RAW WATER SYSTEM IMPROVEMENTS
CONTRACT A – PUMPING STATION
CONTRACT B –TRANSMISSION MAINS
CITY OF LIMA, OHIO

SEALED BIDS TO BE RECEIVED UNTIL 10:00 A.M., LOCAL TIME, FRIDAY, JULY 10, 2009, AT THE PURCHASING DIVISION, CITY OF LIMA, LIMA MUNICIPAL CENTER, 50 TOWN SQUARE, LIMA, OHIO 45801

ARCADIS U.S., INC.
520 SOUTH MAIN STREET, SUITE 2400
AKRON, OHIO 44311-1010
(330) 434-1995
(330) 374-1095 (FAX)

ADDENDUM NO. 2
JULY 2, 2009

The following questions were submitted, via facsimile or email, to the Engineer for clarification. The answers provided herein are provided as the formal responses to these questions and supersede any interpretations previously offered.

Q1. Will Bids be accepted from potential Bidders who did not attend the mandatory Pre-Bid Conference on June 9, 2009?
A1. No. Bids submitted by Bidders not listed on the Pre-Bid Conference Sign-in Sheet will not be opened. See this addendum for further clarification.

Q2. The Rock Anchor detail shown on Drawing Sheet 14 of 40 doesn't give a plate size. What is the size of the bearing plate required?
A2. The bearing plate is to be designed by the rock anchor manufacturer per Section 02230, Paragraph 1.4A., and must meet the requirements of Paragraph 2.3A. Therefore, the size and thickness of the bearing plate is dependent on which rock anchor manufacturer is selected and what their design calculations require (which will be reviewed during the Shop Drawing phase).

Q3. Section 02667, Paragraph 3.7D., and Section 13560, Paragraph 1.3C. both identify that the Contractor shall pay for water used for pressure and leakage testing. What is the dollar rate for water we will need for testing?
A3. Raw water will be permitted to be used by Contractors for their required filling and testing of the transmission main and process piping on the Project. See this addendum for further clarification.

Q4. Can we use precast valve vaults or will they have to be cast-in-place?
A4. The Project's vaults shall be Bid as shown and specified in the Bid Documents.

Q5. On Drawing Sheet 19 of 40 there is a detail titled "Base Slab Connection" " Typical Raised Construction Joint With PVC Waterstop". In reviewing the wall sections on Sheets 10, 11, 12, and 13, this detail is not indicated, nor referenced to Sheet 19. Is this detail relevant, or to be ignored?
A5. The referenced detail is incorrect and has been revised. See this addendum for further clarification.

Q6. In Addendum No.1, Changes to Supplementary Conditions, Article 5, Paragraph 5.02, it states that the Contractor shall prepare and submit the Allen Co. permit to construct within the Road. Does this apply only to Contract B?

A6. Yes. See further clarification included in this addendum.

Q7. On Drawing Sheet 10 of 40, Section A, right hand side, and Enlarged Detail A, please clarify how the walkway and integral beam intersect/connect to the east and west walls of the Intake Channel. Does this requires a beam pocket/key and, if so, to what dimensions?

A7. A note has been added to Drawing Sheet 8 of 40 to clarify the pocket needed for the walkway and beam at the east and west walls of the Intake Channel exterior walls. See this addendum for revisions.

Q8. Sheet 37 of 40 indicates an existing well shelter w/ concrete pad to be removed and replaced. Are there details outlining this item somewhere in the Bid Documents?

A8. It is intended that the Contractor shall remove, protect and reset the Well Shelter during installation of the 42" Transmission Main in this area. This Work is considered incidental to the Contract B Work and shall be performed in accordance with the Bid Documents. The concrete walk and pad for this shelter shall be removed and replaced in accordance with the Bid Documents and payment will be made under the respective Section 02576 Bid Items.

Q9. Are the structural steel, steel handrails and steel stairs to be painted or galvanized?

A9. Structural steel for stair framing members shall be painted/finished in accordance with Sections 05510 and 09900. Stair treads and landings shall be of aluminum materials, and finished as specified in Sections 05510 and 05531. Other structural steel shall be painted, except where indicated to be galvanized in the specifications or shown on the Drawings, all in accordance with Sections 05120, 05500 and 09900. Handrails and railings shall be of aluminum materials, and finished in accordance with Section 05520.

Q10. Does the allowance stated on Page 01019-1, Subparagraph 1.3B.1 (as added by Addendum #1) include the design of the foundation or will this be provided by ARCADIS?

A10. As stated in the Addendum No. 1 changes to Section 03300, specifically Page 03300-2, Paragraph 1.8D., the Cash Allowance does not include the design of the foundation, and costs for "CONTRACTOR's design" shall be included in the Bid Price. Section 16070, Subparagraph 2.1B.1., further states "CONTRACTOR shall submit foundation design to ENGINEER for review and approval.".

Q11. Will the Antenna noted to be relocated on Drawing Sheet 2 of 40 need to remain in service or can we take it out of service for an extended time until after the building/tower foundations are constructed?

A11. The antenna for the existing Auglaize River Pumping Station telemetry system may be taken out of service for a two week period as indicated in Section 16070, Paragraph 3.1B. A longer outage period may be considered with proper coordination and prior approval by OWNER. Preparation and execution of the Work shall be performed in accordance with the Bid Documents.

Q12. Can you provide greater detail for the pipe connection shown on Drawing Sheet 4 of 40, where the new 48" pipe connects to the existing 48" pipe (type of pipe, pipe joint type, joint locations, tied coupling detail, new valve and existing pipe connections, etc.)?

A12. Detailing for this connection cannot be provided, since the connection will be dependent upon the Bidder's Base Bid selection of the new pipe material. However, Bidders shall consider the information currently shown and specified, including but not limited to: the existing 48" Raw Water FM type shown as PCCP on Drawing Sheet 2 of 40; the tied pipe coupling specified in Section 13540; the new valve, YV-4, identified in the Valve Schedule on Drawing Sheet 22 of 40 and specified in Section 13520; and requirements for providing necessary transition pieces and adapters and modification of existing piping as necessary for proper connections per Section 13510.

Q13. Is the Cathodic Protection System specified in Section 13111 to be provided as part of the Hydropneumatic Surge Control System specified in Section 13214?

A13. No. Although associated, and to be coordinated with the Hydropneumatic Surge Control System, the Cathodic Protection System is Work that shall be provided separately and is not included in the Guaranteed Price Work for the Hydropneumatic Surge Control System.

Q14. Are there any specific limitations or regulatory requirements for completing the intake channel work within the Auglaize River?

A14. Please refer to the Supplementary Conditions, Articles 2 and 4 for permit requirements on the project.

CHANGES TO TABLE OF CONTENTS

Page 1 of 4 – At the end of sub-list of attachments following the Supplementary Conditions listing, after the "OEPA Section 401 Permit ID No. 063003 Requirements" listing, insert "Allen County Permit Requirements (2 pages)".

Page 4 of 4 – Under the "Division 17 – Instrumentation" heading, after the "17230 Programmable Logic Controllers" listing, insert "17242 Radio/Modem Hardware".

CHANGES TO INSTRUCTIONS TO BIDDERS

Page IB-9, Paragraph 24.01 – At the end of paragraph, insert the sentence "Bids submitted by Bidders not listed on the Pre-Bid Conference Sign-in Sheet will not be opened.".

CHANGES TO BID

Page BD-6, Paragraph 7.01, Base Bid Manufacturers Listing – In the listing of selectable manufacturers for the Section 13400 Hydraulic Gates, delete the "H. Fontaine Ltd." listing, and replace with "Waterman"; and for the Section 13520 Cushioned Swing Check Valves, delete the "Mueller Co." listing and replace with "Henry Pratt Co.".

CHANGES TO SUPPLEMENTARY CONDITIONS

Page SC-2, Paragraph 5.02 (inserted per Addendum No. 1) – Within this paragraph: before the text "CONTRACTOR", insert the text "After the Award and prior to beginning construction activities, Contract B"; delete the text "(1 page)" and replace with the text "(2 pages)"; and delete the text "$170,000" and replace with the text "$172,000, with Allen County identified as obligee".

Attachments to Supplementary Conditions – At the end of the attachments following this section, after the last page of the "OEPA Section 401 Permit ID No. 063003 Requirements" attachment, insert the attachment "Application for Permit to Construct Within Road Right-of-Way" (2 pages), dated 6/24/09, included with this addendum.

CHANGES TO SPECIFICATIONS

Section 01600, Equipment and Materials Checklist – For this table following Section 01600, revise the page numbering from 01600-1 thru 01600-5, inclusive, to instead be CL-1 thru CL-5, inclusive.

Page CL-5 (as revised above), Equipment and Materials Checklist – Within this table, after the "17230 Programmable Logic Controllers" listing, insert the following:

"

17242	Radio/Modem Hardware	X		X[SI]	X	X

"

Page 02667-4, Paragraph 3.3G. – In this paragraph, delete the text ", to allow for taps to be inserted". After this paragraph, insert the following subparagraph:

"1. Minimum clearance requirement shall be waived between Station 69+00 and Station 71+00 on Agerter Road, and at other locations as approved by ENGINEER.

Page 02667-6, Paragraph 3.7D. – In this paragraph, delete the text ", and pay for the total volume of water used". After this paragraph, insert the following subparagraph:

"1. Raw water for testing may be withdrawn from the Auglaize River or the Bresler Reservoir. Provide screening of raw water to prevent solids and debris larger than 1" from entering the transmission mains.".

Page 13400-2, Sub-subparagraph 2.1A.1.a. – In this sub-subparagraph, delete the text "H. Fontaine Ltd., Series 20" and replace with the text "Waterman, SS-250 Series".

Page 13520-3, Subparagraph 2.6G.3. – In this subparagraph, delete the text "Mueller Co." and replace with the text "Henry Pratt Co., Series 9001".

Page 13560-1, Paragraph 1.3C. – In this paragraph, delete the text ", and pay for total volume of water used". After this paragraph, insert the following subparagraph:

"1. Raw water for testing may be withdrawn from the Auglaize River or the Bresler Reservoir. Provide screening of raw water to prevent solids and debris larger than 1" from entering the process piping.".

Section 17230 – Programmable Logic Controllers – After this section, insert Section 17242 – Radio/Modem Hardware (5 pages) included with this addendum.

Page 17255-2, Paragraph 3.1A. – Delete this paragraph and replace with the following:

"A. Configure the PLC in the new SCADA panel to allow data transfer between the PLC and the existing radio telemetry communications link via the radio modem specified in Section 17242.".

CHANGES TO DRAWINGS

Sheet 2 of 40, Raw Water Pumping Station Existing Site and Demolition Plan – On this sheet, insert the sheet note "NOTE: WORK SHALL NOT BE PERMITTED WITHIN THE CONSTRUCTION LIMITS SHOWN.".

Sheet 4 of 40, Raw Water Pumping Station Piping Plan – On this sheet, insert the sheet note "NOTE: FOR BURIED (CONTRACT A) PROCESS PIPING, PROVIDE RESTRAINED JOINTS A MINIMUM OF 25 FEET BEYOND EACH SIDE OF ALL FITTINGS AND VALVES.".

Sheet 8 of 40, Raw Water Pumping Station Floor Plan – On this sheet:

- along the right side the Plan view, near the location where the Walkway intersects with the east wall of the Intake Channel, insert a leader pointing to this location with leader note that reads "POCKET WALL 5'-0" WIDE x 1'-4" TALL x 6" DEEP FOR WALKWAY AND INTEGRAL BEAM (TYPICAL 2 PLACES)";
- insert the sheet note "NOTE: 1. COORDINATE WORK OF THIS DRAWING WITH FLOOR FRAMING PLAN ON SHT #12.";
- at the interior Stair #4 location along the building's east wall, at the leader pointing to the curb around the stair's floor opening, revise the leader note to read " 6" TALL x 10" WIDE CURB"; and
- within the Plan view, make revisions as identified on the Partial Plan View of Sheet 8 of 40 included with this addendum.

Sheet 10 of 40, Raw Water Pumping Station Sections – In the Section A view:

- make revisions as identified on the Partial Plan View of Sheet 8 of 40 included with this addendum; and
- at the dimension for the pump bowl to the wet well floor, as added by Addendum No. 1, revise the dimension text to be "0.3 to 0.5 x MANUFACTURER'S SUCTION BELL DIAMETER (MAX)".

Sheet 12 of 40, Raw Water Pumping Station Sections – On this sheet:

- in the top-right of the "Bar Rack Details, Section" detail, revise the note for the leader pointing to the 1/2" x 6" Plate to read "1/2" x 6" CONT PLATE WELDED TO 6" x 1" LONG BARS, USE 3/4" DIA EXP ANCH @ 2'-0" C/C IN THE SLOTTED HOLES OF THE 1/2" X 6" PLATE"; and
- in Detail N/9, near the bottom of the CMU wall, extend the line representing the #7@40"c/c wall reinforcement down to touch the top of the concrete floor.

Sheet 13 of 40, Raw Water Pumping Station River Intake Channel Details – On this sheet, make revisions to the Foundation Plan view, and delete the Detail C/13 and replace with the revised Detail C/13 as shown on the Partial Foundation Plan View and Detail of Sheet 13 of 40 included with this addendum.

Sheet 15 of 40, Raw Water Pumping Station Stair Details – On this sheet:

- In the top-center of the "Connection Type 'C' " detail, insert a horizontal dimension for the width of the L6x3-1/2 angle and label with " 3 1/2" "; and
- In the bottom-left of Detail D/15, within the leader note associated with the leader pointing to the Earth/CDF hatching, revise the text "CDF III" to be "CDF II".

Sheet 19 of 40, Miscellaneous Details – On this sheet:

- delete the "Typical PVC Waterstop at Raised Construction Joint in Slabs and Walls" detail and replace with the revised detail "Typical PVC Waterstop at Slabs and Walls" included with this addendum;
- delete the "Typical Raised Construction Joint With PVC Waterstop, Base Slab Connection" detail and replace with the revised detail "Typical Construction Joint With PVC Waterstop, Base Slab Connection or Wall Corner Connection" included with this addendum; and
- delete the "Typical Construction Joint With PVC Waterstop, Sectional Plan or Section in Walls" detail and replace with the revised detail "Typical Construction Joint With PVC Waterstop, Sectional Plan or Section Walls and Slabs" included with this addendum.

Sheet 24 of 40, Vault Details – On this sheet, revise Details A/24 and C/24 as shown on the Partial Vault Details of Sheet 24 of 40 included with this addendum.

Sheet 33 of 40, 54" Transmission Main Plan and Profile Sta 96+00 to Sta 108+00 – In the Plan View, after Sheet Note #3 (inserted per Addendum No. 1), insert the Sheet Note "4. CONTRACTOR SHALL REMOVE ABANDONED CONCRETE FOUNDATION (ESTIMATED AT 2 FT WIDE X 4 FT TALL) ADJACENT TO EXISTING HEADWALL (TO REMAIN) BETWEEN APPROXIMATELY STATION 105+21 TO STATION 105+39, AS NECESSARY TO COMPLETE THE WORK. REMOVAL IS CONSIDERED INCIDENTAL TO THE TRANSMISSION MAIN WORK AND ADDITIONAL PAYMENT WILL NOT BE MADE FOR SUCH REMOVAL EFFORT.".

Sheet E12 of 40, Raw Water Pumping Station Electrical Single Line Diagram – In the bottom-right of the Proposed Single Line Diagram, revise the motor Hp of "750" shown for Pumps No. 1, 2 & 3 to be "800", and revise the motor Hp of "250" shown for Pump No. 4 to be " 300".

Sheet E14 of 40, Raw Water Pumping Station Electrical Schematics – In the top-right of the Raw Water Pump No. 1 control schematic, revise the motor Hp shown as "750" to instead be "800*", and add a note nearby that states "* - PUMP NO. 4 MOTOR TO BE 300 HP".

Private Contractor

APPLICATION FOR PERMIT TO CONSTRUCT WITHIN ROAD RIGHT-OF-WAY

ALLEN COUNTY ENGINEERS OFFICE
1501 N. SUGAR STREET
LIMA, OHIO 45801-3136
PHONE: (419) 228-3196 FAX: (419) 227-2920

City of Lima – Contract B: Raw Water System Improvements

Permit Fee: $100.00
Surety Bond: $172,000.00

Date: _____
Expires one year from above date.
Annual Renewal Required.

(Please Print)
Applicant Name: _____ Phone #: _____

Mailing Address: _____ City _____ State _____ Zip _____

Project location: At or along _____ Road in _____ Township.

☐ North ☐ South ☐ East ☐ West of the closest intersection with _____ Road.

WORK TO BE COMPLETED

(Check all that apply)

☐ **Dirt Work** ☐ **Tile tap, perpendicular to pavement (see Section 1)** ☐ **Catch Basin Installation (see Section 1)**

☐ **Tile Installation, parallel to pavement (see Section 2)** ☐ **Road Bore (see Section 3)** ☐ **Road Cut (see Sections 2 & 4)**

Briefly explain work to be performed: _____

_____ and according to the attached plan.

Final inspection of this project has been performed by the Allen County Engineer's Office.

By _____
County Inspector Date

The Application is hereby released of requirements set forth by this permit.

Private Contractor

Section 4: Road Cut Specifications

A. Conditions necessitating opening of pavement _____

_____

B. The opening in the pavement will be approximately _____ feet long by _____ feet wide by _____ feet deep.

C. Pavement is to be replaced by: _____ as directed by and to the complete satisfaction of the Allen County Engineer.

If this permit is granted, I/we agree to the following conditions:

1. That traffic will be maintained at all times, unless permission is granted by the Allen County Engineer to do otherwise.
2. That the necessary lights, signs, barricades, flagmen and watchmen are maintained for the protection of traffic at all times, day and night, as instructed by the Allen County Engineer until work is completed.
3. That the Surety Bond must name the Allen County Engineer as the obligee.
4. That the permit and the Surety Bond must remain active for a period of one year after the project has been deemed complete by the City of Lima and the Allen County Engineer.
5. That the Surety Bond will not be returned to the applicant until the construction meets the specifications set forth by the Allen County Engineer, the Allen County Inspector, and the Allen County Standard Construction Drawings.
6. That if the one year period between the date given on the permit and the completion of the work is not met, the applicant will be required to renew the permit and the Surety Bond. If the permit expires before the work has begun, the application must be re-filed with the Engineer's Office along with the standard fee.

_____ ☐ Landowner ☐ Contractor

Applicant Signature Date

Office Use Only

Comments: _____

Outlet Available: ☐ Yes ☐ No By: _____

Permit to do this work under the conditions stated is hereby ☐ Granted ☐ Denied

By _____

Engineer Date

SECTION 17242

RADIO/MODEM HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Purchase, installation, programming, configuration, and start-up of radio modems, antennas, coaxial cable and associated hardware.

1.3 SHOP DRAWINGS

A. Provide catalog cuts and manufacturer's product data on all equipment provided, including full model number of all components, listing of optional features being provided, voltage ratings, dimensional data, and manufacturer's product specifications.

B. Submit a bill of material containing component manufacturer, model number, and quantities.

C. Include schematics and wiring diagrams of radio modem on the diagrams prepared in Section 17190. Identify port numbers, pin numbers, the type of communication port, special cables, and source/destination of all communication conductors.

D. Installation Details: Provide mounting information on the radio modem and antenna.

1.4 SPARE PARTS

A. Provide one spare radio modem.

B. Provide one spare communication interface cable for each type provided.

C. Provide one spare antenna.

D. One spare transient protection unit.

1.5 DESCRIPTION OF OPERATION

A. Radio telemetry equipment shall communicate with the existing master telemetry unit via a radio network, consisting of a radio modem at the Raw Water Pumping Station. The existing system is configured for Point-to-Multipoint communications.

B. Self-Recovery: Each radio modem shall return to a normal working mode upon restoration of power, without manual intervention. Communications shall re-establish automatically with re-initialization of the unit.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit four copies of an operation and maintenance (O&M) manual, each of which provides complete data on the equipment provided in this Section. Combine materials in a three-ring binder

with the materials provided in Section 17190, with an index at the front of each manual. Sectionalize each portion of the O&M manual with numbered dividers.

B. Include all material content submitted for Shop Drawing review. Material shall be revised to reflect changes and/or corrections. All changes to diagrams and drawings developed using AutoCAD software shall be made using AutoCAD software. Marked up submittals are not acceptable.

C. Include manufacturer's user manuals, product data bulletins, and assembly and instruction manuals provided by the manufacturer with the product shipment.

D. Include standard programming manuals with each O&M manual, which provides detailed information on all programming languages used for configuration and programming of the radio units.

1.7 PROGRAMMING SERVICES

A. Provide all necessary programming to provide the operation and functions described in the Operational Description above and as specified in Section 17255.

1.8 SOFTWARE DOCUMENTATION

A. Provide four CD's to OWNER at Substantial Completion, containing final backups of the custom software logic.

PART 2 PRODUCTS

2.1 RADIO/MODEM HARDWARE

A. General: Equipment shall be compatible with the OWNER's existing radio telemetry system.

B. Supplier: J & K Communications, Inc., 222 South Tower View Drive, Columbia City, IN 46725-8799, (260) 244-7975.

C. Radio Units: Provide for Raw Water Pumping Station RTU.
1. Manufacturer: MDS.
2. Channels: Two; transmit and receive.
3. Frequency Band: UHF primary frequency 900 MHz
4. Output Power: As required for communication distance.
5. Power Supply: Compatible with uninterruptable power supply.
6. Radio shall include capability of being electronically keyed.

D. Radio Modem: Provide for Raw Water Pumping Station RTU.
1. Communication: Frequency shift key.
2. Baud Rate: 9600 baud with FSK tones.
3. Include interface cables and connectors to connect modem to radio unit.

2.2 LAP-TOP COMPUTER

A. Manufacturer: Dell, or as approved.

B. Quantity: One.

C. Processor: Intel Pentium IV, 2.4 MHz or better; to be selected by OWNER.

D. RAM: 512 megabytes, minimum.

E. Hard Drive: 40 gigabyte minimum.

F. PCMCIA Slots: Minimum of two.

G. Display: 15 inch active matrix.

H. Network Card: Internal 10/100 megabyte Ethernet card.

I. 56K fax/modem.

J. Internal CD-RW drive.

K. Touch pad cursor control.

L. Microsoft Windows XP Professional, latest version; factory-installed.

2.3 ANTENNAS

A. Antennas for Radio/Modem Hardware.
   1. Communication Frequency: 900 MHz.
   2. Types:
      a. Directional Antennas:
         1) Quantity: Two; provide for Raw Water Pumping Station RTU and spare.
         2) Type: Yagi UHF antenna.
      b. Provide required bracket connectors and hardware for mounting antenna to tower.

2.4 COAXIAL CABLE

A. 50 Ohm Coaxial Cable:
   1. RG-8/U:
      a. Single foil, single-braid, flexible coaxial cable.
      b. Attenuation:
         1) 450 MHz Band: Less than 5 dB/100 feet.
         2) 900 MHz Band: Less than 7 dB/100 feet.
         3) 2.4 GHz Band: Less than 12 dB/100 feet.
      c. Maximum Allowable Distance: RG-8/U coaxial cable installations shall not exceed the distances listed below. Use Heliax cable for distances which exceed the listed limits.
         1) 450 MHz Band: 50 foot maximum length.
         2) 900 MHz Band: 30 foot maximum length.
         3) 2.4 GHz Band: 20 foot maximum length.
      d. Outside Diameter: Approximately 0.5 inches OD.
      e. Inner Conductor Diameter: Approximately 0.09 inches.
   2. Heliax (1/2 Inch):
      a. Manufacturers: Andrew LDF4 Series, or equal.
      b. Description: Low attenuation cable with continuous outer copper conductor and foam dielectric.
      c. Attenuation:
         1) 450 MHz Band: Less than 1.6 dB/100 feet.
         2) 900 MHz Band: Less than 2.3 dB/100 feet.
         3) 2.4 GHz Band: Less than 4.5 dB/100 feet.
      d. Maximum Allowable Distance: Use of 1/2 inch coaxial cable installations shall not exceed the distances listed below. Use 1 1/4 inch Heliax cable for distances which exceed the listed limits.
         1) 450 MHz Band: 150 foot maximum length.

2) 900 MHz Band: 150 foot maximum length.
3) 2.4 GHz Band: 60 foot maximum length.

e. Outside Diameter: Approximately 0.65 inches OD.
f. Inner Conductor Diameter: Approximately 0.19 inches.

3. Heliax (1-1/4 Inches):
   a. Manufacturers: Andrew LDF4 Series, or equal.
   b. Description: Low attenuation cable with continuous outer copper conductor and foam dielectric.
   c. Attenuation:
      1) 450 MHz Band: Less than 0.6 dB/100 feet.
      2) 900 MHz Band: Less than 0.9 dB/100 feet.
      3) 2.4 GHz Band: Less than 1.6 dB/100 feet.
   d. Outside Diameter: Approximately 1.55 inches OD.
   e. Inner Conductor Diameter: Approximately 0.5 inches.

2.5 COAXIAL CABLE TRANSIENT SUPPRESSION UNIT

A. Manufacturer: PolyPhaser Corporation, IS-50 Series.

B. Rated for operation on the selected frequency band of the radio units.

C. Mounting: Flange-mount to metallic 4 inches by 4 inches stainless steel plate surface; include ground ring connector on bolt which secures unit to metallic surface and on steel plate. Securely ground suppressions unit in accordance with manufacturer's instructions.

2.6 FCC RADIO LICENSE

A. Retain the services of a company that specializes in FCC licensing for adding this site to the OWNER's existing UHF license.

B. Prepare all paperwork necessary to apply for the radio license.

2.7 RADIO COMMUNICATION PATH STUDY

A. Path study performed by radio system supplier.
   1. Provide complete radio frequency path study for the proposed radio communication path. See Schedule.
   2. Compiler of path study to recommend radio power output, antenna height and gain, length, size and type of coaxial cable, and maximum EPM.
   3. Path selections shall not rely upon a communication path which does not present a line-of-site between the two points. For the purpose of meeting this requirement, line-of-site is defined as complying with all of the following:
      a. A line drawn between the elevations of the two antenna locations (including corrections for the curvature of the earth) does not intersect with the earth at any point within the path of communication.

PART 3 EXECUTION

3.1 INSTALLATION

A. Master Telemetry Radio Unit:
   1. Existing MTU is located at the Water Treatment Plant

B. Remote Telemetry Radio Unit:
   1. Mount antenna on the east side of the relocated antenna tower, adjacent to the existing RTU antenna.
   2. Furnish and install suitable antenna support hardware.

C. Conduit/Wiring Installation:
   1. Terminate all conductors and communication cables as required to complete the system installation. Provide special connectors where required.
   2. Do not use LB or LBD conduit fittings as a pull point for conduits containing Heliax coaxial cable.
      a. For sharp bends, break the conduit raceway and loop the cable between raceways with a minimum bend radius of 12 inches. Seal both ends of the conduit break with silicone to prevent rain and moisture from entering the raceway.
      b. For areas which can accommodate large boxes, provide a 12 inch by 12 inch pull box.
   3. Take care not to bend or kink the coaxial cable during installation.
   4. Ground each coaxial cable transient protection unit with a minimum No. 2 AWG stranded copper ground wire. Connect ground wire to a ground rod provided at the base of the pole/tower via an exothermic connection.

3.2 START-UP AND TESTING

A. Provide complete start-up and testing of system.

B. Ring out all coaxial cable connections prior to connecting the cable to the radio unit, for the purpose of testing for short circuits between the center conductor and the outer shield conductor. Replace coaxial cables which show a short circuit between the two conductors.

C. After connection of antenna, perform a reflective voltage test on the coaxial cable/antenna to test for communication strength and power transfer to the antenna. Correct connections at antenna, transient suppressions unit, and other connections that show high reflectance of the signal. Investigate and rework coaxial cable areas which show high reflectance due to improper bending radius.

D. Include all costs for start-up and testing, including travel, meals, lodging and expenses.

3.3 DEMONSTRATION

A. Demonstrate ability of the remote telemetry panels to communicate with the master telemetry panel.

3.4 TRAINING

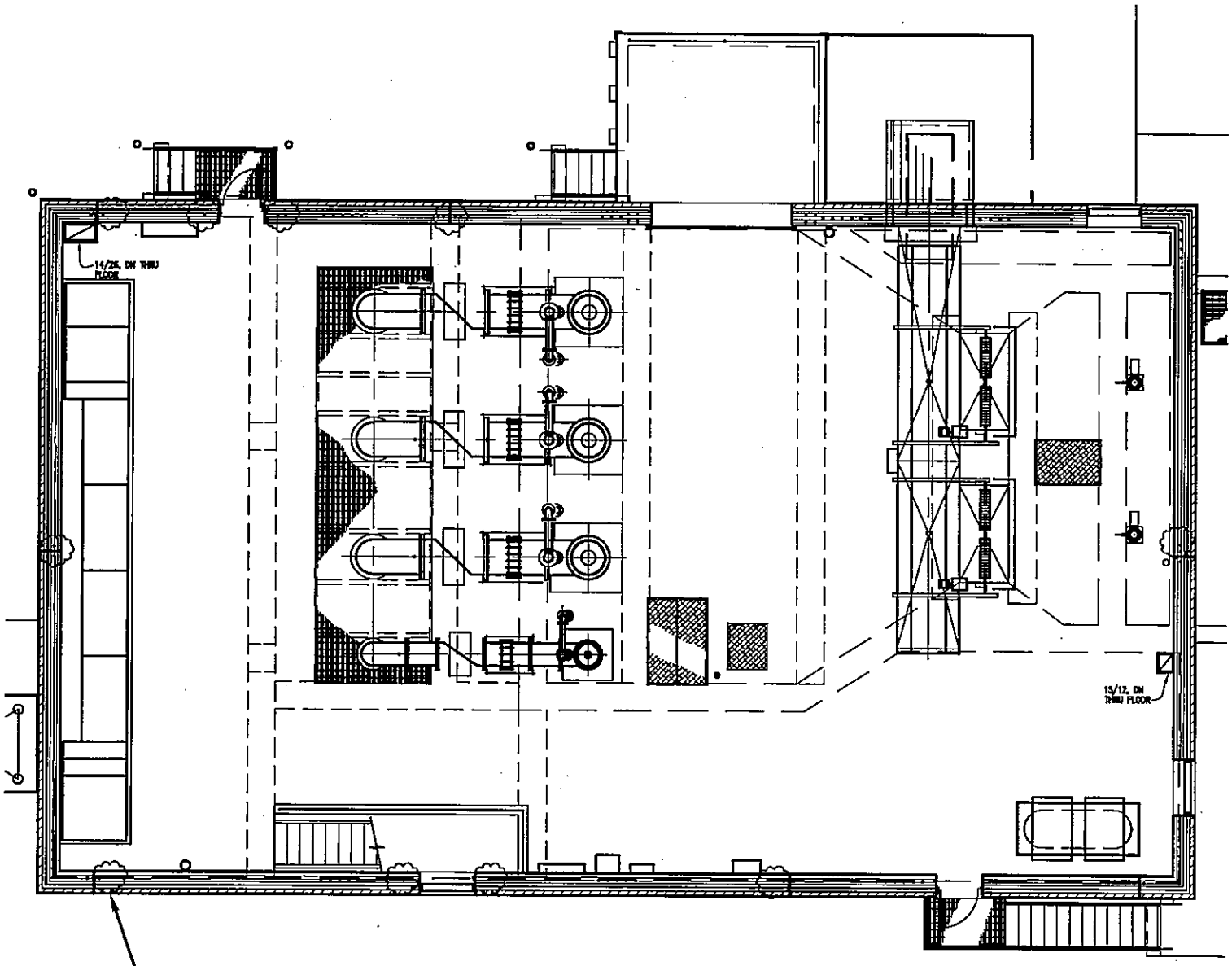
A. Training shall be provided by the radio system supplier.

B. Include one 2 hour training session and one 2 hour follow-up training session on the telemetry system. Training services shall be shall be scheduled at least 30 days apart. Training shall review general operation and maintenance of the telemetry equipment provided. The O&M manuals shall be completed and delivered prior to the follow-up system training session.

3.5 PROPOSED COMMUNICATION PATHS SCHEDULE

PATH	LOCATION	SOURCE		DESTINATION	
		LATITUDE	LONGITUDE	LATITUDE	LONGITUDE
1	Raw Water Pumping Station	N40° 43' 46"	W84° 18' 00"	N40° 44' 37"	W84° 05' 15"

END OF SECTION

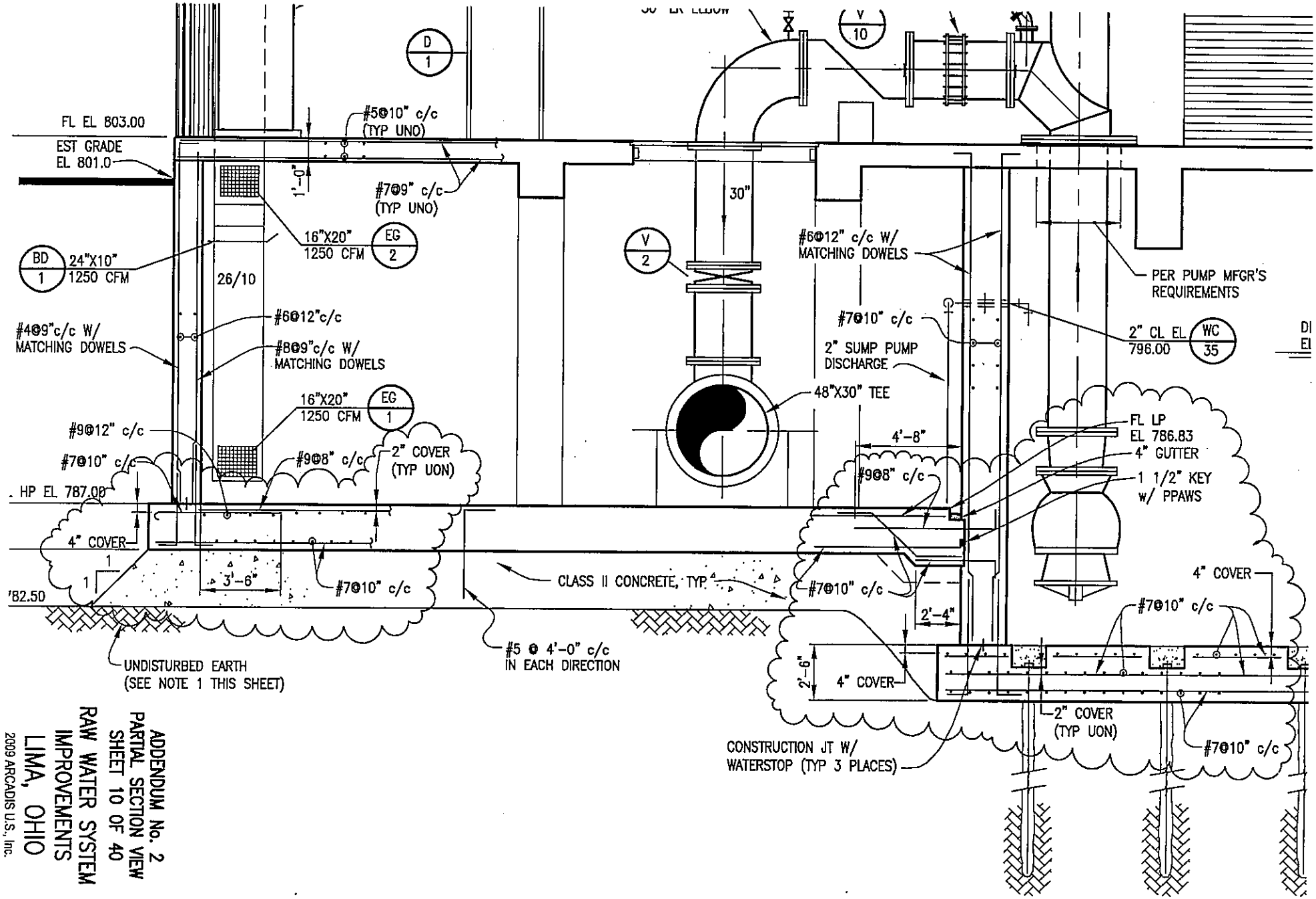


SCALE: NONE

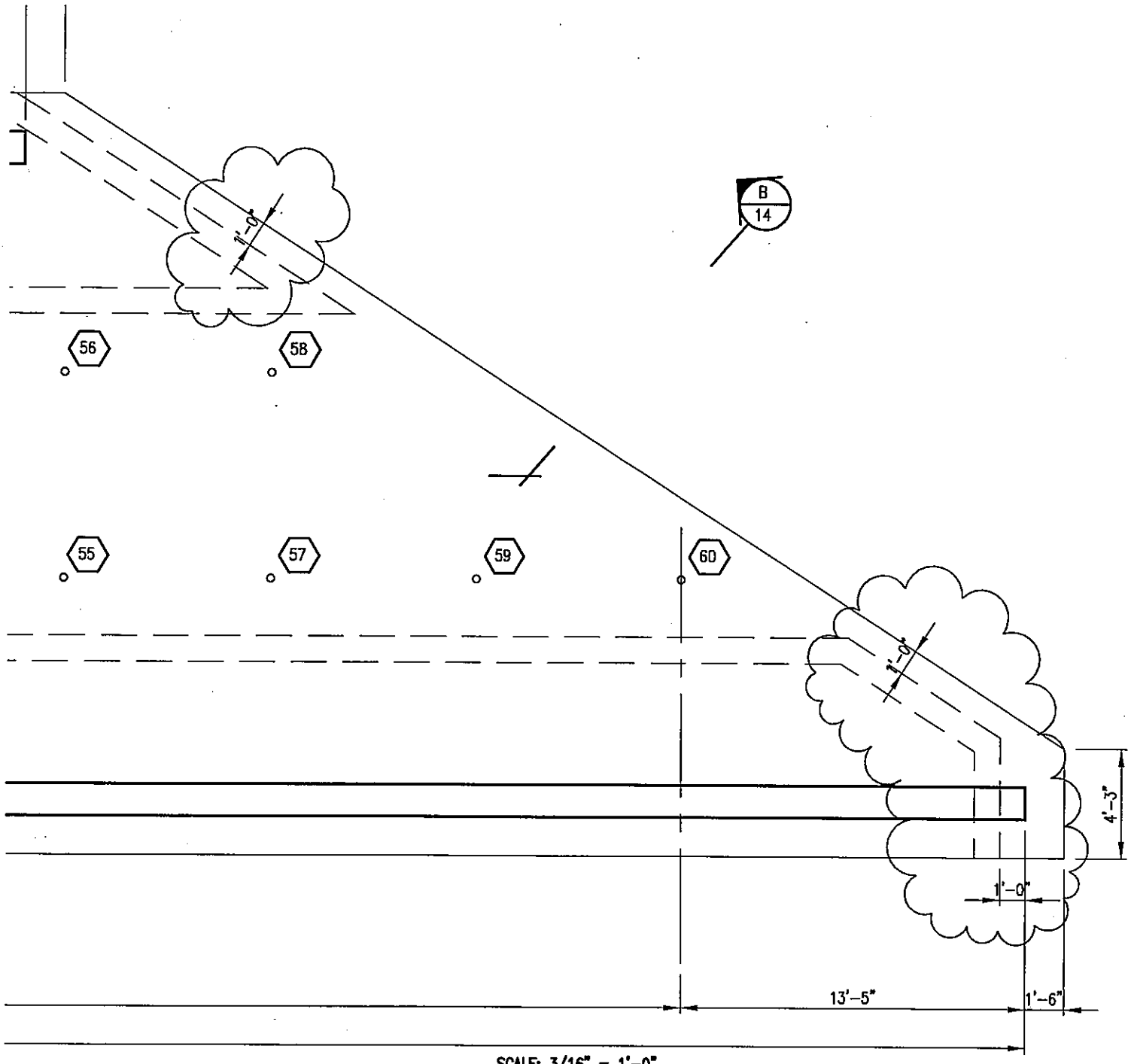
#9 W/ MATCHING DOWELS AT BOTTOM & HOOKED INTO BOND BEAM @ TOP. GROUT FILL CORE AFTER RESTEEL IS PLACED. (TYP ALL BUBBLES)

ADDENDUM No. 2
PARTIAL PLAN VIEW
SHEET 8 OF 40

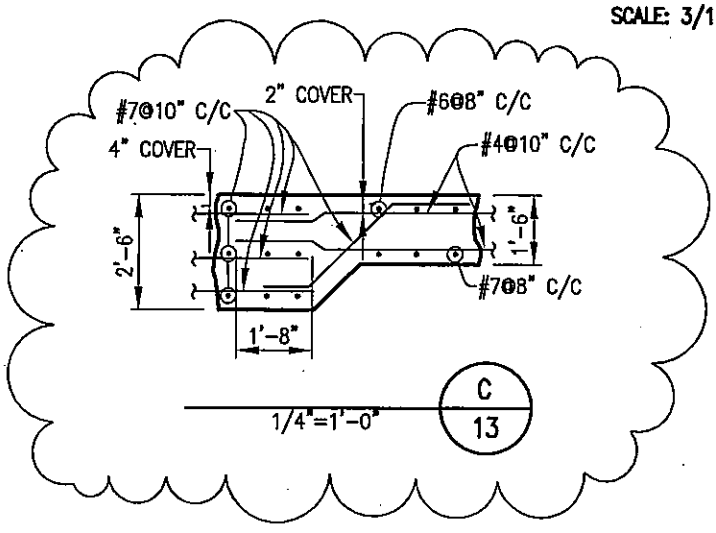
RAW WATER SYSTEM IMPROVEMENTS
LIMA, OHIO



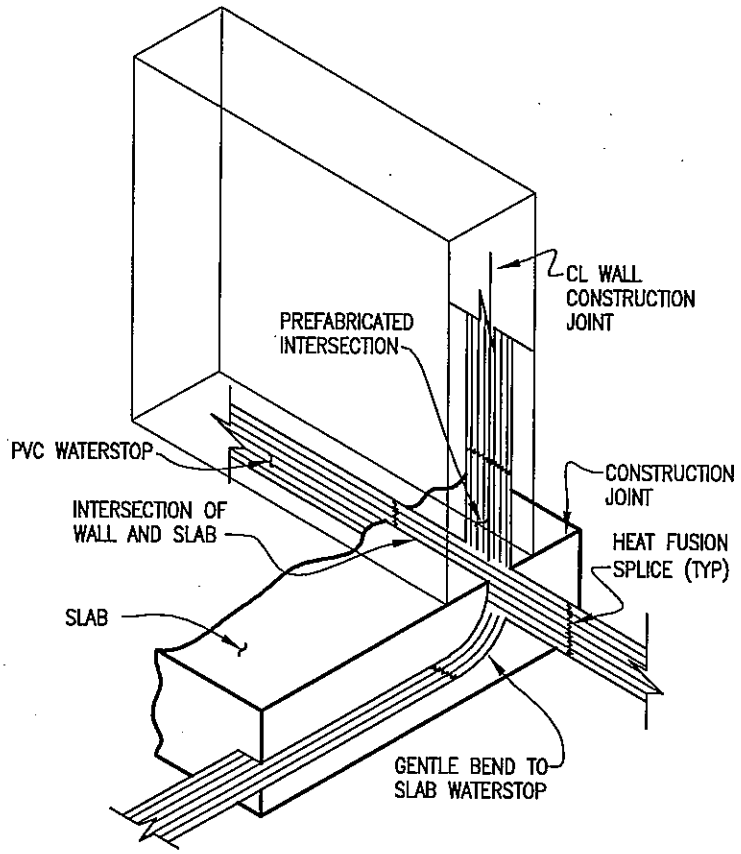
ADDENDUM No. 2
PARTIAL SECTION VIEW
SHEET 10 OF 40
RAW WATER SYSTEM
IMPROVEMENTS
LIMA, OHIO



SCALE: 3/16" = 1'-0"



ADDENDUM No. 2
PARTIAL FOUNDATION
PLAN AND DETAIL VIEW
SHEET 13 OF 40
RAW WATER SYSTEM
IMPROVEMENTS
LIMA, OHIO

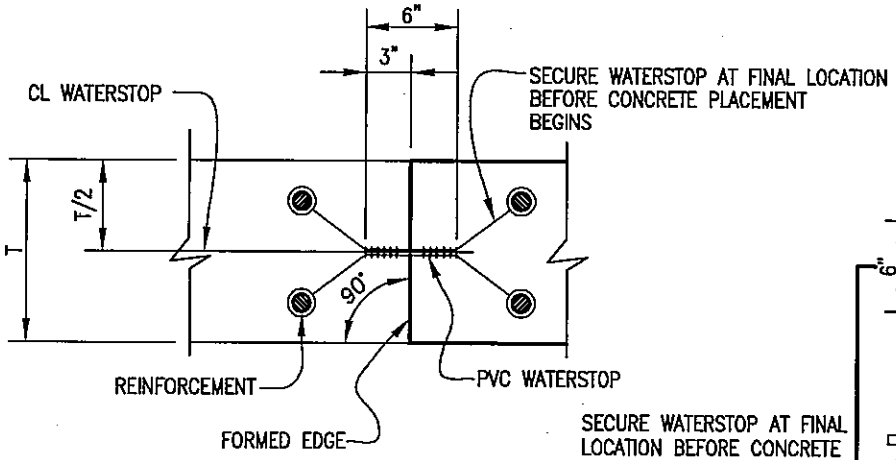


TYPICAL PVC WATERSTOP AT SLABS AND WALLS

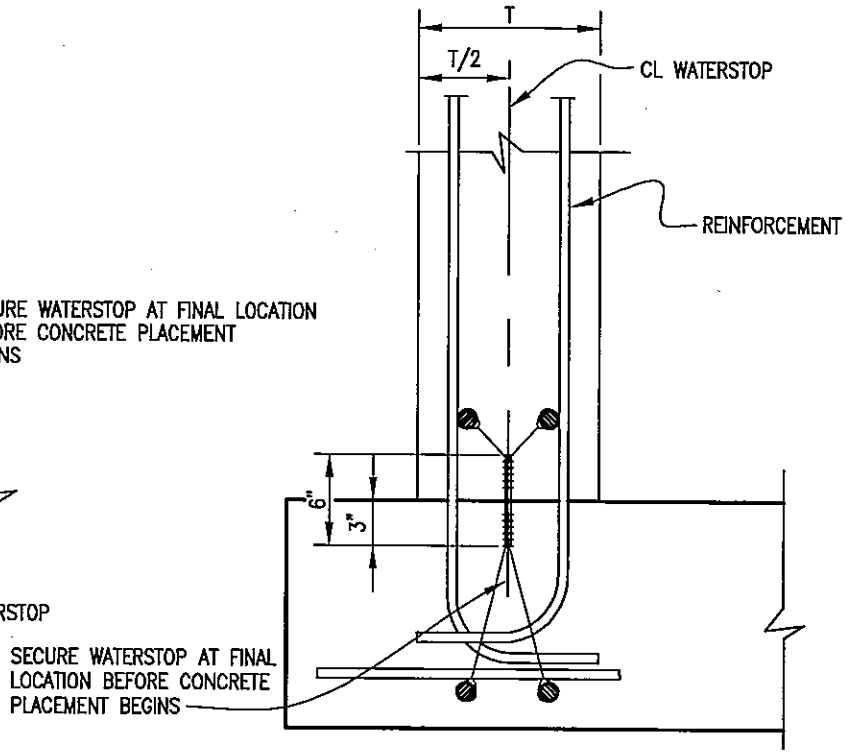
NO SCALE

ADDENDUM No. 2
MISCELLANEOUS DETAILS
SHEET 19 OF 40

RAW WATER SYSTEM
IMPROVEMENTS
LIMA, OHIO



SECTIONAL PLAN OR SECTION
WALLS AND SLABS

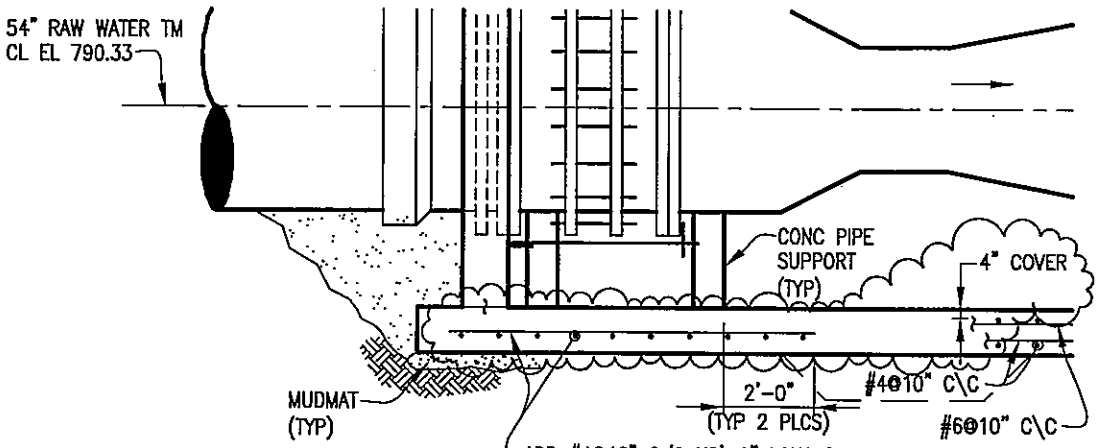


BASE SLAB CONNECTION
OR WALL CORNER CONNECTION

TYPICAL CONSTRUCTION JOINT WITH PVC WATERSTOP

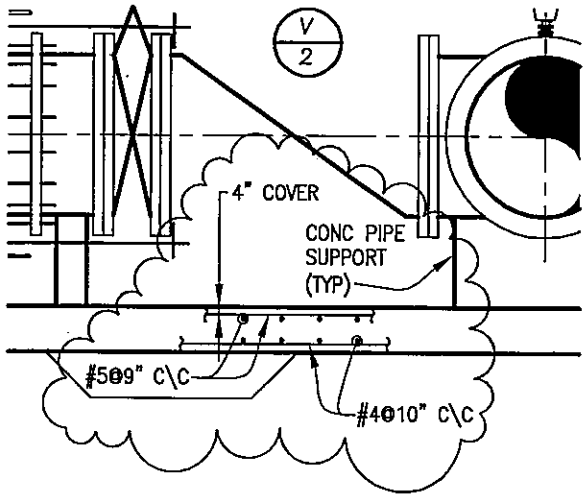
SCALE 1"=1'-0"

ADDENDUM No. 2
MISCELLANEOUS DETAILS
SHEET 19 OF 40
RAW WATER SYSTEM
IMPROVEMENTS
LIMA, OHIO



A / 24

1/4" = 1'-0"



C / 24

1/4" = 1'-0"

SCALE: AS NOTED

ADDENDUM No. 2
PARTIAL VAULT DETAILS
SHEET 24 OF 40

RAW WATER SYSTEM
IMPROVEMENTS
LIMA, OHIO