GENERAL NOTES

1. APPLICABLE CODES

A. These general notes apply to all OWTS drawings. This project is designed in accordance with the **Elbert County Environmental Health Department** and The State of Colorado most current codes and standards.

B. All materials and workmanship shall be in accordance with applicable provisions of the codes specified above.

2. COORDINATION

A. DO NOT SCALE. The design is based on the **Onsite Wastewater Treatment System Evaluation report** by **RMG - Rocky Mountain Group** for **Wayne Connell**, Job No. **159927**, last dated **February 15, 2018** and **Reconnaissance Site Visit** performed on **January 31, 2018**. All changes to the design and layout are required to be approved by the Engineer / Designer for inclusion into these plans. Any discrepancies shall be brought to the attention of the Engineer / Designer immediately.

B. Builders/owners shall review covenants to verify setback or land-clearing restrictions and requirements that might affect the system installation **PRIOR** to construction.

C. **RMG** has provided this design in accordance with the standards of general construction practices. However, as with all underground absorption fields, guarantee against failure is impossible. With proper installation, as outlined for this proposed construction, there remain many uncertainties, and difficulties that 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. **RMG** provides no warranty of this design or installation.

3. INSPECTIONS

A. The Engineer / Designer inspections are separate from that which is required by the County Health Department. The homeowner/contractor must ensure all **COUNTY** and **ENGINEER / DESIGNER** inspections are completed.

B. Contact Engineer / Designer a minimum of **48 hours** prior to schedule required inspections.

C. The Engineer inspections shall be as follows:
   1. The Engineer / Designer shall inspect the installation of all components of the septic system before backfill.
   2. The Engineer / Designer shall inspect the components of the septic system, after backfill, to insure min cover, crowned top of field components, & proper drainage away from field.

4. OWTS

A. Maintain a minimum 2.0% and maximum 3.0% grade on pipe feeding septic tank and on pipe from field back to sump pit or pump station.

B. The homeowner/contractor is responsible for permit. The contractor must obtain approval of the engineered / designed system from the County Health Department. The homeowner/contractor must verify all setbacks and obtain utility clearances prior to construction.

C. Vehicular and/or hoofed animal traffic of any kind over any part of system may cause premature failure and is prohibited. The use of so-called "septic remedies" can result in severe damage to the system. We specifically recommend against their use.

D. Septic and pump tanks shall be concrete and have a minimum of two (2) compartments unless noted otherwise.

E. Provide a drainage swale or berm on the uphill slope of the treatment area.

F. **Do not** locate the absorption field or treatment area within **100ft** of the well per **Elbert County Environmental Health Department** recommendations.

G. The field laterals may be angled or turned to fit land contours with a maximum of 45 degree bends or less.

H. The field laterals may be curved to fit land contours. The maximum radius shall not exceed 100ft.

I. Maintain all minimum setbacks and distances stated in this design and county codes and standards.

J. Refer to all manufacturer specification prior to ordering and installation of components.

K. Cover material shall consist of USDA soil type 0-3A with no particles or fragments larger than 3 inches in diameter.

L. Components placed within the house to effect discharge to the OWTS are the responsibility of the installer. Recommendations for such components are not included herein.

CALCULATIONS FOR ABSORPTION BED

TREATMENT LEVEL 1

DESIGN PARAMETERS

NO. OF BEDROOMS (#BD):	4	
LTAR:	0.30	
Q (GPD):	525	GPD
CHAMBER AREA (CHA):	12	SQ. FT.

ADJUSTMENTS

GRAVITY TRENCH (GT):	1.0
CHAMBERS (CH):	0.7

REQUIRED AREA (A)

FORMULA

$$A = \frac{(Q)(GT)(CH)}{LTAR}$$

CALCULATION

$$A = \frac{(525)(1.0)(0.7)}{0.30}$$

TOTAL

A = MIN 1225 SQ. FT.

REQUIRED CHAMBERS

FORMULA/CALCULATION

$$\text{No. OF CHAMBERS} = \frac{(A)}{(CHA)}$$

$$\text{No. OF CHAMBERS} = \frac{(1225)}{12 \text{ SQ. FT.}} = 102.08$$

TOTAL
CHAMBERS: USE 105 CHAMBERS

REQUIRED FIELD SIZE

A SOIL TREATMENT AREA CONSISTING OF FIVE 3FT WIDE BY 84FT LONG TRENCHES CONTAINING 21 CHAMBERS EACH, RESULTING IN 105 CHAMBERS, TOTALING 1,260 SQ. FT. OF TREATMENT AREA.

COMPONENTS LIST

A. TANK(S):

1. SEPTIC TANK: 1,250 GAL MIN
2. EFFLUENT FILTER REQUIRED AT OUTLET OF SEPTIC TANK
   2.1. ORENCO 4-inch BIOTUBE EFFLUENT FILTER, MODEL FTWO444-36A

B. FIELD:

1. CHAMBER MANUF.: QUICK4
2. TOTAL CHAMBERS: 105
3. TOTAL FIELD TRENCHES: 5
4. LENGTH OF TRENCHES: 84ft MIN
5. WIDTH OF TRENCHES: 3ft MAX
6. CLEAN OUTS & INSPECTION PORTS PER FIELD PLAN AND AS REQUIRED
7. DISTRIBUTION BOX (5 OUTLET MIN)

D. PIPE:

1. ALL PIPE TO BE SCHEDULE 40 (U.N.O.)
2. CLEAN OUT A MAX OF 5ft-0in FROM HOUSE
3. FROM HOUSE TO TANK: 4in Ø SCHD 40
4. FROM TANK TO FIELD: 4in Ø SCHD 40

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ELBERT COUNTY
ELIZABETH, COLORADO
WAYNE CONNELL

ARCH/ENG:	FKW
DRAWN:	MAM
CHECKED:	FKW
DATE	2-21-18

#	REVISION	DATE
1	.	.
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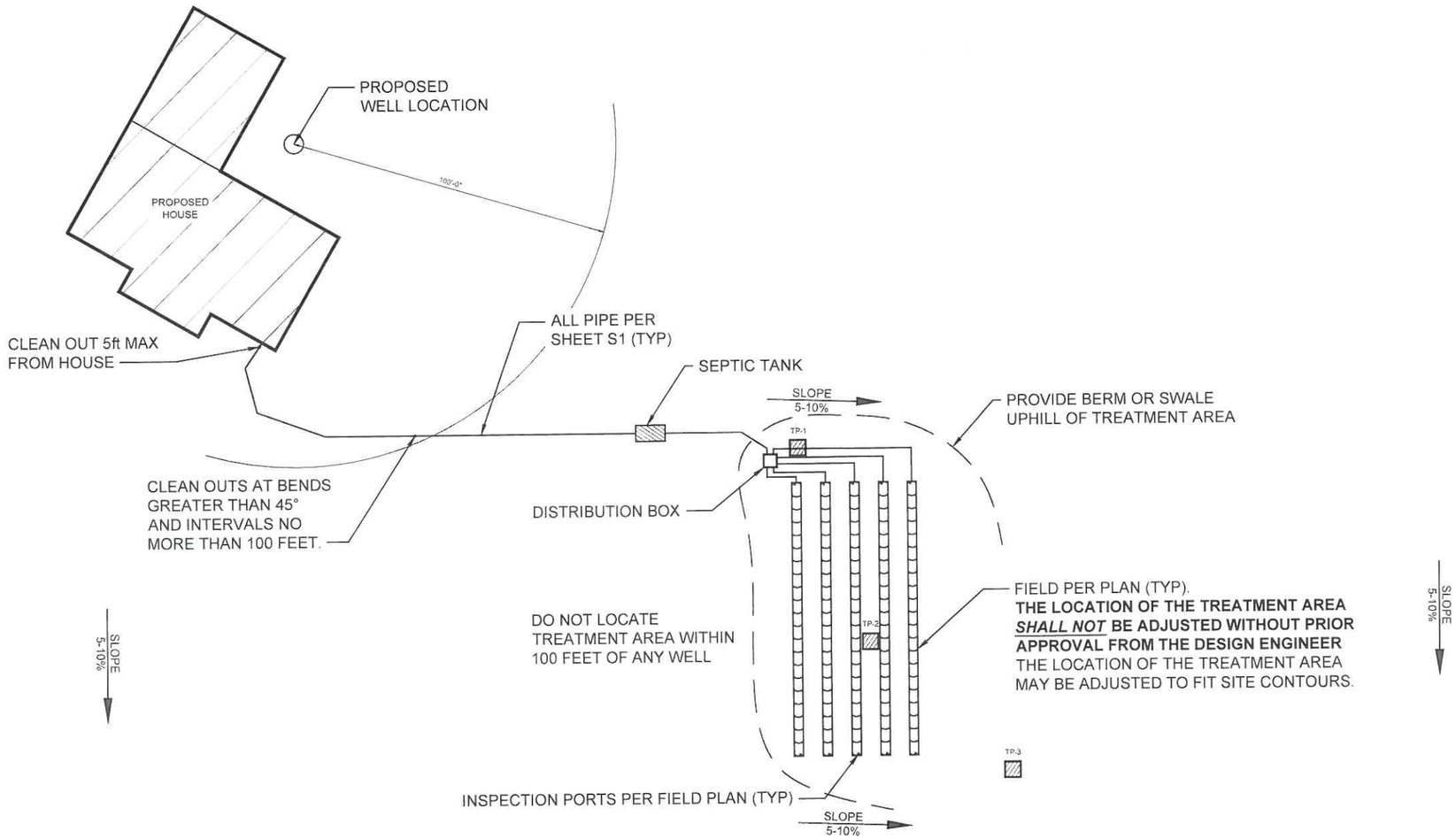
JOB NO. 159927

SHEET NAME
GENERAL NOTES, CALCULATIONS, & COMPONENTS LIST

SHEET NO. S1 of 5



SITE PLAN

SCALE: 1" = 40'-0"

20' 0 20' 40' 80'

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THE LOCATION OF THE TREATMENT AREA *SHALL NOT* BE ADJUSTED WITHOUT PRIOR APPROVAL FROM THE DESIGN ENGINEER

REFERENCE SHEET S1 FOR GENERAL NOTES, CALCULATIONS, AND COMPONENT SPECIFICATIONS AND DESIGNATIONS

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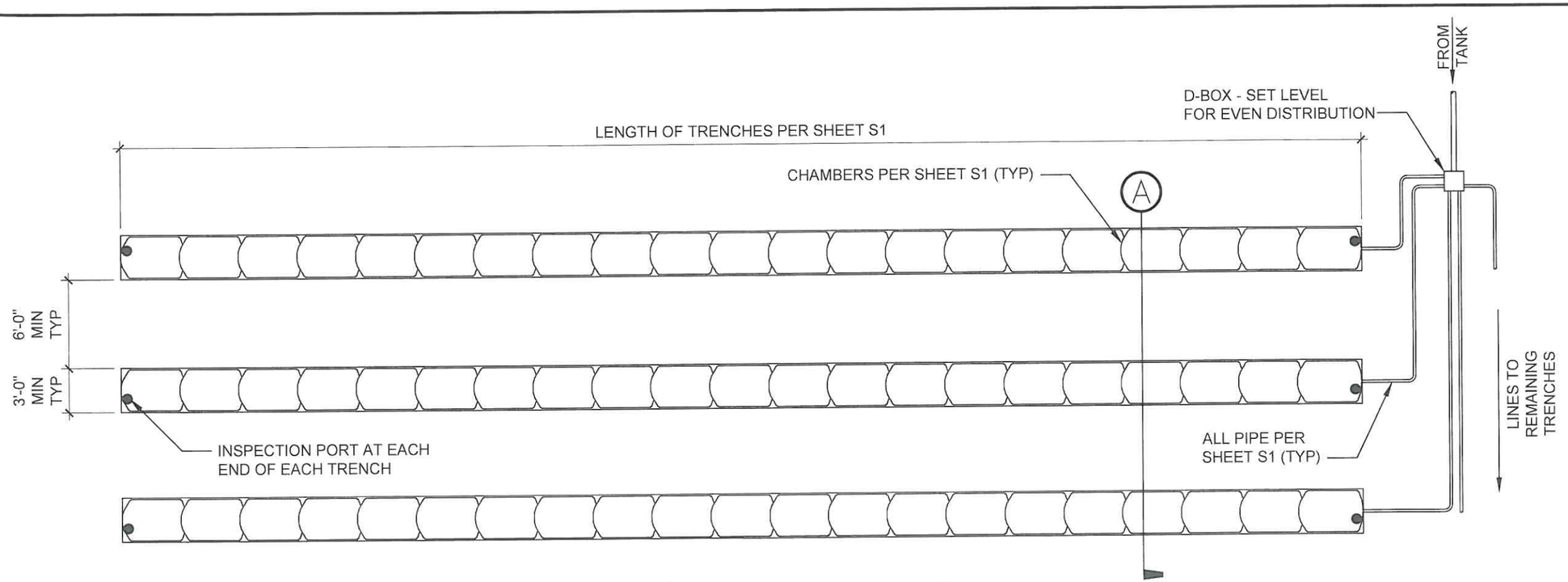
JOB NO. 159927

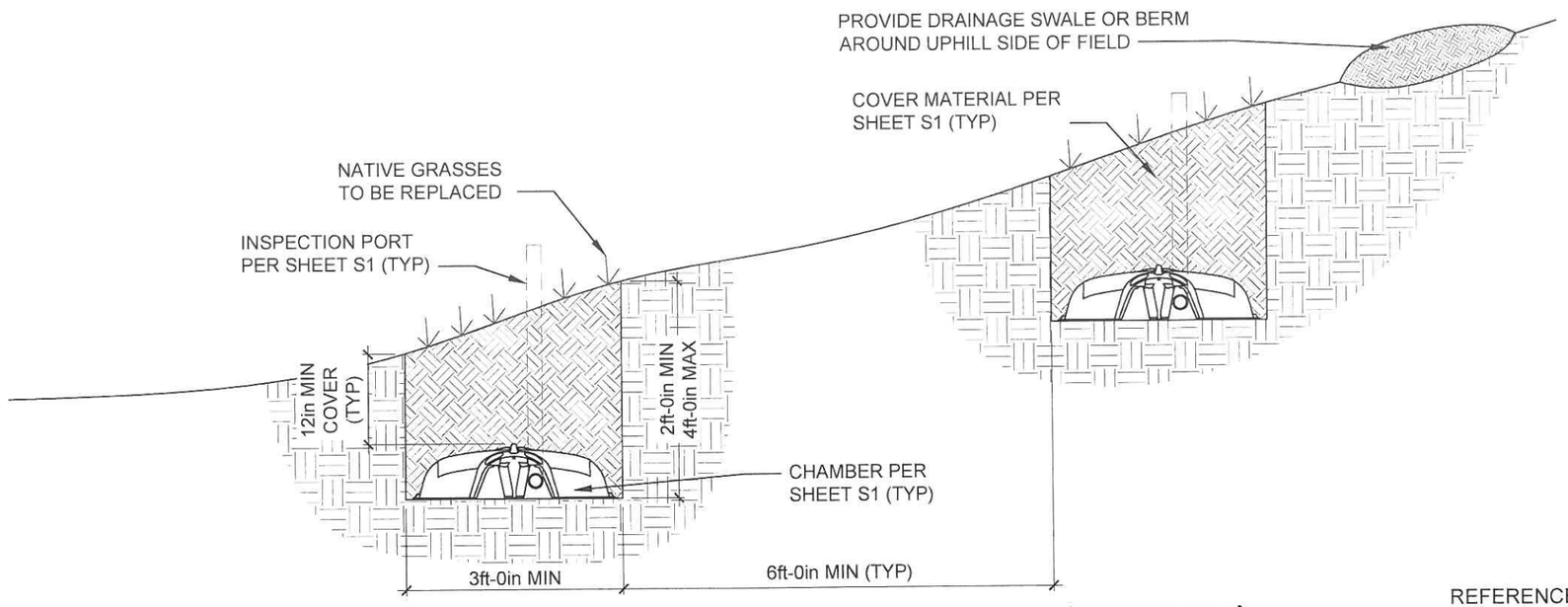
SHEET NAME
SITE PLAN

SHEET NO. S2 of 5



TRENCH / CHAMBER FIELD PLAN

NOT TO SCALE



A TRENCH CROSS SECTION (CHAMBERS)

NOT TO SCALE

REFERENCE SHEET S1 FOR GENERAL NOTES, CALCULATIONS, AND COMPONENT SPECIFICATIONS AND DESIGNATIONS

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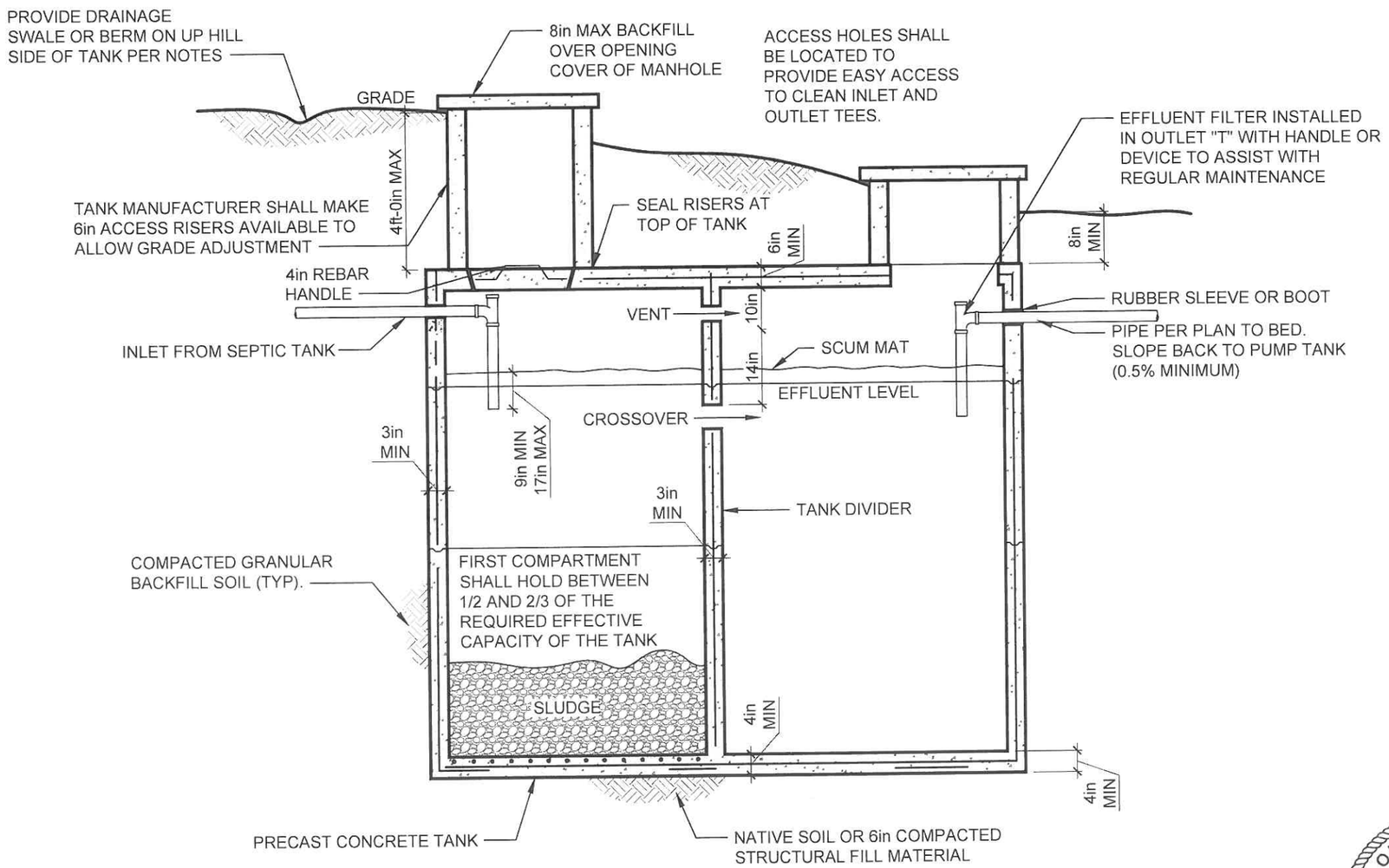
JOB NO. 159927

SHEET NAME
FIELD PLAN & CROSS SECTION

SHEET NO. S3 of 5



SEPTIC TANK CROSS SECTION (DUAL TANK)

NOT TO SCALE

REFERENCE SHEET S1 FOR GENERAL NOTES, CALCULATIONS, AND COMPONENT SPECIFICATIONS AND DESIGNATIONS

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JOB NO. 159927

SHEET NAME
PUMP DETAIL

SHEET NO. S4 of 5

INTRODUCTION: A residential On-site Wastewater Treatment System (OWTS) significantly differs from municipal sewer connections and services. Connections to public utilities, such as municipal sewer systems, provides a virtual guarantee that a homeowner will be able to send a large volume of water or sewage down the municipal sewer system with no particular problem. However, with an On-site Wastewater Treatment System (OWTS) (formerly known as septic systems), homeowners should be aware that system is distinctly limited as to the quantity and constituents of water or sewage (also known as effluent) sent. Limiting factors of a system are primarily the size and distribution method of the system and the Long-Term Acceptance Rate (LTAR) of the soils in the soil treatment area (commonly referred to as an absorption or leach field).

INSTALLATION: Proper installation of an OWTS is crucial to developing a successful OWTS. Careful or conservative design and proper operation and maintenance of a system cannot substitute for improper installation or poorly built components and systems. Typically, a licensed or certified installer will be familiar with the current regulations in the area where the OWTS is to be installed. Homeowner installation is not recommended. If the homeowner desires to perform the installation of the OWTS, they must become familiar with the specific county regulations prior to proceeding with the installation process. Consult with the Health Department for the regulating county prior to beginning installation to obtain the proper information and permits required. An OWTS design does not comprise of a detailed, step-by-step guide to installation and many details relating to proper construction are omitted because they are already required by county regulations. If uncertain, contact an engineer or the regulating Health Department for further clarification. During installation, careful observation of several items will aid in ensuring the OWTS is properly installed. The subgrade below the septic tank should be well and evenly compacted prior to installation to help limit future settling of the tank. Conveyance pipes should only slope uphill if a pump is installed at the bottom of the slope and an air release valve is installed at the top of the slope. The lines in the distribution field should be installed level. If multiple fields or different levels in the field are used, a device that will effectively distribute the effluent shall be installed. The soil comprising the soil treatment area should never be mechanically compacted. After installation of the distribution lines, media, and other pertinent components, the covering soil should not be compacted and minimal to no grading should be performed above the soil treatment area. If a mound system is installed, the mound sand should be allowed to consolidate naturally by sprinkling or lightly spraying with water to reduce settlement after the system is placed into operation. The area surrounding the OWTS, especially uphill of the soil treatment area, if applicable, should be graded to divert surface water or runoff away from the system. This can often be accomplished by construction of a berm or a swale around the uphill side and along the sides of the system's components.

GENERAL OPERATION: Implementing water conservation practices will help in preserving the lifespan of an OWTS. Reducing the amount of excess water that is fed to the system will help prevent it from overflowing, backing up to the house or otherwise disrupting the proper functioning of the system. We recommend that leaking faucets and toilets be repaired immediately, taking long showers should be avoided, and dishwashers or washing machines should be run only when full and at reduced water settings when possible. We also recommend against sending unnecessary materials into the system. Do not dispose of or dump non-biodegradable materials (e.g. greases, plastics, rubber based materials) into the OWTS. These substances will not break down as desired in the septic tank and can lead to clogging or needing to pump the tank more frequently than would be ordinarily necessary. Do-not dispose of harmful or caustic chemicals (e.g. pesticides, paint thinner, oils, and antifreeze) into the OWTS. These chemicals can kill the beneficial bacteria that contribute to treating the effluent in the system and also damage the system, shortening the lifespan of the system and causing an increase in required maintenance. We recommend the homeowner limit the use of common household cleaning products (e.g. bleaches, disinfectants, and toilet bowl cleaners) that may reach the OWTS, as they can also kill the beneficial bacteria and disrupt the functioning of the system. The proper functioning of an OWTS can also be affected by the presence or introduction of surface water or runoff or from outlets from sump pumps and foundation drains. Care and attention should be given to diverting or preventing unnecessary water from reaching the system and ongoing maintenance is essential to preventing future, premature failure of a system.

CAUSES OF FAILURE: Most On-site Wastewater Treatment Systems can function for years if installed, operated, and maintained appropriately. However, wastewater treatment systems do fail and may fail earlier than anticipated. Because the engineering or design of any OWTS relies on many variables, some of which are uncontrollable, systems may fail unexpectedly and earlier than could have been predicted. There are many factors that may contribute to the failure of an OWTS. Proper installation, operation, and maintenance, as described previously, will help prevent system failure. However, common factors that can contribute to system failure are listed below. We cannot address all causes to system failure and this list should not be considered completely inclusive.

--EXCESS WATER USE: Sizing of On-site Wastewater Treatment Systems is partially dependent on the design flow determined by the governing county health department. If the amount of wastewater or effluent that is sent to the system exceeds this design flow, it can shorten the lifespan of an OWTS. Frequently exceeding the design flow can add significant stress to a system. Sending large amounts of water in a short time (e.g. draining hot tubs, multiple appliances draining water at once, multiple showers running at once) can also shorten the lifespan of an OWTS. Doing so can disturb the settlement process in septic tanks, flood soil treatment areas, and otherwise damage or overwhelm individual components in the system.

--SURFACE DRAINAGE/RUNOFF: Allowing outside water sources (e.g. sprinklers, discharge from downspouts or subsurface drains) to flow into the soil treatment area should be avoided. Surface flows should be directed away from the treatment area. It is important to maintain the surface grading uphill from the treatment area to ensure that surface water is directed away from the treatment area. Any landscaping improvements should also maintain positive drainage away from the treatment area.

--CLOGGING: Soil treatment areas are designed to accommodate liquids only. They are not meant to handle solid or greasy, semi-solid substances. These substances are intended to be separated from the wastewater in the septic tank before it is sent to the soil treatment area. Disrupting this separation process can cause these substances to enter the soil treatment area and settle in or clog the pipes. If the pipes become clogged, entire sections can become inoperable and unusable, adding additional stress to the remaining soil treatment area. If clogging occurs, it is often hard to detect and fix. Clogging can be prevented by monitoring the water use, regulating the disposal of inappropriate materials, and regularly having the septic tank pumped by a professional.

--COMPACTION: The effective treatment of wastewater in the soil treatment area also relies on the area's ability to breathe and receive fresh air. This allows the effluent to more effectively be treated and breakdown. Compaction of the soil above the soil treatment area can hamper the soil's ability to treat the effluent by restricting the air flow to the treatment area. Refer to the INSTALLATION guidelines for more information on placement of soils above the components in the treatment area during installation. After installation, care should be taken to prevent additional compaction to the soils above the treatment area. Small animals (such as cats and dogs) and human traffic are unlikely to cause significant additional compaction. However, larger animals, especially hoofed animals, can cause sufficient compaction to the soils and should not be allowed on the surface directly above the treatment area. Vehicular traffic will cause addition compaction and can quickly shorten the lifespan of systems. Vehicular traffic can also cause the wastewater treatment system to fail by crushing components. Vehicles should not be allowed on the surface directly above the soil treatment area. We also discourage the installation of light structures (e.g. playgrounds, sheds) above the treatment area, as these structures may cause additional compaction and encourage additional traffic over the treatment area.

SUMMARY: On-Site Wastewater Treatment Systems differ greatly from public sewer systems and require the homeowner to monitor and maintain the condition of the system and the components. On-site Wastewater Treatment Systems are complex systems that are designed to handle a limited amount of wastewater from a household and cannot handle many of the materials that often make it into the public sewer systems. It is an installer's responsibility to carefully install the components of a system to both the design's specifications and the governing county health department regulations. It is a homeowner's responsibility to care for and maintain the system. The previously discussed items regarding installation, care and maintenance are not inclusive and do not cover all aspects of an On-site Wastewater Treatment System. Following the previously discussed recommendations will not guarantee that the system will not fail. These items cover the common sources of failure and can help to preserve the lifespan of the system, but will not prevent all possible sources of failure. We recommend regular inspections by qualified professionals to help monitor the system and prevent premature failure.

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JOB NO. 159927

SHEET NAME
OPERATION & MAINTENANCE SPECIFICATIONS

SHEET NO. S5 of 5