CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: HONORABLE MAYOR AND CITY COUNCIL

FROM: Kerrie Romanow
Barry Ng

SUBJECT: **SEE BELOW**

DATE: March 8, 2017

Approved D. DSyL Date 3/8/17

INFORMATION

SUBJECT: DECISION TO USE THE PROGRESSIVE DESIGN-BUILD DELIVERY METHOD FOR THE YARD PIPING AND ROAD IMPROVEMENTS 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 Yard Piping and Road Improvements Project (Project) and to provide a summary of the reasoning behind such decision. The next step for this Project will be to procure a professional services firm to provide Owner's Advisor services that will assist the City in developing the detailed project execution plan and in procuring a design-build contractor.

EXECUTIVE SUMMARY

The Directors of Environmental Services and Public Works have accepted a recommendation by staff to use the progressive design-build (design-build) delivery method for all, or a portion of, the Yard Piping and Road Improvements Project (Project). This decision was reached after an evaluation of the seven key criteria that the Capital Improvement Program (CIP) uses for selecting a project delivery method; namely, Project Size, Environmental Review & Permitting, Complexity, Performance Risk, Design Control, Optimizing Quality, Scope & Cost and Schedule.

The Project has a planned eight-year construction period, with total construction costs estimated to be approximately $85,000,000, which comprises $79,000,000 for condition assessment and pipe repair and $6,000,000 for road repairs. The total Project estimate is based on pipelines currently considered a high priority for repair. This pipe repair estimate may change as more condition assessments are performed. Should additional high priority pipes be identified, the current Project budget and schedule may need to be adjusted or separate future projects may be

current Project budget and schedule may need to be adjusted or separate future projects may be initiated. The Project was included in the Plant Master Plan (PMP) in 2011, and is one of the 33 projects prioritized by the CIP Validation process in 2014. The Project envisions the rehabilitation of pipelines and roadways for preventative maintenance and needed remedial action, as prioritized by condition assessments of existing piping and roads in various areas of the San José-Santa Clara Regional Wastewater Facility[1] (RWF) and the construction of new pipes. The overall goal of the Project is to repair or replace aging infrastructure in a timely manner, while minimizing operational disruptions and to continue to provide the required levels of service for future decades.

Undertaking repairs on the extensive and complex piping network at the RWF requires detailed planning, including extensive coordination with RWF Operations staff, since construction activities could cause disruptions to the treatment process. Another challenge is the lack of available information on the actual condition of the yard piping, and conflicting records of pipe location. The Project needs to schedule portions of the work to be undertaken during the dry season and to sequence work in coordination with other CIP projects while keeping the RWF operational. Due to the overall complex nature of the Project and these specific challenges, staff have assessed that, at a minimum, the delivery method for this Project must be able to provide:

1. Ongoing collaboration between the design and construction teams and City staff (including project team and O&M)
2. Means to construct access and repairs during condition assessment
3. Extensive subsurface investigations and condition assessments
4. Progressive development of scope as more information is obtained
5. High expertise in condition assessment, pipe rehabilitation and understanding of complicated shutdown processes

The Project is still in its early planning phases, and staff will now procure an Owner's Advisor who will assist the City in determining the scope and further refine the approach for completing the Project. Staff has considered a number of different approaches to delivering the Project, including variations on traditional design-bid-build project delivery and on-call contracting. Staff believes that some of the areas where design-build has shown advantages over traditional delivery methods will be applicable to the Project. Ultimately, there are potential risks and advantages offered by both design-bid-build and design-build delivery methods, and some portions of the Project may best be accomplished using traditional design-bid-build or on-call contractors. Staff will return to City Council with a recommendation for Owner's Advisor Consultant award for approval as well as future contract awards.

For each project in the CIP, staff evaluates alternative delivery approaches, comparing the benefits of design-build to traditional design-bid-build. For this Project, staff conducted an analysis and consulted with industry experts on these delivery approaches, and held a workshop

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[1] *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.*

to discuss the advantages of the two delivery approaches for the Project. The design-build approach was determined during the workshop to be the preferred delivery method, primarily due to its ability to obtain extensive constructability input from the contractor throughout the design process. Staff anticipates that the design-build approach will minimize the risks of operational disruption due to construction activity, and allow construction to begin earlier than under design-bid-build.

Based on this analysis, the Director of Environmental Services and the Director of Public Works have accepted a recommendation by staff to use the design-build delivery method for the Project.

BACKGROUND

The 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, and 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 a resolution approving the use of low bid design-build and progressive design-build as possible delivery methods for projects in the RWF's 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 CIP projects.

The Yard Piping and Road Improvements Project is one of those CIP projects, and contemplates the prioritized rehabilitation of pipelines and roadways for preventative maintenance and needed remedial action and the construction of new pipelines. The RWF has more than 300,000 linear feet (LF) of piping, along with associated valves and related appurtenances. The pipes vary in age, material, condition, reliability, redundancy and diameter (up to 144 inches). They carry gas, liquids, sludge, air, steam and other process streams to and from the various treatment areas. Seventy percent of the pipes at the RWF are more than 25 years old, with more than ten percent over 50 years of age.

The RWF's existing roads are between 30 and 50 years old and require frequent maintenance. Some of the RWF's roadways have never been resurfaced or patched and thus need replacement. In all, nearly 15.2 lane miles of paved surfaces are in need of rehabilitation and/or replacement due to excessive wear, heavy vehicle traffic, and drainage issues.

In preparation for this Project, the City commissioned Black & Veatch in 2015 to conduct a desktop study on the process pipes at the RWF. In total, the study reviewed information for 67,000 linear feet of pipe consisting of process piping above eight inches diameter. Based on interviews with Operations & Maintenance (O&M), and review of work orders from the

Computerized Maintenance Management System, Black & Veatch developed a risk-based framework that prioritized the piping systems as to which ones should be assessed first based on likelihood of failure and consequence of failure. The study also provides the project team with guidelines on data collection criteria, inspection technology, and strategies for conducting condition assessments.

Apart from the existing maintenance records and anecdotal information, there is inadequate information on the actual condition of the piping system to make informed detailed decisions. This Project intends to gather actual condition information that will serve as the basis for prioritizing rehabilitation and repair work. In a number of cases, construction-related work is needed to allow condition assessments to be performed, such as the provision of isolation points and access points, which are an integral part of the piping condition assessments.

Project Description

This Project plans to undertake needed yard piping and roadway repairs and improvements in a major, long-term rolling program of repairs and replacements, based on condition assessments of existing piping and roads in various RWF areas. The Project intends to systematically:

1. Perform condition assessment (CA) based on pipe priority and risk rating;
2. Construct isolation points and access points where needed for CA and for subsequent repairs
3. Design and package solutions based on CA results
4. Construct the piping repairs or replacements
5. Construct new pipes where warranted, to increase redundancy and reduce risk
6. Improve the state of the roads within the RWF

Over the Project's anticipated eight-year duration, the construction costs are estimated to be approximately $85,000,000, which comprises $79,000,000 for condition assessment and pipe repair and $6,000,000 for road repairs. The total Project estimate is based on pipelines currently considered a high priority for repair. This pipe repair estimate may change as more condition assessments are performed. Should additional high priority pipes be identified, the current Project budget and schedule may need to be adjusted or separate future projects may be initiated.

One of the key characteristics of the Project is the need to complete the condition assessments and the repair and rehabilitation work while maintaining ongoing operations, maintaining expected levels of service and meeting permit requirements. To accomplish these objectives, it will be imperative to develop shutdown protocols and detailed schedules in collaboration with the O&M team, and ideally with constructability input from the contractor that will be doing the work. Staff has identified that for the condition assessments to be successfully performed, there is the need for construction of some new access points and performance of limited repair work for urgent situations.

The Project team has developed an initial work plan that includes preliminary shutdown plans, an analysis of different condition assessment technologies, recommended condition assessment

methods, budgets and schedules for undertaking the condition assessments on 16 high priority pipe segments representing over 21,000 linear feet of large diameter RWF yard piping. It is anticipated that condition assessments, and subsequent rehabilitation and repairs where needed, will be completed on these pipe segments over the first two years of the Project. The estimated cost of condition assessment and rehabilitation for the first two years is approximately $44,000,000.

The following Analysis section explains the project team's rationale for recommending a design-build delivery method. However, the preferred delivery method still provides the City the flexibility to implement some portions of the Project using traditional design-bid-build contracts, if the work is clearly defined and has minimal risk of operational impacts. This flexibility does not change the recommended next step to procure a professional services firm to provide Owner's Advisor services to assist the City in developing the detailed project execution plan and in procuring a design-build contractor who will undertake the bulk of the construction work.

ANALYSIS

To determine which delivery method was most appropriate for this Project, the project team conducted a workshop with RWF staff to evaluate traditional design-bid-build compared to design-build methods. The workshop participants, comprising of O&M and CIP staff, evaluated seven factors before recommending a delivery method. 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 & Cost
7. Schedule

Based on the evaluation discussed below, the team's recommendation is to use the progressive design-build (design-build) delivery method for the Project.

1. Project Size

The Yard Piping and Road Improvements Project total project budget is estimated at $134,000,000, which exceeds the State's $1,000,000 minimum project size requirement for design-build. The total estimate for construction and condition assessment for the first two years of the Project alone exceeds $44,000,000. On average, construction-related work will cost about $13,000,000 a year for the eight-year Project. Due to the large size and complexity of the Project, either delivery method is likely to attract a number of capable design and construction teams, and no inherent advantage exists for design-build or design-bid-build delivery based on

the size of the Project alone.

2. Environmental Review & Permitting

The Yard Piping and Road Improvements Project will need to obtain California Environmental Quality Act (CEQA) approval. Since the Project covers a wide area, both within the RWF fence line and outside, there may be different CEQA requirements for work within the fence line and outside. The required environmental permits will be completed well in advance of procuring the design-build firm and is not a critical path item. Based on the analysis of the environmental requirements of this Project there is no advantage to using design-build over design-bid-build, as both methods can adequately incorporate environmental review and permitting in the schedule.

3. Complexity

The Project is logistically one of the most complex projects in the RWF CIP. The high-level complexity is due to the following factors:

- Challenges related to isolating and shutting down key processes to allow for condition assessment and repair while at the same time maintaining operations. Key concerns identified include:
    - Difficulties in process shutdowns
    - Unknown condition of many of the valves required for isolation
    - Lack of access points for some pipe segments
    - Lack of redundancy for key process pipes

- The presence of many overlapping underground pipes in congested areas, makes it difficult to access the pipes
- Lack of complete information on locations and materials of all pipes as a result of multiple phases of construction over many years
- Multiple piping interfaces with other ongoing and planned CIP projects, requiring ongoing coordination in each process area for condition assessment, repairs and rehabilitation.

Due to the complex nature of the Project, it will benefit from flexibility and frequent collaboration between operations, engineering, design, and construction teams. The overall complexity over the eight-year duration of this Project favors design-build over the design-bid-build delivery approach since it allows for constructability input from the contractor and collaboration between the City and the design-build contractor prior to agreeing on a price for the construction work. Based on the analysis of the complexity of this Project, design-build has an advantage over design-bid-build.

4. Performance Risk

Performance risk, as it relates to this Project, refers to the risk of disruptions to operations and other factors that could negatively affect the implementation of the Project. The risks for this

Project are primarily due to difficulties in shutting down unit operations, unknown subsurface conditions, the lack of reliable information on the locations and condition of pipes, valves and related appurtenances. In terms of unforeseen conditions, there is no advantage to using design-build over design-bid-build. However, in terms of the risk of disruptions to operations, design-build, by allowing for constructability input during design, offers an advantage over design-bid-build.

5. Design Control

Staff requires significant input throughout the Project design, particularly related to piping routes, materials, and specific construction methods and sequencing. Both design-build and design-bid-build allow for high collaboration between the design team and the City. The CIP program has instituted design review guidelines that ensure a high level of design control regardless of the delivery method. Based on the analysis of design control for this Project, there is no inherent advantage to using design-build over design-bid-build as both methods can adequately incorporate the necessary design control elements.

6. Optimizing Quality, Scope and Cost

The design-build delivery method allows the City to select the design-build contractor based on the qualifications of the design-build entity and price. Using a pre-qualification process, the City could achieve similar qualification assurances using traditional design-bid-build. Using either delivery method, the City will require contractors performing work for the Project to have expertise in pipe rehabilitation and experience successfully working to rehabilitate or repair pipes within an operational wastewater treatment facility. In terms of selecting qualified professionals to perform the Project, no inherent advantage exists for design-build because both design-build and design-bid-build are able to obtain qualified professionals to perform the Project.

An advantage of design-build over design-bid-build is that the scope of construction work is developed collaboratively with the contractor who will perform the work. Design-build has the potential to offer a significant advantage over design-bid-build in terms of obtaining constructability input from the contractor during the preliminary design phase, thus allowing the City to better refine the scope of the Project before agreeing on the price for the construction work.

Both design-bid-build and design-build would allow the City to use cost competition in the form of bidding for construction work on the Project. In addition, design-build has the potential to allow the City a higher degree of cost control for the Project by utilizing an open book cost approach. The City will be able to review cost elements factored into project pricing and reduce the scope of the design-build work as a way to manage project costs. Based on the analysis of quality, scope and cost considerations for this Project, design-build has an advantage over design-bid-build in terms of scope.

7. Schedule

Maintaining the project schedule is imperative for this Project. The earlier that the 'high risk' pipes can be assessed and rehabilitated, the lower the chances of pipe failure and associated operational impacts, up to and including a possible violation of the Facility's permit requirements. Staff estimates that the design-build approach will allow for the repair of pipes to begin several months earlier than in design-bid-build. The design-build approach appears to offer a schedule advantage, potentially allowing repairs to happen earlier than under a design-bid-build method. Based on the analysis of the schedule, design-build appears to offer an advantage over design-bid-build.

Planned Implementation

Staff has developed a preliminary scope of work, budgets and schedules for condition assessment and rehabilitation work for the highest priority pipes at the RWF. However, many portions of the Project are yet to be defined. Staff will now procure an Owner's Advisor consultant to help the City further define the scope and refine the delivery approach for the Project. The refinement will consider, in addition to design-build, the use of on-call contractors and traditional design-bid-build to execute some portions of the Project. Staff currently anticipates the Project will have multiple phases for condition assessments, design and construction over the eight-year period. The need for multiple phases is due to the duration of the Project, the volume of work, the complicated piping network, seasonal restrictions, coordination with other CIP projects and shutdown considerations.

The core elements of the Project such as condition assessments, design and repair work will need to be repeated on a recurring basis during the Project. Condition assessment and construction work may happen concurrently, but on different pipe systems. The extent of the construction work in a particular year will be informed by information obtained from prior year condition assessments, piping system operational and maintenance history, and an overall need to minimize operational risk by repairing highest risk pipes and adding redundancy.

A design-build contract will be developed with outside counsel to address unique issues arising from this Project including:

- Long contract duration
- Multiple phases
- Compensation structures, including multiple and guaranteed maximum prices for the construction work
- Ensuring the City has contractual off ramps to give it flexibility to manage the Project in the most advantageous way
- Insurance and bonding requirements
- Pricing and cost control

Conclusion

Based on the evaluation undertaken by the Project team, staff recommends that design-build be used as the delivery method for this Project. While this unique Project presents a number of potential issues and considerations, staff believe that the constructability input during the Project's design phases will be a significant advantage over traditional design-bid-build.

COORDINATION

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

/s/
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/s/
BARRY NG
Director of Public Works

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