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**MEMORANDUM**

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**TO:** MS. KAT MCCARVY, EPCHD

**FROM:** ALEX EWERS, P.E.

**SUBJECT:** MONUMENT GLAMPING I

**DATE:** AUGUST 30<sup>TH</sup>, 2024

**CC:** MR. KEVIN BOLINSKY

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Ms. McCarvy,

3 Rocks Engineering and Surveying (“3 Rocks”) has been hired by Mr. Chris Jeub of Monument Glamping I, located at 16315 Rickenbacker Ave, Monument, CO 80132 to provide consultation regarding their existing Onsite Wastewater Treatment System (OWTS). The design that was permitted was originally completed by Geoquest, LLC (Appendix A). 3 Rocks has reviewed the following: EPCPH OWTS Regulations, The State of Colorado Regulation 43, the previous consultant’s design. Below are 3 Rocks’ findings:

1. The design flow assigned for Monument Glamping I by Geoquest, LLC was 1,200 GPD.
2. The appropriate design flow is 50 GPD per glamping tent according to Table 6-2 of the EPCPH OWTS Regulation as opposed to a residential wastewater hydraulic load of 75 GPD per capita.
3. The previous design was for 8 glamping units, which results in a design flow of 400 GPD for the entire facility.
4. The developer of the property proposes to add 4 glamping tents and combine the existing 4-bedroom residence within the property to this existing OWTS to bring this property into compliance concerning the WQSA State Policy 6.
5. The total proposed design flow is as follows:

	Design Flow (GPD)	Amount	Design Flow
(8) Existing Glamping Units	50	8	400
(4) Proposed Glamping Units	50	4	200
Existing 5 Bedroom Residence	525	1	525
		Total Design Flow	1125 GPD

6. According to this information, the OWTS’ proposed design flow remains under 1,200 GPD. Therefore, 3 Rocks recommends **that no amendments or repairs be required for the** proposed additions to the existing OWTS.

As with other facilities, 3 Rocks recommends that the maximum month average daily flow is recorded for the Client's benefit and to verify compliance with the regulating documents. 3 Rocks provides no expressed guarantee concerning the soils evaluation and design of the previous consultant or the installation of the OWTS.

Best regards,



*Pablo Bolaños, Civil E.I.T.*

**Pablo Bolaños**

*Civil E.I.*

pablob@3rocksenineering.com

719.465.0518



**Alex Ewers, PE, CFM**

*Civil Engineer, Owner*

[alexe@3rocksenineering.com](mailto:alexe@3rocksenineering.com)

719.430.5333

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# Appendix A

## Cover Page

### CALCULATIONS (New OWTS):

Multi-Family Camping Site  
 Up to 4 Plumbed "Premium" Campsites (2 Occupants/Site)  
 Bathhouse Serving up to 4 "Off-Grid" Campsite (2 Occupants/Site)  
 n=16 Occupants  
 q=75 GPD/Occupant

**NO SEWER CONNECTION FOR AGRICULTURAL BARN.**

**LTAR = 0.50 Gallons per Day per Square Foot (GPD/SF).  
 USDA Soil Type 2A per Profile Pit 2/4/2022.**

$Q = (16 \text{ Occupants})(75 \text{ GPD/Occupant})$   
 $Q = 1,200.0 \text{ GPD}$

$$A = \frac{Q}{\text{LTAR}} = \frac{1,200.0 \text{ GPD}}{0.50 \text{ GPD/SF}}$$

$A = 2,400.0 \text{ SF}$

Gravity Fed Chamber Beds:

$A = (2,400.0 \text{ SF})(1.2)(0.7)$

$A = 2,016.0 \text{ SF Required}$

### CHAMBER BED SYSTEM (Gravity Fed):

Infiltrator Systems Inc. Quick 4 Standard Chambers  
 # Chambers = SF RQD / 12.0 SF per Chamber  
 # Chambers = 2,016.0 SF / 12.0 SF = Min. 168 Chambers  
 Install 2 Zones: 4 Rows x 21 Chambers Long  
 # Chambers Provided = 168 Total  
 Total Contact Area = 2,016.0 SF Actual  
 Total Contact Area = 2,016.0 SF Required

Note: Use of Alternative Chambers is Acceptable.  
 For ARC 36 Standard Chambers (15.0 SF / Chamber, Min. 135  
 Chambers). Install 2 Zones with 4 Rows of 17 Chambers (136  
 Total). Contact Engineer for Clarification.

### MAXIMUM DEPTH:

**48" As Measured on the Up-Hill Side of the Excavation**

### TANK SIZES:

Minimum Tank Capacity = Min. 2,500 Gallons. USE 1,500 Gallon (One-Compartment)  
 + 1,000 Gallon (One-Compartment). EPCPH Approved Effluent Filter on Outlet.  
 Lift Station = 1,000 Gallon (Two-Compartment) + 500 Gallon Pump Chamber.

Geoquest, LLC. has Provided this Design in Accordance with the Standards of Practice Common to the Area. However, as with All Underground Absorption Fields, Guarantee from Failure is Impossible. Even with Proper Installation, as Outlined for this Proposed Construction, There Can Remain Many Uncertainties, and Difficulties Can Still Arise in the Operation of the System in the Future. Proper Design, Construction, and Maintenance can Assist in Minimizing Uncertainties, but Cannot Entirely Eliminate Them. Homeowners Should be Advised of Maintenance and Special Considerations for Septic Systems. Refer to El Paso County Public Health Brochure: "Maintaining Your Septic System" for Additional Information. Due to the Possibility of Unknown Water Usage Factors, Geoquest, LLC. Provides No Warranty of this Design or Installation Against Failure or Damage of Any Type. Therefore, the Limits of Liability Extend Only to the Fee Rendered for the Professional Services Provided.

### INSPECTIONS REQUIRED ARE AS FOLLOWS:

- 1.) Engineer Will Inspect the Installation of All OWTS Components (i.e. All Plumbing, Tanks, Pump Chamber, STA, etc.) Prior to Backfill.
- 2.) Engineer to Inspect the Soil Treatment Area After Backfill to Insure Min. Cover and Proper Drainage Away from Soil Treatment Area. Please Notify this Office Min. 24 Hours Prior to Inspection.

### PIPE NOTES:

Provide 2.0% Min. Grade on Pipe to Septic Tank. Provide 2.0% Min. Grade on Pipe to the Soil Treatment Area.

All Bends Limited to 45 Degree Ells or Long Sweep Quarter Bends. Areas Under Driveways Shall Be Protected as Per El Paso County Health Department Regulations.

Building Sewer Clean-Outs Shall Be Installed within 5 FT of the Structure and at Intervals Not to Exceed 100' in Straight Runs and When the Cumulative Change in Direction Exceeds 135 Degrees.

### FINAL GRADING NOTES:

Soil Treatment Area Shall Be Crowned and Covered with a Minimum of 6" of Select Topsoil to Provide a Base for Good Vegetative Cover.

Contact Soil Conservation Service or County Extension Agent for Vegetation Best Suited for the Area. Grasses are Best. Trees and Shrubs May Damage/Block Pipes. Vegetation Shall Be Maintained and Mowed to Prevent Formation of Bio-Matting. Do Not Pave Over the Soil Treatment Area.

Provide Drainage Swale Around Uphill Side of the Soil Treatment Area.

### HOMEOWNER RESPONSIBILITY:

- Have Septic Tank Pump Every 3-5 Years (or As Needed, Contact Licensed Pumper)
  - Have OWTS Inspected Annually
    - Clean Effluent Filter
    - Check Water Levels in Inspection Ports
  - Plant Native Grass Over STA (No Plants with Roots or that Require Irrigation)
  - Don't Pour Chemicals Down Drain
  - Don't Throw Trash in Toilet (Minimize Toilet Paper Consumption)
  - Use of Garbage Disposal is Discouraged
  - Conserve Water and Repair Leaking Fixtures
- This is NOT a Complete List (Contact Local Health Department and EPA List of Septic "Do's and Don'ts")

### GENERAL NOTES:

All Work per El Paso County Board of Health Regulations Chapter 8: On-Site Wastewater Treatment Systems (OWTS) Criteria.

All Setbacks Shall Conform to El Paso County Regulations (See Table 7-1 in the Regulations for Additional Information). Contractor/Homeowner Must Verify All Setbacks and Obtain Utility Clearances Prior to Construction.

Contractor/Homeowner is Responsible for Permit. Contractor/Homeowner Must Obtain Approval of Engineered OWTS from the El Paso County Health Department.

All Bends Limited to 45 Degree Ells or Long Sweep Quarter Bends. Areas Under Driveways Shall Be Protected as Per El Paso County Health Department Regulations.

Building Sewer Clean-Outs Shall Be Installed within 5 FT of the Structure and at Intervals Not to Exceed 100 FT in Straight Runs, Upstream at Each Change of Direction Greater Than 45°, and at Any Combination of Bends Greater Than 45° within a 40 FT Section of Building Sewer.

Grade Surrounding Area to Drain Away from the Soil Treatment Area (STA).

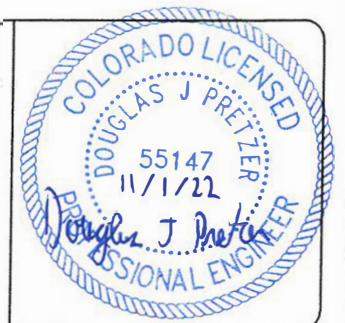
**Paving, Planting of Trees/Shrubs, Irrigation, Vehicular Traffic or Hoofed Animal Traffic of Any Kind Over the STA may Cause Premature Failure and is Prohibited.**

**Refer to Sheet 2, 3, 4, and 5 for Additional Details and Information.**

**GEOQUEST, LLC.**

5072 LIST DRIVE  
 COLORADO SPRINGS,  
 COLORADO 80919

OFFICE: (719) 481-4560



Project: 22-0086	<b>Project Name and Address</b>
Sheet: 1 of 5	Christopher Jeub
Date: 7 Mar 2022	16315 Rickenbacker Avenue
Revised: 1 Nov 2022	Lot #2, Block #1,
Drawn by: djp	Vans Subdivision,
Checked by: djp	Sch. No. 7127001011
	El Paso County, Colorado



**CHAMBER BED SYSTEM (Gravity Fed):**

Infiltrator Systems Inc. Quick 4 Standard Chambers  
 # Chambers = SF RQD / 12.0 SF per Chamber  
 # Chambers = 2,016.0 SF / 12.0 SF = Min. 168 Chambers  
 Install 2 Zones: 4 Rows x 21 Chambers Long  
 # Chambers Provided = 168 Total  
 Total Contact Area = 2,016.0 SF Actual  
 Total Contact Area = 2,016.0 SF Required

Note: Use of Alternative Chambers is Acceptable.  
 For ARC 36 Standard Chambers (15.0 SF / Chamber, Min. 135 Chambers). Install 2 Zones with 4 Rows of 17 Chambers (136 Total). Contact Engineer for Clarification.

1060 Gal. Two-Compartment Infiltrator Septic Tank. Inlet Approx. 24" Below Existing Grade. Risers to Grade. Install EPCPH Approved Effluent Filter on Outlet (Requires Regular Maintenance). PLUS 540 Gal Infiltrator Pump Chamber. See Pump Chamber Detail on Page 5. Inlet Approx. 30" Below Existing Grade. Exact Location to be Field Determined.

2"Ø Sch. 40 PVC from Pump Chamber to Main Septic Tank. Install Air Relief Valve at the Highest Point in the Line from Pump to Tank. Transition to 4"Ø Sch. 40 PVC Before Inlet to Main Septic Tank. See Page 5 for Detail.

1530 Gal. One-Compartment Infiltrator Septic Tank PLUS 1060 Gal. One-Compartment Infiltrator Septic Tank w/ EPCPH Approved Effluent Filter on Outlet (Requires Regular Maintenance). Inlet Approx. 24" Below Existing Grade. Risers to Grade with Secure Access Cover (Water Tight, Min. 3" Above Finish Grade, Typ. All Septic Tank Access Locations). Exact Location to be Field Determined.

Minor Rotation or Curvature (ie. Less Than 15°) of the Soil Treatment Area (STA) Beds to Best Fit the Site Topography is Acceptable (i.e. Parallel to Site Contours). STA shall Maintain the Approximate Orientation Shown w/ Respect to Buildings and Lot Lines. Contact Engineer for Clarification.

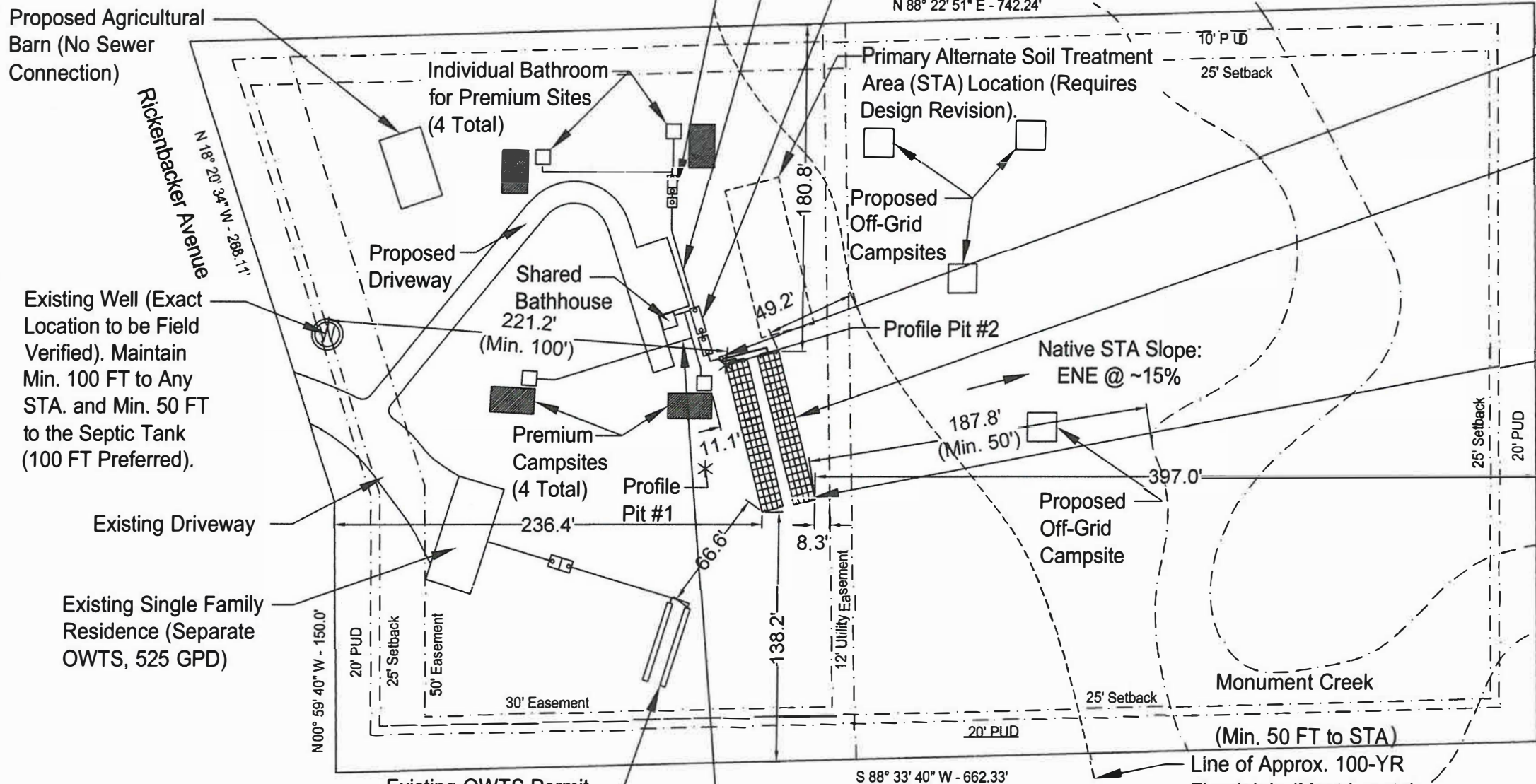
Install Drainage Swale Between the House and Soil Treatment Area to Ensure Surface Runoff is Diverted Around the STA. Downspouts near the STA Shall Discharge into the Swale or Extended Beyond the STA.

Distribution Box w/ Speed Levelers to Ensure Equal Distribution. Install a Secure Access Riser to Grade to Allow for Future Speed Leveler Adjustment.

**Quick4 Plus Standard Chambers:**  
 34" W x 48" L x 12" H Each  
 2 Zones: 4 Rows x 21 Chambers Long (168 Total).  
**Max. Depth of Installation 48" Below Native Grade (As Measured on the Uphill Side).** See STA Layout and Cross-Section for Additional Detail and Clarification.

Inspection Port / Vent at Each Corner of Each Bed (Typ. of 8 Total). See Detail on Page 3 for Additional Information.

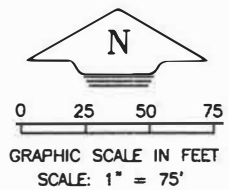
OWTS to be Roped Off (Caution Tape or Temporary Construction Fencing is Acceptable) Prior To and During Construction to Prevent Construction Traffic from Compacting Surface Soils and Protect the STA from Traffic After Installation.



\* Indicates Geoquest, LLC. Profile Pit Test Locations  
 Location from Northwest Lot Corner to Profile Pit #1: S. 45° E. - 346'  
 Location from Profile Pit #1 to Profile Pit #2: N. 12° E. - 60'  
 GPS Coordinates Profile Pit #1: N. 39° 04' 5.0", W. 104° 52' 28.9"  
 GPS Coordinates Profile Pit #2: N. 39° 05' 5.5", W. 104° 52' 28.8"

4" Ø Sch. 40 PVC Solid Pipe from Each Bathroom to the Septic Tank, with Cleanouts within 5 FT of Each Structure and at Intervals Not to Exceed 100 FT in Straight Runs, Upstream at Each Change of Direction Greater Than 45°, and at Any Combination of Bends Greater Than 45° within a 40 FT Section of Building Sewer. Maintain 2.0% Min. Grade on Pipe Feeding the Septic Tank. When Pipes Merge Use Sanitary Tee or Wye Fittings.

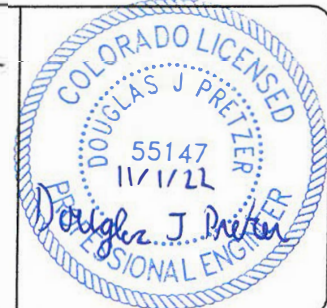
**Site Plan**



**GEOQUEST, LLC.**

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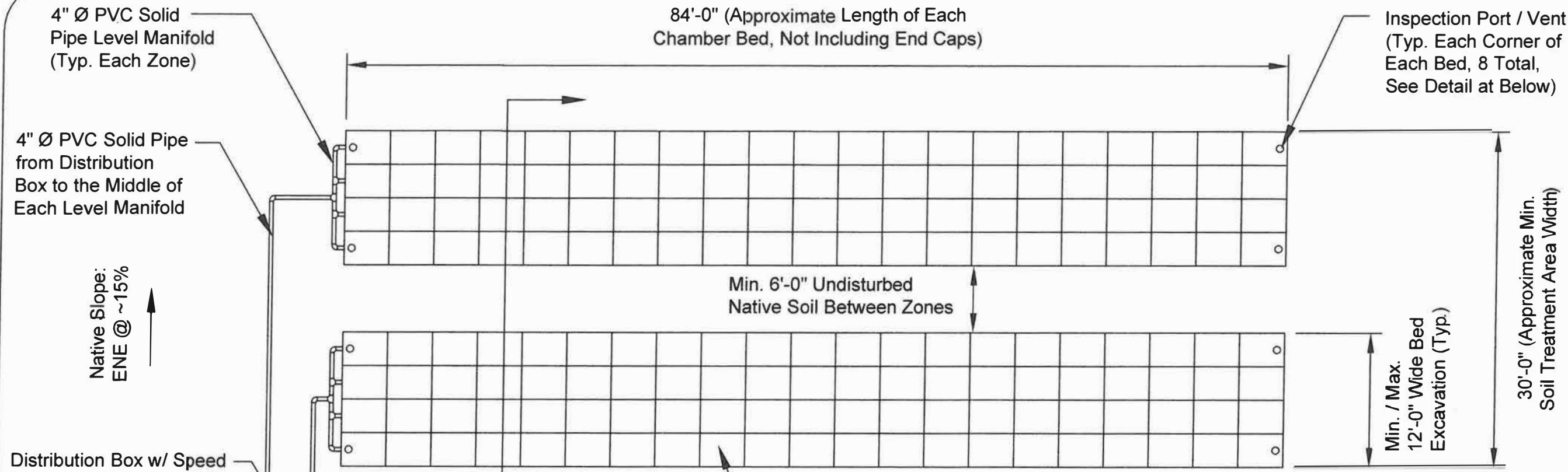
OFFICE: (719) 481-4560



Project: 22-0086
Sheet: 2 of 5
Date: 7 Mar 2022
Revised: 1 Nov 2022
Drawn by: djp
Checked by: djp

Project Name and Address
Christopher Jeub 16315 Rickenbacker Avenue Lot #2, Block #1, Vans Subdivision, Sch. No. 7127001011 El Paso County, Colorado





Distribution Box w/ Speed Levelers to Ensure Equal Distribution. Install a Access Riser or Sprinkler Box to Grade to Allow for Future Speed Leveler Adjustment.

4" Ø PVC Solid Pipe from Septic Tank to Distribution Box

See STA Cross-Section Detail on Page 4 for Additional Information and Clarification.

**Quick4 Plus Standard Chamber Modules**  
 34" W x 48" L x 12" H Each (Typ.)  
 Install 2 Beds: 4 Rows x 21 Chambers Long (168 Total Chambers)

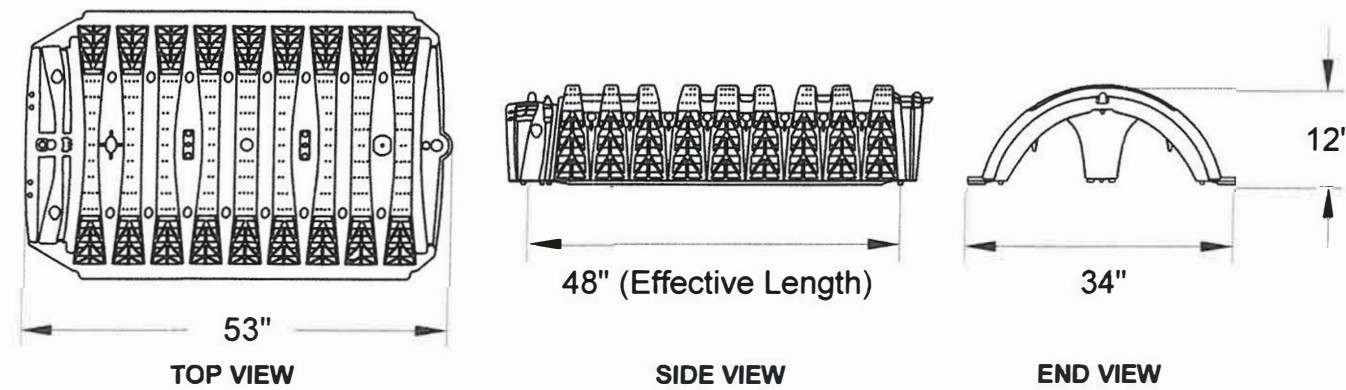
Note: Use of Alternative Chambers is Acceptable.  
 For ARC 36 Chambers (15.0 SF / Chamber, Min. 135 Chambers)  
 Install 2 Beds: 4 Rows x 17 Chambers Long (136 Total Chambers).  
 Contact Engineer for Clarification.

**Special Note:** STA Layout Illustrates the General Design Layout. Minor Rotation or Curvature (ie. Less Than 15°) of the Soil Treatment Area (STA) Beds to Best Fit the Site Topography is Acceptable.

Note: Min. 6 FT Undisturbed Native Soil Between Zones. Each Bed Shall be Level End to End and Side to Side. Step Beds as Required by Native Slope. Max. 4 FT to the Bottom of the Chambers from Finished Grade as Measured on the Uphill Side of Each Chamber Bed.

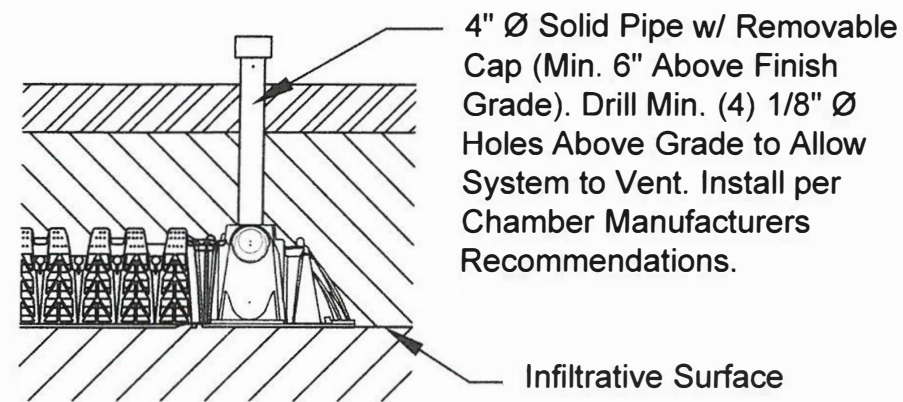
### Soil Treatment Area (STA) Layout (Chamber Beds)

SCALE: 1" = 10'



### Quick 4 Plus Standard Details

Not to Scale



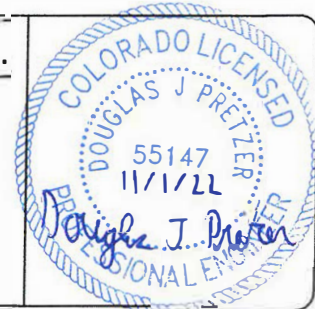
### Inspection Port / Vent Detail

Not to Scale

### GEOQUEST, LLC.

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 El Paso County, Colorado



Provide Min. 12" (36" Max.) Cover Over Top of Chambers with Min. 6" Topsoil. Install a Continuous Crowned Slope Over All Chamber Beds to Prevent Ponding of Precipitation. It is Acceptable to Cover Each Bed Individually if Desired. Special Care Shall be Taken to Grade the Area Between Beds to Prevent Ponding of Precipitation.

Provide Positive Drainage Swale on Uphill Side to Divert Surface Precipitation Runoff Around the Soil Treatment Area (Min. 2% Grade)

30'-0" (Approximate Min. Soil Treatment Area Width)

Min. 6'-0" Undisturbed Native Soil Between Chamber Beds

Min. / Max. 12'-0" Wide Excavation for Each Bed (Typ.)

Max. 48" from Native/Finished Grade (24" to 36" Preferred) as Measured on the Uphill Side of the Each Zone to Maintain 48" from Groundwater Evidence @ 86"

Plant w/ Native Grasses and Maintain (See Notes)

Native Slope: ENE @ ~15%

Roughen Sidewall Surface to Eliminate Bucket Smear (Typ. All Sides of Each Excavation)

Remove All Native Topsoil within STA Footprint and Stockpile for Re-Use (Approx. 4" Native), then Remove Approx. 20"-32" Native Material in the Area Each Chamber Bed. Scarify Bottom of Each Bed and Eliminate Bucket Smear on All Excavation Sidewalls (Prior to Placing Chambers, Typ. Each Bed). Max. 48" to the Bottom of the Chambers from Finished Grade as Measured on the Uphill Side of Each Chamber Bed.

Step Beds as Required by Native Slope. Chambers Shall be Set Level in Each Bed.


Quick4 Plus Standard Chamber Modules  
34" W x 48" L x 12" H Each (Typ.)


Install 2 Beds: 4 Rows x 21 Chambers Long (168 Total Chambers)


Note: Use of Alternative Chambers is Acceptable.  
For ARC 36 Chambers (15.0 SF / Chamber, Min. 135 Chambers)  
Install 2 Beds: 4 Rows x 17 Chambers Long (136 Total Chambers).  
Contact Engineer for Clarification.

### Soil Treatment Area (STA) Cross-Section (Chamber Beds)

Not to Scale

 Topsoil (Min. 6" on Final Cover)  
Native Topsoil (Approx. 4", Remove All from STA Footprint and Stockpile for Re-Use on Final Cover)

 Approved Material to Provide Cover (Min. 12", Max. 36" Total, Including Topsoil)

 Native Soil - Sandy Loam (USDA 2A, Approx. 4" - 8' Below Existing Grade)

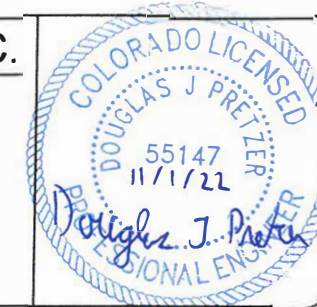
Note: Min. 6 FT Undisturbed Native Soil Between Zones. Each Bed Shall be Level End to End and Side to Side. Step Beds as Required by Native Slope. Max. 48" to the Bottom of the Chambers from Finished Grade as Measured on the Uphill Side of Each Chamber Bed.

Special Note: STA Layout Illustrates the General Design Layout. Minor Rotation or Curvature (ie. Less Than 15°) of the Soil Treatment Area (STA) Beds to Best Fit the Site Topography is Acceptable.

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OFFICE: (719) 481-4560



Project: 22-0086

Sheet: 4 of 5

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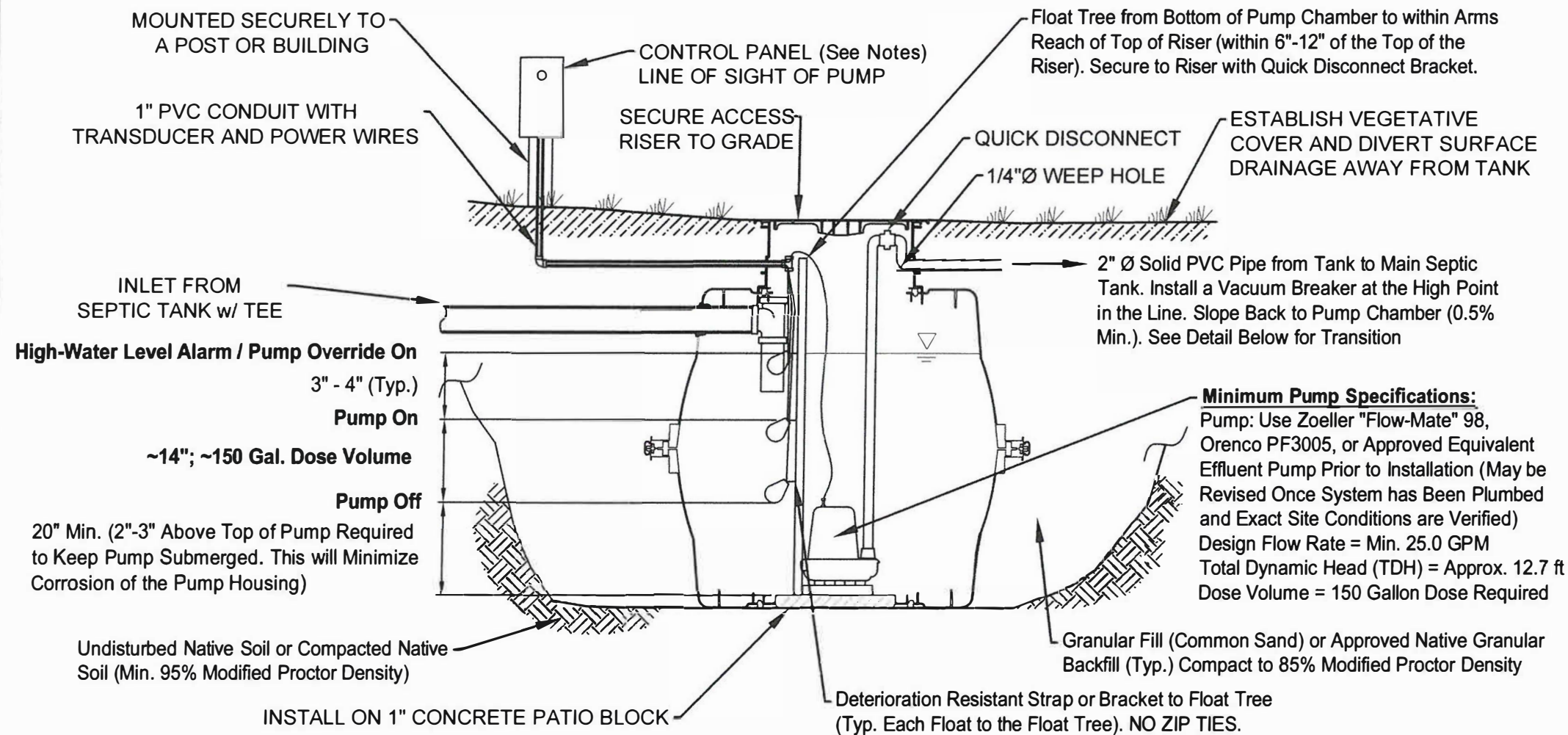
Drawn by: djp

Checked by: djp

Project Name and Address

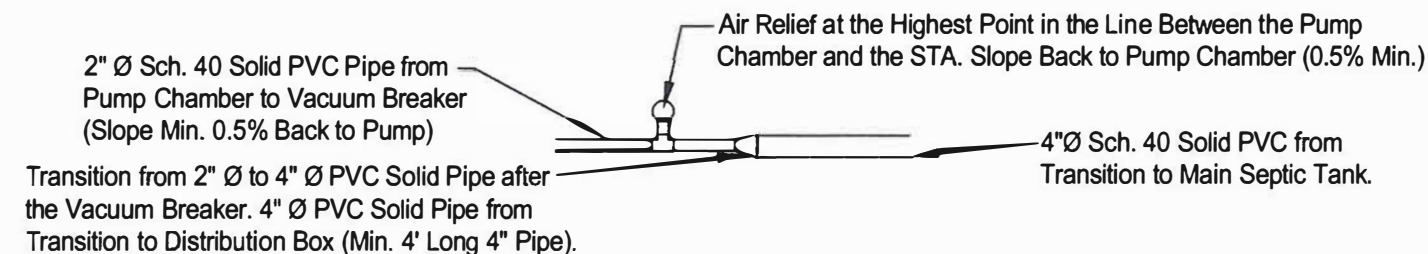
Christopher Jeub  
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Vans Subdivision,  
Sch. No. 7127001011  
El Paso County, Colorado





### IM-540 Pump Chamber Cross Section

Not to Scale



### Transport Pump Transition Detail

Not to Scale

**Electrical Code Requirements:** All Electrical Work, Equipment, and Material Shall Comply with the Requirements of the Currently Applicable National Electrical Code as Designated by the State Electrical Board Rules and Regulations (3 CCR 710-1) on the Date of the Permit. The Electrical Installer Shall Contact the Electrical Inspector for the Location where the OWTS is Constructed. All Electrical Components Shall be Protected from Moisture and Corrosive Gases. Special Care Shall be Taken to Ensure the Electrical Requirements of Each Component Meet Manufacturer Specifications (i.e. Voltage and Amperage).

1. All Wire Splices Shall be Enclosed in a National Electrical Manufacturers Association (NEMA) 4x Splice Box OR Control Panel. The Splice Box or Control Panel Shall be Placed in an Accessible Location Positioned Outside of the Tank Riser.
2. All Wires Shall be Spliced with Corrosion-Resistant, Watertight Connectors. **NO WIRE SPLICES ARE ALLOWED WITHIN THE PUMP CHAMBER OR RISER.**
3. Conduits Shall be Sealed to Prevent Gases from Entering the Splice Box or the Control Panel (if System is so Equipped) and Electrical panel.
4. A Means to Disconnect the House Power Supply to OWTS Components Shall be Provided at the Splice Box or at the Pump Control Panel (if System is so Equipped).
5. The Branch Circuit Wire from the Building to the Splice Box or Control Panel Shall be a Minimum of 24" Below the Ground Surface. Lines Buried Less than 24" are Allowed, but Will be Required to be in Conduit or have Ground Fault Protection on the Circuit. Conduit from the Splice Box or Control Panel to the House is Strongly Recommended for All Wiring.

6. Conduit Risers for Physical Protection Must Extend Min. 18" Below Finish Grade.

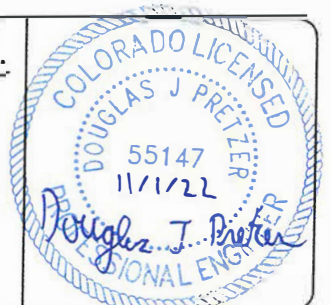
**Best Practices Guidelines:** The Following "Best Practices" are Intended to Facilitate Maintenance and Servicing of the Electrical Components Associated with Lift Stations, Dosing Systems, and Treatment Units that are Part of an OWTS.

1. The "Quick Disconnect" for the Pump Discharge pipe (i.e. Union) Shall be Located within 6"-12" of the Top of the Riser(s). Electrical Lines at the Septic Tank, Dosing Tank, or Treatment Unit Must be Placed in such a Manner as to Protect them from Damage During Backfill. Conduit from the Splice Box or Control Panel to the House is Strongly Recommended for All Wiring.
2. The Floats Shall be Secured to a Separate Float Tree with Approved Connecting Straps or Brackets that will Remain Secure Underwater and Not Deteriorate. Electrical Tape is Not Acceptable. Top of Float Tree to be within 6" - 12" of the Top of the Lift Station, Dosing System Tank or Treatment Unit Riser.
3. If a Separate Riser is Used, it Shall be Secured to the Tank to Maintain the Riser in an Upright and Plumb Position.
4. Control Panels, if Used, Shall be Placed within "Line of Sight" of the Pump.
5. The Alarm, Pump Control Floats, and Pump Shall be Placed on a Separate Dedicated Circuits

**GEOQUEST, LLC.**

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**CONTROL PANEL AND ALARM: A Manual Pump Run Switch is Required. A Control Panel is the Most Common Device to Fulfill these Requirements (as well as the Alarm System). We Recommend the use of the Orenco MVP, Aquaworkx IPC, SJE-Rhombus or Approved Equivalent Control Panel Equipped with a Manual Pump Run Switch. Engineer to Approve Prior to Installation.**

Project: 22-0086  
 Sheet: 5 of 5  
 Date: 1 Nov 2022  
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