



CWM CHEMICAL SERVICES, LLC

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April 27, 2012

Mr. Dennis Weiss, P.E.
NYS Department of Environmental Conservation
270 Michigan Avenue, Region 9
Buffalo, New York 14203-2999

RE: Revised Design Report for Process Area IV Extraction Wells and Response to Comments

Dear Mr. Weiss:

On February 2, 2012, CWM Chemical Services, LLC (CWM) submitted a Design Report for Process Area IV Extraction Wells, prepared by Golder Associates Inc. The extraction system was proposed to reduce the hydraulic gradient in the vicinity of seeps in the roadway between the laboratory facility and the Transformer Decommissioning Building and remove/collect potentially impacted groundwater for treatment at the on-site Aqueous Waste Treatment (AWT) Facility. The Design Report included a tank design assessment for new proposed tank T-8009, as required by 6 NYCRR 373-2.10(c)(1). In a letter dated April 5, 2012, the New York State Department of Environmental Conservation (NYSDEC) provided comments on the Design Report. Attached please find CWM's responses to each of the NYSDEC comments. Also attached is an updated design assessment report for your review and approval which addresses the NYSDEC comments and replaces the February 2012 report in its entirety.

CWM requests that the NYSDEC expedite the review and approval of this revised report so that the system may be installed as soon as practical. If you have any questions or comments, please contact Mr. Jonathan Rizzo at (716) 286-0354 or myself at (716) 286-0246.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Sincerely,
CWM CHEMICAL SERVICES, L.L.C.

Jill A. Banaszak
Technical Manager
Model City Facility

JPR/JAB/jpr

April 27, 2012

Mr. Dennis Weiss, P.E.

NYSDEC

RE: Revised Design Report for Process Area IV Extraction Wells and Response to Comments

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CWM Chemical Services, LLC
Design Report for Process Area IV Extraction System
February 2012

Responses to NYSDEC Comments Dated April 5, 2012

Note: NYSDEC comments are in *italicized* text followed by CWM response.

Cover Letter Comment

NYSDEC Comment: With submission of the report revisions, CWM should submit a Permit modification request for inclusion of proposed Tank T -8009 into the Permit. With this request, CWM must submit all appropriate revisions to its July 2011 Permit renewal application which are affected by the Tank T -8009 Permit modification request.

CWM Response: For Process Area Phase IV Corrective Measures, including new tank T-8009, CWM will prepare a Permit Modification Request and revisions to the July 2011 revised Site-Wide Renewal Application, which will be submitted under separate cover.

General Comments

1. Section 2.1 Groundwater Collection Wells

NYSDEC Comment: The primary function of the proposed groundwater collection wells is groundwater depression. Therefore, the well design and installation procedures to prevent impacting lower groundwater flow zones are acceptable.

CWM Response: No revision or response to comment necessary.

2. Section 2.6 Monitoring and Performance Assessment

NYSDEC Comment: It is stated here that upon completion of construction of the Process Area IV system, CWM will submit revisions to the "Groundwater Extraction Systems O&M Manual" to include the operational aspects of the new system. The revisions to this manual should be provided as part of CWM's Permit renewal application so that the revised document can be incorporated into the Permit upon renewal.

CWM Response: The Groundwater Extraction Systems Operations and Maintenance (O&M) Manual (April 2008) will be revised and will be submitted under separate cover with the Permit Modification Request and revised Site-Wide Renewal Application.

NYSDEC Comment: The report must indicate that initial samples of collected liquids from Tank T -8009 will be analyzed for a full Target Compound/Target Analyte list (TCL/TAL) of parameters. Based on the results of the analysis, routine monitoring parameters will be determined.

CWM Response: The initial sample collected from tank T-8009 will be analyzed for TCL/TAL parameters. CWM will include routine annual monitoring parameters for T-8009 in the Groundwater Extraction Systems O&M Manual consistent with monitoring of tanks located at

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similar groundwater extraction systems at the facility. Based on the results of the analysis of initial samples, routine monitoring parameters for T-8009 in the Groundwater Extraction Systems O&M Manual may be revised if necessary.

Tank T -8009 System Design and Assessment
Comments

1. Section 2.2 Pumps and Piping

NYSDEC Comment: The proposed air driven pumping system is consistent with existing groundwater remedial systems and is therefore acceptable as a pumping system.

This section describes the above ground tubing (i.e., piping) and fittings used to connect the extraction wells to Tank T-8009. For the piping located outside of the tank's secondary containment, the design report must provide further design details to indicate how this piping complies with the ancillary equipment exception requirements of 6 NYCRR 373-2.10(d)(6) of the regulations.

CWM Response: The above-ground tubing (i.e., piping) to transfer extracted groundwater from the wells to storage tank T-8009 will be continuous solid 1-inch O.D., U.V. protected, above ground nylon tubing with no flanges, fittings, valves or other connections located outside secondary containment. All flanges, fittings, and other connections will either be located inside the well head or located within the tank's secondary containment. Section 2.2 of the design report has been revised to reflect this design information. In accordance with 6 NYCRR 373-2.10(d)(6)(i), the above-ground tubing (i.e., piping) will be inspected daily.

2. Section 4.1 -Operation

NYSDEC Comment: This section indicates that the discharge piping from the extraction wells to the T.O. Building will be within "weather-tight enclosures" to provide for year-round operation. Additional details must be provided indicating the design of these enclosures and how they will be heated during the winter months to prevent pumped liquids from freeze/thaw conditions which could rupture piping.

CWM Response: The weather tight enclosures around the wells will be constructed of wood framing and siding and will be insulated and heated. The tubing/piping from the well head to the interior of the Transformer Decommissioning (T.O.) Building will be pitched to drain back to the well and/or to the tank. The tubing/piping will also be heat traced and insulated. Section 4.1 of the design report has been revised to include this design information and a note has been added to Sheet 1 of Appendix A.

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3. Appendix A, Sheet 1-Extraction Well Equipment Layout and Site Plan

NYSDEC Comment: The drawing showing the layout of proposed Tank T-8009 within the T.O Building must also show the location of the Container Storage Area (CSA) Containment Pans and indicate that a minimum aisle space of 2 feet will be maintained between the closest pan and the tank's secondary containment structure to facilitate inspection of each.

CWM Response: Sheet 1 of Appendix A has been revised to show the potential location(s) of Container Storage Area (CSA) Containment Pans. A note has been added to this sheet to indicate that a minimum of 2 feet of aisle space shall be maintained between individual containment pans and containment pans and building walls and/or equipment.

NYSDEC Comment: The detail in the lower left corner of this drawing contains a note indicating a "500 gallon FRP storage tank"; however, the Tank Design Assessment indicates a 525 gallon HDLP tank. This discrepancy must be corrected.

CWM Response: The detail located in the lower left corner of the Sheet 1 of Appendix A has been revised to indicate that the tank will be a 525-gallon HDLP tank.

4. Appendix A, Sheet 3- Miscellaneous Details

NYSDEC Comment: Section 3.3 of the report indicates that the tank's secondary containment will include a steel floor. However, the tank detail in the lower left corner of this drawing does not show a steel floor, nor is one indicated in the notes. The detail must show a steel floor with a note indicating that it will be continuously welded to the steel sides.

CWM Response: Section 3.3 of Design Report is accurate and the secondary containment will be constructed with a coated steel floor and sides. Sheet 3 of Appendix A has been revised to include a detail of the 8'x 6.5'x 1.5' coated secondary containment structure that incorporates a steel floor.

NYSDEC Comment: The Camlock connection for emptying the tank, which is shown on the top of the tank in the lower left detail, does not appear to be completely within the tank's secondary containment. This entire connection must be within the secondary containment to comply with 6 NYCRR 3 73-2.10(d)(6) of the regulations since it is not considered to fit the identified exemptions. Therefore, the design must be modified so that the entire connection is within the secondary containment.

CWM Response: The Camlock connection for emptying T-8009 shown on Detail 3 on Sheet 3 of Appendix A, of the Design Report shows that the connection is located within the secondary containment of the tank. The Camlock connection will be installed within the tank secondary containment to meet the requirements of 6 NYCRR 373-2.10(d)(6) of the regulations. The length of the proposed tank as indicated in the text and in Appendix B of the Design Report is

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71-inches (6 feet, 11 inches), while the length of the proposed secondary containment is 8-feet. Detail 3 on Sheet 3 of Appendix A has been revised to clearly show that the Camlock connection will be entirely located within the secondary containment.

NYSDEC Comment: This drawing indicates that the tank will be fitted with a vent that will extend above the roof of the T.O. Building. The design report must include information indicating how the venting of this tank complies with 6 NYCRR 373-2.29. Similarly, the report must indicate how the design complies with 6 NYCRR 373-2.28 with respect to the associated ancillary piping. If an exclusion from these regulations is being claimed based on the organic concentration of the waste, appropriate supporting information must be provided.

CWM Response: The installation of the Process Area Phase IV Groundwater Extraction System is part of the RCRA Corrective Measures for the facility. As indicated in 6 NYCRR 373-2.29(a)(2)(v) and 40 CFR 264.1080(b)(5), for air emission standards for tanks:

“The requirements of this section do not apply to the following waste management units at the facility: A waste management unit that is used solely for on-site treatment or storage of hazardous waste that is placed in a unit as a result of implementing remedial activities required under the corrective action authorities of RCRA sections 3004(u), 3004(v), or 3008(h); CERCLA authorities, or similar Federal or State authorities including, but not limited to, 6 NYCRR Parts 373 and 375, ECL 71-2727(3), and ECL Article 27 Titles 9 and 13.”

Therefore, CWM is not required to comply with 6 NYCRR 373-2.29. However, CWM has elected to revise the tank system design to include a carbon unit to treat emissions from the tank as a Best Management Practice (BMP). Section 3.0 of the Design Report has been revised to include this air emission control system information.

At this time, CWM believes that the liquids removed by the extraction system and stored in tank T-8009 will have organic concentrations of less than 10-percent by weight. The report has been revised to indicate that initial samples of collected liquids from Tank T -8009 will be analyzed for full TCL/TAL parameters. If results of the analysis indicate the presence of organics greater than 10-percent by weight, CWM will comply with 6 NYCRR 373-2.28 requirements.

NYSDEC Comment: Note 1 on this drawing indicates that the dimensions of the secondary containment will vary and there is no indication of its actual capacity. Calculations of the secondary containment's capacity using the containment's actual internal dimensions must be provided in the design to demonstrate compliance with 6 NYCRR 373-2.10(d)(2).

CWM Response: Note 1 has been revised to indicate that the secondary containment shall be 8'x6.5'x1.5' coated steel meeting the requirements of 6 NYCRR 373-2.10(d). The capacity of the secondary containment is approximately 583 gallons, which is greater than 100% of the storage tank capacity (525 gallons) meeting the requirements of 6 NYCRR 373-2.10(d)(2).

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5. Appendix A, Sheet 4 General Notes and Specifications

NYSDEC Comment: Item 2 under the Storage Tank and Secondary Containment Dike Specifications indicates that a coating product will be applied to the steel secondary containment. Information must be provided regarding this product's compatibility with the waste in accordance with 6 NYCRR 373-2.10(d)(5)(ii)(d').

CWM Response: The specification for the coatings for the secondary containment has been revised to Sherwin Williams Kem Bond® HS Primer and Macropoxy® 646 Epoxy or equivalent. Product and compatibility information are provided in Appendix B of the revised Design Report.

NYSDEC Comment: Under the Pressure Testing Specification, a procedure is provided for testing of the tank's tubing (i.e., piping). However, a procedure must also be provided for testing the tightness of the tank itself in accordance with 6 NYCRR 373-2.10(c)(4) and Condition B.4 in Module IV of the Permit.

CWM Response: New tank T-8009 will be hydrostatically tested over a 24-hour period. The tank will be filled to capacity with clean potable water and the tank will be observed for leaks over a 24-hour period. The Design Report and Sheet 4 of Appendix A have been revised to indicate the required tightness testing for tank T-8009.

6. Other Comments - PIDs

NYSDEC Comment: The Design Report must include a Process Information Diagram for the Tank T-8009 system.

CWM Response: A Process and Instrumentation Diagram for Process Area Phase IV Groundwater Extraction System (T-8009) has been prepared and included as a new appendix in the Design Report and will be submitted under separate cover with the Permit Modification Request and revised Site-Wide Renewal Application.



REPORT

DESIGN REPORT FOR PROCESS AREA IV EXTRACTION WELLS

CWM CHEMICAL SERVICES LLC,
MODEL CITY, NEW YORK

Submitted To: CWM Chemical Services, LLC
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Submitted By: Golder Associates Inc.
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Distribution:
4 Copies - CWM Chemical Services, LLC
1 Copy - Golder Associates, Inc.

January 2012 (Revised April 2012)

Project No. 113-89352

A world of
capabilities
delivered locally



**DESIGN REPORT FOR PROCESS AREA IV AND TANK
ASSESSMENT
FOR
TANK T-8009**

CWM Chemical Services, LLC
Model City, New York Facility

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Golder Associates Inc.
Patrick T. Martin, P.E.

4/25/12
Date



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1.0 INTRODUCTION

Golder Associates Inc. (Golder) has been contracted by CWM Chemical Services, LLC (CWM) to develop the detailed design for additional corrective measures in the Process Area located at the Model City TSD Facility in Model City, New York. Specifically, corrective measures are proposed for an area south of the Transformer Decommissioning (TO) Building herein referred to as Process Area IV (PA IV). Refer to Figures 1 and 2 for CWM Site and PA IV project location maps, respectively.

As required by Condition V.2 of Module I of CWM's current 6NYCRR Part 373 Site-Wide Permit No. 9-2934-00022/00097, semi-annual inspections are performed in the Process Area in accordance with the Process Area Investigation Plan, dated April 2005 (revised April 2006). Areas of broken asphalt in the roadway between the laboratory facility and the T.O. building were observed during Spring 2011 inspection performed by Golder. Additionally, water appeared to be seeping from the subsurface through the broken asphalt in a swale in the asphalt between the laboratory and the TO Building, subsequently migrating into the ditch ("B" Ditch) located along Hall Street. Subsequently, CWM collected surface water samples from the swale and the B Ditch and analyzed the samples at the onsite laboratory for volatile organic compounds (VOCs). VOCs were detected in the surface water samples collected from the swale and the B Ditch.

CWM has reviewed with NYSDEC representatives the observed seepage occurring from the edge of pavement into the drainage swale on the north side of the access road that runs between the Laboratory and T.O. building. As required by Condition E.1.a. of Module II of CWM's Sitewide Permit, CWM is obligated to perform SWMU-specific corrective measures if such actions are necessary as part of a "source control" program.

The agreed approach between CWM and the NYSDEC was to expedite the design and installation of a groundwater extraction system in the area where the seeps are occurring in order to reduce the hydraulic gradient in the vicinity of these seeps and remove/collect potentially impacted groundwater for treatment at the on-site Aqueous Waste Treatment (AWT) Facility. The basic components and the detailed design presented in this document for the PA IV extraction well system are based closely on a similar extraction well system design that was approved by the NYSDEC (1996) for the PCB Warehouse area. The proposed PA IV design includes, submersible pumps in two new groundwater extraction wells, automatic pumping based on water levels, a storage tank with secondary containment, and treatment of collected groundwater at the Model City AWT facility.

1.1 Objective

The objective of this corrective measures design is to address the groundwater contamination in the PA IV area located south of the T.O. Building and mitigate seeps. The primary purpose of the corrective



measures is to restrict migration of groundwater contaminants in groundwater in the area. This objective will be achieved through groundwater collection and treatment.

This document presents the detailed design for the proposed corrective measures in PA IV. Information related to design analyses, operation and maintenance, health and safety requirements, construction quality assurance objectives, and schedule is presented. The detailed design drawings are attached in Appendix A. Specifications for the corrective measures are included on the design drawings. In addition, manufacturer's technical data on proposed equipment is provided in Appendix B.



2.0 SYSTEM DESIGN

Data collected during the RCRA Facility Investigation (RFI), findings of the Site-Wide Corrective Measures Study (CMS), operational data from the PCB Warehouse Collection System and other existing groundwater collection systems in the Process Area and adjacent Lagoons Area have been used to establish a design basis for corrective measures in PA IV.

2.1 Groundwater Collection Wells

Two groundwater extraction wells, EW17 and EW18, will be installed just south of the T.O. Building (refer to Sheet 1, Appendix A). The extraction wells will be spaced approximately 50 feet apart to reduce the potential for constituent migration between individual capture zones. The wells will be installed in close proximity to the T.O. Building exterior walls and each well will be enclosed with insulated and heated wood frame sheds that will connect with the exterior wall of the T.O. Building to allow for weather and freeze protected operation of the air supply and groundwater discharge lines between the sheds and the T.O. Building interior where the air compressor and storage tank will be located.

The wells will be constructed of 8-inch diameter, 304 stainless steel screen and riser to a depth of 6-inches above the top of the Glaciolacustrine Clay or to a maximum depth of 15 feet below grade surface to avoid penetrating into the Glaciolacustrine Clay Unit. The wells will be constructed within 10-1/4-inch I.D. hollow stem augers. The annulus will be filled with #1Q silica sand (serving as the sand pack) followed by a 1-foot bentonite pellet seal, followed by concrete fill to 1-foot above ground surface.

The extraction wells will be constructed with an 8-inch long well sump at the bottom which will terminate a minimum of 6-inches above the Glaciolacustrine Clay. The extraction well screen will be 10 feet in length, (#6 slot size). A 10-inch diameter anodized aluminum protective casing will be placed into the concrete fill prior to placement of the final 1-foot of grout. The casing will extend 3 feet above grade and 1 foot below grade. The protective casing pipe will be capped by a aluminum lockable cover. Placement of the casing will be followed by the construction of a 4-foot square concrete well pad, 6 inches thick, and protective bollards to complete the extraction well installation. Pea gravel will be placed on top of the concrete fill in the annular space in the surface casing.

Each of 8-inch extraction well risers will be fitted with a separate 4-inch diameter slotted PVC pump tube to house the pneumatic well pump. The pump tubes will be open at the bottom and terminate 4-inches above the extraction well sump. The slotted length will be the lower 10 feet on each tube. The extraction wells will also house two, 2-inch diameter, slotted PVC tubes. One of the 2-inch tubes will be slotted continuously and terminate with a cap 2 inches above the 8-inch extraction well sump. It will be used for obtaining water levels and water samples, if necessary. The second 2-inch tube will have a 10-foot slotted length (the bottom 10 feet of the tube) and extend to within 1 inch of the bottom of the extraction well sump. It will be utilized for DNAPL checks and DNAPL removal, if present.



2.2 Pumps and Piping

To maximize the recovery of contaminated groundwater, automatic pumping based on water levels will be used. Controllerless, pneumatic pumps were selected for the corrective measures design.

The positive air displacement pumps selected for the design have a water level float built into the body of the pump. As the water level rises in the well and the pump body, the float slides an actuator rod upward causing air to enter the pump. The incoming air pressure seats the inlet check ball, keeping groundwater from entering or leaving through the pump inlet. Groundwater in the pump body is forced into the discharge tube and up to the surface. The discharge check ball is unseated by the upward force of the liquid. As the water level decreases in the well or the pump body, the float slides the actuator rod downward, shutting off the air supply and allowing the compressed air in the pump to vent. The inlet check ball unseats (absent any air pressure to hold it down), which allows the next fill of groundwater from the well into the pump. The discharge check ball is seated by the weight of the groundwater in the discharge tube above it, preventing collected groundwater from falling back into the pump body. As the pump body refills, the float rises back to the top position and the cycle is repeated.

Initially, it is estimated that each pump will discharge a maximum of 2.5 to 3 gallons/minute (gpm). This rate will be sustained until the submerged well volume has been evacuated. The discharge rate is anticipated to decrease rapidly thereafter, and will be based on the capacity of the surrounding hydrogeologic unit to recharge the well. Based on well yields from existing groundwater collectors that are screened in the Upper Tills unit, the equilibrium extraction rate is anticipated to be approximately 10- 15 gpd.

The pumps will discharge extracted groundwater through continuous 1-inch O.D., U.V. protected, above ground nylon tubing. Each extraction well will have a single tube from the extraction well to the storage tank. All flanges, fittings, and other connections will either be located inside the well head or located within the tanks secondary containment. The tubing will be placed in a coated steel channel or equivalent for support. The channel will be supported by "U" shape steel fittings connected to the Telespar tubing. The groundwater transfer system will be installed approximately 4-feet above ground surface to facilitate visual inspections.

2.3 Storage Tank (T- 8009) and Secondary Containment

The extracted groundwater will discharge into a high density linear polyethylene (HDLP) horizontal storage tank located within the T.O. Building. The storage tank will have a capacity of approximately 525 gallons. The storage tank will be located in a steel secondary containment basin with a capacity that will provide in excess of 100 percent of the storage tank's capacity. To insure the integrity of tank T-8009 prior to system start-up, the tank will be hydrostatically tested over a continuous 24-hour period. The tank will



be filled to capacity with clean potable water and the tank will be visually observed for leaks over a 24-hour period.

A tank high level float alarm has been provided in the design. When the water level in the tank reaches a pre-determined height (approximately 80 percent capacity), a high level alarm (flashing light) mounted externally and near the control panel will notify CWM personnel that the storage tank is full. The flashing light will remain on until acknowledged by site personnel. In addition to the alarm light, the high level float will also trigger a solenoid valve that will close the air supply to the well extraction pumps, thereby shutting down the collection system. The system will be restarted after the storage tank has been emptied.

The groundwater collected in the storage tank will be transferred by truck by CWM personnel to the on-site AWT Facility for treatment and ultimate discharge to the Niagara River under the existing State Pollution Discharge Elimination System (SPDES) permit.

2.4 Compressed Air Supply

Air will be supplied to the pumps using a 5 horsepower, 480 VAC, 3 phase, air compressor that will be located within the utility shed. The air compressor will be mounted on a horizontal 80 gallon tank and will operate intermittently when the air pressure in the tank is between 90 psi and 120 psi. The air compressor will be fitted with a coalescing filter that will remove 99.99 percent of oil aerosols and all particles 0.025 microns and larger, according to manufacturer specifications. The air filter will minimize the potential for introducing operation-related contamination to the extracted groundwater and biasing any sampling analysis that might be performed.

A single air pressure regulator will be located within the T.O. Building and serve both well pumps. It is estimated that the required operating pressure at the pumps would be approximately 80 psi. An additional air filter is supplied with the regulator that will further improve the air quality at the pumps.

The compressed air will be supplied to the pumps through 1/2-inch O.D., U.V. protected, nylon tubing. A single tube with tees to individual wells has been specified in the design. The diameter of the tubing has been designed to ensure that air flow is sufficient to maintain design pumping rates for both pumps when both are operating. The air supply tubing will be secured into the support channel using U.V. protected, nylon cable ties.

The electrical panel for the air compressor will be supplied by CWM. The electric panel will house the electrical disconnect, motor starter and O/L's, fuses, control transformer, push-button start and stop buttons, and elapsed time meter.



Turning off the air compressor will not shut down the system. The pumps will continue to cycle until the high level alarm is triggered or until the air supply (80 gallon tank and tubing) is reduced below the minimum operating pressure set point.

2.5 Instrumentation and Controls

The pumps selected for the corrective measures at PA IV do not require instrumentation and control panels to regulate air intake and groundwater discharge cycles. This cycle is controlled downwell, at the pump. The controls for the design consist of a storage tank level-control panel and air compressor enclosure located and mounted on the inside of the T.O. Building. Sheet 5 illustrates the control panels provided in the design.

A storage tank level-control panel will be provided for the 525 gallon storage tank. The storage tank panel will be powered by 115 VAC from the mini power zone and will interface with the high level float in the storage tank, a solenoid valve at the air supply, and a flashing alarm light. The sequence of operations is as follows:

- The high level float in the storage tank will transmit a signal to the control panel that the storage tank is full. When the signal is received, the high level dome light located on the outside of the T.O. Building will begin flashing. The high level signal will also trigger the solenoid valve that shuts down air supply to the pumps;
- CWM personnel will acknowledge the high level alarm by depressing “PB2” on the control panel which will stop the light from flashing. The light will remain on as a reminder that the groundwater system is not operating;
- After CWM personnel have removed the collected groundwater, “PB 1” should be depressed to reset the high level alarm, turn off the non-flashing light, and open the solenoid valve (this will resume normal operation); and
- A selector switch is available on the control panel that will turn off the system’s power. With power off, the solenoid valve will return to its normally closed position and shut down the air supply to the pumps.

2.6 Monitoring and Performance Assessment

The Groundwater Extraction Systems Operation and Maintenance (O&M) Manual (April 2008) will be revised to include PA IV. The PA IV system will be operated consistent with the remedial system installed at the PCB Warehouse, with the exception that the PA IV system is intended to operate year round. Monitoring and Performance assessment of the corrective measures at PA IV will include the following procedures:



- Tank T-8009 will be sampled during the first quarter of operations and annually thereafter. The initial samples collected from T-8009 will be analyzed for full Target Compound/Target Analyte list (TCL/TAL) of parameters. The annual samples will be collected when samples are collected from other sitewide corrective measures systems (Tanks T-8005 through T-8007) in the fall. Samples will be analyzed for the Site Specific Priority Pollutant VOC List of 27 compounds by Method 8260 unless the results of the initial samples indicate analyses for additional parameters would be appropriate;
- For PA IV, groundwater elevation measurements will be taken from extraction wells EW17 and EW18 annually during the site wide water level measurement event. In conjunction with the groundwater level measurements, the DNAPL sumps will be checked for the presence of non-aqueous material. DNAPL has been detected if any liquid non-aqueous matter remains on the water level measuring device;
- The performance of the PA IV system at meeting the objective of mitigating seeps in the alley between the T.O. Building and Laboratory will at a minimum be evaluated semi-annually as part of the Process Area Inspection and during the annual groundwater elevation measurement and tank sampling event; and
- The volume of collected groundwater in T-8009 will be measured and recorded at the storage tank prior to removal by CWM personnel. The possible presence of DNAPL in the tank will be evaluated prior to tank emptying through use of a clear sampling tube. The observations, date and time will be recorded so that an approximate extraction rate could be calculated for the groundwater collection system.

The PA IV corrective measures system operating data will be incorporated into the site's quarterly corrective action reports that are submitted to the NYSDEC. The reports will contain the monthly volume of groundwater removed from the storage tank, the cause and duration of any system down time, and any actions taken to resolve recurrent operational problems. The first report that includes data from the PA IV corrective measures will be submitted to NYSDEC following the first full quarter of operation.



3.0 TANK DESIGN ASSESSMENT

The 525 gallon, HDLP tank has been designed to meet the requirements of 6 NYCRR §373-2.10. The purpose of this section is outline the design criteria set forth by this regulation.

3.1 Location

The tank will be located inside the T.O. Building (southeast corner) adjacent to the south wall of the building as shown on Sheet 1 located in Appendix A.

3.2 Dimensions and Capacity

The horizontally oriented tank is 49 inches (4.1 ft) in diameter and 71 inches (5.9 ft) long. The nominal storage capacity is 525 gallons. A schematic drawing of the tank is presented on the manufacturers design drawing located in Appendix B.

3.3 Structural Support and Foundation

The HDLP tank is designed to be self supporting with an 11-inch wide molded flat bottom section that spans the majority of the length of the tank base (there is a one-foot arched section in the middle of the span which enhances tank shell structural capacity. Due to the leak detection requirements for this tank and the flat bottom design, the tank will be placed on top of 1-inch thick fiberglass grating mounted inside the steel secondary containment system. The tank will be secured from rotational movement within the secondary containment structure by two 304 stainless steel hold down straps installed at pre-molded strap indentation locations spaced 21 $\frac{3}{8}$ inches from each end of the tank. The hold down straps will be bolted to 1 $\frac{3}{4}$ inch channel (Unistrut or equal) welded to the side walls of the steel secondary containment structure at each of the four strap termination locations.

The secondary containment system will be fabricated from continuously welded, reinforced 7 gauge steel which will be placed directly on the existing T.O. Building concrete floor. CWM personnel indicated that it is understood that the concrete floor in the T.O. Building is a minimum of six-inches thick. The minimum six-inch thick reinforced concrete floor in the T.O. Building is believed to have been designed to support static loads in excess 2,000 pounds per square foot (psf). The calculated static loading that the storage tank system (at full capacity) will exert is estimated to be less than 110 psf.

3.4 Materials of Construction

The tank will be constructed of HDLP which is chemically compatible and highly resistant to the anticipated low-level concentrations of VOCs anticipated in the extracted groundwater.

Tank walls will be $\frac{3}{4}$ - inch thick and are designed to meet or exceed the strength requirements of ASTM D1998-06 for molded polyethylene tanks.



The tank hold down straps will be stainless steel and nuts, bolts and backing steel will be galvanized steel.

3.5 Tank Attachments

The tank will have a number of attachments that include a manway and various flanges. There will be one 21-inch manway located on the top of the tank. The following is a list of flanges to be used:

- 1 - 2" flange for high level float control
- 1- 2" flange for vacuum truck access for tank emptying
- 1 – 2" bulkhead coupling air vent
- 1 – 3" bulkhead coupling for groundwater discharge

3.6 Overfill Protection

Overfilling will be prevented by a high level float alarm. When the level in the tank reaches a pre-determined height, a flashing red light located on the outside of the T.O. Building will notify CWM personnel that the tank is full. The light will remain on until deactivated by CWM personnel. In addition to the alarm light, the high level float will also trigger a solenoid valve that will close the air supply to the pumps, thereby shutting down the collection system. The system will be restarted after the storage tank has been emptied.

3.7 Air Emissions

The installation of the Process Area Phase IV Groundwater Extraction System is part of the RCRA Corrective Measures for the facility. As indicated in 6 NYCRR §373-2.29(a)(2)(v) and 40 CFR 264.1080(b)(5), air emission standards for tanks do not apply to; *"A waste management unit that is used solely for on-site treatment or storage of hazardous waste that is placed in a unit as a result of implementing remedial activities required under the corrective action authorities of RCRA"* However, CWM has elected to include a carbon unit in the design, similar to existing groundwater extraction systems currently operating on site, to treat emissions from the tank as a Best Management Practice (BMP).

At this time, CWM believes that the liquids that will be removed by the extraction system and stored in tank T-8009 will have organic concentrations of less than 10-percent by weight based on the analysis of groundwater removed by the groundwater extraction system at Process Area Phase II. Therefore, the requirements of 6 NYCRR §373-2.28 will not be applicable. As indicated in Section 2.6, initial samples of collected liquids from Tank T-8009 will be analyzed for full TCL/TAL parameters. If results of the analysis indicate the presence of organics greater than 10-percent by weight, CWM will comply with 6 NYCRR 373-2.28 requirements.



3.8 Secondary Containment and Leak Detection

The storage tank will be located in a coated steel secondary containment dike (8 ft by 6.5 ft by 1.5 ft) with a capacity that will be a minimum of 100 % of the storage tanks capacity meeting the requirements of 6 NYCRR §373-2.10(d). The capacity of the secondary containment is 583 gallons, which is greater than 100% of the storage tank capacity (525 gallons).

The steel secondary containment will be coated with Sherwin Williams Kem Bond® HS Primer and Macropoxy® 646 Epoxy or equivalent. Product and compatibility information are provided in Appendix B.

Leak detection of the storage tank, all above ground piping, and the secondary containment area will be by visual and manual means on a daily basis during operation of the system.

3.9 Process Description

The groundwater collected in the storage tank will be stored until operating capacity is achieved (approximately 80 percent of total capacity) and will be transferred by CWM personnel to the on-site AWT Facility for treatment.

A Process and Instrumentation Diagram (P&ID) has been prepared for the PA IV groundwater extraction system and is included in Appendix C.



4.0 OPERATION AND MAINTENANCE

The following operation and maintenance procedures represent those that CMW has employed and gained during approximately 15 years of similar operational experience of the PCB Warehouse Extraction Wells which is the basis for this proposed Corrective Measures design.

4.1 Operation

The proposed design of the PA IV Corrective Measures provides for weather-tight enclosures of the two extraction wells and associated discharge piping and air supply lines. The enclosures will be constructed of wood framing and siding and will be insulated and heated. The tubing/piping from the well head to the interior of the T.O. Building will be pitched to drain back to the well and/or to the tank. The tubing/piping will also be heat traced and insulated. This will allow for year round operation of the extraction well system. Typically, in accordance with the Part 373 Site-Wide Permit, CWM operates all other groundwater collection and pumping systems between April 15 and November 1 to avoid operational and maintenance problems caused by freezing.

4.2 Inspection/Maintenance

If the corrective measure system is inoperable for a period of more than three consecutive days or five days in a thirty day period, CWM will notify the NYSDEC. The notification will include a plan for restoring system operation as soon as possible. The following is a description of the long-term monitoring and maintenance that will be conducted for the corrective measures at PA IV:

- The submersible pumps will be inspected annually to ensure that they are functioning properly;
- A daily inspection of all above ground tubing, the storage tank, and secondary containment shall be performed and include documentation of any required maintenance; and
- The storage tank will be emptied within eight (8) hours of a high level alarm. Water levels within the tank shall be confirmed and reported with estimated system shut down and start-up time and date.

The PA IV corrective measures system operating data will be incorporated into the sites quarterly corrective action reports that are submitted to the NYSDEC. The reports will contain the monthly volume of groundwater removed from the storage tank, the cause and duration of any system down time, and any actions taken to resolve recurrent operational problems.



5.0 HEALTH AND SAFETY REQUIREMENTS

This project involves a state mandated corrective action and also may involve contact with hazardous substances, it will be necessary for the Contractor to comply with OSHA 1910.120 (HAZWOPER) regulations. A Health, Safety and Emergency Response Plan is required to be developed by the Contractor as detailed in the Technical Specifications.

Safety is of utmost importance to CWM with any project undertaken. In addition to the OSHA 1910.120 requirements, any other pertinent federal, state or county requirements must be followed as well as CWM's own Contractor Safety Procedures.



6.0 PROJECT SCHEDULE

The construction activities are anticipated to require eight weeks to perform. This estimate includes contractor mobilization/demobilization, but does not include the time required to select a contractor using a competitive bidding process, or fabrication of the collection tank and secondary containment. CWM proposes the following schedule for implementing the design and installation of the corrective measures at PA IV:

Activity	Submittal Period
Begin Construction of the PA IV Corrective Measure	Within 60 days of written receipt of final Department approval of the Detailed design of PA IV Corrective Measures (Weather permitting)
Complete Construction of the PA IV Corrective Measures	Approximately 60 days after construction begins.
Submittal of the Certification report	Within 30 days of completing construction.
Begin operation of the PA IV Corrective Measures	Within 15 days of written receipt of Department approval of the Certification Report.

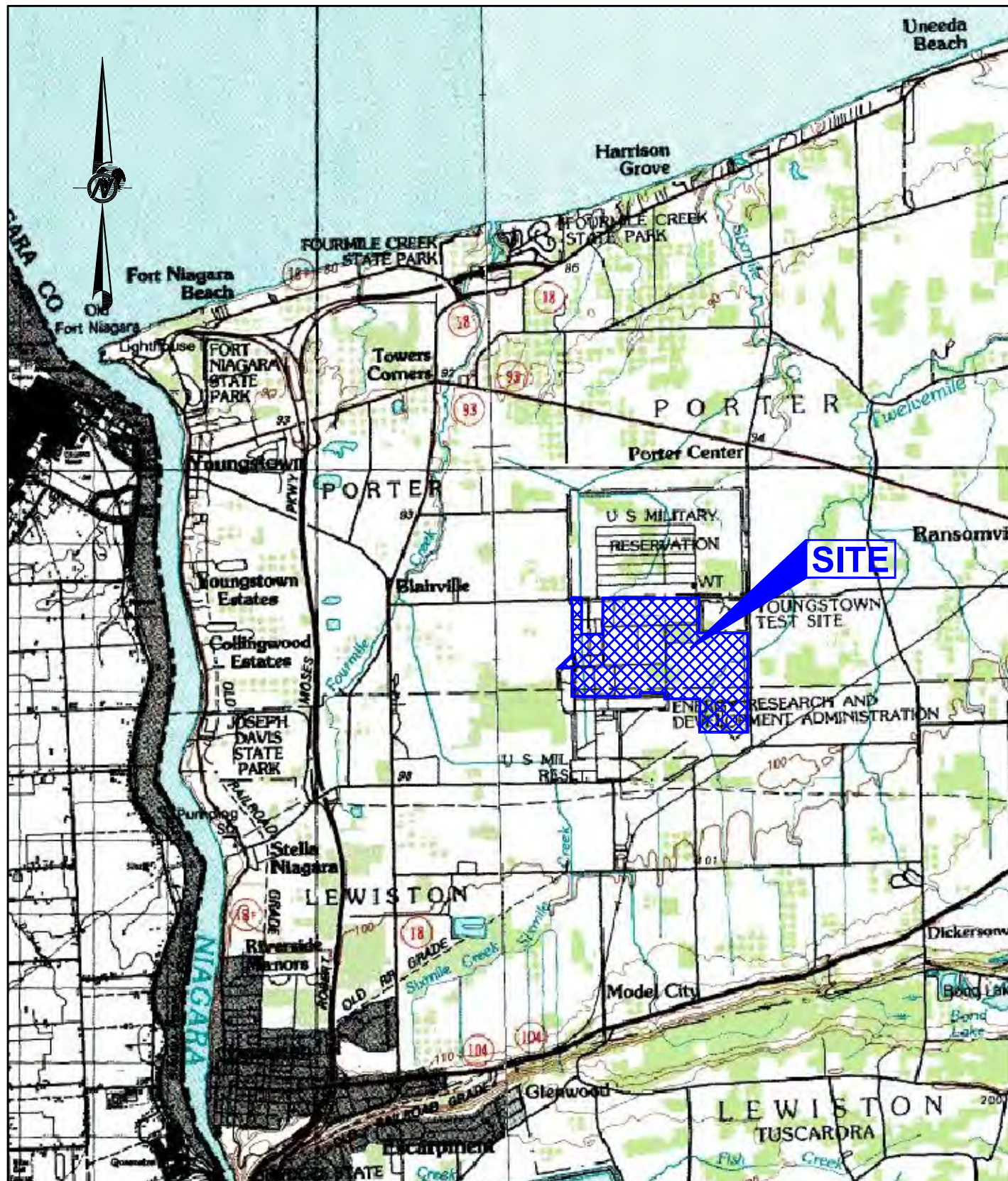
The time estimate presumes that the work to be performed is that identified in the detailed design documents without significant changes or modification. Major design changes may significantly impact the schedule. Any changes or modifications which are deemed appropriate based on material availability and/or interim construction activities will be reviewed with the NYSDEC at the earliest opportunity.

GOLDER ASSOCIATES INC.

Patrick T. Martin, P.E., BCEE
Senior Consultant

Michael L. Bracci
Associate

FIGURES



REFERENCE

1.) DRAWING WAS ADAPTED FROM THE USGS TOPOGRAPHIC QUADRANGLE OF RANSOMVILLE, NEW YORK, OBTAINED FROM www.topozone.com.



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DATE 01/26/12

DESIGN AJN

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SITE LOCATION MAP

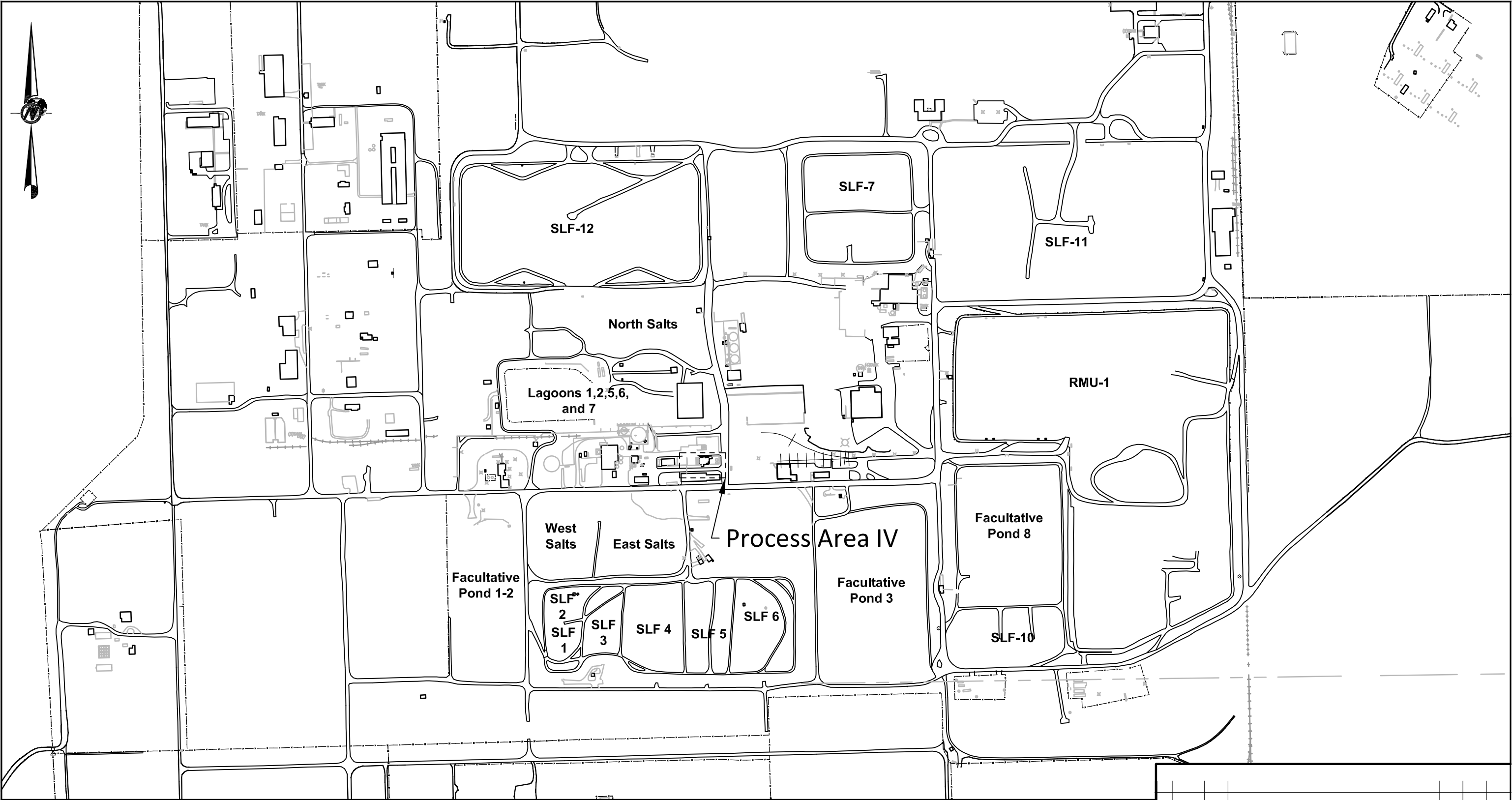
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PROJECT No. 113-89352 REV. 0

CWM CHEMICAL SERVICES, L.L.C./MODEL CITY TSD FACILITY

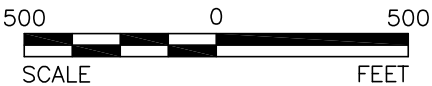
FIGURE

1



REFERENCES

1.) BASE MAP COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY
DATED MAY 31, 2001 BY AIR SURVEY CORP., DULLES, VIRGINIA.




REV	DATE	DES	REVISION DESCRIPTION					CADD	CHK	RVW		
PROJECT CWM CHEMICAL SERVICES, L.L.C. MODEL CITY, NEW YORK												
TITLE PROCESS AREA IV PROJECT LOCATION MAP												
NJ Authorization #24GA28029100			PROJECT No.		113-89352		FILE No.			11389352A011		
 Golder Associates Mt. Laurel, New Jersey			DESIGN	AML	01/23/12		SCALE	AS SHOWN	REV.	0		
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			REVIEW	MLB	01/30/12							

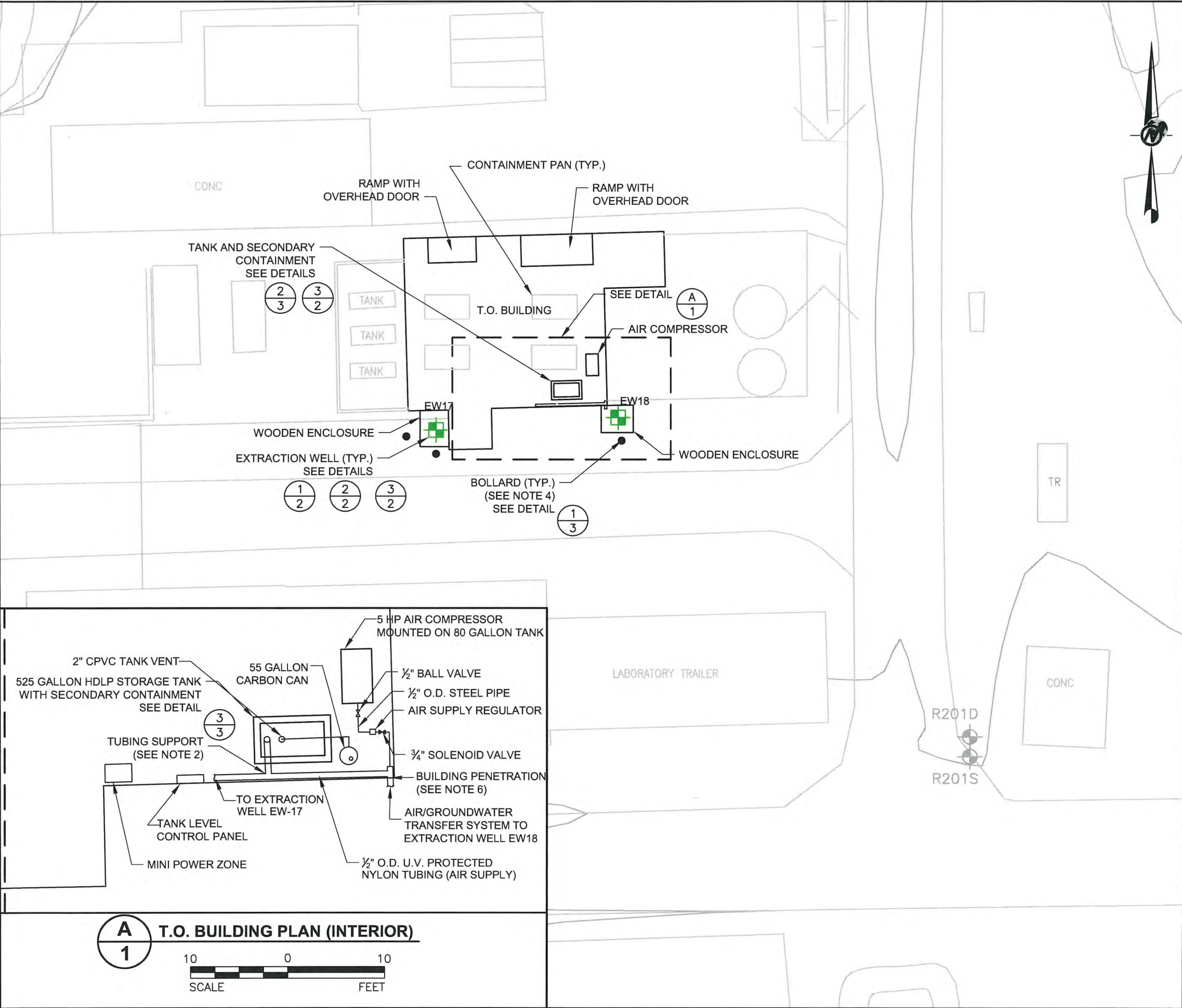


Figure 2

APPENDIX A

DETAILED DESIGN DRAWINGS

- Sheet 1 - Extraction Well Equipment Layout and Site Plan**
- Sheet 2 - Collection System Details**
- Sheet 3 - Miscellaneous Details**
- Sheet 4 - General Notes and Specifications**
- Sheet 5 - Electrical Details**



LEGEND

UPPER TILLS AND GLACIOLACUSTRINE SILT/SAND UNIT MONITORING WELL

PROPOSED EXTRACTION WELL

BOLLARD

NOTES

1.) FIELD VERIFY SOURCE AND AVAILABILITY OF 480 VAC, 3ø, 60 Hz POWER SUPPLY PRIOR TO SUBMITTING BID.

2.) TUBING SUPPORT INSIDE T.O. BUILDING SHALL BE SUPPORTED FROM ABOVE AT 7-FOOT HEIGHT (MIN.). SUPPORT SHALL END ABOVE GROUNDWATER DISCHARGE COUPLING ON STORAGE TANK.

3.) GROUNDWATER DISCHARGE TUBING SHALL DROP UNSUPPORTED FROM TUBING SUPPORT CHANNEL END TO 2-INCH PVC WELL CAP AND 3/4-INCH COMPRESSION FITTING ON STORAGE TANK.

4.) BOLLARDS SHALL BE PLACED 5'-0" FROM GROUNDWATER TRANSFER ENCLOSURES.

5.) EXTRACTION WELL IDENTIFICATION FROM WEST TO EAST EW17 AND EW18.

6.) ALL NEW WALL PENETRATIONS AND OPENINGS SHALL BE SEALED TO BE WEATHERPROOF.

7.) A MINIMUM AISLE SPACE OF 2-Feet WILL BE MAINTAINED BETWEEN THE CLOSEST PAN AND THE TANK'S SECONDARY CONTAINMENT STRUCTURE.

8.) ALL PIPE/TUBING SHALL BE HEAT TRACED AND INSULATED AND SLOPED BACK TO EITHER WELL OR TANK FROM HIGH POINT.

9.) WOODEN ENCLOSURE TO BE CONSTRUCTED OF WOOD FRAMING AND SIDING. INTERIOR OF ENCLOSURE TO BE INSULATED.

REFERENCES

1.) BASE MAP COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY DATED MAY 31, 2001 BY AIR SURVEY CORP., DULLES, VIRGINIA.

2.) INTERIOR OF TRANSFORMER DECOMMISSIONING (T.O.) BUILDING DIGITIZED FROM TO BUILDING DETAILS - P4.PDF, ENTITLED "TRANSFORMER DECOMMISSIONING (T.O.) BUILDING," PREPARED BY BLASLAND, BOUCK & LEE, INC.

STATE OF NEW YORK

PATRICK T. MARTIN

No. 71014-1

REGISTERED PROFESSIONAL ENGINEER

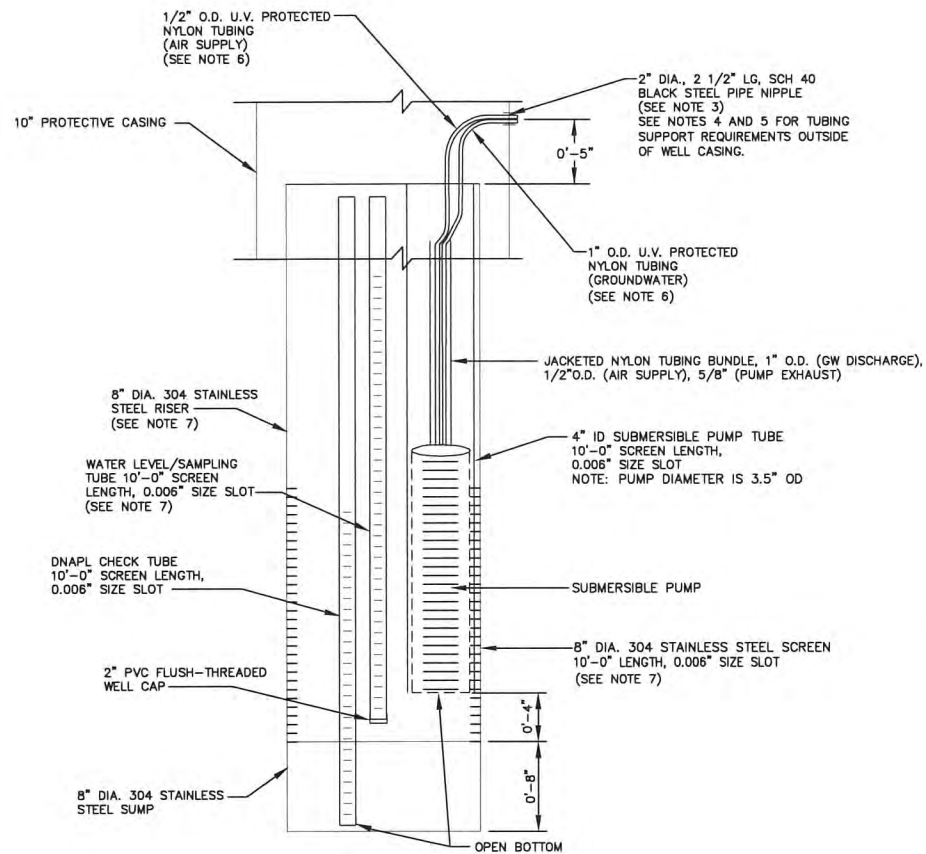
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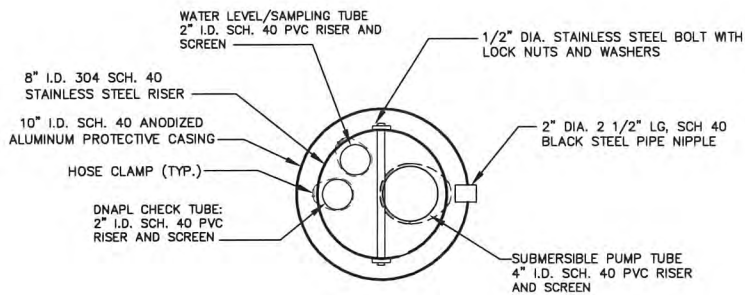
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T.O. BUILDING PLAN (INTERIOR)

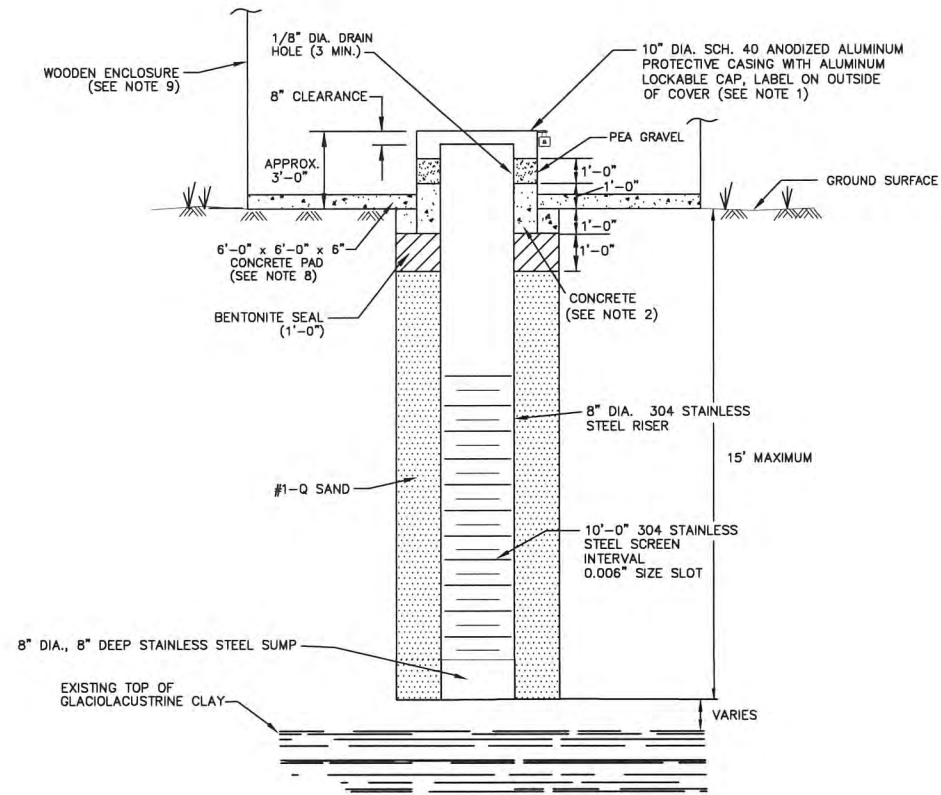
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1
2 **TYPICAL EXTRACTION WELL**
BOTTOM DETAIL
NOT TO SCALE



3
2 **PLAN VIEW**
EXTRACTION WELL DETAIL
NOT TO SCALE




2
2 **TYPICAL EXTRACTION WELL**
NOT TO SCALE

NOTES

1. EXTRACTION WELL LABELS SHALL BE CUSTOM NUMBERED BLACK PLASTIC PLATES WITH WHITE LETTERING. PLATES SHALL BE SECURELY FASTENED TO LOCKABLE CAP.
2. FILL ANNULUS BETWEEN OUTER PROTECTIVE CASING AND STAINLESS STEEL RISER WITH CONCRETE TO 1'-0" min. ABOVE GROUND SURFACE.
3. FILL ANNULUS BETWEEN TUBING AND NIPPLE WITH FOAM PIPE INSULATION.
4. AIR SUPPLY TUBING AND U.V. PROTECTED TUBING SHALL BE INSTALLED IN UNISTRUT SUPPORT CHANNEL AND SECURED EVERY 3 FEET WITH U.V. RESISTANT BLACK NYLON CABLE TIES. TUBING SUPPORT SHALL BE COATED STRUCTURAL GRADE STEEL 2 INCH CHANNEL WITH HOLES. UNISTRUT P1000 OR EQUIVALENT.
5. TUBING SUPPORT CHANNEL SHALL BE CONNECTED TO TELESAR TUBING USING GALV. STEEL "U" SHAPE FITTINGS. UNISTRUT P1048 OR EQUIVALENT.
6. ALL TUBE FITTINGS INCLUDING TEES, ELBOWS, AND UNIONS SHALL BE COMPRESSION FITTINGS. ALL TUBE FITTINGS SHALL BE MADE OF MATERIAL THAT PROVIDES U.V. PROTECTION. IF UNAVAILABLE, UNPROTECTED FITTINGS SHALL BE WRAPPED WITH TAPE SUITABLE FOR OUTDOOR USE THAT PROVIDES U.V. PROTECTION.
7. ALL PVC TUBES AND STAINLESS STEEL RISERS SHALL BE FLUSH THREADED.
8. CONCRETE PAD SHALL BE CONSTRUCTED OF 3000 psi (min.) CONCRETE WITH WELDED WIRE REINFORCEMENT.
9. WOODEN ENCLOSURES TO BE FIELD CONSTRUCTED. ENCLOSURE TO BE ANCHORED TO NEW CONCRETE PAD AND T.O. BUILDING. ENCLOSURE TO BE HEATED FOR WINTER OPERATION.



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PROJECT						
CWM CHEMICAL SERVICES, L.L.C. MODEL CITY, NEW YORK						
TITLE						
PROCESS AREA IV COLLECTION SYSTEM DETAILS						
<div>  <div> Golder Associates Mt Laurel, New Jersey </div> </div>						
PROJECT No. 113-89352			FILE No. 11389352A005			
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REVIEW	PTM	04/20/12				



1. STEEL PLATE FOR PAN FLOOR AND SIDEWALLS TO BE A 36 MILD STEEL, 1 GAUGE THICKNESS.
2. PAN TO BE PRIMED WITH SHERWIN-WILLIAMS KEM BOND HS AND PAINTED WITH SHERWIN-WILLIAMS MACROPOXY 646.
3. DIMENSIONS SHOWN ARE INSIDE MINIMUM REQUIRED.

A. FLOOR AND SIDEWALL PLATES TO BE CONTINUOUSLY WELDED.

B. 3" ANGLE, $\frac{1}{4}$ " THICK CONTINUOUSLY WELDED TO FLOOR AND SIDEWALLS.

C. 2" ANGLE, $\frac{1}{4}$ " THICK STITCH WELDED TO OUTSIDE TOP OF PAN WALLS.

D. 3" ANGLE TABS TO ANCHOR PAN TO CONCRETE. DRILL HOLE IN TABS. (4 TABS TOTAL).

1. TANK T-8009 WILL BE LOCATED IN A COATED STEEL SECONDARY CONTAINMENT DIKE (8FT. BY 8.5FT. BY 1.5FT.) WITH A CAPACITY THAT WILL BE A MINIMUM OF 100% OF THE STORAGE TANK CAPACITY. THE CAPACITY OF THE SECONDARY CONTAINMENT IS 583 GALLONS, WHICH IS GREATER THAN 100% OF THE STORAGE TANK CAPACITY OF 525 GALLONS.
2. 304 SS TANK HOLD DOWN STRAPS (BY TANK MFR) SHALL BE BOLTED TO 1 3/4-INCH UNISTRUT WHICH IS WELDED TO THE BOTTOM OF THE INSIDE OF THE CONTAINMENT FLOOR AT FOUR LOCATIONS.
3. GROUNDWATER INLET COUPLING SHALL BE COVERED WITH 2-INCH PVC WELL CAP WITH 3/4-INCH NYLON COMPRESSION, MALE CONNECTOR, TUBE FITTING.
4. STORAGE TANK TO VENT TO A 55 GALLON CARBON CANISTER WHICH WILL VENT TO BUILDING. CWM WILL TEST CARBON CAN WEEKLY IN ACCORDANCE WITH SITE PROCEDURES.
5. STORAGE TANK SHALL BE POSITIONED IN SECONDARY CONTAINMENT TO ALLOW FOR VISUAL INSPECTION OF SECONDARY CONTAINMENT BOTTOM FROM ALL SIDES.
6. LABELS SHALL BE CUSTOM NUMBERED BLACK PLASTIC PLATES WITH WHITE LETTERING. PLATES SHALL BE SECURELY FASTENED TO LOCKABLE CAP.
7. BOLLARDS SHALL BE PRIME COATED AND FINAL PAINTED PRIOR TO INSTALLATION.
8. CONTRACTOR IS RESPONSIBLE FOR INSURING THAT ROOF VENT DOES NOT LEAK. AT OWNERS DISCRETION, TANK VENT MAY EXIT OUTSIDE OF T.O. BUILDING.
9. SECONDARY CONTAINMENT SIDEWALLS AND FLOOR SHALL BE OF CONTINUOUSLY WELDED, REINFORCED STEEL CONSTRUCTION OF 7 GAUGE THICKNESS (min).
10. TANK WILL BE MOUNTED ON 1-INCH THICK FIBERGLASS GRATING TO PROVIDE LEAK DETECTION FOR TANK BOTTOM



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CWM CHEMICAL SERVICES, L.L.C. MODEL CITY, NEW YORK										
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Golder Associates <small>Mt Laurel, New Jersey</small>										

GENERAL NOTES

A. HEALTH AND SAFETY

1. All contractor employees must attend a pre-job safety orientation provided by CWM Chemical Services, Inc., prior to performing any work on Model City premises.
2. All contractors must coordinate with the owner to ensure compliance with all applicable site, local, state, regional, and federal requirements regarding health and safety, operations and Emergency Response, OSHA, Confined Space and general industry standards. CONTRACTOR is responsible for all PPE requirements and air monitoring equipment. For drillers, a minimum of level C PPE required and upon air monitoring results may downgrade to level D.
3. The contractor must sign and work in conformance with CWM Chemical Services, Inc.'s document, Safety Regulations for Outside Contractors.
4. CONTRACTOR shall supply OWNER with a MSDS manual of all materials brought on site.
5. CONTRACTOR shall submit a list to OWNER of all equipment to be utilized for this project.

B. CONSTRUCTION

1. CONTRACTOR shall attend a mandatory site visit, coordinate with owner to identify all work including but not limited to: proposed instrumentation and power wiring connections, pipe routing, existing facilities modifications, contractor access and use of utilities, and other site requirements and conditions.
2. Before the start of construction the CONTRACTOR shall submit to the owner a proposed progress schedule for the work. Work shall not begin until this progress schedule is approved by the OWNER.
3. All work shall be coordinated with the OWNER to minimize interruption to daily operations. The CONTRACTOR shall limit his activities and area of work to the immediate area of construction.
4. The CONTRACTOR shall be responsible for returning all disturbed areas of work to the conditions existing prior to the start of construction including grading and placement of topsoil, seeding, and fertilizing of lawn areas.
5. The CONTRACTOR is responsible for and shall verify and coordinate all dimensions and details concerning his work before proceeding with said work. Any discrepancies shall be brought to the immediate attention of the OWNER.
6. The CONTRACTOR shall locate, protect, and maintain all utilities such as leachate piping, storm sewers, water mains, electrical conduit, and telephone duct bank. All work possibly affecting utilities shall be coordinated with the OWNER.
7. The CONTRACTOR shall fully brace, secure and otherwise protect his work in progress and all existing structures, utilities, etc. until structures and/or backfilling are complete. All work shall be conducted in a safe and workmanlike manner, in compliance with OSHA and construction industry safety practices.
8. All excavated material from the work areas shall be disposed of or reused as directed by the OWNER.
9. Compressor tank shall be grounded.
10. All scraps and additional materials shall be disposed of by CONTRACTOR off-site at CONTRACTOR'S expense.
11. CONTRACTOR is responsible for determining the appropriate utility requirements for this construction project and is responsible for supplying said utilities if needed.

C. DECONTAMINATION AND CONTAINMENT OF EXCAVATED SOILS

1. Decontamination of heavy equipment and drill auger flights and bits shall be conducted using CONTRACTOR owned steam cleaner and shall be performed at an OWNER approved on-site location.
2. Material that is excavated as part of work associated with bollard and extraction well construction shall be containerized in OWNER supplied roll-offs or drums. CONTRACTOR shall be responsible for maintaining roll-offs/drums and replacing covers when not in use.
3. CONTRACTOR is responsible for placing all excavated materials into roll-off containers or drums.

SPECIFICATIONS

T.O. BUILDING

1. CONTRACTOR shall field verify the condition of existing electrical conduit, wiring, and fixtures for use in this project. CONTRACTOR shall evaluate existing electrical components for compliance with NEC and applicable codes. Evaluation shall be performed prior to submitting bids. All electrical components that are not useable or in compliance with code shall be replaced. CONTRACTOR to submit list of equipment and parts to be supplied.

GROUNDWATER COLLECTION SYSTEM:

1. Pumps shall be 4-inch O.D., 3/8-inch long positive air displacement, bottom inlet type of stainless steel construction. QED Model LDAF4+B.
2. Pumps shall be installed in extraction wells according to manufacturer's instructions. See SHEET 2.
3. Downwell tubing shall be jacketed nylon tubing bundle with 1-inch, 1/2-inch, and 5/8-inch, O.D. tubing.
4. Exhaust tubing and drain vent (3/8-inch and 1/4-inch O.D.) shall be into the protective well casing.
5. Groundwater discharge tubing shall be 1-inch, O.D., U.V. protected nylon tubing. See SHEET 2.
6. The groundwater discharge tubing shall be placed into 2-inch galv. steel channel with holes.
7. The support channel shall be supported approximately 7-feet above grade. The support will be provided by coated steel channel. Unistrut or equivalent.
8. Compression fittings for groundwater discharge and air supply tubing shall be used at all support channel 90° elbows and tees.

STORAGE TANK AND SECONDARY CONTAINMENT DIKE:

1. The 525 gallon storage tank shall be a horizontal high density linear polyethylene (HDLP) tank fabricated by American Process Technologies, or equivalent. See SHEET 3.
2. The secondary containment dike shall be carbon steel construction and all surfaces prime coated and final painted by the manufacturer. Interior and exterior of dike shall be sandblasted and then coated with Sherwin-Williams MACROPROXY 646 or equivalent epoxy finish paint in gray color. The capacity of the secondary containment dike shall be at least 100 percent of the storage tank capacity.
3. Tank fittings will be installed by CWM and shall include, (3) 2-inch flanges, (1) 3-inch flange, and (1) 18-inch screwed manway. Location of fittings shall be verified by OWNER prior to fabrication. All bolts shall be 304 SS supplied by CWM and gaskets shall be durable type bolts shall be 304 SS supplied by CWM and gaskets shall be durable type supplied by manufacturer.
4. Upon completion of fabrication work CWM Chemical Services, Inc. shall test for water tightness and repair leaks or defects.
5. The high level float, Madison vertical liquid level switch, 316 SS, NO/NC and cord or equivalent shall be installed in the storage tank in accordance with manufacturer's recommendations and OWNER requirements. The high level float signal shall be transmitted to the storage tank control panel. See SHEET 5. Connections for the high level float shall include 2-inch blind flange with 1/2-inch coupling NPT and 1/2-inch cord grip (B/W Controls or equivalent). Wiring between this float and the control panel shall be isolated in a separate conduit per NEC standards (for intrinsically safe wiring).
6. CONTRACTOR must submit welding procedures, specifications, and welder and welding operator qualifications and test reports. In addition, proposed testing and QC methods, materials products information, steel mill test reports, material certificates and CONTRACTOR certifications.

AIR SUPPLY

1. Air compressor shall be two stage, electric driven A/C with 5 horsepower, TEFC, 480 VAC, 3 phase, 1.15 SF motor capable of delivering a minimum 16 SCFM at 100 psi. The air compressor shall be horizontal mounted on 80 gallon ASME tank with factory set pressure switch at 90 psi cut-in and 120 psi cut-out, coalescing filter with auto-drain, electronic tank drain and low shutoff switch. Saylor-Beall, FS Curtis, Ingersoll-Rand.
2. Electronic tank drain shall discharge condensate to HDLP storage tank.
3. Air compressor manufacturer shall provide enclosure with disconnect, starter & O/L's fuses, control transformer, push button start/stop and elapsed time meter.
4. All control panel enclosures shall be NEMA 3R Type. Square D or equivalent.
5. An air pressure regulator with filter, QED Part No. 37055 or equivalent, shall be installed in the T.O. Building. The in-line pressure shall be set in accordance with pump manufacturer's recommendation. Outlet air line at regulator shall be 3/4-inch O.D. nylon tubing, maximum operating pressure shall be at least 150 psi.
6. Prior to exiting the T.O. Building, the 3/4-inch O.D., U.V. protected, nylon tubing shall be fitted with a 3/4-inch NPT ASCO No. 8210G9, 120 VAC, NEMA 4X, brass body, normally closed solenoid valve or equivalent. The valve shall be controlled at the storage tank level control panel. See SHEET 5.
7. Immediately following the solenoid valve, the air supply line shall be 3/4-inch O.D. U.V. protected nylon tubing, maximum operating pressure shall be at least 150 psi. The tubing shall be attached to the 2-inch steel support channel at three foot intervals using outdoor black nylon cable ties. See SHEET 1.
8. Air supply tubing between well cap and the support channel shall be 1/2-inch O.D., U.V. protected nylon tubing, maximum operating pressure shall be at least 150 psi. The 1/2-inch O.D., U.V. protected, nylon tubing shall be secured to the 3/4-inch, O.D., U.V. protected nylon groundwater discharge tubing using outdoor black nylon cable ties. See SHEET 2.


PRESSURE TESTING:

1. CONTRACTOR shall perform low pressure air testing of the groundwater transfer 1-inch nylon tubing. CONTRACTOR shall provide all necessary equipment and material for performing tests.
2. Pressure test in presence of OWNER'S REPRESENTATIVE and submit results to OWNER.
3. Perform tests after tubing is installed.
4. Isolate section to be tested by plugging ends with air tight plugs.
5. Add air slowly to test section until pressure inside pipe is raised to 5.0 psig.
6. After pressure of 5.0 psig obtained, control supply of air so internal pressure maintained between 4.5 and 5.0 psig for a minimum of 2 minutes to allow temperature of air to come into equilibrium with temperature of pipe walls.
7. After temperature stabilized for 2-minute period disconnect air supply, allow to stabilize for one hour, and record pressure at 10 minute intervals for one hour following stabilization period. Test section is acceptable for installation if less than 1.0 psig per 100 ft. of piping pressure drop is recorded over entire hour.
8. Include the following information in the test report.
 - Date of test;
 - Description and identification of piping system tested;
 - Type of test performed;
 - Test fluid;
 - Test pressure;
 - Type and location of leaks detected;
 - Corrective action taken to repair leaks; and
 - Results of retesting.
9. Tank T-8009 will be hydrostatically tested over a 24-hour period. The tank will be filled to capacity with clean, potable water and the tank will be visibly observed for leaks over the 24-hour period immediately following tank filling.

WELL CONSTRUCTION:

1. Extraction wells (2) shall be located as shown on SHEET 1.
2. Maintain a daily drilling log which shall be a detailed drilling record of the drilling and well construction. The drilling log shall include the following information:
Date, driller's name, depth at which each change in formation occurs, depths of noted groundwater, descriptions of material penetrated, descriptions of the auger diameter, auger type, final well depth, length and type of screen, riser, and protective casing and number of bags of sand, cement, and bentonite used. Contractor shall submit a copy of the daily drilling log to the OWNER or OWNER'S REPRESENTATIVE at the completion of the drilling activities.
3. Extraction wells shall be constructed such that screen, riser, and protective casing are set round, plumb, and true to line. (+ 1" vertical).
4. At each extraction well location, continuously soil sample using standard 2-inch splitspoons the entire length of the boring
5. The sand pack material shall consist of inert, well rounded grains that are smooth and uniform. Sand pack shall be comprised of #10 siliceous (quartz) sand. Calcareous or chert particles will not be allowed.
6. Bentonite pellets will also be utilized as a 1-foot seal above the sand pack.
7. Bentonite/Cement grout will consist of not more than 6 gallons of clean, potable water per 94 pound bag of Portland Type 1 cement (ASTM C150) and approximately 5% by weight bentonite. The cement weight shall be determined by balance. The slurry weight will exceed 14 pounds/gallon.
8. All drilling equipment shall be thoroughly steam cleaned prior to arriving at the site.
9. A minimum 6-foot square Portland cement concrete pad shall be poured around the protective casing 6-inches thick, minimum.
10. CONTRACTOR shall be responsible for survey layout of extraction wells. CONTRACTOR to submit certification of installation in the specified locations.
11. Drilling CONTRACTOR shall follow the requirements and procedures for drilling activities in accordance with CWM's generic project soil excavation monitoring and management plan.



REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RWW
PROJECT						
CWM CHEMICAL SERVICES, L.L.C. MODEL CITY, NEW YORK						
TITLE						
PROCESS AREA IV GENERAL NOTES AND SPECIFICATIONS						
N.J. Authorization #E4GA28029159						
 Golder Associates Mt Laurel, New Jersey		PROJECT No.		113-89352		FILE No.
				11389352A004		
		DESIGN	AML	11/29/11	SCALE	AS SHOWN
		CADD	AML	04/20/12	REV.	0
		CHECK	MLB	04/20/12	SHEET 4	
		REVIEW	PTM	04/20/12		

STORAGE TANK CONTROL PANEL
SEQUENCE OF OPERATIONS

1. UPON HIGH LEVEL, CR1 AND CR2 ARE ON AND FLASHES DOME ALARM LIGHT.
2. SITE OPERATOR ACKNOWLEDGES ALARM BY DEPRESSING PB2. THIS STOPS FLASHING LIGHT, BUT LIGHT REMAINS ON.
3. AFTER OPERATOR REMOVES LIQUID, PB1 IS DEPRESSED TO RESET THE ALARM SYSTEM AND TO TURN OFF THE NON-FLASHING DOME LIGHT.
4. SSW1 SHUTS DOWN AIR SUPPLY AND THEREFORE GROUNDWATER COLLECTION SYSTEM.

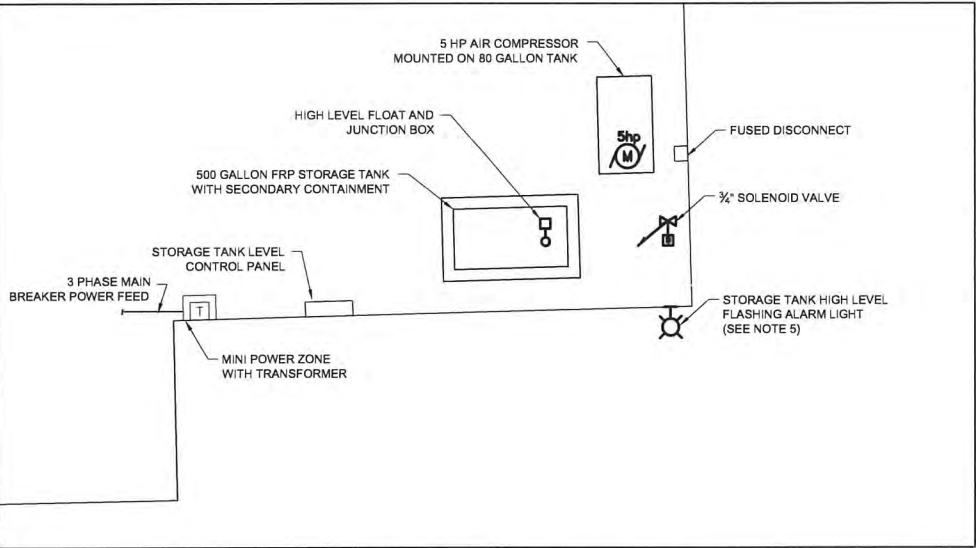
NOTES

1. PROVIDE COMPLETE CONDUIT RACEWAY SYSTEM FOR BRANCH CIRCUITS INSIDE BUILDING. USE EXISTING IF APPROPRIATE.
2. ALL CONDUCTORS SHALL BE COPPER, 600V INSULATION, MINIMUM 12AWG AND COLOR CODED AS REQ'D BY CODE. USE TYPE THWN SOLID FOR NO. 10 AWG + SMALLER, XHHW STRANDED FOR LARGER.
3. MOUNT EQUIPMENT ON WOODEN BACKPLATE. MOUNTING METHOD SHALL BE APPROVED BY OWNER.
4. INSTALL IN ACCORDANCE WITH NEC AND APPLICABLE CODES. GROUND ELECTRICAL SYSTEM AS REQ'D BY NEC, UTILITY AND OR LOCAL ORDINANCES.
5. LIGHT IS FEDERAL SIGNAL MODEL 191X, 120V AC; AMBER LENS (A-19) WITH FLASHER NO. 8285236, OR EQUAL.
6. PROVIDE CUSTOM NUMBERED BLACK PLASTIC PLATES WITH WHITE LETTERING FOR CONTROL PANEL NAMEPLATES.
7. CONTRACTOR SHALL EVALUATE EXISTING ACCESS TO POWER SUPPLY AND ELECTRICAL COMPONENTS WITHIN T.O. BUILDING PRIOR TO SUBMITTING BID.
8. CONTRACTOR SHALL INSTALL AIR COMPRESSOR AS PER MANUFACTURER'S REQUIREMENTS FOR THE SPECIFIED TYPE AND MODEL.
9. ALL CONDUCTORS SHALL BE RUN IN GALVANIZED STEEL CONDUIT PROPERLY SIZED FOR CONDUCTORS SHOWN.
10. CONTRACTOR SHALL PROVIDE START-UP ASSISTANCE TO THE OWNER. THIS ASSISTANCE SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
 - FIELD CHECKING ALL ELECTRICAL CONNECTIONS
 - CONTINUITY CHECKS
 - COMPONENT TESTING (eg. Power, Switches, etc.)
11. IT IS THE CONTRACTORS RESPONSIBILITY TO INSURE THAT ALL ELECTRICAL EQUIPMENT IS WEATHER RESISTANT AND IS PROPERLY STORED AND PROTECTED UNTIL INSTALLATION.

LEGEND

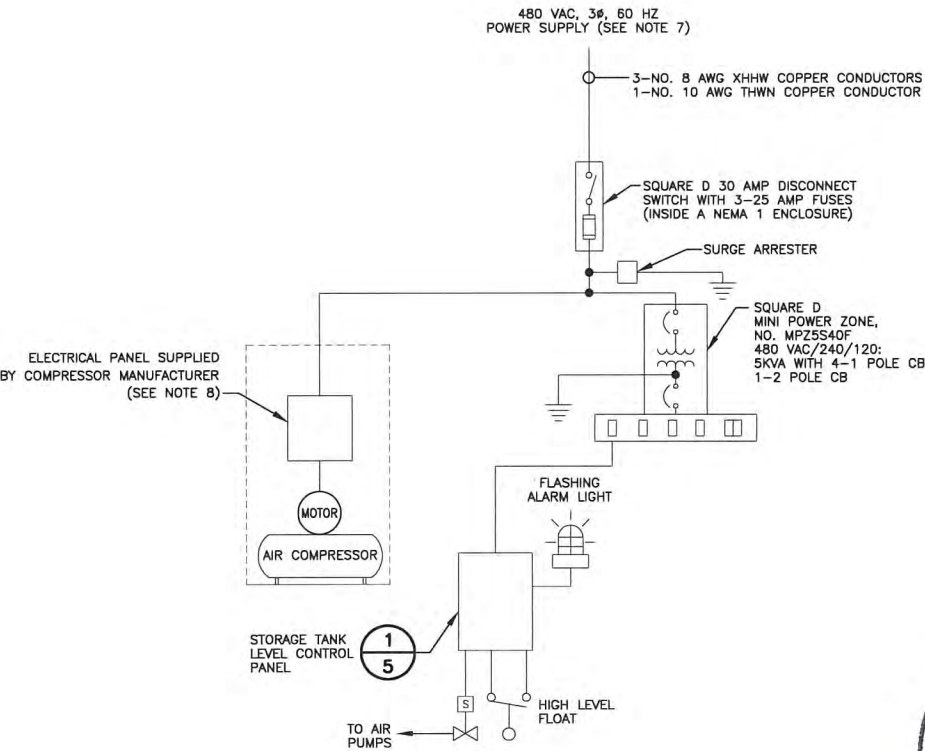
- ⊕ DUPLEX GROUNDED RECEPTACLE-120VAC
- Ⓜ_{5hp} MOTOR AND HORSEPOWER
- ⦿ INCANDESCENT OR HID FIXTURE (WALL MOUNTED)
- Ⓢ AIR SOLENOID VALVE
- Ⓣ MINI POWER ZONE TRANSFORMER/ CIRCUIT BREAKERS

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RW
PROJECT						
CWM CHEMICAL SERVICES, L.L.C..						
TITLE						
PROCESS AREA IV ELECTRIC DETAILS						
PROJECT No. 113-89352 FILE No. 11389352A006						
DESIGN	AML	11/30/11	SCALE	AS SHOWN	REV.	0
CADD	AM	11/30/11				
CHECK	MLB	11/30/11				
REVIEW	PTM	01/23/12				
SHEET 5						



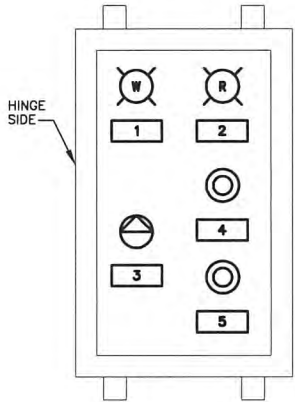
T.O. BUILDING ELECTRICAL PLAN

NOT TO SCALE



A/C BUILDING POWER RISER DIAGRAM

NOT TO SCALE

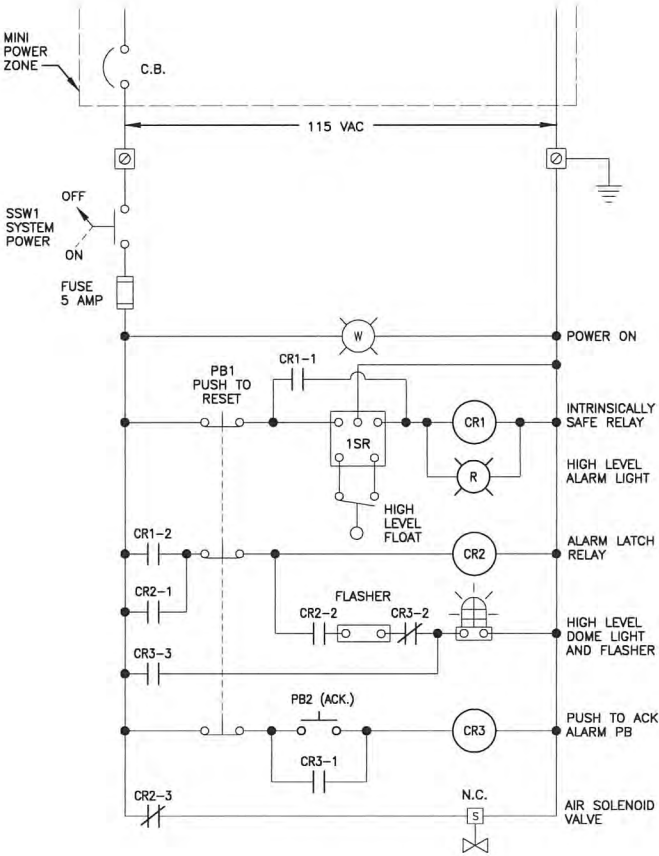


NAMEPLATE SCHEDULE (SEE NOTE 6)

1. POWER ON
2. HIGH LEVEL ALARM
3. SYSTEM POWER (SSW1)
4. ALARM RESET (PB1)
5. ALARM ACKNOWLEDGE (PB2)

STORAGE TANK LEVEL CONTROL
PANEL NAMEPLATE DETAIL

NOT TO SCALE



STORAGE TANK LEVEL
CONTROL PANEL SCHEMATIC

NOT TO SCALE

APPENDIX B

WELL PUMP AND STORAGE TANK DESIGN MANUFACTURER'S DATA SECONDARY CONTAINMENT COATING SYSTEM DATA



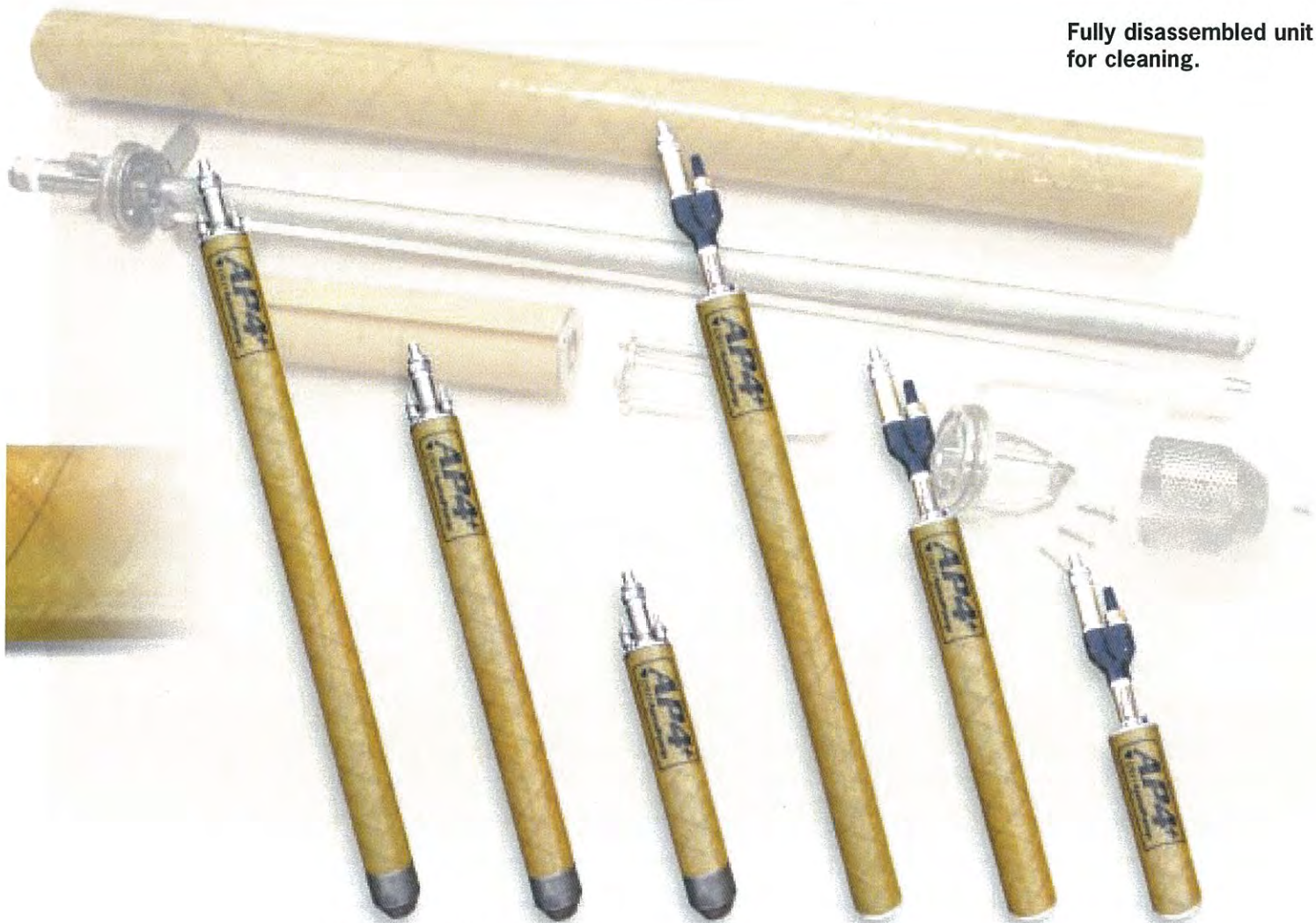
The Next Generation AutoPump® AP4+

- Easier to Disassemble and Clean
- Same Proven AutoPump® Air Control Mechanism
- Upgraded Materials
- Expanded 5-year Warranty



On A Tradition Of Success

Fully disassembled unit
for cleaning.



AP4+ Series Pumps

	4" Pump Long AP4+B	4" Pump Short AP4+B	4" Pump LD AP4+B	4" Pump Long AP4+T	4" Pump Short AP4+T	4" Pump LD AP4+T
Fluid Inlet	Bottom	Bottom	Bottom	Top	Top	Top
Diameter	3.6 in. (9.1 cm) OD	3.6 in. (9.1 cm) OD	3.6 in. (9.1 cm) OD	3.6 in. (9.1 cm) OD	3.6 in. (9.1 cm) OD	3.6 in. (9.1 cm) OD
Length	51.4 in. (131 cm)	39.3 in. (100 cm)	27.5 in. (70 cm)	56.7 in. (144 cm)	45 in. (110 cm)	30.75 in. (78 cm)
Maximum Flow	14 gpm (69 Lpm)	13 gpm (49 Lpm)	7 gpm (26.5 Lpm)	10 gpm (38 Lpm)	9 gpm (34 Lpm)	6.4 gpm (24 Lpm)
Maximum Depth	250 ft. (76 m)	250 ft. (76 m)	250 ft. (76 m)	250 ft. (76 m)	250 ft. (76 m)	250 ft. (76 m)
Actuation Level	38.4 in. (98 cm)	26.7 in. (68 cm)	15.3 in. (39 cm)	53.3 in. (135 cm)	41.6 in. (106 cm)	27.4 in. (70 cm)

All pumps can handle temperatures of 180° F. Special models available for severe applications, including high temperatures, high viscosity and corrosive conditions. Visit our website at www.qedenv.com for specifications, flow rates and operating conditions, or contact QED directly at 1-800-624-2026.

Products Designed for Easy Field Operation

QED utilizes over 20 years of experience in air-powered pumping to find ways to improve the value we offer our customers, including helping reduce the total cost of pump installation, service and ownership.



Easy Wellheads

Wellheads in both flange and vacuum seal styles are easy to install because they are pre-equipped with your preferred fittings and accessories, such as pump cycle counters, check and shut-off valves, access ports, etc.



Easy Tubing with Easy Fittings

- Pump is easy to snap onto and off of the tubing with Easy Fittings without cutting the tubing.
- Our sheathed tubing is available cut-to-length and individually labeled, with Easy Fittings factory-installed.



Easy Bolt

Easy bolts make flanges easy to access with no wrenches or tools.



5-year Warranty

Expanded 5-year warranty for ease of mind.

Visit our website at www.qedenv.com for complete pump specifications and flow rates, or call us

800-624-2026

for prompt, expert assistance on your pumping project needs.



Every QED AutoPump system is backed by QED's unequalled reputation and dedication to quality and service. QED leads the industry in customer service, from our worldwide sales representation and our large services staffs in both Ann Arbor, Michigan and San Leandro, California, to our 24-hour, toll-free service hotline. Call or e-mail QED for prompt assistance with your unique project needs.

The World Leader in Air-Powered Pumps

For Remediation, Landfills and Groundwater Sampling



6095 Jackson Road
Ann Arbor, MI 48106-3726
USA

1565 Alvarado Street
San Leandro, CA 94577
USA

800-624-2026
T: 734-995-2547
F: 734-995-1170
info@qedenv.com
www.qedenv.com

800-624-2026
T: 510-346-0400
F: 510-346-0414
info@qedenv.com
www.qedenv.com



The New AP4+ Builds

Same proven internal design, improved user features and value

The AutoPump® AP4 has been the gold standard for landfill and remediation pumping for over 20 years, proving itself #1 in reliability, long service life and the longest warranty in the industry. Although the original design has proven superior over time, QED has continued to refine it to make it even more reliable. The new AP4+ model now builds on the world's #1 choice for landfill and remediation pumping and makes it even better, to deliver more value to our customers. At the same time, the new AP4+ keeps the same internal mechanism design that AP4 users have depended on for over 20 years, along with the industry's leading pumping rates and low air consumption.

What makes the AP4+ even better?

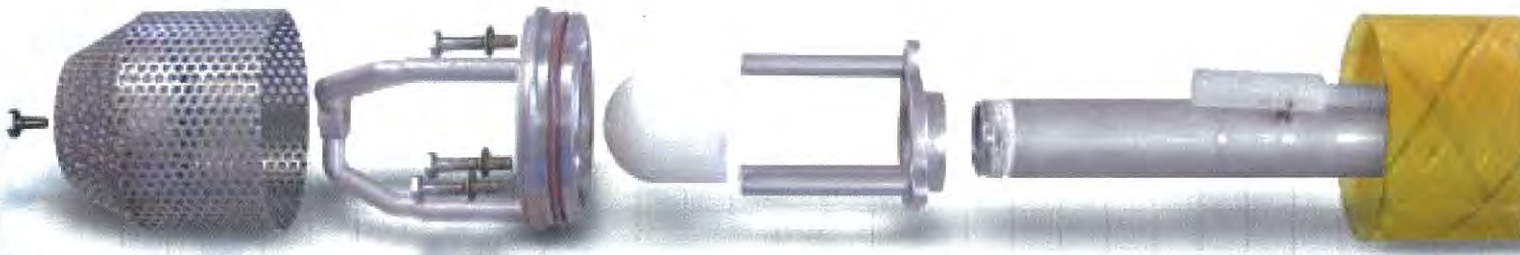
- Easier to clean
- Upgraded materials
- Expanded 5-year warranty terms



Removing the spring clip allows for easy disassembly of the float.



Smooth ID helps reduce the rate of solid buildup inside the casing.



AP4+ Bottom Inlet Disassembly

Easier to Disassemble and Clean

The AP4+ was made easier to clean by borrowing from our HammerHead® pump design, using 3 bolts to attach the pump inlet and open up the pump. This is easier than having to rotate the inlet multiple turns to unthread it from the center tube inside the pump, especially under field conditions of silt, deposits and coatings. Removing the inlet is also aided by the new, precision ID pump casing, ensuring a more controlled fit. The new pump casing's smoother internal surface has the added benefit of reducing the rate of buildup of solids and coatings inside in some cases. The Easy Fittings make it a snap to remove the tubing from the pump without cutting, and the float is now easily removed by pulling a clip.

Upgraded Materials

The new AP4+ features upgraded materials for many parts to further extend the service life of the pump and to broaden the range of conditions each model can be used in. All nonmetallic internal parts are now made of PVDF*; this is a high-grade engineering plastic with higher strength at elevated temperatures and extremely broad chemical resistance, including to acidic and oxidizing cleaning agents sometimes used for pump maintenance. All stainless steel parts have been upgraded to 304 grade or higher for improved corrosion resistance.

Expanded 5-year Warranty

The new and improved warranty, a straight 5-year warranty with no pro-rating, is proof of the AP4+'s successful history and continued improvements.

Of course, the new AP4+ is compatible with the AutoPump Family of Accessories, including:

- Sheathed nylon pump tubing sets for maximum chemical resistance, reduced weight, less tangling and easier handling, another innovation lead by QED.
- QED's Easy Fittings for affordable, quick connection and removal of the pump from its tubing set, built to function easily even under high solids well conditions. These are now available pre-installed to pump and tubing so pump system installation just snaps together!
- QED's Easy Bolts for rapid access to flanged wellheads.
- The industry's widest range of wellhead completions to match your site so that pump installation goes smoothly. Custom options are available to fit your specific wellhead requirements.



Pull out the release clips.



Once the clips are removed, simply pull the connections apart.



See the AP4+ disassembled in two minutes with this video online: <http://www.qedenv.com/AP4plus>

* Except for the standard top-filling wye, which is made of acetal.

Alltankscom LLC

PO Box 680747
Houston, TX 77268
281 825 4000
281 825 4099 Fx

Quotation

Date	Quotation
1/12/2012	8360

Name / Address
Stephen Rydzyk Waste Management 1550 Balmer Road Model City, NY 14107 716-286-0325 FAX:0224

Ship To
Waste Management 1550 Balmer Road Model City, NY 14107 716-286-0325 FAX:0224 Stephen Rydzyk

P.O. No.	Terms	Rep	FOB	Project
	Prepay	DT	NY	

Item	Description	Qty	Rate	Total
525 HL...	525 gallon Horizontal leg tank High Density Linear Polyethylene, translucent white in color, Standard with 16" Manway and 2" Polypropylene drain fitting 1.5 Specific Gravity, 49"NW x 54" H x 71" L Full length support is required We have 3 of these tanks in inventory in NY so can ship quickly.	1		
Misc.	2" Polypropylene Bulk Head Fittings (loose)	4		
Misc.	Steel Support Bands (Optional)	2		
Freight	Shipping and handling is Estimated.			

Subtotal	
Sales Tax (8.25%)	
Total	

Confirm acceptance of pricing and terms. Add sales tax exemption form if applicable.

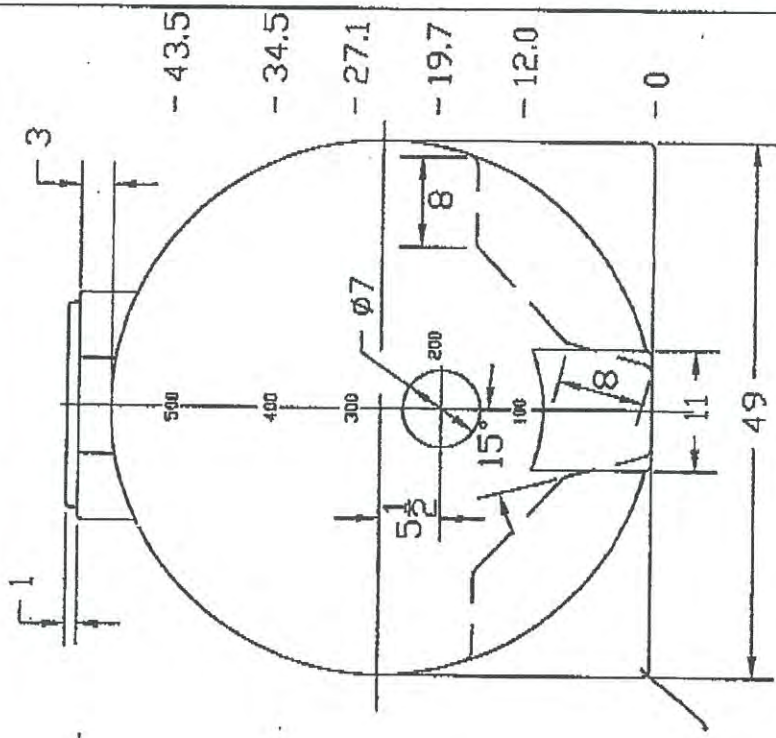
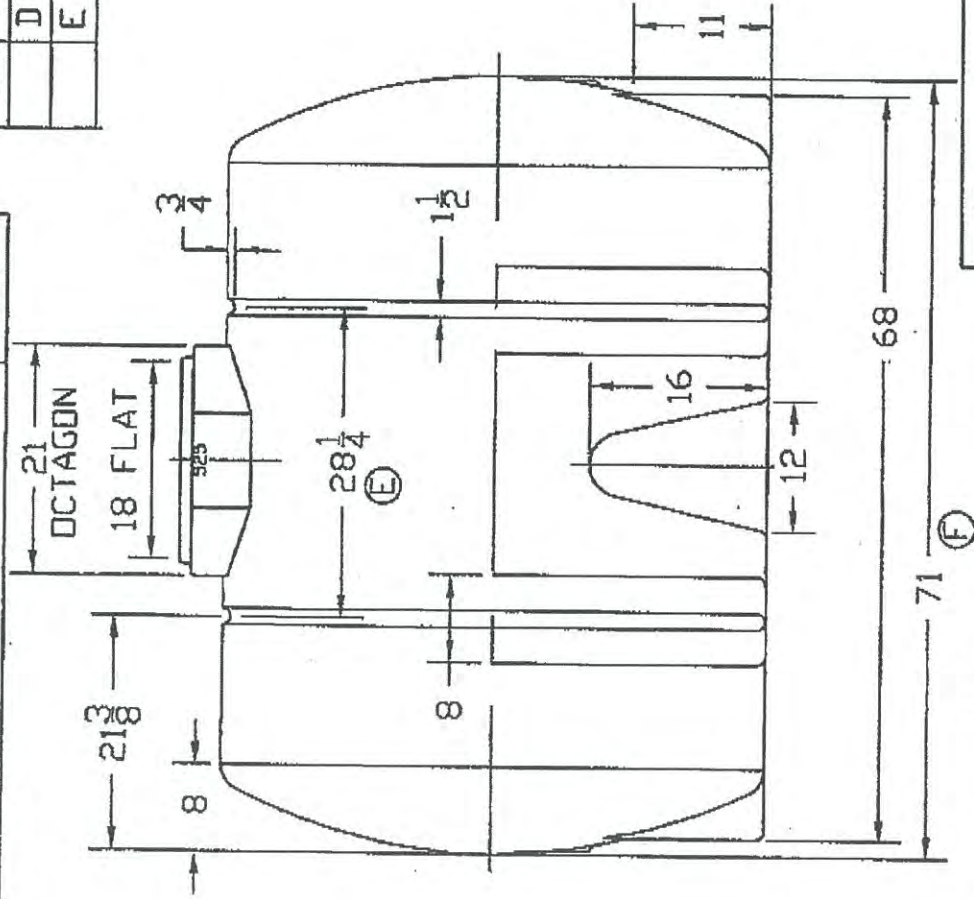
Date _____

Signed _____

Phone #	Fax #	E-mail
281 825 4000	281 825 4099	gene@alltanks.com

ZONE	REV	DESCRIPTION	DATE
	F	WAS 72 1/2	03DEC04

REVISIONS			
ZONE	REV	DESCRIPTION	DATE
	D	REDRAWN, SPARGER REV'D	03MAY01
	E	CORRECTED, WAS 27-1/2	23SEP02



NOTE: GALLONAGE MARKS ONE END



American Process Technology, Inc.
TANK & PROCESS DESIGN
SPECIALISTS
www.apitech.com, info@apitech.com

525 GAL HORIZONTAL TANK

TANKS PRODUCED IN GRIFFIN, GA ONLY

JTP	03MAY01	SIZE	FSCM NO.	DWG NO.	REV
		A			F
SCALE 1/16		SHEET			



Protective & Marine Coatings

KEM BOND® HS UNIVERSAL METAL PRIMER

B50NZ3
B50WZ4
B50AZ8

RED OXIDE
OFF WHITE
GRAY

Revised 12/11

PRODUCT INFORMATION

2.12

PRODUCT DESCRIPTION

KEM BOND HS is a fast drying, high solids, low VOC, heavy metal free, rust inhibitive, universal, phenolic alkyd metal primer. Kem Bond HS can be topcoated with alkyd, acrylic, and high performance coatings. Also suitable as a "barrier" coat over conventional coatings which would normally be attacked by strong solvents in high performance coatings.

- High build to protect sandblasted steel
- Good corrosion and rust protection
- Can be used as a "universal" primer under high performance topcoats
- Fast drying
- Low temperature application

PRODUCT CHARACTERISTICS

Finish:	Flat
Color:	Red Oxide, Off White, Gray
Volume Solids:	61% ± 2%, may vary by color
Weight Solids:	79% ± 2%, may vary by color
VOC (EPA Method 24):	Unreduced: <320 g/L; 2.65 lb/gal Reduced 5%: <340 g/L; 2.80 lb/gal

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	3.0 (75)	8.0 (200)
Dry mils (microns)	2.0 (50)	5.0 (125)
~Coverage sq ft/gal (m ² /L)	195 (4.8)	490 (12.0)
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	976 (24.0)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 4.0 mils wet (100 microns):

	@ 40°F/4.5°C	@ 77°F/25°C 50% RH	@ 120°F/49°C
To touch:	1 hour	30 minutes	10 minutes
To handle:	3 hours	1 hour	15 minutes
To recoat:			
alkyds	6 hours	2 hours	1 hour
urethane	24 hours	24 hours	6 hours
acrylic	48 hours	24 hours	6 hours
To cure:	5 days	2 days	1 day

Drying time is temperature, humidity, and film thickness dependent.

Shelf Life:	36 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C).
Flash Point:	90°F (32°C), PMCC
Reducer/Clean Up:	Xylene R2K4

RECOMMENDED USES

For industrial application on steel to protect against atmospheric corrosion. Interior/exterior use. A premium shopcoat primer. For use under a variety of coatings, including high performance topcoats.

- Rail cars
- Structural steel
- Machinery and equipment
- Piping and pipe racks
- Marine applications
- Conforms to AWWA D102, OCS #1
- Suitable for use in USDA inspected facilities
- Acceptable for use in high performance architectural applications.
- Tanks
- Bridges
- Vessels
- Bulkheads

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*: SSPC-SP2

System Tested*:

1 ct. Kem Bond HS @ 3.0 mils (75 microns) dft

1 ct. Industrial Enamel HS @ 3.0 mils (75 microns) dft

*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance (primer only)	ASTM D4060, 500 cycles, 500 gm Load	46 mg loss
Adhesion	ASTM D4541	392 psi
Direct Impact Resistance (primer only)	ASTM D2794	60 in. lbs.
Dry Heat Resistance, primer only	ASTM D2485	250°F (121°C) (discolors)
Exterior Durability	1 year at 45° South	Excellent
Flexibility (primer only)	ASTM D522, 180° bend, 1" mandrel	Passes
Moisture Condensation Resistance	ASTM D4585, 100°F (38°C), 500 hours	No blisters, rust, delamination, or creepage
Pencil Hardness	ASTM D3363	H
Salt Fog Resistance	ASTM B117, 500 hours	No softening, cracking, or delamination; No more than 1/32" rust creepage at scribe
Thermal Shock	ASTM D2246, 15 cycles	Passes

Provides performance comparable to products formulated to federal specifications: TT-P-664.



Protective & Marine Coatings

KEM BOND® HS UNIVERSAL METAL PRIMER

B50NZ3
B50WZ4
B50AZ8

RED OXIDE
OFF WHITE
GRAY

PRODUCT INFORMATION

2.12

RECOMMENDED SYSTEMS

		Dry Film Thickness / ct.	
		Mils	(Microns)
Steel, Alkyd Topcoat:			
1 ct.	Kem Bond HS Primer	2.0-5.0	(50-125)
1-2 cts.	Industrial Enamel HS Series	2.0-4.0	(50-100)
Steel, Aluminum Finish:			
1 ct.	Kem Bond HS Primer	2.0-5.0	(50-125)
1-2 cts.	Silver-Brite Aluminum	1.0-1.5	(25-40)
Steel, Epoxy Topcoat:			
1 ct.	Kem Bond HS Primer	2.0-5.0	(50-125)
1-2 cts.	Tile-Clad HS Epoxy	2.5-4.0	(63-100)
Steel, Acrylic Topcoat:			
Topcoat only after 24 hours minimum dry 77°F & 50% RH			
1 ct.	Kem Bond HS Primer	2.0-5.0	(50-125)
1-2 cts.	DTM Acrylic Coating	2.5-4.0	(63-100)
or			
1-2 cts.	Sher-Cryl HPA	2.5-4.0	(63-100)
Steel, Polyurethane Topcoat:			
1 ct.	Kem Bond HS Primer	2.0-5.0	(50-125)
1-2 cts.	Sherthane 2K Urethane	2.5-5.0	(63-125)
or			
1-2 cts.	Acrolon 218 HS Polyurethane	3.0-6.0	(75-150)

The systems listed above are representative of the product's use, other systems may be appropriate.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:
Iron & Steel: SSPC-SP2

Surface Preparation Standards					
Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE	
White Metal	Sa 3	Sa 3	SP 5	1	
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2	
Commercial Blast	Sa 2	Sa 2	SP 6	3	
Brush-Off Blast	Sa 1	Sa 1	SP 7	4	
Hand Tool Cleaning	C St 2	C St 2	SP 2	-	
Pitted & Rusty	D St 2	D St 2	SP 2	-	
Rusty	C St 3	C St 3	SP 3	-	
Power Tool Cleaning	D St 3	D St 3	SP 3	-	

TINTING

Do not tint.

APPLICATION CONDITIONS

Temperature: 40°F (4.5°C) minimum, 120°F (49°C) maximum
(air, surface, and material)
At least 5°F (2.8°C) above dew point

Relative humidity: 85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging: 1 gallon (3.78L) and 5 gallon (18.9L) containers

Weight (Red Oxide): 13.26 ± 0.2 lb/gal, 1.6 Kg/L

Weight (Off White): 13.70 ± 0.2 lb/gal, 1.65 Kg/L

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.



Protective & Marine Coatings

KEM BOND® HS UNIVERSAL METAL PRIMER

B50NZ3
B50WZ4
B50AZ8

RED OXIDE
OFF WHITE
GRAY

Revised 12/11

APPLICATION BULLETIN

2.12

SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel

Minimum surface preparation is Hand Tool Clean per SSPC-SP2. Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. For better performance, use Commercial Blast Cleaning per SSPC-SP6/NACE 3, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils / 50 microns). Prime any bare steel within 8 hours or before flash rusting occurs.

Previously Painted Surfaces

If in sound condition, clean the surface of all foreign material. Smooth, hard, or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, or if this product attacks the previous finish, removal of the previous coating may be necessary. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above.

APPLICATION CONDITIONS

Temperature: 40°F (4.5°C) minimum, 120°F (49°C) maximum
(air, surface, and material)
At least 5°F (2.8°C) above dew point
Relative humidity: 85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Reducer/Clean UpXylene, R2K4

Airless Spray

Pressure..... 1800 psi minimum
Hose..... 1/4 - 3/8" ID
Tip..... .017" - .019"
Filter..... 60 mesh
Reduction..... As needed up to 5% by volume

Conventional SprayNot recommended

Brush

Brush..... Natural Bristle or Nylon Polyester
Reduction..... Not recommended

Roller

Cover 1/4 - 3/8" woven solvent resistant
core
Reduction..... Not recommended

If specific application equipment is not listed above, equivalent equipment may be substituted.

Surface Preparation Standards

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	C St 2	C St 2	SP 2	-
Pitted & Rusty	D St 2	D St 2	SP 2	-
Rusty	C St 3	C St 3	SP 3	-
Power Tool Cleaning	Pitted & Rusty	D St 3	SP 3	-



Protective & Marine Coatings

KEM BOND® HS UNIVERSAL METAL PRIMER

B50NZ3
B50WZ4
B50AZ8

RED OXIDE
OFF WHITE
GRAY

APPLICATION BULLETIN

2.12

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mixing Instructions: Mix paint thoroughly to a uniform consistency with low speed power agitation prior to use.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	3.0 (75)	8.0 (200)
Dry mils (microns)	2.0 (50)	5.0 (125)
~Coverage sq ft/gal (m ² /L)	195 (4.8)	490 (12.0)
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	976 (24.0)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 4.0 mils wet (100 microns):

	@ 40°F/4.5°C	@ 77°F/25°C 50% RH	@ 120°F/49°C
To touch:	1 hour	30 minutes	10 minutes
To handle:	3 hours	1 hour	15 minutes
To recoat:			
alkyds	6 hours	2 hours	1 hour
urethane	24 hours	24 hours	6 hours
acrylic	48 hours	24 hours	6 hours
To cure:	5 days	2 days	1 day

Drying time is temperature, humidity, and film thickness dependent.

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Xylene, R2K4. Clean tools immediately after use with Xylene, R2K4. Follow manufacturer's safety recommendations when using any solvent.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

PERFORMANCE TIPS

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and adhesion.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Xylene, R2K4.

Intimate contact of the steel surface and primer is necessary for adhesion and rust inhibition.

According to AISC, shop coat primers are intended for protection for only a short period of exposure in ordinary atmospheric conditions, and is considered a temporary and provisional coating.

Not recommended for immersion service or exposure to acids or alkalis.

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.



Protective & Marine Coatings

MACROPOXY® 646 FAST CURE EPOXY

PART A
PART B

B58-600
B58V600

SERIES
HARDENER

Revised 2/12

PRODUCT INFORMATION

4.53

PRODUCT DESCRIPTION

MACROPOXY 646 FAST CURE EPOXY is a high solids, high build, fast drying, polyamide epoxy designed to protect steel and concrete in industrial exposures. Ideal for maintenance painting and fabrication shop applications. The high solids content ensures adequate protection of sharp edges, corners, and welds. This product can be applied directly to marginally prepared steel surfaces.

- Low VOC
- Low odor
- Outstanding application properties
- Meets Class A requirements for Slip Coefficient, 0.36 @ 6 mils / 150 microns dft (Mill White only)
- Chemical resistant
- Abrasion resistant

PRODUCT CHARACTERISTICS

Finish:	Semi-Gloss
Color:	Mill White, Black and a wide range of colors available through tinting
Volume Solids:	72% ± 2%, mixed, Mill White
Weight Solids:	85% ± 2%, mixed, Mill White
VOC (EPA Method 24): mixed	Unreduced: <250 g/L; 2.08 lb/gal Reduced 10%: <300 g/L; 2.50 lb/gal
Mix Ratio:	1:1 by volume

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	7.0 (175)	13.5 (338)
Dry mils (microns)	5.0* (125)	10.0* (250)
~Coverage sq ft/gal (m ² /L)	116 (2.8)	232 (5.7)
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	1162 (28.2)	

*May be applied at 3.0-10.0 mils dft as an intermediate coat. Refer to Recommended Systems (page 2). See Performance Tips section also.

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 7.0 mils wet (175 microns):

	@ 35°F/1.7°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	4-5 hours	2 hours	1.5 hours
To handle:	48 hours	8 hours	4.5 hours
To recoat:			
minimum:	48 hours	8 hours	4.5 hours
maximum:	1 year	1 year	1 year
To cure:			
Service:	10 days	7 days	4 days
Immersion:	14 days	7 days	4 days

If maximum recoat time is exceeded, abrade surface before recoating.
Drying time is temperature, humidity, and film thickness dependent.
Paint temperature must be at least 40°F (4.5°C) minimum.

Pot Life: 10 hours 4 hours 2 hours
Sweat-in-time: 30 minutes 30 minutes 15 minutes

When used as an intermediate coat as part of a multi-coat system:

Drying Schedule @ 5.0 mils wet (125 microns):

	@ 35°F/1.7°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	3 hours	1 hour	1 hour
To handle:	48 hours	4 hours	2 hours
To recoat:			
minimum:	16 hours	4 hours	2 hours
maximum:	1 year	1 year	1 year

PRODUCT CHARACTERISTICS (Cont'd)

Shelf Life:	36 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C).
Flash Point:	91°F (33°C), TCC, mixed
Reducer/Clean Up:	Reducer, R7K15
In California:	Reducer R7K111 or Oxsol 100

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*: SSPC-SP10/NACE 2

System Tested*:

1 ct. Macropoxy 646 Fast Cure @ 6.0 mils (150 microns) dft

*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	84 mg loss
Accelerated Weathering-QUV ¹	ASTM D4587, QUV-A, 12,000 hours	Passes
Adhesion	ASTM D4541	1,037 psi
Corrosion Weathering ¹	ASTM D5894, 36 cycles, 12,000 hours	Rating 10 per ASTM D714 for blistering; Rating 9 per ASTM D610 per rusting
Nuclear Decontamination	ASTM D4256/ANSI N 5.12	99% Water Wash; 95% Overall
Direct Impact Resistance	ASTM D2794	30 in. lb.
Dry Heat Resistance	ASTM D2485	250°F (121°C)
Exterior Durability	1 year at 45° South	Excellent, chalks
Flexibility	ASTM D522, 180° bend, 3/4" mandrel	Passes
Fuel Contribution	NFPA 259	5764 btu/lb
Humidity Resistance	ASTM D4585, 6000 hours	No blistering, cracking, or rusting
Immersion	1 year fresh and salt water	Passes, no rusting, blistering, or loss of adhesion
Radiation Tolerance	ASTM D4082 / ANSI 5.12	Pass at 21 mils (525 microns)
Pencil Hardness	ASTM D3363	3H
Salt Fog Resistance ¹	ASTM B117, 6,500 hours	Rating 10 per ASTM D610 for rusting; Rating 9 per ASTM D1654 for corrosion
Slip Coefficient, Mill White*	AISC Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts	Class A, 0.36
Surface Burning	ASTM E84/NFPA 255	Flame Spread Index 20; Smoke Development Index 35 (at 18 mils or 450 microns)
Water Vapor Permeance	ASTM D1653, Method B	1.16 US perms

Epoxy coatings may darken or discolor following application and curing.

*Refer to Slip Certification document

Footnotes:

¹ Zinc Glad II Plus Primer

DISCLAIMER

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Protective & Marine Coatings

MACROPOXY® 646 FAST CURE EPOXY

PART A
PART B

B58-600
B58V600

SERIES
HARDENER

PRODUCT INFORMATION

4.53

RECOMMENDED USES

- Marine applications
- Fabrication shops
- Pulp and paper mills
- Power plants
- Offshore platforms
- Nuclear Power Plants
- Nuclear fabrication shops
- Refineries
- Chemical plants
- Tank exteriors
- Water treatment plants
- DOE Nuclear Fuel Facilities
- DOE Nuclear Weapons Facilities
- Mill White and Black are acceptable for immersion use for salt water and fresh water, not acceptable for potable water
- Suitable for use in USDA inspected facilities
- Conforms to AWWA D102 OCS #5
- Conforms to MPI # 108
- This product meets specific design requirements for non-safety related nuclear plant applications in Level II, III and Balance of Plant, and DOE nuclear facilities*.

* Nuclear qualifications are NRC license specific to the facility.

RECOMMENDED SYSTEMS

		Dry Film Thickness / ct.	
		Mils	(Microns)
Immersion and atmospheric:			
Steel:			
2 cts.	Macropoxy 646	5.0-10.0	(125-250)
Concrete/Masonry, smooth:			
2 cts.	Macropoxy 646	5.0-10.0	(125-250)
Concrete Block:			
1 ct.	Kem Cati-Coat HS Epoxy Filler/Sealer	10.0-20.0	(250-500)
<i>as needed to fill voids and provide a continuous substrate.</i>			
2 cts.	Macropoxy 646	5.0-10.0	(125-250)
Atmospheric:			
Steel:			
(Shop applied system, new construction, AWWA D102, can also be used at 3 mils minimum dft when used as an intermediate coat as part of a multi-coat system)			
1 ct.	Macropoxy 646 Fast Cure Epoxy	3.0-6.0	(75-150)
1-2 cts.	of recommended topcoat		
Steel:			
1 ct.	Recoatable Epoxy Primer	4.0-6.0	(100-150)
2 cts.	Macropoxy 646	5.0-10.0	(125-250)
Steel:			
1 ct.	Macropoxy 646	4.0-6.0	(100-150)
1-2 cts.	Acrolon 218 Polyurethane	3.0-6.0	(75-150)
or	Hi-Solids Polyurethane	3.0-5.0	(75-125)
or	SherThane 2K Urethane	2.0-4.0	(50-100)
or	Hydrogloss	2.0-4.0	(50-100)
Steel:			
2 cts.	Macropoxy 646	5.0-10.0	(125-250)
1-2 cts.	Tile-Clad HS Epoxy	2.5-4.0	(63-100)
Steel:			
1 ct.	Zinc Clad II Plus	3.0-6.0	(75-150)
1 ct.	Macropoxy 646	3.0-10.0	(75-250)
1-2 cts.	Acrolon 218 Polyurethane	3.0-6.0	(75-150)
Steel:			
1 ct.	Zinc Clad III HS	3.0-5.0	(75-125)
or	Zinc Clad IV	3.0-5.0	(75-125)
1 ct.	Macropoxy 646	3.0-10.0	(75-250)
1-2 cts.	Acrolon 218 Polyurethane	3.0-6.0	(75-150)
Aluminum:			
2 cts.	Macropoxy 646	5.0-10.0	(125-250)
Galvanizing:			
2 cts.	Macropoxy 646	5.0-10.0	(125-250)

The systems listed above are representative of the product's use, other systems may be appropriate.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel	
Atmospheric:	SSPC-SP2/3
Immersion:	SSPC-SP10/NACE 2, 2-3 mil (50-75 micron) profile
Aluminum:	SSPC-SP1
Galvanizing:	SSPC-SP1
Concrete & Masonry	
Atmospheric:	SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 1-3
Immersion:	SSPC-SP13/NACE 6-4.3.1 or 4.3.2, or ICRI No. 310.2, CSP 1-3

Surface Preparation Standards

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	C St 2	C St 2	SP 2	-
Pitted & Rusty	D St 2	D St 2	SP 2	-
Rusty	C St 3	C St 3	SP 3	-
Power Tool Cleaning	Pitted & Rusty	D St 3	SP 3	-

TINTING

Tint Part A with Maxitones at 150% strength. Five minutes minimum mixing on a mechanical shaker is required for complete mixing of color.

Tinting is not recommended for immersion service.

APPLICATION CONDITIONS

Temperature:	35°F (1.7°C) minimum, 120°F (49°C) maximum (air and surface) 40°F (4.5°C) minimum, 120°F (49°C) maximum (material) At least 5°F (2.8°C) above dew point
Relative humidity:	85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:	
Part A:	1 gallon (3.78L) and 5 gallon (18.9L) containers
Part B:	1 gallon (3.78L) and 5 gallon (18.9L) containers
Weight:	12.9 ± 0.2 lb/gal ; 1.55 Kg/L mixed, may vary by color

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

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WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.



Protective & Marine Coatings

MACROPOXY® 646 FAST CURE EPOXY

PART A
PART B

B58-600
B58V600

SERIES
HARDENER

Revised 2/12

APPLICATION BULLETIN

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SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel, Atmospheric Service:

Minimum surface preparation is Hand Tool Clean per SSPC-SP2. Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. For better performance, use Commercial Blast Cleaning per SSPC-SP6/NACE 3, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils / 50 microns). Prime any bare steel within 8 hours or before flash rusting occurs.

Iron & Steel, Immersion Service:

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils / 50-75 microns). Remove all weld spatter and round all sharp edges by grinding. Prime any bare steel the same day as it is cleaned.

Aluminum

Remove all oil, grease, dirt, oxide and other foreign material by Solvent Cleaning per SSPC-SP1.

Galvanized Steel

Allow to weather a minimum of six months prior to coating. Solvent Clean per SSPC-SP1 (recommended solvent is VM&P Naphtha). When weathering is not possible, or the surface has been treated with chromates or silicates, first Solvent Clean per SSPC-SP1 and apply a test patch. Allow paint to dry at least one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7 is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2, prime the area the same day as cleaned.

Concrete and Masonry

For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 1-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with Steel-Seam FT910.

Concrete, Immersion Service:

For surface preparation, refer to SSPC-SP13/NACE 6, Section 4.3.1 or 1.3.2 or ICRI No. 310.2, CSP 1-3.

Follow the standard methods listed below when applicable:

ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete.

SSPC-SP 13/Nace 6 Surface Preparation of Concrete.

ICRI No. 310.2 Concrete Surface Preparation.

Previously Painted Surfaces

If in sound condition, clean the surface of all foreign material. Smooth, hard or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, or if this product attacks the previous finish, removal of the previous coating may be necessary. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above.

Surface Preparation Standards

Condition of Surface	ISO 8501-1	Swedish Std.	SSPC	NACE
White Metal	BS7079:A1	SIS055900	SP 5	1
Near White Metal	Sa 3	Sa 3	SP 10	2
Commercial Blast	Sa 2.5	Sa 2.5	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	C St 2	C St 2	SP 2	-
Pitted & Rusty	D St 2	D St 2	SP 2	-
Rusty	C St 3	C St 3	SP 3	-
Power Tool Cleaning	Pitted & Rusty	D St 3	SP 3	-

APPLICATION CONDITIONS

Temperature: 35°F (1.7°C) minimum, 120°F (49°C) maximum (air and surface)
40°F (4.5°C) minimum, 120°F (49°C) maximum (material)
At least 5°F (2.8°C) above dew point

Relative humidity: 85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Reducer/Clean Up Reducer R7K15
In California Reducer R7K111

Airless Spray

Pump 30:1
Pressure 2800 - 3000 psi
Hose 1/4" ID
Tip017" - .023"
Filter 60 mesh
Reduction As needed up to 10% by volume

Conventional Spray

Gun DeVilbiss MBC-510
Fluid Tip E
Air Nozzle 704
Atomization Pressure 60-65 psi
Fluid Pressure 10-20 psi
Reduction As needed up to 10% by volume
Requires oil and moisture separators

Brush

Brush Nylon/Polyester or Natural Bristle
Reduction Not recommended

Roller

Cover 3/8" woven with solvent resistant core
Reduction Not recommended

Plural Component Spray ... Acceptable

Refer to April 2010 Technical Bulletin - "Application Guidelines for Macroxy 646 & Recoatable Epoxy Primer Utilizing Plural Component Equipment"

If specific application equipment is not listed above, equivalent equipment may be substituted.



Protective & Marine Coatings

MACROPOXY® 646 FAST CURE EPOXY

PART A
PART B

B58-600
B58V600

SERIES
HARDENER

APPLICATION BULLETIN

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APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly with low speed power agitation. Make certain no pigment remains on the bottom of the can. Then combine one part by volume of Part A with one part by volume of Part B. Thoroughly agitate the mixture with power agitation. Allow the material to sweat-in as indicated prior to application. Re-stir before using.

If reducer solvent is used, add only after both components have been thoroughly mixed, after sweat-in.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	7.0 (175)	13.5 (338)
Dry mils (microns)	5.0* (125)	10.0* (250)
-Coverage sq ft/gal (m ² /L)	116 (2.8)	232 (5.7)
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	1162 (28.2)	

*May be applied at 3.0-10.0 mils dft as an intermediate coat. Refer to Recommended Systems (page 2). See Performance Tips section also.

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 7.0 mils wet (175 microns):

	@ 35°F/1.7°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	4-5 hours	2 hours	1.5 hours
To handle:	48 hours	8 hours	4.5 hours
To recoat:			
minimum:	48 hours	8 hours	4.5 hours
maximum:	1 year	1 year	1 year
To cure:			
Service:	10 days	7 days	4 days
Immersion:	14 days	7 days	4 days

If maximum recoat time is exceeded, abrade surface before recoating.

Drying time is temperature, humidity, and film thickness dependent.

Paint temperature must be at least 40°F (4.5°C) minimum.

Pot Life:	10 hours	4 hours	2 hours
Sweat-in-time:	30 minutes	30 minutes	15 minutes

When used as an intermediate coat as part of a multi-coat system:

Drying Schedule @ 5.0 mils wet (125 microns):

	@ 35°F/1.7°C	@ 77°F/25°C 50% RH	@ 100°F/38°C
To touch:	3 hours	1 hour	1 hour
To handle:	48 hours	4 hours	2 hours
To recoat:			
minimum:	16 hours	4 hours	2 hours
maximum:	1 year	1 year	1 year

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Reducer R7K15. Clean tools immediately after use with Reducer R7K15. In California use Reducer R7K111. Follow manufacturer's safety recommendations when using any solvent.

PERFORMANCE TIPS

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and adhesion.

Do not mix previously catalyzed material with new.

Do not apply the material beyond recommended pot life.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Reducer R7K15. In California use Reducer R7K111.

Tinting is not recommended for immersion service.

Use only Mil White and Black for immersion service.

Insufficient ventilation, incomplete mixing, miscatalyzation, and external heaters may cause premature yellowing.

Excessive film build, poor ventilation, and cool temperatures may cause solvent entrapment and premature coating failure.

Quik-Kick Epoxy Accelerator is acceptable for use. See data page 4.99 for details.

When coating over aluminum and galvanizing, recommended dft is 2-4 mils (50-100 microns).

Acceptable for Concrete Floors.

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

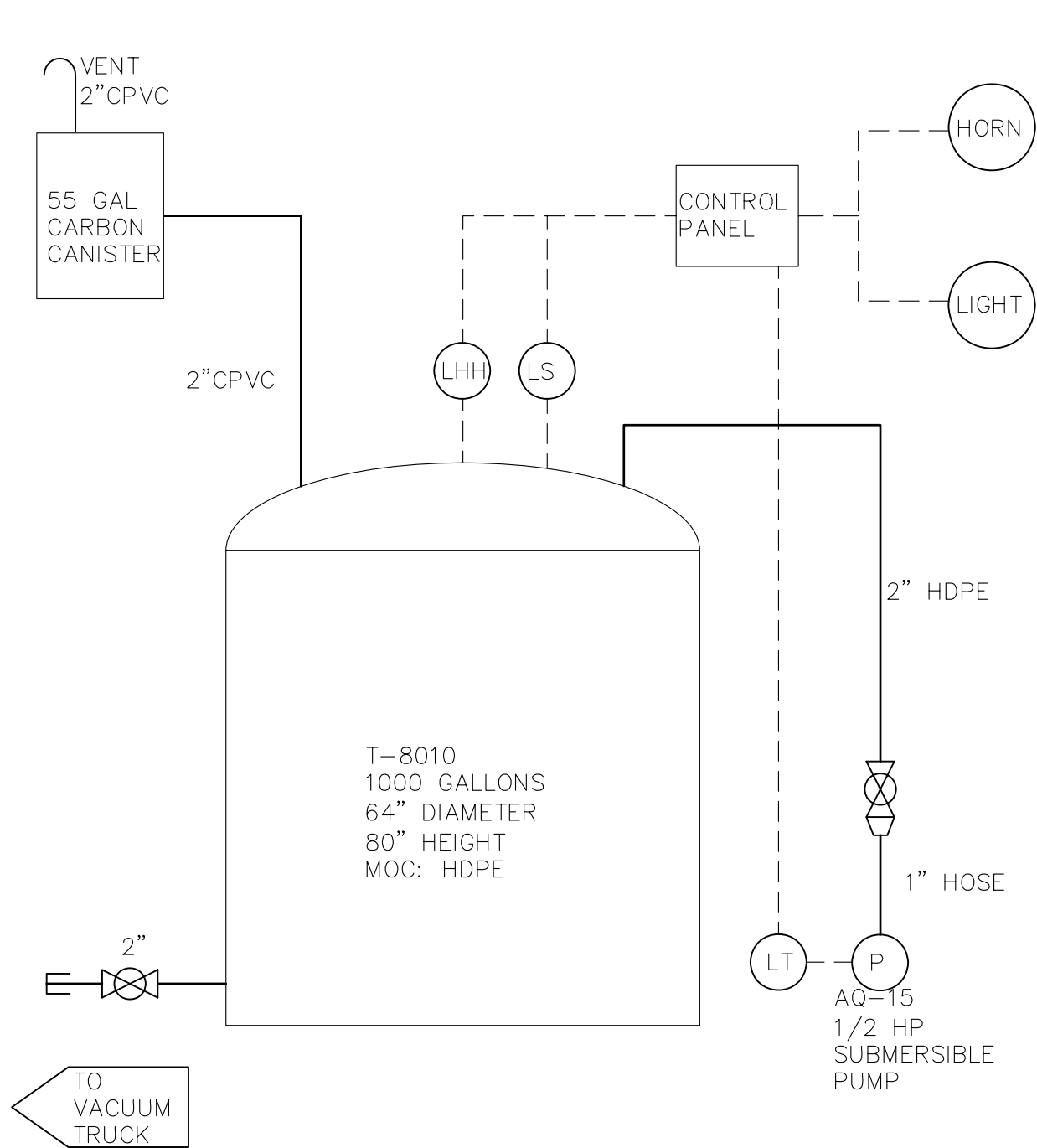
WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

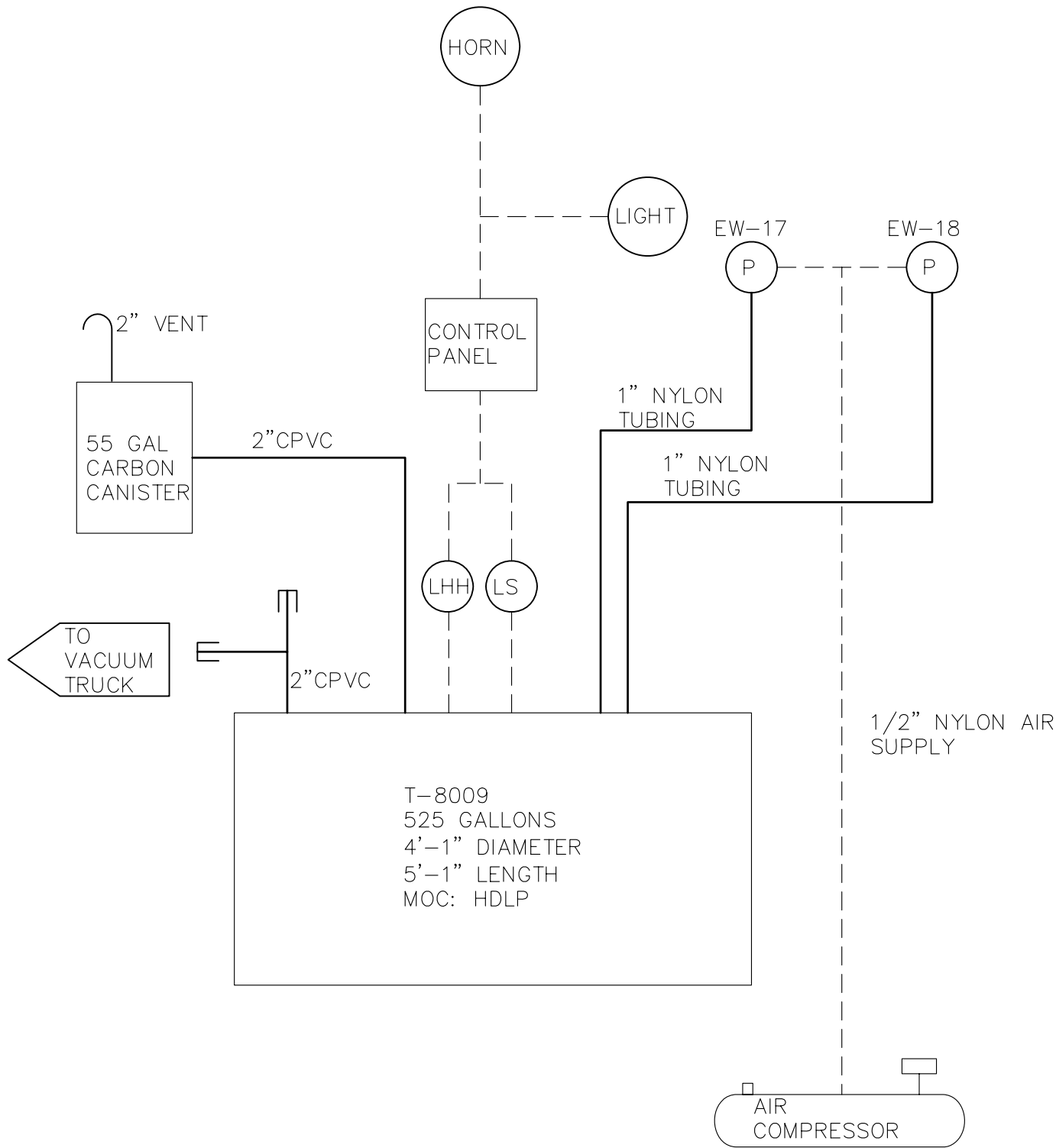
APPENDIX C

PROCESS AREA IV PROCESS AND INSTRUMENTATION DIAGRAM

X:\AA\Ap\CWM\12-7008 Sitewide Permit P & ID Drawing Updates (Task 4) Groundwater Pumping Systems (Sheets 8 & 8A) \D08A-12-7008-C-GWA-SHT8A.dwg, 4/24/2012 2:53:20 PM, J. Darling



PROCESS AREA III
(SOUTH OF TRAILER PARK AREA)



PROCESS AREA IV
(T.O. BUILDING)

REVISION	NO.	BY	DATE	<div>EnSol, Inc.</div> <div>Environmental Solutions</div> <div>661 MAIN STREET NIAGARA FALLS, NY 14301 PHONE (716) 285-3920 FAX (716) 285-3928</div>	PROJECT NO: 12-7008		TITLE: GROUNDWATER PUMPING SYSTEM PA III AND PA IV PROCESS AND INSTRUMENTATION DIAGRAM			
					SCALE: NOT TO SCALE					
					DWG: D08A-12-7008-C-GWA-SHT8A.dwg		PROJECT: CWM FACILITY P&ID UPDATES			DRAWING C-GWA (SHEET 8A)
					DRAWN BY: JCD CHECKED BY: BDS		PREPARED FOR: CWM CHEMICAL SERVICES, LLC. MODEL CITY FACILITY			
					DATE: APRIL 2012		TOWN OF PORTER		COUNTY OF NIAGARA	
IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW, ARTICLE 145 SECTION 7209, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY.										

At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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