EXAMPLE
On-site Wastewater Treatment System (OWTS) Report

Owner: Joe Neighbor & Mary Neighbor
Site address: 10000, WCR 1000, Town, CO 80000
Legal Description: Lot “A” RE 209X, Parcel # 10172300202
Phone # (970) 010-6666
E-mail Address: Owner does not have.

By
ACME Engineering, LLC
bill.g@acme-eng.com
The content of this On-site Wastewater Treatment System (OWTS) report was created/performed by me or under my direct supervision.
William P. Goble Colorado Professional Engineer (P.E.)
P.E. 00001
1. Preliminary Site Investigation:
   Date: 7/16/2014
   Water Well Location/Water Supply:
   Existing OWTS records:
   Published site Information
   A. Topography: Topography at the site consist of slopes from the north to the south-south west at 2 to 3%. Soil Data: A Web Soil Survey has been obtained from the USDA, natural Resources Conservation Service and is attached to this report. From said report the soil type at the site is a Bresser Sandy Loam with 0 to 3% slopes. The rating of the said soil is somewhat limited and is due to slow water movement, please see the attached report.
   B. Existing Septic permits: No existing septic permits are located on the parcel, however a septic permit was obtained for a site located to the immediate west, Permit # SP-970037, 31504 WCR 88, Ault, CO 81623. From this septic permit, the percolation rate of 10 min./in. was used.
   Existing Site Features/Conditions: Weld County Road (WCR) 42 is located to the south and is elevated relative to the site. No barrow ditch is located on the northern side of WCR 42, on the southern side of the said road is a barrow ditch and irrigation ditch. A mobile home park is located to the west. A residential lot/home site is located to the southwest, a statement of existing septic system is on file with the Weld County Heath and Environment. To the south, south of WCR 42, is an existing residential lot/home site. The land use to the north and east is row crops that are irrigated by a pivot. The prior land use at the site was a wheat crop.
   Preliminary absorption bed/trench size: Using 30 min./in. for a percolation rate, Web Soils Survey (Sandy Loam), the absorption bed size using chambers is as follows. LTAR = 0.5 Gallons/day/SF, Table 30-10-1. For a three (3) bedroom structure, the hydraulic loading rate per day is 450 gallons per day, Table 30-6-1. Adjustment factors: Table 30-10-2, bed = 1.2, Table 30-10-3, Chambers (Quick 4 Infiltrators) = 0.7. From the equation listed in Section 30-10-20-D, Design Flow (gallons/day)/LTAR (gallons/day/SF) = 450/0.5 = 900 SF, 900SF*1.2*0.7 = 756 SF. The preliminary bed size is 756 SF, the number of chambers required = 756 SF/(9.2 SF/Unit) = 82.2 Infiltrator Units
   Additional Information:
   A. Survey: A survey by Compile & Peel to create RE 209X. The subject property is Lot “A” of said RE. As there is nothing on site to locate the proposed septic too, survey locates were obtained using a total station and the percolation holes and test pit/Profile hole was located, please see the attached scalable drawing.
   B. Easements: No easements are noted on the RE 209X drawing.
C. Floodplain: The site is not located in a publish floodplain as obtained from the Weld County Property Information Portal.

D. Geology and basin maps and descriptions: The supporting geology of the area is Cretaceous sandstone, claystone, shale and coal of the Laramie Fm formations per the Ogden Tweto, Geological Map of Colorado, 1979.

E. Aerial: An aerial from the Weld County Property Information Portal has been attached to this report.

F. Climate information: From Appendix 30-C of the Weld County Code, the site is located on or just east of the 45 in/year Free Water Surface Evaporation line.

G. Delineated Wetlands: No Wetlands were observed on site.

2. Reconnaissance:

Landscape position: No landscaping or trees presently exist in the area where the septic system is to be installed.

Topography: Topography at the site consist of slopes from the north to the south-south west at 2 to 3%. No unique topographic features exist on this site, i.e. drainage swales, irrigation ditches, reservoirs or lakes.

Vegetation: At the present time the site is fallow, wheat stubble and a few weeds is the current ground cover.

Natural and cultural features: No natural or known cultural features exist on this site.

Current and historic land use: The current use of the parcel is as farm ground. The historic use was as row crops. From the Weld County Property Information Portal and using the aerial time period photos, a center pivot has been installed in the last 2 years. The area where the proposed septic system is to be install is not irrigated by the pivot and was last planted in a wheat crop and is now wheat stubble. The area that is irrigated by the center pivot is now planted in row crops. Deep compaction from farming operations has likely occurred at the site as soil below 18” are very tight in nature.

3. Detailed Soil/Site Investigation:

Date: 7/17/2014

Visual and tactile evaluation: A visual and tactical evaluation was performed at the site. Two major soil types were observed in the profile hole/test pit. A tactile evaluation was performed on the two (2) soils observed in the test pit. “The Feel Method for Soil Texturing” was performed on both of the observed soils. The upper level soils produced a 1 inch ribbon and indicates a Sandy Clay Loam, please see the attached photo. The lower level soils produced a ribbon longer than 2 inches, this soil is classified as a Clay/Silty Clay and is considered a limiting layer.

Percolation test: A percolation test was performed at the site and consisted of a 7 hole percolation test with the percolation test holes spread throughout the proposed absorption bed area. Four (4) of the percolation test holes, #2, #3, #6 and #7, were between 20 to 23 inches in depth. The remaining 3 holes, #1, #4 and #5, were 34 to 35” in depth. The percolation test was started at 10:45 and concluded at 1:15 when the water-level drops became consistent, 1/16 inch or less, with the previous water-level drop measurements in the shallow percolation test. The following results were obtained for the 20 to 23 inches in depth holes Hole #2—0-13/16”, Hole #3—1-3/8”, Hole #6—0-
11/16”, Hole #7—0-5/8”. The data, as obtained for the shallow percolation test, produces a percolation rate of 34.29 min./in. The following results were obtained for the 34 to 35” inches in depth holes, Hole #1—1-0", Hole # 4—0-7/8", Hole #5—0-7/16”. The data, as obtained for the deep percolation test, produces a percolation rate of 38.92 min./in.

4. **Graphic soil log/profile:** I was present during the excavation of the soil profile/test pit and the profile hole/test pit was dug by the use of a backhoe. The soil profile hole/test pit was unstable and prone to side wall collapse. The observed soil profile is as follows: 0” to 69” Sandy Clay Loam as determined by “The Feel Method for Soil Texturing” (1” Ribbon). 69” to 90”, Clay as determined by “The Feel Method for Soil Texturing” (2”+ Ribbon). A Graphic Soil Log has been created and can be found in the attachments of this report.

5. **Groundwater table:** Groundwater was observed at 69” and appeared to be irrigation water trapped on top of the clay layer. In addition, as the backhoe excavated to 7.5’ in depth, ground water was observed welling up from the bottom of Profile Hole/Test Pit. Due to the Profile Hole/Test Pit being unstable and the close proximity of the mobile home park. The Profile Hole/Test Pit was covered after my observations for safety. Photos were taken of the Profile Hole/Test Pit before the Pit was covered, the photos can be found in the appendix of this report. The system installer has installed an inspection port for the Environmental Health Department inspection.

6. **Set-back from site features:** The Set-Backs required at this site include set-back for occupied buildings (Modular Housing Unit) and from property lines to include the Weld County Road Right Of Way (ROW). No other septic system set-backs are required at this site.

7. **Site drawing:** The site plan drawing is based on the Recorded Exemption drawing create by McRae and Short, RE 2067. The Test Pit/Profile Pit were located using a Trimble 5600 total station. The reference monuments used were the South Quarter (1/4) Corner and Southwest Section Corner as shown on the RE 2067 drawing. No property pins/corners were located. The Site drawing can be found in the appendix in the back of this report.
OWTS Design
Commercial: NO
Residential: Three (3) bedroom house, the number of people living in the structure is unknown as this residence is to be used as a rental unit.
Design flow values: 450 gallons as obtained from Table 30-6-1, 3 Bedroom House.
Minimum Horizontal Set-backs: The set-backs that apply to this site, for the absorption bed, include set-backs from the proposed housing unit, 20 feet and property line set-backs. The septic tank set-backs are as follows, 5 feet from the proposed structure and absorption bed. In addition the distribution box and absorption bed requires an additional 5 feet.
Vertical Separations: 4 feet of vertical separation is required between the bottom of the Quick 4 infiltrators and the groundwater table. The groundwater was observed at 5 foot 9 inches, the maximum bury depth of the Quick 4 infiltrator system is 1 foot 9 inches. The absorption bed cap will be above the existing grade, however no lift station is required.
Surface Activity: No surface activities that compact the soils of the absorption shall be permitted. It is recommended that the absorption area be fenced and/or barriers be installed to protect the absorption bed.
Class V Injection Well permit requirement: Not required.
Tanks and Vaults: The required septic tank size is 1,000 gallons per table 30-9-1. Sign and sealed shop drawings of the septic can be found in the appendix of this report. The proposed septic tank top is to be set 9” or 0.75’ above the existing grade/ground surface.
Tank anchoring requirement: No tank anchoring is required as the bottom of the septic tank is 0.17 feet above the groundwater elevation.
Distribution box: The distribution box shall be set a minimum of 5 feet from the absorption bed and 5 feet from the septic tank. The invert out of the distribution box shall be set 3 inches, or 0.25' above the existing ground elevation.
Wastewater pumping/Lift stations: No lift stations or pumping of wastewater is required at this site.
Soil Treatment area:
  a. Soil Profile Classification/Limiting layers: Two major soil types were observed in the soil profile hole/test pit and they consist of Sandy Clay Loam and Clay. The soil Classification was determined using the Feel Method for Soil Texturing. The soils to be used for the soil absorption produced a test ribbon 1" long (Sandy Clay Loam). The clay layer produced a test ribbon longer than 2" (Clay). Groundwater (irrigation water) appeared to be trapped on and above the existing clay layer. The depth of the groundwater above the clay layer is 1 inch. Groundwater was observed at 5’9” below the existing ground elevation. From Table 30-10-1, LTAR = 0.50 gallons/SF (Sandy Clay Loam).
  b. Replacement soils: Replacement soils are not required at this site.
  c. Sand filter: A sand filter is not required at this site.
  d. Absorption system type: The proposed absorption area is to be a bed configuration with a Low Profile Quick 4 Infiltrator system. Please see the attached cut sheet.
e. Adjustment factors: From Table 30-10-2, Bed absorption 1.2 (Gravity), Table 30-10-3, Chambers 0.7.

f. Sizing: From Section 30-10-20-D, Soil Treatment Area = Design Flow/LTAR, 450/0.5 = 900. With Adjustment factors 900*1.2*0.7 = 756 SF. The number of LP Quick 4 Infiltrators required = 756/9.2 = 82.17 units, use a minimum of 83 LP Quick 4 Infiltrators configured in three (3) rows of 17 units and two (2) rows of 16 units. Additional LP Quick 4 Infiltrator units may be used at the owners/installers discretion. The recommended absorption bed configuration is 5 rows of 17 units.

g. Depth of absorption treatment area: The maximum depth of the bottom of the Low Profile (LP) Quick 4 Infiltrators shall be no more than 1.3 feet below the existing ground elevation. The cap of the absorption area will be mounded above the existing ground elevation by 0.2 feet

h. Ground cover: The absorption area shall be planted with native grasses, water until the native grass is established. Continually watering the absorption area will cause premature absorption system failure.

i. Soil treatment area protection: The absorption area shall be protected from vehicular traffic, livestock and any activity that compacts absorption soils. It is recommended that the absorption area be fenced or barriers placed around the absorption area.

**OWTS Construction**
The OWTS shall be constructed to meet all Weld County Code, Chapter 30, requirements. Please see the attached septic system design drawings for elevations of the key components of the OWTS.

**OWTS Maintenance**
Please see the attached material from the Weld County Department of Health and Environment on how to take care of and maintain the OWTS. The use of a garbage grinder in the kitchen sink will require a more frequent pumping schedule due to the solids introduced into the septic system. Please consult a septic system cleaner or a Septic system designer to determine the frequency of or pumping schedule for the septic tank.

Food greases should not be introduced into the septic system as they will cause premature absorption bed failure and buildup of scum in the septic tank which can lead to system failure.

**After the establishment of the native grasses on the absorption bed/trench, no further irrigation shall be permitted on the absorption area.** Per Weld County Code, mow the native grasses when the height of 12” or higher is present.
### Percolation Test Log & Calculation Results

<table>
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<tr>
<th>Hole Number</th>
<th>Depth (inches)</th>
<th>Start Time</th>
<th>Time Interval (min)</th>
<th>Water Level Interval (inches)</th>
<th>Rate at Final Interval (min/inch)</th>
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</table>

**Notes:**
EXAMPLE

TP-1
0-53", SANDY LOAM TEXTURE
COLOR= TAN/LIGHT BROWN
MOISTURE= MOIST
STRUCTURE-SHAPE= BLOCKY
STRUCTURE-GRADE= MODERATE
CONSISTENCE= 2 SLIGHTLY HARD
NO REDOXYMORPHIC FEATURES

GROUNDWATER
STABILIZED AT 73"

53"-96", SANDY CLAY LOAM TEXTURE
COLOR= TAN/LIGHT BROWN
MOISTURE= MOIST TO SATURATED
STRUCTURE-SHAPE= BLOCKY
STRUCTURE-GRADE= MODERATE
CONSISTENCE= 2 SLIGHTLY HARD
NO REDOXYMORPHIC FEATURES

TP-2
0-53", SANDY LOAM TEXTURE
COLOR= TAN/LIGHT BROWN
MOISTURE= MOIST
STRUCTURE-SHAPE= BLOCKY
STRUCTURE-GRADE= MODERATE
CONSISTENCE= 2 SLIGHTLY HARD
NO REDOXYMORPHIC FEATURES

GROUNDWATER
STABILIZED AT 73"

53"-96", SANDY CLAY LOAM TEXTURE
COLOR= TAN/LIGHT BROWN
MOISTURE= MOIST TO SATURATED
STRUCTURE-SHAPE= BLOCKY
STRUCTURE-GRADE= MODERATE
CONSISTENCE= 2 SLIGHTLY HARD
NO REDOXYMORPHIC FEATURES

NOTES: 1. THE EXPLORATORY PROFILE HOLE WAS DUG AND EVALUATED ON
7-16-14 USING A JOHN DEERE 450 WHEELED BACKHOE.
2. FREE WATER WAS ENCOUNTERED AT THE TIME OF EXCAVATING.

ACME OWC, LLC
Onsite Wastewater Engineering-Civil Engineering
7123 W. 32nd Street, LaSalle, CO 81643
Voice: (970) 610-0019 Fax: (970) 610-0018

32603 WCR 27, SIMMS OWTS
JOB NO. 14-106
DATE: 03/22/2013
FIGURE A1

LOG OF SOILS PROFILE HOLES
The Quick4 Plus Standard Low Profile (LP) Chamber offers maximum strength through its four center structural columns. This chamber can be installed in a 36-inch-wide trench. It is shorter in height than Infiltrator’s other Standard model chambers, allowing for shallower installation. Like the original line of Quick4 chambers, it offers advanced contouring capability with its Contour Swivel Connection™, which permits turns up to 15°, right or left. The Quick4 Plus All-in-One 8 and Quick4 Plus Endcaps provide increased flexibility in system design and configurations.

Quick4 Plus Standard LP Chamber Specifications

Size
34"W x 53"L x 8"H
(864 mm x 1346 mm x 203 mm)

Effective Length
48" (1219 mm)

Louver Height
6.3" (160 mm)

Storage Capacity
32 gal (121 L)

Invert Height
3.3" (84 mm), 9.6" (244 mm)

Quick4 Plus All-in-One Periscope Benefits:
- Allows for raised invert installations
- 180° directional inletting
- 12" raised invert is ideal for serial applications

Quick4 Plus All-in-One 8 Endcap Benefits:
- May be used at the end of chamber row for an inlet/outlet or can be installed mid-trench
- Mid-trench connection feature allows center feed inletting of chamber rows
- Center-feed connection allows for easy installation of serial distribution systems
- Variable pipe connection options allow for side, end or top inletting
- Piping drill points are set for gravity or pressure pipe

Certified by the International Association of Plumbing and Mechanical Officials (IAPMO)
EXAMPLE

THE LOCATIONS OF EXISTING AND PROPOSED IMPROVEMENTS SHOWN HEREIN &
THE WELL & Drainfield LOCATIONS STATED AT THE SITE ARE THE RESULT
OF A PROPERTY SURVEY BY H&M SURVEYING. FOR MORE INFORMATION
ABOUT
THE SURVEY OR CONTROL, CONTACT H&M SURVEYING AT 970-010-9900. IT IS
THE INSTALLER’S RESPONSIBILITY TO VERIFY PROPERTY BOUNDARIES & ENSURE
ALL ONSITE IMPROVEMENTS ARE LOCATED WITHIN THE PLATTED SITE & OUT OF
EASEMENTS. ALL SEPARATION DISTANCES ARE TO BE VERIFIED PRIOR TO
BEGINNING EXCAVATION.

THIS DESIGN INCLUDES BOTH THE DRAWINGS AND THE WRITTEN
REPORT: REVIEW BOTH BEFORE BIDDING.

CALL UNCC
TWO WORKING DAYS BEFORE DIGGING
800-922-1987
UTILITY NOTIFICATION CENTER OF COLORADO

LOT A
RECORDED EXEMPTION 1581-06-4-RE 1983B
OWNER:
JOSEPH R. AND MILICENT A. SIMMS
ASSessor PARCEL NO. 257105201140
NW1/4 SECTION 6
T2N, R63W, 6TH P.M.

N 89° 26' 11" E 1451.76'

HORIZONTAL CONTROL IS BASED ON NAD 83-COLORADO STATE PLANE
NORTH. VERTICAL CONTROL IS BASED ON NAVD 88. DRAWING
COORDINATES ARE MODIFIED TO GROUND TO OBTAIN STATE PLANE
COORDINATES DIVIDE COORDINATE VALUES BY A SCALE FACTOR OF
1.0002697097 UTILIZING CP #19 AS THE POINT OF ORIGIN. INFORMATION
LISTED BELOW AS: POINT NUMBER, NORTING, EASTING, ELEVATION AND
DESCRIPTION.

2. 1253147.2810, 3191116.8530, 4951.64, FOUND NGS MONUMENT-U85
MP237.85 RT
3. 1275396.8360, 3193505.3510, 4908.31, FOUND NGS
MONUMENT-4907
19. 1274149.3540, 3188732.2860, 4894.81, SET NO. 5 RIBER
20. 1274141.4070, 3188446.4700, 4895.85, SET CHISELED "X" ON
CONCRETE
21. 1274227.4260, 3188512.2110, 4895.22, SET CHISELED "X" ON
CONCRETE

PROPERTY LINE, TYP

DESIGN
PORTION OF
PROPERTY

44.6 ACRES MORE OR LESS

ACME Engineering, LLC
Onsite Wastewater & Civil Engineers
7123 W. 32nd Street, LaSalle, CO 81643
Voice: (970) 010-9019 Fax: (970) 010-9018

OVERALL PROPERTY PLAN

JOB NO. B953
Figure 1 of 6
Example