

Cover Page

CALCULATIONS (New OWTS):

Proposed Guest House
Residence with 2 Bedrooms

**LTAR = 0.30 Gallons per Day per
Square Foot (GPD/SF). USDA Soil
Type 3A per Profile Pit Evaluations 6/6/2020
Ground Water Encountered at 64" and 96"
Below Existing Grade**

$Q = (2 \text{ BDRM})(150 \text{ GPD})$
 $Q = 300.0 \text{ Gallons per Day (GPD)}$

$$A = \frac{Q}{\text{LTAR}} = \frac{300.0 \text{ GPD}}{0.30 \text{ GPD/SF}}$$

$A = 1,000.0 \text{ SF}$

Uniformly Pressure Dosed Chamber Bed:
 $A = (1,000.0 \text{ SF})(1.0)(0.7)$
 $A = 700.0 \text{ SF Required}$

CHAMBER BED SYSTEM (Uniformly Pressure Dosed):

Infiltrator Systems Inc. Quick 4 Plus Low-Profile Chambers
Chambers = SF RQD / 12.0 SF per Chamber
Chambers = 700.0 SF / 12.0 SF = Min. 59 Chambers
Install 1 Zone: 4 Rows x 15 Chambers Long
Chambers Provided = 60 Total
Total Contact Area Actual = 720.0 SF
Total Contact Area Required = 700.0 SF

Note: Use of Alternative Chambers is Acceptable.
For ARC 36 Chambers (15.0 SF / Chamber, Min. 47 Chambers).
Install 1 Zone: 4 Rows of 12 Chambers (48 Total). Contact
Engineer for Clarification.

INSPECTIONS REQUIRED ARE AS FOLLOWS:

- 1.) Engineer to Inspect Excavation Prior to Placement of Approved Sand Fill.
 - 2.) Engineer Will Inspect the Installation of All OWTS Components (i.e. All Plumbing, Tanks, Pump Chamber, STA, etc.) Prior to Backfill.
 - 3.) 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.

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.

TANK SIZES:

Main Tank Size = Min. 1,000 Gallons (Two-Compartment)
Pump Chamber = Min. 500 Gallons (See Pump Chamber
Detail on Page 5 for Additional Information).

IMPORTED SAND SPECIFICATION (See Page 3 and 4):

Sand for Soil Treatment Area Absorption Bed to be Imported

"Preferred" Sand Media:
Effective Size (D10) = 0.25-0.60 mm
Coefficient of Uniformity, Cu (D60/D10) \leq 4.0
Note: 100% Passing #4 Sieve
Less Than 3% Passing #200 Sieve

"Secondary" Sand Media:
Effective Size (D10) = 0.15-0.60 mm
Coefficient of Uniformity, Cu (D60/D10) \leq 7.0
Note: 100% Passing #4 Sieve
Less Than 3% Passing #200 Sieve

Note: ASTM C-33 w/ Less Than 3% Fines Generally Meets
"Secondary" Sand Media Requirements.

Gradation Curve of the Sand Media Used MUST be Provided to
Engineer Prior to Installation. Gradation Must be Dated No More
Than One Month Prior to Installation Date.

HOMEOWNER RESPONSIBILITY:

- Maintain Active Service Contract w/ Licensed Operation & Maintenance Contractor per EPCHD Regulations
- Have OWTS Inspected Annually (Service Contract)
 - Clean Effluent Filter
 - Flush Laterals
 - Function Test Valve Assemblies
 - Check Water Levels in Inspection Ports
- Have Septic Tank Pump Every 3-5 Years
(or As Needed, Contact Licensed Pumper)
- 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. 6825 SILVER PONDS HEIGHTS SUITE 101 COLORADO SPRINGS, CO 80908 OFFICE: (719) 481-4560 FAX: (719) 481-9204	
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Project: 18-0986	Project Name and Address
Sheet: 1 of 5	Night Hawk Companies Inc.
Date: 10 Nov 2020	12124 Oregon Wagon Trail,
Revised:	Lot #22, Filing #2-B,
Drawn by: jhr	The Trails
Checked by: djp	Sch. No. 4217006023
	El Paso County, Colorado

CHAMBER BED SYSTEM (Uniformly Pressure Dosed):

Infiltrator Systems Inc. Quick 4 Plus Low-Profile Chambers
 # Chambers = SF RQD / 12.0 SF per Chamber
 # Chambers = 700.0 SF / 12.0 SF = Min. 59 Chambers
 Install 1 Zone: 4 Rows x 15 Chambers Long
 # Chambers Provided = 60 Total
 Total Contact Area Actual = 720.0 SF
 Total Contact Area Required = 700.0 SF

Note: Use of Alternative Chambers is Acceptable.
 For ARC 36 Chambers (15.0 SF / Chamber, Min. 47 Chambers).
 Install 1 Zone: 4 Rows of 12 Chambers (48 Total). Contact
 Engineer for Clarification.

4" Ø PVC Solid Pipe from the Proposed House to the Septic Tank, with Cleanout within 5 FT of House 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. Exact Location of the Discharge Line from the House per Plumbing Design by Others.

Min. 1,000 Gal. Precast Concrete Two Compartment Septic Tank w/ EPCPH Approved Effluent Filter (Requires Regular Maintenance) on Outlet. Main Tank Inlet Approx. 24" Below Existing Grade. Risers to Grade with Secure Access Cover (Min. 3" Above Finish Grade, Water Tight, Typ. All Septic Tank Access Locations). Exact Locations to be Field Determined.

Min. 500 Gal. Precast Concrete Pump Chamber per County Health Department Regulations (Use of Two Compartment 1,250 Gal. Septic Tank w/ Pump in Second Compartment is an Acceptable Alternative for the Pump Chamber. See Pump Chamber Detail on Page 5 for Additional Information). Pump Chamber Inlet Approx. 30" Below Existing Grade. Risers to Grade with Secure Access Cover (Min. 3" Above Finish Grade, Water Tight, Typ. All Septic Tank Access Locations). Exact Locations to be Field Determined.

1-1/2" Ø Pipe from Pump Chamber to Level Zone Manifold. Install Vacuum Breaker at Highest Point.

Quick4 Plus Low-Profile Chambers:

34" W x 48" L x 8" H Each; Install 1 Zone: 4 Rows x 15 Chambers Long (60 Total). See STA Layout and Cross-Section for Additional Detail and Clarification. Full Length 1-1/2" Ø Sch. 40 PVC Pipe Suspended from the Top of Chambers per Manufacturers Recommendations (Typ. Each Lateral); Drill 1/8" Ø Holes @ 36" O.C. (Top of Pipe Typ. and Every Third on Bottom)

*Indicates Geoquest, LLC. Profile Pit Test Locations

Location from Northeast Lot Corner to Profile Pit # 1: S. 28° W. - 141'

Location from Profile Pit # 1 to Profile Pit # 2: S. 35° W. - 225'

Location from Profile Pit # 2 to Profile Pit # 3: S. 10° E. - 63'

GPS Coordinates:

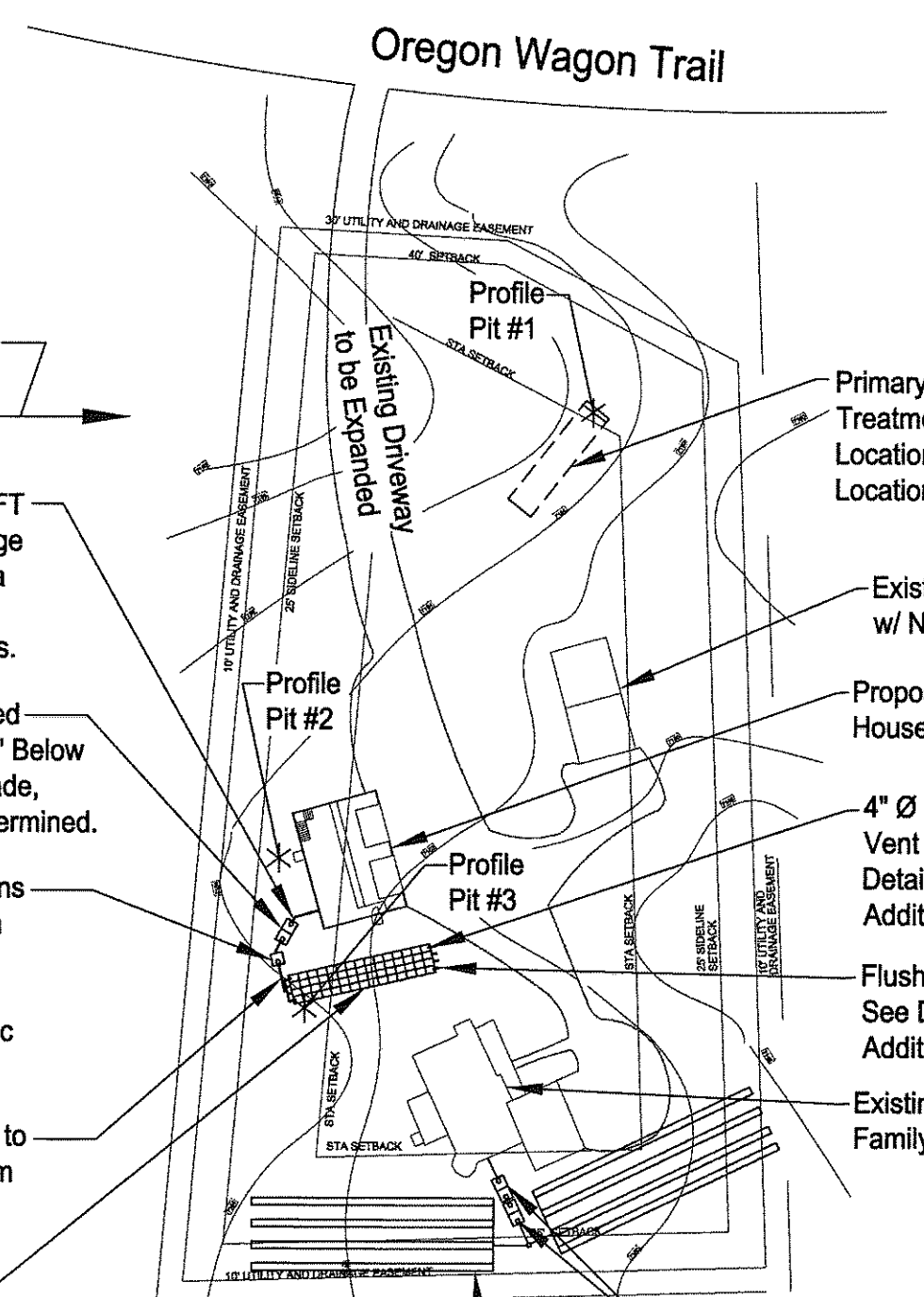
Pit # 1: N. 39° 00' 8.00" , W. 104° 34' 44.53"

Pit # 2: N. 39° 00' 6.24" , W. 104° 34' 46.18"

Pit # 3: N. 39° 00' 5.63" , W. 104° 34' 46.07"

Site on Existing Public Water Main. Min. 25 FT to Water Line from OWTS.

Native Slope:
 E. @ ~3.0 %



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.

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.

Install Drainage Swale on All Uphill Sides to Ensure Surface Runoff is Diverted Around the STA. Downspouts near the STA Shall Discharge into the Swale or Extended Beyond the STA.

Primary Alternate Soil Treatment Area (STA) Location (Multiple Locations Exist Onsite)

Existing Garage w/ New Addition

Proposed Guest House (2 BDRMs)

4" Ø Inspection Port / Vent (Typ. of 4). See Detail on Page 3 for Additional Information.

Flushing Valve (Typ. of 4). See Detail on Page 3 for Additional Information.

Existing Single Family Residence

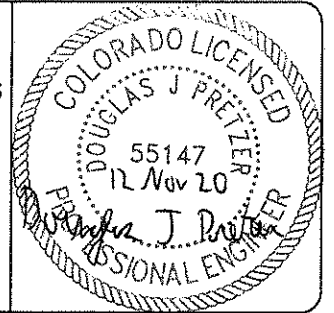
Existing 1,250 Gal. and 1,000 Gal. Septic Tanks

Existing OWTS to Remain in Use for Existing Single Family Residence. Permit #ON0007372, Dated: 11/20/2006.

GEOQUEST, LLC.

6825 SILVER PONDS HEIGHTS SUITE 101 COLORADO SPRINGS, CO 80908

OFFICE: (719) 481-4560 FAX: (719) 481-9204



Project: 18-0986

Sheet: 2 of 5

Date: 10 Nov 2020

Revised:

Drawn by: jhr

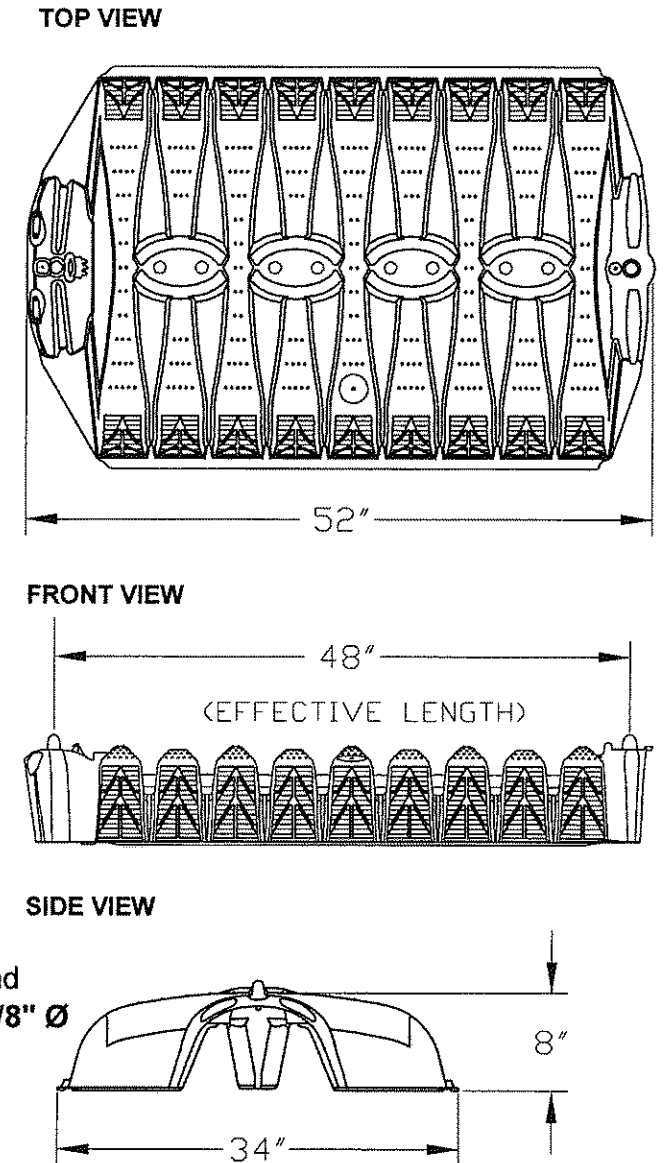
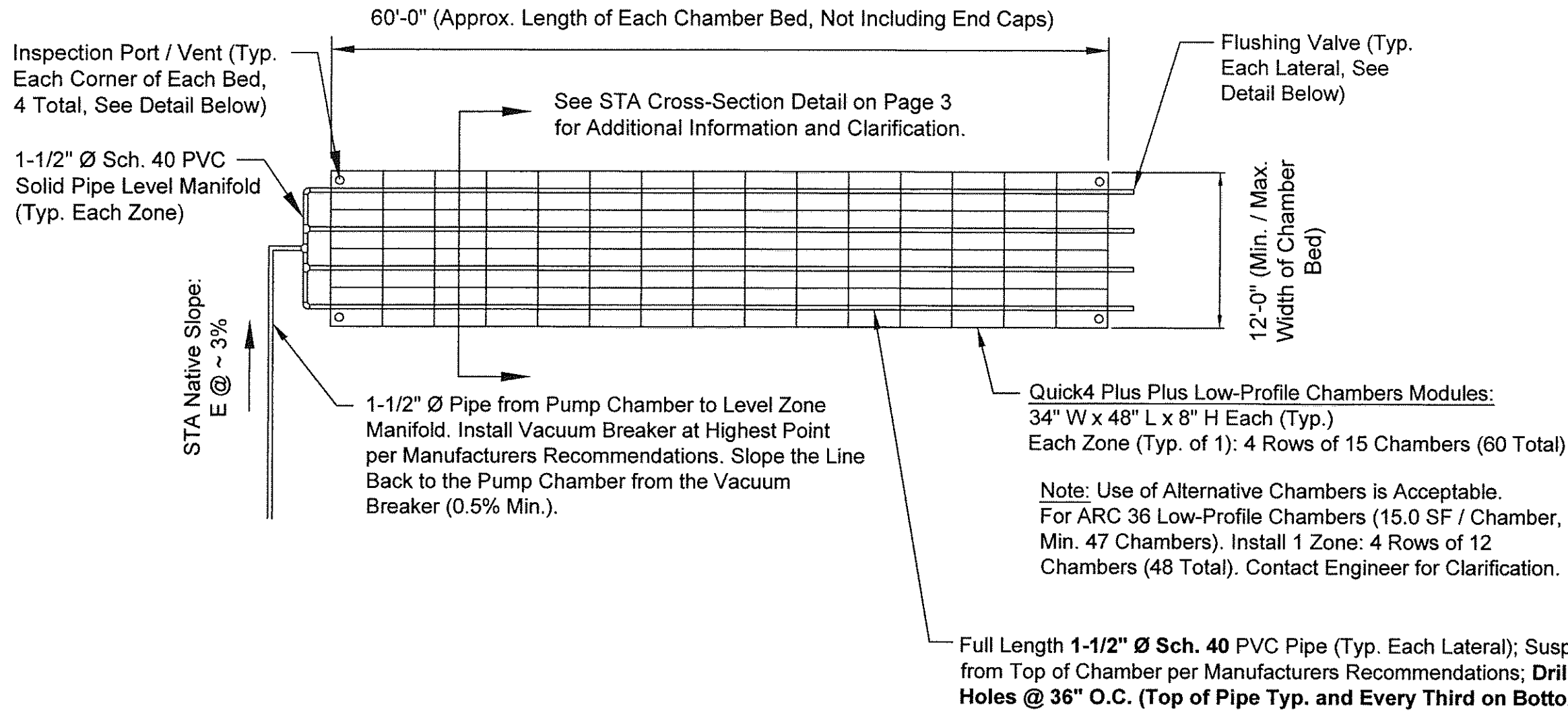
Checked by: djp

Project Name and Address

Night Hawk Companies Inc.

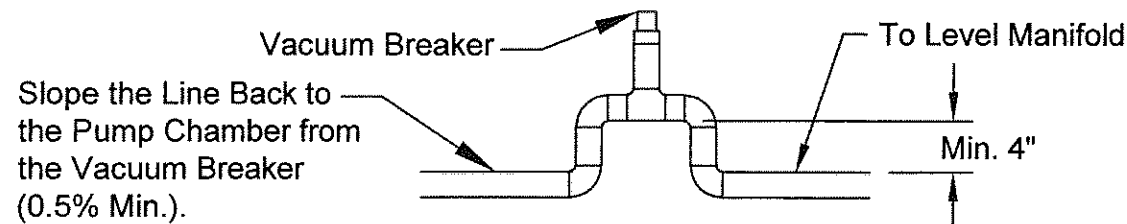
12124 Oregon Wagon Trail, Lot #22, Filing #2-B, The Trails Sch. No. 4217006023 El Paso County, Colorado

Site Plan



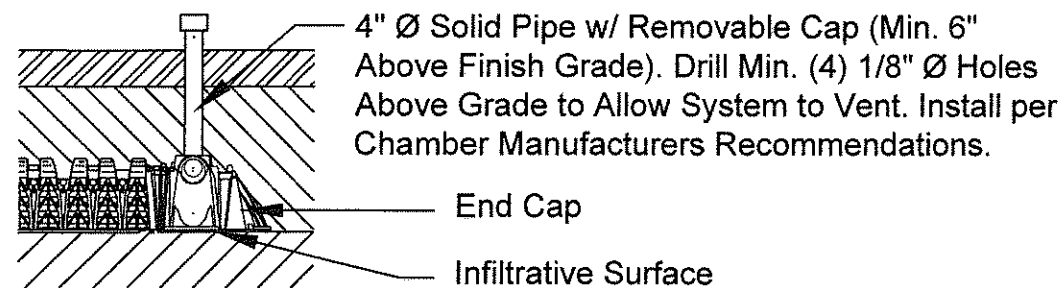
Soil Treatment Area (STA) Layout (Uniformly Pressure Dosed Chamber Beds)

SCALE: 1" = 10'



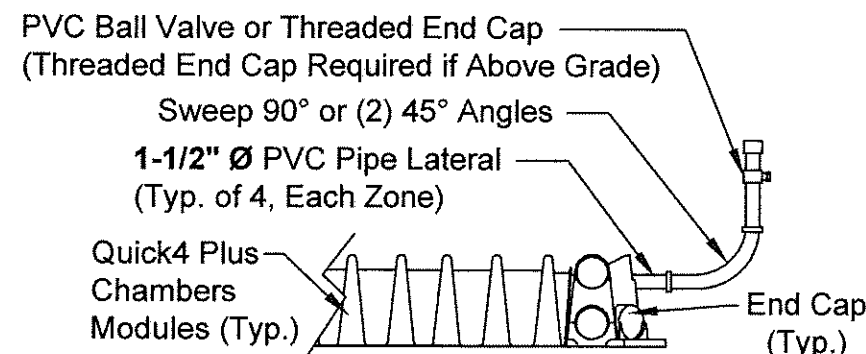
Vacuum Breaker Detail

Not to Scale



Inspection Port / Vent Detail

Not to Scale



Min. 6" Above Finish Grade or May be Placed in Small Valve Box if Desired. This Will Provide Access to Flush Each Lateral, Allowing for Removal of the Build-Up of Organics (System Maintenance).

Flushing Valve Detail

Not to Scale

Quick 4 Plus Low Profile Details

Not to Scale

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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.

Plant w/ Native Grasses and Maintain (See Notes)

STA Native Slope: E at ~3%

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

Min. 36" Separation between Chambers and Groundwater Evidence @ 64" Below Grade

Groundwater Encountered at ~64" & 96" Below Existing Grade.

12'-0" (Min. / Max. Width of Chamber Bed)

Max. 28" From Native Grade to Bottom of Chambers As Measured on the Uphill Side (Typ. of Each Zone)

Quick4 Plus Plus Low-Profile Chambers Modules:
34" W x 48" L x 8" H Each (Typ.)
Each Zone (Typ. of 1): 4 Rows of 15 Chambers (60 Total)




Note: Use of Alternative Chambers is Acceptable. For ARC 36 Low-Profile Chambers (15.0 SF / Chamber, Min. 47 Chambers). Install 1 Zone, 4 Rows of 12 Chambers (48 Total). Contact Engineer for Clarification.

Remove All Native Topsoil (Approx. 8") within STA Footprint and Stockpile for Re-Use , then Remove Max. 8" 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. 28 in. to the Bottom of the Chambers from Existing Native Grade as Measured on the Uphill Side of Each Chamber Bed Due to Encountering Groundwater Evidence at 64" Below Existing Grade.**

Full Length 1-1/2" Ø Sch. 40 PVC Pipe (Typ. Each Lateral); Suspend from Top of Chamber per Manufacturers Recommendations; **Drill 1/8" Ø Holes @ 36" O.C. (Top of Pipe Typ. and Every Third on Bottom).** See STA Layout for Additional Information.

Soil Treatment Area (STA) Cross-Section (Uniformly Pressure Dosed Chamber Beds)

Not to Scale

-  Topsoil (Min. 6" on Final Cover). Native Topsoil (Approx. 8", Remove from STA and Stockpile for Re-Use on Final Cover)
-  Approved Granular Material to Provide Cover (Min. 12", Max. 48" Total, Including Topsoil)
-  Native Soil - Sandy Clay Loam (USDA 3A, Approx. 8" - 8'-0" Below Existing Grade)

Imported Clean Well Graded Sand Fill Under Chamber Bed per EPCHD Specifications Below As Necessary to Maintain Min. 36" to Bedrock and Ground Water Evidence Encountered at 50" Below Native Grade. Sand Should Not be Required if STA is Installed Parallel to Site Contours.

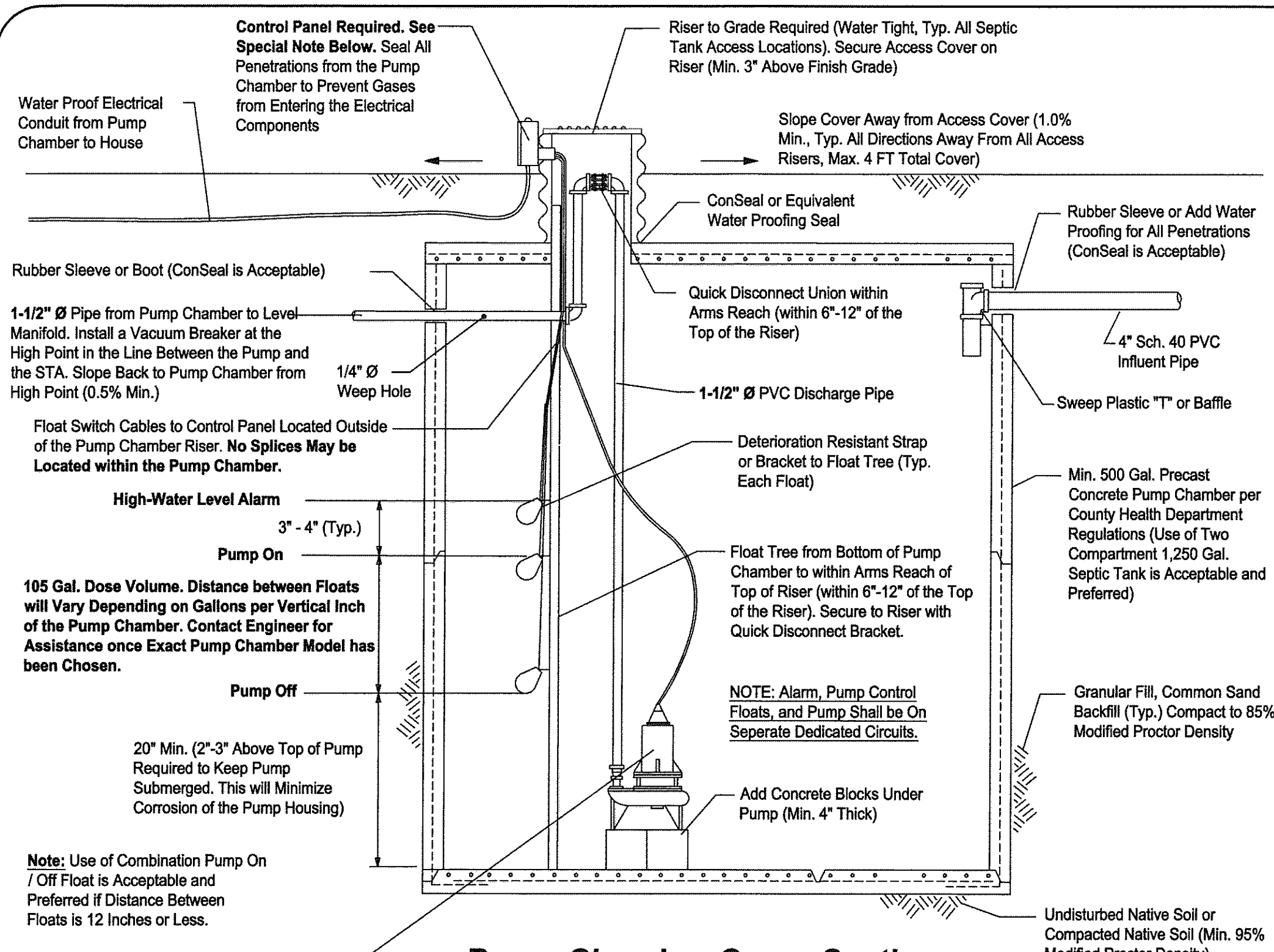
NOTES:

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

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.

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Pump Chamber Cross Section
Not to Scale

Special Note: Per El Paso County Board of Health Regulations Chapter 8: On-Site Wastewater Treatment Systems (OWTS) Criteria, the Pump System shall have a Mechanism for Tracking Both the Amount of Time the Pump Runs (Pump Run Counter) and the Number of Cycles the Pump Operates (Event Counter). 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, Pump Run Counter, and Event Counter. Engineer to Approve Prior to Installation.

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).

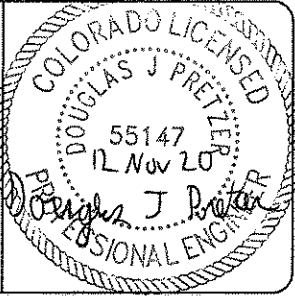
1. All Wire Splices Shall be Enclosed in the Control Panel. The Control Panel Shall be Placed in an Accessible Location Positioned Outside of the Tank Riser.
2. All Wires Shall be Spliced with Corrosion-Resistant, Watertight Connectors. **NO WIRE SPLICES ARE ALLOWED WITHIN THE PUMP CHAMBER OR RISER.**
3. Conduits Shall be Sealed to Prevent Gases from Entering the Control Panel and Electrical panel.
4. A Means to Disconnect the House Power Supply to OWTS Components Shall be Provided at the Control Panel.
5. The Branch Circuit Wire from the Building to the 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 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 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 Riser.
3. The Risers Shall be Secured to the Tank to Maintain the Riser in an Upright and Plumb Position. Special Care Shall be Taken During Backfill to Ensure Riser Maintains Upright and Plumb Position.
4. Control Panel 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

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Minimum Pump Specifications:
Pump: Use Zoeller "Dose-Mate" 152, Orenco PF5005, or Approved Equivalent Effluent Pump Prior to Installation (May be Revised Once System has Been Plumbed and Exact Site Conditions are Verified)
Design Flow Rate = Min. 36.5 GPM
Total Dynamic Head (TDH) = Approx. 21.2 ft
Operating (Residual) Head = 5 FT
Dose Volume = 105 Gallon Dose Required