Memo

4 November 2021
To: Mayor and City Council members
Detailed background and heads-up regarding variety of **issues from supply chain and materials cost and schedule negatively impacting** our surface water treatment plant construction and integral distribution mains. Clay

To: Clay Pearson, City Manager
From: Skipper Jones, Assistant Director Projects
CC: Trent Epperson, Deputy City Manager
Robert Upton, Director of Engineering & Public Works
Ronald Burton, Surface Water Plant Manager

Date: November 4, 2021

Re: Construction Schedule for Surface Water Treatment Plant

Executive Summary

This memo provides information about schedule delays and cost impacts on the Surface Water Treatment Plant (SWTP) project from recent supply chain issues. The substantial completion date established in the Guaranteed Maximum Price (GMP) contract was originally established for December 2022 with a final completion date of March 2023. The project is experiencing schedule impacts resulting from the supply chain interruptions imposed by current nation-wide social and economic events and policies driving these situations. A by-product the supply chain created delays is increasing the cost of our contracted Construction Phase Services.

Supply Chain Issues

All plastic pipe products (PVC and HDPE) are currently unavailable due to resin production interruptions, which is putting a greater strain on the ductile iron pipe and fittings market. The lack of raw material is adversely impacting availability and pushing deliveries out beyond 20 weeks, or more in some cases, and driving costs up. Costs for these items, plastic and steel pipe, have risen 30-85% in the last six months. The Construction Manager at Risk's (CMAR) built-in contingency is covering some of these cost increases to date but, it is depleting the contractor's contingency rapidly with only about 30% of the work now complete.

American Iron and Steel (AIS) requirements, incumbent in the low interest loan from Texas Water Development Board (TWDB), require all products containing iron and steel to be sourced from the United States and manufactured domestically. Current supply chain interruptions have reduced the availability of domestic sourced and manufactured materials stretching out the delivery times and driving costs up, in some cases by as much as five times bid costs. Substitution of these products with foreign sourced materials, in an effort to protect the schedule, negates the City's ability to receive TWDB low interest loan reimbursement of these costs. The result is pushing more of the project cost to the City revenue bond funds at slightly higher interest rates.

Construction Phase Services Impacts

The delay to the construction schedule from these issues is requiring the extension of the Construction Phase Services (CPS) portions for several of the Engineering contracts. This is particularly acute with the Construction Phase Services provided in the Construction Management and Construction Inspection (CM/CI) services provided by the Ardurra Group. The cost of CM/CI services are based on the time it takes to complete a project. The supply chain issues that are delaying portions of the work do not stop the need for the continued presence of CM/CI personnel. Instead the supply chain issues impact the ability of the Contractor to prosecute work items concurrently extending the time required to complete affected components delaying the overall project completion of the work and extending the time required for CM/CI

services on site. These CM/CI efforts required for the longer construction duration will require contract amendments to add man/hours for these services. Additionally, the Construction Phase Services for the design engineering firms Stantec and CDM will require amendments for the additional efforts to review alternative materials and supplies to help mitigate the supply chain impacts and for the extended time on the project due to delays.

A final area where additional Construction Inspection hours are required is to complete the pipeline work outside the plant site simultaneously with work inside the fence. This work was originally contemplated to be handled by a combination of consultant inspectors within the existing contracts and City inspectors. Due to the current work sequencing that has been impacted by the delayed inspection activities will require additional short term contracted personnel to inspect the work.

Time Impacts

Material shortage and availability conditions have forced the CMAR to revise its projected **substantial completion of construction to April 2023 and final completed date to late May 2023, a four-month delay based on delivery schedules AT THIS TIME**. If supply chain disruptions do not improve the completion may further be extended.

Cost Impacts

To date, impacts to the GMP from material and construction cost increases have been absorbed in the CMAR's contract contingency. If the contingency runs out, there are no contract provisions that address the excessive inflationary impacts

Additionally, we are working through some Owner requested changes and changes due to Unforeseeable Conditions will fall into the Work Change Directives section of the Contract (part 1.9). The Contract addresses the use of Work Change Directives to facilitate the necessary work prior to reaching agreement on both price and additional time to perform the work ultimately resulting in a Change Order adjusting both contract cost and contract time. These are currently under discussion with the CMAR and suppliers and when enough information is available will be communicated in future memos.

For the Construction Phase Services, staff is reviewing a contract amendment to the Ardurra Group contract for CM/CI Services. Potential increases in Construction Phase Services are pending for the Stantec and CDM contracts for Engineering Construction Phase Services due to these delays extending the duration of construction.

Upcoming Planned Project Steps

One Owner Requested change that is being considered at this time is to increase the size of the Uninterrupted Power Supply (UPS) module associate with the SCADA and Information Technology for the plant. This change will upsize the UPS from rack-mounted units to a free-standing unit. Staff are considering all options available to provide uninterrupted power to this major City-wide network data center and SCADA center. We are awaiting pricing for this solution.

A planned upcoming item for Council's consideration and approval in early December 2021 is the authorization for purchase of Information Technology equipment associated with the Owner's provided SCADA and Data Network. The material list has been assembled and Staff is making final revisions and cost saving reductions. This will be a direct City purchase through existing technology vendors and was included in the existing Furniture, Fixtures and Equipment (FF&E) budget of $1.5 million. At this time this is estimated at $1,200,000.

Background

The project entails the design and construction of a 10 million gallon per day (mgd) water treatment plant to supplement the City's drinking water supply to meet the demands of current and future population growth. Council awarded contracts for all three final design packages in early 2019 and the Guaranteed Maximum price proposed by PLW Waterworks was accepted by Council in September 2020. The original project schedule anticipated a construction substantial completion by late December 2022.

The Texas Water Development Board (TWDB) administers the project funding for this project through the Drinking Water State Revolving Fund (DWSRF). Which requires oversight and approval of plans, specifications and commercial documents (contracts and sub-contracts) and places requirements on the project for compliance with certain federal guidelines such as American Iron and Steel, and Davis-Bacon Wage Rates. TWDB's project review procedures have not been updated to accommodate the faster paced CMAR delivery methodology which significantly increased the time required to review and approve the commercial processes and contract documents. The TWDB process, manned by a single person, was overwhelmed by the multiple commercial documents causing the review process to extend well beyond six months scheduled for this activity. This consumed the "float" initially contained within the CMAR's schedule and by September 2020, the proposed Substantial Completion date for the project was then locked in to the December 2022. Eliminating the potential for an earlier completion and made the schedule vulnerable to unforeseen and unanticipated delays.

The contractual definition of Substantial Completion for a project is that point in the construction progress when major process components for the facility have been made suitable for the City to take useful possession of the project. For the Surface Water Treatment Plant, this will occur when all major components are functionally complete, have passed initial testing and have been commissioned. At this point a plant-wide start-up has been coordinated to begin making water in preparation of meeting Texas Commission on Environmental Quality (TCEQ) regulations. TCEQ has a multi-step process for water plant approval process. Step 1 was completed with the submission of the plans and design plans.

Once the project has reached Substantial Completion, TCEQ regulations require the project to submit the data and reports contained in the Membrane Water Plant Use Checklist (Step 2). The list contains sampling of the finished water for physical and chemical constituents, submittal and approval of the corrosion control treatment program, credentials of the licensed operator(s), verification of the results of the concentration time study and provide certification of compliance with the plans and change orders on file with the TCEQ. Start up, adjustment of flow rates and chemical feeds, sampling and analysis will require 30 to 45 days. Report preparation and submittal can take approximately 15 days and TCEQ's review, comment and revisions will require another 30 to 45 days. Bringing the acceptance phase schedule to a minimum of 90 days prior to introduction of water into the public water supply. The time required to complete this process is about 90 days after the substantial completion that is identified in the construction schedule for the introduction of surface water to the Public Water Supply.

The project is currently in budget. However, the material market environment is changing and will further impact the completion dates and the City's share of project costs as described below.

Current Status

As noted above, contracts containing material supplies under direct control of the CMAR as well as sub-contracts for full systems, were finalized and approval by the City in August of 2020, well before these supply chain impacts appeared on the horizon.

However, as early as April 2021, the CMAR began receiving letters from no less than 12 material suppliers announcing significant delays to delivery times and availabilities of product ranging from PVC and HDPE piping with raw material costs increasing 21 to 41% and in some cases, quotations were completely suspended. Ductile Iron pipe would see an immediate 9% cost increase with expectations for another increase by February 2022 and lead times ran out to 24 to 36 weeks. All sizes of lined ductile pipe lead times went from 4 to 8 weeks to 12 to 16 weeks or longer. AWWA approved pipe fittings increase by up to 13% and restrained joint fittings for PVC and Ductile pipe increased by 23%. Jobsite delays that might delay the need for ductile material would require moving the delivery site for storage or face a cancelation and a 5% cancellation fee. In other cases, suppliers were cancelling their 30 day hold for pricing and only taking orders for full truck loads with immediate ship dates. Steel and stainless-steel piping, flanges, valves and even nuts, bolts and gaskets have been affected. Steel valve lead times ran out to 30+ weeks. In some isolated cases, orders would have quantity limitations placed on them to allow wider distribution of products. The letters reference a variety of causes ranging from domestic labor shortages, rapidly recovering demand for domestic as well as foreign sourced pipe products, shipping delays, shipping container and vessel shortages, a resurgence of COVID-19 virus in India and changes to Chinese export tax credits and raw material cost increases of 30-85%. As a result, the validity of price quotations for materials were shortened from months to days. In many cases products were simply no longer available (many sizes and types of PVC and HDPE pipe) and for those executed contracts that would still be honored, delivery delays of months were going to become the norm. Information from other projects shows that they have been subject to Force-Majeure notices from vendors resulting in cancelled orders and indefinite delivery dates. **To date, the project has not been subject to these claims**.

The material delay situation is further aggravated by the Buy-American program American Iron and Steel (AIS) requirements of the TWDB funding. The AIS program requires that all incorporated steel products be U.S. based manufacturer sourced, including the raw materials. Documentation of this must be provided for every purchase from structural and process equipment down to the nuts and bolts. The market demand for domestic materials coupled with COVID-19 based production slow-downs and extended unemployment benefits has eliminated the commercial stockpile. Consequently, demand for foreign sourced materials has greatly increased and as noted above shipping and receiving port capacity to un-load and transfer to the land-based transportation have bottle-necked the alternative source supply chain. Lead time and, consequently, delivery schedules for acceptable products from these sources has become unreliable and plagued by delay.

Staff is attempting to mitigate this situation by requiring any decision to shift to foreign sourced materials be vetted against loss of lower interest funding and impact to schedule to attempt to exert some control over where and when materials are substituted to mitigate the impact to the schedule. It is a tedious review process and is increasing construction phase engineering hours in submittal reviews and responses to Requests for Information (RFIs) from the contractor. In addition, staff has been communicating with Texas Water Development Board regarding the current situation and the collapse of the supply chain for American made materials and components. Ultimately the “best-case scenario” is that these decisions will result in a classic trade-off either increasing the portions of costs that TWDB would not fund in the low interest loan and the City will have to shift to revenue bonds at a slightly higher interest rate for non-compliance with AIS funding requirements or there would be further delays and additional costs to the completion schedule for the project.

In a “worst-case scenario” the project will experience both delay and potential incremental interest cost increases as funding source is shifted from TWDB loan funds to revenue bonds. Given that this is the most likely scenario, and holding all other factors equal, this new water source will not be ready for introduction into the Public Water Supply before July 2023, due to the April 2023 substantial completion and the 90-day testing period.

Next Steps

Delays to the construction and completion schedule is not the only or even an isolated impact to the project. The delays mean that engineering consultant contracts for construction phase services, originally based on the construction completion schedule in late 2022 and water introduction in early 2023 will need to be extended. Package 1 engineering should be complete by the end of this year leaving Packages 2 with CDM (the Plant and SCADA) and 3 with Stantec (the transmission lines and High Service Pump Building) most likely to require extensions. At the present time it is likely that the Package 3, Transmission line work will complete in early 2022 if the contractor is able to obtain PVC pipe, leaving only the High Service Pump Building and the public side of the plant in that package. In both cases this should limit additional construction phase engineering effort for packages 1 and 3. Additional services for plant process component start-up, SCADA Control and Monitoring and Construction Management and Inspection will be the Engineering items requiring extended effort to complete the project. Standard processes dictate that a request to extend these contracts will be forthcoming and include the need for a temporary second inspector under the Ardurra contract.

To date the project has made use of the City’s in-house Engineering Inspectors along with our Construction Materials Testing firm, Terracon, to monitor progress and provide quality control/ over sight on the project. One full time inspector has been assigned to the project on a permanent basis for the last year. This was a cost savings measure implemented early in the construction phase at the cost of removing one inspector from other duties in development and capital projects. With the increased pace of work on-site (inside the fence) the single inspector and the construction manager are unable to keep up with pipeline work going on outside of the fence on the transmission lines. Reviews of available inspector resources versus demands preclude the full-time dedication of another in-house inspector. In order to ensure quality workmanship a second inspector is required for the duration of the transmission line work estimated to be complete in another 6 months, again dependent on material availabilities.

Extension of the Ardurra contract for Task 5, Engineering Services During Construction will be needed to extend continued assistance coordinating with TWDB on funding and payment issues, Construction Phase Services including facilitating additional progress meetings with the CMAR and sub-contractors/ Vendors, coordination and ad-hoc meetings, additional meetings with design engineers, continued submittal control and coordination, continued management of requests for information and responses to those, continued inspection, documentation and record keeping and provision of a second inspector for this extended duration and continued budget tracking and analysis. The exact scope and fee for this extension is still in discussion and once finally agreed will be brought to Council for consideration of an award of an amendment to extend these services.

Budget Info

Funding Sources	Series	To Date	Future	Total Budget
W/S Revenue Bonds	2017B	6,012,500		6,012,500
Impact Fee - Debt	2017B	6,012,500		6,012,500
W/S Revenue Bonds	2018A	4,325,000		4,325,000
Impact Fee - Debt	2018A	4,325,000		4,325,000
W/S Revenue Bonds	2019A	10,500,000		10,500,000
Impact Fee - Debt	2019A	10,500,000		10,500,000
W/S Revenue Bonds	2020A	53,800,000		53,800,000
Impact Fee - Debt	2020A	53,800,000		53,800,000
W/S Revenue Bonds	TBS 2022	13,112,500		13,112,500
Impact Fee - Debt	TBS 2022	13,112,500		13,112,500
Cash				-
Other Funding Sources				-
Total Funding Sources		**175,500,000**	**-**	**175,500,000**

Expenditures	To Date	Future	Total
PER	8,773,058		8,773,058
Land	172,408	150,000	322,408
Design	16,338,003	300,000	16,638,003
Construction	136,027,793	4,050,000	140,077,793
Construction Management/Inspection	3,125,014	850,000	3,975,014
Construction Materials Testing	462,860		462,860
FF&E		1,500,000	1,500,000
Total Expenditures	**164,899,137**	**6,850,000**	**171,749,137**

Project Contingency	**2.1%**	**3,750,863**
Project Balance		**0**

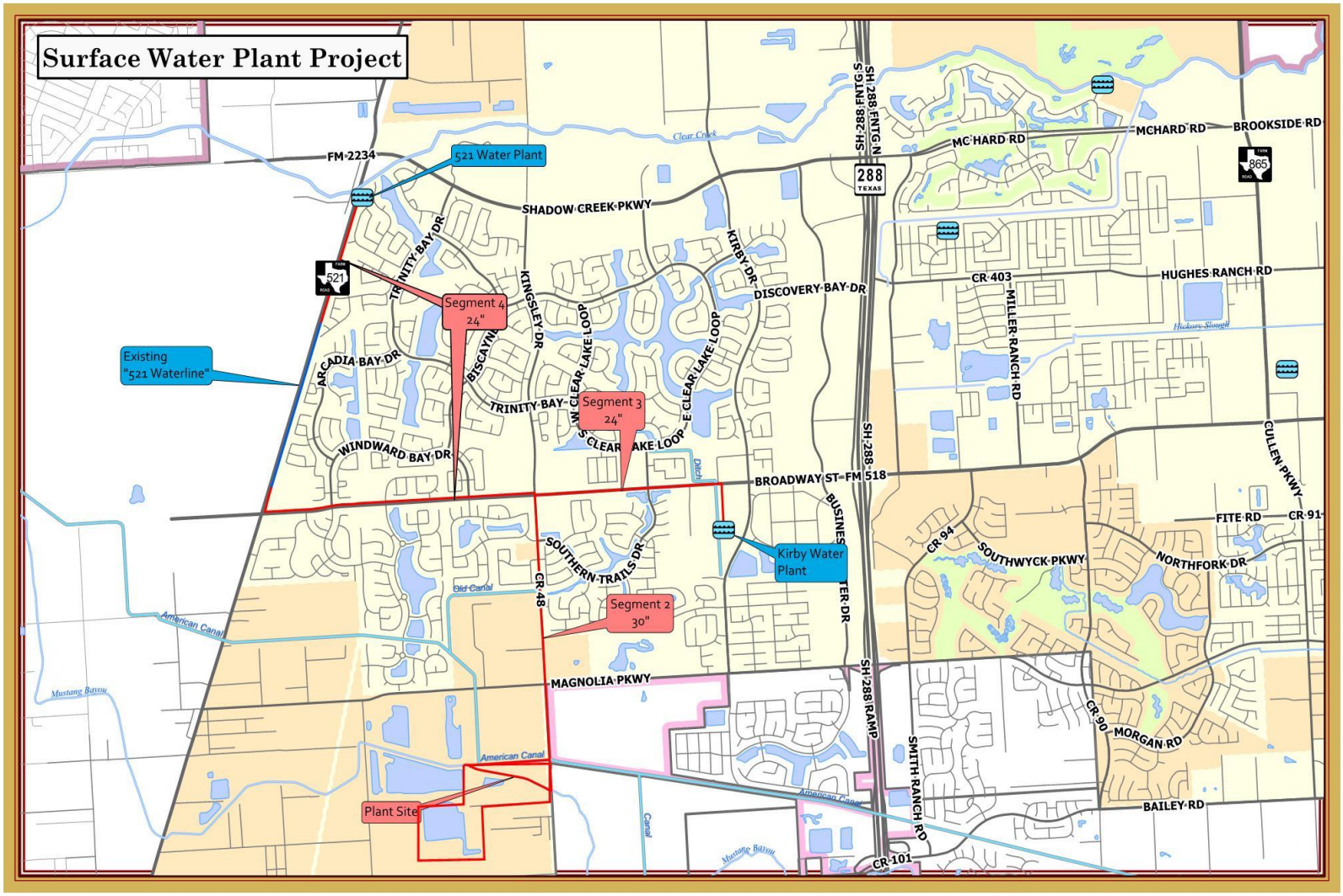
Schedule Info

	Base Line	*Current*
Design Start - Package 1	August-19	September-19
Design Start - Package 2	February-19	March-19
Design Start - Package 3	August-19	September-19
Bid Start	March-20	January-19
Construction Start	May-20	June-20
Construction Completion	December-22	Projected Mar-23

Previous Memos

6/10/21, 6/16/16, 2/2/17, 3/9/17, 4/13/17, 3/29/18, 4/19/18, 1/10/19, 2/21/19, 3/28/19, 8/1/19, 8/8/19, 1/23/20, 3/05/20, 4/16/20, 9/17/20, 3/4/21, 6/10/21, 7/29/21

Project Location Map



Site view looking West showing Pre-Treatment Basin in the foreground with Gravity Thickener and Wash Water Recovery facilities immediately west. In far background is the foundation for the Solids Processing/ Belt Press Filter building

View of the Membrane Building foundation and below grade piping

Looking East; Membrane Building foundation in foreground with Operations Building foundation immediately east, maintenance Building to the north (left) and Electrical Building foundation just beyond the crane.

View looking east/ Southeast with the membrane building foundation preparations in the foreground and the Operations building structure being assembled in the background