AMENDMENT NUMBER <u>1</u> TO PROGRESSIVE DESIGN-BUILD FOR WTP SCADA MODERNIZATION PROJECT

This Amendment Number <u>1</u> ("Amendment") is to the agreement between the City of Ann Arbor, ("City") and <u>J. Ranck Electric, Inc.</u>, ("Contractor") for <u>Professional Services</u> for the Progressive Design-Build for WTP SCADA Modernization Project , which is dated <u>January 23rd, 2019</u> ("Agreement"). City and Contractor agree to amend the Agreement as follows:

1) Article <u>6.2</u>, <u>Substantial Completion and Final Completion</u>, is amended to read as follows:

6.2.1 Substantial Completion of the entire Work shall be achieved no later than <u>*Twenty*</u> <u>*Four* <u>Twenty</u> (<u>24</u> <u>20</u>) consecutive calendar months after the Date of Commencement ("Scheduled Substantial Completion Date").</u>

6.2.2 Interim milestones and/or Substantial Completion of identified portions of the Work shall be achieved as follows: <u>Phase I GMP shall be achieved no later than Eight (8)</u> consecutive calendar months after the Date of Commencement.

6.2.3 Final Completion of the Work or identified portions of the Work shall be achieved no later than <u>Sixty Thirty</u> (60 30) calendar days after Substantial Completion. Final Completion is the date when all Work is complete pursuant to the definition of Final Completion set forth in Section 1.2.7 of the General Conditions of Contract.

6.2.4 All of the dates set forth in this Article 6 ("Contract Time(s)") shall be subject to adjustment in accordance with the General Conditions of Contract.

2) Article <u>7.6</u>, <u>The Guaranteed Maximum Price</u> is amended to read as follows:

7.6.1 Design-Builder guarantees that it shall not exceed the GMP of Four million one hundred twenty-six thousand five hundred two dollars and seventy-nine cents TBD Dollars (\$4,126,502.79). Documents used as basis for the GMP shall be identified as the Contract Price Amendment to this Agreement. Design-Builder does not guarantee any specific line item provided as part of the GMP, provided, however, that it does guarantee the line item for its general project management and general conditions costs, in the amount of **Two Hundred Forty-Three Thousand** (\$ 243,598.00 Five Hundred Ninety-eight TBD Dollars), and as set forth in the Contract Price Amendment ("General Conditions Cap"). Design-Builder agrees that it will be responsible for paying the applicable general conditions costs in excess of the General Conditions Cap, as well as be responsible for all costs of completing the Work which exceed the GMP, as said general conditions line item and the GMP may be adjusted in accordance with the Contract Documents, including but not limited to the markups for Change Orders set forth in Section 7.3 herein.

7.6.2 The GMP includes a Contingency in the amount of <u>One hundred thirteen</u> <u>thousand four hundred four dollars and seventeen cents</u> <u>TBD</u> Dollars (\$ <u>113,404.17</u>) which is available, if Owner consents in writing, for Design-Builder's use for unanticipated costs it has incurred that are not the basis for a Change Order under the Contract Documents. By way of example, and not as a limitation, such costs may include: (a) trade buyout differentials: (b) overtime or acceleration: (c)

costs may include: (a) trade buy-out differentials; (b) overtime or acceleration; (c) escalation of materials; (d) correction of defective, damaged or nonconforming Work, design errors or omissions, however caused; (e) Subcontractor defaults; or (f) those events under Section 8.2.2 of the General Conditions of Contract that result in an extension of the Contract Time but do not result in an increase in the Contract Price. Design-Builder shall provide Owner notice of all anticipated charges against the Contingency, and shall provide Owner as part of the monthly status report required by Section 2.1.2 of the General Conditions of Contract an accounting of the Contingency, including all reasonably foreseen uses or potential uses of the Contingency in the upcoming three (3) months. Design-Builder agrees that with respect to any expenditure from the Contingency relating to a Subcontractor default or an event for which insurance or bond may provide reimbursement, Design-Builder will in good faith exercise reasonable steps to obtain performance from the Subcontractor and/or recovery from any surety or insurance company. Design-Builder agrees that if Design-Builder is subsequently reimbursed for said costs, then said recovery will be credited back to the Contingency.

7.6.3 Savings.

7.6.3.1 If the sum of the actual Cost of the Work and Design-Builder's Fee (and, if applicable, any prices established under Section 7.1.3 hereof) is less than the GMP, as such GMP may have been adjusted over the course of the Project, the difference ("Savings") shall be shared as follows:

Thirty	percent (30 %) to Design-Builder and
Seventy	percent (70 %) to Owner.

or

7.6.3.2 Savings shall be calculated and paid as part of Final Payment under Section 8.4 hereof, with the understanding that to the extent Design-Builder incurs costs after Final Completion which would have been payable to Design-Builder as a Cost of the Work, the parties shall recalculate the Savings in light of the costs so incurred, and Design-Builder shall be paid by Owner accordingly.

3) Article <u>12.2</u>, <u>Listing of Exhibits and documents incorporated herein:</u> is amended to read as follows:

Exhibit A – Project Technical Requirements Exhibit B – Scope of Design-Builder Services Exhibit C – Fee Proposal DBIA Document No. 535, Standard Form of General Conditions of Contract Between Owner and Design-Builder Modified for City of Ann Arbor ("General Conditions of Contract")

Amendment – Over \$25K Rev. 2019

Contract Price Amendment, if any (to be developed for Phase 2). Exhibit B-1 – Phase II Scope of Work Exhibit C-1 – Phase II Contract Pricing Summary and Supporting Documentation Exhibit D-1 – Insurance Exhibit E-1 – Prevailing Wage Information Attachments: Attachment A – Vendor Conflict of Interest Disclosure Form Attachment B – Non-Discrimination Ordinance Declaration of Compliance Form Attachment C – Non-Discrimination Ordinance Poster Attachment D – Living Wage Declaration of Compliance Form Attachment E – Living Wage Ordinance Attachment F – Performance Bond Form Attachment G – Labor and Material Bond Form Attachment H – Contractor's Declaration Form Attachment I – Contractor's Affidavit Form Attachment J – Prevailing Wage Declaration of Compliance Attachment K – Certified Payroll Form

4) Exhibit, <u>Insurance</u> is replaced in its entirety and is reattached as **Exhibit D-1**.

All terms, conditions, and provisions of the Agreement, unless specifically amended above, shall apply to this Amendment and are made a part of this Amendment as though expressly rewritten, incorporated, and included herein.

City and Contractor agree that for this Amendment and any documents related to the Agreement: 1) signatures may be delivered electronically in lieu of an original signature; 2) to treat electronic signatures as original signatures that bind them; and 3) signatures may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

This Amendment to the Agreement shall be binding on the Parties' heirs, successors, and assigns.

[SIGNATURE PAGE FOLLOWS]

For Contractor	For City of Ann Arbor
By Its:	By Christopher Taylor, Mayor
Date:	
	By Jacqueline Beaudry, City Clerk
	Date:
	Approved as to substance
	By Tom Crawford, Interim City Administrator

Craig Hupy, Public Service Area Administrator

Approved as to form and content

Stephen K. Postema, City Attorney

Amendment - Over \$25K Rev. 2019

Exhibit B-1

Phase II Scope of Work

CITY OF ANN ARBOR WTP SCADA MODERNIZATION PROGRESSIVE DESIGN-BUILD PROJECT ANN ARBOR, MICHIGAN

Phase II Scope of Work

J. Ranck Electric, Inc.



and

Commerce Controls, Inc.

February 27, 2020

Purpose – This document describes the scope of work to be performed in the accompanying Guaranteed Maximum Price spreadsheet for the City of Ann Arbor SCADA Modernization Progressive Design-Build Project. The accompanying GMP spreadsheet is inclusive of the tasks described within this scope document.

This project utilizes allowances to perform many tasks. Allowance budgets have been provided but the allowance budget may or may not be adequate to complete all work described within this scope document.

1.1 FLOOR PLAN LAYOUT

Considerations

The City previously evaluated the Control Room and, with the assistance of Stantec, developed a conceptual layout of the space. This layout was a starting point for this current design effort and modified over the course of two workshops and several communications.

Per the conceptual layout developed by the City, the current Control Room is to be subdivided into two spaces (Control Room and Meeting Room), separated by sliding panels so that they can be opened to each other. Some functions in the existing Control Room will be relocated to the Maintenance Workroom, requiring minor modifications to accommodate these new functions. Modifications will extend to the south and West Corridors, driven by both the new Control Room layout along with the need to improve circulation. The following program elements are to be included in each of these spaces:

- Control Room
 - Control Desk (facing west) with ten 22-inch wide monitors
 - Storage behind the desk
 - Storage along west wall
 - Large (or four ganged, frameless) monitor(s) on west wall
 - Access to south and West Corridors
 - Access to Meeting Room
 - Access to Lab
- Meeting Room
 - Conference table to accommodate ten
 - Kitchen with sink, refrigerator, range, dishwasher, and microwave
 - Existing electronic cabinets (the south cabinet may not be required)
 - Copier
 - Four-drawer file cabinets
 - Bookshelves
 - Access to Control Room
 - Access to South Corridor
- Maintenance Workroom
 - Workstation
 - Two walk-up (hoteling) workstations
 - Mailboxes
 - Bookshelves (three of the five existing to remain)

- West Corridor
 - Large monitor

Approach

Control Room

The west wall of the Control Room will be demolished and shifted toward the West Corridor to allow more space within the Control Room. Other than the enlarged column enclosure (noted below), the west wall will be floor-to-ceiling glass in aluminum storefront framing. As with the west wall, the south wall of the future Control Room will be demolished and rebuilt with glass in aluminum storefront framing. Aluminum and glass entrance doors will be located at the northwest and southeast corners of the room. Along the east wall of the Control Room, the column enclosure will also be enlarged (also described below); the remaining openings into the Meeting Room will have aluminum and glass sliding doors. Each opening will consist of three panels, two of which will slide and stack in front of the third (fixed) panel. Similarly, the opening on the north wall into the Lab (left as a result of demolishing the large control cabinet) will be filled with aluminum and glass sliding doors, two of which will slide and stack in front of the third stack in front of the third (fixed) panel.

The primary functional element in the Control Room will be the control desk. This desk is approximately 18 feet long and typically staffed by up to two Operators, though it will accommodate four Operators (with additional standing space behind). The desk will consist of a solid framed wall supporting a solid surface worksurface, at 29 inches above the floor. The wall will extend up to approximately 46 inches above the floor and be capped with a 12-inch-wide solid surface transaction top. Miscellaneous steel framing posts (with base plates anchored into the concrete slab) will be located within the wall to provide lateral support. The wall above the counter will include power receptacles along with data and communications jacks. In addition, there will be full-motion mounts secured to the wall for ten combination computer/monitors (monitor screens to be 22 inches wide). These mounts will keep the monitors off of the countertop, while still allowing for adjustment of each individual monitor. There is no cabinet or storage under the desktop other than pencil drawers.

Opposite the control desk, between the Control Room and West Corridor, the column enclosure will be enlarged to accommodate storage. This storage area will be in two millwork cabinets; the cabinet above will face the corridor and the cabinet below will face the Control Room. As the cabinet above is expected to house electronic equipment, it will be equipped with a small cooling system (described below). A single large monitor or a group of four frameless monitors will be mounted high on this enclosure, facing the control desk. If frameless monitors are used, it is the city's goal to allow these four monitors to act together as a single display to enlarge the image.

Similarly, behind the control desk, the column enclosure will be enlarged to accommodate storage for the Operators and the Meeting Room. This enclosure will also be horizontally subdivided with file drawers and hutch (below) facing the Control room and bookshelves (above) facing the Meeting Room. On the Control Room side, six millwork file drawers (in two rows of three) will be below a hutch with a flap door. The shelves above will face the Meeting Room and behind a pair of cabinet doors, which will have marker boards on the face.

The skylight, located high in the light well over the south half of the future Control Room, will be replaced as part of this project. Currently, the translucent glazing of the skylight does not allow sufficient daylight into the Control Room; the proposed glazing will be tinted, insulating, low-e vision glass (with the color of the glass to be determined). As the vision glass will add more light into the space, a horizontal roller shade will be added in the light well to allow control of the daylight.

Meeting Room

As with the new Control Room, the south wall of the Meeting Room will be partially demolished to incorporate a new aluminum and glass entrance door with sidelight. The general functional layout of this space will remain similar to the existing, with a kitchen area along two walls in the southeast corner, a conference area, and a work/storage area in the northeast corner.

The center of the Meeting Room will be occupied by a new conference table with seating for ten people. This table will incorporate power, data, and communications which will be plugged in through the recessed floor box below the table. A monitor on the north wall of the space will be linked to a floor box under the table; this will allow laptop computers to display on the monitor screen.

The kitchen in the southeast corner will be replaced and upgraded. The kitchen area will include new cabinets with solid surface countertops, a sink with disposal, refrigerator, range with exhaust hood and microwave shelf, and dishwasher.

Also in the Meeting Room, four-drawer file cabinets will be located at the northeast corner with a solid surface countertop and wall cabinets. A copier (not provided on this project) will be in the northwest corner, near the monitor on the north wall.

As noted above, a two-door cabinet (with bookshelves behind), will be on the west wall. The cabinet doors will have marker boards on their face.

Maintenance Workroom

The Maintenance Workroom is south of and across the corridor from the Control Room. It currently houses two small desks, small conference table, five three-foot wide bookshelves, and four four-drawer file cabinets.

This space will be modified to accommodate a single workstation, two hoteling (walk-up) workstations, and mailboxes (all millwork items designed for the space). The new layout will necessitate removing the file cabinets; WTP staff indicated that these will functionally be replaced by the file cabinets in the northeast corner of the Meeting Room. Two of the bookshelves will also be displaced from the workroom; similarly, WTP staff noted that they would clear out obsolete manuals and consolidate down to the remaining three shelf units. The small desks and conference table will be removed from the space.

The Maintenance Workshop will be the location of the temporary Control Room during renovation. This may require additional power and data cabling.

West Corridor

As noted above, the wall between the Control Room and West Corridor will be moved toward the corridor to allow for more space in the Control Room. The new wall will be floor-to-ceiling glass in an aluminum framing system. To continue accommodating visiting groups, the mailboxes (currently on the west wall) will be relocated to the Maintenance Workroom.

South Corridor

As with the West Corridor, the wall between the Control Room and South Corridor will be moved toward the corridor, and will be floor-to-ceiling glass in an aluminum framing system.

1.2 EQUIPMENT AND FURNISHINGS

Equipment included as part of the architectural/mechanical/electrical scope includes the following

- Refrigerator: 24 cubic foot, French Door, bottom drawer freezer with thru-door ice and water
- Range: Electric, self-cleaning single over with ceramic cooktop
- Microwave: 2.0 cubic foot, countertop carousel
- Dishwasher: Built-in
- Range Hood: 30" wide, 400 cfm

Furnishings included in the scope are limited to the Conference Table, chairs, and miscellaneous display boards. As noted above, the conference table, in the Meeting Room, will have power, data, and communications connections which, in turn, lead to a new recessed floor box. All chairs will be desk-type arm chairs with casters.

Tack boards will be located in the Meeting Room on the north wall above the copier and on the east wall near the file cabinets. Magnetic marker boards will be located in the Meeting Room on the bookshelf doors and in the Control Room near the north door (functioning as the attendance board). A map rail will be located on the west wall of the Control Room.

1.3 MATERIALS AND FINISHES

As both the Control Room and Meeting Room are visually "busy" spaces (featuring various monitors, cabinets, and display materials), the finishes should be restrained and simple. Materials are to be durable and readily cleanable while the color palette acknowledges other areas of the building. Finish materials identified during the Workshops include the following:

- Flooring has been discussed, but there is not yet a consensus on the material; discussions have included polished/stained concrete, luxury vinyl tile, and a seamless sheet product (costs between these three products are similar).
- Walls and soffits will be painted a single color.

- The ceiling system will be a metal panel in a lay-in grid system. Attempts will be made to raise the ceiling over the control desk. A metal panel system will allow access to dampers and devices above the ceiling.
- As noted previously, countertops will be solid surface materials while cabinets will be laminate-faced.
- The front of the control desk will be finished with tile matching the tile outside the Filter Gallery.

As this Project moves forward into the next phase, color boards will be developed for these finishes.

1.4 PLUMBING

Plumbing will be limited to the Meeting Room kitchen. Hot- and cold-water lines and drain to the sink will be re-used while cold-water will be extended to the refrigerator (for the icemaker) and stubbed above the counter (for a coffee maker).

1.5 HVAC

The existing Control Room is served by a roof-top air handling unit (AHU) with air distributed through four diffusers. Per the original scope there has been no evaluation of the existing AHU, including an investigation of the spaces served. However, given the physical size of the unit, it is believed that this unit serves the Lab, various offices, and possibly spaces on the lower level, (in addition to the current control room). While the original scope included only removing and replacing the diffusers and adjusting ducts as required, the WTP indicated that they would like to replace the AHU as part of this work. The assumed scope is a new roof-top AHU (with associated ductwork), serving only the proposed Control Room and Meeting Room will be added. The existing diffusers and returns will be disconnected including removing all branch ductwork and capping at the main ducts. The existing AHU and exhaust fan will remain in place. The power needs for the new AHU will be evaluated.

As part of any effort, air balance reports will be completed prior to the start of the work (to establish a baseline of air volume) and after completion.

The kitchen area in the Meeting Room will have an exhaust hood over the range (or this will be connected to the presumed existing exhaust fan). This hood, which will exhaust approximately 400 cfm, will be routed up through the roof. Make up air for the hood will be taken from adjacent spaces and corridors.

The new cabinet at the West Corridor is tentatively expected to house electronic equipment, which will require cooling. A small wall-mounted, mini-split air-conditioning system (with roof-mounted condensing unit) will be added. Refrigerant lines will run between the unit and its roof-mounted condenser.

1.6 POWER

Power to the renovated spaces is anticipated to be fed from existing panels. General convenience receptacles will be included in the Control Room and Meeting Room with specific power needs also addressed. Along the control desk, receptacles will be included above the countertop for the combination processor/monitors and for miscellaneous requirements; no receptacles will be below the countertop. In the electronics cabinet, receptacles will be included for equipment (as well as for the cooling unit). Receptacles will also be included at all wall-mounted monitors, at the copier, at the countertop (above the file cabinets) in the northeast corner of the Meeting Room and recessed in the floor below the Meeting Room conference table. The kitchen area will have receptacles for the appliances along with adequate receptacles to accommodate small countertop appliances, such as microwave, coffee maker, and toaster.

1.7 LIGHTING

Lighting design for the Control Room and Meeting Room will include ceiling-recessed LED fixtures. Light fixtures at the skylight well will be replaced with new surface-mounted LED fixtures. All fixtures will be controlled by a combination of dimmer switches with occupancy sensors. The lighting will be switched to allow control over which group of fixtures are on. Lamp color will be selected to reduce blue-light. Lighting in the Maintenance Workshop will not be changed.

1.8 **DATA**

It is anticipated that servers will be located either in a nearby office or in in the server room downstairs. Processors at the control desk will likely be wired to the rack downstairs using CAT-6 network cable. The floor-recessed box Wall-mounted monitors will also be wired with CAT-6 cable back to the control desk. In addition, each wall-mounted monitor will have an HDMI convertor module. All cable will be run in conduit.

1.9 COMMUNICATIONS

Phone jacks will be located at the control desk and in the recessed floor box under the Meeting Room conference table. Phone drops will be added at the Maintenance Workroom workstation and walk-up stations.

1.10 MISCELLANEOUS SYSTEMS

The generator switch located on the east wall of the existing Control Room will be relocated to the control desk as will remote pushbuttons for gate operation. Similarly, the fire alarm panel located on the east wall of the existing Control Room will be relocated to the new control room, onto the wall behind the control desk.

Speakers in both the Control Room and Meeting Room will be tied back to the building's existing system.

Network panel in the control room will be demolished, existing wiring will be rerouted to the downstairs server room where a new network panel will be located.

1.11 METHOD OF COMPENSATION

The compensation methods are listed in the General Conditions and Control Room sections of the GMP spreadsheet. Most items are fixed prices as defined in this report and the 30% drawings. Some items that were not selected at the 30% stage (such as the flooring and AHU) are included as an allowance.

2.0 PLC PANELS

2.1 PLC REPLACEMENT

Considerations

Much of the PLC hardware at the treatment plant that controls the main processes consists of Allen-Bradley PLC-5, 1771 / 1785 series, controllers and I/O. There are other areas which control smaller processes at the treatment facility that have been installed and/or upgraded to Allen-Bradley CompactLogix, 1769 series, controllers and I/O. The PLC-5 series of processors and I/O is now legacy and either no longer available or very difficult to find replacements. The existing CompactLogix PLCs will not be replaced at this time although their firmware may be updated to a common revision.

The need is to replace the existing PLC's with newer, reliable and readily available PLC's which will serve as the backbone of the treatment processes for years to come.

In addition to the PLC hardware replacement there are components within the control panels that have been identified during our onsite research and discussion with City staff for component upgrades. These include Power Supplies, Branch Circuit Breakers, fiber patch panels and Uninterruptible Power Supplies (UPS). A layer-2 managed Ethernet switch and Ground Fault Circuit Interrupter (GFCI) convenience receptacle will be added to each of the PLC and Remote Input/output (RIO) control panels. The enclosures themselves are intact and able to be reused except for the LOX Heater panels.

The following PLC and RIO panels are to be upgraded:

- 1. PLC-C1
- 2. PLC-C2
 - a. Integrate the existing ControlLogix IO into the new ControlLogix IO if there is room otherwise use the existing chassis as RIO.
- 3. RIO-C2
- 4. PLC-HS
- 5. PLC-OZ
- 6. RIO-OZ
- 7. PLC-P1
- 8. PLC-P2
- 9. PLC-FP
- 10. PLC-F1,F2,F3
- 11. PLC-EQ

The following panels are to be investigated for possible firmware upgrades:

- 1. PLC-LOX
- 2. Lime Slaker #1 & #2 PLC Control Panels

- 3. West High Service Pump Station
- 4. Liquid Oxygen PLC Control Panel
- 5. Ozone Generator #1, #2, #3 & #4 PLC Control Panels
- 6. Destruct Units #1 & #2 PLC Control Panels
- 7. Switchgear PLC Control Panel
- 8. Argo Dam
- 9. Barton Dam
- 10. Barton Hydro
- 11. Barton Pumping Station
- 12. Geddes Dam
- 13. Superior Dam
- 14. Superior Hydro
- 15. Manchester Elevated Tank
- 16. Industrial Pump Station
- 17. Liberty Pump Station
- 18. Steere Farm
- 19. Pilot Filter Control Panel

Approach

Hardware selected:

- 1. 1771-IAD 120vac Discrete Input Module = 1756-IA16
- 2. 1771-IBD 24vdc Discrete Input Module = 1756-IB16
- 3. 1771-OW16 Relay Output Module = 1756-OW16I
- 4. 1771-IFE/C Analog Input Module = 1756-IF16
- 5. 1771-IL Analog Input Module = 1756-IF8I
- 6. 1771-OFE2 Analog Output Module = 1756-OF8I
- 7. 1771-L40E Processor = 1756-L81E, firmware rev32
- 8. 1771-L80E Processor = 1756-L81E, firmware rev32
- 9. 1756-EN2TR for additional Ethernet Communications where required
- 10. Corning 6-port SHP-01 Patch Panel + ST Connector Plate
- 11. Allen-Bradley 1606-XLS Series DC Power Supply, 120W
- 12. Allen-Bradley 1492 series fuse holders with indicators
- 13. APC SMT series UPS + relay card for status (15-minute runtime)
- 14. Allen-Bradley (1489 series) finger-safe branch circuit breakers
- 15. Phoenix Contact 15Amp GFCI DIN Mount Duplex Receptacle
- 16. Phoenix Contact 15Amp DIN Mount Duplex Receptacle
- 17. All required CAT6 and Fiber Optic (ST to LC) patch cables

2.2 LOGIX PROGRAMMING

Considerations

The existing PLC programs are configured such that all relevant logic for the devices is scattered throughout multiple ladder logic files. In addition, the logic structure is specific to the 1771/1785 series controllers and therefore does not contain the multi-dimensional data arrays, Add-On-Instructions (AOI's), User Defined Data Types (UDT's) and tag naming attributes available in the newer ControlLogix PLC platform.

There are no documented programming standards currently in place for the system. A rewrite of the existing logic will require development of a documented set of standards for programming prior to programming. This document would include tag naming conventions, AOI, UDT and Program structures.

Approach

The rewriting of the PLC code method of conversion would need to include development of a sequence of operation document prior to any logic changes and / or hardware upgrades to form a baseline for the project. Currently this task is assumed to be completed by the City before software programming commencement. Once the operation has been documented, a set of workshops with the City will be held to discuss and develop the PLC programming standards. These standards will include tag naming conventions, AOI, UDT and Program structures. This document will be a living document as the project is executed and will be updated with any changes. The final document will be turned over to the Owner at the end of the project.

Once the process has been documented and the PLC Programming Standards have been developed the programmer will convert the existing logic to the new format by rewriting the existing ladder code.

The rewritten PLC logic will be tested during an unwitnessed factory acceptance test followed by a witnessed factory test at the programmer's facility. The logic shall be simulated in a fashion such that all operations can be verified to the satisfaction of the Owner prior to deployment at the treatment facility. Since this will be a retrofit of the hardware the testing can be accomplished by utilizing simulation logic built in to the AOIs described previously.

2.3 ASSUMPTIONS

- We have determined that all of the main process PLCs will be reprogrammed in this upgrade project. Some additional programming may be necessary to accommodate any PLC to PLC communication between the main process PLCs and ancillary system PLCs.
- For the PLC code rewriting option two workshops to discuss and finalize the AOI & UDT structures, program format and tag naming conventions will be necessary to develop a standard format which could be used as the basic format for future additions to the operating process.
- If the goal is to develop and deploy a set of programming standards as guidelines for future programming endeavors system wide, it is in the opinion of the Design Build Team that

the restructuring of the PLC software by utilizing the native tools available in the ControlLogix platform would be the most cost-effective solution if implemented at the time of this proposed upgrade. If this were to be implemented after said upgrade project, it would require a complete rewrite of the newly developed VTScada HMI application resulting in significant additional costs.

- The existing ControlLogix Chassis / hardware in the PLC-C2 control panel will be incorporated into a converted chassis.
- No field instrumentation, current to current isolators / splitters or process meters have been included in the estimate.
- Rescaling or calibration of field instruments has not been included in the estimate.
- No new PLC Software license or Rockwell TechConnect renewal has been included in the allowance.

2.4 METHOD OF COMPENSATION

This work will be completed at a fixed price as indicated in the PLC Replacement/Program Rewrite section of the GMP spreadsheet.

3.0 HMI SCREEN PROGRAMMING

3.1 INTRODUCTION

A Human Machine Interface (HMI) is the generic name given to a computer or other type of industrial display unit used to present process data to a human operator and through which the human operator can control the process through a SCADA system. The SCADA System presents the information to the operating personnel graphically, in the form of a mimic diagram. This allows the operator to see a schematic representation of the process being controlled.

For example, a picture of a pump connected to a pipe can show the operator that the pump is running and the rate fluid it is pumping through the pipe at any moment. The operator can use the computer to adjust the flow rate of the fluid in real time or switch the pump off.

HMI software includes visualization components as well as historical databases, alarm databases, web views, computer/operational security, remote notification, remote user capability, and data retrieval that make up a complete control system.

The HMI package for the SCADA system typically includes a drawing (visualization) program that the developers use to change the way these points are represented in the interface. These representations can be as simple as an on-screen traffic light, which represents the state of an actual traffic light in the field, or as complex as a multi-projector display representing the position of all the elevators in a skyscraper or all of the trains on a railway.

The City of Ann Arbor WTP control system currently utilizes General Electric Proficy iFIX Human Machine Interface (HMI) software to allow plant operators, maintenance staff and plant management control of the entire WTP and related remote stations from general personal computers (PC's) distributed throughout the WTP. The iFIX HMI software has been serving the WTP for more then 20-years with periodic updates of the application software to allow it to run on modern operating systems and PC hardware.

In April 2017, the City of Ann Arbor issued a Request for Proposal (RFP) seeking suitable qualified Supervisory Control and Data Acquisition (SCADA) software manufactures and/or certified sales representatives (software vendors) to submit proposals for the replacement of the City's iFIX HMI software. Seven respondents issued formal proposals to the City and after a thorough selection process the VTScada product from Trihedral was selected as the software to replace the existing GE Proficy iFIX. The intent of the selected software is to use the new Trihedral VTScada product as the replacement of the existing HMI during the City's SCADA modernization project that will not only replace the HMI software but also upgrade the majority of the WTP obsoleted Allen-Bradley PLC-5's & associated equipment, upgrade the existing control room architecture, upgrade all the SCADA related computing hardware and update the remote station hardware and communication.

3.2 SCREENS

Approach

Tetra Tech recommends at least some (subset of the above ideas) of the High-Performance HMI ideas be incorporated into the City of Ann Arbor HMI system and these ideas were presented within the HMI screens workshop and include the following:

- No animation except for specific alarm-related graphic behavior
- Embedded, properly-formatted trends of important parameters
- Analog representation of important measurements, indicating their value relative to normal, abnormal, and alarm conditions
- Low-contrast depictions in 2-D, not 3D, specifically piping
- Logical and consistent navigation methods
- Consistent flow depiction and layout to minimize crossing lines
- Validation and security measures
- Embedded information in context (via right-click menus or similar methods) such as alarm documentation and rationalization, standard operating procedures, etc.

3.3 ALARMS

An important part of most SCADA implementations is alarm handling. The system monitors whether certain alarm conditions are satisfied to determine when an alarm event has occurred. Once an alarm event has been detected, one or more actions are taken such as the activation of one or more alarm indicators, and perhaps the generation of email or text messages so that management or remote SCADA operators are informed. In many cases, a SCADA operator may have to acknowledge the alarm event; this may deactivate some alarm indicators, whereas other indicators remain active until the alarm conditions are cleared.

3.4 HISTORIANS

In the last decade automatic collection and storage of treatment facility data continues to increase in importance in the Water/Wastewater industry. This data is critical to supporting the increasing needs of EPA/compliance reporting and is the basis for driving operational performance and maintenance improvements. The increased ability of modern SCADA historians has extended the ability of a traditional system to effectively store data and make use of the data more efficiently. More recently, SCADA historians have migrated into critical data repositories that contain process performance data that deliver extended capability while being completely compatible with the treatment system's IT infrastructure. Modern SCADA historians also extend these capabilities by offering predesigned data exchange mechanisms allowing runtime data to be exchanged with disparate systems like laboratory Information Management Systems (LIMS), Water/Wastewater reporting systems and Computer Maintenance Management Systems (CMMS) to be dynamically and securely exchanged amongst each other. Due to the critical nature of the historical data it's important that proper data retention schemes be implemented to provide the necessary protection to quickly restore data if a disaster were to occur.

Approach

The planned HMI software migration from iFIX to the new Trihedral VTScada includes upgrading the HMI computer architecture to take advantage of the latest computer hardware and operating systems that will inherently increase system reliability as well as provide new features that enhance system operation and overall operator effectiveness.



Figure 3-1: Proposed VTSCADA Architecture

The new system will consist of three main virtual host servers that are geographically dispersed, two located at the WTP and one offsite running VMWare virtualization software that will allow multiple servers to run on each of the host servers.

The migration method includes development of a new HMI application with new computing hardware installed in parallel with the existing GE Proficy iFIX system. Parallel operation of the new HMI and the old HMI will only be available for the existing PLC's that are not part of the planned upgrade as those controller tag structures will remain the same. For the controllers slated for upgrade, they will be migrated to the new HMI during conversion of old (PLC-5) to new (ControlLogix) without the ability to run in parallel with the old system so operators will operate the converted PLC's on the new system only.

The base features of the iFIX to Trihedral migration include the following:

- Conversion of the existing tag name database (approximately 14,000 tags).
- Redrawing of each of the existing HMI screens including pop-up display screens, overview screens, and detail screens. HMI background colors and overall color schemes will be discussed with Owner during application development.
- Selection, development and implementation of VTScada pump, motor, valve and other operable equipment graphics from the standard VTScada graphics library to replace the existing iFIX graphics. Note that the look and feel of each of these graphic symbols will remain largely the same as existing with the goal to accurately depict each process area.
- Replacement of the existing screen process piping which is currently 3D piping graphics with simple line graphics that will retain the correct piping configuration but eliminate the 3D look (HP HMI feature).
- Development of three (3) new WTP graphics that includes a 3D type look to be used during plant tours and other plant demonstrations.
- Redesign of the alarm banner screens to include an alarm banner-less application except for approximately 5 screens that would retain an alarm banner at the bottom. An alarm notification panel will be developed to allow operators the ability to visualize active alarms (HP HMI feature).
- Redesign of the existing screen navigation menus to include menu's emanating from the left side of the screen with retainage of familiar main menu navigation. This may include a hover feature to allow hovering the mouse to allow menu activation (HP HMI feature).
- Design the HMI application to allow 4-levels of security (HP HMI feature).
- Development of standard alarm priorities, alarm shelving, and alarm sort by process areas will be developed (HP HMI feature).
- Design, deployment and testing of a separate Microsoft SQL server will be deployed on the Pivot server. This will facilitate real-time VTScada Historian data to be pushed to the new SQL server which will be the data repository used by the business reporting systems (CMMS, LIMS, Yellowfin, CityWorks). (see details in chapter 5).

Onsite startup of the system will occur with the new VTSCADA deployment and testing of communication to the existing controllers that are not getting upgraded as well as remote site communication. It's expected that WTP staff will utilize both the old system and new system for the duration of the startup period. As each of the PLC-5 controllers are upgraded to ControlLogix the process equipment controlled by that PLC will be tested from the new Trihedral application and will no longer operate from the GE iFIX application. This will continue until all process area PLC's are updated and then the GE iFIX application can be decommissioned.

3.5 DESIGN PLAN OPTIONS

Optional items discussed during the workshops and other onsite meetings are as follows and will be completed from the project allowance.

1. Pop-up screen, alarming and tag name standardization based on proposed use of Rockwell RSLogix Add-on-Instructions (AOI). This would include additional tabs for process

statistics, setpoints, critical process equipment alarm status and other features to be developed in the AOI standards.

- This option assumes the tag structure for each piece of operable equipment will be changed to the new AOI standard structure.
- The AOI option also requires significant amount of additional testing of the PLC Logic and HMI screens, pop-ups, alarming and related subsystems since the tag structures for these items will be changed.
- 2. Development, testing and deployment of Key-Performance-Indicator (KPI) screens. This would include a workshop to get City input, development of new KPI screens, testing and deployment of screens.
- 3. Development, testing and deployment of alarm notification via mobile device.
- 4. Development, testing and deployment of high-performance graphics features for level displays that show alarm setpoints, out of range indication and are colored or shaded to be eye catching during abnormal conditions for up to 100 analog values.
- 5. Development, testing and deployment of HMI screen hot-links to equipment user manuals and SOP's.
- 6. Implementation of the VTScada operator log book.
- 7. Implementation of the VTScada remote dial-out capability that will allow remote notification of alarms via text message.
- 8. Consolidation of up to 5 HMI screens by redrawing, rearranging existing screen graphics to reduce screen count and consolidate information and/or controls.
- 9. Historical data migration of existing up to 24-months of iFIX history (H24) log files to VTScada format and import into VTScada Historian.
- 10. The City presented a 35-point control system improvement list that was developed by staff and it is recommended that an allowance be established to allow the design-build team to address a portion of the list as-directed by Owner.

3.6 METHOD OF COMPENSATION

VT SCADA (provided by Kennedy Services) will be a fixed price. We understand that VT SCADA will perform historical data conversion within this fixed price. Tetra Tech's engineering costs will be a fixed price. Programming costs will be through an allowance. When the project reach a stage where programming costs can be converted to a fixed price, a contract change order will be executed.

4.0 HARDWARE/DATA STORAGE

4.1 INTRODUCTION

The current control system computer architecture consists of a mixture of servers and desktop computers (operator workstations) that serve as the backbone of the current GE Proficy HMI system. Although the GE Proficy HMI software utilizes a server-client configuration the system utilizes all thick-client type operator workstations. Each of the operator workstations has GE Proficy HMI software installed on a Windows 7 professional operating system (OS). The system utilizes a typical labor-intensive manual copy process to distribute the HMI application across all the operator workstations after development changes within the GE iFIX HMI system.

Historical data is logged via the native GE Proficy iFIX proprietary trending mechanisms with data storage on the local workstations.

The overall GE Proficy iFIX system software and related system architecture has been in service with various upgrades for more than 20 years.

4.2 PLANNED DESIGN DESCRIPTION

Approach

The City prefers the SCADA computing equipment to be Dell branded to maintain platform consistency across the City of Ann Arbor enterprise which has standardized on Dell equipment. Standardization of computing equipment helps with managing inventory more efficiently, enables the development of long-term replacement/upgrade policies and allows the City to take advantage of volume pricing. The City indicated they would direct purchase all required SCADA computers and related Dell equipment for this project.

Virtualization topics discussed and recommended by Tetra Tech with conceptual concurrence from City IT. Virtualization relies on software to simulate hardware functionality and create a virtual computer system. This enables the ability to run multiple operating systems and applications on one physical server.

A virtual computer system is known as a "virtual machine" (VM): a tightly isolated software container with an operating system and application inside. Each self-contained VM is completely independent. Putting multiple VMs on a single computer enables several operating systems and applications to run on just one physical server, or "host."

A thin layer of software called a "hypervisor" decouples the virtual machines from the host and dynamically allocates computing resources to each virtual machine as needed. This requires the host computers to be sufficiently sized with the appropriate CPU, memory and disk space resources for its intended purpose.

The resulting benefits include economies of scale, greater efficiency along with downtime-free upgrades and software patching ability. Upgrades and patching can be done by creating a new

VM (virtual machine), load and test the upgrade or patch, and swap out the old VM for the new one in production when everything checks out. This is particularly useful as you adopt new analytics applications, sensor data collection systems, and other elements that have the potential to disrupt the production SCADA system.

Virtualization of SCADA systems provides cost savings by reducing hardware since virtualization allows multiple applications to run side-by-side on one physical server. The recommended design includes two virtualized severs that eliminates a single-point of failure that could occur with a single physical server. In addition, the selection of the Trihedral VTScada product which will serve as the HMI software for this project lends itself to designing inherent fault tolerance with the VTScada product having a built-in failover mechanism between server computers.

The system includes two Dell R6xx class physical host servers with recommended level of system resources (memory, disk & CPU). Operator workstations are shown to be Dell Precision 3430 small form factor (SFF) PC's running Windows 10 professional operator system. As a same cost alternative to the Dell Precision 3430 SFF PC the Dell OptiPlex 3070 Micro PC could be selected (utilized) if an even smaller form factor is desired or required due to workspace restrictions. Proposed workstation desktop monitors are Dell P2419h which will allow resolution standardization of 1920x1080. Five of the desktop computers will include dual monitors so a total of 20 monitors will be provided in the new system.

Each of the ten filter console area workstations and monitors are recommended for replacement with Dell embedded box PC 5000 industrial computers which will be located within the existing stainless-steel enclosures and Dynics SW15 industrial wide screen displays will replace the existing Dynics industrial computers. The Dynics SW15 displays will fit the existing panel openings with only a slight modification to the opening size. In addition, the Dynics SW15 displays have a native resolution of 1920x1080 which will adhere to the new resolution standard.

Virtualization software will be VMWare which will match the current City standards and will allow City IT to provide long-term management and maintenance of the system if desired. The VMWare vSphere essentials kit will provide the required VMWare licensing for up to three physical servers with up to 2-CPU's per server.

Virtual servers include a primary and secondary SCADA active directory domain controllers. The domain controller (DC) is a server that responds to security authentication requests within a Windows Server domain. The domain controller is the centerpiece of the Windows Active Directory service. It authenticates users, stores user account information and enforces security policy for the Windows domain. This allows centralized management of the SCADA user access credentials and allows adherence to standard cybersecurity practices. Two active directory servers will be implemented for redundancy and the proposed architecture shows them as virtual machines (VM's), one on each physical server.

The Trihedral VTScada login credentials will also use DC credentials and will be centrally administered though the Microsoft Active Directory Users and Computers management console or Remote User Administrator Tool console.

The proposed system backup solution includes a Dell network attached storage (NAS) device to be specified during final design along with a Windows Server 2016 R2 VM running Nakivo replication & backup software. Other backup solutions and software will be researched during final design phase with the final design solution being fully agreeable to City IT solutions and practices.

With the proposed virtualization solution and the built-in redundancy features of the Trihedral VTScada software backup plans should focus on periodic VM snapshots and nightly backups of the HMI application, domain controllers and real-time historical data.

The design team will meet with City IT to confirm the equipment through the development of a bill of materials. These services are provided as a fixed cost in the GMP (Hardware/Data Storage Design).

4.3 DESIGN PLAN OPTIONS

Options include development of a comprehensive disaster recovery plan. A disaster recovery plan would be developed to provide a detailed document highlighting critical procedures for system backup, system recovery, and re-commissioning of the SCADA System in the event of a system disaster. Included in the plan would be roles, and responsibilities, inventory requirements, and other critical information to restore the SCADA System and its components promptly.

4.4 METHOD OF COMPENSATION

Hardware and software will be purchased through an allowance.

Costs to select hardware and software will be a fixed cost. This disaster recovery plan is provided as a fixed cost in the GMP spreadsheet.

5.0 ANALYTICS AND INTEGRATION

5.1 INTRODUCTION

Integration of existing Computerized Maintenance Management Systems (CMMS), Laboratory Information Systems (LIMS) and utilization of the City-owned analytics software package Yellowfin (hereinafter referred to as maintenance reporting packages) was studied as part of the SCADA modernization project. In addition, the City indicated a desire for the design-build team to design the system to allow future accommodations for connections to their asset management software CityWorks.

Currently the existing the GE Proficy iFIX system transfers data between itself and the LIMS system via a CSV file that is generated by the WTP reporting software from Sytech Inc. called XLReporter. The XLReporter system allows creation of Microsoft Excel like reports utilizing a variety of real-time data sources such as the GE Proficy iFIX system.

5.2 PLANNED DESIGN DESCRIPTION

Considerations

As part of the design-build SCADA modernization project an Analytics and Integration workshop was held at the WTP on June 17, 2019 to discuss items critical to the integration and analytics of the maintenance reporting package systems.

The workshop included discussion of topics ranging from the general needs of the system output reports and data exchange between the maintenance reporting packages to desired system analytics that could be done and reported on through the Yellowfin dashboarding/reporting/analytics package.

Approach

The consensus was that a centralized data repository would be required with a data feed to/from the new Trihedral VTScada historian.

The planned design for the data flow from the new Trihedral VTScada HMI to the maintenance reporting package systems includes the design and implementation of a new common database architecture shown in the design concept drawing SC-006. The design concept includes utilizing a Microsoft SQL database as a central data repository that each of the maintenance reporting packages can exchange data without custom data managers.

Basic requirements of the system include the need for the system to support future growth of data, support data exchange between each of the maintenance reporting packages, minimize the need for custom data managers & complex coding as well as be fully maintainable by City staff. In addition, the existing transfer of data from GE Proficy iFIX to the LIMS system via the CSV file

will need to be phased out and transitioned to the new method that includes a data transfer from Trihedral VTScada to the new SQL data repository.

Desired analytics from the system include the following:

- a. Realtime Chlorine Contact (CT) time calculations utilizing free chlorine concentration.
- b. Realtime water quality analysis.
- c. Plant performance reports.
- d. Turbidity analytics turbidity event rules.
- e. Main break analytics pressure loss triggers.
- f. Energy usage reports and analytics.
- g. Filter performance
 - i. Turbidity
 - ii. Average per filter runtimes
 - iii. Hours since last backwash
 - iv. Head of plant return analytics based on existing Excel data calculations.
- h. Tank fill/draw rate of change and time to empty/full analytics.
- i. Rate of change alarms for dams
- j. Data comparisons between USGS river flow versus hand readings captured by City staff.

As part of the base design and implementation the design-build team will have responsibility of the design and configuration of the Microsoft SQL database as well as the data exchange mechanisms between VTScada and the new SQL database (data repository) and possibly configuration/programming of data analytics within the PLC or so-called pre-analytics before data is transferred to the data repository.

The design-build team will coordinate the desired data sets, pre-analytics of data, and testing of data of communication between the new database and existing maintenance reporting packages to allow the City to achieve the desired data outcome for each package.

Its assumed that the current XLReporter tool will be maintained by the design-build team throughout the upgrade conversion process (iFIX to VTSCADA) then after the system is fully converted and identified to be stable the new SQL database will be populated with data contained with the XLReporter tool (report) and the City would then assume responsibility of reconfiguration, testing and deployment of existing LIMS and/or other reports.

5.3 DESIGN PLAN OPTIONS

Design plan options include the development of data scheme creation for input data criteria, data output criteria, data checking criteria, and analytics of data (determination of where the analytics takes place) would be developed as part of the data exchange and data analytics reporting systems by the design builder team.

5.4 METHOD OF COMPENSATION

All services in this section will be compensated through a contract allowance.

6.0 REMOTE SITE COMMUNICATION

6.1 INTRODUCTION

System architecture and communication is a critical element in any remote telemetry system. The existing remote site communications network consists of three main forms of electronic communication between the WTP and twenty-seven (27) remote sites. The three forms of communication consist of fiber optic network via the City fiber optic ring network (IP based), High Speed 5.8 GHz radio (IP based) and 450 MHz UHF licensed (Serial based) radio. Note that the Steere Farm Well site (Station No. 5 in the table below) includes a 900 MHz spread spectrum radio link to the City owned fiber optic connection on the same site at the Ann Arbor municipal airport.

Most of the stations utilize 450 MHz licensed industrial radios with Motorola MOSCAD remote telemetry units serving as the station controller. The MOSCAD units are a programmable microprocessor-based RTU with associated input/output modules that serve to act like the more common Rockwell programmable logic controllers but adhere to their own Motorola developed protocols and programming languages.

The Motorola MOSCAD units in service are the older MOSCAD L models that have been obsoleted by the manufacture and need to be upgraded to either a newer version of Motorola MOSCAD units called the ACE 3600 or to the more common Rockwell PLC type RTU's that are in service at the City of Ann Arbor WTP & WWTP.

WTP staff has indicated that the Motorola units have been reliable in operation and service from the local Motorola distributor has been good yet widespread knowledge of the Motorola product is lacking with very few (possibly one) companies offer sales and service of the Motorola product line.

6.2 **REMOTE TERMINAL UNITS (RTU)**

As for the standard RTU, it was decided through discussions with the City, PDB team and owner's advisor, that the City abandon the Motorola MOSCAD in favor of ACE 3600 system. This item will be addressed through an allowance to be tentatively used for physical site survey, additional antenna towers with Tt oversight of work on these towers, changes to the communication paths, and for any investigation of and procurement of new radio frequencies.

6.3 METHOD OF COMPENSATION

All services performed for this task will be through a contract allowance.

7.0 CYBERSECURITY AND NETWORKING

This section outlines the approach to construct the SCADA network and secure that network from cyber threats. The section begins with an overview of the criticality of the City's SCADA system, discusses various network and cybersecurity principles and concludes with recommendations and cost opinion.

7.1 SCADA CRITICALITY

The criticality of the SCADA system to plant operations was discussed. It was determined that the PLC's operating key WTP processes are the highest priority, followed by other supporting functions and remote sites. The general criticality is described below:

- 1. PLCs must remain operational at all times. Outages of more than 15-30 minutes will significantly disrupt operations.
- 2. The remainder of the SCADA system is less critical. The plant can be operated for several days in the absence of SCADA, provided the PLCs remain operational and can communicate, including the use of peer-to-peer PLC communications.
- 3. Separation must be provided between AA WTP and other AA remotes that are not Ann Arbor properties (e.g. Scio Township).
- 4. FERC dam sites are of the highest criticality and must be treated as completely separate systems. FERC sites must maintain the ability to operate independently if separated from the AA WTP. Normal communications between the AA WTP and each FERC site will be restricted to only those communications necessary for authorized system operation. Note that this report does not constitute an assessment of the connectivity to, or network equipment at FERC sites. Figure 1 below illustrates the isolation of FERC sites from the Ann Arbor WTP network by means of the SCADA firewall.



Figure 7-1: FERC Site Connectivity

FERC site isolation will be maintained as follows:

1. Limited connectivity will be permitted from the Ann Arbor WTP SCADA network in accordance with existing City policies. In the event of a communications failure, or a disruption of the Ann Arbor SCADA network, FERC sites can be physically or logically isolated.

7.2 NETWORK

Tetra Tech will provide a high-level system functional description for use by the network equipment integrator. This description will include:

- 1. Logical network architecture, including security zones, IP and VLAN identification.
- 2. Physical network architecture, including identification of equipment types, port configurations (e.g. copper or MM fiber) and capacity.
- 3. Firewall configuration identifying firewall rules (ACLs or Conduits) between zones.

Several network topics were discussed during the workshop.

7.2.1 Remote Site Connectivity

Sites currently on the SCADA radio system will remain on this system. Sites will be reviewed for possible migration to fiber as the fiber ring is expanded as part of a separate initiative.

The current MOSCAD is can be upgraded although the City would like to have Tetra Tech present options from other manufacturers as MOSCAD requires the City to use a single vendor. The City wishes to remain on the licensed 450 MHz frequency.

A few remote sites are planned to connect to a new fiber ring this fall.

7.2.2 Staff Remote Access

Remote SCADA system access will be provided by means of the City's remote access server on the Enterprise network, then connecting to SCADA servers through a SCADA firewall. Some City staff will need control access. Others only need view-only access to SCADA.

7.2.3 On-plant WiFi Access

The cost for the City IT procured equipment is via an allowance in the Phase II contract to select and install WiFi hardware. The PDB team has budgeted modest time to assist with the review of equipment specifications, installation locations, and networking.

7.2.4 Alarms and Alerts

City currently gets text/email alarms. It was debated whether this needed to continue with mobile interfaces, but the City determined these would likely need to continue.

7.2.5 Virtualization and Emergency Operations

Virtualization allows the consolidation of server hardware into a smaller number of virtual hosts. Separate physical servers are replaced with virtual hosts, optimizing the usage of hardware, simplifying hardware complexity, and reducing physical, power and HVAC requirements. Virtualization greatly simplifies Disaster Recovery as virtual servers can be restored to any hardware with sufficient capacity, often in a fraction of the time required to configure a physical server. Virtualization is in future for most water utilities.

The City currently operates a virtualized server environment. The use of a 2nd physical interface on the City's existing virtualization servers will allow logical separation between SCADA and Enterprise systems residing on shared network hardware. So long as no connections are provided between networks in the virtual environment, the ability to create a logical "air gap" between SCADA and the Enterprise remains.

7.2.6 Physical Security

This was discussed at the workshops. The control room is accessed by numerous doors and this would require securing at least four doors inclusive of the lab doors. The City elected to defer securing doors and to work toward establishing a secure physical perimeter for the WTP in the future. No costs for physical survey outside lockable PLC cabinets will be included in this SCADA project.

7.2.7 Cybersecurity

Tetra Tech's approach incorporates controls and capabilities identified in current leading SCADA/ICS cybersecurity guidance for water and waste water control systems, including:

- AWWA Cyber Security Guidance Tool (2016)
- National Institute of Standards and Technology (NIST) Cybersecurity Framework (2014)
- National Institute of Standards and Technology (NIST) SP800-82 Rev. 1 Guide to Industrial Control Systems (ICS) Security (2013)
- ISA/IEC-62443 (Formerly ISA-99) Industrial Automation and Control Systems Security, including TR99.00.02 (2007)
- North American Electric Reliability Corporation (NERC) 1300 Critical Infrastructure Protection (CIP) standards v5 (2016)

Progressive Design-Builder's services include selection of equipment, network configuration, and testing.

Once implemented, these recommendations will contribute to a design that fully supports authorized SCADA system access while providing protection against unauthorized access and network-based attacks. These standards and guidance are cited as consensus standards for the securing of water cyber infrastructure in accordance with America's Water Infrastructure Act of 2018 (AWIA).

Leading cybersecurity guidance for SCADA and Industrial Control Systems (ICS), including ISA/IEC-62443 (ISA-99) and NIST SP800-82, recommends separating networked equipment into "zones", with each zone corresponding to a particular category of device (e.g. server, PLC). Traffic between zones is denied unless explicitly permitted. Authorized communications between zones are facilitated through "conduits" – essentially firewall rules – defining the permissible device, network range, protocol or other characteristics of permissible traffic.

7.3 SEPARATE SCADA DOMAIN

SCADA/ICS cybersecurity guidance recommends the use SCADA domain credentials unique from those used for Enterprise access. This prevents an attacker that has compromised a user's Enterprise credentials from simultaneously gaining access into the SCADA system. A separate SCADA domain allows the use of individual user accounts and passwords and allows access to the SCADA system even if connectivity between the plant network and City is blocked. Other topics for consideration include:

- Domains and domain accounts for the systems and applications
- Users, groups, and associated policies for each system user, expected role, and machine function
- Remote access groups and policies governing the secured use of remote access
- Software update policies, procedures, and functional components
- Integration with SCADA security
- File shares and storage permissions
- Locations for Domain Controllers
- Domain administration

Isolating domain control functions will also allow the City to "air-gap" the SCADA System in the event the Enterprise System is attacked. SCADA domain control would not be affected by physically disconnecting from the Enterprise network.

7.4 ASSUMPTIONS

Tetra Tech's functional network description is based on the following assumptions:

- 1. 20 existing SCADA panels will be configured with one switch each.
- 2. Device count per-panel is low (<8 devices).
- 3. Network equipment will be industrial-class DIN rail mount.
- 4. Existing MM fiber is terminated at each panel.
- 5. Existing fiber will be tested for suitability for use with new network equipment.
- 6. Sufficient spare terminated fiber is available for 100% switch redundancy (to facilitate cutover).
- 7. Existing wireless bridges will be re-used for this deployment.
- 8. Wireless sites will be cut-over on a site-by-site basis.
- 9. The new plant Ethernet network will connect to external sites via a SCADA firewall to be installed as part of this project.

- 10. The 5 wireless access points (WAPs) will be adequate for the areas desired to be covered by WiFi. A WiFi study would be required to assure that there are no dead areas and such a study is outside the scope of this Phase of the project.
- 11. Connections to non-IP (MOSCAD) sites will be treated as a separate security zone, isolated from the IP network by means of the new SCADA firewall.
- 12. The City will confirm that ability of FERC sites to operate independently of any other site, including the Ann Arbor WTP.

7.5 SYSTEM CONFIGURATION

The network will be configured, tested and installed independently of the PLC upgrades. Network configuration and testing will be completed in a phased manner allowing testing and acceptance by the City at every step without disrupting production processes. These phases are:

- 1. Factory Acceptance Testing (FAT)
- 2. Site Acceptance Testing (SAT)
- 3. Final Acceptance Testing

7.5.1 Factory Acceptance Testing

Factory Acceptance Testing (FAT) will be conducted off-site at the Network Integrator's facility. The purpose of this testing is to validate that the correct equipment and software has been received and functioning properly. The integrator will have ready access to the equipment and all vendor support services without needlessly interfering with the plant operation. A formal test plan will be developed to verify proper operation of the network under simulated plant conditions. FAT will consist of:

- 1. Network equipment unpacking.
- 2. Equipment installation and cabling.
- 3. Power-on testing and validation.
- 4. Port, module and interface testing and validation.
- 5. Equipment configuration.
- 6. Basic system functionality testing (100% test).

Upon completion of basic and testing configuration by the integrator, formal witnessed FAT will be performed, allowing the City to verify expectations and verify proper operation of the system. FAT will be completed prior to shipping of equipment to the Ann Arbor WTP.

7.5.2 Site Acceptance Testing

Site Acceptance Testing (SAT) will be conducted in a central location on the City's Ann Arbor WTP campus. Equipment will be positioned and tested to test for damage during shipment and allow an opportunity to make final adjustments with all equipment in a central location prior to field installation. A formal test plan will be developed to verify proper operation of the new equipment in the existing production plant network. SAT will consist of:

- 1. Network equipment unpacking.
- 2. Network equipment unpacking.
- 3. Equipment installation and cabling.
- 4. Power-on testing and validation.
- 5. Port, module and interface testing and validation.
- 6. Basic system functionality testing.

Upon completion of setup by the integrator, final witnessed SAT will be performed, allowing the City to confirm that all equipment has been received and configured properly prior to final field installation. SAT will be completed prior to installation of equipment throughout the plant.
7.5.3 Final Acceptance Testing

Final Field Acceptance Testing (FFAT) will be conducted once all network equipment is installed in final locations throughout the plant. FFAT testing is intended to verify proper system operation in its final state. FFAT will consist of:

- 1. Installation of network equipment in racks.
- 2. Final cabling of network equipment.
- 3. Network and connectivity testing.

Upon completion and acceptance of FFAT, the network is considered ready for production. SCADA software testing and installation can then proceed with confidence in the underlying network.

7.6 METHOD OF COMPENSATION

All hardware will be purchased through a contract allowance.

Engineering services (selection of equipment, FAT, SAT and testing) will be compensated as a fixed cost.

8.0 GENERAL CONDITIONS AND ENGINEERING

8.1 GENERAL CONDITIONS

J. Ranck's general conditions include such items as project superintendence, project management, progress meetings, bonds, insurance, on-site office and mobilization.

8.2 ENGINEERING/ARCHITECTURAL SERVICES

Design service will be performed to complete the design. Some progress meetings will occur to solicit City input on the final design. Engineering/architectural services will be provided during construction to perform such services are reviewing product submittals, periodic construction progress meetings, and periodic site visits to troubleshoot construction concerns. Record drawings of completed work will be prepared.

A professional interior designer will be retained. Colors and finishes will be selected through up to four (4) meetings with the project team. The Design-Builder and architect may not attend all of these meetings. Product boards will be prepared and may be left in common spaces for input by staff who cannot attend these meetings.

8.3 METHOD OF COMPENSATION

Compensation will be fixed costs for the services described.

9.0 TRAINING

Control system training is recommended for both operators and technical staff to facilitate a better understanding of the complex components of the modernized WTP SCADA system. Since WTP staff have years of experience operating and maintaining the existing HMI and PLC system, training should be focused on the new components (Trihedral HMI) of the upgraded system.

Current staff has experience with the Rockwell ControlLogix controllers and related RSLogix 5000 software, so training should be more tailored on the differing aspects of this project which include new analog signal scaling, add-on-instruction (AOI) blocks, data register layout and general maintenance training of the Rockwell ControlLogix system.

Training on the new Trihedral VTScada software should include standard screen, tag and system development for technical staff and HMI operation training for operation staff.

The design-build team recommends formal classroom training to be conducted at the WTP for both the PLC and HMI systems and be scheduled to allow all-shifts to be adequately trained. Technical training should take place as part of the design-build team system standard and HMI screen development process while operational training should be conducted before the first control panel is commissioned as part of the phased upgrade approach.

The design-build team recommends and has included the following within the base project.

Training provided by Design-Build team:

Technical Training -

- Conduct five (5) workshop style training sessions at the WTP for technical staff.
 - Agenda will be co-developed by City and design-build team.
 - Assumes 6-hour session time/workshop, working lunch type approach.
 - Assumes workshops conducted during normal working hours (8am-4pm)

Operator Training -

- Conduct six (6) workshop style training sessions at the WTP for operation staff.
 - Agenda will be co-developed by City and design-build team.
 - Assumes 3-hour session time/workshops.
 - Assumes workshops conducted during two separate operator shifts. Three workshops for 1st shift and three workshops for 2nd shift.

Deliverables will include training content (PowerPoint type material) and onsite classroom training.

In addition, the design-build team recommends at least one City technical staff member attend formal Level-1 Trihedral training course "VTScada Operation and Configuration" which is offered throughout the year at various offsite locations by Trihedral professional training staff. This cost has not been included in this report.

9.1 METHOD OF COMPENSATION

Training costs are a fixed cost within the engineering task of the GMP spreadsheet.

10.0 PERMITS

Some municipalities require permits for municipal construction and others do not. On past Tetra Tech projects with Ann Arbor, the building department has required the Water Treatment Services Unit to pull permits. On past projects, this has been limited to such items as electrical and building construction. Thus, the City should expect permits to be pulled for these portions of the projects. Replacing PLCs and monitors is not a typical item that would require a permit. An allowance has been included in the GMP to cover permit application costs. Progressive Design-Builder will prepare necessary building permit applications.

The Michigan Department of Environment, Great Lakes and Energy (EGLE) permits alterations to the water treatment process. However, it has been Tetra Tech's experience that this agency considers PLC replacement as in-kind work that does not need to be permitted. The EGLE confirmed through email to Tetra Tech that no permit would be required for this project.

10.1 METHOD OF COMPENSATION

The general conditions section of the GMP spreadsheet as an allowance for permits.

11.0 DRAWINGS

Further design information can be found in the "Ann Arbor WTP Control Room" drawing set with a revision date of 07/19/19. The information contained in this drawing package is part of the Phase II scope of work and associated GMP.

12.0 DELIVERABLES

Project deliverables will include the following:

- Meeting minutes
- Issued for Construction Drawings
- Bill of materials
- Pay applications
- Factory test reports
- Shop drawings/project submittals
- O&M manuals
- Daily construction reports
- Record drawings

13.0 COMPENSATION

Compensation will be according to the method outline in the compensation spreadsheet and sections within this report. Some tasks will be compensated by guaranteed price and others by allowance.

14.0 SCHEDULE

A schedule has been included that shows the planned sequencing of tasks. This schedule may be altered during Phase II and specific constraints of the WTP's process and control system are determined.

							CI	ry of	ANN	ARB DR/	OR - F AFT S	PHAS CHEE	E II C OULE	ONST	RUC	TION					
Activity ID	Activity Name	Original Start	Finish				2020											2	2021		
Dhoop 2 Imploy	montation ² Construction	111w 13.4pr.20	30-May-22	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	Kick off / Dra Construction Meeting	0 12 Apr 20*	12 Apr 20																		
JRE. IC. I	Nick off / Pre Construction Meeting	0w 13-Apr-20"	13-Apr-20				1														
JRE. IC. 2	Complete 100% Construction Documents	16w 13-Apr-20	31-Jul-20					4													
JRE. IC. 3	Schedule Development	8w 07-Jul-20	31-Aug-20					-	=												
JRE. IC. 4	Procurement and Permitting	30w 07-Jul-20	01-Feb-21				-		-	-	-			2							
JRE. IC. 5	Construction & Installation	52w 02-Feb-21	31-Jan-22																		
JRE. IC. 6	Start-Up, Testing and Commissioning	4w 01-Feb-22	28-Feb-22																		
JRE. IC. 7	Training & Demonstration	8w 01-Mar-22	25-Apr-22																		
JRE. IC. 8	Substantial Completion	0w 25-Apr-22	25-Apr-22	_																	
JRE. IC. 9	Close-Out	5w 26-Apr-22	30-May-22																		

Page 1 of 1	TASK filter: All Activities



Exhibit C-1

Phase II Contract Pricing Summary and Supporting Documentation

Contract Price Amendment for Phase 2 Scope

BASE SCOPE (INCLUDED IN GMP)

CONTRACT PRICE AMENDMENT (PHASE 2)

Item	Description	Price	Notes
1.0	GENERAL CONDITIONS	\$ 243,598.00	(General Conditions per Clause 7.6.1)
2.0	ENGINEERING	\$ 135,000.00	
3.0	CONTROL ROOM	\$ 373,090.00	
4.0	PLC REPLACEMENT / PROGRAM RE-WRITE	\$ 1,125,077.00	
5.0	HMI SCREEN PROGRAMMING	\$ 82,080.00	
6.0	HARDWARE/DATA STORAGE	\$ 50,000.00	
7.0	ANALYTICS & INTEGRATION	\$-	
8.0	REMOTE SITE COMMUNICATION	\$-	
9.0	CYBER SECURITY & NETWORKING	\$ 101,000.00	
	SUB-TOTAL	\$ 2,109,845.00	
	Design Builder Fee @ 7.5%	\$ 158,238.38	
	SUB-TOTAL	\$ 2,268,083.38	
	5% Contractor's Contingency	\$ 113,404.17	(Contingency per Clause 7.6.2)
	BASE TOTAL (Inclusive of Contingency)	\$ 2,381,487.54	(GMP per Clause 7.6.1)
	ALLOWANCES (NOT IN GMP)		
Item	Description	Price	Notes
1.0		¢ 2 E00 00	
1.0		\$ 5,500.00 ¢	
2.0		- - - - - - - - - - - - - -	
3.0		\$ 155,456.00 \$ 25,000.00	
4.0 5.0		\$ 25,000.00 \$ 625,000.00	
5.0		\$ 280,000,00	
7.0		\$ 280,000.00	
7.0 8.0		\$ 45,000.00 \$ 414,000.00	
0.0		\$ 414,000.00 \$ 95,212.00	
9.0	CIDER SECORITY & NETWORKING	\$ 95,512.00	
	SUB-TOTAL	\$ 1,623,270.00	
	Design Builder Fee @ 7.5%	\$ 121,745.25	
	ALLOWANCE TOTAL (No Contingency)	\$ 1,745,015.25	(Allowance per Clause 7.7)

\$ 4,126,502.79

Contract Price Recap for Phase 2 Scope

GENERAL CONDITIONS (J. Ranck)	Phase 2 Scope of Work Reference	Base Price	Allowance Item
Project Manager (800 Total hrs @ \$89 Hr)	8.0 General Conditions and Engineering	\$ 71,200.00	
*Meetings			
*Schedule Updates			
*Project Documentation			
Project Superintendent (1,320 Total hrs @ \$89 Hr)	8.0 General Conditions and Engineering	\$ 117,480.00	
*Monthly Meetings			
*Weekly Safety Meetings			
*Daily Logs & Documentation			
Expendables	8.0 General Conditions and Engineering	\$ 1,500.00	
On Site Office	8.0 Constal Conditions and Engineering	\$ 2,700,00	
Truck & Eucl (1 220 brs \otimes \$10.00 Hr)	8.0 General Conditions and Engineering	\$ 2,700.00 \$ 12,200.00	
Dermits	10.0 Dermits	\$ 15,200.00	\$ 3,500,00
Bonding Costs	10.0 / emilts	\$ 37 518 00	\$ 5,500.00
Item Te	otals	\$ 243 598 00	\$ 3,500,00
		Ç 213,550.00	<i>\$</i> 3,300.00
ENGINEERING	Phase 2 Scope of Work Reference	Base Price	Allowance Item
Tetra Tech (Construction Engineering)	8.0 General Conditions and Engineering	\$ 106.000.00	
*Submittal Review		+	
*RFI's			
*Meetings			
*Observations			
*Record Drawings			
Tetra Tech (Training/Commissioning)	9.0 Training	\$ 29,000.00	
ltem To	otals	\$ 135,000.00	\$-

CONTROL ROOM	Phase 2 Scope of Work Reference	Ва	se Price	All	owance Item
Tetra Tech (Final Design) Control Room	1.0 Control Room	\$	18,000.00		
Tetra Tech (Final Design) Electrical	1.0 Control Room	\$	18,000.00		
Tetra Tech (Final Design) Air Handling	1.0 Control Room	\$	14,000.00		
Tetra Tech (Mechanical Construction) Air Handling	1.0 Control Room	\$	9,000.00		
Konwinski (General Trades)	1.0 Control Room	\$	221,550.00		
Konwinski (General Trades)				\$	99,796.00
Konwinski (1 new Air Handler BOD Option No. 2)	1.0 Control Room			\$	17,172.00
BMID (Interior Design)		\$	8,400.00		
General Allowance (for City Use)				\$	10,000.00
J. Ranck Electric (Electrical/Includes Temporary Relocation)	1.0 Control Room	\$	84,140.00		
J. Ranck Electric (Electrical/Mechanical Feeders & Controls)	1.0 Control Room			\$	8,490.00
Item Totals		\$	373,090.00	\$	135,458.00

PLC REPLACEMENT / PROGRAM RE-WRITE	Phase 2 Scope of Work Reference	Base Price	All	owance Item
Commerce Controls (Engineering Services)	2.0 PLC Panels	\$ 159,600.00		
Commerce Controls (Programming)	2.0 PLC Panels	\$ 145,080.00		
Commerce Controls (Construction)	2.0 PLC Panels	\$ 105,300.00		
Commerce Controls (Commissioning)	2.0 PLC Panels	\$ 49,140.00		
Commerce Controls (Panel Modifications Conversion Kits)	2.0 PLC Panels	\$ 594,200.00		
Commerce Controls (Replace PLC-LOX Panel)		\$ 20,520.00		
Commerce Controls (Replace Misc. panel equipment)	2.0 PLC Panels	\$ 16,508.00		
Spare parts			\$	25,000.00
J. Ranck Electric (Electrical)	2.0 PLC Panels	\$ 34,729.00		
Item Totals		\$ 1,125,077.00	\$	25,000.00

HMI SCREEN PROGRAMMING	Phase 2 Scope of Work Reference	Bas	se Price	All	owance Item
VT SCADA Software (Kennedy)	3.0 HMI Screen Programming	\$	60,080.00		
Tetra Tech (Engineering)	3.0 HMI Screen Programming	\$	22,000.00		
Tetra Tech (Programming)	3.0 HMI Screen Programming			\$	325,000.00
Tetra Tech (Optional Programming Tasks)	3.0 HMI Screen Programming			\$	300,000.00
Iter	m Totals	\$	82,080.00	\$	625,000.00
HARDWARE/DATA STORAGE	Phase 2 Scope of Work Reference	Bas	se Price	All	owance Item
Dell (Hardware)	4.0 Hardware/Data Storage			\$	190,000.00
Project (Software)	4.0 Hardware/Data Storage			\$	90,000.00
*Disaster Recovery Plan					
Tetra Tech (Disaster Recovery Plan)	4.0 Hardware/Data Storage	\$	30,000.00		
Tetra Tech (Design)	4.0 Hardware/Data Storage	\$	20,000.00		
Iter	n Totals	\$	50,000.00	\$	280,000.00
ANALYTICS & INTEGRATION	Phase 2 Scope of Work Reference	Bas	se Price	All	owance Item
Tetra Tech (Set-Up, Design & Configuration)	5.0 Analytics and Integration			\$	45,000.00
Iter	m Totals	\$	-	\$	45,000.00

REMOTE SITE COMMUNICATION	Phase 2 Scope of Work Reference	Base Price	e /	Allowance Item
UIS (ACE 3600 System)	6.0 Remote Site Communication			\$ 280,000.00
BOD (Allowance for 3 towers, minor oversight, survey)				\$ 125,000.00
Tetra Tech (Engineering)	6.0 Remote Site Communication			9,000.00
Item Totals		\$		\$ 414,000.00

CYBER SECURITY & NETWORKING	Phase 2 Scope of Work Reference	Base Price	Allowance Item
Owner (Hardware)	7.0 Cybersecurity and Networking		\$ 49,312.00
Tetra Tech (Selection of Equipment, Network Configuration,	7.0 Cybersecurity and Networking	\$ 101,000.00	
FAT. SAT & Testing)			
J. Ranck (WiFi Hardware and Installation)	7.0 Cybersecurity and Networking		\$ 46,000.00
Item Totals		\$ 101,000.00	\$ 95,312.00
		Base Price	Allowance Item
COLUMN TOTALS		\$ 2,109,845.00	\$ 1,623,270.00
Design Builder Fee @ 7.5%		\$ 158,238.38	\$ 121,745.25
SUB-TOTAL		\$ 2,268,083.38	\$ 1,745,015.25
5% Contractor's Contingency (Base Price only)	(Contingency as per Clause 7.6.2)	\$ 113,404.17	
BASE TOTAL inclusive of Contingency	(GMP as per Clause 7.6.1)	\$ 2,381,487.54	
TOTAL ALLOWANCES	(As per Clause 7.7)		\$ 1,745,015.25
Contract Price Amendment (Phase 2)		\$ 4,126,502.79	

www.jranck.com



Mt. Pleasant, Michigan 1993 Gover Parkway Mt. Pleasant, MI 48858 phone 800-792-3822 fax 989-775-8830

February 27, 2020

Ryan Justin, SCADA Network Administrator

City of Ann Arbor, Water Treatment Plant 919 Sunset Road Ann Arbor, MI 48103

Re: City of Ann Arbor Water Treatment Plant Progressive Design-Build for SCADA Modernization Project Guaranteed Maximum Price Proposal

Dear Mr. Justin,

Attached for you review is our GMP proposal totaling \$4,126,503.00 for the above referenced project as prepared by our team of J. Ranck Electric, Inc., Tetra Tech, Commerce Controls Inc. and Konwinski Construction Inc. and breaks down as follows:

Base Bid

•	Base Bid Sub total	\$2,109,845.00
•	Design Builder Fee @ 7.5%	\$ 158,238.38
•	5% Contractor's Contingency	<u>\$ 113,404.17</u>
	Base Bid Total	\$2,381,487.54
Allow	ances	
•	Allowance Total	\$1,623,270.00
•	Design Builder Fee @ 7.5%	<u>\$ 121,745.25</u>
	Base Bid Total	\$1,745,015.25

Our proposal is based on the attached GMP pricing recap for the work scopes outlined in the Phase II Scope of Work document dated February 27, 2020 that was developed over the course of the Phase 1 design meetings and workshops.



Flint, Michigan 3015 Airpark Drive N. Flint, MI 48507 Sault Ste. Marie, Michigan 3137 South Baker Side Rd. Sault Ste. Marie, MI 49783



Page 2 February 20, 2020 City of Ann Arbor Water Treatment Plant Progressive Design-Build for SCADA Modernization Project Guaranteed Maximum Price Proposal

With the anticipated start date of April 2020, substantial completion will be in April 2022 and final completion in June of 2022. We have attached a preliminary baseline schedule that will be updated and itemized to include seasonal restrictions or other issues that could affect equipment and processes out of service. This will be done after the award of the Phase II contract during the completion of the construction drawings.

In addition to the pricing recap and schedule, the final scope of work document and team member proposals are included.

We appreciate the opportunity to provide this proposal, if you have any questions or need any additional information, please contact us.

Sincerely,

J. Ranck Electric, Inc.

Bill Diment Project Manager

Exhibit D-1

Insurance

Exhibit D-1

Insurance

Worker's Compensation Insurance in accordance with all applicable state and federal statutes.

Employers Liability Insurance of at least:

Bodily Injury by Accident - \$500,000 each accident Bodily Injury by Disease - \$500,000 each employee Bodily Injury by Disease - \$500,000 each policy limit

Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 07 98 or current equivalent:

\$1,000,000	Each occurrence as respect Bodily Injury Liability or Property Damage
	Liability, or both combined.
\$2,000,000	Per Job General Aggregate
\$1,000,000	Personal and Advertising Injury
\$2,000,000	Products and Completed Operations Aggregate
	(to be maintained for at least three years following completion)

Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 07 97 or current equivalent. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. The limits of liability shall be no less than \$1,000,000 for each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

Umbrella/Excess Liability Insurance excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of \$1,000,000.

Professional Liability Insurance in an amount of at least \$1,000,000 per claim, which insurance Design-Builder shall maintain until the applicable statute of repose extinguishes any claims related to the Agreement.

Exhibit E-1

Prevailing Wage Information

"General Decision Number: MI20200100 01/24/2020

Superseded General Decision Number: MI20190100

State: Michigan

Construction Type: Building

County: Washtenaw County in Michigan.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification	Number	Publication	Date
0		01/03/2020	
1		01/24/2020	

ASBE0025-003 06/01/2019

Townships of Ann Arbor, Augusta, Lodi, Northfield, Pittsfield, Salem, Saline, Scio, Superior, Webster, Ypsilanti & York

INSULATOR.....\$ 31.82 17.88

beta.SAM.gov

BOIL0169-001 03/01/2018		
	Rates	Fringes
BOILERMAKER	\$ 38.65	26.22
BRMI0009-010 08/01/2019		
	Patas	Eningos
	Rales	Fringes
BRICKLAYER	\$ 36.26	22.76
TILE FINISHER	\$ 28.26 \$ 35 18	20.21
CARP0687-001 06/01/2019		
	Rates	Fringes
CARPENTER, Includes Drywall		
Hanging, Form Work, and Metal	¢ 30 70	28 94
	···p 52.70	20.94
CARP1045-001 06/01/2019		
	Rates	Fringes
CARPENTER (Floor Layer -		
Carpet, Resilient, & Vinyl	<i>t</i>	
Flooring)	\$ 29.60	24.33
CARP1102-002 06/01/2019		
	Rates	Fringes
MILLWRIGHT	\$ 34.50	32.65
ELEC0252-010 06/03/2019		
	Rates	Fringes
		TT Inges
ELECTRICIAN	\$ 45.78 	24.33
ENGI0324-017 06/01/2019		
	Rates	Fringes
OPERATOR: Power Equipment		
GROUP 1	\$ 41.89	24.45
GROUP 2	\$ 40.39	24.45
GROUP 3	\$ 38.89	24.45
	••••••••••••••••••••••••••••••••••••••	24.45
	\$ 3/.//	24.45
	••• 3Ε 04 4 3Ε 04	24.40
	•• <i>μ</i> ••• ¢ 2/ 72	24.43
	۰.پ ۲4.25 م کو کو	24.43 DA AE
UNUUF 9	p 23.89	24.45
FOOTNOTES:		
lower cranes: to be paid the	crane operato	r rate determined
by the combined length of the	mast and the	boom. It the
worker must climb 50 ft. or m	ore to the wo	тк station, \$.25
per nour additional.		

Derrick and cranes where the operator must climb 50 ft. or

more to the work station, \$.25 per hour additional to the applicable crane operator rate.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS GROUP 1: Crane with boom and jib or leads 400' or longer GROUP 2: Crane with boom and jib or leads 300' or longer GROUP 3: Crane with boom and jib or leads 220' or longer GROUP 4: Crane with boom and jib or leads 140' or longer GROUP 5: Crane with boom and jib or leads 120' or longer GROUP 6: Regular crane operator, and concrete pump with boom operator GROUP 7: Backhoe/Excavator/Trackhoe, bobcat/skid Loader, broom/sweeper, bulldozer, grader/blade, highlift, hoist, loader, roller, scraper, tractor & trencher GROUP 8: Forklift & extend-a-boom forklift GROUP 9: Oiler IRON0025-019 06/01/2019 Rates Fringes IRONWORKER REINFORCING.....\$ 30.98 27.99 STRUCTURAL.....\$ 36.77 29.03 LAB00334-005 06/01/2019 Rates Fringes LABORER: Landscape & Irrigation GROUP 1.....\$ 20.75 7.10 GROUP 2....\$ 18.75 7.10 CLASSIFICATIONS GROUP 1: Landscape specialist, including air, gas and diesel equipment operator, lawn sprinkler installer, skidsteer (or equivalent) GROUP 2: Landscape laborer: small power tool operator, material mover, truck driver and lawn sprinkler installer tender _____ LAB00499-005 08/01/2019 Rates Fringes LABORER Common or General; Grade Checker; Sandblaster.....\$ 29.37 4.40 Mason Tender - Brick; Mason Tender -Cement/Concrete.....\$ 29.58 4.40

12/2020		beta.SAM.gov
Pipelayer	\$ 29.71	4.40
PAIN0022-003 06/01/2015		
	Rates	Fringes
PAINTER: Brush and Roller	\$ 26.06	17.66
PAINTER: Drywall Finishing/Taping PAINTER: Spray	\$ 27.05 \$ 26.86	18.26 17.66
PAIN0357-002 06/01/2019		
	Rates	Fringes
GLAZIER	\$ 33.10	20.31
PAID HOLIDAYS: New Year's Day July, Labor Day, Thanksgiving provided that the employee has scheduled work day prior to the regular scheduled work day fou the employee is physically ab	, Decoration Day and Chr: s worked the he holiday, a llowing the l le to work.	Day, Fourth of istmas Day; last full regular and the first full holiday, provided
PLAS0514-006 06/01/2018		
	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER.	\$ 31.47	13.81
PLUM0190-004 06/01/2019		
	Rates	Fringes
PIPEFITTER (Including HVAC Pipe Installation; Excluding HVAC System Installation) PLUMBER, Excludes HVAC Pipe	\$ 42.26	23.24
and Unit Installation	\$ 42.26	23.24
ROOF0070-001 06/01/2019		
	Rates	Fringes
ROOFER	\$ 33.67	17.28
* SFMI0704-001 01/02/2020		
	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers)	\$ 44.25	28.68
SHEE0080-001 07/01/2018		
	Rates	Fringes
SHEET METAL WORKER, Includes HVAC Duct and Unit		
Installation	\$ 41.05	26.66
TEAM0247-001 06/01/2018		

Rates Fringes

TRUCK DRIVER GROUP 1 Flatbed; Pickup; Dump & Tandem.....\$ 26.71 0.70+a GROUP 2 Semi.....\$ 26.86 0.70+a GROUP 3 Lowboy.....\$ 26.96 0.70+a PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. If any of the above holidays fall on a Sunday, the following Monday shall be considered the holiday and, if work is performed, the rate shall be double time. FOOTNOTE: a. \$456.70 per week, plus \$67.10 per day.

SUMI2011-025 02/01/2011

	Rates	Fringes
IRONWORKER, ORNAMENTAL	\$ 18.48	7.93
TRUCK DRIVER: Tractor Haul Truck	\$ 13.57	1.18

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage

determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations Wage and Hour Division U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION"

- Attachment A Vendor Conflict of Interest Disclosure Form
- Attachment B Non-Discrimination Ordinance Declaration of Compliance Form
- Attachment C Non-Discrimination Ordinance Poster
- Attachment D Living Wage Declaration of Compliance Form
- Attachment E Living Wage Ordinance
- Attachment F Performance Bond Form
- Attachment G Labor and Material Bond Form
- Attachment H Contractor's Declaration Form
- Attachment I Contractor's Affidavit Form
- Attachment J Prevailing Wage Declaration of Compliance
- Attachment K Certified Payroll Form

Attachment A

Vendor Conflict of Interest Disclosure Form



Vendor Conflict of Interest Disclosure Form

All vendors interested in conducting business with the City of Ann Arbor must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the City of Ann Arbor's conflict of interest policies as stated within the certification section below.

If a vendor has a relationship with a City of Ann Arbor official or employee, an immediate family member of a City of Ann Arbor official or employee, the vendor shall disclose the information required below.

- 1. No City official or employee or City employee's immediate family member has an ownership interest in vendor's company or is deriving personal financial gain from this contract.
- 2. No retired or separated City official or employee who has been retired or separated from the City for less than one (1) year has an ownership interest in vendor's Company.
- 3. No City employee is contemporaneously employed or prospectively to be employed with the vendor.
- 4. Vendor hereby declares it has not and will not provide gifts or hospitality of any dollar value or any other gratuities to any City employee or elected official to obtain or maintain a contract.
- 5. Please note any exceptions below:

Vendor Name

Conflict of Interest Disclosure*			
Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest.	 () Relationship to employee () Interest in vendor's company () Other (please describe in box below) 		
*Disclosing a potential conflict of interest does not disquali conflicts of interest and they are detected by the City, vend I certify that this Conflict of Interest Disclos contents are true and correct to my knowled certify on behalf of the Vendor by my signate	ify vendors. In the event vendors do not disclose potentia dor will be exempt from doing business with the City. sure has been examined by me and that its dge and belief and I have the authority to so are below:		

Signature of Vendor Authorized Representative	Da	ite	Printed Name of Vendor Authorized Representative

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500, procurement@a2gov.org

Vendor Phone Number

Attachment B

Non-Discrimination Ordinance Declaration of Compliance Form

CITY OF ANN ARBOR DECLARATION OF COMPLIANCE

Non-Discrimination Ordinance

The "non discrimination by city contractors" provision of the City of Ann Arbor Non-Discrimination Ordinance (Ann Arbor City Code Chapter 112, Section 9:158) requires all contractors proposing to do business with the City to treat employees in a manner which provides equal employment opportunity and does not discriminate against any of their employees, any City employee working with them, or any applicant for employment on the basis of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight. It also requires that the contractors include a similar provision in all subcontracts that they execute for City work or programs.

In addition the City Non-Discrimination Ordinance requires that all contractors proposing to do business with the City of Ann Arbor must satisfy the contract compliance administrative policy adopted by the City Administrator. A copy of that policy may be obtained from the Purchasing Manager

The Contractor agrees:

- (a) To comply with the terms of the City of Ann Arbor's Non-Discrimination Ordinance and contract compliance administrative policy, including but not limited to an acceptable affirmative action program if applicable.
- (b) To post the City of Ann Arbor's Non-Discrimination Ordinance Notice in every work place or other location in which employees or other persons are contracted to provide services under a contract with the City.
- (c) To provide documentation within the specified time frame in connection with any workforce verification, compliance review or complaint investigation.
- (d) To permit access to employees and work sites to City representatives for the purposes of monitoring compliance, or investigating complaints of non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the Ann Arbor Non-Discrimination Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Non-Discrimination Ordinance, obligates the Contractor to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract.

Company Name	
Signature of Authorized Representative	Date
Print Name and Title	
Address, City, State, Zip	
Phone/Email Address	
Questions about the Notice o	r the City Administrative

Questions about the Notice or the City Administrative Policy, Please contact: Procurement Office of the City of Ann Arbor (734) 794-6500

Attachment C

Non-Discrimination Ordinance Poster

CITY OF ANN ARBOR NON-DISCRIMINATION ORDINANCE

Relevant provisions of Chapter 112, Nondiscrimination, of the Ann Arbor City Code are included below. You can review the entire ordinance at www.a2gov.org/humanrights.

<u>Intent:</u> It is the intent of the city that no individual be denied equal protection of the laws; nor shall any individual be denied the enjoyment of his or her civil or political rights or be discriminated against because of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight.

<u>Discriminatory Employment Practices:</u> No person shall discriminate in the hire, employment, compensation, work classifications, conditions or terms, promotion or demotion, or termination of employment of any individual. No person shall discriminate in limiting membership, conditions of membership or termination of membership in any labor union or apprenticeship program.

<u>Discriminatory Effects:</u> No person shall adopt, enforce or employ any policy or requirement which has the effect of creating unequal opportunities according to actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight for an individual to obtain housing, employment or public accommodation, except for a bona fide business necessity. Such a necessity does not arise due to a mere inconvenience or because of suspected objection to such a person by neighbors, customers or other persons.

Nondiscrimination by City Contractors: All contractors proposing to do business with the City of Ann Arbor shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All city contractors shall ensure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon any classification protected by this chapter. All contractors shall agree not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of any applicable protected classification. All contractors shall be required to post a copy of Ann Arbor's Non-Discrimination Ordinance at all work locations where its employees provide services under a contract with the city.

<u>Complaint Procedure:</u> If any individual believes there has been a violation of this chapter, he/she may file a complaint with the City's Human Rights Commission. The complaint must be filed within 180 calendar days from the date of the individual's knowledge of the allegedly discriminatory action or 180 calendar days from the date when the individual should have known of the allegedly discriminatory action. A complaint that is not filed within this timeframe cannot be considered by the Human Rights Commission. To file a complaint, first complete the complaint form, which is available at www.a2gov.org/humanrights. Then submit it to the Human Rights Commission by e-mail (hrc@a2gov.org), by mail (Ann Arbor Human Rights Commission, PO Box 8647, Ann Arbor, MI 48107), or in person (City Clerk's Office). For further information, please call the commission at 734-794-6141 or e-mail the commission at hrc@a2gov.org.

<u>Private Actions For Damages or Injunctive Relief</u>: To the extent allowed by law, an individual who is the victim of discriminatory action in violation of this chapter may bring a civil action for appropriate injunctive relief or damages or both against the person(s) who acted in violation of this chapter.

THIS IS AN OFFICIAL GOVERNMENT NOTICE AND MUST BE DISPLAYED WHERE EMPLOYEES CAN READILY SEE IT.

Attachment D

Living Wage Declaration of Compliance Form
CITY OF ANN ARBOR LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that an employer who is (a) a contractor providing services to or for the City for a value greater than \$10,000 for any twelvemonth contract term, or (b) a recipient of federal, state, or local grant funding administered by the City for a value greater than \$10,000, or (c) a recipient of financial assistance awarded by the City for a value greater than \$10,000, shall pay its employees a prescribed minimum level of compensation (i.e., Living Wage) for the time those employees perform work on the contract or in connection with the grant or financial assistance. The Living Wage must be paid to these employees for the length of the contract/program.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from compliance with the Living Wage Ordinance. If this exemption applies to your company/non-profit agency please check here [___] No. of employees____]

The Contractor or Grantee agrees:

(a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as \$13.61/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than \$15.18/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance with Section 1:815(3).

Check the applicable box below which applies to your workforce

- [___] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits
- [__] Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits
- (b) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.
- (c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.
- (d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.
- (e) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services or agrees to accept financial assistance in accordance with the terms of the Living Wage Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Living Wage Ordinance, obligates the Employer/Grantee to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract or grant of financial assistance.

Company Name		Street Address					
Signature of Authorized Representative	Date	City, State, Zip					
Print Name and Title		Phone/Email address					

City of Ann Arbor Procurement Office, 734/794-6500, procurement@a2gov.org

Attachment E

Living Wage Ordinance

CITY OF ANN ARBOR LIVING WAGE ORDINANCE

RATE EFFECTIVE APRIL 30, 2019 - ENDING APRIL 29, 2020



If the employer provides health care benefits*

\$15.18 per hour

If the employer does **NOT** provide health care benefits*

Employers providing services to or for the City of Ann Arbor or recipients of grants or financial assistance from the City of Ann Arbor for a value of more than \$10,000 in a twelve-month period of time must pay those employees performing work on a City of Ann Arbor contract or grant, the above living wage.

ENFORCEMENT

The City of Ann Arbor may recover back wages either administratively or through court action for the employees that have been underpaid in violation of the law. Persons denied payment of the living wage have the right to bring a civil action for damages in addition to any action taken by the City.

Violation of this Ordinance is punishable by fines of not more than \$500/violation plus costs, with each day being considered a separate violation. Additionally, the City of Ann Arbor has the right to modify, terminate, cancel or suspend a contract in the event of a violation of the Ordinance.

* Health Care benefits include those paid for by the employer or making an employer contribution toward the purchase of health care. The employee contribution must not exceed \$.50 an hour for an average work week; and the employer cost or contribution must equal no less than \$1/hr for the average work week.

The Law Requires Employers to Display This Poster Where Employees Can Readily See It.

For Additional Information or to File a Complaint contact Colin Spencer at 734/794-6500 or cspencer@a2gov.org

Revised 2/1/2019

Attachment F

Performance Bond Form

PERFORMANCE BOND

corporation duly authorized to do business in the State of Michigan (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for

\$______, the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.

(2) The Principal has entered a written Contract with the City dated _____, 201_, for: ______ and

this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963, as amended, being MCL 129.201 <u>et seq</u>.

- (3) Whenever the Principal is declared by the City to be in default under the Contract, the Surety may promptly remedy the default or shall promptly:
 - (a) complete the Contract in accordance with its terms and conditions; or

(b) obtain a bid or bids for submission to the City for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, arrange for a Contract between such bidder and the City, and make available, as work progresses, sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in paragraph 1.

- (4) Surety shall have no obligation to the City if the Principal fully and promptly performs under the Contract.
- (5) Surety agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, or the specifications accompanying it shall in any way affect its obligations on this bond, and waives notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work, or to the specifications.

SIGNED AND SEALED this _____ day of _____, 201_.

Attachment G

Labor and Material Bond Form

LABOR AND MATERIAL BOND

(1)		
of		(referred to
as "Principal"), and		, a corporation
duly authorized to do business	in the State of	Michigan, (referred to as "Surety"), are bound
to the City of Ann Arbor, Michig	gan (referred to a	as "City"), for the use and benefit of claimants
as defined in Act 213 of Michig	gan Public Acts	of 1963, as amended, being MCL 129.201 et
seq., in the amount of		
\$, for the	payment of whi	ch Principal and Surety bind themselves, their
heirs, executors, administrators	s, successors ar	nd assigns, jointly and severally, by this bond.
(2) The Principal has entered a wr	itten Contract w	ith the City, dated, 201_,
for		· · · · · · · · · · · · · · · · · · ·
		; and this bond is
given for that Contract in comp amended;	liance with Act N	No. 213 of the Michigan Public Acts of 1963 as
(3) If the Principal fails to prompti- required under the Contract, th	y and fully repay ie Surety shall pa	y claimants for labor and material reasonably ay those claimants.
(4) Surety's obligations shall not ex no obligation if the Principal pro	<ceed amour="" and="" fully<="" omptly="" th="" the=""><th>nt stated in paragraph 1, and Surety shall have pays the claimants.</th></ceed>	nt stated in paragraph 1, and Surety shall have pays the claimants.
SIGNED AND SEALED this	day of	, 201
(Name of Surety Company)		(Name of Principal)
(Signature)		By
		(Signature)
Its (Title of Office)		Its (Title of Office)
Approved as to form:		Name and address of agent:
Stephen K Postema City Attorney		

Stephen K. Postema, City Attorney

Attachment H

Contractor's Declaration Form

CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period ______, 20___, to _____, 20 , performed any work, furnished any materials, sustained any loss, damage or delay, or otherwise done anything in addition to the regular items (or executed change orders) set forth in the Contract titled _______, for which I shall ask, demand, sue for, or claim compensation or extension of time from the City, except as I hereby make claim for additional compensation or extension of time as set forth on the attached itemized statement. I further declare that I have paid all payroll obligations related to this Contract that have become due during the above period and that all invoices related to this Contract received more than 30 days prior to this declaration have been paid in full except as listed below.

There <u>is/is not</u> (Contractor please circle one <u>and</u> strike one as appropriate) an itemized statement attached regarding a request for additional compensation or extension of time.

Contractor

Date

By _____

(Signature)

Its _____

(Title of Office)

Past due invoices, if any, are listed below.

Attachment I

Contractor's Affidavit Form

CONTRACTOR'S AFFIDAVIT

The undersigned Contractor,	_, represents that on	
20, it was awarded a contract by the City of Ann Arbor	r, Michigan to	under
the terms and conditions of a Contract titled		The Contractor
represents that all work has now been accomplished and	the Contract is comple	ete.

The Contractor warrants and certifies that all of its indebtedness arising by reason of the Contract has been fully paid or satisfactorily secured; and that all claims from subcontractors and others for labor and material used in accomplishing the project, as well as all other claims arising from the performance of the Contract, have been fully paid or satisfactorily settled. The Contractor agrees that, if any claim should hereafter arise, it shall assume responsibility for it immediately upon request to do so by the City of Ann Arbor.

The Contractor, for valuable consideration received, does further waive, release and relinquish any and all claims or right of lien which the Contractor now has or may acquire upon the subject premises for labor and material used in the project owned by the City of Ann Arbor.

This affidavit is freely and voluntarily given with full knowledge of the facts.

Contractor	Date		
By (Signature)	-		
Its(Title of Office)	-		
Subscribed and sworn to before me, on	this	_ day of County, Michigan	_, 20
Notary Public		_ ,, ,	
County, MI			
iviy commission expires on:			

Attachment J

Prevailing Wage Declaration of Compliance

CITY OF ANN ARBOR PREVAILING WAGE DECLARATION OF COMPLIANCE

The "wage and employment requirements" of Section 1:320 of Chapter 14 of Title I of the Ann Arbor City Code mandates that the city not enter any contract, understanding or other arrangement for a public improvement for or on behalf of the city unless the contract provides that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor City Code are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used. Further, to the extent that any employees of the contractor providing services under this contract are not part of the class of craftsmen, mechanics and laborers who receive a prevailing wage in conformance with section 1:320 of Chapter 14 of Title I of the Code of the City of Ann Arbor, employees shall be paid a prescribed minimum level of compensation (i.e. Living Wage) for the time those employees perform work on the contract in conformance with section 1:815 of Chapter 23 of Title I of the Code of the City of Ann Arbor.

At the request of the city, any contractor or subcontractor shall provide satisfactory proof of compliance with this provision.

The Contractor agrees:

- (a) To pay each of its employees whose wage level is required to comply with federal, state or local prevailing wage law, for work covered or funded by this contract with the City,
- (b) To require each subcontractor performing work covered or funded by this contract with the City to pay each of its employees the applicable prescribed wage level under the conditions stated in subsection (a) or (b) above.
- (c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.
- (d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the wage and employment provisions of the Chapter 14 of the Ann Arbor City Code. The undersigned certifies that he/she has read and is familiar with the terms of Section 1:320 of Chapter 14 of the Ann Arbor City Code and by executing this Declaration of Compliance obligates his/her employer and any subcontractor employed by it to perform work on the contract to the wage and employment requirements stated herein. The undersigned further acknowledges and agrees that if it is found to be in violation of the wage and employment requirements of Section 1:320 of the Chapter 14 of the Ann Arbor City Code it shall has be deemed a material breach of the terms of the contract and grounds for termination of same by the City.

Company Name		
1 2		

Signature of Authorized Representative Date

Print Name and Title

Address, City, State, Zip

Phone/Email address

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500

9/25/15 Rev 0

Attachment K

Certified Payroll Form

Michigan Department Of Transportation CP-347 (04/10)

MICHIGAN DEPARTMENT OF TRANSPORTATION CERTIFIED PAYROLL COMPLETION OF CERTIFIED PAYROLL FORM FULFILLS THE MINIMUM MDOT PREVAILING WAGE REQUIREMENTS

Page 1 of 2

(1) NAME OF CONTRACTOR / SUBCONTRACTOR (GROLE ONE) (2) ADDRESS																					
(3) PAYROLL NO. (4) FOR WEEK ENDING (5) PROJECT AND LO					DLOCA	TION (6) CONTRACT ID															
(8)	(b)	(C)	(d) DAY AND DATE			(e)	(f)	(1) (9)	(h) GROSS	(1)			(j) DED	(j) DEDUCTIONS							
EMPLOYEE INFORMATION	WORK CLASSIFICATION	Hour Type		HOUR	RS WO	RKEDI	ON PR	OJECT		TOTAL HOURS ON PROJECT	PROJECT RATE OF PAY	PROJECT RATE OF FRINGE PAY	PROJECT EARNED GROSS WEEKLY EARNED	TOTAL WEEKLY HOURS WORKED ALL JOBS	FICA	FEDERAL	STATE		OTHER	TOTAL DEDUCT	TOTAL WEEKLY WAGES PAID FOR ALL JOBS
NAME:										0			\$0.00	1						\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	s								0											
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ETH/GEN: ID #:	GROUP/CLASS #:	s								0											
NAME:		L								0			\$0.00							\$0.00	\$0.00
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NAME:										0			\$0.00	1						\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	s								0											
NAME:										0			\$0.00	1						\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	s								0											
NAME:										0			\$0.00	1						\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	s								0											
NAME:		L								0			\$0.00	1						\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	s								0											
		L								0			\$0.00							\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	s								0			\checkmark								

MDOT CP-347 (04/10)

Date ____

I._____(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

(Contractor or Subcontractor)

; that during the payroll period commencing on the (Building or Work)

_____ day of _____, ____, and ending the _____ day of _____, ____, all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

(Contractor or Subcontractor)

____ from the full

_ on the

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Start. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training. United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below. (b) WHERE FRINGE BENEFITS ARE PAID IN CASH

 Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION						
REMARKS:							
NAME AND TITLE	SIGNATURE						
THE WILLFUL FALSFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 10 OF THE UNITED STATES CODE							

Page 2 of 2