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

Permit: EH-10-034

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: **50215 MOON HILL DRIVE C**
Legal description of property: LOT 8 MOON HILL MEADOWS SUBD FILING 1
Parcel Id.: 141200008 Lot No.: 008

Owner: WHITTINGHAM, DAVE
Address: 50215 MOONHILL DRIVE
STEAMBOAT SPRINGS CO 80487
Phone: 970-879-2053

Applicant: WHITTINGHAM, DAVE
Address: 50215 MOON HILL DRIVE
STEAMBOAT SPRINGS CO 80487
Phone: 970-879-2053

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: **Number of bedrooms: 3**
Percolation Rate: 30 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: SG 09/30/2010 REFER TO ORIGINAL PERMIT #71-06
Notice: All Sewage *HOLDING* Tanks must be Concrete. Inspections required (24 hour advanced notice required).

Environmental Health Specialist: **Date of Issue:** 9/30/10

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

Environmental Health Specialist: **Date** 1/14/11

Fee:	**State fee**	**$23.00**
	Percolation	**$0.00**
	Permit	**$252.00**
		$275.00

RECEIPT

RECEIPT NUMBER: R100001297

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

APD #: EH-10-034 TYPE: EH-Ind. Sewage Disp Sys
SITE ADDRESS: 50215 MOON HILL DRIVE C
PARCEL: 141200008

May include fees collected within the jurisidiction.

TRANSACTION DATE: 09/30/2010

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

TRANSACTION LIST:

Type	Method	Description	Amount
Payment	Check	#5677	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: 09/30/2010 TIME: 08:44 AM

OK full permit
SD 10/29/10

EH-10-034
BUILDING PERMIT # N/A
PERMIT PD 275.00 ck
PERC PD _____
#5677
David Whittingham

APPLICATION FOR INDIVIDUAL SEWAGE SYSTEM PERMIT

NEW X REMODEL ___ REPAIR ___ EMERGENCY USE ___

Name of Owner Dave Whittingham Mailing Address _____ Phone 879-2053

Name of Applicant Same. Mailing Address Same Phone _____

LOCATION OF PROPOSED SYSTEM: Street Address 50215 Moon Hill Dr. Steamboat 80487

Legal Description _____ Parcel ID# Reference 71-06 14/200008
(Lot# and Subdivision if applicable) (this# can be found in the Assessor's Office)

Size of Lot 6 acres (X)Residential ( )Commercial ( )Other (Describe) _____

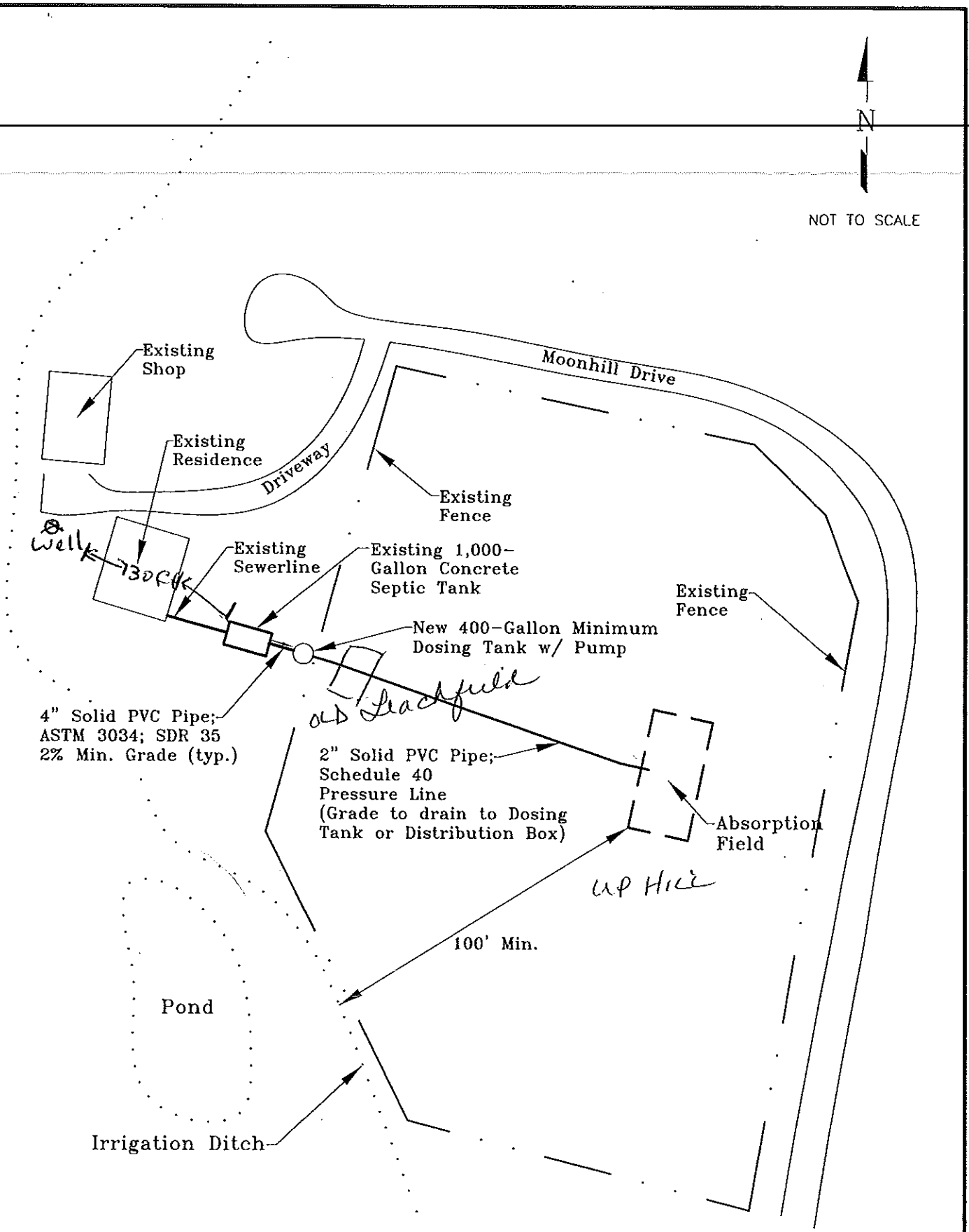
Number of: Bedrooms 3

Water Supply: (X) Private Well
( ) Public (give name of supply) ABANDON OLD SYSTEM

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 Dave Whittingham Date 9/27/10



Title: O.W.S.-SITE PLAN	Date: 9/20/10	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering - Materials Testing (970)879-7688 - Fax (970)879-7691 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Job Name: Whittingham Residence	Job No. 10-8670	
Location: 50215 Moonhill Drive, Routt County, Colorado	Figure #1	

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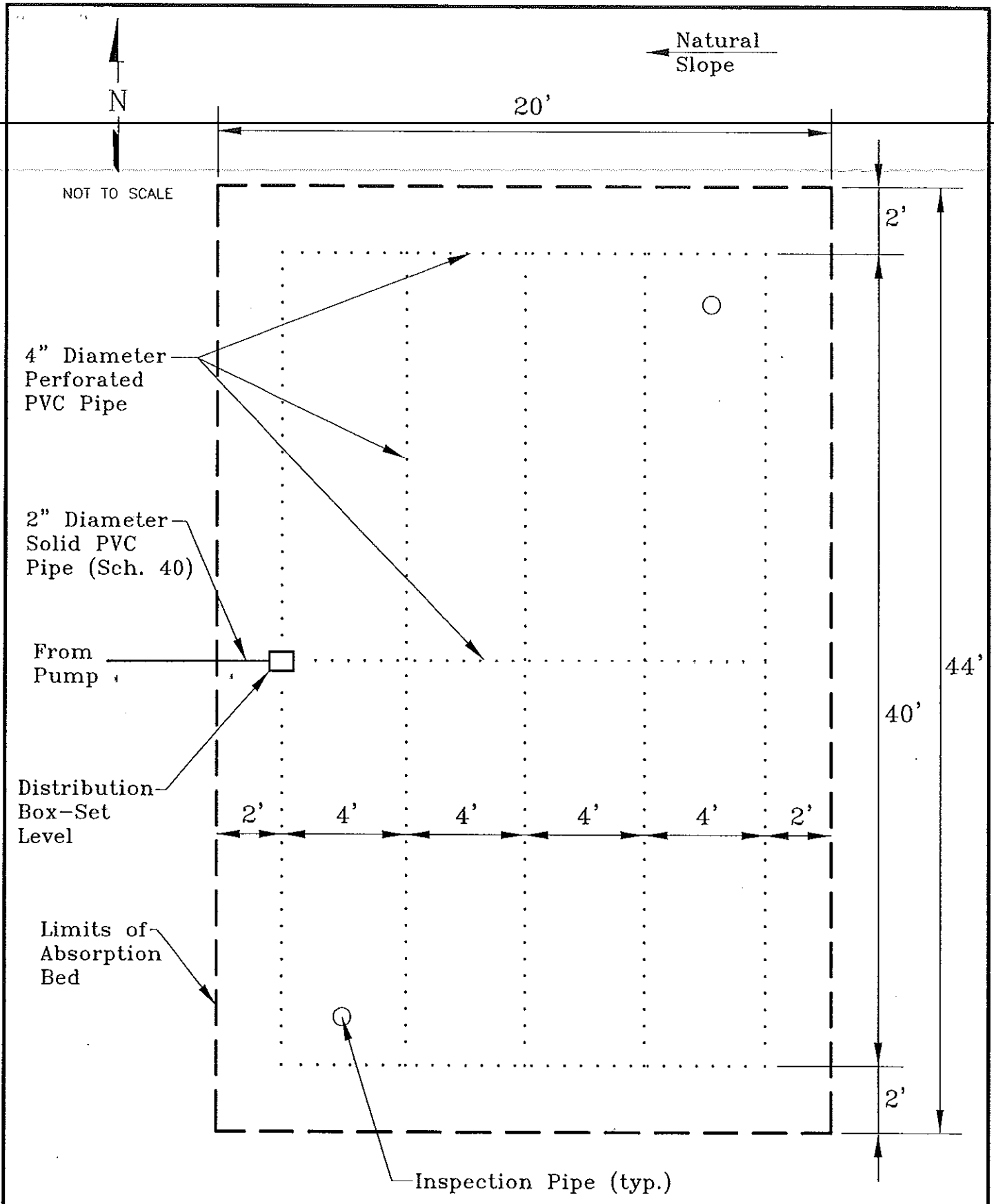

Title: SEEPAGE BED PLAN		Date: 9/20/10
Job Name: Whittingham Residence		Job No. 10-8670
Location: 50215 Moonhill Drive, Routt County, Colorado		Figure #2

NWCC
North West Colorado Consultants, Inc.
Geotechnical / Environmental Engineering - Materials Testing
(970)879-7858 - Fax (970)879-7851
2550 Copper Ridge Drive
Steamboat Springs, Colorado 80487

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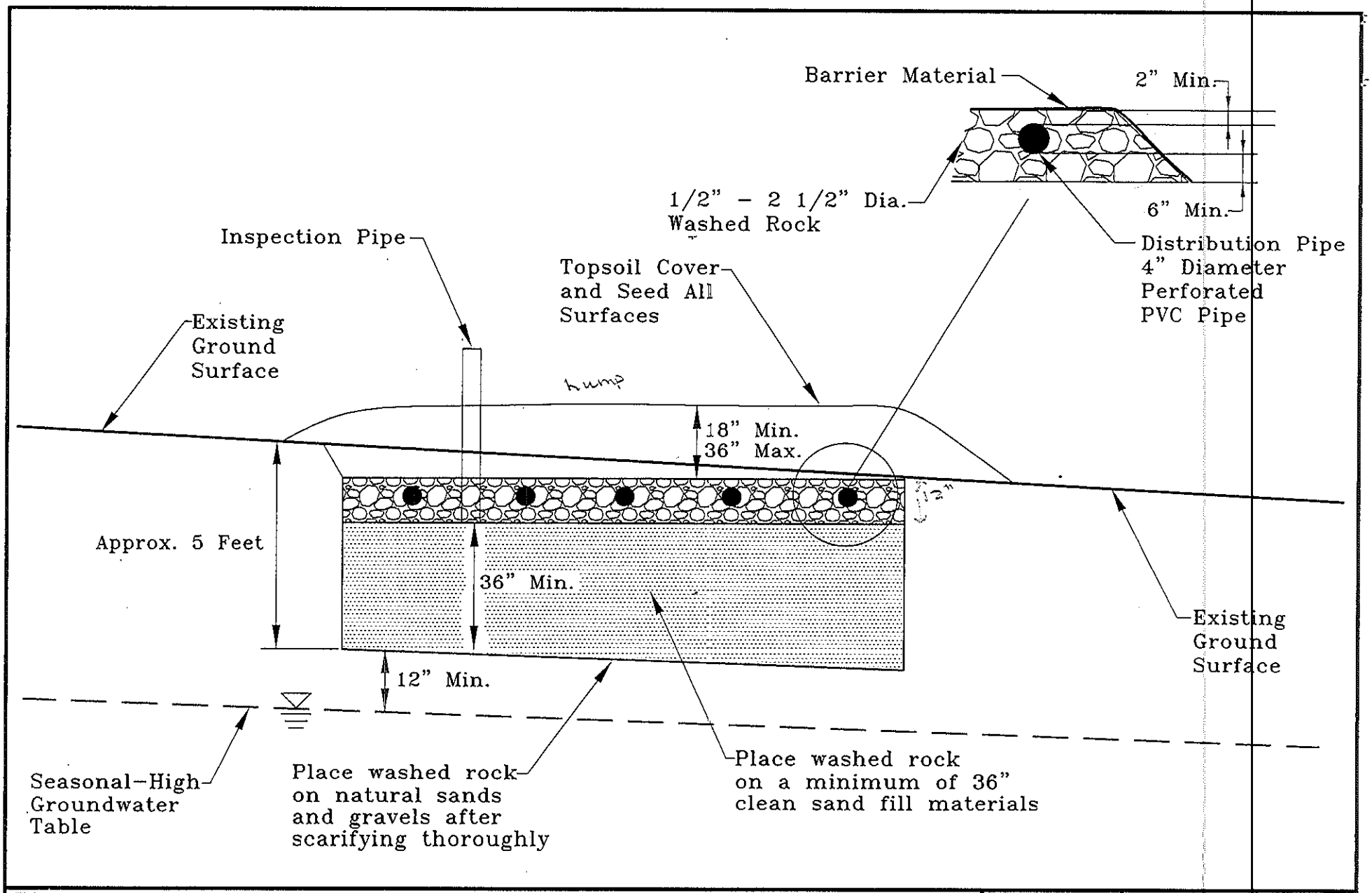

Title:	SEEPAGE BED CROSS SECTION	Date:	9/20/10
Job Name:	Whittingham Residence	Job No.	10-8670
LOCATION:	50215 Moonhill Drive, Routt County, Colorado	Figure	#3

NWCC
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Geotechnical / Environmental Engineering - Materials Testing
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2580 Copper Ridge Drive
Steamboat Springs, Colorado 80487

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APPENDIX A

SUMMARY OF DESIGN CALCULATIONS

A. Sewage Volume Calculations

1) Residence-3 Bedrooms.....3 Bedrooms x 150 gpd/BR

2) Total Average Flow.....450 gpd

3) Peak Factor.....x 1.75

4) Peak Flow for Design..... Q = 788 gpd

B. System Sizing

1) Minimum bed area = (Q)(perc rate of natural/fill materials)$^{0.5}$/5 = (788)(30)$^{0.5}$/5 = 863 ft^2

2) Designed bed area = 20' x 44' = 880 ft^2

3) Septic Tank - Three-bedroom Residence - 1,000-gallon minimum tank required.

4) Minimum well, irrigation ditch and open water setback = 100 ft per Routt County Regulations

5) Minimum seasonal drainage setback = 25 ft per Routt County Regulations

6) Minimum property line setback = 10 ft per Routt County Regulations

APPENDIX B

1) The regulations of the Routt County Department of Environmental Health and the Colorado Department of Health must be complied with during the construction/installation of the system.

2) Periodic inspections must be made by the Design Engineer from NWCC at the following points during Construction:

   a. After subgrade excavation and septic tank installation.
   b. After mound fill, washed rock and pipe placement, but before pipes or mound 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. The perforated pipe shall be set level. The 2-inch diameter piping (Schedule 40) should be sloped (2% minimum) to drain to the absorption field or back to the dosing tank.

4) The soils beneath the pipes entering and leaving a septic or dosing 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 tanks.

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 or be protected from freezing using insulation or other approved means. A layer of compacted clay fill materials should be placed along the sides of the mound that are constructed above the existing ground surface. The clays should be compacted to at least 95% of the maximum standard Proctor density and have at least 70% passing the No. 200 sieve. Special care should be taken when backfilling the system to prevent disturbance/crushing of the distribution lines. In addition, the distribution lines should be carefully bedded to minimize the settlement in these lines.

6) The surface drainage shall be ditched and diverted away from sewage disposal areas.

7) The disturbed surfaces, mounds and berms shall be covered with topsoil and heavily seeded.

8) The washed rock shall be covered with straw and untreated building paper or synthetic filter fabric before overlying soils layers are placed.

9) The washed rock will consist of gravel from 0.5 to 2.5 inches in size.

10) Inspection pipes to be constructed of PVC pipe with the portion of the pipe penetrating the gravel bed being perforated. Cleanouts must be placed in the solid distribution line at maximum intervals of 100' downstream of the septic tank and at a maximum interval of 50' upstream of the septic tank.

11) It is the responsibility of the owner and the installer to comply with all of the minimum setback requirements.

12) The mound fill materials should be approved by the design engineer from NWCC prior to use and consist of a clean, well-graded sand with less than 7 percent passing the No. 200 sieve.

NorthWest Colorado Consultants, Inc.
Geotechnical / Environmental Engineering • Materials Testing

September 22, 2010

Dave Whittingham
50215 Moonhill Drive
Steamboat Springs, CO 80487

Job Number: 10-8670

Subject: On-Site Wastewater System Design, Whittingham Residence, 50215 Moonhill Drive, Routt County, Colorado.

Ladies and Gentlemen:

This report presents the results of an On-site Wastewater System (OWS) design for the Whittingham Residence located at 50215 Moonhill Drive in Routt County, Colorado.

Existing Conditions: Based on our conversations with the owner, it is our understanding that the existing OWS is failing and a new system is desired. The existing residence is located south of the cul-de-sac at the north end of Moonhill Drive. The residence consists of three bedrooms. The existing OWS consists of an existing 1,000-gallon concrete septic tank and absorption field located to the east of the existing residence. The area where the existing absorption field is located was very moist to wet at the time of our site visit on July 15, 2010. It is our understanding that this area remains wet due to flows in irrigation ditches to the east and south of the field. The Elk River is located to the west of the residence. The new absorption field for the OWS will be located on a small knob located east of the existing field.

The vegetation in the area of the proposed OWS site consists of grasses and weeds. The topography in the vicinity of the new absorption field is variable and typically slopes gently to moderately down to the west and north on the order of 5 to 10 percent.

Subsurface Conditions: A profile pit was advanced in the vicinity of the new absorption field on July 21, 2010. The subsurface conditions encountered in the profile pit generally consisted of a layer of topsoil and organics overlying natural clays and sands and gravels to the maximum depth investigated, 8 feet below the existing ground surface (bgs).

The topsoil and organics layer encountered in the test pit was approximately 20 inches in thickness. Natural clays were encountered below the layer of topsoil and organic materials and extended to a depth of 5 feet bgs. The natural clays were sandy, moderately plastic, stiff to very stiff, slightly moist to moist and brown in color. Natural sands and gravels were encountered below the clays and extended to the maximum depth investigated, 8 feet bgs. The sands and gravels were silty to slightly clayey, fine to coarse

grained, very low to non-plastic, medium dense, moist to wet and brown to gray in color. Groundwater seepage was encountered at a depth of 7 ½ feet bgs in the profile pit at the time of excavation. It appears that the seasonal high groundwater table is located from 5 to 6 feet bgs.

Percolation testing was conducted in the area of the proposed OWS site on July 22, 2010. The percolation tests indicate that the upper 20 inches of topsoil and organic materials exhibited highly variable percolation rates ranging from 40 to in excess of 160 minutes per inch (mpi). The natural clays also exhibited a percolation rate in excess of 160 mpi. We have assumed that the deeper natural sands and gravels will exhibit an average percolation rate of 30 mpi.

System Design: Due to the topography of the site, high percolation rate of the topsoil and clay materials and depth to the seasonal groundwater table, we recommend that the new OWS absorption field consist of a modified seepage bed absorption system. The design consists of a minimum of 36 inches of approved granular fill materials placed over the natural sands and gravels, and under the seepage bed after all of the topsoil materials and clays have been removed.

The system design is based on the residence containing a total of three bedrooms with occupancy of two persons/bedroom. Using these facts, we have calculated a maximum peak effluent flow of 788 gallons per day (gpd) for the system. Based on the percolation test results completed by our firm, an average percolation rate of 30 minutes per inch for the natural sands and gravels and granular fill materials were used in the design of the system.

Based on the design values given above, we have calculated a minimum absorption bed area of 863 square feet. The granular fill material placed under the seepage bed should consist of a clean, well-graded sand approved by the design engineer from NWCC prior to placement. All of the topsoil and clay materials should be removed prior to placement of the granular fill materials.

A septic tank with a minimum capacity of 1,000-gallons is required for the three-bedroom residence. The existing septic tank should be pumped and inspected to determine the condition and exact size. Anchoring of the septic tank may be required to reduce the risk of floatation. We also recommend that an effluent filter be installed in the outlet 'T' connection of the septic tank.

Based on the elevation difference between the residence and absorption field, it appears that a pump will be required to deliver the effluent to the absorption bed. The pump should be installed in a minimum 400-gallon concrete dosing tank installed downstream of the existing septic tank. Anchoring of the dosing tank may be required due to the groundwater conditions at the site to reduce the risk of floatation. The effluent pump should consist of an approved commercial grade, float-activated effluent pump installed in the dosing tank. We recommend the floats in the dosing tank be set to provide a dose of between 125 and 150 gallons per dose. 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 between the pump and the absorption field should be constructed to drain (2% minimum) to the absorption field or drain back to weep holes in the dosing tank, when the pump is not in operation. A pressure relief valve (aka: "Snifter") should be installed at the high point between the pump and the absorption field.

The OWS design and general layout are shown in Figures #1 through #3 and the design calculations and specifications are given in Appendices A and B, respectively.

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 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 pumps and floats should be inspected and serviced immediately.

3) *Absorption Field*: The absorption field should be fenced off to vehicular traffic and livestock. The surface area around the absorption field should be observed monthly for signs of failure, such as lush vegetation growth or ponding. Liquid levels in the seepage bed should be observed through the inspection 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 were obtained from the EPA "Design Manual - On-site Wastewater Treatment and Disposal Systems", 1980, as well as the Colorado Department of Health "Guidelines on Individual Sewage Disposal Systems", revised 2000, and the Routt County Individual Sewage Disposal Regulations, February 1999. The OWS design presented is based on currently accepted design procedures, the proposed structures and usage of the facilities. If the usage of the structure or addition of new facilities to those currently planned in the building changes, the OWS design will also most likely change. It should also be noted that all on-site wastewater systems require periodic

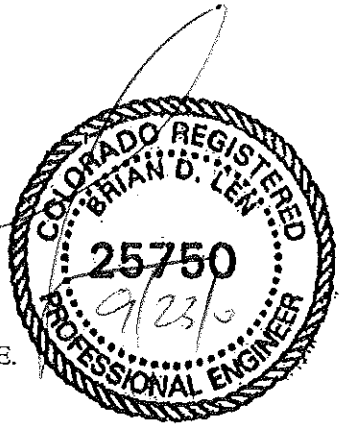
maintenance as noted above. The failure of the owner to provide periodic inspection and maintenance of the system can lead to premature system failure.

Please be advised that Colorado law requires that a permit must be obtained prior to construction, alteration or use of an on-site wastewater system. In addition, this office must be retained by the client to observe the construction/installation of the OWS and to provide an as-built report to the Routt County Department of Environmental Health.

If you have any questions concerning this report, 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, P.E.

10-034

NorthWest Colorado Consultants, Inc.
Geotechnical / Environmental Engineering • Materials Testing

December 21, 2010

Dave Whittingham
50215 Moonhill Drive
Steamboat Springs, CO 80487

Job Number: 10-8670

Subject: On-Site Wastewater System Observations, Whittingham Residence, 50215 Moonhill Drive, Routt County, Colorado.

Ladies and Gentlemen:

As requested, NWCC, Inc. (NWCC) visited the project site on October 18, 19 and November 8, 2010 to observe the construction of the On-site Wastewater System (OWS) for the Whittingham Residence located at 50215 Moonhill Drive in Routt County, Colorado. NWCC previously designed the OWS to replace a failed system for the existing residence under this job number and dated September 20, 2010. The system design incorporates a modified seepage bed absorption system with a minimum of 36 inches imported granular fill materials placed under the absorption bed and over the natural sands and gravels.

At the time of our site visit on October 18, 2010, the excavator, Peak Excavating, had placed the sand fill materials, approximately 6 to 8 inches of washed rock for the seepage bed and the 4-inch diameter perforated pipe in the washed rock. It appeared that the imported sand fill materials had been placed to an elevation approximately 3 to 4 feet over the natural sands and gravels. The seepage bed appeared to have been constructed to approximately 20' by 44', which meets the minimum area. The contractor had also installed an inspection pipe at each end of the seepage bed. We advised the contractor that washed rock should be placed to a minimum of 2 inches over the perforated piping.

At the time of our site visit on October 19, 2010, the contractor had installed a 400-gallon concrete dosing tank to the east of the existing 1,000-gallon concrete septic tank, located to the east-southeast of the existing residence. The 4-inch diameter piping (ASTM 3034; SDR 35) from the septic tank to the new dosing tank had been placed and appeared to meet the minimum grade requirements. We did not observe the existing piping between the residence and the septic tank. An effluent pump had been installed in the dosing tank; however, the electric lines to the pump had not been connected. The contractor had also placed the piping (2" Schedule 40) from the pump in the dosing tank to a plastic distribution box in the absorption field. A weep hole was located in the 2-inch piping at elbow in the dosing tank and the piping was graded to drain back into the dosing tank when the pump is not operating. A vent to reduce pressure in the piping was also placed in the distribution box. An as-built drawing taken from field measurements of the system is presented in Figure #1.

We recommended that that a minimum of 18 inches of soil cover be placed over the seepage bed after the washed rock and barrier material had been placed and a minimum of 24 inches of soil cover be placed over all of the piping.

At the time of our site visit on November 8, 2010, the system had been backfilled. The risers and lids for the existing septic tank and dosing tank had been brought to the surface. It appeared that sufficient cover had been placed over the septic tank, piping and absorption field. The disturbed areas had been seeded at the time of our site visit. The power to the pump had been connected and the high water alarm had been mounted on the fence, near the dosing tank. Based on conversations with the owner, the pump was tested and the pump was operating properly and flowing back into the dosing tank when the pump shut off.

Based on our part-time observations, it appears that the portions of the system, which were completed and observed at the time of our site visits, had been constructed in general accordance with the design previously completed by our firm, with the exceptions noted above. We believe that the system should function properly with proper care and maintenance, as outlined below, if the components backfilled or not completed at the time of our visits were properly constructed.

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 of the OWS be periodically monitored and a qualified, licensed maintenance contractor perform 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 Pumping System*: The effluent filter at the septic tank outlet should be cleaned when the septic tank is inspected or as required. The effluent pump should be checked semi-annually to ensure the pump is functioning properly. If the high water alarm sounds, the pumps and floats should be inspected and serviced immediately.

3) *Absorption Field*: The absorption field should be fenced off to vehicular traffic and livestock. The surface area around the absorption field should be observed monthly for signs of failure, such as lush vegetation growth or ponding. Liquid levels in the seepage bed should be observed through the inspection pipes.

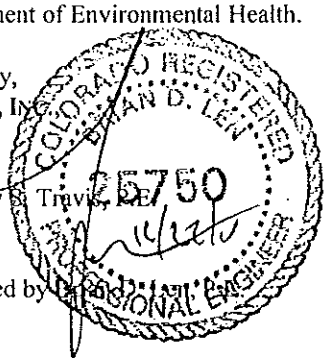
4) *Treated Water*: We do not recommend that the water softeners or water treatment systems be connected to the OWS. The chemical and hydraulic loading from the backwash of these treatment systems may be detrimental to the OWS. If a treatment system is used, a separate dry well should be constructed 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

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, requiring 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 provided to the Routt County Department of Environmental Health.

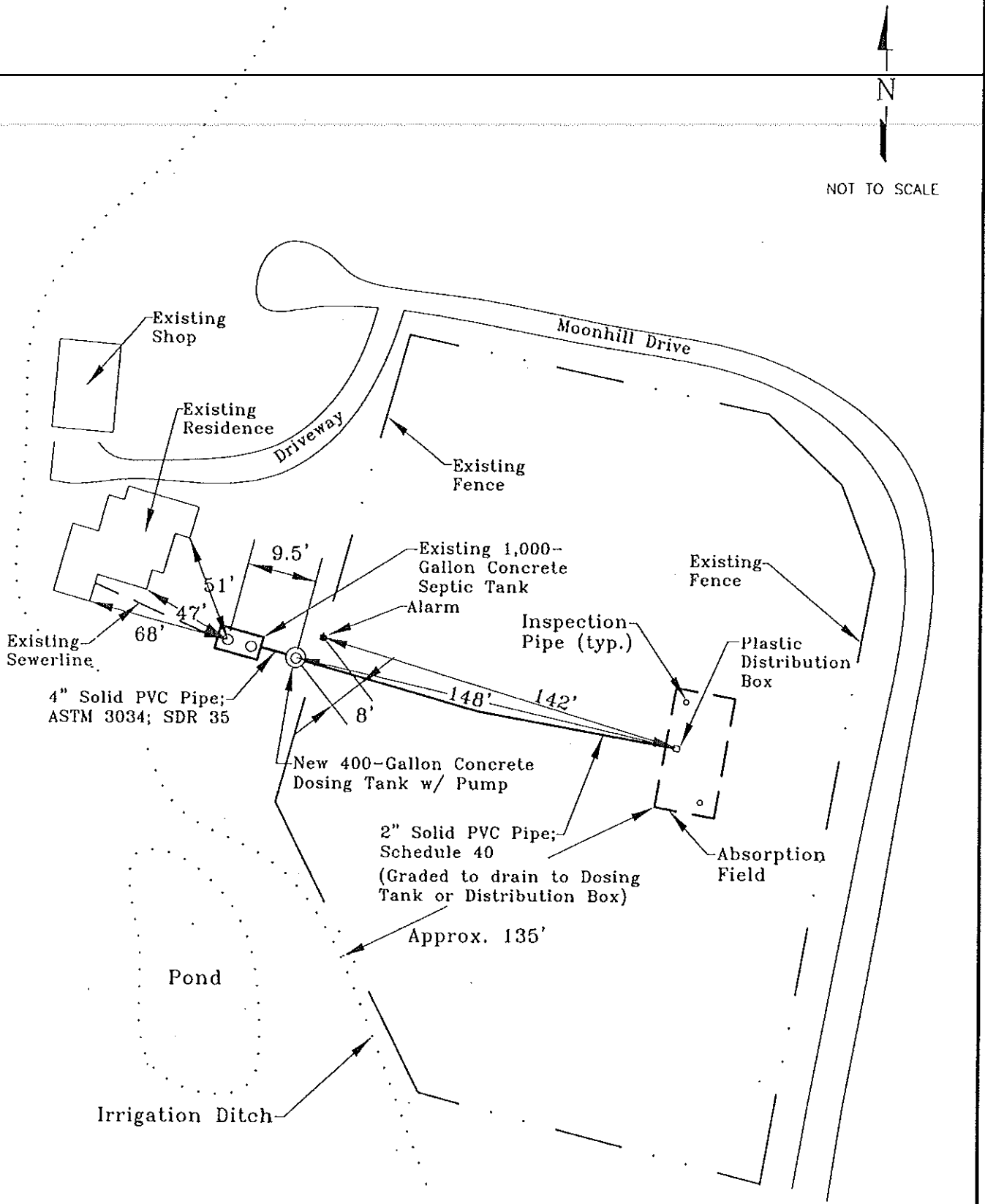
Sincerely,
NWCC, Inc.



Timothy S. Travis, PE

Reviewed by [illegible]

cc: Routt County Department of Environmental Health



Title: O.W.S.-AS BUILT	Date: 12/21/10	NWCC Northwest Colorado Consultants, Inc. Geotechnical / Environmental Engineering / Materials Testing (970) 879-7888 • Fax (970) 879-7851 2583 Copper Ridge Drive Steamboat Springs, Colorado 80487
Job Name: Whittingham Residence	Job No. 10-8670	
Location: 50215 Moonhill Drive, Routt County, Colorado	Figure #1	

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