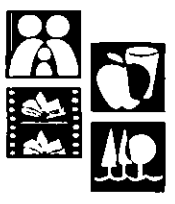


1998-07-

PERMIT # 1160



TRI-COUNTY HEALTH DEPARTMENT
Serving Adams, Arapahoe and Douglas Counties

APPLICATION TO
 INSTALL(255) REPAIR(256) EXPAND(256)
\$300 \$250 \$250
AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM

ADDRESS OF PROPERTY SERVED BY PROPOSED SYSTEM:

5803 GRANITE WAY CASTLE ROCK
Street Address City
80104 DOUGLAS DIAMOND RIDGE ESTATES
Zip Code County

1/4 Sec ___ 1/4 Sec ___ Parcel ___ Section ___ Township ___ Range ___ Lot 18 Block 2
Legal Description (if no street address)

If GPS Information Available/Obtained: Longitude ___ Latitude ___ Elevation ___

Diamond Ridge Estates
Subdivision Name Filing (if applicable)

Property Owner:	
Name	<u>MERIDIAN INTERESTS</u>
Address	<u>9580 DEL PERO SUITE 7-201</u>
City, State	<u>Folsom, CALIF 95630</u>
Zip	<u>95630</u>
Phone	<u>916-987-1692</u>

Applicant:	
Name	<u>HABITAT DESIGN INC</u>
Address	<u>13318 E. FLA. AURORA</u>
City, State	<u>AURORA, CO</u>
Zip	<u>80012</u>
Phone	<u>303-4057</u>

TCHD Use Only: License # _____

Systems Contractor HECAX CONST

Soils/Percolation Test Engineer E.O. CHURCH Job # 8524C

TCHD Use Only: FSE # _____

Design Engineer (if applicable) E.O. CHURCH Job # 8524C

TCHD Use Only: FSE # _____

Is this to be an Engineered System? Yes No

PROPOSED FACILITY:

Single Family (SF) Multi-Family (MF) Commercial (CM) Other (OT)

WATER SUPPLY:

On Site: Yes No Community Water Yes No If Yes, Supplier CASTLE ROCK

Lot size: 1.37

Continued on back

SINGLE FAMILY RESIDENTIAL GENERAL INFORMATION:

Number of Bedrooms 4 Basement: Full (F) Walkout(W) Partial(P) None(N)

Basement Plumbed: Yes No ROUGH

Are Additional Bedrooms Planned? Yes No Are the premises within 400 ft. of a sewer line? Yes No

Is property within boundaries of a sewer district? Yes No

If Yes, name of sewer district _____

COMMERCIAL GENERAL INFORMATION:

Type of Business: _____

TCHD Use Only: SIC Code 291110

Number of Employees _____

Design Flow > 3,000 Gallons/Day Yes No

If Yes, has Site Approval been given from CDPHE? Yes No

(Note: Permit cannot be issued until site approval is given from CDPHE)

Floor Drains Yes No

EPA Shallow Injection Well Inventory Request Form Completed Yes No

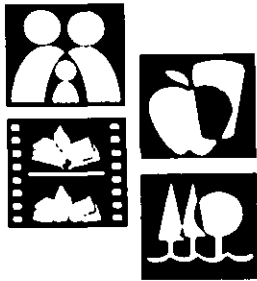
Date Paid: 10-26-98 Received By: BA

Payment Type: Cash
 Check (# 2965)
 Charge
 Other _____

Amount Paid \$ 300.

Applicant's Name ROBERT H.E. LUCERO
Please Print

Applicant's Signature Robert H.E. Lucero Date Oct. 26, 1998



Tri-County Health Department

Serving Adams, Arapahoe and Douglas Counties Permit # 1998-07-001160

Chris J. Wiant, M.P.H., Ph.D.
Executive Director

**PERMIT TO CONSTRUCT
AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM**
Tri-County Health Department
7000 East Belleview Avenue Suite 301
Englewood, Colorado 80111

Owner **MERIDIAN INTERESTS**
Location: 5803 Granite Way Lot 18 Block 2
Installer: 60000049 HEACOCK CONSTRUCTION INC

=====
System Requirements:

Design Requirements for: Trench System: Bed System:

See specifications as noted by the Design Engineer

*****Special Conditions*****

INSTALL PER E.O. CHURCH, INC., JOB NO. 8524C DATED 04/25/97.

=====
A Permit to CONSTRUCT shall expire ONE YEAR from the date of issuance unless extended to a fixed date upon request by the Applicant and approved by the Tri-County Health Department.

This Permit Expires: 11/19/1999

Issued by: Tri-County Health Department on November 19, 1998

OWNER MUST MAKE SURE THAT HIS/HER ENTIRE WASTE DISPOSAL SYSTEM REMAINS OPEN FOR INSPECTION UNTIL IT HAS RECEIVED APPROVAL BY TRI-COUNTY HEALTH DEPARTMENT. TRI-COUNTY HEALTH DEPARTMENT CANNOT ASSUME RESPONSIBILITY IN CASE OF FAILURE OR INADEQUACY OF A WASTE DISPOSAL SYSTEM BEYOND CONSULTING IN GOOD FAITH WITH THE PROPERTY OWNER.

Permit Fee: 300.00 Payment Method Check #2965

Received By: Dutton, Becky on 10/26/1998

() Owner Copy () Bldg. Dept. Copy () Installer Copy () H.D.

For Accounting Use Only:
680-500000

300.00

Fifty years of working to **50** *improve the public's health*

SINGLE FAMILY RESIDENTIAL GENERAL INFORMATION:

Number of Bedrooms 4 Basement: Full (F) Walkout(W) Partial(P) None(N)

Basement Plumbed: Yes No ROUGH

Are Additional Bedrooms Planned? Yes No Are the premises within 400 ft. of a sewer line? Yes No

Is property within boundaries of a sewer district? Yes No

If Yes, name of sewer district _____

COMMERCIAL GENERAL INFORMATION:

Type of Business: _____

TCHD Use Only: SIC Code _____

Number of Employees _____

Design Flow > 3,000 Gallons/Day Yes No

If Yes, has Site Approval been given from CDPHE? Yes No

(Note: Permit cannot be issued until site approval is given from CDPHE)

Floor Drains Yes No

EPA Shallow Injection Well Inventory Request Form Completed Yes No

Date Paid: 10-26-98 Received By: ba

Payment Type: Cash

Check (# 2965)

Charge

Other _____

Amount Paid \$ 300.

Applicant's Name ROBERT H.E. LUCERO
Please Print

Applicant's Signature Robert H.E. Lucero

Date Oct 26, 1998

1998-07-

PERMIT # 1160



TRI-COUNTY HEALTH DEPARTMENT
Serving Adams, Arapahoe and Douglas Counties

APPLICATION TO

INSTALL(255) REPAIR(256) EXPAND(256)
\$300 \$250 \$250

AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM

ADDRESS OF PROPERTY SERVED BY PROPOSED SYSTEM:

5003 GRANITE WAY CASTLE ROCK
Street Address City
80104 DOUGLASS DIAMOND RIDGE ESTATES
Zip Code County

1/4 Sec ___ 1/4 Sec ___ Parcel ___ Section ___ Township ___ Range ___ Lot 18 Block 2
Legal Description (if no street address)

If GPS Information Available/Obtained: Longitude ___ Latitude ___ Elevation ___

Diamond Ridge Estates
Subdivision Name Filing (if applicable)

Property Owner:	
Name	<u>MEDIAN INVESTMENTS</u>
Address	<u>9580 OAKVIEW SUITE 7-201</u>
City, State	<u>FOLSOM, CALIF 95630</u>
Zip	<u>95630</u>
Phone	<u>916-987-1692</u>

Applicant:	
Name	<u>HABITAT DESIGN INC</u>
Address	<u>13318 E. FLA. AURORA</u>
City, State	<u>AURORA, CO</u>
Zip	<u>80012</u>
Phone	<u>303-4057</u>

TCHD Use Only: License # _____

Systems Contractor HECAY CONST

Soils/Percolation Test Engineer E.O. CHURCH Job # 8524C

TCHD Use Only: FSE # _____

Design Engineer (if applicable) E.O. CHURCH Job # 8524C

TCHD Use Only: FSE # _____

Is this to be an Engineered System? Yes No

PROPOSED FACILITY:

Single Family (SF) Multi-Family (MF) Commercial (CM) Other (OT) _____

WATER SUPPLY:

On Site: Yes No Community Water Yes No If Yes, Supplier CASTLE ROCK

Lot size: 1.37

Continued on back

PERMIT # 1160

SINGLE FAMILY RESIDENTIAL GENERAL INFORMATION:

Number of Bedrooms 4 Basement: Full (F) Walkout(W) Partial(P) None(N)

Basement Plumbed: Yes No Reason

Are Additional Bedrooms Planned? Yes No Are the premises within 400 ft. of a sewer line? Yes No

Is property within boundaries of a sewer district? Yes No

If Yes, name of sewer district _____

COMMERCIAL GENERAL INFORMATION:

Type of Business: _____

TCHD Use Only: SIC Code

Number of Employees _____

Design Flow > 3,000 Gallons/Day Yes No

If Yes, has Site Approval been given from CDPHE? Yes No

(Note: Permit cannot be issued until site approval is given from CDPHE)

Floor Drains Yes No

EPA Shallow Injection Well Inventory Request Form Completed Yes No

Date Paid: 10-26-98 Received By: ba

Payment Type: Cash

Check (# 2965)

Charge

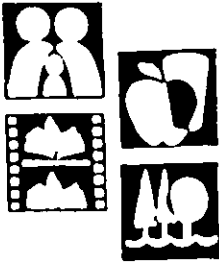
Other _____

Amount Paid \$ 300.

Applicant's Name ROBERT H.E. LUCERO
Please Print

Applicant's Signature Robert H.E. Lucero

Date Oct 26, 1998



Onsite System
As-Built
Drawing

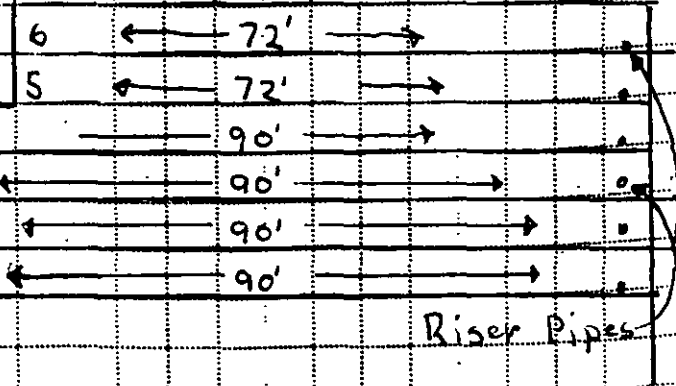
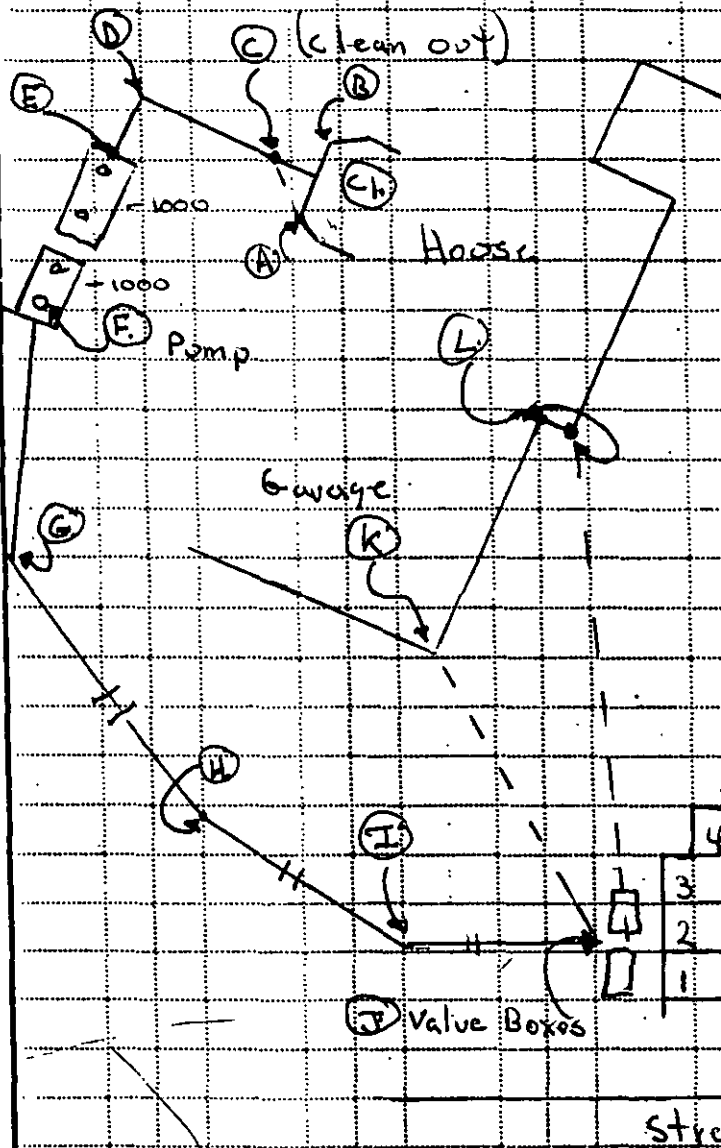
Property Address 5803 Granite Way
 Permit # 2000-07-002994
 Date System Completed 10/17/00
 Installer's Name Ross Excavating
 Installer's License # 2000-6000733
 Installer's Address and Phone 793 Eagle Feather Way
Low Tree CO. 80124
 Ph (303) 799-7932

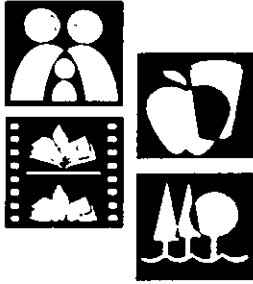
Table of measurements

- A to C = 6'6"
- B to C = 6'6"
- C to C = 5'
- C to D = 21'
- D to E = 3'
- E to F = 26'
- F to G = 32'
- G to H = 60'
- H to I = 20'
- I to J = 40'
- K to J = 52'
- L to J = 59'

Field information

Fields 1-4 consist of 5 lines (Each Field) at 90'
 Fields 5 & 6 consist of 5 lines (Each Field) at 72'
 total field area 5040 sq/ft





Tri-County Health Department

Serving Adams, Arapahoe and Douglas Counties

Chris J. Wiant, M.P.H., Ph.D.
Executive Director

CERTIFICATION OF INDIVIDUAL SEWAGE DISPOSAL SYSTEM

This certifies that Individual Sewage Disposal System (ISDS) at
5803 Granite Way Castle Rock CO 80104
Subdivision: Diamond Ridge Estates County: Douglas
has been permitted and installed in compliance with Tri-County Health
Department Regulation Number I-96. A file for the ISDS will be kept in
our Castle Rock office.

SUMMARY OF INFORMATION

The permit number for the system was: 2000-07-002994

The soils and percolation test was performed by: Church & Associates Inc

The design engineer for the system was: Church & Associates Inc

The system was installed by: Rus Construction Inc

The system consists of:

- A 1,000 gallon septic tank
- 1,000 gallon dosing tank
- 5,000 square foot absorption area.

The system is sized for 4 bedrooms. If additional bedrooms are added, an expansion may be necessary.

Maintenance Requirements:

The septic tank must be pumped and inspected every 4 years

If the septic or dosing tank is equipped with an effluent filter, the filter must be cleaned annually

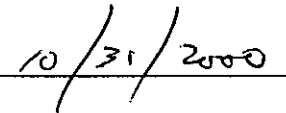
If the system has alternating beds or is a drip irrigation system, beds or zones must be rotated annually

Additional maintenance requirements may apply. Refer to the operations manual or engineer's report for specific requirements.

Signature:


KLECKNER, JOHN T.

Date:





PERMIT # 2000-07-1002994

TRI-COUNTY HEALTH DEPARTMENT
Serving Adams, Arapahoe and Douglas Counties

APPLICATION TO
 INSTALL(255) REPAIR(256) EXPAND(256)
\$300 \$250 \$250
AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM

ADDRESS OF PROPERTY SERVED BY PROPOSED SYSTEM:

5803 Granite Way Castle Rock
Street Address City
80104 Douglas
Zip Code County

Parcel 1/4 Sec 1/4 Sec Section Township Range Lot 18 Block 2
Legal Description (if no street address)

Diamond Ridge 1
Subdivision Name Filing (if applicable)

If GPS Information Available/Obtained: Longitude Latitude Elevation

Property Owner:
Name Spectre Development
Address 9267 Surrey Rd
City, State Castle Rock, Colo
Zip 80104 Phone 303-888-4055

Applicant:
Name Russell Homes Inc
Address 9267 Surrey Rd
City, State Castle Rock Colo
Zip 80104 Phone 303-888-4055

Systems Contractor: Rus Inc
Soils/Percolation Test Engineer E.O. Church

TCHD Use Only License #
Job # 85246

TCHD Use Only FSE #

Design Engineer (if applicable) E.O. Church

Job # 85246

TCHD Use Only FSE #

Is this to be an Engineered System? Yes No

Lot Size: 1.3 Acres

Is Lot Marked and Are Perc Holes Staked? Yes No

PROPOSED FACILITY:

Single Family (SF) Multi-Family (MF) Commercial (CM) Other (OT)

WATER SUPPLY:

On Site: Yes No Community Water Yes No If Yes, Supplier Town of Castle Rock

Continued on back

SINGLE FAMILY RESIDENTIAL GENERAL INFORMATION:

Number of Bedrooms 4 Basement: Full (F) Walkout (W) Partial (P) None (N)

Basement Plumbed: Yes No

Are Additional Bedrooms Planned? Yes No Are the premises within 400 ft. of a sewer line? Yes No

Is property within boundaries of a sewer district? Yes No

If Yes, name of sewer district _____

COMMERCIAL GENERAL INFORMATION:

Type of Business: _____

~~TCHD Use Only: SIC Code: _____~~

Number of Employees _____

Design Flow > 3,000 Gallons/Day Yes No

If Yes, has Site Approval been given from CDPHE? Yes No

(Note: Permit cannot be issued until site approval is given from CDPHE)

Floor Drains Yes No

EPA Shallow Injection Well Inventory Request Form Completed Yes No

Date Paid: 8-31-00 Received By: [Signature]

Payment Type: Cash

Check (# 2199)

Charge

Other _____

Amount Paid \$ 300

Applicant's Name Russell Homes Inc
Please Print

Applicant's Signature [Signature] Date 9-1-00

Aurora
15400 E. 14th Place
Suite 309
Aurora, CO 80011
303-341-9370

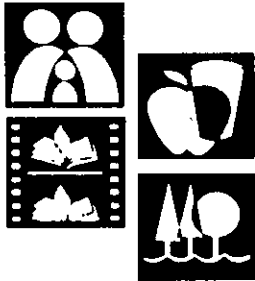
Castle Rock
101 3rd Street
Castle Rock, CO 80104
303-663-7650

Commerce City
4301 E. 72nd Avenue
Commerce City, CO
80022
303-288-6816

Englewood
4857 S. Broadway
Englewood, CO 80110
303-761-1340

Northglenn
10190 Bannock Street,
Suite 100
Northglenn, CO 80221
303-452-9547

Fowall



Tri-County Health Department

Permit # 002994

Serving Adams, Arapahoe and Douglas Counties
PERMIT TO CONSTRUCT

AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM
Tri-County Health Department

Chris J. Want, M.P.H., Ph.D. Executive Director
7000 East Belleview Avenue Suite 301
Englewood, Colorado 80111

Owner **SPECTRE DEVELOPMENT**
Location: **5803 Granite Way Castle Rock CO 80104**
Subdivision: **Diamond Ridge Estates County: Douglas**

=====
Design Requirements:

Install system per specifications of the Design Engineer

Number of Chambers: Refer to TCHD Form #S-183 Rev Date 12/15/97

*****Special Conditions*****
INSTALL SYSTEM AS PER CHURCH & ASSOCIATES JOB #8524C.

=====
A Permit to **CONSTRUCT** shall expire **ONE YEAR** from the date of issuance unless extended to a fixed date upon request by the Applicant and approved by the Tri-County Health Department.

This Permit Expires: **09/07/2001**

Issued by: Kleckner, John T.,  EHS
Tri-County Health Department on **September 7, 2000**

OWNER MUST MAKE SURE THAT HIS/HER ENTIRE WASTE DISPOSAL SYSTEM REMAINS OPEN FOR INSPECTION UNTIL IT HAS RECEIVED APPROVAL BY TRI-COUNTY HEALTH DEPARTMENT. TRI-COUNTY HEALTH DEPARTMENT CANNOT ASSUME RESPONSIBILITY IN CASE OF FAILURE OR INADEQUACY OF A WASTE DISPOSAL SYSTEM BEYOND CONSULTING IN GOOD FAITH WITH THE PROPERTY OWNER.

Permit Fee: 300.00 Payment Method **Check** #2199

Received By: on 09/01/2000

() Owner Copy () Bldg. Dept. Copy () Installer Copy () H.D.

For Accounting Use Only:
680-500000 300.00

FINAL VISIT WORKSHEET

Permit Number: 2000-07-002994

Date Printed: September 7, 2000

Property Location: 5803 Granite Way Lot 18 Block 2

County: Douglas

Owner: Spectre Development

System Installer: Russ Inc

SITE INFORMATION:

Keys for completing information on installed tanks:

Usage (D)osing (T)reatment (V)ault

Tank Manufacturer

- 100 Aguilers Corp
- 104 Dekta Env. Products
- 107 Front Range Precast
- 110 Vaughn Concrete
- 102 Colorado Precast
- 105 Erie Precast
- 108 Schmitt Reddi Mix
- 103 Copeland
- 106 Firebaugh Pre-Cast
- 109 Sterling Pre Cast

Tank Type: (C)oncrete (PT)Polyethelene (FG)Fiber Glass

TANK INFORMATION

Number of Tanks Installed: 2

Tank Size in gallons and Usage:

Tank 1:
 Size 1000
 Type (C) (PT) (FG)
 Use (D) (T) (V)
 T's or Baffles (T) (B)
 Mfg 109
 Effluent Screen (Y) (N)

Tank 2:
 Size 1000
 Type (C) (PT) (FG)
 Use (D) (T) (V)
 T's or Baffles (T) (B)
 Mfg 109
 Effluent Screen Y (N)

Tank 3:
 Size _____
 Type (C) (PT) (FG)
 Use (D) (T) (V)
 T's or Baffles (T) (B)
 Mfg _____
 Effluent Screen Y N

Secondary Treatment System Y (N) If yes, type: (circle one)

- Sand Filter (SF)
- Aerobic System (AS)
- Constructed Wetlands (CW)
- Recirculating Sand Filter (RSF)
- Trickling Filter (TF)
- Other (OT)

Final Treatment Type:

- Bed (BD)
- ET (ET)
- Bed (Chambers) (BD-CH)
- Trench (Chambers) (TR-CH)
- Area Size (s.f.) 5000
- Mound (MD)
- Pond (PD)
- Trench SB-2 (TR-SB)
- Other (OT)
- If Chambers Used, # _____
- Trench (T)
- Sand Filter (SF)
- Drip Irrigation (DR)
- ET Lined Y (N)

Method of Waste Water Application:

- Dosed w/Pump (DP)
- Uniformly Dosed w/ Pump (UDP)
- Dosed w/Siphon (DS)
- Uniformly Dosed w/ Siphon (UDS)
- Gravity (GR)

Continued on Next Page

FINAL VISIT WORKSHEET

Permit Number: 2000-07-002994

Date Printed

RECORD OF SITE VISITS:

(It is important to record any extra visits for billing purposes)

Visit 1 Date 10/17/2000 By (EHS #) 408

Visit 2 Date _____ By (EHS #) _____

Visit 3 Date _____ By (EHS #) _____

Visit 4 Date _____ By (EHS #) _____

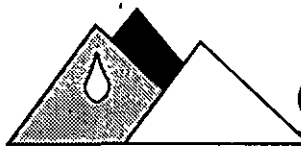
TCHD Engineer Review Y N Time _____ EHS# _____

FINAL SITE VISIT COMMENTS:

Need AS-BUILT
" ENG. Letter (church)

Final Approval Given Y N By (EHS #) 408

2- / 1000
5000
church
Ruro Inc



CHURCH & Associates, Inc.

ENGINEERS & GEOLOGISTS

October 19, 2000

Russell Homes
Attn: Cody Powell
9267 Surrey Drive
Castle Rock, CO 80104

Subject: OWS Installation Observation
Proposed Residence, 5803 Granite Way
Lot 18, Block 2, Filing 1, Diamond Ridge Estates
Douglas County, Colorado
Job No. 8524C

Dear Mr. Powell,

As requested, the installation of the onsite wastewater system (OWS) at the subject site was observed Tuesday, October 17, 2000. The system was designed as a low-pressure, shallow-trench OWS as presented in the OWS Design Report, Job No. 8524C, dated April 25, 1997.

The OWS was installed for a four-bedroom residence. The system included the installation of 5040 square feet of field in six sections consisting of four 10-feet by 90-feet and two 10-feet by 72-feet sections. A 1000-gallon, two-compartment, precast concrete septic tank with a Biotube[®] effluent filter in the outlet followed by a 1,000-gallon, two-compartment, precast concrete septic tank with a pump in the second compartment was installed. A series of valves were installed to allow access to alternate sections of the field. Power was not available at the time of the observation.

The watertight sealant for the risers at the manholes was not in place at the time of inspection. Rodney Sisler of RUS, Inc. Excavating Company was present at the time of inspection and assured us the sealant would be properly installed prior to backfill. The remaining components of the OWS were installed in general conformance with the design report.

If there are questions or if we can be of further service, please call.

Sincerely,

CHURCH & Associates, Inc.

Preston E. Clark, P. E.



PEC\kph

2 copies sent

cc: Tri-County Health Department, Castle Rock
RUS, Inc. Excavating Company

SITE VISIT WORKSHEET

Permit Number: 2000-07-002994

Date Printed: September 5, 2000

Property Location: 5803 Granite Way Lot 18 Block 2

County: Douglas

Owner: Spectre Development

SITE INFORMATION AS REPORTED BY ENGINEER:

PERC RATE:

Holes:

One 6 Two 15 Three 10 Four 120 Five 60 Six 120 Avg Rate 56 Sizing Rate 60

CIRCLE ONE:

Bedrock Encountered? Yes No If Yes, Type Sandstone Depth to Bedrock (ft) 3

Ground Water Encountered? Yes No If Yes, Depth to Groundwater (ft)

Ground Slope at Absorption Area (%) 9

Max depth of disposal area (in) 30 (not to exceed depth of percolation test holes)

Min depth of disposal area (in) 12

SOIL CLASSIFICATION: Most prohibitive soil below bottom of bed (circle one)

- CL Clay (low-med plasticity) CH Clay (high plasticity) MH Silt
ML Silt ML-CL Silt & Clay SC Clayey Sand
SM-SC Silty Clayey Sand SM Silty Sand SW Sand, Well Graded
SP Sand, Poorly Graded GC Clayey Gravel GM-GC Silty Clayey Gravel
GM Silty Gravel BR Bedrock GW Gravel, Well Graded

FIELD OBSERVATIONS:

Field Observations Consistent with Engineer's Data: Yes No
IF NO, complete below (circle one)

Bedrock Encountered? Yes No If Yes, Type Depth to Bedrock (ft)

Ground Water Encountered? Yes No If Yes, Depth to Groundwater (ft)

Ground Slope at Absorption Area (%)

Max depth of disposal area (in) (not to exceed depth of percolation test holes)

Min depth of disposal area (in)

SOIL CLASSIFICATION:

- CL Clay (low-med plasticity) CH Clay (high plasticity) MH Silt
ML Silt ML-CL Silt & Clay SC Clayey Sand
SM-SC Silty Clayey Sand SM Silty Sand SW Sand, Well Graded
SP Sand, Poorly Graded GC Clayey Gravel GM-GC Silty Clayey Gravel
GM Silty Gravel BR Bedrock GW Gravel, Well Graded

CONTINUED ON THE NEXT PAGE

SITE VISIT WORKSHEET

Permit Number: 2000-07-002994

Date Printed: September 5, 2000

RECORD OF SITE VISITS:

(It is important to record any extra visits for billing purposes)

Visit 1 Date 9/5/2000 By (EHS #) 408

Visit 2 Date _____ By (EHS #) _____

Visit 3 Date _____ By (EHS #) _____

Visit 4 Date _____ By (EHS #) _____

SPECIAL CONDITIONS

Install system as per Chuck E associates Job # 8524 C

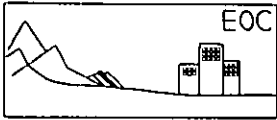
COMMENTS

Cody - doing ODHob.

Signature TCHD Inspector: John Klackner

Date 9/6/2000

2-1000
5000



E.O. CHURCH, INC.
ENGINEERS & GEOLOGISTS

April 25, 1997

Habitat Design
ATTN: Bob Lucero
13318 East Florida Avenue
Aurora, CO 80012

Subject: Onsite Wastewater System Design, Proposed Residence
Lot 18, Block 2, Diamond Ridge Estates
Castle Rock, Colorado
Job No. 8524C

Gentlemen,

As requested, we have investigated subsurface conditions and prepared an onsite wastewater system (OWS) design for the site. The purpose of our investigation was to determine subsurface parameters for the design of an OWS for the property.

SITE CONDITIONS - The site is a 1.37-acre lot located in a developing residential area northeast of Castle Rock, Colorado. A single-family residence is proposed in the southeast-central portion of the lot. The slope at the proposed field is 7% to the northeast. The site was vacant at the time of our design. The site has a good cover of native grasses with sandstone rock outcrops.

PROPOSED CONSTRUCTION - The location of the proposed four-bedroom residence and field are presented on Fig. 1. The sewage load for the four-bedroom dwelling is 600 gallons per day (GPD), 900 GPD with a 1.5 peaking factor. Our design loading includes a garbage grinder and washing machines. Water will be provided by the Town of Castle Rock.

SUBSURFACE CONDITIONS - Subsurface conditions were investigated on April 15, 1997 by drilling one profile borings and six percolation holes in the locations indicated on Fig. 1. Subsurface conditions consisted of 3 feet of clayey sand, underlain by sandstone bedrock to 10 feet, the maximum depth explored. No free water was encountered. Percolation test results ranged from 10 to 120 minutes per inch (MPI). The average percolation rate was 56 MPI. Logs of the profile holes, laboratory test results and percolation test results are presented on Figs. 5 - 8.

RECOMMENDATIONS - Because of the shallow bedrock, we recommend a low-pressure, shallow-trench OWS be installed in the natural soils in the vicinity of the profile and percolation holes. We recommend the design be based on an application rate of 0.26 gallons/square-foot/day (GAL/SF/DAY). This application rate uses slow-rate soil absorption. The system should be designed for a sewage load of 600 GPD. A design based on these criteria is presented on Figs. 1 - 4. As indicated on Figs. 1 and 2, the field has an area of 5000 square feet (SF) in five sections. The OWS installation will require two 1000-gallon, two-compartment, precast concrete septic tanks.

If the owner is anticipating finishing of additional bedrooms in unfinished areas, we recommend the OWS be constructed to handle the additional loading. The installation of a properly sized OWS to serve future buildout can be cost-effective. The proposed septic tank configuration will serve up to five-bedrooms. For greater than five bedrooms, either or both of the septic tanks can be upsized to 1250 gallons to accommodate up to seven bedrooms. Each additional bedroom beyond four would require an additional 1250 SF of field.

We recommend the surface of the field be seeded after installation of the OWS. We recommend using a seed mix such as "Foothills, Pasture, or Prairie" mixes available at seed stores. These mixes do not require irrigation and develop a growth 10 to 15 inches high. No automatic sprinkler system should be installed over the field area.

The owner must realize an OWS is different from public sewer service. The owner must assume the responsibility for maintenance of the OWS. The system is relatively maintenance-free, but the owner must have the septic tanks pumped. We recommend the trash chambers (first tank) be pumped every two years. There are daily considerations, such as not putting plastic or other nonbiodegradable material down the OWS. Water use must be monitored so toilets are not allowed to run when seals malfunction. To illustrate the point, a freely running toilet can consume in excess of 1000 gallons per day. An excess 1000 GPD will flood and irreparably harm the system.

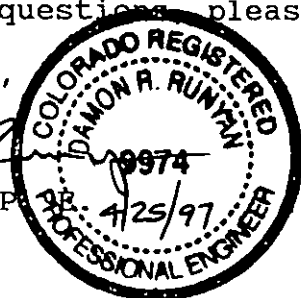
We caution about installation of a water softener. The hydraulic loading from the backwash of a water softener may be detrimental to OWS and a separate drywell should be constructed for the backwash waste, if a softener is installed. No landscaping or plastic can be used over the field, which will reduce performance of the field. Chemically treated water from a swimming pool or spas should not be introduced to the OWS. Livestock must be fenced from field areas.

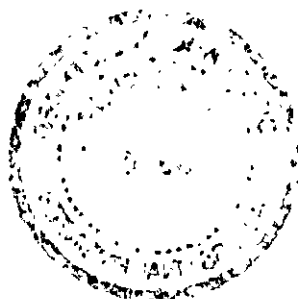
LIMITATIONS - A low-pressure, shallow-trench design requires installation by a contractor who is experienced in its installation. Our investigation, layout, design and recommendations are based on the data submitted. If subsurface conditions considerably different from those described in this report are encountered, we should be notified to evaluate the changes on the proposed OWS. If modifications to this design are made by the Health Department, we should be contacted to evaluate the impact on the performance of our OWS design. All materials, construction and specifications which are not specifically shown in this design are to conform to Health Department ISDS regulations. The installation of this design must be observed by a representative of this office during construction.

If there are any questions please call.

E. O. CHURCH, INC,

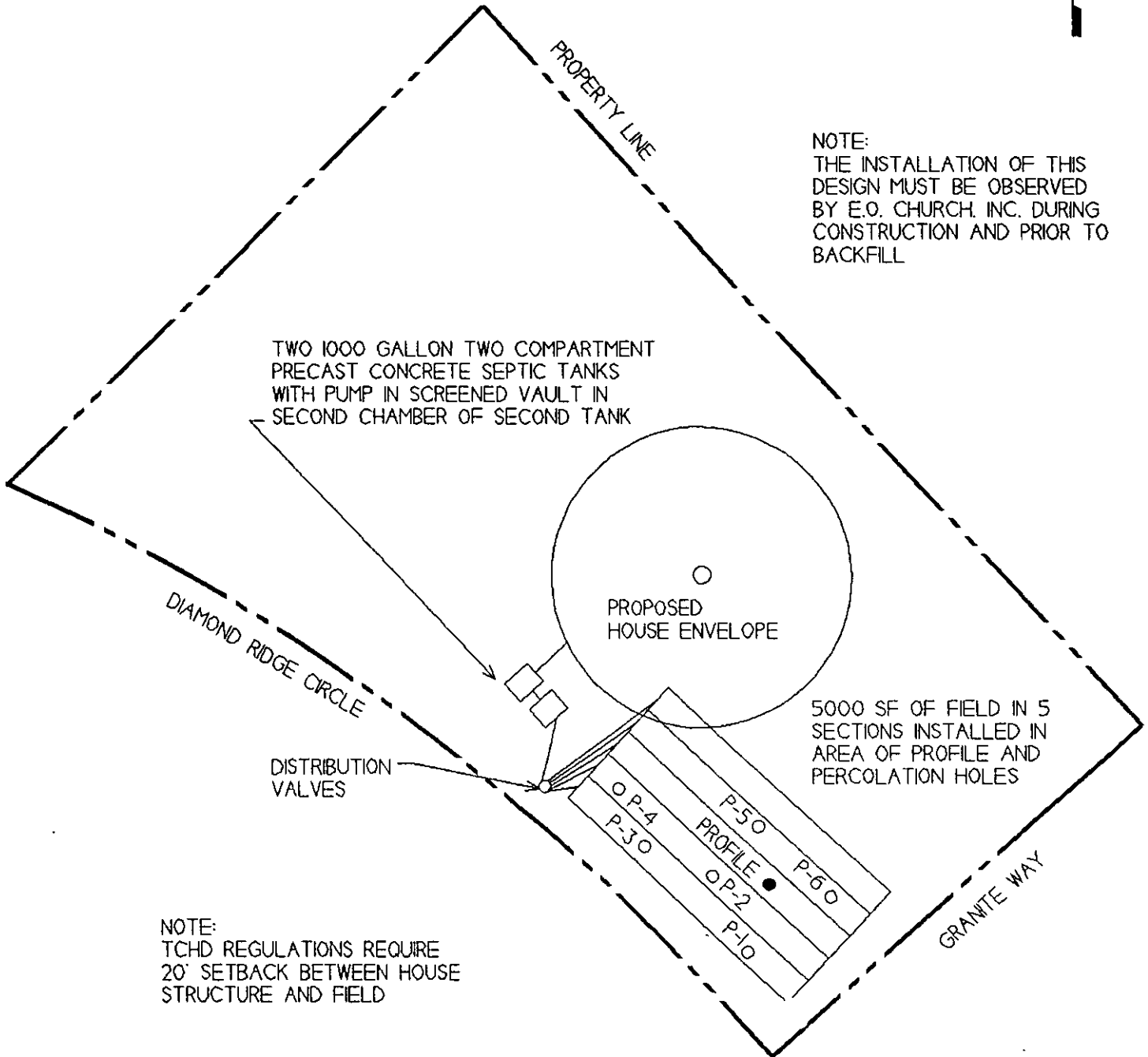
Damon R. Runyan
 Damon R. Runyan, P.E.
 DRR/dp
 3 copies sent





1.37 ACRES
LOT 18, BLOCK 2, DIAMOND RIDGE ESTATES
CASTLE ROCK, COLORADO

SCALE
1" = 50'

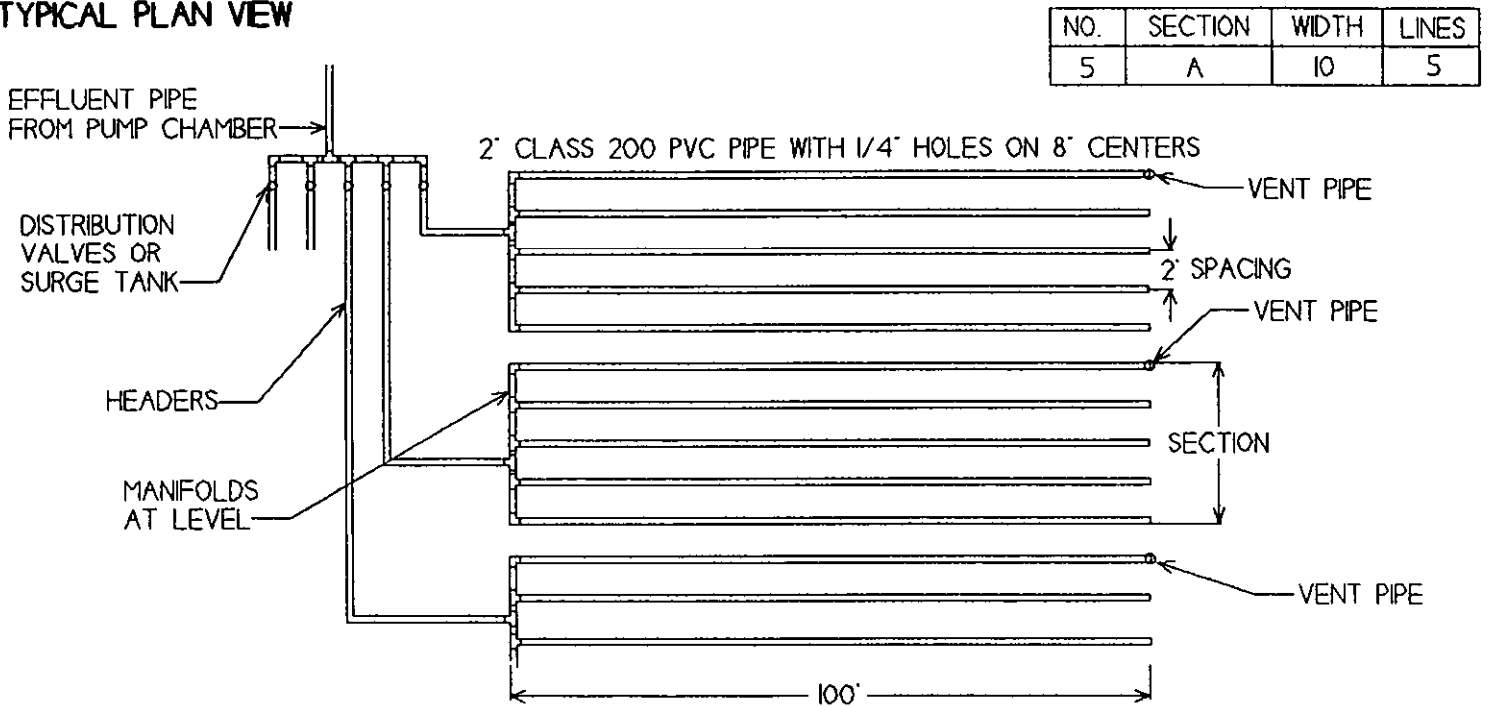


NOTE:
THE INSTALLATION OF THIS DESIGN MUST BE OBSERVED BY E.O. CHURCH, INC. DURING CONSTRUCTION AND PRIOR TO BACKFILL

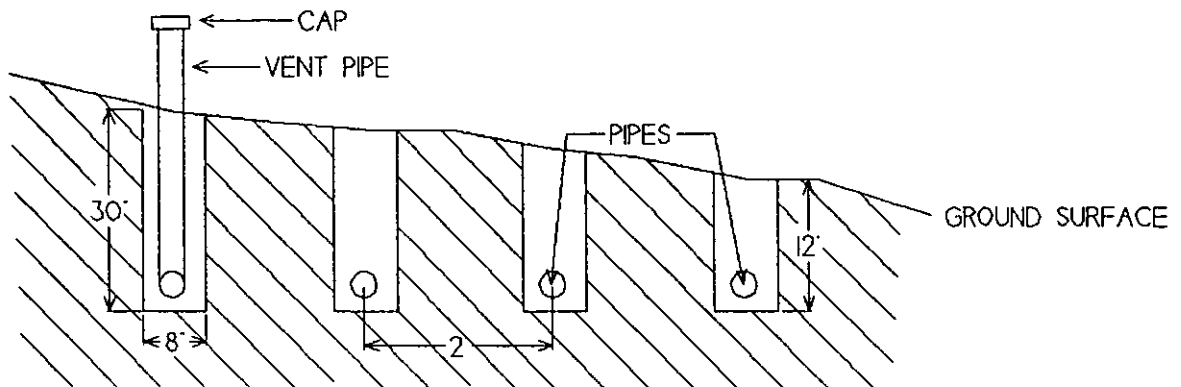
NOTE:
TCHD REGULATIONS REQUIRE 20' SETBACK BETWEEN HOUSE STRUCTURE AND FIELD

SITE PLAN AND LOCATION OF PROPOSED OWS

TYPICAL PLAN VIEW



TYPICAL FIELD CROSS-SECTION



SPECIFICATIONS AND DESIGN CALCULATIONS

TREATMENT UNIT

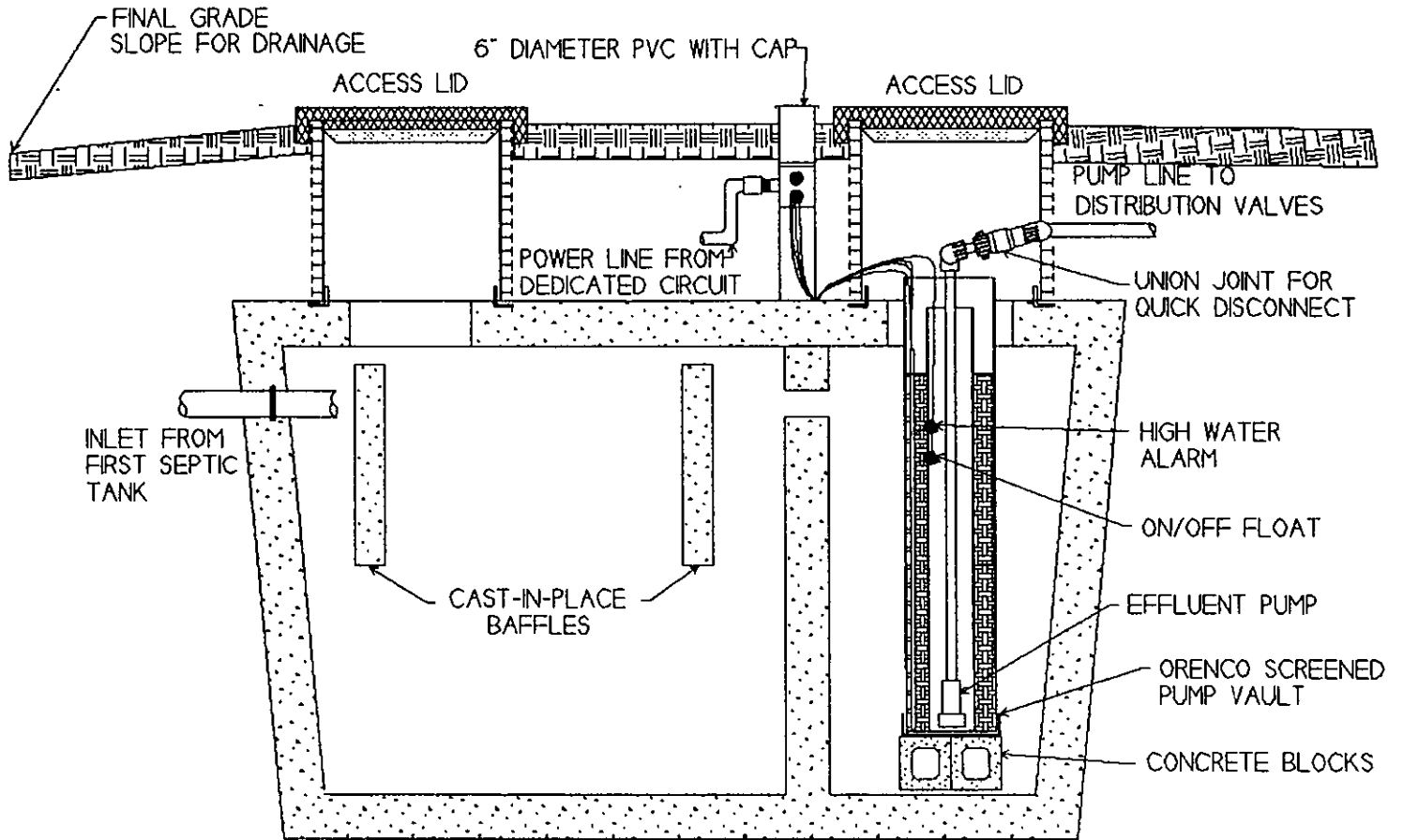
1. TWO 1000 GALLON TWO COMPARTMENT PRECAST CONCRETE SEPTIC TANKS WITH PUMP IN SCREENED VAULT IN SECOND CHAMBER OF SECOND TANK
2. PUMP: 0.4 HP GOULD OR EQUIVALENT
3. ALARM/CONTROL PANEL LOCATION AT OWNER'S REQUEST
4. RISERS: 4 TO THE SURFACE
5. DRAINBACK TO PUMP AND FIELD

DISTRIBUTION FIELD

1. 4 BEDROOM SINGLE FAMILY RESIDENCE
2. SEWAGE LOADING - Q = 600 GPD
3. PERCOLATION RATE - R = 57 MPI
4. APPLICATION RATE - R = 0.26 GAL/SF/DAY
5. AREA - $(Q/R) \times 1.5 \times 1.6 \times 0.75 \times 1.17 = 4860$ SF
6. PROPOSED FIELD AREA - 5000 SF
7. PROPOSED LINE - 2500 LF
8. TRENCH WIDTH - 8 INCHES
9. LANDSCAPING IS THE RESPONSIBILITY OF THE OWNER

SHALLOW TRENCH DETAILS

1000 GALLON TWO COMPARTMENT PRECAST CONCRETE SEPTIC TANK OR SEPERATE
500 GALLON CHAMBER. (APPROVED TANK WITH 18" OPENING)



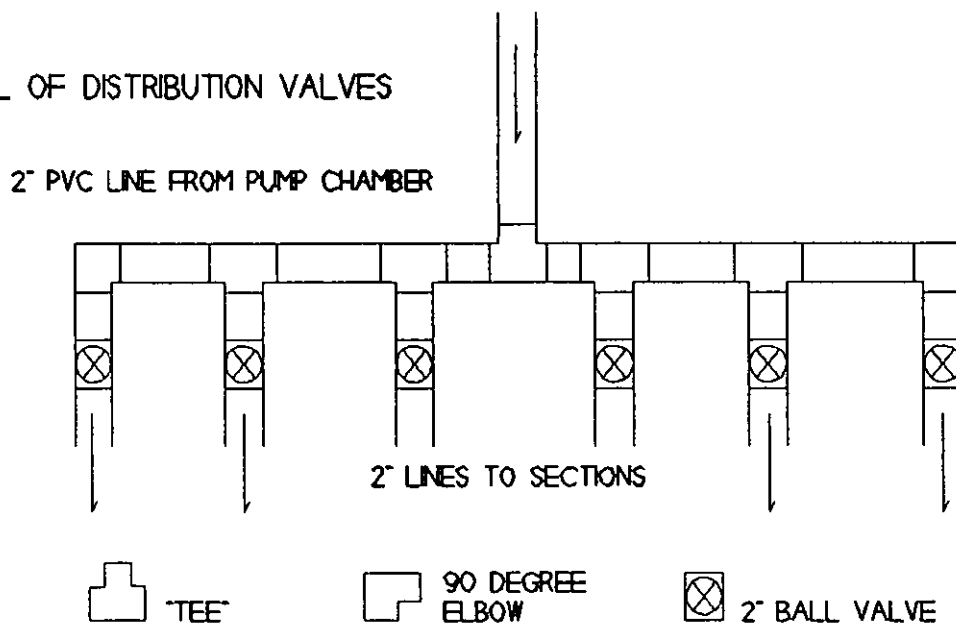
SPECIFICATIONS:

1. PUMP 0.40 HP 1 1/2-INCH DISCHARGE 36 GPM/15 HEAD: GOULD, TECUMSEH, ZOELLER OR EQUIVALENT
2. PUMP ON LEVEL WITH A MINIMUM OF 150 GALLONS FOR PUMPING
3. INSTALL PRESSURE RELIEF VALVE AT HIGH POINT IN PUMP LINE.
4. AUDIBLE ALARM IN BUILDING. ALARM LEVEL 3 INCHES ABOVE "ON" FLOAT LEVEL OF TANK.

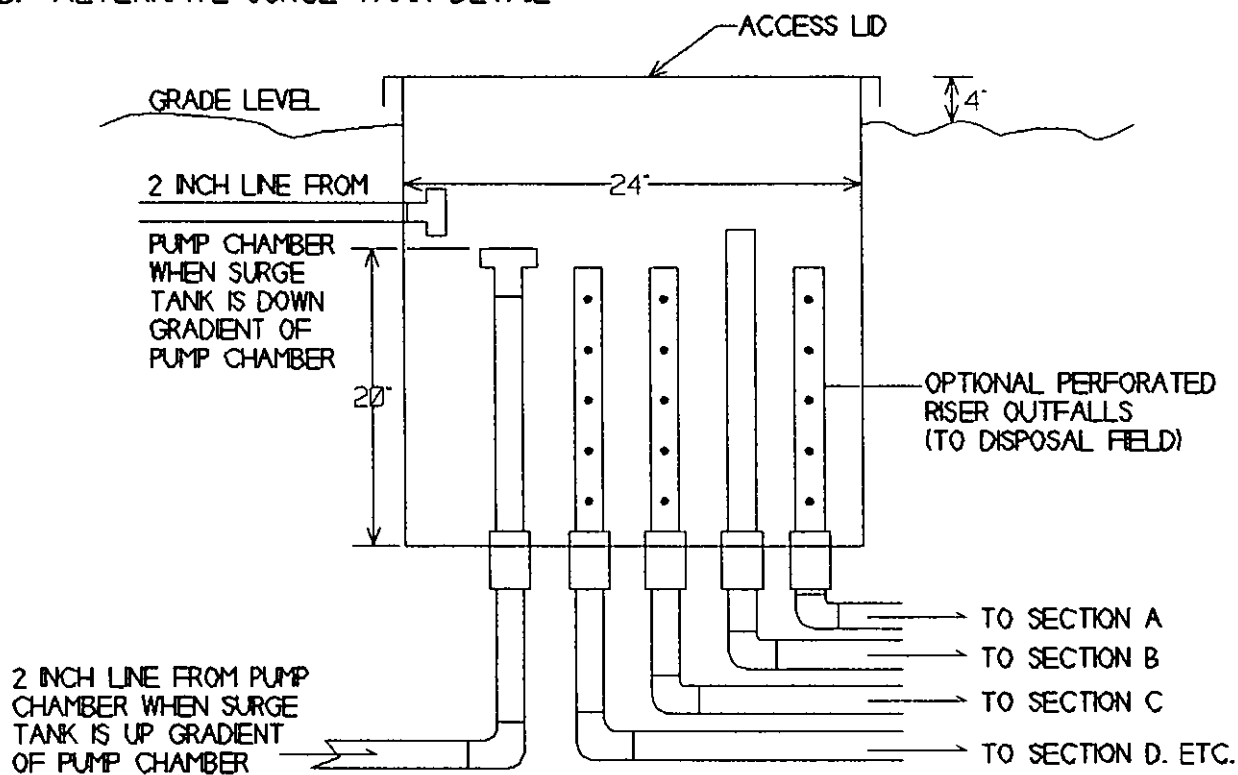
PUMP CHAMBER DETAIL

THE DISTRIBUTION VALVES OR THE SURGE TANK CONTROL FLOW OF EFFLUENT TO EACH SECTION OF THE FIELD. WE RECOMMEND ONE SECTION OF THE FIELD BE CLOSED AT ALL TIMES TO ALLOW DRYING OF SEGMENTS OF THE FIELD TO EXTEND THE LIFE OF THE FIELD. THIS CAN BE ACCOMPLISHED BY SEQUENTIALLY ROTATING THE VALVES OR THE NON-PERFORATEED TALL RISER EVERY SIX MONTHS.

A. DETAIL OF DISTRIBUTION VALVES

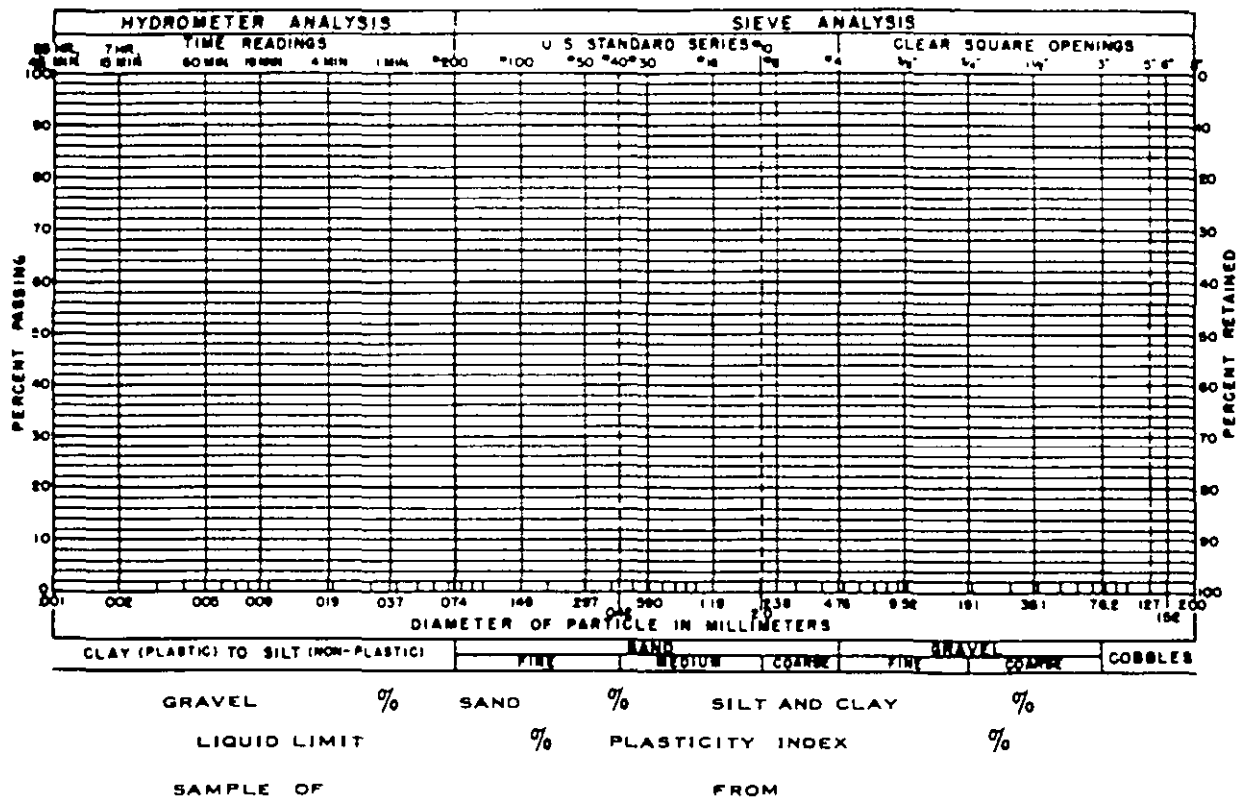
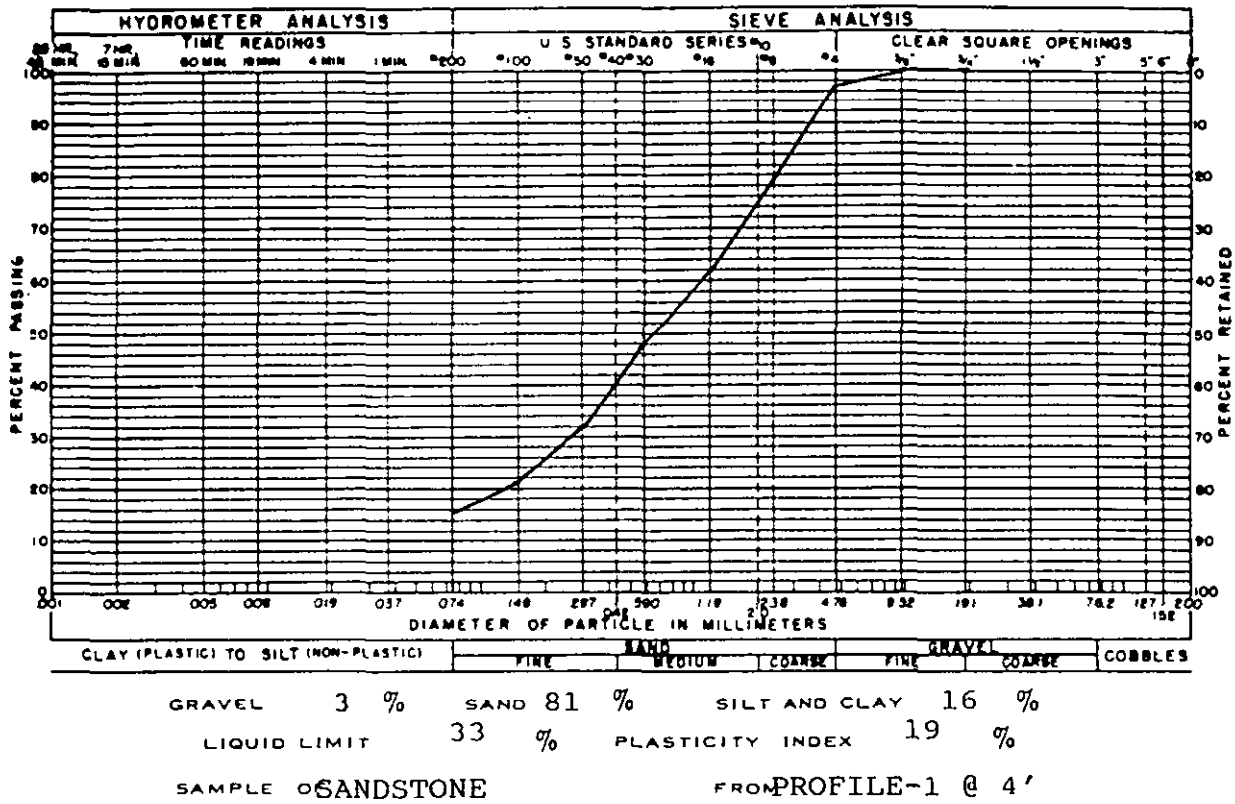


B. ALTERNATE SURGE TANK DETAIL



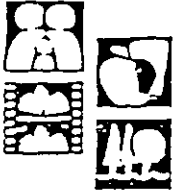
PIPES TO SECTIONS SHOULD SLOPE 1/8" DOWNGRADE FOR FROST PROTECTION

DISTRIBUTION VALVES
AND SURGE TANK DETAIL



Form 12

GRADATION TEST RESULTS



TRI-COUNTY HEALTH DEPARTMENT

Percolation Test and Soils Data Form

Property address _____

Legal Description LOT 18, BLOCK 2, DIAMOND RIDGE ESTATES

Property Owner:

Name HABITAT DESIGN ATTN: BOB LUCERO

Address 13318 EAST FLORIDA AVENUE, AURORA CO, 80012

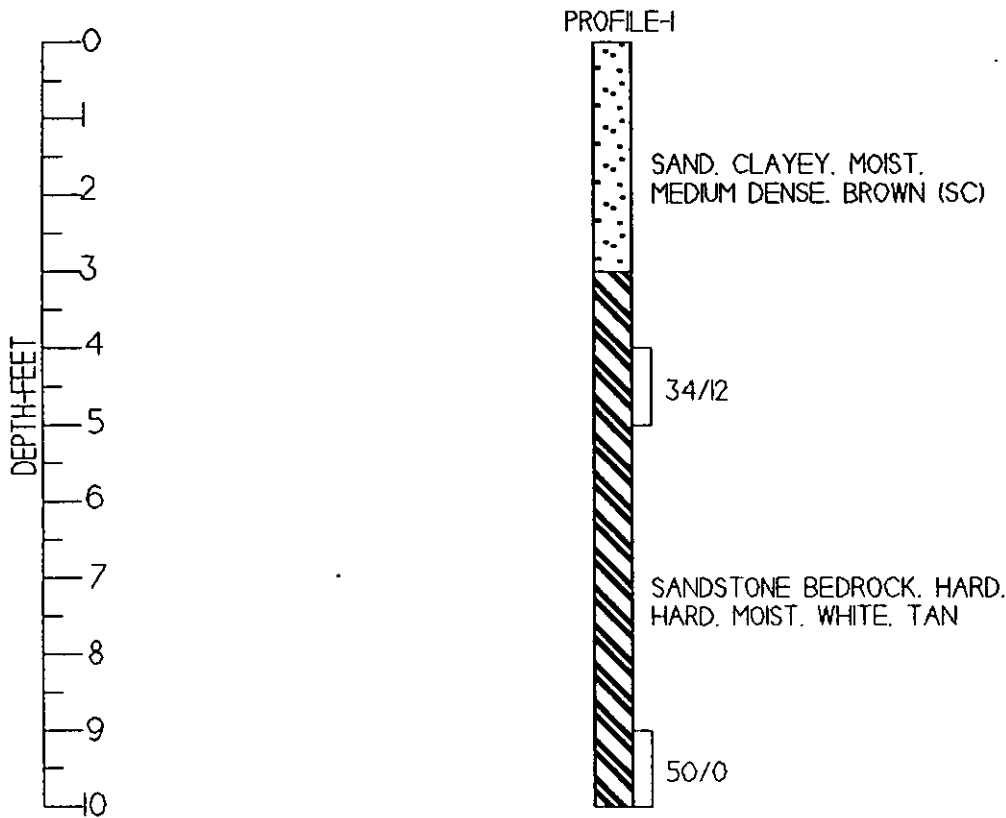
Phone 368-4057

Note:

- * Percolation Test Form, Site Plan and Grain Size Distribution Curve of the Sample must be submitted with this form.
- * For all Lots <5 acres the site plan must include the entire lot. Test locations must be accurately tied to lot corners or other permanent markers.

<p>Saturation and Swelling:</p> <p>* Smearred surfaces removed: <u>X</u>Yes <u> </u>No</p> <p>* Sand or gravel added: <u> </u>Yes <u>X</u>No</p> <p>* Date and time presoak water added: <u>4-15-97 10:00 A.M.</u></p> <p>* Amount of water added (gallons) <u>3 GALLONS/HOLE</u></p> <p>* Date and time perc test started: <u>4-16-97 11:00 A.M.</u></p> <p>* Did water remain in hole overnight</p> <table style="width: 100%; border: none;"> <tr><td>Hole 1</td><td><u> </u>Yes</td><td><u>X</u>No</td></tr> <tr><td>Hole 2</td><td><u> </u>Yes</td><td><u>X</u>No</td></tr> <tr><td>Hole 3</td><td><u> </u>Yes</td><td><u>X</u>No</td></tr> <tr><td>Hole 4</td><td><u> </u>Yes</td><td><u>X</u>No</td></tr> <tr><td>Hole 5</td><td><u> </u>Yes</td><td><u>X</u>No</td></tr> <tr><td>Hole 6</td><td><u> </u>Yes</td><td><u>X</u>No</td></tr> </table> <p>Percolation Rate Measurement</p> <p>Percolation Rate (min./in.)</p> <table style="width: 100%; border: none;"> <tr><td>Hole 1</td><td><u> 6</u></td><td>Hole 5</td><td><u> 60</u></td></tr> <tr><td>Hole 2</td><td><u> 15</u></td><td>Hole 6</td><td><u> 120</u></td></tr> <tr><td>Hole 3</td><td><u> 10</u></td><td>Hole 8</td><td><u> </u></td></tr> <tr><td>Hole 4</td><td><u> 120</u></td><td>Hole 9</td><td><u> </u></td></tr> <tr><td colspan="4">Average Holes <u> 56</u></td></tr> </table>	Hole 1	<u> </u> Yes	<u>X</u> No	Hole 2	<u> </u> Yes	<u>X</u> No	Hole 3	<u> </u> Yes	<u>X</u> No	Hole 4	<u> </u> Yes	<u>X</u> No	Hole 5	<u> </u> Yes	<u>X</u> No	Hole 6	<u> </u> Yes	<u>X</u> No	Hole 1	<u> 6</u>	Hole 5	<u> 60</u>	Hole 2	<u> 15</u>	Hole 6	<u> 120</u>	Hole 3	<u> 10</u>	Hole 8	<u> </u>	Hole 4	<u> 120</u>	Hole 9	<u> </u>	Average Holes <u> 56</u>				<p>Groundwater:</p> <p>* Encountered at <u> NONE</u> FT.</p> <p>* Estimated depth to maximum seasonal water table if not encountered in profile: <u>>10'</u></p> <p>* Is area belived to be subject to fluctuations which could result in a seasonal water table within 8' of surface? <u> </u>Yes <u>X</u>No</p> <p>Slope determination in absorption area <u> 9</u> % to the <u> NE</u> direction.</p> <p>Bedrock:</p> <p>* Encountered @ <u> 3</u> feet.</p> <p>* Estimated depth if not encountered in profile: <u> </u></p> <p>* Type of Bedrock: <u> SANDSTONE</u></p> <p>* Is bedrock WEATHERED? <u> </u>Yes <u>X</u>No</p> <p>* Is bedrock believed to be permeable? <u> </u>Yes <u>X</u>No</p>
Hole 1	<u> </u> Yes	<u>X</u> No																																					
Hole 2	<u> </u> Yes	<u>X</u> No																																					
Hole 3	<u> </u> Yes	<u>X</u> No																																					
Hole 4	<u> </u> Yes	<u>X</u> No																																					
Hole 5	<u> </u> Yes	<u>X</u> No																																					
Hole 6	<u> </u> Yes	<u>X</u> No																																					
Hole 1	<u> 6</u>	Hole 5	<u> 60</u>																																				
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Hole 3	<u> 10</u>	Hole 8	<u> </u>																																				
Hole 4	<u> 120</u>	Hole 9	<u> </u>																																				
Average Holes <u> 56</u>																																							

PROFILE HOLE INFORMATION (Cont.)
 (Soils must be classified using Unified System ASTM D2487)



Certification

I certify that the above information is correct and complete to the best of my knowledge and that all tests were performed in accordance with the provisions of Tri-County Health Department Regulation I-96 by myself or under my supervision.

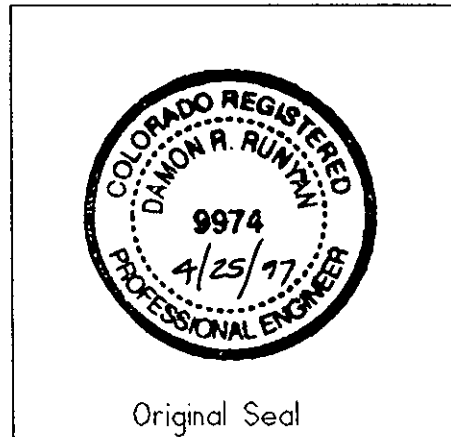
Damon R Runyan
 Original Signature

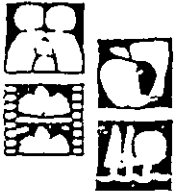
APRIL 25, 1997
 Date

E. O. CHURCH, INC.
 Company Name

P.O. BOX 763 CASTLE ROCK, CO
 Address

(303) 660-4358
 Phone





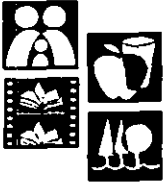
TRI-COUNTY HEALTH DEPARTMENT

Percolation Test Result Form

Hole No.	Hole Depth (in.)	Length of Interval (min.)	Depth @ Start of Interval (in.)	Depth @ End of Interval (in.)	Drop in Water Level (in.)	Percolation Rate @ Final Interval (min./in.)
P-1	30	30	13.75	22.00	8.25	
		30	8.00	17.50	9.50	
		30	17.50	23.50	6.00	
		30	23.50	29.00	5.50	
		30	6.00	15.00	9.00	
		30	6.25	15.00	7.75	
		30	15.00	20.50	5.50	
		30	20.50	23.00	2.50	12
P-2	26	30	11.25	17.00	5.75	
		30	17.00	21.00	4.00	
		30	5.00	14.00	9.00	
		30	14.00	19.00	5.00	
		30	6.25	14.00	7.75	
		30	5.25	13.50	8.25	
		30	13.50	16.00	2.50	
		30	16.00	18.00	2.00	15
P-3	28	30	9.75	16.25	7.00	
		30	16.25	20.75	4.50	
		30	7.50	14.50	7.00	
		30	14.50	19.00	4.50	
		30	8.50	15.00	6.50	
		30	5.00	13.50	8.50	
		30	13.50	17.00	3.50	
		30	17.00	20.00	3.00	10
P-4	23	30	8.00	9.50	1.50	
		30	9.50	10.50	1.00	
		30	10.50	11.50	1.00	
		30	11.50	12.75	1.25	
		30	12.75	13.00	0.25	
		30	5.00	7.25	2.25	
		30	7.25	9.25	2.00	
		30	9.25	9.50	0.25	120
P-5	25	30	6.75	9.25	2.50	
		30	9.25	11.50	2.25	
		30	11.50	12.00	0.50	
		30	12.00	13.25	1.25	
		30	13.25	14.00	0.75	
		30	7.00	9.00	2.00	
		30	9.00	10.00	1.00	
		30	10.00	10.50	0.50	60
P-6	22	30	7.00	7.75	0.75	
		30	7.75	8.25	0.50	
		30	8.25	8.75	0.50	
		30	8.75	10.00	1.25	
		30	10.00	10.25	0.25	
		30	6.50	7.50	1.00	
		30	7.50	9.25	1.75	
		30	9.25	9.50	0.25	120

1998-07-

PERMIT # 1160



TRI-COUNTY HEALTH DEPARTMENT
Serving Adams, Arapahoe and Douglas Counties

APPLICATION TO
 INSTALL(255) REPAIR(256) EXPAND(256)
\$300 \$250 \$250
AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM

ADDRESS OF PROPERTY SERVED BY PROPOSED SYSTEM:

5803 GRANITE WAY CASTLE ROCK
Street Address City
80104 DOUGLASS DIAMOND RIDGE ESTATES
Zip Code County

1/4 Sec ___ 1/4 Sec ___ Parcel ___ Section ___ Township ___ Range ___ Lot 18 Block 2
Legal Description (if no street address)

If GPS Information Available/Obtained: Longitude ___ Latitude ___ Elevation ___

Diamond Ridge Estates
Subdivision Name Filing (if applicable)

Property Owner:
Name MERIDIAN INTERESTS
Address 9580 OAKVIEW SUITE 7-201
City, State FULSOM, CALIF 95630
Zip 95630 Phone 916-987-1692

Applicant:
Name HABITAT DESIGN INC
Address 13318 E. FLA. AURORA
City, State AURORA, CO
Zip 80012 Phone 308-4057

Systems Contractor HEALTH CONSULT

TCHD Use Only: License # _____

Soils/Percolation Test Engineer E.O. CHURCH Job # 8524C
TCHD Use Only: FSE # _____

Design Engineer (if applicable) E.O. CHURCH Job # 8524C
TCHD Use Only: FSE # _____

Is this to be an Engineered System? Yes No

PROPOSED FACILITY:
 Single Family (SF) Multi-Family (MF) Commercial (CM) Other (OT) _____

WATER SUPPLY:
On Site: Yes No Community Water Yes No If Yes, Supplier CASTLE ROCK
Lot size: 1.37

Continued on back

SINGLE FAMILY RESIDENTIAL GENERAL INFORMATION:

Number of Bedrooms 4 Basement: Full (F) Walkout(W) Partial(P) None(N)

Basement Plumbed: Yes No ROUGH

Are Additional Bedrooms Planned? Yes No Are the premises within 400 ft. of a sewer line? Yes No

Is property within boundaries of a sewer district? Yes No

If Yes, name of sewer district _____

COMMERCIAL GENERAL INFORMATION:

Type of Business: _____

TCHD Use Only: SIC Code _____

Number of Employees _____

Design Flow > 3,000 Gallons/Day Yes No

If Yes, has Site Approval been given from CDPHE? Yes No

(Note: Permit cannot be issued until site approval is given from CDPHE)

Floor Drains Yes No

EPA Shallow Injection Well Inventory Request Form Completed Yes No

Date Paid: 10-26-98 Received By: BA

Payment Type: Cash

Check (# 2965)

Charge

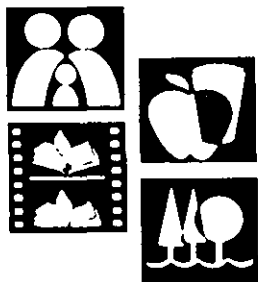
Other _____

Amount Paid \$ 300.

Applicant's Name ROBERT H.E. LUCERO
Please Print

Applicant's Signature Robert H.E. Lucero

Date Oct 26, 1998



Tri-County Health Department

Serving Adams, Arapahoe and Douglas Counties Permit # 1998-07-001160

Chris J. Want, M.P.H., Ph.D.
Executive Director

**PERMIT TO CONSTRUCT
AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM**
Tri-County Health Department
7000 East Belleview Avenue Suite 301
Englewood, Colorado 80111

Owner **MERIDIAN INTERESTS**
Location: **5803 Granite Way Lot 18 Block 2**
Installer: **60000049 HEACOCK CONSTRUCTION INC**

=====
System Requirements:

Design Requirements for: Trench System: Bed System:

See specifications as noted by the Design Engineer

*****Special Conditions*****

INSTALL PER E.O. CHURCH, INC., JOB NO. 8524C DATED 04/25/97.

=====
A Permit to CONSTRUCT shall expire ONE YEAR from the date of issuance unless extended to a fixed date upon request by the Applicant and approved by the Tri-County Health Department.

This Permit Expires: 11/19/1999

Issued by: Tri-County Health Department on November 19, 1998

OWNER MUST MAKE SURE THAT HIS/HER ENTIRE WASTE DISPOSAL SYSTEM REMAINS OPEN FOR INSPECTION UNTIL IT HAS RECEIVED APPROVAL BY TRI-COUNTY HEALTH DEPARTMENT. TRI-COUNTY HEALTH DEPARTMENT CANNOT ASSUME RESPONSIBILITY IN CASE OF FAILURE OR INADEQUACY OF A WASTE DISPOSAL SYSTEM BEYOND CONSULTING IN GOOD FAITH WITH THE PROPERTY OWNER.

Permit Fee: 300.00 Payment Method Check #2965

Received By: Dutton, Becky on 10/26/1998

() Owner Copy () Bldg. Dept. Copy () Installer Copy () H.D.

For Accounting Use Only:
680-500000

300.00

Fifty years of working to **50** *improve the public's health*

SITE VISIT WORKSHEET

Permit Number: 1998-07-001160

Date Printed: October 26, 1998

Property Location: 5803 Granite Way Lot 18 Block 2

Owner: Meridian Interests

System Installer: 60000049, Heacock Construction Inc

SITE INFORMATION AS REPORTED BY ENGINEER:

PERC RATE:

Holes:

One 6 Two 15 Three 10 Four 120 Five 60 Six 120 Avg Rate 56 Sizing Rate 87

CIRCLE ONE:

Bedrock Encountered? Yes No If Yes, Type SS Depth to Bedrock (ft) 3.0

Ground Water Encountered? Yes No If Yes, Depth to Groundwater (ft)

Ground Slope at Absorption Area (%) 9

Max depth of disposal area (ft) 2.5 (not to exceed depth of percolation test holes)

Min depth of disposal area (ft) 1.0

SOIL CLASSIFICATION:

CL Clay (low-med plasticity) CH Clay (high plasticity) MH Silt
ML Silt ML-CL Silt & Clay SC Clayey Sand
SM-SC Silty Clayey Sand SM Silty Sand SW Sand, Well Graded
SP Sand, Poorly Graded GC Clayey Gravel GM-GC Silty Clayey Gravel
GM Silty Gravel GW Gravel, Well Graded

FIELD OBSERVATIONS:

Field Observations Consistent with Engineer's Data: Yes No

CIRCLE ONE:

Bedrock Encountered? Yes No If Yes, Type SS

Depth to Bedrock (ft) 2.5

Ground Water Encountered? Yes No If Yes, Depth to Groundwater (ft)

SOIL CLASSIFICATION:

CL Clay (low-med plasticity) CH Clay (high plasticity) MH Silt
ML Silt ML-CL Silt & Clay SC Clayey Sand
SM-SC Silty Clayey Sand SM Silty Sand SW Sand, Well Graded
SP Sand, Poorly Graded GC Clayey Gravel GM-GC Silty Clayey Gravel
GM Silty Gravel GW Gravel, Well Graded

CONTINUED ON THE NEXT PAGE

SITE VISIT WORKSHEET

Permit Number: **1998-07-001160**

Date Printed: **October 26, 1998**

RECORD OF SITE VISITS:

(It is important to record any extra visits for billing purposes)

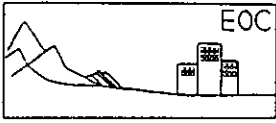
Visit 1 Date <u>11-18-98</u>	By (EHS #) <u>832</u>	Time Spent <u>1.25</u>
Visit 2 Date _____	By (EHS #) _____	Time Spent _____
Visit 3 Date _____	By (EHS #) _____	Time Spent _____
Visit 4 Date _____	By (EHS #) _____	Time Spent _____

SPECIAL CONDITIONS

Install per E.D. Church, Inc Job No. 8524C
Dated 4-25-97.

COMMENTS

Signature TCHD Inspector:  Date 11-18-98



E.O. CHURCH, INC.
ENGINEERS & GEOLOGISTS

April 25, 1997

Habitat Design
ATTN: Bob Lucero
13318 East Florida Avenue
Aurora, CO 80012

Subject: Onsite Wastewater System Design, Proposed Residence
Lot 18, Block 2, Diamond Ridge Estates
Castle Rock, Colorado
Job No. 8524C

Gentlemen,

As requested, we have investigated subsurface conditions and prepared an onsite wastewater system (OWS) design for the site. The purpose of our investigation was to determine subsurface parameters for the design of an OWS for the property.

SITE CONDITIONS - The site is a 1.37-acre lot located in a developing residential area northeast of Castle Rock, Colorado. A single-family residence is proposed in the southeast-central portion of the lot. The slope at the proposed field is 7% to the northeast. The site was vacant at the time of our design. The site has a good cover of native grasses with sandstone rock outcrops.

PROPOSED CONSTRUCTION - The location of the proposed four-bedroom residence and field are presented on Fig. 1. The sewage load for the four-bedroom dwelling is 600 gallons per day (GPD), 900 GPD with a 1.5 peaking factor. Our design loading includes a garbage grinder and washing machines. Water will be provided by the Town of Castle Rock.

SUBSURFACE CONDITIONS - Subsurface conditions were investigated on April 15, 1997 by drilling one profile borings and six percolation holes in the locations indicated on Fig. 1. Subsurface conditions consisted of 3 feet of clayey sand, underlain by sandstone bedrock to 10 feet, the maximum depth explored. No free water was encountered. Percolation test results ranged from 10 to 120 minutes per inch (MPI). The average percolation rate was 56 MPI. Logs of the profile holes, laboratory test results and percolation test results are presented on Figs. 5 - 8.

RECOMMENDATIONS - Because of the shallow bedrock, we recommend a low-pressure, shallow-trench OWS be installed in the natural soils in the vicinity of the profile and percolation holes. We recommend the design be based on an application rate of 0.26 gallons/square-foot/day (GAL/SF/DAY). This application rate uses slow-rate soil absorption. The system should be designed for a sewage load of 600 GPD. A design based on these criteria is presented on Figs. 1 - 4. As indicated on Figs. 1 and 2, the field has an area of 5000 square feet (SF), in five sections. The OWS installation will require two 1000-gallon, two-compartment, precast concrete septic tanks.

If the owner is anticipating finishing of additional bedrooms in unfinished areas, we recommend the OWS be constructed to handle the additional loading. The installation of a properly sized OWS to serve future buildout can be cost-effective. The proposed septic tank configuration will serve up to five-bedrooms. For greater than five bedrooms, either or both of the septic tanks can be upsized to 1250 gallons to accommodate up to seven bedrooms. Each additional bedroom beyond four would require an additional 1250 SF of field.

We recommend the surface of the field be seeded after installation of the OWS. We recommend using a seed mix such as "Foothills, Pasture, or Prairie" mixes available at seed stores. These mixes do not require irrigation and develop a growth 10 to 15 inches high. No automatic sprinkler system should be installed over the field area.

The owner must realize an OWS is different from public sewer service. The owner must assume the responsibility for maintenance of the OWS. The system is relatively maintenance-free, but the owner must have the septic tanks pumped. We recommend the trash chambers (first tank) be pumped every two years. There are daily considerations, such as not putting plastic or other nonbiodegradable material down the OWS. Water use must be monitored so toilets are not allowed to run when seals malfunction. To illustrate the point, a freely running toilet can consume in excess of 1000 gallons per day. An excess 1000 GPD will flood and irreparably harm the system.

We caution about installation of a water softener. The hydraulic loading from the backwash of a water softener may be detrimental to OWS and a separate drywell should be constructed for the backwash waste, if a softener is installed. No landscaping or plastic can be used over the field, which will reduce performance of the field. Chemically treated water from a swimming pool or spas should not be introduced to the OWS. Livestock must be fenced from field areas.

LIMITATIONS - A low-pressure, shallow-trench design requires installation by a contractor who is experienced in its installation. Our investigation, layout, design and recommendations are based on the data submitted. If subsurface conditions considerably different from those described in this report are encountered, we should be notified to evaluate the changes on the proposed OWS. If modifications to this design are made by the Health Department, we should be contacted to evaluate the impact on the performance of our OWS design. All materials, construction and specifications which are not specifically shown in this design are to conform to Health Department ISDS regulations. The installation of this design must be observed by a representative of this office during construction.

If there are any questions, please call.

E. O. CHURCH, INC,

Damon R Runyan

Damon R. Runyan, P.
DRR/dp

3 copies sent

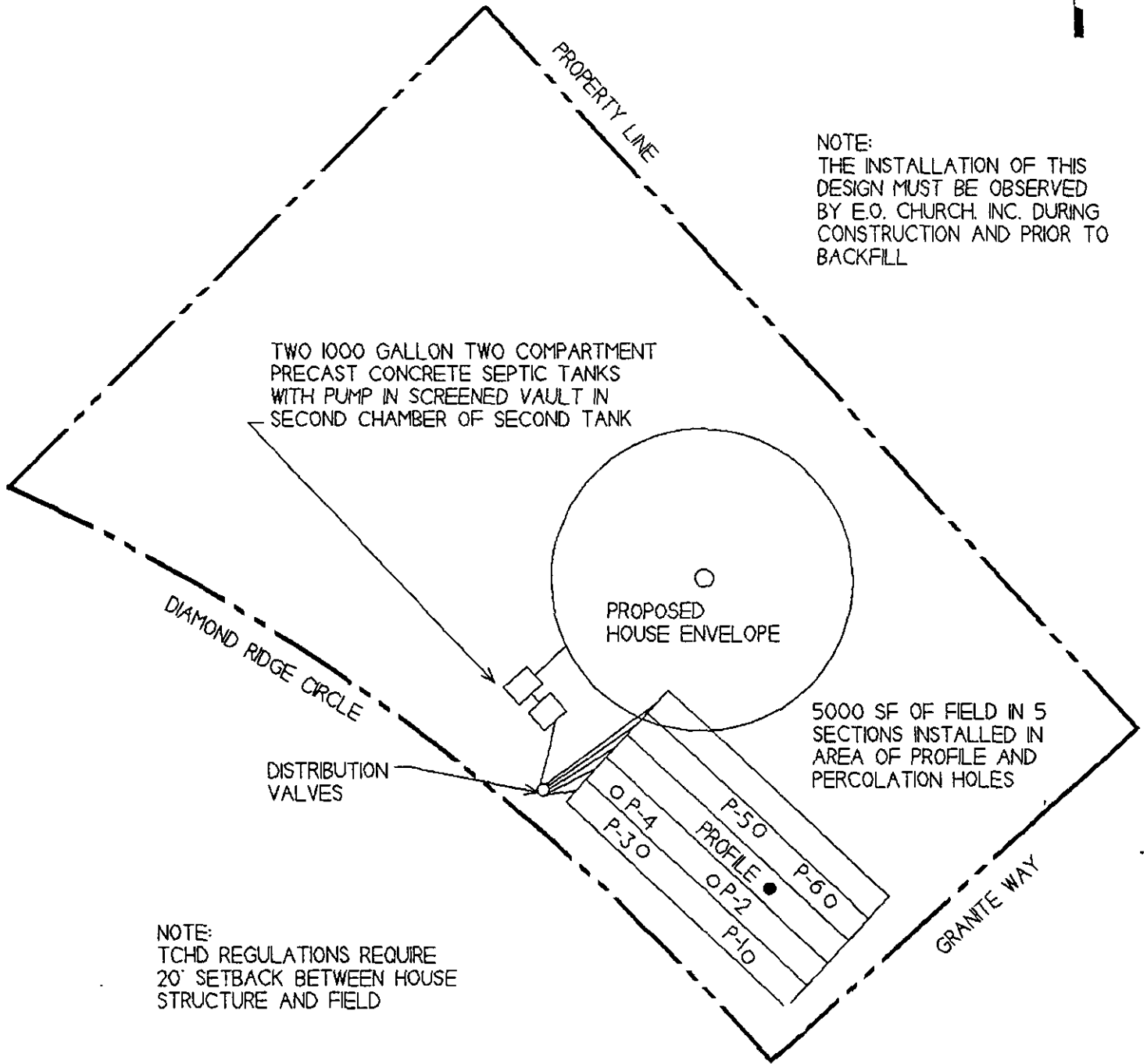


1.37 ACRES
LOT 18, BLOCK 2, DIAMOND RIDGE ESTATES
CASTLE ROCK, COLORADO

SCALE
1" = 50'



NOTE:
THE INSTALLATION OF THIS
DESIGN MUST BE OBSERVED
BY E.O. CHURCH, INC. DURING
CONSTRUCTION AND PRIOR TO
BACKFILL



TWO 1000 GALLON TWO COMPARTMENT
PRECAST CONCRETE SEPTIC TANKS
WITH PUMP IN SCREENED VAULT IN
SECOND CHAMBER OF SECOND TANK

PROPOSED
HOUSE ENVELOPE

5000 SF OF FIELD IN 5
SECTIONS INSTALLED IN
AREA OF PROFILE AND
PERCOLATION HOLES

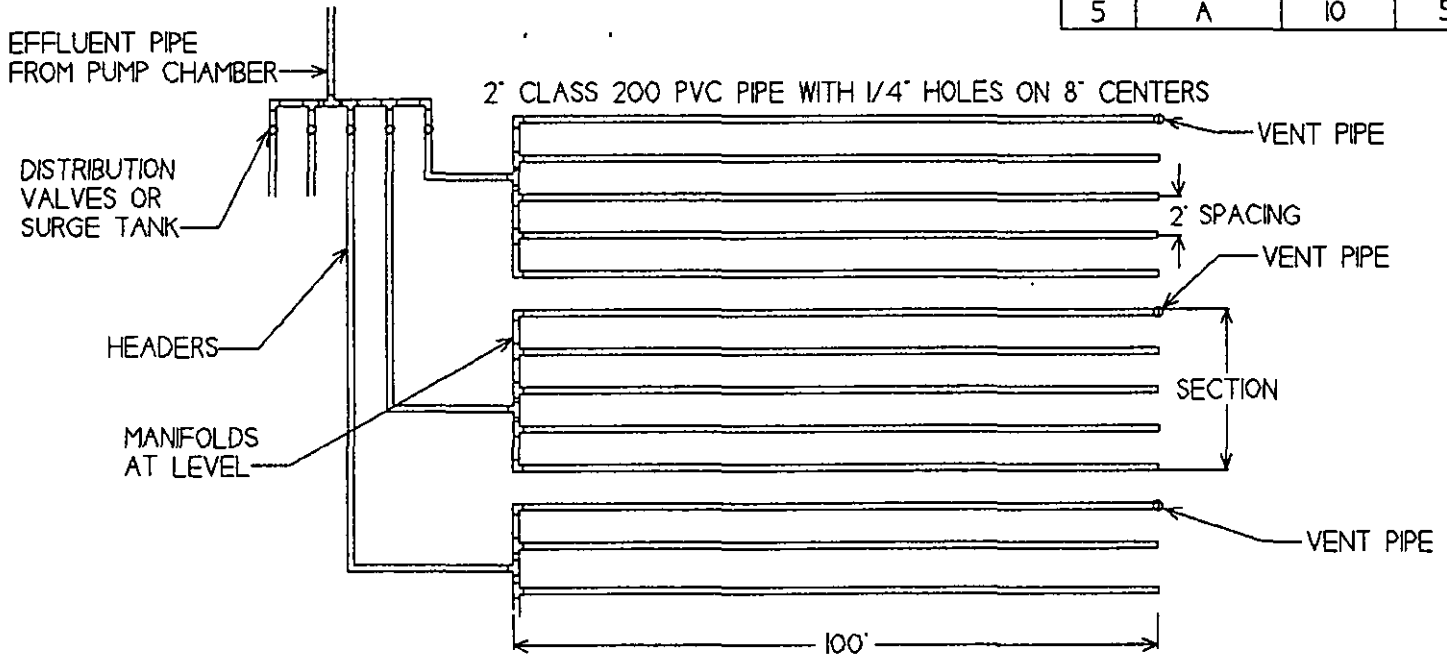
DISTRIBUTION
VALVES

NOTE:
TCHD REGULATIONS REQUIRE
20' SETBACK BETWEEN HOUSE
STRUCTURE AND FIELD

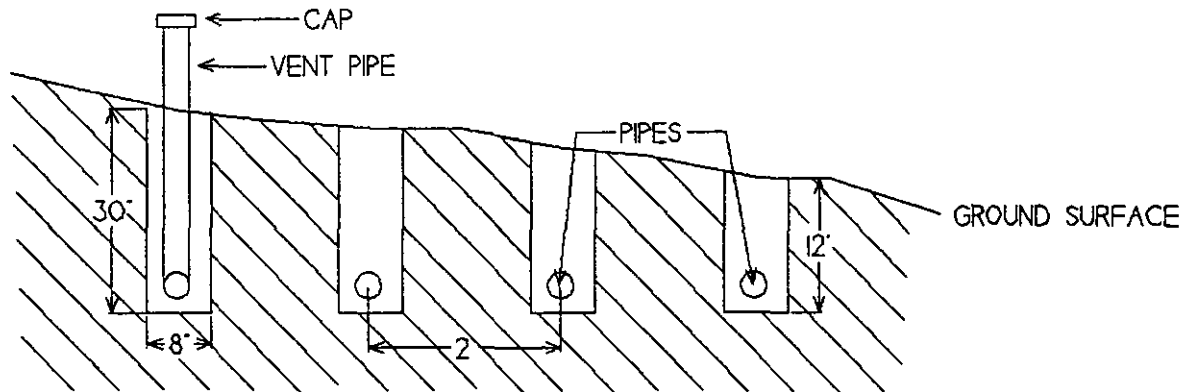
SITE PLAN AND LOCATION
OF PROPOSED OWS

TYPICAL PLAN VIEW

NO.	SECTION	WIDTH	LINES
5	A	10	5



TYPICAL FIELD CROSS-SECTION



SPECIFICATIONS AND DESIGN CALCULATIONS

TREATMENT UNIT

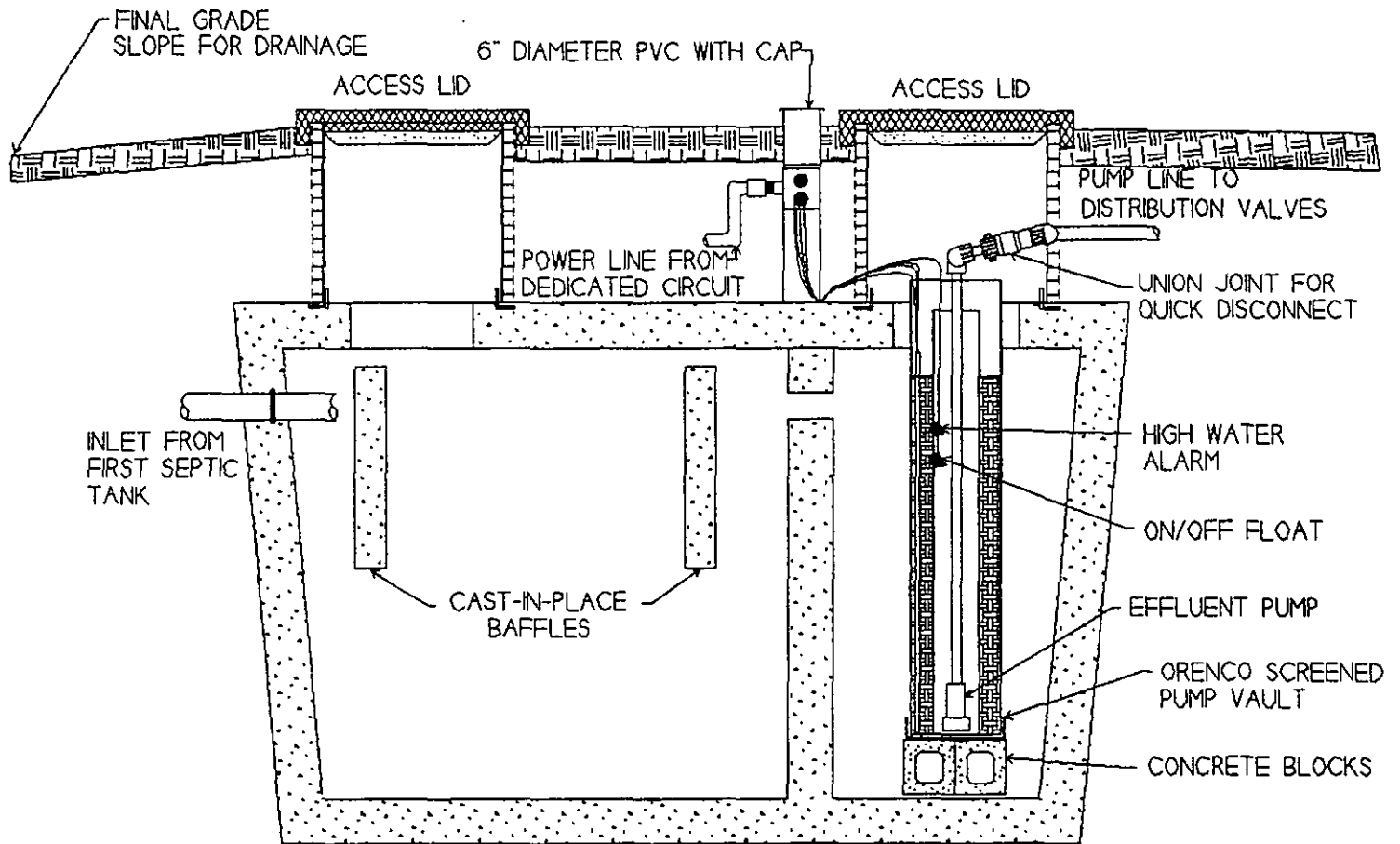
1. TWO 1000 GALLON TWO COMPARTMENT PRECAST CONCRETE SEPTIC TANKS WITH PUMP IN SCREENED VAULT IN SECOND CHAMBER OF SECOND TANK
2. PUMP: 0.4 HP GOULD OR EQUIVALENT
3. ALARM/CONTROL PANEL LOCATION AT OWNER'S REQUEST
4. RISERS: 4 TO THE SURFACE
5. DRAINBACK TO PUMP AND FIELD

DISTRIBUTION FIELD

1. 4 BEDROOM SINGLE FAMILY RESIDENCE
2. SEWAGE LOADING - Q - 600 GPD
3. PERCOLATION RATE - 57 MPI
4. APPLICATION RATE - R - 0.26' GAL/SF/DAY
5. AREA - $(Q/R) \times 1.5 \times 1.6 \times 0.75 \times 1.17 = 4860$ SF
6. PROPOSED FIELD AREA - 5000 SF
7. PROPOSED LINE - 2500 LF
8. TRENCH WIDTH - 8 INCHES
9. LANDSCAPING IS THE RESPONSIBILITY OF THE OWNER

SHALLOW TRENCH DETAILS

1000 GALLON TWO COMPARTMENT PRECAST CONCRETE SEPTIC TANK OR SEPERATE 500 GALLON CHAMBER. (APPROVED TANK WITH 18" OPENING)



SPECIFICATIONS:

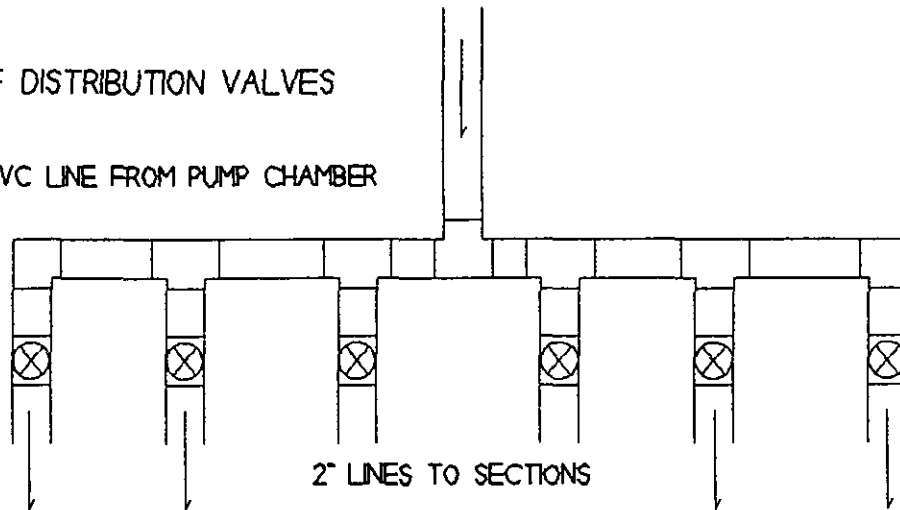
1. PUMP 0.40 HP 1 1/2-INCH DISCHARGE 36 GPM/15 HEAD: GOULD, TECUMSEH, ZOELLER OR EQUIVALENT
2. PUMP ON LEVEL WITH A MINIMUM OF 150 GALLONS FOR PUMPING
3. INSTALL PRESSURE RELIEF VALVE AT HIGH POINT IN PUMP LINE.
4. AUDIBLE ALARM IN BUILDING. ALARM LEVEL 3 INCHES ABOVE "ON" FLOAT LEVEL OF TANK.

PUMP CHAMBER DETAIL

THE DISTRIBUTION VALVES OR THE SURGE TANK CONTROL FLOW OF EFFLUENT TO EACH SECTION OF THE FIELD. WE RECOMMEND ONE SECTION OF THE FIELD BE CLOSED AT ALL TIMES TO ALLOW DRYING OF SEGMENTS OF THE FIELD TO EXTEND THE LIFE OF THE FIELD. THIS CAN BE ACCOMPLISHED BY SEQUENTIALLY ROTATING THE VALVES OR THE NON-PERFORATEED TALL RISER EVERY SIX MONTHS.

A. DETAIL OF DISTRIBUTION VALVES

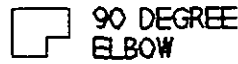
2" PVC LINE FROM PUMP CHAMBER



2" LINES TO SECTIONS



TEE

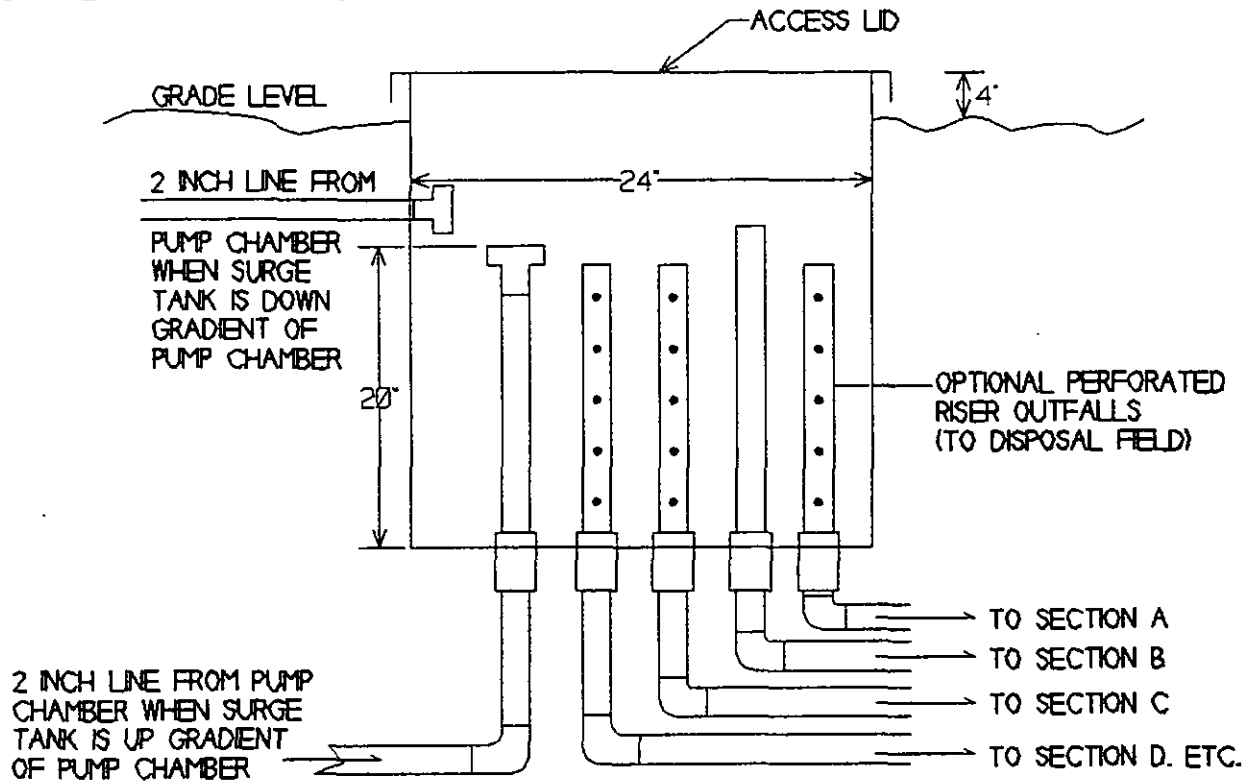


90 DEGREE ELBOW



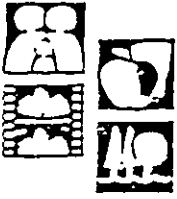
2" BALL VALVE

B. ALTERNATE SURGE TANK DETAIL



PIPES TO SECTIONS SHOULD SLOPE 1/4% DOWNGRADE FOR FROST PROTECTION

DISTRIBUTION VALVES AND SURGE TANK DETAIL



TRI-COUNTY HEALTH DEPARTMENT

Percolation Test and Soils Data Form

Property address _____

Legal Description LOT 18, BLOCK 2, DIAMOND RIDGE ESTATES

Property Owner:

Name HABITAT DESIGN ATTN: BOB LUCERO

Address 13318 EAST FLORIDA AVENUE, AURORA CO, 80012

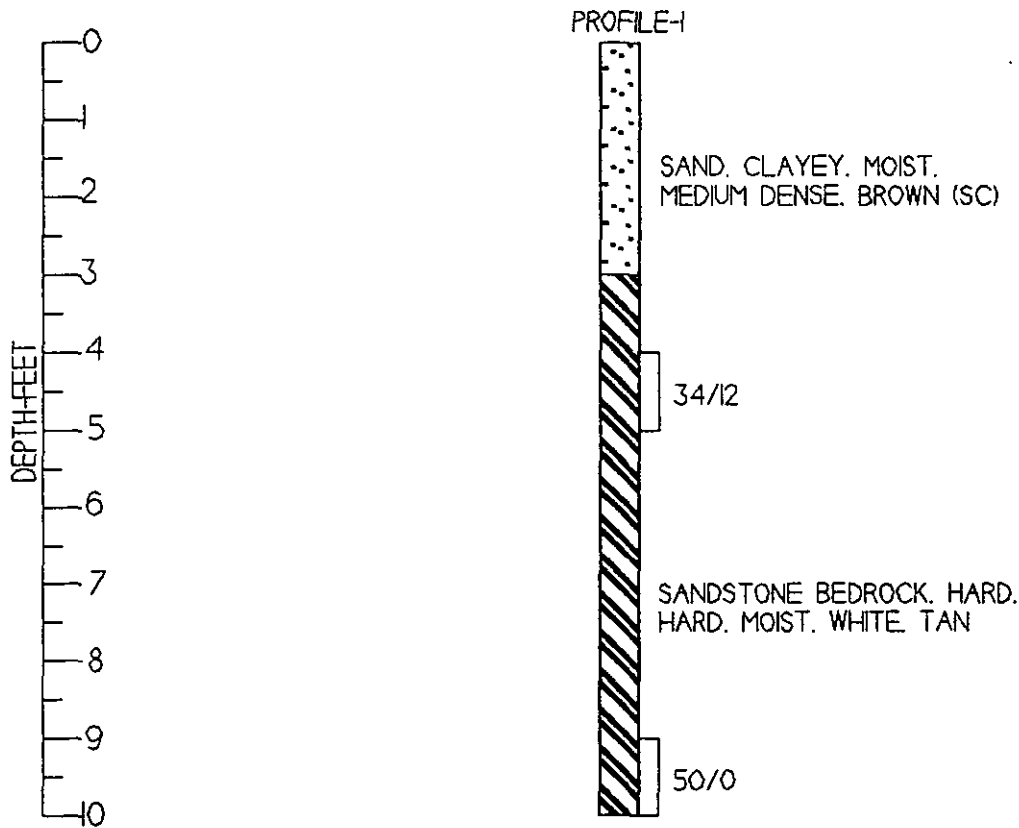
Phone 368-4057

Note:

- * Percolation Test Form, Site Plan and Grain Size Distribution Curve of the Sample must be submitted with this form.
- * For all Lots <5 acres the site plan must include the entire lot. Test locations must be accurately tied to lot corners or other permanent markers.

<p>Saturation and Swelling:</p> <p>* Smearred surfaces removed: <input checked="" type="checkbox"/>Yes <input type="checkbox"/>No</p> <p>* Sand or gravel added: <input type="checkbox"/>Yes <input checked="" type="checkbox"/>No</p> <p>* Date and time presoak water added: <u>4-15-97 10:00 A.M.</u></p> <p>* Amount of water added (gallons) <u>3 GALLONS/HOLE</u></p> <p>* Date and time perc test started: <u>4-16-97 11:00 A.M.</u></p> <p>* Did water remain in hole overnight</p> <table><tr><td>Hole 1</td><td><input type="checkbox"/> Yes</td><td><input checked="" type="checkbox"/> No</td></tr><tr><td>Hole 2</td><td><input type="checkbox"/> Yes</td><td><input checked="" type="checkbox"/> No</td></tr><tr><td>Hole 3</td><td><input type="checkbox"/> Yes</td><td><input checked="" type="checkbox"/> No</td></tr><tr><td>Hole 4</td><td><input type="checkbox"/> Yes</td><td><input checked="" type="checkbox"/> No</td></tr><tr><td>Hole 5</td><td><input type="checkbox"/> Yes</td><td><input checked="" type="checkbox"/> No</td></tr><tr><td>Hole 6</td><td><input type="checkbox"/> Yes</td><td><input checked="" type="checkbox"/> No</td></tr></table> <p>Percolation Rate Measurement</p> <p>Percolation Rate (min./in.)</p> <table><tr><td>Hole 1</td><td><u>6</u></td><td>Hole 5</td><td><u>60</u></td></tr><tr><td>Hole 2</td><td><u>15</u></td><td>Hole 6</td><td><u>120</u></td></tr><tr><td>Hole 3</td><td><u>10</u></td><td>Hole 8</td><td>_____</td></tr><tr><td>Hole 4</td><td><u>120</u></td><td>Hole 9</td><td>_____</td></tr><tr><td colspan="4">Average Holes <u>56</u></td></tr></table>	Hole 1	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Hole 2	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Hole 3	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Hole 4	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Hole 5	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Hole 6	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Hole 1	<u>6</u>	Hole 5	<u>60</u>	Hole 2	<u>15</u>	Hole 6	<u>120</u>	Hole 3	<u>10</u>	Hole 8	_____	Hole 4	<u>120</u>	Hole 9	_____	Average Holes <u>56</u>				<p>Groundwater:</p> <p>* Encountered at <u>NONE</u> FT.</p> <p>* Estimated depth to maximum seasonal water table if not encountered in profile: <u>>10'</u></p> <p>* Is area belived to be subject to fluctuations which could result in a seasonal water table within 8' of surface? <input type="checkbox"/>Yes <input checked="" type="checkbox"/>No</p> <p>Slope determination in absorption area <u>9</u> % to the <u>NE</u> direction.</p> <p>Bedrock:</p> <p>* Encountered @ <u>3</u> feet.</p> <p>* Estimated depth if not encountered in profile: _____</p> <p>* Type of Bedrock: <u>SANDSTONE</u></p> <p>* Is bedrock WEATHERED? <input type="checkbox"/>Yes <input checked="" type="checkbox"/>No</p> <p>* Is bedrock believed to be permeable? <input type="checkbox"/>Yes <input checked="" type="checkbox"/>No</p>
Hole 1	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No																																					
Hole 2	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No																																					
Hole 3	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No																																					
Hole 4	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No																																					
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Hole 3	<u>10</u>	Hole 8	_____																																				
Hole 4	<u>120</u>	Hole 9	_____																																				
Average Holes <u>56</u>																																							

PROFILE HOLE INFORMATION (Cont)
 (Soils must be classified using Unified System ASTM D2487)



Certification

I certify that the above information is correct and complete to the best of my knowledge and that all tests were performed in accordance with the provisions of Tri-County Health Department Regulation I-96 by myself or under my supervision.

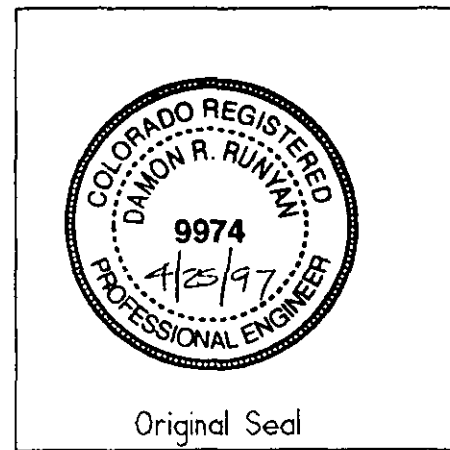
Damon R Runyan
 Original Signature

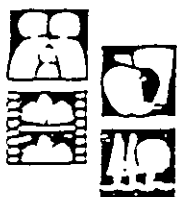
APRIL 25, 1997
 Date

E. O. CHURCH, INC.
 Company Name

P.O. BOX 763 CASTLE ROCK, CO
 Address

(303) 660-4358
 Phone





TRI-COUNTY HEALTH DEPARTMENT

Percolation Test Result Form

Hole No.	Hole Depth (in.)	Length of Interval (min.)	Depth @ Start of Interval (in.)	Depth @ End of Interval (in.)	Drop in Water Level (in.)	Percolation Rate @ Final Interval (min./in.)
P-1	30	30	13.75	22.00	8.25	12
		30	8.00	17.50	9.50	
		30	17.50	23.50	6.00	
		30	23.50	29.00	5.50	
		30	6.00	15.00	9.00	
		30	6.25	15.00	7.75	
		30	15.00	20.50	5.50	
		30	20.50	23.00	2.50	
P-2	26	30	11.25	17.00	5.75	15
		30	17.00	21.00	4.00	
		30	5.00	14.00	9.00	
		30	14.00	19.00	5.00	
		30	6.25	14.00	7.75	
		30	5.25	13.50	8.25	
		30	13.50	16.00	2.50	
		30	16.00	18.00	2.00	
P-3	28	30	9.75	16.25	7.00	10
		30	16.25	20.75	4.50	
		30	7.50	14.50	7.00	
		30	14.50	19.00	4.50	
		30	8.50	15.00	6.50	
		30	5.00	13.50	8.50	
		30	13.50	17.00	3.50	
		30	17.00	20.00	3.00	
P-4	23	30	8.00	9.50	1.50	120
		30	9.50	10.50	1.00	
		30	10.50	11.50	1.00	
		30	11.50	12.75	1.25	
		30	12.75	13.00	0.25	
		30	5.00	7.25	2.25	
		30	7.25	9.25	2.00	
		30	9.25	9.50	0.25	
P-5	25	30	6.75	9.25	2.50	60
		30	9.25	11.50	2.25	
		30	11.50	12.00	0.50	
		30	12.00	13.25	1.25	
		30	13.25	14.00	0.75	
		30	7.00	9.00	2.00	
		30	9.00	10.00	1.00	
		30	10.00	10.50	0.50	
P-6	22	30	7.00	7.75	0.75	120
		30	7.75	8.25	0.50	
		30	8.25	8.75	0.50	
		30	8.75	10.00	1.25	
		30	10.00	10.25	0.25	
		30	6.50	7.50	1.00	
		30	7.50	9.25	1.75	
		30	9.25	9.50	0.25	

FINAL VISIT WORKSHEET

Permit Number: **1998-07-001160**
ted:

Date Prin

RECORD OF SITE VISITS:

(It is important to record any extra visits for billing purposes)

Visit 1 Date _____ By (EHS #) _____ Time Spent _____

Visit 2 Date _____ By (EHS #) _____ Time Spent _____

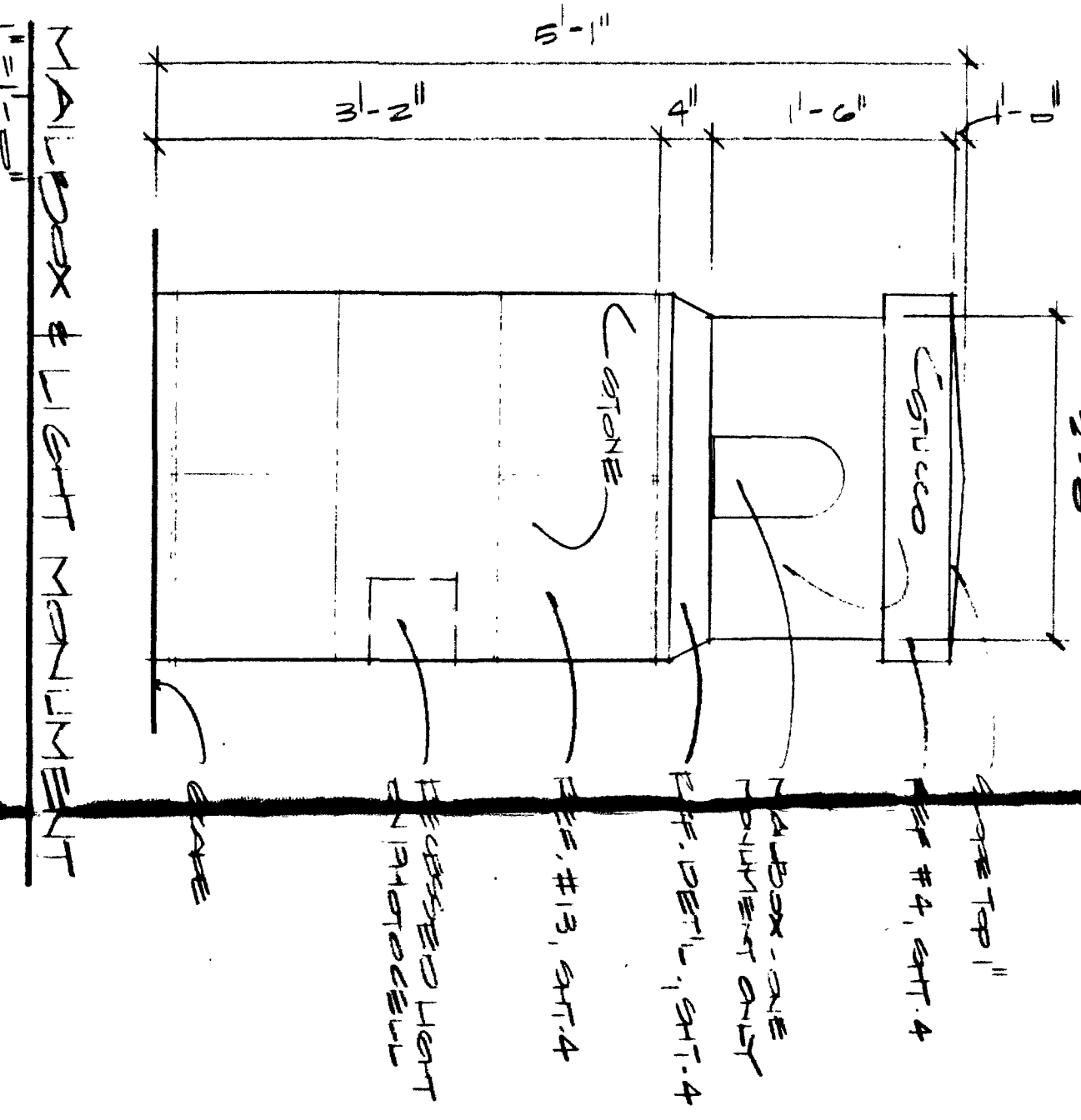
Visit 3 Date _____ By (EHS #) _____ Time Spent _____

Visit 4 Date _____ By (EHS #) _____ Time Spent _____

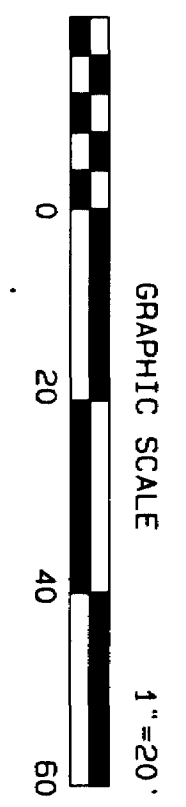
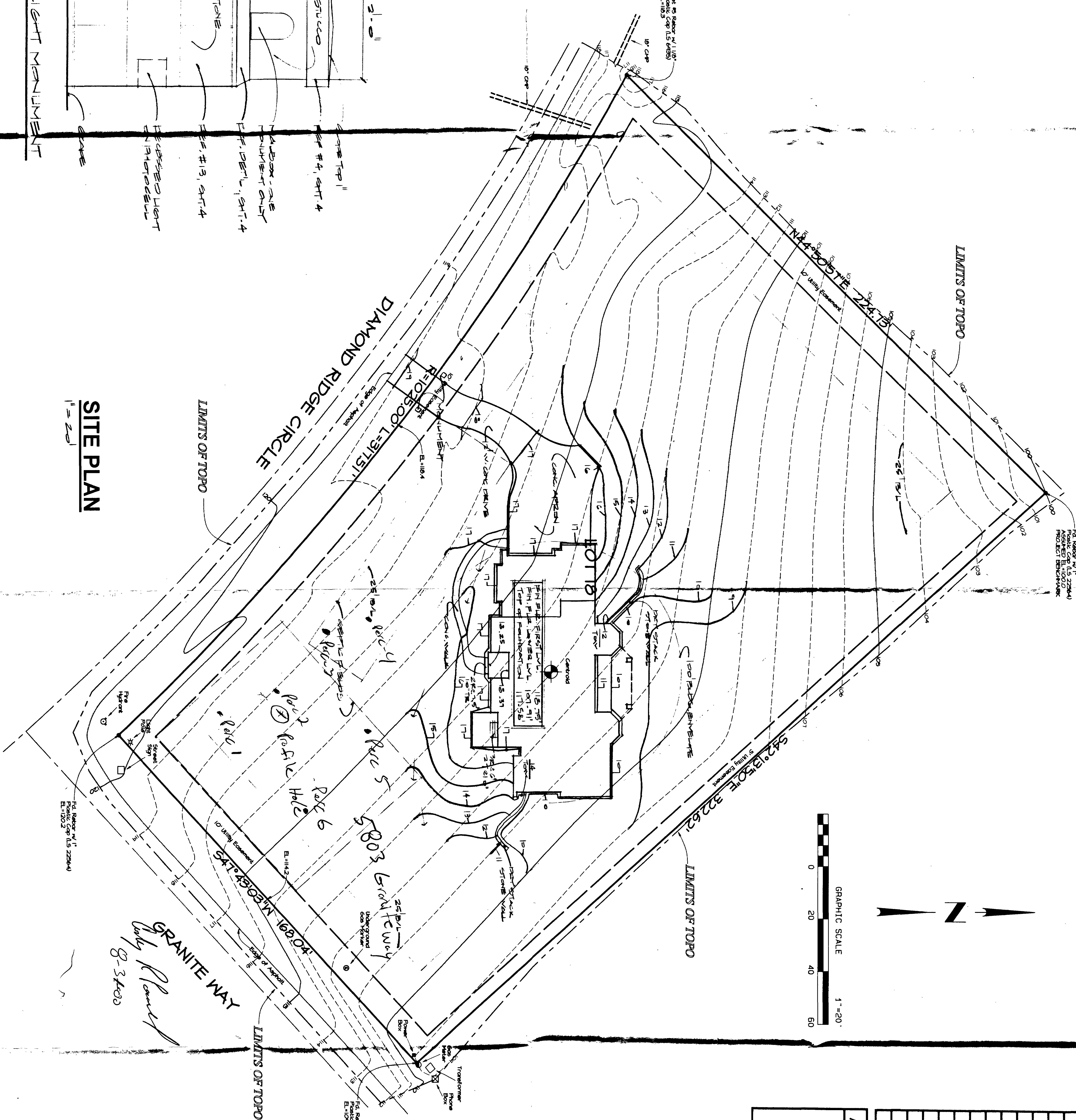
TCHD Engineer Review Y N Time _____ EHS# _____

FINAL SITE VISIT COMMENTS:

Final Approval Given Y N By (EHS #) _____



SITE PLAN
1" = 20'



SHEET INDEX	
NUMBER	CONTENTS
1	SITE PLAN
2	LOWER LEVEL PLAN
3	FIRST LEVEL PLAN
4	FIRST, SECOND ELEVATION
5	LEFT, RIGHT ELEVATION, SECTION
6	ROOF PLAN
7	LOWER LEVEL ELECTRICAL PLAN
8	FIRST LEVEL ELECTRICAL PLAN
9	FIRST LEVEL PLUMBING PLAN
10	
11	
12	
13	
14	
15	STRUCTURAL EXHIBIT - BT CONCRETE

AREA TABULATIONS	
FIRST LEVEL	2,240 SF
LOWER LEVEL	1,720 SF
TOTAL LIVING	4,700 SF

