PUBLIC WORKS DEPARTMENT
Engineering Division
303 West Commonwealth Avenue, Fullerton, CA 92832-1775
Telephone: 714-738-6845
Website: www.cityoffullerton.com

May 17, 2024

WELL 7A EQUIPPING
PROJECT NO. 53005

ADDENDUM NO. 6

TO: ALL PLAN AND SPECIFICATION HOLDERS

THIS ADDENDUM, AS DESCRIBED BELOW, IS FOR USE OF CONTRACTORS AND SUBCONTRACTORS SUBMITTING BIDS ON THIS PROJECT. ALL BIDDERS SHALL INDICATE ON THE BID PROPOSAL FORM THAT THEY HAVE RECEIVED THIS ADDENDUM.

1. **CHANGES TO APPENDIX 2: TECHNICAL SPECIFICATIONS SECTION 40 61 13 – PROCESS CONTROL SYSTEM GENERAL PROVISIONS**

   Replace Section 40 61 13 PROCESS CONTROL SYSTEM GENERAL PROVISIONS in its entirety with the attached revised Specification Section 40 61 13 PROCESS CONTROL SYSTEM GENERAL PROVISIONS (Rev. 1 - May 17, 2024).

2. **CHANGES TO APPENDIX 2: TECHNICAL SPECIFICATIONS SECTION 40 05 24.23 – STEEL PIPE FOR WATER SERVICE**

   Replace Section 40 05 24.23 2.02. E in its entirety with the following:

   Buried welded steel pipe shall be cement mortar lined in accordance with AWWA C205, shall be manufactured to the nominal pipe sizes as shown on the drawings, and shall have the minimum wall thicknesses as follows:

Buried Steel Pipe Schedule (Water Service)

Nominal Inside Diameter (inches)	Interior Lining Type	Lining Thickness (inches)	Minimum Sheet or Plate Thickness
4 to 10	Cement Mortar	0.25	0.25 in
11 to 23	Cement Mortar	0.312	0.25 in
24	Cement Mortar	0.375	0.25 in
25 to 36	Cement Mortar	0.375	0.312 in

END OF ADDENDUM

SECTION 40 61 13
PROCESS CONTROL SYSTEM GENERAL PROVISIONS
(REV. 1 - MAY 17, 2024)

PART 1 – GENERAL

1.01 SCOPE

A. The Contractor shall provide, through the services of an instrumentation and control system subcontractor, components, system installation services, as well as required and specified ancillary services in connection with the Instrumentation, Control and Information System.

B. The System includes materials, labor, tools, fees, charges, and documentation required to furnish, install, test and place in operation a complete and operable instrumentation, control and information system.

C. The System shall include measuring elements, signal converters, transmitters, local control panels, digital hardware and software, signal and data transmission systems, interconnecting wiring, and pertinent accessories.

D. The scope of the work to be performed under this Division includes but is not limited to the following:

1. The Contractor shall retain overall responsibility for the instrumentation and control system as specified herein.

2. Furnish and install process instrumentation and associated taps and supports as scheduled or shown on the Drawings, unless otherwise noted or supplied by equipment vendors.

3. Furnish and install local control panels, field panels and associated cabinets and panels as shown on the Drawings and as specified in Division 40, inclusive and where included.

4. Furnish and install digital control system hardware and software as specified in Division 40, inclusive and where included.

5. Final termination and testing of instrumentation and control system signal wiring and power supply wiring at equipment furnished under Division 40, inclusive and where included.

6. Furnish, install and terminate special cables for devices (e.g., instruments). Furnish and terminate control system communication network cables.

020119

7. Furnish and install surge protection devices for digital equipment, local control panels, remote telemetry units, and instrumentation provided under this Division, including connections to grounding system(s) provided under Division 26.

8. Coordinate grounding requirements with the electrical subcontractor for digital equipment, local control panels, and instrumentation provided under this Division. Terminate grounding system cables at equipment provided under this Division.

9. Provide system testing, calibration, training and startup services as specified herein and as required to make systems fully operational.

E. It is the intent of the Contract Documents to construct a complete and working installation. Items of equipment or materials that may reasonably be assumed as necessary to accomplish this end shall be supplied whether or not they are specifically stated herein.

1.02 RELATED ITEMS

A. Field mounted switches, torque switches, limit switches, gauges, valve and gate operator position transmitters, sump pump controls, and other instrumentation and controls furnished with mechanical or electrical equipment not listed in the instrument schedule shall be furnished, installed, tested, and calibrated as specified under other Divisions unless otherwise indicated.

B. Additional and related work performed under Division 26 includes the following:

1. Instrument A.C. power source and disconnect switch for process instrumentation, A.C. grounding systems, and A.C. power supplies for equipment, control panels and accessories furnished under Sections Division 40, inclusive and where included.

2. Conduit and raceways for instrumentation and control system signal wiring, grounding systems, special cables and communication network cables.

3. Instrumentation and control system signal wiring.

4. Install control system communication network cables.

5. Furnish and install grounding systems for digital equipment, local control panels, remote telemetry units, and instrumentation provided under Division 40, inclusive and where included. Grounding systems shall be complete to the equipment provided under Division 40, inclusive, and where included, ready for termination by the instrumentation subcontractor.

6. Termination of instrumentation and control system signal wiring at equipment furnished under other Divisions of the Specifications.

7. Final wiring and termination to A.C. grounding systems and to A.C. power sources (e.g., panelboards, motor control centers, and other sources of electrical power).

1.03 GENERAL INFORMATION AND DESCRIPTION

A. Where manufacturers are named for a particular item of equipment, it is intended as a guide to acceptable quality and performance and does not exempt such equipment from the requirements of these Specifications or Drawings.

B. In order to centralize responsibility, it is required that equipment (including field instrumentation and control system hardware and software) offered under this Division shall be furnished and installed by the instrumentation subcontractor, or under the supervision of the instrumentation subcontractor, who shall assume complete responsibility for proper operation of the instrumentation and control system equipment, including that of coordinating signals, and furnishing appurtenant equipment.

C. The Contractor shall retain total responsibility for the proper detailed design, fabrication, inspection, test, delivery, assembly, installation, activation, checkout, adjustment and operation of the entire instrumentation and control system as well as equipment and controls furnished under other Divisions of the Specifications. The Contractor shall be responsible for the delivery of detailed drawings, manuals and other documentation required for the complete coordination, installation, activation and operation of mechanical equipment, equipment control panels, local control panels, field instrumentation, and related equipment/systems and shall coordinate with the SCADA Programmer and provide the services of a qualified installation engineer to supervise activities required to place the completed facility in stable operation under full digital control.

D. The instrumentation and control system shall be capable of simultaneously implementing all real time control and information system functions, and servicing all operator service requests as specified, without degrading the data handling and processing capability of other system components.

E. Control system inputs and outputs are listed in Section 40 61 93 – Process Control System Input/Output List. This information, together with the functional control descriptions, process and instrumentation diagrams, and electrical control schematics, describes the real time monitoring and control functions to be performed. In addition, the system shall provide various man/machine interface and data reporting functions as specified in the software sections of this Specification.

F. The mechanical, process, and electrical drawings indicate the approximate locations of field instruments, control panels, systems and equipment as well as field mounted equipment provided by others. The instrumentation subcontractor shall examine the mechanical, process and electrical drawings to determine actual size and locations of process connections and wiring requirements for instrumentation and controls furnished under this Contract. The instrumentation subcontractor shall inspect equipment, panels, instrumentation, controls, and appurtenances, either existing or furnished on the Project

to determine requirements for interfacing with the control and information system. The Contractor shall coordinate the completion of required modifications with the associated supplier of the item furnished.

G. The instrumentation subcontractor shall review and approve the size and routing of instrumentation and control cable and conduit systems furnished by the electrical subcontractor for suitability for use with the associated cable system.

H. The Contractor shall coordinate the efforts of each supplier to aid in interfacing systems. This effort shall include, but shall not be limited to, the distribution of approved shop drawings to the electrical subcontractor and to the instrumentation subcontractor furnishing the equipment under this Division.

I. The Contractor shall be responsible for providing a signal transmission system free from electrical interference that would be detrimental to the proper functioning of the instrumentation and control system equipment.

J. The Owner shall have the right of access to the subcontractor's facility and the facilities of his equipment suppliers to observe materials and parts; witness inspections, tests and work in progress; and examine applicable design documents, records, and certifications during all stages of design, fabrication, and tests. The instrumentation subcontractor and his equipment suppliers shall furnish office space, supplies, and services required for these observation activities.

K. The terms "Instrumentation," "Instrumentation and Control System," and "Instrumentation, Control and Information System" shall hereinafter be defined as equipment, labor, services, and documents necessary to meet the intent of the Specifications.

1.04 INSTRUMENTATION AND CONTROL SYSTEM SUBCONTRACTORS

A. Instrumentation and control system subcontractors shall be regularly engaged in the detailed design, fabrication, installation, and startup of instrumentation and control systems for water and wastewater treatment facilities, remote telemetry systems for water supply/distribution systems, and remote telemetry systems for wastewater collection systems. Instrumentation and control system subcontractors shall have a minimum of five years of such experience and shall have completed a minimum of three projects of similar type and size as that specified herein. Where specific manufacturers/models of major hardware or software products (PLC, HMI software, network, etc.) are specified to be used on this project, the instrumentation and control system subcontractor shall have completed at least one project using that specified hardware or software. As used herein, the term “completed” shall mean that a project has been brought to final completion and final payment has been made.

B. Acceptable instrumentation and control system subcontractors shall be one of the following:

Northern Digital, Inc.
4701 Corporate Court
Bakersfield, CA 93311
Contact: Joseph Marcus, Vice President Business Development
joseph.marcus@ndi.us
(661) 322-6044

Tetra Tech
3475 E Foothill Blvd.
Pasadena, CA 91107
Contact: Amir Ibrahim, Operating Unit Manager
amir.ibrahim@tetratech.com
(760) 216-4122

C. Acceptable SCADA Programmer for SCADA integration ONLY shall be PROVIDED BY THE CITY and will be provided by XV Solutions: no equal.

1.05 DEFINITIONS

A. Solid State: Wherever the term solid state is used to describe circuitry or components in the Specifications, it is intended that the circuitry or components shall be of the type that convey electrons by means of solid materials such as crystals or that work on magnetic principles such as ferrite cores. Vacuum tubes, gas tubes, slide wires, mechanical relays, stepping motors or other devices will not be considered as satisfying the requirements for solid state components of circuitry.

B. Bit or Data Bit: Whenever the terms bit or data bit are used in the Specification, it is intended that one bit shall be equivalent to one binary digit of information. In specifying data transmission rate, the bit rate or data bit rate shall be the number of binary digits transmitted per second and shall not necessarily be equal to either the maximum pulse rate or average pulse rate.

C. Integrated Circuit: Integrated circuit shall mean the physical realization of a number of circuit elements inseparably associated on or within a continuous body to perform the function of a circuit.

D. Mean Time Between Failures (MTBF): The MTBF shall be calculated by taking the number of system operating hours logged during an arbitrary period of not less than six months and dividing by the number of failures experienced during this period plus one.

E. Mean Time to Repair (MTTR): The MTTR shall be calculated by taking the total system down time for repair over an arbitrary period of not less than six months coinciding with

that used for calculation of MTBF and dividing by the number of failures causing down time during the period.

F. Availability: The availability of a non-redundant device or system shall be related to its MTBF and MTTR by the following formula:

$$A = 100 \times (MTBF / (MTBF + MTTR)) \text{ Percent}$$

The availability of a device or system provided with an automatically switched backup device or system shall be determined by the following formula:

$$A = A2 + 1 - ((1 - A1) * (1 - A1))$$

where:

A1 = availability of non-redundant device or system

A2 = availability of device or system provided with an automatically switched backup device or system

G. Abbreviations: Specification abbreviations include the following:

1. A - Availability
2. ADC - Analog to Digital Converter
3. AI - Analog Input
4. AO - Analog Output
5. AVAIL - Available
6. BCD - Binary Coded Decimal
7. CSMA/CD - Carrier Sense Multiple Access/Collision Detect
8. CPU - Central Processing Unit
9. CRC - Cyclic Redundancy Check
10. CS - Control Strategy
11. DAC - Digital to Analog Converter
12. DBMS - Data Base Management System
13. DI - Discrete Input
14. DMA - Direct Memory Access

15. DO - Discrete Output
16. DPDT - Double Pole, Double Throw
17. DVE - Digital to Video Electronics
18. EPROM - Erasable, Programmable Read Only Memory
19. FDM - Frequency Division Multiplexing
20. FSK - Frequency Shift Keyed
21. HMI - Human Machine Interface (Software)
22. I/O - Input/Output
23. LAN - Network and Communication Equipment
24. LCD - Liquid Crystal Display
25. LDFW - Lead Follow
26. MCC - Motor Control Center
27. MTBF - Mean Time Between Failures
28. MTTR - Mean Time to Repair
29. OS - Operating System
30. PAC - Programmable Automation Controller
31. PCB - Printed Circuit Board
32. PID - Proportional Integral and Derivative Control
33. PLC - Programmable Logic Controller or Programmable Controller
34. PROM - Programmable Read Only Memory
35. RAM - Random Access Memory
36. RDY - Ready
37. RMSS - Root Mean Square Summation
38. RNG - Running
39. ROM - Read Only Memory

40. RTU - Remote Telemetry Unit

41. SPDT - Single Pole, Double Throw

42. ST/SP - Start/Stop

43. TDM - Time Division Multiplexing

44. UPS - Uninterruptible Power Supply

45. VFD - Variable Frequency Drive

H. To minimize the number of characters in words used in textual descriptions on displays, printouts and nameplates, abbreviations may be used subject to the Engineer's approval. If a specified abbreviation does not exist for a particular word, an abbreviation may be generated using the principles of masking and or vowel deletion. Masking involves retaining the first and last letters in a word and deleting one or more characters (usually vowels) from the interior of the word.

1.06 ENVIRONMENTAL CONDITIONS

A. Instrumentation equipment and enclosures shall be suitable for ambient conditions specified. All system elements shall operate properly in the presence of telephone lines, power lines, and electrical equipment.

B. Inside control rooms and climate-controlled electrical rooms, the temperature will normally be 20 to 25 degrees C; relative humidity 40 to 80 percent without condensation and the air will be essentially free of corrosive contaminants and moisture. Appropriate air filtering shall be provided to meet environmental conditions (e.g., dust).

C. Other indoor areas may not be air conditioned/heated; temperatures may range between 0 and 40 degrees C with relative humidity between 40 and 95 percent.

D. Field equipment including instrumentation and panels may be subjected to wind, rain, lightning, and corrosives in the environment, with ambient temperatures from -20 to 40 degrees C and relative humidity from 10 to 100 percent. All supports, brackets, interconnecting hardware, and fasteners shall be aluminum, type 316 stainless steel, or metal alloy as otherwise suitable for chemical resistance within chemical feed/storage areas shown on the installation detail drawings.PRODUCTS (NOT USED)

PART 2 – EXECUTION

2.01 SCHEDULE OF PAYMENT

A. Payment to the Contractor for Control and Information System materials, equipment, and labor shall be in accordance with the General and Supplementary Conditions. The schedule of values submitted as required by the General and Supplementary Conditions

shall reflect a breakdown of the work required for completion of the Control and Information System. The breakdown shall include sufficient detail to permit the Engineer to administer payment for the Control and Information System.

B. Requests for payment for materials and equipment that are not installed on site, but are required for system construction and the factory witness test (e.g., digital hardware), or are properly stored as described in the General and Supplementary Conditions and herein, shall be accompanied by invoices from the original supplier to the instrumentation subcontractor substantiating the cost of the materials or equipment.

C. Any balance remaining within the schedule of values for field instruments and other materials installed on the site, or for other materials for which payment is made by invoice, will be considered due upon completion of the Final Acceptance test.

2.02 CLEANING

A. The Contractor shall thoroughly clean soiled surfaces of installed equipment and materials.

B. Upon completion of the instrumentation and control work, the Contractor shall remove surplus materials, rubbish, and debris that has accumulated during the construction work. The entire area shall be left neat, clean, and acceptable to the Owner.

2.03 FINAL ACCEPTANCE

A. Final acceptance of the Instrumentation, Control and Information System will be determined complete by the Engineer, and shall be based upon the following:

1. Receipt of acceptable start up completion and availability reports and other documentation as required by the Contract Documents.

2. Completion of the Availability Demonstration.

3. Completion of control system training requirements.

4. Completion of punch-list items that are significant in the opinion of the Engineer.

B. Final acceptance of the System shall mark the beginning of the warranty period.

END OF SECTION