Memo

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: March 10, 2022

Re: Progress Update Surface Water Treatment Plant

Executive Summary

This memo provides information about construction progress, scheduling challenges and details regarding a forthcoming Change Order(s) to the CMAR contract for Owner Directed Changes (additions) to the Work totaling $1,078,000. This is within budget and represents costs expended to take advantage of significant savings opportunities as well as complying with changed windstorm requirements. Although information of these change orders has been previously reported they will be discussed here in detail and costs have been finalized. The Change Orders are scheduled for presentation to Council on the March 28 Agenda.

Background

The project entails the design and construction of a 10 million gallon per day (MGD) surface water treatment plant to supplement the City's drinking water supply to meet the demands of current and future population growth. The work includes the construction of a transmission line system to bring water from the plant north along Kingsley (CR48) to Broadway and from there to the Kirby Water Plant to the east and FM521 Water Plant on the west end of town. The work will also extend the City's fiber network to allow a second Data Center to be housed in the Plant Operations building.

Council awarded a Guaranteed Maximum price contract in three parts to PLW Waterworks, Early Works Package 1 in early February 2020 in the amount of $**7,479,256**, Early Works 2 in late February in the amount of $**13,758,502** and the Balance of Project (BOP) in September 2020 in the amount of $**113,667,603** bringing the total Guaranteed Maximum Price (including the previously awarded Pre-Construction Services contract) to $**135,997,681**. This total contract value contained approximately $3,900,000 in total contingency. During close out of Early Works Packages 1 and 2, $334,000 was returned to the City as an Owner's contingency and remains for the Owner's sole use within the CMAR contract. This reduced the CMAR's contingency to approximately $3.5 million. The original project schedule anticipated substantial completion by December 2022 and water into the system by late March 2023.

Market Conditions and Schedule Impacts

Since July 2021 the project schedule has shifted back and forth as material and equipment supplies have evaporated from the U.S. market. The project team has been challenged with shifting material delivery schedules and unavailable material forcing the team to make decisions to accept alternative materials to protect the schedule. As noted in prior communications, material prices are in an upward spiral and when substitutions have been made to allow work to continue those prices have been subject to the current market price of the day. While current work in the field is proceeding well, the timing of equipment deliveries and material availability are still impacting the schedule. The following two cases highlight the most recent

scheduling dilemmas the team is dealing with.

Medium Voltage Switch Gear located in the Main Electrical Building was approved and released for fabrication and delivery in November (22nd) 2021 with an original delivery date of February 16-22, 2022. On February 9th the CMAR received notification from the manufacturer, Square D, that the switch gear equipment and some of the Motor Control Centers would be delayed to early March 2nd, 2022. On March 1st Square D notified the CMAR that the subject switch gear would not ship until April 7th with some pieces not arriving before April 27th. Standard installation schedule for this equipment is approximately six weeks to pull in cabling between the gear and the end user and terminate both ends. The work cannot be done prior to setting the equipment without damaging the conductor insulation. Delays as a result of the equipment also delays CenterPoint's installation of permanent power to the site. This pushes factory certification and start-up of equipment into mid-June two full months behind the last reported schedule update.

Tapered Roofing Insulation to be installed on the roof of the High Service Pump/ Visitor Center building was included in the turn-key sub-contract for the construction of the entire building. Tapered insulation is one of several products that is simply unavailable in the market currently and will not be available before July or August. There are no domestic or foreign substitute that will meet specification and comply with the warranty requirements. Without the insulation the roof cannot be installed, without the roof no finish work can be installed inside the building and everything in place will be subjected to the external environment. The team is working this challenge from multiple directions to locate alternative solutions.

Although the project schedule is still in flux, primary sub-contractors are working with the CMAR and the City to minimize as much as possible the impacts of these delays that are beyond the control of the CMAR or the City. Based on the latest iteration (1/27/22), including the above setbacks, the schedule now projects a final completion and water into the system date of June 2023. This date is extremely fluid and literally changes on a weekly basis as it responds to delivery developments and efforts to adjust to those.

There are NO financial impacts to the City anticipated from either of the above cases. The completion schedule is the only component at risk and the only remedy available to the CMAR is additional time added to the schedule. Completion dates are being revised on almost a weekly basis and the June date is likely to improve as deliveries arrive and electrical work schedules shorten.

Pending Change Orders

There are four items that will be presented to Council for consideration on the March 28th Agenda. Presently these are anticipated to be presented as a single Change Order with multiple components. They stem from changes to the design that added work to the scope of the Project after the CMAR presented and was awarded the Guaranteed Maximum Price in September 2020. For clarity, the CMAR refers to these as WORK CHANGE DIRECTIVES (WCDs) confirming that this additional work was requested by the City. Staff's intent to bring this to Council as a single Change Order (#8) with pricing for each of the Work Change Directives identified separately. Per terms of the contract the direct costs associated with the Work are open to the Owner's review and involvement (negotiation when necessary). This provides the total transparency associated with the CMAR Delivery Process. The CMAR is then allowed to add the cost of Insurance and Bonds (payment and performance) at 2% plus the CMAR's fee which is limited to 4.85%.

The CMAR has not requested additional time in conjunction with these changes as these do not impact the schedule.

WCD #1:
After construction began the City and its design consultants requested, and was eventually granted, permission from Gulf Coast Water Authority (GCWA) to return belt press filtrate in quantities of up to 1 million gallons per day (MGD) to the American Canal downstream of the plant intake. The original plant design had anticipated this water being sent to the Sanitary Sewer Lift Station and pumped via a 12-inch force main to a point in the gravity sewer collection system that would eventually take it to the Reflection Bay Water Reclamation Facility for treatment. This would have consumed up to 1 MGD of treatment capacity at that plant and accelerated the need to conduct another expansion of plant capacity. Currently, wastewater treatment plant expansion projects are running between $16 and $18 dollars per gallon, or a projected savings in today's dollars of $16 - $18 million dollars. The change also downsized the sanitary lift station, reducing the number of pumps required and reduced the pipe size of the force main producing additional savings to the project. The work changes included changes to the storm water and wastewater drain piping at the De-Watering Building, changes to the in-slab drain piping, adding an out fall pipe to the canal, adding some flexi-mat outfall paving within the canal and the addition of a single large flow meter to record and transmit raw water intake flows to the plant from the canal. The cost of these addition work items is $187,000

Additional items that were added to this WCD by the City after the GMP include the changes made to the facilities to accommodate the City's standard COVID preparations, specifically the hands-free plumbing fixtures a hands free "wave" door opener on the public entrance of the Visitor's Center and Merv13 air filters within the HVAC equipment. The Net cost of these adds is $37,000.

Total Net costs for WCD#1 $224,000

WCD#2
The design of the plant was based on the use of Pall Membranes, a manufacturer that has supplied the majority of the water membrane filtration in Texas. The selection of a single manufacturer as the basis of design is a standard practice to avoid trying to placate all possible vendors' special requirements.

However, when the Sealed Competitive Proposals were opened the Toray membranes proposed with OEM manufacturer H2O represented the lowest capital costs by nearly $2 million dollars and this system, which met all of the technical and performance requirements, had operating costs approximately $375,000 per year lower than the membranes used in the basis of design. With pilot testing confirmation that Toray membranes performed equally well, the City selected the Toray membranes and the H2O proposal. This change required modifications to the existing Membrane Building to accommodate the different equipment and operating conditions. Specifically, the floor drains within the building had to be moved, backwash pipe sizes were enlarged and some changes to the building roof structure to accommodate these larger pipes and their movement that would be supported from the roof. The Net cost of the changes required to revise the facility to accommodate the Toray/ H2O membrane filter system is $352,000.

After the building structural requirements were established in the bid plans to meet the 2018 International Building Codes, the Texas Department of Insurance, Windstorm Inspector increased the Wind Load requirements to meet Critical Facility Occupancy designation for this location. This pushed the requirement from 150 mph to 155 mph and required structural changes to several of the buildings. These changes occurred after the CMAR had issued contracts for the buildings impacted (Membrane, Chlorine, Chlorine DiOxide and DeWatering) The Net costs associated with the changes to meet the critical facility classification for windstorm are $382,000.

Total Net costs for WCD#2 is $734,000

WCD #3
Initial planning for the Surface Water Plant SCADA system focused on the GE I-Fix system, which was installed at the Reflection Bay Wastewater Treatment Plant and was intended to be the City's SCADA system. The City-wide SCADA system replacement/upgrade project running in parallel with the plant determined that better performance and lower costs could be obtained by going to the newer, more capable VT SCADA system. The specifications and exact criteria for the VT SCADA system were not available at the time the CMAR submitted and was awarded the GMP for the plant project.

Additionally, City IT planned to build a City-wide redundant Data Center located within the Server room in the Operations Building. The redundant Data Center meets cyber-security and emergency management best practices of having a redundant data center within our environment along with our contracted off-site backup data center. This was accommodated within the planned server room but a recent decision to replace the rack mounted uninterruptable power supplies (UPS's) in the room with a single stand-alone larger (40kVa) UPS did require changes to the equipment, provided by the sub-contractor, and the room configuration. The larger UPS system will assure uninterrupted data collection within the plant network and no loss of service for this Data Center in the event of a loss of the Data Center at the PSB.

Total Cost of the WCD#3 is $120,000

The total cost for Change Order #8 including WCD's 1, 2 and 3 is $1,078,000
This amount is within the existing budget and constitutes less than 1 percent (0.8%) of the total contract. The final Change Order is scheduled for presentation to Council on the March 28 Agenda.

Previous Change Orders include:
CO#1 and CO #2 were Early Works Packages 1and 2 the total totaling $22,330,078
CO#3 added TWDB Supplemental Conditions to the contract with PLW and was a Zero Dollar CO
CO#4 was the GMP change to the contract adding $113,667,603 bringing the contract to $135,997,681
CO#5 deducted $51,503 from the Prof Services contract and added it to the Owner's Contingency in the GMP
CO#6 deducted $334,401 from the balance of EWP1 and moved it to Owner's Contingency in the GMP
CO#7 deducted $249,705 from the balance of EWP2 and moved it to CMAR's Contingency in the GMP

Progress Update
Despite the gloom and doom of the above information there is good progress being made. Work completed in late January and February includes the following progress;

- The climber screens at the Raw Water Pump Station have been mechanically completed
- In the DeWatering Building the building and canopy are nearly complete, the Belt Presses have been set on foundations and are now bolted down and the polymer tanks have been set
- In the Washwater Recycle unit the clarifier mechanicals are now complete same for the Gravity Thickener
- The pre-Treatment unit has completed the installation of the 24-inch flap-gates (2)
- The Membrane Building structure is complete and pre-cast panels installed, the CMU block walls are complete, the contractor is working on the chemical containment walls and installing equipment pads
- Yard Piping, storm and sanitary is now 80% complete

- The Operations building is complete for exterior metal stud framing and sheathing in going on, roof membrane is on and work has started on MEP installation
- The Maintenance Building has completed installation of CMU block walls, exterior walls are erected and the roofing in going on and work has started on MEP installation
- HSP Building/ Visitors Center concrete floor is in place, pump room floor has been poured, exterior pre-cast panel walls erected and complete and the roof deck is in place
- Main Electrical walls are erected, roof is installed and waiting on electrical switch gear. Centerpoint has completed the initial construction for permanent underground power
- Chlorine building is installing the exterior pre-cast panel walls
- Transmission line is complete along Kingsley, Broadway, Kirby to Shadow Grove and along the BDD4 drainage ditch to the Kirby Water Plant. Fiber optic conduit and inter-duct is approximately 90% complete and the intersection of Kingsley and Broadway has been restored and traffic returned to normal operations

Pay Application #25 (for January 2022) approved February 22nd records a total Earned to Date of $81,078,000 making the project 60% complete by dollars and (528 day out of 915 days) 58% complete by time.

This memo contains a number of progress photos taken March 1. However, it is much easier to see the progress being made in the aerial video. PLW Video 3-1-22.MP4

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	173,394		173,394
Design	16,338,003	300,000	16,638,003
Construction	135,068,231	2,578,000	137,646,231
Construction Management/Inspection	4,100,474		4,100,474
Construction Materials Testing	462,860		462,860
FF&E	1,130,812	369,188	1,500,000
Total Expenditures	**166,046,832**	**3,247,188**	**169,294,020**

Project Contingency	**3.5%**	**6,205,980**
Project Balance		**0**

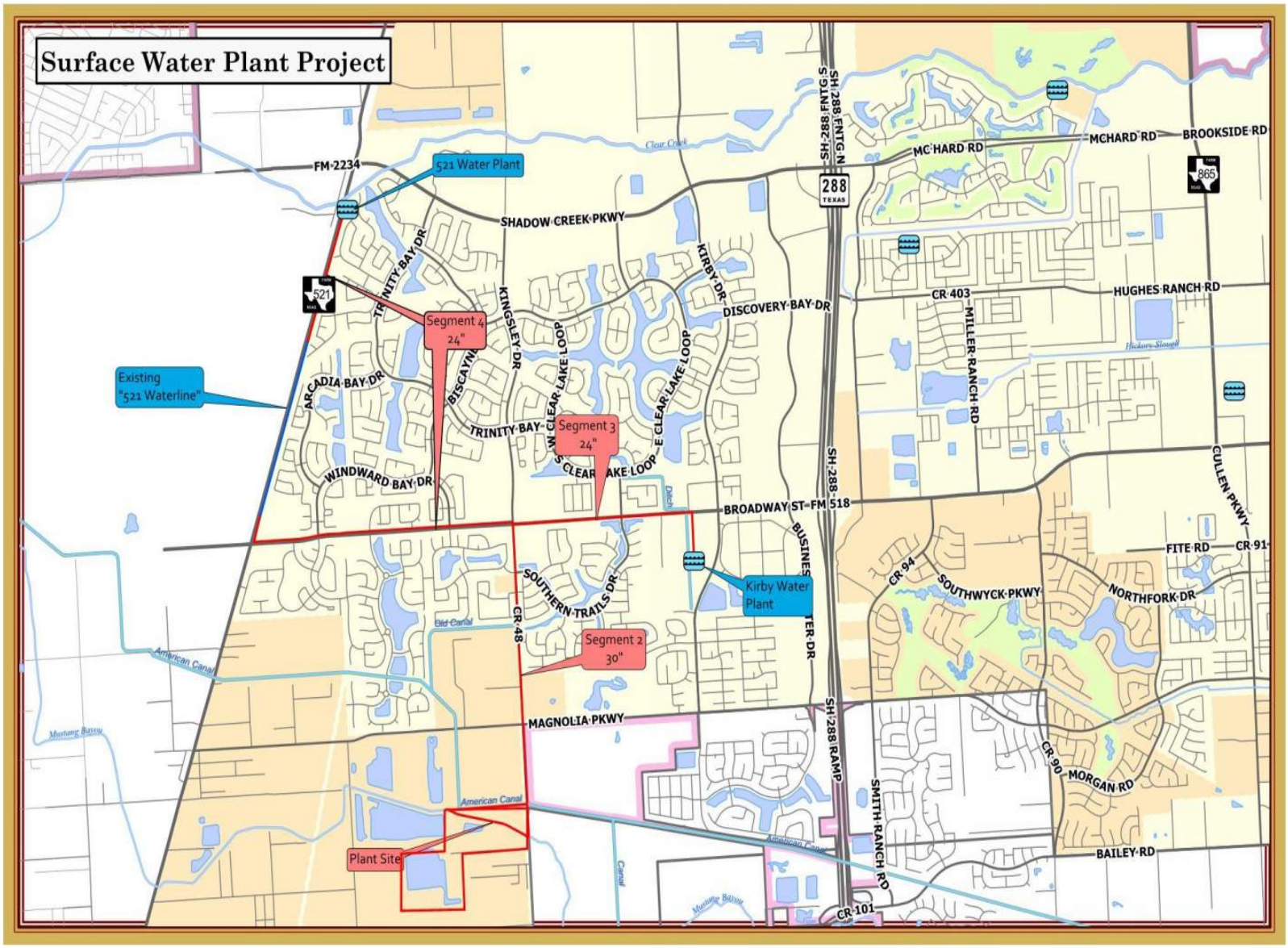
Schedule Info

	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	June-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, 11/4/21

Project Location Map



Project Photos

Front side of Administration (right) and High Service Pump building (left)

Back side of High Service Pump Building looking North East

Main Electrical Building, West looking East, Location of the main gate in background and Permanent power entrance into the plant just beyond the Electrical Building

Maintenance Building East looking west with Operations Building to the left and Membrane in the background

Maintenance Bldg in foreground Operations Bldg and Membrane buildings behind

Front view of Operations Bldg from South end with High Service Pump and visitor Center on left

Front of Operations Building with Membrane Bldg in background

GAC Reactors Foundation and Chlorine Contact Transfer Pump Piping

Gas Chloring and Chlorine DiOxide bldg. pre-cast exterior wall panels being erected.

Back side of the Gas Chloring bld'g showing (front to back) Electrical Room, Mechanical Room and Chloring Generator Room with outdoor storage area to the left front and Chlorine gas storage room left rear.

Membrane Bldg from southeast looking north west

Membrane Bldg south wall showing roof and wall structure. This is the heart of the plant and must be capable of remaining in operation during storms. Precast concrete panel walls and reinforced roof provide that required level of storm resistance.

Top down view into the interior of the Membrane Bldg showing the early installation of process equipment and status of work on Electrical Room buildout.

South side of Pre-Treatment Basin showing completed installation of the over-flow flapper gates to the right below the catwalk.

Aerial view of the east end of Pre-Treatment basin showing settled water suction piping and pump foundation pads.

West end of Pre-Treatment basin showing Raw Water intake piping

Gravity Thickener in foreground and Washwater Recycle in the background. The small structure in between these is the Belt Press Feed Pump Station. These structures were the first to be built on site avoiding the need to shore or bench the deep excavations.

Solids Handling Bldg contains the Belt Presses and polymer storage and will house the solids transfer and truck loading operations. The loading bay is located towards the right hand side of the building.

Solids Handling building showing installation of Belt Presses.

Belt Presses were set, shimmed and bolted down in mid-February prior to the installation of the building structure.

Raw Water Electrical Building and Generator foundation.

Raw Water Intake in canal bank with primary trash screens mounted above and below the ordinary water level in the canal. This allows the intake to continue to work during anticipated low water levels in the canal.

Raw Water intake and slope paving on canal bank. Note the cast in stair steps for maintenance access to the primary screens. Lowest step is below the ordinary normal water elevation of the canal.

This picture shows the vertical climber screens that will remove any large solids that make it through the initial screens at the water's edge. These screens scroll up-ward and dump collected debris into a rolling dumpster to be collected by the City's trash contractor.

Overall site showing the layout of the components and orientation with the canal on right Mustang Bayou on the left and CR48 in the foreground.