MEMORANDUM

Las Ventanas Ranch Mutual Benefit Water Company

Date: November 14, 2022

To: Brian Whetsler, Environmental Health Specialist II
County of San Luis Obispo Environmental Health Ser

From: Rob Miller, P.E., General Manager

Subject: Las Ventanas Ranch Preliminary Design Report (PDR)

On June 30, 2022 a corrective action plan letter was submitted to the County of San Luis Obispo Environmental Health Services Department (County) addressing manganese levels above the secondary MCL of 50 ppb in the water supplied to Las Ventanas Mutual Benefit Water Company (LVRMWC) customers. An action plan and timeline were provided as part of that letter to address the manganese exceedances. The purpose of this document is to describe the preliminary design and associated costs to construct water system improvements for Las Ventanas Ranch Mutual Benefit Water Company (LVRMWC).

Existing Waster System Description

The existing water system consists of two Wells that pump to two steel water storage tanks situated on a hill. The water storage tanks are fed using a 6” CL150 C900 PVC water line that branches off into two 4” CL150 C900 PVC water lines for each tank. Water is distributed to customers using a 10” CL150 C900 PVC water main with system pressure being maintained by gravity. No treatment currently takes place at the site other than chlorination at tank site. The water tank site was designed to include a set aside area next to the water storage tanks for a future water treatment building. The next section describes the proposed water treatment building and equipment that will be installed in this set aside area.

Water System Design Criteria

In order to remove manganese, raw water will need to be pre-treated with permanganate to oxidize the iron and manganese and a coagulant will added to aid in the filtration process. After chemical pre-treatment the water will be sent through the iron/manganese filter which uses greensand (GS) filtration media with an anthracite cap to remove the contaminants. After iron and manganese are removed by the filtration medial treated water will then be pumped to the existing water storage tanks for distribution.

The filtration vessel media will need to be backwashed at regular intervals. The system will be designed to have two vessels that operate in parallel with one vessel remaining online for treatment while the other is being backwashed. Backwash water will be recovered on-site using a high efficiency backwash recovery system. The

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recovery system uses a cone bottom tank to settle out solids while water is decanted off the top of the tank and sent back to the media filter inlet using a backwash recovery pump. A sludge transfer pump is used to pump sludge from the bottom of the cone tank to a sludge holding tank for off-site disposal. The processes described above will be automated using a PLC, flow meters, pressure gauges, and solenoid operated valves.

The proposed water system layout is provided in Attachment 2. Water treatment system design parameters are provided in Table 1 with additional details and equipment cut sheets provided in Attachment 3.

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Table 1. Water Treatment System Design Parameters

Design Criteria		Design Data
AdEdge Iron/Manganese Filtration System	Number of Vessels	2
	Vessel Lining	NSF61 Epoxy
	ADGS Vessel Media, ft^3 (per vessel	30
	Anthracite Media, ft^3 (per vessel)	15
	Flow Rate @ 30 psi, gpm	120
Backwash Supply Pump	Number of Pumps	1
	Type of Pump	Vertical Centrifugal
	Pump Model	Gundfos CR 45-1
	Pump Flowrate @ 30 psi, gpm	155
	Pump Horsepower	10
	Power Supply	230v/1phase/60hz
Backwash Recycle Pump	Number of Pumps	1
	Type of Pump	Vertical Multi-Stage Centrifugal
	Pump Model	Gundfos CR 5-8
	Pump Flowrate @ 212' TDH, gpm	25
	Pump Horsepower	1
	Power Supply	230v/1phase/60hz
Sludge Transfer Pump	Number of Pumps	1
	Type of Pump	Horizontal Close Coupled Centrifugal
	Pump Model	Flowserve SMP
	Pump Flowrate	-
	Pump Horsepower	1/3
	Power Supply	230v/1phase/60hz
Backwash Recycle Tank	Number of Tanks	1
	Type of Tank	Snyder Cone Bottom
	Tank Volume, gal	4,400
	Tank Diameter, in	90
	Tank Height (with stand), in	222
Sludge Holding Tank	Number of Tanks	1
	Type of Tank	Poly Flat Bottom
	Tank Volume, gal	3,000
	Tank Diameter, in	95
	Tank Height, in	108
KMn04 (Permanganate) Chemical Feed Module	Number of Modules	1
	Peristaltic Chemical Feed Pump	4-20ma
	Chemical Storage Tank Volume, gal	30
	Stainless Steel shaft mixer, qty	1
	3" Dual Port Static Mixer, qty	1

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Table 1. Water Treatment System Design Parameters (Continued)

Design Criteria		Design Data
Coagulant Feed Module	Number of Modules	1
	Peristaltic Chemical Feed Pump	4-20ma
	Type of Coagulant	Kroff 4110
	Chemical Storage Tank Volume, gal	30
	Static Mixer (Shared with KMn04)	-
Polymer Feed Module	Number of Modules	1
	Peristaltic Chemical Feed Pump	4-20ma
	Type of Coagulant	Kroff F2311
	Chemical Storage Tank Volume, gal	30
	3” Static Mixer, qty	1
Flow Meter	Number of Meters	2
	Type of Meter	E+H Promag W 400
	Location of Meter	Filter Vessel Inlet
PLC and Controls	Allen Bradely Compact Logix PLC	1
	C-More 10” Color Touchscreen HMI	1
	304SS NEMA 4X Control Panel Enclosure	1
Treatment Building	Manufacturer	PWS
	Material Type	Painted Steel
	Dimensions, LxWxH, ft	20x25x12
	Metal Rollup Door Dimensions, WxH, ft	14x10
	Steel Access Door Width, in	36
	Slab and Subgrade	Per Manufacturer

Proposed Water System Improvements Cost

Table 2 provides a breakdown of the proposed water system improvements, including capital costs, engineering, permitting and construction.

Table 2. Capital Cost Estimate for LVRMWC Improvements

Line #	Description	Qty	Cost ($)
1	**Iron/Manganese Treatment Skid**: Includes chemical pre-treatment & dosing equipment	1	$217,350
2	**Backwash Recovery System**: Includes backwash reclaim tank, poly sludge tank on base and transfer pumps. Does not include reclaim tank slab.	1	$50,000
3	**Metal Building**: Includes metal building, structural, grading, concrete slab and utility stub-ups	1	$55,000
4	**Tank Slab**: Includes structural and concrete slab design for backwash reclaim tank.	1	$10,000
5	**Yard Piping & Equipment Install**	1	$70,000
	Subtotal		$397,350
6	**Construction Contingency** (15% of subtotal)		$60,353
7	**Soft Costs**: Engineering, administration, construction management, inspections & permitting (10% of Subtotal)		$40,235
	Total Project Cost		**$502,938**

A bench scale treatability study will also be performed by the treatment equipment manufacturer (AdEdge) to determine the optimal pretreatment chemical usage and the need for coagulation and flocculation prior to filtration. The study will also address chemical usage and treatment process that minimize the production of disinfection byproducts.

List of Attachments

Attachment 1: Water System Record Drawings
Attachment 2: Water System Improvement Plans
Attachment 3: Water System Equipment Preliminary Scope & Equipment Cut Sheets
Attachment 4: Treatability Study Scope

S014-0001

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3

SCHEDULE OF MATERIALS

ITEM NO.	DESCRIPTION	QUANTITY
1	EXTERNAL LIGHTS	–
2	WATER LEVEL INDICATOR	2
3	VENT	2
4	EXTERNAL LADDER W/ SAFETY CAGE	2
5	ACCESS HATCH W/ INTERNAL LADDER	2
6	3" TAPPING SADDLE & GATE VALVE	1
7	10" PVC CL150 C900	–
8	10" 90° FITTING	6
9	10" 45° FITTING	1
10	10" TEE	1
11	10" MUELLER OS&Y GATE VALVE FULLY RESTRAINED JOINTS	5
12	10" EBAA IRON FLEX-TEND DOUBLE BALL EXPANSION JOINT MODEL 410F21	2
13	4" EBAA IRON FLEX-TEND DOUBLE BALL EXPANSION JOINT MODEL 404F21	2
14	~~12" HDPE~~	–
15	6" FLOOR DRAIN	7
16	6" PVC CL150 C900	–
17	6" 90° FITTING	6
18	6" X 4" REDUCER	–
19	4" WELDED GALVANIZED STEEL	–
20	4" CL150 C900 PVC	–
21	4" 90° FITTING	20
22	4" 45° FITTING	2
23	4" GATE VALVE	8
24	4" TEE	1
25	4" SDR 35	–
26	TRIPOD STORAGE TANK STAND W/ METERING PUMP MOUNTING SHELF	1
27	LIQUID CHLORINE METERING PUMP: STENNER SERIES 45	1
28	CHLORINE LIQUID STORAGE: 35 GALLON P.E. TANK	1
29	¾" BLACK PE TUBING WITH TAPPING SADDLE	–
30	~~MARLO MOA 40 IRON/MN FILTER~~ NOT INSTALLED, FUTURE IF REQUIRED	1
31	SCADA ANTENNA	1
32	3" SCH 40 PVC	–
33	4" ø BOLLARD – CONCRETE FILLED	12

LIMIT OF WORK 5+00.0 EL=870.35
SEE RRM PLANS SHEET IP-31

6" WELL SUPPLY (BY RRM)
10" DISTRIBUTION MAIN (BY RRM)
PERCOLATION BED SEE SHEET W-5
6' CHAIN LINK SECURITY FENCE
16' WIDE GATE
14.00'
R20.50'
R3.00'
R5.00'
THRUST BLOCK PER SLO CNTY STD W-3 (TYP)
3" SCH 40 PVC
30.00'
ROLL-UP DOOR
NORTHING = 18457.42
EASTING = 27155.50
N 80°56'40" E
10" SDR 35 PVC PIPE
S.D.
BELOW GROUND
ABOVE GROUND
10 S.F.
6 S.F.
4" DRAIN LINE FOR FILTER BACKWASH
3" STUB-UP FOR FILTER BACKWASH
VALVE CLUSTER ABOVE GROUND (CURRENT SCOPE)
~~WATER TREATMENT SHED 20'x25' SEE SHEET W-5~~ FUTURE, IF REQUIRED
CHLORINATION MOVED NEXT TO PG&E BACK BOARD
NORTHING = 18349.96
EASTING = 27141.52
NORTHING = 18390.82
EASTING = 27158.63
30.00'
12.00' TYP
12.00' TYP PAVING EDGE
TANK WALL
BOLLARDS
3 S.F.
7.5 S.F.
GRAPHIC SCALE
0 2.5 5 10
(IN FEET)
1 inch = 5 ft.

1. CONTRACTOR SHALL SUBMIT BUILDING CONDUIT PLAN PRIOR TO CONSTRUCTION.

RECORD DRAWING
WHERE NOTED, THIS DRAWING INDICATES CONSTRUCTION WHICH DIFFERED FROM THE ORIGINAL DESIGN INCLUDING APPROVED REVISIONS. THE MODIFICATIONS SHOWN ARE ACCORDING TO RECORDS PROVIDED BY THE CONTRACTOR AND CONSTRUCTION MANAGER.
SIGNATURE M. Wheeler DATE 12/1/08
LIC. EXP. DATE 6/30/10 (M12872)

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. WHEELER
No: 61741
Exp. 6-30-07
CIVIL
STATE OF CALIFORNIA

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TRACT 2408 - BIDDLE RANCH EAST

TANK UTILITY & DIMENSION PLAN

Design/ Drawn:	County Checker:	
MJW/SLS	WEW	Development Services Engineer — Date
Job No.: S014-0001	County W.O. No. 201R1ID698	Project Engineer — 10-05-06 Date
California Coordinates: N 2256200 E 5804450		SHEET W-3 OF 5

S014-0001

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3

EMBEDDED RIP RAP APRON
4'x4' BOX
D50=8"ø
UNDERLAIN W/ NO. 2 BACKING
RSP FABRIC NON-WOVEN

DAYLIGHT SWALE
Q10 = 2.1 CFS

INSTALL EROSION CONTROL MATTING FOR LENGTH OF SWALE PER DETAIL 1/W-5

PERCOLATION BED FOR FILTER BACKWASH
28' X 16' X 2.5'
VOL = 8,300 CU
(CURRENT SCOPE)

BOTTOM LENGTH= 35'

TREATMENT & CONTROL SHED 20'X 25' SEE DETAIL 2/W-5

CONCRETE LANDING PAD (FUTURE)

MUTUAL WATER COMPANY EASEMENT. SEE RRM PLANS FOR COORDINATES

6" AC DIKE (TYP)

DRAIN THRU DIKE 1.25' @ 5% (TYP)

LIMIT OF WORK
STA: 5+00.3 GRND EL=870.35
SEE RRM PLANS SHEET IP-31

OPERATOR PARKING AREA

PROPOSED WATER TREATMENT BLDG FF=874.00

N18447.61
E27138.08

CURB-BREAK FOR DRAINAGE (TYP)

REMOVE EXISTING FENCE

OVERFLOW & DRAIN INLET
TG = 875.25
INV = 871.25

PROPOSED WATER TANK
FF=876.00

GRAVEL AROUND DI
3" DIAMETER

GRAVEL AROUND TANK
1"-3" DIAMETER

N18390.85
E27158.63

PANEL DRAIN

ALL-WEATHER ACCESS ROAD AROUND TANKS
SEE NOTE: THIS SHEET

SWALE HIGH POINT

6' HIGH CHAIN LINK SECURITY FENCE

MUTUAL WATER COMPANY EASEMENT. SEE RRM PLANS FOR COORDINATES

REMOVE EXISTING FENCE

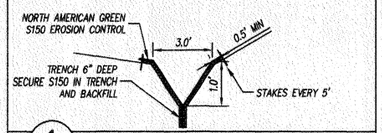
EXISTING LIGHT POLE TO BE REMOVED (TYP)

EMBEDDED RIP RAP APRON
10' LONG
D50=8"ø
UNDERLAIN W/ NO.2 BACKING
RSP FABRIC NON-WOVEN

12" HDPE STORM DRAIN SLOPE = 4%

DAYLIGHT SWALE
Q10 = 1.3 CFS

GRAPHIC SCALE
0 5 10 20
(IN FEET)
1 inch = 10 ft.

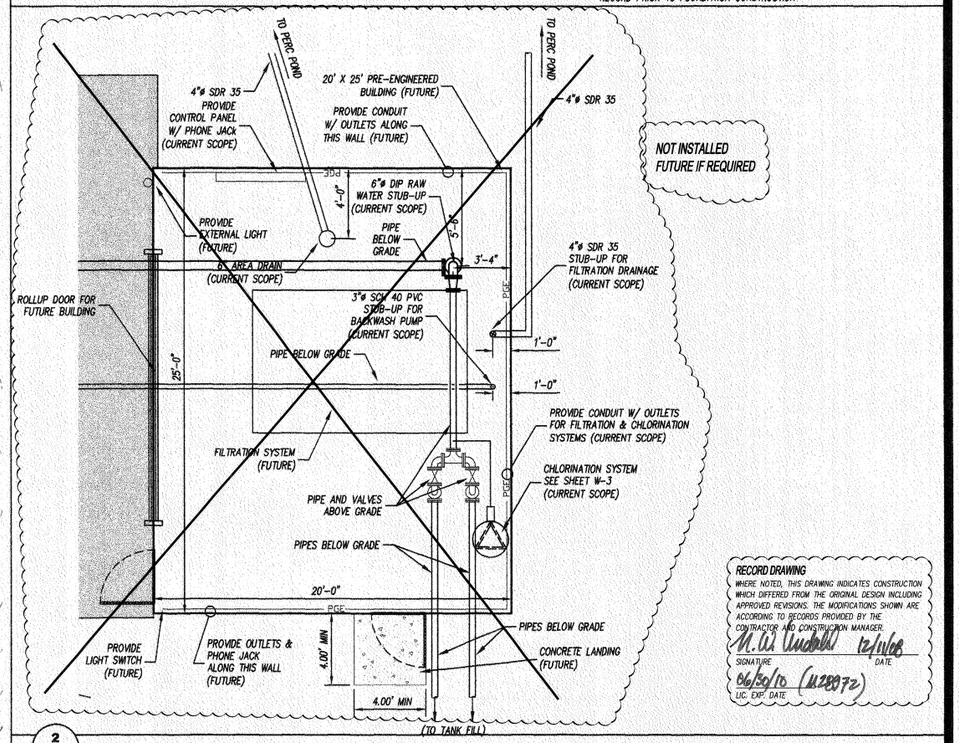


1/W-5 **SWALE PROTECTION** NTS

AC PAVEMENT SECTION NOTES:
TRAFFIC INDEX = 5.0
A.C. THICKNESS = 2.5"
CLII BASE THICKNESS = 4.0"
CLII BASE COMPACTED TO 95% R.C.
TOP 12" SUBGRADE COMPACTED TO 95% R.C.

GRADING PLAN NOTES:
1. FOR EROSION CONTROL/SEEDING SPECIFICATIONS, SEE RRM PLANS SHEET C-EC2
2. PER SOIL REPORT FROM GEOSOLUTIONS, OVEREXCAVATION SHALL BE 12'-0" DUE TO THE EXISTANCE OF LOOSE SOIL AT THE TANK SITE. THIS VALUE MAY BE REDUCED WITH APPROVAL OF A GEOTECHNICAL ENGINEER FROM GEOSOLUTIONS. IT IS RECOMMENDED TO KEEP GEOSOLUTIONS ON SITE DURING TANK SITE EXCAVATION.

BUILDING NOTES:
1. STANDARD 20' X 25' PRE-ENGINEERED METAL BUILDING AND FOUNDATION SHALL BE PROVIDED BY VARCO PRUDEN, BUTLER MANUFACTURING, BROOKS RANSOM ASSOC., OR APPROVED EQUAL.
2. BUILDING PAD, CONDUIT, PIPE STUB-UPS, & CHLORINATION EQUIPMENT SHALL BE PROVIDED AS SHOWN. BUILDING AND FILTRATION EQUIPMENT MAY BE PROVIDED IN FUTURE.
3. CONTRACTOR SHALL SUBMIT BUILDING CONDUIT PLAN TO ENGINEER OF RECORD PRIOR TO FOUNDATION CONSTRUCTION



2/W-5 **TREATMENT BUILDING LAYOUT** SCALE: 1" = 4'

RECORD DRAWING
WHERE NOTED, THIS DRAWING INDICATES CONSTRUCTION WHICH DIFFERED FROM THE ORIGINAL DESIGN INCLUDING APPROVED REVISIONS. THE MODIFICATIONS SHOWN ARE ACCORDING TO RECORDS PROVIDED BY THE CONTRACTOR AND CONSTRUCTION MANAGER.
M.A. Underhill 12/16/08
SIGNATURE DATE
06/30/10 (42897)
LIC. EXP. DATE

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. WHEELER
No: 61741
Exp. 6-30-07
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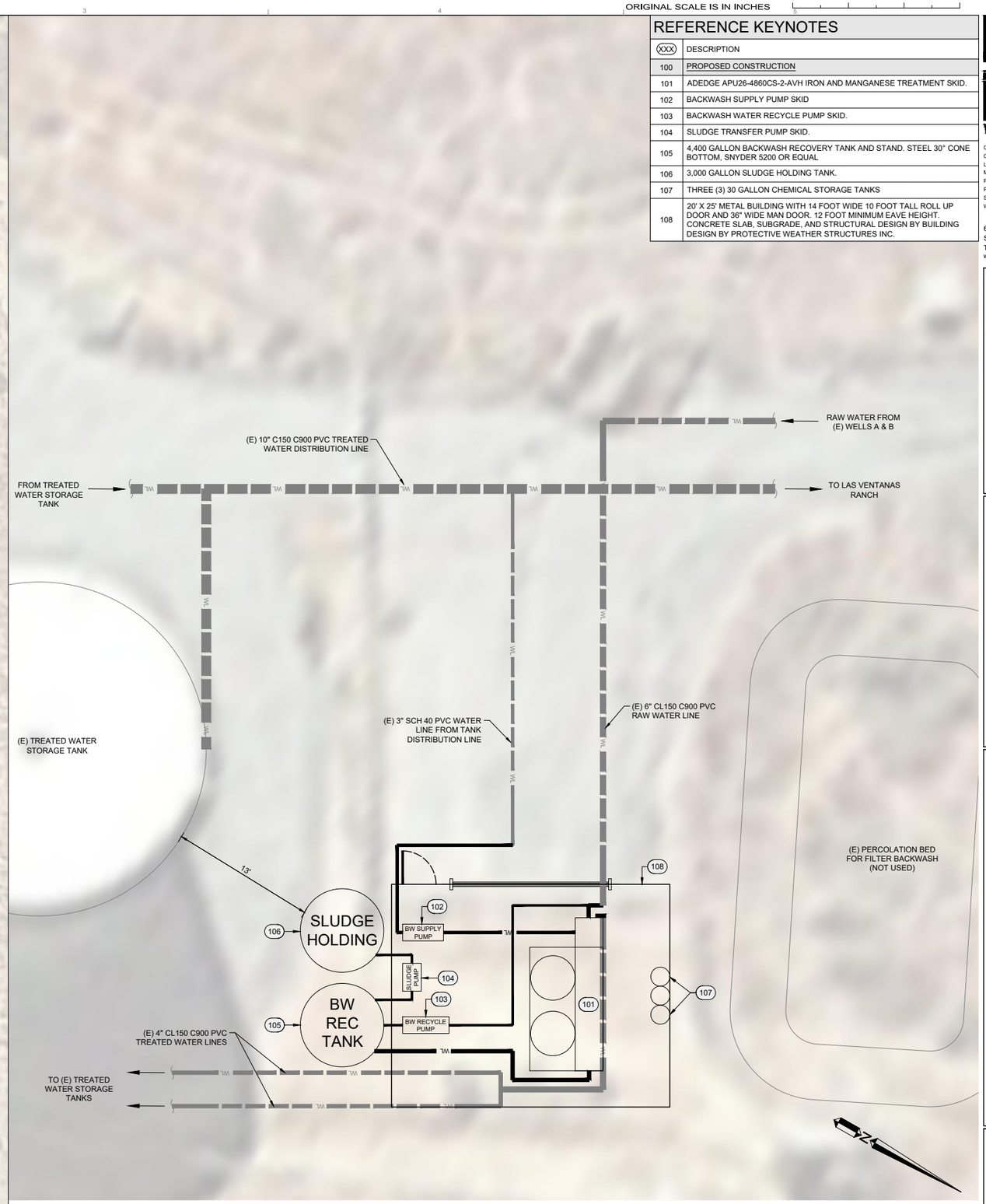
TRACT 2408 - BIDDLE RANCH EAST

TANK SITE GRADING PLAN

Design/ Drawn:	County Checker:		
MJW/SLS	WEW	Development Services Engineer	Date
Job No.: S014-0001	County W.O. No. 2011110699	Project Engineer	01-03-07 Date
California Coordinates: N 2256230	E 5804450	SHEET W-5 OF 5	

FILE NAME: 840-0001-UTIL.DWG

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES
0 1 2 3



A WATER TREATMENT BUILDING DETAILS

SCALE: 1"= 5'

REFERENCE KEYNOTES

(XXX)	DESCRIPTION
100	PROPOSED CONSTRUCTION
101	ADEDGE APU26-4860CS-2-AVH IRON AND MANGANESE TREATMENT SKID.
102	BACKWASH SUPPLY PUMP SKID
103	BACKWASH WATER RECYCLE PUMP SKID.
104	SLUDGE TRANSFER PUMP SKID.
105	4,400 GALLON BACKWASH RECOVERY TANK AND STAND. STEEL 30" CONE BOTTOM, SNYDER 5200 OR EQUAL
106	3,000 GALLON SLUDGE HOLDING TANK.
107	THREE (3) 30 GALLON CHEMICAL STORAGE TANKS
108	20' X 25' METAL BUILDING WITH 14 FOOT WIDE 10 FOOT TALL ROLL UP DOOR AND 36" WIDE MAN DOOR. 12 FOOT MINIMUM EAVE HEIGHT. CONCRETE SLAB, SUBGRADE, AND STRUCTURAL DESIGN BY BUILDING DESIGN BY PROTECTIVE WEATHER STRUCTURES INC.

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REGISTERED PROFESSIONAL ENGINEER
ROBERT S. MILLER
No. 57474
FOR PLAN REVIEW ONLY
NOT FOR CONSTRUCTION
CIVIL
STATE OF CALIFORNIA

SIGNATURE

DATE SIGNED

LAS VENTANAS RANCH
MUTUAL BENIFIT WATER COMPANY
P-1 WATER TREATMENT PLAN

JOB #: 0840-0001
DESIGNERS: RSM
DRAWN BY: NFW
DATE: 11/7/2022

DRAWING NO.
C-1
1 OF 1 SHEETS

AdEdge Water Technologies - Preliminary Scope of Supply

Las Ventanas Ranch Mutual Benefit Water Company - California

AdEdge Oxidation & Filtration System for Iron & Manganese Removal

Doug Craver, Western Regional Sales Manager
480-243-1824
dcraver@adedgetechnologies.com

Rev #
9/12/2022

Parameter	Design
Model	APU26-4860CS-2-AVH

Item	Detail	Design	Supply	Install
	APU26-4860CS-2-AVH, Skid Mounted Carbon Steel Vessel System, Automatic Operation Pre-packaged Skid Mounted System with Vessels, Interconnecting Piping, and Valve Harness designed to run in parallel. System is shipped Factory Assembled, Skid Mounted, Pre-piped and Wired, Pressure and Flow Tested, and Ready for Installation.	**AdEdge**	**AdEdge**	**Others**
A	**Carbon Steel Pressure Vessels** Skid Mounted Carbon Steel Vessels Operating in parallel with Media and Underbedding 100 psi Non-Code Vessels Vessels are lined with internal NSF61 Epoxy Liner One (1) Drain Valve per Vessel One (1) Manway for Media Loading Sch80 PVC Internal Inlet Distributor and Hub and Lateral Design One (1) Combination Air/Vacuum Release Valve per Vessel	**AdEdge**	**AdEdge**	**Others**
B	**Process Valves and Piping** 3" Sch80 PVC Inlet, Treated Outlet, and Backwash Headers with Flanged Tie Points 3" Sch80 PVC Harness Piping on Each Vessel Valve Harness with Five (5) Lug-Style Bray Butterfly Control Valves with 120VAC RCEL Electric Actuators Manual Isolation Valve at the Inlet of Each Vessel Manual Flow Control Valve on System Backwash Outlet Manual Flow Control Valve on System Treated Outlet Auxiliary Backwash Inlet Connection for Treated Water Backwash Supply	**AdEdge**	**AdEdge**	**Others**
C	**PLC and Controls Detail** Automatic System Operation (Service, Backwash, and Rinse Modes) Allen Bradley CompactLogix PLC Installed Inside Control Panel for Automatic Operation C-More 10" Color Touch Screen HMI Mounted on Control Panel Operator "Touch" Graphics Screens for Automatic and Manual Operation 304SS NEMA 4X Skid-mounted Control Panel to House Electrical and System Controls Terminal Locations on Control Panel for Ancillary Controls and Device Inputs/Outputs (factory installed and labeled)	**AdEdge**	**AdEdge**	**Others**
D	**Instrumentation / Monitoring** 304SS Hydraulic Panel with System Inlet/Outlet Pressure Gauges and Sample Ports, One (1) per system Pressure Gauges and Sample Ports on Each Vessel's Inlet and Outlet E+H Electromagnetic Promag W 400 Flow Meter on Each Vessel's Inlet Pressure Sensors on System Inlet/Outlet for System DP measurement	**AdEdge**	**AdEdge**	**Others**
E	**Coagulation Filtration Media and Underbedding** ADGS+ Coagulation Filtration Media with Anthracite Cap 30 cuft GS+ per vessel (60 cuft total), 15 cuft Anthracite per vessel (30 cuft total) Gravel Underbedding 15 cuft per vessel (30 cuft total)	**AdEdge**	**AdEdge**	**Others**
F	**KMnO4 (Permanganate) Chemical Feed Module** One (1) Peristaltic chemical feed pump with 30 gal storage tank 4-20mA controls and flow pacing with system HMI One (1) stainless steel shaft mixer for tank (assumed powder addtion) One (1) 3/4" Injection Quill, tubing and check valve One (1) 3" Shared dual port Static Mixer for Coagulant and KMnO4 One (1) 36" x 72" Composite Fiber Contact Tank with Tripod Legs	**AdEdge**	**AdEdge**	**Others**
G	**Coagulant Feed Module (Kroff 4110)** One (1) Peristaltic chemical feed pump with 30 gal storage tank 4-20mA controls and flow pacing with system HMI One (1) 3/4" Injection Quill, tubing and check valve Shared Static mixer with Permanganate feed module	**AdEdge**	**AdEdge**	**Others**
H	**Polymer Feed Module (Kroff F2311)** One (1) Peristaltic chemical feed pump with 30 gal storage tank 4-20mA controls and flow pacing with system HMI One (1) 3/4" Injection Quill, tubing and check valve One (1) 3" Static Mixer One (1) 36" x 72" Composite Fiber Contact Tank with Tripod Legs	**AdEdge**	**AdEdge**	**Others**

I	**Backwash Supply Pump Skid**	**AdEdge**	**AdEdge**	**Others**
	Simplex Backwash supply pump skid with HOA Panel and Automated Controls 230VAC/1PH or 460VAC/3PH as options 155 gpm at 30 psi Vertical Centrifugal Pump mounted on a stainless steel skid with check valve, guages, isolation valves 3" Flange connections inlet / outlet			
J	**Included Field Services and Miscellaneous**	**AdEdge**	**AdEdge**	**NA**
	O&M Manuals (+1 Hardcopy, +1 Electronic Copy) including Engineering Drawings, Design Report, and Control Description System Commissioning Plan and Coordination of Installation with Installer (Pre-Startup) System Startup and Comissioning On-Site Including Media Loading Supervision and Initial Media Flush Three (3) x 8 hour Days Included for Start-Up and Training. Additional Work Billed on Time and Materials Basis Operator Training During System Startup			
K	**Factory Testing**	**AdEdge**	**AdEdge**	**NA**
	Factory Acceptance Testing in accordance with AdEdge QC procedures and SOPs Hydraulic and Mechanical Testing to Ensure System Meets Requirements Pressure Testing per AdEdge Standard Procedures to Test for Leaks			
L	**Warranty and Maintenance**	**NA**	**AdEdge**	**NA**
	Standard 1-year Equipment Warranty			
M	**Freight for Media, Sub-Fill, and System**		**Not Included**	
N	**Taxes (end use, sales or duty taxes as applicable)**		**Not Included**	

Estimated Fabrication and Delivery Schedule

1	Produce Shop Drawings / Submittals from Award / PO	*3 - 4 weeks*
2	Fabrication of System upon approval of Shop Drawings (based on shop availability and project timing)	*20+ weeks (based on the time of order and backlog)*
3	Shipping to the site	*3 - 4 days*
4	Installation of the System	*TBD by others*
5	Startup, Commissioning, Training following Mech/Electrical Completion	*2-3 days*

Pricing Schedule

Scope of Supply Total:	Included
Optional Items:	N/A
Subtotal:	**$189,000**
Freight:	Not Included
Taxes:	Not Included
Total:	**$189,000**

Pricing in this proposal is valid for 30 calendar days from date issued.

Payment Schedule and Terms and Conditions

- *Progress Invoice #1: 10% on contract*
- *Progress Invoice #2: 30% upon design release to manufacturing / fabrication; due on approved shop drawings & initiation of fabrication*
- *Progress Invoice #3: 55% upon shipment*
- *Progress Invoice #4: 5% upon successful startup or 45 days after shipment, whichever is first*
- *All invoices due net 30 days*
- *Project schedule is subject to timely receipt of progress payments. T his is not a pay when paid contract, therefore delayed payments will result in a temporary hold on the project until received.*
- *Late payments subject to 18% per annum interest .*
- *Alternative payment terms may result in an interest charge being added to the price to cover interest associated with financing.*

Notes, Clarifications and Exceptions

1	Freight for media and equipment supplied, IF included in the pricing accounts for one joint shipment. Customer requested split shipments will be at customer's expense
2	AdEdge will coordinate closely with Installer and the Engineer on all equipment and design related items.
3	No state and local permits or building, use or environmental permits will be secured by AdEdge.
4	No site engineering is included; primary interface with regulators will be completed by engineer with support from AdEdge.
5	System will be shipped for offloading by personnel other than AdEdge personnel with appropriate equipment and trained operator.
6	Media will be shipped in pallets or supersacks for offloading by forklift. - By Others
7	No system foundations, offloading, placement, piping, pipe supports, insulation or tie-ins will be completed by AdEdge.
8	Owner or others will be responsible for furnishing chemicals, unless otherwise specified in Scope.
9	Wiring and tie in of any external devices not part of the AdEdge scope e.g., SCADA shall be by the Owner or Others.
10	Unless otherwise specified in scope of supply, no seismic engineering or seismic related design or equipment modifications are considered in the pricing; can be incorporated as appropriate for the project.
11	If, during the performance of this contract, from the date of the contract signing until the release to manufacturing milestone only, the price of materials significantly increases through no fault of AdEdge, a change order will be issued to equitably adjust the contract value by an amount reasonably necessary to cover any such significant price increase. AdEdge shall provide documentation from the impacted manufacturer that substantiates any such increase. As used herein, a significant price increase shall mean any increase in price exceeding 5%, as compared to prices used at the date of contract signing.
12	AdEdge Standard Purchase Agreement applies unless otherwise noted.
13	AdEdge will request a 48-hour delivery window for treatment equipment delivery. AdEdge will closely coordinate with the customer/contractor during system shipment.
14	Unless otherwise specified in scope of supply, treatment System does not meet American Iron & Steel (AIS) requirements. AIS requirements can be met upon request at an additional cost.
15	Delays / Schedule: AdEdge has presented its offer and firm pricing in this proposal for a system that will be fabricated within provided project specific schedule. If after execution of the contract, Purchaser delays the equipment fabrication for whatever reason beyond four (4) months (including that from late payments) AdEdge reserves the right to assess reasonable escalation charges in the form of a change order to the project at the rate of 1% of the contract value per month for each month the project is delayed after four (4) months and/or adjust prices to pass on materials cost increases which exceed 5% incurred due to customer fabrication delays over four (4) months

16 Start Up Services Delays / Schedule: AdEdge has presented its offer and firm pricing in this proposal for a system that will be started up within provided project specific schedule. If after execution of the contract, Purchaser delays the startup for whatever reason beyond two (2) months (including that from late payments) AdEdge reserves the right to assess travel related escalation charges, if 5% or more, in the form of a change order to the project for increased travel expenses which may result from this delay.

Items Supplied By Others / Contractor

- **A** *Interconnecting pipe to the system, appropriate electrical connections to AdEdge Equipment*
- **B** *Pressurized water supply for use during start-up*
- **C** *Non-AdEdge system related site, civil, or structural engineering or support costs from Owner*
- **D** *Safety equipment as required for media loading, startup/commissioning*
- **E** *Offloading, storage and placement of all equipment and media*
- **F** *Site work and any building structure / facility or shade structure to be provided; HVAC*
- **G** *Construction of structural concrete pad as necessary for treatment equipment provided by AdEdge*
- **H** *Anchoring Equipment, tanks and other equipment to the building's foundation/structural pads*
- **I** *Dedicated power supply to AdEdge equipment; Interconnecting control and instrumentation wiring to control panel*
- **J** *Multiple Laborers for Media loading with AdEdge Supervision*
- **K** *Interface with Regulators / Permitting and all permits for successful completion of the project*

Confidentiality Notice

Acceptance

The parties hereto acknowledge that the signatory below is authorized to represent the respective party and bind that party to the terms and conditions contained herein.

Acceptance by Purchaser:

By: _____
Signature

Name (print): _____

Title:_____

Date of Acceptance: _____

Purchase Order # _____

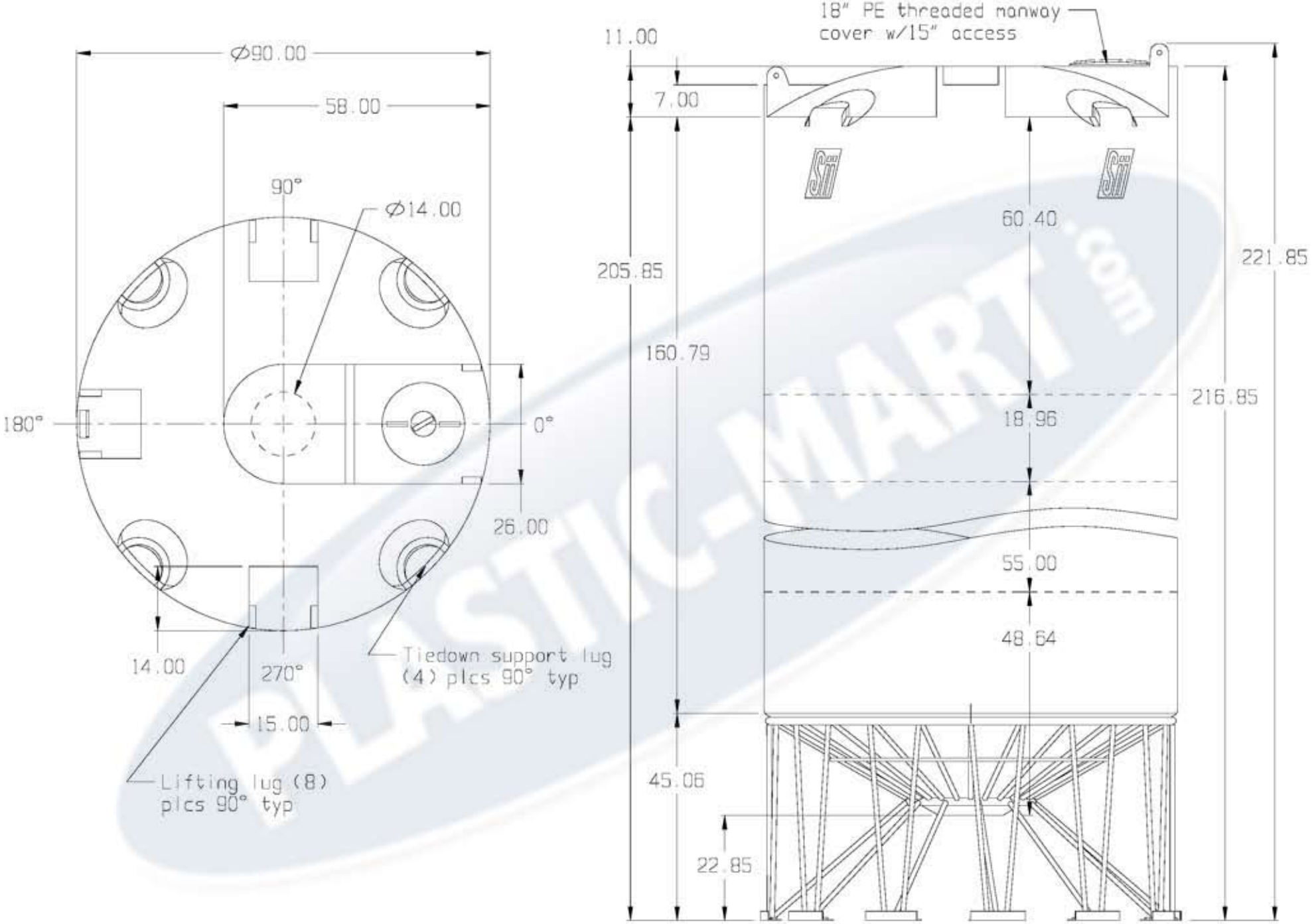
AdEdge Water Technologies, LLC
2055 Boggs Road
Duluth, Georgia 30096
678-835-0052 Fax: 678-835-0057

By: _____
Signature

Name (print): _____

Title:_____

Date of Acceptance: _____



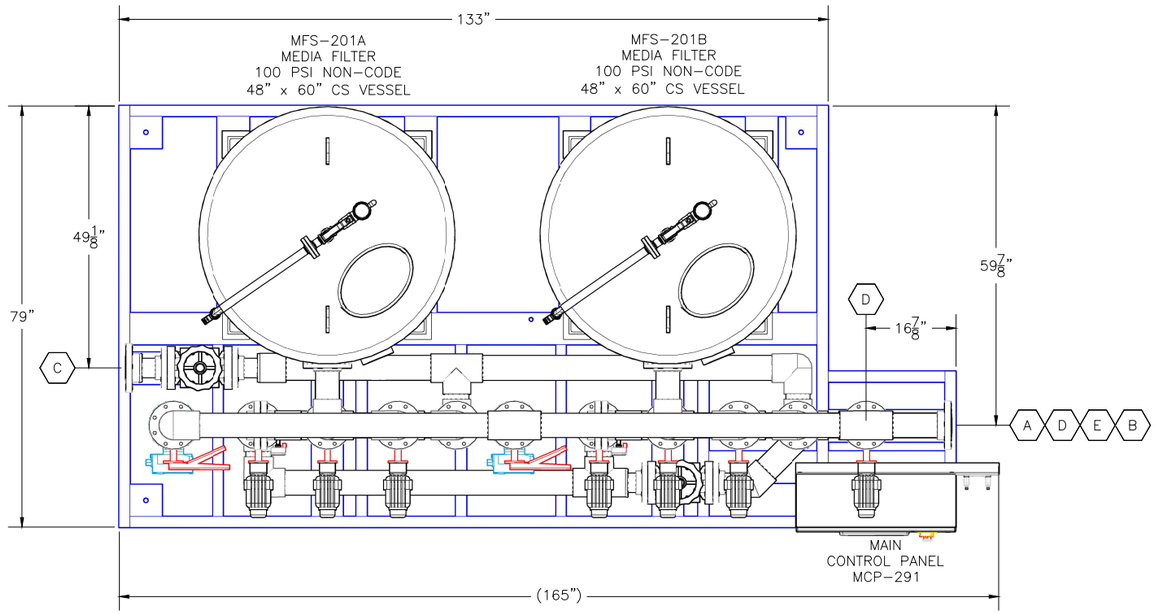
SNYDER INDUSTRIES INC.

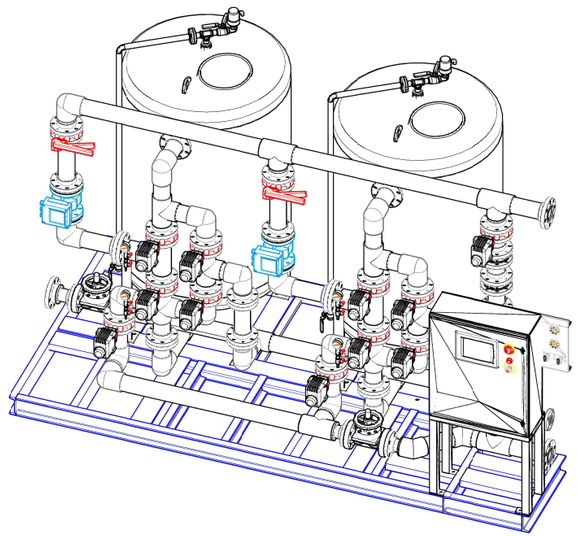
(all dimensions in inches)

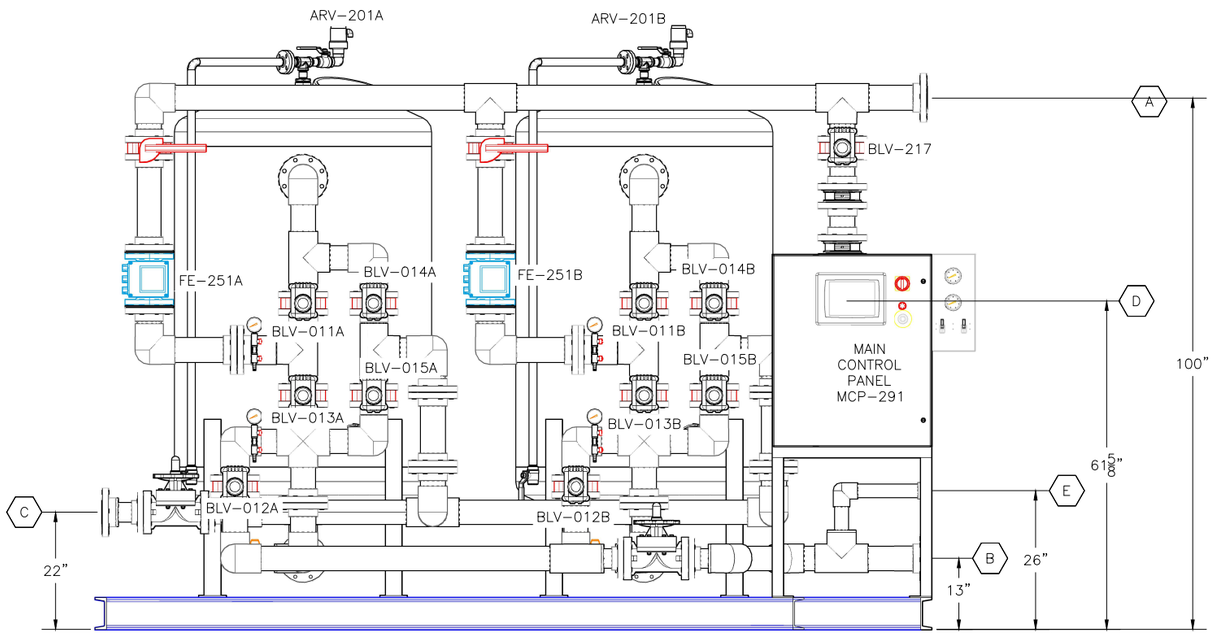
BASE FITTINGS TO BE LEFT INSTALLED AT TIME OF SHIPMENT PER Sii PROCEDURE

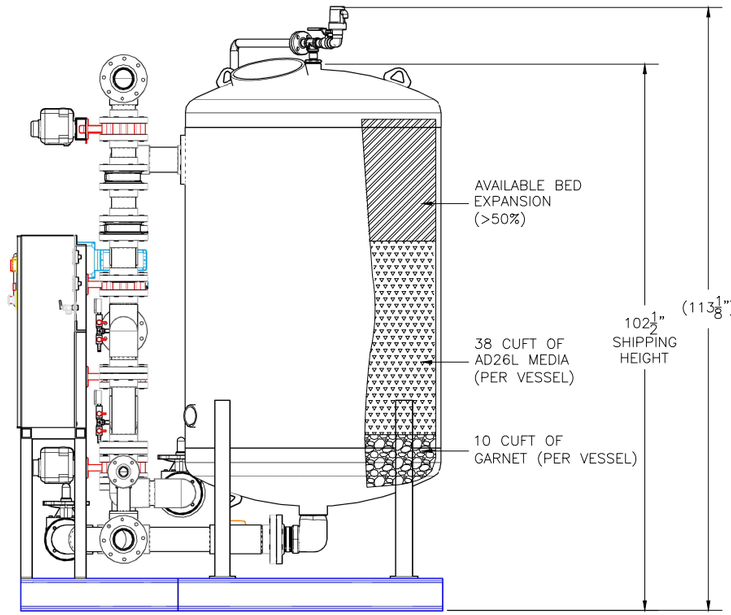
4,400 GALLON 30° CONE BOTTOM TANK

PART #	TANK:	5200--NO SUMP
	STAND:	79300
		79800 (SEISMIC)
REF#:	0000	10/03/02









EXAMPLE SALES DRAWING

AdEdge water technologies tm
2055 Boggs Road
Duluth, GA 30096
P. 678–835–0052 F. 678–835–0057
www. adedgetechnologies.com

TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:
A	RAW WATER INLET	4" SCH80 150# FLANGE
B	TREATED WATER OUTLET	4" SCH80 150# FLANGE
C	BACKWASH OUTLET	4" SCH80 150# FLANGE
D	AUX. BACKWASH INLET	4" SCH80 150# FLANGE
E	TREATED WATER TO BW SUPPLY TANK	2" SCH80 150# FLANGE

TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:

REV. #	DATE:	BY:	APPROVED BY:	REVISION DESCRIPTION:

DRAWN BY:	CHECKED BY:	APPROVED BY:	PROJECT #:	DATE:	SCALE:
SM	FH	BM	AWNC–0719	7/17/19	NTS

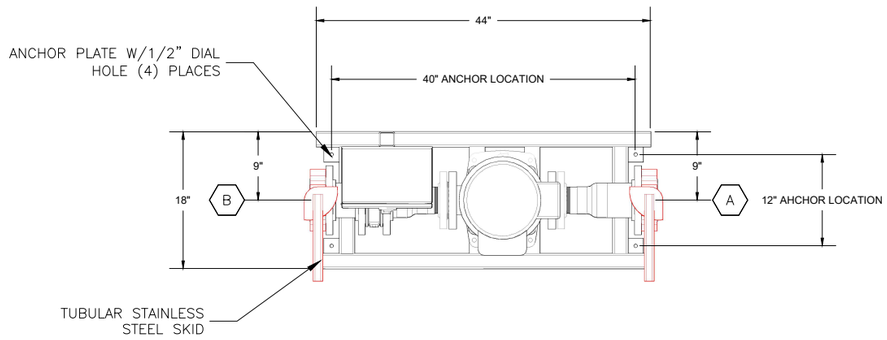
MODEL:
ADEDGE IRON & MANGANESE
TREATMENT SYSTEM
MODEL APU26–4860CS–2–AVH

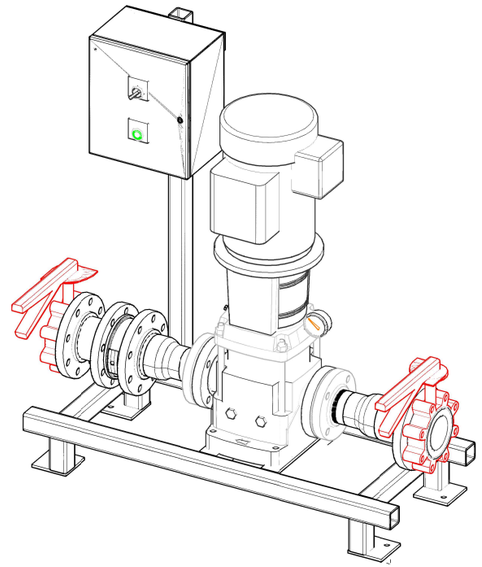
CUSTOMER:

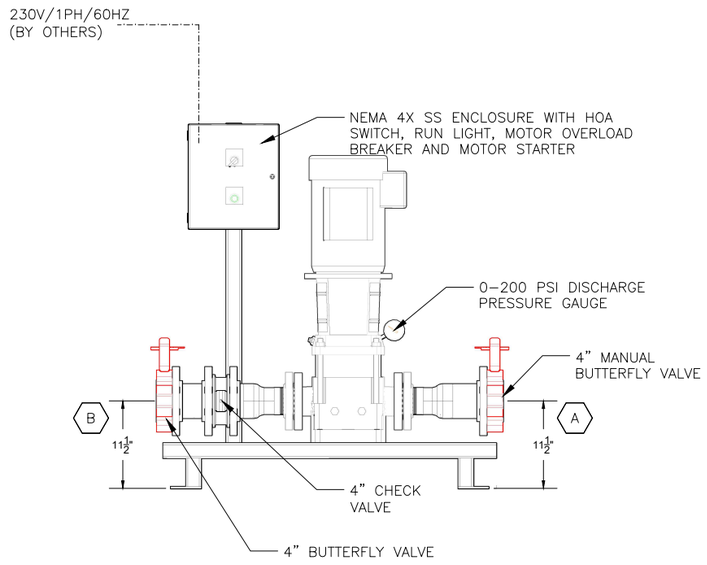
TITLE: GENERAL ARRANGEMENT

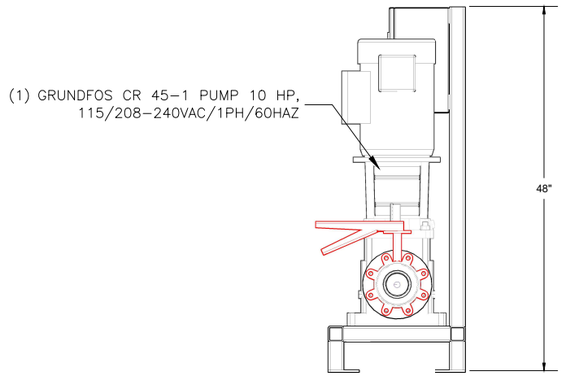
DRAWING NUMBER: M–001

SHEET:









EXAMPLE SALES DRAWING

AdEdge water technologies tm
2055 Boggs Road
Duluth, GA 30096
P. 678–835–0052 F. 678–835–0057
www. adedgetechnologies.com

TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:
A	BW SUPPLY PUMP INLET	4" FLANGE, 304SS
B	BW SUPPLY PUMP OUTLET	4" FLANGE, 304SS

TP.	SERVICE CONNECTIONS:	TYPE/MATERIAL:

REV. #	DATE:	BY:	APPROVED BY:	REVISION DESCRIPTION:

DRAWN BY:	CHECKED BY:	APPROVED BY:	PROJECT #:	DATE:	SCALE:
SM	FH	BM	AWNC–0719	7/17/19	NTS

MODEL: ADEDGE IRON & MANGANESE TREATMENT SYSTEM

CUSTOMER:

TITLE: BACKWASH SUPPLY PUMP SKID

DRAWING NUMBER: M–003

SHEET:

DESCRIPTION:

1. SKID-MOUNTED PUMP ASSEMBLY
2. VERTICAL CENTRIFUGAL MULTI-STAGE PUMP
3. SYSTEM PRESSURE: 100 PSI MAX

DIMENSIONAL NOTES:

1. ALL DIMENSIONS ARE +/- 2".
2. DO NOT SCALE DRAWING. REFER TO ADEDGE ENGINEERING DEPT FOR ALL DIMENSIONS.
3. (##): REFERENCE DIMENSION

GENERAL SYSTEM SPECIFICATIONS:

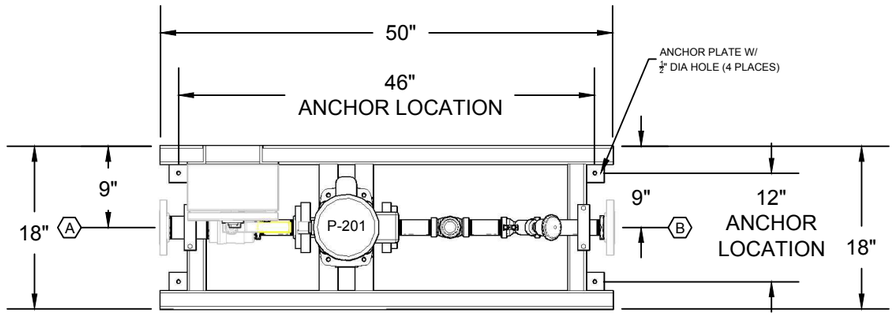
1. 304SS TUBULAR SKID FRAME
2. 2" 304SS ANSI 150# FLANGED INLET SKID CONNECTION
3. 2" 304SS ANSI 150# FLANGED OUTLET SKID CONNECTION
4. 2" 304SS BALL VALVE ON SUCTION
5. 1 1/4" CIRCUIT BALANCING VALVE ON DISCHARGE
6. 1 1/4" SHARPE SWING CHECK VALVE ON DISCHARGE

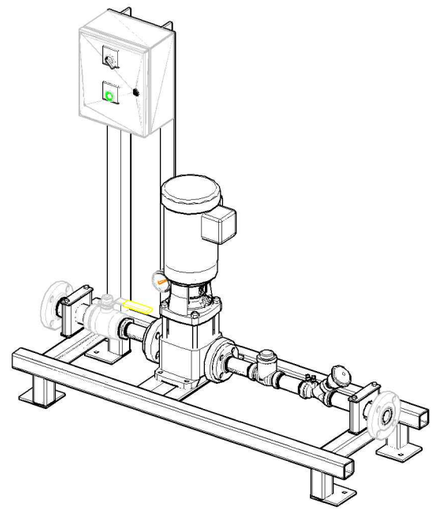
PUMP SPECIFICATIONS:

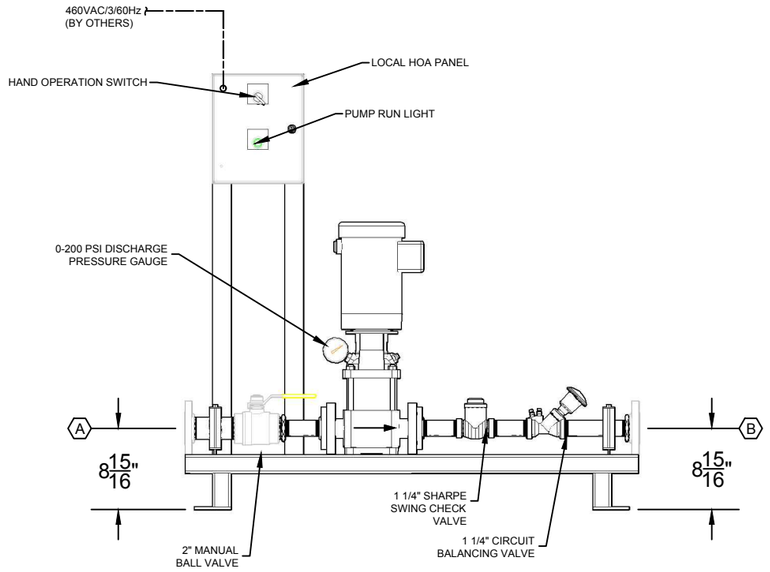
1. GRUNDFOS CR 5-8 VERTICAL CENTRIFUGAL MULTI-STAGE
2. CAST IRON HOUSING
3. 304SS IMPELLER
4. HQQE SHAFT SEAL
5. ANSI FLANGE STANDARD
6. BALDOR 1 HP TEFC MOTOR 115 / 208-230VAC / 3PH / 60Hz
7. 25 GPM @ 212' TDH

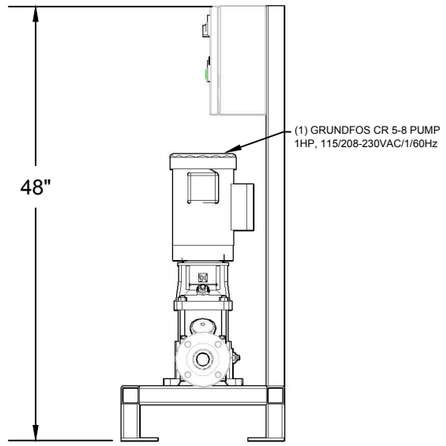
SHIPPING WEIGHT:

1. APPROX 400 LBS









FOR REFERENCE ONLY

REV #	DATE	REVISIONS
1	-	-

AdEdge water technologies
2055 Boggs Rd
Duluth, GA 30096
P. 678-835-0052 F. 678-835-0057
www.adedgetechnologies.com

TP	SERVICE CONNECTIONS	TYPE / MATERIAL
A	SUPPLY PUMP SKID INLET	2" FLANGE, 304SS
B	SUPPLY PUMP SKID OUTLET	2" FLANGE, 304SS

Title: GENERAL ARRANGEMENT

BACKWASH WATER RECYCLE PUMP SKID

Designed by	Checked by	Approved by	Project	Date	Scale
					NTS

Customer: GENERAL ARRANGEMENT

Dwg. File	Rev. Date	Rev.No	Sheet
			1 OF 1

FOR REFERENCE ONLY

DESCRIPTION:

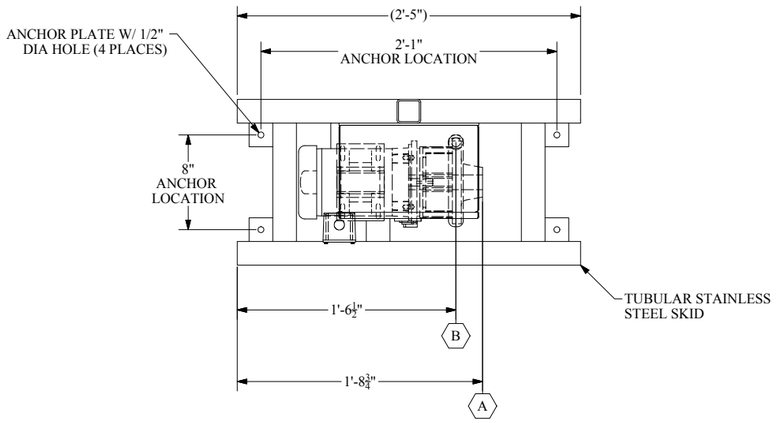
1. SLUDGE PUMP SKID

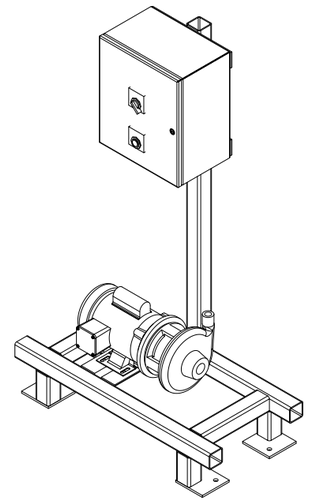
DIMENSIONAL NOTES:

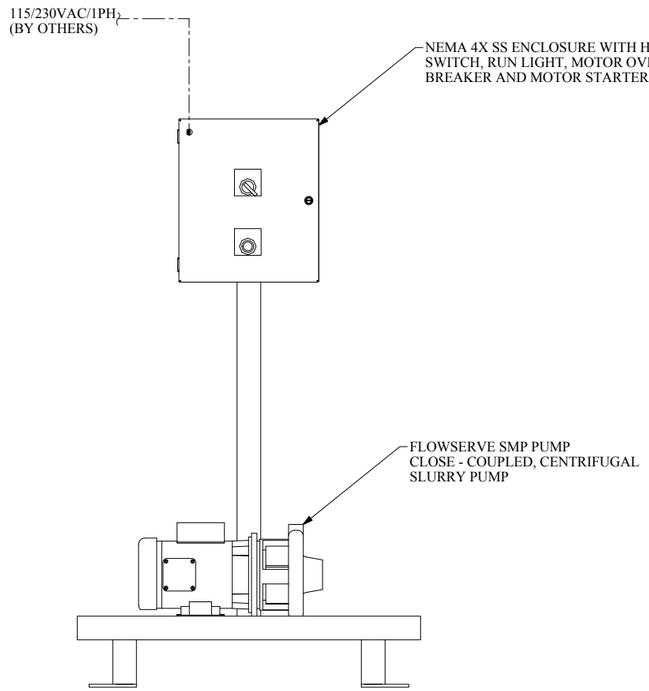
1. ALL DIMENSIONS ARE +/- 2".
2. DO NOT SCALE DRAWING. REFER TO ADEDGE ENGINEERING DEPT FOR ALL DIMENSIONS.
3. (##): REFERENCE DIMENSION

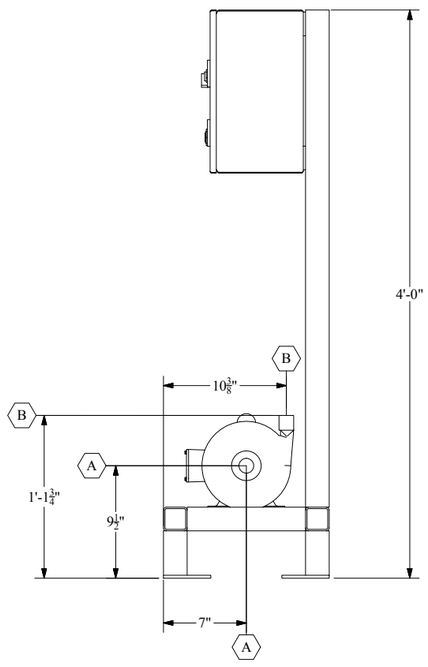
GENERAL SYSTEM SPECIFICATIONS:

1. 304SS TUBULAR SKID FRAME
2. NEMA 4X FIBERGLASS ENCLOSURE FOR ELECTRICAL COMPONENTS
3. 2" FNPT CONNECTIONS
4. PUMP MOTOR: .33 HP, TEFC 115/230VAC/1PH
5. 2" ELECTRICAL ACTUATED BALL VALVE FOR PUMP ISOLATION (SUPPLIED LOOSE)









REV #	DATE	REVISIONS

AdEdge water technologies
2055 BOGGS ROAD
DULUTH, GA 30096
P. 678-835-0052 F. 678-835-0057
www.adedgetechnologies.com

TP	SERVICE CONNECTIONS	TYPE/MATERIAL
A	SLUDGE PUMP INLET	2" FNPT
B	SLUDGE PUMP OUTLET	2" FNPT

Title: GENERAL ARRANGEMENT

SLUDGE PUMP SKID

MODEL: ADE-STPS-20

Drawn by	Checked by	Approved by	Project	Date	Scale
					NTS

Customer
GENERAL ARRANGEMENT

Dwg. File	Rev. Date	Rev. No	Sheet
			1 OF 1

TANK SYSTEM SPECIFICATIONS

STENNER PUMPS

TANK SYSTEM

7.5-Gallon (28.4 Liters)

15-Gallon (56.8 Liters)

30-Gallon (113.6 Liters)

C USA
THIS TANK IS TESTED AND CERTIFIED BY WQA ACCORDING TO NSF/ANSI 61 FOR CONTACT WITH SODIUM HYPOCHLORITE AND WATER ONLY AND NSF/ANSI 372.

Tank System consists of the tank and pump and is built with Classic single head adjustable or fixed, M128 or Econ series.

FEATURES

- Shipped pre-assembled for easy installation and convenience
- Includes rain roof to help protect motor (Classic series only)
- Vertically mounted for solution containment
- Child resistant lid
- Polyethylene construction is lightweight and rugged
  UV resistant gray or translucent white

MATERIALS OF CONSTRUCTION

Tank Polyethylene, approved to NSF/ANSI 61
Lid with child resistant lock Polypropylene
Grommets Viton
Screws Stainless steel

SHIPPING WEIGHT AND BOX DIMENSIONS

Tank Size	Shipping Weight			Box Dimensions
	Classic Adjustable or M128	Classic Fixed	Econ	
7.5-Gallon	18 lbs (8.1 kg)	15 lbs (6.8 kg)	14 lbs (6.4 kg)	23 x 23 x 21 in. (58.4 x 58.4 x 53.3 cm)
15-Gallon	27 lbs (12.3 kg)	25 lbs (11.3 kg)	23 lbs (10.4 kg)	23 x 23 x 27 in. (58.4 x 58.4 x 68.6 cm)
30-Gallon	35 lbs (15.9 kg)	32 lbs (14.5 kg)	31 lbs (14 kg)	23 x 23 x 38 in. (58.4 x 58.4 x 96.5 cm)

PRODUCT DIMENSIONS

- 7.5-Gallon: 20.5 OD x 19.6 in. (52.1 OD x 49.8 cm)
- 15-Gallon: 20.5 OD x 25.3 in. (52.1 OD x 64.1 cm)
- 30-Gallon: 20.5 OD x 37.5 in. (52.1 OD x 95.3 cm)

FSPECSTS 0314

STENNER PUMP COMPANY
Jacksonville, Florida USA
www.stenner.com

TANK SPECIFICATIONS

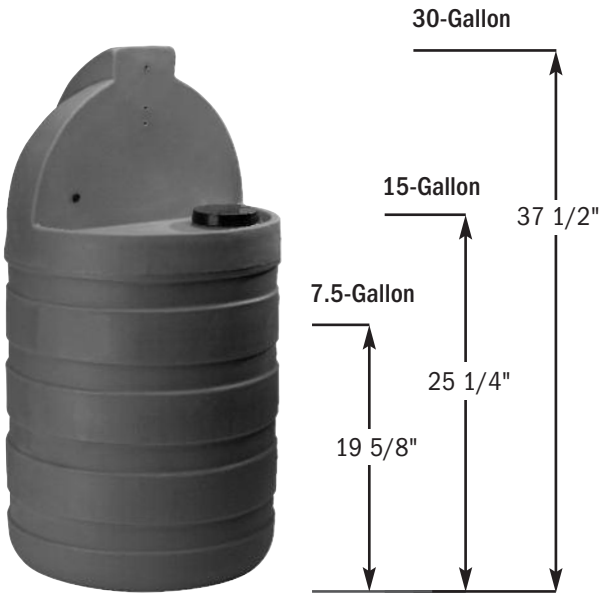
STENNER PUMPS

TANKS

7.5-Gallon (28.4 Liters)

15-Gallon (56.8 Liters)

30-Gallon (113.6 Liters)



C USA
THIS TANK IS TESTED AND CERTIFIED BY WQA ACCORDING TO NSF/ANSI 61 FOR CONTACT WITH SODIUM HYPOCHLORITE AND WATER ONLY AND NSF/ANSI 372.

TANK MODEL NUMBERS

FOR 45, 85 OR ECON* SERIES PUMPS includes screws and grommets

7.5-gallon gray STS7GC	7.5-gallon white STS7NC
15-gallon gray STS15GC	15-gallon white STS15NC
30-gallon gray STS30GC	30-gallon white STS30NC

FOR SVP SERIES PUMPS includes screws and grommets

7.5-gallon gray STS7G-02	7.5-gallon white STS7N-02
15-gallon gray STS15G-02	15-gallon white STS15N-02
30-gallon gray STS30G-02	30-gallon white STS30N-02

MATERIALS OF CONSTRUCTION

Tank Polyethylene, approved to NSF/ANSI 61

Lid with child resistant lock Polypropylene

Grommets Viton

Screws Stainless steel

COLORS

UV resistant gray

Translucent white

DIMENSIONS AND SHIPPING WEIGHT

7.5-gallon 20 1/2 OD x 19 5/8 in. (52.1 OD x 49.9 cm); 9 lbs (4.1 kg)

15-gallon 20 1/2 OD x 25 1/4 in. (52.1 OD x 64.1 cm); 19 lbs (8.6 kg)

30-gallon 20 1/2 OD x 37 1/2 in. (52.1 OD x 95.3 cm); 26 lbs (11.8 kg)

* Econ Series tank mounting kit sold seperately.

FSPECSTS 0314

STENNER PUMP COMPANY
Jacksonville, Florida USA
www.stenner.com

Date: October 4, 2022

To: Mr. Rob Miller, PE
Principal Engineer
Wallace Group
612 Clarion Court
San Luis Obispo, CA CA 93401

Subject: Treatability Testing Proposal – Las Ventanas Ranch Well Site
Well Water Treatment for Fe and Mn Removal

AdEdge Water Technologies, LLC (AdEdge) appreciates the opportunity to assist you with this water treatment need for the Las Ventanas Ranch well site. The purpose of this memo is to propose an outline for some initial small-scale lab treatability work recommended to support the suggested treatment approach to ensure the scale-up success.

Based on the water quality shared with us and contaminants of concern, AdEdge recommends some limited small-scale treatment to consider to finalize the recommended treatment approach for the subject well site. The following water quality has been provided for Well A and Well B.

Water Chemistry

	Parameters			Parameters	
pH	7.85 - 7.77		**Ammonia**	.32 - ND	mg/L NH_3-N
Total Arsenic	.002 - .0007	mg/L As	**Nitrate**	3.0 - 1.1	mg/L NO_3-N
Arsenic (III)		mg/L As(III)	**Sodium**	31 - 33	mg/L Na
Total Sulfides	ND - 2.4	mg/L Total Sulfides	**Chloride**	31	mg/L Cl
Alkalinity	320 - 300	mg/L (as $CaCO_3$)	**Sulfate**	22 - 24	mg/L as SO_4
Bicarbonate	320-300	mg/L (as $CaCO_3$)	**Fluoride**	0.35 -0.38	mg/L F
Hardness		mg/L (as $CaCO_3$)	**Total Dissolved Solids**	660 - 640	mg/L TDS
Calcium	100 - 110	mg/L Ca	**Total Suspended Solids**	ND - ND	mg/L TSS
Magnesium	42 - 45	mg/L Mg	**Gross Alpha**	1.7 - 2.71	pCi/L
Phosphate	.17 - .16	mg/L PO_4	**Combined Radium**		pCi/L Ra 226/228
Silica	28 - 29	mg/L SiO_2	**Uranium**	ND - .0052	mg/L U 238
Vanadium	ND - .005	mg/L V	**Turbidity**	0.1 - 0.1	NTU
Iron	ND - ND	mg/L Fe	**Temperature**		°F
Manganese	.33 - .056	mg/L Mn	**Dissolved Oxygen**	9.2 - 9.1	mg/L DO
TOC	ND - 13	mg/L TOC	**Chromium VI**	ND - ND	mg/L Cr(VI)

While an iron and manganese treatment approach can be routine, there are certain water quality parameters that can interfere or inhibit the treatment process or can form secondary water quality concerns. For this water quality, as noted above, there is a very high level of naturally occurring organics in the water measured as Total Organic Carbon (TOC) as well as ammonia and small amount Turbidity that are above what is normally present in groundwater.

Background and Treatment Goals:

1. The overall Goal is for AdEdge to confirm the proposed treatment approach to provide reliable Fe and Mn reduction using our direct oxidation / filtration process to below MCLs (< 0.05 mg/L Mn, < 0.3 mg/L Fe)
2. Chlorine is typically the preferable oxidant to use, but secondary issues can result with the reaction of chlorine with naturally occurring organics in the water to form disinfection by products (DBPs) which are manifested as total Trihalomethanes (TTHM) or Haloacetic acid compounds (HAA5) above the primary MCL for drinking water.
3. There is a notable level of ammonia and very high levels of TOC in this water and high chlorine demand and potential for interferences are likely for oxidizing and removing the iron and manganese.
4. Experiments will be conducted to consider the potential interference of the TOC and ammonia in the process and to consider overall oxidant demand with chlorine.
5. Other aesthetic (and non-health related) concerns with the proposed treatment should be evaluated (i.e., adding chlorine to high TOC water may enhance color as an example).
6. It may be necessary to utilize a flocculant in addition to an oxidant for effective and reliable contaminant removal. Less chemical is naturally preferred for the process.

Treatability Plan Outline

The various steps of the small-scale treatability include the following:

1. Analyze the incoming (received) sample for total Fe, total Mn, pH, Ammonia, Silica, TOC, UVT, and Color.
2. Determine the total chlorine demand of the raw sample (in mg/L) to achieve a free chlorine residual of 1 mg/L for subsequent DBP testing.
3. Use the optimal chlorine oxidant run and filter the sample with a 10-um disk filter and vacuum funnel and analyze for total and dissolved Iron and Manganese before and after filtration.
4. Measure ORP, UVT, and Color of the raw sample before oxidant addition and after oxidation and filtration with the oxidant.
5. In the optimized chlorine oxidant sample that achieves the best iron and manganese removal (and exhibits a free chlorine residual above 1 mg/L for 24 hours. Test Disinfection byproduct formation at 3, and 5 days. Grab the samples and put into the lab sample bottles (with preservative) at the intervals so it captures that time (with no further reactions) and submit the samples to the lab for TTHM and HAA5 analyses, analyze for disinfection by products (TTHM and HAA5).
6. Repeat the experimental steps 2-5 above with an appropriate dose of an alternate oxidant, Potassium Permanganate (KMnO4).
7. If excellent removal of total iron and total manganese well below the MCL is not achieved in either of the oxidants above, conduct trials with selected flocculants and range of doses to determine if such an additive significantly improves the removal of iron and manganese through the 10-micron disc filter compared to the baseline results with oxidant only.
8. No backwash recycling shall be utilized on this site, so settling and filtrate evaluation are not relevant.
9. Tabulate the data and prepare a summary report of results with recommendations from the jar testing and filtration.
10. Verify the key design parameters needed for the 100-gpm treatment system to be deployed in the full-scale.

Facility / Shipping

AdEdge will utilize a partner subcontract laboratory for this treatability work. All work will be directed by and performed under instructions from AdEdge's Chief Technology Officer, Greg Gilles. A 5-gallon representative sample of the well water shall be obtained from the source water to be treated and shipped under a chain of custody to the following location:

KROFF
Attention: Mr. Jacob Very
2301 Buss Avenue
Building 1A Suite 34
Ambridge, PA 15003

Schedule
Upon receipt of the 5-gallon representative samples from both Well A and Well B, the lab treatability work including the analytical can be completed in approximately 2-3 weeks. Preliminary results will be shared as they become available.

Report
Upon receipt of the results from the lab, AdEdge will provide a short summary writeup of the results with recommendations for the treatment process. AdEdge will also revisit the current full-scale treatment proposal and technical approach and adjust or make recommendations for modification as needed. All results will remain confidential between the parties and shall not be shared without permission.

Responsibility Matrix and Costs
The following summarizes the Scope of Work division for the two activities along with the associated costs:

Task	***Responsibility***	***Comments***
Treatability Testing objectives and outline	*AdEdge*	*TBD*
Obtain representative water sample and ship to the designated laboratory provided	*Wallace Group*	*5-gallon sample*
Conduct testing and lab work	*AdEdge*	*Kroff Labs*
Summary of Findings with Recommendations	*AdEdge*	*Summary of results*
Proposal modifications for full scale	*AdEdge*	
Treatability Costs	***$ 13,000 USD***	***For Well A & Well B***

Terms and Conditions

- Invoice of 100% on completion of the treatability work and summary report.
- Amount Due Net 30 after receipt of the treatability report
- Sales taxes or end use taxes (if applicable) are excluded; applicable taxes will be added to invoicing.
- Contract is subject to credit approval.

Project Authorization

Work will proceed upon receipt of an authorized signature below. With both Parties endorsement below, the customer and AdEdge agree that the scope of work, price, and terms of this proposal are acceptable to both Parties, and work is authorized to proceed.

Wallace Group ***Client: Las Ventanas Ranch Mutual Water Co***	**AdEdge Water Technologies**
_____ Signature	_____ Signature
Robert S. Miller, PE _____ Printed Name	_____ Printed Name
General Manager _____ Title	_____ Title

PO #: