

January 23, 2023

**NOTICE OF ADDENDUM  
ADDENDUM 3**

**CONTRACT NO. 9342  
PROJECT NO. 14092  
UNIT WELL 15 PFAS TREATMENT FACILITY**

Revise and amend the contract document(s) for the above project as stated in this addendum, otherwise, the original document shall remain in effect.

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**General Notes and Inclusions:**

1. Pre-bid Meeting Minutes for the Virtual meeting on January 9, 2024 are attached to this addendum.
2. Pre-bid Meeting Minutes for the On-site meeting on January 17, 2024 are attached to this addendum.
3. Two documents related to the existing air stripper equipment are provided for references with this addendum:
  - a. Documents are sourced from <https://www.qedenv.com/en-us/products/ez-tray-air-stripper/>
  - b. The *System Operation & Maintenance Manual* can be found at this link:  
<https://qed.blob.core.windows.net/media/iu3fxuq3/95168-ez-tray-system-manual.pdf>
4. Pilot testing information can be located through the following web links:
  - a. [https://www.cityofmadison.com/water/documents/2021\\_Well\\_15\\_Feasibility\\_Study\\_PFAS\\_Removal\\_Report\\_Final.pdf](https://www.cityofmadison.com/water/documents/2021_Well_15_Feasibility_Study_PFAS_Removal_Report_Final.pdf)
  - b. <https://madison.legistar.com/View.ashx?M=F&ID=11350858&GUID=3CEC8640-6A44-44F1-99E6-2AFA770DF583>

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**Changes to SPECIFICATIONS:**

1. Section 01 11 00 Summary of Work, REPLACE in its entirety:
  - a. Added information on liquidated damages.
  - b. Added that Madison Water Utility will complete SCADA programming for the project.
  - c. Added beneficial occupancy information.
2. Section 01 25 00 Substitution Procedures, ADD in its entirety.
3. Section 01 33 00 Submittals, REPLACE in its entirety:
  - a. Added information on online platform required for submittal management.
  - b. Added quantities for resubmittals prior to reimbursement required.

**[Continued on Next Page]**

4. Section 44 43 31 Pressure Filtration Equipment – GAC and Ion Exchange, REPLACE in its entirety:
  - a. Spare parts added.
  - b. Clarifications on ASME pressure, design pressure, and media volume minimums are provided. Updated manway quantity and size.
  - c. Updated internals lateral material type.
  - d. Noted expansion joints to be provided within the system package.
  - e. Note – Seismic calculations are not required and not added to the specifications.
  - f. Note – Contractor is responsible for all piping and valves within drawing set even if vendor/supplier does not provide those items within their scope.

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**Changes to PLANS:**

1. 02-C-01 CIVIL SITE PLAN, REPLACE:
  - a. Laydown area now noted.
2. 06-R-05 ELECTRICAL AND POWER (REMOVAL), REPLACE:
  - a. More detail on conduit and wire moving requirements now included.

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Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on the Bid Express web site at:

<http://www.bidexpress.com>

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 receive the material by another route.



1/23/2024

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Pete Holmgren, PE  
Chief Engineer – Madison Water Utility



**Pre-Bid Meeting Minutes**  
 Madison Water Utility

Pete Holmgren, PE  
 Water Utility – Chief Engineer &  
 Project Manager  
 (608) 261-5530  
 pholmgren@madisonwater.org

Angel Gebeau, PE (WI)  
 AECOM  
 Project Manager  
 (715) 498-1254  
[Angel.gebeau@aecom.com](mailto:Angel.gebeau@aecom.com)

Meeting: **Unit Well 15 PFAS TREATMENT**  
**Pre-Bid Meeting - Virtual**

Contract: Madison Contract No. 9342  
 Date and Time: Tuesday, January 9, 2024 – 1:00 P.M. (CST)  
 Place: Zoom (Virtual) – see below:  
Meeting ID: 840 3324 7952      Passcode: 1YZJ9r

	<b>Item</b>	<b>Time</b>
<b>I.</b>	Welcome and Introductions <ul style="list-style-type: none"> <li>A. Vendors                             <ul style="list-style-type: none"> <li><i>i.</i> Bob Bergsgaard – Aqueous Vets</li> </ul> </li> <li>B. Madison Water Utility – Project Management Team                             <ul style="list-style-type: none"> <li><i>i.</i> Joe Grande – Water Quality Manager</li> <li><i>ii.</i> Adam Wiederhoeft – Design and Construction Eng</li> <li><i>iii.</i> Pete Holmgren – Chief Eng</li> </ul> </li> <li>C. AECOM                             <ul style="list-style-type: none"> <li><i>i.</i> Angel Gebeau – Project Manager</li> </ul> </li> </ul>	1:00 pm
<b>II.</b>	City of Madison Affirmative Action Division and Associated Safe Drinking Water Loan Funding Requirements <ul style="list-style-type: none"> <li>A. Small Business Enterprise (DBE) requirements</li> <li>B. Affirmative Action Plan (AAP) process/requirements</li> <li>C. Goal – 8% DBE</li> <li>D. Guide:                             <ul style="list-style-type: none"> <li>Sheet A-1 For reference</li> <li><a href="http://www.cityofmadison.com/Business/PW/contractCompliance.cfm">http://www.cityofmadison.com/Business/PW/contractCompliance.cfm</a></li> </ul> </li> </ul>	1:12 pm

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Item	Time
<p>E. SBE Pre-bid meeting: January 18<sup>th</sup> Scheduled Meeting. Coordinate for in-person or phone call options. See Section A – Advertisement for Bids and Instructions to Bidders.</p> <p>F. Tracy Lomax – Affirmative Action Division / TLomax@cityofmadison.com / (608) 266-6510</p> <p>G. Jesus Sanchez-Cruz – Contract Compliance Specialist / jsanchez-cruz@cityofmadison.com / (608) 261-9162</p>	
<hr/> <b>III. Safe Drinking Water Loan Funding Requirements</b>	
<p>A. Disclosure of Ownership Form</p> <p>B. Wage Rates</p> <p>C. BABA Waiver</p> <p>D. American Iron and Steel</p>	
<hr/> <b>IV. Bidding Info, Contract Timeline and Permit Status Update</b>	1:20 pm
<p>A. Bids Due: 1/25/24 at 2:00 PM, opened at 2:30 PM (by hand to 1600 Emil St) (on-line at <a href="https://bidexpress.com">https://bidexpress.com</a> – City of Madison Contract No. 9342)</p> <p>B. Insurance</p> <p>C. Addendum 1 pending issue this week.</p> <ol style="list-style-type: none"><li>1. Completion dates</li><li>2. Liquidated damages</li><li>3. BABA Waiver and AIS requirements</li><li>4. Contractor document tracking program required</li><li>5. Limitations on submittals</li><li>6. Division 26 add to specifications</li><li>7. Beneficial occupancy definition</li></ol>	

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Item	Time
8. Pre-bid meeting minutes	
9. Available space for site trailer	
10. Wage rates if updated	
D. Prequalification/Affirmative Action Plan submittals	
E. Anticipated start dates.	
F. Permit Update: PSC / DNR / City Eng / Zoning / Building Permits: PSC Construction Auth., WDNR plan review, City of Madison. City of Madison building, HVAC, plumbing plan permit applications will be submitted upon bid award, and prior to construction. Contractor responsible for scheduling inspections.	
<b>V. General Project Information and Noteworthy Details</b>	1:25 pm
A. Well 15 General Project Overview	
B. Division 1	
1. Summary of Work –	
A. City of Madison Standard Specifications for Public Works Construction – 2023 Edition, forms a part of the contract documents as if attached. Available online.	
B. Requires all approvals prior to Notice To Proceed	
C. Madison Water Utility will provide programming work (work by others).	
D. Milestones – roof removal needs to be coordinated with weather and equipment delivery.	
2. Site Health and Safety and Protection of the Environment	
A. Wellhead protection area, no leaking equipment. Report leaks and spills immediately!	
B. Confined space entry is anticipated but not specifically	

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Item	Time
listed.	
3. Measurement and Payment	
A. Lump Sum work	
B. Schedule of values to be provided	
C. Price for media separate for reference	
D. Price for equipment shall be separated from installation for the equipment.	
4. Project Meetings	
A. Weekly meetings	
5. Submittals	
A. Online program requirements	
B. Iteration limits for submittals	
6. Testing Laboratory Services	
A. By Contractor	
7. Temp Construction Facilities and Utilities	
A. Space for trailer not currently shown on drawing set	
B. Restroom on site	
8. Operation and Maintenance	
A. Use forms provided	
9. Training	
A. Document training	
10. Project Record Documents	
A. Photos	
B. Markups	
C. Existing Conditions / Removals	
D. Architectural	
E. Structural	
F. Plumbing	
G. HVAC	

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Item	Time
H. Electrical	
I. Controls	
J. Process	
<b>VI. Questions from Contractors/ Misc. Topics</b>	<b>1:35 pm</b>
A. Is vessel ASME Stamp to be 125 PSI? Spec says operating pressure less than 100 psi. ASME Stamp may be 100 psi or higher.	
B. No further questions	

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**Notes:**

Someone did arrive for an onsite meeting but will return for the rescheduled on-site meeting. They did not attend virtually. Name of the on-site bidder was not available but they were not a noted plan holder.

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# Pre-Bid Meeting Minutes

Madison Water Utility

Pete Holmgren, PE  
 Water Utility – Chief Engineer &  
 Project Manager  
 (608) 261-5530  
[pholmgren@madisonwater.org](mailto:pholmgren@madisonwater.org)

Angel Gebeau, PE (WI)  
 AECOM  
 Project Manager  
 (715) 498-1254  
[Angel.gebeau@aecom.com](mailto:Angel.gebeau@aecom.com)

Meeting: **Unit Well 15 PFAS TREATMENT**  
**Pre-Bid Meeting**

Contract: Madison Contract No. 9342  
 Date and Time: Wednesday, January 17, 2024 – 10:00 A.M. (CST)  
 Place: UW15 – Project Site

### Item

**I. Welcome and Introductions**

**SIGN IN SHEET**

Name	Email	Representing	Phone No.
Angel Gebeau	<a href="mailto:angel.gebeau@aecom.com">angel.gebeau@aecom.com</a>	AECOM / Engineer	715-498-1254
Ashley Kahlhamer	<a href="mailto:akahlhamer@jfahern.com">akahlhamer@jfahern.com</a>	J.F. Ahern Co. / Estimator	920-907-5501
Jake Cates	<a href="mailto:jake.cates@danielsco.com">jake.cates@danielsco.com</a>	Daniels Construction	608-235-1859
Pat Dwyer	<a href="mailto:Pdwyer@mononaPFP.com">Pdwyer@mononaPFP.com</a>	Monona Plumbing	608-212-5182
Jeff Ladwis	<a href="mailto:jladwis@jfahern.com">jladwis@jfahern.com</a>	J.F. Ahern Co.	920-570-5070
Bob Bergsgaard	<a href="mailto:Rbergsgaard@aqueousvets.com">Rbergsgaard@aqueousvets.com</a>	Aqueous Vets	651-666-8020
Craig VanGrhsuen	<a href="mailto:Cvangrhsuer@augustwinter.com">Cvangrhsuer@augustwinter.com</a>	August Winter	920-585-1122
Rob Weissmann	<a href="mailto:Robert.Weissmann@pieperpower.com">Robert.Weissmann@pieperpower.com</a>	Pieper	262-402-7867
Jacob Loehr	<a href="mailto:jloehr@jfahern.com">jloehr@jfahern.com</a>	J.F. Ahern Co.	920-579-9094
Mike Knauf	<a href="mailto:mike@interstatesawing.com">mike@interstatesawing.com</a>	Interstate Sawing	262-343-2724
Lou Olson	<a href="mailto:lolson@findorff.com">lolson@findorff.com</a>	J.H. Findorff & Son	608-442-7368
Jim Thomas	<a href="mailto:Jim@interstatesawing.com">Jim@interstatesawing.com</a>	Interstate Sawing	608-513-5716

- A. Madison Water Utility – Project Management Team
  - i.* Joe Grande – Water Quality Manager
  - ii.* Adam Wiederhoeft – Design and Construction Eng
  - iii.* Pete Holmgren – Chief Eng
  - iv.* Doug and Dennis - Operations
- B. AECOM
  - i.* Angel Gebeau – Project Manager



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ii. Ginger L’Heureux – Project Engineer (not present)

[ginger.lheureux@aecom.com](mailto:ginger.lheureux@aecom.com)

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**II.** City of Madison Affirmative Action Division and Associated Safe Drinking Water Loan Funding Requirements

- A. Small Business Enterprise (DBE) requirements
- B. Affirmative Action Plan (AAP) process/requirements
- C. Goal – 8% DBE
- D. Guide:
  - Sheet A-1 For reference
  - <http://www.cityofmadison.com/Business/PW/contractCompliance.cfm>
- E. SBE Pre-bid meeting: January 18<sup>th</sup> Scheduled Meeting. Coordinate for in-person or phone call options. See Section A – Advertisement for Bids and Instructions to Bidders.
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- G. Jesus Sanchez-Cruz – Contract Compliance Specialist / [jsanchez-cruz@cityofmadison.com](mailto:jsanchez-cruz@cityofmadison.com) / (608) 261-9162

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**III.** Safe Drinking Water Loan Funding Requirements

- A. Disclosure of Ownership Form
  - B. Wage Rates
  - C. BABA Waiver
  - D. American Iron and Steel
-

**IV. Bidding Info, Contract Timeline and Permit Status Update**

- A. Bids Due: 1/25/24 at 2:00 PM, opened at 2:30 PM (by hand to 1600 Emil St) (on-line at <https://bidexpress.com> – City of Madison Contract No. 9342) (Since been changed!)
- B. Insurance
- C. Addendum pending issue this week.
  - 1. Completion dates
  - 2. Liquidated damages
  - 3. BABA Waiver and AIS requirements
  - 4. Contractor document tracking program required
  - 5. Limitations on submittals
  - 6. Division 26 add to specifications
  - 7. Beneficial occupancy definition
  - 8. Pre-bid meeting minutes
  - 9. Available space for site trailer
  - 10. Wage rates if updated
  - 11. Response to current comments / questions
- D. Prequalification/Affirmative Action Plan submittals
- E. Anticipated start dates.
- F. Permit Update: PSC / DNR / City Eng / Zoning / Building Permits: PSC Construction Auth., WDNR plan review, City of Madison. City of Madison building, HVAC, plumbing plan permit applications will be submitted upon bid award, and prior to construction. Contractor responsible for scheduling inspections.

**V. General Project Information and Noteworthy Details**

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- 
- A. Well 15 General Project Overview
  - B. Division 1
    - 1. Summary of Work –
      - A. City of Madison Standard Specifications for Public Works Construction – 2023 Edition, forms a part of the contract documents as if attached. Available online.
      - B. Requires all approvals prior to Notice To Proceed
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      - A. Wellhead protection area, no leaking equipment. Report leaks and spills immediately!
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    - 3. Measurement and Payment
      - A. Lump Sum work
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    - 4. Project Meetings
      - A. Weekly meetings
    - 5. Submittals
      - A. Online program requirements
      - B. Iteration limits for submittals
    - 6. Testing Laboratory Services
      - A. By Contractor
    - 7. Temp Construction Facilities and Utilities
-

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- A. Space for trailer not currently shown on drawing set
  - B. Restroom on site
  - 8. Operation and Maintenance
    - A. Use forms provided
  - 9. Training
    - A. Document training
  - 10. Project Record Documents
    - A. Photos
    - B. Markups
  - C. Existing Conditions / Removals
  - D. Architectural
  - E. Structural
  - F. Plumbing
  - G. HVAC
  - H. Electrical
  - I. Controls
  - J. Process
-

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**VI. Questions from Contractors/ Misc. Topics**

Air Stripper is QED model EZ96.6 ([Data on model added in Addenda 3](#))

Driveway work- noted work is for mill and overlay only. Details on base provided for reference. ([No modifications to plan set required](#))

Pilot test information was requested. ([links provided in Addenda 3](#))

Clarification on the tank height was requested. ([No modifications are anticipated as drawings provide adequate information](#))

AIS exemption may be provided as applicable. ([No modifications are anticipated to plan set](#))

Tank interior coatings must be suitable for media selected. ([No modifications are anticipated to plan set](#))

New glass block for roof is acceptable provided it matches existing. ([No modifications are anticipated to plan set](#))

New floor will not require epoxy coating. ([No modifications are anticipated to plan set](#))

Madison Water will provide any updates if attic stock is available for block. ([No modifications are anticipated to plan set](#))

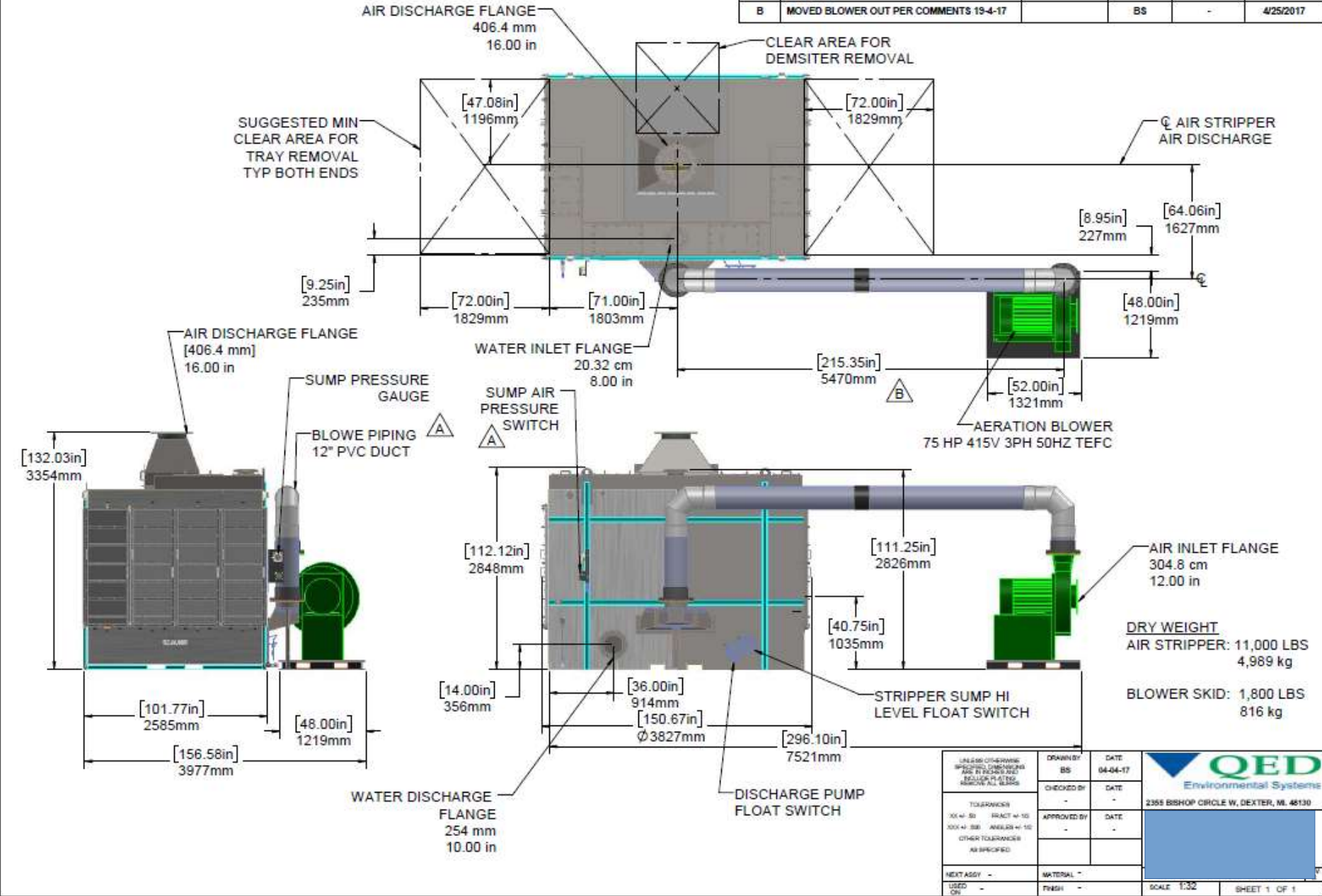
More time was requested for bidding. ([Addenda 2 extended the bid duration](#))

It was noted that the electrical work to move conduit is extensive and was not clear in the documents. Photos and videos of the site are available upon request to engineer at [angel.gebeau@aecom.com](mailto:angel.gebeau@aecom.com)

# ADDENDUM 3

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF Q.E.D. ENVIRONMENTAL. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF Q.E.D. ENVIRONMENTAL IS PROHIBITED.

REVISIONS					
REV.	DESCRIPTION	ECO #	DRAWN BY	CHECKED BY	DATE
	RELEASED FOR APPROVAL		BS		4-4-17
A	REMOVED JUNCTION BOX, ADDED FLOAT SWITCHES		BS	-	4/11/2017
B	MOVED BLOWER OUT PER COMMENTS 19-4-17		BS	-	4/25/2017



USE AND OTHERS SPECIFIED DIMENSIONS FOR FITTINGS AND BOLTER PLATES REMOVE ALL BARS	DRAWN BY BS	DATE 04-04-17	<p>2355 BISHOP CIRCLE W, DEXTER, MI 48130</p>
TOLERANCES XX ± .50 FRACT ± .10 XXX ± .001 ANGLES ± .10 OTHER TOLERANCES AS SPECIFIED	CHECKED BY -	DATE -	
NEXT ASSY -	APPROVED BY -	DATE -	
USED ON -	MATERIAL -	FINISH -	
SCALE: 1:32		SHEET 1 OF 1	

# E-Z Tray®

## The #1 Choice in Sliding Tray Air Stripper Technology



The only self-contained Air Stripper  
certified by NSF to NSF/ANSI Standard 61

QED's E-Z Tray® and E-Z Stacker® Air Strippers are covered by U.S. Patents: 5,518,668; 8,523,152; and 8,678,353

# Leadership in Technology, Design, and Support

QED leads the way in innovative air strippers,  
making them easier to operate and maintain:

1. The original, patented sliding-tray air strippers
2. From the top process technology experts in the industry, with 20+ years of successful air stripper application experience
3. Continued innovation for improved performance and reduced maintenance costs



## ***E-Z Tray***®

- Lower long-term O&M costs due to easier tray maintenance than tower-type or stacking tray strippers
- Lightweight, slide-out trays that don't require hoists, regardless of the size of the air stripper
- Requires less building space, which can lower building costs



## ***E-Z Stacker***®

- Sized and priced to be the economical choice for low to moderate-flow cleanup applications
- Highly efficient VOC removal
- Positive-seal engineering prevents leakage problems

\* QED's E-Z Tray® and E-Z Stacker® Air Strippers are covered by U.S. Patents: 5,518,668; 8,523,152; and 8,678,353



# Highly effective VOC removal rates and lightweight trays that allow for quick and easy maintenance by one person

Uncoated stainless steel



No-stick coating

Air flows up through perforated trays creating a turbulent froth zone with a high air-to-liquid surface area for mass transfer of volatile organic compounds (VOCs).



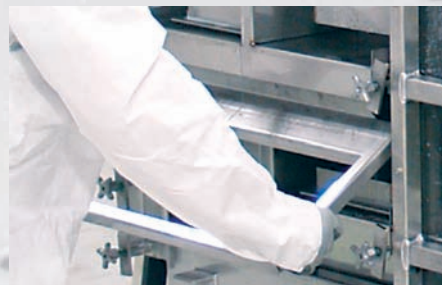
E-Z Tray access area

Additional space required by conventional stacking tray Air Strippers

A conventional air stripper needs more than twice the access and tray removal space as an E-Z Tray® Air Stripper.



Optional hinged door allows for easy access without door removal.



Slide-out trays allow maintenance by one person.



E-Z Stacker® Air Strippers provide a lower cost solution for low flow removal of volatile organic compounds (VOCs) from groundwater.



# Sliding Tray Air Strippers



Exclusive Design Results  
in VOC Removal Efficiencies  
of up to 99.99%  
at Flow Rates up to  
1,000 GPM.



The only self-contained Air Stripper certified by NSF to NSF/ANSI Standard 61

The E-Z Tray® Air Stripper is a sliding tray, stainless steel air stripper used to remove volatile organic compounds (VOCs) from contaminated groundwater and waste streams. The exclusive design of the E-Z Tray stripper results in very high removal efficiencies in an easier to maintain process unit.

Any air stripping process subject to fouling conditions has to contend with periodic cleaning in order to retain treatment efficiencies and capacity. Tower air strippers can become maintenance headaches when the tower packing becomes clogged and cemented together with bio-fouling or precipitants. When the perforated trays in stacking tray air strippers become fouled they require major disassembly, cranes or hoists, and lots of access space.

Unlike traditional air strippers, E-Z Tray Air Strippers from QED use removable, lightweight, front slide-out trays. This unique feature provides many advantages, including one person cleaning and less building space.

E-Z Tray Air Strippers are available in configurations with 4 or 6 trays, with maximum flow rates from 50 gpm (4-100 Lpm) all the way up to 1,000 gpm (3,784 Lpm).

### High Capacity Process Air Strippers

These air strippers are engineered to serve in larger, process-type projects involving multiple treatment stages, where they are an effective component of large-scale water or wastewater processes in manufacturing, refining, chemical processing, and other industries. They can act as a pre-treatment stage for other process elements, such as large aerobic bio treatment units, removing VOCs at much lower airflow rates to reduce the costs of off-gas treatment.

All of this, combined with the easier maintenance and a smaller footprint, has led QED's E-Z Tray sliding tray Air Strippers to become the preferred choice for major remediation and process stream projects in the U.S. and abroad.

## The Advantages of E-Z Tray over Conventional Air Strippers

### E-Z Tray Air Strippers

- Single person cleaning
- Easy process monitoring and inspection, even while in operation
- Reduced footprint for installation and maintenance
- High removal efficiencies easier to maintain
- Easily modeled online to facilitate process evaluation

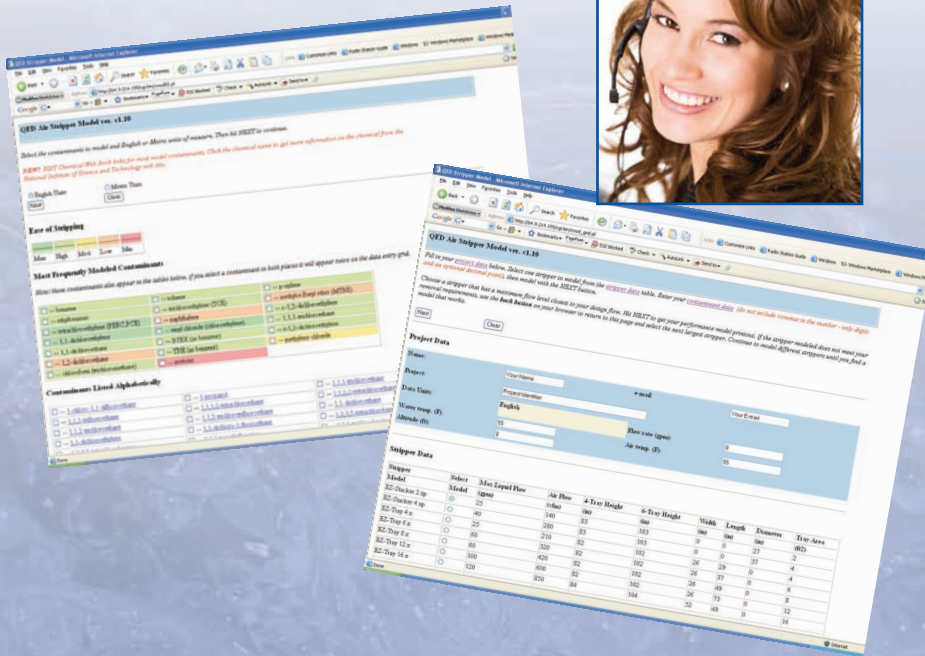
### Tower Air Strippers

- Packing condition and liquid and air flow distribution are very difficult to observe
- Small footprint but very tall structure required
- More difficult to keep operating at design performance
- More complex process design assistance required
- Laborious packing replacement and interior cleaning required

### Stacking Tray Air Strippers

- Major disassembly steps and crew needed
- Difficult or impossible to observe air and liquid flow distribution during operation
- Lots of space needed for disassembly, to access all sides and to lift and store tray stages
- More difficult to keep operating at design performance
- Online modeler not offered

# Online Modeler with Accessible Technical Support!



The first Online Performance Modeler, developed to assist you in selecting the most effective air stripping package for your groundwater cleanup project

Try it for yourself today! Use our exclusive online stripper modeler at [www.qedenv.com/modeler](http://www.qedenv.com/modeler) to spec the exact size and configuration for your project. Then talk to a QED applications specialist toll-free at **(800) 624-2026** for fast, free system design assistance and a price quote.



## How it Works

As contaminated groundwater enters through the top of the air stripper, millions of air bubbles are forced by blower pressure up through the perforated trays. This creates a turbulent froth zone with an extremely high air-to-liquid surface area for mass transfer of volatile organic compounds (VOCs) from liquid to air. Using the froth instead of a conventional tower packing delivers high VOC removal efficiencies even under fouling conditions, and it is easier to inspect and maintain.



The only self-contained Air Stripper certified by NSF to NSF/ANSI Standard 61

“QED’s E-Z Tray® Air Stripper is the first self-contained air stripper that has earned certification from NSF International, demonstrating QED’s dedication to enhancing water quality,” said Theresa Bellish, Business Unit Manager for NSF International. For the details on the certification visit [www.qedenv.com/airstripper](http://www.qedenv.com/airstripper).

# Stacking Tray Air Strippers

## *E-Z Stacker*<sup>®</sup>

**Innovative Stacking Design  
Delivers Economical,  
Reliable Air Stripping**



### **Low-Cost, Low-Maintenance, Low-Flow Performance**

The innovative design of E-Z Stacker<sup>®</sup> Air Strippers delivers many advantages to environmental consultants, remediation contractors, and end users.

E-Z Stacker models are sized and priced to be the most economical choice for many low to moderate flow cleanup applications (up to 40 gpm). Low capital expense and low O&M requirements make the difference.

The unique E-Z Stacker configuration consists of a series of integrally molded shell / tray modules. The multiple sieve tray design uses forced-draft air bubble generation to provide rapid, effective VOC removal.

### **Easy Disassembly for Routine Cleaning is a Quick, Simple One-person Job**

The whole stack (4 or 6 trays) can be taken apart by releasing just four or six connections. Trays have no loose parts when disassembled, and cannot be reassembled incorrectly. Two sizes are available in four or six tray versions, for maximum flow ranges from 1-40 gpm.

### **Engineered for Maximum Ruggedness and Reliability**

Every element of the heavy-duty HDPE construction has been engineered for durable, reliable performance with a multi-step positive seal against leakage.

The plastic construction makes for a low cost, corrosion-resistant air stripper for installations where the waste water has high chloride content, such as energy operations waste water.

### **Positive-Seal Construction for Leak-Free Performance**

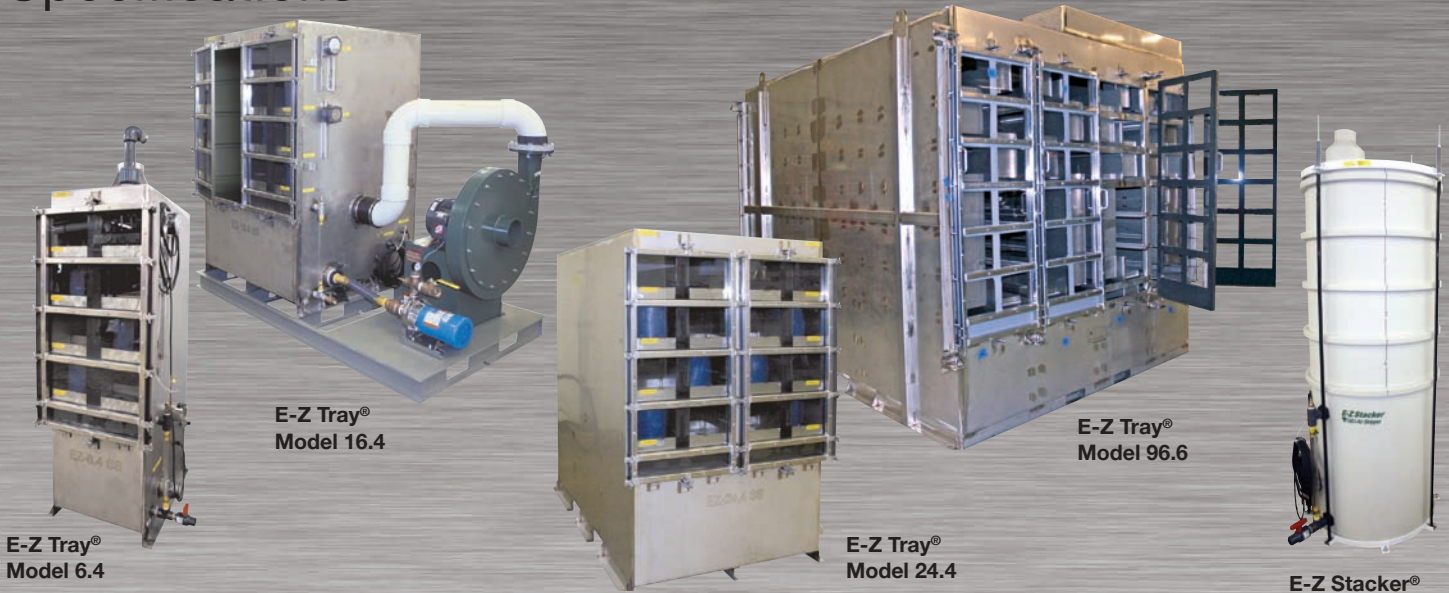
Cylindrical shape provides consistent tray-to-tray contact with no loose or weak points from corners or edges. And, the unique 360 degree lockdown ring, made of solid 2x2x.25 steel angle stock, applies even pressure to the whole circumference of the complete stack.

Tray bottom geometry prevents contact between the water and the gaskets, to further reduces chance of leaking. While heavy-duty gaskets are captured on both inboard and outboard edges to eliminate creeping out of position. Continuous molded-in o-ring bead provides optimum gasket compression.

Unlike tedious, potentially weak tray-to-tray latches, the whole stack sets down securely with just four or six easy-access connections.

The competition just doesn't stack up! Call QED today to talk to one of our Applications Specialists about which E-Z Stacker model is the best choice for your project.

# Specifications



## E-Z Tray® Stainless Steel, Removable Tray Air Stripper Specifications

Model No.	Max. Flow Range gpm (Lpm)	Dry Weight lbs. (kg)	Oper. Weight lbs. (kg)	Shell Dimension DxWxH in. (cm)	Trays Per Tier lbs. (kg)	Active Area ft. <sup>2</sup> (m <sup>2</sup> )	Nominal Air Flow cfm (m <sup>3</sup> /min)	Add'l Space for Tray Removal* in. (cm)
4.4	1-50 (4-189)	630 (286)	985 (447)	30 x 34 x 82 (76 x 86 x 208)	4 x 29 (4 x 13)	2.8 (0.26)	210 (5.95)	27 (69)
4.6	1-50 (4-189)	780 (354)	1,219 (553)	30 x 34 x 102 (76 x 86 x 259)	6 x 29 (6 x 13)	2.8 (0.26)	210 (5.95)	27 (69)
6.4	1-65 (4-246)	790 (358)	1,285 (583)	39 x 34 x 82 (99 x 86 x 208)	4 x 40 (4 x 18)	3.8 (0.35)	320 (9.06)	37 (94)
6.6	1-65 (4-246)	978 (443)	1,591 (722)	39 x 34 x 102 (99 x 86 x 259)	6 x 40 (6 x 18)	3.8 (0.35)	320 (9.06)	37 (94)
8.4	1-75 (4-284)	955 (433)	1,615 (733)	51 x 34 x 82 (130 x 86 x 208)	4 x 50 (4 x 23)	5.6 (0.52)	420 (11.9)	47 (119)
8.6	1-75 (4-284)	1,182 (536)	1,956 (887)	51 x 34 x 102 (130 x 86 x 259)	6 x 50 (6 x 23)	5.6 (0.52)	420 (11.9)	47 (119)
12.4	1-120 (4-454)	1,165 (528)	2,105 (955)	75 x 34 x 82 (191 x 86 x 208)	4 x 60 (4 x 27)	8.8 (0.82)	600 (17.0)	72 (183)
12.6	1-120 (4-454)	1,442 (654)	2,606 (1,182)	75 x 34 x 102 (191 x 86 x 259)	6 x 60 (6 x 27)	8.8 (0.82)	600 (17.0)	72 (183)
16.4	1-150 (4-566)	1,625 (737)	2,870 (1,302)	52 x 59 x 84 (132 x 150 x 213)	8 x 50 (8 x 23)	11.1 (1.03)	850 (24.1)	47 (119)
16.6	1-150 (4-566)	2,011 (912)	3,553 (1,612)	52 x 59 x 104 (132 x 150 x 264)	12 x 50 (12 x 23)	11.1 (1.03)	850 (24.1)	47 (119)
24.4	1-250 (4-946)	2,100 (953)	3,980 (1,805)	75 x 59 x 84 (191 x 150 x 213)	8 x 60 (8 x 27)	17.5 (1.63)	1,300 (36.8)	72 (183)
24.6	1-250 (4-946)	2,599 (1,179)	4,926 (2,234)	75 x 59 x 104 (191 x 150 x 264)	12 x 60 (12 x 27)	17.5 (1.63)	1,300 (36.8)	72 (183)
36.4	1-375 (1,420)	3,200 (1,451)	6,085 (2,760)	75 x 98 x 96 (191 x 249 x 244)	4 x 60 (4 x 27)	26.3 (2.4)	1,900 (53.8)	72 (183)
36.6	1-375 (1,420)	3,900 (1,769)	7,532 (3,416)	75 x 98 x 116 (191 x 249 x 295)	6 x 60 (6 x 27)	26.3 (2.4)	1,900 (53.8)	72 (183)
48.4	1-500 (1,893)	5,000 (2,270)	12,500 (5,670)	124 x 76 x 96 (315 x 193 x 244)	16 x 60 (16 x 27)	27 (2.51)	2,600 (73.6)	72 (183)
48.6	1-500 (1,893)	5,500 (2,495)	13,000 (5,897)	124 x 76 x 116 (315 x 193 x 295)	24 x 60 (24 x 27)	27 (2.51)	2,600 (73.6)	72 (183)
72.4	10-750 (2,839)	6,400 (2,903)	14,600 (6,622)	149 x 98 x 100 (378 x 249 x 254)	4 x 60 (4 x 27)	52.5 (4.88)	3,800 (108)	2 x 72 (2 x 183)
72.6	10-750 (2,839)	7,800 (3,538)	15,100 (6,849)	149 x 98 x 120 (378 x 249 x 305)	6 x 60 (6 x 27)	52.5 (4.88)	3,800 (108)	2 x 72 (2 x 183)
96.4	10-1,000 (3,785)	11,000 (4,990)	25,000 (11,340)	149 x 124 x 100 (378 x 315 x 254)	32 x 60 (32 x 27)	54 (5.02)	5,200 (147)	2 x 72 (2 x 183)*
96.6	10-1,000 (3,785)	11,500 (5,216)	30,000 (13,608)	149 x 124 x 120 (378 x 315 x 305)	48 x 60 (48 x 27)	54 (5.02)	5,200 (147)	2 x 72 (2 x 183)*

Standard construction is 304 SS, other alloys upon request. \*Allow additional space for accessory components (blower, piping, etc.).

## E-Z Stacker® Cylindrical, Poly, Low-flow Air Stripper Specifications

Model	Flow gpm (Lpm)	Dry Weight lbs. (kg)	Operation Weight lbs. (kg)	Shell Dim. Diam.xH in. (cm)	No. Trays and Weight: lbs. (kg)	Active Area: ft. <sup>2</sup> (m <sup>2</sup> )	Nominal airflow: cfm (m <sup>3</sup> /min)
EZ-2.4P	1-25 (4-94.6)	103 (46.72)	483 (219)	27 x 83 (68.6 x 210.8)	4 @ 18 (8.2)	2.6 (0.24)	140 (3.96)
EZ-2.6P	1-25 (4-94.6)	135 (61.3)	531 (240.9)	27 x 103 (68.6 x 261.6)	6 @ 18 (8.2)	2.6 (0.24)	140 (3.96)
EZ-4.4P	1-40 (4-151.4)	155 (70.3)	1,004 (455.4)	37 x 83 (94.0 x 210.8)	4 @ 37 (16.8)	5.8 (0.54)	280 (7.93)
EZ-4.6P	1-40 (4-151.4)	203 (92.1)	1,134 (514.4)	37 x 102 (94.0 x 259.1)	6 @ 37 (16.8)	5.8 (0.54)	280 (7.93)

\* skid mounted

# A comprehensive collection of QED's Air Stripper Case Studies can be found online at: [www.qedenv.com/Airstrippers](http://www.qedenv.com/Airstrippers)



### **Removing Trichlorethene (TCE) from Drinking Water**

The U.S. Army Corps of Engineers decided that the most logical and cost effective groundwater treatment choice was low-profile air strippers. Air stripping is a simple, reliable, and proven technology for the removal of TCE from water supplies.



### **Treating Vinyl Chloride in Drinking Water with 99.99% Removal Efficiency**

The Cedarburg, Wisconsin Light and Water Utility installed an E-Z Tray Air Stripper in a discreet addition to their existing production pump building to treat groundwater containing vinyl chloride that has been traced back to a nearby landfill.



### **Removing Chlorinated Solvent Contamination in Australia**

A Superfund site in Sydney, Australia chose E-Z Tray Air Strippers organized in series (40 units total) to overcome all of the site's challenges. The client would have used packed towers, but was concerned about workers having easy access to maintain the units, and the highly corrosive environment.



### **Ballast Water Treatment on Alaskan Coastline**

An Alaskan oil terminal collects and treats contaminated ballast water before discharge, while dealing with extreme fluctuations of liquid temperatures and contaminant concentrations. QED ran different scenarios using our on-line air stripper performance model, and the site selected four of the largest 1,000 gallon per minute E-Z Tray units.



### **Pre-treating Using Air Strippers**

Two pharmaceutical plants in Puerto Rico use large SBR systems to treat wastewater. New regulations require them to treat the SBR off-gas. Instead of installing a very large CATOX, they decided to pre-treat the wastewater with a more efficient E-Z Tray Air Stripper before it enters the SBRs so they can use a much smaller CATOX unit.



### **Using a Compact Design to Treat a Gasoline Spill in a Residential Area**

A petroleum company installed compact E-Z Tray Air Strippers on a small lot in a high-end residential neighborhood on Long Island, New York. Compact shipping containers were used to house three E-Z Tray units and other equipment in the same space that would have been totally filled by just one traditional stripper.

Watch previously recorded webinars at [qedenv.com/webinars](http://qedenv.com/webinars)  
 Visit [www.youtube.com/QEDmovies](http://www.youtube.com/QEDmovies) to view two online movies



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## SECTION 01 11 00

## SUMMARY OF WORK

## PART 1 GENERAL

## 1.01 SUMMARY

A. This project includes Unit Well 15 (UW 15) PFAS treatment equipment. Project includes two GAC vessels, two ion exchange vessels, roof movement to accommodate vessels, treated water reservoir separation to create a filter-to-waste tank, chemical feed location changes, acid feed system changes, general HVAC, electrical, and architectural improvements, and driveway resurfacing, all within the City of Madison, Dane County, Wisconsin.

B. Measurement and Payment:

1. Comply with Section 01 29 02.

## 1.02 FORM OF SPECIFICATIONS

A. These Specifications are written in imperative and abbreviated form. Imperative language of Specification sections is directed at CONTRACTOR, unless specifically noted otherwise. Incomplete sentences in Specifications shall be completed by inserting “shall,” “CONTRACTOR shall,” “shall be,” and similar mandatory phrases by inference in same manner as they are applied to notes on Drawings. Words “shall be” shall be supplied by inference where colon (:) used within sentences or phrases. Except as worded to contrary, fulfill (perform) indicated requirements whether stated imperatively or otherwise.

B. Items of Work are specified by section. Specifications or requirements of one or more sections may apply or be referenced in other sections.

C. Provide Work described and comply with requirements stated in each Specification section and Drawings unless specifically assigned to other CONTRACTORS or OWNER.

## 1.03 CONTRACTS

A. Perform Work under single lump sum price Contract(s) with OWNER.

B. Contract “Notice To Proceed” will be provided following:

1. DNR approval of the pump station design has been received.
2. DSPS approval, if required, has been received.
3. PSC approval and OWNER acceptance of terms has been received.
4. City board approval.

C. Failure to meet the deadlines for any of beneficial occupancy, substantial completion, or final completion will result in liquidated damages as specified in the City of Madison’s Standard Specifications for Public Works Construction - 2023 Edition, Section 109.9.

## 1.04 WORK BY OTHERS

A. Utility Services:

1. Madison Water Utility will operate existing and new valves connecting to the active water system.
2. Wisconsin Public Service will make adjustments to their facilities (generator) should the need arise concurrent with Work under this Contract.
- 2.3. Madison Water Utility will complete programing updates for the SCADA system.

B. Rehabilitation of Well 15 by OTHERS.

C. Materials Provided by OWNER:

1. None

1.05 MILESTONES (WORK SEQUENCE)

A. Construct Work in stages to accommodate use of site during construction period; coordinate Construction Progress Schedule and operations with OWNER and ENGINEER.

1. Work within existing road right of ways or easements indicated on Drawings.
2. Access to all existing driveways shall be maintained to extent possible.

B. Construct Work in stages to provide for vessel installation.

1. Do not remove roof until vessel delivery is confirmed.
2. Do not remove roof when danger of freezing conditions is imminent.

C. Erosion control measures shall be in place prior to the start of construction. Erosion control measures shall be inspected regularly and maintained throughout the project Work in accordance with the notes on the construction plans.

D. The entire project shall be and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before dates specified in the agreement.

1.06 BENEFICIAL OCCUPANCY

A. Completion Dates

1. Deadline for beneficial occupancy will be June 30, 2025.
2. Failure to meet the beneficial occupancy deadline will result in liquidated damages.

- a. Liquidated damages are specified in the City of Madison's Standard Specifications for Public Works Construction - 2023 Edition, Section 109.9.

B. Complete the following before requesting Engineer's inspection for certification of beneficial occupancy:

1. Assure the following:
  - a. All equipment signed off from the vendor
  - b. All equipment has been tested, adjusted and properly started and commissioned.



- c. Facility commissioning is successful.
- d. All inspections complete (see below)
- e. Owner has unrestricted use of entire facility.
- f. Owner is able to operate the complete facility as designed and is able to provide safe and reliable water supply to the water distribution system.
- 2. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
- 3. Obtain, submit releases enabling Owner unrestricted use of the Work and access to services and utilities.
- 4. Regulatory requirements:
  - a. Where required, obtain occupancy permits, operating certificates, similar releases.
  - b. Obtain necessary State, City, Fire, Building Department, and other inspections as required
- 5. Bonding and insurance:
  - a. Consent of Surety to Reduction In or Partial Release of Retainage.
  - b. Advise Owner of pending insurance change-over-requirements.

C. Inspection Procedures:

- 1. When prerequisites are complete, submit request in writing to Engineer stating that all requirements are satisfied, and requesting inspection.
- 2. Upon receipt of Contractor's request for inspection, Engineer will either proceed with inspection or advise Contractor of unfilled prerequisites.
- 3. Following initial inspection, Engineer will either prepare Certificate of Substantial Completion, or advise Contractor of work which must be performed before certificate will be issued. Engineer will repeat inspection when requested and when assured that work has been substantially completed.
- 4. Results of completed inspection will form the basis of requirements for Final Acceptance.

1.07 CONTRACTOR'S USE OF PREMISES

- A. Limit use of premises for Work and storage to allow for following.
  - 1. Work by other CONTRACTORS.
  - 2. OWNER occupancy.
- B. Coordinate use of premises with ENGINEER and OWNER.
- C. Assume full responsibility for protection and safekeeping of products under this Contract.
- D. Obtain and pay for use of additional storage or Work areas needed for operations at no additional cost to OWNER.

- E. Confine operations to areas within road right of ways and easements indicated. Do not disturb portions of site beyond areas in which Work is indicated. Work is adjacent to public park and protection from public entering site is required.
- F. Keep driveways, roads, and entrances serving premises clear and available to private residents at all times, except when driveway approach, including curb and gutter across, is being poured and cured. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on Site.
- G. Contractor shall maintain the project worksite in an orderly fashion, including stockpiled material, pipe for utilities, equipment, and tools. Contractor will cleanup, remove, or relocate said materials, equipment, pipe, or tools as directed by Engineer or Owner.

1.07 EASEMENTS, LICENSES, AND PERMITS

- A. Easements, construction licenses, and permits obtained for Work shown on Drawings.
  - 1. OWNER has copies of documents on file for review.
  - 2. Comply with provisions of easements, licenses, and permits.
  - 3. Obtain additional construction easements necessary to complete Work.
  - 4. Easements are shown on Drawings.
  - 5. Perform construction within existing rights-of-way or within limits of easements and construction licenses.
  - 6. Obtain written authorization from affected property owners or maintaining authorities if construction is outside these areas.
  - 7. Comply with requirements of owners or maintaining authorities.
  - 8. Obtain written approval of restoration from easement and construction license grantors shown on Drawings.

1.08 STANDARD SPECIFICATIONS

- A. Perform utility Work in accordance with these Specifications and City of Madison Standard Specifications (“City Specifications”) available online:  
<https://www.cityofmadison.com/engineering/developers-contractors/standard-specifications>

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not Used)

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Section includes administrative and procedural requirements for substitutions.

1.02 DEFINITIONS:

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.03 SUBMITTALS:

- A. Submit the following shop drawings in accordance with Section 01 33 00.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use Form 01 25 00-1 to request substitution.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Justification for use of the proposed equivalent item(s), including evidence, as applicable, that Contract specified material, product or equipment is unobtainable or unobtainable within an acceptable time for Contract completion.
    - b. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable. If the Contractor is proposing the substitution because of unavailability of the product, submit a letter from the manufacturer stating the product is unavailable with an explanation of why it is unavailable with the Form 01 25 00-1
    - c. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
    - d. Detailed comparison of qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, electrical characteristics, visual effect, sustainable design characteristics, warranties, and

specific features and requirements indicated and specified. Indicate deviations, if any, from the Work specified.

- e. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - f. Samples, where applicable or requested.
  - g. Certificates and qualification data, where applicable or requested.
  - h. List of similar installations for completed projects with project names and addresses and names, telephone numbers and addresses of engineers and owners.
  - i. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - j. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - k. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - l. Cost information, including a proposal of change, if any, in the Contract Sum.
  - m. A prediction of any effects the proposed change will have on operation and maintenance costs, where applicable.
  - n. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is intended for applications indicated.
  - o. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.04 ACCEPTABLE EQUIVALENT PRODUCTS, MATERIALS AND EQUIPMENT:

- A. Any other product the contractor wants to substitute must follow the requirements of this Section.
- B. If the Contractor chooses to substitute equipment other than a named manufacturer, any additional costs required to accommodate such equipment shall be made without a change in the Contract Price or Contract Time and at no additional cost to the Owner.

1.05 MATERIAL AND WORKMANSHIP:

- A. Whenever a material, article, system or sub-system is specified or described by using the name and/or model of a proprietary product or trademark or the name of the manufacturer or vendor, the specified item shall establish the type, function, and quality required; it shall be understood that the words “or approved equivalent” are implied whether or not they follow the proprietary enumeration.
- B. The Owner reserves the right to determine when proprietary items have no equivalency, and when uniformity of operations, interchangeability of parts, standard parts inventory, etc., are in Owner’s best interest.
- C. Requests for review of equivalency will be considered upon submission of sufficient information as described herein, to allow complete review.
- D. Such requests will not be accepted from anyone other than the Contractor. Such submission must be made prior to purchase, fabrication, manufacture or use of the equivalent items under consideration.
- E. The Contractor is responsible for all delays caused by its failure to submit complete and accurate information with any request for approval of any material, article, system or subsystem, as an equivalent.

1. Contractor Risk:

- a. If the Contractor includes in his bid or later proposes any material, product or equipment that he considers equivalent to that specified, the Contractor assumes all risk of any sort associated with acceptance or rejection of proposed equivalent items.
- b. The Contractor shall have no right to make claim based upon his bid that includes a proposed equivalent item(s) of work which resulted in a lower bid amount for said item(s) or lower total bid.

2. Equivalency:

- a. An item will be considered equivalent to the item specified if:
  - (1) It is equal or better in design and strength in all subparts, quality, reliability and durability, operation, maintenance and serviceability, as applicable; and
  - (2) It is equal or better in specified parameters in performance in all respects for the specific function(s) indicated in the contract.

3. Supplemental Requirements:

- a. The time associated with equivalency review will be paid by the Contractor.
- b. Any tests required by the Owner to establish quality and performance standards shall be promptly conducted by or through the Contractor at no additional cost to the Owner.
- c. The Contractor shall submit any additional data requested by the Engineer for the equivalency review.

- d. The Contractor shall satisfactorily accomplish all changes, including any engineering associated with use of equivalent items, at no additional cost to the Owner.
- e. The Contractor shall have no right of appeal to any decision rejecting the equivalency of any item.

1.06 QUALITY ASSURANCE:

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers at no cost to the Engineer or Owner.

1.07 PROCEDURES:

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS:

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

- 1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
  - a. Requested substitution is consistent with the Contract Documents and will produce specified and indicated results.
  - b. Substitution request is fully documented and properly submitted.
  - c. Requested substitution will not negatively affect Contractor's construction schedule.
  - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - e. Requested substitution is compatible with other portions of the Work.
  - f. Requested substitution has been coordinated with other portions of the Work.
  - g. Requested substitution provides specified warranty.
  - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

- B. Substitutions for Convenience: Not allowed unless otherwise indicated in Specifications.
1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution offers Owner an advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    - b. Requested substitution does not require revisions to the Contract Documents.
    - c. Requested substitution is consistent with the Contract Documents and will produce specified and indicated results.
    - d. Substitution request is fully documented and properly submitted.
    - e. Requested substitution will not affect Contractor's construction schedule.
    - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - g. Requested substitution is compatible with other portions of the Work.
    - h. Requested substitution has been coordinated with other portions of the Work.
    - i. Requested substitution provides specified warranty.
    - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

### PART 3 - EXECUTION

#### 3.01 CONTRACT CLOSEOUT:

- A. Provide in accordance with Section 01 77 00.

**Form 01 25 00-1  
SUBSTITUTION REQUEST**

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to design, including Engineer design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: \_\_\_\_\_

Signed by: \_\_\_\_\_

Firm: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Attachments: \_\_\_\_\_

**Engineer REVIEW AND ACTION**

- Substitution approved – Make submittals in accordance with Specification Section 01 25 00.
- Substitution approved as noted – Make submittals in accordance with Specification Section 01 25 00.
- Substitution rejected – Use specified materials.
- Substitution Request received too late – Use specified materials.

Signed by: \_\_\_\_\_ Date: \_\_\_\_\_

Additional Comments:  Contractor  Subcontractor  Supplier  Manufacturer  Engineer

Other: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Form 01 25 00-1 (Continued)  
SUBSTITUTION REQUEST

Project: \_\_\_\_\_ Substitution Request Number: \_\_\_\_\_  
 \_\_\_\_\_ From: \_\_\_\_\_  
 To: \_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_ Engineer Project Number: \_\_\_\_\_  
 Re: \_\_\_\_\_ Contract For: \_\_\_\_\_  
 Specification Title: \_\_\_\_\_ Description: \_\_\_\_\_  
 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Article/Paragraph: \_\_\_\_\_  
 Proposed Substitution: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Trade Name: \_\_\_\_\_ Model No. \_\_\_\_\_  
 Installer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 History:  New product  1-4 years old  5-10 years  More than 10 years old  
 Differences between proposed substitution and specified product: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Point-by-point comparative data attached – REQUIRED BY Engineer  
 Reason for not providing specified item: \_\_\_\_\_  
 \_\_\_\_\_

Similar Installation:  
 Project: \_\_\_\_\_ Engineer/Architect: \_\_\_\_\_  
 Address: \_\_\_\_\_ Owner: \_\_\_\_\_  
 \_\_\_\_\_ Date Installed: \_\_\_\_\_

Proposed substitution affects other part of Work:  No  Yes, explain \_\_\_\_\_  
 \_\_\_\_\_

Savings to Owner for accepting substitution: \_\_\_\_\_  
 Proposed substitution changes Contract Time:  No  Yes [Add] [Deduct] \_\_\_\_\_ days.  
 Supporting Data Attached:  Drawings  Product Data  Samples  Tests  Reports \_\_\_\_\_

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. ~~1.~~ Procedural requirements for Work-related submittals including Construction Progress Schedules, Shop Drawings, product data, samples, operation and maintenance (O&M) data, schedule of values and other miscellaneous Work-related submittals.

B. Tracking

1. Submittal tracking shall be managed through an online platform of the contractor's choosing.
2. Submittal tracking shall be free for use to the OWNER and ENGINEER.
- ~~1.3.~~ Email notices and reminders shall be sent automatically through the submittal tracking software.

1.02 DEFINITIONS

A. Submittal for Review:

1. Submittal for ENGINEER's review in accordance with requirements of Contract Documents.

B. Submittal for Record:

1. Submittal for inclusion into OWNER's records prior to Substantial Completion. Submittal will not be reviewed by ENGINEER.

1.03 CONSTRUCTION PROGRESS SCHEDULES

A. Prepare and submit Construction Progress Schedule to ENGINEER for review, within 5 days after effective date of Contract.

B. No Work shall be done between 6:00 p.m. and 7:00 a.m., nor on Saturdays, Sundays or legal holidays without written permission of OWNER. Emergency Work may be done without prior permission. Saturday Work may be allowed with written permission of OWNER, with no equipment start up prior to 7:30 a.m.

C. Night Work may be established by CONTRACTOR as regular procedure with written permission of OWNER. Such permission may be revoked at any time by OWNER.

D. Prepare schedules in form of horizontal bar chart.

1. Provide separate horizontal bar for each operation.

2. Horizontal Time Scale: Identify first work day of each week.
3. Scale and spacing to allow space for notations and future revisions.
4. Arrange listings in order of start of each item of Work.

E. Construction Progress Schedule:

1. Show complete sequence of construction by activity.
2. Show dates for beginning and completion of each major element of construction and installation dates for major items. Elements shall include, but not be limited to, following.
  - a. Material and equipment order, manufacturer, delivery.
  - b. Performance tests and supervisory services activity.
  - c. Water main, sanitary sewer and other utility installation.
  - d. Asphalt pavement removal.
  - e. Excavation, backfilling.
  - f. Site grading.
  - g. Concrete work.
  - h. Dewatering.
  - i. Connections to existing water main and sanitary sewer.
  - j. Subcontractor's items of Work.
  - k. Paving asphaltic surface.
  - l. Restoration and landscaping.
  - m. Final cleanup.
  - n. Allowance for inclement weather.
  - o. Miscellaneous items.
3. Show projected percentage of completion for each item as of first day of each month.

F. Schedule Revisions:

1. Every 30 days to reflect changes in progress of Work.
2. Indicate progress of each activity at date of submittal.
3. Show changes occurring since previous submittal of schedule.
  - a. Major changes in scope.
  - b. Activities modified since previous submittal.
  - c. Revised projections of progress and completion.
  - d. Other identifiable changes.
4. Provide narrative report as needed to define following.
  - a. Problem areas, anticipated delays, and impact on schedule.
  - b. Corrective action recommended and its effect.
  - c. Effect of changes on schedules of other CONTRACTORS.

1.04 SHOP DRAWINGS AND PRODUCT DATA

A. Scheduling:

1. CONTRACTOR is not required to submit preliminary or final schedule of Shop Drawing submissions as required in Subparagraph 2.05.A.2 and Paragraph 2.07 of General Conditions.

**B. CONTRACTOR's Responsibilities:**

1. Review Shop Drawings and product data prior to submittal.
2. Determine and verify following.
  - a. Field measurements.
  - b. Field construction criteria.
  - c. Catalog numbers and similar data.
  - d. Conformance with Specifications.
3. Coordinate each submittal with requirements of Work and Contract Documents.
4. Notify ENGINEER in writing, at time of submittal, of deviations in submittals from requirements of Contract Documents.
5. Begin no fabrication or Work requiring submittals until return of submittals with ENGINEER approval.
6. Designate in Construction Progress Schedule, dates for submittal and receipt of reviewed shop drawings and samples.
7. Submittals received but not requested in Specifications shall be returned without review.

**C. Submittals shall contain:**

1. Date of submittal and dates of previous submittals.
2. Project title and number.
3. Contract identification.
4. Names of:
  - a. CONTRACTOR.
  - b. Supplier.
  - c. Manufacturer.
5. Identification of product, with identification numbers, and Drawing and Specification section numbers.
6. Field dimensions, clearly identified.
7. Identify details required on Drawings and in Specifications.
8. Show manufacturer and model number, give dimensions, and provide clearances.
9. Relation to adjacent or critical features of Work or materials.
10. Applicable standards, such as ASTM or Federal Specification numbers. Identification of deviations from Contract Documents.
11. Identification of revisions on resubmittals.
12. 8 in. by 3 in. blank space for CONTRACTOR and ENGINEER stamps.
13. CONTRACTOR's stamp, signed, certifying to review of submittal, verification of products, field measurement, field construction criteria, and coordination of information within submittal with requirements of Work and Contract Documents.

**D. Resubmittal Requirements:**

1. Comply with submittal requirements.

2. Make corrections or changes in submittals required by ENGINEER. Resubmittals required until approved.
3. Identify on transmittal form submittal is resubmission.
4. Shop Drawings and Product Data:
  - a. Revise initial drawings or data and resubmit as specified for initial submittal.
  - b. Indicate changes made other than those requested by ENGINEER.
  - c. ENGINEER's responsibility for variation or revisions from previously reviewed submittal is established in Article 6.17.D.3 of General Conditions.

E. Distribute reproductions of Shop Drawings and copies of product data which carry ENGINEER's stamp approval to following.

1. Jobsite file.
2. Record documents file.
3. Subcontractors.
4. Supplier or fabricator.

F. ENGINEER's Duties:

1. Review submittals in accordance with schedule.
2. Affix stamp and signature, and indicate requirements for resubmittal or approval of submittal.
3. Return submittals to CONTRACTOR for distribution or for resubmittal.

#### 1.05 TEST RESULTS AND CERTIFICATIONS

- A. Submit test results and certifications required in Specification sections.
- B. Submit test results upon completion of test or submittal of results from testing laboratory.
- C. Test results and certifications are to be submitted for review of conformance with specified requirements and information.

#### 1.06 DELAYS AND RECOVERY

- A. If, at any time during Project, CONTRACTOR fails to complete activity by its latest scheduled completion date, CONTRACTOR shall, within three working days, submit to ENGINEER written statement as to how and when Work force will be reorganized to return Contract to current construction schedule.
- B. When it becomes apparent from progress evaluation and updated schedule data that milestone completion or Contract completion dates will not be met, CONTRACTOR shall take some or all of the following actions:
  1. Increase construction staffing in such quantities and crafts as shall substantially eliminate backlog of Work.
  2. Increase number of working hours per shift, shifts per work day, work days per week, or amount of construction equipment, or combination of foregoing sufficient to substantially eliminate backlog of Work.

3. Reschedule Work items to achieve concurrency of accomplishment.
- C. Addition of equipment or construction forces, increasing working hours or other method, manner, or procedure to return to current Construction Progress Schedule will not be considered justification for amending Contract Documents or treated as acceleration.
- 1.07 GUARANTEE, WARRANTIES, MAINTENANCE AGREEMENTS, AND WORKMANSHIP BONDS
- A. Refer to Specification sections for requirements. Submittal considered final when submittal is returned by ENGINEER, marked "No Exception Taken" or "Make Corrections Noted."
  - B. In addition to copies desired for CONTRACTOR's use, furnish 2 executed copies. Provide 2 additional copies where required for maintenance data.
- 1.08 OPERATION AND MAINTENANCE (O&M) DATA
- A. Compile product data and related information appropriate for OWNER's maintenance and operation of products furnished under Contract. Prepare O&M data as specified in this section and as referenced in other pertinent sections of Specifications.
  - B. Manual Format: Prepare data in form of instructional manual for use by OWNER's personnel.
    1. Size: 8-1/2 in. by 11 in. or 11 in. by 17 in. folded, with standard 3-hole punching.
    2. Text: Manufacturer's printed data, or neatly typewritten.
    3. Drawings:
      - a. Provide reinforced punched binder tab, bind in with text.
      - b. Fold larger drawings to size of text pages and place in envelopes which are to be bound into manual. Place suitable identification on outside of each envelope.
    4. Cover: Identify each manual with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS and following."
      - a. Title of Project.
      - b. Identity of CONTRACTOR.
      - c. Identity of general subject matter covered in manual.
      - d. Identity of section number as set forth in Contract Documents.
      - e. Date of installation.
    5. Binders:
      - a. Commercial quality binders with durable and cleanable plastic covers.
  - C. Product Data:
    1. Include only those sheets pertinent to specific product.
    2. Annotate each sheet to:
      - a. Identify specific product or part installed.

- b. Identify data applicable to installation.
  - c. Delete references to inapplicable information.
3. Provide table of contents.
4. Project installation schedule listing dates and locations of products installed.

1.09 ACTION ON SUBMITTALS

A. ENGINEER's Action:

1. General:

- a. Except for submittals for record and similar purposes, where action and return on submittals required or requested, ENGINEER will review each submittal, mark with appropriate action, and return. Where submittal must be held for coordination, ENGINEER will so advise CONTRACTOR without delay.
- b. ENGINEER will stamp each submittal with action stamp, appropriately marked with submittal action.

2. Notification of Insufficient Information:

- a. If information submitted is not sufficient to complete review of submittal, ENGINEER will send transmittal to CONTRACTOR notifying CONTRACTOR that additional information is required.
- b. Submittal will not be returned. Submittal will be placed in an "on hold" status until CONTRACTOR provides additional information.

B. Action Stamp:

1. Marking: No Exception Taken.

- a. Final Unrestricted Release: Where submittals are marked as "No Exceptions Taken," Work covered by submittal may proceed provided it complies with Contract Documents. Acceptance of Work depends on that compliance.

2. Marking: Make Corrections Noted.

- a. Final-But-Restricted Release: When submittals are marked as "Make Corrections Noted," Work covered by submittal may proceed provided it complies with ENGINEER's notations or corrections on submittal and with Contract Documents. Acceptance of Work depends on that compliance. Resubmittal is not required.

3. Marking: Rejected; See Remarks.

- a. Submittal Not Accepted: When submittals are marked as "Rejected; See Remarks," do not proceed with Work covered by submittal. Work covered by submittal does not comply with Contract Documents.
- b. Prepare new submittal for different material or equipment supplier or different product line or material of same supplier complying with Contract Documents.

4. Marking: Amend and Resubmit.
  - a. Returned for Resubmittal: When submittals are marked as "Amend and Resubmit," do not proceed with Work covered by submittal. Do not permit Work covered by submittals to be used at Project site or elsewhere where Work is in progress.
  - b. Revise submittal or prepare new submittal in accordance with ENGINEER's notations. Resubmit without delay. Repeat if required to obtain different action marking.

## PART 2 PRODUCTS

(Not Used)

## PART 3 EXECUTION

### 3.01 SUBMITTAL REQUIREMENTS

A. Provide complete copies of required submittals as follows.

1. Construction Progress Schedule:
  - a. Digital copies of initial schedule.
  - b. Digital copies of each revision.
2. Shop Drawings and Product Data: 6 hard copies or 1 PDF copy.
3. Test Results: 1 PDF copy.
4. Construction Photos: 1 PDF copy.
5. Other Submittals:
  - a. 1 PDF copy if required for review.
  - b. 1 PDF copy if required for record.
6. All digital files to have bookmarks for file management.

### B. Resubmittals

1. Update submittals to address comments prior to resubmittal.
2. Resubmittals will be returned unreviewed if significant errors are noted.
3. Reviews of resubmittals is limited to 2 (3 total submittals with original submittal).
4. Excess submittals may be subject to contractor reimbursement for engineering fees related to additional reviews.

END OF SECTION



SECTION 44 43 31

PRESSURE FILTRATION EQUIPMENT – GAC AND ION EXCHANGE

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Provide and test filtration equipment including, pressure vessel[s], valves, piping, fittings, underdrains, media, with water from potable water drinking water supply as indicated and in compliance with Contract Documents.
- B. Granular Activated Carbon (GAC) and Ion Exchange (IX) will not be backwashed automatically. Media replacement and backwash will be operated manually.
- C. All materials shall meet Buy America – Build America Act.
- D. Provide equipment information with bid as noted in the bid form.

1.02 REFERENCES:

- A. American Society for Testing and Materials International (ASTM):
  - 1. A53/A53M: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- B. American Water Works Association (AWWA):
  - 1. B100: Granular Filter Material
  - 2. C200: Steel Water Pipe - 6 in. (150 mm) and Larger
  - 3. C207: Steel Pipe Flanges for Waterworks Service— Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)
- C. NSF International (NSF):
  - 1. 61: Drinking Water System Components - Health Effects

1.03 SUBMITTALS:

- A. Submit the following shop drawings in accordance with Section 01 33 00.
  - 1. Certified shop and erection drawings.
  - 2. Data, regarding filter characteristics and performance:
    - a. Prior to fabrication and testing, provide guaranteed performance based on service conditions specified.
  - 3. Shop drawing data for accessory items.

4. Certified setting plans, with tolerances, for anchor bolts.
  5. Manufacturer's literature as needed to supplement certified data.
  6. Operating and maintenance instructions and parts lists.
  7. Listing of reference installations as specified with contact names and telephone numbers.
  8. Qualifications of field service engineer.
  9. Shop and Field inspections reports.
  10. List of spare parts.
  11. Recommendations for short and long term storage.
  12. Special tools.
  13. Shop and field testing procedures and equipment to be used.
  14. Recommended location and mounting of equipment and appurtenances.
  15. Number of service person days provided and per diem field service rate.
  16. Manufacturer's product data and specifications for shop painting including statement of compliance for compatibility and NSF Std. 61 approval.
  17. The latest ISO 9001 series certification or other quality control plan.
  18. Material Certification:
    - a. Provide certification from the equipment manufacturer that the materials of construction specified are recommended and suitable for the service conditions specified and indicated. If materials other than those specified are proposed based on incompatibility with the service conditions, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated including an installation list of a minimum of five (5) installations in operation for a minimum of five (5) years. Provide proposed materials at no additional cost to the Owner.
    - b. Where materials are not specified, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated.
- B. A copy of the contract mechanical process, electrical and instrumentation drawings, with addenda that are applicable to the equipment specified in this section, marked to show all changes necessary for the equipment proposed for this specification section. If no changes are required, mark all drawings with "No changes required" or provide a statement that no changes are required.

1. Failure to include all drawings or a statement applicable to the equipment specified in this section will result in submittal return without review until a complete package is submitted.
  - C. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance or marked and indexed to indicate requested deviations and clarifications from the specified requirements.
    1. If deviations and clarifications from the specifications are indicated, therefore requested by the Contractor, provide a detailed written justification for each deviation and clarification.
    2. Failure to include a copy of the marked-up specification sections and or the detailed justifications for any requested deviation or clarification will result in submittal return without review until marked up specifications and justifications are submitted in a complete package.
- 1.04 SPARE PARTS:
- A. Comply with the requirements specified in Section 01 61 00.
  - B. Provide manway gaskets 2 for each size and type.
  - C. Spare water distribution and collection nozzles – 10 percent of each size and type where used.
  - D. Flange gaskets 2 for each size and type.
  - A.E. Provide other spare parts as required for first year preventative maintenance and to maintain warranties noted in contract documents.
- 1.05 QUALITY ASSURANCE:
- A. Comply with the requirements specified in Section 01 43 00.
  - B. Standardization and System Responsibility:
    1. For specific purposes of standardization and total system responsibility, equipment included in this section shall be furnished by single manufacturer.
    2. To ensure proper operating systems, manufacturer of filtration equipment shall also be responsible for providing following:
      - a. Butterfly valves, ball valves, and air release valves associated with equipment operation.
      - b. Piping associated with standard equipment package. Piping shall include all piping to vessel isolation valves.
  - C. Services of Manufacturer's Representative as stated in Section 01 43 00 and as specified herein.
  - D. Provide services of factory-trained Service Technician, specifically trained on type of equipment specified:

1. Service Technician must have a minimum of five (5) years of experience, all within the last seven (7) years, on the type and size of equipment.
2. Service Technician must be present on site for all items listed below. Person-day requirements listed are exclusive of travel time, and do not relieve Contractor of the obligation to place equipment in operation as specified.
3. Installation: Inspect grouting, location of anchor bolts; setting, leveling, alignment, field erection; coordination of piping, electrical and miscellaneous utility connection:
  - a. 2 person-days.
4. Functional Testing: Calibrate, check alignment and perform a functional test dry and a test with water. Tests to include all items specified.
  - a. 4 person-days.
5. Performance Testing: Field performance test equipment specified.
  - a. 2 person-days.
6. Vendor Training: Provide classroom and field operation and maintenance instruction including all materials, slides, videos, handouts and preparation to lead and teach classroom sessions.
  - a. 1 person-days.
7. Credit to the Owner, all unused service person-days specified above, at the manufacturer's published field service rate.
8. Any additional time required of the factory trained service technician to assist in placing the equipment in operation, or testing or to correct deficiencies in installation, equipment or material shall be provided at no additional cost to the Owner.

E. Manufacturer of specified equipment shall have a minimum of ten (10) operating installations with equipment of the size specified and in the same service as specified operating for not less than five (5) years.

1.06 DELIVERY STORAGE AND HANDLING:

- A. Comply with the requirements specified in Section 01 61 00.
- B. Transport and store media to avoid contamination.
- C. Transport, delivery and store in accordance with written instructions from the manufacturer.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION:

- A. Design Requirements:

1. Hydraulic Conditions:
  - a. Design Flow, gpm: 700
  - b. Working Pressure, psi: less than 100
  - c. Maximum Loading Rate, gpm/ft<sup>2</sup>: 6.2

2.02 MANUFACTURERS:

- A. Calgon Carbon.
- B. AqueoUS Vets.

2.03 PRESSURE VESSELS:

A. Vertical Pressure Filter:

1. Minimum Filtering Area/Filter, feet<sup>2</sup>: 113.1
2. Number of Vessels: 4
3. Filter size: 12 feet diameter
  - a. 20,000 lb capacity GAC media
  - b. 3 minute minimum IX media contact time.
  - c. 3 foot minimum IX media depth (minimum 340 cubic feet).
4. Maximum overall height – see drawings
5. Material: Welded Steel Construction:
  - a. SA-516 Grade 70 steel.
  - b. Design with pressure safety factor of 4.
  - c. Factory test to 50 percent above design system pressure.
  - d. 100 psi or higher ASME code with stamp.
6. Access manhole in each filter at both the top above the media and the bottom. Provide with spare gasket. Minimum 124 inches (300 mm) x 16-18 inches (400 mm) manway.
7. Adjustable cast iron jacklegs or other methods to adjust height for level installation.
8. Flanges for piping connections.

B. Vessel:

1. Provide all pressure vessels constructed in accordance with Section VIII of the ASME code requirements for cold fired pressure vessels, and bear the ASME stamp.
  - a. Minimum thicknesses: Provide accordance with ASME code requirements. Verification of ASME code design to include calculated head and shell thicknesses. Submit with the first submittal drawing and be approved by the Engineer Representative prior to authorization of fabrication. Vessels shall be fabricated in a facility holding a current ASME U-stamp. Facilities holding an ASME R (“repair”) or other certification are not acceptable.
2. Provide all flanges, plates, angles, channels, and beams, including side shell to head connections, joined by full penetration welds, each side, continuous welding.
3. Flanges: Factory welded on split centers.

C. Vessel Interior Construction:

1. Influent and Collection System:
  - a. The influent and collection system shall be the manufacturer standard design and shall be capable of continuously collecting water at the maximum design loading rates.
  - b. Provide the influent and collection system capable of uniform water distribution.
  - c. Adjust IX media influent system to accommodate reduced media capacity in vessel.
  - d. Materials must be compatible with media.
  - e. Metals internals shall be 316 Stainless Steel Schedule 10 or higher.
  - e.f. Use of teflon tape on internal systems is prohibited.

D. Vessel Miscellaneous Components:

1. Provide each filter cell equipped with a sufficient number of 14-inches (350 mm) x 18-inches (450 mm) manways, rated for the working pressure of the vessel for the purposes of media loading, observation of backwash functions and inspection.
2. Provide 1/2-inch (13 mm) diameter, full couplings for sample taps.
3. Provide Type 316 anchor bolts and hardware.
4. Provide pipe and isolation valves for media replacement as noted in drawings.
- 4.5. Provide expansion joint at connections to the vessels as noted in the drawings.

2.04 GAC MEDIA:

- A. 20,000 lbs of C400 Calgon Carbon GAC media per 2 vessels (40,000 lbs total):
  1. F400 Media

2. Mesh Size 12x40
  3. Mean Diameter 9.7 micrometer
  4. Conform to NSF 61.
- B. Media installed in field.
- 2.05 IX MEDIA:
- A. PFA 694 E by Purolite OR PSR 2+ by Dow
    1. Mesh Size 16x50 Or 16x40
    2. Conform to NSF 61.
  - B. Media installed in field.
- 2.06 SUPPORT GRAVELS MEDIA:
- A. In lieu of support gravel, GAC or IX media shall be used, respectively, and collection headers shall be self-supporting.
- 2.07 VALVES:
- A. Filter function valves: Provide motor actuated valves.
    1. Valve size as specified and indicated
  - B. Valves: Wafer lug style butterfly valves in accordance with Section 40 23 13.01.
  - C. Provide four motor actuators for FCV 15-, FCV 15-2, FCV 15-3, FCV 15-4.
    1. Rotork QT-3 or Equal.
  - D. Provide position switches integral to motor operator.
  - E. Provide all valves with visual valve position indicators.
  - F. Provide manual hand-wheel overrides.
  - G. Combination air/ vacuum release valves, provide one for each vessel in accordance with Section 40 23 13.01.
- 2.08 INSTRUMENTATION:
- A. Loss of Head Gauge Panel PI/PDIT 15-1, PI/PDIT 15-2, PI/PDIT 15-2, and PI/PDIT 15-4.
    1. Provide a Type 316 stainless steel loss of head gauge panel completely factory fabricated.
    2. The gauge panel shall have the following 4-1/2 inch flush-mounted gauges:

- a. Inlet header: 0-100 psi (0 – 690 kPa)
  - b. Effluent header: 0-100 psi (0 – 690 kPa)
  - c. Loss of head - between influent and effluent headers, 0-10 psi (0 – 70 kPa) differential pressure gauge with switch
3. Provide a differential pressure transmitter manufactured by Rosemount (3051 series) or equal to indicate the differential pressure between the influent and effluent of each filter. The 4~20 mA differential pressure signal shall be wired to the UW15 PLC control panel.
  4. Each panel shall be equipped with the following components:
    - a. Phenolic nameplates identifying gauges and sample taps.
    - b. Two flush mounted sample taps for influent and effluent locations.
    - c. Manufacturer nameplate, aluminum construction.
  5. Provide mounting hardware (brackets, U-bolts, nuts, washers, etc.) for affixing to face piping.

2.09 SHOP PAINTING:

- A. The interior of the filter including above and below the underdrain plate shall be sandblasted and protected from corrosion by proper application of approved coatings for potable water. The exterior of the vessel shall be sandblasted and prime painted at the factory.
- B. Surface preparation:
  1. Interior - Sandblast to near white blast cleaning (SSPC-SP10).
  2. Exterior - Sandblast to commercial blast cleaning (SSPC-SP6).
- C. Coating:
  1. Interior - All interior coatings shall be NSF Std. 61 approved. Stripe coating: hand-apply one coat Tnemec pota-pox tank white to all welds and hard to reach areas using high quality natural or synthetic bristle brush, to a dry film thickness of 3-5 mils. Prime coating: Tnemec pota-pox Beige primer to a dry mil thickness of 3-5 mils before any rust can form. Finish coating: Tnemec pota-pox tank white to a dry mil thickness of 4-6 mils for a total dry film thickness of 7-11 mils.
  2. Exterior - Stripe coating: hand-apply one coat Tnemec Series 20 tank white to all welds and hard to reach areas using high quality natural or synthetic bristle brush, to a dry film thickness of 3-5 mils. Prime coating: Tnemec Series 20 Beige primer to a dry mil thickness of 3-5 mils before any rust can form. The exterior finish coat shall be applied by others with compatible system.
- D. The total paint system shall be the product of and be applied in accordance with the recommendations of one manufacturer. Alternate paint systems must be pre-approved by Engineer Representative. Contractor shall provide an adequate amount of field touch-up paint.



PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Installation shall be as shown on the plans and in accordance with the manufacturer's recommendations, installation instructions and assembly drawings. Manufacturer's installation instructions and assembly drawings shall be submitted and approved by the Engineer Representative prior to shipment of equipment. Installation of the filtration system shall be in strict accordance with the details shown on the drawings and in complete conformance to manufacturer's instructions and procedures.
- B. Disinfection of IX media vessels shall be completed prior to IX media installation but following installation of all other media influent and collection piping systems within the vessel.

3.02 FACTORY SERVICES AND START-UP:

- A. Installation Supervision. The Contractor shall coordinate with the treatment equipment manufacturer to provide factory supervision (as outlined on the Equipment Schedule) or direction during critical phases of installation. Critical phases will include setting of equipment, installation of internals, installation of controls, wiring instrumentation and other components critical to the successful operation of the system.
- B. Media Installation. Installation of support gravels and filter media shall be under the direct supervision of an employee of the filter manufacturer experienced in this procedure as required by AWWA B100 standard and in accordance with the Equipment Schedule. This includes GAC backwash and IX flushing (manual processes).
- C. System Start-Up and Training:
  - 1. The contractor will verify in writing that the project is ready for manufacturer's field services. Copies of written verification shall be given to the manufacturer, Engineer Representative and Owner prior to scheduling field services.
  - 2. The contractor shall provide the services of a factory representative during installation and on-site start-up supervision of the treatment equipment. The contractor shall provide installation and on-site start-up supervision. At a minimum, the equipment manufacturer's technician shall perform the following start-up functions:
    - a. Provide the number of days indicated to the Contractor during installation of the equipment.
    - b. Inspect the final installation to assure proper installation, connection and wiring of all equipment of the manufacturer's supply.
    - c. Start-up of the equipment in the presence of the Contractor and Owner's operating personnel.
    - d. Training of Owner's operating personnel in proper operation and maintenance procedures, start-up/shutdown procedures, response to emergency conditions, and troubleshooting. The responsibility of the Contractor and the factory service representative with regard to start-up shall be fulfilled when the start-up is

complete, the equipment is functioning properly, operating personnel have been trained and the equipment has been accepted by the Owner.

3.03 FIELD TOUCH-UP PAINTING:

- A. After installation and approved testing by the Engineer Representative, Contractor shall apply field touch-up paint to all scratched, abraded and damaged shop painted surfaces. Coating type and color shall match shop painting.

3.04 CONTRACT CLOSEOUT

- A. Provide in accordance with Section 01 77 00.

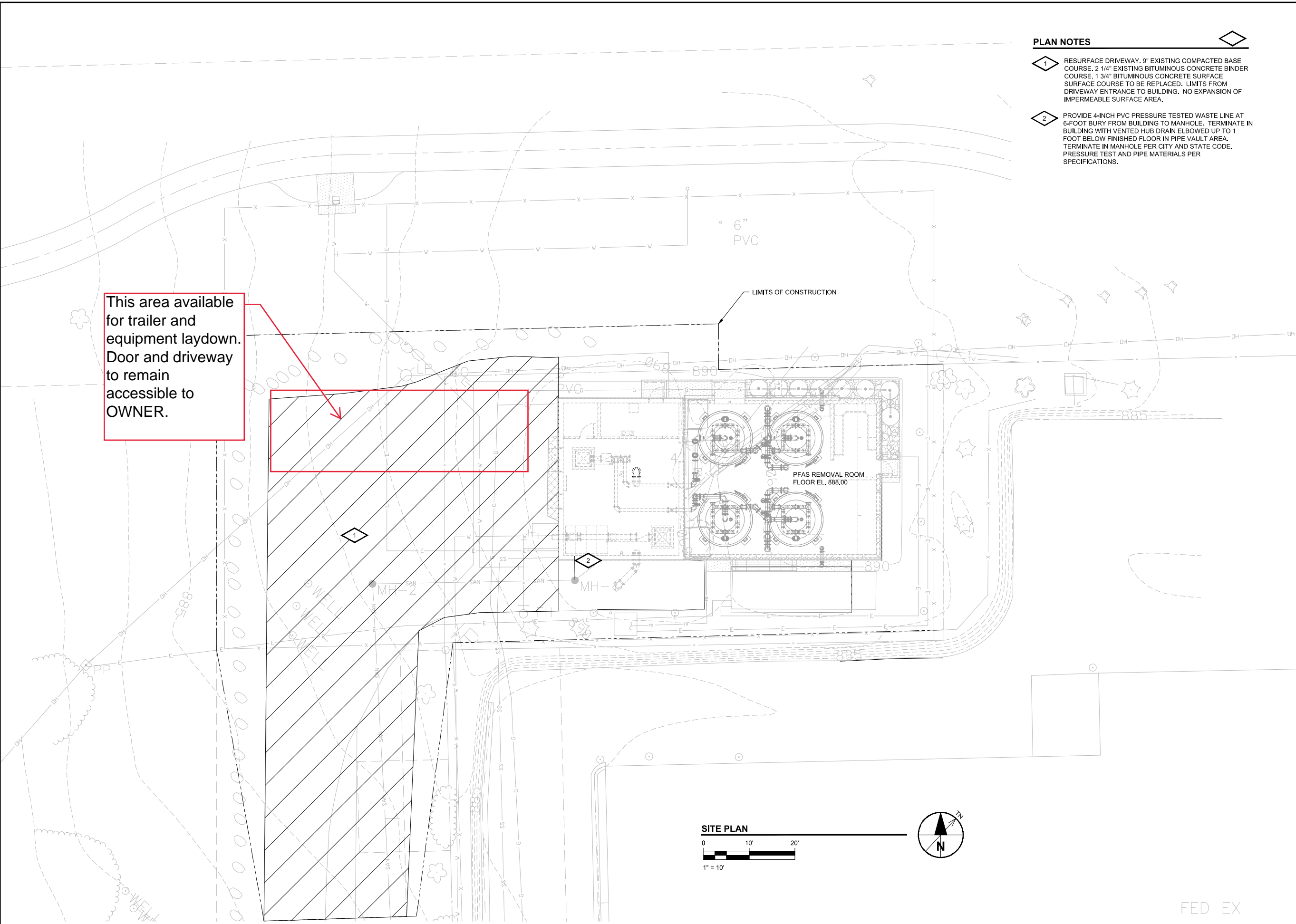
END OF SECTION

**PROJECT**  
UNIT WELL 15 PFAS  
TREATMENT FACILITY

**CLIENT**  
MADISON WATER UTILITY  
119 E. OLIN AVENUE  
MADISON, WISCONSIN 53713  
Tel 608.266.4651 www.cityofmadison.com

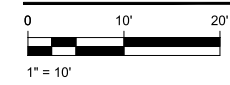
**PLAN NOTES**

- 1 RESURFACE DRIVEWAY, 9" EXISTING COMPACTED BASE COURSE, 2 1/4" EXISTING BITUMINOUS CONCRETE BINDER COURSE, 1 3/4" BITUMINOUS CONCRETE SURFACE COURSE TO BE REPLACED. LIMITS FROM DRIVEWAY ENTRANCE TO BUILDING. NO EXPANSION OF IMPERMEABLE SURFACE AREA.
- 2 PROVIDE 4-INCH PVC PRESSURE TESTED WASTE LINE AT 6-FOOT BURY FROM BUILDING TO MANHOLE. TERMINATE IN BUILDING WITH VENTED HUB DRAIN ELBOWED UP TO 1 FOOT BELOW FINISHED FLOOR IN PIPE VAULT AREA. TERMINATE IN MANHOLE PER CITY AND STATE CODE. PRESSURE TEST AND PIPE MATERIALS PER SPECIFICATIONS.



This area available for trailer and equipment laydown. Door and driveway to remain accessible to OWNER.

**SITE PLAN**



FED EX

**ISSUE/REVISION**

I/R	DATE	DESCRIPTION
1	12/22/23	ISSUE FOR BID

**KEY PLAN**

**PROJECT NUMBER**

60686092

**SHEET TITLE**

CIVIL SITE PLAN

**DWG NUMBER**

02-C-01

**SHT NUMBER**

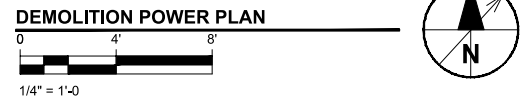
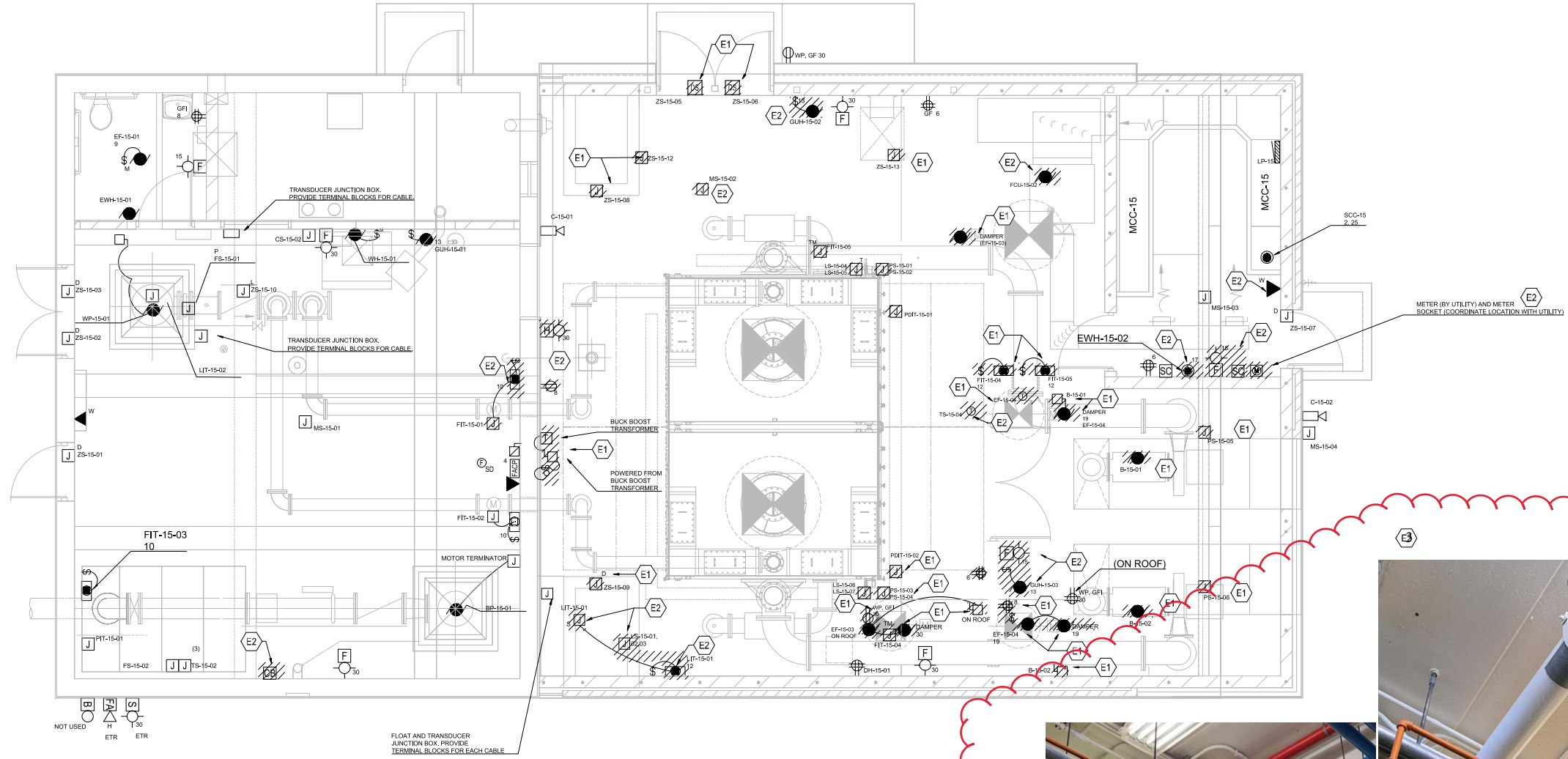
09 OF 55

**GENERAL NOTES**

1. REFER TO SPECIFICATION SECTION 16990 FOR WIRING ASSOCIATED WITH THE SCADA SYSTEM.
2. ALL EXTERIOR MOUNTED DEVICES SHALL BE INSTALLED IN RECESSED BOXES.
3. REFER TO SHEET 10-A-01 FOR THE FIRE RATED WALLS.
4. ALL CONDUIT PENETRATIONS BETWEEN INTERIOR SPACES SHALL BE CONSIDERED FIRE RATED PENETRATIONS AND SHALL BE SEALED TO MAINTAIN THE EXISTING FIRE RATING.
5. ALL SHADED DEVICES ARE TO BE REMOVED.

**REMOVAL NOTES**

- E1 DISCONNECT AND REMOVE ALL POWER RECEPTACLE AND EQUIPMENT AND ASSOCIATED CONDUIT AND WIRING BACK TO NEAREST JUNCTION BOX. IF ALL DEVICES ON THE ASSOCIATED CIRCUIT ARE REMOVED, MARK CIRCUIT SPARE IN PANEL BOARD DIRECTORY. ANY REMAINING DEVICES ON THE CIRCUIT ARE TO REMAIN OPERATIONAL AFTER DEMOLITION.
- E2 DISCONNECT AND REMOVE POWER RECEPTACLE AND EQUIPMENT. POWER RECEPTACLE AND EQUIPMENT TO BE RELOCATED, SEE DRAWING 26-E-03 FOR NEW LOCATION, REUSE EXISTING CONDUIT AND WIRING AS MUCH AS IS FEASIBLE.
- E3 ALL CONDUIT AND ASSOCIATED WIRE IN TREATMENT AREA SHALL BE MOVED / REPLACED TO ACCOMODATE NEW TREATMENT EQUIPMENT. REUSE MATERIALS AS APPROPRIATE.



**ISSUE/REVISION**

NO.	DATE	DESCRIPTION
1	12/22/23	ISSUE FOR BID

**KEY PLAN**

**PROJECT NUMBER**  
00686092

**SHEET TITLE**  
ELECTRICAL AND POWER

**DWG NUMBER**      **SHT NUMBER**  
06-R-05                      14 OF 55