater Facility.

*Project Description*

Digested Sludge Dewatering Facilities at wastewater treatment plants are of high importance as they process digested sludge to reduce the water content in it to allow easier disposal and beneficial reuse of resulting biosolids. The current biosolids treatment process stabilizes the wastewater solids in anaerobic digesters and then transfers the digested sludge to open-air lagoons, for approximately three and a half years, before moving the biosolids to drying beds for another six months. After drying, the Class A biosolids are transported to the adjacent Newby Island landfill for use as an alternative daily cover material.

In 2008, the RWF embarked on a master planning process to rehabilitate and upgrade its facilities and to explore potential process changes. The Plant Master Plan (PMP) used an extensive community engagement process to develop overarching environmental, economic, social, and operational goals for the RWF. To support these goals, the PMP envisioned a comprehensive Biosolids Management Plan (BMP) that would transition from the current open lagoons and drying bed process to an enclosed, mechanical treatment system with the resulting dewatered biosolids hauled off-site. This transition would allow the complete decommissioning of the lagoons and drying beds, thereby opening up the use of approximately 750 acres for open space, land development, and other community purposes. Odors from the open air lagoons and drying beds would be eliminated, as the new dewatering facility will be a completely enclosed building with state-of-the-art odor treatment systems. A mechanical dewatering facility will produce a biosolids product suitable for land application, agricultural fertilizer, and general use in the local community as a soil amendment. The PMP was adopted by the San José City Council in November 2013 and by Santa Clara City Council in December 2013.

In 2014, a Biosolids Transition Strategy was developed to address certain specific issues regarding implementation of the transition from the current biosolids management system to the PMP's recommended system, taking into consideration the changes that have occurred since the technical aspects of the PMP were developed. A mechanical sludge dewatering facility is an integral component of this Transition Strategy. The implementation of the new Digested Sludge Dewatering Facility project was approved at the June 2, 2015, City Council meeting.

This complex project is anticipated to include the installation of mechanical dewatering units, a feed storage tank for biosolids prior to dewatering, polymer storage and dosage facilities, and solids conveyance systems, all housed in a dedicated building. An overhead crane will be provided to remove heavy equipment. A new sludge cake storage facility will be provided as part of this facility and includes necessary conveying, pumping, and tankage. The storage will consist of multiple storage silos or hoppers, with odor control, feeding conveyors, and controls. The building will be an architecturally enhanced structure, and is anticipated to include a process control room, Motor Control Center, heating/ventilating/air conditioning systems, showers, lockers, bathrooms, and a parts storage area. Additional new facilities that are anticipated to be part of the project include a dewatered cake truck load-out facility with weighing scales, conversion of two existing digesters to sludge storage tanks with a new transfer pump station, piping, and upgrades to existing pump stations. Attachment A shows the location of the new Digested Sludge Dewatering facility.

The new Dewatering Facility will be constructed in a “green field” area adjacent to the main operational area of the RWF which will reduce project interface risks, but it remains a high capital value and complex mechanical installation project. The facility will be an enclosed structure, with air ducting and high level odor treatment systems to minimize the release of odors into the surrounding community. The facility will be designed with dedicated operation and maintenance support facilities to allow the RWF staff to monitor and control the various sludge processing, transporting, and load-out facilities. There are a number of interconnections with existing facilities and piping that must be handled carefully whilst the Facility remains on line at all times. In addition, this is an entirely new process, and completely changes how biosolids are handled and treated at the RWF. These factors make it one of the most complex projects being implemented within the CIP.

#### Project Delivery Methods

Design-bid-build (DBB) is the conventional project delivery method the RWF has used for many years. It is based upon a sequential process of engineering a detailed design, advertising of the design for bidding by contractors, and awarding a construction contract to the lowest responsive and responsible bidder.

Under the progressive design-build (PDB) project delivery method, the design-build entity is selected through a (primarily) qualifications-based process. Once selected, the design-build entity will enter into contract with the City for preliminary services to advance the project design from a conceptual level while simultaneously providing construction cost estimates in an open-book format until the detail design is completed and a Guaranteed Maximum Price (GMP) is agreed upon. It is possible that early equipment procurement can begin before final design details have been developed, but in general, construction of the project does not start until the contract with the design-build entity has been amended to include the GMP.

### ANALYSIS

To determine which delivery method was most appropriate, the Digested Sludge Dewatering Facility Project team consisting of RWF operations and maintenance (O&M) and CIP staff (including Program consultants and City engineers) evaluated seven factors before recommending a delivery method to CIP leadership. These seven factors form part of a methodology developed by the CIP to determine the preferred delivery method for any given project and are listed below:

1. Project Size
2. Environmental Review & Permitting
3. Complexity
4. Performance Risk
5. Design Control
6. Optimizing Quality, Scope and Cost
7. Schedule

Staff's recommendation to use the progressive design-build delivery method for the Digested Sludge Dewatering Facility Project is based on an analysis of these seven factors. A discussion of the pertinent information for each factor is included below, with project complexity, design performance risk and potential for quality optimization with cost factors as the main drivers for the recommendation. During the review process, low bid design-build was eliminated from further consideration because of the dynamic between the environmental permitting process, procurement process and the delivery method that would likely result in significant schedule delays (approximately six months to one year). The following analysis is focused on comparing design-bid-build with progressive design-build for delivering the project.

1. Project Size

The Digested Sludge Dewatering Facility Project is currently estimated to cost a total of approximately \$86,000,000 (based on latest scope of work) which exceeds the State's \$1,000,000 minimum project size requirement for design-build. Due to the large size and complexity of the project, any delivery method is likely to attract a number of capable design and construction teams and no inherent advantage was found in a particular delivery method, based on the size of the project alone.

2. Environmental Review & Permitting

The Digested Sludge Dewatering Facility Project will need to go through the California Environmental Quality Act (CEQA) review and approval process. Furthermore, biological permits may be required before the start of construction of the Project. There was no inherent advantage identified between the design-bid-build and the progressive design-build method as both methods can adequately incorporate environmental review and permitting in the schedule.

3. Complexity

The new Dewatering Facility will be constructed in a "green field" area on the eastern side of the RWF fence line. The location will require multiple piping, electrical, instrumentation, and other utility interconnections with existing facilities and piping, hence the construction for this project is anticipated to be complex. The transporting of digested liquid sludge will require specialized pumping, piping, and cleanout facilities.

As part of the new Dewatering Facility project, existing tankage and structures will be utilized for conveyance and storage. Many of these tanks are over 50 years old, and may require extensive rehabilitation.

The process technologies under consideration for the Digested Sludge Dewatering Facility Project are industry-standard; however, these technologies have not been used before at the RWF. O&M staff has limited experience with these technologies, making the Digested Sludge Dewatering Facility Project operationally complex. The conceptual and detailed design of the Facility will require extensive input from operations and maintenance staff to ensure the equipment and systems function as intended.

The overall high complexity characterization of this Project favors the PDB delivery approach since it facilitates additional collaboration processes and efforts between City CIP, O&M staff, and The Design-Build entity.

4. Performance Risk

While the Digested Sludge Dewatering equipment is operationally proven and well-understood, there are new technological advances that will be considered in this project's design once these have been proven at other sites. As the digestion process is currently being modified from mesophilic digestion to Temperature Phased Anaerobic Digestion (TPAD), the feed sludge is currently unavailable to allow prediction of the dewatering process performance. There are a number of design performance parameters (cake percent solids, polymer consumption rates, power requirements, non-potable water usage, and odor performance) that are tied to the feed sludge. Design parameters must be sufficiently flexible to allow for a range of performance of each process system.

Given these complexities, constructing the project using the progressive design-build delivery method provides a significant advantage over traditional design-bid-build because the contract will require that the design-build entity be generally responsible for meeting the performance specifications for the project, as established by the City. When the designer and contractor are procured separately, as with design-bid-build, there may be conflicting opinions regarding whose responsibility it is to resolve a project performance issue. This transfer of responsibility under a PDB approach shifts much of the performance risk to the single design-build entity and is an important component of the progressive design-build process. Because the design-build entity will take on much of the performance risk from the City, progressive design-build is the preferred delivery method. In addition, the PDB approach would allow frequent interaction of the design builder with RWF O&M staff, which would help in selection of high-quality dewatering equipment to meet the performance criteria.

5. Design Control

Staff prefers to have input throughout the design on equipment, layout and construction sequencing because of the potential major impacts to RWF operations. Both progressive design-build and design-bid-build offer a high level of design control. While both delivery methods provide design control, the PDB approach allows for enhanced interaction with the contractor during the design process. This allows for increased innovation resulting from this interaction, and slightly favors the PDB approach.

6. Optimizing Quality, Scope and Cost

Given the importance of the Digested Sludge Dewatering facilities in the treatment process, the type and quality of the specialized equipment installed is extremely important to the successful operations of the RWF. Both progressive design-build and design-bid-build can provide a high level of involvement from City staff when specifying the equipment requirements for the contractor procurement documents. However, the progressive design-build method can be more advantageous in procuring high-quality equipment from reliable manufacturers since contractors selected in the design-bid-build often base their bid on

cheaper or lower quality equipment to win the construction contract. During the design-build process, the equipment is proposed, jointly approved by the design-build entity and the City, priced under the GMP, and then installed.

Construction contracts for design-bid-build are cost competitive and generally based upon lowest bid costs; however, construction cost savings may be equally, if not more, attainable in progressive design-build as a result of the increased collaborated and creativity between the City, designer, and contractor. Claims, disputes and change orders in complex projects also tend to be less prevalent in progressive design-build since the scope of a project is negotiated as part of the development of the GMP. Progressive design-build was considered to be a significantly more advantageous delivery method for optimizing quality, scope and cost for this project.

7. Schedule

This project would have to be completed prior to the decommissioning of the lagoons and drying beds to complete the biosolids transition, and there are no other schedule drivers for the project at present. As the DBB and PDB construction schedules for the project are very similar, the schedule factor did not favor any particular delivery method.

Conclusion

The overall evaluation indicates that progressive design-build would be the most advantageous delivery method for the Digested Sludge Dewatering Facility Project as it is expected to reduce the City's risk, potentially lower the volume and cost of change orders, decrease construction delays, increase the likelihood of having high-quality specialized equipment installed, result in more efficient solutions to complex construction sequencing issues, and provide a superior end-product. In addition, the complexity and performance standards of the project will require substantial and timely input from operations and maintenance staff at the RWF collaborating with the Design Build Contractor on optimizing solutions, which is facilitated by the PDB approach. Therefore, staff has chosen the progressive design-build approach as the most appropriate delivery method for the Digested Sludge Dewatering Facility Project.

Staff has completed scoping the Digested Sludge Dewatering Facility Project and is finalizing a Request for Qualifications to procure the services of a consulting firm to evaluate alternatives, and prepare the procurement documents to select a design-build entity. This consulting firm will represent the City (as an owner's representative) and will provide design management and construction management services. Staff will return to Council for approval of both the consultant agreement and contract with the progressive design-build entity for the Digested Sludge Dewatering Facility Project following the respective procurement processes.

HONORABLE MAYOR AND CITY COUNCIL

January 19, 2016

**Subject: Decision to Use the Progressive Design-Build Delivery Method for the Digested Sludge Dewatering Facility Project**

Page 7

**COORDINATION**

This memo has been coordinated with the Office of the City Attorney.

/s/Ashwini Kantak for  
KERRIE ROMANOW  
Director, Environmental Services

/s/  
BARRY NG  
Director of Public Works

For questions please contact Ashwini Kantak, Assistant Director of the Environmental Services Department at (408) 975-2553.

Attachment A: Digested Sludge Dewatering Facility Project Location within the San José-Santa Clara Regional Wastewater Facility

**Attachment A: Digested Sludge Dewatering Facility Project Location within the San José-Santa Clara Regional Wastewater Facility**

