

• I.S.D.S. PERMIT •
TO INSTALL, CONSTRUCT, ALTER OR REPAIR
AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM

Permit: EH-09-055

New: Y
Repair: N
Alteration: N
Addition: N

ROUTT COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH • P.O. BOX 770087 • STEAMBOAT SPRINGS, CO • 970-870-5588

This permit effective only on premises located at: ~~40345~~ VIRTUS WAY C

Legal description of property: TR IN NE4 & S2 SEC 4-6-84 (AKA □ UPPER PARCEL)

Parcel Id.: 936041007

Lot No.:

Owner: AMETHYST RANCH, LLC

Address: P O BOX 4337

HOUSTON TX 77210-4337

Applicant: GILLASPIE CONSTRUCTION

Address: ATTN: JOE GILLASPIE P.O. BOX 771811

STEAMBOAT SPRINGS CO 80477

Phone: 970-879-0973

As authorized and required by Chapter 25, Article 10 C.R.S., permission is hereby granted to the owner or a Routt County licensed ISDS installer to construct or repair an I.S.D.S. system at the property indicated above. All work must comply with the specifications on this permit and the Guidelines on Individual Sewage Disposal Systems - Revised 1988 - Colorado State Board of Health, 5 CCR 1003-6. This permit expires one year from date of issue.

SPECIFICATIONS

Y Residential N Commercial Other:

Percolation Rate: 17 MPI

Minimum Septic Tank Capacity: 1000 gallon

Tank Material: Y Concrete N Polyethylene

Design: 1: Engineer shall certify that construction complies with permitted design.

Comments:

Notice: All Sewage *HOLDING* Tanks must be Concrete. Inspections required (24 hour advanced notice required).

Number of bedrooms: 2

*see copy of attached
Permit # EH-12-017*

Environmental Health Specialist: 

Date of Issue:

10/6/09

The above individual sewage disposal system installed by  has received a final inspection. The system is hereby approved for use.

Environmental Health Specialist: 

Date

3/6/12

State fee \$23.00

Fee: Percolation \$0.00

Permit \$252.00

\$275.00

RECEIPT

RECEIPT NUMBER:

R090001542

Routt County Environmental Health Department
P.O. Box 770087 Phone 970-870-5588
Steamboat Springs, CO 80477

APD #: EH-09-055
SITE ADDRESS: 40345 VIRTUS WAY C
PARCEL: 936041007
TYPE: EH-Ind. Sewage Disp Sys

May include fees collected within the jurisdiction.

TRANSACTION DATE: 10/06/2009

TOTAL PAYMENT: 275.00
TOTAL PAID FROM TRUST: .00
TOTAL PAID FROM CURRENCY: 275.00

TRANSACTION LIST:

Type	Method	Description	Amount
Payment	Check	#16221	275.00
TOTAL:			275.00

ACCOUNT ITEM LIST:

Description	Account Code	Current Pmts
I.S.D.S. Permit Fee	01-20-22-000-568	252.00
State Surcharge for ISDS	01-20-22-000-546	23.00
TOTAL:		275.00

RECEIPT ISSUED BY: SG

INITIALS: SAG

ENTERED DATE: 10/06/2009

TIME: 08:45 AM

OK per
JASON 10/15/09
BUILDING PERMIT # 03-00-00000
PERMIT PD 275.00 paid
PERC PD
Mullapare Const
10/1/09 # 16231

APPLICATION FOR INDIVIDUAL SEWAGE SYSTEM PERMIT

NEW ☒ REMODEL _____ REPAIR _____ EMERGENCY USE _____

Name of Owner AMETHYST RANCH LLC HD 4304 TA 77210
Mailing Address PO BOX 4337 Phone _____
Name of Applicant ELLISAGUE CONSTRUCTION Mailing Address 7718th Phone 970 830 9777

LOCATION OF PROPOSED SYSTEM: Street Address 40345 VICTORY WAY ROUTT COUNTY
55.40

Legal Description TRIN NE 4 3 5 2 5 2 4 6 84 Parcel ID# 936041007
(Lot# and Subdivision if applicable)

(this# can be found in the Assessor's Office)
Size of Lot 256.29 () Residential () Commercial () Other (Describe) 936041007

Number of: Bedrooms 2

Water Supply: (☒) Private Well
() Public (give name of supply) _____

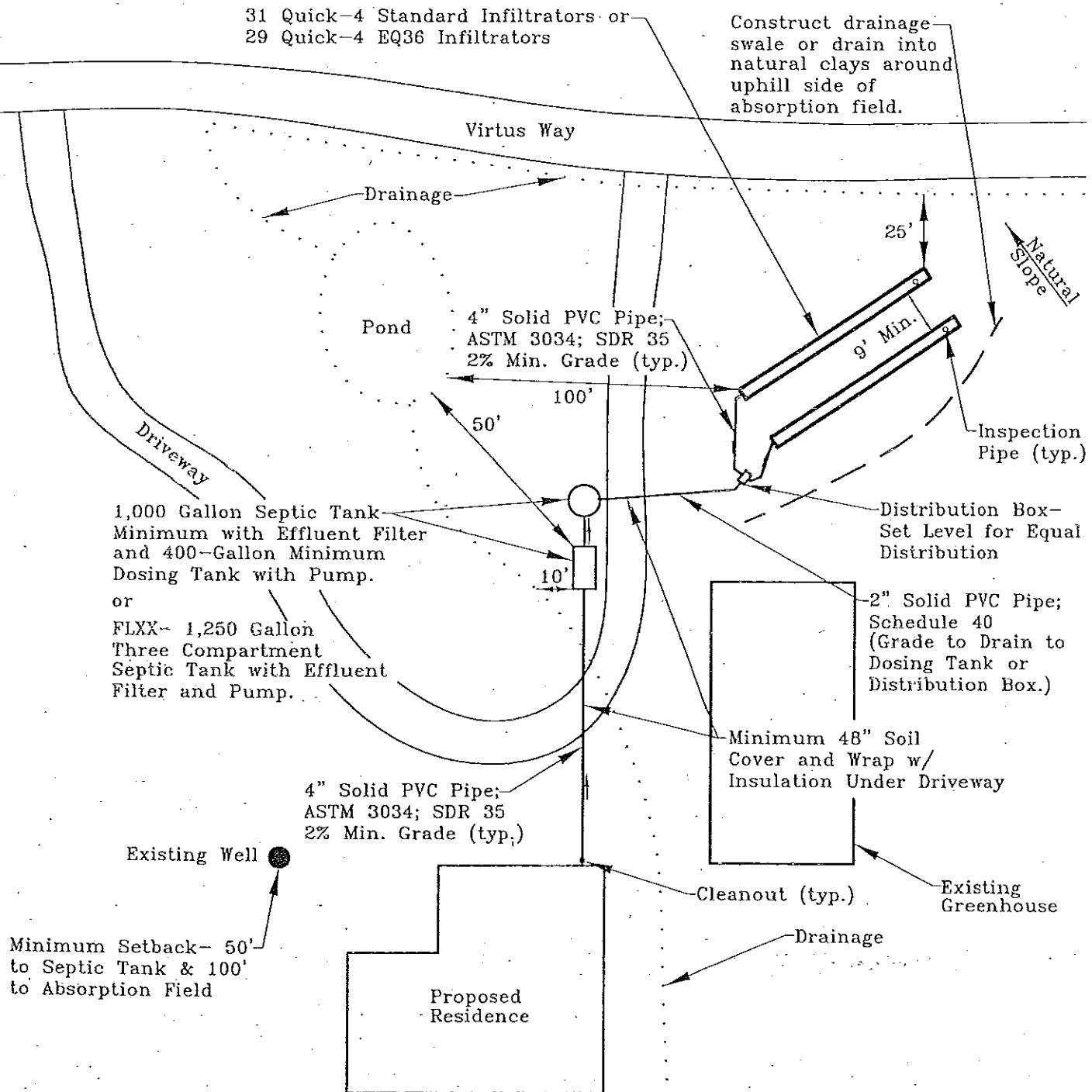
An appropriate plot plan must accompany this application showing required information. Percolation tests and an on-site inspection must be arranged with the Routt County Department of Environmental Health after receipt of the application and plot plan. The permit, upon approval of this application may be obtained at the Routt County Department of Environmental Health with payment of the required fee.

Application for an individual sewage disposal system is hereby submitted. The individual sewage disposal system will be constructed, installed and operated in accordance with the regulations governing individual sewage disposal systems within Routt County and will comply with applicable State Regulations adopted pursuant to Article 10 of Title 25, C.R.S. 1973, as amended. The undersigned acknowledges that the above information is true and that false information will invalidate the application or subsequent permit. The owner assumes all responsibility in case of failure or inadequacy of this sewage disposal system. (*Hot tubs and Jacuzzi's shall not be connected on-site sewage disposal systems.)

Signature of Applicant [Signature] Date 10-1-09

* Note: Actual System Layout & Construction
May Require Adjustments in the Field Due to
Variations in Topography and Vegetation.

NOT TO SCALE



Title: **O.W.S.-INFILTRATOR SITE PLAN**

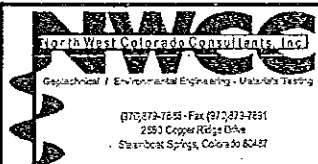
Job Name: **Proposed Elkstone Caretaker Residence**

Location: **Virtus Way, Routt County, Colorado**

Date: **9/18/09**

Job No. **08-7888**

Figure **#1**





September 24, 2009

Terry Hufington
P.O. Box 4337
Houston, TX 77210

Job Number: 07-7888

Subject: On-site Wastewater System
Design, Proposed Elkstone Caretaker
Residence, Virtus Way, Routt County,
Colorado.

Ladies and Gentlemen:

This report presents the results of an On-site Wastewater System (OWS) design for the proposed Elkstone Caretaker Residence to be constructed on Virtus Way in Routt County, Colorado. NWCC, Inc. previously completed a Subsoil and Foundation Investigation report for the Caretaker Residence under this job number and dated August 26, 2009.

Proposed Construction: It is our understanding, based on conversations with the contractor, that the Caretaker Residence will be constructed with a total of two bedrooms when completed. In addition, an second kitchen used for the cleaning and preparation of the produce from the greenhouse will be located in the basement of the caretaker residence. The absorption field for the OWS will be located east of Virtus Way and west of the existing Greenhouse.

Site Conditions: The proposed Caretaker Residence is located east of Virtus Way in Routt County, Colorado. The vegetation at the site of the OWS consisted of natural grasses, weeds, deciduous brush and aspen trees. An existing pond is located to the south of the proposed OWS. The pond is fed by a seasonal drainage located to the north of the proposed Caretaker Residence and south of the existing greenhouse. A drainage ditch is also located along the east side of Virtus Way.

The topography at the site is variable and the area of the proposed absorption field generally slopes gently to moderately down to the southwest on the order of 5 to 10 percent.

Subsurface Conditions: A profile pit was excavated in the area of the proposed absorption field on July 29, 2009. The subsurface conditions encountered in the profile pit generally consisted of approximately 24 to 30 inches of topsoil and organic materials overlying natural sands and clays that extended to the maximum depth investigated, 6 feet. The natural sands and clays were silty, fine to medium grained with occasional gravels, very low to low plastic, medium dense to medium stiff, moist to very moist and brown

in color. Groundwater seepage was not encountered in the profile pit at the time of excavation and no evidence of a seasonal high groundwater table was observed in the profile pit.

A set of 6-percolation test holes, ranging from 12 to 38 inches in depth, was advanced in the area of the proposed OWS. Percolation testing was conducted by our office on July 29, 2009 to determine the percolation rate of the natural soils. The percolation tests indicate that the upper 24 to 30 inches of natural topsoil and organic materials in the area of the proposed OWS exhibited percolation rates from ranging from 10 to 20 minutes per inch (mpi) with an average percolation rate of 17 mpi. The deeper natural sands and clays exhibited percolation rates of 80 to 120 mpi.

System Design: Based on our understanding of the proposed construction, the topography of the site, the soils encountered in the profile pit and the percolation test results, a modified trench absorption system utilizing Standard or EQ36 Infiltrator chambers placed in the upper 12 inches of natural topsoil and organic materials has been designed for this site.

The OWS design presented below is based on the total anticipated number of bedrooms and appurtenances for the structures, as well as the average percolation rate for the natural soils. Considering the anticipated construction, we have calculated a peak effluent flow of 613 gallons per day (gpd) for the system. Based on the percolation results, a minimum absorption area of 505 square feet is required for conventional trench or bed absorption systems.

Using a 40% reduction in the required absorption area with Infiltrator chambers, we have calculated that the system can be constructed using thirty-one (31) Quick-4 Standard Infiltrator chambers. As an alternate, we have calculated that the system can also be constructed using twenty-nine (29) Quick-4 EQ36 Infiltrator chambers. We recommend that the trenches for the chambers be placed a maximum of 12 inches below the natural ground surface. In addition, we recommend that a distribution box be installed to ensure that equal flow is distributed to all of the chambers. We also recommend that the base and sides of the chambers be covered/wrapped with a 1/4-inch galvanized steel mesh to help prevent rodent intrusion. A minimum of 18 inches of soil cover should be placed over the chambers in accordance with the chamber manufacturer's recommendations.

A septic tank with a minimum capacity of 1,000-gallons is required for a two-bedroom residence. Due to the subsurface conditions encountered at the site, we recommend that a concrete septic tank be used. An effluent filter must be installed in the downstream outlet 'T' of the septic tank. We recommend that the tank be placed to allow access for pumping. Generally a septic tank can be pumped from 100 feet away with a maximum lift of 10 feet; however, a local pump contractor should be consulted in regards to the tank maintenance access.

Due to the elevation difference from the septic tank to the absorption field, a float-activated effluent pumping system will be required. The pumping system should consist of a minimum 400-gallon concrete dosing tank installed downstream of the septic tank with an approved commercial grade, float-activated effluent pump installed in the dosing tank. An alternate system would be to use a FLXX 1,250-gallon three-compartment septic tank with the pumping system installed in the downstream compartment. We

recommend the floats in the dosing tank be set to provide a dose of between 125 and 150 gallons per dose to the leach field. The system should have a high water alarm system installed in the residence to warn the owner in the event of a pump malfunction. A secondary or backup pump installed in the dosing tank is also recommended in the event of a pump failure. The piping (2-inch diameter, Schedule 40) between the pump and absorption field must be sloped to drain to the field or back to the dosing tank. A pressure relief valve (aka: "Sniffer") should also be placed at the high point of the piping between the pump and field.

The system design is presented in Figures #1 and #2. The design calculations are shown in Appendix A and the specifications for the system are given in Appendix B.

Operation and Maintenance: Observing the operation and performing routine maintenance of the OWS is essential to allow proper, long term functioning of the system. We recommend that the operation be monitored periodically and a qualified, licensed maintenance contractor performs maintenance of the system.

1) **Septic Tank:** The scum and sludge accumulation in the septic tank should be monitored yearly. Once the scum or sludge thickness reaches 25% of the chamber depth, the septic tank should be pumped. A pumping frequency of 1 to 3 years is likely at the design flows used in this design; however, depending on actual use, pumping may only be required every 3 to 5 years.

2) **Effluent Filter and Pumping System:** The effluent filter at the septic tank outlet should be cleaned when the septic tank is inspected or as required. The effluent pumps should be checked semi-annually to ensure the pumps are functioning properly. If the high water alarm sounds, the system should be inspected and serviced immediately.

3) **Absorption Field:** If the system is not activated within 30 days of installation or is inactive for an extended period of time, we recommend that water be run into the Infiltrator chambers periodically (once every 30 days) to prevent rodents from nesting and burrowing in the chambers, which could result in premature failure of the system. We also recommend that the system be fenced off to vehicular traffic and livestock. The surface area around the absorption fields should be observed monthly for signs of failure, such as lush vegetation growth or ponding. Liquid levels within each run of Infiltrators should be observed through the observation/vent pipes.

4) **Treated Water:** We do not recommend that the water softeners or water treatment systems be connected to the OWS. The chemical and hydraulic loading from the backwash of these treatment systems may be detrimental to the OWS. If a treatment system is used, a separate dry well should be constructed for the backwash waste. In addition, chemically treated water from a swimming pool or spa must not be discharged into the OWS.

5) **General Notes:** The owner should be aware that the operation of the OWS is different from a public sewer service. Plastic and other non-biodegradable materials should not be placed into the system. Water use should be monitored so fixtures are not allowed to run if a seal malfunctions. Allowing fixtures to flow continuously to prevent water lines from freezing or a malfunctioning

faucet or toilet can consume in excess of 1,000 gallons per day. Excessive flows could flood and cause premature failure of the system. No plastic or landscaping that requires additional irrigation should be placed over the absorption field.

Limitations: The procedures and design criteria used in this design was obtained from the EPA "Design Manual - On-site Wastewater Treatment and Disposal Systems", 1980, the Colorado Department of Health "Guidelines for Individual Sewage Disposal Systems" (rev. 2000) and the Routt County "Individual Sewage Disposal System Regulations" (February, 1999). The wastewater disposal system design presented is based on currently accepted design procedures and the proposed features and usage of the facilities. If the usage of the facilities or addition of new facilities to those proposed in the building changes, the OWS design will also most likely change. It should also be noted that all on-site wastewater disposal systems require periodic maintenance as noted above. The failure of the owner to provide proper periodic inspection and maintenance of the system can lead to premature failure of the system.

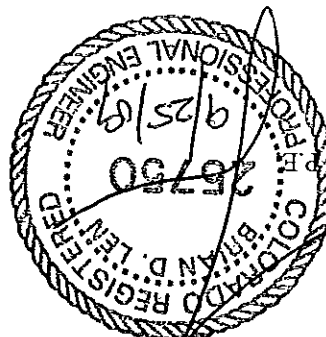
Please be advised that Colorado law requires that a permit must be obtained prior to the construction, alteration, or use of an on-site wastewater system. In addition, the client must retain our office to observe the construction/installation of the on-site wastewater system. If you have any questions concerning this report or our recommendations, or if we may be of further service, please contact this office.

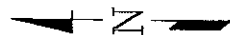
Sincerely,
NWCC, INC.

Timothy S. Travis, P.E.

Reviewed by Brian D. Lein, P.E.

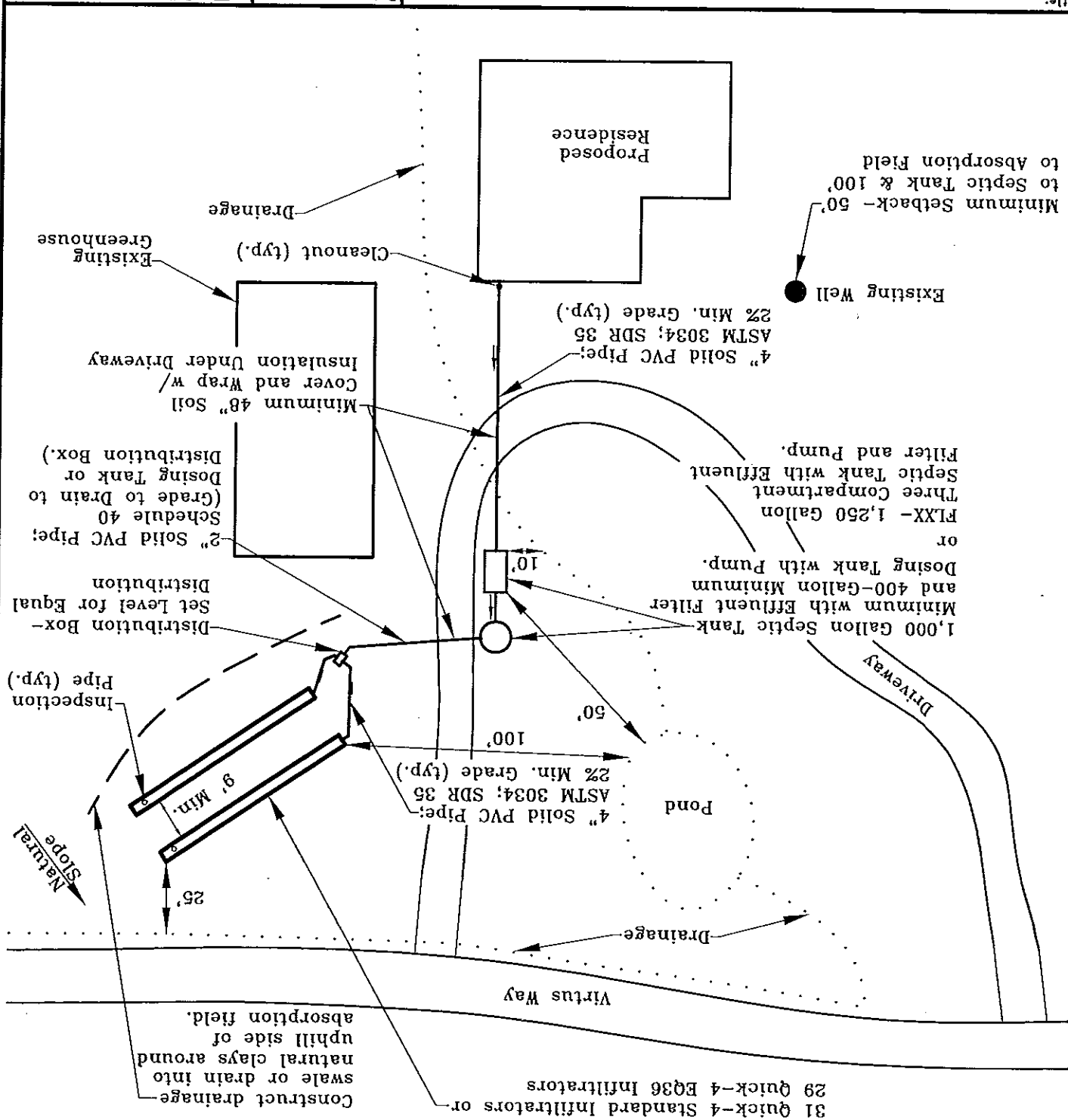
xc: Gillaspie Construction
Michael Thompson





NOT TO SCALE

* Note: Actual System Layout & Construction
May Require Adjustments in the Field Due to
Variations in Topography and Vegetation.



O.W.S.-INFILTRATOR SITE PLAN

Date:

9/18/09

Job No.

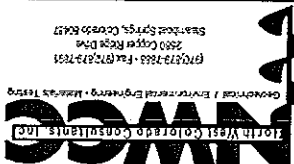
08-7888

Figure

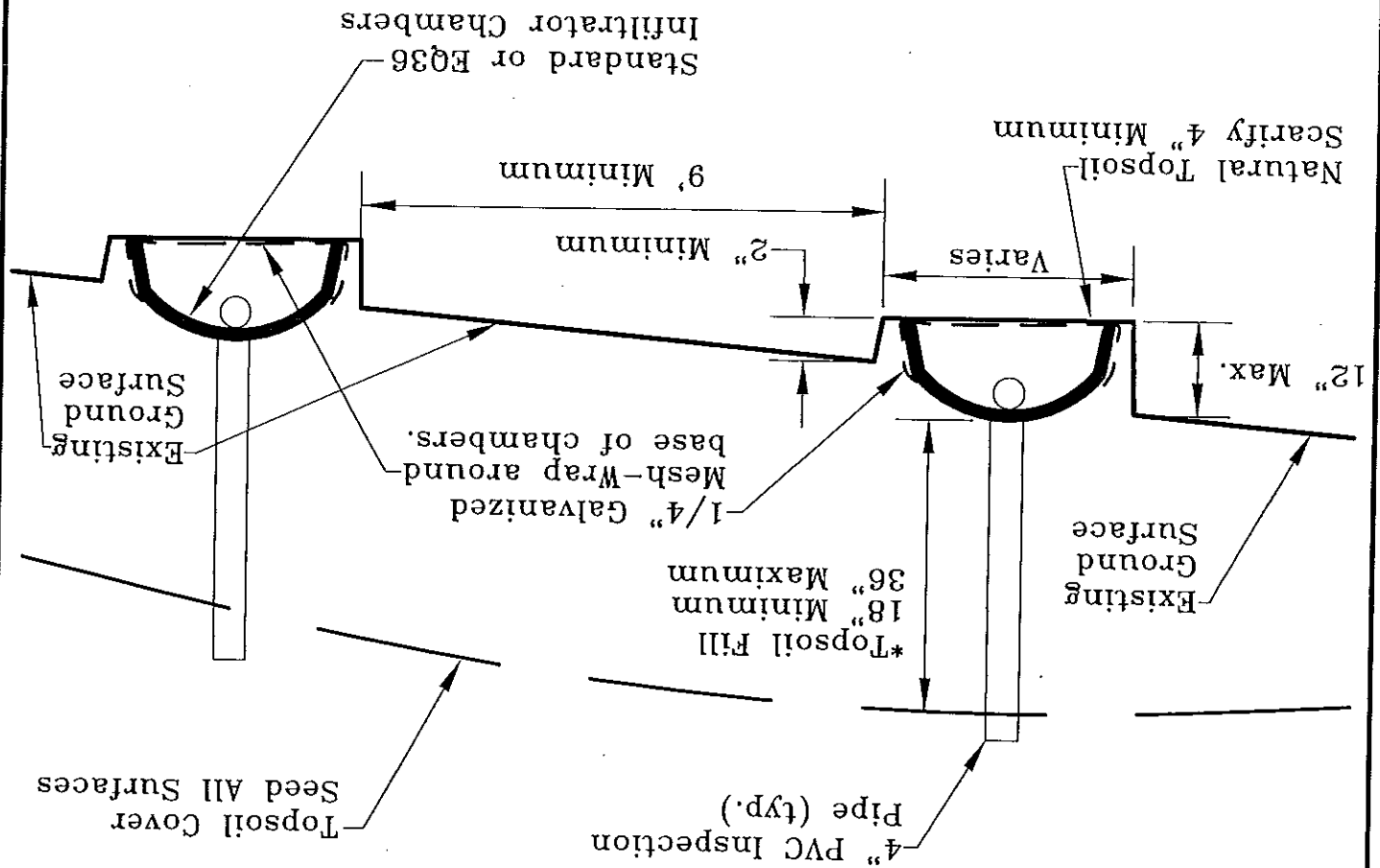
#1

Location: Virtus Way, Routt County, Colorado

Job Name: Proposed Elkstone Caretaker Residence



* The chambers should be backfilled in accordance with the manufacturer's recommendations.



INFILTRATOR SYSTEM CROSS SECTION

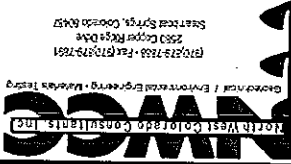
Date: 9/18/09

Job No. 08-7888

Figure #2

Job Name: Proposed Elkstone Caretaker Residence

Location: Virtus Way, Routt County, Colorado



APPENDIX A

SUMMARY OF DESIGN CALCULATIONS

A. Sewage Volume Calculations

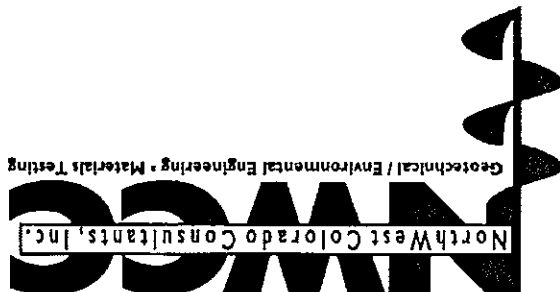
- 1) Number of Bedrooms-Two Bedrooms:2BR x 150 gpd/bedroom = 300 gpd
- 1a) Caretaker Residence-Additional Kitchen:50 gpd
- 2) Total Average Flow350 gpd
- 3) Peak Factorx 1.75
- 4) Peak Flow for Design.....Q = 613 gpd

B. System Sizing

- 1) Minimum absorption area = $Q (t^{1/2})/5 = (613)(17)^{1/2}/5 = 505 \text{ ft}^2$
- 2) Less 40% for Standard or Quick-4 Infiltrator Chambers: $505 \times 0.60 = 303 \text{ ft}^2$
- 3) No. of Quick-4 Std. Infiltrator Chambers: $303 \text{ ft}^2/10 \text{ ft}^2/\text{chamber} = 30.3 \text{ chambers} \Rightarrow \text{use } 31 \text{ Quick-4 Standard Infiltrator chambers.}$
- 3A) No. of Quick-4 EQ36 Infiltrator Chambers: $303 \text{ ft}^2/10.67 \text{ ft}^2/\text{chamber} = 28.4 \text{ chambers} \Rightarrow \text{use } 29 \text{ Quick-4 EQ36 Infiltrator chambers.}$
- 4) Septic Tank-per Routt County Regulations: Use a minimum 1,000-gallon tank for a two-bedroom residence.
- 5) Minimum well, watershed and open water setback-per Routt County Regulations: 100 Feet Minimum.
- 6) Minimum seasonal drainage setback-per Routt County Regulations: 25 Feet Minimum
- 7) Minimum property line setback-per Routt County Regulations: 10 Feet Minimum
- 8) Minimum Waterline setback-per Routt County Regulations: 25 Feet

APPENDIX B

- 1) The Regulations of the Rount County Department of Environmental Health must be complied with during the construction/installation of the system.
- 2) Periodic construction observations must be made by the Design Engineer from NWC, Inc. at the following points during Construction:
 - a. After subgrade excavation and septic/dosing tank installation.
 - b. After placement of chambers, but before chambers are covered.
 - c. Upon final completion of the project.
- 3) The PVC pipe, perforated or non perforated, shall conform to ASTM 3034 or better quality. Any 2" solid PVC pipe shall be Schedule 40 or better quality. Each trench shall be constructed level.
- 4) The soils beneath the pipes entering and leaving a septic or aeration tank, which has been excavated, shall be backfilled in 6 inch lifts and mechanically compacted to a minimum of 95% of the maximum standard proctor density. Cast iron pipe or PVC pipe meeting ASTM 3034 SDR 35 or schedule 40 shall be used for 5 feet on either side of the tank.
- 5) Provide a minimum of 12 inches of soil cover over the septic tank and 24 inches of soils cover over all pipes. Any piping placed under a driveway or other ploved areas should have a minimum of 48 inches of soil cover and be protected from freezing using insulation or other approved means. If the 2-inch pressure line cannot drain to the distribution box or back to the dosing tank, we recommend a minimum cover of 7 feet under driveways or other ploved areas and the line should be protected from freezing using insulation or other approved means. Special care should be taken when backfilling the system to prevent disturbance/crushing of the distribution lines and chambers. The manufacturers recommendations should be closely followed when backfilling the chambers. In addition, the distribution lines should be carefully bedded and compacted prior to placement of the pipe to minimize the settlement in these lines.
- 6) The surface drainage shall be ditched and diverted away from absorption areas.
- 7) The disturbed surfaces, mounds and berms shall be covered with topsoil and heavily seeded. Heavy farm equipment and livestock should be fenced or kept off of the Infiltrators.
- 8) Inspection pipes to be constructed of PVC pipe with the portion of the pipe penetrating the infiltrator chamber being perforated. Cleanouts must be placed in the 4" solid distribution lines at maximum intervals of 100' downstream of the septic tank and at a maximum interval of 50' upstream of the septic tank.
- 9) The owner and installer are responsible for meeting and maintaining all of the minimum setback requirements.



March 2, 2012

Terry Hufington

P.O. Box 4337

Houston, TX 77210

Job Number: 07-7888

Subject: On-site Wastewater System Observations,
Elkstone Caretaker Residence, Virtus Way, Routt
County, Colorado.

Ladies and Gentlemen:

As requested by Deano Temple, NWCC, Inc. (NWCC) visited the project site on October 27, November 19 and 23, 2009 and August 5 and October 28, 2010 to observe the On-site Wastewater System (OWS) being constructed for the Elkstone Caretaker Residence under construction on Virtus Way in Routt County, Colorado. NWCC previously designed the OWS for the Caretaker Residence under this job number and dated September 25, 2009.

Site Observations: At the time of our site visit on October 27, 2009, the contractor, Temple Construction, had placed the 4-inch diameter building sewer piping (ASTM 3034; SDR 35) from the Caretaker Residence to near the septic tank location. The piping appeared to meet the minimum grade requirement. The contractor had provided a minimum of 48 inches of cover and was in the process of placing insulation of the portion of the pipe located under the driveway.

At the time of our site visit on November 19, 2009, the contractor had placed a 1,250-gallon (3-compartment) concrete septic/dosing tank to the west of the caretaker residence, currently under construction and southwest of an existing greenhouse structure. The contractor had completed the building sewer piping (ASTM 3034; SDR 35) between the residence to the septic tank. The piping appeared to meet the minimum grade requirement. The inlet and outlet 'T' connections in the septic tank visually appeared to have been constructed properly at the time of our visit. An effluent filter was placed in the outlet 'T' of the septic tank, between the 2nd and 3rd compartments. The pump had not been installed in the dosing chamber of the septic tank.

At the time of our site visit on November 23, 2009, the contractor had placed the 2-inch diameter pressure piping (Schedule 40 PVC) from the outlet of the dosing tank to near the proposed distribution box for the absorption field. The 2-inch diameter piping was graded to flow back to the dosing chamber in the septic tank. The contractor had provided approximately 72 inches of cover and was in the process of placing insulation over the portion of the pipe located under the driveway.

We advised Mr. Gillespie and RCDEH that the OWS was designed for an additional 50 gpd of average flow from the additional kitchen. An average flow of 300 gpd was also used for the residence resulting in a total average daily flow of 350 gpd. We recommend that the water/wastewater flow be monitored to determine if excess wastewater is flowing into the OWS. If the wastewater flows generally regularly exceed 250 gallons per day from the residence and additional kitchen, we recommend operation of the OWS be evaluated and additional capacity for the absorption field may be required.

Based on our conversations with the general contractor, Joe Gillespie, and the Routt County Department of Environmental Health (RCDEH), it is our understanding that the kitchen in the lower level of the caretaker residence may be used for limited commercial operations. It is our understanding the commercial operations will include washing cleaning vegetables and fruit produced from the greenhouse in preparation for commercial sale. This will require approximately 3 to 4 sinks for different uses.

Based on our part time observations, it appears that the portions of the system, which were completed at the time of our site visits, had been constructed in general accordance with the design previously completed by NWCC. We believe that the system should function properly with proper care and maintenance if the components not completed at the time of our visits were properly constructed. An as-built drawing taken from field measurements of the system is presented in Figure #1.

At the time of our site visit on October 28, 2010, the septic tank, absorption field and piping had been backfilled. It appeared that sufficient amount of fill had been placed over the septic tank, distribution pipes and chambers. The risers on the septic tank had been raised to near the finished ground surface. The lids should be properly secured or locked to prevent unauthorized access. The pump installation and electrical wiring had also been completed at the time of our site visit.

We advised the contractor the system should be backfilled in accordance with the manufacturer's recommendations. We also advised them that a minimum of 18 inches and a maximum of 36 inches of soil cover should be placed over the tops and sides of the chambers and a minimum of 24 inches of soil cover over the distribution lines. If sufficient amounts of fill are not placed over the chambers, seepage may occur during high usage periods. The disturbed areas should be heavily seeded with a drought tolerant grass.

At the time of our site visit on August 5, 2010, the contractor had placed 1 run of 16 and 1 run of 15 chambers for a total of 31 Quick-4 Standard Infiltrator chambers. The piping (ASTM 3034; SDR 35) from a plastic distribution box to each of the chamber runs had been placed and appeared to meet the minimum grade requirements. It appeared that the Infiltrator chambers were placed a maximum of 12 inches below the natural ground surface. The contractor had placed galvanized mesh on the bottom and sides of the chambers. Inspection pipes had also been placed at the end of the chamber runs at the time of our visit.

Operation and Maintenance: Observing the operation and performing routine maintenance of the OWS is essential to allow proper, long term functioning of the system. We recommend that the operation be monitored and a qualified, licensed maintenance contractor performs maintenance of the system.

- 1) **Septic Tank:** The scum and sludge accumulation in the septic tank should be monitored yearly. Once the scum or sludge thickness reaches 25% of the chamber depth, the septic tank should be pumped. A pumping frequency of 1 to 3 years is likely at the design flows. Depending on use, pumping may only be required every 3 to 7 years.

- 2) **Effluent Filter and Dosing System:** The effluent filter at the septic tank outlet should be cleaned when the septic tank is inspected or as required. The pump should be checked semi-annually to ensure the pump is functioning properly. If the high water alarm sounds, the system should be inspected and serviced immediately. A backup pump should be installed in the dosing tank or kept on site for easy replacement.

- 3) **Absorption Field:** If the system is not activated within 30 days of installation or is inactive for an extended period of time, we recommend that water be run into the Infiltrator chambers periodically (once every 30 days) to prevent rodents from nesting and burrowing in the chambers, which could result in premature failure of the system. We also recommend that the system be fenced off to vehicular traffic and livestock. The surface area around the absorption fields should be observed monthly for signs of failure, such as lush vegetation growth or ponding. Liquid levels within each run of Infiltrators should be observed through the observation/vent pipes.

- 4) **Treated Water:** We do not recommend that the water softeners or water treatment systems be connected to the OWS. The chemical and hydraulic loading from the backwash of these treatment systems may be detrimental to the OWS. If a treatment system is used, a separate dry well should be constructed for the backwash waste. In addition, chemically treated water from a swimming pool or spa must not be discharged into the OWS.

- 5) **General Notes:** The owner should be aware that the operation of the OWS is different from a public sewer service. Plastic and other non-biodegradable materials should not be placed into the system. Water use should be monitored so fixtures are not allowed to run if a seal malfunctioning. Allowing fixtures to flow continuously to prevent water lines from freezing or a malfunctioning faucet or toilet can consume in excess of 1,000 gallons per day. Excessive flows could flood and cause premature failure of the system. No plastic or landscaping that requires additional irrigation should be placed over the absorption field.

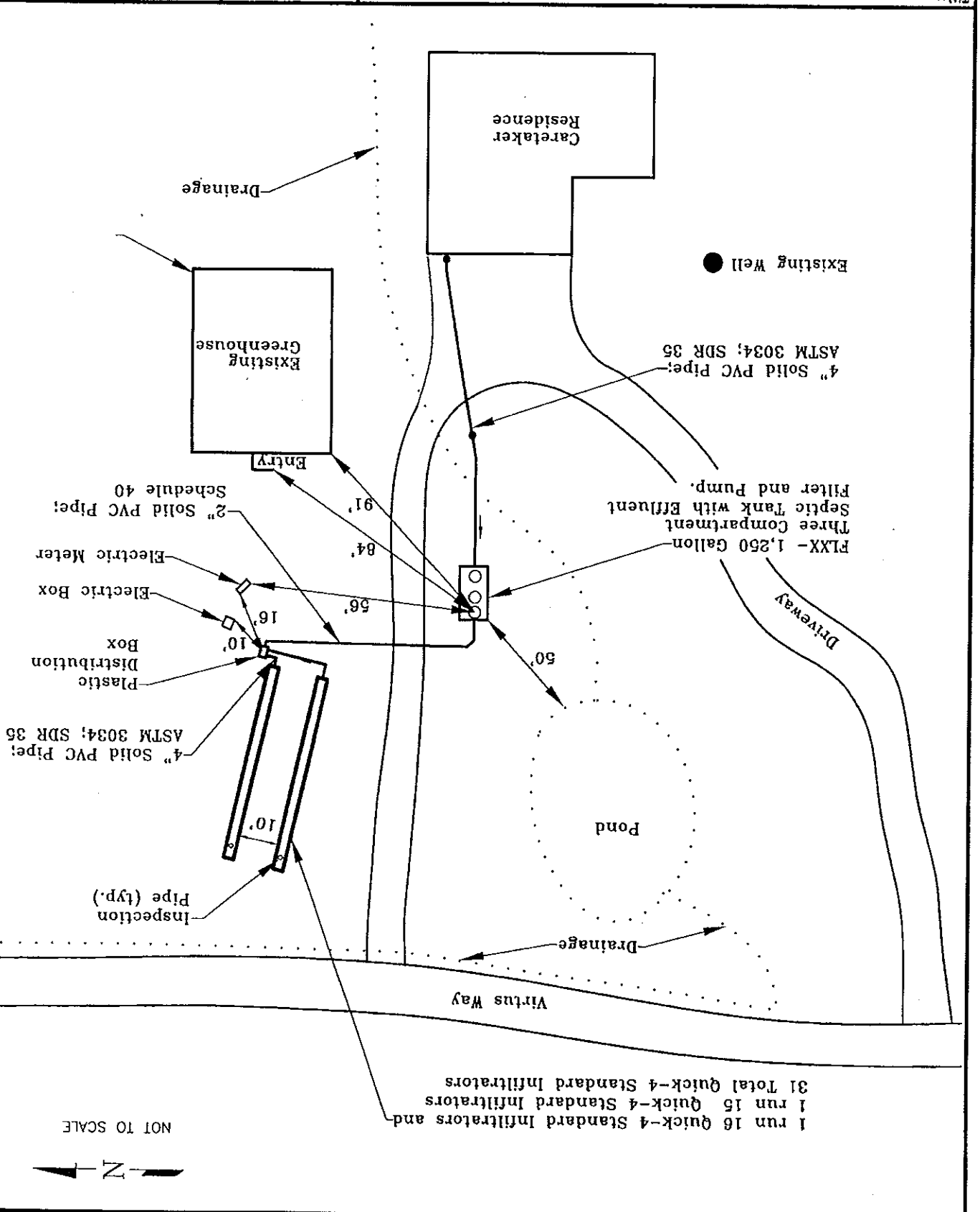
If you have any questions regarding this report, our observations or recommendations or if we may be of further service, please contact this office. A copy of this report has been submitted to the Routt County Department of Environmental Health.

Sincerely,
NWCC, Inc.,

Timothy S. Travis, P. E.



Reviewed by Harold N. Schlich, P. E.
cc: Routt County Department of Environmental Health
Joe Gillespie



• I.S.D.S. PERMIT •
TO INSTALL, CONSTRUCT, ALTER OR REPAIR
AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM

Permit: EH-12-017

New: N
Repair: N
Alteration: Y
Addition: N

ROUTT COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH • P.O. BOX 770087 • STEAMBOAT SPRINGS, CO • 970-870-5588

This permit effective only on premises located at: 40345 VIRTUS WAY C

Legal description of property: TR IN NE4 & S2 SEC 4-6-84 (AKA UPPER PARCEL)

Parcel Id.: 936041007

Lot No.:

Owner: ELKSTONE FARM

Address: P O BOX 4337

HOUSTON TX 77210-4337

Phone: 970-879-5566

Applicant: GILLASPIE CONSTRUCTION

Address: ATTN: JOE GILLASPIE P.O. BOX 771811

STEAMBOAT SPRINGS CO 80477

Phone: 970-879-0973

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SPECIFICATIONS

☒ Residential ☒ Commercial Other:

Percolation Rate: 17 MPI

Minimum Septic Tank Capacity: 1000 gallon

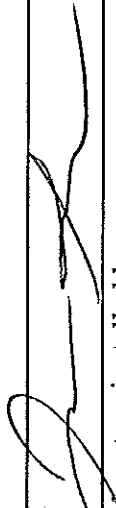
Tank Material: ☒ Concrete ☒ Polyethylene

Design: 1: Engineer shall certify that construction complies with permitted design.

Comments: SG 06/08/2012 THIS IS AN ALTERATION OF ORIGINAL

SYSTEM IN PERMIT #EH-09-055.

Notice: All Sewage *HOLDING* Tanks must be Concrete. Inspections required (24 hour advanced notice required).

Environmental Health Specialist: 

Date of Issue:

6/8/12

The above individual sewage disposal system installed by _____

_____ has received a final inspection. The system is hereby approved for use.

Environmental Health Specialist:

Date

State fee \$0.00

Fee: Percolation \$0.00

Permit \$0.00

\$100.00

RECEIPT

RECEIPT NUMBER: R120000516

Routt County Environmental Health Department
P.O. Box 770087 Phone 970-870-5588
Steamboat Springs, CO 80477

APD #: BH-12-017
SITE ADDRESS: 40345 VIRTUS WAY C
PARCEL: 936041007
TYPE: BH-Ind. Sewage Disp Sys

May include fees collected within the jurisdiction.

TRANSACTION DATE: 06/08/2012
TOTAL PAYMENT: 100.00
TOTAL PAID FROM TRUST: .00
TOTAL PAID FROM CURRENCY: 100.00

TRANSACTION LIST:
Type Method Description Amount
Payment Check #17510
TOTAL: 100.00

ACCOUNT ITEM LIST:
Description Account Code Current Pmts
Loan Inspection Fee 01-20-22-000-564 100.00
TOTAL: 100.00

RECEIPT ISSUED BY: SG
INITIALS: SAG
ENTERED DATE: 06/08/2012
TIME: 11:58 AM

OK full permit
J.S. 6/8/12

EH-12-017
BUILDING PERMIT # CB-12-1145
PERMIT PD 100.00
PERC PD

Ch # 17510
Wellscope Construction
EMERGENCY USE rec'd 6/7/12

APPLICATION FOR INDIVIDUAL SEWAGE SYSTEM PERMIT

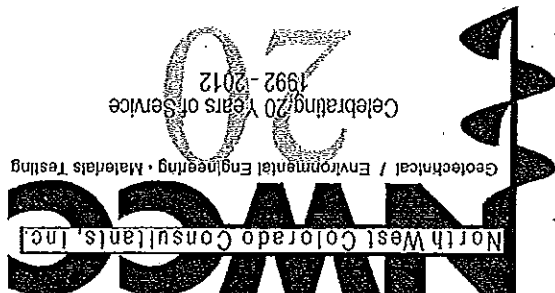
NEW REMODEL X REPAIR

Name of Owner ELKSTONE FARM Mailing Address Box 4337 Phone 870-5566
Name of Applicant same Mailing Address HOUSTON TX 77210-4337 Phone
LOCATION OF PROPOSED SYSTEM: Street Address 40345 VIRGUS WAY
Legal Description T2 IN NE 4 & S2 SEC 4-6-84 (aka upper 2nd) Parcel ID# 936041007
(this# can be found in the Assessor's Office)
(Lot# and Subdivision if applicable)
Size of Lot () Residential () Commercial (X) Other (Describe) AGRICULTURE
Number of: Bedrooms 2
Water Supply: (X) Private Well
() Public (give name of supply) Refer to Permit # EH-09-055

An appropriate plot plan must accompany this application showing required information. Percolation tests and an on-site inspection must be arranged with the Routt County Department of Environmental Health after receipt of the application and plot plan. The permit, upon approval of this application may be obtained at the Routt County Department of Environmental Health with payment of the required fee.

Application for an individual sewage disposal system is hereby submitted. The individual sewage disposal system will be constructed, installed and operated in accordance with the regulations governing individual sewage disposal systems within Routt County and will comply with applicable State Regulations adopted pursuant to Article 10 of Title 25, C.R.S. 1973, as amended. The undersigned acknowledges that the above information is true and that false information will invalidate the application or subsequent permit. The owner assumes all responsibility in case of failure or inadequacy of this sewage disposal system. (*Hot tubs and Jacuzzis shall not be connected on-site sewage disposal systems.)

Signature of Applicant [Signature] Date 6-7-12



*File to Ameytapt
Ranch CB-12-145*

June 5, 2012

Gillaspie Construction
P.O. Box 771811
Steamboat Springs, CO 80487
Job Number: 12-9167

Subject: On-site Wastewater System
Design, Proposed Elkstone Seedhouse,
40345 Virtus Way, Routt County, Colorado.

Ladies and Gentlemen:

This report presents the results of an On-site Wastewater System (OWS) design for the proposed Elkstone Seedhouse to be constructed at 40345 Virtus Way in Routt County, Colorado. NWCC, Inc. (NWCC) previously completed a Subsoil and Foundation Investigation report for the Seedhouse under this job number and dated May 2, 2012. NWCC also completed Subsoil and Foundation Investigation's, design and construction observations of the existing OWS for the existing greenhouse structure and caretaker's residence constructed to the east of Virtus Way under our job number 07-7888.

Proposed Construction: It is our understanding, based on a review mechanical plan and conversations with the architect, Robert Ralston, and the client that the proposed Seedhouse will be constructed with a bathroom (water closet and lavatory) and washroom (two wash sinks and lavatory). It should be noted that the water from the wash sinks cannot be discharged to a cistern and used to surface irrigate the landscaping or meadow. Therefore, flows from all sinks and toilets will be plumbed to flow to the new septic tank. The absorption field for the OWS constructed for the Caretaker's Residence, to the east of Virtus Way, will be expanded to allow for the additional flows anticipated from the proposed Seedhouse structure.

Site Conditions: The proposed Seedhouse is located west of Virtus Way in Routt County, Colorado. The vegetation at the site of the existing/proposed OWS consisted of natural grasses, weeds, deciduous brush and aspen trees. An existing pond is located to the south of the existing/proposed OWS. The pond is fed by a seasonal drainage located to the north of the proposed Caretaker Residence and south of the existing greenhouse. The pond discharges into a drainage at the southwest corner of the pond and flows under Virtus Way in an east to west direction to the south of a recently constructed soft-cover greenhouse. A roadside drainage ditch is also located along the east side of Virtus Way and the ditch flows in a north to south direction.

The topography at the site is variable and the area of the existing absorption field generally slopes gently to moderately down to the southwest on the order of 5 to 10 percent.

Subsurface Conditions: A profile pit was excavated in the area of the absorption field on July 29, 2009. The subsurface conditions encountered in the profile pit generally consisted of approximately 24 to 30 inches of topsoil and organics overlying natural sands and clays to the maximum depth investigated, 6 feet. The natural sands and clays were silty, fine to medium grained with occasional gravels, very low to low plastic, medium dense to medium stiff, moist to very moist and brown in color. Groundwater seepage was not encountered in the profile pit at the time of excavation and no evidence of a seasonal high groundwater table was observed in the profile pit.

A set of 6-percolation test holes, ranging from 12 to 38 inches in depth, was advanced in the area of the proposed OWS. Percolation testing was conducted by our office on July 29, 2009 to determine the percolation rate of the natural soils. The percolation tests indicate that the upper 24 to 30 inches of natural topsoil and organic materials in the area of the proposed OWS exhibited percolation rates from ranging from 10 to 20 minutes per inch (mpi) with an average percolation rate of 17 mpi. The deeper natural sands and clays exhibited percolation rates of 80 to 120 mpi.

System Design: Based on our understanding of the proposed construction, the topography of the site, the soils encountered in the profile pit and the percolation test results, we recommend the existing trench absorption system utilizing Standard Infiltrator chambers be expanded to treat the additional flows anticipated from the proposed seedhouse. It should be noted that standard Infiltrator chambers placed in the upper 12 inches of natural topsoil and organic materials were constructed for the existing absorption field.

The OWS design presented below is based on the total anticipated apertures for the structure, as well as the average percolation rate for the natural soils. Considering the anticipated construction, we have calculated an additional peak effluent flow of 193 gallons per day (gpd) for the system. Based on the percolation results, a minimum absorption area of 159 square feet is required for conventional trench or bed absorption systems.

Using a 40% reduction in the required absorption area with Infiltrator chambers, we have calculated that the system should be constructed using ten (10) additional Quick-4 Standard Infiltrator chambers. We recommend that the trenches for the chambers be placed a maximum of 12 inches below the natural ground surface. In addition, we recommend that a new distribution box be installed at the northwest end of the absorption field to allow flow into both ends of each run of chambers. We also recommend that the base and sides of the chambers be covered/wrapped with a 1/4-inch galvanized steel mesh to help prevent rodent intrusion. A minimum of 18 inches of soil cover should be placed over the chambers in accordance with the chamber manufacturer's recommendations.

A septic tank with a minimum capacity of 1,000-gallons is required for the proposed Seedhouse. Due to the subsurface conditions encountered at the site, we recommend that a concrete septic tank be used. An effluent filter must be installed in the downstream outlet "T" of the septic tank. We recommend that the tank be placed to allow access for pumping. Generally a septic tank can be pumped from 100 feet away with a maximum lift of 10 feet; however, a local pump contractor should be consulted in regards to the tank maintenance access.

Due to the elevation difference from the Seedhouse to the Infiltrator chambers, a float-activated effluent pumping system will be required. We recommend that a FLXX 1,250-gallon three-compartment septic tank with an approved commercial grade, float-activated effluent pump installed in the downstream compartment be used for the system. We recommend the floats in the dosing tank be set to provide a dose of between 125 and 150 gallons per dose to the leach field. The system should have a high water alarm system installed in the residence to warn the owner in the event of a pump malfunction. A secondary or backup pump installed in the dosing chamber or stored on-site is also recommended in the event of a pump failure. The piping (2-inch diameter, Schedule 40) between the pump and absorption field must be sloped to drain to the field or back to the dosing tank. A pressure relief valve (aka: "Snifter") should also be placed at the high point of the piping between the pump and field.

The system design is presented in Figures #1 and #2. The design calculations are shown in Appendix A and the specifications for the system are given in Appendix B.

Operation and Maintenance: Observing the operation and performing routine maintenance of the OWS is essential to allow proper, long term functioning of the system. We recommend that the operation be monitored periodically and a qualified, licensed maintenance contractor perform maintenance of the system.

1) Septic Tanks: The scum and sludge accumulation in the septic tanks should be monitored yearly. Once the scum or sludge thickness reaches 25% of the chamber depth, the septic tank should be pumped. A pumping frequency of 1 to 3 years is likely at the design flows used in this design; however, depending on actual use, pumping may only be required every 3 to 5 years.

2) Effluent Filters and Pumping Systems: The effluent filters at the septic tank outlets should be cleaned when the septic tanks are inspected or as required. The effluent pumps should be checked semi-annually to ensure the pumps are functioning properly. If the high water alarm sounds, the system should be inspected and serviced immediately.

3) Absorption Field: If the system is not activated within 30 days of installation or is inactive for an extended period of time, we recommend that water be run into the Infiltrator chambers periodically (once every 30 days) to prevent rodents from nesting and burrowing in the chambers, which could result in premature failure of the system. We also recommend that the system be fenced off to vehicular traffic and livestock. The surface area around the absorption fields should be observed monthly for signs of failure, such as lush vegetation growth or ponding. Liquid levels within each run of Infiltrators should be observed through the observation/vent pipes.

4) Treated Water: We do not recommend water softeners or water treatment systems be connected to the OWS. The chemical and hydraulic loading from the backwash of these treatment systems may be detrimental to the OWS. If a treatment system is used, a separate dry well should be constructed for the backwash waste. In addition, chemically treated water from a swimming pool or spa must not be discharged into the OWS.

5) General Notes: The owner should be aware that the operation of the OWS is different from a public sewer service. Plastic and other non-biodegradable materials should not be placed into the

system. Water use should be monitored so fixtures are not allowed to run if a seal malfunctioning. Allowing fixtures to flow continuously to prevent water lines from freezing or a malfunctioning faucet or toilet can consume in excess of 1,000 gallons per day. Excessive flows could flood and cause premature failure of the system. No plastic or landscaping that requires additional irrigation should be placed over the absorption field.

Limitations: The procedures and design criteria used in this design was obtained from the BPA "Design Manual - On-site Wastewater Treatment and Disposal Systems", 1980, the Colorado Department of Health "Guidelines for Individual Sewage Disposal Systems" (rev. 2000) and the Routt County "Individual Sewage Disposal System Regulations" (February, 1999). The wastewater disposal system design presented is based on currently accepted design procedures and the proposed features and usage of the facilities. If the usage of the facilities or addition of new facilities to those proposed in the building changes, the OWS design will also most likely change. It should also be noted that all on-site wastewater disposal systems require periodic maintenance as noted above. The failure of the owner to provide proper periodic inspection and maintenance of the system can lead to premature failure of the system.

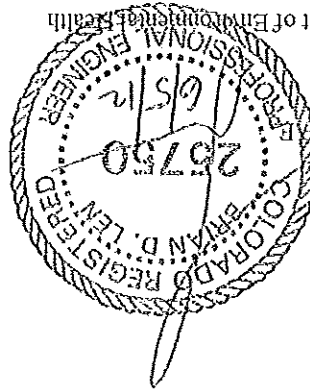
Please be advised that Colorado law requires that a permit must be obtained prior to the construction, alteration, or use of an on-site wastewater system. In addition, the client must retain our office to observe the construction/installation of the on-site wastewater system.

If you have any questions concerning this report or our recommendations, or if we may be of further service, please contact this office.

Sincerely,
NWCC, INC.

Timothy S. Travis, P.E.

Reviewed by Brian D. Len,



cc: Routt County Department of Environmental Health

 NWCC NORTHWESTERN WATER CONSTRUCTION COMPANY, INC. Generalist / Environmental Engineering - Materials Testing	Title: INFILTRATOR CROSS SECTION	Job Name: Proposed Elkstone Seedhouse	Location: 40345 Virtus Way, Routt County, Colorado	Figure #2
12000 Canyon Blvd. Suite 2000 Boulder, CO 80501	Date: 6/5/12	Job No. 12-9167		

APPENDIX A

SUMMARY OF DESIGN CALCULATIONS

A. Sewage Volume Calculations

- 1) Three Employees @ 20gpd/employee:3 employees x 20 gpd/employee = 60 gpd
- 1a) Additional Wash Sinks (25 gpd/sink): 2 sinks x 25 gpd/sink =50 gpd
- 2) Total Average Flow 110 gpd
- 3) Peak Factor x 1.75
- 4) Peak Flow for Design.....Q = 193 gpd

B. System Sizing

- 1) Additional required absorption area = $Q (t^{1/2})/5 = (193)(17)^{1/2}/5 = 159 \text{ ft}^2$
- 2) Less 40% for Standard or Quick-4 Infiltrator Chambers: $159 \times 0.60 = 95.5 \text{ ft}^2$
- 3) No. of Additional Quick-4 Std. Infiltrator Chambers: $95.5 \text{ ft}^2/10 \text{ ft}^2/\text{chamber} = 9.55 \text{ chambers} \Rightarrow \text{use } 10$
Additional Quick-4 Standard Infiltrator chambers.
- 4) Septic Tank-per Routt County Regulations: Use a minimum 1,000-gallon tank for the Seedhouse.
- 5) Minimum well, watershed and open water setback-per Routt County Regulations: 100 Feet Minimum.
- 6) Minimum seasonal drainage setback-per Routt County Regulations: 25 Feet Minimum
- 7) Minimum property line setback-per Routt County Regulations: 10 Feet Minimum
- 8) Minimum Waterline setback- per Routt County Regulations: 25 Feet

APPENDIX B

- 1) The Regulations of the Routt County Department of Environmental Health must be complied with during the construction/installation of the system.
- 2) Periodic construction observations must be made by the Design Engineer from NWCC at the following points during Construction:
 - a. After subgrade excavation and septic/dosing tank installation.
 - b. After placement of additional chambers, but before chambers are covered.
 - c. Upon final completion of the project.
- 3) The PVC pipe, perforated or non perforated, shall conform to ASTM 3034 or better quality. Any 2" solid PVC pipe shall be Schedule 40 or better quality. Each trench shall be constructed level.
- 4) The soils beneath the pipes entering and leaving a septic or aeration tank, which has been excavated, shall be backfilled in 6 inch lifts and mechanically compacted to a minimum of 95% of the maximum standard proctor density. Cast iron pipe or PVC pipe meeting ASTM 3034 SDR 35 or Schedule 40 shall be used for 5 feet on either side of the tank.
- 5) Provide a minimum of 12 inches of soil cover over the septic tank and 24 inches of soils cover over all pipes. Any piping placed under a driveway or other plowed areas should have a minimum of 48 inches of soil cover and be protected from freezing using insulation or other approved means. If the 2-inch pressure line cannot drain to the distribution box or back to the dosing tank, we recommend a minimum cover of 7 feet under driveways or other plowed areas and the line should be protected from freezing using insulation or other approved means. Special care should be taken when backfilling the system to prevent disturbance/crushing of the distribution lines and chambers. The manufacturers recommendations should be closely followed when backfilling the chambers. In addition, the distribution lines should be carefully bedded and compacted prior to placement of the pipe to minimize the settlement in these lines.
- 6) The surface drainage shall be ditched and diverted away from absorption areas.
- 7) The disturbed surfaces, mounds and berms shall be covered with topsoil and heavily seeded. Heavy farm equipment and livestock should be fenced or kept off of the Infiltrators.
- 8) Inspection pipes to be constructed of PVC pipe with the portion of the pipe penetrating the infiltrator chamber being perforated. Cleanouts must be placed in the 4" solid distribution lines at maximum intervals of 100' downstream of the septic tank and at a maximum interval of 50' upstream of the septic tank.
- 9) The owner and installer are responsible for meeting and maintaining all of the minimum setback requirements.